

CONTRACT: C201775

STRUCTURE

TIP PROJECT: B-4317

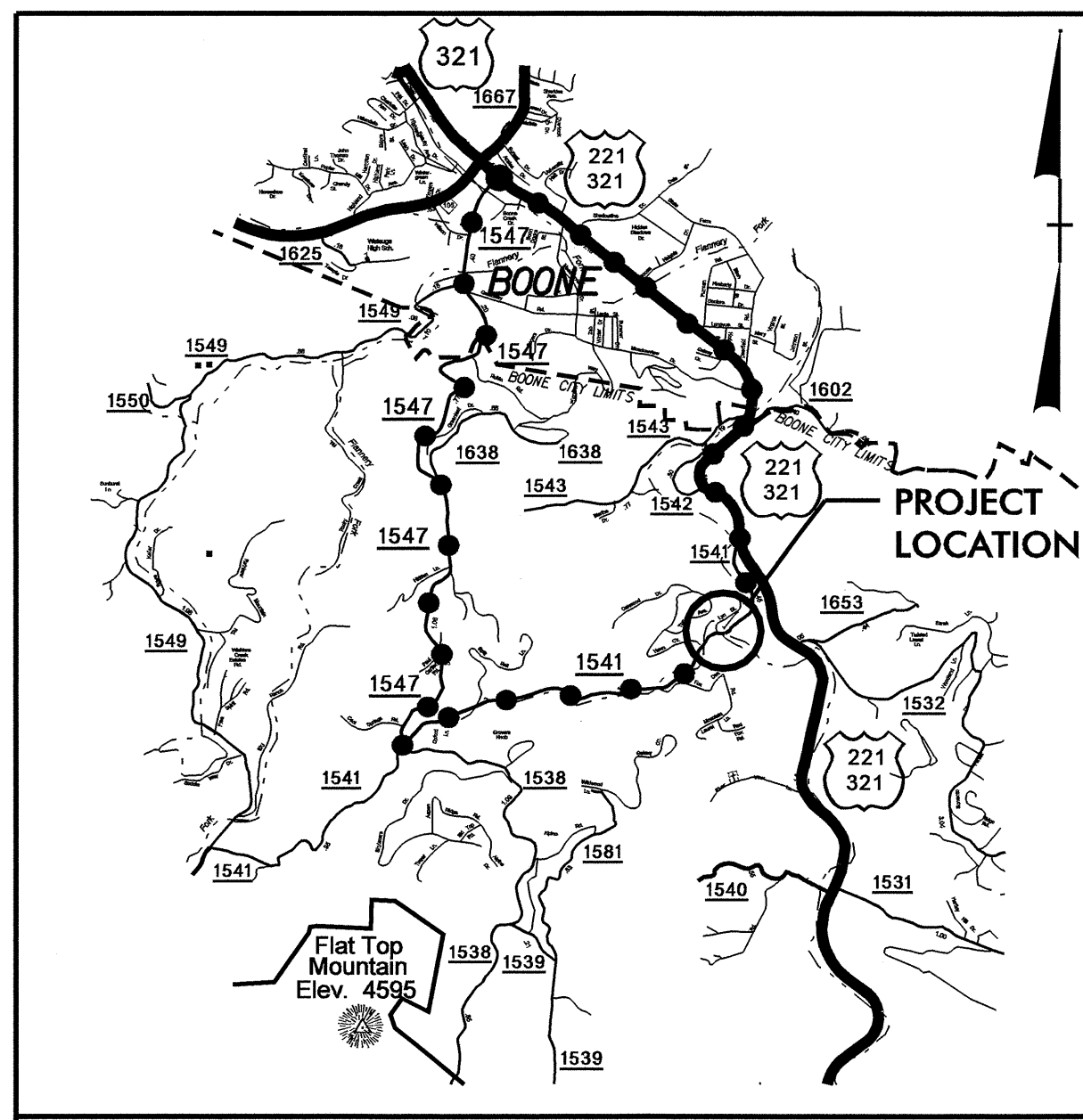
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**WATAUGA COUNTY**

**LOCATION: BRIDGE NO. 16 OVER MIDDLE FORK CREEK  
ON SR 1541 (PAYNE BRANCH ROAD)**

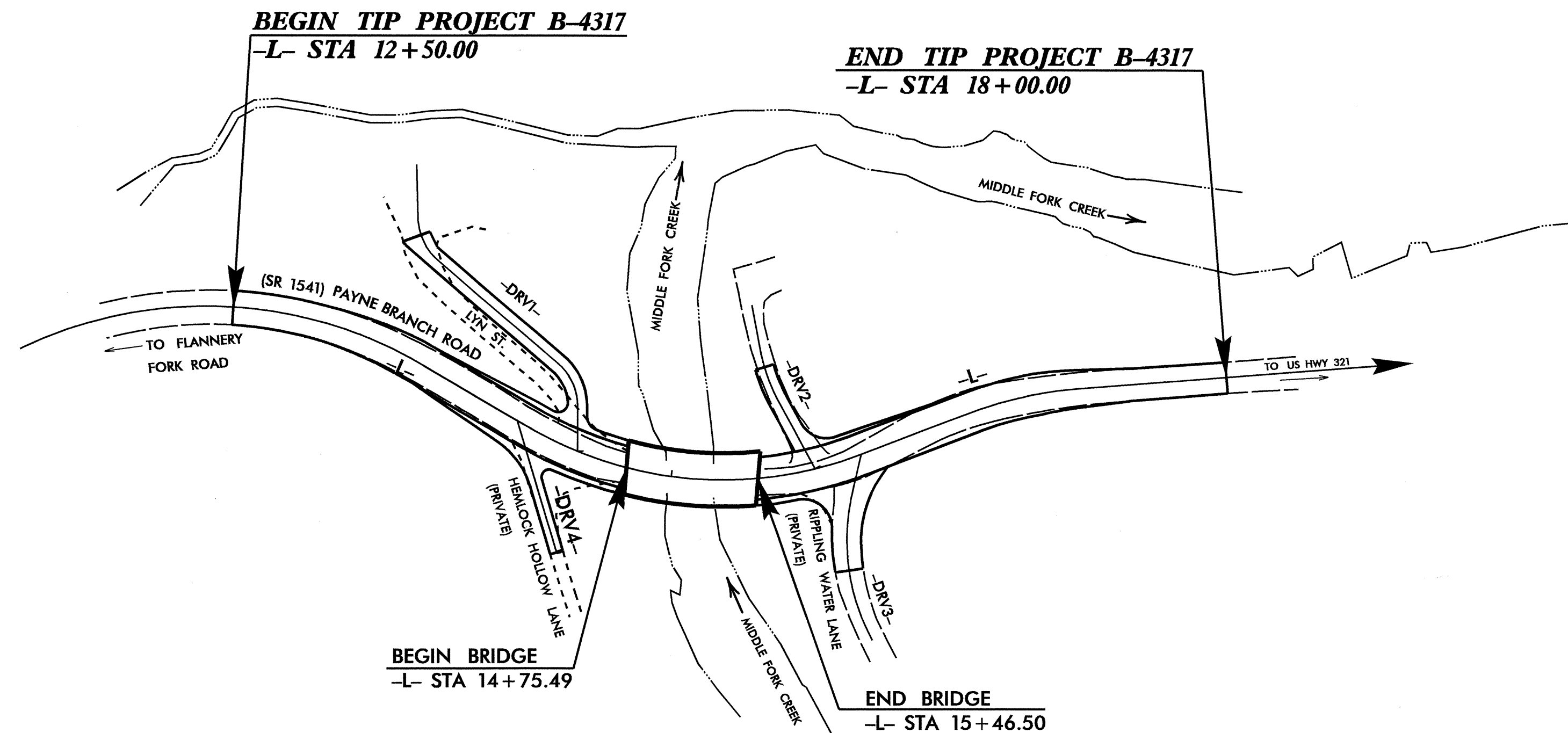
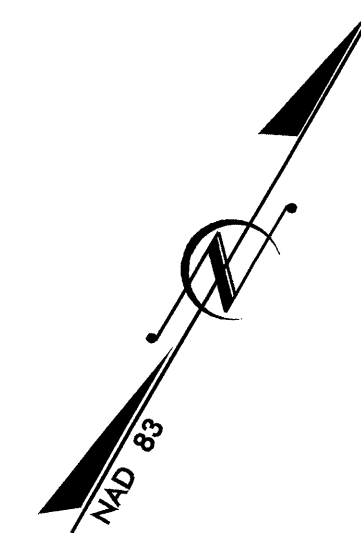
**TYPE OF WORK: GRADING, DRAINAGE, PAVING &  
STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	
N.C.	B-4317	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
33654.1.1	BRZ-1541(3)	PE
33654.2.1	BRZ-1541(3)	ROW & UTIL
33654.3.1	BRZ-1541(3)	CONSTR.

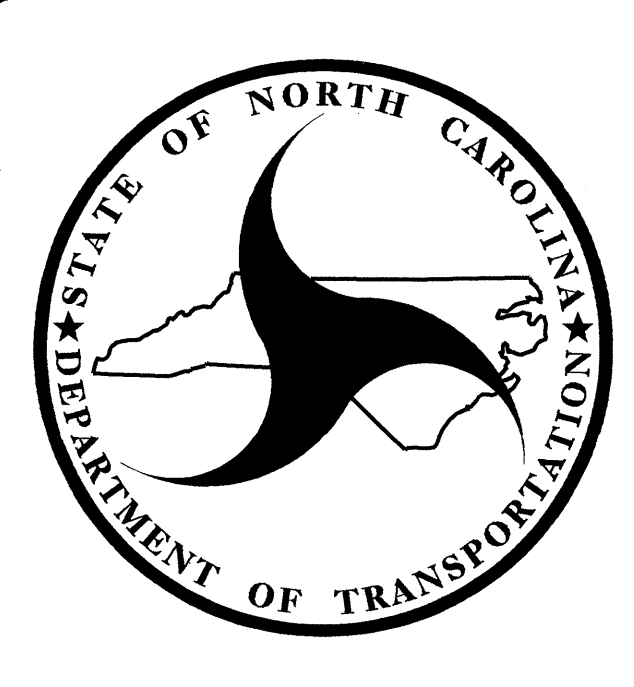


VICINITY MAP

●●●● OFFSITE DETOUR



\*\* DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED (30mph), MINIMUM HORIZONTAL CURVE RADIUS (205') AND HORIZONTAL STOPPING SIGHT DISTANCE (120').



**DESIGN DATA**  
(RURAL LOCAL)

ADT 2008 =	1009
ADT 2028 =	1705
DHV =	10 %
D =	60 %
T =	3 % *
** V =	55 MPH
* TTST 1% +	DUAL 2%

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4317 =	0.091 MI
LENGTH STRUCTURE TIP PROJECT B-4317 =	0.013 MI
TOTAL LENGTH TIP PROJECT B-4317 =	0.104 MI

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2006 STANDARDS SPECIFICATION

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LETTING DATE:  
FEBRUARY 19, 2008

Prepared in the Office of:  
**DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS**  
1000 Birch Ridge Drive Raleigh, N.C. 27610

**B. S. COX, P.E.**  
PROJECT ENGINEER

**D. E. PETREY, P.E.**  
PROJECT DESIGN ENGINEER

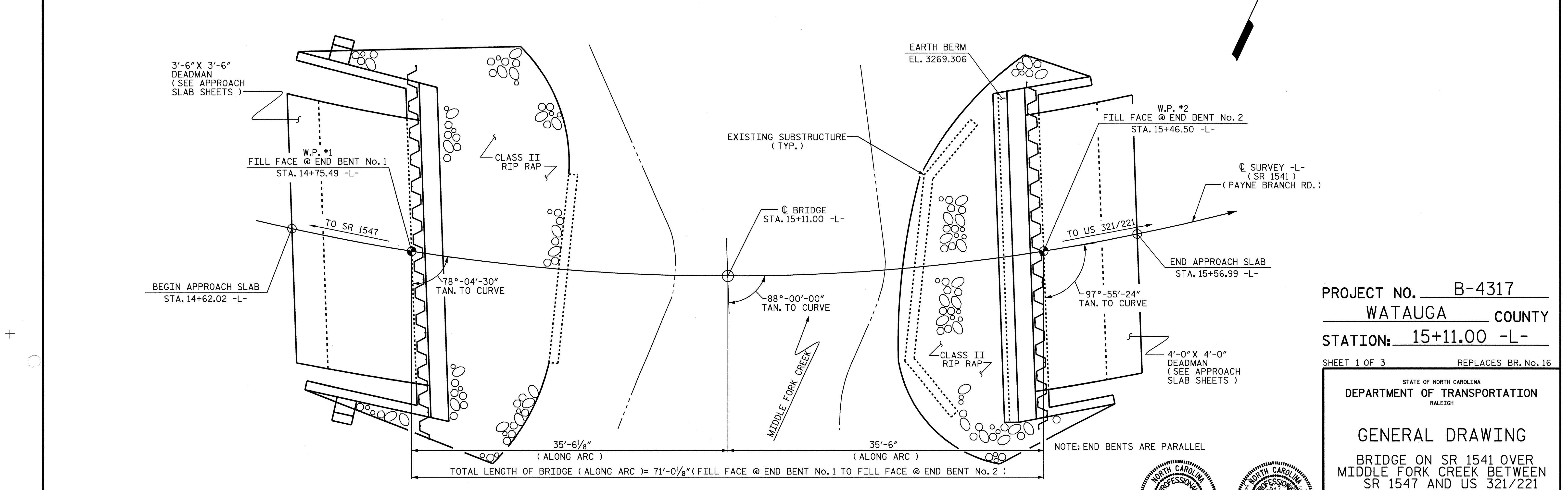
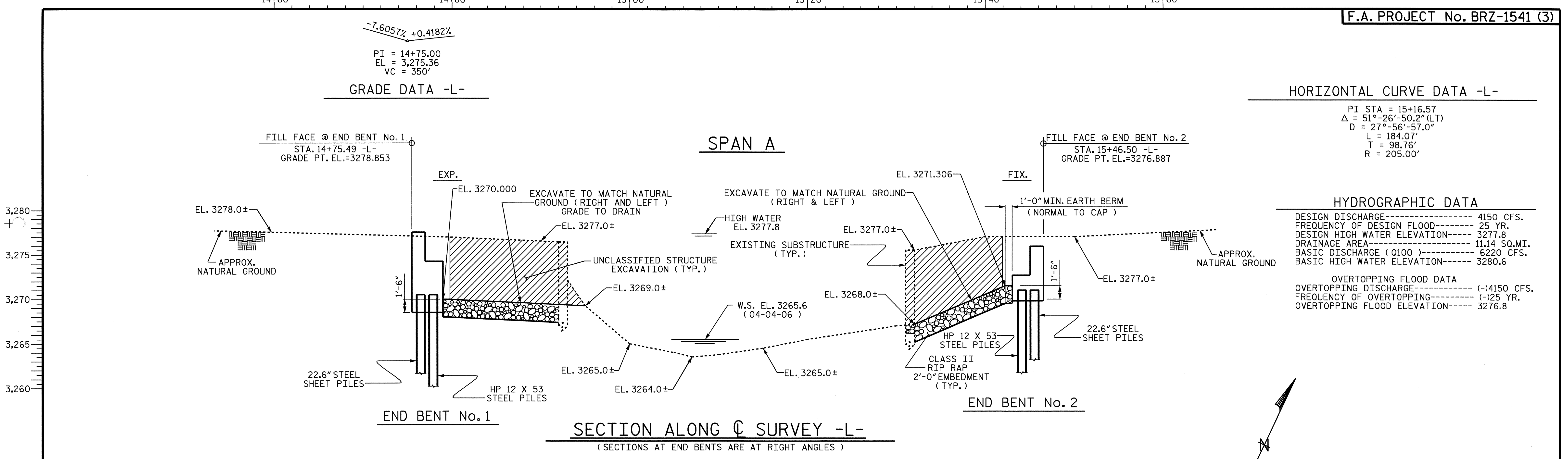
STRUCTURE DESIGN UNIT

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

P.E.  
STATE HIGHWAY ENGINEER - DESIGN

DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

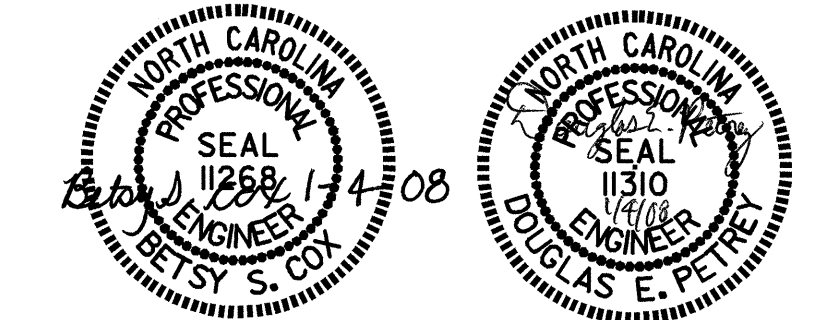
APPROVED FOR  
DIVISION ADMINISTRATOR DATE



DRAWN BY : N. PIERCE DATE : 10-07  
 CHECKED BY : J.M. BRITT DATE : 10-07

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PLAN  
 (FOR CLARITY, HP 12 X 53 PILES NOT SHOWN IN PLAN VIEW)



PROJECT NO. B-4317  
 WATAUGA COUNTY  
 STATION: 15+11.00 -L-

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

# NOTES

ASSUMED LIVE LOAD = HS 20 OR ALTERNATE LOADING, EXCEPT THAT THE GIRDERS HAVE BEEN DESIGNED FOR HS 25.

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

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON PLANS.

THE EXISTING STRUCTURE CONSISTING OF TIMBER DECK WITH ASPHALT WEARING SURFACE ON I-BEAMS WITH A SPAN OF 41'-4" AND A CLEAR ROADWAY WIDTH OF 17'-1" ON REINFORCED CONCRETE ABUTMENTS AND LOCATED AT THE SITE OF THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY. SEE SPECIAL PROVISIONS.

THE EXISTING STRUCTURE SHALL BE REMOVED IN ACCORDANCE WITH THE SPECIAL PROVISIONS AND STANDARD SPECIFICATIONS WITH THE FOLLOWING EXCEPTIONS. THE ABUTMENT AT END BENT No. 2 SHALL BE REMOVED TO ONE FOOT BELOW THE LEVEL OF THE NATURAL GROUND RIGHT AND LEFT OR AS DIRECTED BY THE ENGINEER. THE ABUTMENT AT END BENT No. 1 SHALL BE REMOVED TO THE LEVEL OF THE NATURAL GROUND RIGHT AND LEFT OR AS DIRECTED BY THE ENGINEER.

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.

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

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.

DRIVE PILES AT END BENT No. 1 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 ALLOWABLE BEARING CAPACITY FOR PILES AT END BENT No. 1 IS 60 TONS PER PILE.

PILE EXCAVATION IS REQUIRED TO INSTALL PILES AT END BENT No. 1 (RT) EXCAVATE HOLES TO ELEVATION 3265.5 FT. (RT). SEE PILE EXCAVATION SPECIAL PROVISION.

DRIVE PILES AT END BENT No. 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 ALLOWABLE BEARING CAPACITY FOR PILES AT END BENT No. 2 IS 60 TONS PER PILE.

FOR BLASTING ADJACENT TO HIGHWAY STRUCTURES, SEE ARTICLE 410-11 OF THE STANDARD SPECIFICATIONS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY, 2001.

THE SCOUR CRITICAL ELEVATION FOR END BENT No. 2 IS ELEVATION 3263.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE. IF SCOUR OCCURS BELOW ELEVATION 3263.0 FT., INSTALL SCOUR COUNTERMEASURES (RIP RAP) AGAINST SHEET PILING TO ELEVATION 3265.0 FT.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 22 FT. EACH SIDE OF THE CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION.

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OF 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.

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.

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 COST 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 AT STATION 15+11.00 -L-."

FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

STEEL SHEET PILES SHALL BE HOT ROLLED.

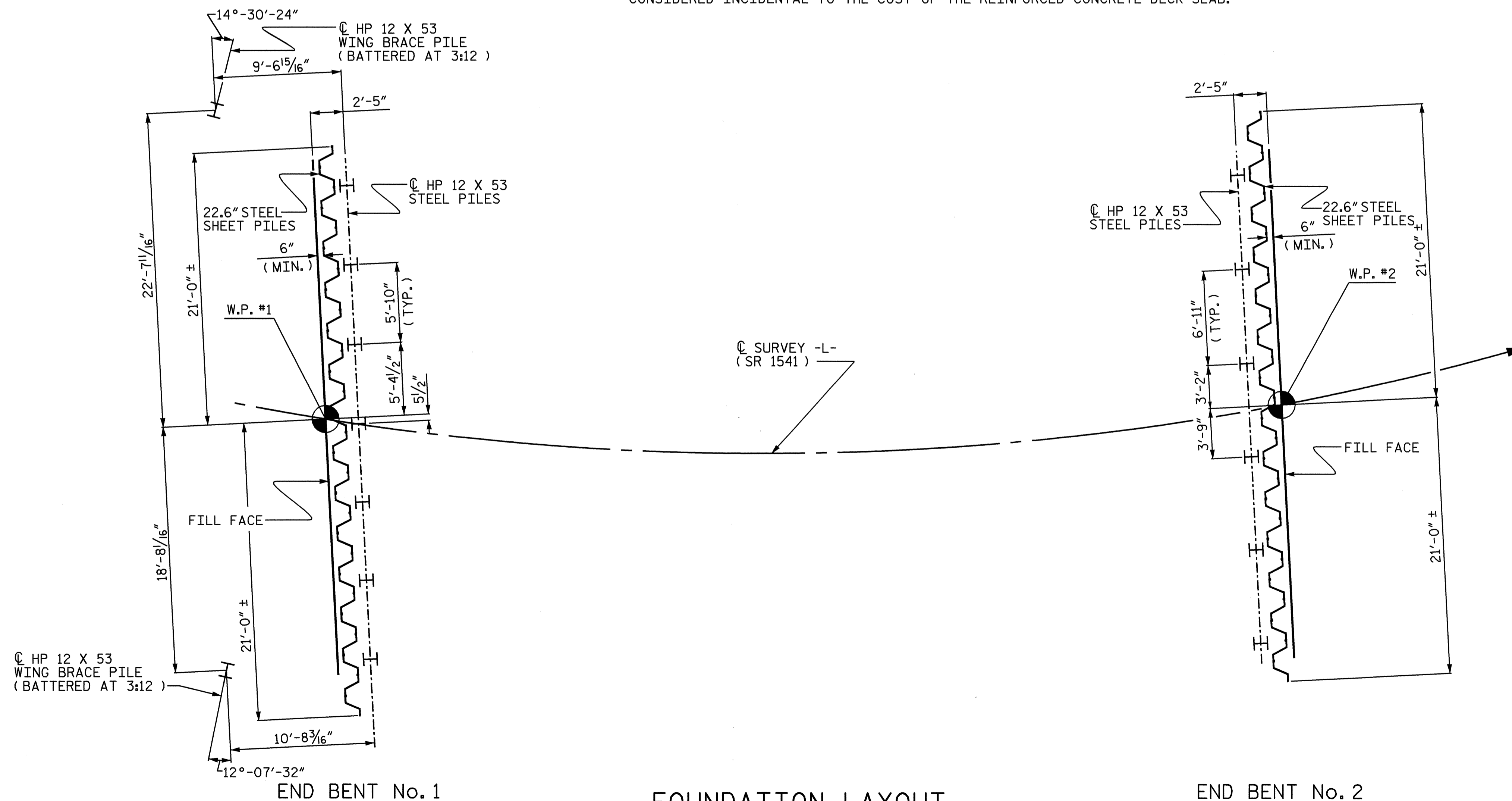
FOR 22.6" STEEL SHEET PILES, SEE STEEL SHEET PILES SPECIAL PROVISION.

INSTALL STEEL SHEET PILES TO REFUSAL ELEVATION.

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

FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.



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**FOUNDATION LAYOUT**  
 (DIMENSIONS LOCATING END BENT WING PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF WING ELEVATION.)

PROJECT NO. B-4317  
WATAUGA COUNTY  
 STATION: 15+11.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**

BRIDGE ON SR 1541 OVER  
 MIDDLE FORK CREEK BETWEEN  
 SR 1547 AND US 321/221

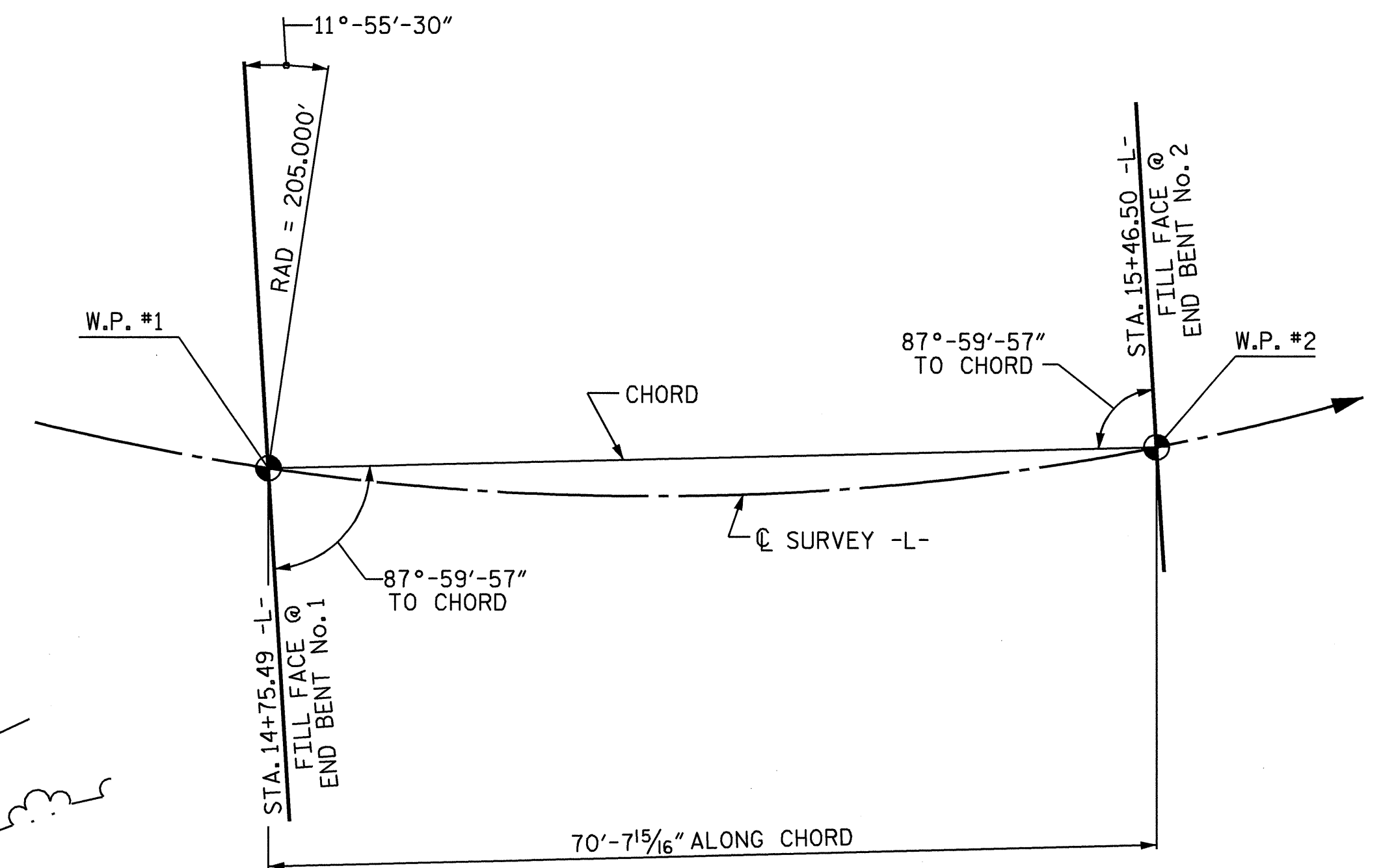
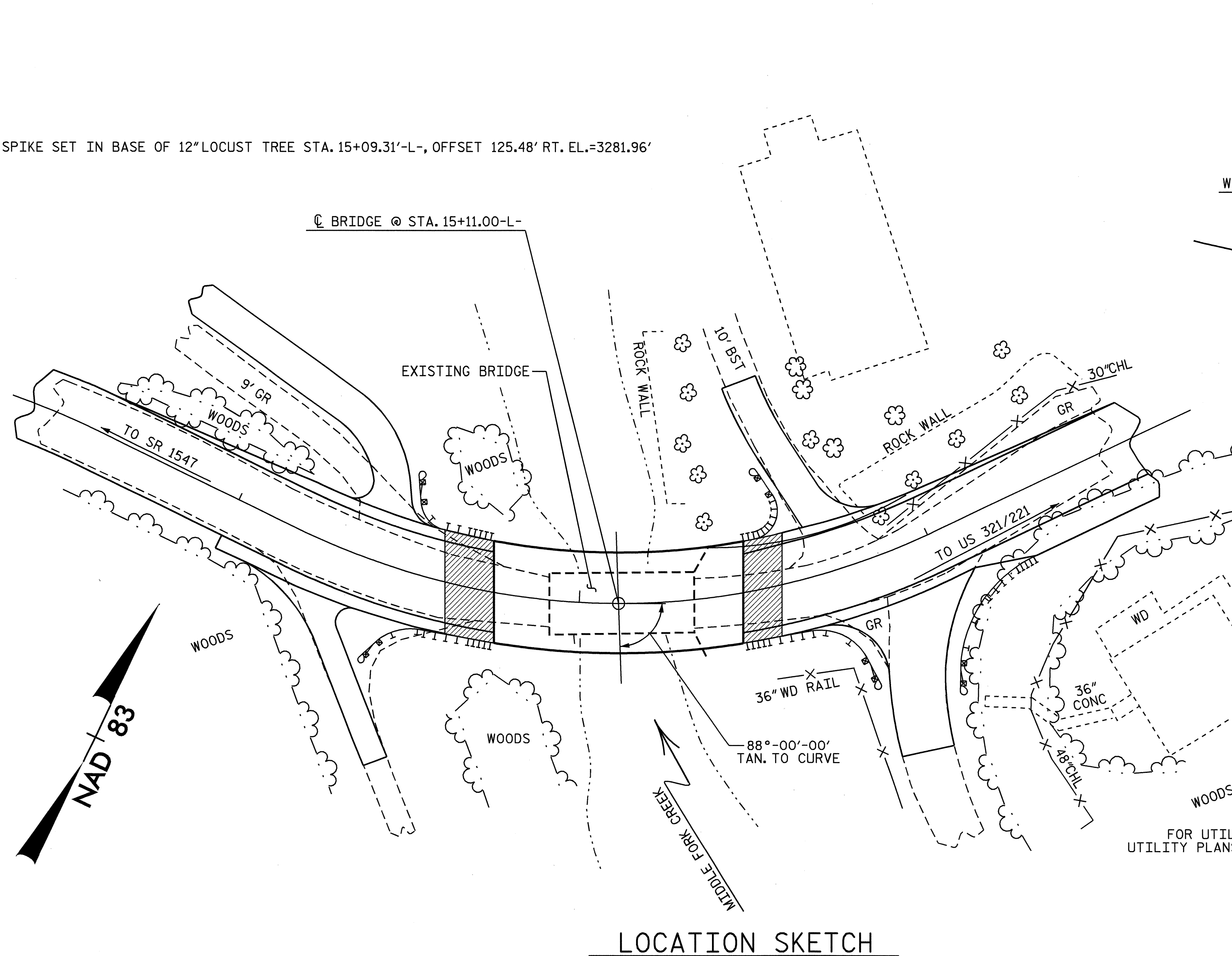


REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			24

NC005

TOTAL BILL OF MATERIAL																				
	REMOVAL OF EXISTING STRUCTURE	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL	STRUCTURAL STEEL	HP 12 X 53 STEEL PILES	22.6" STEEL SHEET PILES	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	EVAZOTE JOINT SEALS		
	LUMP SUM	LIN. FT.	LIN. FT.	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	APPROX. LBS.	No.	LIN. FT.	SQ. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM	
SUPERSTRUCTURE					2121	2298					59400			135.78						
END BENT No. 1		15	9				48.5		5313	152		9	120	545		62	69			
END BENT No. 2							24.6		3321	152		6	90	615		42	47			
TOTAL	LUMP SUM	15	9	LUMP SUM	2121	2298	73.1	LUMP SUM	8634	304	59400	15	210	1160	135.78	104	116	LUMP SUM	LUMP SUM	

B.M.#2 R.R. SPIKE SET IN BASE OF 12" LOCUST TREE STA. 15+09.31'-L-, OFFSET 125.48' RT. EL.=3281.96'



**CHORD LAYOUT**  
NOTE: END BENTS ARE PARALLEL

PROJECT NO. B-4317  
WATAUGA COUNTY  
STATION: 15+11.00-L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**GENERAL DRAWING**

BRIDGE ON SR 1541 OVER  
MIDDLE FORK CREEK BETWEEN  
SR 1547 AND US 321/221



NOTE:  
FOR UTILITY INFORMATION, SEE  
UTILITY PLANS AND SPECIAL PROVISIONS.

**LOCATION SKETCH**

DRAWN BY: N. PIERCE DATE: 10-07  
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			24

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.

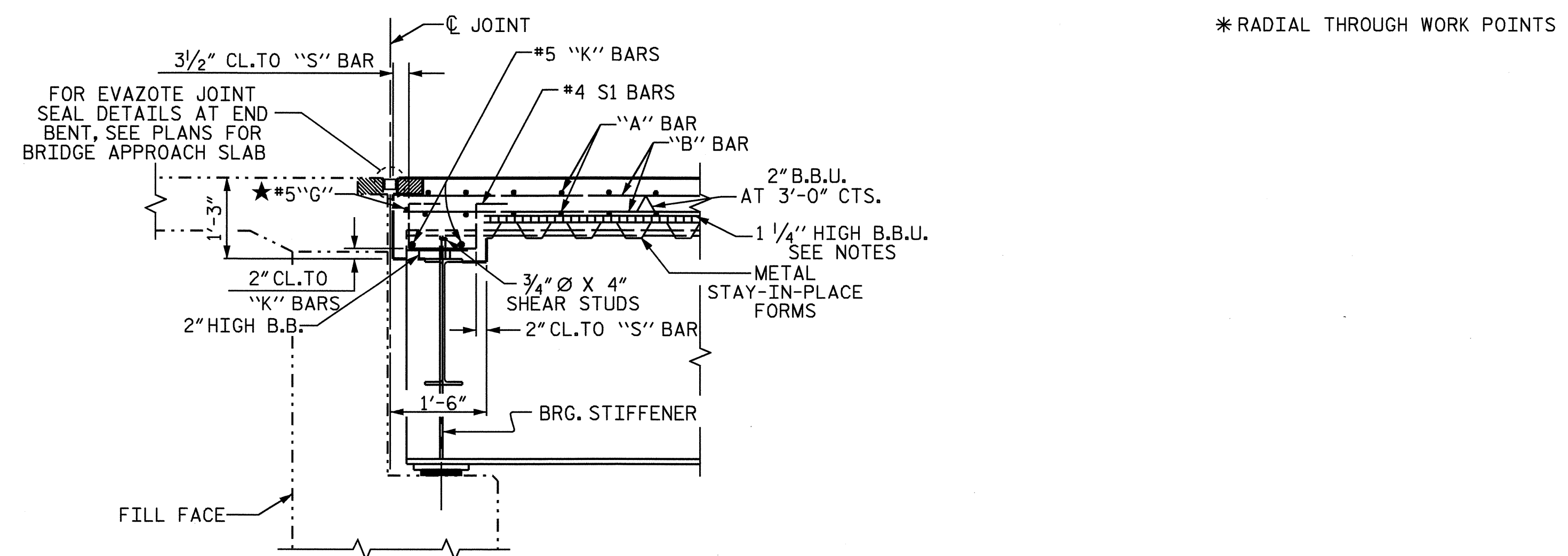
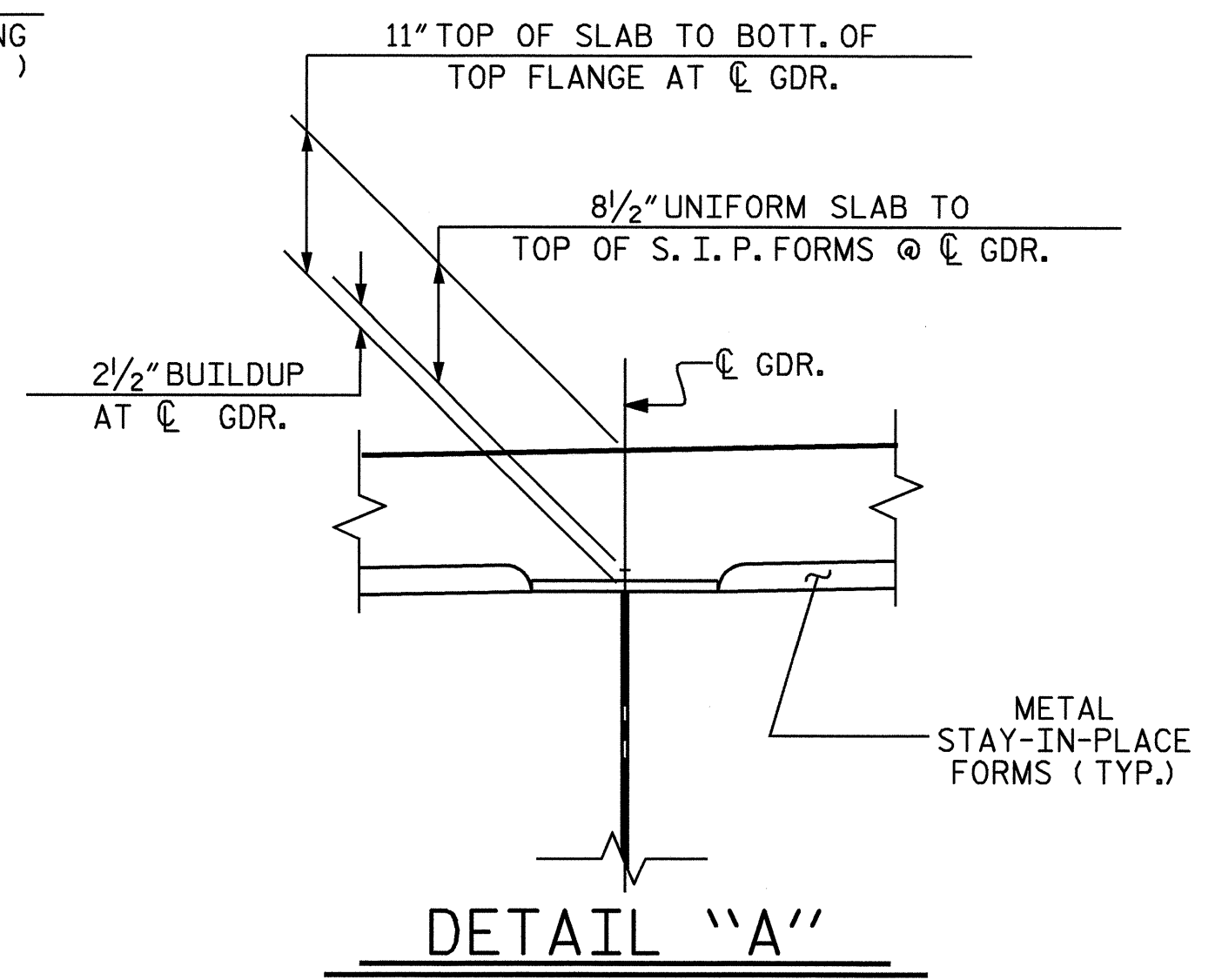
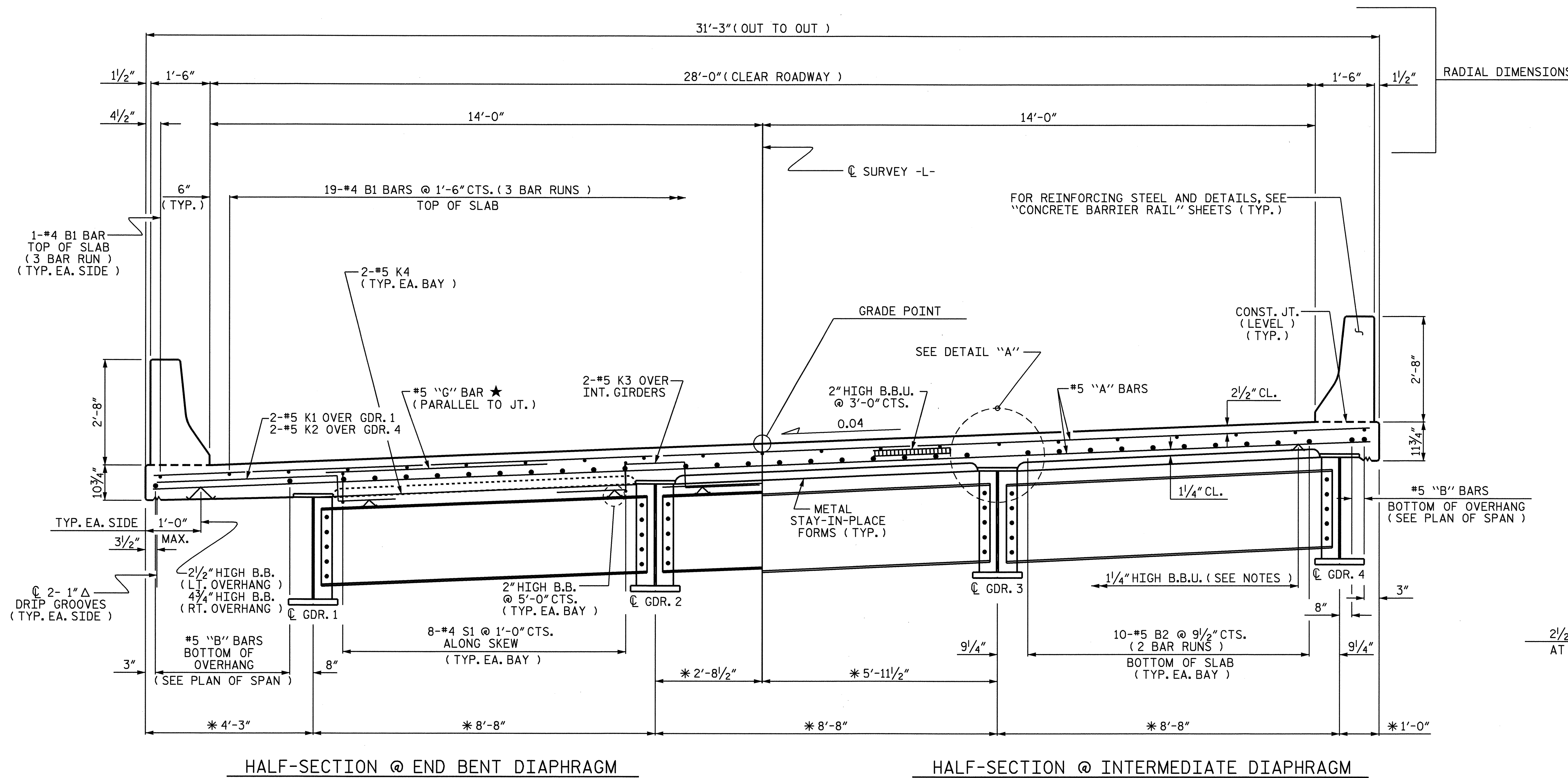
BARRIER RAIL SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND BEAM/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.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 2 1/2" AT THE END BENTS. FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.



SECTION THROUGH END BENT

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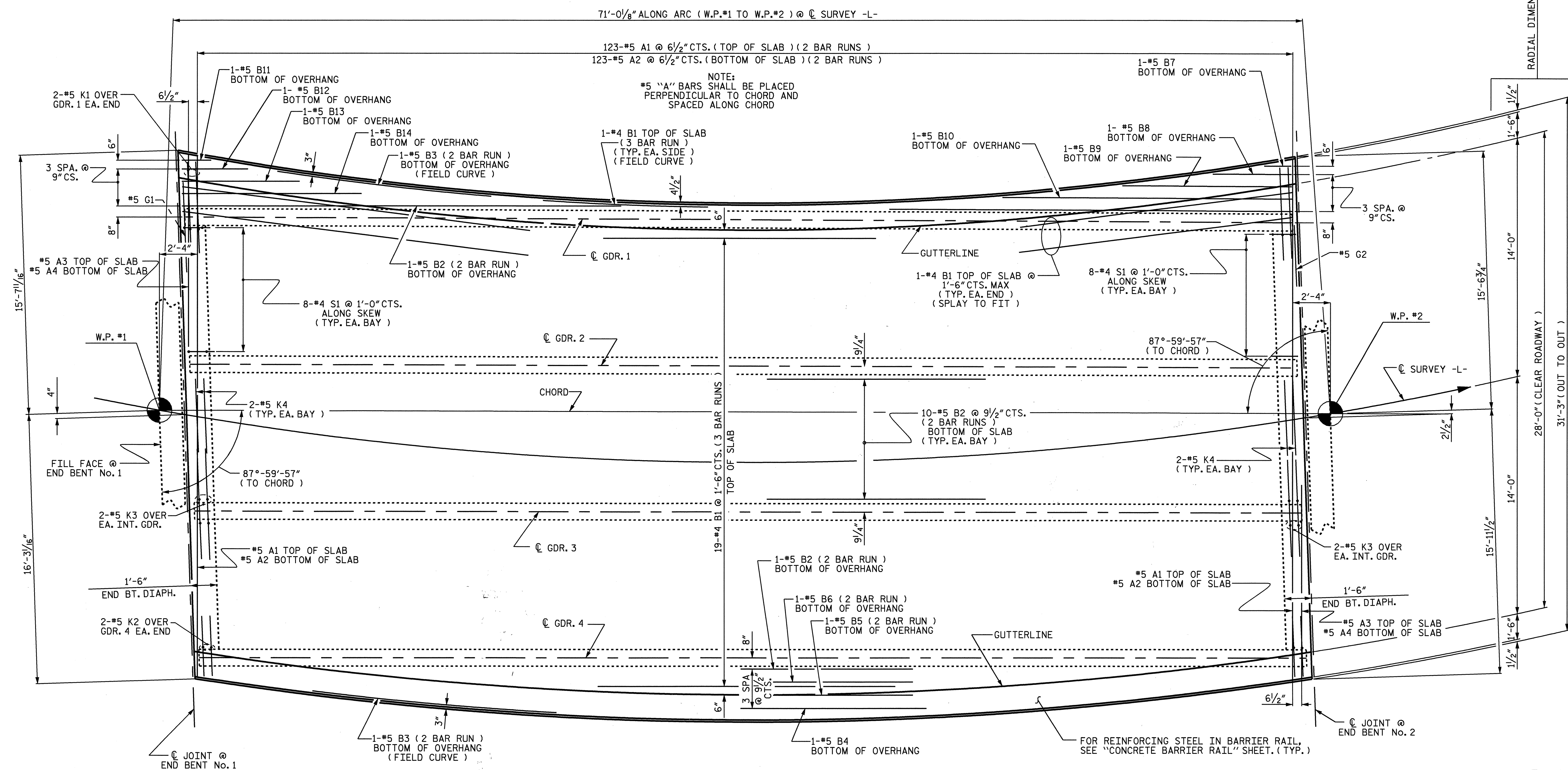
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\* RADIAL THROUGH WORK POINTS

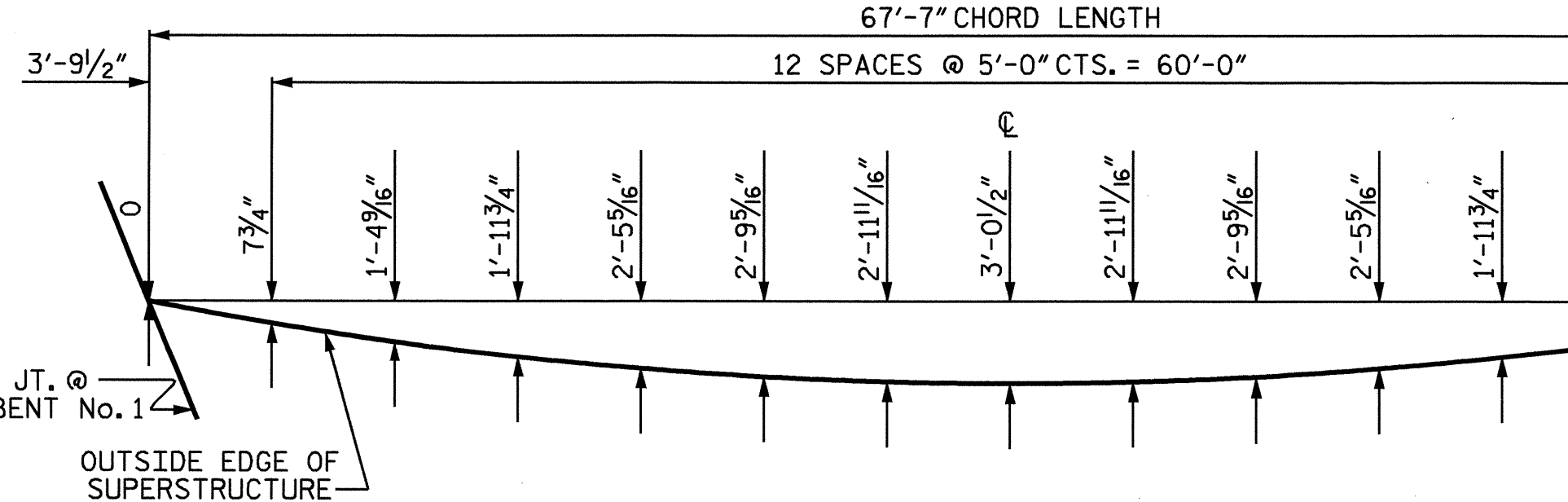
PROJECT NO. B-4317  
 WATAUGA COUNTY  
 STATION: 15+11.00 -L-



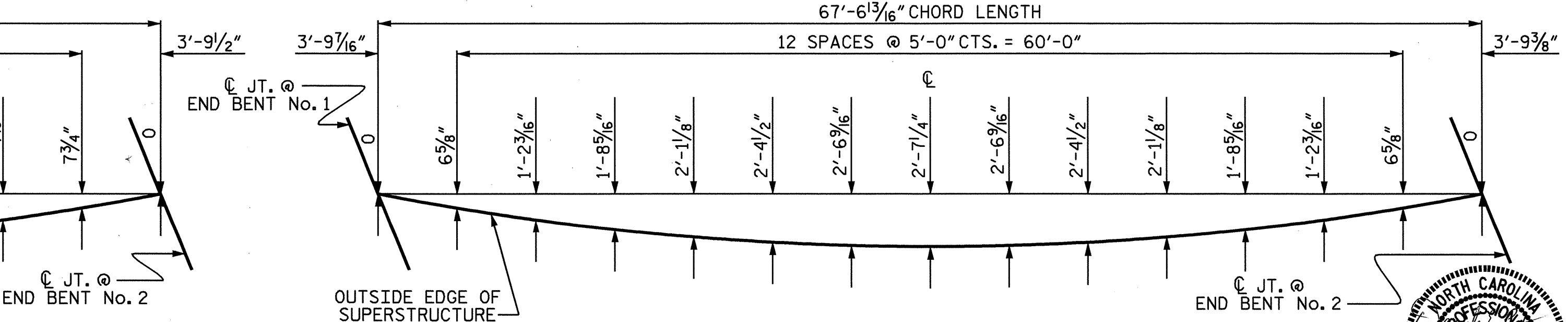
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-4
					TOTAL SHEETS 24



PLAN OF SPAN A



ARC OFFSETS- LEFT SIDE  
TAKEN ALONG OUTSIDE EDGE OF SUPERSTRUCTURE

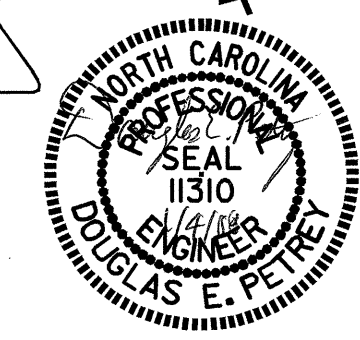


ARC OFFSETS- RIGHT SIDE  
TAKEN ALONG OUTSIDE EDGE OF SUPERSTRUCTURE

PROJECT NO. B-4317  
WATAUGA COUNTY  
STATION: 15+11.00 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

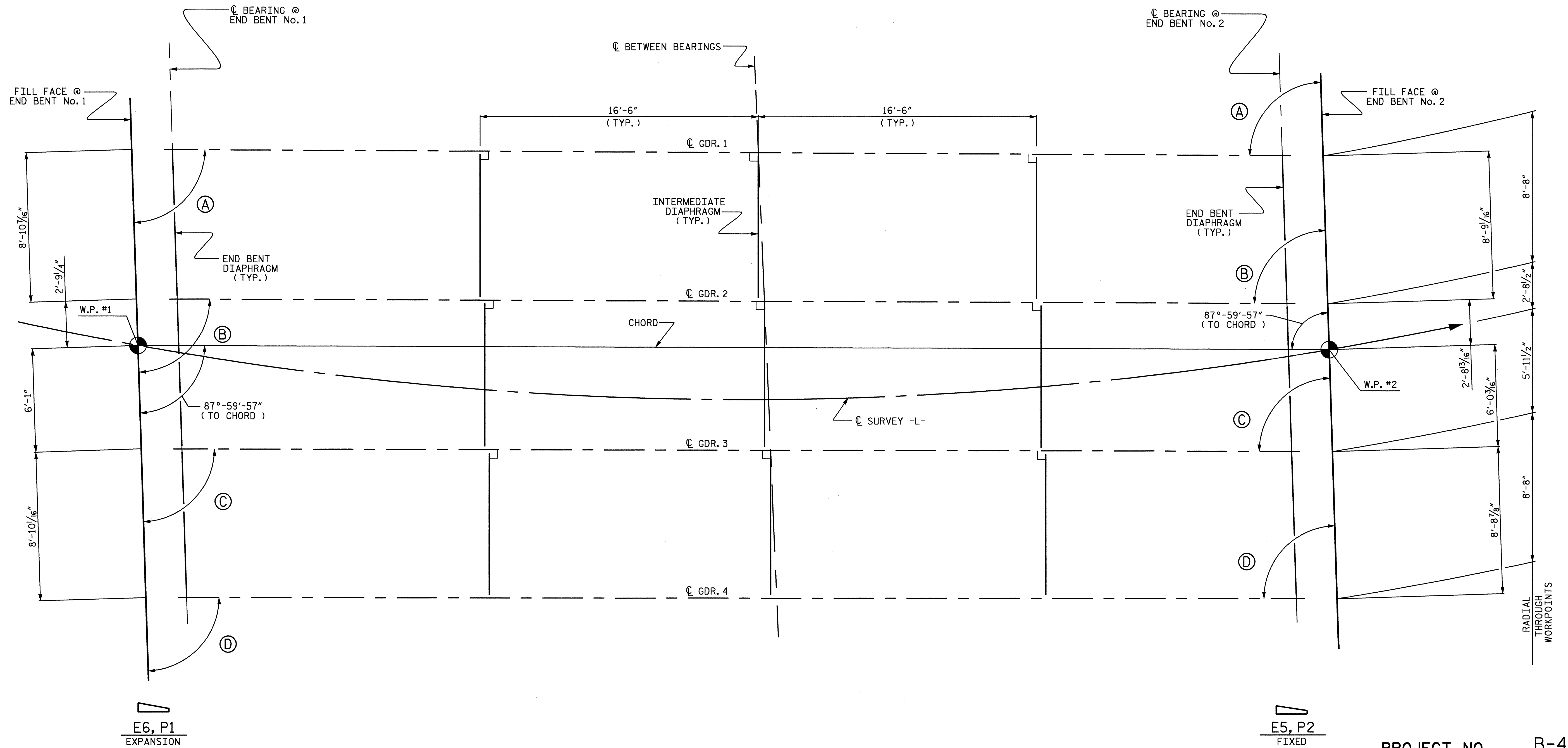
SUPERSTRUCTURE  
PLAN OF SPAN A



DRAWN BY: N. PIERCE DATE: 09-07  
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REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5	
1			3			TOTAL SHEETS	
2			4			24	

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FRAMING PLAN

ANGLES

- (A) 87°-52'-39"
- (B) 87°-58'-17"
- (C) 88°-03'-26"
- (D) 88°-08'-10"

PROJECT NO. B-4317  
WATAUGA COUNTY  
 STATION: 15+11.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

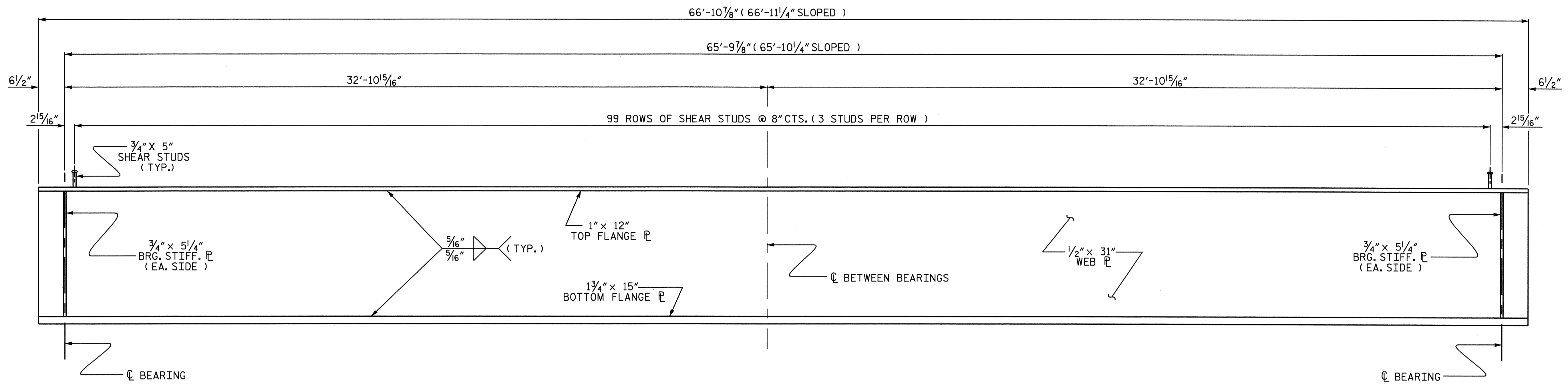
SUPERSTRUCTURE  
 FRAMING PLAN



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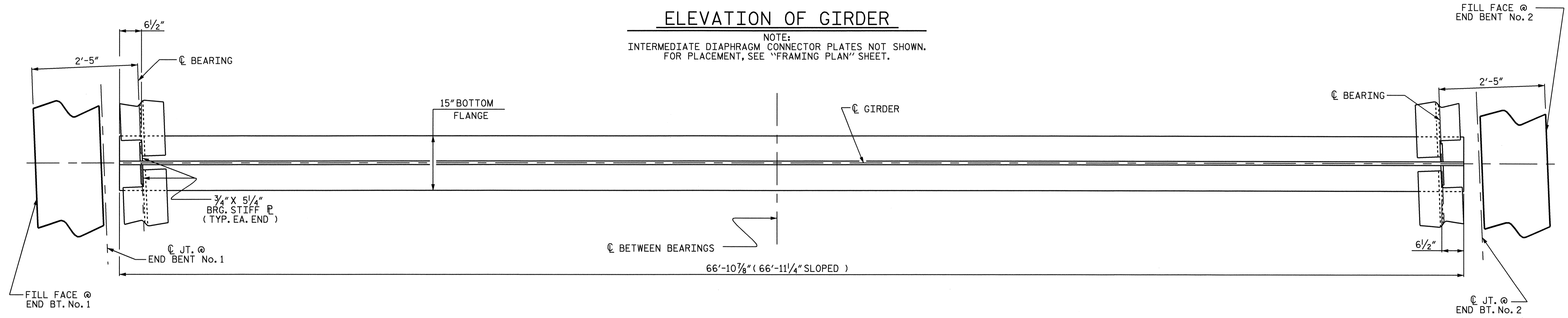
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1			3			TOTAL SHEETS
2			4			24

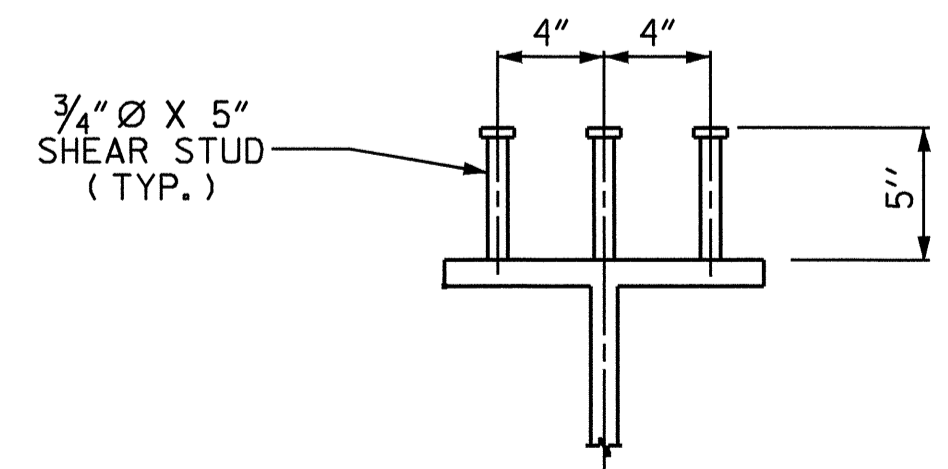


**ELEVATION OF GIRDER**

NOTE:  
INTERMEDIATE DIAPHRAGM CONNECTOR PLATES NOT SHOWN.  
FOR PLACEMENT, SEE "FRAMING PLAN" SHEET.



**BOTTOM FLANGE DETAIL**



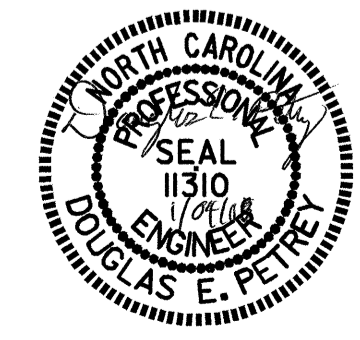
**SHEAR STUD DETAILS**  
(TYPICAL EACH GIRDER)

PROJECT NO. B-4317  
WATAUGA COUNTY  
STATION: 15+11.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
STRUCTURAL STEEL  
DETAILS



DRAWN BY : N. PIERCE DATE : 09-07  
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			24

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**NOTES**

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

BEARING STIFFENERS ARE TO BE PLUMB.

A CHARTY V-NOTCH TEST IS REQUIRED FOR WEB PLATES AND BOTTOM FLANGE 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.

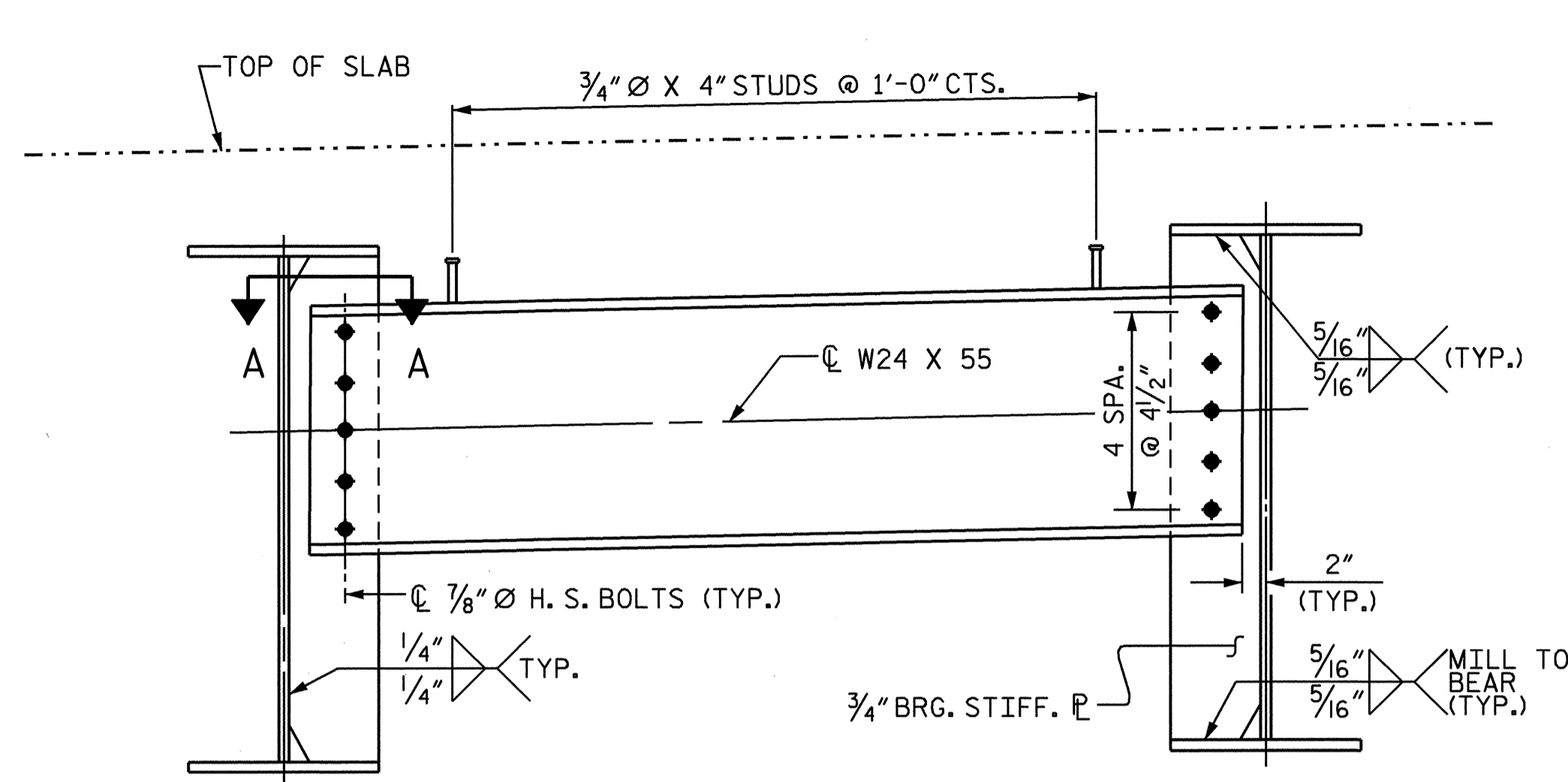
STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

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

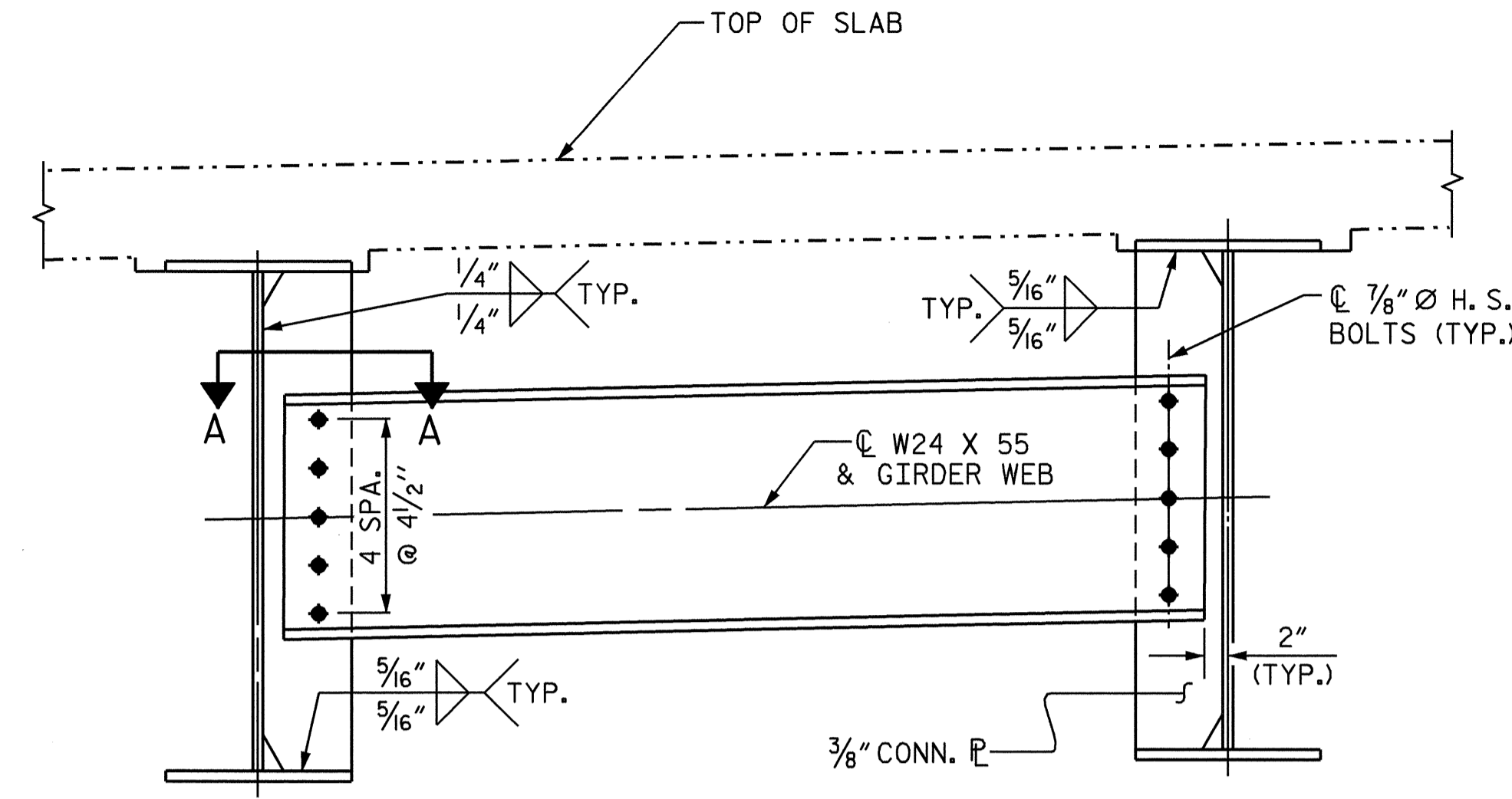
END OF GIRDERS SHALL BE PLUMB.

BEARING STIFFENER WIDTH SHOWN IS A MINIMUM DIMENSION. WIDTH MAY BE INCREASED TO ACCOMMODATE THE END BENT DIAPHRAGM.

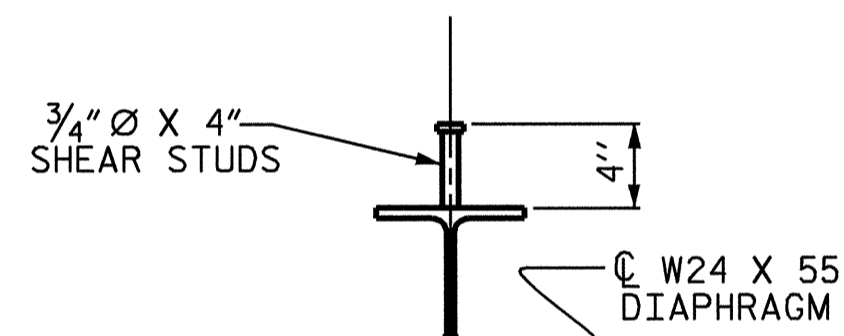
BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE TO AVOID INTERFERENCE WITH THE ANCHOR BOLT.



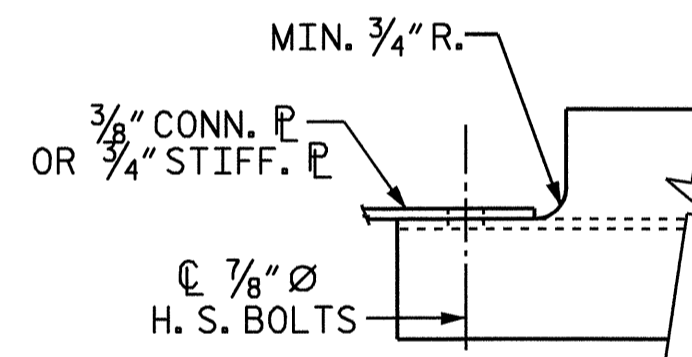
**TYPICAL END BENT DIAPHRAGM**



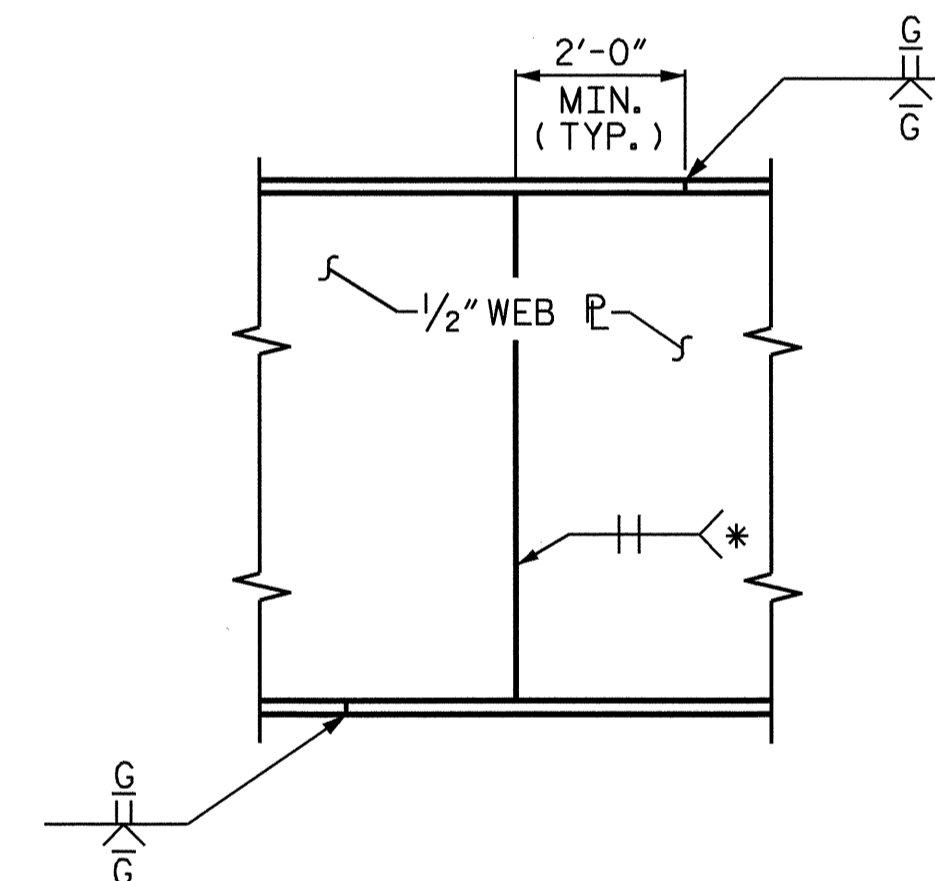
**INTERMEDIATE DIAPHRAGM**



**SHEAR STUD DETAILS**

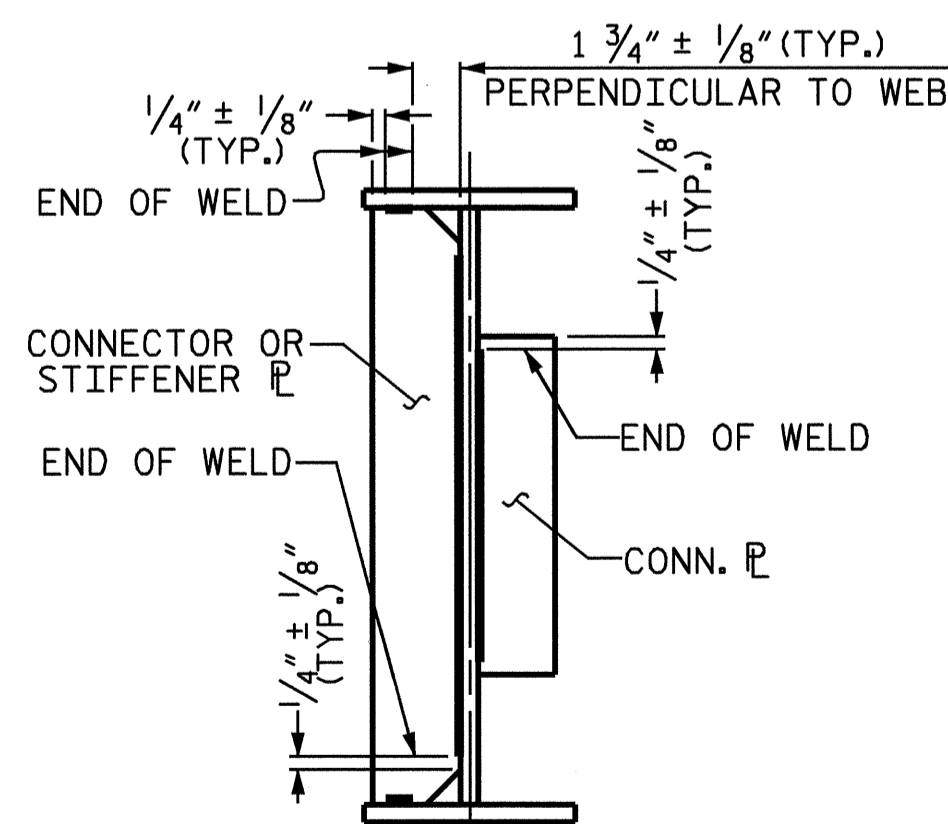


**SECTION A-A**

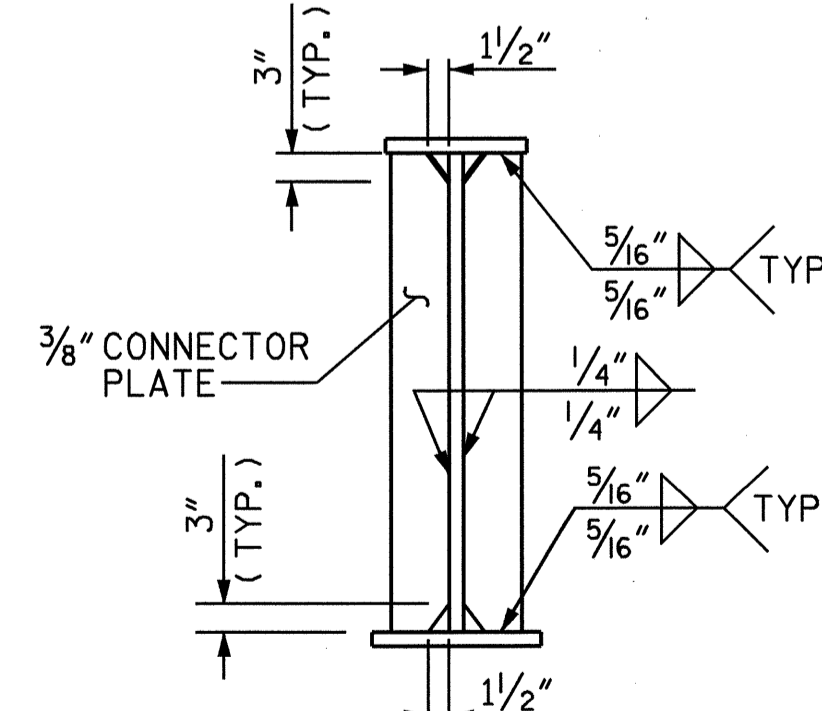


**PERMISSIBLE SHOP FLANGE & WEB SPLICE**

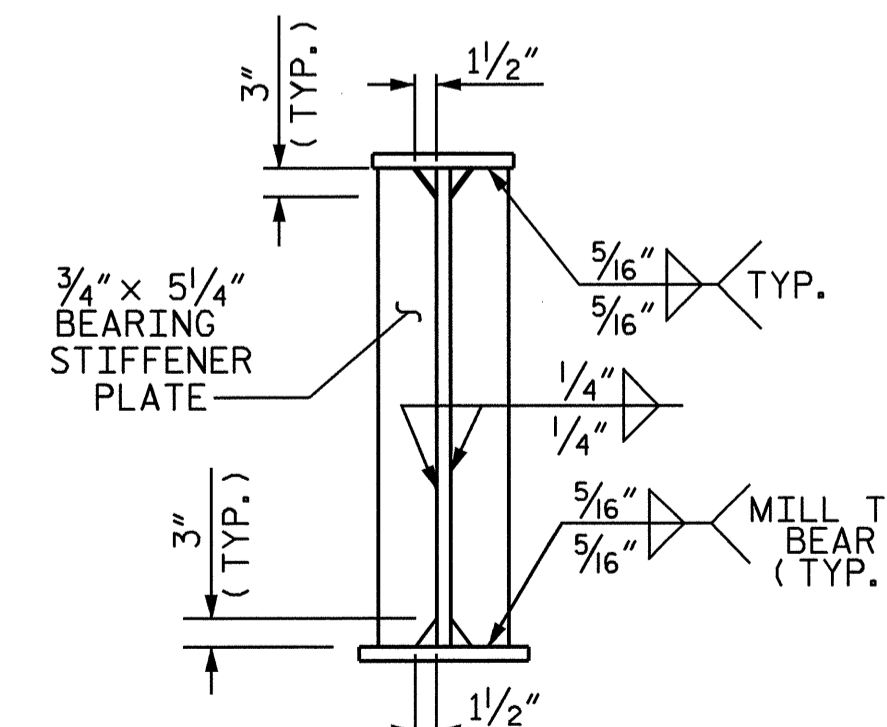
\* GRIND SMOOTH AND FLUSH ON OUTSIDE OF EXTERIOR GIRDER



**TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS**  
**WELD TERMINATION DETAILS**



**CONNECTOR PLATE**



**BEARING STIFFENER**

PROJECT NO. B-4317  
WATAUGA COUNTY  
STATION: 15+11.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
STRUCTURAL STEEL  
DETAILS



REVISIONS						SHEET NO. S-8
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 24
2			4			

DRAWN BY: N. PIERCE DATE: 09-07  
CHECKED BY: J.M. BRITT DATE: 09-07

### DEAD LOAD DEFLECTION TABLE FOR GIRDERS

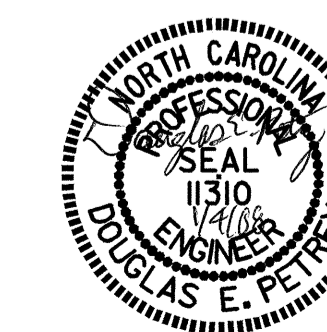
GIRDER #1											
TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.007	0.014	0.019	0.022	0.023	0.022	0.019	0.014	0.007	0
* DEFLECTION DUE TO WEIGHT OF SLAB	0	0.012	0.048	0.076	0.094	0.100	0.094	0.076	0.048	0.012	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.003	0.006	0.008	0.010	0.010	0.010	0.008	0.006	0.003	0
TOTAL DEAD LOAD DEFLECTION	0	0.022	0.068	0.103	0.125	0.133	0.125	0.103	0.068	0.022	0
★ VERTICAL CURVE ORDINATE	0	0.047	0.086	0.115	0.134	0.141	0.137	0.122	0.093	0.053	0
▲ SUPERELEVATION ORDINATE	0	0.041	0.072	0.088	0.088	0.088	0.088	0.088	0.072	0.041	0
REQUIRED CAMBER ↓	0	-1 <sup>3</sup> / <sub>16</sub> "	-1 <sup>1</sup> / <sub>16</sub> "	-1 <sup>3</sup> / <sub>16</sub> "	-1 <sup>3</sup> / <sub>16</sub> "	-1 <sup>1</sup> / <sub>8</sub> "	-1 <sup>3</sup> / <sub>16</sub> "	-1 <sup>5</sup> / <sub>16</sub> "	-1 <sup>3</sup> / <sub>16</sub> "	-1 <sup>7</sup> / <sub>8</sub> "	0
GIRDER #2											
TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.007	0.014	0.019	0.023	0.024	0.023	0.019	0.014	0.007	0
* DEFLECTION DUE TO WEIGHT OF SLAB	0	-0.008	0.030	0.059	0.078	0.084	0.078	0.059	0.030	-0.008	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.003	0.006	0.008	0.010	0.010	0.010	0.008	0.006	0.003	0
TOTAL DEAD LOAD DEFLECTION	0	0.002	0.050	0.087	0.110	0.118	0.110	0.087	0.050	0.002	0
★ VERTICAL CURVE ORDINATE	0	0.044	0.079	0.105	0.122	0.129	0.126	0.111	0.085	0.048	0
▲ SUPERELEVATION ORDINATE	0	0.039	0.069	0.091	0.104	0.108	0.104	0.091	0.069	0.039	0
REQUIRED CAMBER ↓	0	-1"	-1 <sup>3</sup> / <sub>16</sub> "	-1 <sup>5</sup> / <sub>16</sub> "	-1 <sup>3</sup> / <sub>8</sub> "	-1 <sup>7</sup> / <sub>16</sub> "	-1 <sup>7</sup> / <sub>16</sub> "	-1 <sup>3</sup> / <sub>8</sub> "	-1 <sup>1</sup> / <sub>4</sub> "	-1"	0
GIRDER #3											
TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.007	0.014	0.019	0.023	0.024	0.023	0.019	0.014	0.007	0
* DEFLECTION DUE TO WEIGHT OF SLAB	0	-0.029	0.011	0.042	0.062	0.069	0.062	0.042	0.011	-0.029	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.003	0.006	0.008	0.010	0.010	0.010	0.008	0.006	0.003	0
TOTAL DEAD LOAD DEFLECTION	0	-0.018	0.031	0.070	0.094	0.103	0.094	0.070	0.031	-0.018	0
★ VERTICAL CURVE ORDINATE	0	0.040	0.073	0.097	0.112	0.119	0.115	0.102	0.078	0.044	0
▲ SUPERELEVATION ORDINATE	0	0.037	0.066	0.087	0.099	0.104	0.099	0.087	0.066	0.037	0
REQUIRED CAMBER ↓	0	-1 <sup>1</sup> / <sub>8</sub> "	-1 <sup>5</sup> / <sub>16</sub> "	-1 <sup>3</sup> / <sub>8</sub> "	-1 <sup>3</sup> / <sub>8</sub> "	-1 <sup>7</sup> / <sub>16</sub> "	-1 <sup>7</sup> / <sub>16</sub> "	-1 <sup>7</sup> / <sub>16</sub> "	-1 <sup>3</sup> / <sub>8</sub> "	-1 <sup>3</sup> / <sub>16</sub> "	0
GIRDER #4											
TENTH POINTS	0	.10	.20	.30	.40	.50	.60	.70	.80	.90	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.007	0.014	0.019	0.022	0.023	0.022	0.019	0.014	0.007	0
* DEFLECTION DUE TO WEIGHT OF SLAB	0	-0.049	-0.007	0.026	0.046	0.054	0.046	0.026	-0.007	-0.049	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.003	0.006	0.008	0.010	0.010	0.010	0.008	0.006	0.003	0
TOTAL DEAD LOAD DEFLECTION	0	-0.038	0.013	0.053	0.078	0.087	0.078	0.053	0.013	-0.038	0
★ VERTICAL CURVE ORDINATE	0	0.037	0.067	0.090	0.104	0.109	0.106	0.094	0.072	0.041	0
▲ SUPERELEVATION ORDINATE	0	0.026	0.054	0.073	0.085	0.089	0.085	0.073	0.054	0.026	0
REQUIRED CAMBER ↓	0	-1 <sup>3</sup> / <sub>16</sub> "	-1 <sup>5</sup> / <sub>16</sub> "	-1 <sup>5</sup> / <sub>16</sub> "	-1 <sup>5</sup> / <sub>16</sub> "	-1 <sup>5</sup> / <sub>16</sub> "	-1 <sup>3</sup> / <sub>8</sub> "	-1 <sup>3</sup> / <sub>8</sub> "	-1 <sup>3</sup> / <sub>8</sub> "	-1 <sup>1</sup> / <sub>4</sub> "	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).  
 ★ VERTICAL CURVE ORDINATE TO BE SUBTRACTED FROM TOTAL DEAD LOAD DEFLECTION.  
 ▲ SUPERELEVATION ORDINATE TO BE SUBTRACTED FROM TOTAL DEAD LOAD DEFLECTION.

PROJECT NO. B-4317  
WATAUGA COUNTY  
 STATION: 15+11.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

### SUPERSTRUCTURE DEAD LOAD DEFLECTIONS



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : N. PIERCE DATE : 09-07  
 CHECKED BY : J.M. BRITT DATE : 09-07

**NOTES**

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

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

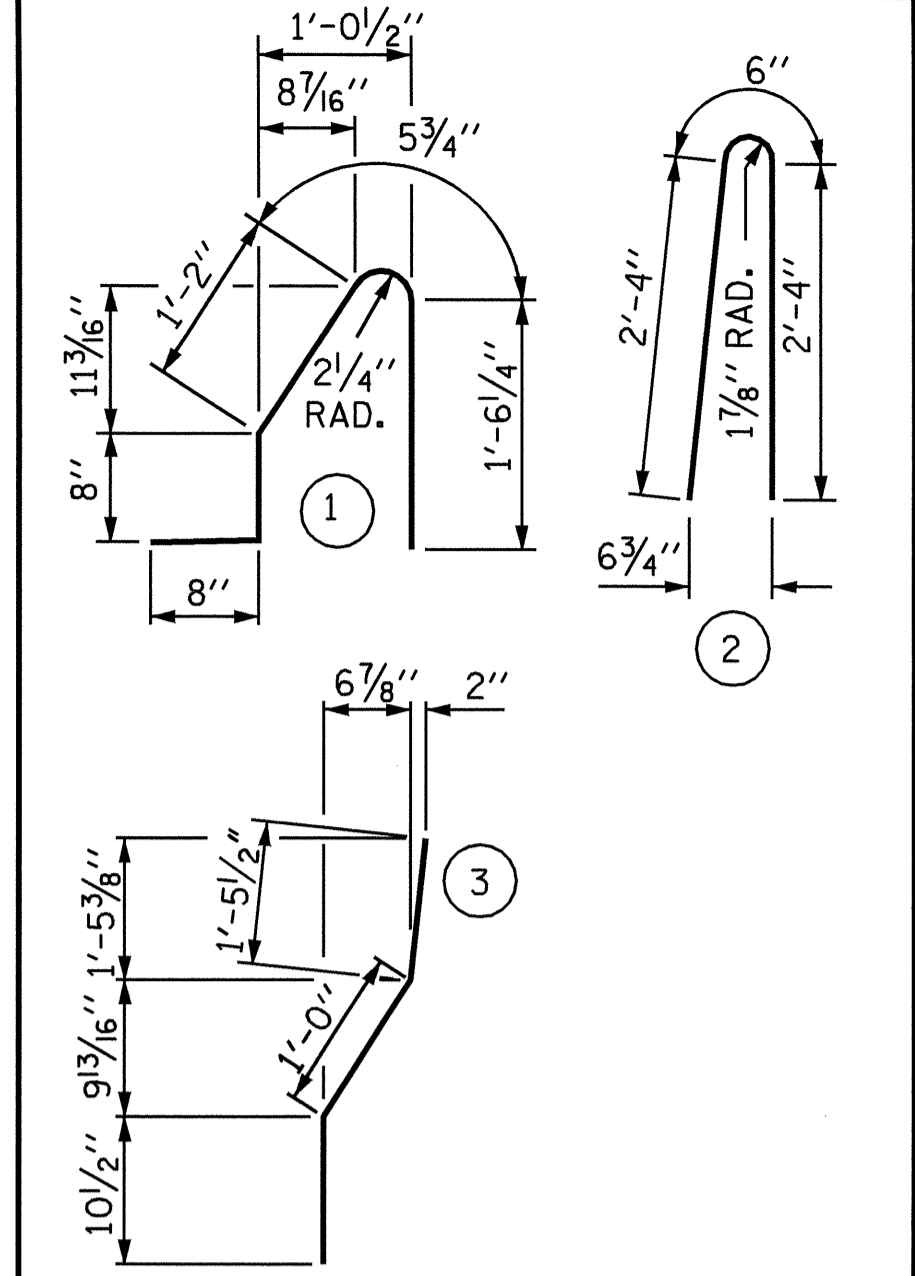
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3 AND #5 S4 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 AND #5 S4 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

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

THE #5 S1 AND S2 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL IN BARRIER RAIL.

**BAR TYPES**



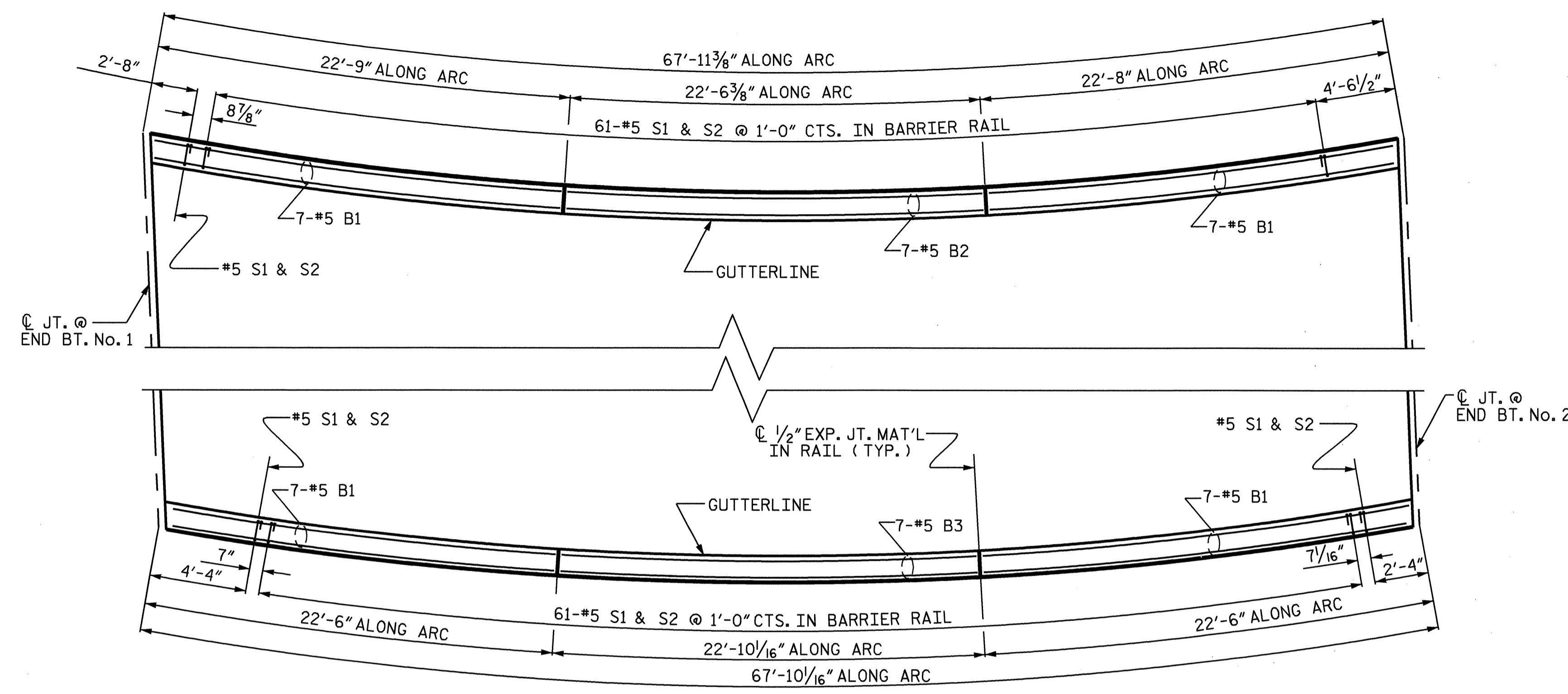
ALL BAR DIMENSIONS ARE OUT TO OUT

**BILL OF MATERIAL**

FOR CONCRETE BARRIER RAIL ONLY

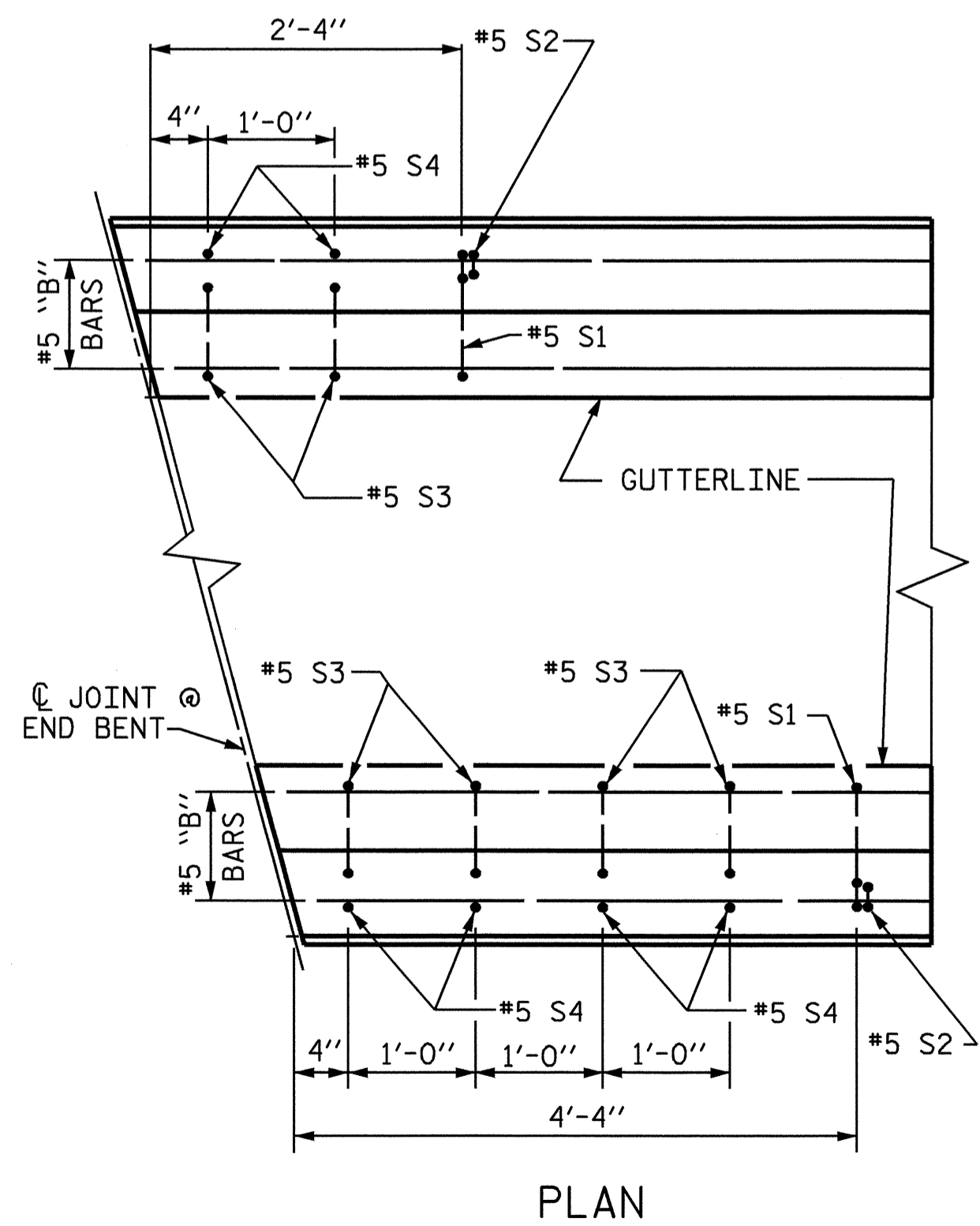
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	28	#5 STR	22'-0"	642
* B2	7	#5 STR	22'-2"	162
* B3	7	#5 STR	22'-4"	163
* S1	125	#5	1	587
* S2	125	#5	2	674
* S3	12	#5	3	42
* S4	12	#5	STR	40

* EPOXY COATED REINFORCING STEEL	2310 LBS.
CLASS AA CONCRETE	13.6 CU. YDS.
CONCRETE BARRIER RAIL	135.78 LTN. FT.



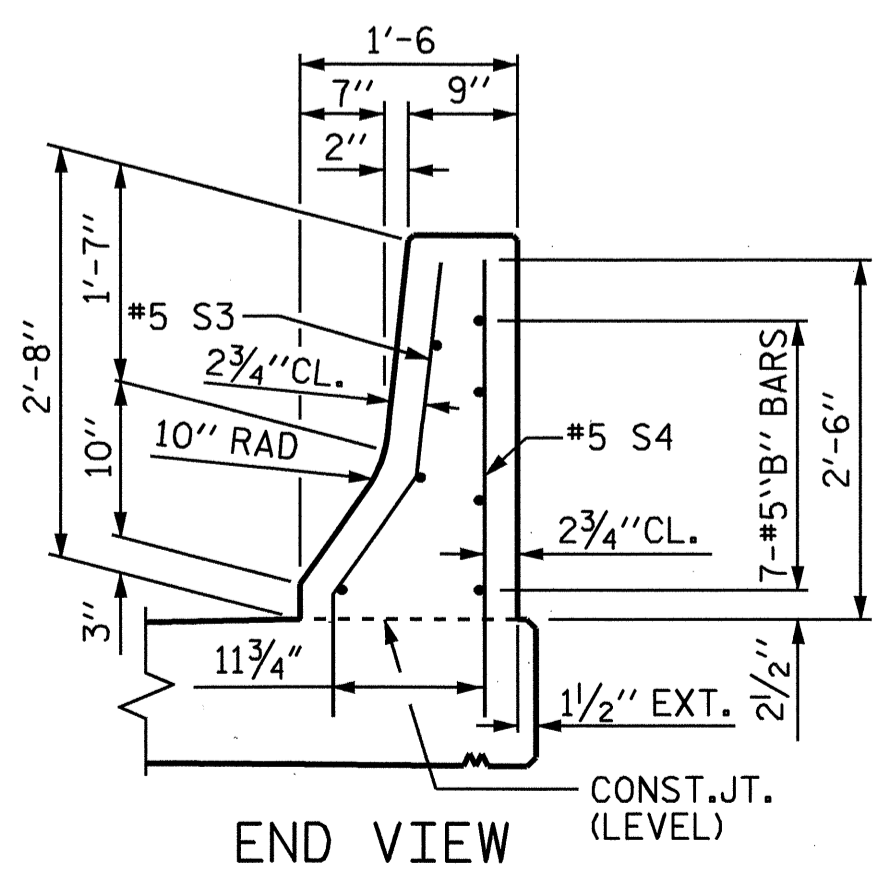
**PLAN OF BARRIER RAIL**

(DIMENSIONS ARE TAKEN ALONG THE OUTSIDE FACE OF THE BARRIER RAIL)

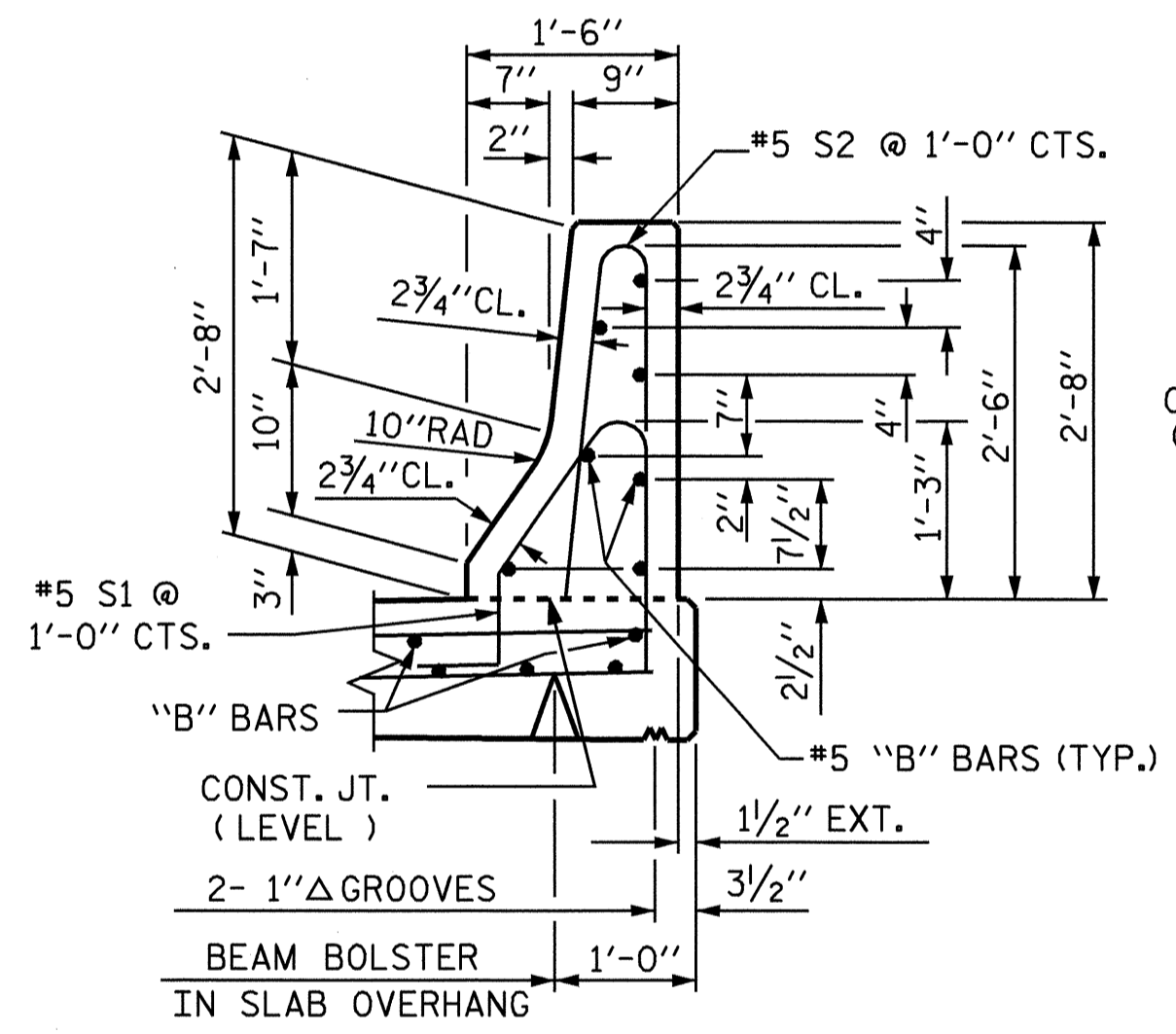


**PLAN END OF RAIL DETAILS**

FOR ADHESIVE ANCHORING AT SAWED JOINTS  
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR)

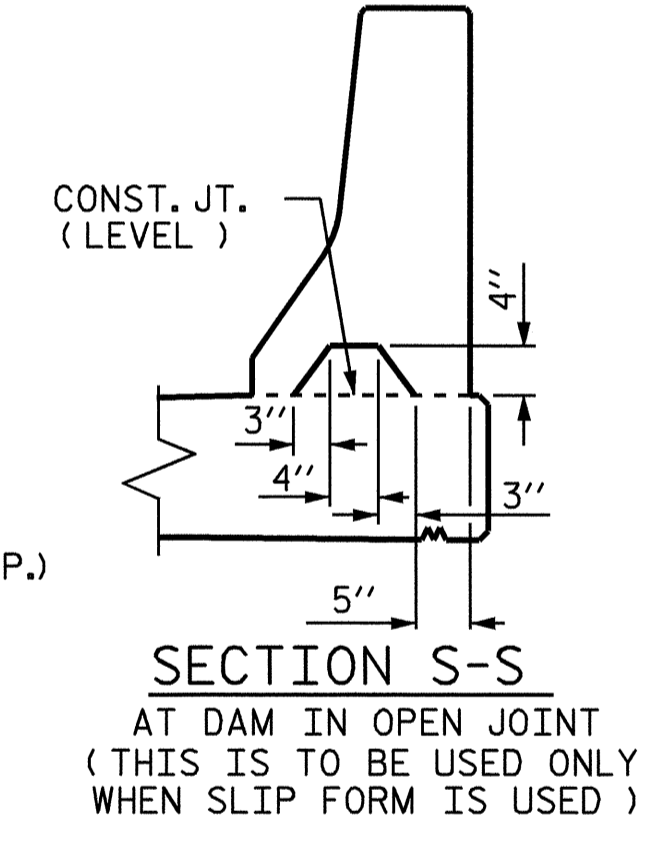


**END VIEW**

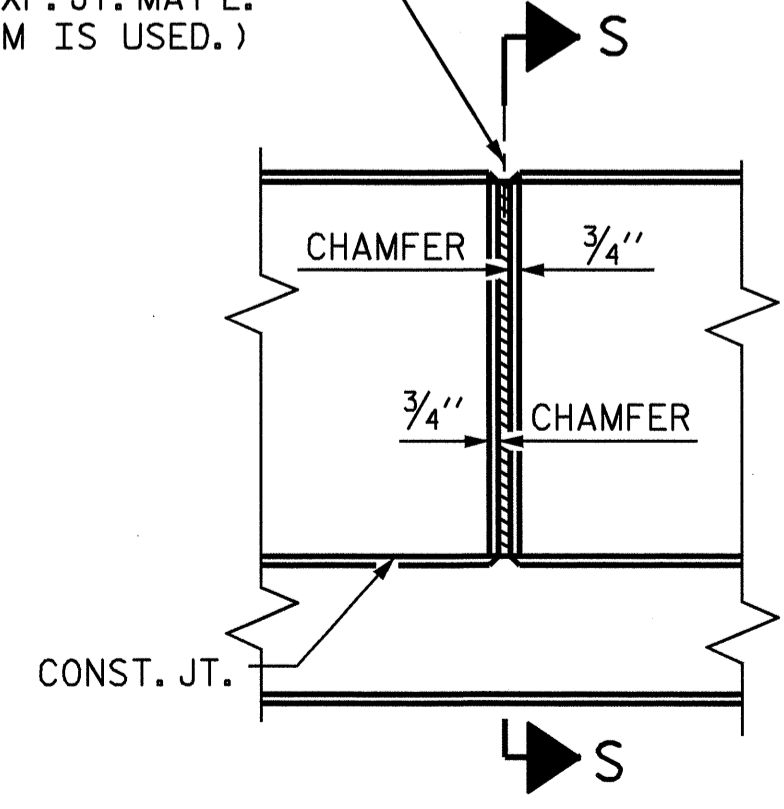


**SECTION THRU RAIL**

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



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



**ELEVATION AT EXPANSION JOINTS BARRIER RAIL DETAILS**

ASSEMBLED BY : N. PIERCE	DATE : 09-07
CHECKED BY : J.M. BRITT	DATE : 09-07
DRAWN BY : ARB 5/87	REV. 10/17/00 RWW/LES
CHECKED BY : SJD 9/87	REV. 5/1/03R RWW/JTE
	REV. 5/1/06 TLA/GM

PROJECT NO. B-4317  
WATAUGA COUNTY  
STATION: 15+11.00 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**STANDARD CONCRETE BARRIER RAIL**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS 24
2			4			



NOTES

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

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

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

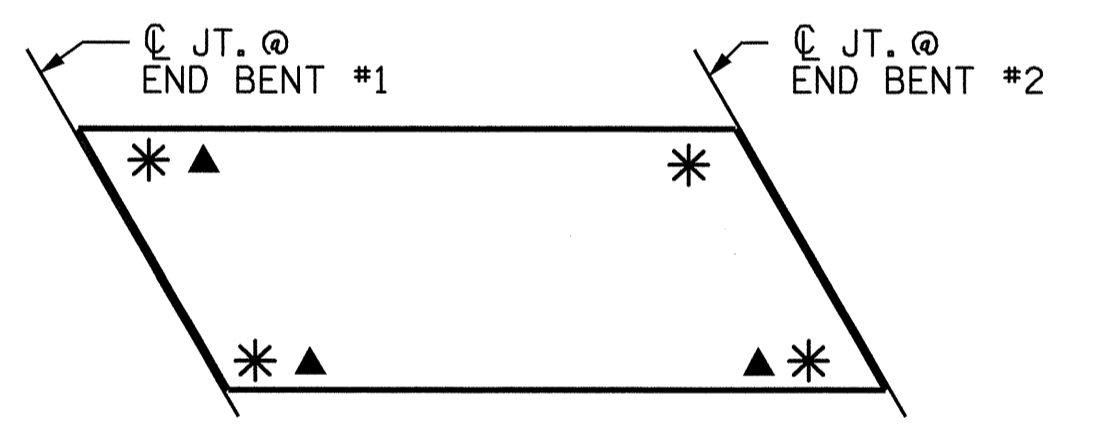
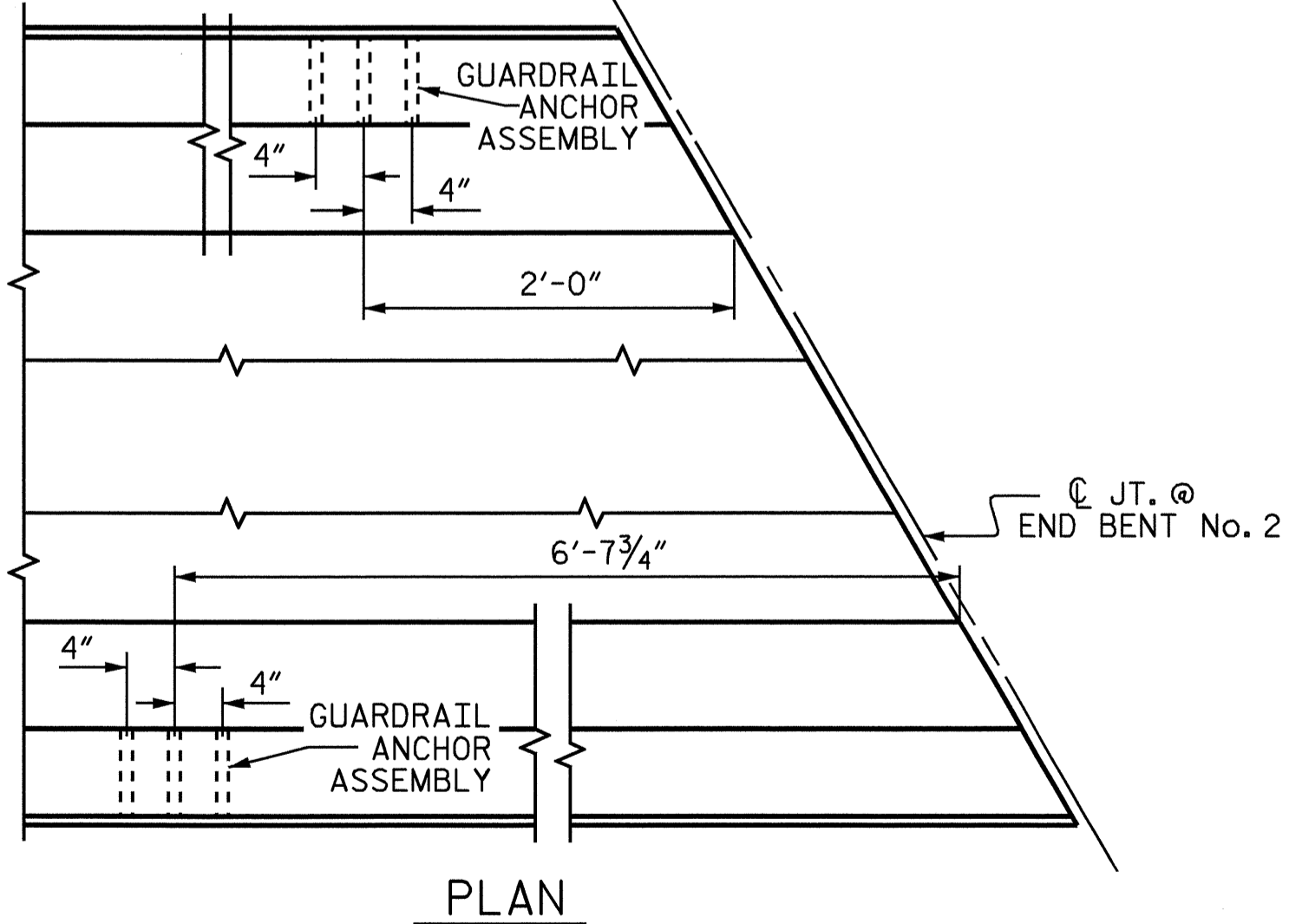
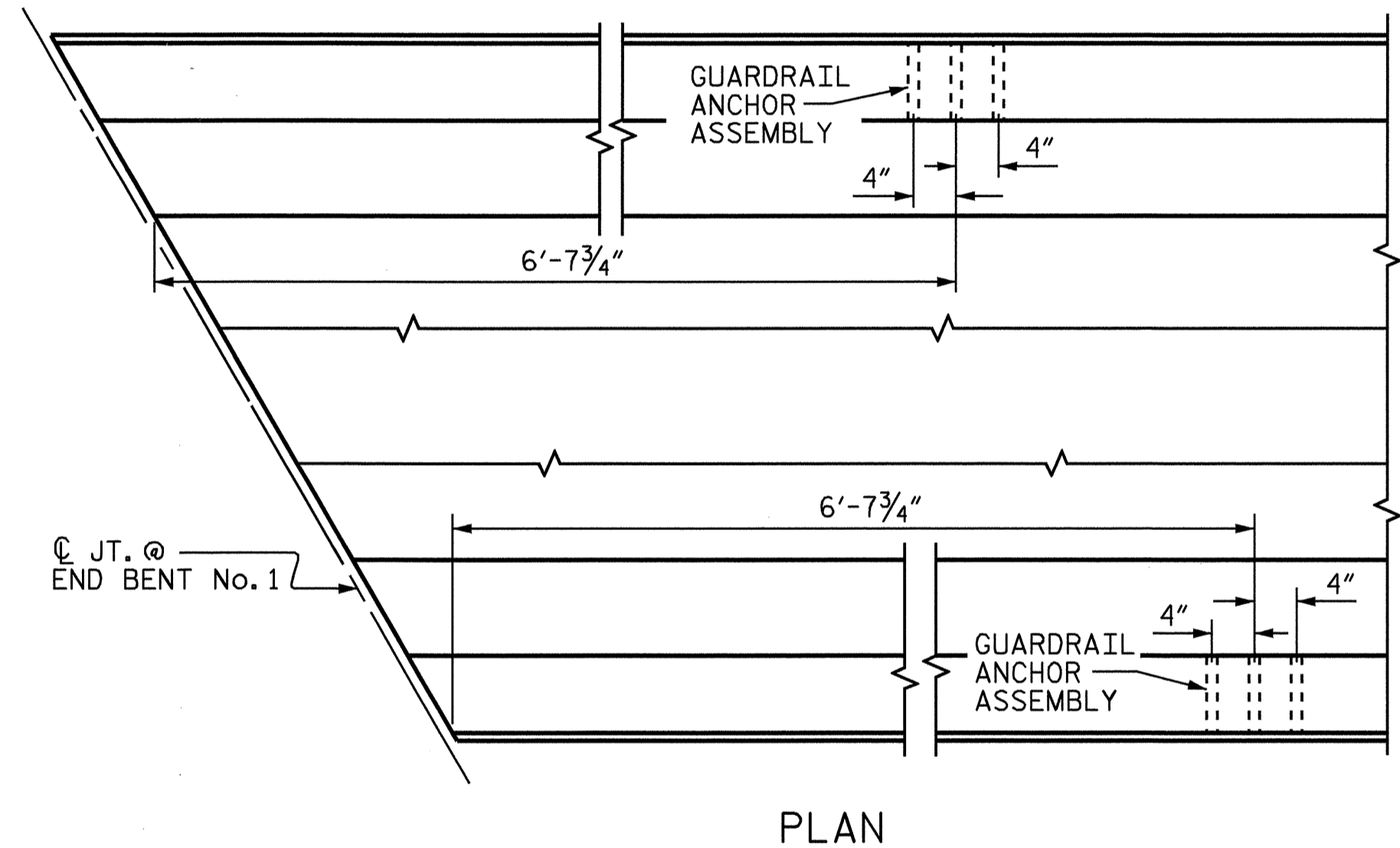
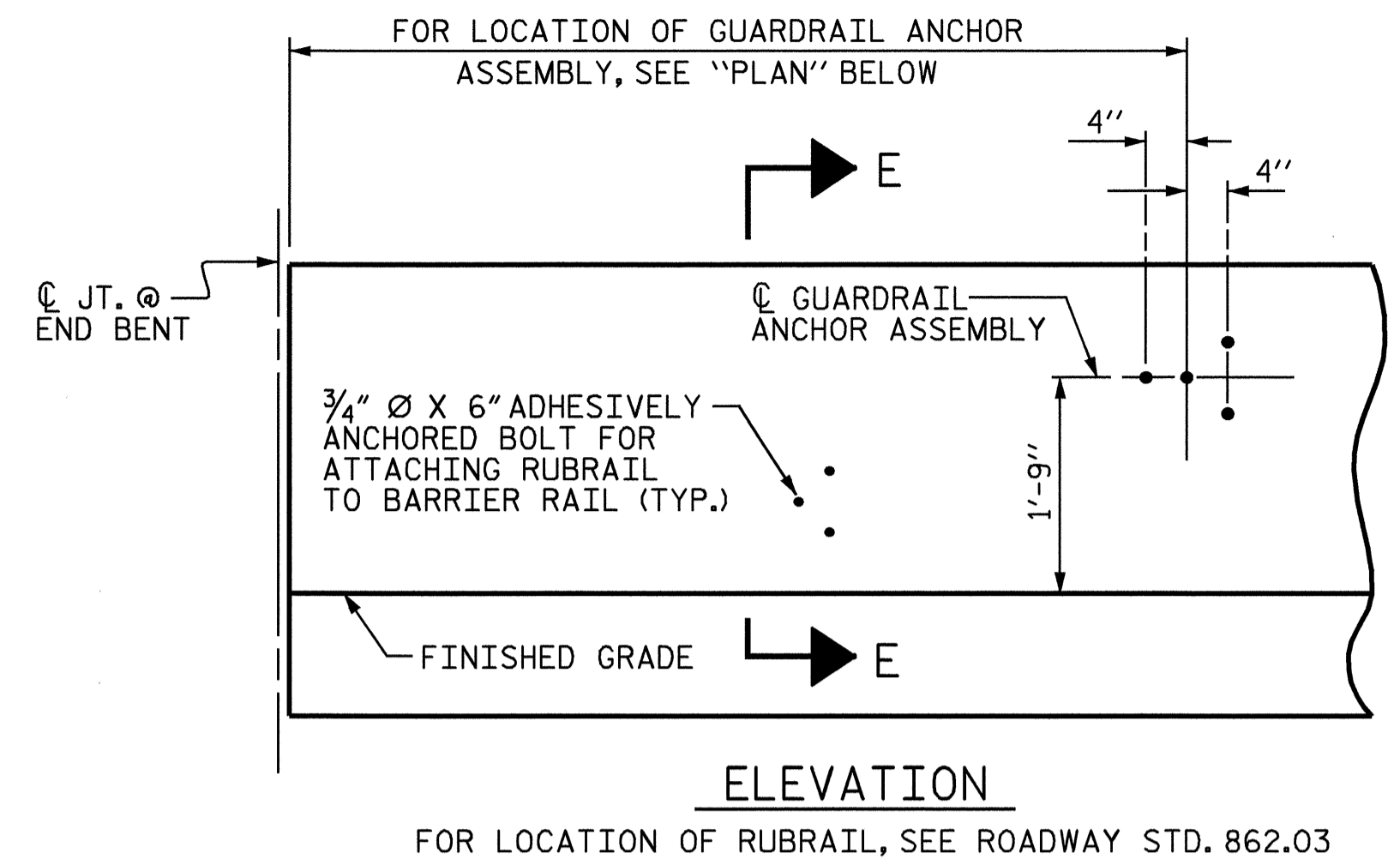
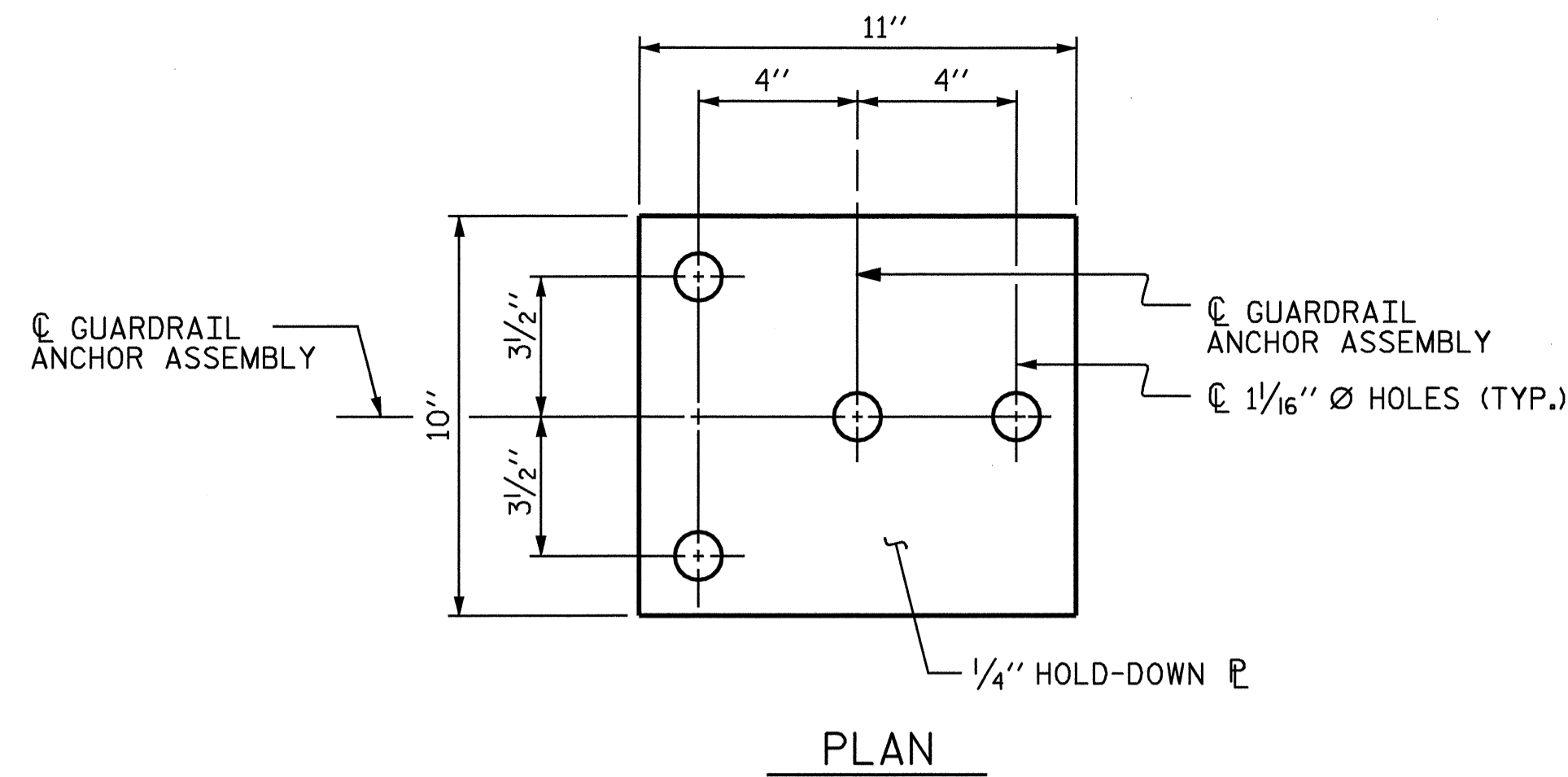
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

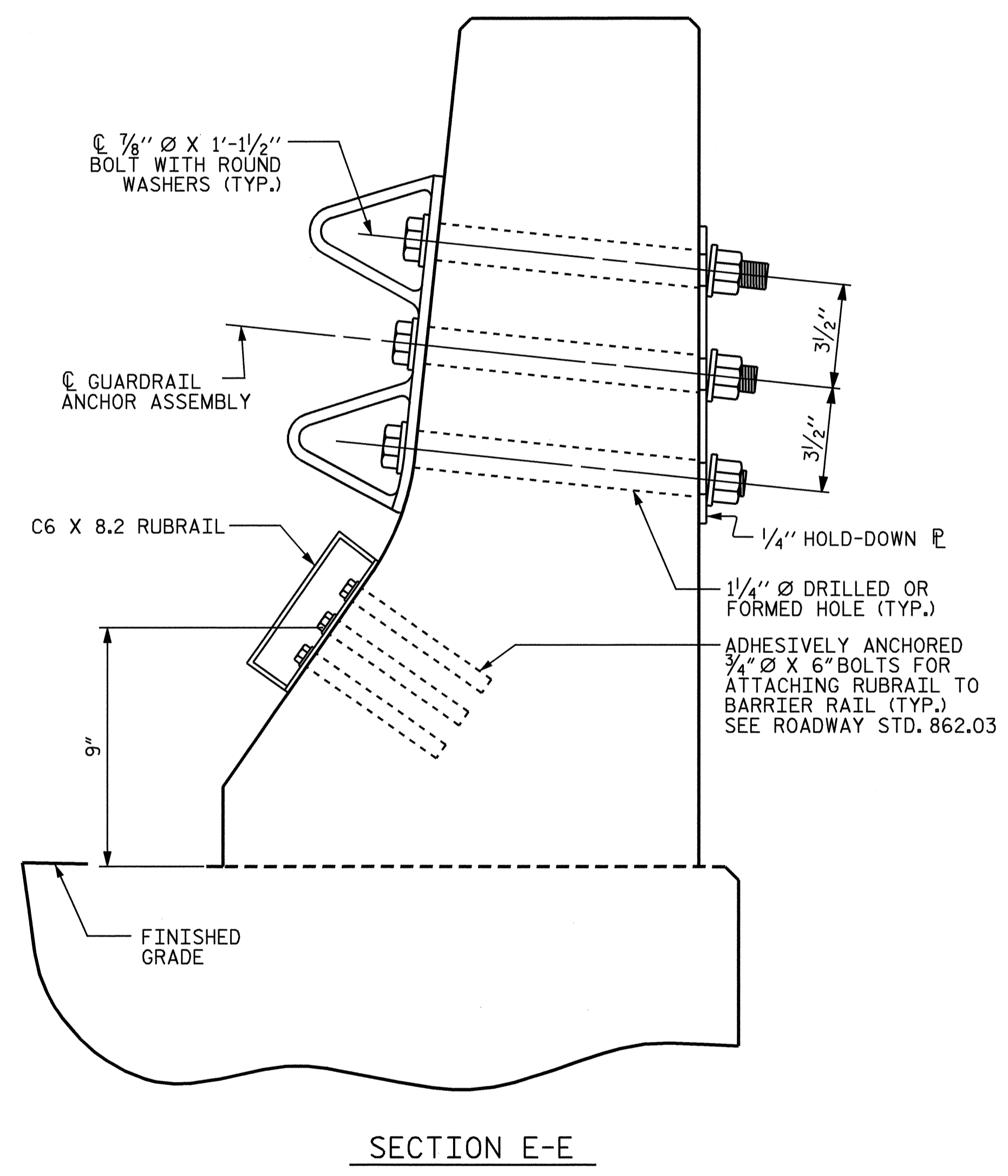
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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



SKETCH SHOWING POINTS OF ATTACHMENTS

- \* DENOTES GUARDRAIL ANCHOR ASSEMBLY
- ▲ DENOTES RUBRAIL ATTACHMENT



GUARDRAIL ANCHOR ASSEMBLY DETAILS

LOCATION OF ANCHORS FOR GUARDRAIL

PROJECT NO. B-4317  
WATAUGA COUNTY  
 STATION: 15+11.00 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-11	
STANDARD GUARDRAIL ANCHORAGE FOR BARRIER RAIL						TOTAL SHEETS 24	
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				
2			4				



ASSEMBLED BY : N. PIERCE	DATE : 09-07
CHECKED BY : J.M. BRITT	DATE : 09-07
DRAWN BY : TLA 5/06	ADDED 5/1/06R KMM/GM
CHECKED BY : GM 5/06	

**NOTES**

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

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

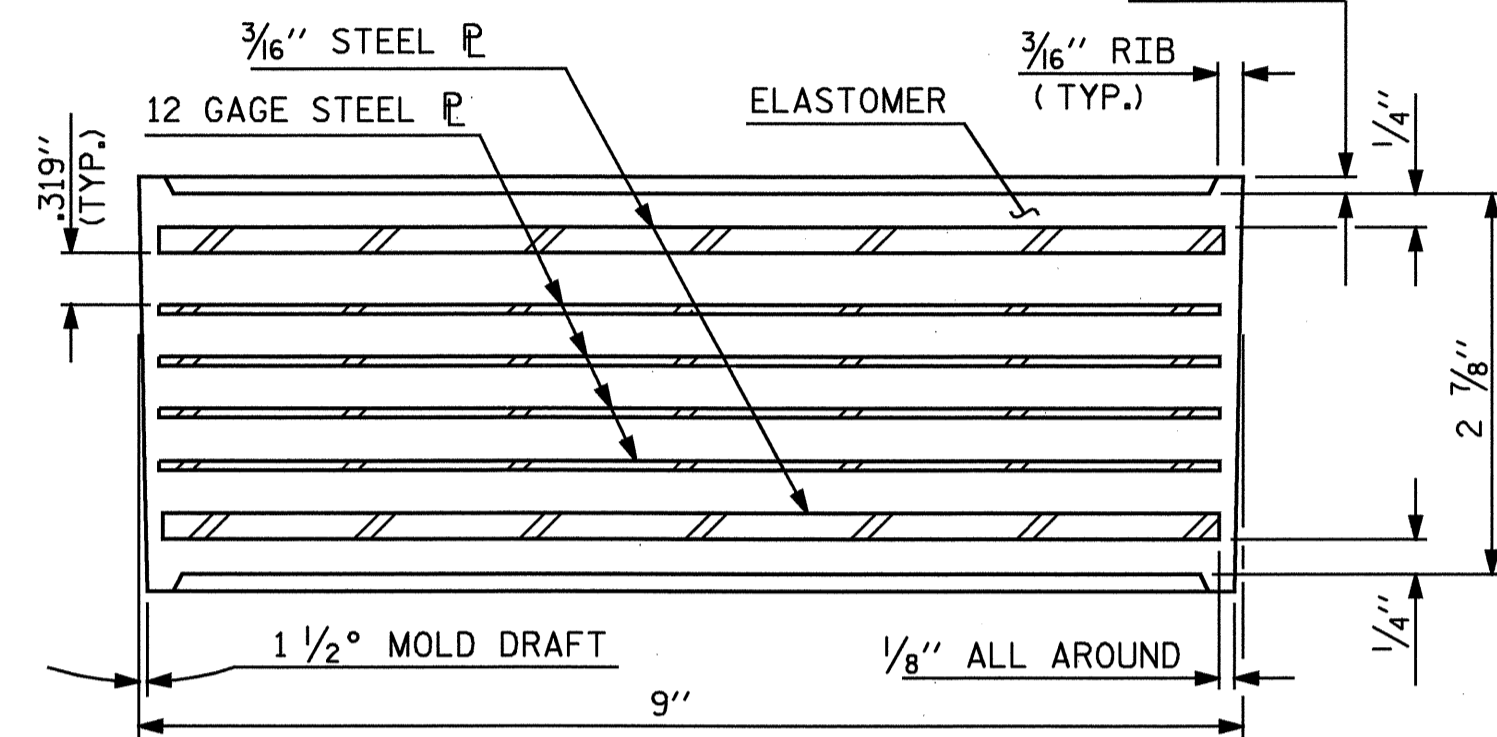
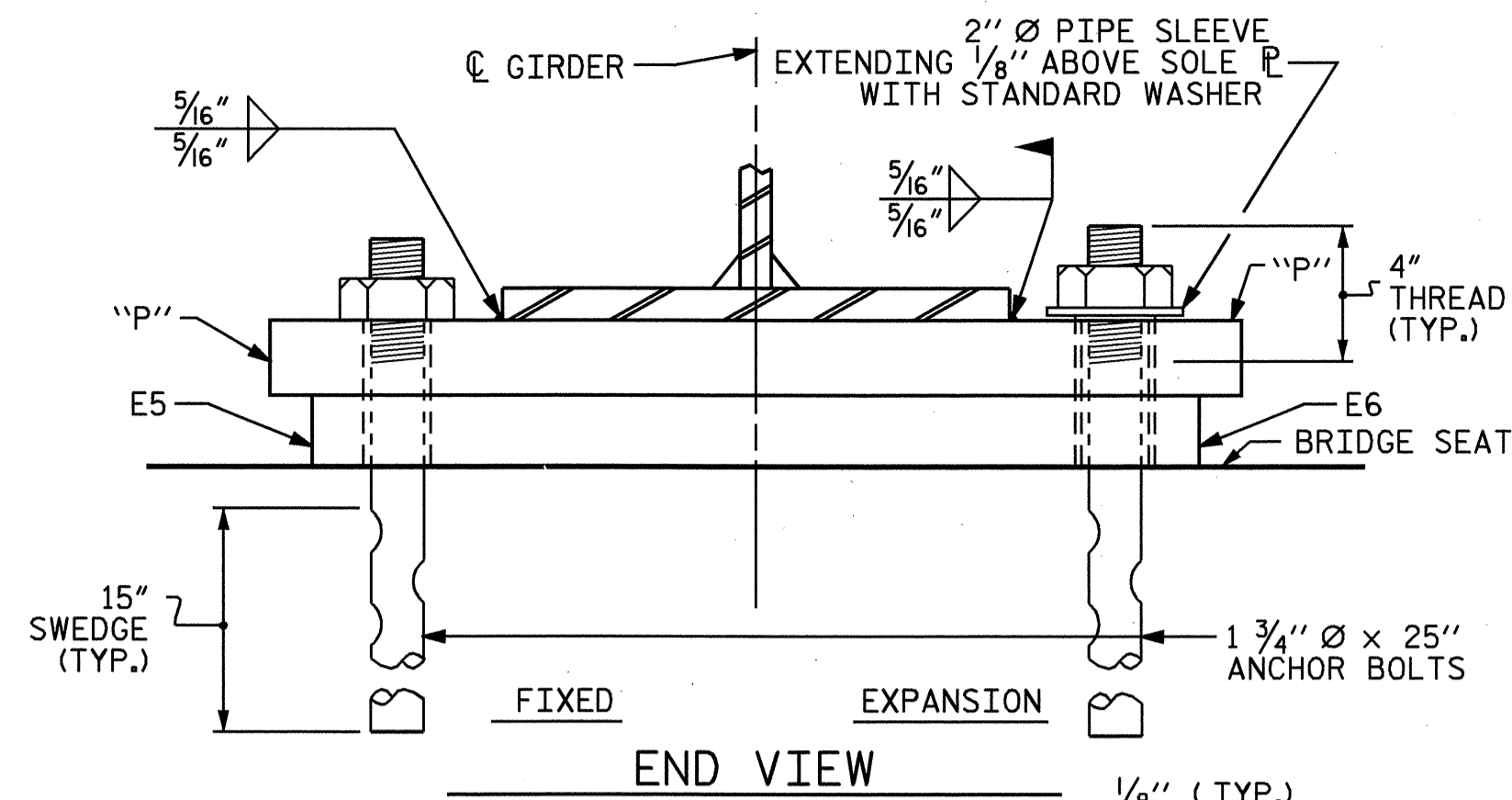
THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.

FOR AASHTO M270 GRADE 50W STRUCTURAL STEEL, SOLE PLATE 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.

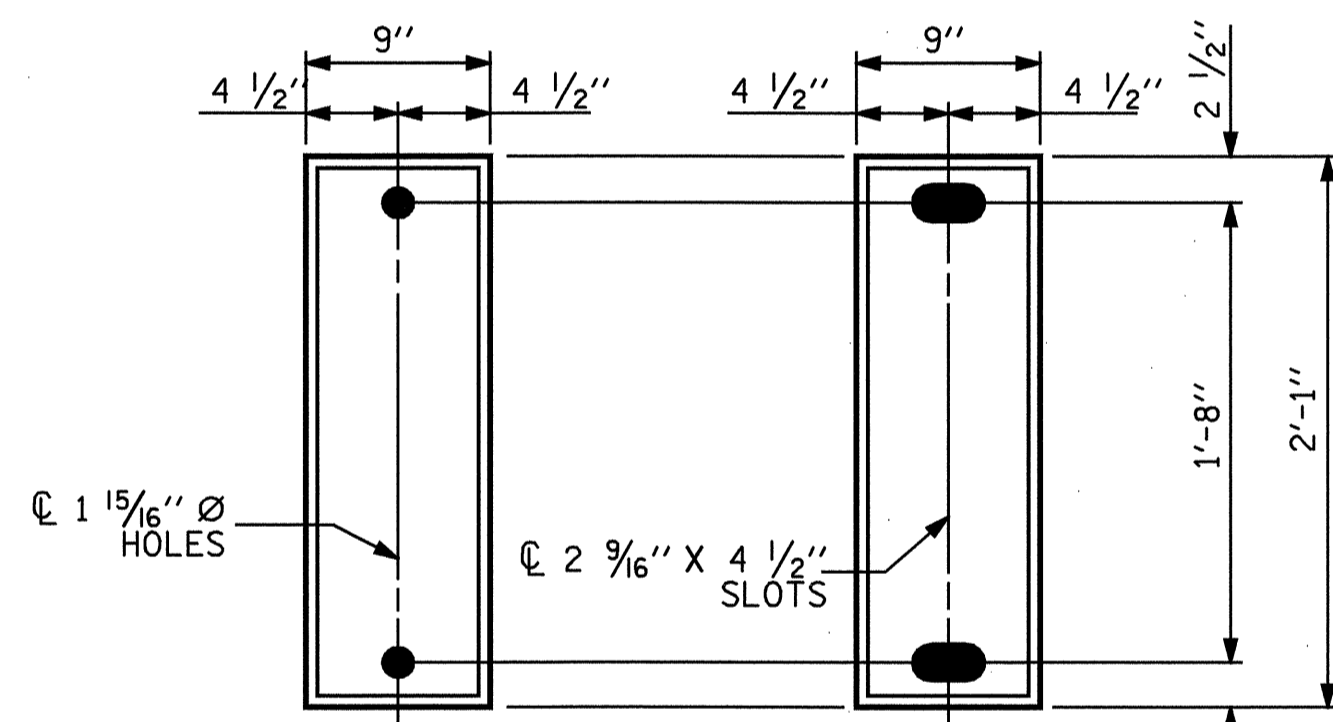
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

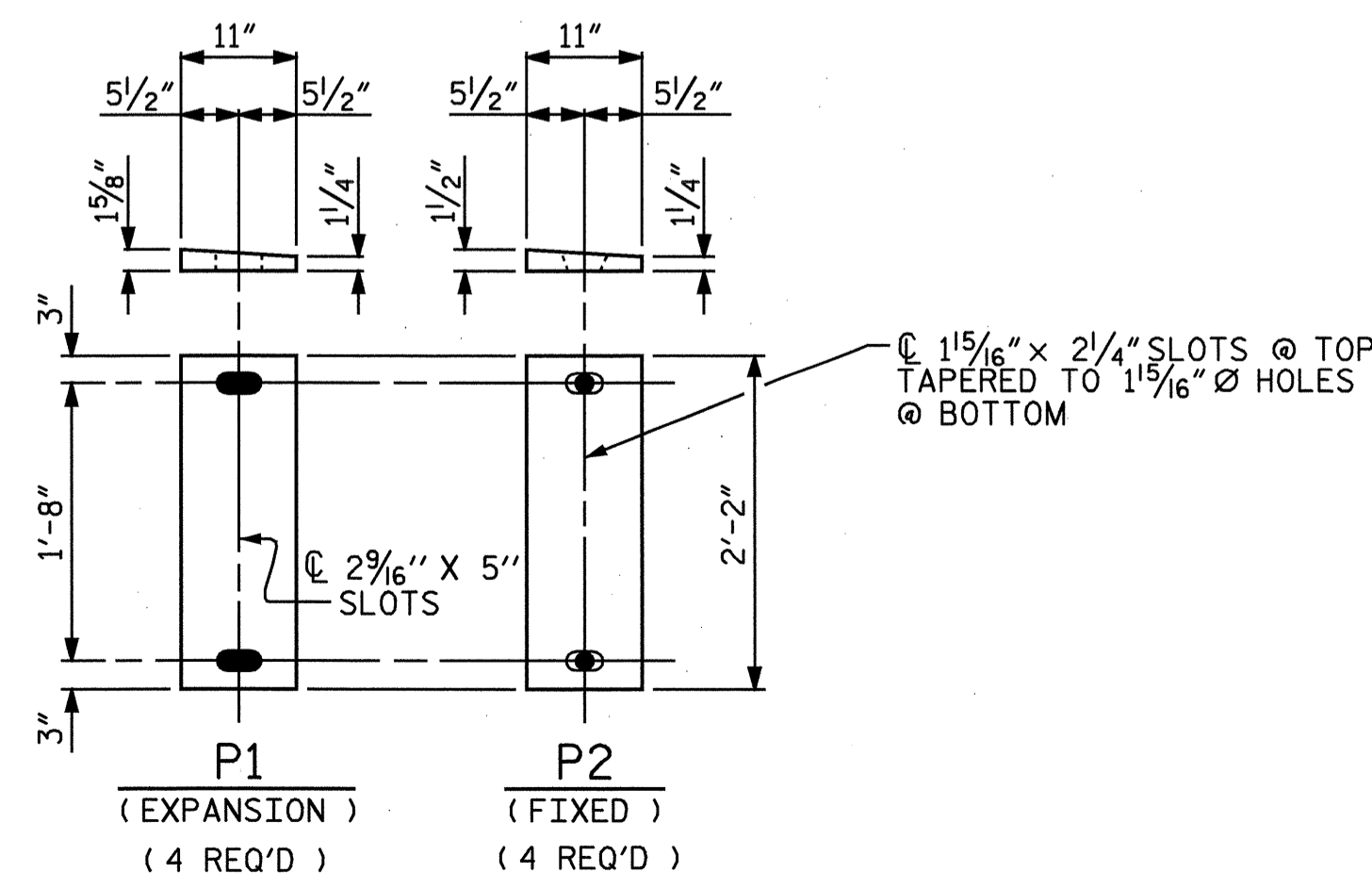


TYPICAL SECTION OF ELASTOMERIC BEARINGS



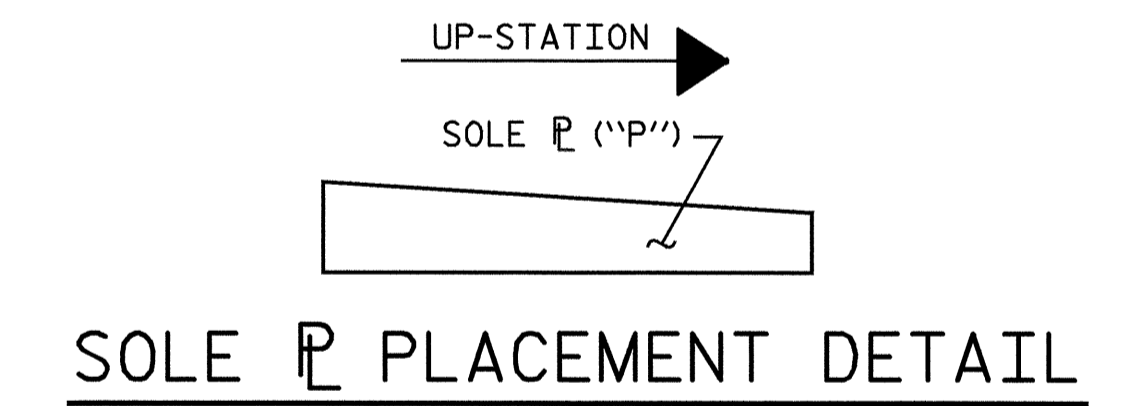
E5 ( 4 REQ'D ) E6 ( 4 REQ'D )  
PLAN VIEW OF ELASTOMERIC BEARING

**TYPE III**



SOLE PLATE DETAILS ("P")

-LOAD RATINGS-	
TYPE III	MAX.D.L.+L.L. 144 K



SOLE PLATE PLACEMENT DETAIL

PROJECT NO. B-4317  
WATAUGA COUNTY  
STATION: 15+11.00 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
ELASTOMERIC BEARING  
DETAILS  
( STEEL SUPERSTRUCTURE )



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			24

ASSEMBLED BY : N. PIERCE	DATE : 09-07
CHECKED BY : J.M. BRITT	DATE : 09-07
DRAWN BY : JMB 11/87	REV. 8/16/99 MAB/LES
CHECKED BY : ARB 11/87	REV. 10/17/00 RWW/LES
	REV. 5/1/06 TLA/GM

**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"			

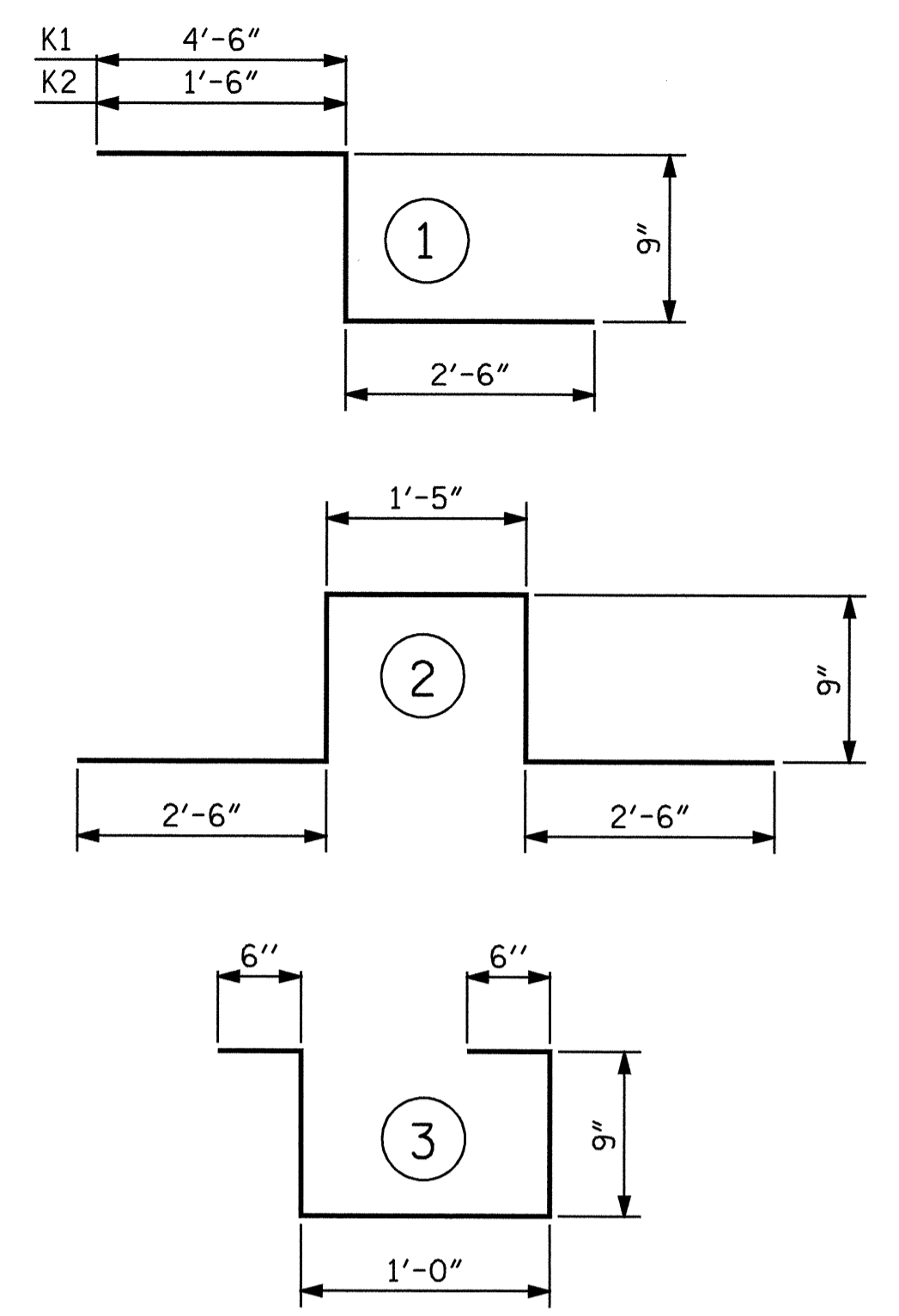
**BILL OF MATERIAL**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	246	#5	STR	17'-0"	4362
A2	246	#5	STR	16'-10"	4319
* A3	2	#5	STR	14'-8"	31
A4	2	#5	STR	14'-8"	31
* B1	67	#4	STR	23'-10"	1067
B2	64	#5	STR	34'-8"	2314
B3	4	#5	STR	34'-10"	145
B4	1	#5	STR	35'-1"	37
B5	2	#5	STR	29'-7"	62
B6	2	#5	STR	32'-4"	67
B7	1	#5	STR	1'-6"	2
B8	1	#5	STR	4'-9"	5
B9	1	#5	STR	10'-6"	11
B10	1	#5	STR	18'-8"	19
B11	1	#5	STR	1'-6"	2
B12	1	#5	STR	5'-9"	6
B13	1	#5	STR	11'-6"	12
B14	1	#5	STR	20'-1"	21
* G1	1	#5	STR	31'-6"	33
* G2	1	#5	STR	31'-2"	33
* K1	4	#5	1	7'-9"	32
* K2	4	#5	1	4'-9"	20
* K3	8	#5	2	7'-11"	66
* K4	12	#5	STR	7'-9"	97
* S1	48	#4	3	3'-6"	112

REINFORCING STEEL 7053 LBS.  
 \* EPOXY COATED REINFORCING STEEL 5853 LBS.

\* THESE BARS ARE EPOXY COATED

**BAR TYPES**



ALL BAR DIMENSIONS ARE OUT TO OUT

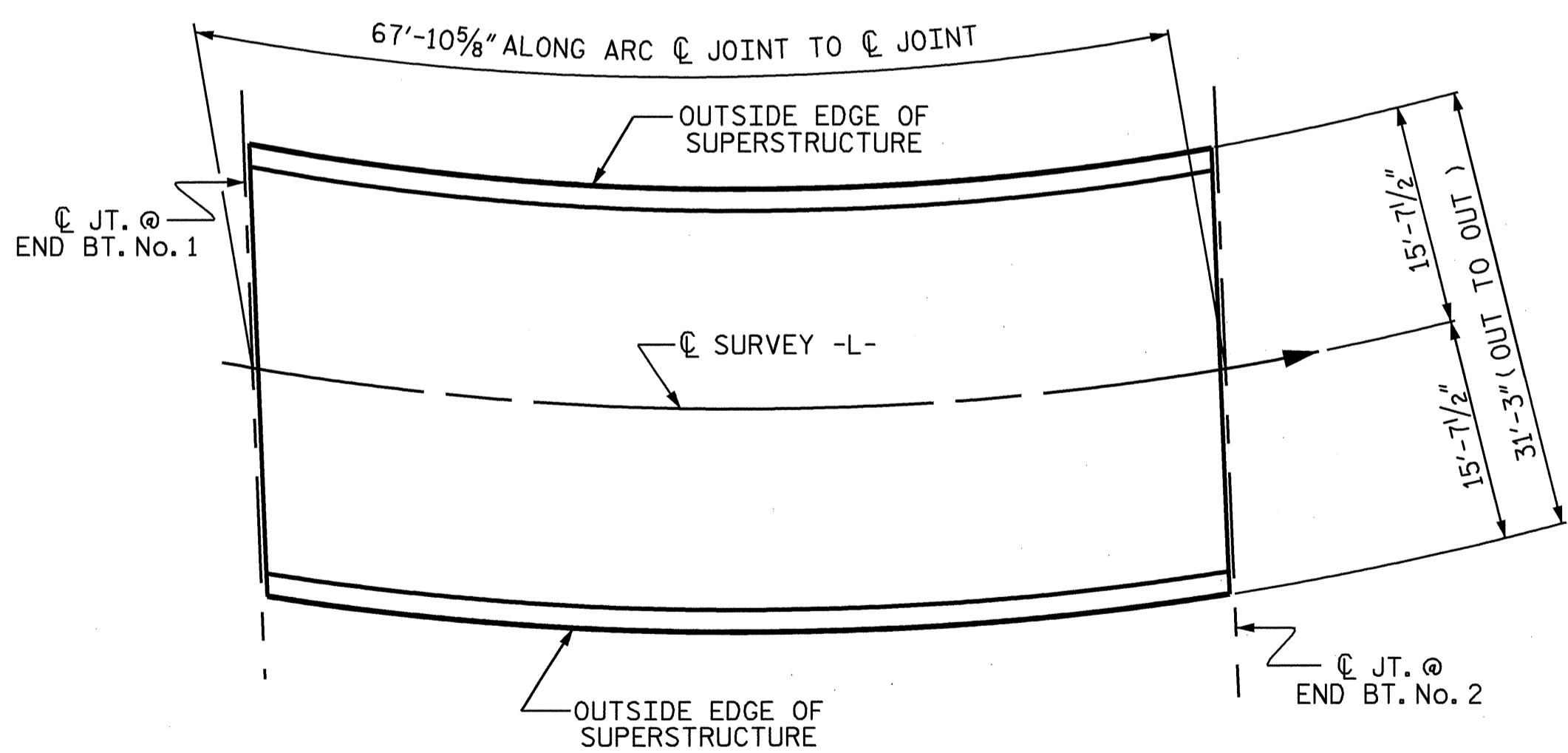
**SUPERSTRUCTURE BILL OF MATERIAL**

	CLASS AA CONCRETE ( CU.YDS.)	REINFORCING STEEL ( LBS.)	EPOXY COATED REINFORCING STEEL ( LBS.)
TOTALS**	65.3	7053	5853

\*\*QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

**GROOVING BRIDGE FLOORS**

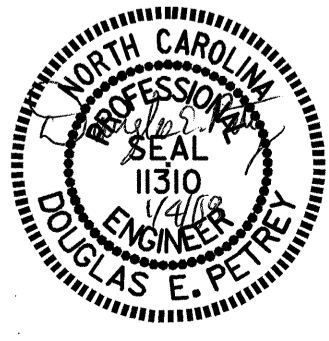
APPROACH SLABS	633 SQ.FT.
BRIDGE DECK	1665 SQ.FT.
TOTAL	2298 SQ.FT.



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB ( SQ. FT. = 2,121 )

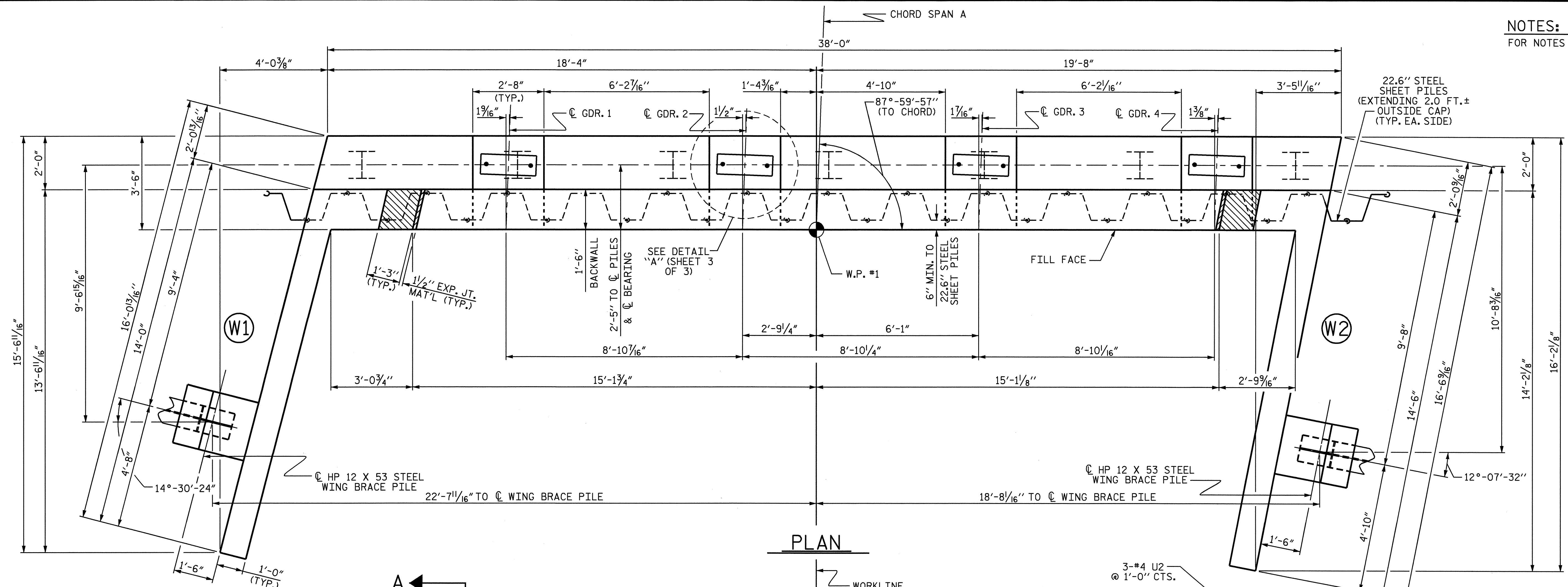
PROJECT NO. B-4317  
WATAUGA COUNTY  
 STATION: 15+11.00 -L-

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

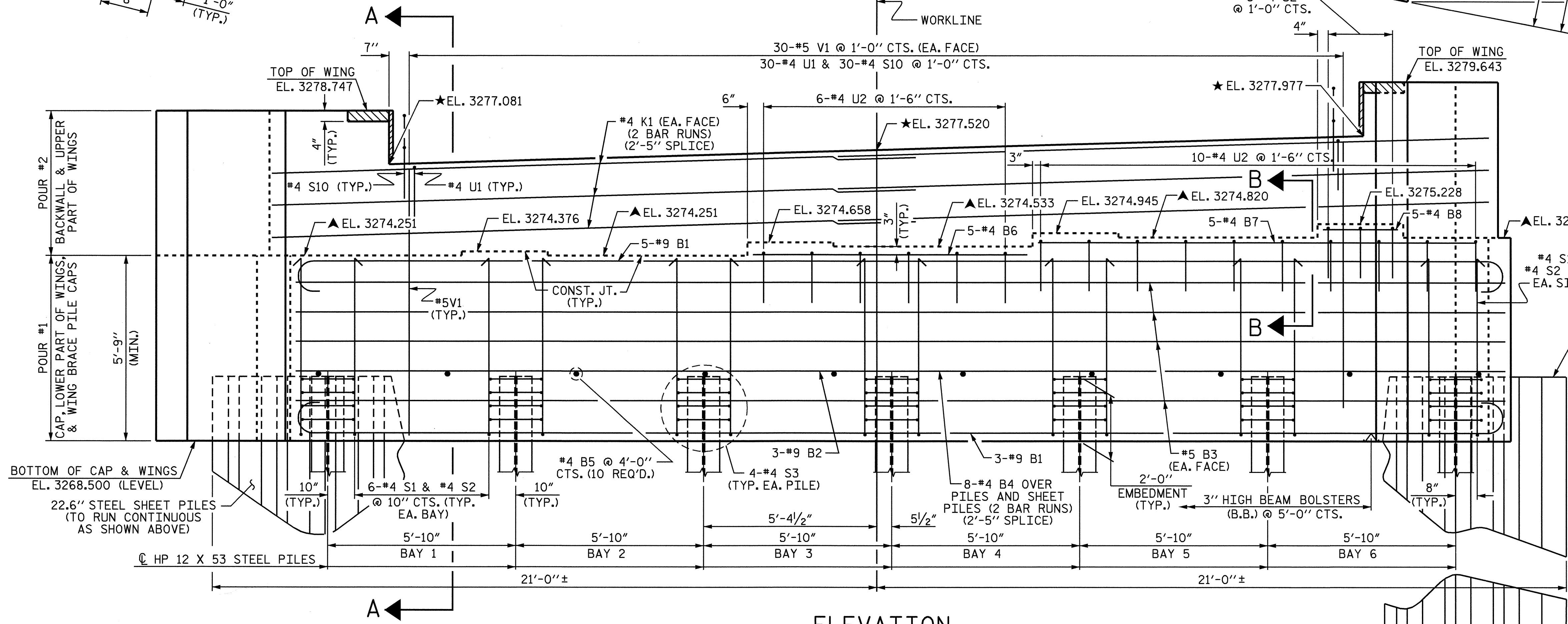


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS 24
2			4			

ASSEMBLED BY : N. PIERCE	DATE : 09-07
CHECKED BY : J.M. BRITT	DATE : 09-07
DRAWN BY : JMB 5/87	REV. 6/1/94 EEM/GRP
CHECKED BY : SJD 9/87	REV. 8/16/99 RWW/LES
	REV. 5/1/06 TLA/GM



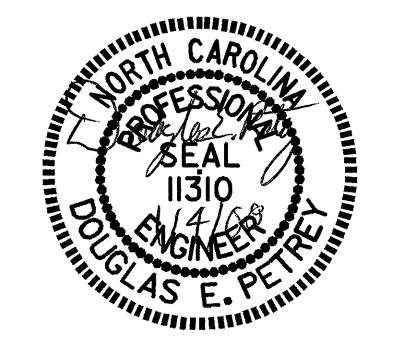
PLAN



ELEVATION

(FOR CLARITY, BRACE PILE CAPS AT WINGS NOT SHOWN)

▲ FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEATS, SEE "SECTION A-A", SHEET 3 OF 3.  
★ THIS ELEVATION TAKEN ON FILL FACE OF BACKWALL.



PROJECT NO. B-4317  
WATAUGA COUNTY  
STATION: 15+11.00 -L-

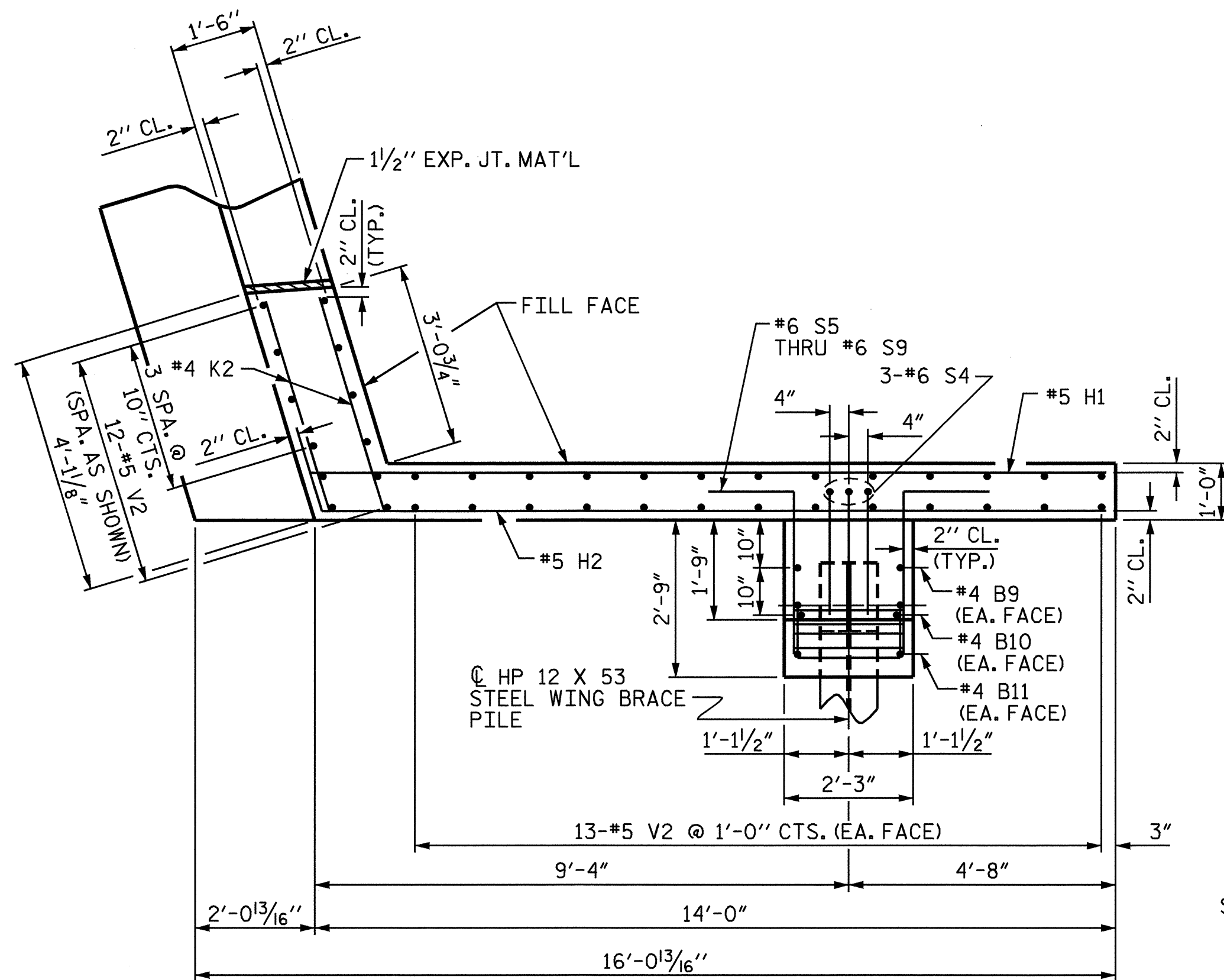
SHEET 1 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

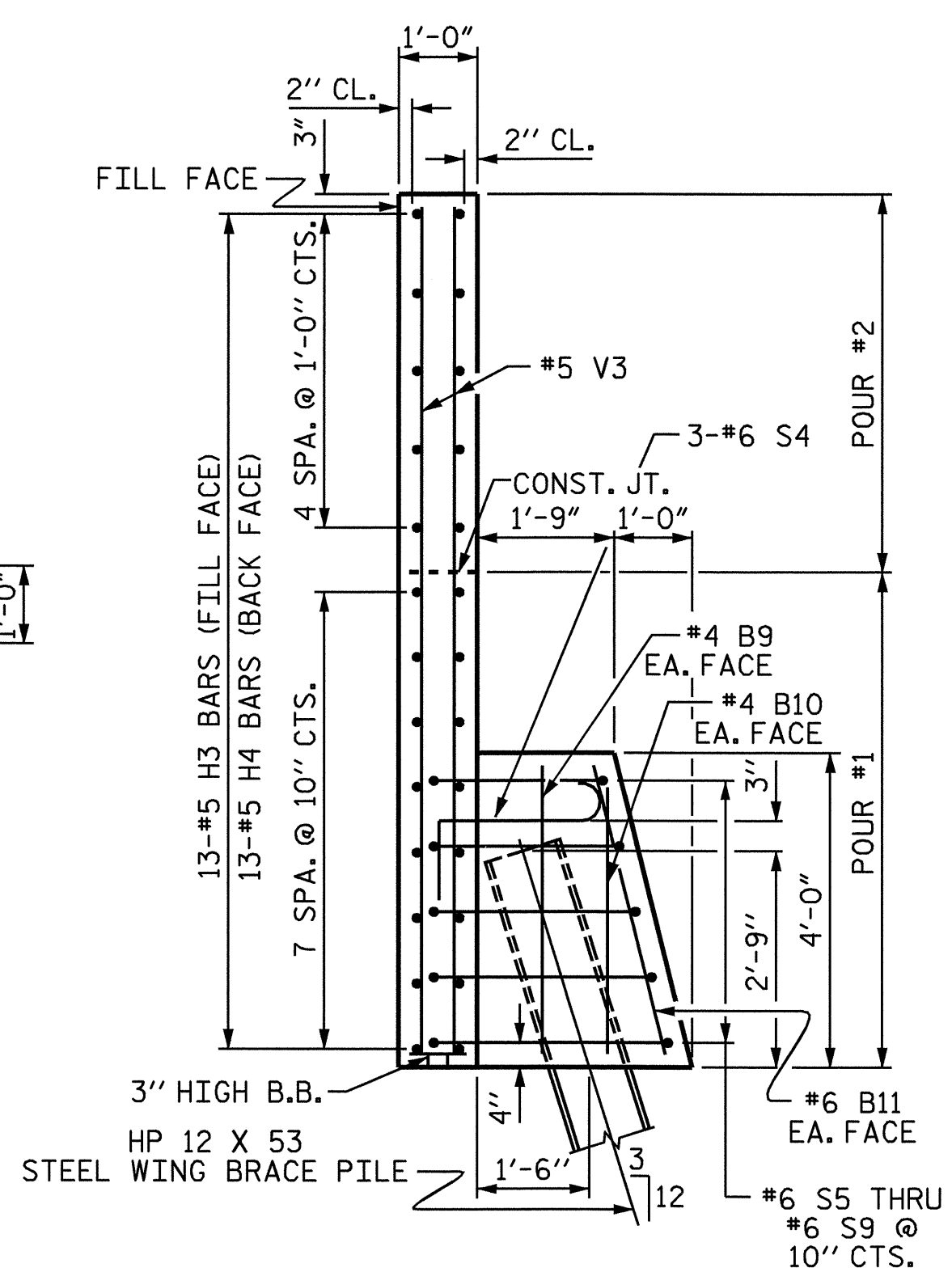
SUBSTRUCTURE  
END BENT No. 1

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14	
1			3			TOTAL SHEETS	
2			4			24	

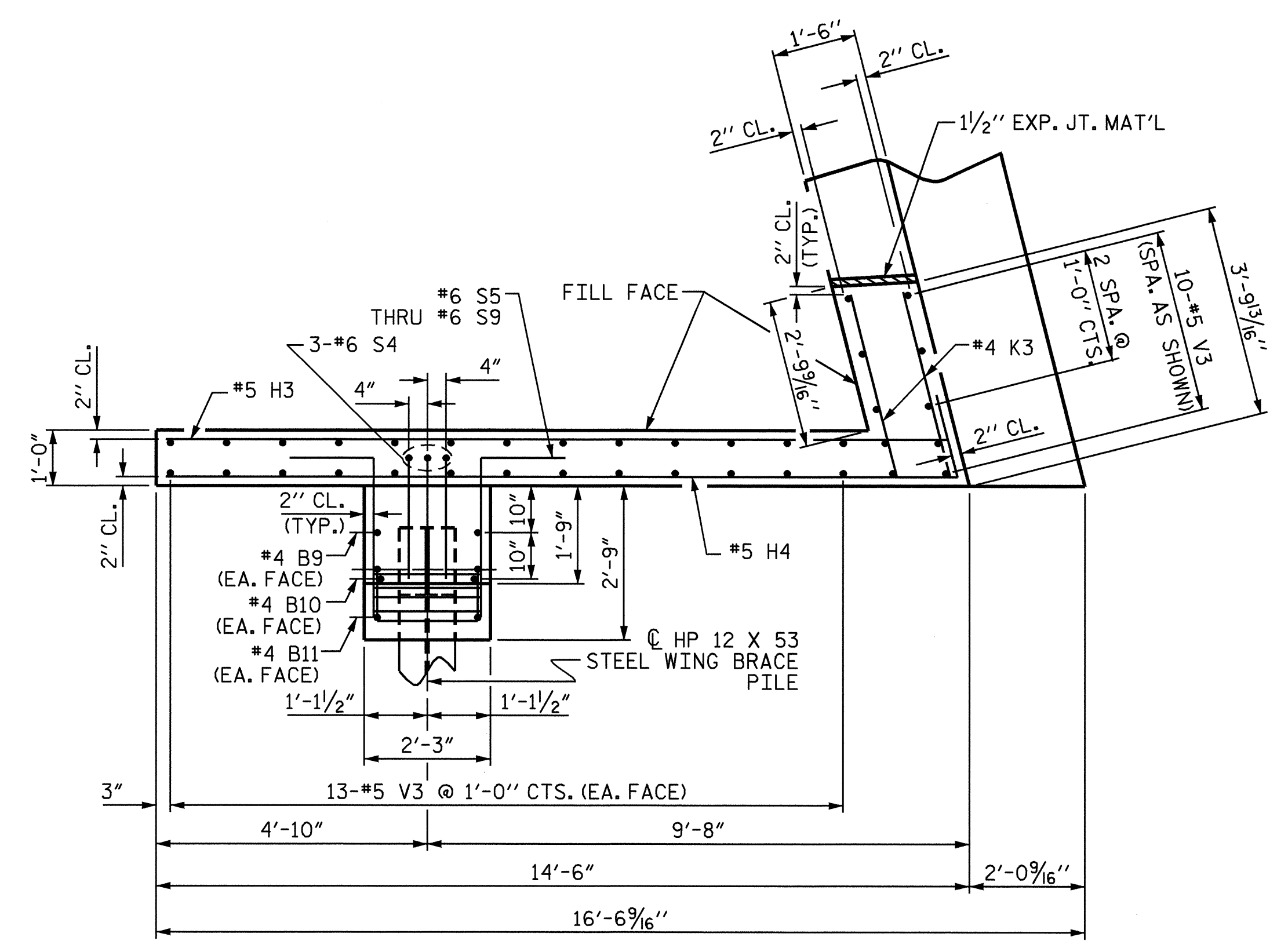
DRAWN BY : B. L. GREEN DATE : 10/22/07  
CHECKED BY : J. M. BRITT DATE : 10/24/07



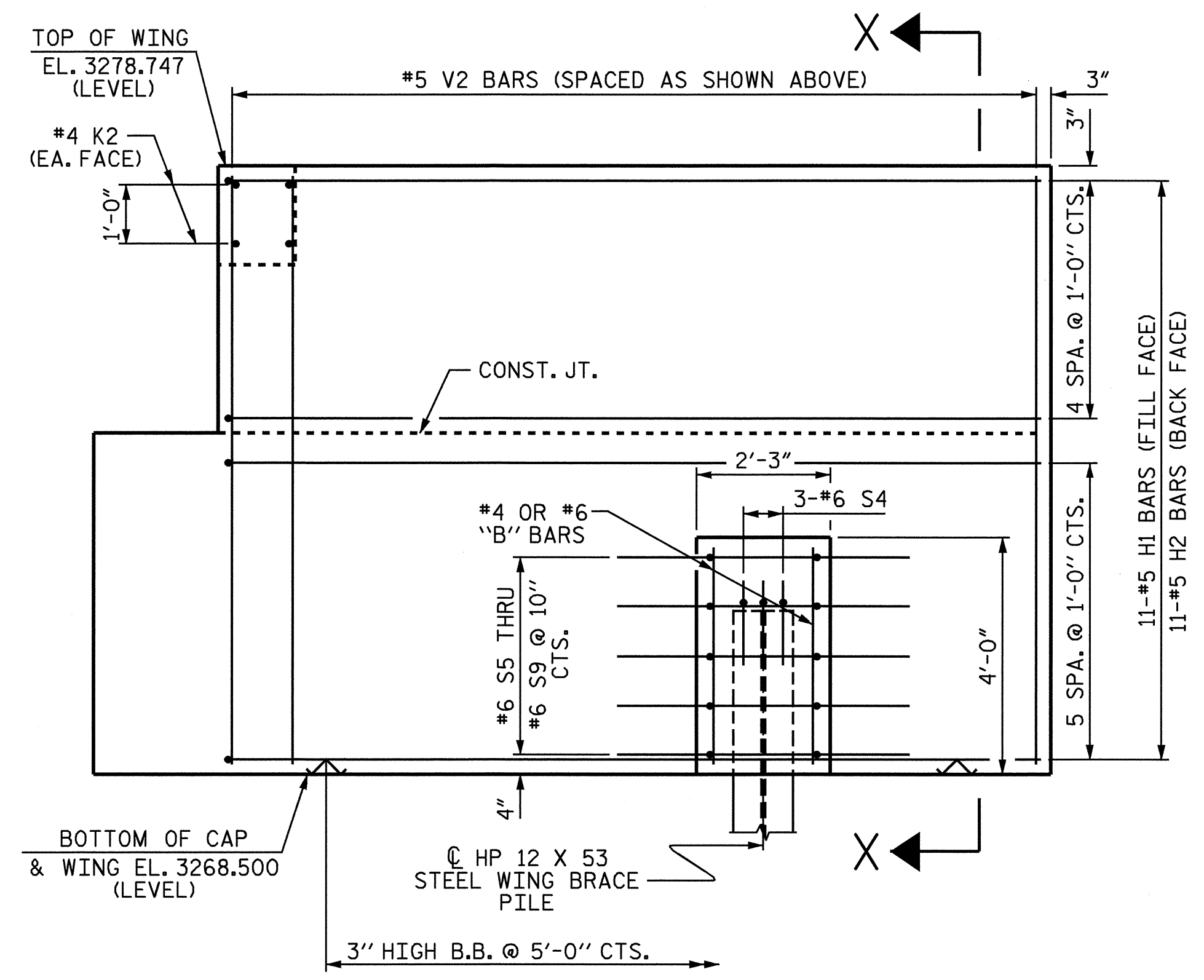
PLAN OF WING W1



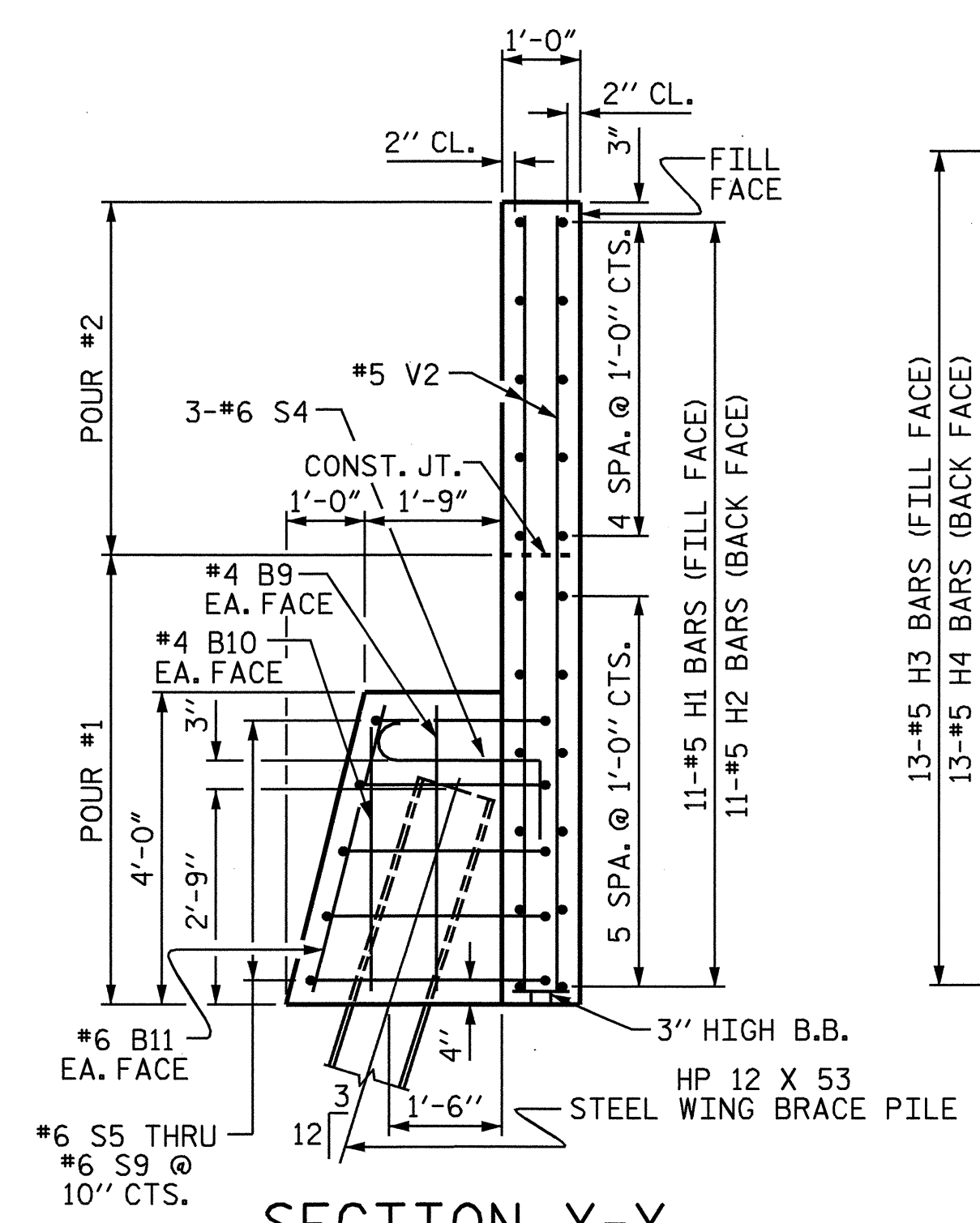
SECTION Y-Y



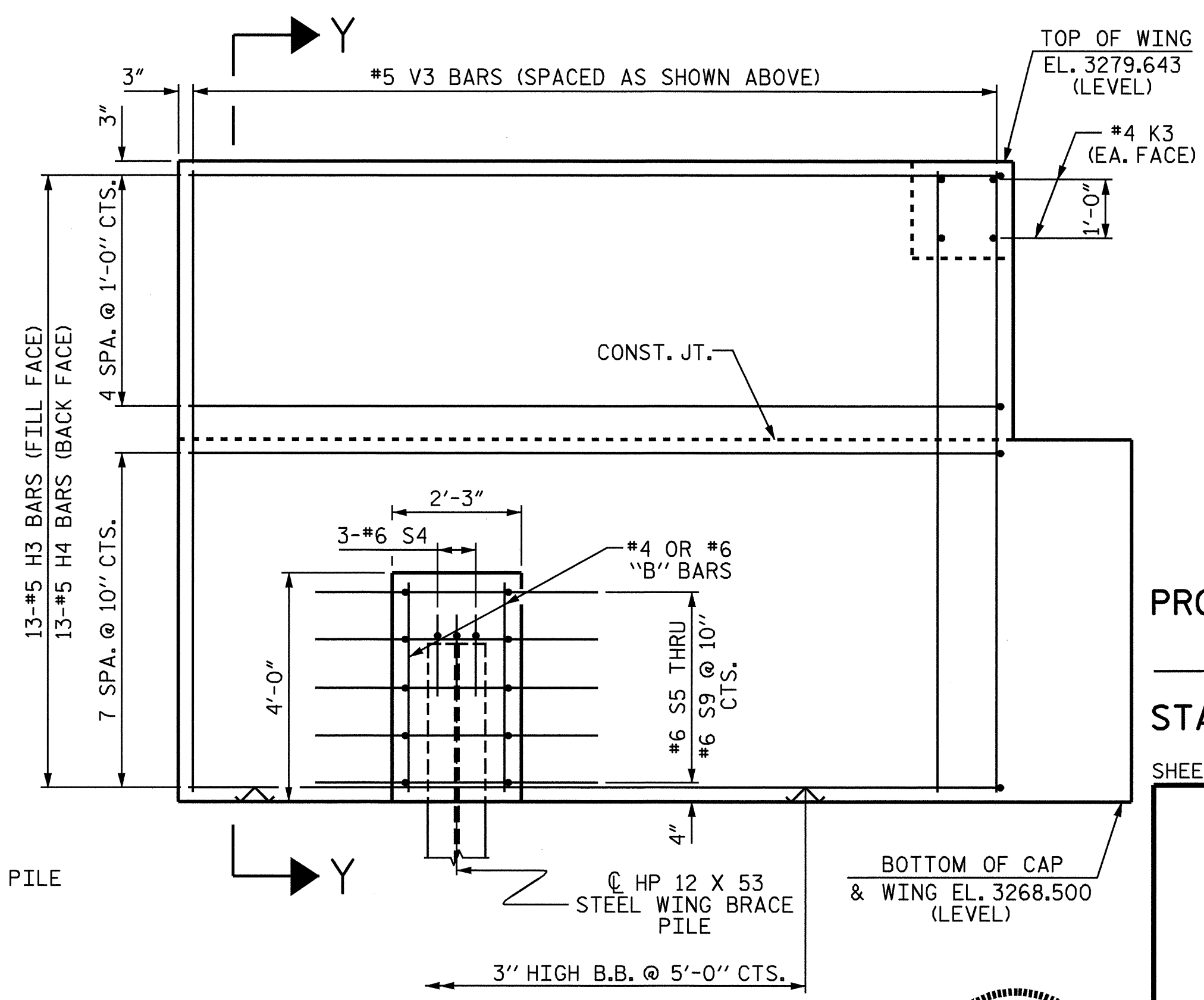
PLAN OF WING W2



ELEVATION OF WING W1



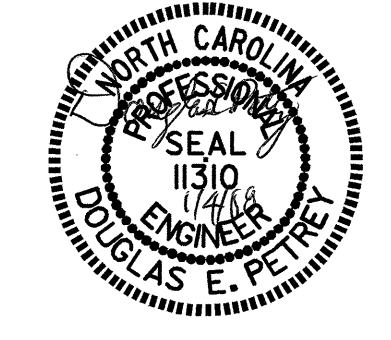
SECTION X-X



ELEVATION OF WING W2

PROJECT NO. B-4317  
 WATAUGA COUNTY  
 STATION: 15+11.00 -L-

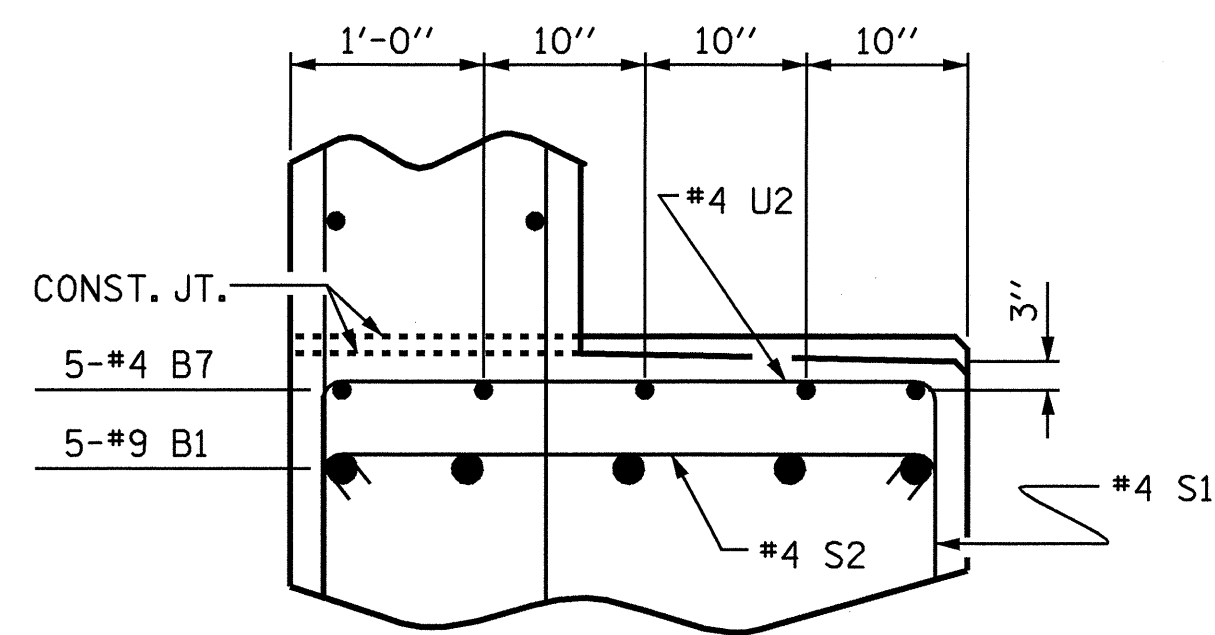
SHEET 2 OF 3  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 1



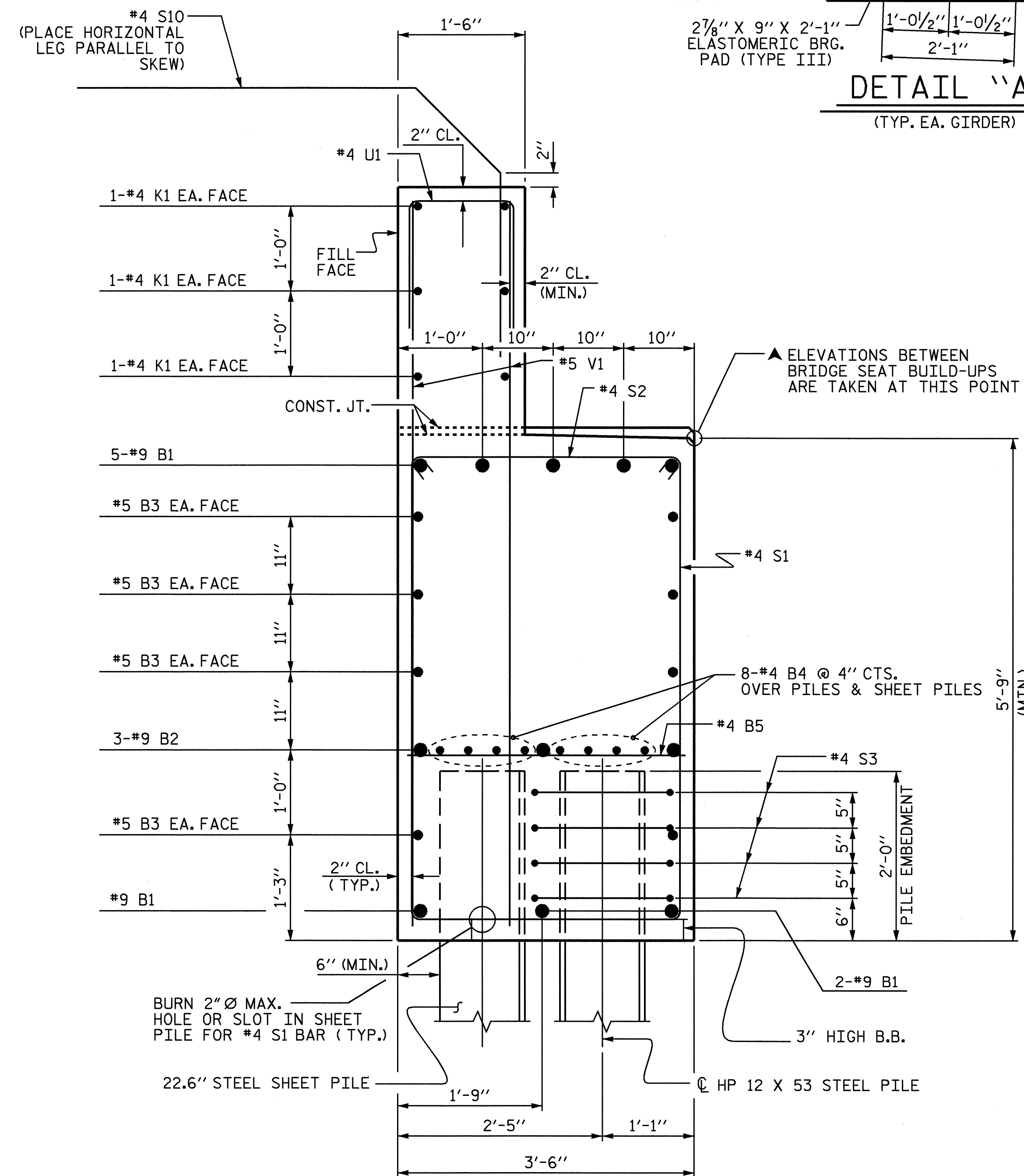
DRAWN BY: B. L. GREEN DATE: 10/22/07  
 CHECKED BY: J. M. BRITT DATE: 10/26/07

REVISIONS						SHEET NO.	
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2			4				

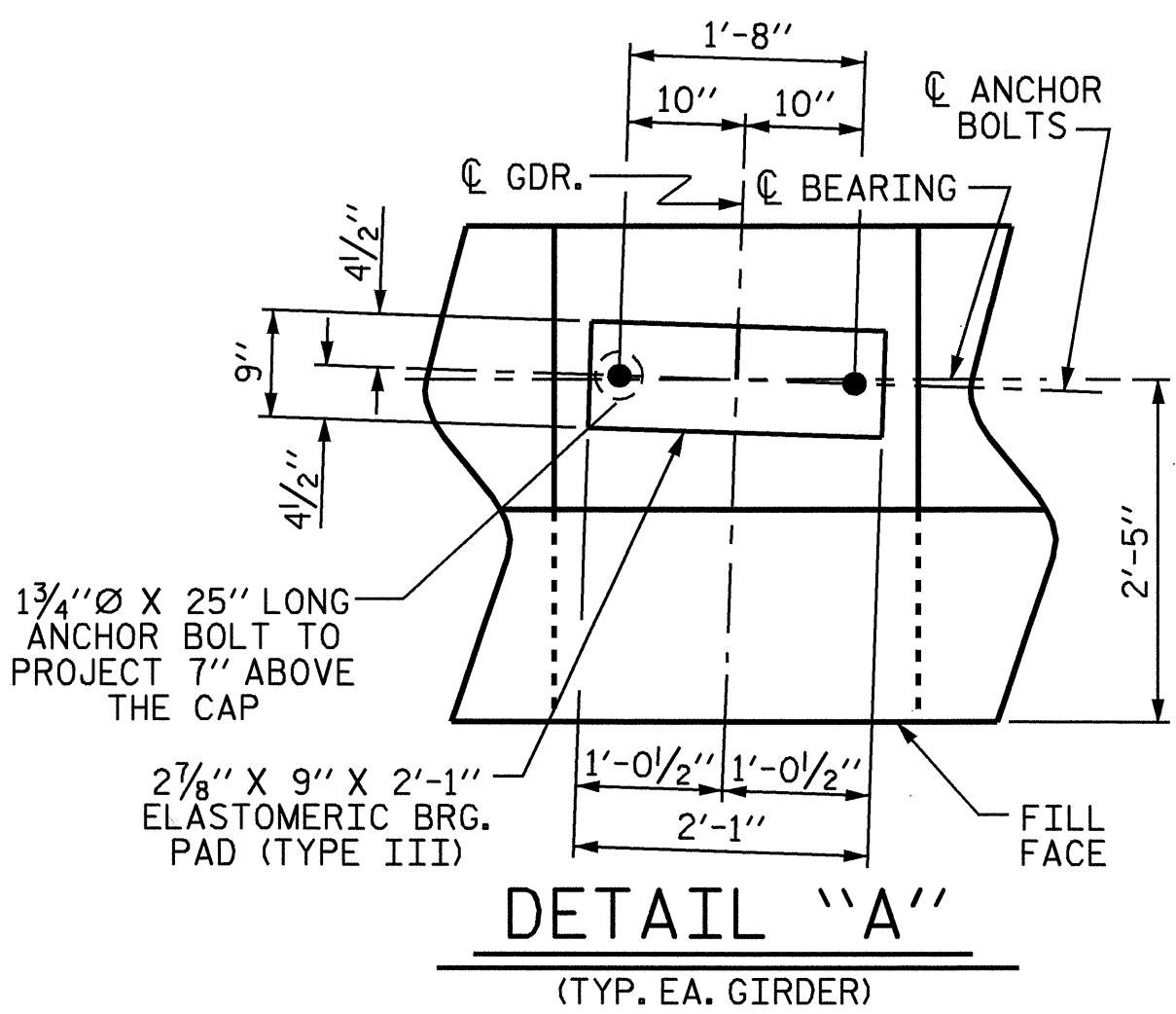




PARTIAL SECTION B-B



SECTION A-A



**NOTES:**

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

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

THE #5 V1 IN THE BACKWALL SHALL BE PLACED 2" CLEAR FROM THE TOP OF THE BACKWALL.

STEEL SHEET PILES SHALL BE DRIVEN A MINIMUM OF 6" CLEAR FROM FILL FACE AND EMBEDDED A MINIMUM OF 2'-0" INTO END BENT CAP.

THE STEEL SHEET PILES SHALL BE HOT ROLLED, HAVE A MINIMUM THICKNESS OF 0.50 INCHES AND A MINIMUM SECTION MODULUS OF 48.5 CUBIC INCHES PER LINEAR FOOT OF WALL.

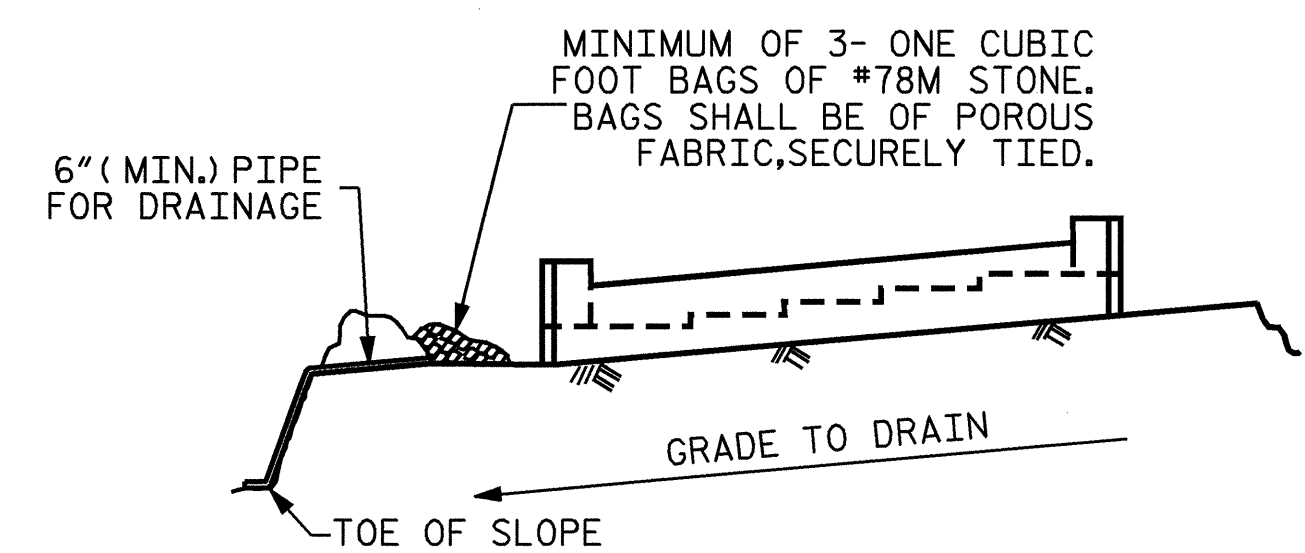
INSTALL SHEET PILES TO REFUSAL ELEVATION.

DRIVE HP 12 X 53 STEEL PILES PRIOR TO INSTALLING SHEET PILES.

FOR STEEL SHEET PILES, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL. SEE APPROACH SLAB SHEET. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

FOR PILE SPlice DETAILS SEE END BENT 2 SHEET 3 OF 3.

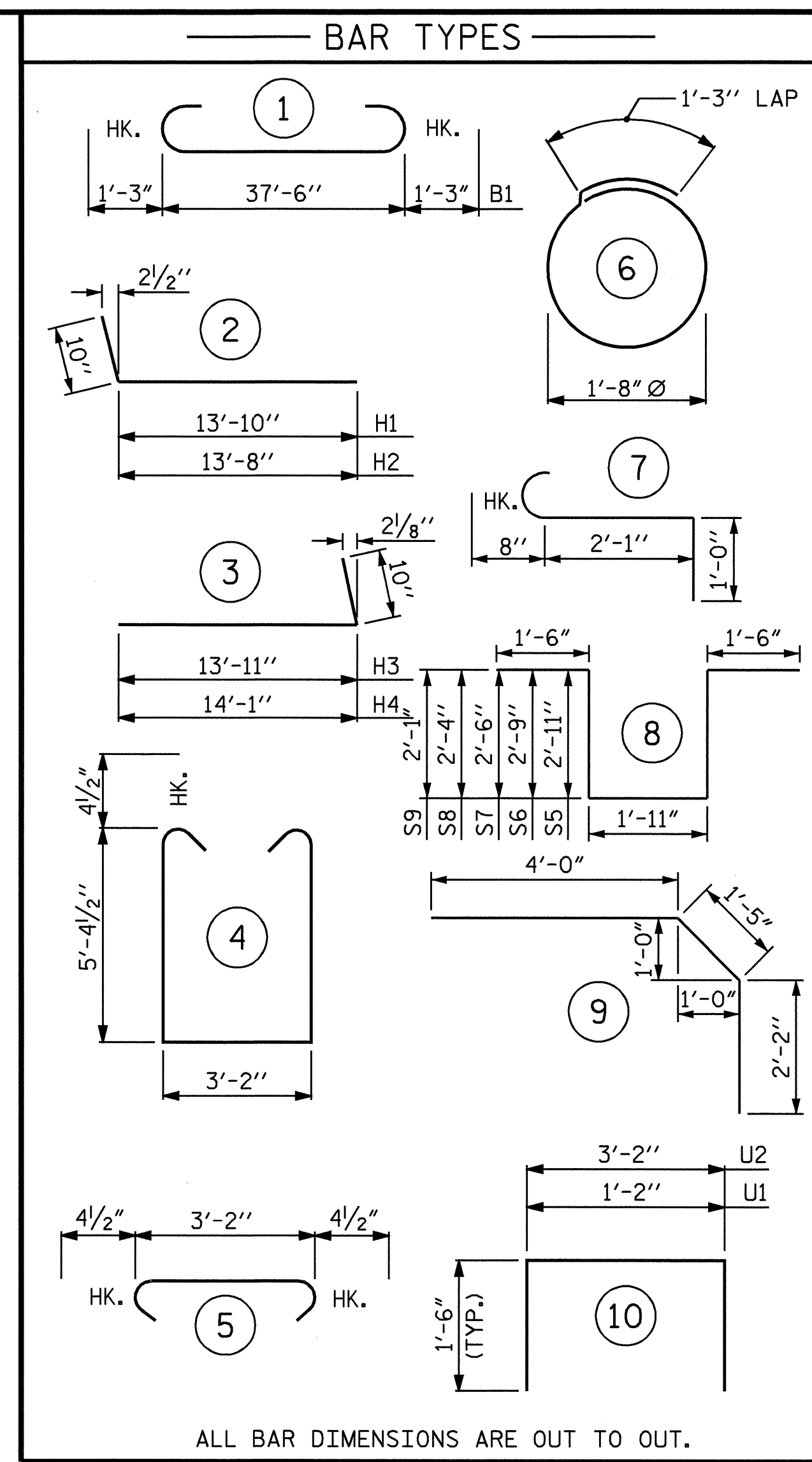


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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



BILL OF MATERIAL					
END BENT No. 1					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	8	9	1	40'-0"	1088
B2	3	9	STR	37'-8"	384
B3	8	5	STR	37'-8"	314
B4	16	4	STR	20'-1"	215
B5	10	4	STR	3'-2"	21
B6	5	4	STR	8'-6"	28
B7	5	4	STR	13'-8"	46
B8	5	4	STR	2'-4"	8
B9	4	4	STR	3'-8"	10
B10	4	4	STR	3'-5"	9
B11	4	6	STR	3'-9"	23
H1	11	5	2	14'-8"	168
H2	11	5	2	14'-6"	166
H3	13	5	3	14'-9"	200
H4	13	5	3	14'-11"	202
K1	12	4	STR	20'-1"	161
K2	4	4	STR	3'-9"	10
K3	4	4	STR	3'-4"	9
S1	38	4	4	14'-8"	372
S2	38	4	5	3'-11"	99
S3	28	4	6	6'-6"	122
S4	6	6	7	3'-9"	34
S5	2	6	8	10'-9"	32
S6	2	6	8	10'-5"	31
S7	2	6	8	9'-11"	30
S8	2	6	8	9'-7"	29
S9	2	6	8	9'-1"	27
*S10	30	4	9	7'-7"	152
U1	30	4	10	4'-2"	84
U2	19	4	10	6'-2"	78
V1	60	5	STR	8'-3"	516
V2	38	5	STR	9'-11"	393
V3	36	5	STR	10'-9"	404

* EPOXY COATED REINFORCING STEEL	LBS.	152
REINFORCING STEEL	LBS.	5,313
CLASS A CONCRETE BREAKDOWN:		
POUR #1 - CAP, LOWER WING, & WING BRACE PILE CAPS	C.Y.	37.2
POUR #2 - BACKWALL & UPPER WINGS	C.Y.	11.3
TOTAL	C.Y.	48.5
HP 12 X 53 STEEL PILES	NO. = 9	LIN. FEET = 120
22.6" STEEL SHEET PILES	NO. = 28	SQ. FEET = 545
PILE EXCAVATION IN SOIL	15	LIN. FT.
PILE EXCAVATION NOT IN SOIL	9	LIN. FT.

\* THESE BARS ARE EPOXY COATED

PROJECT NO. B-4317  
WATAUGA COUNTY  
 STATION: 15+11.00 -L-

SHEET 3 OF 3

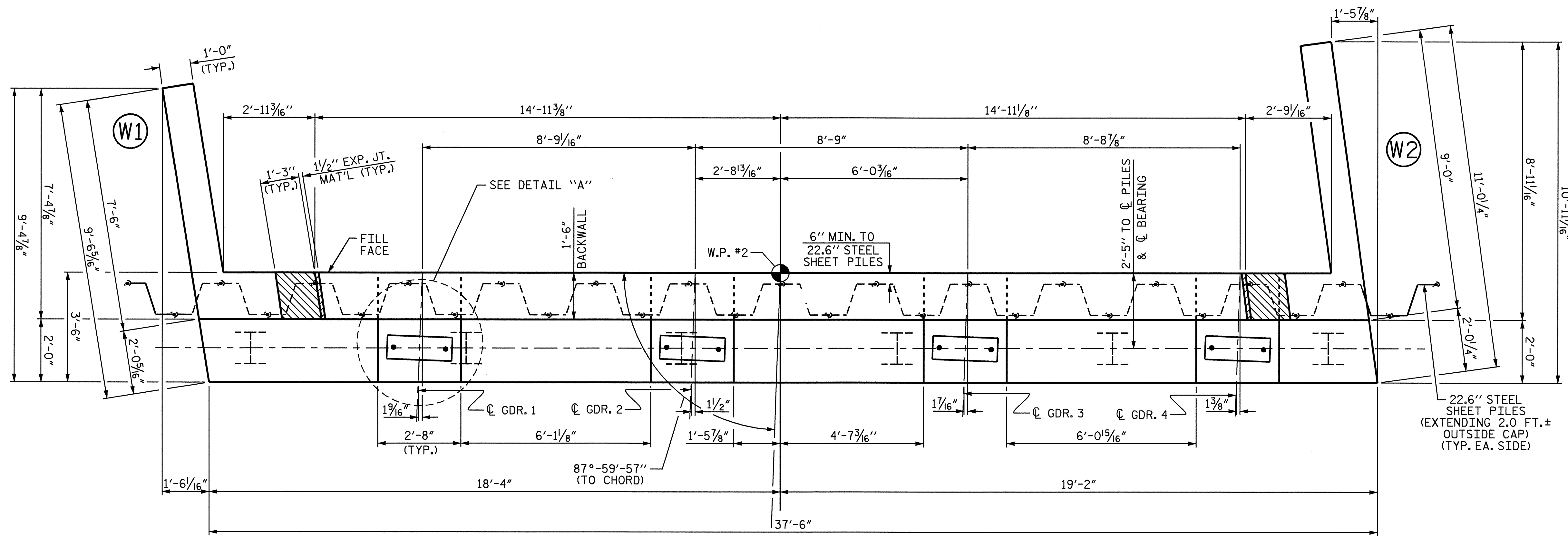
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1



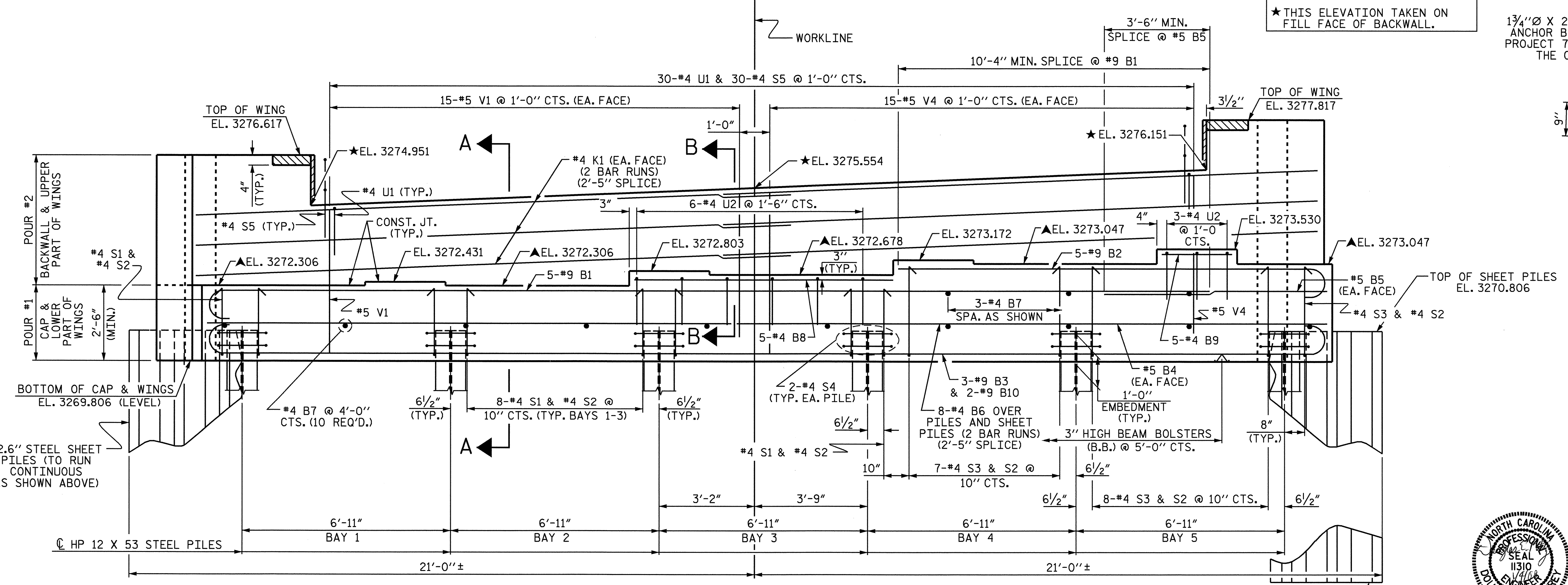
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : B. L. GREEN DATE : 10/22/07  
 CHECKED BY : J. M. BRITT DATE : 10/26/07

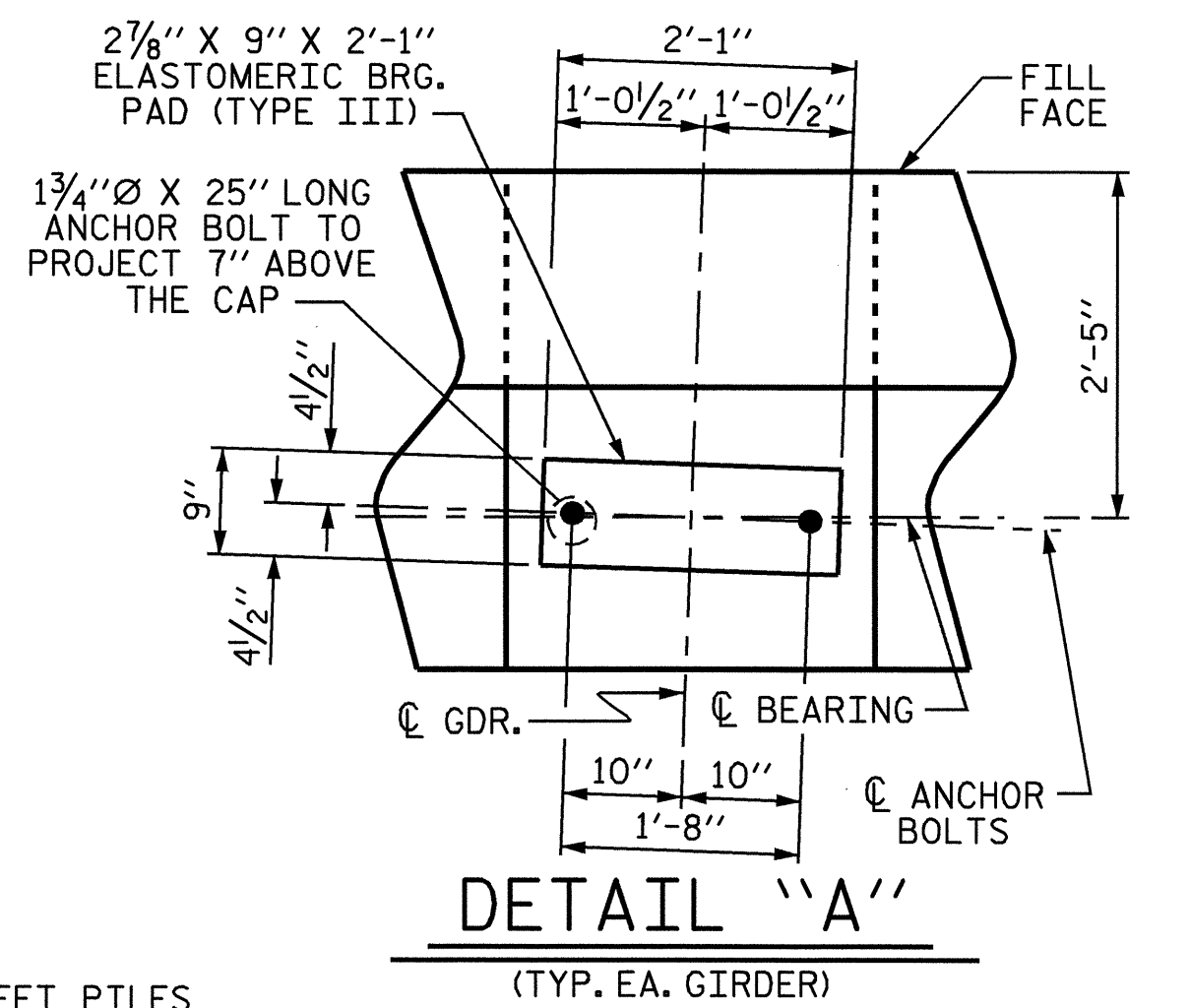


PLAN

▲ FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEATS, SEE SECTION A-A SHEET 3 OF 3.  
 ★ THIS ELEVATION TAKEN ON FILL FACE OF BACKWALL.



ELEVATION



DETAIL "A"

PROJECT NO. B-4317  
 WATAUGA COUNTY  
 STATION: 15+11.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

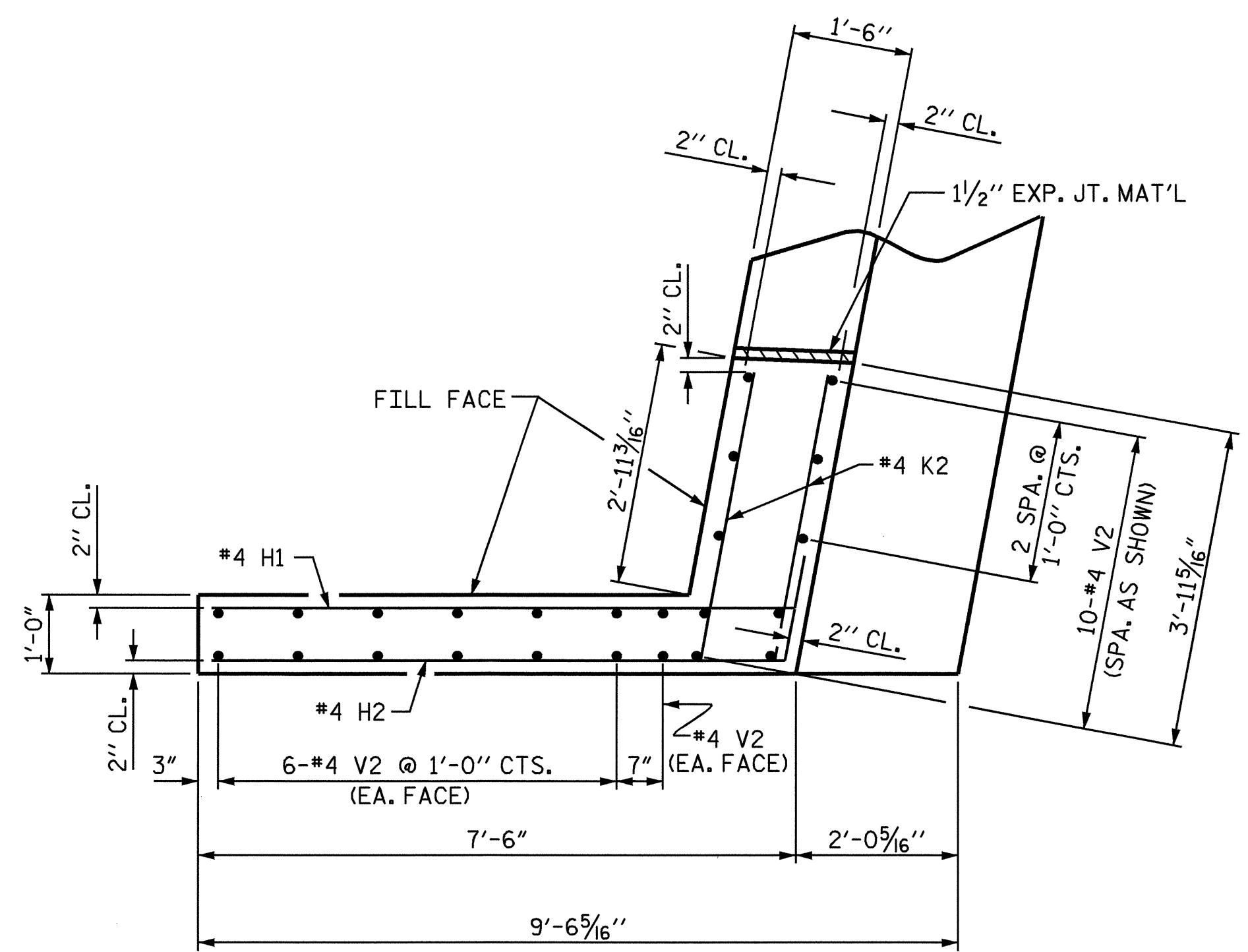
SUBSTRUCTURE  
 END BENT No. 2

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17	
1			3			TOTAL SHEETS 24	
2			4				

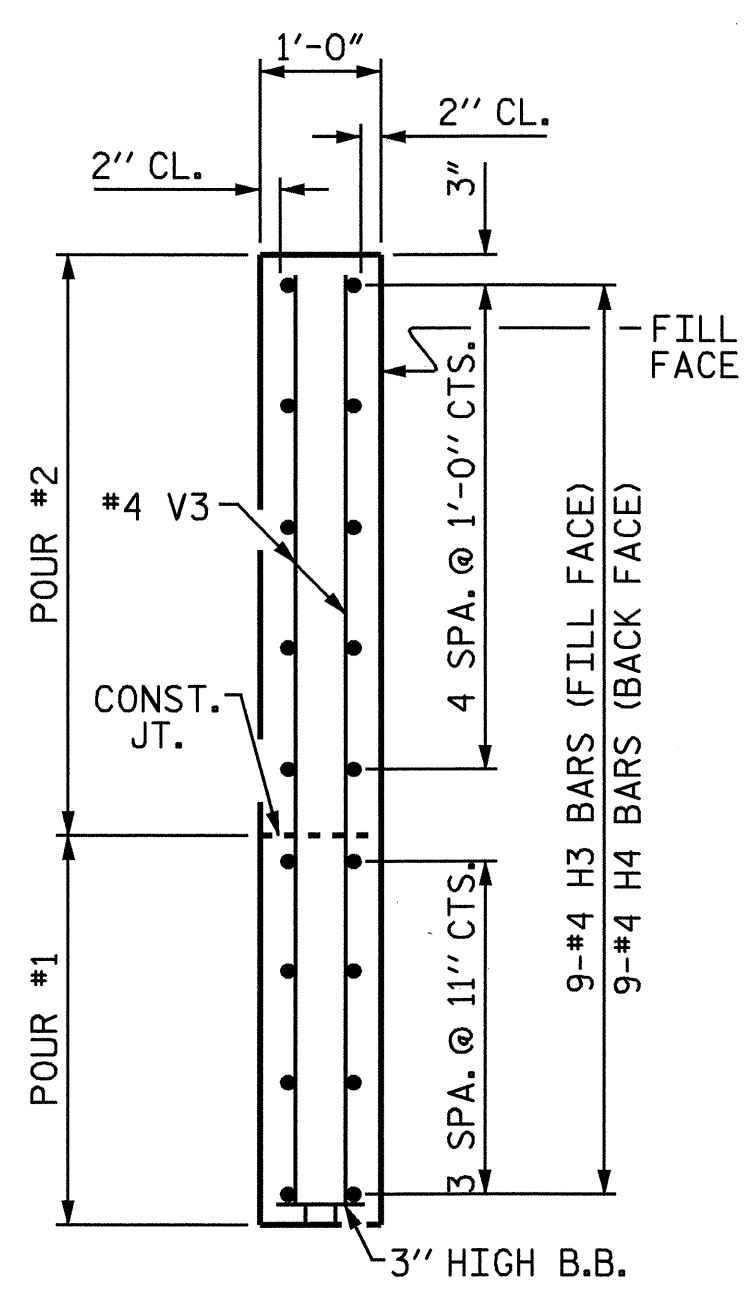
DRAWN BY : B. L. GREEN DATE : 10/22/07  
 CHECKED BY : J. M. BRITT DATE : 10/31/07

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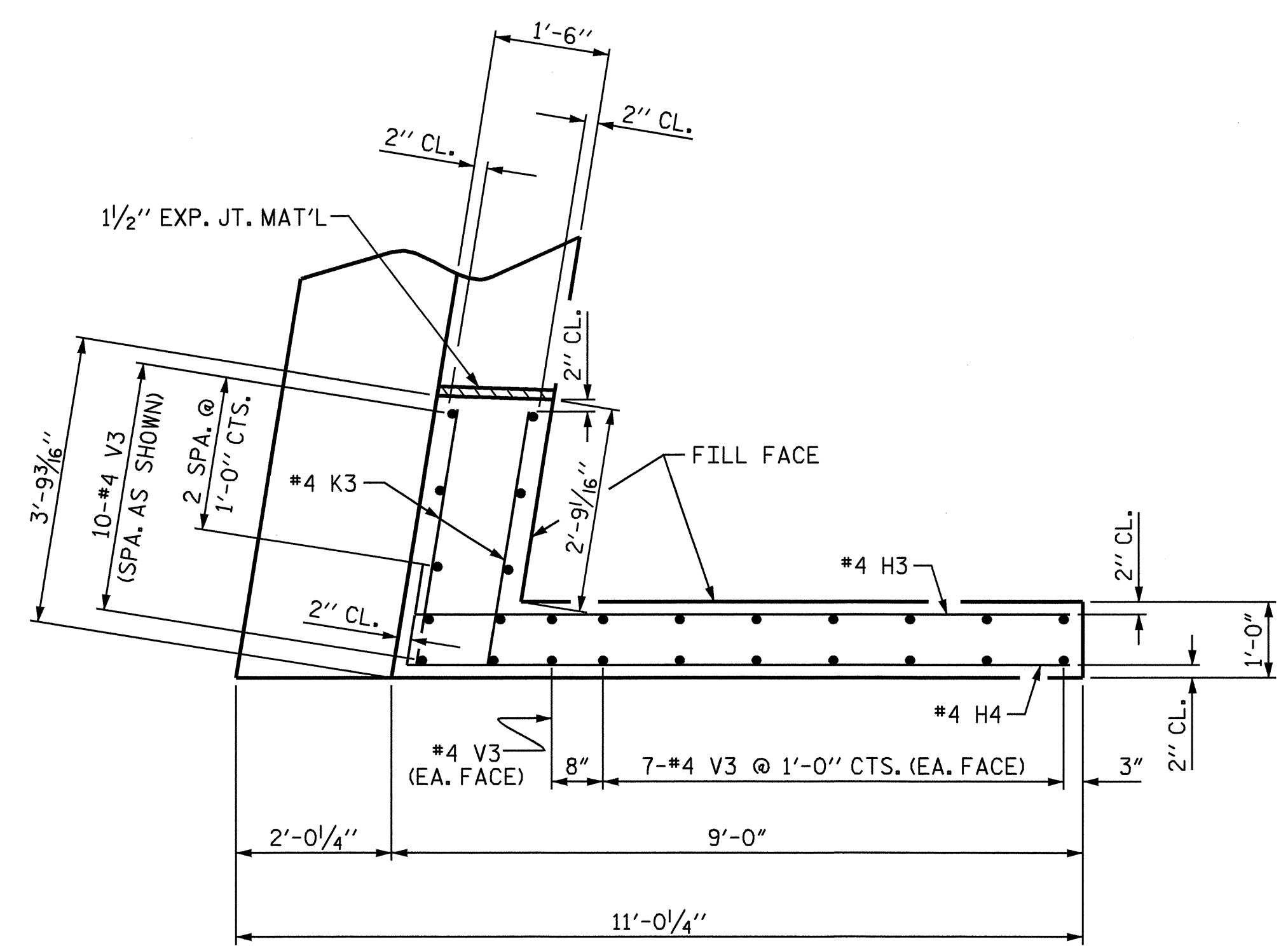




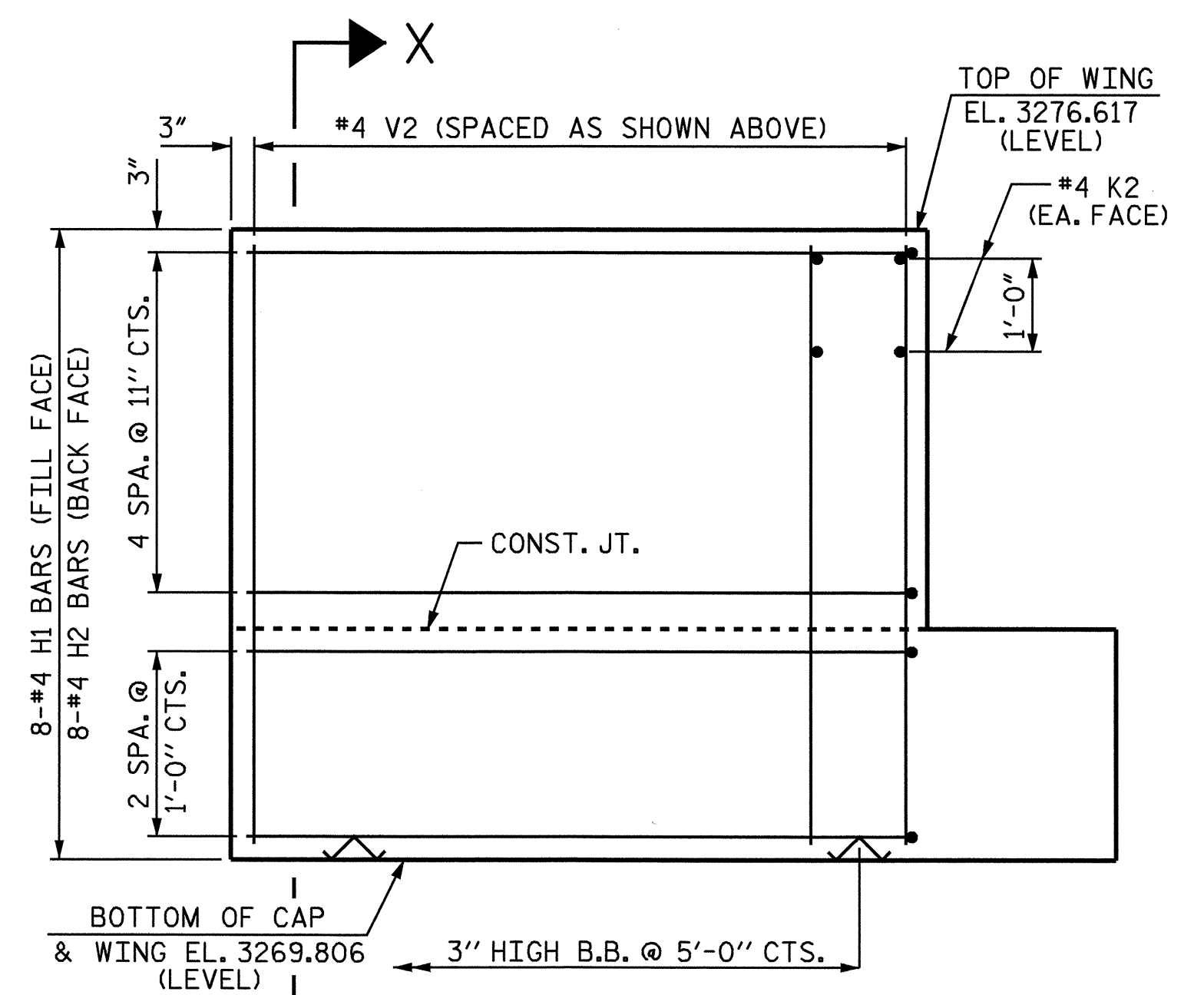
PLAN OF WING (W1)



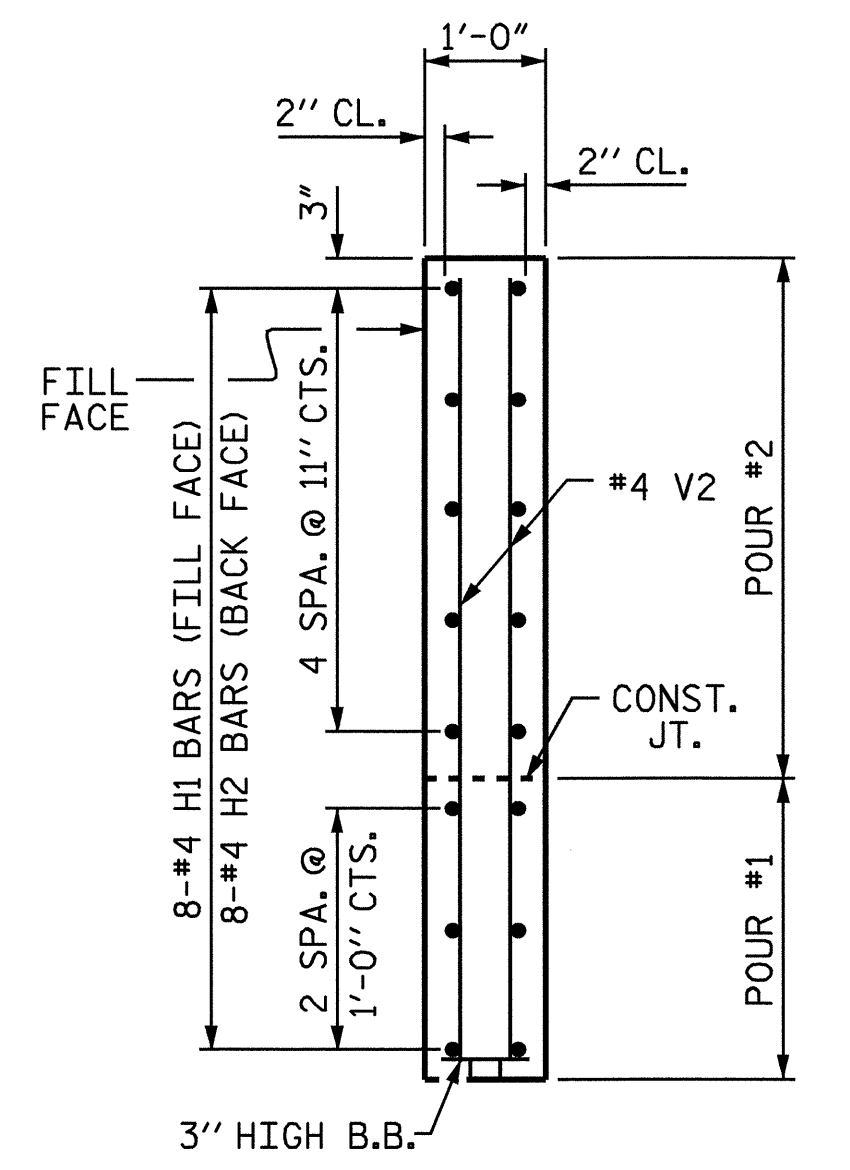
SECTION Y-Y



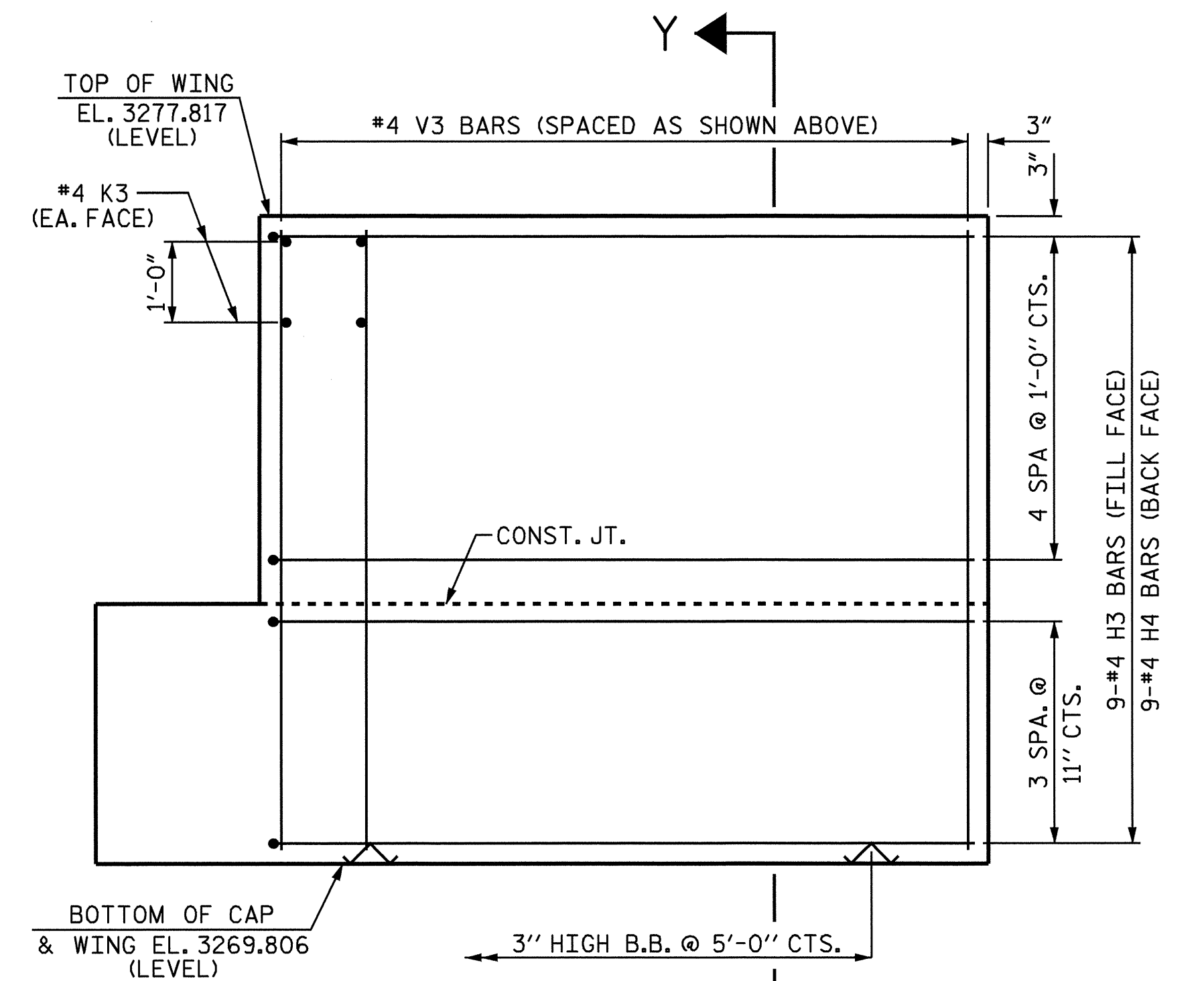
PLAN OF WING (W2)



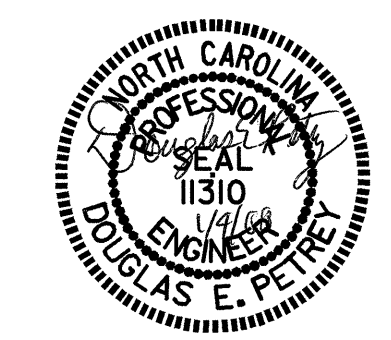
ELEVATION OF WING (W1)



SECTION X-X



ELEVATION OF WING (W2)

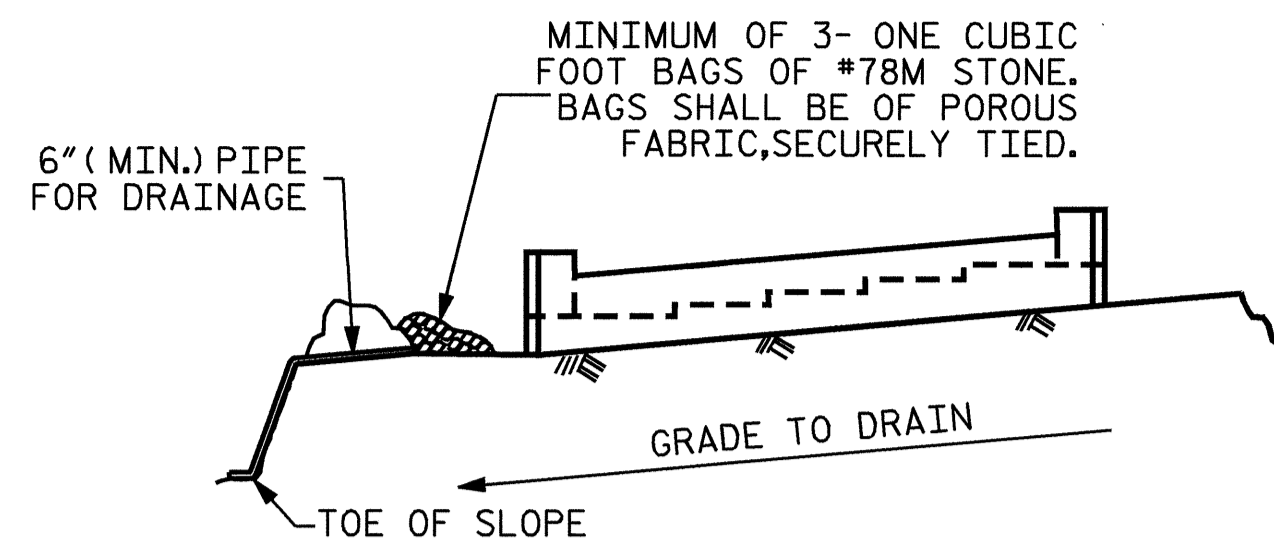


PROJECT NO. B-4317  
 WATAUGA COUNTY  
 STATION: 15+11.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT No. 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
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					TOTAL SHEETS 24

DRAWN BY : B. L. GREEN DATE : 10/22/07  
 CHECKED BY : J. M. BRITT DATE : 10/31/07

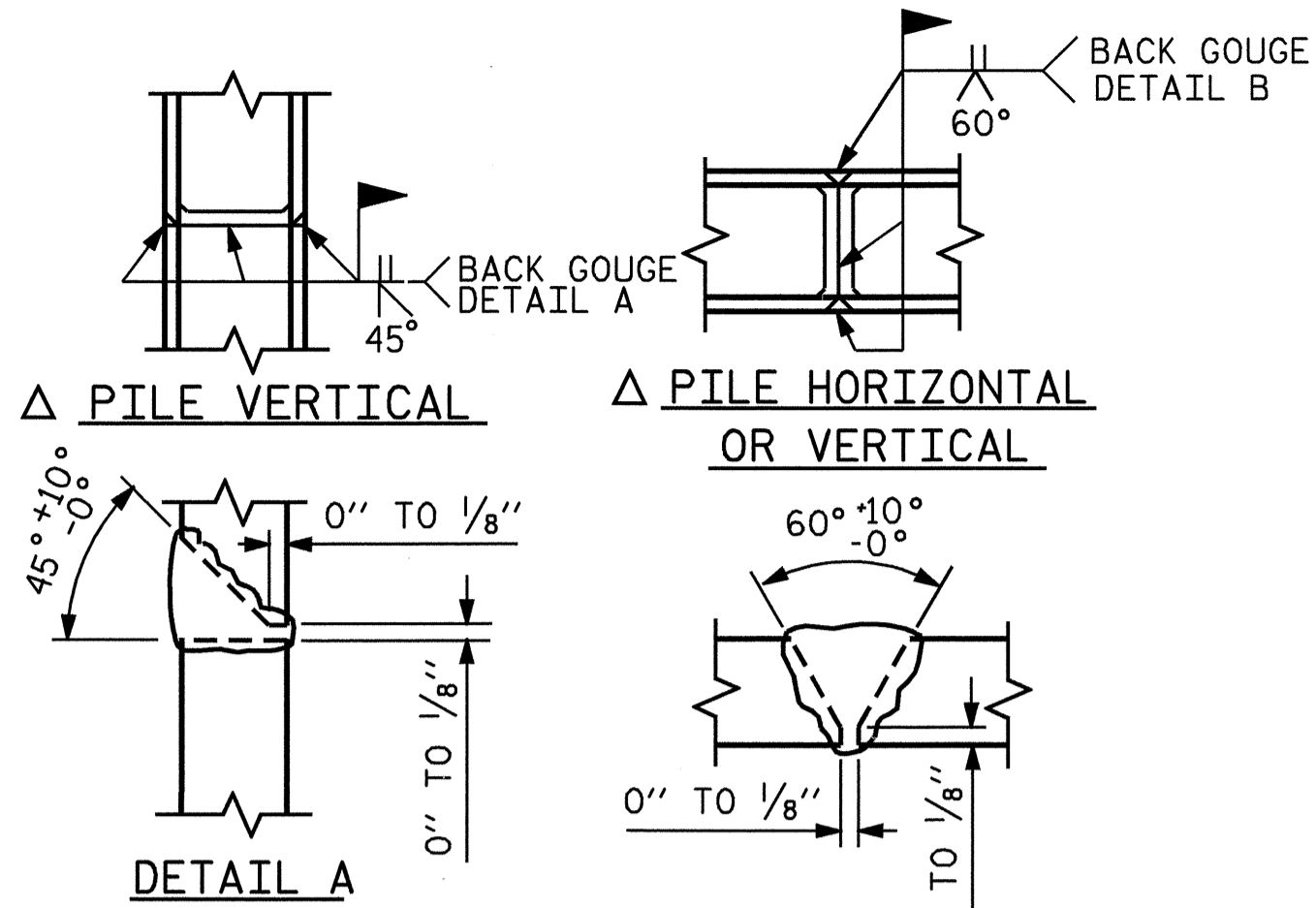


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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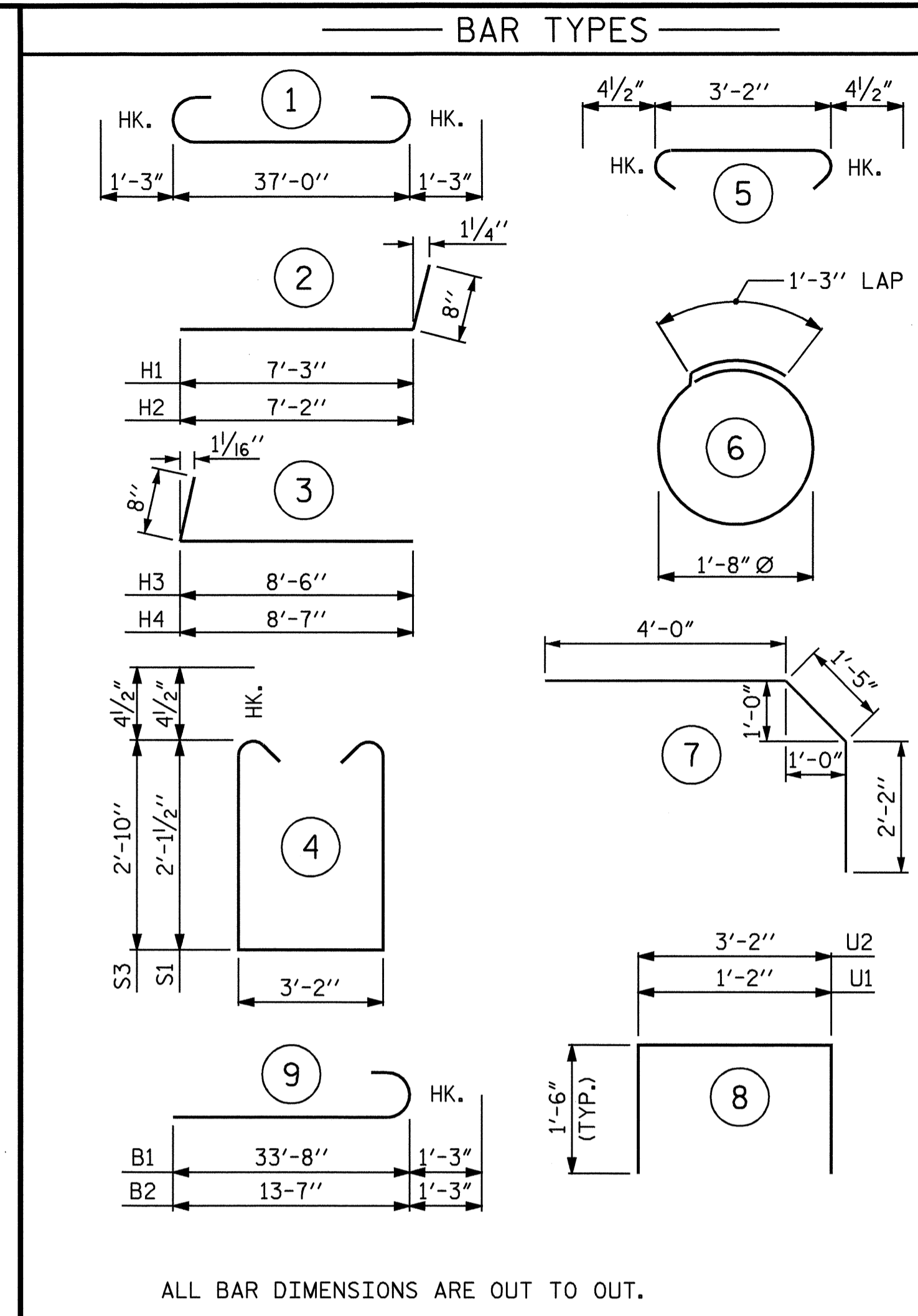
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

### PILE SPLICE DETAILS



### BILL OF MATERIAL

#### END BENT No. 2

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	5	9	9	34'-11"	594
B2	5	9	9	14'-10"	252
B3	3	9	1	39'-6"	403
B4	2	5	STR	37'-2"	78
B5	2	5	STR	6'-11"	14
B6	16	4	STR	19'-10"	212
B7	13	4	STR	3'-2"	27
B8	5	4	STR	8'-7"	29
B9	5	4	STR	2'-4"	8
B10	2	9	STR	37'-0"	252
H1	8	4	2	7'-11"	42
H2	8	4	2	7'-10"	42
H3	9	4	3	9'-2"	55
H4	9	4	3	9'-3"	56
K1	12	4	STR	19'-10"	159
K2	4	4	STR	3'-7"	10
K3	4	4	STR	3'-4"	9
S1	26	4	4	8'-2"	142
S2	42	4	5	3'-11"	110
S3	16	4	4	9'-7"	102
S4	12	4	6	6'-6"	52
*S5	30	4	7	7'-7"	152
U1	30	4	8	4'-2"	84
U2	9	4	8	6'-2"	37
V1	30	5	STR	4'-9"	149
V2	24	4	STR	6'-5"	103
V3	26	4	STR	7'-8"	133
V4	30	5	STR	5'-4"	167

\* EPOXY COATED REINFORCING STEEL LBS. 152

REINFORCING STEEL LBS. 3,321

CLASS A CONCRETE BREAKDOWN:

POUR #1 - CAP & LOWER WINGS C.Y. 15.7

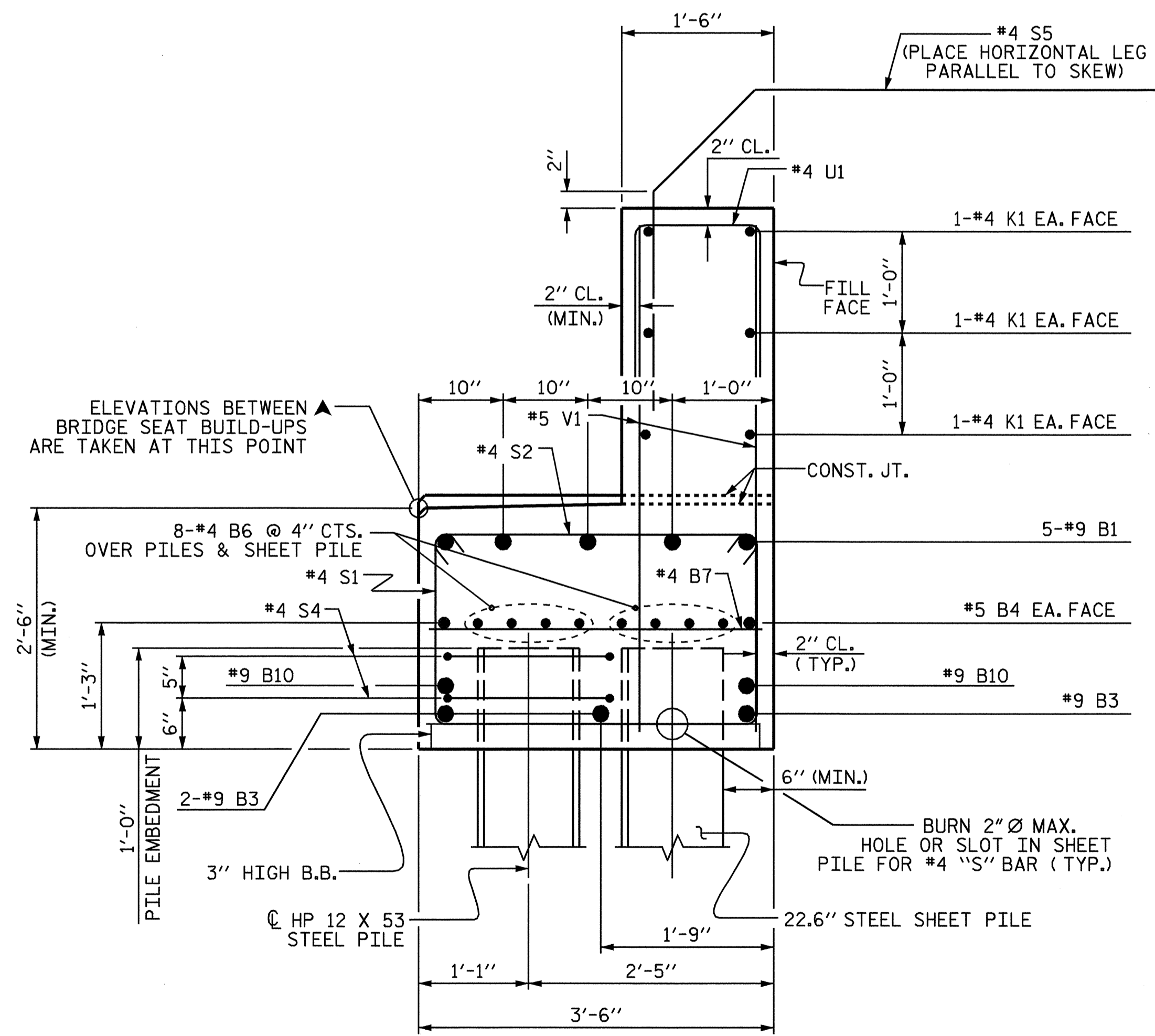
POUR #2 - BACKWALL & UPPER WINGS C.Y. 8.9

TOTAL C.Y. 24.6

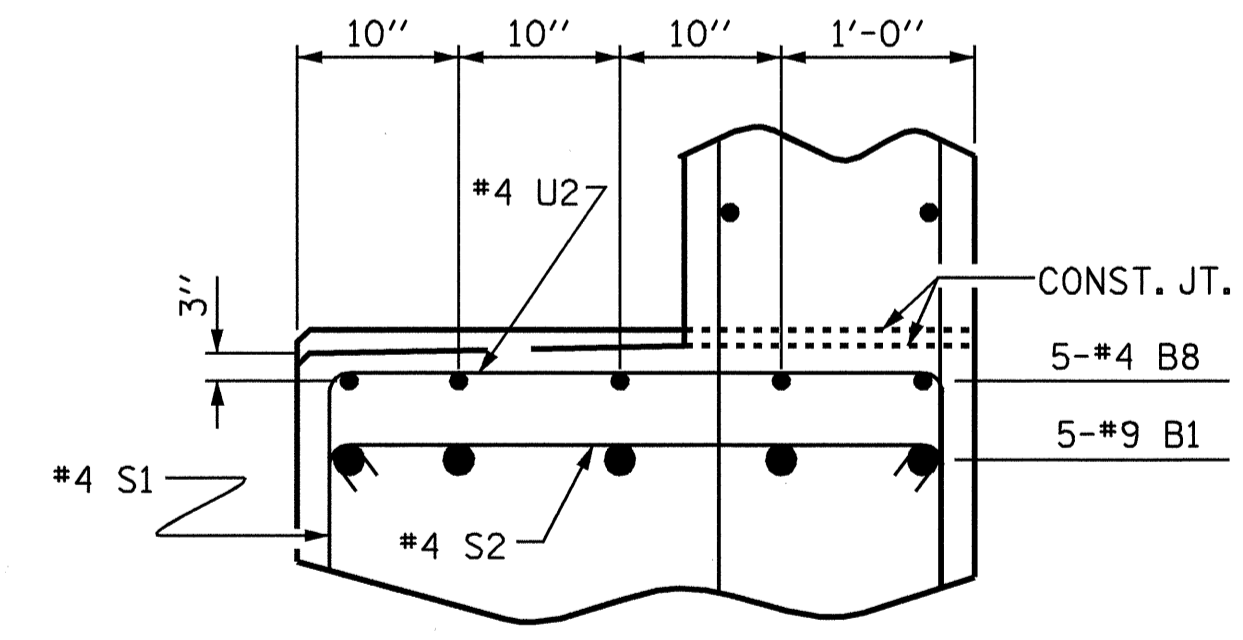
HP 12 X 53 STEEL PILES NO. = 6 LIN. FEET = 90

22.6" STEEL SHEET PILES NO. = 28 SQ. FEET = 615

\* THESE BARS ARE EPOXY COATED



### SECTION A-A



### PARTIAL SECTION B-B

PROJECT NO. B-4317

WATAUGA COUNTY

STATION: 15+11.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT No. 2

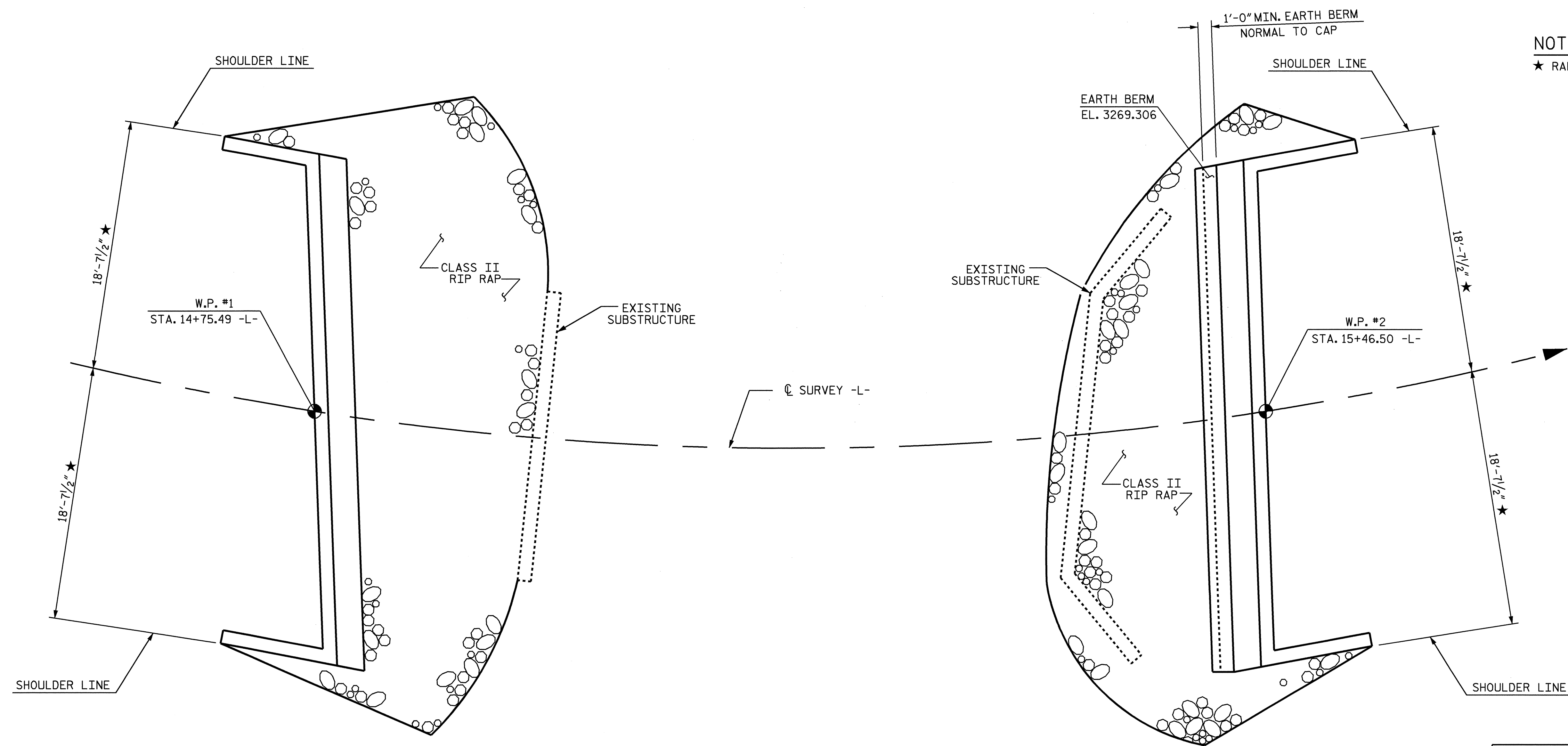


DRAWN BY : B. L. GREEN DATE : 10/22/07  
CHECKED BY : J. M. BRITT DATE : 10/31/07

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS 24
2			4			

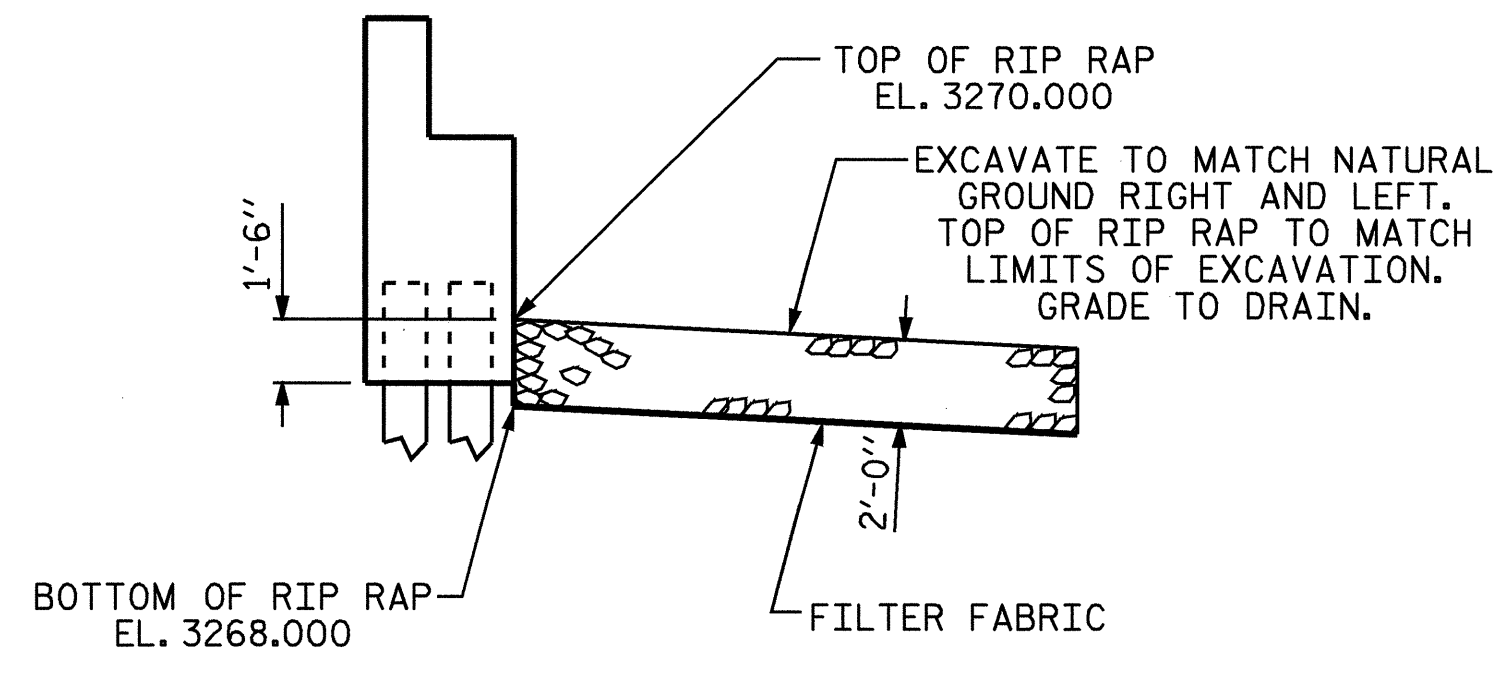
NOTES :  
 ★ RADIAL DIMENSIONS THROUGH WORK POINTS.



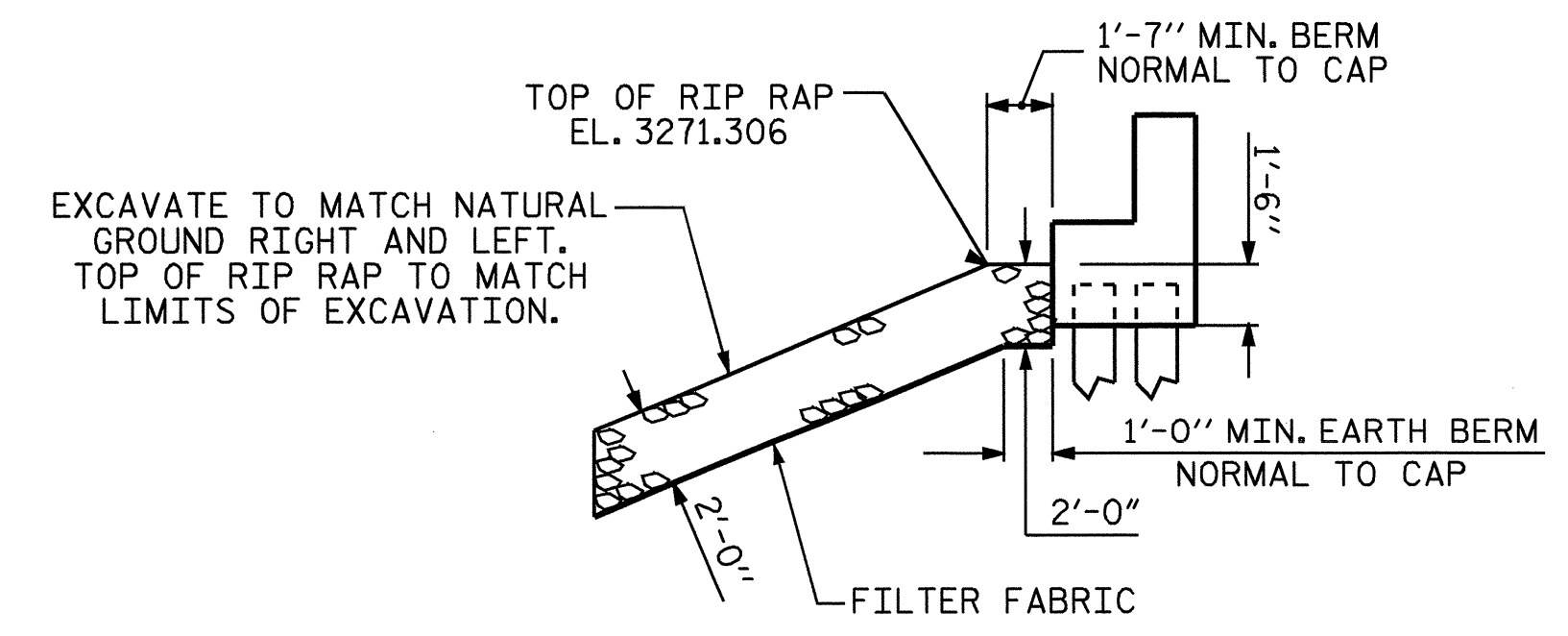
PLAN @ END BENT No. 1

PLAN @ END BENT No. 2

ESTIMATED QUANTITIES		
BRIDGE @ STA. 15+11.00 -L-	RIP RAP CLASS II	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	62	69
END BENT 2	42	47



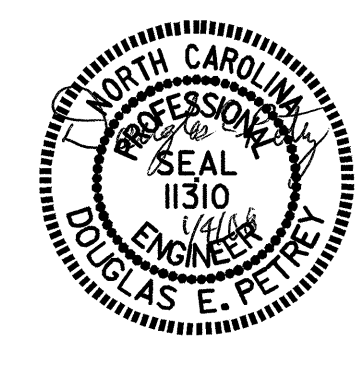
SECTION @ END BENT No. 1



SECTION @ END BENT No. 2

PROJECT NO. B-4317  
WATAUGA COUNTY  
 STATION: 15+11.00 -L-

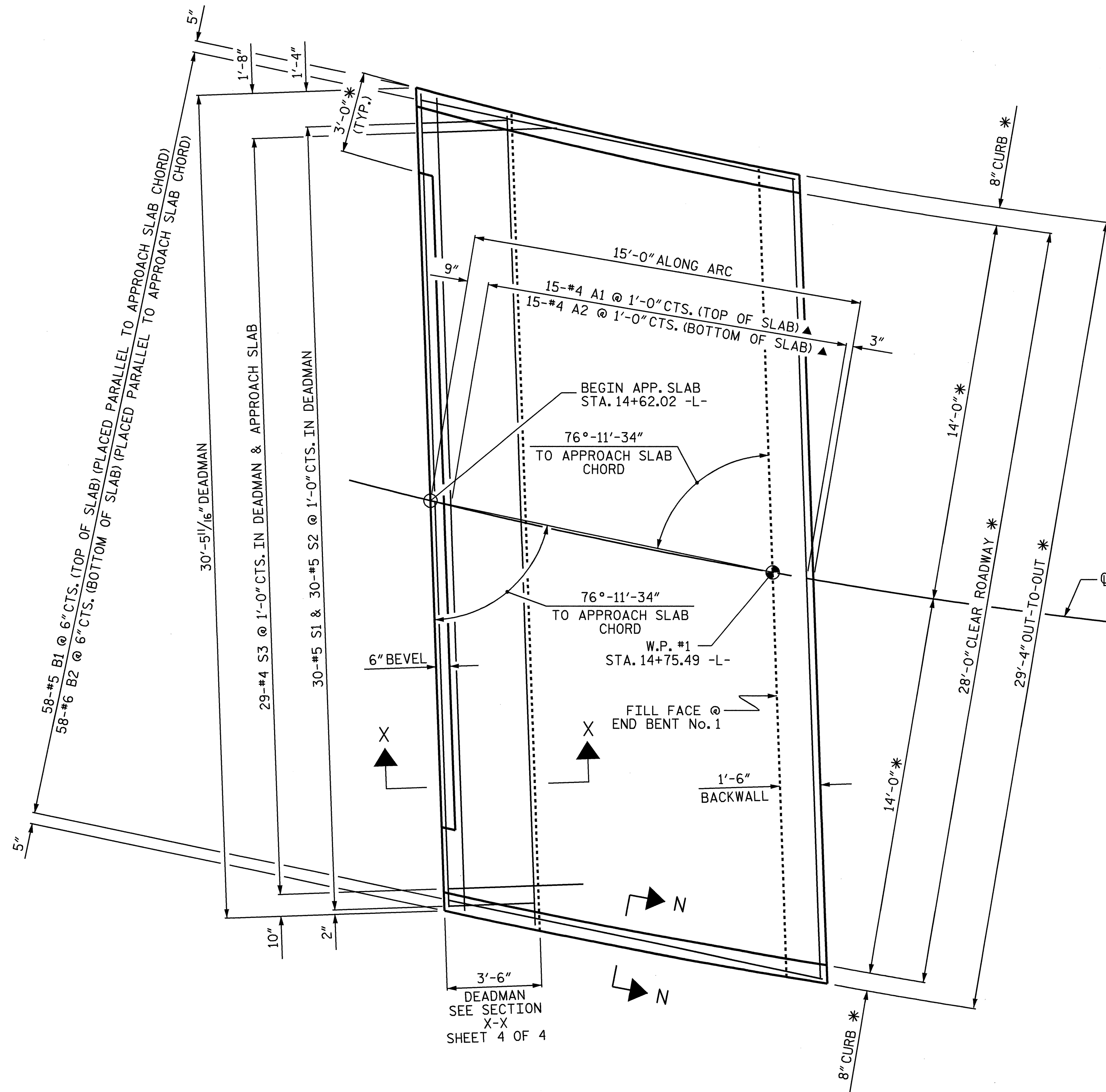
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 RIP RAP DETAILS



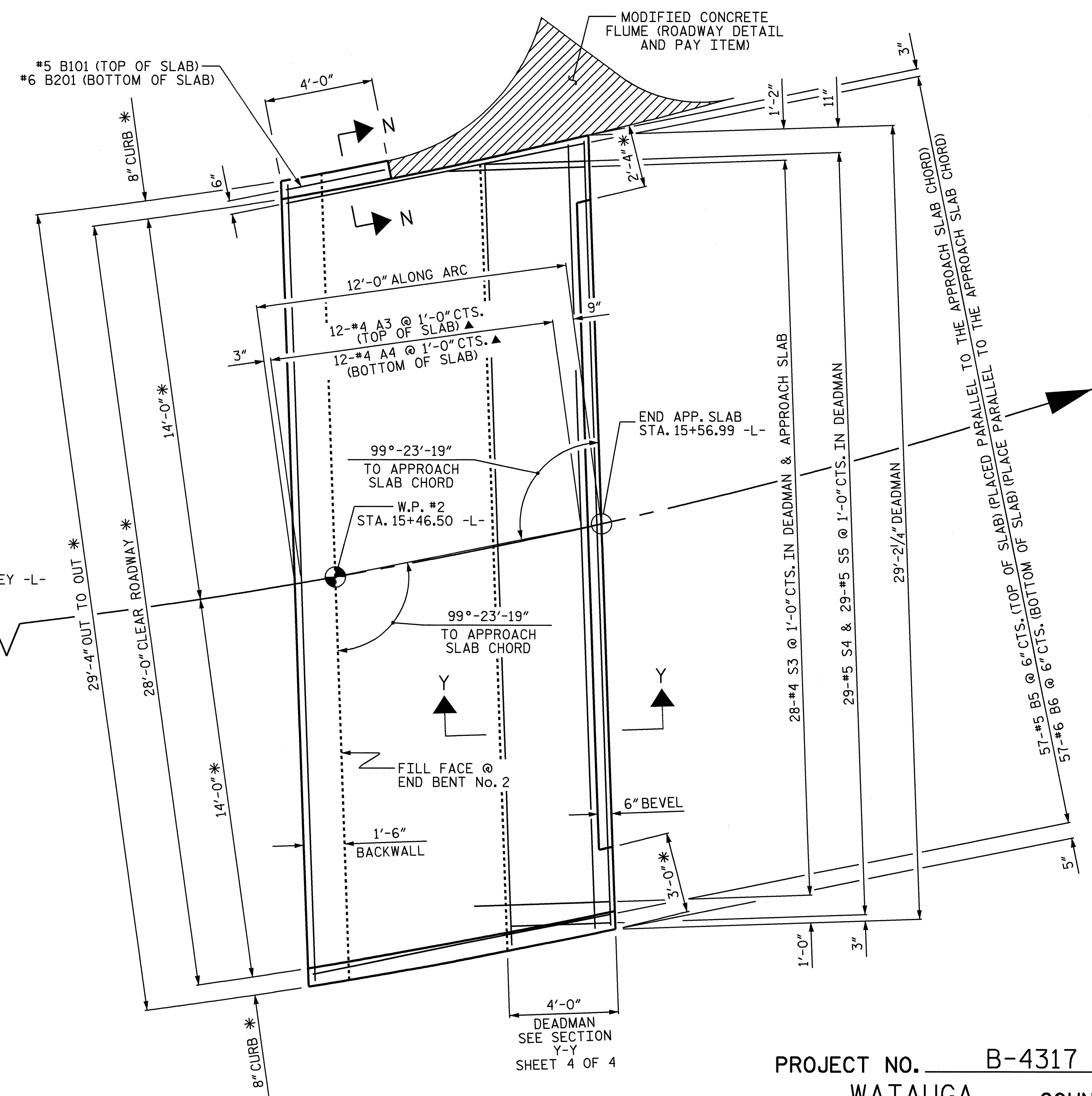
ASSEMBLED BY: A. V. ROYAL DATE: 9/07  
 CHECKED BY: D. E. PETREY DATE: 10/07  
 DRAWN BY: REK 1/84 REV. 8/16/99 RWW/LES  
 CHECKED BY: RDU 1/84 REV. 10/17/00 RWW/LES  
 REV. 5/1/06 TLA/GM

REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	DATE:	S-20
1			3		TOTAL SHEETS
2			4		24

11-DEC-2007 14:57  
 R:\Structures\Miscellaneous\B-4317.sd.RR.dgn  
 dpetrey



PLAN OF APPROACH SLAB @ END BENT No. 1



PLAN OF APPROACH SLAB @ END BENT No. 2

PLAN OF APPROACH SLABS

**NOTE:**  
 \*MEASURED RADIALLY  
 ▲"A" BARS ARE SPACED ALONG  
 APPROACH SLAB CHORD AND  
 PLACED PARALLEL TO THE FILL FACE.

PROJECT NO. B-4317  
WATAUGA COUNTY  
 STATION: 15+11.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

BRIDGE APPROACH SLAB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : T. BANKOVICH DATE : 9/07  
 CHECKED BY : M.L. BROWN DATE : 9/07



NOTES

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

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 EXTEND 1'-0" OUTSIDE 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 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 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.

IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, CLASS III TYPE II SELECT MATERIAL, 6" COMP. A.B.C. & #78M STONE SHALL BE PAID FOR UNDER LUMP SUM PRICE BID FOR BRIDGE APPROACH SLABS.

THE COST OF THE DEADMAN INCLUDING REINFORCING STEEL AND CONCRETE SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR BRIDGE APPROACH SLABS.

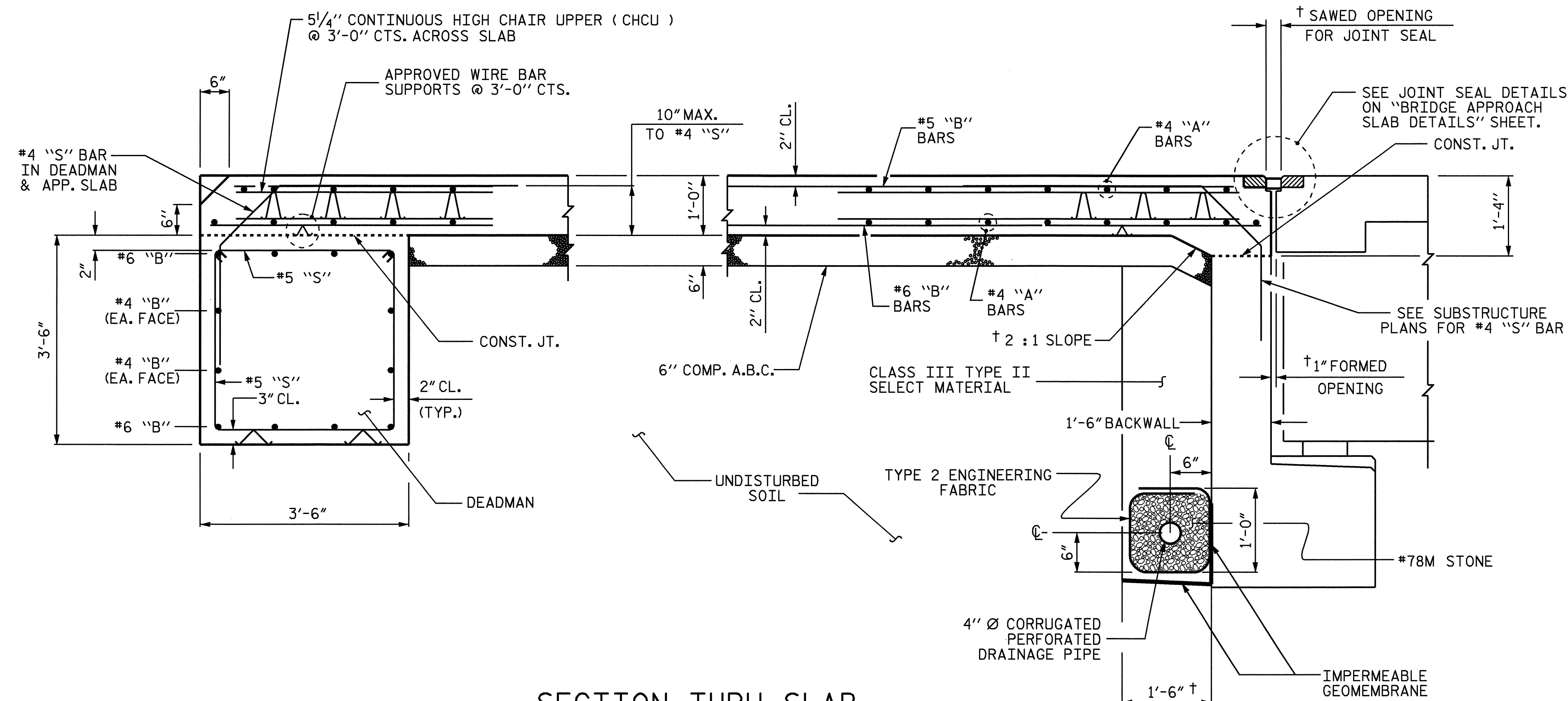
FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

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

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

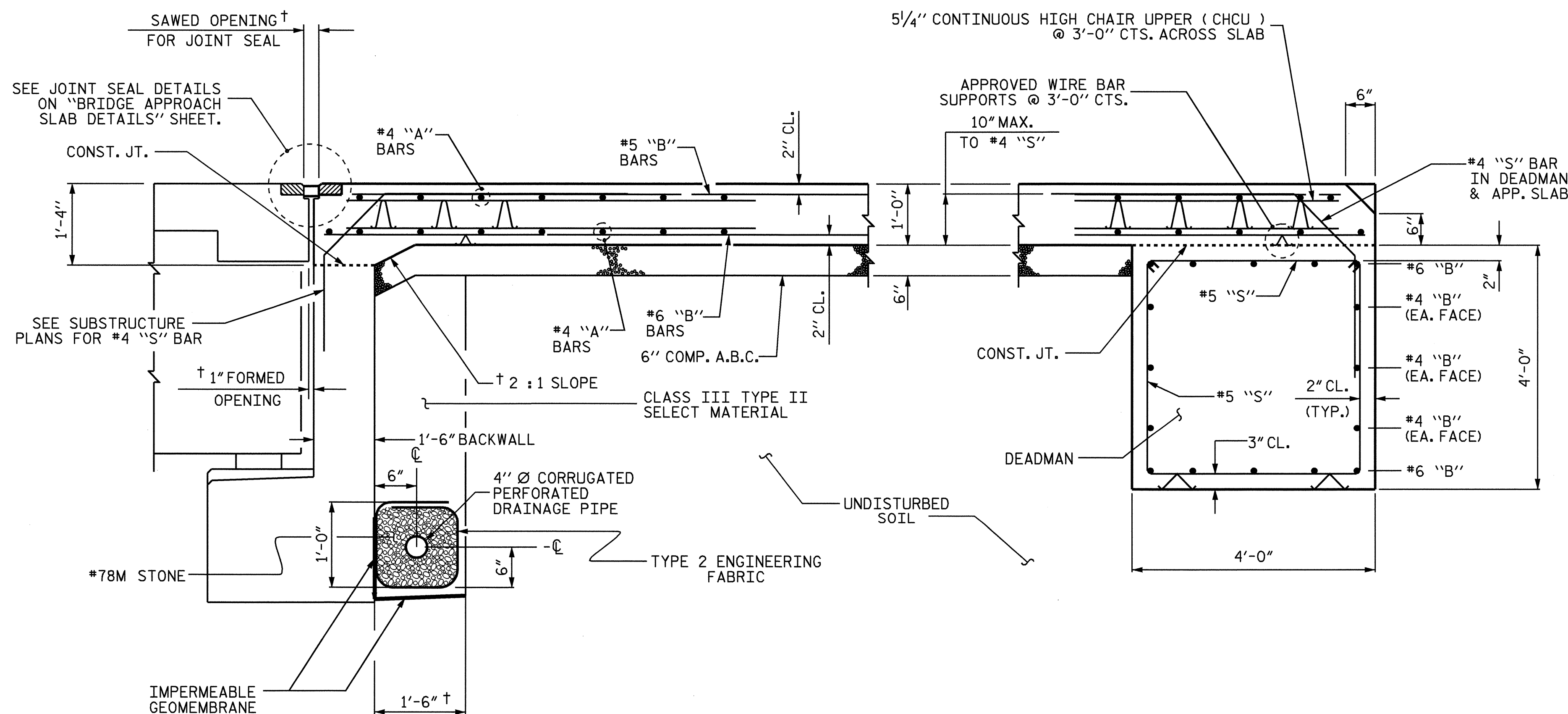
EVAZOTE JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPE FACE OF THE BARRIER RAIL

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL

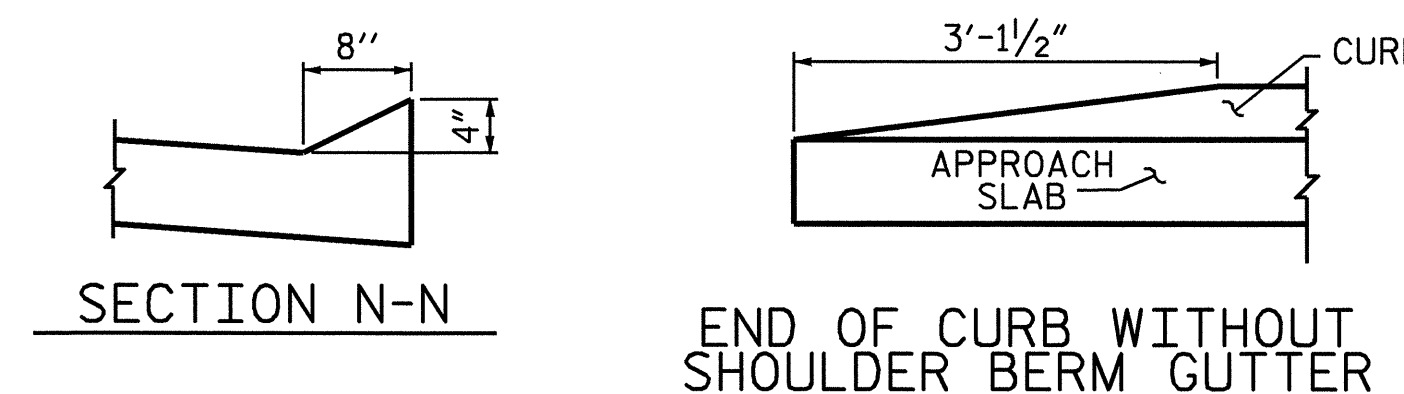


SECTION THRU SLAB  
AT END BENT No. 1

† NORMAL TO END BENT



SECTION THRU SLAB  
AT END BENT No. 2



CURB DETAILS

PROJECT NO. B-4317  
WATAUGA COUNTY  
STATION: 15+11.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

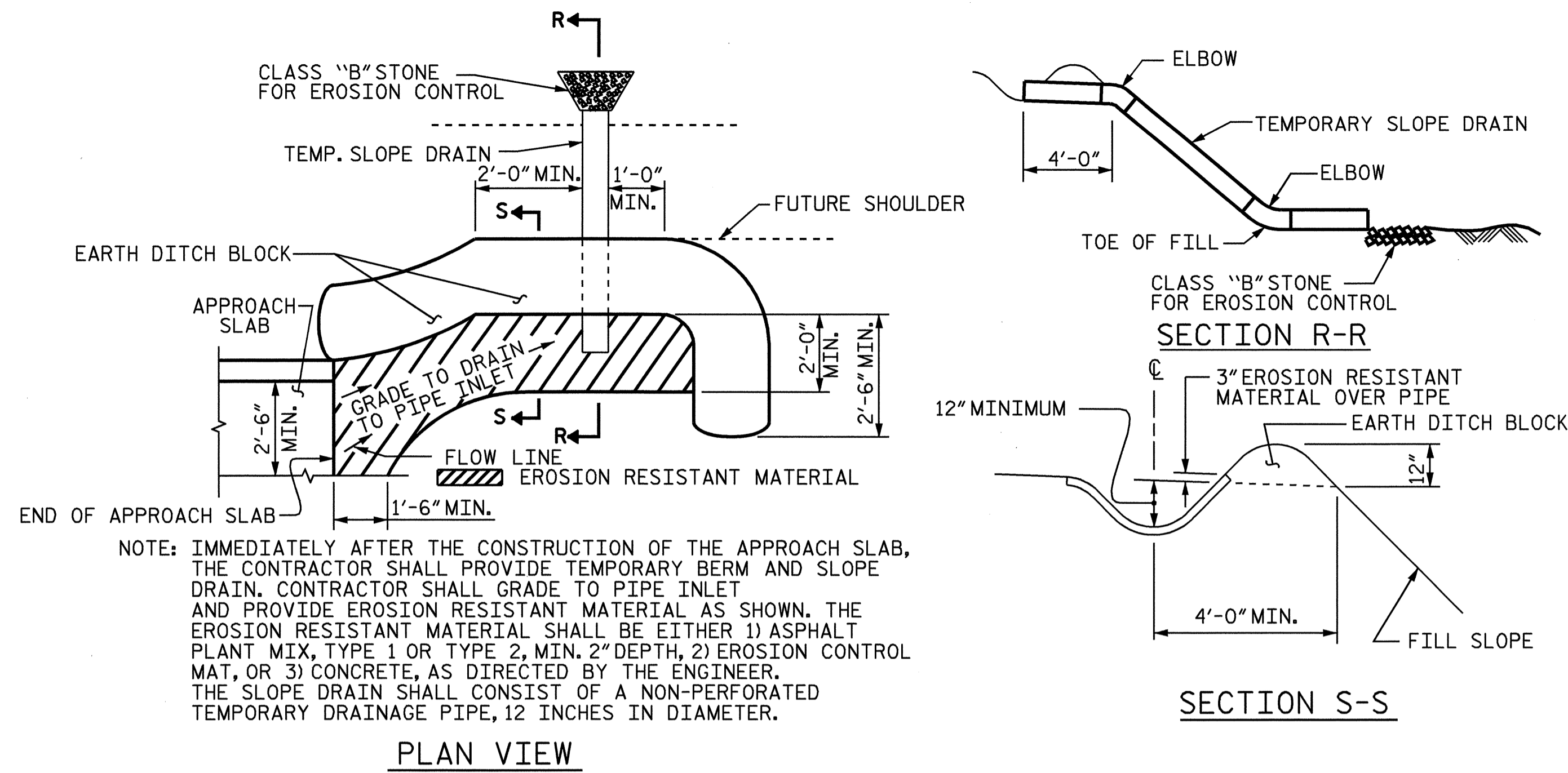
BRIDGE APPROACH SLAB  
FOR FLEXIBLE PAVEMENT



DRAWN BY : T. BANKOVICH DATE : 9/07  
CHECKED BY : M.L. BROWN DATE : 9/07

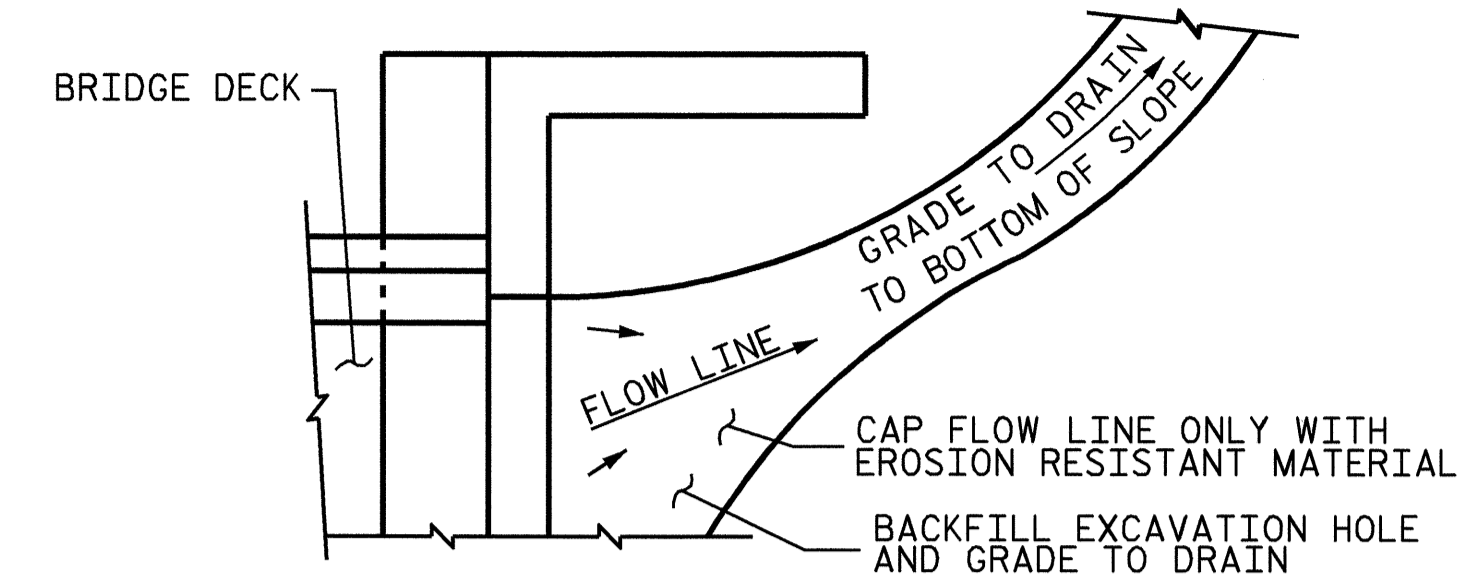
11-DEC-2007 14:33  
R:\Structures\Miscellaneous\B4317.sd.AS.dgn  
tbankovlch

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			24



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

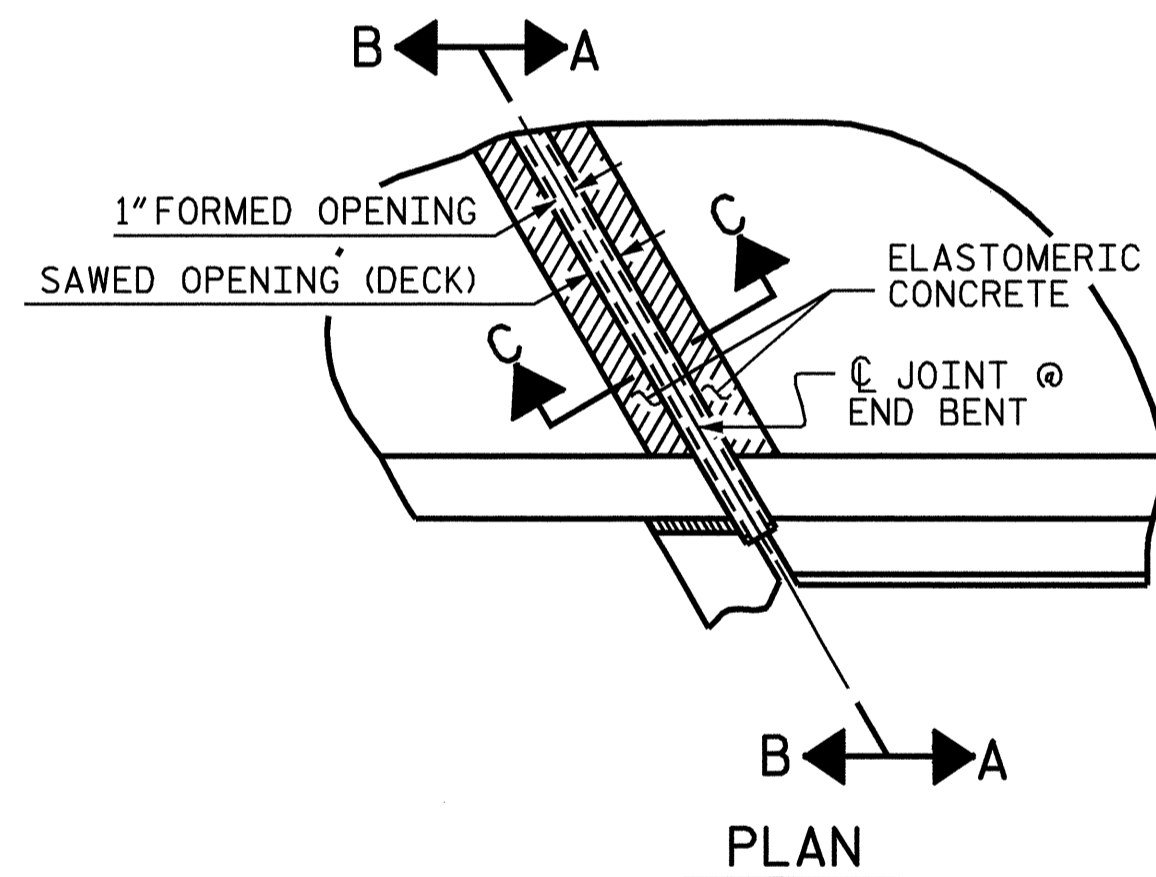
PLAN VIEW



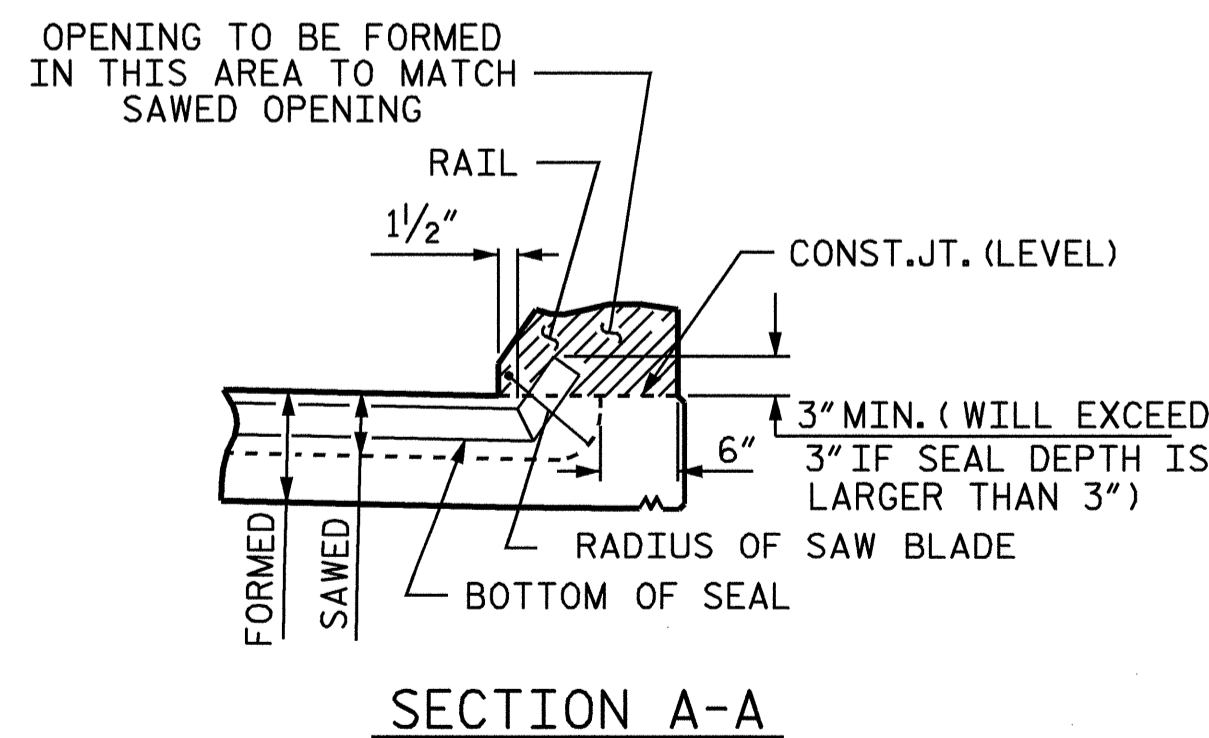
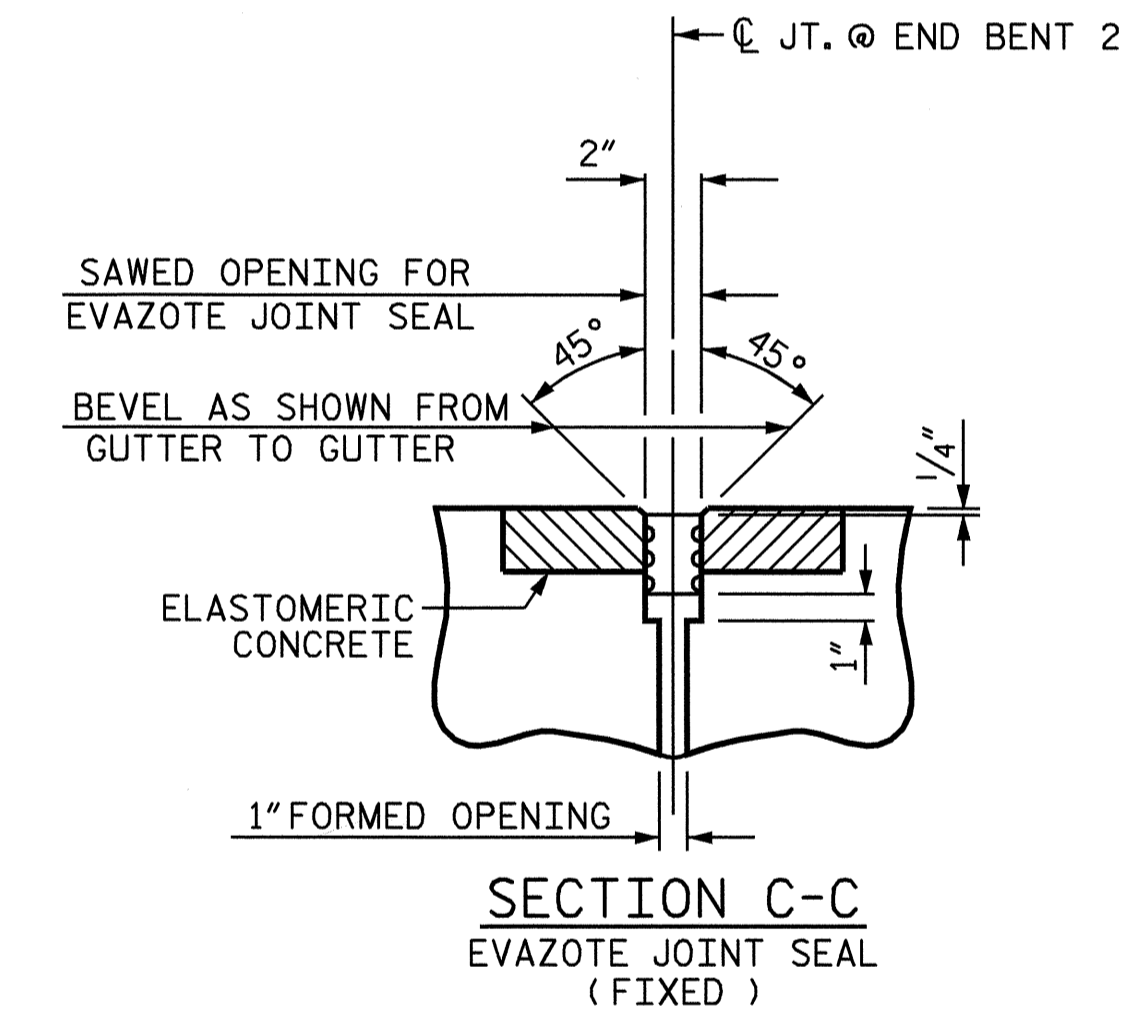
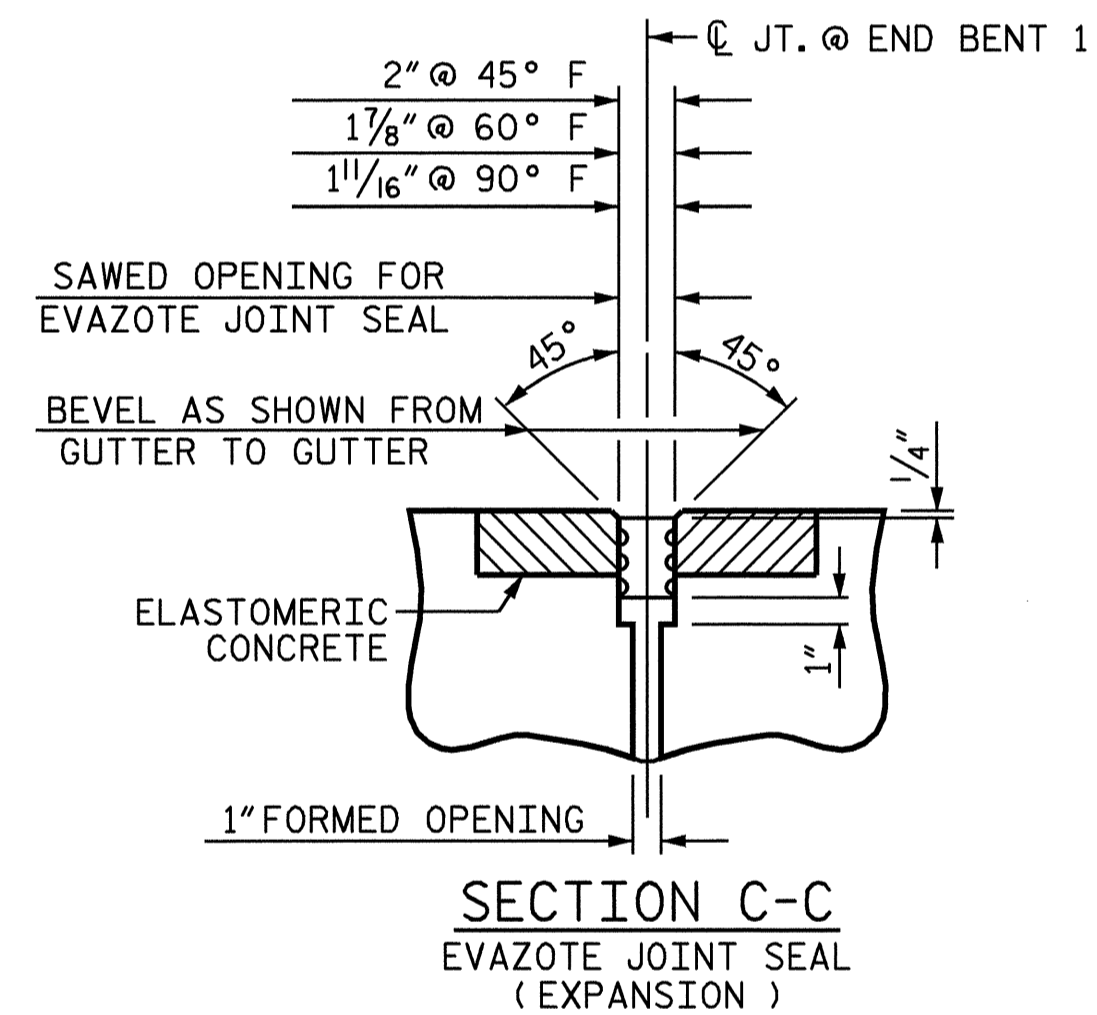
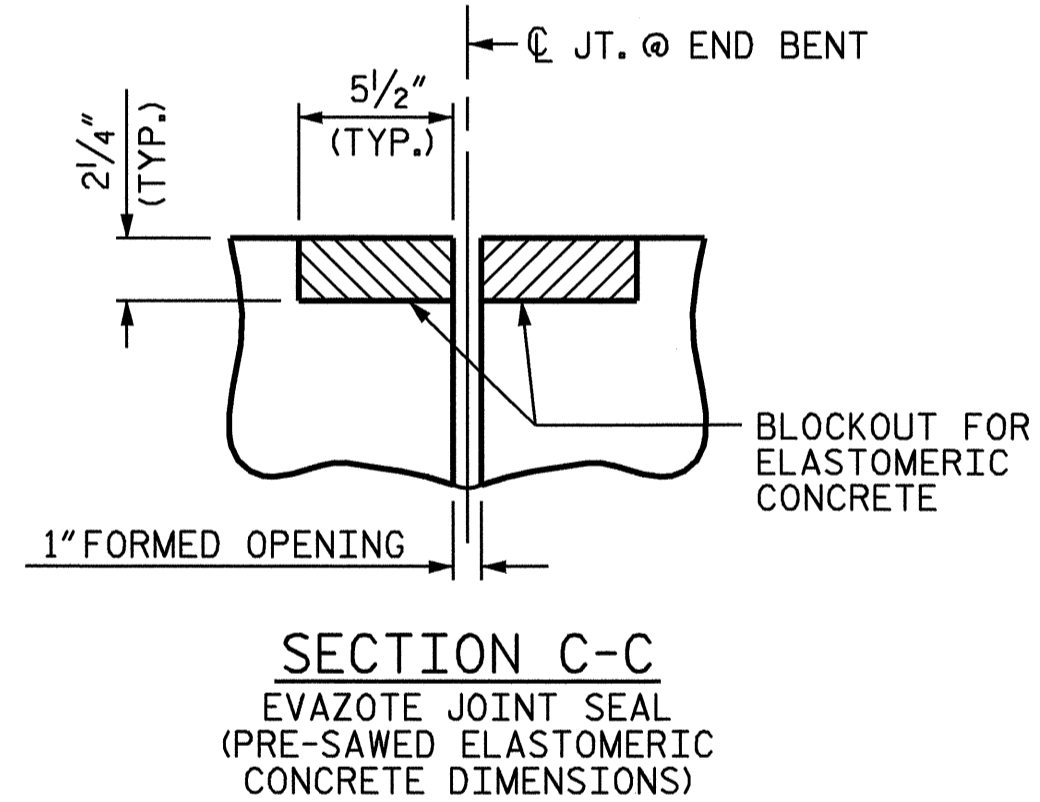
TEMPORARY DRAINAGE DETAIL

TEMPORARY BERM AND SLOPE DRAIN DETAILS

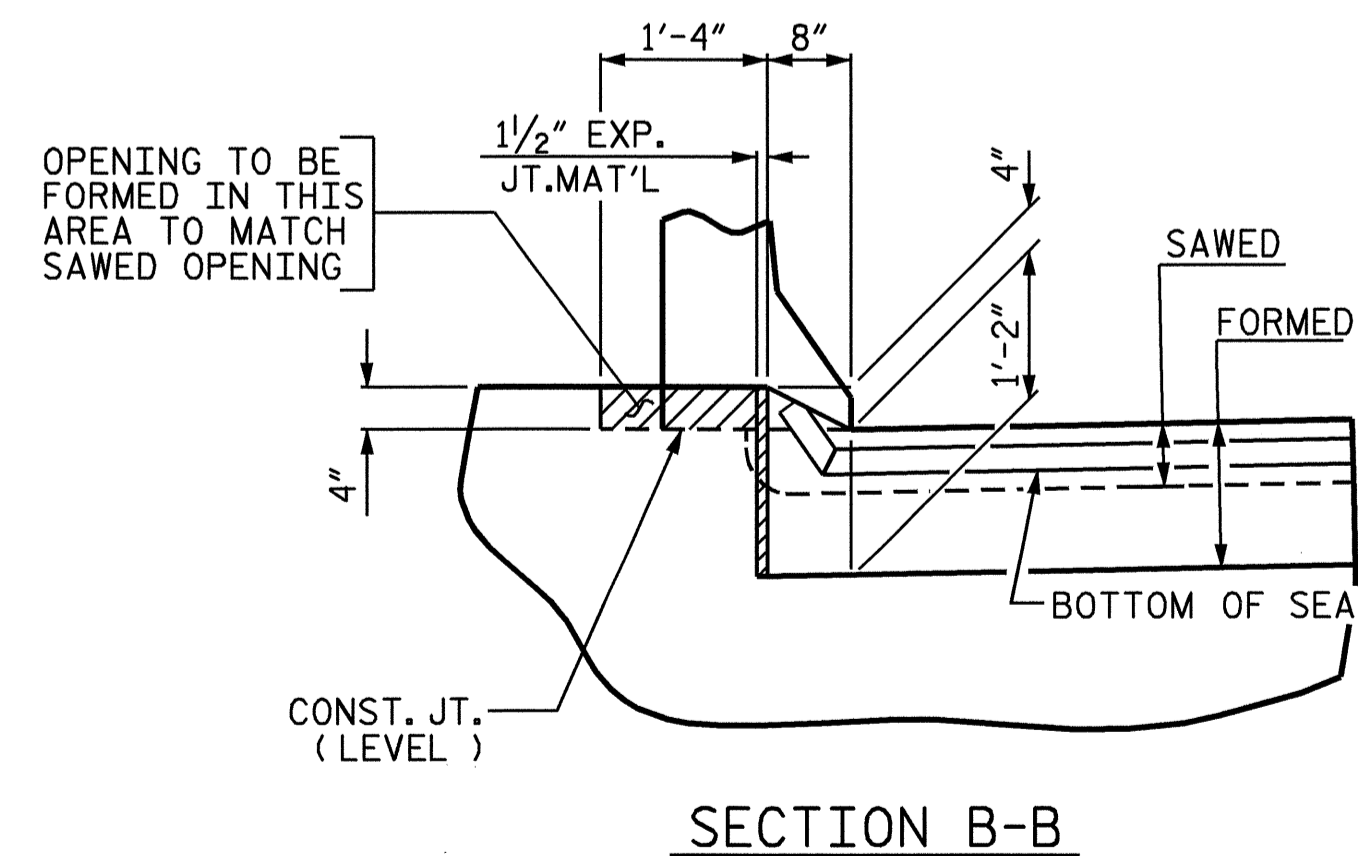
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



PLAN



SECTION A-A



SECTION B-B

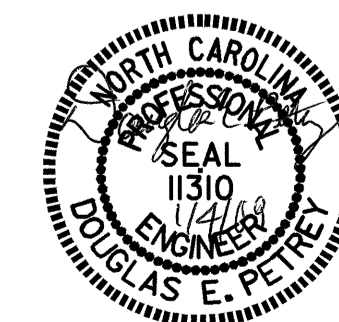
ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	4.9
2	4.9
TOTAL	9.8

\* BASED ON THE MINIMUM BLOCKOUT SHOWN.

PROJECT NO. B-4317  
WATAUGA COUNTY  
 STATION: 15+11.00 -L-

SHEET 3 OF 4

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



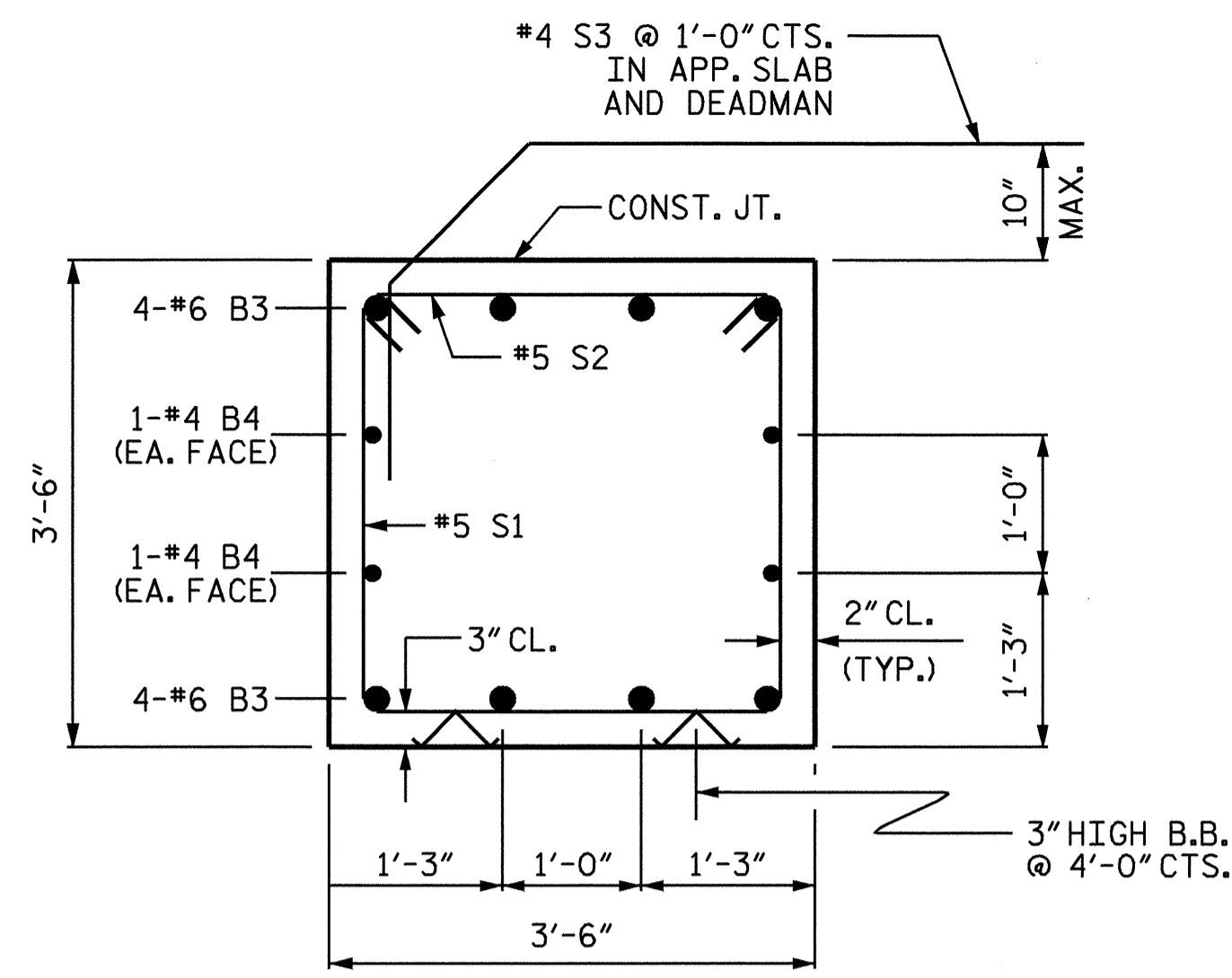
ASSEMBLED BY : T. BANKOVICH	DATE : 9/07
CHECKED BY : M.L. BROWN	DATE : 9/07
DRAWN BY : FCJ 11/88	REV. 10/17/00 RWW/LES
CHECKED BY : ARB 11/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

JOINT SEAL DETAILS @ END BENT

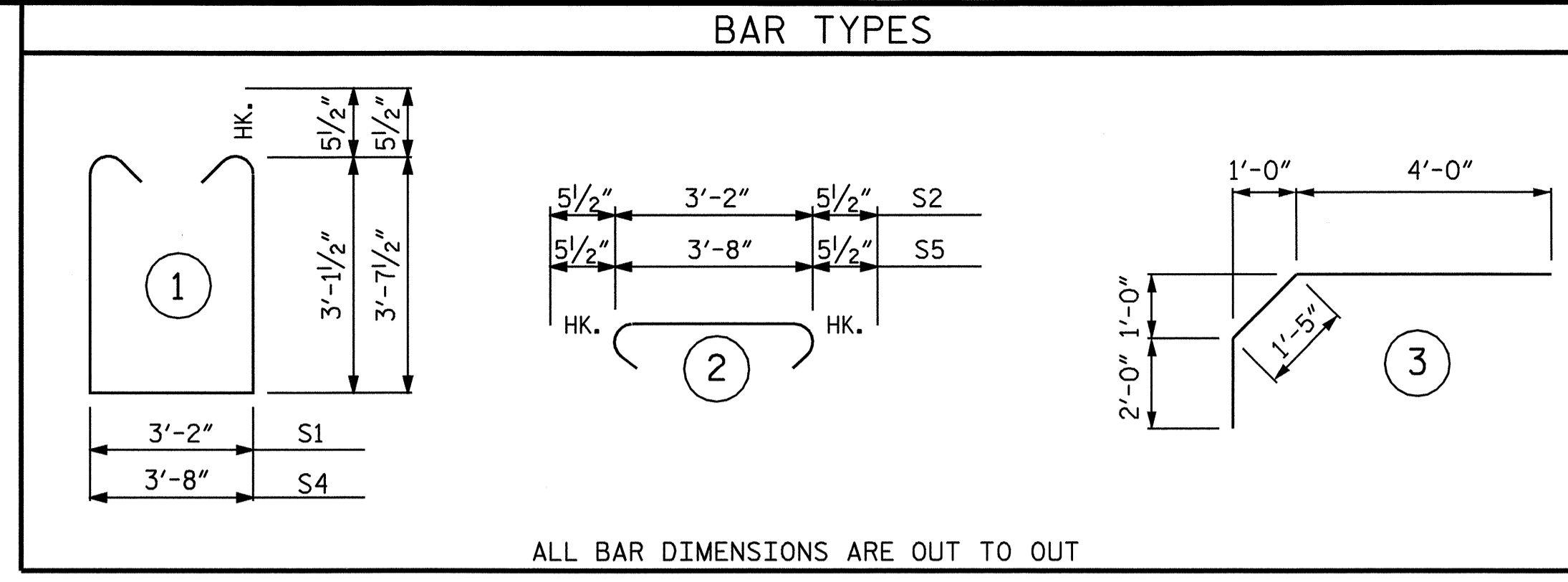
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR)

REVISIONS						SHEET NO. S-23
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 24
2			4			



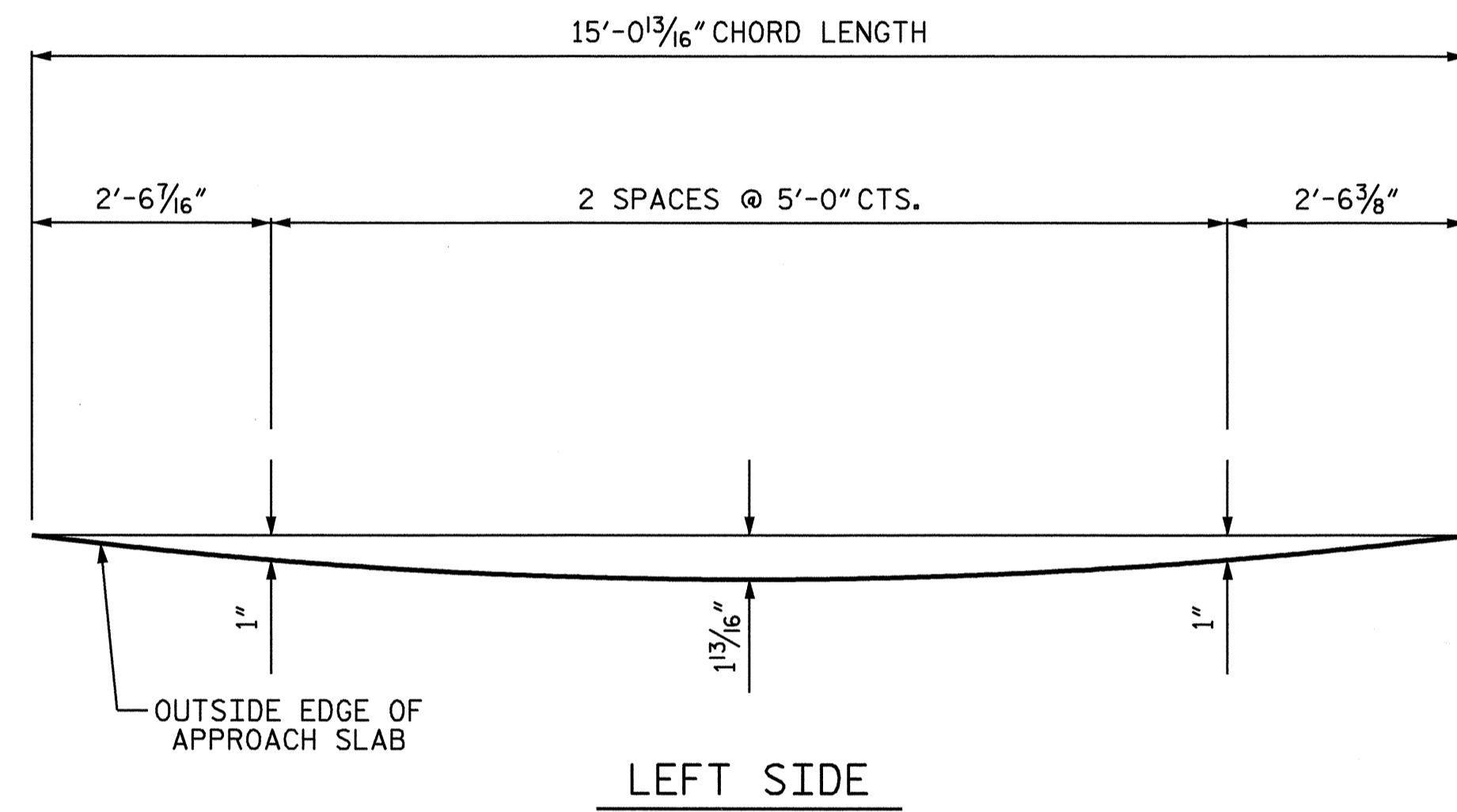


SECTION X-X

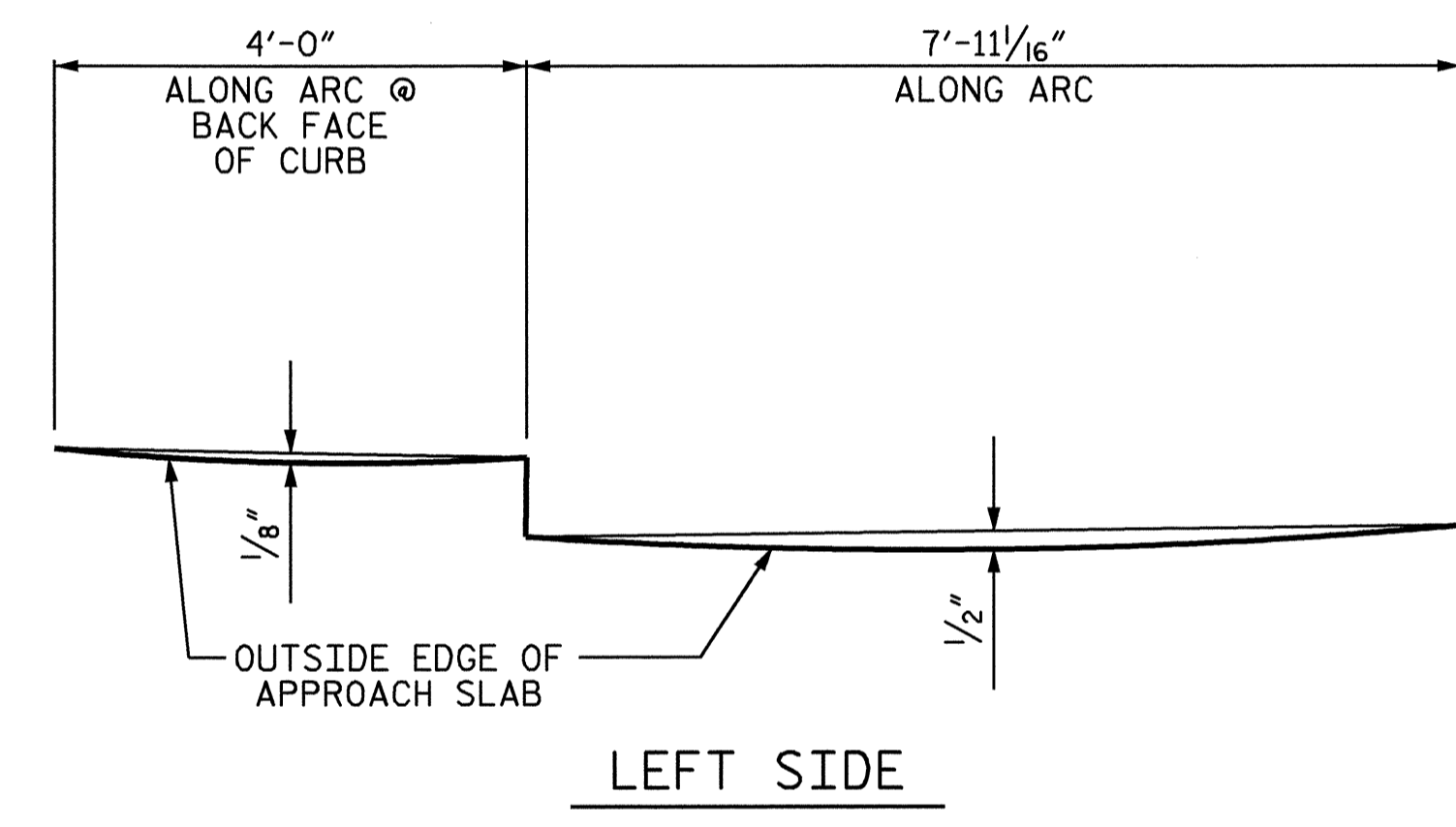


ALL BAR DIMENSIONS ARE OUT TO OUT

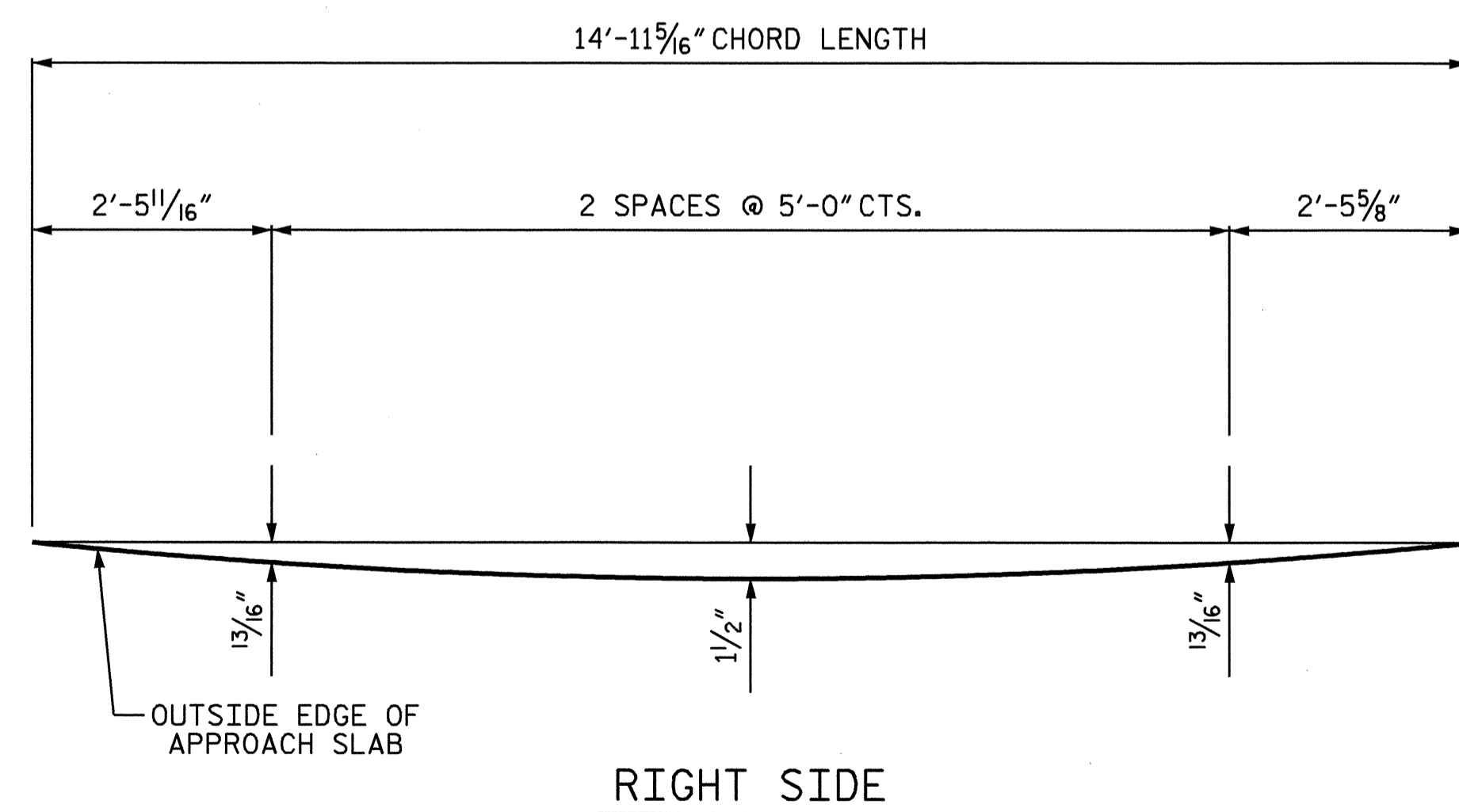
BILL OF MATERIAL											
APPROACH SLAB @ END BENT No. 1						APPROACH SLAB @ END BENT No. 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	15	#4	STR	29'-8"	297	*A3	12	#4	STR	28'-8"	230
A2	15	#4	STR	29'-8"	297	A4	12	#4	STR	28'-8"	230
*B1	58	#5	STR	14'-2"	857	*B5	57	#5	STR	11'-2"	664
B2	58	#6	STR	14'-8"	1278	*B101	1	#5	STR	3'-8"	4
B3	8	#6	STR	30'-0"	360	B6	57	#6	STR	11'-8"	999
B4	4	#4	STR	30'-0"	80	B201	1	#6	STR	3'-8"	6
S1	30	#5	1	10'-4"	323	B7	10	#6	STR	28'-10"	433
S2	30	#5	2	4'-1"	128	B8	6	#4	STR	28'-10"	116
*S3	29	#4	3	7'-5"	144	*S3	28	#4	3	7'-5"	139
						S4	29	#5	1	11'-10"	358
						S5	29	#5	2	4'-7"	139
REINFORCING STEEL					2466 LBS.	REINFORCING STEEL					2281 LBS.
*EPOXY COATED REINFORCING STEEL					1298	*EPOXY COATED REINFORCING STEEL					1037 LBS.
CLASS AA CONCRETE BREAKDOWN						CLASS AA CONCRETE BREAKDOWN					
POUR 1 DEADMAN					13.8 C. Y.	POUR 1 DEADMAN					17.3 C. Y.
POUR 2 SLAB & CURB					17.0 C. Y.	POUR 2 SLAB & CURB					13.5 C. Y.
CLASS AA CONCRETE					30.8 C. Y.	CLASS AA CONCRETE					30.8 C. Y.



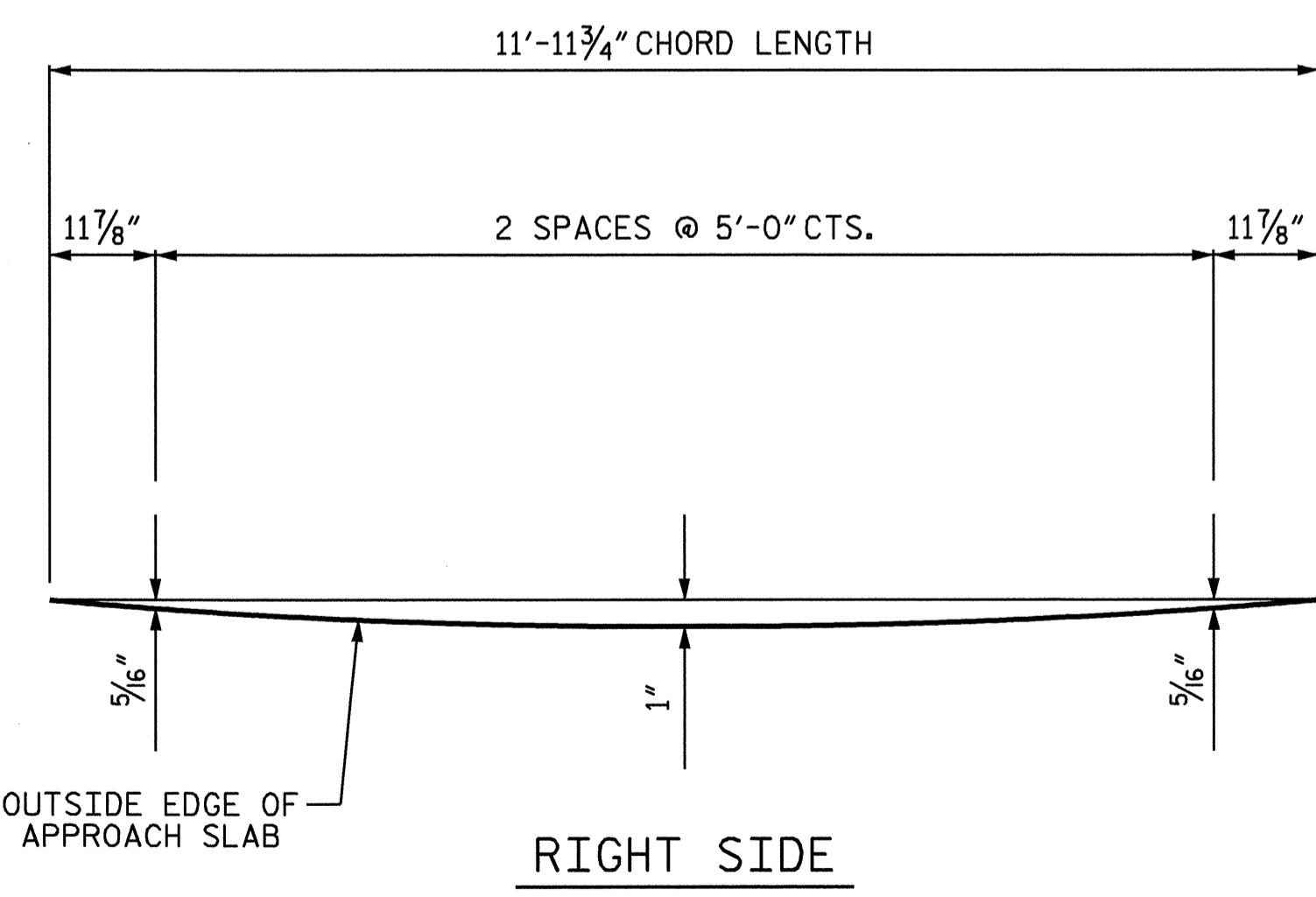
LEFT SIDE



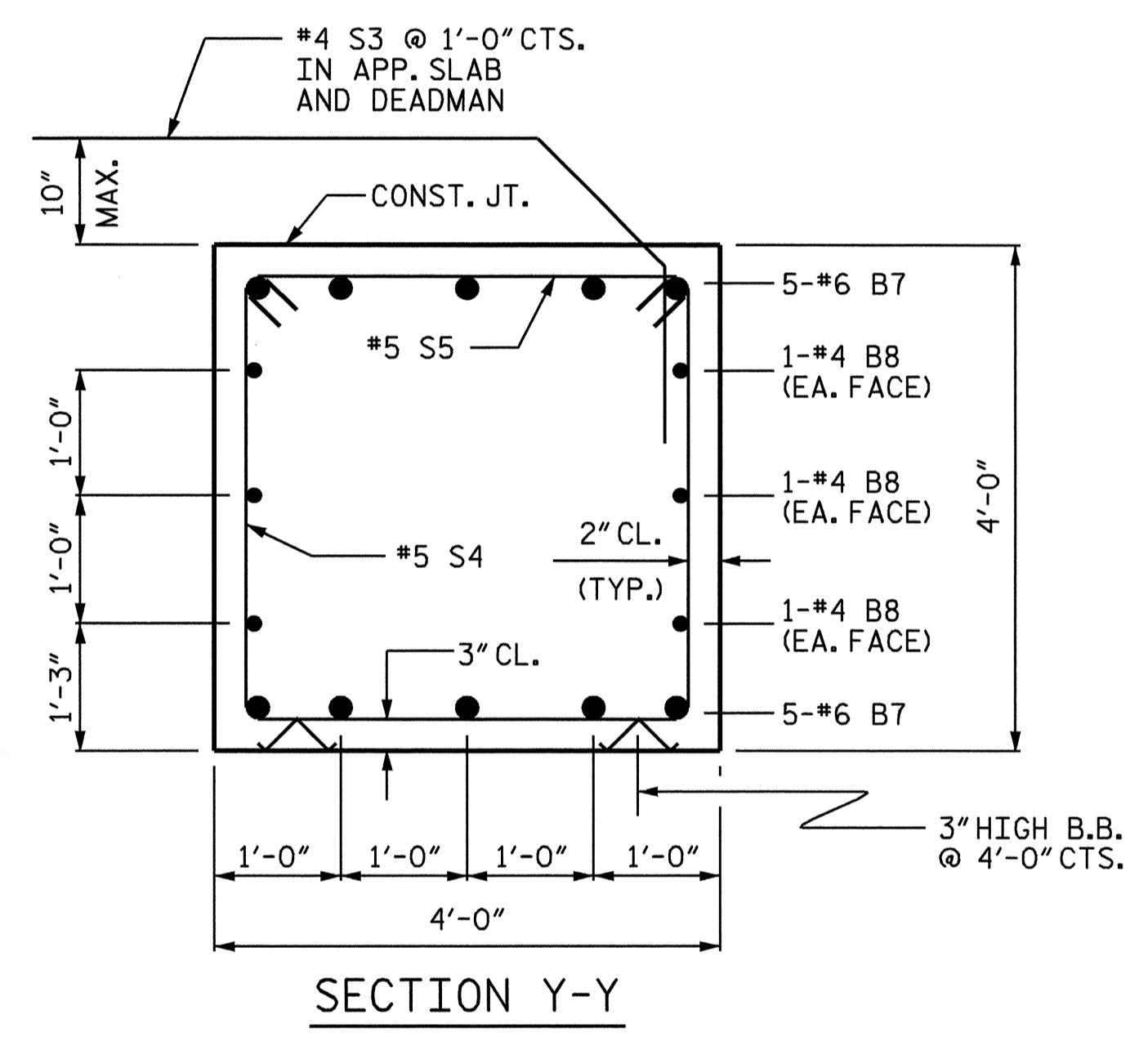
LEFT SIDE



RIGHT SIDE



RIGHT SIDE



SECTION Y-Y

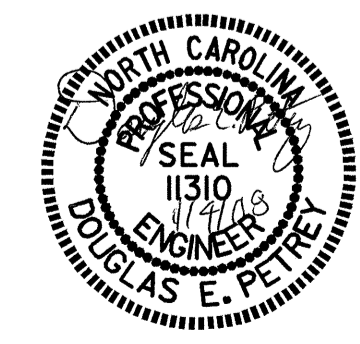
ARC OFFSETS @ END BENT No. 1

ARC OFFSETS @ END BENT No. 2

PROJECT NO. B-4317  
WATAUGA COUNTY  
 STATION: 15+11.00 -L-

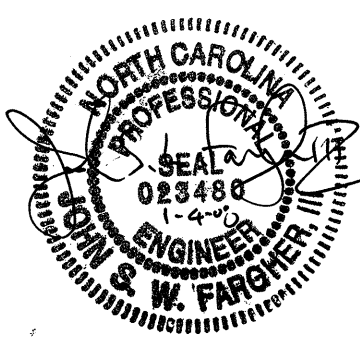
SHEET 4 OF 4

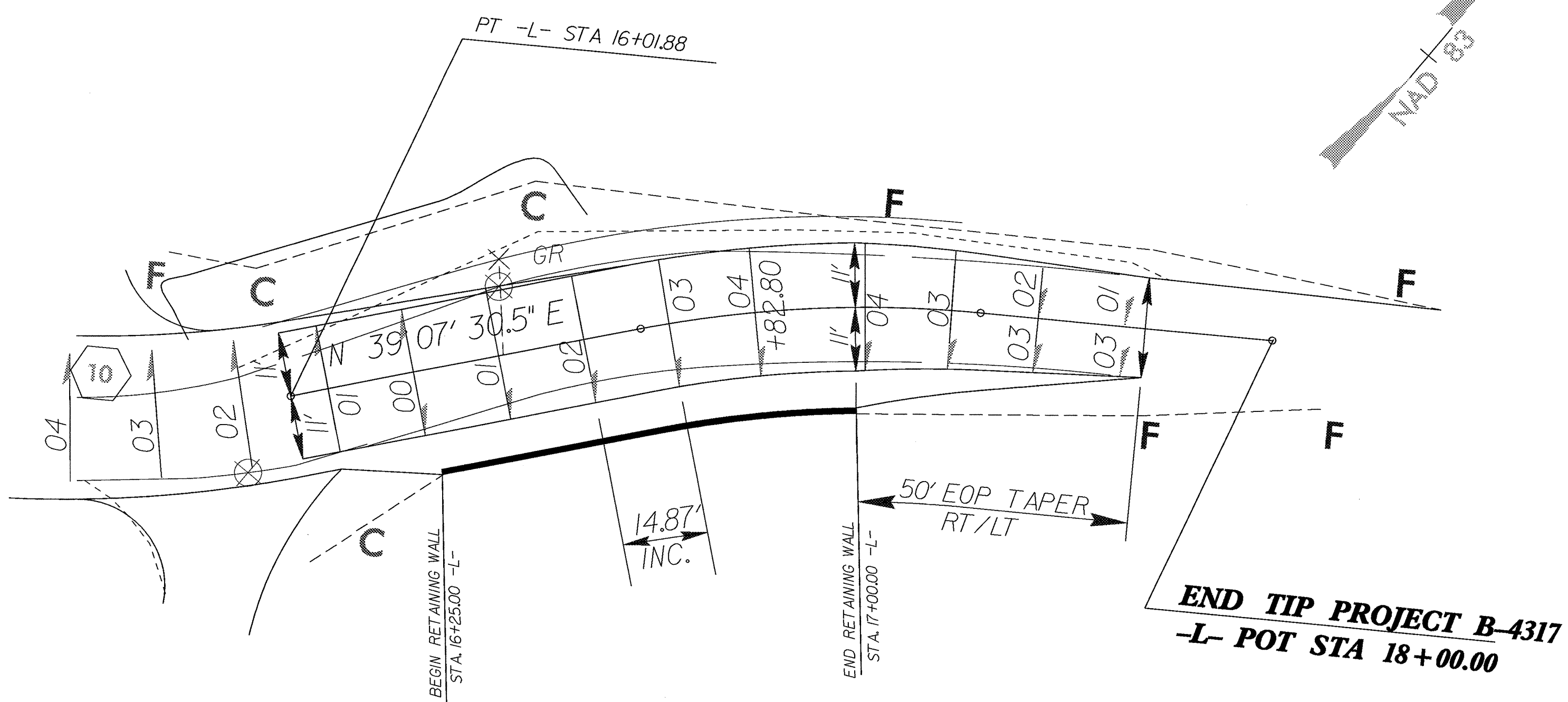
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH				
BRIDGE APPROACH SLAB DETAILS				
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	
TOTAL SHEETS				24



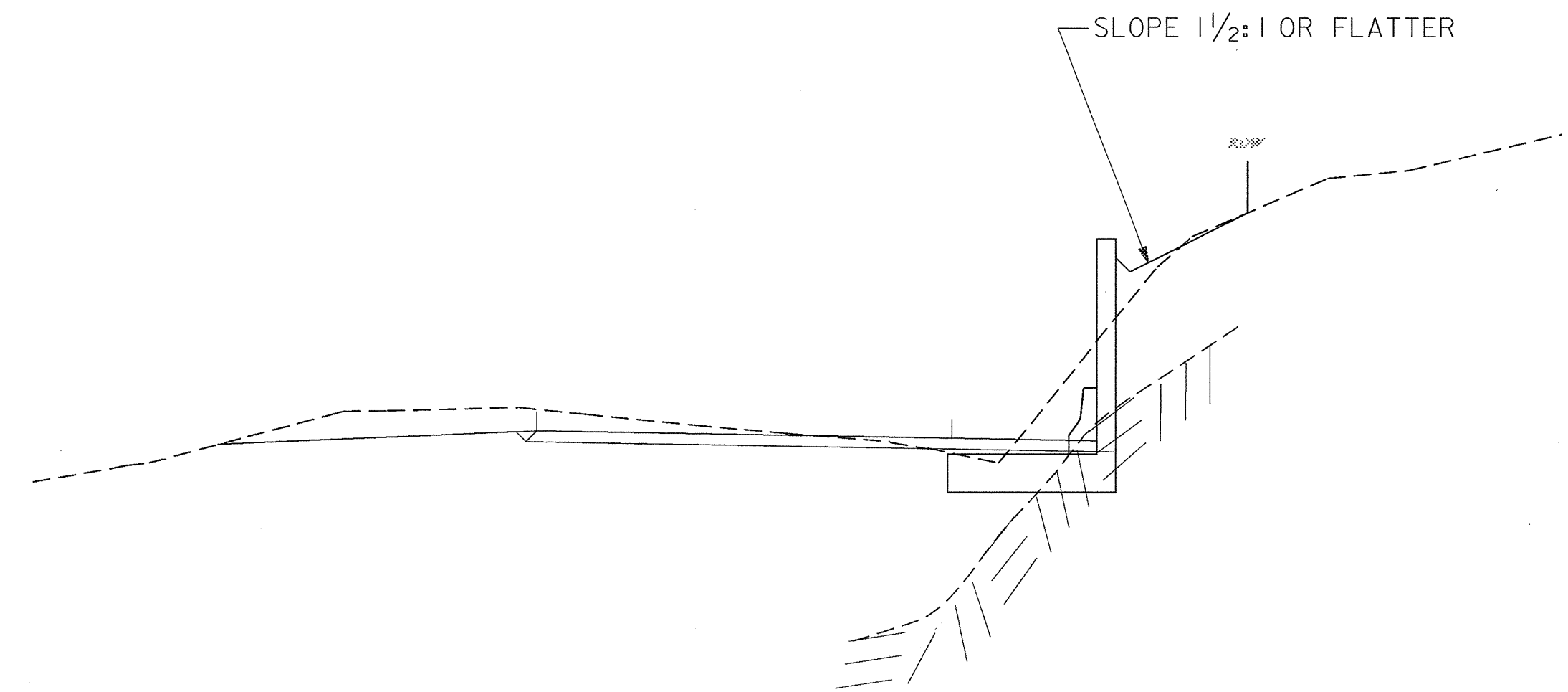
DRAWN BY : T. BANKOVICH DATE : 9/07  
 CHECKED BY : M.L. BROWN DATE : 9/07

BM - 112 RR SPIKE IN BASE OF 60" PECAN TREE STA. 24+41.07 -L- 104.00' RT.  
 EL. = 772.50' N 75552 E 1629786

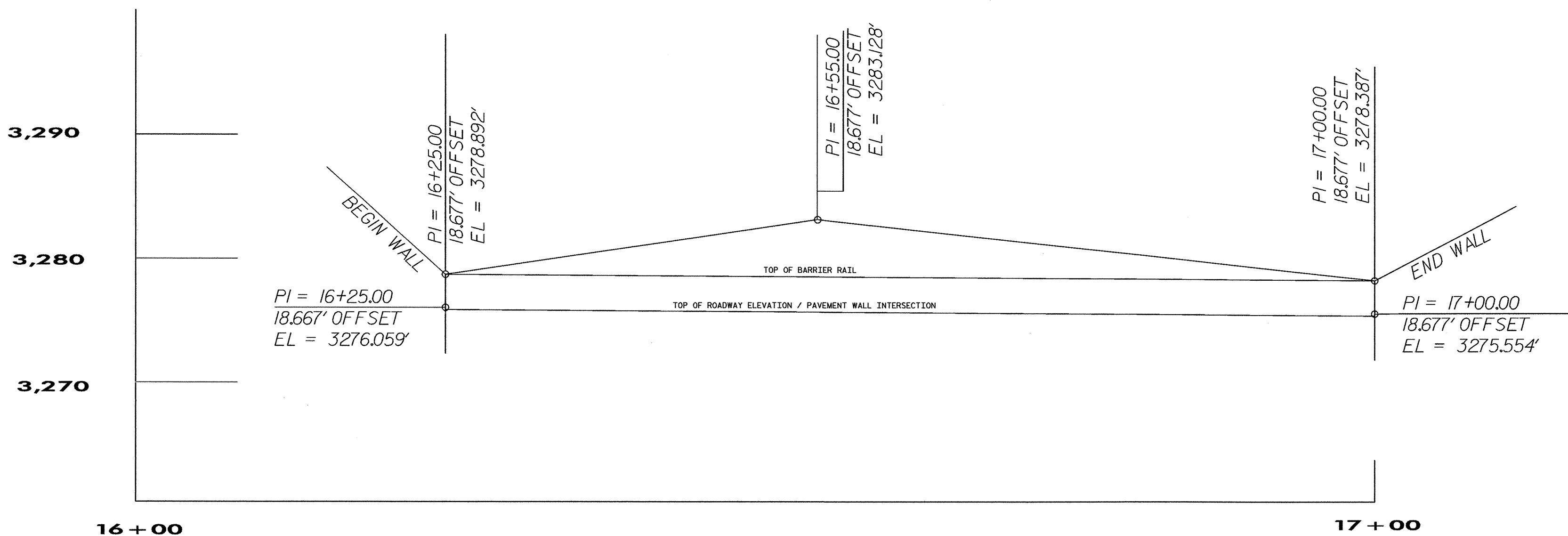
GEOTECHNICAL ENGINEER		ENGINEER	
			
SIGNATURE	DATE	SIGNATURE	DATE



LOCATION SKETCH



TYPICAL SECTION  
NTS



**PROPOSED WALL ENVELOPE**  
**-L- STA 16+25 TO 17+00, RT**

**PROJECT NO.:** B-4317  
**WATAUGA COUNTY**  
**STATION:** 16+25.00 -L- TO 17+00.00 -L-  
 SHEET 1 OF 5

PREPARED BY:	J.T. WILLIAMS	DATE:	06/25/07
REVIEWED BY:	S.C. CLARK	DATE:	06/25/07

**GEOTECHNICAL ENGINEERING UNIT**

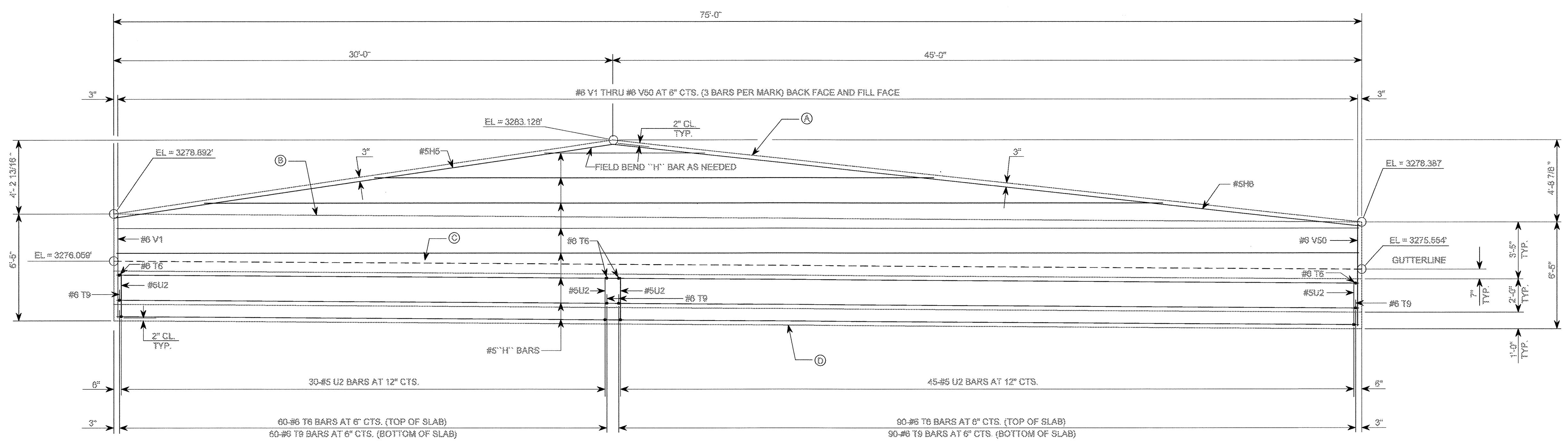
EASTERN REGIONAL OFFICE  
 WESTERN REGIONAL OFFICE

**STATE OF NORTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**RALEIGH**

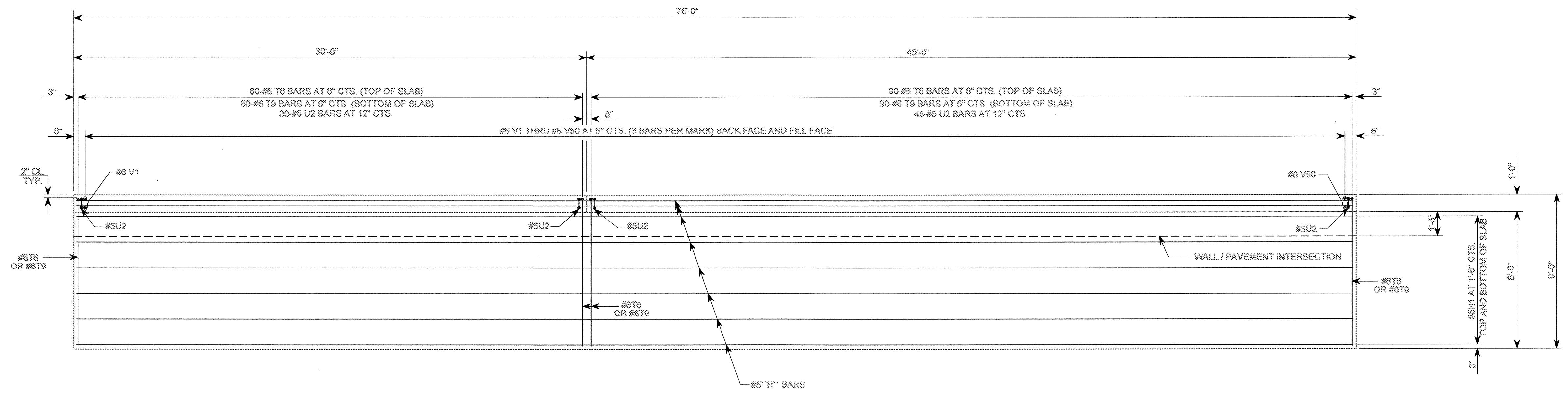
<b>WALL #1</b>						SHEET NO. W-1
<b>REVERSE CANTILEVER</b>						
<b>RETAINING WALL</b>						TOTAL SHEETS 5
<b>REVISIONS</b>						
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

GEOTECHNICAL ENGINEER  
 ENGINEER  
 NORTH CAROLINA PROFESSIONAL ENGINEERS AND SURVEYORS  
 SEATED 023480  
 1-4-05  
 JOHN S. W. FARGHER  
 SIGNATURE DATE SIGNATURE DATE

- (A) TOP OF WALL (VARIES)
- (B) TOP OF BARRIER RAIL
- (C) FINISHED PAVEMENT ELEVATION
- (D) BOTTOM OF WALL "HEEL" ALONG SHOULDER



**ELEVATION**



**PLAN**

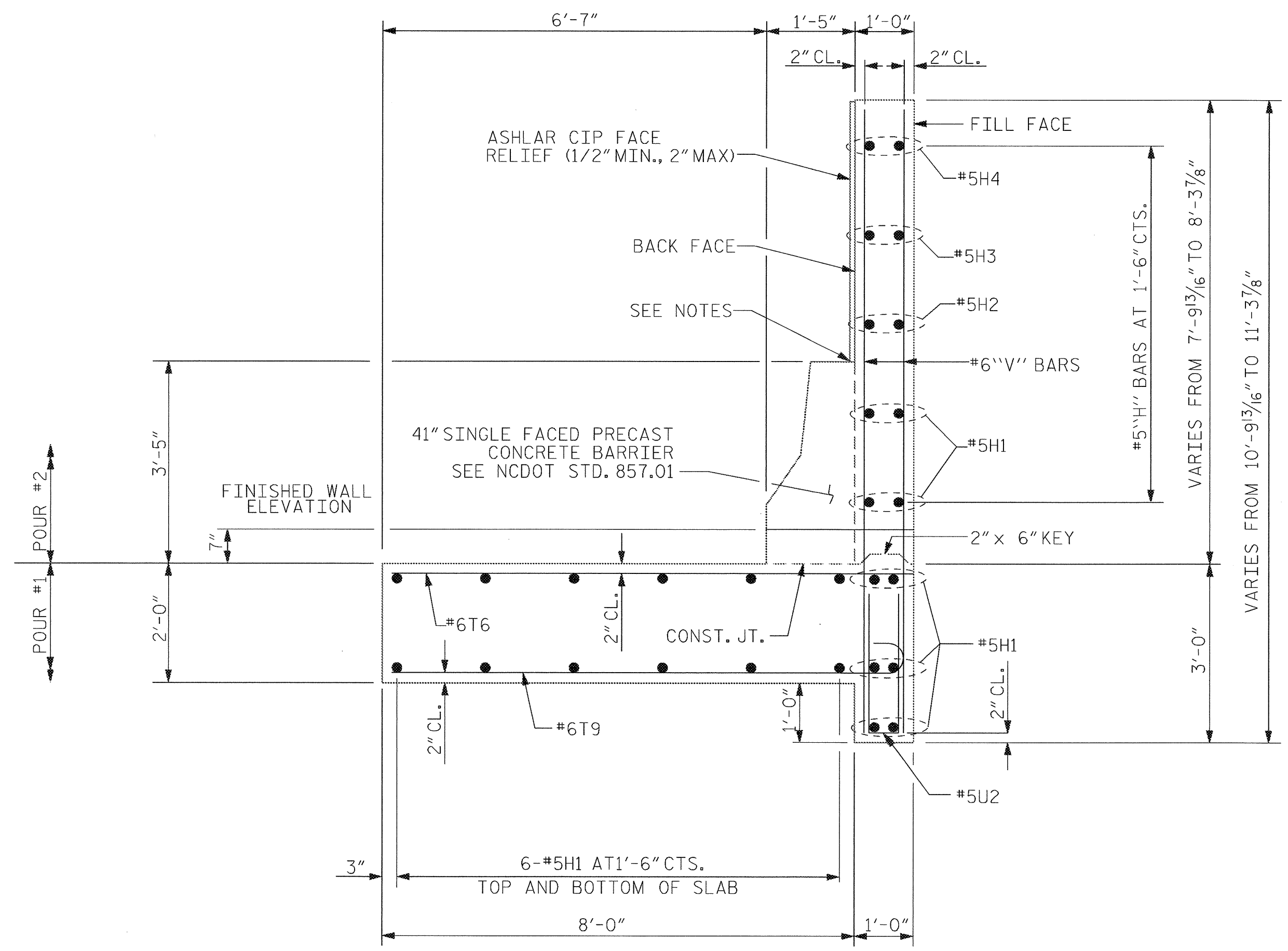
**PROJECT NO.:** B-4317  
**WATAUGA COUNTY**  
**STATION:** 16+25.00 -L- TO 17+00.00 -L-  
 SHEET 2 OF 5

PREPARED BY: E.J. SALVO DATE: 10/07  
 REVIEWED BY: S.C. CLARK DATE: 10/07

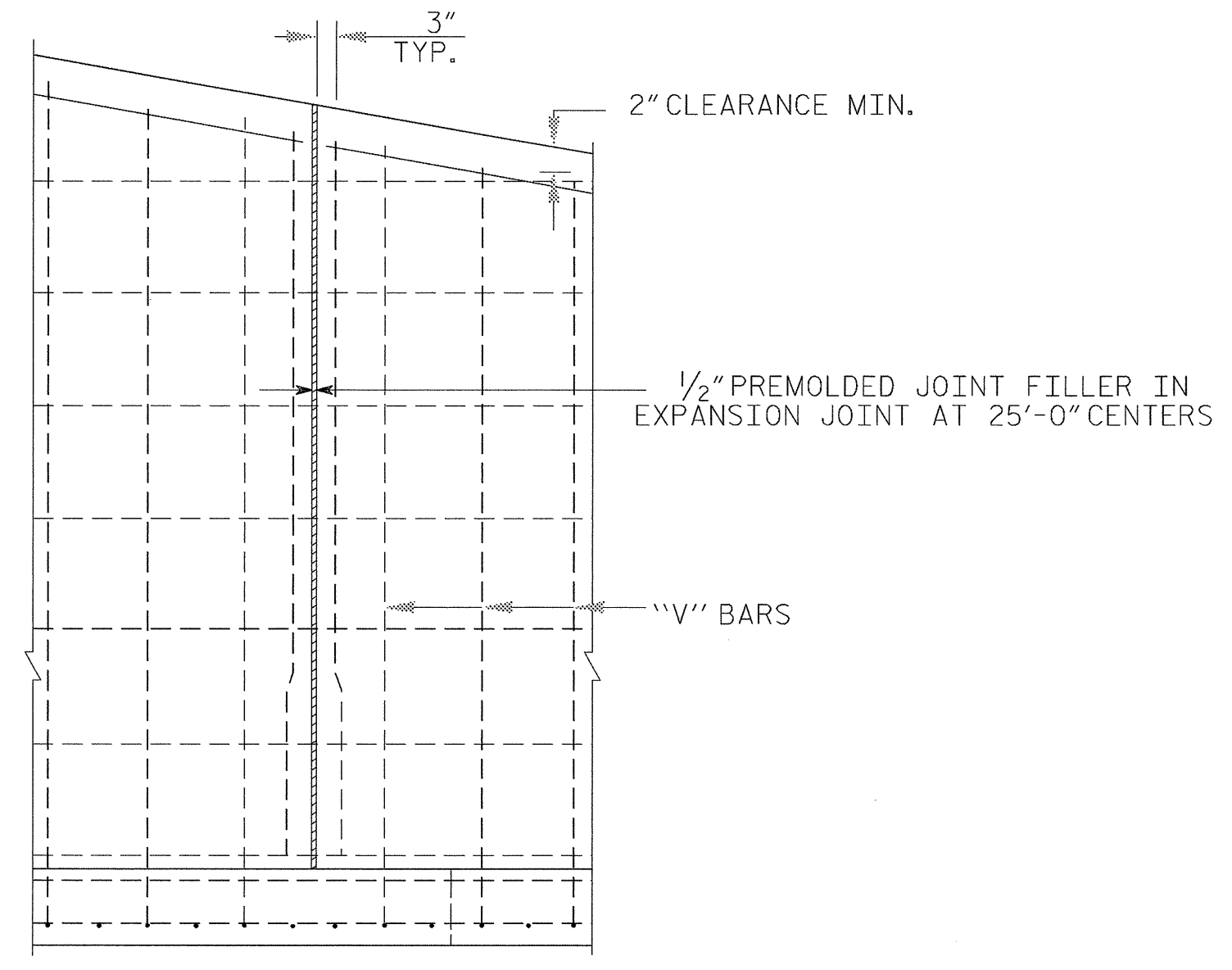
**GEOTECHNICAL ENGINEERING UNIT**  
 EASTERN REGIONAL OFFICE  
 WESTERN REGIONAL OFFICE  
**STATE OF NORTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**RALEIGH**

**WALL #1 REVERSE CANTILEVER RETAINING WALL**

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-2
1			3			TOTAL SHEETS
2			4			5



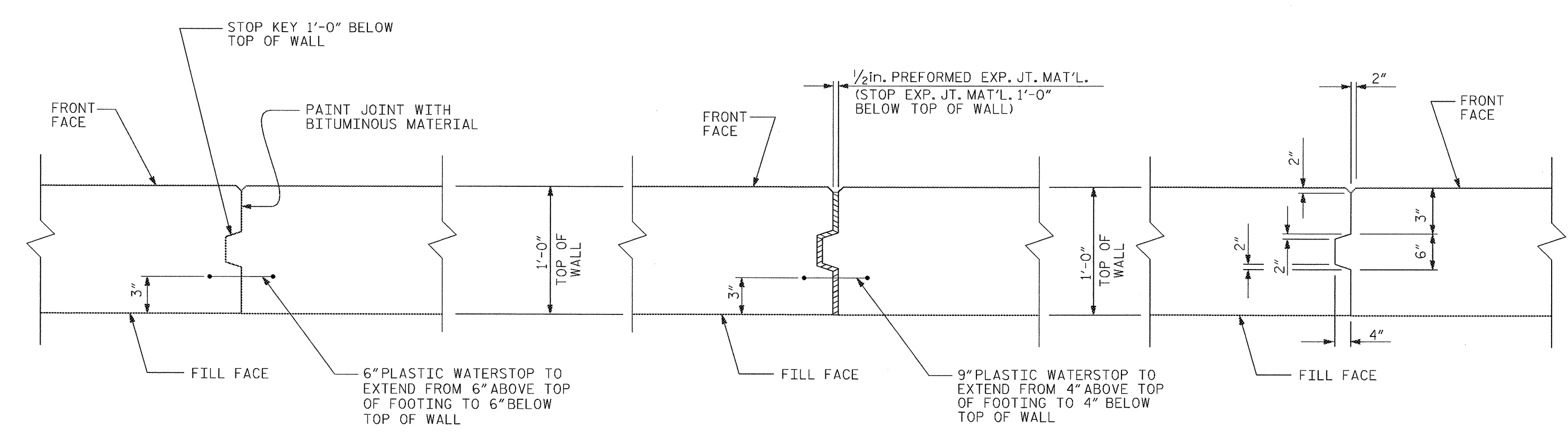
TYPICAL SECTION



ELEVATION SECTION

NOTES

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE JOINT FORMED BETWEEN THE BARRIER RAIL AND THE ASHLAR WALL FACE IS TO BE SEALED IN A WAY AS TO PREVENT WATER FROM COLLECTING BEHIND THE BARRIER RAIL.



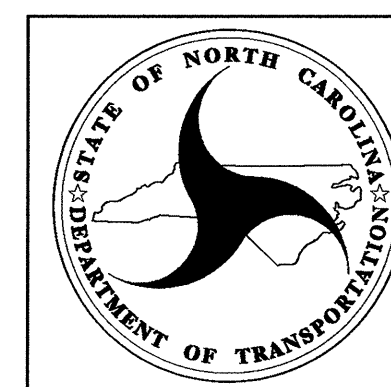
CONTRACTION JOINT DETAIL

EXPANSION JOINT DETAIL

TYPICAL KEY DETAIL

**PROJECT NO.:** B-4317  
**WATAUGA COUNTY**  
**STATION:** 16+25.00-L- TO 17+00.00-L-  
 SHEET 3 OF 5

PREPARED BY: E.J. SALVO DATE: 10/07  
 REVIEWED BY: S.C. CLARK DATE: 10/07



**GEOTECHNICAL ENGINEERING UNIT**  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

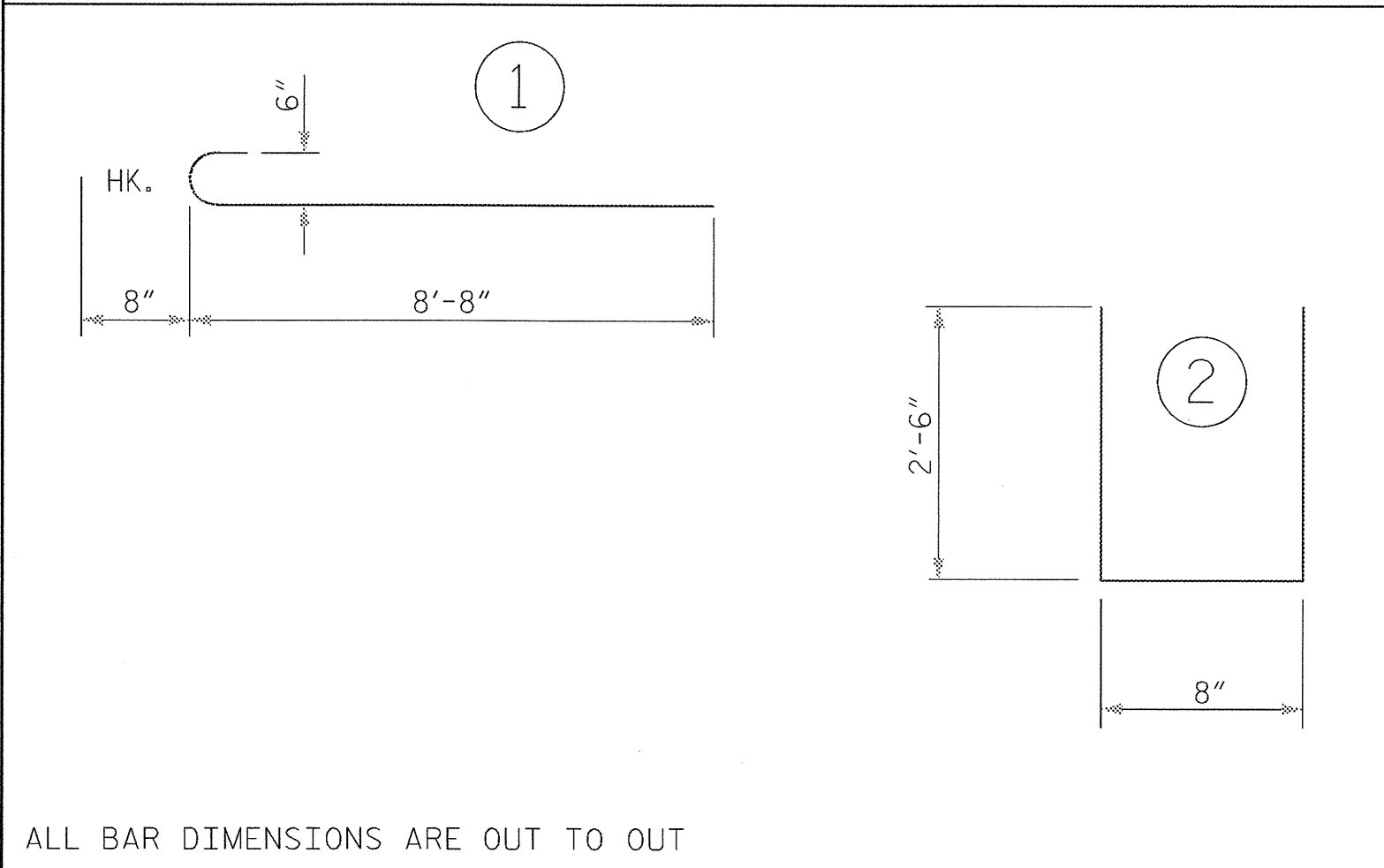
**WALL #1**  
**REVERSE CANTILEVER**  
**RETAINING WALL**

SHEET NO. W-3  
 TOTAL SHEETS 5

**BILL OF MATERIAL**

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	44	#5	STR	38'-7"	1771	V31	6	#6	STR	9'-0"	81
H2	2	#5	STR	57'-7"	120	V32	6	#6	STR	8'-10"	80
H3	2	#5	STR	33'-7"	70	V33	6	#6	STR	8'-8"	78
H4	2	#5	STR	9'-7"	20	V34	6	#6	STR	8'-6"	77
H5	2	#5	STR	31'-6"	66	V35	6	#6	STR	8'-5"	76
H6	2	#5	STR	46'-6"	97	V36	6	#6	STR	8'-3"	74
						V37	6	#6	STR	8'-1"	73
T6	150	#6	STR	8'-8"	1953	V38	6	#6	STR	7'-11"	71
T9	150	#6	1	9'-4"	2103	V39	6	#6	STR	7'-9"	70
						V40	6	#6	STR	7'-7"	68
U2	75	#5	2	5'-8"	443	V41	6	#6	STR	7'-6"	68
						V42	6	#6	STR	7'-4"	66
V1	6	#6	STR	6'-1"	55	V43	6	#6	STR	7'-2"	65
V2	6	#6	STR	6'-4"	57	V44	6	#6	STR	7'-0"	63
V3	6	#6	STR	6'-7"	59	V45	6	#6	STR	6'-10"	62
V4	6	#6	STR	6'-10"	62	V46	6	#6	STR	6'-8"	60
V5	6	#6	STR	7'-0"	63	V47	6	#6	STR	6'-6"	59
V6	6	#6	STR	7'-3"	65	V48	6	#6	STR	6'-5"	58
V7	6	#6	STR	7'-6"	68	V49	6	#6	STR	6'-3"	56
V8	6	#6	STR	7'-9"	70	V50	6	#6	STR	6'-1"	55
V9	6	#6	STR	7'-11"	71						
V10	6	#6	STR	8'-2"	74						
V11	6	#6	STR	8'-5"	76						
V12	6	#6	STR	8'-8"	78						
V13	6	#6	STR	8'-10"	80						
V14	6	#6	STR	9'-1"	82						
V15	6	#6	STR	9'-4"	84						
V16	6	#6	STR	9'-7"	86						
V17	6	#6	STR	9'-9"	88						
V18	6	#6	STR	10'-0"	90						
V19	6	#6	STR	10'-3"	92						
V20	6	#6	STR	10'-6"	95						
V21	6	#6	STR	10'-7"	95						
V22	6	#6	STR	10'-5"	94						
V23	6	#6	STR	10'-3"	92						
V24	6	#6	STR	10'-1"	91						
V25	6	#6	STR	9'-11"	89						
V26	6	#6	STR	9'-9"	88						
V27	6	#6	STR	9'-7"	86						
V28	6	#6	STR	9'-6"	86						
V29	6	#6	STR	9'-4"	84						
V30	6	#6	STR	9'-2"	83						
					REINFORCING STEEL						10,386 Lbs.
					ASHLAR CIP FACING						173.0 SQ. FT.
CLASS A CONCRETE BREAKDOWN											
					POUR #1						
					FOOTINGS & KEY						52.8 CU. YDS.
					POUR #2						
					WALL						24.2 CU. YDS.
					CLASS A CONCRETE TOTAL						77.0 CU. YDS.

**BAR TYPES**



GEOTECHNICAL ENGINEER 	ENGINEER  SIGNATURE _____ DATE _____
------------------------------	--

RETAINING WALL REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS	
BAR SIZE	SPLICE LENGTHS
#5	2'-6"

TOTAL BILL OF MATERIALS	
CLASS A CONCRETE	77.0 CU. YDS.
REINFORCING STEEL	10,386 LBS.
PVC COATED 5'-0" HIGH CHAIN LINK FENCE	75.0 LIN. FT.

FOR PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS.

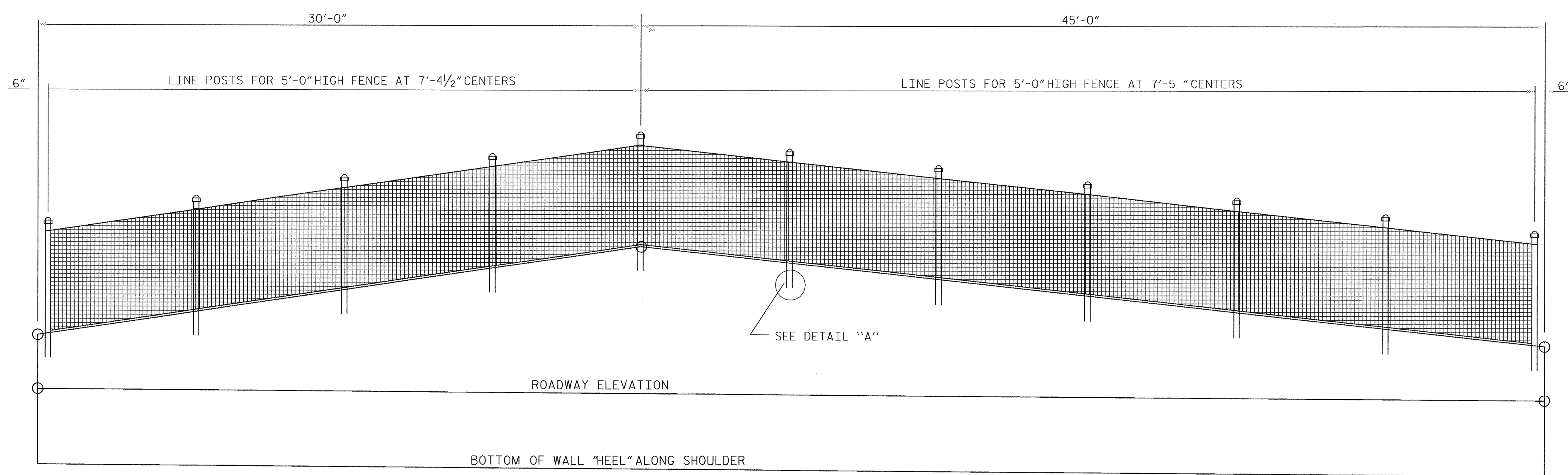
CAST THE EXPOSED CONCRETE FACE OF THE RETAINING WALL LOCATED ABOVE THE PRECAST BARRIER RAIL TO PRODUCE AN ASHLAR STONE PATTERN. PAYMENT FOR THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE COST OF THE CLASS A CONCRETE.

FOR PVC COATED 5'-0" HIGH CHAIN LINK FENCE, SEE SPECIAL PROVISIONS.

**PROJECT NO.:** B-4317  
**WATAUGA COUNTY**  
**STATION:** 16+25.00-L- TO 17+00.00-L-  
 SHEET 4 OF 5

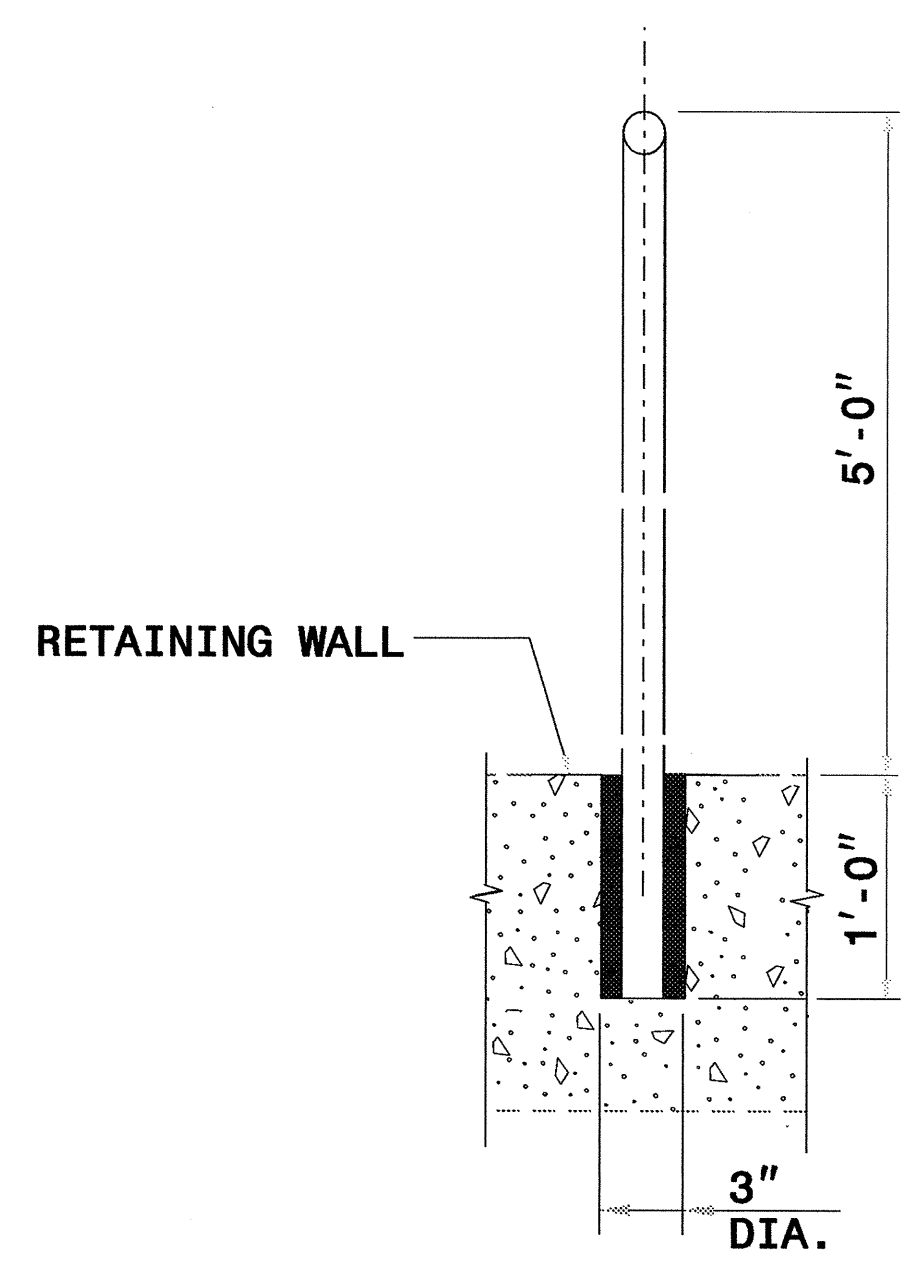
PREPARED BY: E.J. SALVO	DATE: 10/07
REVIEWED BY: S.C. CLARK	DATE: 10/07

<p><b>GEOTECHNICAL ENGINEERING UNIT</b></p> <p>STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH</p>	<p><b>WALL #1 REVERSE CANTILEVER RETAINING WALL</b></p>	SHEET NO. W-4 TOTAL SHEETS 5
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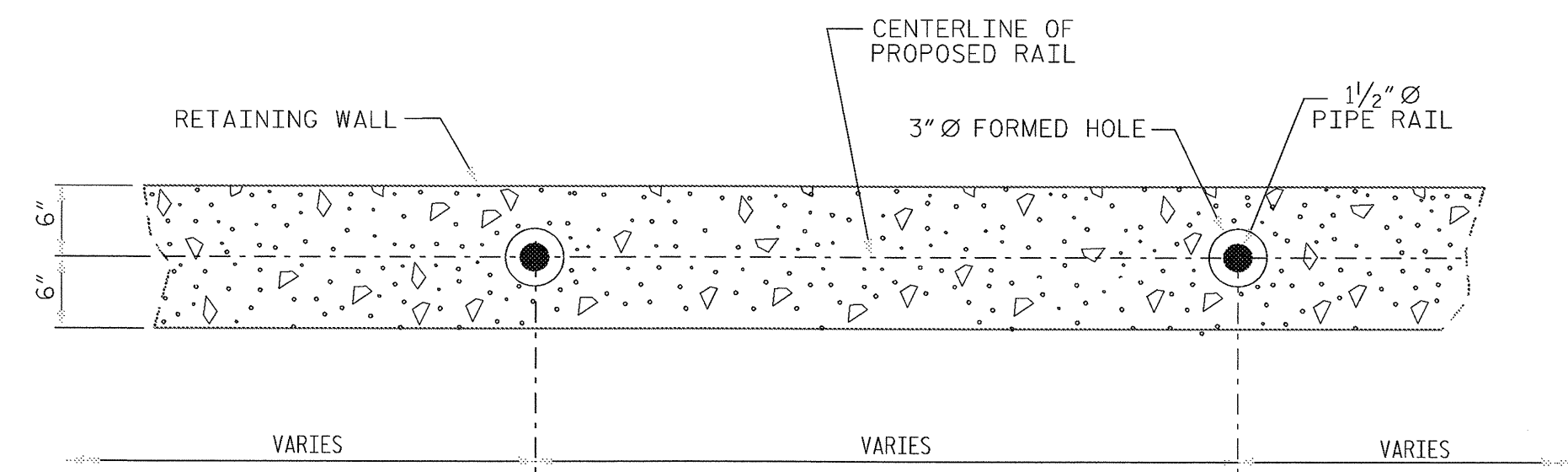


TOTAL BILL OF MATERIAL	
PVC COATED 5'-0" HIGH CHAIN LINK FENCE	75.0 LIN.FT.

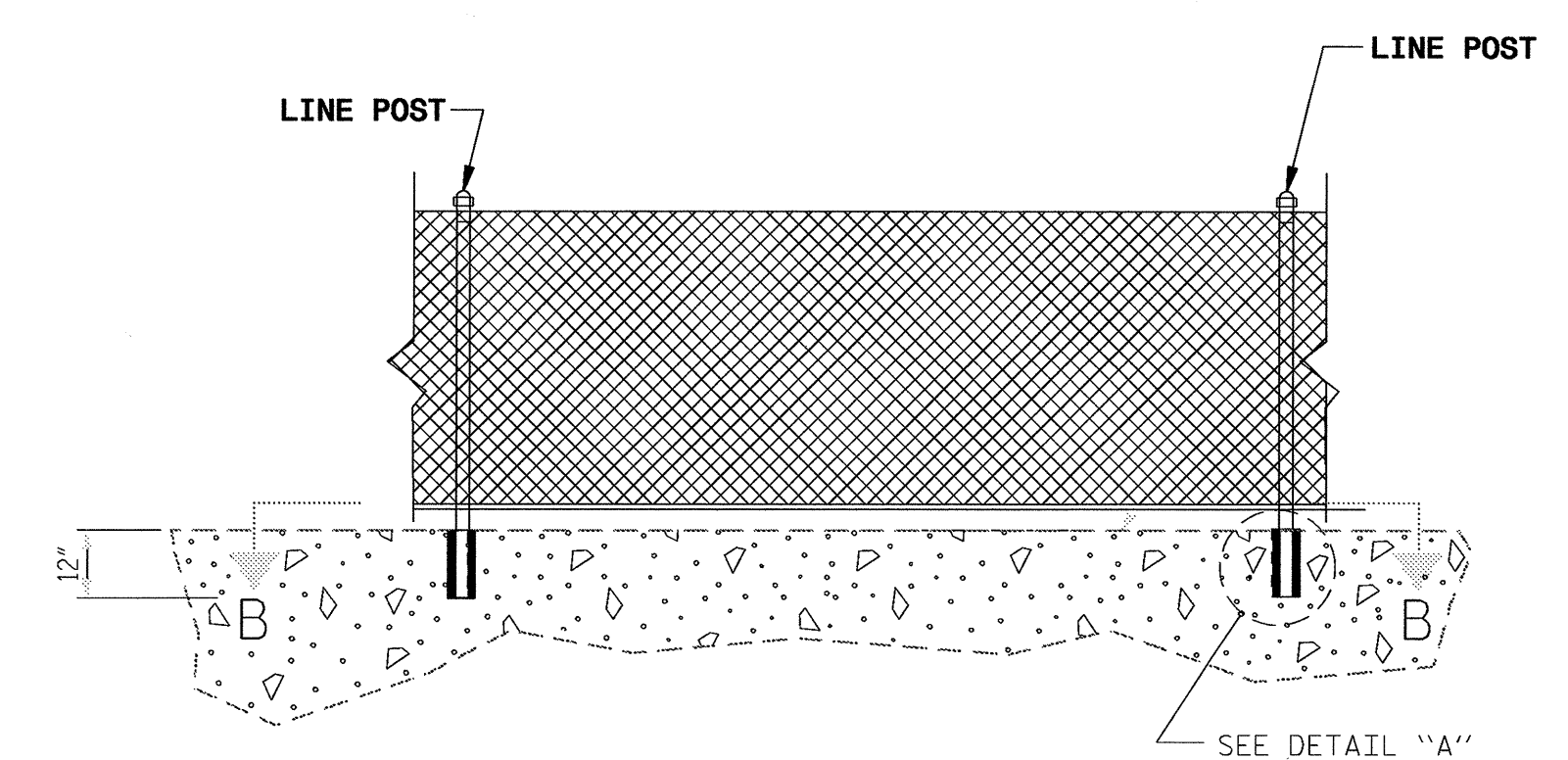
ELEVATION OF PROPOSED CHAIN LINK FENCING



**DETAIL 'A'**



SECTION B-B



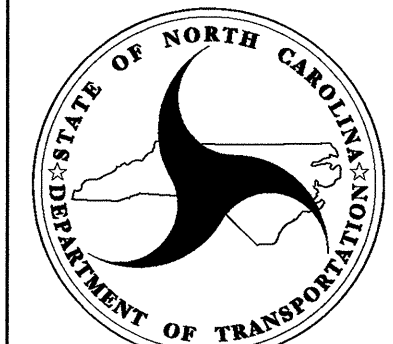
ELEVATION OF PROPOSED CHAIN LINK FENCING  
(TYP. EACH BAY)

NOTES

SEE NCDOT STANDARD 866.01 FOR ADDITIONAL CONSTRUCTION DETAILS AND SPECIFICATIONS

CHAIN LINK FENCE MESH AND COMPONENTS SHALL BE COATED WITH GREEN PVC, AT THE DIRECTION OF THE ENGINEER

PROJECT NO.: **B-4317**  
**WATAUGA** COUNTY  
 STATION: 16+25.00 -L- TO 17+00.00 -L-  
 SHEET 5 OF 5

  
**GEOTECHNICAL ENGINEERING UNIT**  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**WALL #1**  
**REVERSE CANTILEVER**  
**RETAINING WALL**  
 SHEET NO. W-5  
 TOTAL SHEETS 5

PREPARED BY: E.J. SALVO	DATE: 10/07
REVIEWED BY: S.C. CLARK	DATE: 10/07

## 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. 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