

\$DATE\$

**CONTRACT: C202067**

**TIP PROJECT: R-4430**

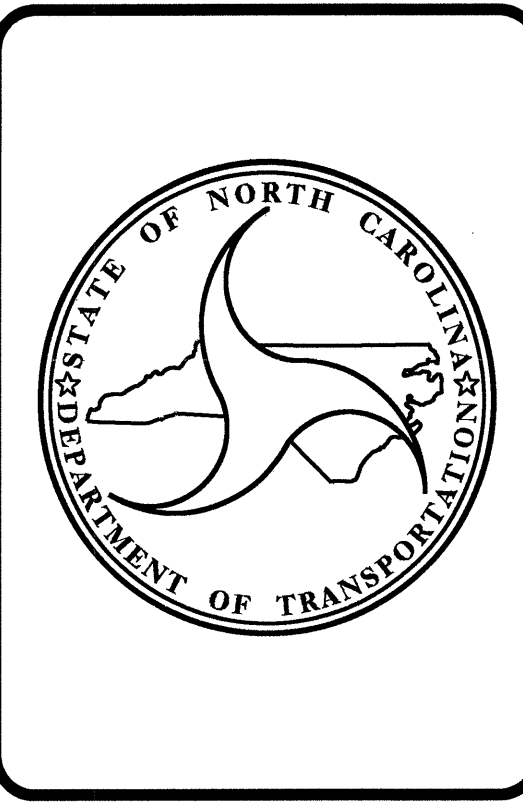
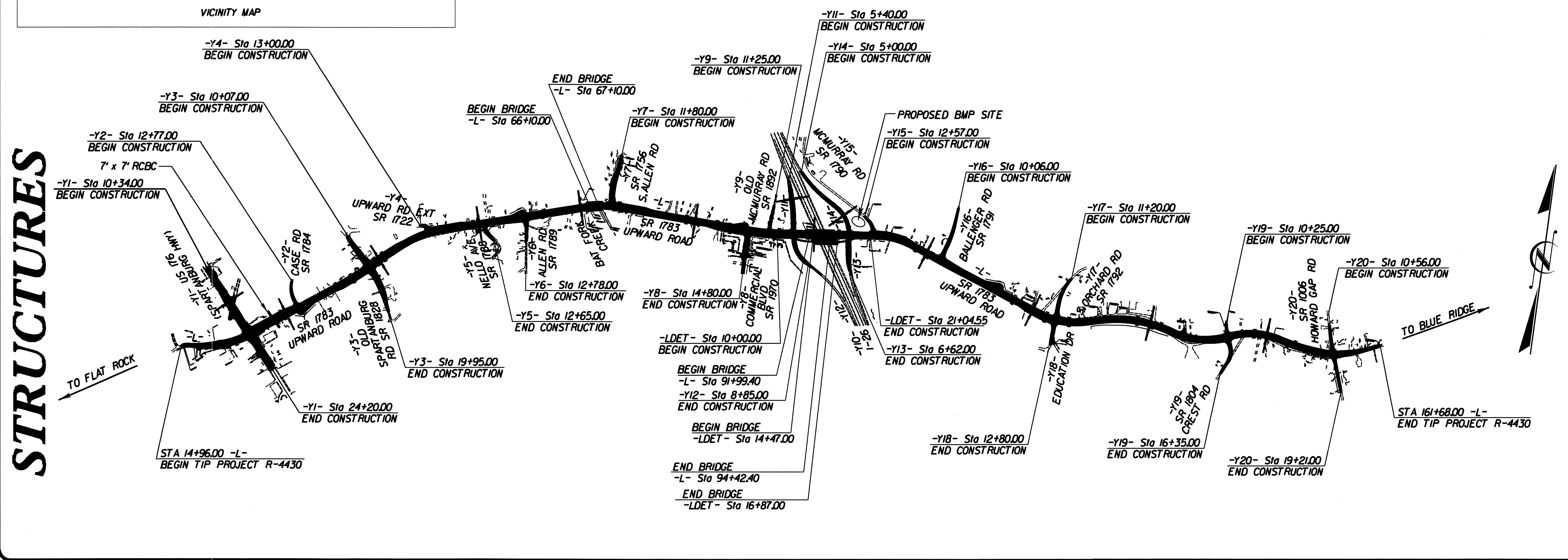
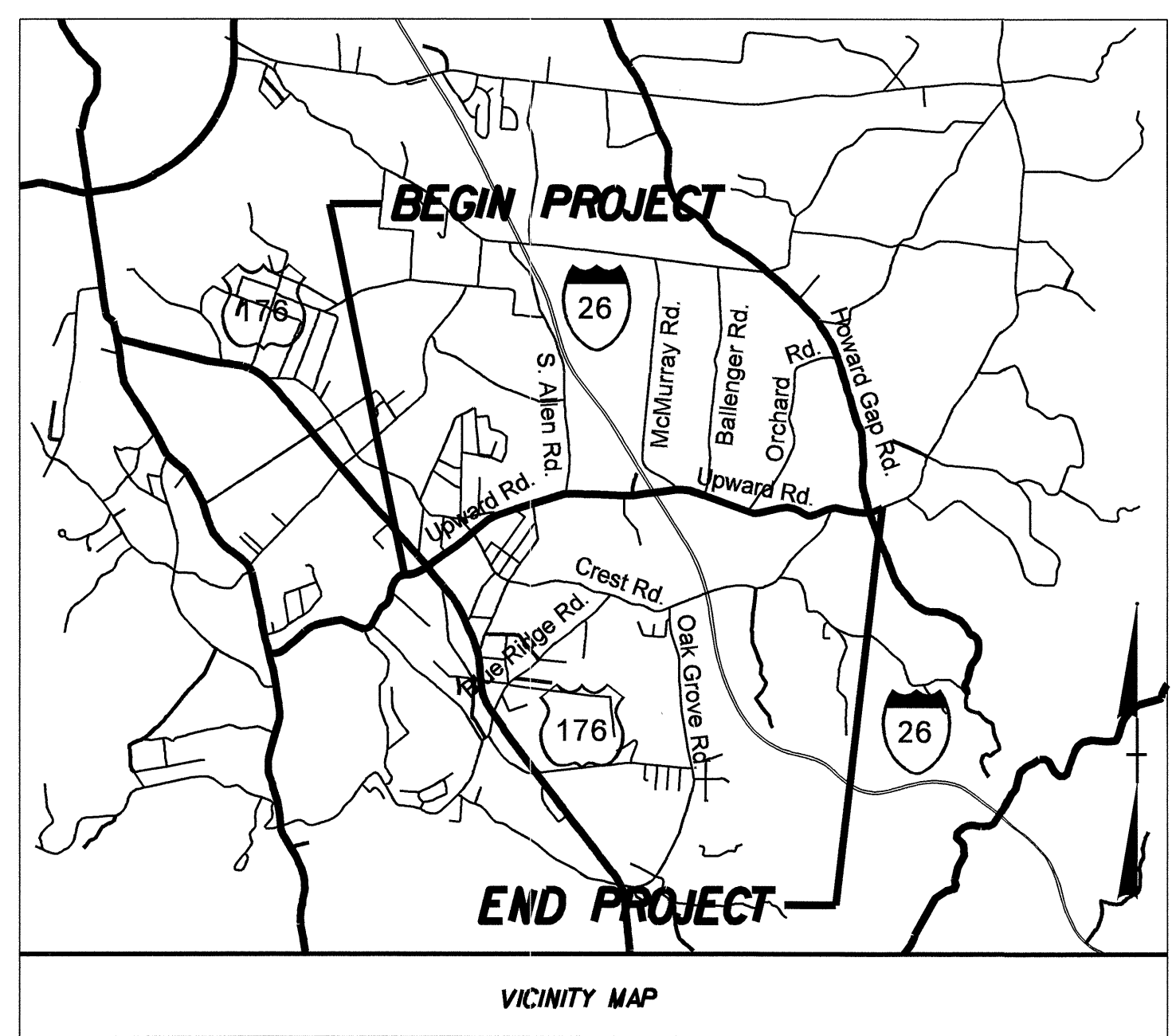
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**HENDERSON COUNTY**

**LOCATION: SR 1783 (UPWARD ROAD) FROM US 176 (SPARTANBURG HWY) TO SR 1006 (HOWARD GAP ROAD)**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNALS, CULVERT, AND STRUCTURES**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4430		
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
34623.1.1	STP-1783 (1)	P.E.	
34623.3.1	STP-1783 (1)	R / W	
34623.3.1	STP-1783 (1)	UTILITIES	
34623.2.2	STP-1783 (3)	CONSTRUCTION	



**DESIGN DATA**

ADT 2009 = 21,400 VPD  
ADT 2030 = 35,800 VPD  
DHV = 10%  
D = 55%  
T = 5% \*  
V = 50 mph

VERTICAL CURVE  
DESIGN EXCEPTIONS

FUNCTIONAL CLASSIFICATION:  
URBAN ARTERIAL

\* (TTST 3% + DUAL 2%)

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT R-4430 = 2.714 MILES  
LENGTH STRUCTURE TIP PROJECT R-4430 = 0.065 MILES  
TOTAL LENGTH TIP PROJECT R-4430 = 2.779 MILES

PLANS PREPARED IN THE OFFICE OF:  
**DIVISION OF HIGHWAYS**

2006 STANDARD SPECIFICATIONS

**LETTING DATE:**  
MARCH 16, 2010

**Q. H. NGUYEN, P.E.**  
PROJECT ENGINEER

**J. R. DUGGINS, JR., P.E.**  
PROJECT DESIGN ENGINEER

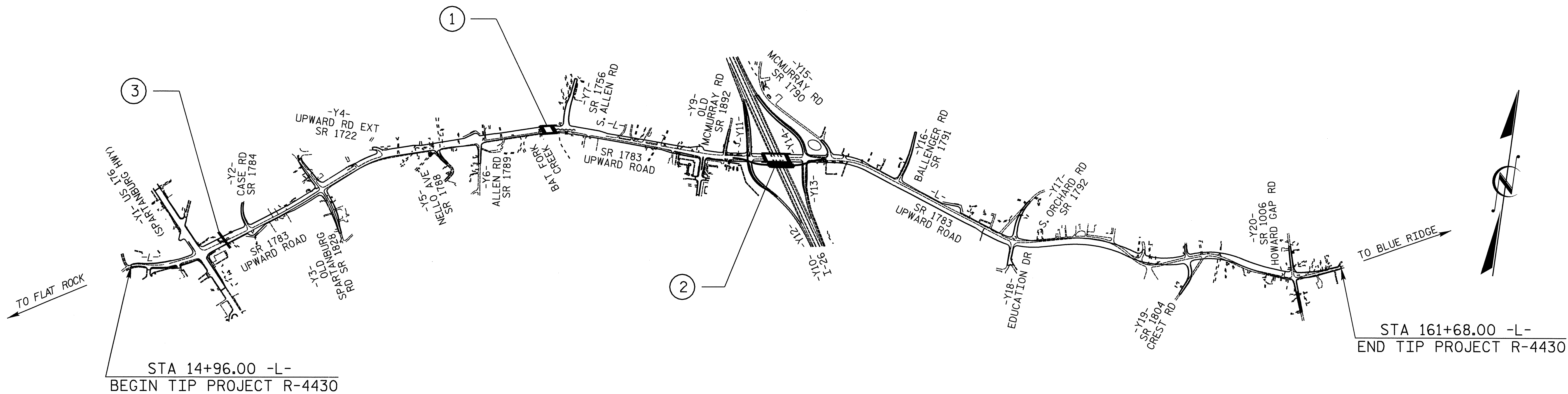
**STRUCTURE DESIGN UNIT**  
1000 BIRCH RIDGE DRIVE  
RALEIGH, N.C. 27610

**DIVISION OF HIGHWAYS**  
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER  
DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

APPROVED  
DIVISION ADMINISTRATOR

P.E.  
DATE



— INDEX —

STR. NO.	STATION	DESCRIPTION	SHEET NUMBERS
1	66+60.00 -L-	BRIDGE ON SR 1783 (UPWARD ROAD) OVER BAT FORK CREEK BETWEEN SR 1789 AND SR 1756	S-1 THRU S-36
2	93+31.40 -L-	BRIDGE ON SR 1783 (UPWARD ROAD) OVER I-26 BETWEEN SR 1892 AND SR 1790	S-37 THRU S-71
3	26+43.00 -L-	CULVERT FOR "UNNAMED TRIBUTARY TO KING CREEK" UNDER SR 1783 (UPWARD ROAD) BETWEEN US 176 AND SR 1784	C-1 THRU C-10

PROJECT NO. R-4430  
HENDERSON COUNTY

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STRUCTURE INDEX

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

DRAWN BY : A. SORSENGINH DATE : 11/05/08  
CHECKED BY : JR DUGGINS DATE : 11/05/08



**NOTES**

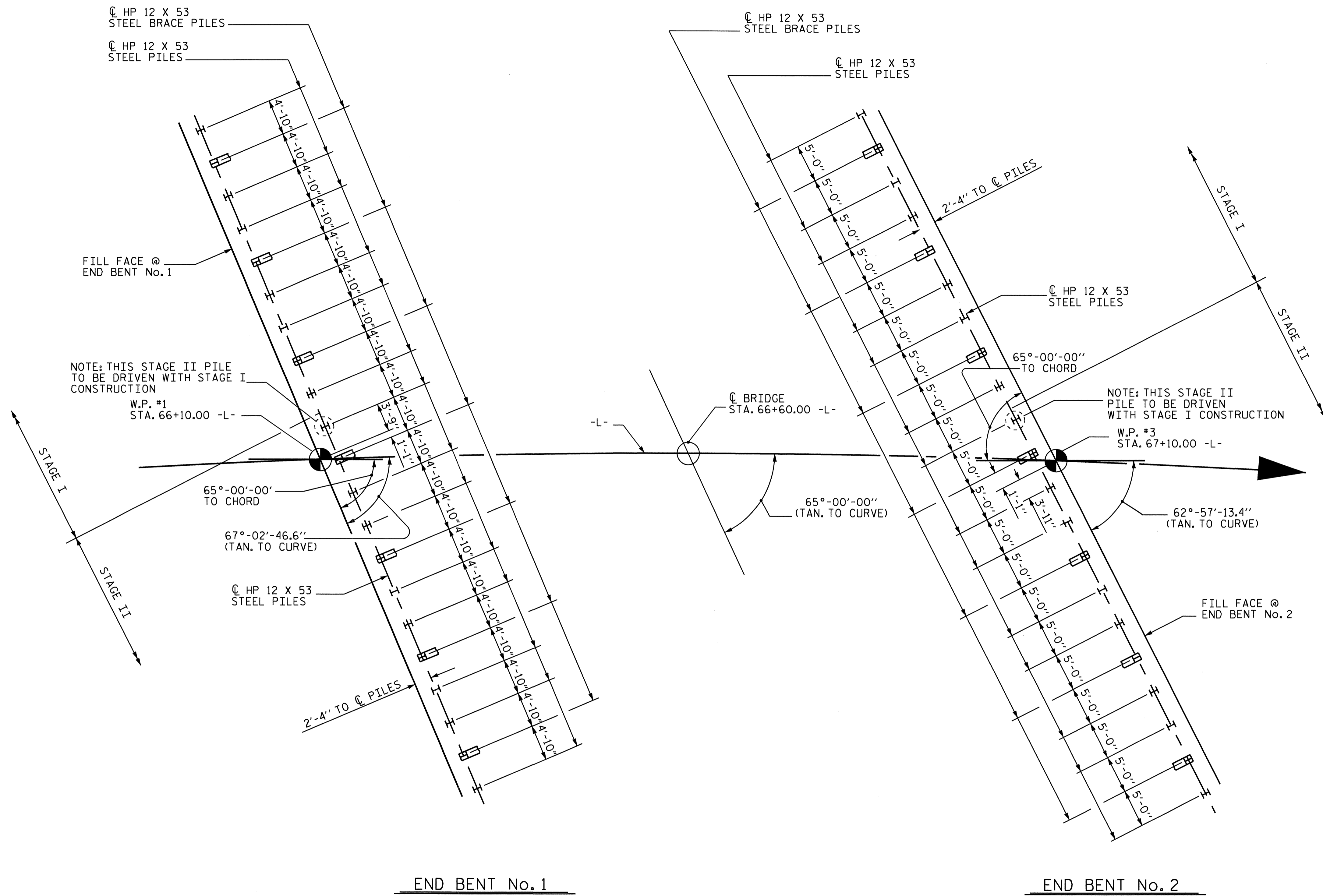
DRIVE PILES AT END BENT No.1 TO A REQUIRED BEARING CAPACITY OF 120 TONS PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO.

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

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 PILES, SEE SPECIAL PROVISIONS.



END BENT No. 1

END BENT No. 2

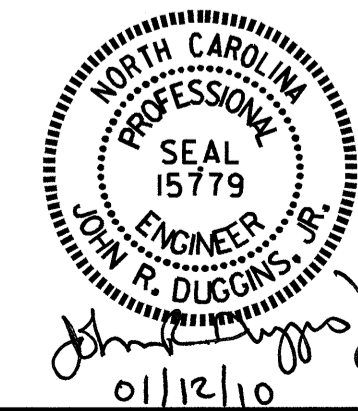
**FOUNDATION LAYOUT**

DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF CAP.  
 BRACE PILES ARE BATTERED 3 : 12

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

SHEET 2 OF 4

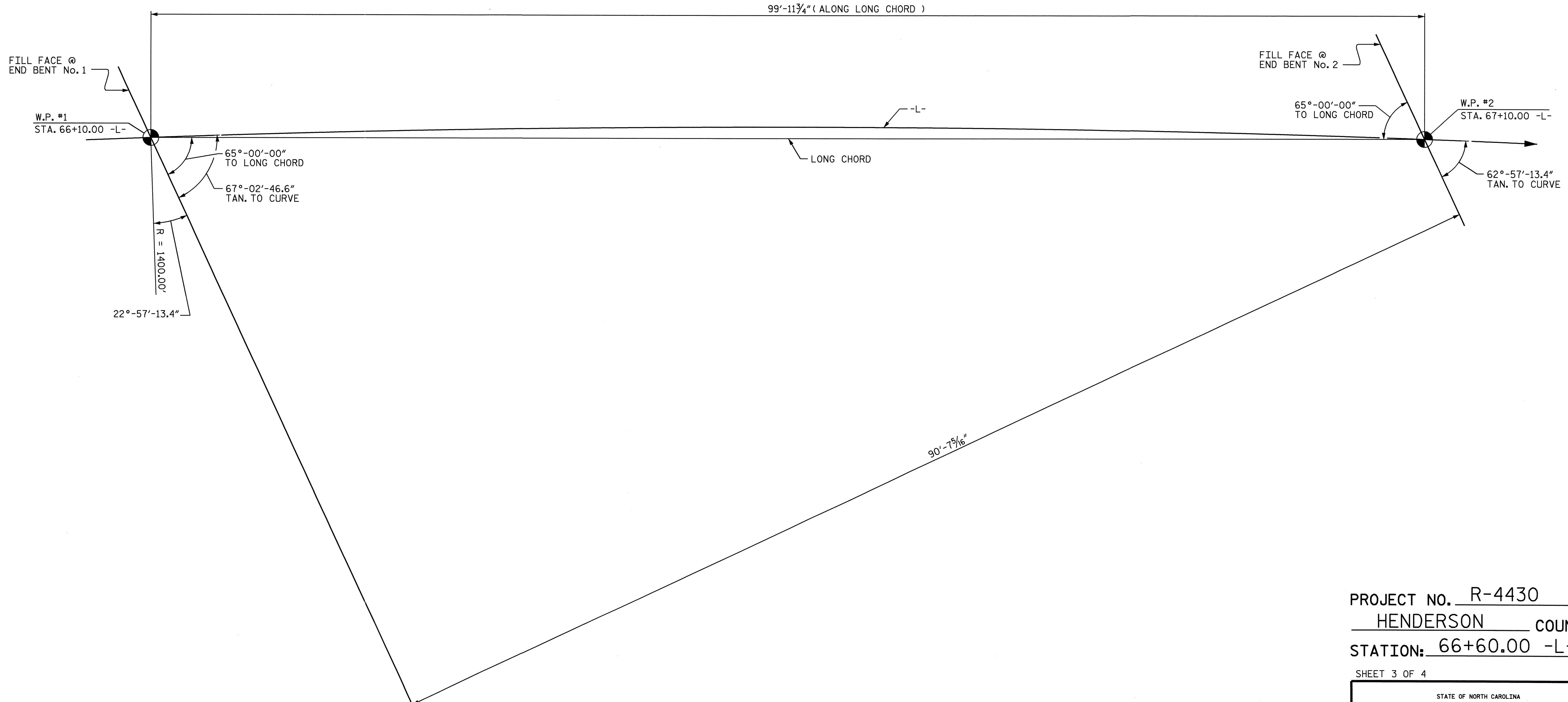
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR  
 BRIDGE ON SR 1783  
 (UPWARD ROAD)  
 OVER BAT FORK CREEK  
 BETWEEN SR 1789 AND SR 1756



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-2
2			4			71

DRAWN BY : M. POOLE DATE : 10/08  
 CHECKED BY : J. R. DUGGINS DATE : 10/08

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 ddodge



**LONG CHORD LAYOUT**

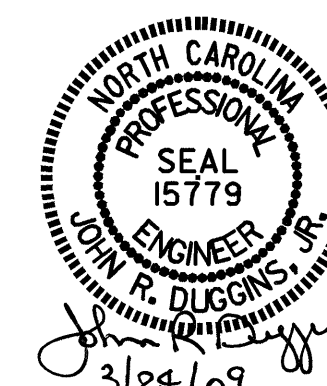
NOTE: END BENTS ARE PARALLEL

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 FOR  
 BRIDGE ON SR 1783  
 (UPWARD ROAD)  
 OVER BAT FORK CREEK  
 BETWEEN SR 1789 AND SR 1756

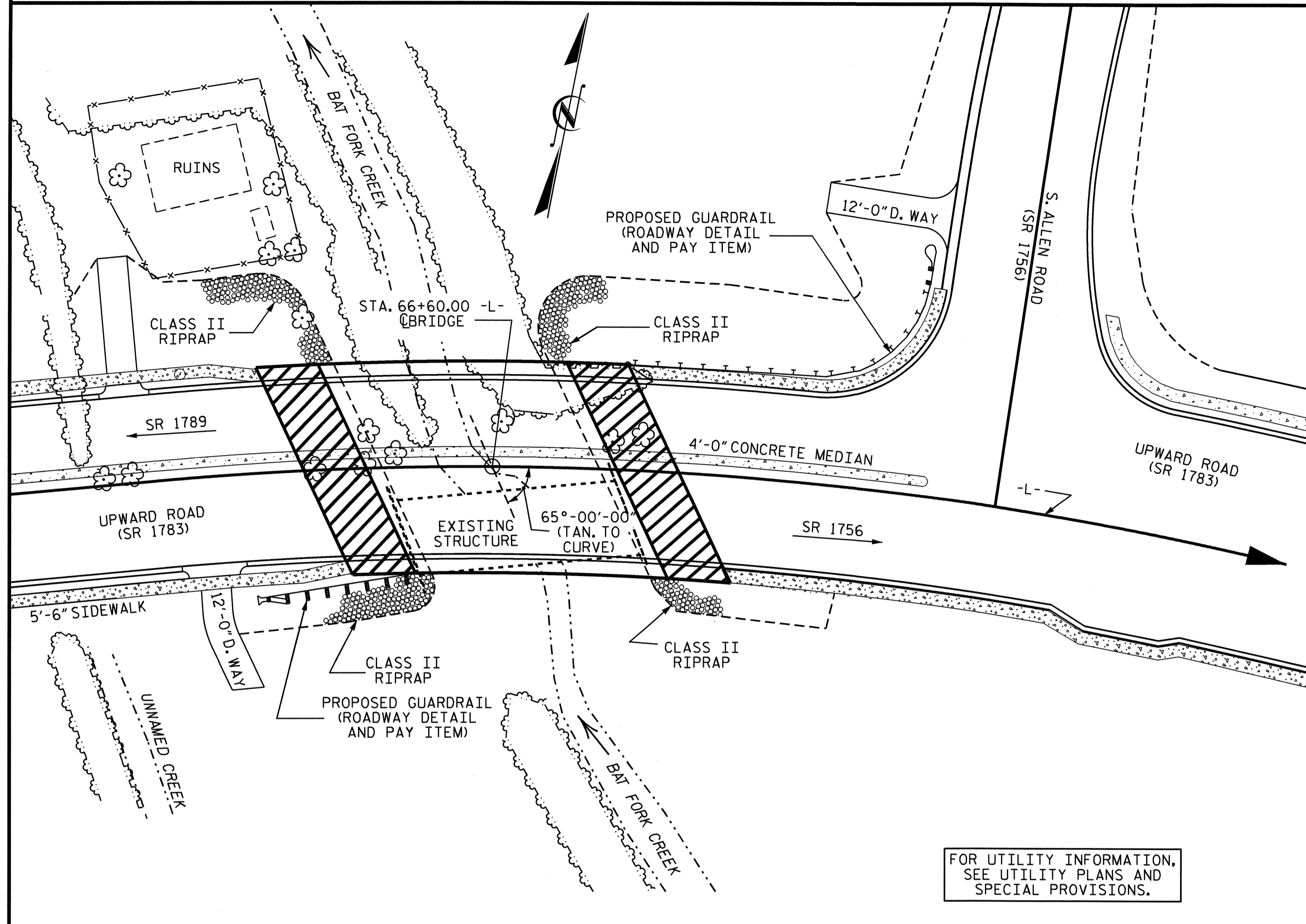


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 CHECKED BY : J.R. DUGGINS DATE : 12/08

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			71

STR. #1



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

NOTES

ASSUMED LIVE LOAD = HS20 OR ALTERNATE LOADING, EXCEPT THAT THE GIRDERS HAVE BEEN DESIGNED FOR HS25.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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.

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

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING STRUCTURE CONSISTING OF 3 SPANS (1 SPAN @ 30'-3", 1 @ 30'-0", 1 @ 30'-3") WITH A PRESTRESSED CONCRETE CORED SLAB SUPERSTRUCTURE AND A CLEAR ROADWAY WIDTH OF 29'-5" ON A SUBSTRUCTURE CONSISTING OF REINFORCED CONCRETE CAP ON STEEL H-PILES BENTS AND END BENTS AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT 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 MATERIAL SHOWN IN THE CROSS-HATCHED AREA (SEE SHEET 1 OF 4) SHALL BE EXCAVATED FOR A DISTANCE OF 50 FEET TO EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 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.

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 ARTICLE 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.

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.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWING: FOR PROJECT 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 SPLICES WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

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

FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

HYDRAULIC DATA

DESIGN DISCHARGE	=	1,890 C.F.S.
FREQUENCY OF DESIGN FLOOD	=	50 YRS.
DESIGN HIGH WATER ELEVATION	=	2,095.4 FT.
DRAINAGE AREA	=	5.52 SQ. MI.
BASIC DISCHARGE (Q100)	=	2,150 C.F.S.
BASIC HIGH WATER ELEVATION	=	2,095.8 FT.

OVERTOPPING FLOOD DATA

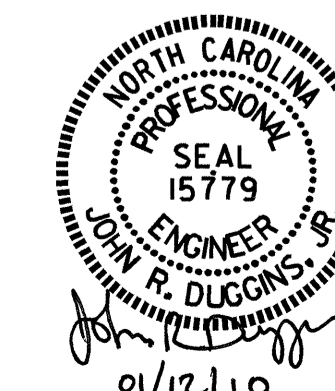
OVERTOPPING DISCHARGE	=	? C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	=	500 YRS.
OVERTOPPING FLOOD ELEVATION	=	2,100.6 FT.

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	3 BAR METAL RAIL	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	EVAZOTE JOINT SEALS
	LUMP SUM	LUMP SUM	SO. FT.	SO. FT.	CU. YDS.	LUMP SUM	LBS.	APPROX. LBS.	NO.	LIN. FT.	LIN. FT.	SO. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE	LUMP SUM		8,508	9,139		LUMP SUM		329,500		179.23			LUMP SUM	LUMP SUM
END BENT NO. 1					54.7		8,400		21	415		278		
END BENT NO. 2					57.1		8,427		21	570		289		
TOTAL	LUMP SUM	LUMP SUM	8,508	9,139	111.8	LUMP SUM	16,827	329,500	42	985	179.23	567	LUMP SUM	LUMP SUM

DRAWN BY : A.L. FIGUEROA DATE : 11-18-08  
 CHECKED BY : J.D. DUGGINS DATE : 11-19-08

11-JAN-2010 14:58  
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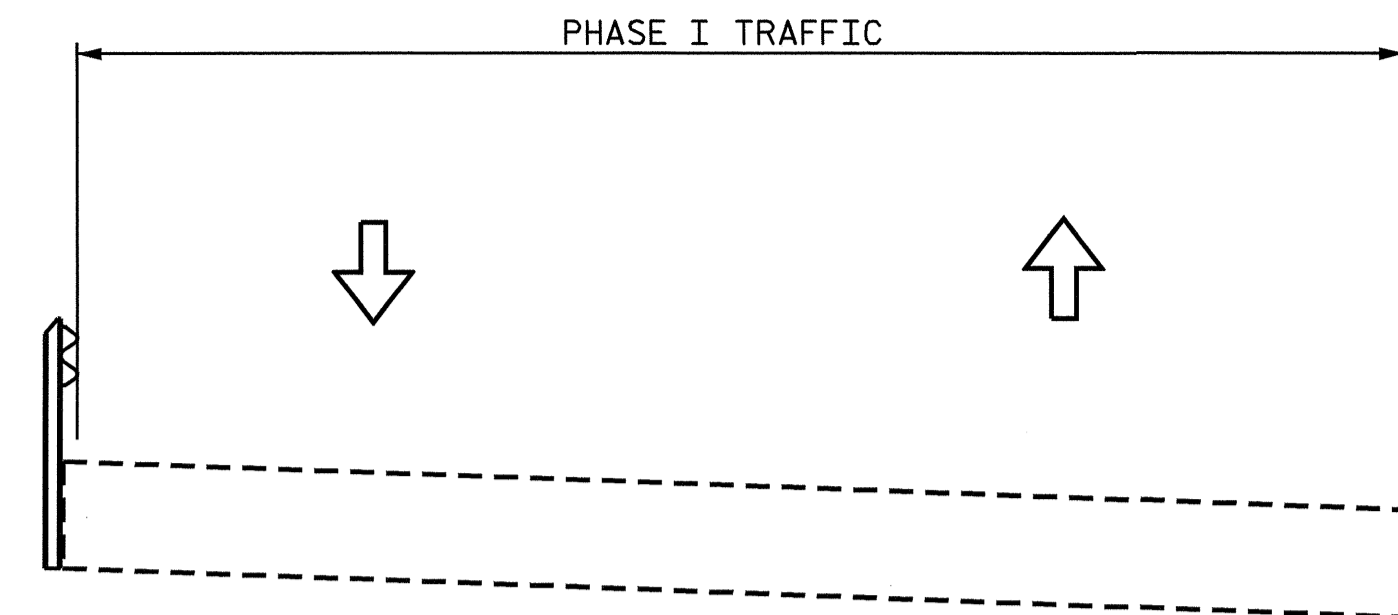
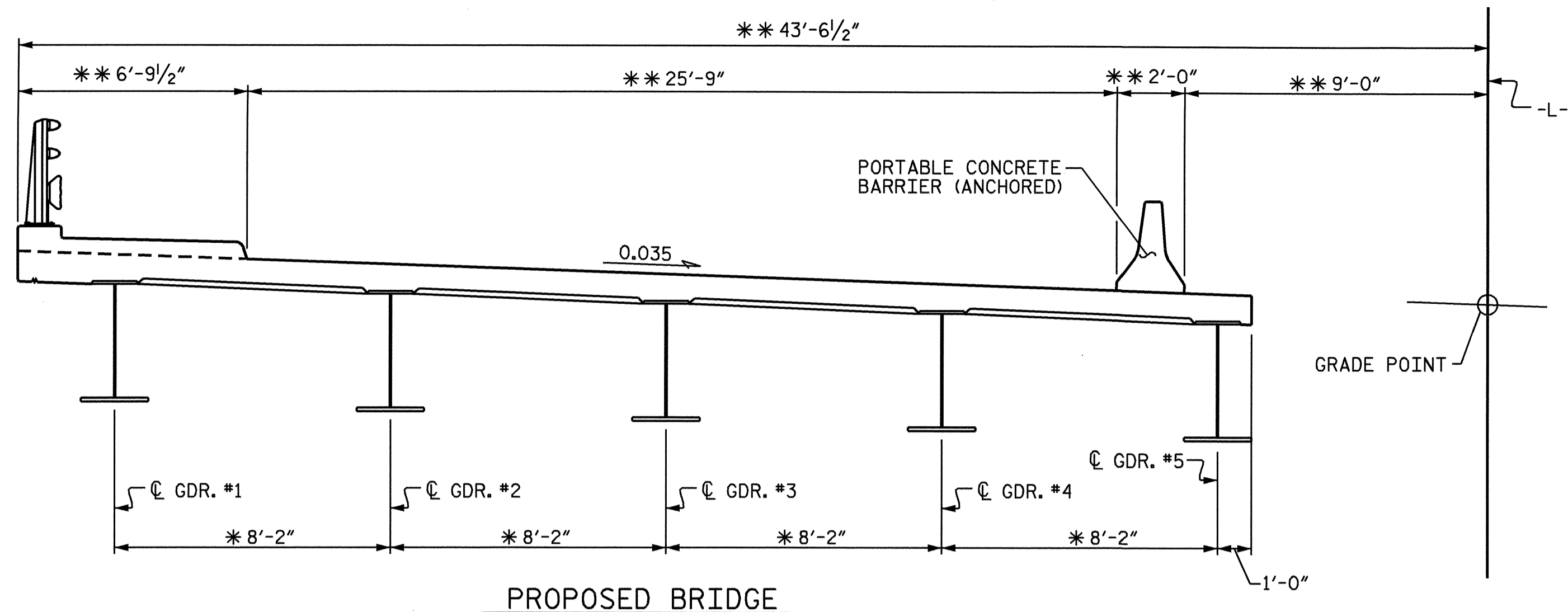
PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 66+60.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR  
 BRIDGE ON SR 1783  
 (UPWARD ROAD)  
 OVER BAT FORK CREEK  
 BETWEEN SR 1789 AND SR 1756

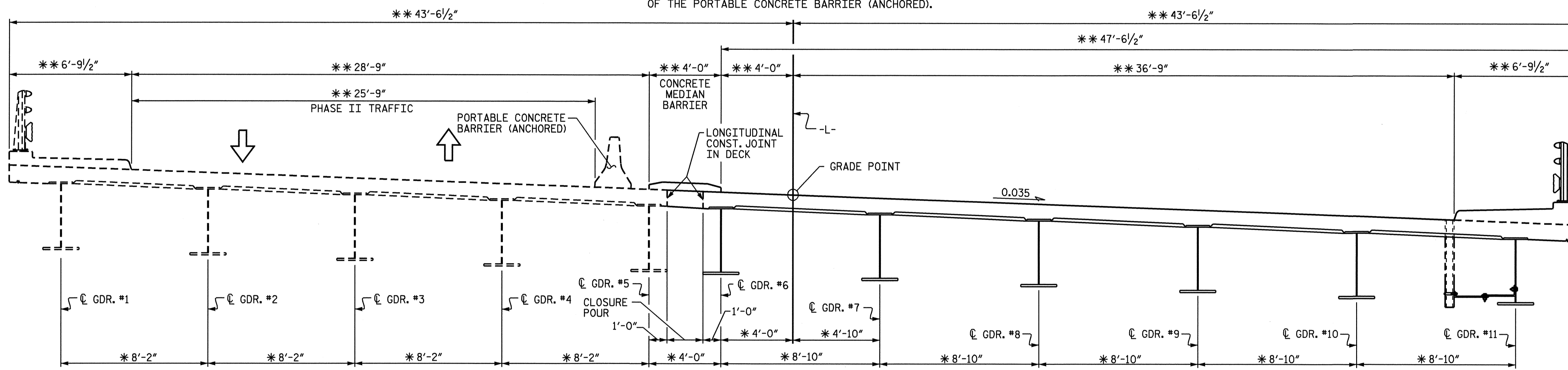
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2			4			

STR. #1

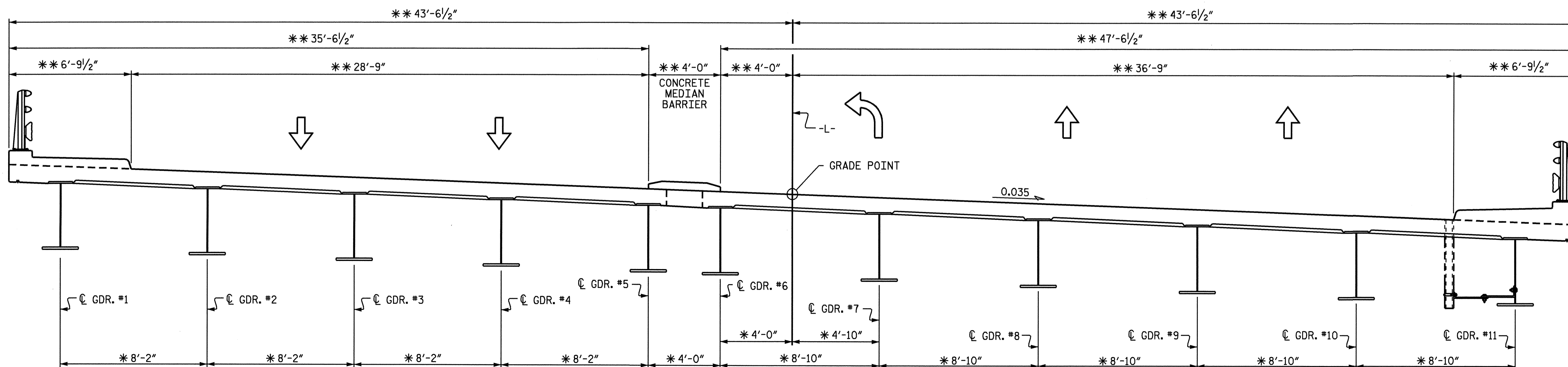


**STAGE I CONSTRUCTION**

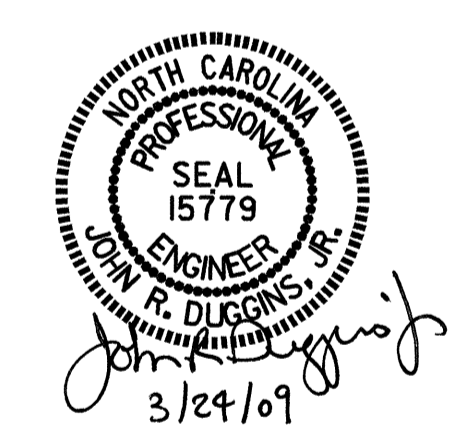
SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE PORTABLE CONCRETE BARRIER (ANCHORED).



**STAGE II CONSTRUCTION**



**FINAL TYPICAL SECTION**



PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**CONSTRUCTION SEQUENCE**

FOR BRIDGE ON SR 1783  
 (UPWARD ROAD) OVER  
 BAT FORK CREEK BETWEEN  
 SR 1789 AND SR 1756

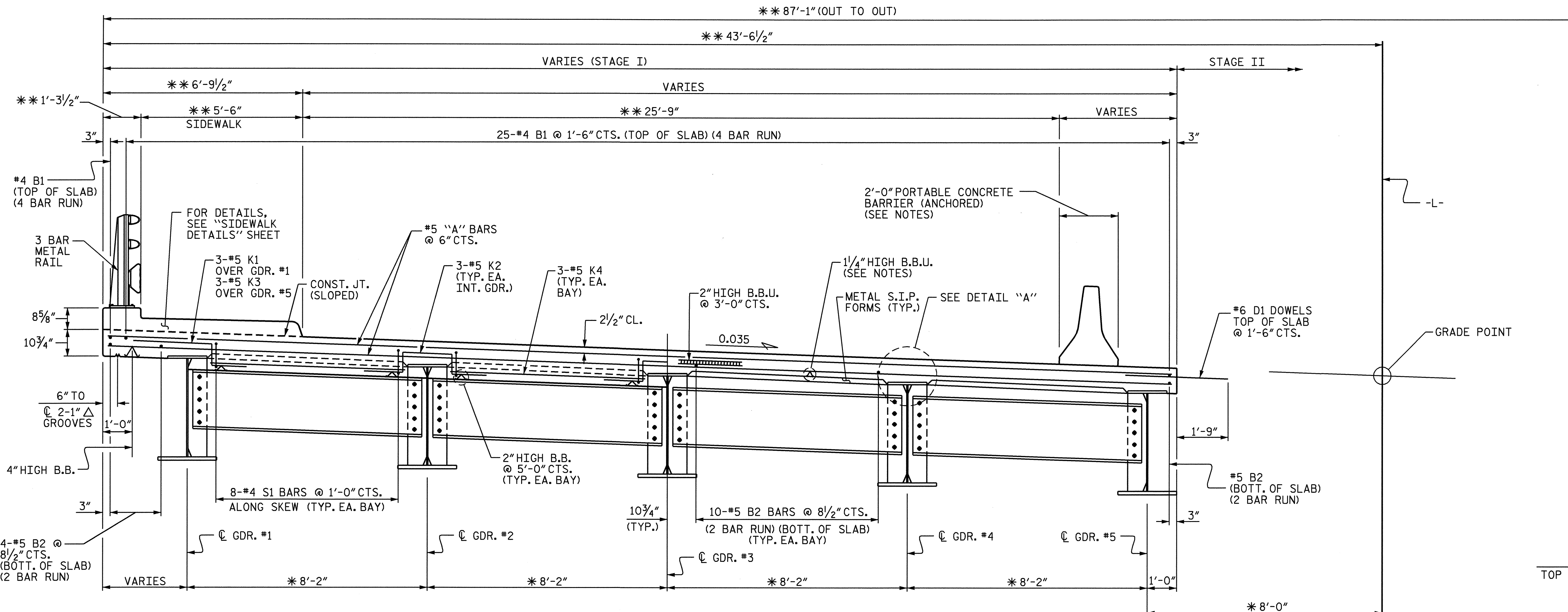
DRAWN BY : D. HODGE DATE : 11/08  
 CHECKED BY : J.R. DUGGINS DATE : 11/08

\* DIMENSIONS RADIAL THROUGH WORKPOINTS  
 \*\* RADIAL DIMENSIONS

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REVISIONS						SHEET NO.
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1			3			5
2			4			7

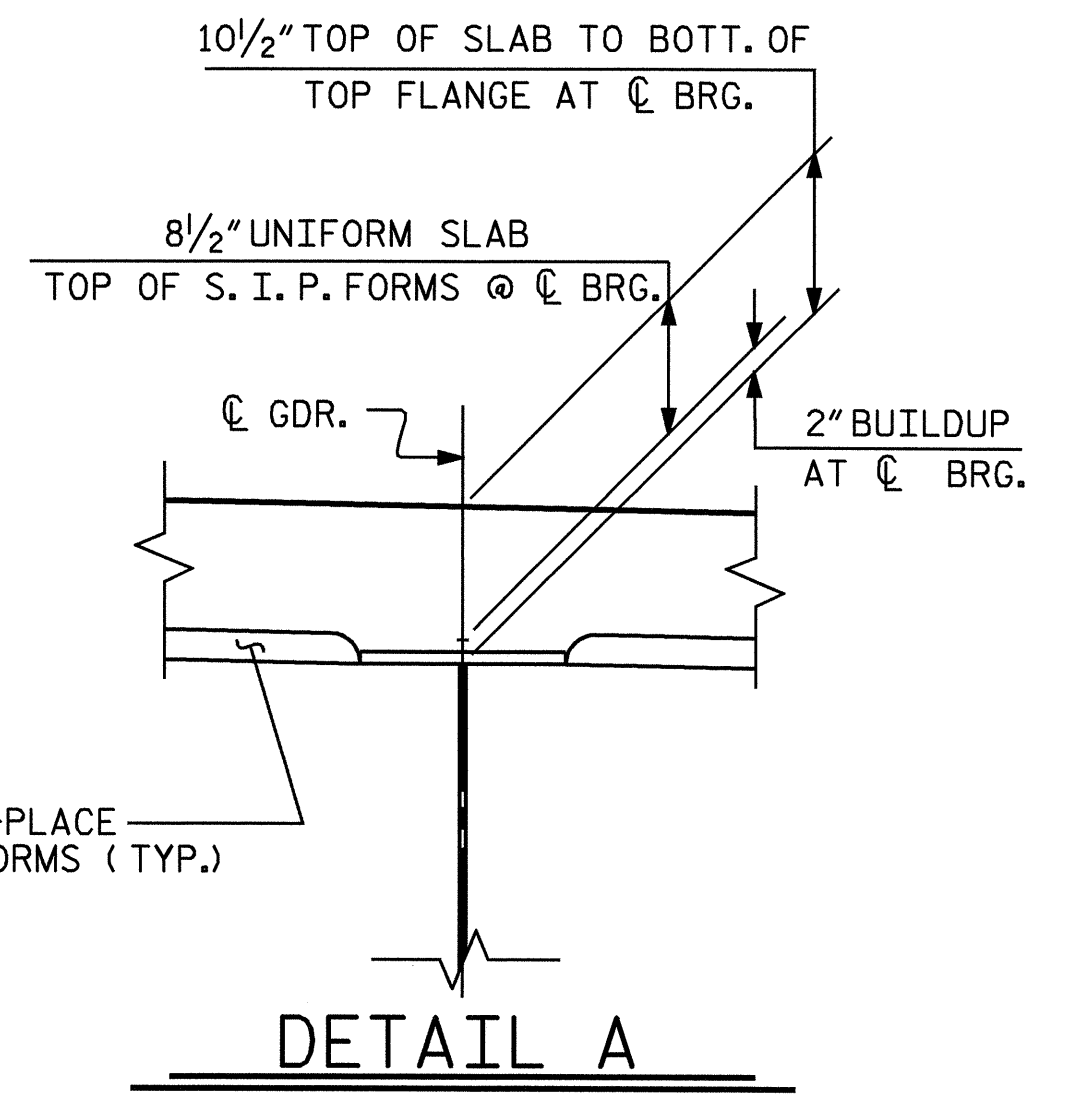
STR #1



HALF-SECTION SHOWING END BENT DIAPHRAGMS

HALF-SECTION SHOWING INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION (STAGE I)



\* DIMENSIONS RADIAL THROUGH WORKPOINTS  
 \*\* RADIAL DIMENSIONS

NOTES

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

DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP SLAB REINFORCING STEEL.

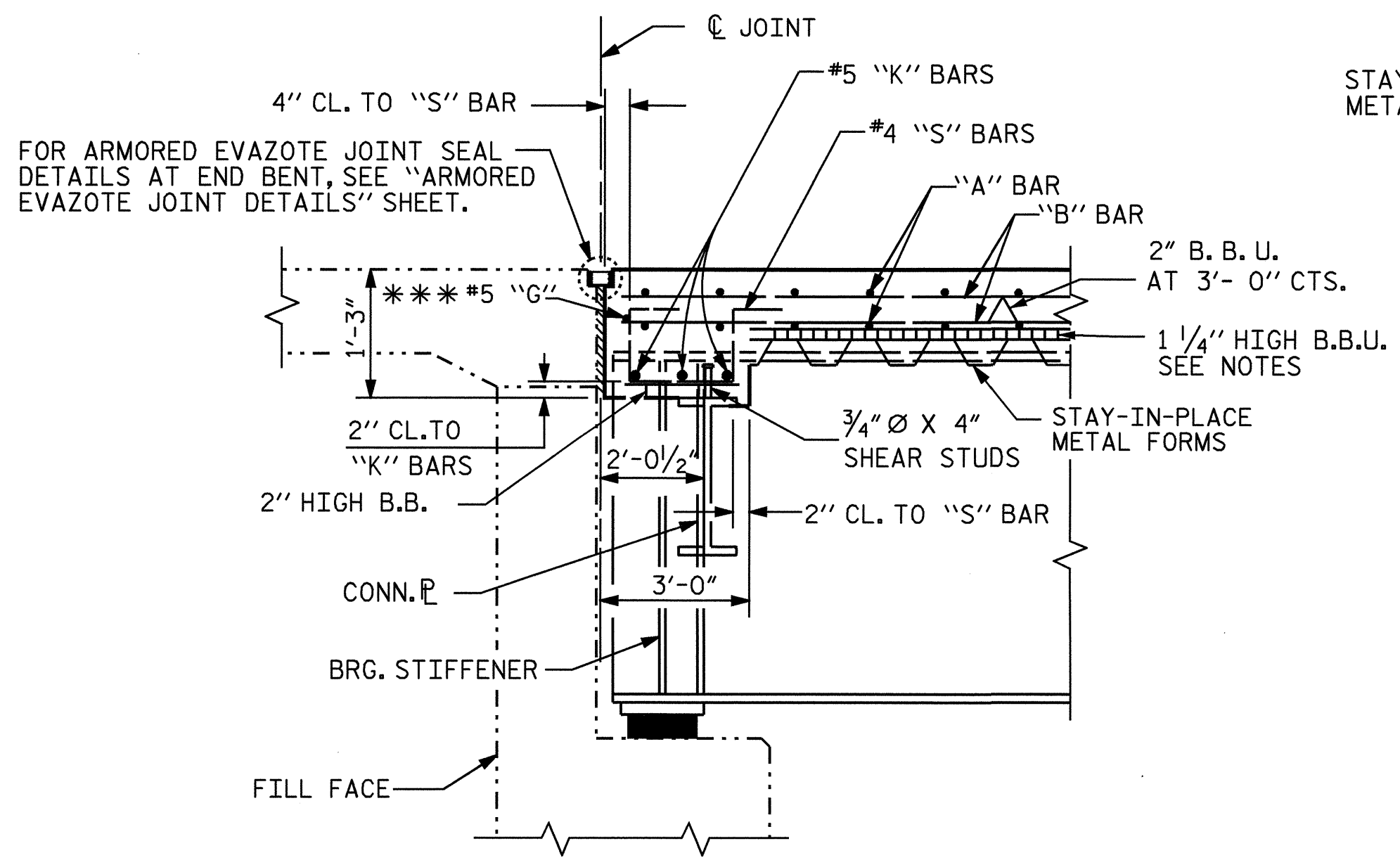
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED DOWELS IN PLACE OF #6 D1 DOWELS. LEVEL I FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE DOWELS IS 26.4 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

SIDEWALK SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT STAGE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

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.

DIRECTION OF CASTING DECK CONCRETE SHALL BE FROM THE FIXED BEARING END TOWARD THE EXPANSION BEARING END OF THE SPAN.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE PORTABLE CONCRETE BARRIER (ANCHORED).

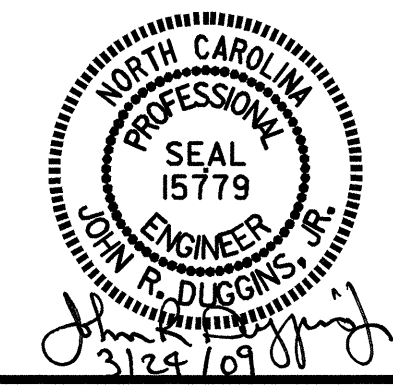


SECTION THRU END BENT DIAPHRAGM

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

DRAWN BY : D. HODGE DATE : 9/08  
 CHECKED BY : J.R. DUGGINS DATE : 11/08

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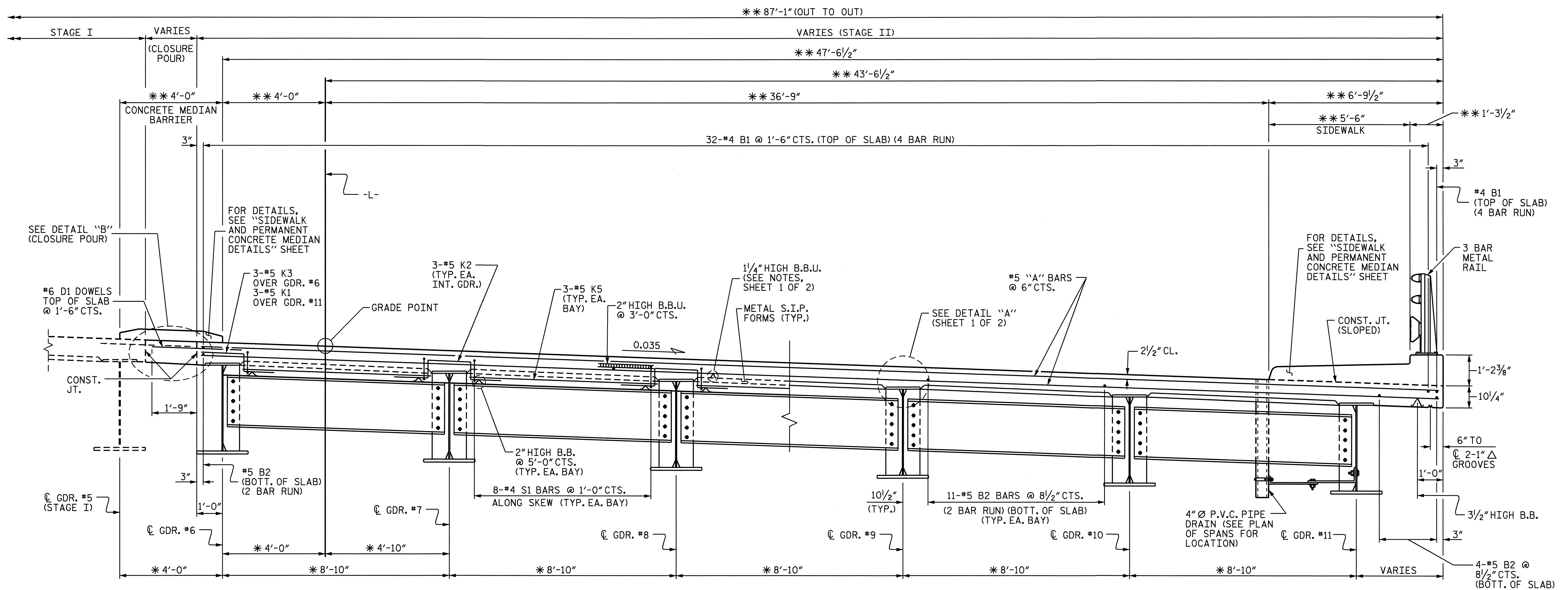
PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 66+60.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					5-6
TOTAL SHEETS					71

STR. #1





HALF-SECTION SHOWING END BENT DIAPHRAGMS

HALF-SECTION SHOWING INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION (STAGE II)

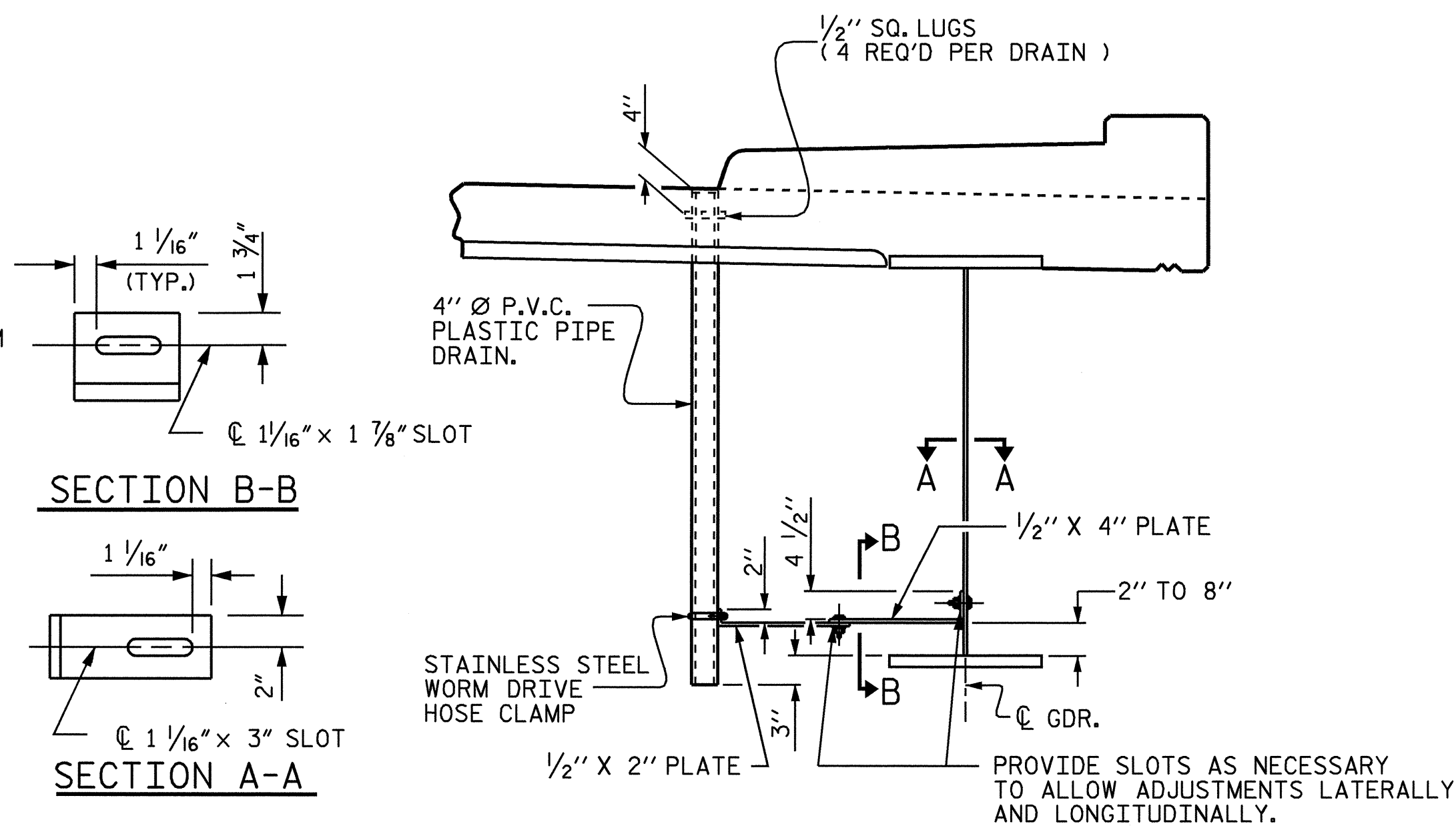
\* DIMENSIONS RADIAL THROUGH WORKPOINTS  
 \*\* RADIAL DIMENSIONS

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

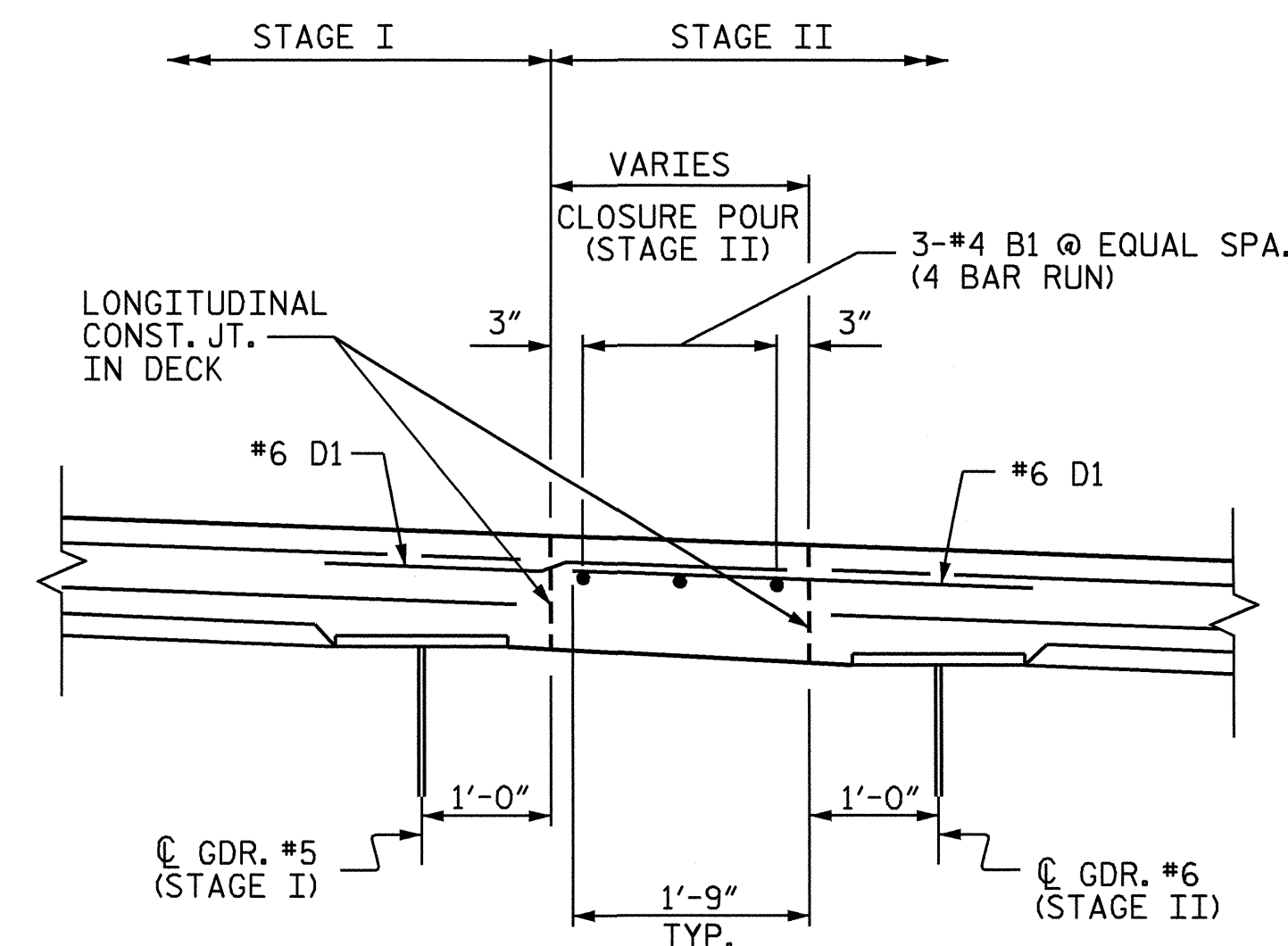
TOP OF FLOOR DRAIN TO BE SET 3/8" BELOW SURFACE OF SLAB.

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.

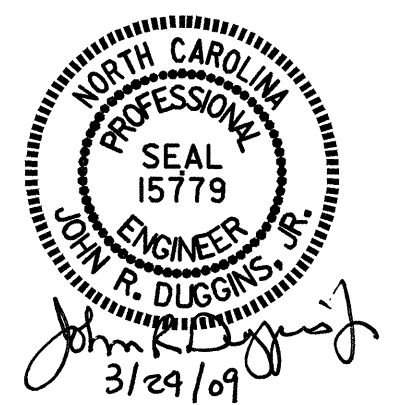
BOLT SIZE TO BE SAME AS DIAPHRAGM AND CROSSFRAME CONNECTIONS. STAINLESS STEEL WORM DRIVE HOSE CLAMP SHALL BE COMMERCIAL QUALITY.



DRAIN CONNECTOR DETAIL



DETAIL "B"



PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 66+60.00 -L-  
 SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

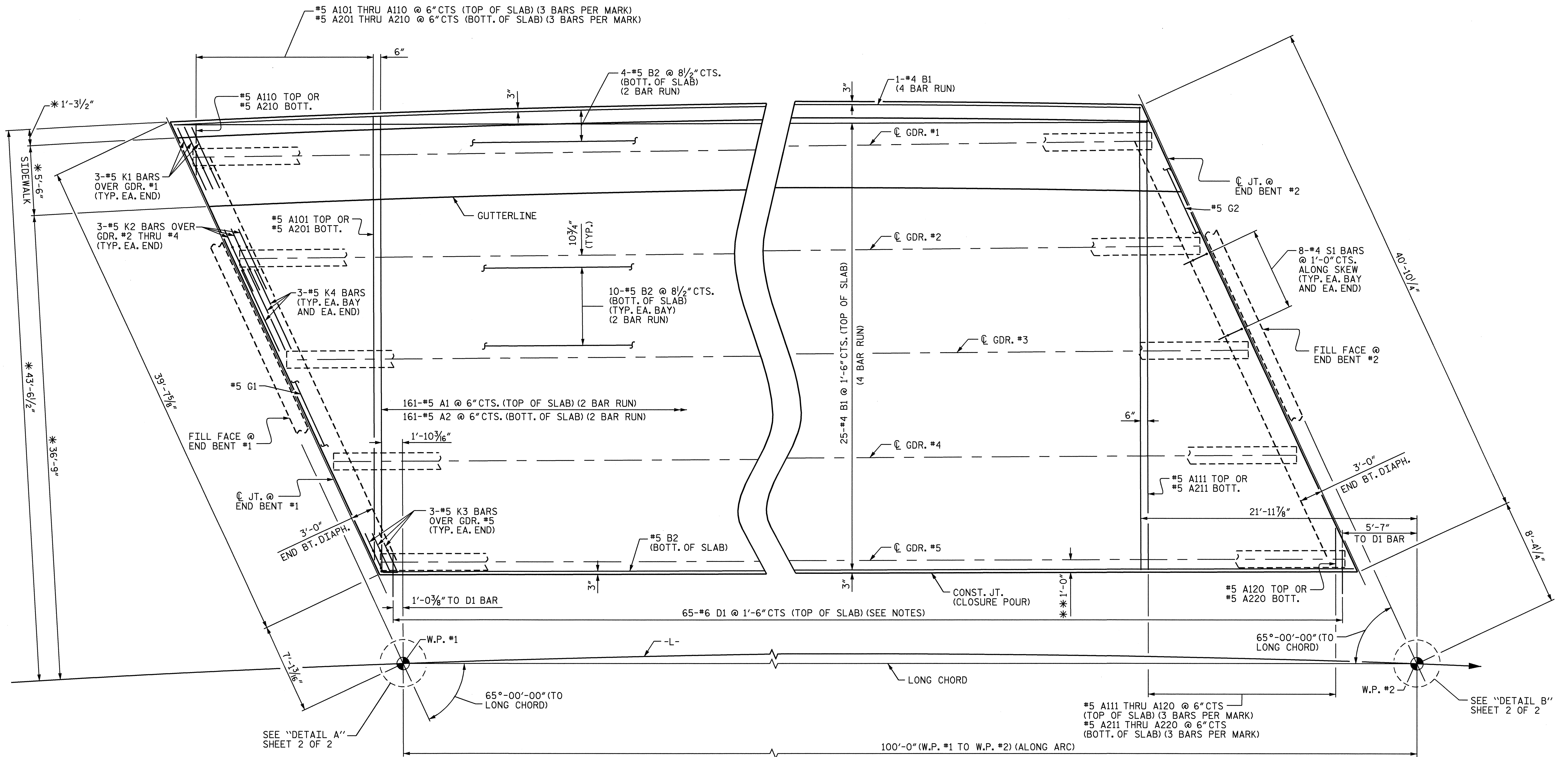
SUPERSTRUCTURE  
 TYPICAL SECTION

DRAWN BY : D. HODGE DATE : 9/08  
 CHECKED BY : J.R. DUGGINS DATE : 11/08

20-MAR-2009 14:46  
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 dhodge

REVISIONS						SHEET NO. 5-7
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 71
2			4			

STR. #1



**PLAN OF SPAN**

**(STAGE I)**

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

\* #5 "A" BARS PLACED PERPENDICULAR TO LONG CHORD.

THE #6 D1 BARS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE MAIN SLAB REINFORCING STEEL. THE #6 D1 BARS SHALL EXTEND 1'-9" INTO STAGE II CLOSURE POUR.

\* RADIAL DIMENSION

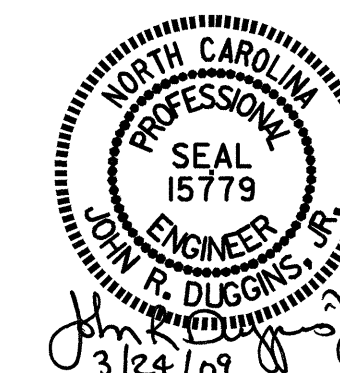
\*\* THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THE CONSTRUCTION JOINT IN THE CLOSURE POUR IS PARALLEL TO G GIRDER #5.

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

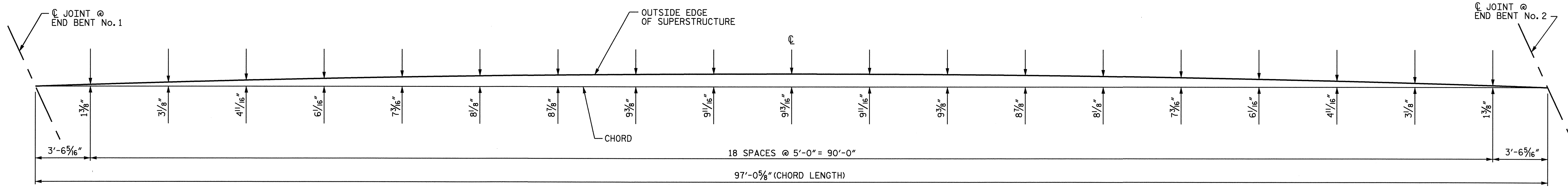
SUPERSTRUCTURE  
 PLAN OF SPAN  
 (STAGE I)



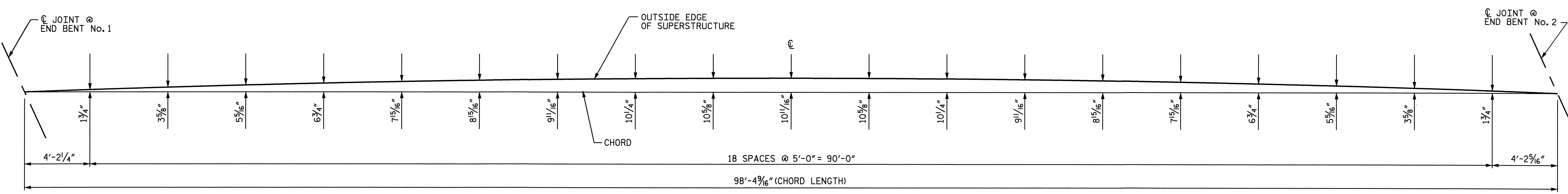
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-8
2			4			71

DRAWN BY: D. HODGE DATE: 9/08  
 CHECKED BY: J.R. DUGGINS DATE: 11/08





ARC OFFSETS - LEFT SIDE (STAGE I)



ARC OFFSETS - RIGHT SIDE (STAGE II)

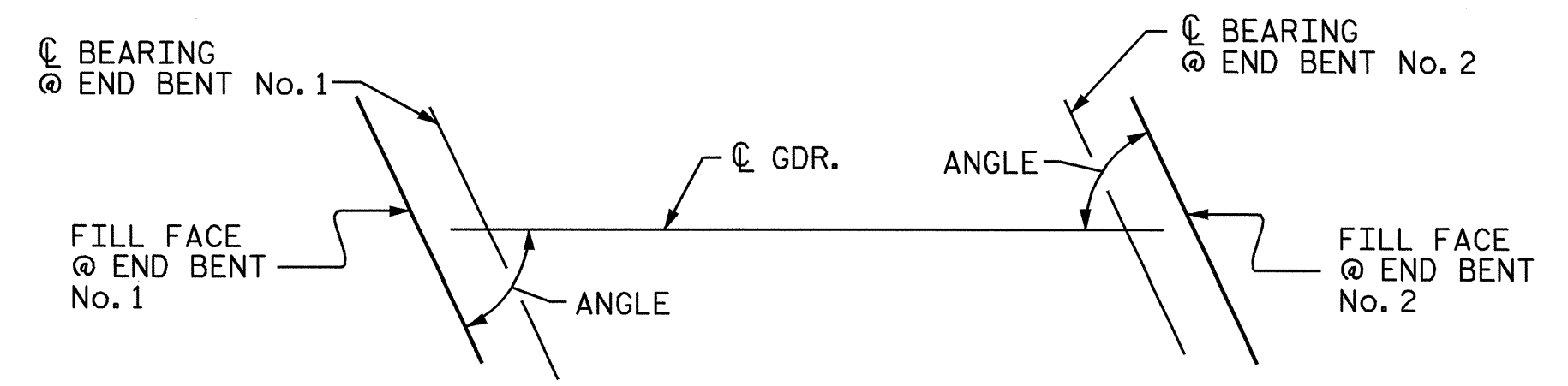
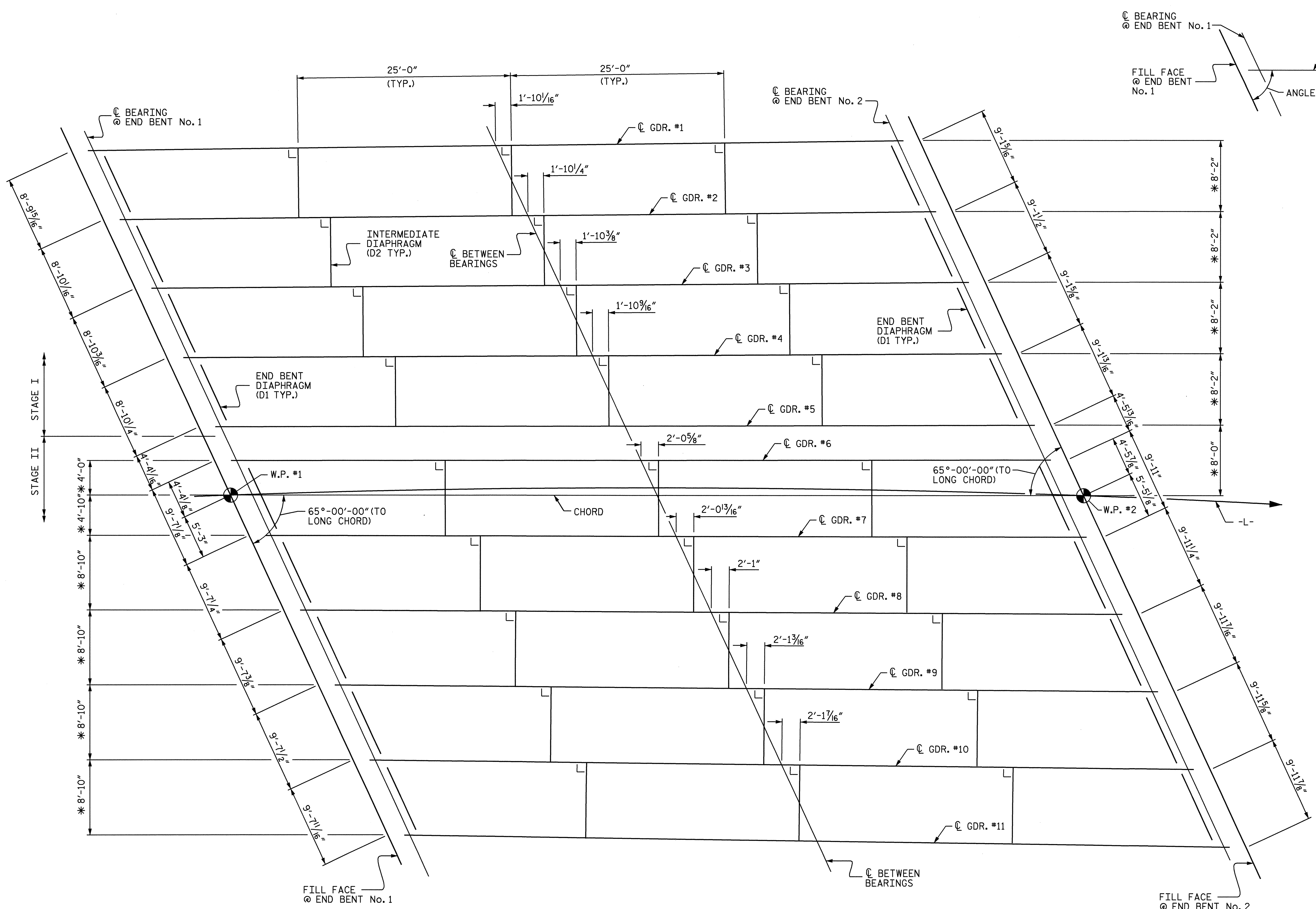
PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE ARC OFFSETS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-10 TOTAL SHEETS 71

3/24/09  
 JOHN R. DUGGINS  
 PROFESSIONAL ENGINEER  
 SEAL 15779

DRAWN BY : D. HODGE DATE : 10/08  
 CHECKED BY : J.R. DUGGINS DATE : 11/08

20-MAR-2009 14:55  
 F:\structures\4430\str1\dhodge\R4430\_sd\_ArcOffsets.dgn  
 dhodge



GIRDER ANGLES	
GIRDER	ANGLE
1	65°-45'-11"
2	65°-36'-20"
3	65°-27'-23"
4	65°-18'-18"
5	65°-09'-07"
6	65°-04'-34"
7	64°-54'-26"
8	64°-44'-09"
9	64°-33'-44"
10	64°-23'-09"
11	64°-12'-25"

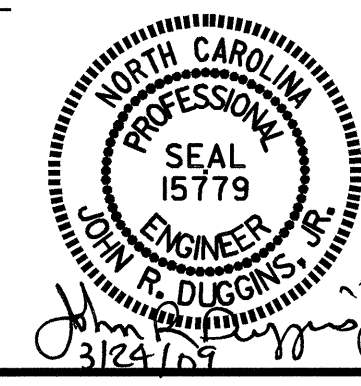
\* DIMENSIONS RADIAL THRU WORKPOINTS

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 FRAMING PLAN**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-11
2			4			71

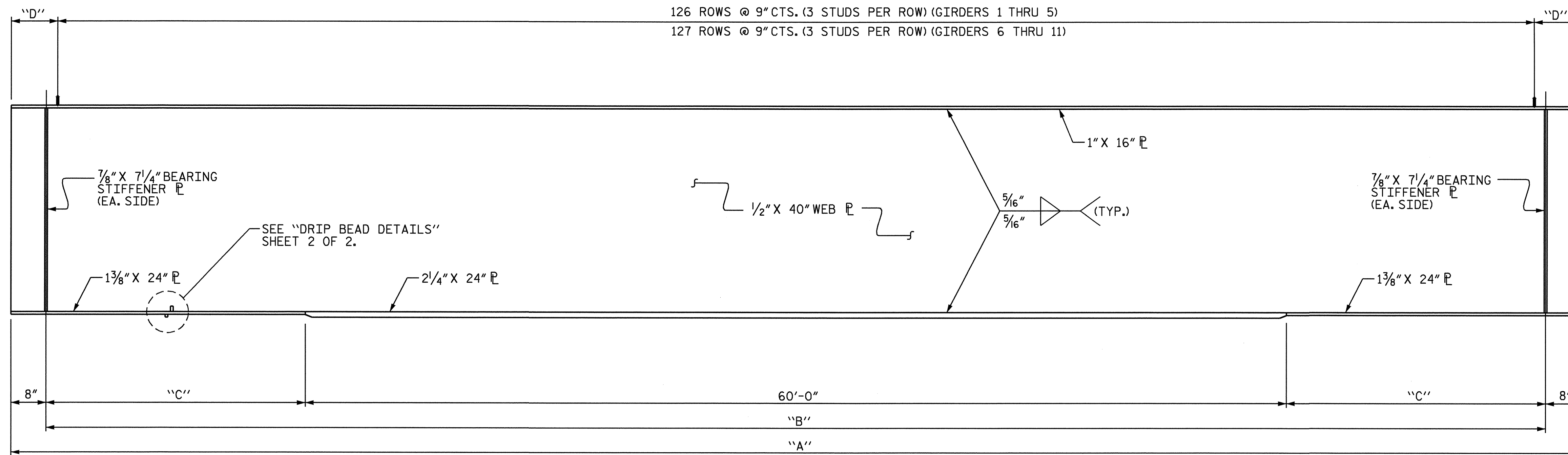


DRAWN BY: D. HODGE DATE: 11/08  
 CHECKED BY: J.R. DUGGINS DATE: 12/08

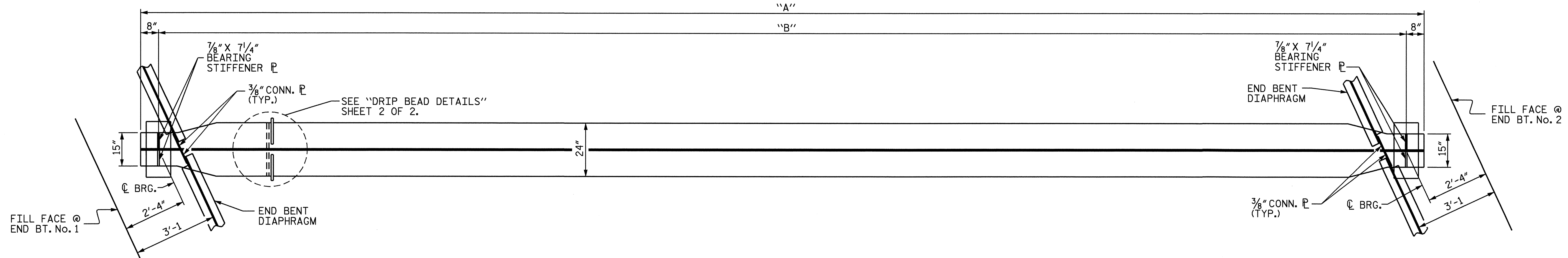
FIXED  
 E2, P2

FRAMING PLAN

EXP.  
 E1, P1

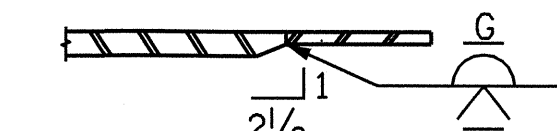


**GIRDER ELEVATION**  
(INTERMEDIATE DIAPHRAGMS NOT SHOWN)



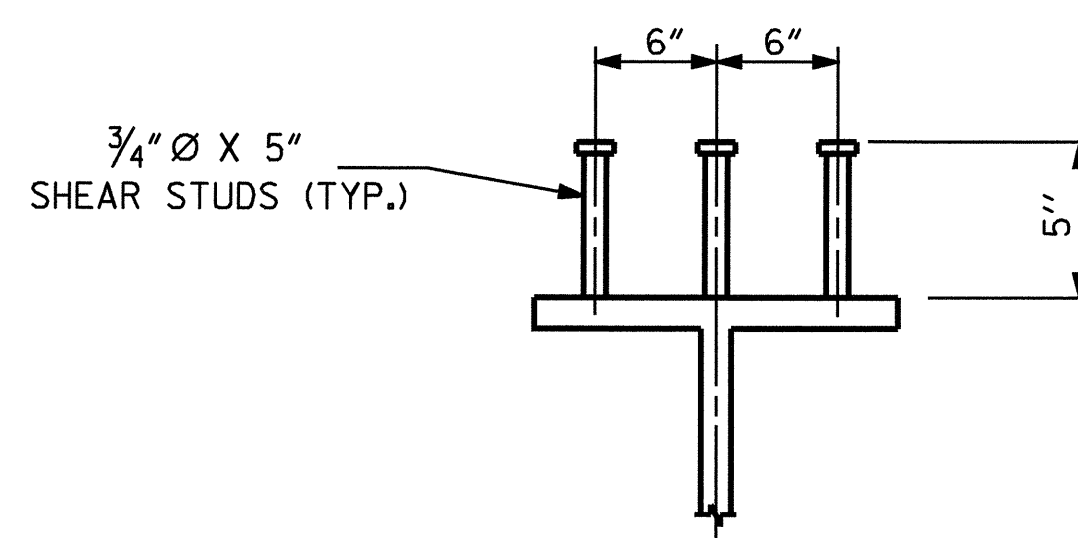
**BOTTOM FLANGE DETAIL**

OMIT 3/8" CONNECTOR PLATE ON OUTSIDE OF GIRDERS #1, #5, #6 AND #11

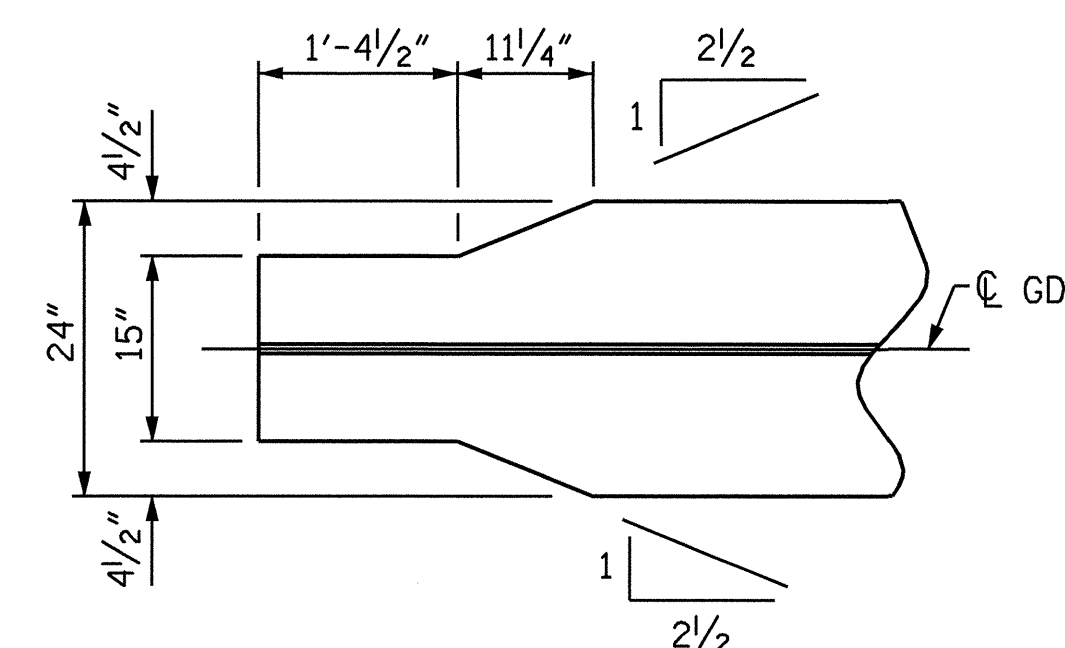


**SECTION THRU FLANGE**

GIRDER DIMENSIONS				
GIRDER	"A"	"B"	"C"	"D"
1	95'-7 1/8"	94'-3 1/8"	17'-1 9/16"	11 1/16"
2	95'-8 1/2"	94'-4 1/2"	17'-2 1/4"	11 3/4"
3	95'-9 3/4"	94'-5 3/4"	17'-2 7/8"	1'-0 3/8"
4	95'-11 1/8"	94'-7 1/8"	17'-3 9/16"	1'-1 1/16"
5	96'-0 5/8"	94'-8 5/8"	17'-4 5/16"	1'-1 3/16"
6	96'-1 1/4"	94'-9 1/4"	17'-4 5/8"	9 5/8"
7	96'-2 1/8"	94'-10 1/8"	17'-5 1/16"	10 1/16"
8	96'-4 3/8"	95'-0 3/8"	17'-6 3/16"	11 3/16"
9	96'-6 1/8"	95'-2 1/8"	17'-7 1/16"	1'-0 1/16"
10	96'-7 3/4"	95'-3 3/4"	17'-7 7/8"	1'-0 7/8"
11	96'-9 1/2"	95'-5 1/2"	17'-8 3/4"	1'-1 3/4"



**SHEAR STUD DETAILS**

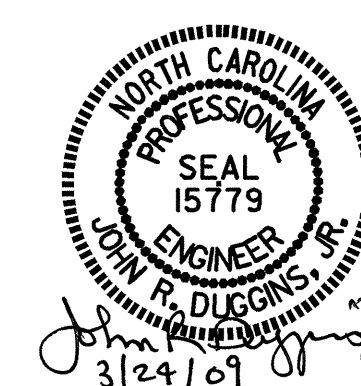


**END OF GIRDER DETAIL**  
(BOTTOM FLANGE ONLY)

PROJECT NO. R-4430  
HENDERSON COUNTY  
STATION: 66+60.00 -L-

SHEET 1 OF 2

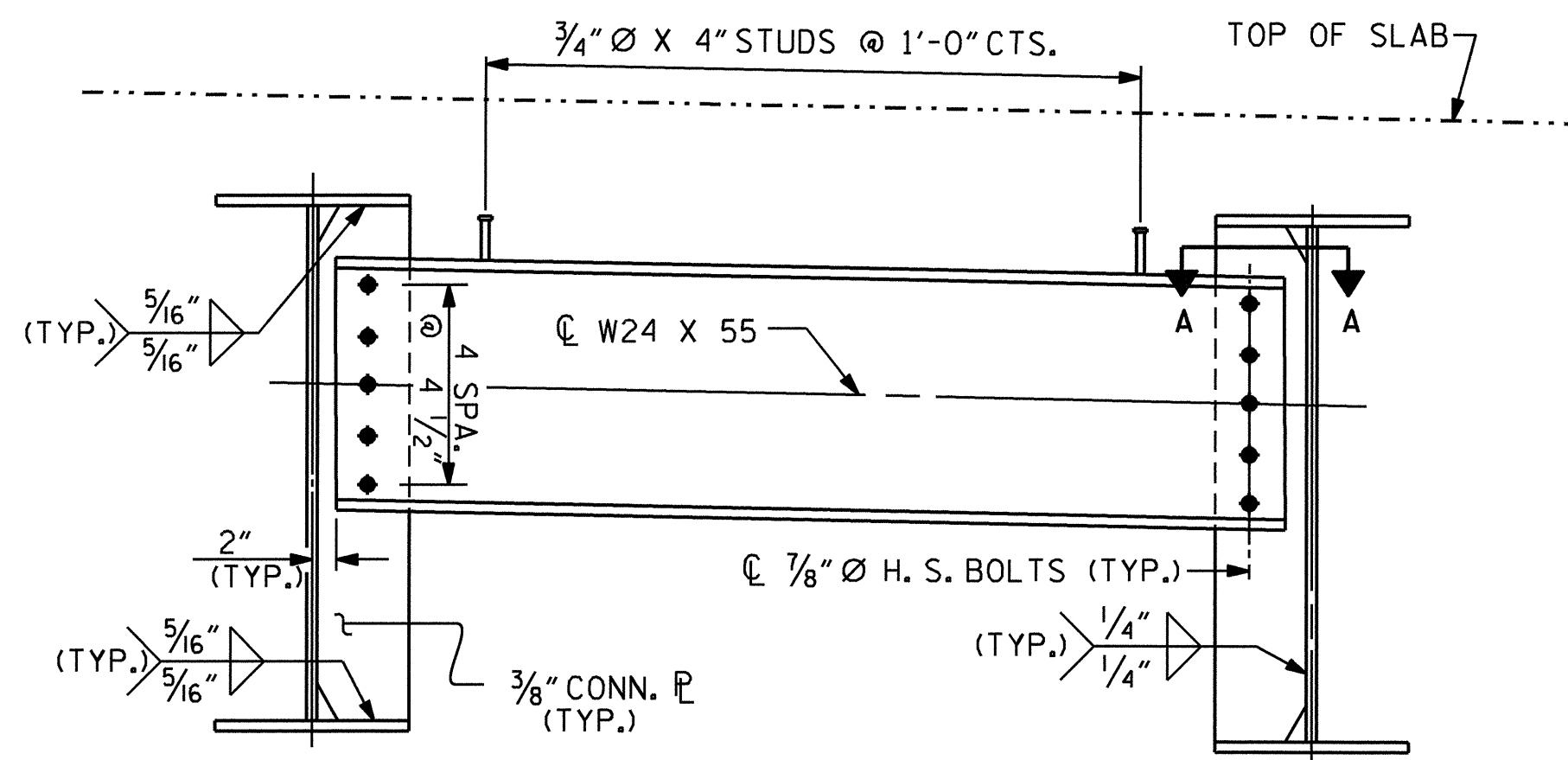
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SUPERSTRUCTURE STRUCTURAL STEEL	
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS	
1			3			5-12	
2			4			71	



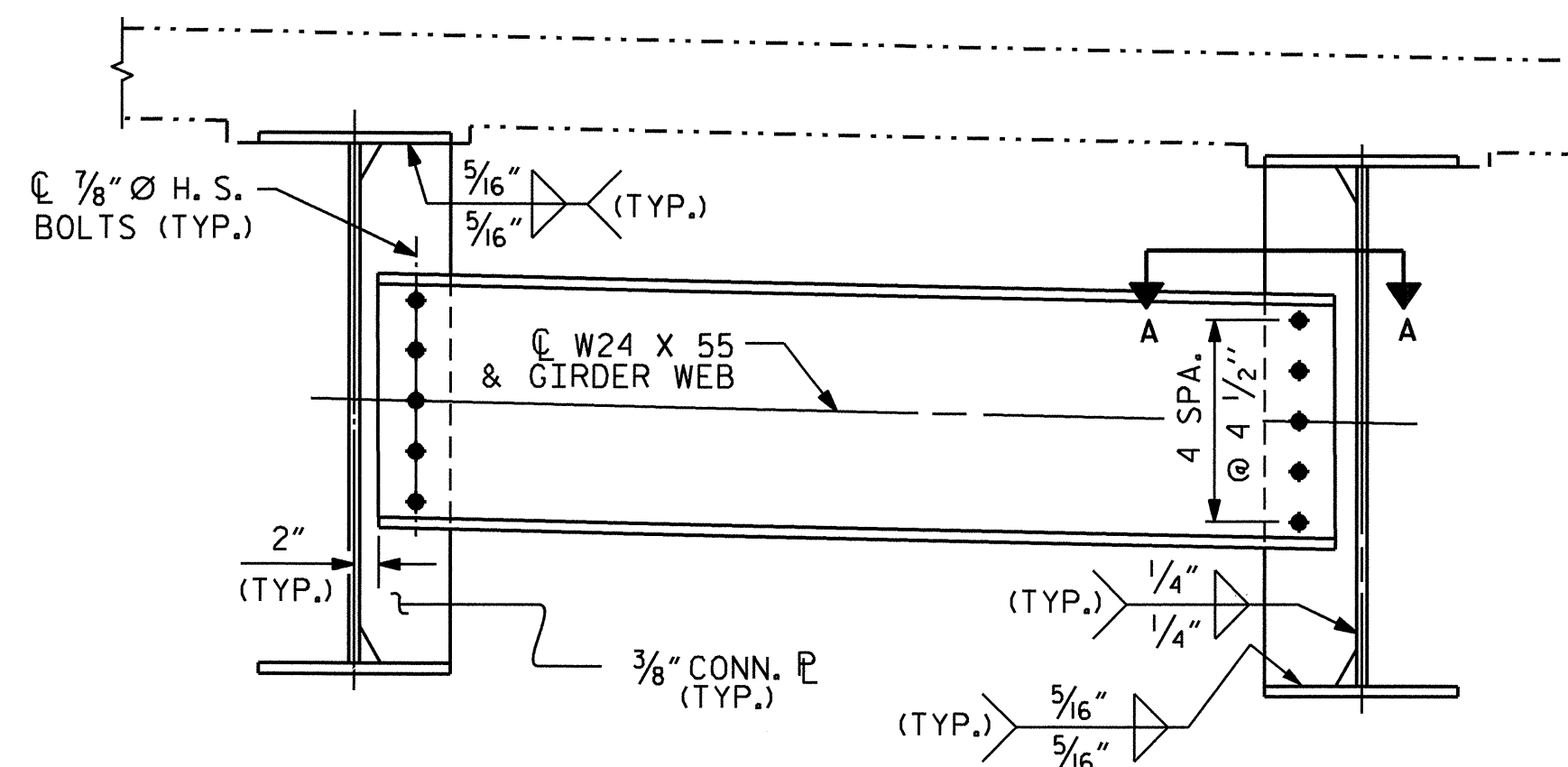
DRAWN BY: D. HODGE DATE: 9/08  
CHECKED BY: J.R. DUGGINS DATE: 10/08

20-MAR-2009 14:50  
F:\structures\R-4430\Str1\dhodge\R4430\_sd.ss.dgn  
dhodge

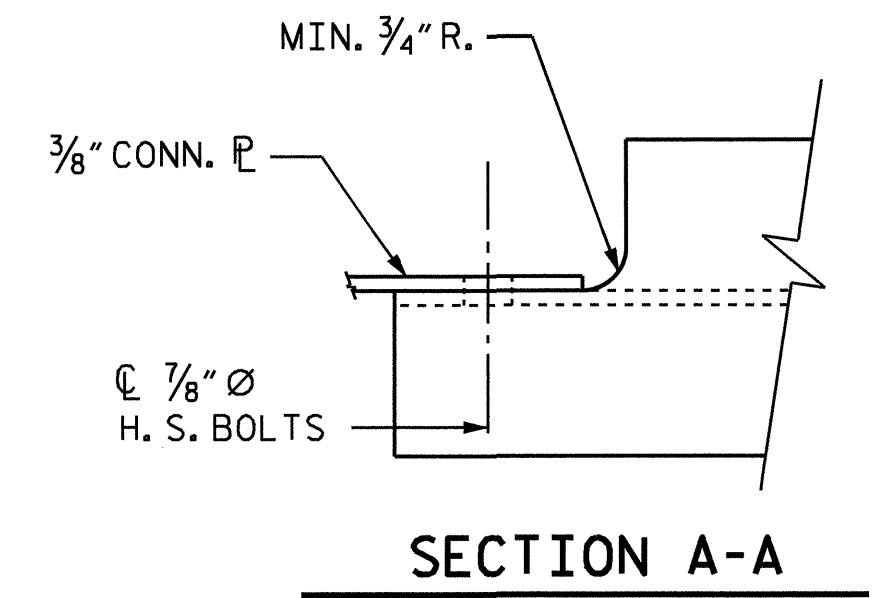
STR. #1



**TYPICAL END BENT DIAPHRAGM (D1)**



**INTERMEDIATE DIAPHRAGM (D2)**



**SECTION A-A**

**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.

FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

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

A CHARPY 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.

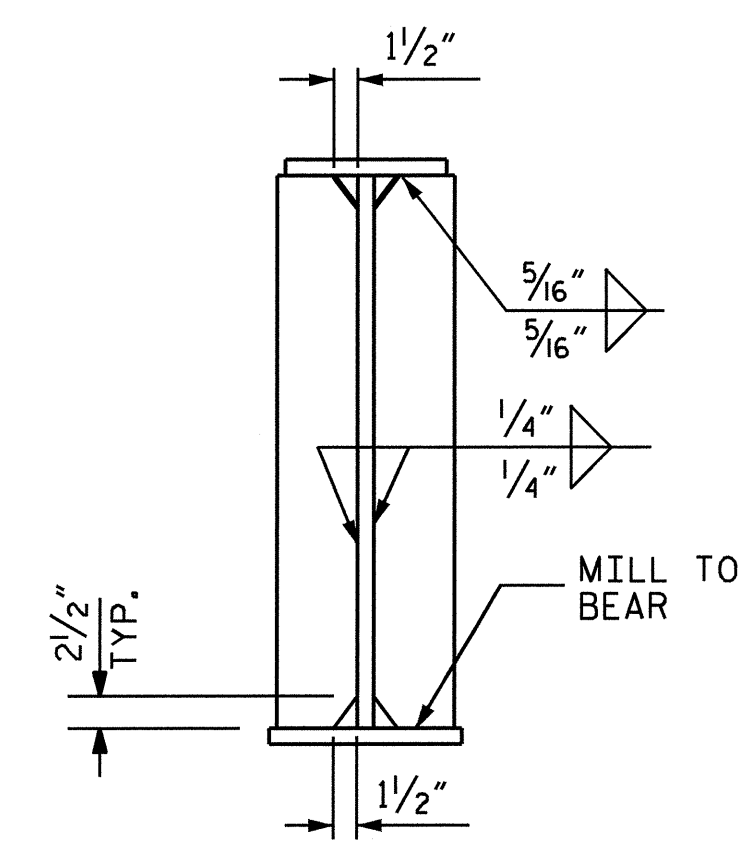
SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 60 FEET AND WEB PIECE LENGTHS TO 45 FEET. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION (NOR WITHIN 15 FEET OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS). KEEP 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.

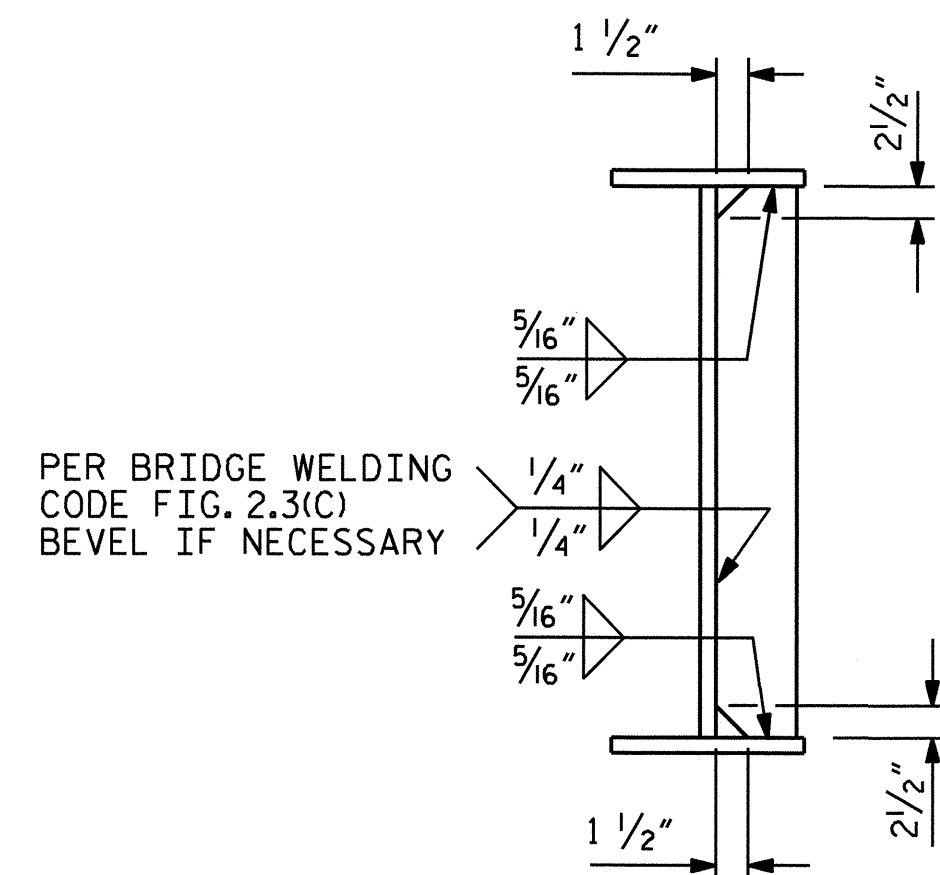
TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

FOR DIRECT TENSION INDICATORS, SEE SPECIAL PROVISIONS.

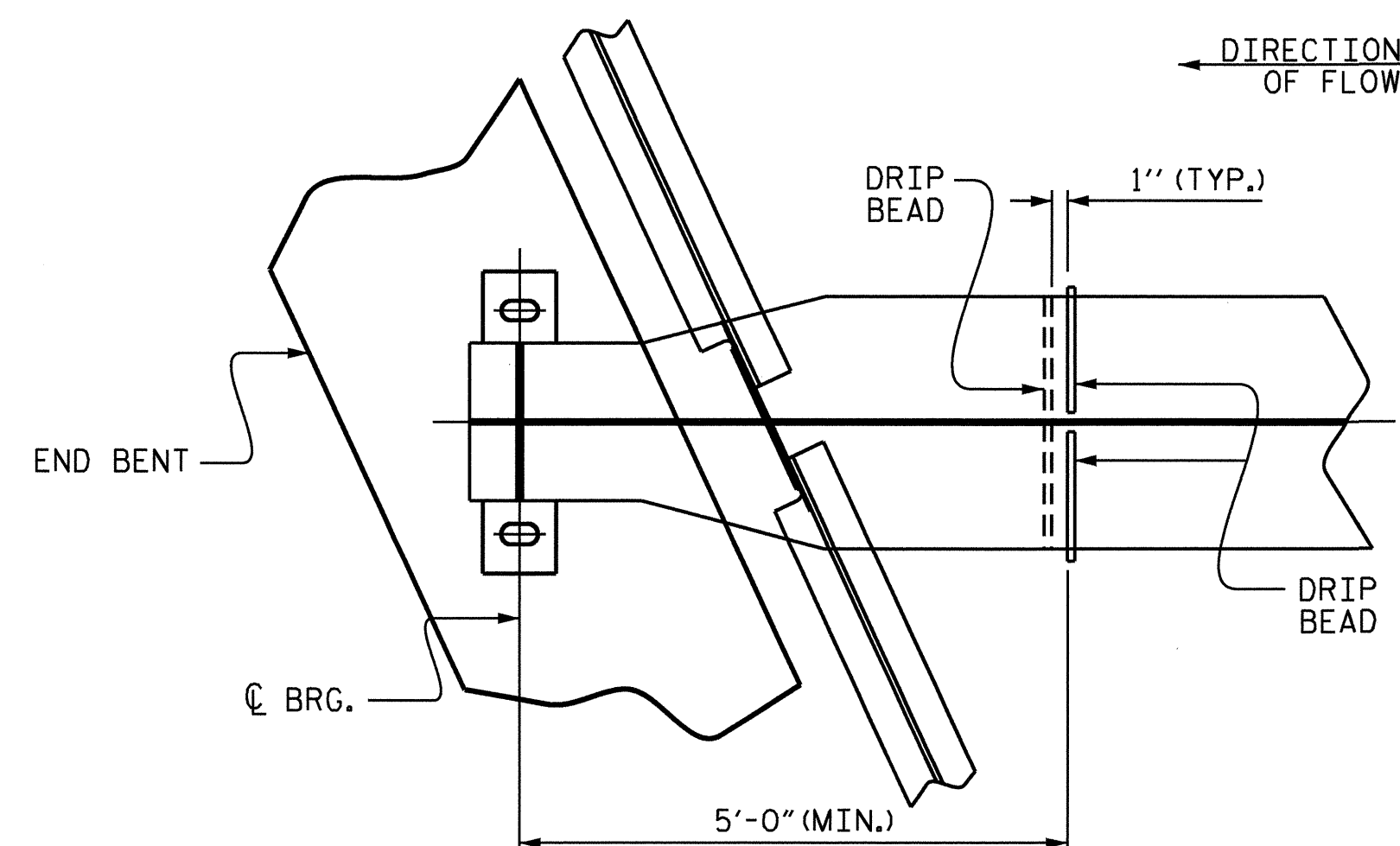
END OF GIRDERS SHALL BE PLUMB.



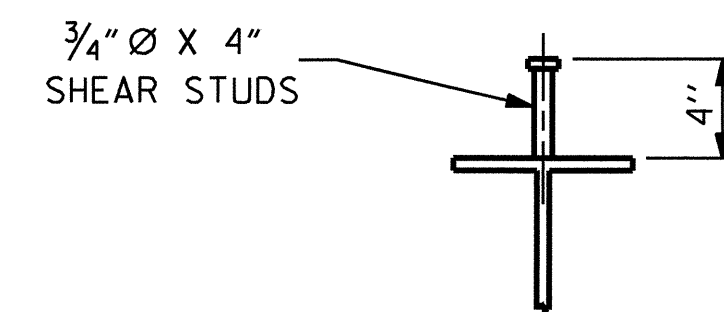
**BEARING STIFFENER**



**END BENT & INTERMEDIATE DIAPHRAGM CONNECTOR**

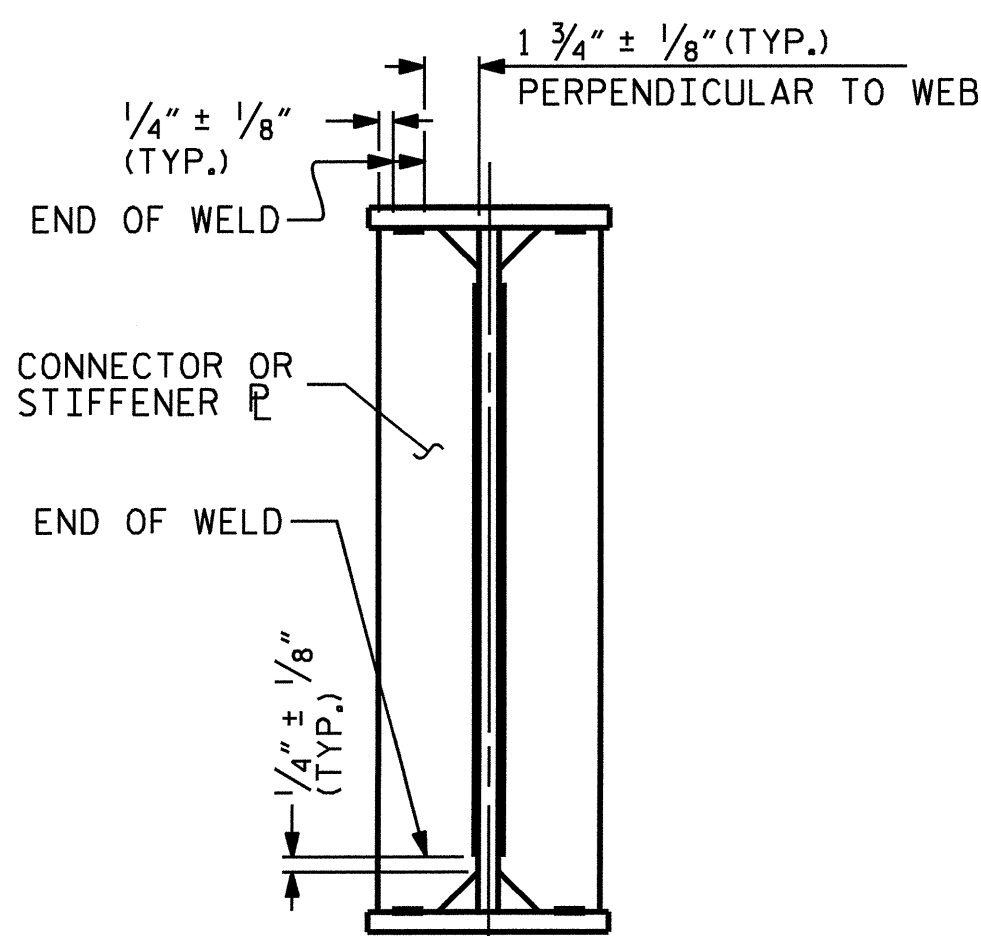


**PART PLAN - BOTTOM FLANGE**

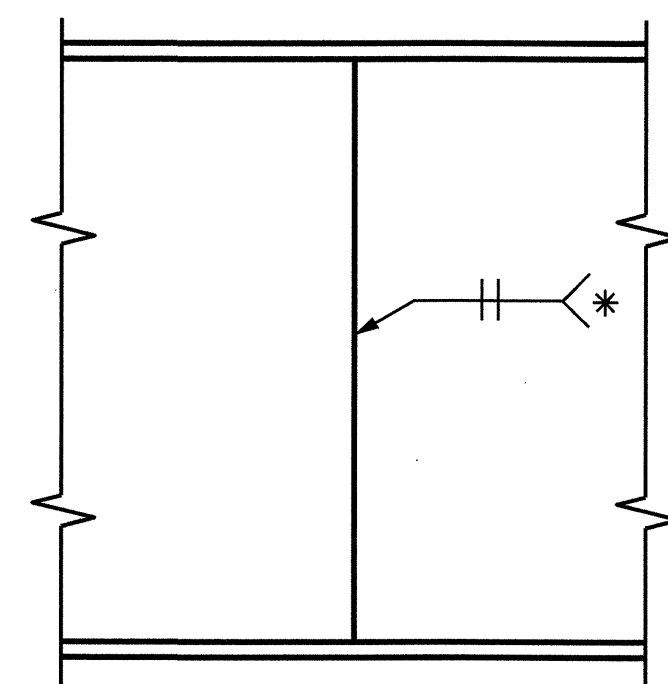


**SHEAR STUD DETAILS**

(TYP. EA. END BENT DIAPHRAGM)

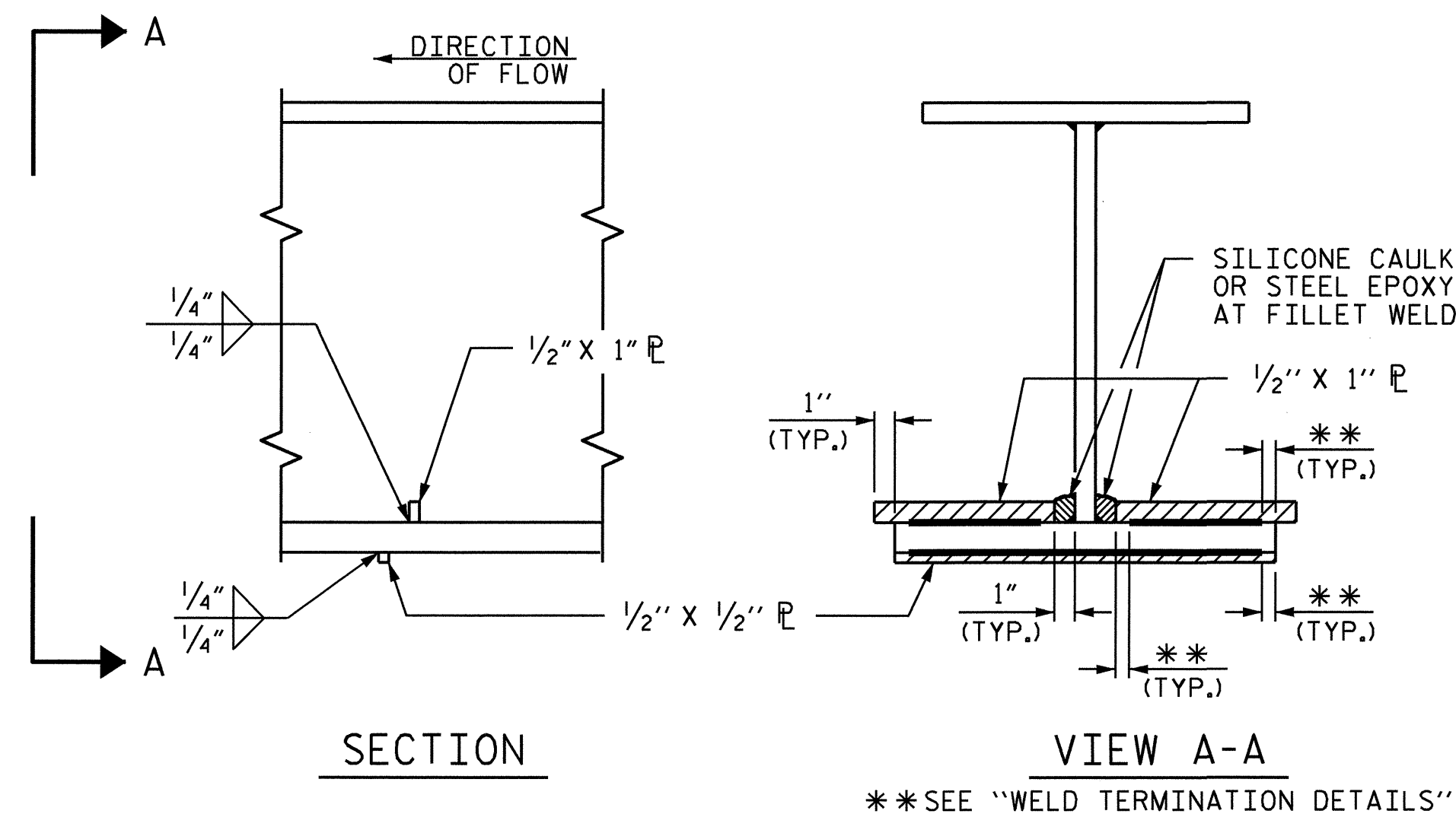


**TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS WELD TERMINATION DETAILS**



**PERMISSIBLE SHOP WEB SPLICE**

\* GRIND SMOOTH AND FLUSH ON OUTSIDE OF EXTERIOR GIRDERS



**SECTION**

**VIEW A-A**

**DRIP BEAD DETAILS**

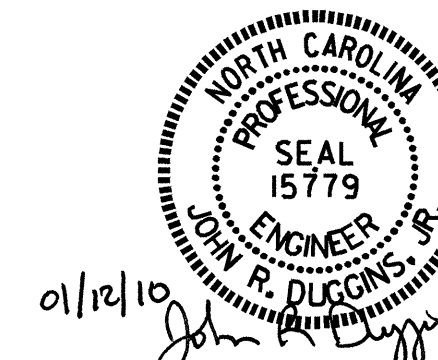
\*\* SEE "WELD TERMINATION DETAILS"

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 STRUCTURAL STEEL

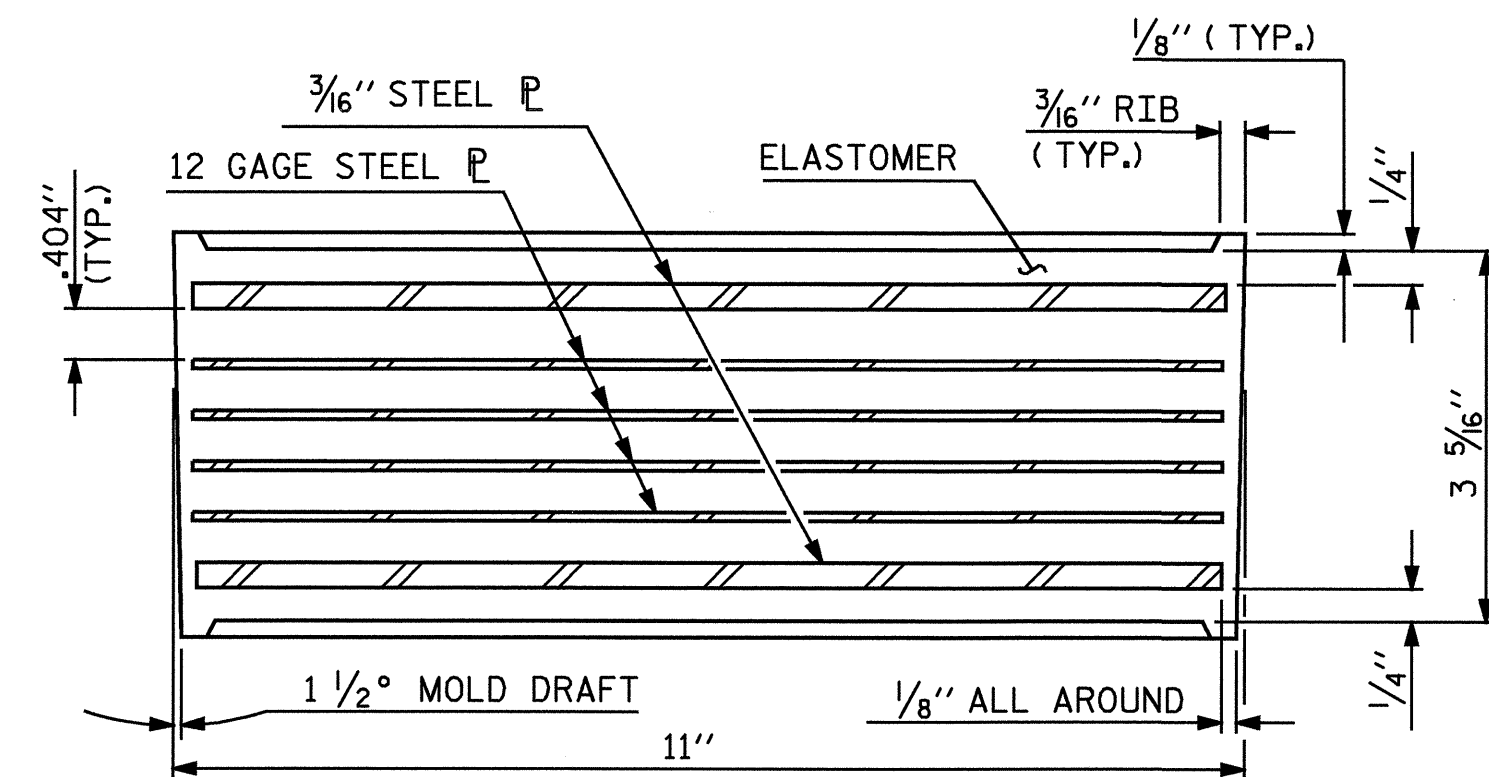
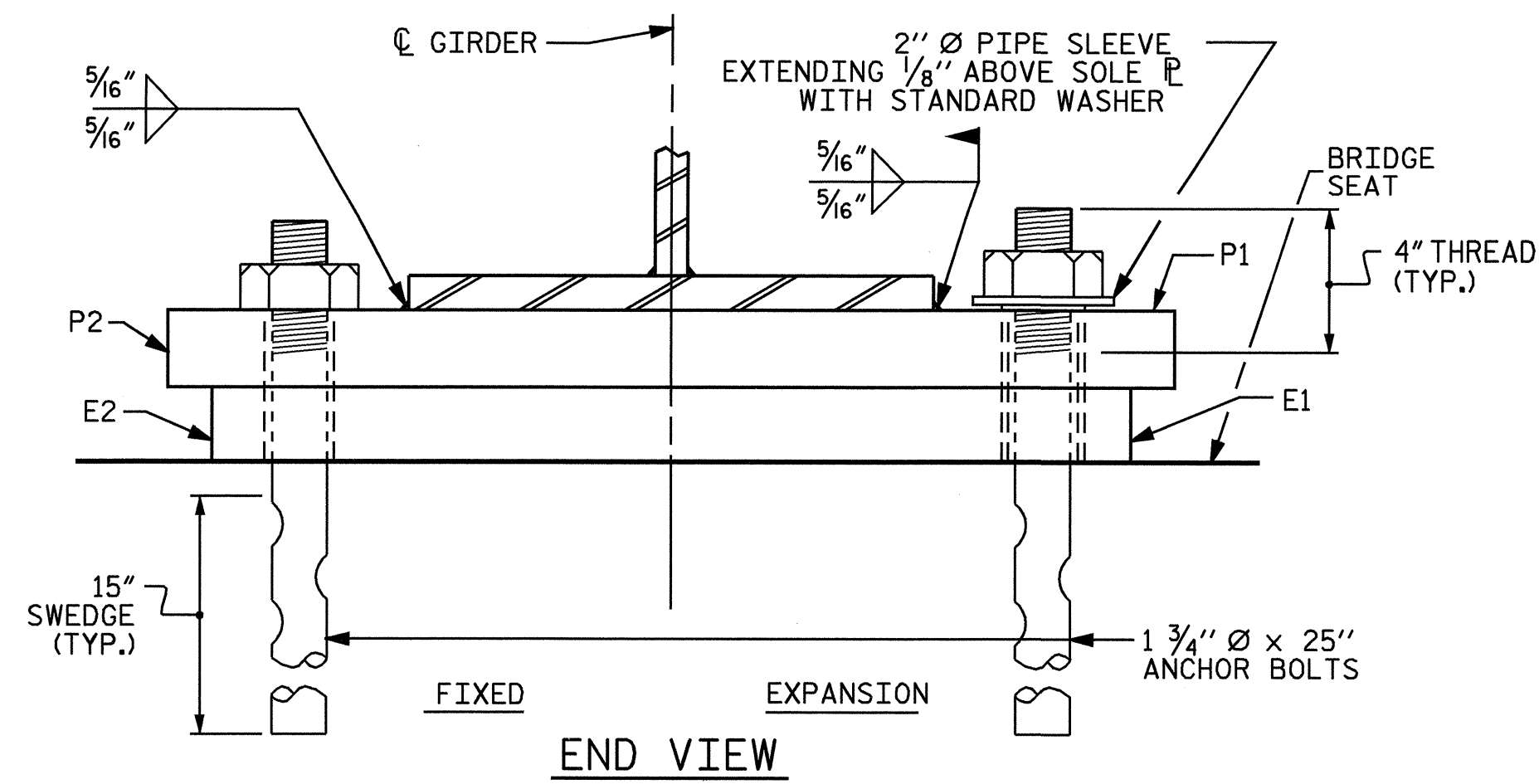


**REVISIONS**

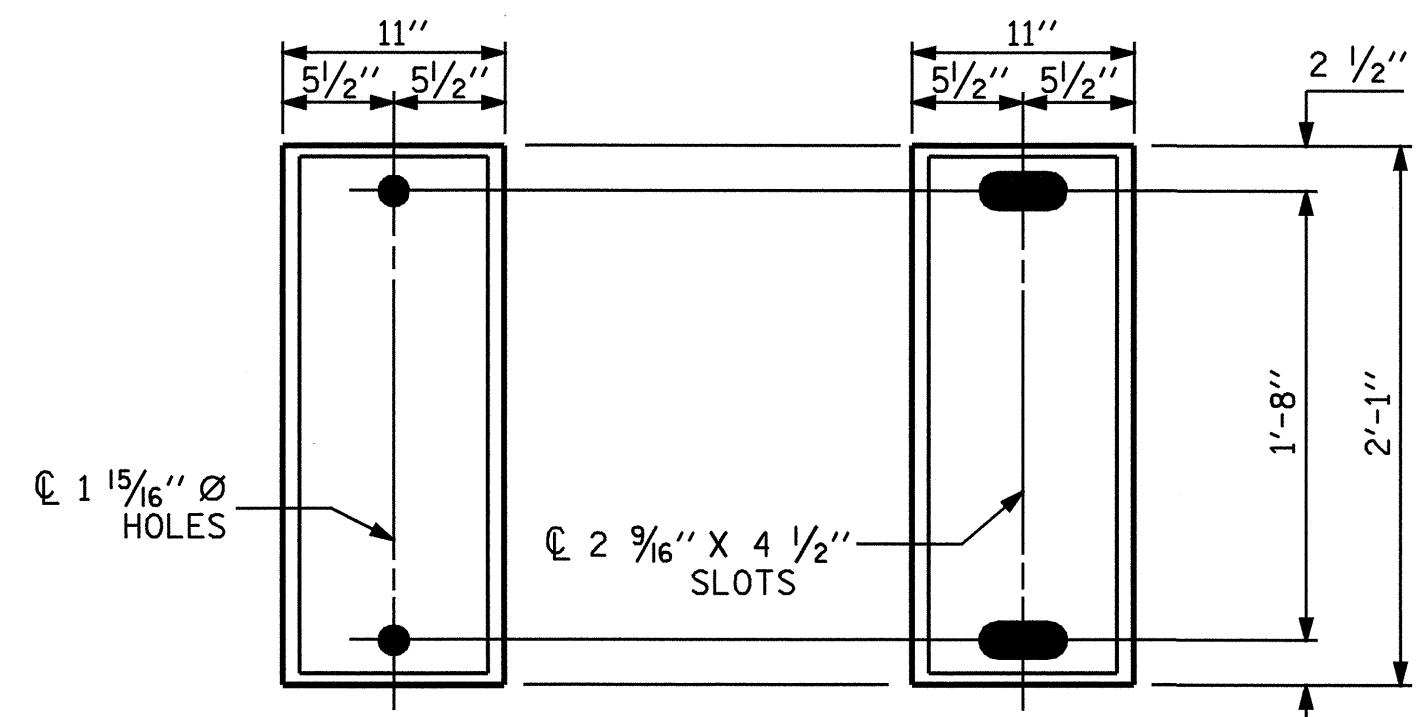
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	S-13
TOTAL SHEETS	71

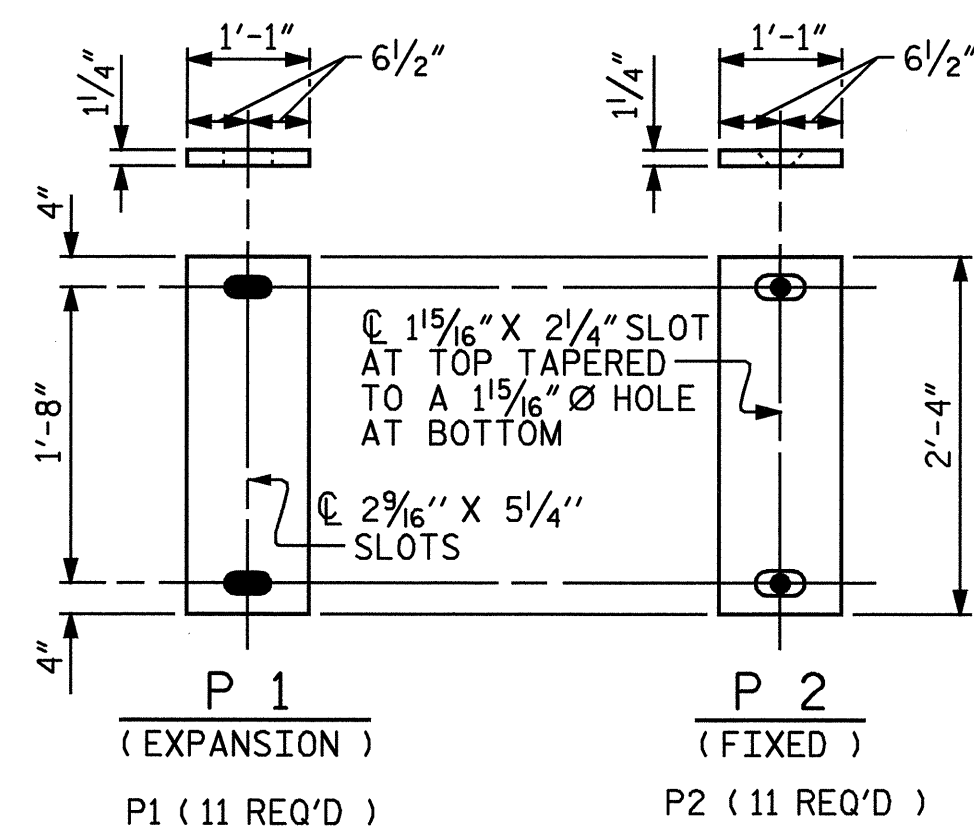
DRAWN BY: D. HODGE DATE: 11/08  
 CHECKED BY: J.R. DUGGINS DATE: 11/08



TYPICAL SECTION OF ELASTOMERIC BEARING



PLAN VIEW OF ELASTOMERIC BEARING  
TYPE IV



SOLE PLATE DETAILS ("P")

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.

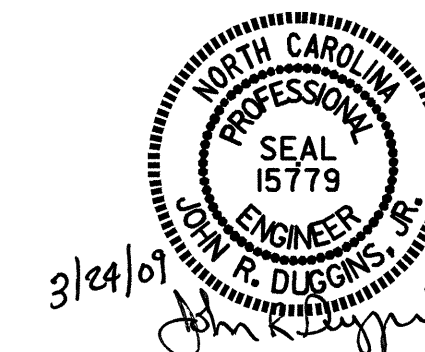
WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

-LOAD RATINGS-	
TYPE IV	MAX.D.L.+ L.L.
	184 K

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

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



ASSEMBLED BY : D. HODGE	DATE : 11/08
CHECKED BY : J.R. DUGGINS	DATE : 11/08
DRAWN BY : EEM 10/95	REV. 10/17/00 RWW/LES
CHECKED BY : PEK 10/95	REV. 7/10/01 LES/RDR
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-14
2			4			71

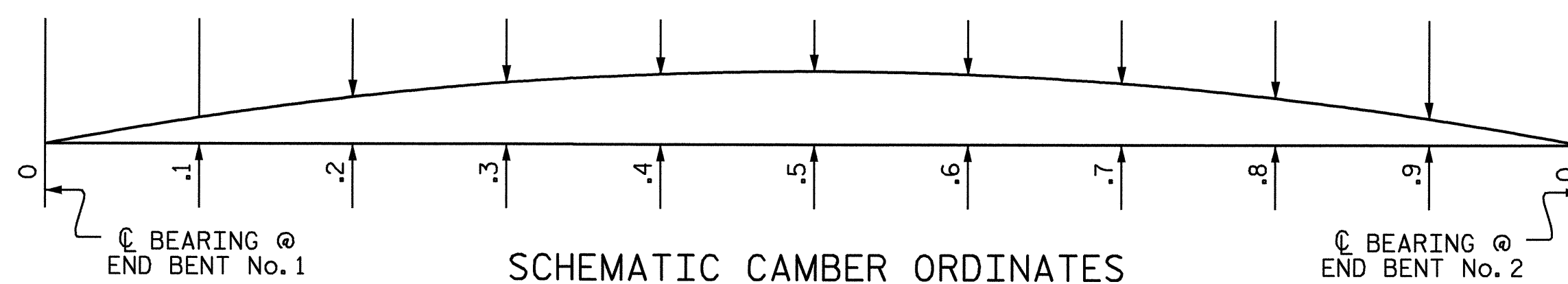


DEAD LOAD DEFLECTION TABLE FOR GIRDERS																																	
TENTH POINTS	GIRDER 1										GIRDER 2										GIRDER 3												
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.020	0.037	0.050	0.059	0.062	0.059	0.050	0.037	0.020	0	0	0.020	0.038	0.051	0.060	0.063	0.060	0.051	0.038	0.020	0	0	0.020	0.038	0.051	0.060	0.063	0.060	0.051	0.038	0.020	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.044	0.100	0.143	0.170	0.180	0.170	0.143	0.100	0.044	0	0	0.013	0.066	0.107	0.133	0.142	0.133	0.107	0.066	0.013	0	0	0.000	0.032	0.071	0.096	0.104	0.096	0.071	0.032	0.000	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK	0	0.010	0.016	0.021	0.021	0.021	0.021	0.021	0.016	0.010	0	0	0.010	0.016	0.016	0.021	0.021	0.021	0.016	0.016	0.010	0	0	0.010	0.016	0.016	0.021	0.021	0.021	0.016	0.016	0.010	0
TOTAL DEAD LOAD DEFLECTION	0	0.074	0.153	0.214	0.250	0.263	0.250	0.214	0.153	0.074	0	0	0.043	0.120	0.174	0.214	0.226	0.214	0.174	0.120	0.043	0	0	0.030	0.086	0.138	0.177	0.188	0.177	0.138	0.086	0.030	0
ORDINATE DUE TO SUPERELEVATION	0	-0.010	-0.017	-0.023	-0.026	-0.027	-0.026	-0.023	-0.017	-0.010	0	0	-0.010	-0.017	-0.023	-0.026	-0.027	-0.026	-0.023	-0.017	-0.010	0	0	-0.010	-0.018	-0.023	-0.026	-0.027	-0.026	-0.023	-0.018	-0.010	0
REQUIRED CAMBER	0	3/4"	1 5/8"	2 5/16"	2 1/16"	2 3/16"	2 1/16"	2 5/16"	1 5/8"	3/4"	0	0	3/8"	1/4"	1 3/16"	2/4"	2 3/8"	2/4"	1 3/16"	1/4"	3/8"	0	0	1/4"	1 3/16"	1 3/8"	1 3/16"	1 5/16"	1 3/16"	1 3/8"	1 3/16"	1/4"	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).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
TENTH POINTS	GIRDER 4										GIRDER 5											
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.020	0.038	0.051	0.060	0.063	0.060	0.051	0.038	0.020	0	0	0.020	0.037	0.051	0.059	0.062	0.059	0.051	0.037	0.020	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.000	0.000	0.035	0.058	0.067	0.058	0.035	0.000	0.000	0	0	0.000	0.000	0.000	0.021	0.029	0.021	0.000	0.000	0.000	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK	0	0.010	0.016	0.016	0.021	0.021	0.021	0.016	0.016	0.010	0	0	0.010	0.016	0.021	0.021	0.021	0.021	0.021	0.016	0.010	0
TOTAL DEAD LOAD DEFLECTION	0	0.030	0.054	0.102	0.139	0.151	0.139	0.102	0.054	0.030	0	0	0.030	0.053	0.072	0.101	0.112	0.101	0.072	0.053	0.030	0
ORDINATE DUE TO SUPERELEVATION	0	-0.010	-0.018	-0.023	-0.027	-0.028	-0.027	-0.023	-0.018	-0.010	0	0	-0.010	-0.018	-0.023	-0.027	-0.028	-0.027	-0.023	-0.018	-0.010	0
REQUIRED CAMBER	0	1/4"	7/16"	1 5/16"	1 3/8"	1 1/2"	1 3/8"	1 5/16"	7/16"	1/4"	0	0	1/4"	7/16"	9/16"	7/8"	1"	7/8"	9/16"	7/16"	1/4"	0

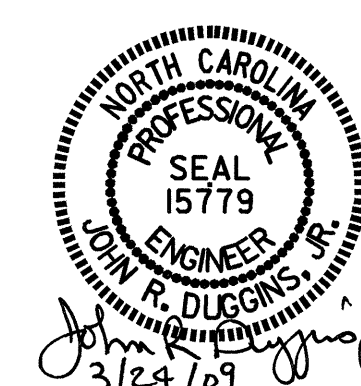
\* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.  
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).



PROJECT NO. R-4430  
HENDERSON COUNTY  
STATION: 66+60.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUPERSTRUCTURE  
DEAD LOAD  
DEFLECTION TABLES  
(STAGE I)



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			8-15
2			4			71

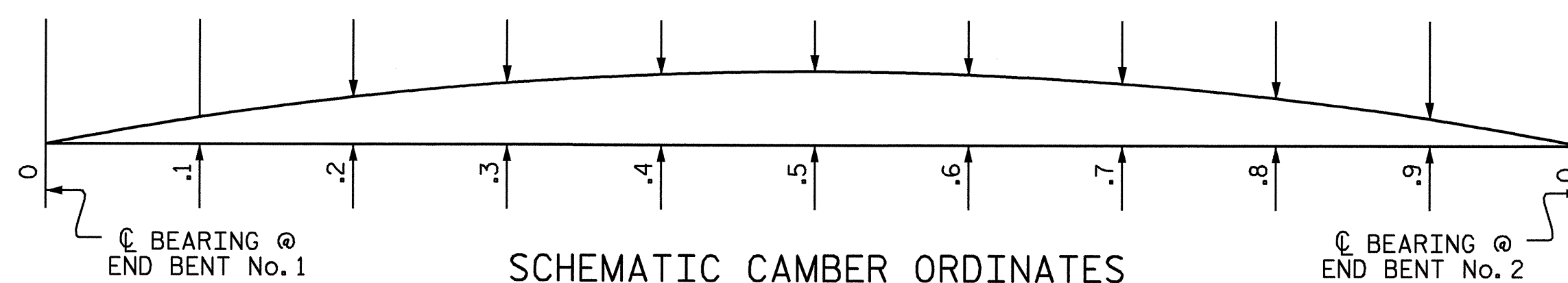
DRAWN BY: D. HODGE DATE: 11/08  
CHECKED BY: J.R. DUGGINS DATE: 11/08

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																																	
TENTH POINTS	GIRDER 6											GIRDER 7										GIRDER 8											
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.020	0.038	0.051	0.060	0.063	0.060	0.051	0.038	0.020	0	0	0.021	0.040	0.054	0.063	0.066	0.063	0.054	0.040	0.021	0	0	0.021	0.040	0.054	0.063	0.066	0.063	0.054	0.040	0.021	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.000	0.003	0.044	0.071	0.080	0.071	0.044	0.003	0.000	0	0	0.000	0.027	0.070	0.097	0.106	0.097	0.070	0.027	0.000	0	0	0.000	0.050	0.095	0.123	0.133	0.123	0.095	0.050	0.000	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
TOTAL DEAD LOAD DEFLECTION	0	0.020	0.041	0.095	0.131	0.143	0.131	0.095	0.041	0.020	0	0	0.021	0.067	0.124	0.160	0.172	0.160	0.124	0.067	0.021	0	0	0.021	0.090	0.149	0.186	0.199	0.186	0.149	0.090	0.021	0
ORDINATE DUE TO SUPERELEVATION	0	-0.010	-0.018	-0.024	-0.027	-0.028	-0.027	-0.024	-0.018	-0.010	0	0	-0.010	-0.018	-0.024	-0.027	-0.028	-0.027	-0.024	-0.018	-0.010	0	0	-0.010	-0.018	-0.024	-0.027	-0.029	-0.027	-0.024	-0.018	-0.010	0
REQUIRED CAMBER	0	1/8"	1/4"	7/8"	1 1/4"	1 3/8"	1 1/4"	7/8"	1/4"	1/8"	0	0	1/8"	9/16"	1 3/16"	1 5/8"	1 3/4"	1 5/8"	1 3/16"	9/16"	1/8"	0	0	1/8"	7/8"	1 1/2"	1 5/16"	2 1/16"	1 5/16"	1 1/2"	7/8"	1/8"	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).

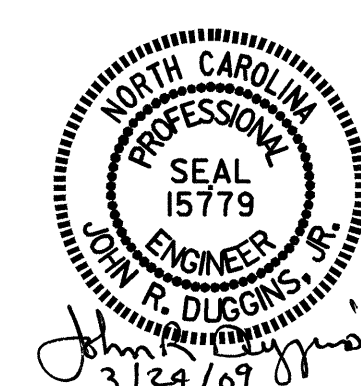
DEAD LOAD DEFLECTION TABLE FOR GIRDERS																																	
TENTH POINTS	GIRDER 9											GIRDER 10										GIRDER 11											
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.021	0.040	0.054	0.063	0.066	0.063	0.054	0.040	0.021	0	0	0.021	0.040	0.054	0.063	0.066	0.063	0.054	0.040	0.021	0	0	0.021	0.040	0.055	0.064	0.067	0.064	0.055	0.040	0.021	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.014	0.074	0.120	0.149	0.159	0.149	0.120	0.074	0.014	0	0	0.036	0.097	0.145	0.175	0.185	0.175	0.145	0.097	0.036	0	0	0.057	0.121	0.170	0.201	0.212	0.201	0.170	0.121	0.057	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK	0	0.010	0.021	0.026	0.026	0.031	0.026	0.026	0.021	0.010	0	0	0.010	0.021	0.026	0.026	0.031	0.026	0.026	0.021	0.010	0	0	0.010	0.021	0.026	0.031	0.031	0.031	0.026	0.021	0.010	0
TOTAL DEAD LOAD DEFLECTION	0	0.045	0.135	0.200	0.238	0.256	0.238	0.200	0.135	0.045	0	0	0.067	0.158	0.225	0.264	0.282	0.264	0.225	0.158	0.067	0	0	0.088	0.182	0.251	0.296	0.310	0.296	0.251	0.182	0.088	0
ORDINATE DUE TO SUPERELEVATION	0	-0.010	-0.018	-0.024	-0.028	-0.029	-0.028	-0.024	-0.018	-0.010	0	0	-0.011	-0.019	-0.024	-0.028	-0.029	-0.028	-0.024	-0.019	-0.011	0	0	-0.011	-0.019	-0.025	-0.028	-0.029	-0.028	-0.025	-0.019	-0.011	0
REQUIRED CAMBER	0	7/16"	1 3/8"	2 1/8"	2 1/2"	2 3/4"	2 1/2"	2 1/8"	1 3/8"	7/16"	0	0	1 1/16"	1 11/16"	2 7/16"	2 13/16"	3 1/16"	2 13/16"	2 7/16"	1 11/16"	1 1/16"	0	0	1 5/16"	1 15/16"	2 11/16"	3 3/16"	3 3/8"	3 3/16"	2 11/16"	1 15/16"	1 5/16"	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. R-4430  
HENDERSON COUNTY  
STATION: 66+60.00 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
DEAD LOAD  
DEFLECTION TABLES  
(STAGE II)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	9-16
1			3			TOTAL SHEETS
2			4			71

DRAWN BY : D. HODGE DATE : 11/08  
CHECKED BY : J.R. DUGGINS DATE : 11/08

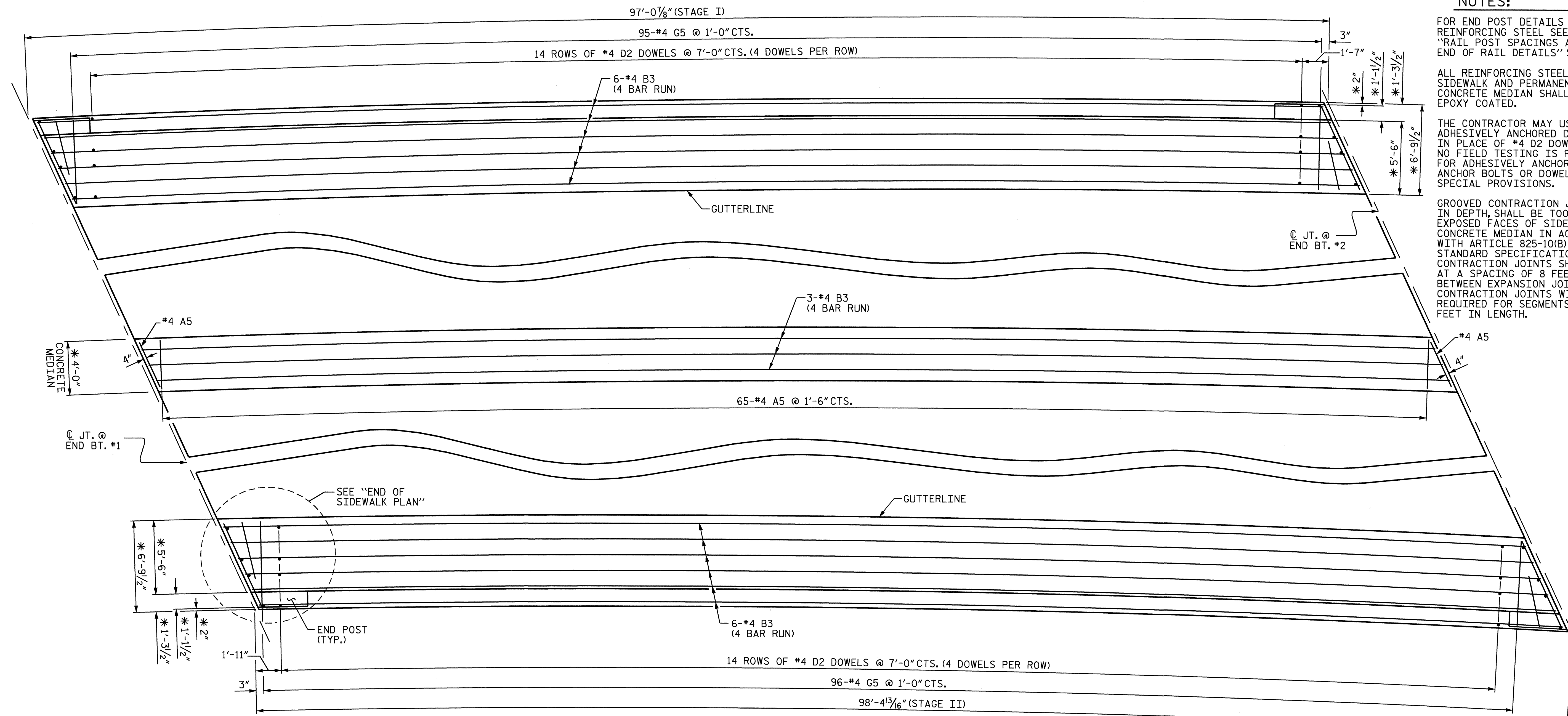
**NOTES:**

FOR END POST DETAILS AND REINFORCING STEEL SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.

ALL REINFORCING STEEL IN SIDEWALK AND PERMANENT CONCRETE MEDIAN SHALL BE EPOXY COATED.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED DOWELS IN PLACE OF #4 D2 DOWELS. NO FIELD TESTING IS REQUIRED. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

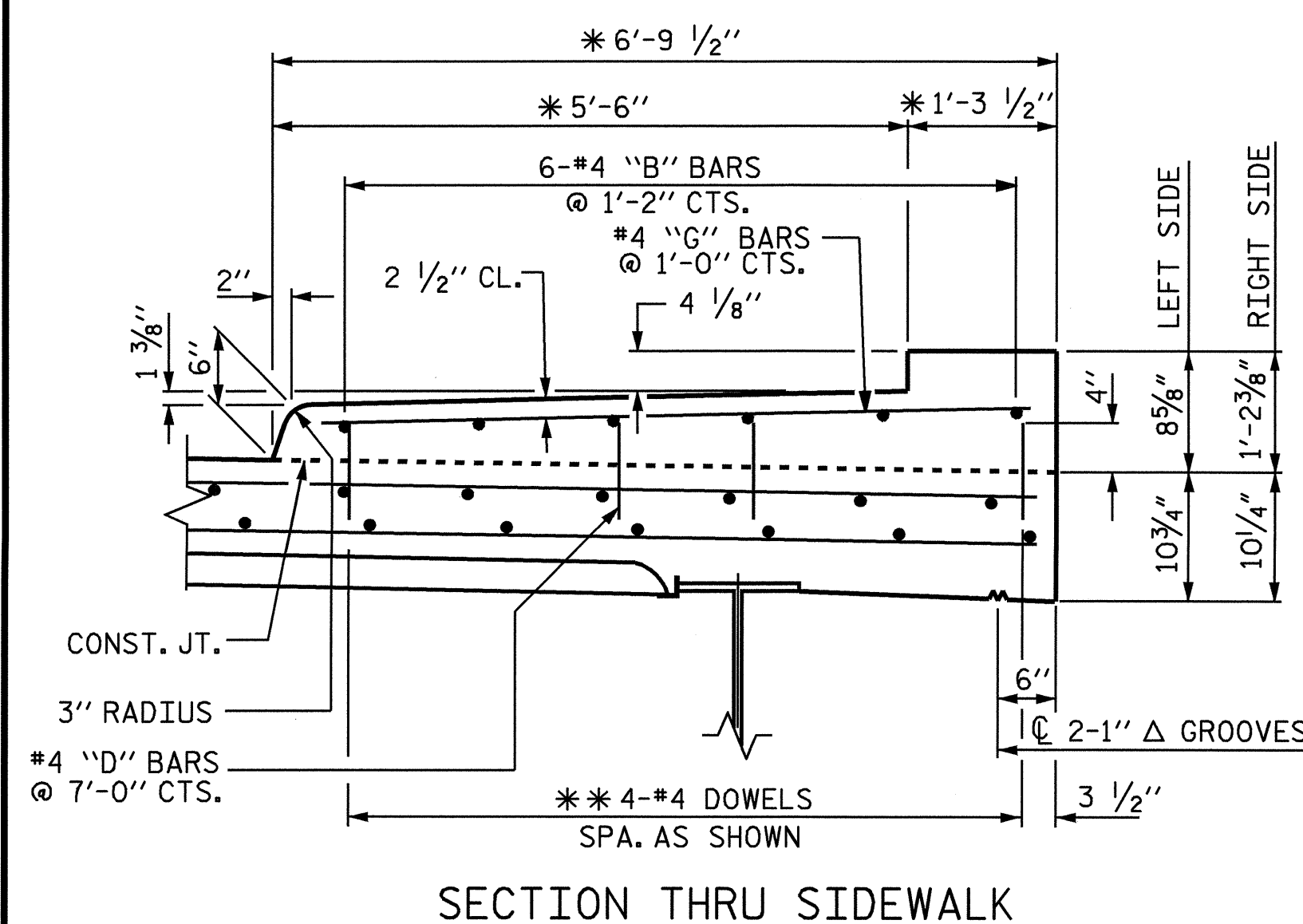
GROOVED CONTRACTION JOINTS 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK AND CONCRETE MEDIAN IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS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



**PLAN OF SIDEWALKS AND PERMANENT CONCRETE MEDIAN**

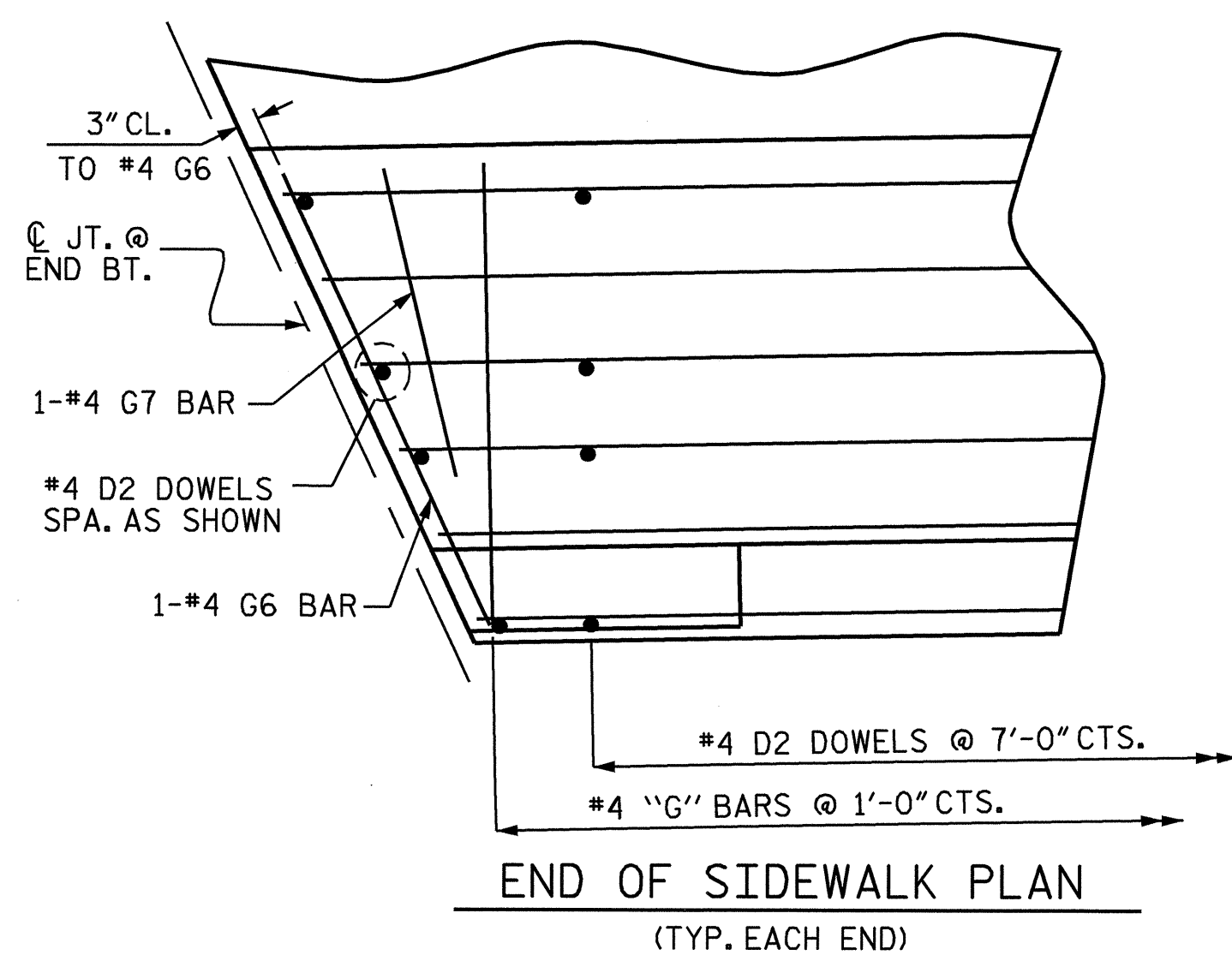
SIDEWALK DIMENSIONS ARE MEASURED ALONG ARC AT OUTSIDE EDGE OF SUPERSTRUCTURE.

\* RADIAL DIMENSIONS



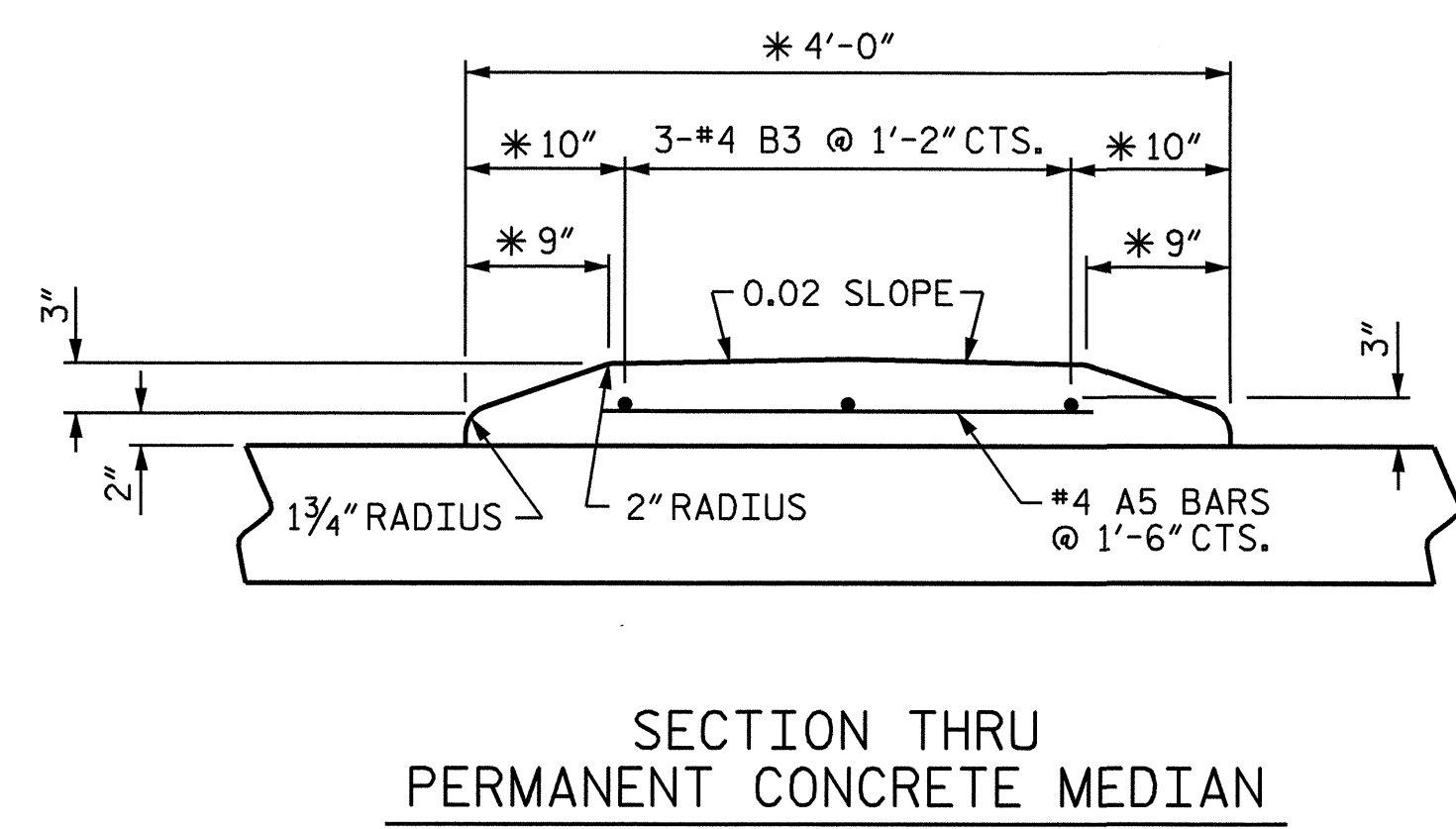
**SECTION THRU SIDEWALK**

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



**END OF SIDEWALK PLAN**

(TYP. EACH END)



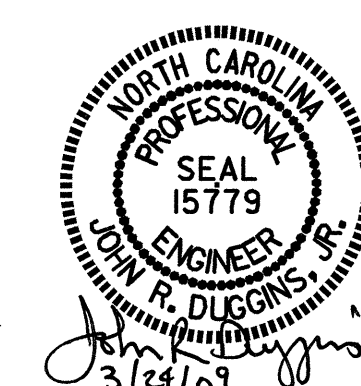
**SECTION THRU PERMANENT CONCRETE MEDIAN**

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE SIDEWALK AND PERMANENT CONCRETE MEDIAN DETAILS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-17
2			4			71



DRAWN BY : D. HODGE DATE : 9/08  
 CHECKED BY : J.R. DUGGINS DATE : 11/08

**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.

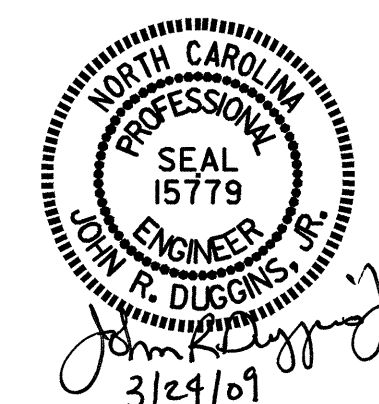
TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAIN VISIBLE AFTER RAIL PLACEMENT.

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 = 179.23 LIN. FT.



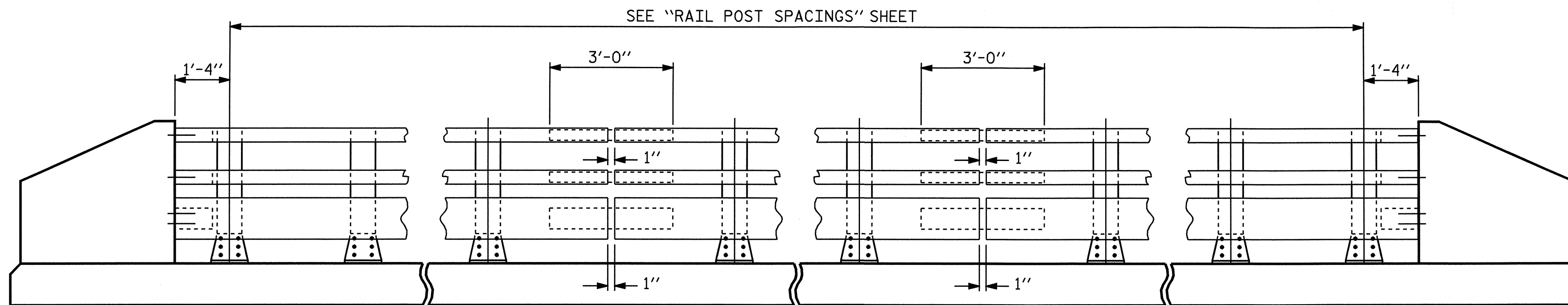
PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

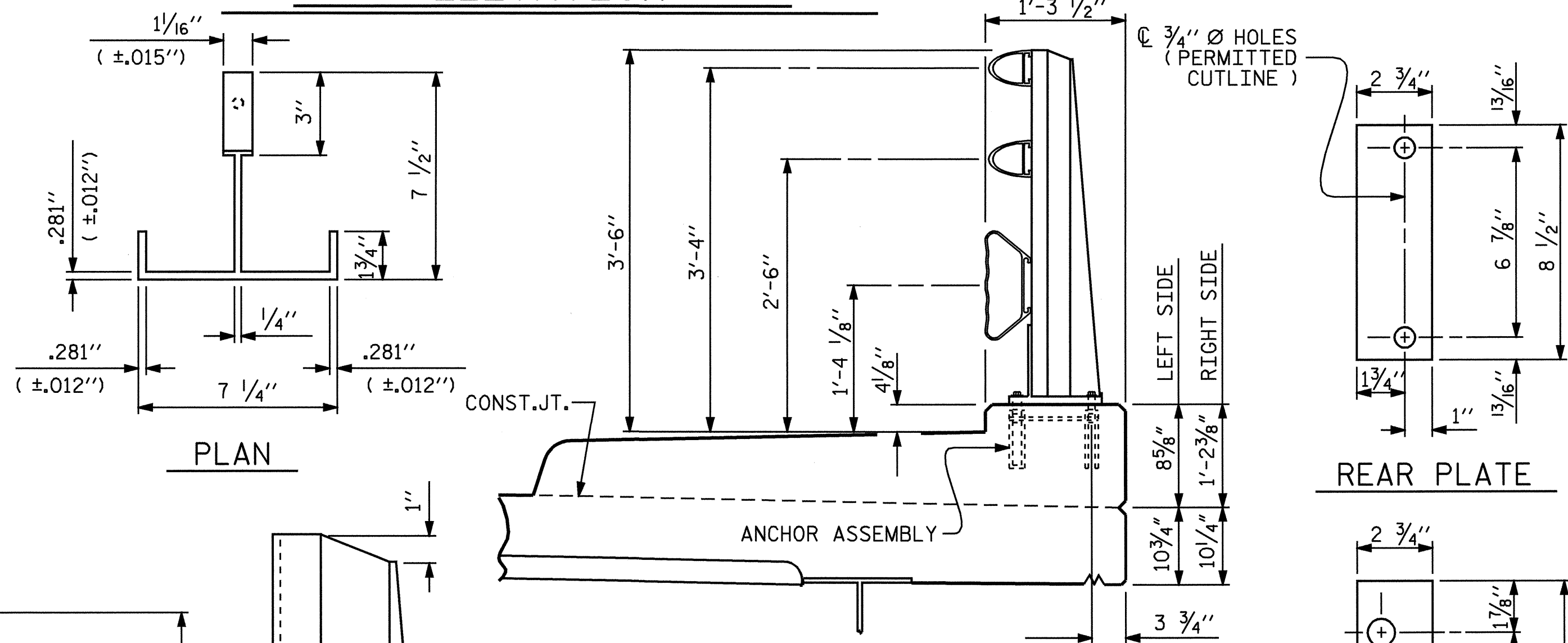
STANDARD  
**3 BAR METAL RAIL**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-18
2			4			71



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

**ELEVATION**

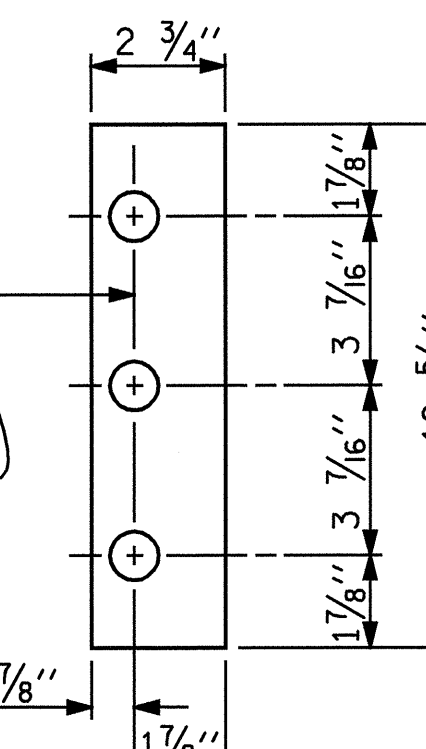


**PLAN**

**SECTION THRU RAIL**

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

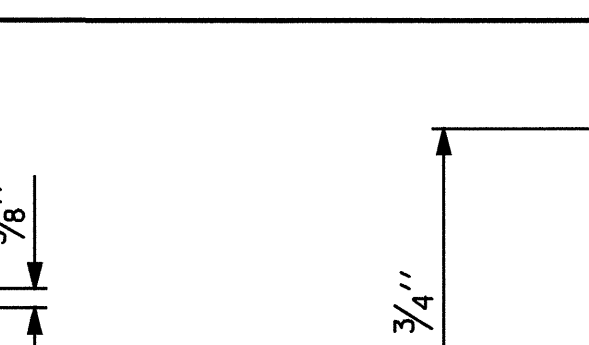
**REAR PLATE**



**FRONT PLATE SHIM DETAILS**

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

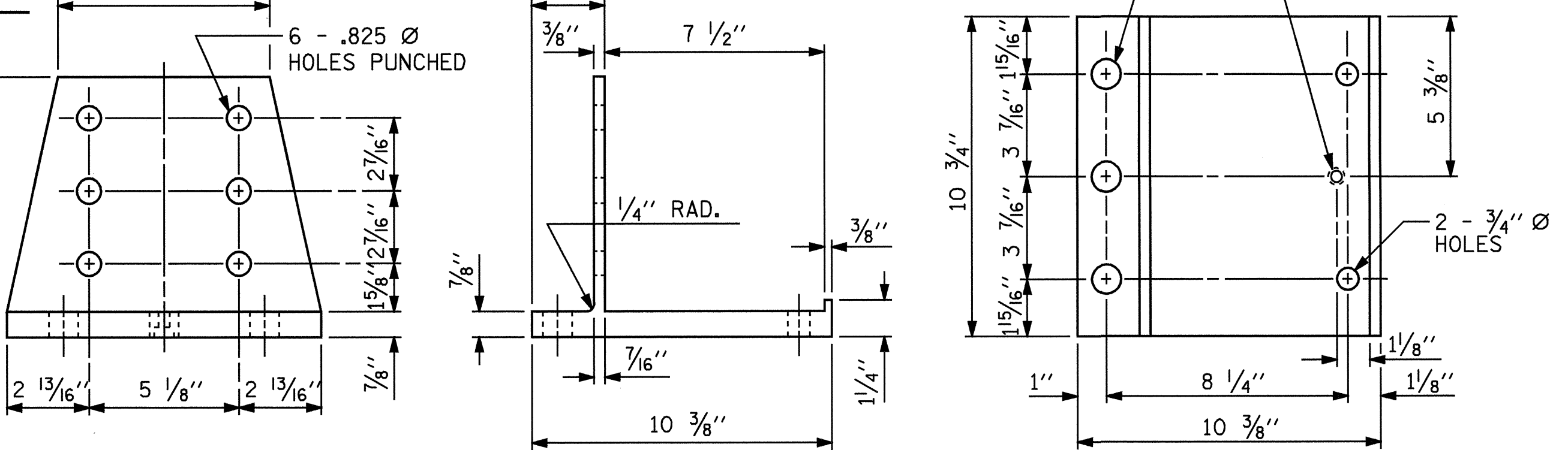
**RIVET DETAIL**



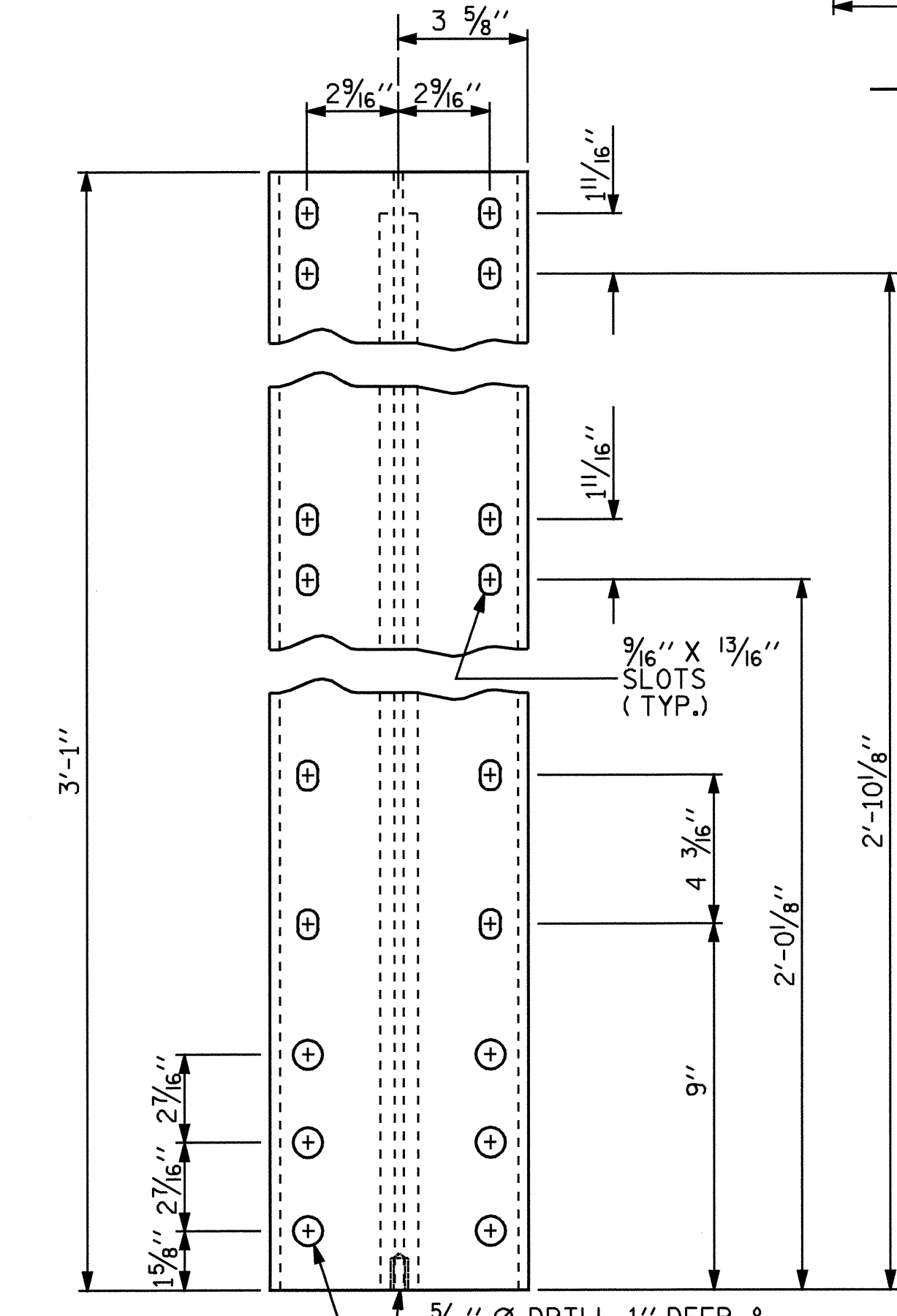
**FRONT ELEVATION**

**SIDE ELEVATION**

**PLAN**



**POST BASE DETAILS**



**FRONT ELEVATION**

**SIDE ELEVATION**

**DETAILS OF POST**

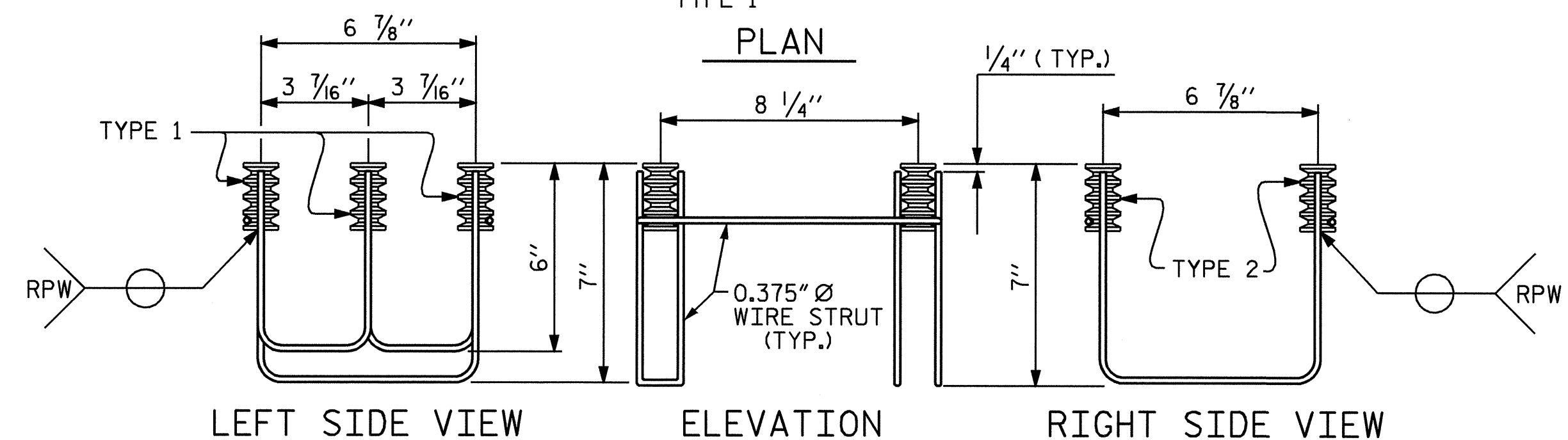
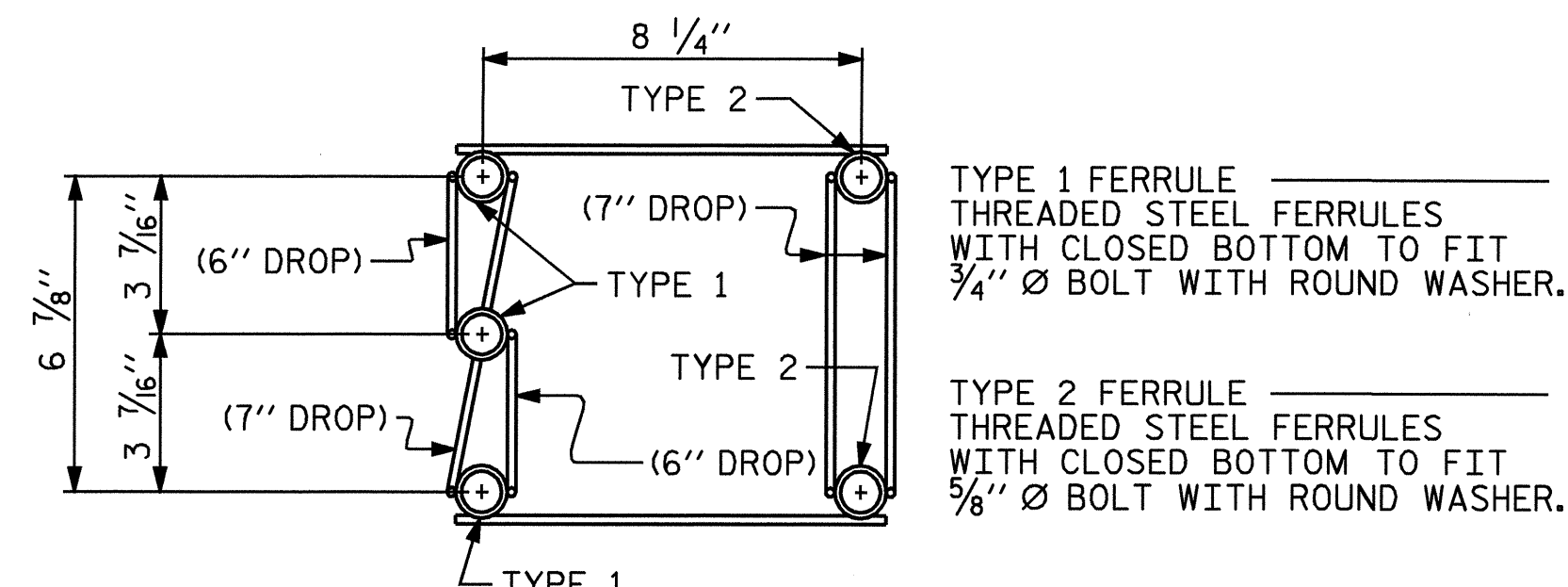
ASSEMBLED BY : D. HODGE	DATE : 10/08
CHECKED BY : J.R. DUGGINS	DATE : 11/08
DRAWN BY : JMB 1/88	REV. 10/17/00 RWW/LES
CHECKED BY : GGH 1/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

**NOTES**

**STRUCTURAL CONCRETE ANCHOR ASSEMBLY**

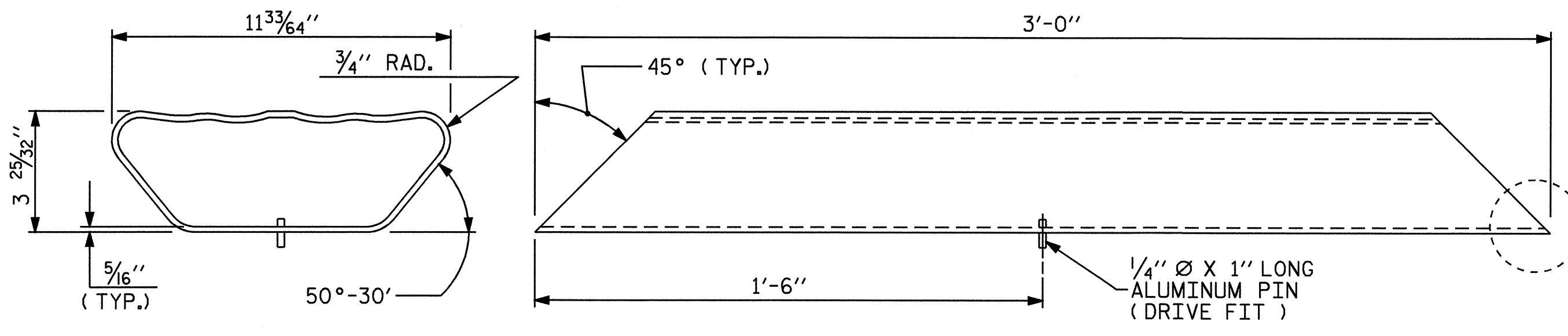
THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

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

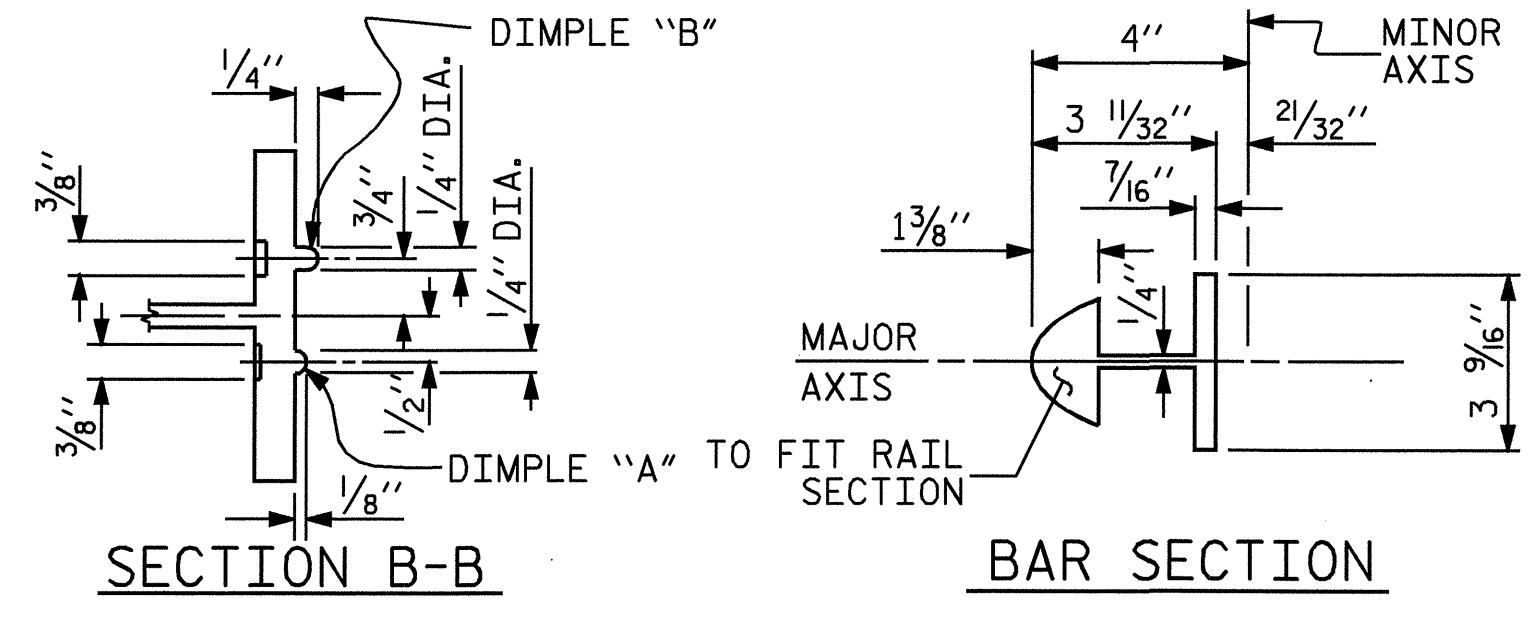
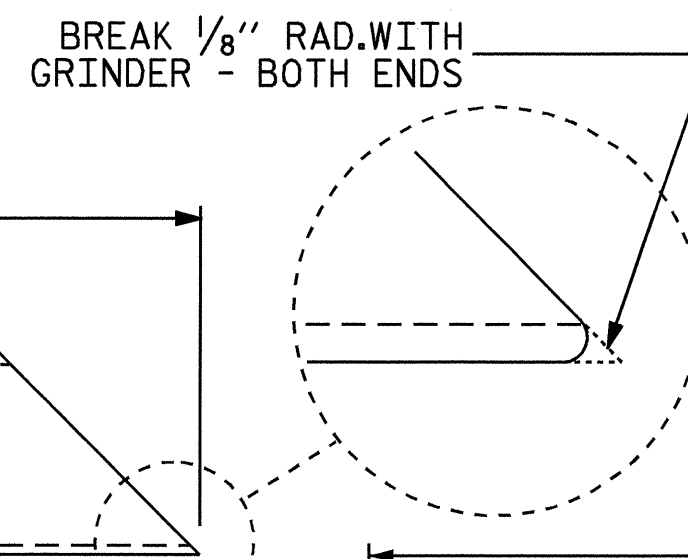


**5-BOLT METAL RAIL ANCHOR ASSEMBLY**

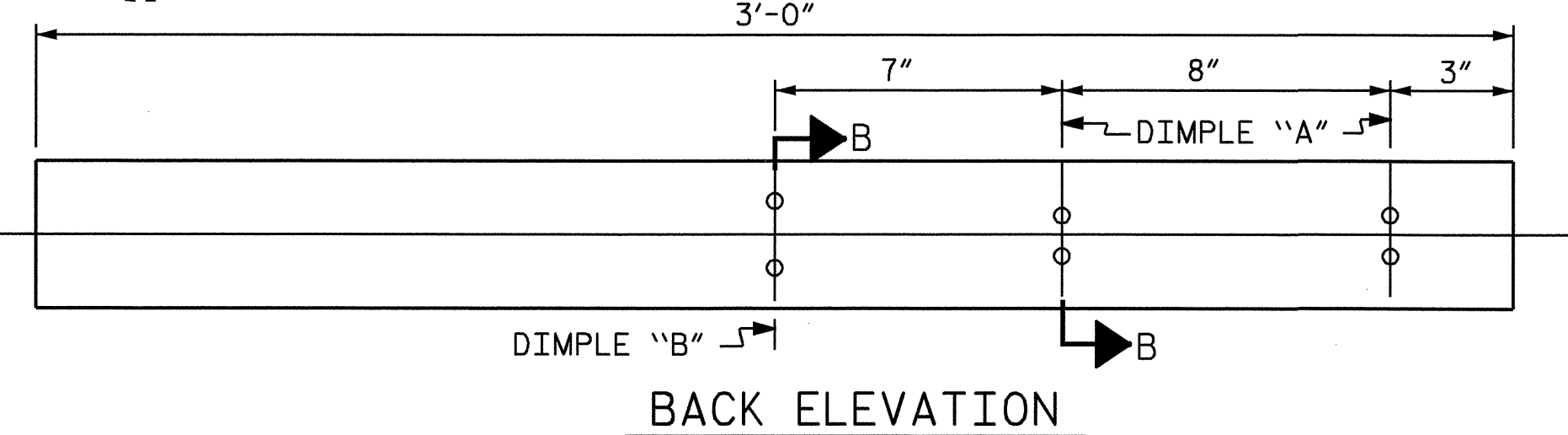
(34 ASSEMBLIES REQUIRED)



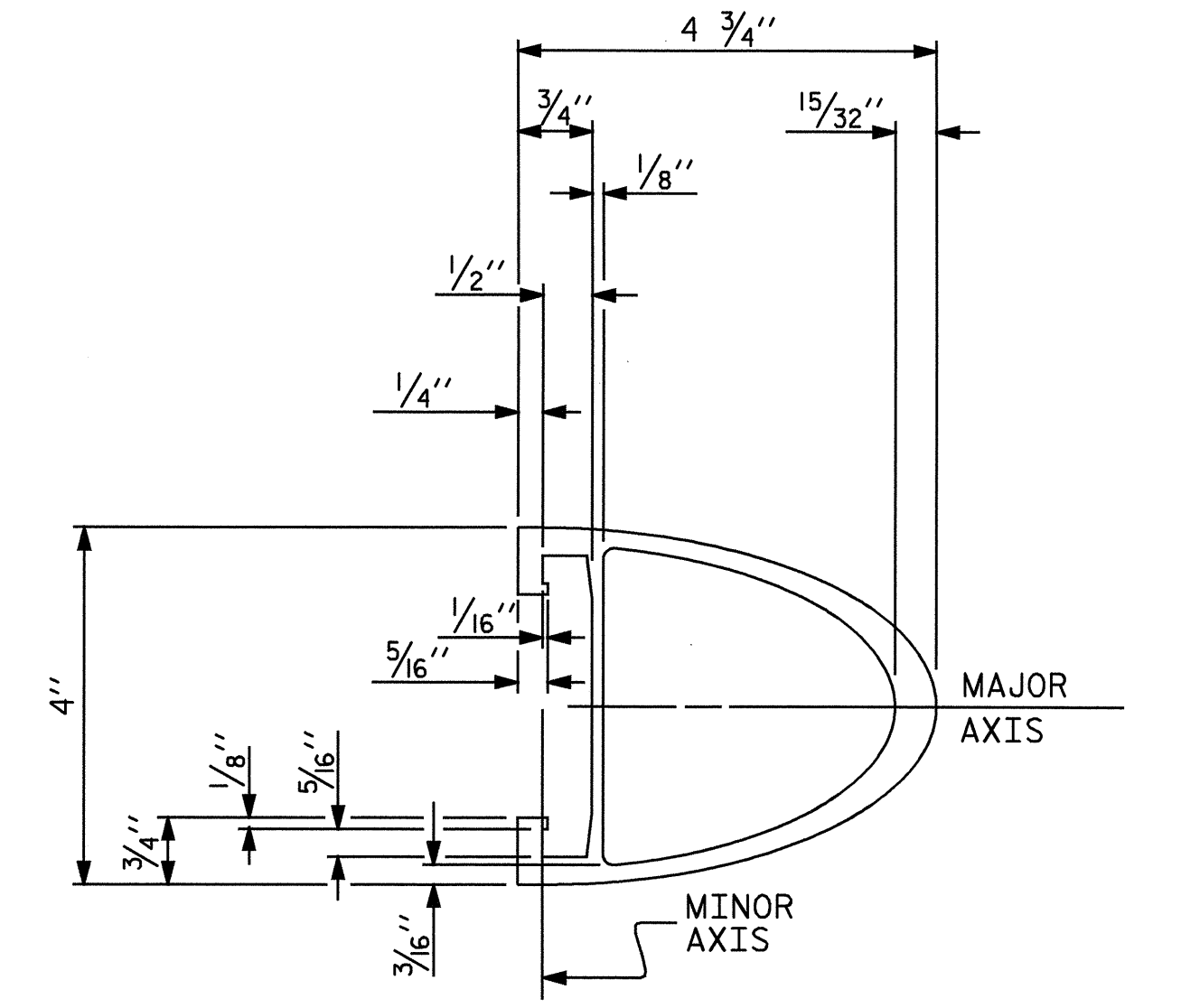
**BOTTOM RAIL EXPANSION BAR**



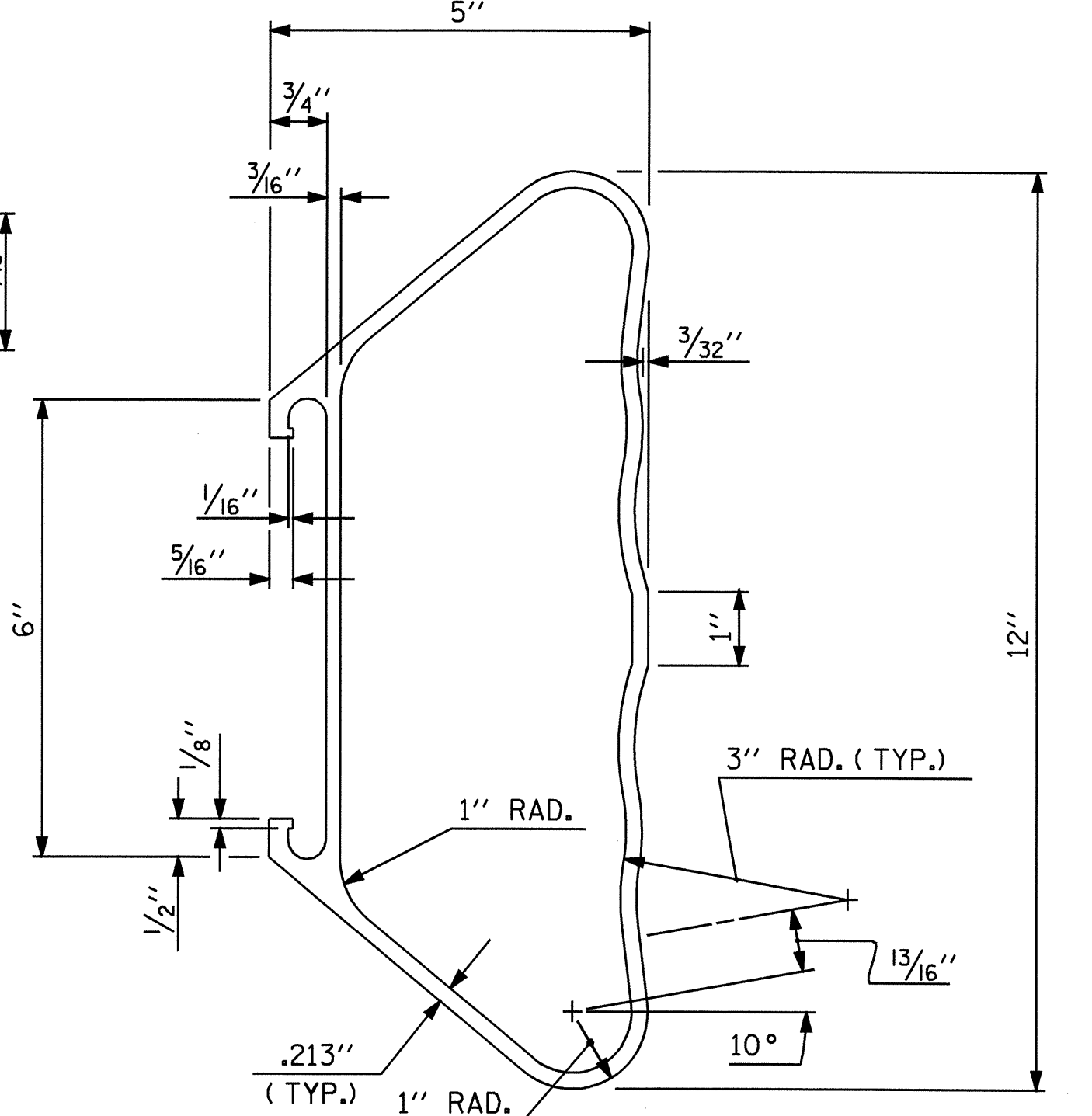
**SECTION B-B BAR SECTION**



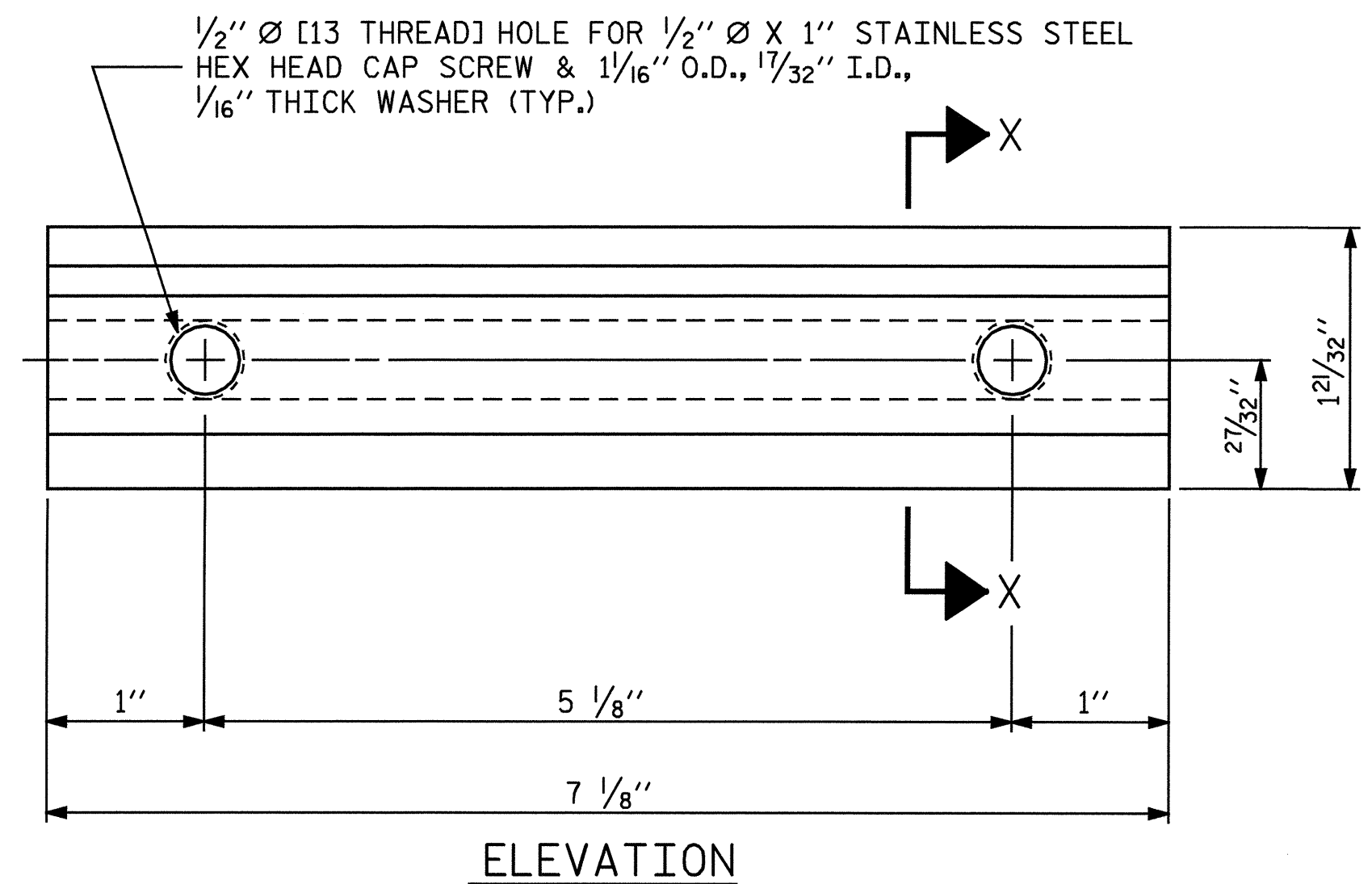
**TOP & MIDDLE RAIL EXPANSION BAR**



**TOP & MIDDLE RAIL SECTION**

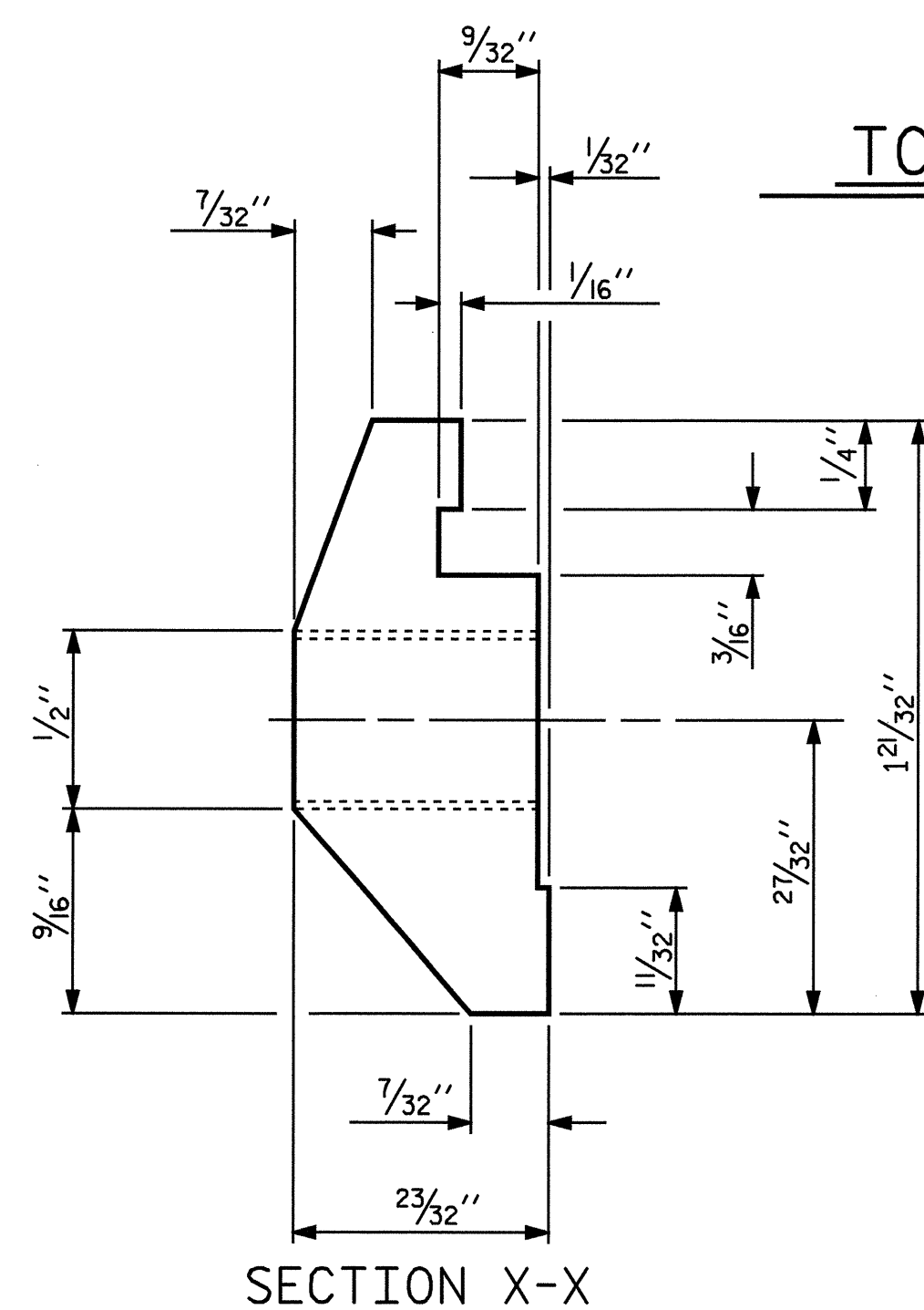


**BOTTOM RAIL SECTION**

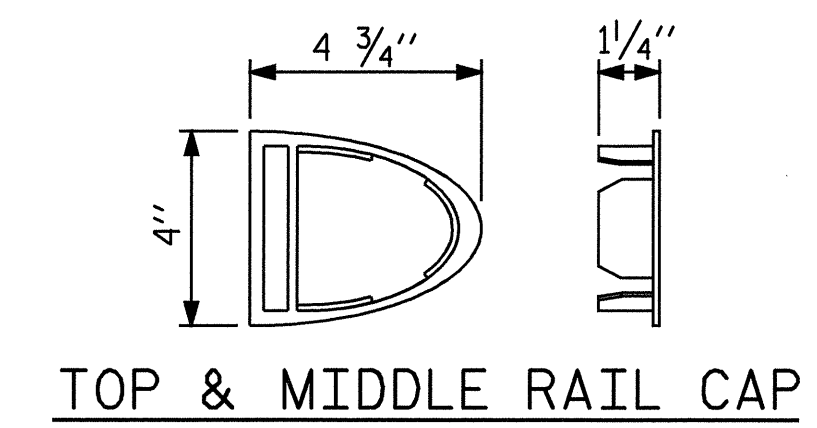


**CLAMP BAR DETAIL**

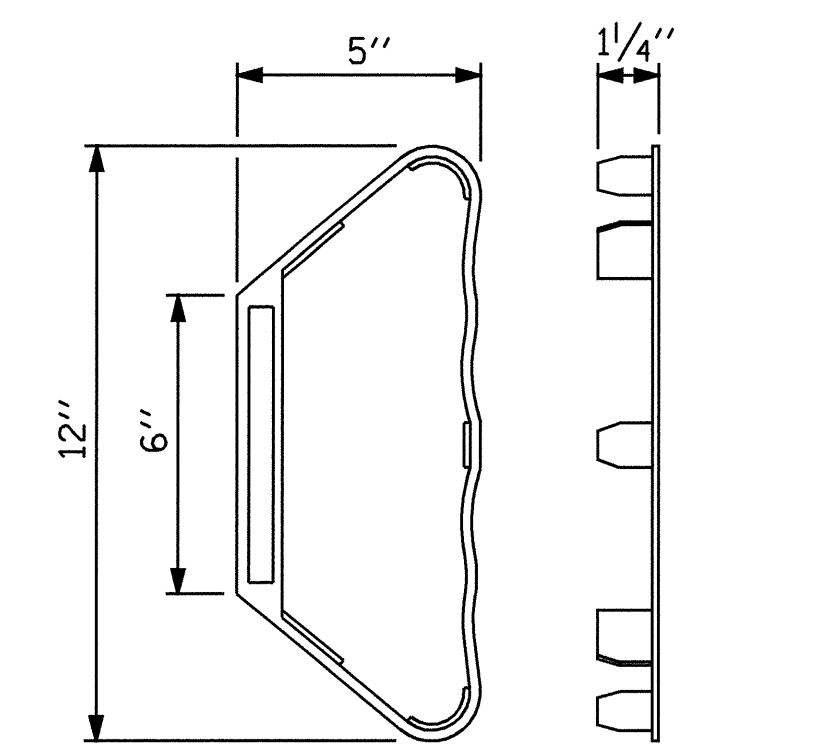
(6 REQUIRED PER POST)



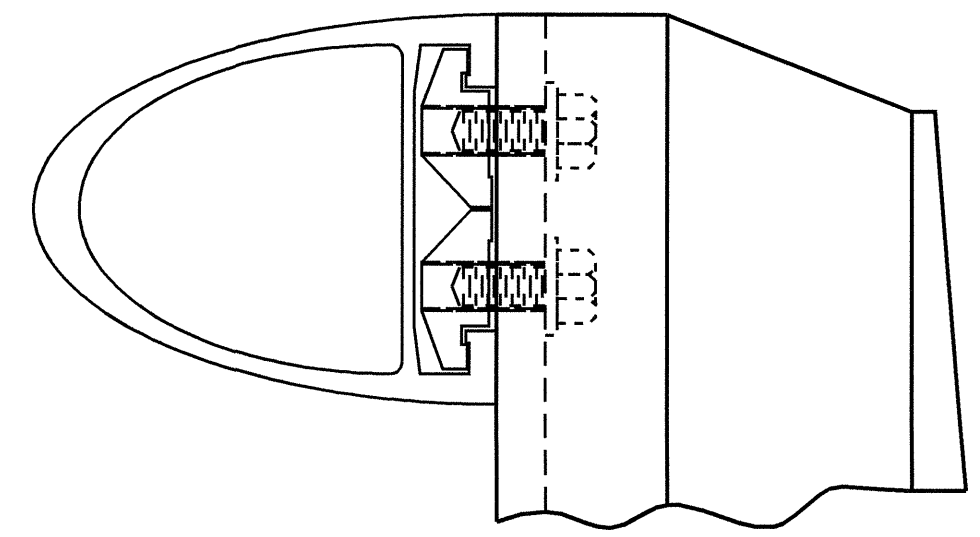
**SECTION X-X**



**TOP & MIDDLE RAIL CAP**



**BOTTOM RAIL CAP**



**CLAMP ASSEMBLY**

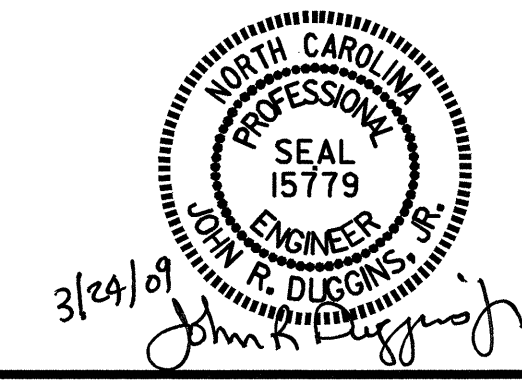
(MIDDLE & BOTTOM RAIL ARE SIMILAR)

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**3 BAR METAL RAIL**

ASSEMBLED BY : D. HODGE	DATE : 10/08
CHECKED BY : J.R. DUGGINS	DATE : 11/08
DRAWN BY : JMB 1/88	REV. 7/10/01 RWW/LES
CHECKED BY : GGH 1/88	REV. 5/17/03 RWW/JTE
	REV. 5/1/06 TLA/GM



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-19
2			4			71

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.

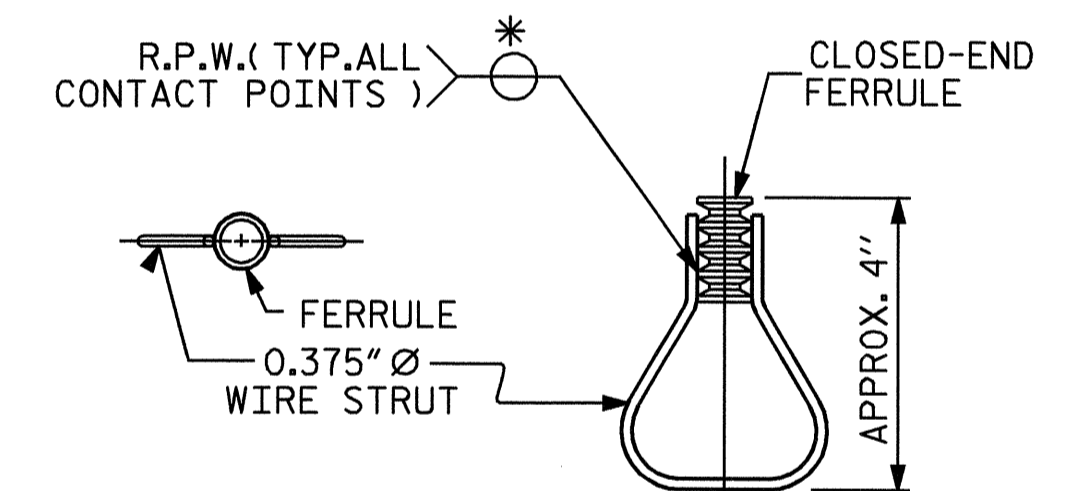
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT 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 CONTRACTORS 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 1/8" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.



PLAN ELEVATION  
STRUCTURAL CONCRETE INSERT

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

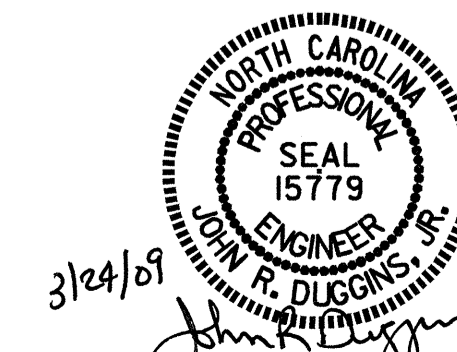
PROJECT NO. R-4430  
HENDERSON COUNTY  
STATION: 66+60.00 -L-

SHEET 3 OF 3

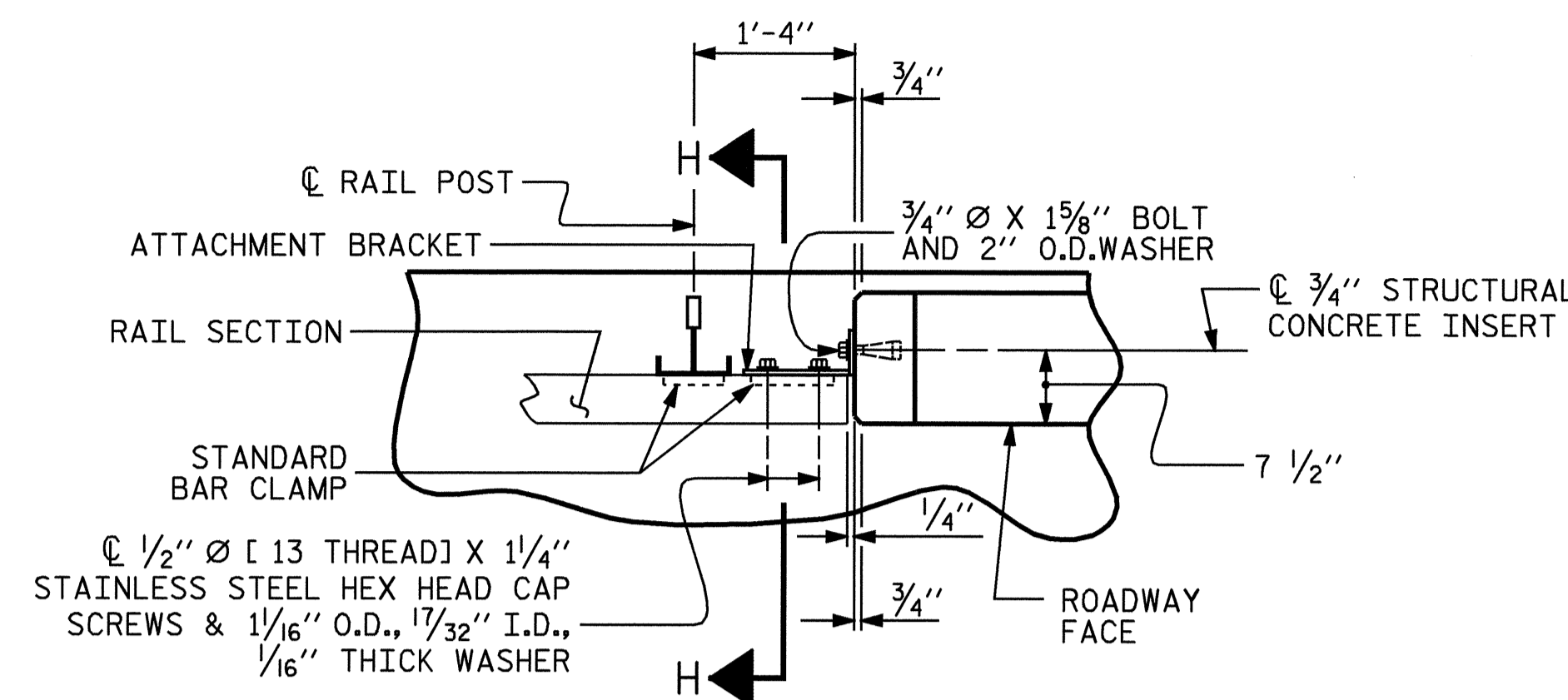
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
3 BAR METAL RAIL

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20	
1			3			TOTAL SHEETS	
2			4			71	

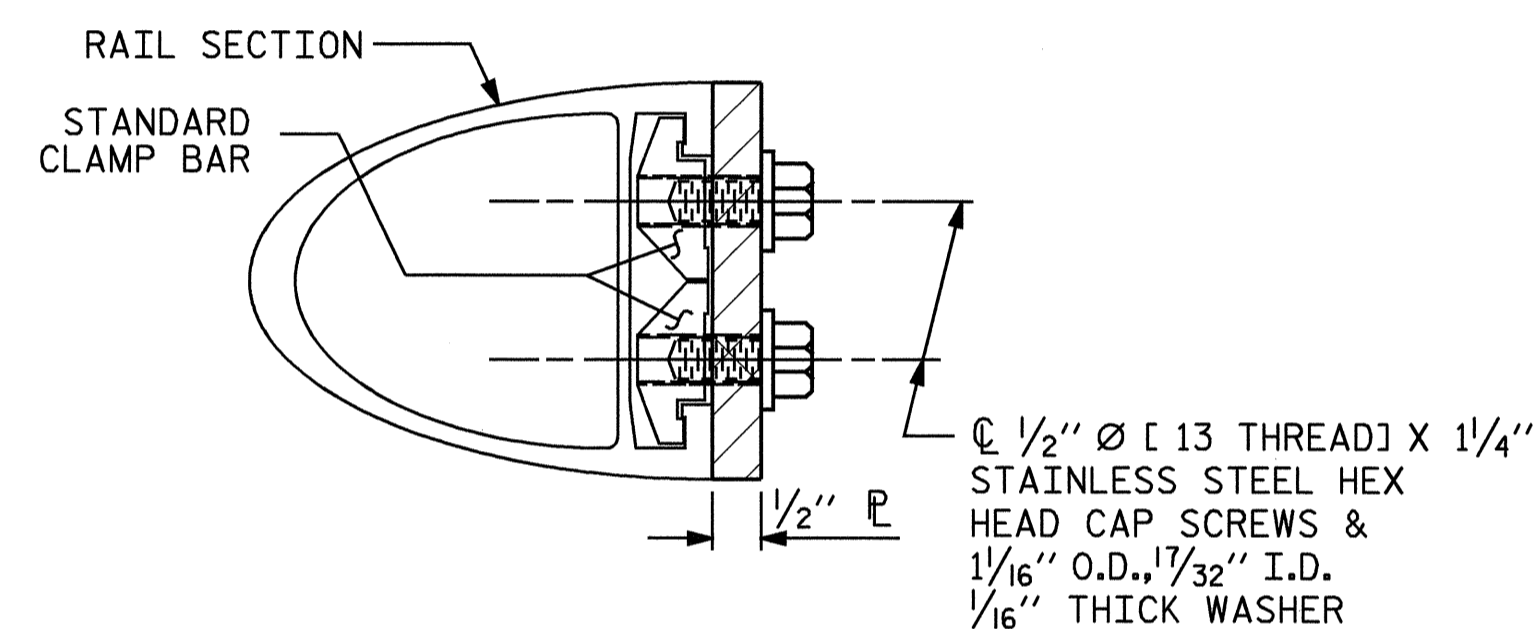


STR. #1 STD. NO. BMR7



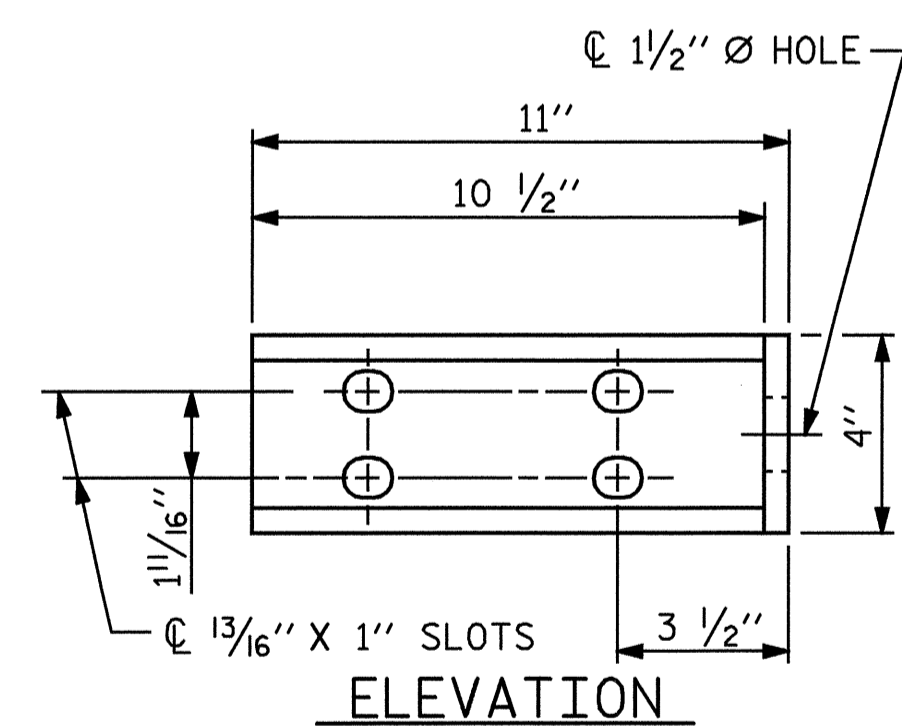
PLAN OF RAIL AND END POST

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

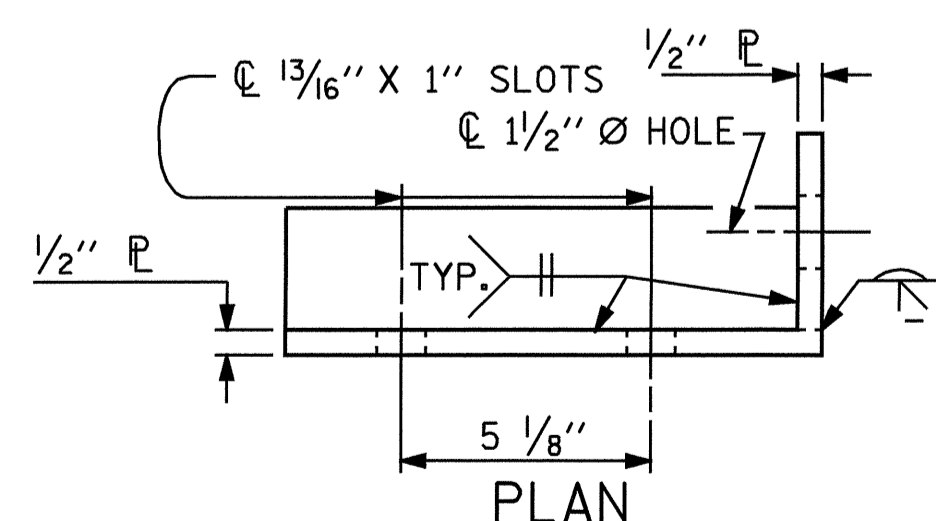


SECTION H-H

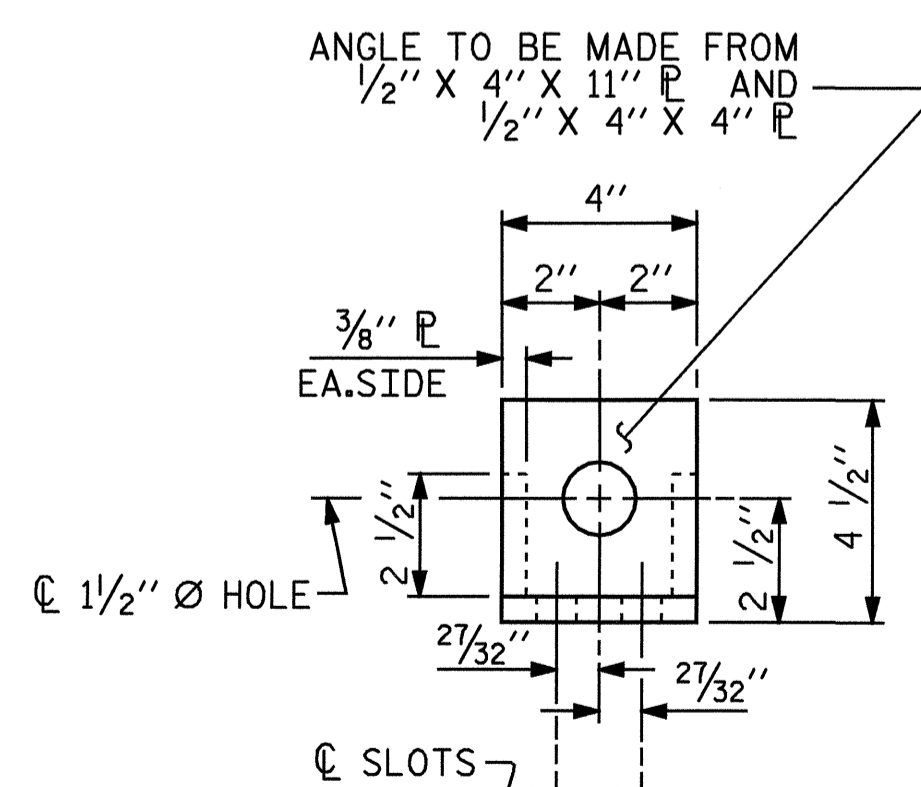
(FOR TOP & MIDDLE RAIL)



ELEVATION



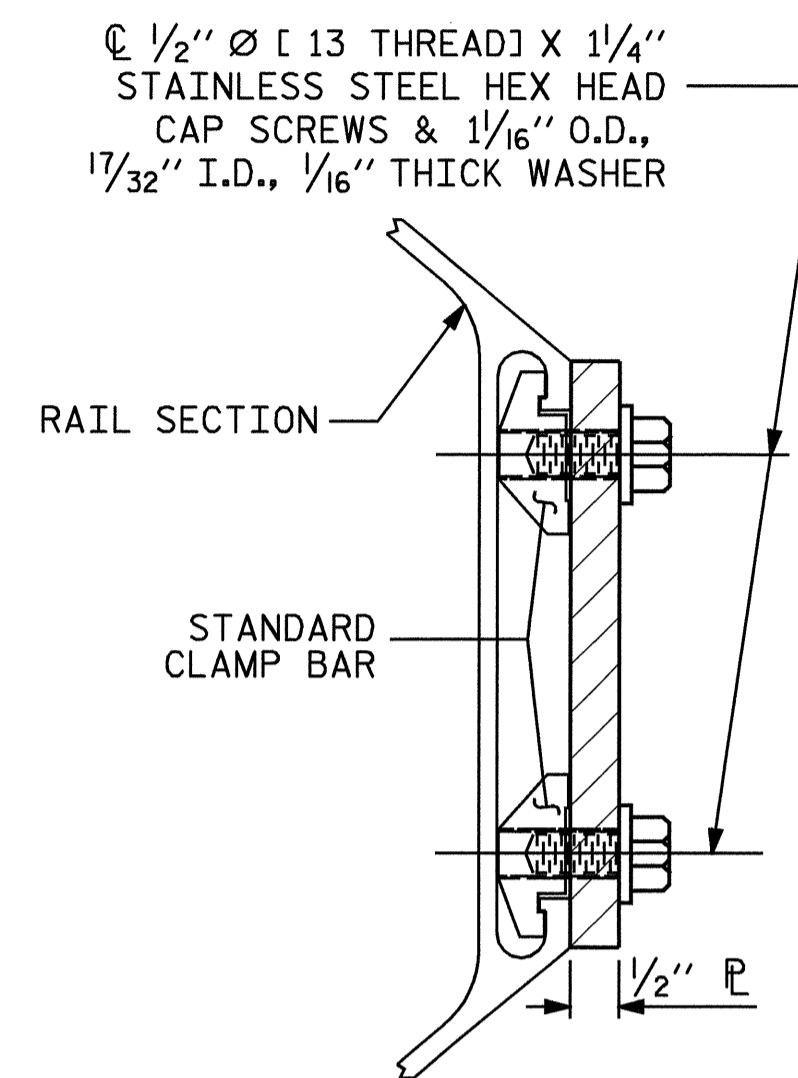
PLAN



END VIEW  
(FIX. AND EXP.)

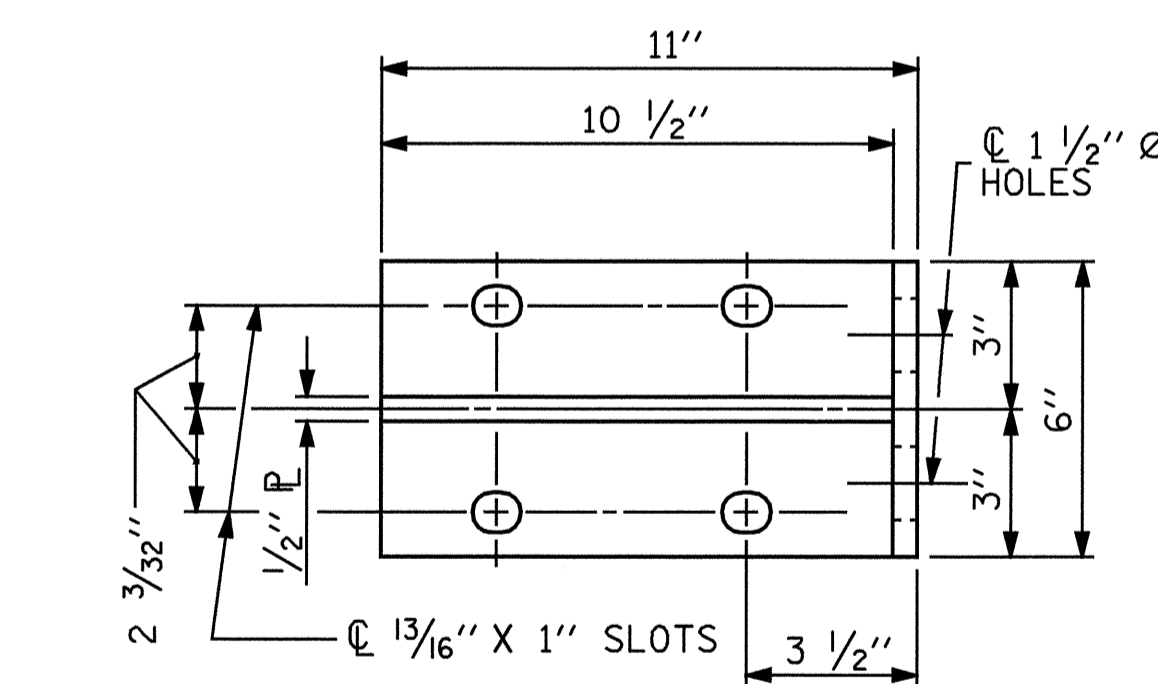
DETAILS FOR ATTACHMENT BRACKET

(TOP & MIDDLE RAIL ONLY)

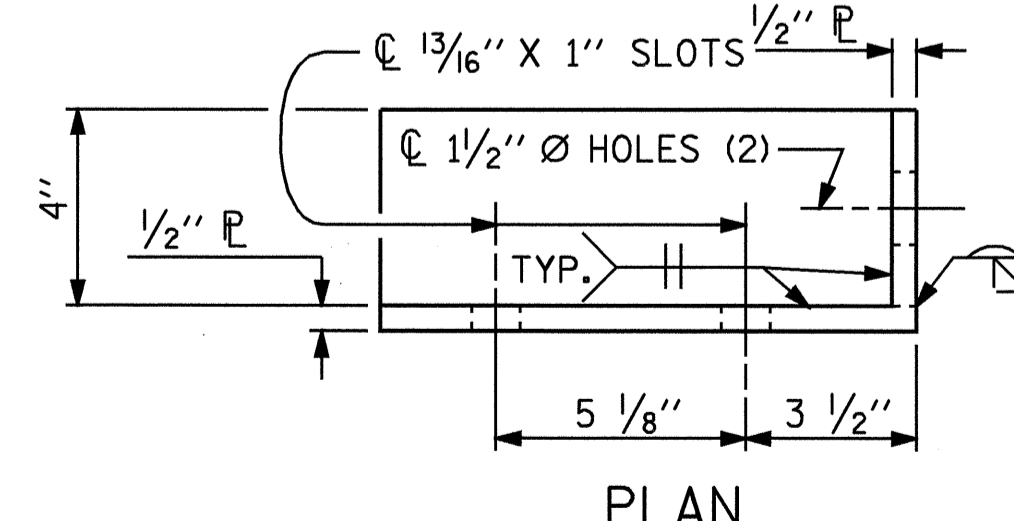


SECTION H-H

(FOR BOTTOM RAIL)



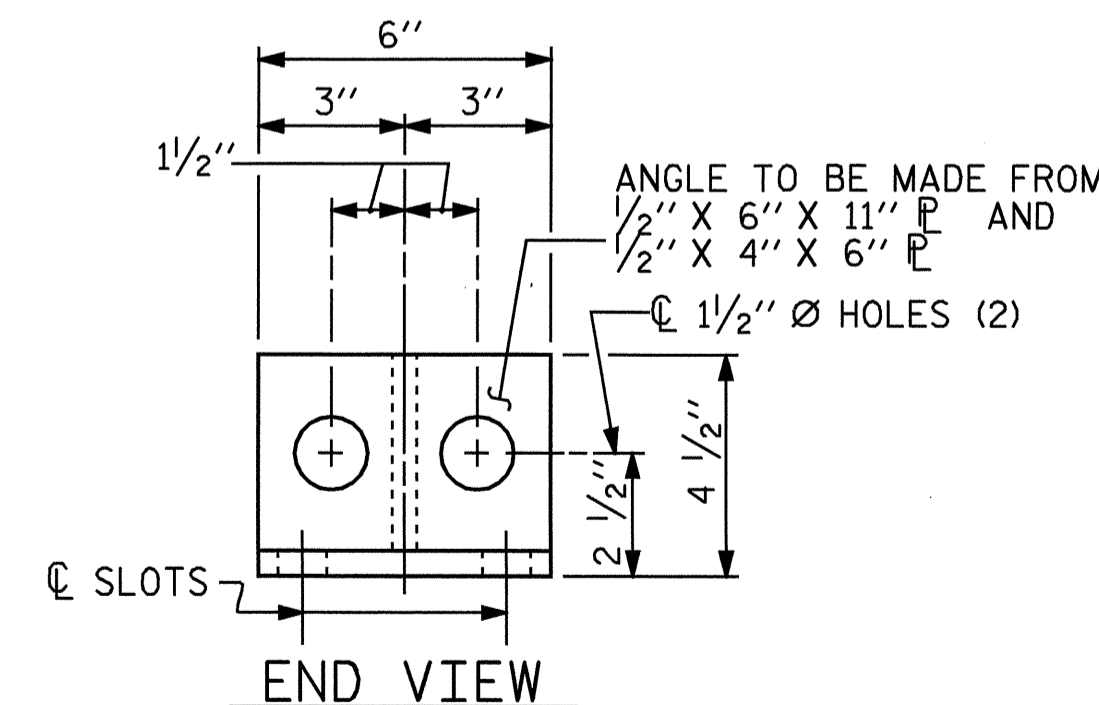
ELEVATION



PLAN

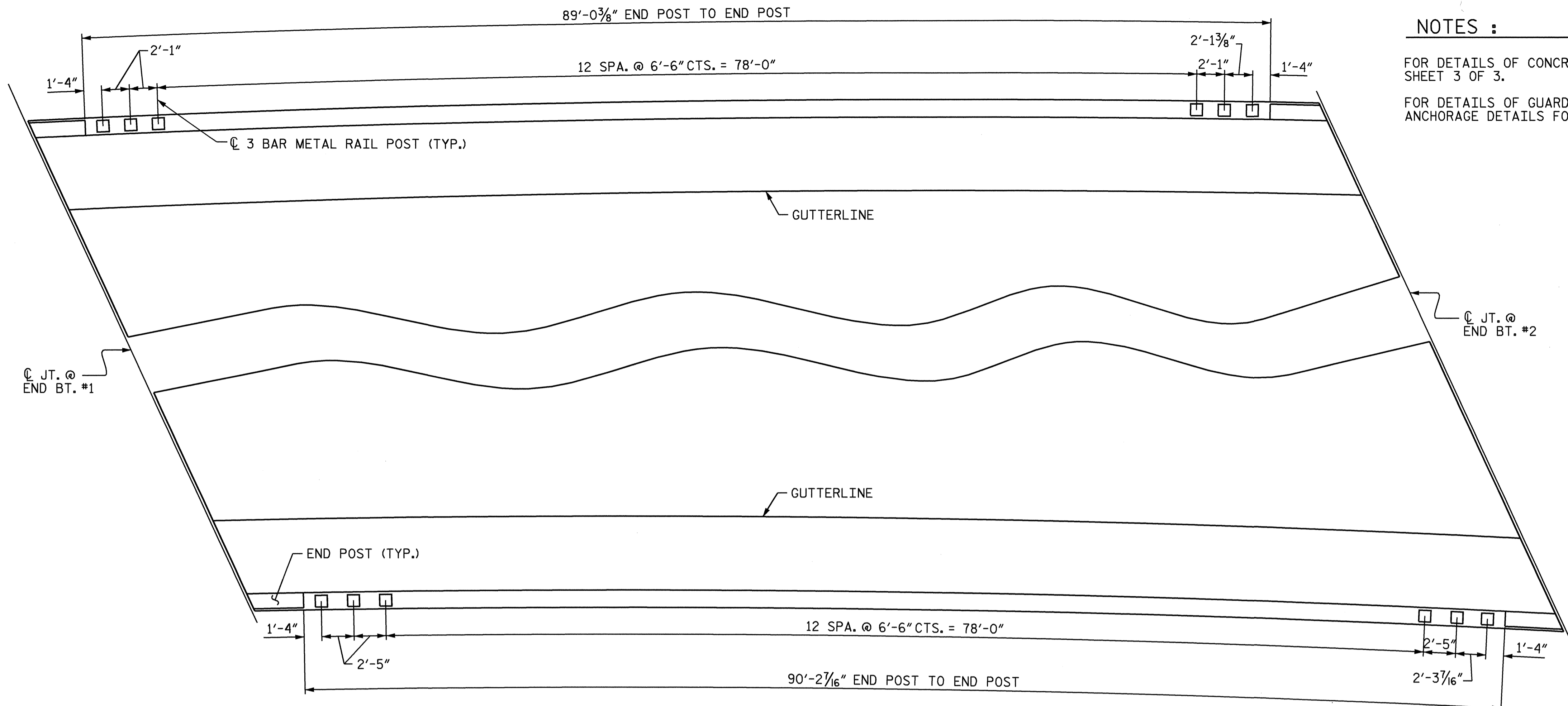
DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)



END VIEW

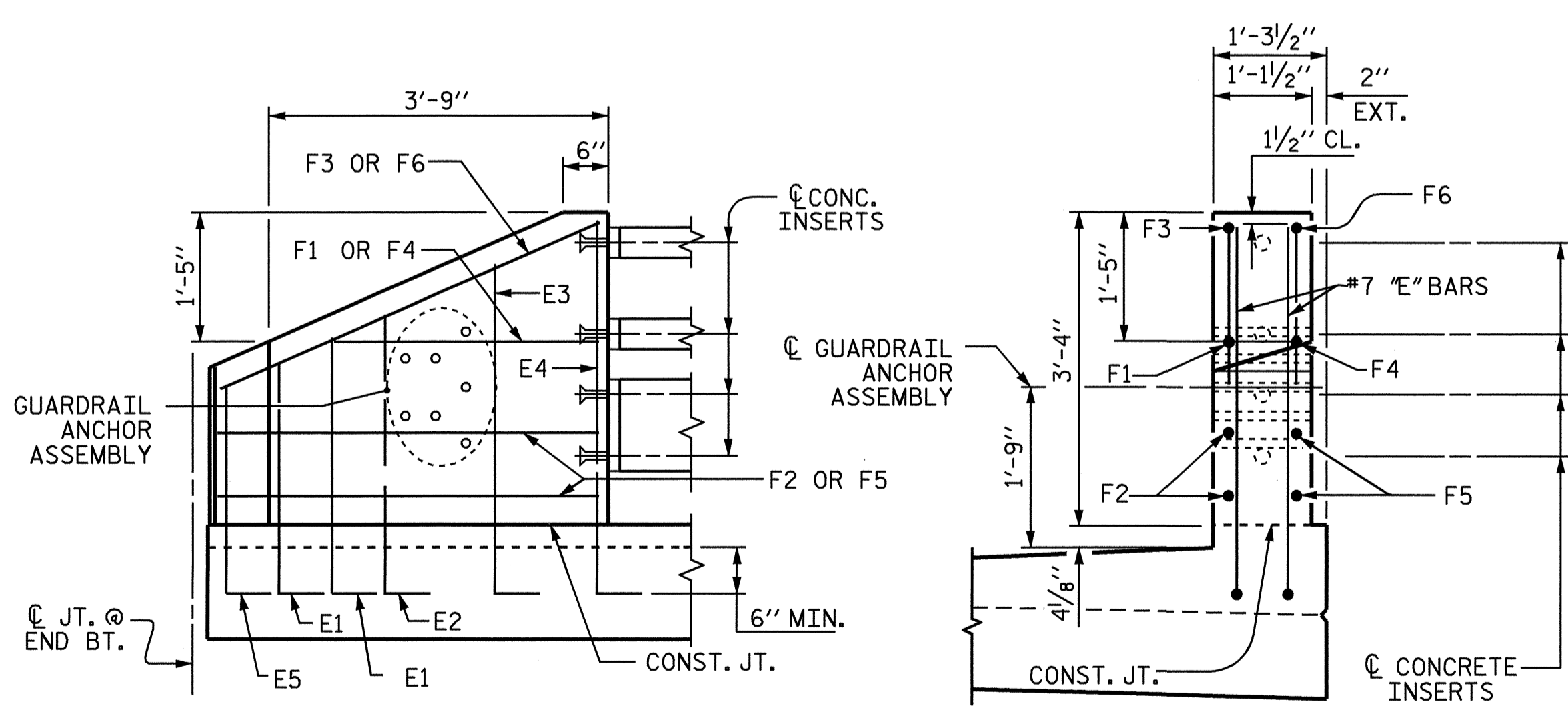
ASSEMBLED BY : D. HODGE	DATE : 10/08
CHECKED BY : J.R. DUGGINS	DATE : 11/08
DRAWN BY : JMB 1/88	REV. 7/10/01 RWW/LES
CHECKED BY : GGH 1/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM



**NOTES :**  
 FOR DETAILS OF CONCRETE INSERTS, SEE "3 BAR METAL RAIL" SHEET 3 OF 3.  
 FOR DETAILS OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET.

**PLAN OF RAIL POST SPACING**

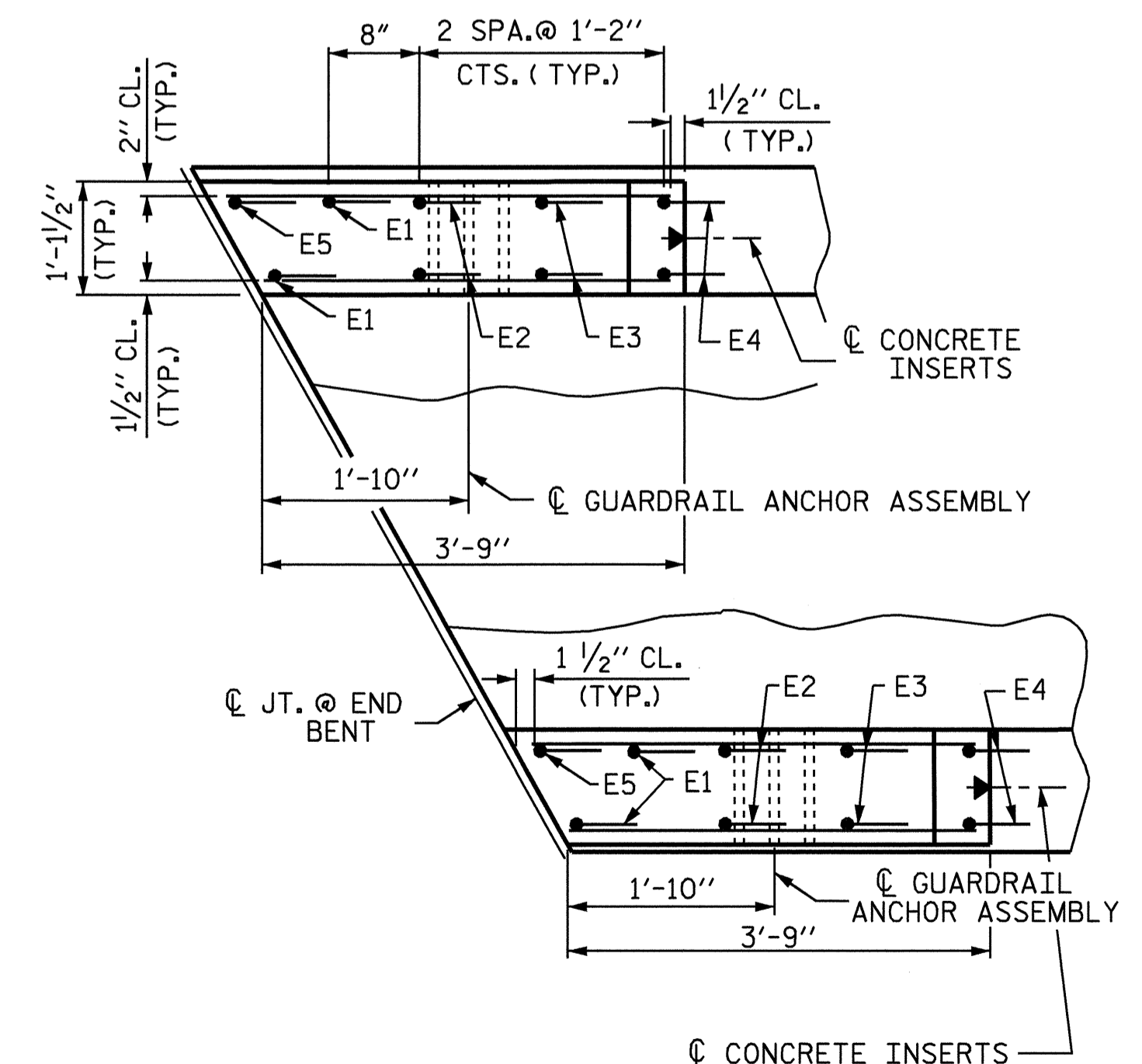
RAIL POST DIMENSIONS ARE MEASURED ALONG ARC AT OUTSIDE OF SUPERSTRUCTURE.



**ELEVATION**

**END VIEW**

**END POST DETAILS**



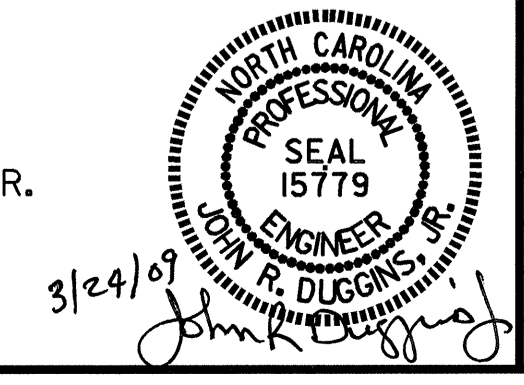
**PLAN**

\* CENTER E1 BETWEEN E5 AND E2 IF E5 BAR IS NEEDED TO REINFORCE LONG CORNER.

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**RAIL POST SPACINGS  
 AND  
 END OF RAIL DETAILS  
 FOR 3 BAR METAL RAILS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-21
2			4			71



DRAWN BY : D. HODGE DATE : 10/08  
 CHECKED BY : J.R. DUGGINS DATE : 11/08

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.

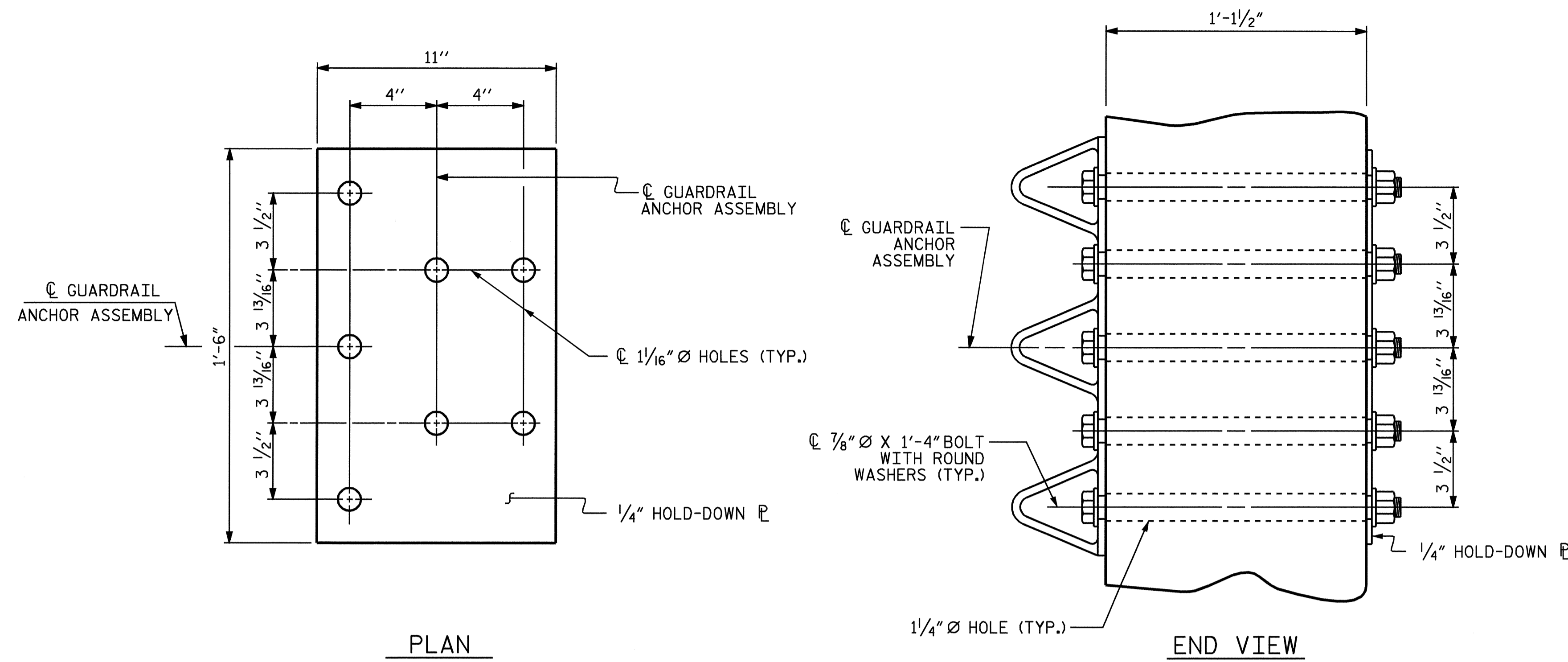
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS.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

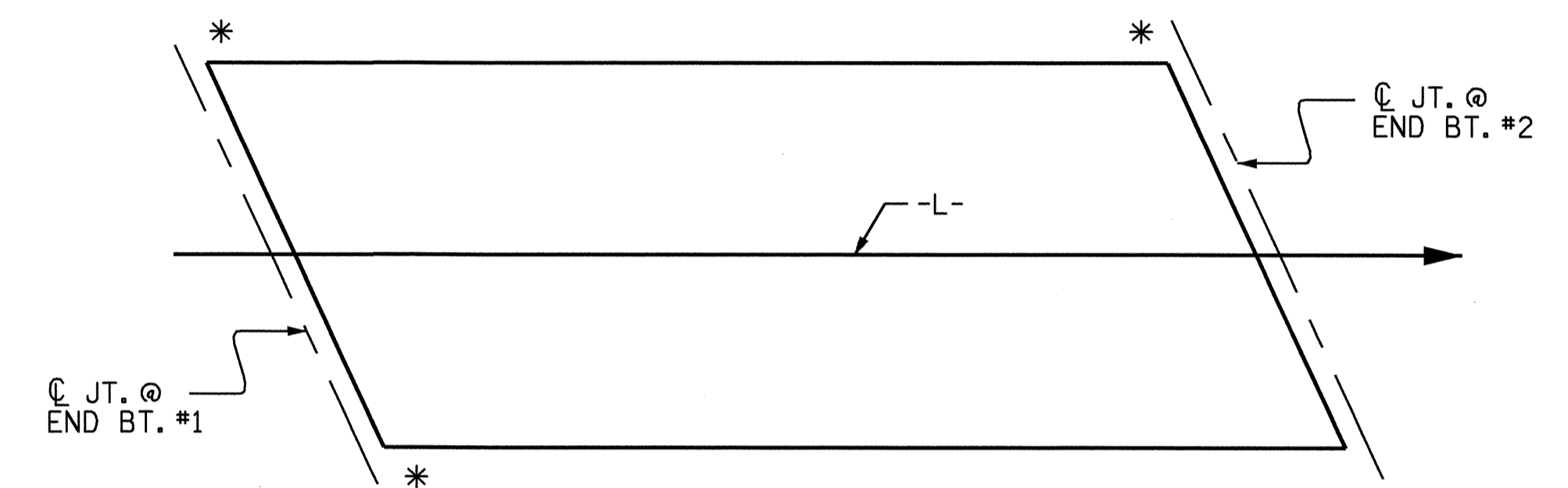
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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.

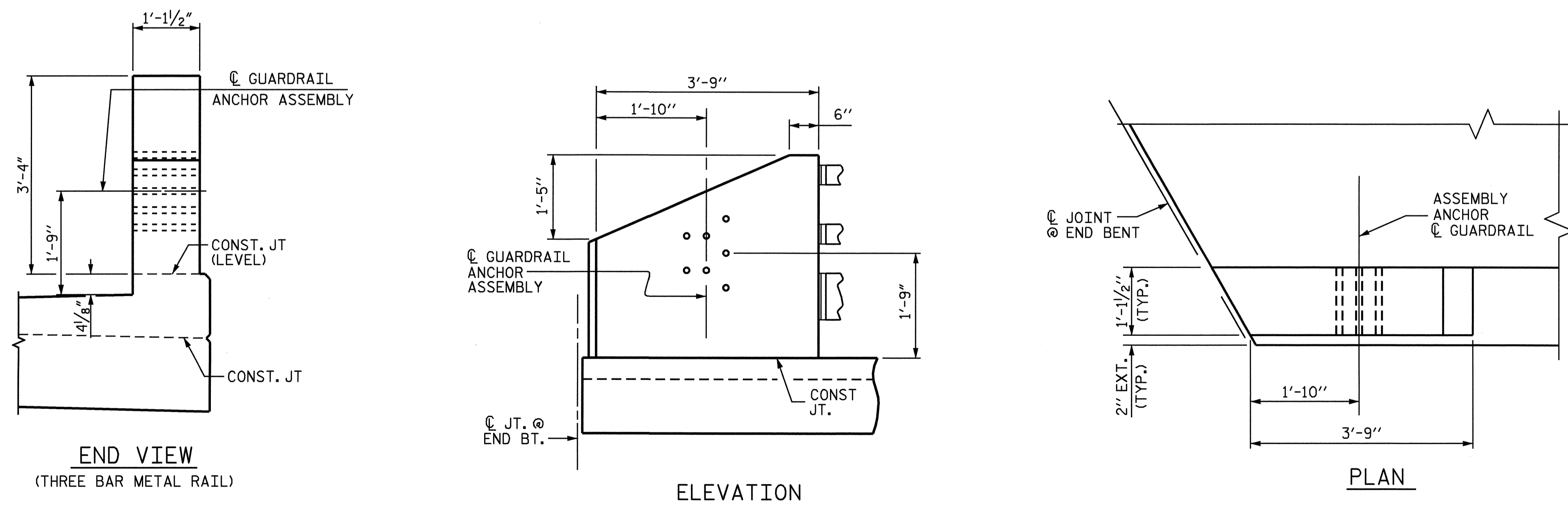


GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

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

ASSEMBLED BY : D. HODGE DATE : 10/08  
 CHECKED BY : J.R. DUGGINS DATE : 11/08  
 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

3/24/09  
 JOHN R. DUGGINS  
 PROFESSIONAL ENGINEER  
 SEAL 15779

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-22
2			4			TOTAL SHEETS
						71



NOTES

ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169 GRADES 1010 THRU 1020 OR APPROVED EQUAL.

STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON THE PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.

UPON COMPLETION OF SHOP FABRICATION, THE ENTIRE ANCHOR ASSEMBLY SHALL BE METALLIZED. THE 1/2" Ø STUD ANCHORS AND ANCHOR TABS NEED NOT BE METALLIZED. SEE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).

ANCHOR ASSEMBLY SHALL BE MADE CONTINUOUS THE LENGTH OF THE JOINT FROM GUTTER TO GUTTER. FOR FIELD SPLICES AT ALL CROWN BREAK POINTS, THE ENDS OF THE STEEL ANGLES SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE. FINISHED FIELD WELDS SHALL BE GRIND SMOOTH AND COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

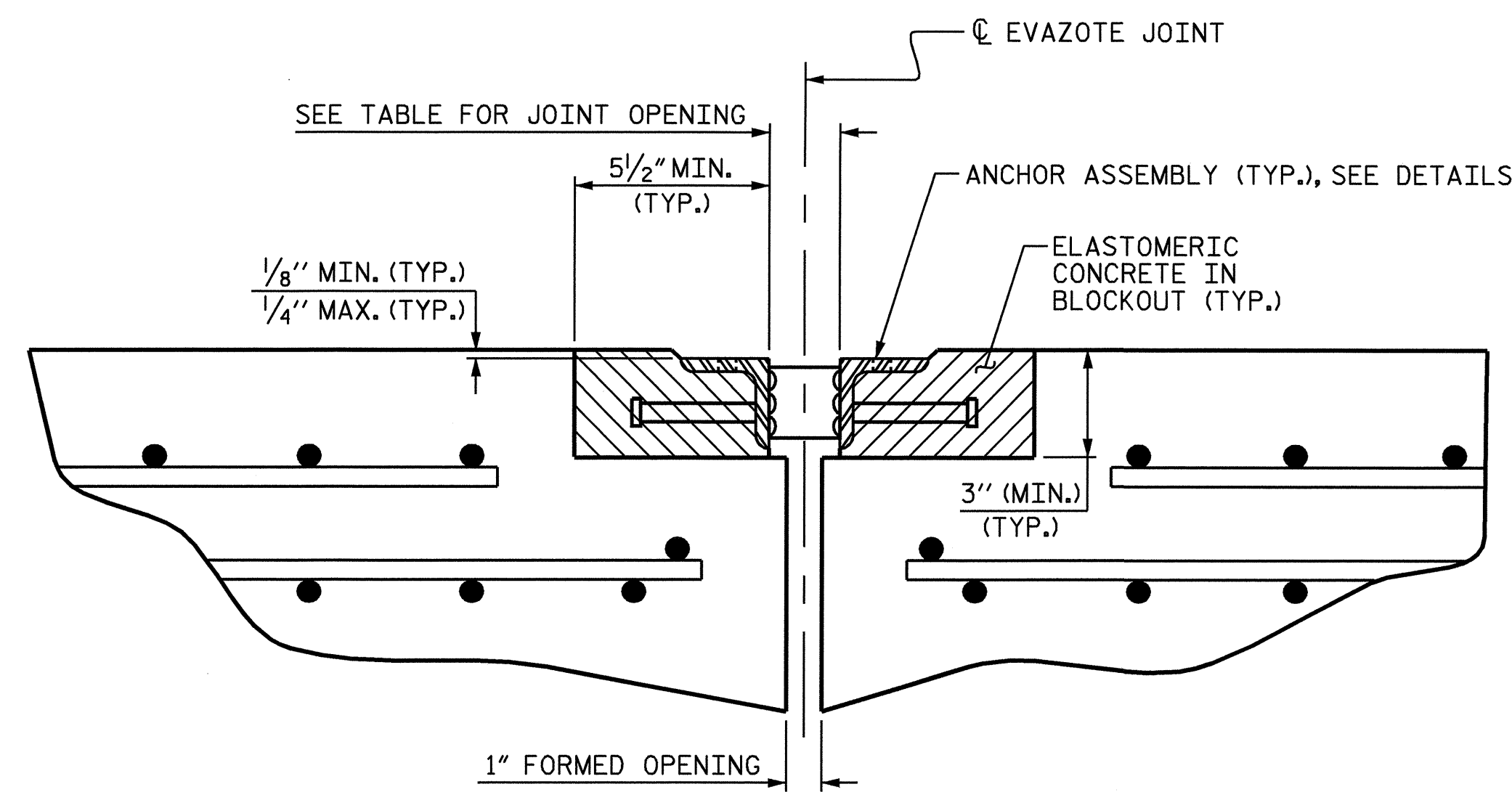
ANCHOR ASSEMBLY SEGMENTS SHALL NOT BE LESS THAN 12 FEET NOR MORE THAN 20 FEET IN LENGTH. SHORTER SEGMENTS MAY BE USED AT THE EDGE OF ROADWAY OR AT POINTS OF STAGED CONSTRUCTION.

THE ANCHOR ASSEMBLY SHALL BE SECURED AND LEVELED AS SHOWN IN THE "ARMORED JOINT ANCHOR ASSEMBLY DETAILS". NO SUBMITTALS ARE REQUIRED FOR 3/8" Ø EXPANSION ANCHORS, NUTS OR WASHERS. THE CONTRACTOR MAY SUBMIT FOR APPROVAL AN ALTERNATE METHOD OF ALIGNING AND LEVELING THE ANGLES. THE ALTERNATE METHOD SHALL NOT INCLUDE ANY WELDING TO THE OUTSIDE FACE OF THE ANGLES.

AFTER THE ELASTOMERIC CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE ANY EXCESS CONCRETE THAT COMES THROUGH THE WEEP HOLES AND THOROUGHLY CLEAN THE ANGLES. ANY DAMAGED STEEL SHALL BE COATED WITH A MINIMUM OF 4 MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

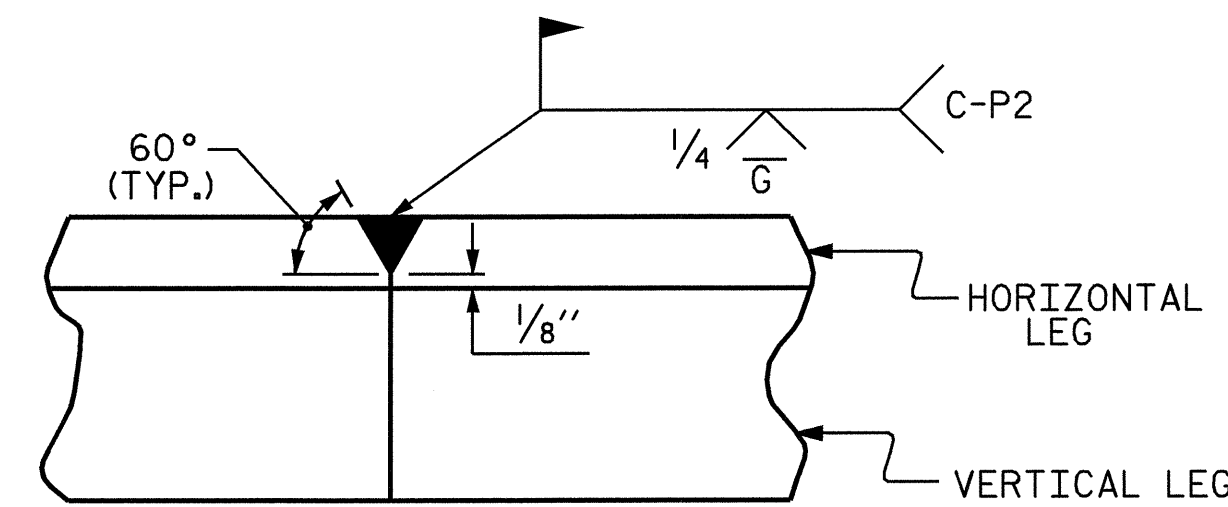
SEE SPECIAL PROVISIONS FOR EVAZOTE JOINT SEALS.

SEE SPECIAL PROVISIONS FOR ELASTOMERIC CONCRETE.

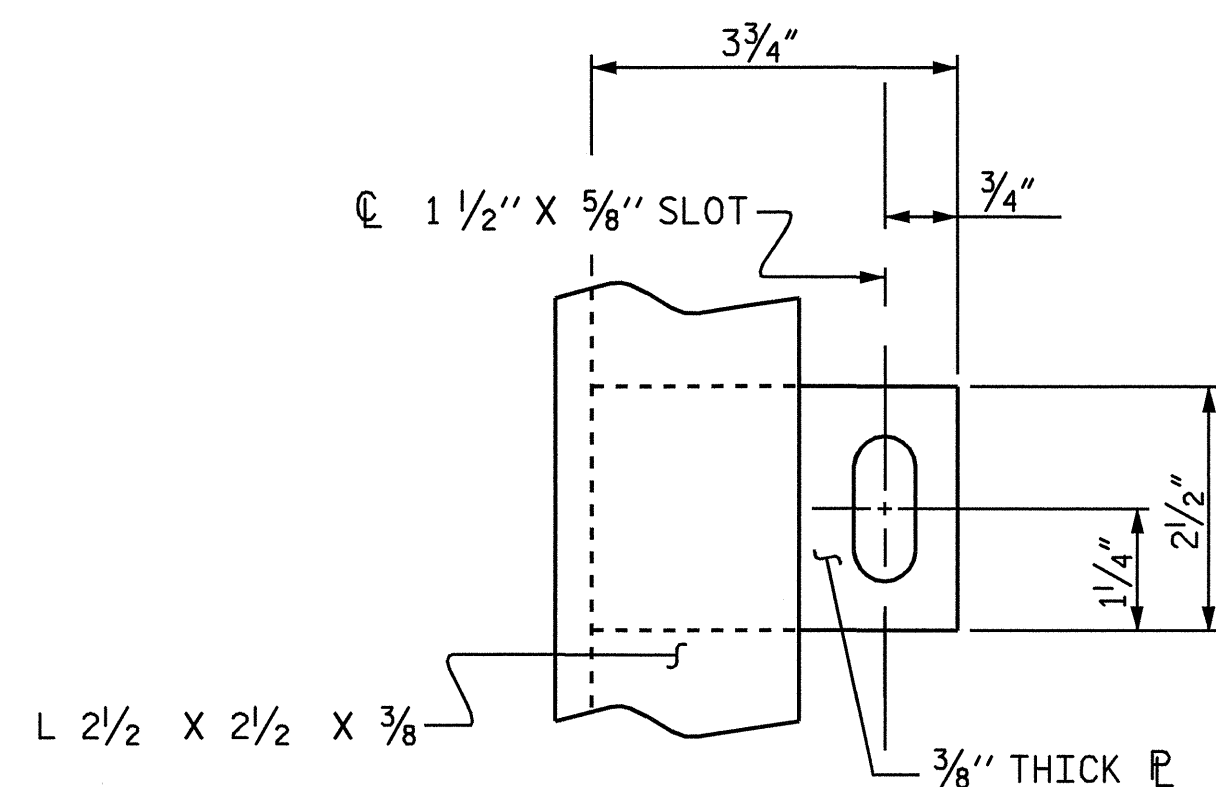


ARMORED JOINT DETAILS

SECTION NORMAL TO JOINT AT BENT



DETAIL- FIELD WELD SPLICE OF ANGLE



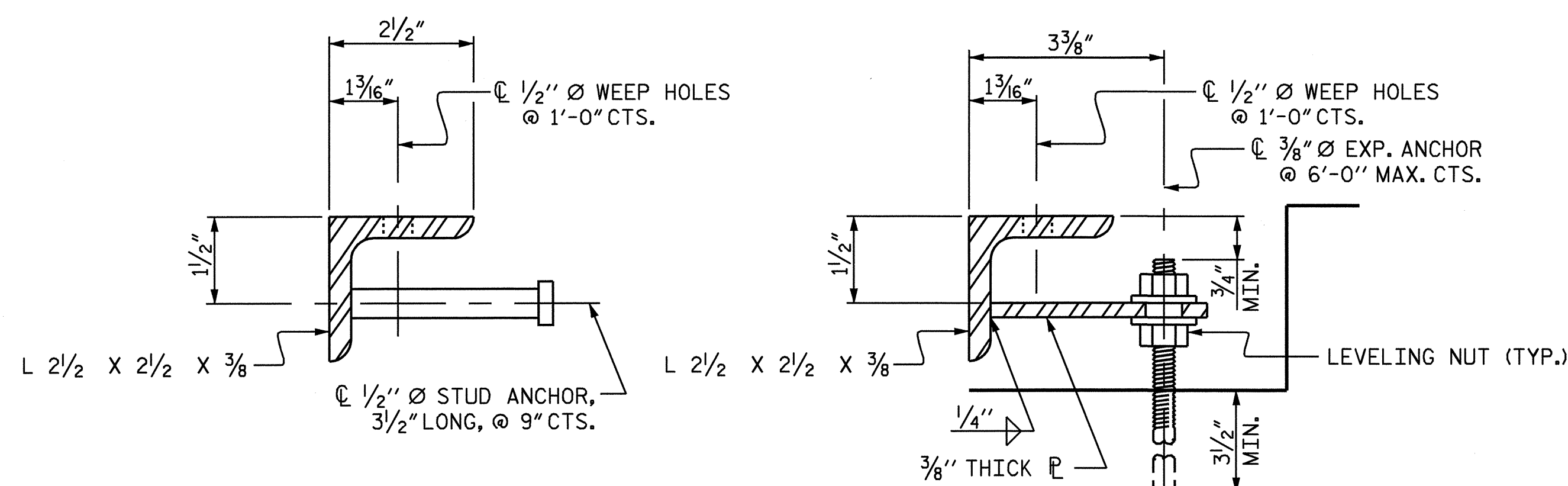
PLAN VIEW OF TAB

MOVEMENT AND SETTING AT EVAZOTE JOINT						
	SKIEW ANGLE	NOMINAL UNCOMPRESSED SEAL WIDTH	TOTAL MOVEMENT (ALONG C.RDWAY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
END BENT No. 1	65°	2 1/2"	0	1 7/8"	1 7/8"	1 7/8"
END BENT No. 2	65°	2 1/2"	15/16"	2"	1 7/8"	1 7/8"

TOTAL MOVEMENT IS CALCULATED ALONG THE CENTERLINE OF ROADWAY. JOINT OPENINGS ARE MEASURED PERPENDICULAR TO THE JOINT.

BILL OF MATERIAL				
	STAGE I		STAGE II	
	ELASTOMERIC CONCRETE * (CU. FT.)	TOTAL LENGTH OF ANGLE (FT)	ELASTOMERIC CONCRETE * (CU. FT.)	TOTAL LENGTH OF ANGLE (FT)
END BENT No. 1	7.4	64'-4 3/4"	10.9	95'-3 3/4"
END BENT No. 2	7.6	66'-4 1/2"	11.3	98'-7 1/2"

\* BASED ON THE MINIMUM BLOCKOUT SHOWN.



SECTION VIEW OF STUD

SECTION VIEW OF TAB

ARMORED JOINT ANCHOR ASSEMBLY DETAILS

PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 66+60.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 ARMORED EVAZOTE  
 JOINT DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-23
2			4			71

ASSEMBLED BY : D. HODGE DATE : 10/08  
 CHECKED BY : J.R. DUGGINS DATE : 11/08  
 DRAWN BY : EEM 1/96  
 CHECKED BY : RGW 1/96

REV. 7/10/01 LES/RDR  
 REV. 5/7/03RR RWW/JTE  
 REV. 5/1/06 TLA/GM

3/24/09  
 JOHN R. DUGGINS, INC.  
 PROFESSIONAL ENGINEER  
 SEAL 15779



NOTES

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

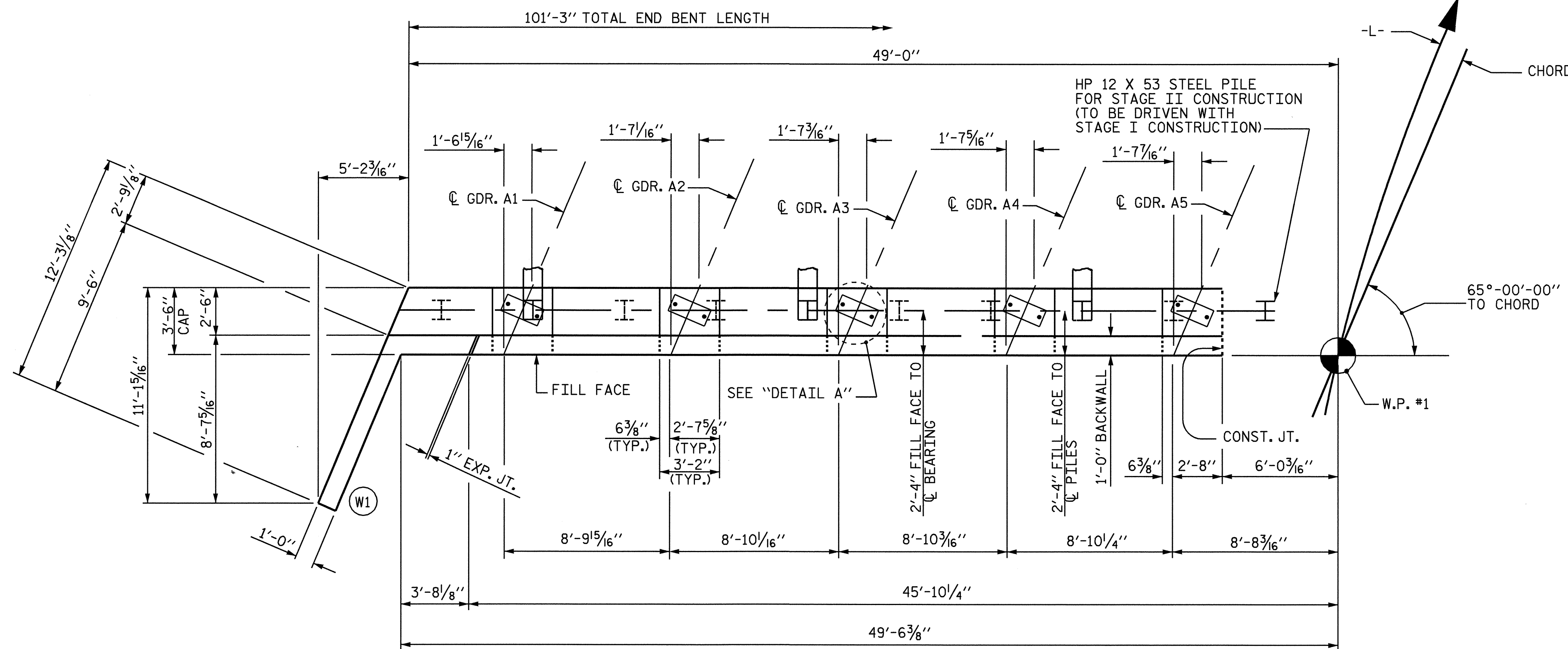
FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

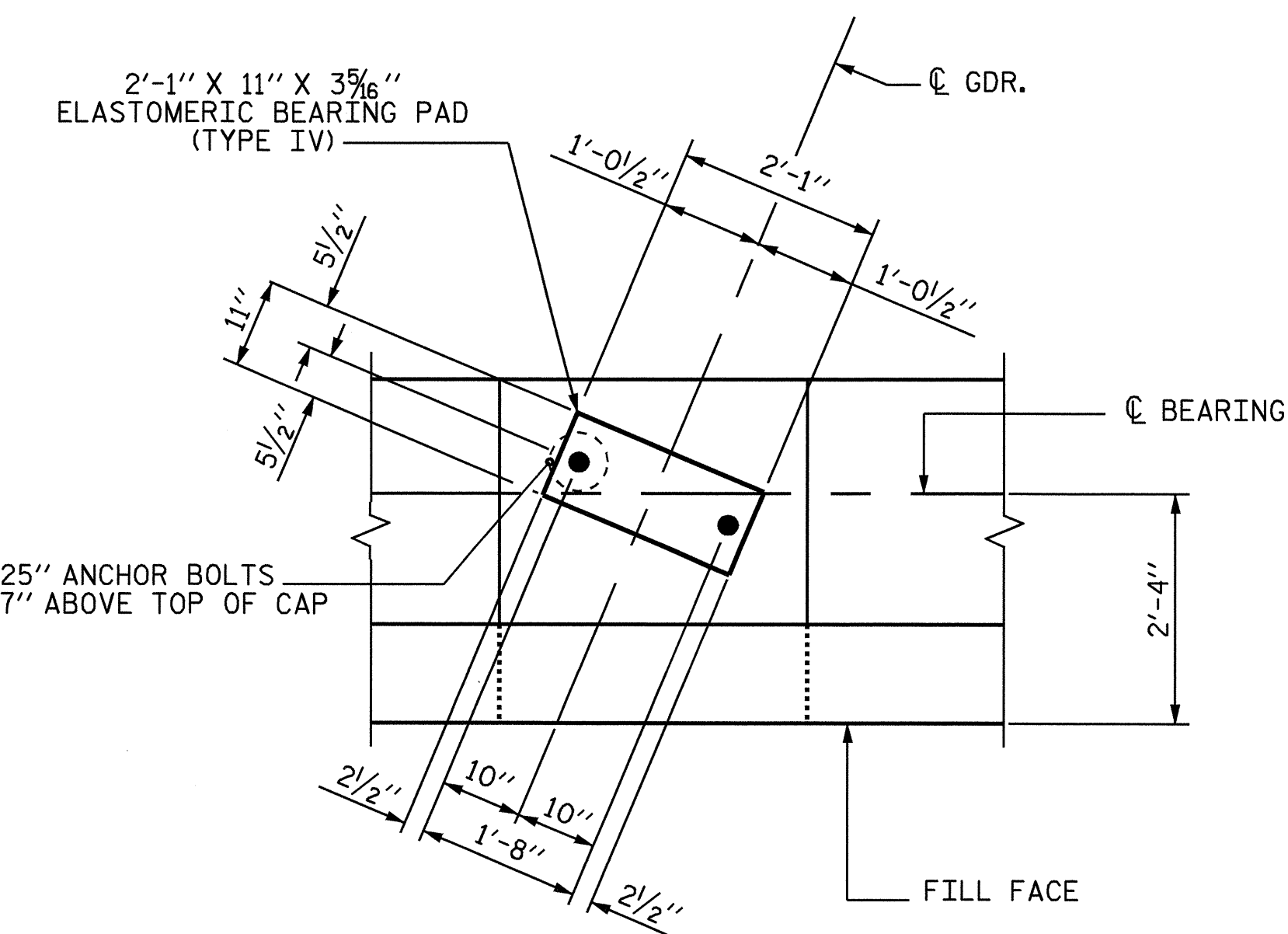
THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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%.

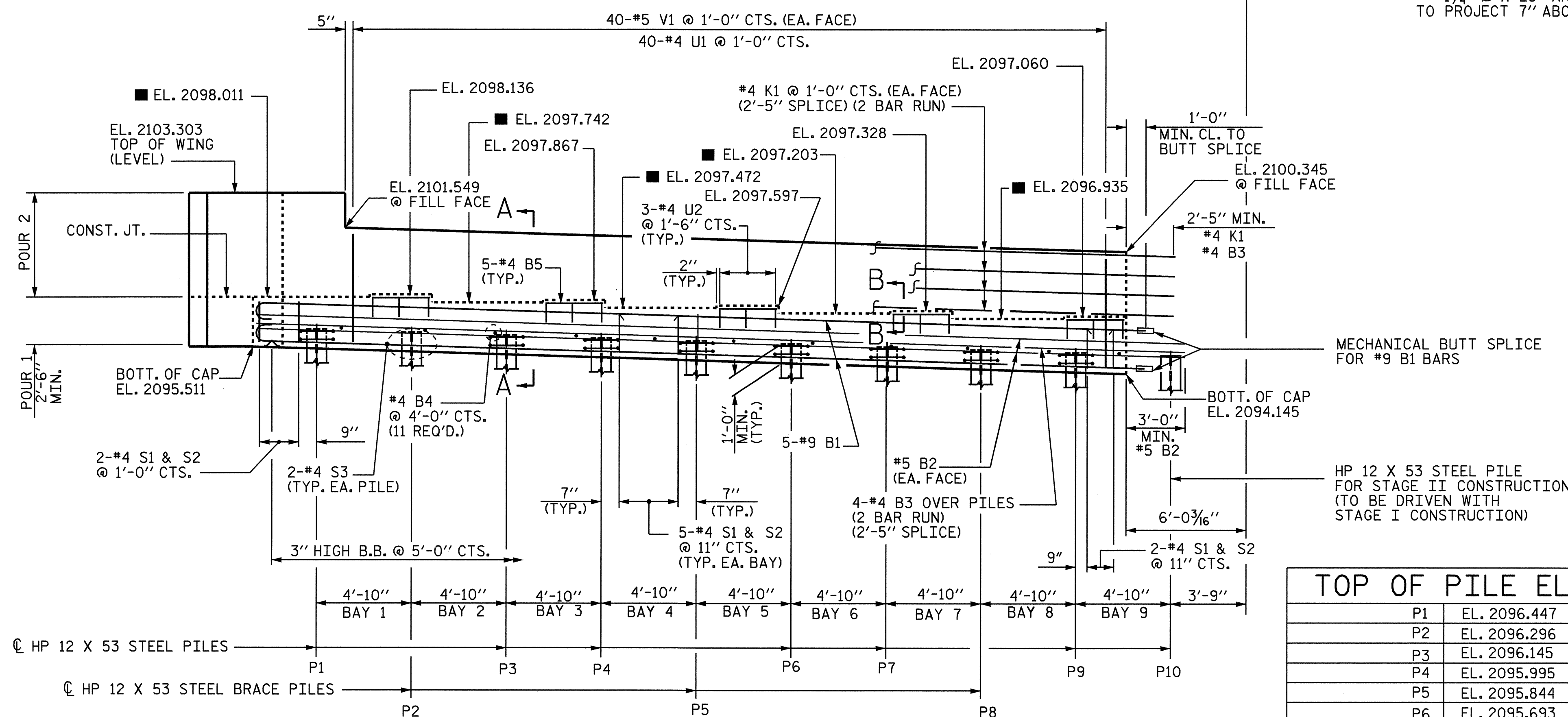
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



PLAN - STAGE I



DETAIL A



ELEVATION - STAGE I

TOP OF PILE ELEVATION	
P1	EL. 2096.447
P2	EL. 2096.296
P3	EL. 2096.145
P4	EL. 2095.995
P5	EL. 2095.844
P6	EL. 2095.693
P7	EL. 2095.542
P8	EL. 2095.392
P9	EL. 2095.241
P10	EL. 2095.090

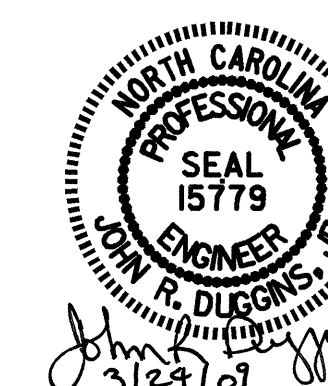
FOR "SECTION A-A & SECTION B-B" DETAILS, SEE SHEET 4 OF 4.  
 ■ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE "SECTION A-A"

PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 66+60.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

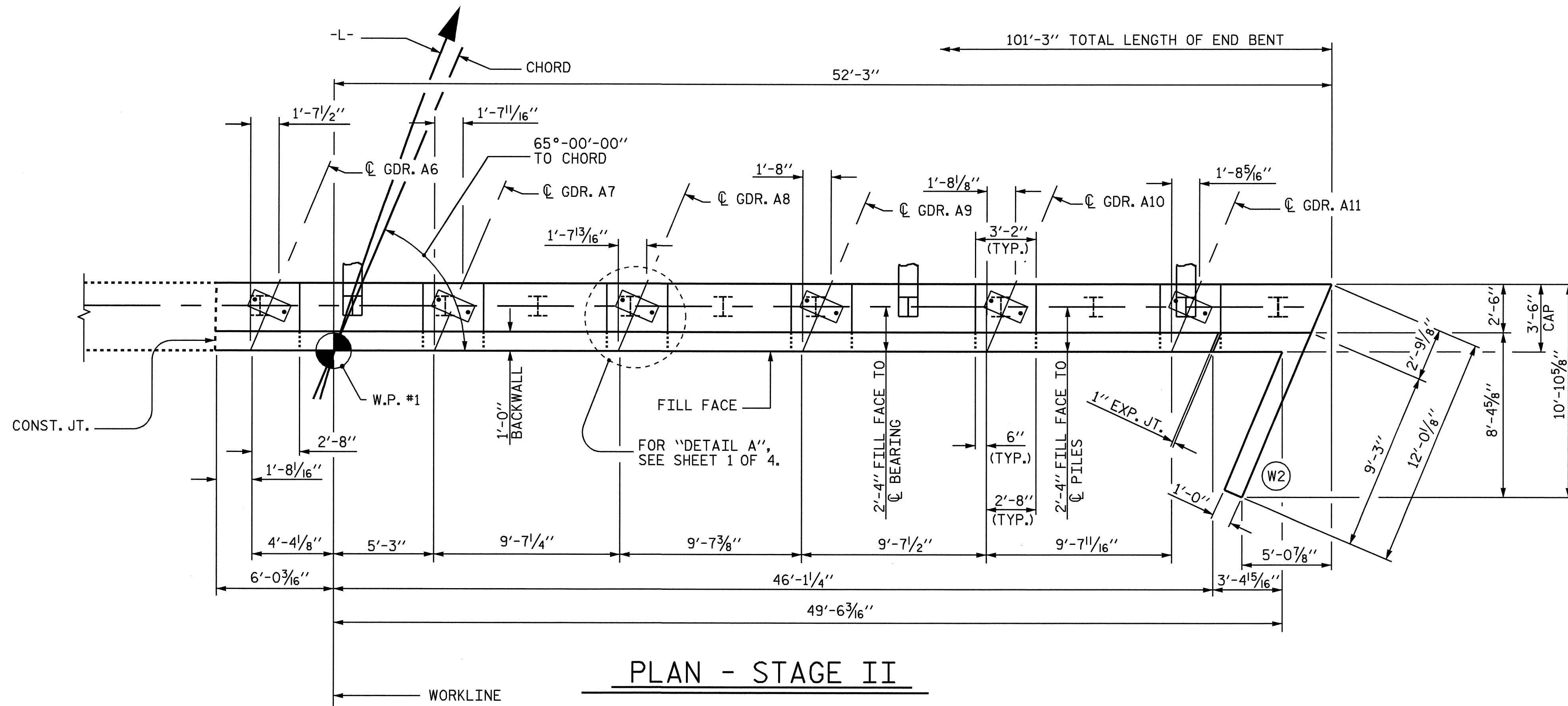
SUBSTRUCTURE  
 END BENT No. 1  
 STAGE I



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			S-25
2			4			71

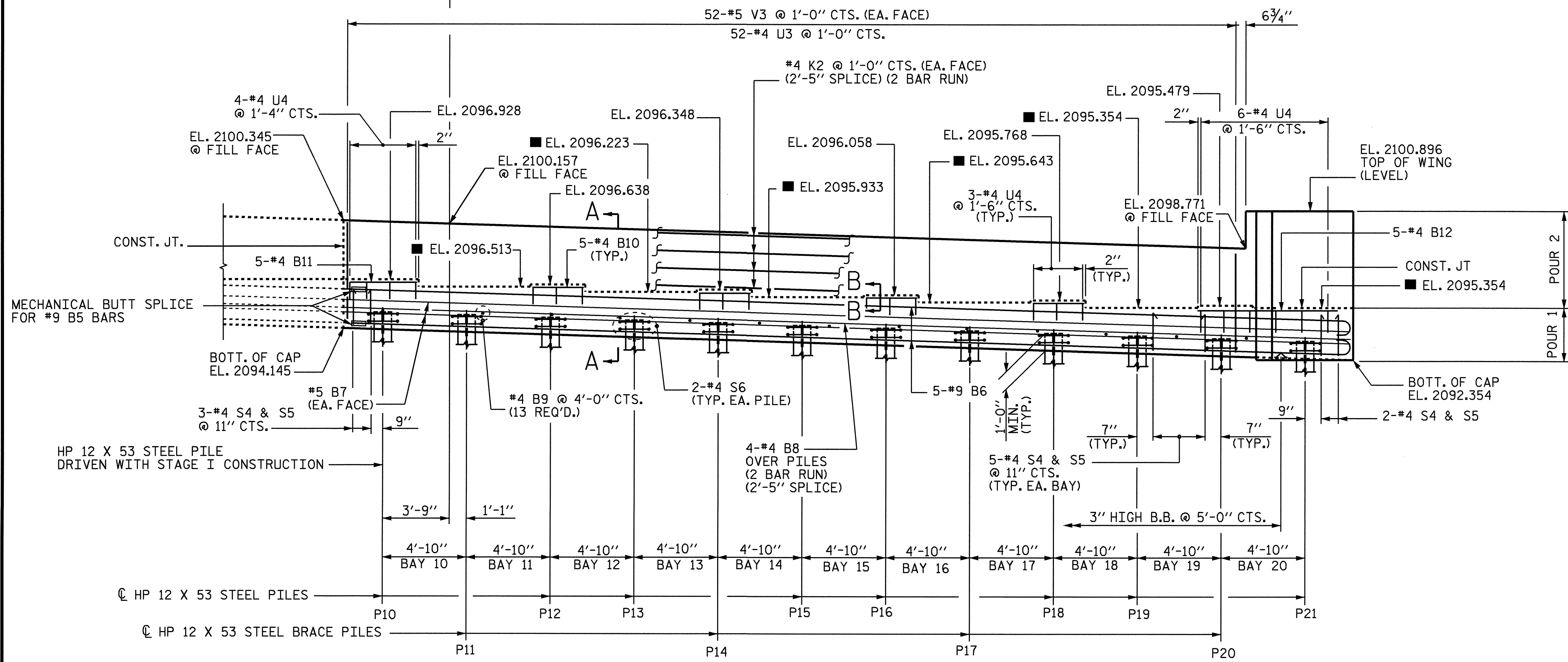
DRAWN BY: M. POOLE DATE: 11/08  
 CHECKED BY: J.R. DUGGINS DATE: 11/08

20-MAR-2009 14:56  
 r:\structures\4430\str1\moodle\Microstation\4430.sd.el.01.dgn  
 dahodge



PLAN - STAGE II

TOP OF PILE ELEVATION	
P10	EL. 2095.090
P11	EL. 2094.940
P12	EL. 2094.789
P13	EL. 2094.638
P14	EL. 2094.487
P15	EL. 2094.337
P16	EL. 2094.186
P17	EL. 2094.035
P18	EL. 2093.885
P19	EL. 2093.734
P20	EL. 2093.583
P21	EL. 2093.433

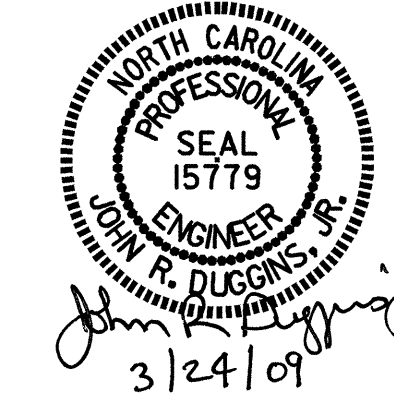


ELEVATION - STAGE II

FOR "SECTION A-A" & "SECTION B-B" DETAILS, SEE SHEET 4 OF 4.  
 ■ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE "SECTION A-A"

DRAWN BY : M. POOLE DATE : 11/08  
 CHECKED BY : J.R. DUGGINS DATE : 11/08

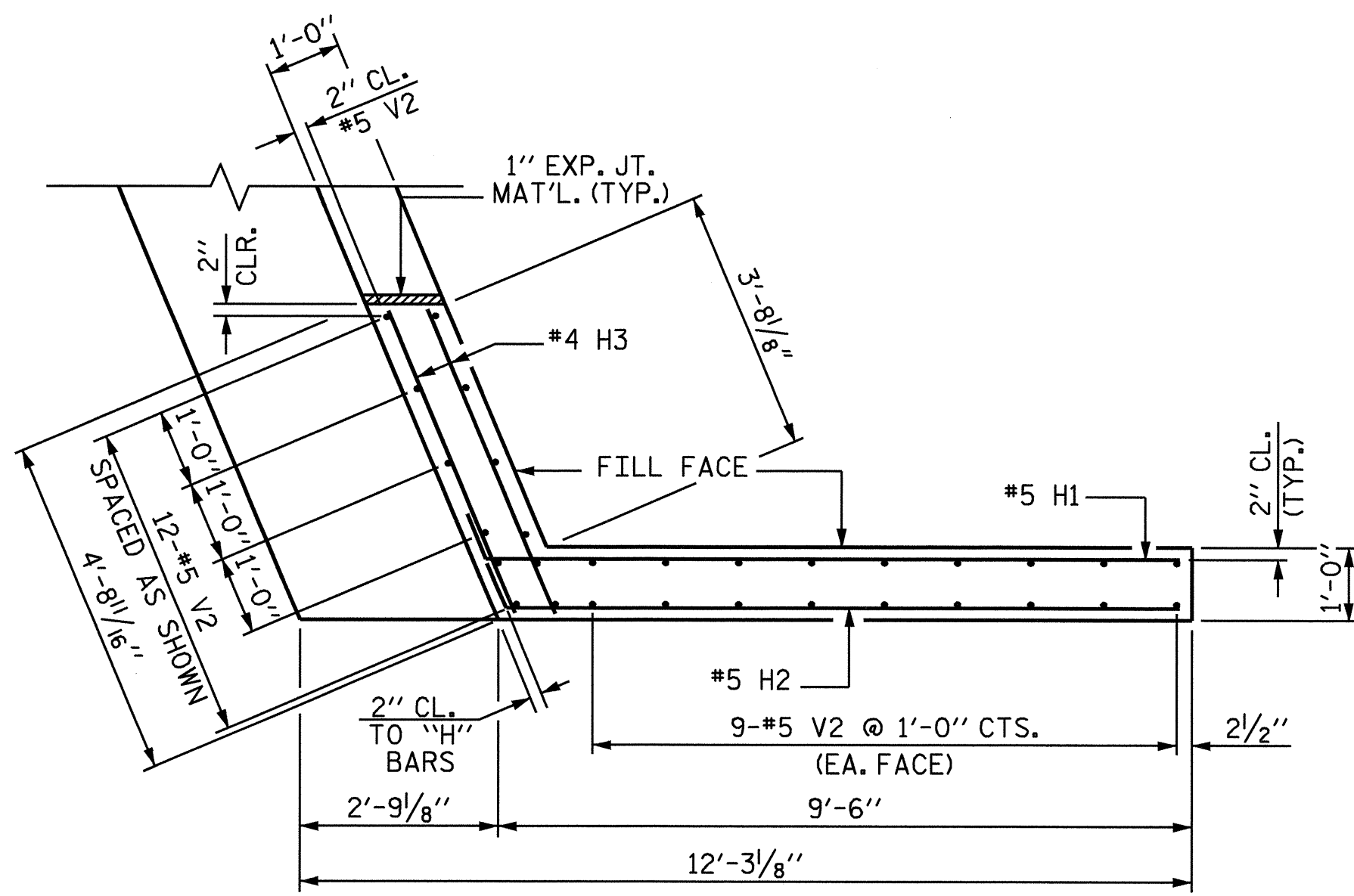
20-MAR-2009 14:57  
 I:\Structure\4430\Str1\m\poole\l\m\rostat\4430.sd.e1.01.dgn  
 dahodge



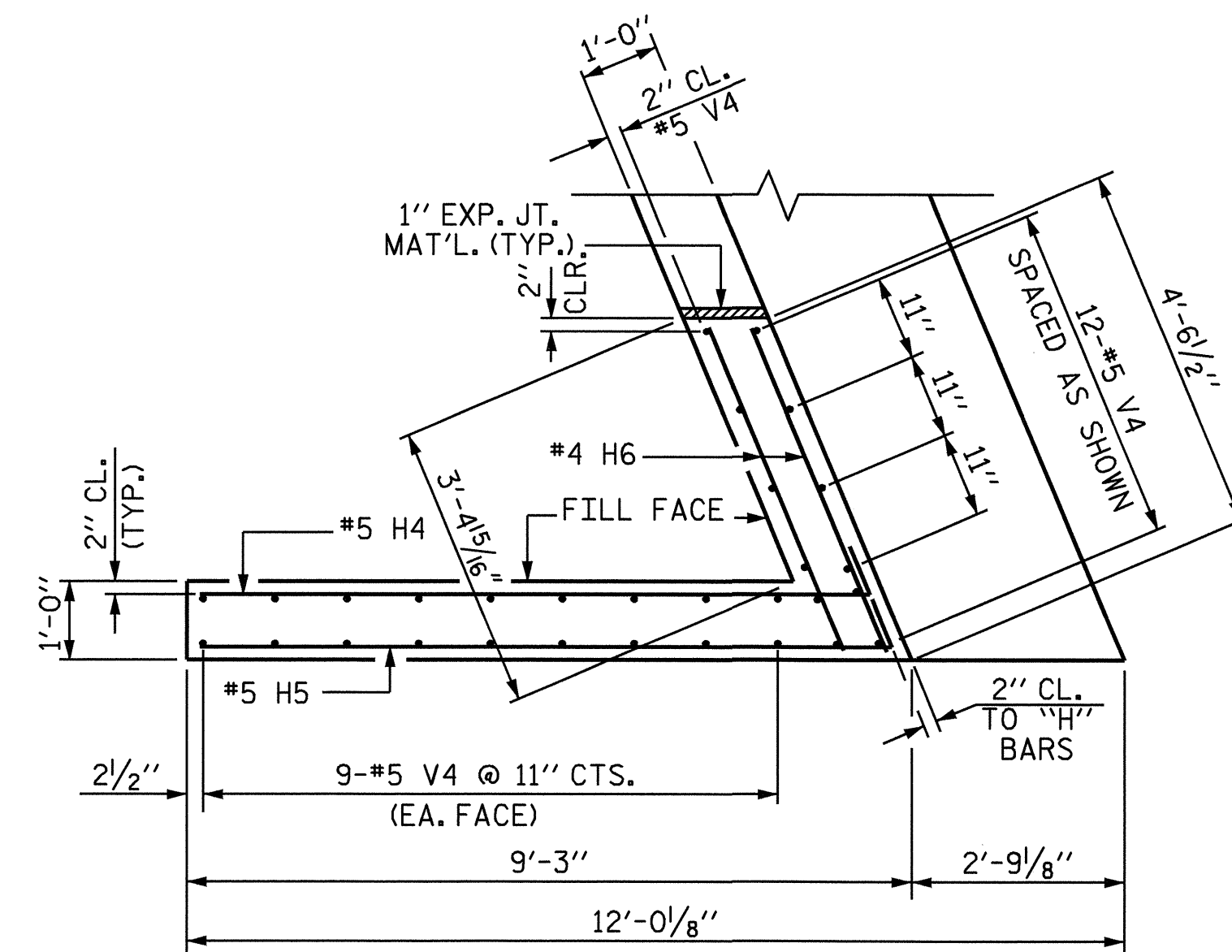
PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 66+60.00 -L-

SHEET 2 OF 4  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 1  
 STAGE II

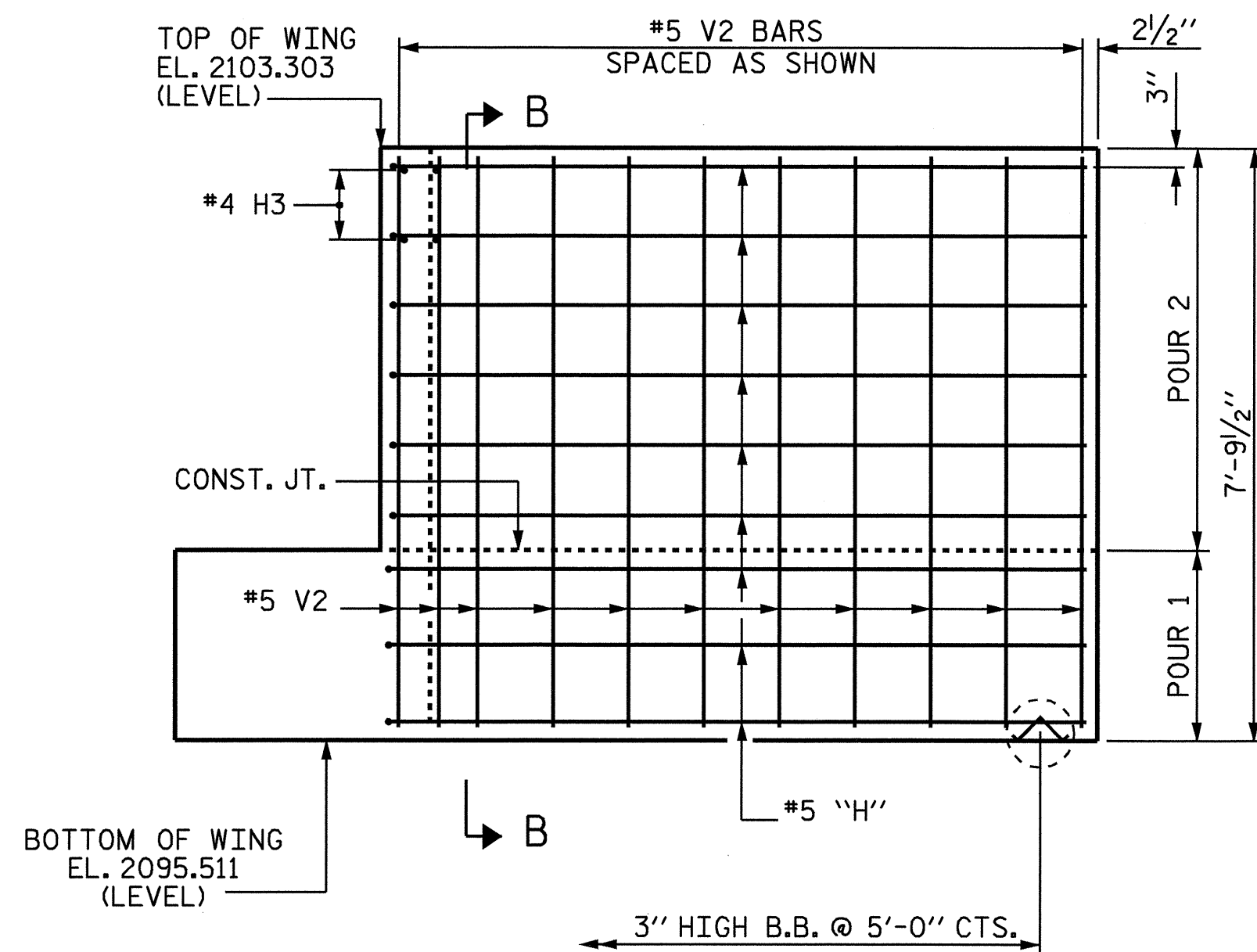
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-26
2			4			TOTAL SHEETS 71



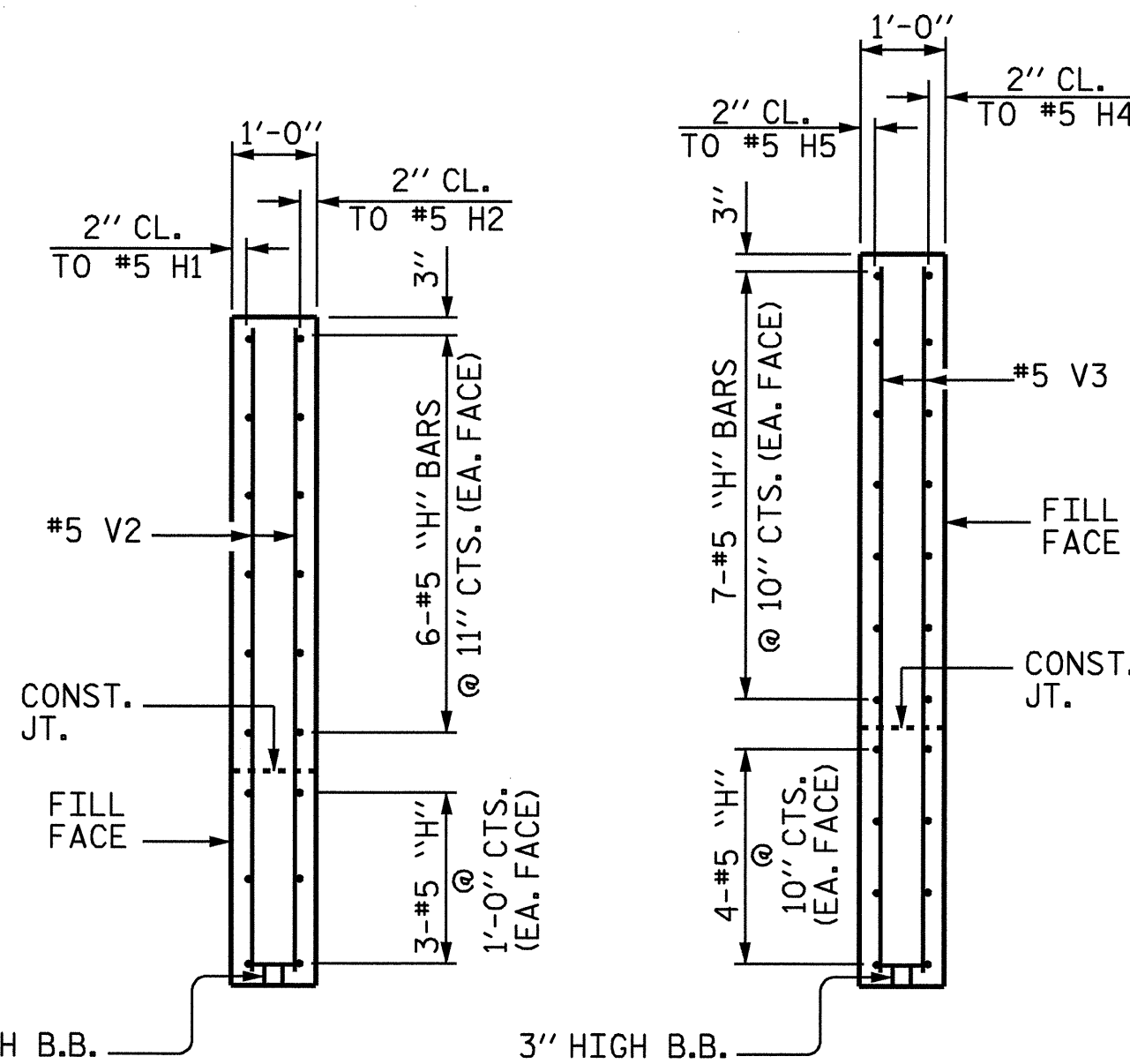
PLAN OF LEFT WING - W1  
STAGE I



PLAN OF RIGHT WING - W2  
STAGE II

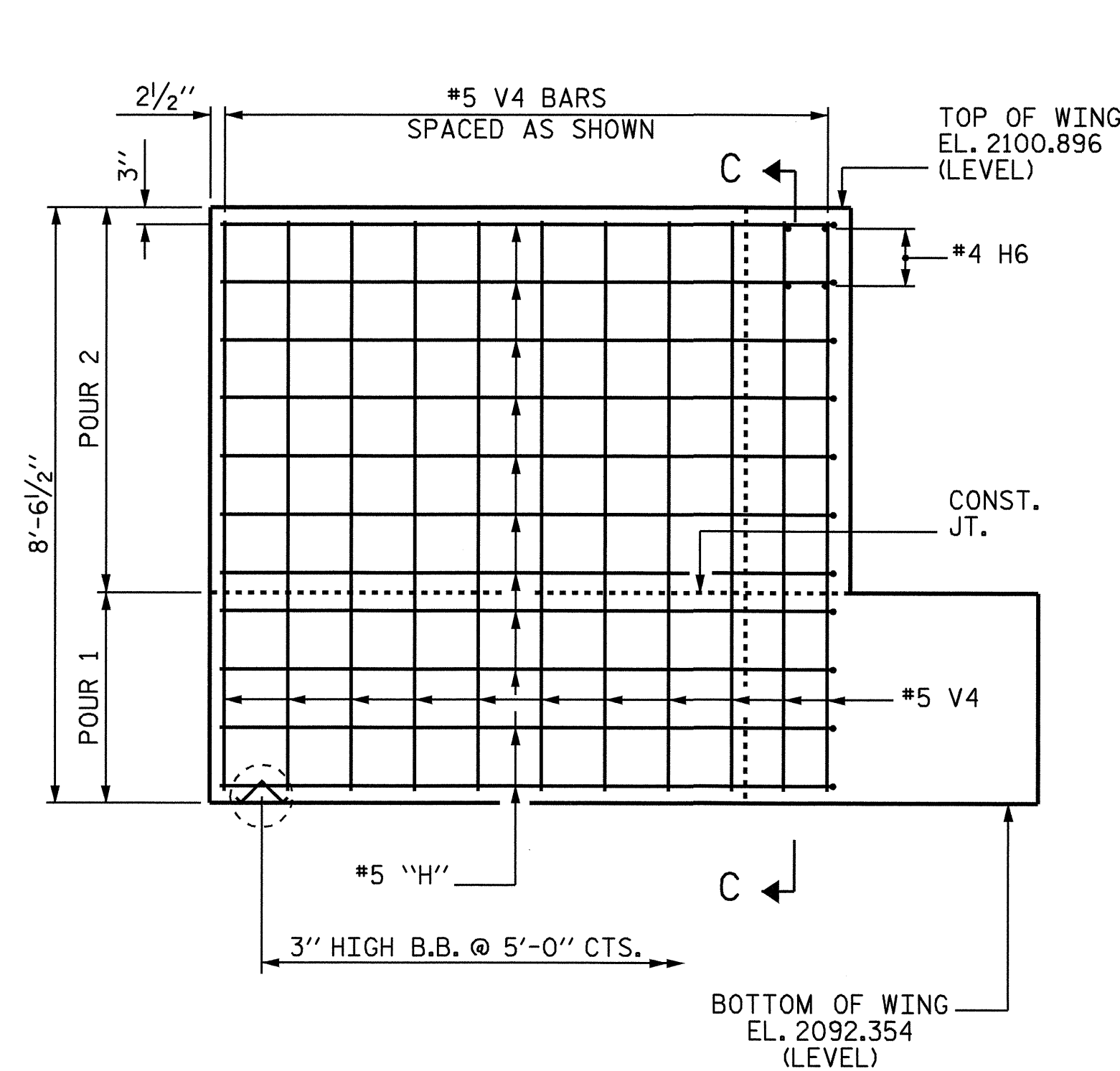


ELEVATION OF LEFT WING - W1  
STAGE I



SECTION B-B  
STAGE I

SECTION C-C  
STAGE II



ELEVATION OF RIGHT WING - W2  
STAGE II

PROJECT NO. R-4430  
HENDERSON COUNTY  
STATION: 66+60.00 -L-

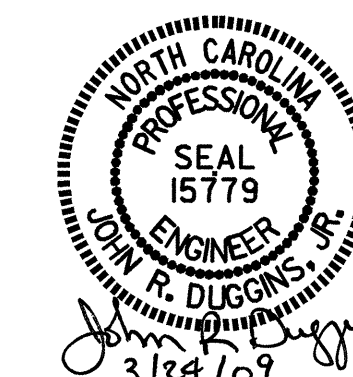
SHEET 3 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

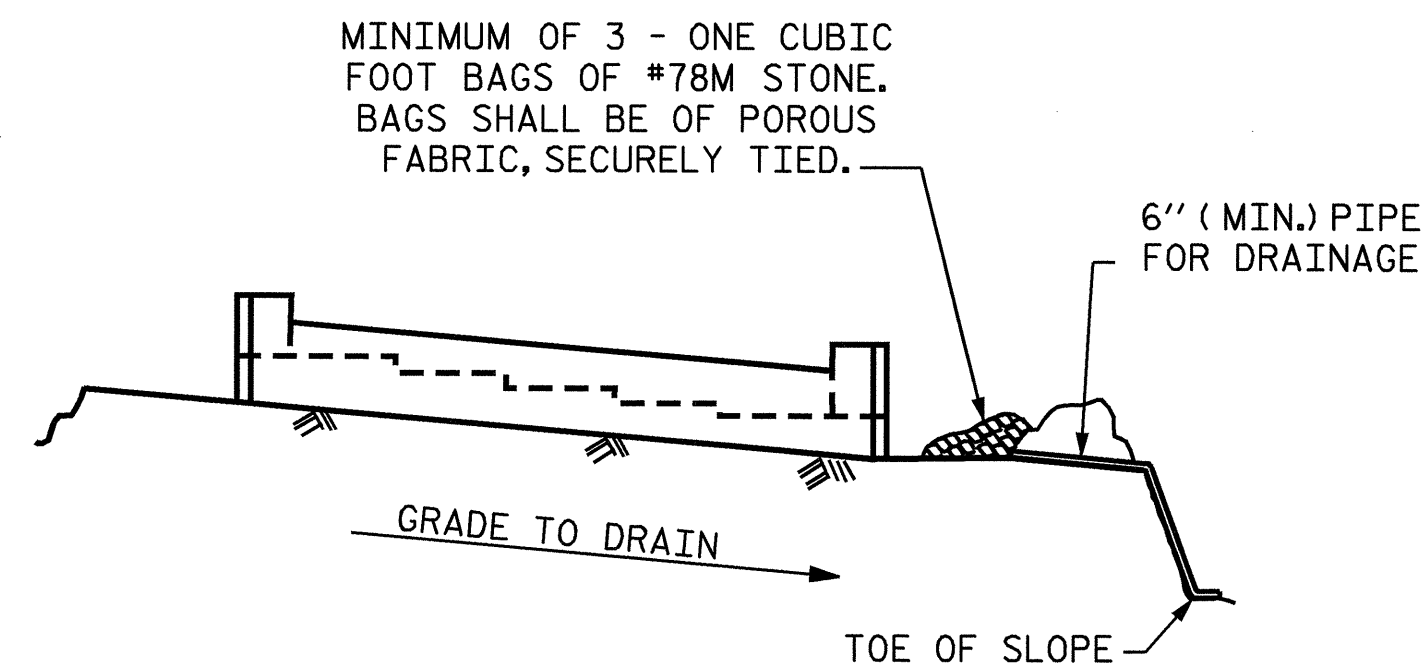
SUBSTRUCTURE  
END BENT No. 1

DRAWN BY: M. POOLE DATE: 11/08  
CHECKED BY: J.R. DUGGINS DATE: 12/08

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-27
2			4			TOTAL SHEETS 71

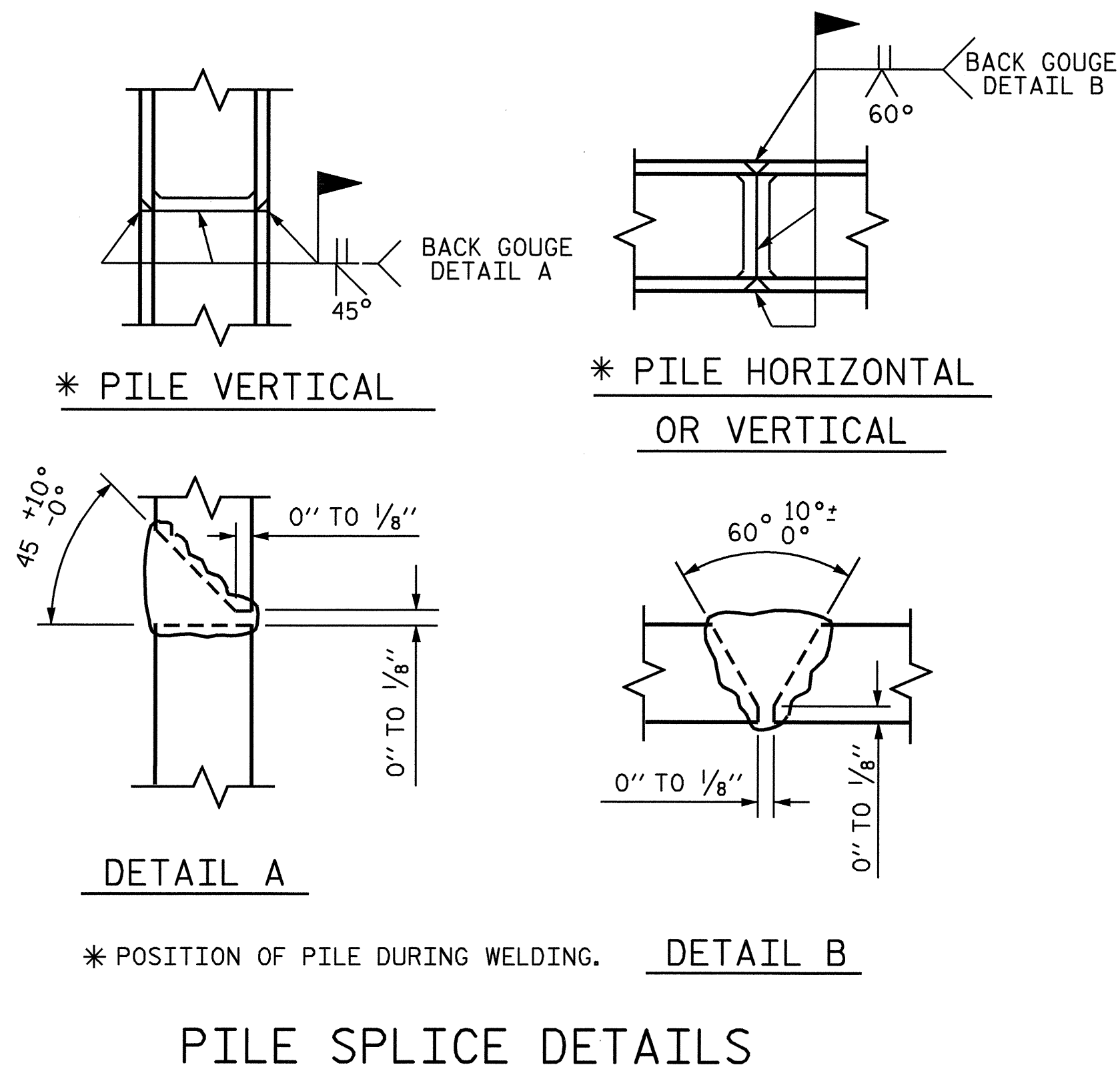


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

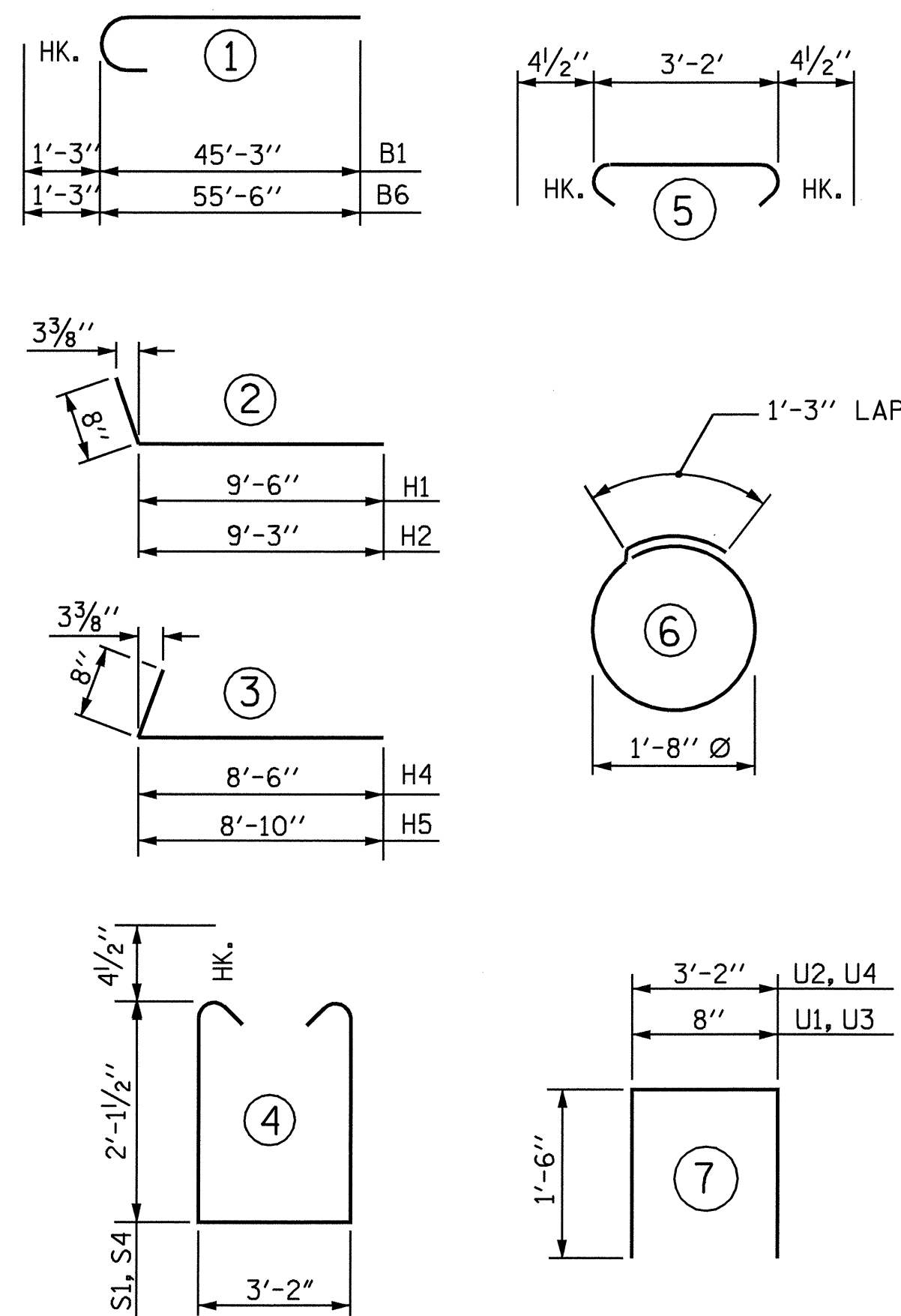
### TEMPORARY DRAINAGE AT END BENT



\* POSITION OF PILE DURING WELDING.

### PILE SPLICE DETAILS

### BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

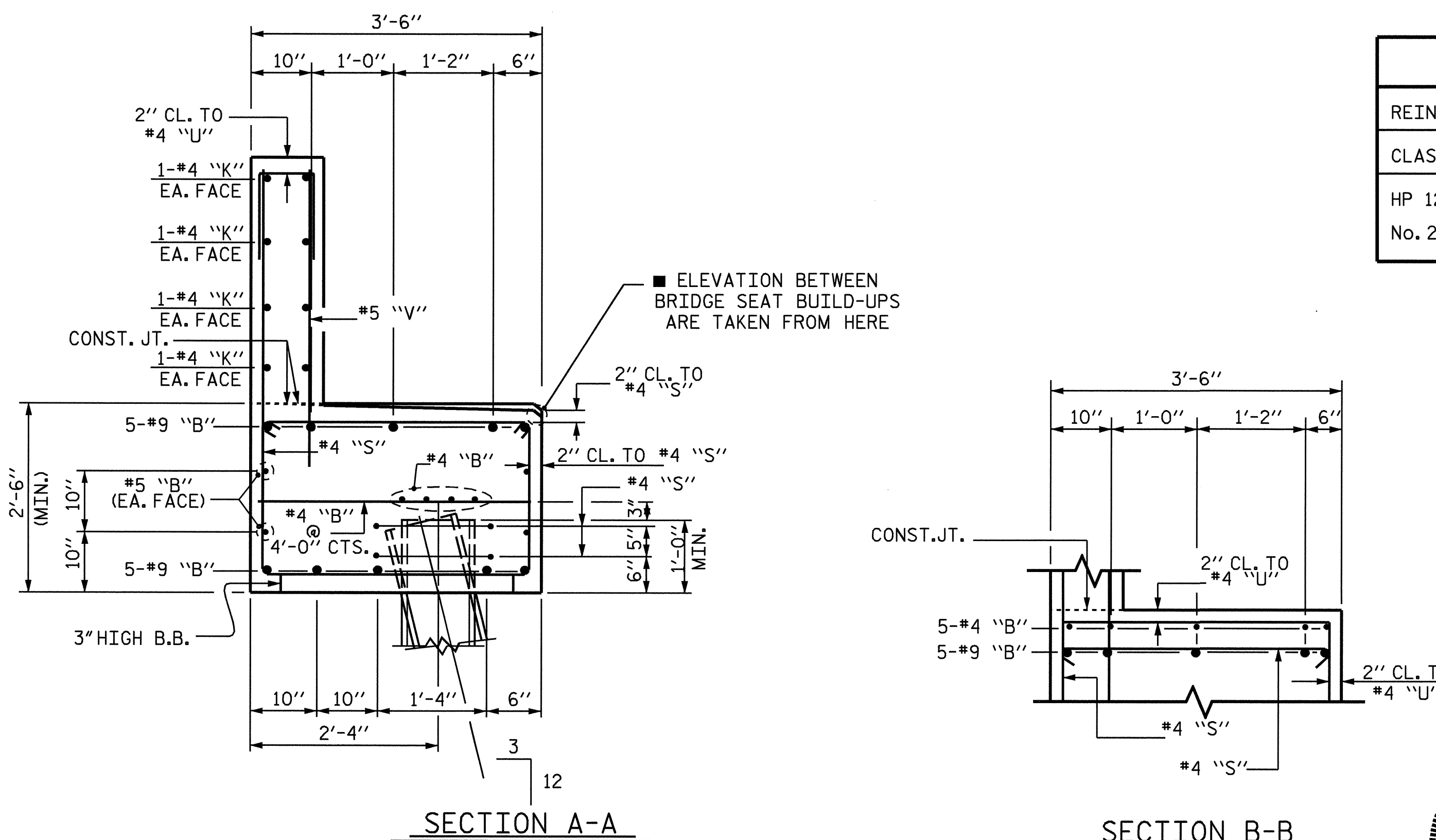
### BILL OF MATERIAL

#### END BENT No. 1

STAGE I						STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	46'-6"	1581	B6	10	#9	1	56'-9"	1930
B2	4	#5	STR	47'-4"	197	B7	4	#5	STR	56'-6"	236
B3	8	#4	STR	24'-3"	130	B8	8	#4	STR	29'-10"	159
B4	11	#4	STR	3'-2"	23	B9	13	#4	STR	3'-2"	27
B5	25	#4	STR	2'-10"	47	B10	20	#4	STR	2'-10"	38
						B11	5	#4	STR	4'-0"	13
H1	9	#5	2	10'-2"	95	B12	5	#4	STR	7'-2"	24
H2	9	#5	2	9'-11"	93						
H3	4	#4	STR	4'-4"	12	H4	11	#5	3	8'-6"	98
						H5	11	#5	3	8'-10"	101
K1	16	#4	STR	24'-7"	263	H6	4	#4	STR	4'-2"	11
S1	44	#4	4	8'-2"	240	K2	16	#4	STR	29'-6"	315
S2	44	#4	5	3'-11"	115						
S3	18	#4	6	6'-6"	78	S4	60	#4	4	8'-2"	327
						S5	60	#4	5	3'-11"	157
U1	40	#4	7	3'-8"	98	S6	24	#4	6	6'-6"	104
U2	15	#4	7	6'-2"	62						
						U3	52	#4	7	3'-8"	127
V1	80	#5	STR	5'-10"	487	U4	22	#4	7	6'-2"	91
V2	30	#5	STR	7'-5"	232						
						V3	104	#5	STR	5'-10"	633
						V4	30	#5	STR	8'-2"	256
REINFORCING STEEL 3753 LBS.						REINFORCING STEEL 4647 LBS.					
CLASS A CONCRETE BREAKDOWN						CLASS A CONCRETE BREAKDOWN					
POUR 1 (CAP & LOWER WINGS) 16.1 C.Y.						POUR 1 (CAP & LOWER WINGS) 21.2 C.Y.					
POUR 2 (BACKWALL & UPPER WINGS) 7.7 C.Y.						POUR 2 (BACKWALL & UPPER WINGS) 9.7 C.Y.					
TOTAL 23.8 C.Y.						TOTAL 30.9 C.Y.					
HP 12 x 53 STEEL PILES						HP 12 x 53 STEEL PILES					
NO. 10 250 LIN. FT.						NO. 11 165 LIN. FT.					

### TOTAL QUANTITIES

REINFORCING STEEL	8400 LBS.
CLASS A CONCRETE	54.7 C.Y.
HP 12 X 53 STEEL PILES	415 LIN. FT.
No. 21	

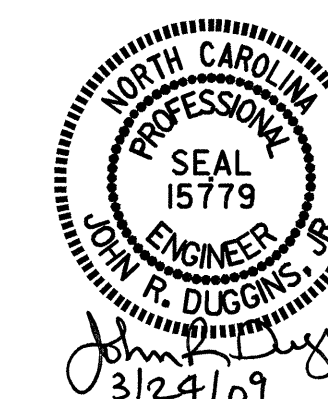


PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 66+60.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

### SUBSTRUCTURE END BENT No. 1



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			71
2			4			

DRAWN BY: M. POOLE DATE: 11/08  
 CHECKED BY: J.R. DUGGINS DATE: 12/08

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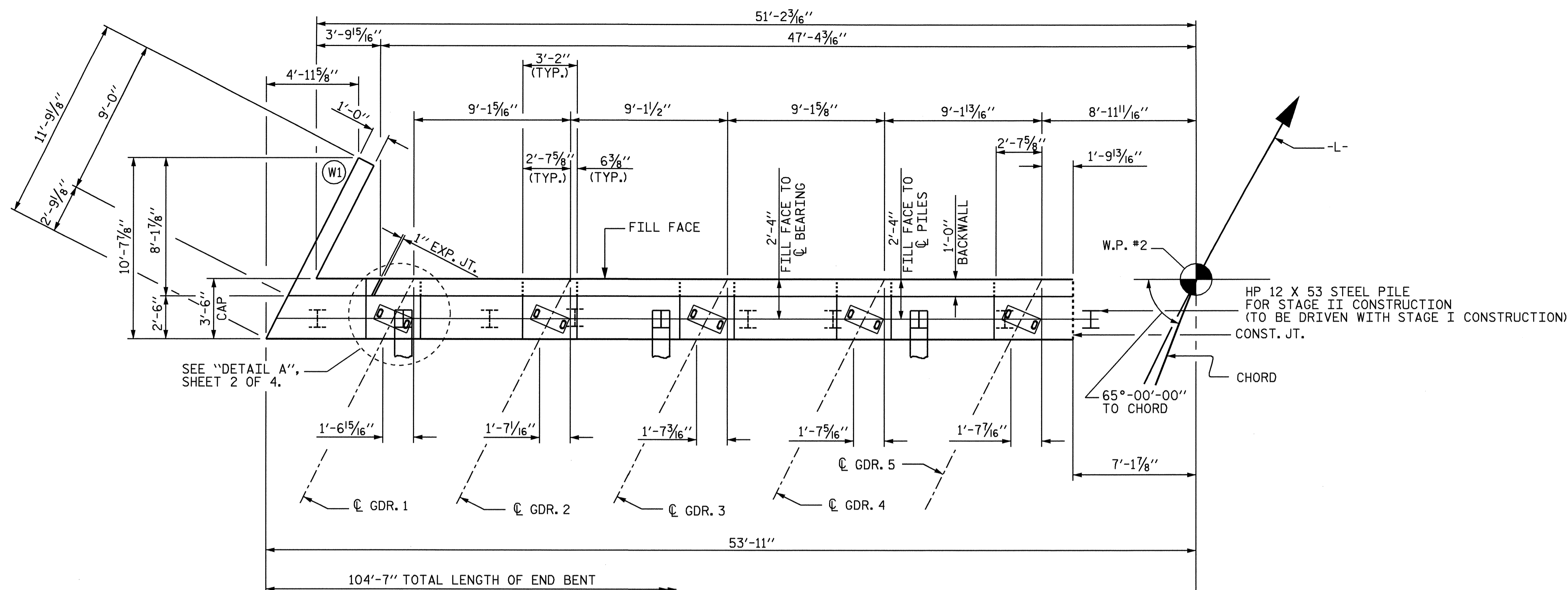
**NOTES**

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.  
 FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.  
 BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

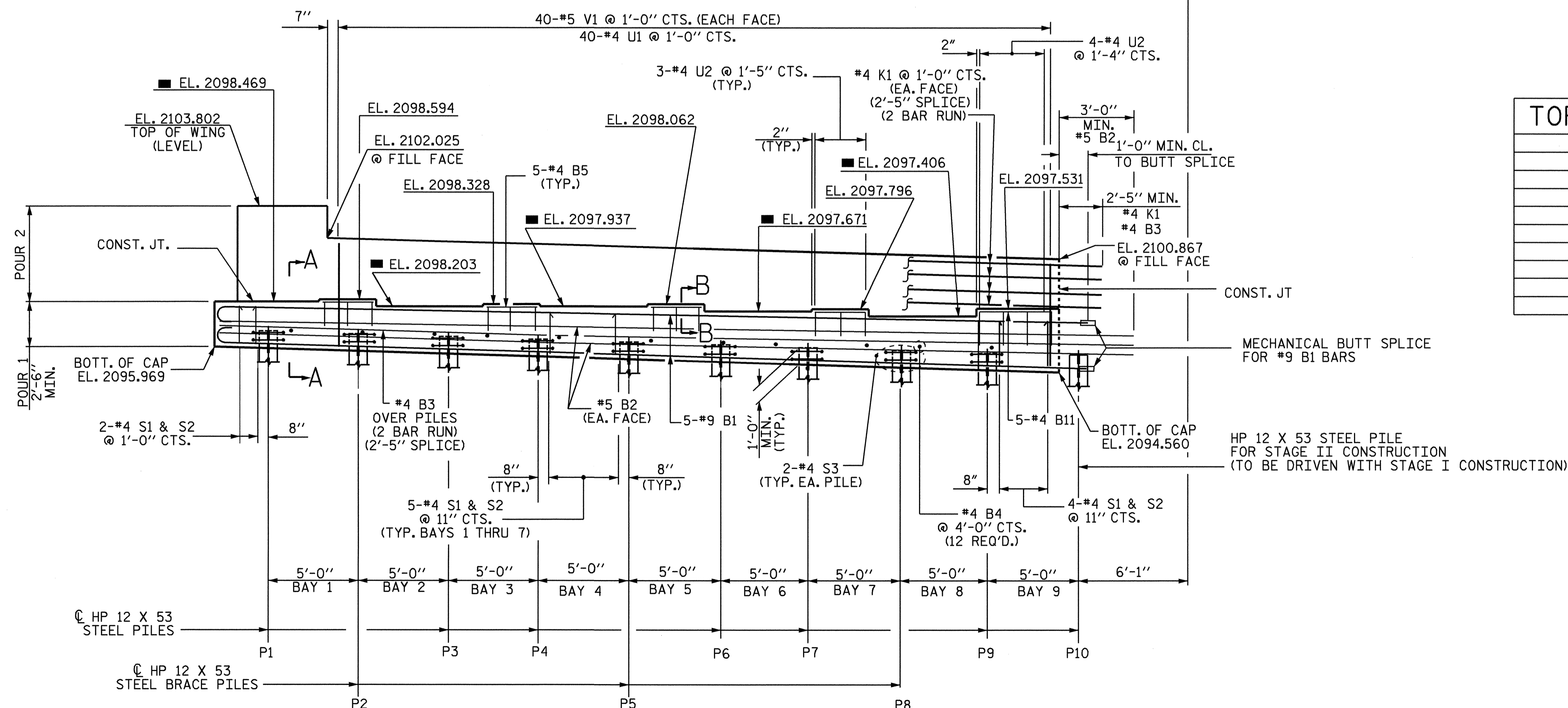
THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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 CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS. SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.



**PLAN - STAGE I**



**ELEVATION - STAGE I**

FOR "SECTION A-A & SECTION B-B", DETAILS, SEE SHEET 4 OF 4.

FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILDUPS, SEE "SECTION A-A".

**TOP OF PILE ELEVATIONS**

P1	EL. 2096.922
P2	EL. 2096.769
P3	EL. 2096.616
P4	EL. 2096.462
P5	EL. 2096.309
P6	EL. 2096.156
P7	EL. 2096.003
P8	EL. 2095.849
P9	EL. 2095.696
P10	EL. 2095.543

PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 66+60.00 -L-

SHEET 1 OF 4

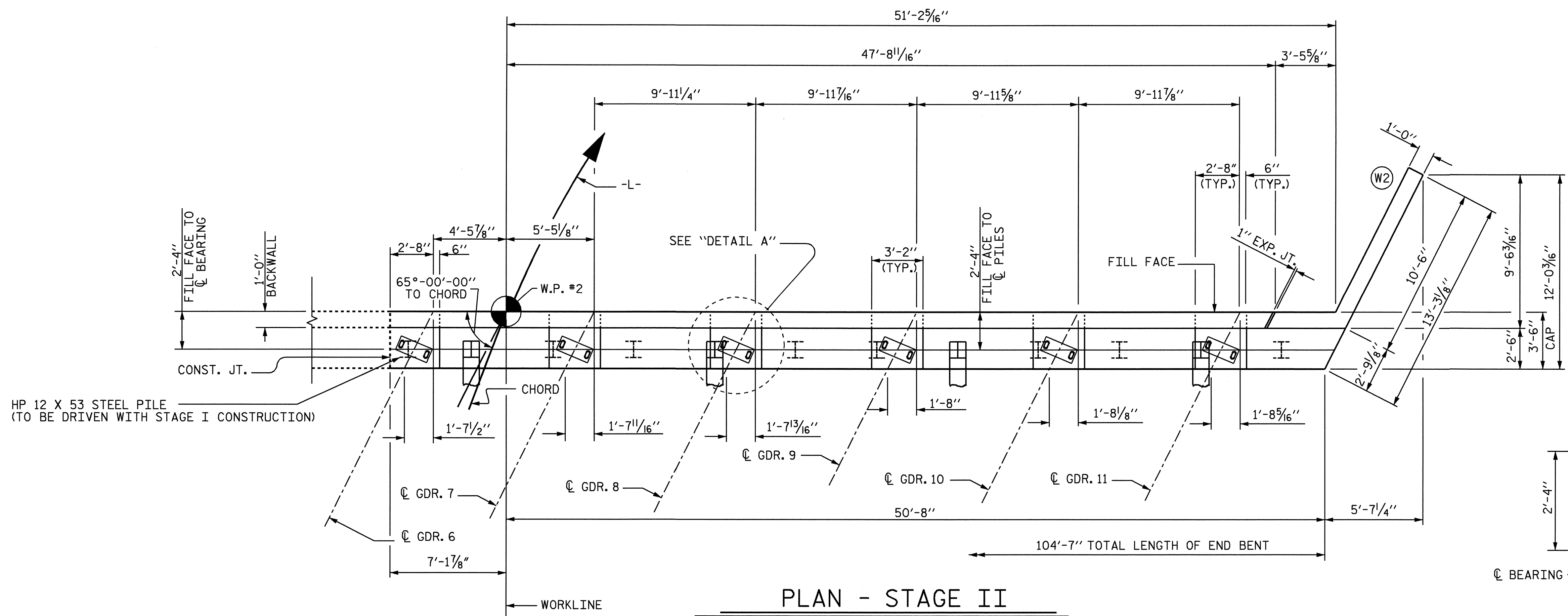
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 2  
 STAGE I

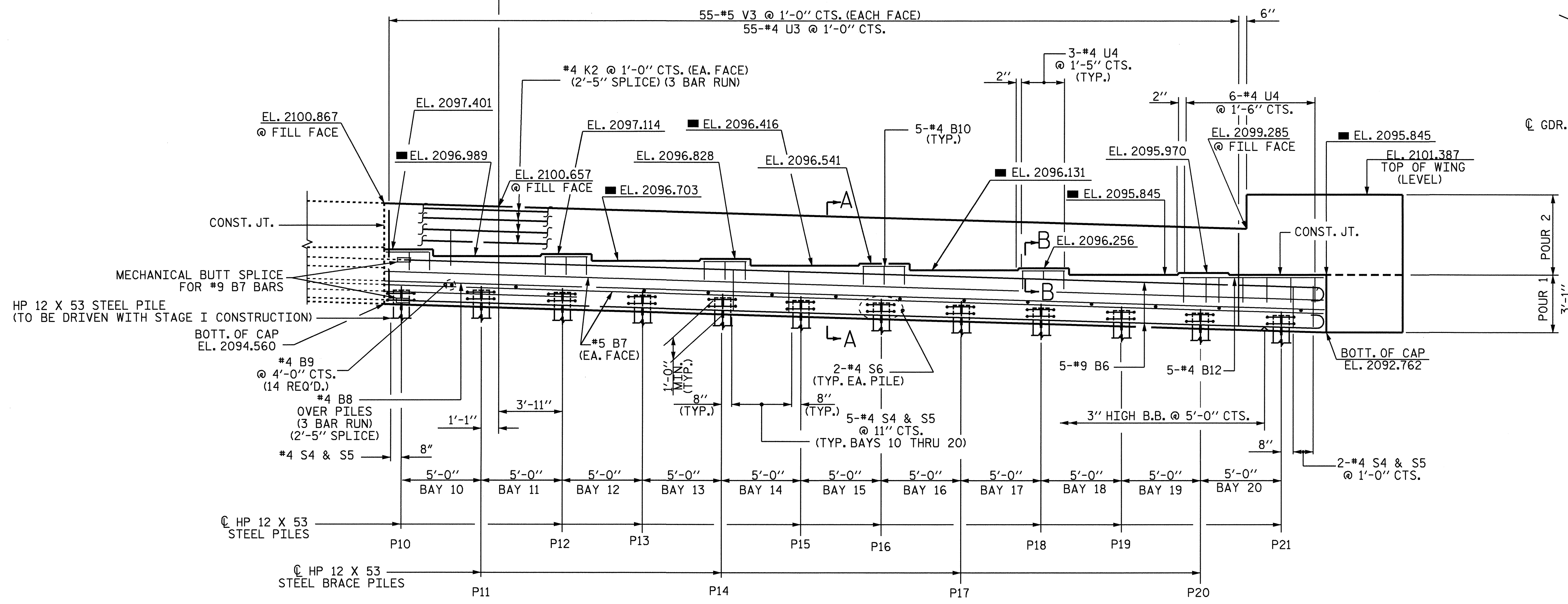
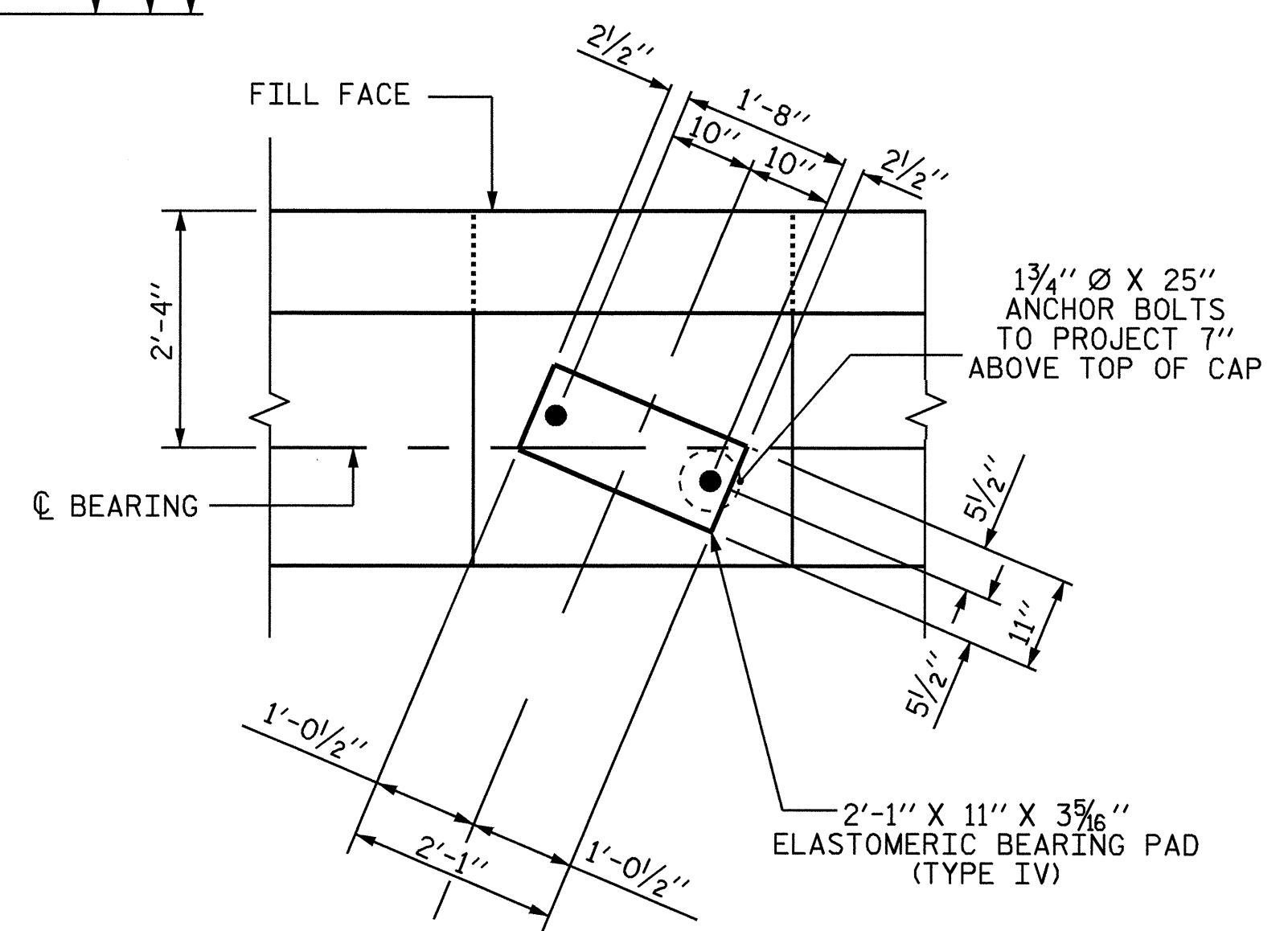


REVISIONS						SHEET NO. S-29
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 71
2			4			

DRAWN BY: M. POOLE DATE: 11/08  
 CHECKED BY: J. R. DUGGINS DATE: 11/08



TOP OF PILE ELEVATIONS	
P10	EL. 2095.543
P11	EL. 2095.389
P12	EL. 2095.236
P13	EL. 2095.083
P14	EL. 2094.929
P15	EL. 2094.776
P16	EL. 2094.623
P17	EL. 2094.469
P18	EL. 2094.316
P19	EL. 2094.163
P20	EL. 2094.009
P21	EL. 2093.856



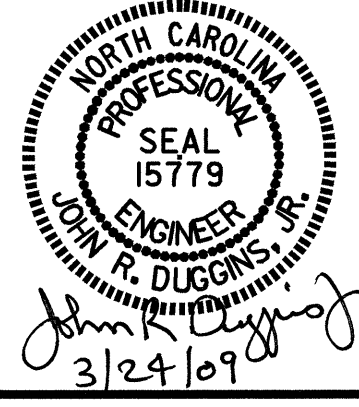
ELEVATION - STAGE II

FOR "SECTION A-A & B-B" DETAILS, SEE SHEET 4 OF 4.  
 FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILDUPS, SEE "SECTION A-A".

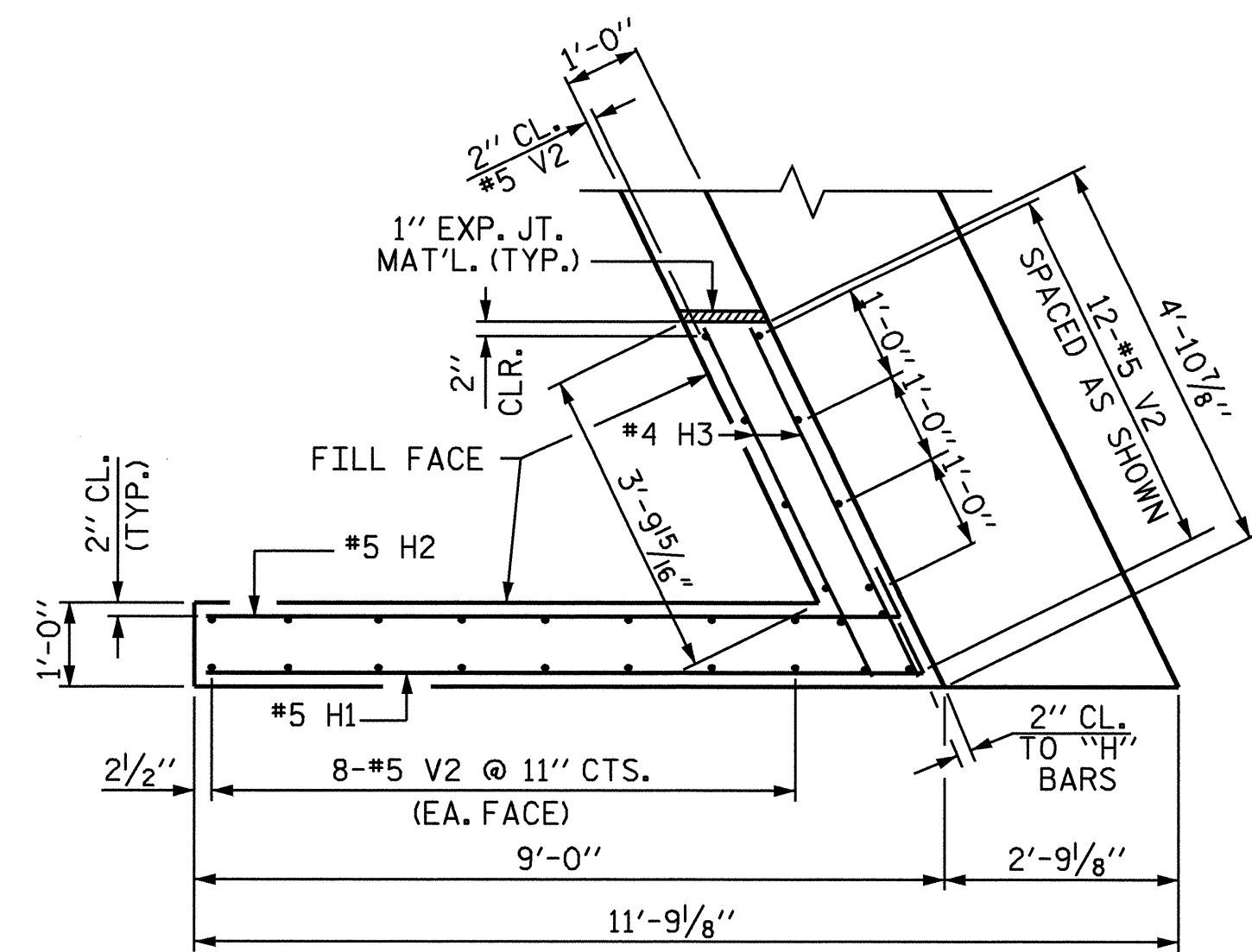
PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 66+60.00 -L-  
 SHEET 2 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT No. 2 STAGE II					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					5-30
					71

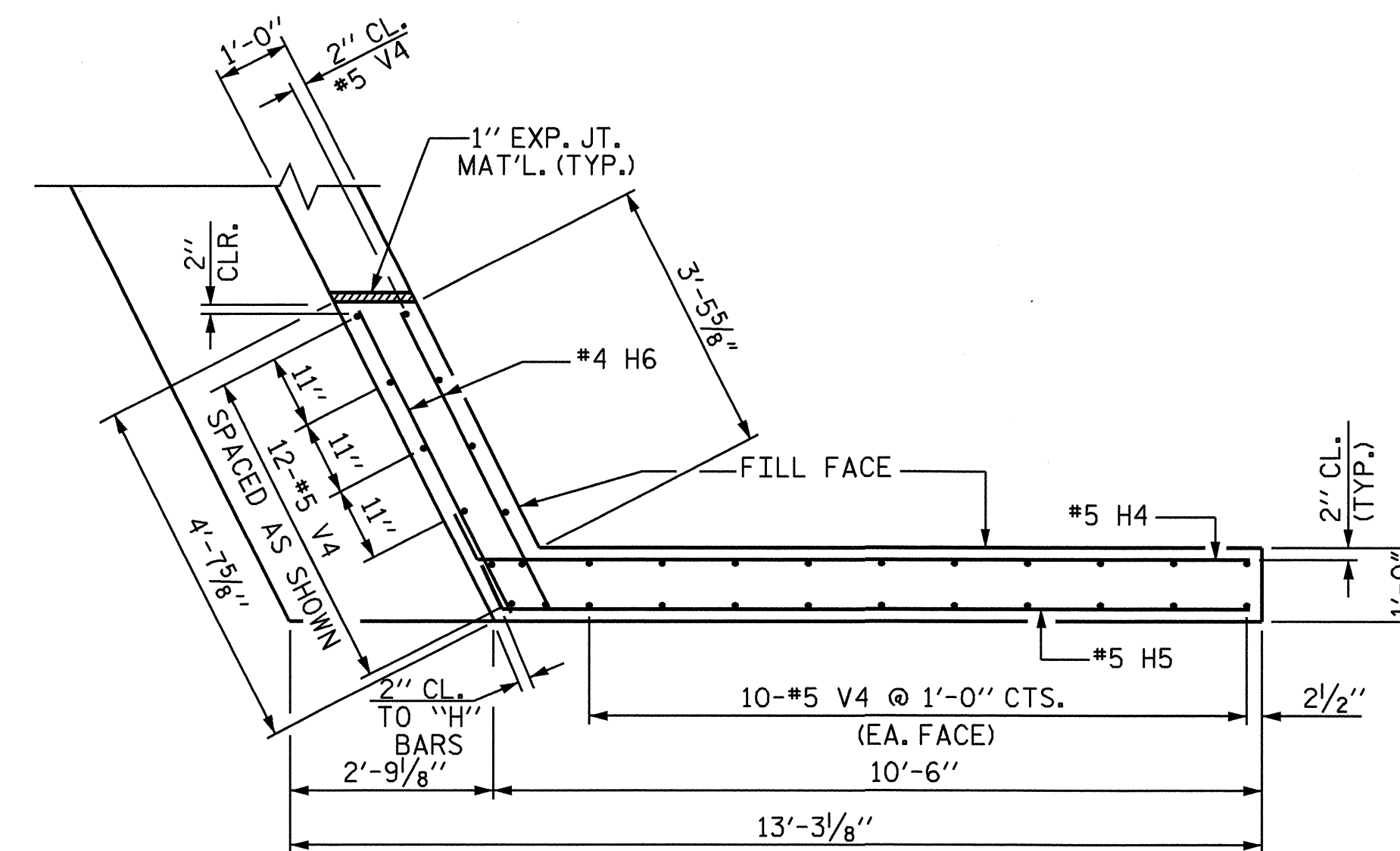
DRAWN BY: M. POOLE DATE: 11/08  
 CHECKED BY: J. R. DUGGINS DATE: 11/08



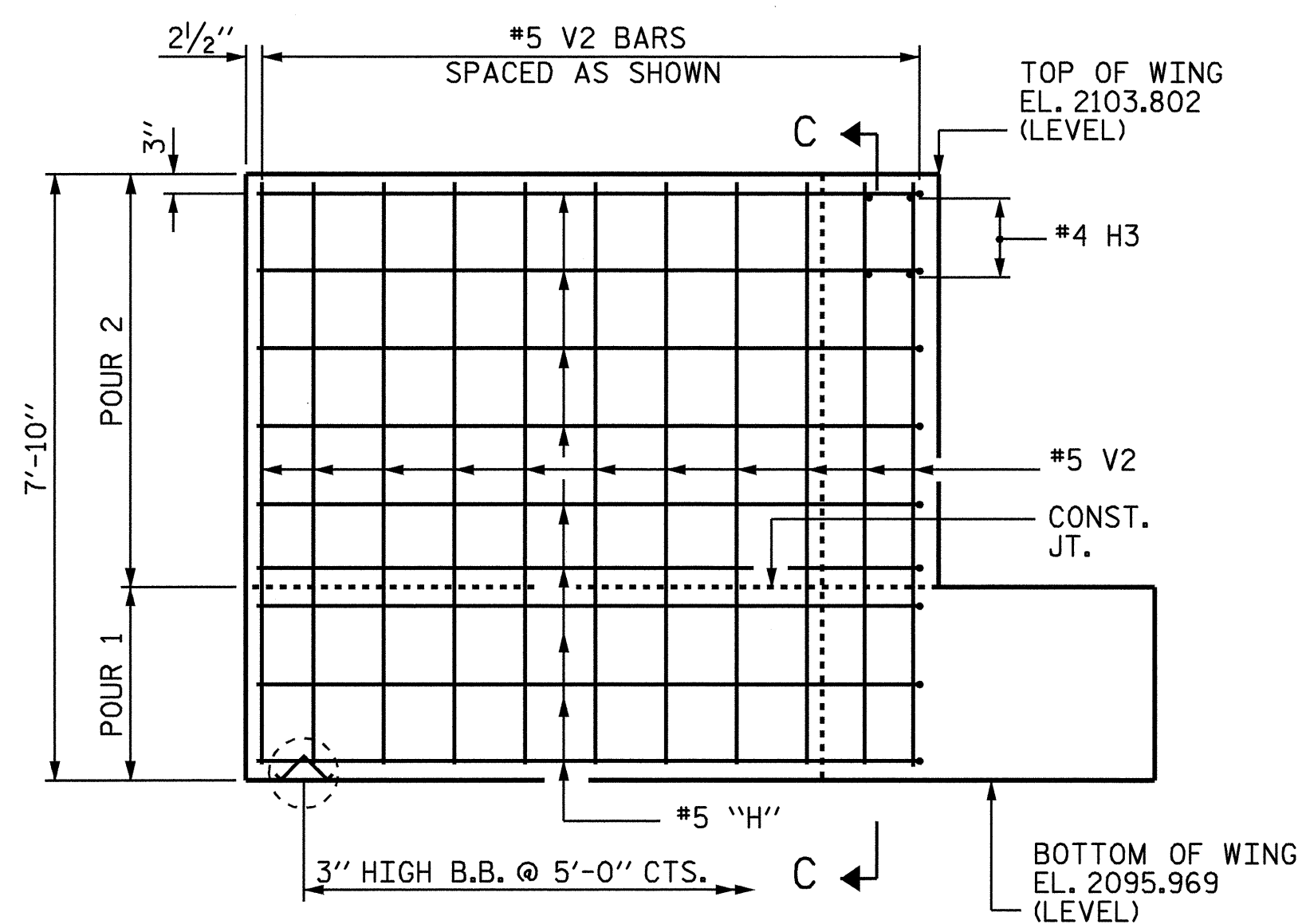




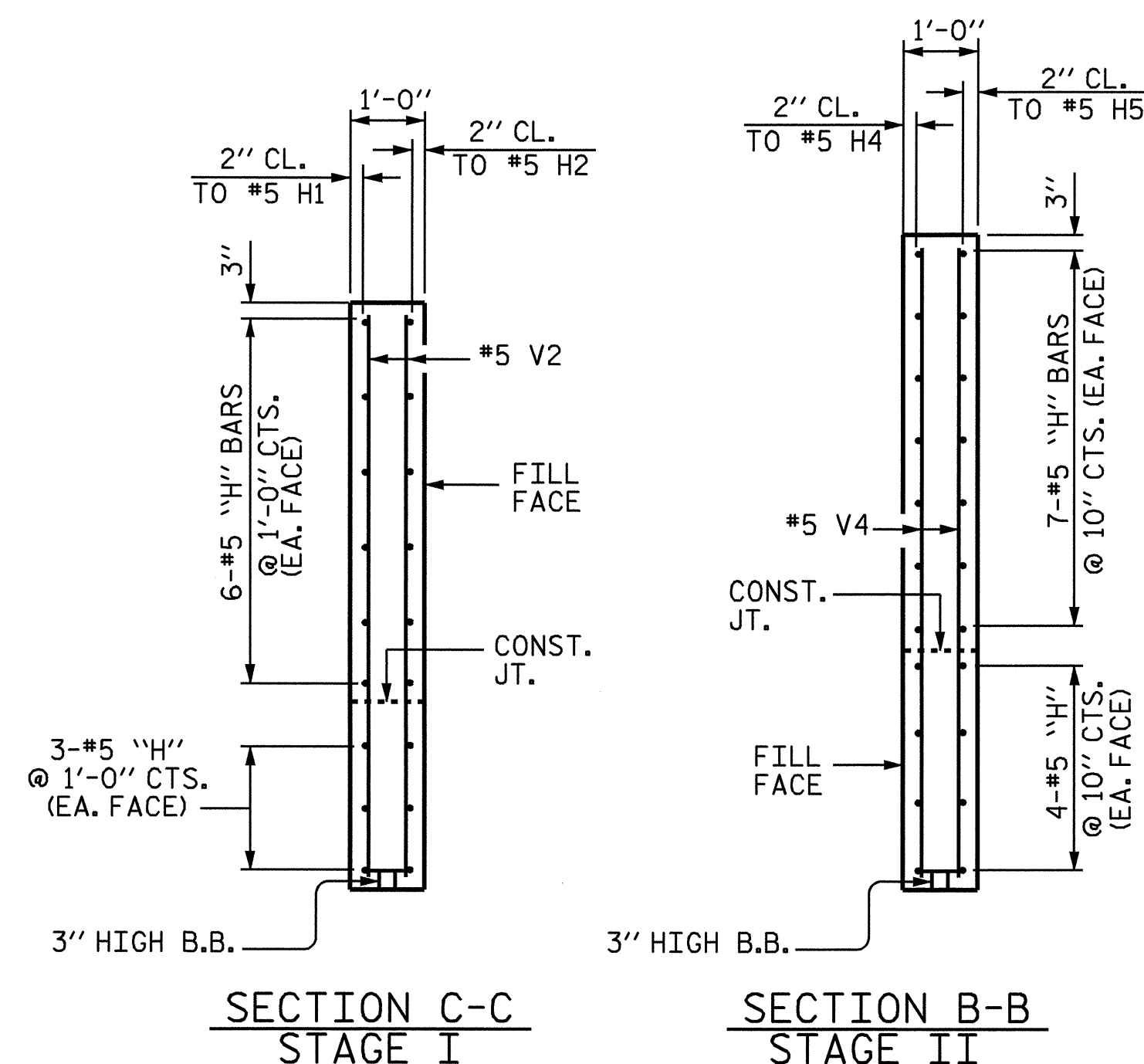
PLAN OF LEFT WING - W1  
STAGE I



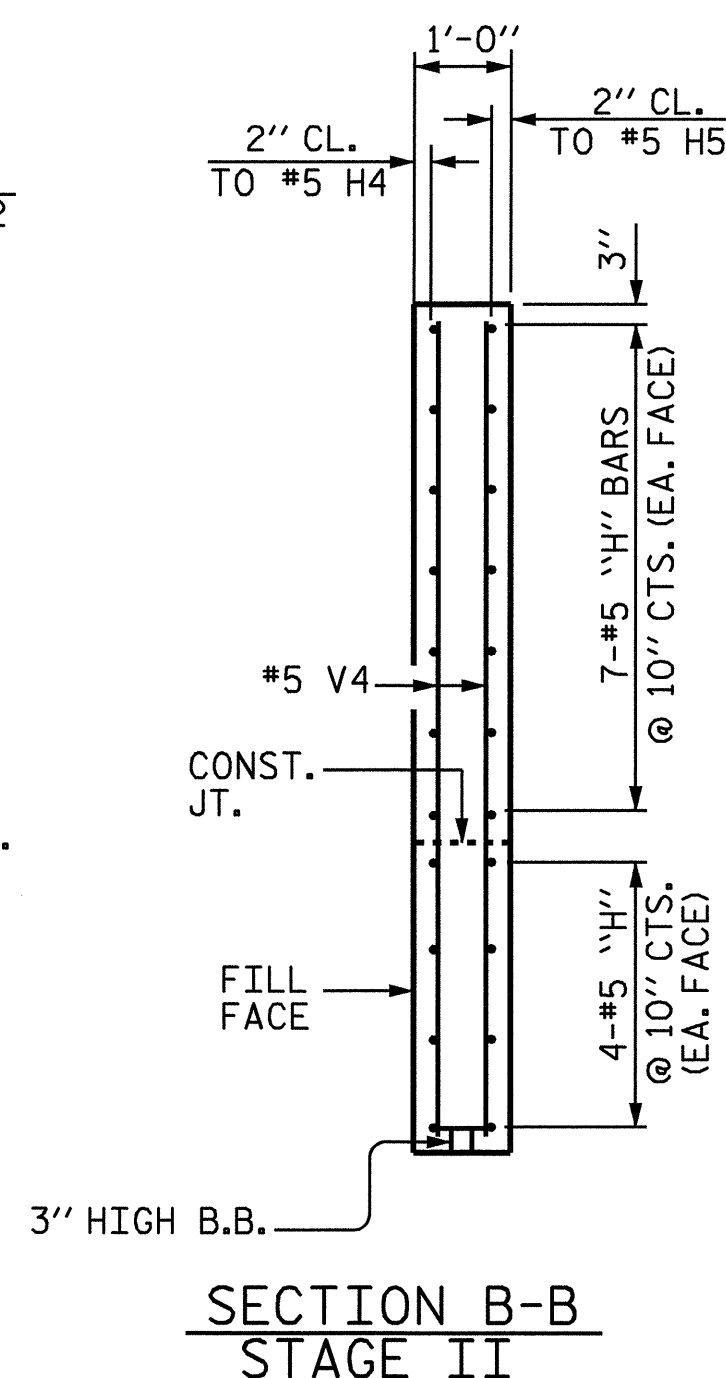
PLAN OF RIGHT WING - W2  
STAGE II



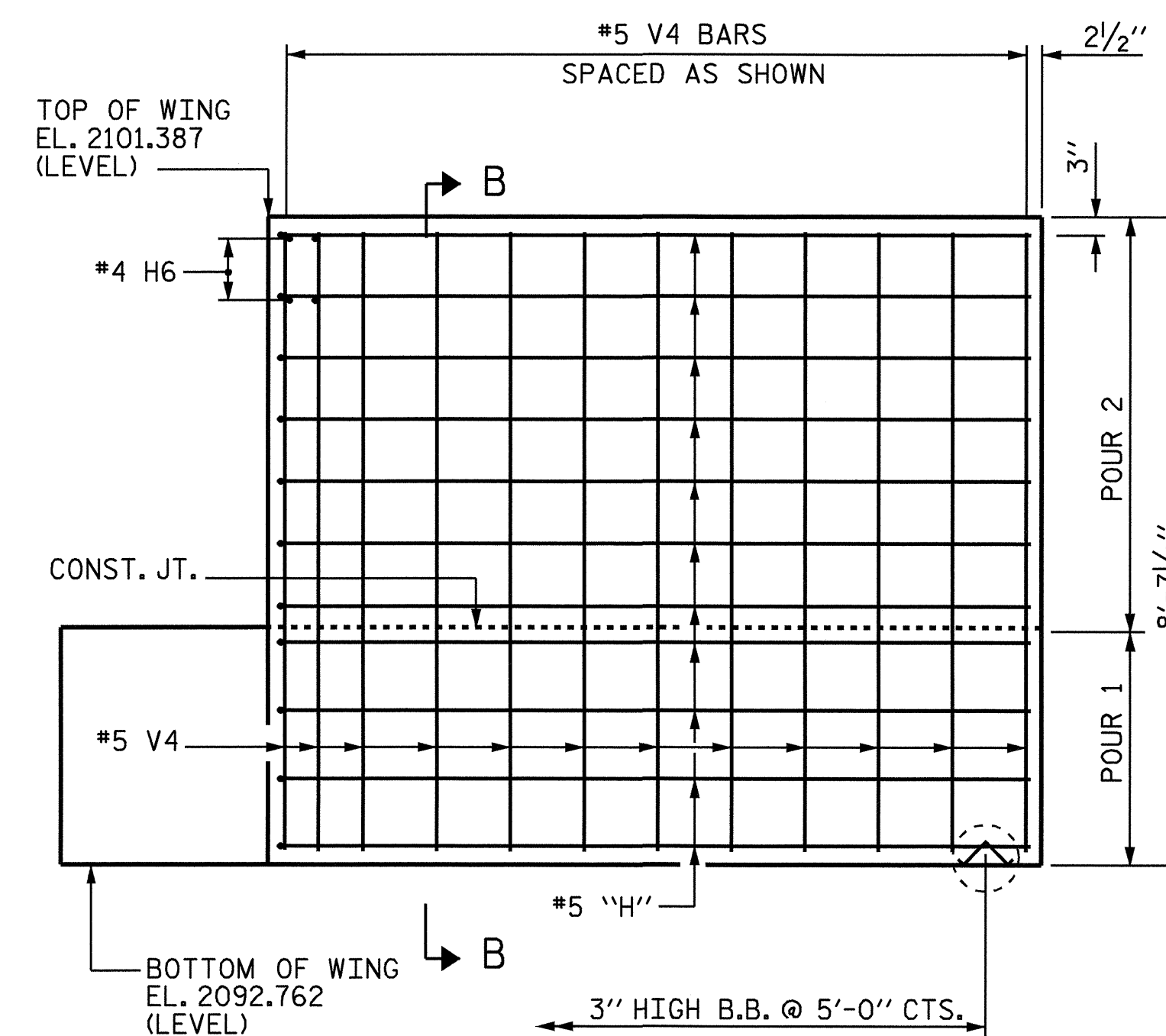
ELEVATION OF LEFT WING - W1  
STAGE I



SECTION C-C  
STAGE I



SECTION B-B  
STAGE II



ELEVATION OF RIGHT WING - W2  
STAGE II

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

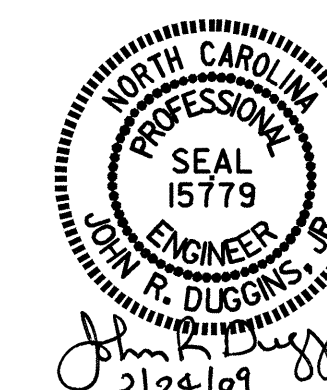
SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 2

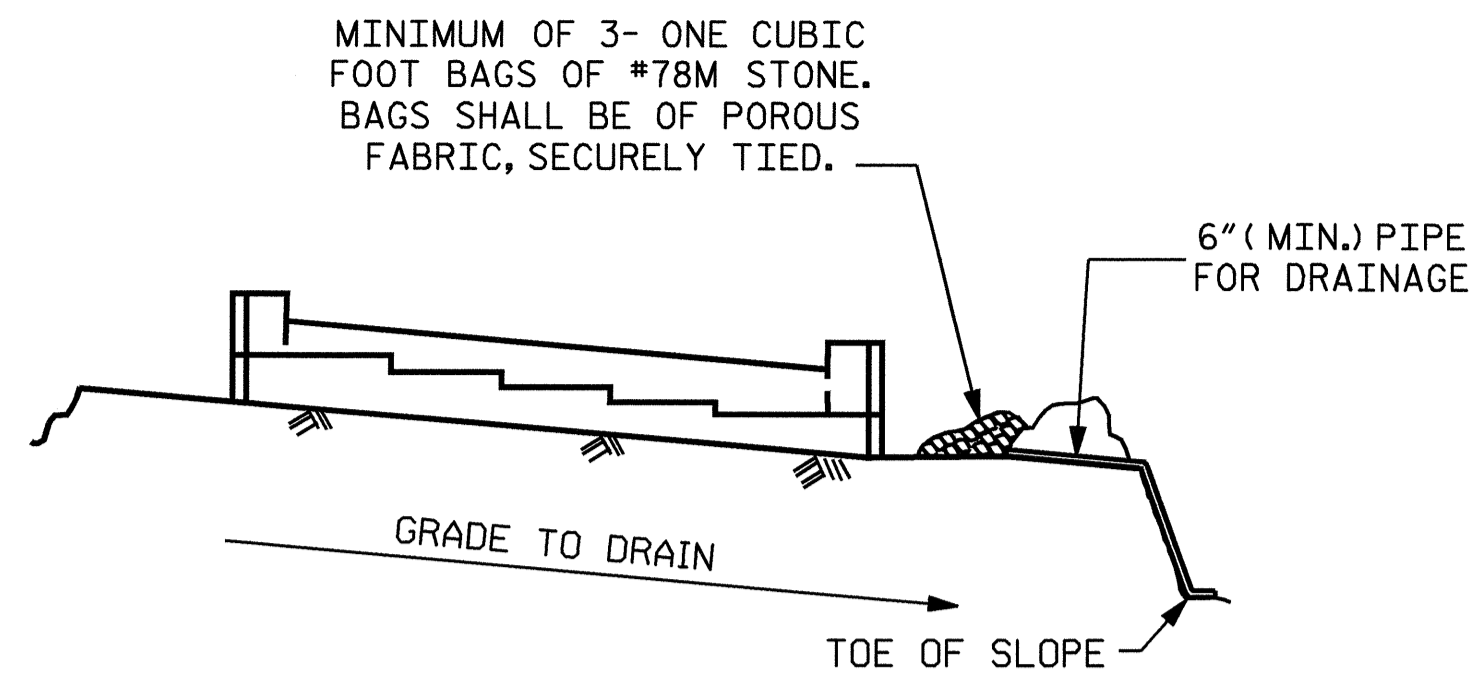
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 CHECKED BY : J.R. DUGGINS DATE : 11/08

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			71

NCBDS STR. #1

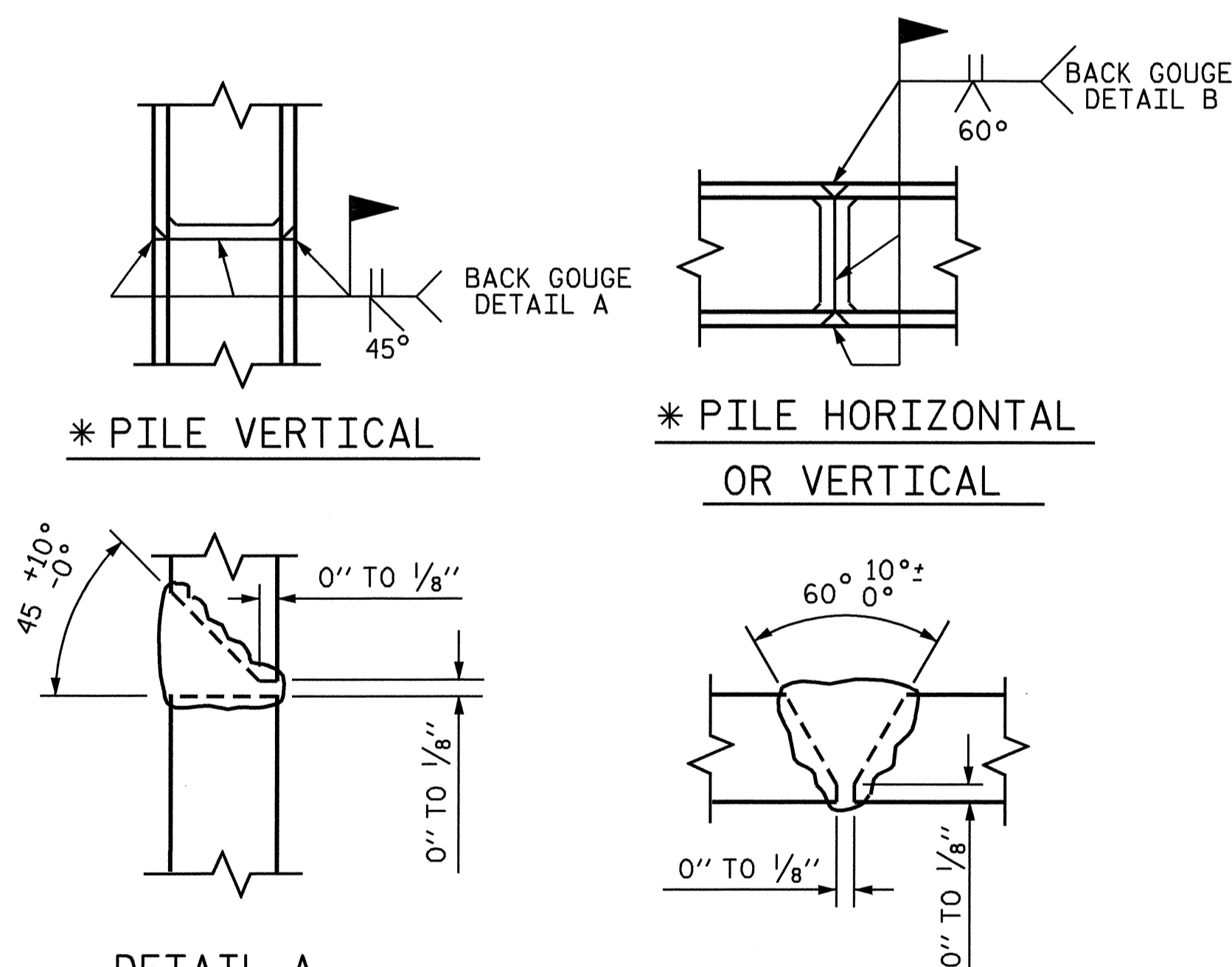


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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



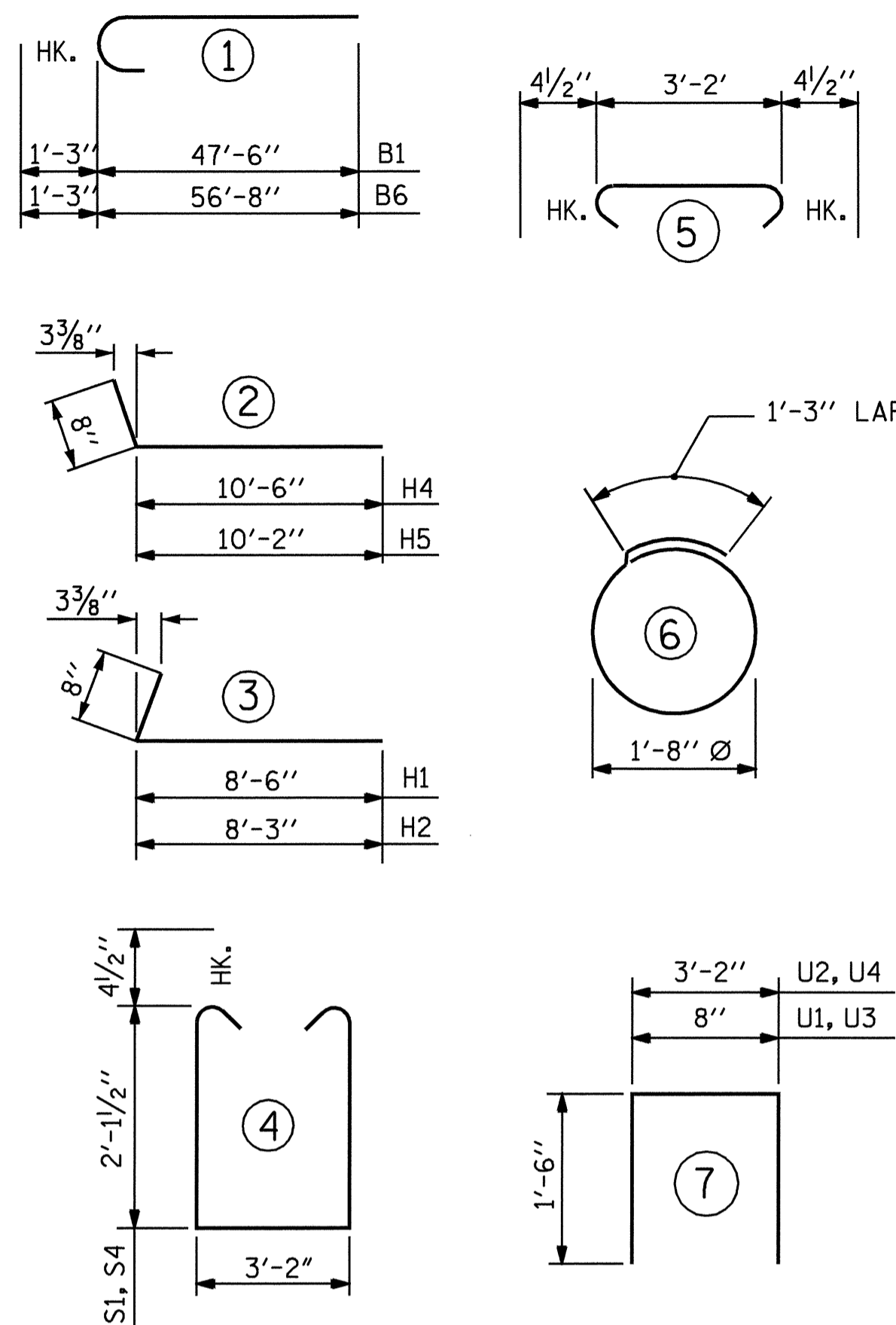
DETAIL A

DETAIL B

### PILE SPLICE DETAILS

DRAWN BY: M. POOLE DATE: 11/08  
 CHECKED BY: J.R. DUGGINS DATE: 11/08

### BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

### BILL OF MATERIAL

#### END BENT No. 2

STAGE I						STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	48'-9"	1658	B6	10	#9	1	57'-11"	1969
B2	4	#5	STR	49'-6"	207	B7	4	#5	STR	57'-8"	241
B3	8	#4	STR	25'-7"	137	B8	12	#4	STR	20'-11"	168
B4	12	#4	STR	3'-2"	25	B9	14	#4	STR	3'-2"	30
B5	20	#4	STR	2'-10"	38	B10	25	#4	STR	2'-10"	47
B11	5	#4	STR	4'-1"	14	B12	5	#4	STR	7'-10"	26
H1	9	#5	2	9'-2"	86	H4	11	#5	3	11'-2"	128
H2	9	#5	2	8'-11"	84	H5	11	#5	3	10'-10"	124
H3	4	#4	STR	4'-7"	12	H6	4	#4	STR	4'-3"	11
K1	16	#4	STR	25'-1"	268	K2	24	#4	STR	21'-3"	341
S1	46	#4	4	8'-2"	251	S4	58	#4	4	8'-2"	316
S2	46	#4	5	3'-11"	120	S5	58	#4	5	3'-11"	152
S3	18	#4	6	6'-6"	78	S6	24	#4	6	6'-6"	104
U1	40	#4	7	3'-8"	98	U3	55	#4	7	3'-8"	135
U2	16	#4	7	6'-2"	66	U4	21	#4	7	6'-2"	87
V1	40	#5	STR	5'-10"	243	V3	110	#5	STR	5'-10"	669
V2	28	#5	STR	7'-6"	219	V4	32	#5	STR	8'-3"	275

REINFORCING STEEL	3604 LBS.	REINFORCING STEEL	4823 LBS.
CLASS A CONCRETE BREAKDOWN		CLASS A CONCRETE BREAKDOWN	
POUR 1 (CAP & LOWER WINGS)	16.9 C.Y.	POUR 1 (CAP & LOWER WINGS)	22.2 C.Y.
POUR 2 (BACKWALL & UPPER WINGS)	7.7 C.Y.	POUR 2 (BACKWALL & UPPER WINGS)	10.3 C.Y.
TOTAL	24.6 C.Y.	TOTAL	32.5 C.Y.
HP 12 x 53 STEEL PILES		HP 12 x 53 STEEL PILES	
No. 10	350 LIN FT.	No. 11	220 LIN FT.

#### TOTAL QUANTITIES

REINFORCING STEEL	8427 LBS.
CLASS A CONCRETE	57.1 C.Y.
HP 12 X 53 STEEL PILES	
No. 21	570 LIN. FT.

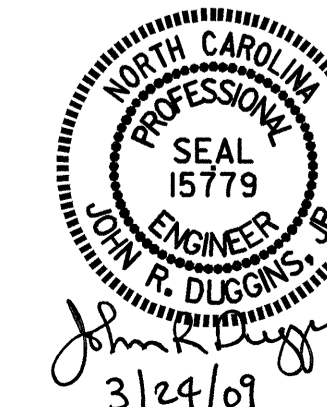
PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 66+60.00 -L-

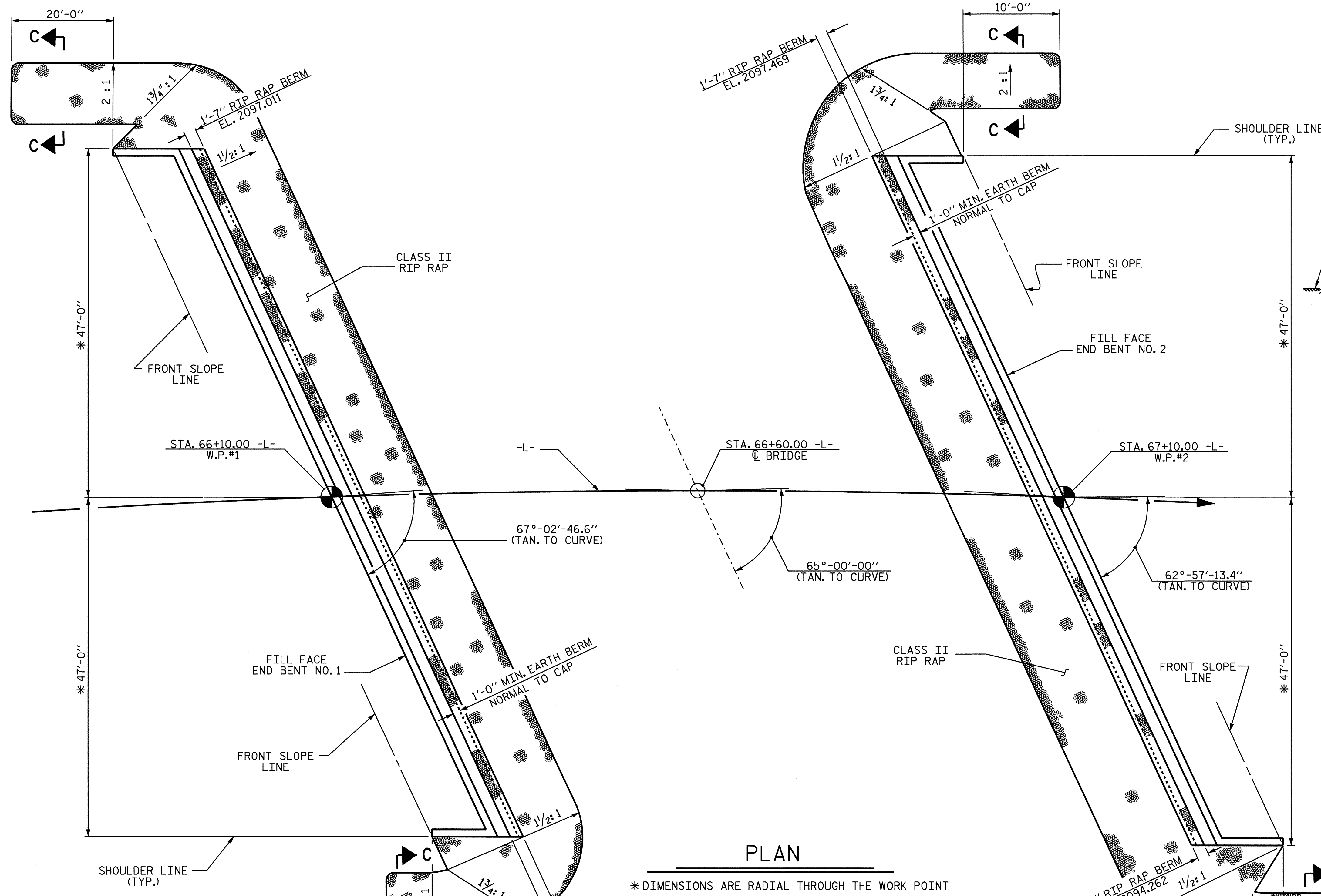
SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

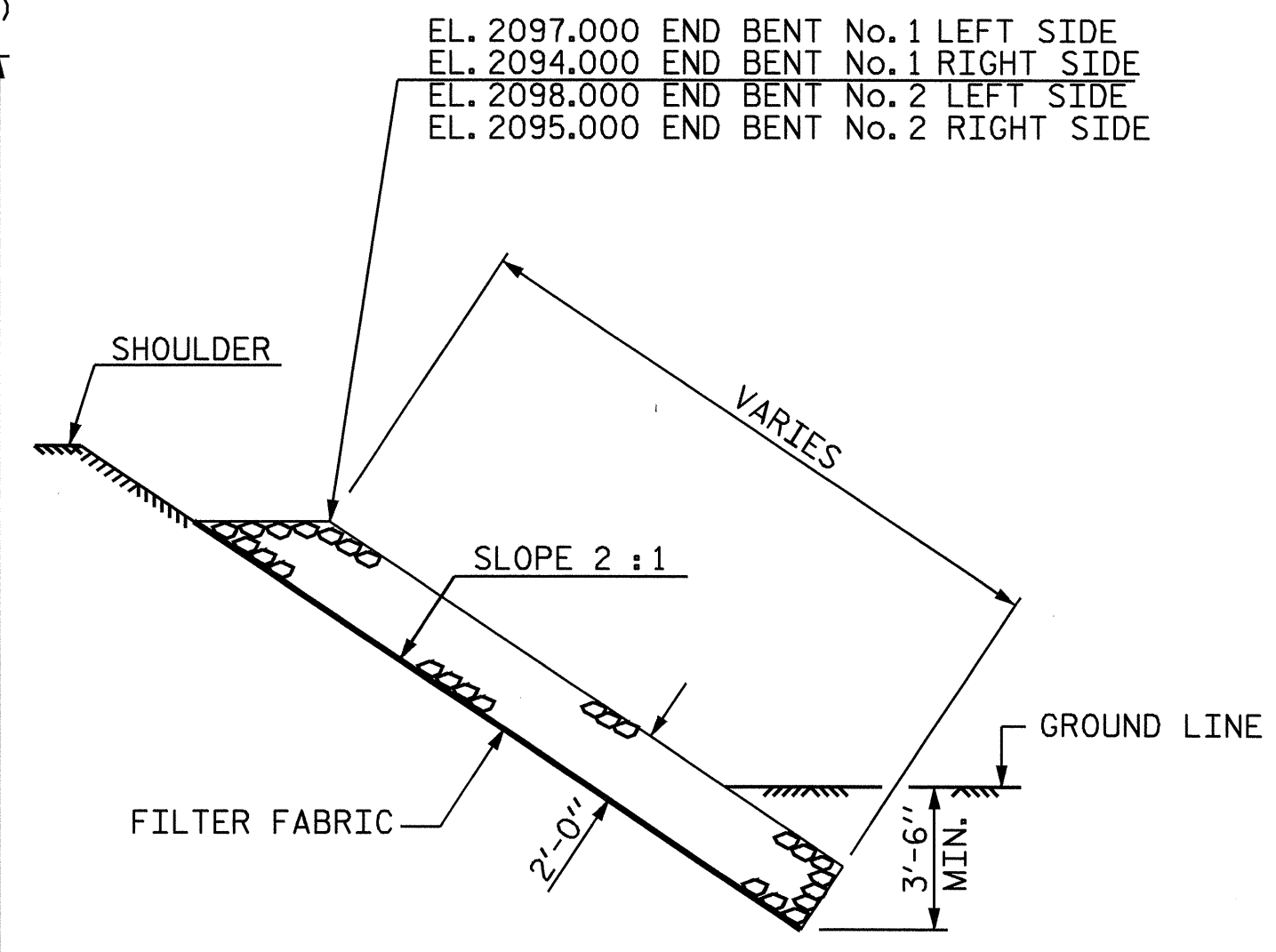
### SUBSTRUCTURE END BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			71



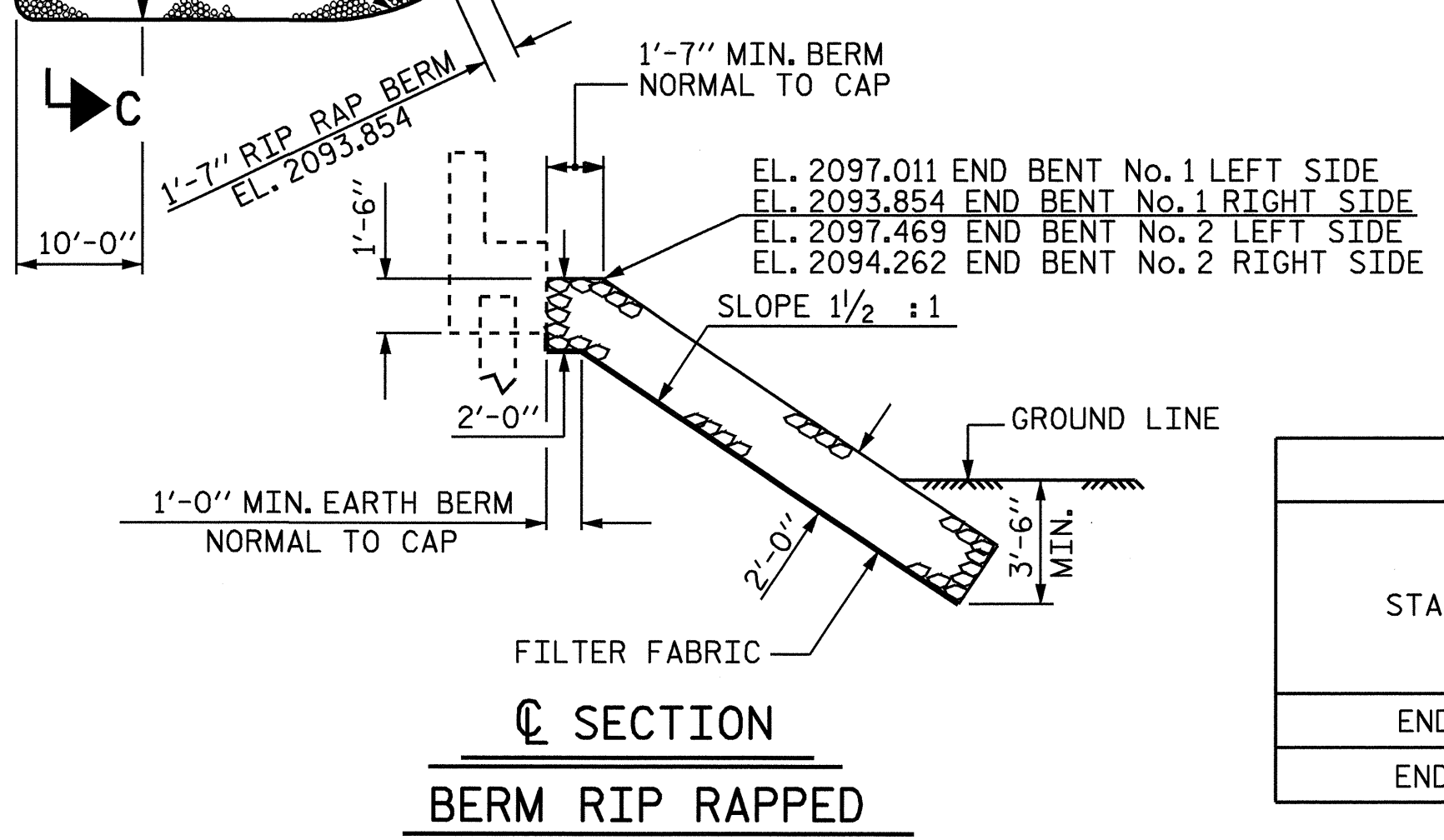


**NOTES :**  
FOR EARTH BERM ELEVATIONS, SEE GENERAL DRAWING.



**PLAN**

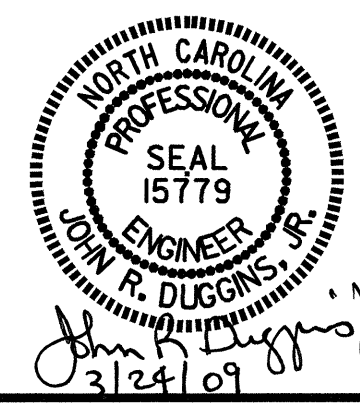
\* DIMENSIONS ARE RADIAL THROUGH THE WORK POINT



PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 66+60.00 -L-

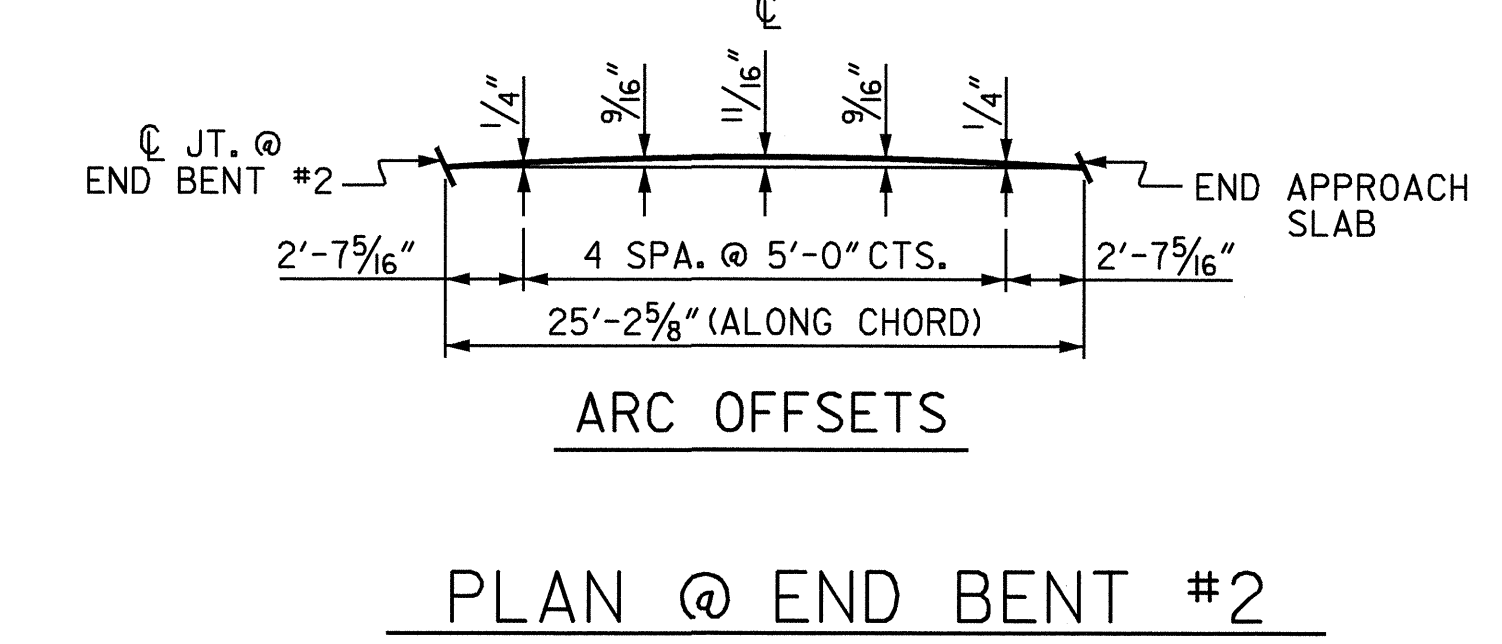
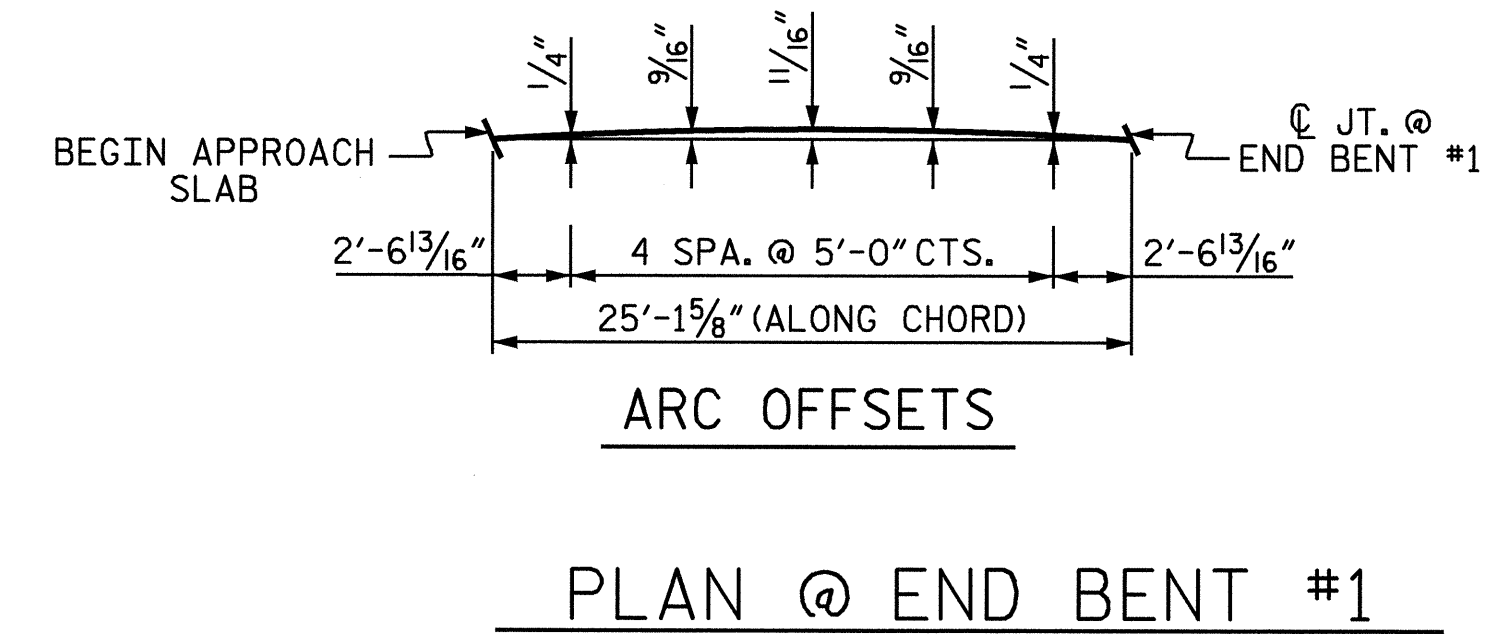
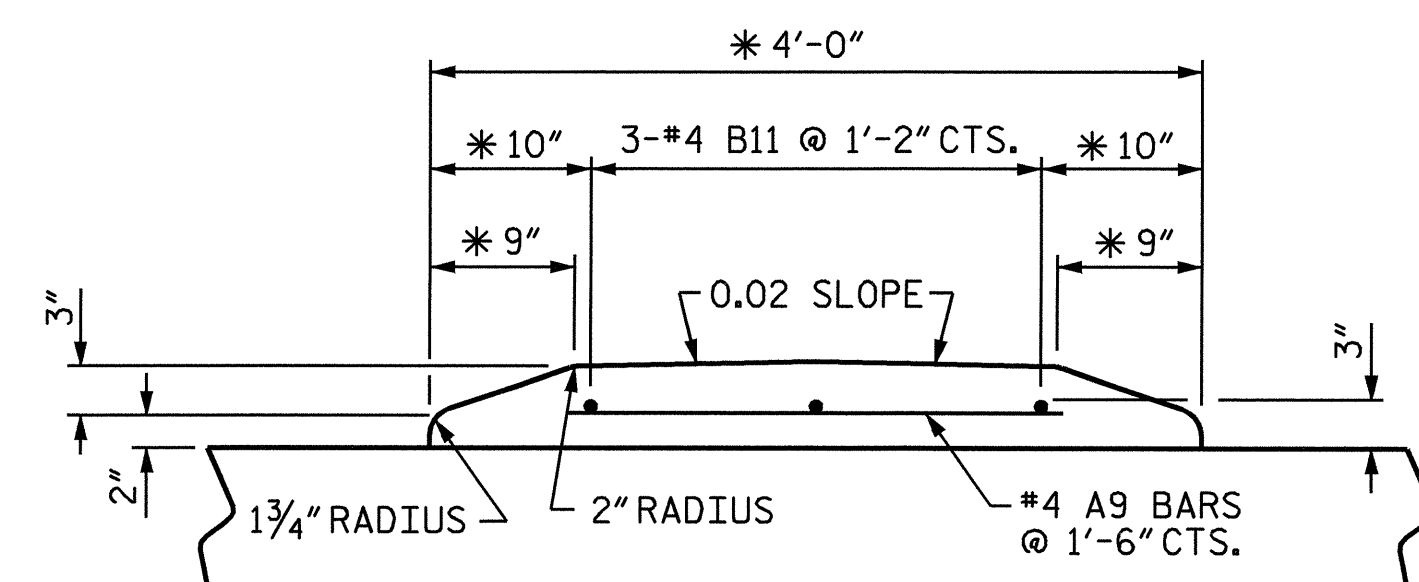
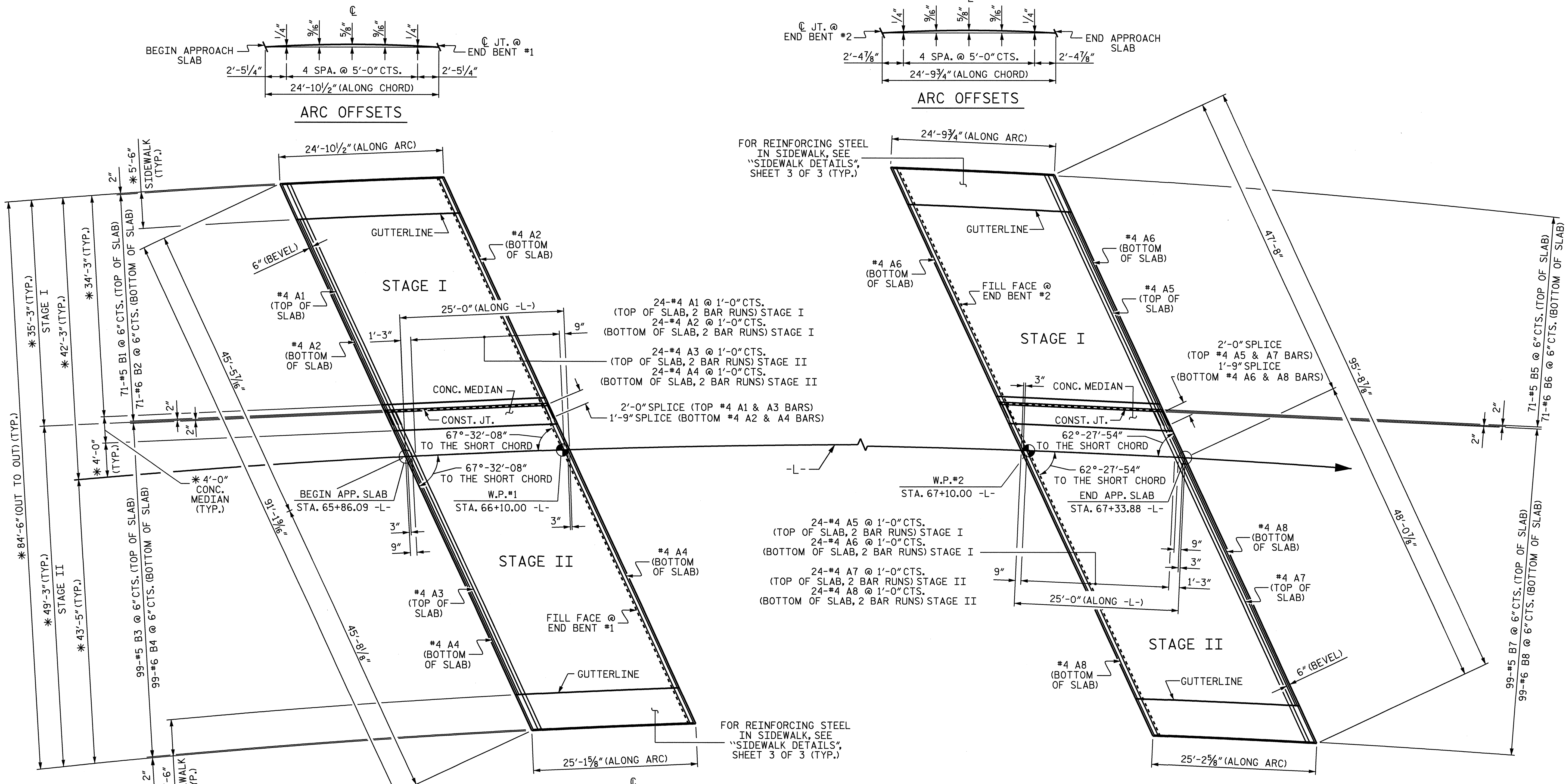
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
<b>RIP RAP DETAILS</b>					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					33
					71

ESTIMATED QUANTITIES		
BRIDGE @ STA. 66+60.00 -L-	RIP RAP CLASS II	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT No. 1	250	278
END BENT No. 2	260	289



DRAWN BY : M. POOLE DATE : 10/08  
 CHECKED BY : J.R. DUGGINS DATE : 11/08

20-MAR-2009 14:59  
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ASSEMBLED BY : A. SORSENGINH DATE : 11/05/08  
 CHECKED BY : J.R. DUGGINS DATE : 12/11/08  
 DRAWN BY : EEM 3/95  
 CHECKED BY : VAP 3/95

REV. 7/10/01 LES/RDR  
 REV. 5/7/03R RWW/JTE  
 REV. 5/1/06R KMM/GM

20-MAR-2009 15:00  
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 dahodge



PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 66+60.00-L-

SHEET 1 OF 3

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			34
2			4			71

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.

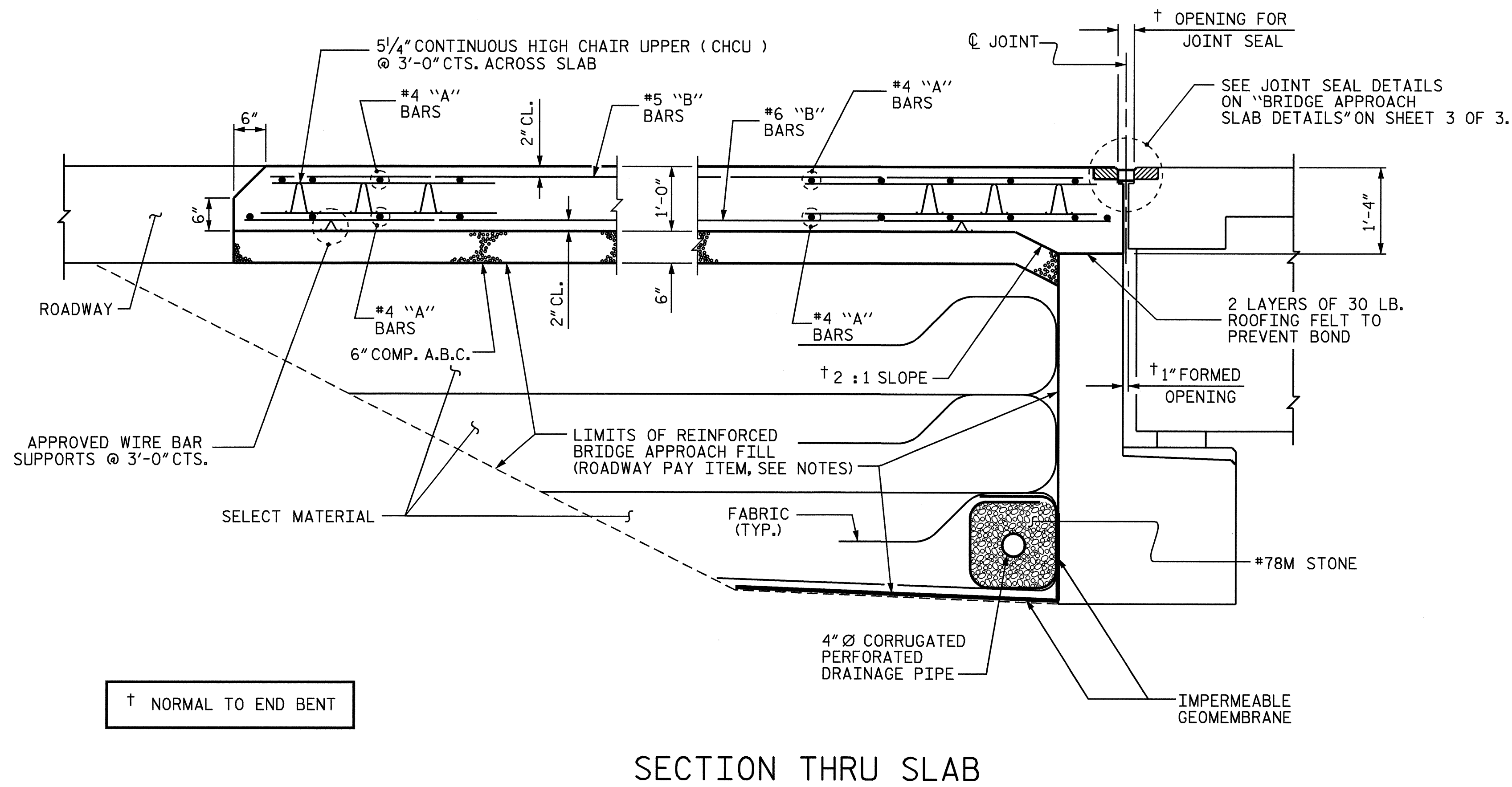
THE 6" COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 1'-0" OUTSIDE EACH EDGE OF THE APPROACH SLAB.

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 BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH 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 ROADWAY END OF THE APPROACH 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.

BILL OF MATERIAL

APPROACH SLAB AT EB #1 STAGE I						APPROACH SLAB AT EB #1 STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	21'-0"	701	*A3	50	#4	STR	27'-5"	916
A2	52	#4	STR	20'-10"	724	A4	52	#4	STR	27'-4"	949
						*A9	17	#4	STR	2'-8"	30
*B1	71	#5	STR	23'-6"	1740						
B2	71	#6	STR	24'-6"	2613	*B3	99	#5	STR	23'-6"	2427
*B9	5	#4	STR	24'-6"	82	B4	99	#6	STR	24'-6"	3643
						*B10	5	#4	STR	24'-9"	83
*D1	20	#4	STR	1'-0"	13	*B11	3	#4	STR	24'-8"	49
*G1	25	#4	STR	5'-6"	92	*D1	20	#4	STR	1'-0"	13
						*G1	25	#4	STR	5'-6"	92
REINFORCING STEEL LBS. 3337						REINFORCING STEEL LBS. 4592					
*EPOXY COATED REINFORCING STEEL LBS. 2628						*EPOXY COATED REINFORCING STEEL LBS. 3610					
CLASS AA CONCRETE POUR 1 (SLAB) 32.8 C.Y.						CLASS AA CONCRETE POUR 1 (SLAB) 46.2 C.Y.					
POUR 2 (SIDEWALK) 2.8 C.Y.						POUR 2 (SIDEWALK) 2.8 C.Y.					
TOTAL 35.6 C.Y.						POUR 3 (MEDIAN) 1.4 C.Y.					
						TOTAL 50.4 C.Y.					
APPROACH SLAB AT EB #2 STAGE I						APPROACH SLAB AT EB #2 STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A5	50	#4	STR	21'-10"	729	*A7	50	#4	STR	28'-6"	952
A6	52	#4	STR	21'-8"	753	A8	52	#4	STR	28'-5"	987
						*A9	17	#4	STR	2'-8"	30
*B5	71	#5	STR	23'-6"	1740						
B6	71	#6	STR	24'-6"	2613	*B7	99	#5	STR	23'-6"	2427
*B9	5	#4	STR	24'-6"	82	B8	99	#6	STR	24'-6"	3643
						*B10	5	#4	STR	24'-6"	82
*D1	20	#4	STR	1'-0"	13	*B11	3	#4	STR	24'-8"	49
*G1	25	#4	STR	5'-9"	96	*D1	20	#4	STR	1'-0"	13
						*G1	25	#4	STR	5'-9"	96
REINFORCING STEEL LBS. 3366						REINFORCING STEEL LBS. 4630					
*EPOXY COATED REINFORCING STEEL LBS. 2660						*EPOXY COATED REINFORCING STEEL LBS. 3649					
CLASS AA CONCRETE POUR 1 (SLAB) 32.9 C.Y.						CLASS AA CONCRETE POUR 1 (SLAB) 46.3 C.Y.					
POUR 2 (SIDEWALK) 2.8 C.Y.						POUR 2 (SIDEWALK) 2.8 C.Y.					
TOTAL 35.7 C.Y.						POUR 3 (MEDIAN) 1.4 C.Y.					
						TOTAL 50.5 C.Y.					



SECTION THRU SLAB

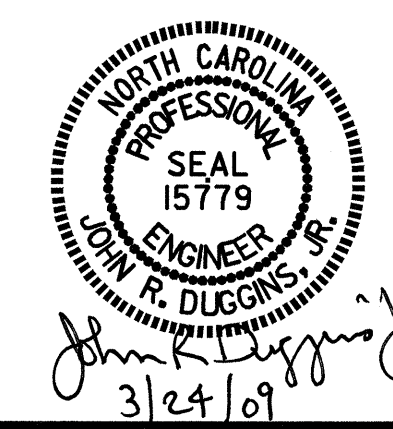
PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 66+60.00-L-

SHEET 2 OF 3

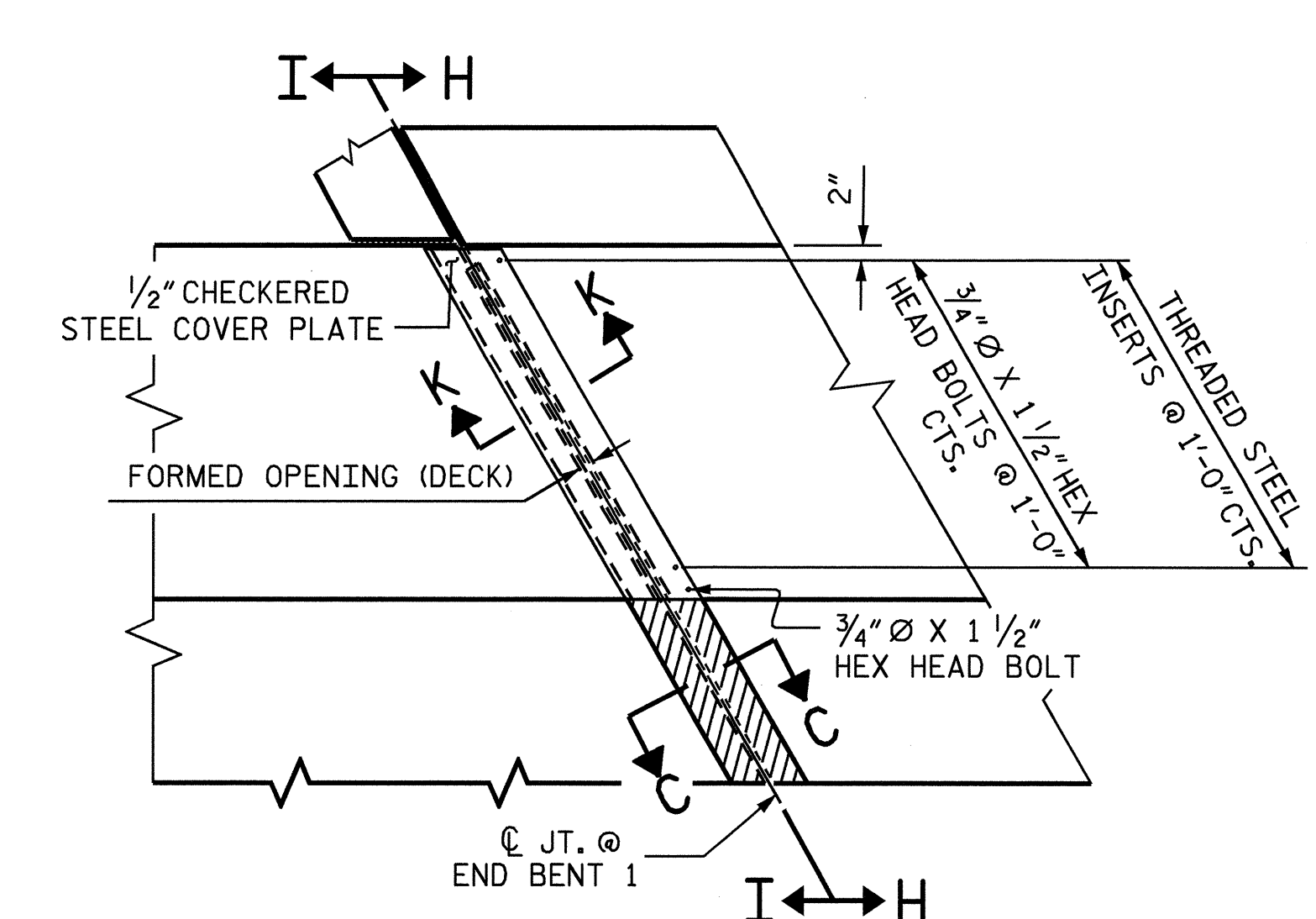
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

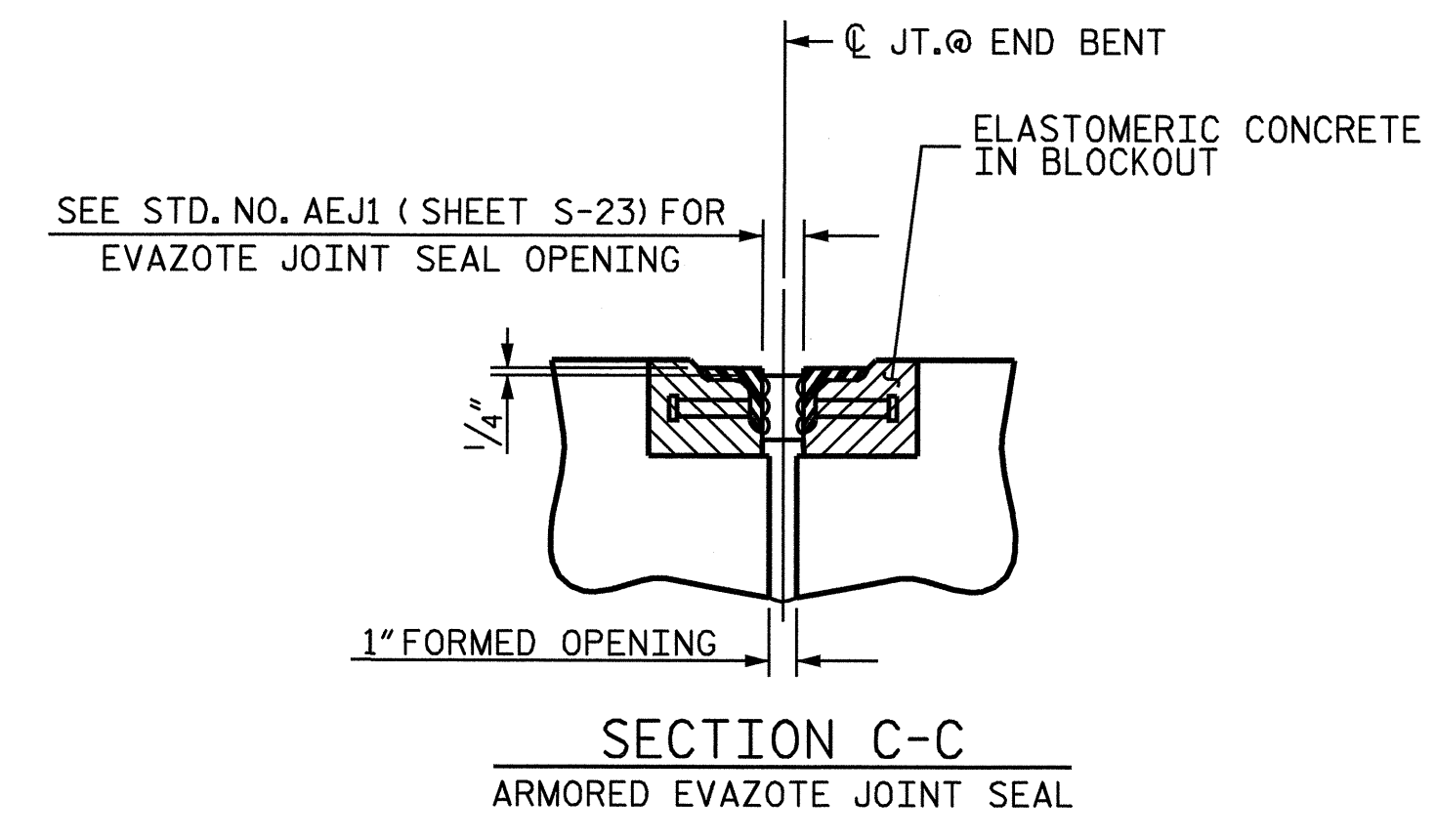
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35	
1			3			TOTAL SHEETS 71	
2			4				



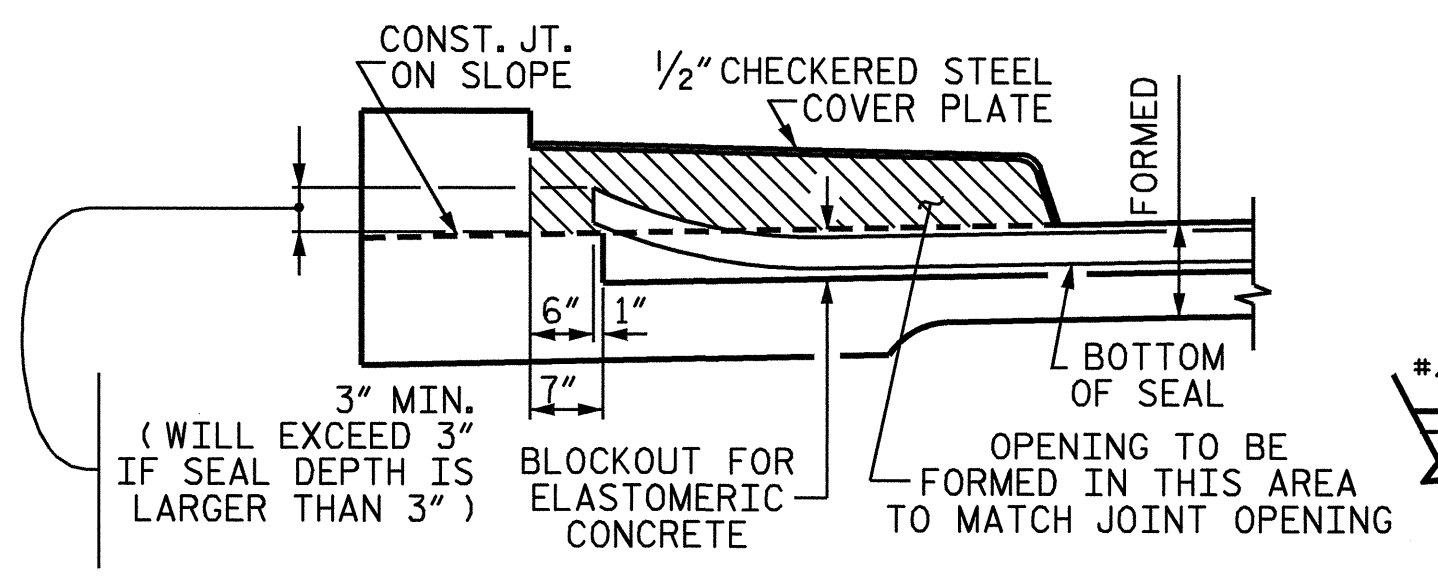
ASSEMBLED BY: A. SORSENGINH DATE: 11/05/08  
 CHECKED BY: J.R. DUGGINS DATE: 12/11/08  
 DRAWN BY: EEM 3/95 REV. 7/10/01 LES/RDR  
 CHECKED BY: VAP 3/95 REV. 5/7/03R RHW/JTE  
 REV. 5/1/06R KMM/GM



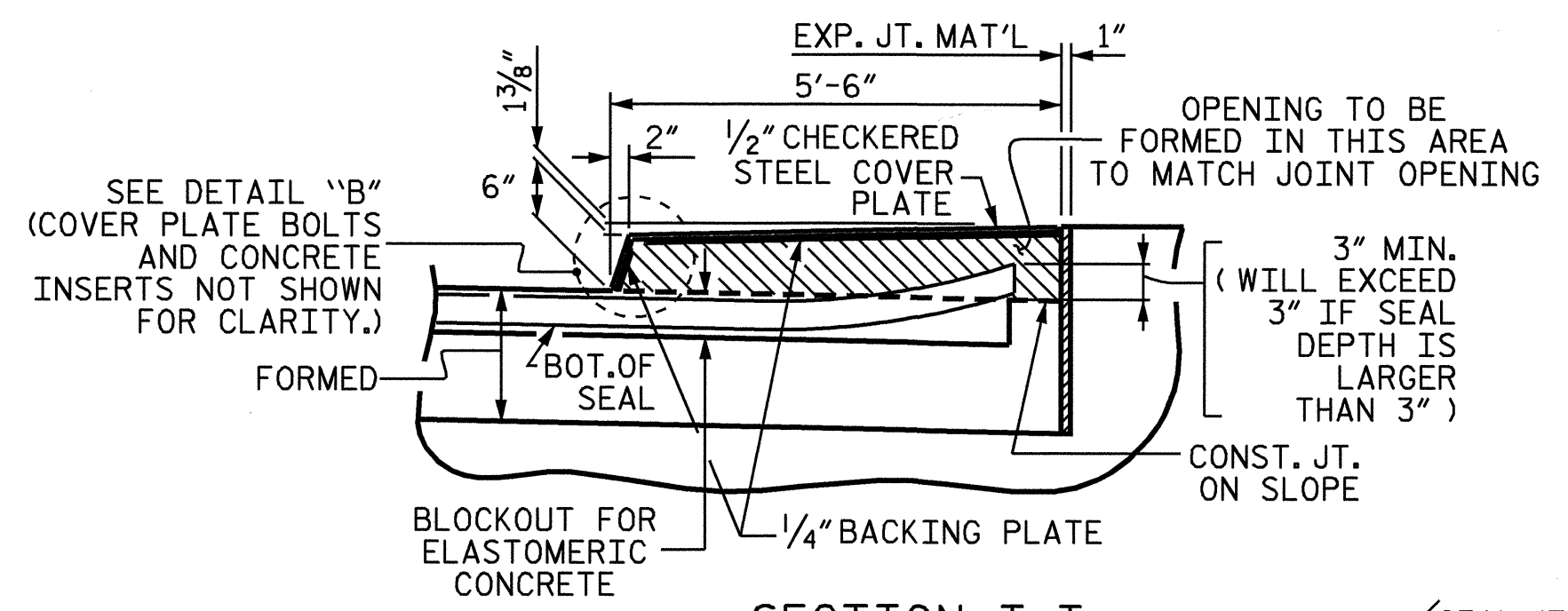
PLAN VIEW OF EVAZOTE JOINT SEAL @ END BENT FOR SIDEWALK



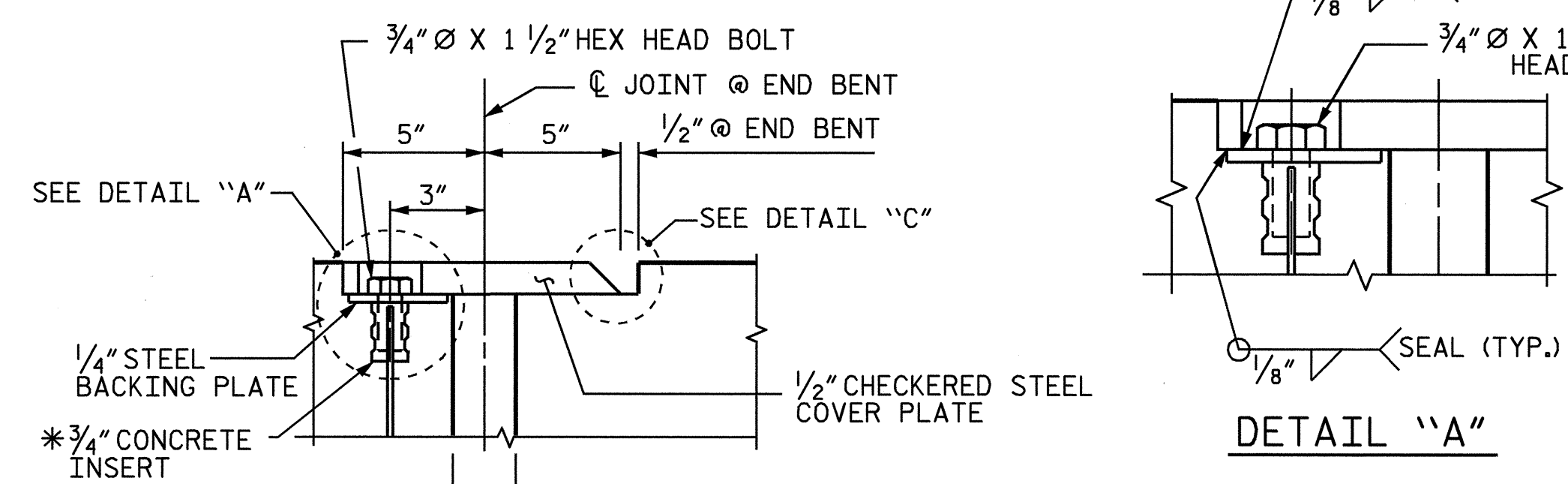
SECTION C-C ARMORED EVAZOTE JOINT SEAL



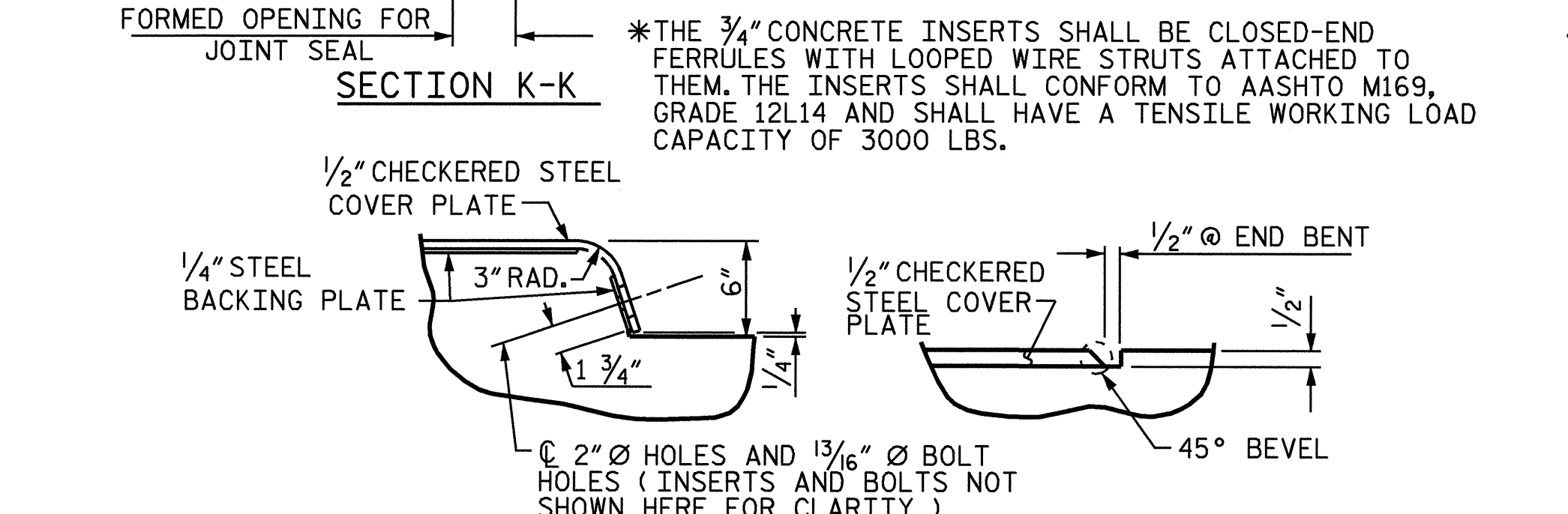
SECTION H-H



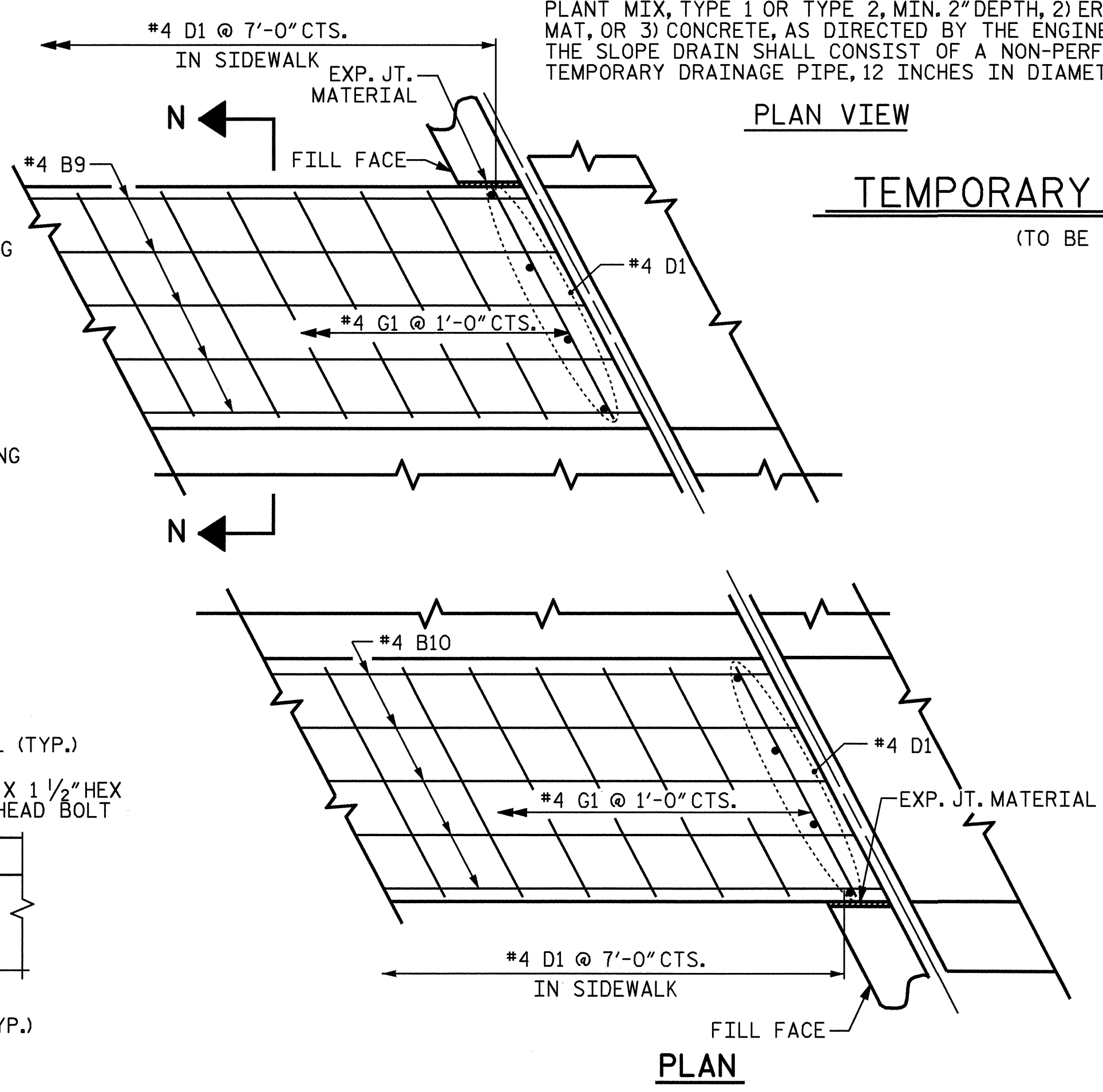
SECTION I-I



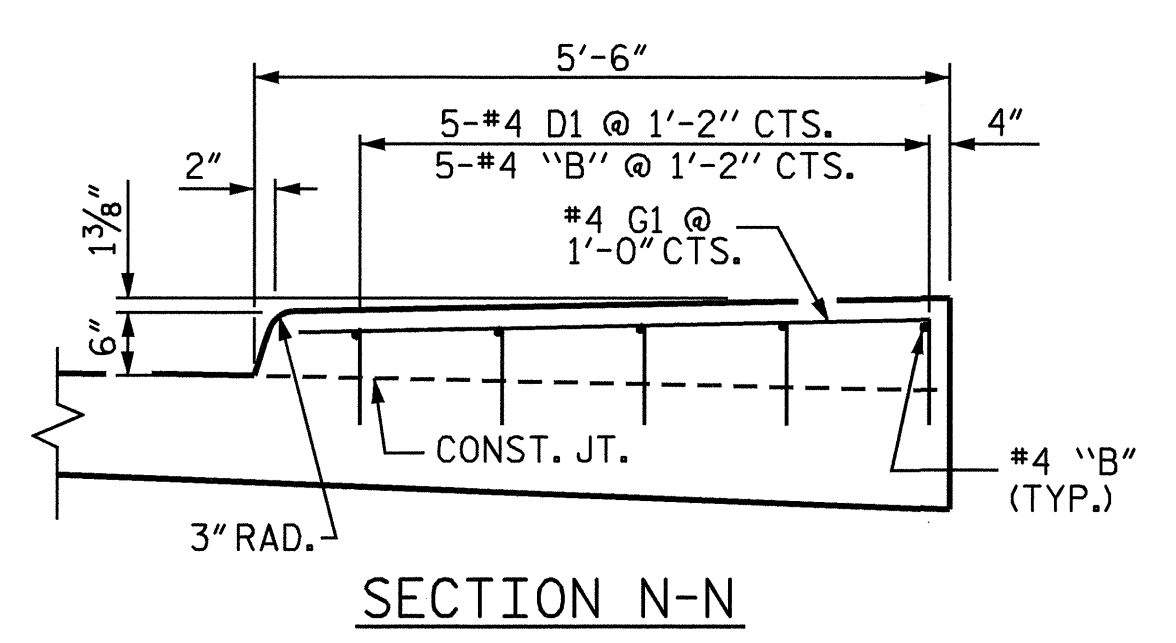
DETAIL "A"



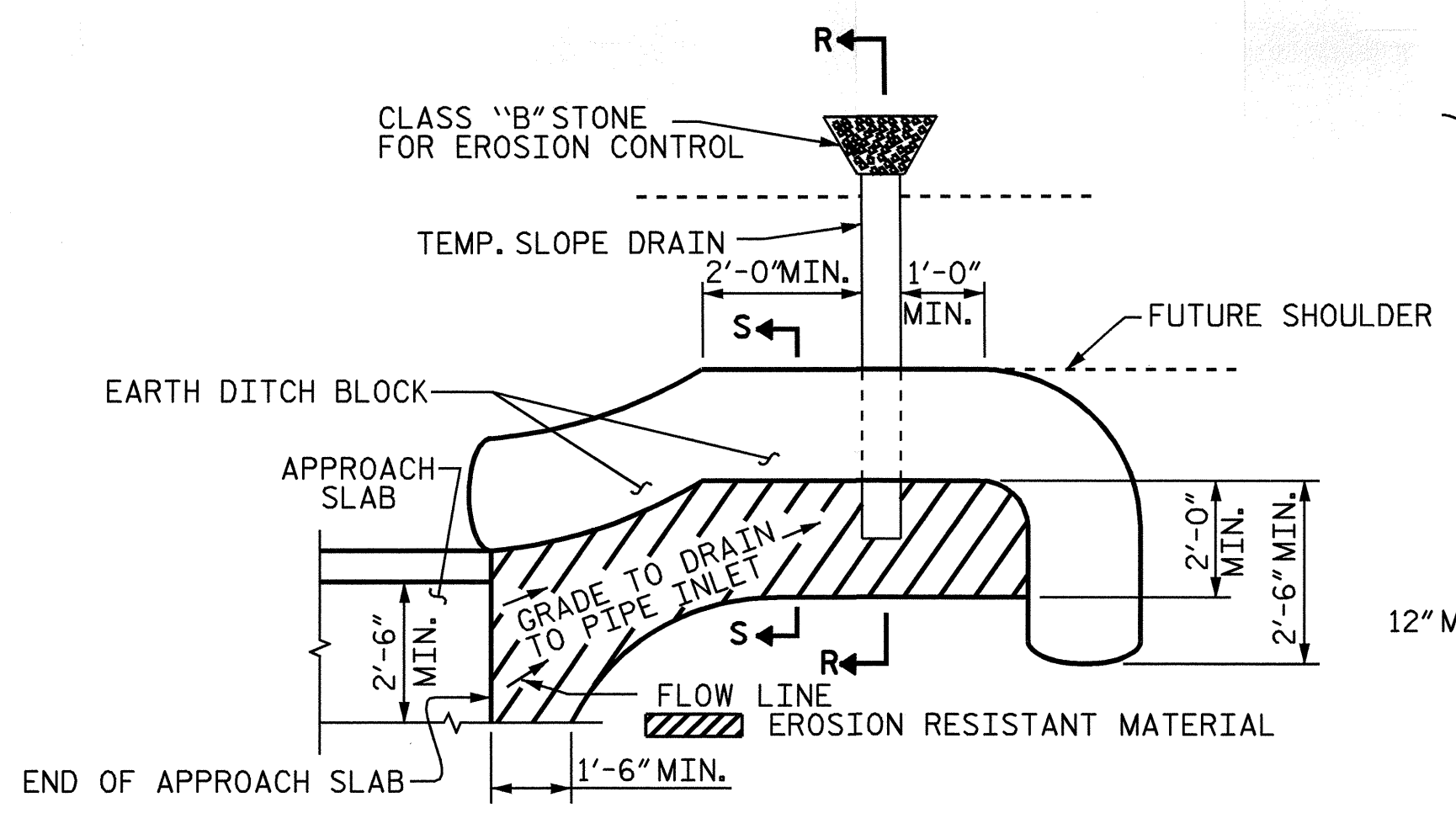
SECTION K-K  
DETAIL "B" JOINT SEAL DETAILS @ END BENT  
DETAIL "C"



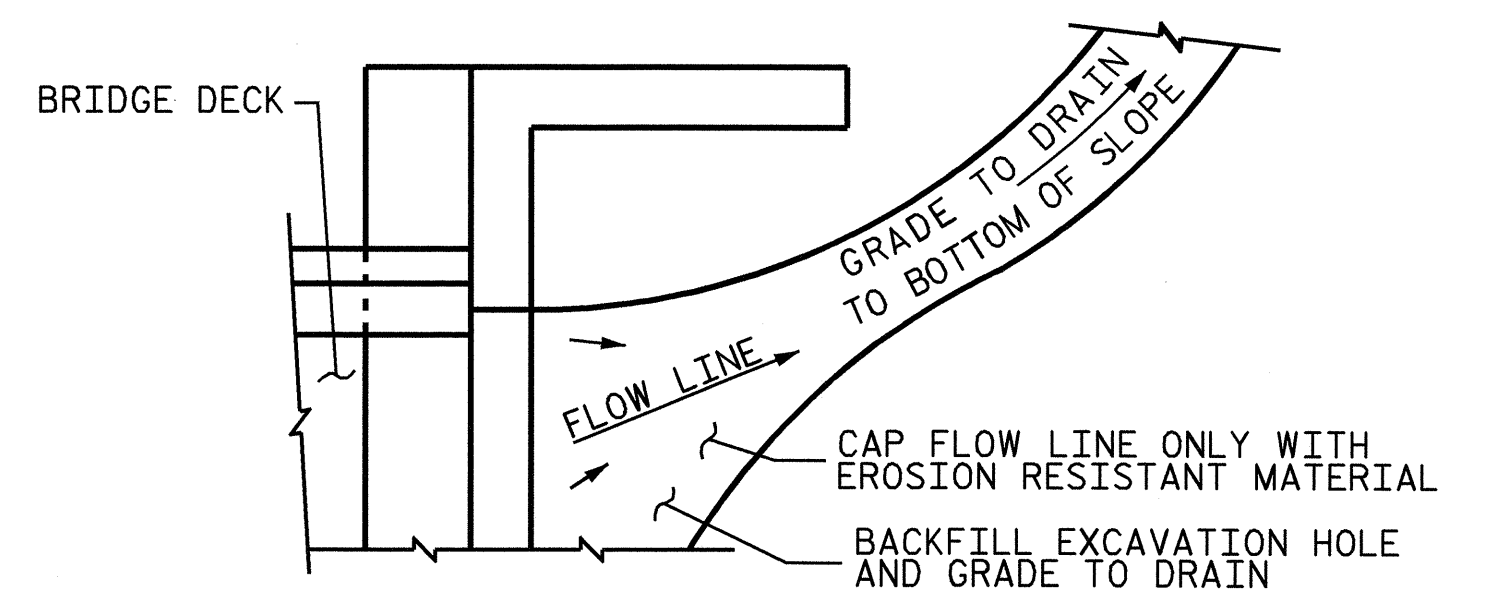
PLAN VIEW  
DETAILS OF SIDEWALK ON APPROACH SLAB



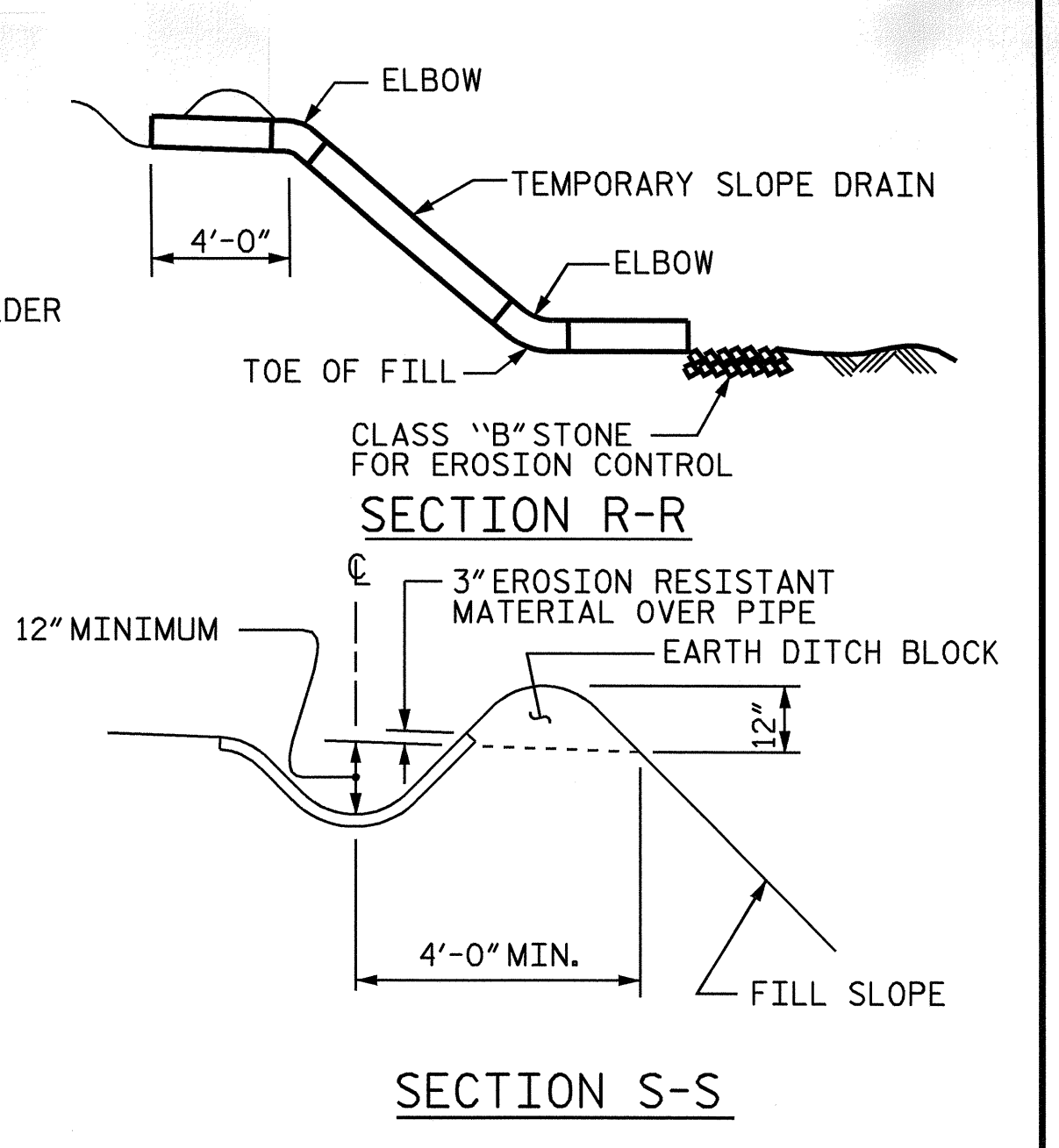
SECTION N-N  
SIDEWALK DETAILS



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

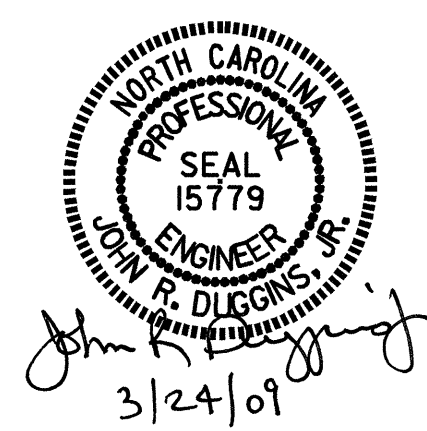


TEMPORARY DRAINAGE DETAIL  
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND 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 R-R  
SECTION S-S

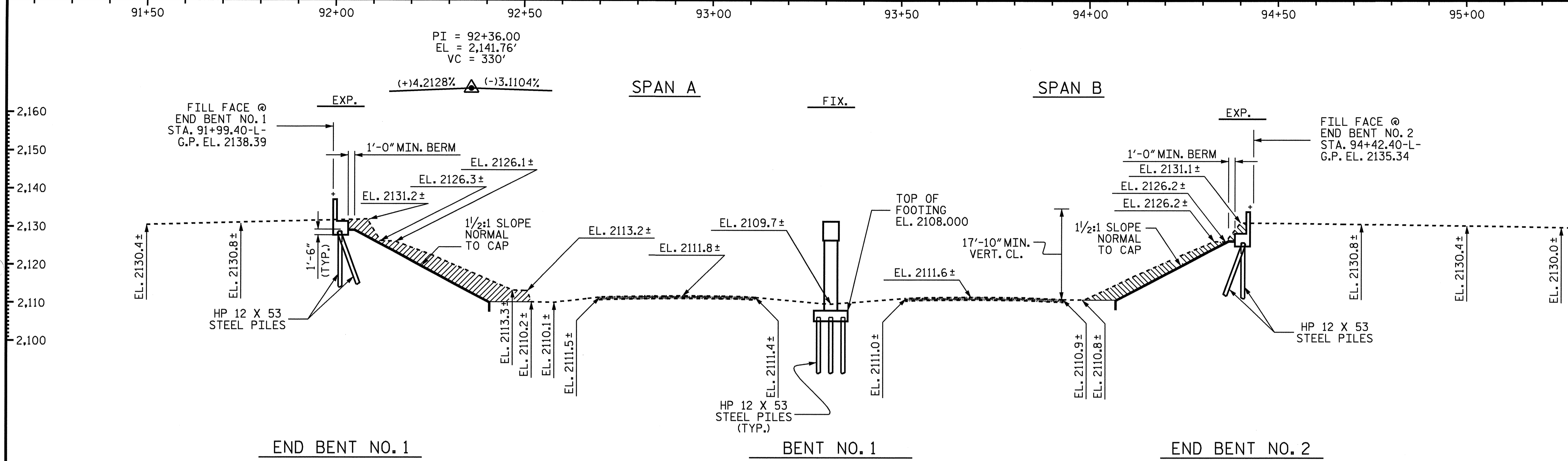
ASSEMBLED BY :	A. SORSENGIH	DATE :	11/05/08
CHECKED BY :	J.R. DUGGINS	DATE :	12/11/08
DRAWN BY :	FCJ	11/88	REV. 10/17/00
CHECKED BY :	ARB	11/88	REV. 5/7/03
			REV. 5/1/06R



PROJECT NO. R-4430  
HENDERSON COUNTY  
STATION: 66+60.00 -L-

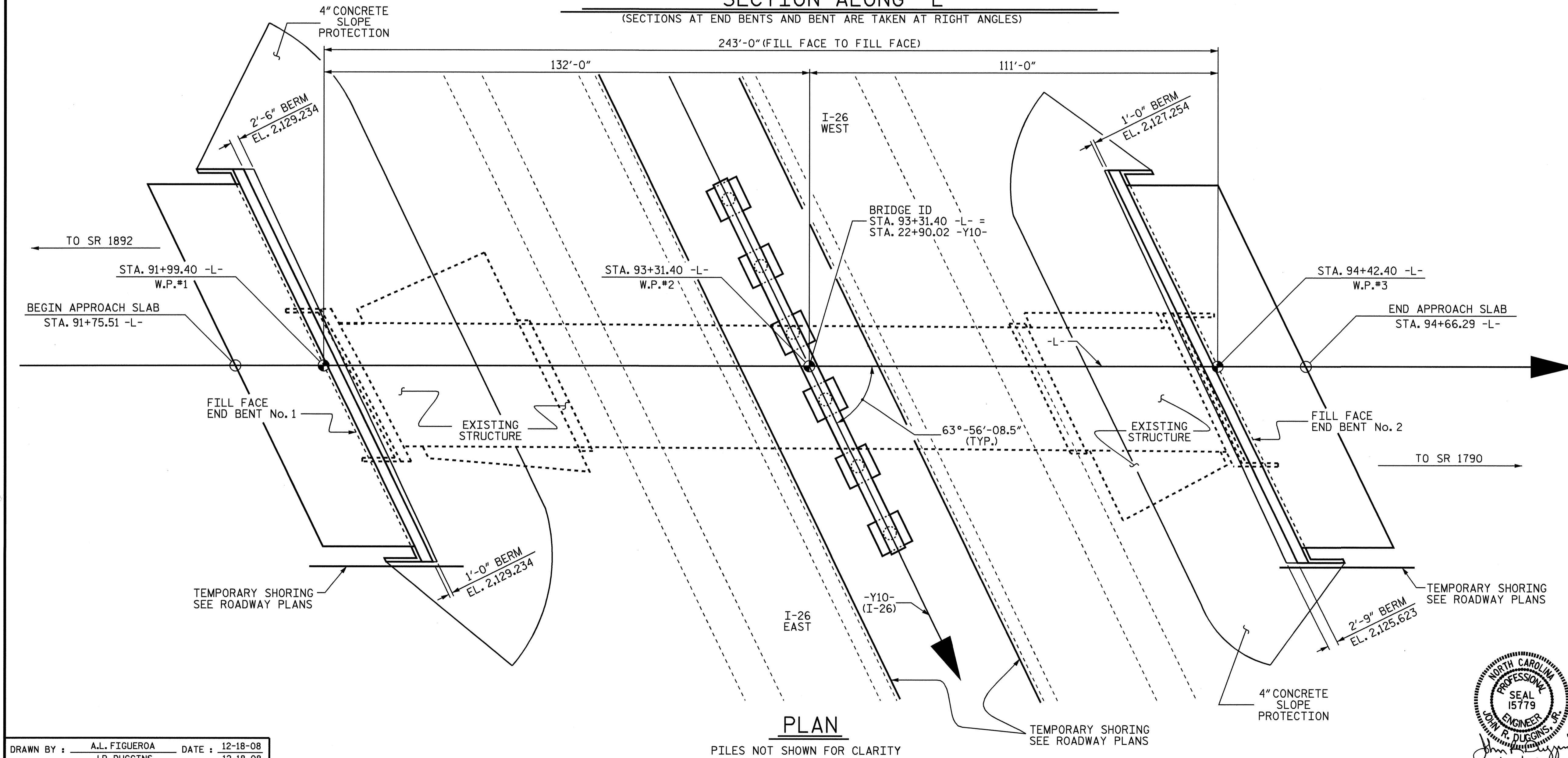
SHEET 3 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-36
BRIDGE APPROACH SLAB DETAILS						TOTAL SHEETS 71
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



UNCLASSIFIED STRUCTURE EXCAVATION

SECTION ALONG -L-  
(SECTIONS AT END BENTS AND BENT ARE TAKEN AT RIGHT ANGLES)



Quang H. Nguyen 3-24-09

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 93+31.40-L-  
 SHEET 1 OF 3 REPLACES BRIDGE #162

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON SR 1783  
 (UPWARD ROAD)  
 OVER INTERSTATE 26  
 BETWEEN SR 1892 AND SR 1790

REVISIONS						SHEET NO. S-37
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 71
2			4			

DRAWN BY: A.L. FIGUEROA DATE: 12-18-08  
 CHECKED BY: J.R. DUGGINS DATE: 12-18-08

NORTH CAROLINA  
 PROFESSIONAL  
 SEAL  
 15779  
 ENGINEER  
 JOHN R. DUGGINS, JR.  
 3/24/09

NOTES

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.

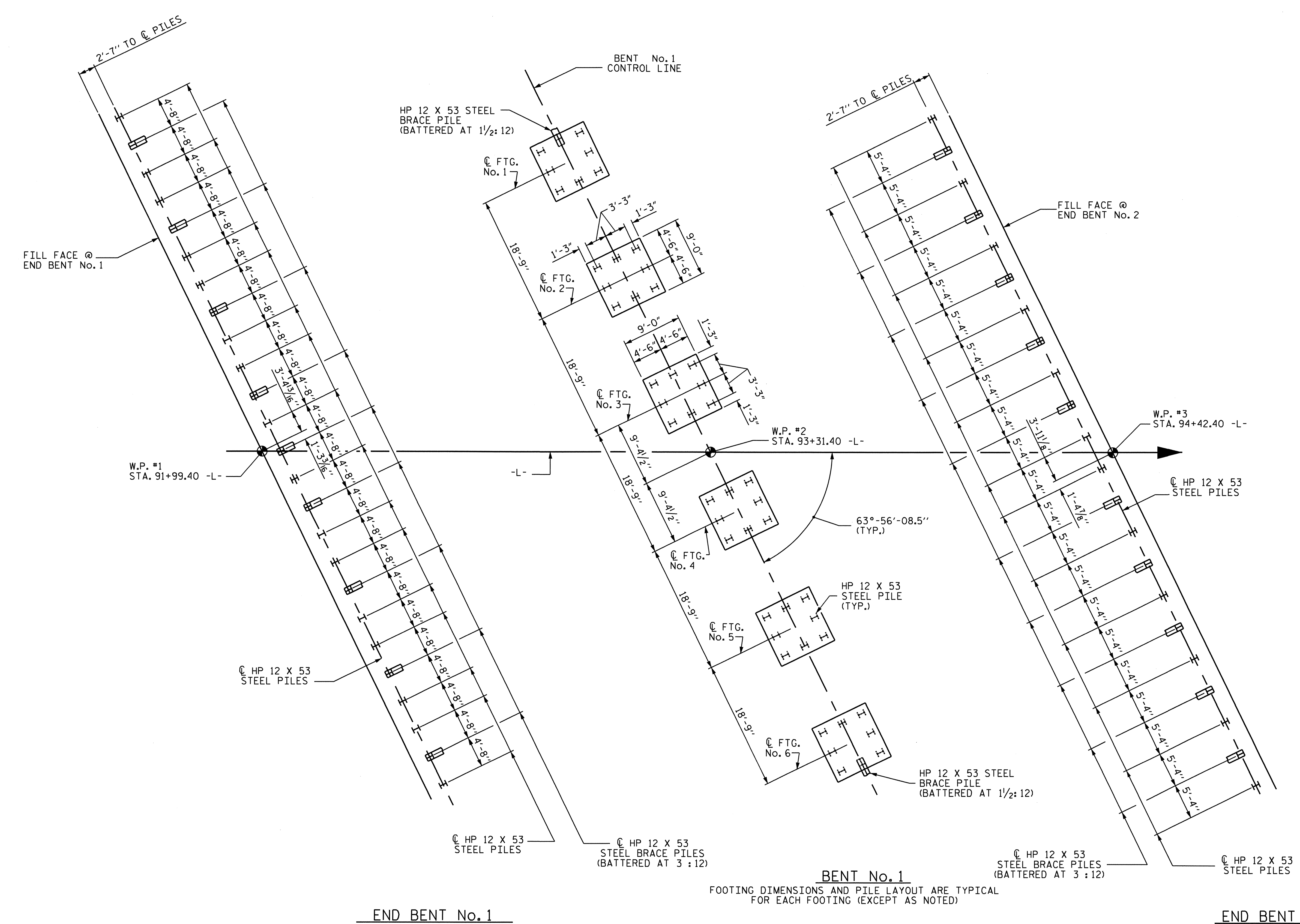
DRIVE PILES AT BENT No.1 TO A REQUIRED BEARING CAPACITY OF 120 TONS PER PILE. THE REQUIRED BEARING CAPACITY IS EQUAL TO THE ALLOWABLE BEARING CAPACITY WITH A MINIMUM FACTOR OF SAFETY OF TWO.

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

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 PILES, SEE SPECIAL PROVISIONS.



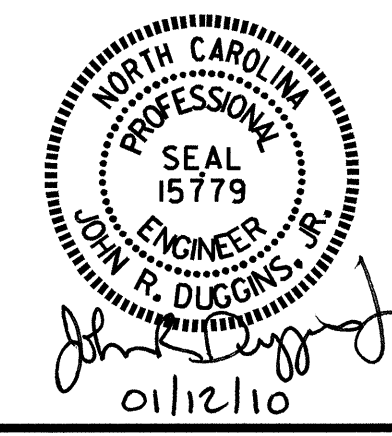
BENT No. 1  
FOOTING DIMENSIONS AND PILE LAYOUT ARE TYPICAL FOR EACH FOOTING (EXCEPT AS NOTED)

FOUNDATION LAYOUT

ALL PILES ARE HP 12 X 53 STEEL PILES  
DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE AT THE BOTTOM OF THE CAP OR FOOTING.

PROJECT NO. R-4430  
HENDERSON COUNTY  
STATION: 93+31.40 -L-

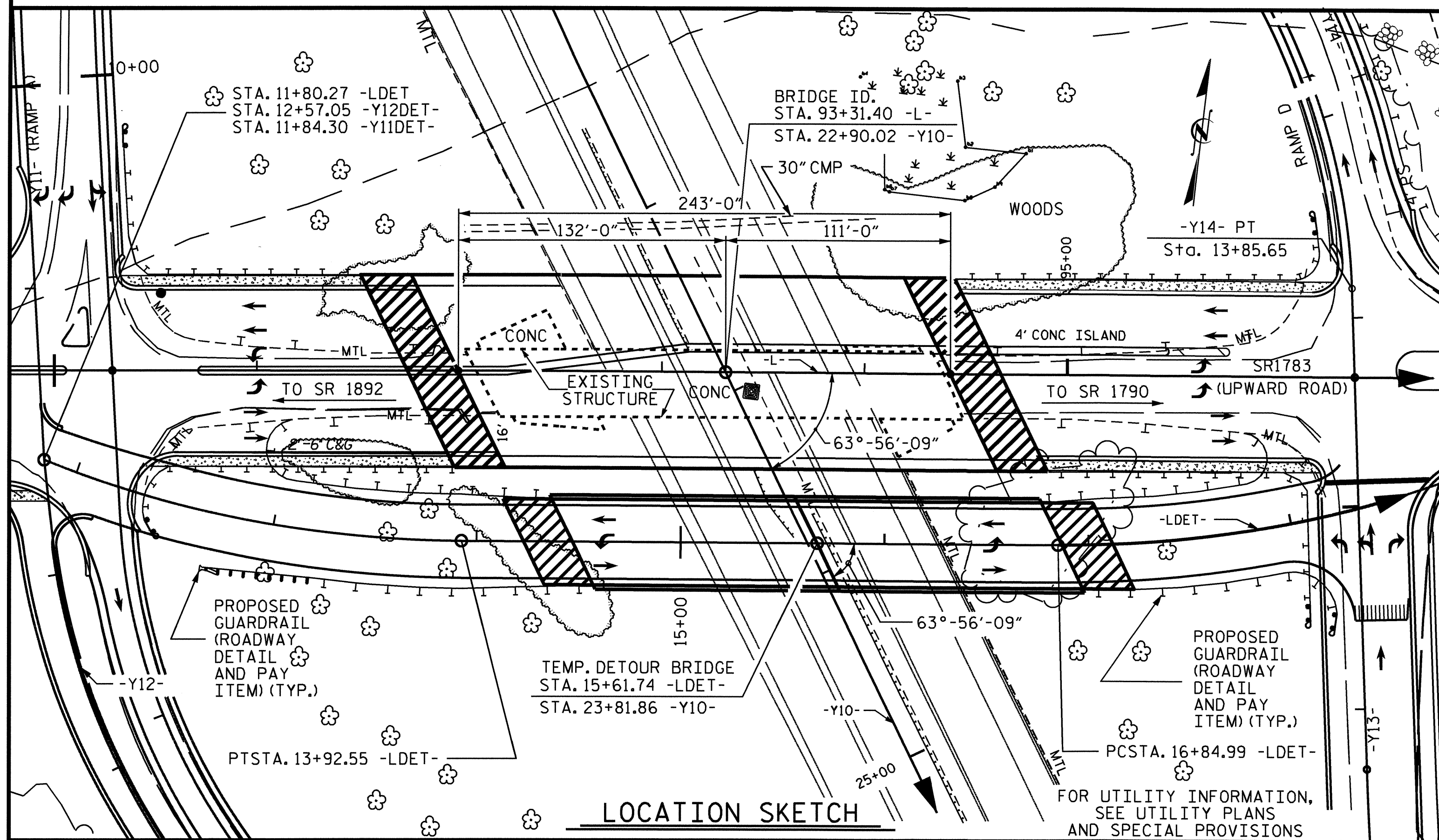
SHEET 2 OF 3  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
GENERAL DRAWING  
BRIDGE ON SR 1783  
(UPWARD ROAD)  
OVER INTERSTATE 26  
BETWEEN SR 1892 AND SR 1790



DRAWN BY: M. POOLE DATE: 09/08  
CHECKED BY: D. HODGE DATE: 12/08

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38	
1			3			TOTAL SHEETS	
2			4			71	





NOTES

ASSUMED LIVE LOAD = HS20 OR ALTERNATE LOADING, EXCEPT THAT THE GIRDER HAVE BEEN DESIGNED FOR HS25.

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 THE PLANS.

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

THE EXISTING STRUCTURE CONSISTING OF 4 SPANS (1 SPAN @ 59'-5", 2 @ 63'-8", 1 @ 44'-1") WITH A REINFORCED CONCRETE DECK ON STEEL I-BEAMS SUPERSTRUCTURE AND A CLEAR ROADWAY OF 28'-0" ON A SUBSTRUCTURE CONSISTING OF END BENTS ON CONCRETE CAPS WITH STEEL H-PILES AND BENTS CONSISTING OF REINFORCED CONCRETE CAP AND COLUMNS WITH FOOTING ON STEEL H-PILES AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED.

THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STATION 15+61.74 -LDET- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA (SEE SHEET 1 OF 3) SHALL BE EXCAVATED FOR A DISTANCE OF 75 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION.

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

THE 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 ARTICLE 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 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.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWING: FOR PROJECT 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 SPICES WITH REPLACEMENTS 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 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 AT STATION 93+31.40 -L-.'

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

THE BRIDGE RAILS ON THE TEMPORARY STRUCTURE SHALL BE DESIGNED FOR THE AASHTO LRFD TEST LEVEL 3 (TL-3) CRASH TEST CRITERIA. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

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

FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

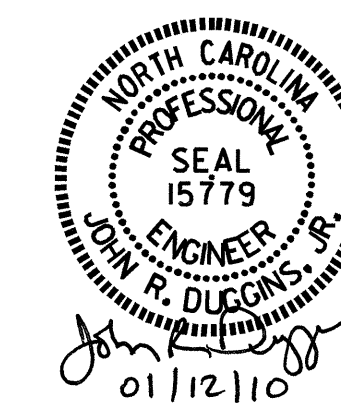
	CONSTRUCTION, MAINTENANCE & REMOVAL OF TEMPORARY STRUCTURE	REMOVAL OF EXISTING STRUCTURE	FOUNDATION EXCAVATION FOR BENT	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	STRUCTURAL STEEL	HP 12 X 53 STEEL PILES	3 BAR METAL RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EVAZOTE JOINT SEALS	
	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	SO. FT.	SO. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	APPROX. LBS.	NO.	LIN. FT.	LIN. FT.	SO. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE		LUMP SUM			23,487	21,210		LUMP SUM			1,046,700		465.07		LUMP SUM	LUMP SUM	
END BENT NO. 1							86.1		11,687			25	1565		680		
BENT NO. 1			LUMP SUM				163.2		32,475	3070		48	1440				
END BENT NO. 2							82.2		11,206			22	1045		570		
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	23,487	21,210	331.5	LUMP SUM	55,368	3070	1,046,700	95	4050	465.07	1250	LUMP SUM	LUMP SUM

PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 93+31.40-L-

SHEET 3 OF 3

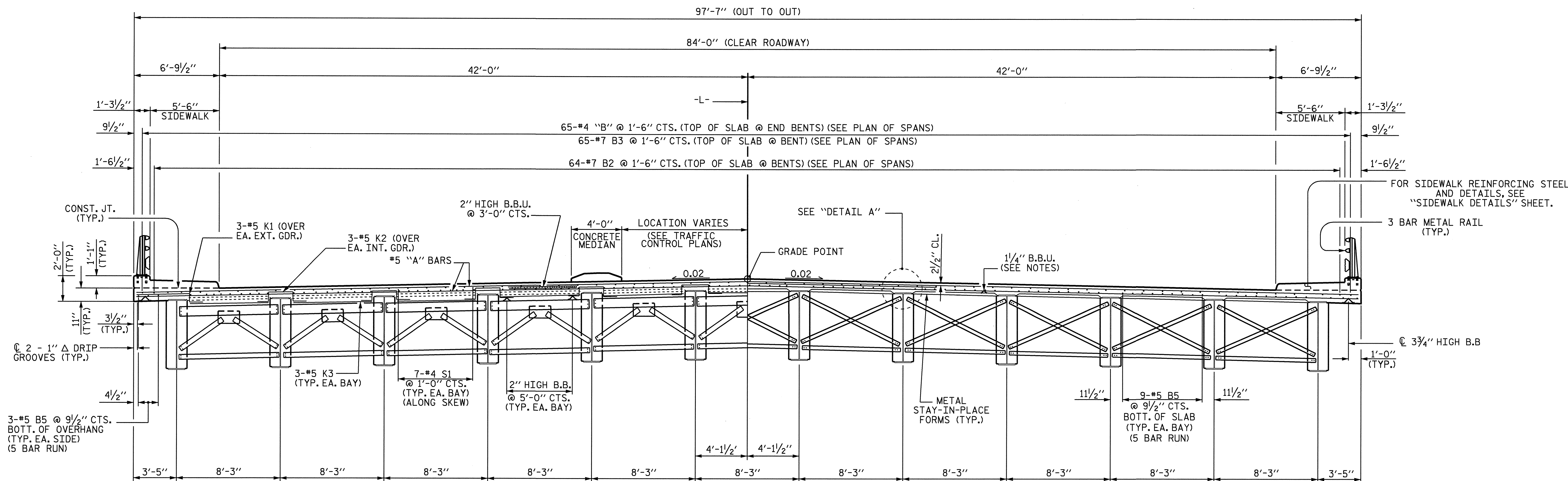
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 FOR BRIDGE ON SR 1783  
 (UPWARD ROAD)  
 OVER INTERSTATE 26  
 BETWEEN SR 1892 SR 1790



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			9-39
2			4			TOTAL SHEETS 71

DRAWN BY: A.L. FIGUEROA DATE: 12-18-08  
 CHECKED BY: J.R. DUGGINS DATE: 12-18-08



TYPICAL HALF SECTION  
SHOWING END BENT DIAPHRAGM

TYPICAL HALF SECTION  
SHOWING INTERMEDIATE AND BENT DIAPHRAGM

NOTES

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

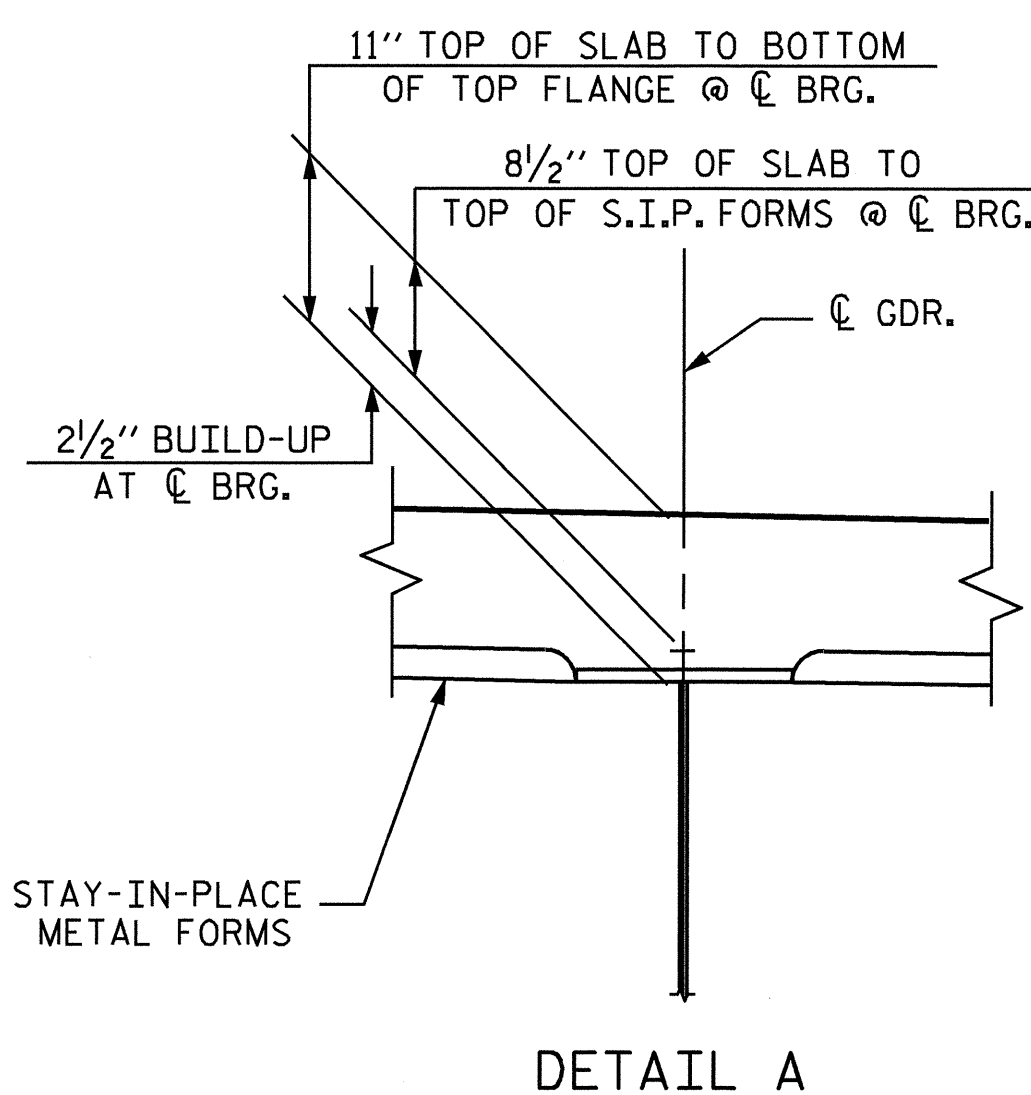
METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

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

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

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.

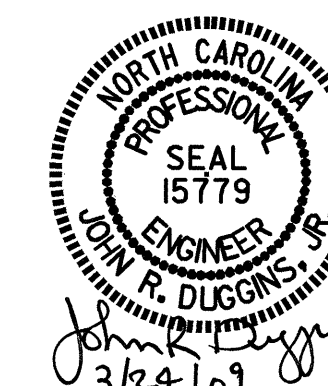
SIDEWALK AND CONCRETE MEDIAN IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.



DETAIL A

DRAWN BY : M. POOLE DATE : 07-08  
CHECKED BY : D. HODGE DATE : 11-08

20-MAR-2009 15:23  
r:\structures\4430\str2\moodle\4430.ed.TS.02.dgn  
dahodge



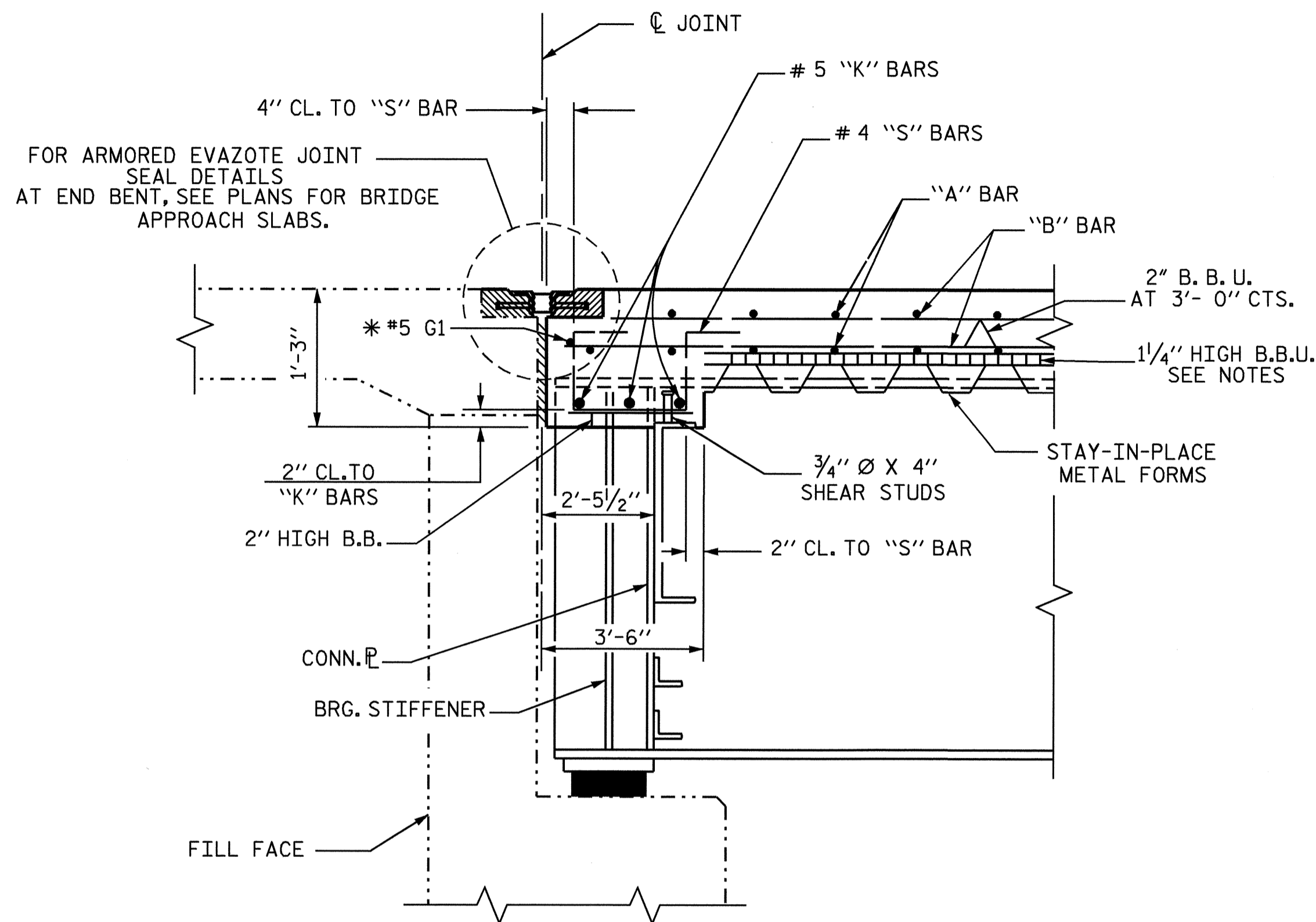
PROJECT NO. R-4430  
HENDERSON COUNTY  
STATION: 93+31.40 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

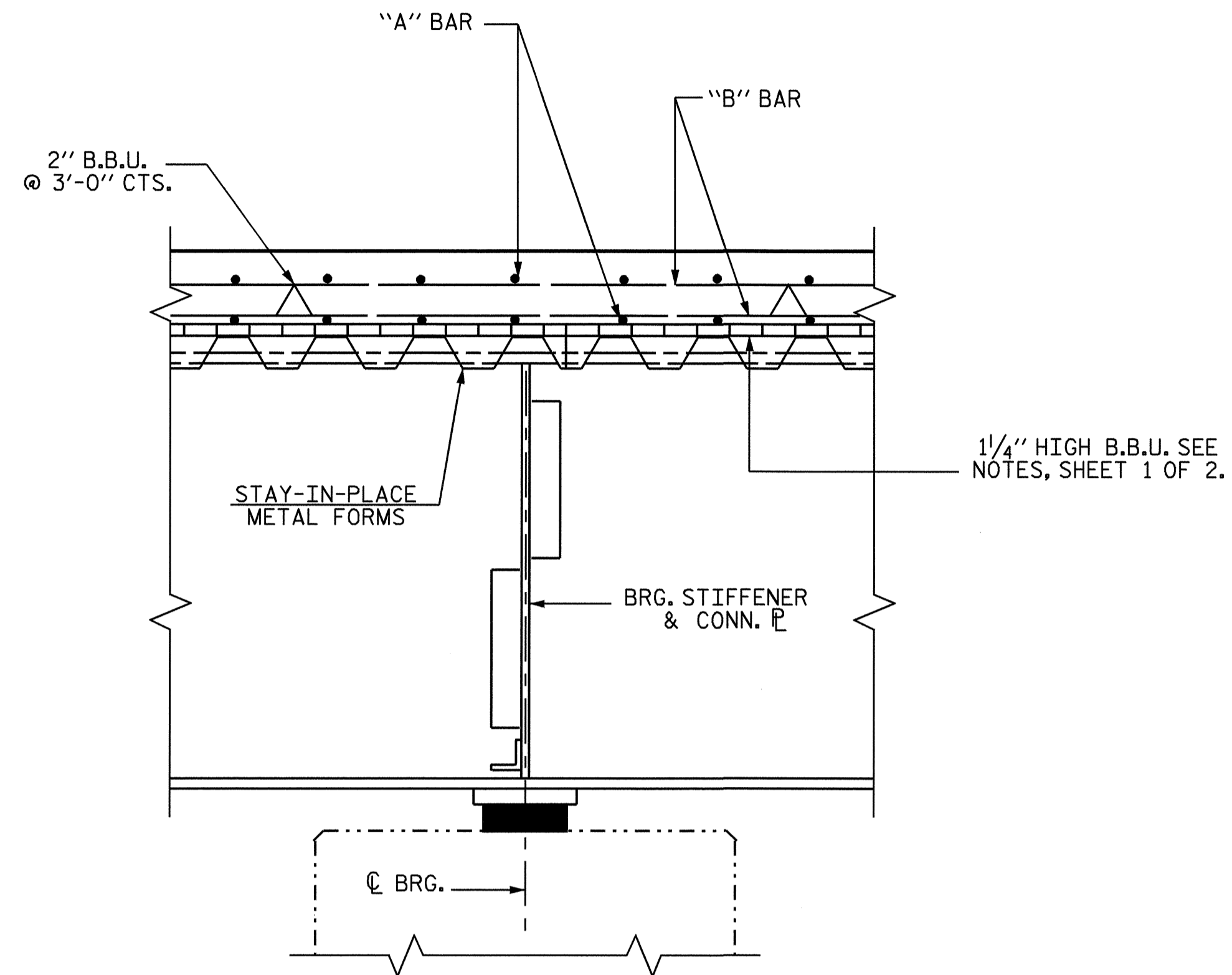
SUPERSTRUCTURE  
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-40
2			4			71



**SECTION THRU END BENT**

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



**SECTION THRU BENT**

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 TYPICAL SECTION



DRAWN BY: M. POOLE DATE: 07-08  
 CHECKED BY: D. HODGE DATE: 11-08

20-MAR-2009 15:23  
 r:\structures\4430\str2\m\poole\R4430.sd.TS.02.dgn  
 dahodge

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			91
2			4			71

#5 A101 THRU A111 @ 6 1/2" CTS.  
(3 BARS PER MARK) (TOP OF SLAB) (2 BAR RUNS)  
#5 A201 THRU A211 @ 6 1/2" CTS.  
(3 BARS PER MARK) (BOTTOM OF SLAB) (2 BAR RUNS)

#5 A112 THRU A128 @ 6 1/2" CTS.  
(3 BARS PER MARK)  
(TOP OF SLAB)

#5 A212 THRU A228 @ 6 1/2" CTS.  
(3 BARS PER MARK)  
(BOTTOM OF SLAB)

#5 A128 OR  
#5 A228

357-#5 A1 @ 6 1/2" CTS.  
(2 BAR RUN) (TOP OF SLAB)  
357-#5 A2 @ 6 1/2" CTS.  
(2 BAR RUN) (BOTTOM OF SLAB)

5'-3" SPLICE

5'-3" SPLICE

3-#5 K1  
(TYP. EA. EXT. GDR.)

3-#5 K2  
(TYP. EA. INT. GDR.)

© JOINT @  
END BENT No. 1

3-#5 K3  
(TYP. EA. BAY)

FILL FACE @  
END BENT No. 1

W.P.#1

SEE "DETAIL A"

#5 A112 OR  
#5 A212

#5 A101 OR  
#5 A201

#5 A111 OR  
#5 A211

#5 A1 OR  
#5 A2

#5 G1

25'-3 5/16"  
TO A1 OR A2

7-#4 S1  
@ 1'-0" CTS.  
ALONG SKEW  
(TYP. EA. BAY)

GUTTERLINE

4 1/2" 3-#5 B5 @ 9 1/2" CTS.  
BOTT. OF OVERHANG  
(TYP. EA. SIDE) (5 BAR RUNS)

132'-0" (W.P. 1 TO W.P. #2)

243'-0" FILL FACE TO FILL FACE

SPAN A

PARTIAL PLAN OF SPANS

FOR REINFORCING STEEL IN SIDEWALK, SEE "SIDEWALK DETAILS" SHEET.  
TRANSVERSE CONSTRUCTION JOINT IS PARALLEL TO BENT No. 1 CONTROL LINE.

SPAN B

46'-9"

53'-3"

36'-9"

43'-3"

5'-3" SPLICE

1'-6 1/2"

9 1/2"

9 1/2"

1'-3 1/2"

5'-6" SIDEWALK

6'-9 1/2"

© GDR. 1

© GDR. 2

© GDR. 3

© GDR. 4

© GDR. 5

© GDR. 6

© GDR. 7

© GDR. 8

© GDR. 9

© GDR. 10

© GDR. 11

© GDR. 12

42'-0"

42'-0"

5'-6" SIDEWALK

1'-3 1/2"

6'-9 1/2"

84'-0" (CLEAR ROADWAY)

97'-7" (OUT TO OUT)

FILL FACE @  
END BENT No. 1

W.P.#1

© JOINT @  
END BENT No. 1

6 1/8"

1'-1 15/16"

DETAIL A

TRANSVERSE CONSTRUCTION JOINT DETAIL

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

DRAWN BY: M. POOLE DATE: 07-08  
CHECKED BY: D. HODGE DATE: 11-08

24-MAR-2009 08:18  
r:\structure\es\4430\str2\m\poole\R4430\_sd.s.02.dgn  
dahodge

PROJECT NO. R-4430

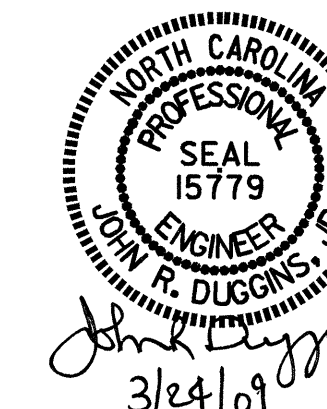
HENDERSON COUNTY

STATION: 93+31.40 -L-

SHEET 1 OF 2

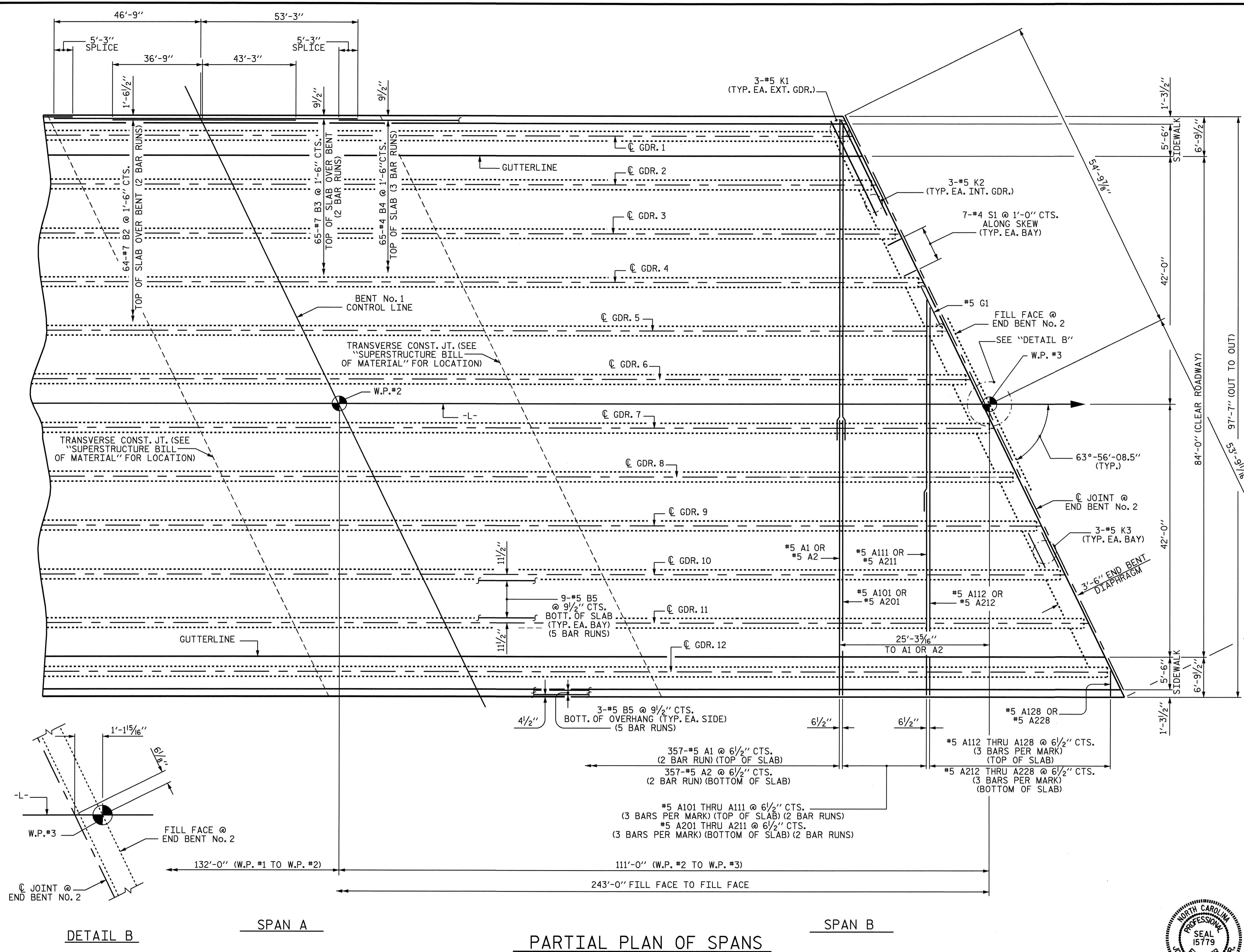
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
PLAN OF SPANS



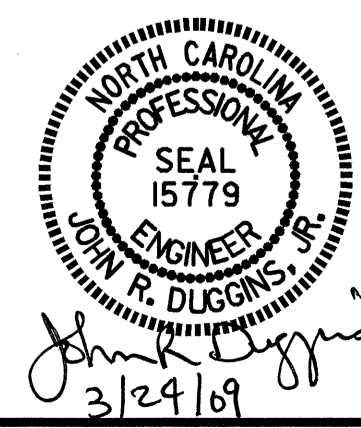
REVISIONS						SHEET NO. S-42
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 11
2			4			

STR. #2



PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 2 OF 2  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 PLAN OF SPANS

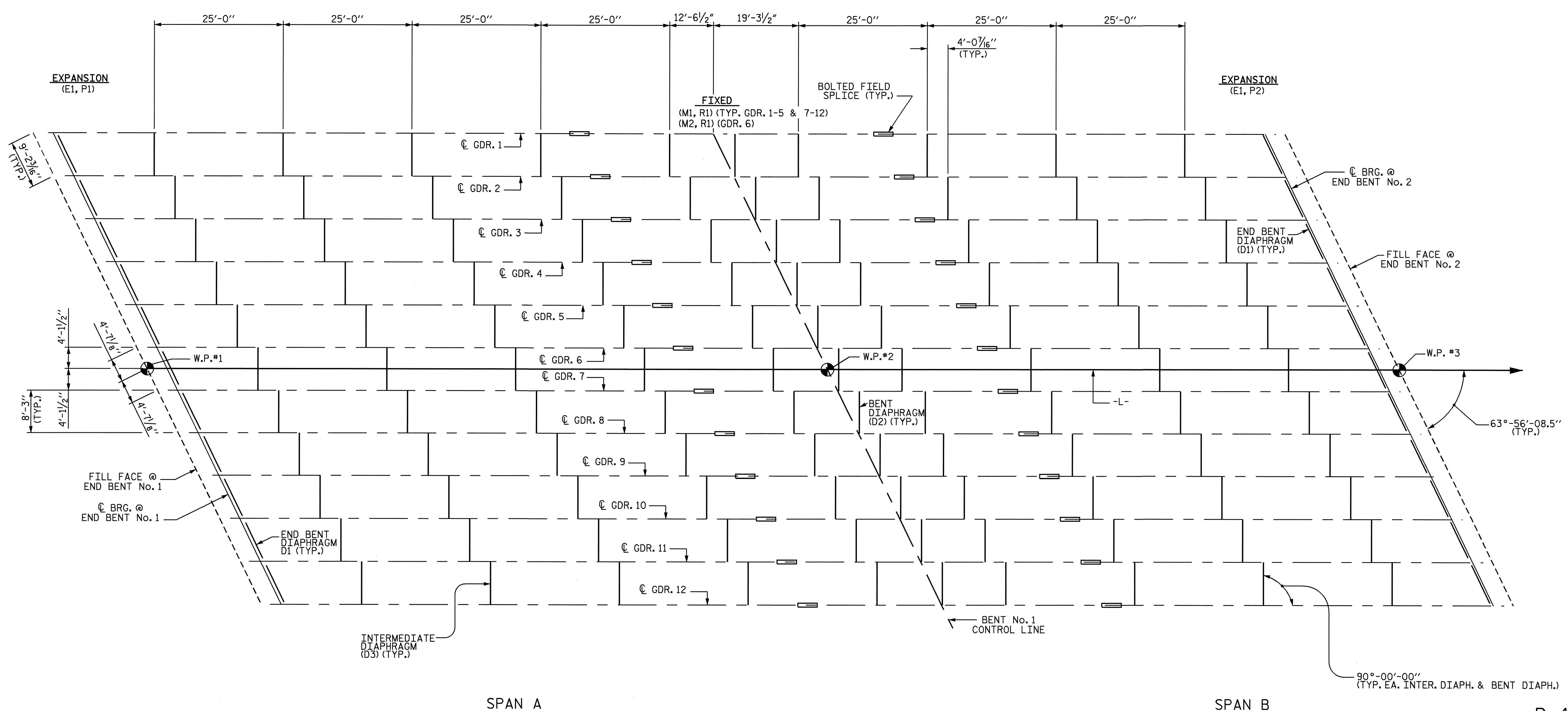


DRAWN BY: M. POOLE DATE: 07-08  
 CHECKED BY: D. HODGE DATE: 11-08

20-MAR-2009 15:22  
 I:\structures\4430\str2\m\poole\R4430.ed.S.02.dgn  
 dhodge

FOR REINFORCING STEEL IN SIDEWALK, SEE "SIDEWALK DETAILS" SHEET.  
 TRANSVERSE CONSTRUCTION JOINT IS PARALLEL TO BENT No. 1 CONTROL LINE.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-43
1			3			TOTAL SHEETS
2			4			71

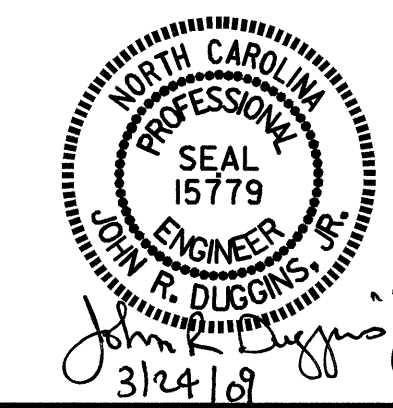


**FRAMING PLAN**

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 93+31.40 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

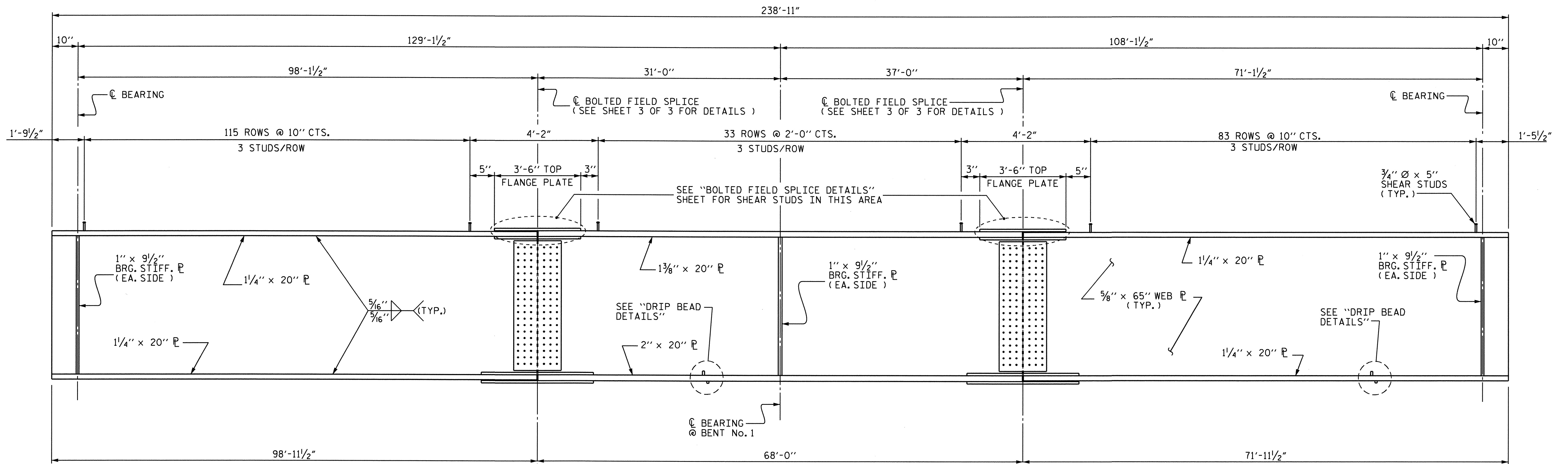
**SUPERSTRUCTURE  
 FRAMING PLAN**



DRAWN BY : M. POOLE DATE : 08/08  
 CHECKED BY : D. HODGE DATE : 11/08

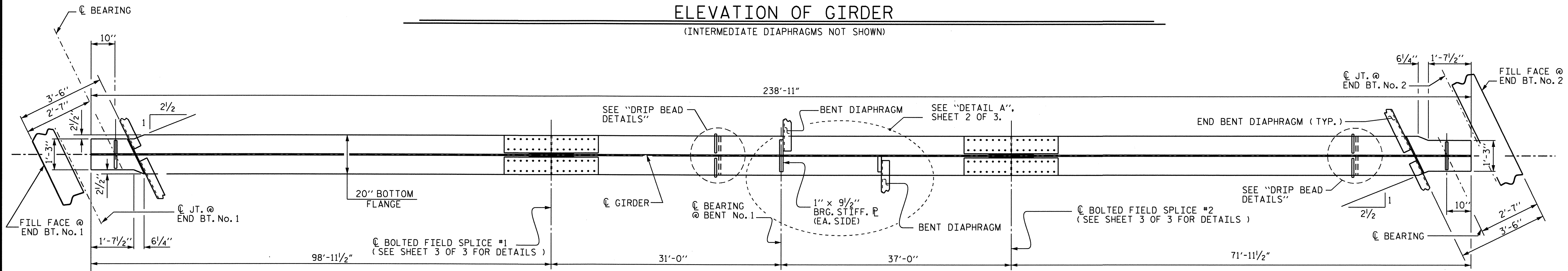
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NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-44
2			4			71

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 dahodge



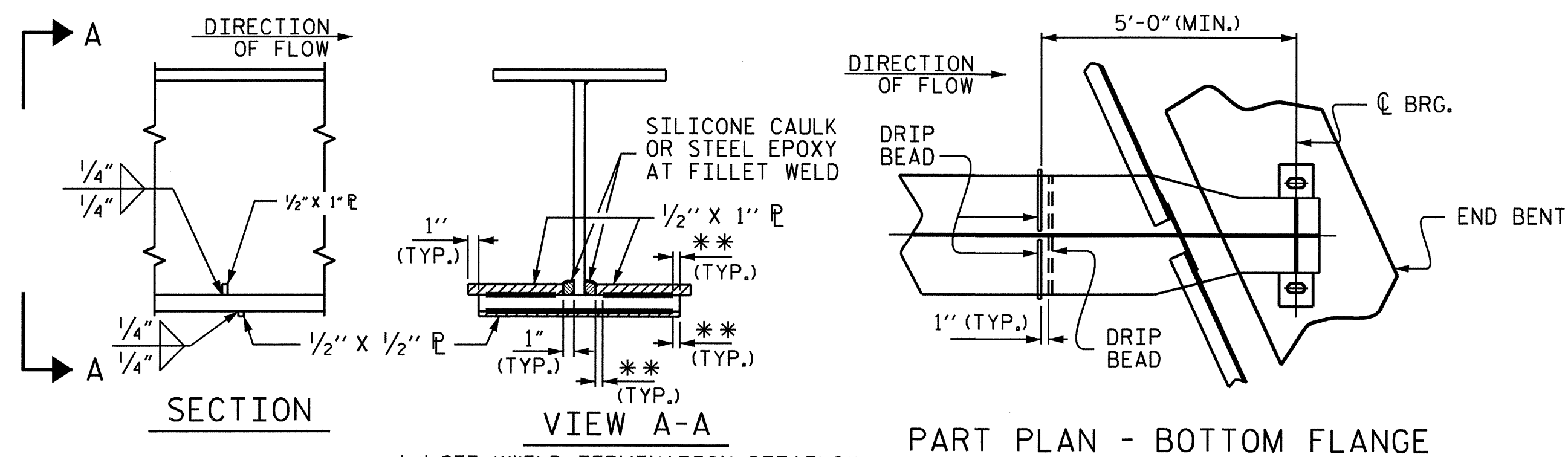
**ELEVATION OF GIRDER**

(INTERMEDIATE DIAPHRAGMS NOT SHOWN)

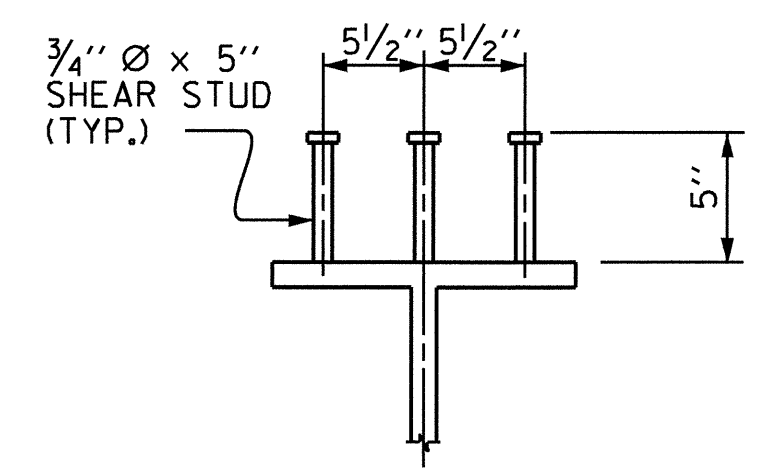


**BOTTOM FLANGE DETAIL**

(INTERMEDIATE DIAPHRAGMS NOT SHOWN)



**DRIP BEAD DETAILS**  
\*\* SEE "WELD TERMINATION DETAILS"



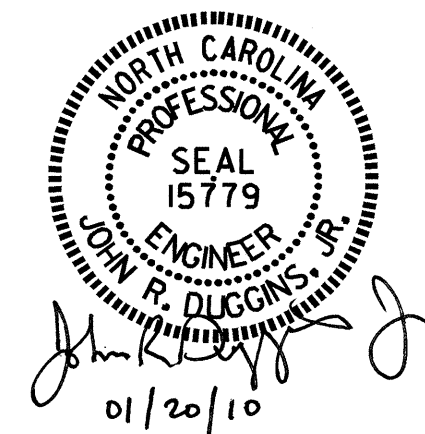
**SHEAR STUD DETAIL**

TYPICAL EXCEPT AT TOP FLANGE SPLICE P  
SEE "BOLTED FIELD SPLICE DETAILS" SHEET  
FOR SHEAR STUDS IN THIS AREA

PROJECT NO. R-4430  
HENDERSON COUNTY  
STATION: 93+31.40 -L-

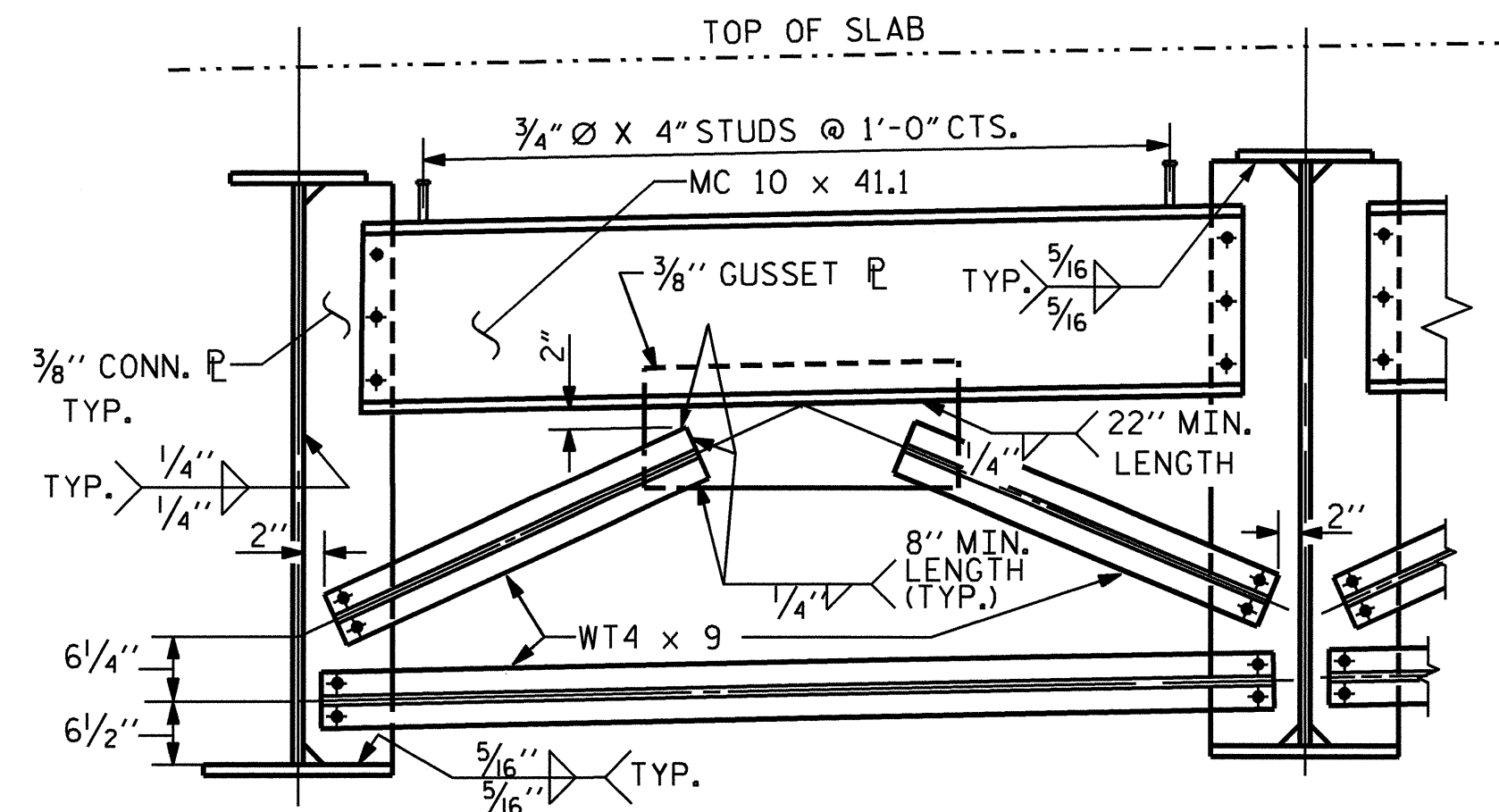
SHEET 1 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE STRUCTURAL STEEL DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-45					TOTAL SHEETS 71

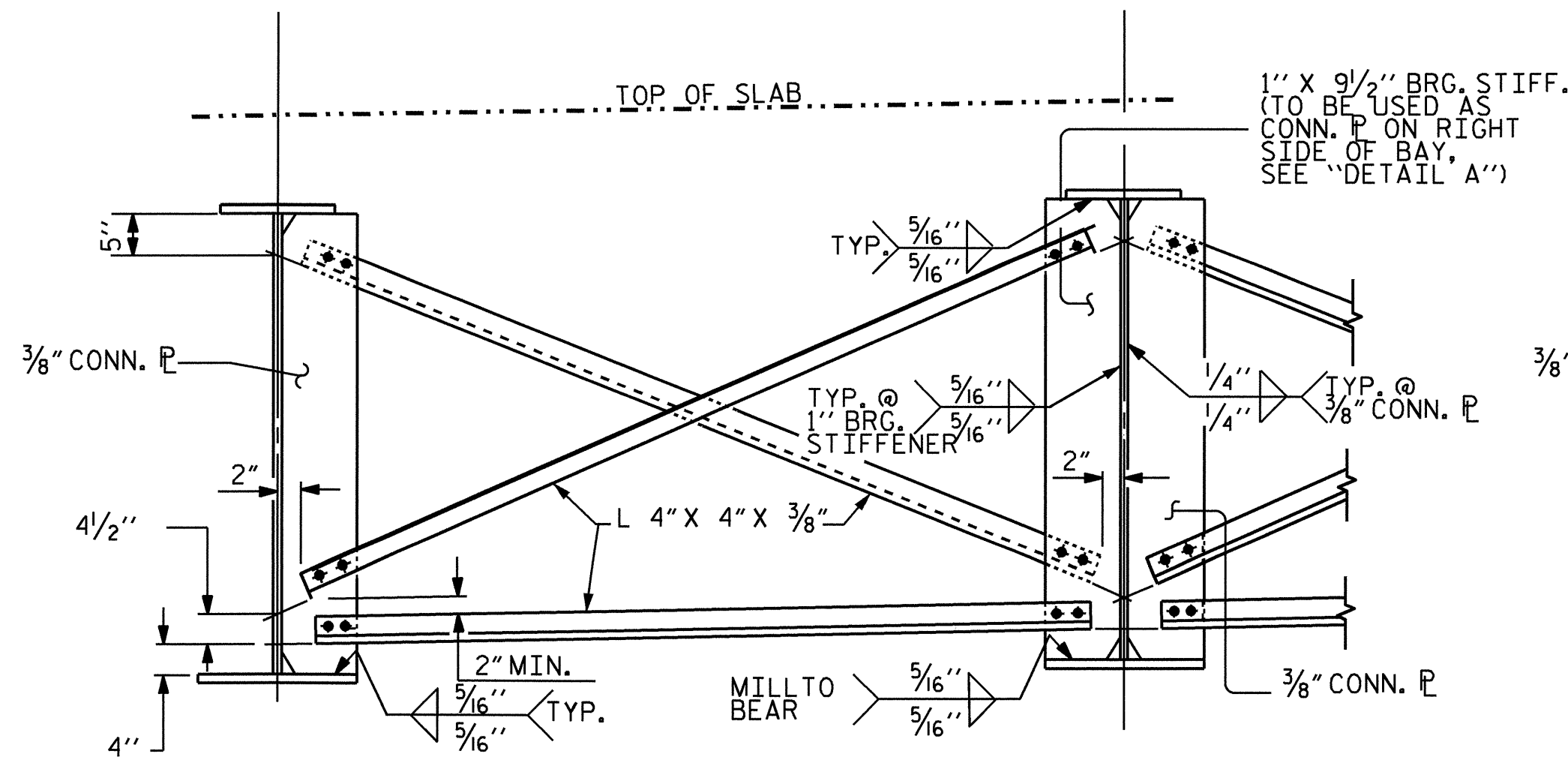


DRAWN BY: M. POOLE DATE: 8-08  
CHECKED BY: D. HODGE DATE: 12/08

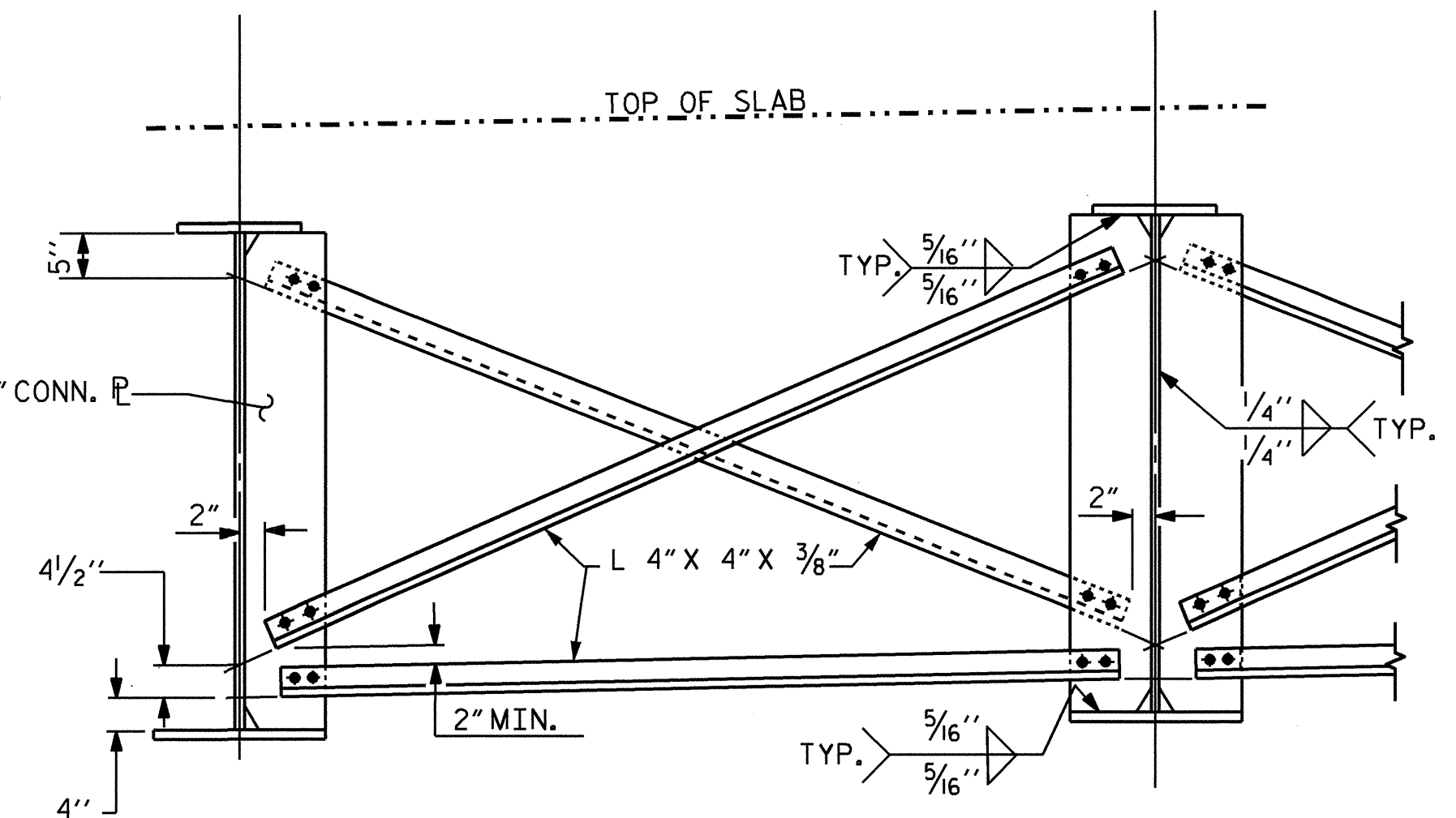
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dahodge



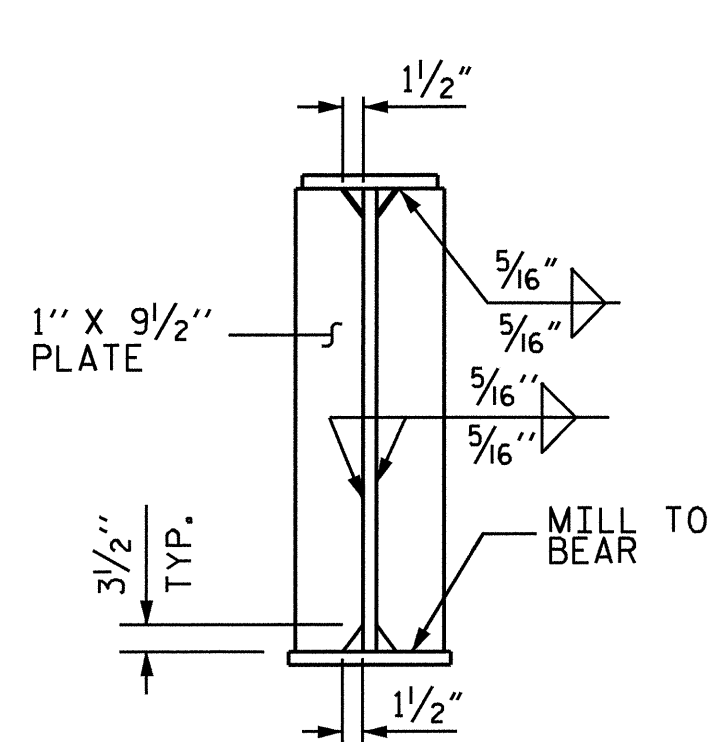
TYPICAL END BENT DIAPHRAGM (D1)



TYPICAL BENT DIAPHRAGM (D2)

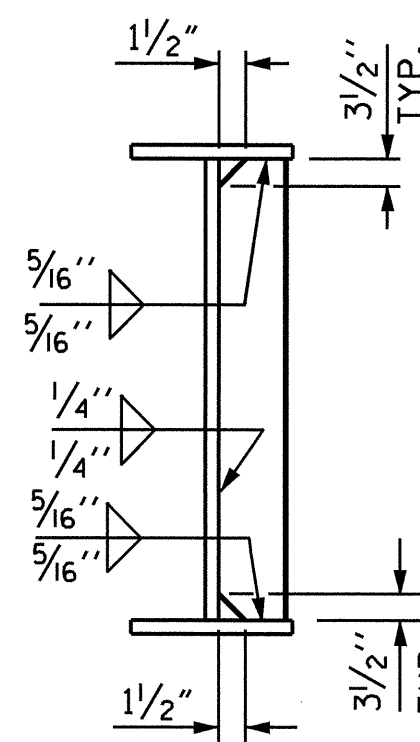


TYPICAL INTERMEDIATE DIAPHRAGM (D3)

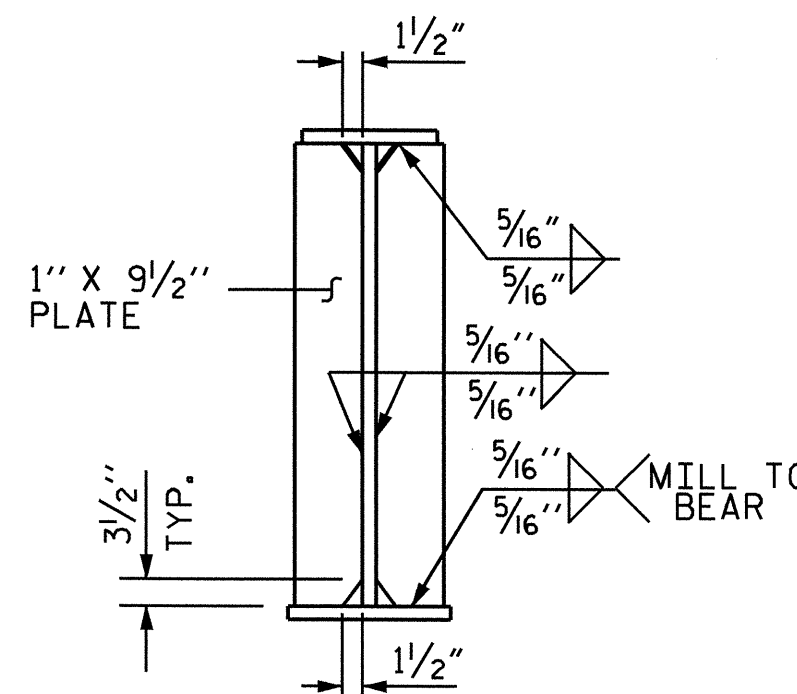


BEARING STIFFENER

(END BENT No. 1 & No. 2)

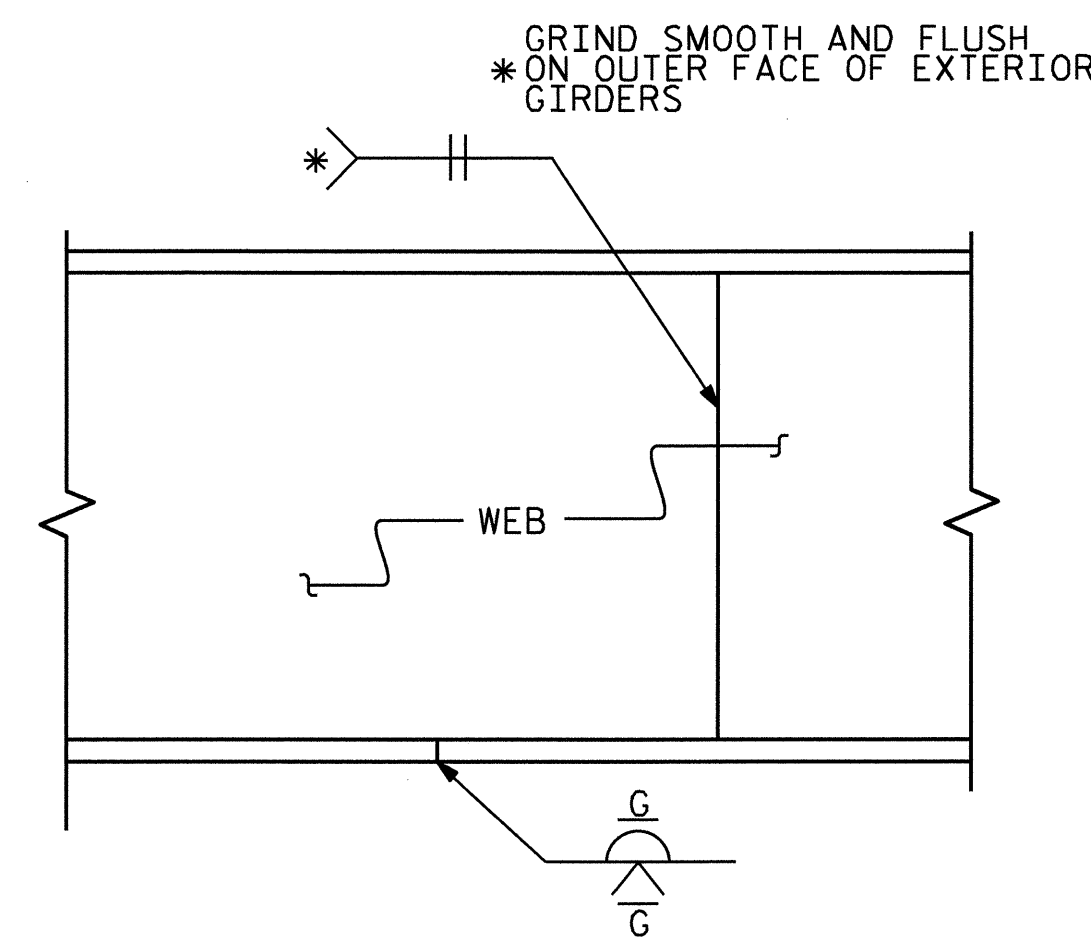


CONNECTOR P



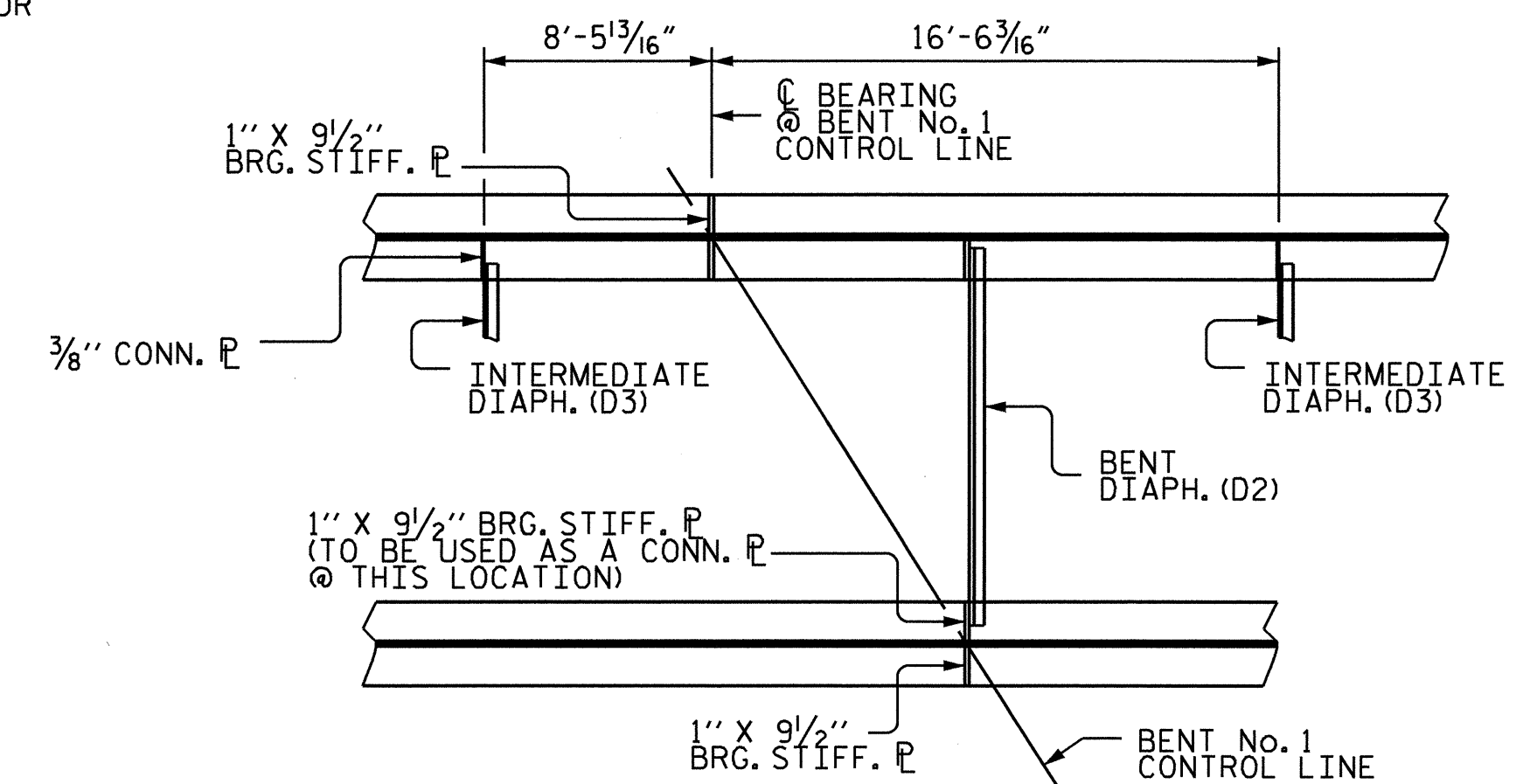
BEARING STIFFENER

(BENT No. 1)

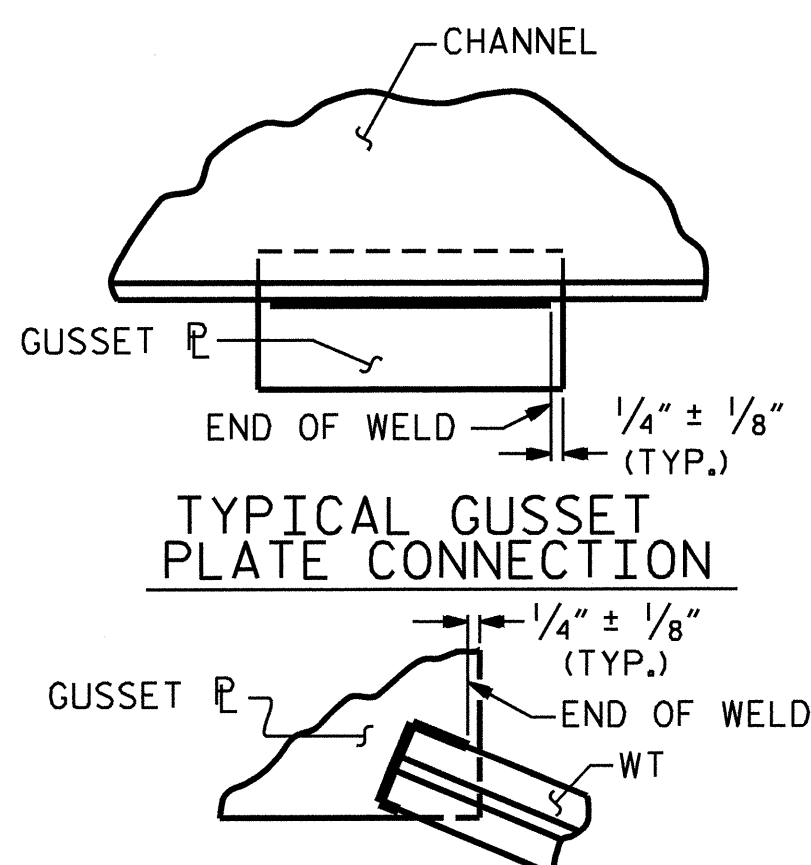


ELEVATION

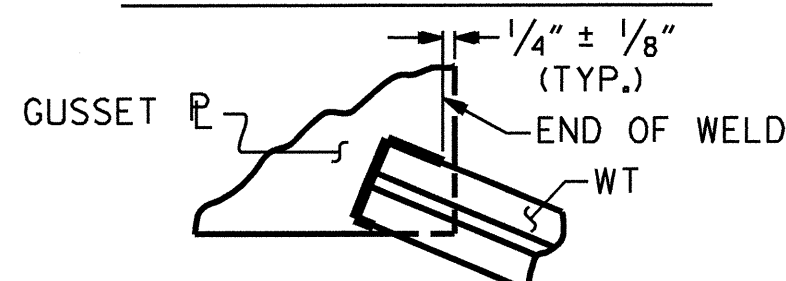
TYPICAL FLANGE AND WEB BUTT JOINT



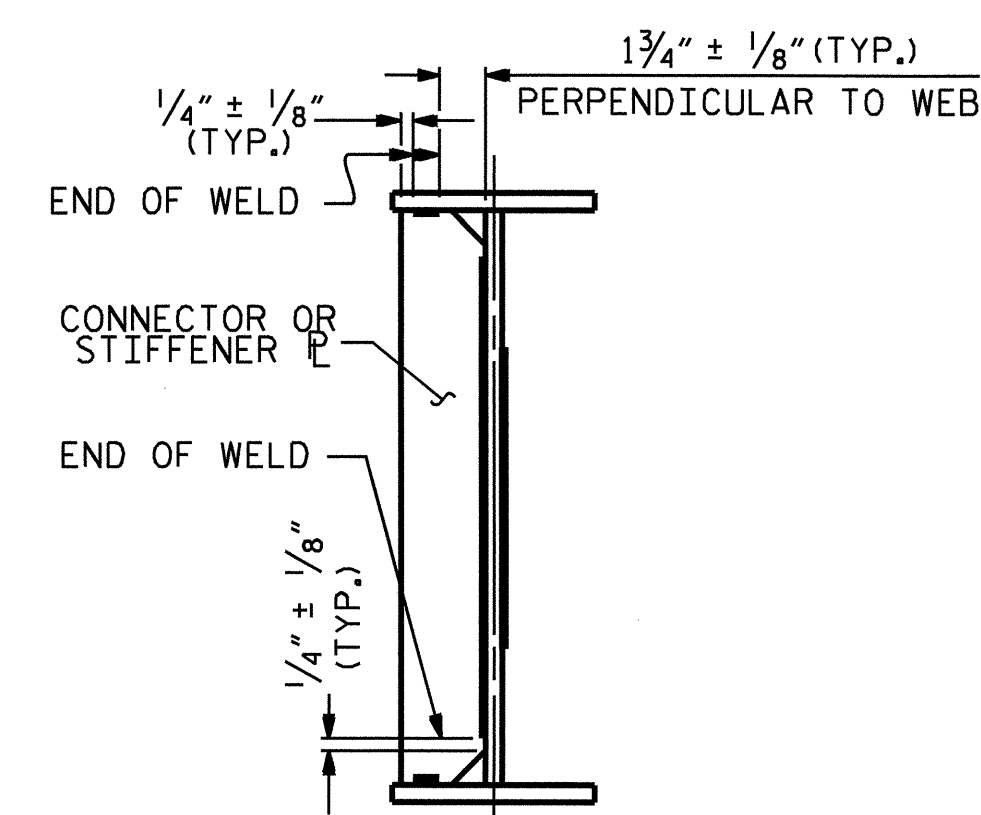
DETAIL A  
(TYP. EA. BAY)



TYPICAL GUSSET PLATE CONNECTION

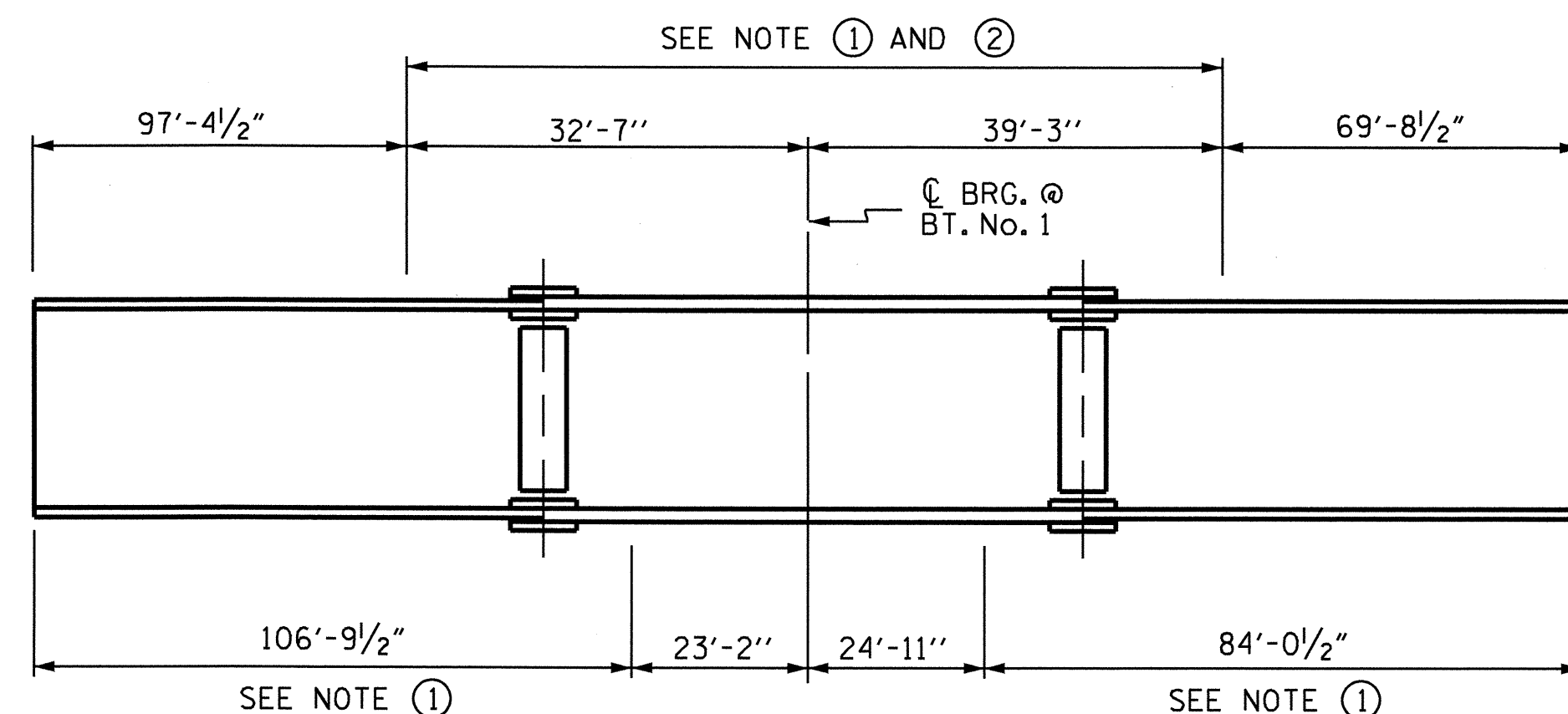


TYPICAL "TEE" TO GUSSET PLATE CONNECTION



TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS

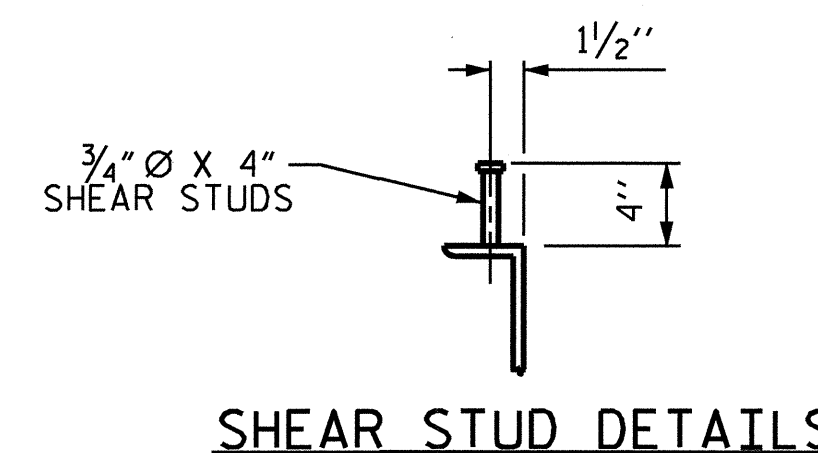
WELD TERMINATION DETAILS



NOTE ①: CHARPY V-NOTCH TESTS ARE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATES WHICH FALL WITHIN THESE LIMITS, ALL WEB PLATES, AND ALL SPLICE PLATES. IF A PERMITTED SHOP FLANGE SPLICE IS NOT USED, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE FLANGE PLATE. FOR CHARPY V-NOTCH TESTS, SEE ARTICLE 1072-9 OF THE STANDARD SPECIFICATIONS.

NOTE ②: NO WELDING OF FORMS OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTED IN THIS REGION

CHARPY V-NOTCH TESTS FOR CONTINUOUS PLATE GIRDERS



SHEAR STUD DETAILS

DRAWN BY: M. POOLE DATE: 08-08  
CHECKED BY: D. HODGE DATE: 11-08

20-JAN-2010 14:35  
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PROJECT NO. R-4430  
HENDERSON COUNTY  
STATION: 93+31.40 -L-

SHEET 2 OF 3

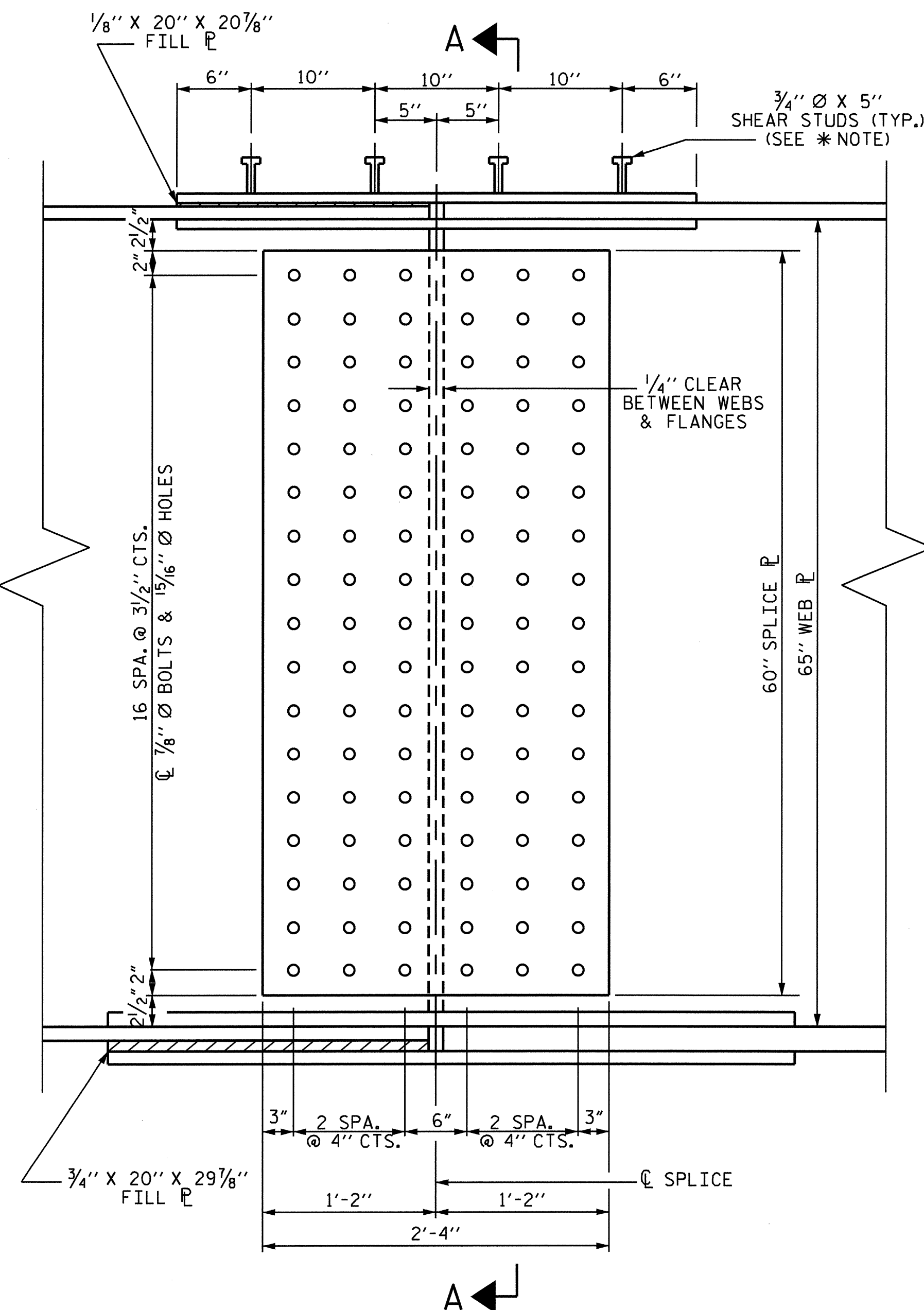
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUPERSTRUCTURE  
STRUCTURAL STEEL  
DETAILS



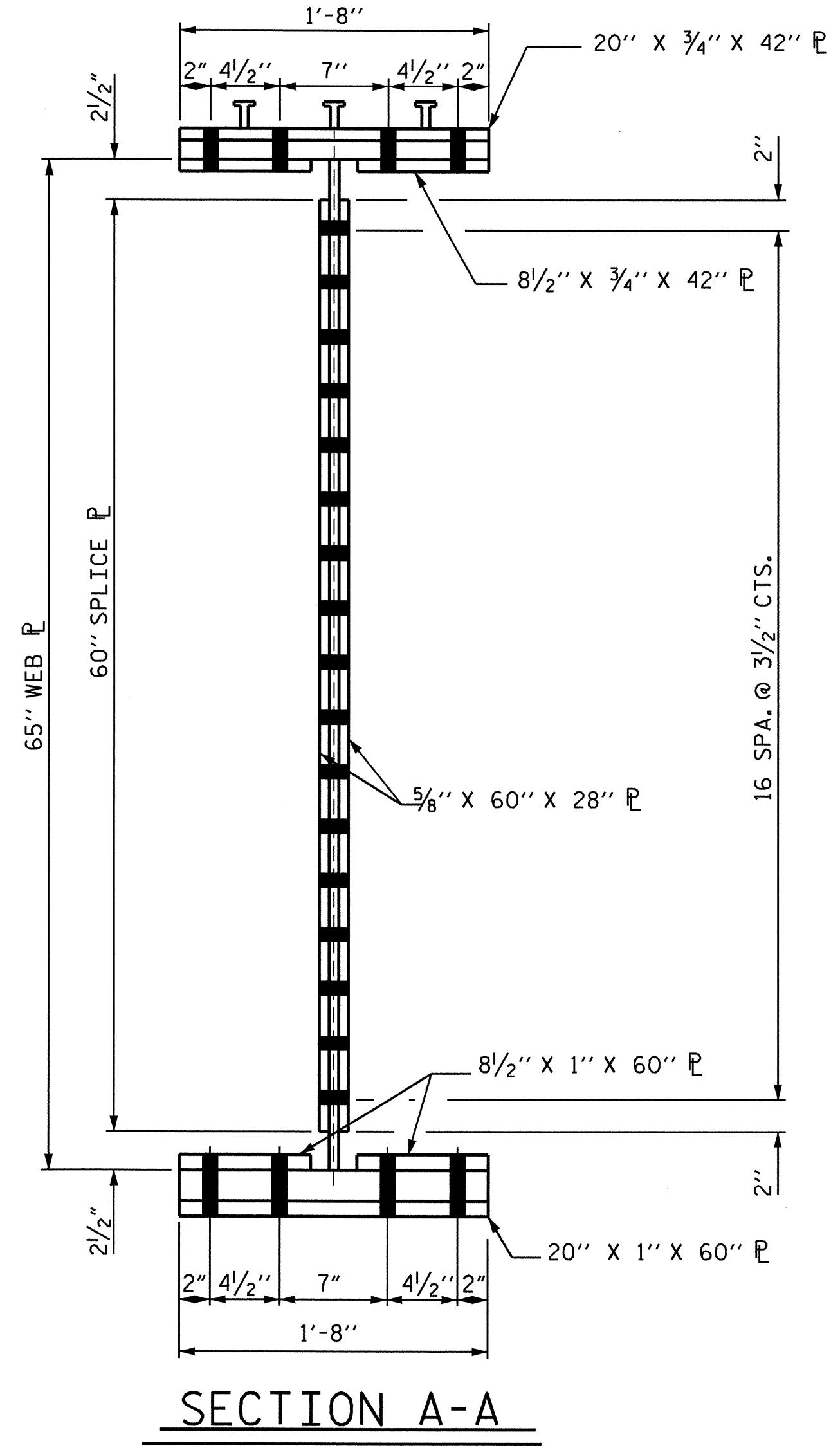
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-46	
1			3			TOTAL SHEETS	
2			4			71	





**ELEVATION**

\* NOTE: SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY.



**SECTION A-A**

**SHEAR STUD DETAILS**

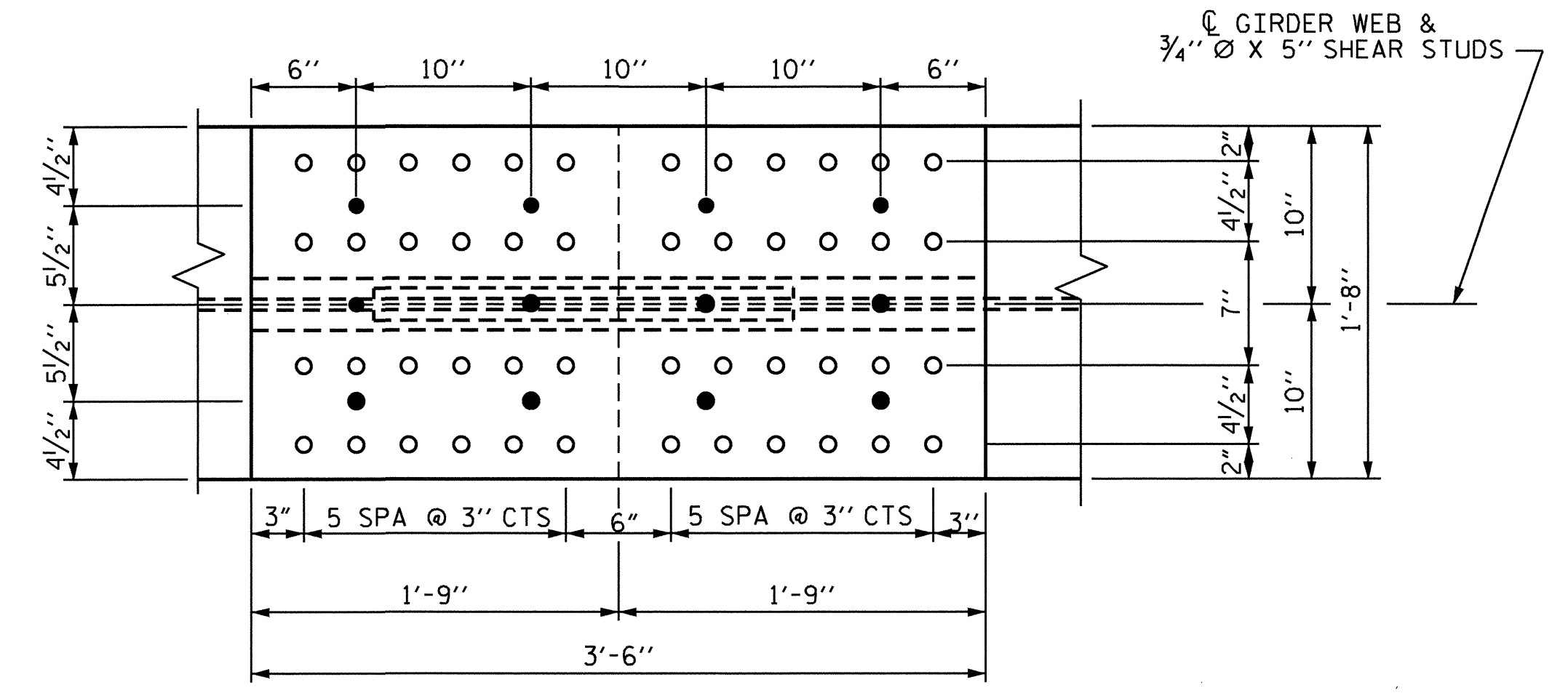
ON TOP FLANGE SPLICE DETAILS

**BOLTED FIELD SPLICE DETAILS**

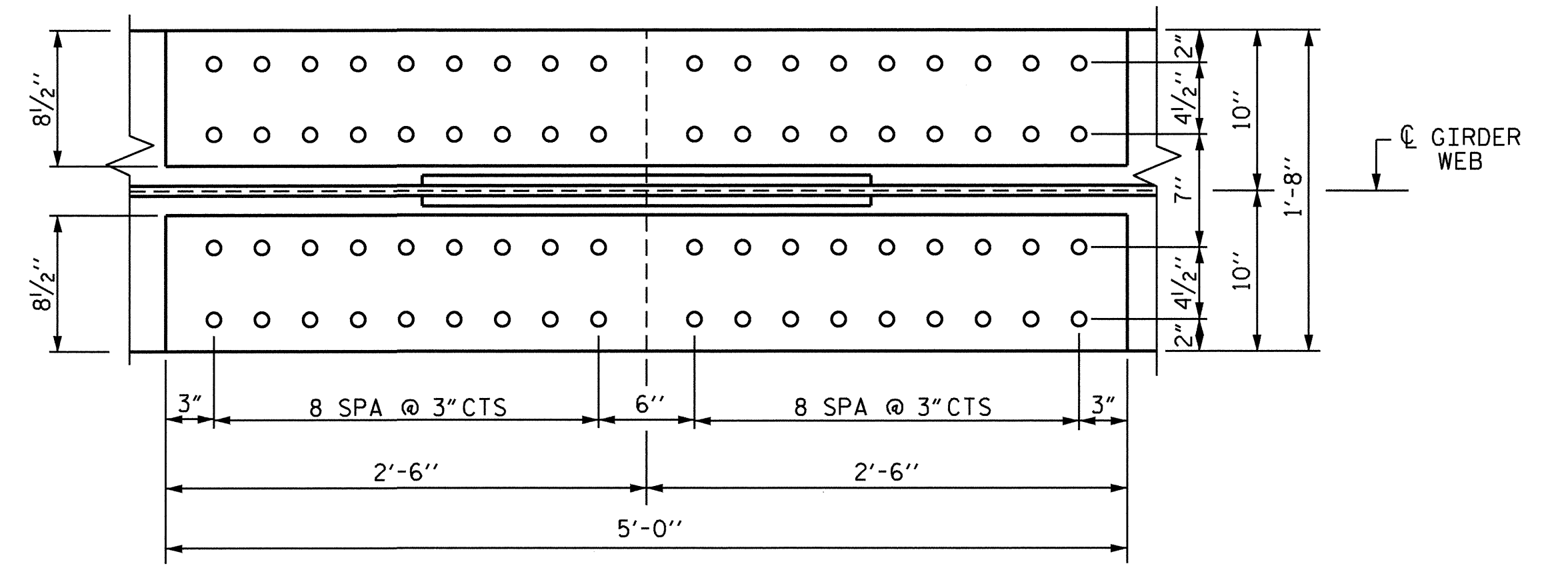
(BOLTED FIELD SPLICE No. 1 SHOWN; BOLTED FIELD SPLICE No. 2 SIMILAR)

**NOTES**

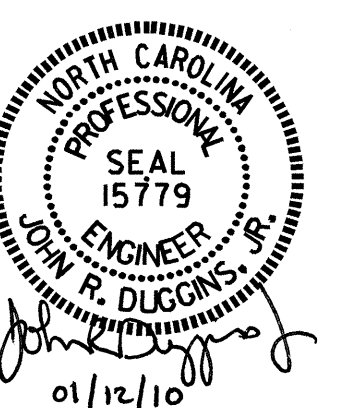
- ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.
- ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.
- ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.
- FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.
- BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.
- AT THE CONTRACTOR'S OPTION, THE DIAPHRAGM WITH WELDED GUSSET PLATES MAY BE USED IN LIEU OF THE DIAPHRAGM WITH BOLTED ANGLES AT NO ADDITIONAL COST TO THE DEPARTMENT.



**PLAN (TOP OF TOP FLANGE)**



**PLAN (TOP OF BOTTOM FLANGE)**



PROJECT NO. B-4430  
HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
**BOLTED FIELD SPLICE No. 1**  
 (SPLICE No. 2 SIMILAR)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-47
2			4			TOTAL SHEETS 71

DRAWN BY: M. POOLE DATE: 08-08  
 CHECKED BY: D. HODGE DATE: 11-08

12-JAN-2010 10:27  
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NOTES

AT 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 & BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

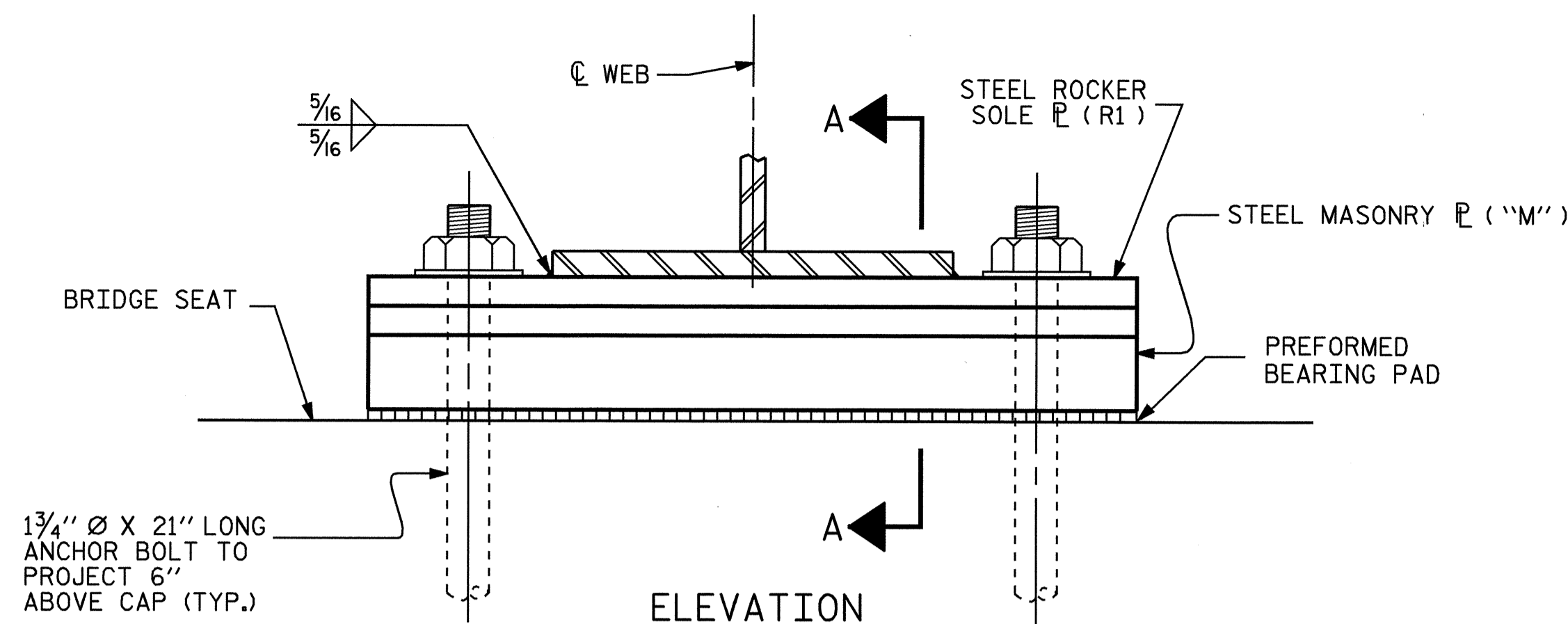
ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 50W.

ON PLATES TO BE PAINTED, ALL SHARP EDGES AND ENDS OF PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16" OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE.

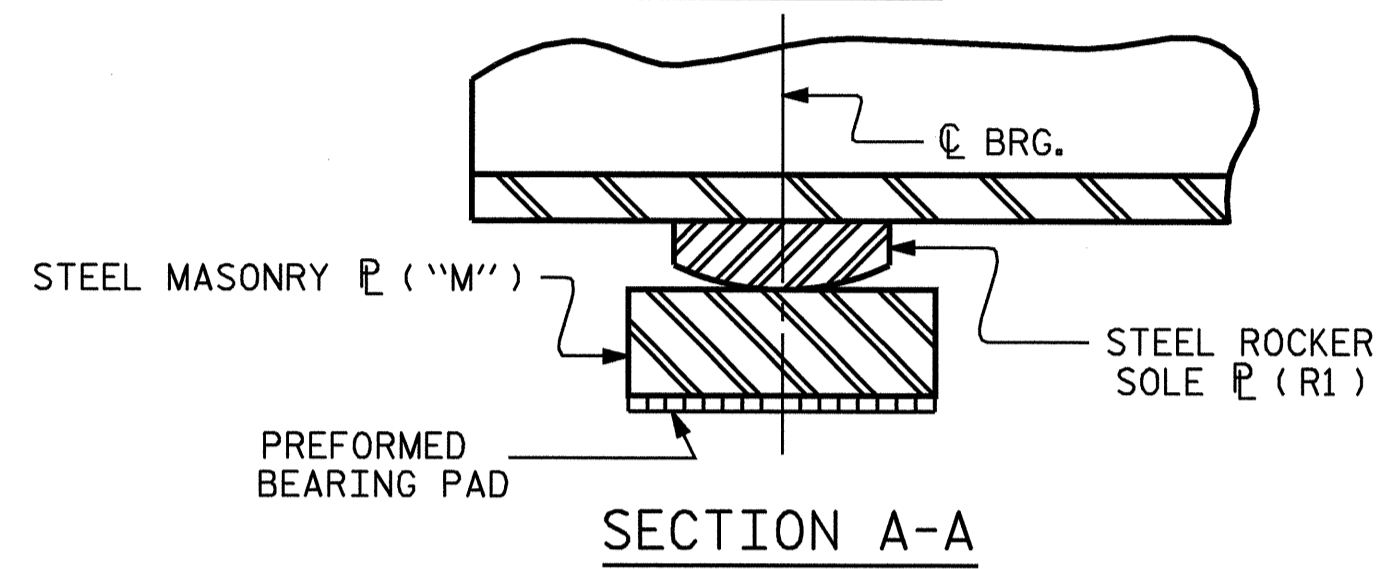
CAMBERED GIRDER LENGTHS SHALL BE ADJUSTED AND BEARINGS ARE TO BE PLACED ON THE CAMBERED GIRDER SO AS TO BE ALIGNED WITH THE ANCHORS AFTER THE DEAD LOAD DEFLECTION HAS OCCURRED. SHOP PLANS SHALL BE PREPARED ACCORDINGLY.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

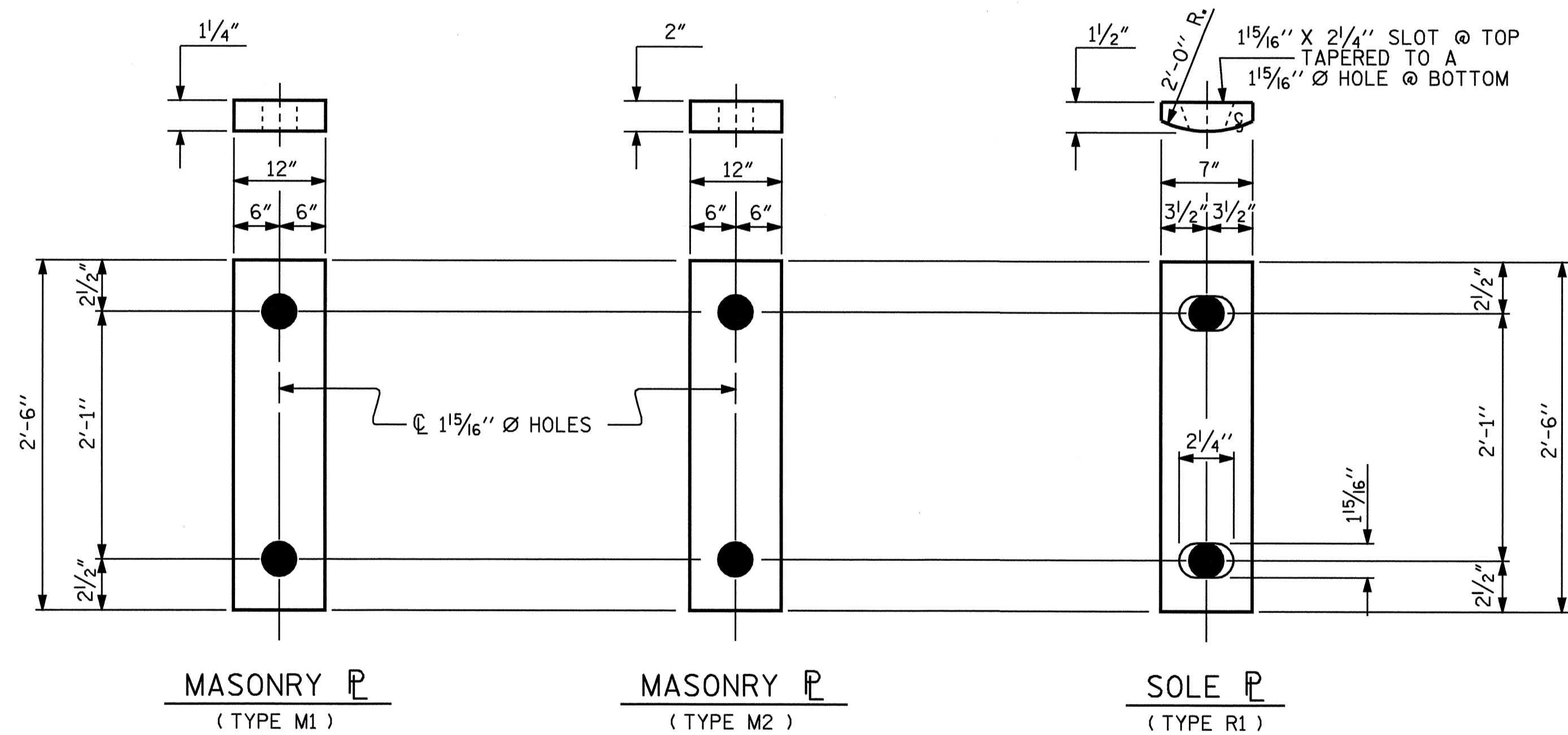
PAYMENT FOR STEEL ROCKER BEARINGS IS INCLUDED WITH THE STRUCTURAL STEEL QUANTITIES



ELEVATION



SECTION A-A



MASONRY PL (TYPE M1)

MASONRY PL (TYPE M2)

SOLE PL (TYPE R1)

FIXED BEARING DETAILS

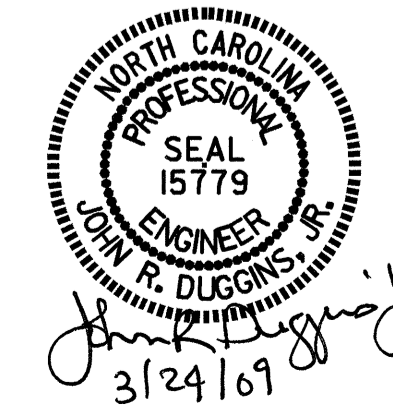
TABLE 1	
ITEM	NO. REQ'D
STEEL ROCKER SOLE PL (TYPE R1)	12
STEEL MASONRY PL (TYPE M1)	11
STEEL MASONRY PL (TYPE M2)	1
1 3/4" Ø X 21" ANCHOR BOLTS	24

PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 93+31.40 -L-

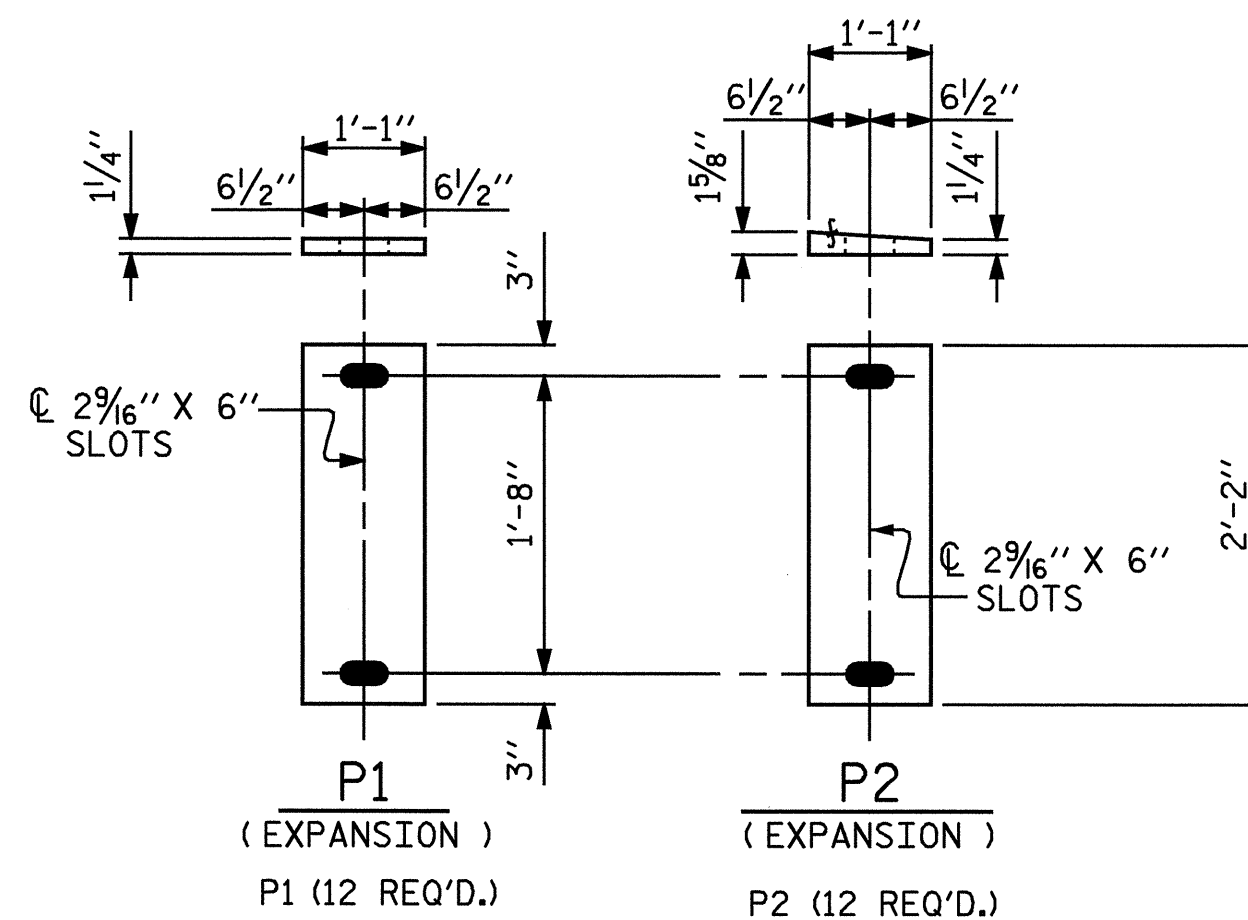
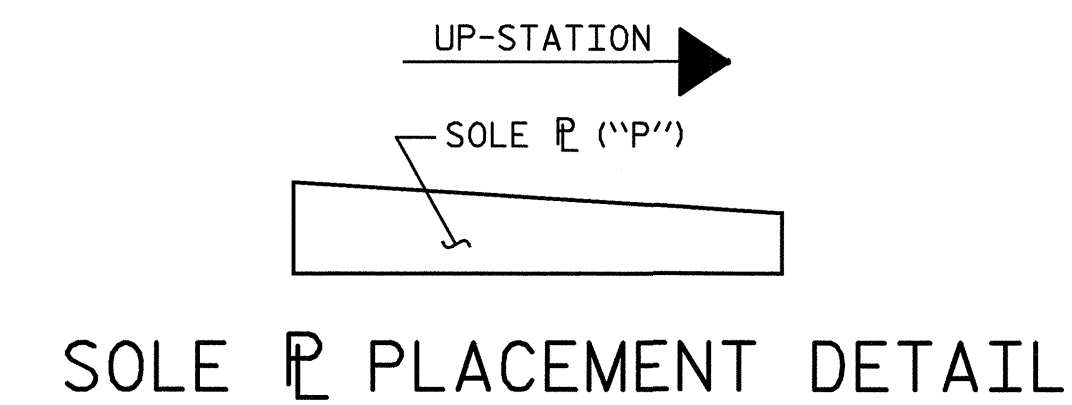
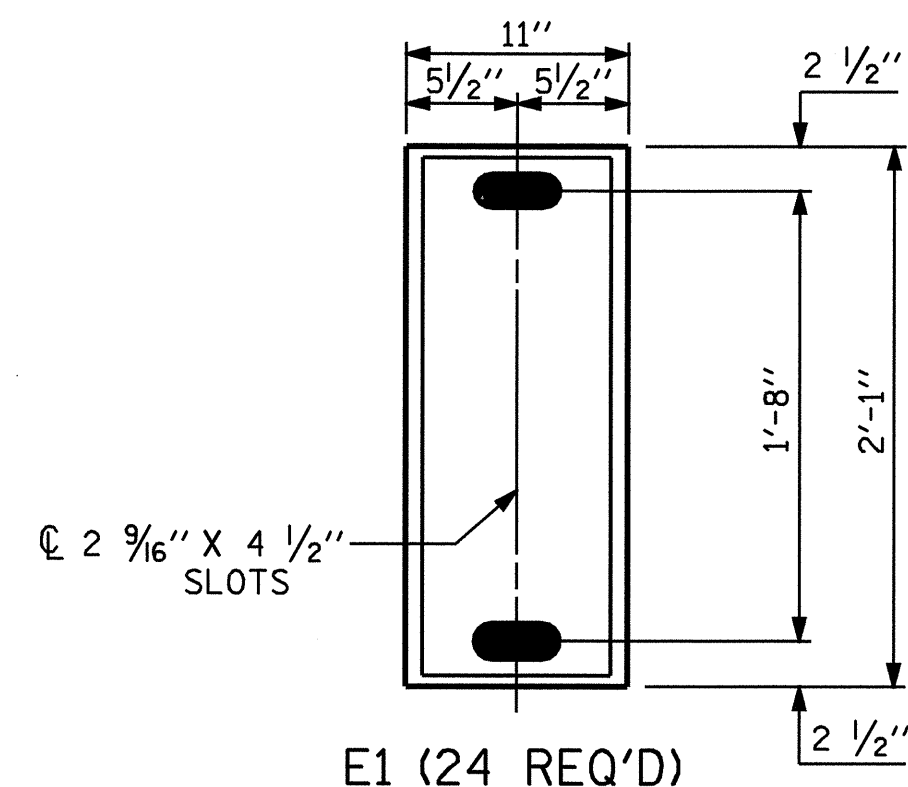
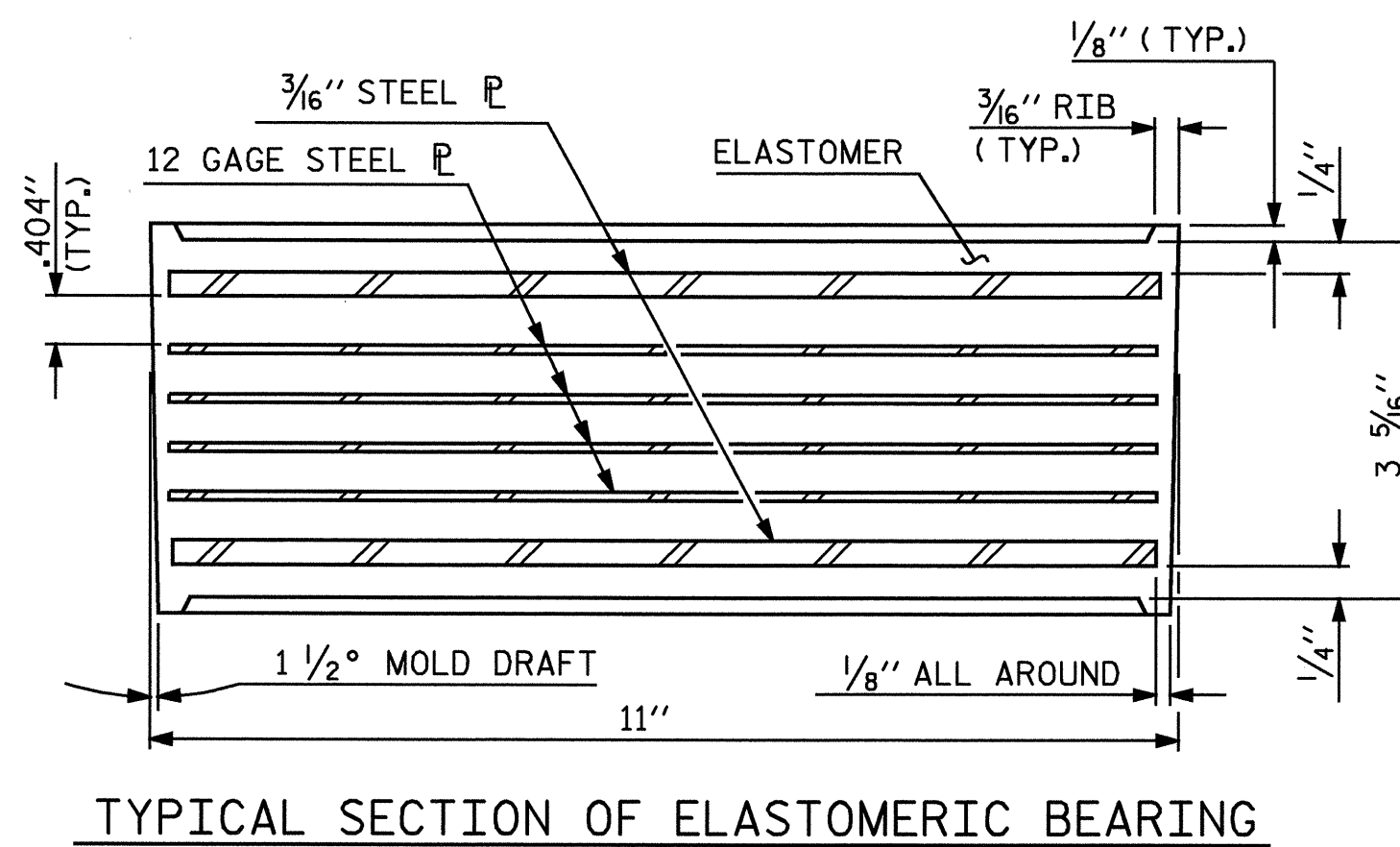
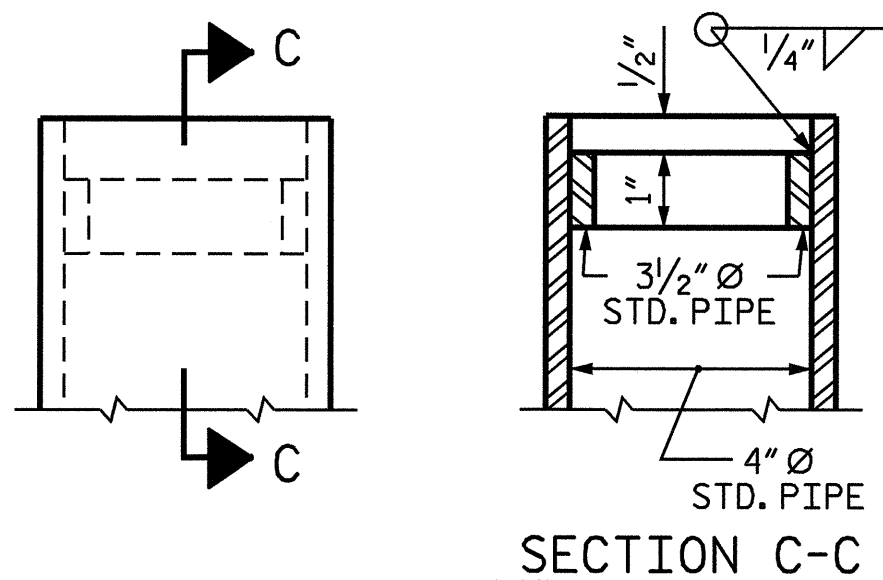
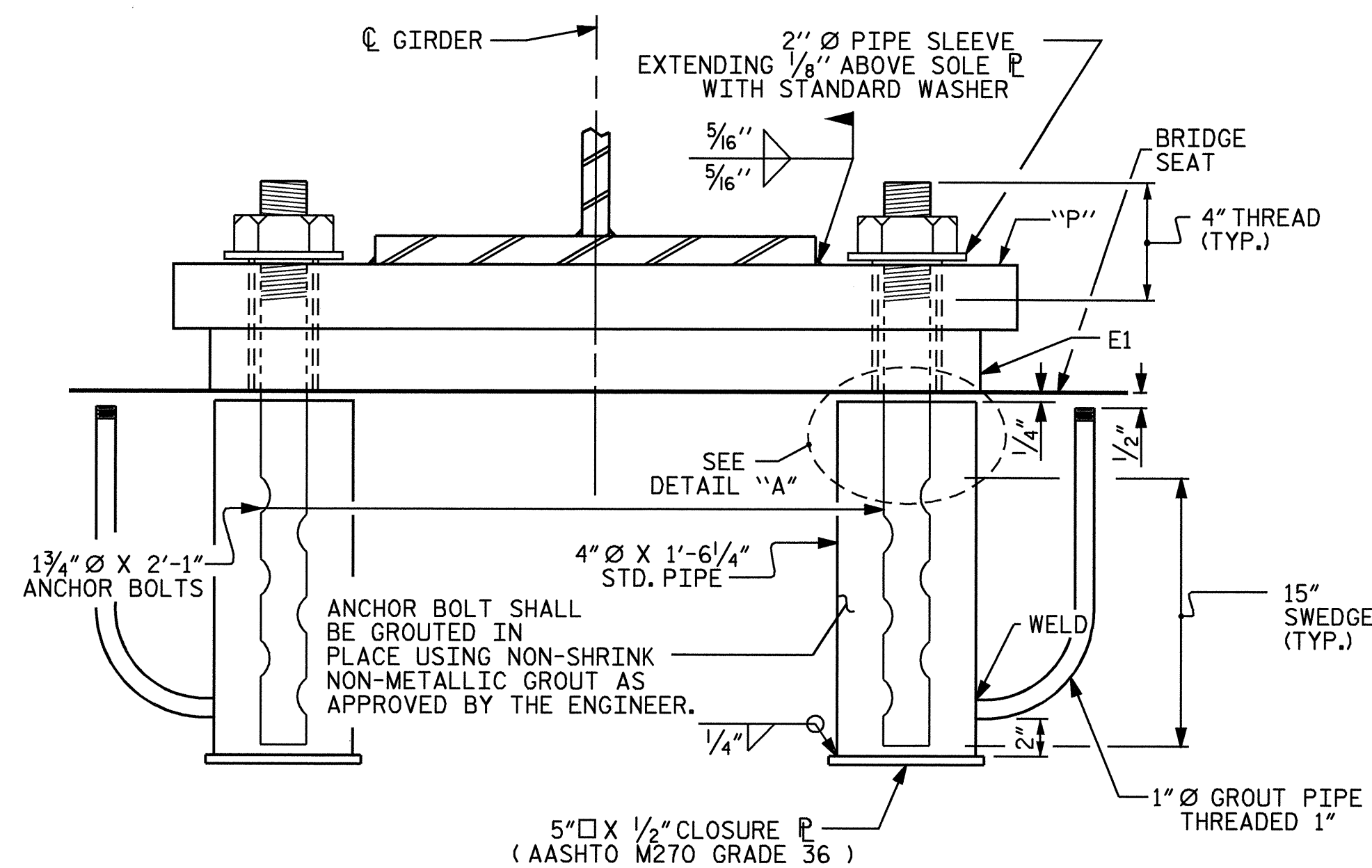
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STEEL ROCKER BEARING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-48
2			4			71



DRAWN BY : M. POOLE DATE : 12/08  
 CHECKED BY : D. HODGE DATE : 12/08



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.

THE CLOSURE PLATE, GROUT PIPE AND STANDARD PIPE FOR THE EXPANSION ASSEMBLY NEED NOT BE GALVANIZED.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FOLLOWING PROCEDURE, WHICH MAY BE REQUIRED BY THE ENGINEER, TO RESET ELASTOMERIC BEARINGS DUE TO GIRDER TRANSLATION AND END ROTATION:

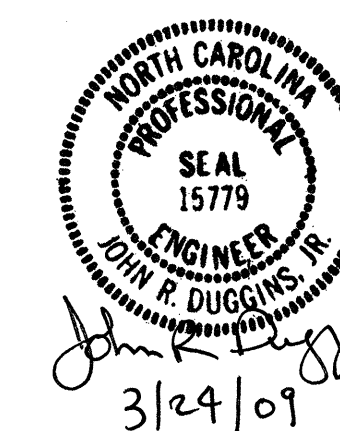
- ONCE THE DECK HAS CURED, THE GIRDERS SHALL BE JACKED THEN THE ANCHOR BOLTS AND ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60° F.
- AFTER CENTERING THE ELASTOMERIC BEARING SLOTS AND ANCHOR BOLTS, THE ANCHOR BOLTS SHALL BE GROUDED.

THE CONTRACTOR MAY PROPOSE ALTERNATE METHODS, PROVIDED DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

-LOAD RATINGS-	
	MAX.D.L.+ L.L.
TYPE IV	184 K

PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 93+31.40 -L-

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



ASSEMBLED BY: M. POOLE DATE: 12/08  
 CHECKED BY: D. HODGE DATE: 12/08  
 DRAWN BY: EEM 10/95 REV. 10/17/00 RWW/LES  
 CHECKED BY: PEK 10/95 REV. 7/10/01 LES/RDR  
 REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-49
2			4			71

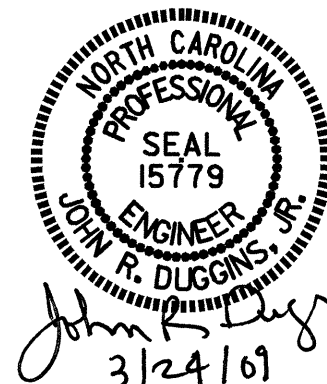
## DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A - GIRDERS 1, 2 10, 11 & 12																					
@ TWENTIETH POINTS BETWEEN @ BEARINGS	@ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	@ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.009	0.018	0.025	0.032	0.038	0.043	0.046	0.048	0.048	0.047	0.044	0.040	0.036	0.030	0.024	0.018	0.012	0.007	0.003	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.023	0.045	0.065	0.083	0.098	0.110	0.118	0.122	0.123	0.120	0.113	0.104	0.092	0.078	0.063	0.047	0.032	0.019	0.007	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK **	0.000	0.004	0.007	0.010	0.013	0.015	0.017	0.018	0.019	0.019	0.018	0.017	0.016	0.014	0.012	0.009	0.007	0.005	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.036	0.070	0.100	0.128	0.151	0.170	0.182	0.189	0.190	0.185	0.174	0.160	0.142	0.120	0.096	0.072	0.049	0.029	0.011	0.000
VERTICAL CURVE ORDINATE	0.000	0.088	0.167	0.236	0.296	0.347	0.389	0.421	0.444	0.458	0.463	0.458	0.444	0.421	0.389	0.347	0.296	0.236	0.167	0.088	0.000
REQUIRED CAMBER	0	1/2"	2/8"	4/16"	5/16"	6"	6 1/16"	7 1/4"	7 5/8"	7 3/4"	7 3/4"	7 9/16"	7 1/4"	6 3/4"	6 1/8"	5 5/16"	4 7/16"	3 7/16"	2 3/8"	1 3/16"	0
SPAN A - GIRDER 3																					
@ TWENTIETH POINTS BETWEEN @ BEARINGS	@ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	@ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.009	0.018	0.025	0.032	0.038	0.043	0.046	0.048	0.048	0.047	0.044	0.040	0.036	0.030	0.024	0.018	0.012	0.007	0.003	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.023	0.045	0.065	0.083	0.098	0.110	0.118	0.122	0.123	0.120	0.113	0.104	0.092	0.078	0.063	0.047	0.032	0.019	0.007	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK **	0.000	0.006	0.011	0.016	0.021	0.024	0.027	0.029	0.030	0.031	0.030	0.028	0.026	0.023	0.019	0.016	0.012	0.008	0.005	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.038	0.074	0.106	0.136	0.160	0.180	0.193	0.200	0.202	0.197	0.185	0.170	0.151	0.127	0.103	0.077	0.052	0.031	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.088	0.167	0.236	0.296	0.347	0.389	0.421	0.444	0.458	0.463	0.458	0.444	0.421	0.389	0.347	0.296	0.236	0.167	0.088	0.000
REQUIRED CAMBER	0	1/2"	2/8"	4/8"	5 3/16"	6 1/16"	6 13/16"	7 3/8"	7 3/4"	7 15/16"	7 15/16"	7 11/16"	7 3/8"	6 7/8"	6 3/16"	5 3/8"	4 1/2"	3 7/16"	2 3/8"	1 3/16"	0
SPAN A - GIRDERS 4, 5, 6 & 7																					
@ TWENTIETH POINTS BETWEEN @ BEARINGS	@ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	@ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.009	0.018	0.025	0.032	0.038	0.043	0.046	0.048	0.048	0.047	0.044	0.040	0.036	0.030	0.024	0.018	0.012	0.007	0.003	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.023	0.045	0.065	0.083	0.098	0.110	0.118	0.122	0.123	0.120	0.113	0.104	0.092	0.078	0.063	0.047	0.032	0.019	0.007	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK **	0.000	0.002	0.004	0.006	0.008	0.010	0.011	0.012	0.012	0.012	0.012	0.011	0.010	0.009	0.008	0.006	0.005	0.003	0.002	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.034	0.067	0.096	0.123	0.146	0.164	0.176	0.182	0.183	0.179	0.168	0.154	0.137	0.116	0.093	0.070	0.047	0.028	0.011	0.000
VERTICAL CURVE ORDINATE	0.000	0.088	0.167	0.236	0.296	0.347	0.389	0.421	0.444	0.458	0.463	0.458	0.444	0.421	0.389	0.347	0.296	0.236	0.167	0.088	0.000
REQUIRED CAMBER	0	1 1/16"	2 3/16"	4"	5"	5 5/16"	6 5/8"	7 3/16"	7 1/2"	7 11/16"	7 11/16"	7 1/2"	7 3/16"	6 11/16"	6 1/16"	5 1/4"	4 3/8"	3 3/8"	2 5/16"	1 3/16"	0
SPAN A - GIRDERS 8 & 9																					
@ TWENTIETH POINTS BETWEEN @ BEARINGS	@ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	@ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.009	0.018	0.025	0.032	0.038	0.043	0.046	0.048	0.048	0.047	0.044	0.040	0.036	0.030	0.024	0.018	0.012	0.007	0.003	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.023	0.045	0.065	0.083	0.098	0.110	0.118	0.122	0.123	0.120	0.113	0.104	0.092	0.078	0.063	0.047	0.032	0.019	0.007	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.032	0.063	0.090	0.115	0.136	0.153	0.164	0.170	0.171	0.167	0.157	0.144	0.128	0.108	0.087	0.065	0.044	0.026	0.010	0.000
VERTICAL CURVE ORDINATE	0.000	0.088	0.167	0.236	0.296	0.347	0.389	0.421	0.444	0.458	0.463	0.458	0.444	0.421	0.389	0.347	0.296	0.236	0.167	0.088	0.000
REQUIRED CAMBER	0	1 1/16"	2 3/4"	3 5/16"	4 5/16"	5 13/16"	6 1/2"	7"	7 3/8"	7 9/16"	7 9/16"	7 3/8"	7 1/16"	6 9/16"	5 9/16"	5 3/16"	4 3/8"	3 3/8"	2 5/16"	1 3/16"	0
SPAN B - GIRDERS 1 & 2																					
@ TWENTIETH POINTS BETWEEN @ BEARINGS	@ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	@ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.000	0.000	0.000	0.001	0.003	0.005	0.007	0.009	0.011	0.013	0.014	0.014	0.014	0.014	0.012	0.011	0.009	0.006	0.003	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.000	0.000	0.000	0.002	0.007	0.012	0.017	0.022	0.027	0.031	0.033	0.035	0.035	0.033	0.030	0.026	0.021	0.015	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK **	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.003	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.003	0.002	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.000	0.000	0.000	0.003	0.011	0.019	0.027	0.034	0.042	0.049	0.052	0.054	0.054	0.052	0.047	0.041	0.033	0.023	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.060	0.113	0.160	0.200	0.234	0.262	0.283	0.297	0.304	0.306	0.300	0.289	0.271	0.246	0.215	0.178	0.134	0.090	0.045	0.000
REQUIRED CAMBER	0	3/4"	1 3/8"	1 5/16"	2 1/16"	2 15/16"	3 3/8"	3 3/4"	4"	4 1/8"	4 1/4"	4 1/4"	4 1/8"	3 7/8"	3 3/16"	3 1/8"	2 5/8"	2"	1 3/8"	1 1/16"	0
SPAN B - GIRDER 3																					
@ TWENTIETH POINTS BETWEEN @ BEARINGS	@ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	@ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.000	0.000	0.000	0.001	0.003	0.005	0.007	0.009	0.011	0.013	0.014	0.014	0.014	0.014	0.012	0.011	0.009	0.006	0.003	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.000	0.000	0.000	0.002	0.007	0.012	0.017	0.022	0.027	0.031	0.033	0.035	0.035	0.033	0.030	0.026	0.021	0.015	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK **	0.000	0.000	0.000	0.000	0.001	0.002	0.003	0.004	0.006	0.007	0.008	0.008	0.009	0.009	0.008	0.008	0.007	0.005	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.000	0.000	0.000	0.004	0.012	0.020	0.028	0.037	0.045	0.052	0.055	0.058	0.058	0.055	0.050	0.044	0.035	0.025	0.013	0.000
VERTICAL CURVE ORDINATE	0.000	0.058	0.110	0.156	0.194	0.227	0.253	0.272	0.285	0.291	0.291	0.285	0.272	0.252	0.226	0.194	0.156	0.117	0.078	0.039	0.000
REQUIRED CAMBER	0	1 1/16"	1 3/8"	1 7/8"	2 3/8"	2 7/8"	3 1/4"	3 5/8"	3 3/8"	4 1/16"	4 1/8"	4 1/16"	3 5/16"	3 3/4"	3 3/8"	2 5/16"	2 3/8"	1 13/16"	1 1/4"	5/8"	0

\* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.  
 \*\* INCLUDES 3 BAR METAL RAIL & CONCRETE MEDIAN BARRIER  
 ALL VALUES ARE SHOWN IN FEET EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DRAWN BY : M. POOLE DATE : 08-08  
 CHECKED BY : D. HODGE DATE : 11-08

20-MAR-2009 15:19  
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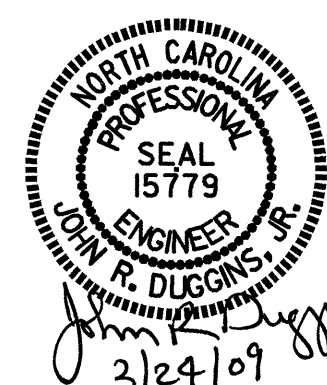


PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE DEAD LOAD DEFLECTIONS					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEET					5-50
71					

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
SPAN B - GIRDERS 4 & 5																					
⊙ TWENTIETH POINTS BETWEEN Ⓞ BEARINGS	Ⓞ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	Ⓞ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.000	0.000	0.000	0.001	0.003	0.005	0.007	0.009	0.011	0.013	0.014	0.014	0.014	0.014	0.012	0.011	0.009	0.006	0.003	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.000	0.000	0.000	0.002	0.007	0.012	0.017	0.022	0.027	0.031	0.033	0.035	0.035	0.033	0.030	0.026	0.021	0.015	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK **	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.001	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.000	0.000	0.000	0.003	0.011	0.018	0.026	0.033	0.041	0.047	0.050	0.052	0.052	0.050	0.045	0.040	0.032	0.022	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.057	0.109	0.154	0.192	0.224	0.250	0.268	0.280	0.286	0.285	0.279	0.265	0.245	0.218	0.185	0.149	0.112	0.075	0.037	0.000
REQUIRED CAMBER	0	1/16"	1/8"	1/8"	2/16"	2 1/16"	3/16"	3/2"	3 3/4"	3 1/2"	4"	3 1/2"	3 1/16"	3 3/16"	3 3/16"	2 3/4"	2 1/4"	1 3/4"	1 3/16"	9/16"	0
SPAN B - GIRDERS 6 & 7																					
⊙ TWENTIETH POINTS BETWEEN Ⓞ BEARINGS	Ⓞ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	Ⓞ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.000	0.000	0.000	0.001	0.003	0.005	0.007	0.009	0.011	0.013	0.014	0.014	0.014	0.014	0.012	0.011	0.009	0.006	0.003	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.000	0.000	0.000	0.002	0.007	0.012	0.017	0.022	0.027	0.031	0.033	0.035	0.035	0.033	0.030	0.026	0.021	0.015	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK **	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.001	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.000	0.000	0.000	0.003	0.011	0.018	0.026	0.033	0.041	0.047	0.050	0.052	0.052	0.050	0.045	0.040	0.032	0.022	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.053	0.101	0.141	0.175	0.202	0.223	0.237	0.245	0.247	0.242	0.231	0.213	0.188	0.162	0.135	0.108	0.081	0.054	0.027	0.000
REQUIRED CAMBER	0	5/8"	1 1/16"	1 1/16"	2 1/8"	2 3/16"	2 7/8"	3 3/16"	3 3/16"	3 3/16"	3 1/2"	3 3/8"	3 3/16"	2 7/8"	2 3/16"	2 3/16"	1 3/4"	1 3/8"	1 5/16"	1 1/2"	0
SPAN B - GIRDER 8																					
⊙ TWENTIETH POINTS BETWEEN Ⓞ BEARINGS	Ⓞ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	Ⓞ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.000	0.000	0.000	0.001	0.003	0.005	0.007	0.009	0.011	0.013	0.014	0.014	0.014	0.014	0.012	0.011	0.009	0.006	0.003	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.000	0.000	0.000	0.002	0.007	0.012	0.017	0.022	0.027	0.031	0.033	0.035	0.035	0.033	0.030	0.026	0.021	0.015	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.000	0.000	0.000	0.003	0.010	0.017	0.024	0.031	0.038	0.044	0.047	0.049	0.049	0.047	0.042	0.037	0.030	0.021	0.011	0.000
VERTICAL CURVE ORDINATE	0.000	0.051	0.095	0.132	0.164	0.188	0.206	0.218	0.223	0.222	0.214	0.200	0.179	0.157	0.134	0.112	0.090	0.067	0.045	0.022	0.000
REQUIRED CAMBER	0	5/8"	1 1/8"	1 1/16"	2"	2 3/8"	2 1/16"	2 7/8"	3 1/16"	3 1/8"	3 1/8"	2 15/16"	2 3/4"	2 1/2"	2 3/16"	1 7/8"	1 1/2"	1 3/16"	1 3/16"	3/8"	0
SPAN B - GIRDERS 9 & 10																					
⊙ TWENTIETH POINTS BETWEEN Ⓞ BEARINGS	Ⓞ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	Ⓞ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.000	0.000	0.000	0.001	0.003	0.005	0.007	0.009	0.011	0.013	0.014	0.014	0.014	0.014	0.012	0.011	0.009	0.006	0.003	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.000	0.000	0.000	0.002	0.007	0.012	0.017	0.022	0.027	0.031	0.033	0.035	0.035	0.033	0.030	0.026	0.021	0.015	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.000	0.000	0.000	0.003	0.010	0.017	0.024	0.031	0.038	0.044	0.047	0.049	0.049	0.047	0.042	0.037	0.030	0.021	0.011	0.000
VERTICAL CURVE ORDINATE	0.000	0.049	0.091	0.126	0.155	0.178	0.193	0.203	0.206	0.203	0.193	0.177	0.157	0.138	0.118	0.098	0.079	0.059	0.039	0.020	0.000
REQUIRED CAMBER	0	9/16"	1 1/16"	1 1/2"	1 7/8"	2 1/4"	2 1/2"	2 3/4"	2 7/8"	2 7/8"	2 7/8"	2 11/16"	2 1/2"	2 1/4"	2"	1 11/16"	1 3/8"	1 1/16"	3/4"	3/8"	0
SPAN B - GIRDER 11																					
⊙ TWENTIETH POINTS BETWEEN Ⓞ BEARINGS	Ⓞ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	Ⓞ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.000	0.000	0.000	0.001	0.003	0.005	0.007	0.009	0.011	0.013	0.014	0.014	0.014	0.014	0.012	0.011	0.009	0.006	0.003	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.000	0.000	0.000	0.002	0.007	0.012	0.017	0.022	0.027	0.031	0.033	0.035	0.035	0.033	0.030	0.026	0.021	0.015	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK **	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.003	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.003	0.002	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.000	0.000	0.000	0.003	0.011	0.019	0.027	0.034	0.042	0.049	0.052	0.054	0.054	0.052	0.047	0.041	0.033	0.023	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.044	0.081	0.112	0.136	0.154	0.166	0.170	0.169	0.161	0.147	0.132	0.117	0.103	0.088	0.073	0.059	0.044	0.029	0.015	0.000
REQUIRED CAMBER	0	1/2"	1"	1 3/8"	1 11/16"	2"	2 1/4"	2 3/8"	2 7/16"	2 7/16"	2 3/8"	2 3/16"	2 1/16"	1 7/8"	1 11/16"	1 1/16"	1 3/16"	1 5/16"	5/8"	5/8"	0
SPAN B - GIRDER 12																					
⊙ TWENTIETH POINTS BETWEEN Ⓞ BEARINGS	Ⓞ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	Ⓞ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.000	0.000	0.000	0.001	0.003	0.005	0.007	0.009	0.011	0.013	0.014	0.014	0.014	0.014	0.012	0.011	0.009	0.006	0.003	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.000	0.000	0.000	0.002	0.007	0.012	0.017	0.022	0.027	0.031	0.033	0.035	0.035	0.033	0.030	0.026	0.021	0.015	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SIDEWALK **	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.003	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.003	0.002	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.000	0.000	0.000	0.003	0.011	0.019	0.027	0.034	0.042	0.049	0.052	0.054	0.054	0.052	0.047	0.041	0.033	0.023	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.041	0.076	0.104	0.126	0.141	0.150	0.152	0.148	0.137	0.125	0.112	0.100	0.087	0.075	0.062	0.050	0.037	0.025	0.013	0.000
REQUIRED CAMBER	0	1/2"	1 5/16"	1 1/4"	1 9/16"	1 13/16"	2"	2 1/8"	2 3/16"	2 1/8"	2 1/16"	1 15/16"	1 7/8"	1 11/16"	1 1/2"	1 3/16"	1 1/16"	1 3/16"	9/16"	5/16"	0



PROJECT NO. R-4430  
HENDERSON COUNTY  
STATION: 93+31.40 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SUPERSTRUCTURE  
DEAD LOAD  
DEFLECTIONS**

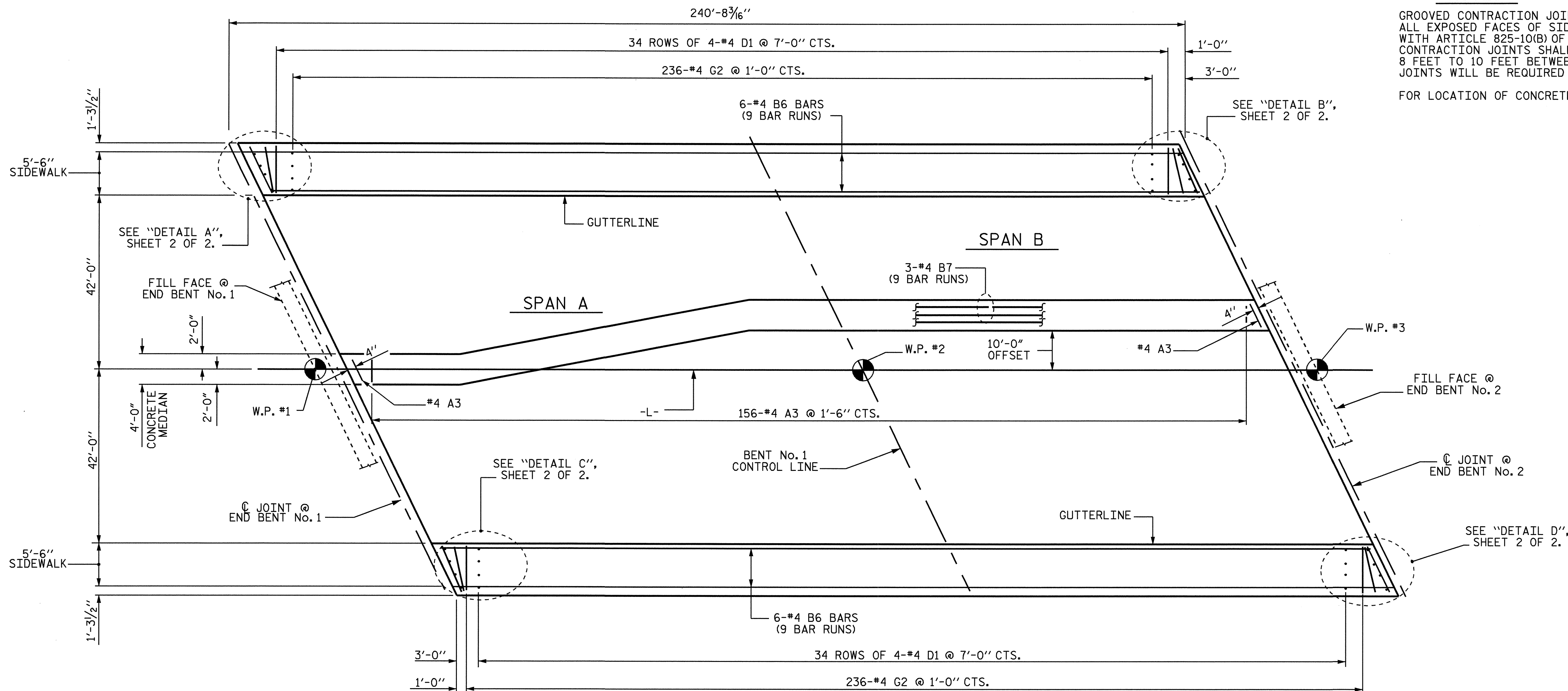
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-51
2			4			TOTAL SHEETS
						71

DRAWN BY: M. POOLE DATE: 08-08  
CHECKED BY: D. HODGE DATE: 11-08

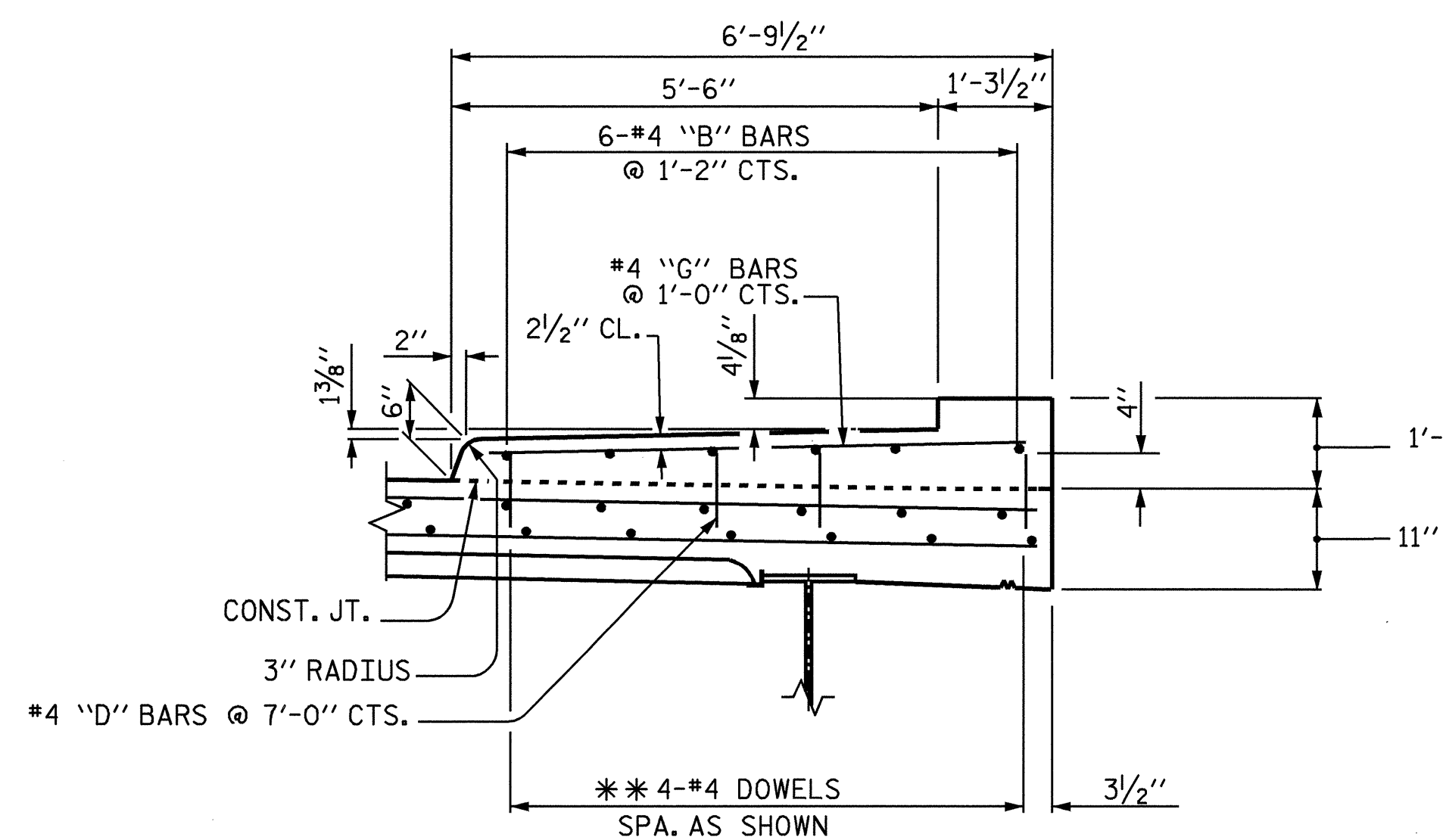
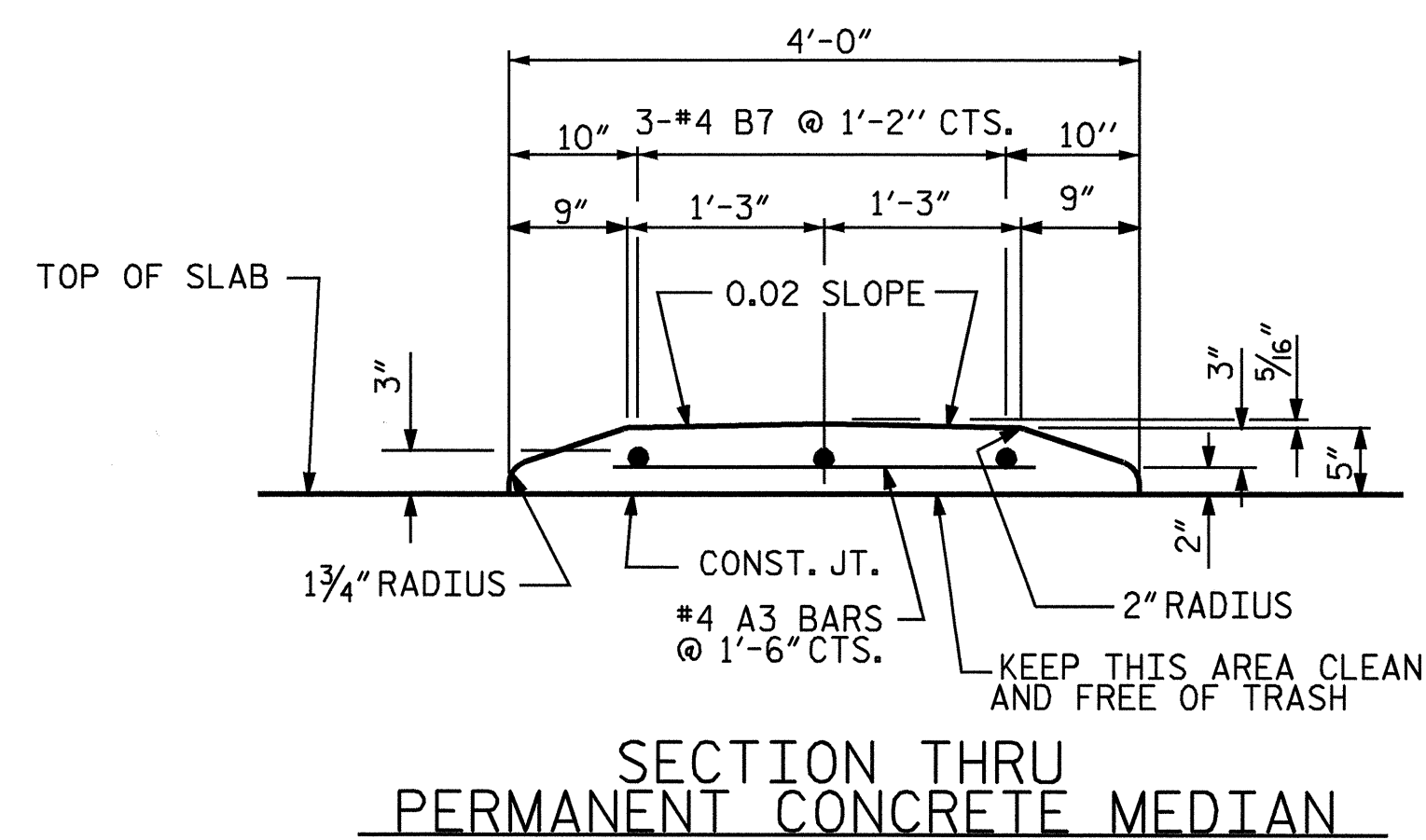
\* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.  
\*\* INCLUDES 3 BAR METAL RAIL & CONCRETE MEDIAN BARRIER  
ALL VALUES ARE SHOWN IN FEET EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

**NOTES**

GROOVED CONTRACTION JOINTS 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK AND CONCRETE MEDIAN 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. FOR LOCATION OF CONCRETE MEDIAN, SEE TRAFFIC CONTROL PLANS.



**PLAN OF SIDEWALK & PERMANENT CONCRETE MEDIAN**



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

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

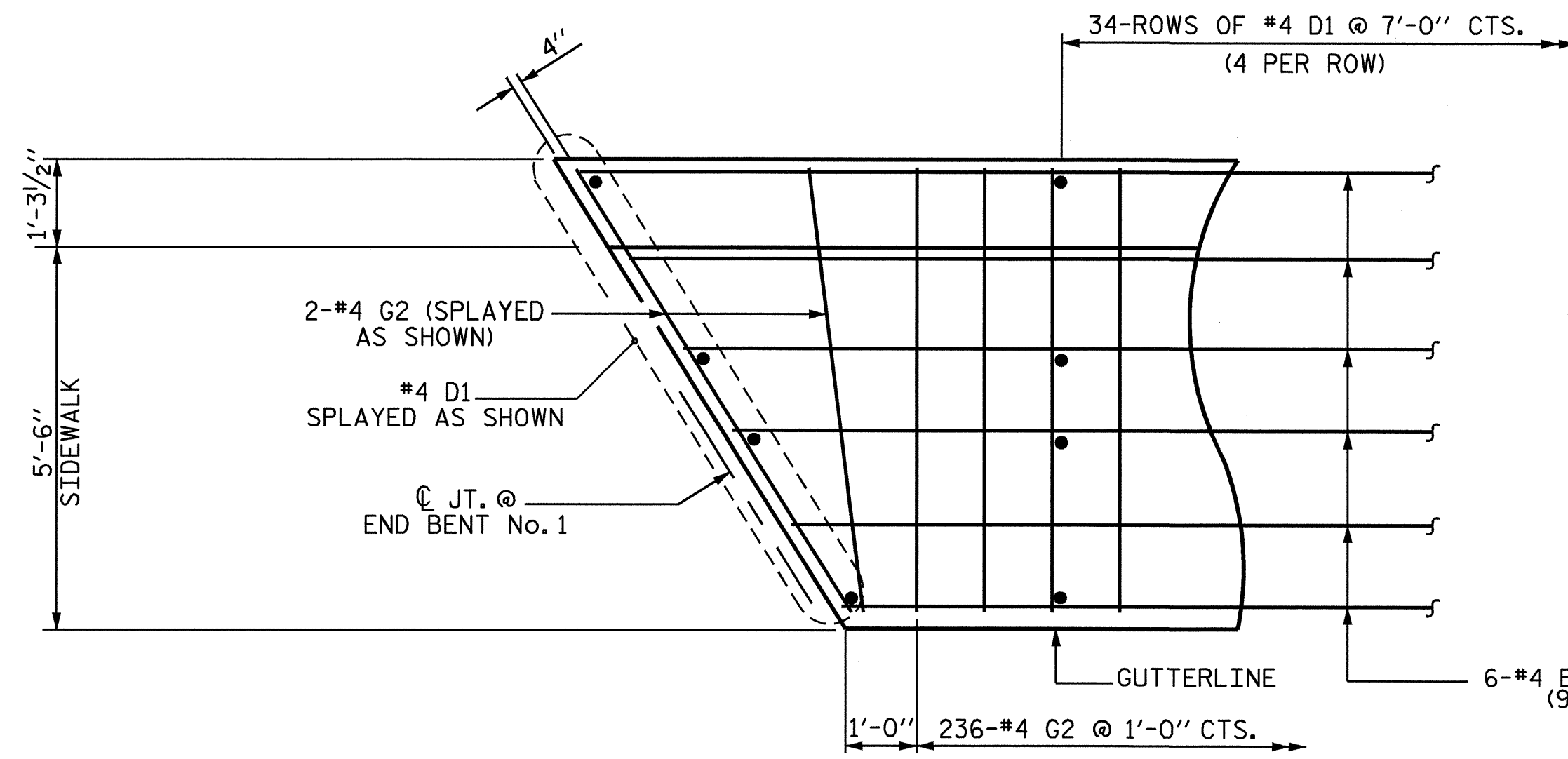
**SUPERSTRUCTURE  
 SIDEWALK AND MEDIAN  
 DETAILS**

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 CHECKED BY: D. HODGE DATE: 11-08

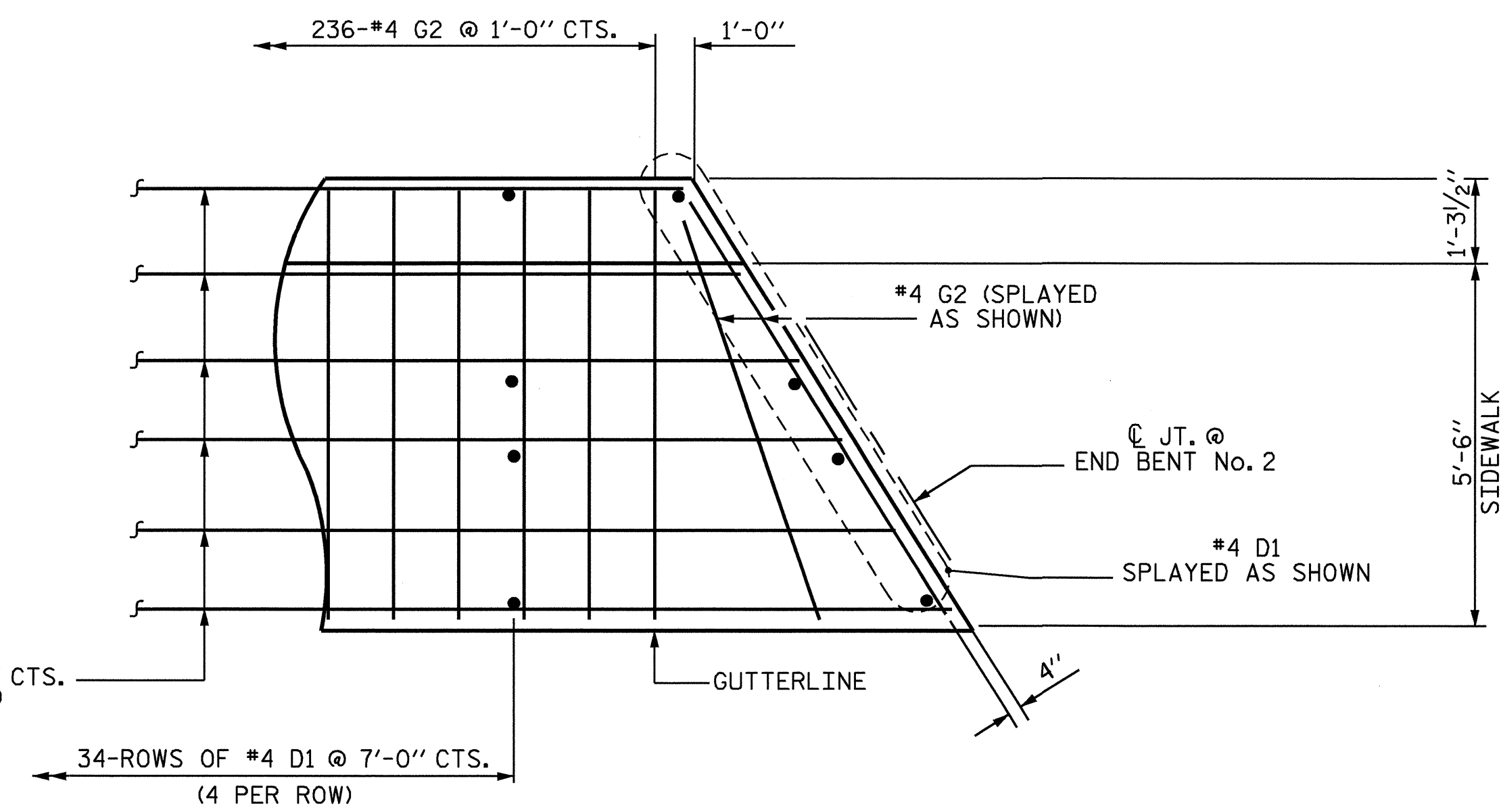
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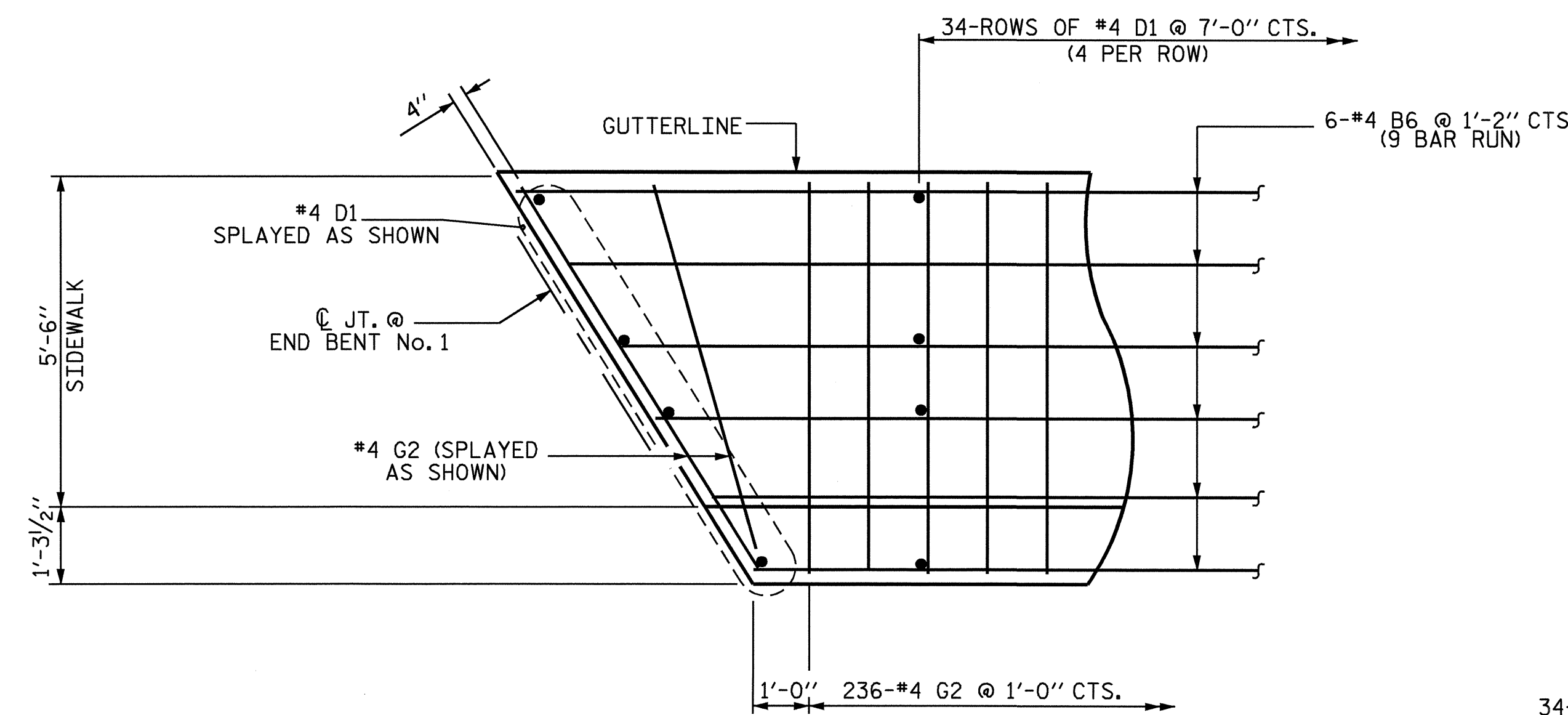
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			71
2			4			



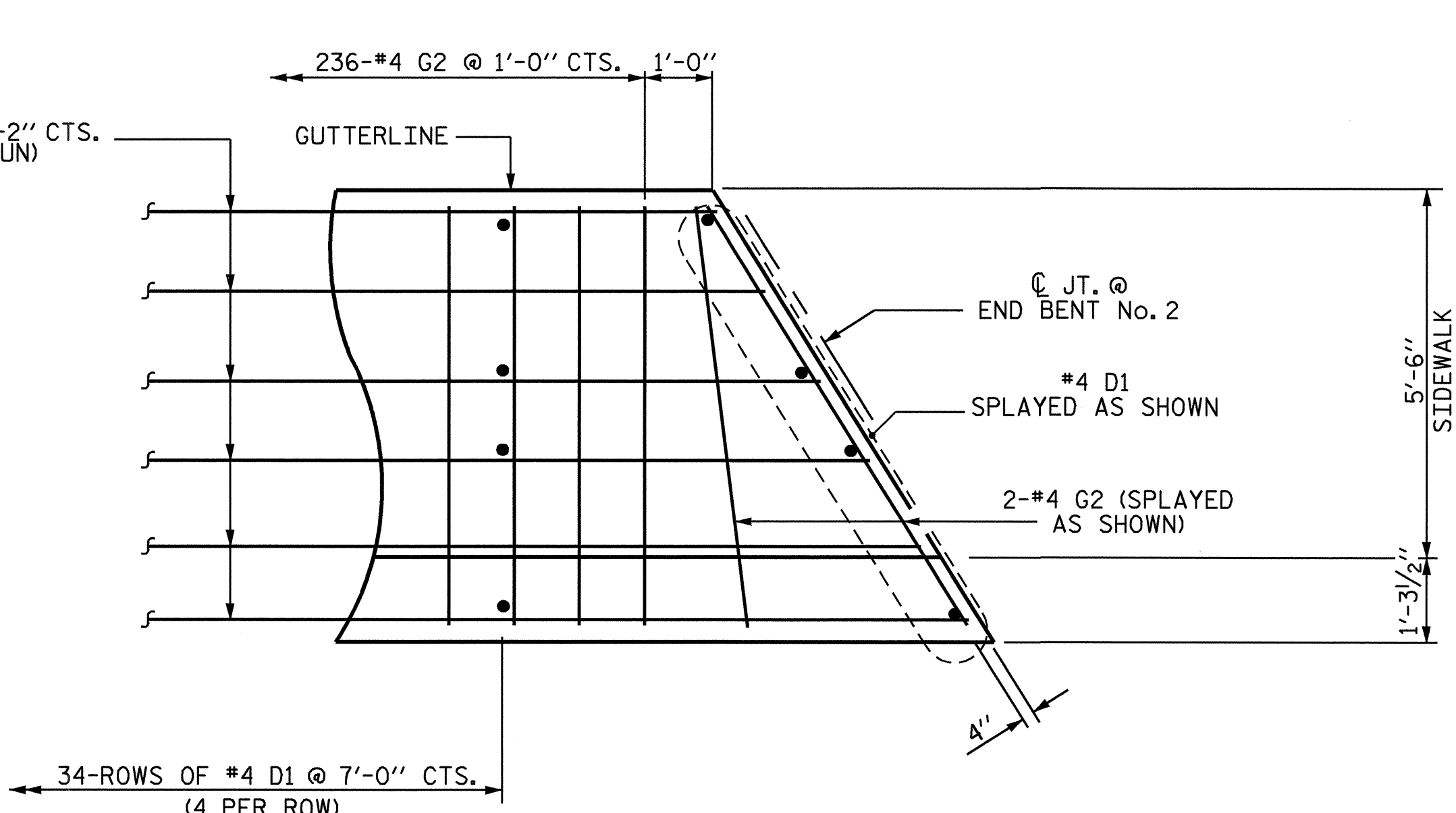
DETAIL A



DETAIL B



DETAIL C



DETAIL D

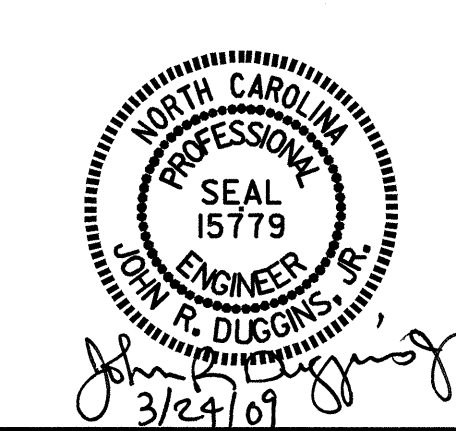
DRAWN BY : M. POOLE DATE : 08-08  
 CHECKED BY : D. HODGE DATE : 11-08

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PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 SIDEWALK AND MEDIAN  
 DETAILS



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			8-53
2			4			71

**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 SPICED 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.

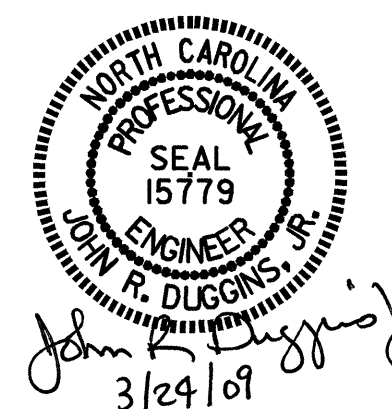
TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAIN VISIBLE AFTER RAIL PLACEMENT.

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 = 465.07 LIN.FT.



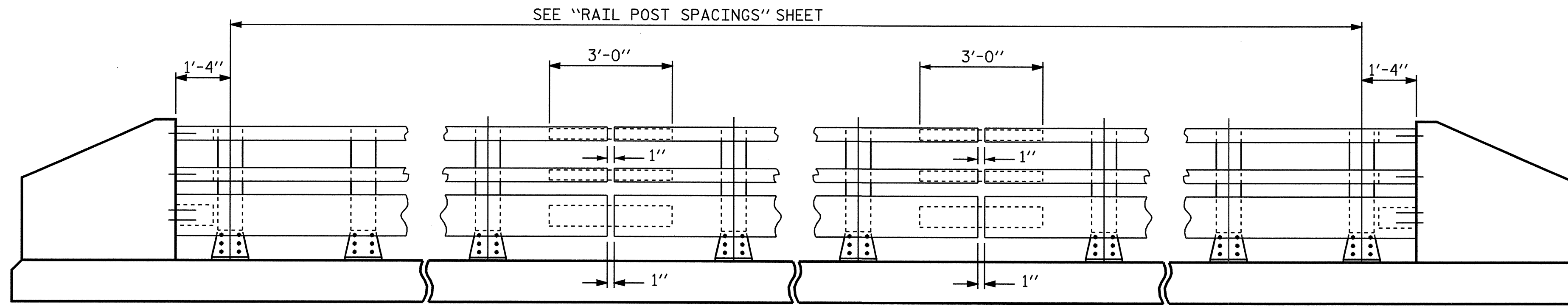
PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**3 BAR METAL RAIL**

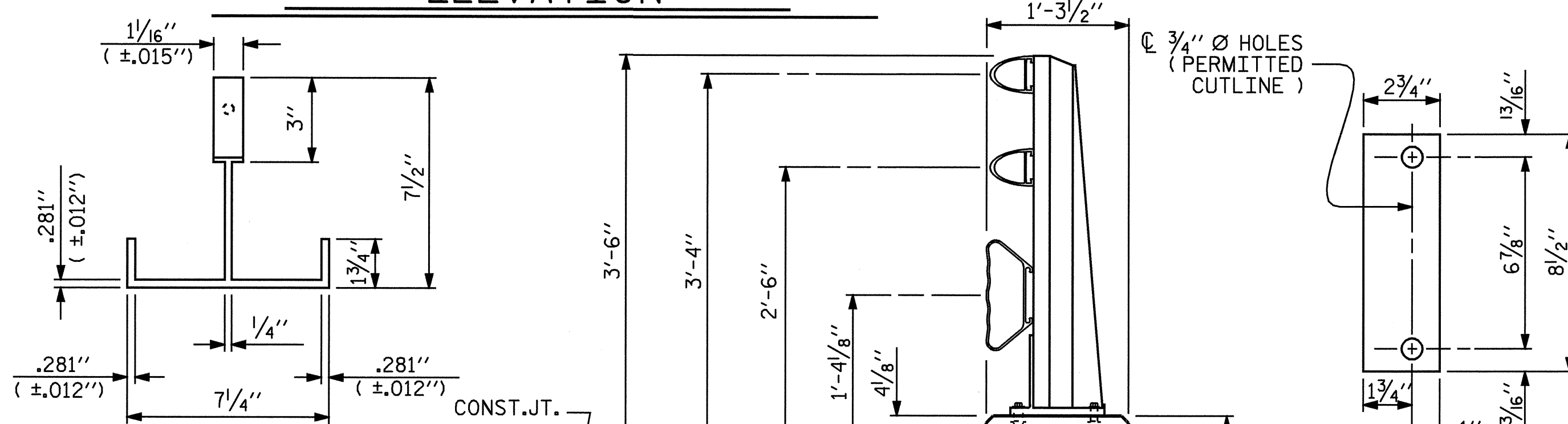
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			71
2			4			

STR. #2 STD. NO. BMR5

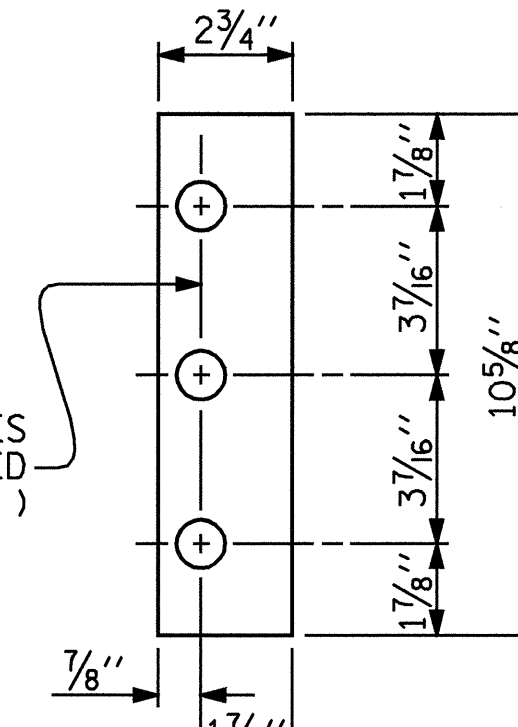


NOTE:  
 FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

**ELEVATION**



**REAR PLATE**

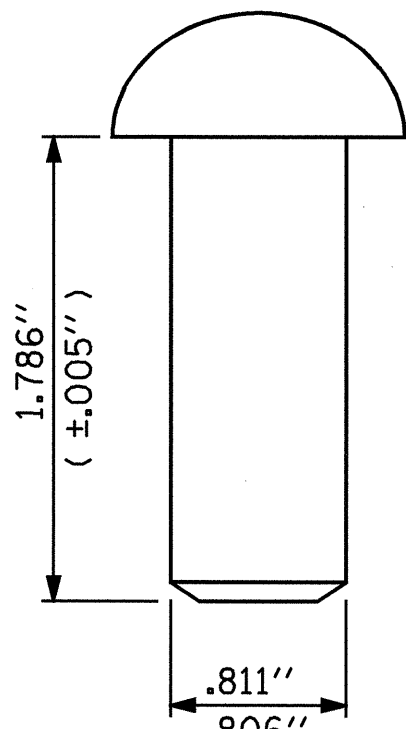


**FRONT PLATE SHIM DETAILS**

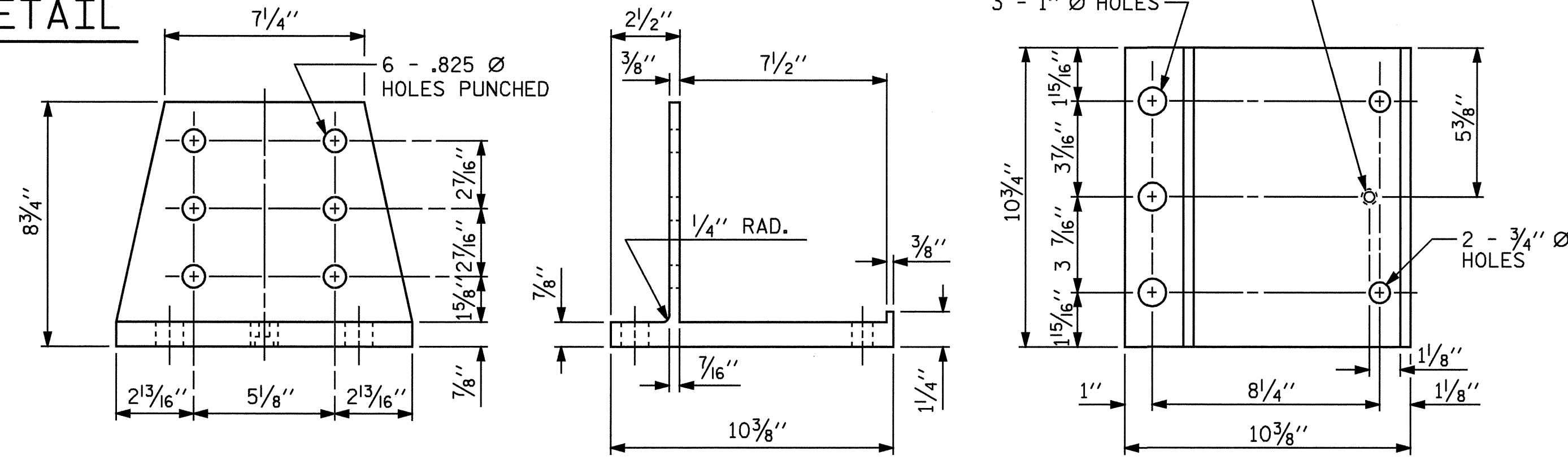
NOTE:  
 SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

**SECTION THRU RAIL**

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



**RIVET DETAIL**

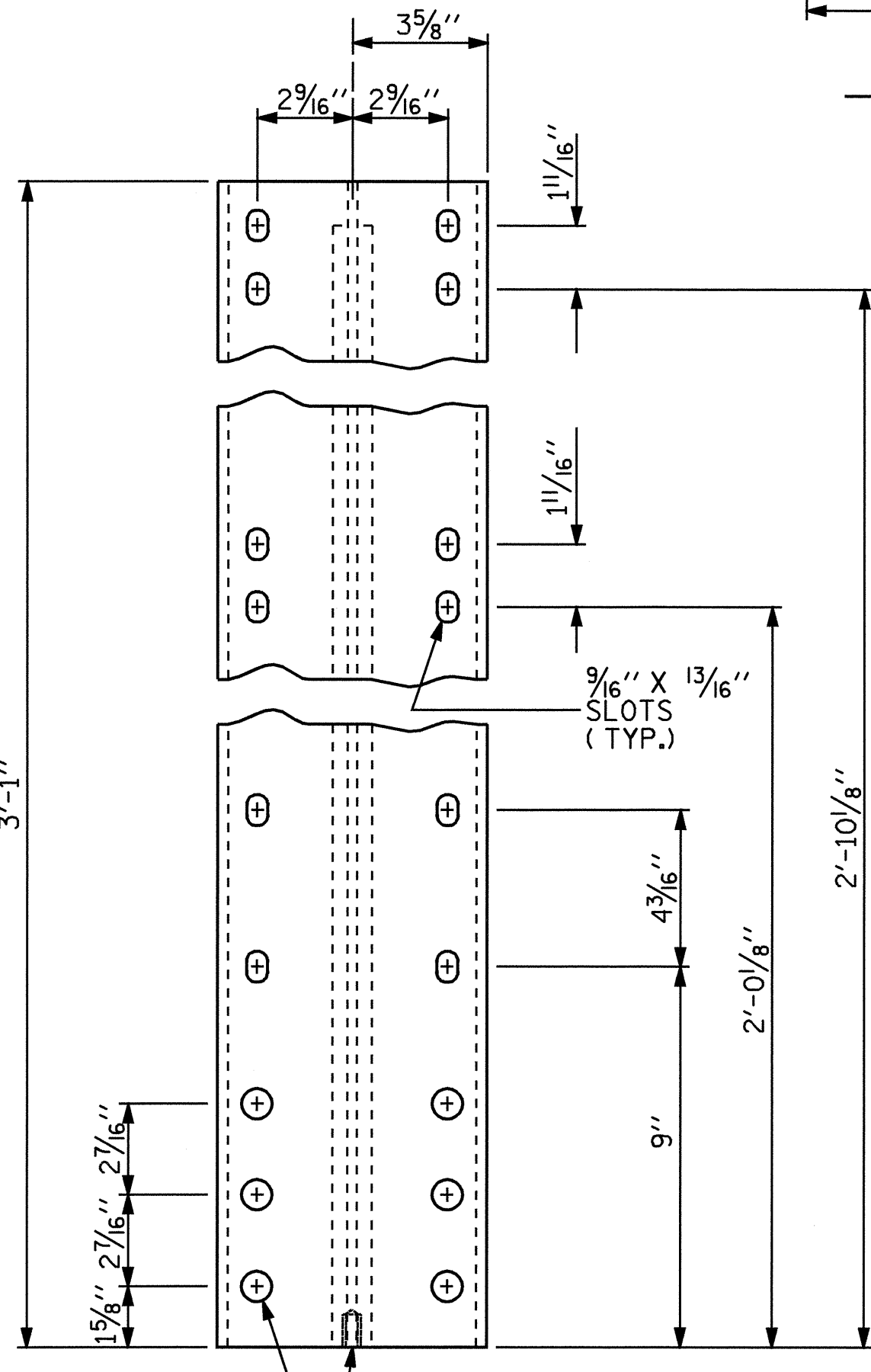


**FRONT ELEVATION**

**SIDE ELEVATION**

**PLAN**

**POST BASE DETAILS**



**FRONT ELEVATION**

**DETAILS OF POST**

6 - .825" Ø HOLES PUNCHED FOR RIVETS  
 5/16" Ø DRILL 1" DEEP & 3/8" Ø [16 THREAD] TAP  
 7/8" DEEP FOR 3/8" Ø X 1 1/2" STAINLESS STEEL CAP SCREW

**SIDE ELEVATION**

ASSEMBLED BY : M. POOLE	DATE : 08-08
CHECKED BY : D. HODGE	DATE : 11-08
DRAWN BY : JMB 1/88	REV. 10/17/00 RWW/LES
CHECKED BY : GGH 1/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

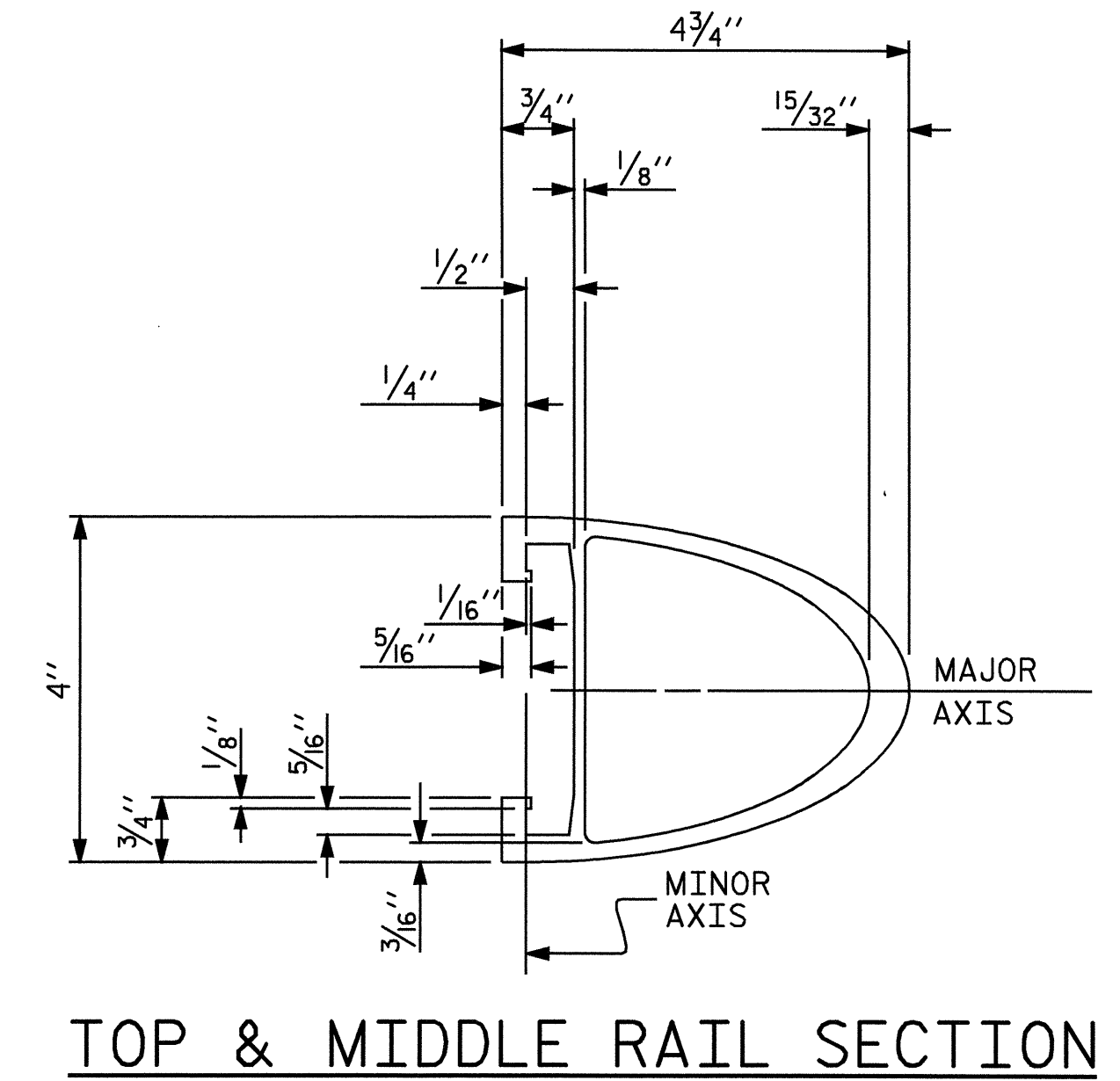


**NOTES**

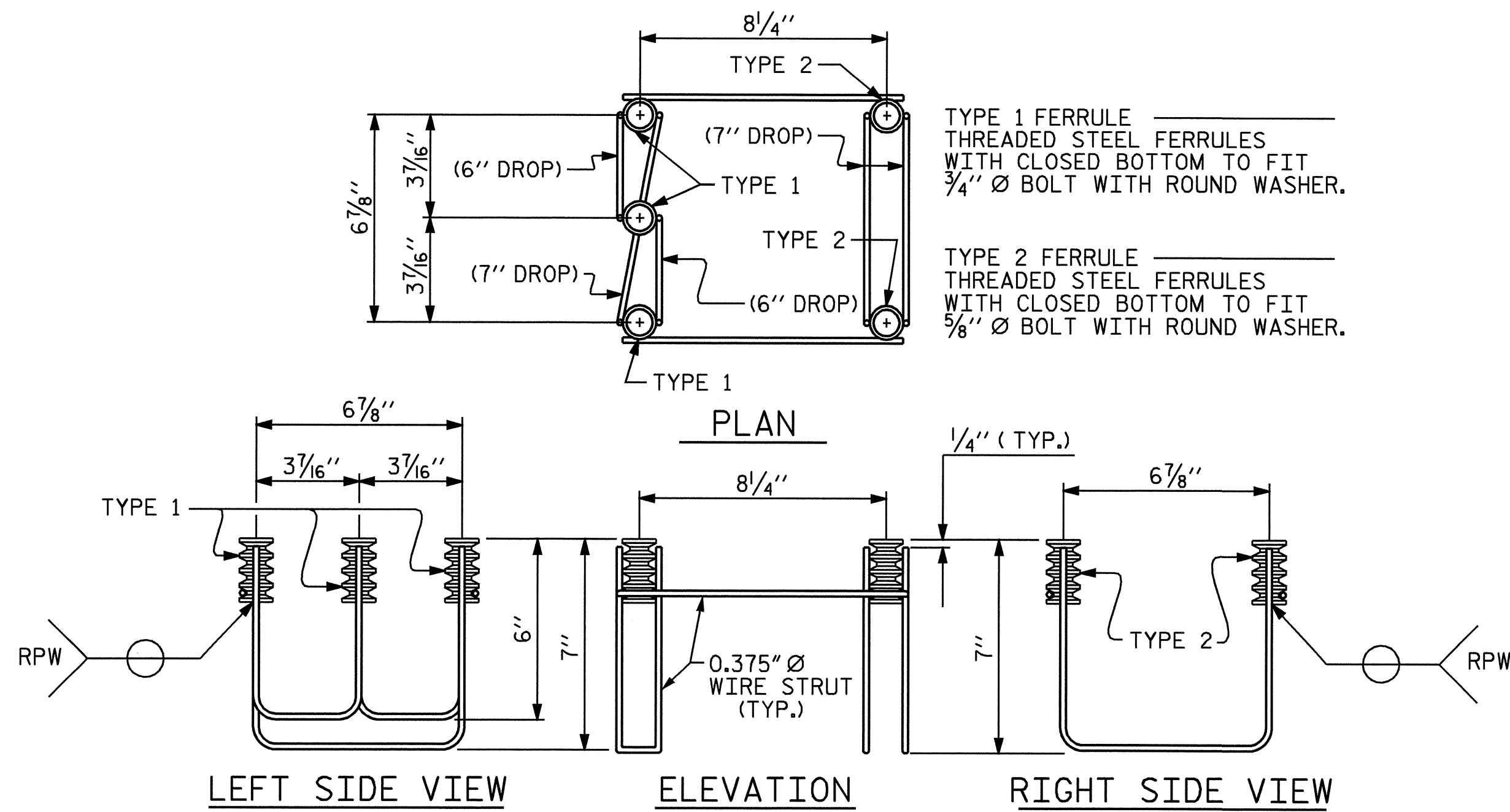
**STRUCTURAL CONCRETE ANCHOR ASSEMBLY**

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.



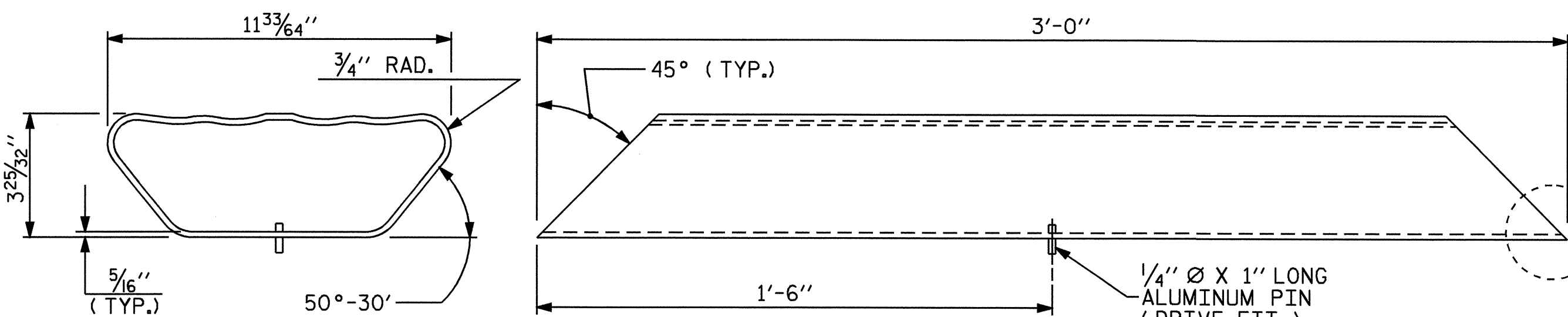
**TOP & MIDDLE RAIL SECTION**



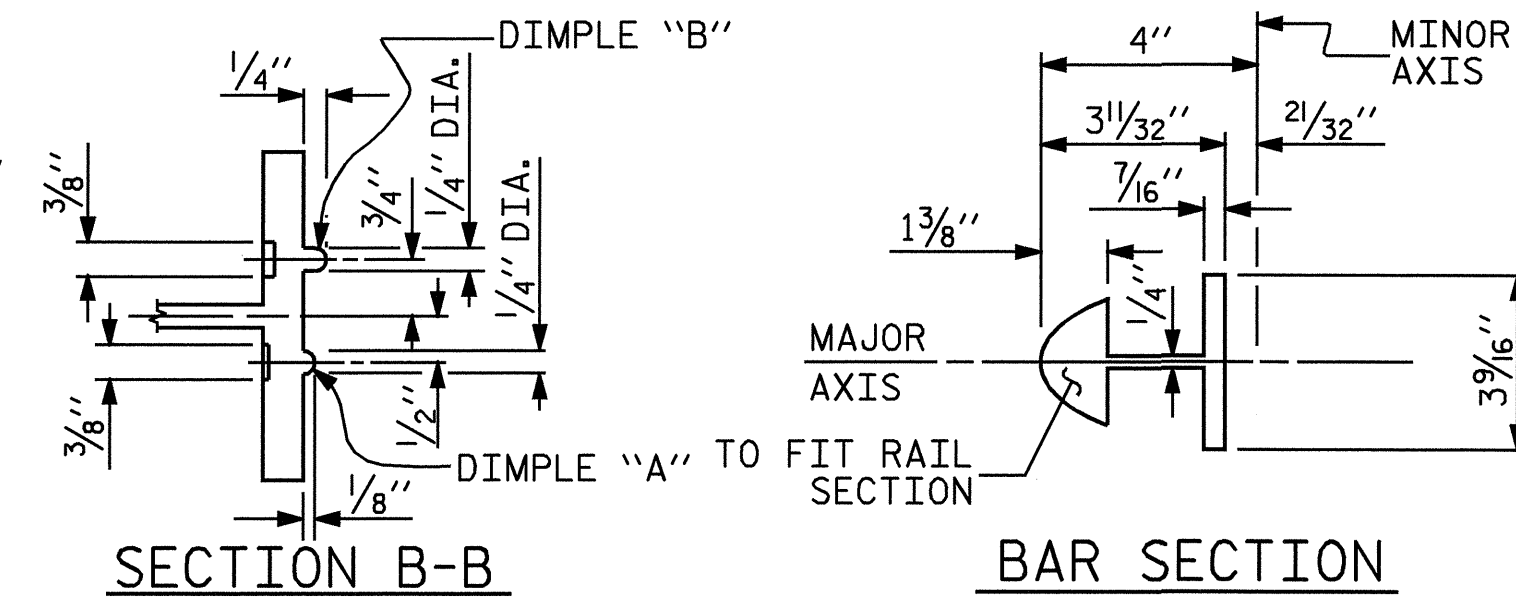
**5-BOLT METAL RAIL ANCHOR ASSEMBLY**

(78 ASSEMBLIES REQUIRED)

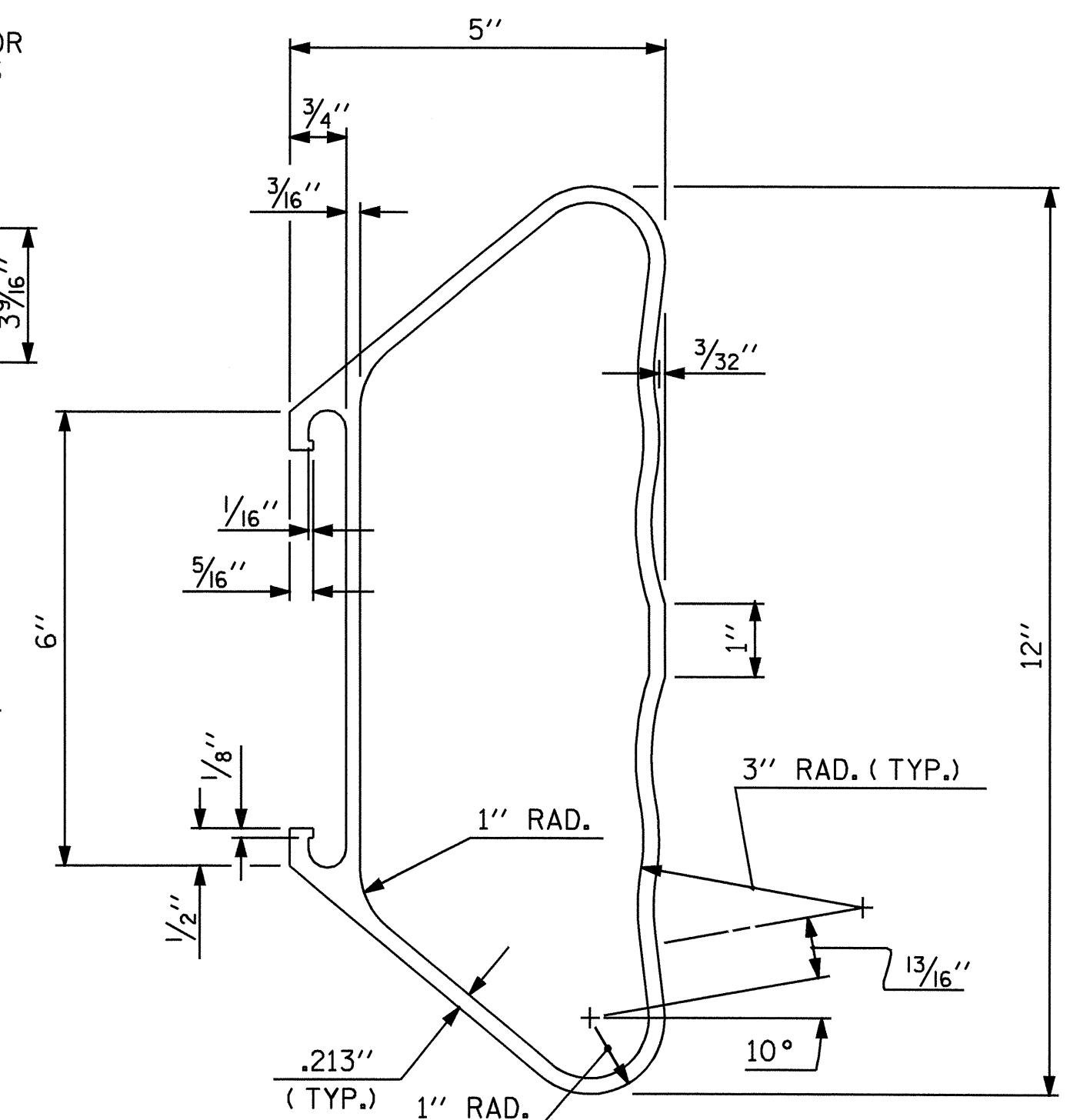
BREAK 1/8" RAD. WITH GRINDER - BOTH ENDS



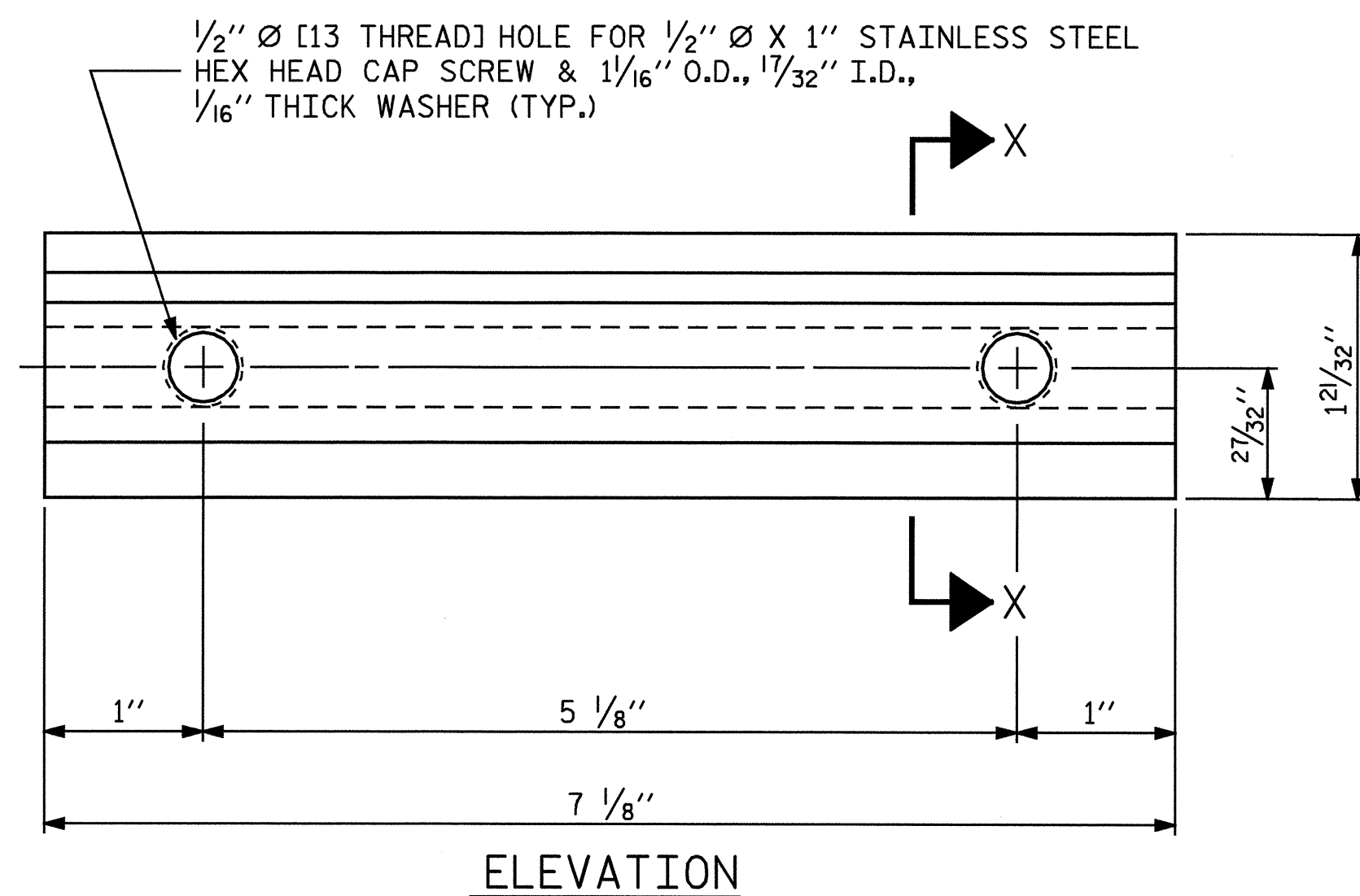
**BOTTOM RAIL EXPANSION BAR**



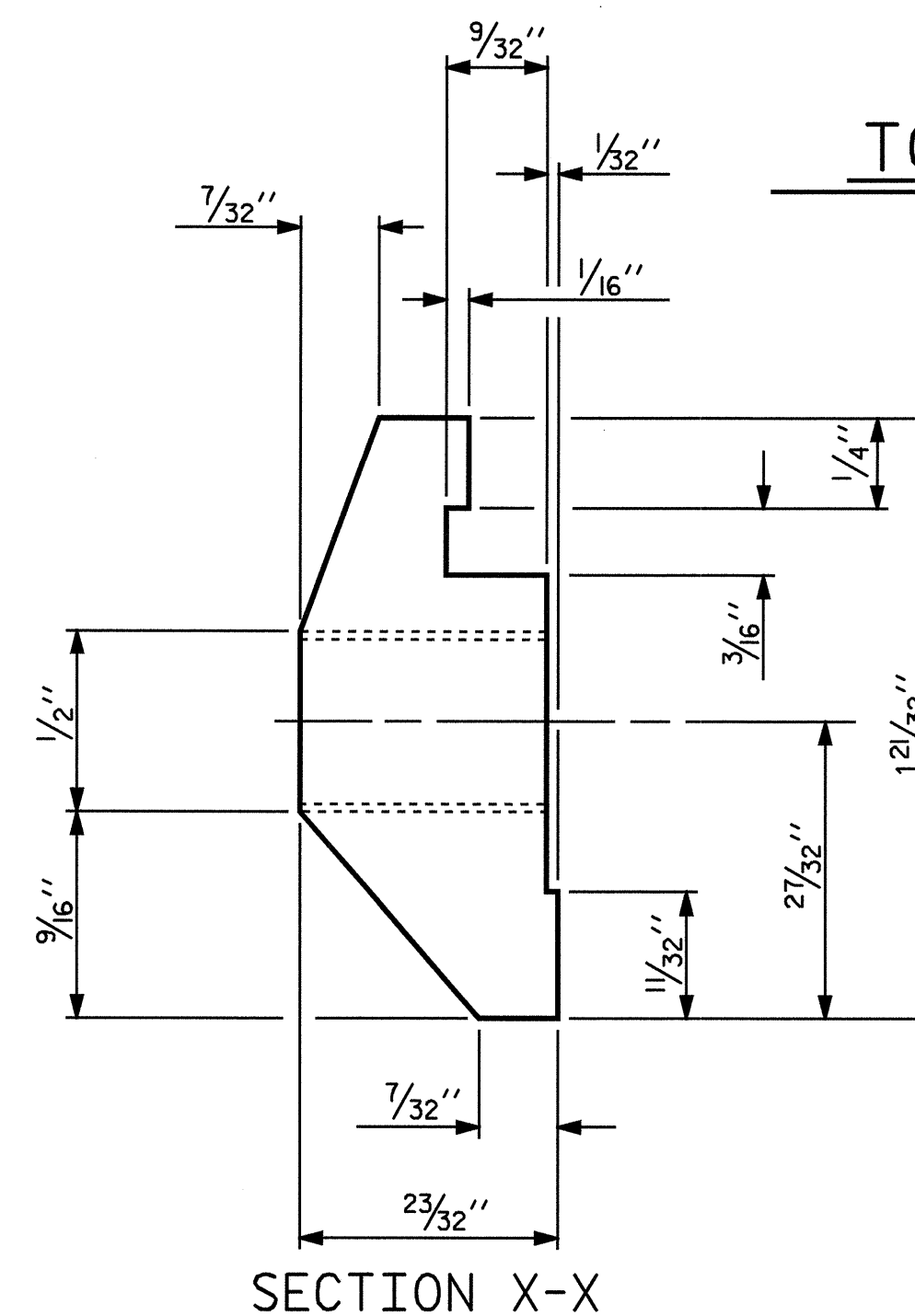
**TOP & MIDDLE RAIL EXPANSION BAR**



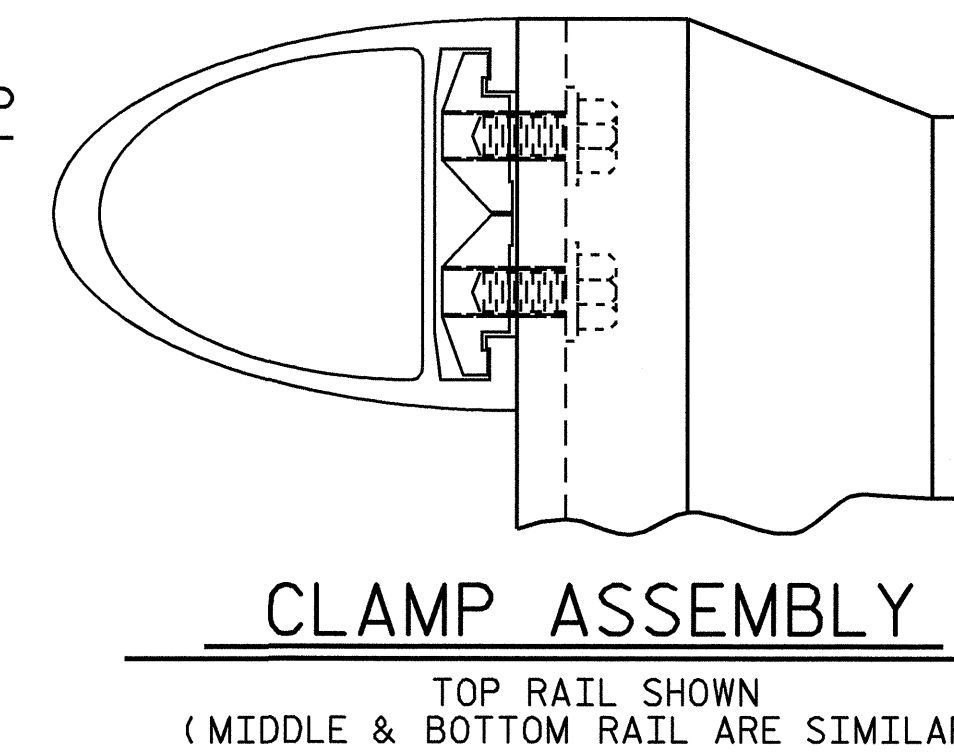
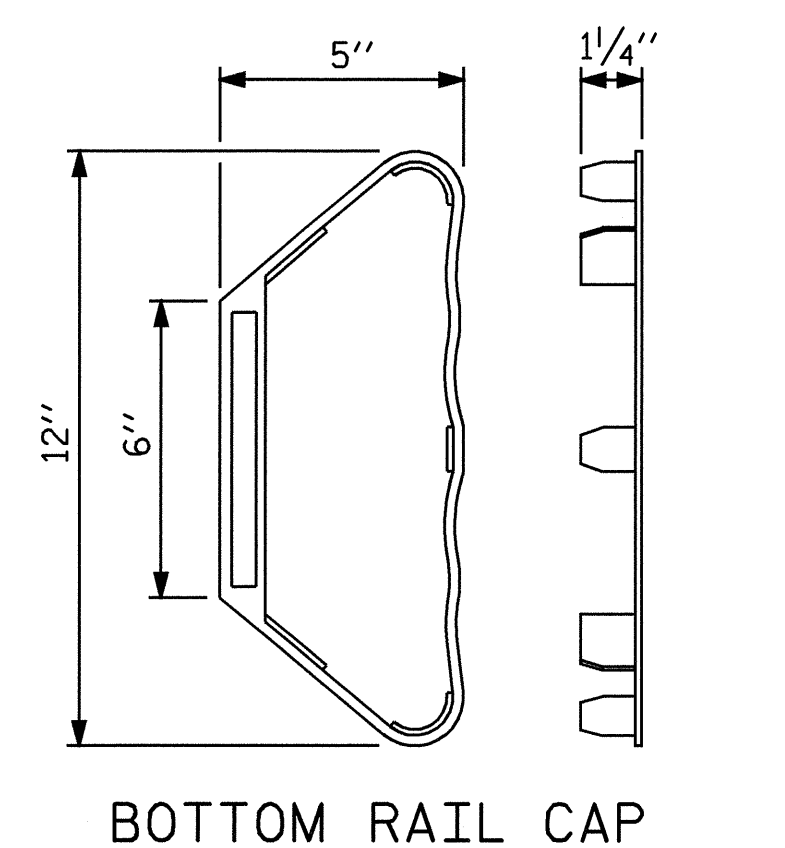
**BOTTOM RAIL SECTION**



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



**TOP & MIDDLE RAIL CAP**



**CLAMP ASSEMBLY**

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**3 BAR METAL RAIL**

ASSEMBLED BY : M. POOLE	DATE : 08-08
CHECKED BY : D. HODGE	DATE : 11-08
DRAWN BY : JMB 1/88	REV. 7/10/01 RWW/LES
CHECKED BY : GCH 1/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

3/24/08  
 NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15779  
 JOHN R. DUGGINS, P.E.

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

STR. #2 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.

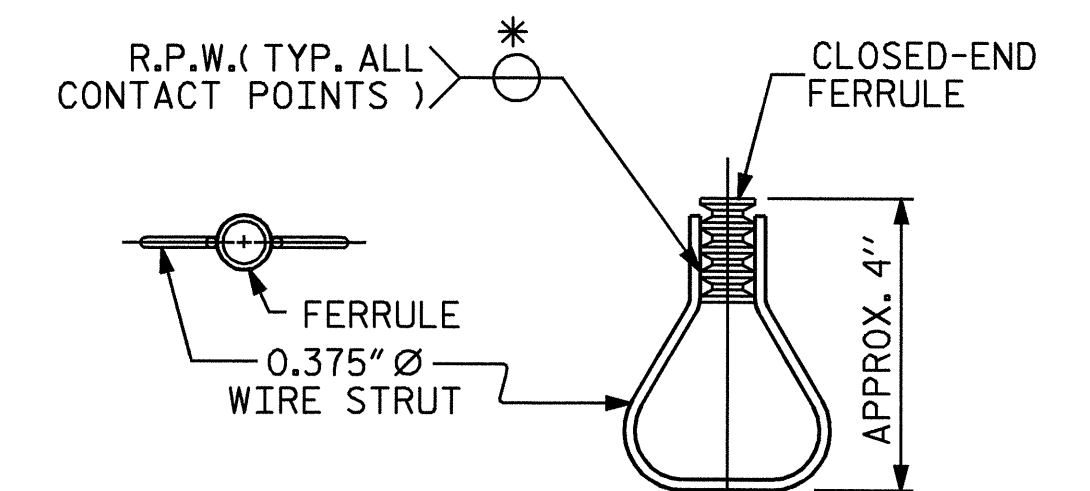
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT 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.



PLAN ELEVATION  
STRUCTURAL CONCRETE INSERT

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

PROJECT NO. R-4430  
HENDERSON COUNTY  
STATION: 93+31.40 -L-

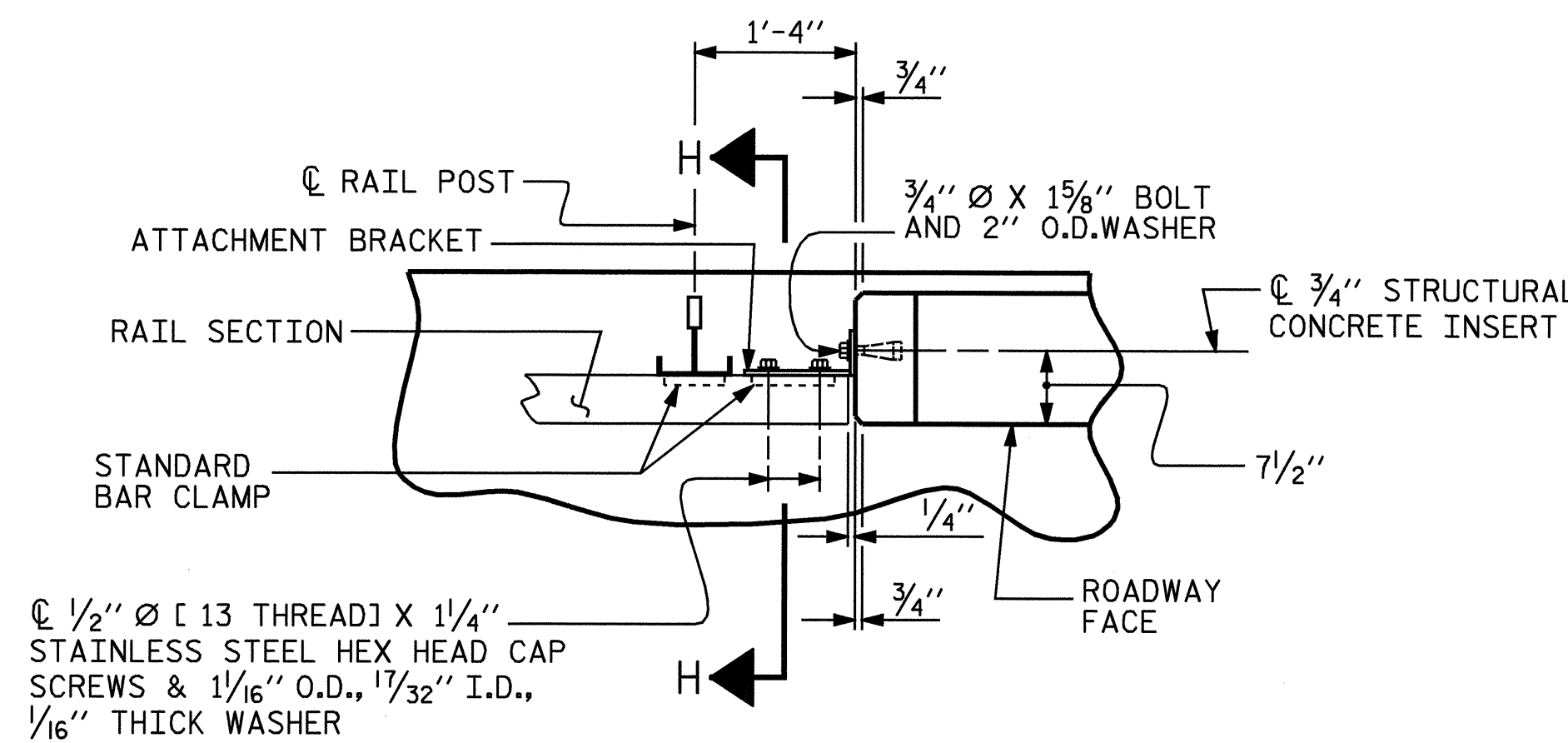
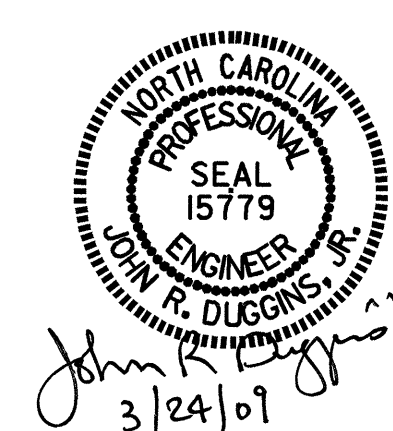
SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
3 BAR METAL RAIL

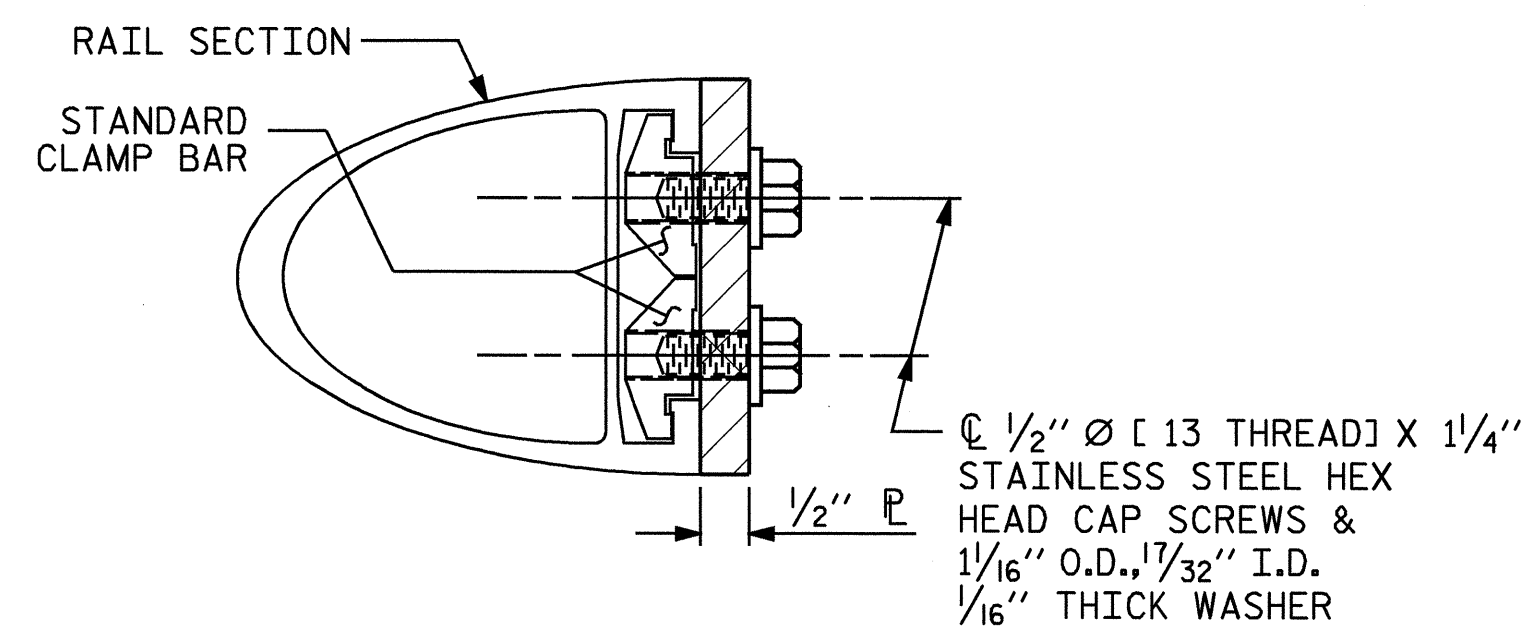
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-56
2			4			71

STR. #2 STD. NO. BMR7



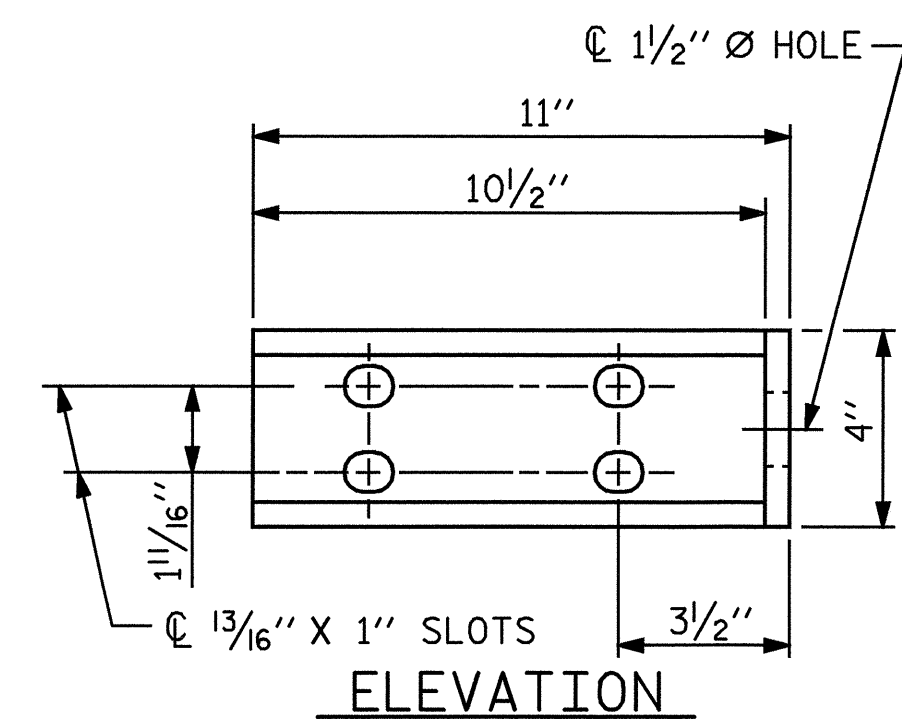
PLAN OF RAIL AND END POST

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

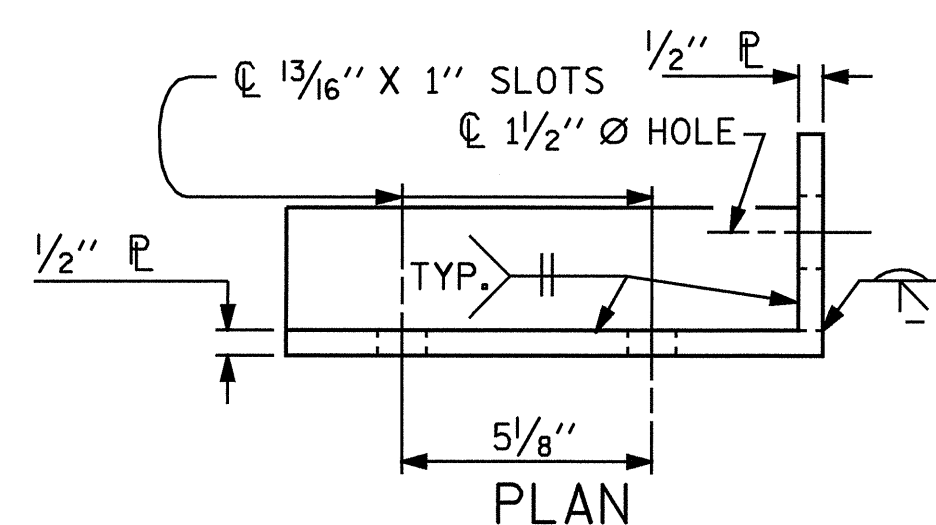


SECTION H-H

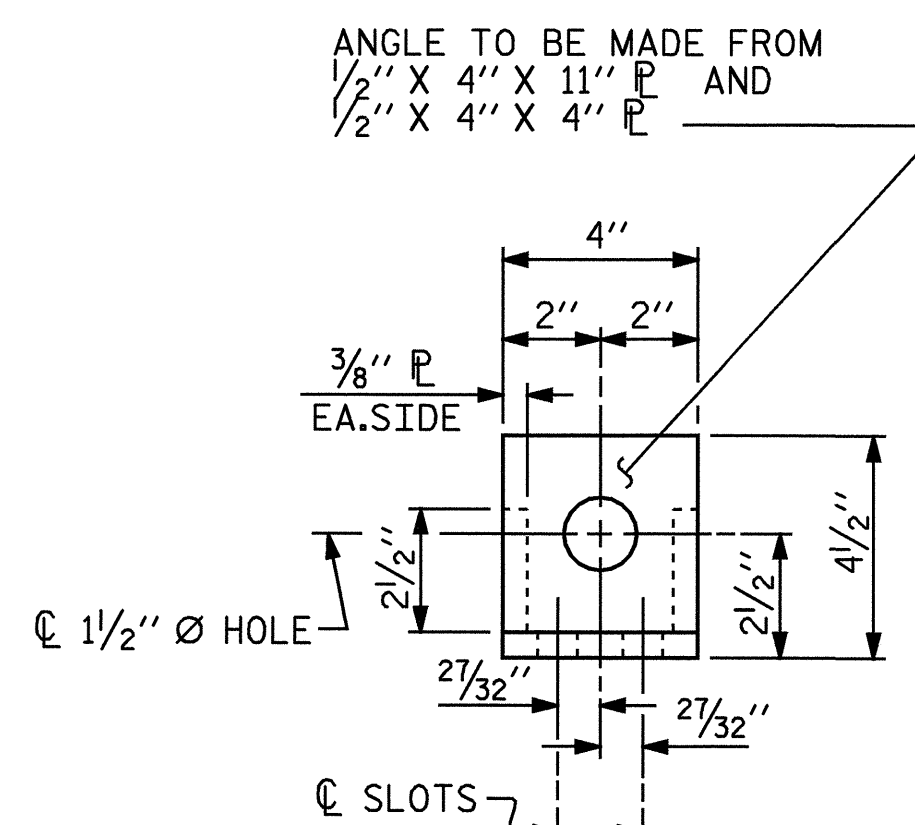
(FOR TOP & MIDDLE RAIL)



ELEVATION



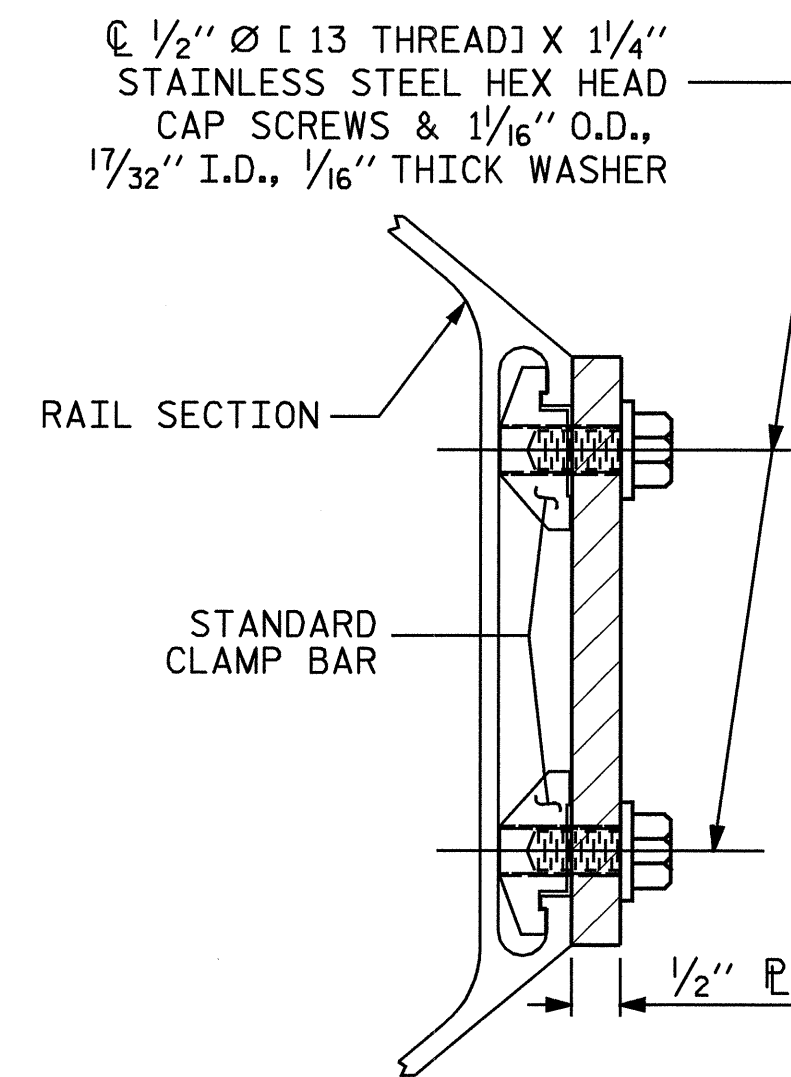
PLAN



END VIEW  
(FIX. AND EXP.)

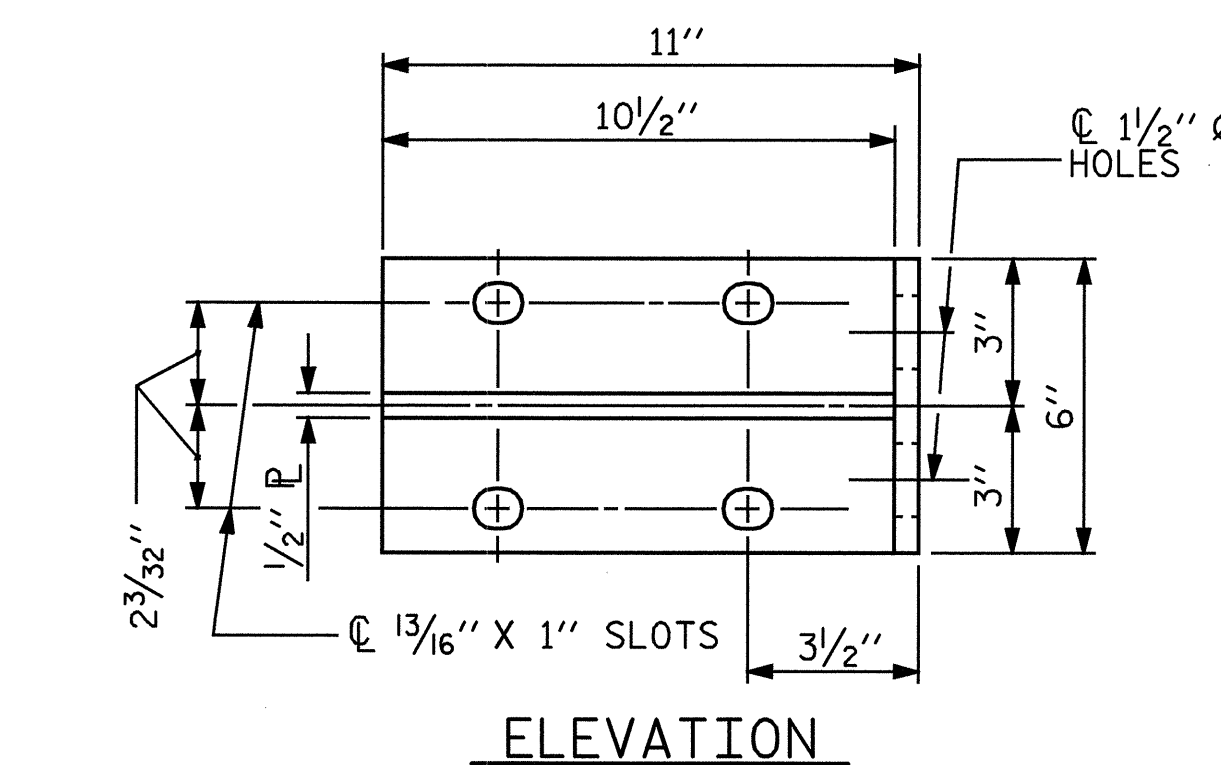
DETAILS FOR ATTACHMENT BRACKET

(TOP & MIDDLE RAIL ONLY)

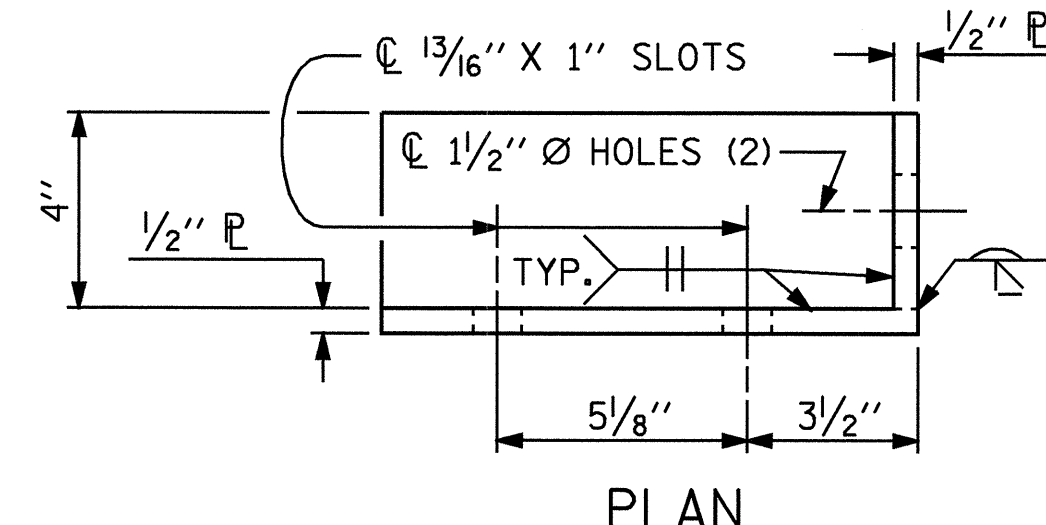


SECTION H-H

(FOR BOTTOM RAIL)



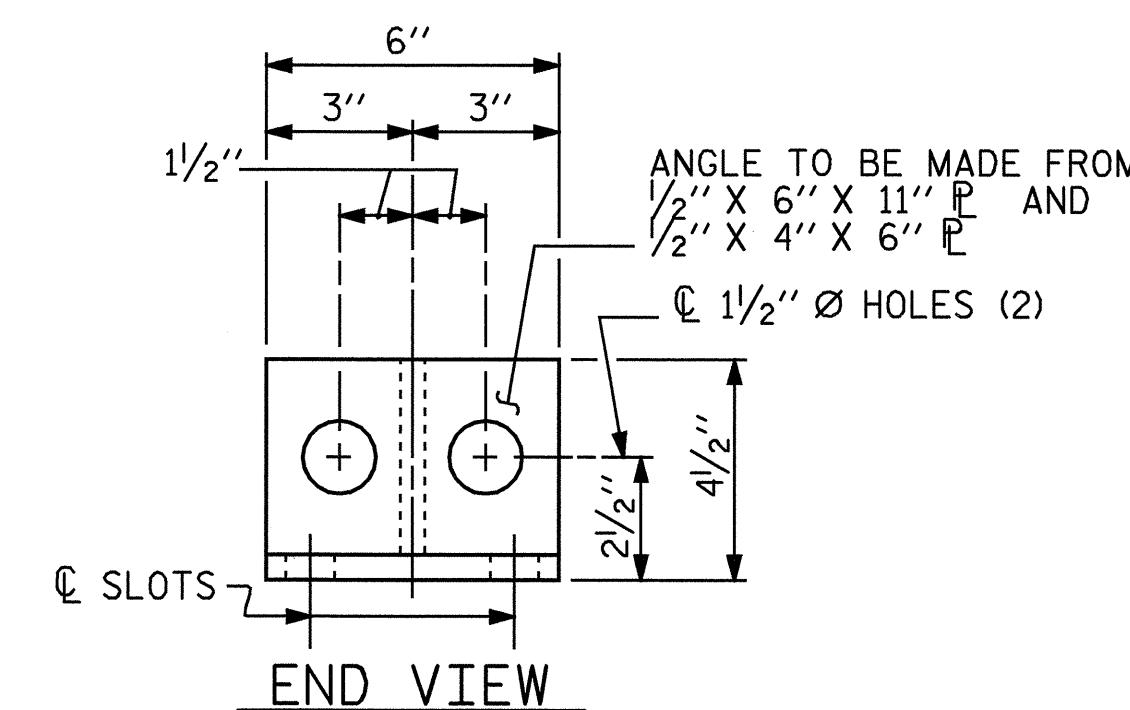
ELEVATION



PLAN

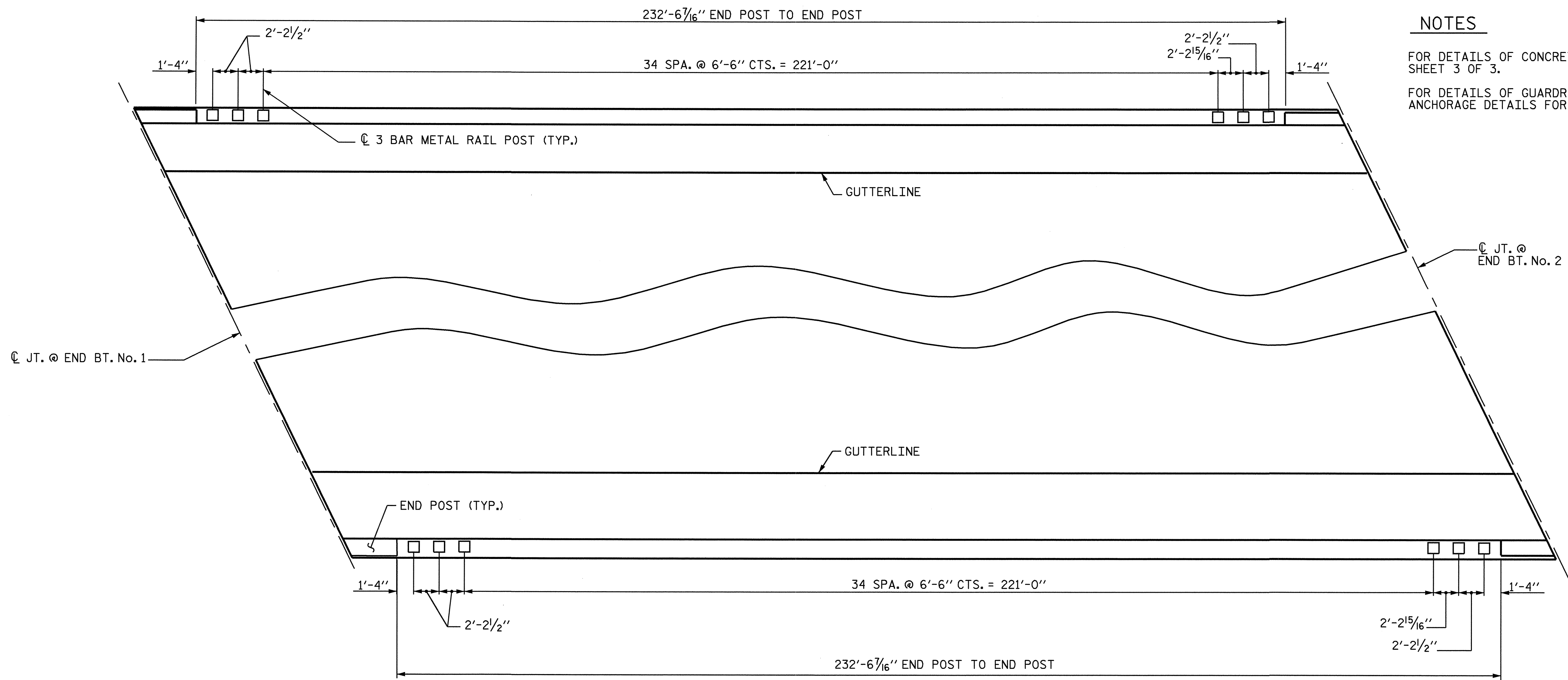
DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)



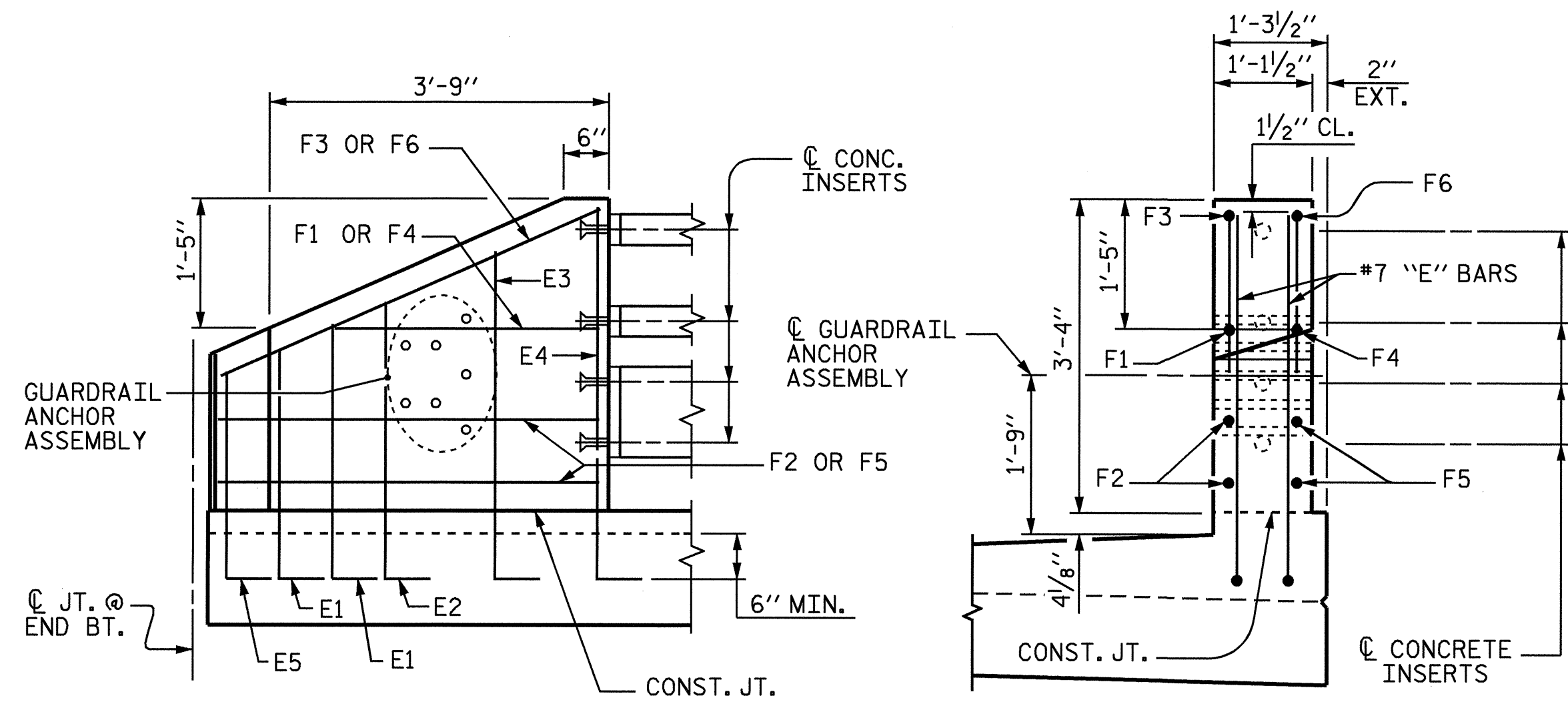
END VIEW

ASSEMBLED BY :	M. POOLE	DATE :	08-08
CHECKED BY :	D. HODGE	DATE :	11-08
DRAWN BY :	JMB 1/88	REV. 7/10/01	RWN/LJS
CHECKED BY :	GGH 1/88	REV. 5/7/03	RWN/JTE
		REV. 5/1/06	TLA/JM



**NOTES**  
 FOR DETAILS OF CONCRETE INSERTS, SEE "3 BAR METAL RAIL" SHEET 3 OF 3.  
 FOR DETAILS OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET.

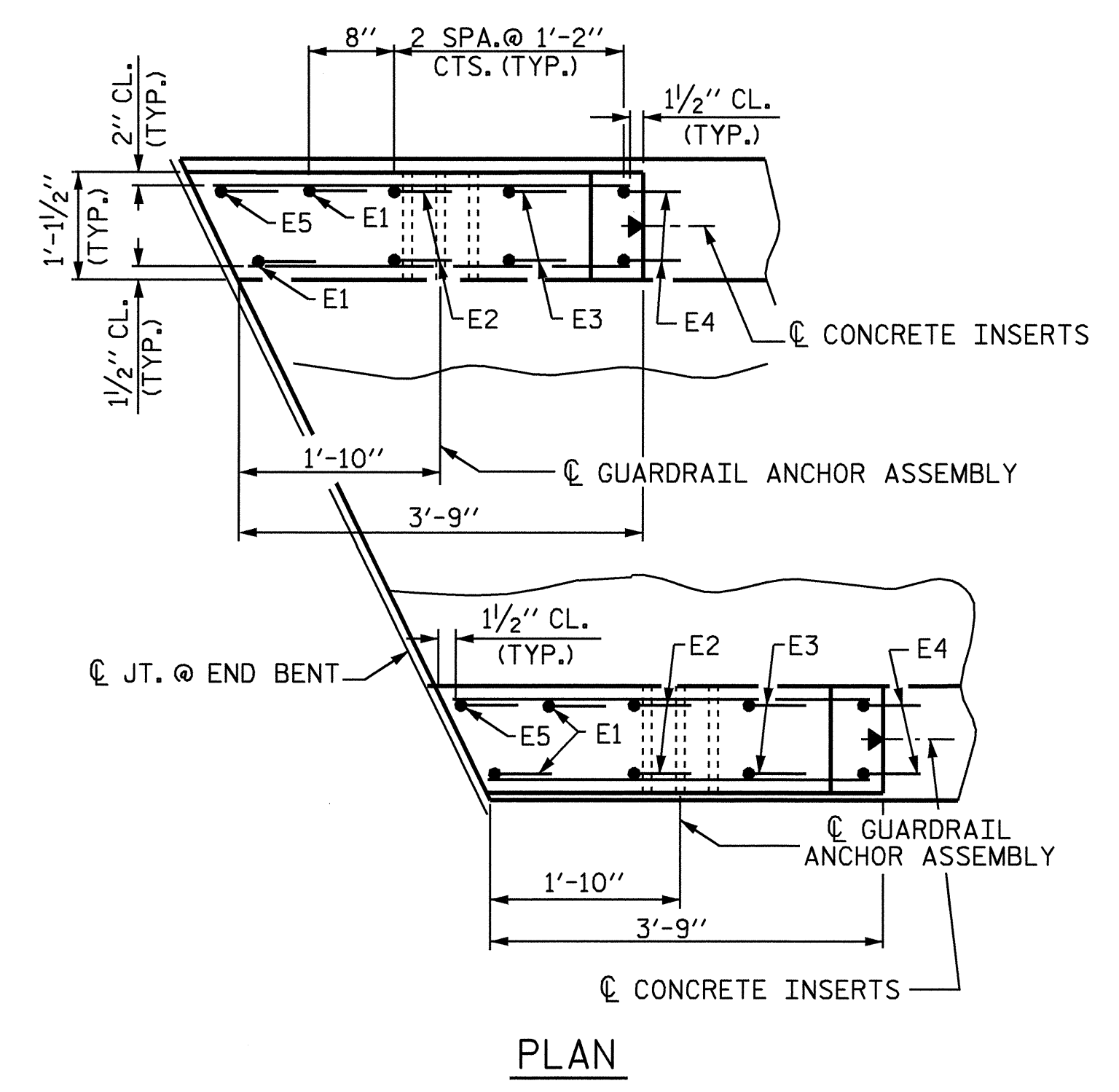
**PLAN OF RAIL POST SPACING**



**ELEVATION**

**END VIEW**

**END POST DETAILS**



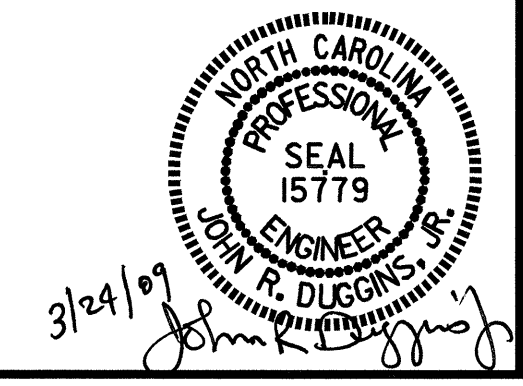
**PLAN**

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 93+31.40 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**RAIL POST SPACINGS  
 AND  
 END OF RAIL DETAILS  
 FOR 3 BAR METAL RAILS**

DRAWN BY : M. POOLE DATE : 11/08  
 CHECKED BY : D. HODGE DATE : 11/08

20-MAR-2009 15:16  
 r:\structures\vr-4430\str2\m\poole\R4430.ed.MR.02.dgn  
 dahodge



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-57
2			4			71

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.

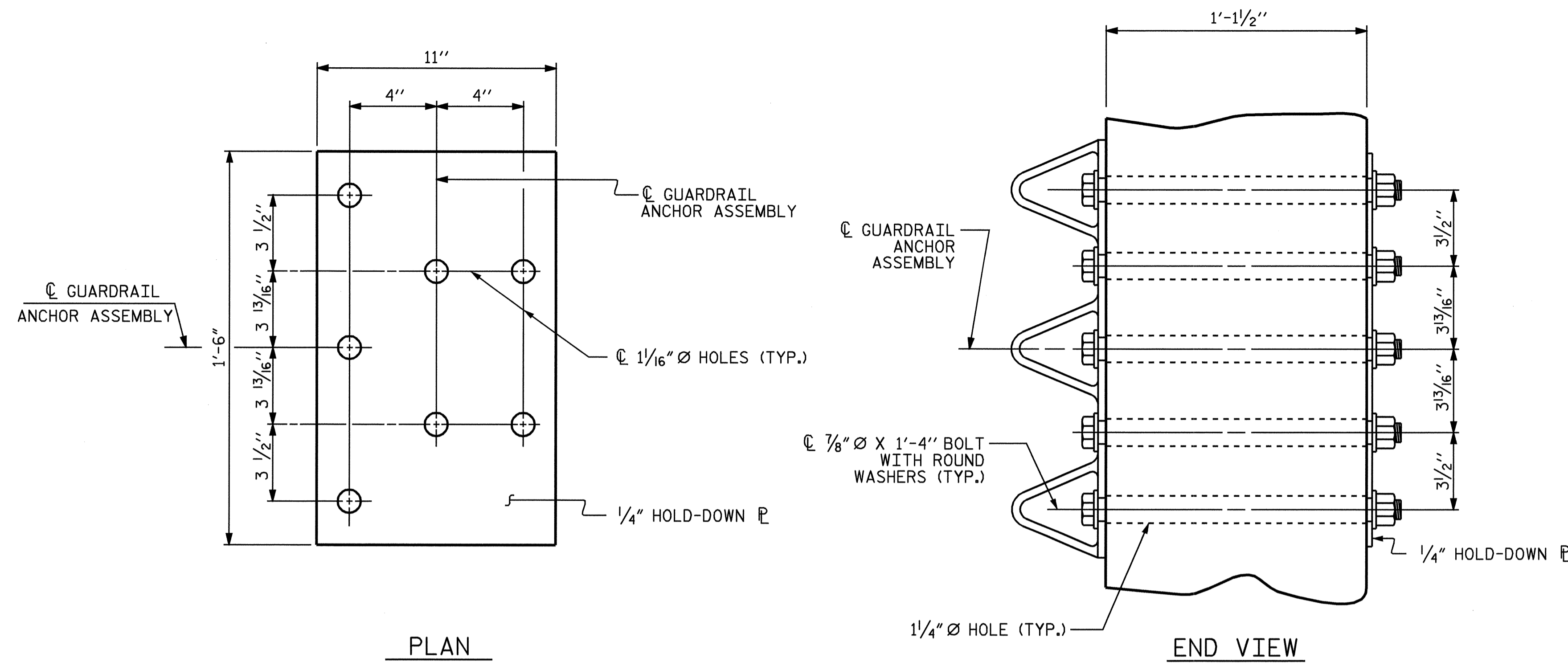
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS.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

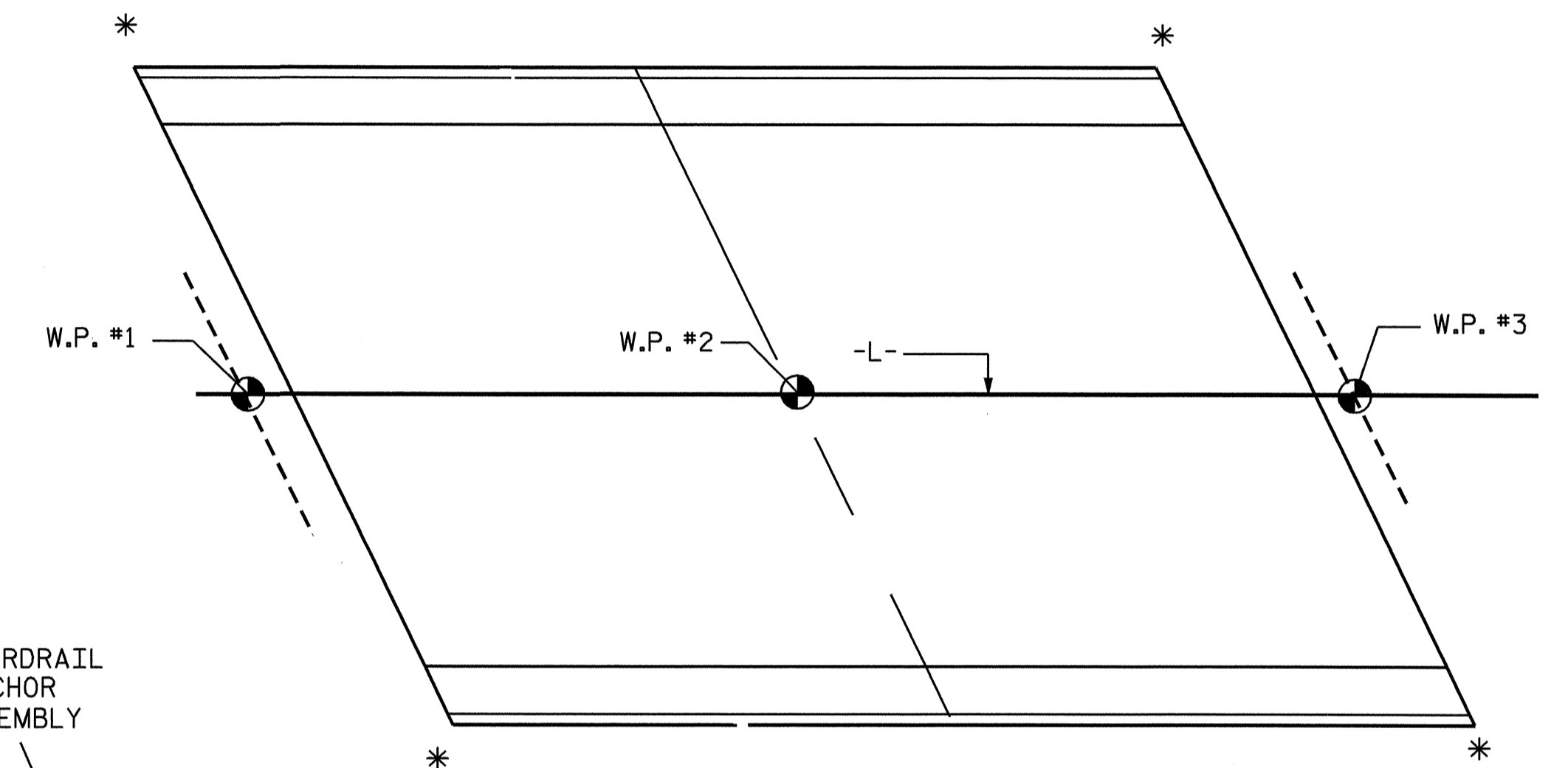
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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.

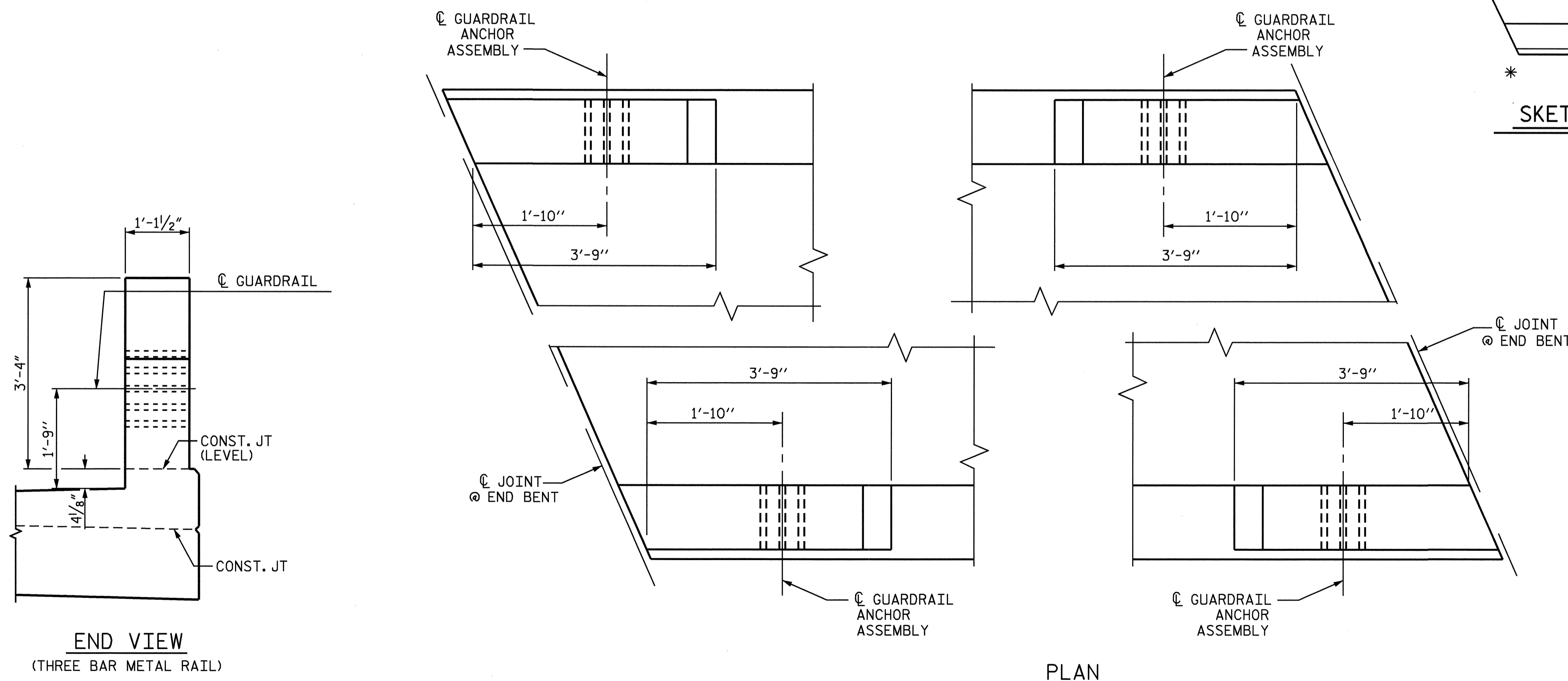


GUARDRAIL ANCHOR ASSEMBLY DETAILS



SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT

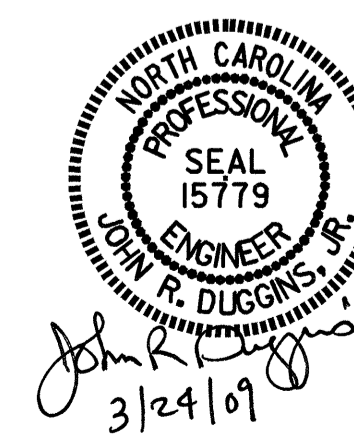


LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 93+31.40 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR METAL RAILS



ASSEMBLED BY :	M. POOLE	DATE :	08/08
CHECKED BY :	D. HODGE	DATE :	11/08
DRAWN BY :	EEM 6/94	REV. 10/17/00	RWW/LES
CHECKED BY :	RGW 6/94	REV. 5/1/03	RWW/JTE
		REV. 5/1/06	TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-58
2			4			71

NOTES

ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169 GRADES 1010 THRU 1020 OR APPROVED EQUAL.

STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON THE PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.

UPON COMPLETION OF SHOP FABRICATION, THE ENTIRE ANCHOR ASSEMBLY SHALL BE METALLIZED. THE 1/2" Ø STUD ANCHORS AND ANCHOR TABS NEED NOT BE METALLIZED. SEE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).

ANCHOR ASSEMBLY SHALL BE MADE CONTINUOUS THE LENGTH OF THE JOINT FROM GUTTER TO GUTTER. FOR FIELD SPLICES AT ALL CROWN BREAK POINTS, THE ENDS OF THE STEEL ANGLES SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE. FINISHED FIELD WELDS SHALL BE GROUND SMOOTH AND COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

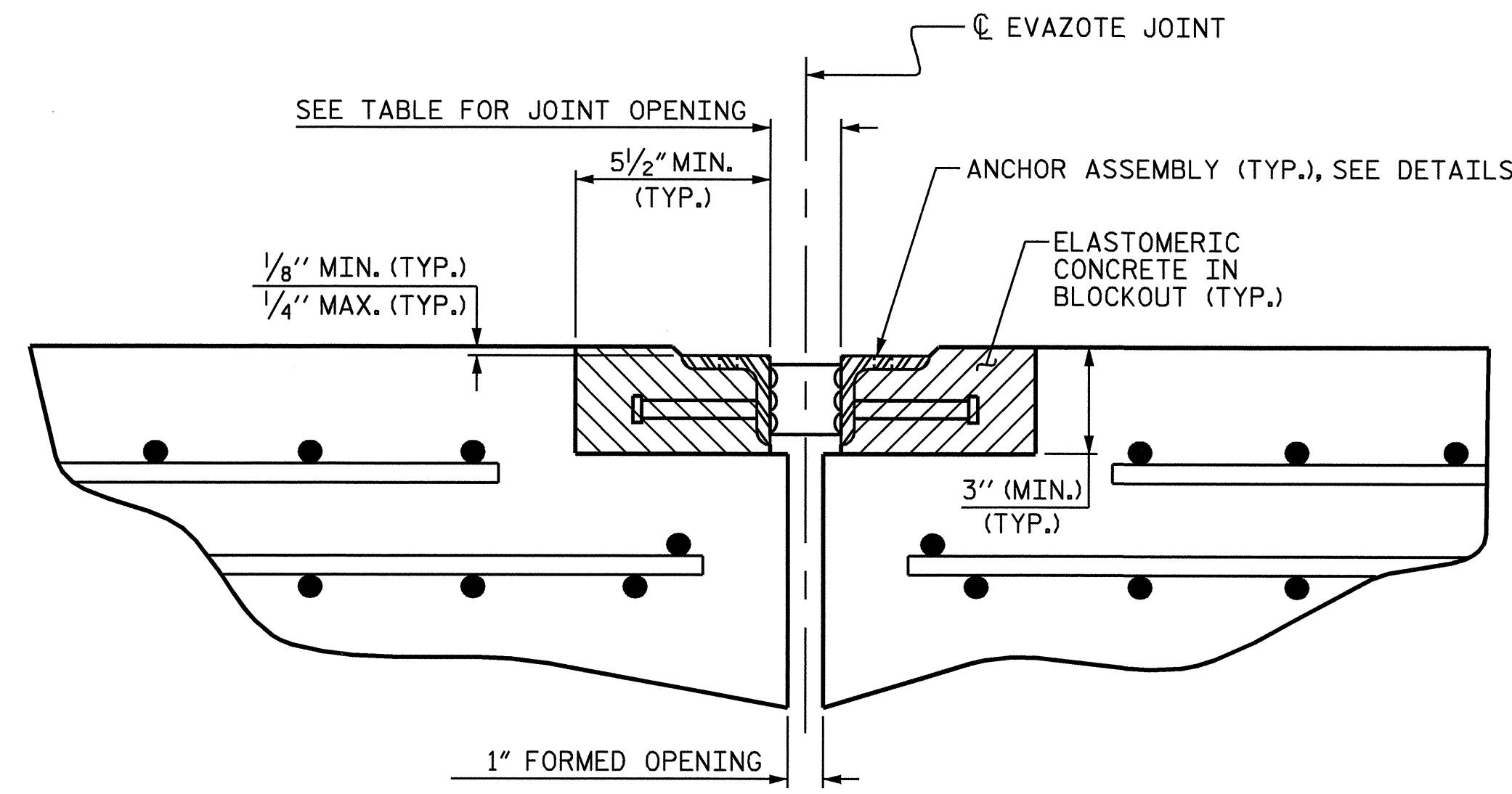
ANCHOR ASSEMBLY SEGMENTS SHALL NOT BE LESS THAN 12 FEET NOR MORE THAN 20 FEET IN LENGTH. SHORTER SEGMENTS MAY BE USED AT THE EDGE OF ROADWAY OR AT POINTS OF STAGED CONSTRUCTION.

THE ANCHOR ASSEMBLY SHALL BE SECURED AND LEVELED AS SHOWN IN THE "ARMORED JOINT ANCHOR ASSEMBLY DETAILS". NO SUBMITTALS ARE REQUIRED FOR 3/8" Ø EXPANSION ANCHORS, NUTS OR WASHERS. THE CONTRACTOR MAY SUBMIT FOR APPROVAL AN ALTERNATE METHOD OF ALIGNING AND LEVELING THE ANGLES. THE ALTERNATE METHOD SHALL NOT INCLUDE ANY WELDING TO THE OUTSIDE FACE OF THE ANGLES.

AFTER THE ELASTOMERIC CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE ANY EXCESS CONCRETE THAT COMES THROUGH THE WEEP HOLES AND THOROUGHLY CLEAN THE ANGLES. ANY DAMAGED STEEL SHALL BE COATED WITH A MINIMUM OF 4 MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

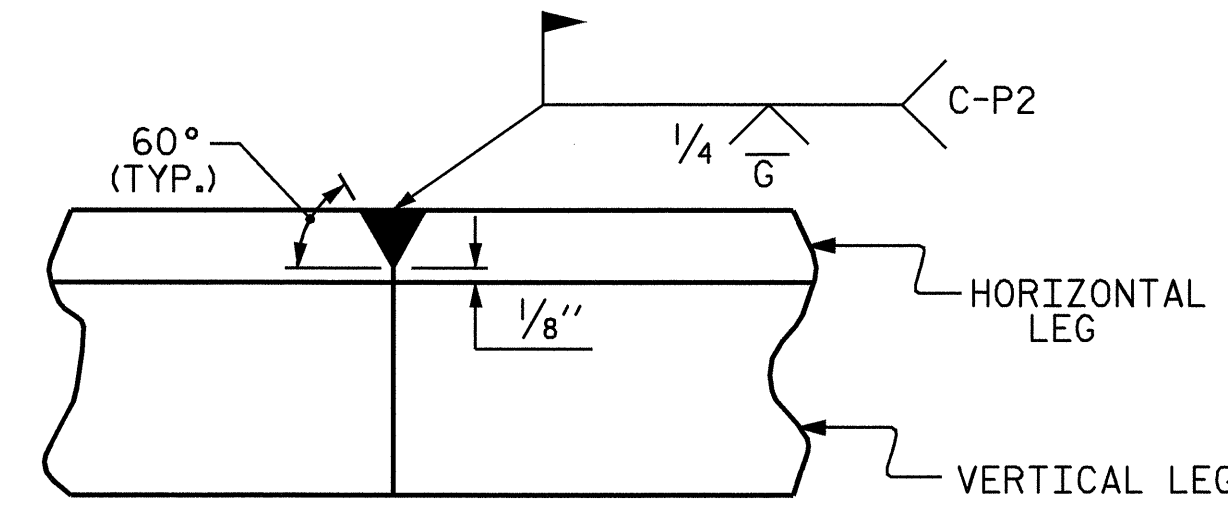
SEE SPECIAL PROVISIONS FOR EVAZOTE JOINT SEALS.

SEE SPECIAL PROVISIONS FOR ELASTOMERIC CONCRETE.

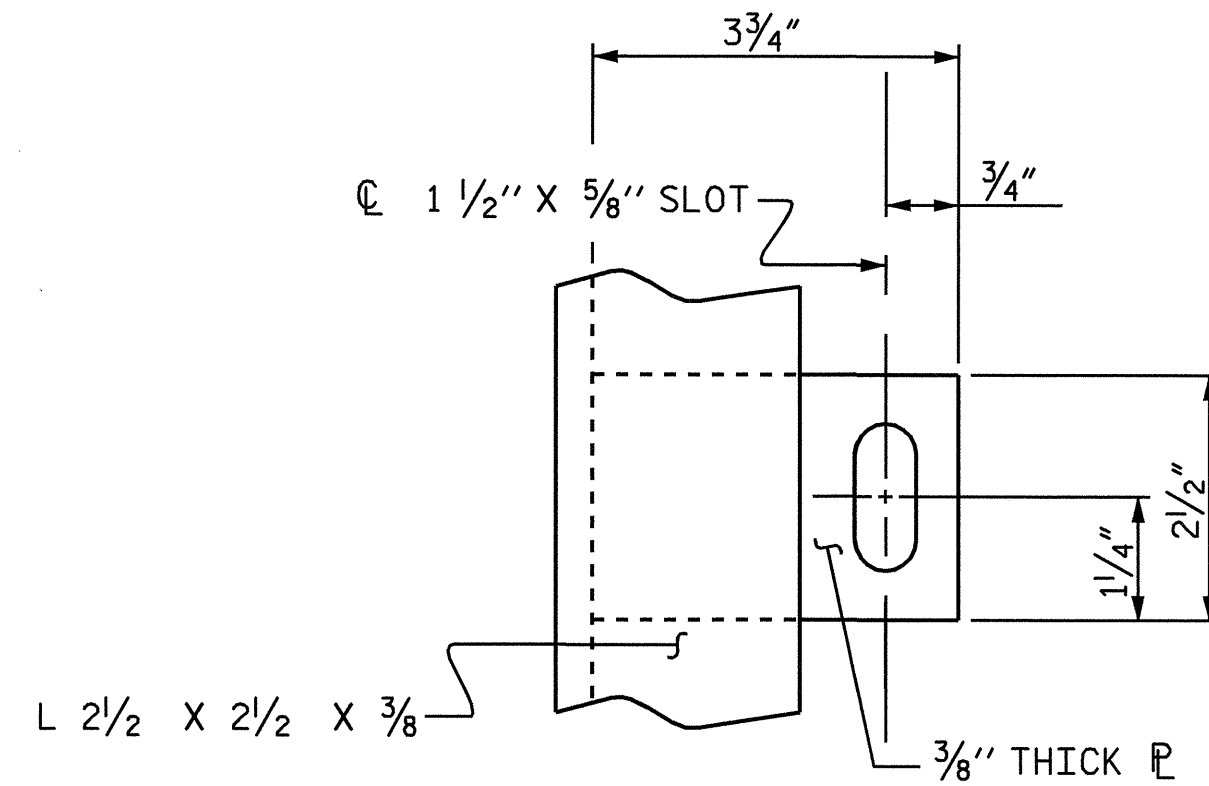


ARMORED JOINT DETAILS

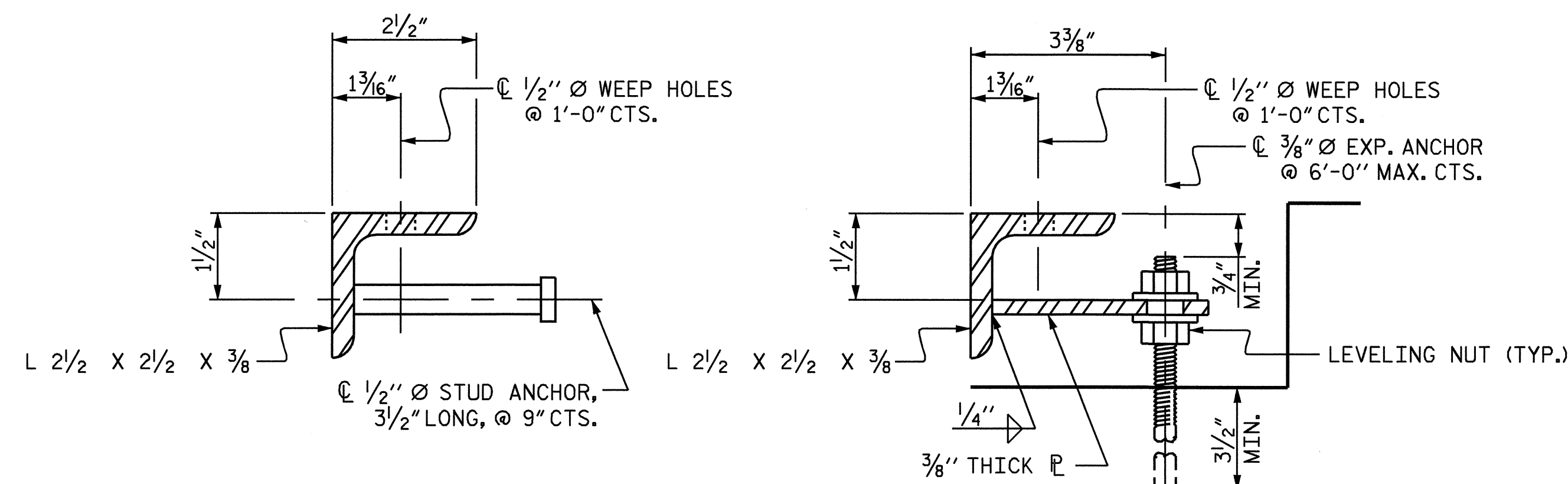
SECTION NORMAL TO JOINT AT END BENTS



DETAIL- FIELD WELD SPLICE OF ANGLE



PLAN VIEW OF TAB



SECTION VIEW OF STUD

SECTION VIEW OF TAB

ARMORED JOINT ANCHOR ASSEMBLY DETAILS

MOVEMENT AND SETTING AT EVAZOTE JOINT						
END BENT NO.	SKEW ANGLE	NOMINAL UNCOMPRESSED SEAL WIDTH	TOTAL MOVEMENT (ALONG C.R.D.WY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	63°-56'-08.5"	2 1/2"	1 1/8"	2 1/16"	1 7/8"	1 1/2"
2	63°-56'-08.5"	2 1/2"	1 1/8"	2 1/16"	1 7/8"	1 1/2"

TOTAL MOVEMENT IS CALCULATED ALONG THE CENTERLINE OF ROADWAY. JOINT OPENINGS ARE MEASURED PERPENDICULAR TO THE JOINT.

BILL OF MATERIAL		
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)	TOTAL LENGTH OF ANGLE (FT)
1	21.4	187'-0 1/4"
2	21.4	187'-0 1/4"

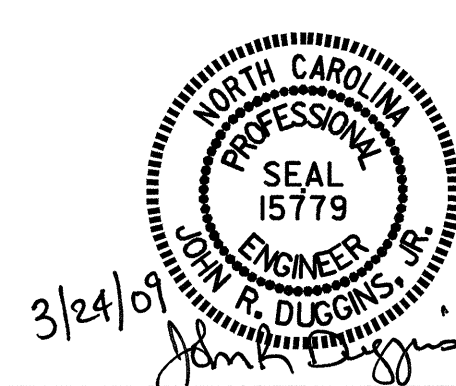
\* BASED ON THE MINIMUM BLOCKOUT SHOWN.

PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 93+31.40 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 ARMORED EVAZOTE  
 JOINT DETAILS

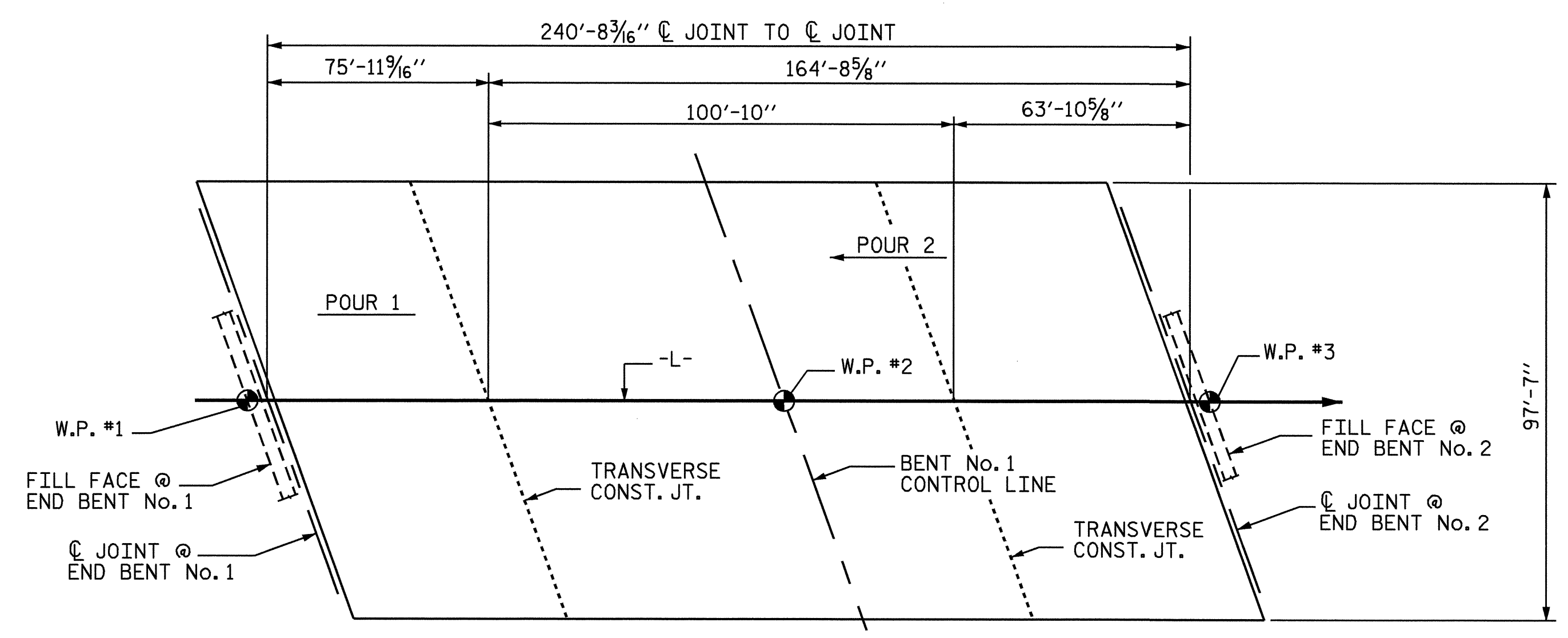
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-59
2			4			71



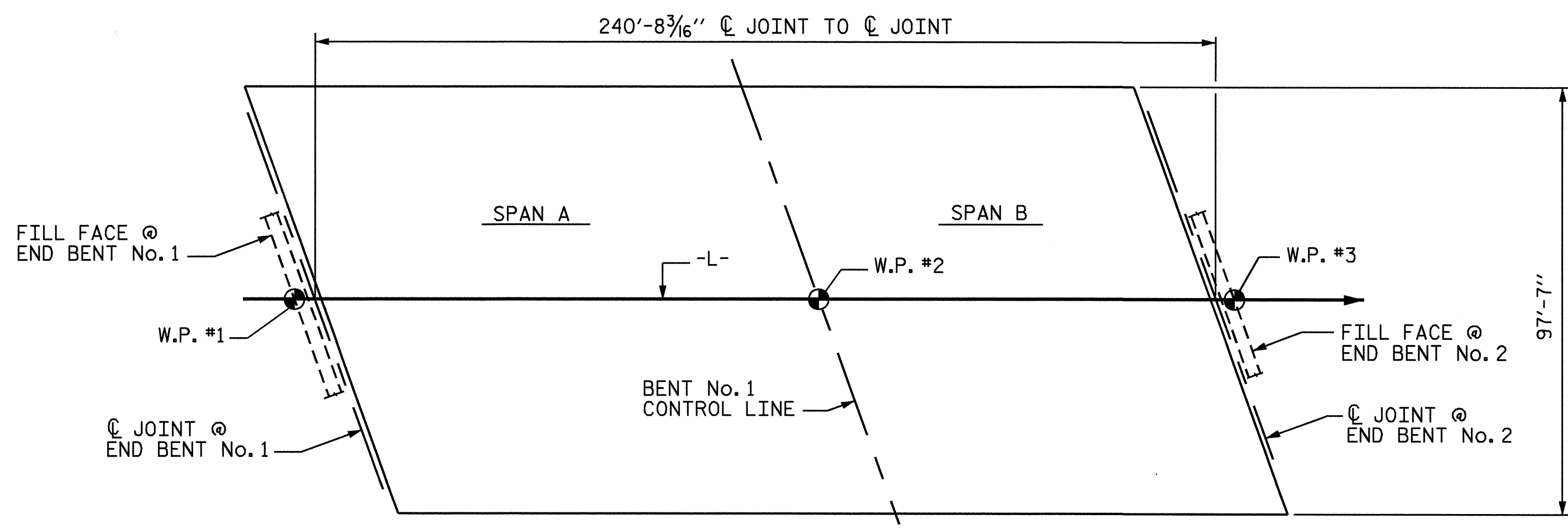
ASSEMBLED BY : M. POOLE DATE : 11/08  
 CHECKED BY : D. HODGE DATE : 11/08  
 DRAWN BY : EEM 1/96 LES/RDR  
 CHECKED BY : RGW 1/96 REV. 5/7/03RR RWW/JTE  
 REV. 7/10/01 TLA/GM  
 REV. 5/1/06

**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"			



**POURING SEQUENCE**



**LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB**  
TOTAL = 23,487 SQ. FEET

DRAWN BY: M. POOLE DATE: 08-08  
CHECKED BY: D. HODGE DATE: 11-08

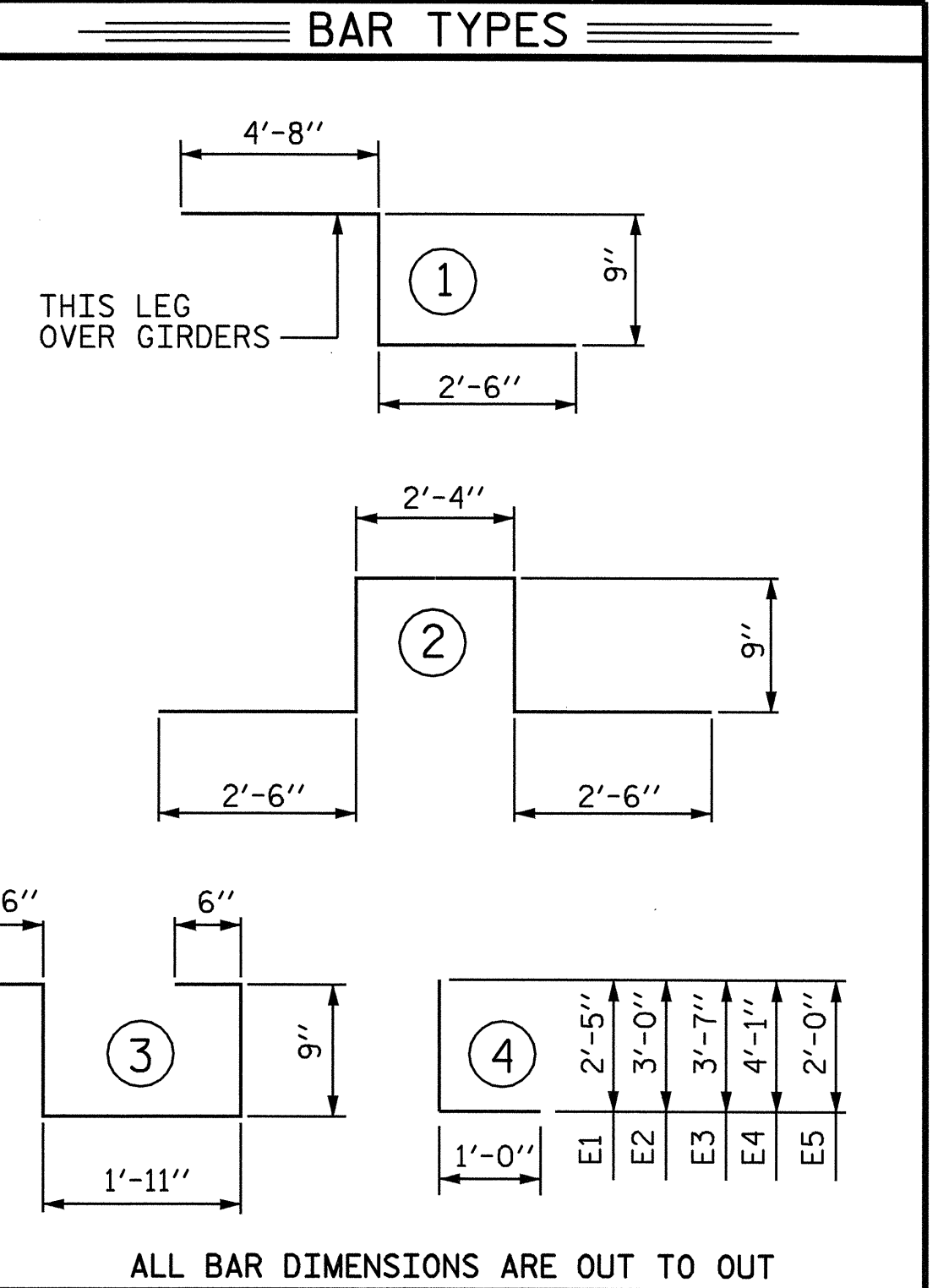
20-MAR-2009 15:14  
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dahodge

**BILL OF MATERIAL**

SPANS A & SPAN B					SPANS A & B SIDEWALK & CONCRETE MEDIAN						
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT		
*A1	714	5	STR	49'-11"	37173	*A3	158	4	STR	2'-8"	281
A2	714	5	STR	49'-9"	37049	*B6	108	4	STR	28'-6"	2056
*A101	12	5	STR	48'-3"	604	*B7	27	4	STR	27'-11"	504
*A102	12	5	STR	46'-7"	583	*D1	288	4	STR	10"	160
*A103	12	5	STR	44'-4"	555	*E1	8	7	4	3'-5"	56
*A104	12	5	STR	43'-3"	541	*E2	8	7	4	4'-0"	65
*A105	12	5	STR	41'-7"	520	*E3	8	7	4	4'-7"	75
*A106	12	5	STR	39'-11"	500	*E4	8	7	4	5'-1"	83
*A107	12	5	STR	38'-3"	479	*E5	4	7	4	3'-0"	25
*A108	12	5	STR	36'-7"	458	*F1	4	6	STR	2'-4"	14
*A109	12	5	STR	34'-11"	437	*F2	8	6	STR	3'-10"	46
*A110	12	5	STR	33'-3"	416	*F3	4	6	STR	4'-1"	25
*A111	12	5	STR	31'-8"	396	*F4	4	6	STR	2'-4"	14
*A112	6	6	STR	57'-4"	359	*F5	8	6	STR	3'-5"	41
*A113	6	6	STR	54'-1"	338	*F6	4	6	STR	3'-7"	22
*A114	6	6	STR	50'-9"	318	*G2	480	4	STR	6'-1"	1951
*A115	6	6	STR	47'-5"	297	* EPOXY COATED REINF. STEEL 5418 LBS.					
*A116	6	6	STR	44'-1"	276						
*A117	6	6	STR	40'-9"	255						
*A118	6	6	STR	37'-5"	234						
*A119	6	6	STR	34'-1"	213						
*A120	6	6	STR	30'-9"	192						
*A121	6	6	STR	27'-6"	172						
*A122	6	6	STR	24'-2"	151						
*A123	6	6	STR	20'-10"	130						
*A124	6	6	STR	17'-6"	110						
*A125	6	6	STR	14'-2"	89						
*A126	6	6	STR	10'-10"	68						
*A127	6	6	STR	7'-6"	47						
*A128	6	5	STR	4'-3"	27						
A201	12	5	STR	48'-1"	602						
A202	12	5	STR	46'-5"	581						
A203	12	5	STR	44'-9"	560						
A204	12	5	STR	43'-1"	539						
A205	12	5	STR	41'-5"	518						
A206	12	5	STR	39'-9"	498						
A207	12	5	STR	38'-1"	477						
A208	12	5	STR	36'-5"	456						
A209	12	5	STR	34'-9"	435						
A210	12	5	STR	33'-1"	414						
A211	12	5	STR	31'-6"	394						
A212	6	6	STR	57'-4"	359						
A213	6	6	STR	54'-1"	338						
A214	6	6	STR	50'-9"	318						
A215	6	6	STR	47'-5"	297						
A216	6	6	STR	44'-1"	276						
A217	6	6	STR	40'-9"	255						
A218	6	6	STR	37'-5"	234						
A219	6	6	STR	34'-1"	213						
A220	6	6	STR	30'-9"	192						
A221	6	6	STR	27'-6"	172						
A222	6	6	STR	24'-2"	151						
A223	6	6	STR	20'-10"	130						
A224	6	6	STR	17'-6"	110						
A225	6	6	STR	14'-2"	89						
A226	6	6	STR	10'-10"	68						
A227	6	6	STR	7'-6"	47						
A228	6	5	STR	4'-3"	27						
*B1	195	4	STR	30'-0"	3908						
*B2	128	7	STR	42'-8"	11163						
*B3	130	7	STR	52'-8"	13995						
*B4	195	4	STR	20'-10"	2714						
B5	525	5	STR	49'-10"	27287						
*G1	4	5	STR	55'-5"	231						
*K1	12	5	1	7'-11"	99						
*K2	60	5	2	8'-10"	553						
*K3	66	5	STR	7'-4"	505						
*S1	154	4	3	4'-5"	454						
REINFORCING STEEL				73,086 LBS							
* EPOXY COATED REIN. STEEL				79,560 LBS							
* THESE BARS ARE EPOXY COATED											

**GROOVING BRIDGE FLOORS**

BRIDGE DECK	17,730 SQ. FEET
APPROACH SLAB	3,480 SQ. FEET
TOTAL	21,210 SQ. FEET



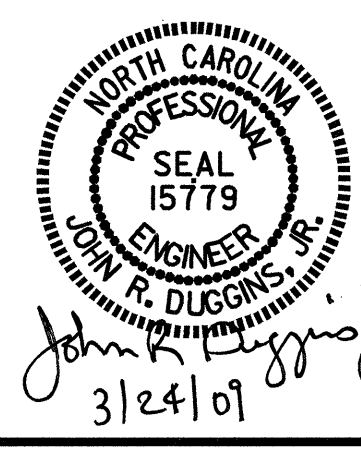
ALL BAR DIMENSIONS ARE OUT TO OUT

**SUPERSTRUCTURE BILL OF MATERIAL**

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
SPANS A & B		73,086 LBS	84,978 LBS
POUR 1	233.3 C.Y.		
POUR 2	501.4 C.Y.		
SIDEWALK	83.9 C.Y.	**	**
END POSTS	1.8 C.Y.	**	**
CONCRETE MEDIAN	13.1 C.Y.	**	**
TOTALS	833.5 C.Y.	73,086 LBS	84,978 LBS

\*\* SIDEWALK, END POST AND CONCRETE MEDIAN REINFORCING STEEL IS INCLUDED IN TOTAL.

PROJECT NO. R-4430  
HENDERSON COUNTY  
STATION: 93+31.40 -L-



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SUPERSTRUCTURE BILL OF MATERIAL**

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

TOTAL SHEETS: 71

**NOTES**

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

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

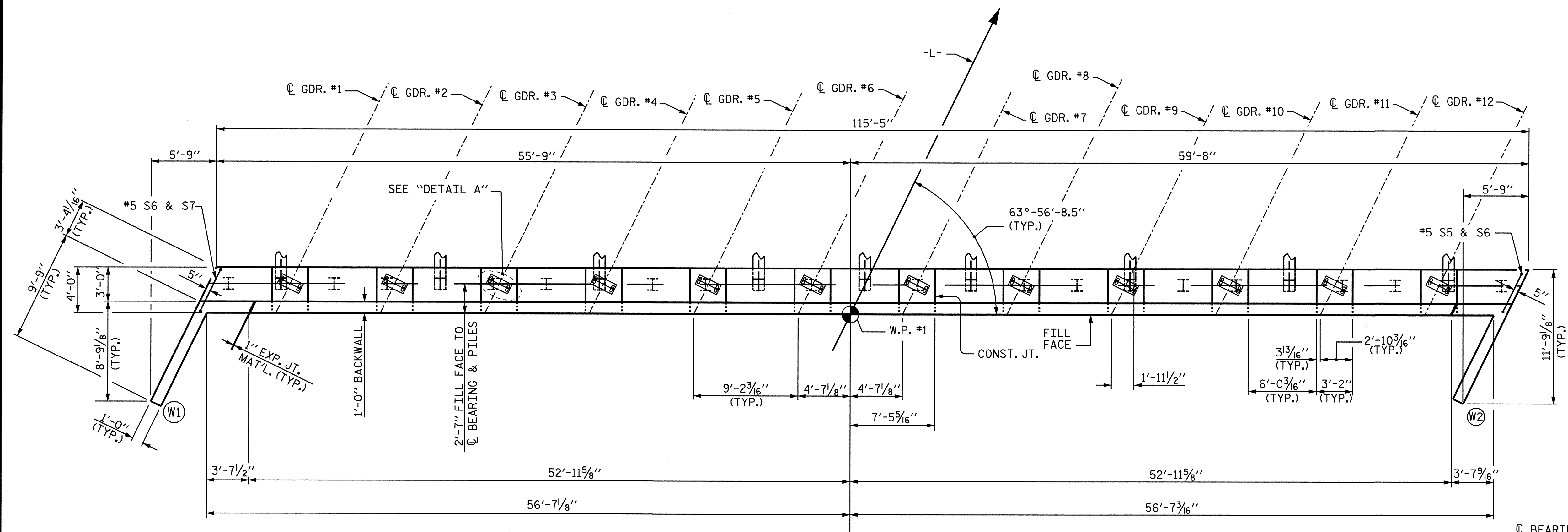
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

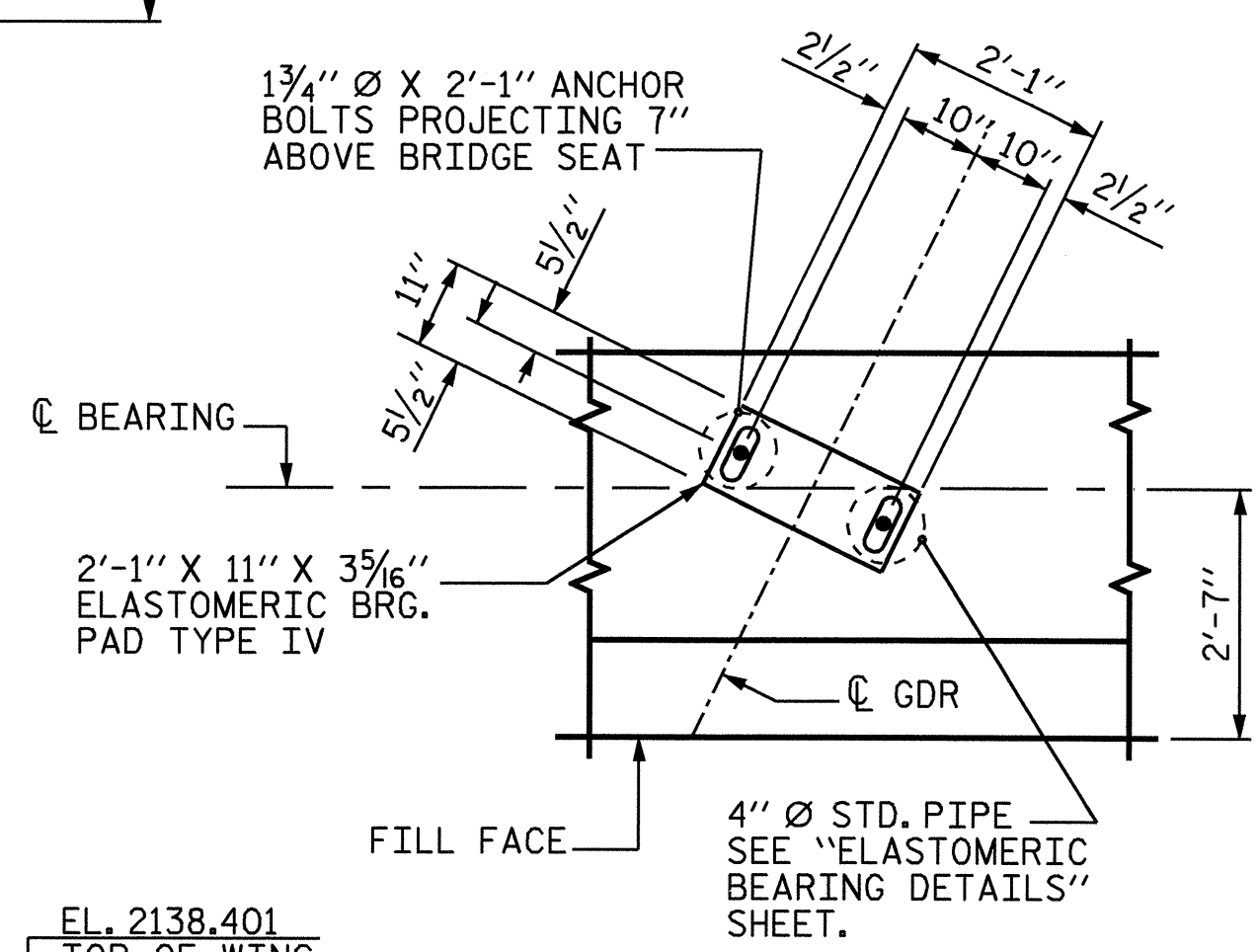
FOR PIPE INSERT DETAILS, SEE BEARINGS SHEET.

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%.

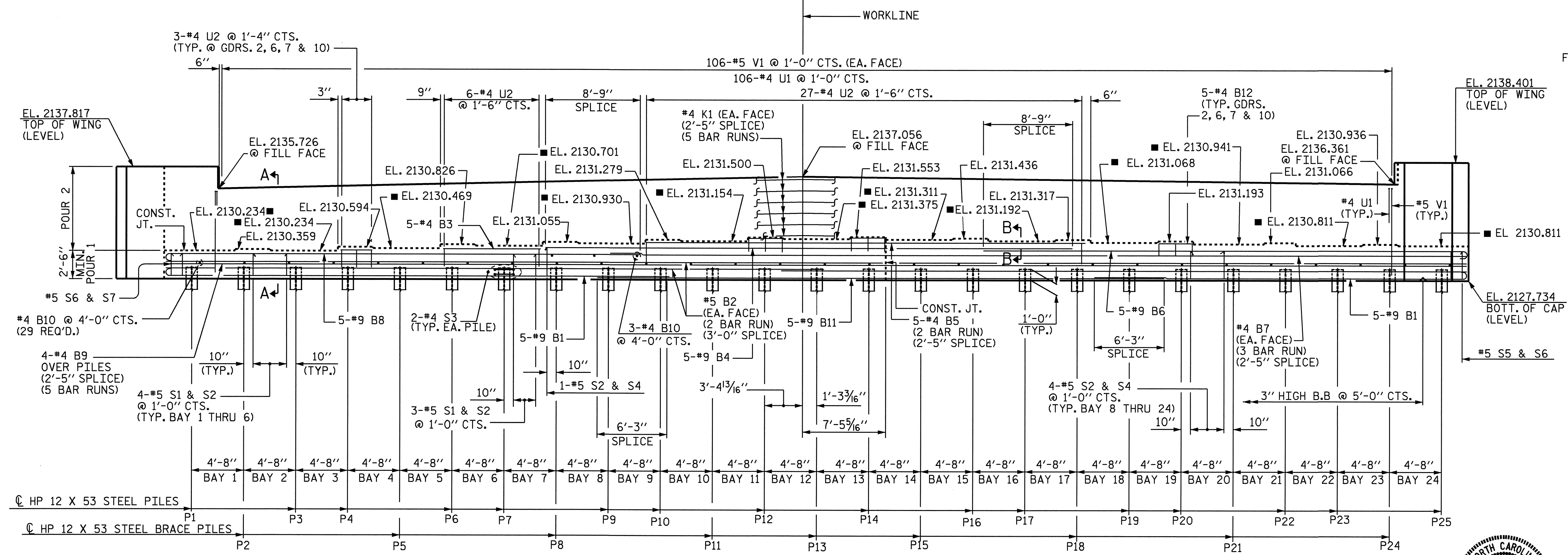
EPOXY COAT THE END BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE GROUTED.



**PLAN**



**DETAIL A**



**ELEVATION**

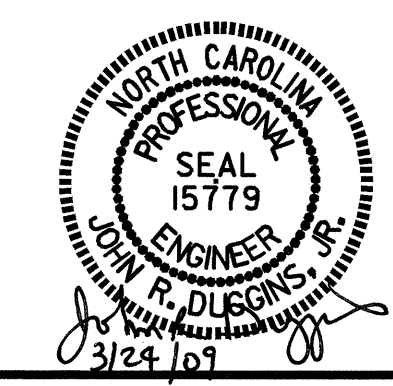
FOR "SECTION A-A" & "SECTION B-B" DETAILS, SEE SHEET 3 OF 3.  
 ■ FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILDUPS, SEE "SECTION A-A"

PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 93+31.40 -L-

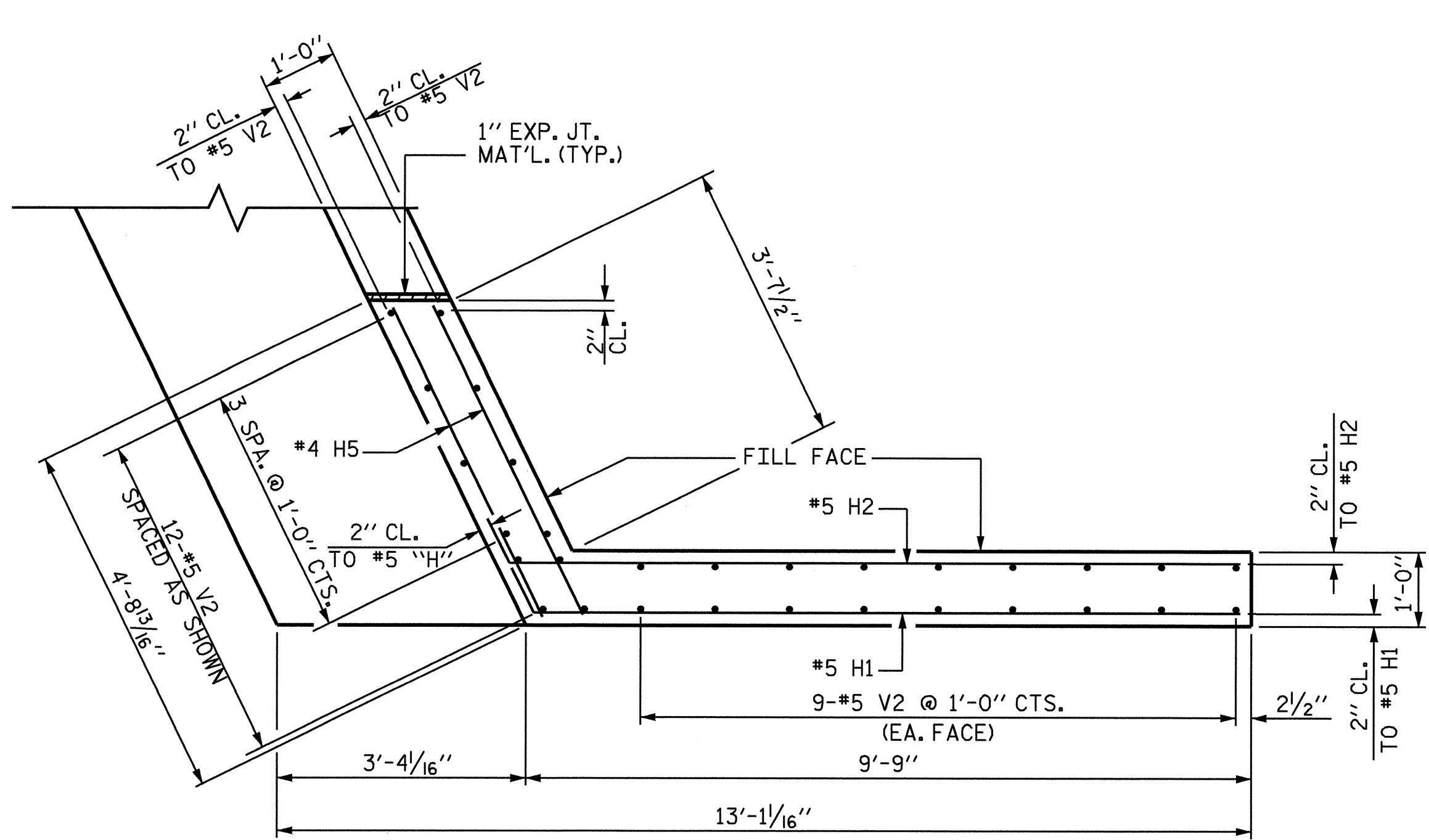
SHEET 1 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT No. 1					
SHEET NO. S-61					
TOTAL SHEETS 71					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

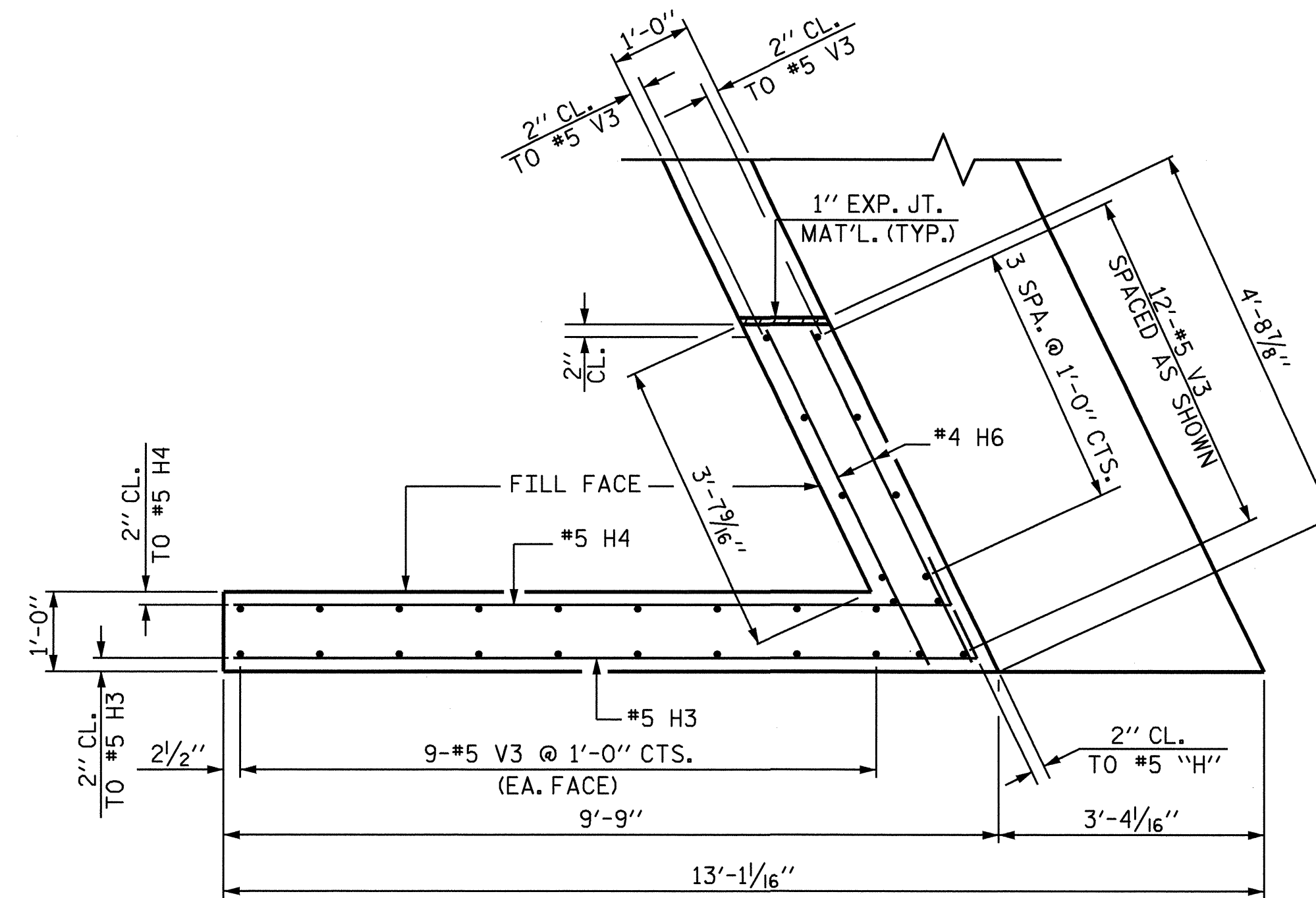
DRAWN BY: M. POOLE DATE: 09/08  
 CHECKED BY: J. DUGGINS DATE: 11/08



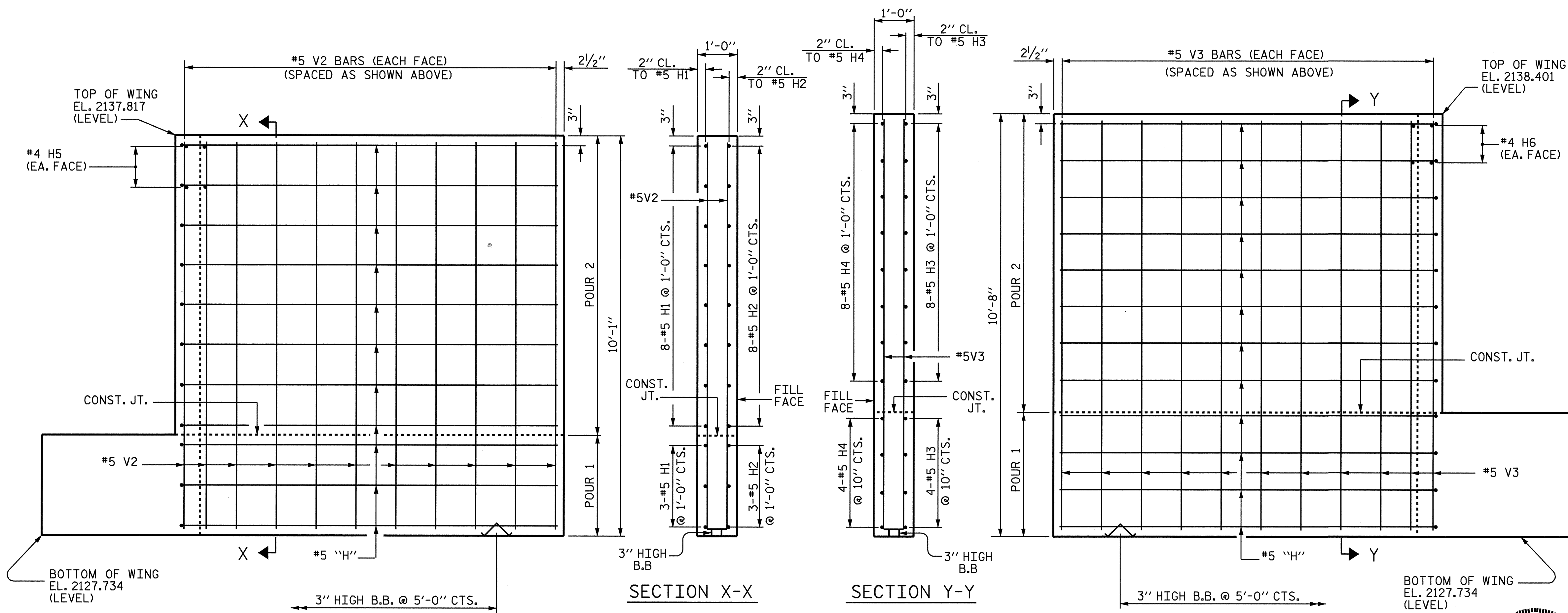
24-MAR-2009 08:19  
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 dahodge



PLAN OF LEFT WING - W1



PLAN OF RIGHT WING - W2



ELEVATION OF LEFT WING - W1

ELEVATION OF RIGHT WING - W2

PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1

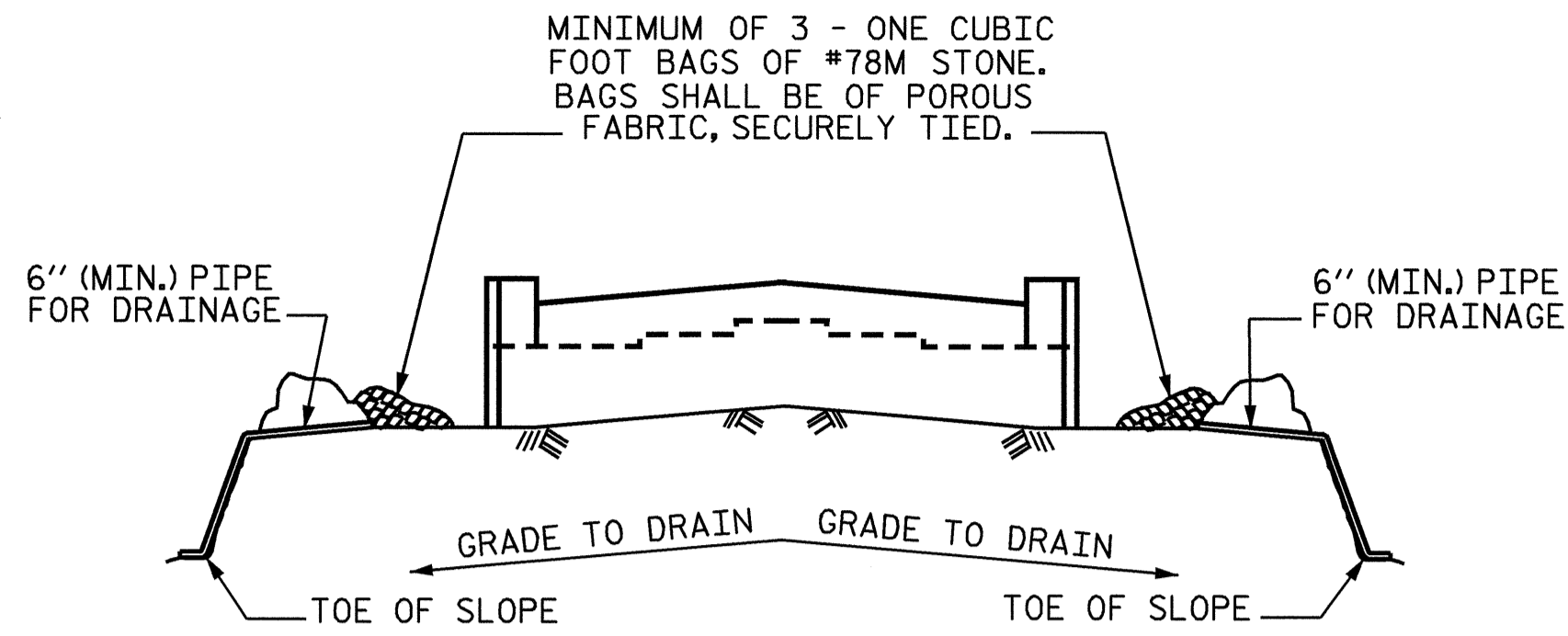


DRAWN BY: M. POOLE DATE: 09/08  
 CHECKED BY: D. HODGE DATE: 11/08

24-MAR-2009 08:20  
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 dahodge

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-62
2			4			TOTAL SHEETS 71



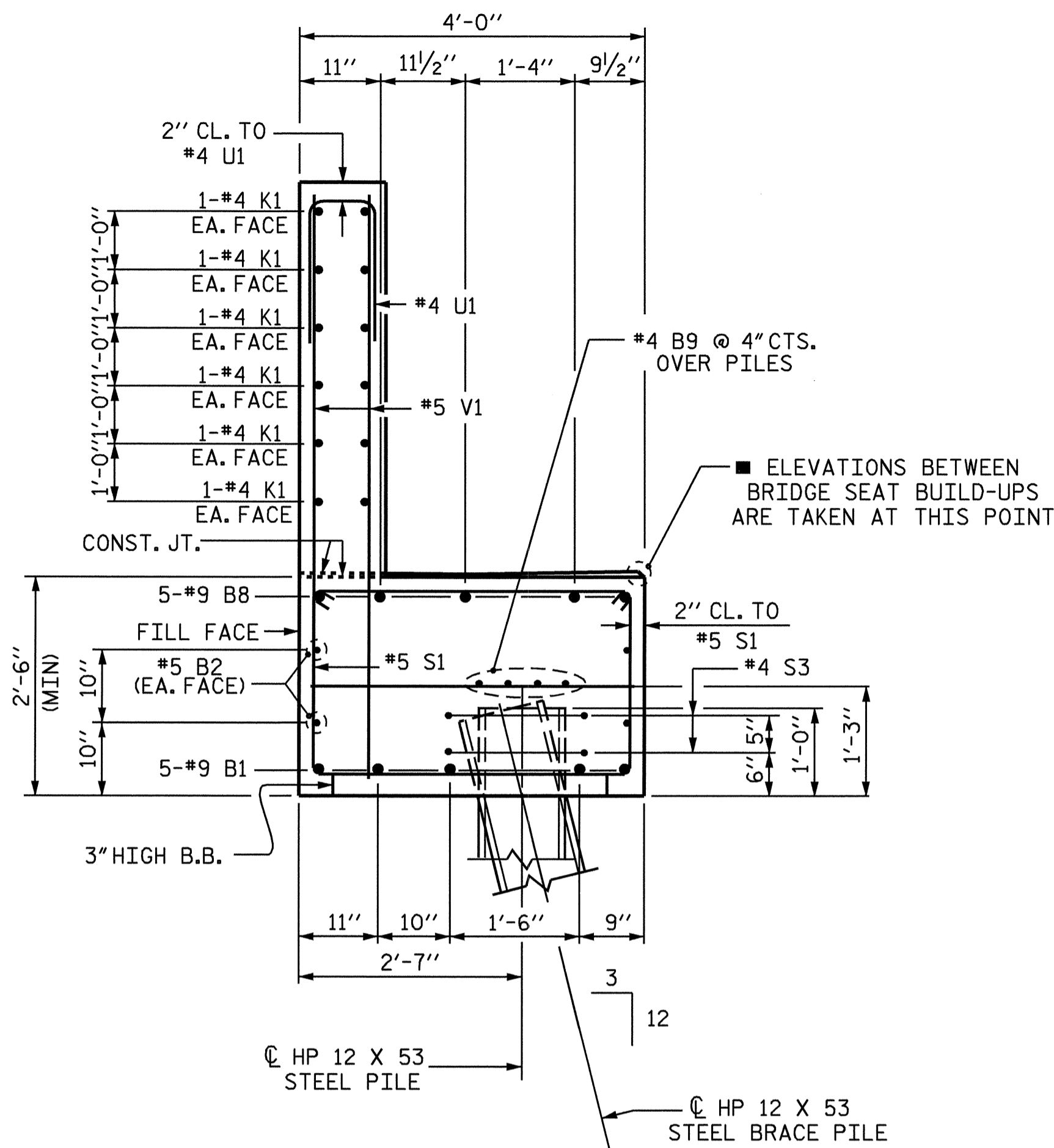


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

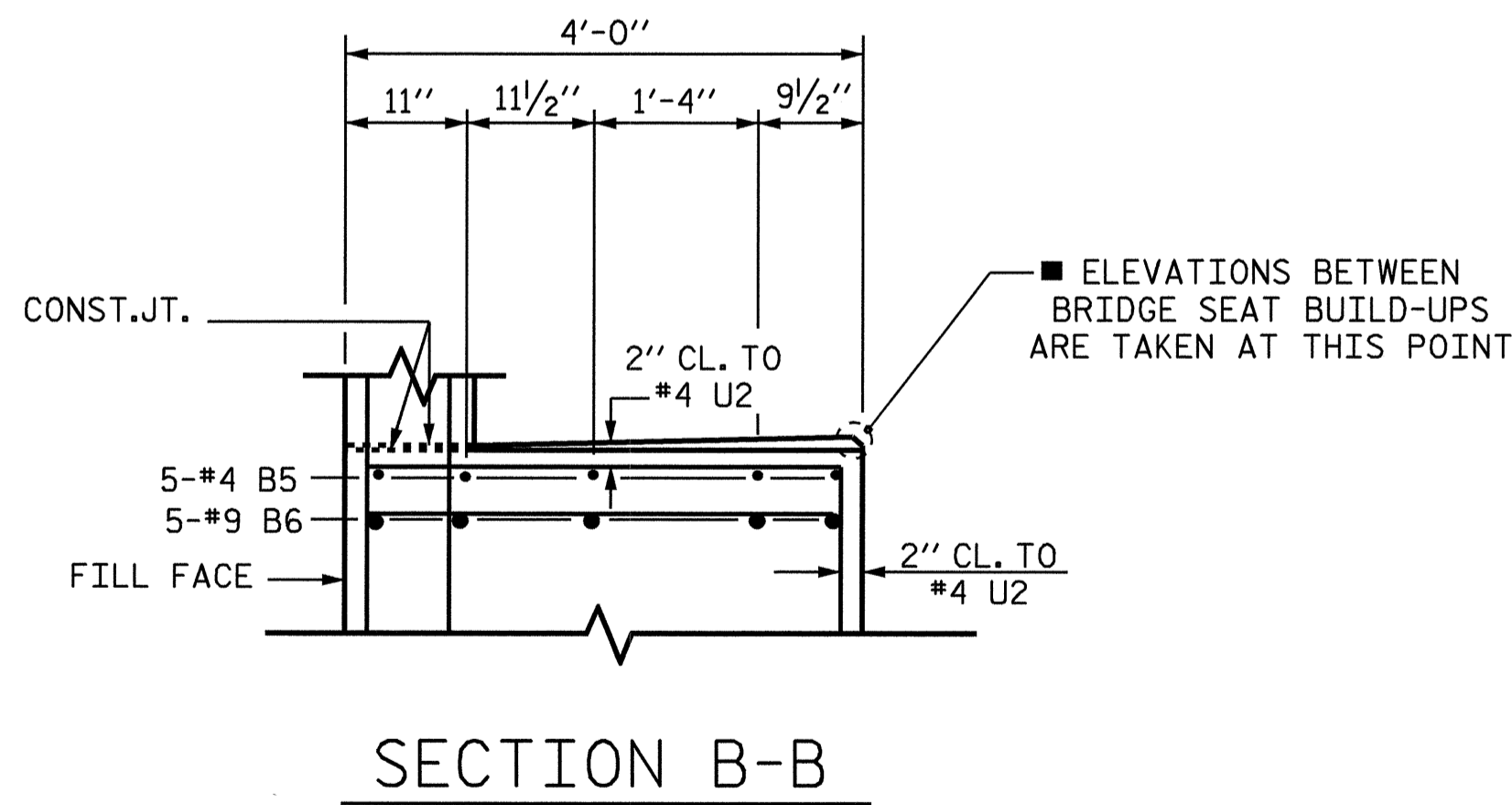
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

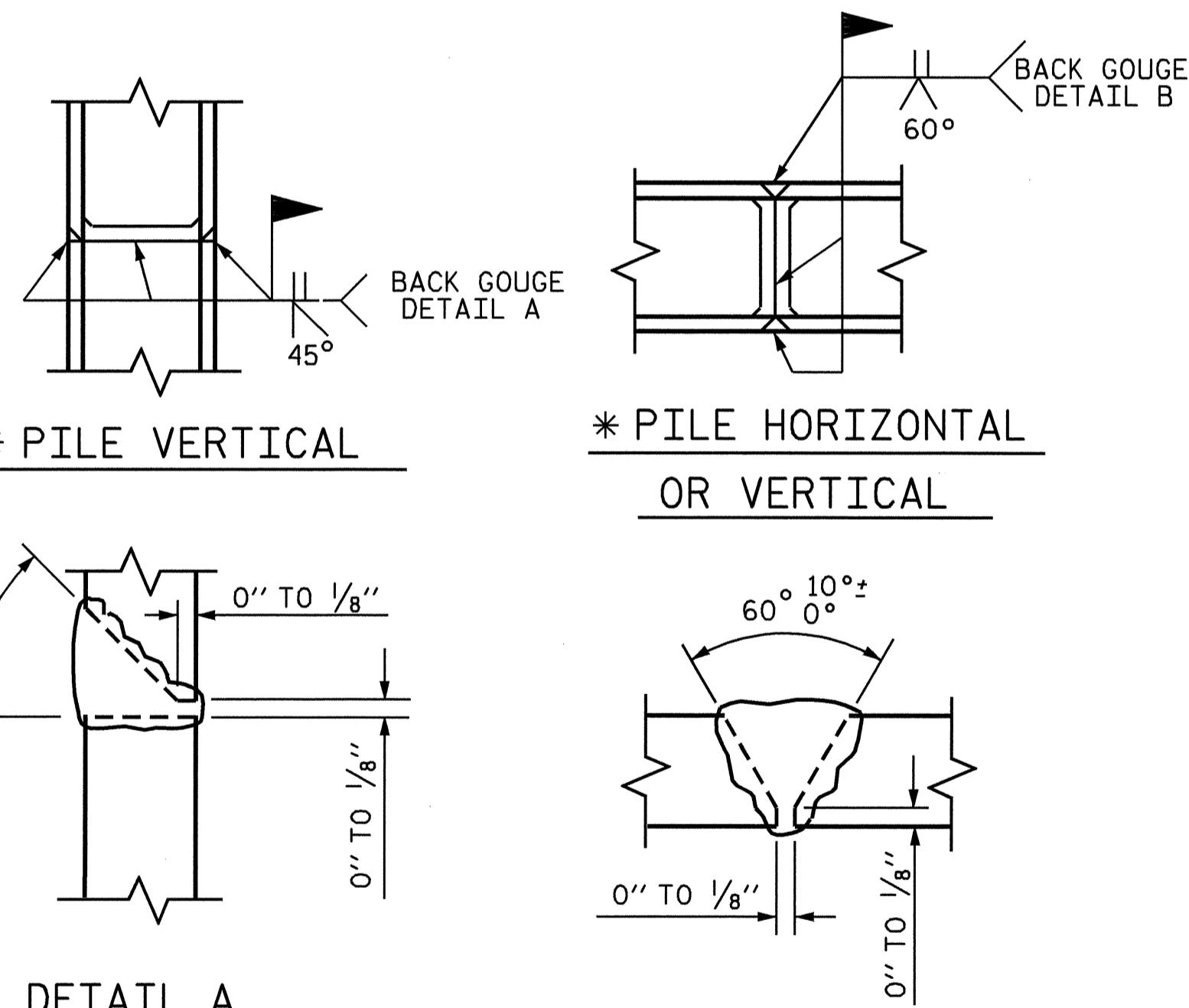
### TEMPORARY DRAINAGE AT END BENT



### SECTION A-A



### SECTION B-B



\* POSITION OF PILE DURING WELDING.

### PILE SPLICE DETAILS

BAR TYPES		BILL OF MATERIAL				
		END BENT No. 1				
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	10	#9	1	43'-10"	1490	
B2	8	#5	STR	59'-1"	493	
B3	5	#4	STR	9'-1"	30	
B4	5	#9	STR	45'-9"	778	
B5	10	#4	STR	21'-0"	140	
B6	5	#9	1	47'-0"	799	
B7	6	#4	STR	27'-1"	109	
B8	5	#9	1	44'-6"	757	
B9	20	#4	STR	25'-0"	334	
B10	32	#4	STR	3'-8"	78	
B11	5	#9	STR	42'-7"	724	
B12	20	#4	STR	2'-10"	38	
H1	11	#5	4	10'-3"	118	
H2	11	#5	4	10'-7"	121	
H3	12	#5	5	10'-1"	126	
H4	12	#5	5	9'-9"	122	
H5	4	#4	STR	4'-4"	12	
H6	4	#4	STR	4'-4"	12	
K1	60	#4	STR	25'-0"	1002	
S1	27	#5	7	8'-10"	249	
S2	96	#5	2	4'-7"	459	
S3	50	#4	6	6'-6"	217	
S4	69	#5	7	10'-0"	720	
S5	1	#5	7	10'-5"	11	
S6	2	#5	2	5'-0"	10	
S7	1	#5	7	9'-3"	10	
U1	106	#4	3	3'-8"	260	
U2	45	#4	3	6'-8"	200	
V1	212	#5	STR	7'-7"	1677	
V2	30	#5	STR	9'-8"	302	
V3	30	#5	STR	9'-3"	289	
REINFORCING STEEL				11,687 LBS.		
CLASS A CONCRETE BREAKDOWN						
POUR 1 (CAP & LOWER WINGS)				56.7 C.Y.		
POUR 2 (BACKWALL & UPPER WINGS)				29.4 C.Y.		
TOTAL				86.1 C.Y.		
HP 12 x 53 STEEL PILES NO. 25				1565 LIN FT.		

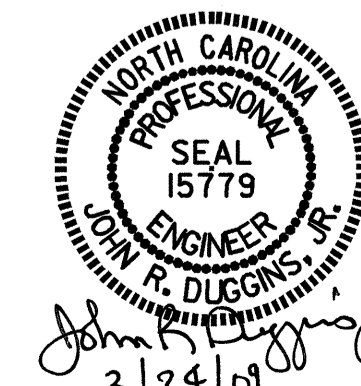
ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1



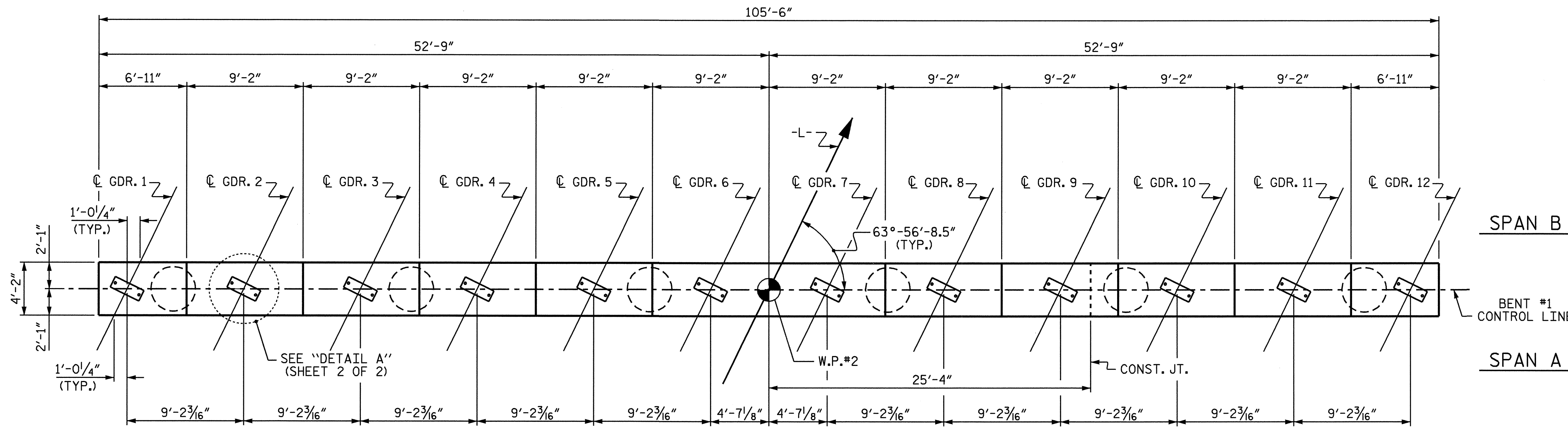
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-63
2			4			71

DRAWN BY: M. POOLE DATE: 09/08  
 CHECKED BY: D. HODGE DATE: 11/08

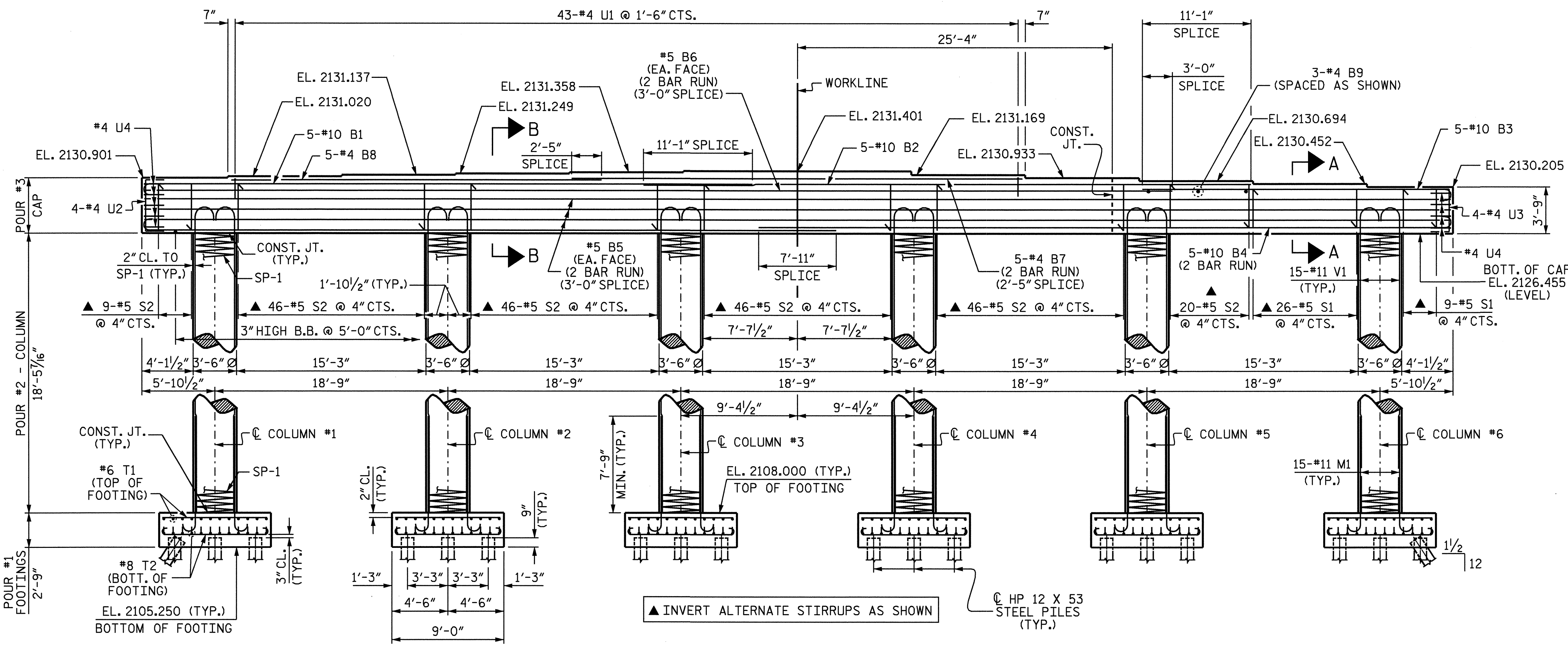
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NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR BOLTS.  
 HOOKS ON V1 AND M1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.  
 T1 AND T2 BARS IN TOP OF FOOTING MAY BE SHIFTED AS NECESSARY TO CLEAR M1 BARS IN FOOTING.  
 FOR PILE SPlice DETAILS, SEE 'END BENT 1 DETAILS AND BOM' SHEET.

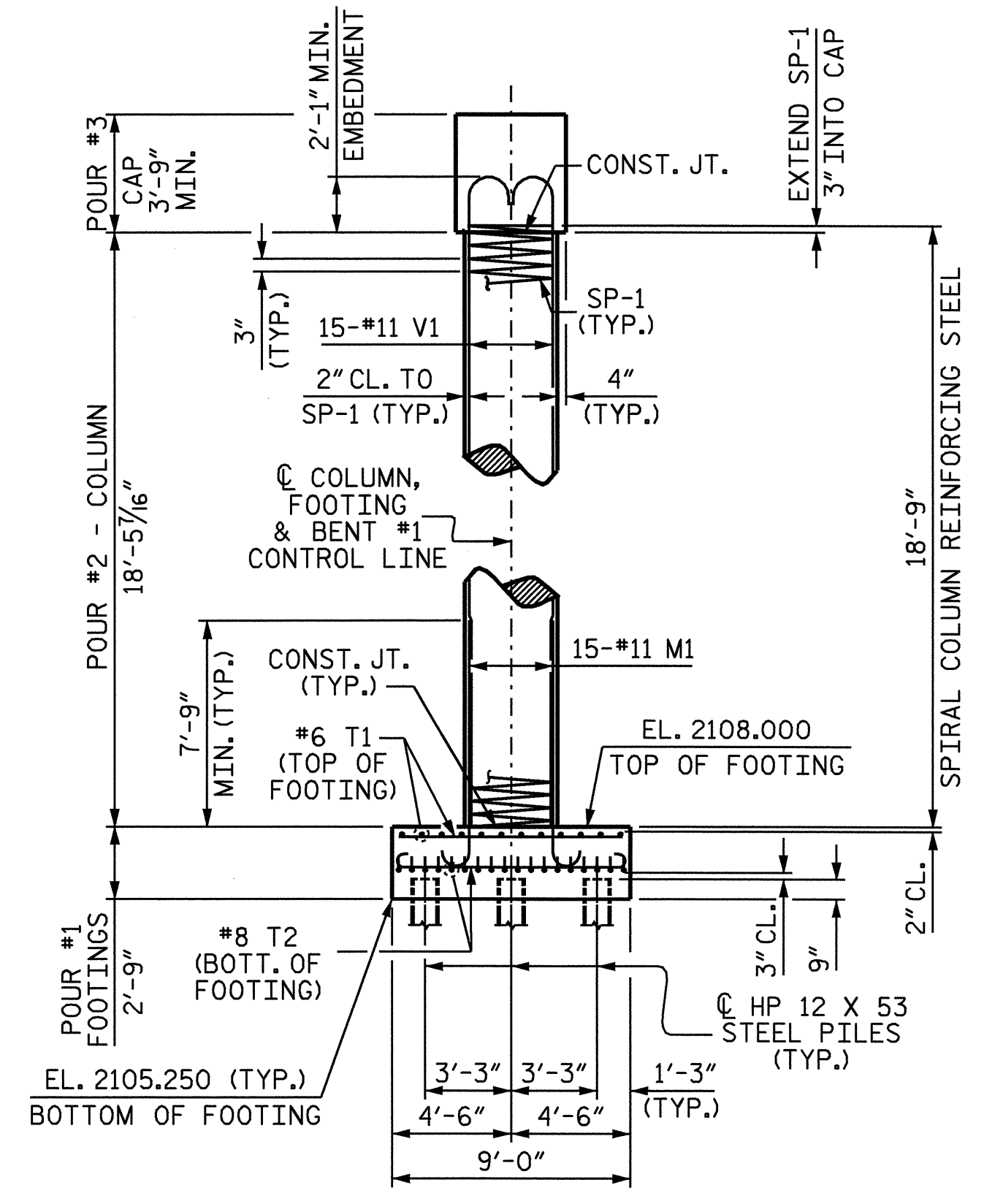


PLAN OF CAP



ELEVATION

REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH COLUMN AND FOOTING.



END VIEW

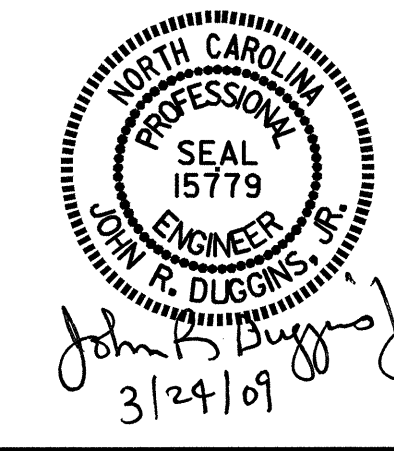
PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

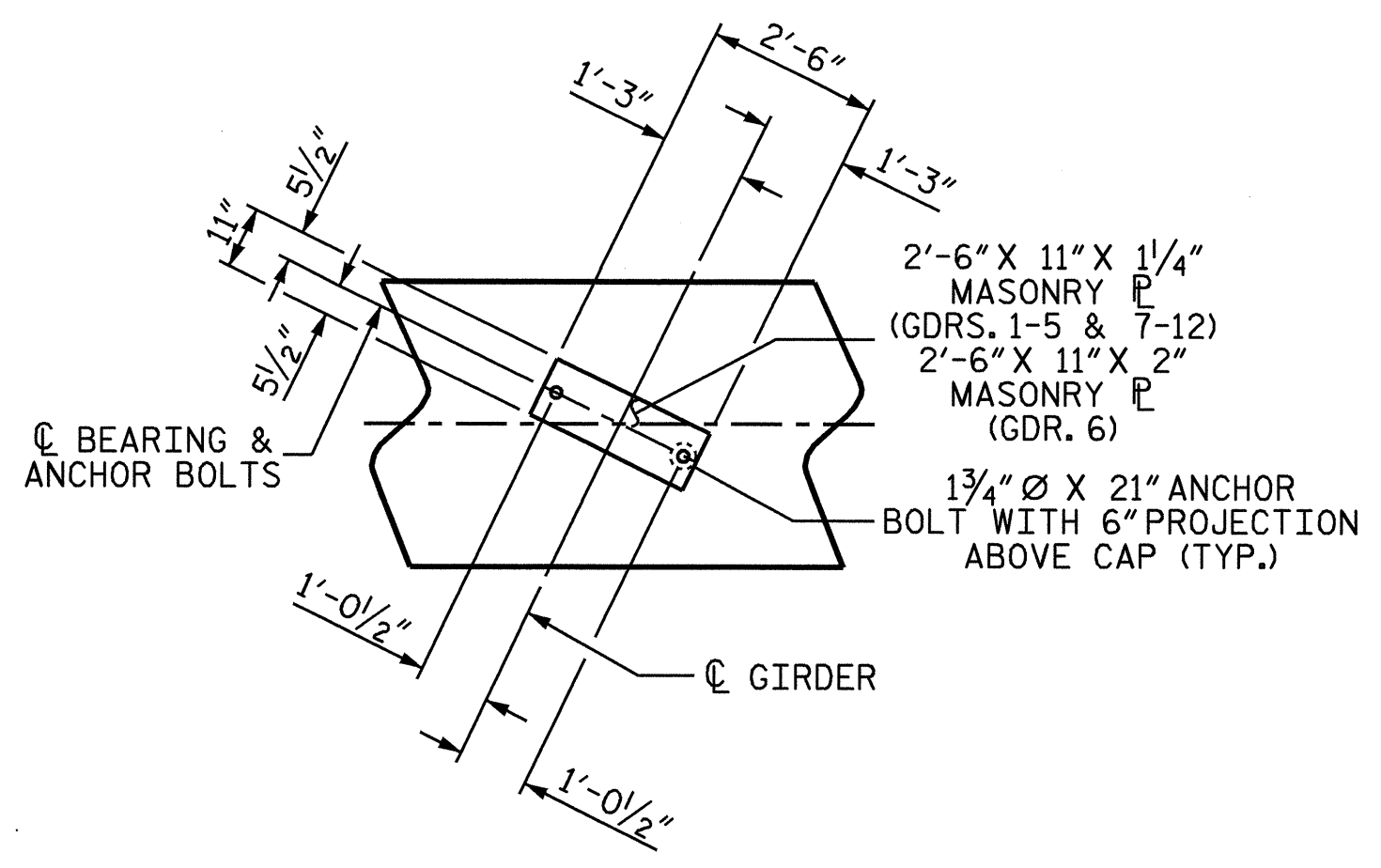
**SUBSTRUCTURE BENT #1**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-64
1			3			TOTAL SHEETS
2			4			71

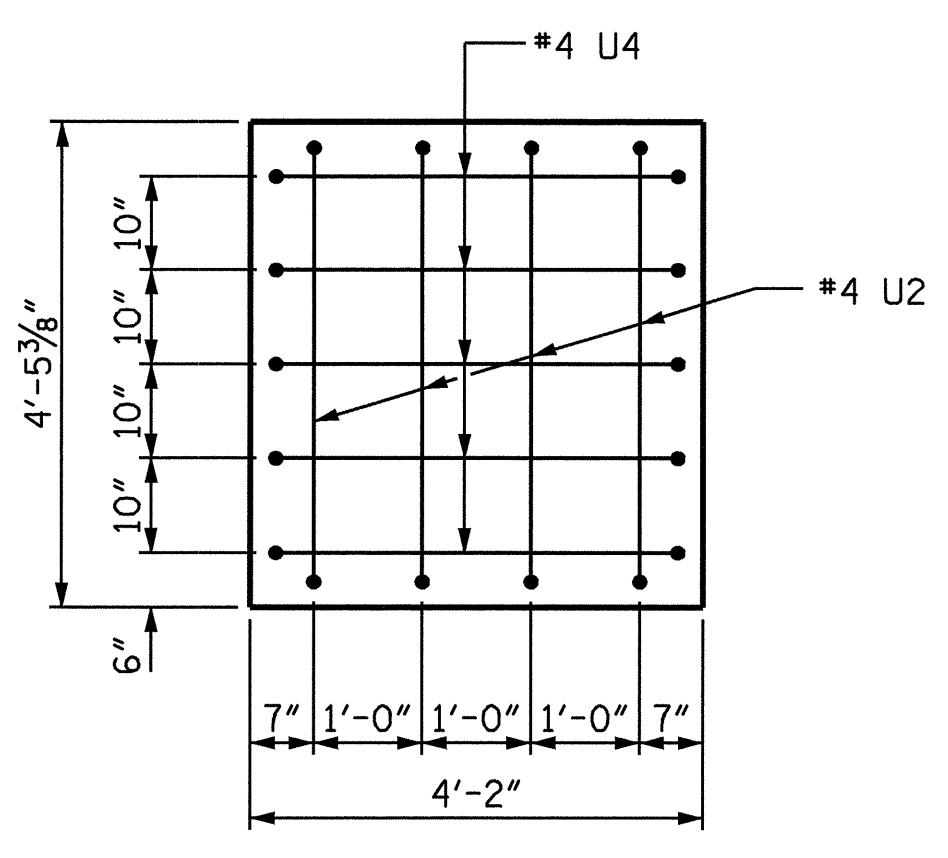


DRAWN BY: A. SORSENGINH DATE: 11/18/08  
 CHECKED BY: D. HODGE DATE: 12/10/08

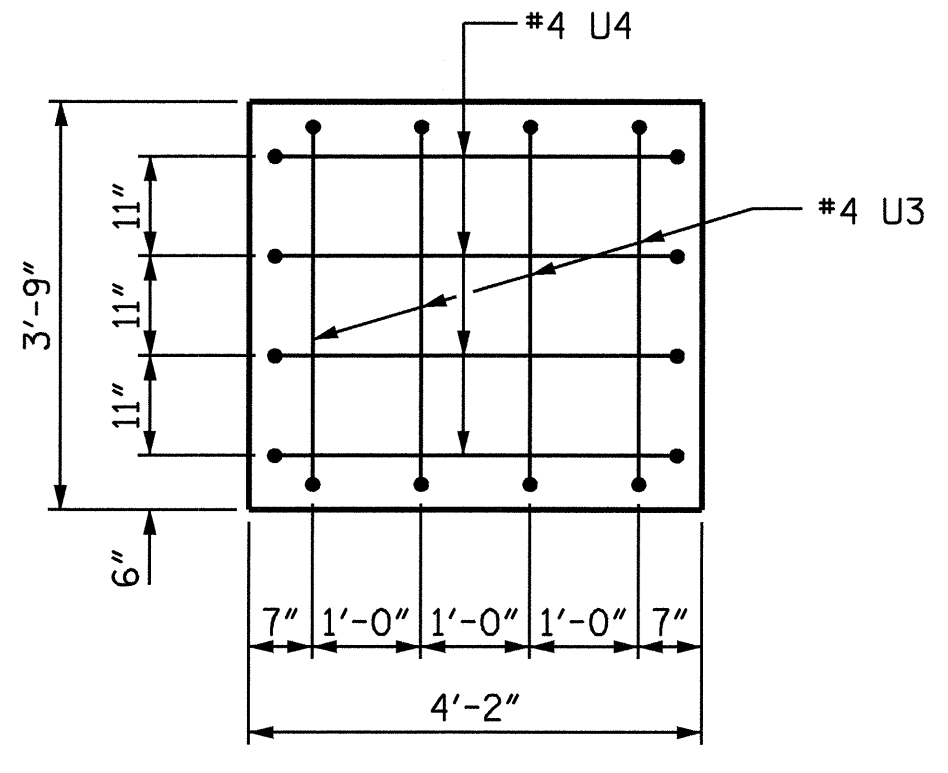
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**DETAIL A**  
(TYP. EACH GIRDER)

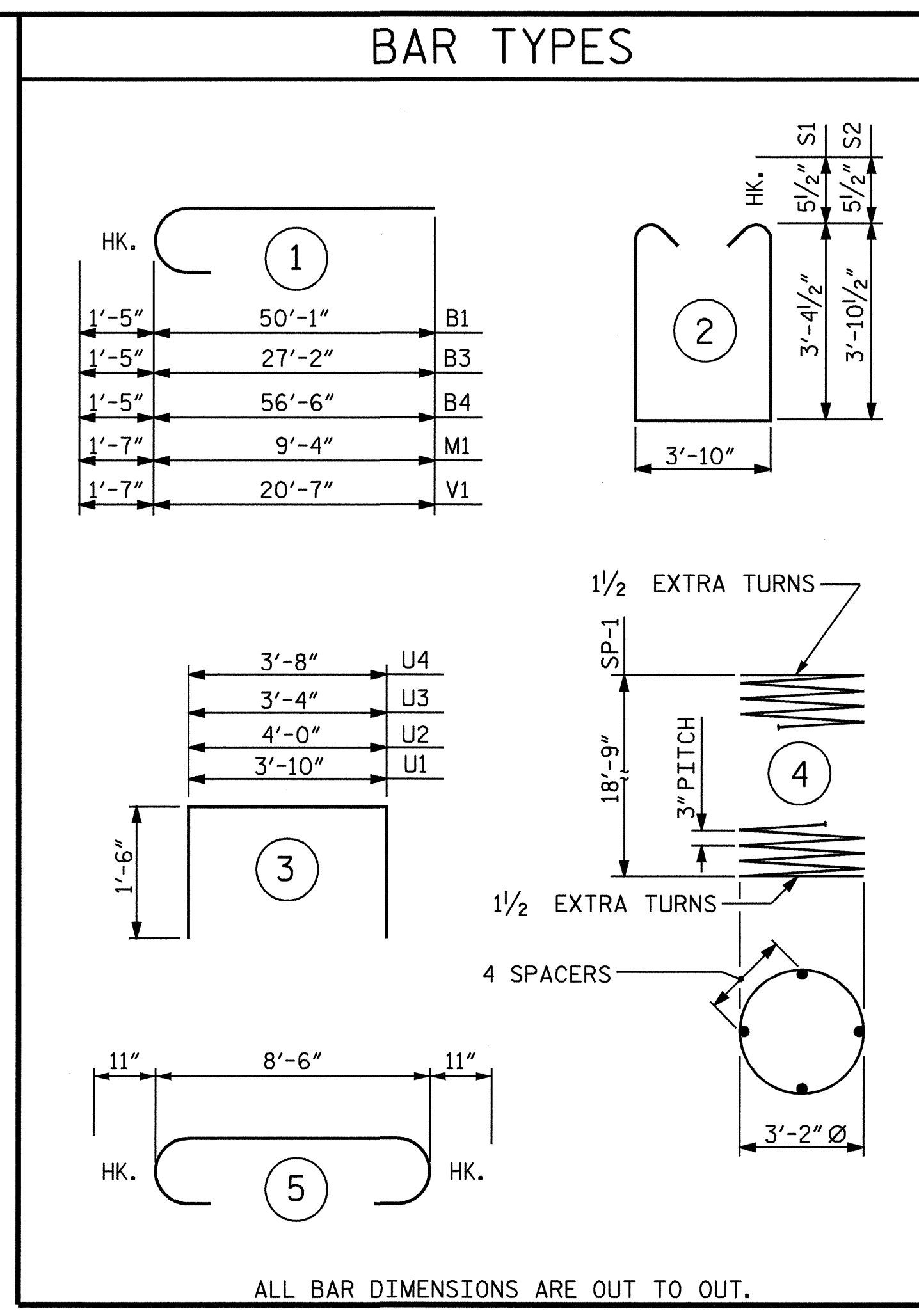


**LEFT END VIEW**



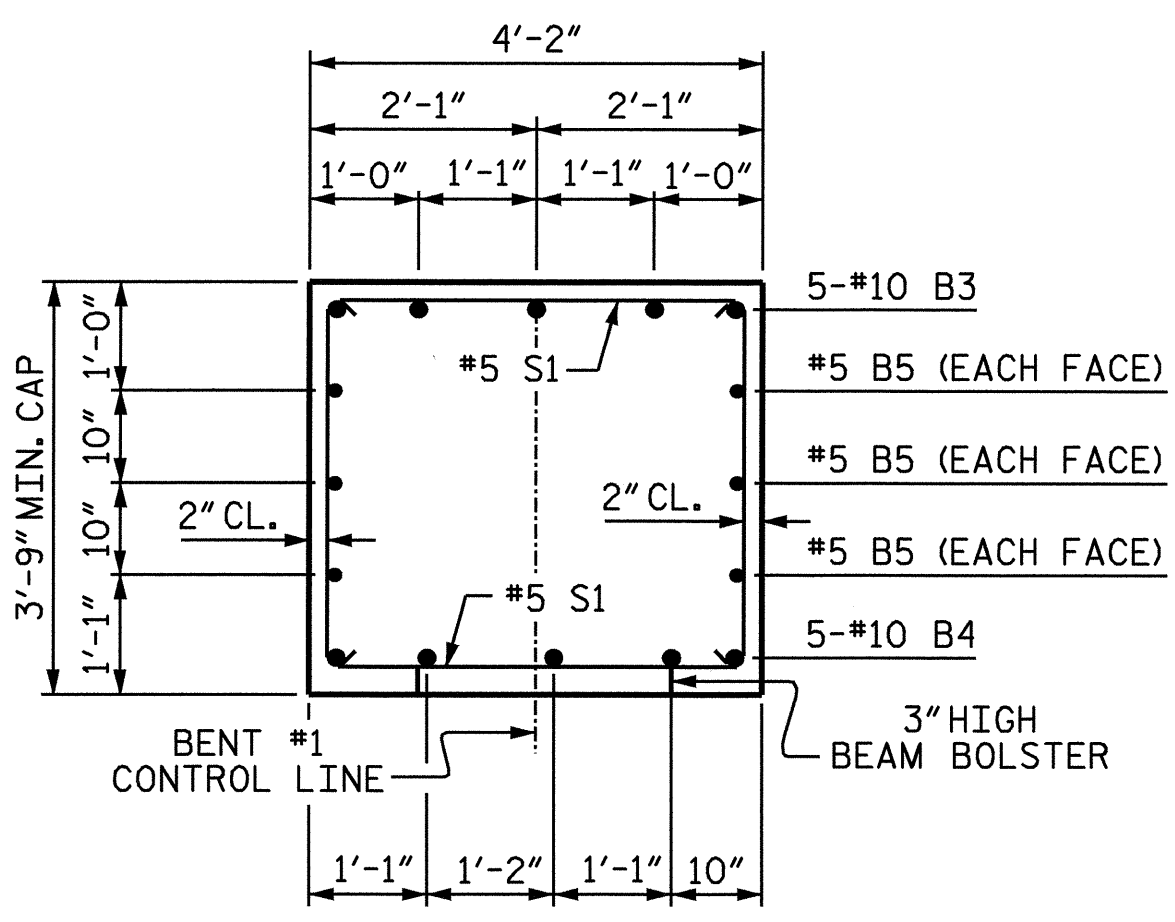
**RIGHT END VIEW**

2" MIN. CONCRETE COVER REQUIRED FOR ALL #4 "U" BARS.  
#4 "U" BARS MAY BE SHIFTED UP TO 2" TO CLEAR "B" BARS.

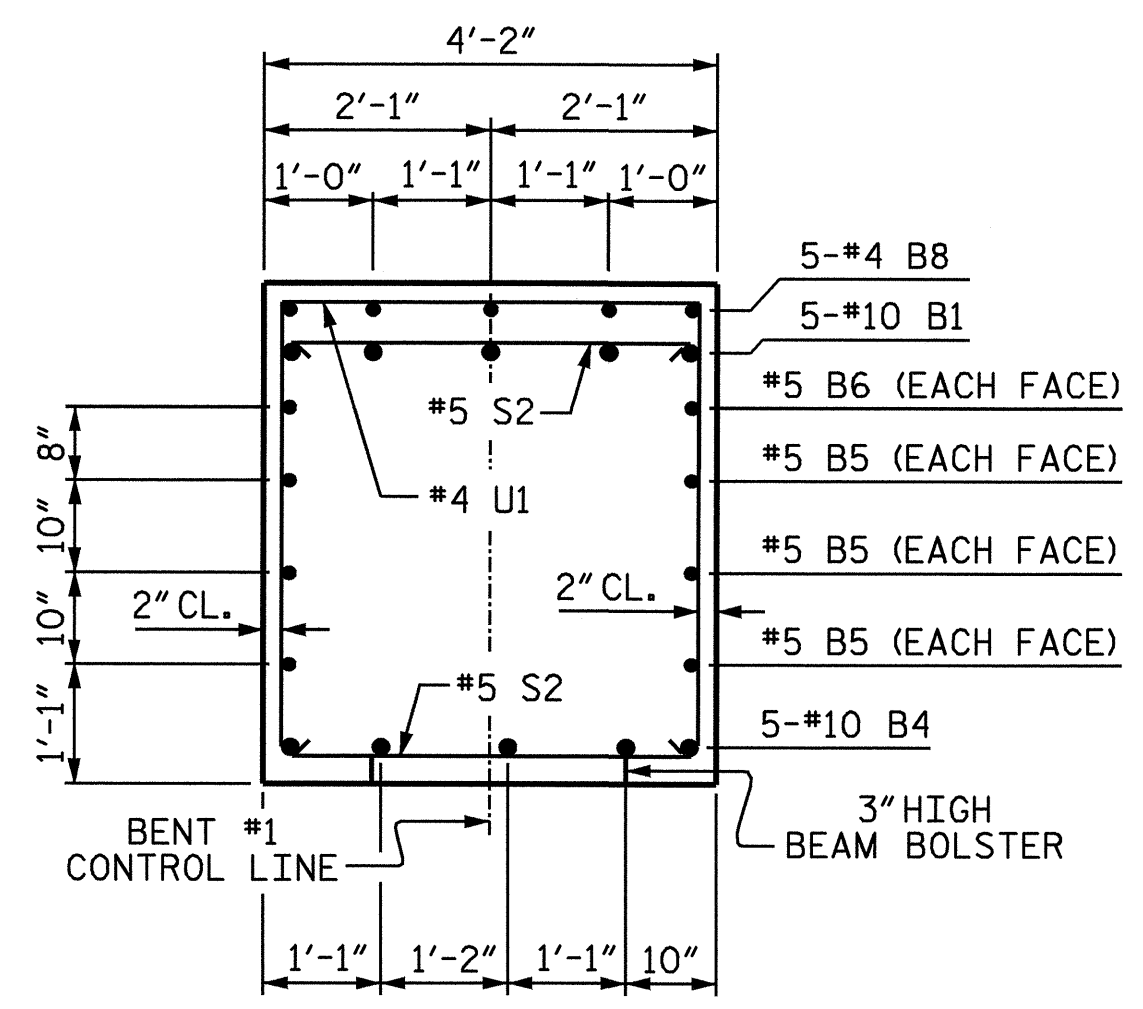


ALL BAR DIMENSIONS ARE OUT TO OUT.  
\* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

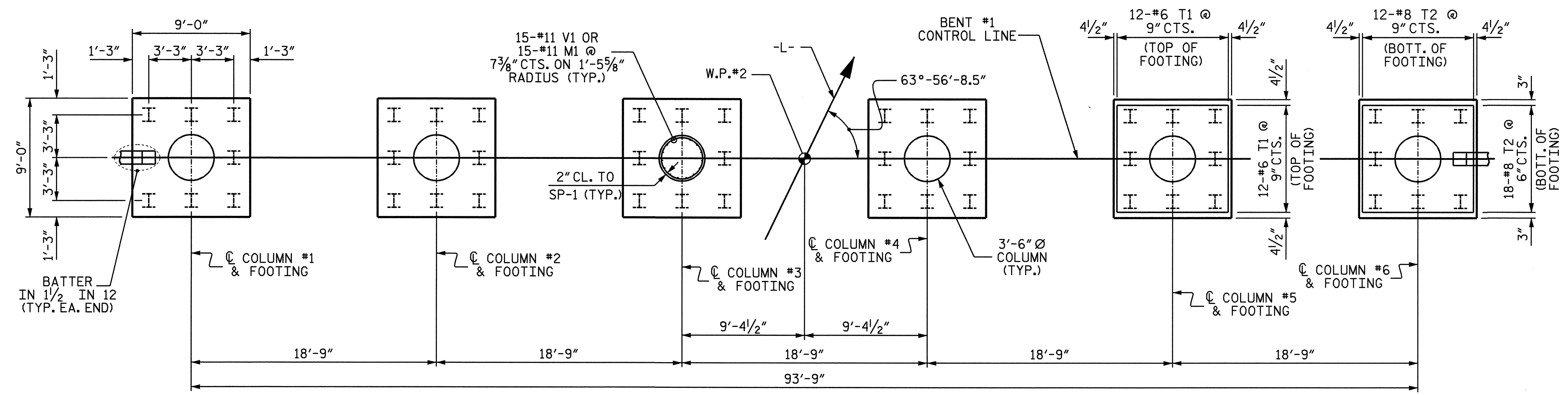
BILL OF MATERIAL					
BENT #1					
BAR	NO	SIZE	TYPE	LENGTH	WEIGHT
B1	5	10	1	51'-6"	1108
B2	5	10	STR	50'-1"	1078
B3	5	10	1	28'-7"	615
B4	10	10	1	57'-11"	2492
B5	12	5	STR	54'-1"	677
B6	4	5	STR	42'-0"	175
B7	10	4	STR	19'-5"	130
B8	5	4	STR	30'-0"	100
B9	3	4	STR	3'-10"	8
M1	90	11	1	10'-11"	5220
S1	35	5	2	11'-6"	420
S2	213	5	2	12'-6"	2777
T1	144	6	STR	8'-6"	1838
T2	180	8	5	10'-4"	4966
U1	43	4	3	6'-10"	196
U2	4	4	3	7'-0"	19
U3	4	4	3	6'-4"	17
U4	9	4	3	6'-8"	40
V1	90	11	1	22'-2"	10599
REINFORCING STEEL					LBS. 32,475
SP-1	6	*	4	766'-1"	3070
SPIRAL COLUMN REINFORCING STEEL					LBS. 3070
CLASS A CONCRETE BREAKDOWN					
POUR #1 (FOOTINGS)				49.5	C.Y.
POUR #2 (COLUMNS)				39.5	C.Y.
POUR #3 (CAP)				74.2	C.Y.
TOTAL					163.2 C.Y.
HP 12 X 53 STEEL PILES					
NO. 48	LIN. FT.			1440	



**SECTION A-A**



**SECTION B-B**



**PLAN OF COLUMNS AND FOOTINGS**

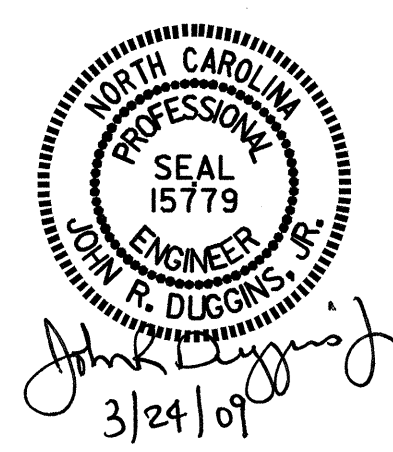
REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR EACH COLUMN AND FOOTING.

PROJECT NO. R-4430  
HENDERSON COUNTY  
STATION: 93+31.40 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SUBSTRUCTURE BENT #1**



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-65
2			4			TOTAL SHEETS 71

DRAWN BY: A. SORSENGINH DATE: 11/18/08  
CHECKED BY: D. HODGE DATE: 12/10/08

**NOTES**

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

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

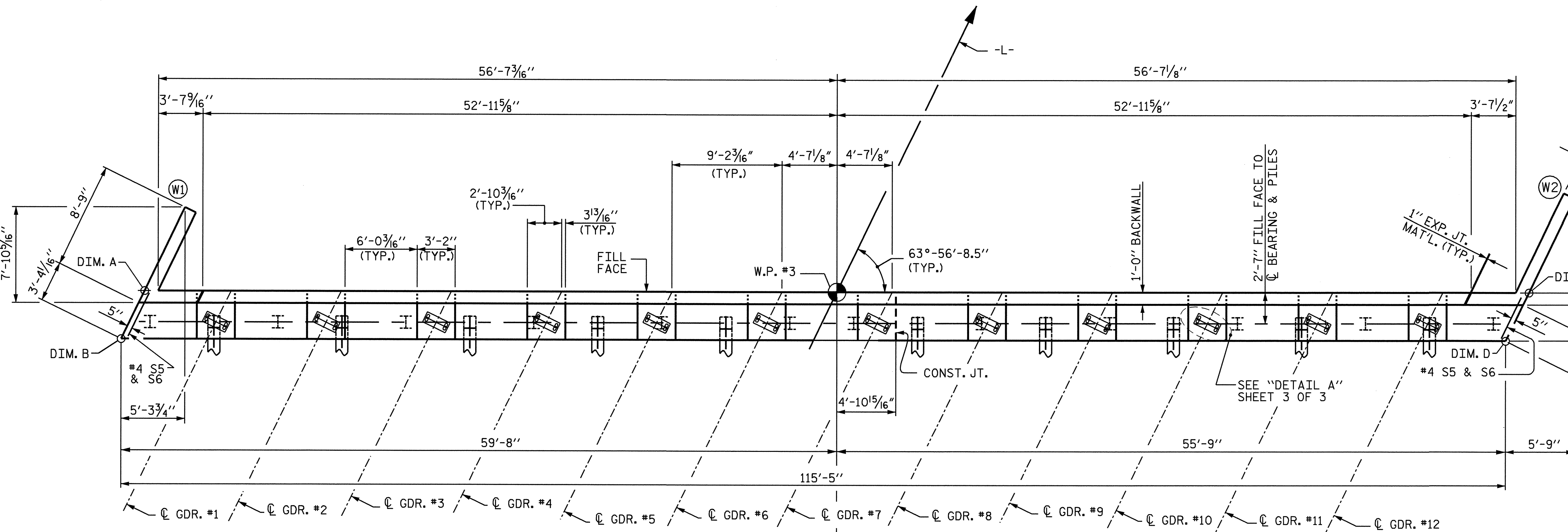
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

FOR PIPE INSERT DETAILS, SEE BEARINGS SHEET.

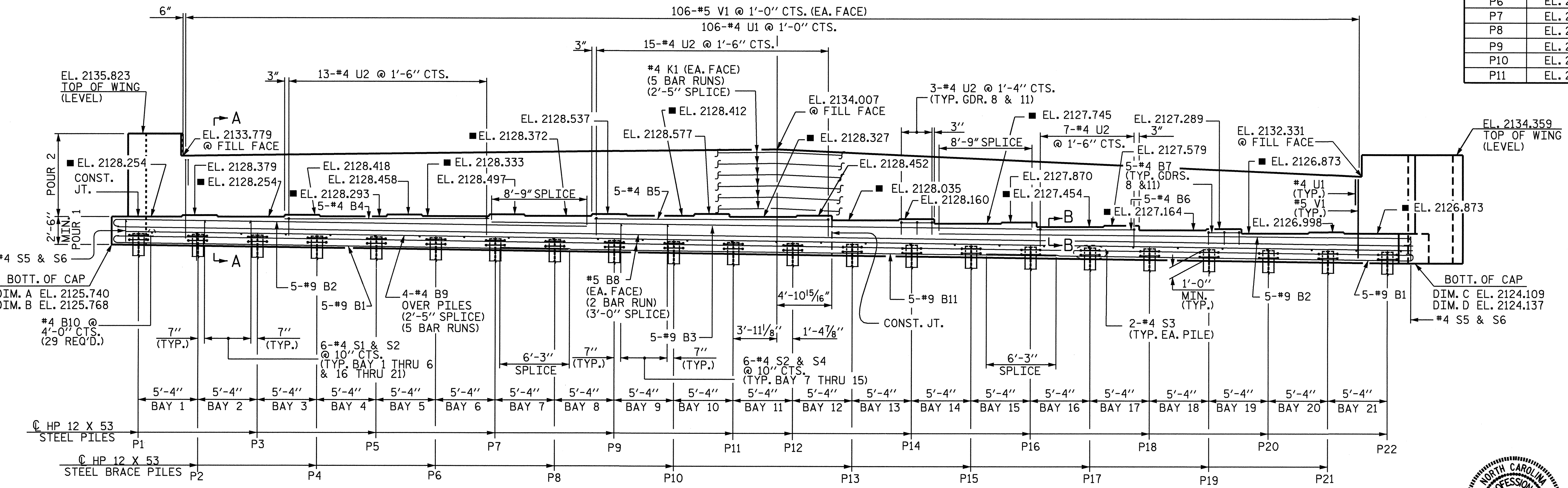
THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

EPOXY COAT THE END BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE GROUTED.



**TOP OF PILE ELEVATION**

PILE	ELEVATION	PILE	ELEVATION
P1	EL. 2126.741	P12	EL. 2125.912
P2	EL. 2126.666	P13	EL. 2125.837
P3	EL. 2126.590	P14	EL. 2125.761
P4	EL. 2126.515	P15	EL. 2125.686
P5	EL. 2126.439	P16	EL. 2125.610
P6	EL. 2126.364	P17	EL. 2125.535
P7	EL. 2126.289	P18	EL. 2125.460
P8	EL. 2126.213	P19	EL. 2125.384
P9	EL. 2126.138	P20	EL. 2125.309
P10	EL. 2126.063	P21	EL. 2125.234
P11	EL. 2125.987	P22	EL. 2125.158

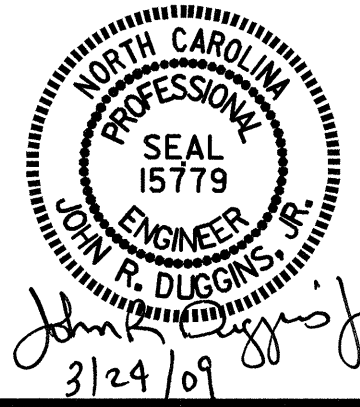


PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUBSTRUCTURE  
 END BENT No. 2**

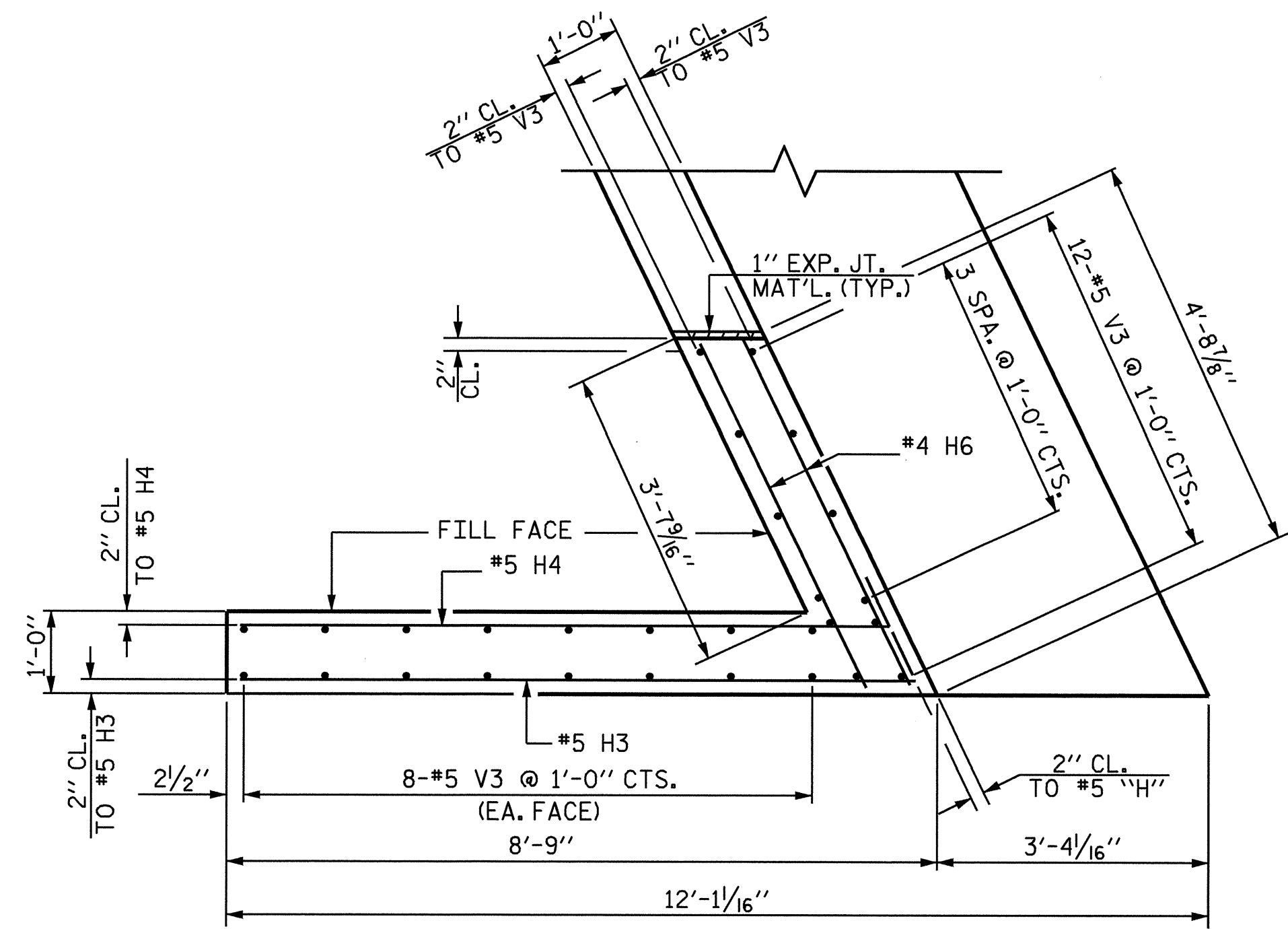


REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

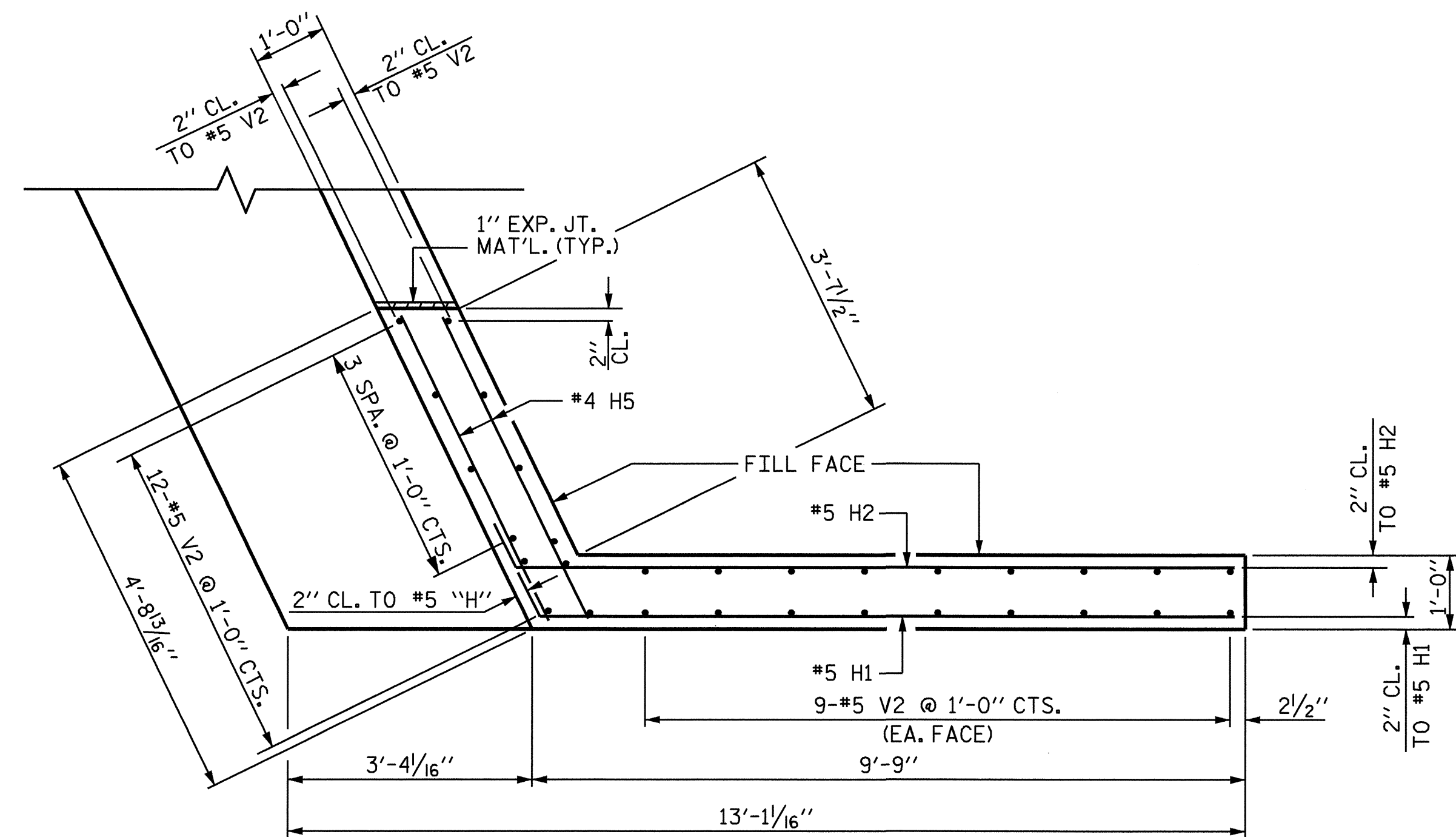
TOTAL SHEETS: 71

DRAWN BY: M. POOLE DATE: 09/08  
 CHECKED BY: J.R. DUGGINS DATE: 12/08

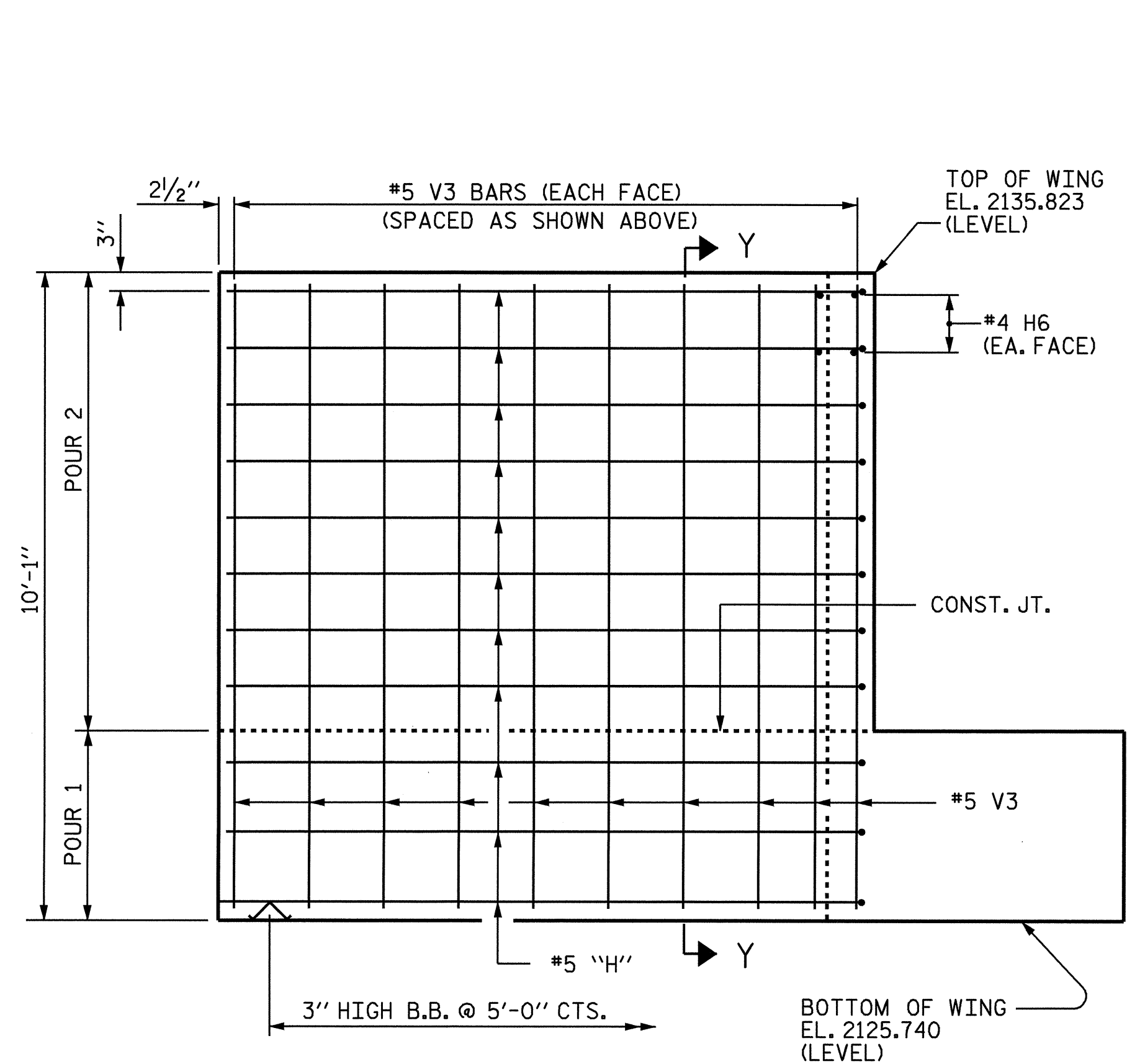
FOR "SECTION A-A" & "SECTION B-B" DETAILS, SEE SHEET 3 OF 3.  
 ■ FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILDUPS, SEE "SECTION A-A"



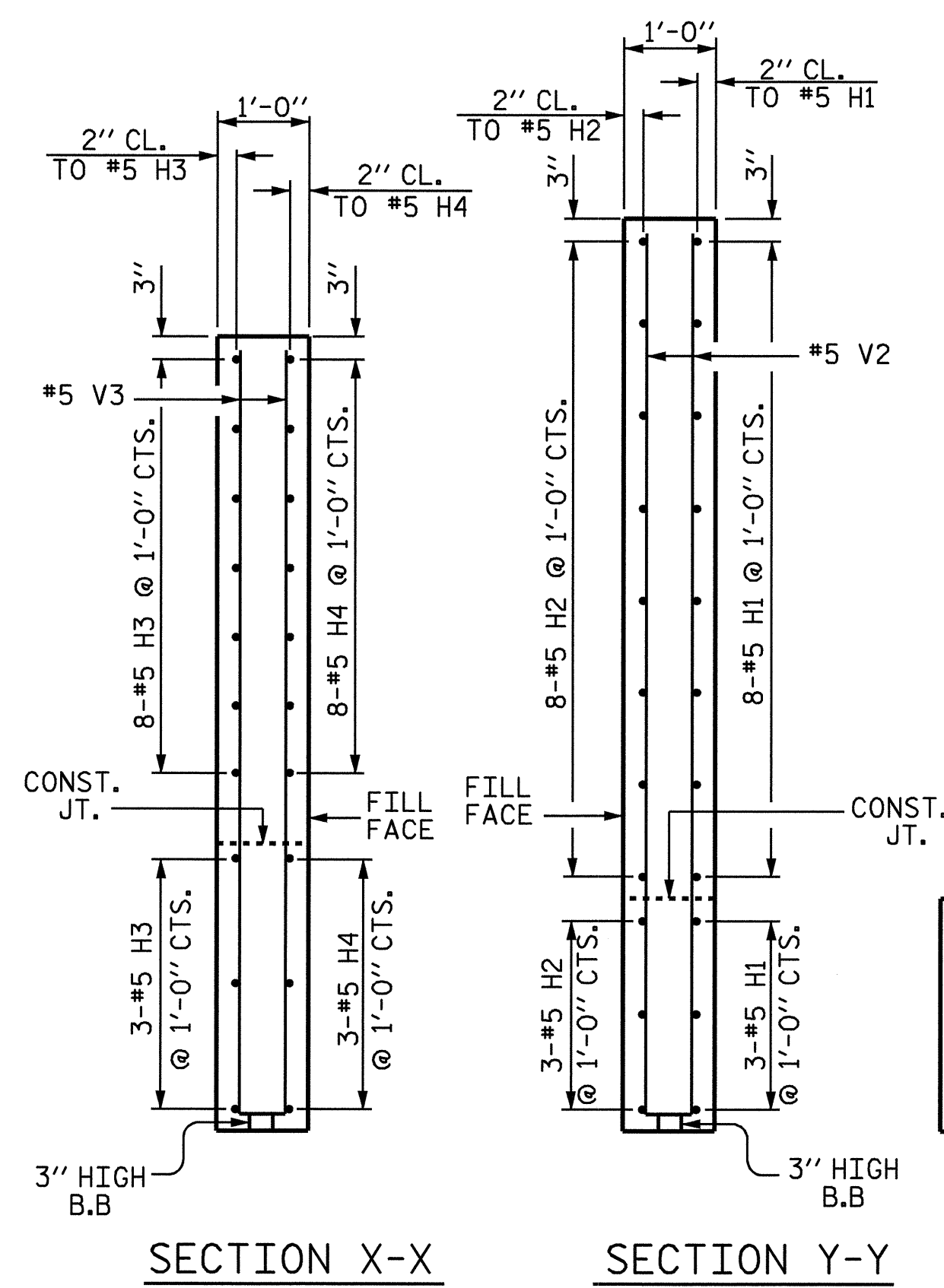
PLAN OF LEFT WING - W1



PLAN OF RIGHT WING - W2

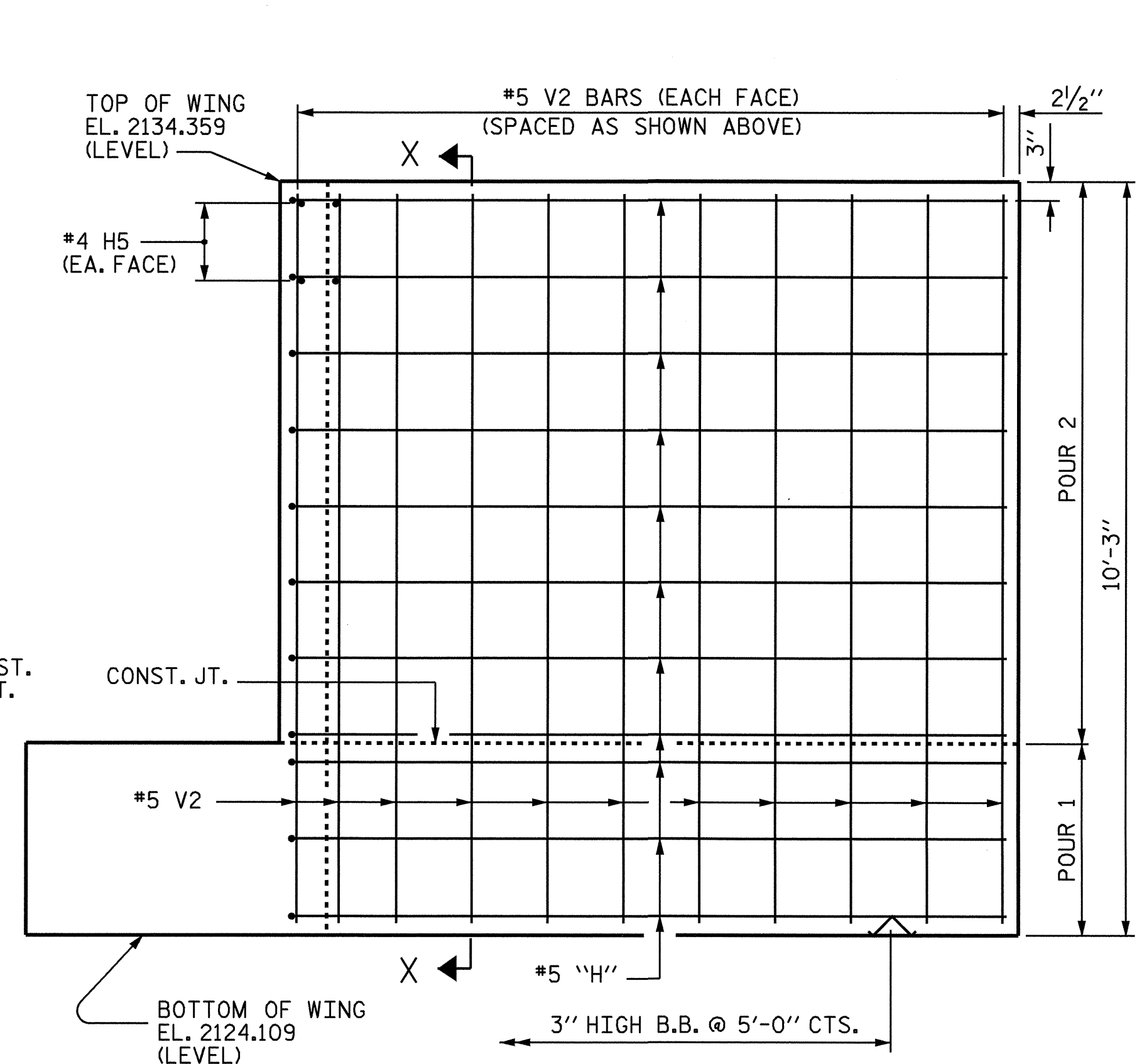


ELEVATION OF LEFT WING - W1



SECTION X-X

SECTION Y-Y



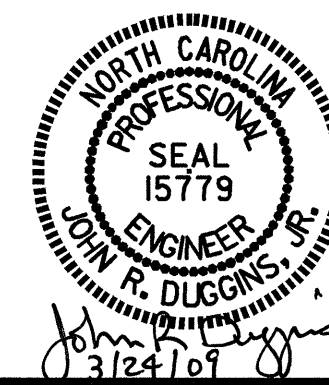
ELEVATION OF RIGHT WING - W2

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

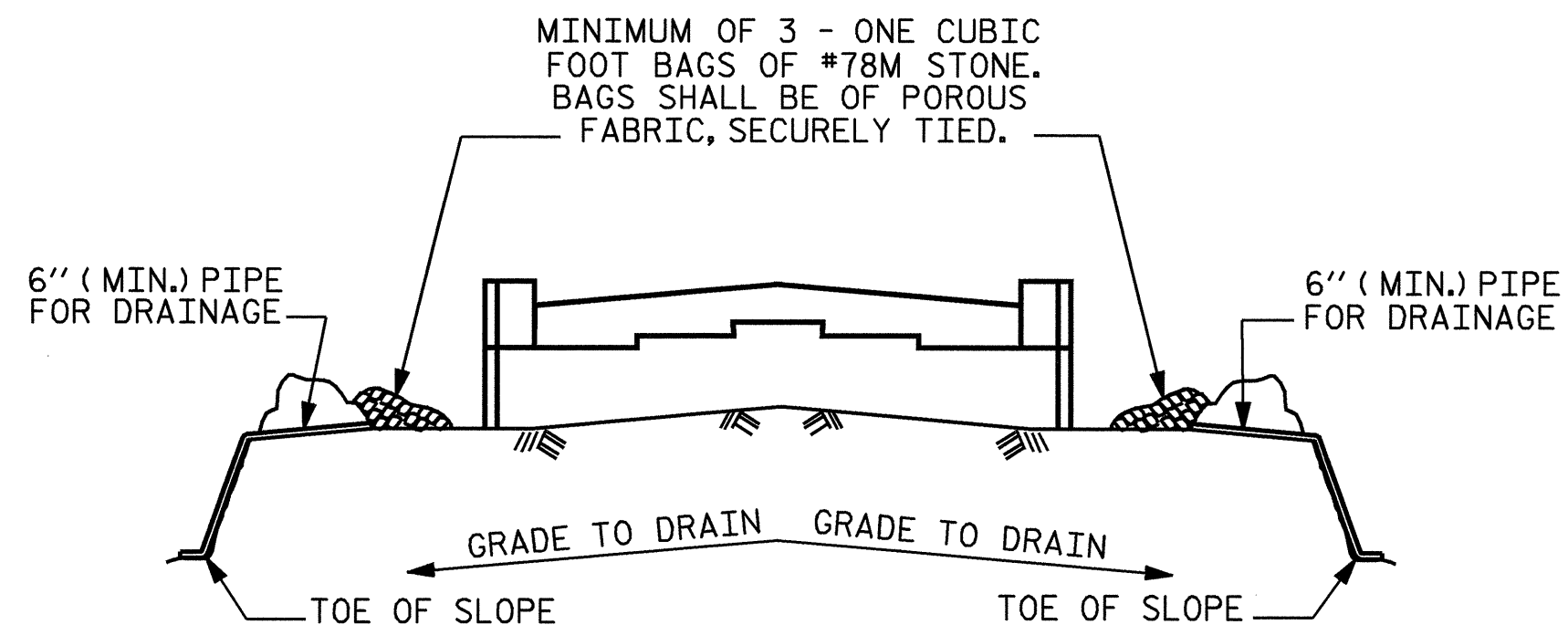
SUBSTRUCTURE  
 END BENT No. 2



DRAWN BY: M. POOLE DATE: 09/08  
 CHECKED BY: J.R. DUGGINS DATE: 12/08

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-67	
1			3			TOTAL SHEETS	
2			4			71	

20-MAR-2009 15:12  
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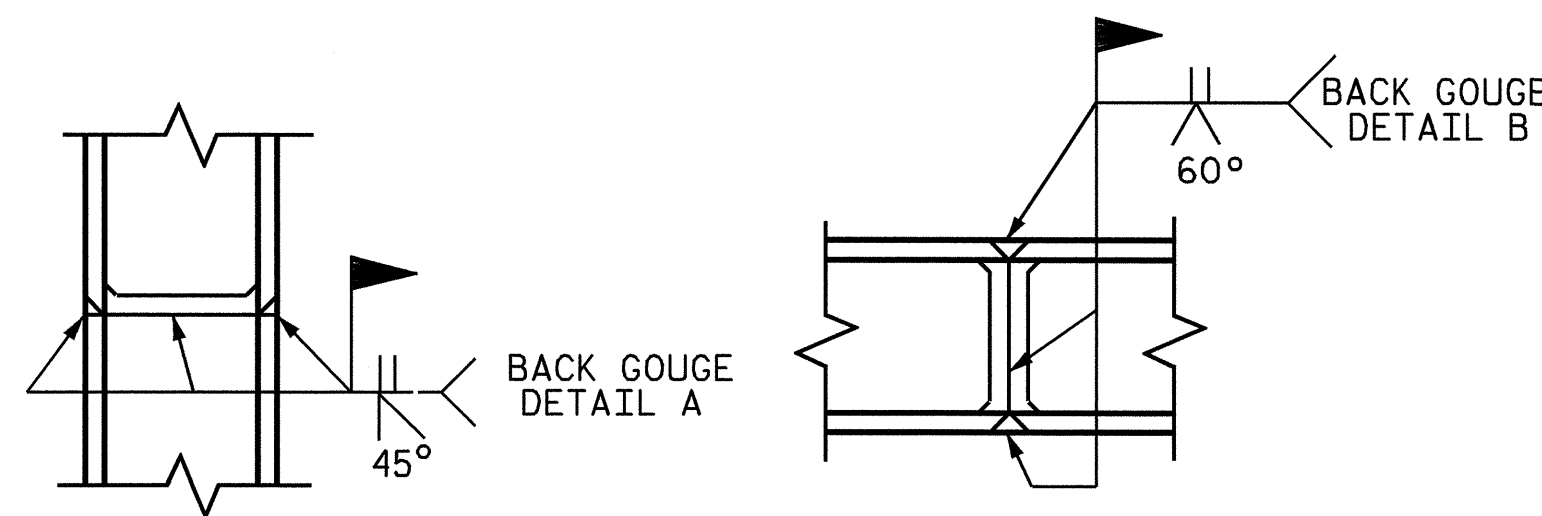


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

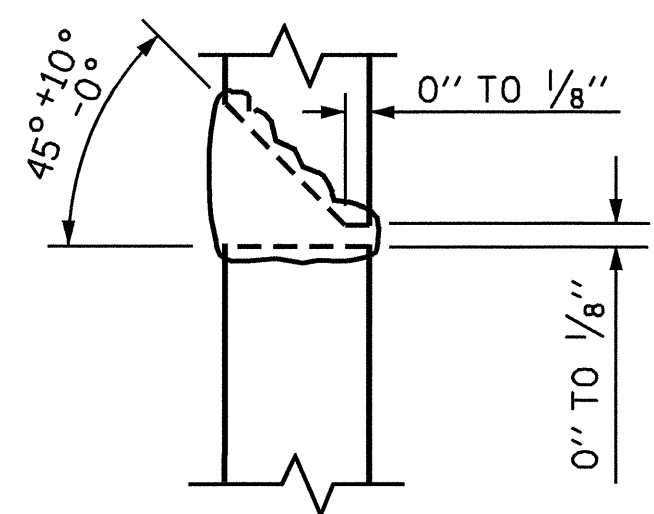
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT



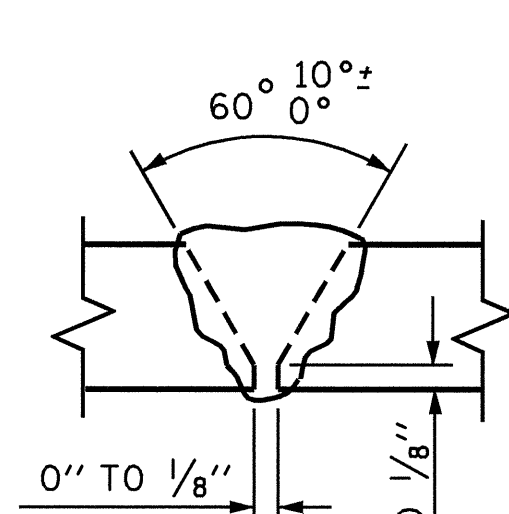
\* PILE VERTICAL

\* PILE HORIZONTAL OR VERTICAL



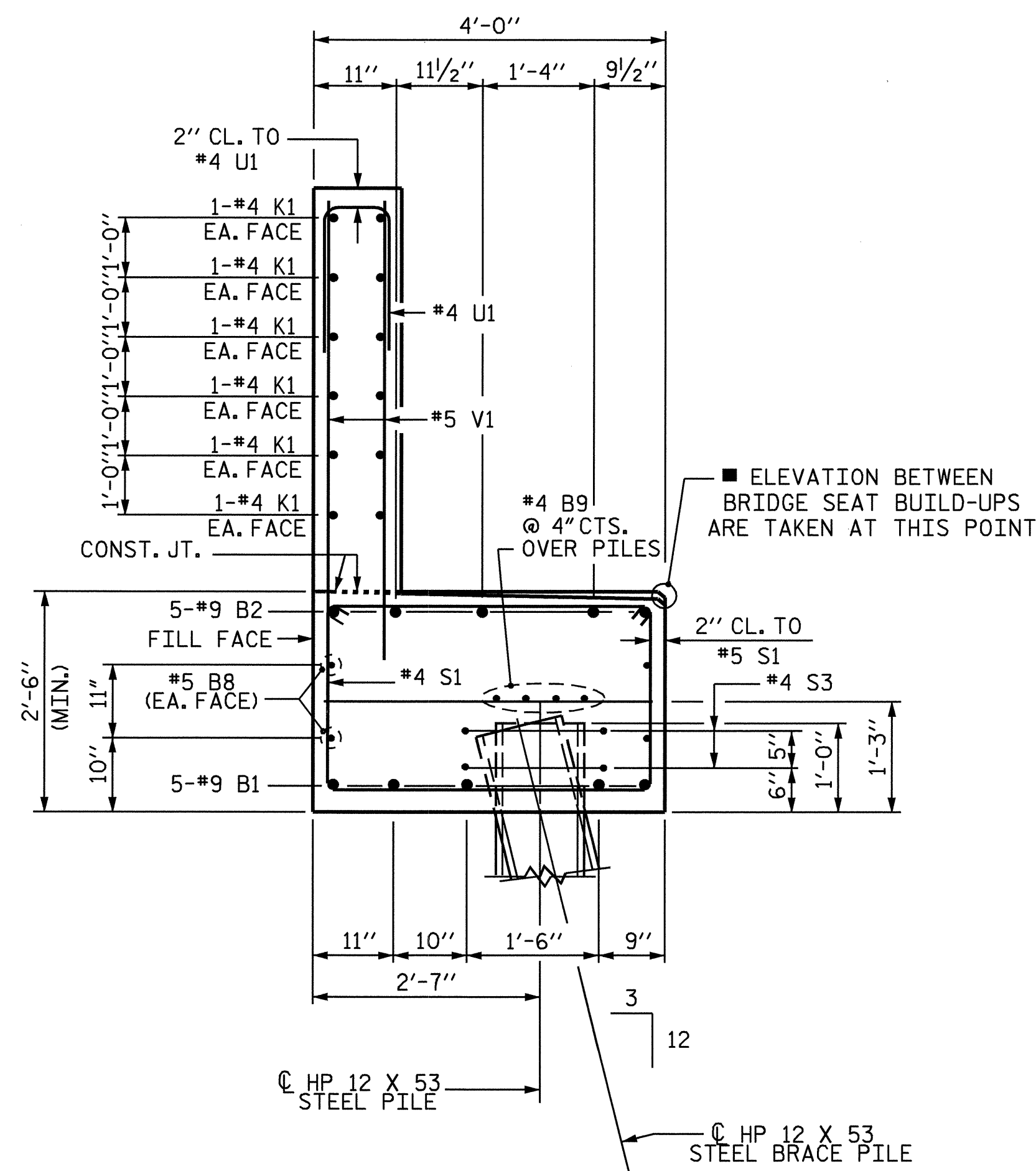
DETAIL A

\* POSITION OF PILE DURING WELDING.

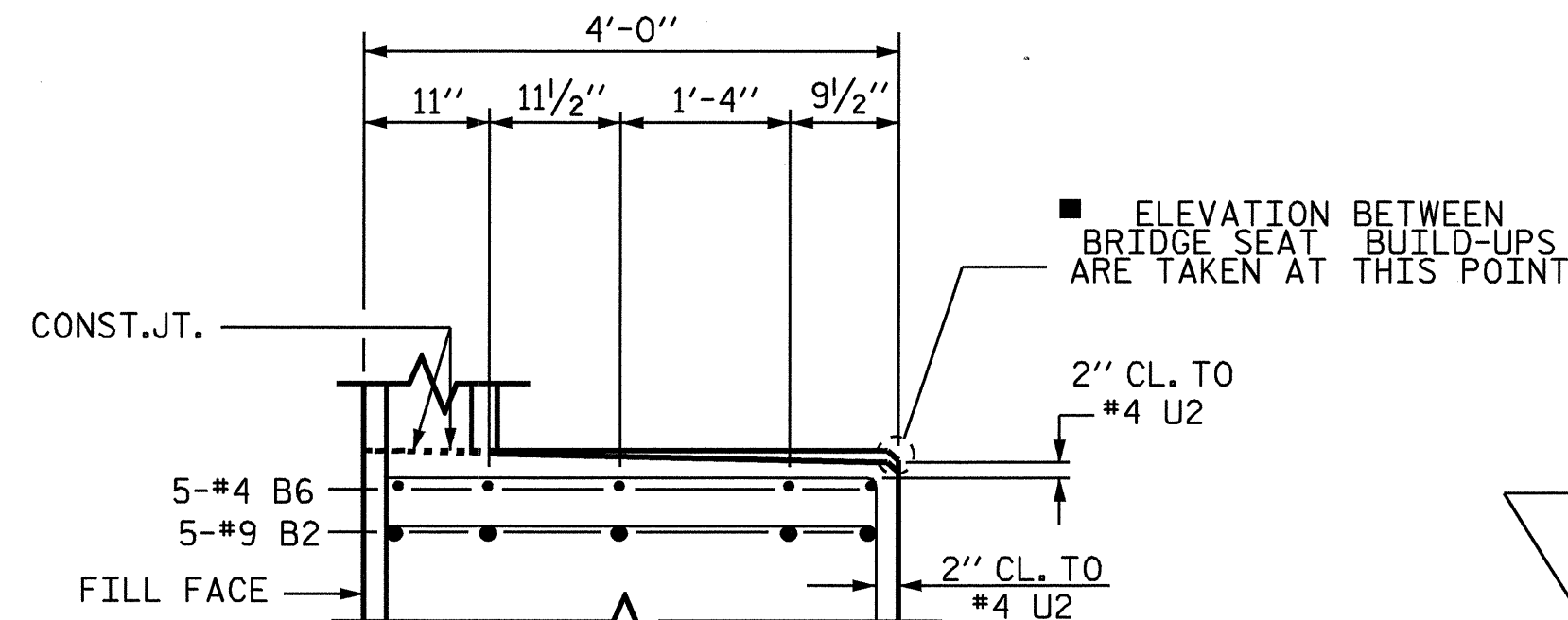


DETAIL B

### PILE SPLICE DETAILS

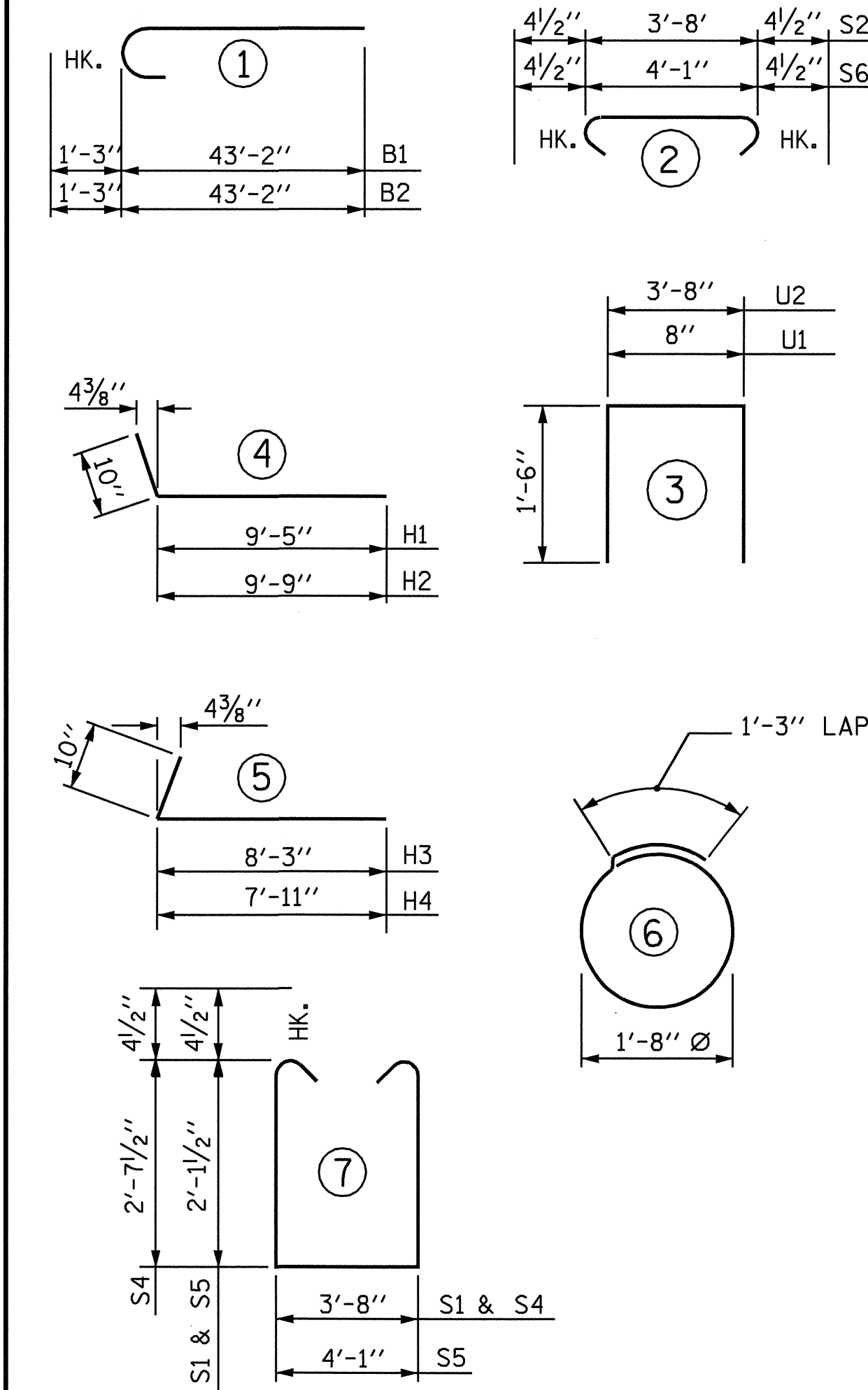


SECTION A-A



SECTION B-B

### BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

### BILL OF MATERIAL

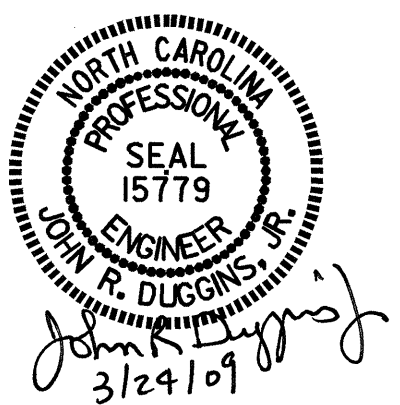
#### END BENT No. 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	44'-5"	1510
B2	10	#9	1	44'-5"	1510
B3	5	#9	STR	48'-9"	829
B4	5	#4	STR	18'-2"	61
B5	5	#4	STR	21'-2"	71
B6	5	#4	STR	9'-0"	30
B7	10	#4	STR	2'-10"	19
B8	8	#5	STR	59'-1"	493
B9	20	#4	STR	25'-0"	334
B10	29	#4	STR	3'-8"	71
B11	5	#9	STR	43'-2"	734
H1	11	#5	4	10'-3"	118
H2	11	#5	4	10'-7"	121
H3	11	#5	5	9'-1"	104
H4	11	#5	5	8'-9"	100
H5	4	#4	STR	4'-4"	12
H6	4	#4	STR	4'-4"	12
K1	60	#4	STR	25'-0"	1002
S1	72	#4	7	8'-8"	417
S2	126	#4	2	4'-5"	372
S3	44	#4	6	6'-6"	191
S4	54	#4	7	9'-8"	349
S5	2	#4	7	9'-1"	12
S6	2	#4	2	4'-10"	6
U1	106	#4	3	3'-8"	260
U2	41	#4	3	6'-8"	183
V1	212	#5	STR	7'-8"	1695
V2	30	#5	STR	9'-10"	308
V3	28	#5	STR	9'-8"	282

REINFORCING STEEL 11,206 LBS.

CLASS A CONCRETE BREAKDOWN  
 POUR 1 (CAP & LOWER WINGS) 53.1 C.Y.  
 POUR 2 (BACKWALL & UPPER WINGS) 29.1 C.Y.  
 TOTAL 82.2 C.Y.

HP 12 x 53 STEEL PILES NO. 22 1045 LIN FT.



PROJECT NO. R-4430  
 HENDERSON COUNTY

STATION: 93+31.40 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

### SUBSTRUCTURE END BENT No. 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-68
2			4			TOTAL SHEETS 71

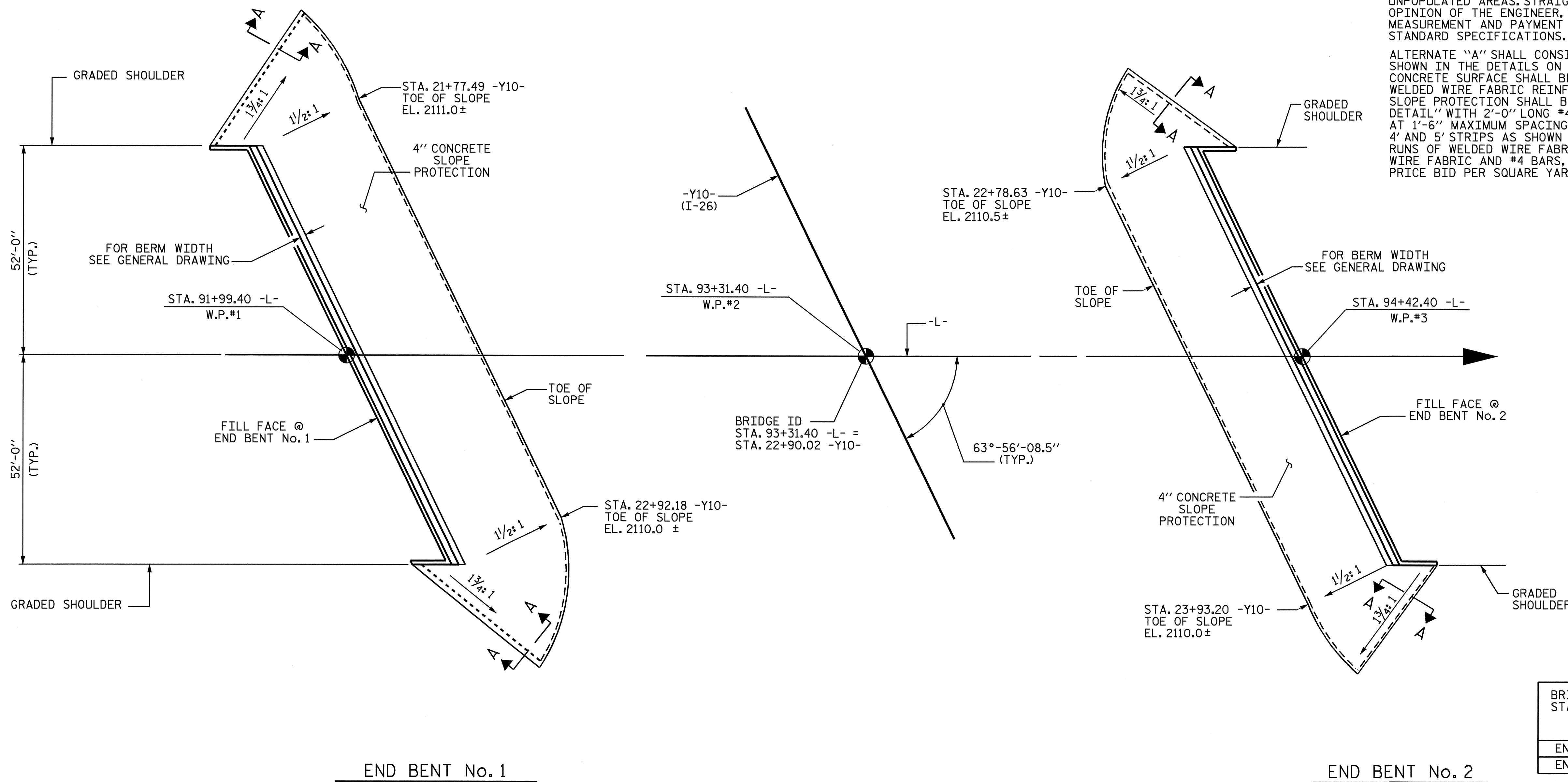
DRAWN BY: M. POOLE DATE: 09/08  
 CHECKED BY: J.R. DUGGINS DATE: 12/08

20-MAR-2009 15:12  
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 dahodge

**GENERAL NOTES**

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. THE CONTRACTOR, AT HIS OPTION, MAY USE ALTERNATE "B" ONLY FOR HIGHWAY OVER HIGHWAY GRADE SEPARATIONS WITH 2:1 END BENT SLOPE IN RURAL, UNPOPULATED AREAS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

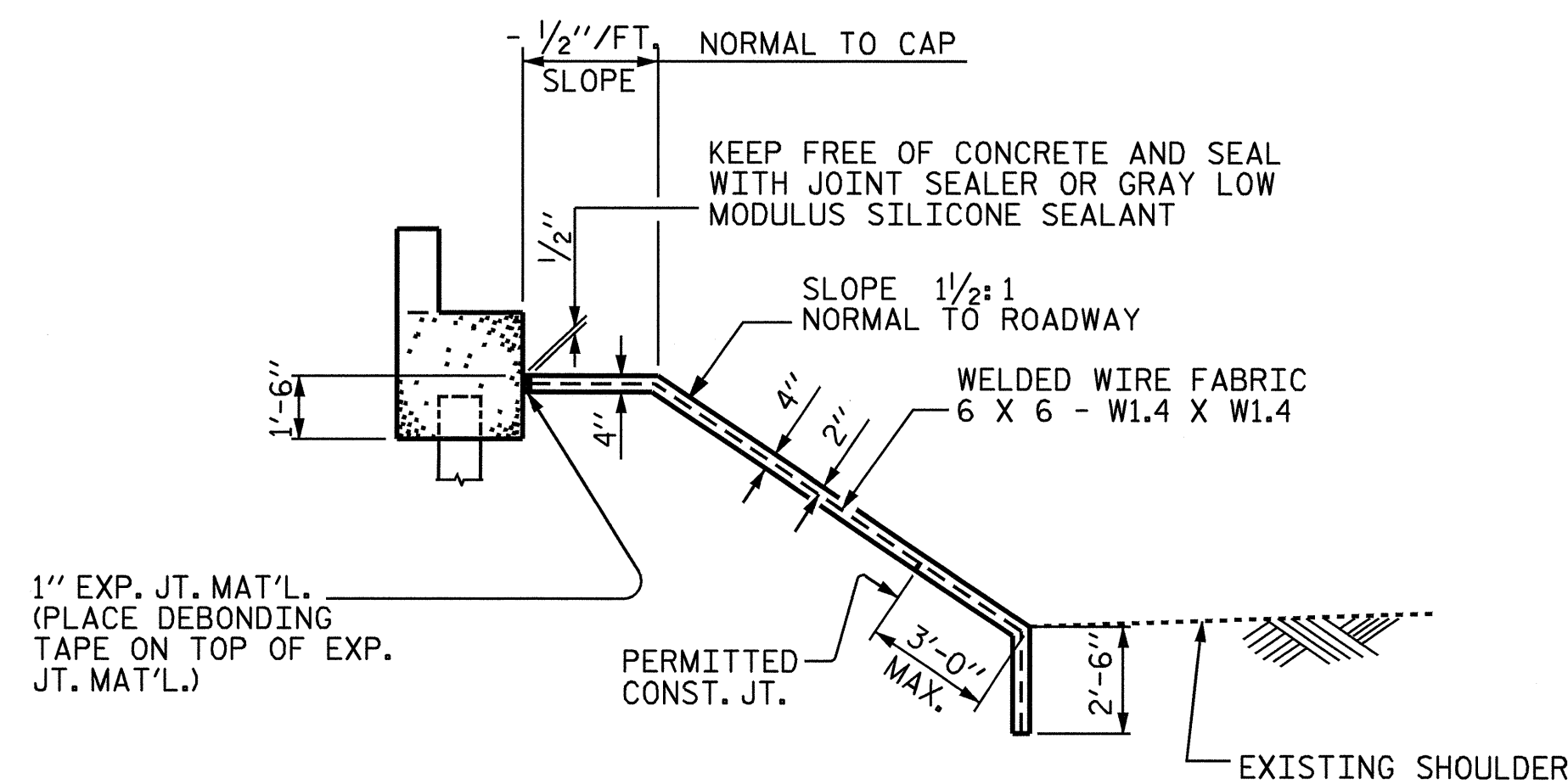
ALTERNATE "A" SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE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



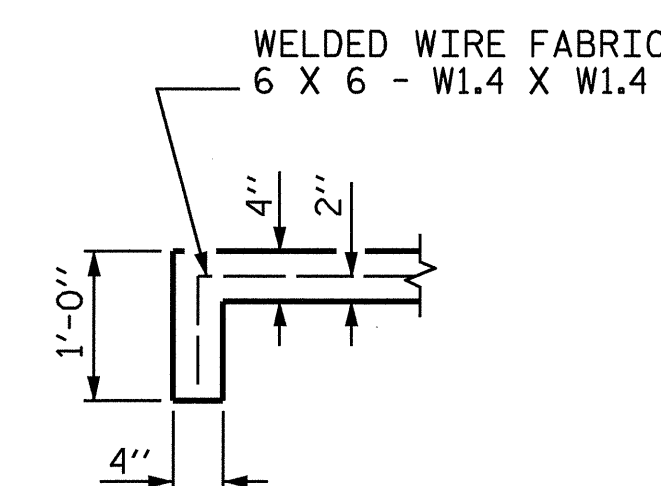
**PLAN**  
(SEE GENERAL DRAWING FOR BERM WIDTHS AND ELEVATIONS)

BRIDGE @ STA. 93+31.40 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT No. 1	680	1360
END BENT No. 2	570	1140

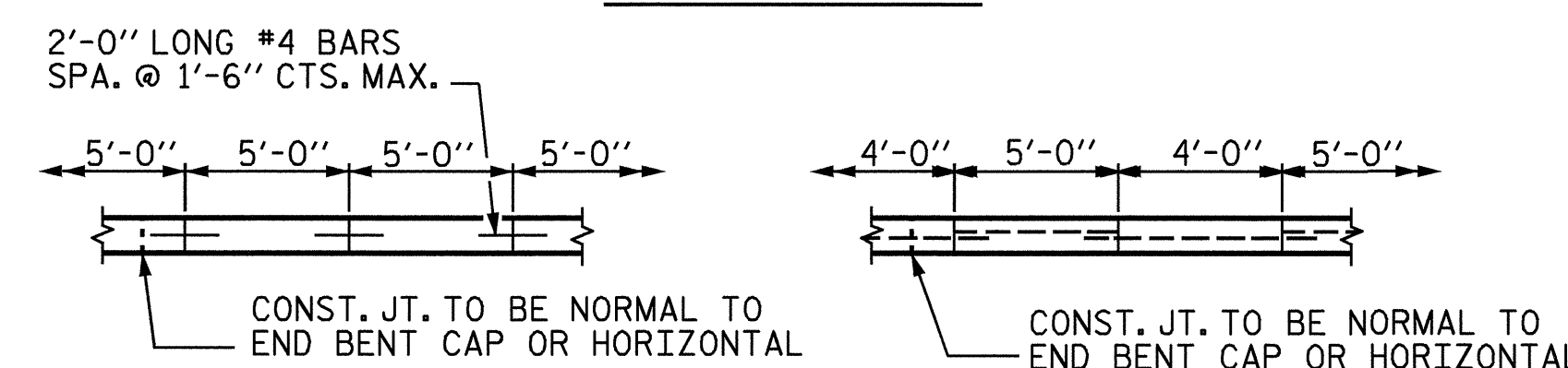
\* QUANTITY SHOWN IS BASED ON 5' POURS.



**SECTION A-A**  
SECTION ALONG C ROADWAY



**SECTION A-A**



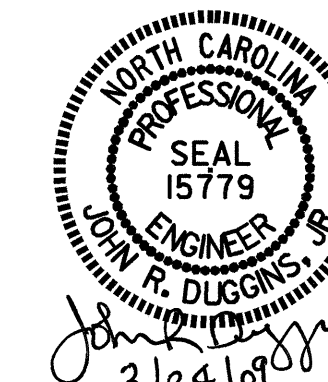
STRIP WIDTHS MAY VARY IN CURVED PORTION. POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

**POURING DETAIL**      **OPTIONAL POURING DETAIL**

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 93+31.40 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

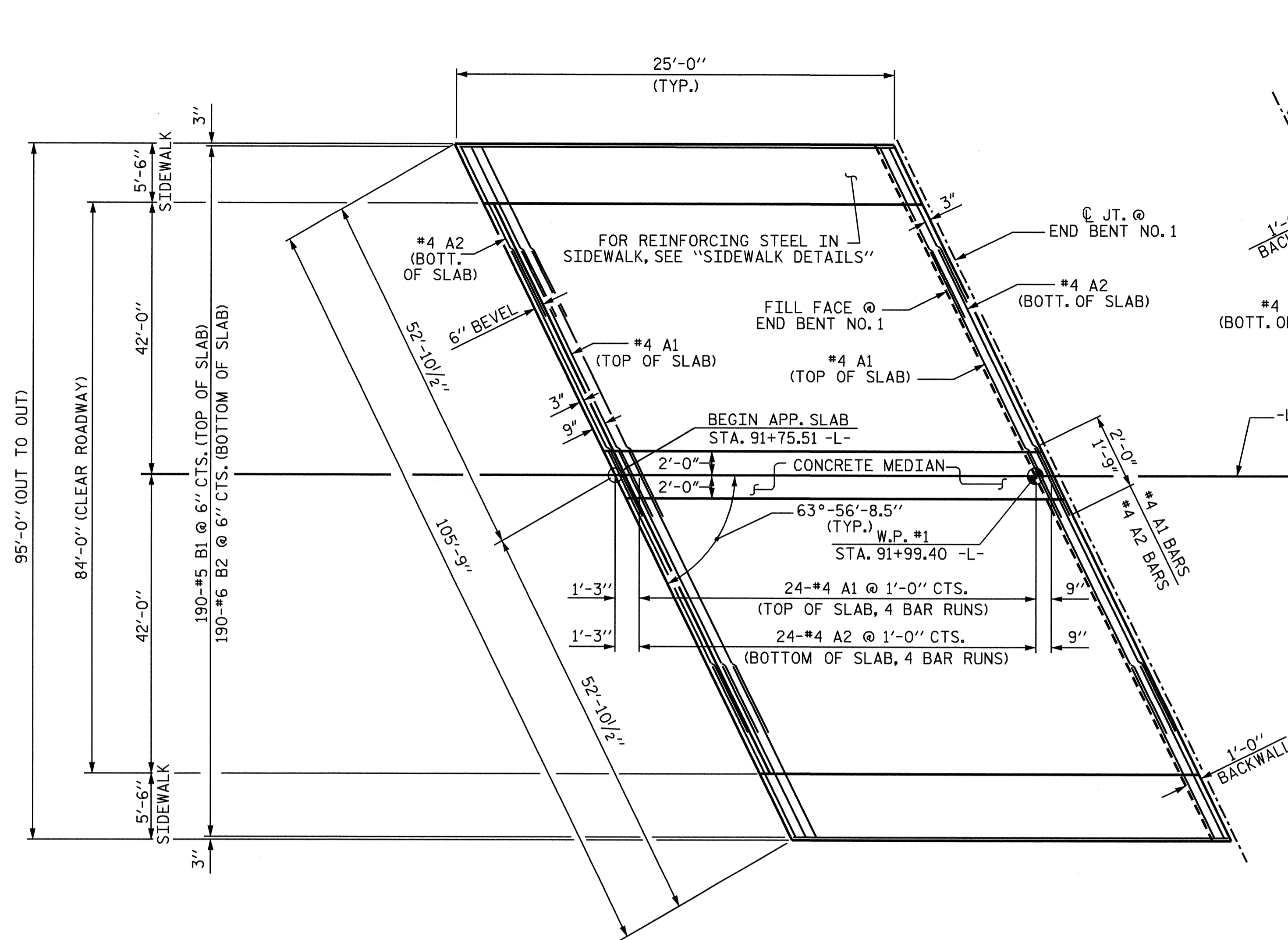
**SLOPE PROTECTION**



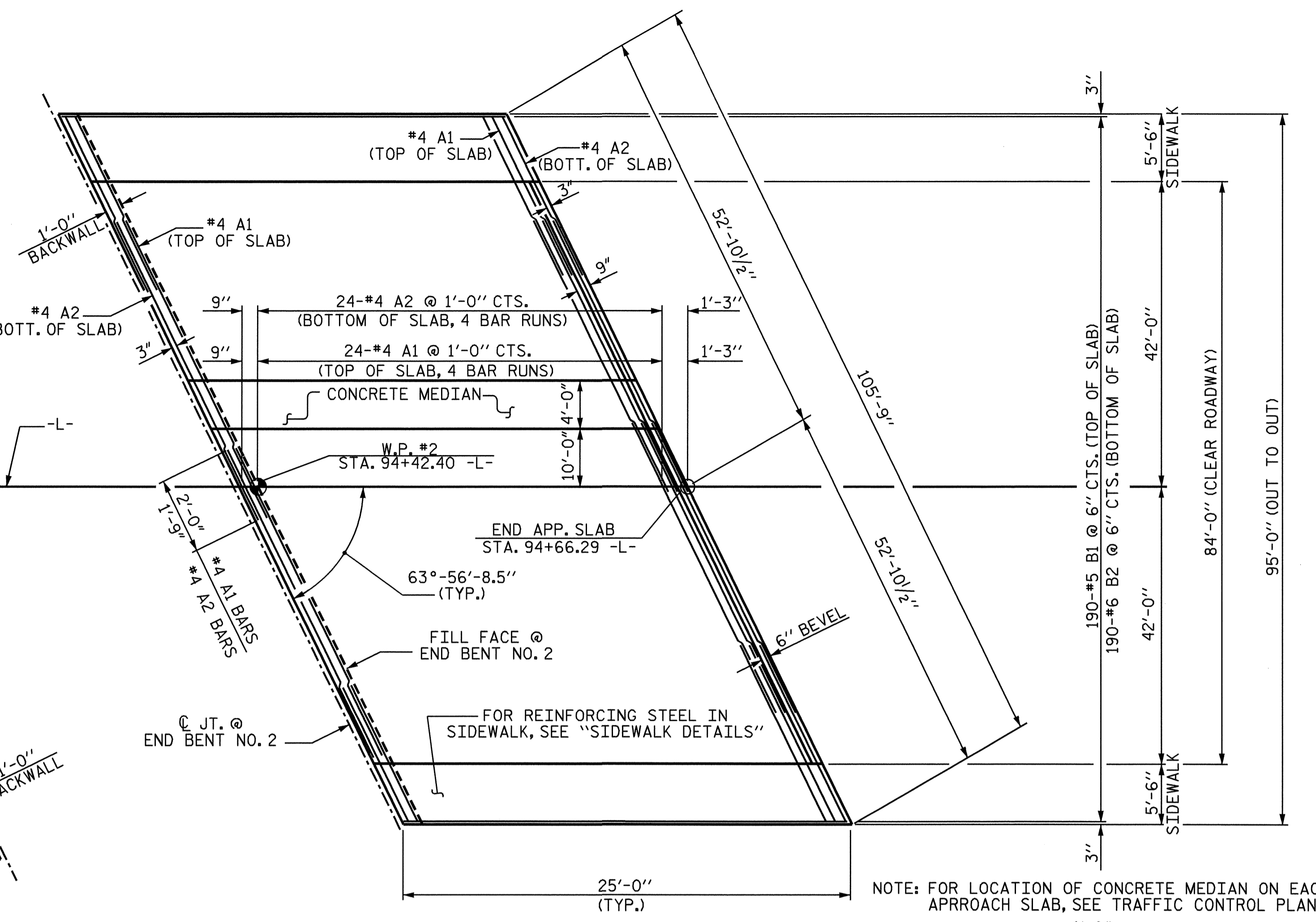
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			5-69
2			4			71

DRAWN BY: M. POOLE DATE: 10/08  
 CHECKED BY: J.R. DUGGINS DATE: 11/08

20-MAR-2009 15:11  
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 dahodge

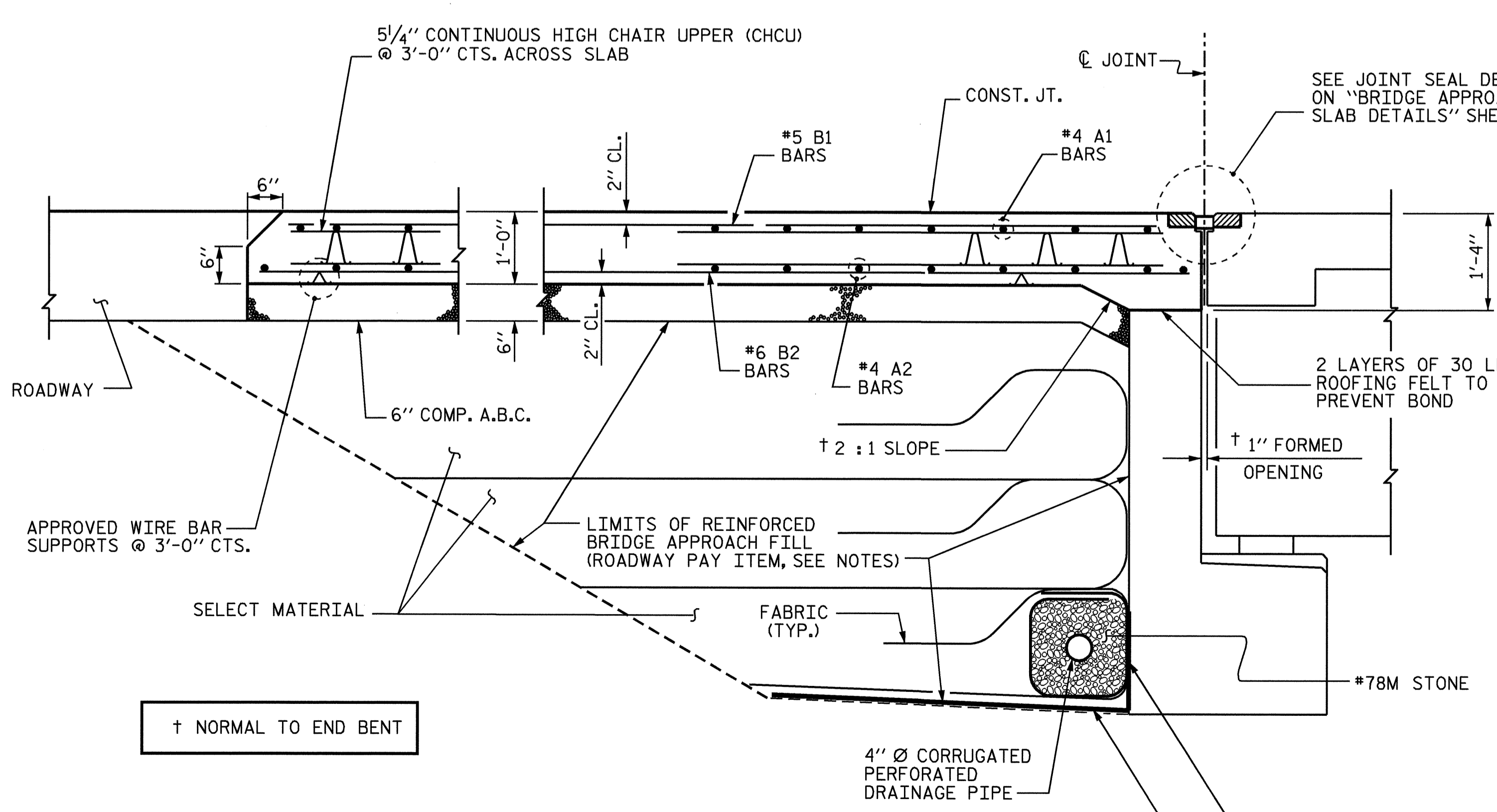


PLAN @ END BENT NO. 1

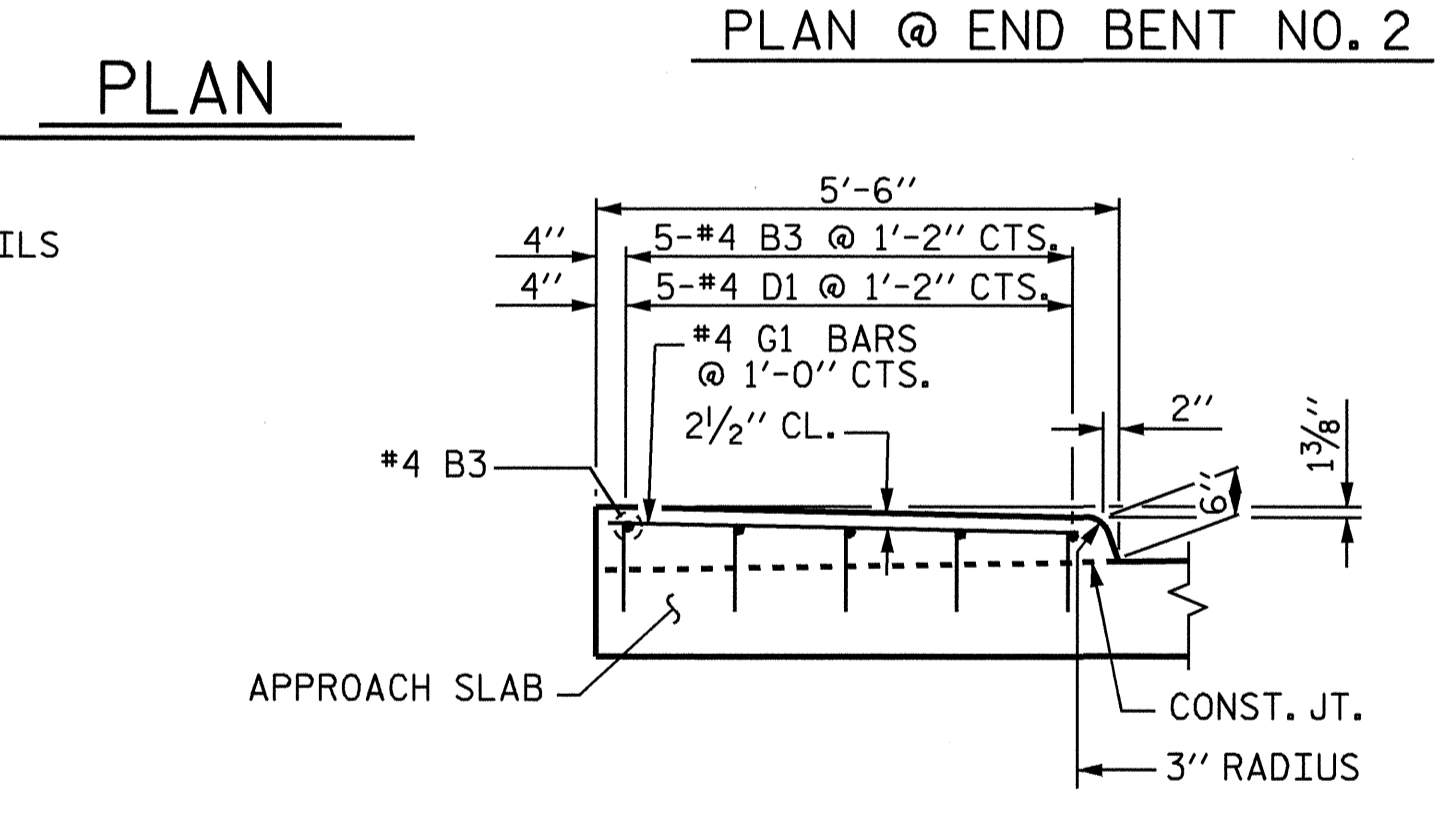


PLAN @ END BENT NO. 2

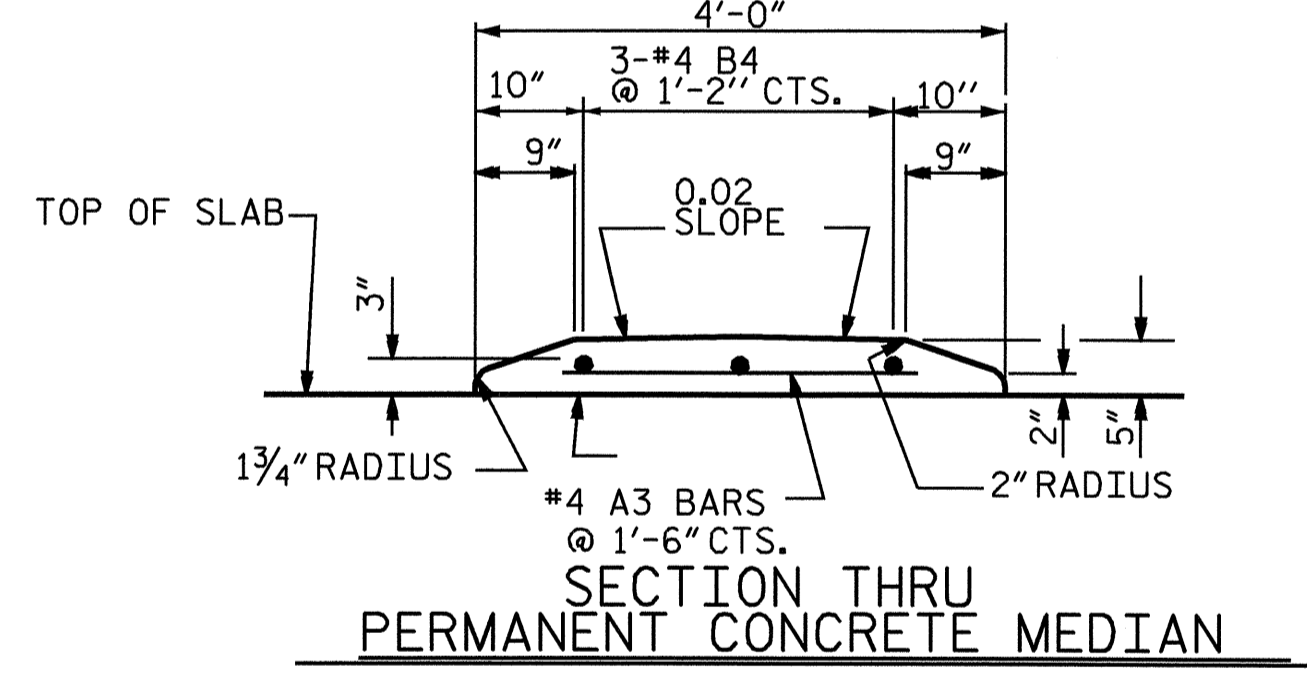
NOTE: FOR LOCATION OF CONCRETE MEDIAN ON EACH APPROACH SLAB, SEE TRAFFIC CONTROL PLANS.



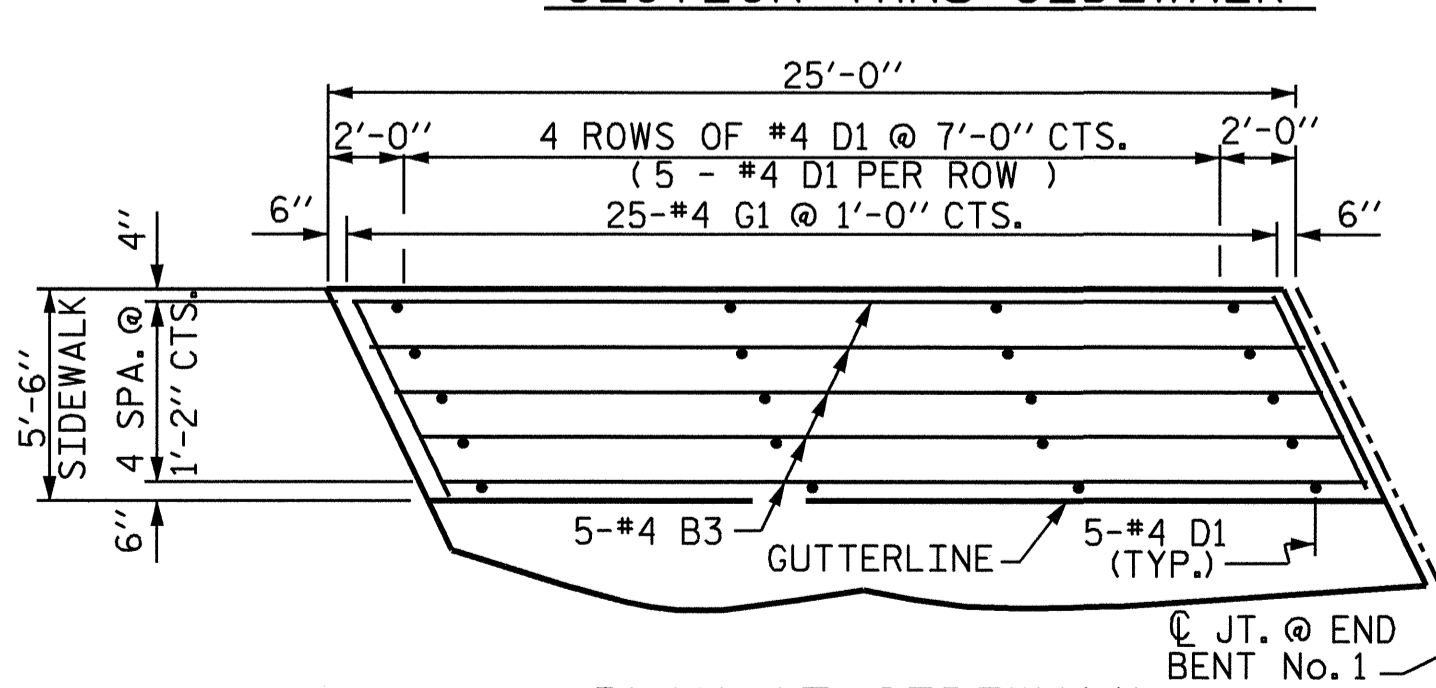
SECTION THRU SLAB



SECTION THRU SIDEWALK



SECTION THRU PERMANENT CONCRETE MEDIAN



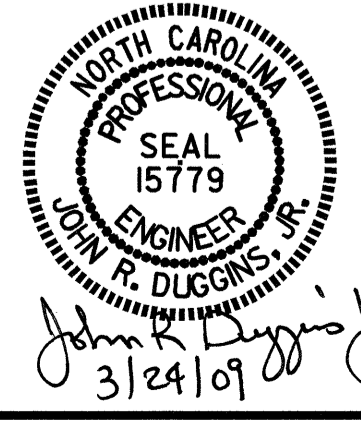
PLAN AT SIDEWALK SIDEWALK DETAILS

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

PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT					
SHEET NO. S-70					
TOTAL SHEETS 71					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		



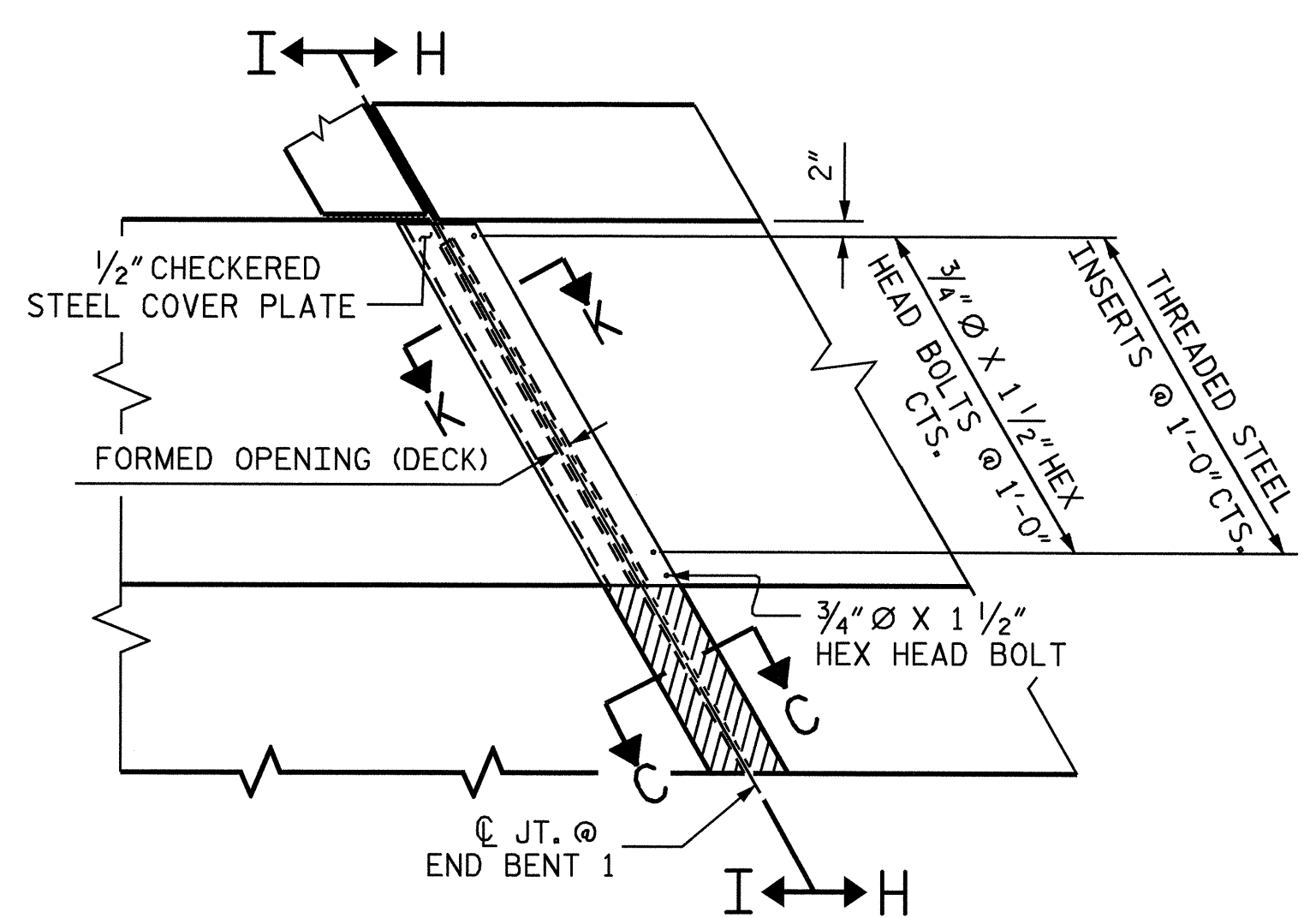
DRAWN BY: M. POOLE DATE: 09/08  
 CHECKED BY: J.R. DUGGINS DATE: 11/08

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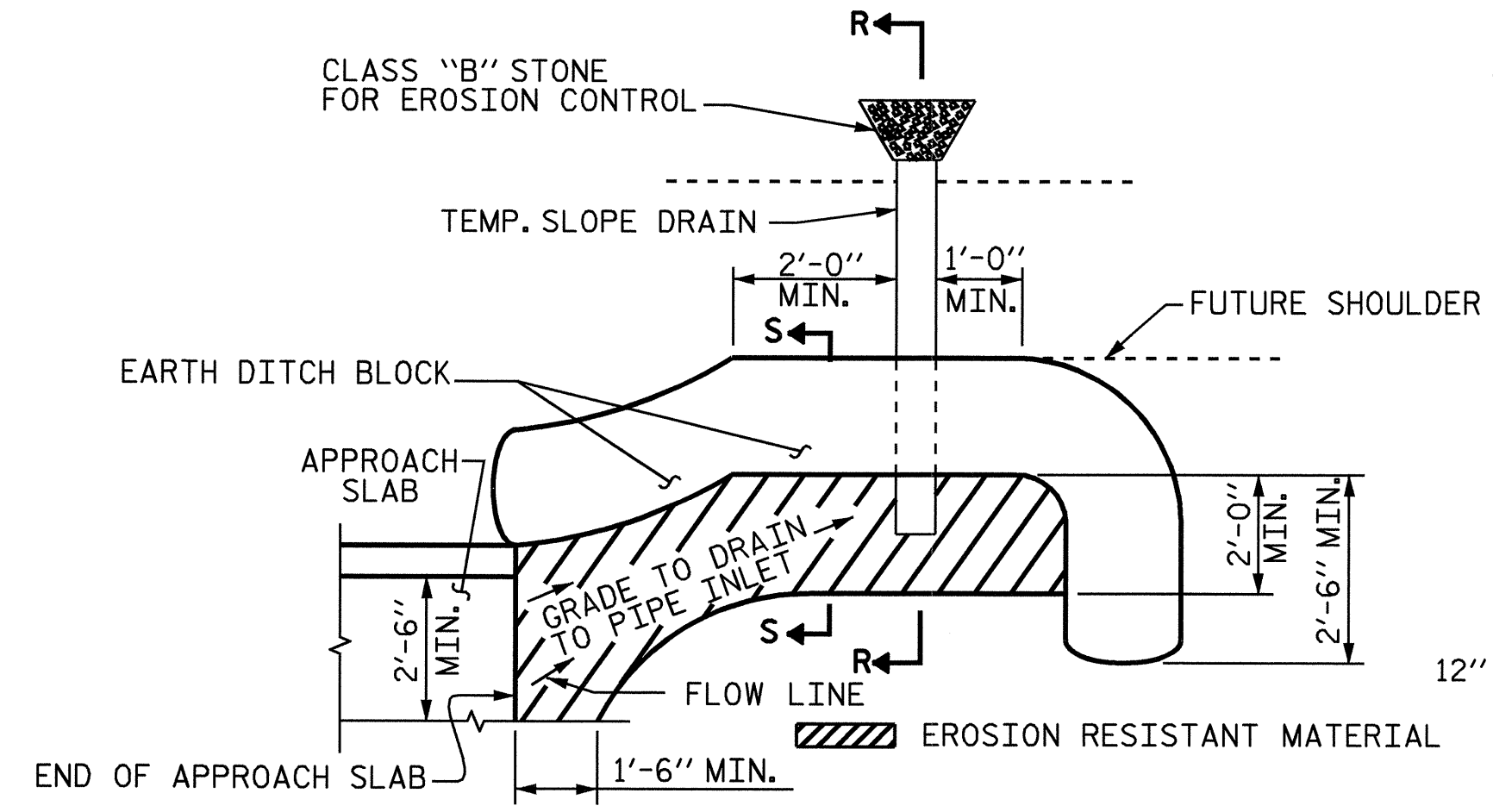


BILL OF MATERIAL FOR ONE APPROACH SLAB (2 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	100	#4	STR	27'-8"	1848
A2	108	#4	STR	27'-11"	2014
*A3	17	#4	STR	2'-8"	30
*B1	190	#5	STR	23'-6"	4657
B2	190	#6	STR	24'-6"	6992
*B3	10	#4	STR	24'-6"	164
*B4	3	#4	STR	24'-8"	49
*D1	40	#4	STR	1'-0"	28
*G1	50	#4	STR	5'-9"	192
REINFORCING STEEL				LBS.	9006
*EPOXY COATED REINFORCING STEEL				LBS.	6968
CLASS AA CONCRETE BREAKDOWN					
POUR 1 (SLAB)				C. Y.	88.7
POUR 2 (SIDEWALKS)				C. Y.	5.6
POUR 3 (CONCRETE MEDIAN)				C. Y.	1.4
TOTAL				C. Y.	95.7

\* THESE BARS ARE EPOXY COATED.

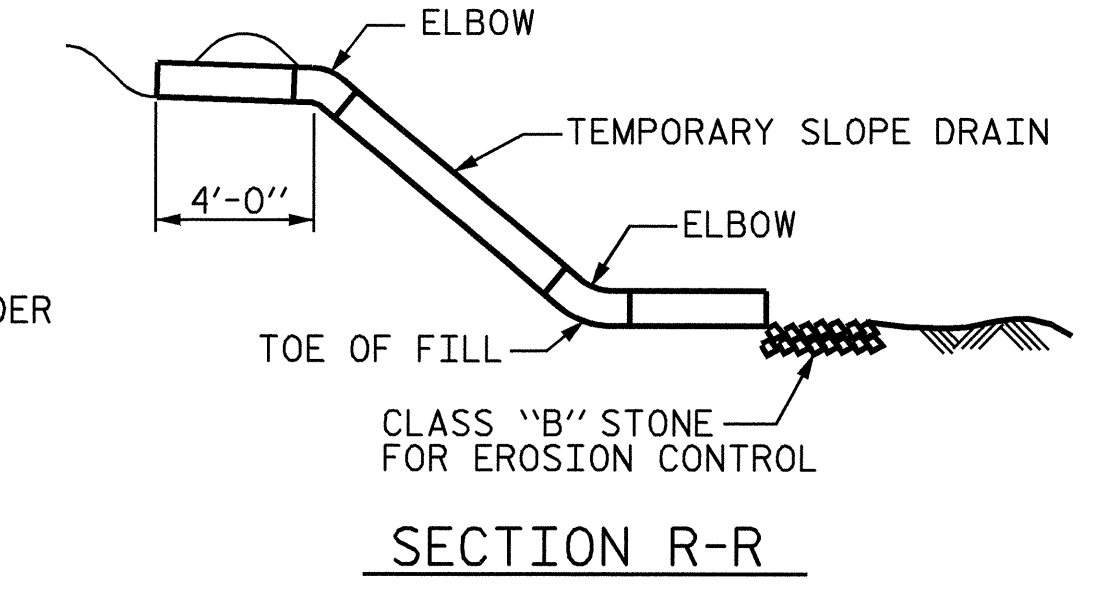


PLAN VIEW OF EVAZOTE JOINT SEAL @ END BENT FOR SIDEWALK

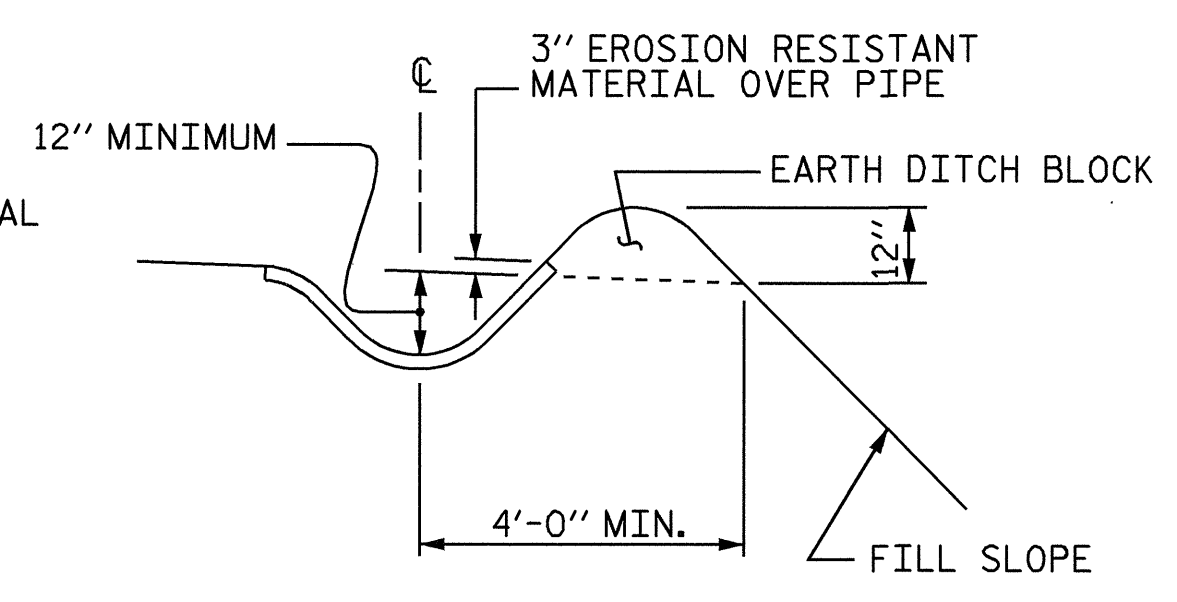


IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 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



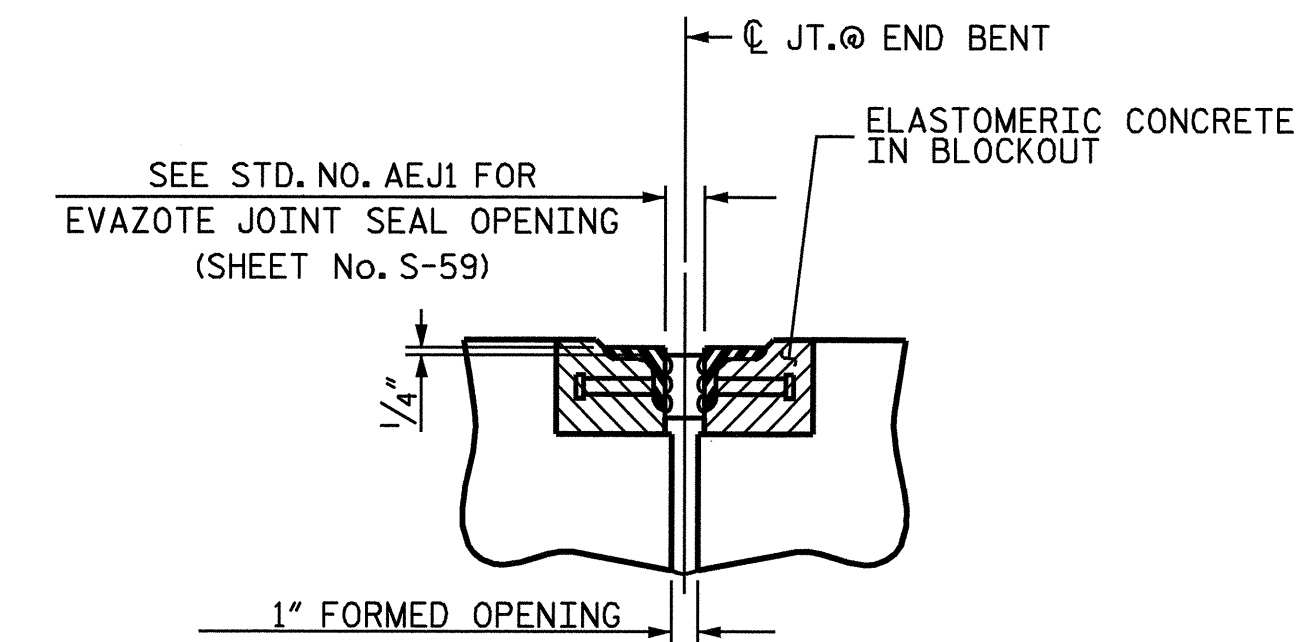
SECTION R-R



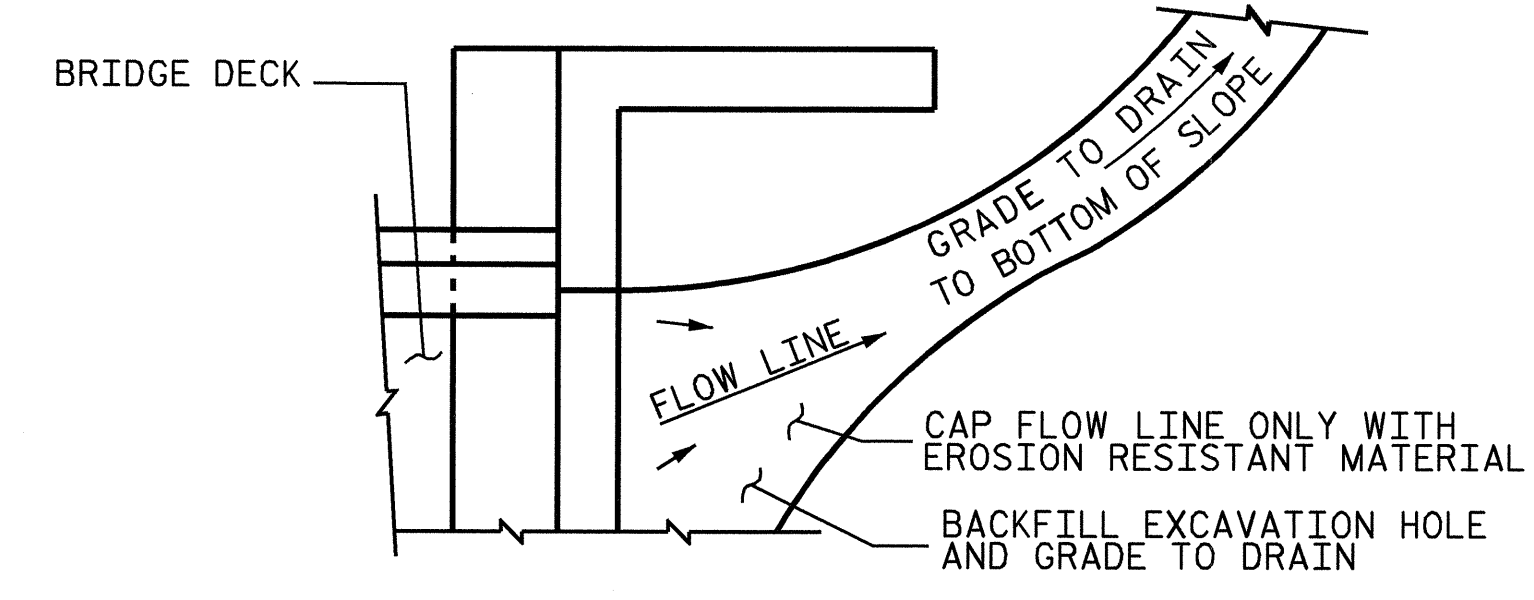
SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

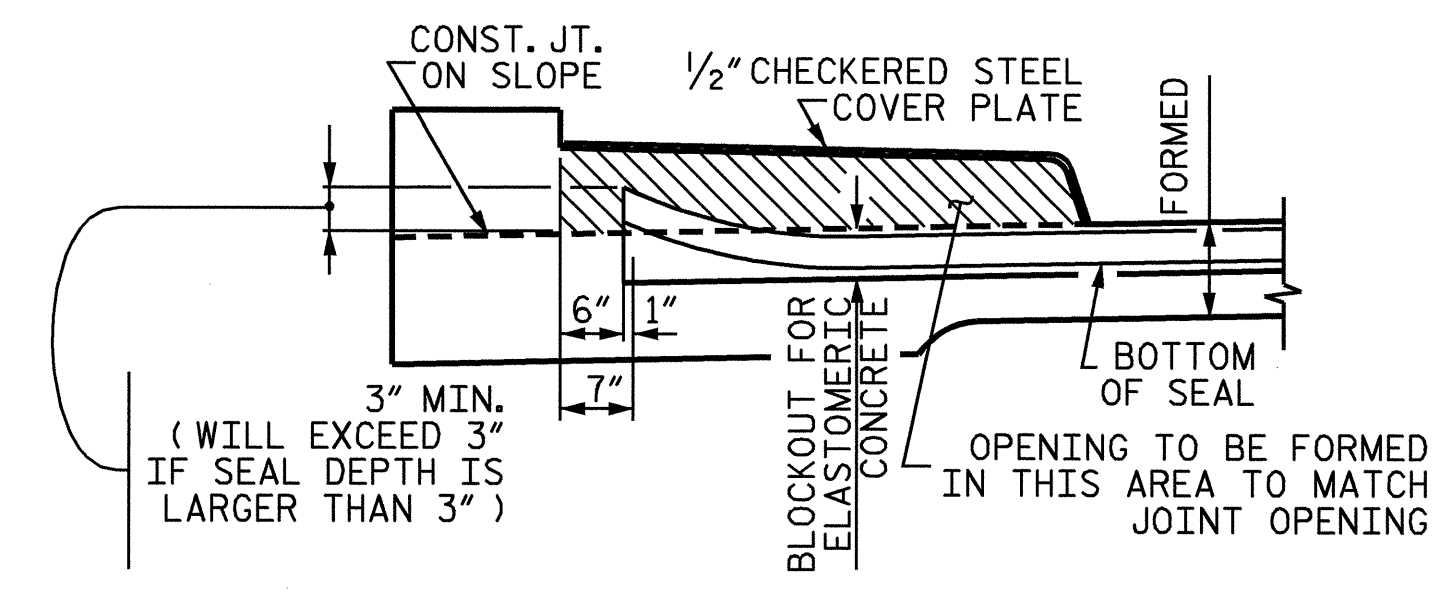


SECTION C-C ARMORED EVAZOTE JOINT SEAL

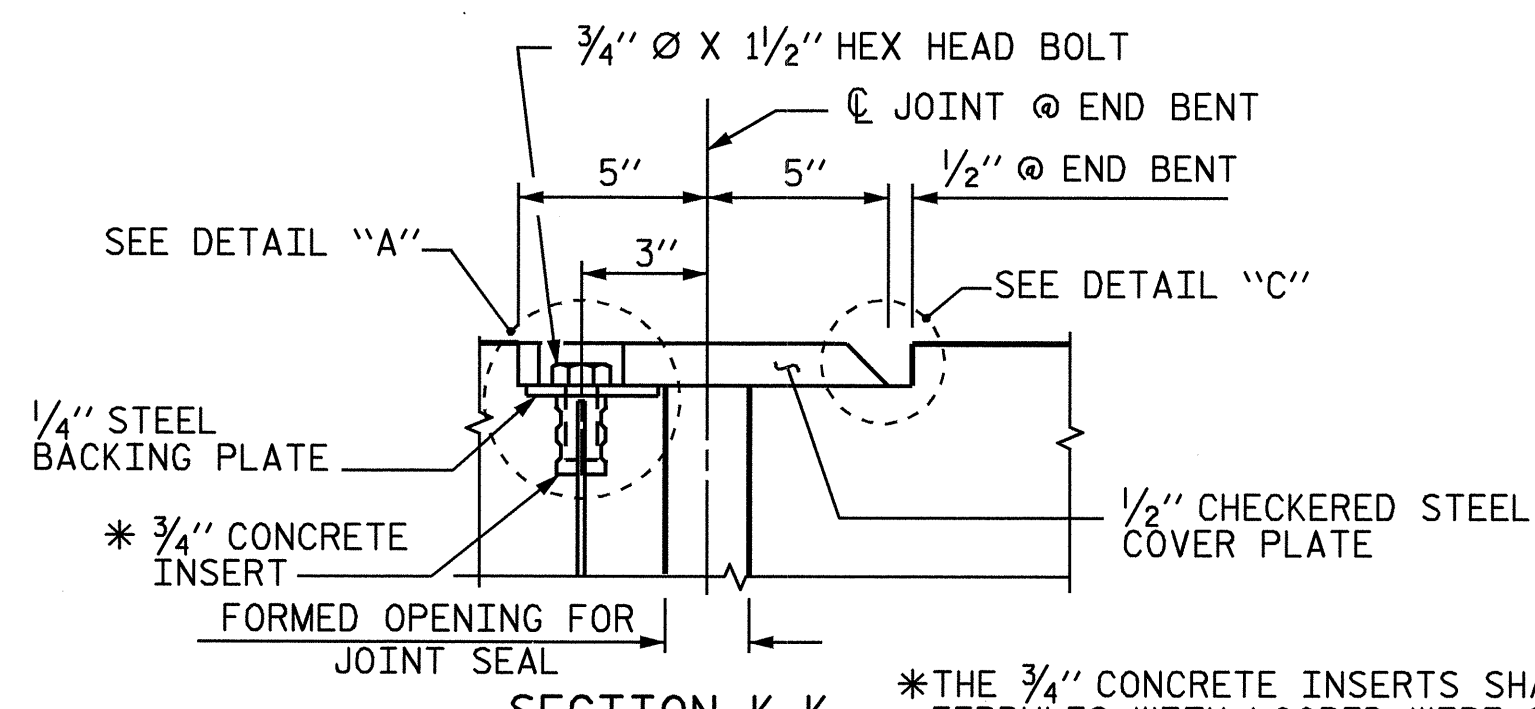


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

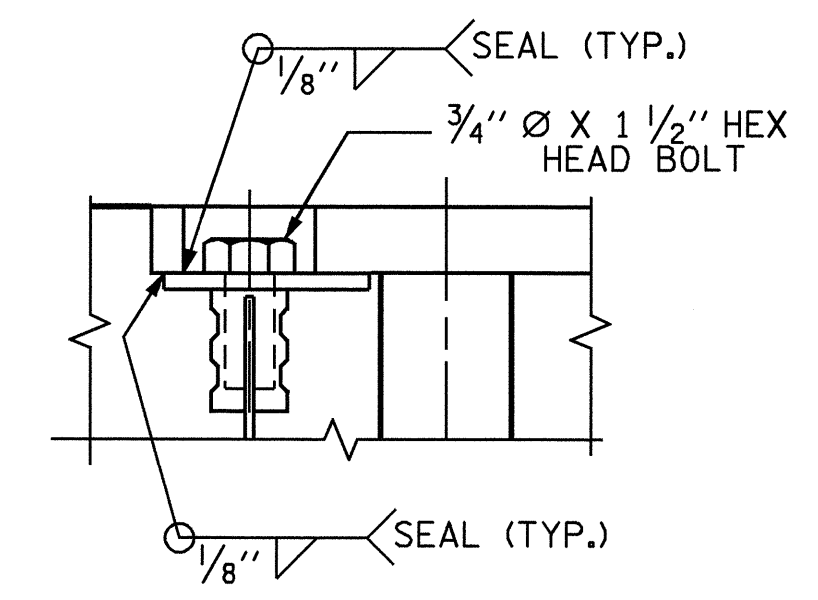
TEMPORARY DRAINAGE DETAIL



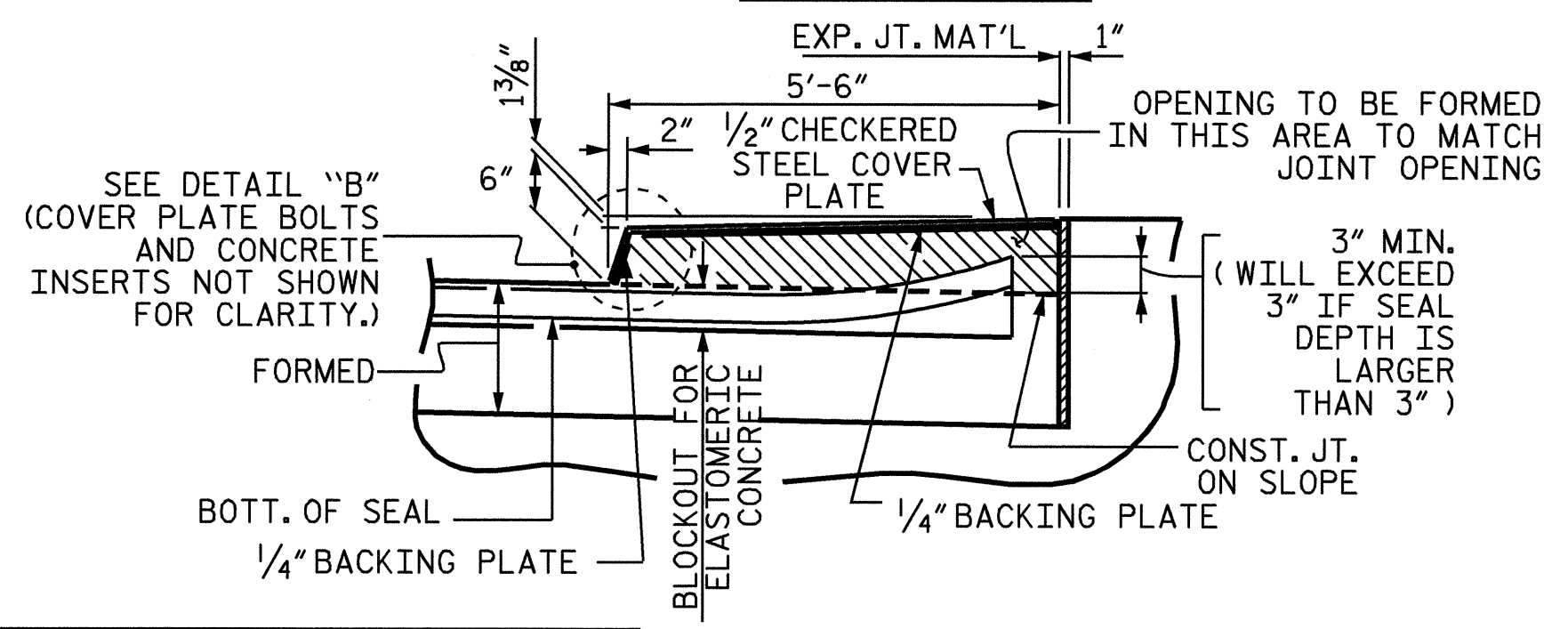
SECTION H-H



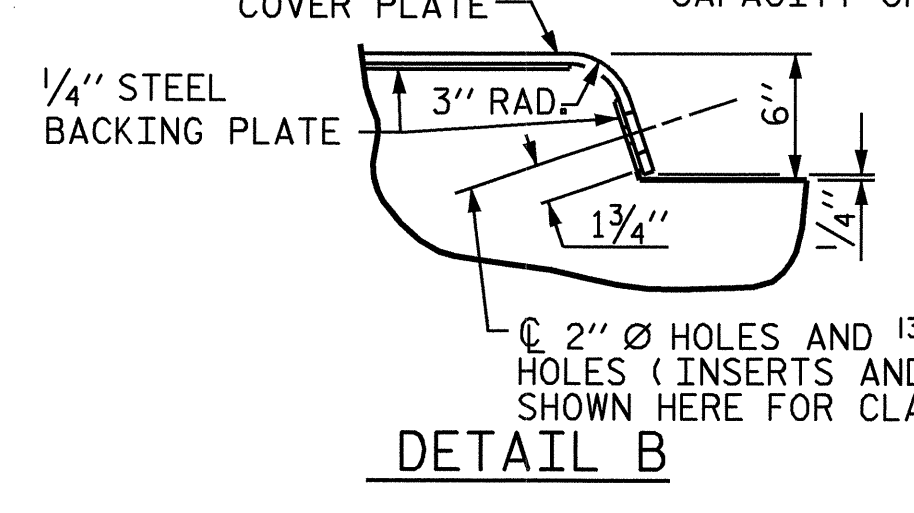
SECTION K-K



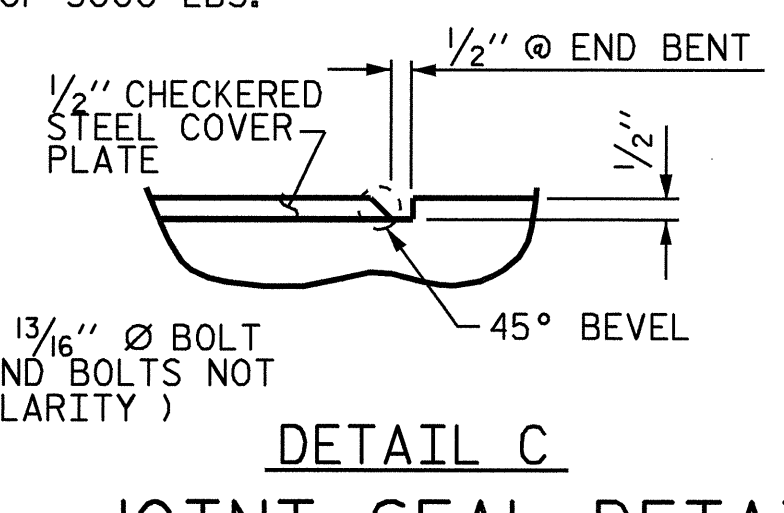
DETAIL A



SECTION I-I



DETAIL B



DETAIL C

JOINT SEAL DETAILS @ END BENT

3/24/08

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 ROADWAY END OF THE APPROACH SLAB AND 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 BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH 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 ROADWAY END OF THE APPROACH 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.

PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 93+31.40 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

BRIDGE APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			8-71
2			4			71

ASSEMBLED BY :	M. POOLE	DATE :	09/08
CHECKED BY :	J.R. DUGGINS	DATE :	11/08
DRAWN BY :	FCJ 11/88	REV. 10/17/00	RWW/LES
CHECKED BY :	ARB 11/88	REV. 5/1/03	RWW/JTE
		REV. 5/1/06R	MAA/KMM

NOTES

ASSUMED LIVE LOAD -----HS20-44 OR ALTERNATE LOADING.  
 DESIGN FILL----- 22.41'  
 FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.  
 3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.  
 CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF VERTICAL WALLS. (IF THE PERMITTED CONSTRUCTION JOINT IS USED)
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY THE ROOF SLAB AND HEAD WALLS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FEET. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

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

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

THE BED MATERIAL EXCAVATED FROM THE SITE FOR THE BOX CULVERT CONSTRUCTION IS TO BE STOCKPILED AND LATER PLACED ON THE FLOOR OF THE COMPLETED CULVERT.

THE BED MATERIAL IS TO BE PLACED IN THE CULVERT TO TOP OF BAFFLES SO AS TO PROVIDE A CONTINUOUS LOW FLOW CHANNEL BETWEEN BAFFLES.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

FOR LIMITS OF TEMPORARY SHORING, SEE TRAFFIC CONTROL PLANS. FOR TEMPORARY SHORING PAY ITEMS, SEE ROADWAY PLANS.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING 72" CMP SHALL BE REMOVED.

PAYMENT FOR REMOVAL OF EXISTING 72" CMP SHALL BE INCLUDED IN CULVERT EXCAVATION QUANTITY.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

HYDRAULIC DATA

DESIGN DISCHARGE	= 370 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 2120.60
DRAINAGE AREA	= 0.20 SQ. MI.
BASIC DISCHARGE (Q100)	= 420 CFS
BASIC HIGH WATER ELEVATION	= 2121.49

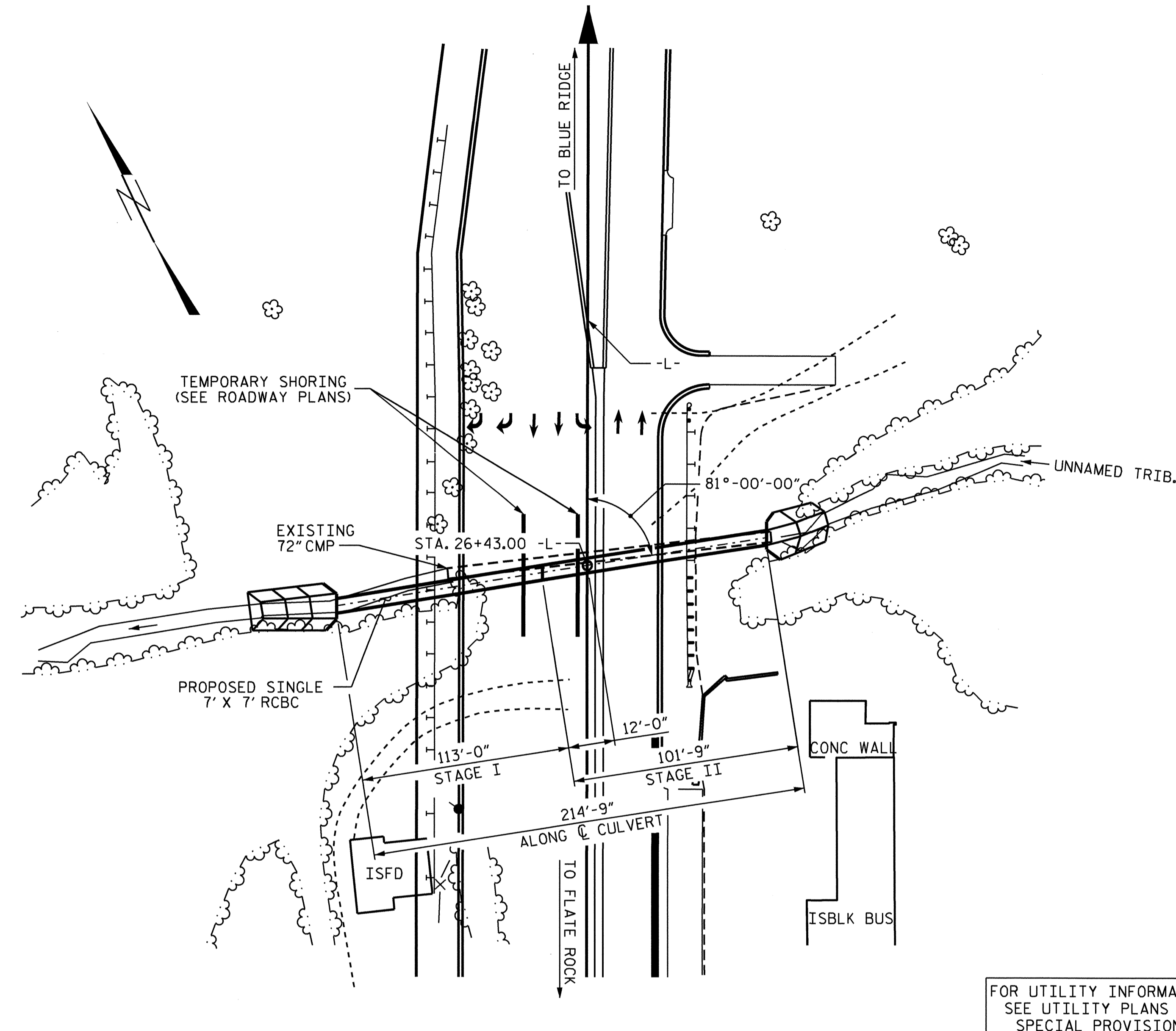
OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 650 CFS
FREQUENCY OF OVERTOPPING FLOOD	= >500 YRS.
OVERTOPPING FLOOD ELEVATION	= >2125.90

GRADE DATA

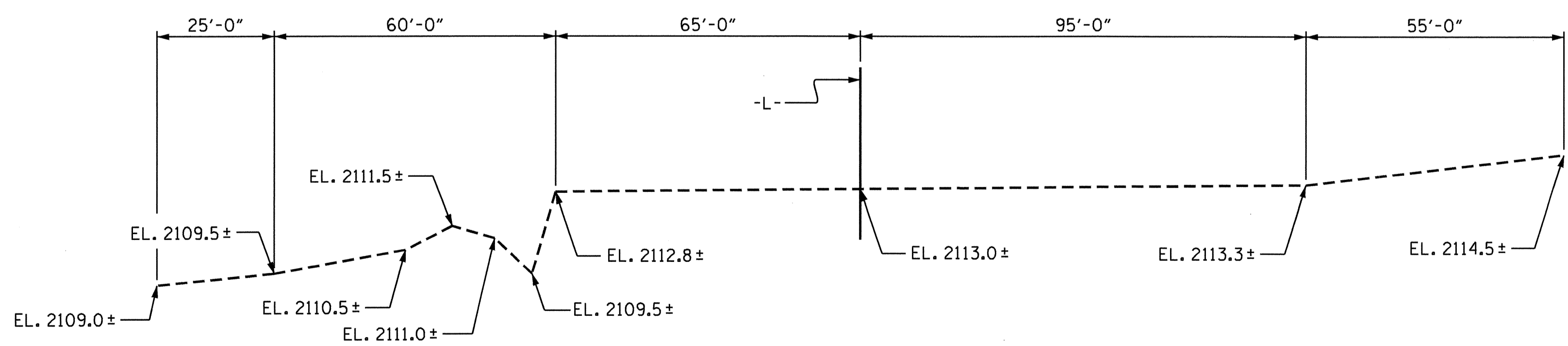
GRADE POINT ELEVATION @	
STA. 26+43.00 -L-	= 2139.500'
BED ELEVATION @	
STA. 26+43.00 -L-	= 2110.85'
ROADWAY FILL SLOPES	= 2:1

TOTAL STRUCTURE QUANTITIES	
CLASS A CONCRETE	
STAGE I	108.5 C.Y.
STAGE II	98.7 C.Y.
TOTAL	207.2 C.Y.
REINFORCING STEEL	
STAGE I	15,564 LBS.
STAGE II	14,014 LBS.
TOTAL	29,578 LBS.
FOUNDATION CONDITIONING MATERIAL	
STAGE I	67 TONS
STAGE II	60 TONS
TOTAL	127 TONS
CULVERT EXCAVATION	LUMP SUM



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH



PROFILE ALONG CULVERT

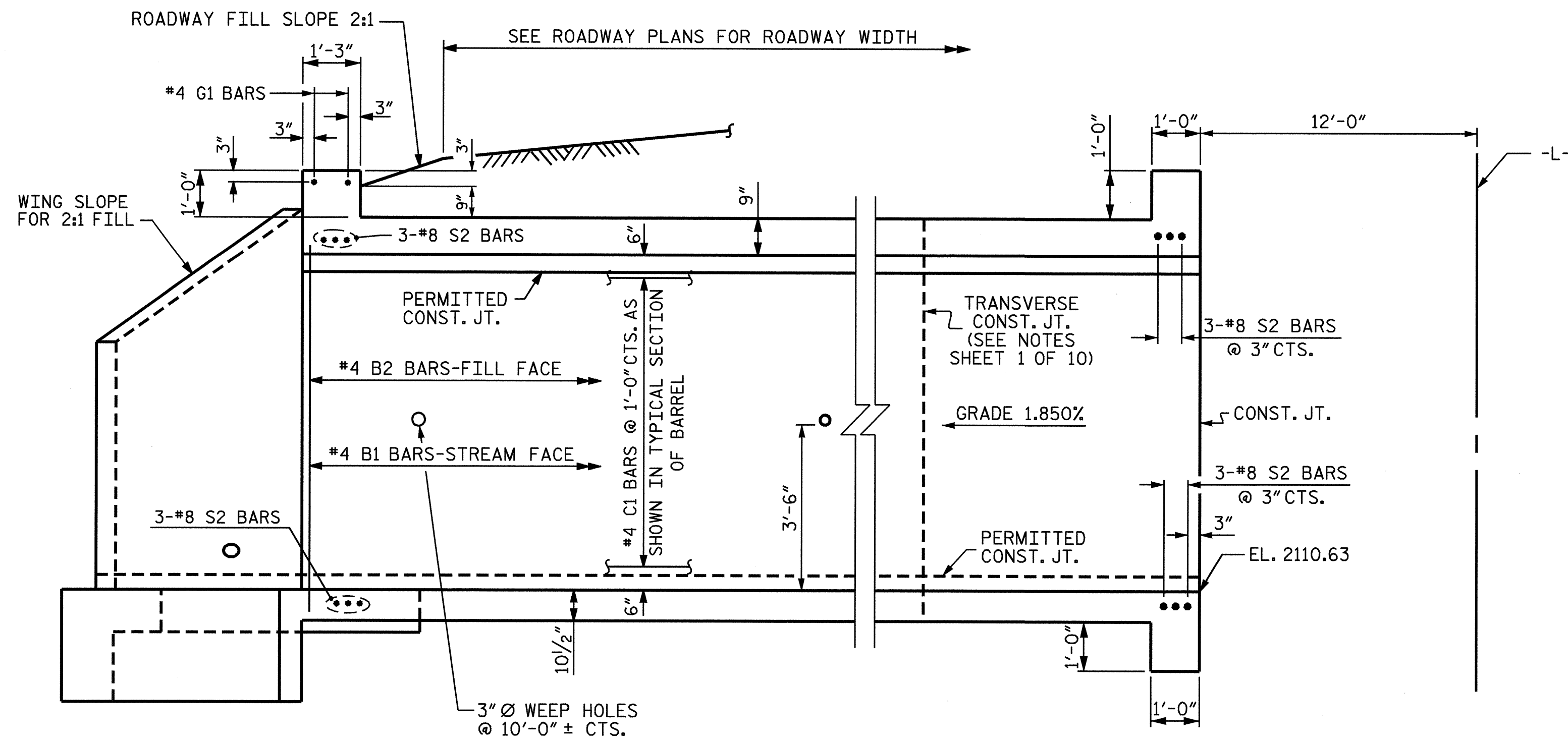
ASSEMBLED BY : A. SORSENGINH DATE : 8/14/08  
 CHECKED BY : J. R. DUGGINS DATE : 10/28/08

Professional Engineer seals for Quang H. Nguyen (Seal 13014) and J. R. Duggins (Seal 15779) with dates 1-12-10 and 01/12/10.

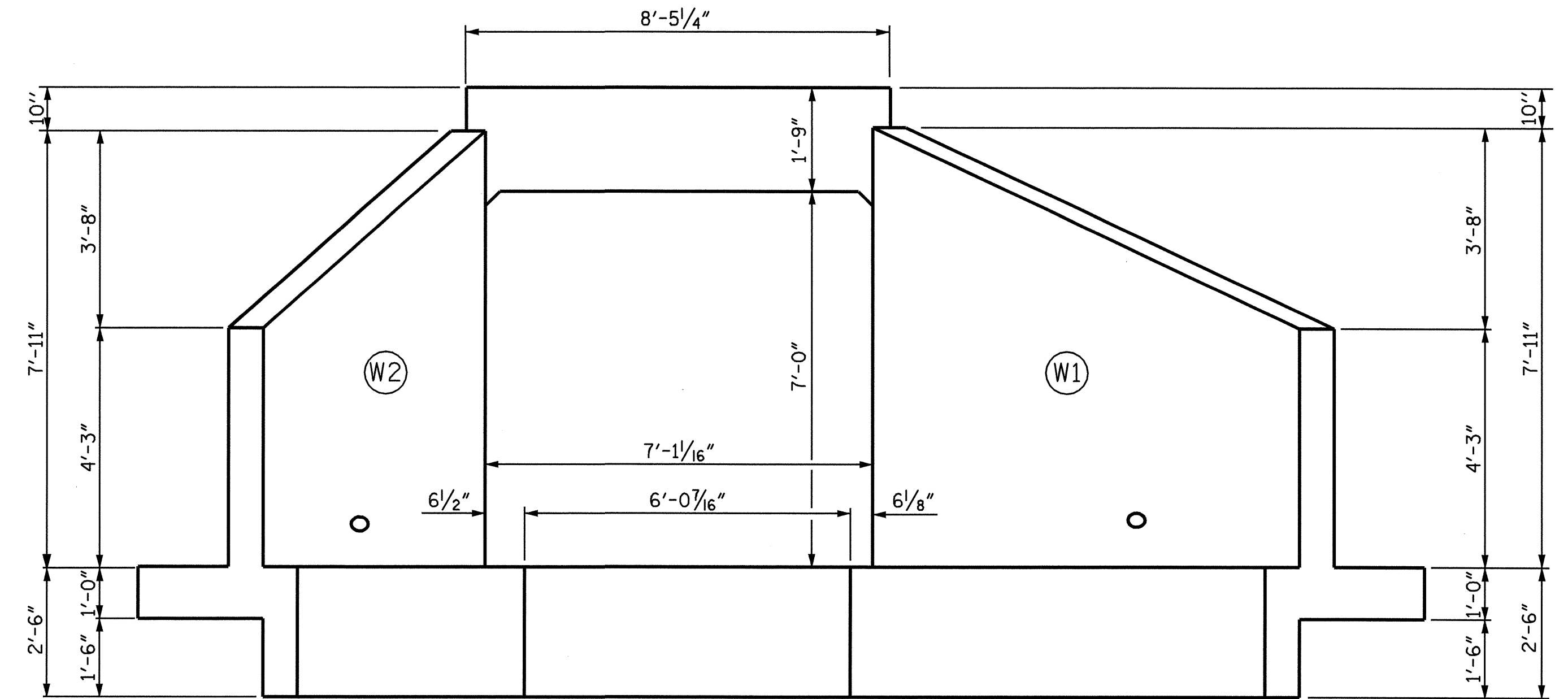
PROJECT NO. R-4430  
 HENDERSON COUNTY  
 STATION: 26+43.00 -L-  
 SHEET 1 OF 10

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SINGLE 7 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 81° SKEW

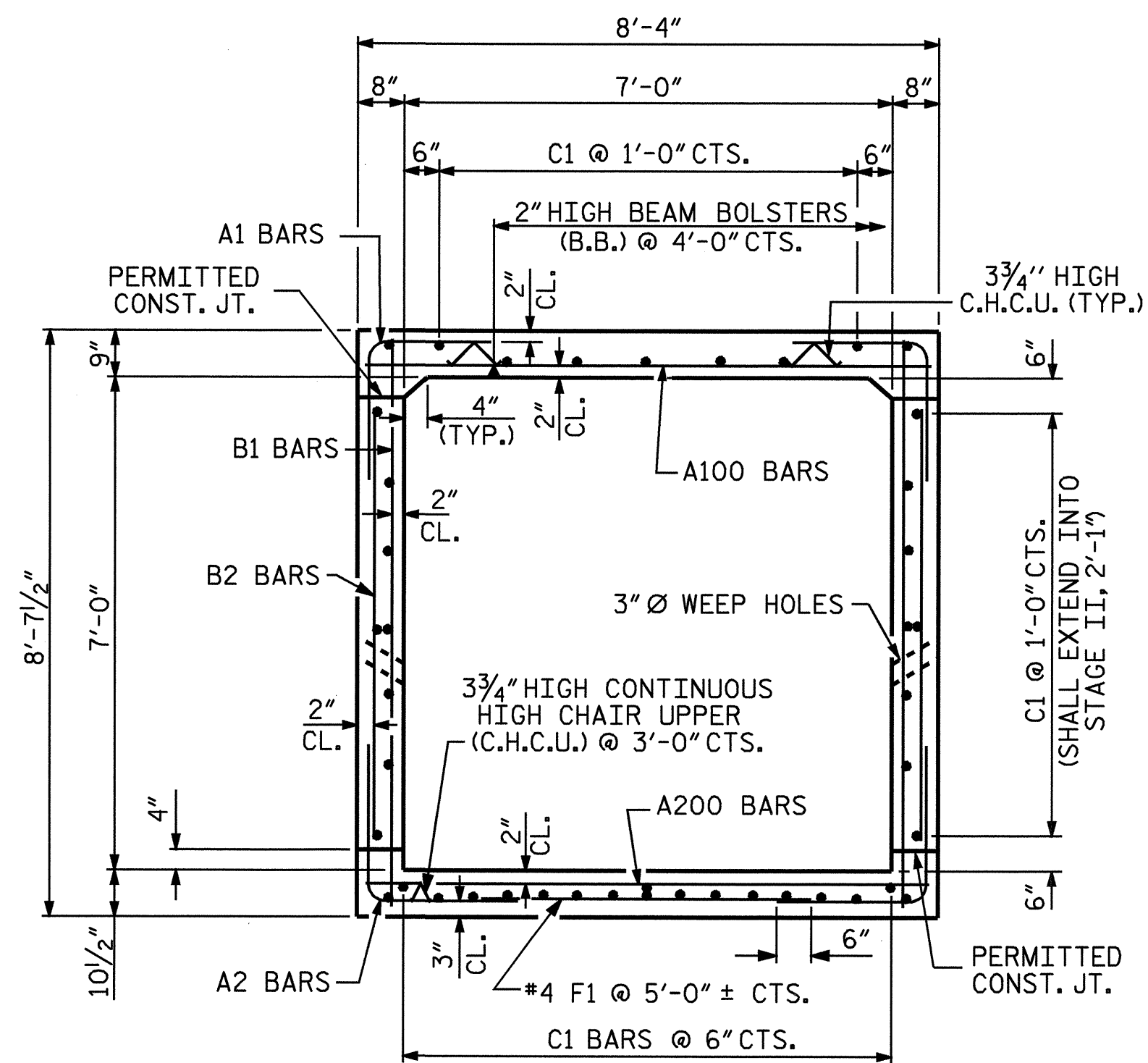
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-1
1			3			TOTAL SHEETS
2			4			10



CULVERT SECTION NORMAL TO ROADWAY  
 STAGE I



OUTLET END ELEVATION NORMAL TO SKEW  
 STAGE I



RIGHT ANGLE SECTION OF BARREL  
 THERE ARE 43 "C" BARS IN SECTION OF BARREL.  
 (LOOKING UPSTREAM)

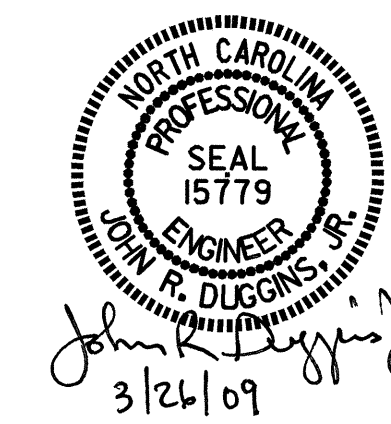
STAGE I STRUCTURE QUANTITIES	
CLASS A CONCRETE	
BARREL @ 0.851 CY/FT	96.2 C.Y.
WINGS ETC.	10.5 C.Y.
SILLS	1.8 C.Y.
TOTAL	108.5 C.Y.
REINFORCING STEEL	
BARREL	14,926 LBS.
WING ETC.	638 LBS.
TOTAL	15,564 LBS.
CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MAT'L	67 TONS

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 26+43.00 -L-

SHEET 2 OF 10

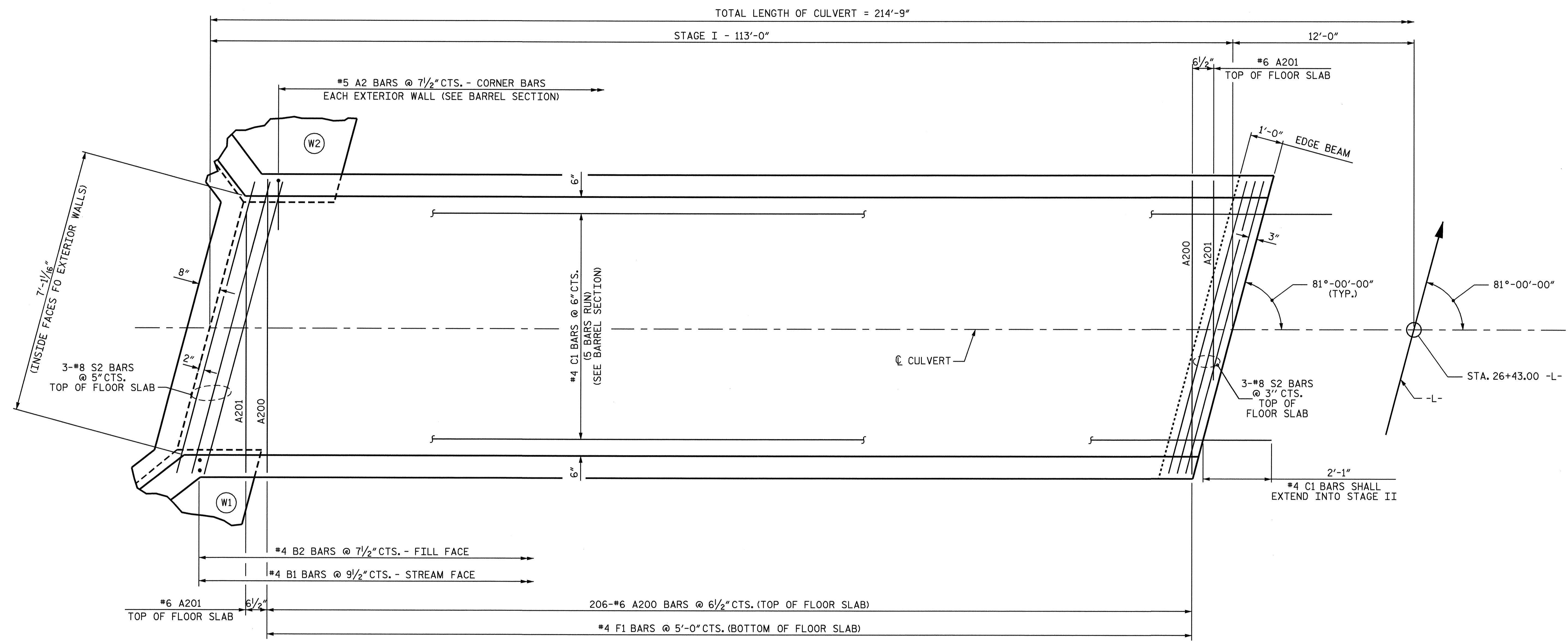
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SINGLE 7 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 STAGE I  
 81° SKEW



ASSEMBLED BY : A. SORSENGINH DATE : 8/18/08  
 CHECKED BY : J. R. DUGGINS DATE : 10/28/08

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



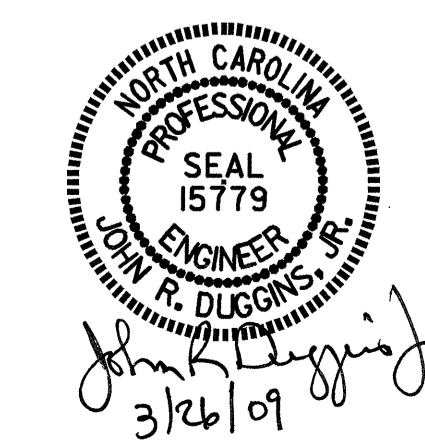
STAGE I  
 PLAN OF FLOOR SLAB

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 26+43.00 -L-

SHEET 3 OF 10

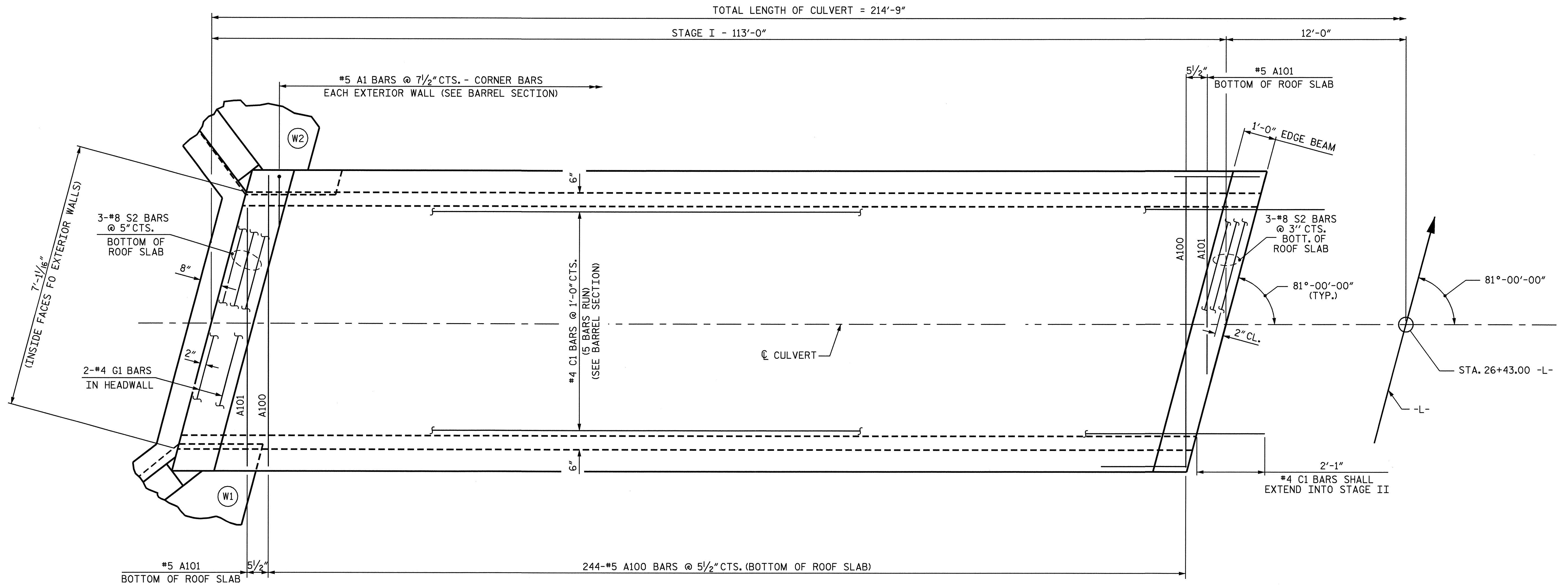
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SINGLE 7 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 STAGE I  
 81° SKEW



ASSEMBLED BY : A. SORSENGINH DATE : 8/18/08  
 CHECKED BY : J. R. DUGGINS DATE : 10/28/08

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



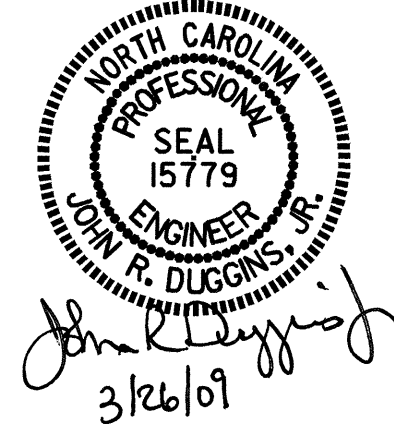
STAGE I  
 PLAN OF ROOF SLAB

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 26+43.00 -L-

SHEET 4 OF 10

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

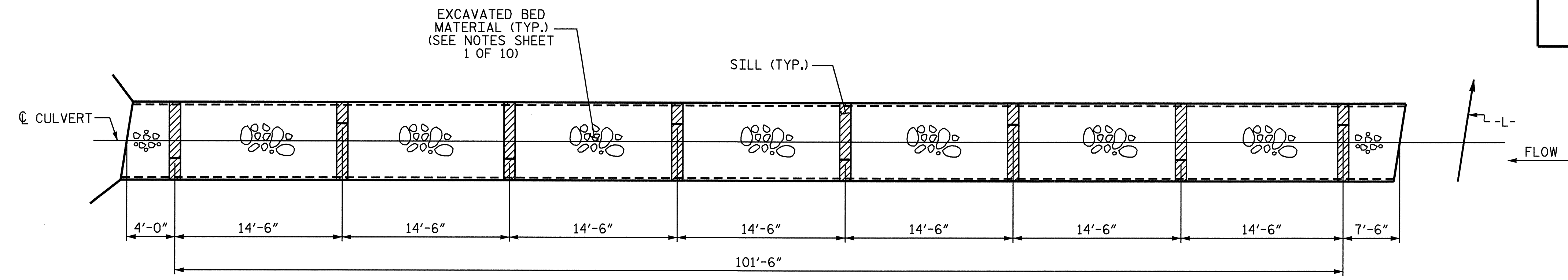
SINGLE 7 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 STAGE I  
 81° SKEW



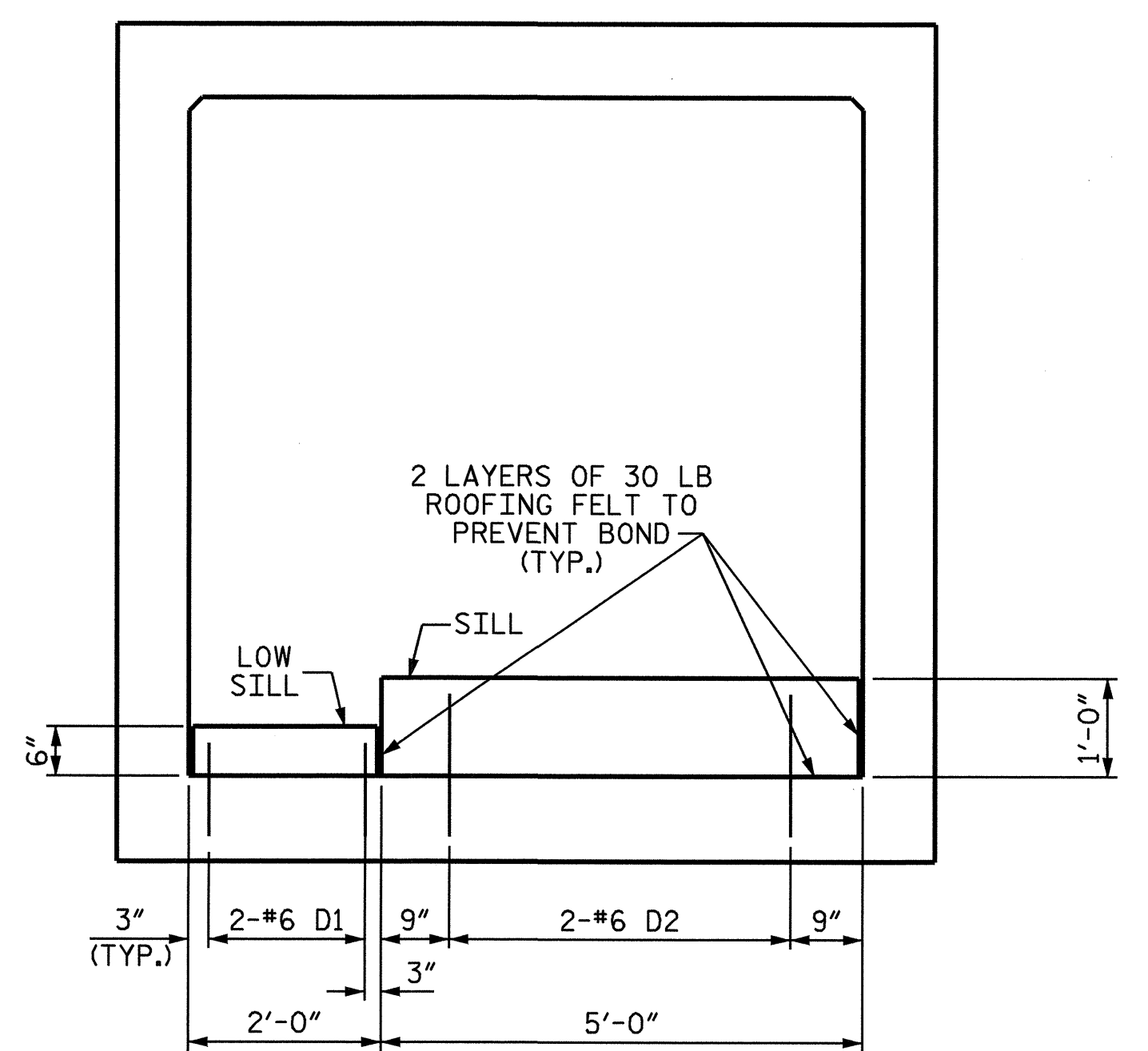
ASSEMBLED BY : A. SORSENGINH DATE : 8/18/08  
 CHECKED BY : J. R. DUGGINS DATE : 10/28/08

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

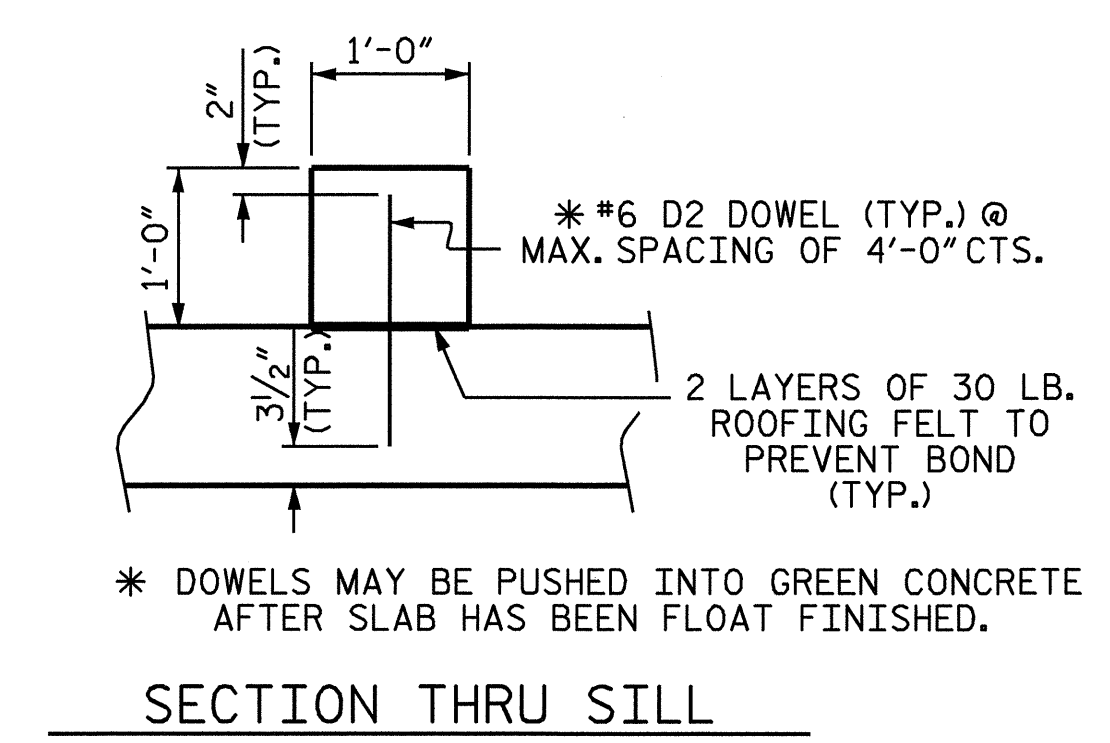
BAR TYPE		BAR SCHEDULE					
		BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
		A100	244	#5	STR	7'-11"	2015
<p>BAR DIMENSIONS ARE OUT TO OUT</p>		A101	2	#5	STR	5'-2"	11
<p>SPLICE LENGTH CHART</p>		A200	206	#6	STR	7'-11"	2450
<p>BAR SIZE LENGTH</p>		A201	2	#6	STR	5'-8"	17
<p>C1 #4 1'-11"</p>		A1	362	#5	6	4'-6"	1699
<p>D1 #6 11"</p>		A2	362	#5	6	4'-7"	1730
<p>B1 #4 8'-1"</p>		B1	286	#4	STR	8'-1"	1544
<p>B2 #4 6'-4"</p>		B2	362	#4	STR	6'-4"	1532
<p>C1 #4 24'-6"</p>		C1	215	#4	STR	24'-6"	3519
<p>D2 #6 1'-5"</p>		D1	16	#6	STR	11"	22
<p>F1 #4 5'-5"</p>		D2	16	#6	STR	1'-5"	34
<p>G1 #4 8'-1"</p>		F1	23	#4	STR	5'-5"	83
<p>S2 #8 8'-1"</p>		G1	2	#4	STR	8'-1"	11
<p>S2 #8 8'-1"</p>		S2	12	#8	STR	8'-1"	259
<p>REINFORCING STEEL = 14,926 LBS</p>							



PLAN OF SILL LOCATIONS  
(STAGE I)



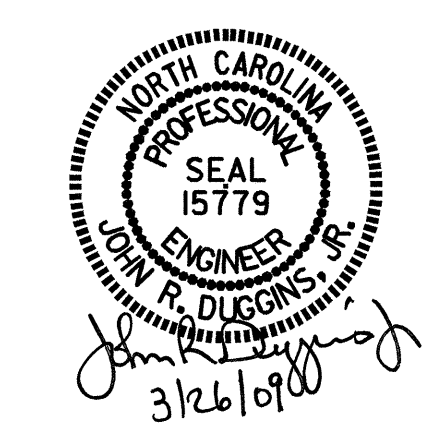
CULVERT SILL DETAILS



SECTION THRU SILL

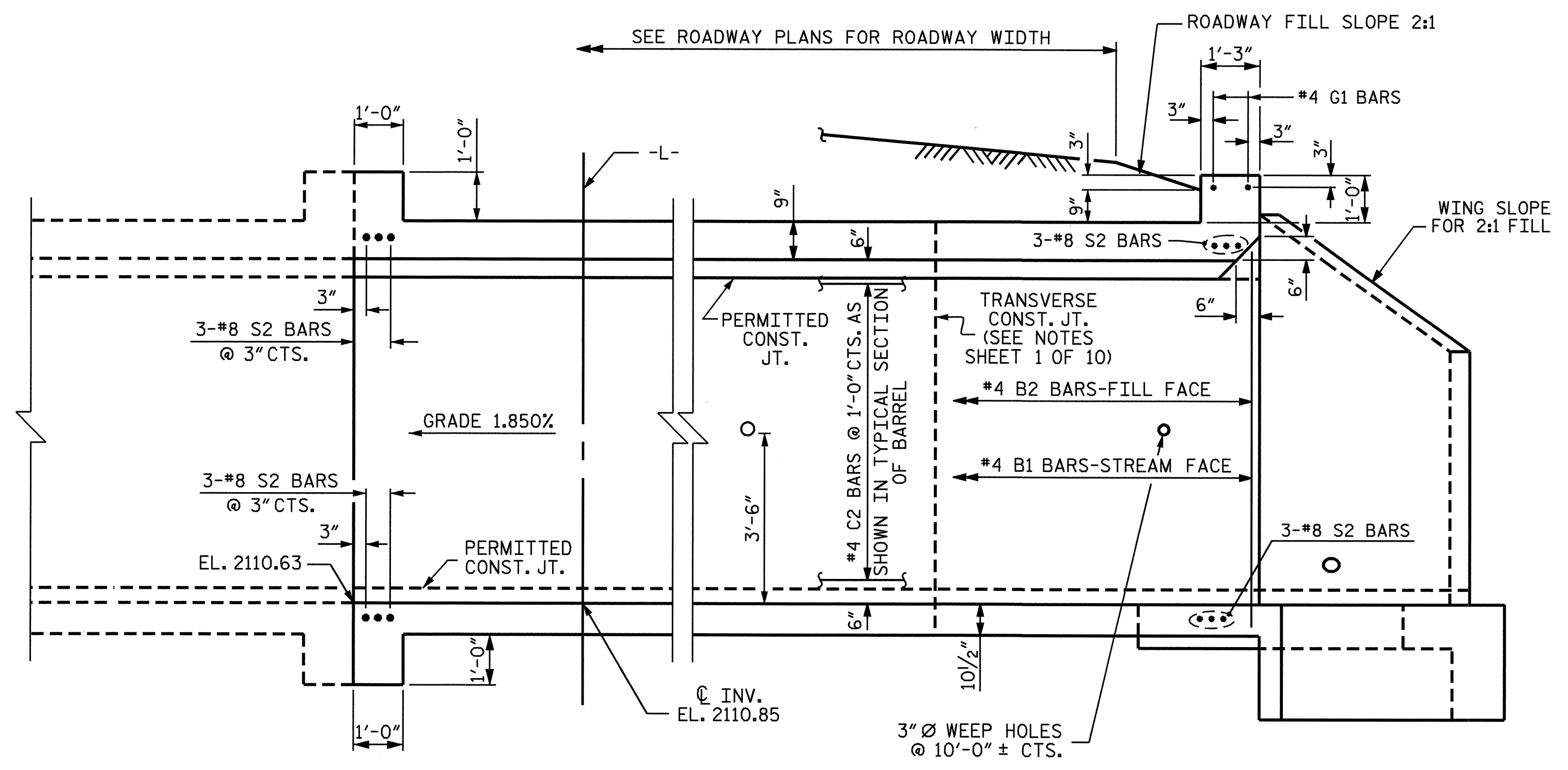
PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 26+43.00 -L-  
 SHEET 5 OF 10

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SINGLE 7 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 STAGE I  
 81° SKEW

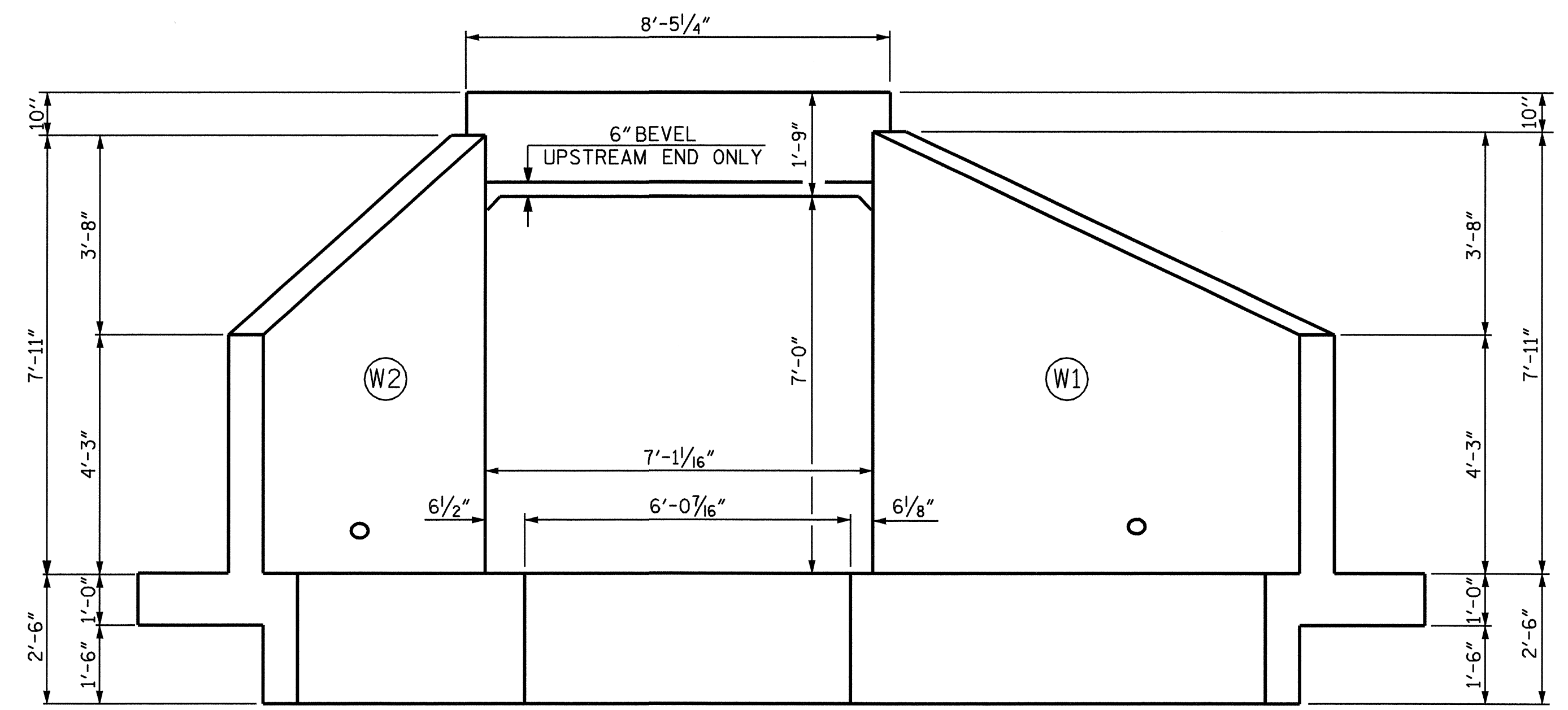


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			10

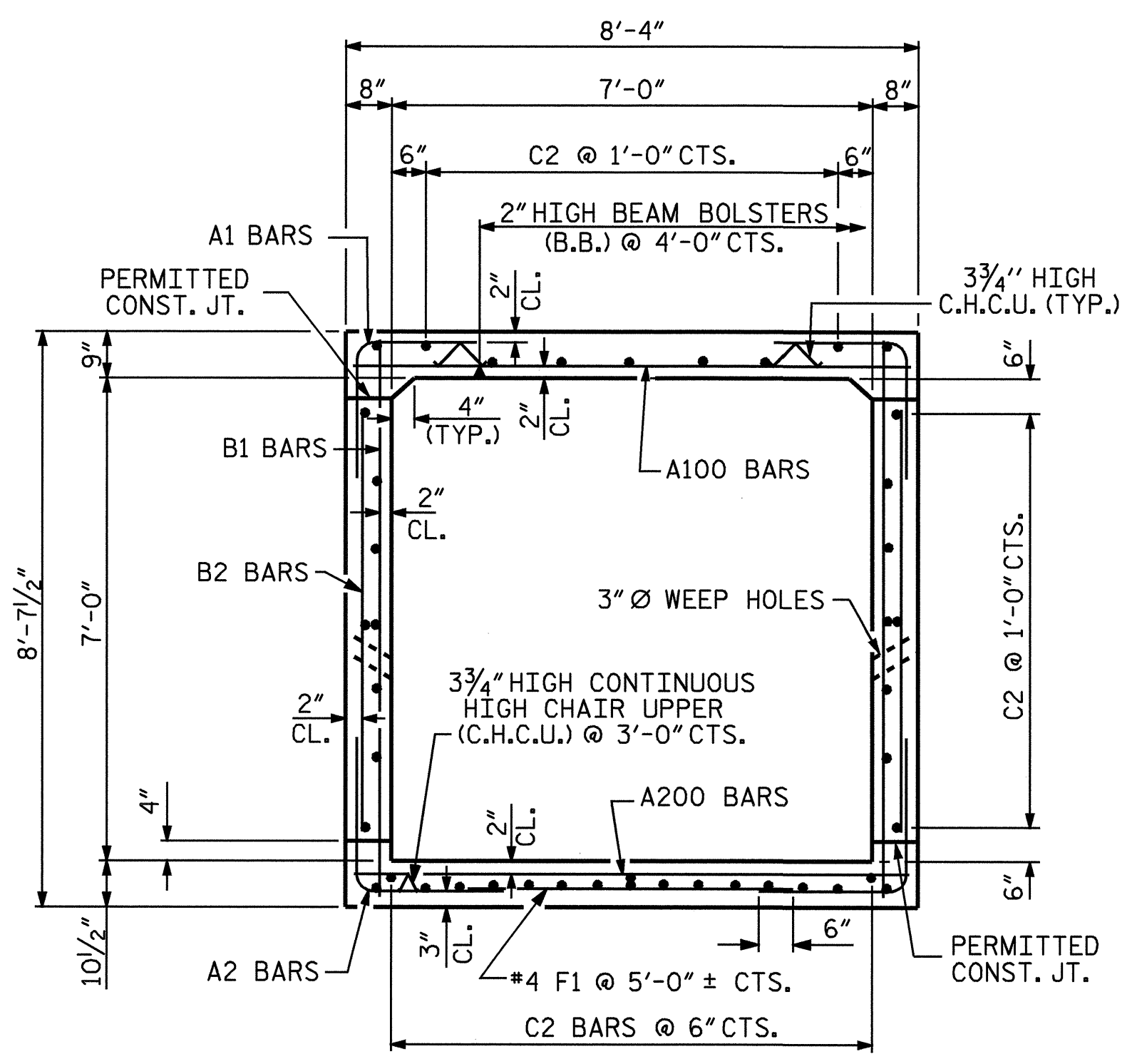
ASSEMBLED BY : A. SORSENGINH DATE : 8/18/08  
 CHECKED BY : J. R. DUGGINS DATE : 10/28/08



**CULVERT SECTION NORMAL TO ROADWAY**  
 STAGE II



**INLET END ELEVATION NORMAL TO SKEW**  
 STAGE II



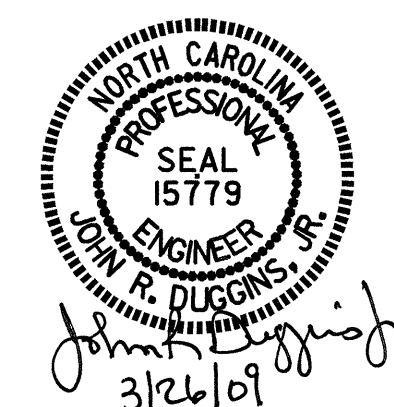
**RIGHT ANGLE SECTION OF BARREL**  
 THERE ARE 43 "C" BARS IN SECTION OF BARREL.  
 (LOOKING UPSTREAM)

STAGE II STRUCTURE QUANTITIES	
CLASS A CONCRETE	
BARREL @ 0.851 CY/FT	86.6 C.Y.
WINGS ETC.	10.5 C.Y.
SILLS	1.6 C.Y.
TOTAL	98.7 C.Y.
REINFORCING STEEL	
BARREL	13,376 LBS.
WING ETC.	638 LBS.
TOTAL	14,014 LBS.
CULVERT EXCAVATION	LUMP SUM
FOUNDATION COND. MAT'L	60 TONS

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 26+43.00 -L-

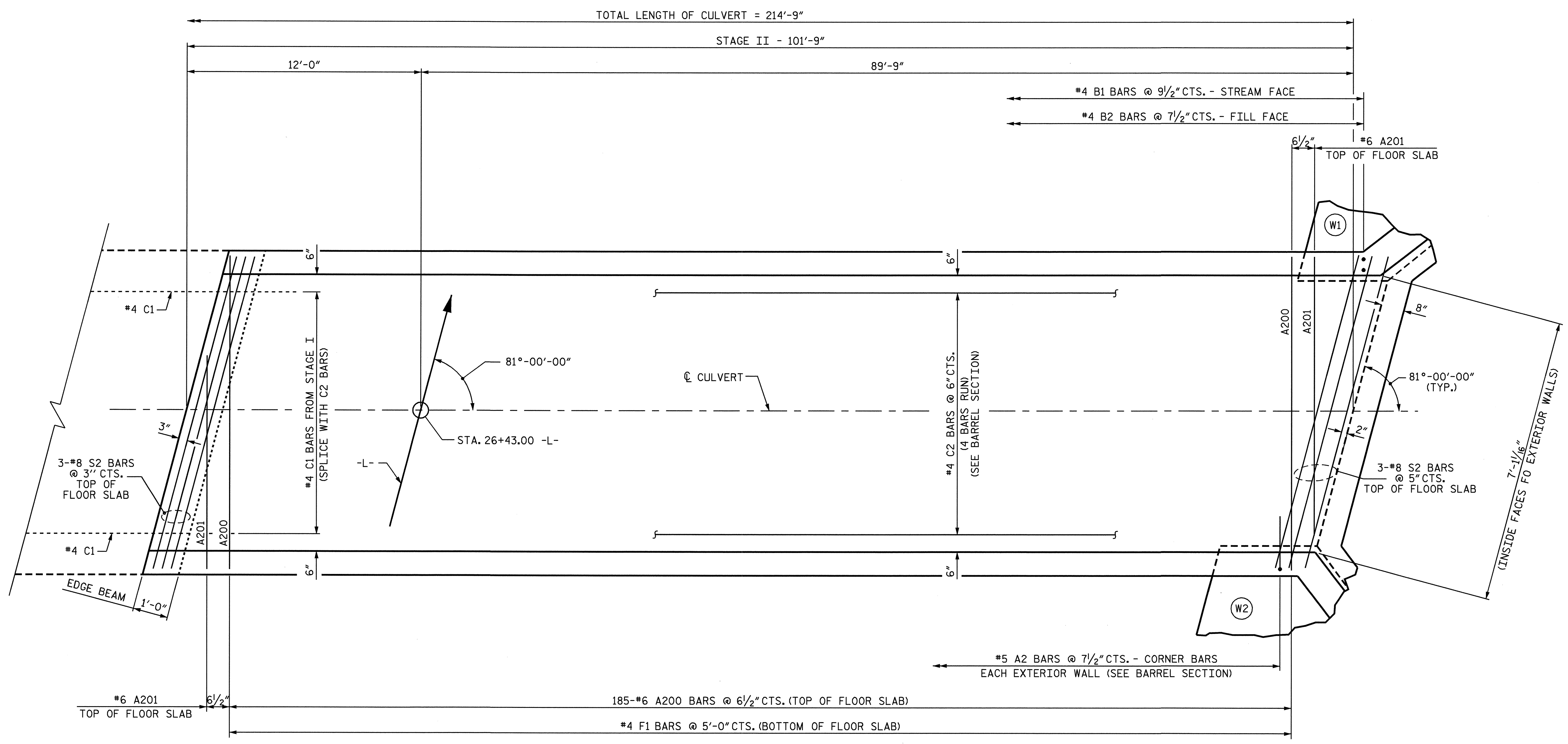
SHEET 6 OF 10

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SINGLE 7 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 STAGE II  
 81° SKEW**



ASSEMBLED BY: A. SORSENGINH DATE: 8/18/08  
 CHECKED BY: J. R. DUGGINS DATE: 10/28/08

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS 10
2			4			



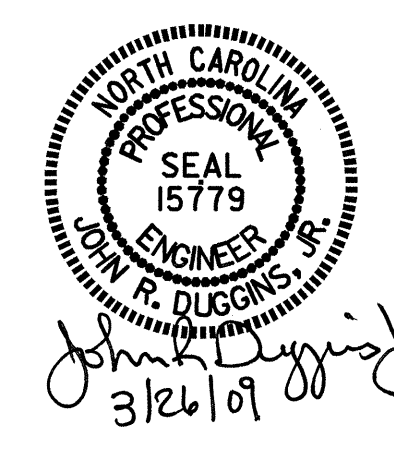
STAGE II  
 PLAN OF FLOOR SLAB

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 26+43.00 -L-

SHEET 7 OF 10

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

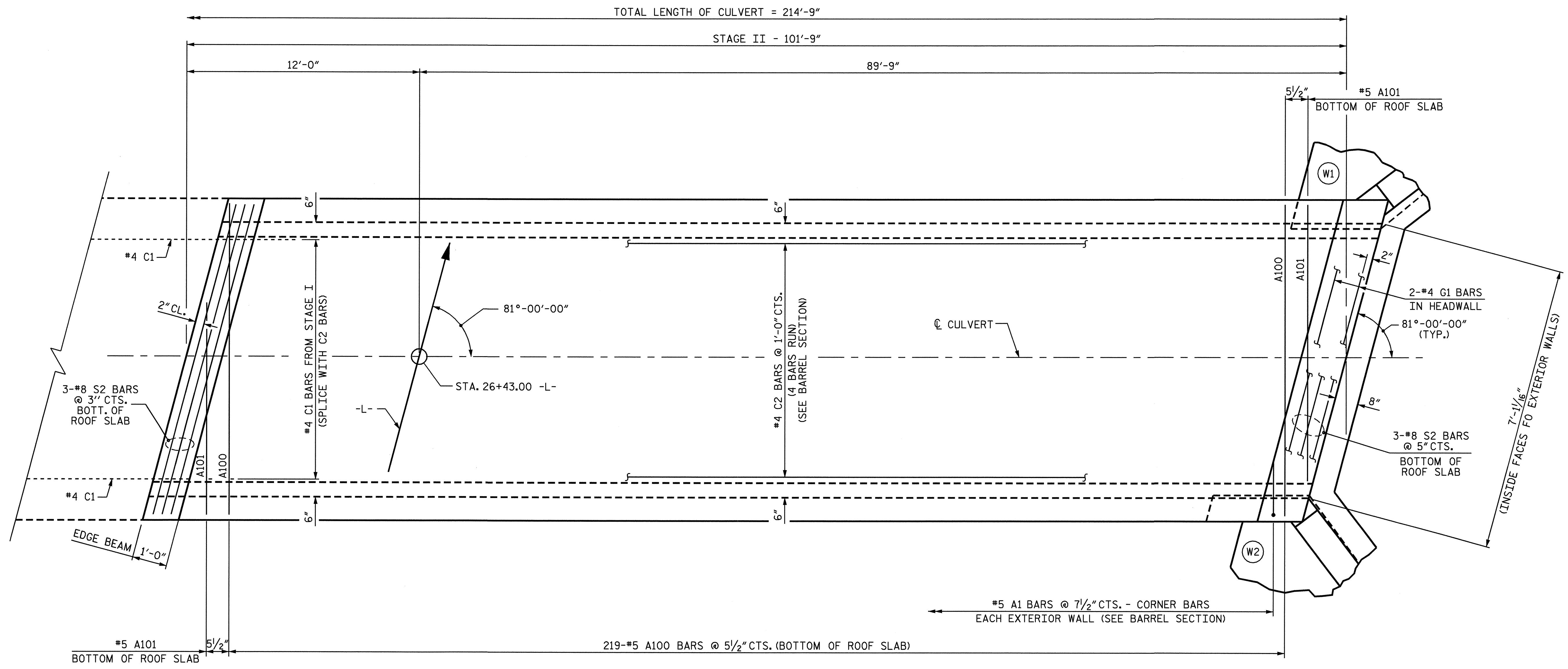
SINGLE 7 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 STAGE II  
 81° SKEW



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7
1			3			TOTAL SHEETS
2			4			10

ASSEMBLED BY: A. SORSENGINH DATE: 8/18/08  
 CHECKED BY: J. R. DUGGINS DATE: 10/28/08





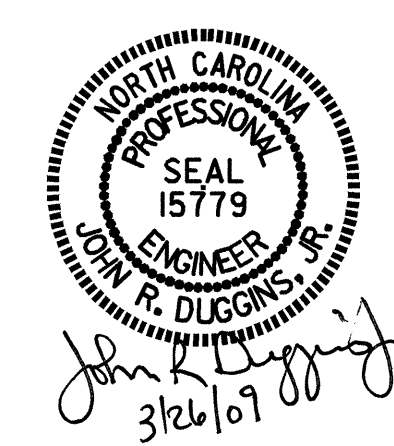
STAGE II  
 PLAN OF ROOF SLAB

PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 26+43.00 -L-

SHEET 8 OF 10

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

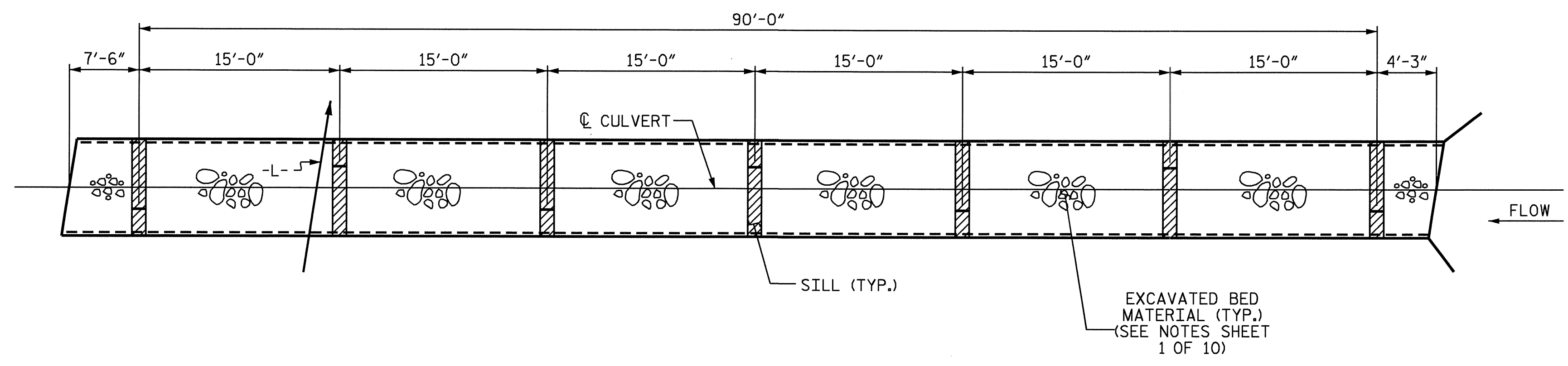
SINGLE 7 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 STAGE II  
 81° SKEW



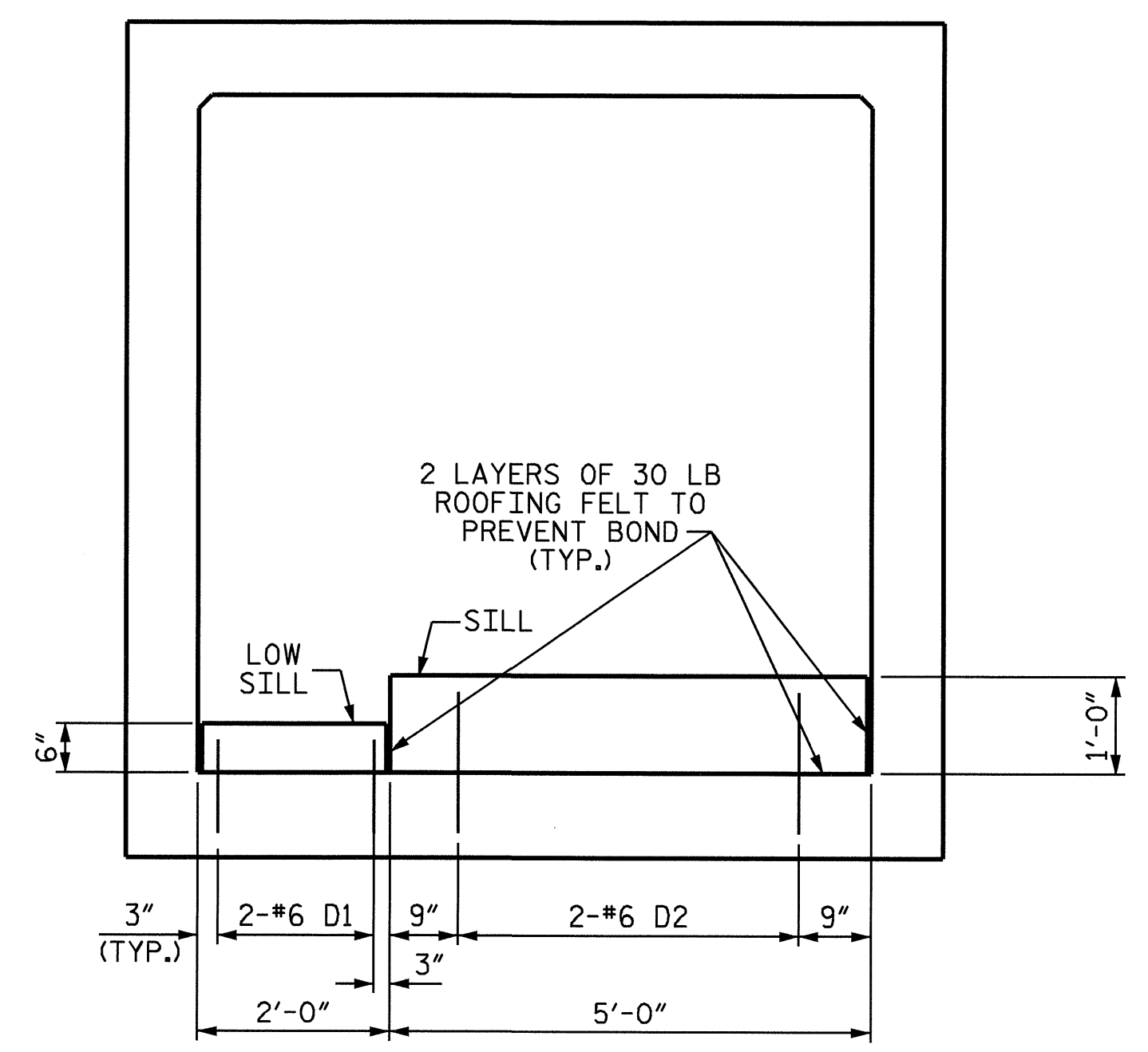
ASSEMBLED BY : A. SORSENGINH DATE : 8/18/08  
 CHECKED BY : J. R. DUGGINS DATE : 10/28/08

REVISIONS						SHEET NO. C-8
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS
2			4			10

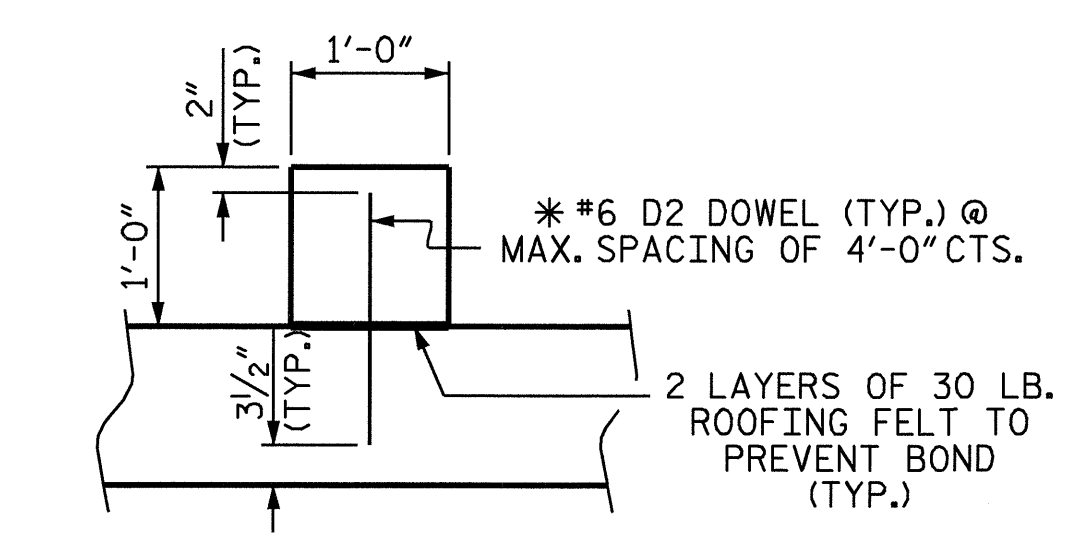
BAR TYPE		BAR SCHEDULE				
	VERTICAL LEG	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT
		6" R.	A100	#5	STR	7'-11"
BAR DIMENSIONS ARE OUT TO OUT						
SPLICE LENGTH CHART						
BAR	SIZE	LENGTH				
C2	#4	1'-11"				
A101	2	#5	STR	5'-10"	12	
A200	185	#6	STR	7'-11"	2200	
A201	2	#6	STR	6'-0"	18	
A1	326	#5	6	4'-6"	1530	
A2	326	#5	6	4'-7"	1558	
B1	258	#4	STR	8'-1"	1393	
B2	326	#4	STR	6'-4"	1379	
C2	172	#4	STR	26'-10"	3083	
D1	14	#6	STR	11"	19	
D2	14	#6	STR	1'-5"	30	
F1	21	#4	STR	5'-5"	76	
G1	2	#4	STR	8'-1"	11	
S2	12	#8	STR	8'-1"	259	
REINFORCING STEEL					= 13,376	LBS



**PLAN OF SILL LOCATION**  
(STAGE II)



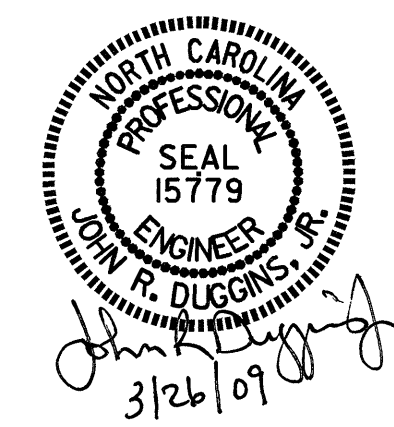
**ELEVATION**  
**CULVERT SILL DETAILS**



**SECTION THRU SILL**

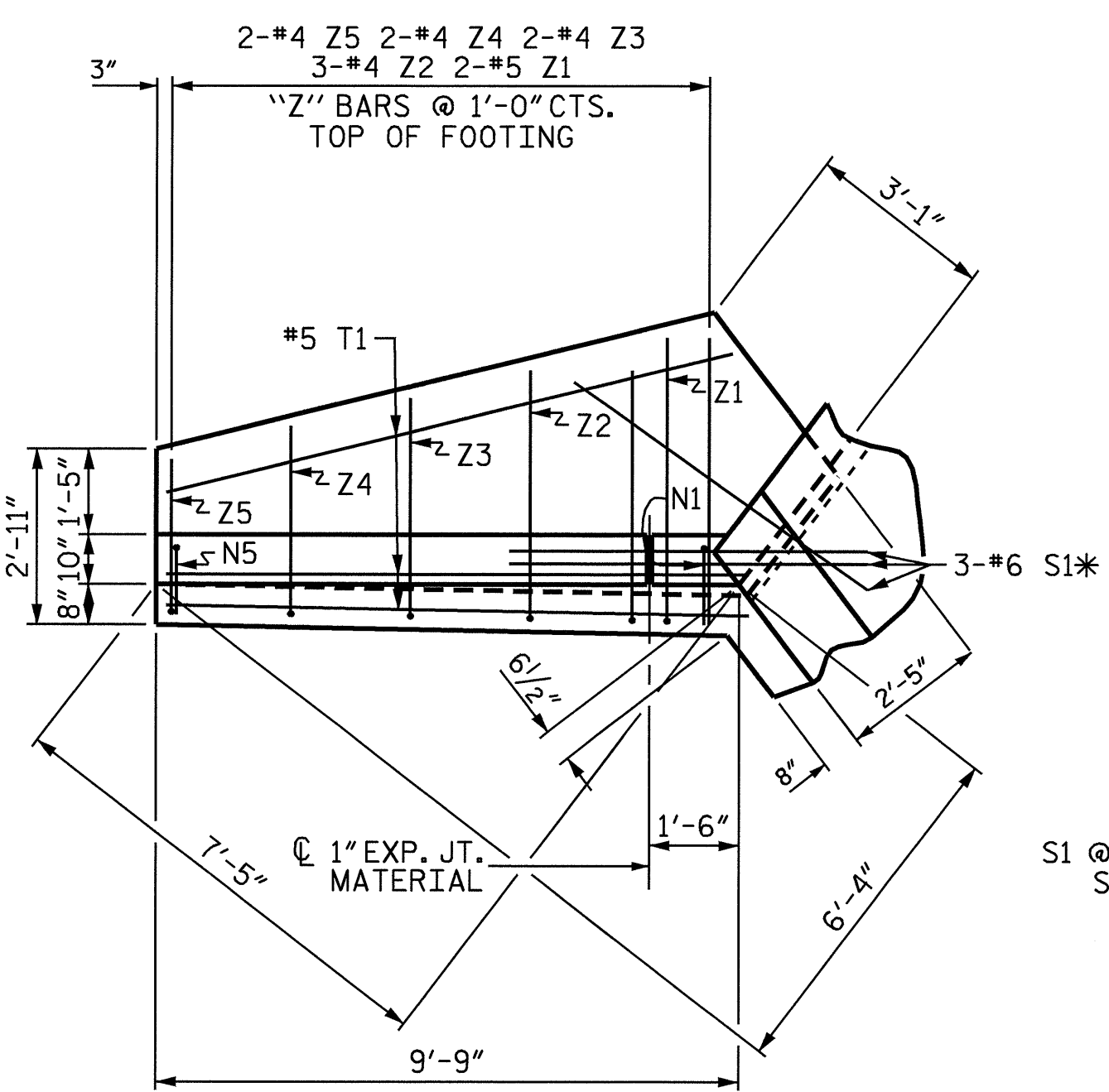
PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 26+43.00 -L-  
 SHEET 9 OF 10

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**SINGLE 7 FT. X 7 FT.  
 CONCRETE BOX CULVERT  
 STAGE II  
 81° SKEW**

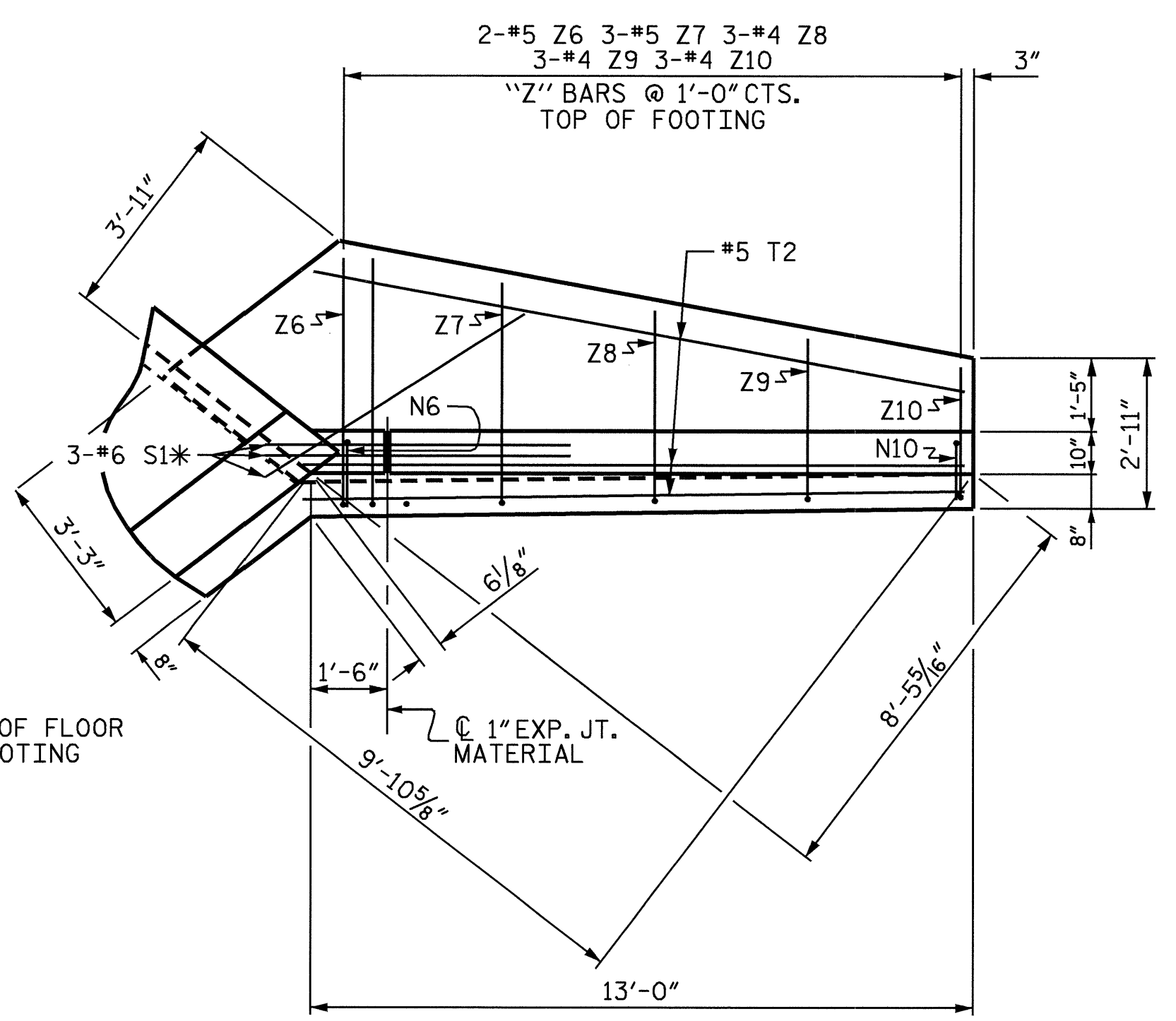


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-9
1			3			TOTAL SHEETS
2			4			10

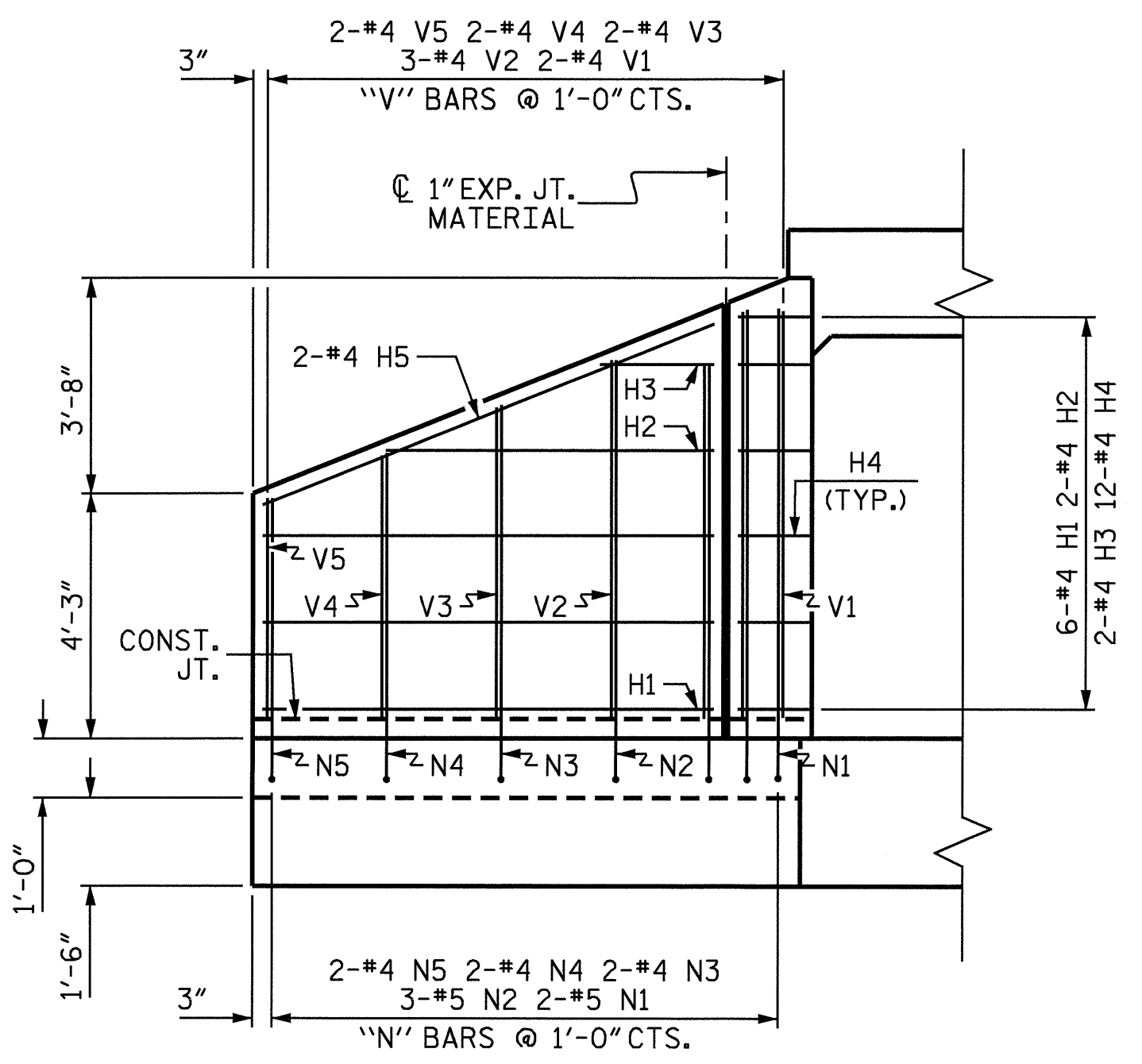
ASSEMBLED BY : A. SORSENGINH DATE : 8/18/08  
 CHECKED BY : J. R. DUGGINS DATE : 10/28/08



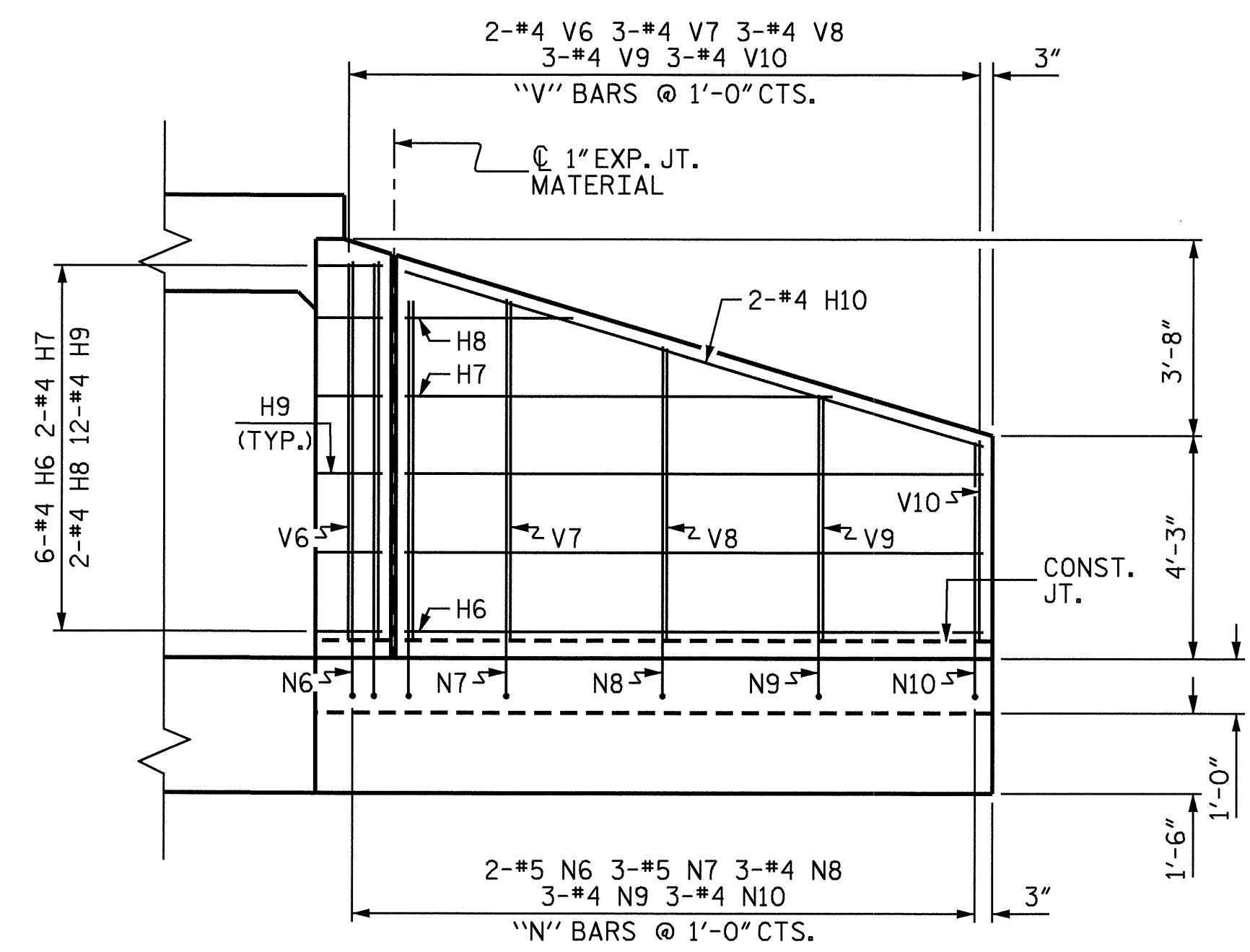
PLAN W2



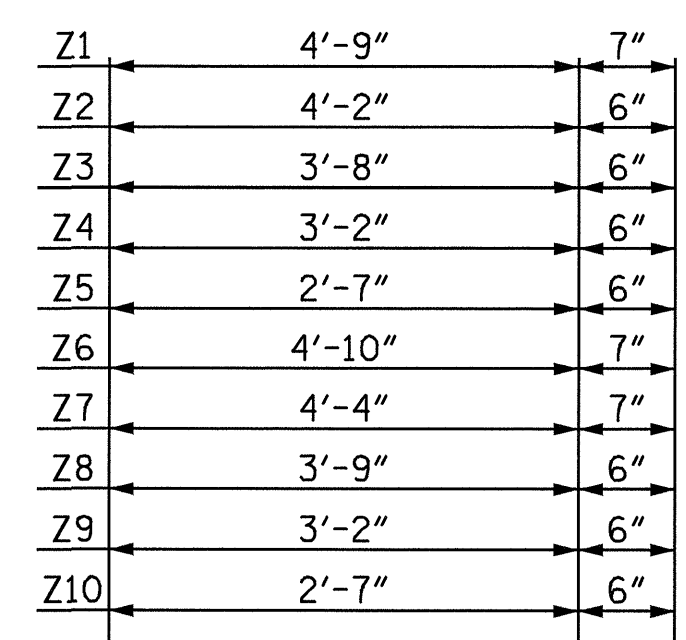
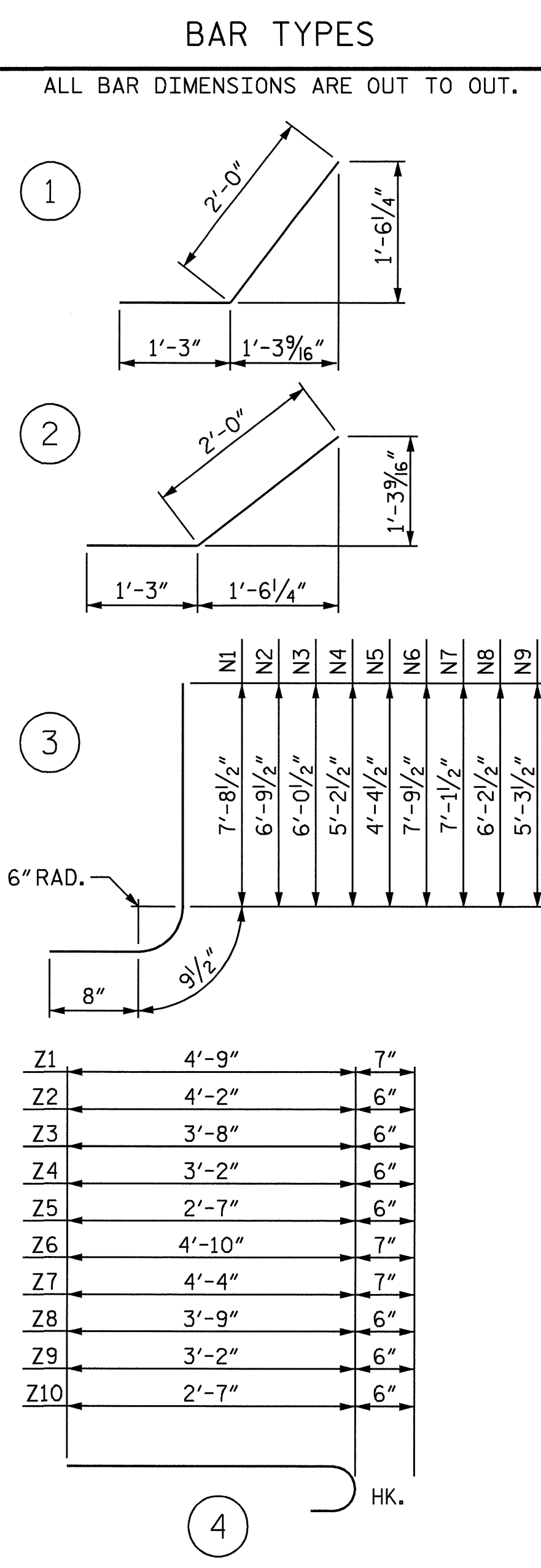
PLAN W1



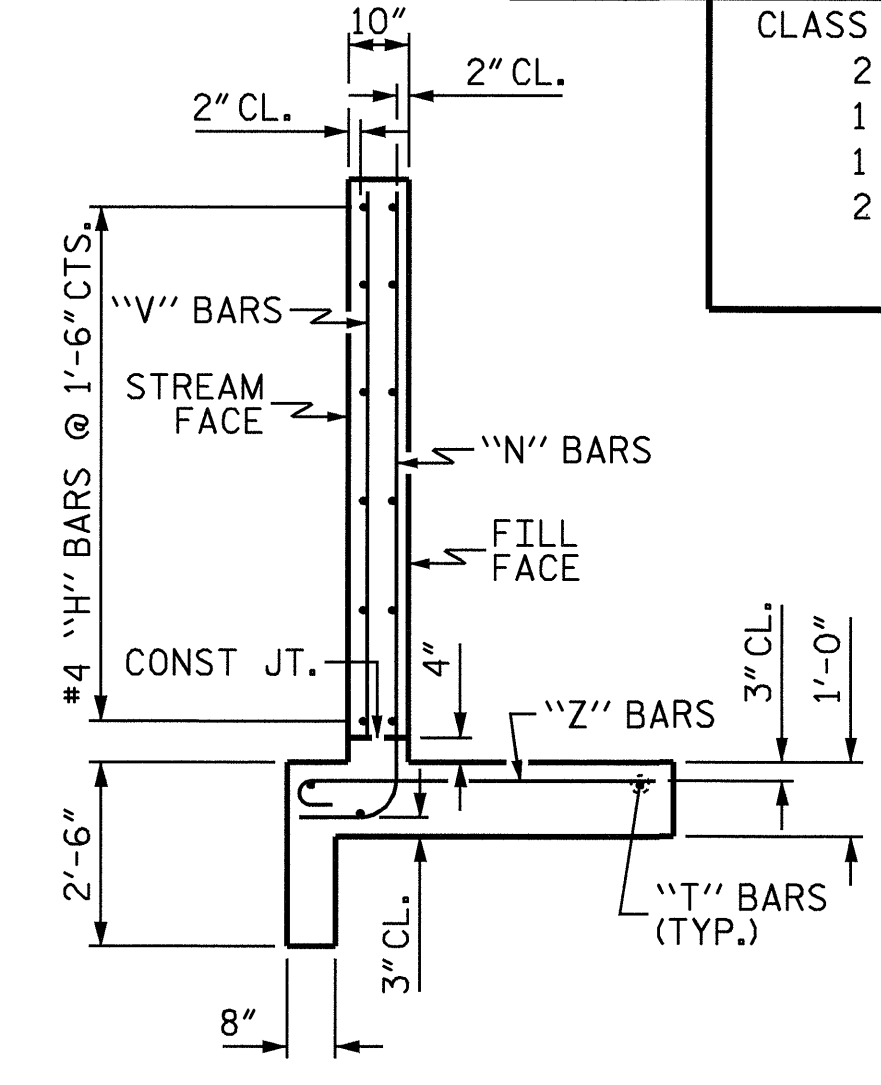
ELEVATION W2



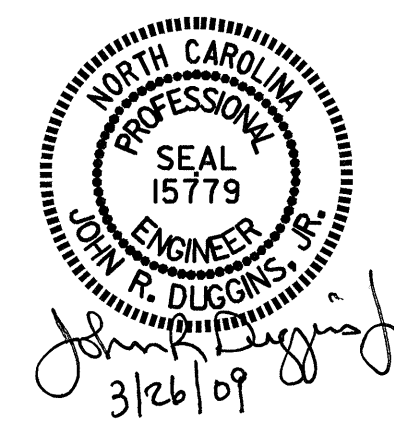
ELEVATION W1



BILL OF MATERIAL FOR STAGE I OR II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	7'-10"	31
H2	2	#4	STR	5'-8"	8
H3	2	#4	STR	2'-0"	3
H4	12	#4	1	3'-3"	26
H5	2	#4	STR	8'-5"	11
H6	6	#4	STR	11'-1"	44
H7	2	#4	STR	8'-2"	11
H8	2	#4	STR	3'-3"	4
H9	12	#4	2	3'-3"	26
H10	2	#4	STR	11'-7"	15
N1	2	#5	3	9'-2"	19
N2	3	#5	3	8'-3"	26
N3	2	#4	3	7'-6"	10
N4	2	#4	3	6'-8"	9
N5	2	#4	3	5'-10"	8
N6	2	#5	3	9'-3"	19
N7	3	#5	3	8'-7"	27
N8	3	#4	3	7'-8"	15
N9	3	#4	3	6'-9"	14
N10	3	#4	3	5'-10"	12
S1	6	#6	STR	6'-0"	54
T1	3	#5	STR	9'-9"	31
T2	3	#5	STR	13'-0"	41
V1	2	#4	STR	7'-1"	9
V2	3	#4	STR	6'-3"	13
V3	2	#4	STR	5'-5"	7
V4	2	#4	STR	4'-7"	6
V5	2	#4	STR	3'-10"	5
V6	2	#4	STR	7'-3"	10
V7	3	#4	STR	6'-6"	13
V8	3	#4	STR	5'-7"	11
V9	3	#4	STR	4'-8"	9
V10	3	#4	STR	3'-10"	8
Z1	2	#5	4	5'-4"	11
Z2	3	#4	4	4'-8"	9
Z3	2	#4	4	4'-2"	6
Z4	2	#4	4	3'-8"	5
Z5	2	#4	4	3'-1"	4
Z6	2	#5	4	5'-5"	11
Z7	3	#5	4	4'-11"	15
Z8	3	#4	4	4'-3"	9
Z9	3	#4	4	3'-8"	7
Z10	3	#4	4	3'-1"	6
REINFORCING STEEL FOR 2 WINGS					638 LBS
CLASS A CONCRETE STAGE I					
2 WINGS					9.1 CY
1 HEADWALL					0.4 CY
1 END CURTAIN WALL					0.4 CY
2 EDGE BEAMS					0.6 CY
TOTAL					10.5 CY
CLASS A CONCRETE STAGE II					
2 WINGS					9.1 CY
1 HEADWALL					0.4 CY
1 END CURTAIN WALL					0.4 CY
2 EDGE BEAMS					0.6 CY
TOTAL					10.5 CY



TYPICAL WING SECTION



PROJECT NO. R-4430  
HENDERSON COUNTY  
 STATION: 26+43.00 -L-  
 SHEET 10 OF 10  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**WINGS FOR CONCRETE BOX CULVERT**  
 STAGE I OR II  
 H = 7'-0" SLOPE = 2:1  
 81° SKEW

ASSEMBLED BY : A. SORSENGH DATE : 8/19/08  
 CHECKED BY : J. R. DUGGINS DATE : 10/28/08  
 DRAWN BY : CCJ 12/99  
 CHECKED BY : RWW 03/00

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

TOTAL SHEETS 10

## STANDARD NOTES

### DESIGN DATA:

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

### MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2006 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N.C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

### CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

### CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

### DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

### ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE. ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

### REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

### STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

### HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. 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

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