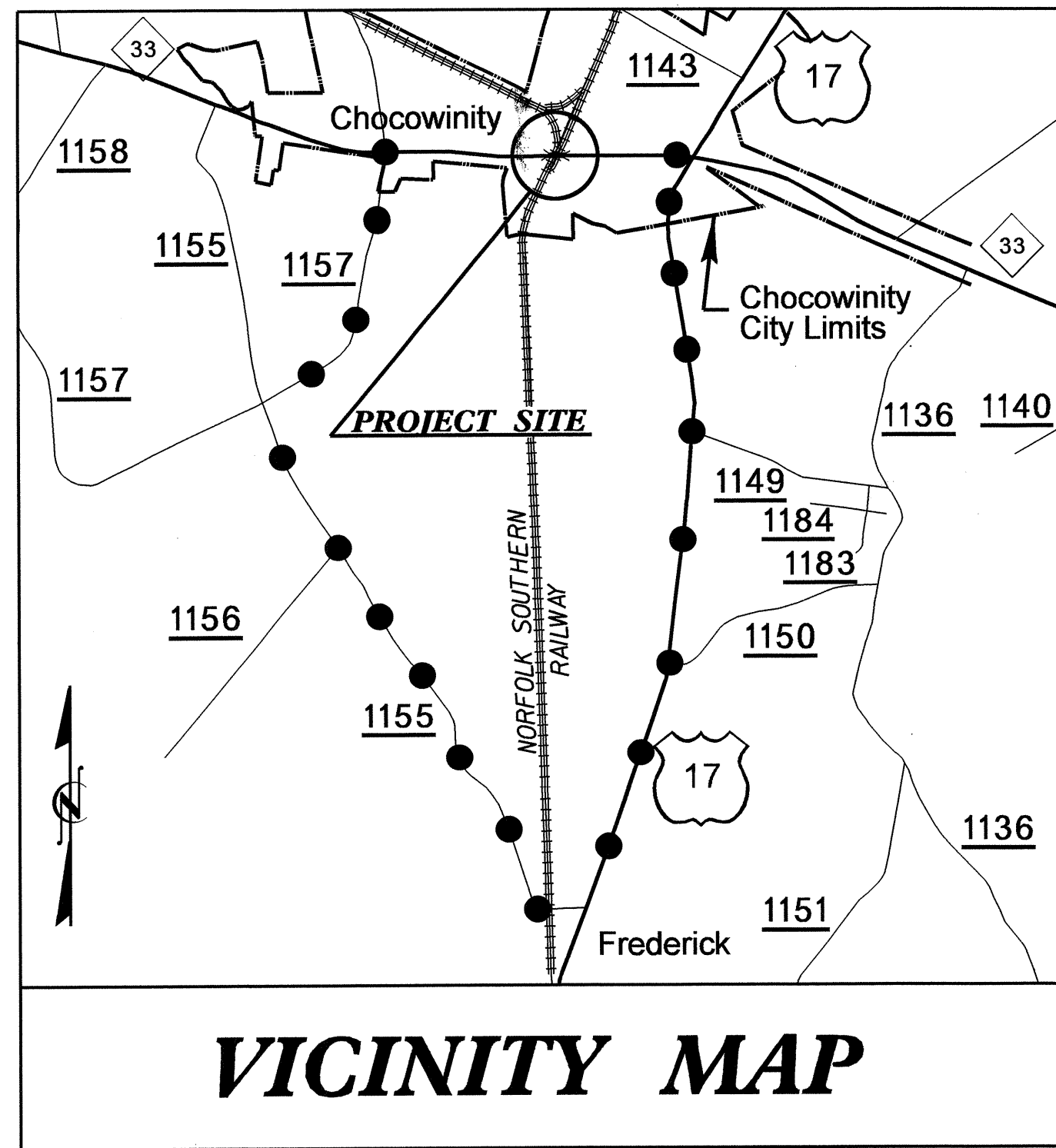


TIP PROJECT: B-4416

CONTRACT: C202728

STRUCTURE



●●●●● OFFSITE DETOUR

STATE OF NORTH CAROLINA

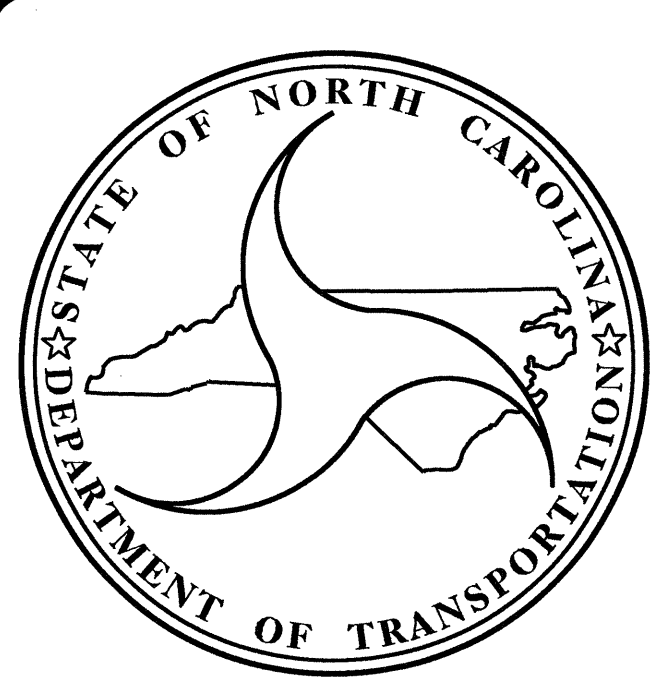
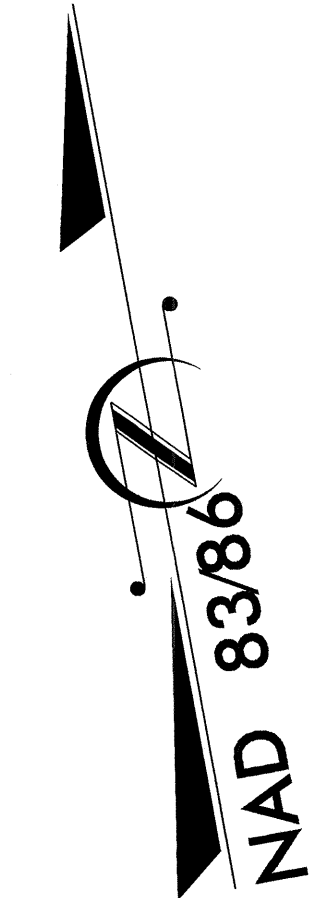
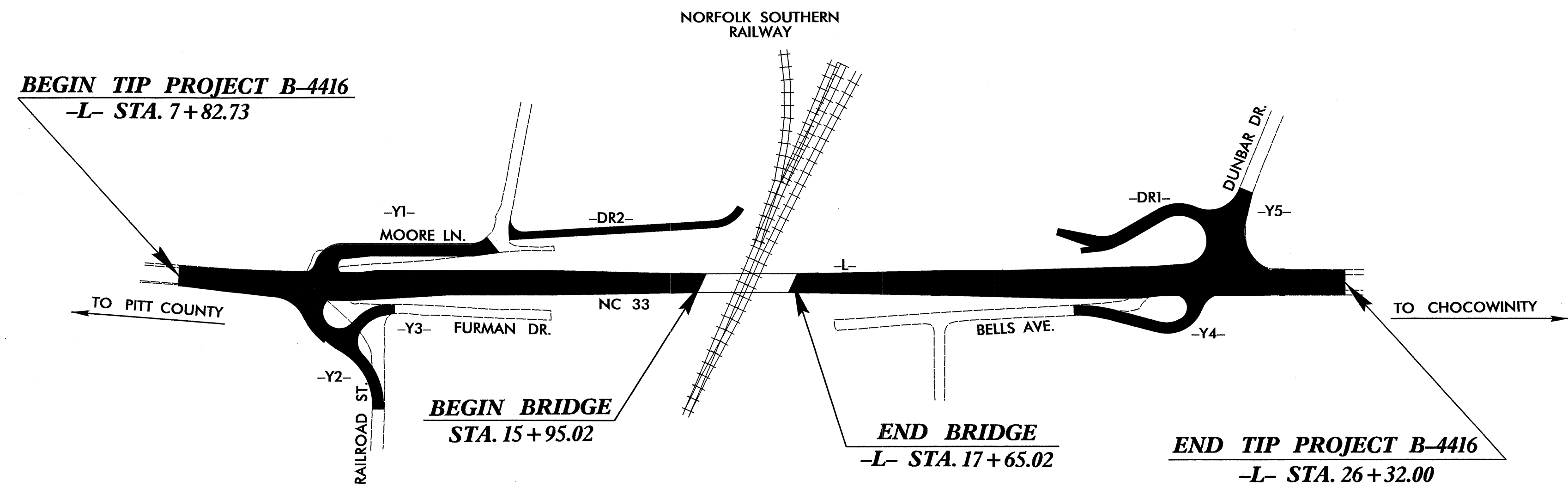
DIVISION OF HIGHWAYS

# BEAUFORT COUNTY

LOCATION: BRIDGE 76 OVER NORFOLK SOUTHERN RAILWAY ON NC 33

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4416		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33692.1.1	BRSTP-0033(5)	P.E.	
33692.2.1	BRSTP-0033(5)	ROW, UTIL	
33692.3.1	BRSTP-0033(5)	CONST.	



**DESIGN DATA**

ADT 2011	=	9538
ADT 2031	=	15077
DHV	=	10 %
D	=	60 %
T	=	7 % *
V	=	50 MPH

\*(TTST 3% + DUAL 4%)

FUNC CLASS = RURAL  
MAJOR COLLECTOR  
CLASS = REGIONAL

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4416	=	0.318 MI.
LENGTH STRUCTURE TIP PROJECT B-4416	=	0.032 MI.
TOTAL LENGTH TIP PROJECT B-4416	=	0.350 MI.

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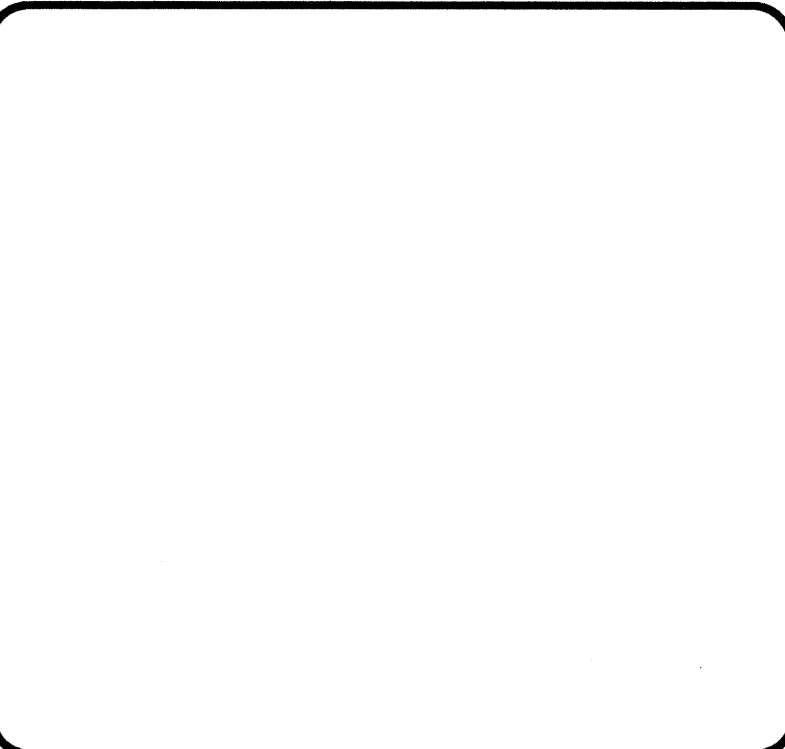
2006 STANDARD SPECIFICATIONS

**LETTING DATE:**  
MARCH 20, 2012

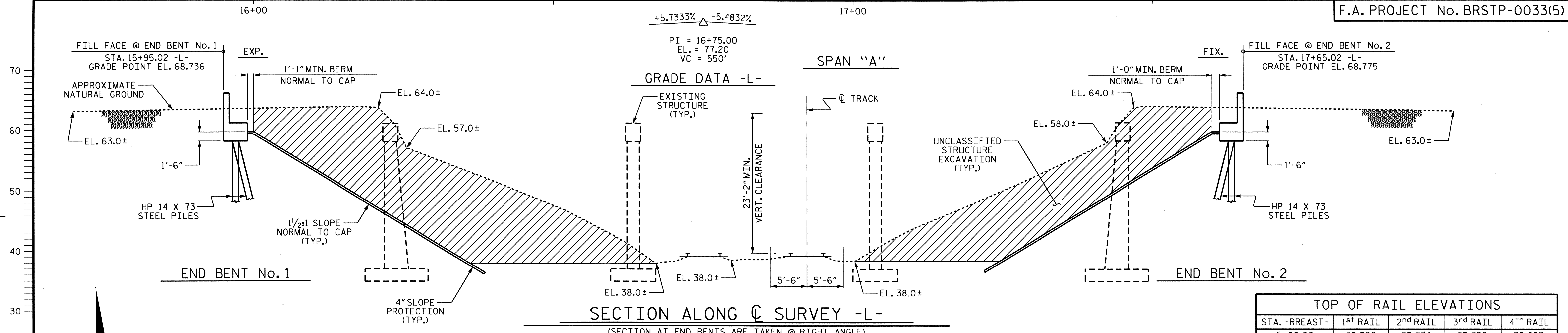
Prepared In the Office of:  
**DEPARTMENT OF TRANSPORTATION**  
1000 BIRCH RIDGE DR.  
RALEIGH, N.C. 27610

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

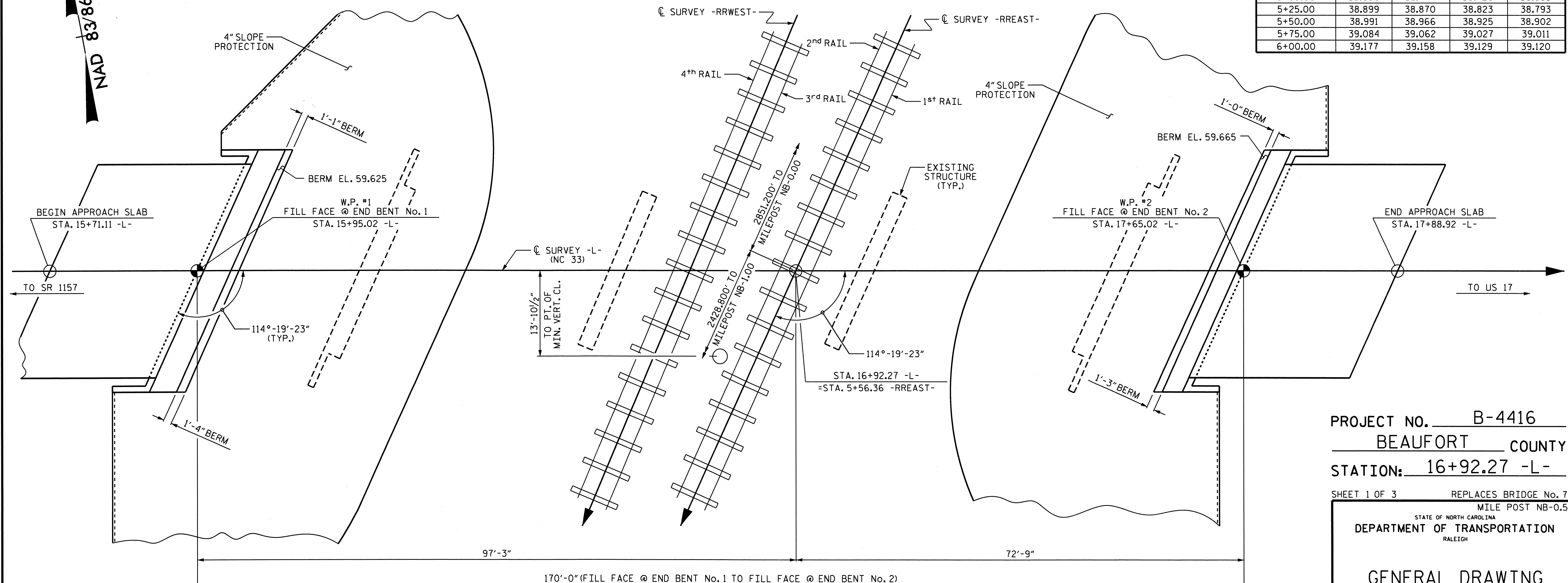
**K. W. ALFORD, P.E.**  
PROJECT DESIGN ENGINEER



DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA



TOP OF RAIL ELEVATIONS				
STA. -RREAST-	1 <sup>st</sup> RAIL	2 <sup>nd</sup> RAIL	3 <sup>rd</sup> RAIL	4 <sup>th</sup> RAIL
5+00.00	38.806	38.774	38.720	38.683
5+25.00	38.899	38.870	38.823	38.793
5+50.00	38.991	38.966	38.925	38.902
5+75.00	39.084	39.062	39.027	39.011
6+00.00	39.177	39.158	39.129	39.120



**PLAN**  
PILES NOT SHOWN IN PLAN VIEW FOR CLARITY

DRAWN BY: T. BANKOVICH DATE: 3-2011  
CHECKED BY: A.V. ROYAL DATE: 3-2011

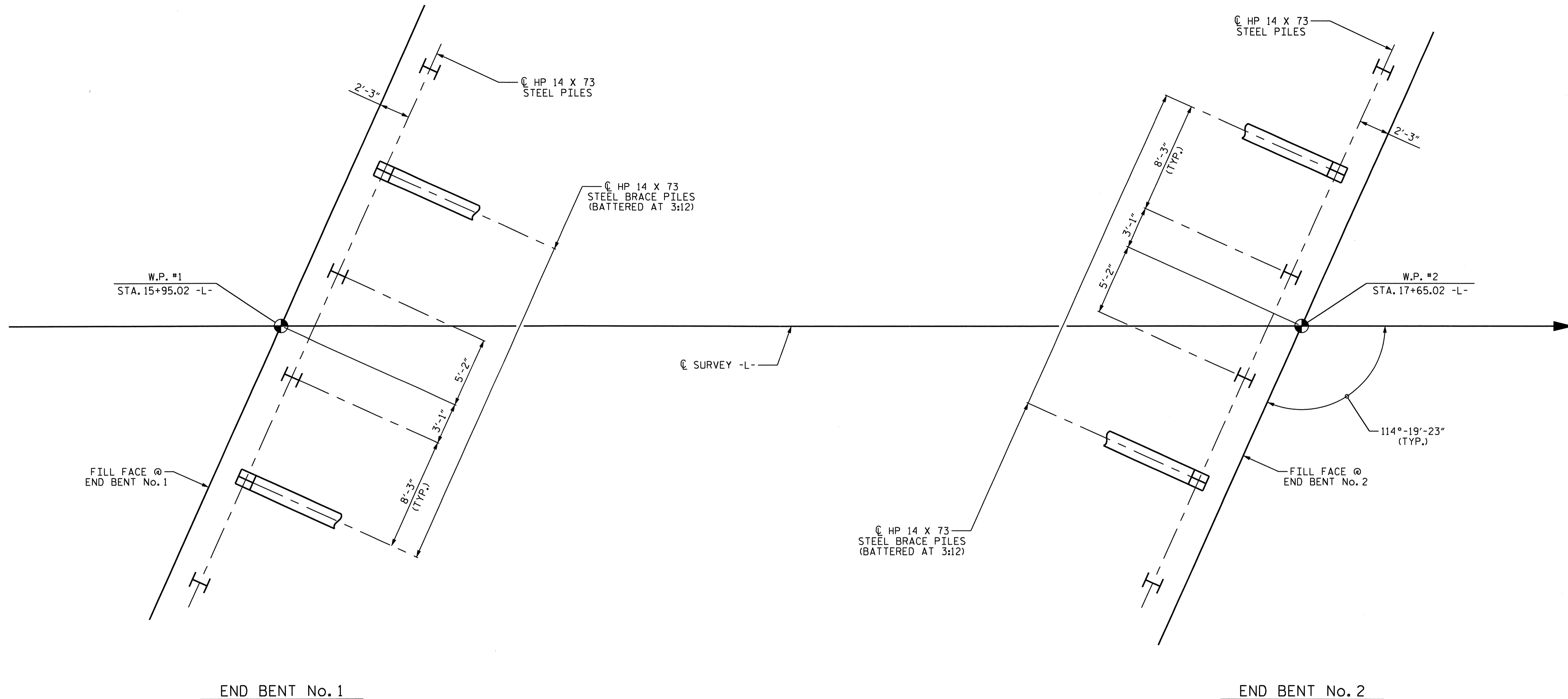
PROJECT NO. B-4416  
BEAUFORT COUNTY  
STATION: 16+92.27 -L-

SHEET 1 OF 3 REPLACES BRIDGE No. 76  
MILE POST NB-0.54  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

GENERAL DRAWING  
BRIDGE ON NC 33 OVER  
NORFORK SOUTHERN RAILWAY  
BETWEEN SR 1157 AND US 17

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			28

30-AUG-2011 10:56  
X:\Structures\GeneralDrawings\b4416.sd.gdgn  
kaiford



**FOUNDATION LAYOUT**

(DIMENSIONS LOCATING PILES ARE TO THE CENTERLINE OF THE PILES AT THE BOTTOM OF THE CAP)

**NOTES:**

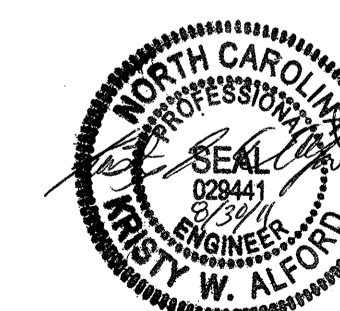
- FOR PILES, SEE SPECIAL PROVISIONS.
- PILES AT END BENT No. 1 AND END BENT No. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 155 TONS PER PILE.
- DRIVE PILES AT END BENT No. 1 AND END BENT No. 2 TO A REQUIRED DRIVING RESISTANCE OF 260 TONS PER PILE.
- TESTING PILES WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PILE DRIVING ANALYZER, SEE PILES SPECIAL PROVISION.
- IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 60-110 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT No. 1 AND END BENT No. 2. THIS ESTIMATE ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH THE PILE PROVISION.
- OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING EMBANKMENT TO WITHIN 2 FT. OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT No. 1 AND END BENT No. 2.
- FOR ADDITIONAL NOTES, SEE SHEET 3 OF 3.

PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

SHEET 2 OF 3

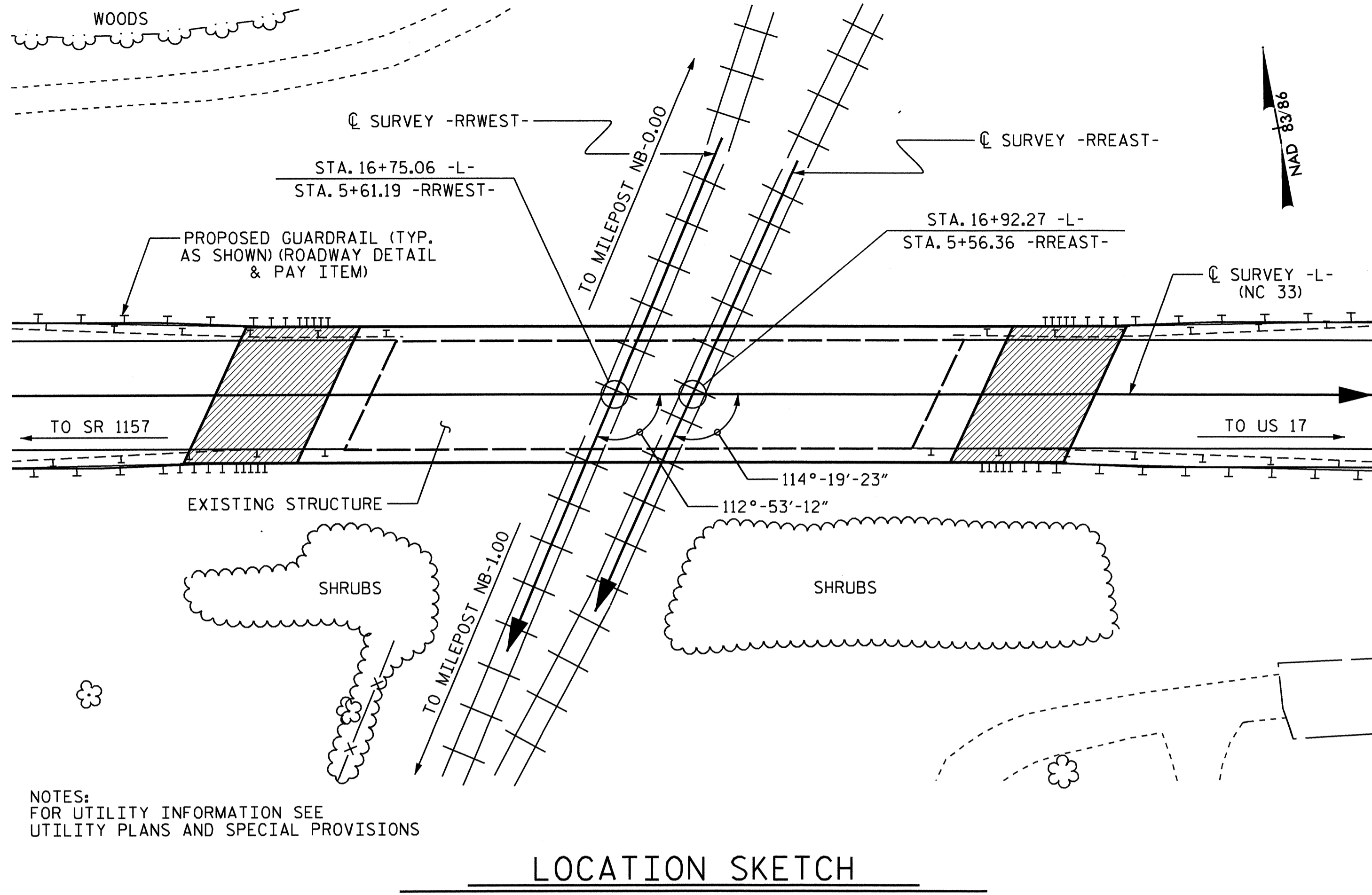
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**  
 BRIDGE ON NC 33 OVER  
 NORFOLK SOUTHERN RAILWAY  
 BETWEEN SR 1157 AND US 17



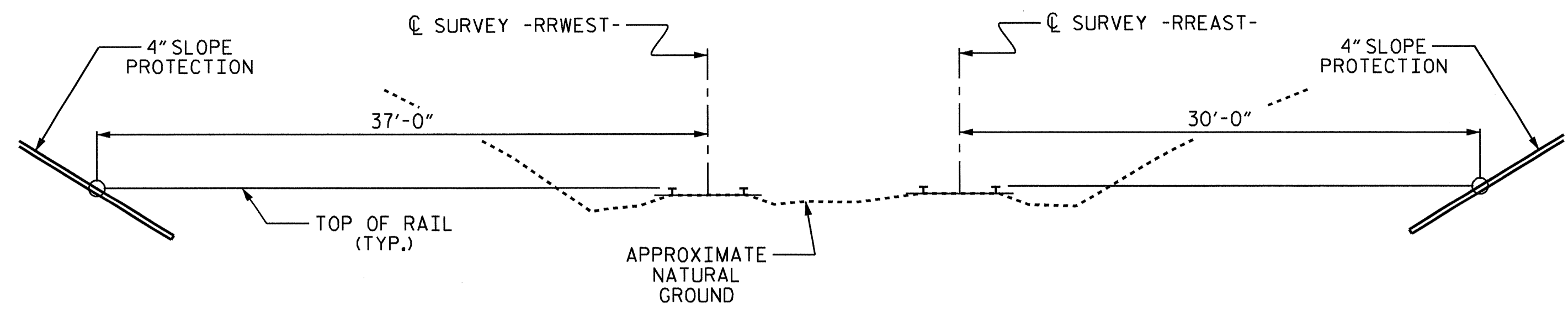
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			28

DRAWN BY : T. BANKOVICH DATE : 3-2011  
 CHECKED BY : A.V. ROYAL DATE : 3-2011



NOTES:  
FOR UTILITY INFORMATION SEE  
UTILITY PLANS AND SPECIAL PROVISIONS

LOCATION SKETCH



SECTION THRU RAILROAD

(SECTION TAKEN AT RIGHT ANGLE TO RAILWAY)  
(SPAN LENGTHS BASED ON THIS SECTION)  
LOOKING TOWARDS MILE POST NB-0.00

NOTES: (CONTINUED FROM SHEET 2 OF 3)

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 60 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. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.
- THE EXISTING STRUCTURE CONSISTING OF 3 SPANS OF 1 @ 41', 1 @ 40' AND 1 @ 41' OF REINFORCED CONCRETE DECK GIRDERS WITH ASPHALT WEARING SURFACE WITH A CLEAR ROADWAY WIDTH OF 24'-0" ON END BENTS AND BENTS OF REINFORCED CONCRETE CAPS, COLUMNS, FOOTINGS AND FOOTING STRUTS ON TIMBER PILES AND LOCATED AT THE SITE OF 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.
- 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.
- FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.
- FOR FORMS FOR CONCRETE BRIDGE DECKS, SEE SPECIAL PROVISIONS.
- FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.
- 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. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.
- 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.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- THE RAILROAD TRACK TOP OF RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

TOTAL BILL OF MATERIAL

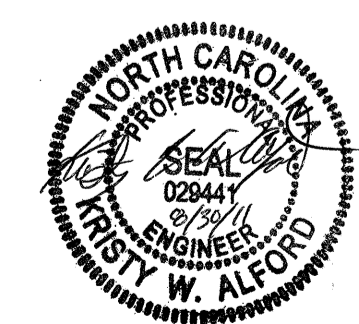
	REMOVAL OF EXISTING STRUCTURE	PDA TESTING	PDA ASSISTANCE	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	STRUCTURAL STEEL	HP 14 X 73 STEEL PILES	PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS	
	LUMP SUM	EACH	EACH	LUMP SUM	SO. FT.	SO. FT.	CU. YDS.	LUMP SUM	LBS.	APPROX. LBS.	No.	LIN. FT.	EACH	LIN. FT.	SO. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE					5,909	6,198				288,000			375.27				
END BENT No. 1							40.0		5,618		6	420	6		545		
END BENT No. 2							40.0		5,618		6	420	6		620		
TOTAL	LUMP SUM	1	1	LUMP SUM	5,909	6,198	80.0	LUMP SUM	11,236	288,000	12	840	12	375.27	1,165	LUMP SUM	LUMP SUM

PROJECT NO. B-4416  
BEAUFORT COUNTY  
STATION: 16+92.27 -L-

SHEET 3 OF 3

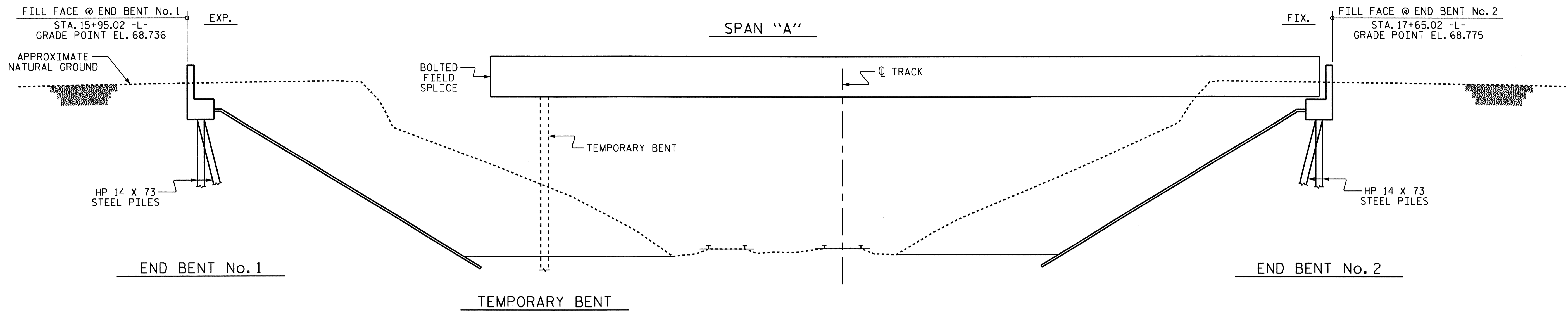
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

GENERAL DRAWING  
BRIDGE ON NC 33 OVER  
NORFOLK SOUTHERN RAILWAY  
BETWEEN SR 1157 AND US 17



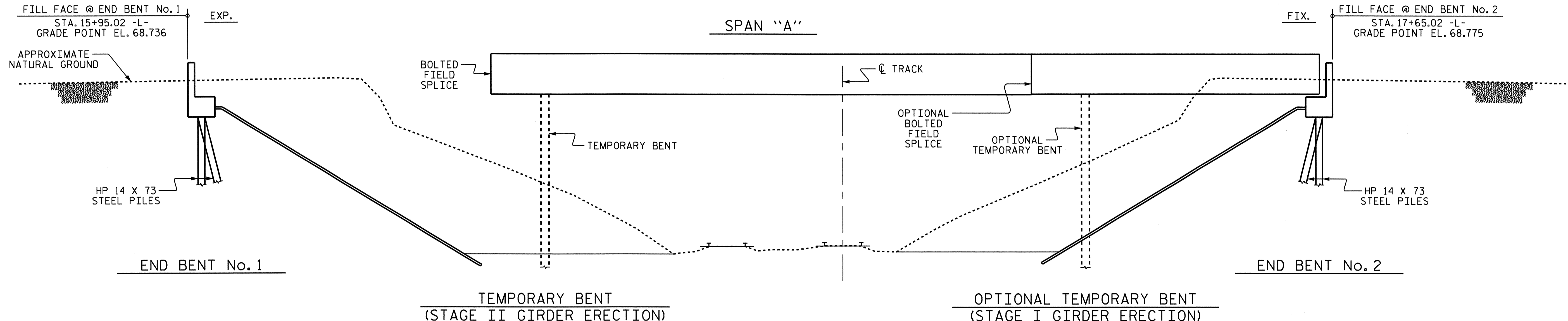
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			28

DRAWN BY: T. BANKOVICH DATE: 3-2011  
CHECKED BY: A.V. ROYAL DATE: 3-2011



**GIRDER ERECTION**

(SECTION AT END BENTS & TEMPORARY BENT ARE TAKEN @ RIGHT ANGLE)



**OPTIONAL GIRDER ERECTION**

(SECTION AT END BENTS & TEMPORARY BENTS ARE TAKEN @ RIGHT ANGLE)

**ERECTION NOTES:**

- ERECT A MINIMUM OF TWO GIRDERS WITH ALL DIAPHRAGMS/CROSSFRAMES BETWEEN THE GIRDERS IN PLACE AND THE BOLTS TIGHTENED PRIOR TO RELEASING THE GIRDERS.
- ERECT EACH SUBSEQUENT GIRDER WITH DIAPHRAGMS/CROSSFRAMES CONNECTING TO THE ADJACENT PREVIOUSLY ERECTED GIRDER AND TIGHTEN ALL BOLTS BEFORE RELEASING THE GIRDER.
- THE STRUCTURAL STEEL SHALL BE SUPPORTED DURING ERECTION IN ITS CAMBERED POSITION.
- PLACEMENT OF TEMPORARY BENTS SHALL BE COORDINATED WITH RAILROAD REQUIREMENTS. SEE RAILROAD PROVISIONS.
- TEMPORARY BENTS SHALL REMAIN IN PLACE UNTIL ALL DIAPHRAGMS/CROSSFRAMES ARE IN PLACE AND ALL HIGH STRENGTH BOLTS ARE TIGHTENED.
- TEMPORARY BENTS SHALL PROVIDE BEARING AT A CONNECTOR PLATE LOCATION. WHEN CONNECTOR PLATES ARE USED AS TEMPORARY BEARING STIFFENERS, DIAPHRAGMS MUST BE ATTACHED.
- THE CONTRACTOR'S ERECTION PLANS SHALL INCLUDE A METHOD OF TEMPORARY BENT REMOVAL THAT WILL UNIFORMLY TRANSFER THE STRUCTURAL WEIGHT TO THE DIAPHRAGMS/CROSSFRAMES AND THE GIRDERS WILL REMAIN IN THE CAMBERED POSITIONS.
- PLANS FOR TEMPORARY BENT ERECTION AND REMOVAL SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.
- THE CONTRACTOR IS RESPONSIBLE FOR DESIGNING THE TEMPORARY BENTS. THE DESIGNS SHALL BE COMPLETED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF NORTH CAROLINA. THE CONTRACTOR SHALL SUBMIT SIGNED AND SEALED WORKING DRAWINGS AND CALCULATIONS FOR APPROVAL BY THE ENGINEER.
- DURING THE GIRDER ERECTION PROCEDURE, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY LATERAL BRACING AND OTHER MEANS OF SUPPORT AS REQUIRED TO ENSURE STABILITY OF THE GIRDERS, AVOID UPLIFT OF THE GIRDERS AT THE TEMPORARY BENTS AND TO ENSURE PLUMBNESS OF THE GIRDERS IN THE FINAL CONDITION.
- NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR PROVIDING THE TEMPORARY BENTS. THE COST FOR ALL MATERIALS, EQUIPMENT, TOOLS, LABOR AND ANY INCIDENTALS NECESSARY TO PROVIDE THE TEMPORARY BENTS SHALL BE CONSIDERED INCIDENTAL TO THE LUMP SUM BID PRICE FOR STRUCTURAL STEEL.
- THE CONTRACTOR MAY SUBMIT AN ALTERNATE ERECTION METHOD TO THE ENGINEER FOR REVIEW AND APPROVAL.

PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GIRDER ERECTION  
 DETAILS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			28



DRAWN BY : T. BANKOVICH DATE : 5-2010  
 CHECKED BY : A.V. ROYAL DATE : 5-2010

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	$\gamma_{DC}$	$\gamma_{DW}$
	STRENGTH I	1.25	1.50
	SERVICE II	1.00	1.00

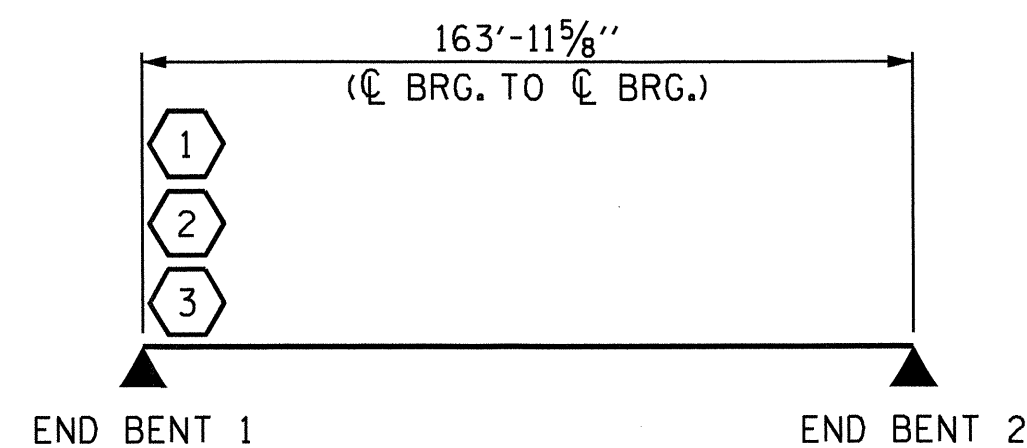
LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE							
						MOMENT					SHEAR					MOMENT							
						LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	1	1.08	--	1.75	0.827	1.41	A	EL/ER	81.980	0.962	1.08	A	I	0.000	1.30	0.827	1.68	A	EL/ER	122.97	
	HL-93 (OPERATING)	N/A	--	1.39	--	1.35	0.827	1.83	A	EL/ER	81.980	0.962	1.39	A	I	0.000	1.00	0.827	2.19	A	EL/ER	122.97	
	HS-20 (INVENTORY)	36.00	2	1.70	61.20	1.75	0.827	2.26	A	EL/ER	81.980	0.962	1.70	A	I	0.000	1.30	0.827	2.69	A	EL/ER	40.99	
	HS-20 (OPERATING)	36.00	--	2.20	79.20	1.35	0.827	2.93	A	EL/ER	81.980	0.962	2.20	A	I	0.000	1.00	0.827	3.50	A	EL/ER	40.99	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	5.43	73.31	1.40	0.827	7.04	A	EL/ER	81.980	0.962	5.43	A	I	0.000	1.30	0.827	6.75	A	EL/ER	122.97
		SNGARBS2	20.000	--	3.74	74.80	1.40	0.827	4.95	A	EL/ER	81.980	0.962	3.74	A	I	0.000	1.30	0.827	4.68	A	EL/ER	40.99
		SNAGRIS2	22.000	--	3.42	75.24	1.40	0.827	4.58	A	EL/ER	81.980	0.962	3.42	A	I	0.000	1.30	0.827	4.30	A	EL/ER	40.99
		SNCOTTS3	27.250	--	2.70	73.58	1.40	0.827	3.50	A	EL/ER	81.980	0.962	2.70	A	I	0.000	1.30	0.827	3.36	A	EL/ER	40.99
		SNAGGRS4	34.925	--	2.16	75.44	1.40	0.827	2.81	A	EL/ER	81.980	0.962	2.16	A	I	0.000	1.30	0.827	2.70	A	EL/ER	122.97
		SNS5A	35.550	--	2.14	76.08	1.40	0.827	2.75	A	EL/ER	81.980	0.962	2.14	A	I	0.000	1.30	0.827	2.65	A	EL/ER	122.97
		SNS6A	39.950	--	1.92	76.70	1.40	0.827	2.48	A	EL/ER	81.980	0.962	1.92	A	I	0.000	1.30	0.827	2.38	A	EL/ER	122.97
		SNS7B	42.000	--	1.85	77.70	1.40	0.827	2.36	A	EL/ER	81.980	0.962	1.85	A	I	0.000	1.30	0.827	2.28	A	EL/ER	122.97
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	2.31	76.23	1.40	0.827	3.01	A	EL/ER	81.980	0.962	2.31	A	I	0.000	1.30	0.827	2.92	A	EL/ER	122.97
		TNT4A	33.075	--	2.29	75.74	1.40	0.827	3.01	A	EL/ER	81.980	0.962	2.29	A	I	0.000	1.30	0.827	2.88	A	EL/ER	40.99
		TNT6A	41.600	--	1.91	79.46	1.40	0.827	2.43	A	EL/ER	81.980	0.962	1.91	A	I	0.000	1.30	0.827	2.36	A	EL/ER	40.99
		TNT7A	42.000	--	1.87	78.54	1.40	0.827	2.42	A	EL/ER	81.980	0.962	1.87	A	I	0.000	1.30	0.827	2.32	A	EL/ER	122.97
		TNT7B	42.000	--	1.83	76.86	1.40	0.827	2.45	A	EL/ER	81.980	0.962	1.83	A	I	0.000	1.30	0.827	2.31	A	EL/ER	122.97
		TNAGRIT4	43.000	--	1.78	76.54	1.40	0.827	2.36	A	EL/ER	81.980	0.962	1.78	A	I	0.000	1.30	0.827	2.25	A	EL/ER	40.99
TNAGT5A	45.000	--	1.73	77.85	1.40	0.827	2.25	A	EL/ER	81.980	0.962	1.73	A	I	0.000	1.30	0.827	2.18	A	EL/ER	122.97		
TNAGT5B	45.000	3	1.70	76.50	1.40	0.827	2.23	A	EL/ER	81.980	0.962	1.70	A	I	0.000	1.30	0.827	2.14	A	EL/ER	40.99		

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE II LIMIT STATES.  
ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93) **
2	DESIGN LOAD RATING (HS-20) **
3	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	
GIRDER LOCATION	
I - INTERIOR GIRDER EL - EXTERIOR LEFT GIRDER ER - EXTERIOR RIGHT GIRDER	



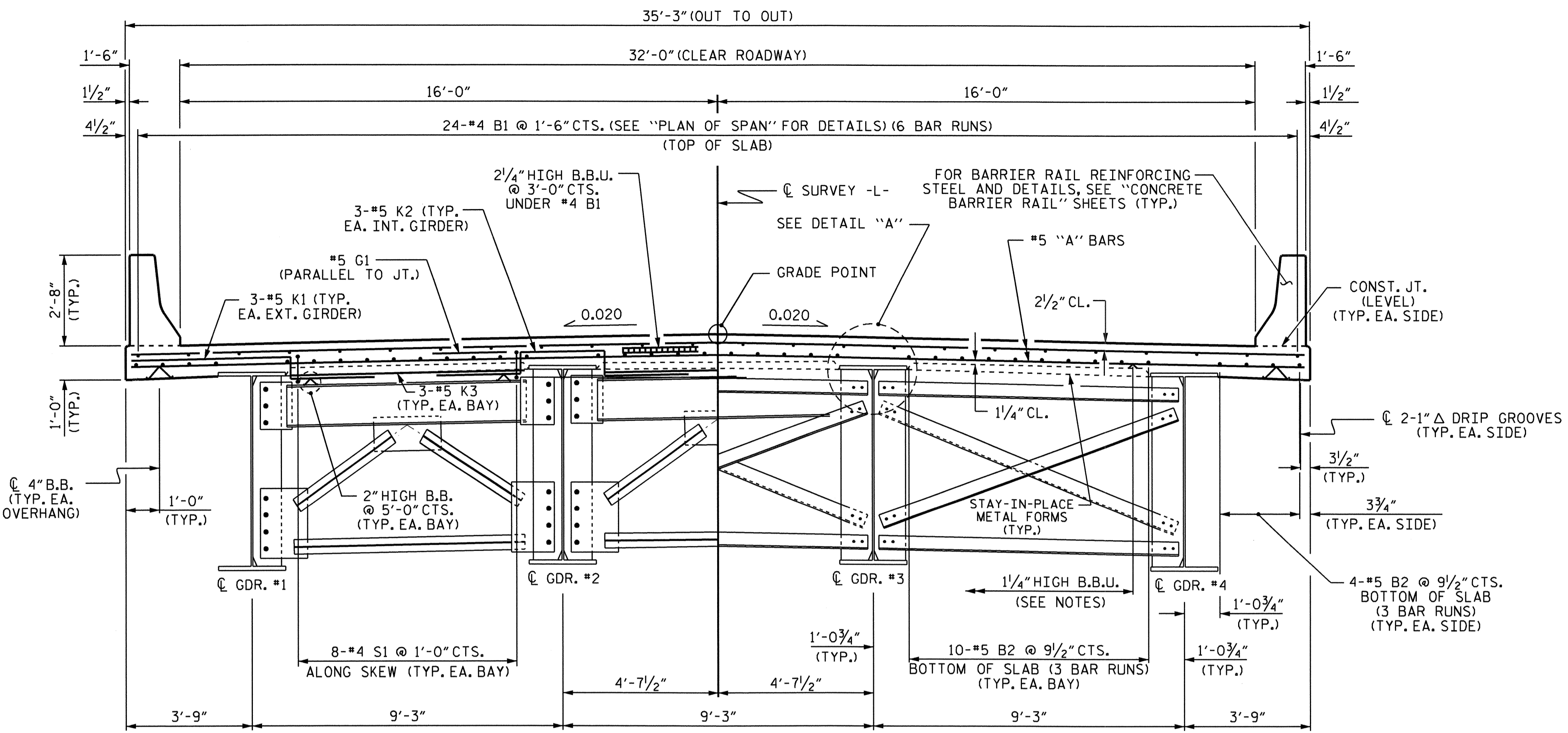
LRFR SUMMARY

PROJECT NO. B-4416  
BEAUFORT COUNTY  
STATION: 16+92.27 -L-



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
STANDARD						S-5
LRFR SUMMARY FOR STEEL GIRDERS (NON-INTERSTATE TRAFFIC)						TOTAL SHEETS
REVISIONS						28
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

ASSEMBLED BY : TMG	DATE : 06/10
CHECKED BY : NAP	DATE : 07/11
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	

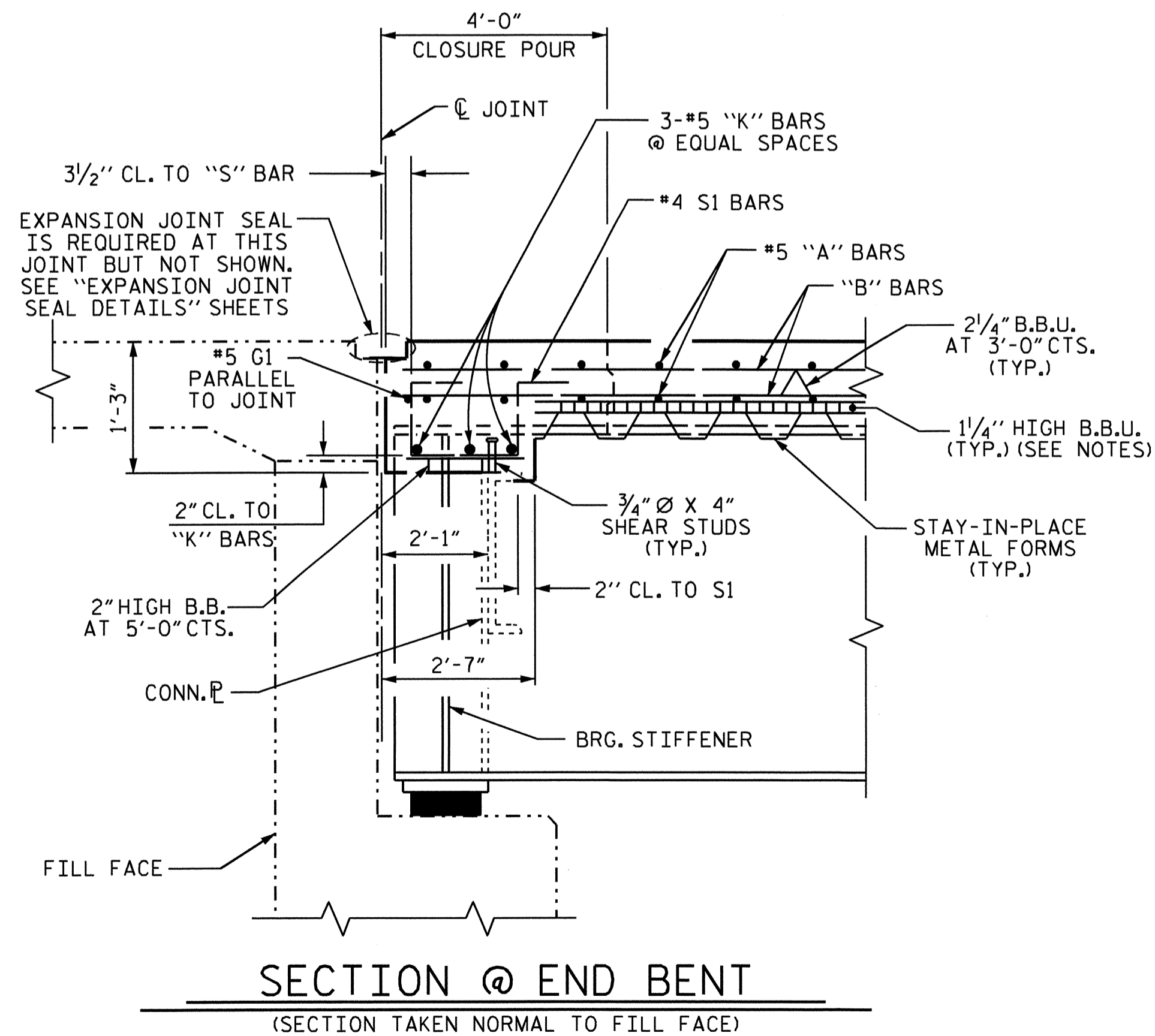


**PART TYPICAL SECTION**

(SHOWING END BENT DIAPHRAGMS)

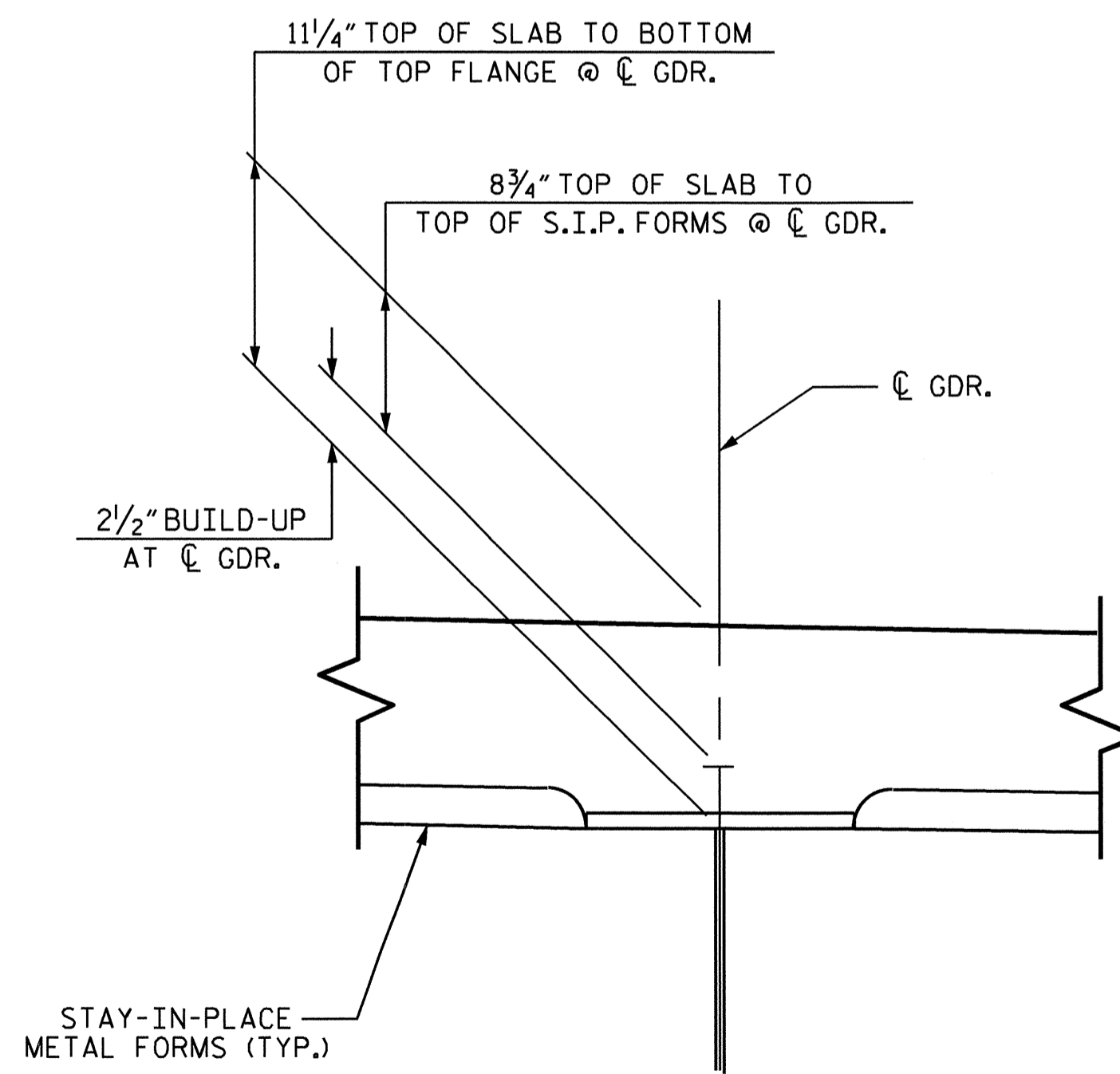
**PART TYPICAL SECTION**

(SHOWING INTERMEDIATE DIAPHRAGMS)



**SECTION @ END BENT**

(SECTION TAKEN NORMAL TO FILL FACE)



**DETAIL "A"**

**NOTES**

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

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

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

ALL REINFORCING STEEL IN BARRIER RAIL SHALL BE EPOXY COATED.

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

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

PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-



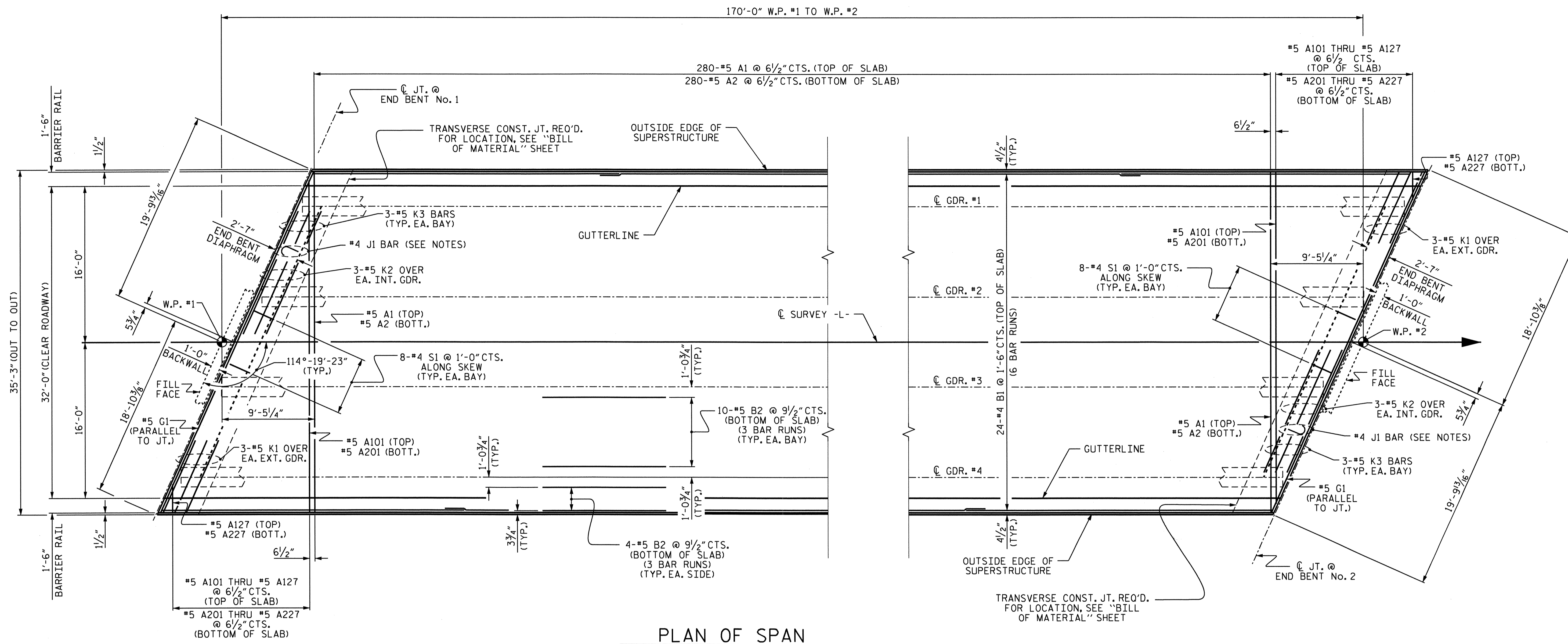
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE  
 TYPICAL SECTION**

DRAWN BY: D. G. ELY DATE: 02/11  
 CHECKED BY: I. M. GARRISON DATE: 02/11

08-AUG-2011 08:50  
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			28



PLAN OF SPAN

NOTES

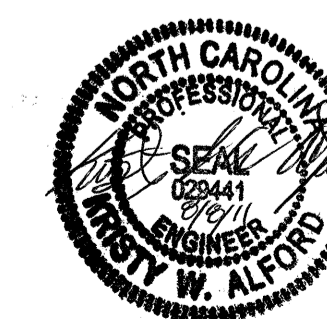
FOR PLACEMENT OF #4 J1 BAR, SEE "EXPANSION JOINT SEAL DETAILS" SHEETS.

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEETS.

PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 PLAN OF SPAN

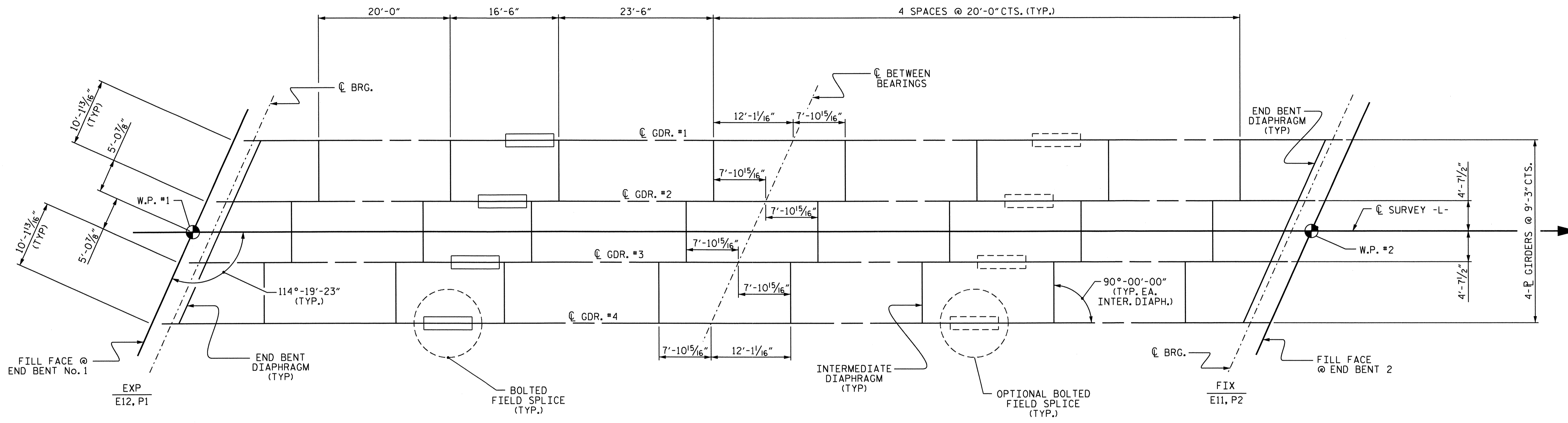


DRAWN BY : D. G. ELY DATE : 02/11  
 CHECKED BY : I. M. GARRISON DATE : 02/11

08-AUG-2011 08:49  
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REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7	
1			3			TOTAL SHEETS	
2			4			28	

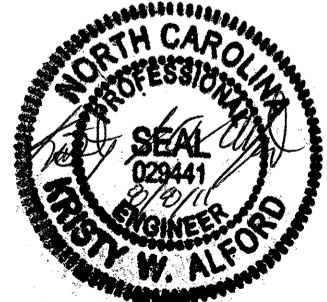




PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 FRAMING PLAN

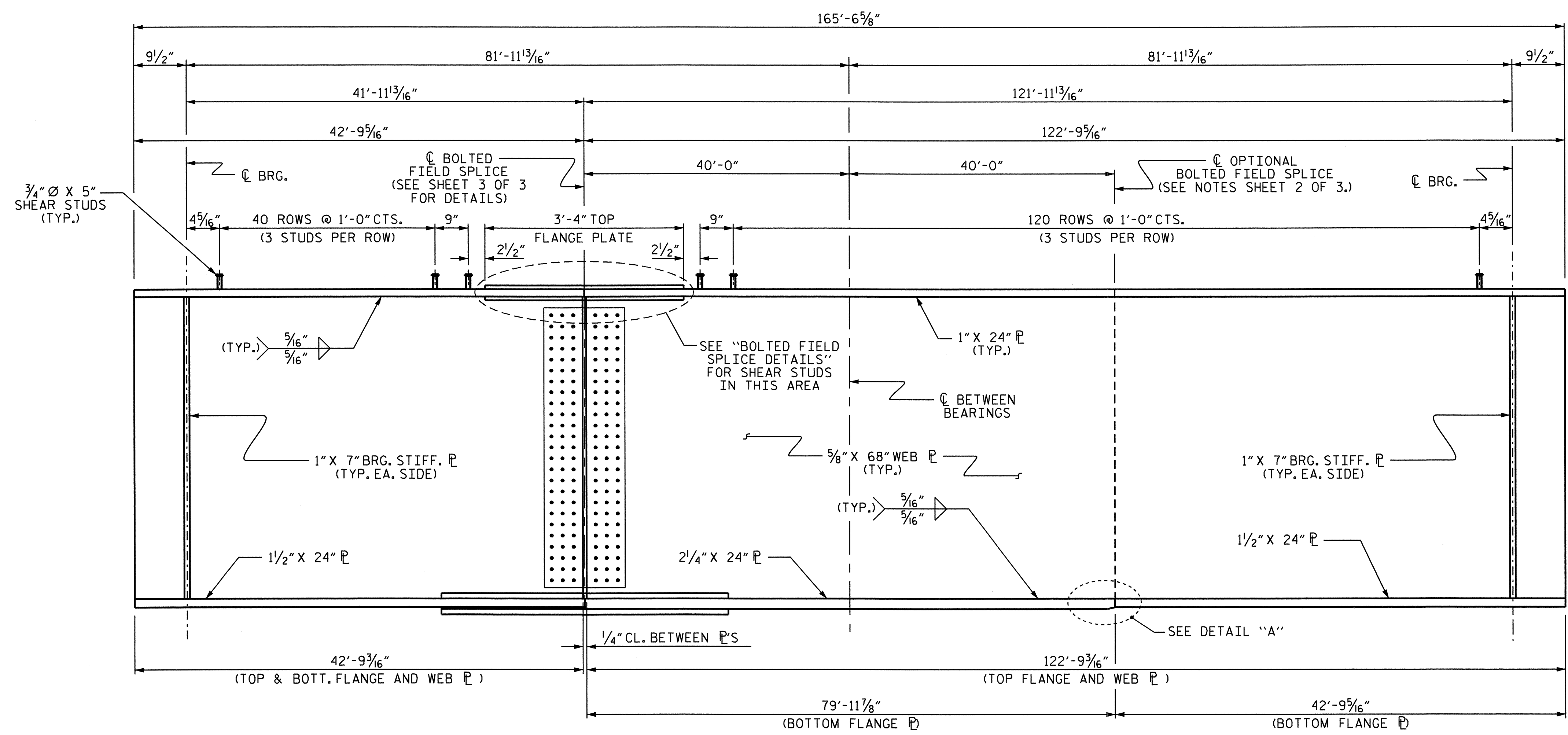


DRAWN BY : D. G. ELY DATE : 02/11  
 CHECKED BY : T. M. GARRISON DATE : 02/11

08-AUG-2011 08:49  
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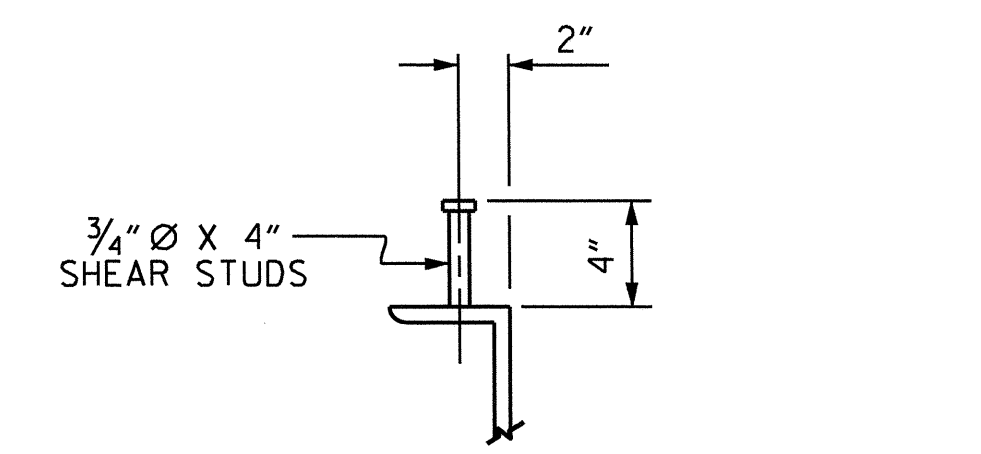
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			28

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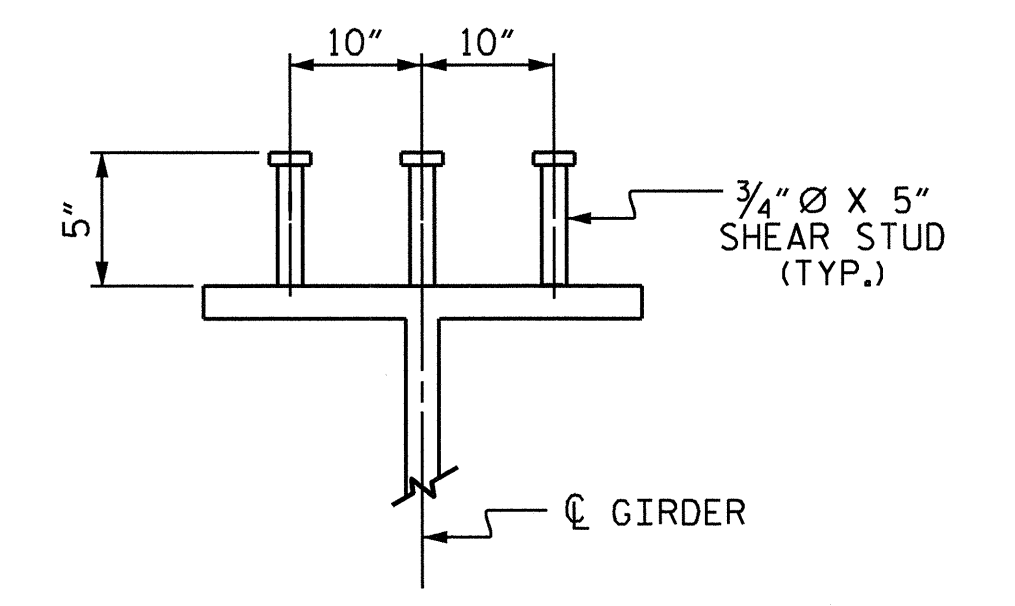


**PLATE GIRDER ELEVATION**

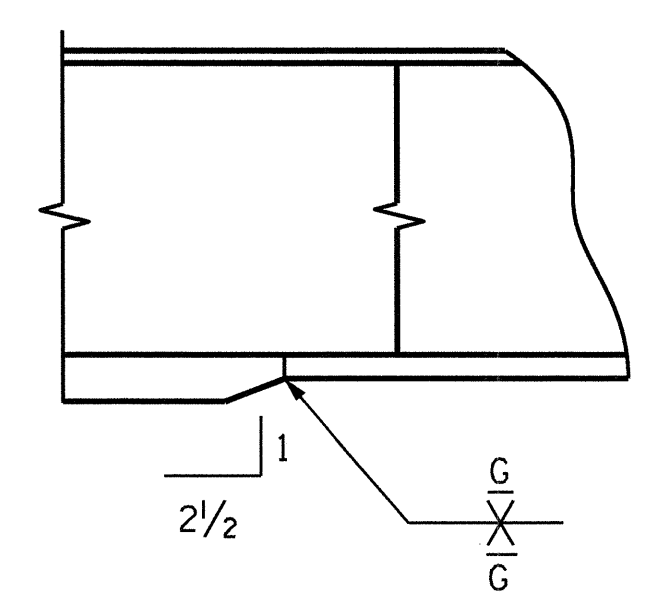
(PLATE DIMENSIONS AND DETAILS ARE SHOWN WITHOUT THE OPTIONAL B.F.S.)  
 (CONNECTOR PLATES NOT SHOWN. FOR PLACEMENT, SEE FRAMING PLAN SHEET.)



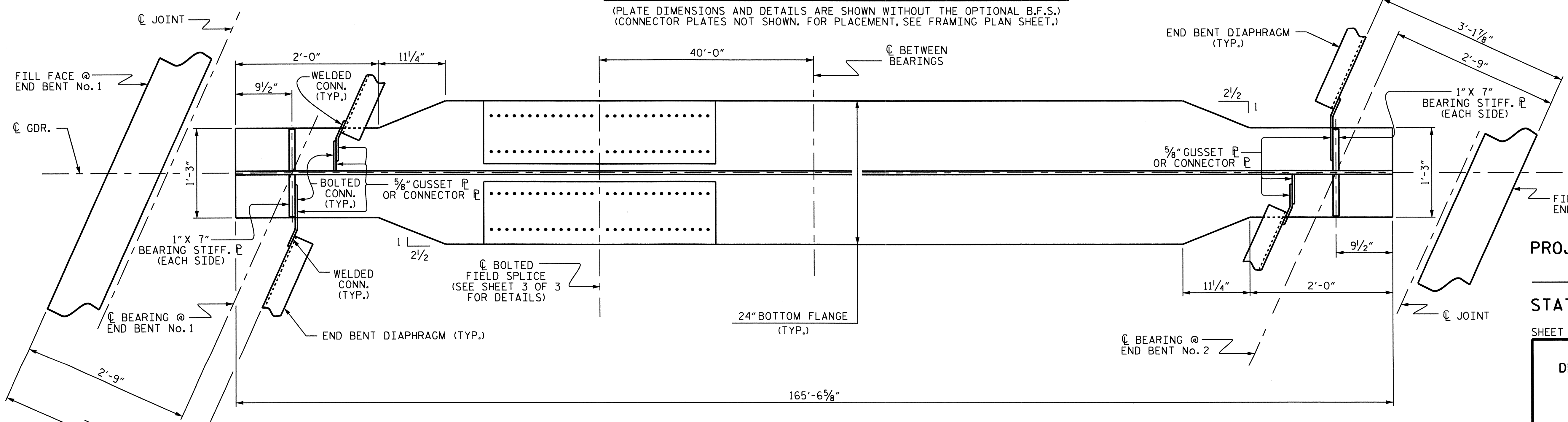
**SHEAR STUD DETAILS**  
 (TYP. END BENT DIAPHRAGM)



**SHEAR STUD DETAILS**  
 (TYPICAL EXCEPT AT TOP FLANGE SPLICE P.  
 SEE "BOLTED FIELD SPLICE DETAILS" SHEET FOR SHEAR STUDS IN THIS AREA.)



**DETAIL "A"**



**BOTTOM FLANGE DETAIL**

DRIP BEAD DETAILS NOT SHOWN FOR CLARITY, SEE SHEET 2 OF 3.  
 CONNECTOR PLATES NOT SHOWN. FOR PLACEMENT, SEE FRAMING PLAN SHEET.

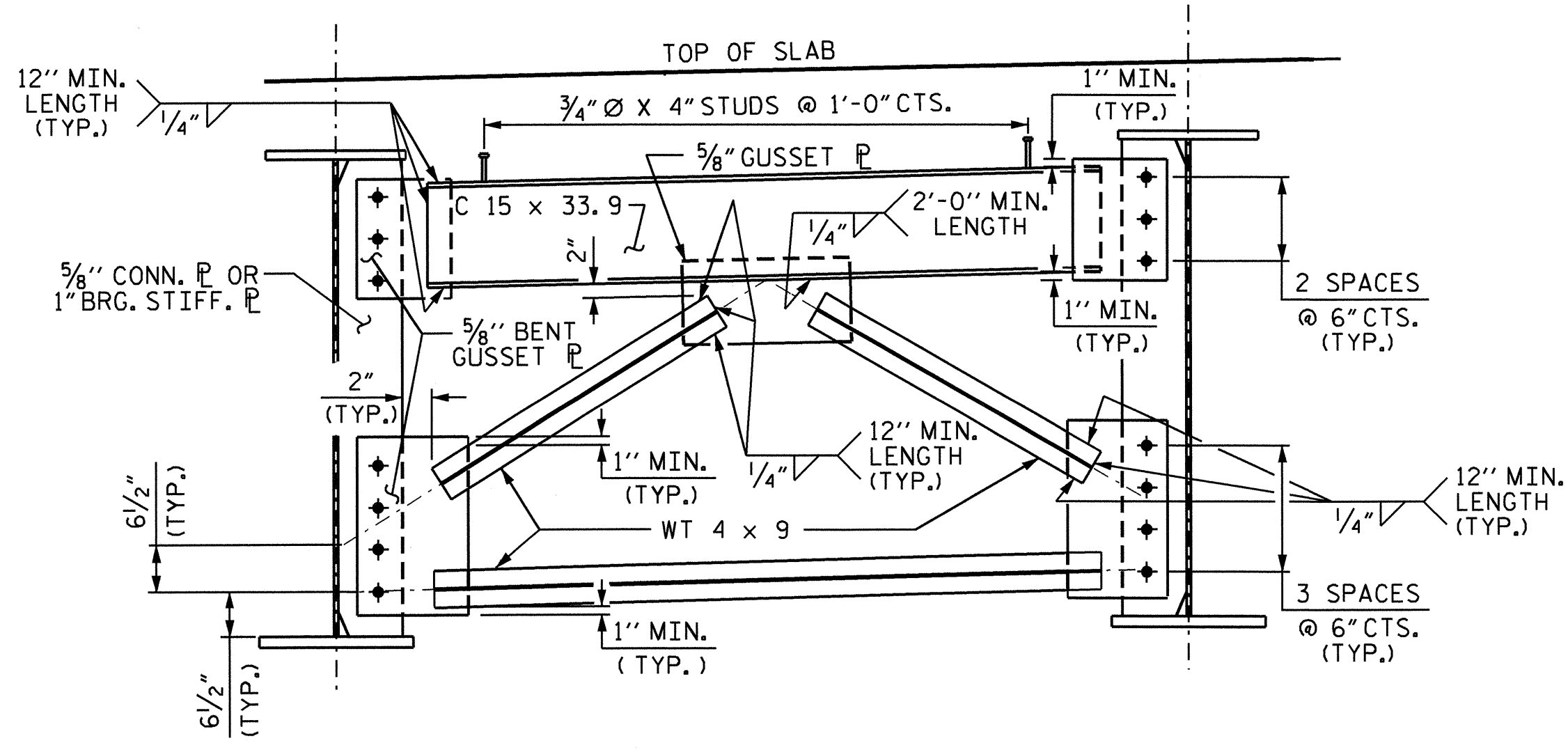
PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-  
 SHEET 1 OF 3



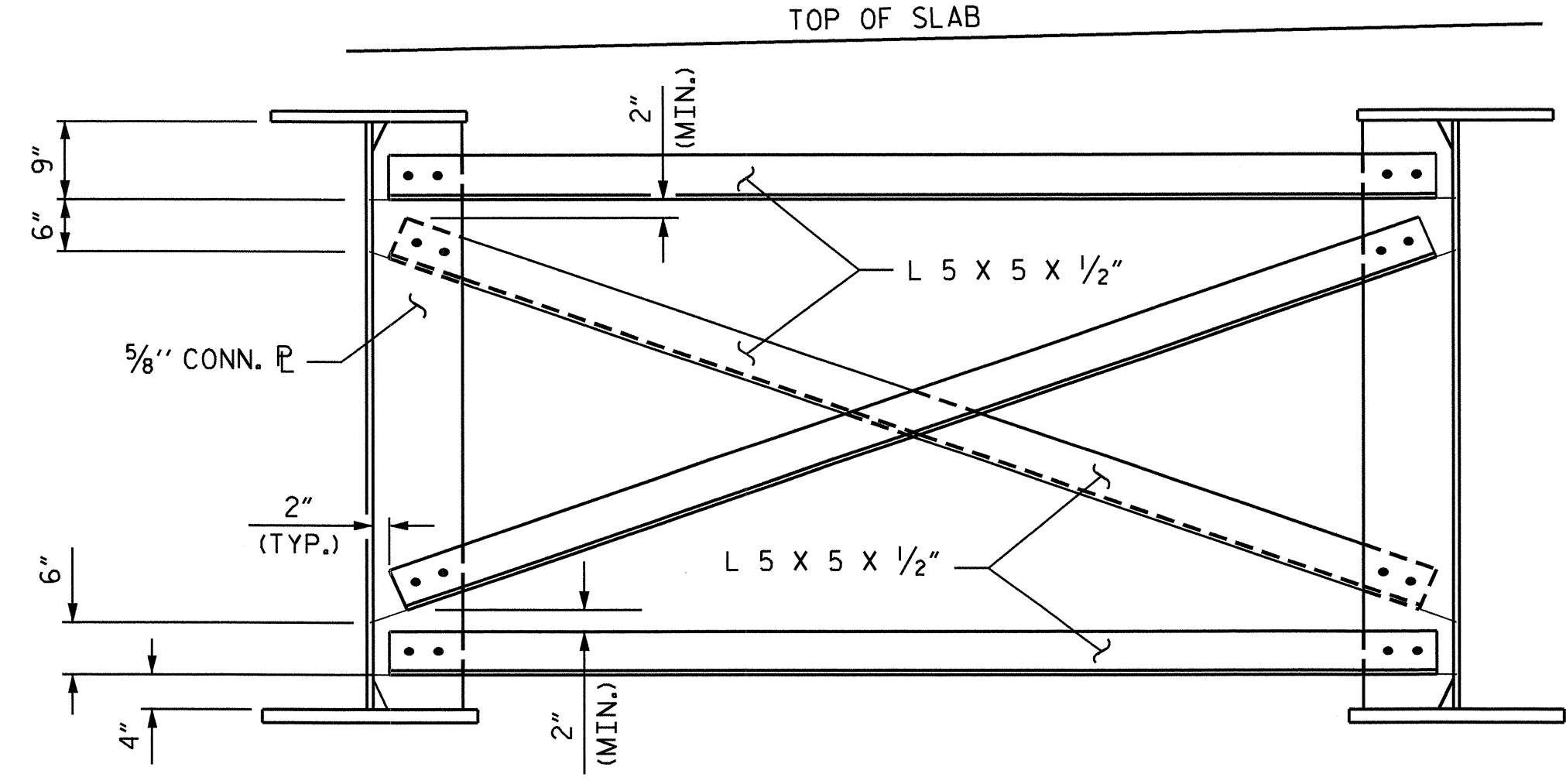
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 STRUCTURAL STEEL  
 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			28

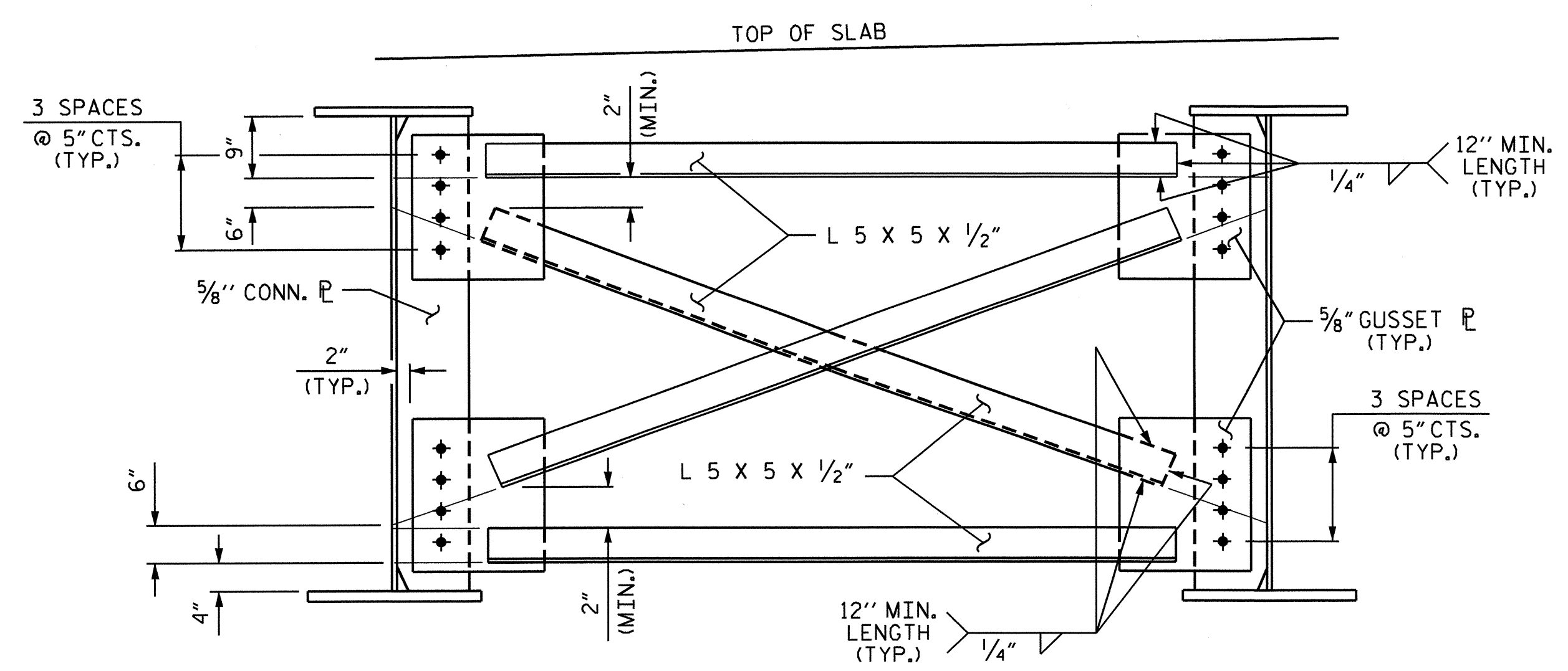
DRAWN BY : D. G. ELY DATE : 02/11  
 CHECKED BY : T. M. GARRISON DATE : 02/11



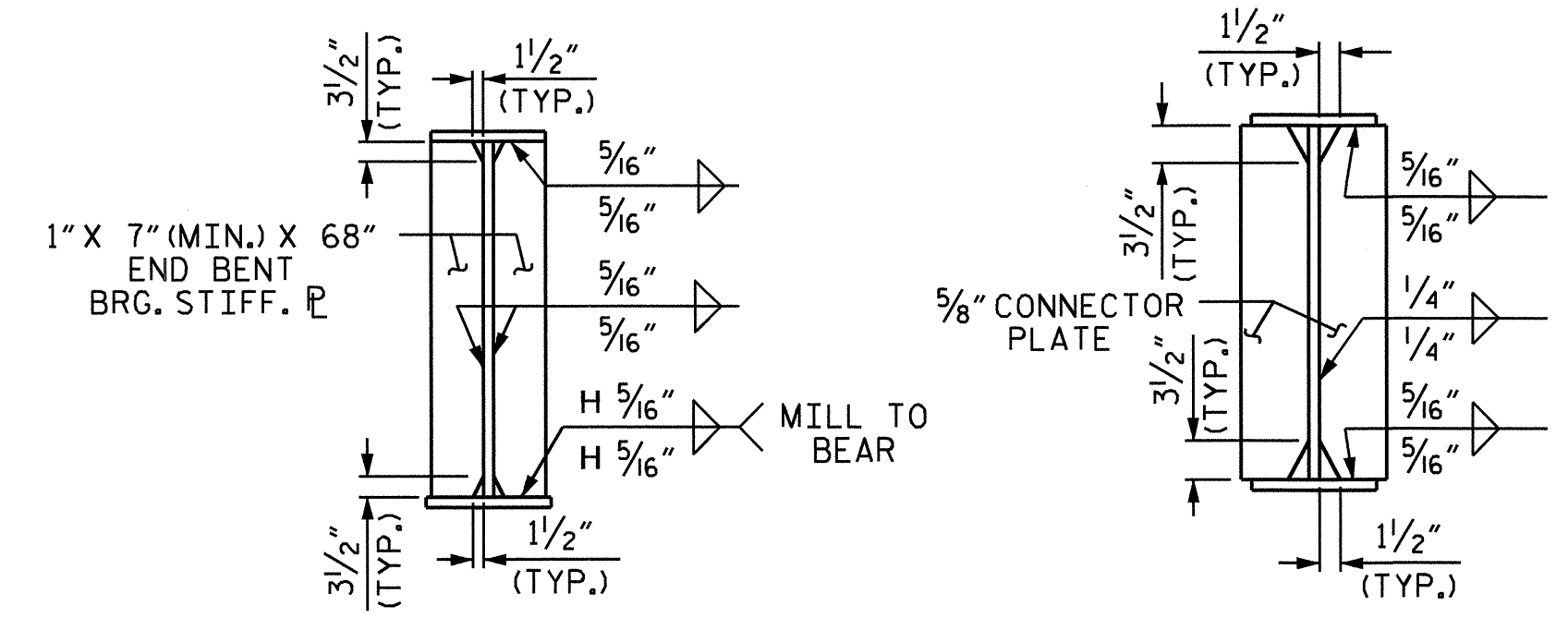
TYPICAL END BENT DIAPHRAGM



TYPICAL INTERMEDIATE DIAPHRAGM



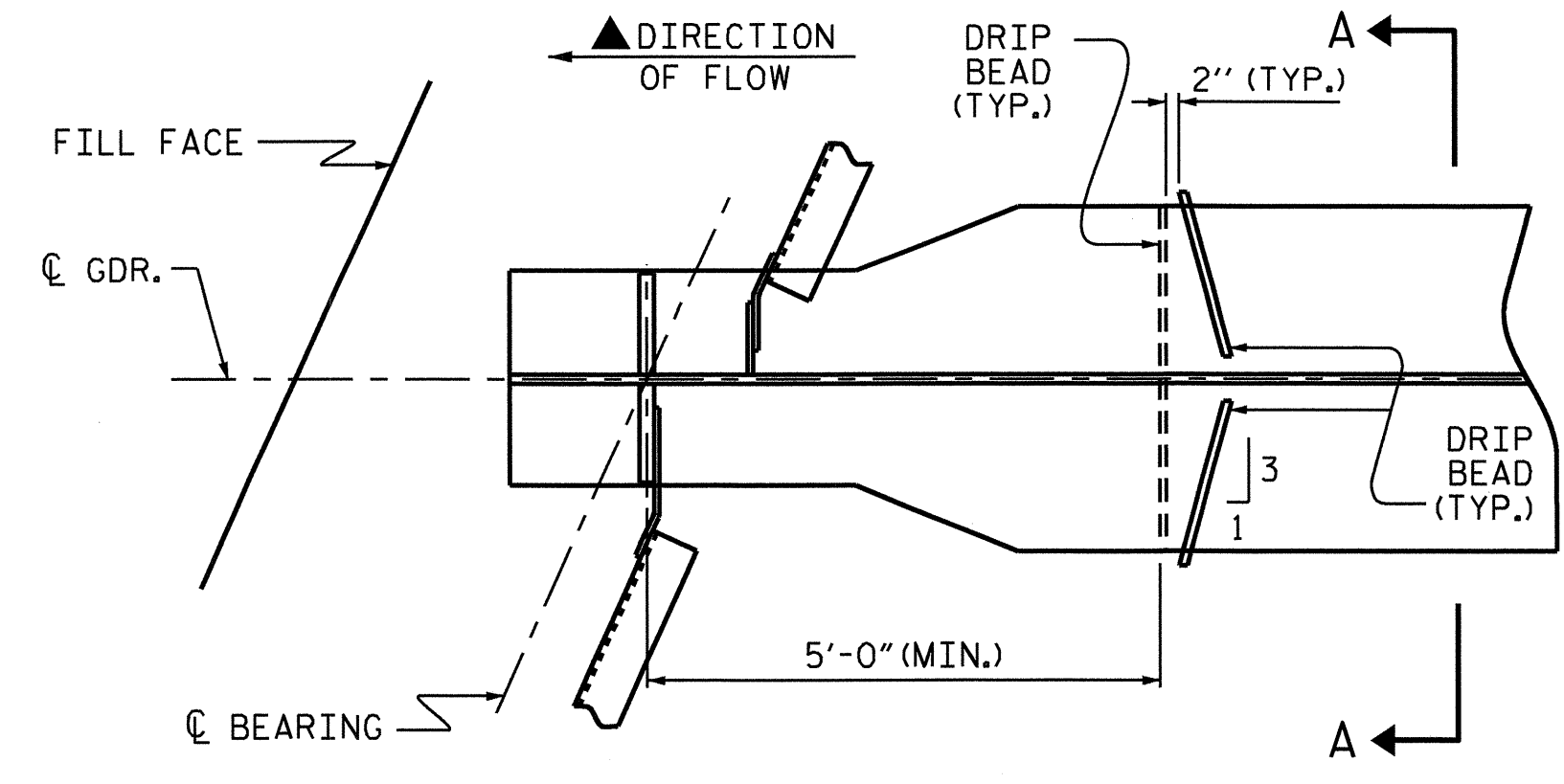
OPTIONAL TYPICAL INTERMEDIATE DIAPHRAGM



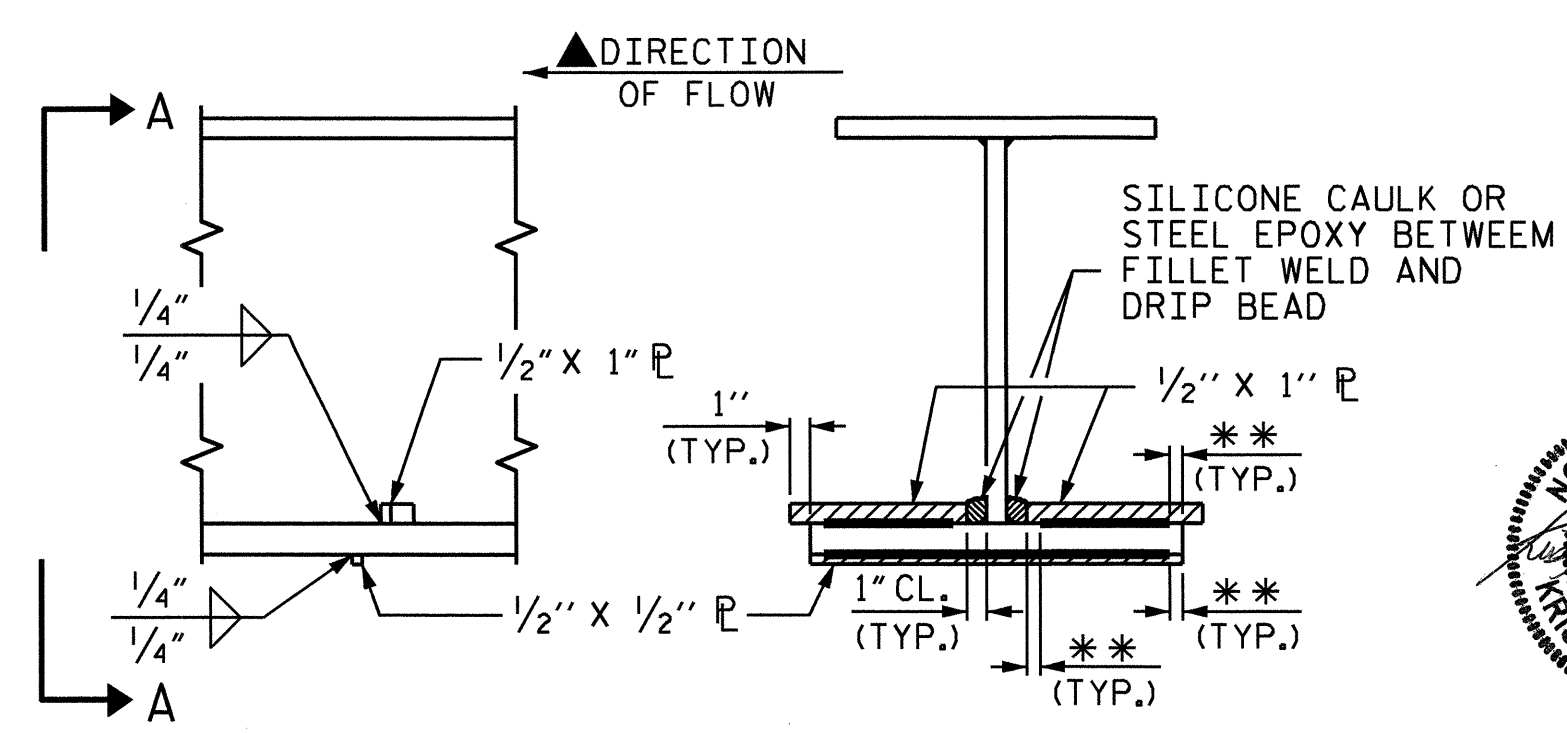
BEARING STIFFENER

CONNECTOR PLATE

H WELD ONLY WHEN BEARING STIFFENER USED AS CONNECTOR PLATE



PART PLAN - BOTTOM FLANGE



SECTION

VIEW A-A

\*\* SEE "WELD TERMINATION DETAILS"

DRIP BEAD DETAILS

STRUCTURAL STEEL NOTES:

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50 AND PAINTED IN ACCORDANCE WITH SYSTEM 1 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" DIAMETER HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.  
 BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.  
 TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS. FOR DIRECT TENSION INDICATORS, SEE SPECIAL PROVISIONS.

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.

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

AN OPTIONAL BOLTED FIELD SPLICE WILL BE PERMITTED IN THE LOCATION SHOWN ON THE PLANS. IF THE OPTIONAL FIELD SPLICE IS USED, IT SHALL BE MADE ENTIRELY AT THE CONTRACTOR'S EXPENSE AND NO ADDITIONAL MEASUREMENT OR PAYMENT WILL BE MADE FOR THE ADDITIONAL MATERIALS REQUIRED. THE OPTIONAL FIELD SPLICE DETAILS SHALL MATCH THE FIELD SPLICE DETAILS ON SHEET 3 OF 3 AND WILL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.  
 FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

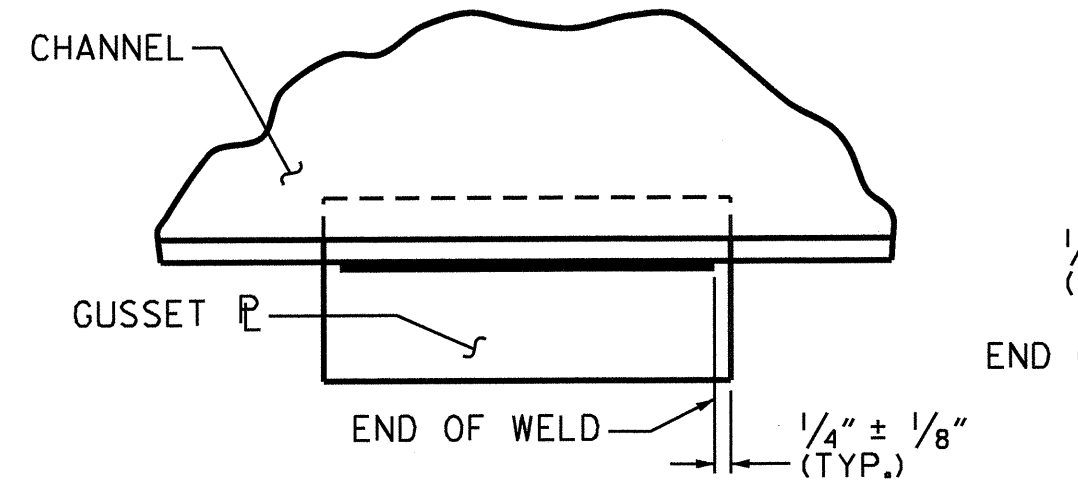
A CHARPY V-NOTCH TEST IS REQUIRED FOR WEB PLATES, BOTTOM FLANGE PLATES, BOTTOM FLANGE SPLICE PLATES AND WEB SPLICE PLATES FOR ALL GIRDERS AND IN ACCORDANCE WITH ARTICLE 1072-9 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, THE DIAPHRAGM WITH THE WELDED GUSSET PLATES MAY BE USED IN LIEU OF THE DIAPHRAGM WITH BOLTED ANGLES AT NO ADDITIONAL COST TO THE DEPARTMENT.

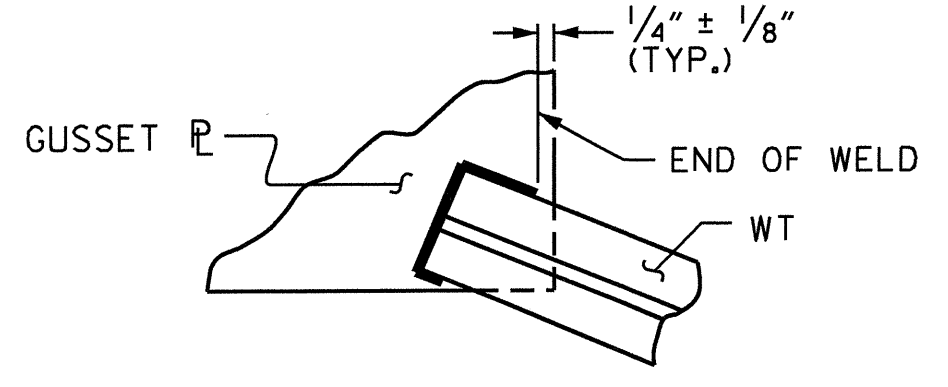
BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE.

FABRICATORS SHALL DETAIL DIAPHRAGM MEMBERS AND CONNECTIONS FOR FULL DEAD LOAD FIT UP. GIRDERS SHALL BE PLUMB AFTER THE FULL AMOUNT OF DEAD LOAD IS APPLIED.

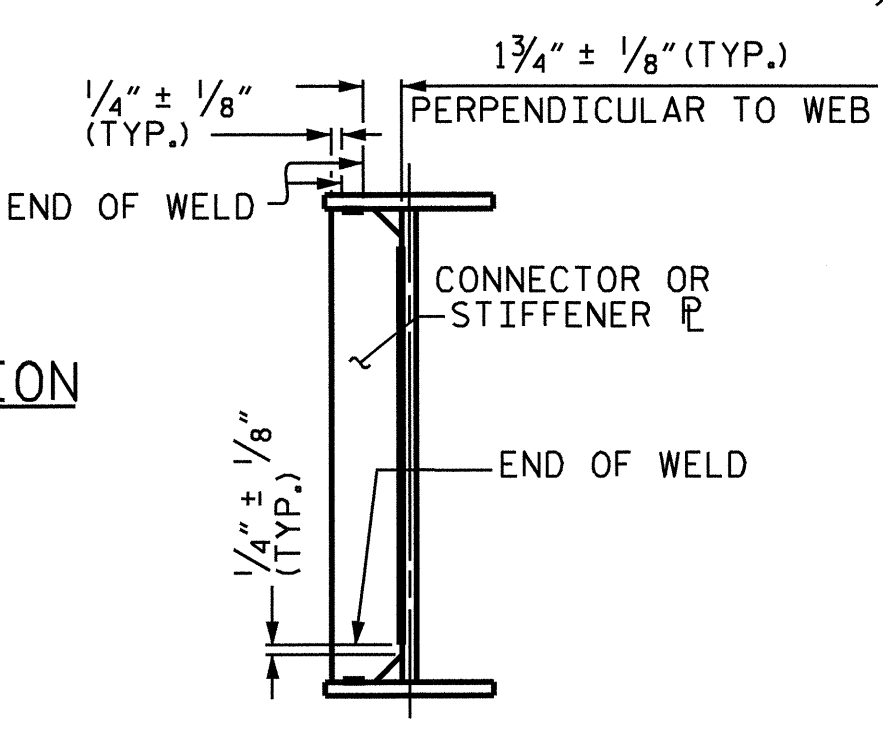
▲ DIRECTION OF FLOW FOR GIRDER 1 & GIRDER 2 IS FROM END BENT No.1 TO END BENT No.2. DIRECTION OF FLOW FOR GIRDER 3 & GIRDER 4 IS FROM END BENT No.2 TO END BENT No.1. DRIP BEADS SHALL BE PLACED AS SHOWN WITH RESPECT TO DIRECTION OF FLOW AT EACH END OF THE GIRDER.



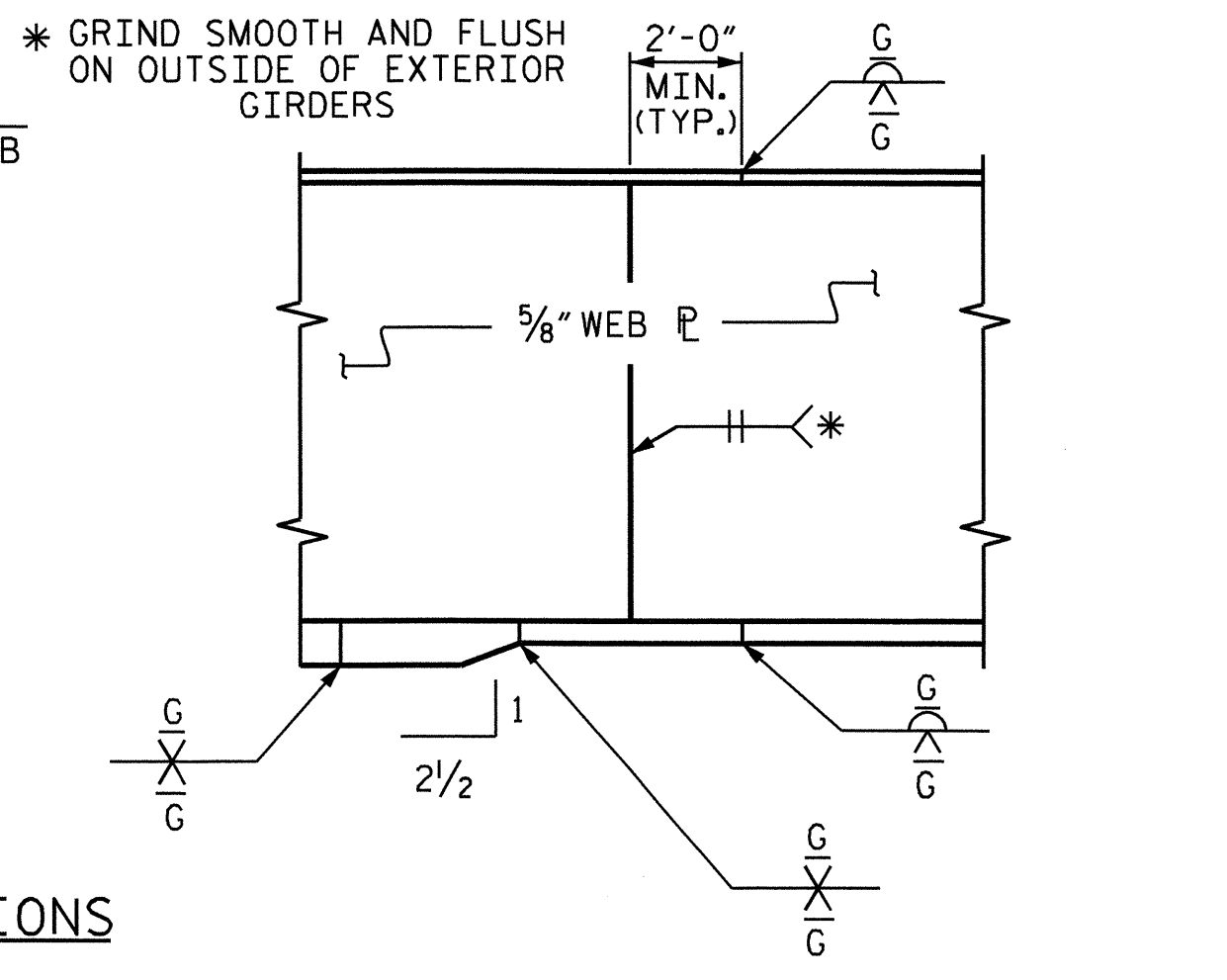
TYPICAL GUSSET PLATE CONNECTION



TYPICAL "TEE" TO GUSSET PLATE CONNECTION



TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS



PERMISSIBLE SHOP FLANGE & WEB SPLICE

WELD TERMINATION DETAILS

DRAWN BY : D. G. ELY DATE : 02/11  
 CHECKED BY : T. M. GARRISON DATE : 02/11

30-AUG-2011 10:47  
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PROJECT NO. B-4416  
 BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 STRUCTURAL STEEL  
 DETAILS



REVISIONS						SHEET NO. S-10
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 28
2			4			



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 AND THE 4" Ø X 1'-6 1/4" STANDARD PIPE ASSEMBLY SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.

FOR PAINTED STRUCTURAL STEEL (EXCLUDING AASHTO M270 GRADE 50W), SOLE PLATES, 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.

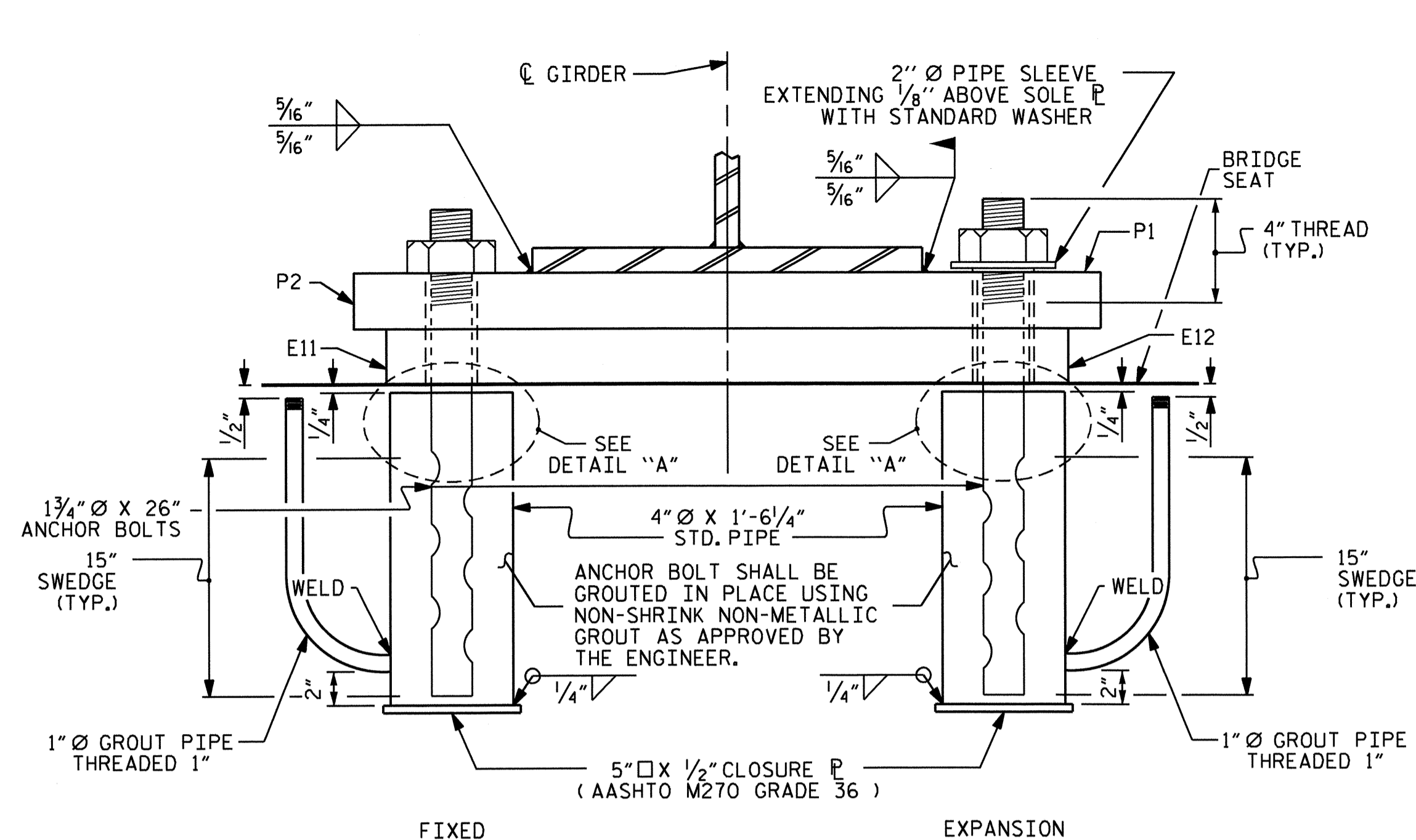
THE CLOSURE PLATE, GROUT PIPE AND STANDARD PIPE FOR THE EXPANSION ASSEMBLY NEED NOT BE GALVANIZED.

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:

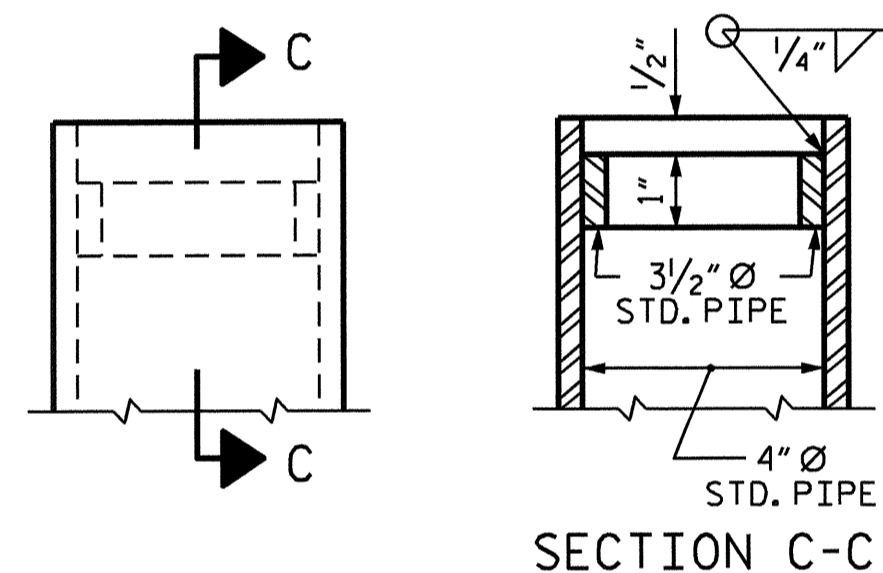
- ONCE THE DECK HAS CURED, THE GIRDERS SHALL BE JACKED THEN THE ANCHOR BOLTS AND ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60° F (16° C).
- AFTER CENTERING THE ELASTOMERIC BEARING SLOTS AND ANCHOR BOLTS, THE ANCHOR BOLTS SHALL BE GROUTED.

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

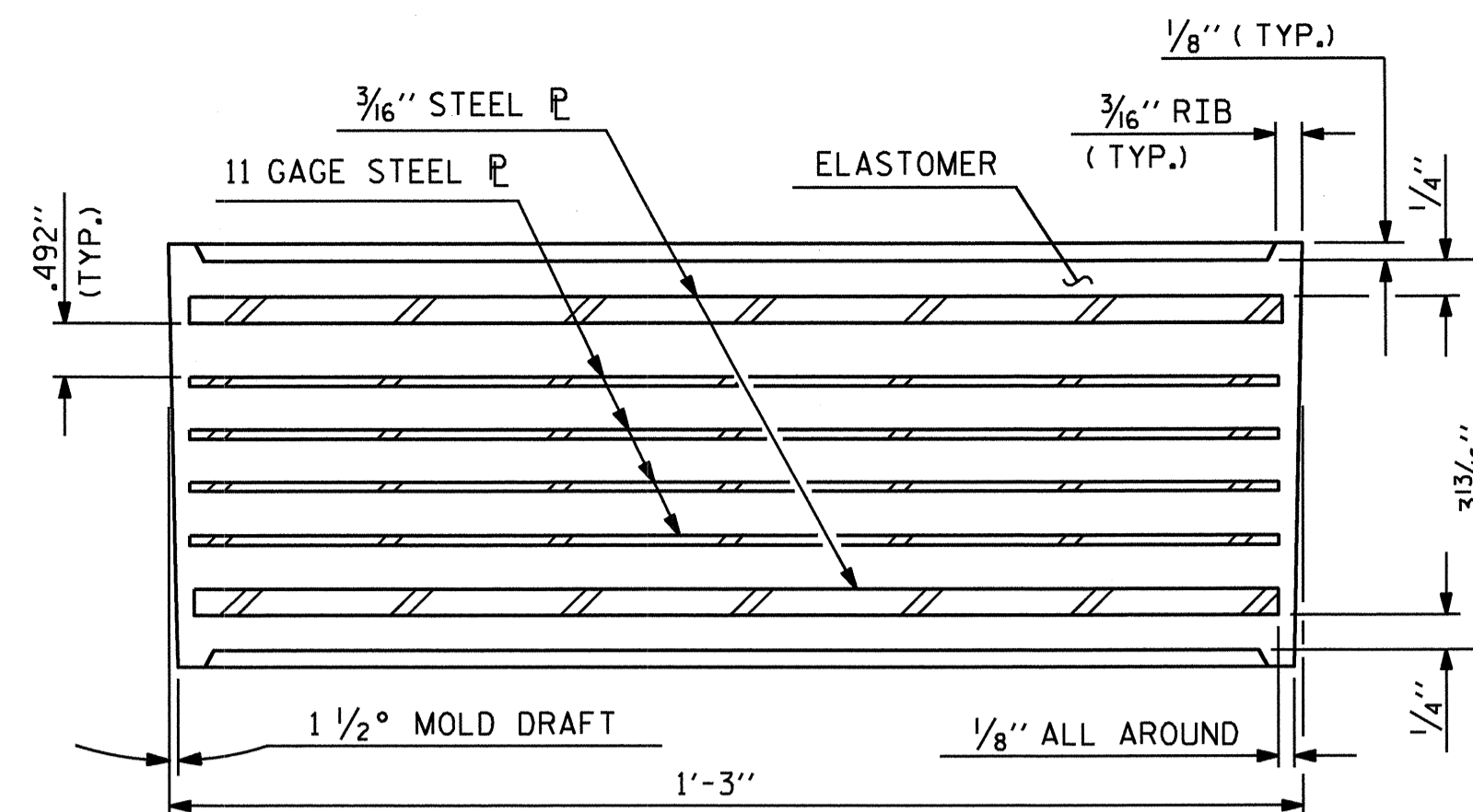
ELASTOMER IN ALL BEARING PADS SHALL BE 60 DUROMETER HARDNESS.



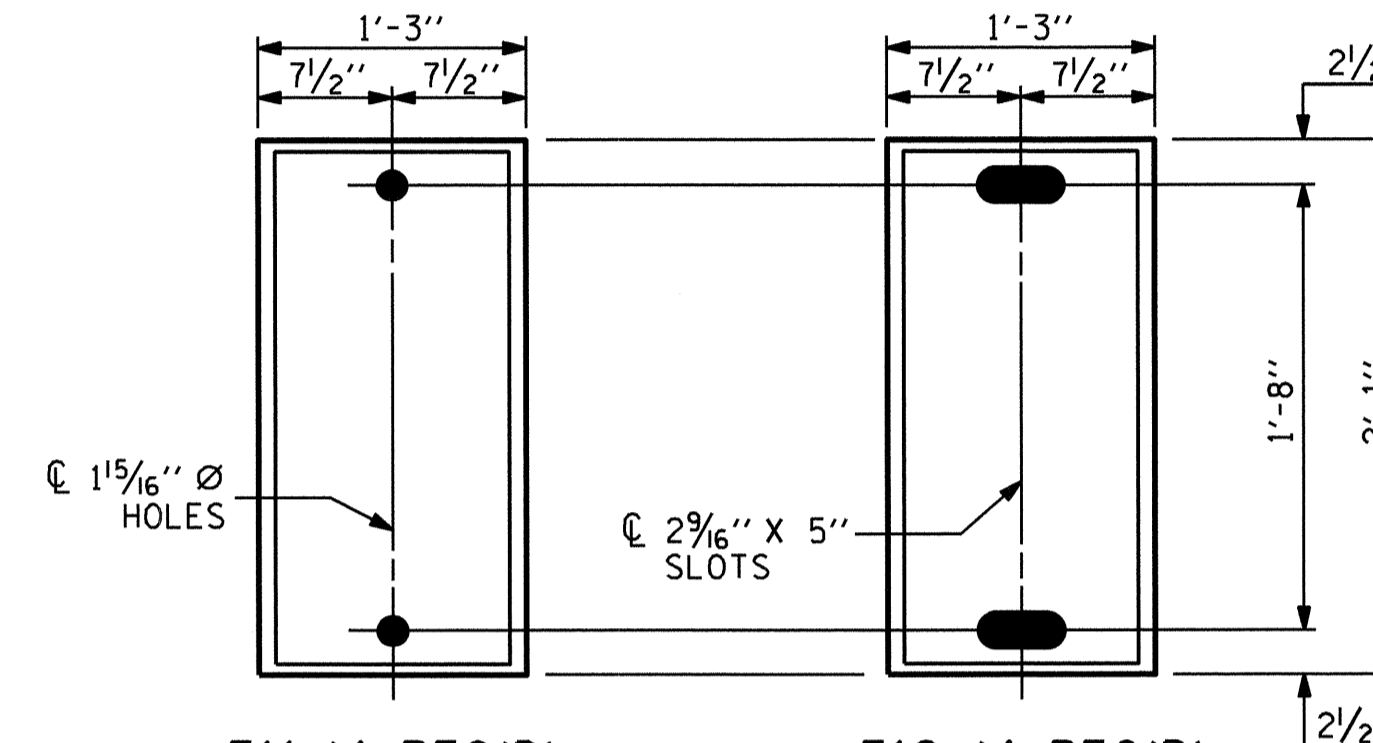
END VIEW



DETAIL "A"

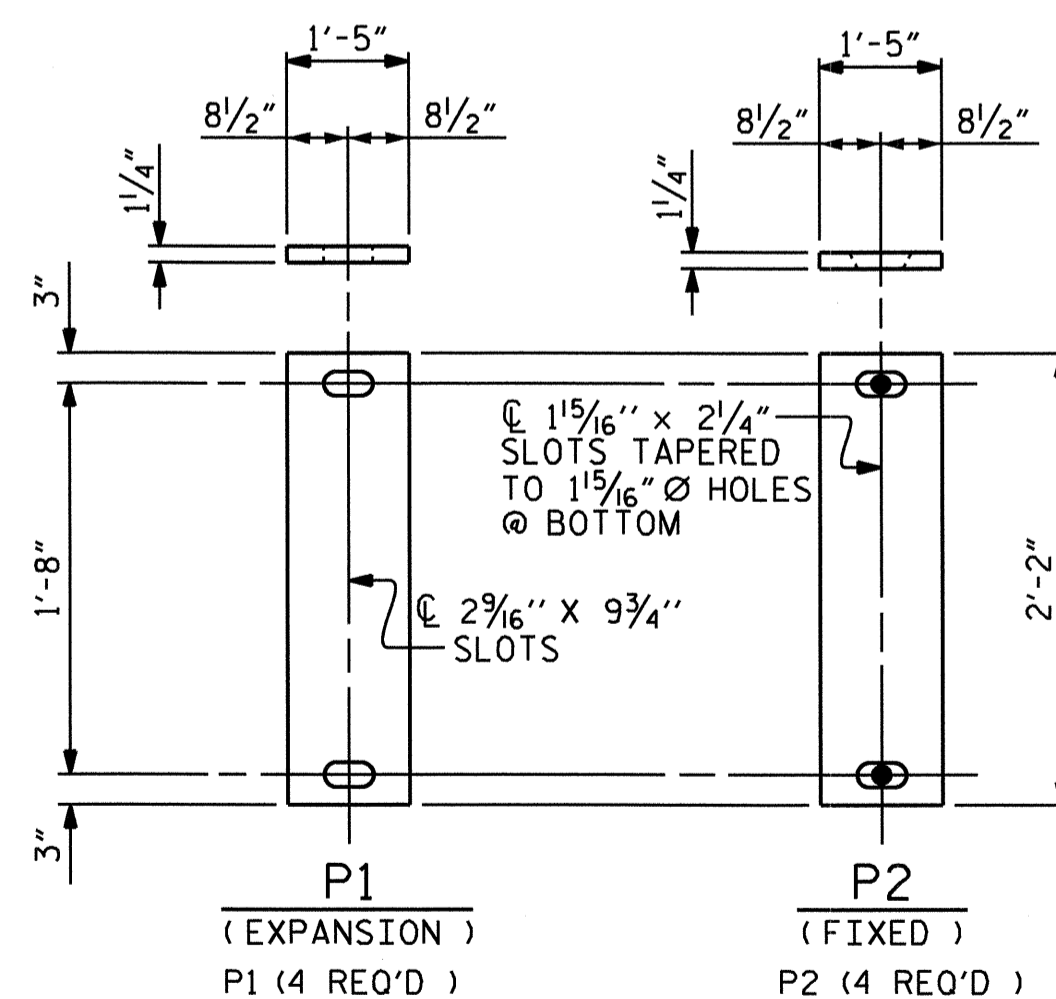


TYPICAL SECTION OF ELASTOMERIC BEARING



PLAN VIEW OF ELASTOMERIC BEARING

TYPE VI  
(60 DUROMETER HARDNESS)



SOLE PLATE DETAILS ("P")

-LOAD RATINGS-	
	MAX.D.L.+ L.L.
TYPE VI	352 k

PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-12
STANDARD ELASTOMERIC BEARING DETAILS (STEEL SUPERSTRUCTURE)						
REVISIONS						TOTAL SHEETS 28
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

ASSEMBLED BY : D. G. ELY	DATE : 09/09
CHECKED BY : T. M. GARRISON	DATE : 10/09
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

**DEAD LOAD DEFLECTION TABLE FOR GIRDERS**

TWENTIETH POINTS	GIRDERS #1 THRU #4																				
	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	0.032	0.063	0.092	0.119	0.142	0.161	0.176	0.187	0.194	0.197	0.194	0.187	0.176	0.161	0.142	0.119	0.092	0.063	0.032	0
* DEFLECTION DUE TO WEIGHT OF SLAB ↓	0	0.079	0.162	0.241	0.312	0.374	0.426	0.467	0.497	0.516	0.522	0.516	0.497	0.467	0.426	0.374	0.312	0.241	0.162	0.079	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL ↓	0	0.010	0.019	0.028	0.036	0.043	0.049	0.053	0.057	0.059	0.059	0.059	0.057	0.053	0.049	0.043	0.036	0.028	0.019	0.010	0
TOTAL DEAD LOAD DEFLECTION ↓	0	0.121	0.244	0.361	0.467	0.559	0.636	0.696	0.741	0.769	0.778	0.769	0.741	0.696	0.636	0.559	0.467	0.361	0.244	0.121	0
VERTICAL CURVE ORDINATE ↑	0	0.130	0.247	0.350	0.439	0.514	0.576	0.624	0.658	0.679	0.685	0.679	0.658	0.624	0.576	0.514	0.439	0.350	0.247	0.130	0
REQUIRED CAMBER ↑	0	3"	5 <sup>7</sup> / <sub>8</sub> "	8 <sup>9</sup> / <sub>16</sub> "	10 <sup>7</sup> / <sub>8</sub> "	12 <sup>7</sup> / <sub>8</sub> "	14 <sup>9</sup> / <sub>16</sub> "	15 <sup>13</sup> / <sub>16</sub> "	16 <sup>13</sup> / <sub>16</sub> "	17 <sup>3</sup> / <sub>8</sub> "	17 <sup>9</sup> / <sub>16</sub> "	17 <sup>3</sup> / <sub>8</sub> "	16 <sup>13</sup> / <sub>16</sub> "	15 <sup>13</sup> / <sub>16</sub> "	14 <sup>9</sup> / <sub>16</sub> "	12 <sup>7</sup> / <sub>8</sub> "	10 <sup>7</sup> / <sub>8</sub> "	8 <sup>9</sup> / <sub>16</sub> "	5 <sup>7</sup> / <sub>8</sub> "	3"	0

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

PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

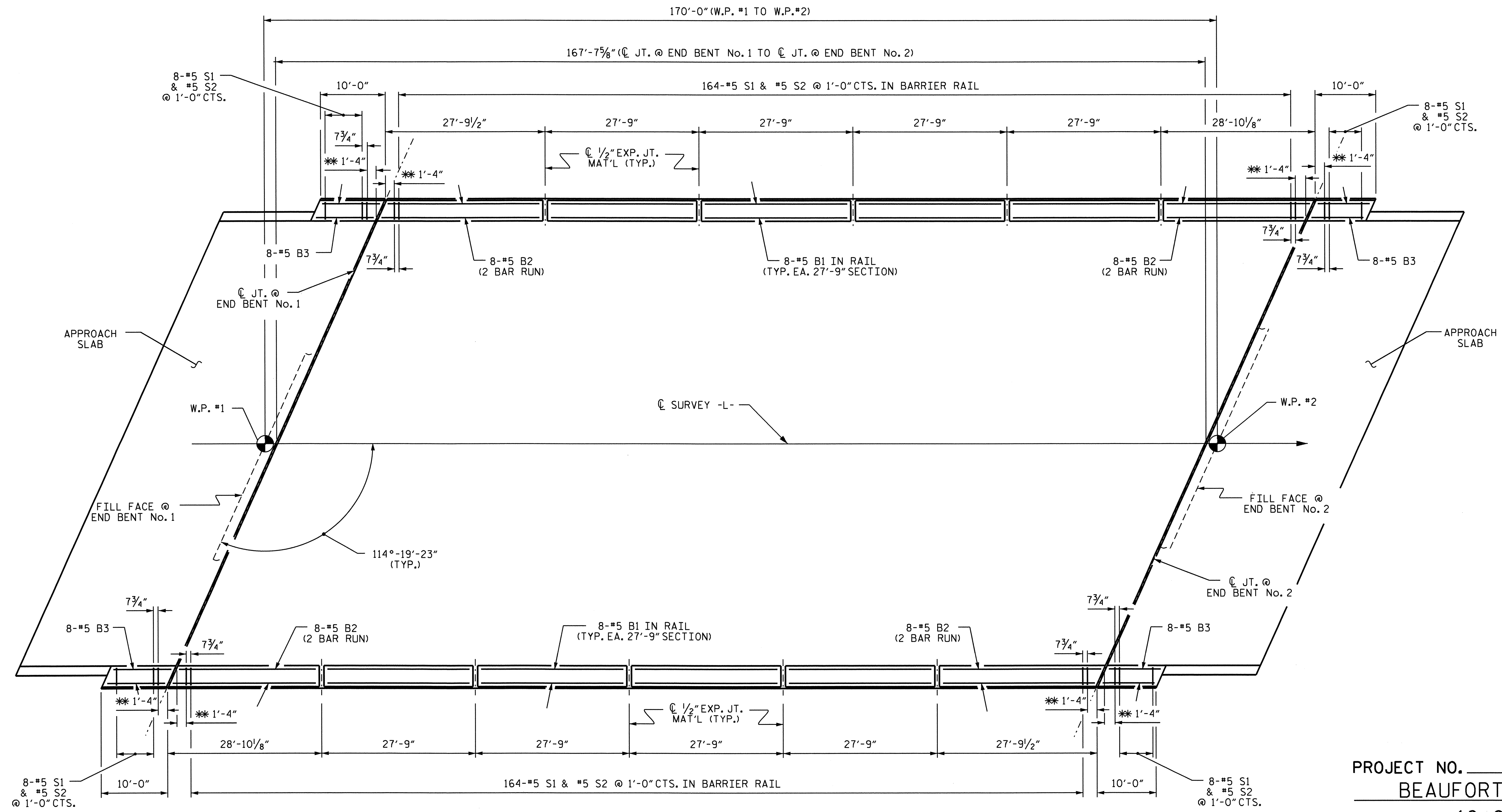


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 DEAD LOAD  
 DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS 28
2			4			

DRAWN BY : D. G. ELY DATE : 09/09  
 CHECKED BY : J. M. GARRISON DATE : 10/09

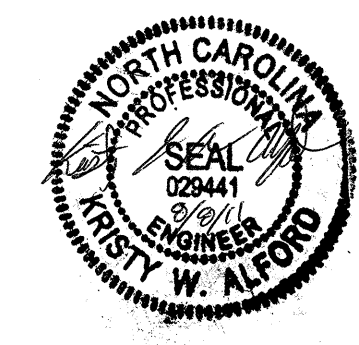


PLAN OF BARRIER RAIL

\*\* SEE "END OF RAIL DETAILS - PLAN VIEW" ON SHEET 2 OF 2 FOR ADDITIONAL REINFORCING STEEL.  
 EXPANSION JOINT SEALS ARE NOT SHOWN FOR CLARITY.  
 DIMENSIONS ARE SHOWN FROM C/J JOINT AT BACK FACE OF BARRIER RAIL.

PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 CONCRETE  
 BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			28

DRAWN BY : D. G. ELY DATE : 02/11  
 CHECKED BY : I. M. GARRISON DATE : 02/11

**NOTES**

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

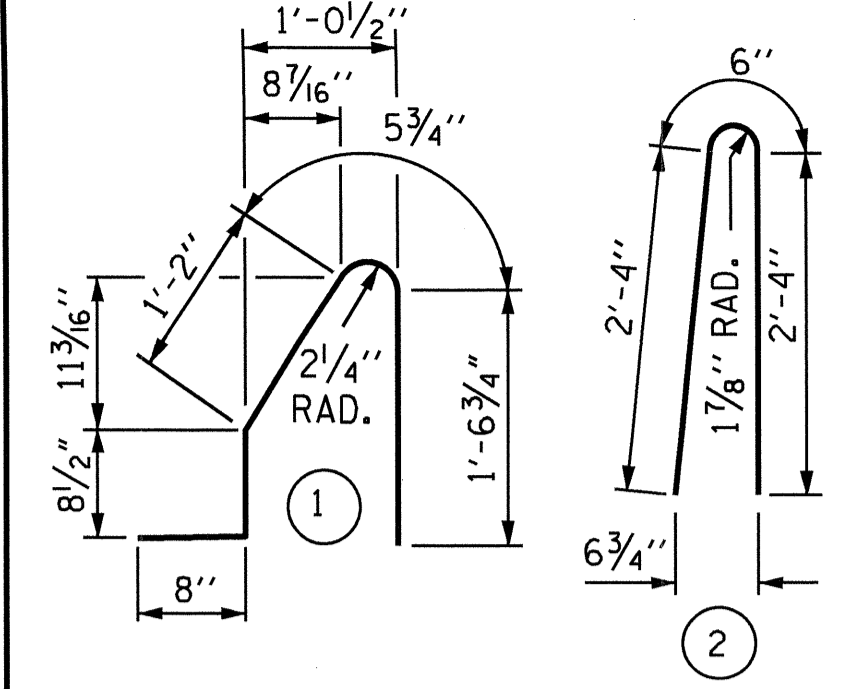
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

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

B3 BARS IN BARRIER RAIL TO BE FIELD CUT AS REQUIRED TO MAINTAIN 2" CLEAR TO THE BLOCKOUT.

**BAR TYPES**

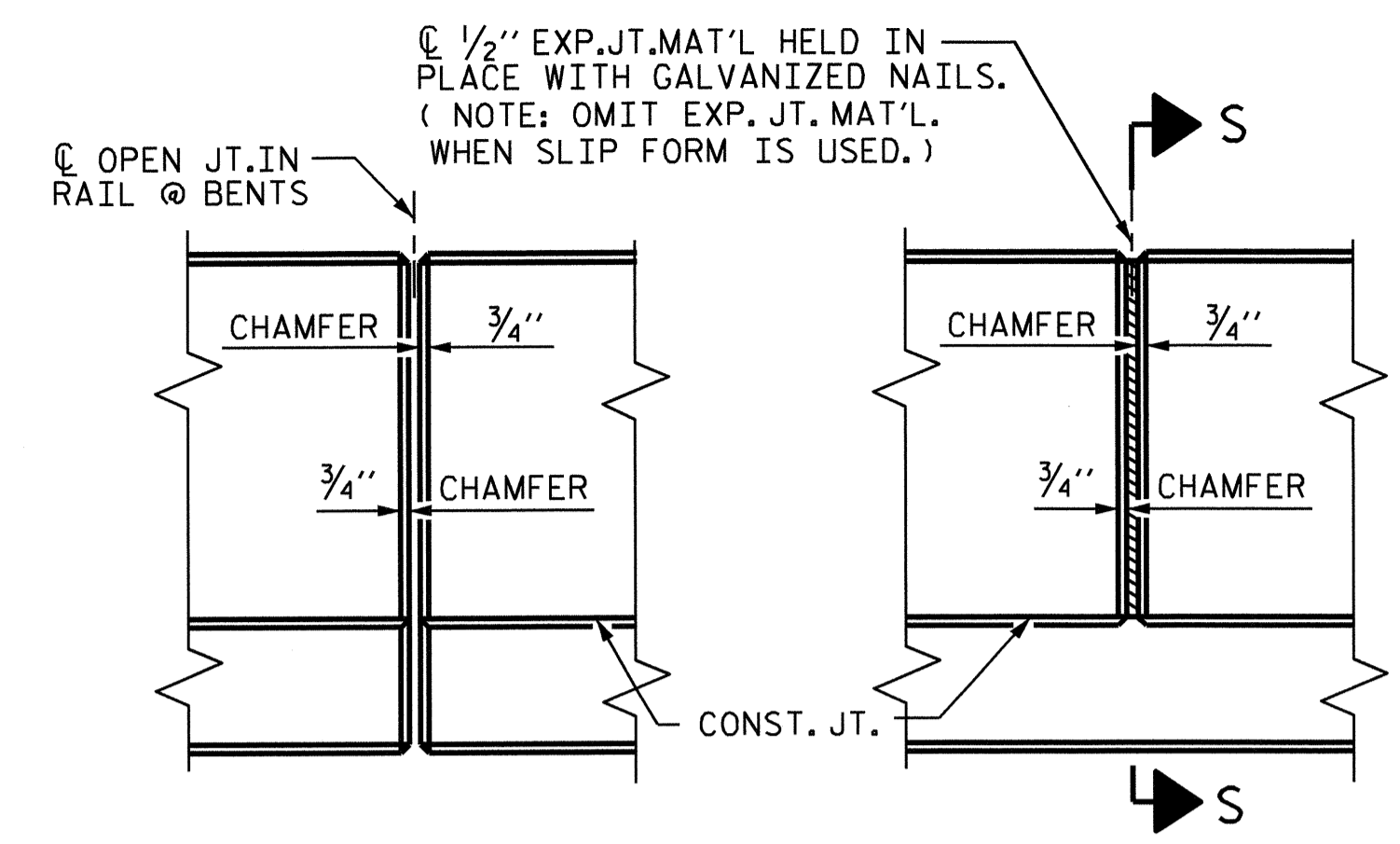


ALL BAR DIMENSIONS ARE OUT TO OUT

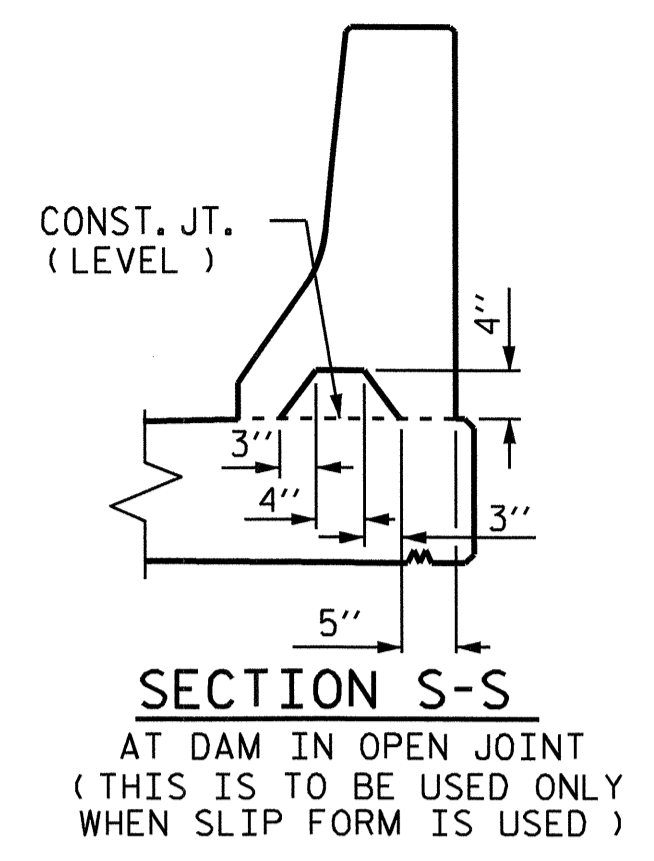
**BILL OF MATERIAL**

FOR CONCRETE BARRIER RAIL ONLY

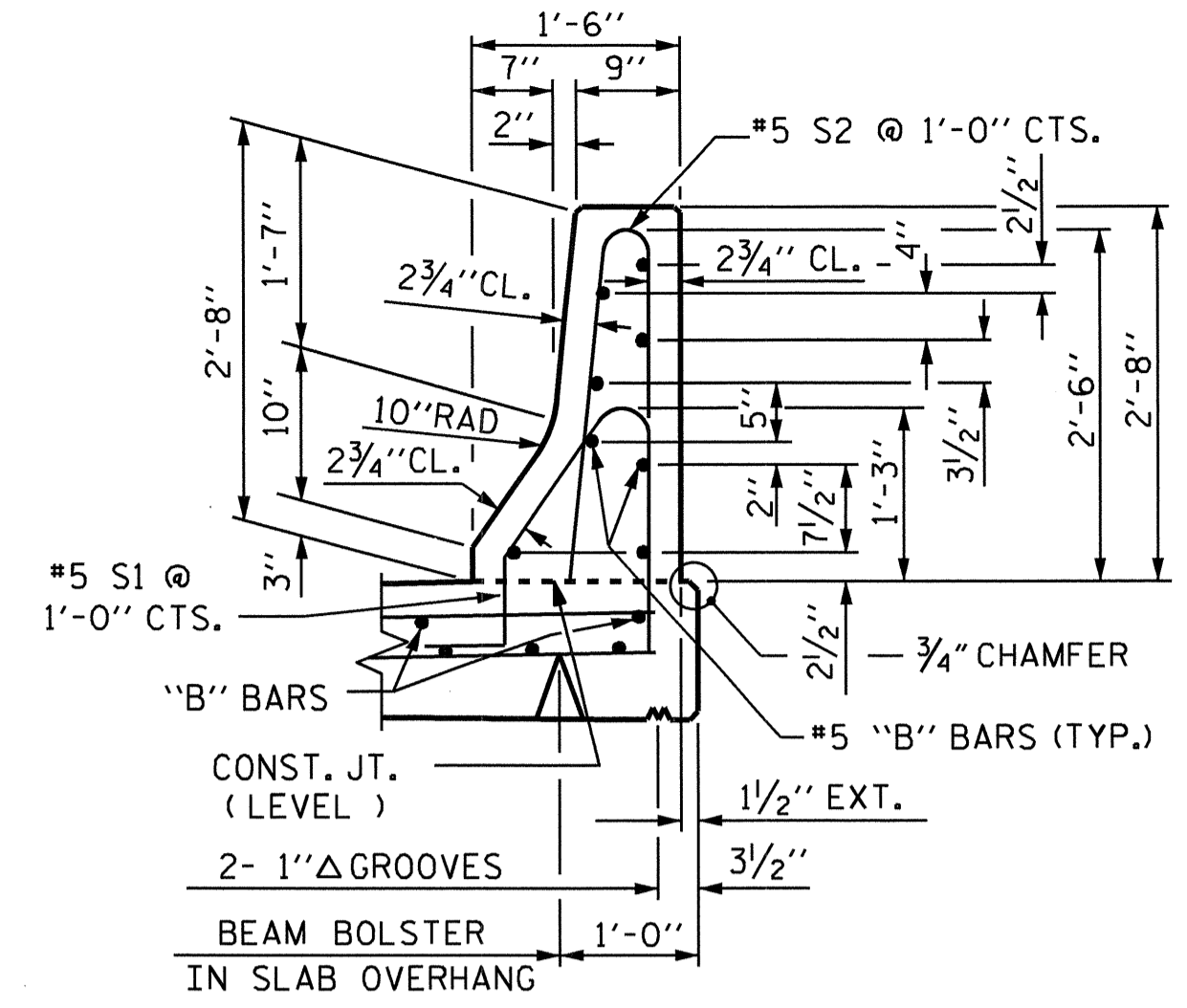
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	64	#5	STR	27'-4"	1825
* B2	64	#5	STR	15'-9"	1051
* B3	32	#5	STR	9'-6"	317
* S1	368	#5	1	4'-7"	1759
* S2	368	#5	2	5'-2"	1983
* S3	32	#5	STR	3'-2"	106
* EPOXY COATED REINFORCING STEEL				7041	LBS.
CLASS AA CONCRETE				37.6	CU. YDS.
CONCRETE BARRIER RAIL				375.27	LN. FT.



**ELEVATION AT EXPANSION JOINTS**

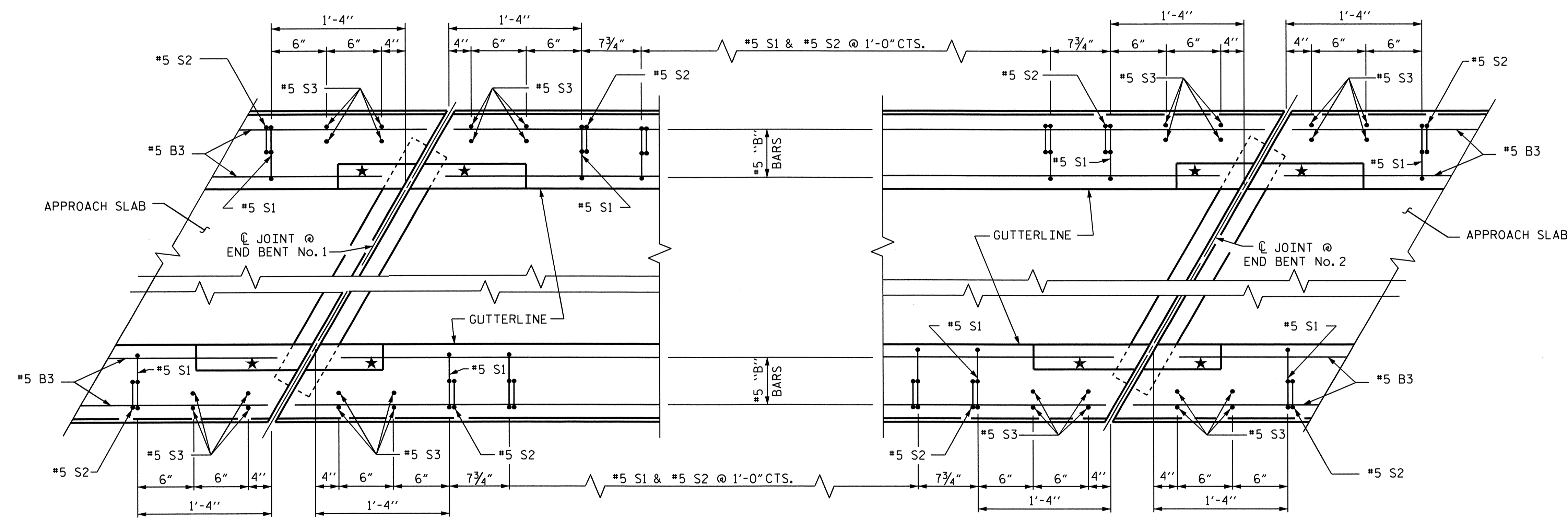


**SECTION S-S**  
AT DAM IN OPEN JOINT  
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



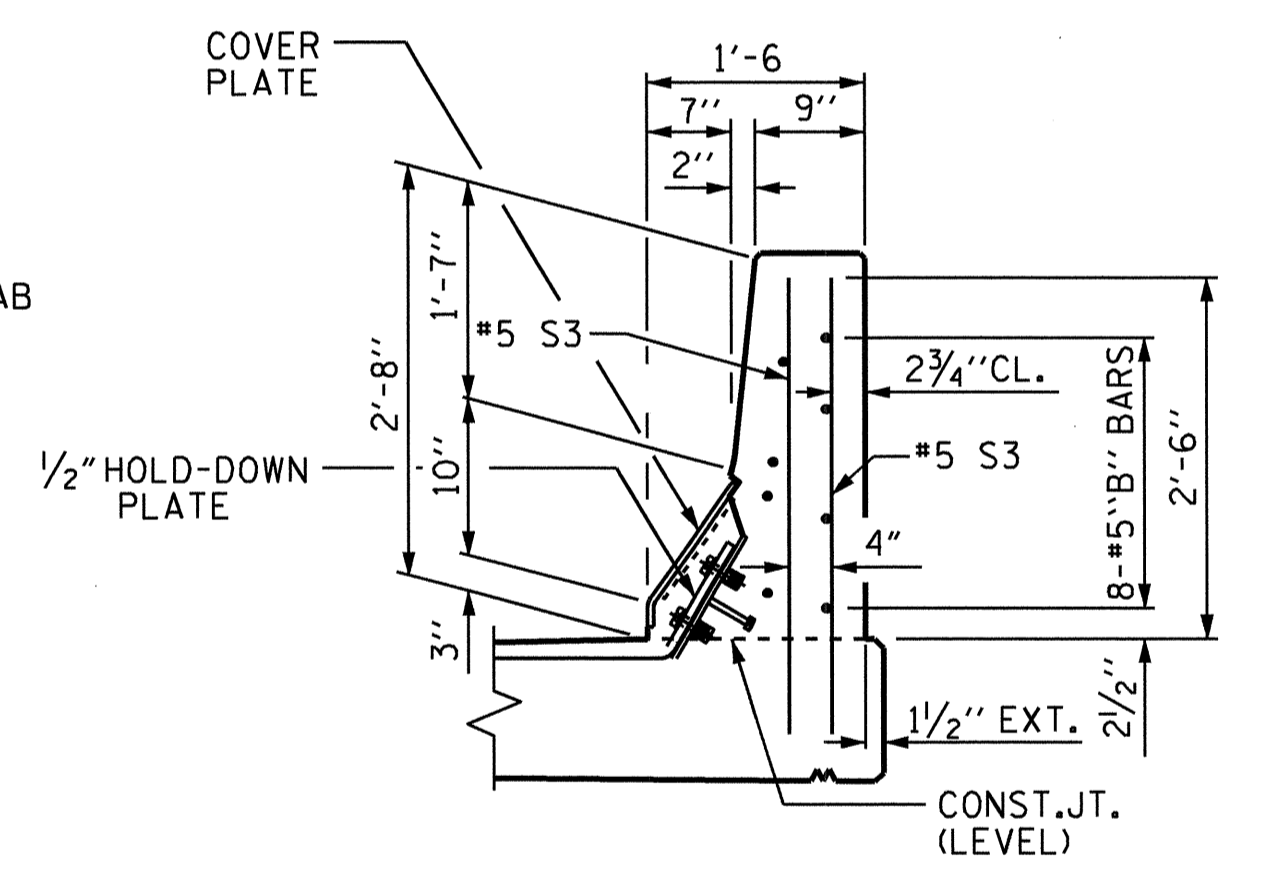
**SECTION THRU RAIL**

**BARRIER RAIL DETAILS**



**PLAN @ END BENT No. 1**

**PLAN @ END BENT No. 2**



**END VIEW @ JOINT**

**END OF RAIL DETAILS**

★ FOR RECESS DETAILS SEE "EXPANSION JOINT SEAL DETAILS" SHEET

PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-  
 SHEET 2 OF 2



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SUPERSTRUCTURE**  
**CONCRETE**  
**BARRIER RAIL**

ASSEMBLED BY : D. G. ELY	DATE : 02/11
CHECKED BY : T. M. GARRISON	DATE : 02/11
DRAWN BY : ARB 5/87	REV. 10/17/00 RWW/LES
CHECKED BY : SJD 9/87	REV. 5/17/03R RWW/JTE
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO. S-15
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 28
2			4			



NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

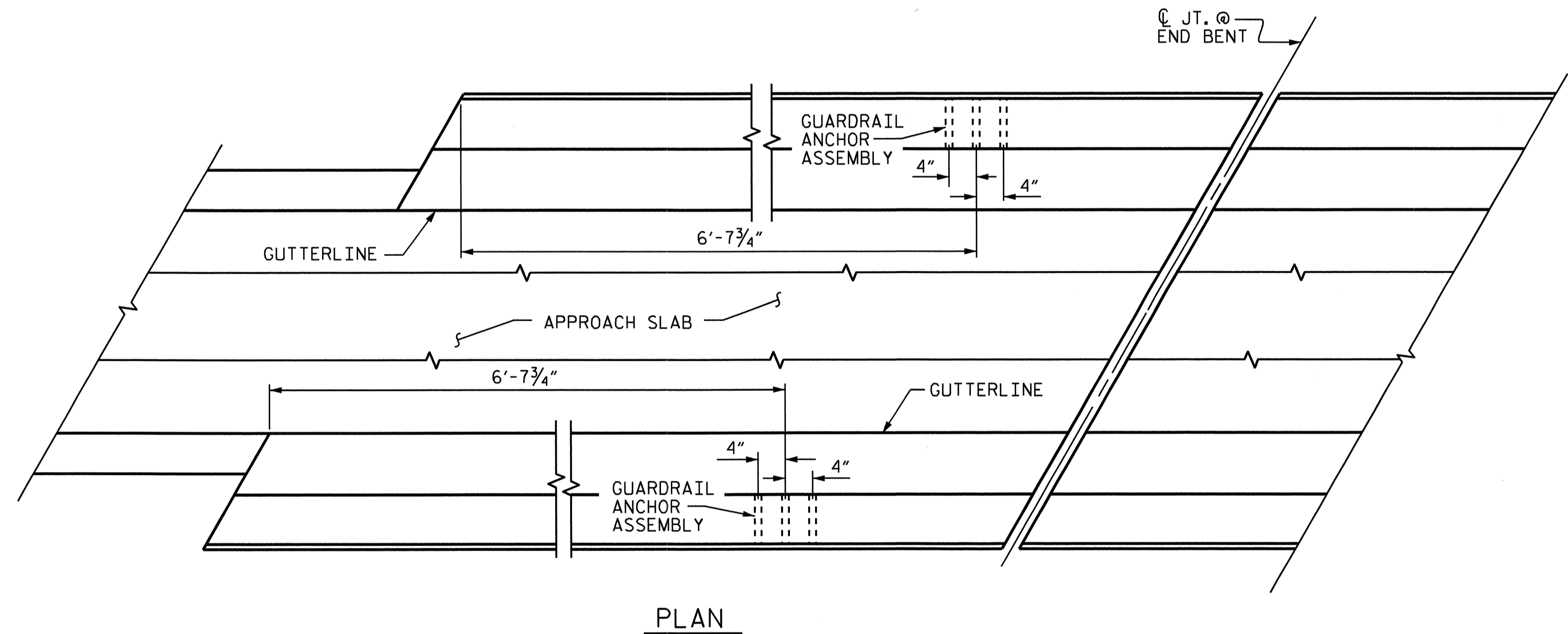
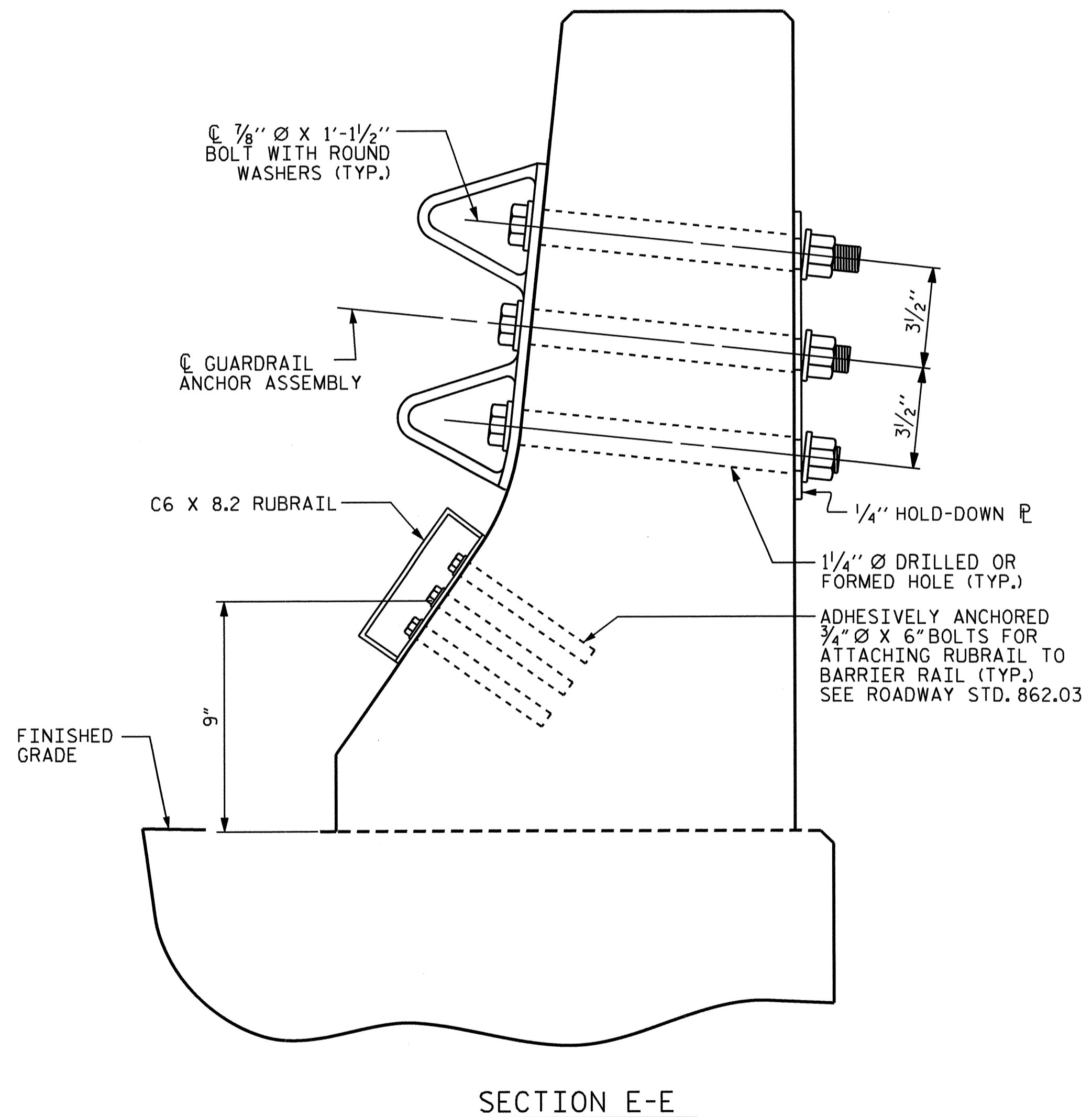
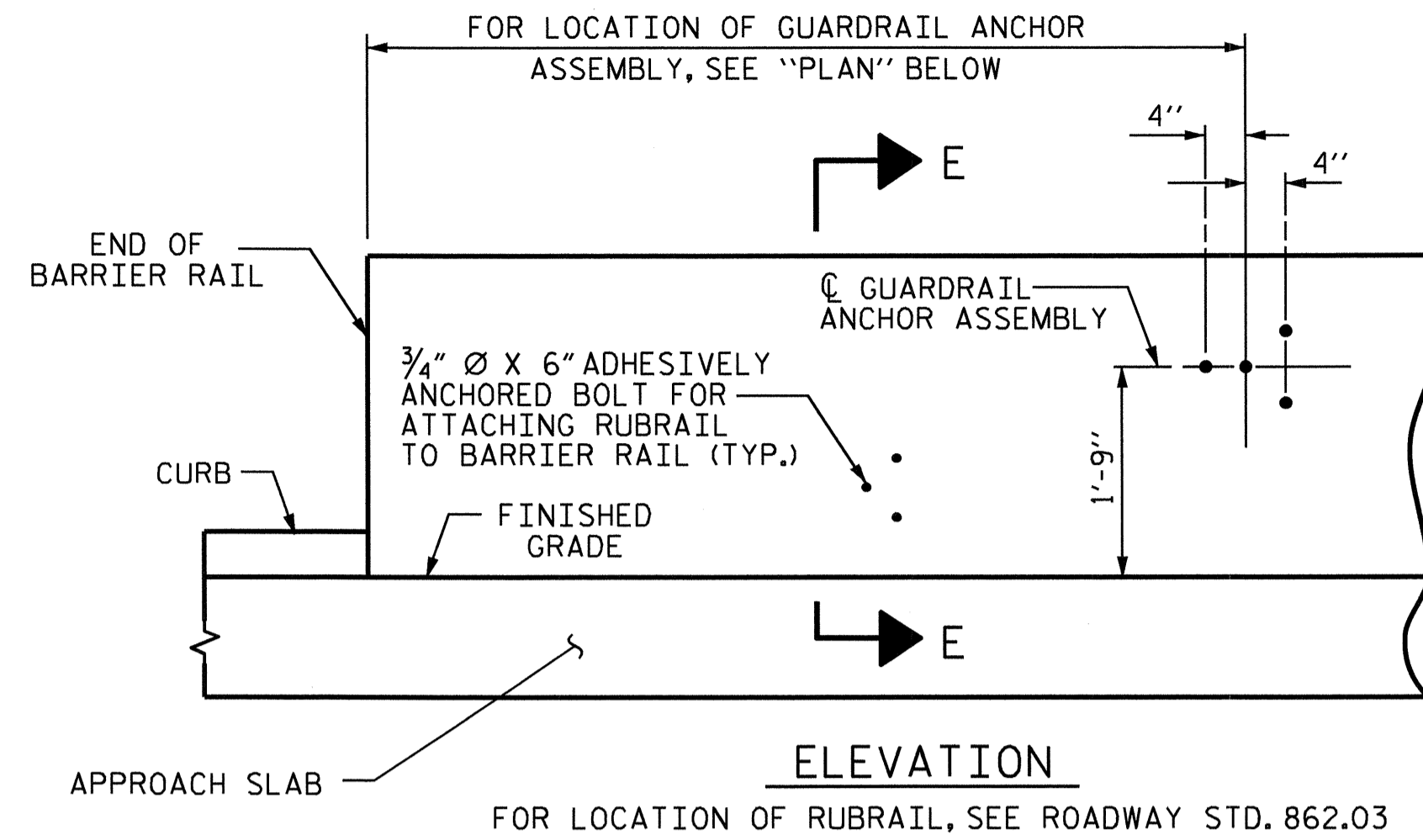
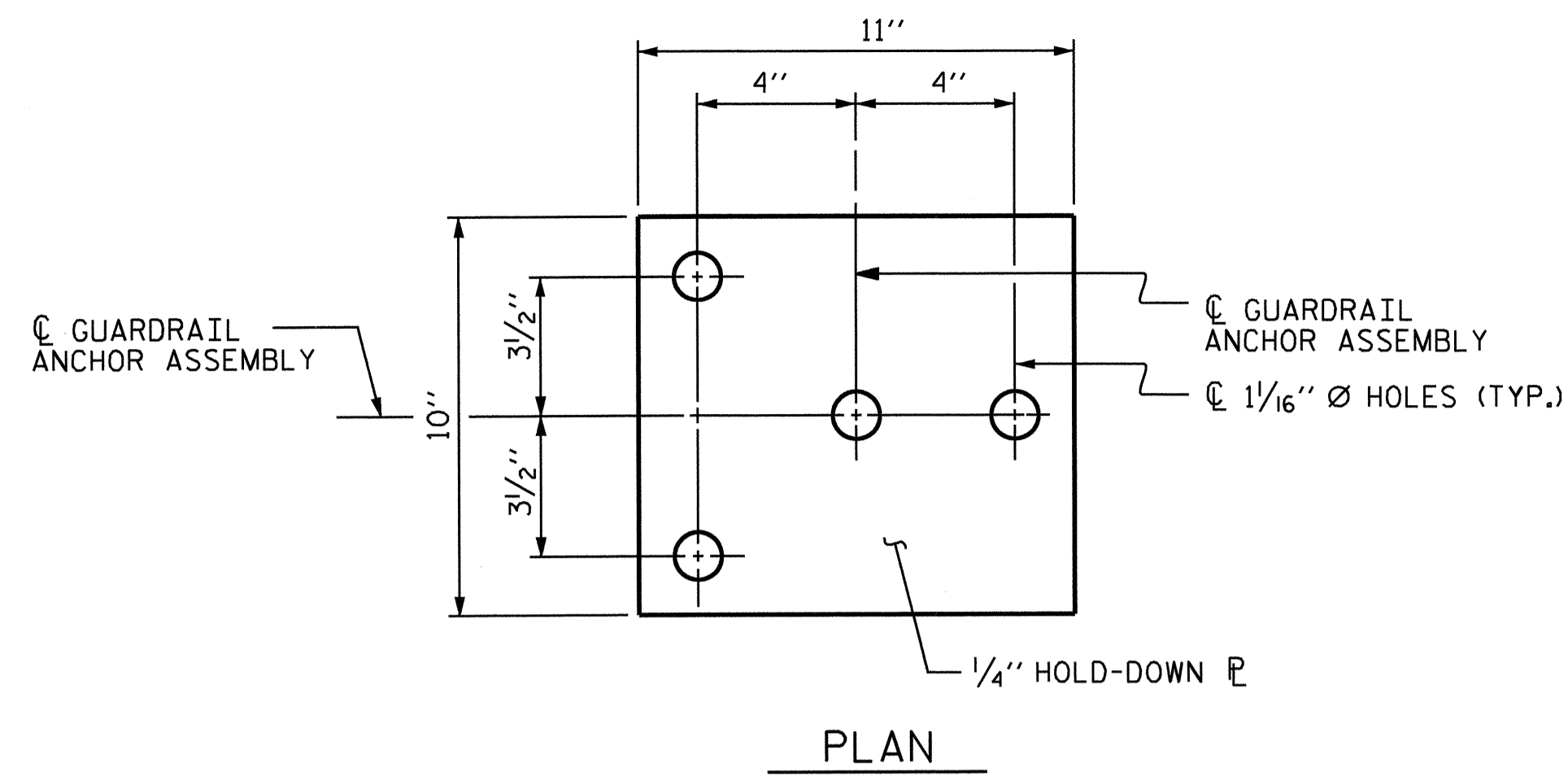
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

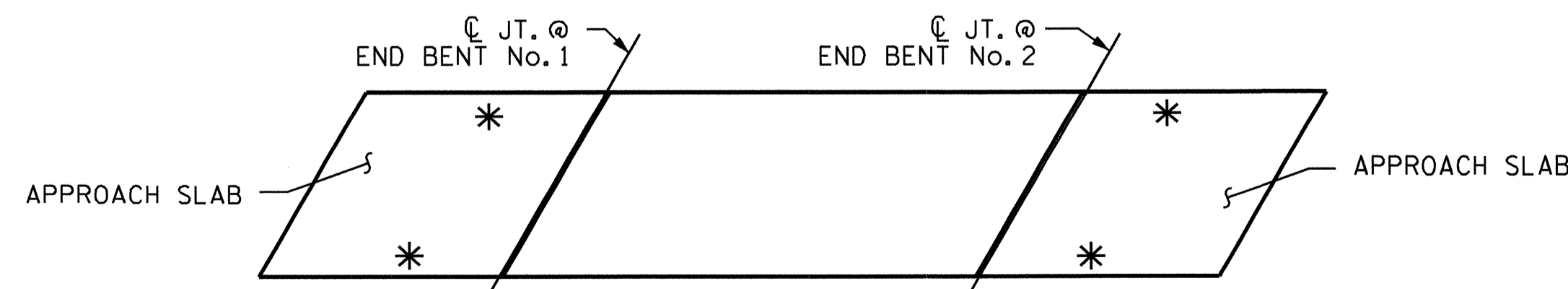
THE 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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



LOCATION OF ANCHORS FOR GUARDRAIL

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



SKETCH SHOWING POINTS OF ATTACHMENTS

\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

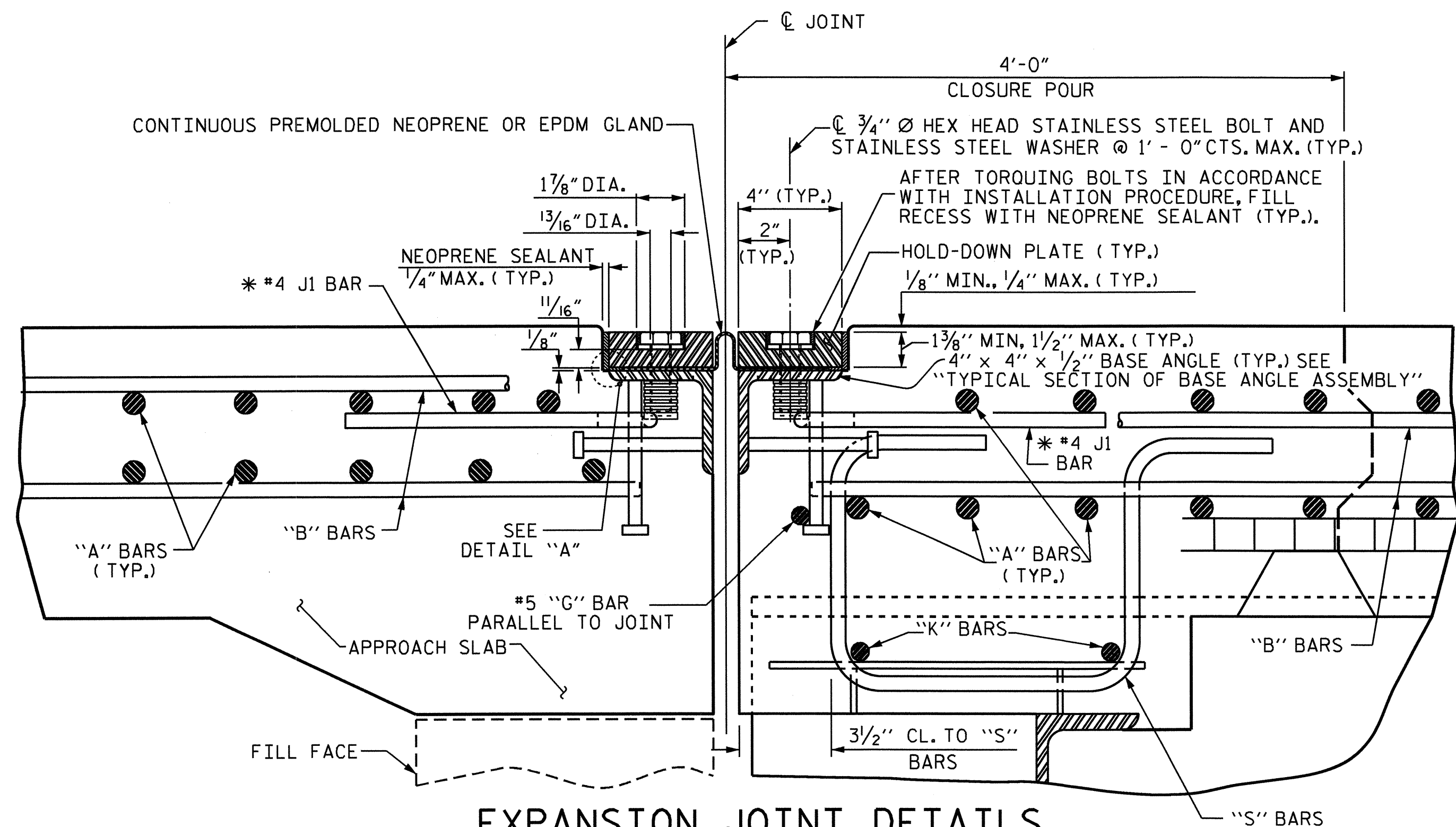
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 GUARDRAIL ANCHORAGE  
 FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-16
1			3			TOTAL SHEETS
2			4			28



ASSEMBLED BY : D. G. ELY DATE : 02/11  
 CHECKED BY : T. M. GARRISON DATE : 02/11  
 DRAWN BY : TLA 5/06  
 CHECKED BY : GM 5/06



**EXPANSION JOINT DETAILS**

SECTION NORMAL TO JOINT -- STEEL SUPERSTRUCTURE

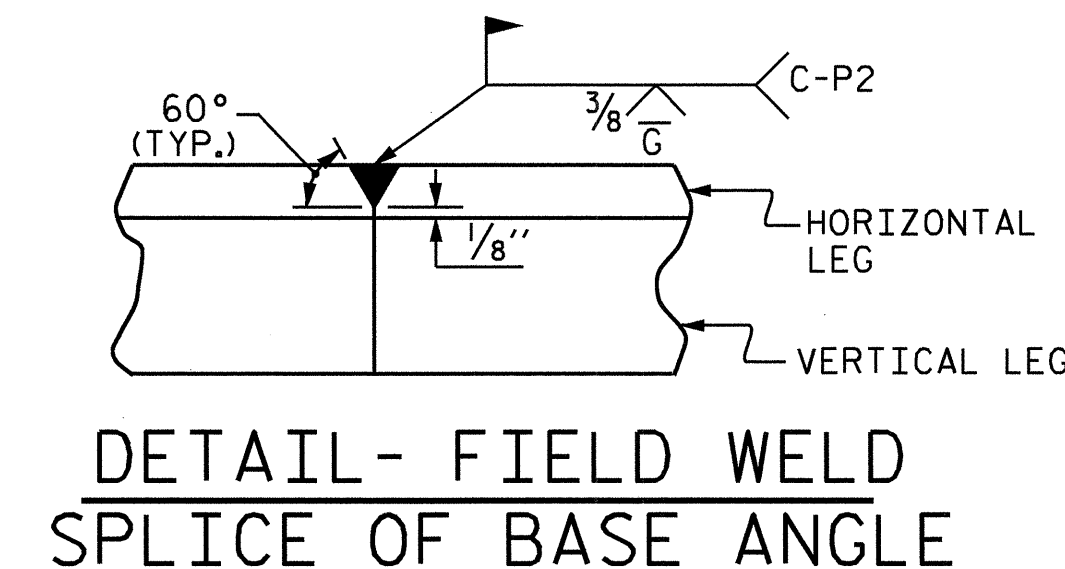
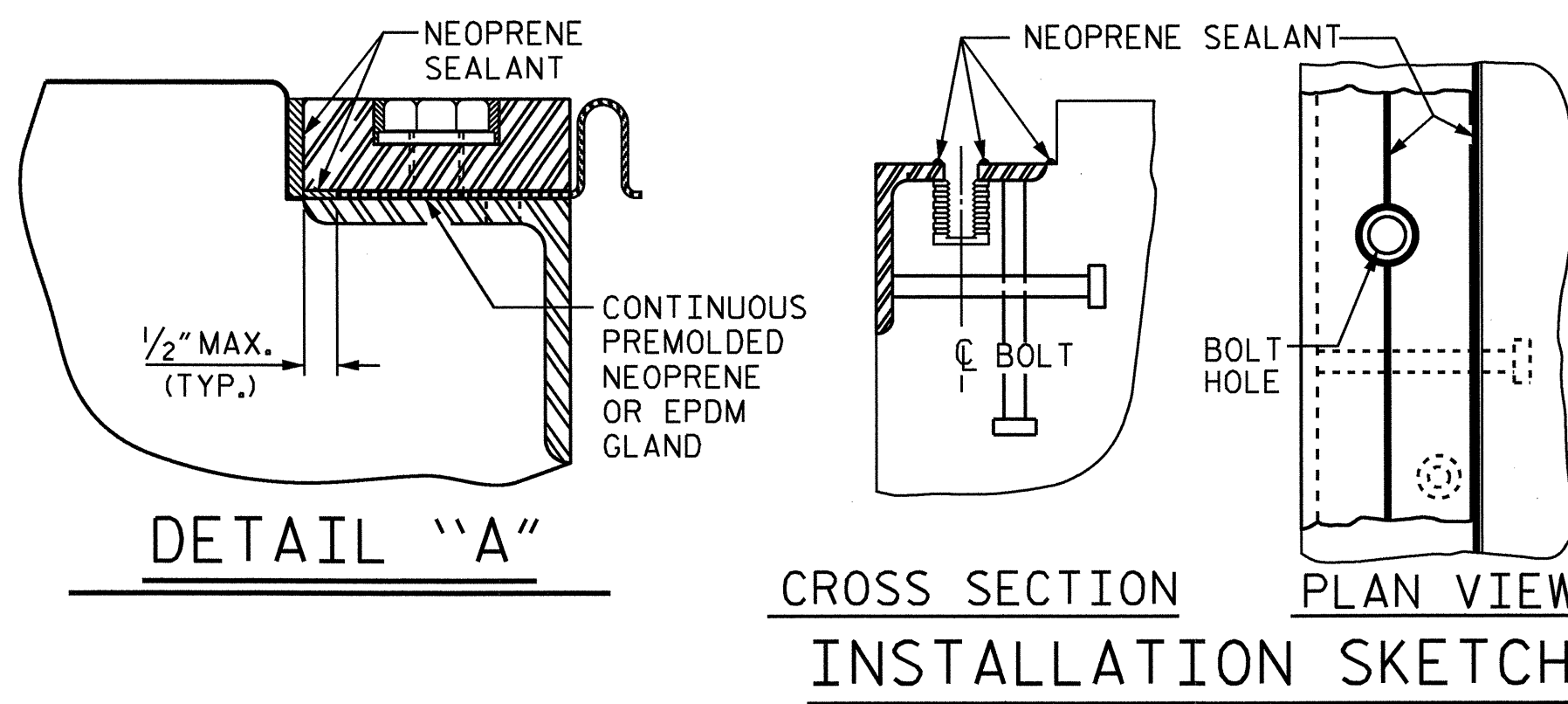
\* THE QUANTITY OF #4 JI BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. JI BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF JI BARS SPECIFIED, ADDITIONAL JI BARS WILL NOT BE REQUIRED.

**INSTALLATION PROCEDURE**

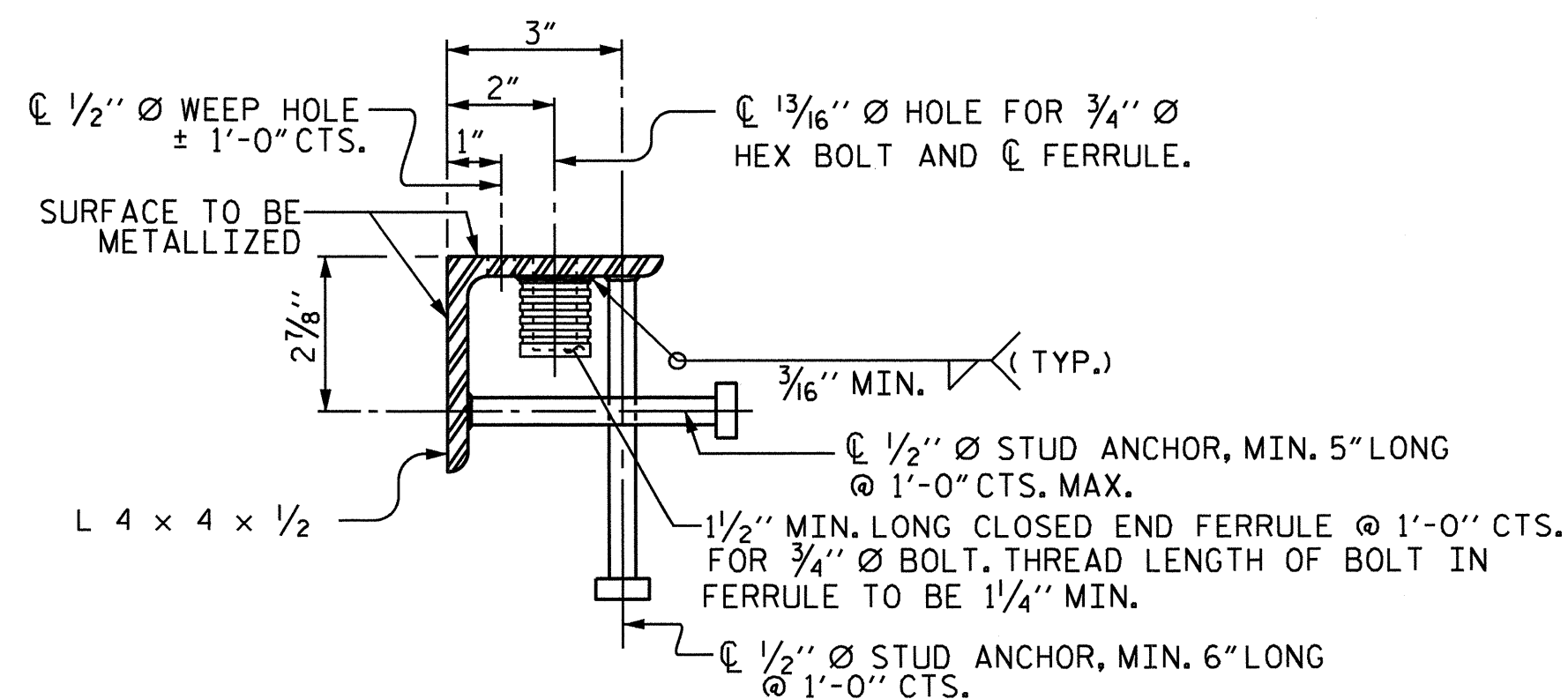
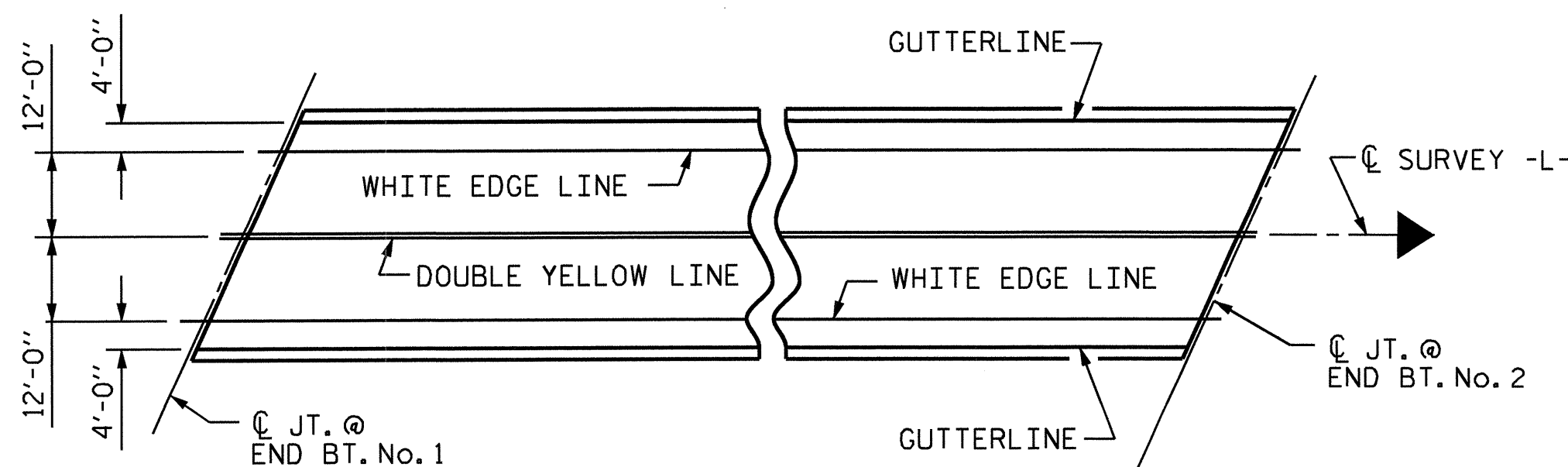
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4 1/8" TO 4 1/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X 1/2" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 1/8" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. THE TORQUE WRENCH SHALL BE CALIBRATED IN ACCORDANCE WITH SECTION 40-B (D) OF THE STANDARD SPECIFICATIONS. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES AND THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, COMPLETELY FILL THESE RECESSES WITH NEOPRENE SEALANT.

**GENERAL NOTES**

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MIN.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED. SEE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
7. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE GROUND SMOOTH AND COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
8. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
9. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
10. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



MOVEMENT AND SETTING AT JOINT					
LOCATION	SKEW ANGLE	TOTAL MOVEMENT (ALONG CL RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
END BENT No. 1	114°-19'-23"	1 3/4"	2"	1 3/16"	1 5/16"
END BENT No. 2	114°-19'-23"	—	1 3/16"	1 3/16"	1 3/16"



PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

SHEET 1 OF 2

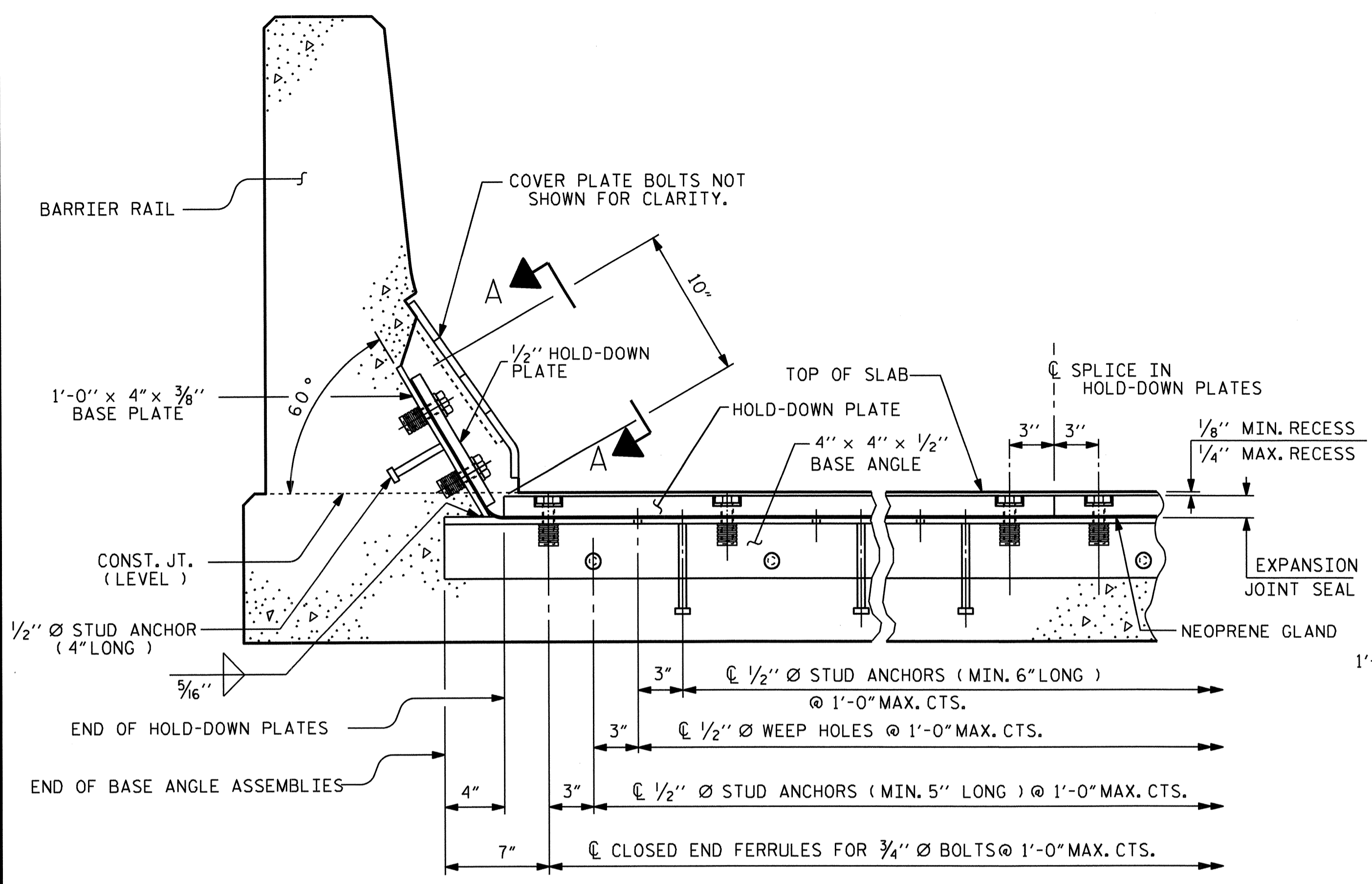
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 EXPANSION JOINT  
 SEAL DETAILS



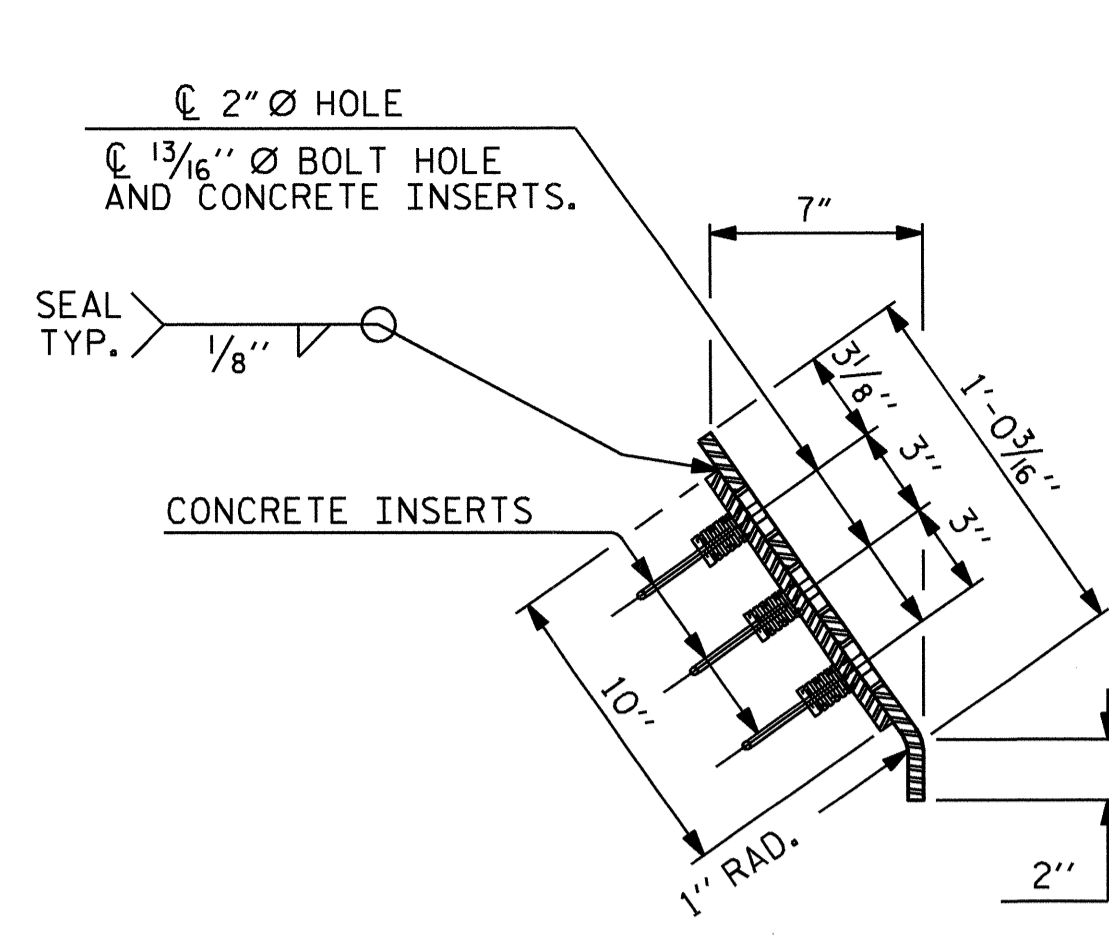
DRAWN BY : D. G. ELY DATE : 02-11  
 CHECKED BY : T. W. GARRISON DATE : 02-11

30-AUG-2011 10:48  
 X:\Structures\SuperstructureDrawings\B4416.SD.EJS.dgn  
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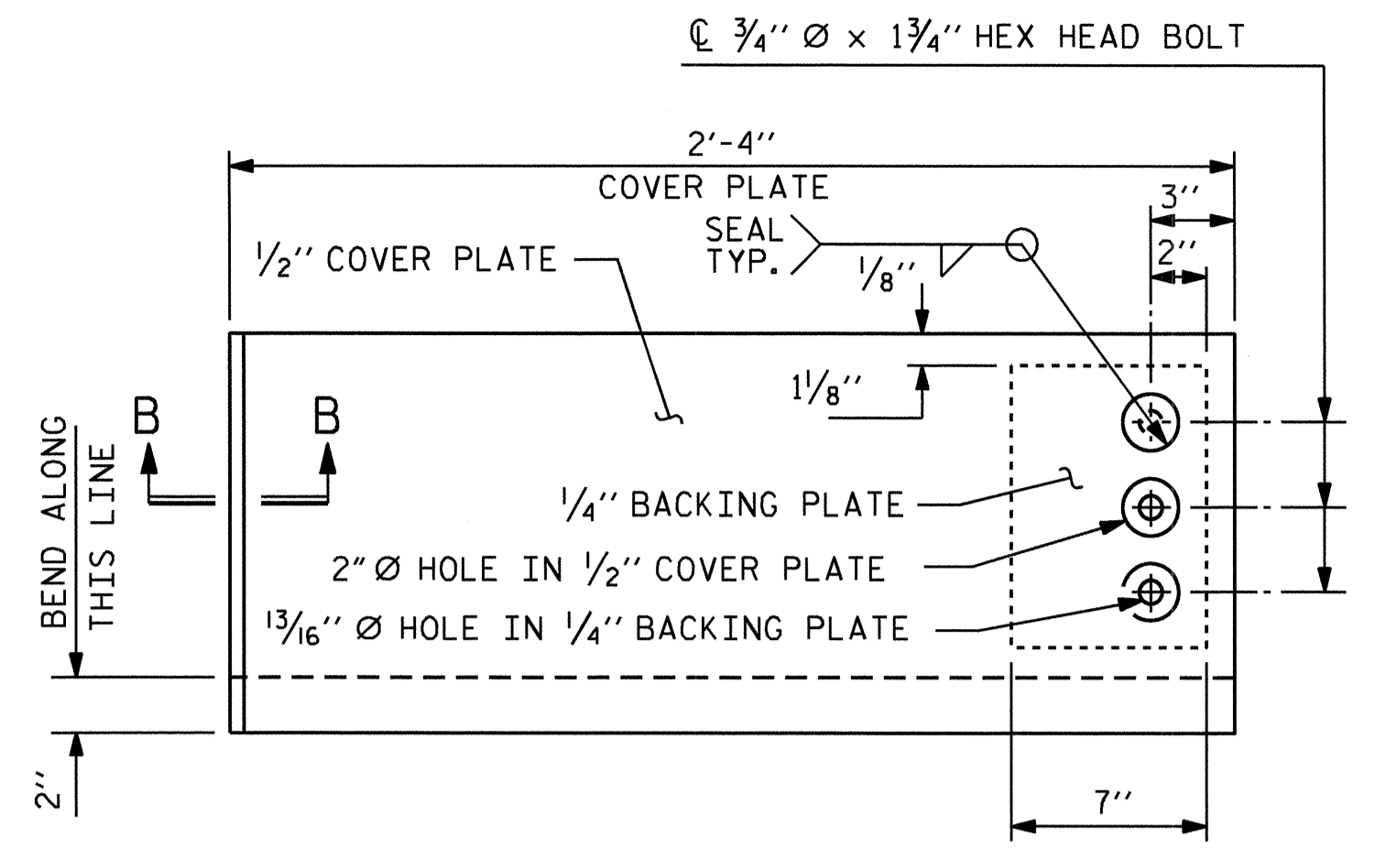
REVISIONS						SHEET NO. S-17
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 28
2			4			



**SECTION THRU RAIL NORMAL TO JOINT**

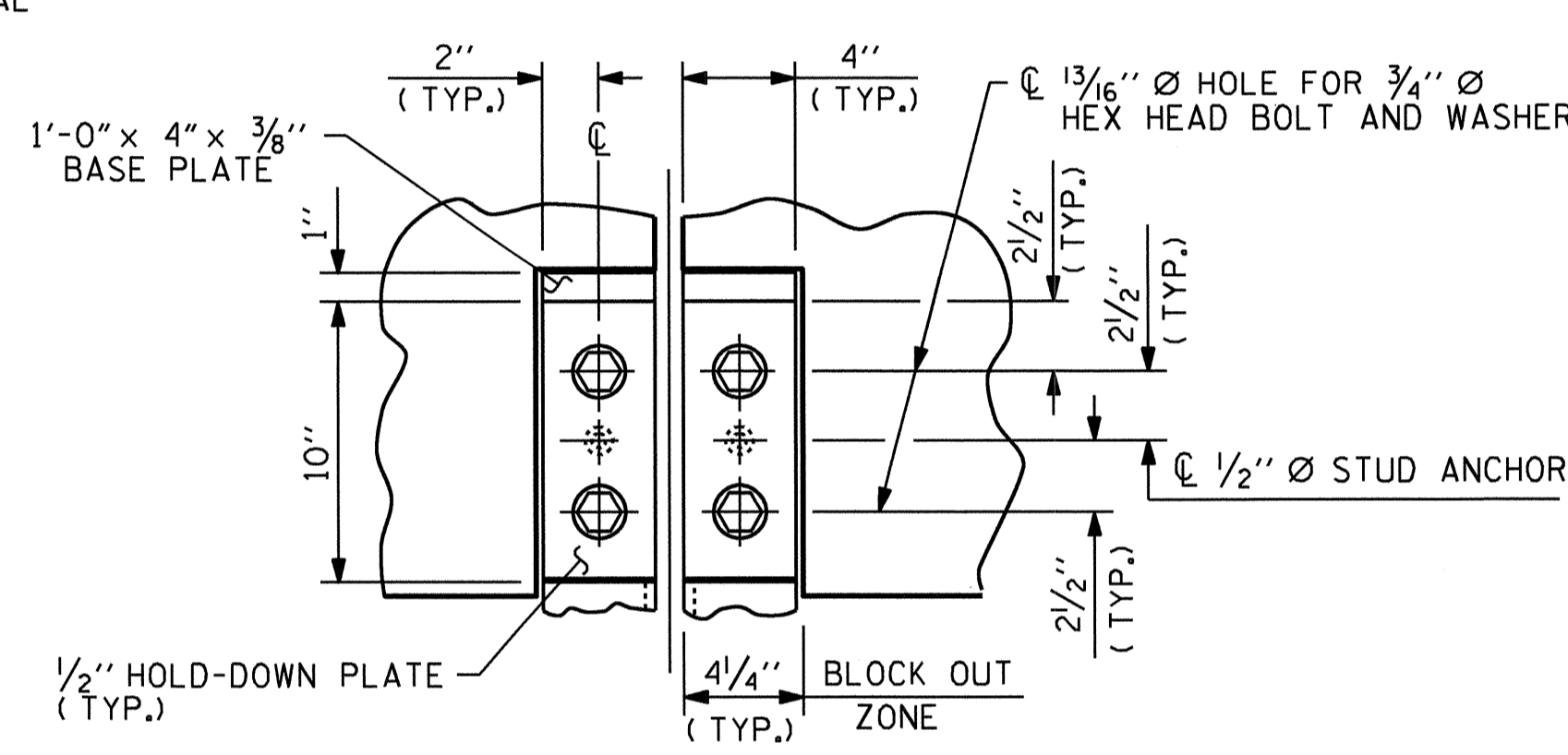


**END VIEW**

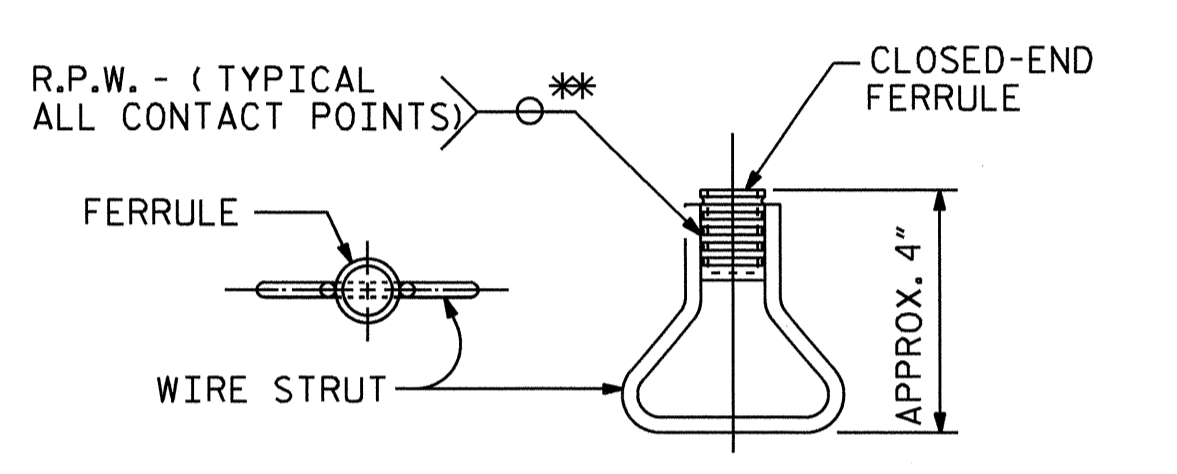


**ELEVATION VIEW**

**COVER PLATE DETAILS**

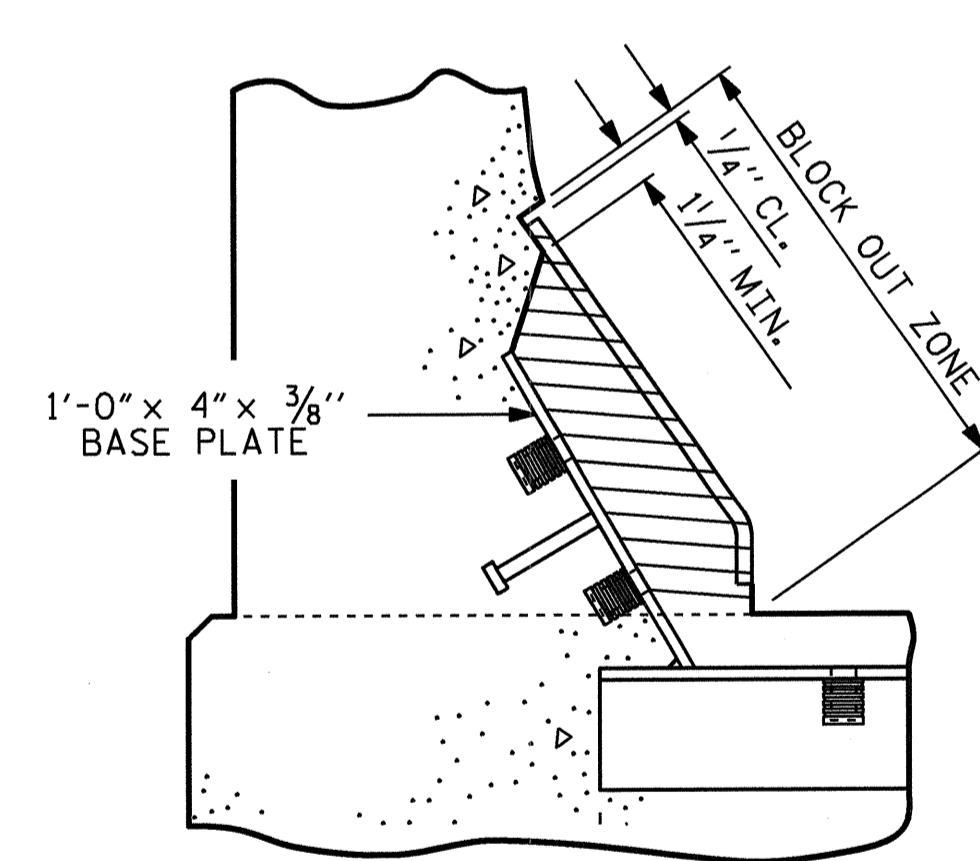


**SECTION A-A**



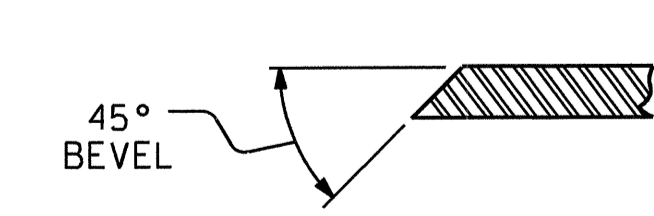
**PLAN ELEVATION CONCRETE INSERT**

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

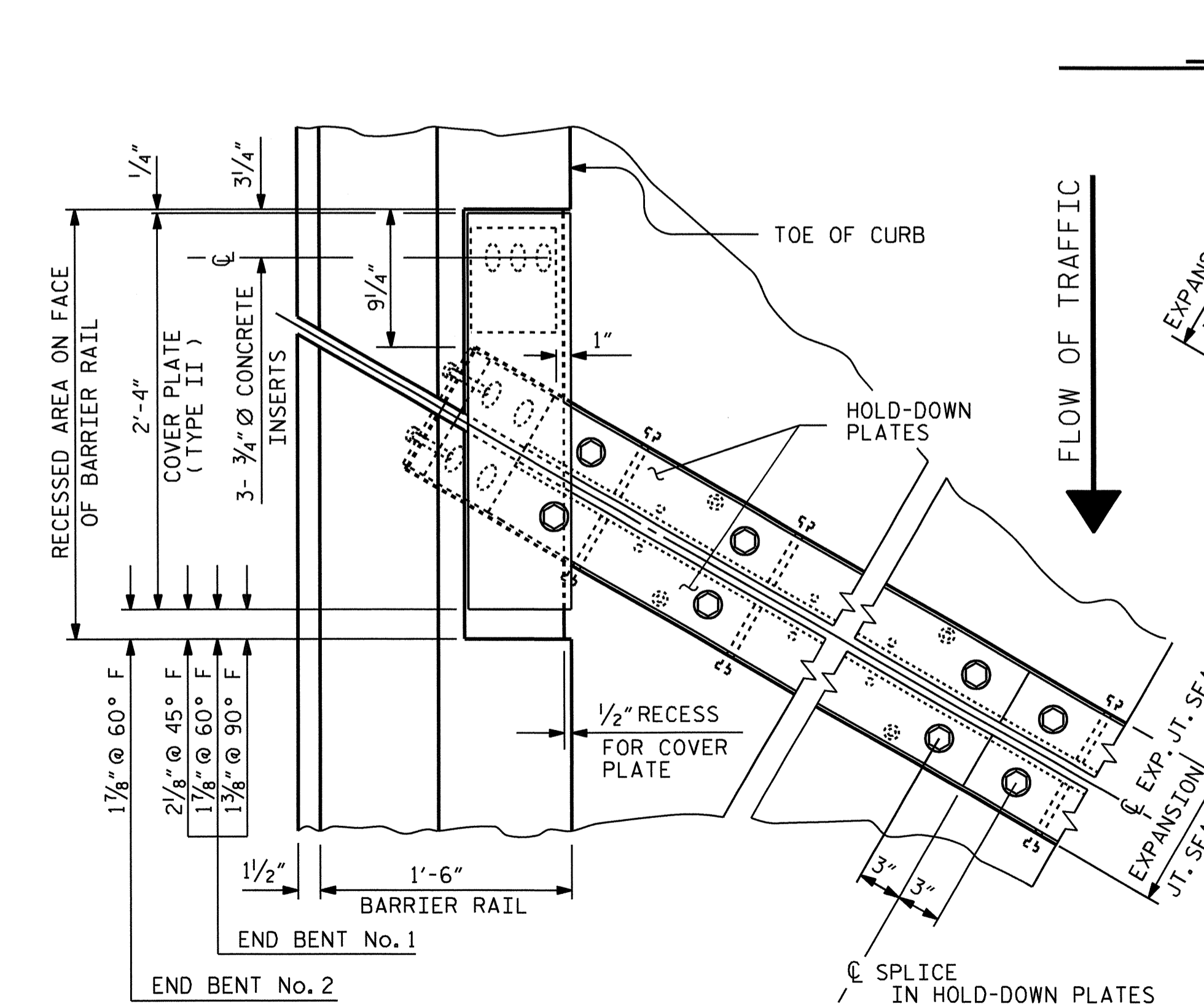


**BLOCK OUT DETAIL**

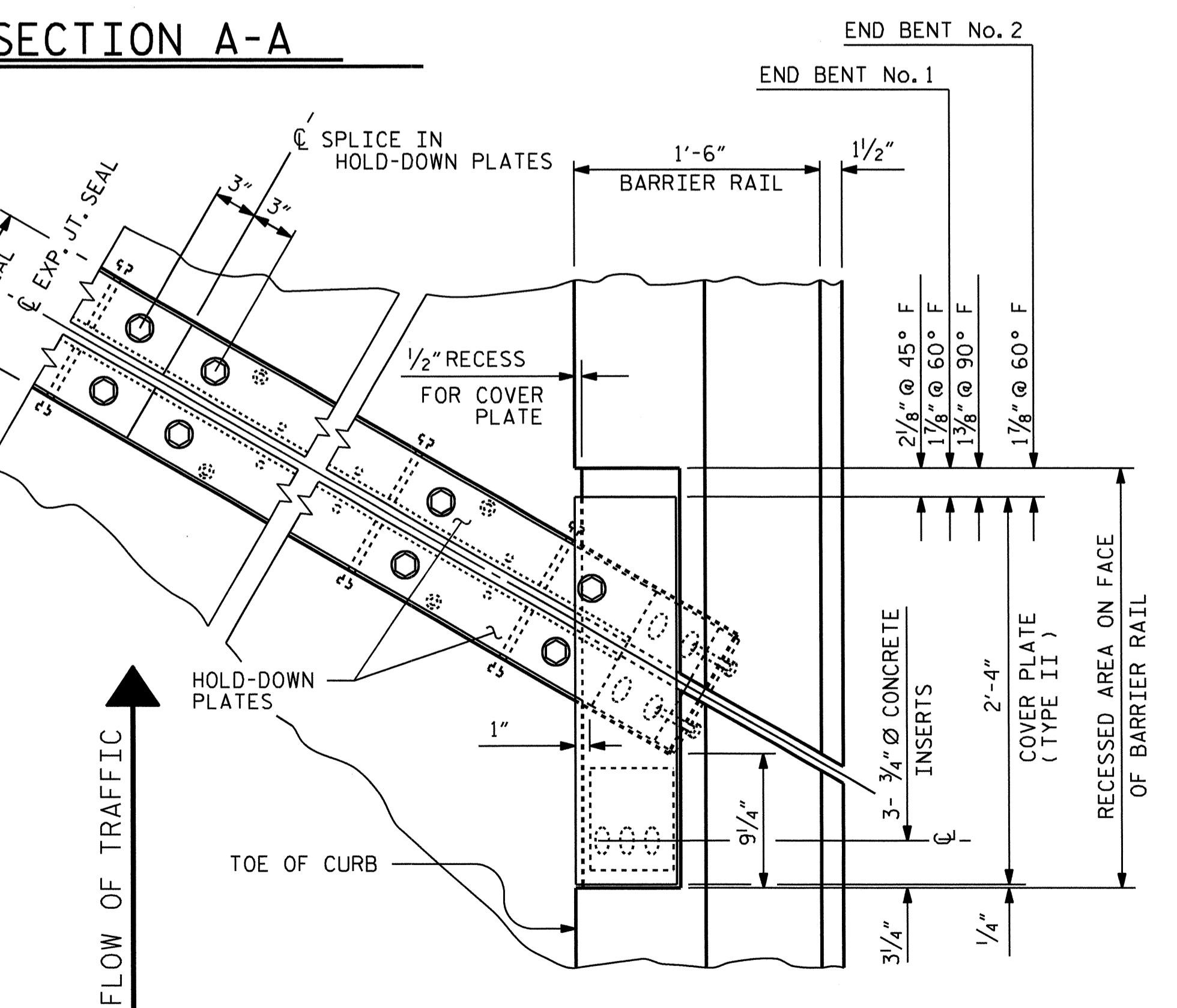
SEE "SECTION A-A" FOR OTHER DETAILS.



**SECTION B-B**



**PLAN OF EXPANSION JOINT SEAL - LEFT SIDE**



**PLAN OF EXPANSION JOINT SEAL - RIGHT SIDE**



PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

SHEET 2 OF 2  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 EXPANSION JOINT  
 SEAL DETAILS  
 FOR BARRIER RAIL

ASSEMBLED BY : D. G. ELY	DATE : 02-11
CHECKED BY : T. M. GARRISON	DATE : 02-11
DRAWN BY : REK 9/87	REV. 7/17/98 RWW/LES
CHECKED BY : CRK 10/87	REV. 10/17/00 RWW/LES
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			28

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"			

GROOVING BRIDGE FLOORS

APPROACH SLABS	1370	SQ.FT.
BRIDGE DECK	4828	SQ.FT.
TOTAL	6198	SQ.FT.

CLASS AA CONCRETE BREAKDOWN

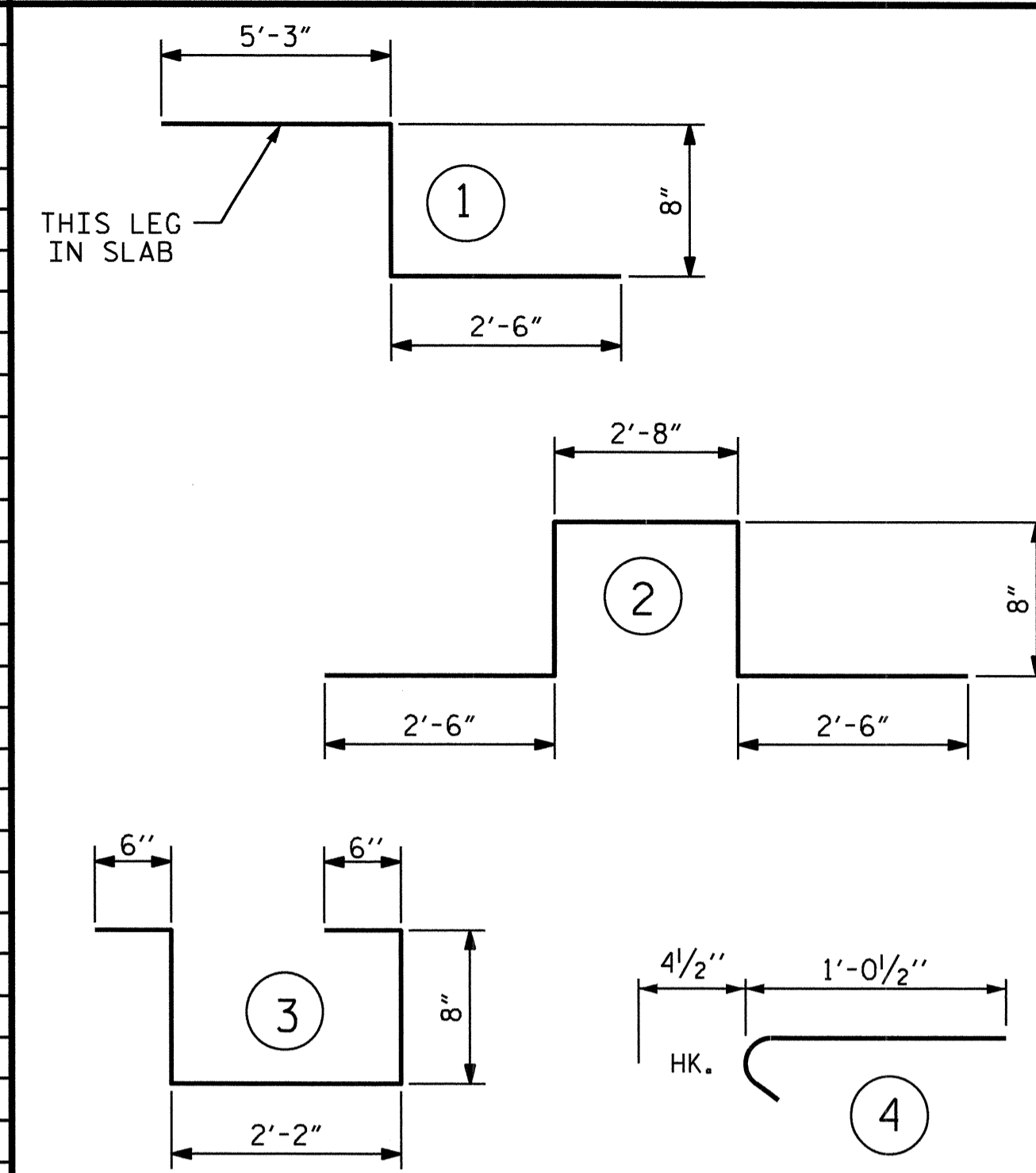
POUR #1	175.5	CU. YDS.
POUR #2	12.3	CU. YDS.
TOTAL	187.8	CU. YDS.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	280	#5	STR	34'-11"	10197	A207	2	#5	STR	26'-10"	56
A2	280	#5	STR	34'-11"	10197	A208	2	#5	STR	25'-7"	53
						A209	2	#5	STR	24'-5"	51
* A101	2	#5	STR	34'-0"	71	A210	2	#5	STR	23'-2"	48
* A102	2	#5	STR	32'-9"	68	A211	2	#5	STR	22'-0"	46
* A103	2	#5	STR	31'-7"	66	A212	2	#5	STR	20'-10"	43
* A104	2	#5	STR	30'-5"	63	A213	2	#5	STR	19'-7"	41
* A105	2	#5	STR	29'-2"	61	A214	2	#5	STR	18'-5"	38
* A106	2	#5	STR	28'-0"	58	A215	2	#5	STR	17'-2"	36
* A107	2	#5	STR	26'-10"	56	A216	2	#5	STR	16'-0"	33
* A108	2	#5	STR	25'-7"	53	A217	2	#5	STR	14'-10"	31
* A109	2	#5	STR	24'-5"	51	A218	2	#5	STR	13'-7"	28
* A110	2	#5	STR	23'-2"	48	A219	2	#5	STR	12'-5"	26
* A111	2	#5	STR	22'-0"	46	A220	2	#5	STR	11'-3"	23
* A112	2	#5	STR	20'-10"	43	A221	2	#5	STR	10'-0"	21
* A113	2	#5	STR	19'-7"	41	A222	2	#5	STR	8'-10"	18
* A114	2	#5	STR	18'-5"	38	A223	2	#5	STR	7'-7"	16
* A115	2	#5	STR	17'-2"	36	A224	2	#5	STR	6'-5"	13
* A116	2	#5	STR	16'-0"	33	A225	2	#5	STR	5'-3"	11
* A117	2	#5	STR	14'-10"	31	A226	2	#5	STR	4'-0"	8
* A118	2	#5	STR	13'-7"	28	A227	2	#5	STR	2'-10"	6
* A119	2	#5	STR	12'-5"	26						
* A120	2	#5	STR	11'-3"	23	* B1	144	#4	STR	29'-7"	2846
* A121	2	#5	STR	10'-0"	21	B2	114	#5	STR	57'-3"	6807
* A122	2	#5	STR	8'-10"	18						
* A123	2	#5	STR	7'-7"	16	* G1	2	#5	STR	38'-3"	80
* A124	2	#5	STR	6'-5"	13						
* A125	2	#5	STR	5'-3"	11	* J1	70	#4	4	1'-5"	66
* A126	2	#5	STR	4'-0"	8						
* A127	2	#5	STR	2'-10"	6	* K1	12	#5	1	8'-5"	105
						* K2	12	#5	2	9'-0"	113
A201	2	#5	STR	34'-0"	71	* K3	18	#5	STR	7'-7"	142
A202	2	#5	STR	32'-9"	68						
A203	2	#5	STR	31'-7"	66						
A204	2	#5	STR	30'-5"	63	* S1	48	#4	3	4'-6"	144
A205	2	#5	STR	29'-2"	61						
A206	2	#5	STR	28'-0"	58						
						REINFORCING STEEL		LBS.			18037
						* EPOXY COATED REINFORCING STEEL		LBS.			14726

\* THESE BARS ARE EPOXY COATED.

BAR TYPES

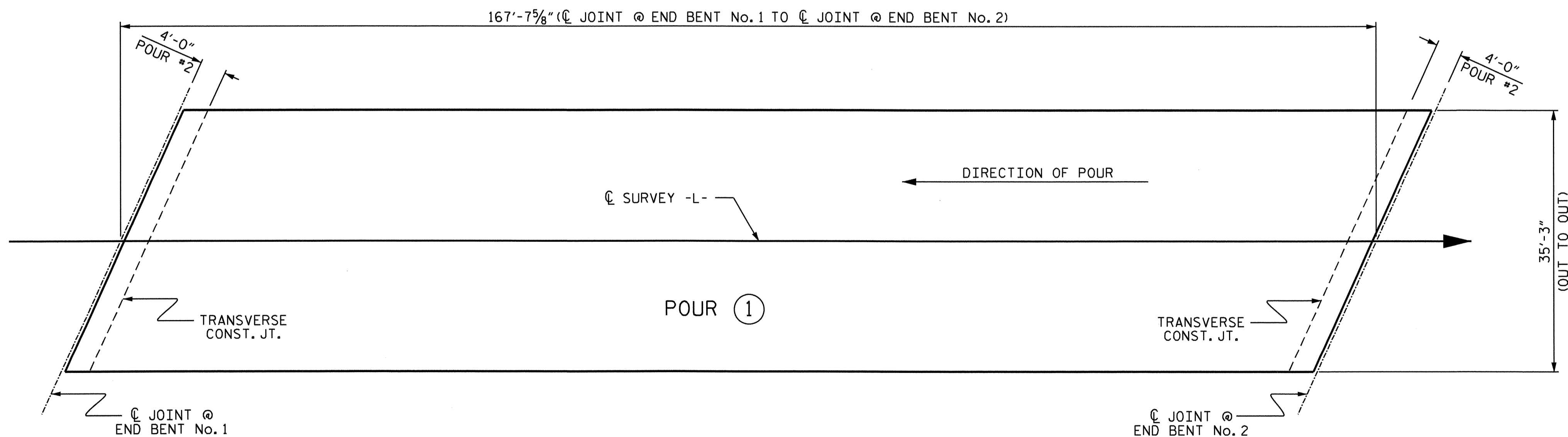


ALL BAR DIMENSIONS ARE OUT TO OUT

— SUPERSTRUCTURE BILL OF MATERIAL —

	CLASS AA CONCRETE (CU.YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
SPAN "A"	187.8	18037	14726
TOTALS**	187.8	18037	14726

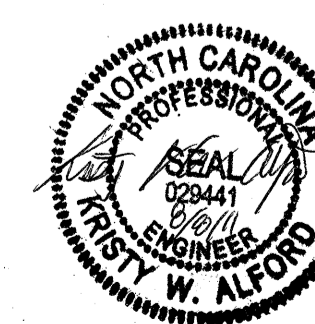
\*\*QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED



CONCRETE POURING SEQUENCE AND LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FT. = 5909)

PROJECT NO. B-4416  
BEAUFORT COUNTY  
STATION: 16+92.27 -L-

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



ASSEMBLED BY : D. G. ELY	DATE : 02/11
CHECKED BY : T. M. GARRISON	DATE : 02/11
DRAWN BY : JMB 5/87	REV. 6/1/94 EEM/GRP
CHECKED BY : SJD 9/87	REV. 8/16/99 RWW/LES
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			28

**NOTES:**

★ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTION A-A ON SHEET 3 OF 3.

▲ THIS ELEVATION TAKEN ON FILL FACE OF BACKWALL.

STIRRUPS & U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

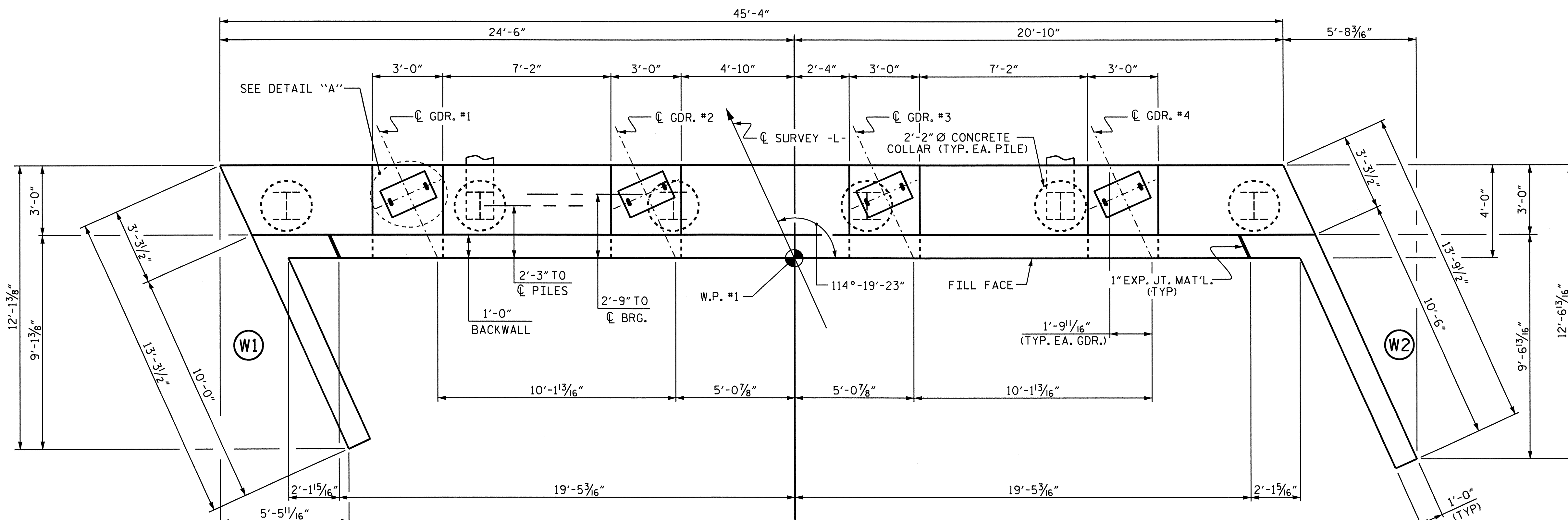
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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%.

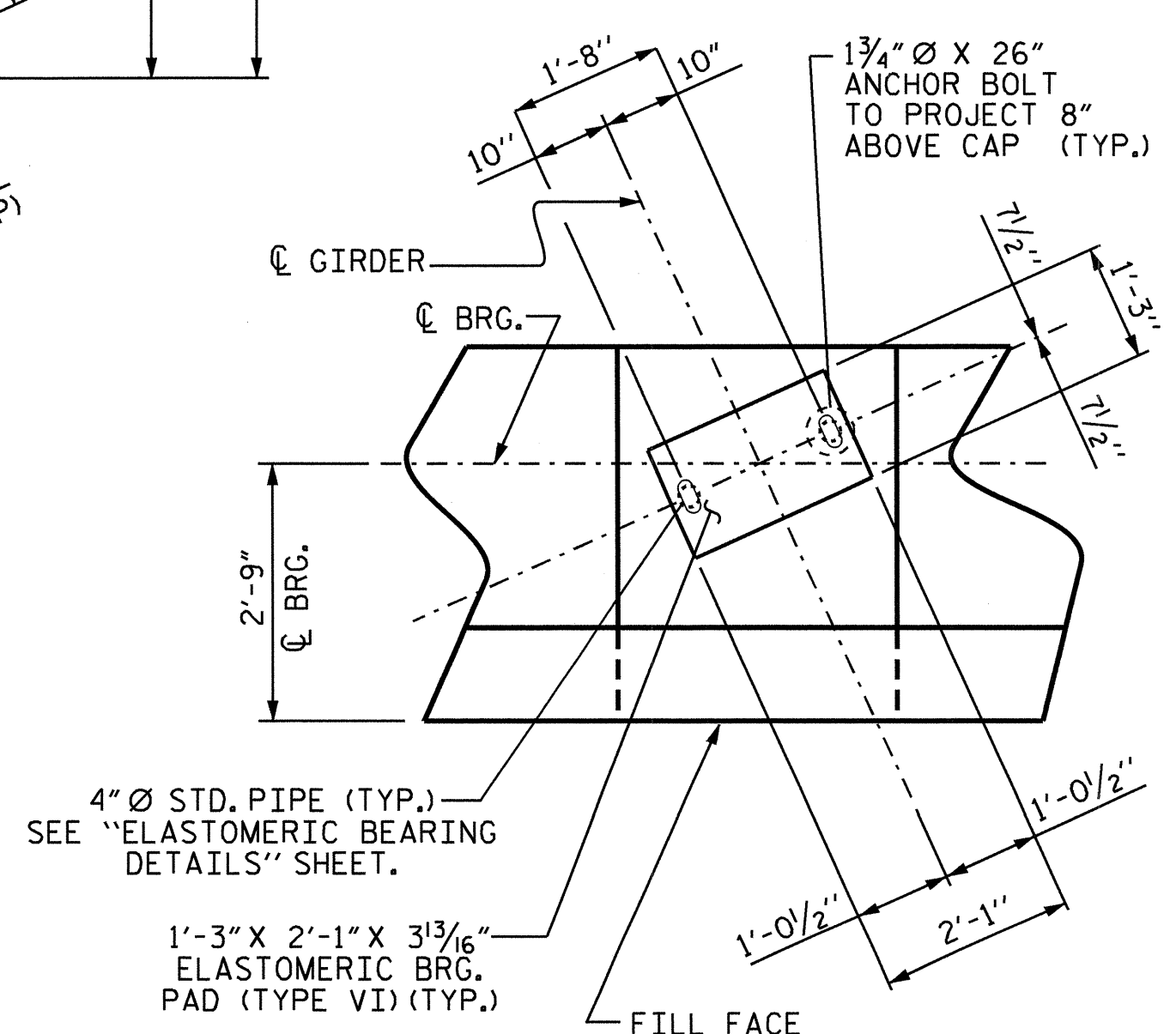
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

#5 "V" BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM TOP OF BACKWALL.

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



**PLAN**



**DETAIL "A"**

(TYP. EA. GIRDER)

PROJECT NO. B-4416  
 BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 1



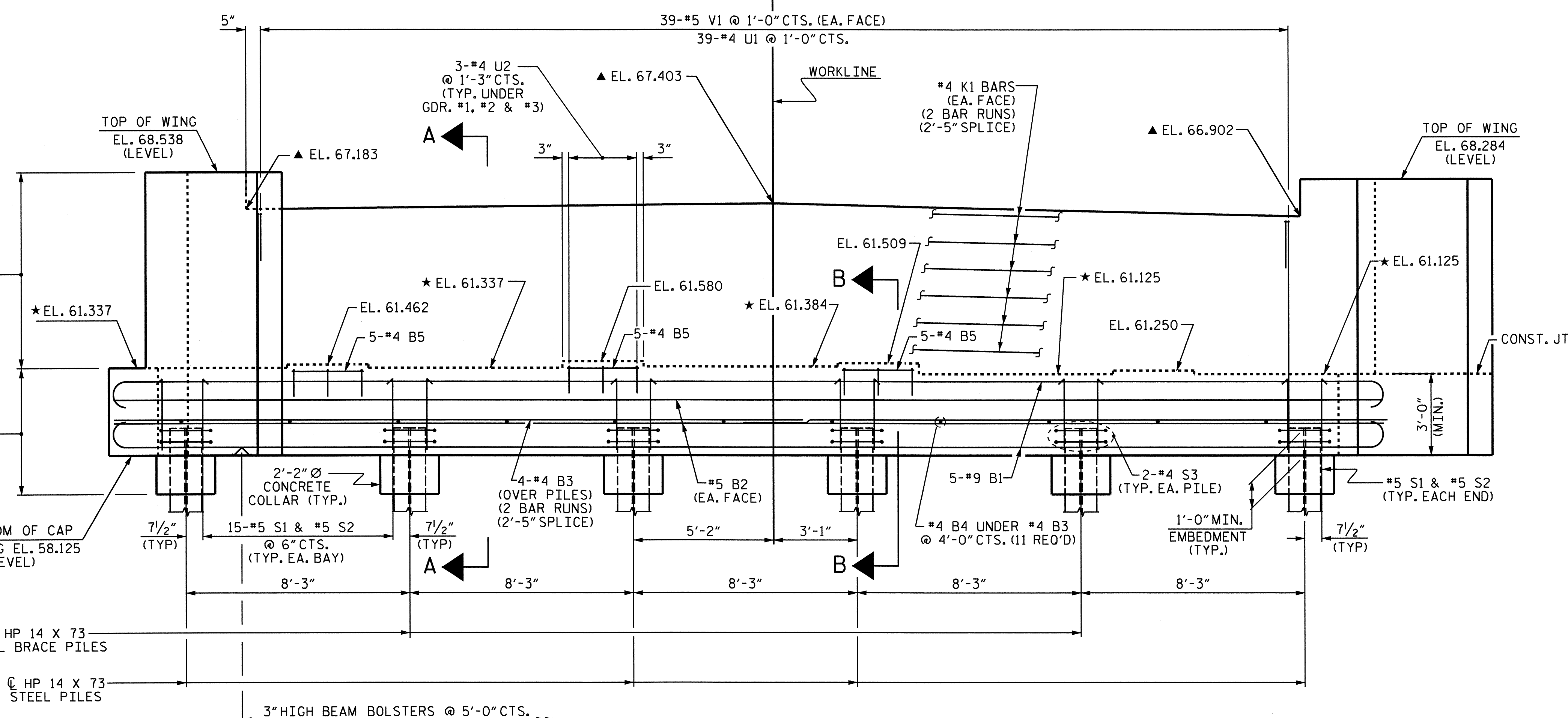
**REVISIONS**

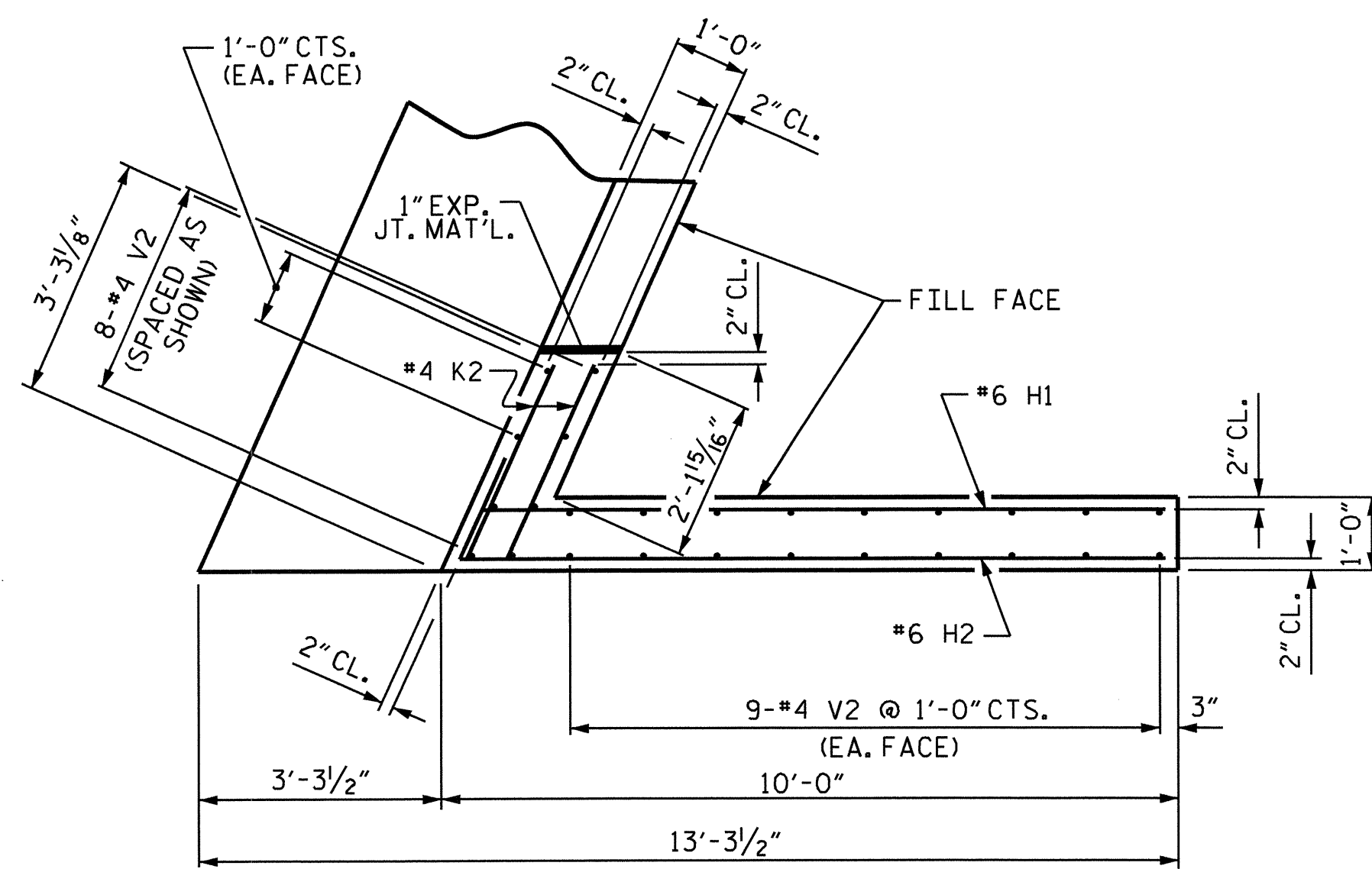
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			TOTAL SHEETS 28
2			4			

DRAWN BY: A. V. ROYAL DATE: 1/11  
 CHECKED BY: S. B. WILLIAMS DATE: 1/11

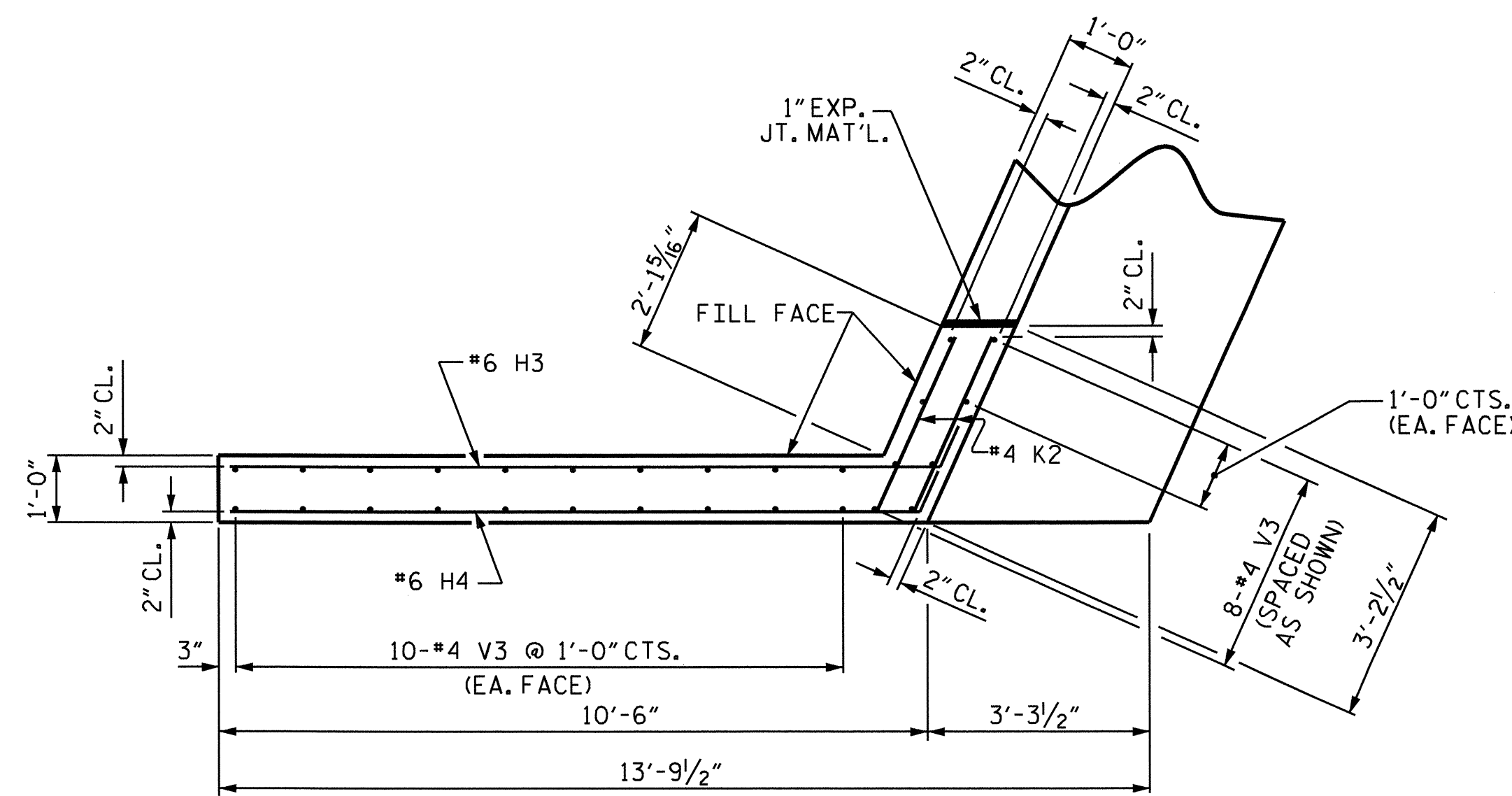
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 kalford

**ELEVATION**

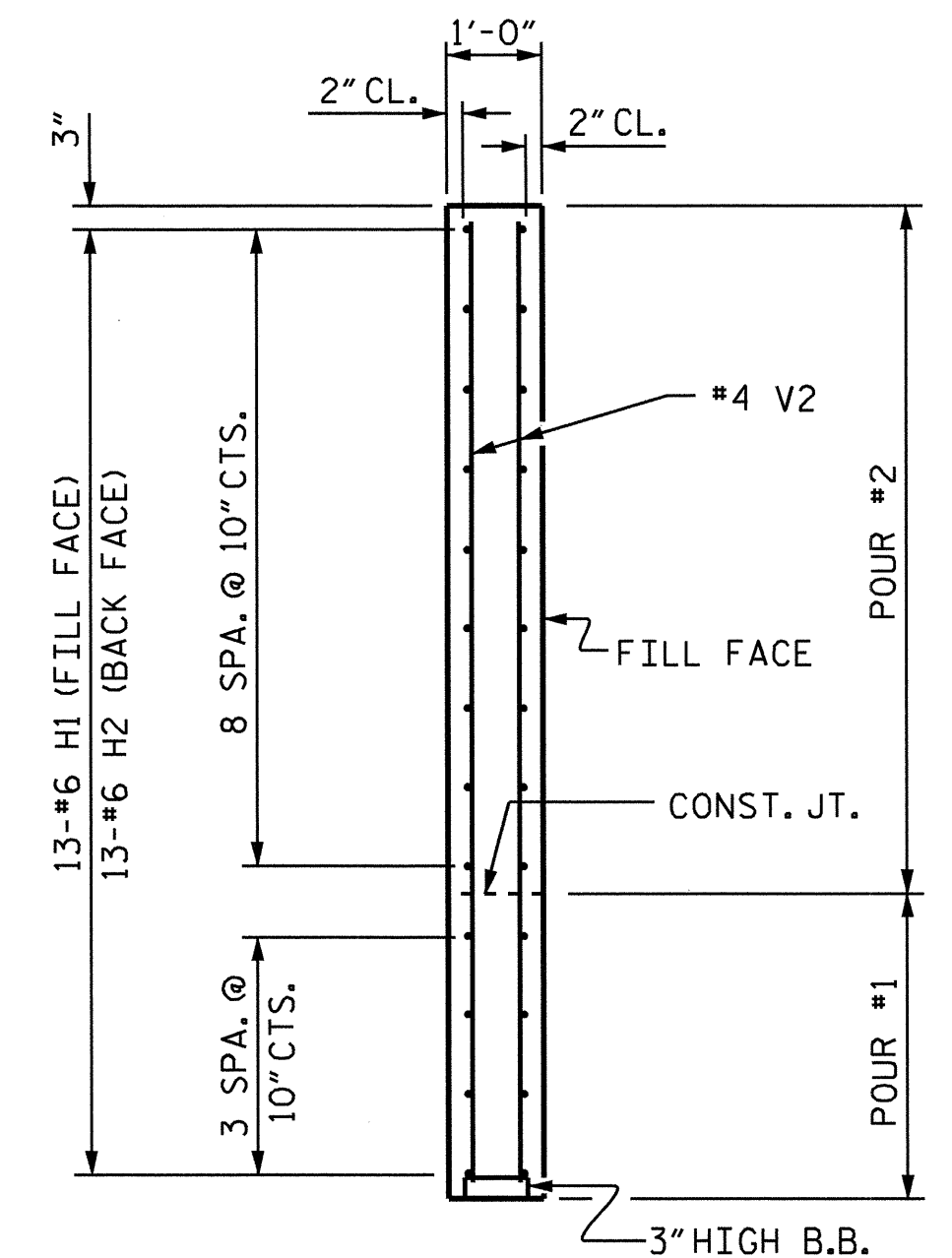




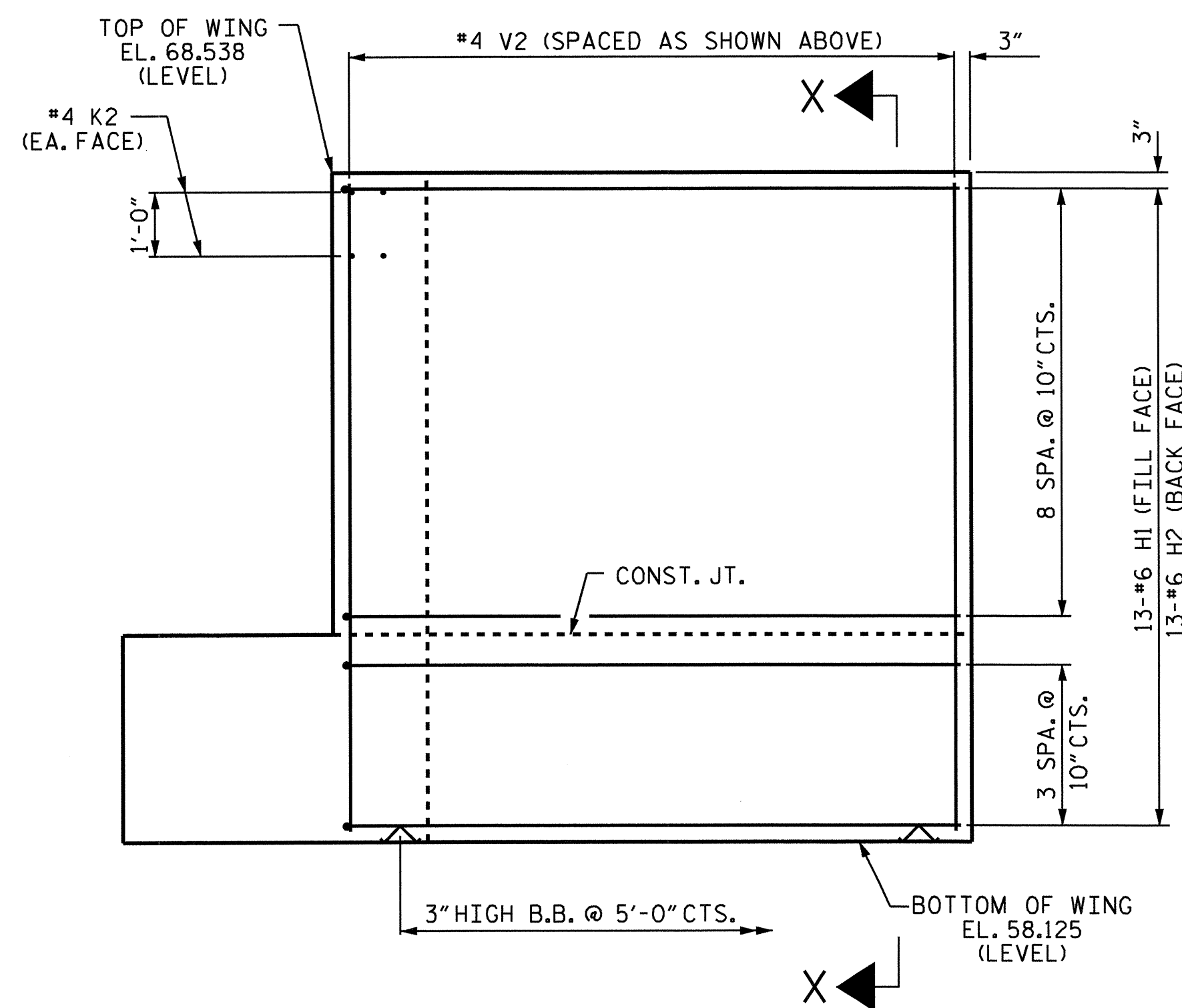
PLAN OF WING (W1)



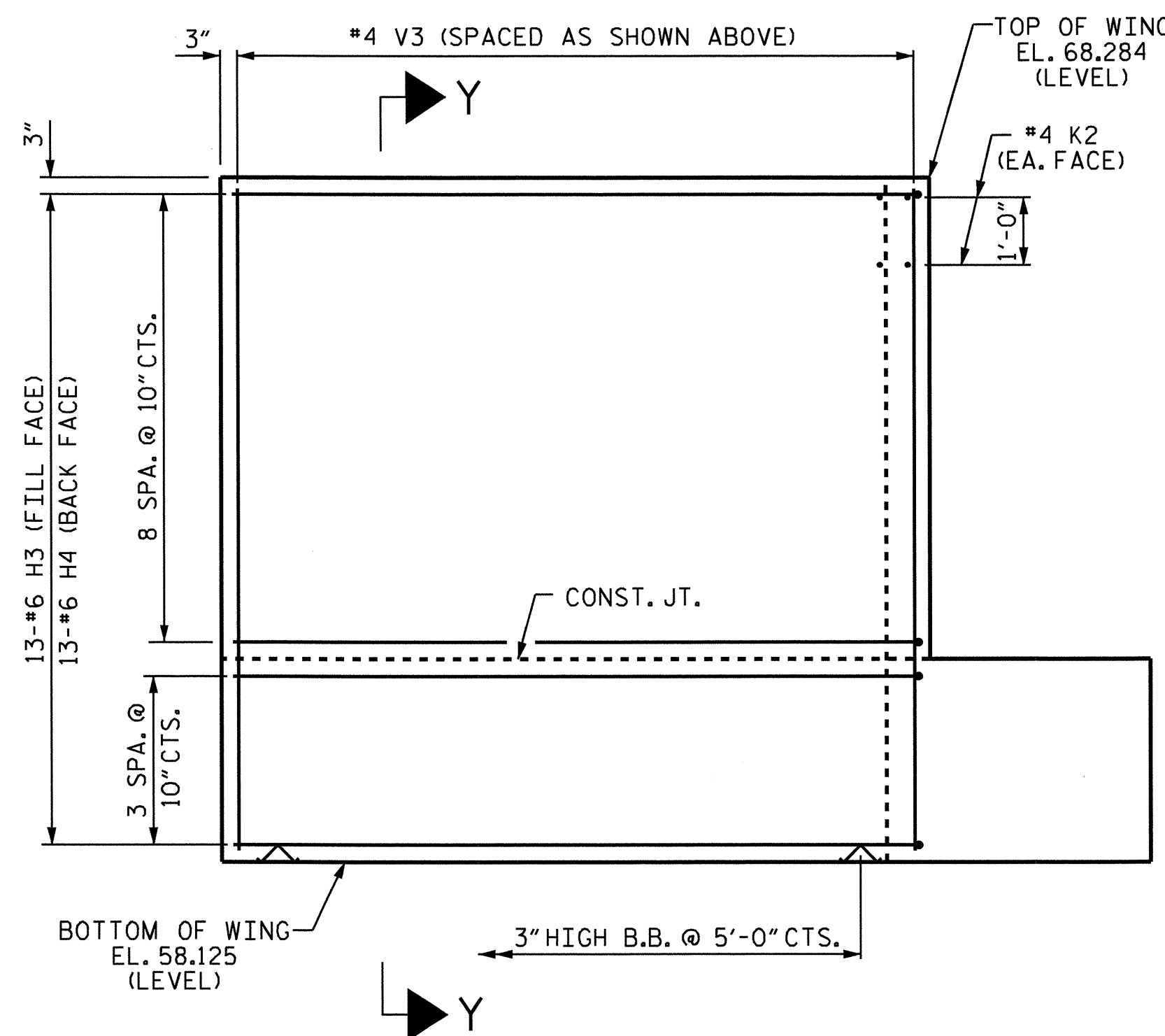
PLAN OF WING (W2)



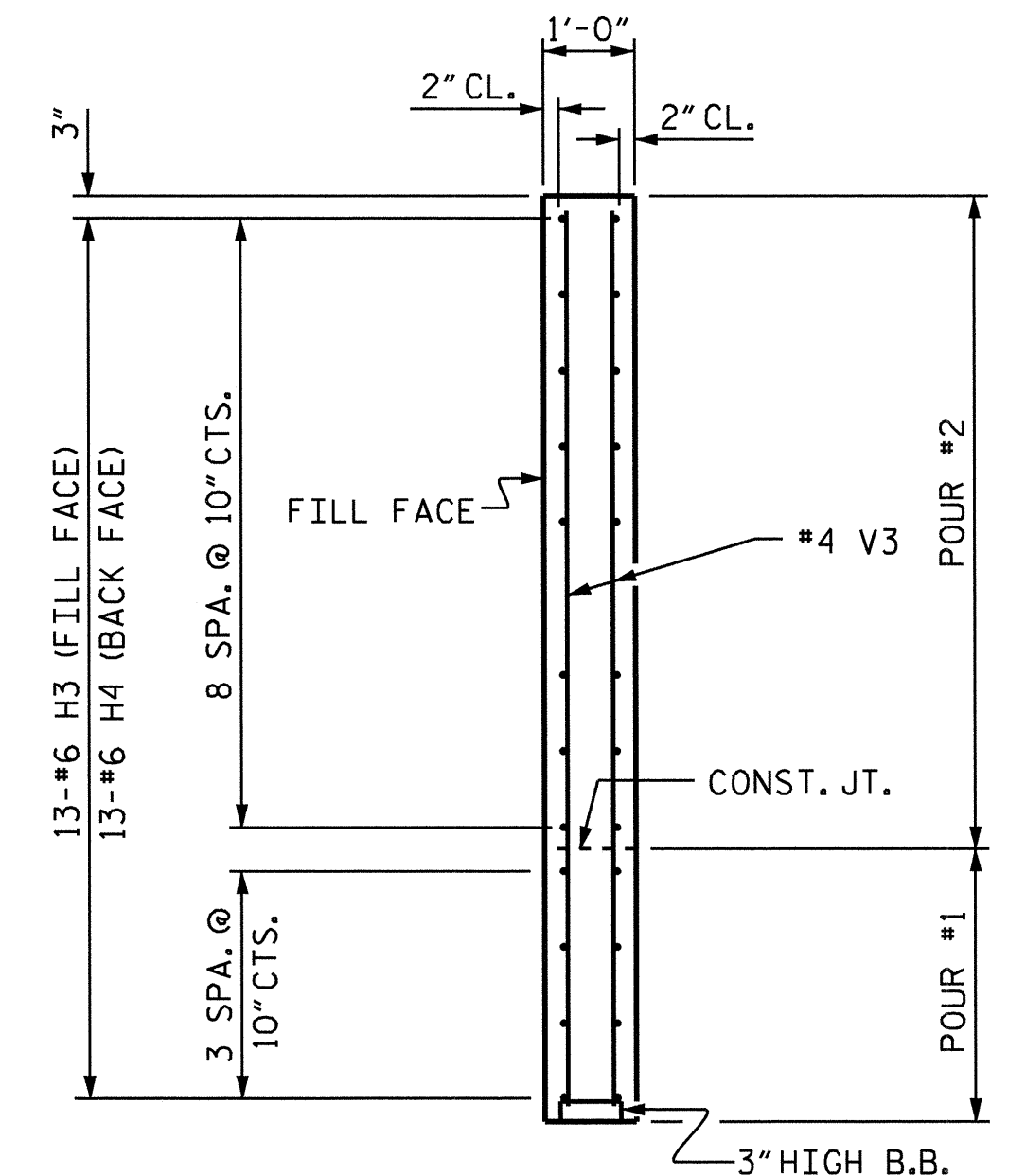
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION Y-Y

PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

SHEET 2 OF 3

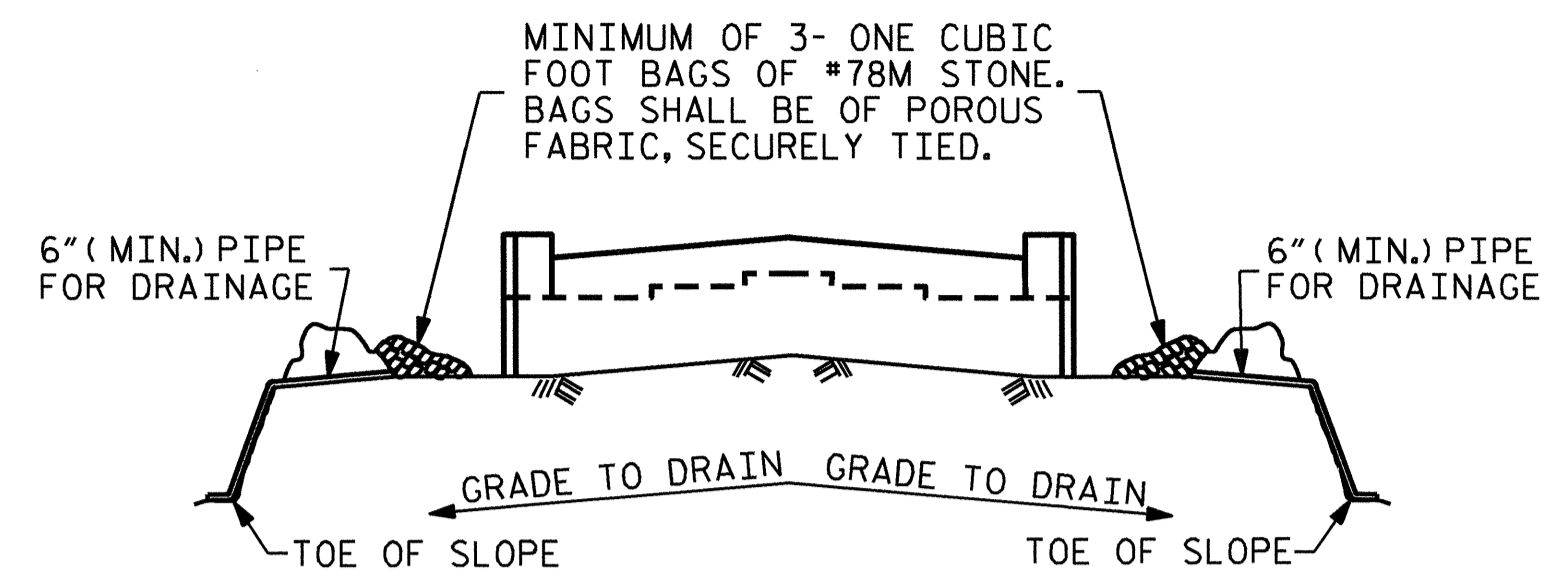


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1

REVISIONS						SHEET NO. S-21
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 28
2			4			

DRAWN BY : A. V. ROYAL DATE : 1/11  
 CHECKED BY : S. B. WILLIAMS DATE : 1/11

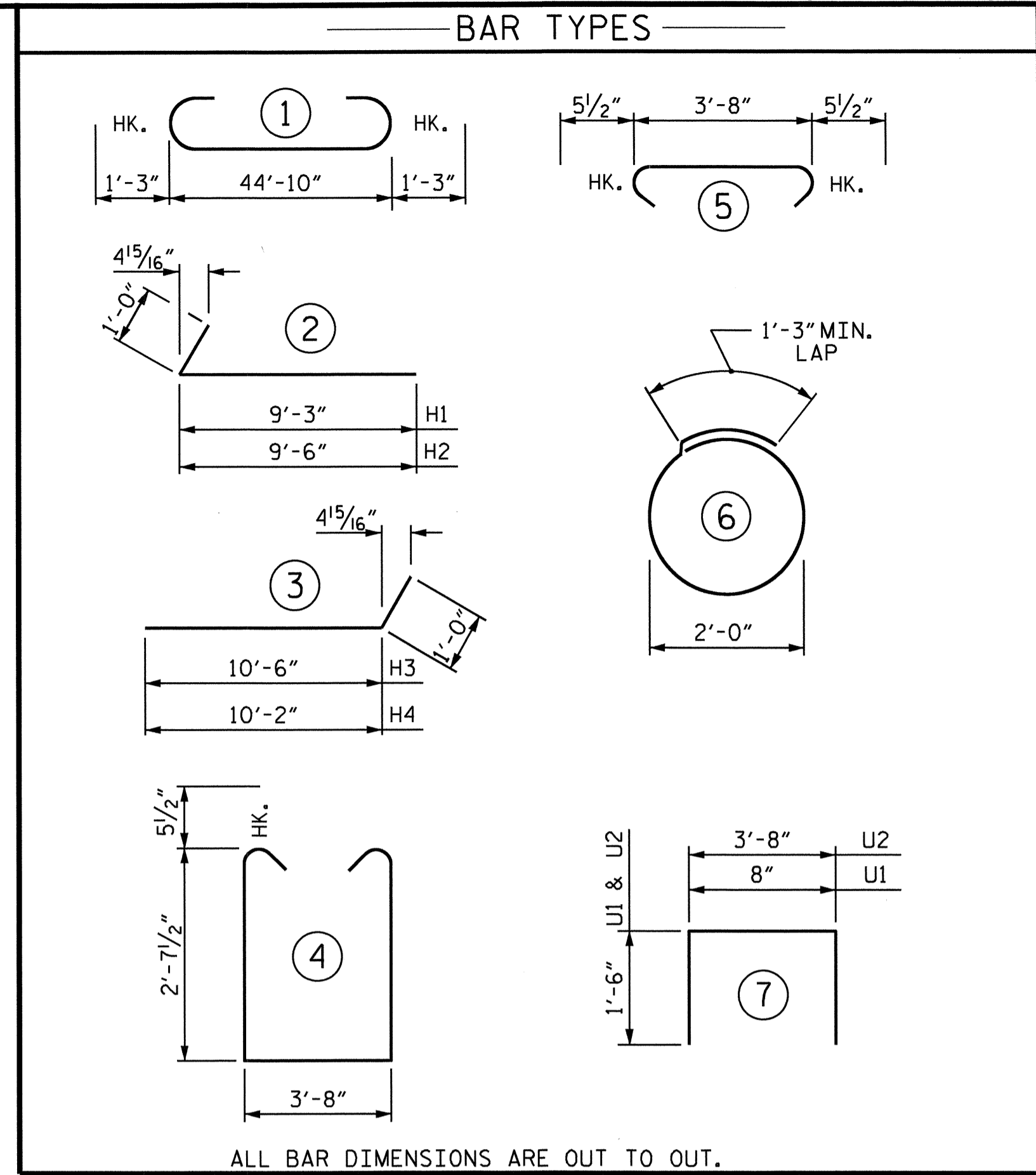


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

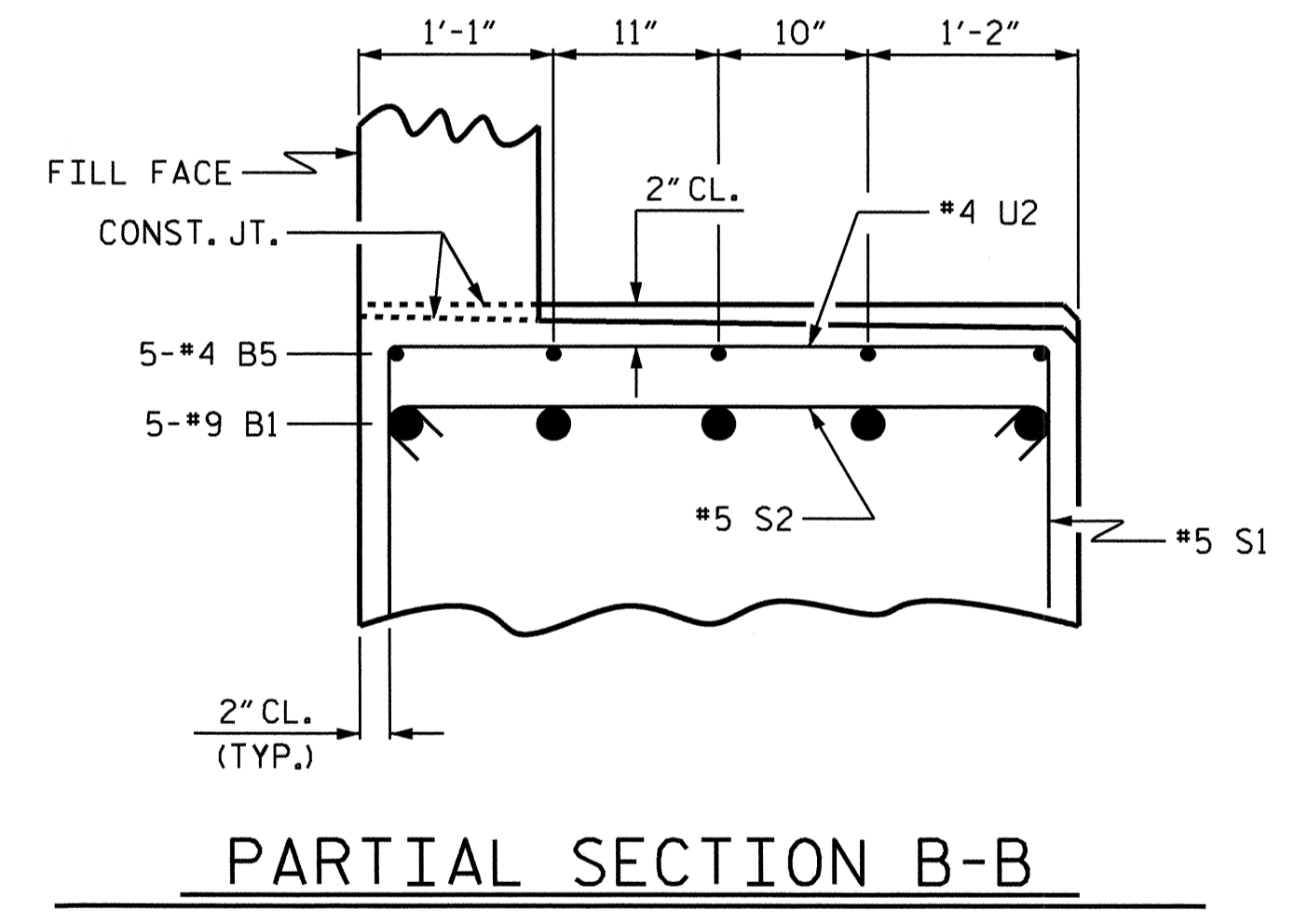
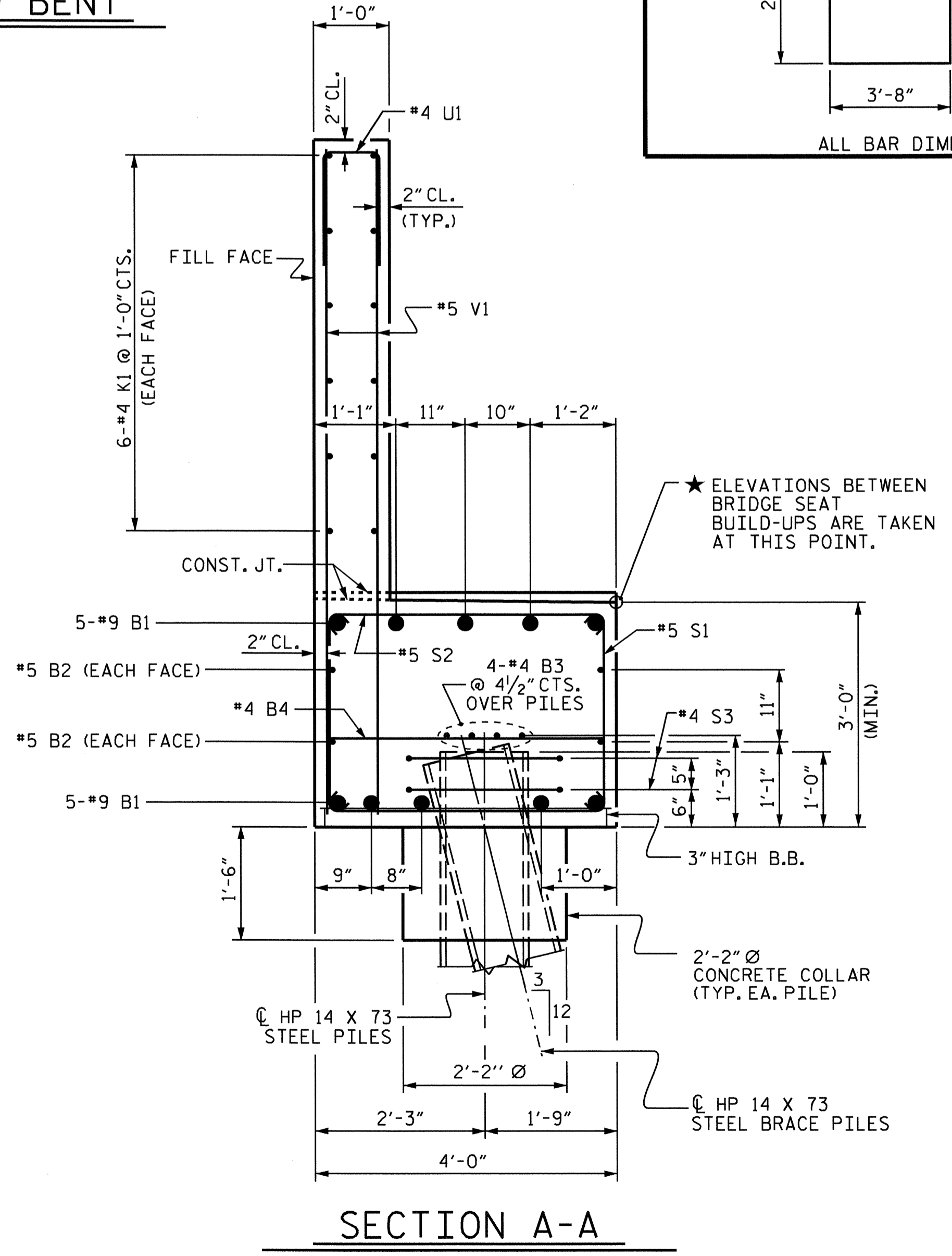
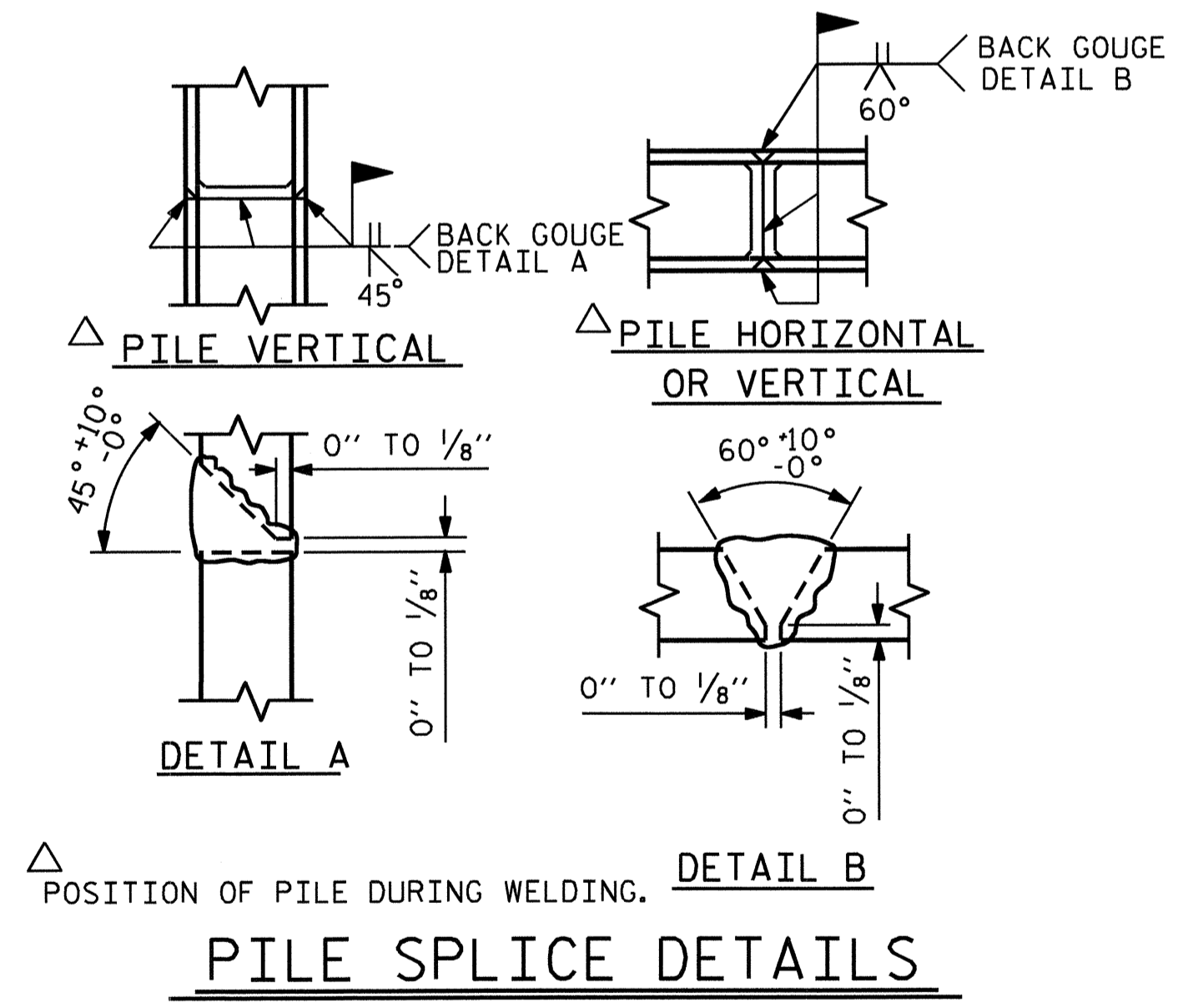
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

**TEMPORARY DRAINAGE AT END BENT**



BILL OF MATERIAL					
END BENT No. 1					
BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	47'-4"	1609
B2	4	#5	STR	45'-0"	188
B3	8	#4	STR	23'-9"	127
B4	11	#4	STR	3'-8"	27
B5	15	#4	STR	2'-8"	27
H1	13	#6	2	10'-3"	200
H2	13	#6	2	10'-6"	205
H3	13	#6	3	11'-6"	225
H4	13	#6	3	11'-2"	218
K1	24	#4	STR	23'-9"	381
K2	8	#4	STR	2'-10"	15
S1	77	#5	4	9'-10"	790
S2	77	#5	5	4'-7"	368
S3	12	#4	6	7'-7"	61
U1	39	#4	7	3'-8"	96
U2	9	#4	7	6'-8"	40
V1	78	#5	STR	8'-5"	685
V2	26	#4	STR	10'-0"	174
V3	28	#4	STR	9'-9"	182
REINFORCING STEEL					5618 LBS.
CLASS A CONCRETE					
POUR #1 (CAP, LOWER WINGS & COLLARS)					24.9 C.Y.
POUR #2 (UPPER WINGS & BACKWALL)					15.1 C.Y.
TOTAL =					40.0 C.Y.
HP 14 X 73 STEEL PILES					
No. = 6					420 LIN. FT.

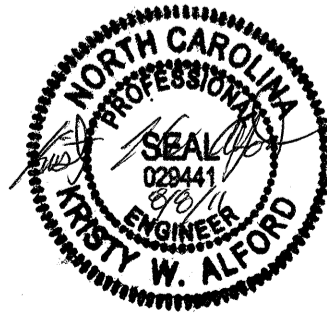


PROJECT NO. B-4416

BEAUFORT COUNTY

STATION: 16+92.27 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SUBSTRUCTURE**  
**END BENT No. 1**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			28

DRAWN BY : A. V. ROYAL DATE : 1/11

CHECKED BY : S. B. WILLIAMS DATE : 1/11

**NOTES:**

★ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTION A-A ON SHEET 3 OF 3.

▲ THIS ELEVATION TAKEN ON FILL FACE OF BACKWALL.

STIRRUPS & U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

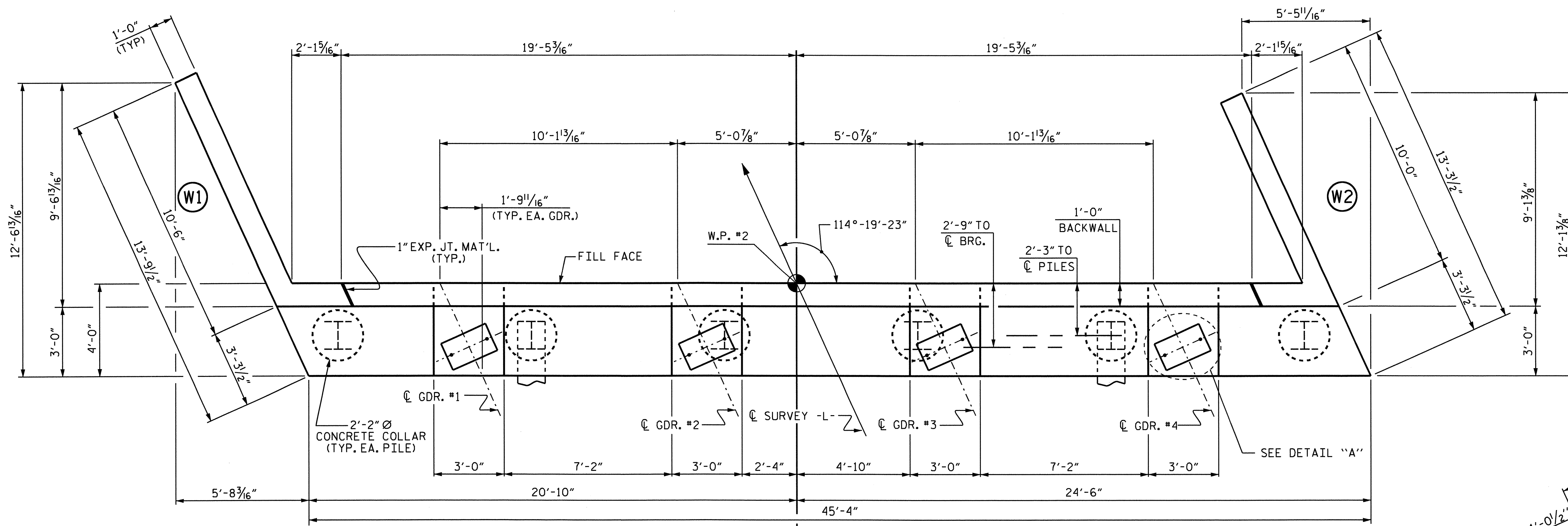
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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%.

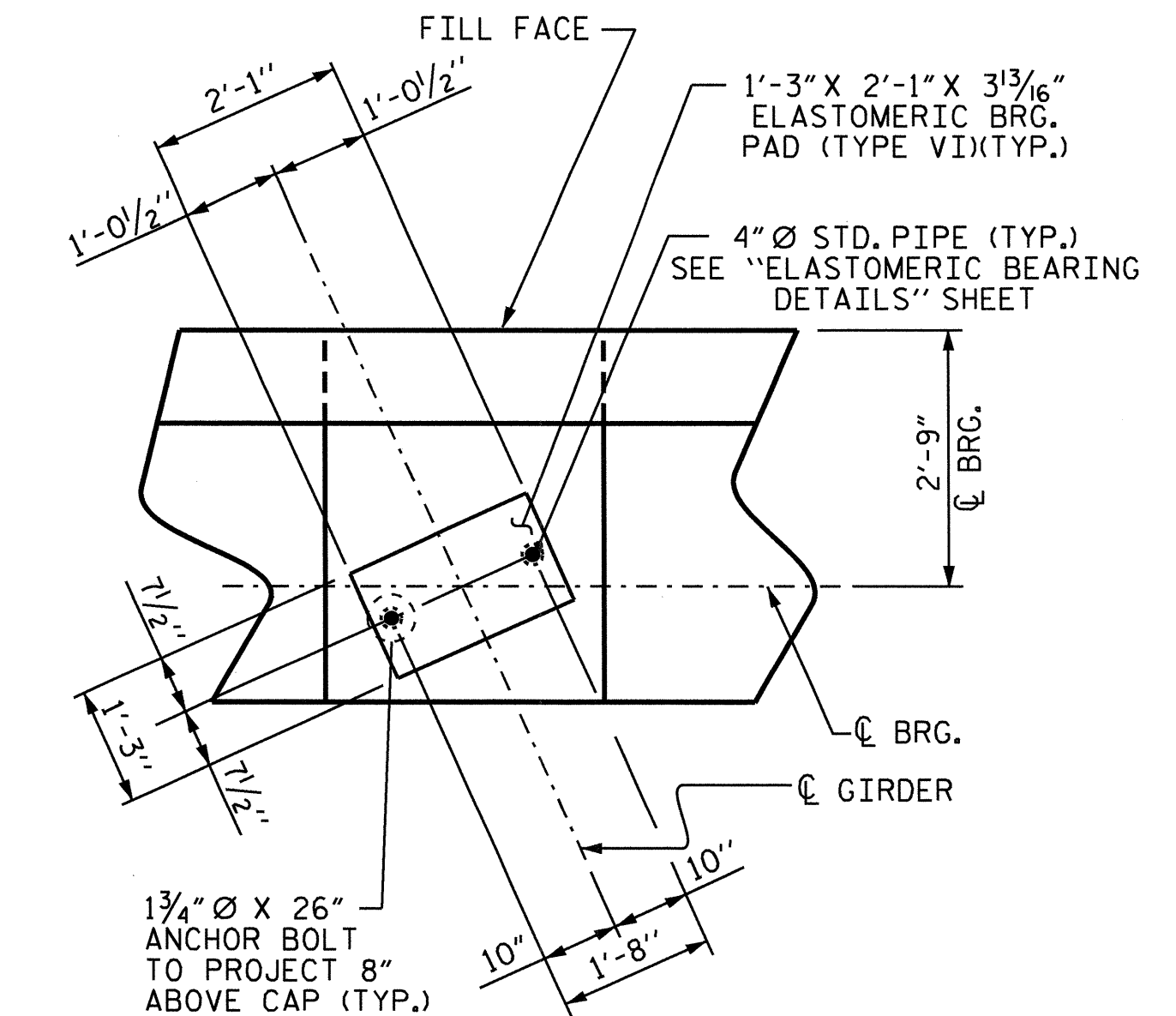
THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

#5 "V" BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM TOP OF BACKWALL.

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



PLAN



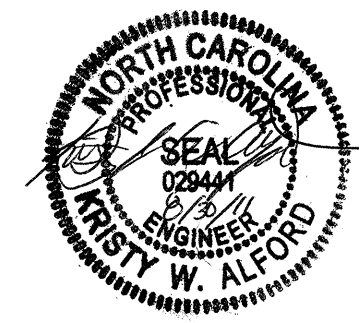
DETAIL "A"

(TYP. EA. GIRDER)

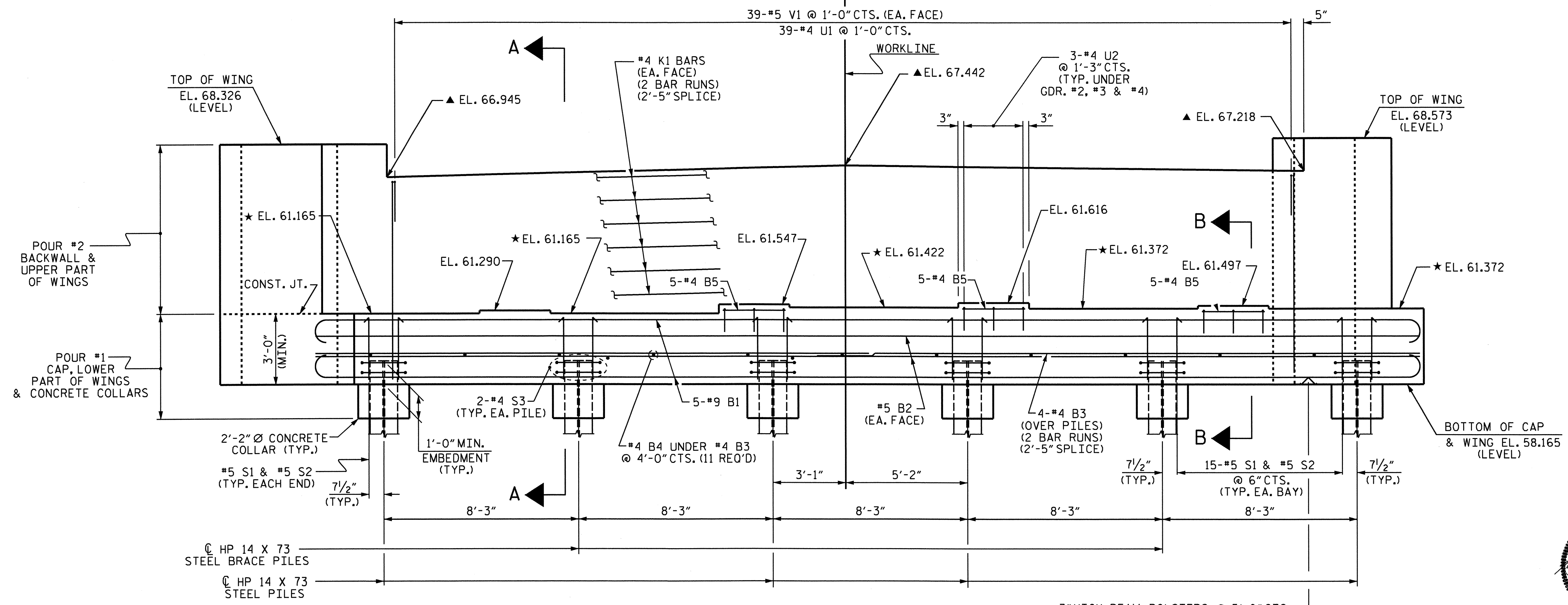
PROJECT NO. B-4416  
BEAUFORT COUNTY  
STATION: 16+92.27 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SUBSTRUCTURE  
END BENT No. 2



REVISIONS				SHEET NO.
BY:	DATE:	NO.	DATE:	S-23
1		3		TOTAL SHEETS
2		4		28

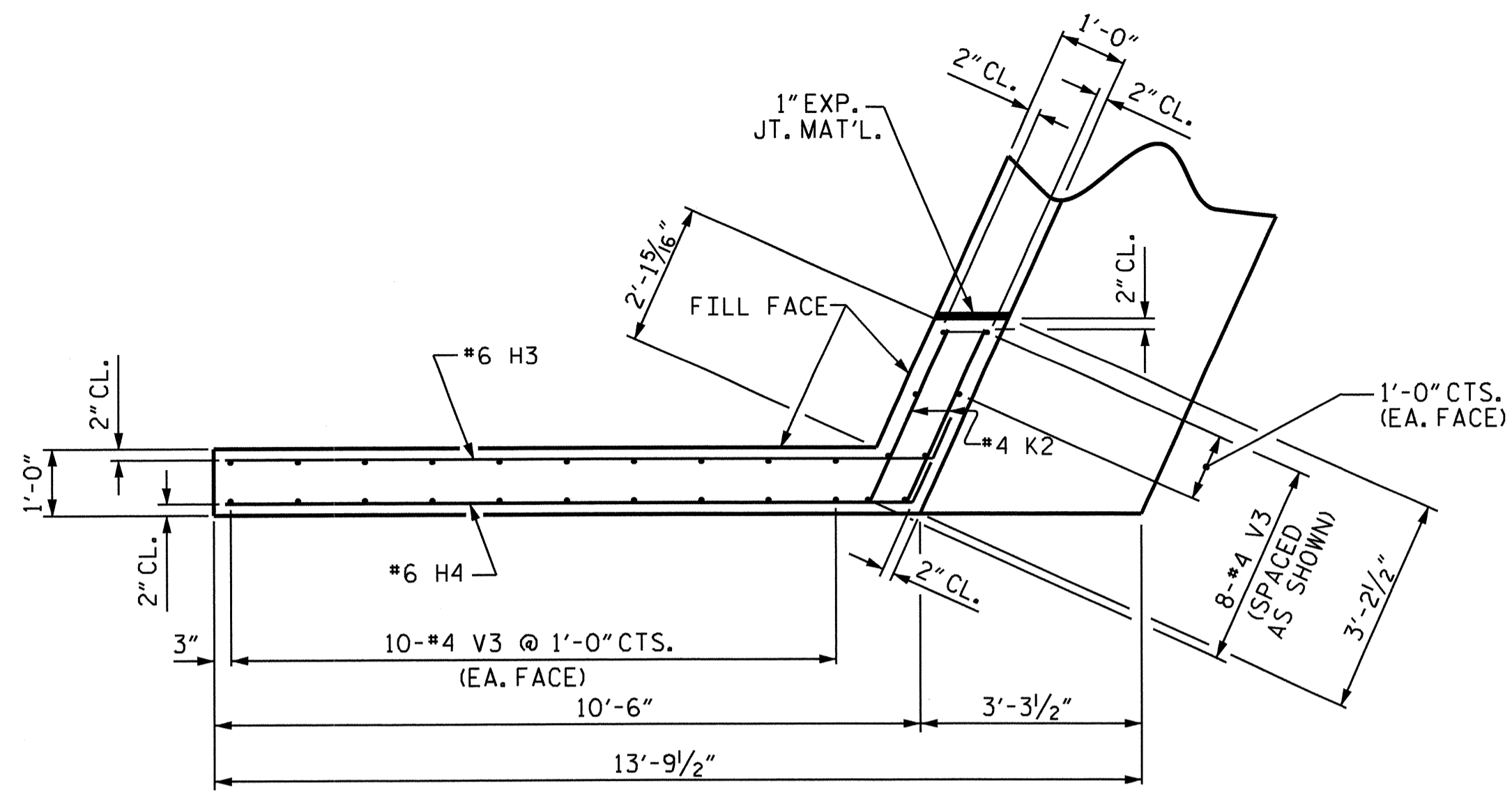


ELEVATION

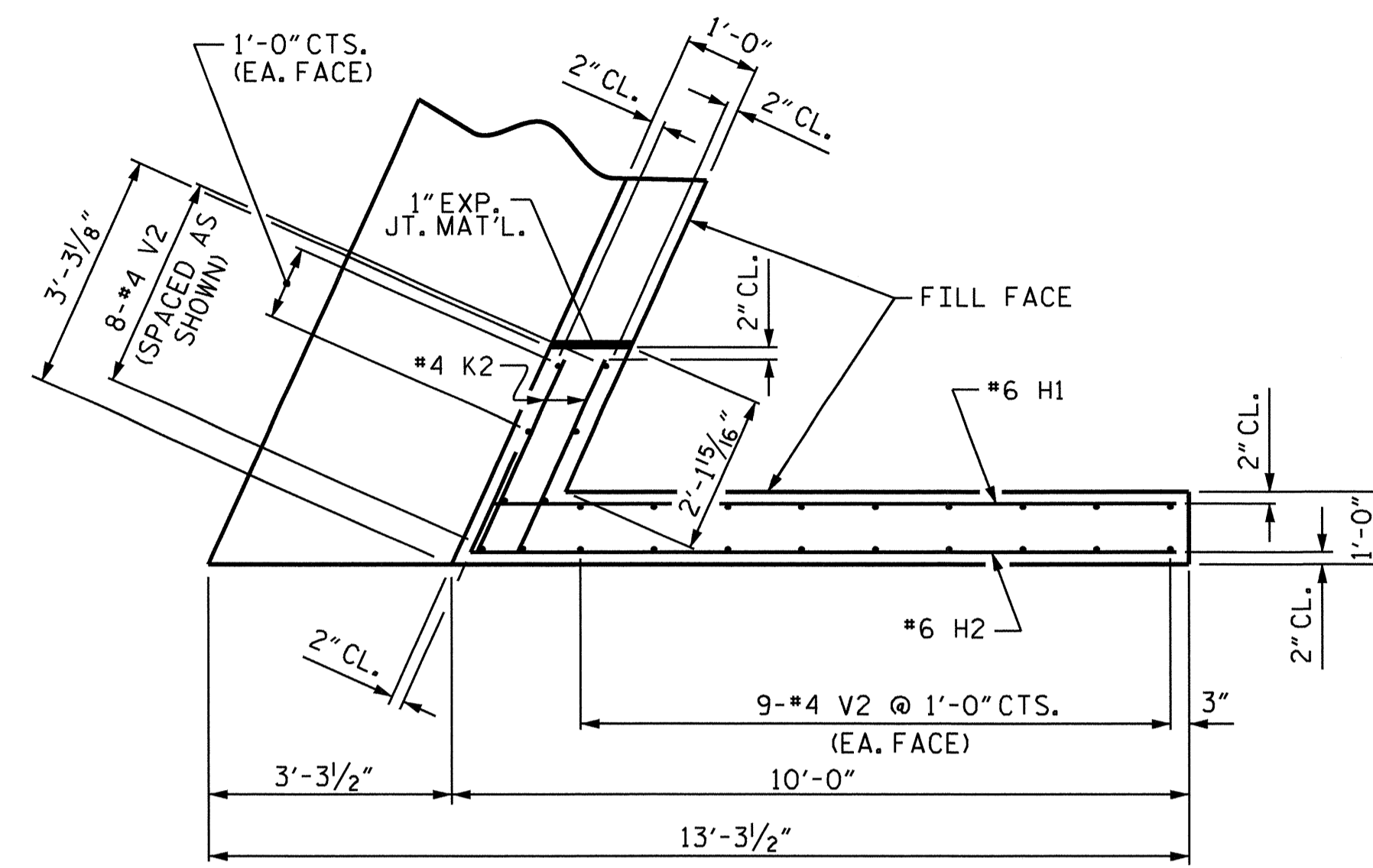
DRAWN BY: A. V. ROYAL DATE: 1/11  
CHECKED BY: S. B. WILLIAMS DATE: 1/11

30-AUG-2011 10:56  
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Kalford

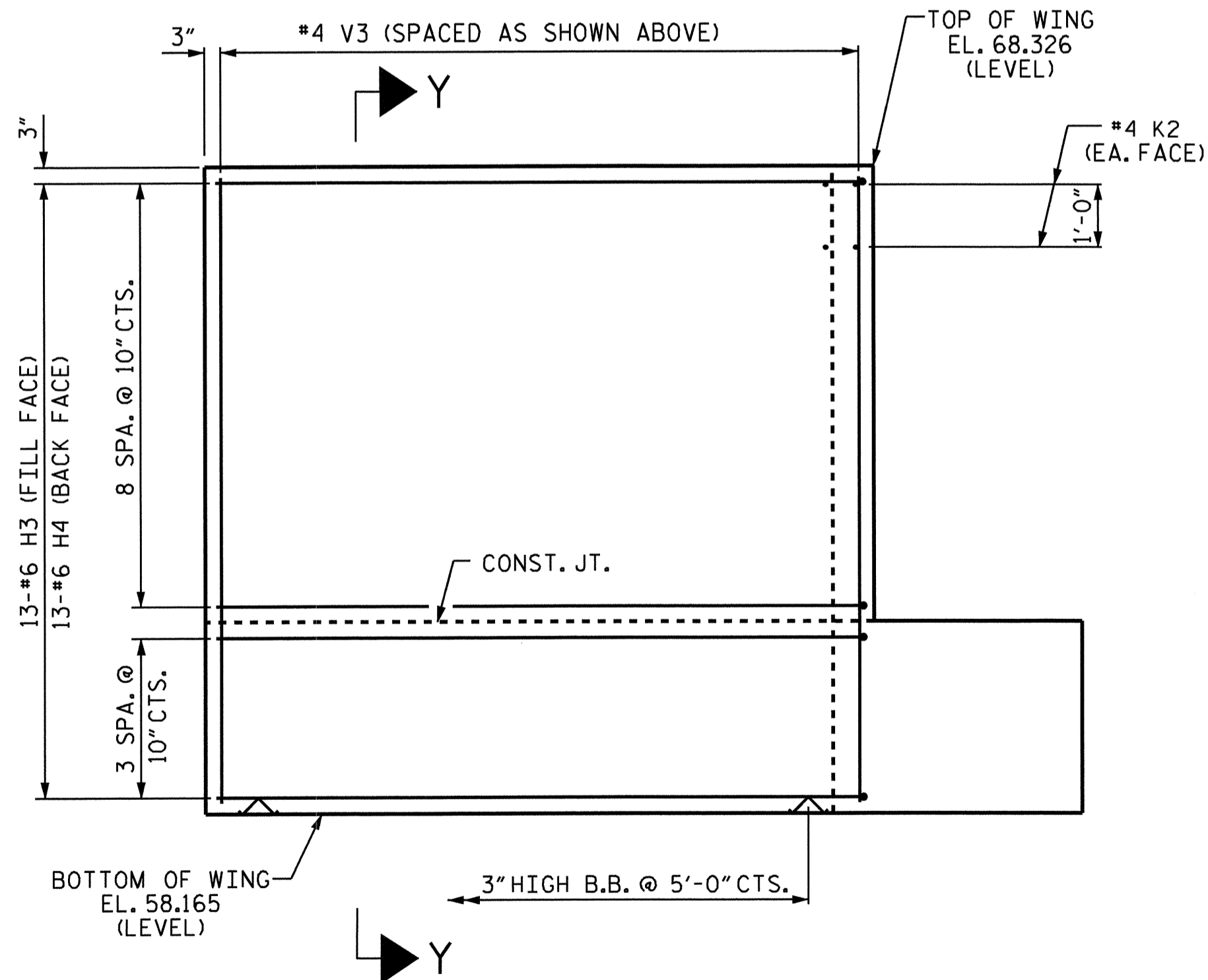




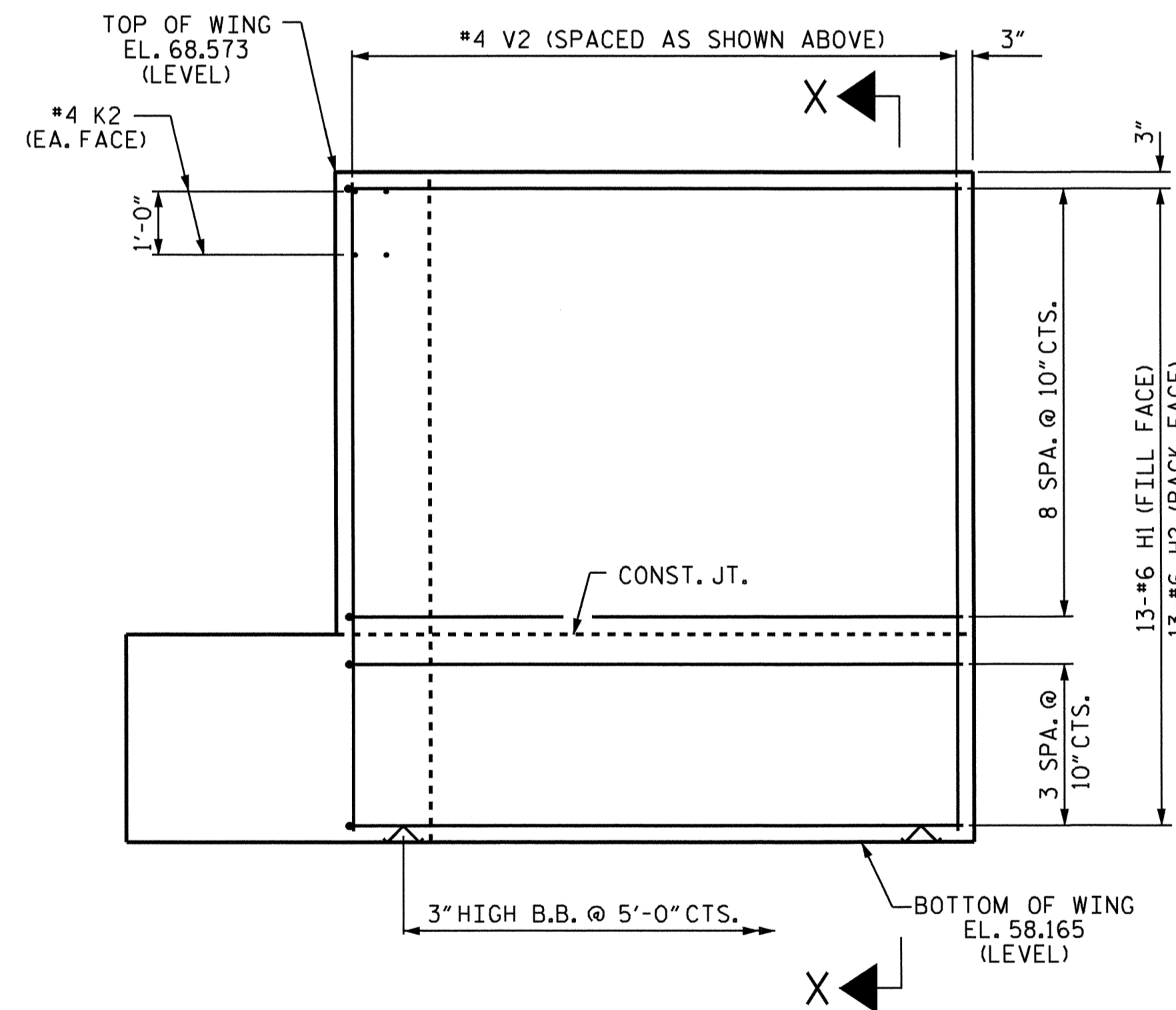
PLAN OF WING (W1)



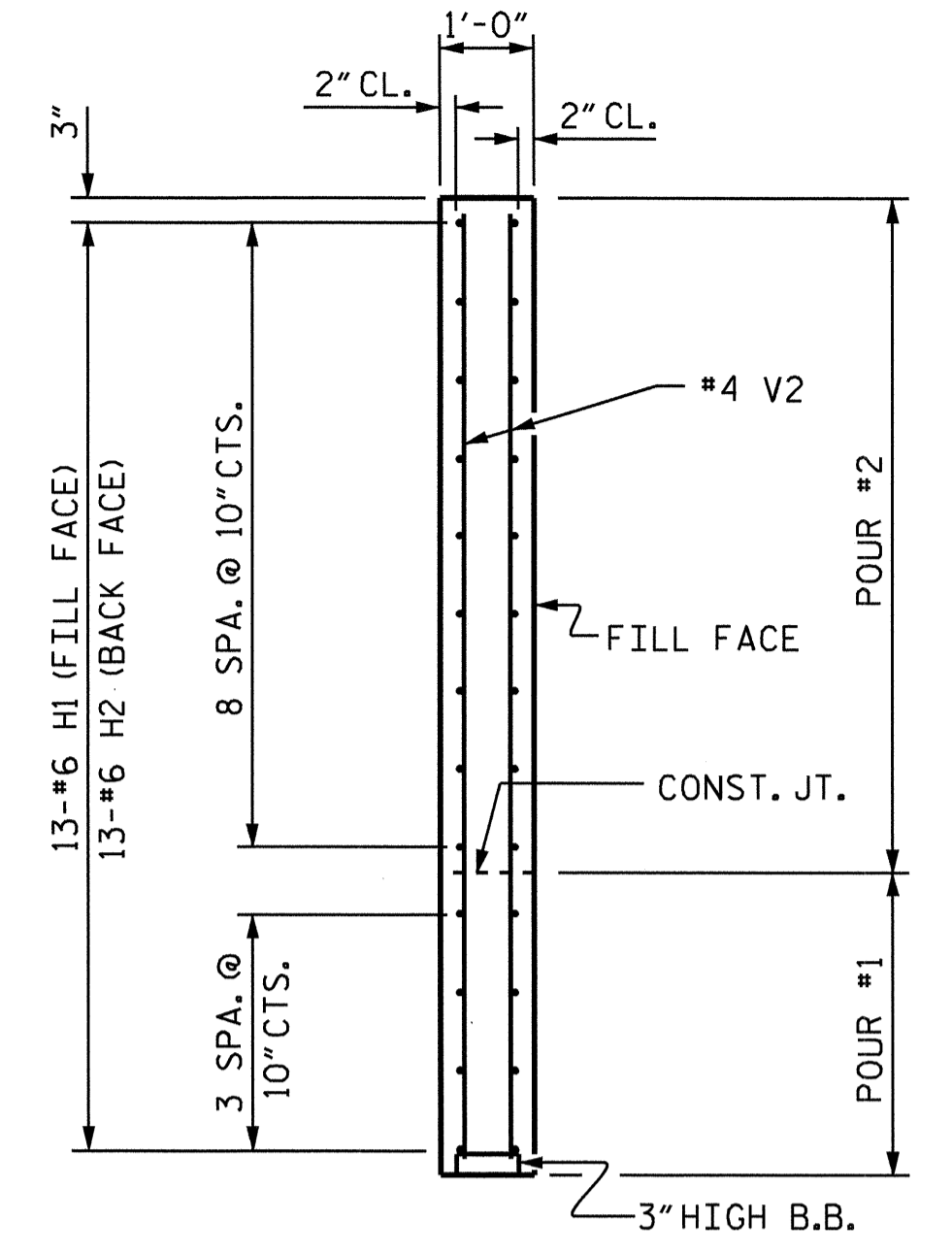
PLAN OF WING (W2)



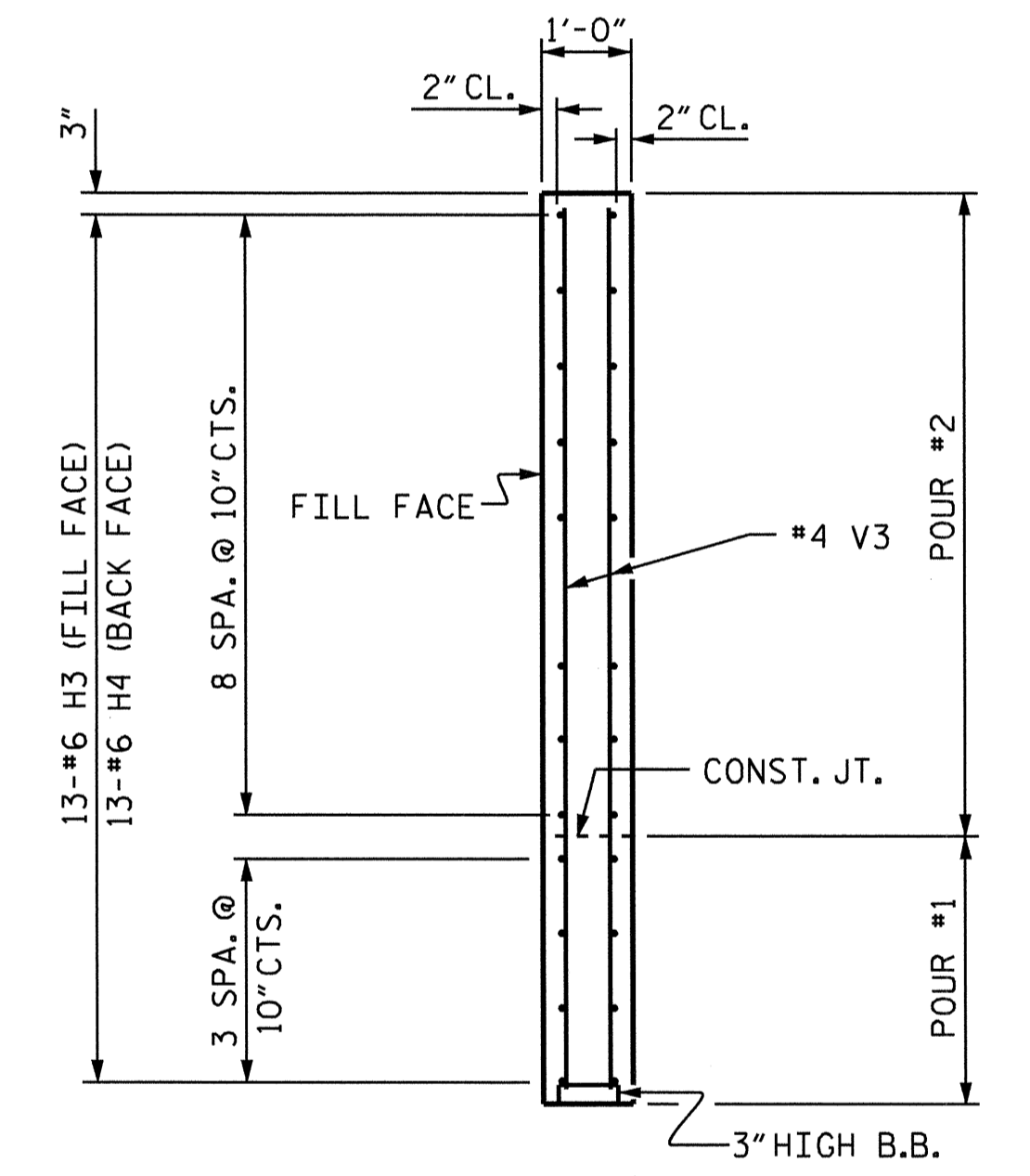
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION X-X



SECTION Y-Y

PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

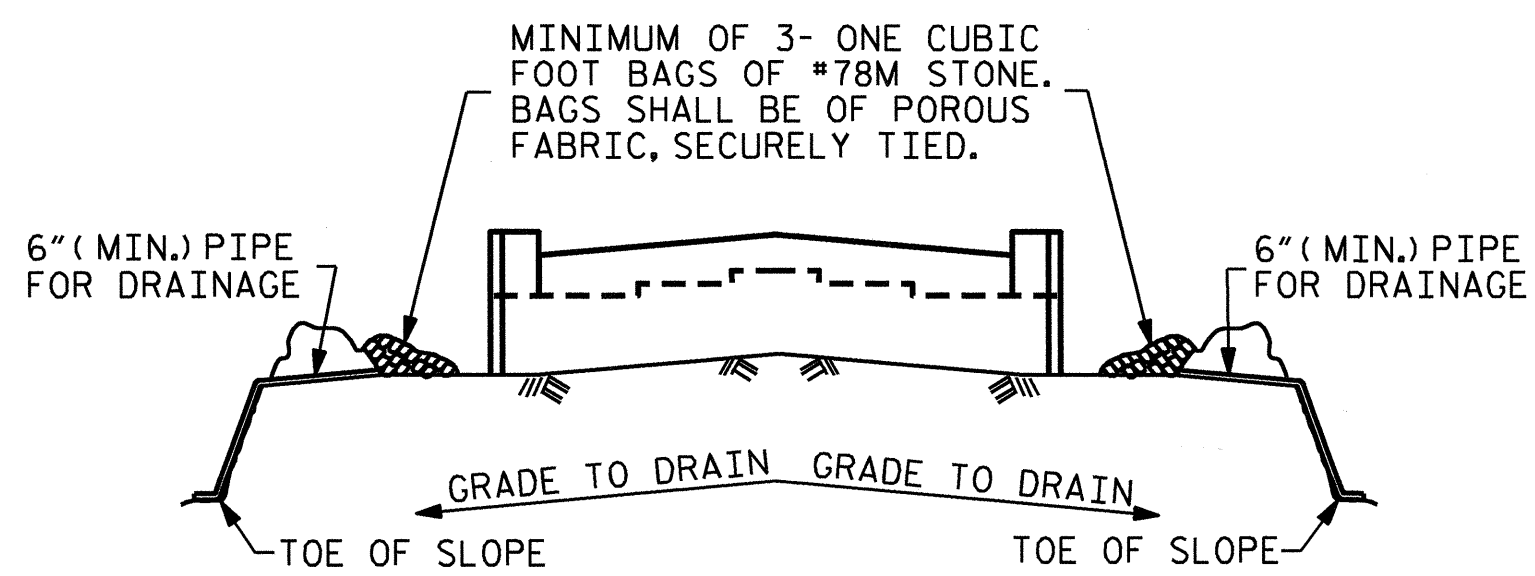
SHEET 2 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 2

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24	
1			3			TOTAL SHEETS 28	
2			4				

DRAWN BY : A. V. ROYAL DATE : 1/11  
 CHECKED BY : S. B. WILLIAMS DATE : 1/11

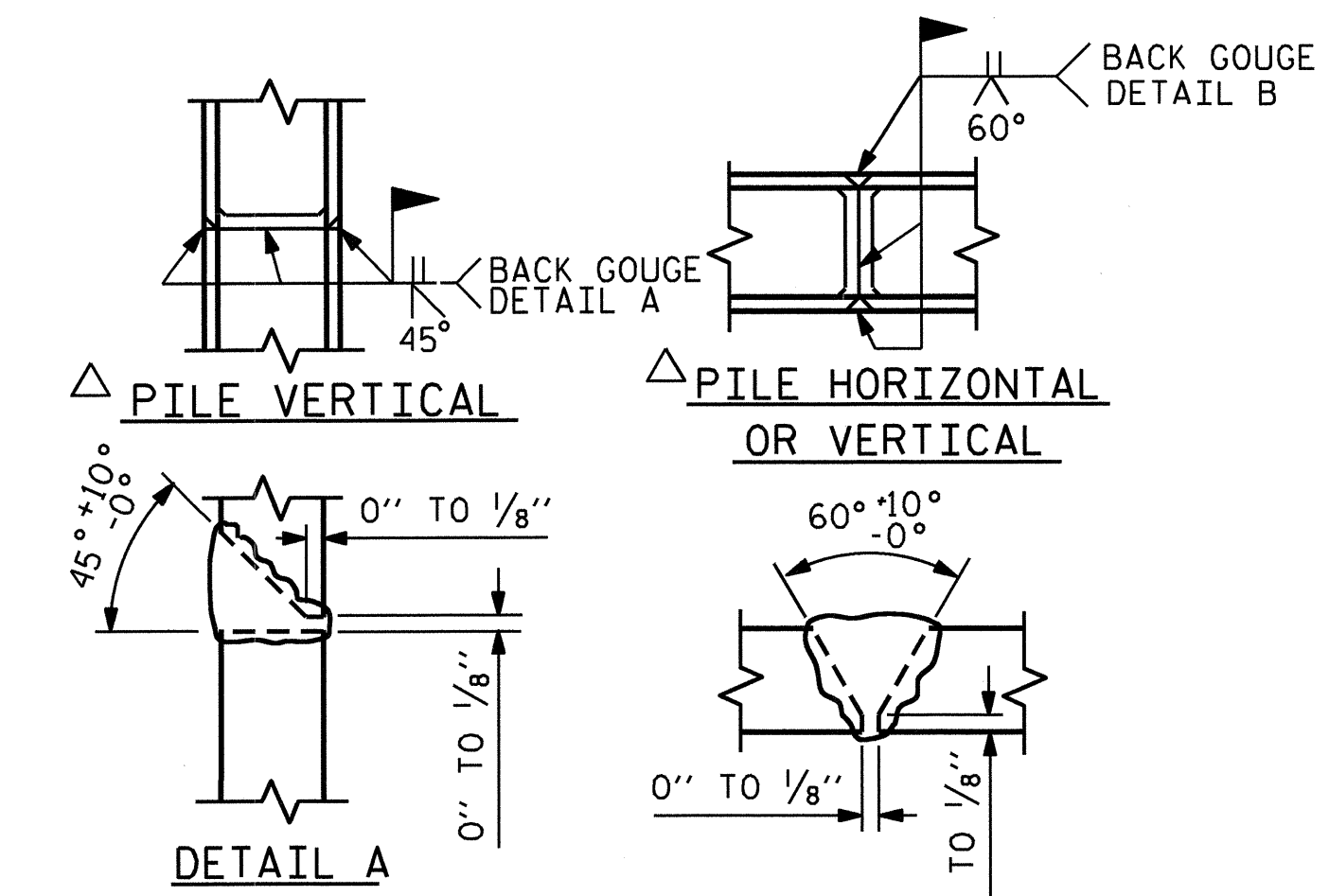


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

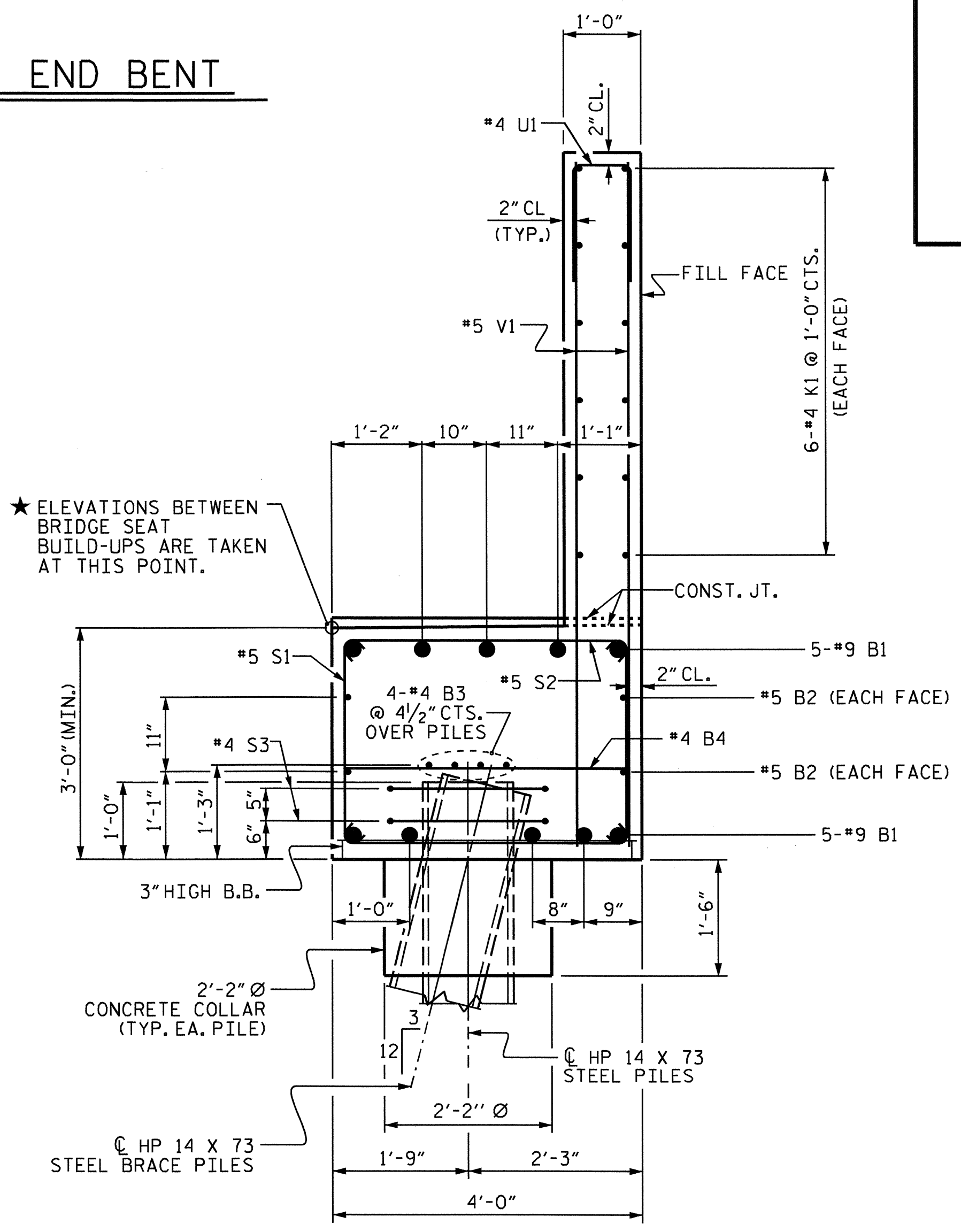
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

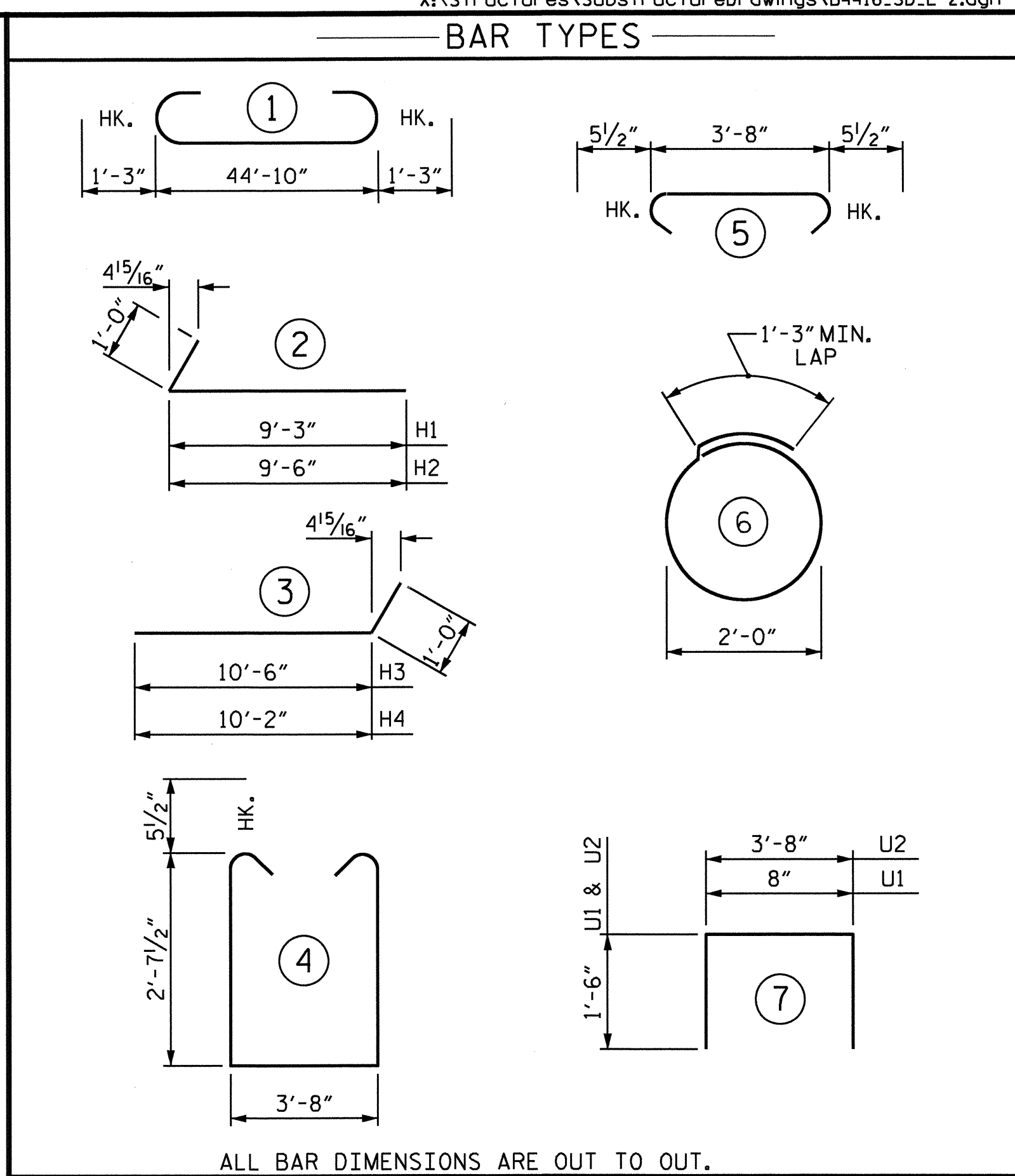
**TEMPORARY DRAINAGE AT END BENT**



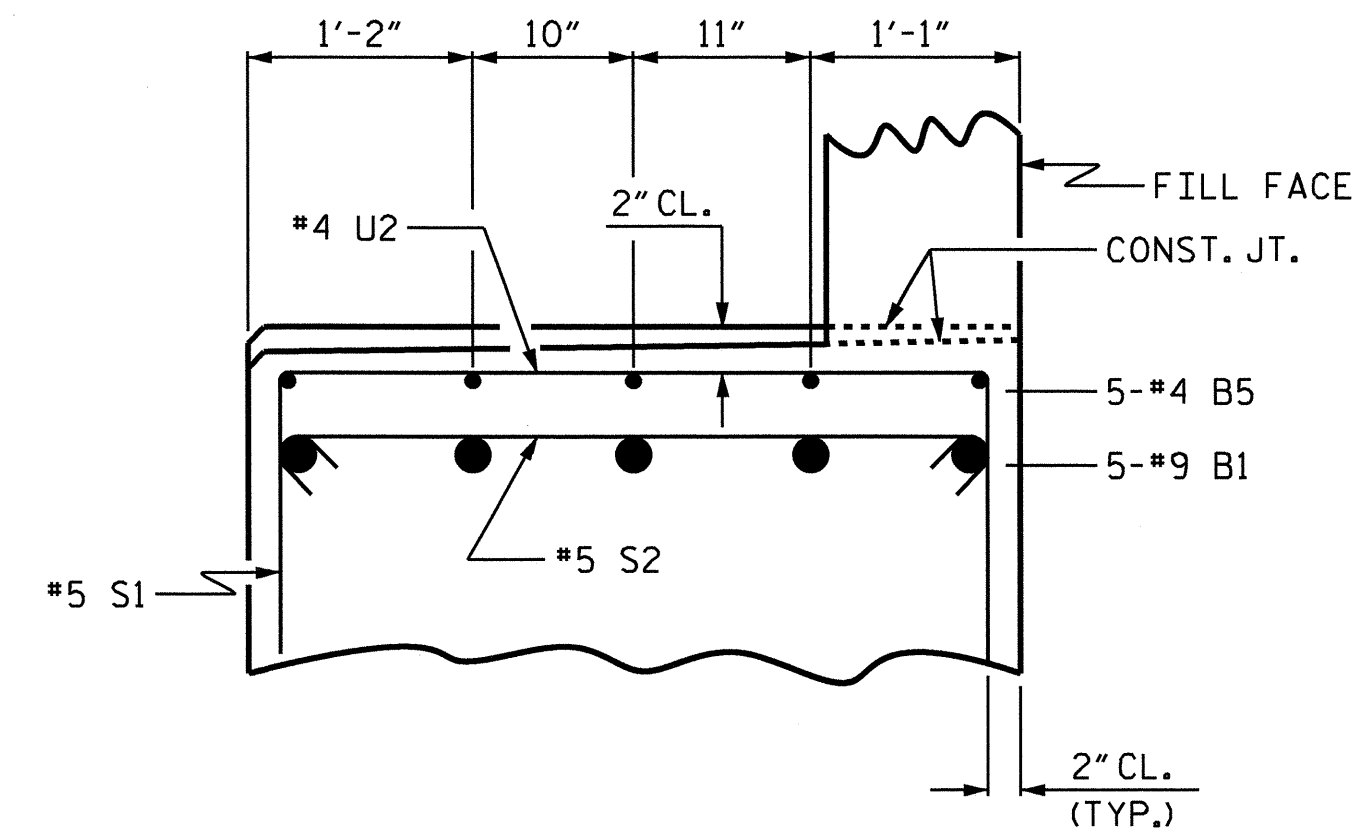
**PILE SPLICE DETAILS**



**SECTION A-A**



BILL OF MATERIAL					
END BENT No. 2					
BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9		47'-4"	1609
B2	4	#5	STR	45'-0"	188
B3	8	#4	STR	23'-9"	127
B4	11	#4	STR	3'-8"	27
B5	15	#4	STR	2'-8"	27
H1	13	#6		10'-3"	200
H2	13	#6		10'-6"	205
H3	13	#6		11'-6"	225
H4	13	#6		11'-2"	218
K1	24	#4	STR	23'-9"	381
K2	8	#4	STR	2'-10"	15
S1	77	#5		9'-10"	790
S2	77	#5		4'-7"	368
S3	12	#4		7'-7"	61
U1	39	#4		3'-8"	96
U2	9	#4		6'-8"	40
V1	78	#5	STR	8'-5"	685
V2	26	#4	STR	10'-0"	174
V3	28	#4	STR	9'-9"	182
REINFORCING STEEL					5618 LBS.
CLASS A CONCRETE					
POUR #1 (CAP, LOWER WINGS & COLLARS)					24.9 C.Y.
POUR #2 (UPPER WINGS & BACKWALL)					15.1 C.Y.
TOTAL =					40.0 C.Y.
HP 14 X 73 STEEL PILES					
No. = 6					420 LIN. FT.



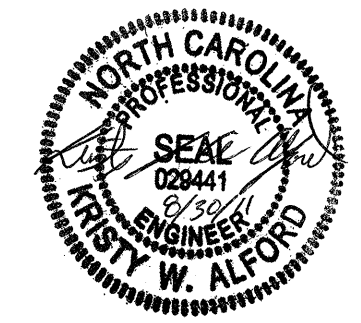
**PARTIAL SECTION B-B**

PROJECT NO. B-4416

BEAUFORT COUNTY

STATION: 16+92.27 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT No. 2

DRAWN BY: A. V. ROYAL DATE: 1/11

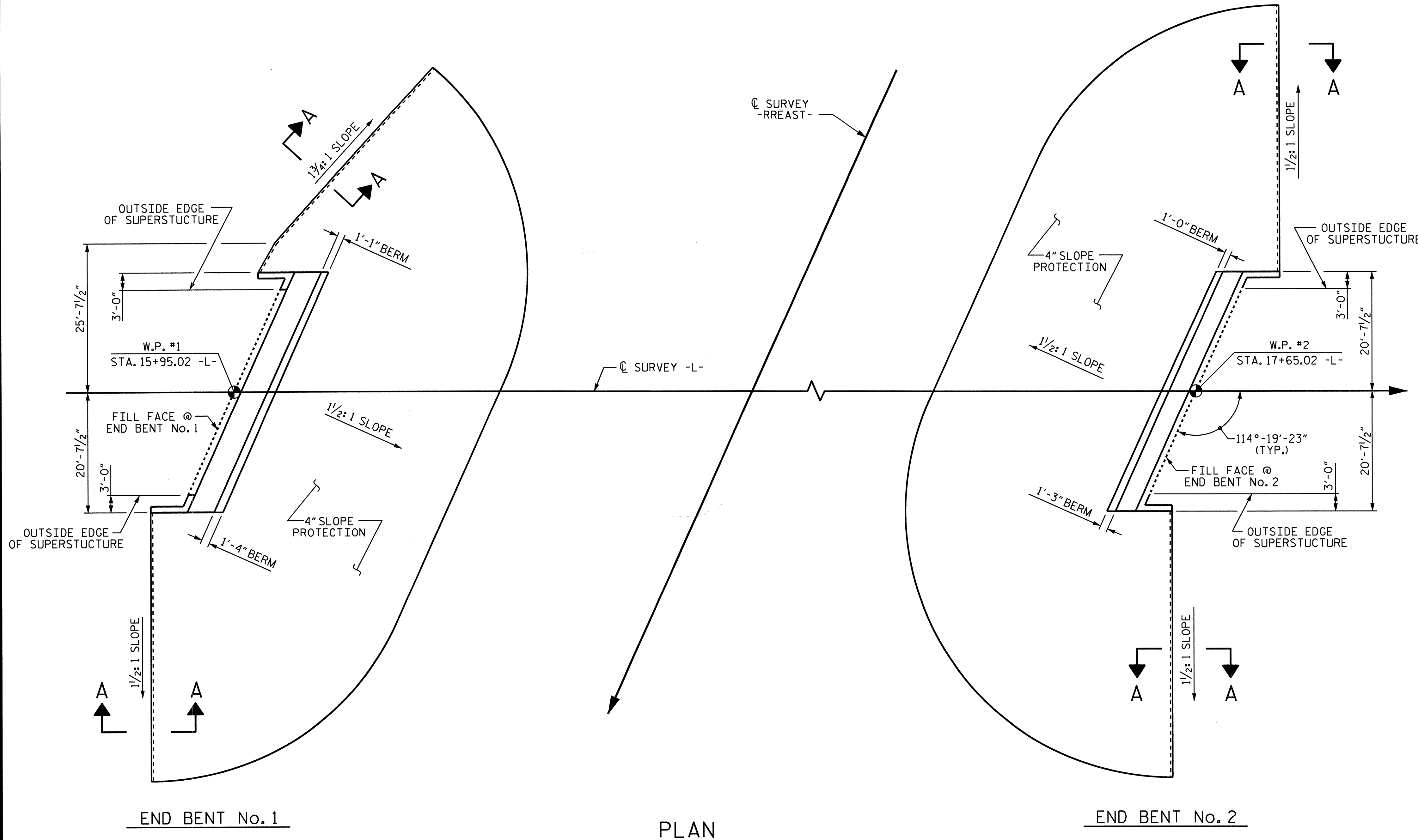
CHECKED BY: S. B. WILLIAMS DATE: 1/11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			28

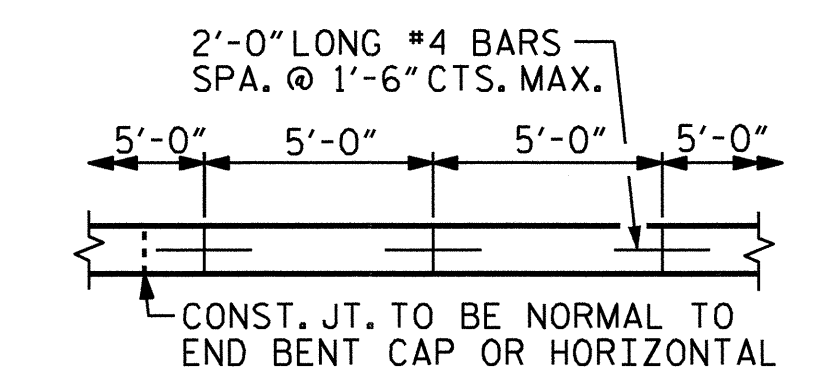
GENERAL NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. 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.

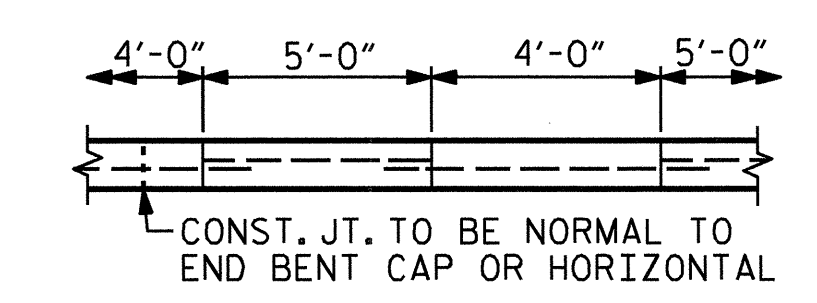
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL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



PLAN



POURING DETAIL

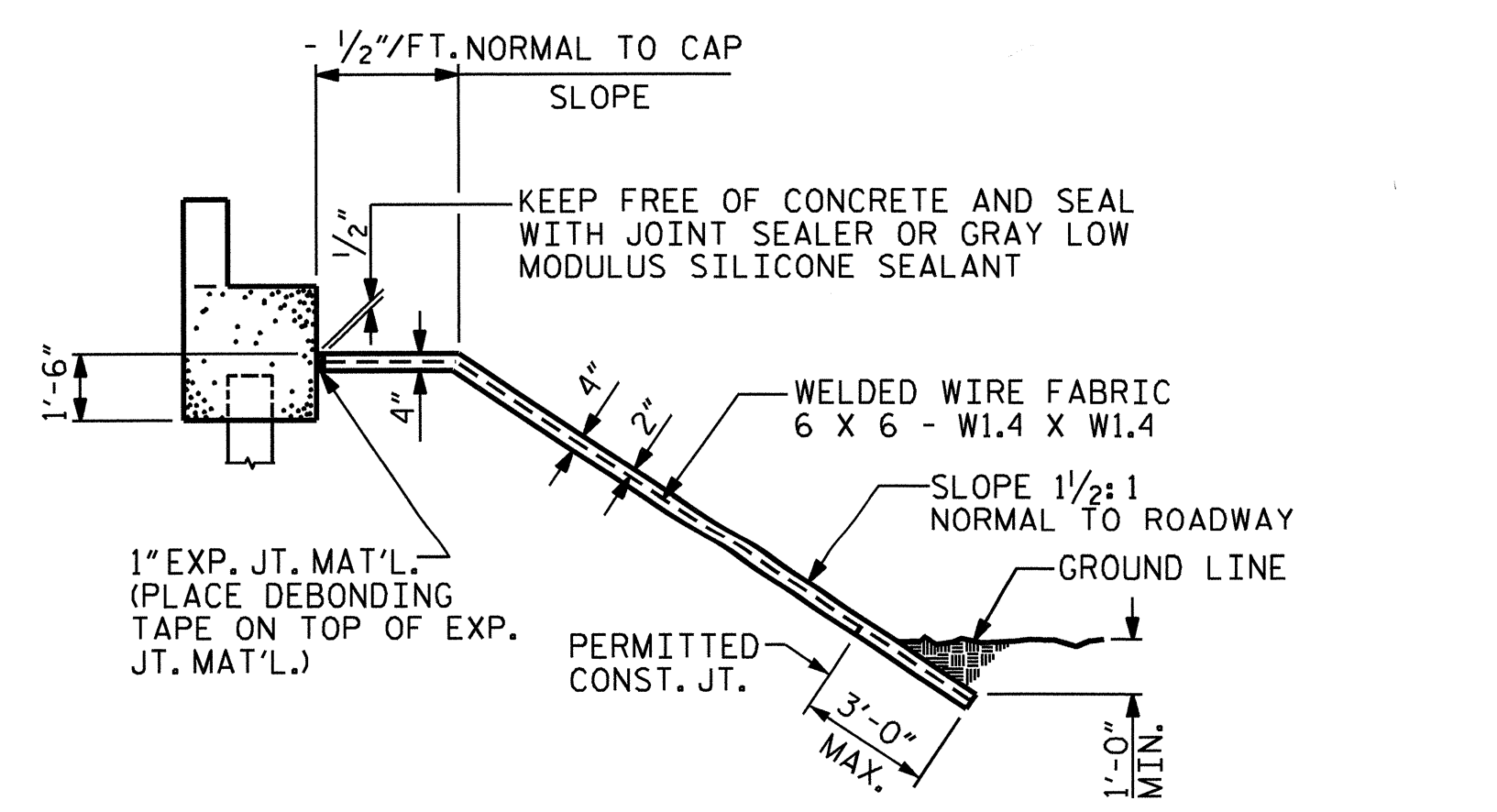


OPTIONAL POURING DETAIL

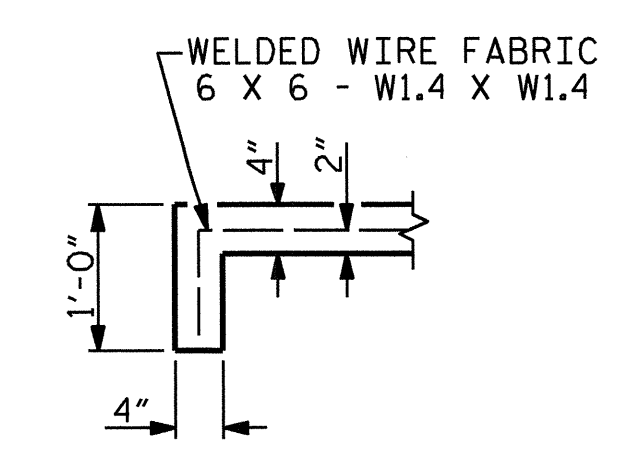
ESTIMATED QUANTITIES		
BRIDGE @ STA. 16+92.27 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT No. 1	545	980
END BENT No. 2	620	1115

\* QUANTITY SHOWN IS BASED ON 5' POURS.

PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-



SECTION ALONG  $\bar{C}$  ROADWAY WHEN DITCH IS NOT PROVIDED



SECTION A-A

DETAILS FOR SLOPE PROTECTION

DRAWN BY: A. V. ROYAL DATE: 01/11  
 CHECKED BY: M. L. BROWN DATE: 01/11

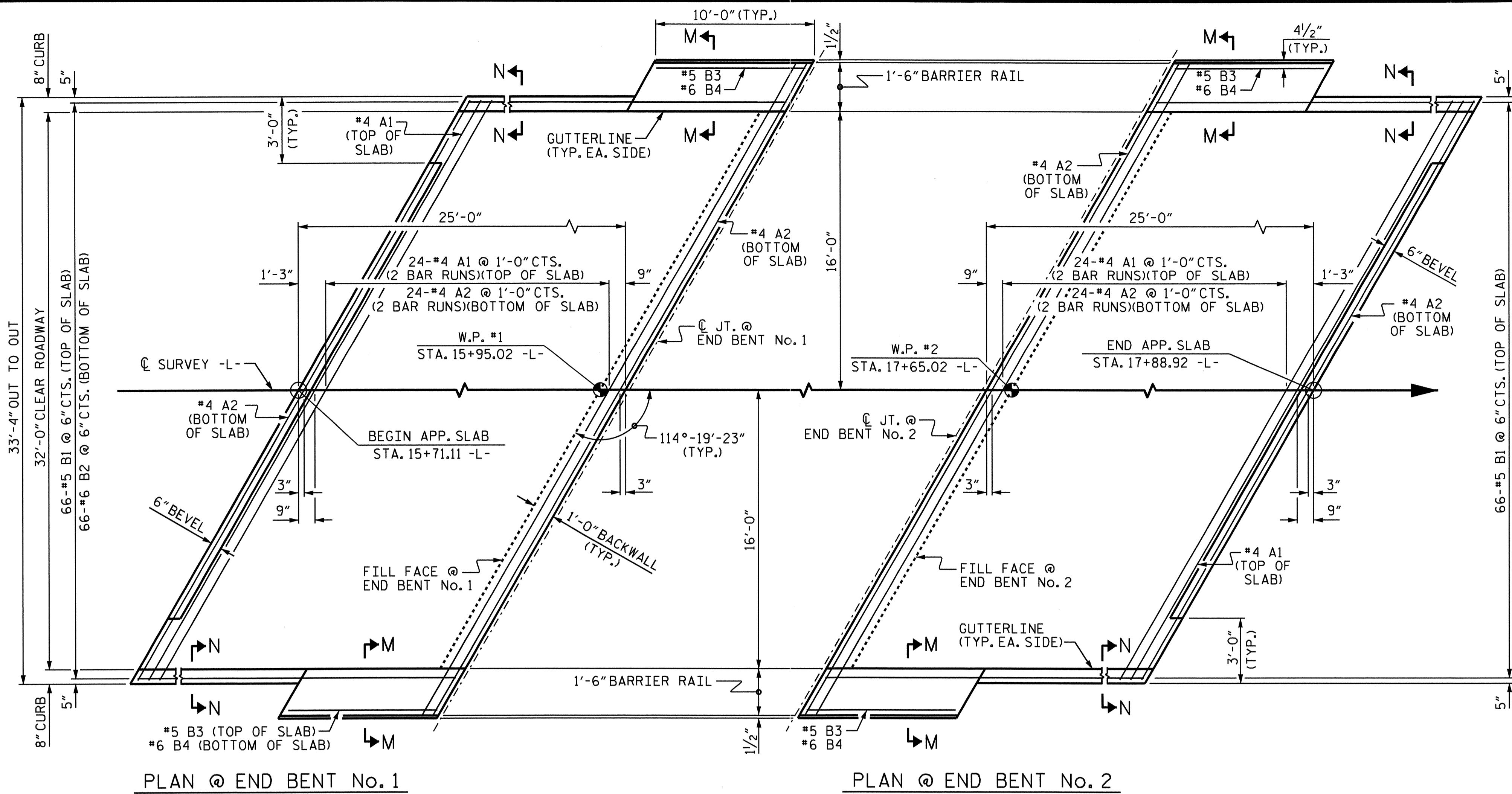
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 kaiford



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 SLOPE PROTECTION  
 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			28



PLAN @ END BENT No. 1

PLAN @ END BENT No. 2

**PLAN OF APPROACH SLAB**

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

**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.

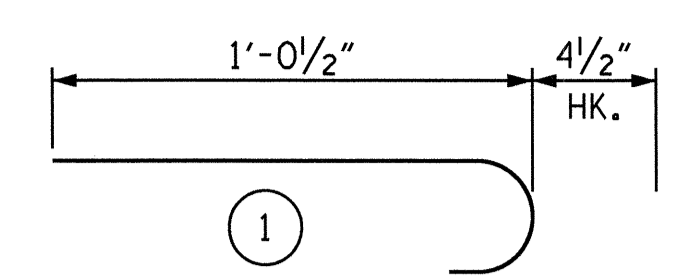
THE 6" COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 1'-0" OUTSIDE EACH EDGE OF THE APPROACH SLAB.

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.

\* FOR PLACEMENT OF #4 J1 BARS, SEE "EXPANSION JOINT SEAL DETAILS" SHEET.

**BAR TYPES**



ALL BAR DIMENSION ARE OUT TO OUT

**BILL OF MATERIAL**

APPROACH SLAB AT EB No. 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	20'-3"	676
A2	52	#4	STR	20'-1"	698
*B1	66	#5	STR	24'-1"	1658
B2	66	#6	STR	24'-7"	2437
*B3	2	#5	STR	9'-7"	20
B4	2	#6	STR	9'-7"	29
*J1	33	#4	1	1'-5"	31

REINFORCING STEEL	3164 LBS
*EPOXY COATED REINFORCING STEEL	2385 LBS

CLASS AA CONCRETE	32.5 C. Y.
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**APPROACH SLAB AT EB No. 2**

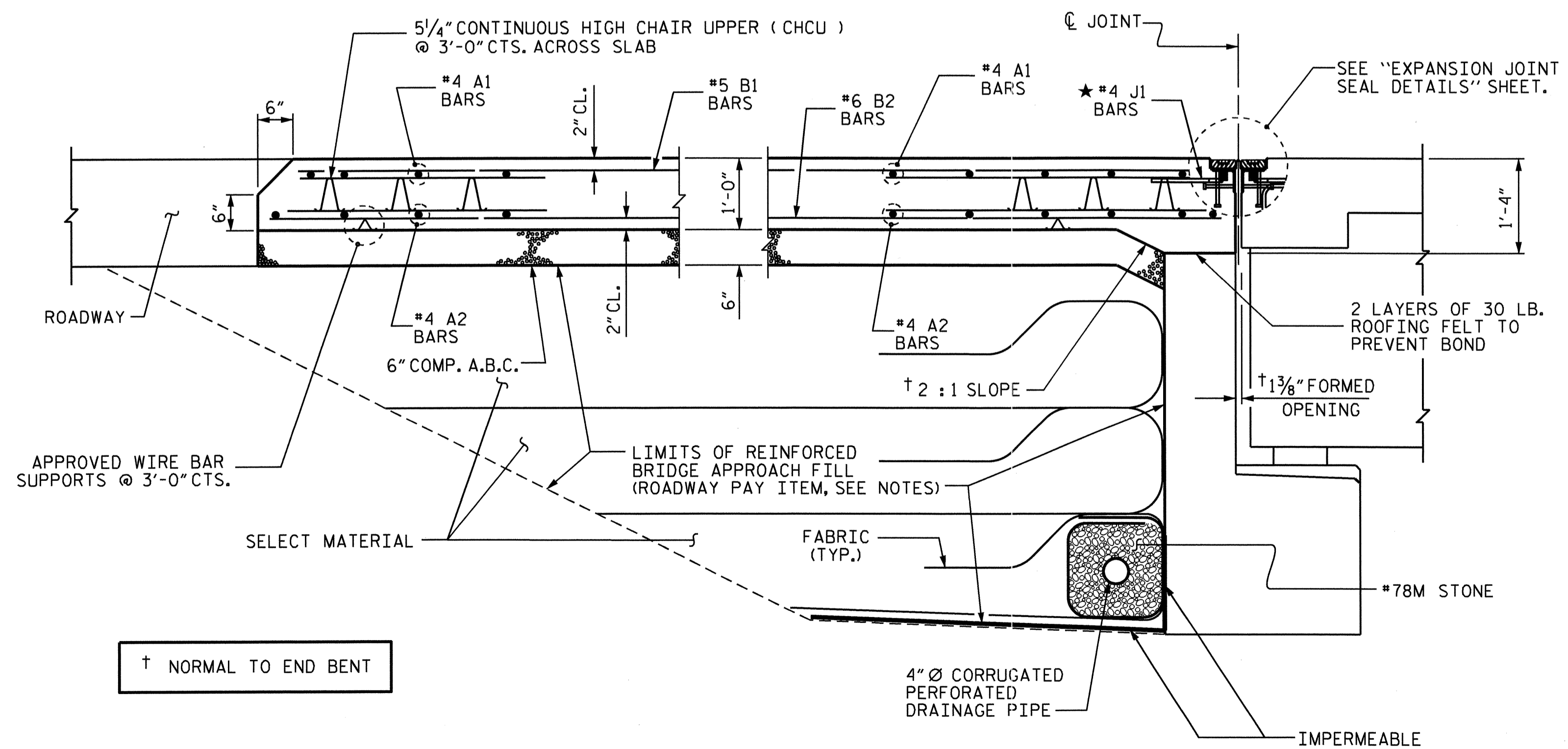
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	20'-3"	676
A2	52	#4	STR	20'-1"	698
*B1	66	#5	STR	24'-1"	1658
B2	66	#6	STR	24'-7"	2437
*B3	2	#5	STR	9'-7"	20
B4	2	#6	STR	9'-7"	29
*J1	33	#4	1	1'-5"	31

REINFORCING STEEL	3164 LBS
*EPOXY COATED REINFORCING STEEL	2385 LBS

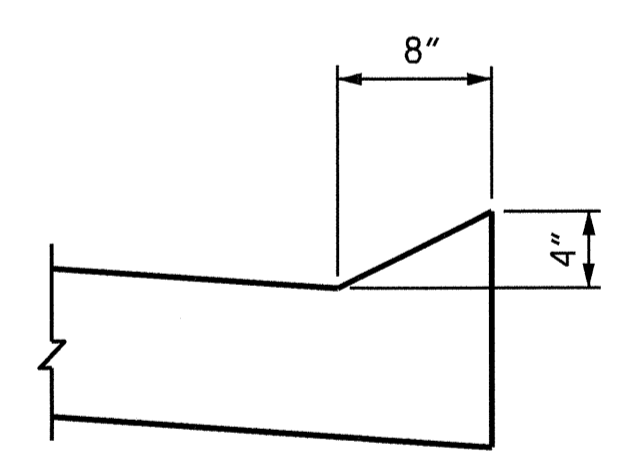
CLASS AA CONCRETE	32.5 C. Y.
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**SPLICE LENGTH CHART**

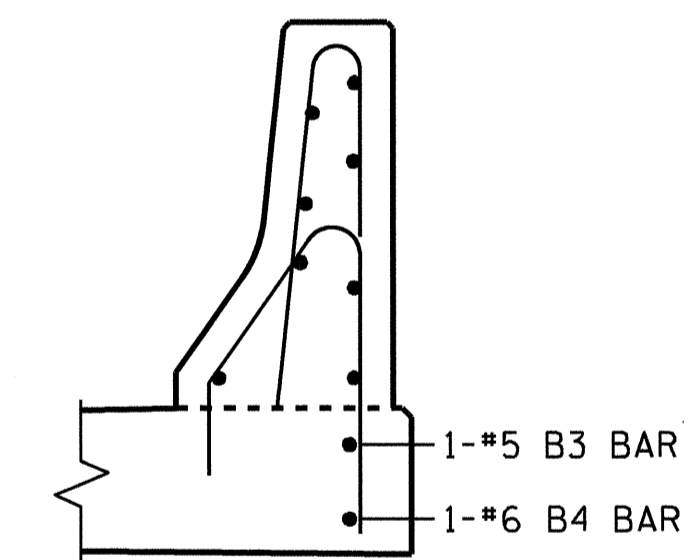
SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



**SECTION THRU SLAB**

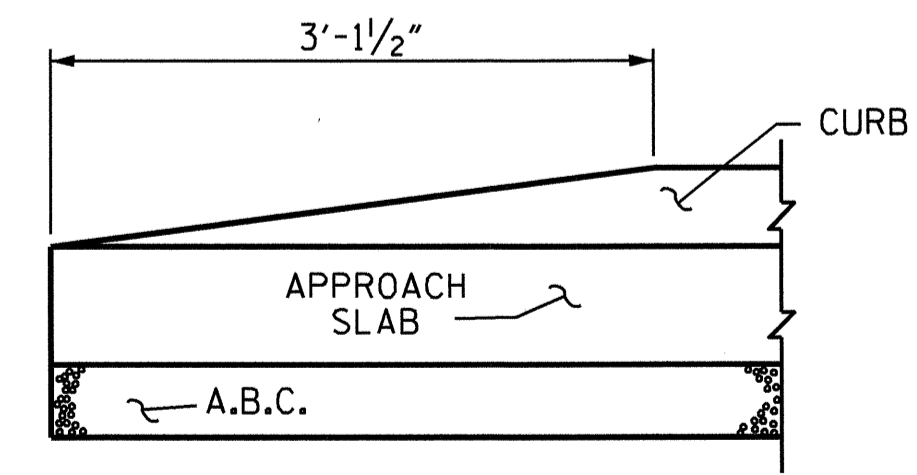


SECTION N-N



SECTION M-M

FOR REINFORCING STEEL LOCATION AND QUANTITIES AND BARRIER RAIL CONCRETE QUANTITIES, SEE "CONCRETE BARRIER RAIL" SHEET.



END OF CURB WITHOUT SHOULDER BERM GUTTER

**CURB DETAILS**

ASSEMBLED BY : M. K. TOM	DATE : 03/11
CHECKED BY : A. V. ROYAL	DATE : 04/11
DRAWN BY : EEM 3/95	REV. 7/10/01 LES/RDR
CHECKED BY : VAP 3/95	REV. 5/7/03R RWW/JTE
	REV. 5/1/06R KMM/GM

PROJECT NO. B-4416  
BEAUFORT COUNTY  
 STATION: 16+92.27 -L-

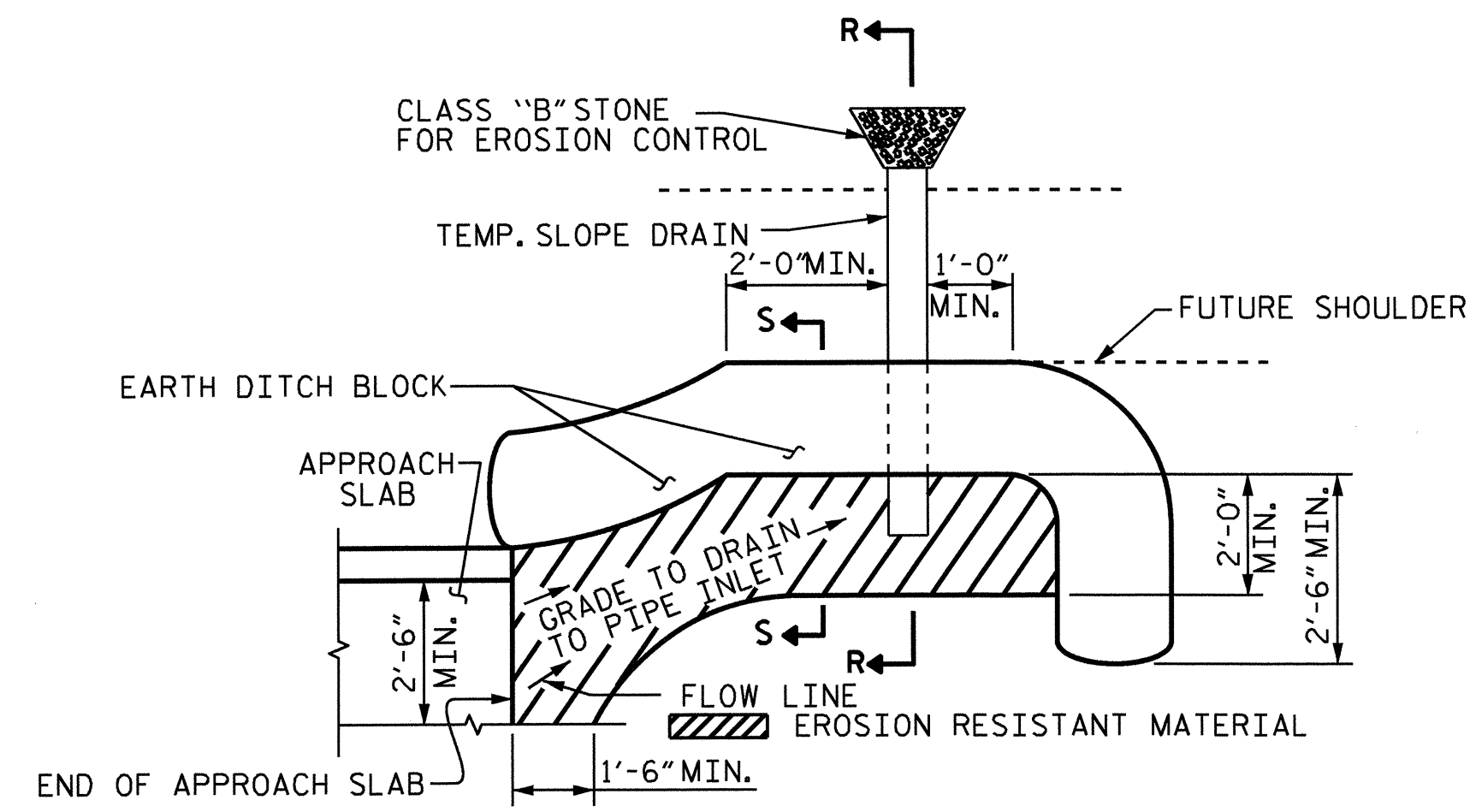
SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 BRIDGE APPROACH  
 SLAB FOR  
 FLEXIBLE PAVEMENT

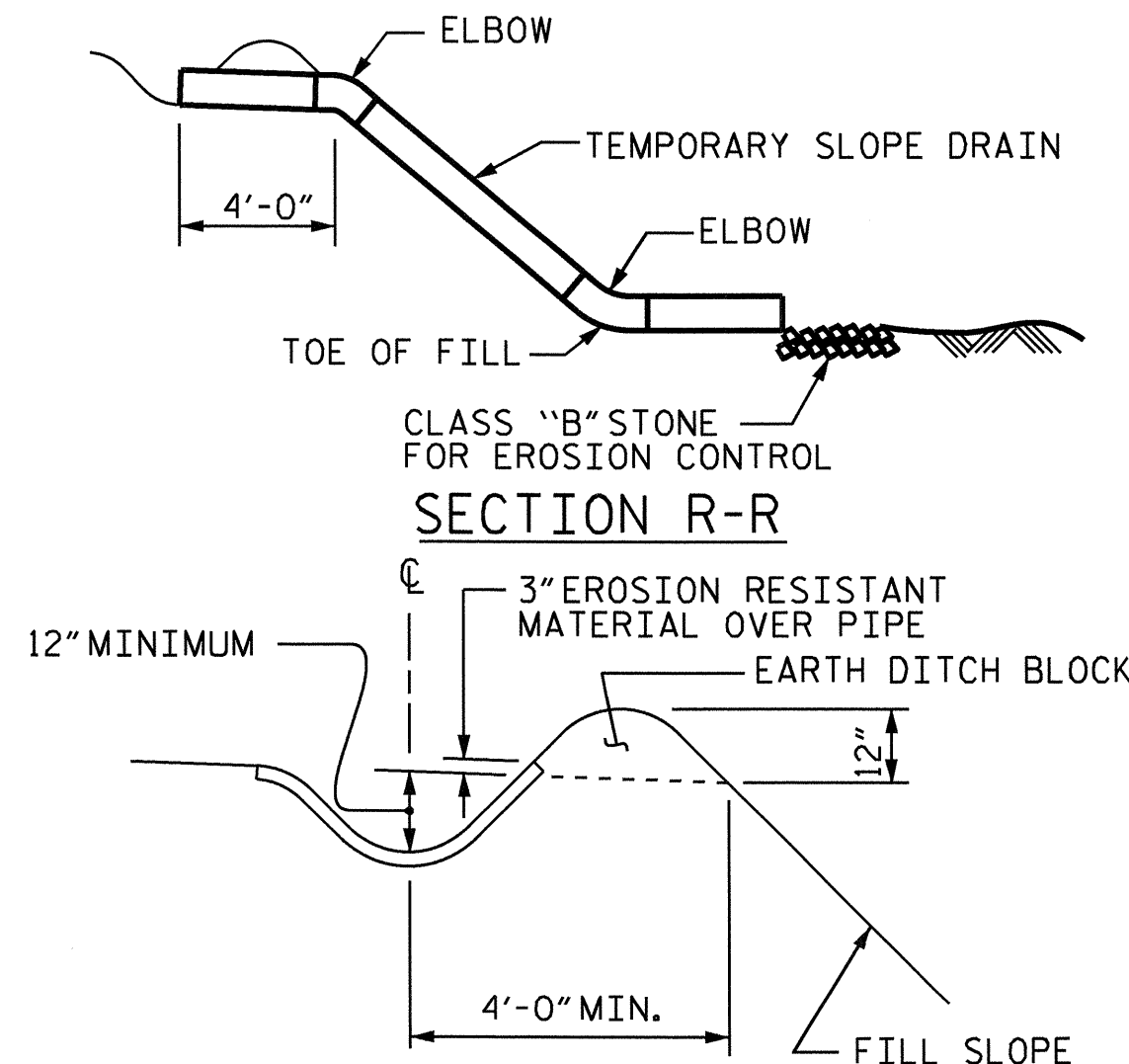
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 28



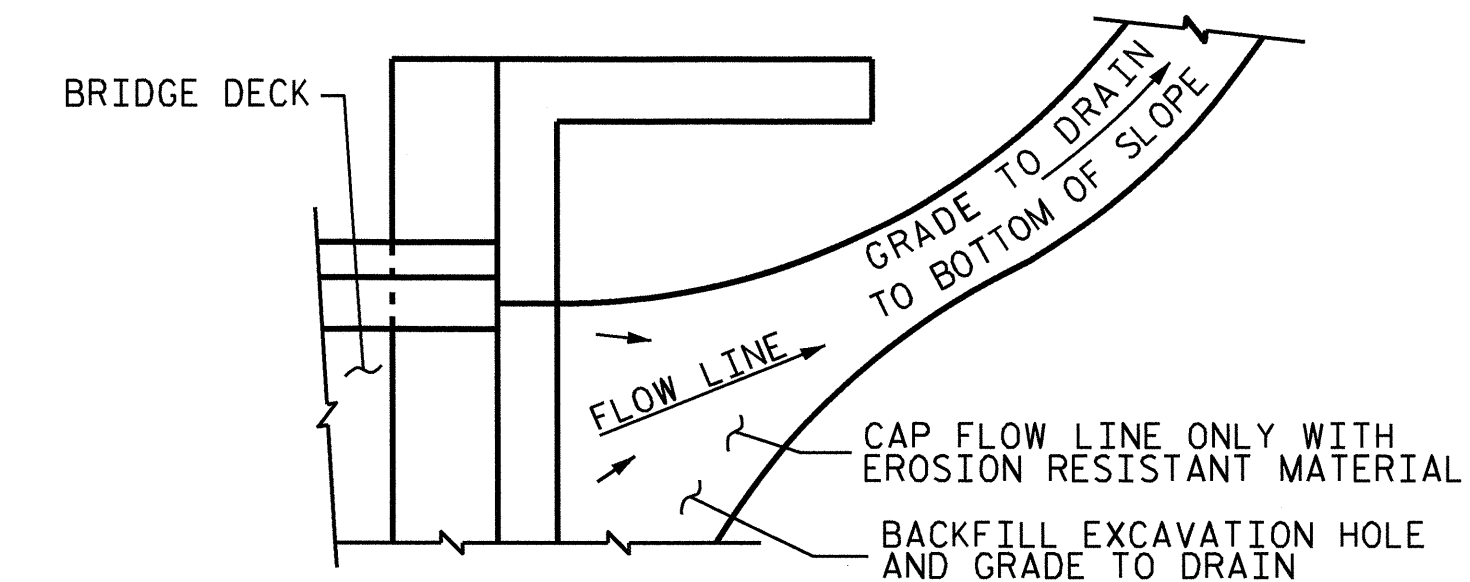
NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW



SECTION R-R

SECTION S-S



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

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

PROJECT NO. B-4416  
BEAUFORT COUNTY  
STATION: 16+92.27 -L-

SHEET 2 OF 2



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

ASSEMBLED BY : M. K. TOM	DATE : 03/11
CHECKED BY : A. V. ROYAL	DATE : 04/11
DRAWN BY : FCJ 11/88	REV. 10/17/00 RWW/LES
CHECKED BY : ARB 11/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06R MAA/KMM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			28

## 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. FINISH AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

### SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN