

TIP PROJECT: R-2246B

CONTRACT: C203093

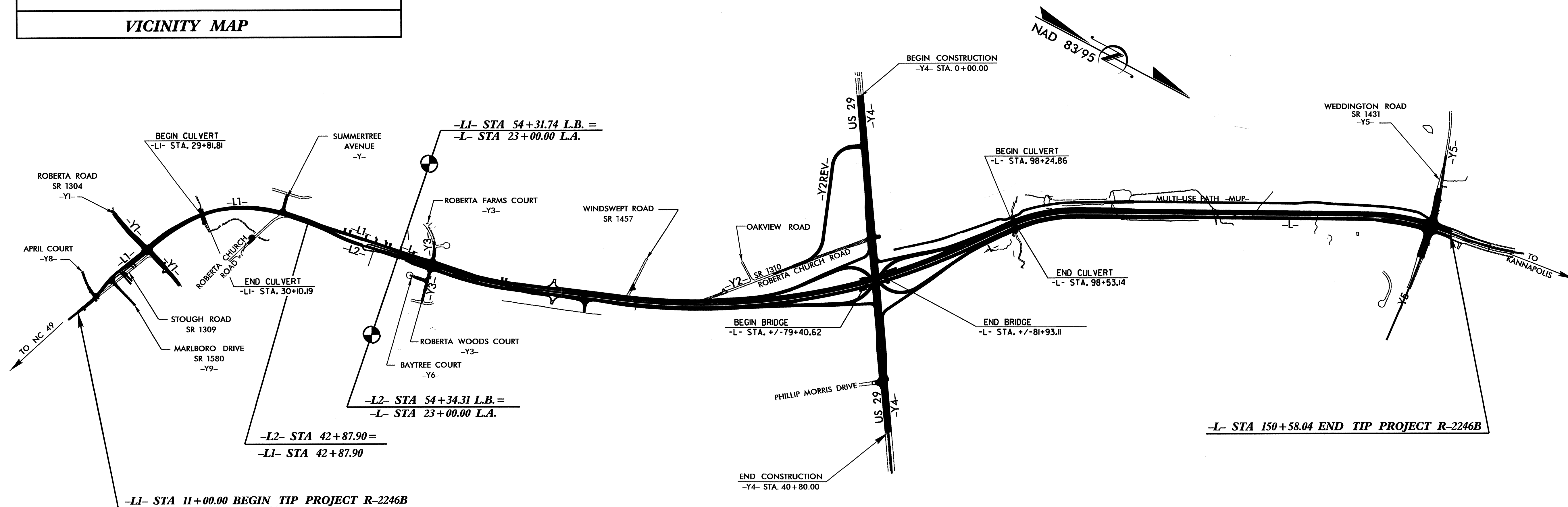
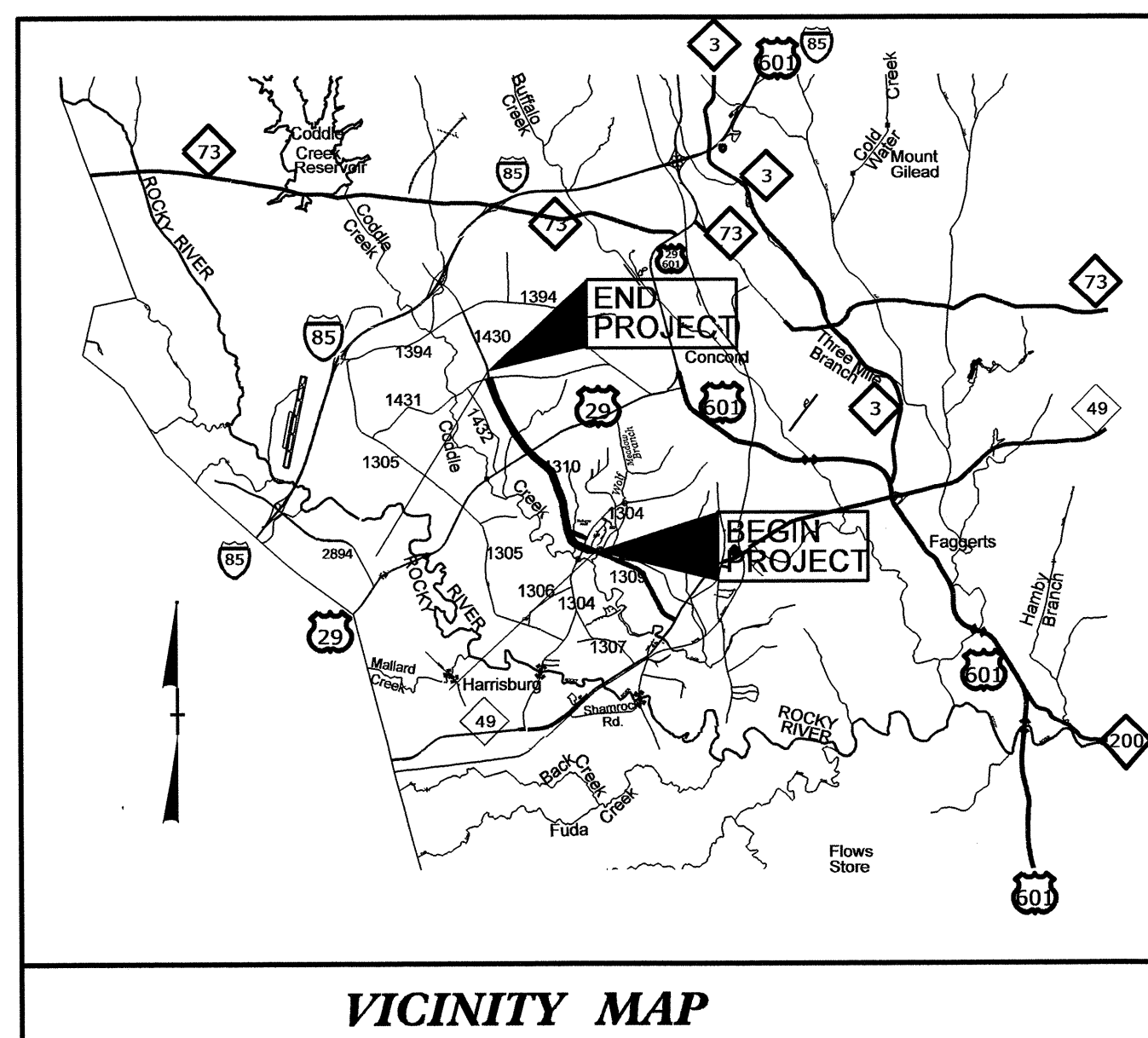
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CABARRUS COUNTY

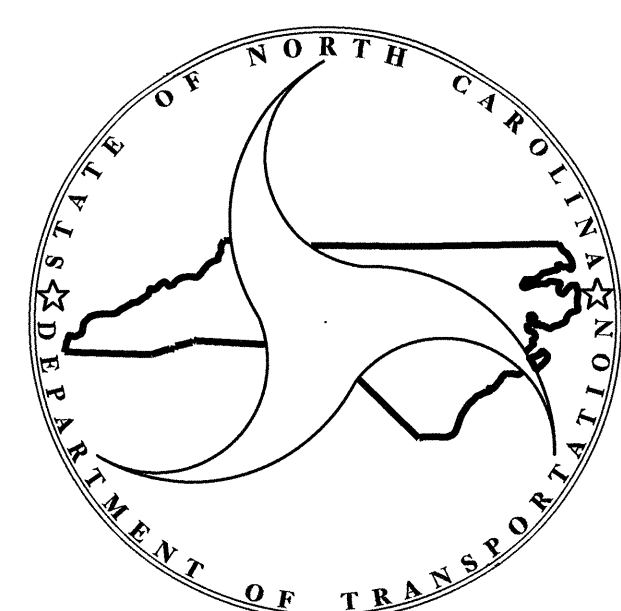
**LOCATION: GEORGE LILES PARKWAY FROM SOUTH OF SR 1304
(ROBERTA ROAD) TO SR 1431 (WEDDINGTON ROAD)**

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2246B		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34408.1.1	STP-000S(46)	PE	
34408.2.6	STP-000S(684)	RW & UTIL	
34408.3.5	STP-1304(13)	CONST.	



STRUCTURES



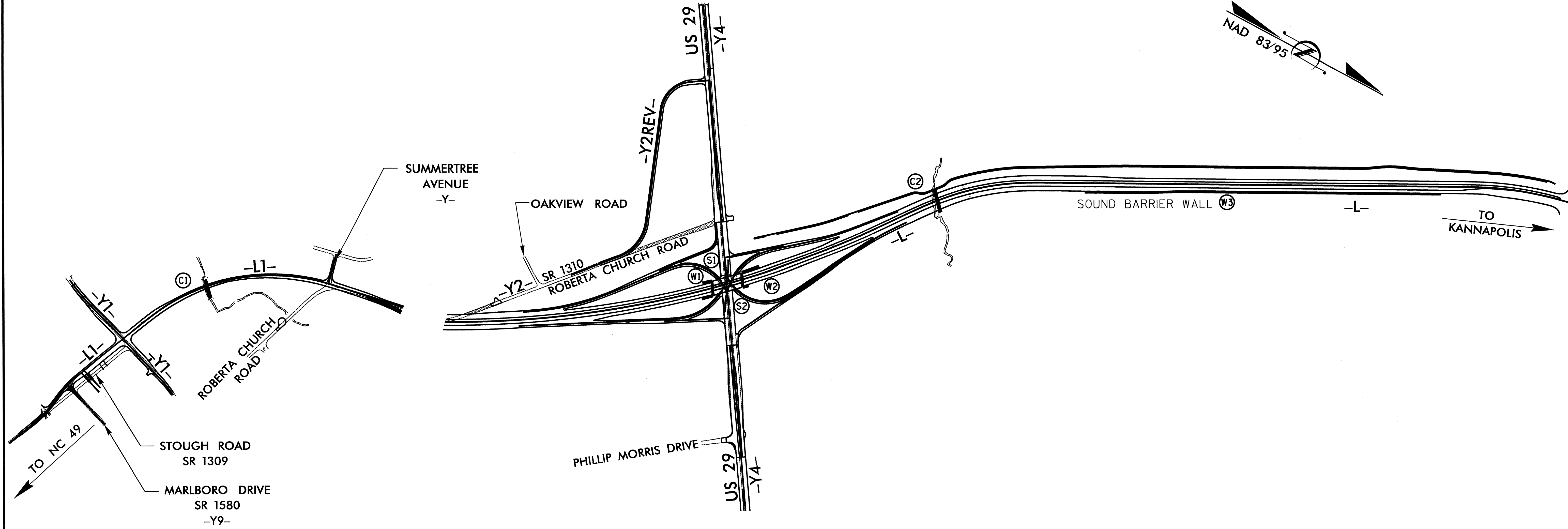
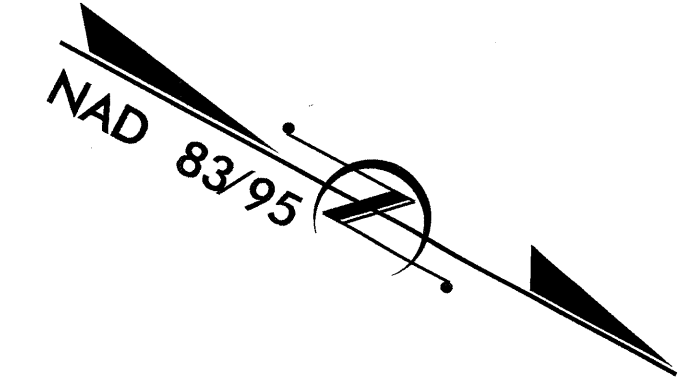
DESIGN DATA	
ADT 2013 =	23,600
ADT 2035 =	42,000
DHV =	10 %
DIR =	55 %
T =	5 % *
V =	60 MPH
* TTST 1% DUAL 4%	
REGIONAL TIER URBAN ARTERIAL	

PROJECT LENGTH	
LENGTH ROADWAY TIP PROJECT R-2246B =	3.178 MILES
LENGTH STRUCTURE TIP PROJECT R-2246B =	0.059 MILES
TOTAL LENGTH TIP PROJECT R-2246B =	3.237 MILES

Prepared In the Office of:	
DIVISION OF HIGHWAYS	
<small>1000 BIRCH RIDGE DR., RALEIGH, NC 27610</small>	
<small>2012 STANDARD SPECIFICATIONS</small>	
LETTING DATE:	B. C. Hunt, PE PROJECT ENGINEER
MAY 21, 2013	V. A. Patel, PE PROJECT DESIGN ENGINEER

STRUCTURES MANAGEMENT UNIT	

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INDEX			
STRUCTURE NO.	STATION	DESCRIPTION	SHEET NUMBERS
(S1)	STA. 80+56.83 -L-	BRIDGE ON SR 1430 (GEORGE LILES PARKWAY) OVER US 29 BETWEEN SR 1304 AND SR 1431 LEFT LANE	S-1 THRU S-28
(S2)	STA. 80+56.83 -L-	BRIDGE ON SR 1430 (GEORGE LILES PARKWAY) OVER US 29 BETWEEN SR 1304 AND SR 1431 RIGHT LANE	S-28 THRU S-56
(C1)	STA. 29+60.00 -L1-	DOUBLE 13FT. x 10FT. CONCRETE BOX CULVERT 95° SKEW	C-1 THRU C-6
(C2)	STA. 29+96.00 -L1-	DOUBLE 13FT. x 9FT. CONCRETE BOX CULVERT 105° SKEW	C-7 THRU C-12
(W1) (W2)	STA. 80+56.83 -L-	RETAINING WALL 1 @ END BENT #1 RETAINING WALL 2 @ END BENT #2	W-1 THRU W-4
(W3)	STA. 110+98.44 -L-	SOUND BARRIER WALL	W-5 THRU W-7

PROJECT NO. R-2246B
CABARRUS COUNTY

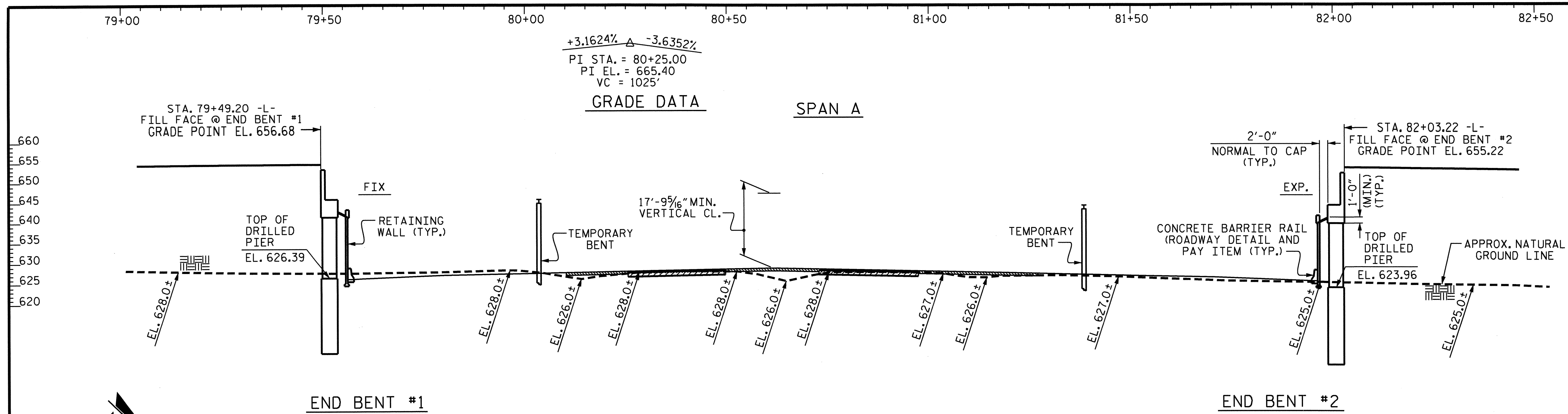
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

INDEX SHEET

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

DRAWN BY : K.D. LAYNE DATE : 11/2012
 CHECKED BY : J.P. ADAMS DATE : 11/29/12

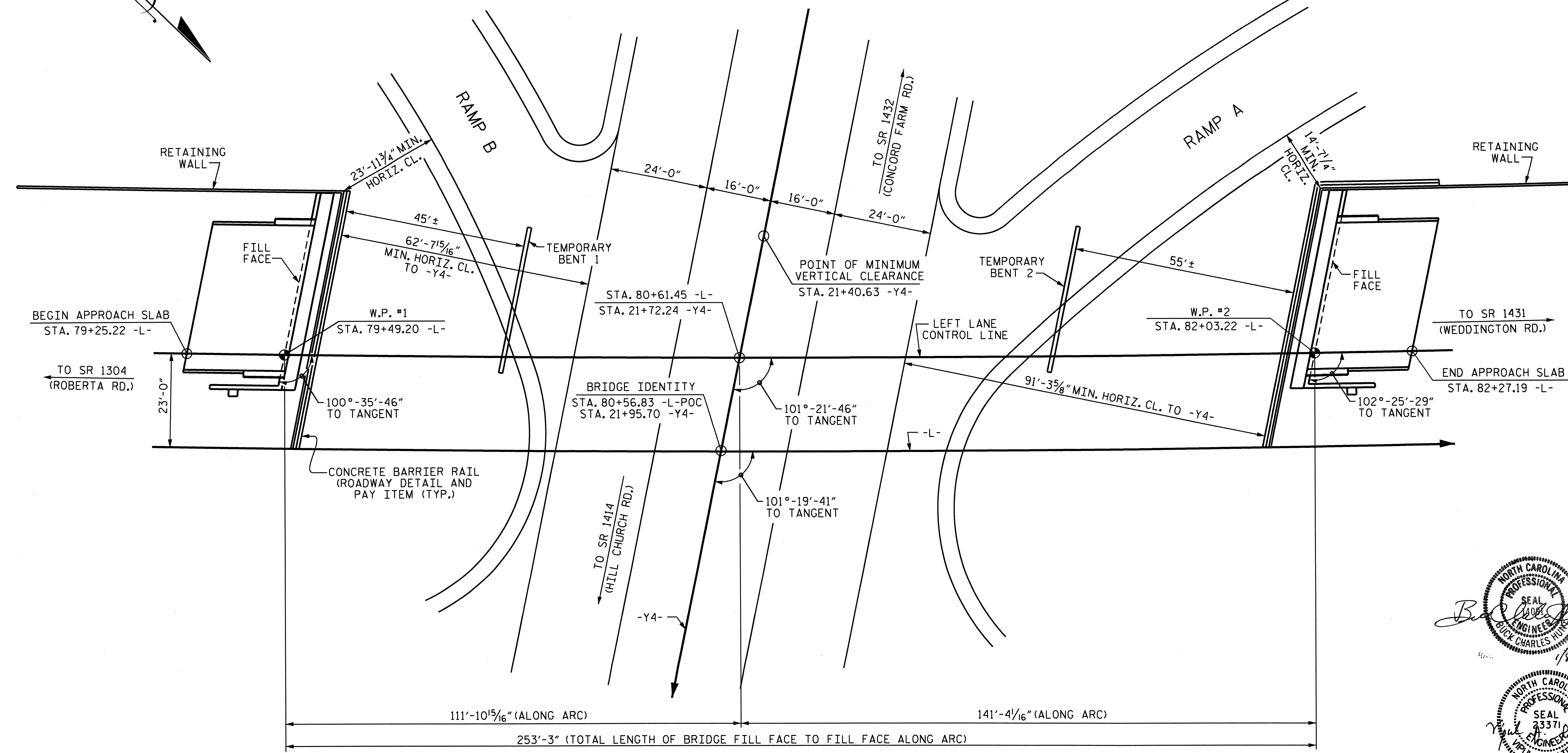
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SECTION ALONG LEFT LANE CONTROL LINE
SECTION TAKEN AT RIGHT ANGLES TO END BENTS

HORIZONTAL CURVE DATA

PI STA.	= 71+90.40 -L-
Δ	= 32°-43'-41.7" (LT)
D	= 0°-44'-56.3"
L	= 4,369.80'
T	= 2,246.31'
R	= 7,650.00'

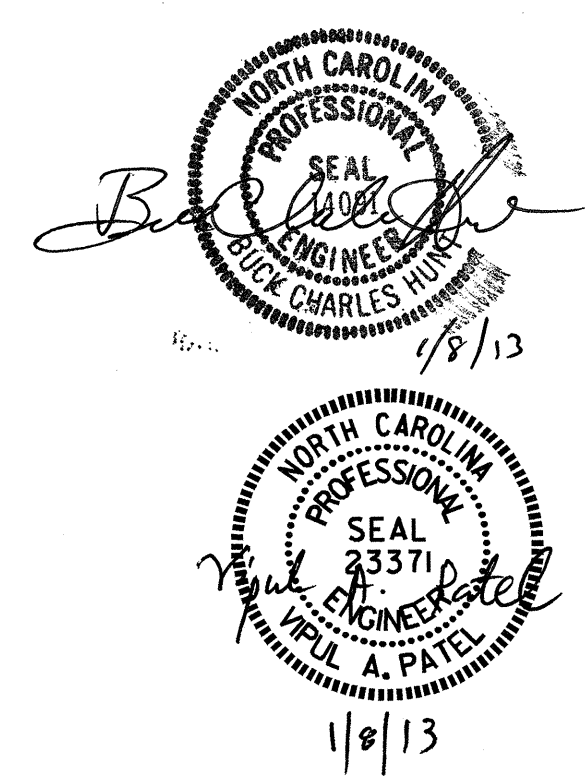


PLAN

DRILLED PIERS AT END BENTS NOT SHOWN FOR CLARITY

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-
21+95.70 -Y4-

SHEET 1 OF 3 BRIDGE NO. 392



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON SR 1430
 (GEORGE LILES PARKWAY)
 OVER US 29 BETWEEN
 SR 1304 AND SR 1431
 (LEFT LANE)

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

DRAWN BY : KEITH D. LAYNE DATE : 10-30-12
 CHECKED BY : J.P. ADAMS DATE : 11/29/12
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 7-12

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FOUNDATION NOTES

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT END BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 885.0 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 80.0 TSF.

INSTALL DRILLED PIERS AT END BENT NO.1 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 608.0 FT. (LT.), 605.5 FT. (CTR.) AND 603.0 FT. (RT.), SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 8 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 885.0 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 80.0 TSF.

INSTALL DRILLED PIERS AT END BENT NO.2 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 605.0 FT, SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 8 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

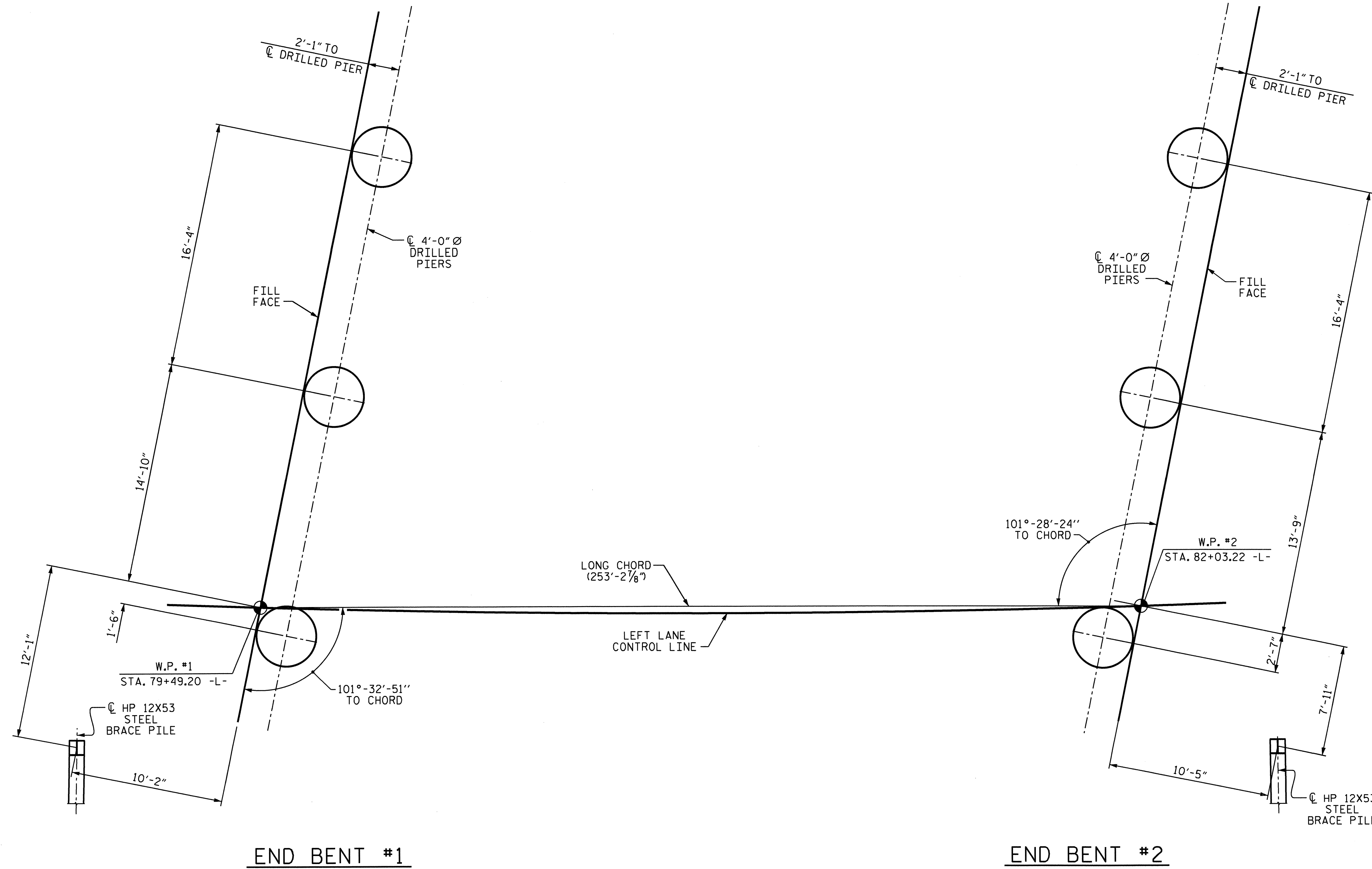
CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SPT MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SPT. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT WING WALL ARE DESIGNED FOR A FACTORED RESISTANCE OF 50 TONS PER PILE.

DRIVE PILES AT WING WALL TO A DRIVING RESISTANCE OF 84 TONS PER PILE.



END BENT #1

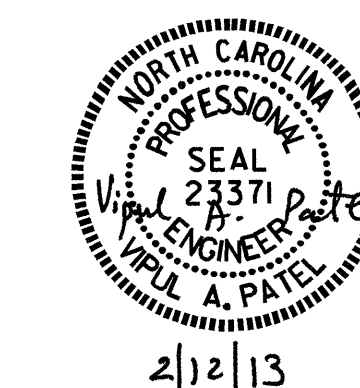
END BENT #2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE TO THE CENTERLINE OF PILE.
 DIMENSIONS LOCATING DRILLED PIERS ARE TO THE CENTERLINE OF PIER.
 ALL END BENT BRACE PILES ARE BATTERED 3:12.
 ALL PILES ARE HP12X53.

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 2 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON SR 1430
 (GEORGE LILES PARKWAY)
 OVER US 29 BETWEEN
 SR 1304 AND SR 1431
 (LEFT LANE)

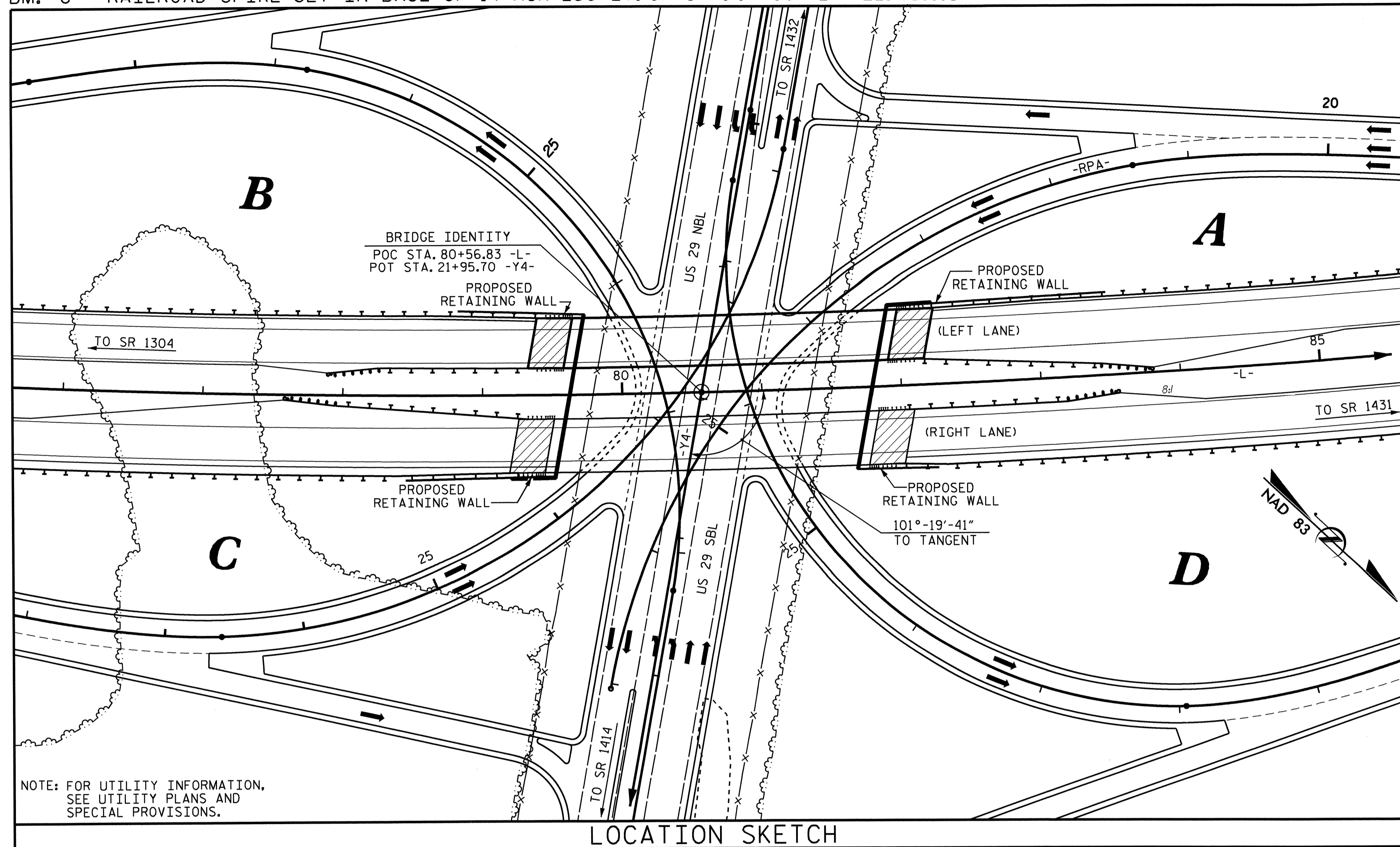
DRAWN BY : KEITH D. LAYNE DATE : 10-30-12
 CHECKED BY : J.P. ADAMS DATE : 11/29/12
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 7-12

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

STR. #1

BM. #8 RAILROAD SPIKE SET IN BASE OF 14" ASH 250' LT. OF STA. 87+39 -L- EL. 618.91



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

LOCATION SKETCH

GIRDER ERECTION SEQUENCE

THE STRUCTURAL STEEL SHALL BE SUPPORTED DURING ERECTION IN ITS CAMBERED POSITION, ONE EXTERIOR GIRDER AND ITS ADJACENT INTERIOR GIRDER SHALL BE ERECTED WITH ALL DIAPHRAGMS AND LATERAL BRACING BETWEEN THE GIRDERS IN PLACE AND ALL BOLTS TIGHTENED PRIOR TO RELEASE OF THE GIRDERS. THE REMAINING GIRDERS SHALL THEN BE ERECTED WITH DIAPHRAGMS CONNECTING THE GIRDER TO THE ADJACENT ERECTED GIRDER AND ALL BOLTS TIGHTENED BEFORE RELEASING THE GIRDER.

A MINIMUM OF TWO TEMPORARY BENTS SHALL BE USED.

TEMPORARY BENTS SHALL REMAIN IN PLACE UNTIL ALL CROSS FRAMES AND LATERAL BRACING ARE IN PLACE AND HIGH STRENGTH BOLTS TIGHTENED.

THE LOCATION OF THE TEMPORARY BENTS SHOWN ON SHEET 1 ARE APPROXIMATE LOCATIONS AND SHALL BE ADJUSTED BY THE CONTRACTOR AS NECESSARY.

PLANS FOR TEMPORARY BENTS, ERECTION SEQUENCE AND TEMPORARY BENT REMOVAL SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

TEMPORARY BENTS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF NORTH CAROLINA.

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 ERECTION BENTS AND MAINTAIN PLUMBNESS OF THE GIRDER WEBS.

THE CONTRACTOR'S ERECTION PLAN SHALL INCLUDE A METHOD OF TEMPORARY BENT REMOVAL THAT WILL UNIFORMLY APPLY THE STRUCTURAL STEEL WEIGHT TO THE BRIDGE CROSS FRAMES.

GIRDERS SHALL BE ERECTED AS FOLLOWS: THE FIRST GIRDER SECTION FROM END BENT 1 TO TEMPORARY BENT 1 SHALL BE SET. THE NEXT SECTION OF GIRDER SHALL BE SET FROM THE FIRST GIRDER SECTION TO TEMPORARY BENT 2. THE LAST GIRDER SECTION SHALL BE SET FROM GIRDER SECTION 2 TO END BENT 2. THE CONTRACTOR MAY SUBMIT ALTERNATE ERECTION METHODS, PLANS FOR SUCH ERECTION METHODS SHALL BE APPROVED BY THE ENGINEER.

FOR TEMPORARY BENTS, SEE SPECIAL PROVISIONS

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, 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.

THE ELEVATION(S) AND CLEARANCE(S) SHOWN ON THE PLANS AT THE POINT(S) OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE PRIOR TO BEGINNING BRIDGE CONSTRUCTION. VERIFY THE ELEVATION(S) ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, 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.

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

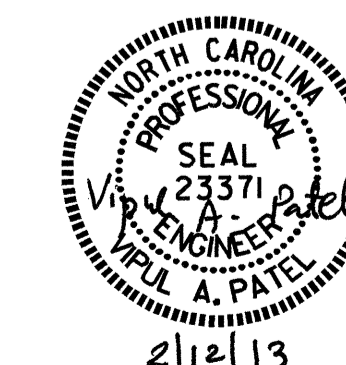
FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	4'-0" DRILLED PIERS IN SOIL	4'-0" DRILLED PIERS NOT IN SOIL	SID INSPECTIONS	SPT TESTING	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	APPROXIMATE STRUCTURAL STEEL	HP12x53 STEEL PILES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	EXPANSION JOINT SEALS	DISC BEARINGS	
	LIN. FT.	LIN. FT.	EACH	EACH	EACH	SO. FT.	SO. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	LBS.	NO.	LIN. FT.	LIN. FT.	SO. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE						9,854	9,820					785,100		542.10			LUMP SUM	LUMP SUM
END BENT NO. 1	25	38						75.8		22,207	2,785		1	25	60			
END BENT NO. 2	13	44						78.5		21,864	2,699		1	25	60			
TOTAL	38	82	1	1	1	9,854	9,820	154.3	LUMP SUM	44,071	5,484	785,100	2	50	120	LUMP SUM	LUMP SUM	

PROJECT NO. R-2246B
CABARRUS COUNTY
STATION: 80+56.83 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
FOR BRIDGE ON SR 1430
(GEORGE LILES PARKWAY)
OVER US 29 BETWEEN
SR 1304 AND SR 1431
(LEFT LANE)

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

DRAWN BY: KEITH D. LAYNE DATE: 10-30-12
CHECKED BY: J.P. ADAMS DATE: 11/29/12
DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE: 7-12

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{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 (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE						COMMENT NUMBER	
						MOMENT					SHEAR					MOMENT							
						LIVE-LOAD FACTORS (γ_{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 (γ_{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	1.04	--	1.75	0.833	1.04	A	ER	123.90	0.750	1.24	A	I	223.02	1.30	0.767	1.19	A	ER	123.90	
	HL-93 (OPERATING)	N/A		1.35	--	1.35	0.833	1.35	A	ER	123.90	0.750	1.61	A	I	223.02	1.00	0.767	1.54	A	ER	123.90	
	HS-20 (INVENTORY)	36.00	②	1.96	70.56	1.75	0.833	1.96	A	ER	123.90	0.750	2.21	A	I	24.78	1.30	0.767	2.24	A	ER	123.90	
	HS-20 (OPERATING)	36.00		2.55	91.80	1.35	0.833	2.55	A	ER	123.90	0.750	2.87	A	I	24.78	1.00	0.767	2.91	A	ER	123.90	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		5.71	77.09	1.40	0.833	6.28	A	ER	123.90	0.750	7.15	A	I	24.78	1.30	0.767	5.71	A	ER	123.90
		SNGARBS2	20.000		3.96	79.20	1.40	0.833	4.35	A	ER	123.90	0.750	4.90	A	I	24.78	1.30	0.767	3.96	A	ER	123.90
		SNAGRIS2	22.000		3.64	80.08	1.40	0.833	4.00	A	ER	123.90	0.750	4.47	A	I	24.78	1.30	0.767	3.64	A	ER	123.90
		SNCOTTS3	27.250		2.83	77.12	1.40	0.833	3.12	A	ER	123.90	0.750	3.55	A	I	24.78	1.30	0.767	2.83	A	ER	123.90
		SNAGGRS4	34.925		2.25	78.58	1.40	0.833	2.48	A	ER	123.90	0.750	2.82	A	I	24.78	1.30	0.767	2.25	A	ER	123.90
		SNS5A	35.550		2.21	78.57	1.40	0.833	2.43	A	ER	123.90	0.750	2.79	A	I	223.02	1.30	0.767	2.21	A	ER	123.90
		SNS6A	39.950		1.98	79.10	1.40	0.833	2.18	A	ER	123.90	0.750	2.50	A	I	24.78	1.30	0.767	1.98	A	ER	123.90
	SNS7B	42.000		1.89	79.38	1.40	0.833	2.08	A	ER	123.90	0.750	2.40	A	I	223.02	1.30	0.767	1.89	A	ER	123.90	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.40	79.20	1.40	0.833	2.64	A	ER	123.90	0.750	3.01	A	I	24.78	1.30	0.767	2.40	A	ER	123.90
		TNT4A	33.075		2.40	79.38	1.40	0.833	2.64	A	ER	123.90	0.750	2.99	A	I	24.78	1.30	0.767	2.40	A	ER	123.90
		TNT6A	41.600		1.92	79.87	1.40	0.833	2.11	A	ER	123.90	0.750	2.45	A	I	24.78	1.30	0.767	1.92	A	ER	123.90
		TNT7A	42.000		1.91	80.22	1.40	0.833	2.10	A	ER	123.90	0.750	2.42	A	I	24.78	1.30	0.767	1.91	A	ER	123.90
		TNT7B	42.000		1.93	81.06	1.40	0.833	2.12	A	ER	123.90	0.750	2.38	A	I	223.02	1.30	0.767	1.93	A	ER	123.90
		TNAGRIT4	43.000		1.87	80.41	1.40	0.833	2.06	A	ER	123.90	0.750	2.32	A	I	24.78	1.30	0.767	1.87	A	ER	123.90
TNAGT5A		45.000	③	1.78	80.10	1.40	0.833	1.96	A	ER	123.90	0.750	2.24	A	I	223.02	1.30	0.767	1.78	A	ER	123.90	
TNAGT5B	45.000	③	1.78	80.10	1.40	0.833	1.96	A	ER	123.90	0.750	2.22	A	I	24.78	1.30	0.767	1.78	A	ER	123.90		
FATIGUE	HL-93 (INVENTORY)	$\gamma_{LL}=0.75$																					

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.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

⊠ CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93) **

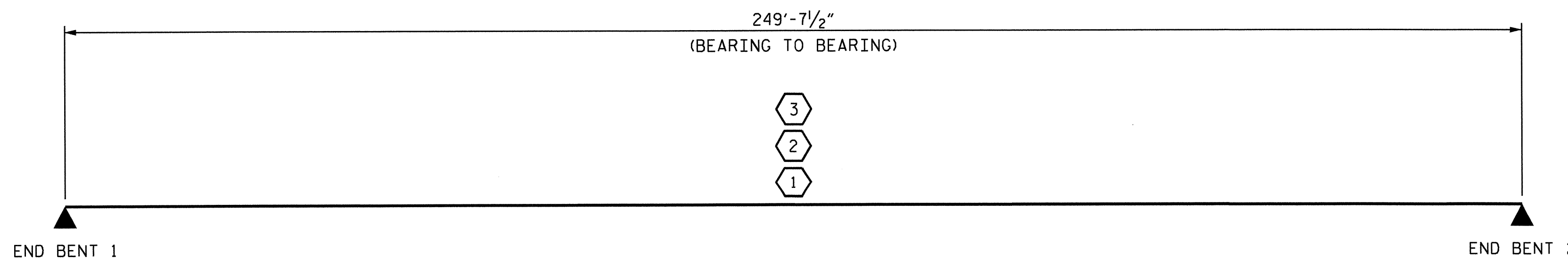
② DESIGN LOAD RATING (HS-20) **

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. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-



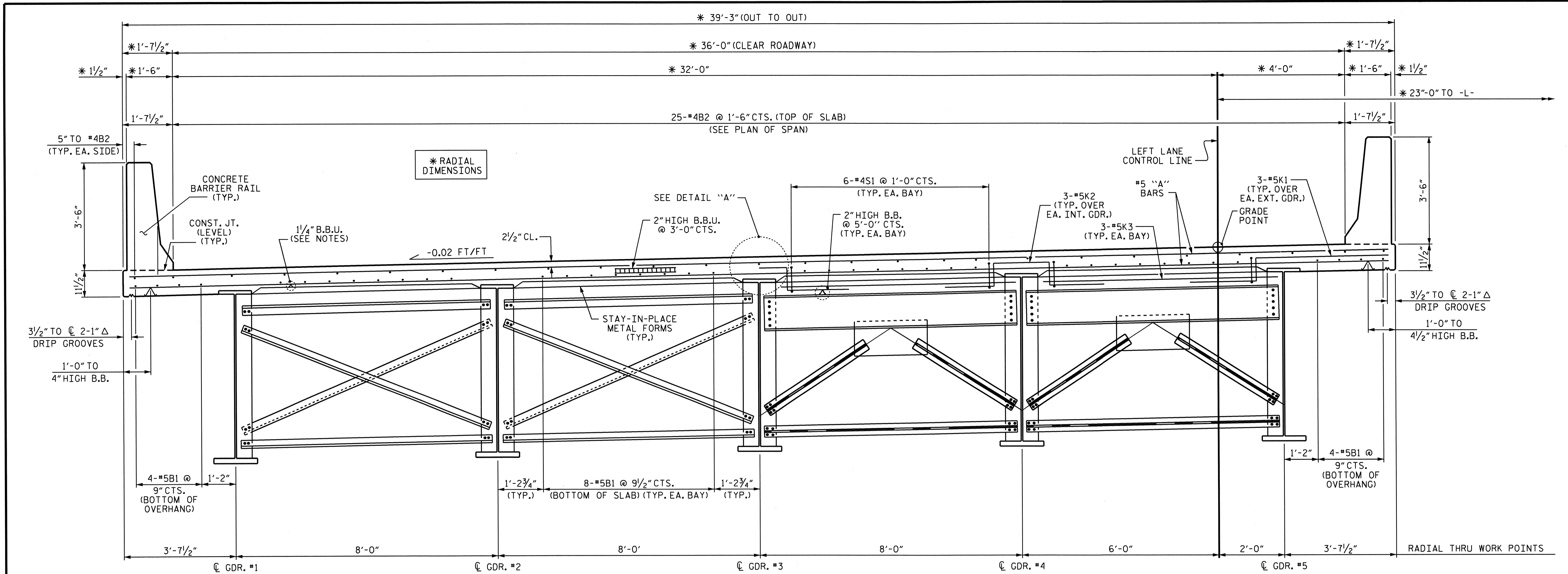
2/12/13

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 LRFR SUMMARY FOR
 STEEL GIRDERS
 (NON-INTERSTATE TRAFFIC)
 (LEFT LANE)

ASSEMBLED BY : H.A. LOCKLEAR	DATE : 10-11
CHECKED BY : R.L. CHESSON	DATE : 5-12
DESIGN ENGINEER OF RECORD : H.A. LOCKLEAR	DATE : 7/2012
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM

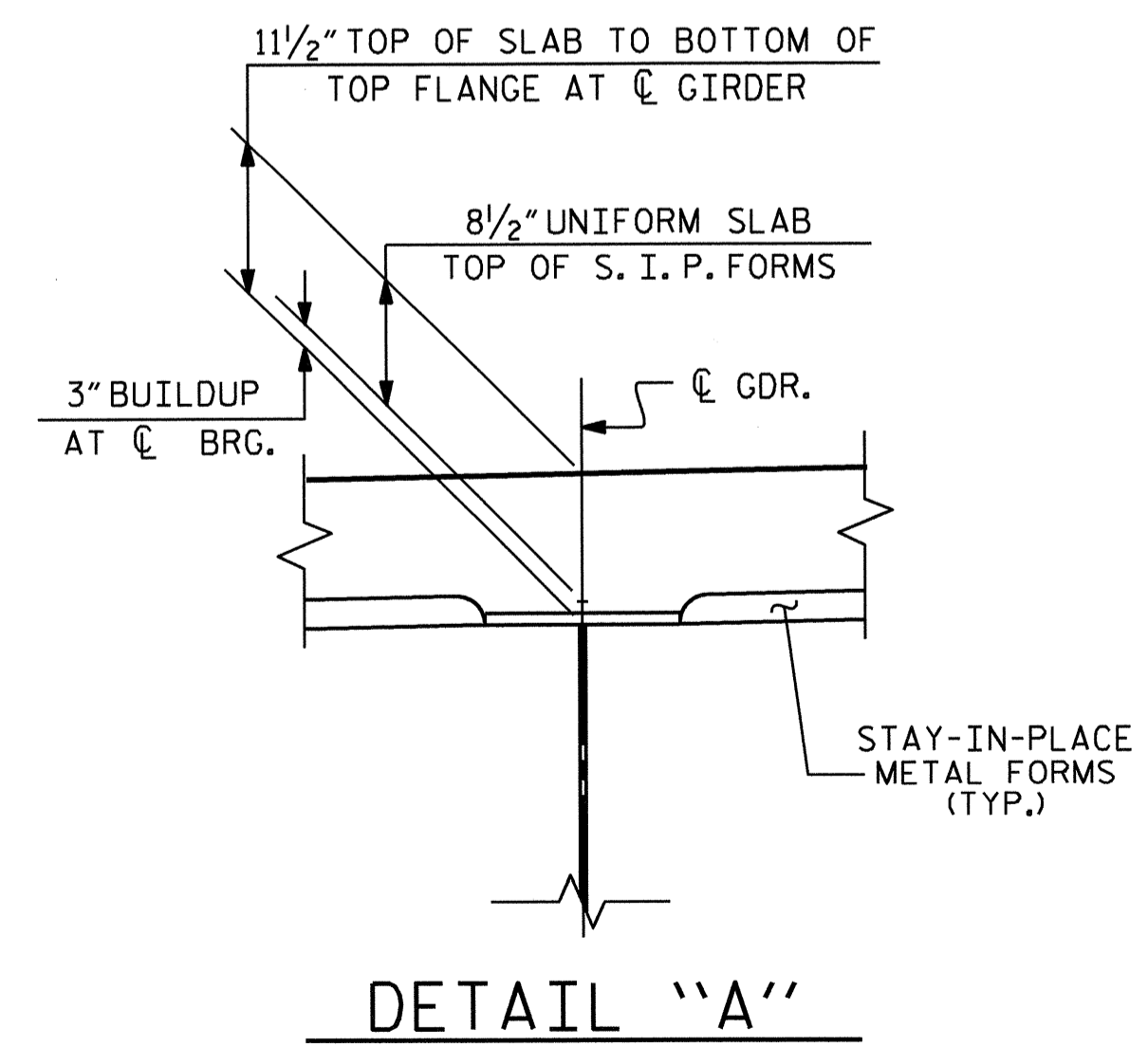
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			56



PARTIAL SECTION SHOWING INTERMEDIATE DIAPHRAGMS

PARTIAL SECTION SHOWING END BENT DIAPHRAGMS

TYPICAL SECTION



DETAIL "A"

NOTES

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

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

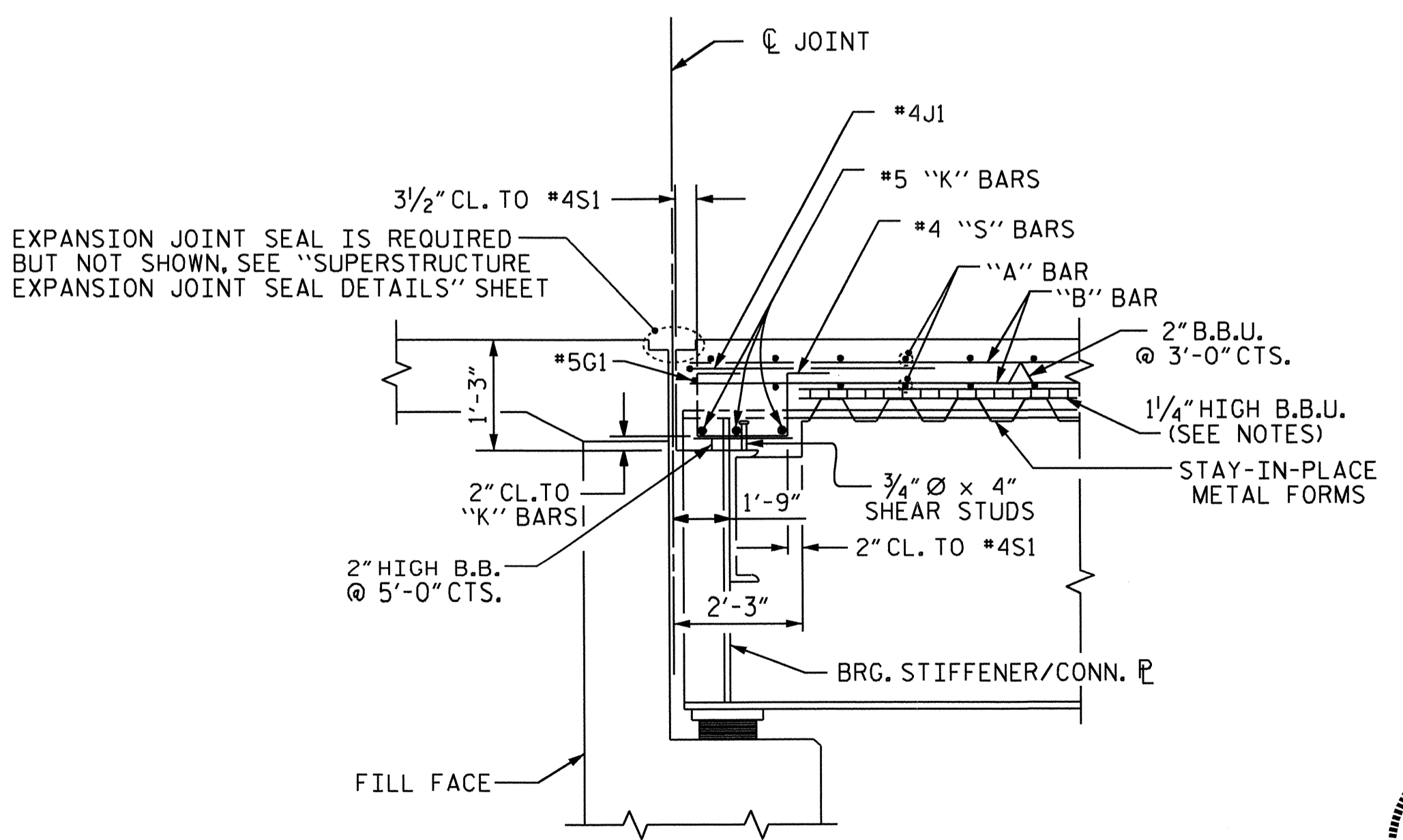
PREVIOUSLY CAST CONCRETE SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE SPAN.

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

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

THE CONTRACTOR SHALL ADJUST THE GIRDER BUILDUPS AS NECESSARY TO INCORPORATE A MAXIMUM PERMISSIBLE VARIATION IN DISC BEARING DEPTH OF 1/2". SEE SPECIAL PROVISION FOR DISC BEARINGS.

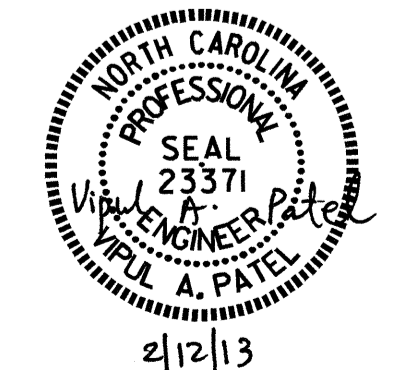
FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.



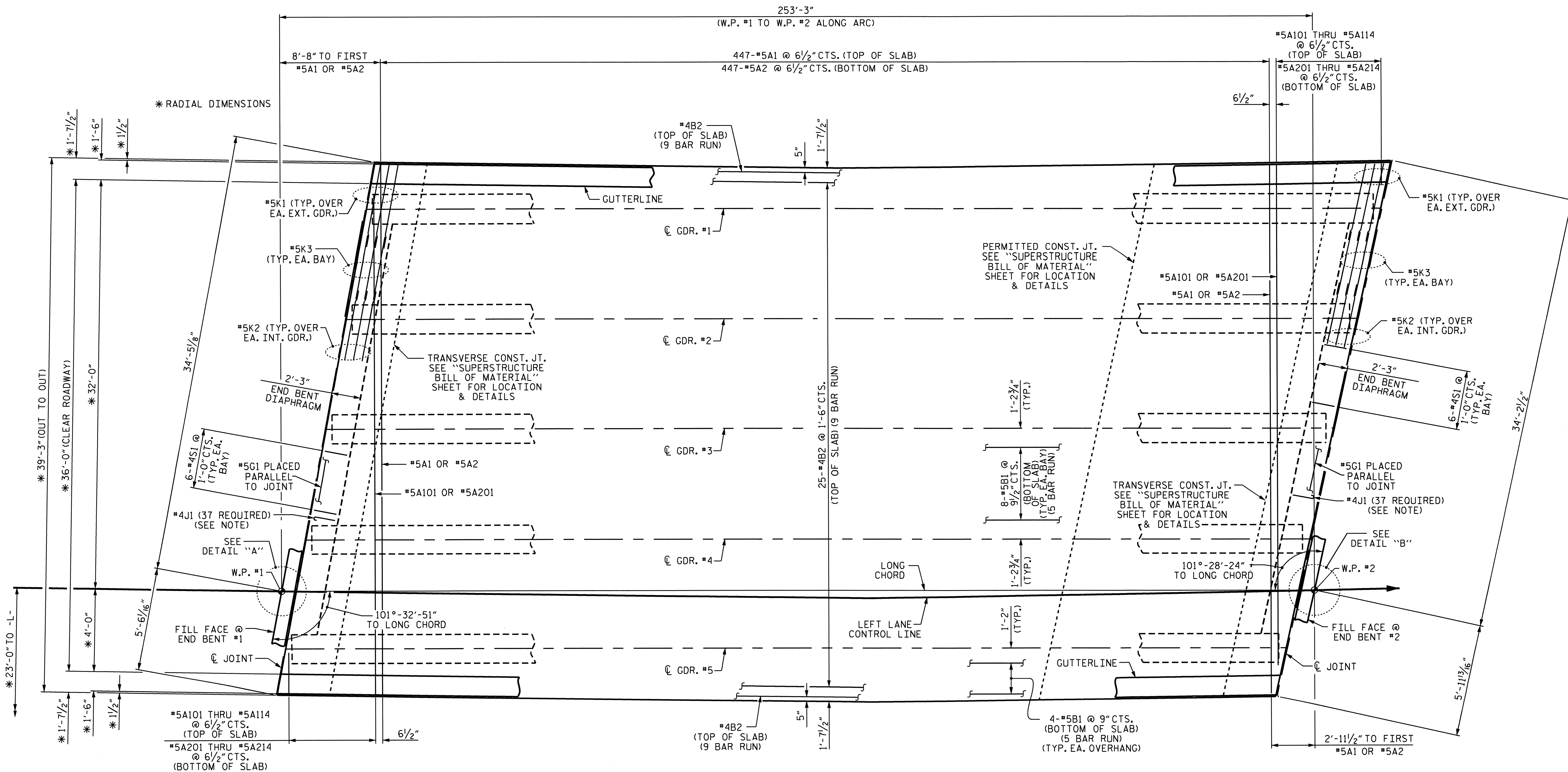
SECTION THRU END BENT DIAPHRAGM

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION (LEFT LANE)					
SHEET NO. S-5					
TOTAL SHEETS 56					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

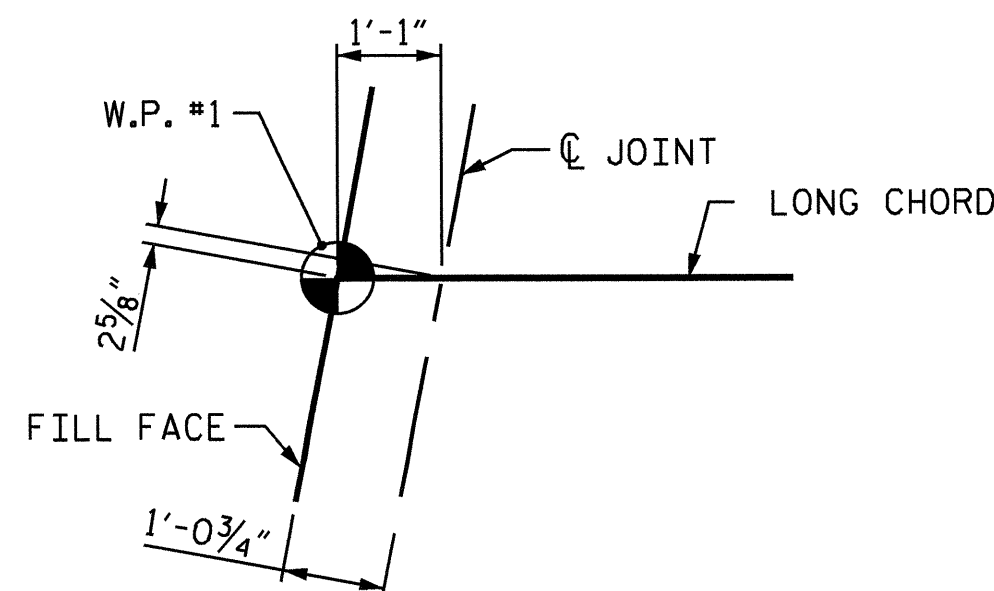


DRAWN BY: J.P. ADAMS DATE: 3/13/12
 CHECKED BY: J. KHARVA DATE: 8/2/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 07/2012

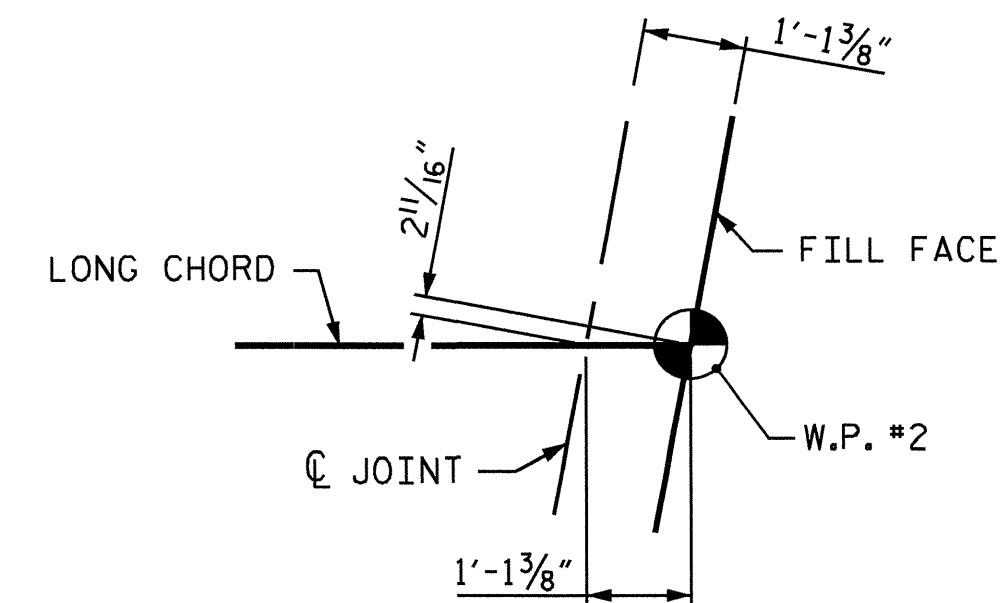


PLAN OF SPAN

THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



DETAIL "A"

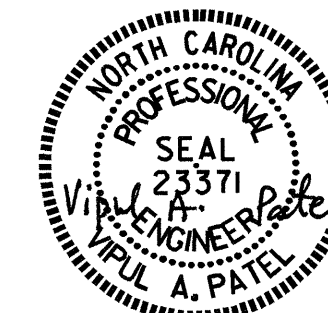


DETAIL "B"

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

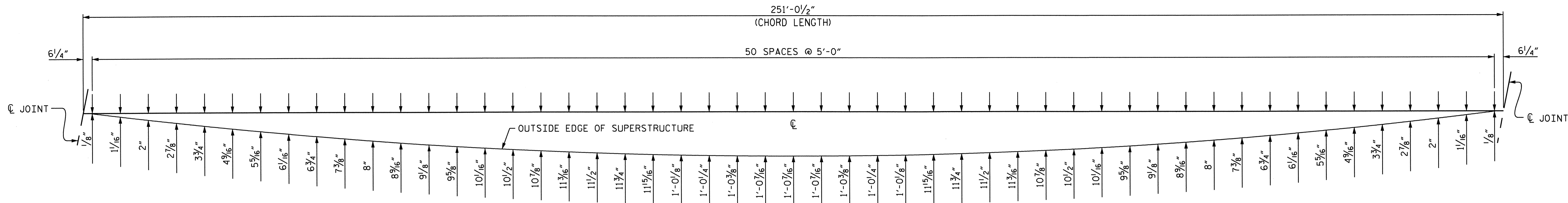
SUPERSTRUCTURE PLAN OF SPAN (LEFT LANE)



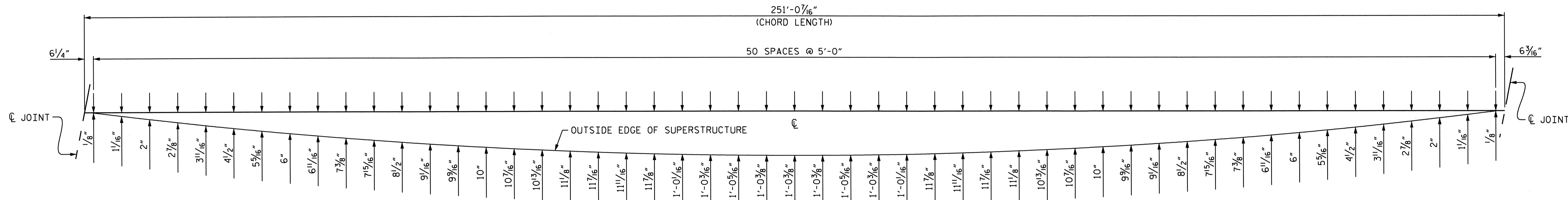
DRAWN BY : J.P. ADAMS DATE : 7/11/12
 CHECKED BY : J. KHARVA DATE : 8/2012
 DESIGN ENGINEER OF RECORD : H.A. LOCKLEAR DATE : 8/2012

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			56

STR. #1

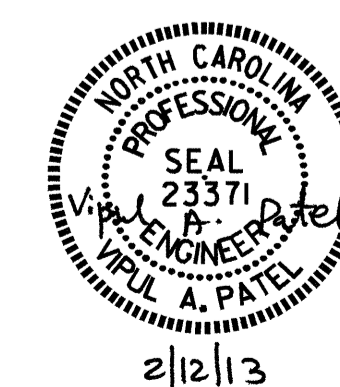


ARC OFFSETS - SPAN A - LEFT SIDE



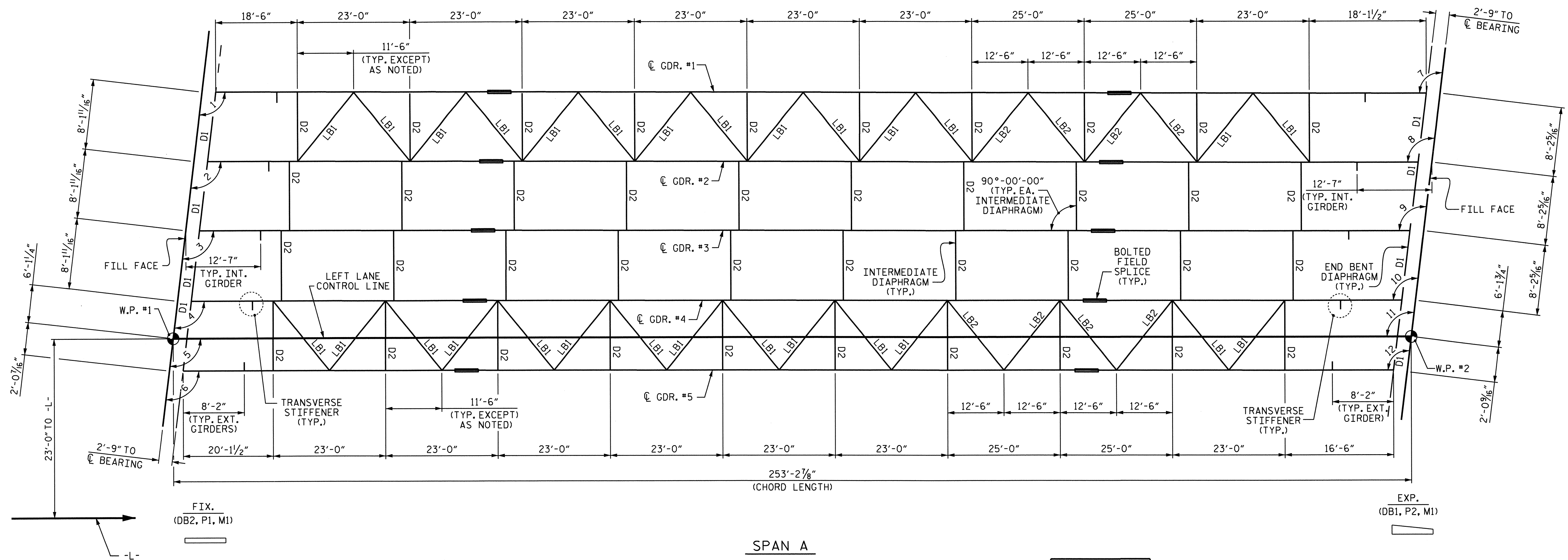
ARC OFFSETS - SPAN A - RIGHT SIDE

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE ARC OFFSETS (LEFT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-7
					TOTAL SHEETS 56

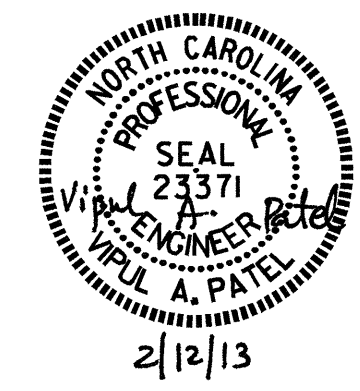
DRAWN BY: J.P. ADAMS DATE: 3/26/12
 CHECKED BY: J. KHARVA DATE: 8/2012
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 8/2012



SPAN A
FRAMING PLAN

- ANGLES -	
1	101°-35'-36"
2	101°-34'-52"
3	101°-34'-08"
4	101°-33'-24"
5	101°-32'-51"
6	101°-32'-40"
7	101°-31'-10"
8	101°-30'-26"
9	101°-29'-41"
10	101°-28'-57"
11	101°-28'-24"
12	101°-28'-13"

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

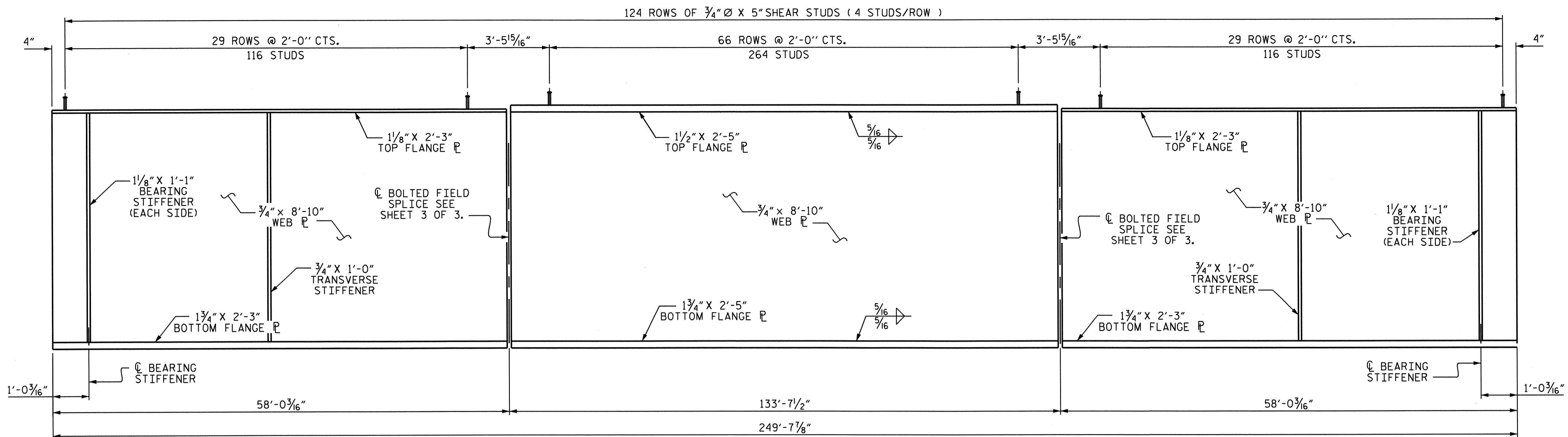


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 FRAMING PLAN
 (LEFT LANE)

DRAWN BY: J.P. ADAMS DATE: 3/26/12
 CHECKED BY: J. KHARVA DATE: 8/2012
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 8/2012

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			56

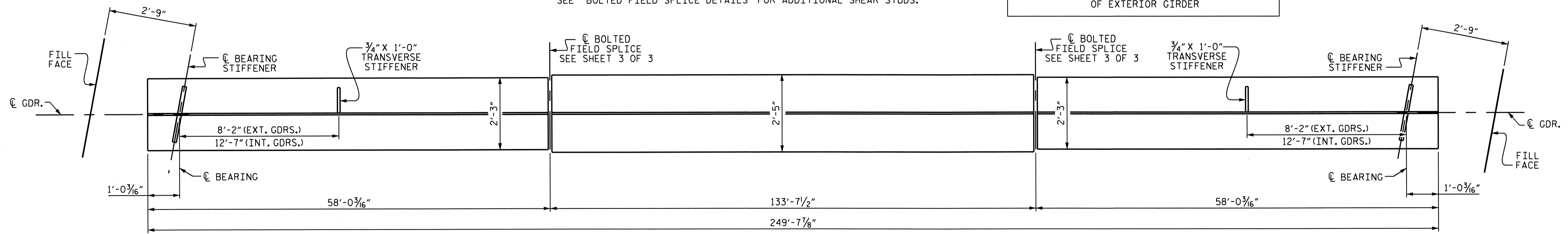
11-FEB-2013 16:11
 O:\Structures\Plans\Plans Str#1 Left Lane\R2246B.SD_FP.01.dgn
 jpadams



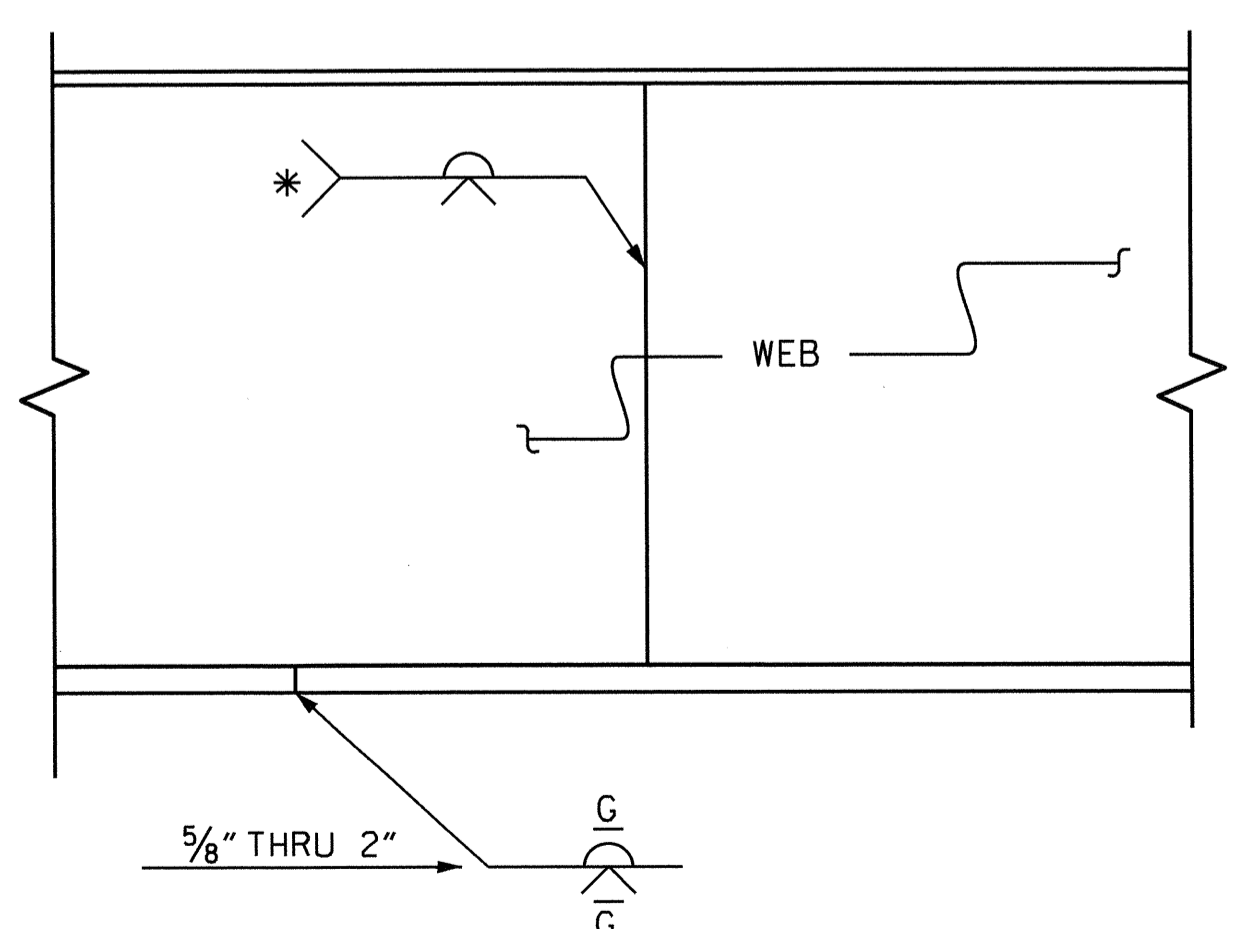
GIRDER ELEVATION

SEE "BOLTED FIELD SPLICE DETAILS" FOR ADDITIONAL SHEAR STUDS.

TRANSVERSE STIFFENERS ARE TO BE PLACED ON ONE SIDE OF THE GIRDER ONLY. TRANSVERSE STIFFENERS ARE NOT TO BE PLACED ON OUTSIDE OF EXTERIOR GIRDER

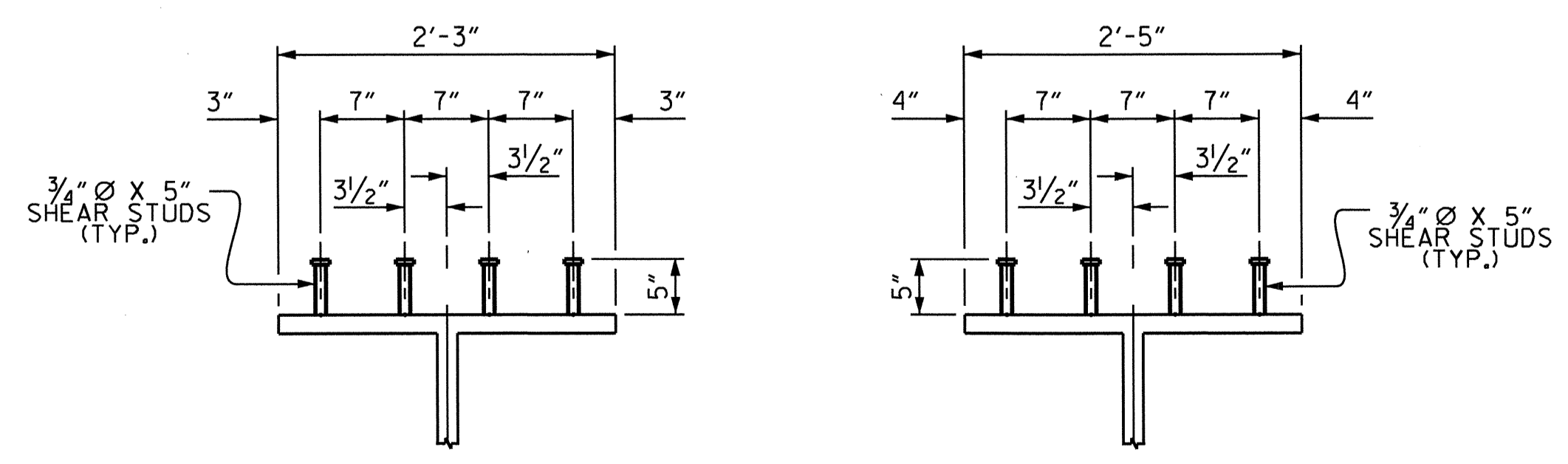


BOTTOM FLANGE DETAILS

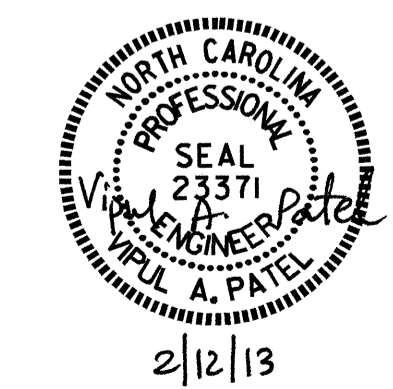


TYPICAL FLANGE AND WEB BUTT JOINT

* GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR GIRDERS



SHEAR STUD DETAILS



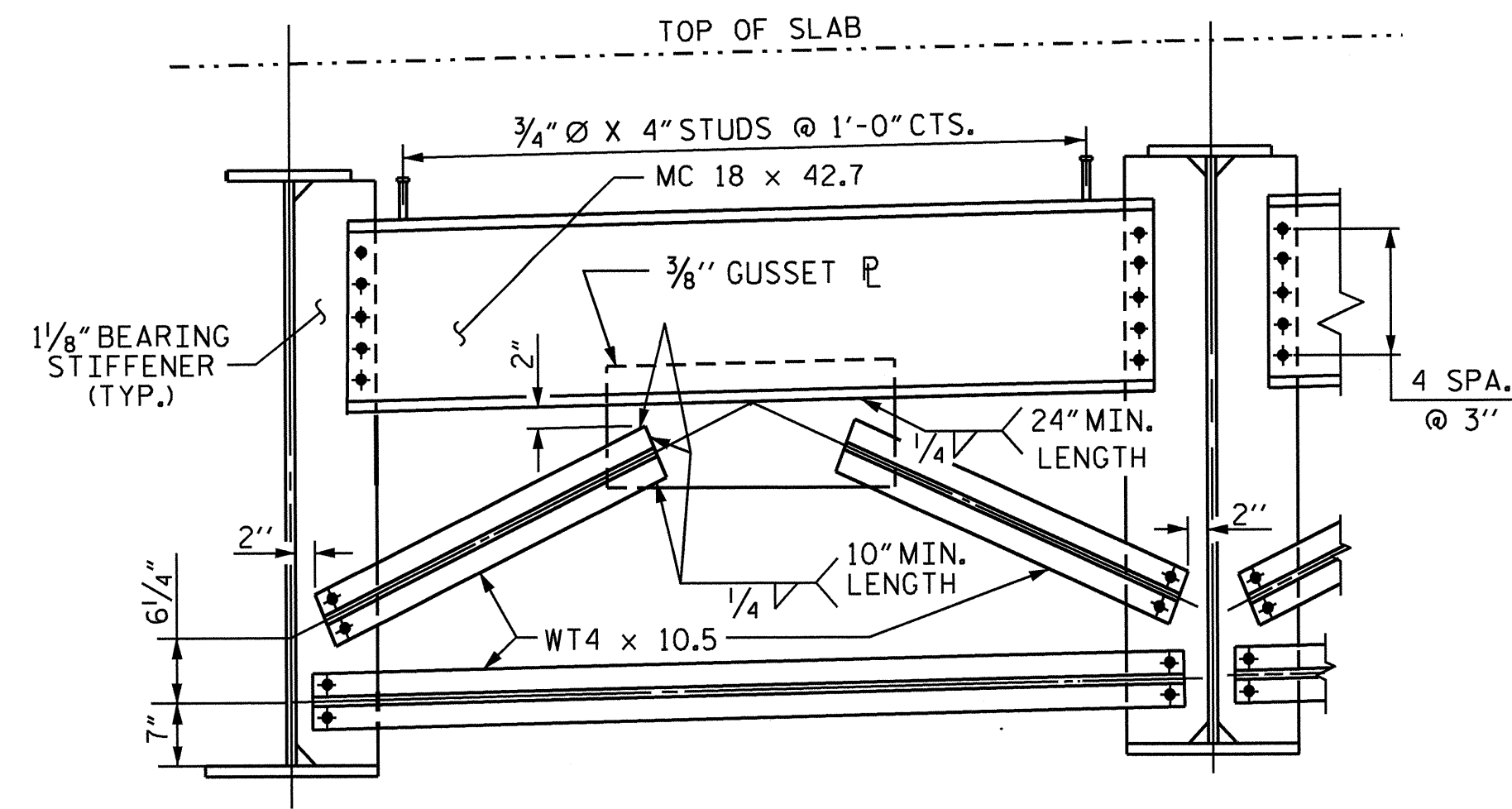
PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 1 OF 3

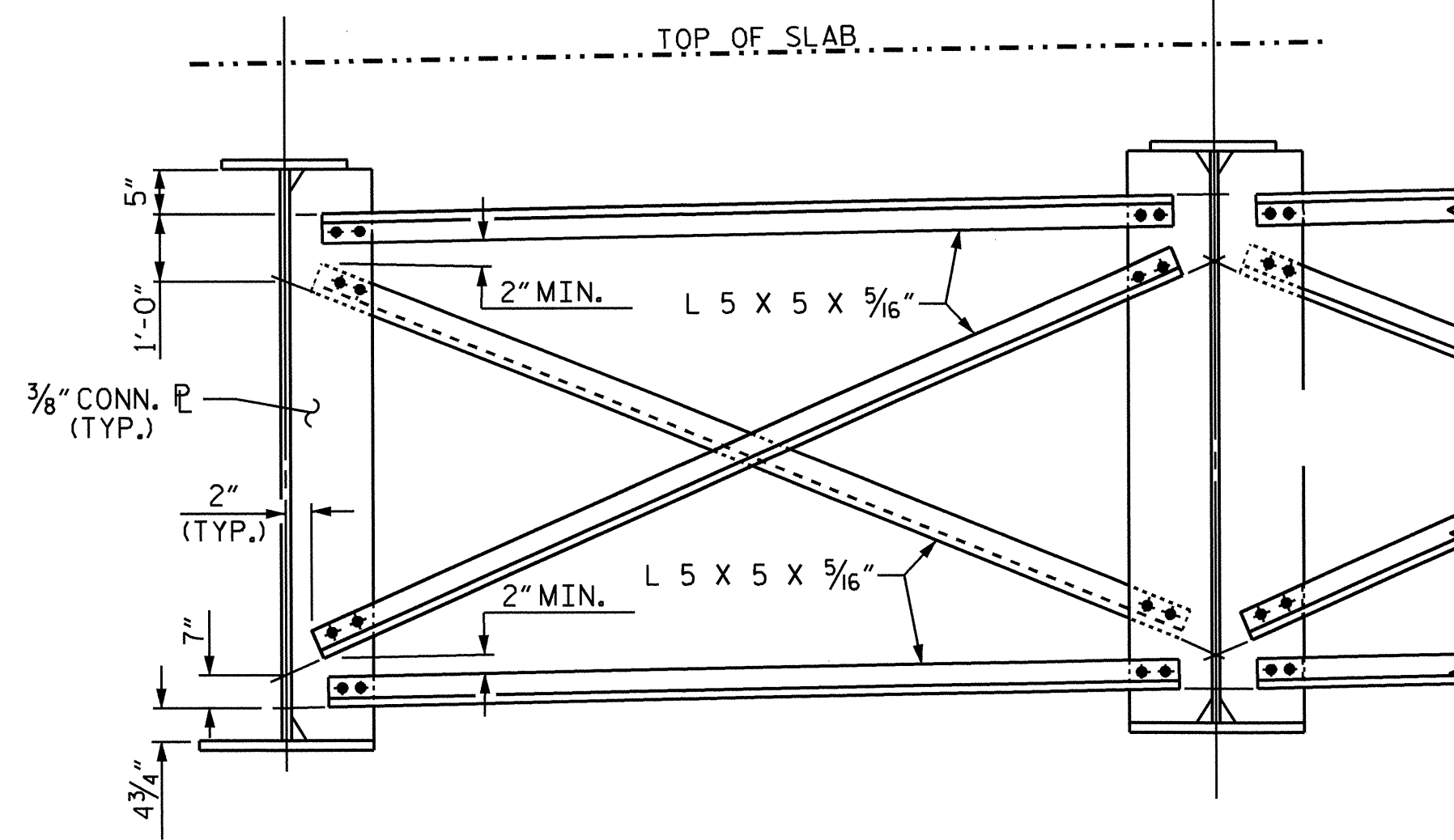
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 STRUCTURAL STEEL
 DETAILS
 (LEFT LANE)

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9	
1			3			TOTAL SHEETS	
2			4			56	

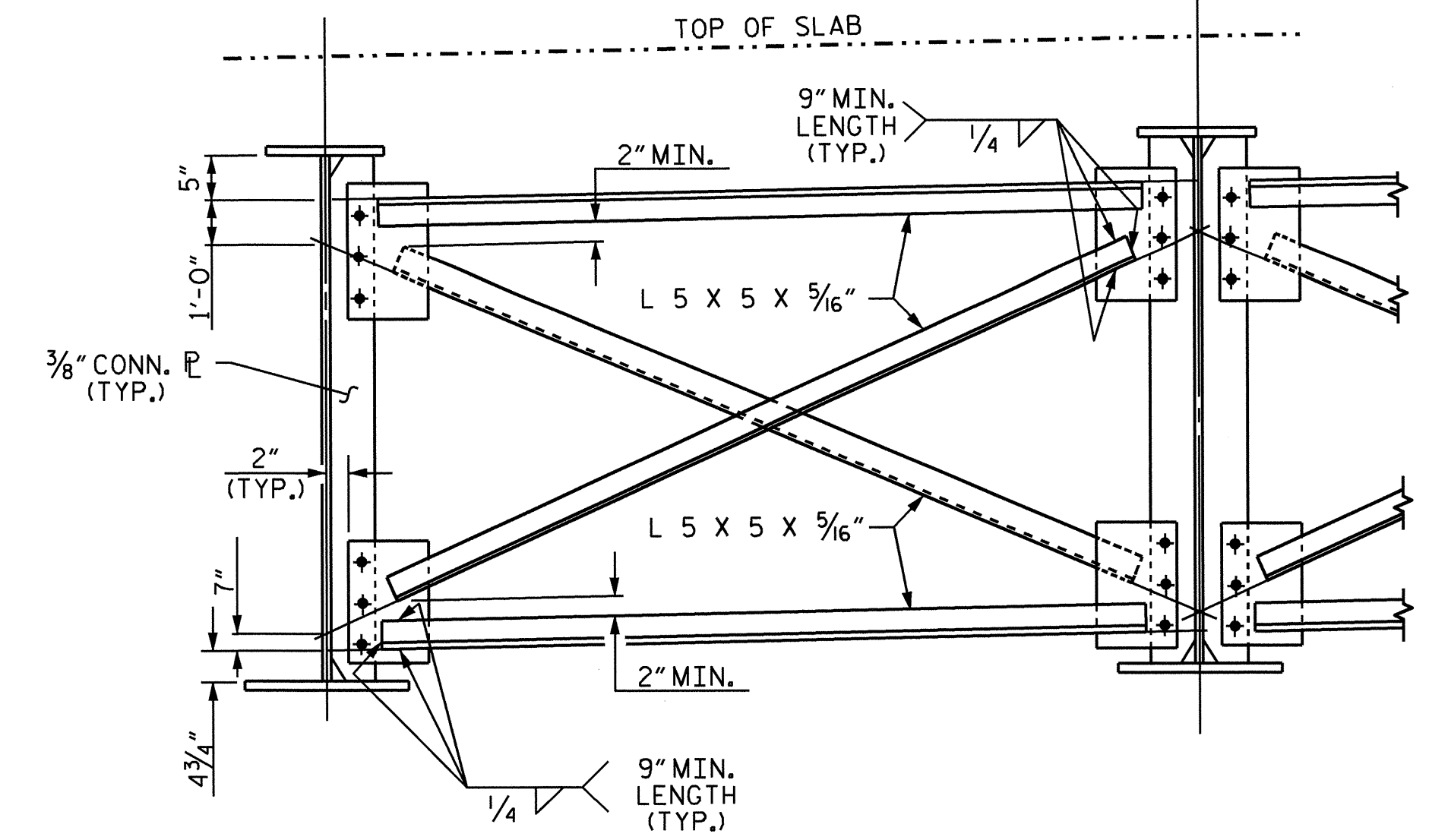
DRAWN BY : J.P. ADAMS DATE : 3/20/12
 CHECKED BY : J. KHARVA DATE : 8/2/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE : 7/2012



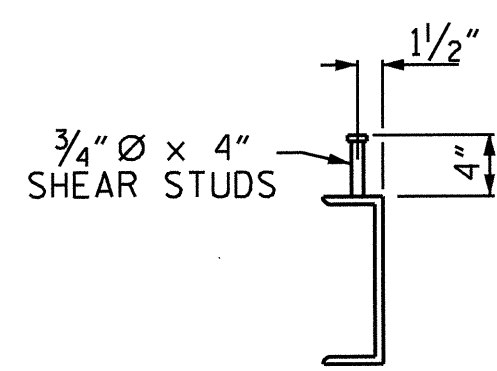
END BENT DIAPHRAGM (D1)



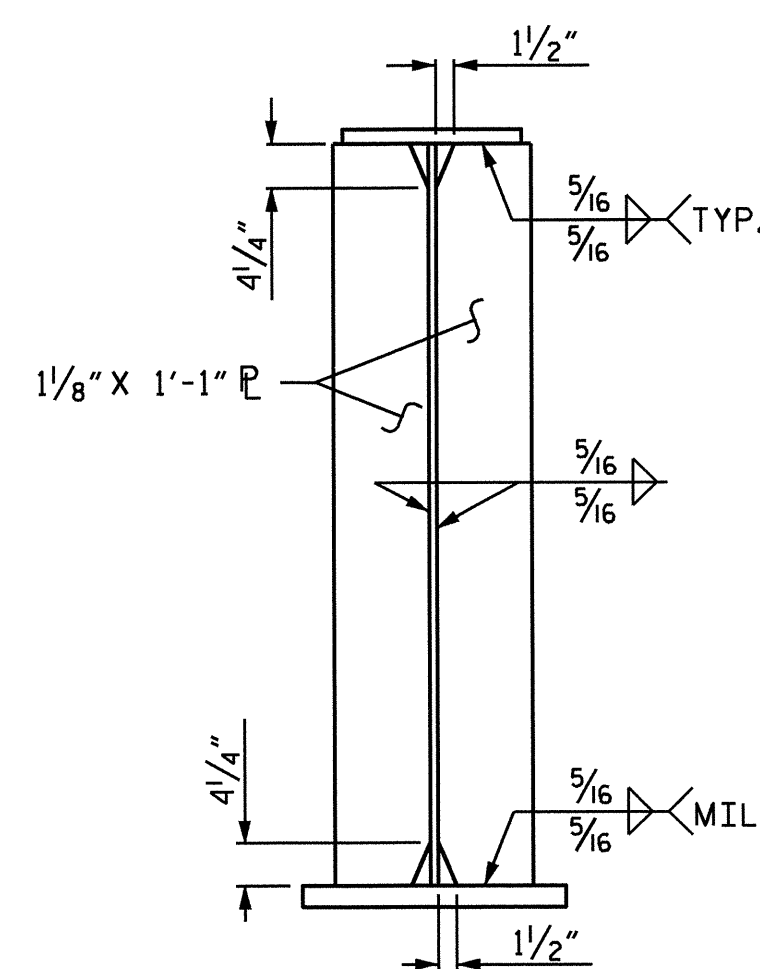
INTERMEDIATE DIAPHRAGM (D2)



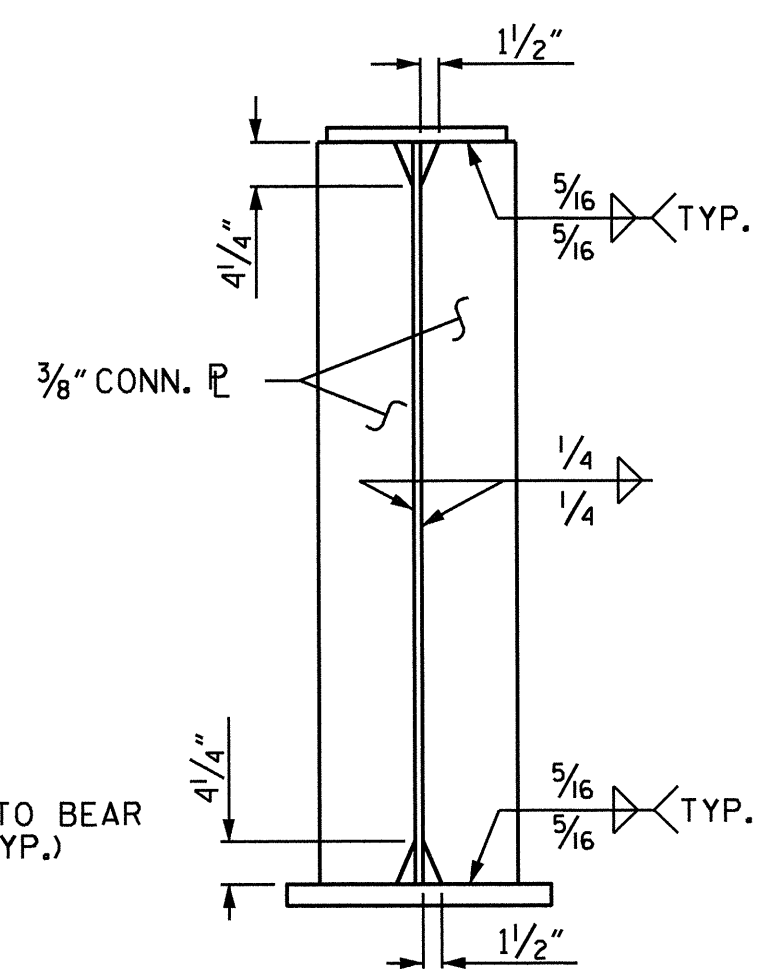
OPTIONAL INTERMEDIATE DIAPHRAGM



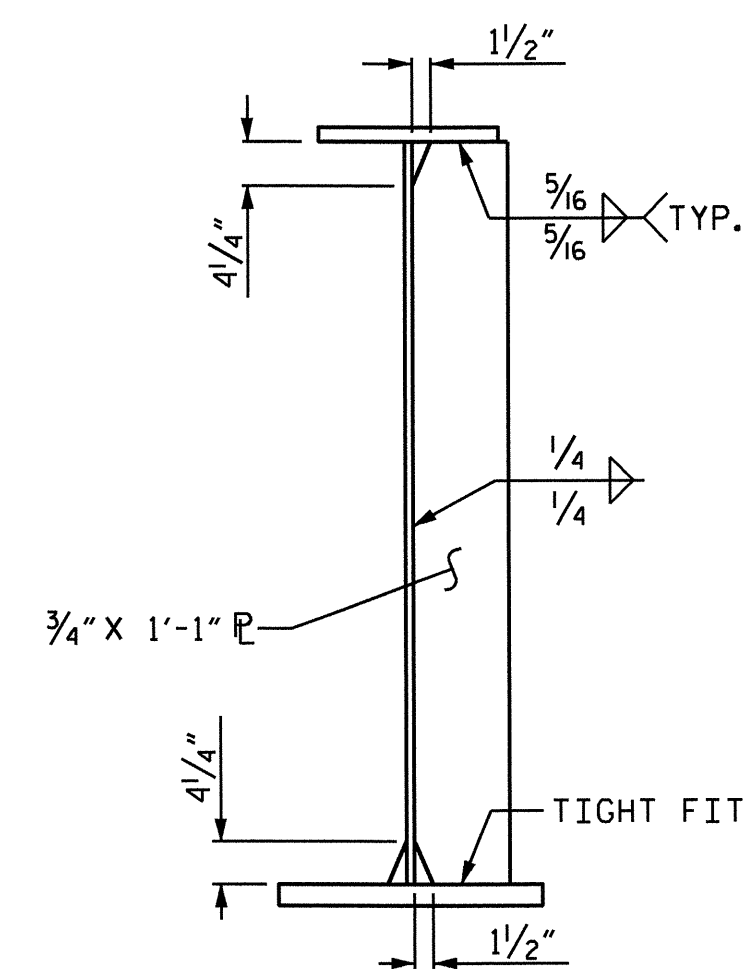
END BENT DIAPHRAGM SHEAR STUD DETAILS



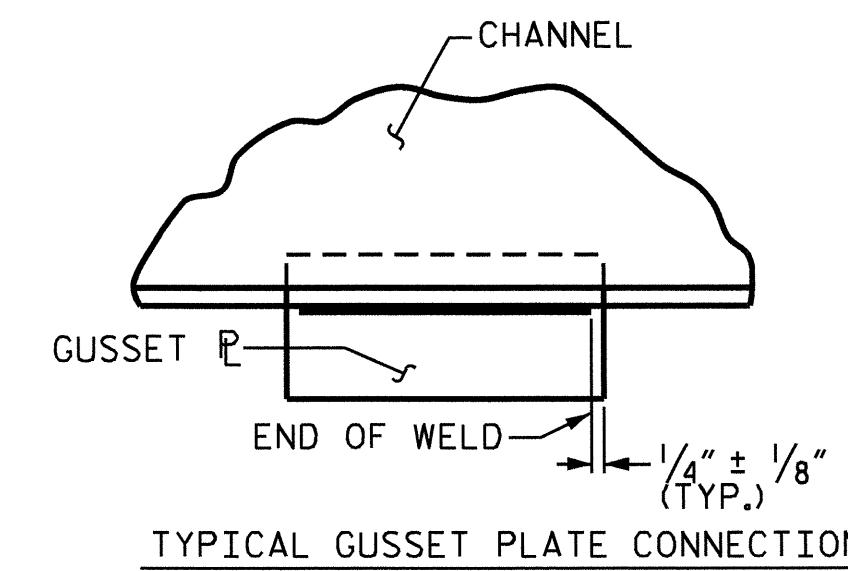
BEARING STIFFENER PLATE DETAIL



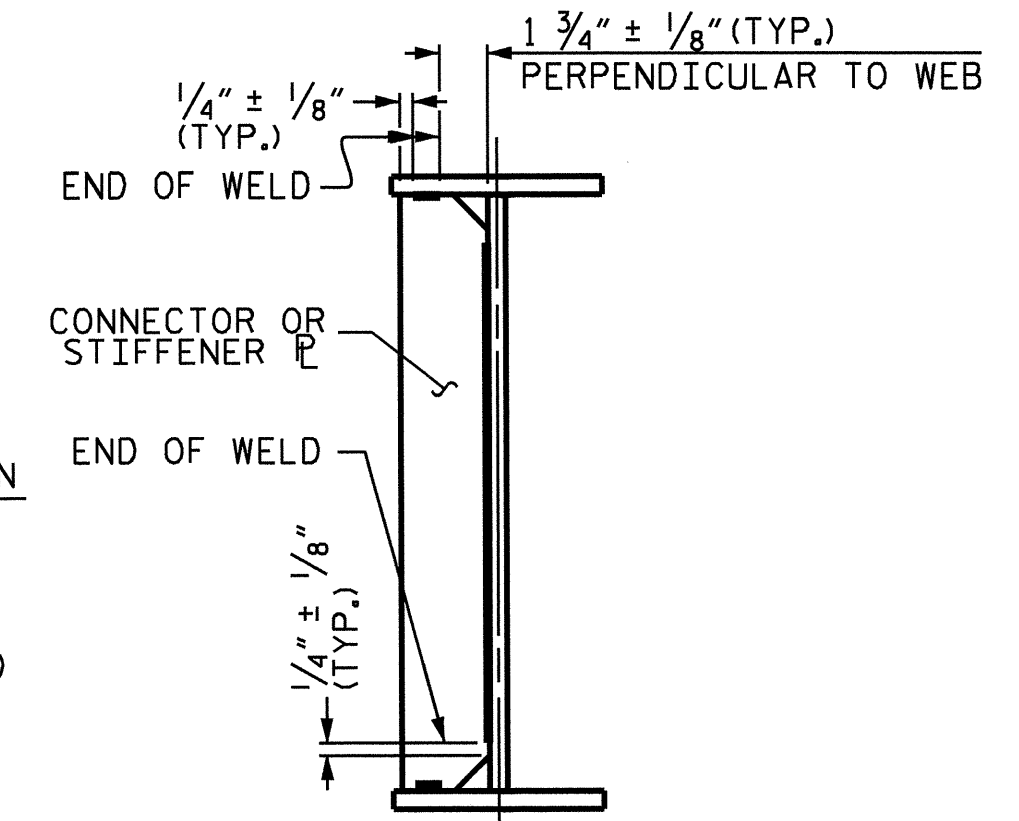
CONNECTOR PLATE DETAIL



TRANSVERSE STIFFENER PLATE DETAIL

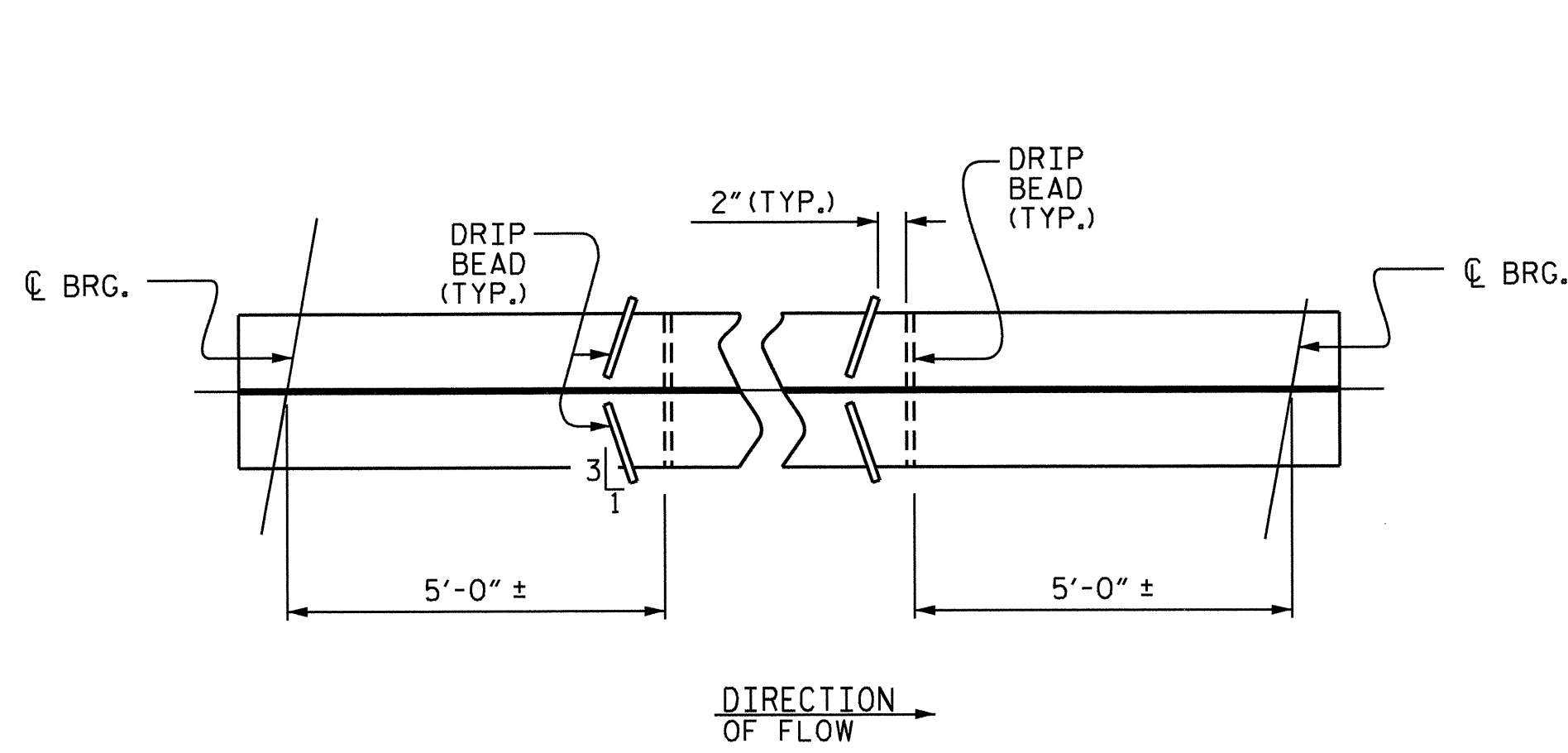


TYPICAL "TEE" TO GUSSET PLATE CONNECTION

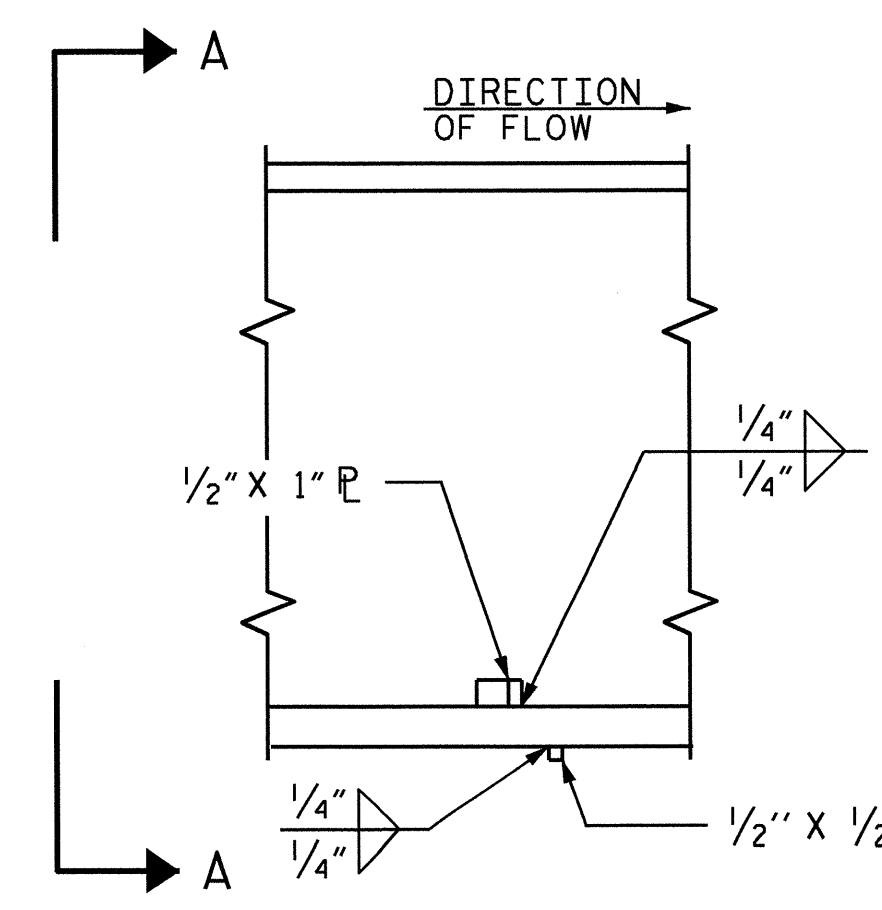


TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTION

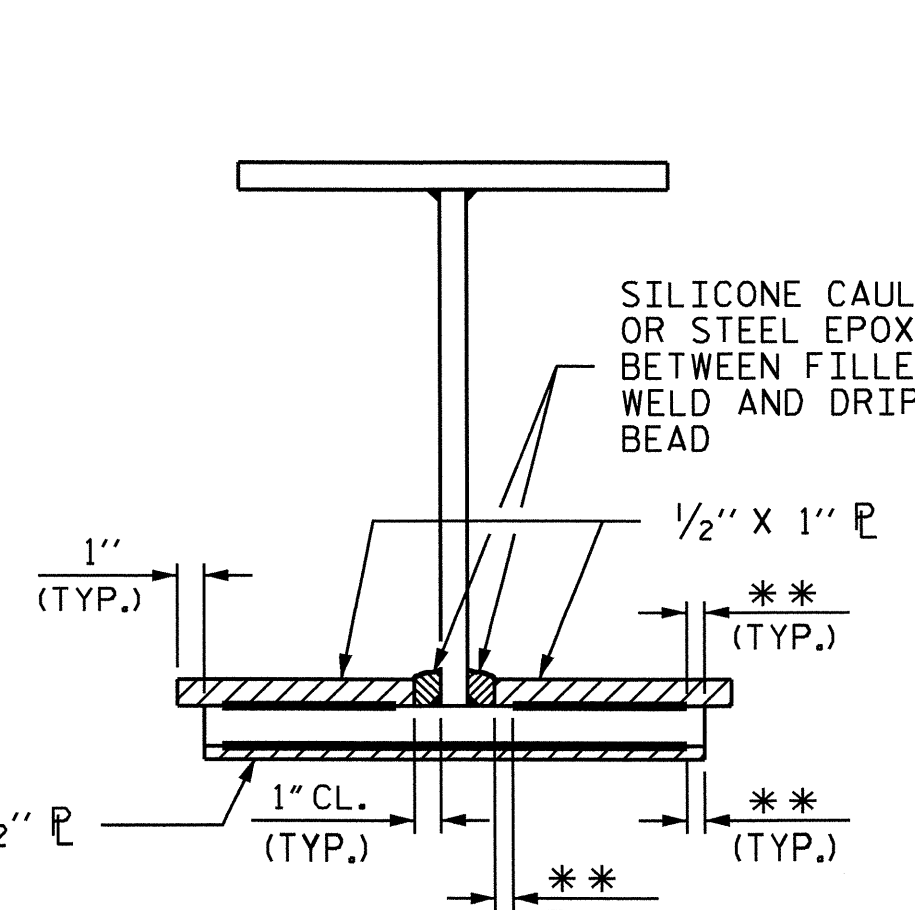
WELD TERMINATION DETAILS



PART PLAN - BOTTOM FLANGE



SECTION



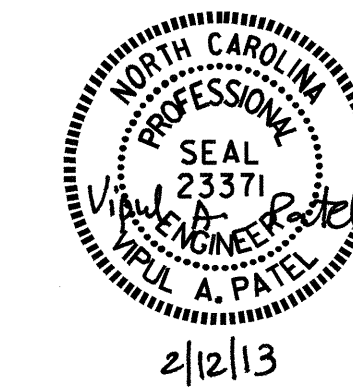
VIEW A-A

** SEE "WELD TERMINATION DETAILS"

DRIP BEAD DETAILS

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 2 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 STRUCTURAL STEEL
 DETAILS
 (LEFT LANE)

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10	
1			3			TOTAL SHEETS 56	
2			4				

DRAWN BY: J.P. ADAMS DATE: 3/20/12
 CHECKED BY: J. KHARVA DATE: 8/2/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 7/2012

NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

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

BEARING STIFFENERS SHALL BE PLUMB.

A CHARPY V-NOTCH TEST IS REQUIRED FOR WEB PLATES, BOTTOM FLANGE PLATES, BOTTOM FLANGE SPLICE PLATES AND WEB SPLICE PLATES (IF USED) FOR ALL GIRDERS AND IN ACCORDANCE WITH ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

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.

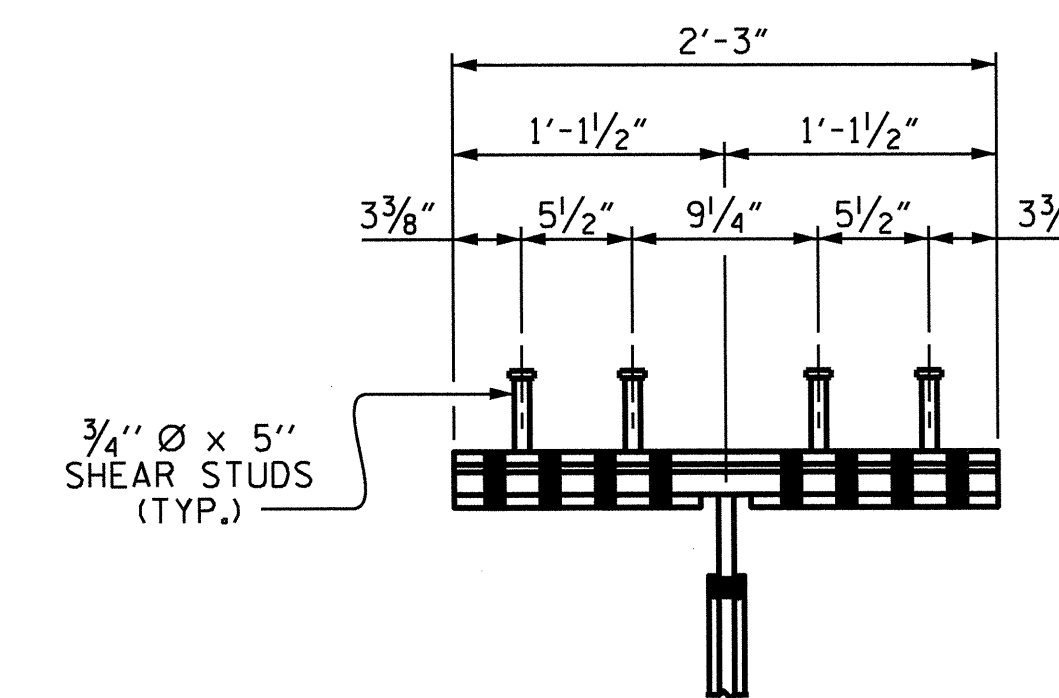
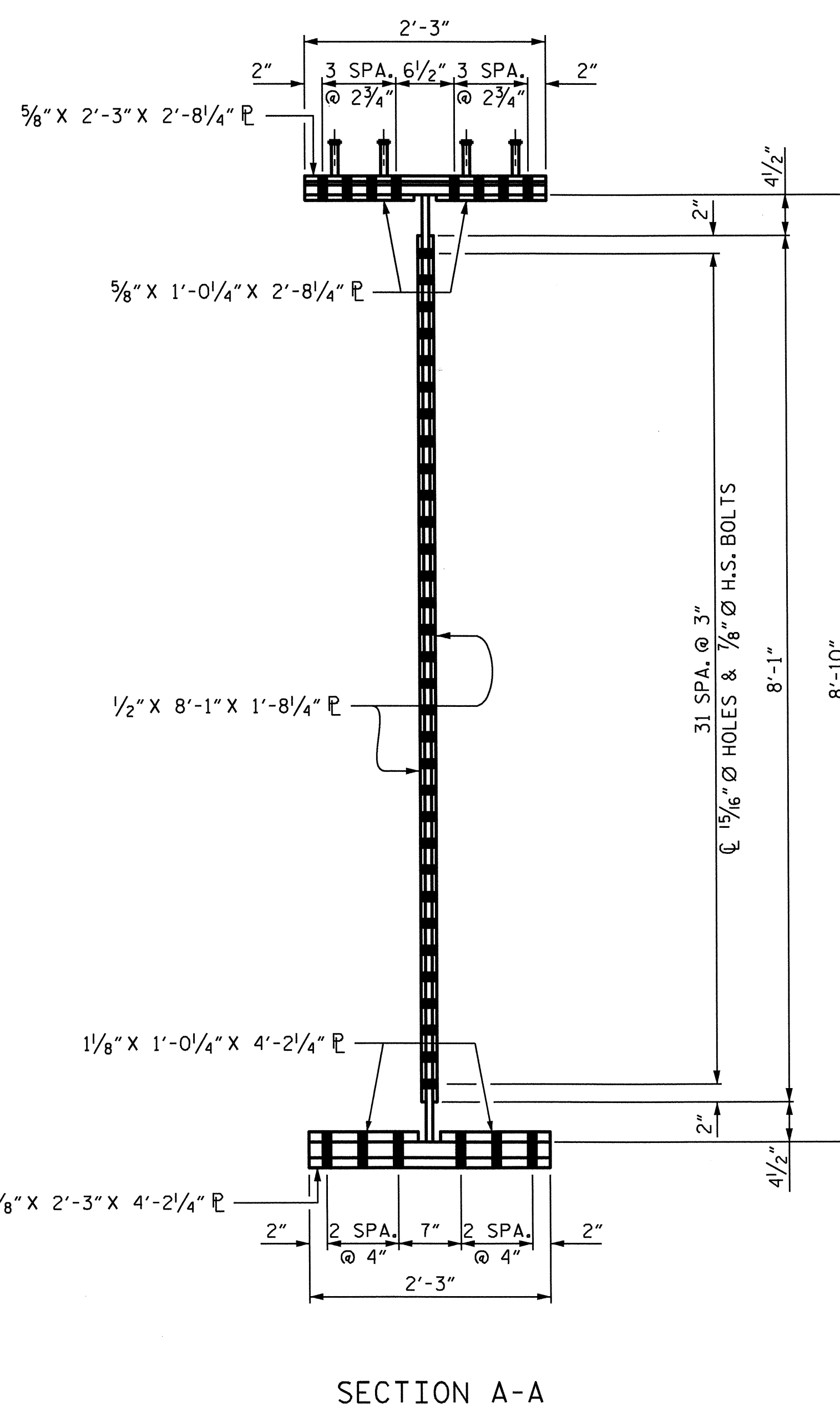
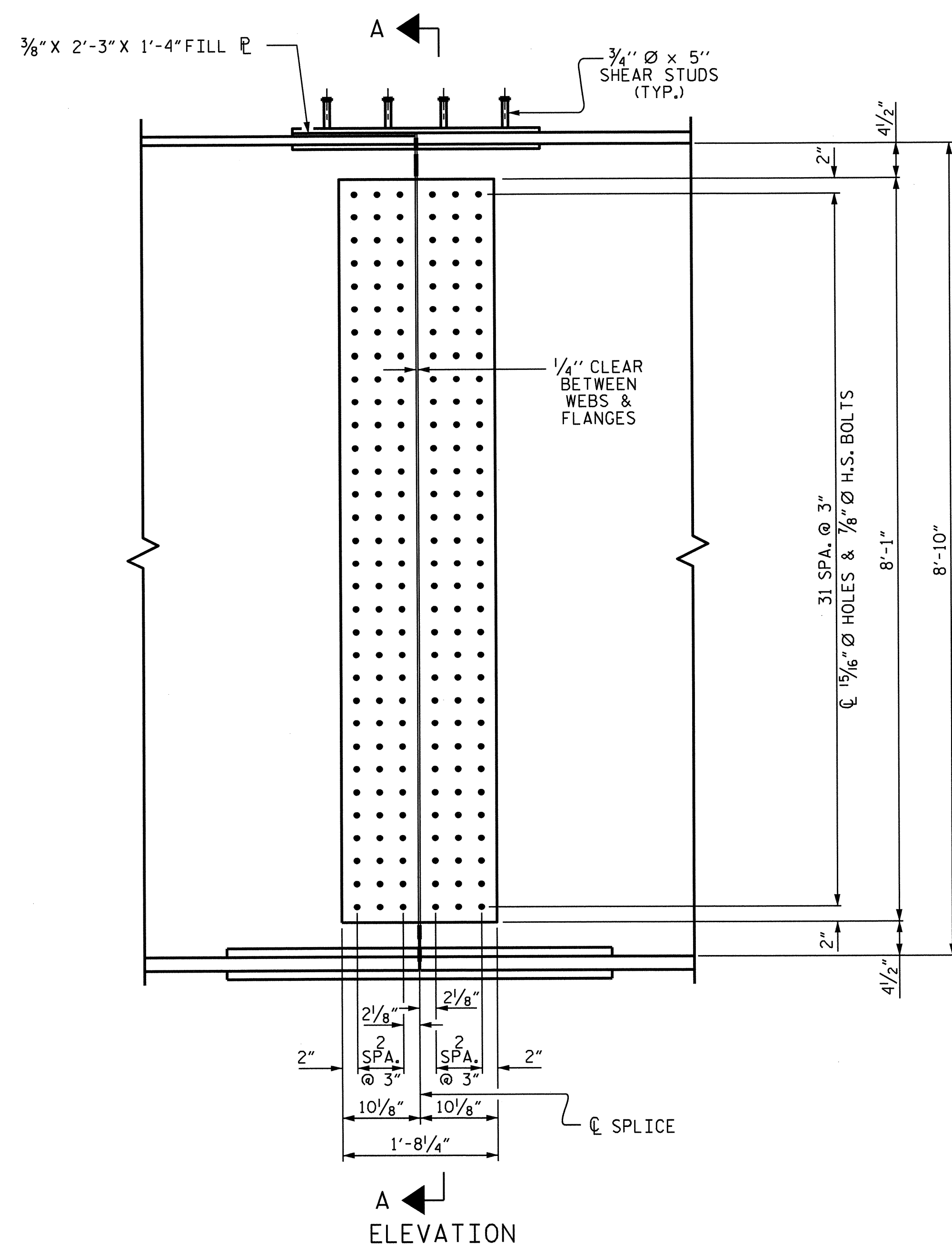
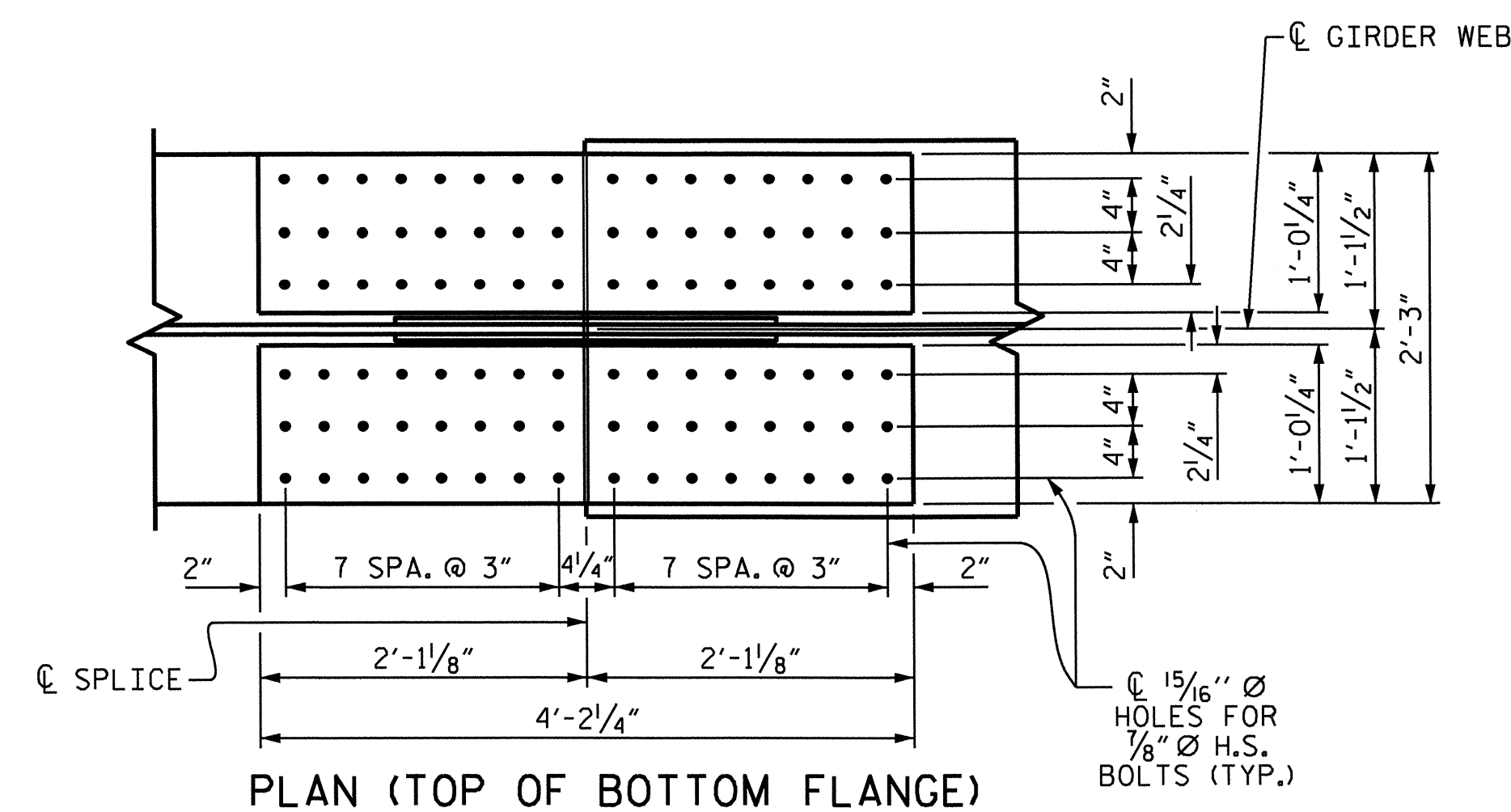
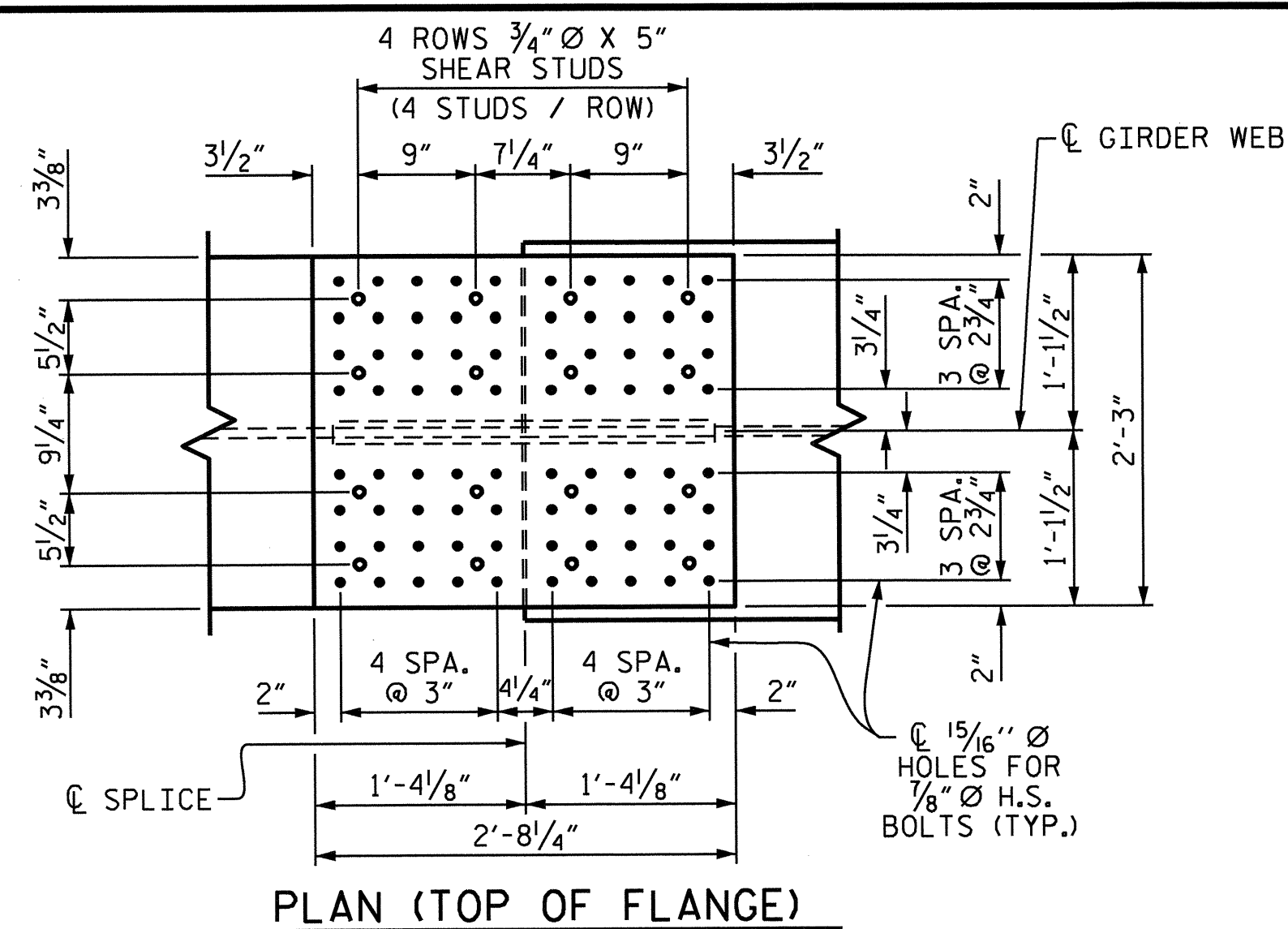
STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

TENSION ON THE ASTM A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 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.

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.

BEARING STIFFENERS MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE.

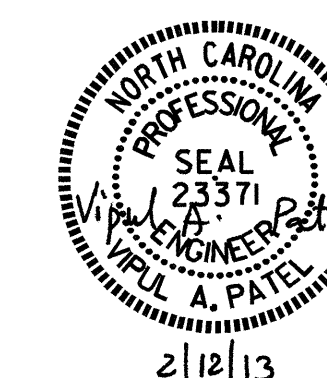


BOLTED FIELD SPLICE DETAILS (TYPICAL EACH FIELD SPLICE)

SHEAR STUD DETAIL FOR TOP FLANGE SPLICE PLATE

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA						SHEET NO. S-11
DEPARTMENT OF TRANSPORTATION RALEIGH						
SUPERSTRUCTURE						TOTAL SHEETS 56
STRUCTURAL STEEL DETAILS (LEFT LANE)						
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DRAWN BY: J.P. ADAMS DATE: 3/28/12
 CHECKED BY: J. KHARVA DATE: 8/2/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 7/2012

NOTES

LATERAL BRACING ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W OR APPROVED EQUAL.

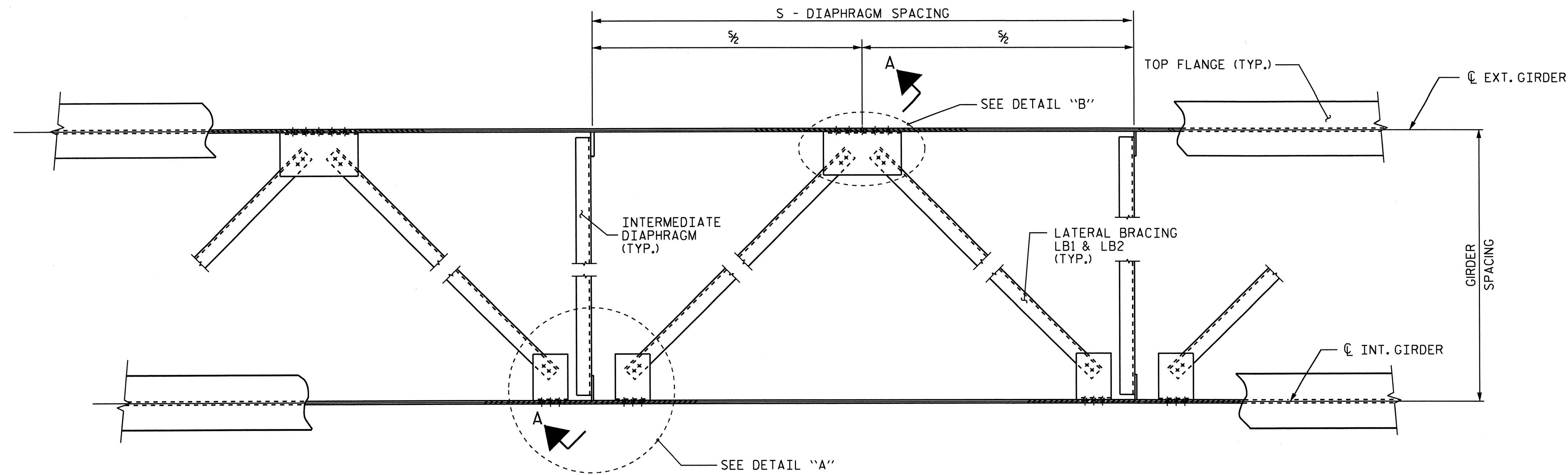
TENSION ON THE ASTM A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL BOLTED CONNECTIONS SHALL BE 7/8" Ø HIGH STRENGTH BOLTS.

THE CONTRACTOR HAS THE OPTION TO CLIP THE PROTRUDING CORNERS OF THE GUSSET PLATES, AT NO ADDITIONAL COST TO THE DEPARTMENT.

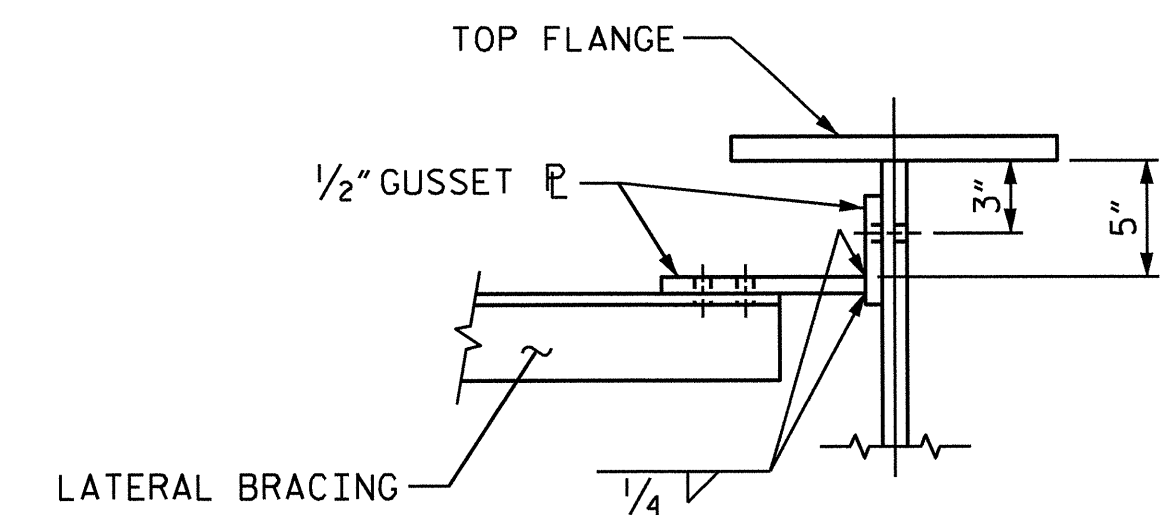
BENT GUSSET PLATES OR ROLLED ANGLE SHAPES MAY BE SUBSTITUTED FOR THE WELDED GUSSET PLATES DETAILED IF APPROVED BY THE ENGINEER, AT NO ADDITIONAL COST TO THE DEPARTMENT.

INSTALL THE LATERAL BRACING AFTER ERECTING THE EXTERIOR GIRDER AND THE ADJACENT INTERIOR GIRDER AND INSTALLING THE INTERMEDIATE DIAPHRAGMS.

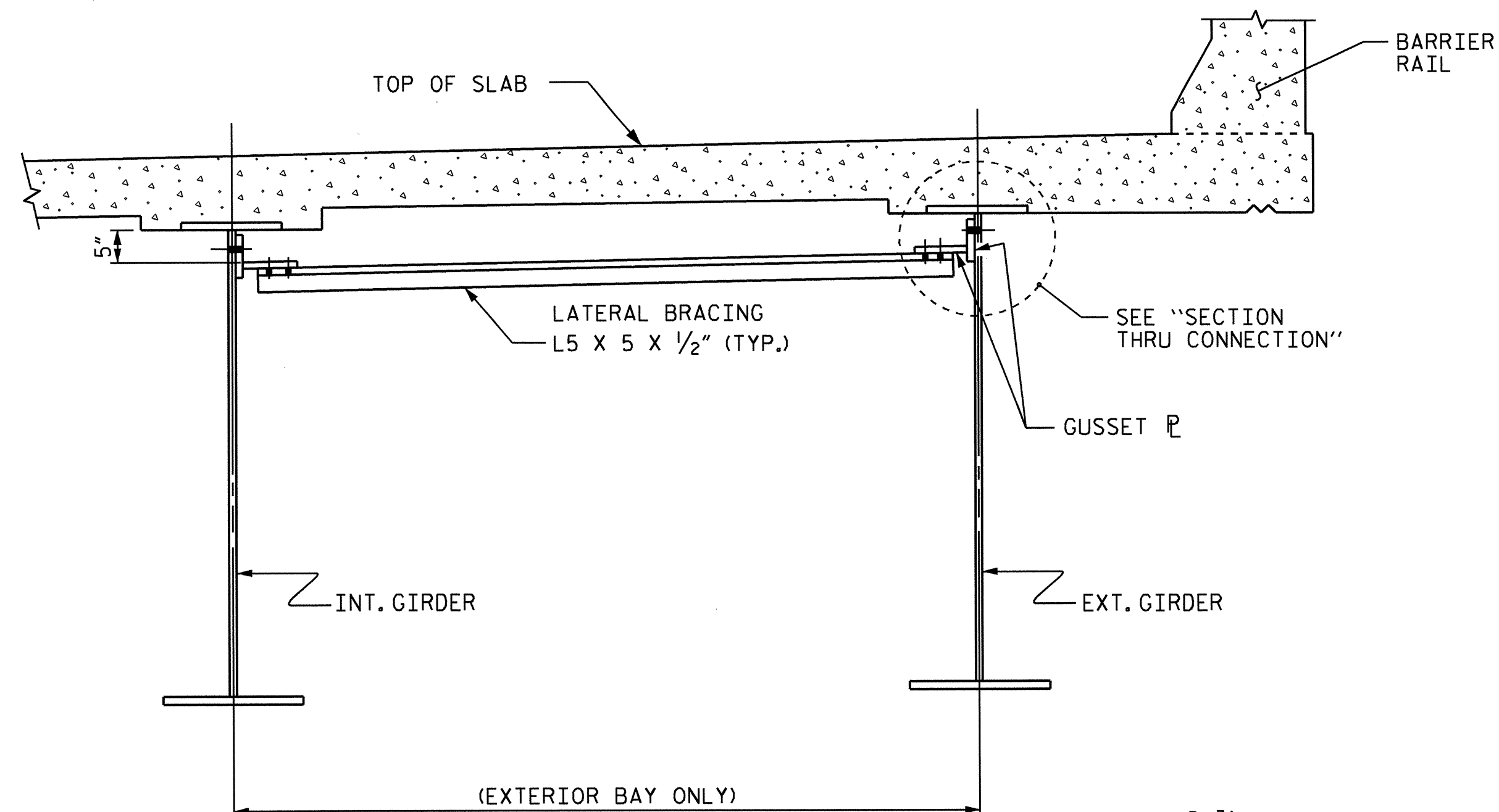


PART PLAN - NEAR TOP FLANGE LATERAL BRACING

(THROUGHOUT EXTERIOR BAYS ONLY)

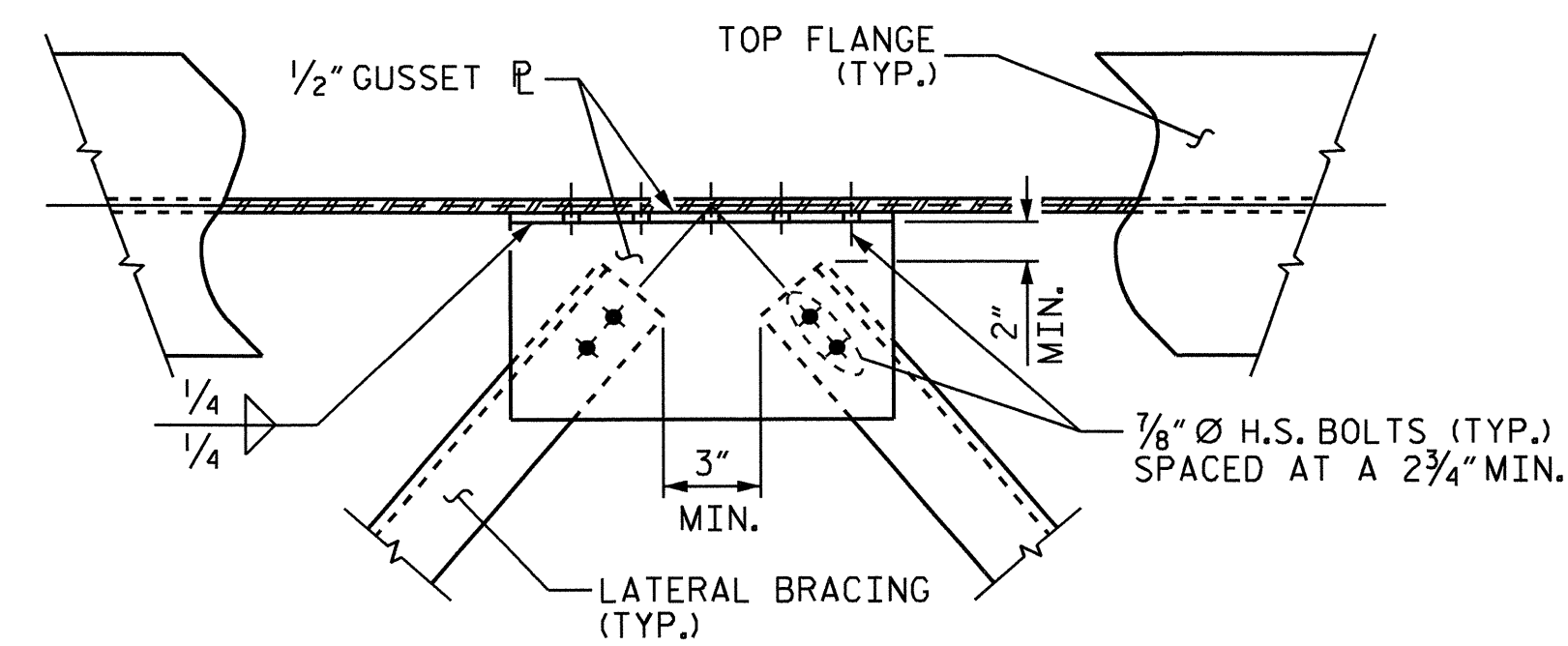


SECTION THRU CONNECTION

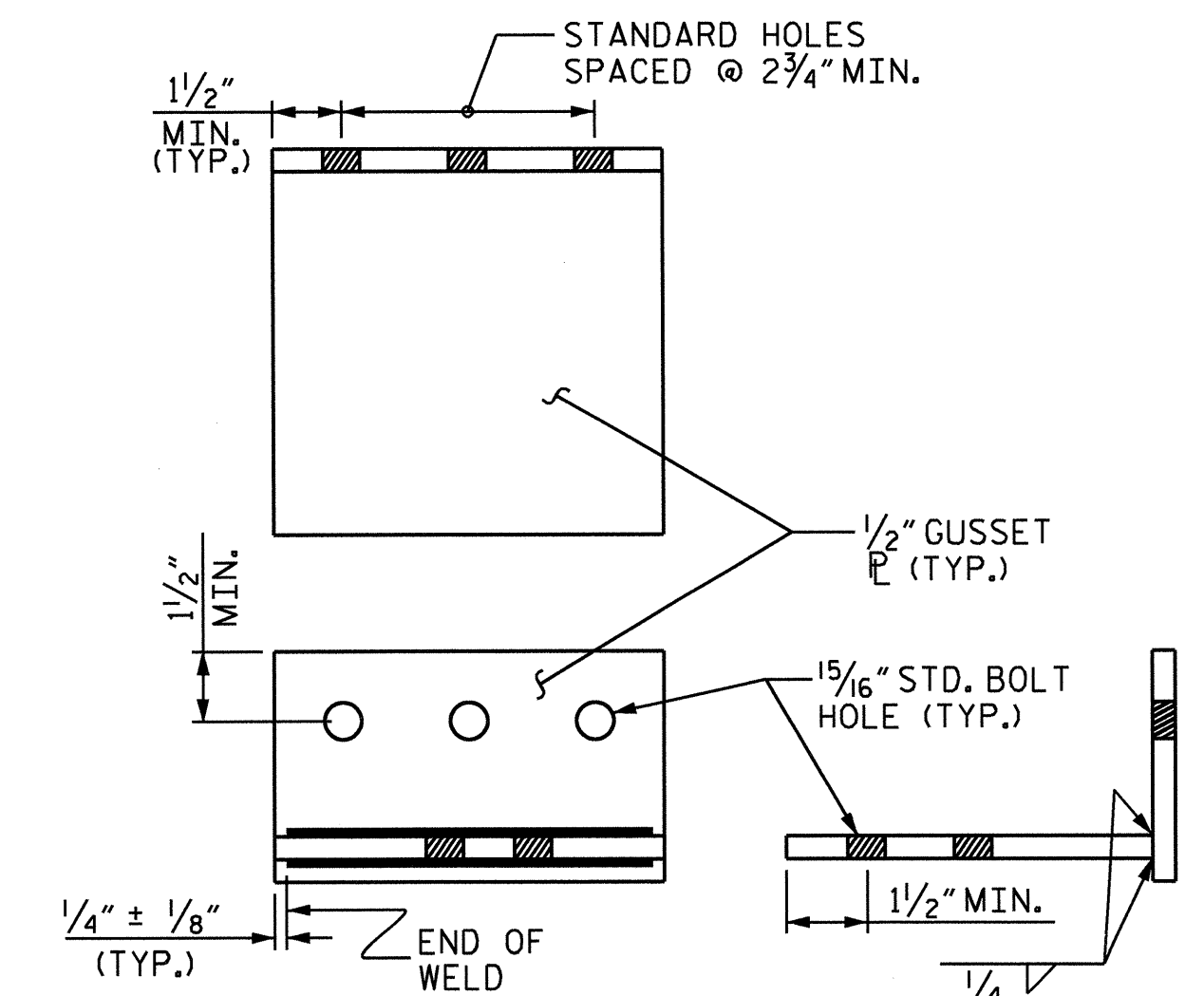


SECTION A-A

(EXTERIOR BAY ONLY)

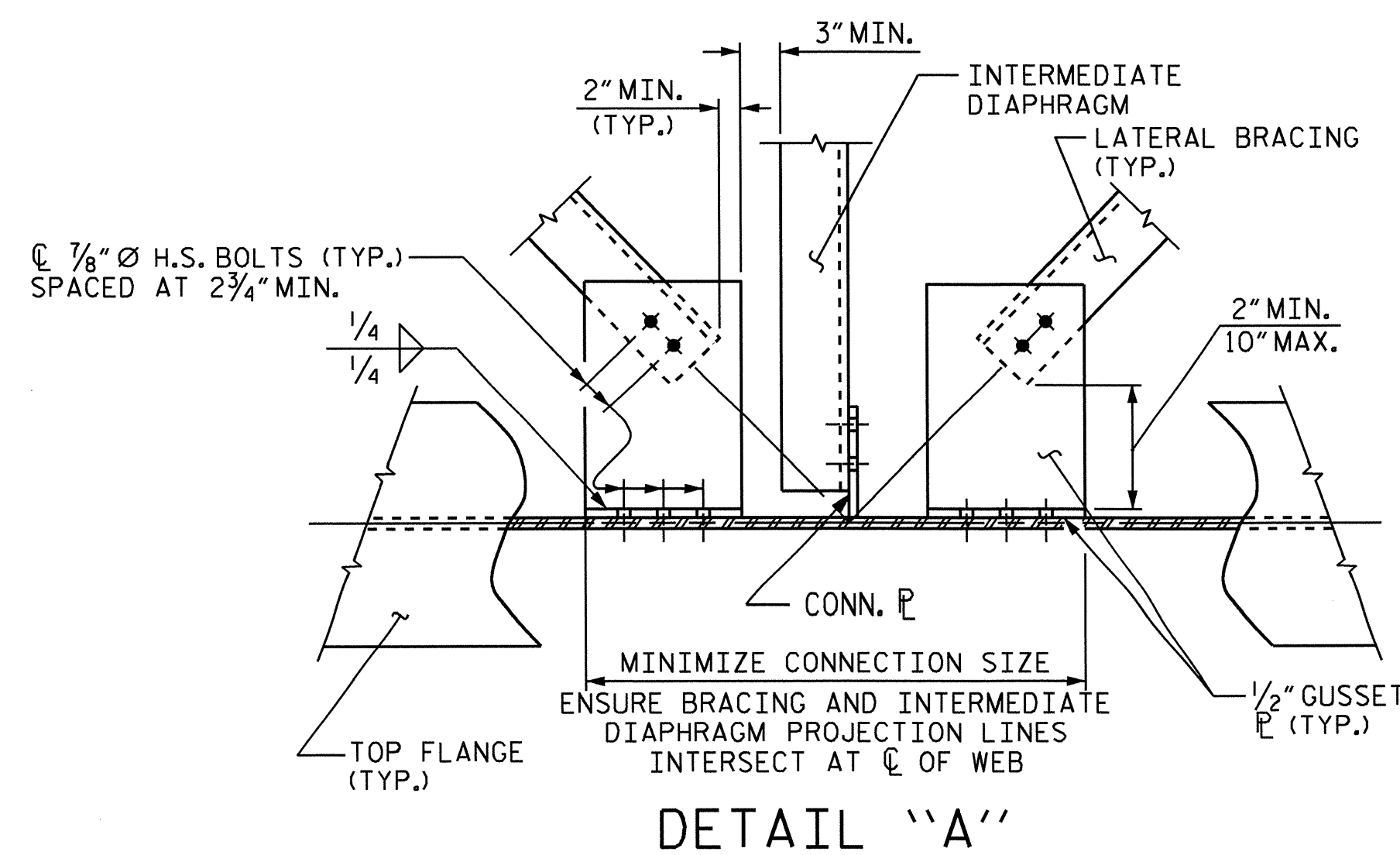


DETAIL "B"



CONNECTION DETAIL

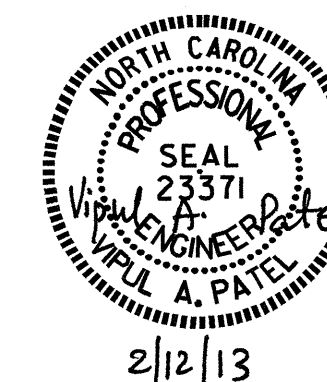
PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-



DETAIL "A"

ASSEMBLED BY: J.P. ADAMS	DATE: 7/11/12
CHECKED BY: J. KHARVA	DATE: 8/2012
DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR	DATE: 7/2012
DRAWN BY: WMC 6/11	ADDED: 10/31/11
CHECKED BY: GM 6/11	

07-JAN-2013 11:58
 O:\Structures\Plans\Plans Str #1 Left Lane\R2246B.LB1.01.dgn
 jpcadams



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LATERAL BRACING
 (LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			56

STR. #1

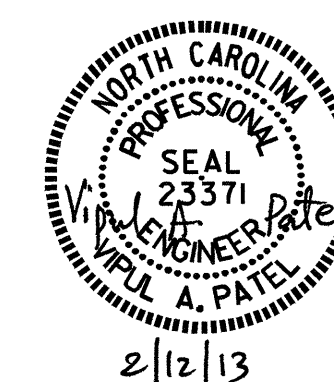
STD. NO. LB1

GIRDER CAMBER TABLE

THIRTIETH POINTS	SPAN A																														
	GIRDER #1 THRU #5																														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.054	0.108	0.159	0.209	0.256	0.299	0.339	0.375	0.406	0.434	0.456	0.474	0.487	0.495	0.497	0.495	0.487	0.474	0.456	0.434	0.406	0.375	0.339	0.299	0.256	0.209	0.159	0.108	0.054	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.072	0.149	0.223	0.295	0.363	0.426	0.483	0.534	0.580	0.619	0.660	0.677	0.696	0.707	0.711	0.707	0.696	0.677	0.656	0.619	0.580	0.534	0.483	0.426	0.363	0.295	0.223	0.149	0.072	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.010	0.019	0.028	0.037	0.046	0.054	0.061	0.067	0.073	0.078	0.083	0.085	0.087	0.089	0.089	0.089	0.087	0.085	0.082	0.078	0.073	0.067	0.061	0.054	0.046	0.037	0.028	0.019	0.010	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.136	0.276	0.410	0.541	0.665	0.779	0.883	0.976	1.059	1.131	1.199	1.236	1.270	1.291	1.297	1.291	1.270	1.236	1.194	1.131	1.059	0.976	0.883	0.779	0.665	0.541	0.410	0.276	0.136	0.000
CAMBER REQUIRED FOR VERTICAL CURVE ORDINATE	0.000	0.067	0.129	0.187	0.240	0.288	0.332	0.371	0.406	0.436	0.461	0.478	0.498	0.510	0.516	0.519	0.516	0.510	0.498	0.481	0.461	0.436	0.406	0.371	0.332	0.288	0.240	0.187	0.129	0.067	0.000
CAMBER REQUIRED FOR SUPERELEVATION ORDINATE	0.000	-0.003	-0.005	-0.007	-0.009	-0.011	-0.013	-0.015	-0.016	-0.017	-0.018	-0.019	-0.020	-0.020	-0.020	-0.020	-0.020	-0.020	-0.020	-0.019	-0.018	-0.017	-0.016	-0.015	-0.013	-0.011	-0.009	-0.007	-0.005	-0.003	0.000
REQUIRED CAMBER	0	2 ³ / ₈ "	4 ¹³ / ₁₆ "	7 ¹ / ₁₆ "	9 ¹ / ₄ "	11 ⁵ / ₁₆ "	13 ³ / ₁₆ "	14 ⁷ / ₈ "	16 ³ / ₈ "	17 ³ / ₄ "	18 ⁷ / ₈ "	19 ⁷ / ₈ "	20 ⁹ / ₁₆ "	21 ¹ / ₈ "	21 ⁷ / ₁₆ "	21 ⁹ / ₁₆ "	21 ⁷ / ₁₆ "	21 ¹ / ₈ "	20 ⁹ / ₁₆ "	19 ⁷ / ₈ "	18 ⁷ / ₈ "	17 ³ / ₄ "	16 ³ / ₈ "	14 ⁷ / ₈ "	13 ³ / ₁₆ "	11 ⁵ / ₁₆ "	9 ¹ / ₄ "	7 ¹ / ₁₆ "	4 ¹³ / ₁₆ "	2 ³ / ₈ "	0

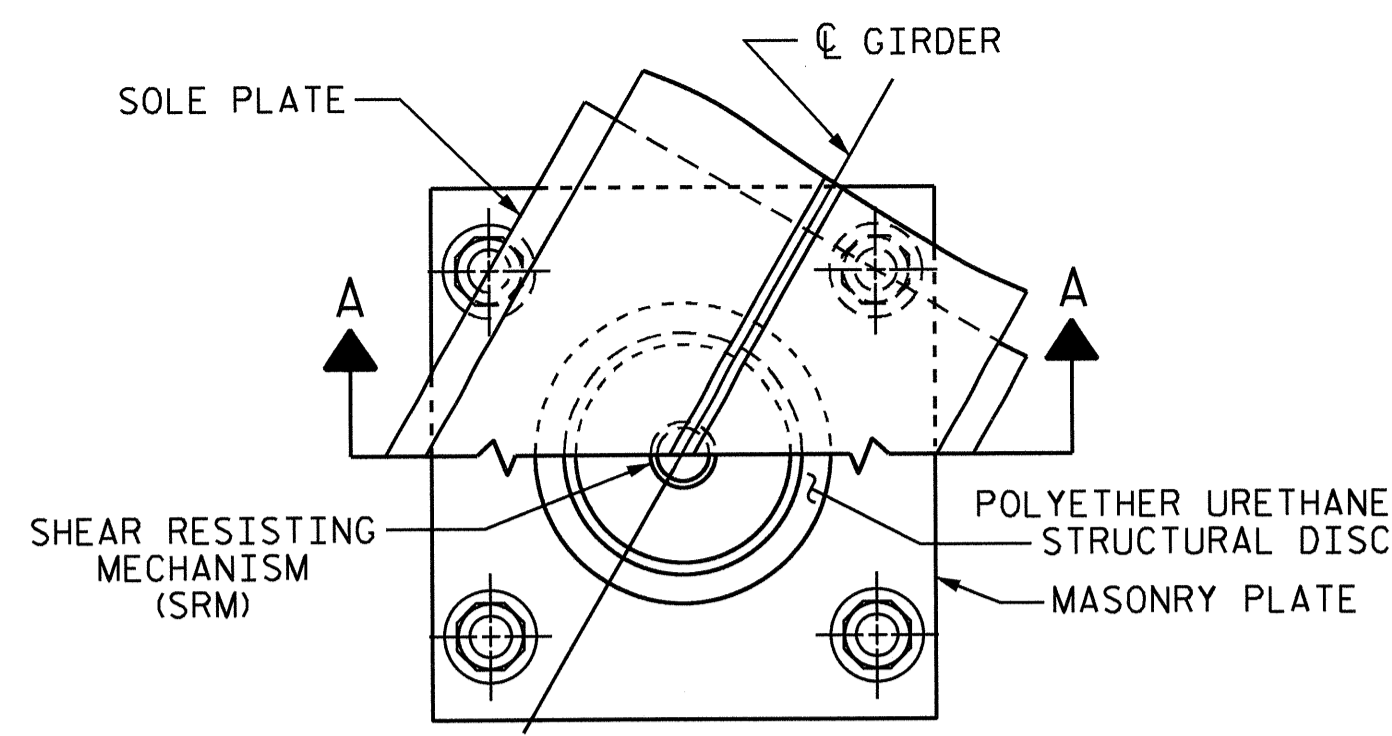
* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
 ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-

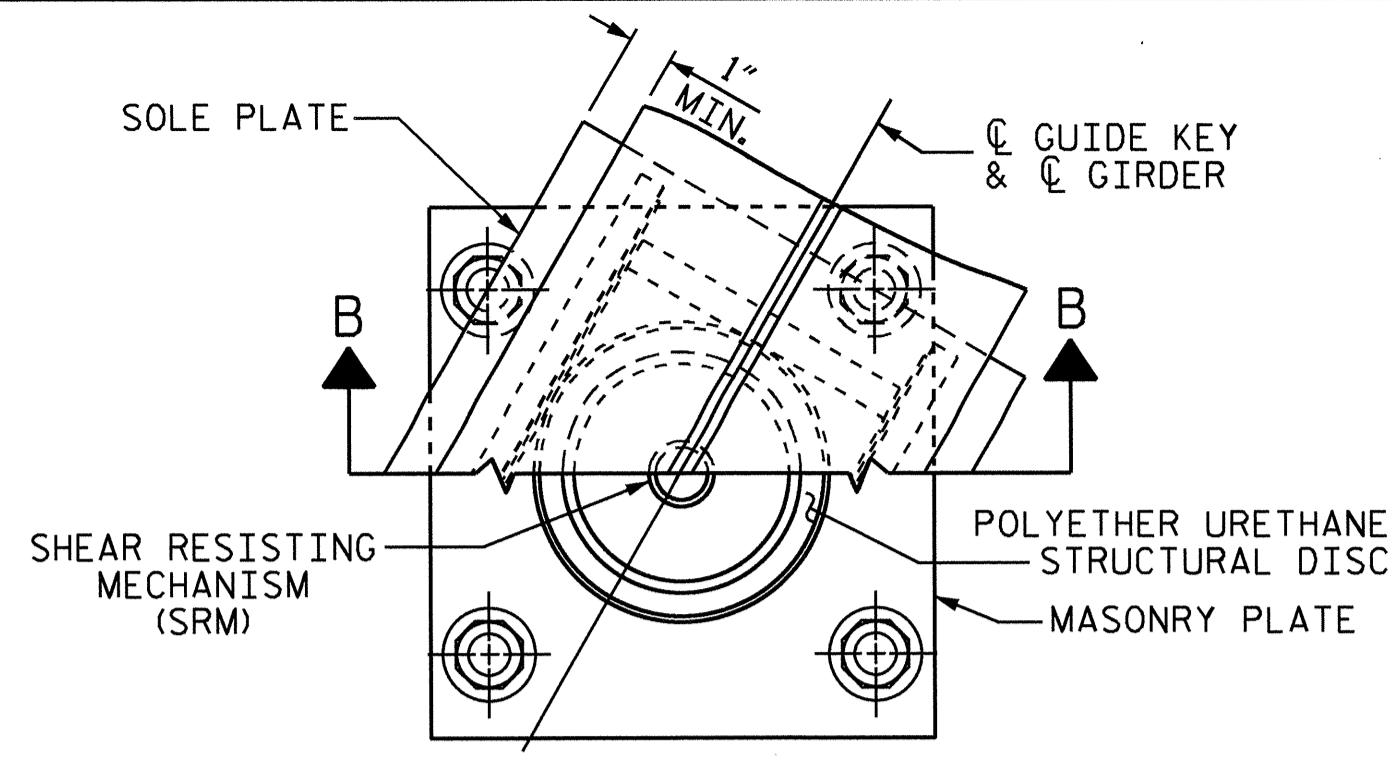


STATE OF NORTH CAROLINA					
DEPARTMENT OF TRANSPORTATION					
RALEIGH					
SUPERSTRUCTURE					
GIRDER					
CAMBER TABLE					
(LEFT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-13
TOTAL SHEETS					56

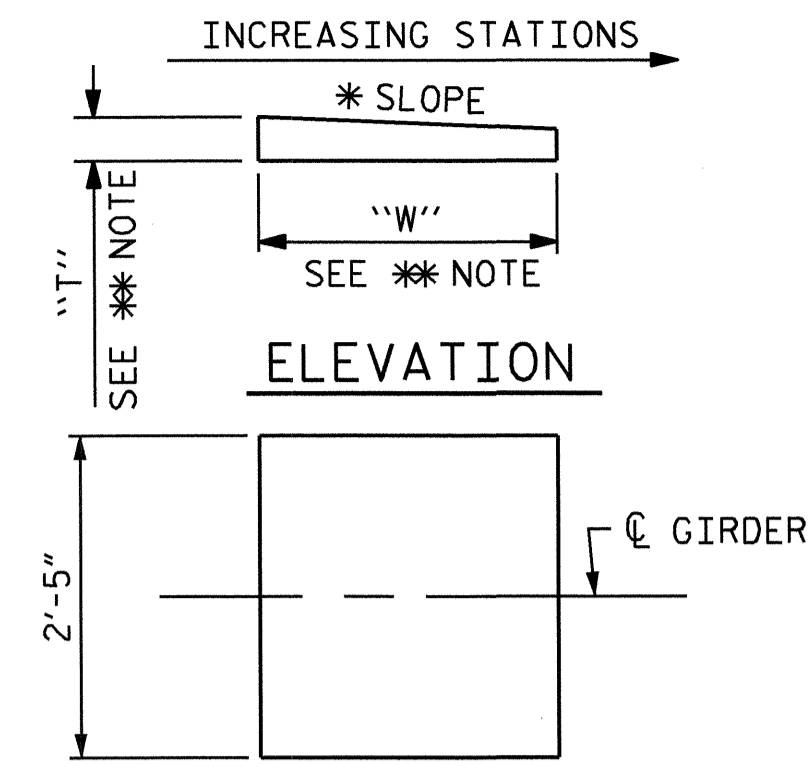
DRAWN BY : J.P. ADAMS DATE : 3/28/12
 CHECKED BY : J. KHARVA DATE : 8/2/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE : 7/2012



CUT-AWAY PLAN



CUT-AWAY PLAN

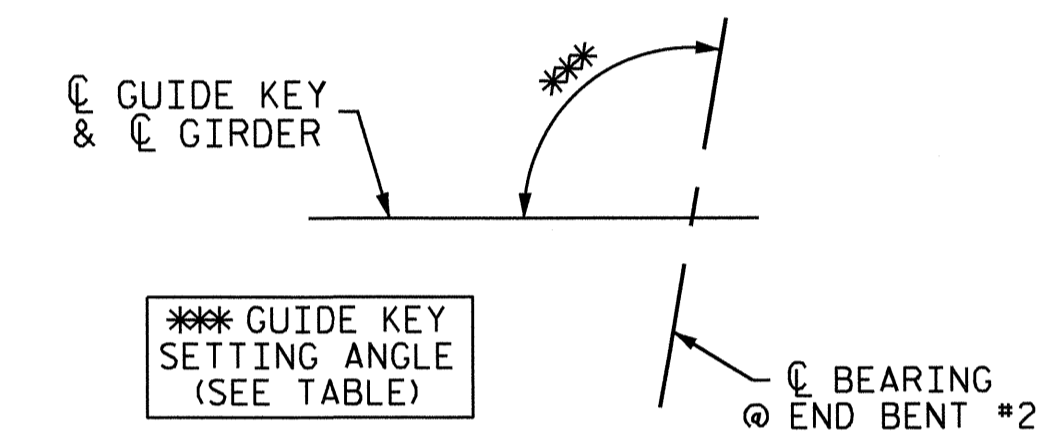


PLAN

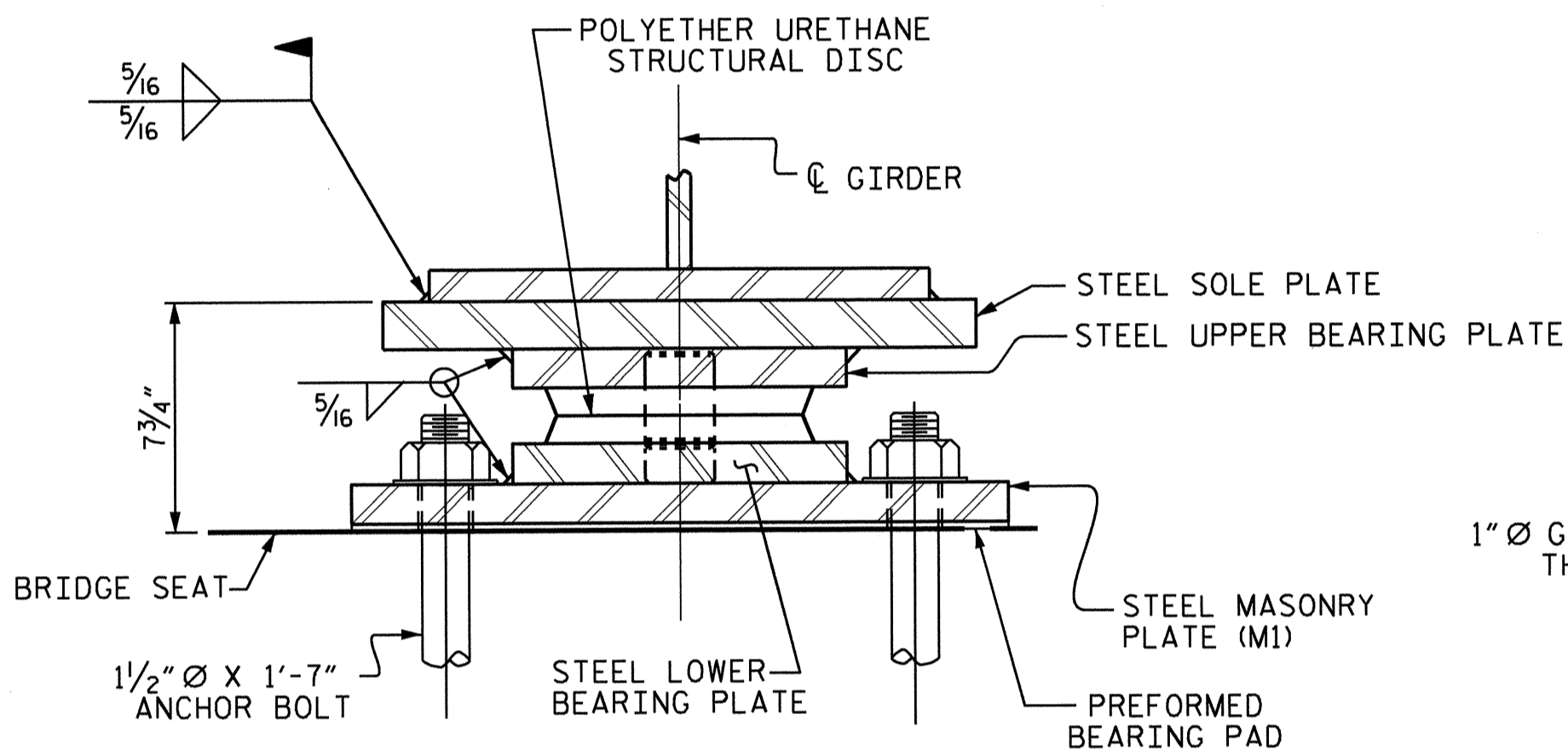
P1 (FIX.) (5 REQ'D) END BENT #1
 * 0.0000%
 P2 (EXP.) (5 REQ'D) END BENT #2
 * 1.4202%

** NOTE:
 DIMENSIONS "W" AND "T" ARE TO BE DETERMINED BY THE MANUFACTURER.

SOLE PLATE DETAILS

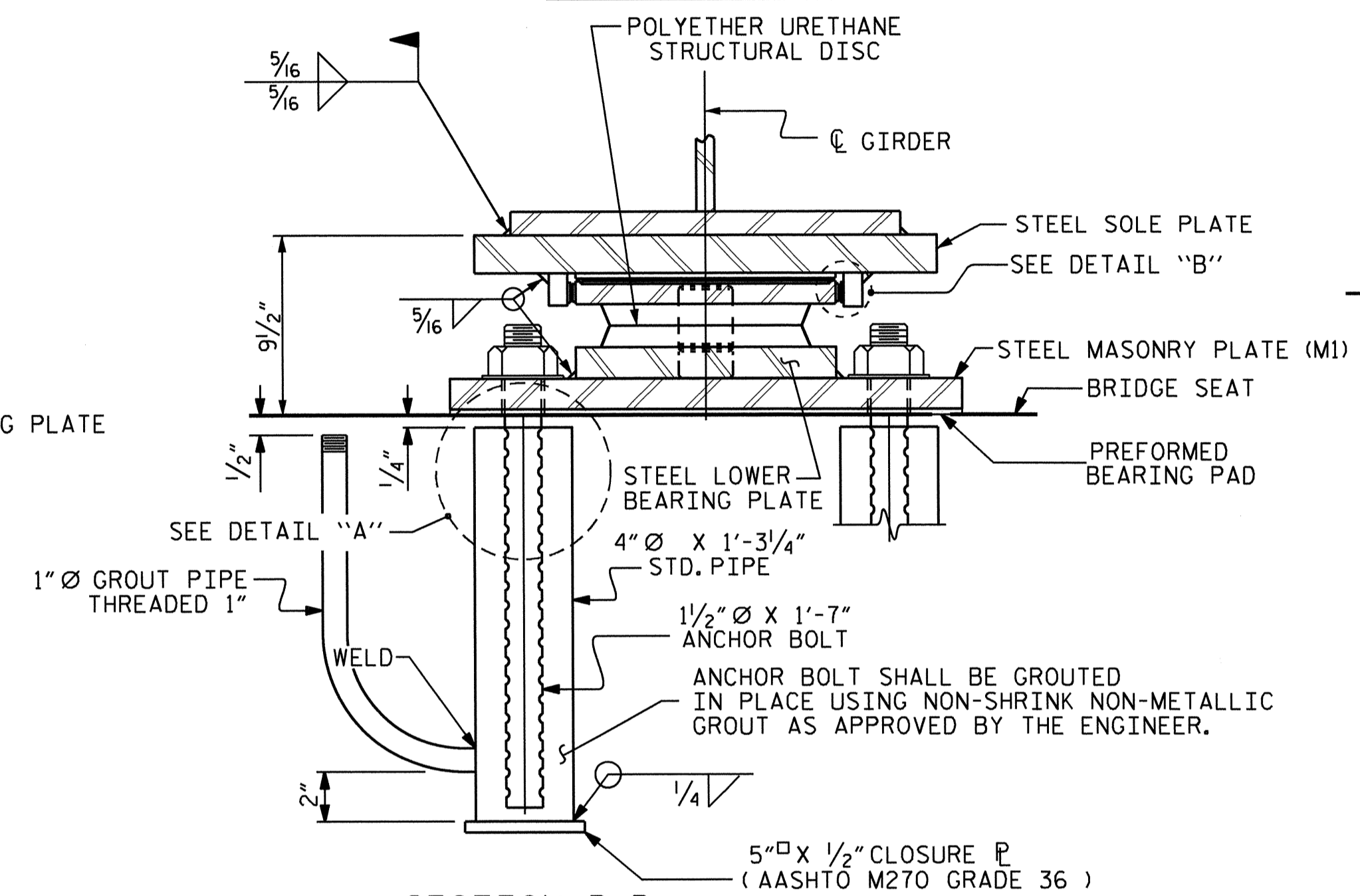


GIRDER	END BENT #2
#1	101°-31'-10"
#2	101°-30'-26"
#3	101°-29'-41"
#4	101°-28'-57"
#5	101°-28'-13"



SECTION A-A

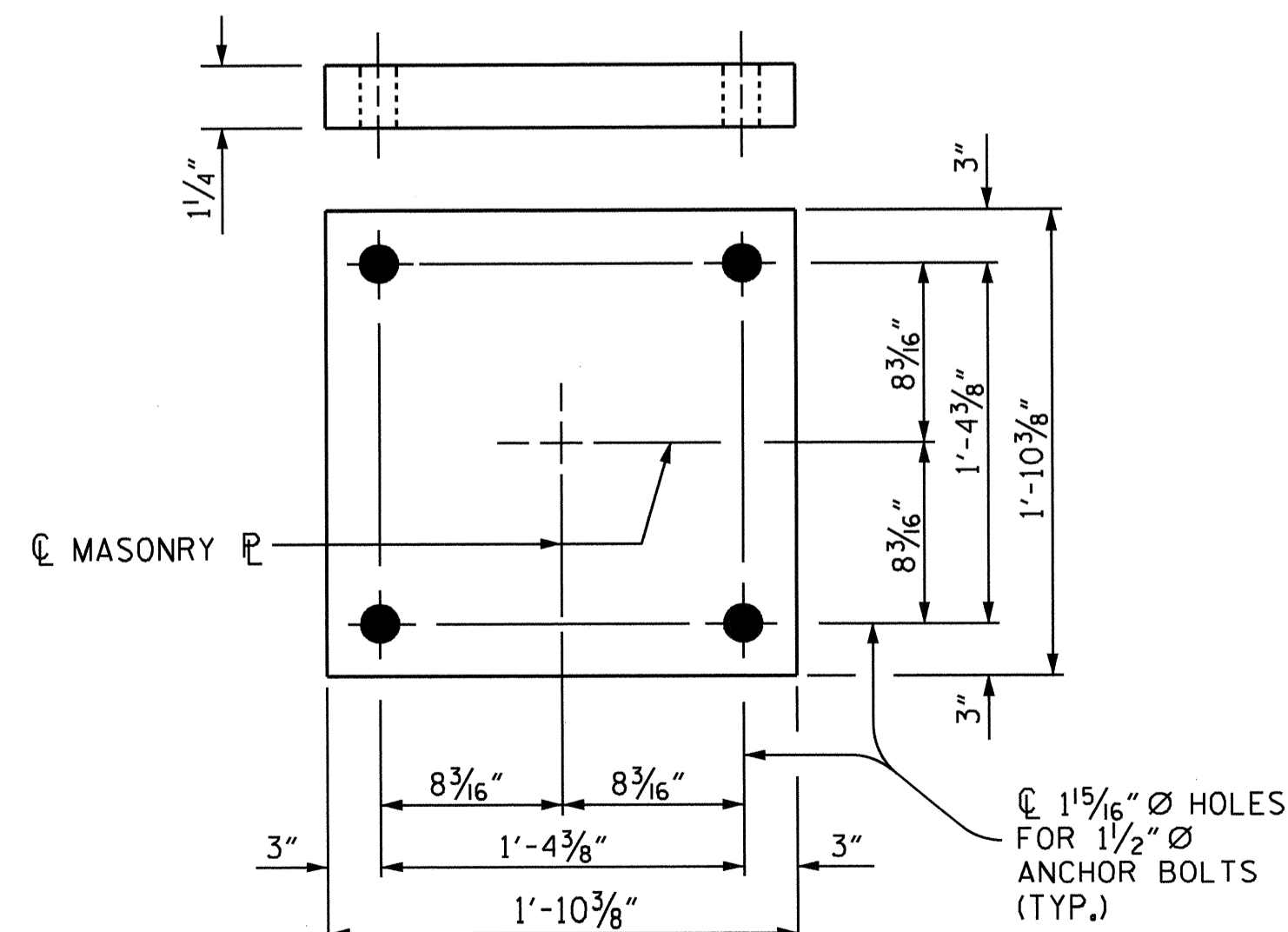
DB2, FIXED
 (5 REQ'D)



SECTION B-B

DB1, EXP.
 (5 REQ'D)

DISC BEARING DETAILS



PLAN
 M1 (10 REQ'D)
 MASONRY PLATE DETAILS

TABLE FOR PLATE SETTING DATA
 (EXPANSION DISC BEARINGS)

TEMPERATURE AT TIME OF SETTING	45° F	60° F	90° F	*
@ END BENT #2	-3/8"	0	3/4"	-1 1/8"

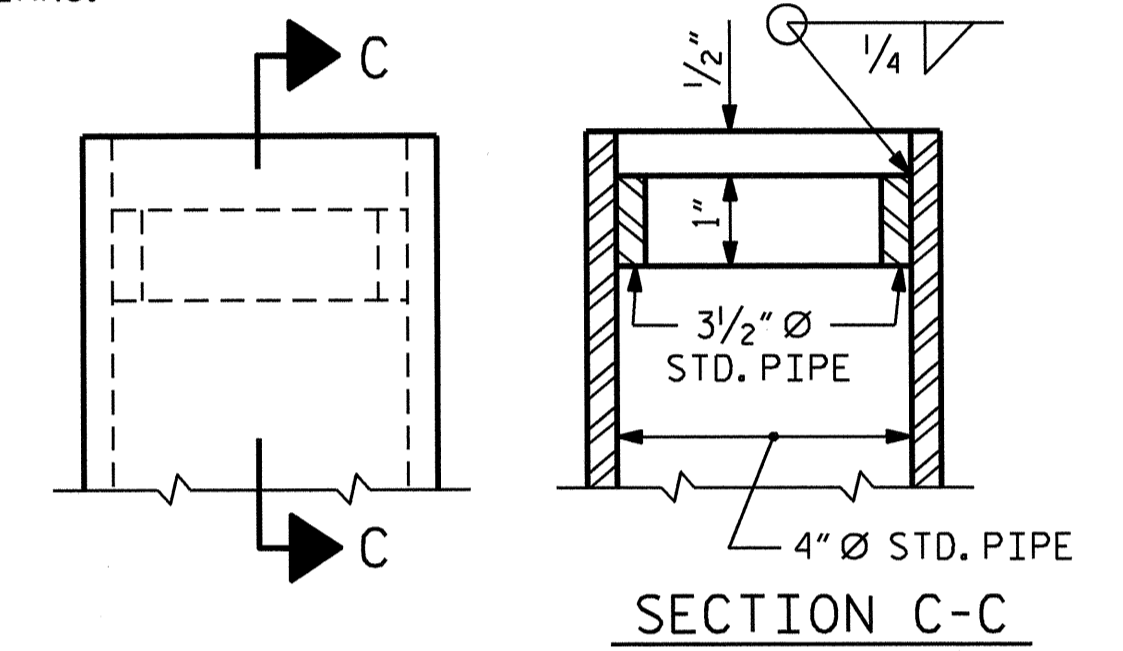
* CORRECTION FOR END ROTATION DUE TO WEIGHT OF SLAB AND COMPOSITE DEAD LOAD.

TEMPERATURE SETTING DETAIL

BEARING	LOCATION	UNFACTORED VERTICAL LOAD (KIPS)			FACTORED LATERAL LOAD (KIPS)	TOTAL MOVEMENT (INCHES)	
		TOTAL					
		DC	DW	LL+IMP.			
DB2 (FIXED)	END BENT #1	232	27	143	402	83	0
DB1 (EXP.)	END BENT #2	232	27	143	402	83	2 1/2"

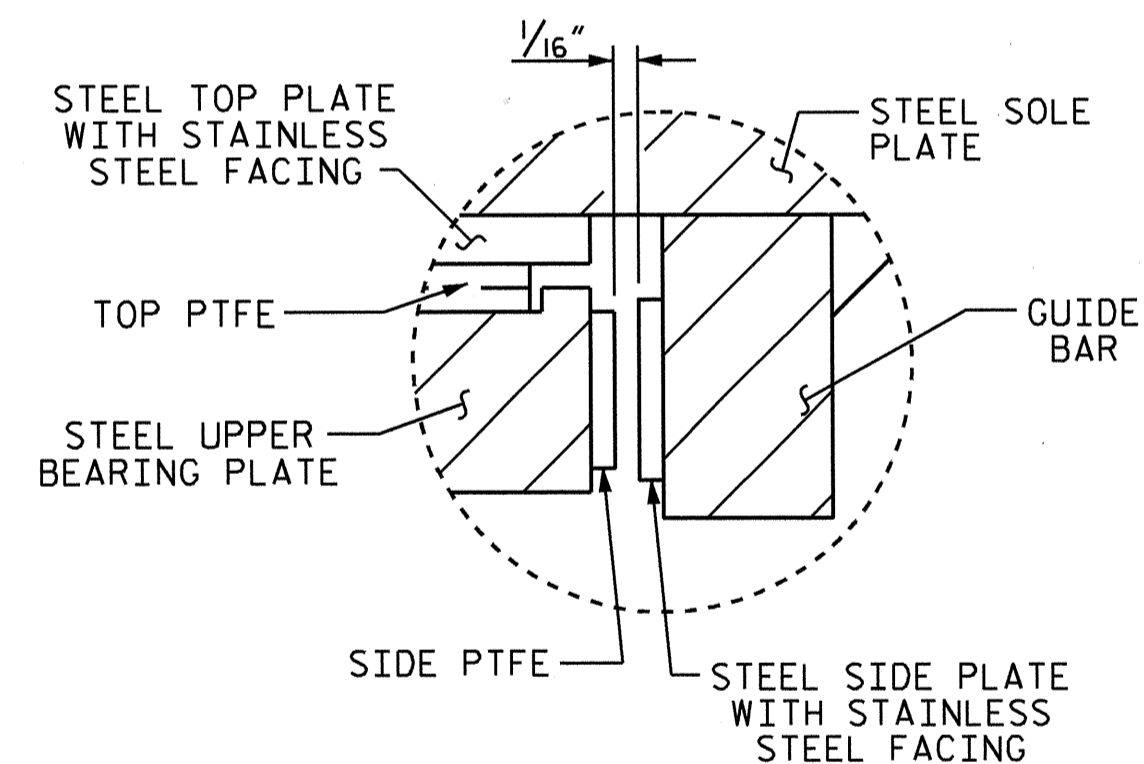
NOTES

FOR DISC BEARINGS, SEE SPECIAL PROVISIONS.
 AT ALL POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS SHALL BE TIGHTENED FINGER TIGHT AND GIVEN AN ADDITIONAL 1/4 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.
 WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE PTFE OR ELASTOMER.
 AFTER BEARING ASSEMBLY IS IN PLACE AND ANCHOR BOLTS HAVE BEEN FINALLY POSITIONED, THEY SHALL BE GROUTED IN PLACE AS SHOWN.
 THE CLOSURE PLATE, GROUT PIPE AND STANDARD PIPE FOR THIS ASSEMBLY NEED NOT BE GALVANIZED.
 SOLE PLATES SHOULD BE WELDED TO BEAM FLANGES AND ANCHOR BOLTS SHOULD BE GROUTED BEFORE FALSEWORK IS PLACED.
 ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.
 FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
 THE MINIMUM ROTATIONAL CAPACITY FOR ALL BEARINGS SHALL BE 0.02 RADIAN.



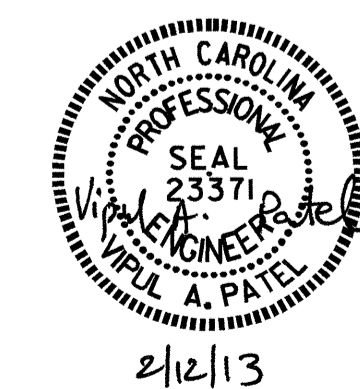
SECTION C-C

DETAIL "A"



DETAIL "B"

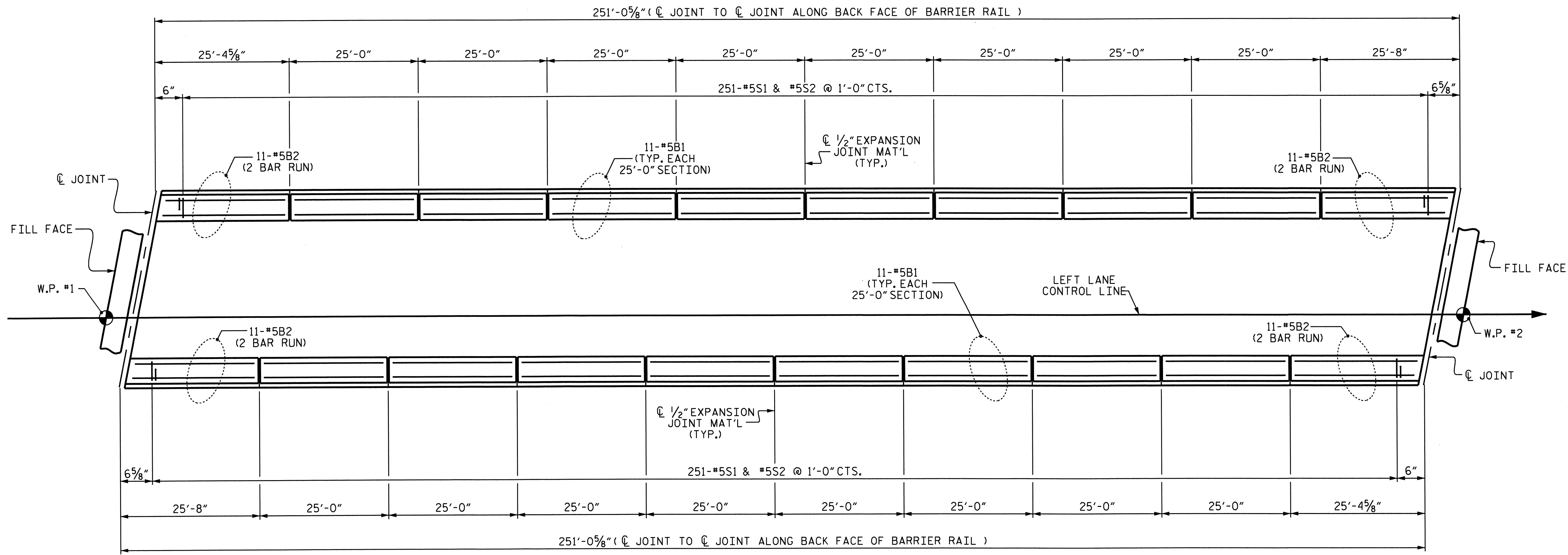
PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-



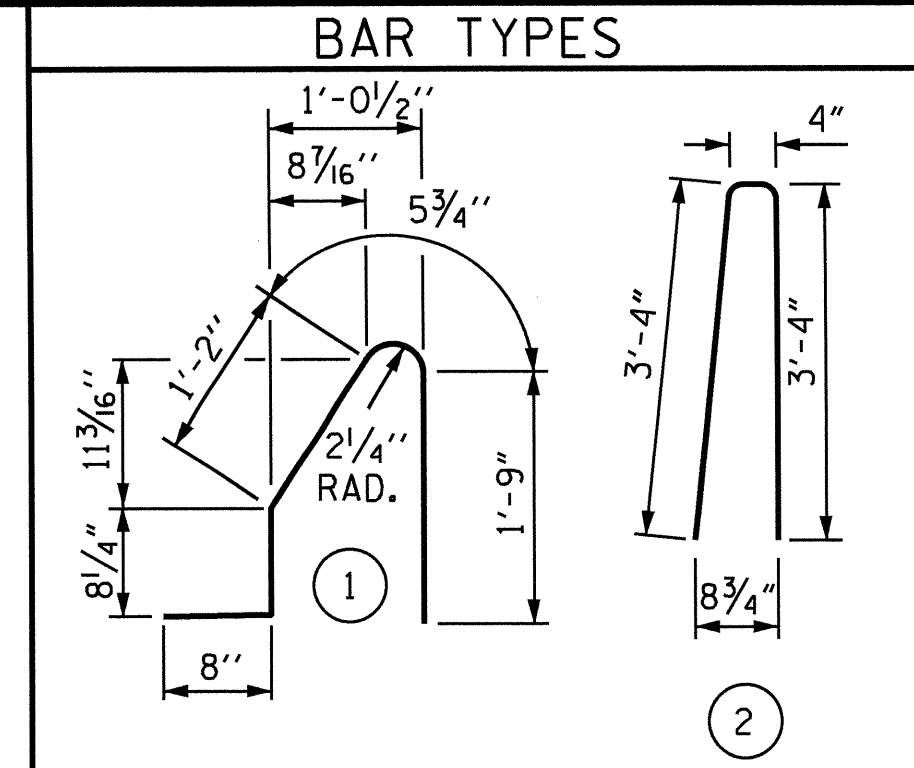
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 DISC BEARING
 DETAILS
 (LEFT LANE)

REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	56
1			3			
2			4			

DRAWN BY : J.P. ADAMS DATE : 3/28/12
 CHECKED BY : J. KHARVA DATE : 8/2/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE : 7/2012



PLAN OF BARRIER RAIL

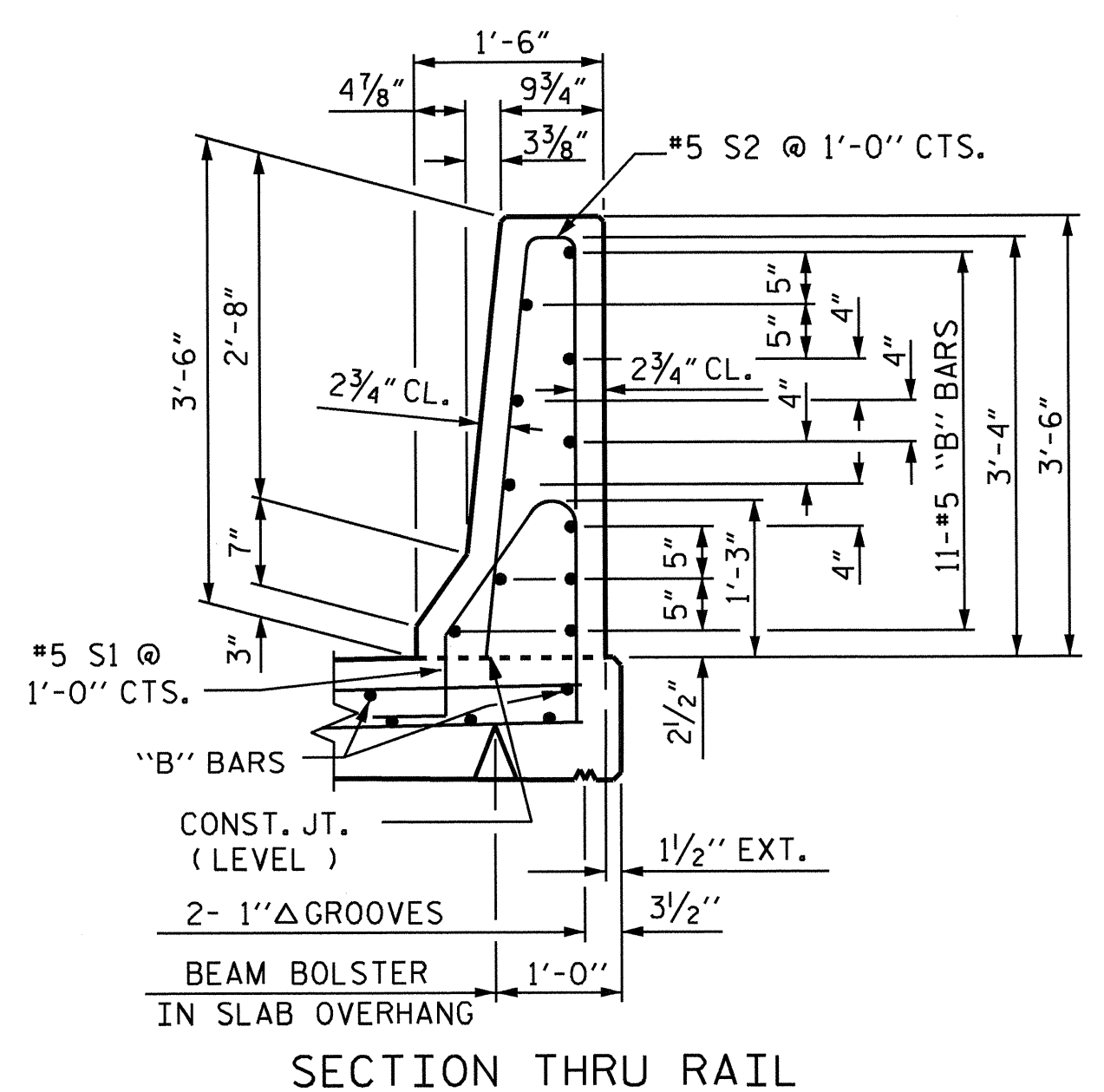


ALL BAR DIMENSIONS ARE OUT TO OUT

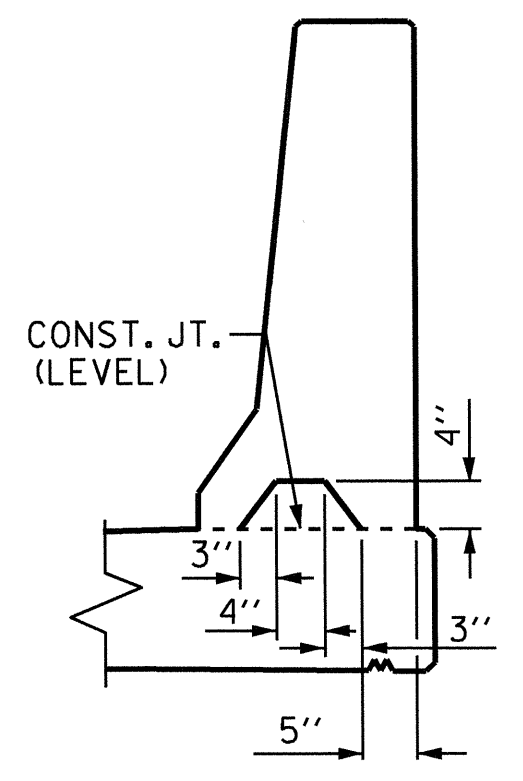
BILL OF MATERIAL					
FOR CONCRETE BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	176	#5	STR.	24'-7"	4513
* B2	88	#5	STR.	14'-5"	1323
* S1	502	#5	1	4'-9"	2487
* S2	502	#5	2	7'-0"	3665

* EPOXY COATED REINFORCING STEEL 11988 LBS.
 CLASS AA CONCRETE 68.3 CU. YDS.
 * CONCRETE BARRIER RAIL 502.10 LIN. FT.

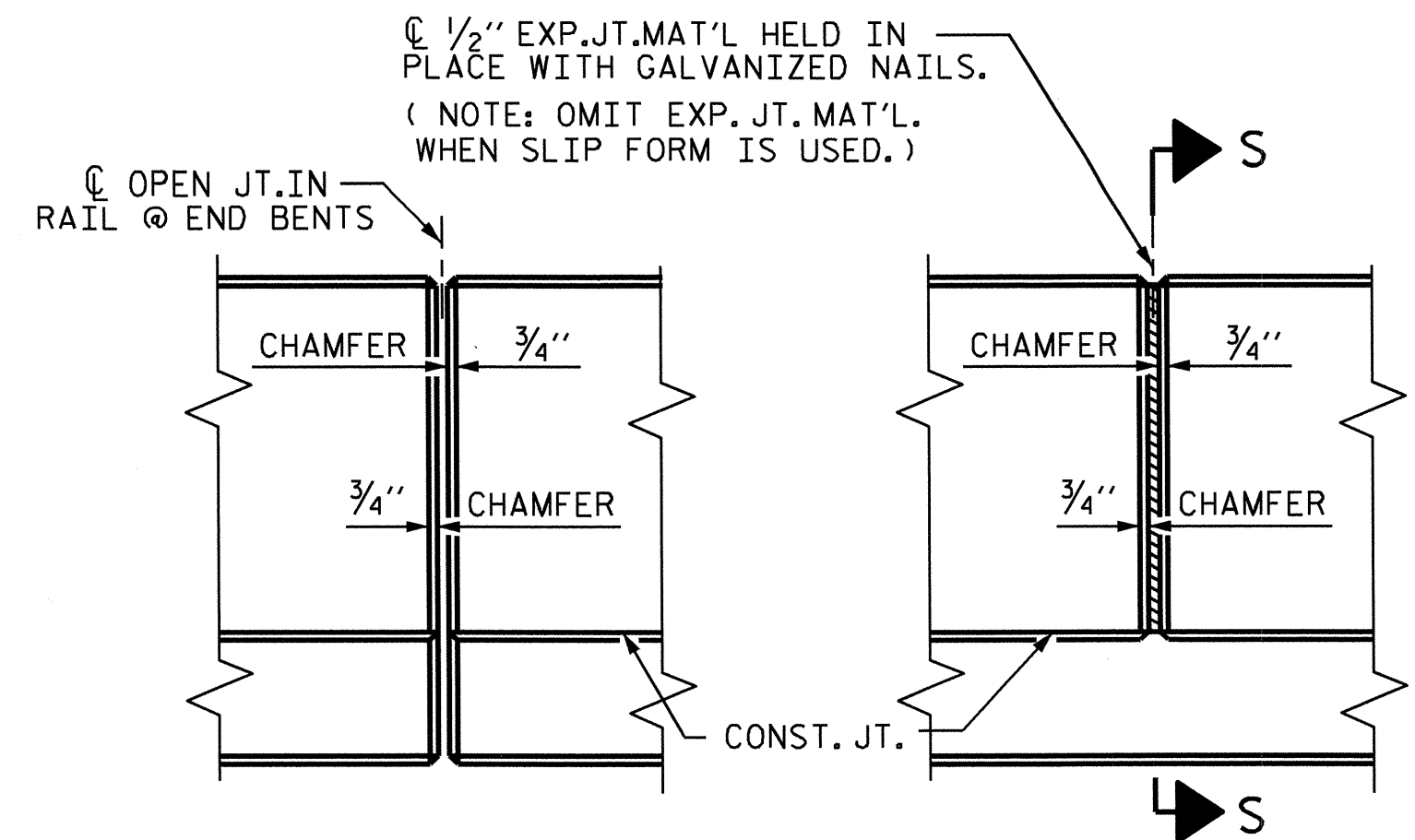
* THE QUANTITIES OF BARRIER RAIL ON THE APPROACH SLABS IS NOT INCLUDED. FOR BARRIER RAIL ON THE APPROACH SLABS, SEE "APPROACH SLAB DETAILS" SHEET.



SECTION THRU RAIL



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



ELEVATION AT EXPANSION JOINTS

NOTES

THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 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 LESS THAN 10 FEET IN LENGTH.

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 CONCRETE
 BARRIER RAIL
 (LEFT LANE)

ASSEMBLED BY: J.P. ADAMS	DATE: 7/11/12
CHECKED BY: J. KHARVA	DATE: 8/2012
DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR	DATE: 7/2012
DRAWN BY: ARB 5/87	REV. 10/1/11 MAA/GM
CHECKED BY: SJD 9/87	REV. 7/12 MAA/GM
	REV. 10/12 MAA/GM

BARRIER RAIL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			56

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.)

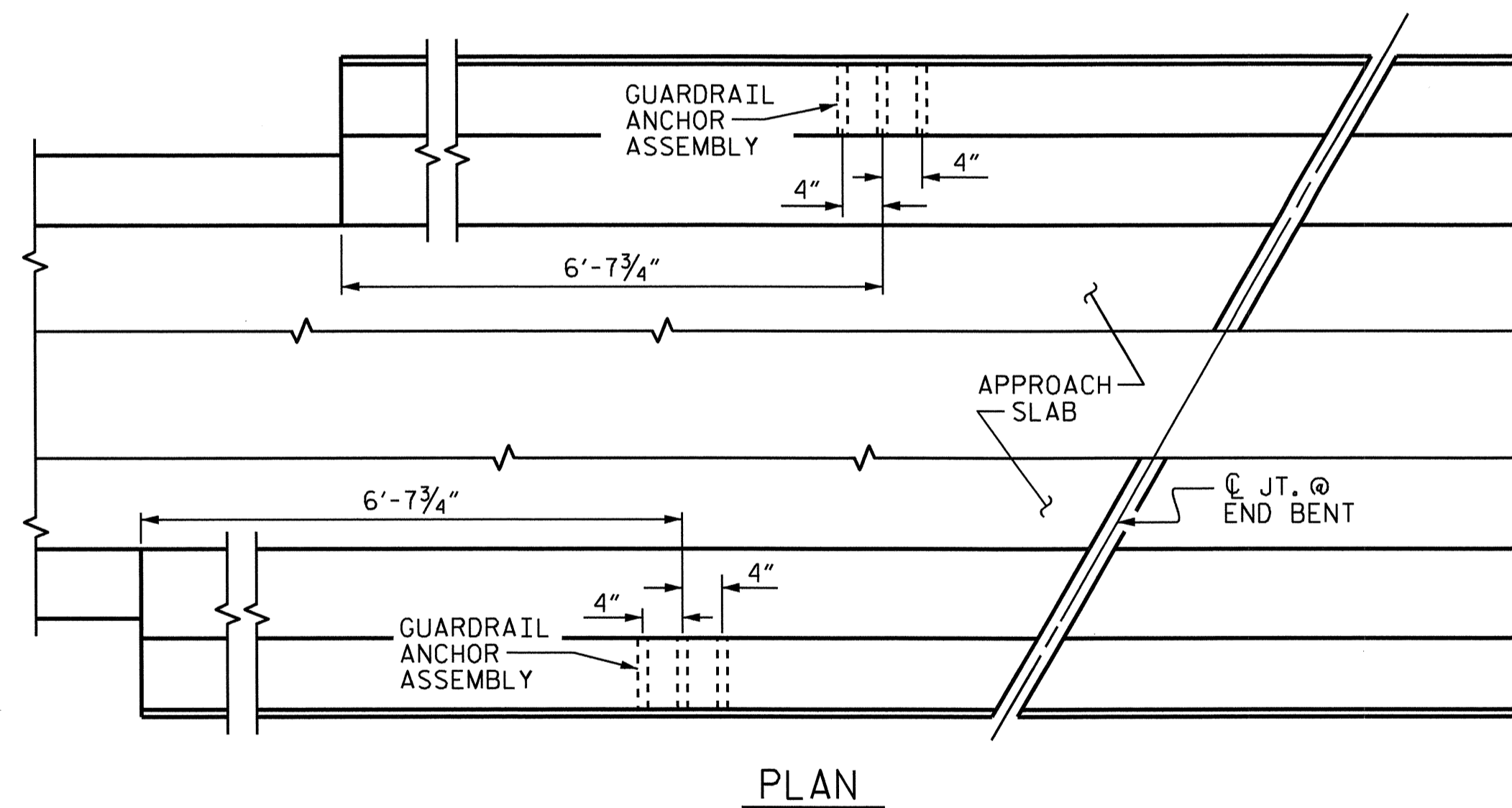
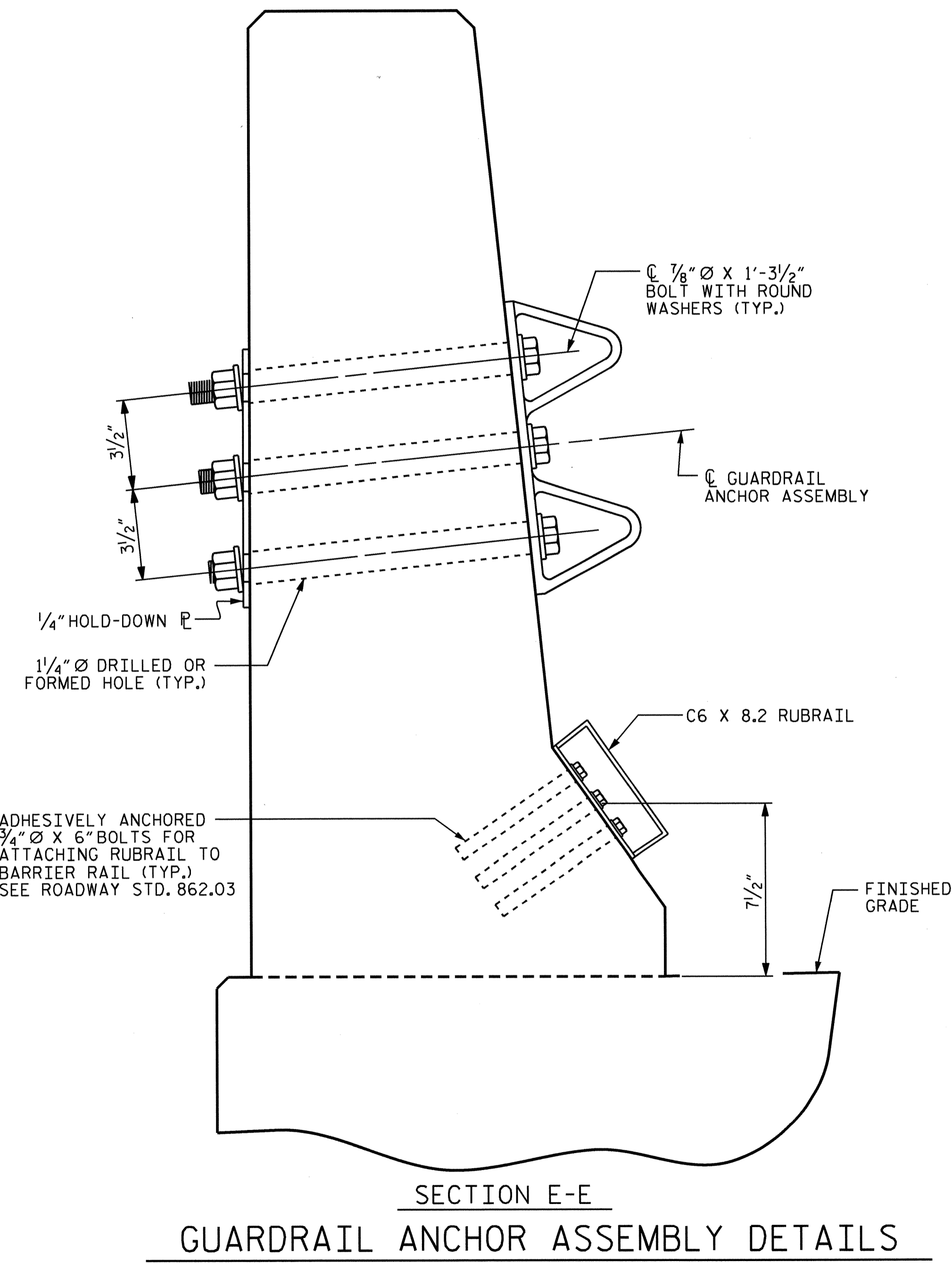
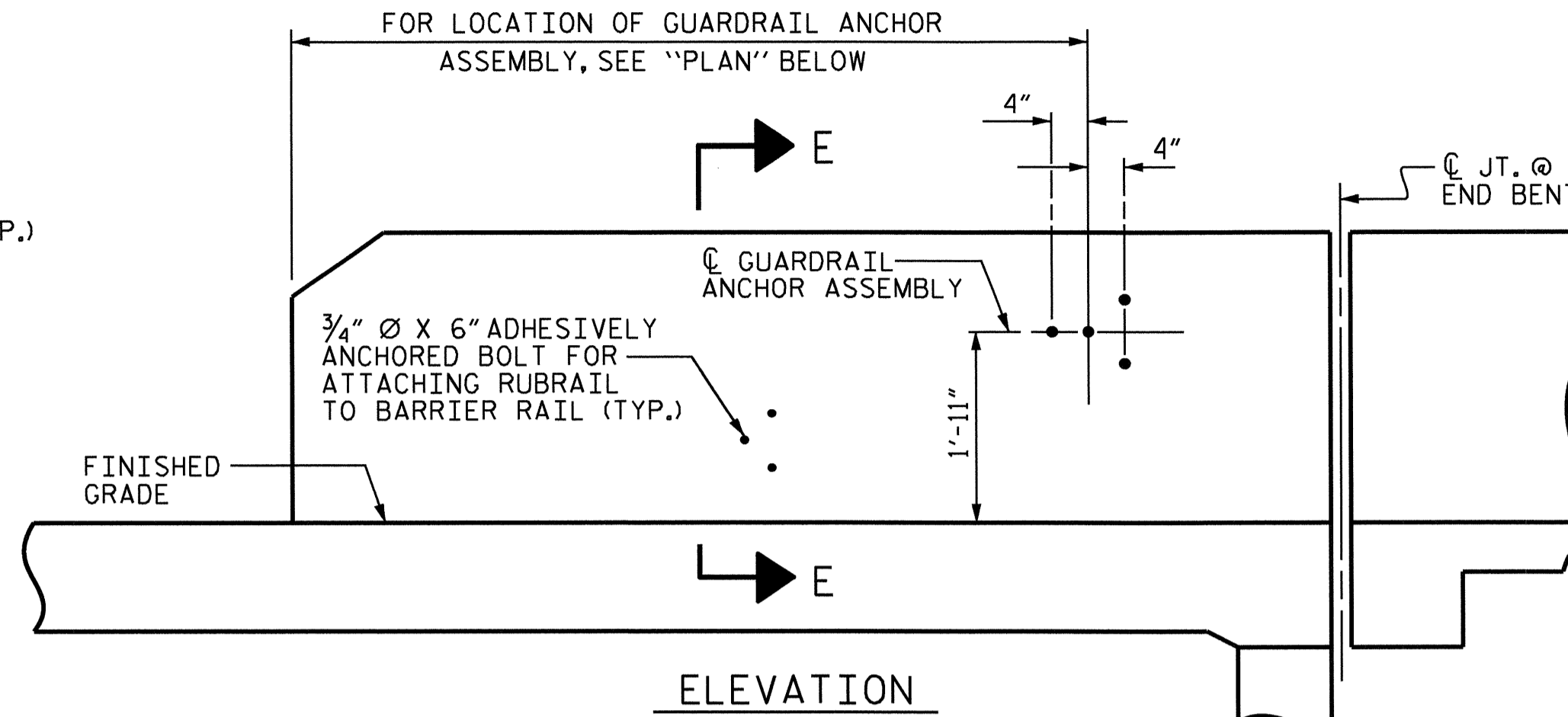
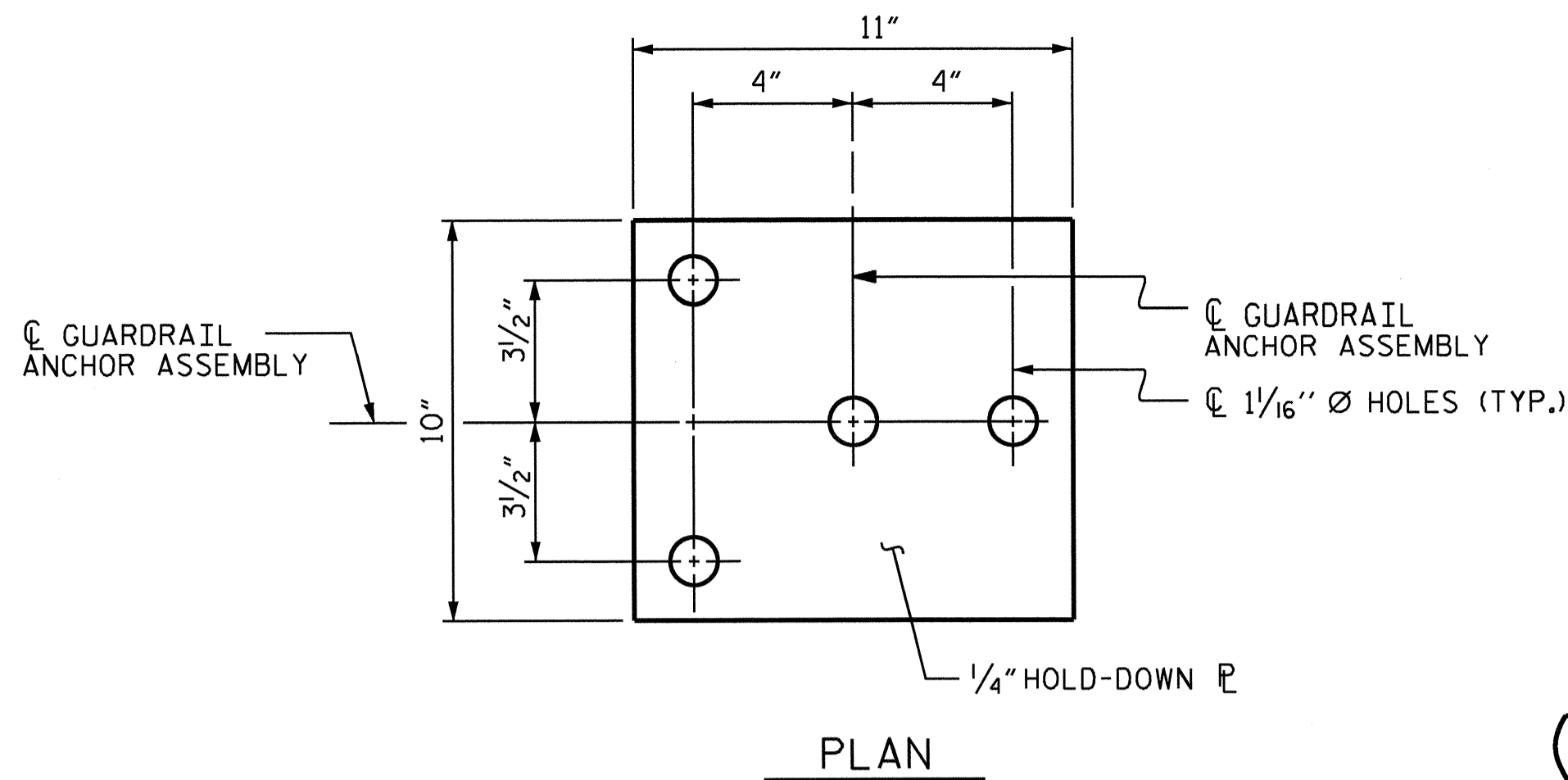
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

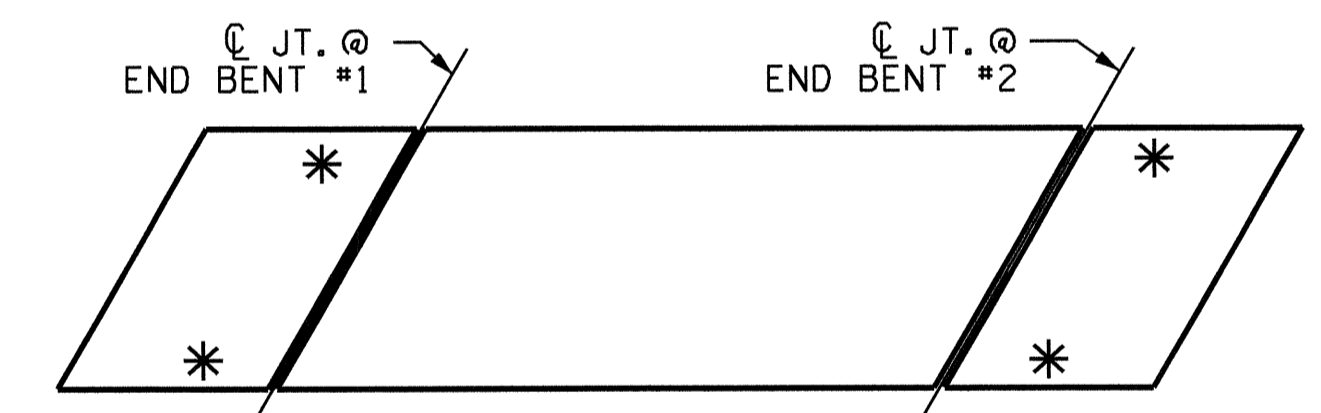
THE 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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 STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



LOCATION OF ANCHORS FOR GUARDRAIL

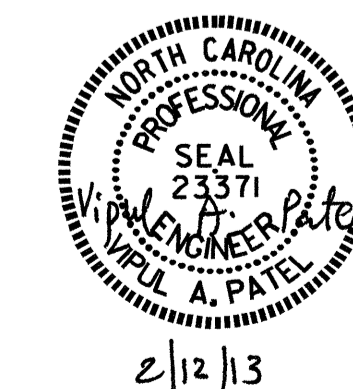
END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

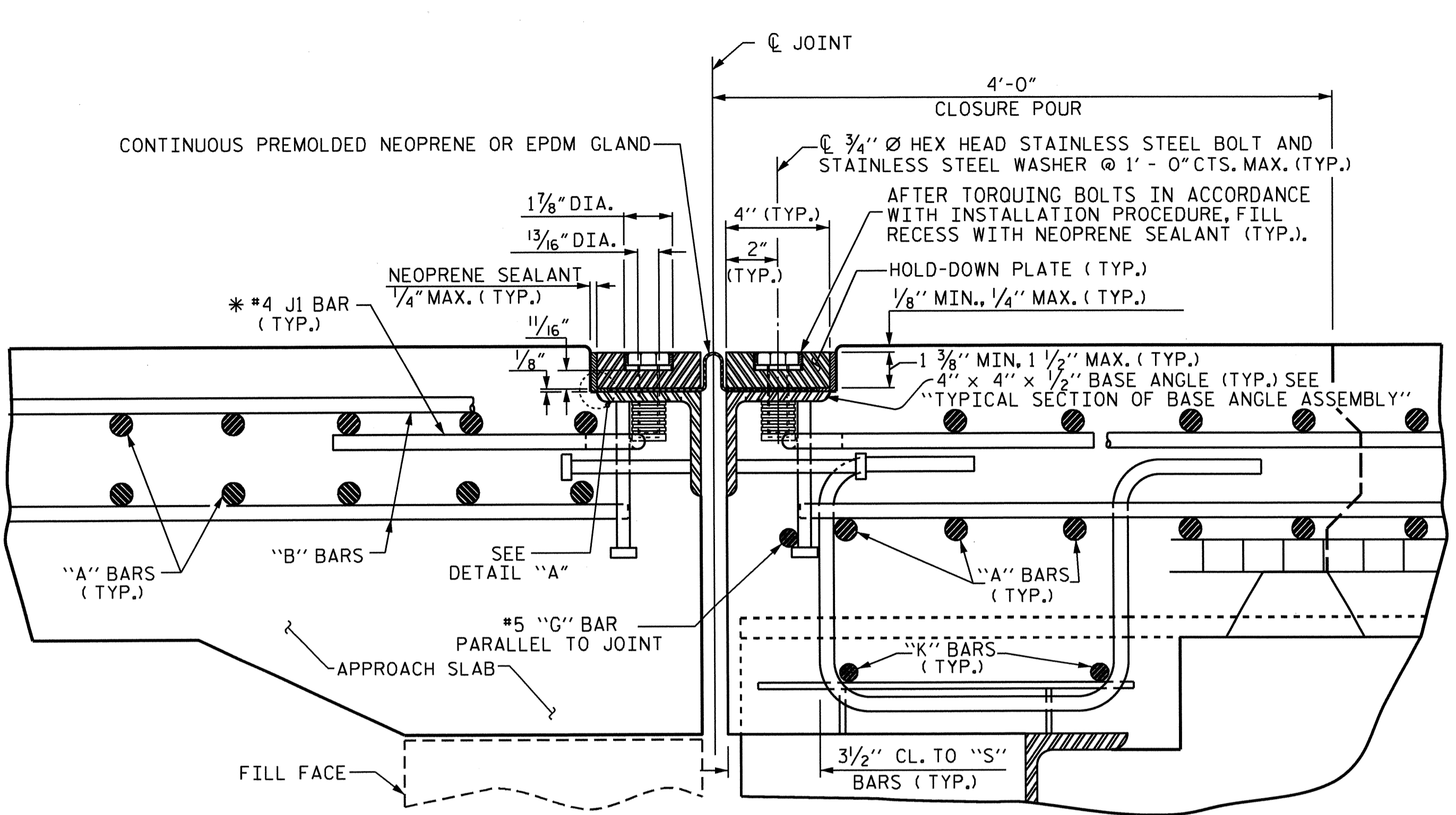
PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 GUARDRAIL ANCHORAGE
 FOR BARRIER RAIL
 (LEFT LANE)

ASSEMBLED BY: J.P. ADAMS	DATE: 7/11/12
CHECKED BY: J. KHARVA	DATE: 8/2012
DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR	DATE: 7/2012
DRAWN BY: TLA 5/06	REV. 10/11/11 MAA/GM
CHECKED BY: GM 5/06	REV. 7/12 MAA/GM
	REV. 10/12 MAA/GM

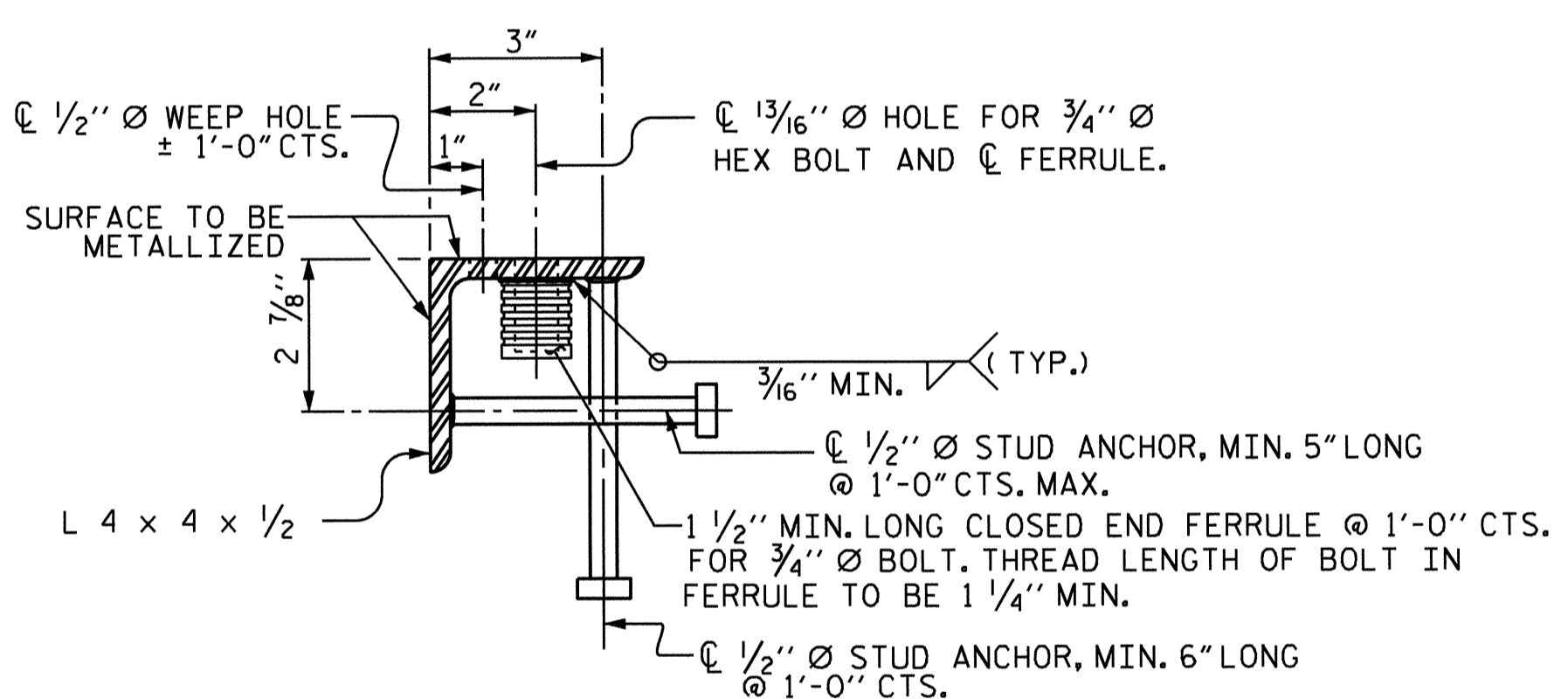
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			S-16
2			4			56



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.



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

MOVEMENT AND SETTING AT JOINT					
LOCATION	SKEW ANGLE	TOTAL MOVEMENT (ALONG C RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
END BENT #1	100°-35'-46"	0	1 1/2"	1 1/2"	1 1/2"
END BENT #2	102°-25'-29"	2 9/16"	2 9/16"	2 1/4"	1 1/2"

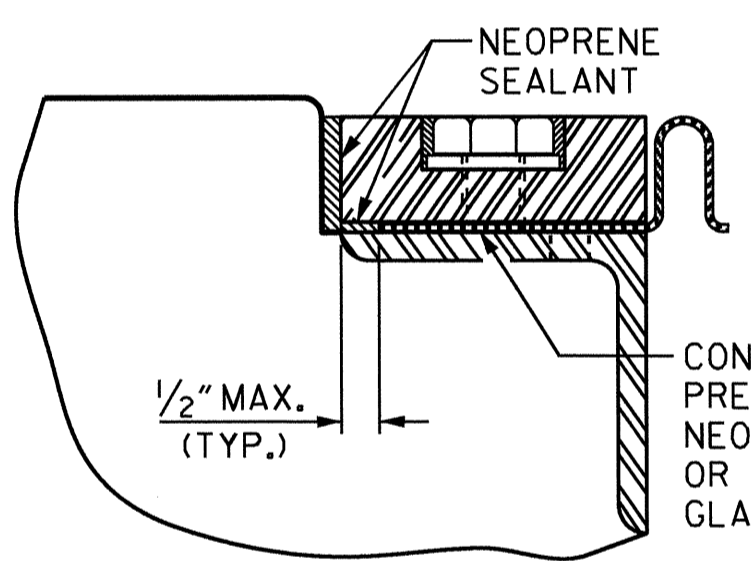
END BENT #1 IS THE FIXED JOINT WITH NO MOVEMENT.
END BENT #2 IS THE EXPANSION JOINT.

INSTALLATION PROCEDURE

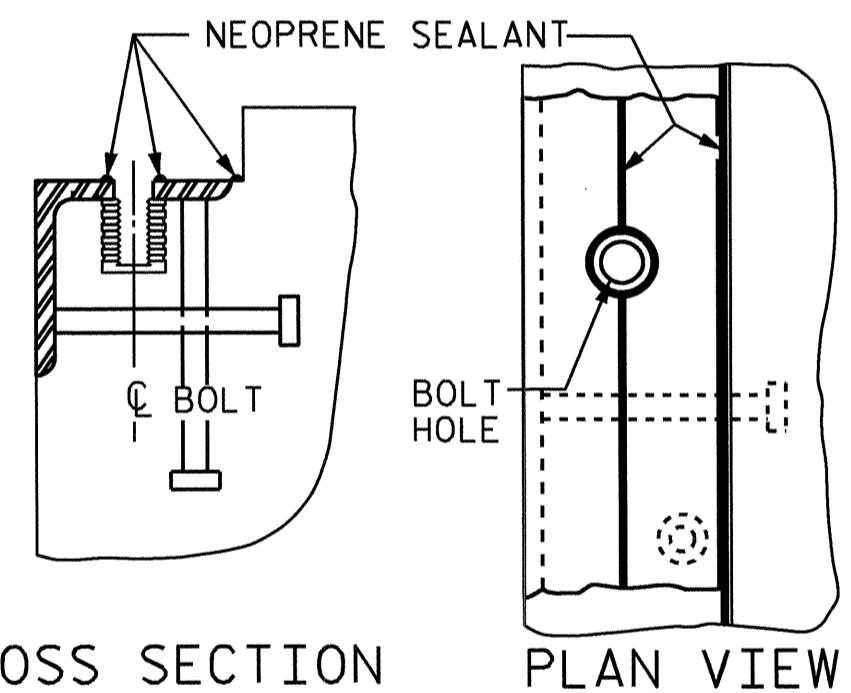
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4/8" TO 4/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO 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 7/8" 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. 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

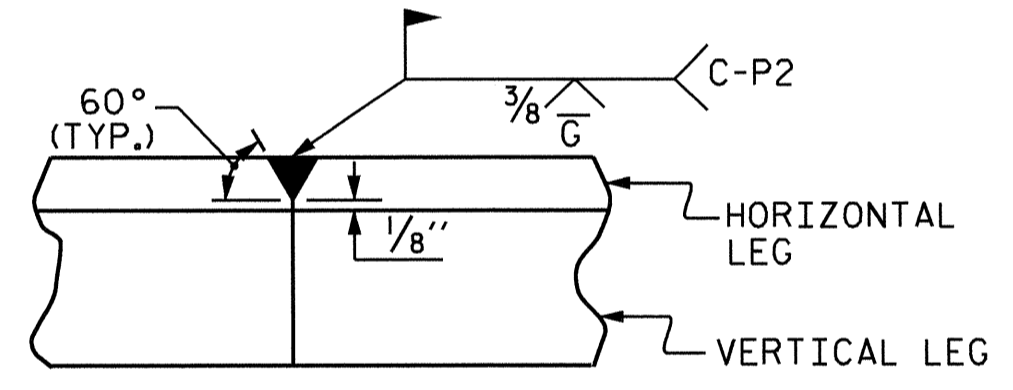
1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS 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 SPICE 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.



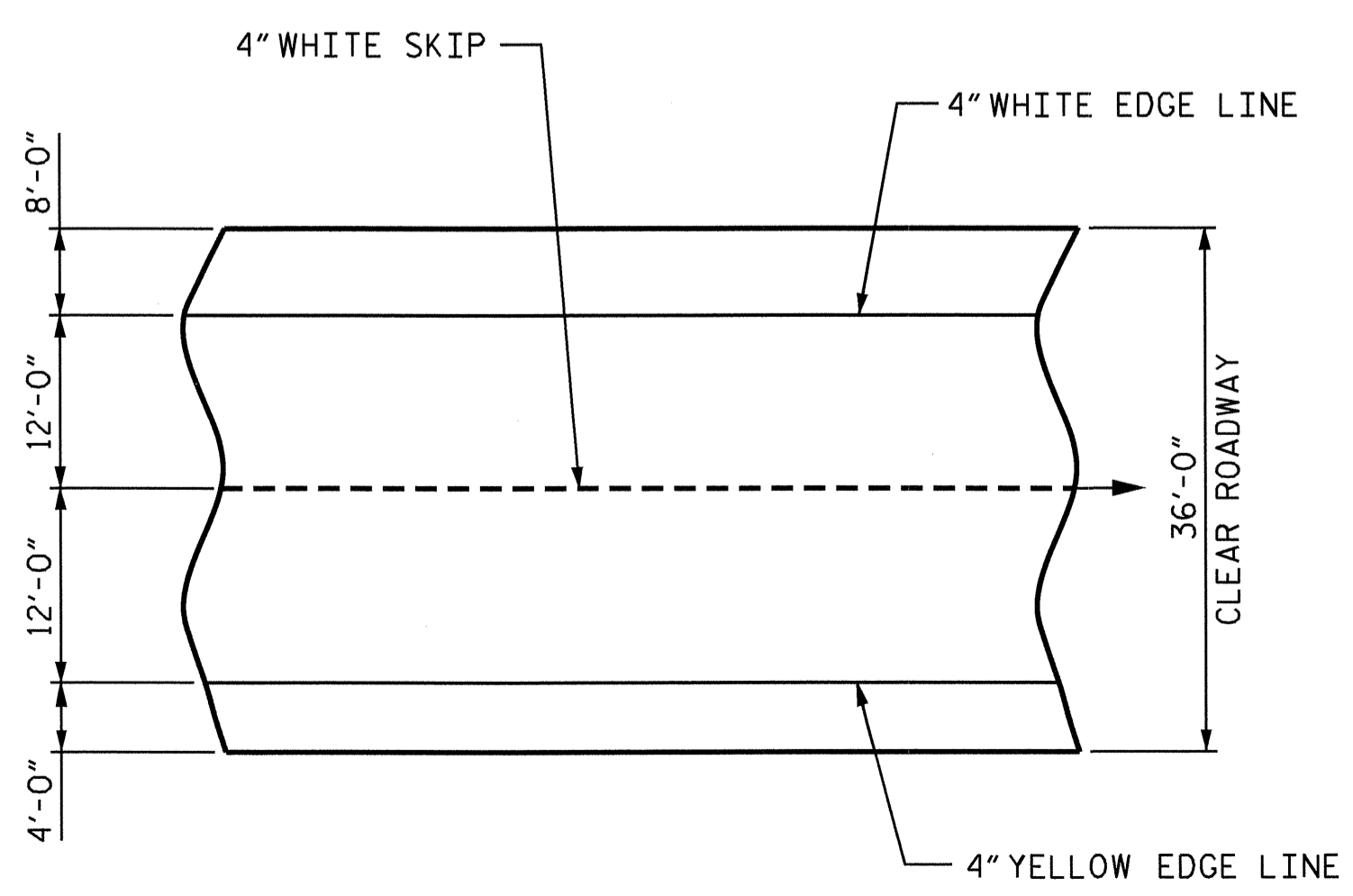
DETAIL "A"



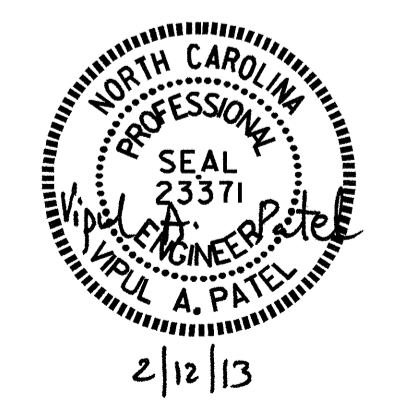
CROSS SECTION
PLAN VIEW
INSTALLATION SKETCH



DETAIL - FIELD WELD SPLICE OF BASE ANGLE



PAVEMENT MARKING ALIGNMENT

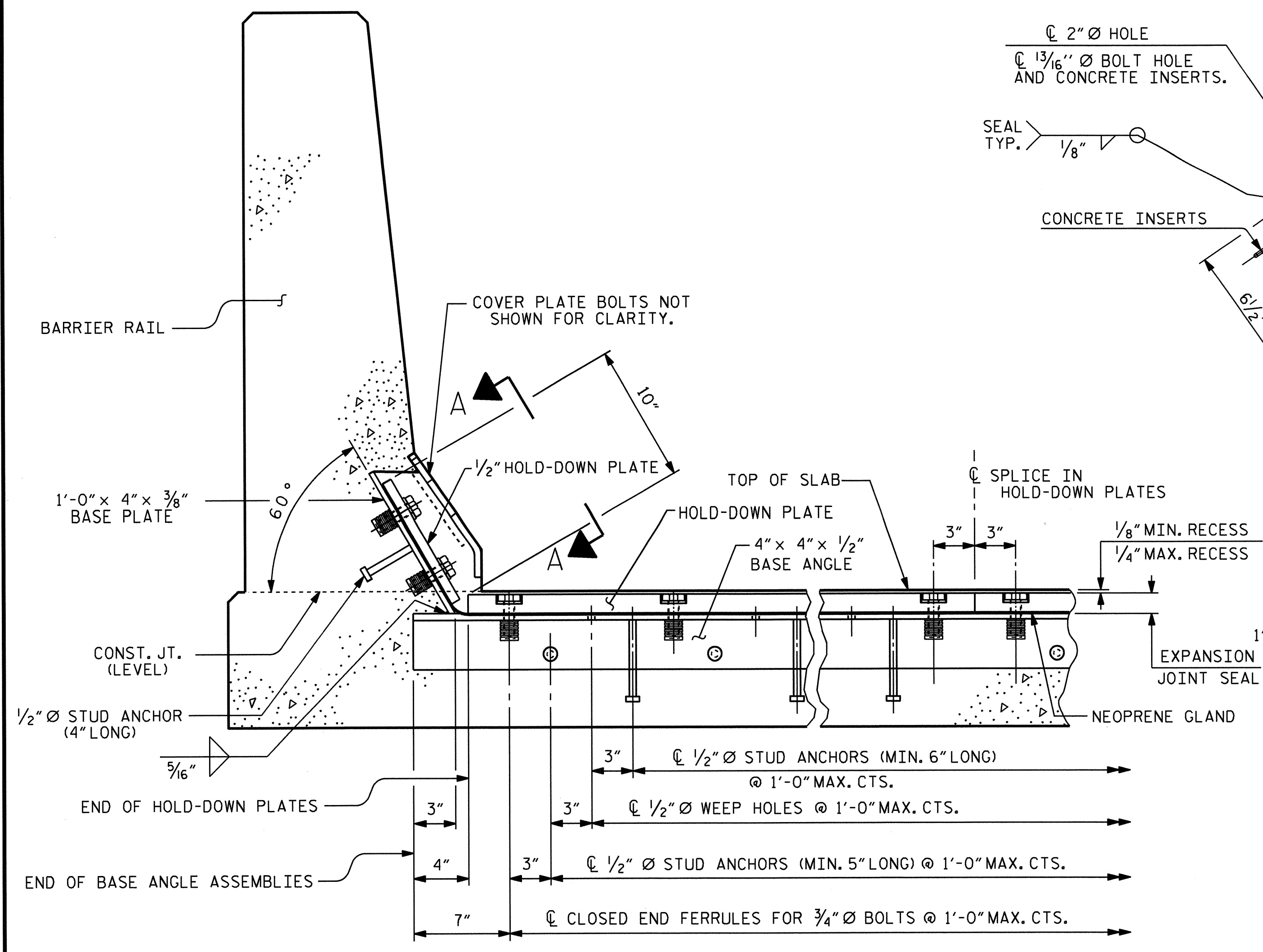


PROJECT NO. R-2246B
CABARRUS COUNTY
STATION: 80+56.83 -L-
SHEET 1 OF 2

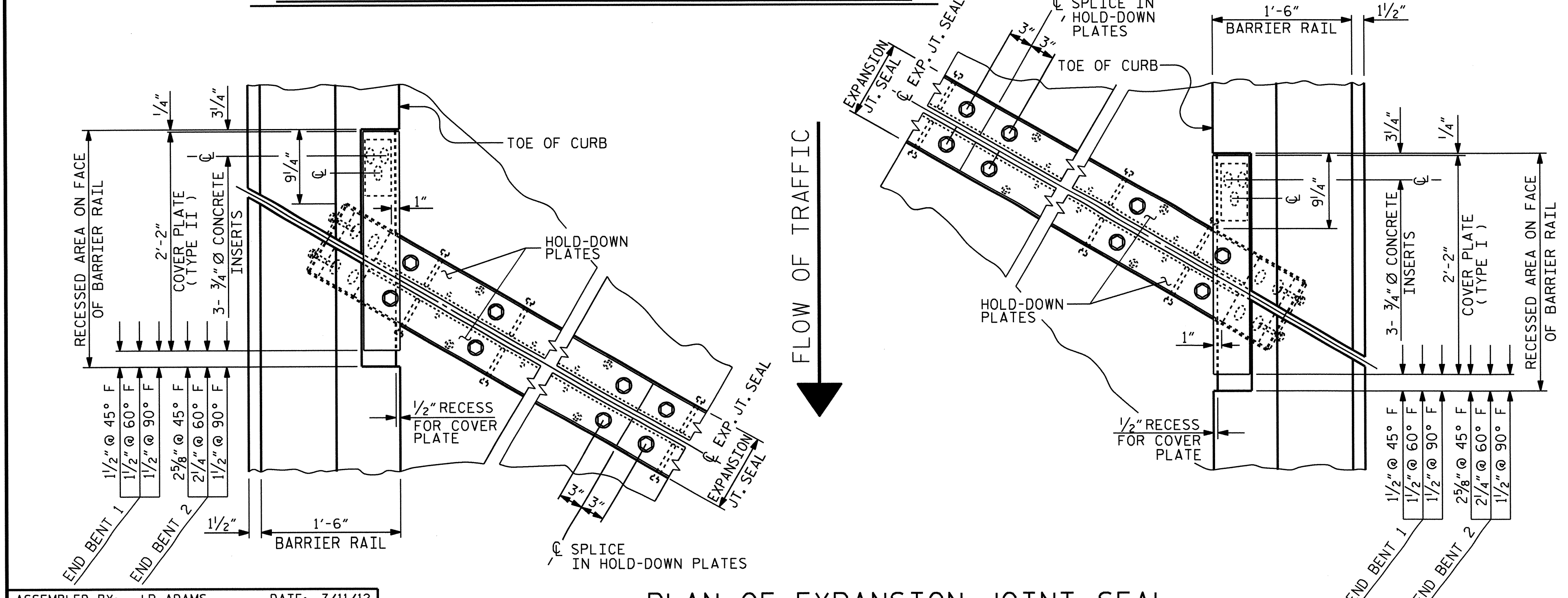
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
EXPANSION JOINT SEAL DETAILS
(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			56

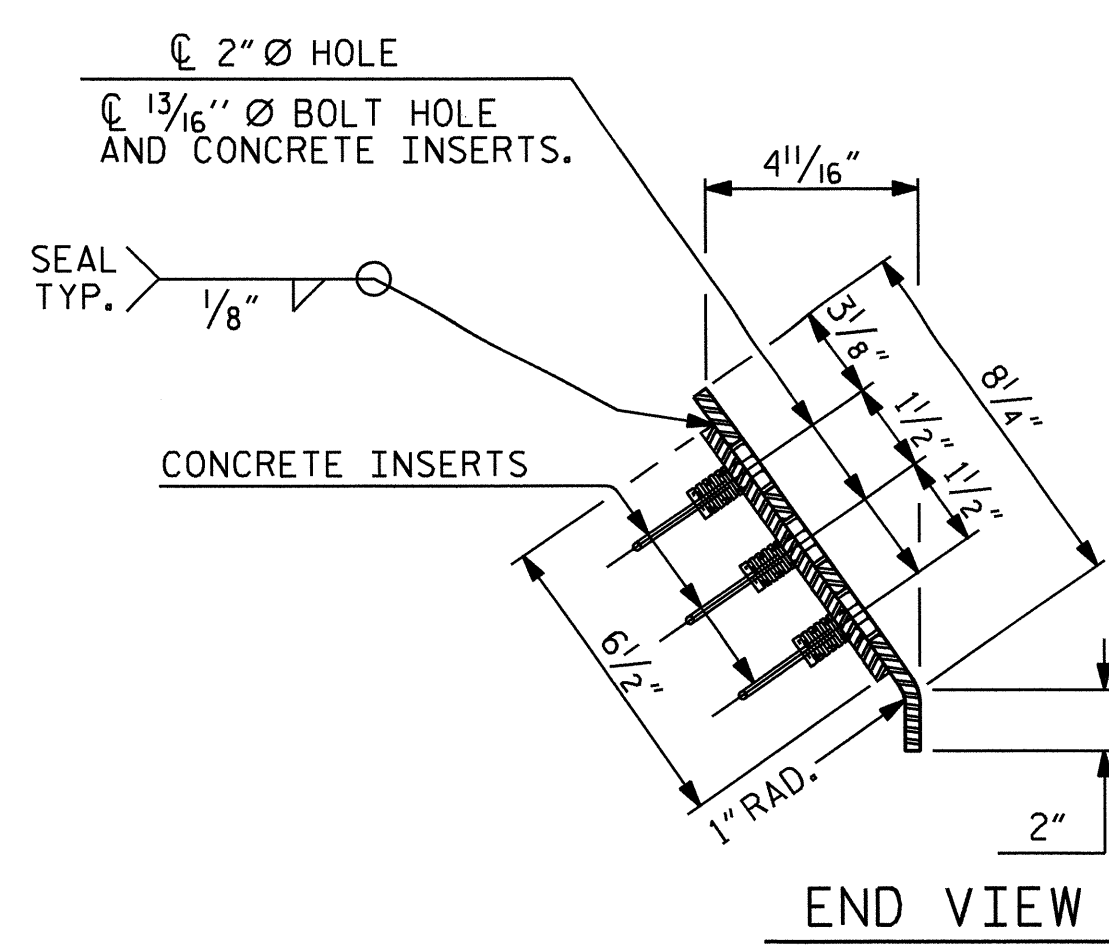
ASSEMBLED BY: J.P. ADAMS DATE: 7/11/12
CHECKED BY: J. KHARVA DATE: 8/2012
DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 7/2012
DRAWN BY: REK 9/87 REV. 5/7/03R RWW/JTE
CHECKED BY: CRK 10/87 REV. 5/1/06R TLA/GM
REV. 10/1/11 MAA/GM



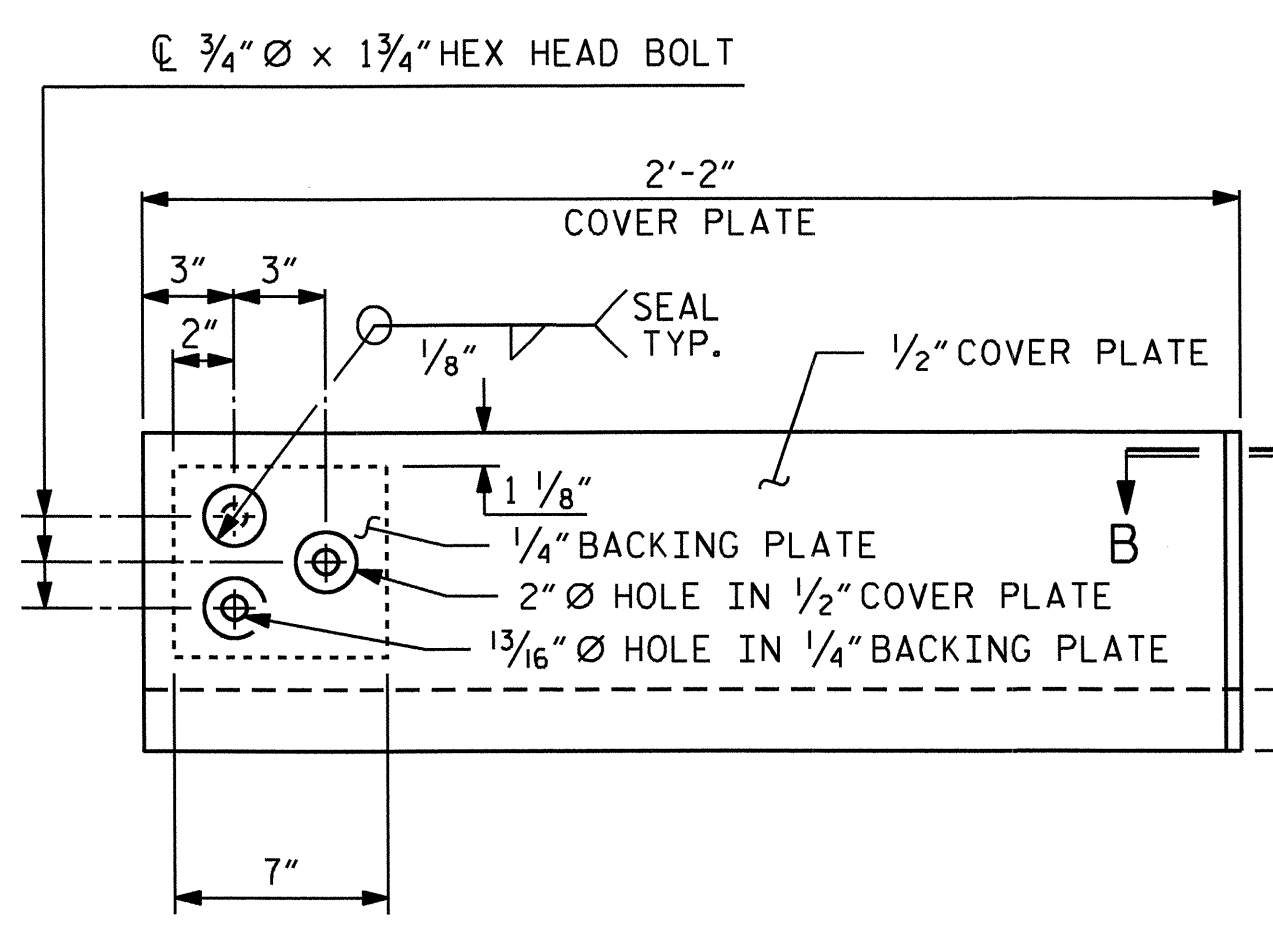
SECTION THRU RAIL NORMAL TO JOINT



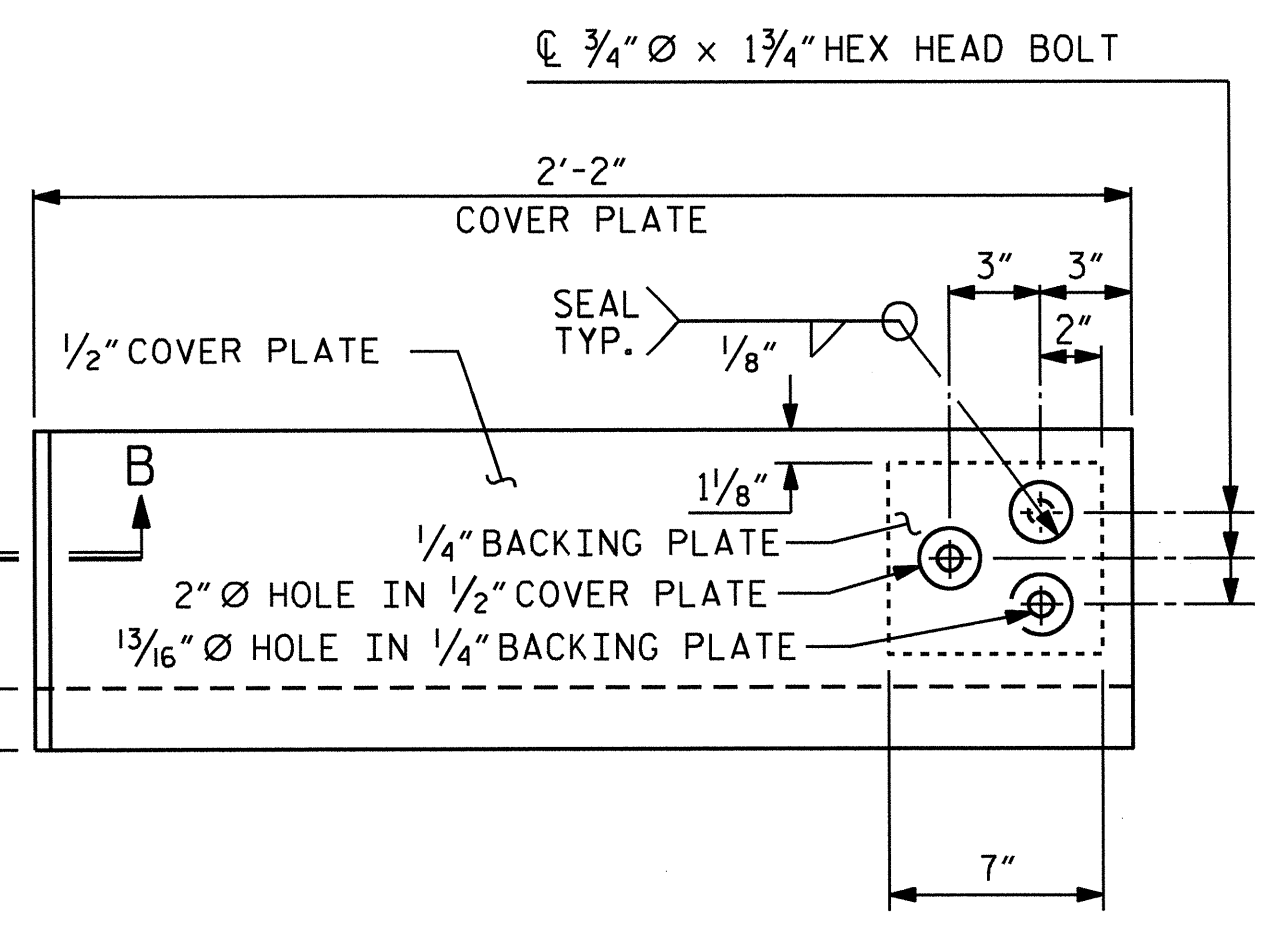
PLAN OF EXPANSION JOINT SEAL



END VIEW

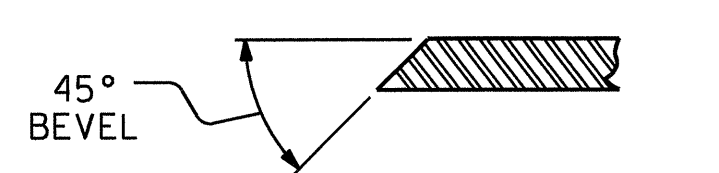


TYPE I - ELEVATION VIEW

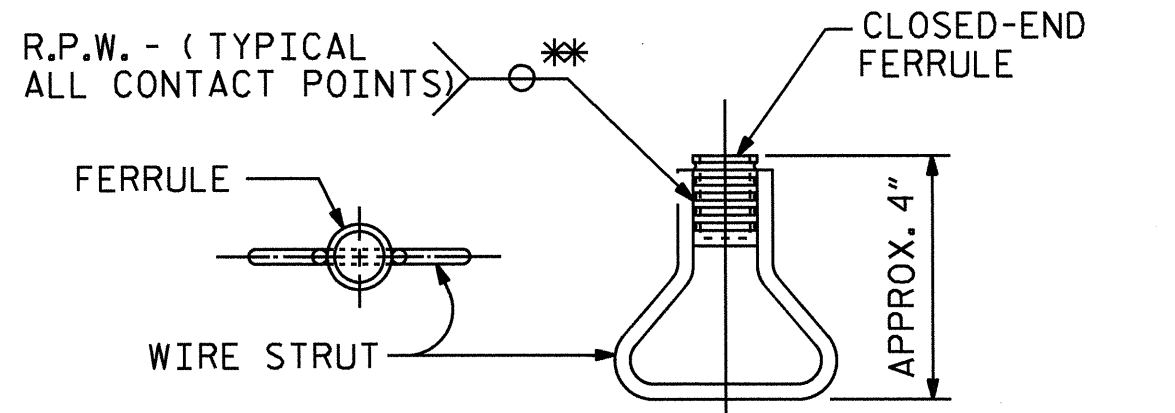
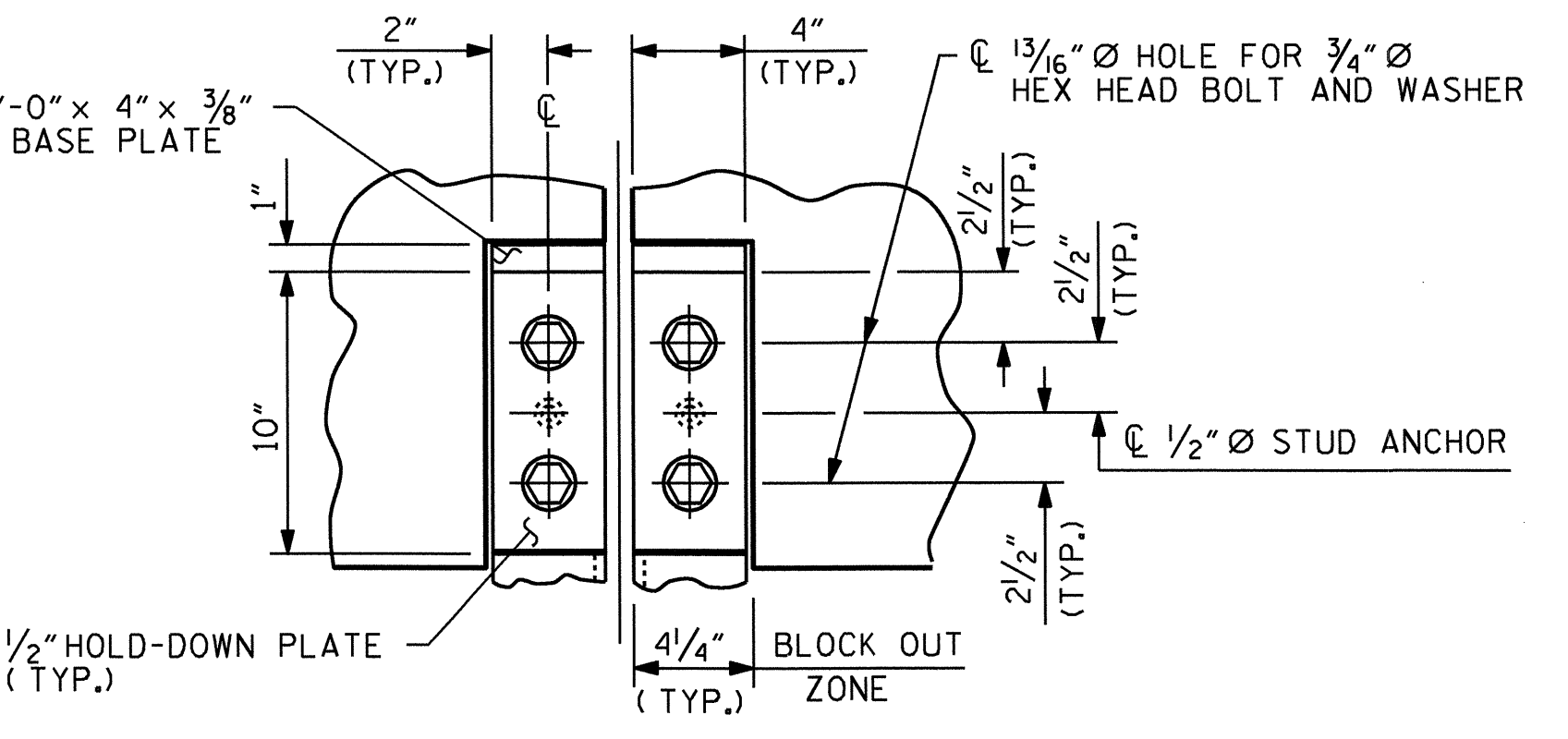


TYPE II - ELEVATION VIEW

COVER PLATE DETAILS

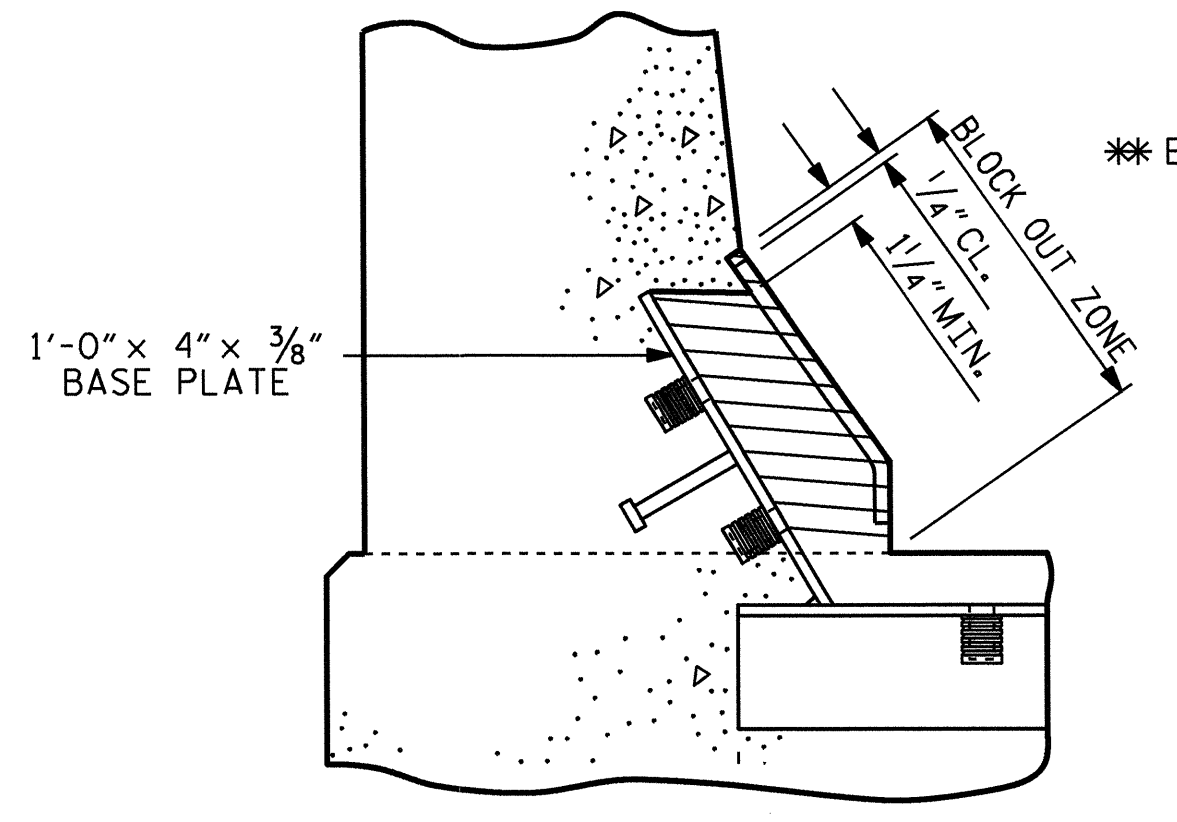


SECTION B-B



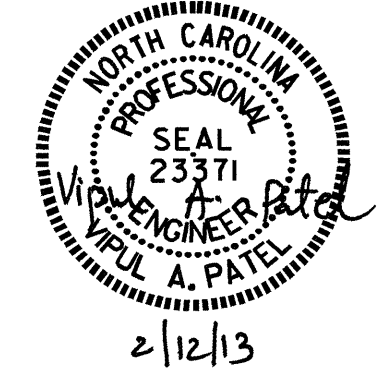
PLAN ELEVATION

CONCRETE INSERT



BLOCK OUT DETAIL

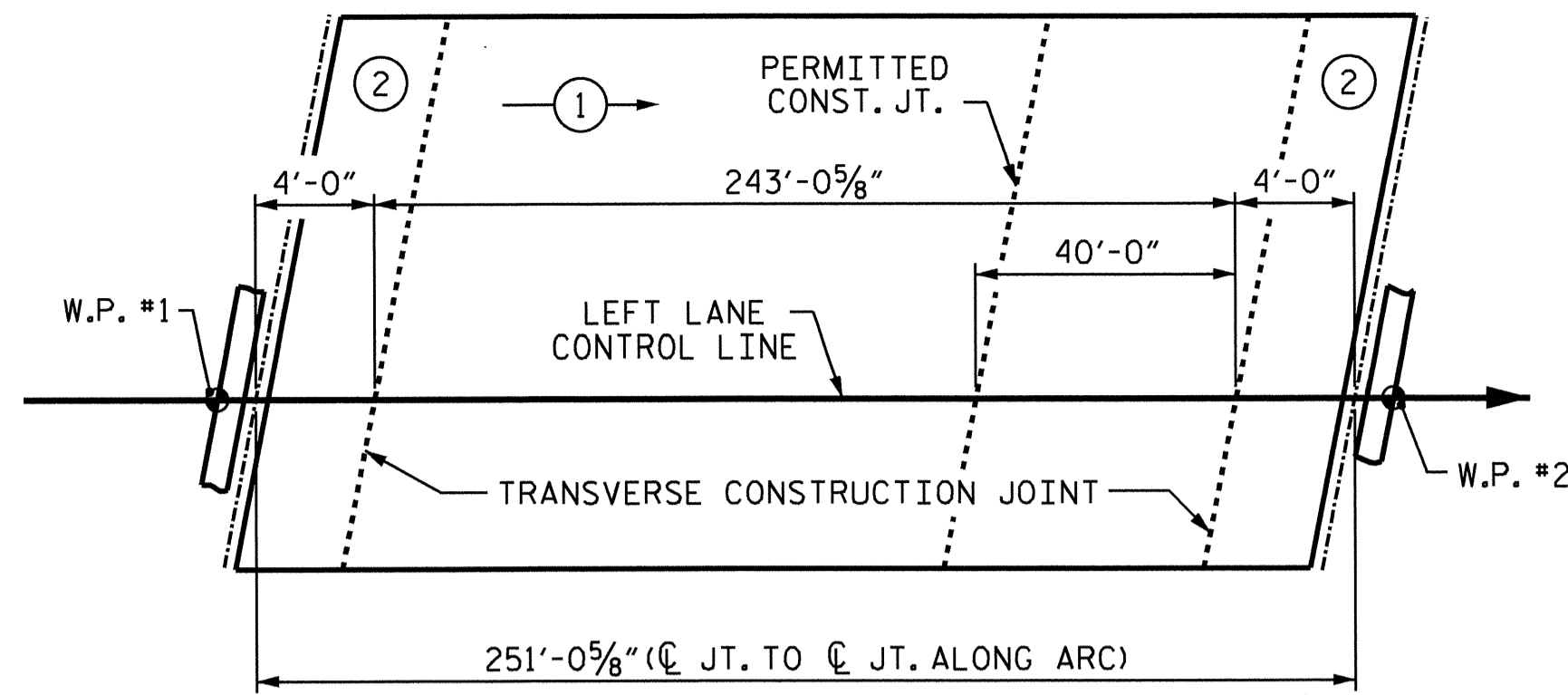
ASSEMBLED BY : J.P. ADAMS	DATE: 7/11/12
CHECKED BY : J. KHARVA	DATE: 8/2012
DESIGN ENGINEER OF RECORD : H.A. LOCKLEAR	DATE: 7/2012
DRAWN BY : REK 9/87	REV. 10/11/11 MAA/GM
CHECKED BY : CRK 10/87	REV. 7/12 MAA/GM
	REV. 10/12 MAA/GM



PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

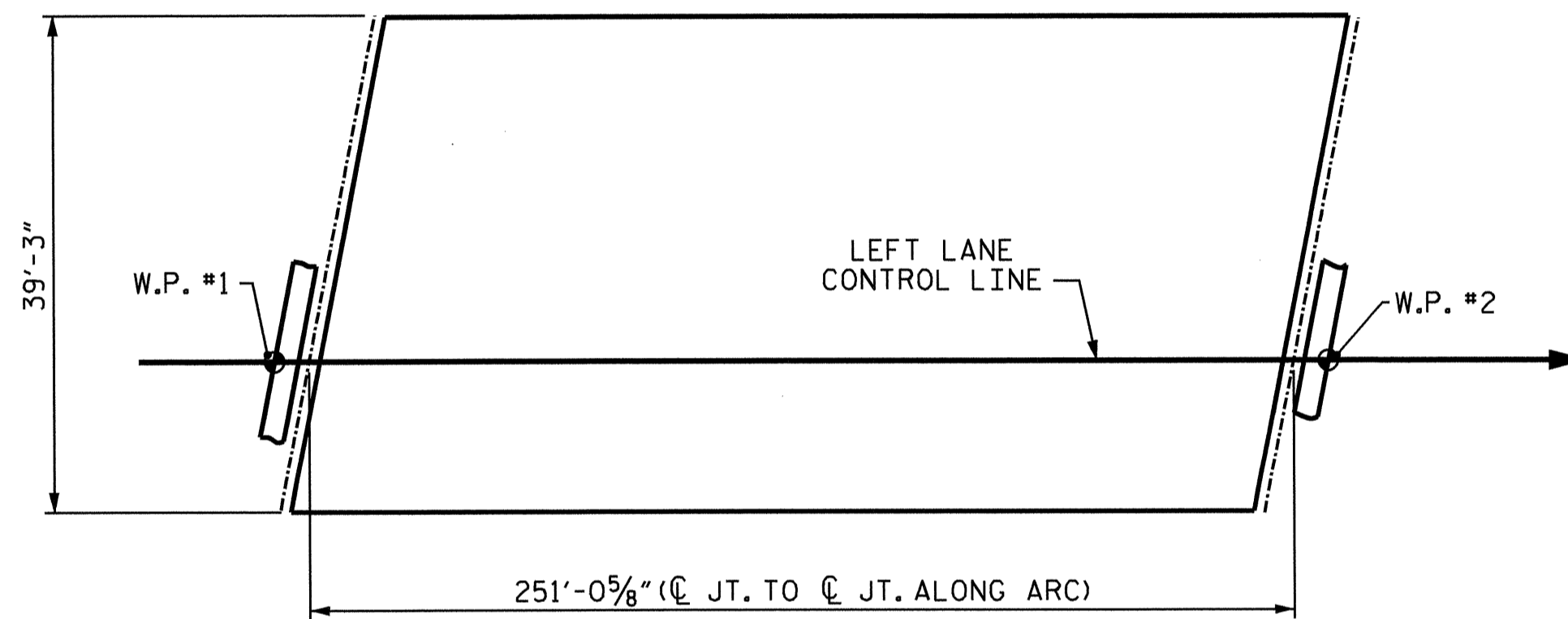
SHEET 2 OF 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-18
1			3			TOTAL SHEETS
2			4			56



LAYOUT FOR POURING SEQUENCE OF REINFORCED CONCRETE DECK SLAB

○ → INDICATES POUR & DIRECTION

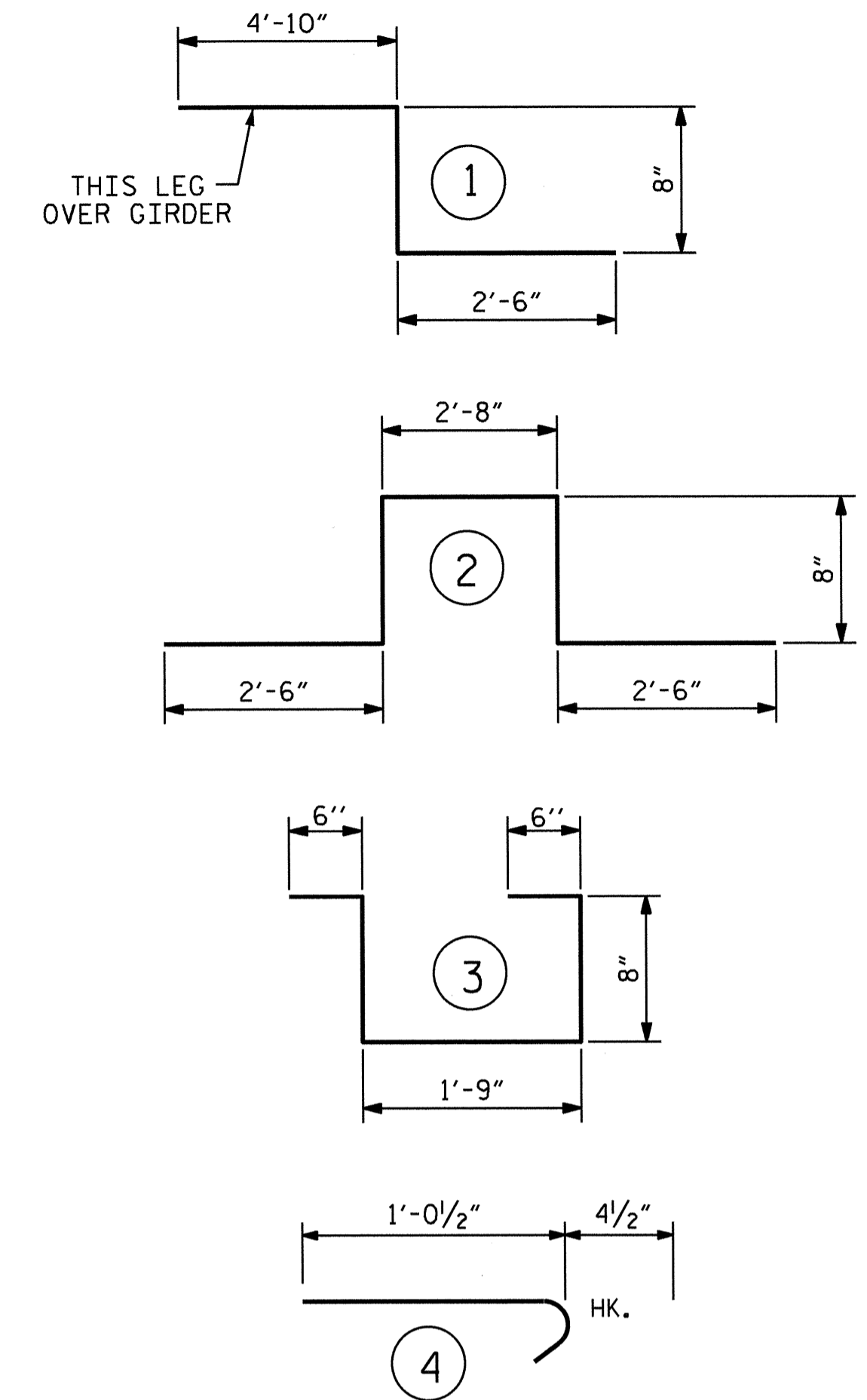


LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FT. = 9854)

REINFORCING BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	447	#5	STR	38'-11"	18144
*A101	2	#5	STR	37'-2"	78
*A102	2	#5	STR	34'-6"	72
*A103	2	#5	STR	31'-11"	67
*A104	2	#5	STR	29'-3"	61
*A105	2	#5	STR	26'-7"	55
*A106	2	#5	STR	23'-11"	50
*A107	2	#5	STR	21'-3"	44
*A108	2	#5	STR	18'-7"	39
*A109	2	#5	STR	15'-11"	33
*A110	2	#5	STR	13'-3"	28
*A111	2	#5	STR	10'-7"	22
*A112	2	#5	STR	7'-11"	17
*A113	2	#5	STR	5'-3"	11
*A114	2	#5	STR	2'-7"	5
A2	447	#5	STR	38'-11"	18144
A201	2	#5	STR	37'-2"	78
A202	2	#5	STR	34'-6"	72
A203	2	#5	STR	31'-11"	67
A204	2	#5	STR	29'-3"	61
A205	2	#5	STR	26'-7"	55
A206	2	#5	STR	23'-11"	50
A207	2	#5	STR	21'-3"	44
A208	2	#5	STR	18'-7"	39
A209	2	#5	STR	15'-11"	33
A210	2	#5	STR	13'-3"	28
A211	2	#5	STR	10'-7"	22
A212	2	#5	STR	7'-11"	17
A213	2	#5	STR	5'-3"	11
A214	2	#5	STR	2'-7"	5
B1	200	#5	STR	51'-11"	10830
* B2	243	#4	STR	29'-8"	4816
* G1	2	#5	STR	39'-7"	83
* J1	74	#4	4	1'-5"	70
* K1	12	#5	1	8'-0"	100
* K2	18	#5	2	9'-0"	169
* K3	24	#5	STR	7'-9"	194
* S1	48	#4	3	4'-1"	131
REINFORCING STEEL (LBS.)				29556	
* EPOXY COATED REINFORCING STEEL (LBS.)				24289	

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.)
POUR 1	298.6		
POUR 2	11.8		
TOTALS**	329.1	29556	24289

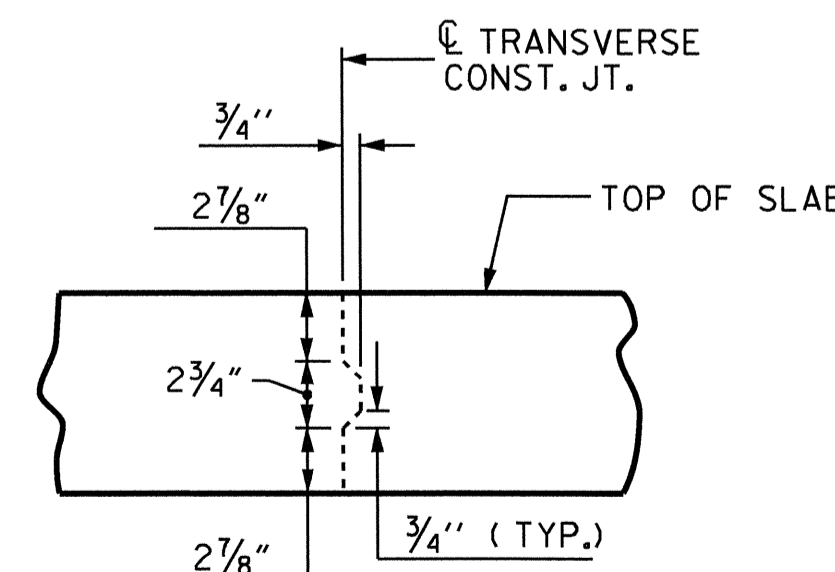
**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	1572 SQ.FT.
BRIDGE DECK	8248 SQ.FT.
TOTAL	9820 SQ.FT.

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

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

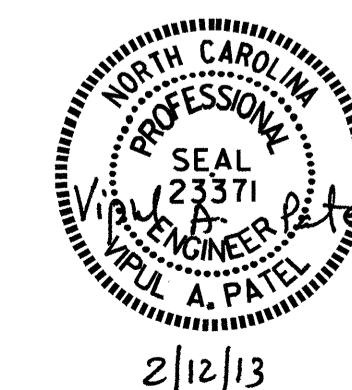


TRANSVERSE CONSTRUCTION JOINT DETAIL

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

ASSEMBLED BY: J.P. ADAMS	DATE: 7/11/12
CHECKED BY: J. KHARVA	DATE: 8/2012
DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR	DATE: 7/2012
DRAWN BY: JMB 5/87	REV. 8/16/99 RWW/LES
CHECKED BY: SJD 9/87	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

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jpadams



2/12/13

PROJECT NO. R-2246B
CABARRUS COUNTY
STATION: 80+56.83 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
SUPERSTRUCTURE
BILL OF MATERIAL
(LEFT LANE)

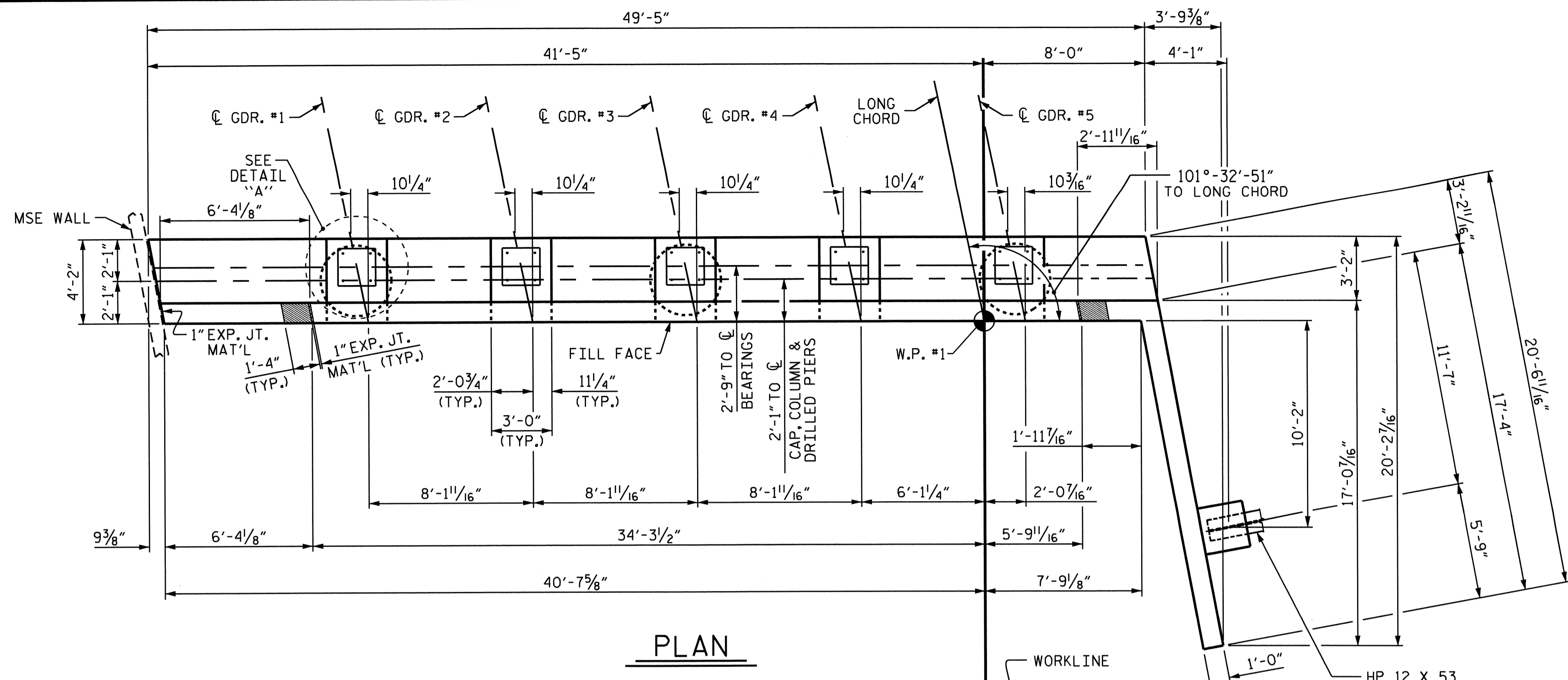
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-19
2			4			TOTAL SHEETS 56

STR. #1

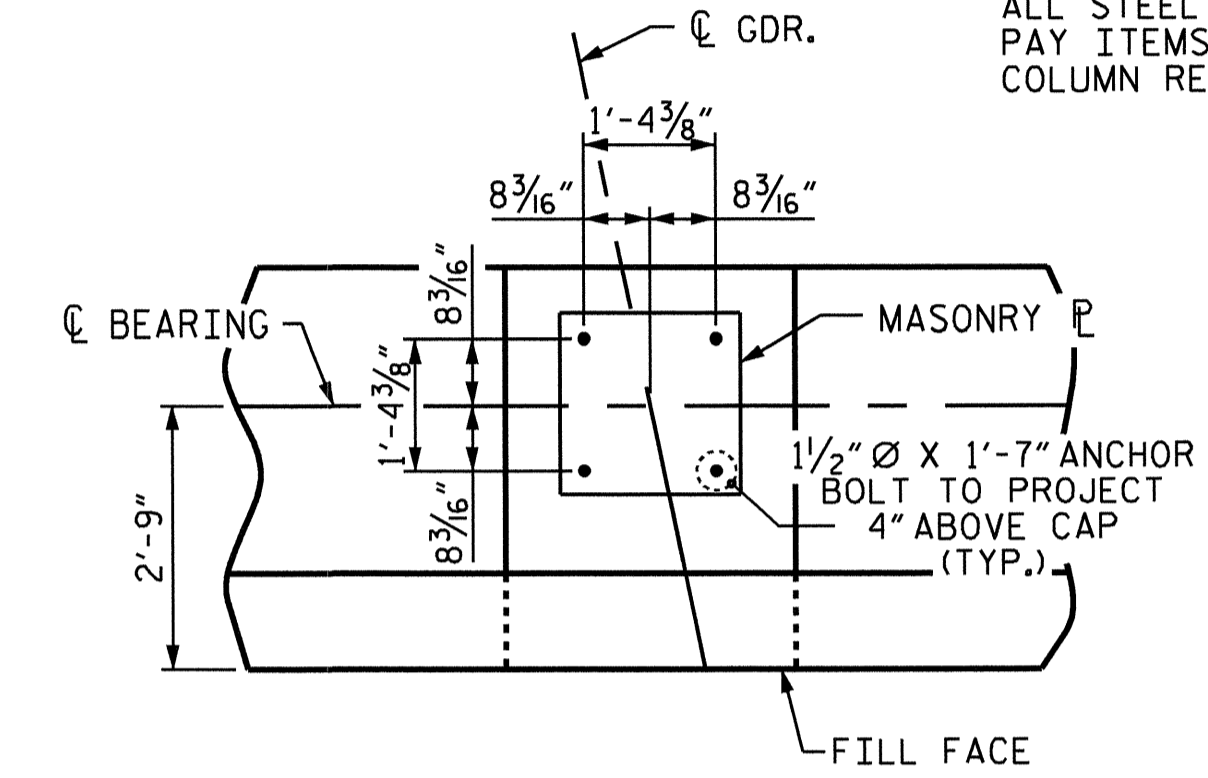
STD. NO. BOM1

NOTES

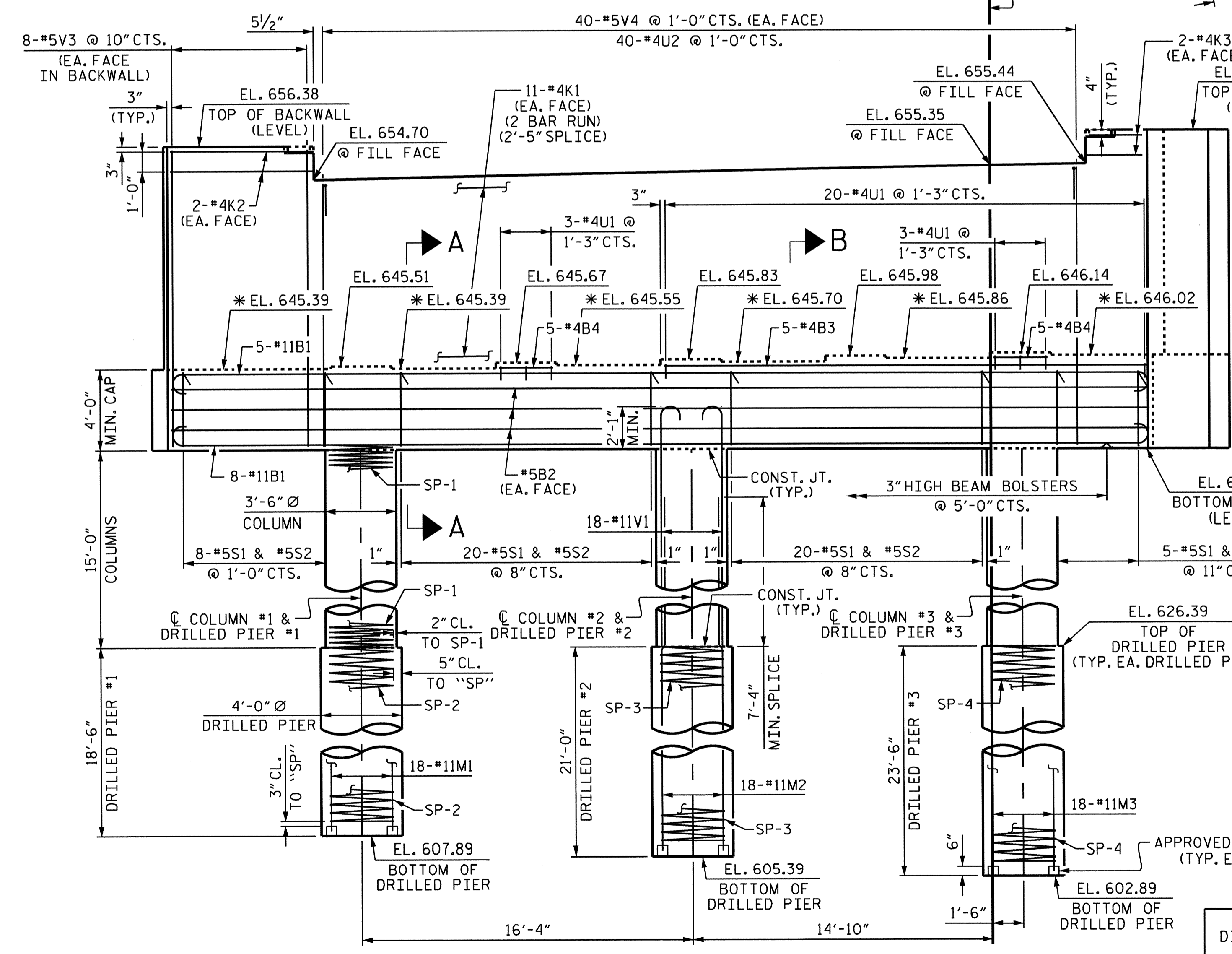
- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- HOOCS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
- THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.
- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".



PLAN

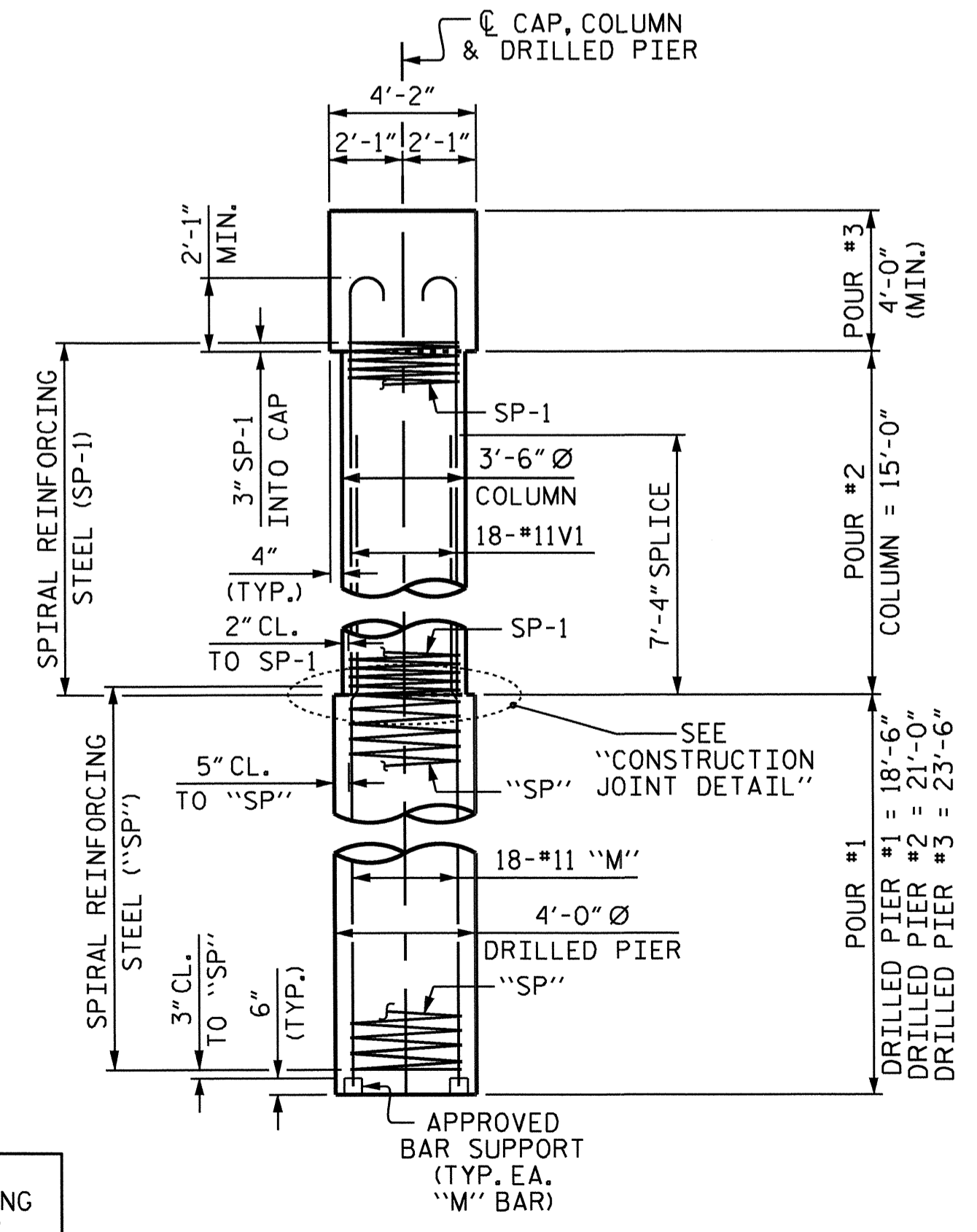


DETAIL "A"
(TYP. EA. BRIDGE SEAT)

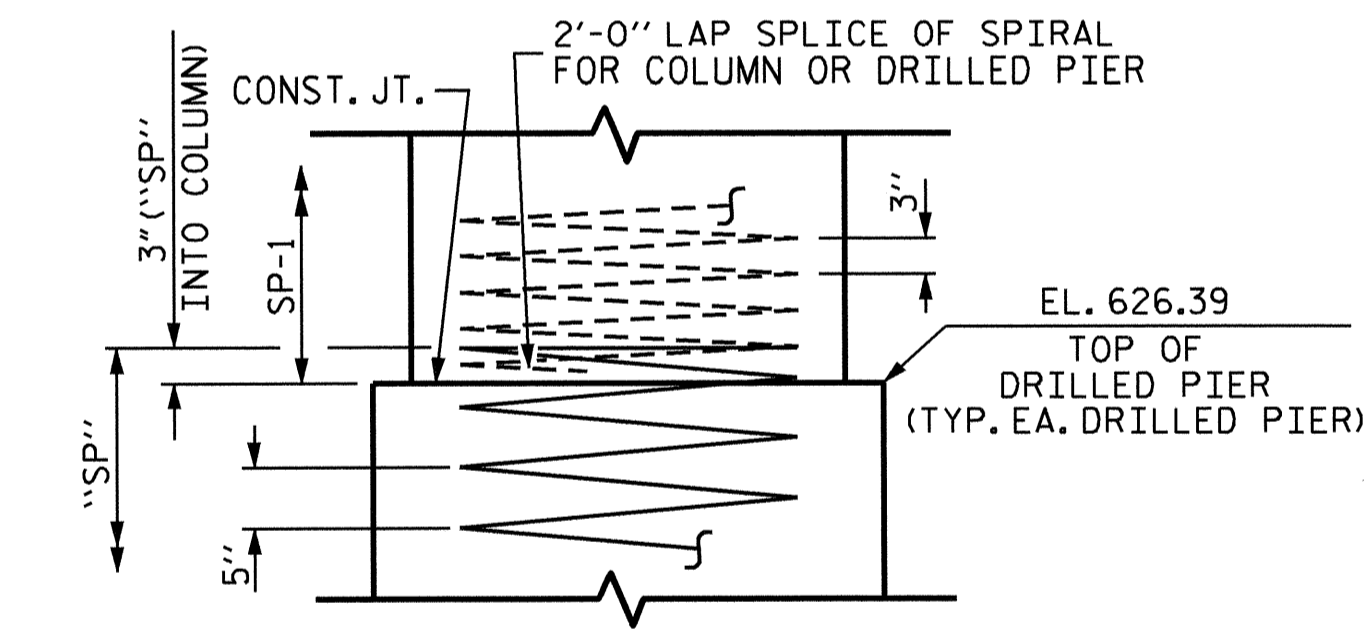


ELEVATION

* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A, SHEET 3 OF 3.



END ELEVATION



CONSTRUCTION JOINT DETAIL

NOTE: DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED

DRAWN BY: J.P. ADAMS DATE: 10/29/12
 CHECKED BY: J. KHARVA DATE: 11/2012
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 7/2012

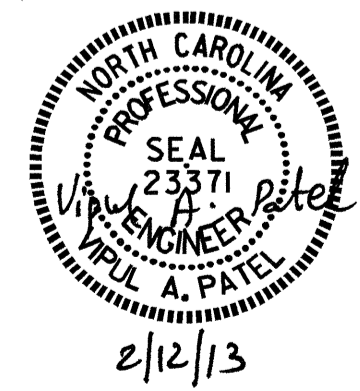
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 jpadams

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 1 OF 3

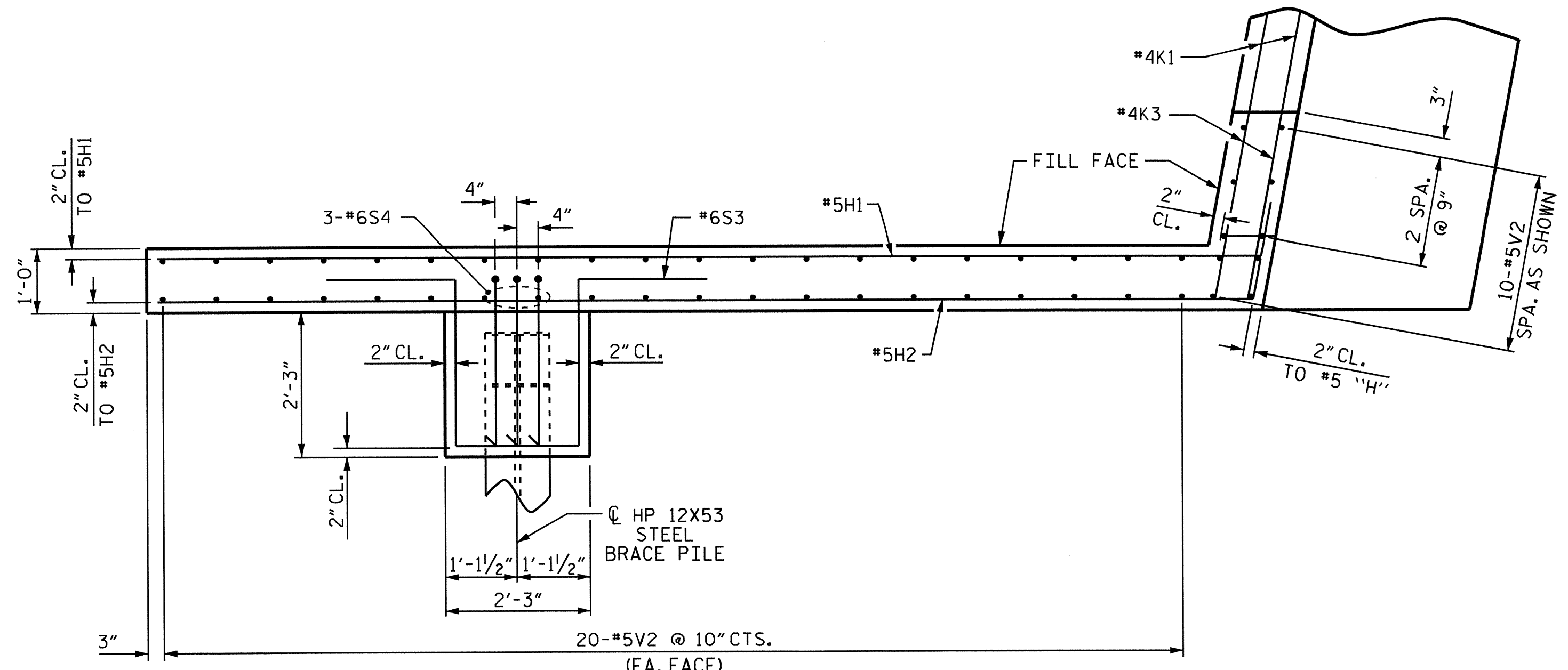
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT #1
 (LEFT LANE)

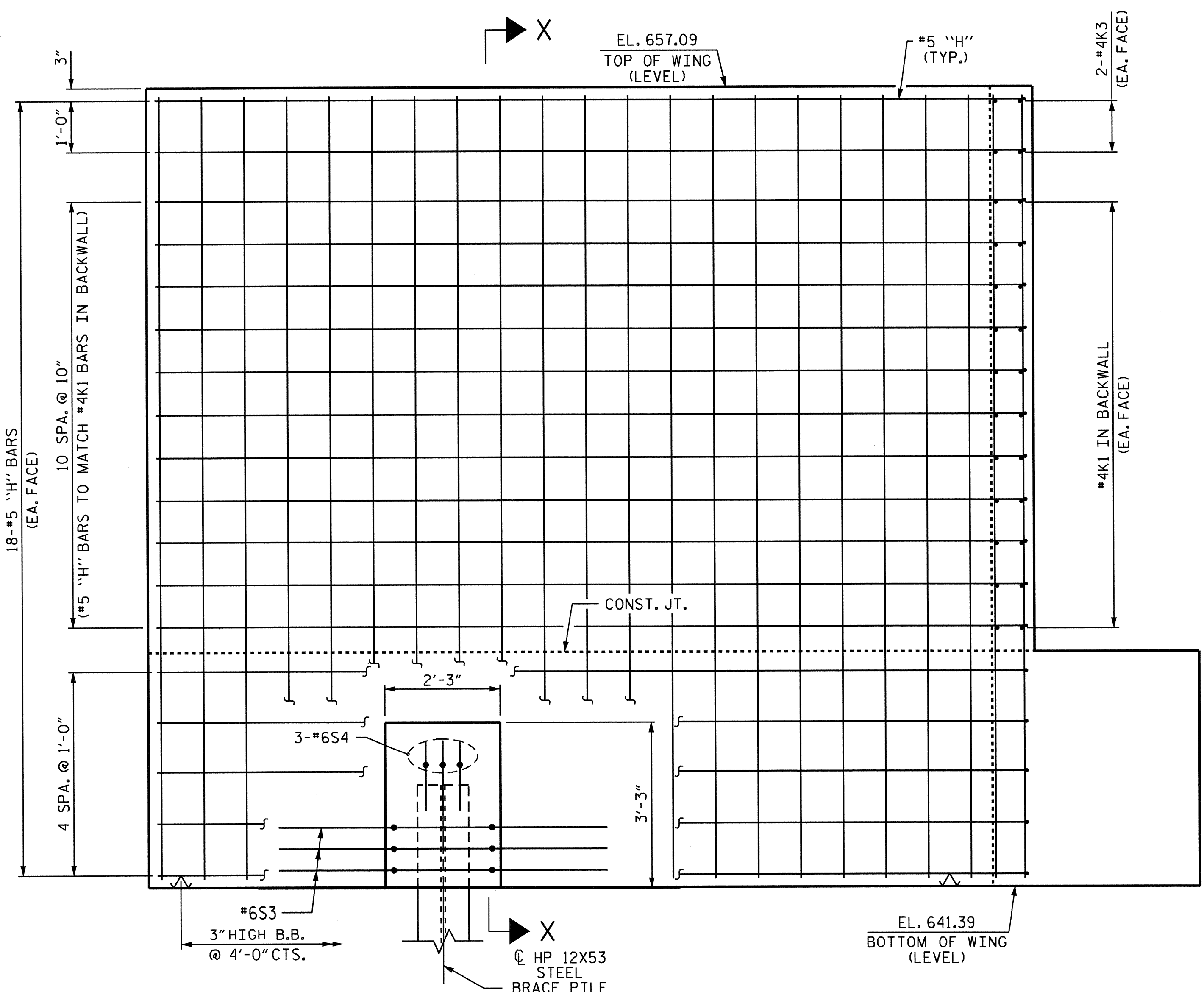


REVISIONS						SHEET NO. S-20
NO.	BY:	DATE:	NO.	BY:	DATE:	
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2			4			

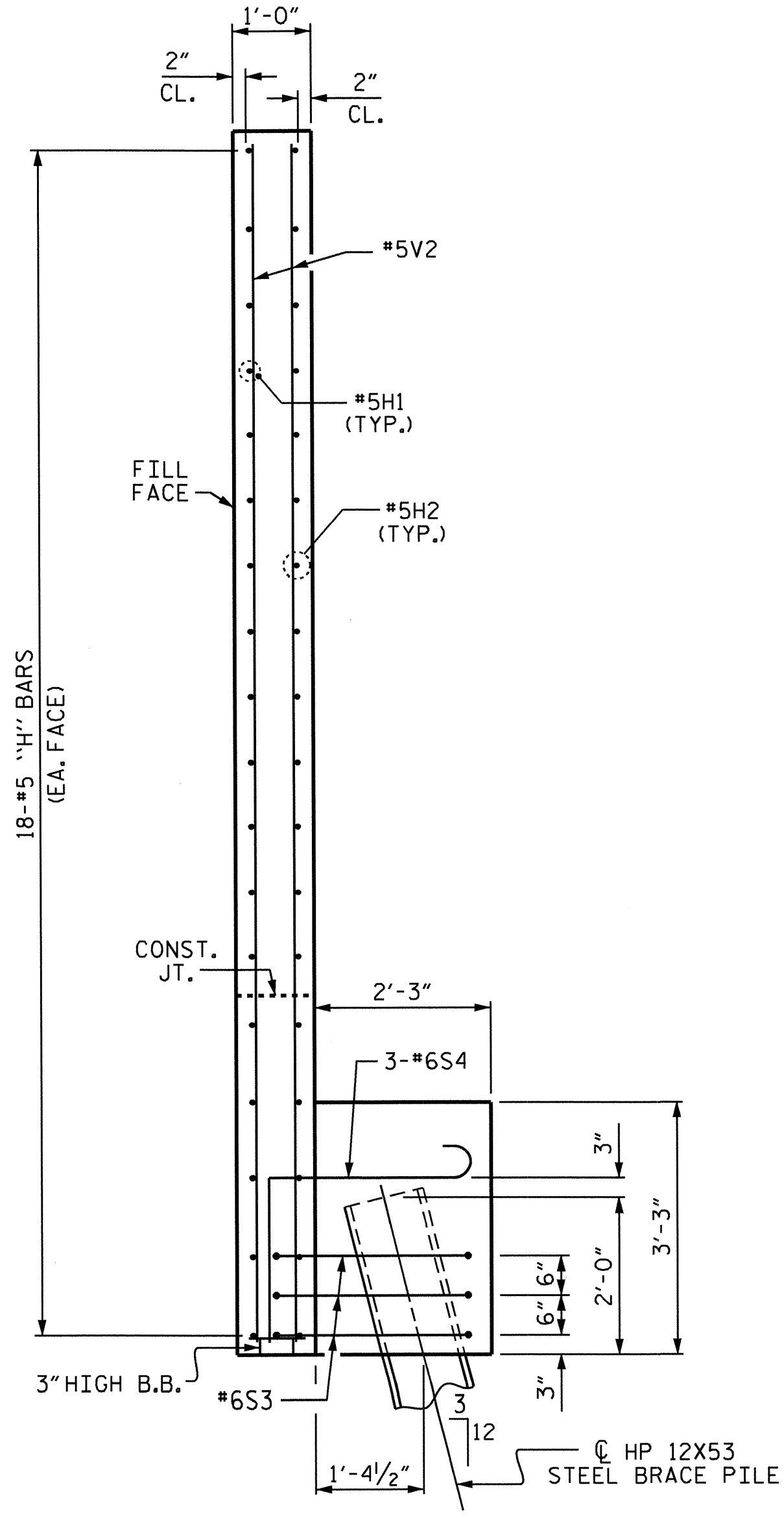
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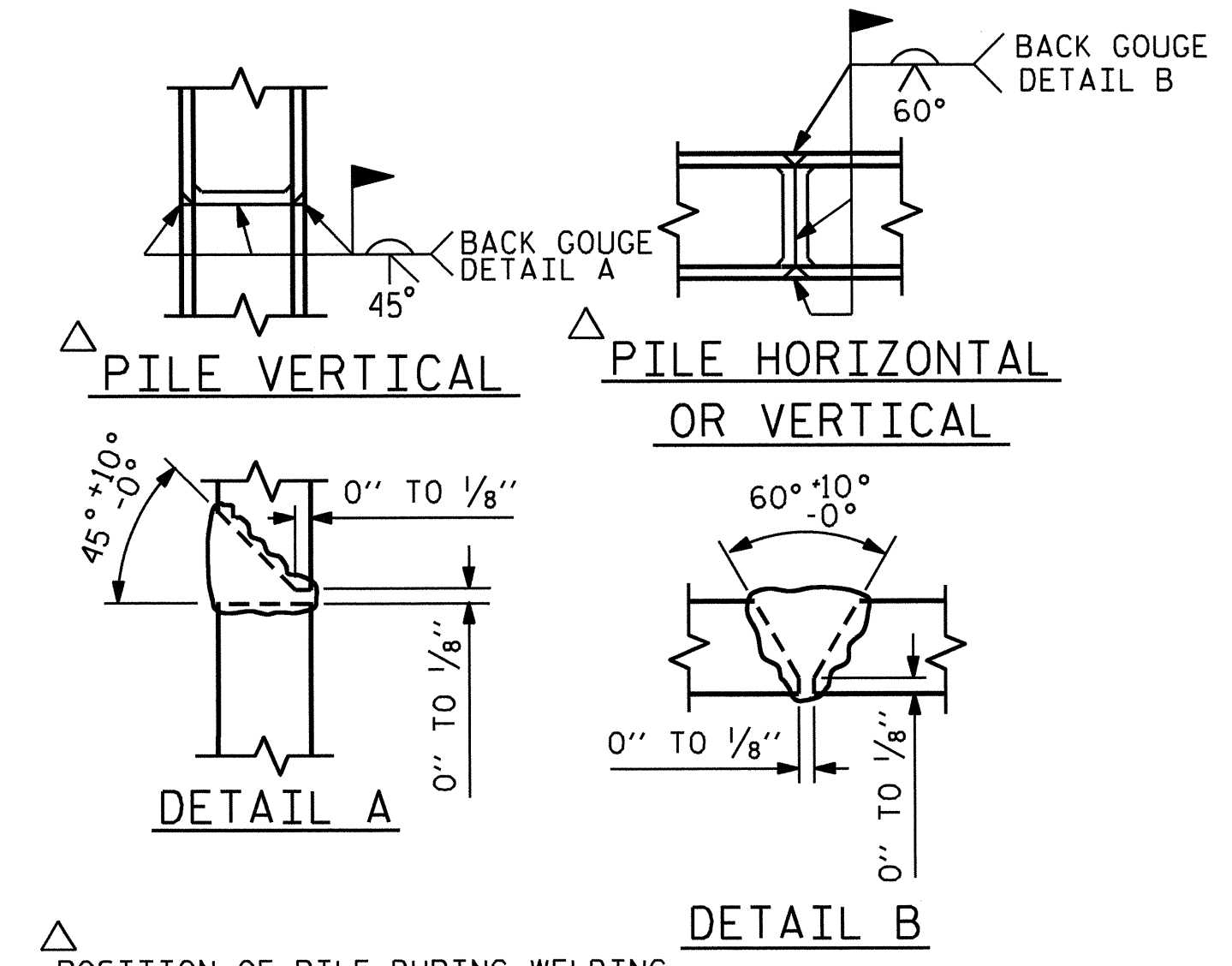
PLAN OF WING



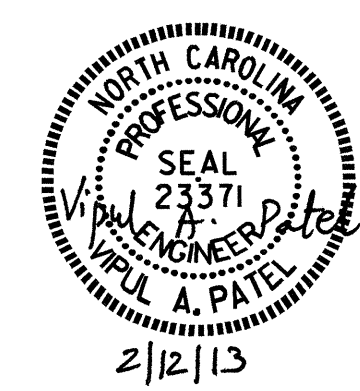
ELEVATION OF WING



SECTION X-X



PILE SPLICE DETAILS



PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-

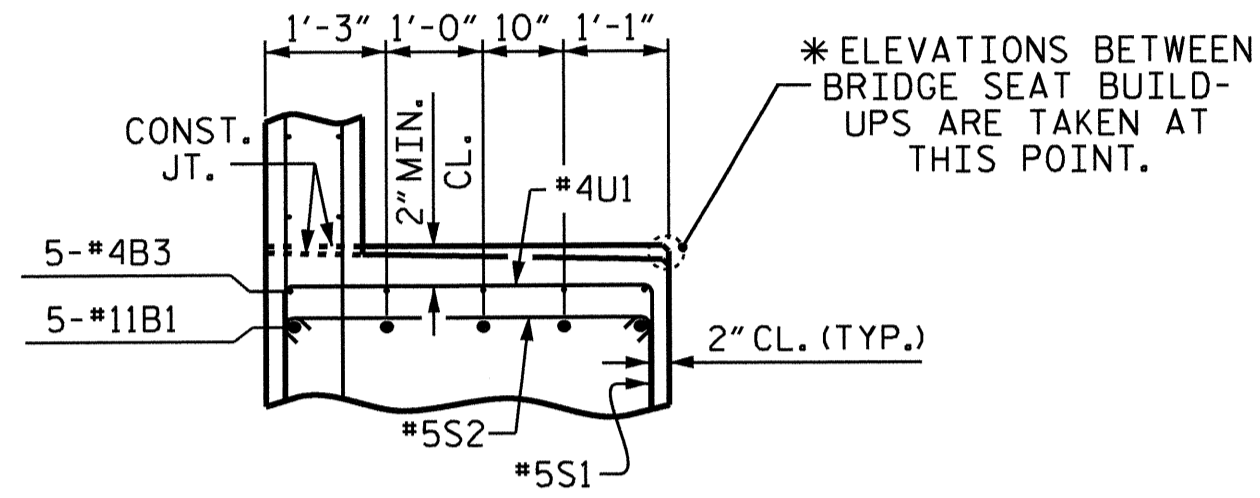
SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

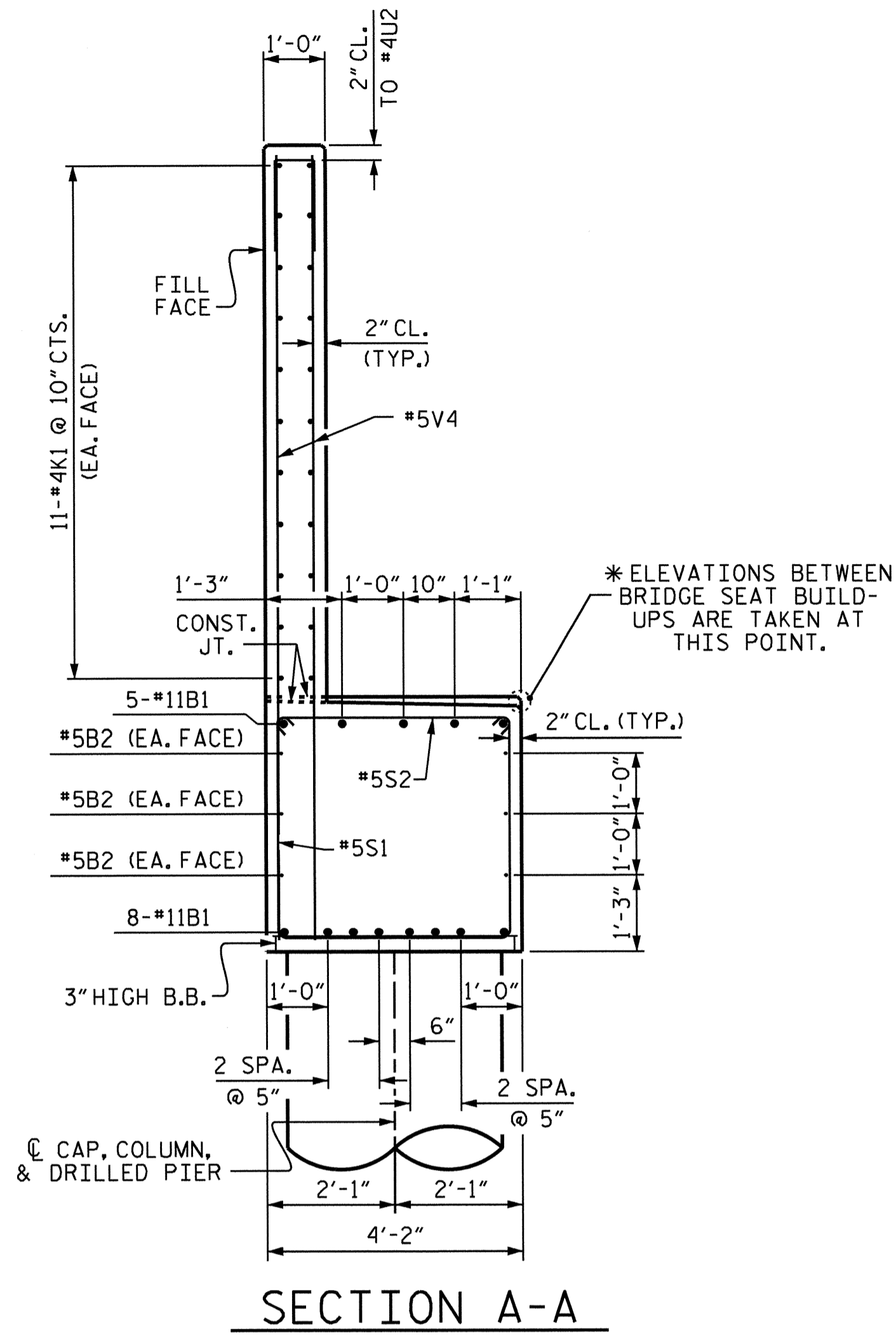
SUBSTRUCTURE
 END BENT #1
 (LEFT LANE)

REVISIONS						SHEET NO.	
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2			4			SHEETS	

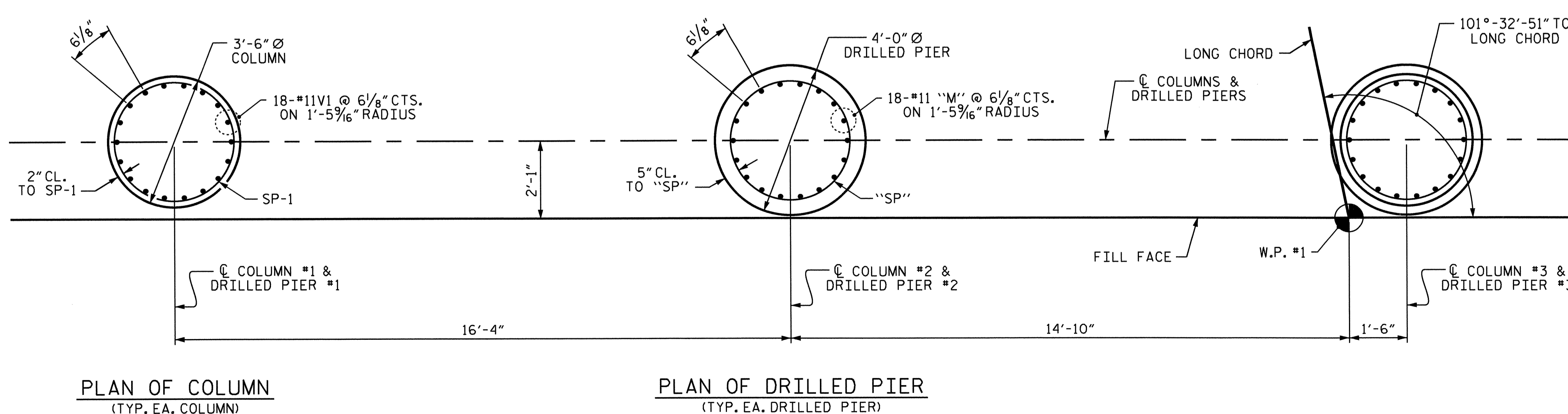
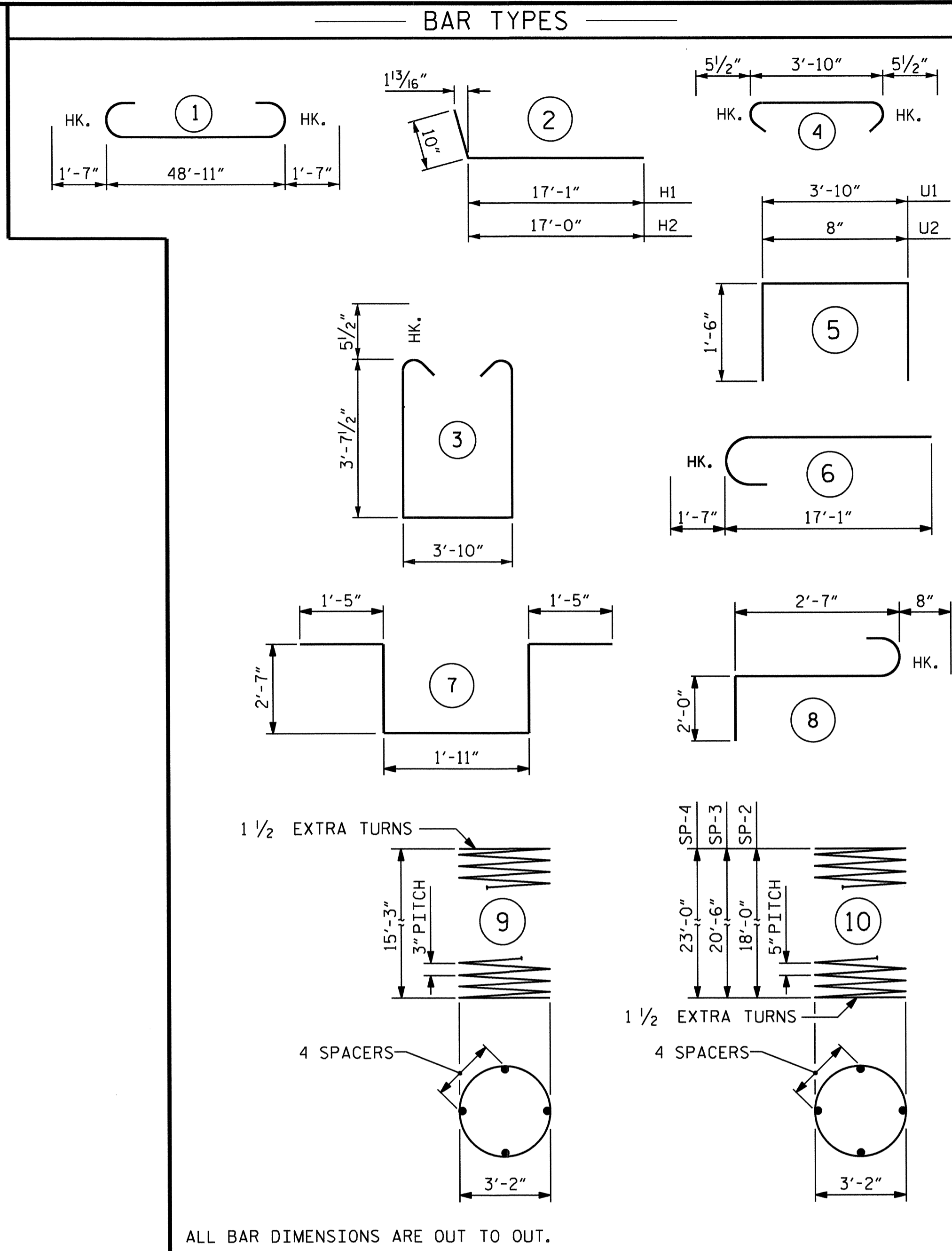
DRAWN BY: J.P. ADAMS DATE: 10/18/12
 CHECKED BY: J. KHARVA DATE: 11/20/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 07/2012



PARTIAL SECTION B



SECTION A-A



PLAN OF COLUMN (TYP. EA. COLUMN)

PLAN OF DRILLED PIER (TYP. EA. DRILLED PIER)

PLAN OF COLUMNS & DRILLED PIERS

BILL OF MATERIAL					
END BENT #1					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	13	#11	1	52'-1"	3597
B2	6	#5	STR.	49'-1"	307
B3	5	#4	STR.	23'-11"	80
B4	10	#4	STR.	2'-8"	18
H1	18	#5	2	17'-11"	336
H2	18	#5	2	17'-10"	335
K1	44	#4	STR.	25'-9"	757
K2	4	#4	STR.	6'-0"	16
K3	4	#4	STR.	2'-7"	7
M1	18	#11	STR.	25'-7"	2447
M2	18	#11	STR.	28'-1"	2686
M3	18	#11	STR.	30'-7"	2925
S1	53	#5	3	12'-0"	663
S2	53	#5	4	4'-9"	263
S3	3	#6	7	9'-11"	45
S4	3	#6	8	5'-3"	24
U1	26	#4	5	6'-10"	119
U2	40	#4	5	3'-8"	98
V1	54	#11	6	18'-8"	5356
V2	50	#5	STR.	15'-4"	800
V3	16	#5	STR.	14'-7"	243
V4	80	#5	STR.	13'-0"	1085
REINFORCING STEEL 22207 LBS.					
SP-1	3	**	9	613'-10"	1230
SP-2	1	***	10	438'-4"	457
SP-3	1	***	10	497'-1"	518
SP-4	1	***	10	555'-10"	580
SPIRAL REINFORCING STEEL = 2785 LBS.					
CLASS A CONCRETE BREAKDOWN					
POUR #2 COLUMNS				16.0	C.Y.
POUR #3 CAP & LOWER WING				36.5	C.Y.
POUR #4 BACKWALL & UPPER WING				23.3	C.Y.
TOTAL CLASS A CONCRETE				75.8	C.Y.
DRILLED PIER CONCRETE					
POUR #1 DRILLED PIERS				29.3	C.Y.
4'-0" Ø DRILLED PIER NOT IN SOIL				38	Lin. Ft.
4'-0" Ø DRILLED PIER IN SOIL				25	Lin. Ft.
CSL TUBES				270	Ft.
HP 12X53 STEEL PILE NO. 1				25	Lin. Ft.

**THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.
 ***THE SP-2, SP-3 AND SP-4 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 3 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT #1
 (LEFT LANE)

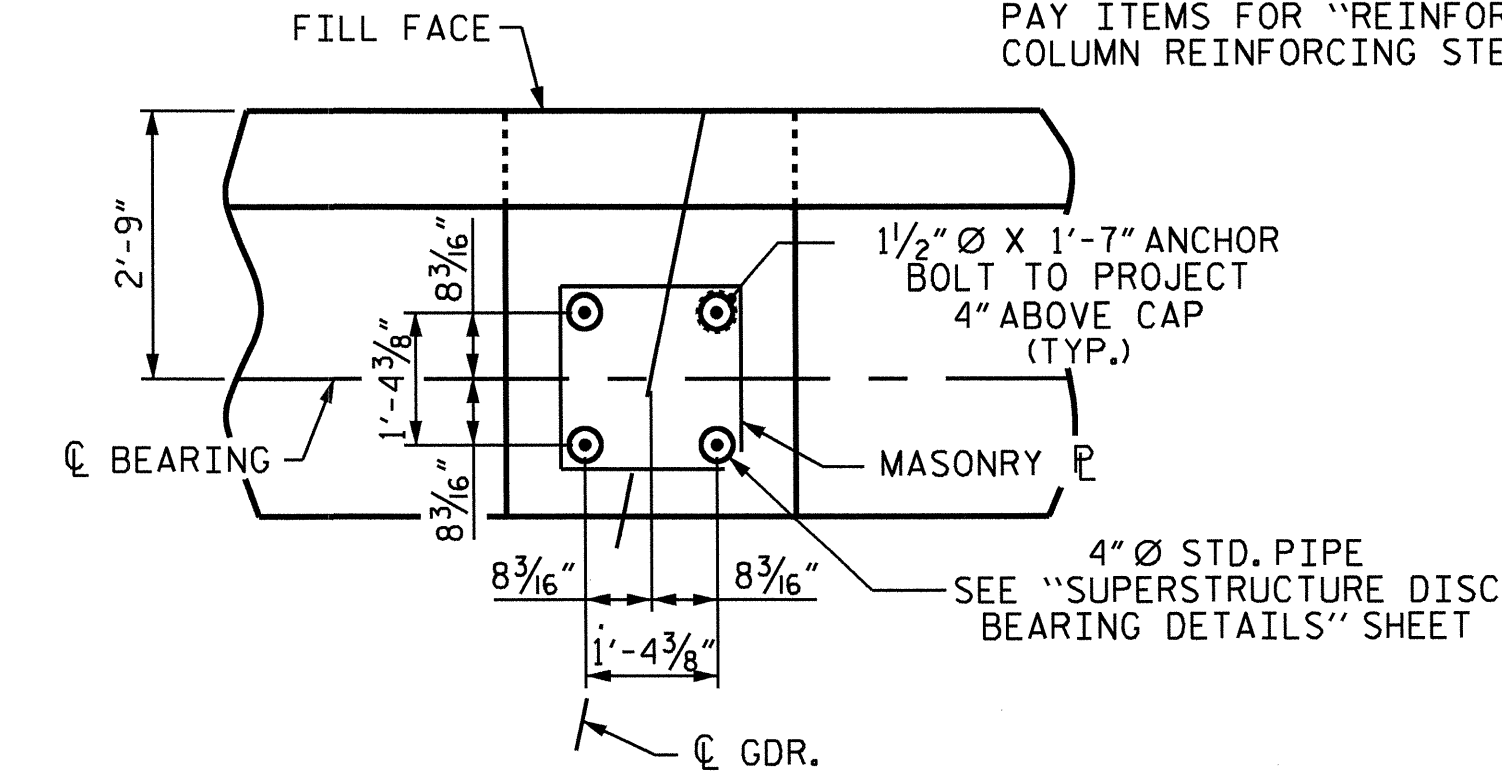
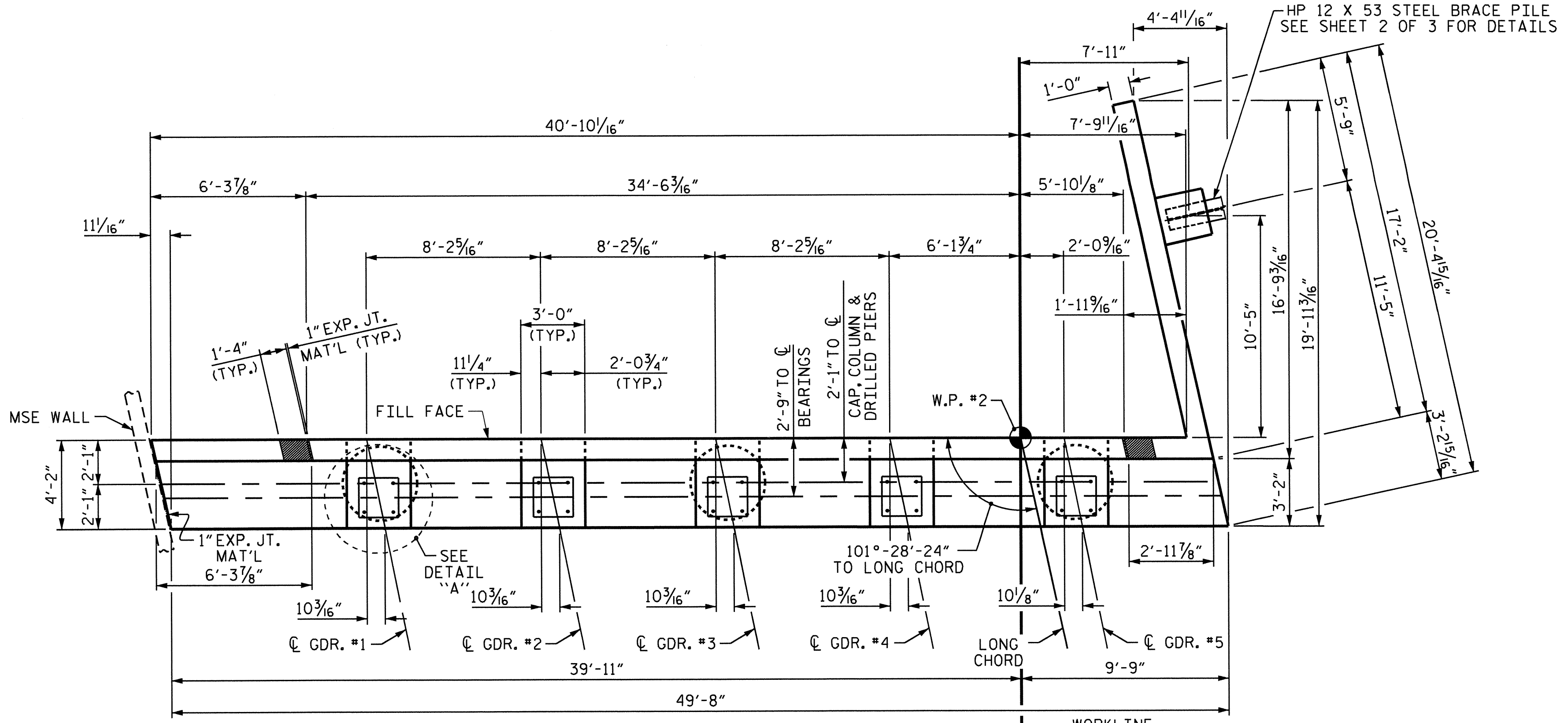


REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		

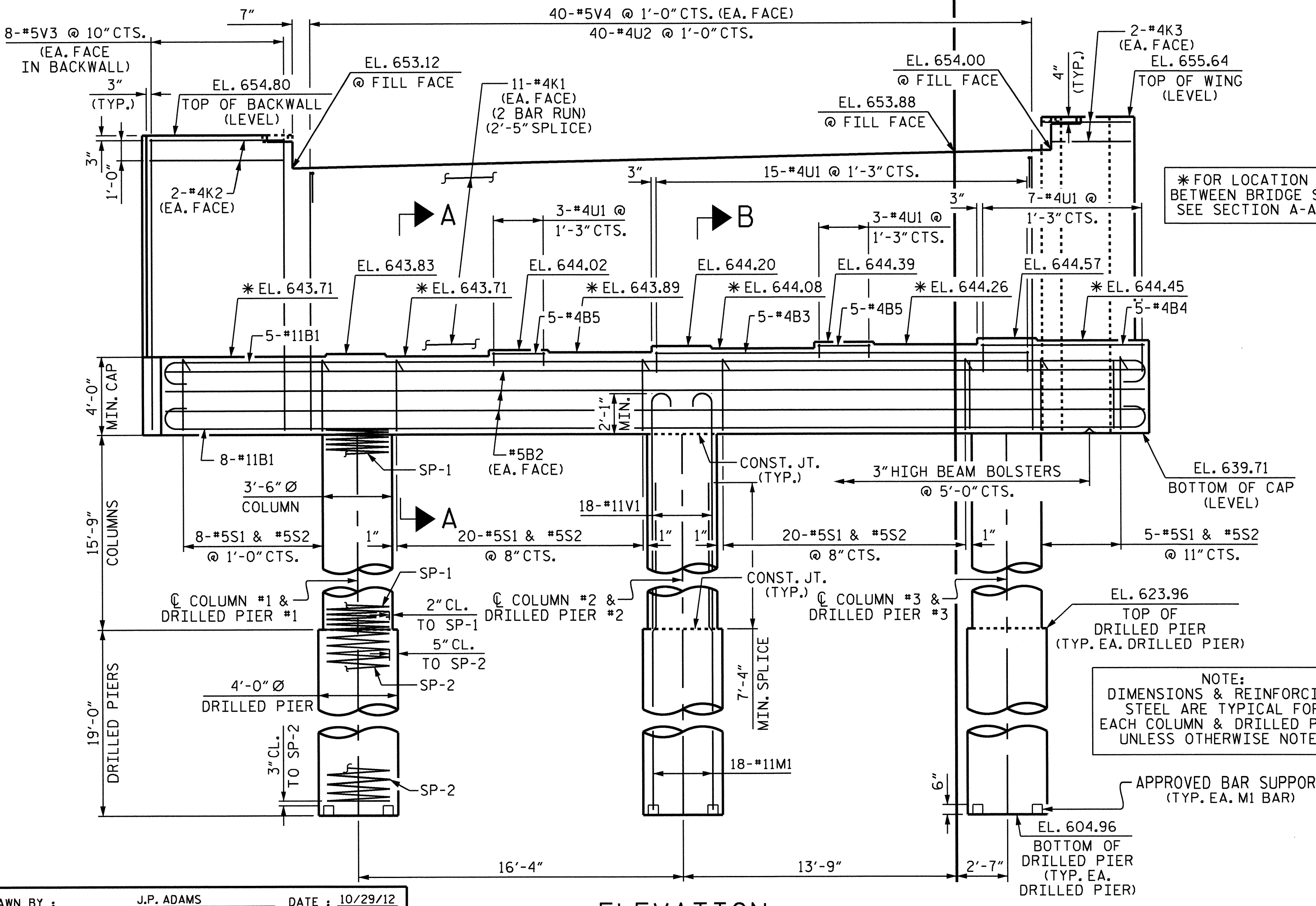
DRAWN BY : J.P. ADAMS DATE : 10/18/12
 CHECKED BY : J. KHARVA DATE : 11/2012
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE : 7/2012

NOTES

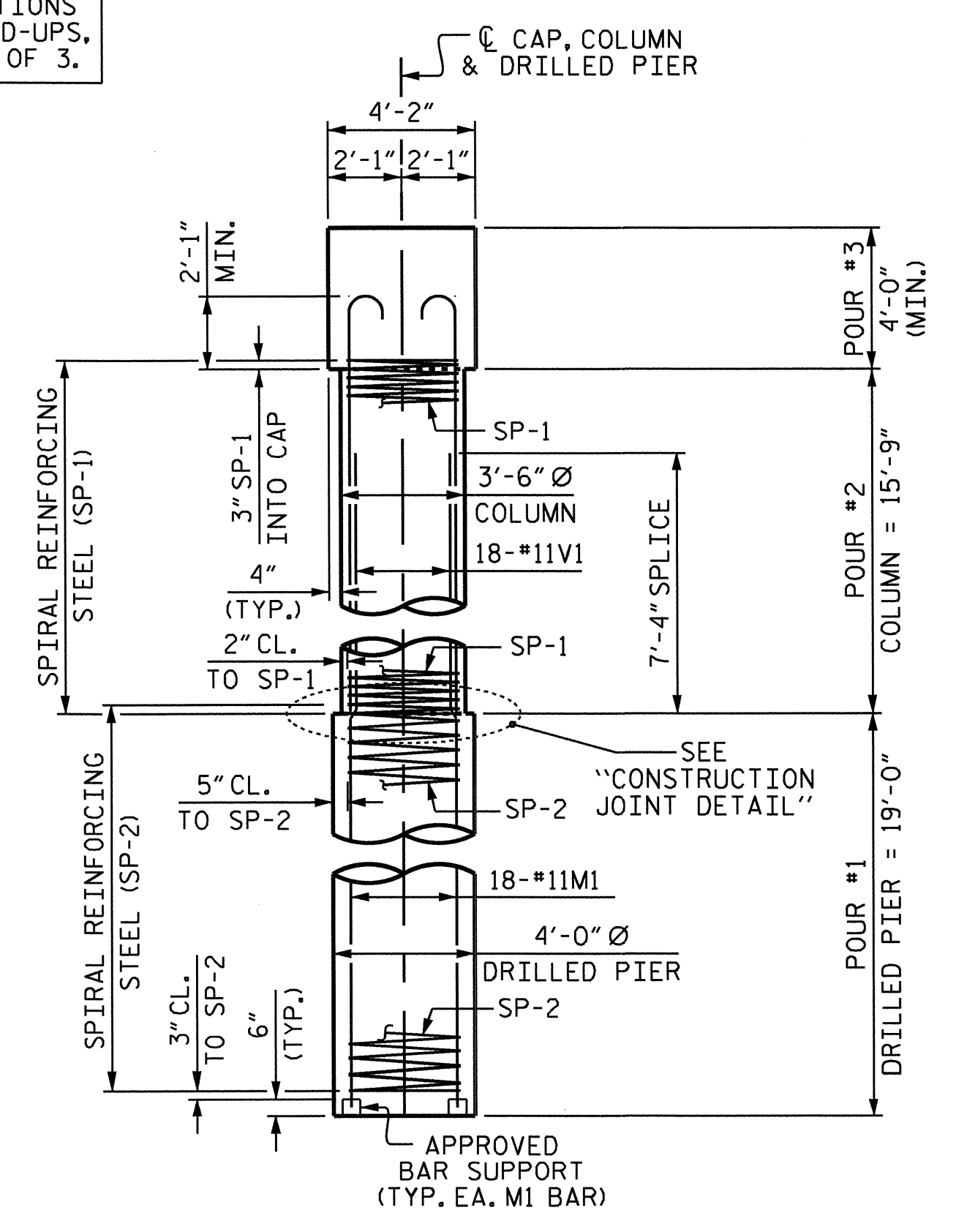
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".



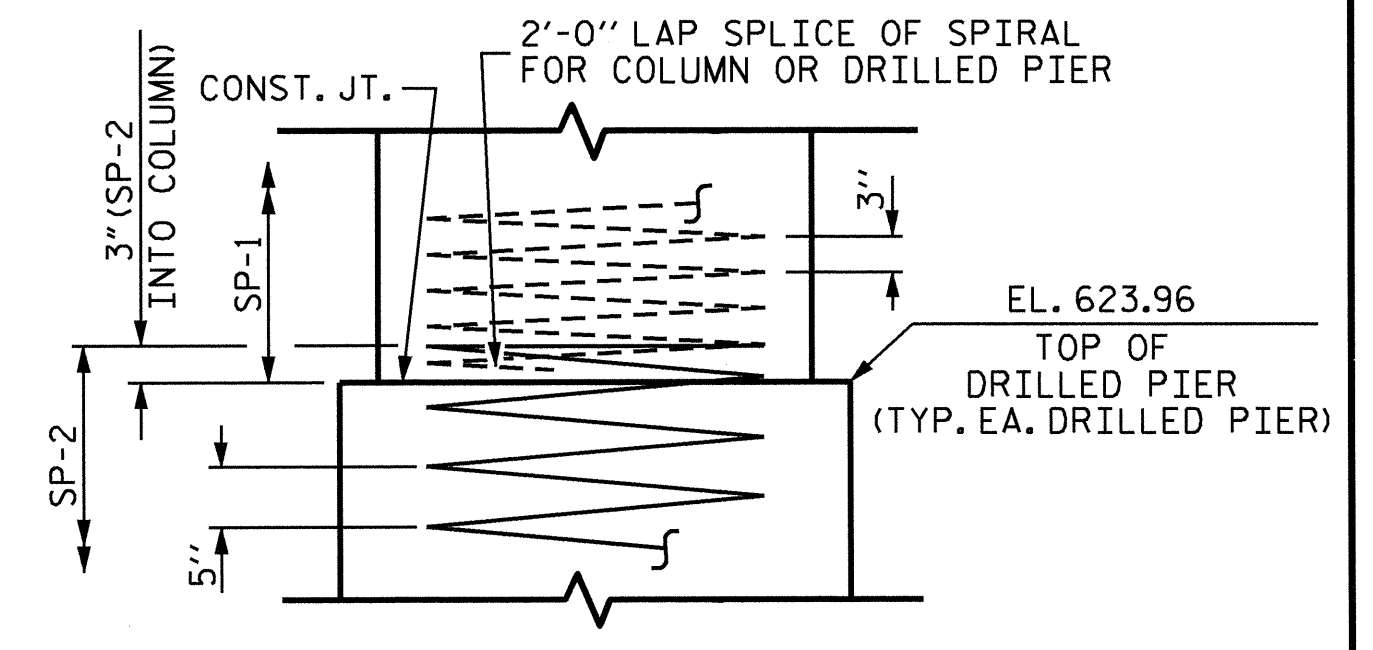
DETAIL "A" (TYP. EA. BRIDGE SEAT)



ELEVATION



END ELEVATION



CONSTRUCTION JOINT DETAIL

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

NOTE: DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED

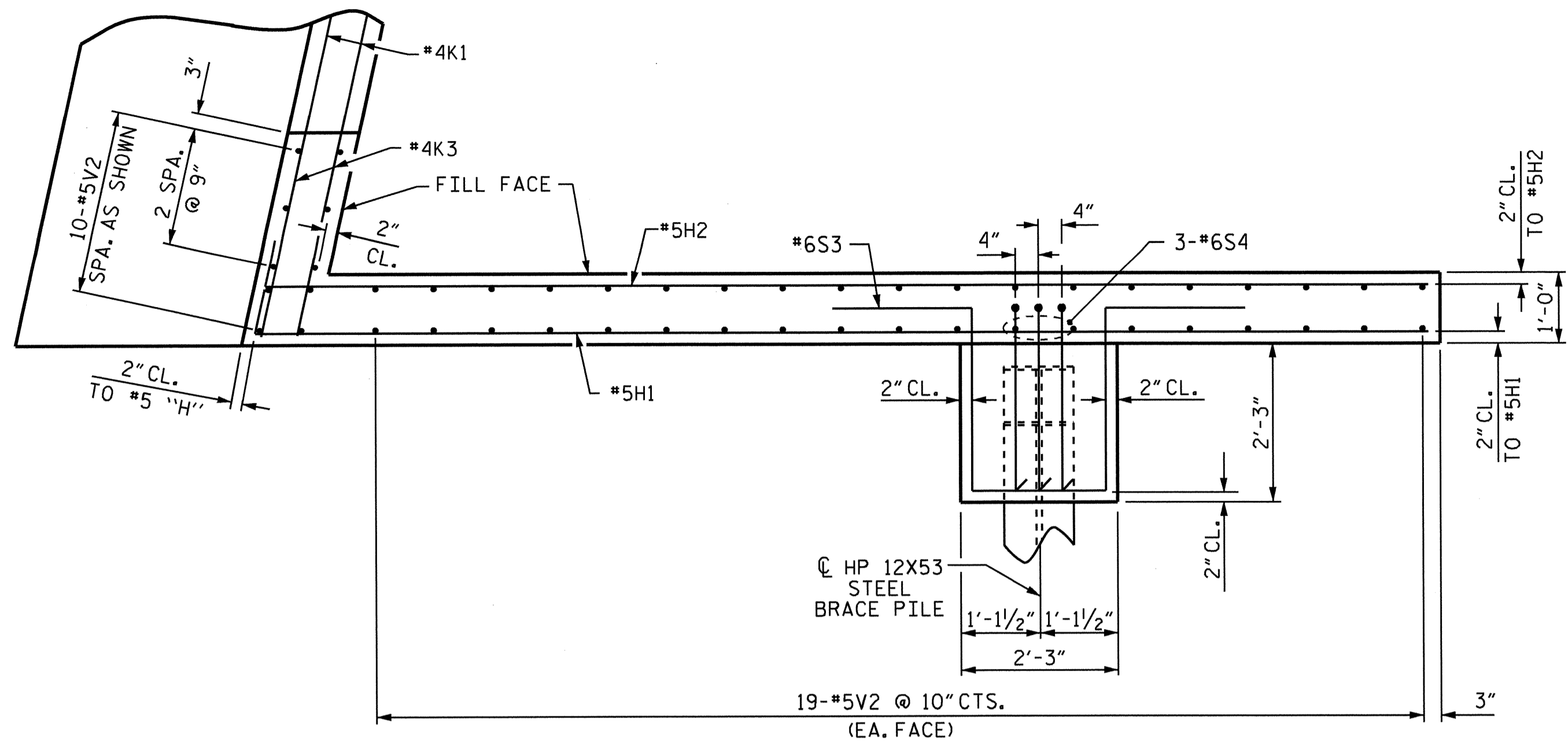
PROJECT NO. R-2246B
CABARRUS COUNTY
STATION: 80+56.83 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT #2
(LEFT LANE)

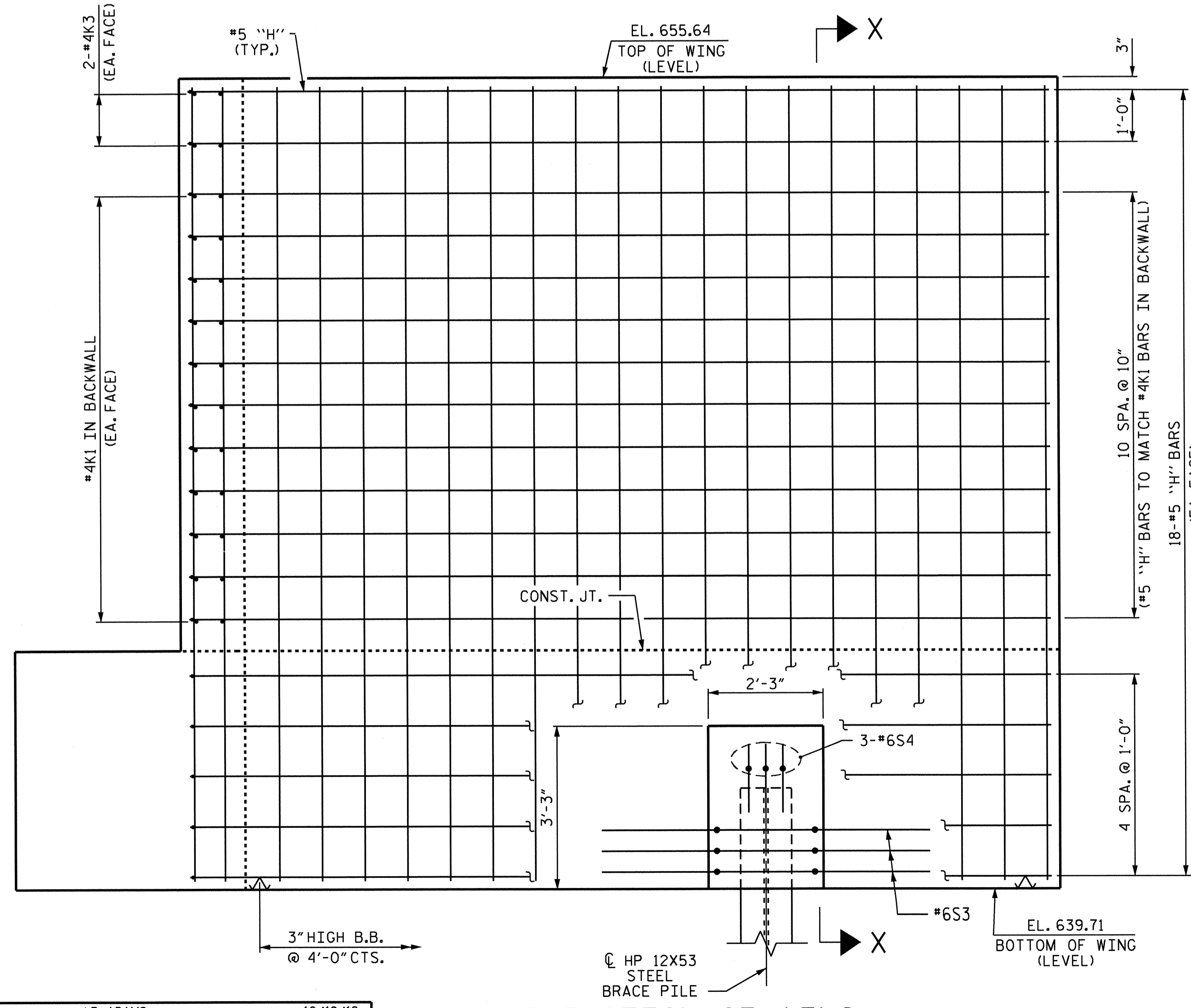
Table with 4 columns: NO., BY, DATE, and SHEET NO. (S-23)



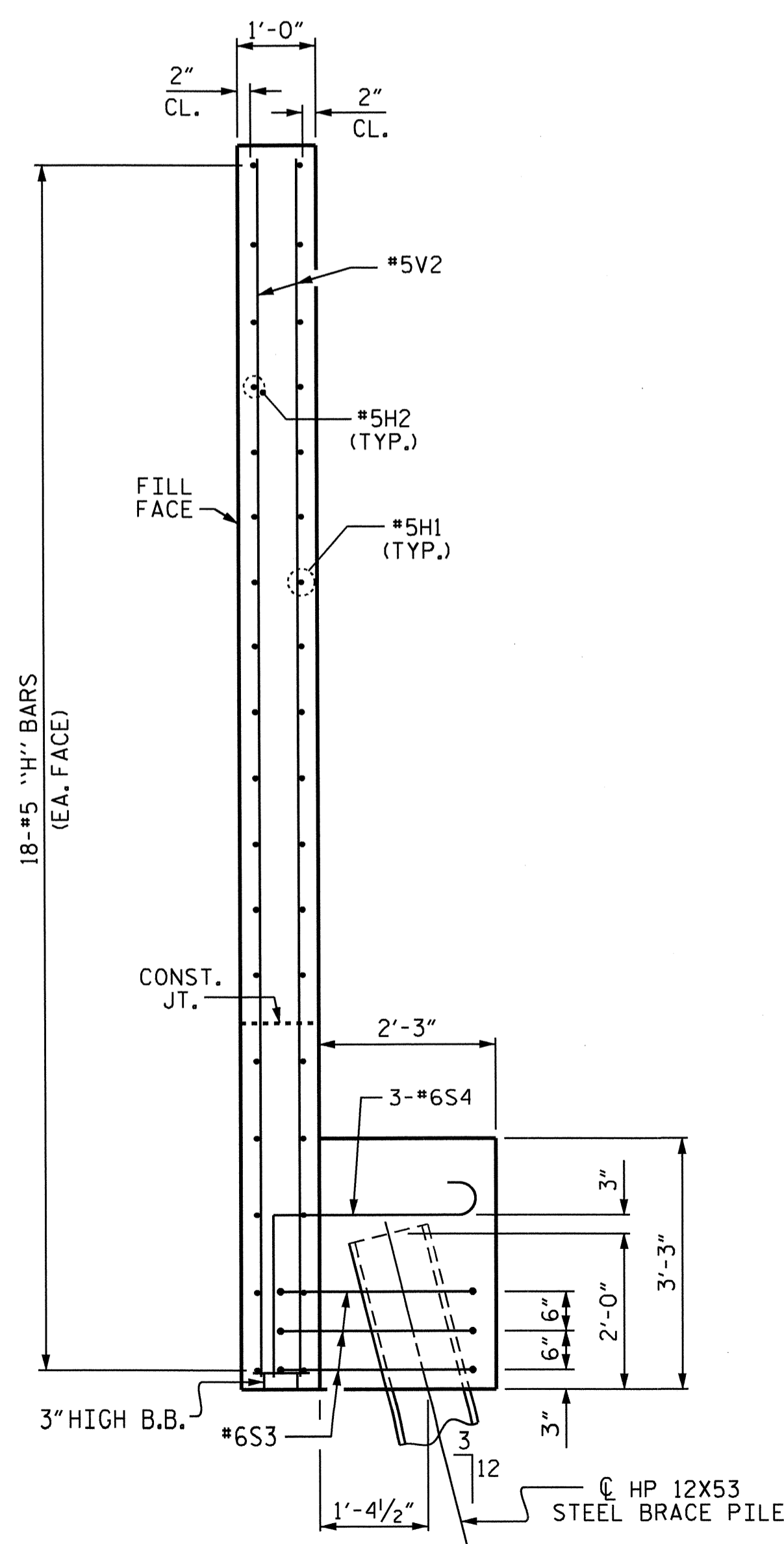
DRAWN BY: J.P. ADAMS DATE: 10/29/12
CHECKED BY: J. KHARVA DATE: 11/20/12
DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 7/20/12



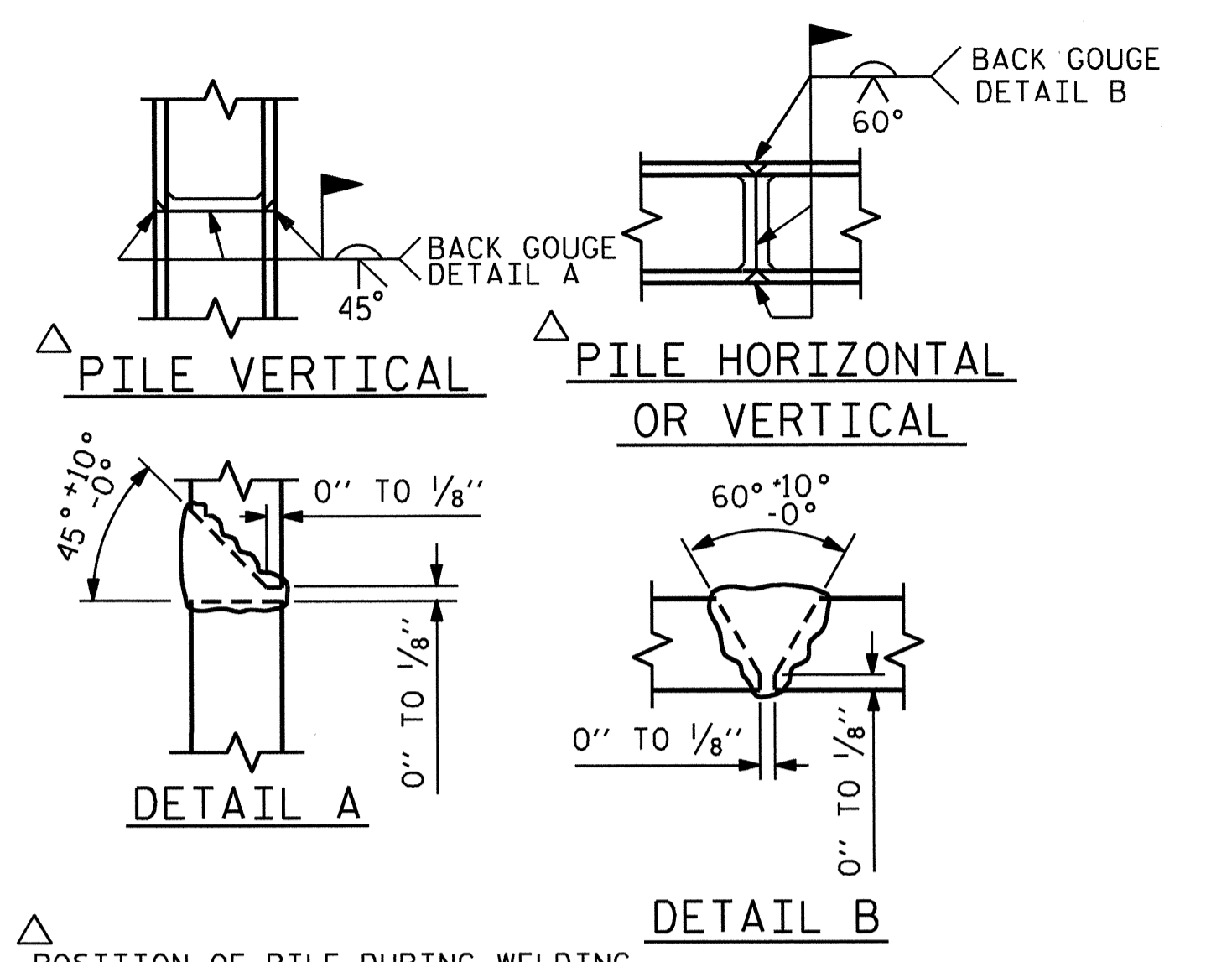
PLAN OF WING



ELEVATION OF WING



SECTION X-X

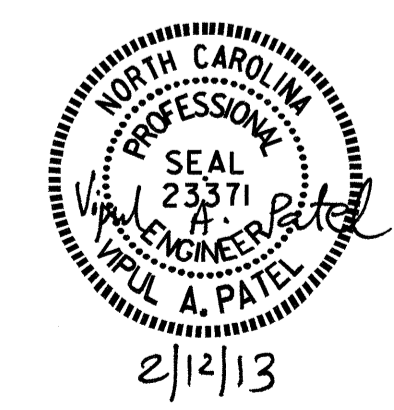


PILE SPLICE DETAILS

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

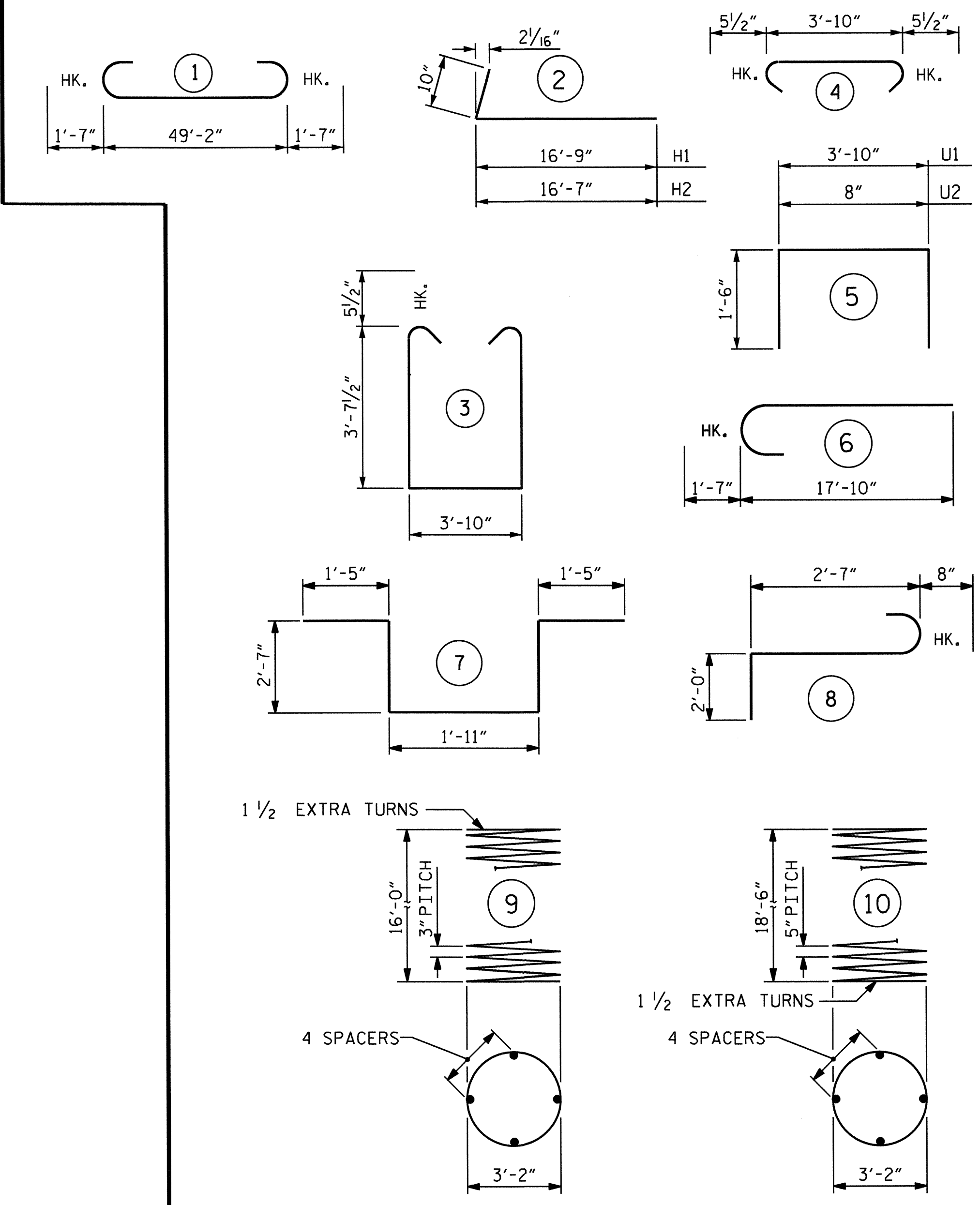
SHEET 2 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT #2 (LEFT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-24
					TOTAL SHEETS 56



DRAWN BY : J.P. ADAMS DATE : 10/18/12
 CHECKED BY : J. KHARVA DATE : 11/20/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE : 07/20/12

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

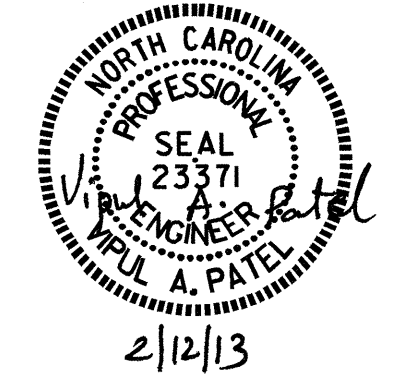
*THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.
 *** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

BILL OF MATERIAL

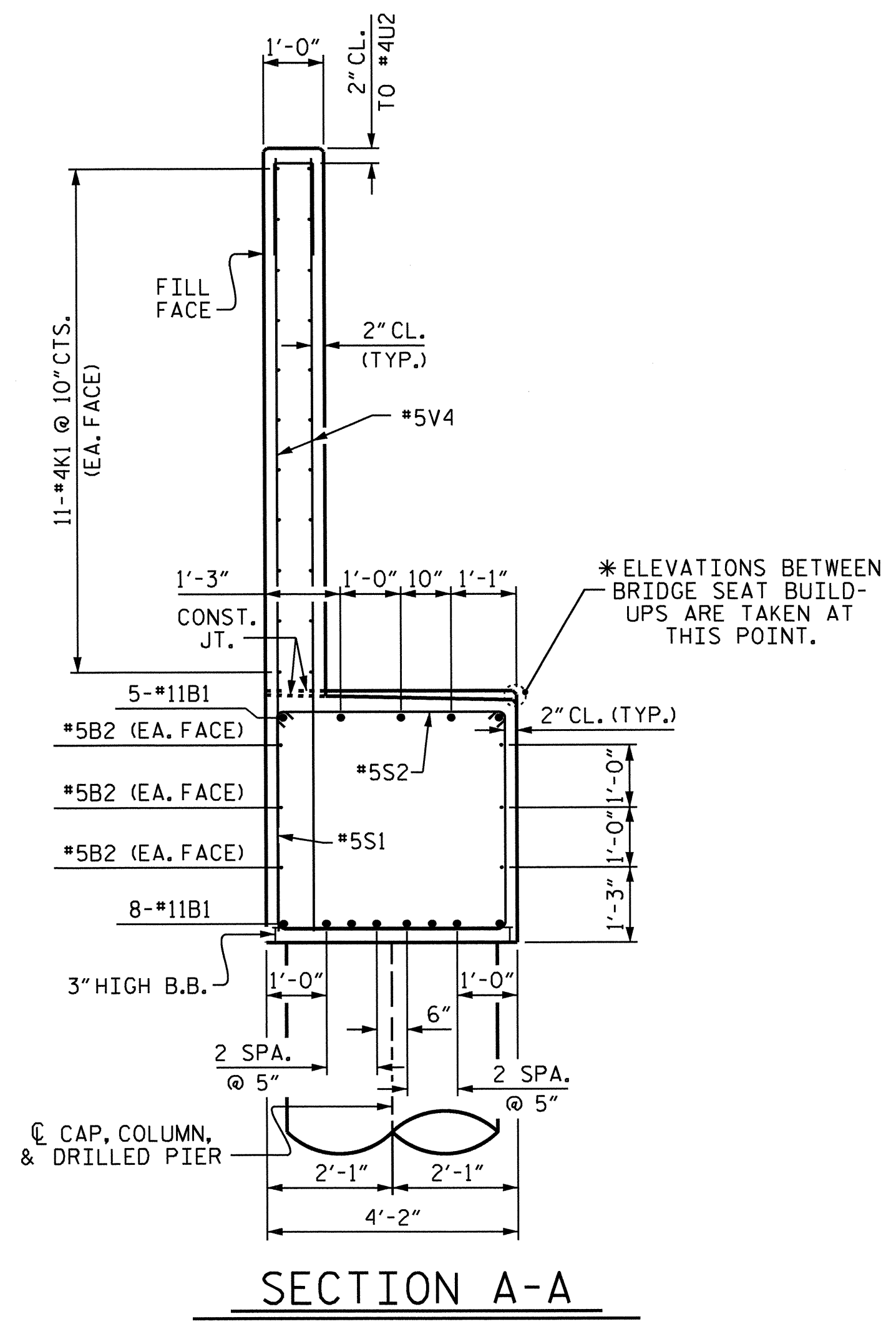
END BENT #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	13	#11	1	52'-4"	3615
B2	6	#5	STR.	49'-4"	309
B3	5	#4	STR.	18'-10"	63
B4	5	#4	STR.	7'-4"	24
B5	10	#4	STR.	2'-8"	18
H1	18	#5	2	17'-7"	330
H2	18	#5	2	17'-5"	327
K1	44	#4	STR.	25'-11"	762
K2	4	#4	STR.	5'-11"	16
K3	4	#4	STR.	2'-7"	7
M1	54	#11	STR.	26'-1"	7483
S1	53	#5	3	12'-0"	663
S2	53	#5	4	4'-9"	263
S3	3	#6	7	9'-11"	45
S4	3	#6	8	5'-3"	24
U1	28	#4	5	6'-10"	128
U2	40	#4	5	3'-8"	98
V1	54	#11	6	19'-5"	5571
V2	48	#5	STR.	15'-7"	780
V3	16	#5	STR.	14'-9"	246
V4	80	#5	STR.	13'-1"	1092
REINFORCING STEEL				21864	LBS.
SP-1	3	**	9	643'-4"	1289
SP-2	3	***	10	450'-7"	1410
SPIRAL REINFORCING STEEL				2699	LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #2 COLUMNS				16.8	C.Y.
POUR #3 CAP & LOWER WING				36.9	C.Y.
POUR #4 BACKWALL & UPPER WING				24.8	C.Y.
TOTAL CLASS A CONCRETE				78.5	C.Y.
DRILLED PIER CONCRETE					
POUR #1 DRILLED PIERS				26.5	C.Y.
4'-0" Ø DRILLED PIER NOT IN SOIL				44	Lin. Ft.
4'-0" Ø DRILLED PIER IN SOIL				13	Lin. Ft.
CSL TUBES				246	Ft.
HP 12X53 STEEL PILE NO. 1				25	Lin. Ft.

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

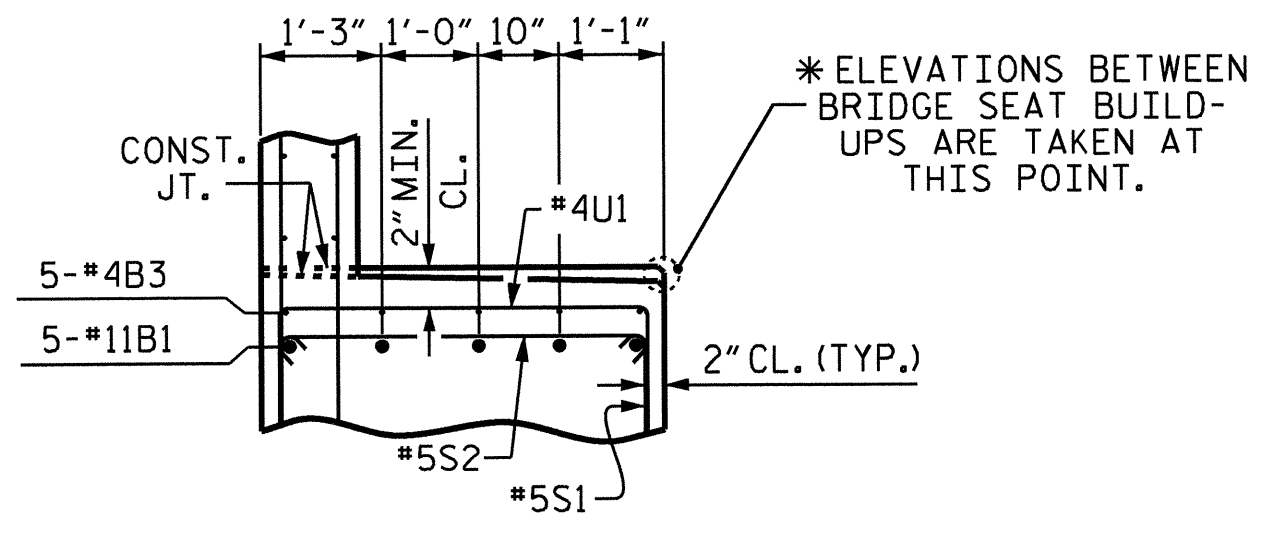
SHEET 3 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT #2
 (LEFT LANE)



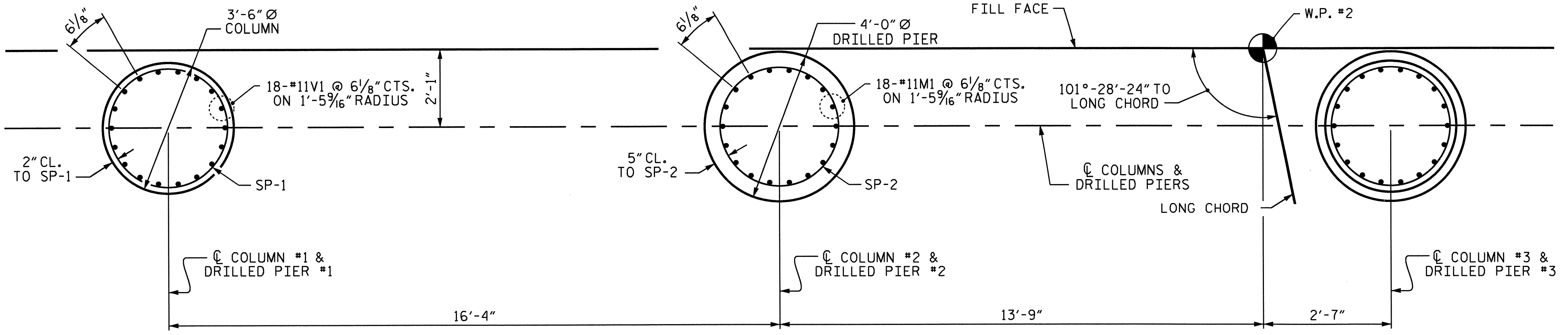
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-25
2			4			56



SECTION A-A



PARTIAL SECTION B



PLAN OF COLUMN (TYP. EA. COLUMN)

PLAN OF DRILLED PIER (TYP. EA. DRILLED PIER)

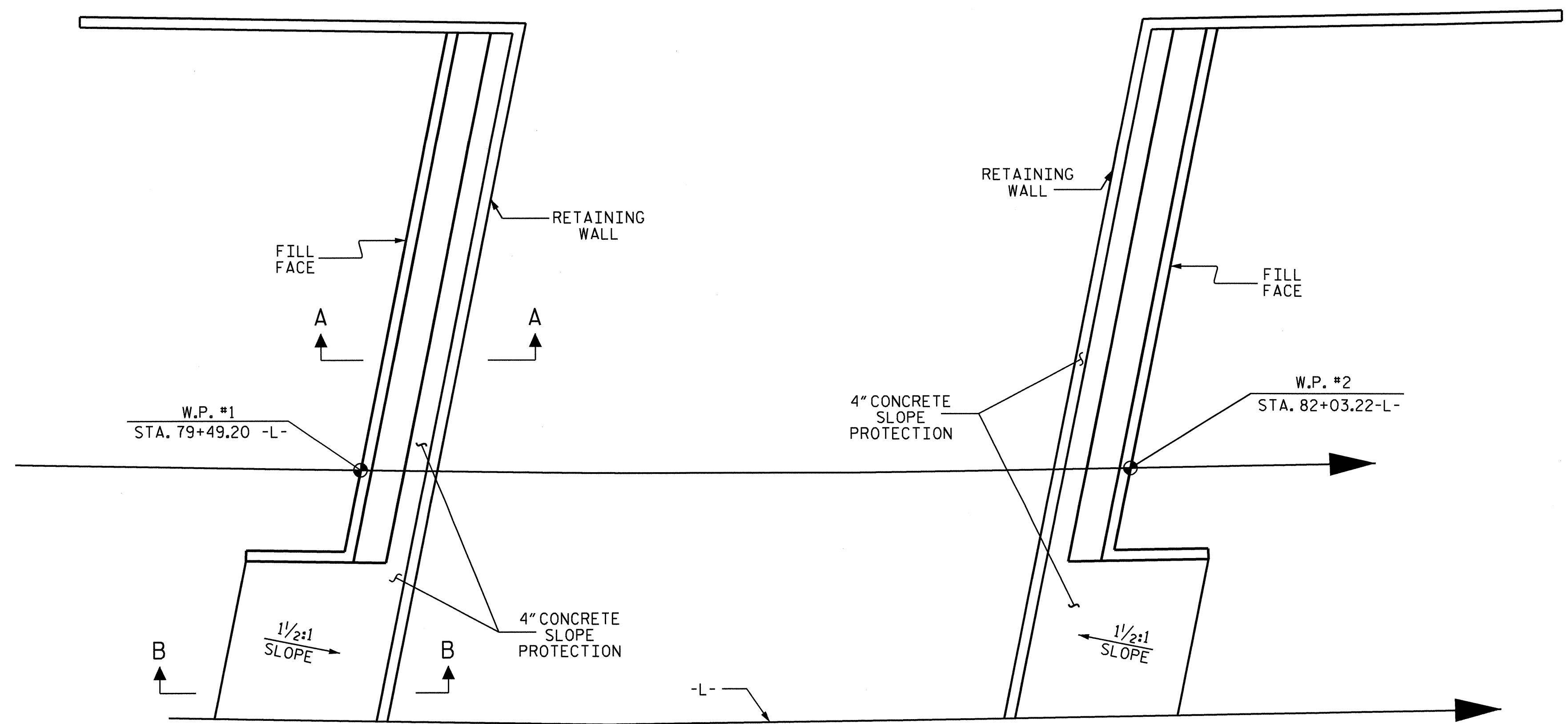
PLAN OF COLUMNS & DRILLED PIERS

DRAWN BY: J.P. ADAMS DATE: 10/18/12
 CHECKED BY: J. KHARVA DATE: 11/20/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 7/20/12

NOTES

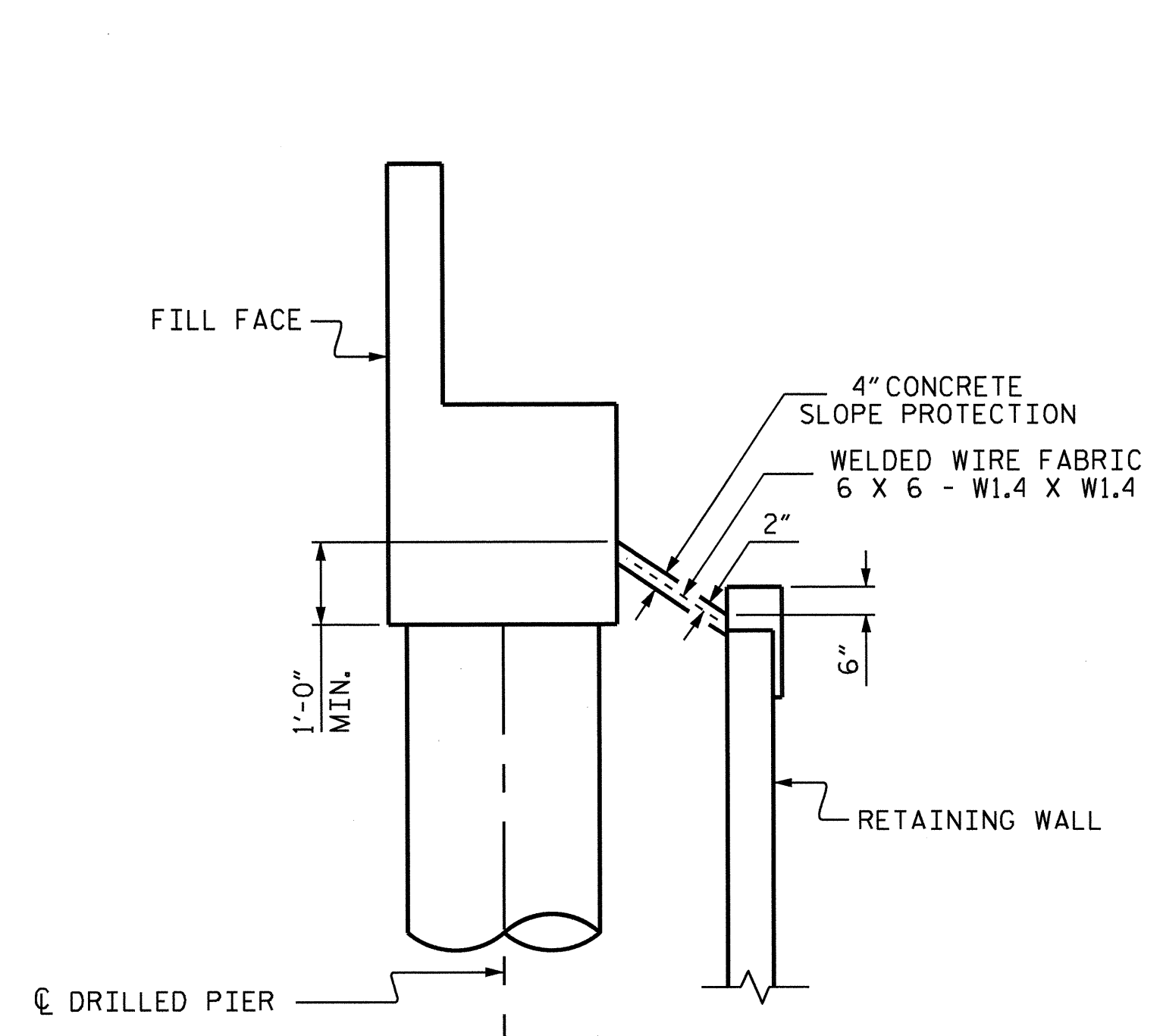
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

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 FINISHED TO THE SATISFACTION OF THE ENGINEER. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 20" WIDE. THE COST OF THE WELDED WIRE FABRIC SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

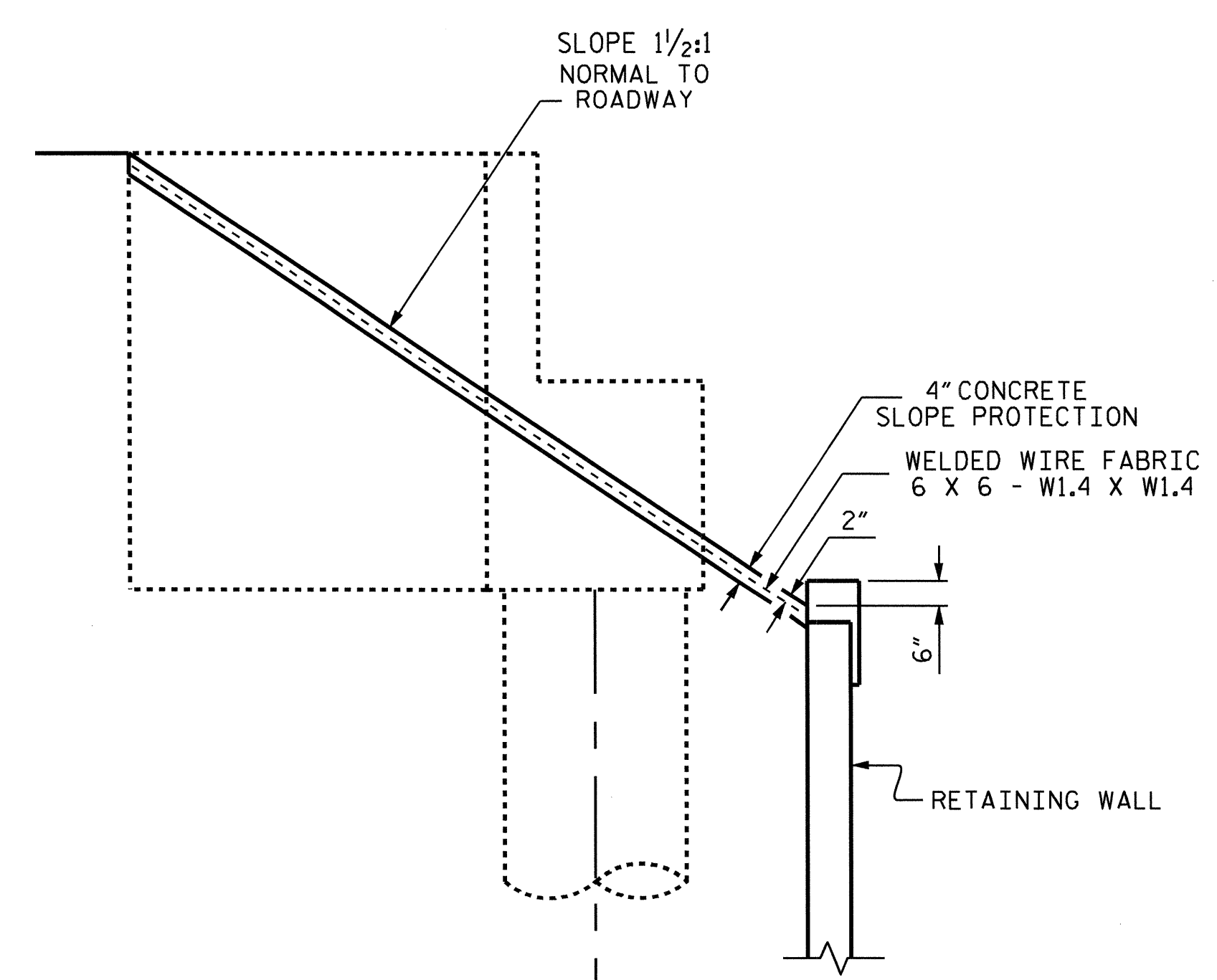


PLAN

BRIDGE @ STA. 80+56.83 -L-	4" SLOPE PROTECTION	WELDED WIRE FABRIC 20 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT #1	60	115
END BENT #2	60	115

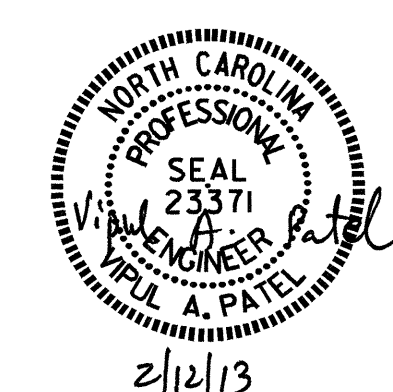


SECTION A-A



SECTION B-B

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-

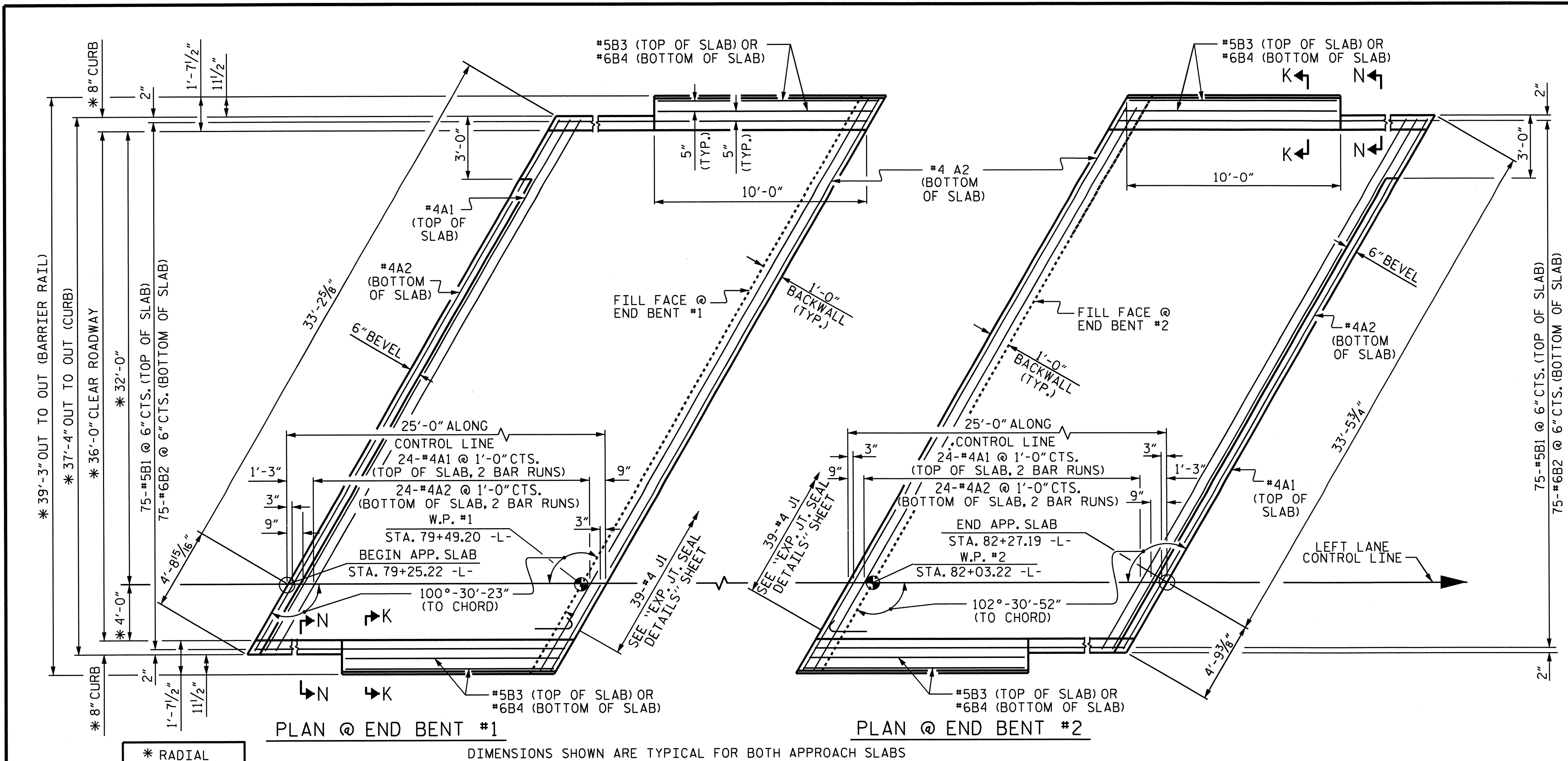


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SLOPE PROTECTION DETAILS (LEFT LANE)

DRAWN BY : J.P. ADAMS DATE : 3/26/12
 CHECKED BY : J. KHARVA DATE : 8/2012
 DESIGN ENGINEER OF RECORD : H.A. LOCKLEAR DATE : 8/2012

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26	
1			3			TOTAL SHEETS	
2			4			56	



PLAN @ END BENT #1

PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
 AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.
 FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
 ARC OFFSETS ARE NEGLIGIBLE AND THEREFORE NOT SHOWN.

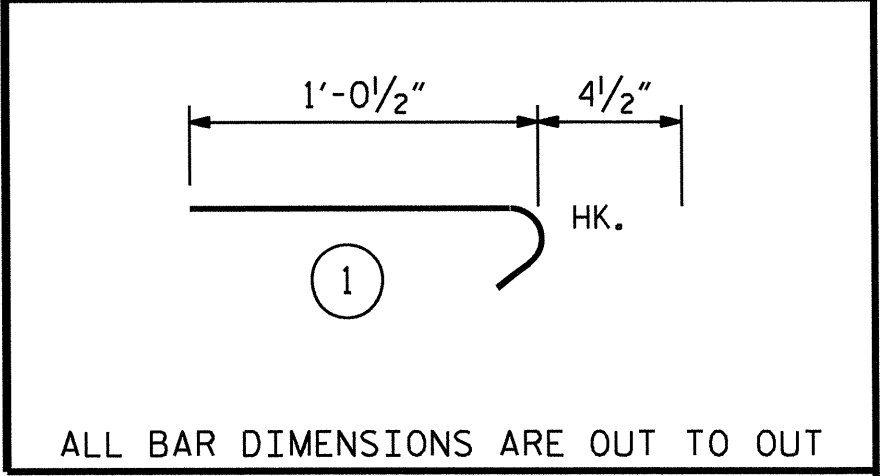
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	20'-10"	696
A2	52	#4	STR	20'-8"	718
*B1	75	#5	STR	24'-1"	1884
B2	75	#6	STR	24'-8"	2779
*B3	4	#5	STR	9'-7"	40
B4	4	#6	STR	9'-7"	58
*J1	39	#4	1	1'-5"	37

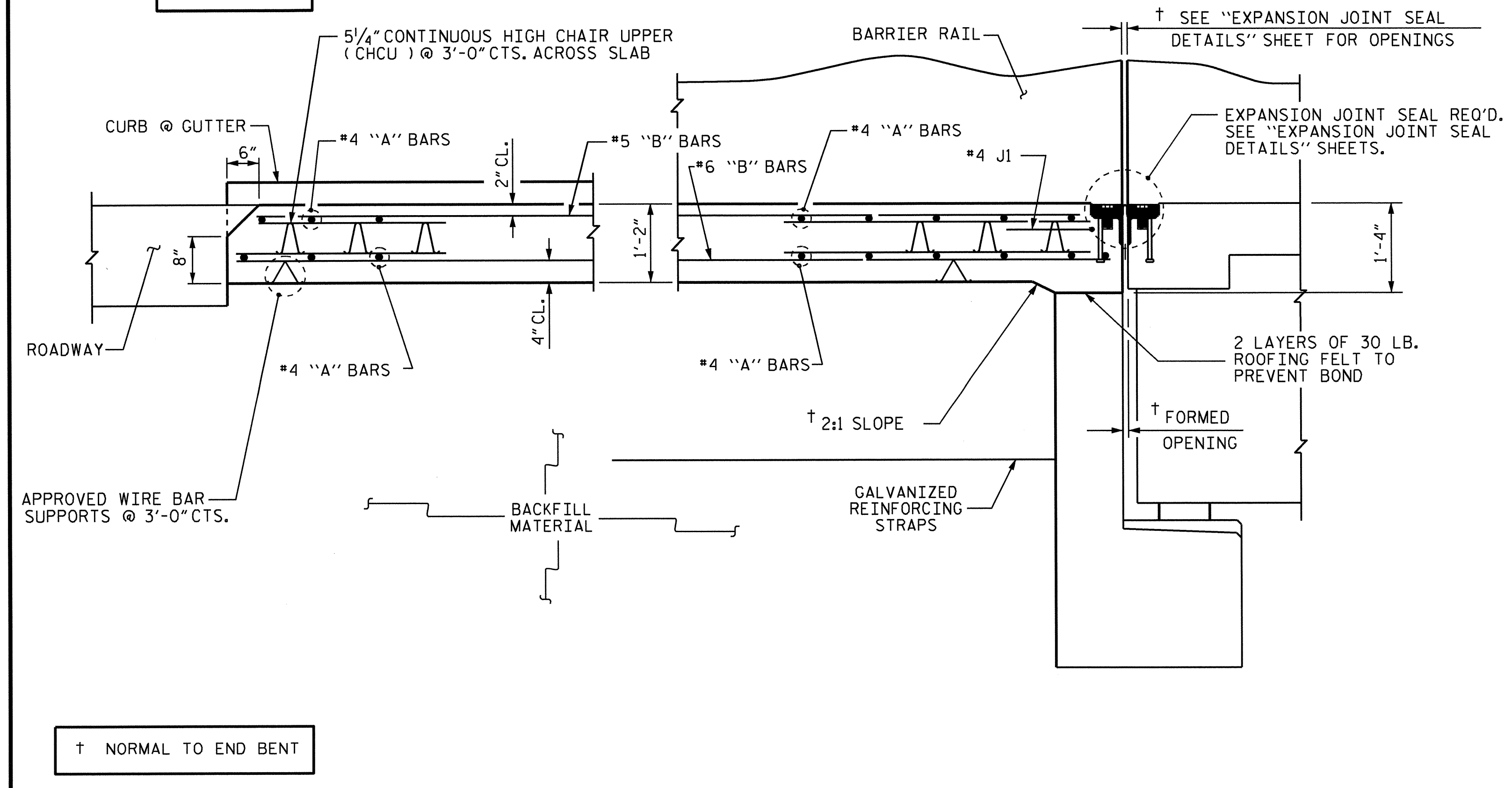
REINFORCING STEEL ** LBS. 3555
 *EPOXY COATED REINFORCING STEEL ** LBS. 2657
 CLASS AA CONCRETE ** C.Y. 41.1

BAR TYPE

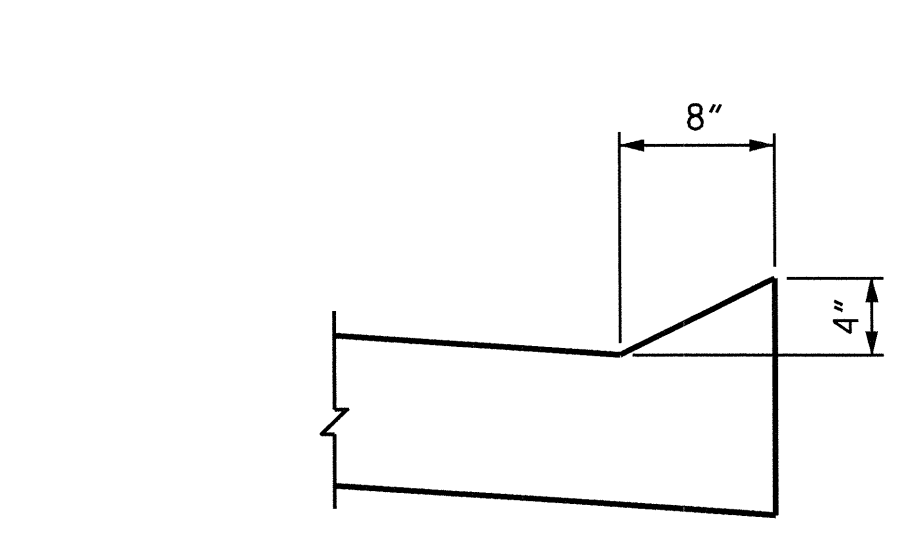


ALL BAR DIMENSIONS ARE OUT TO OUT
 ** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 2 OF 2.

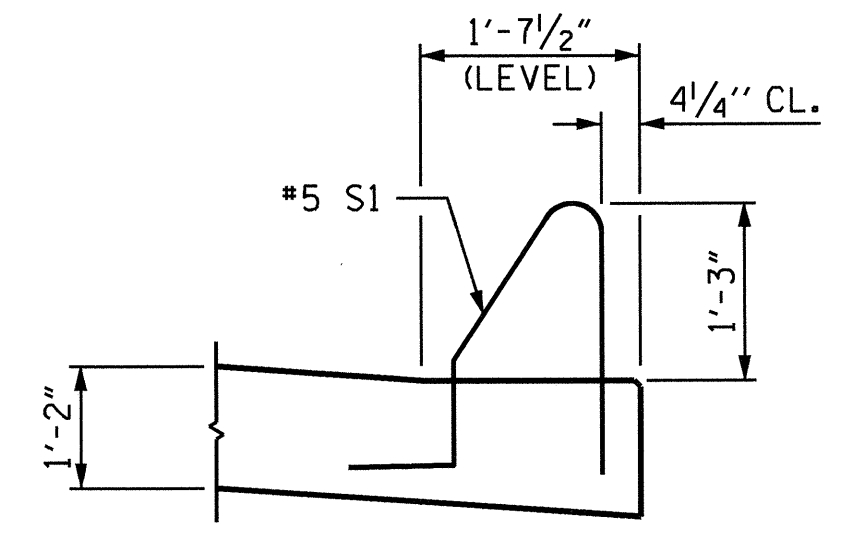
THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



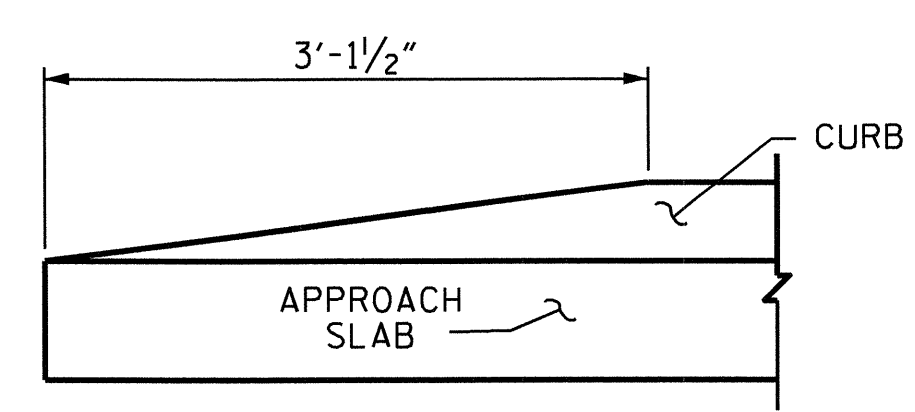
SECTION THRU SLAB



SECTION N-N



SECTION K-K

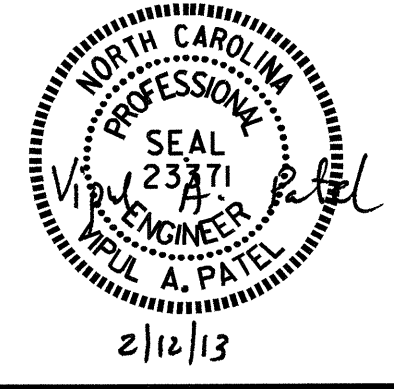


END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

SPLICE LENGTHS

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



PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 1 OF 2

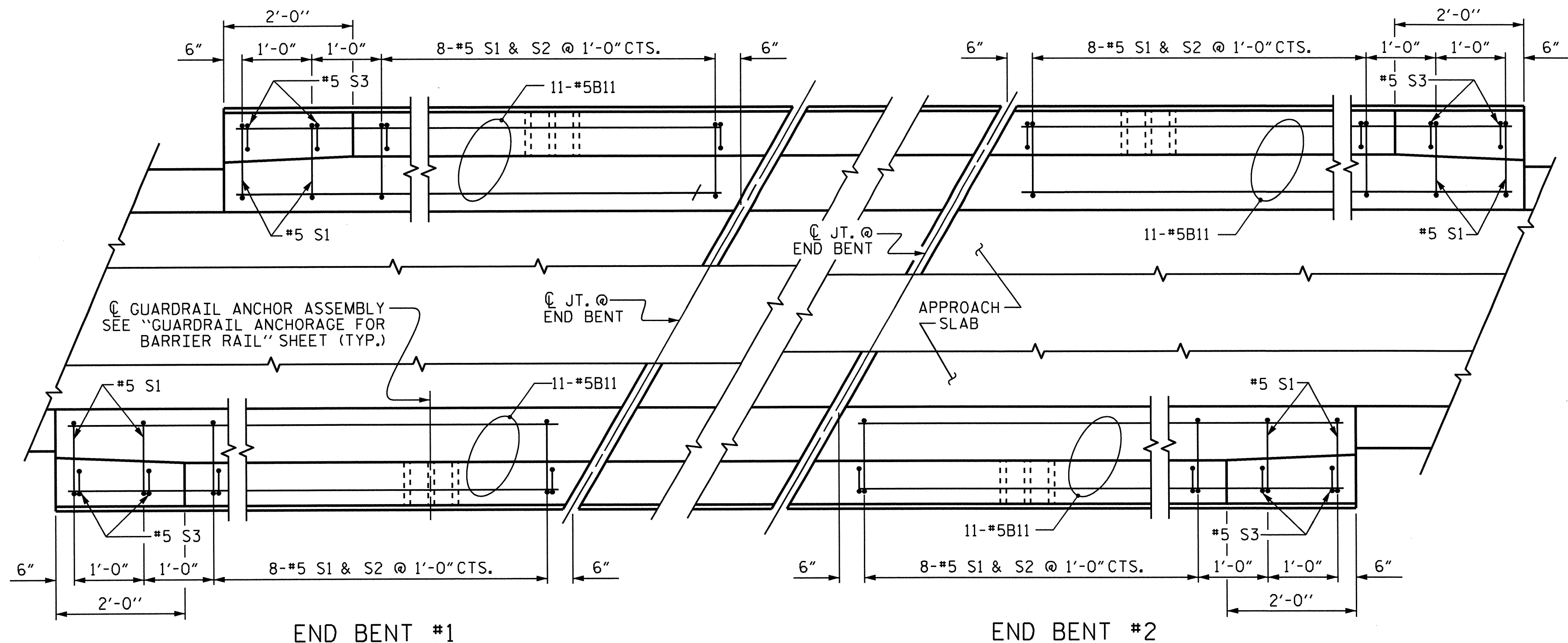
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT (LEFT LANE)

REVISIONS

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

SHEET NO. S-27
 TOTAL SHEETS 56
 STR. #1 STD. NO. BAS2 (SHT 4B)

ASSEMBLED BY: J.G. KHARVA DATE: 10/19/12
 CHECKED BY: R.L. CHESSON DATE: 11/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 7/2012
 DRAWN BY: EEM 3/95 REV. 5/7/03R RWW/JTE
 CHECKED BY: VAP 3/95 REV. 5/1/06RR KMM/GM
 REV. 10/1/11 MAA/CM



PLAN OF BARRIER RAIL

NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

THE BARRIER RAIL ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH 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.

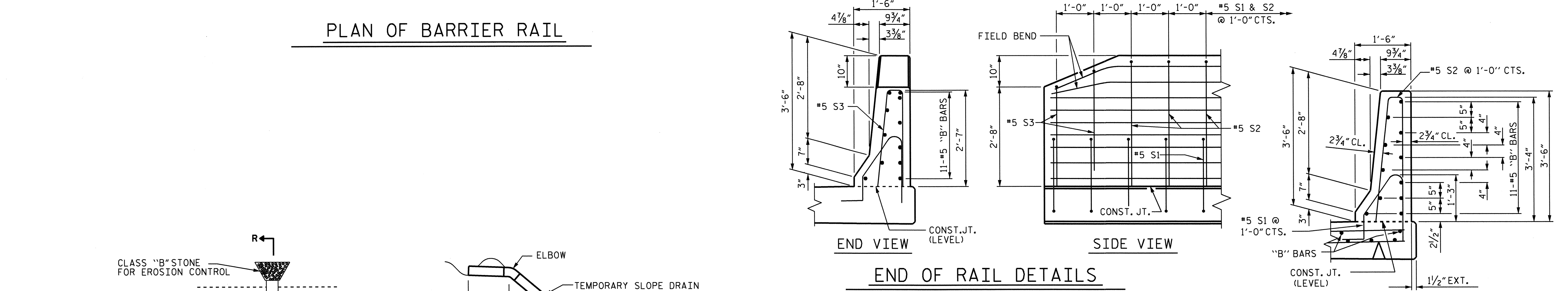
BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

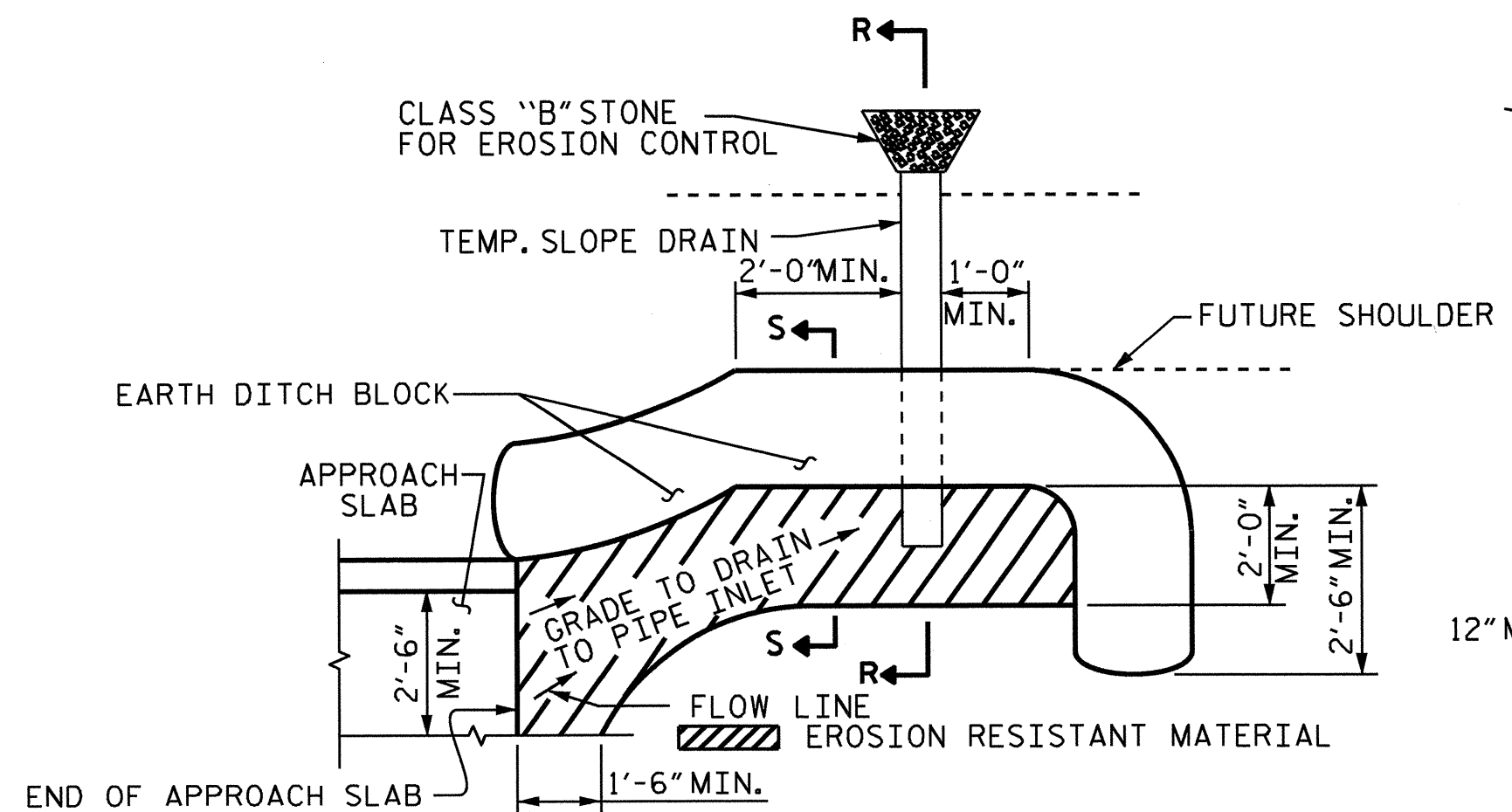
BARRIER RAIL ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B11	44	#5	STR	9'-8"	444
*S1	40	#5	1	5'-1"	212
*S2	32	#5	2	7'-0"	234
*S3	8	#5	2	5'-6"	46

*EPOXY COATED REINFORCING STEEL LBS. 936
 CLASS AA CONCRETE C.Y. 5.5
 CONCRETE BARRIER RAIL 40.0 LIN. FT.

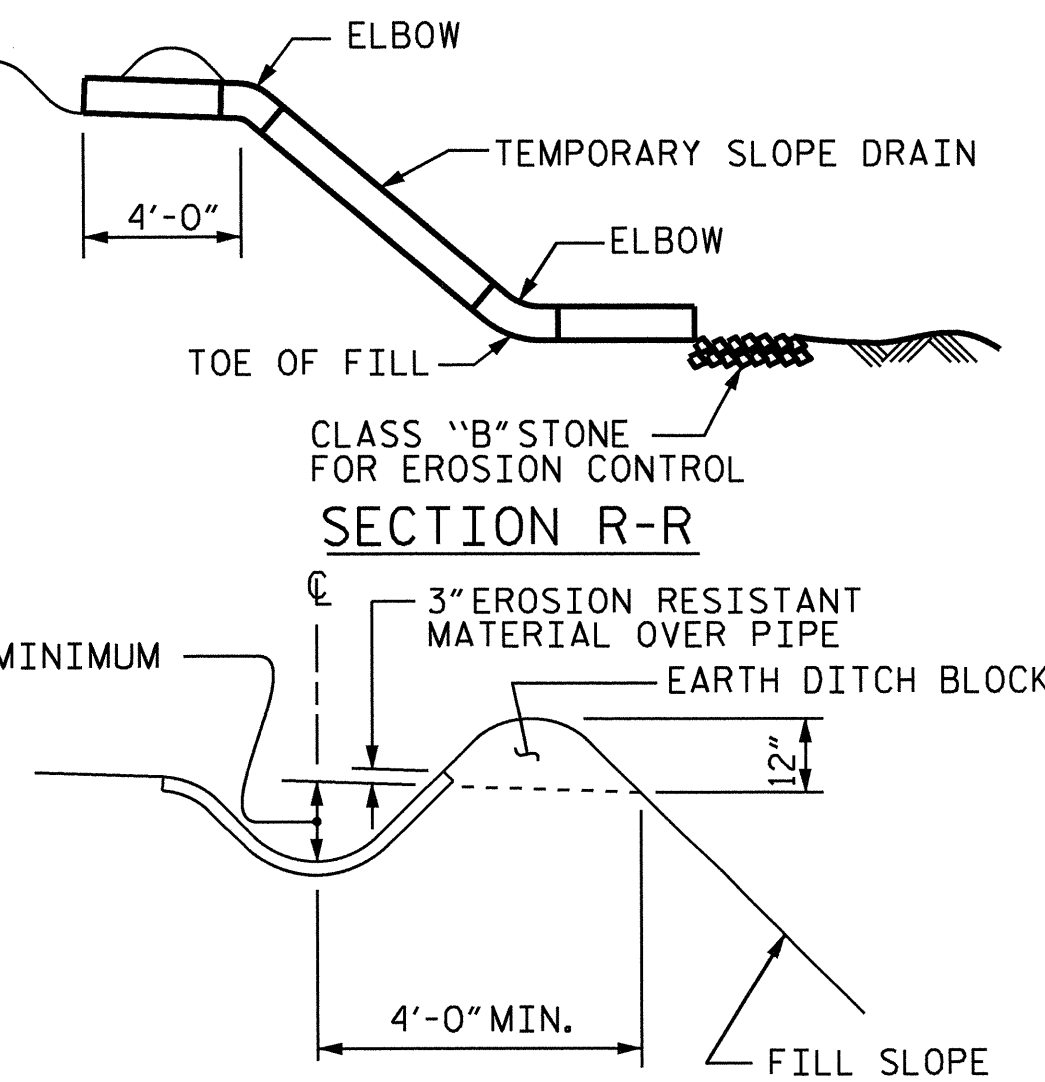


END OF RAIL DETAILS

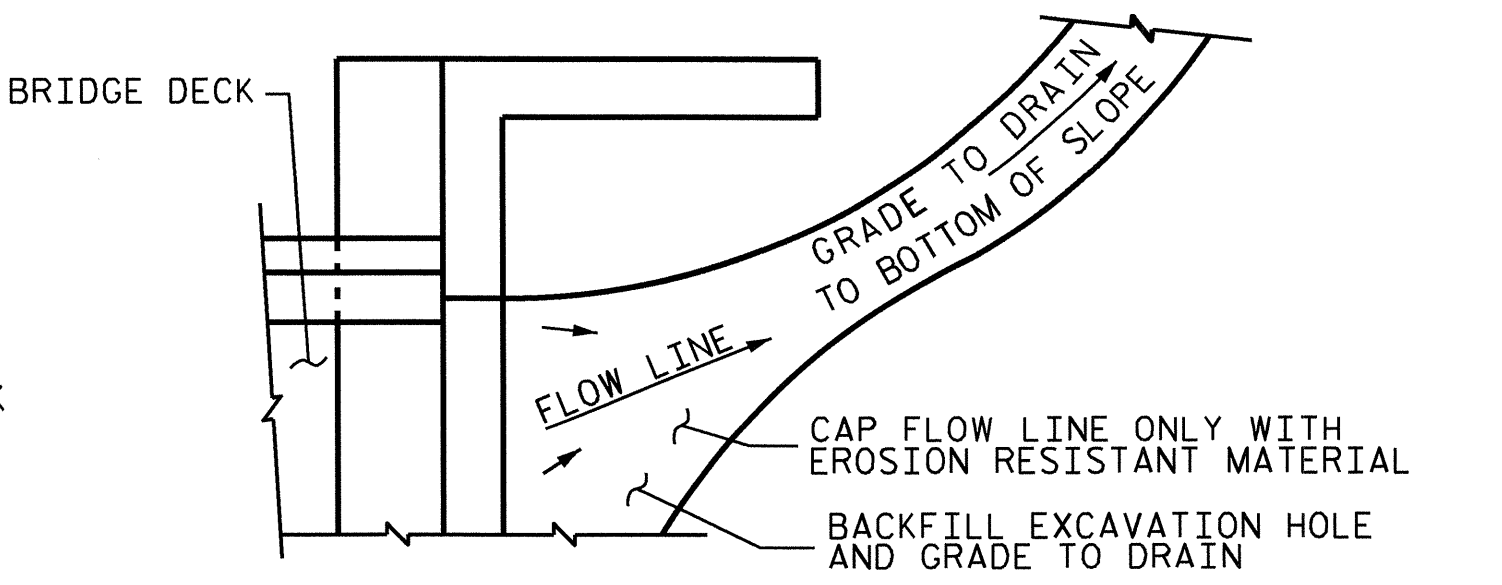
SECTION THRU RAIL



PLAN VIEW



SECTION R-R



SECTION S-S

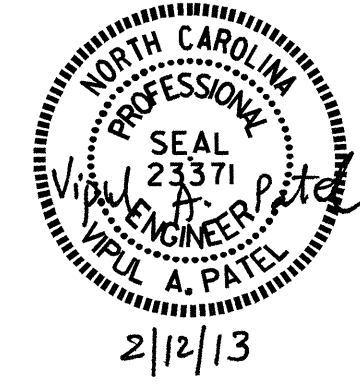
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT 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)

ASSEMBLED BY : J. G. KHARVA	DATE : 10/4/12
CHECKED BY : R. L. CHESSON	DATE : 11/12
DESIGN ENGINEER	
OF RECORD : H.A. LOCKLEAR	DATE : 7/2012
DRAWN BY : FCJ 11/88	REV. 10/11/11 MAA/GM
CHECKED BY : ARB 11/88	REV. 7/12 MAA/GM
	REV. 10/12 MAA/GM



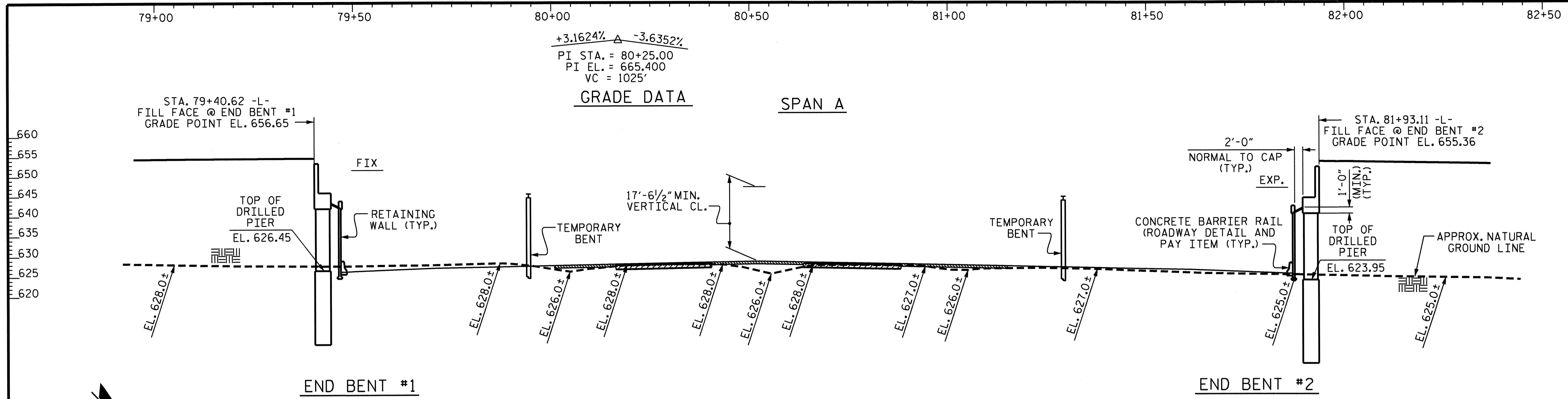
PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 BRIDGE APPROACH
 SLAB DETAILS
 (LEFT LANE)

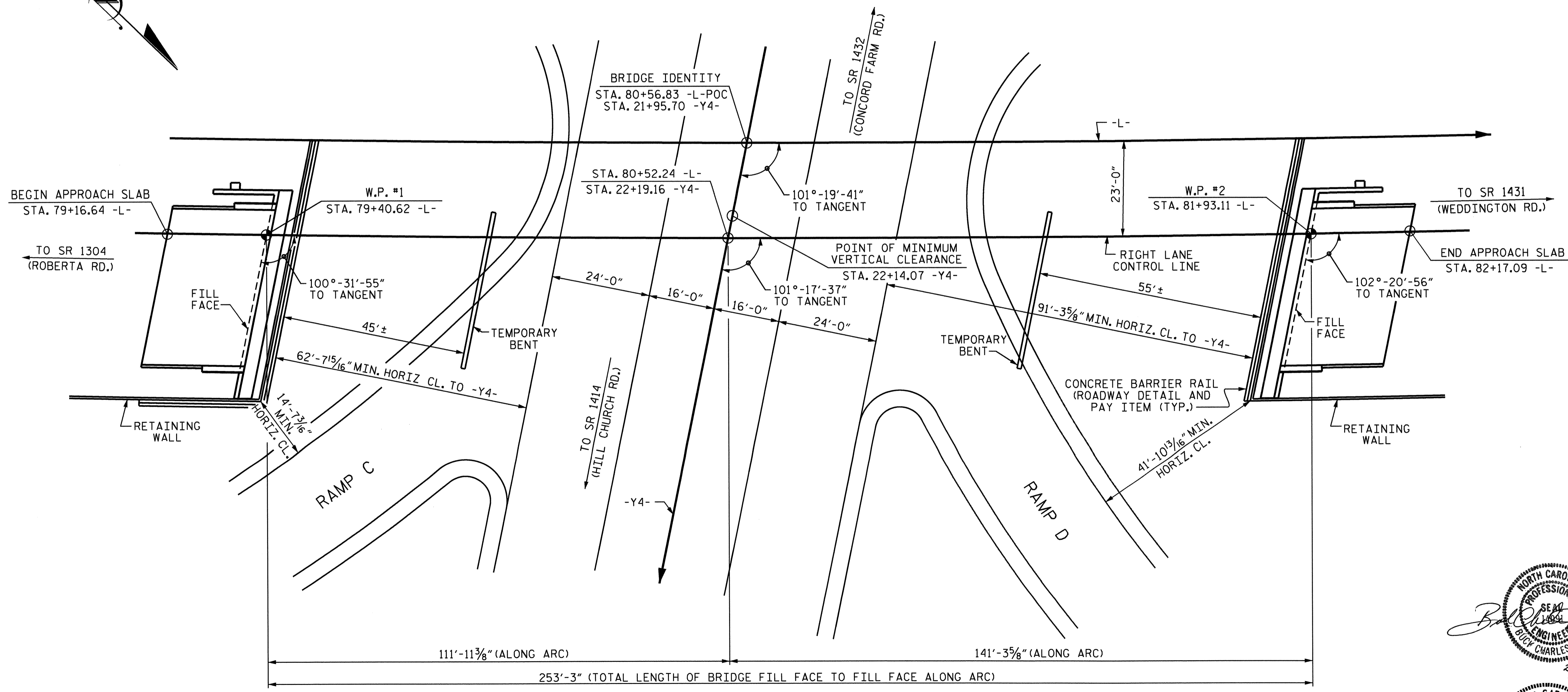
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			56



SECTION ALONG RIGHT LANE CONTROL LINE
SECTION TAKEN AT RIGHT ANGLES TO END BENTS

HORIZONTAL CURVE DATA

PI STA. = 71+90.40 -L-
 $\Delta = 32^\circ - 43' - 41.7''$ (LT)
 $D = 0^\circ - 44' - 56.3''$
 $L = 4,369.80'$
 $T = 2,246.31'$
 $R = 7,650.00'$



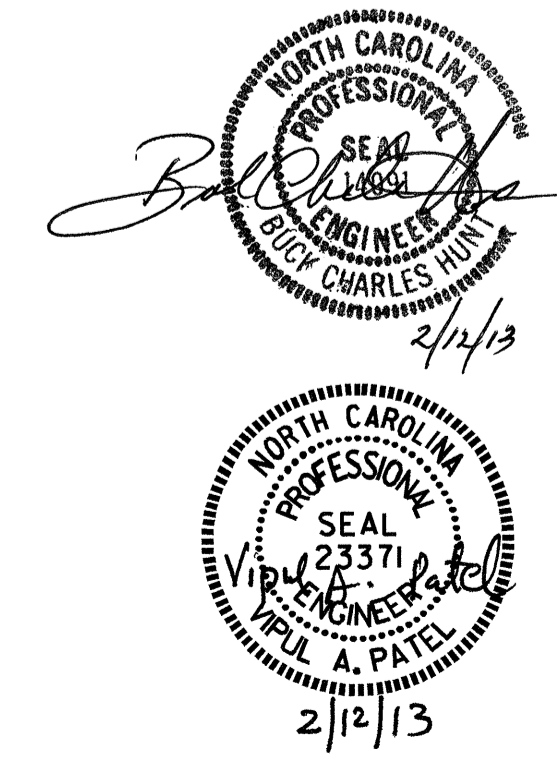
PLAN

DRILLED PIERS AT END BENTS NOT SHOWN FOR CLARITY

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-
21+95.70 -Y4-

SHEET 1 OF 3 BRIDGE NO. 389

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON SR 1430
 (GEORGE LILES PARKWAY)
 OVER US 29 BETWEEN
 SR 1304 AND SR 1431
 (RIGHT LANE)



DRAWN BY : KEITH D. LAYNE DATE : 10-30-12
 CHECKED BY : J. P. ADAMS DATE : 11/29/12
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 7-12

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29	
1			3			TOTAL SHEETS 56	
2			4				

FOUNDATION NOTES

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT END BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 895.0 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 80.0 TSF.

INSTALL DRILLED PIERS AT END BENT NO.1 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 607.95 FT. (LT), 610.45 FT. (CT), AND 612.95 FT. (RT) SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 8 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 895.0 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 80.0 TSF.

INSTALL DRILLED PIERS AT END BENT NO.2 THAT EXTEND TO AN ELEVATION NO HIGHER THAN 602.95 FT. SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 8 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

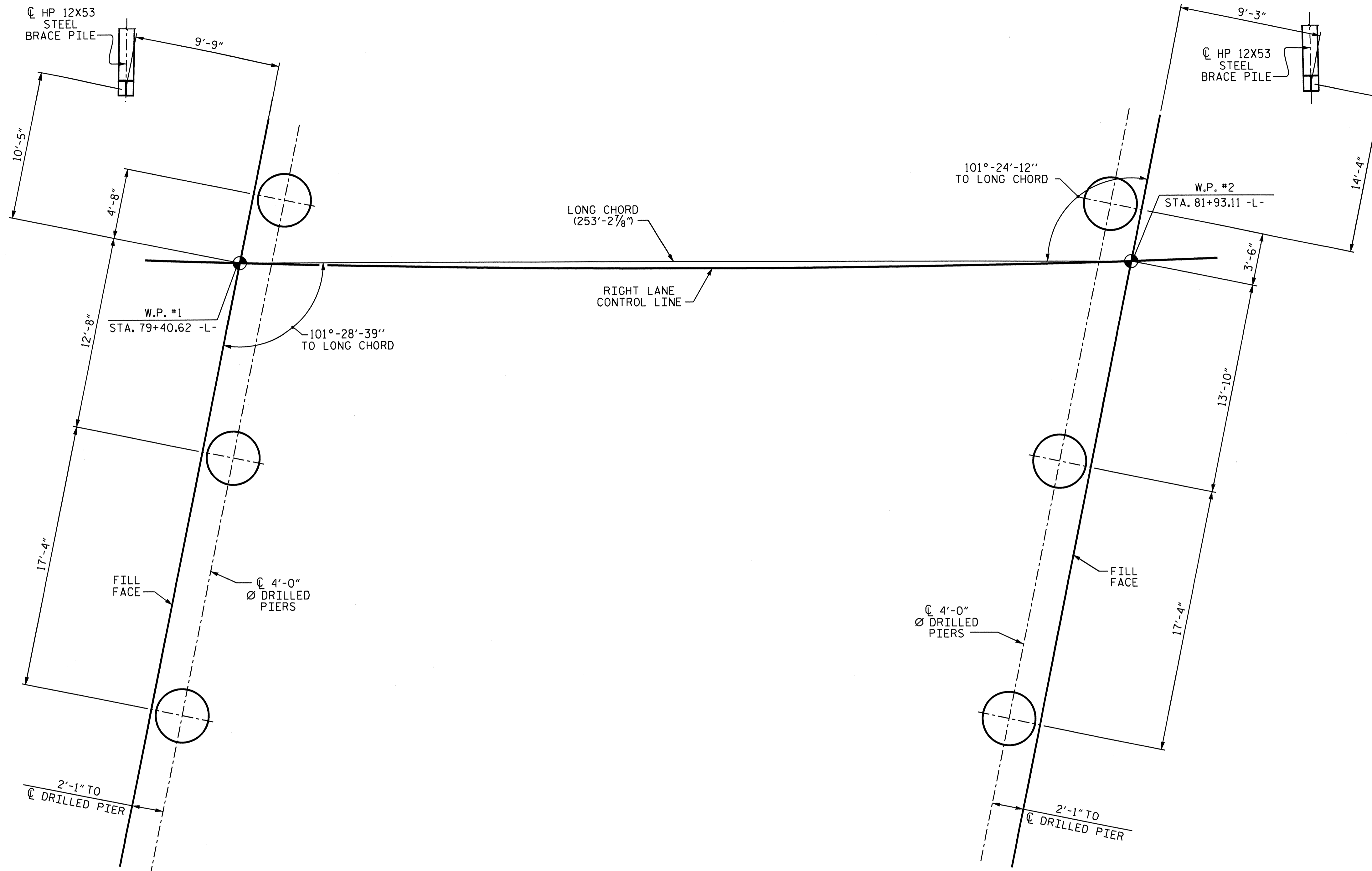
CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SPT MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SPT. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT WING WALL ARE DESIGNED FOR A FACTORED RESISTANCE OF 50 TONS PER PILE.

DRIVE PILES AT WING WALL TO A DRIVING RESISTANCE OF 84 TONS PER PILE.



END BENT #1

END BENT #2

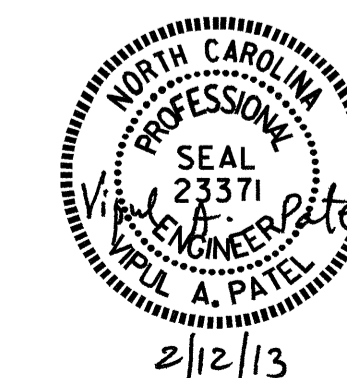
FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE TO THE CENTERLINE OF PILE.
 DIMENSIONS LOCATING DRILLED PIERS ARE TO THE CENTERLINE OF PIER.
 ALL END BENT BRACE PILES ARE BATTERED 3:12.
 ALL PILES ARE HP12X53.

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 2 OF 3

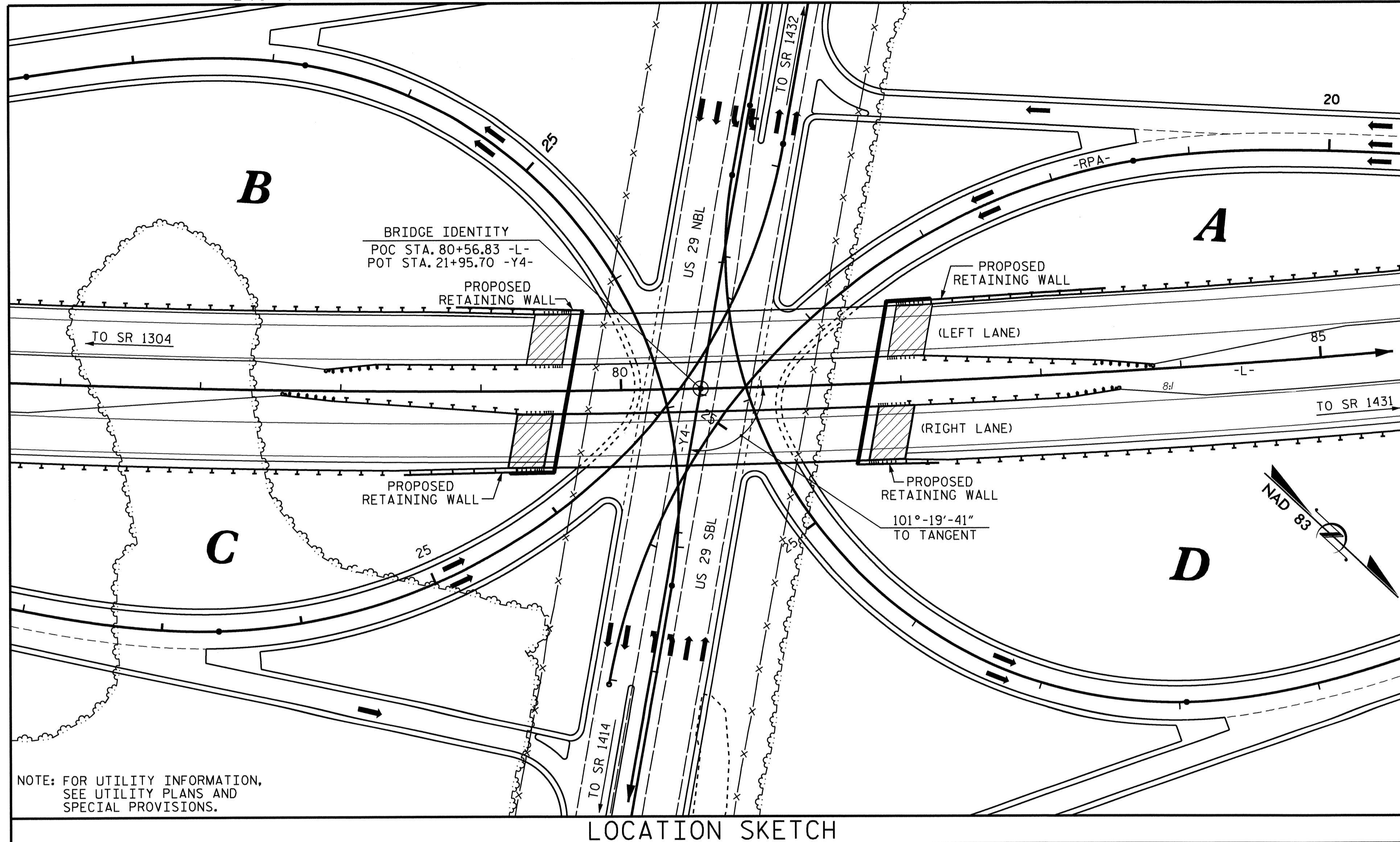
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 FOR BRIDGE ON SR 1430
 (GEORGE LILES PARKWAY)
 OVER US 29 BETWEEN
 SR 1304 AND SR 1431
 (RIGHT LANE)



DRAWN BY : KEITH D. LAYNE DATE : 10-30-12
 CHECKED BY : J. P. ADAMS DATE : 11-29-12
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 7-12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			56

BM. #8 RAILROAD SPIKE SET IN BASE OF 14" ASH 250' LT. OF STA. 87+39 -L- EL. 618.91



LOCATION SKETCH

GIRDER ERECTION SEQUENCE

THE STRUCTURAL STEEL SHALL BE SUPPORTED DURING ERECTION IN ITS CAMBERED POSITION, ONE EXTERIOR GIRDER AND ITS ADJACENT INTERIOR GIRDER SHALL BE ERECTED WITH ALL DIAPHRAGMS AND LATERAL BRACING BETWEEN THE GIRDERS IN PLACE AND ALL BOLTS TIGHTENED PRIOR TO RELEASE OF THE GIRDERS. THE REMAINING GIRDERS SHALL THEN BE ERECTED WITH DIAPHRAGMS CONNECTING THE GIRDER TO THE ADJACENT ERECTED GIRDER AND ALL BOLTS TIGHTENED BEFORE RELEASING THE GIRDER.

A MINIMUM OF TWO TEMPORARY BENTS SHALL BE USED.

TEMPORARY BENTS SHALL REMAIN IN PLACE UNTIL ALL CROSS FRAMES AND LATERAL BRACING ARE IN PLACE AND HIGH STRENGTH BOLTS TIGHTENED.

THE LOCATION OF THE TEMPORARY BENTS SHOWN ON SHEET 1 ARE APPROXIMATE LOCATIONS AND SHALL BE ADJUSTED BY THE CONTRACTOR AS NECESSARY.

PLANS FOR TEMPORARY BENTS, ERECTION SEQUENCE AND TEMPORARY BENT REMOVAL SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

TEMPORARY BENTS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF NORTH CAROLINA.

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 ERECTION BENTS AND MAINTAIN PLUMBNESS OF THE GIRDER WEBS.

THE CONTRACTOR'S ERECTION PLAN SHALL INCLUDE A METHOD OF TEMPORARY BENT REMOVAL THAT WILL UNIFORMLY APPLY THE STRUCTURAL STEEL WEIGHT TO THE BRIDGE CROSS FRAMES.

GIRDERS SHALL BE ERECTED AS FOLLOWS: THE FIRST GIRDER SECTION FROM END BENT 1 TO TEMPORARY BENT 1 SHALL BE SET. THE NEXT SECTION OF GIRDER SHALL BE SET FROM THE FIRST GIRDER SECTION TO TEMPORARY BENT 2. THE LAST GIRDER SECTION SHALL BE SET FROM GIRDER SECTION 2 TO END BENT 2. THE CONTRACTOR MAY SUBMIT ALTERNATE ERECTION METHODS. PLANS FOR SUCH ERECTION METHODS SHALL BE APPROVED BY THE ENGINEER.

FOR TEMPORARY BENTS, SEE SPECIAL PROVISIONS

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, 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.

THE ELEVATION(S) AND CLEARANCE(S) SHOWN ON THE PLANS AT THE POINT(S) OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION(S) ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, 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.

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

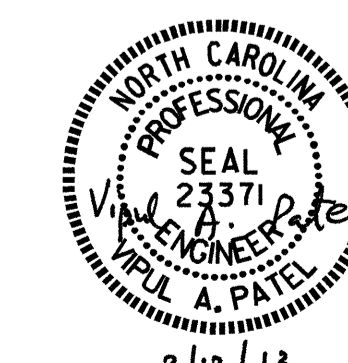
FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	4'-0" DRILLED PIERS IN SOIL	4'-0" DRILLED PIERS NOT IN SOIL	SID INSPECTIONS	SPT TESTING	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	APPROXIMATE STRUCTURAL STEEL	HP12x53 STEEL PILES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	EXPANSION JOINT SEALS	DISC BEARINGS	
	LIN. FT.	LIN. FT.	EACH	EACH	EACH	SO. FT.	SO. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	LBS.	NO.	LIN. FT.	LIN. FT.	SO. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE						10,356	10,415					788,500		542.10			LUMP SUM	LUMP SUM
END BENT 1	6	42						78.7		20,993	2,451		1	25		60		
END BENT 2	12	51						80.9		22,866	2,903		1	25		60		
TOTAL	18	93	1	1	1	10,356	10,415	159.6	LUMP SUM	43,859	5,354	788,500	2	50	120	LUMP SUM	LUMP SUM	

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 FOR BRIDGE ON SR 1430
 (GEORGE LILES PARKWAY)
 OVER US 29 BETWEEN
 SR 1304 AND SR 1431
 (RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			56

DRAWN BY: KEITH D. LAYNE DATE: 10-30-12
 CHECKED BY: J. P. ADAMS DATE: 11/29/12
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE: 7-12

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{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					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ_{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 (γ_{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	1.00	--	1.75	0.776	1.00	A	ER	123.90	0.868	1.15	A	I	24.78	1.30	0.776	1.11	A	ER	123.90		
	HL-93 (OPERATING)	N/A		1.30	--	1.35	0.776	1.30	A	ER	123.90	0.868	1.49	A	I	24.78	1.00	0.776	1.44	A	ER	123.90		
	HS-20 (INVENTORY)	36.00	②	1.89	68.04	1.75	0.776	1.89	A	ER	123.90	0.868	2.04	A	I	24.78	1.30	0.776	2.09	A	ER	123.90		
	HS-20 (OPERATING)	36.00		2.46	88.56	1.35	0.776	2.46	A	ER	123.90	0.868	2.64	A	I	24.78	1.00	0.776	2.72	A	ER	123.90		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		5.33	71.96	1.40	0.776	6.04	A	ER	123.90	0.868	6.59	A	I	24.78	1.30	0.776	5.33	A	ER	123.90	
		SNGARBS2	20.000		3.70	74.00	1.40	0.776	4.18	A	ER	123.90	0.868	4.52	A	I	24.78	1.30	0.776	3.70	A	ER	123.90	
		SNAGRIS2	22.000		3.40	74.80	1.40	0.776	3.85	A	ER	123.90	0.868	4.13	A	I	24.78	1.30	0.776	3.40	A	ER	123.90	
		SNCOTTS3	27.250		2.65	72.21	1.40	0.776	3.00	A	ER	123.90	0.868	3.27	A	I	24.78	1.30	0.776	2.65	A	ER	123.90	
		SNAGGRS4	34.925		2.10	73.34	1.40	0.776	2.38	A	ER	123.90	0.868	2.60	A	I	24.78	1.30	0.776	2.10	A	ER	123.90	
		SNS5A	35.550		2.06	73.23	1.40	0.776	2.33	A	ER	123.90	0.868	2.57	A	I	24.78	1.30	0.776	2.06	A	ER	123.90	
		SNS6A	39.950		1.85	73.91	1.40	0.776	2.10	A	ER	123.90	0.868	2.31	A	I	24.78	1.30	0.776	1.85	A	ER	123.90	
	SNS7B	42.000		1.76	73.92	1.40	0.776	1.99	A	ER	123.90	0.868	2.22	A	I	24.78	1.30	0.776	1.76	A	ER	123.90		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.25	74.25	1.40	0.776	2.55	A	ER	123.90	0.868	2.77	A	I	24.78	1.30	0.776	2.25	A	ER	123.90	
		TNT4A	33.075		2.24	74.09	1.40	0.776	2.53	A	ER	123.90	0.868	2.75	A	I	24.78	1.30	0.776	2.24	A	ER	123.90	
		TNT6A	41.600		1.80	74.88	1.40	0.776	2.04	A	ER	123.90	0.868	2.26	A	I	24.78	1.30	0.776	1.80	A	ER	123.90	
		TNT7A	42.000		1.79	75.18	1.40	0.776	2.03	A	ER	123.90	0.868	2.24	A	I	24.78	1.30	0.776	1.79	A	ER	123.90	
		TNT7B	42.000		1.80	75.60	1.40	0.776	2.04	A	ER	123.90	0.868	2.19	A	I	24.78	1.30	0.776	1.80	A	ER	123.90	
		TNAGRIT4	43.000		1.75	75.25	1.40	0.776	1.98	A	ER	123.90	0.868	2.15	A	I	24.78	1.30	0.776	1.75	A	ER	123.90	
TNAGT5A		45.000	③	1.66	74.70	1.40	0.776	1.88	A	ER	123.90	0.868	2.06	A	I	24.78	1.30	0.776	1.66	A	ER	123.90		
TNAGT5B	45.000	③	1.66	74.70	1.40	0.776	1.88	A	ER	123.90	0.868	2.04	A	I	24.78	1.30	0.776	1.66	A	ER	123.90			
FATIGUE	HL-93 (INVENTORY)	$\gamma_{LL}=0.75$																						

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.

COMMENTS:

-
-
-
-

③ CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93) **

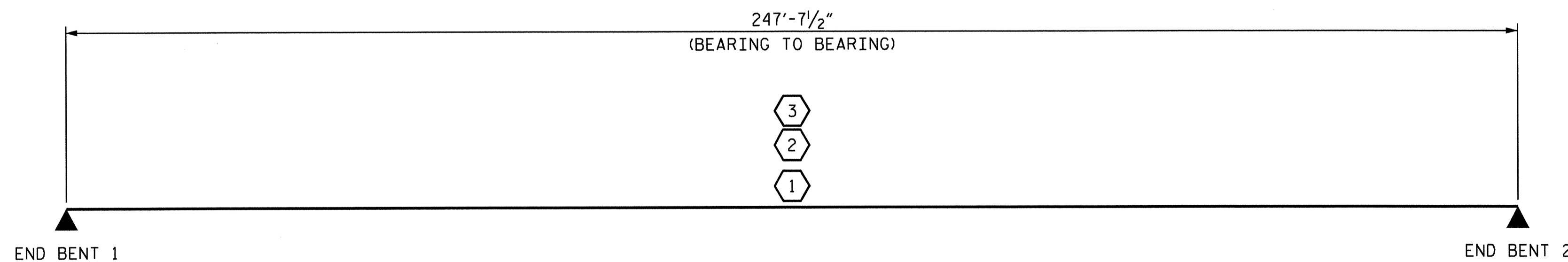
② DESIGN LOAD RATING (HS-20) **

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

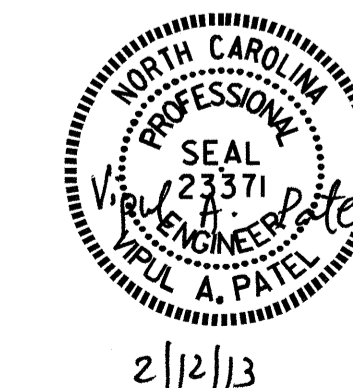
GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56+83 -L-

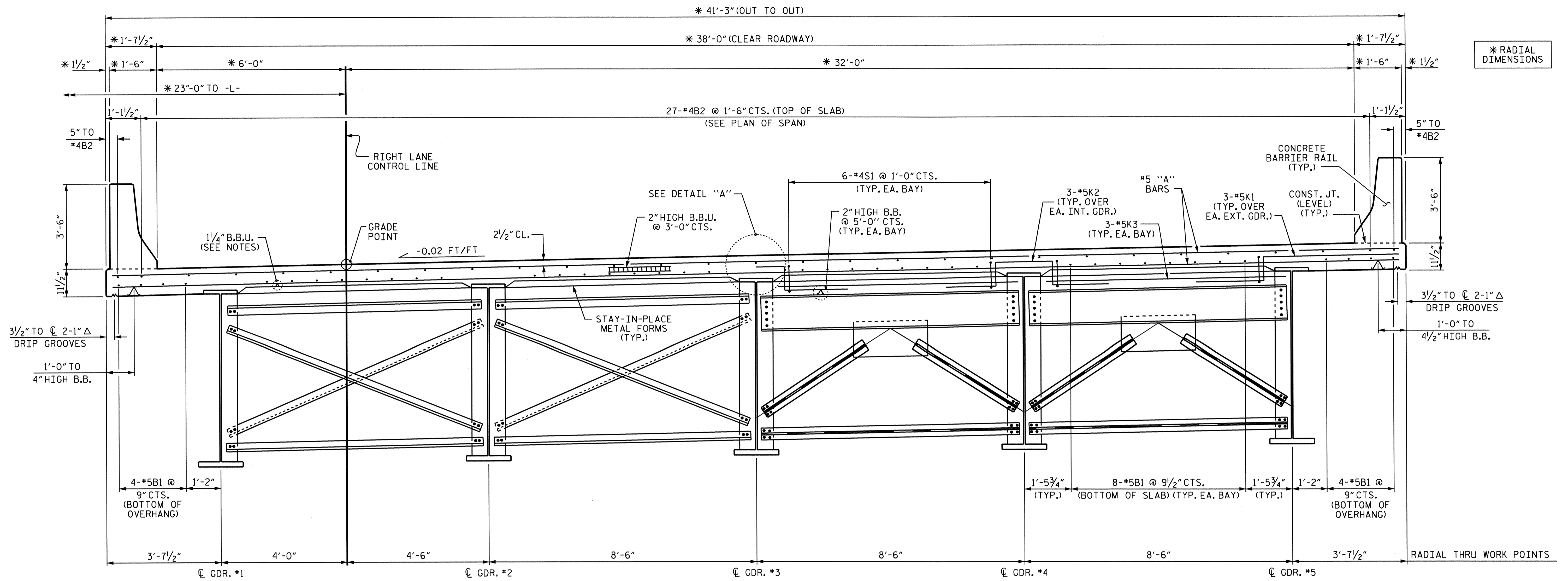


2/12/13

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 STEEL GIRDERS
 (NON-INTERSTATE TRAFFIC)
 (RIGHT LANE)

ASSEMBLED BY : H.A. LOCKLEAR	DATE : 10-11
CHECKED BY : R.L. CHESSON	DATE : 5-12
DESIGN ENGINEER OF RECORD : H.A. LOCKLEAR	DATE : 7/2012
DRAWN BY : MAA	1/08
CHECKED BY : GM/DI	2/08
REV. 11/12/08RR	MAA/GM
REV. 10/11/11	MAA/GM

REVISIONS						SHEET NO. S-32
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 56
2			4			



* RADIAL DIMENSIONS

PARTIAL SECTION SHOWING INTERMEDIATE DIAPHRAGMS

PARTIAL SECTION SHOWING END BENT DIAPHRAGMS

TYPICAL SECTION

NOTES

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

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

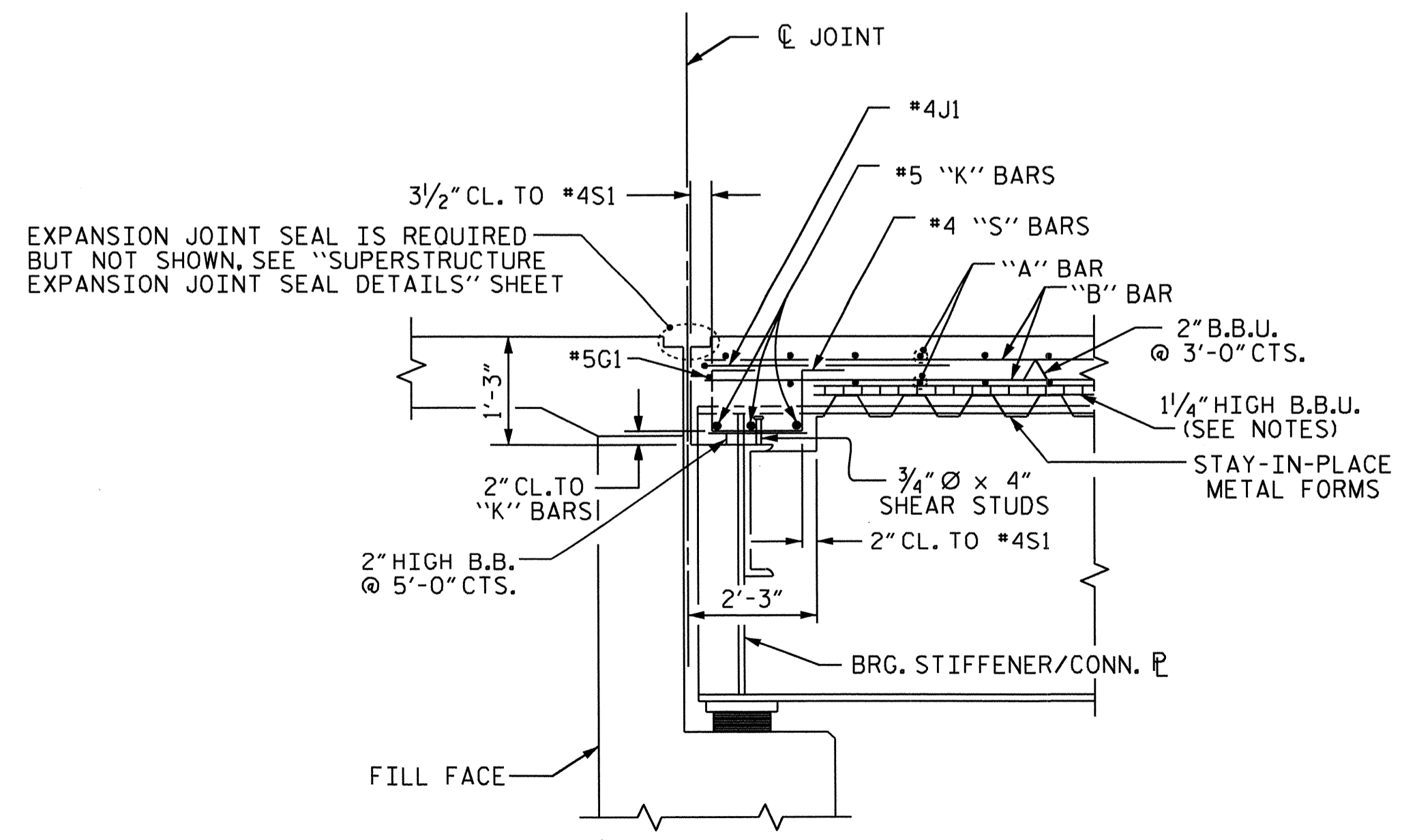
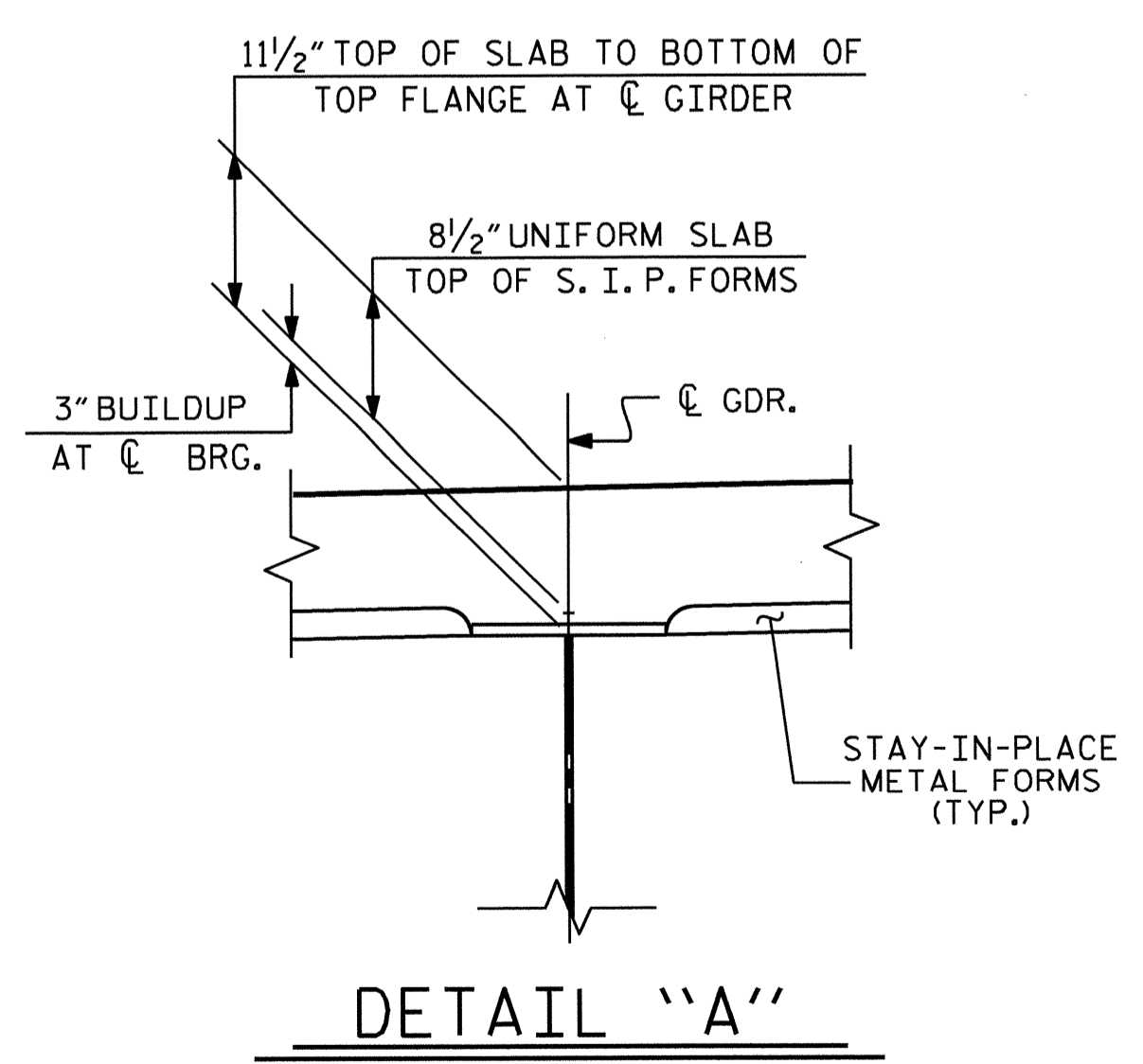
PREVIOUSLY CAST CONCRETE SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE SPAN.

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

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

THE CONTRACTOR SHALL ADJUST THE GIRDER BUILDUPS AS NECESSARY TO INCORPORATE A MAXIMUM PERMISSIBLE VARIATION IN DISC BEARING DEPTH OF 1/2". SEE SPECIAL PROVISION FOR DISC BEARINGS.

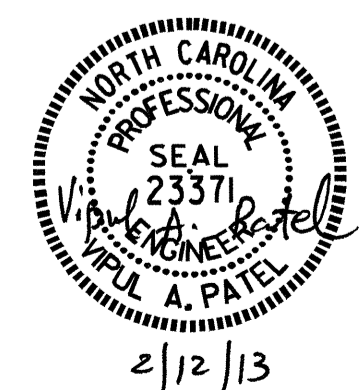
FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.



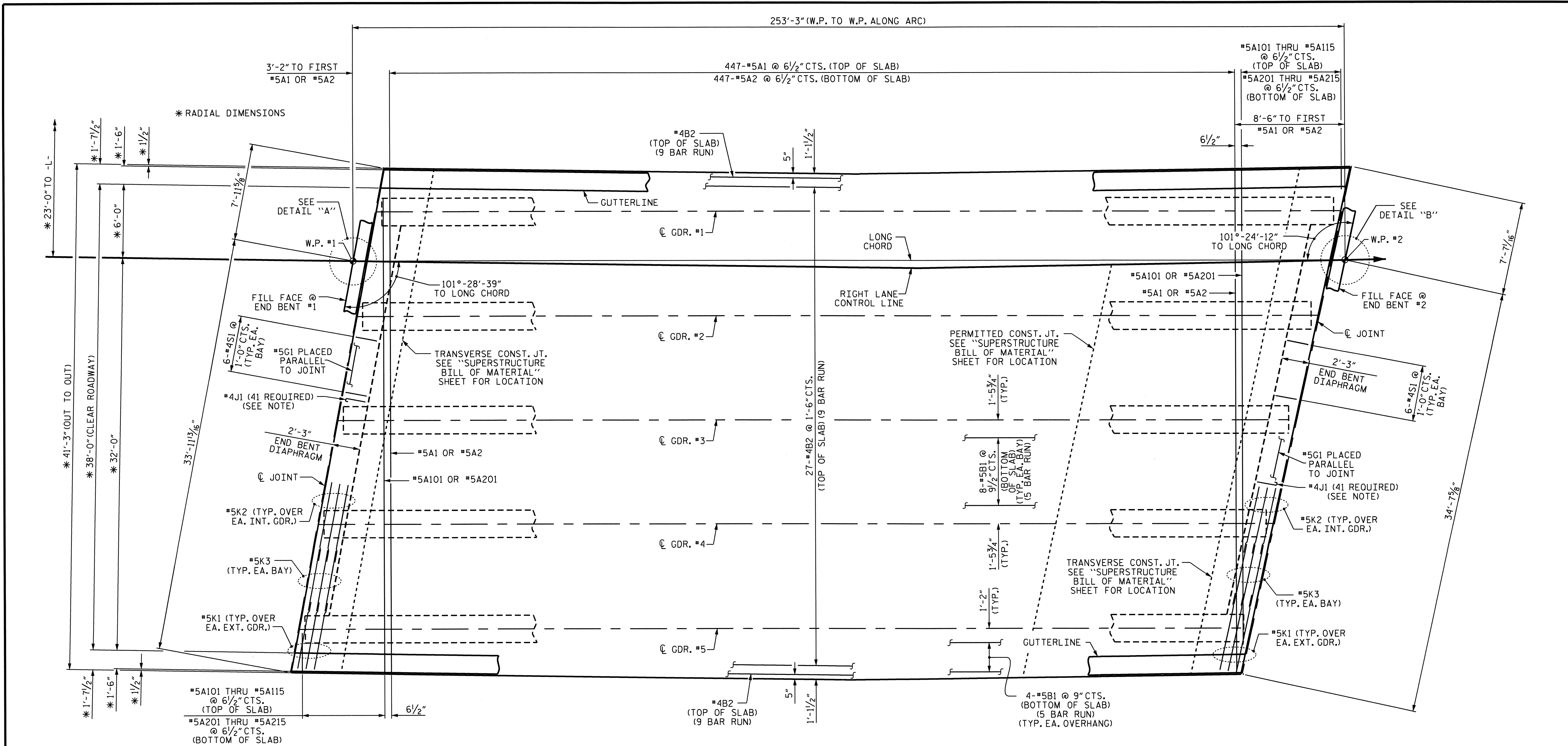
SECTION THRU END BENT DIAPHRAGM

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION (RIGHT LANE)					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 56

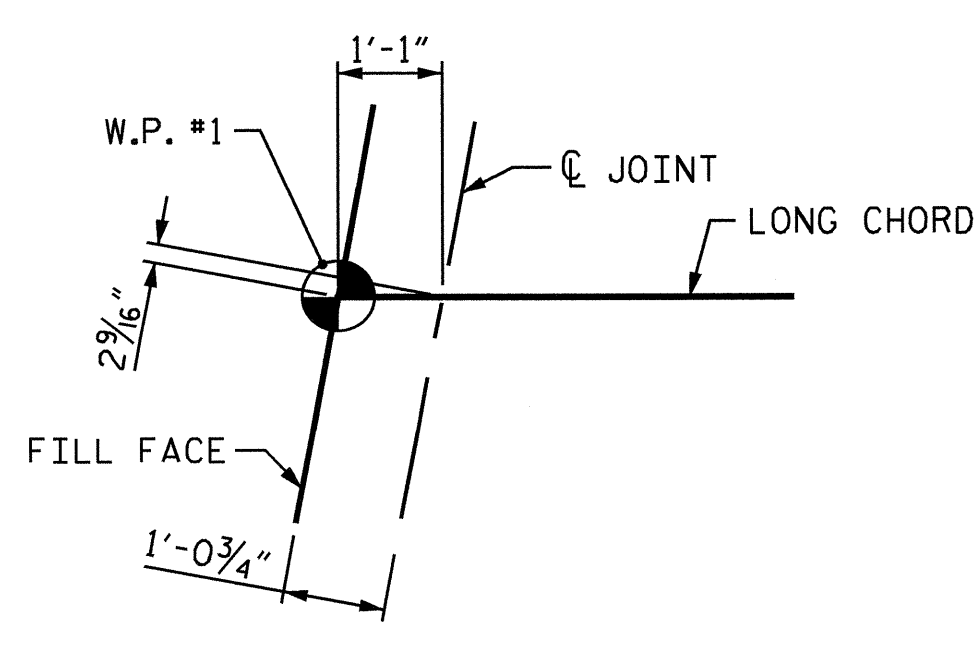


DRAWN BY: J.P. ADAMS DATE: 3/13/12
 CHECKED BY: J. KHARVA DATE: 8/2/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 07/2012

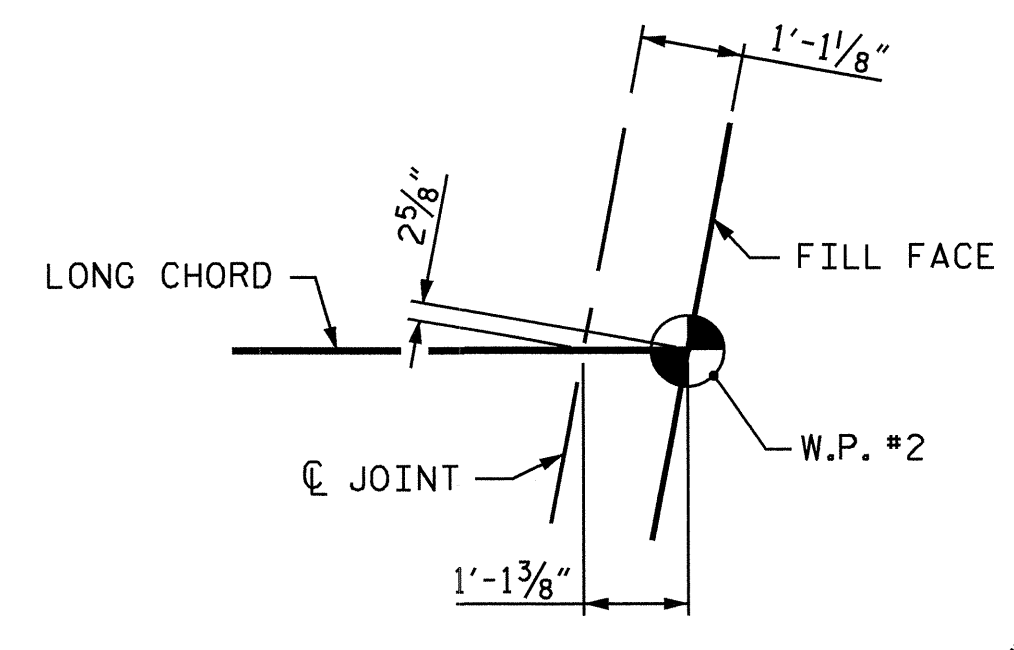


PLAN OF SPAN

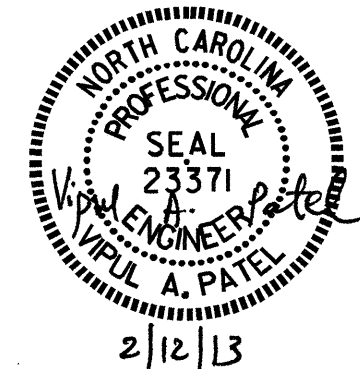
THE QUANTITY OF #4 JI BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. JI BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF JI BARS SPECIFIED, ADDITIONAL JI BARS WILL NOT BE REQUIRED.



DETAIL "A"



DETAIL "B"



PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-

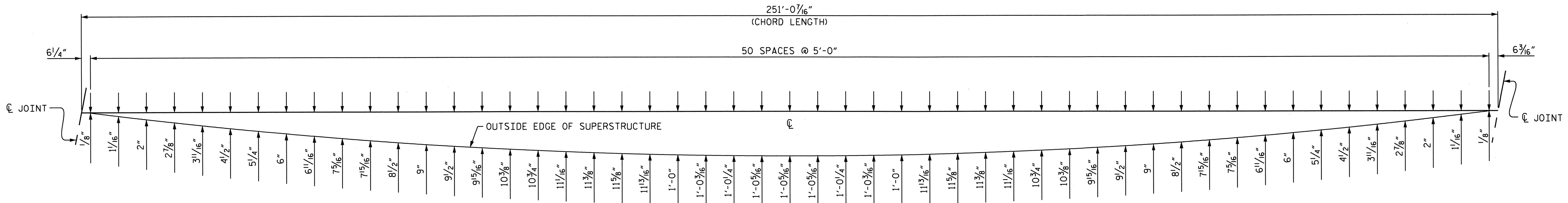
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 PLAN OF SPAN
 (RIGHT LANE)

DRAWN BY : J.P. ADAMS DATE : 7/11/12
 CHECKED BY : J. KHARVA DATE : 8/2012
 DESIGN ENGINEER OF RECORD : H.A. LOCKLEAR DATE : 8/2012

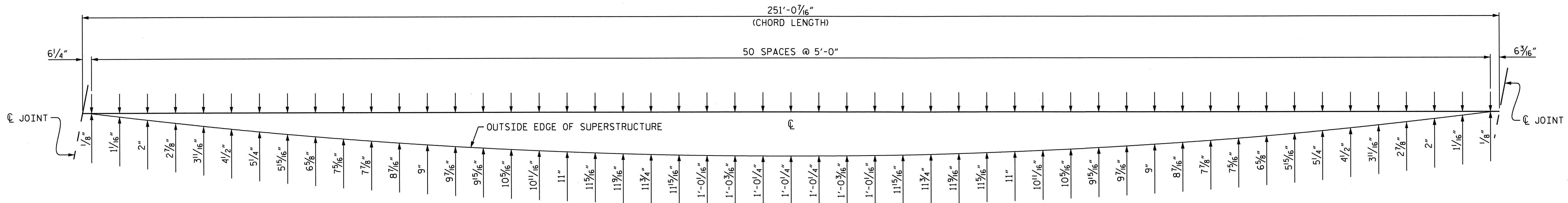
REVISIONS						SHEET NO. S-34
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 56
2			4			

12-FEB-2013 10:15
 O:\Structures\Plans\Plans Str#2 Right Lane\R2246B_SD_5*.02.dgn
 jpadams

STR. #2

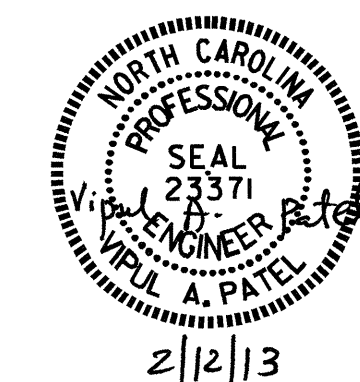


ARC OFFSETS - SPAN A - LEFT SIDE



ARC OFFSETS - SPAN A - RIGHT SIDE

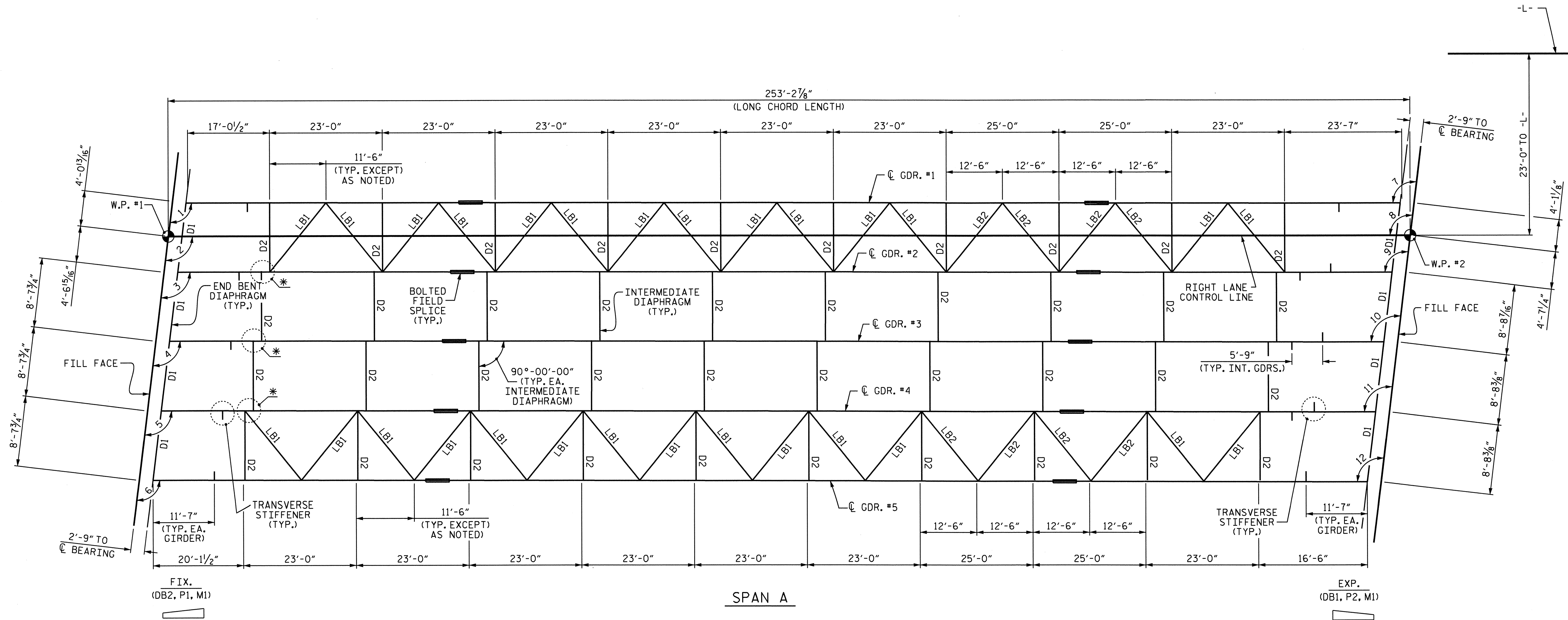
PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 ARC OFFSETS
 (RIGHT LANE)

DRAWN BY: J.P. ADAMS DATE: 3/26/12
 CHECKED BY: J. KHARVA DATE: 8/2012
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 8/2012

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35	
1			3			TOTAL SHEETS	
2			4			56	

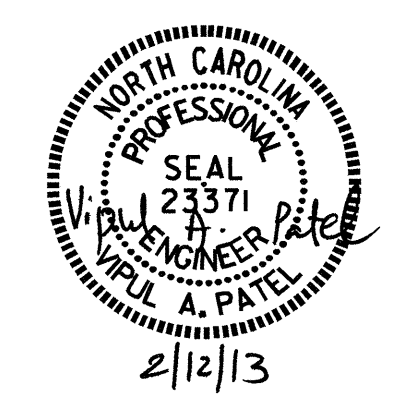


FRAMING PLAN

* TRANSVERSE STIFFENER USED AS CONNECTOR

- ANGLES -	
1	101°-29'-00"
2	101°-28'-39"
3	101°-28'-14"
4	101°-27'-28"
5	101°-26'-42"
6	101°-25'-56"
7	101°-24'-34"
8	101°-24'-12"
9	101°-23'-48"
10	101°-23'-02"
11	101°-22'-16"
12	101°-21'-30"

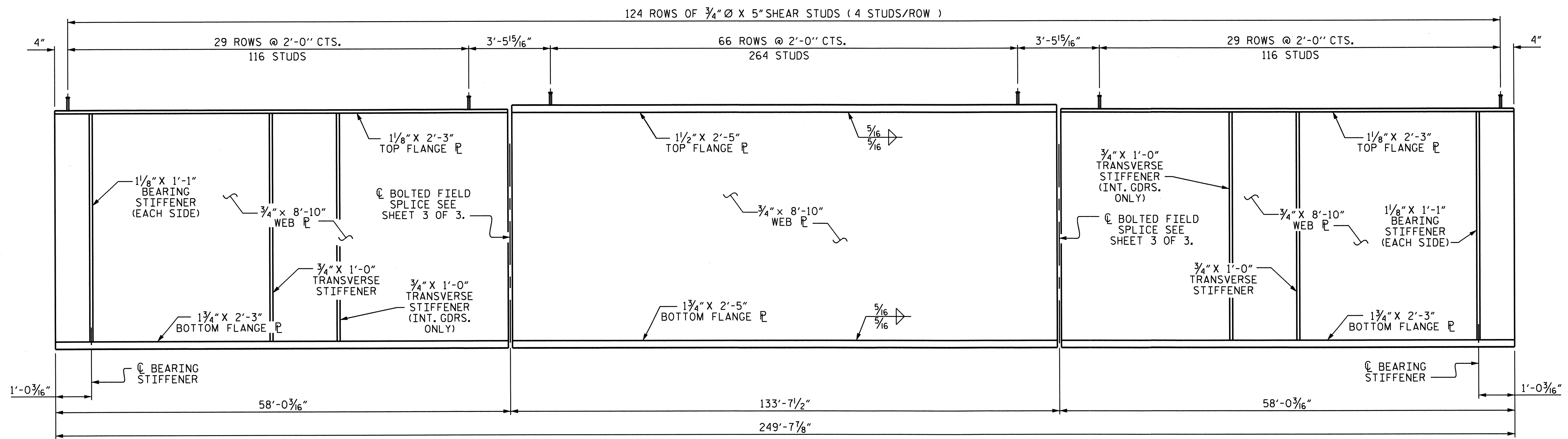
PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 FRAMING PLAN
 (RIGHT LANE)

DRAWN BY : J.P. ADAMS DATE : 3/26/12
 CHECKED BY : J. KHARVA DATE : 8/2012
 DESIGN ENGINEER OF RECORD : H.A. LOCKLEAR DATE : 8/2012

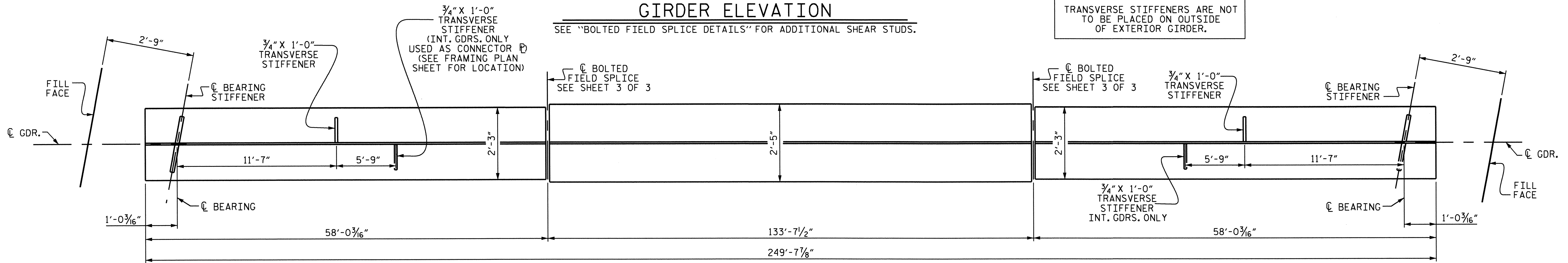
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36	
1			3			TOTAL SHEETS	
2			4			56	



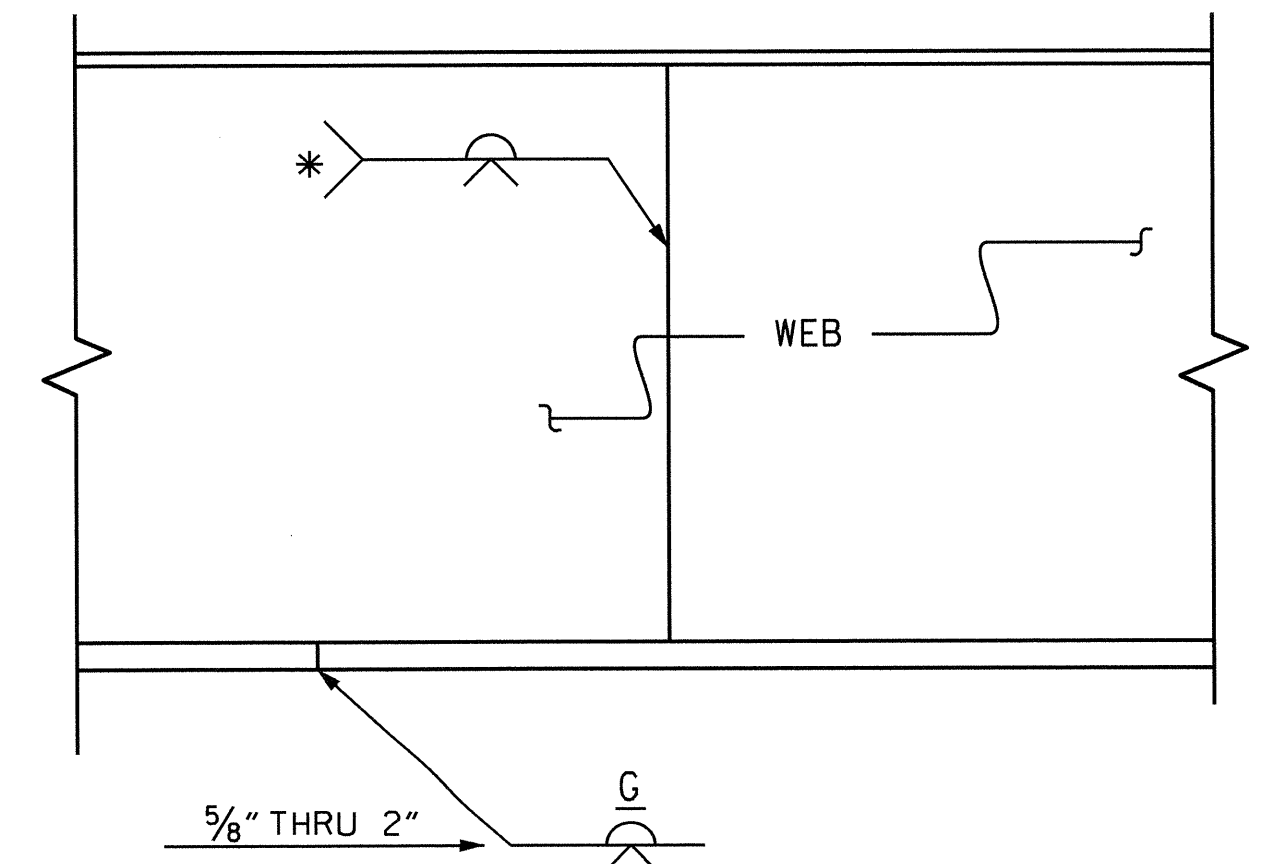
GIRDER ELEVATION

SEE "BOLTED FIELD SPLICE DETAILS" FOR ADDITIONAL SHEAR STUDS.

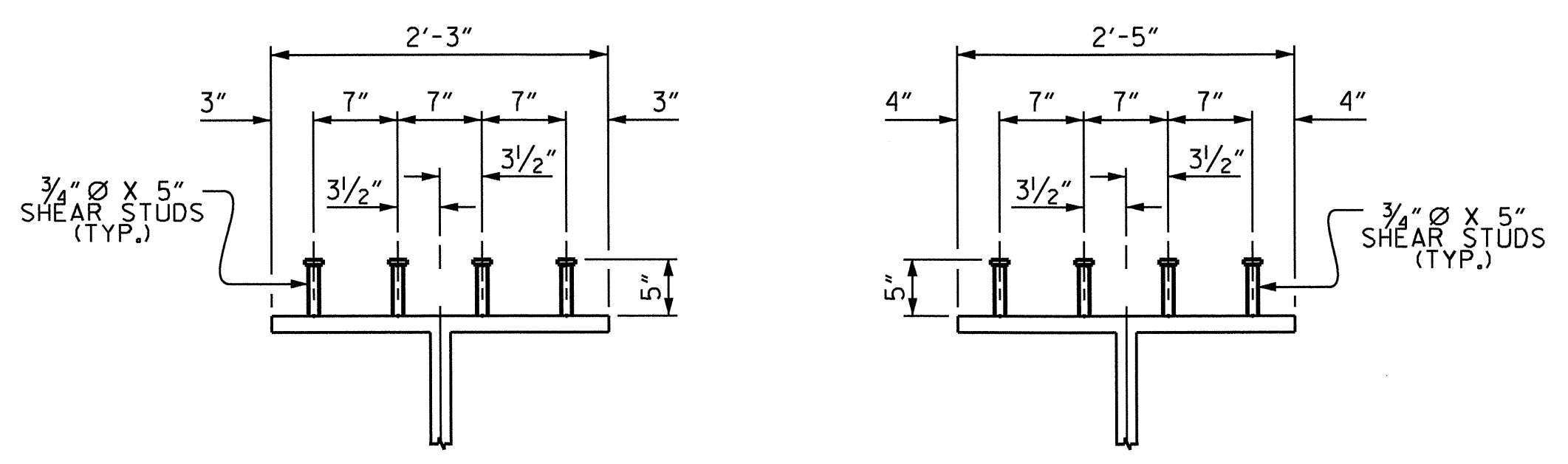
TRANSVERSE STIFFENERS ARE NOT TO BE PLACED ON OUTSIDE OF EXTERIOR GIRDER.



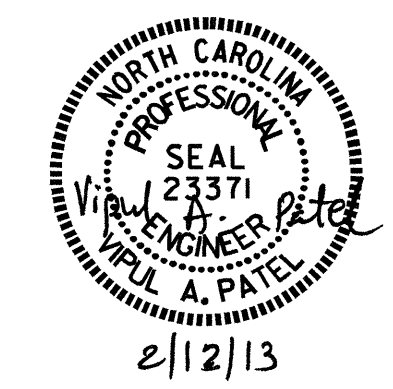
BOTTOM FLANGE DETAILS



TYPICAL FLANGE AND WEB BUTT JOINT
* GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR GIRDERS



SHEAR STUD DETAILS



PROJECT NO. R-2246B
CABARRUS COUNTY
STATION: 80+56.83 -L-

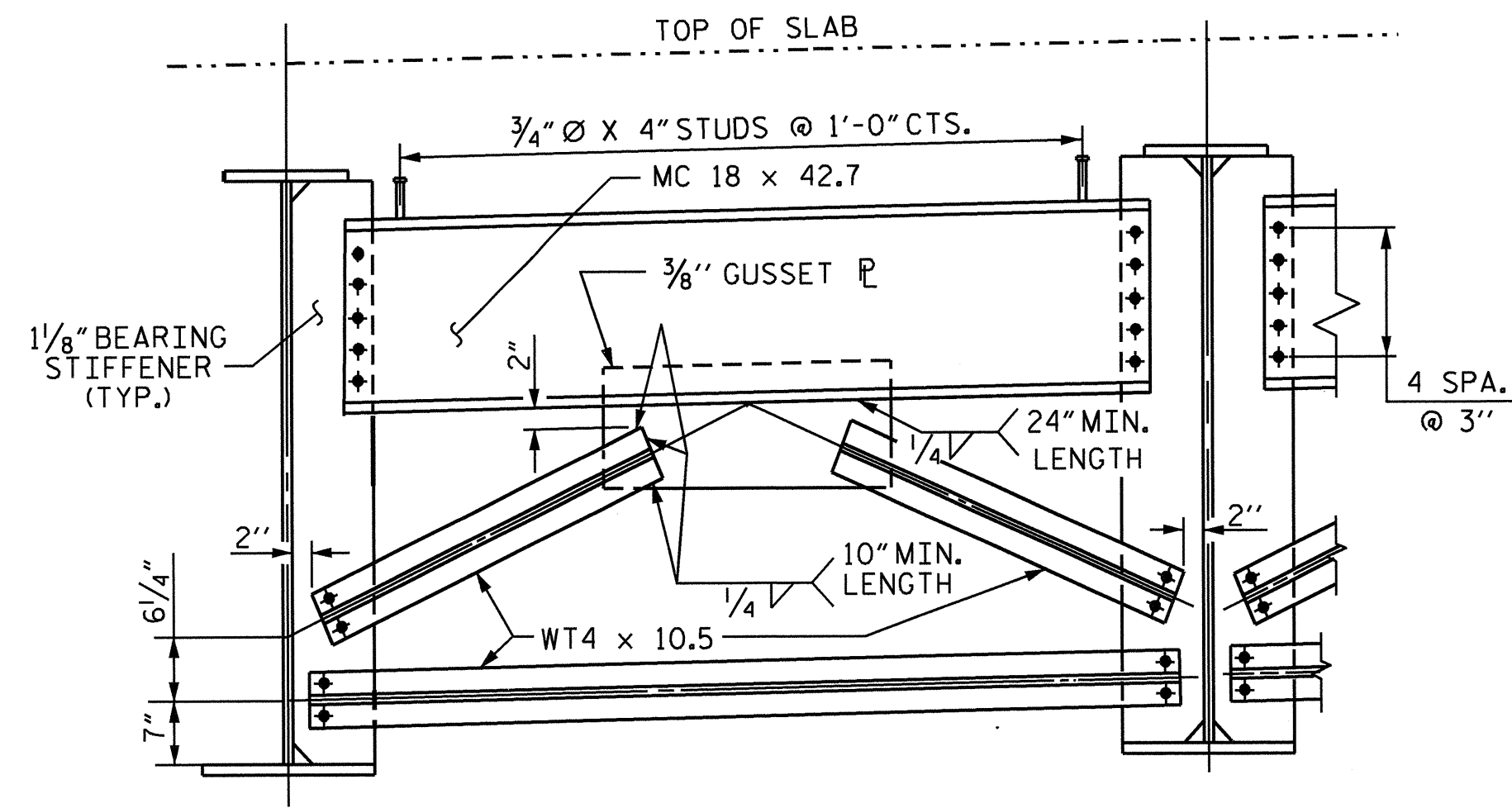
SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

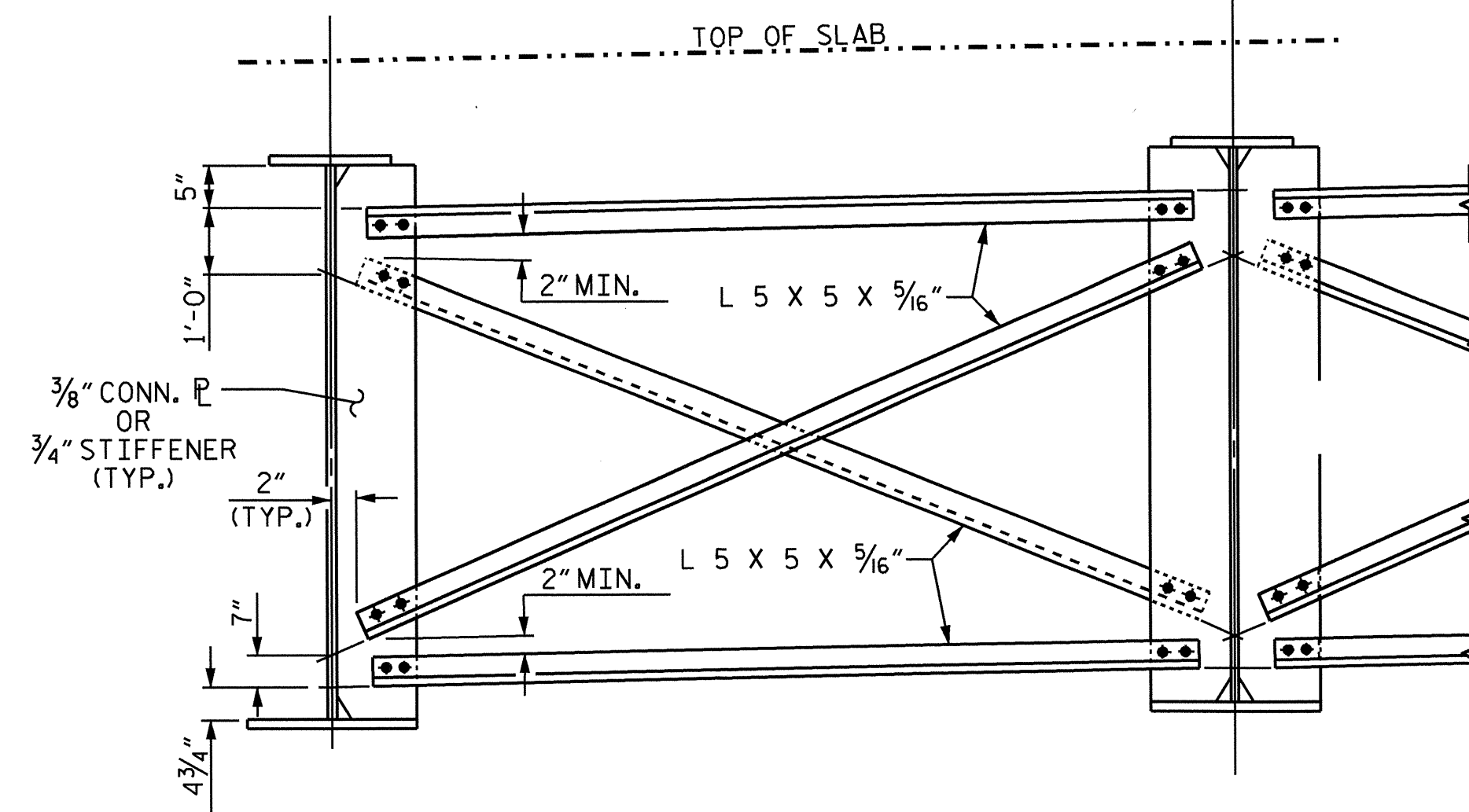
SUPERSTRUCTURE
STRUCTURAL STEEL
DETAILS
(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			56

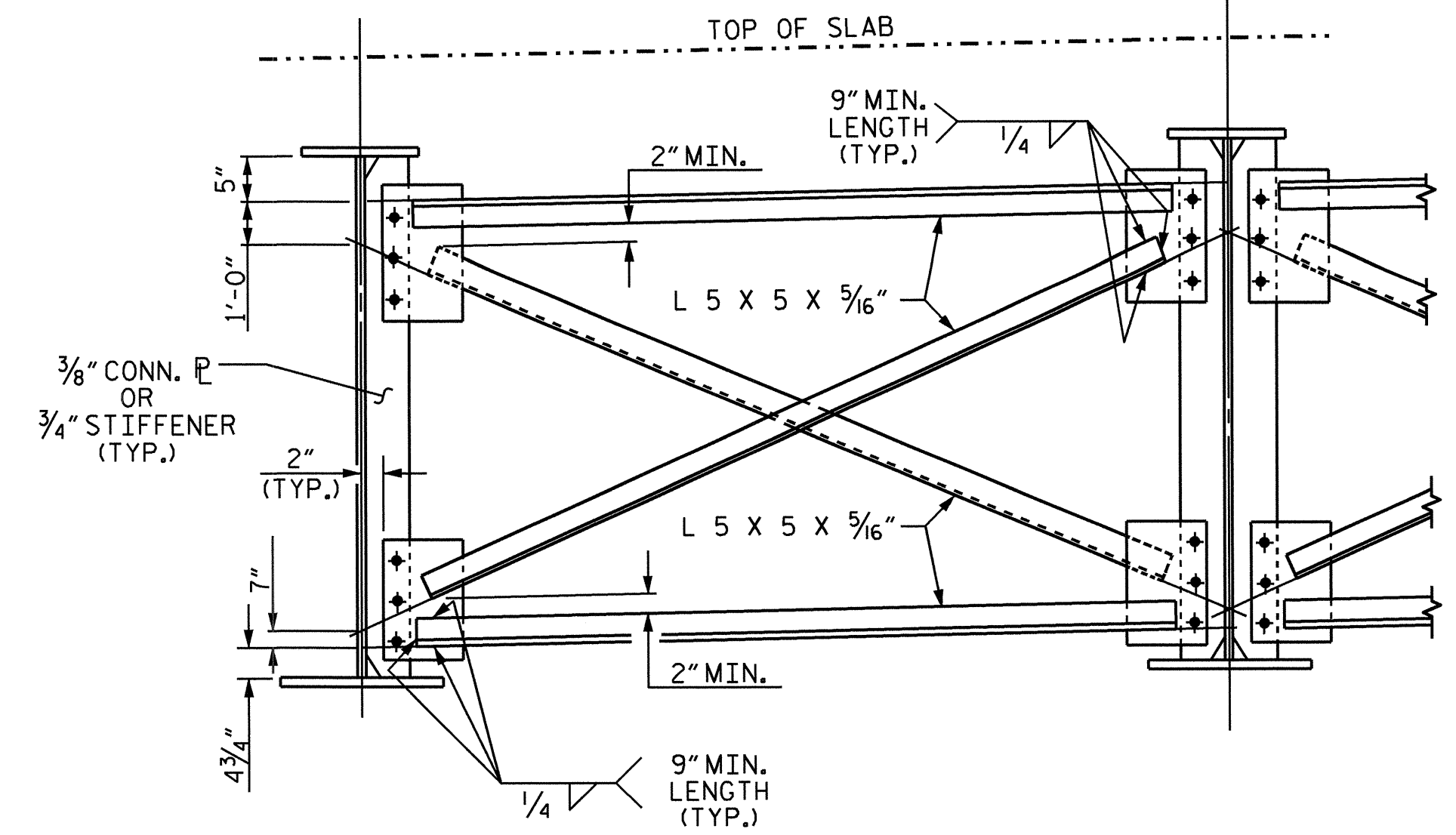
DRAWN BY : J.P. ADAMS DATE : 3/20/12
CHECKED BY : J. KHARVA DATE : 8/2/12
DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE : 7/2012



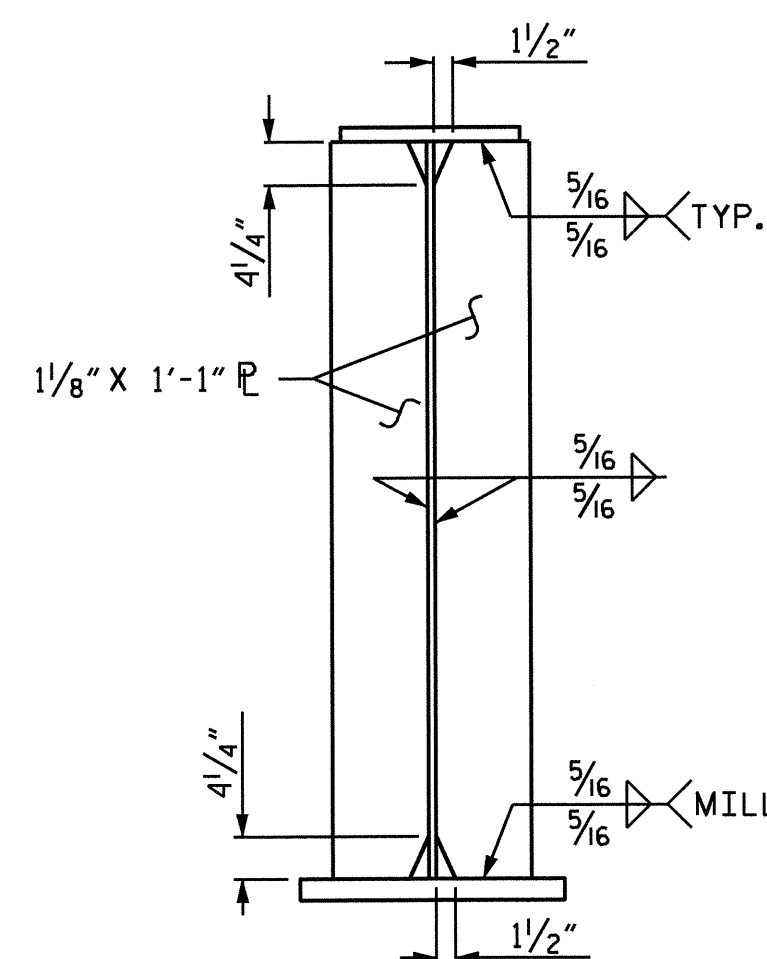
END BENT DIAPHRAGM (D1)



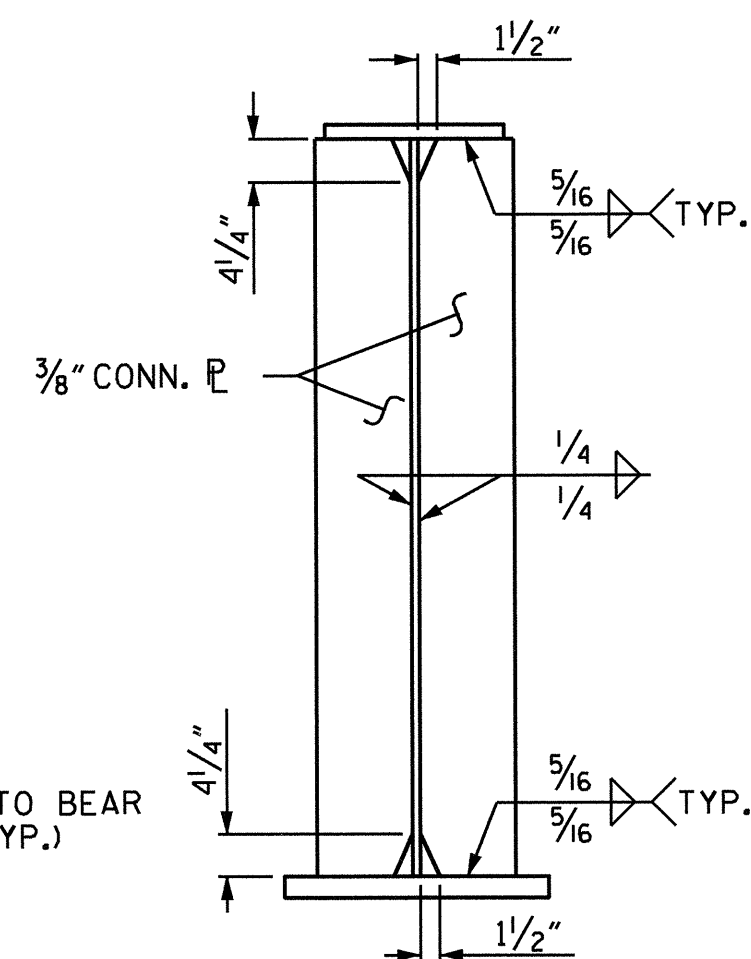
INTERMEDIATE DIAPHRAGM (D2)



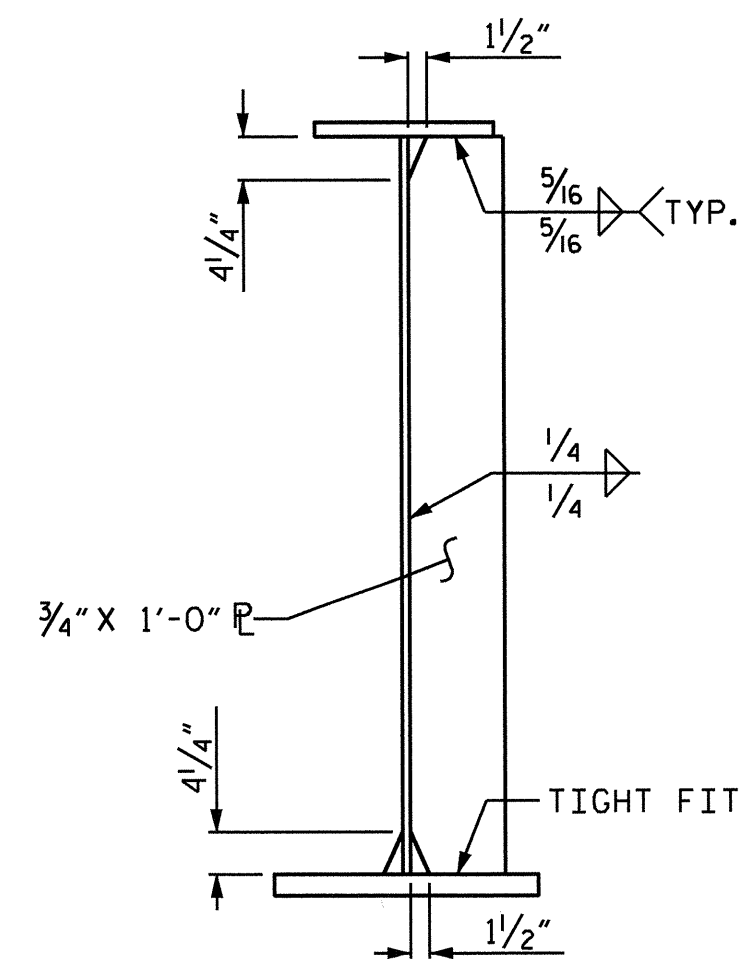
OPTIONAL INTERMEDIATE DIAPHRAGM



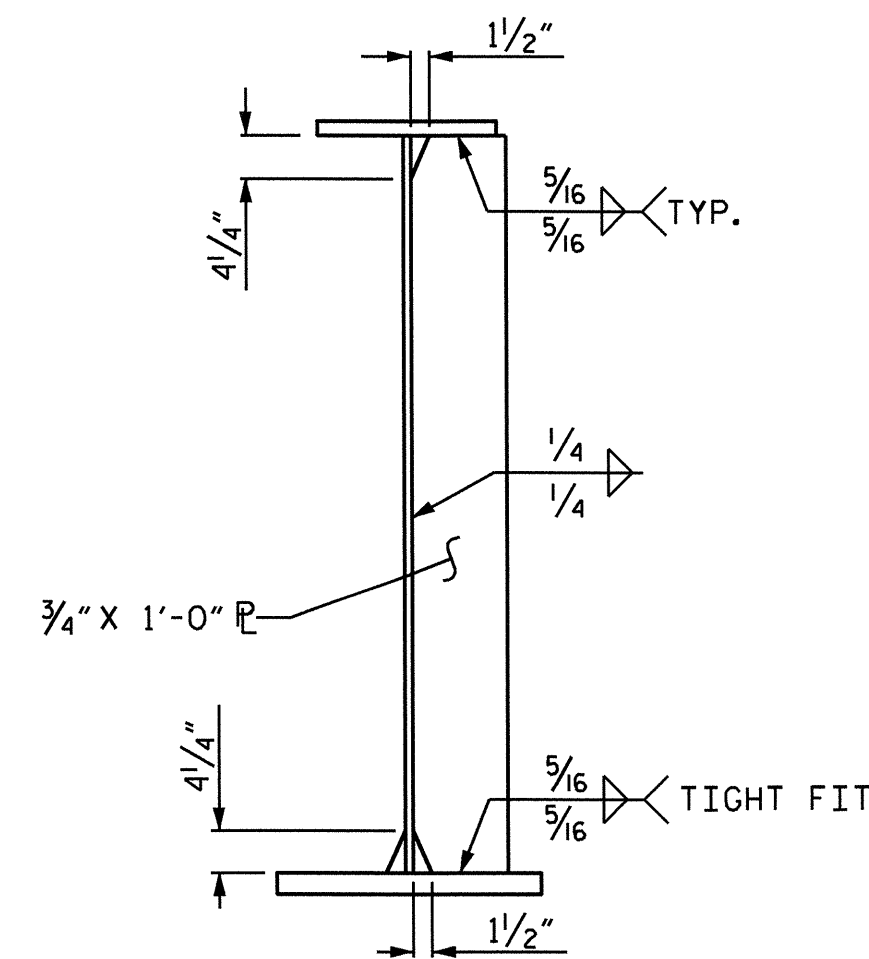
BEARING STIFFENER PLATE DETAIL



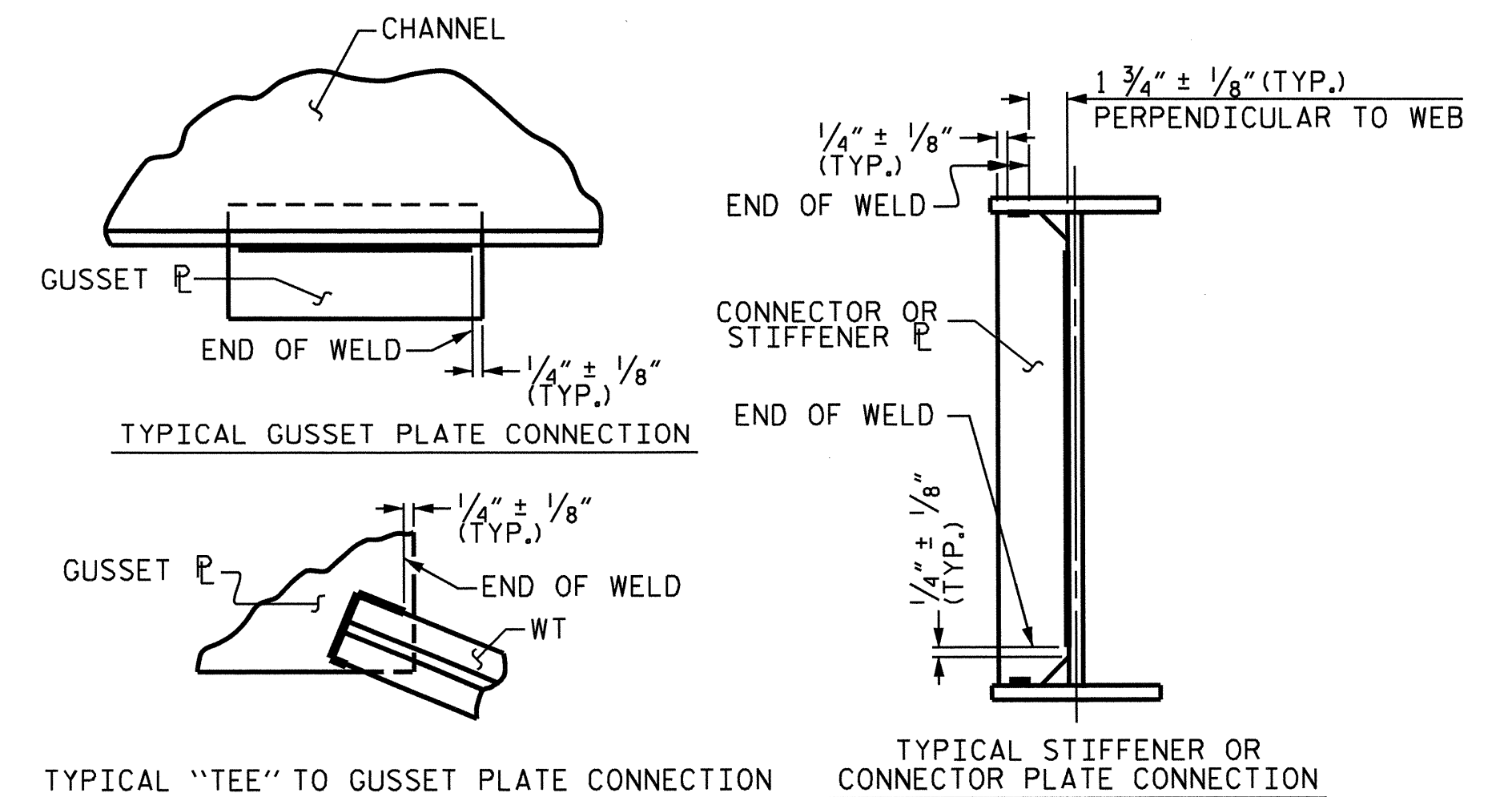
CONNECTOR PLATE DETAIL



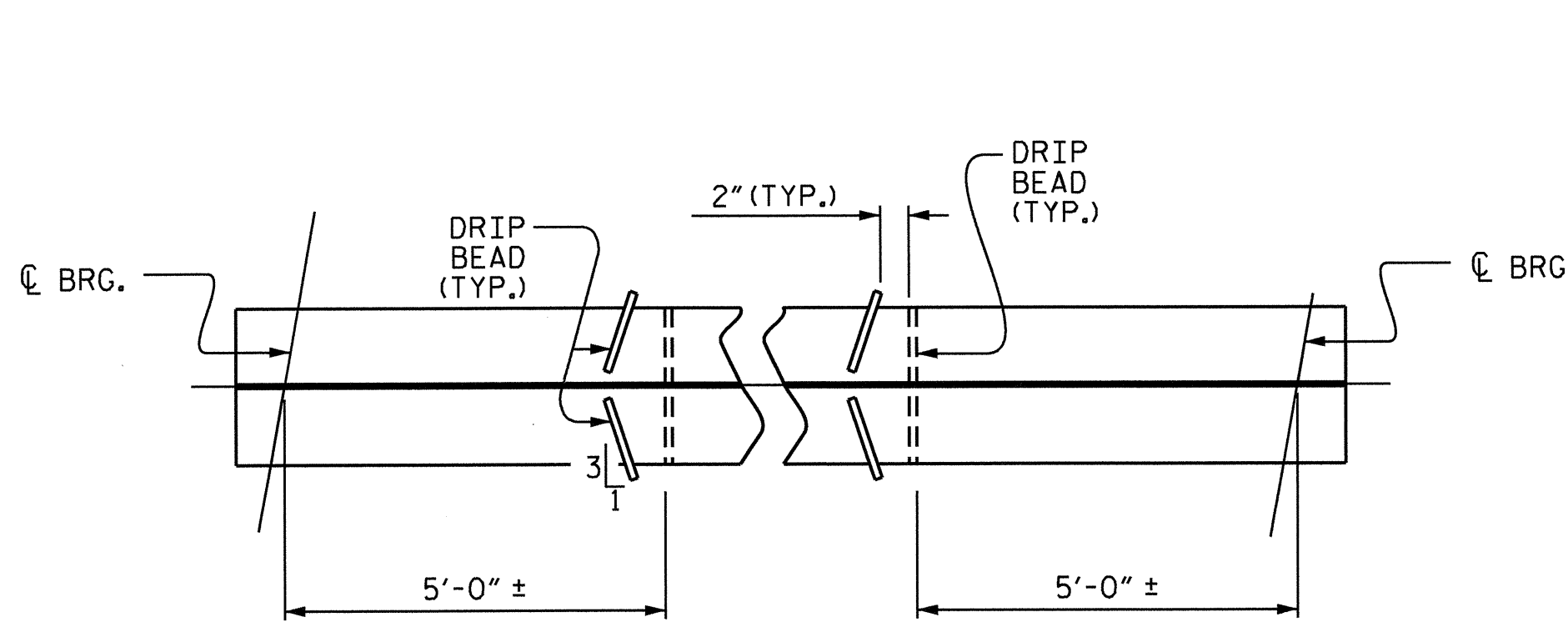
TRANSVERSE STIFFENER PLATE DETAIL



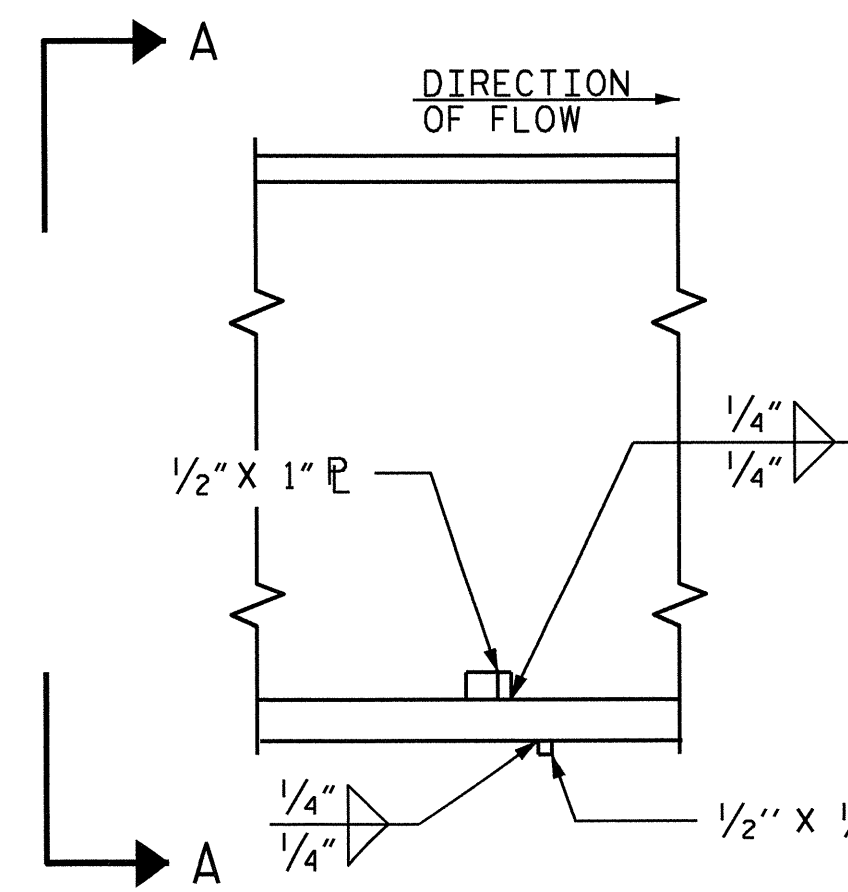
TRANSVERSE STIFFENER PLATE DETAIL
(TRANSVERSE STIFFENER USED AS CONNECTOR P SEE FRAMING PLAN FOR LOCATION)



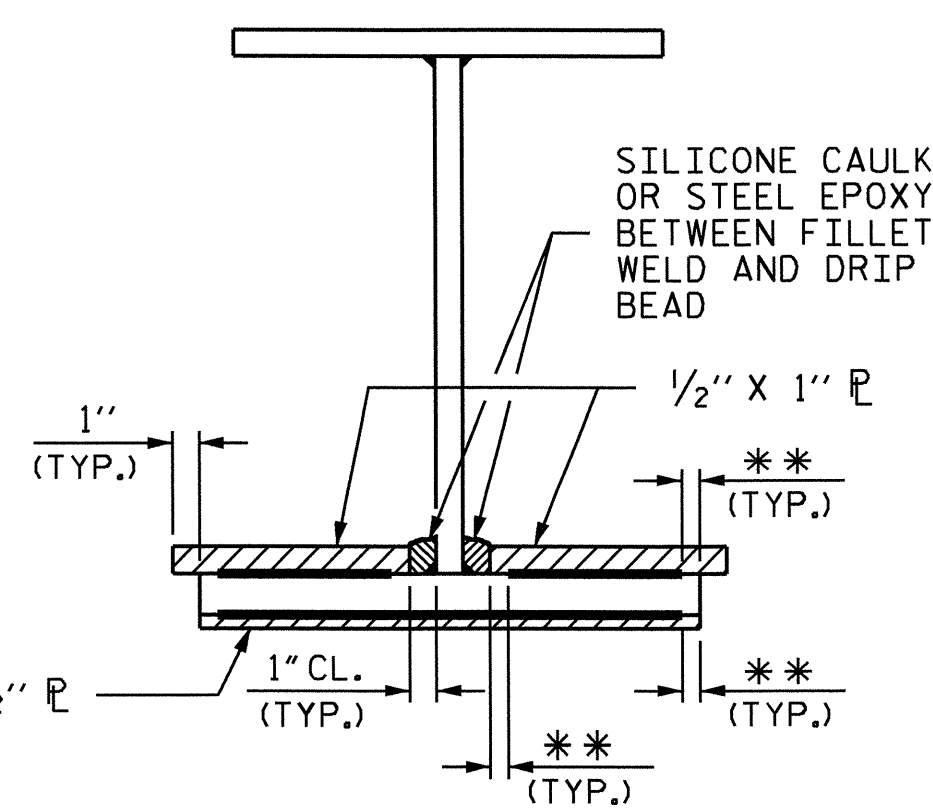
WELD TERMINATION DETAILS



PART PLAN - BOTTOM FLANGE

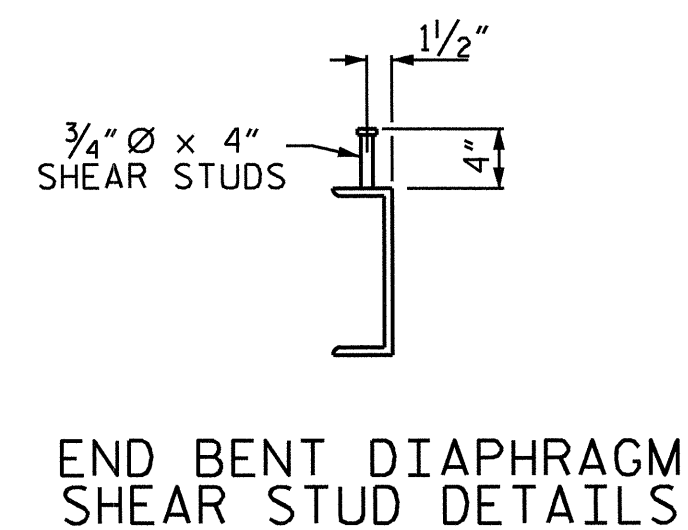


SECTION



VIEW A-A

** SEE "WELD TERMINATION DETAILS"



DRIP BEAD DETAILS

DRAWN BY: J.P. ADAMS DATE: 3/20/12
 CHECKED BY: J. KHARVA DATE: 8/2/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 7/2012

11-FEB-2013 16:11
 OnStructures\Plans\Plans Str*2 Right Lane\R2246B.SD.SS.02.dgn
 jpadams

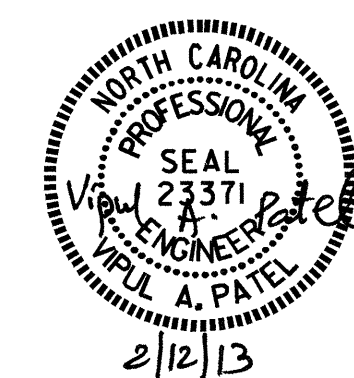
PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 STRUCTURAL STEEL
 DETAILS
 (RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			S-38
2			4			56



STR. #2

NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

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

BEARING STIFFENERS SHALL BE PLUMB.

A CHARPY V-NOTCH TEST IS REQUIRED FOR WEB PLATES, BOTTOM FLANGE PLATES, BOTTOM FLANGE SPLICE PLATES AND WEB SPLICE PLATES (IF USED) FOR ALL GIRDERS AND IN ACCORDANCE WITH ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

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.

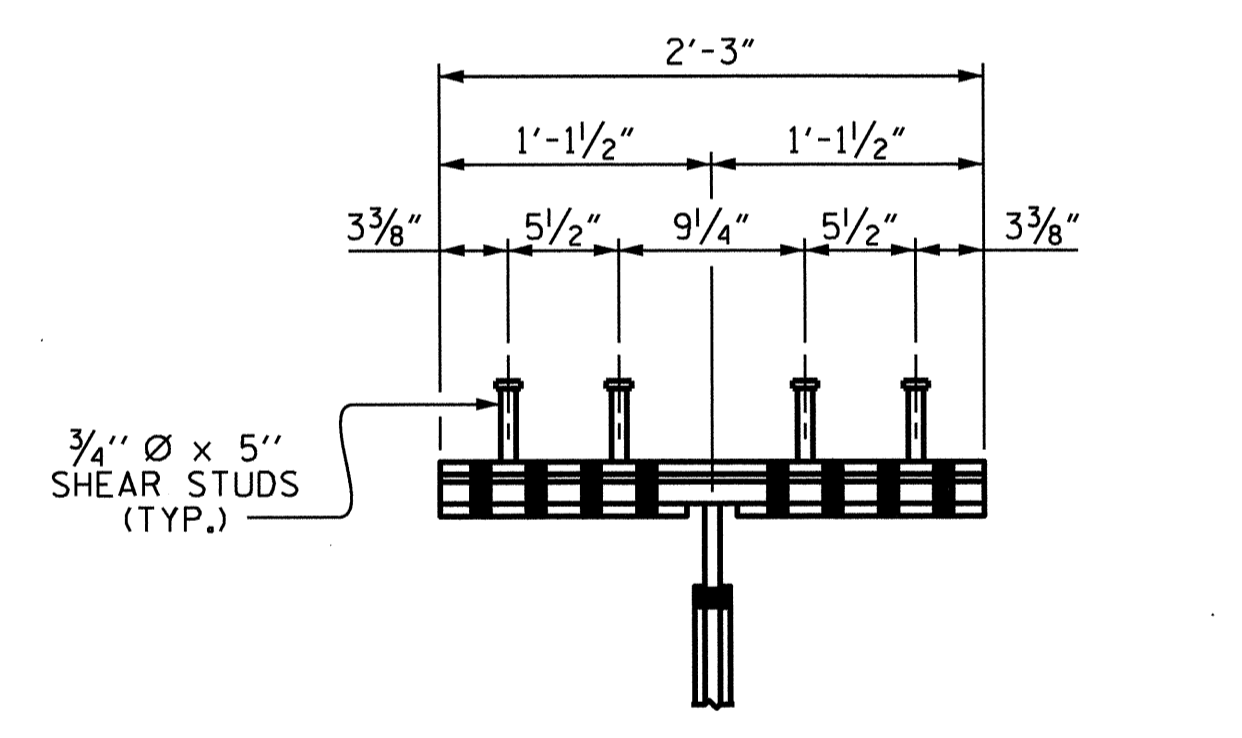
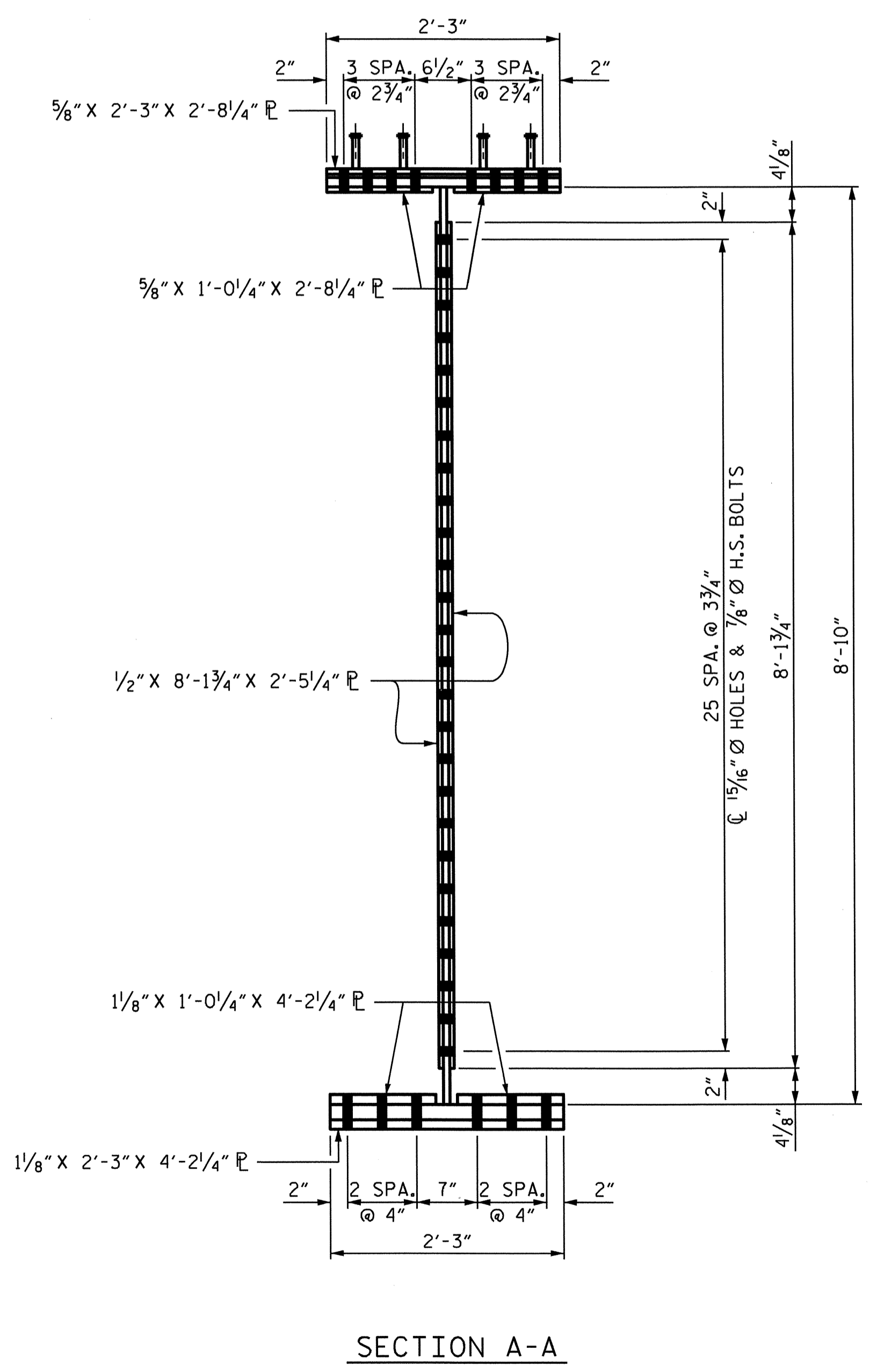
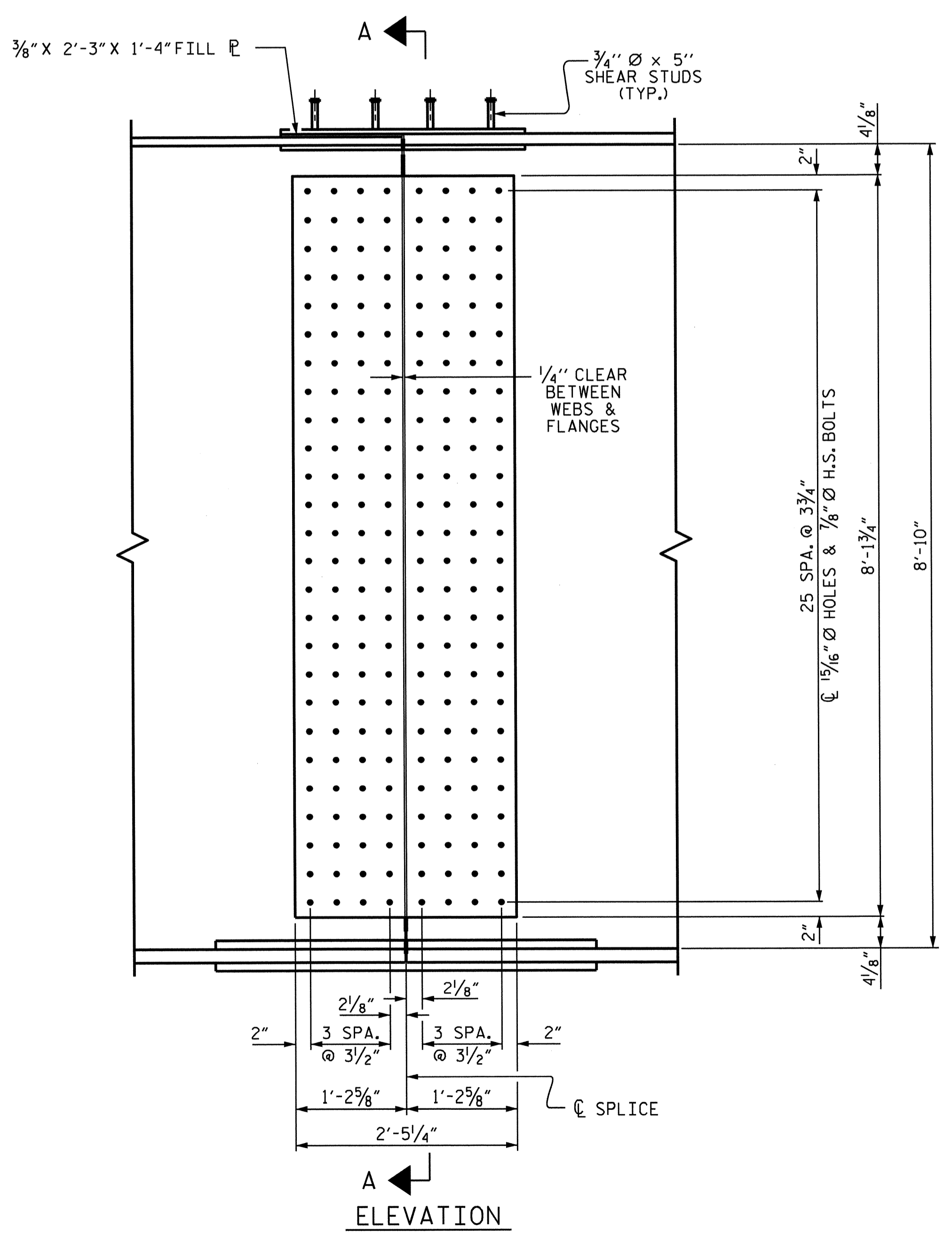
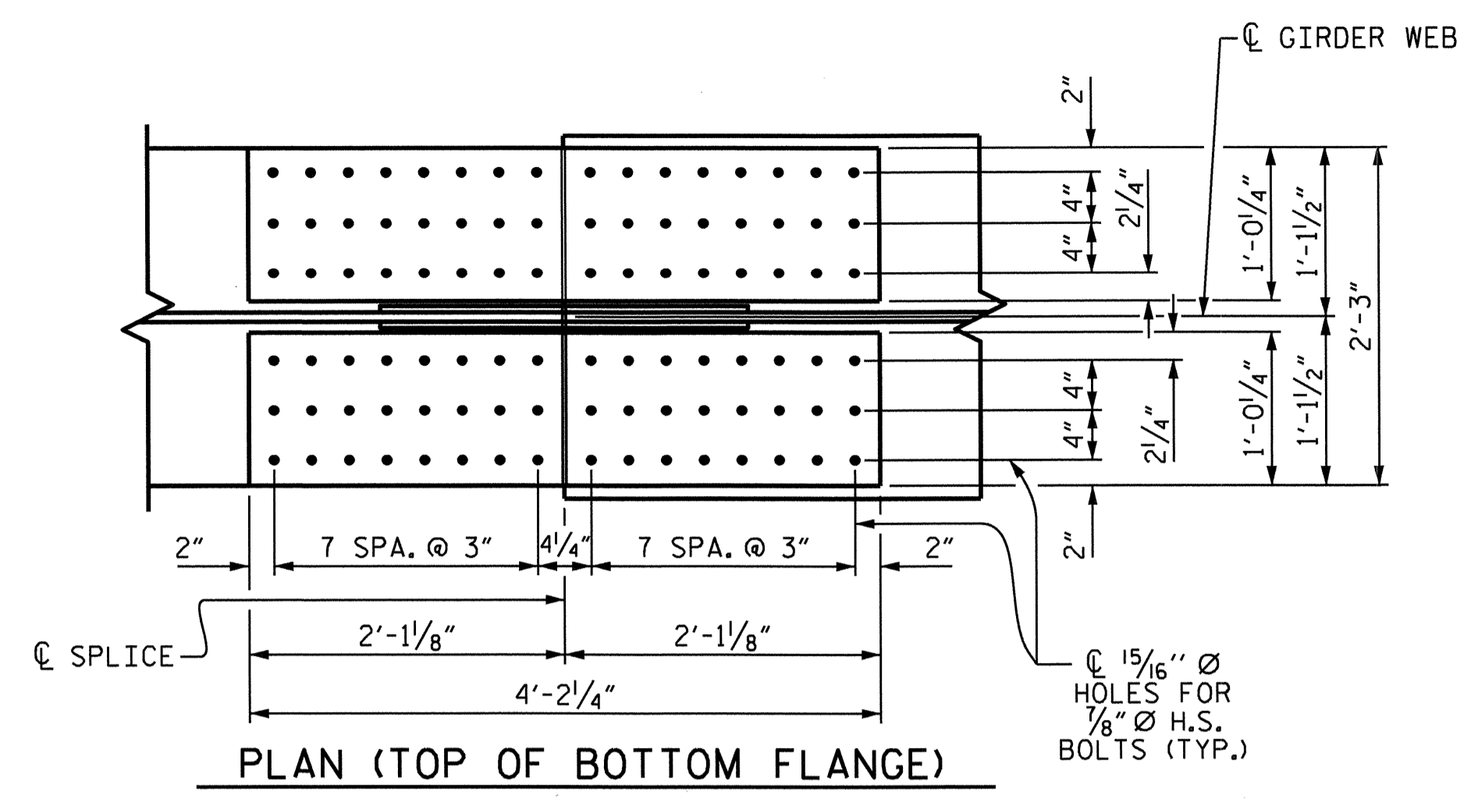
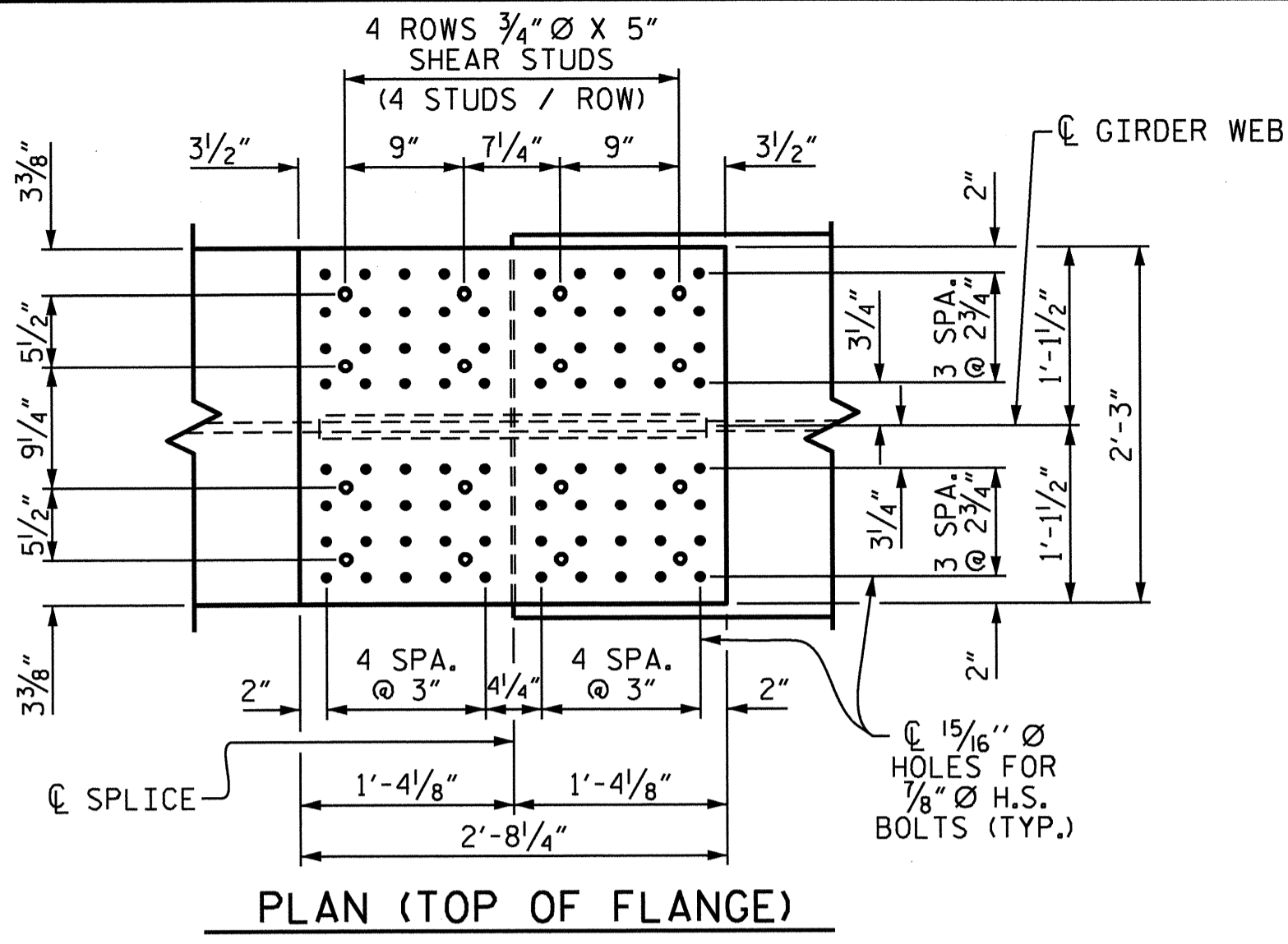
STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

TENSION ON THE ASTM A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 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.

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.

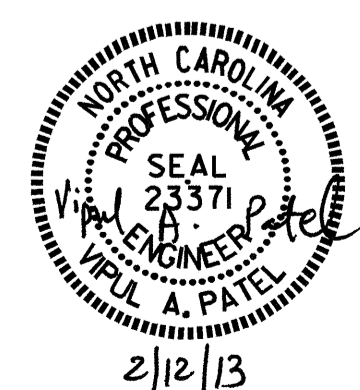
BEARING STIFFENERS MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE.



SHEAR STUD DETAIL FOR TOP FLANGE SPLICE PLATE

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 3 OF 3
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 STRUCTURAL STEEL DETAILS
 (RIGHT LANE)



2/12/13

DRAWN BY: J.P. ADAMS DATE: 3/28/12
 CHECKED BY: J. KHARVA DATE: 8/2/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 7/2012

BOLTED FIELD SPLICE DETAILS
 (TYPICAL EACH FIELD SPLICE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			56

NOTES

LATERAL BRACING ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W OR APPROVED EQUAL.

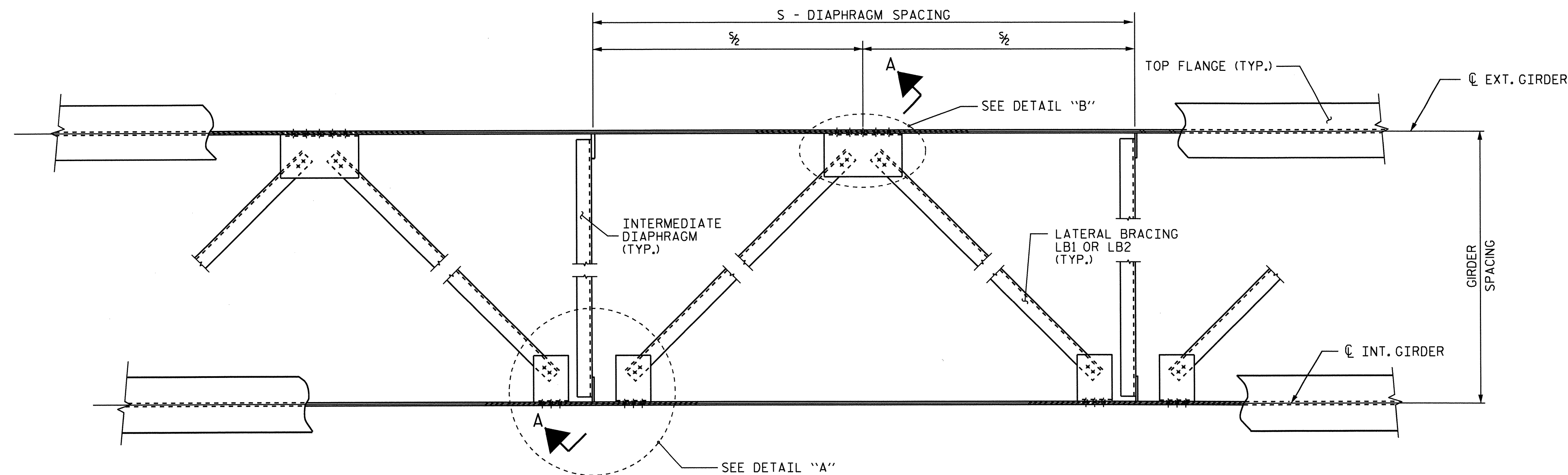
TENSION ON THE ASTM A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL BOLTED CONNECTIONS SHALL BE 7/8" Ø HIGH STRENGTH BOLTS.

THE CONTRACTOR HAS THE OPTION TO CLIP THE PROTRUDING CORNERS OF THE GUSSET PLATES, AT NO ADDITIONAL COST TO THE DEPARTMENT.

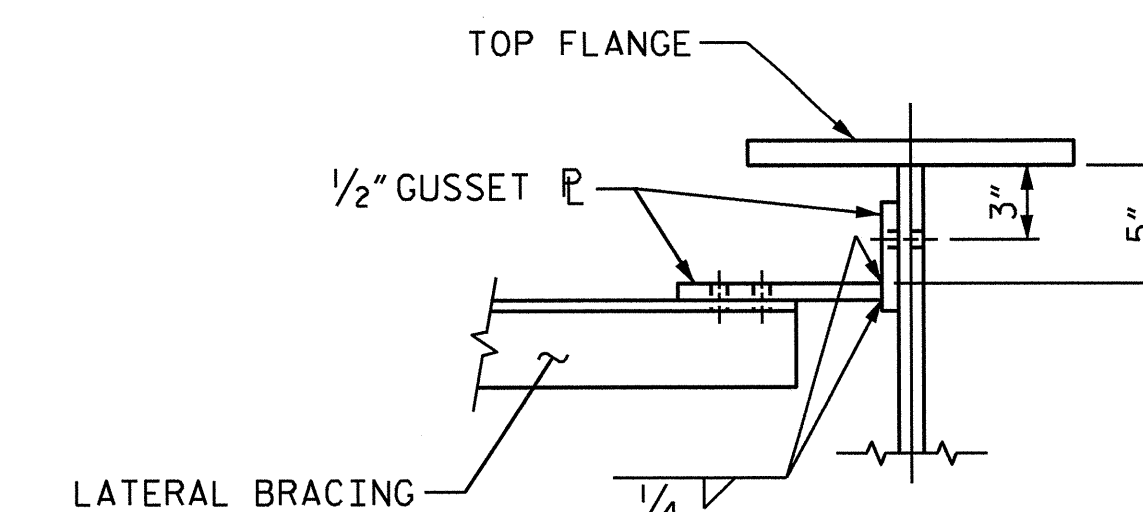
BENT GUSSET PLATES OR ROLLED ANGLE SHAPES MAY BE SUBSTITUTED FOR THE WELDED GUSSET PLATES DETAILED IF APPROVED BY THE ENGINEER, AT NO ADDITIONAL COST TO THE DEPARTMENT.

INSTALL THE LATERAL BRACING AFTER ERECTING THE EXTERIOR GIRDER AND THE ADJACENT INTERIOR GIRDER AND INSTALLING THE INTERMEDIATE DIAPHRAGMS.

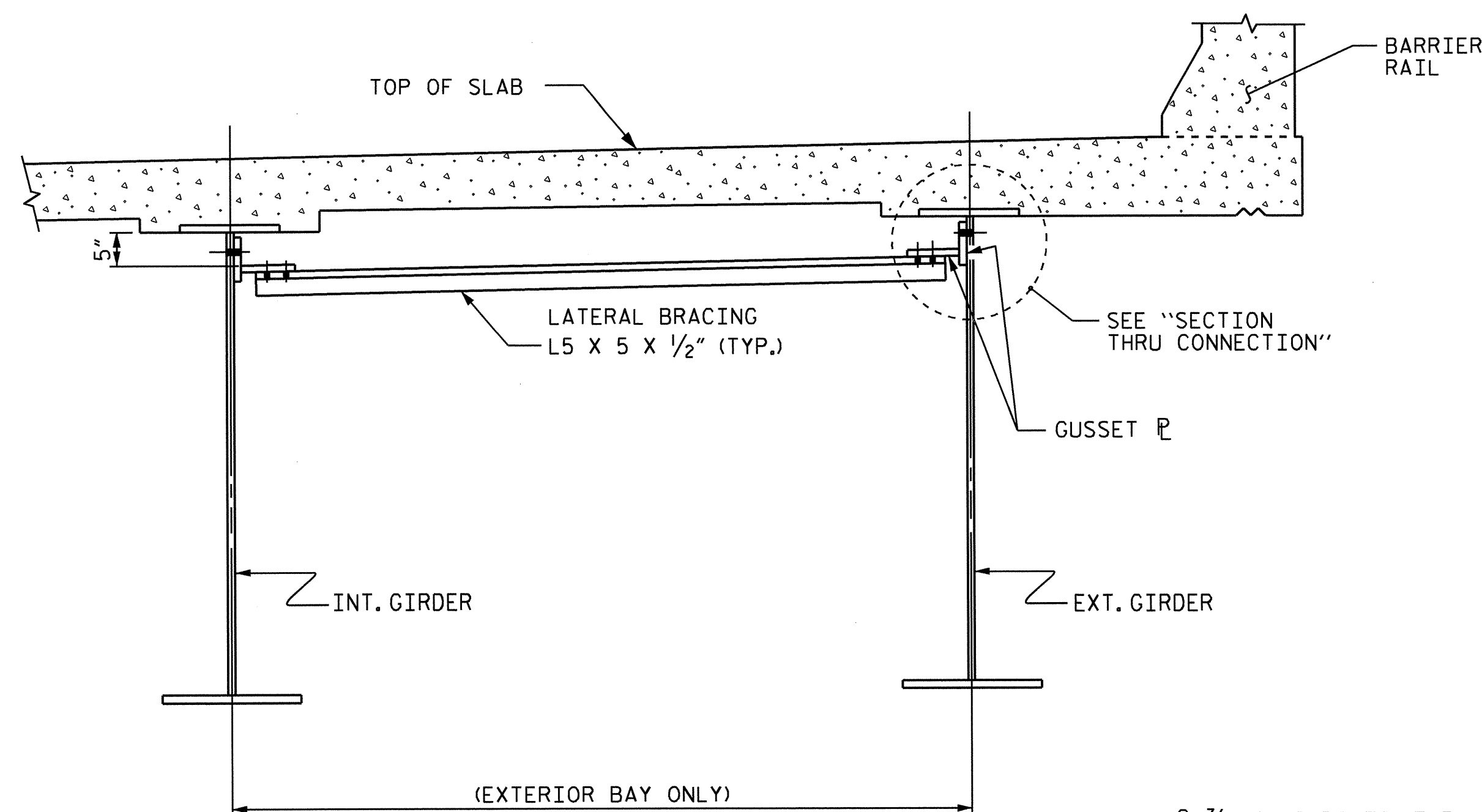


PART PLAN - NEAR TOP FLANGE LATERAL BRACING

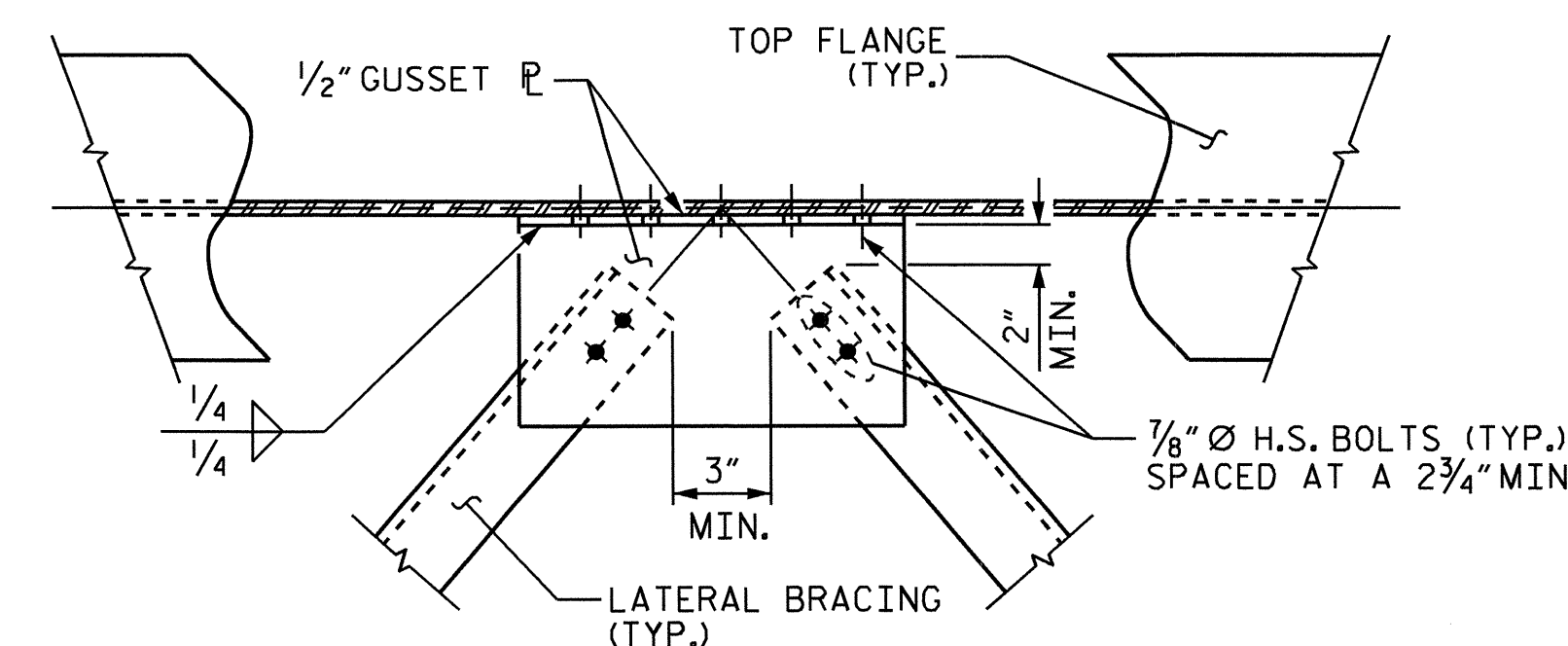
(THROUGHOUT EXTERIOR BAYS ONLY)



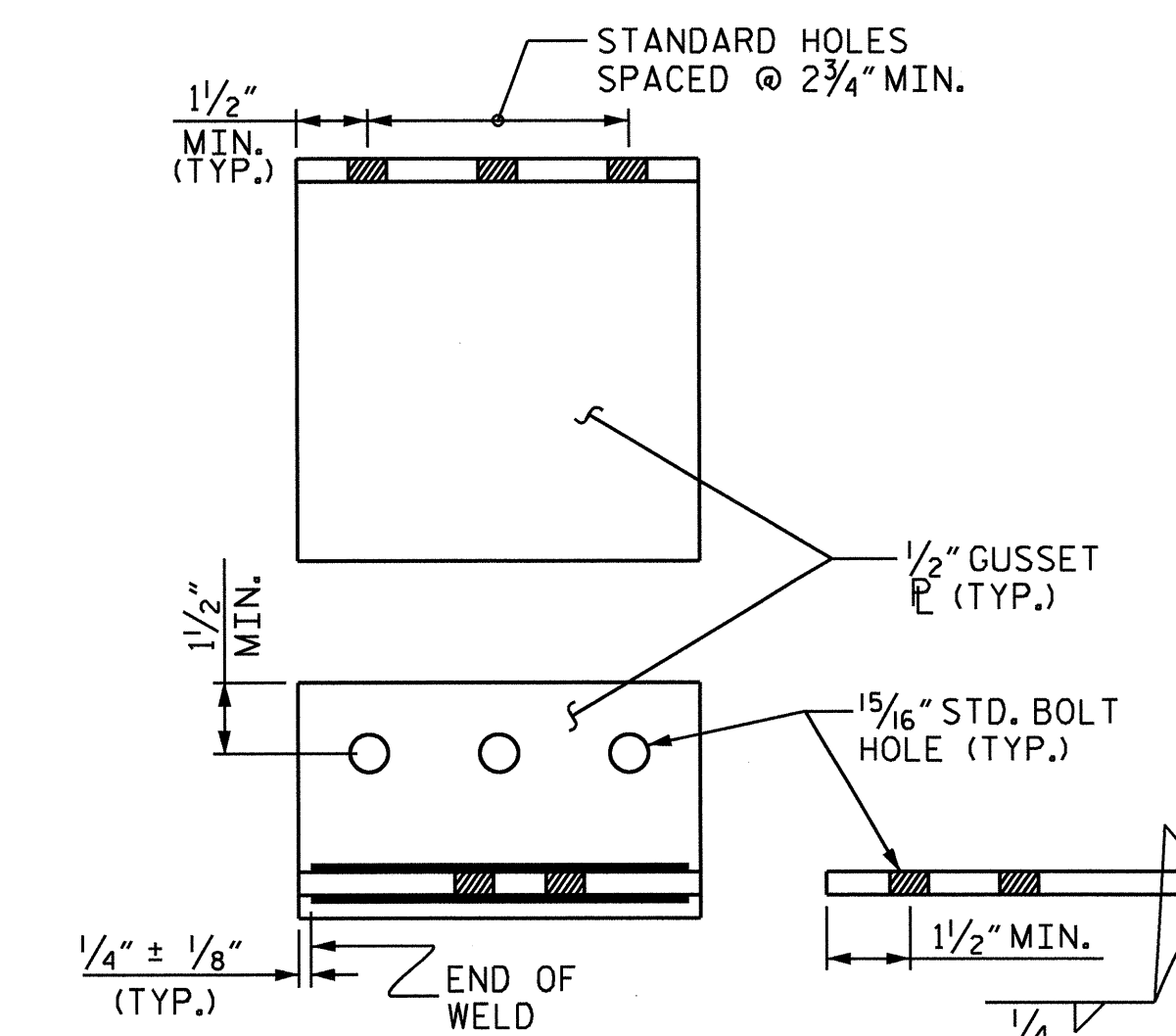
SECTION THRU CONNECTION



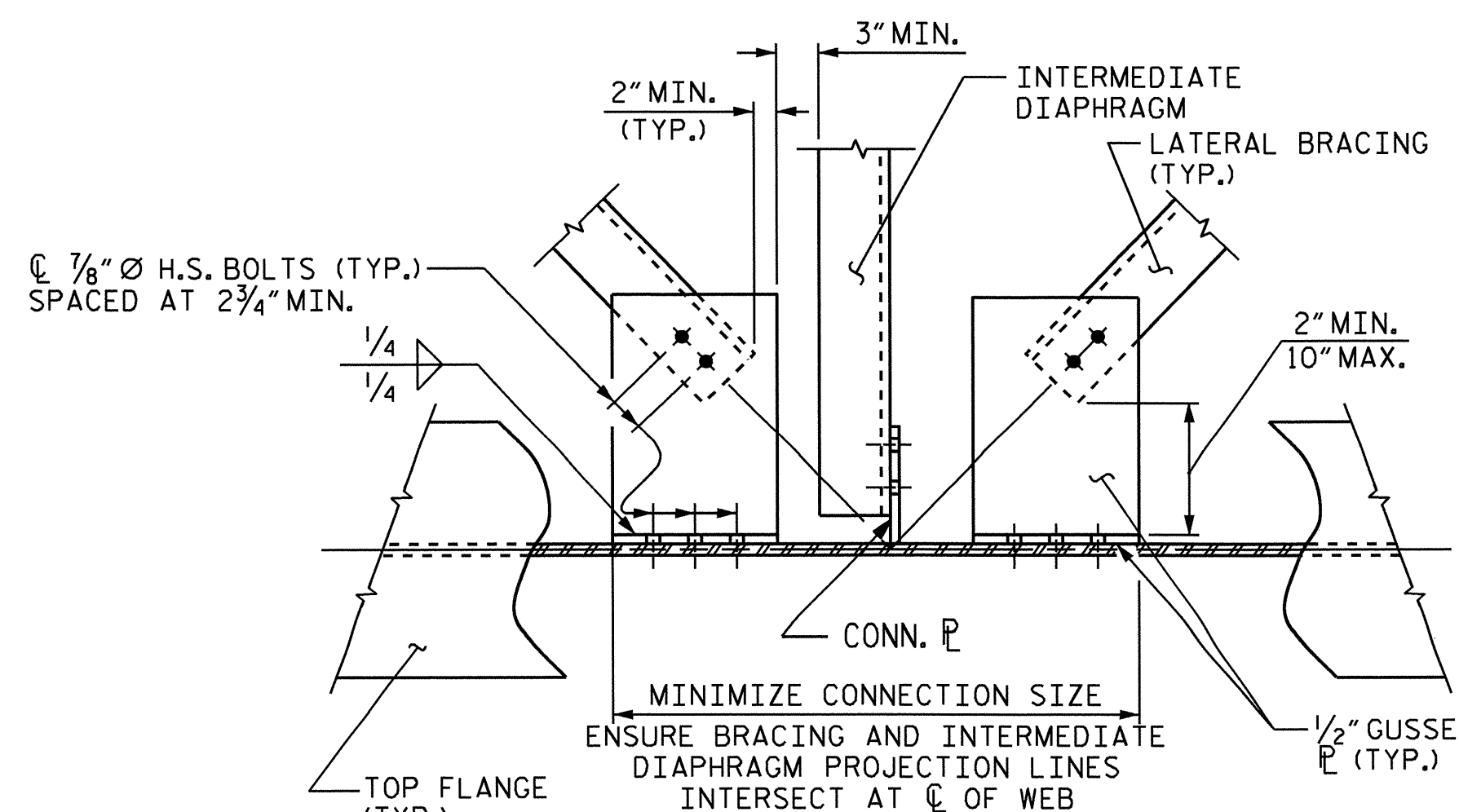
SECTION A-A



DETAIL "B"



CONNECTION DETAIL



DETAIL "A"

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LATERAL BRACING
 (RIGHT LANE)

ASSEMBLED BY: J.P. ADAMS	DATE: 7/11/12
CHECKED BY: J. KHARVA	DATE: 8/2012
DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR	DATE: 7/2012
DRAWN BY: WMC 6/11	ADDED: 10/31/11
CHECKED BY: GM 6/11	

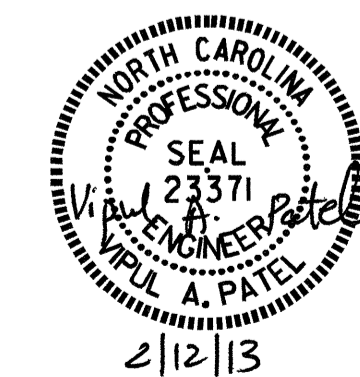
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40	
1			3			TOTAL SHEETS	
2			4			56	

GIRDER CAMBER TABLE

THIRTIETH POINTS	SPAN A																														
	GIRDER #1 THRU #5																														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	0
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.054	0.108	0.159	0.209	0.256	0.299	0.339	0.375	0.406	0.434	0.456	0.474	0.487	0.495	0.497	0.495	0.487	0.474	0.456	0.434	0.406	0.375	0.339	0.299	0.256	0.209	0.159	0.108	0.054	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.078	0.161	0.241	0.318	0.391	0.458	0.519	0.575	0.623	0.666	0.701	0.728	0.748	0.760	0.764	0.760	0.748	0.728	0.701	0.666	0.623	0.575	0.519	0.458	0.391	0.318	0.241	0.161	0.078	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.010	0.019	0.029	0.037	0.046	0.054	0.061	0.067	0.073	0.078	0.082	0.085	0.088	0.089	0.090	0.089	0.088	0.085	0.082	0.078	0.073	0.067	0.061	0.054	0.046	0.037	0.029	0.019	0.010	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.142	0.288	0.429	0.564	0.693	0.811	0.919	1.017	1.102	1.178	1.239	1.287	1.323	1.344	1.351	1.344	1.323	1.287	1.239	1.178	1.102	1.017	0.919	0.811	0.693	0.564	0.429	0.288	0.142	0.000
CAMBER REQUIRED FOR VERTICAL CURVE ORDINATE	0.000	0.065	0.125	0.182	0.233	0.280	0.323	0.361	0.395	0.424	0.449	0.469	0.484	0.496	0.503	0.504	0.503	0.496	0.484	0.469	0.449	0.424	0.395	0.361	0.323	0.280	0.233	0.182	0.125	0.065	0.000
CAMBER REQUIRED FOR SUPERELEVATION ORDINATE	0.000	-0.003	-0.005	-0.007	-0.009	-0.011	-0.013	-0.014	-0.016	-0.017	-0.018	-0.019	-0.019	-0.020	-0.020	-0.020	-0.020	-0.020	-0.019	-0.019	-0.018	-0.017	-0.016	-0.014	-0.013	-0.011	-0.009	-0.007	-0.005	-0.003	0.000
REQUIRED CAMBER		2 7/16"	4 7/8"	7 1/4"	9 7/16"	11 3/16"	13 7/16"	15 3/16"	16 3/4"	18 1/8"	19 5/16"	20 1/4"	21"	21 3/16"	21 5/16"	22"	21 5/16"	21 3/16"	21"	20 1/4"	19 5/16"	18 1/8"	16 3/4"	15 3/16"	13 7/16"	11 3/16"	9 7/16"	7 1/4"	4 7/8"	2 7/16"	

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

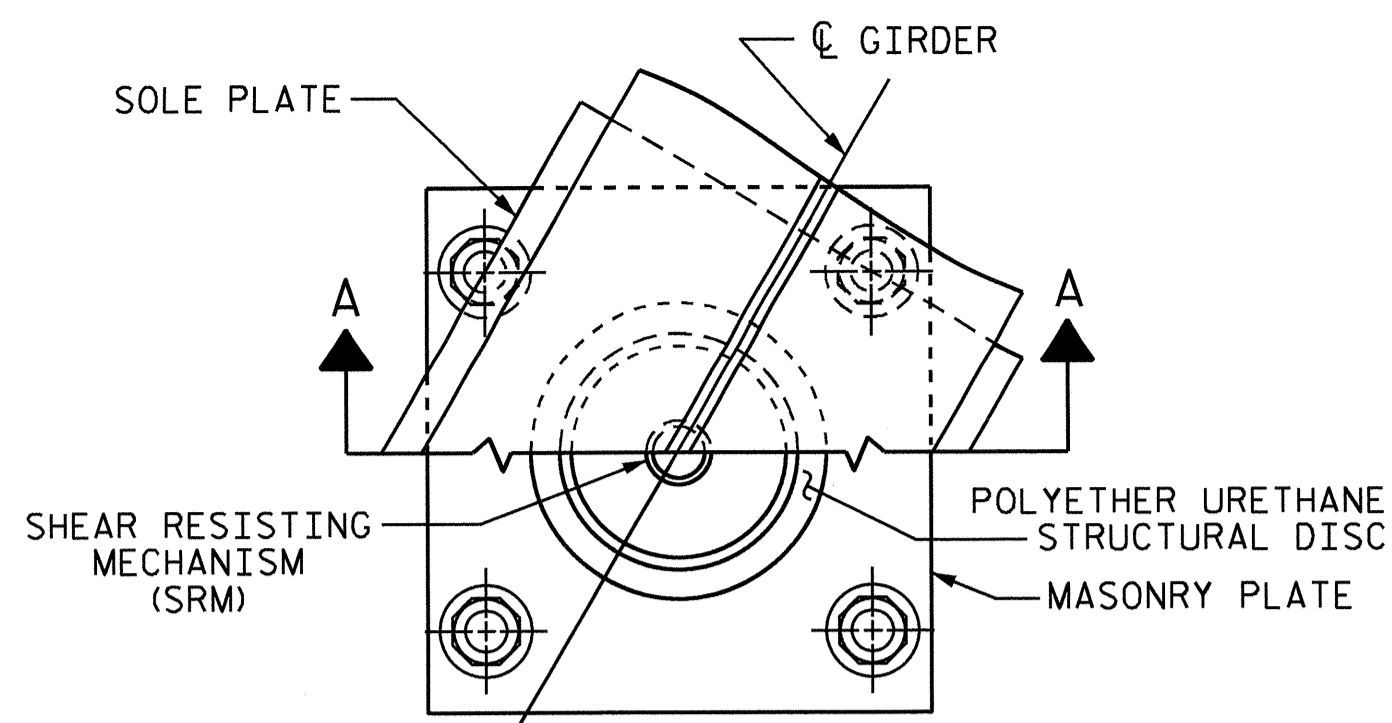
PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-



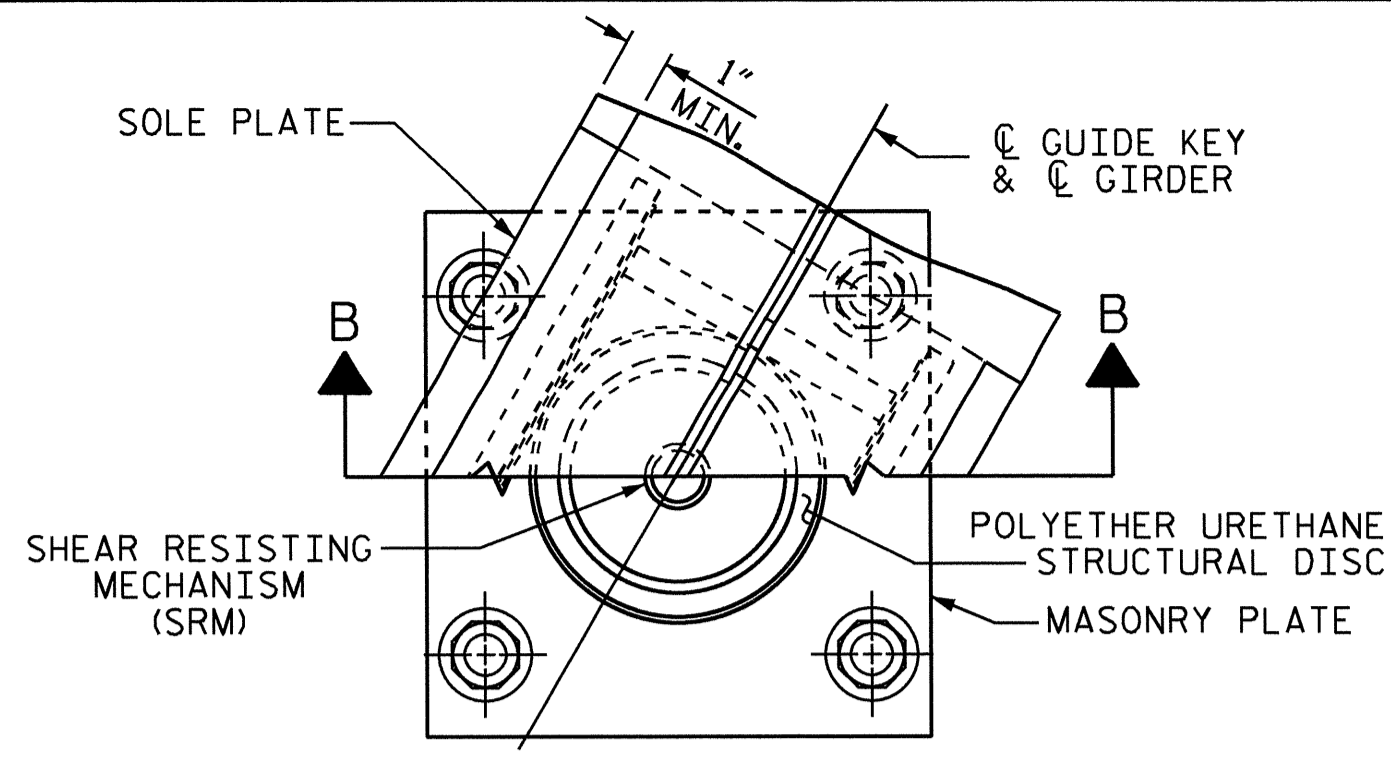
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
**GIRDER
 CAMBER TABLE**
 (RIGHT LANE)

DRAWN BY : J.P. ADAMS DATE : 3/28/12
 CHECKED BY : J. KHARVA DATE : 8/2/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE : 7/2012

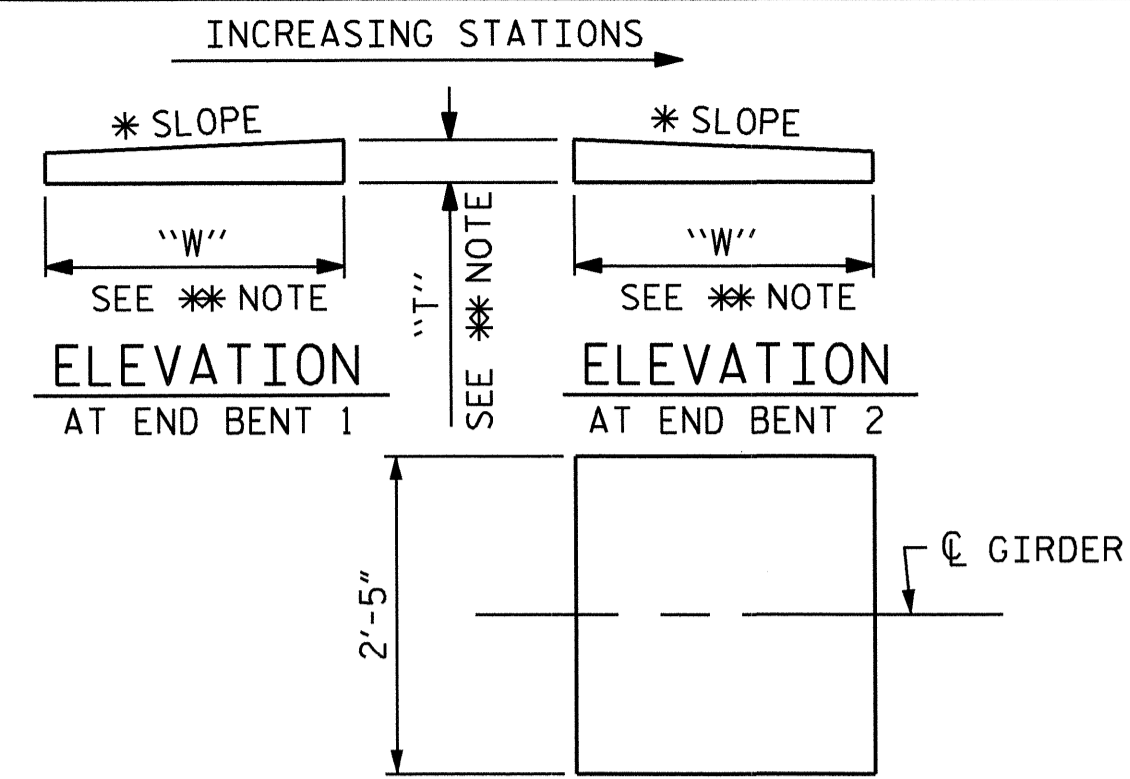
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41
1			3			TOTAL SHEETS
2			4			56



CUT-AWAY PLAN



CUT-AWAY PLAN

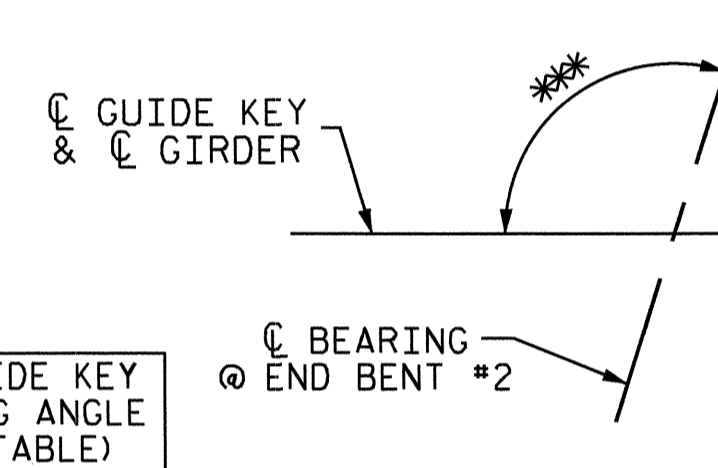


PLAN

P1 (FIX.) (5 REQ'D) END BENT #1
 * 0.3206%
 P2 (EXP.) (5 REQ'D) END BENT #2
 * -1.3140%

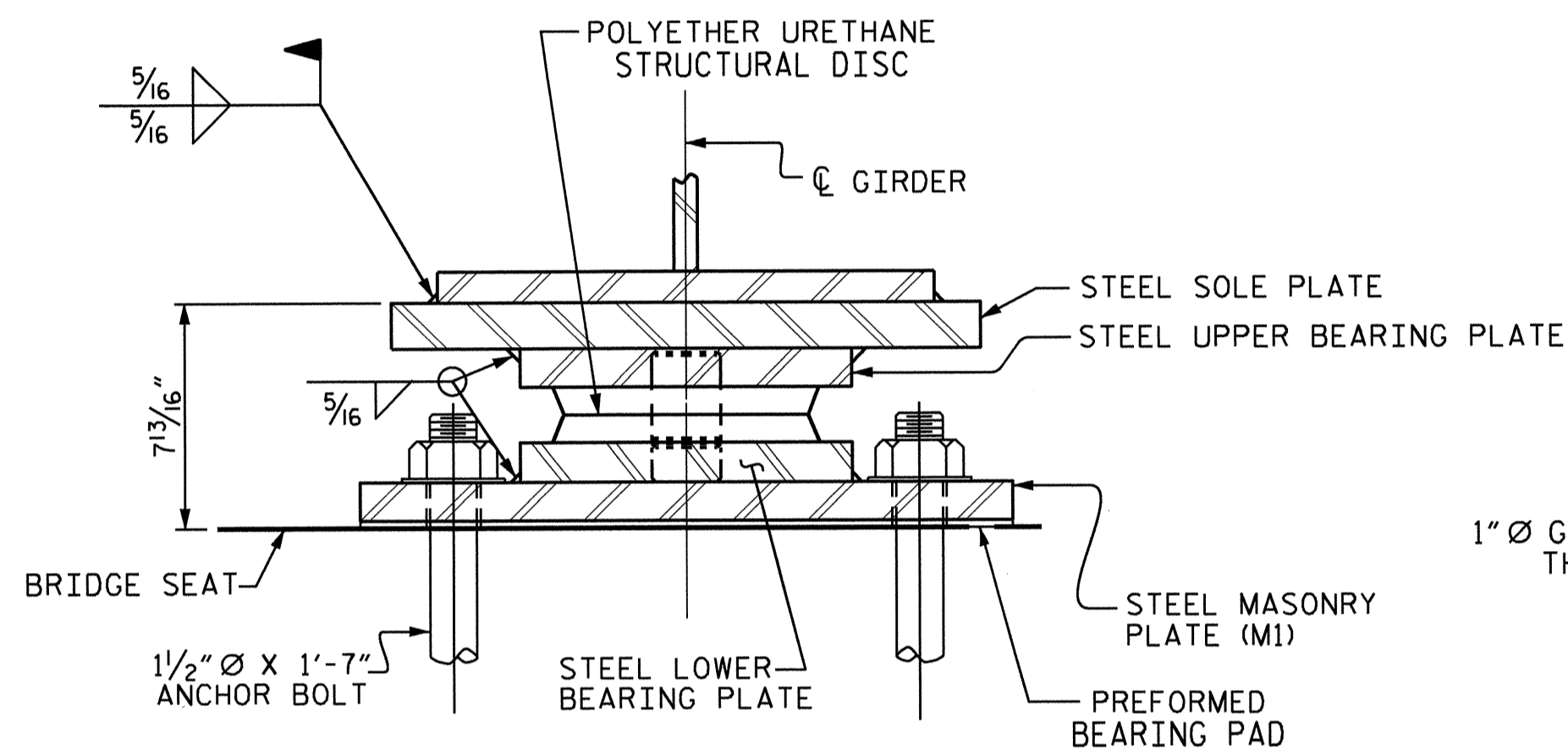
** NOTE:
 DIMENSIONS "W" AND "T" ARE TO BE
 DETERMINED BY THE MANUFACTURER.

SOLE PLATE DETAILS



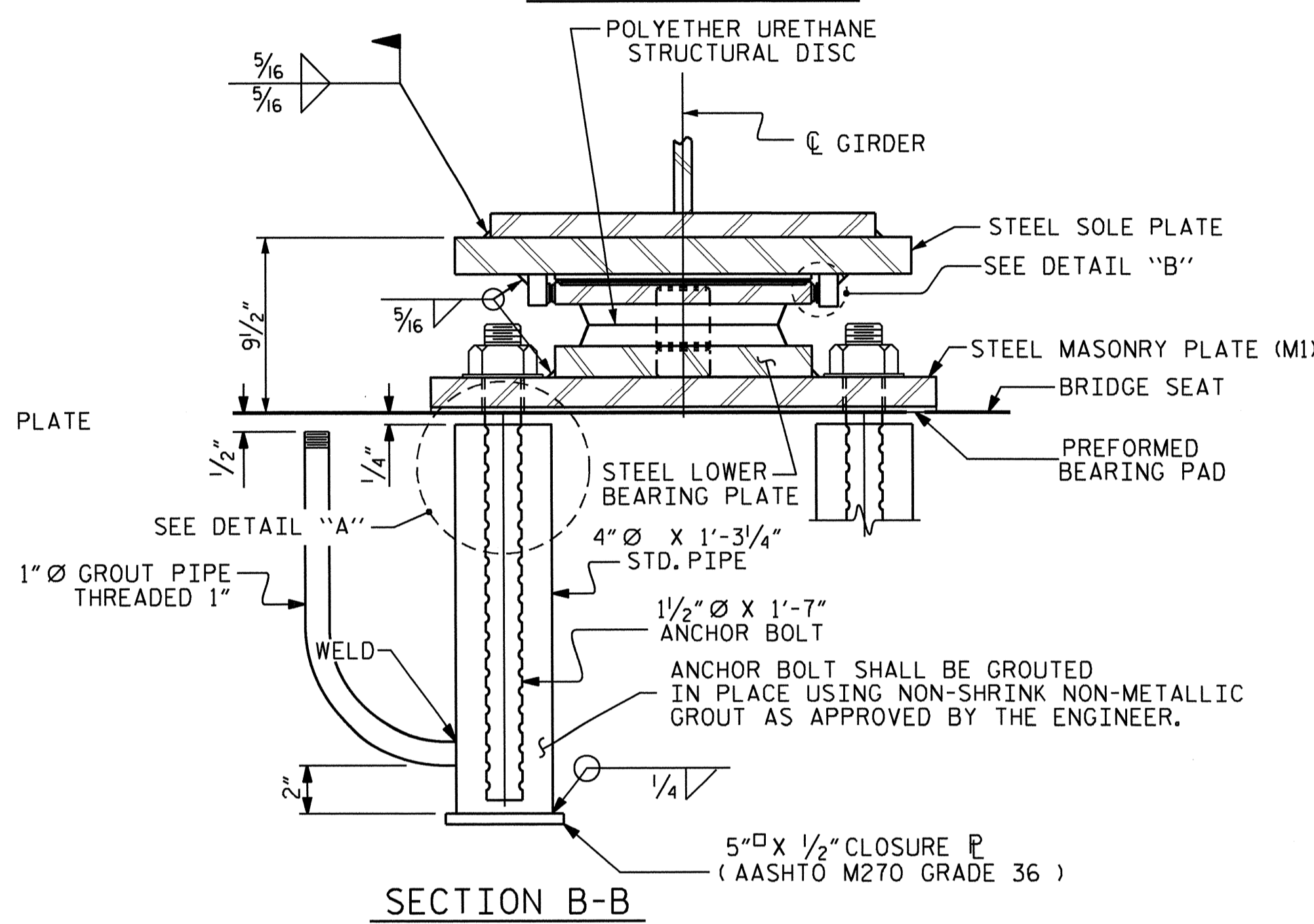
GUIDE KEY SETTING ANGLES

GIRDER	END BENT #2
#1	101°-24'-34"
#2	101°-23'-48"
#3	101°-23'-02"
#4	101°-22'-16"
#5	101°-21'-30"



SECTION A-A

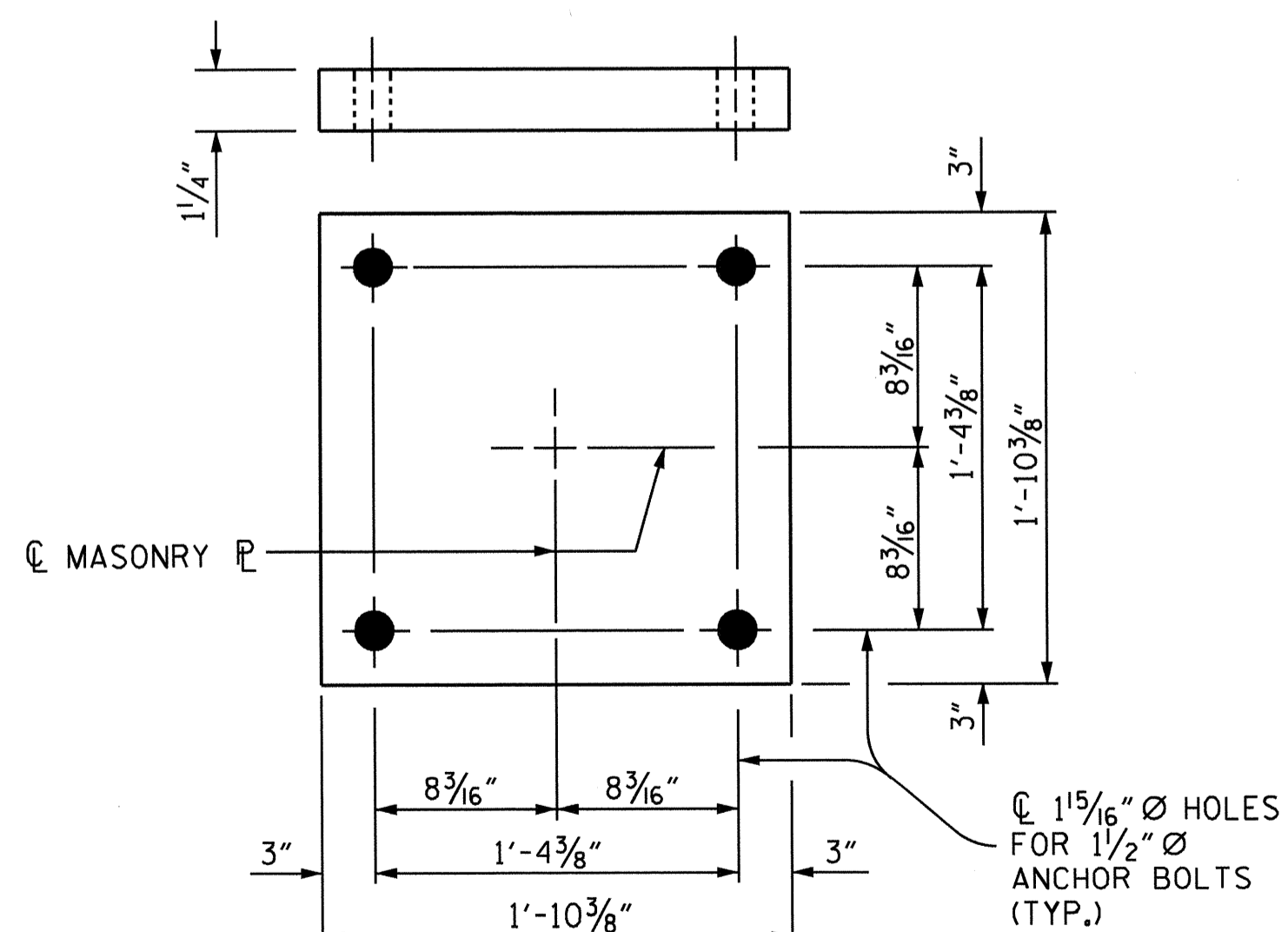
DB2, FIXED
 (5 REQ'D)



SECTION B-B

DB1, EXP.
 (5 REQ'D)

DISC BEARING DETAILS



PLAN
 M1 (10 REQ'D)
 MASONRY PLATE DETAILS

TABLE FOR PLATE SETTING DATA
 (EXPANSION DISC BEARINGS)

TEMPERATURE AT TIME OF SETTING	45° F	60° F	90° F	*
END BENT #2	-3/8"	0	3/4"	-1 1/16"

* CORRECTION FOR END ROTATION DUE TO WEIGHT OF SLAB AND COMPOSITE DEAD LOAD.

TEMPERATURE SETTING DETAIL

BEARING	LOCATION	UNFACTORED			FACTORED		TOTAL MOVEMENT (INCHES)
		VERTICAL LOAD (KIPS)			LATERAL LOAD (KIPS)		
		DEAD	LIVE	TOTAL			
DB2 (FIXED)	END BENT #1	240	28	150	418	86	0
DB1 (EXP.)	END BENT #2	240	28	150	418	86	2 1/2"

NOTES

FOR DISC BEARINGS, SEE SPECIAL PROVISIONS.

AT ALL POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS SHALL BE TIGHTENED FINGER TIGHT AND GIVEN AN ADDITIONAL 1/4 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE PTFE OR ELASTOMER.

AFTER BEARING ASSEMBLY IS IN PLACE AND ANCHOR BOLTS HAVE BEEN FINALLY POSITIONED, THEY SHALL BE GROUTED IN PLACE AS SHOWN.

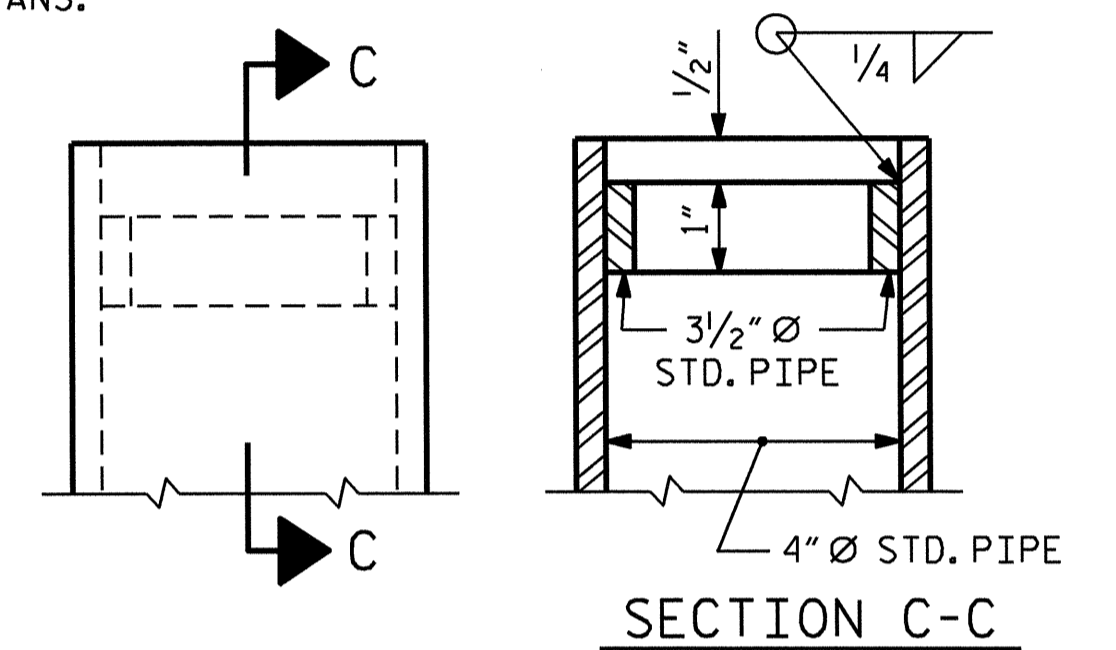
THE CLOSURE PLATE, GROUT PIPE AND STANDARD PIPE FOR THIS ASSEMBLY NEED NOT BE GALVANIZED.

SOLE PLATES SHOULD BE WELDED TO BEAM FLANGES AND ANCHOR BOLTS SHOULD BE GROUTED BEFORE FALSEWORK IS PLACED.

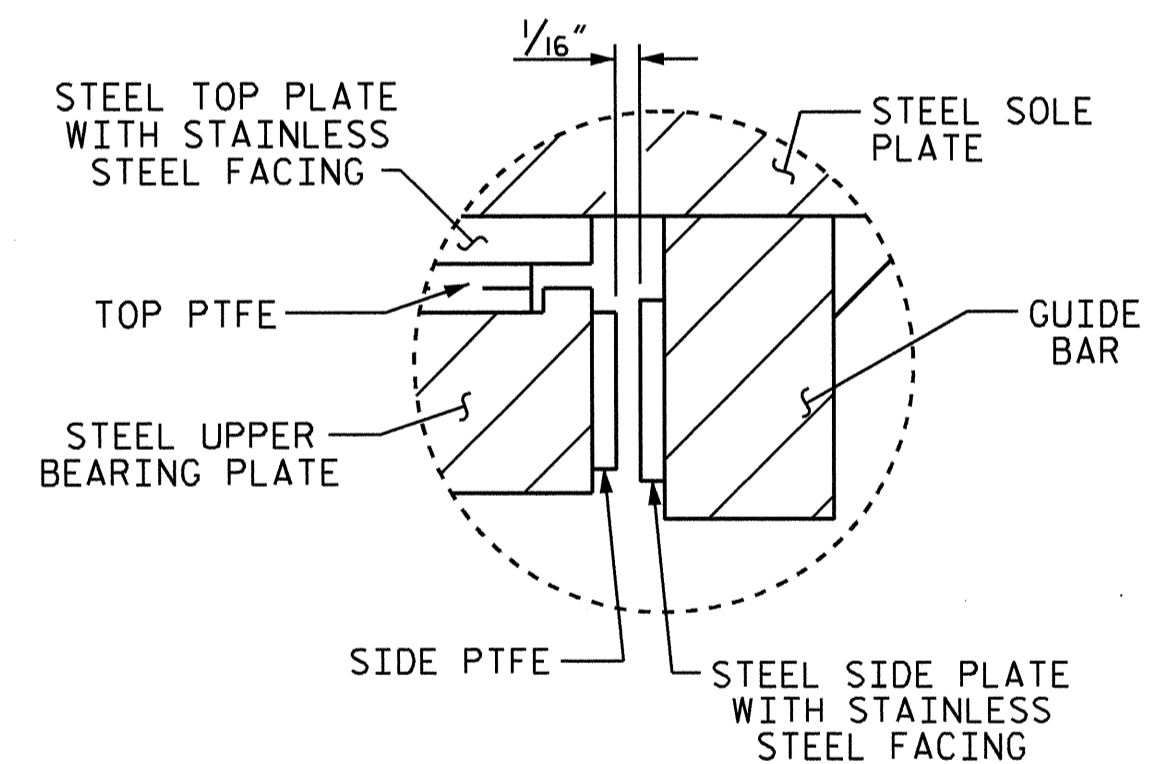
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

THE MINIMUM ROTATIONAL CAPACITY FOR ALL BEARINGS SHALL BE 0.02 RADIAN.



DETAIL "A"

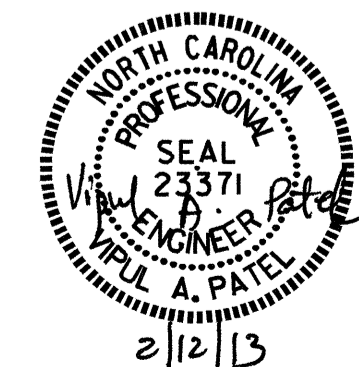


DETAIL "B"

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

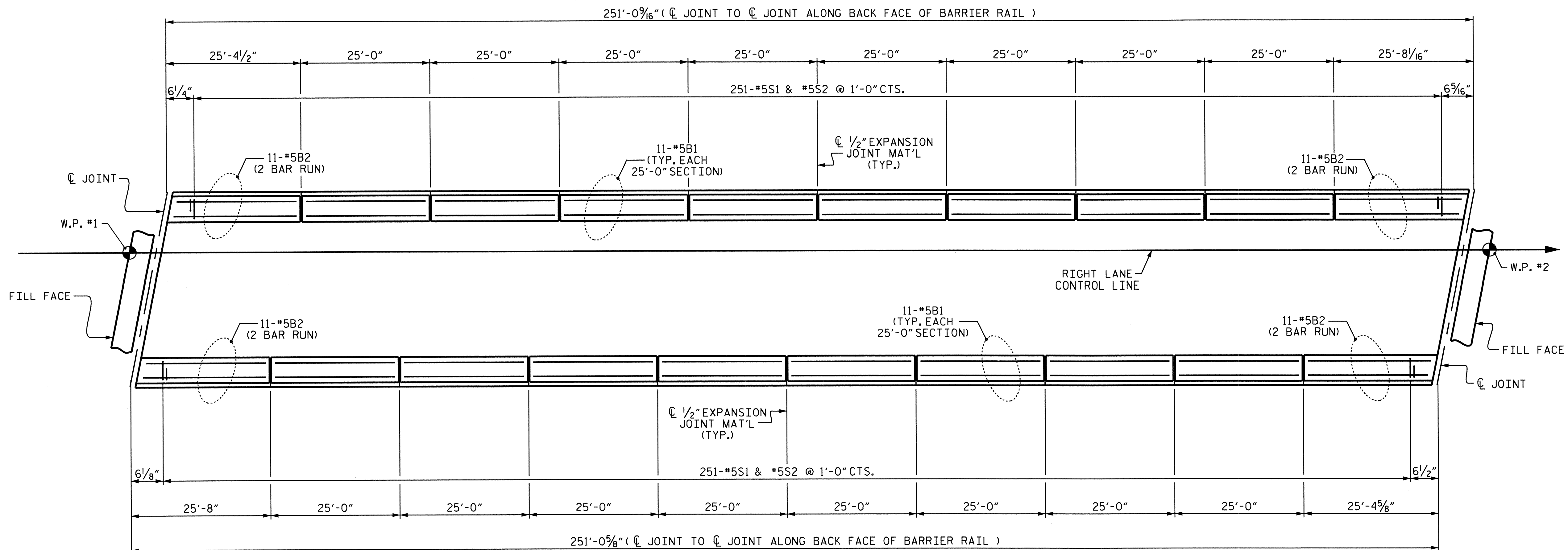
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 DISC BEARING
 DETAILS
 (RIGHT LANE)



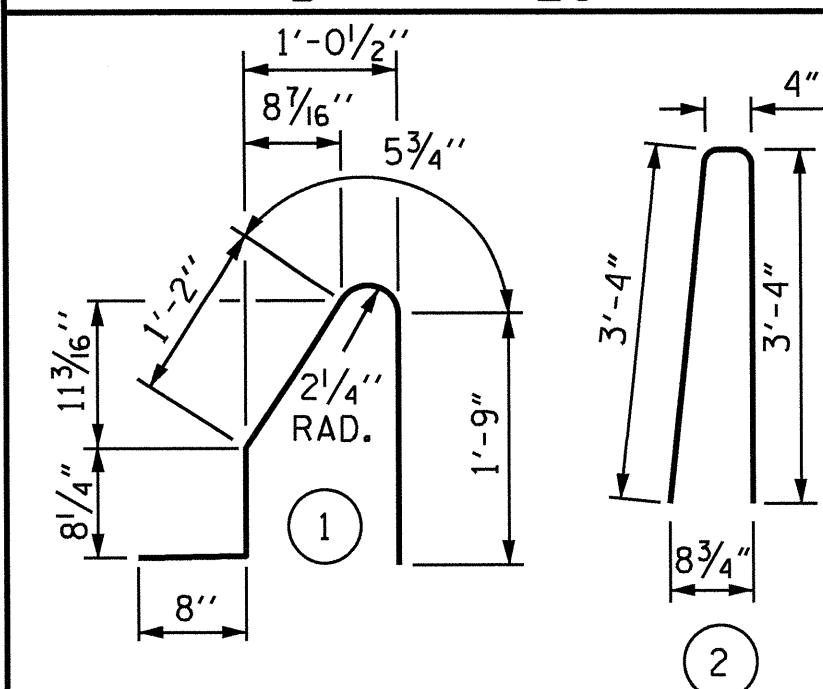
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-42
2			4			TOTAL SHEETS 56

DRAWN BY: J.P. ADAMS DATE: 3/28/12
 CHECKED BY: J. KHARVA DATE: 8/2/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 7/2012



PLAN OF BARRIER RAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	176	#5	STR.	24'-7"	4513
* B2	88	#5	STR.	14'-5"	1323
* S1	502	#5	1	4'-9"	2487
* S2	502	#5	2	7'-0"	3665

* EPOXY COATED REINFORCING STEEL 11988 LBS.

CLASS AA CONCRETE 68.3 CU. YDS.

* CONCRETE BARRIER RAIL 502.10 LIN. FT.

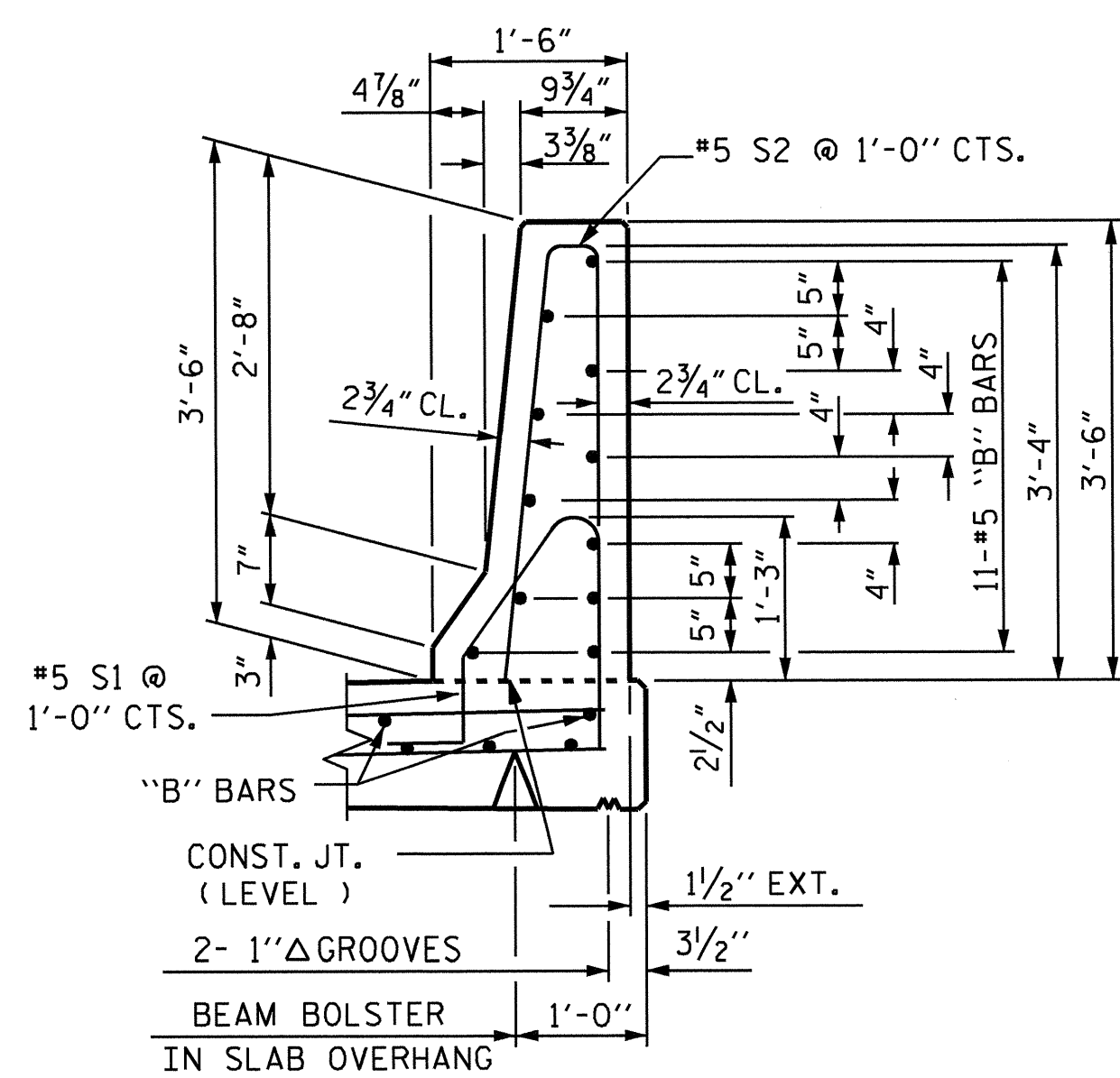
* THE QUANTITIES OF BARRIER RAIL ON THE APPROACH SLABS IS NOT INCLUDED. FOR BARRIER RAIL ON THE APPROACH SLABS, SEE "APPROACH SLAB DETAILS" SHEET.

NOTES

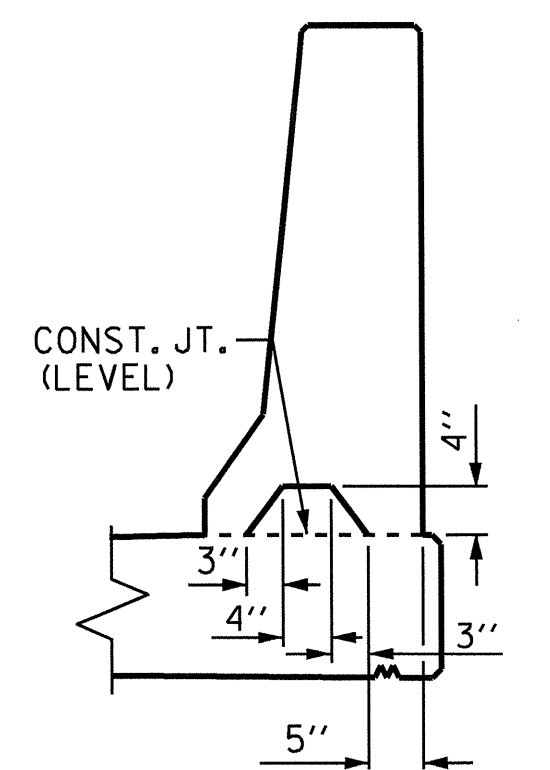
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

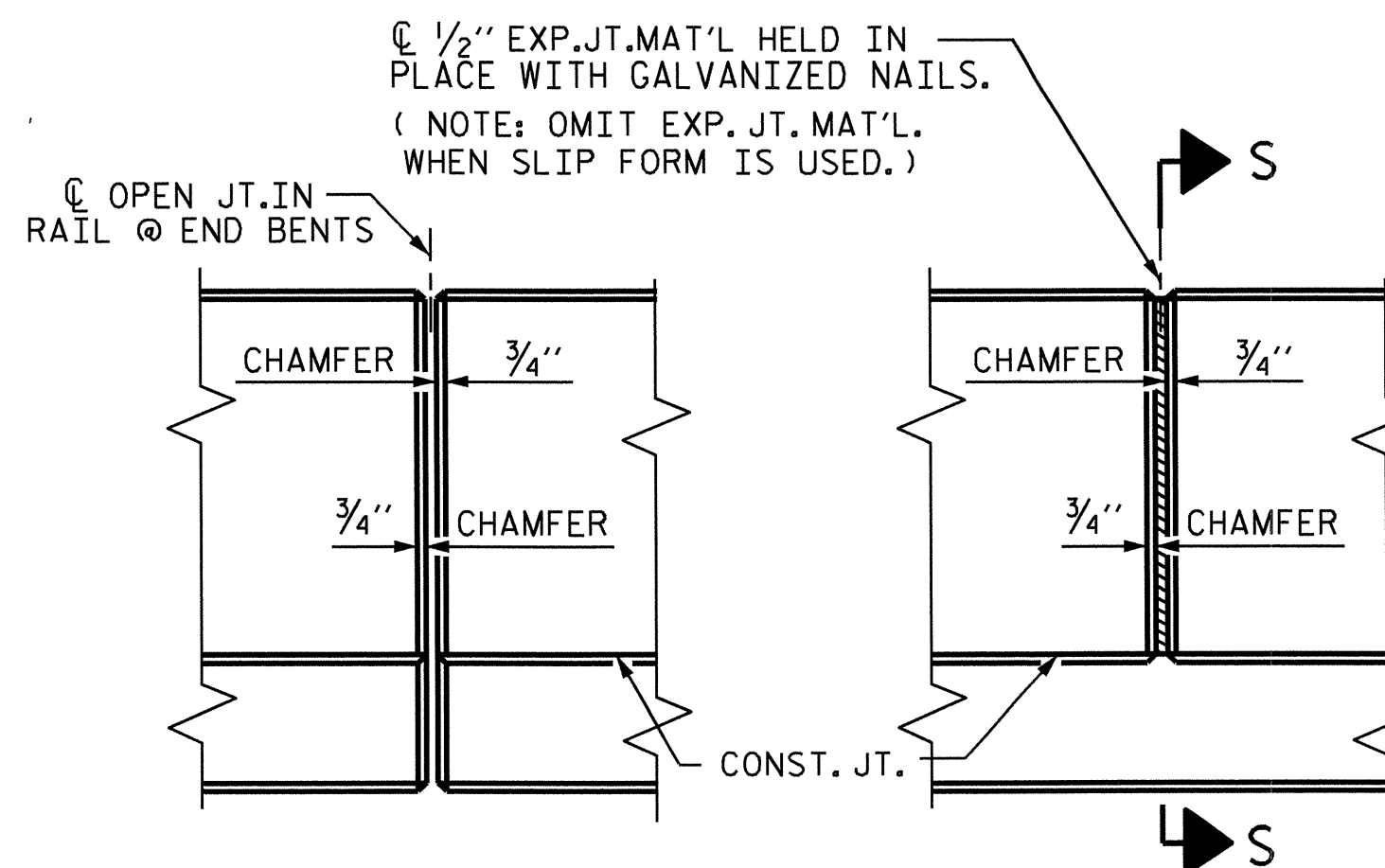
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS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



SECTION THRU RAIL



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

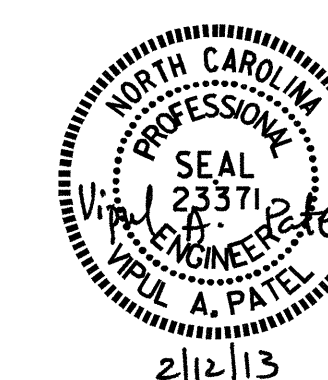


ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

ASSEMBLED BY : J.P. ADAMS	DATE: 7/11/12
CHECKED BY : J. KHARVA	DATE: 8/2012
DESIGN ENGINEER OF RECORD : H.A. LOCKLEAR	DATE: 7/2012
DRAWN BY : ARB 5/87	REV. 10/1/11
CHECKED BY : SJD 9/87	REV. 7/12
	REV. 10/12
	MAA/GM
	MAA/GM
	MAA/GM

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jpadams



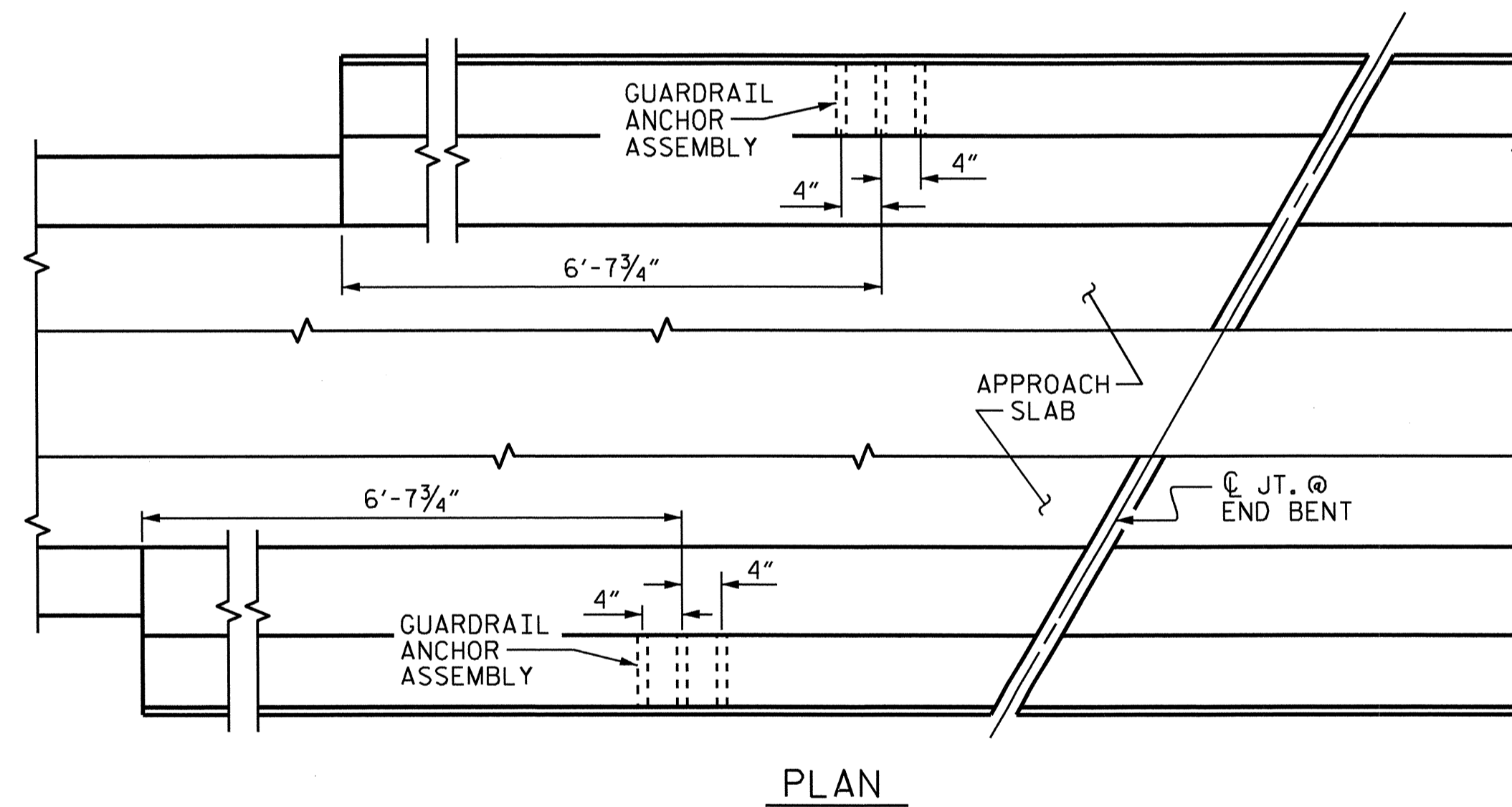
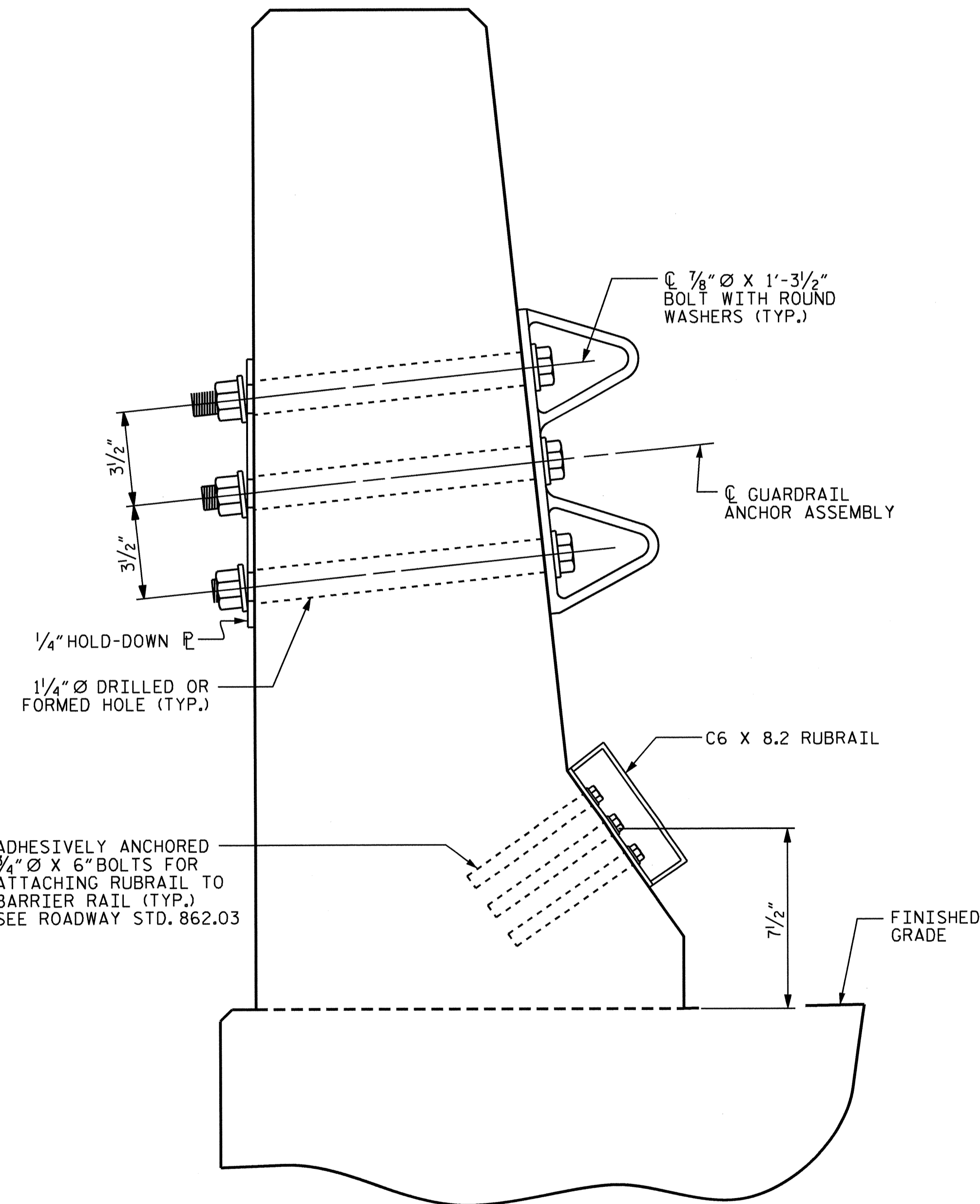
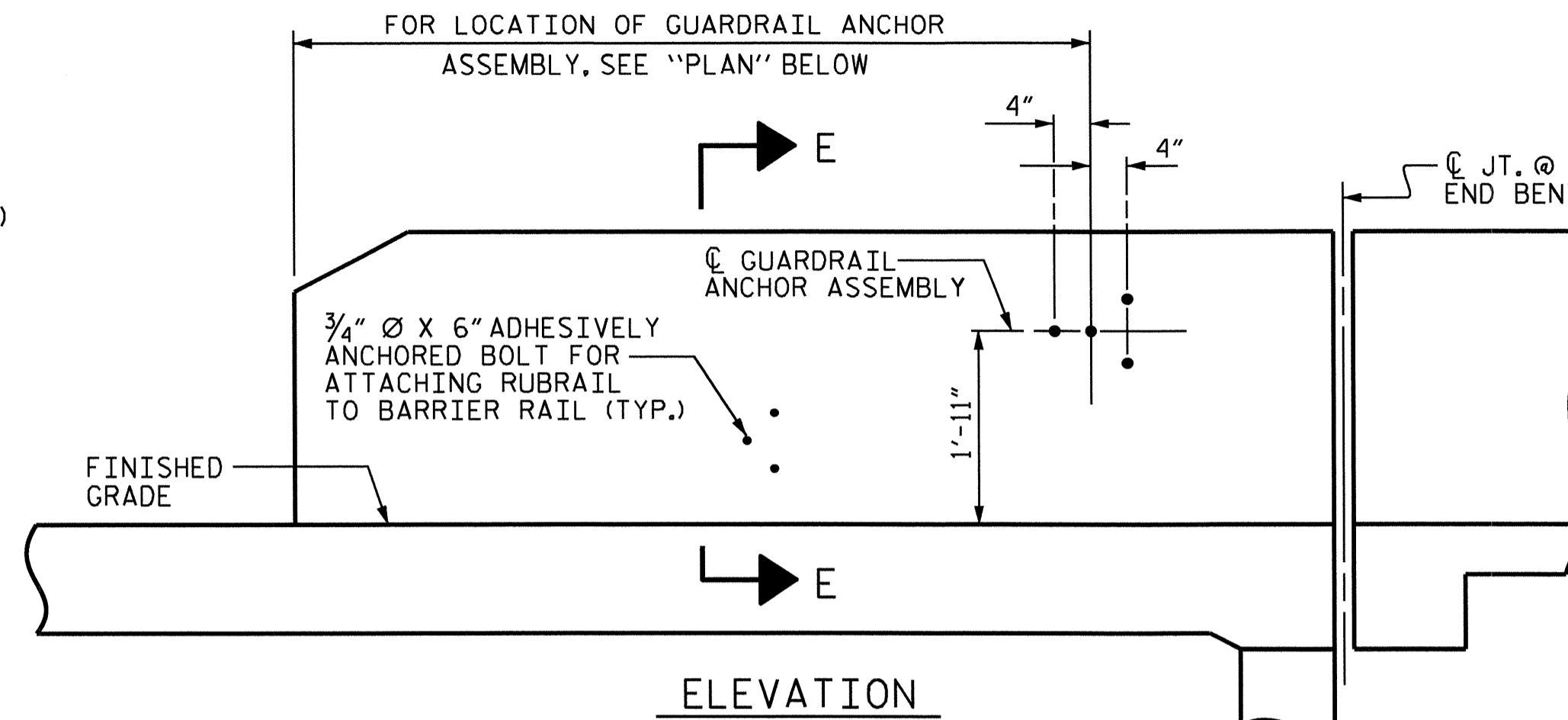
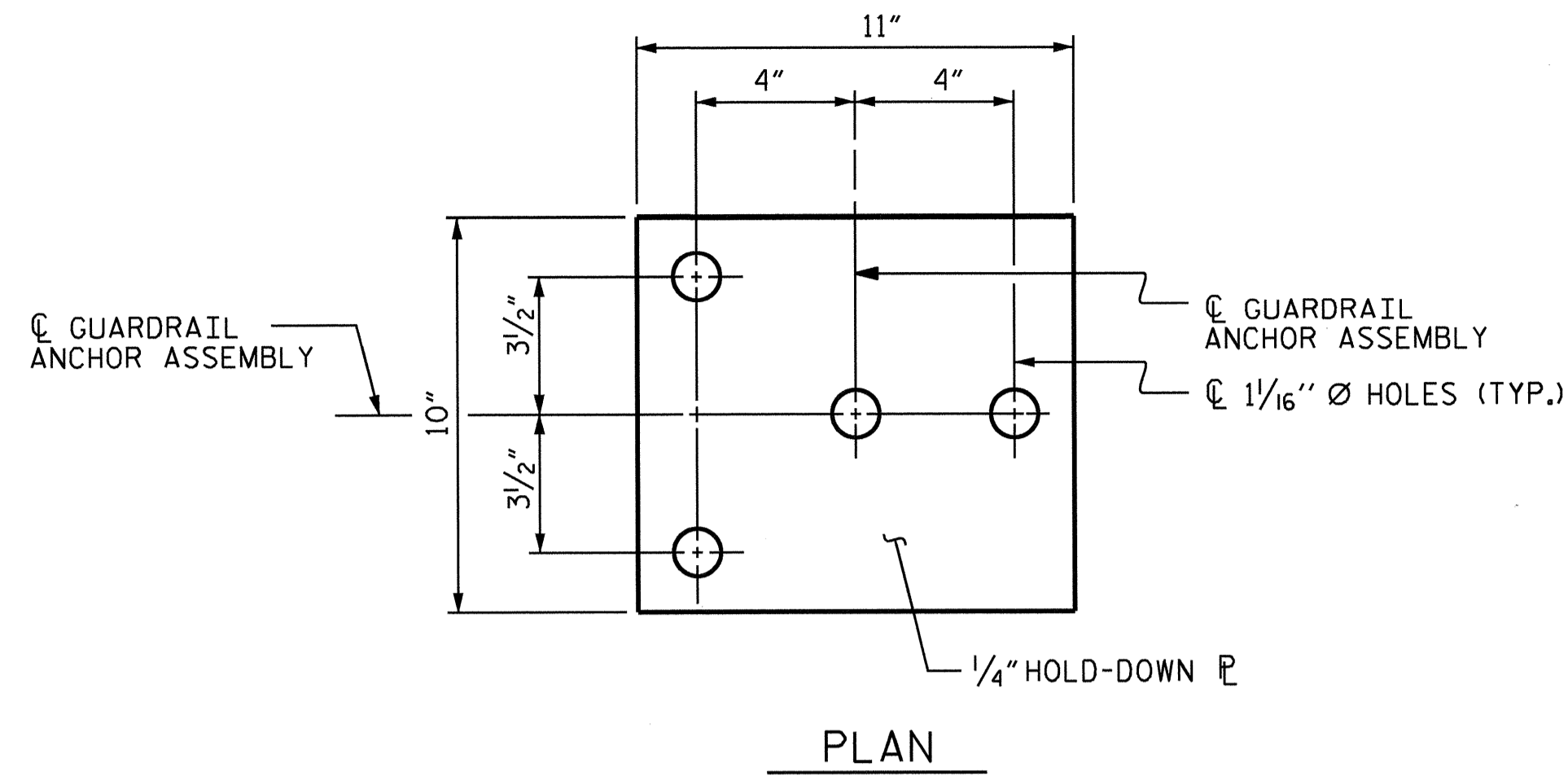
PROJECT NO. R-2246B
CABARRUS COUNTY
STATION: 80+56.83 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
CONCRETE
BARRIER RAIL
(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-43
1			3			TOTAL SHEETS 56
2			4			

STR. #2

STD. NO. CBR1 (SHT 2)



LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.

NOTES

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

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

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

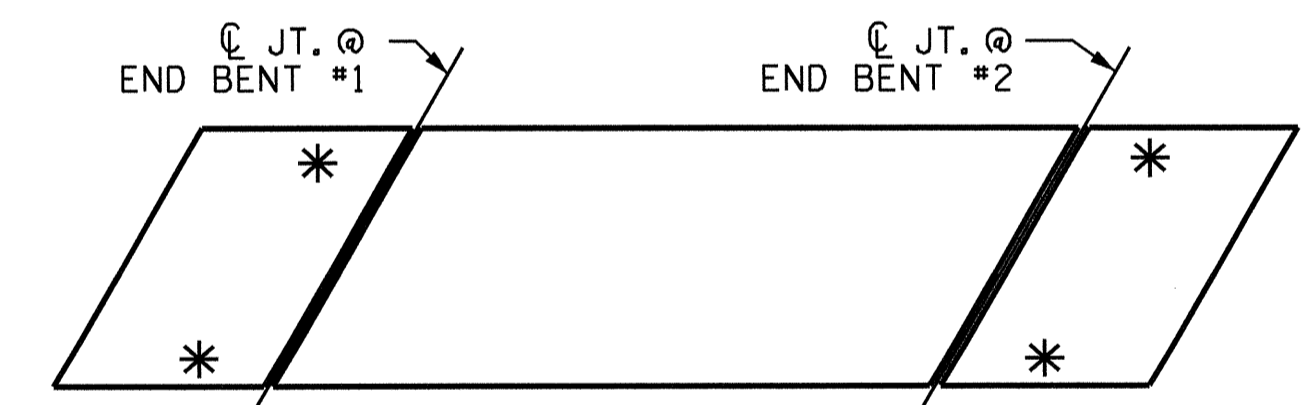
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

THE 1/4" 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.

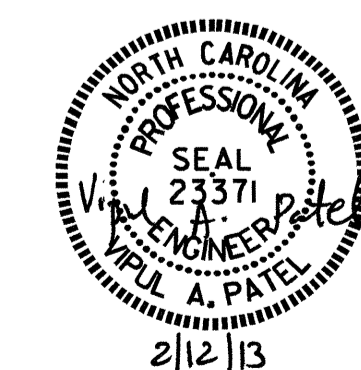
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR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



SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

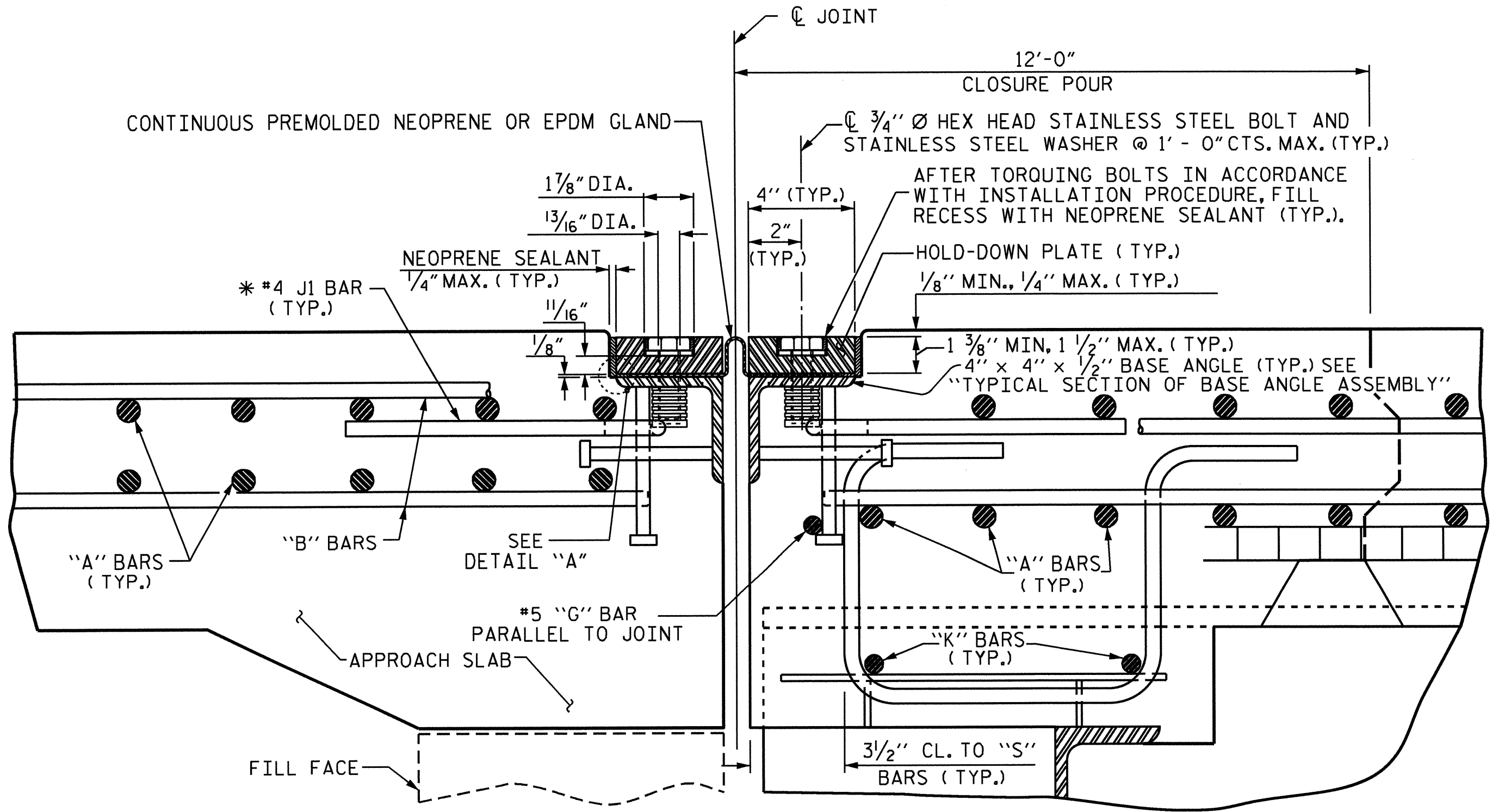
PROJECT NO. R-2246B
CABARRUS COUNTY
STATION: 80+56.83 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE
FOR BARRIER RAIL
(RIGHT LANE)

ASSEMBLED BY: J.P. ADAMS	DATE: 7/11/12
CHECKED BY: J. KHARVA	DATE: 8/2012
DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR	DATE: 7/2012
DRAWN BY: TLA 5/06	REV. 10/1/11 MAA/GM
CHECKED BY: GM 5/06	REV. 7/12 MAA/GM
	REV. 10/12 MAA/GM

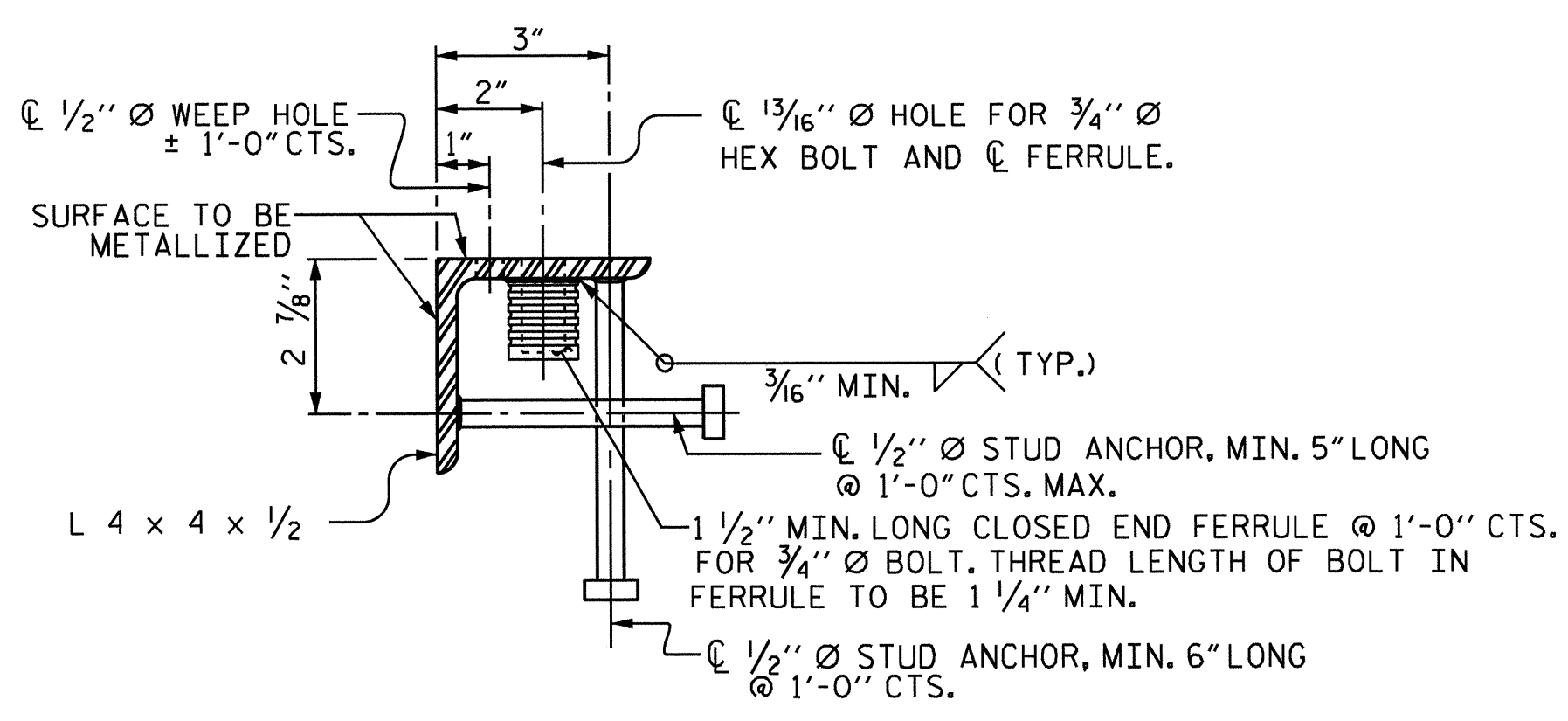
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-44	
1			3			TOTAL SHEETS	
2			4			56	



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- STEEL SUPERSTRUCTURE

* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

MOVEMENT AND SETTING AT JOINT					
LOCATION	SKEW ANGLE	TOTAL MOVEMENT (ALONG C RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
END BENT #1	100°-31'-55"	0	1 1/2"	1 1/2"	1 1/2"
END BENT #2	102°-20'-56"	2 9/16"	2 5/8"	2 1/4"	1 1/2"

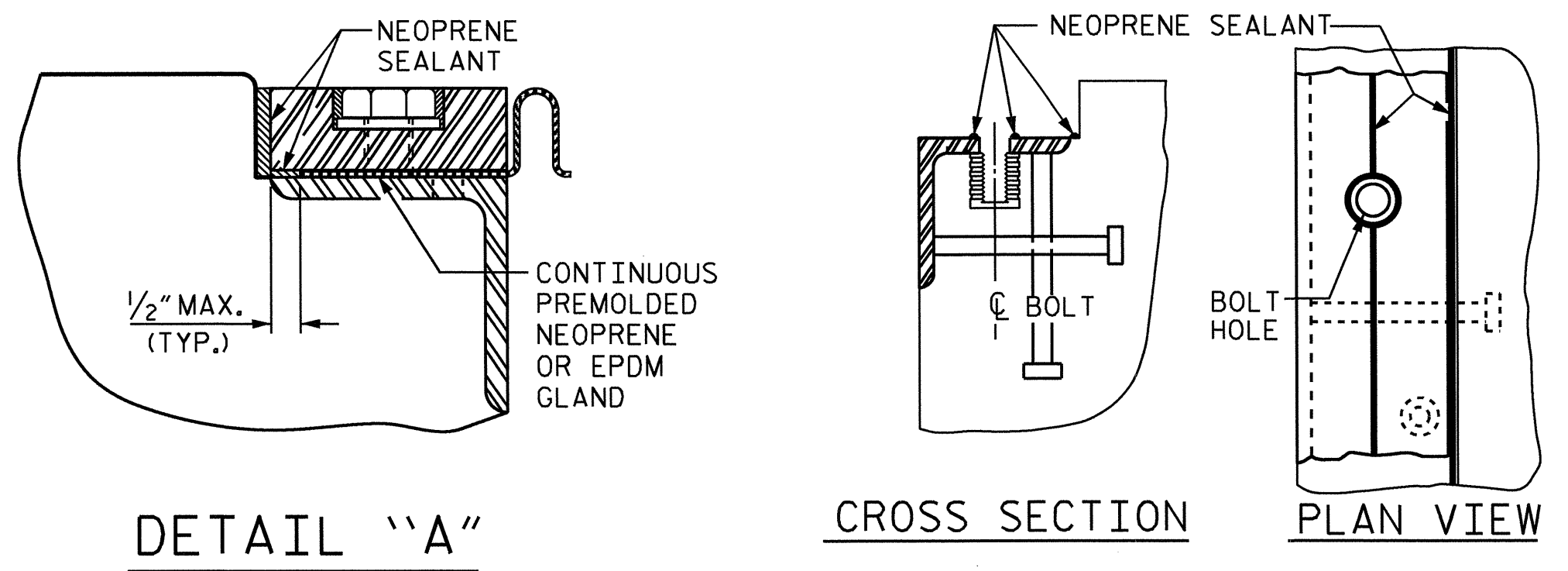
END BENT #1 IS THE FIXED JOINT WITH NO MOVEMENT.
END BENT #2 IS THE EXPANSION JOINT.

INSTALLATION PROCEDURE

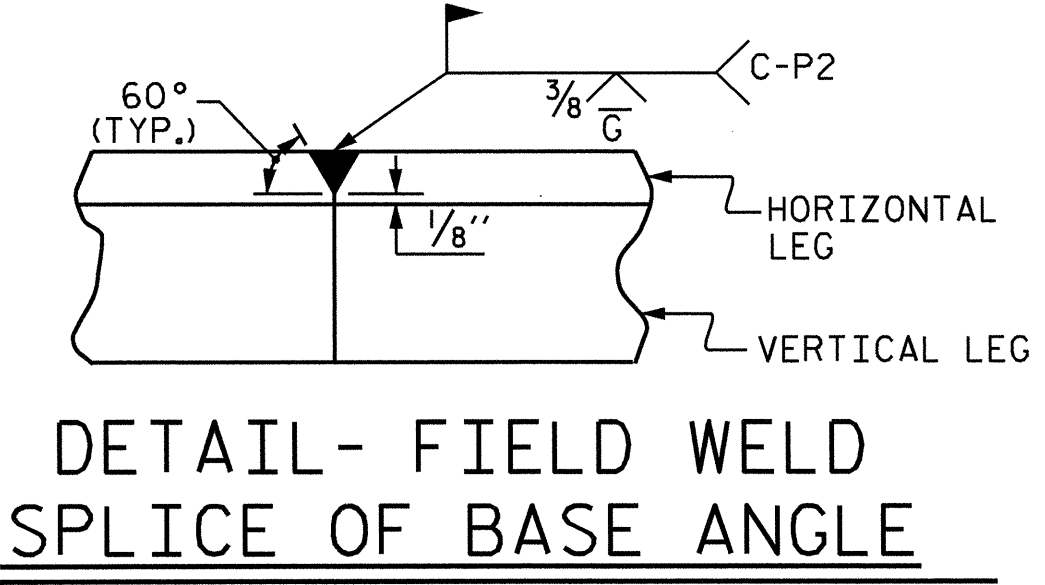
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4 1/8" TO 4 1/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED 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 7/8" 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. 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

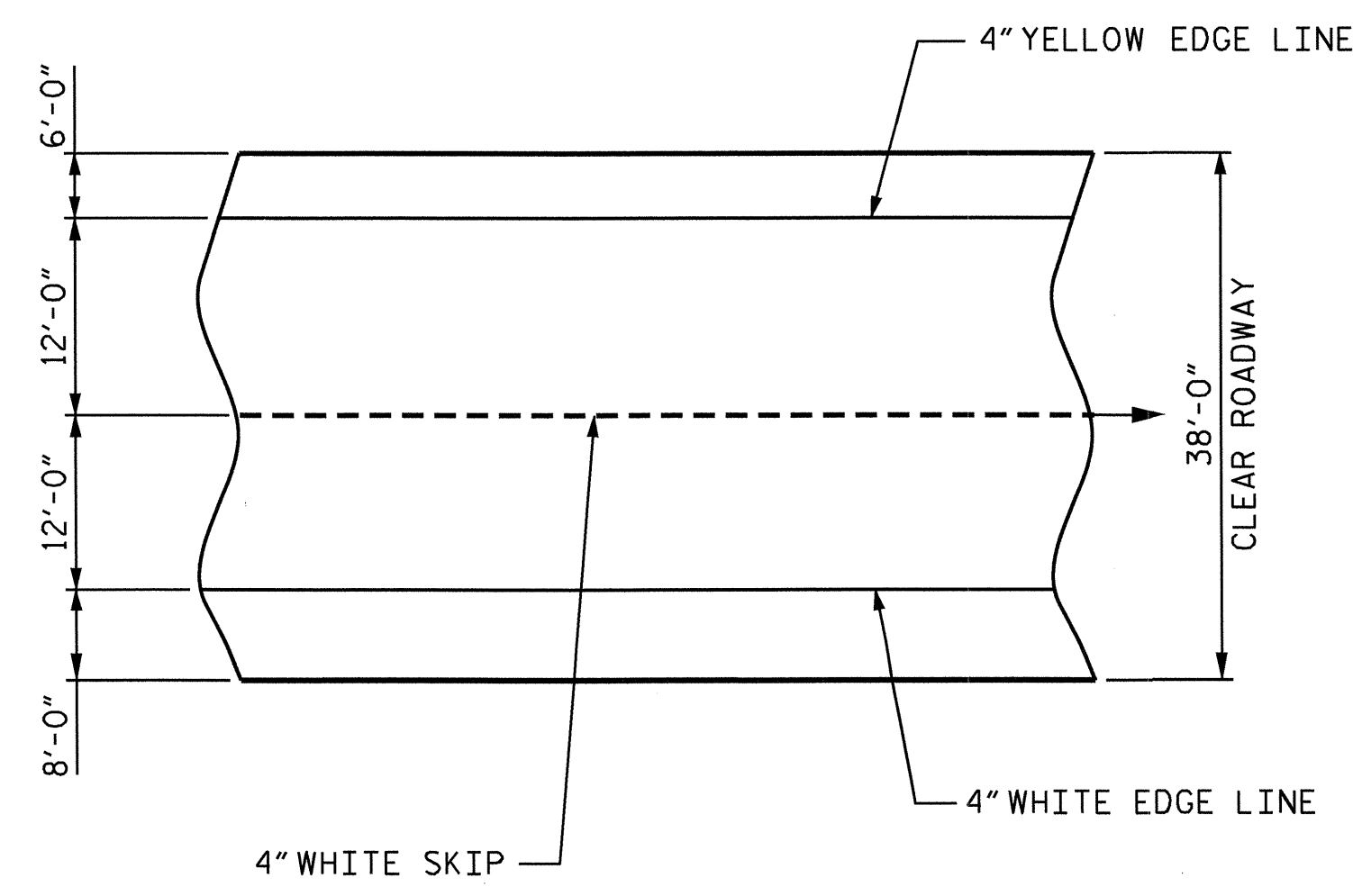
1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS 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.



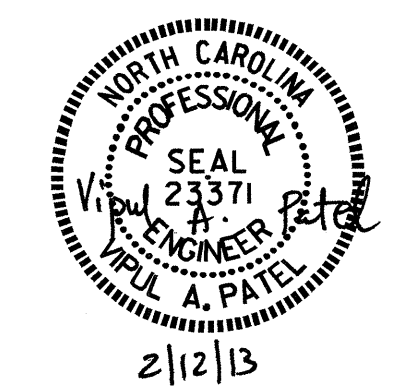
INSTALLATION SKETCH



DETAIL- FIELD WELD SPLICE OF BASE ANGLE



PAVEMENT MARKING ALIGNMENT



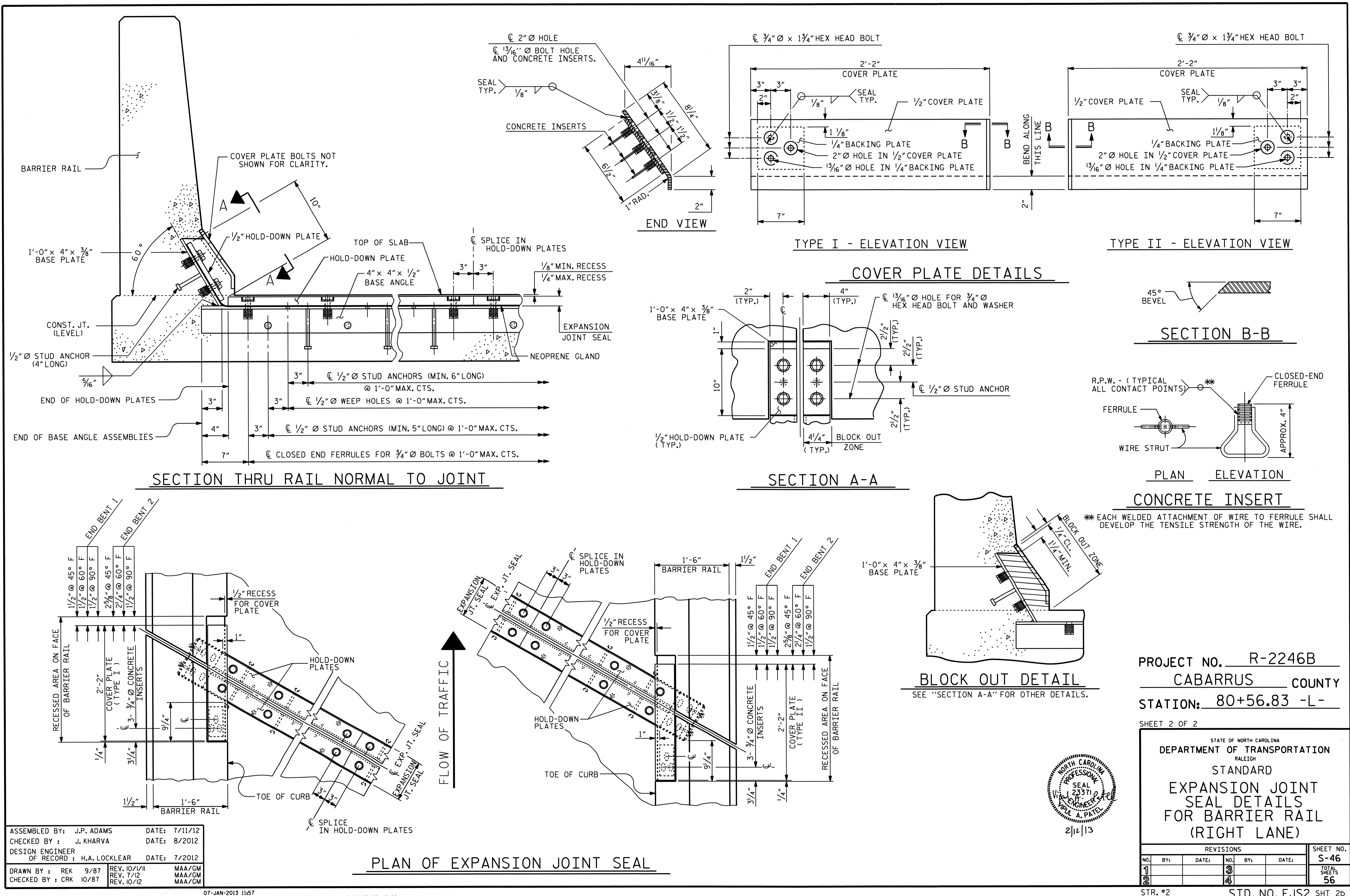
PROJECT NO. R-2246B
CABARRUS COUNTY
STATION: 80+56.83 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
EXPANSION JOINT
SEAL DETAILS
(RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-45
1			3			TOTAL SHEETS
2			4			56

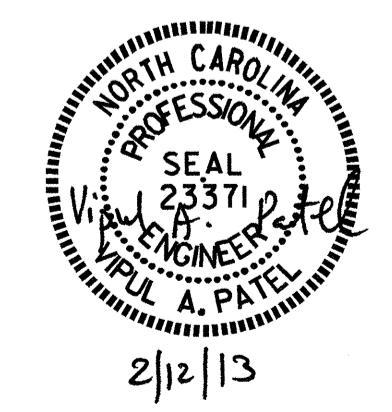
ASSEMBLED BY: J.P. ADAMS	DATE: 7/11/12
CHECKED BY: J. KHARVA	DATE: 8/2012
DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR	DATE: 7/2012
DRAWN BY: REK 9/87	REV. 5/77/03R RWW/JTE
CHECKED BY: CRK 10/87	REV. 5/1/06R TLA/GM
	REV. 10/12/11 MAA/GM



ASSEMBLED BY: J.P. ADAMS DATE: 7/11/12
 CHECKED BY: J. KHARVA DATE: 8/2012
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 7/2012
 DRAWN BY: REK 9/87 REV. 10/11/11 MAA/GM
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 REV. 10/12 MAA/GM

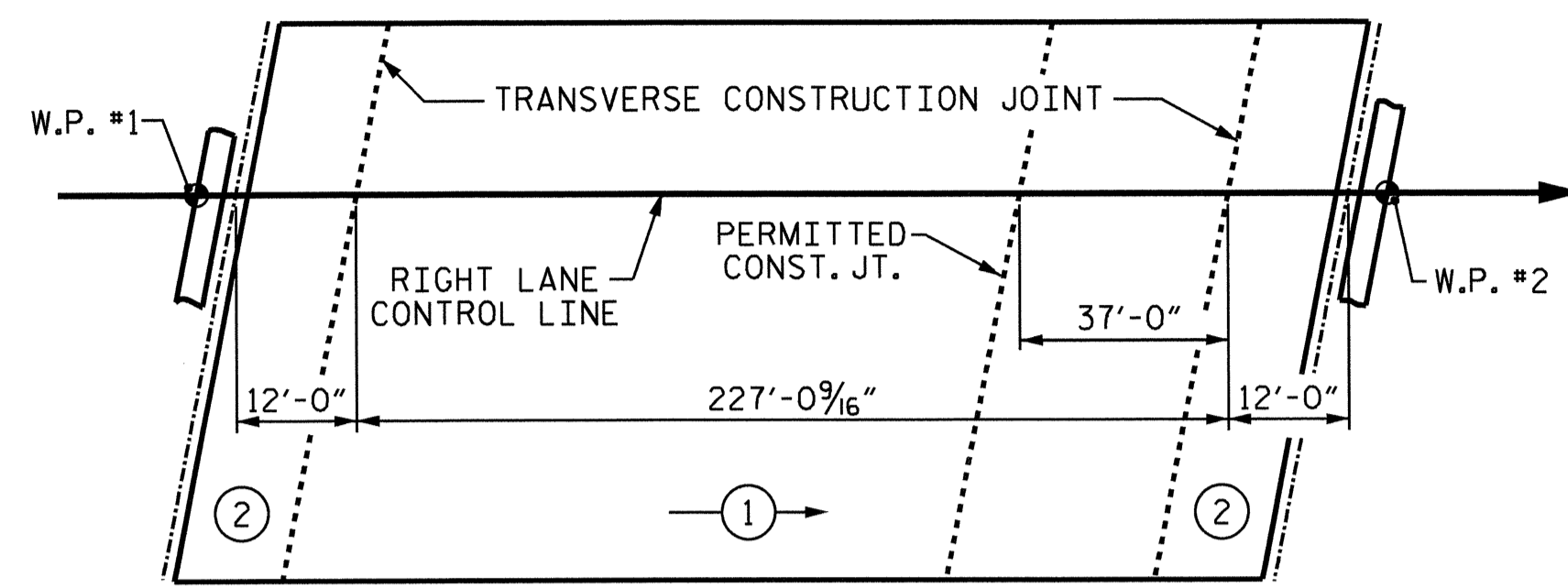
PLAN OF EXPANSION JOINT SEAL

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-
 SHEET 2 OF 2



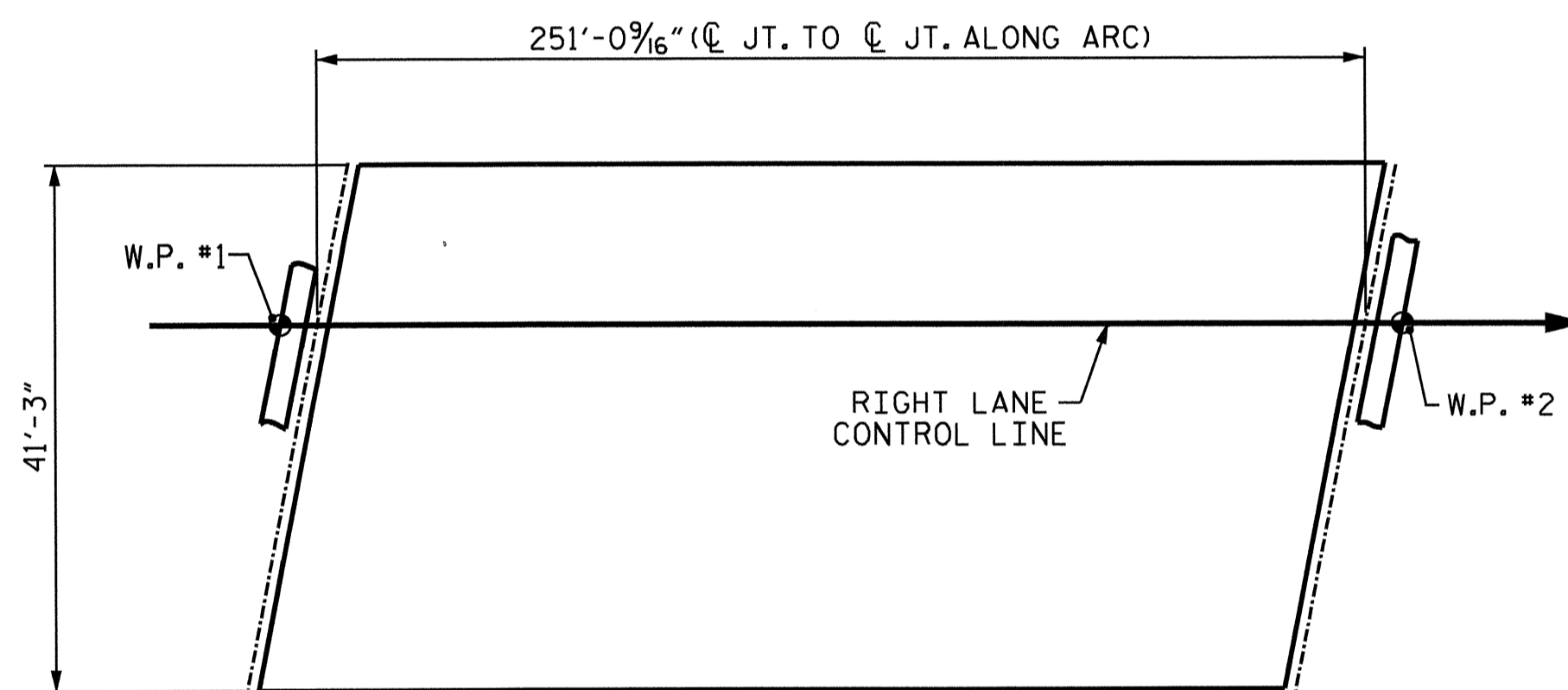
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL (RIGHT LANE)					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-46
TOTAL SHEETS 56



LAYOUT FOR POURING SEQUENCE OF REINFORCED CONCRETE DECK SLAB

○ → INDICATES POUR & DIRECTION

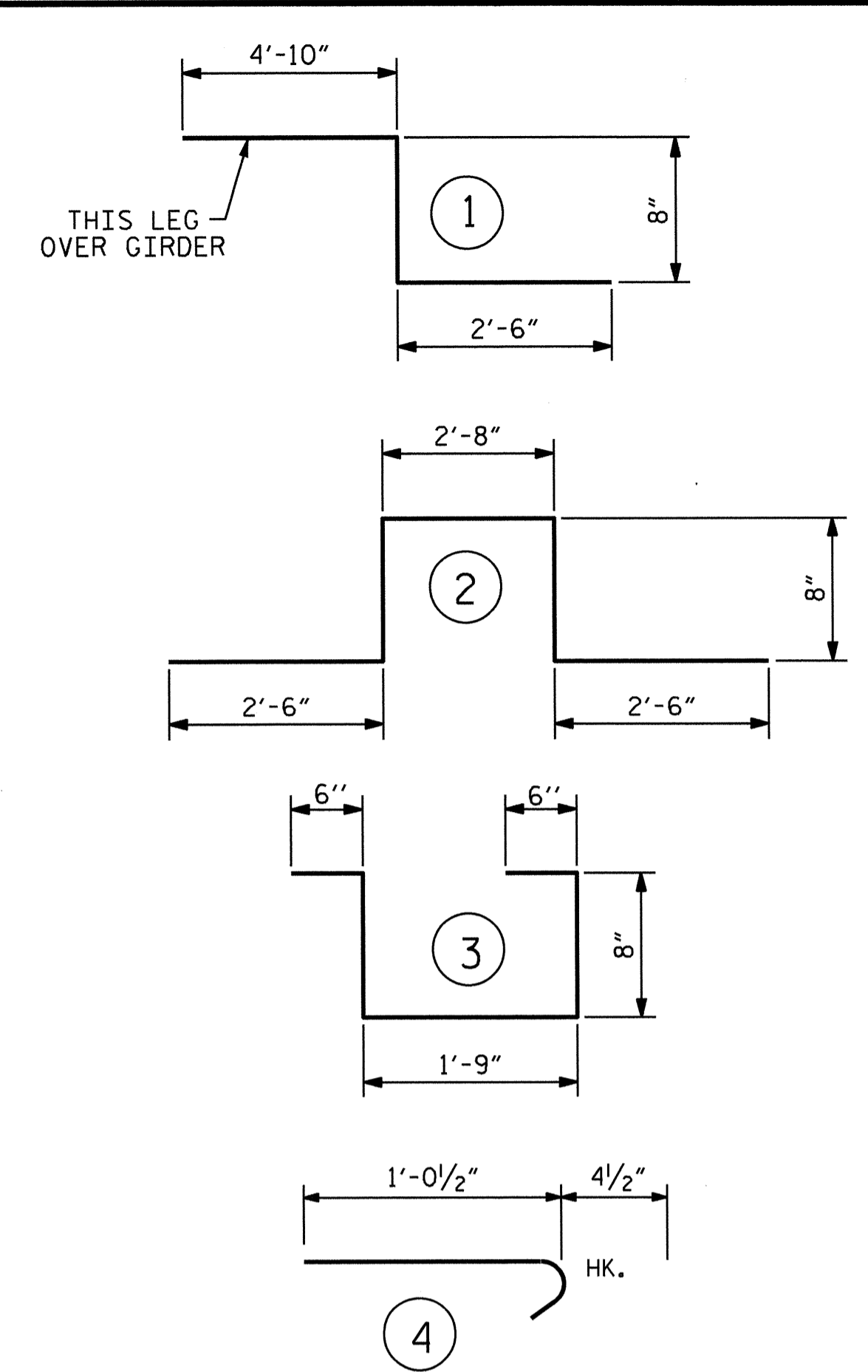


LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FT. = 10356)

REINFORCING BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	447	#5	STR	40'-11"	19076
A2	447	#5	STR	40'-11"	19076
*A101	2	#5	STR	39'-9"	83
*A102	2	#5	STR	37'-0"	77
*A103	2	#5	STR	34'-4"	72
*A104	2	#5	STR	31'-8"	66
*A105	2	#5	STR	29'-0"	60
*A106	2	#5	STR	26'-4"	55
*A107	2	#5	STR	23'-8"	49
*A108	2	#5	STR	21'-0"	44
*A109	2	#5	STR	18'-4"	38
*A110	2	#5	STR	15'-7"	33
*A111	2	#5	STR	12'-11"	27
*A112	2	#5	STR	10'-3"	21
*A113	2	#5	STR	7'-7"	16
*A114	2	#5	STR	4'-10"	10
*A115	2	#5	STR	2'-3"	5
A201	2	#5	STR	39'-9"	83
A202	2	#5	STR	37'-0"	77
A203	2	#5	STR	34'-4"	72
A204	2	#5	STR	31'-8"	66
A205	2	#5	STR	29'-0"	60
A206	2	#5	STR	26'-4"	55
A207	2	#5	STR	23'-8"	49
A208	2	#5	STR	21'-0"	44
A209	2	#5	STR	18'-4"	38
A210	2	#5	STR	15'-7"	33
A211	2	#5	STR	12'-11"	27
A212	2	#5	STR	10'-3"	21
A213	2	#5	STR	7'-7"	16
A214	2	#5	STR	4'-10"	10
A215	2	#5	STR	2'-3"	5
B1	200	#5	STR	51'-11"	10830
* B2	261	#4	STR	29'-8"	5172
* G1	2	#5	STR	41'-8"	87
* J1	82	#4	4	1'-5"	78
* K1	12	#5	1	8'-0"	100
* K2	18	#5	2	9'-0"	169
* K3	24	#5	STR	8'-3"	207
* S1	48	#4	3	4'-1"	131
REINFORCING STEEL (LBS.)				30562	
* EPOXY COATED REINFORCING STEEL (LBS.)				25676	

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.)
POUR 1	300.0		
POUR 2	44.0		
TOTALS**	344.0	30562	25676

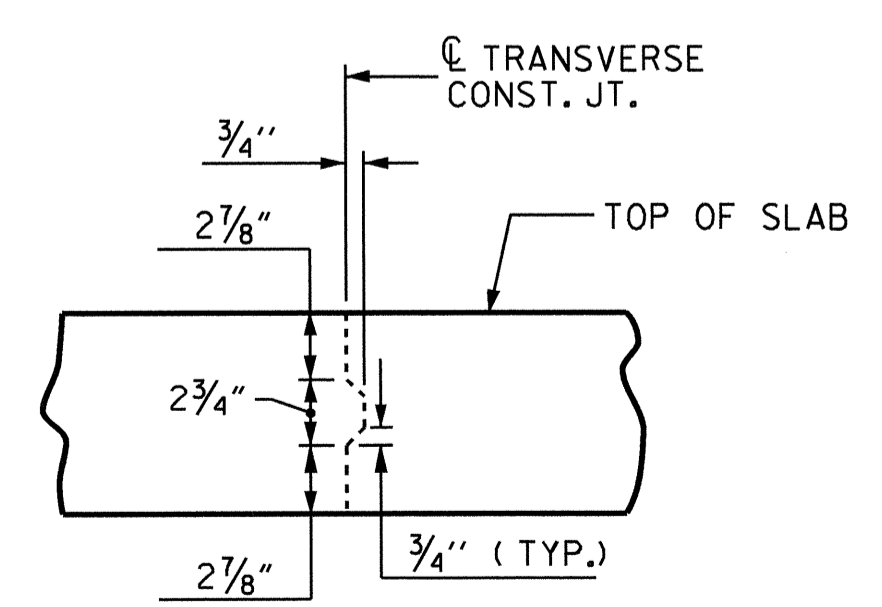
**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

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

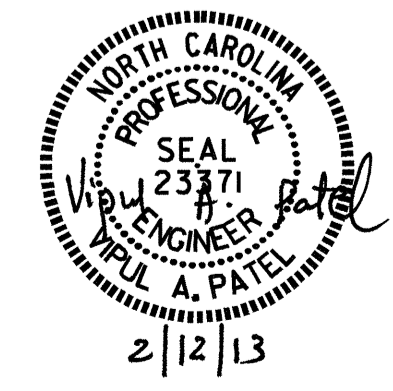
APPROACH SLABS	1667 SO.FT.
BRIDGE DECK	8748 SO.FT.
TOTAL	10415 SO.FT.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

ASSEMBLED BY: J.P. ADAMS	DATE: 7/11/12
CHECKED BY: J. KHARVA	DATE: 8/2012
DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR	DATE: 7/2012
DRAWN BY: JMB 5/87	REV. 8/16/99 RWW/LES
CHECKED BY: SJD 9/87	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM



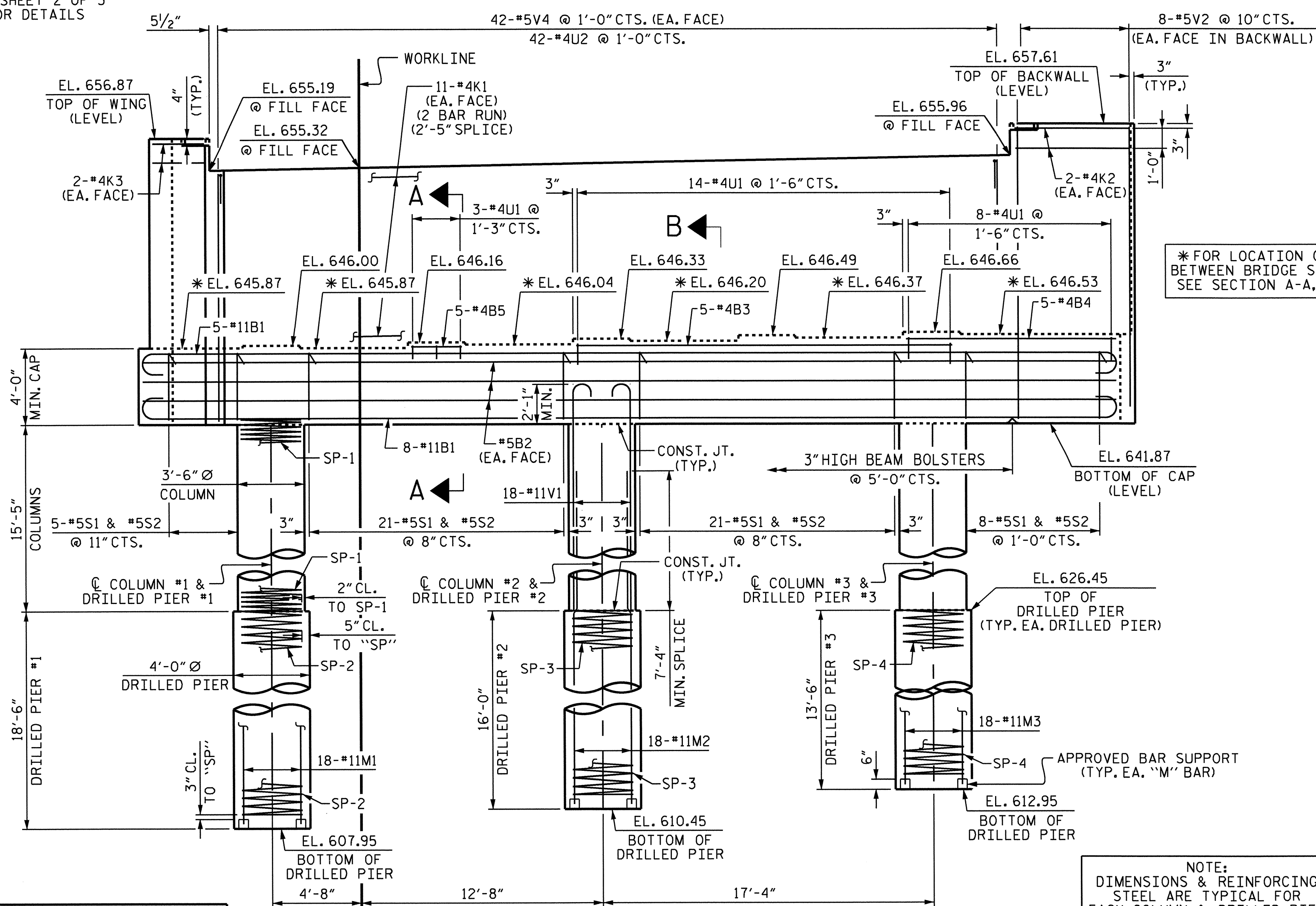
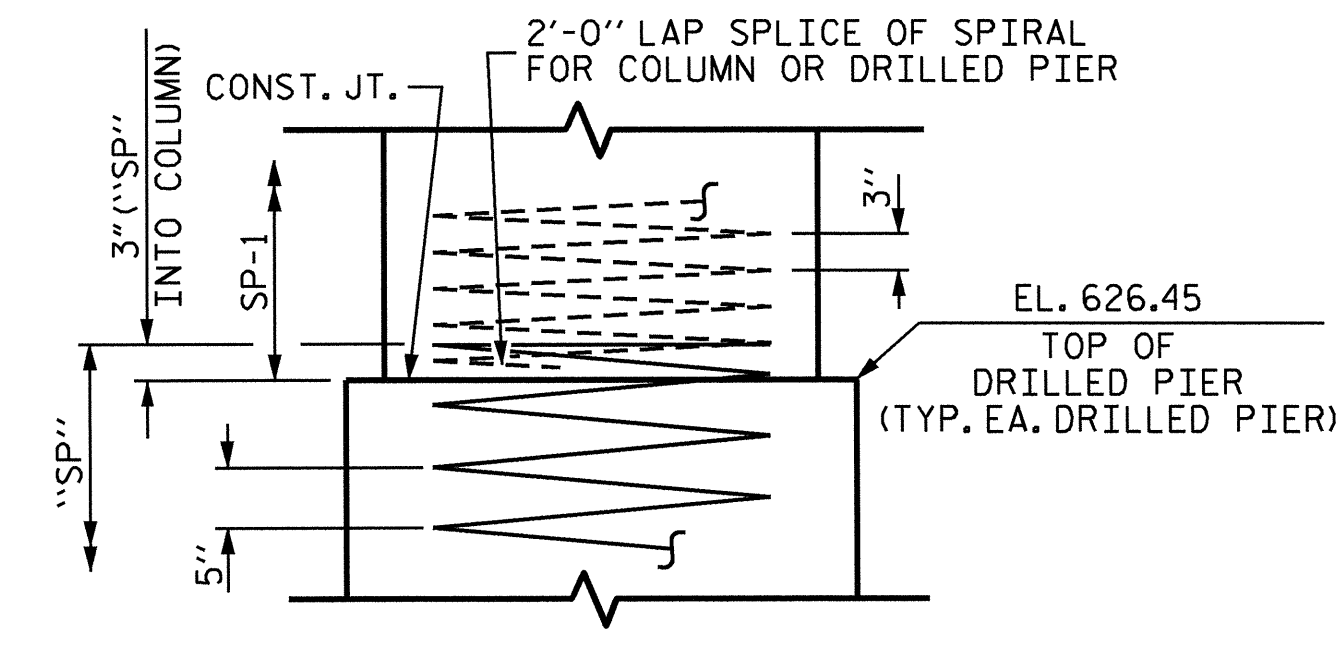
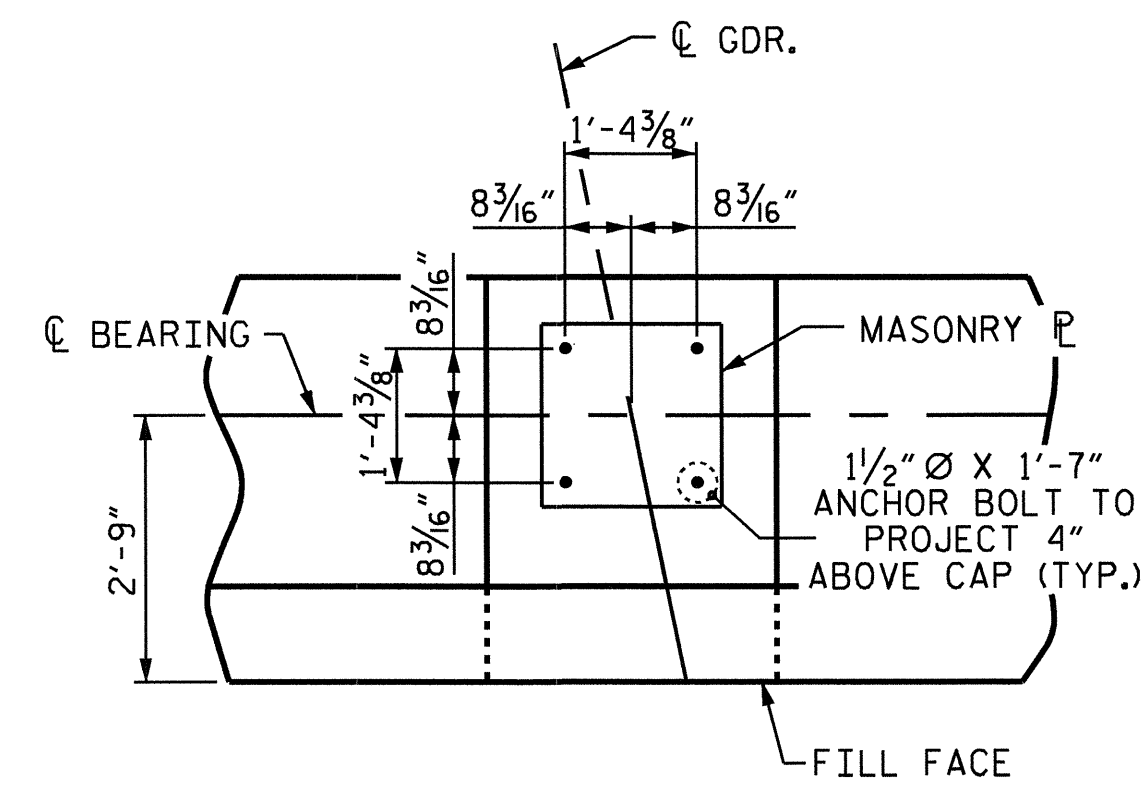
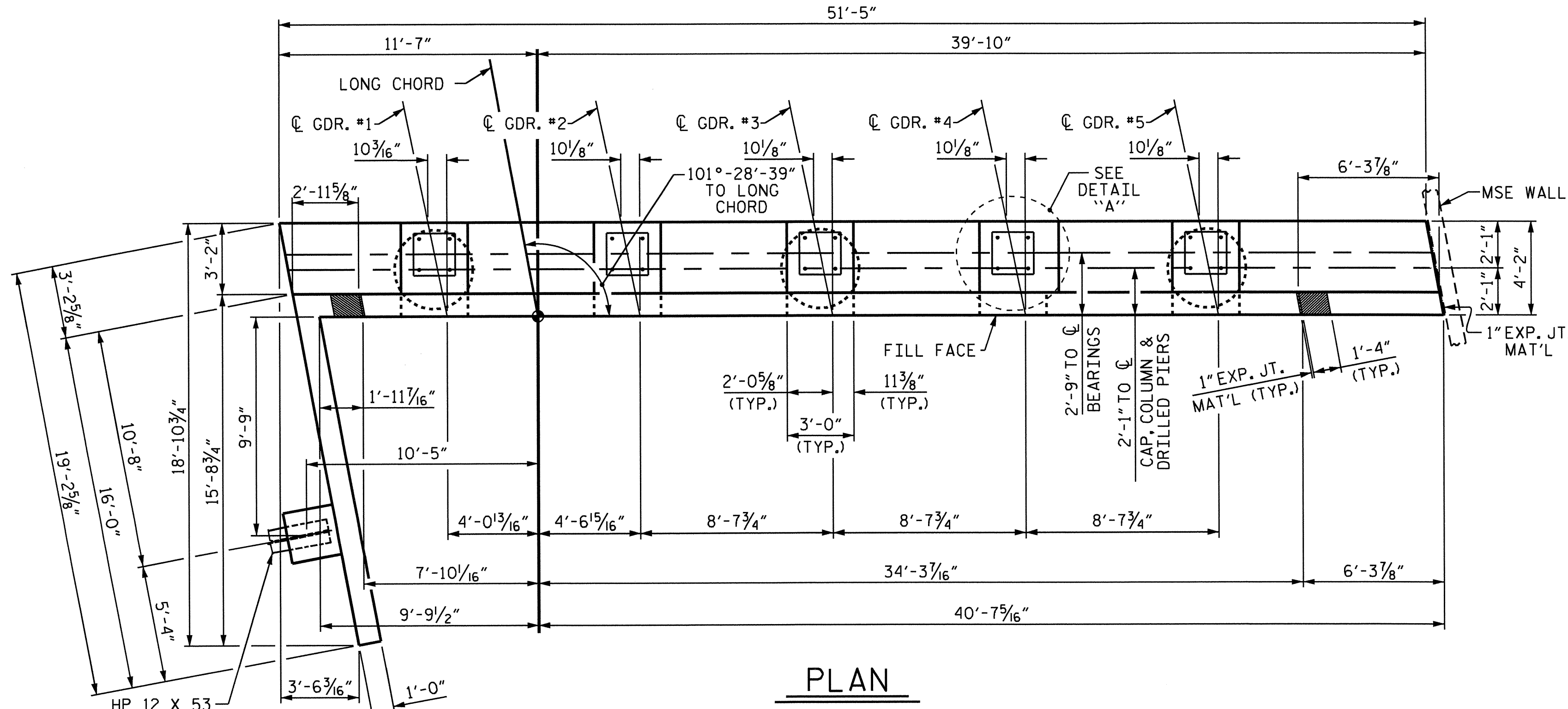
PROJECT NO. R-2246B
CABARRUS COUNTY
STATION: 80+56.83 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
SUPERSTRUCTURE
BILL OF MATERIAL
(RIGHT LANE)

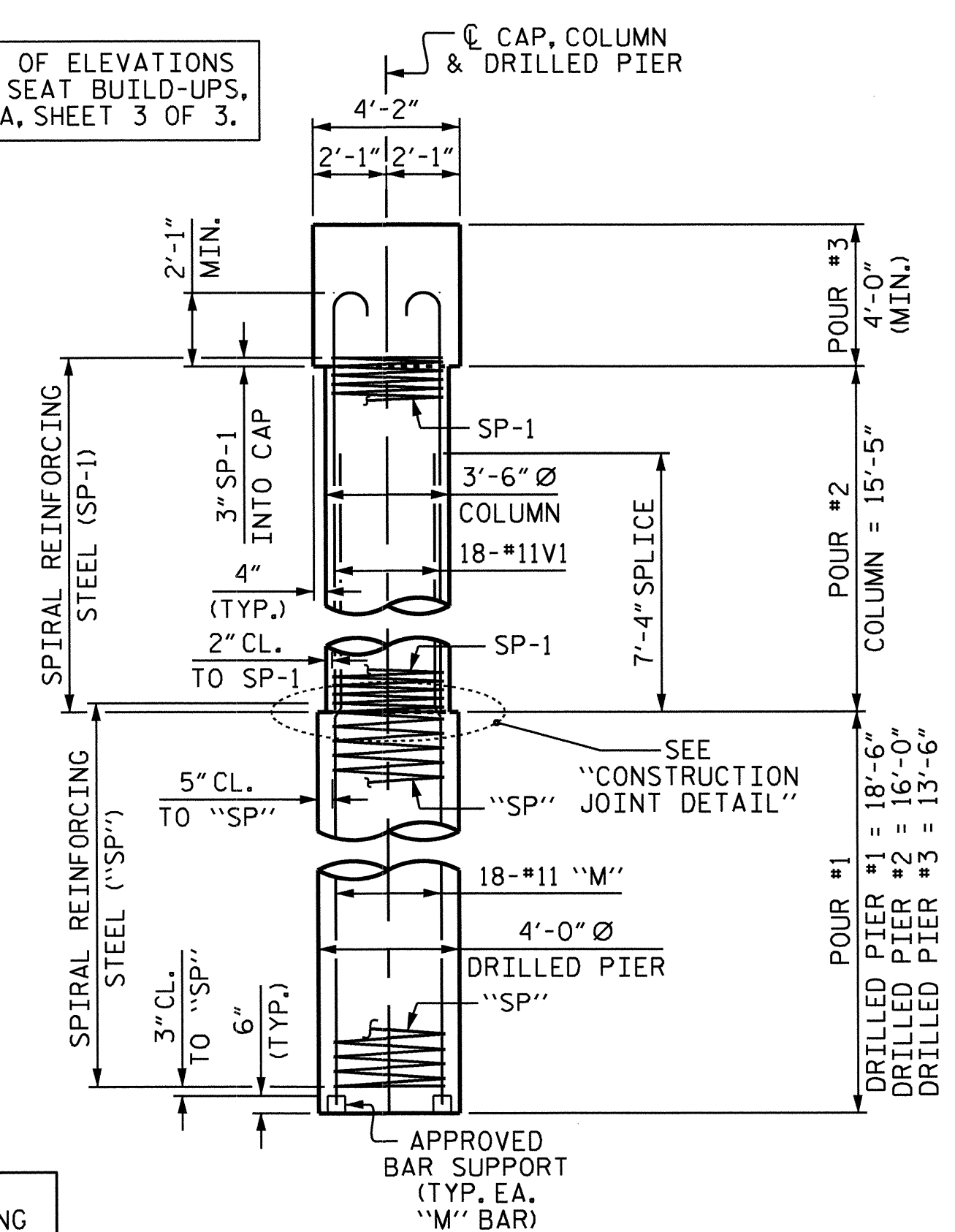
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-47
2			4			TOTAL SHEETS 56

NOTES

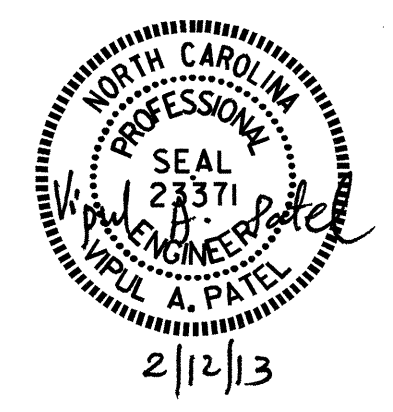
- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
- HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
- THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.
- ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".



* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A, SHEET 3 OF 3.



NOTE: DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED

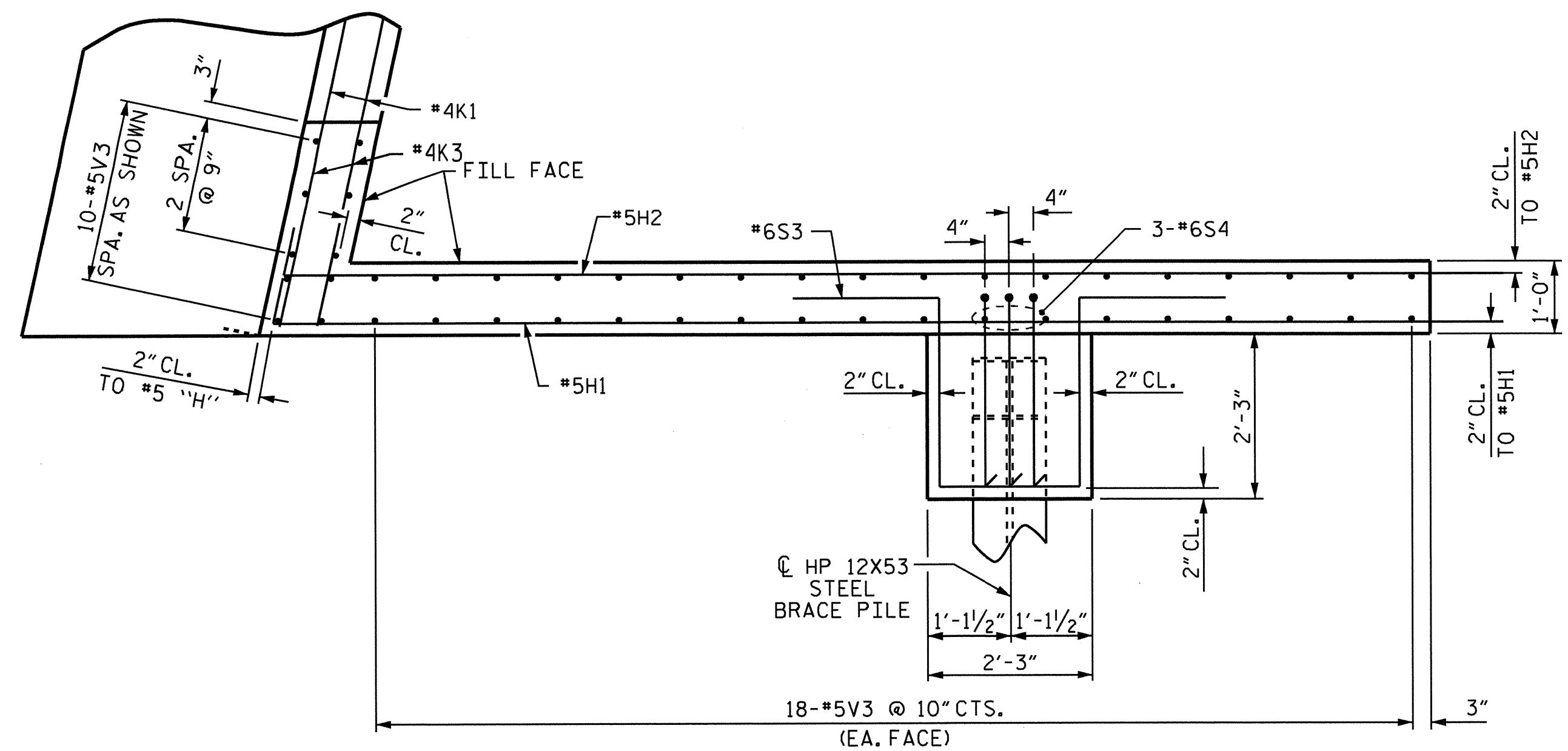


PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-

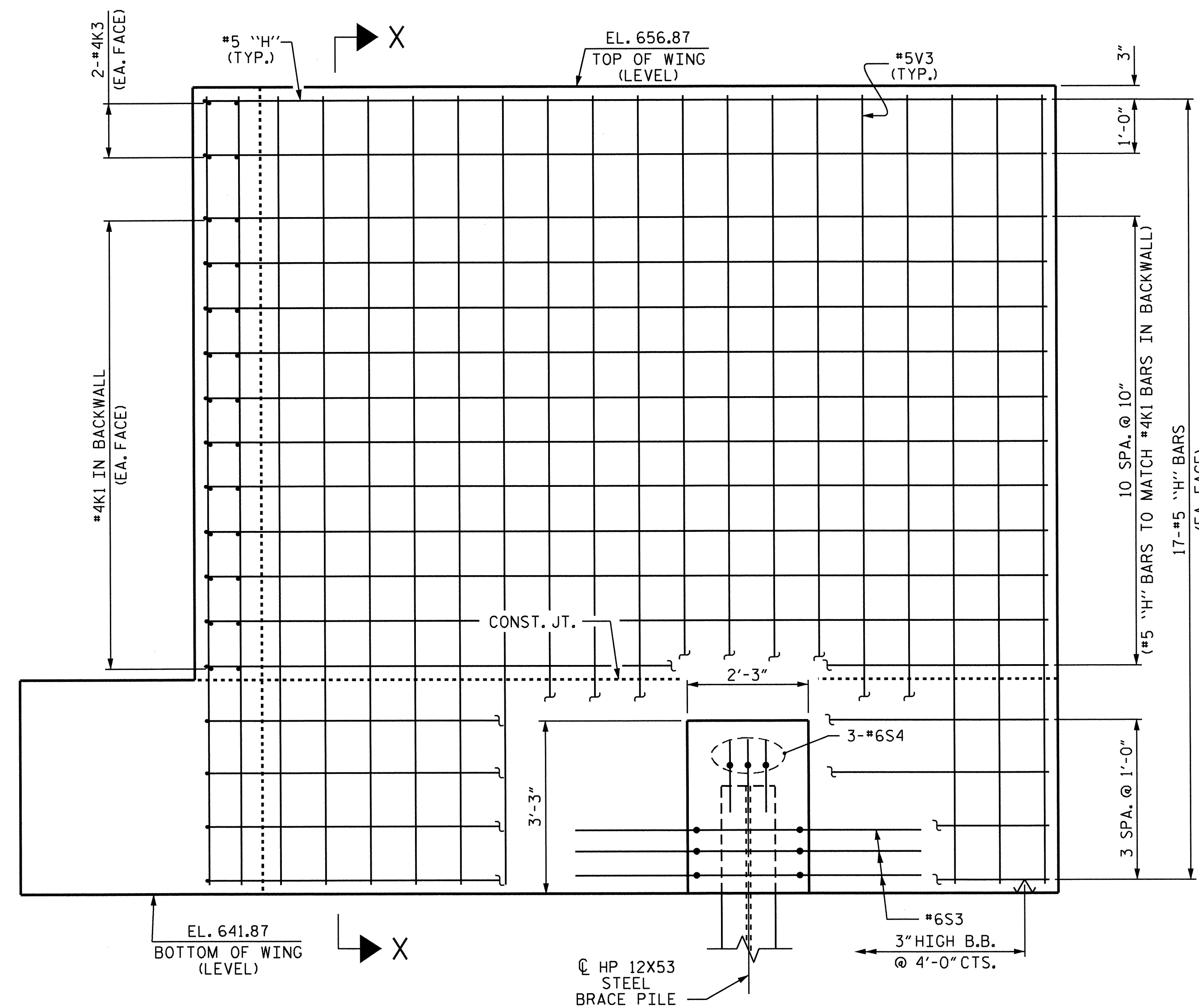
SHEET 1 OF 3

REVISIONS						SHEET NO. S-48
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 56
2			4			

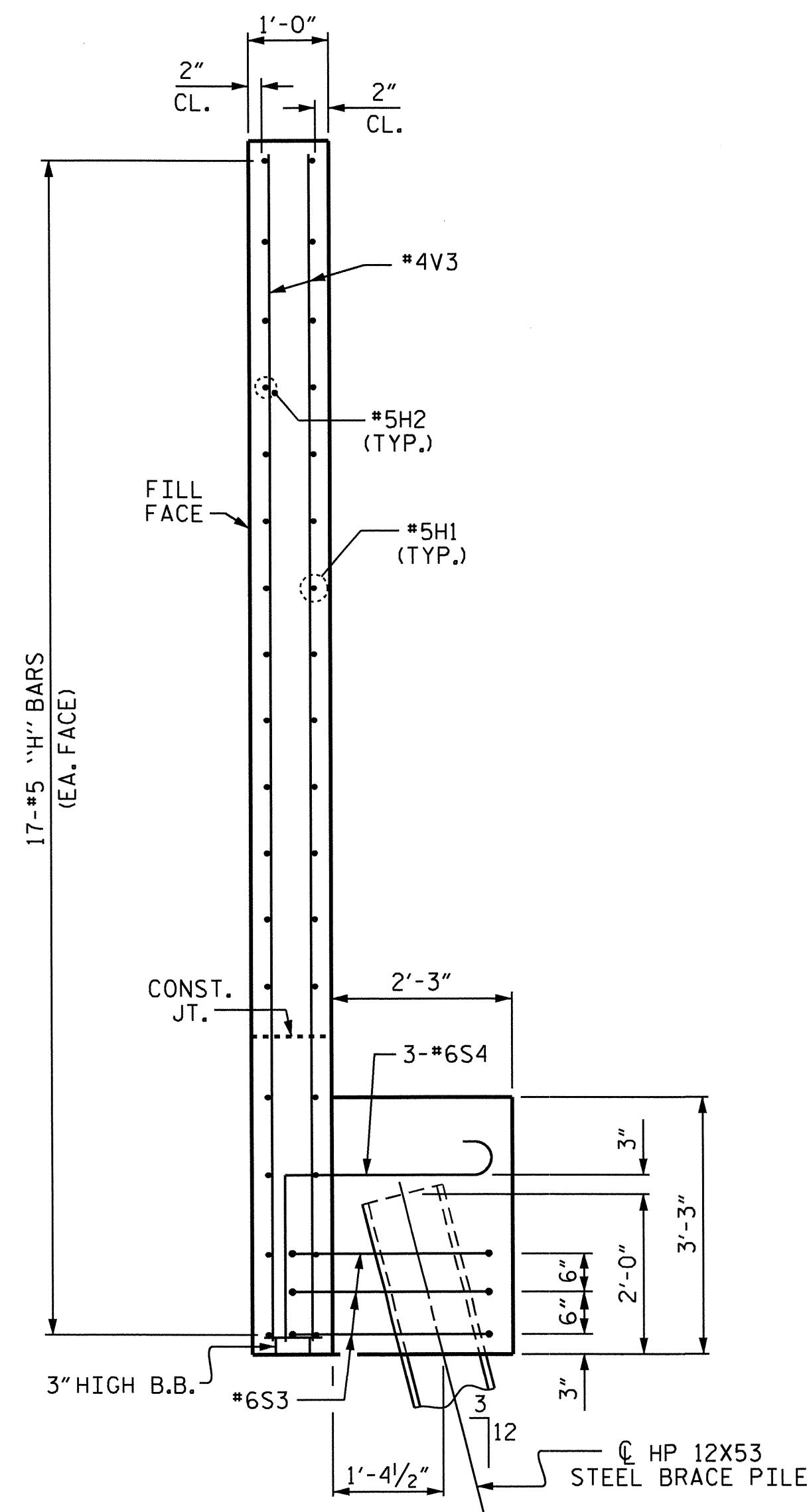
DRAWN BY: J.P. ADAMS DATE: 10/29/12
 CHECKED BY: J. KHARVA DATE: 11/20/12
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 7/20/12



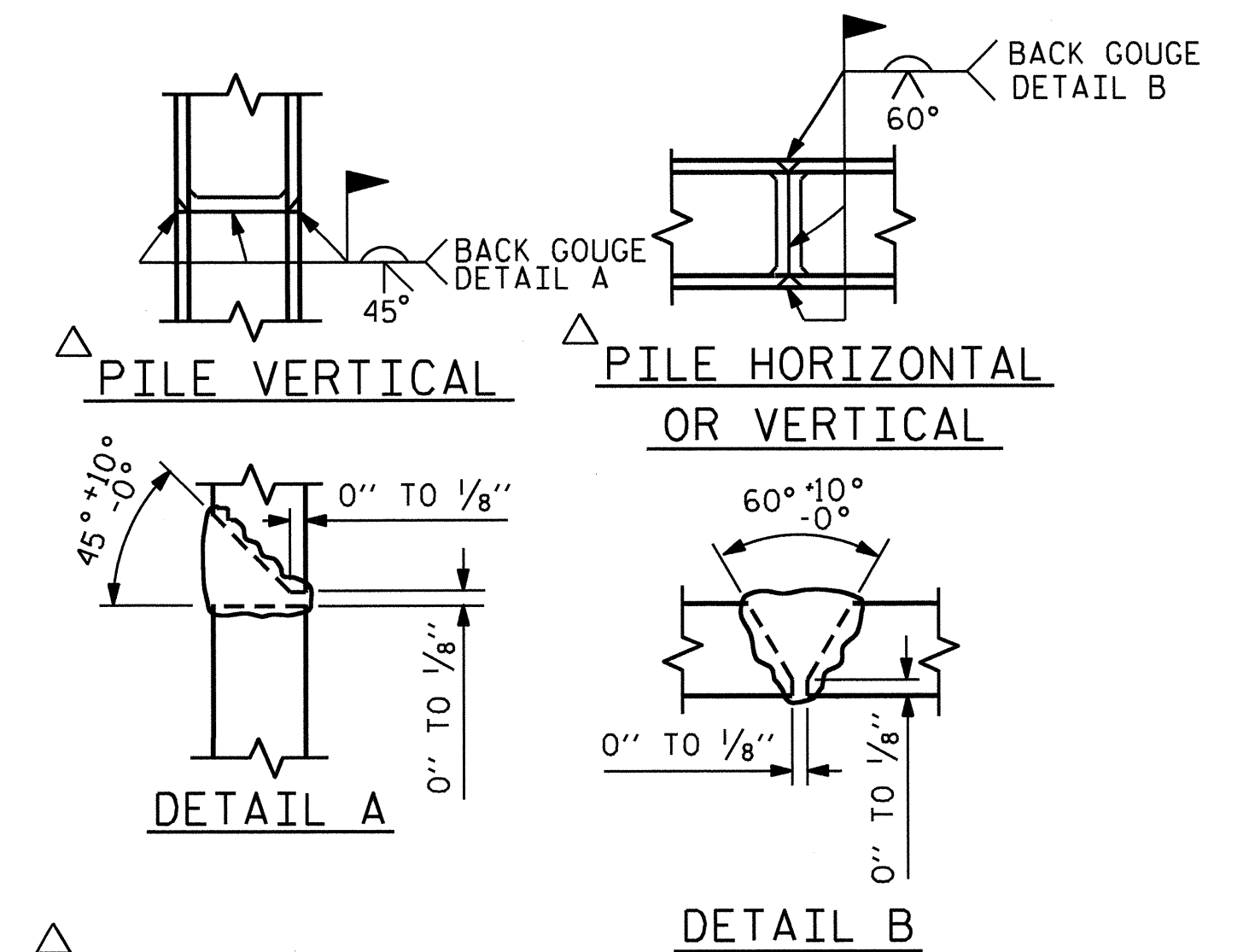
PLAN OF WING



ELEVATION OF WING



SECTION X-X



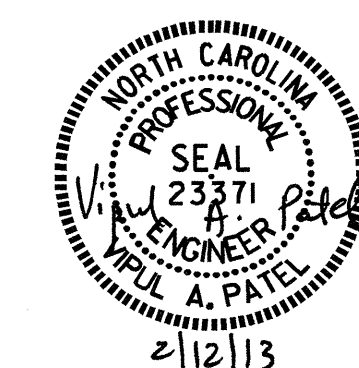
PILE SPLICE DETAILS

DRAWN BY : J.P. ADAMS DATE : 10/18/12
 CHECKED BY : J. KHARVA DATE : 11/2012
 DESIGN ENGINEER OF RECORD : H.A. LOCKLEAR DATE : 07/2012

07-JAN-2013 11:57
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 jpadams

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 2 OF 3



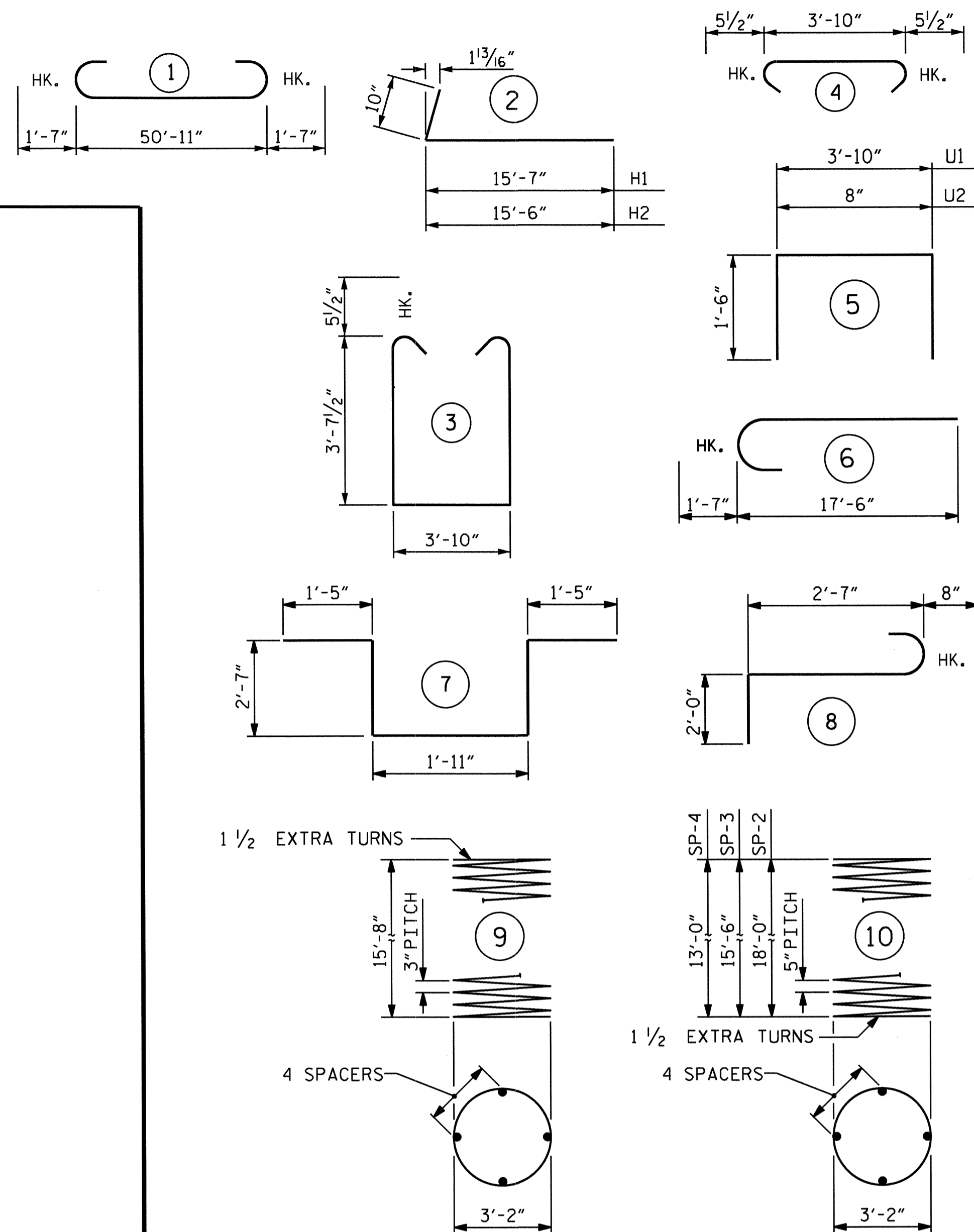
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT #1
 (RIGHT LANE)

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-49	
1			3			TOTAL SHEETS	
2			4			56	

STR. #2

BAR TYPES

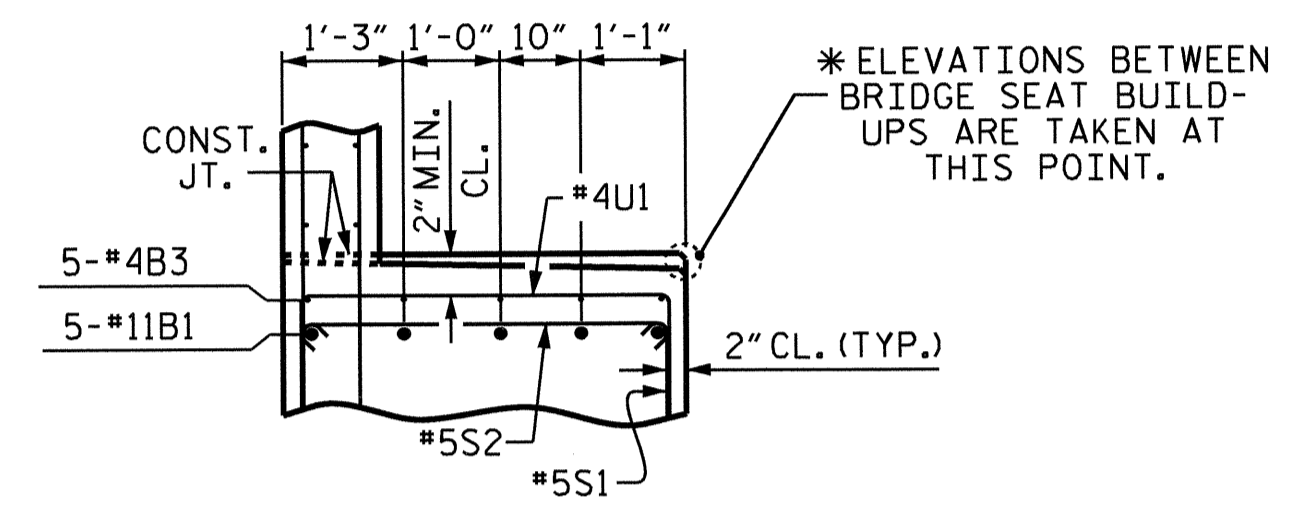
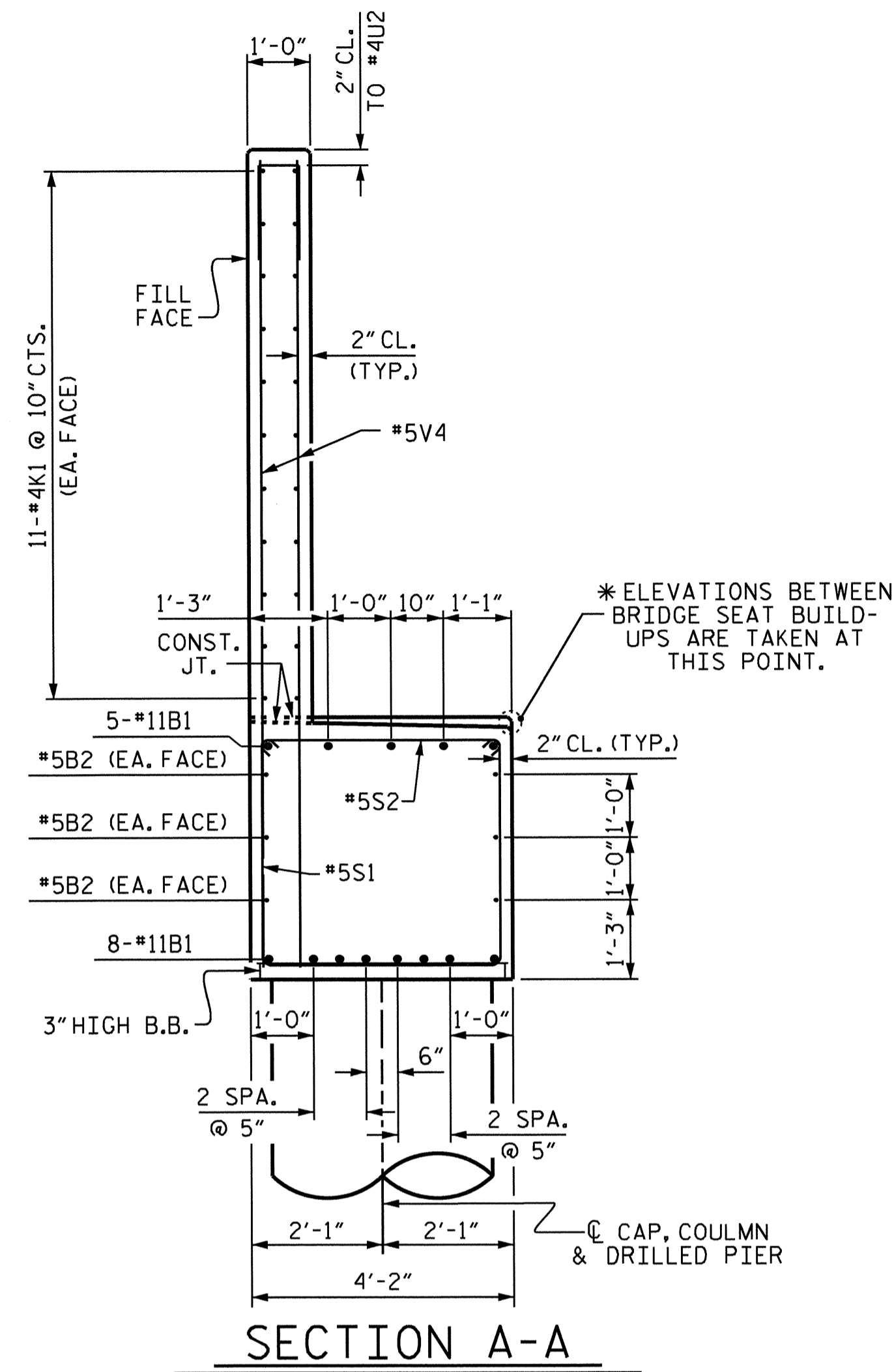


ALL BAR DIMENSIONS ARE OUT TO OUT.

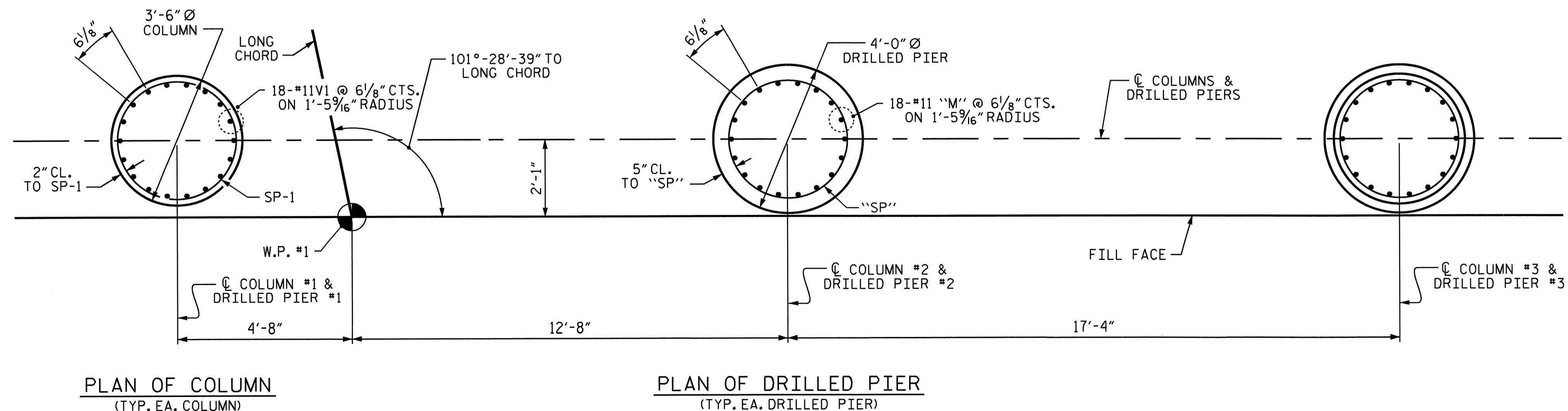
**THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.
 *** THE SP-2, SP-3 AND SP-4 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

BILL OF MATERIAL

END BENT #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	13	#11	1	54'-1"	3735
B2	6	#5	STR.	51'-1"	320
B3	5	#4	STR.	19'-8"	66
B4	5	#4	STR.	11'-0"	37
B5	5	#4	STR.	2'-8"	9
H1	17	#5	2	16'-5"	291
H2	17	#5	2	16'-4"	290
K1	44	#4	STR.	26'-9"	786
K2	4	#4	STR.	5'-11"	16
K3	4	#4	STR.	2'-7"	7
M1	18	#11	STR.	25'-7"	2447
M2	18	#11	STR.	23'-1"	2208
M3	18	#11	STR.	20'-7"	1968
S1	55	#5	3	12'-0"	688
S2	55	#5	4	4'-9"	272
S3	3	#6	7	9'-11"	45
S4	3	#6	8	5'-3"	24
U1	25	#4	5	6'-10"	114
U2	42	#4	5	3'-8"	103
V1	54	#11	6	19'-1"	5475
V2	16	#5	STR.	15'-4"	256
V3	46	#5	STR.	14'-8"	704
V4	84	#5	STR.	12'-11"	1132
REINFORCING STEEL					20993 LBS.
SP-1	3	**	9	631'-0"	1265
SP-2	1	***	10	438'-4"	457
SP-3	1	***	10	378'-11"	395
SP-4	1	***	10	320'-3"	334
SPIRAL REINFORCING STEEL =					2451 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #2 COLUMNS					16.5 C.Y.
POUR #3 CAP & LOWER WING					37.7 C.Y.
POUR #4 BACKWALL & UPPER WING					24.5 C.Y.
TOTAL CLASS A CONCRETE					78.7 C.Y.
DRILLED PIER CONCRETE					
POUR #1 DRILLED PIERS					22.3 C.Y.
4'-0" Ø DRILLED PIER NOT IN SOIL					42 Lin. Ft.
4'-0" Ø DRILLED PIER IN SOIL					6 Lin. Ft.
CSL TUBES					210 Ft.
HP 12X53 STEEL PILE NO. 1					25 Lin. Ft.



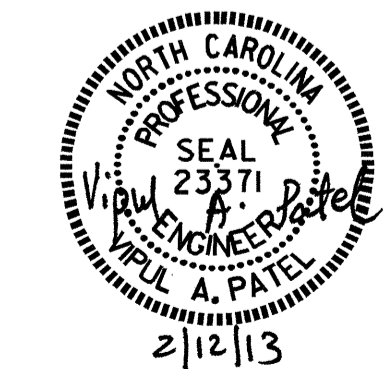
PARTIAL SECTION B



PLAN OF COLUMNS & DRILLED PIERS

DRAWN BY : J.P. ADAMS DATE : 10/18/12
 CHECKED BY : J. KHARVA DATE : 11/2012
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE : 7/2012

11-FEB-2013 16:11
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 jpadams



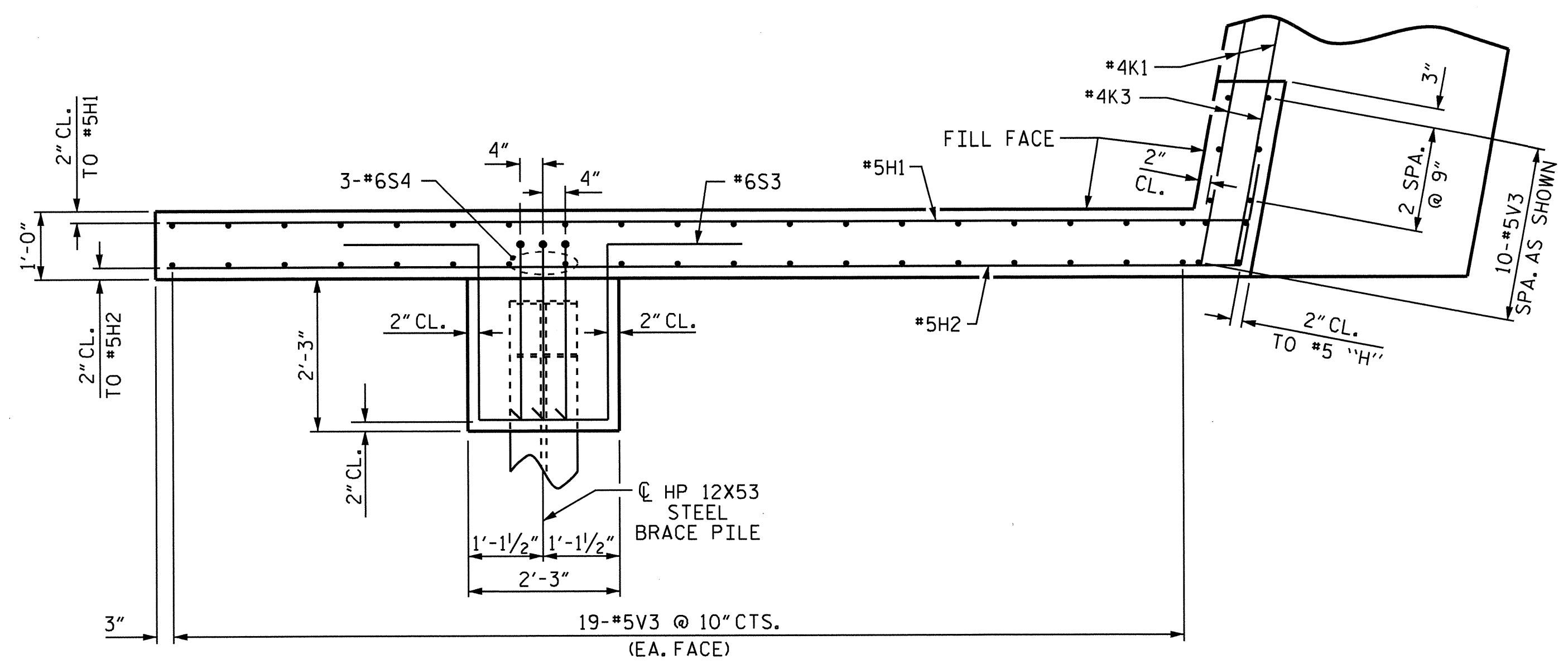
PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 3 OF 3

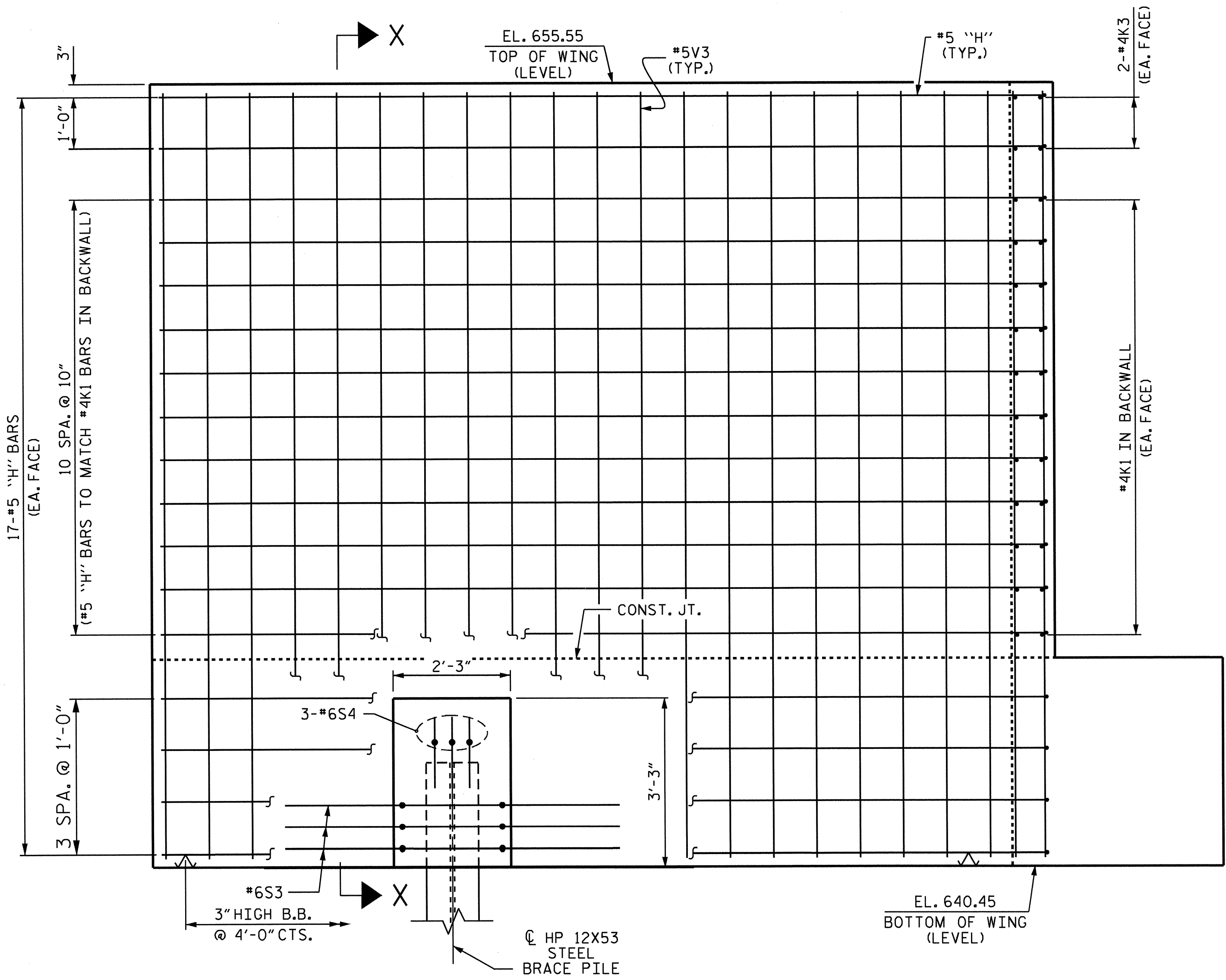
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT #1
 (RIGHT LANE)

REVISIONS						SHEET NO. S-50
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 56
2			4			

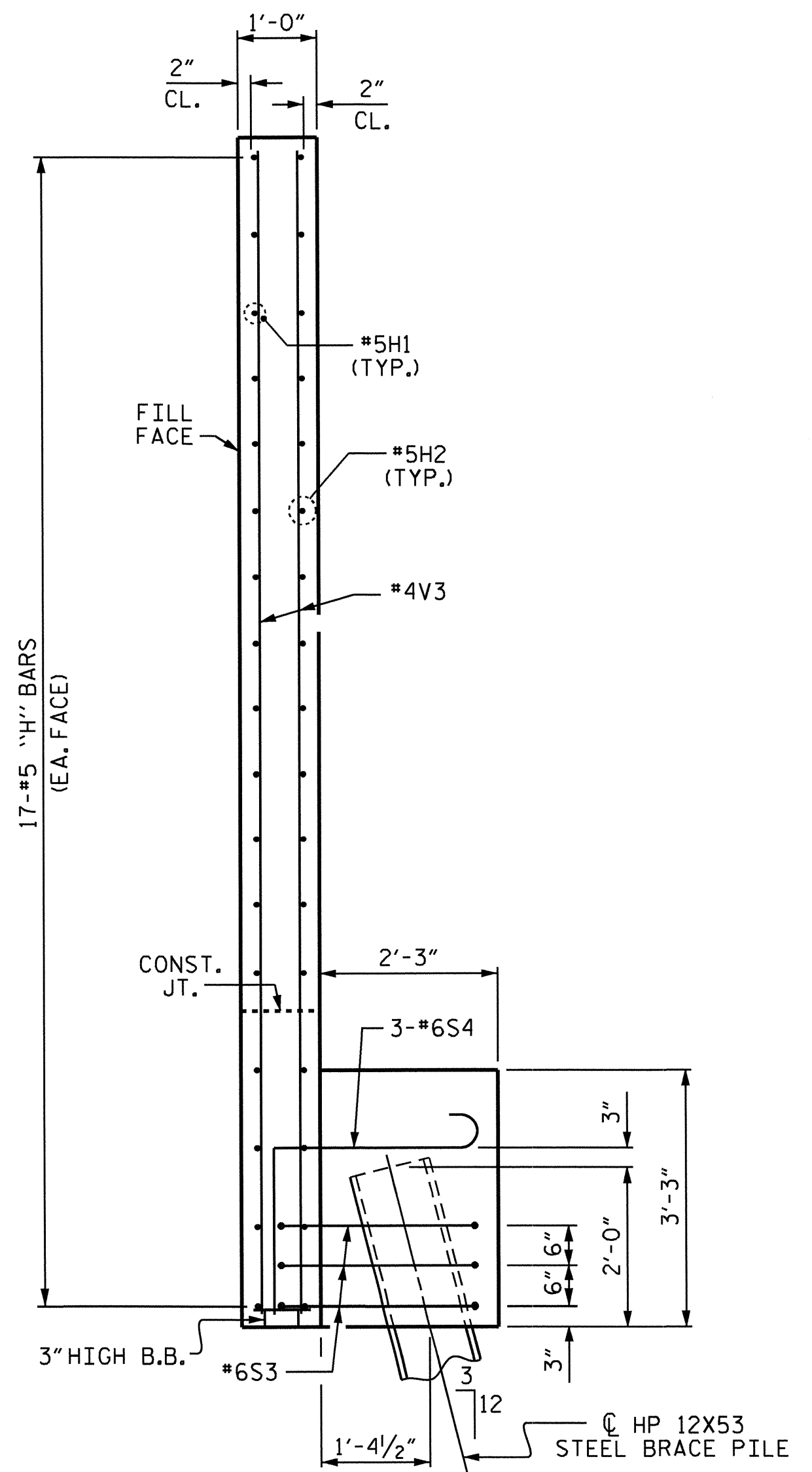
STR. #2



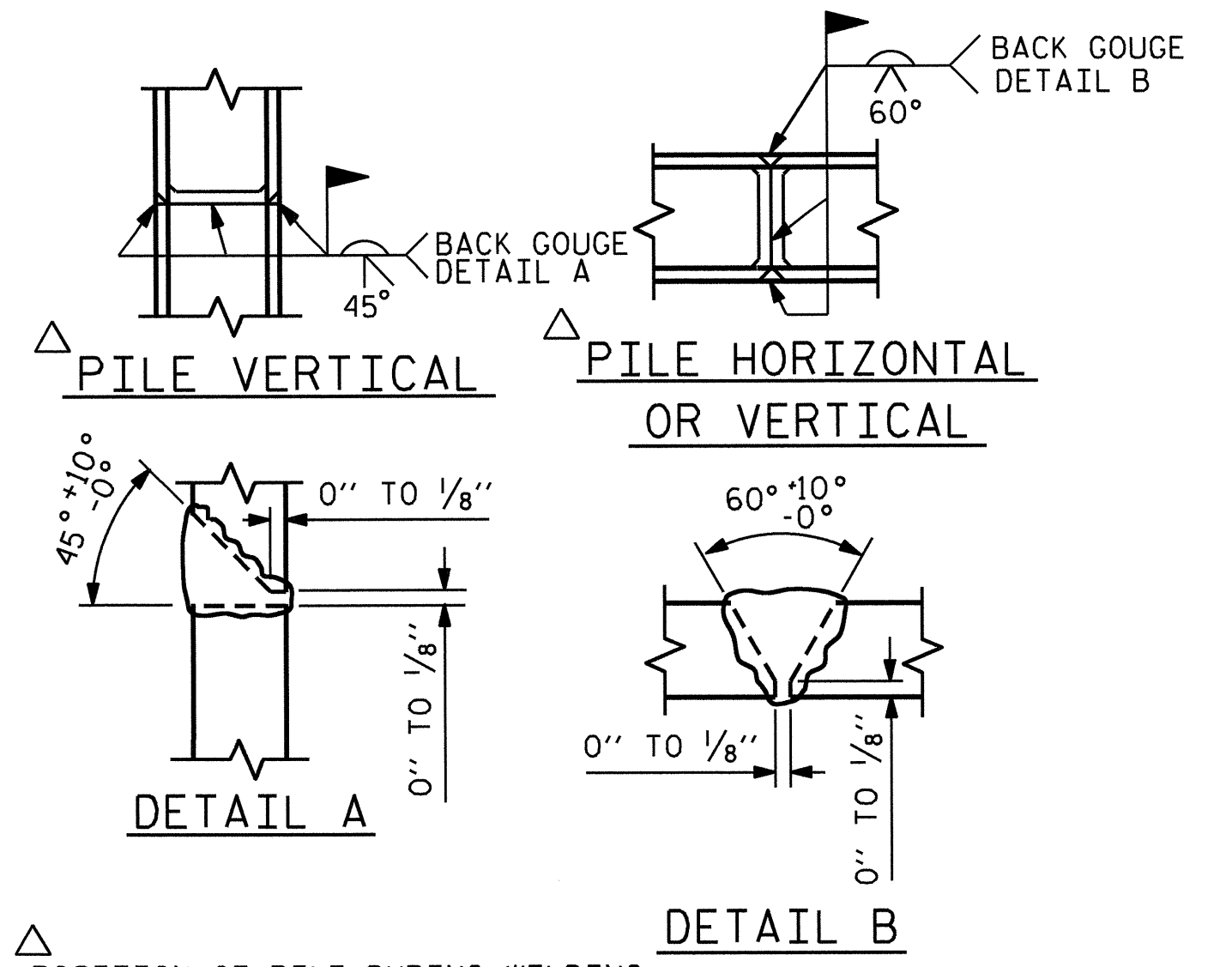
PLAN OF WING



ELEVATION OF WING



SECTION X-X



POSITION OF PILE DURING WELDING.
PILE SPLICE DETAILS

DRAWN BY : J.P. ADAMS DATE : 10/18/12
 CHECKED BY : J. KHARVA DATE : 11/2012
 DESIGN ENGINEER OF RECORD : H.A. LOCKLEAR DATE : 07/2012

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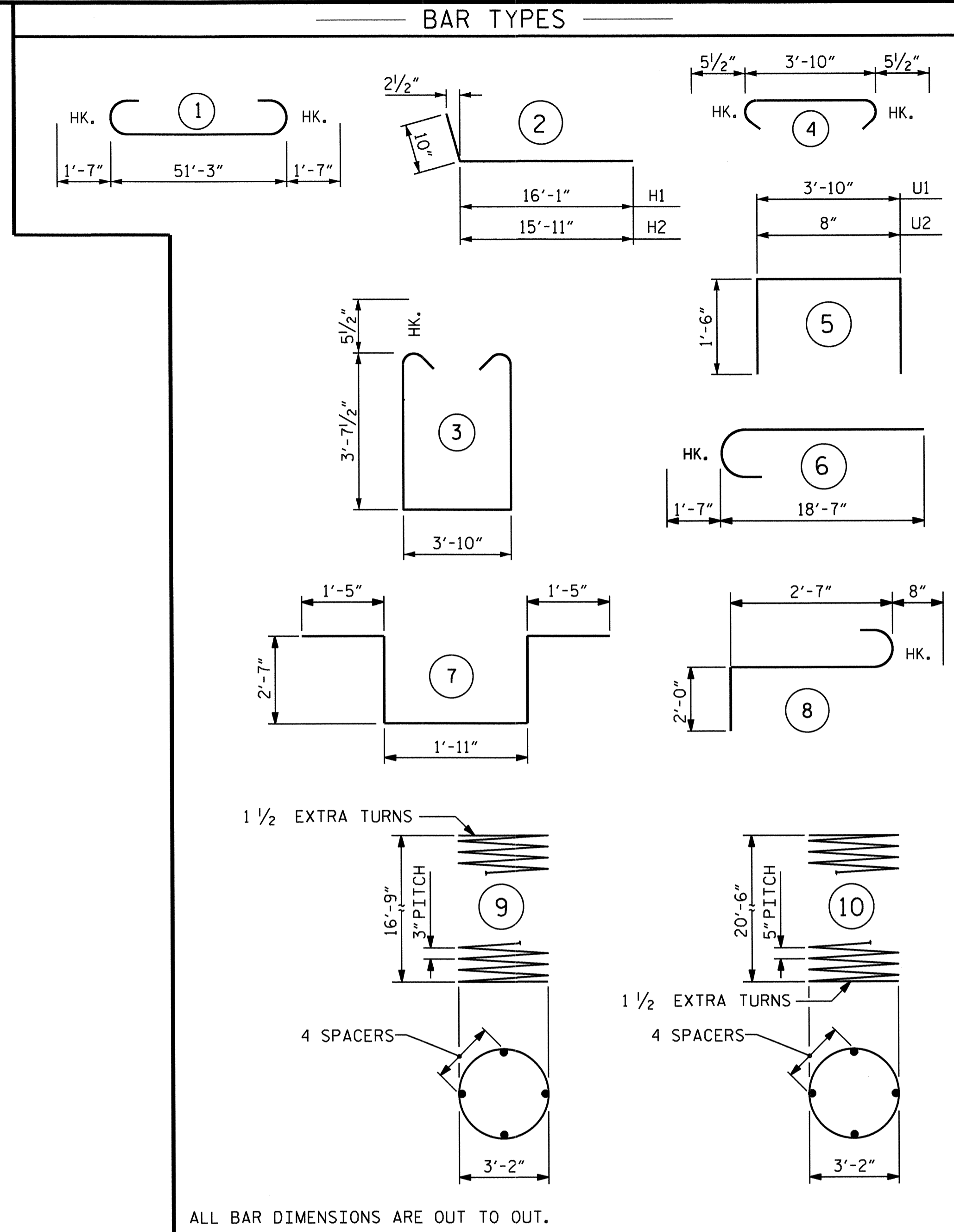
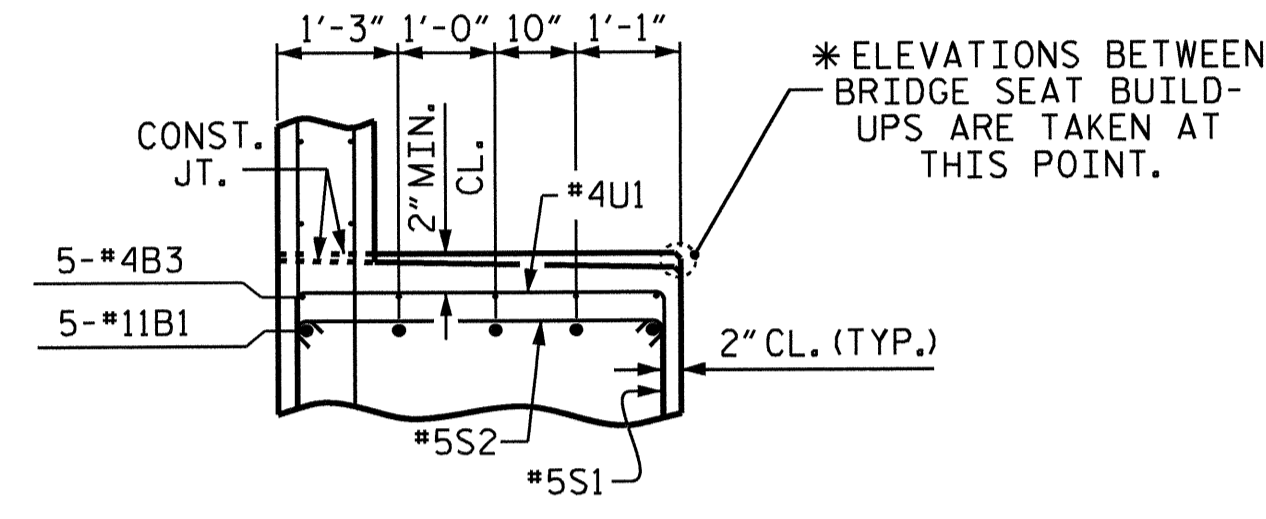
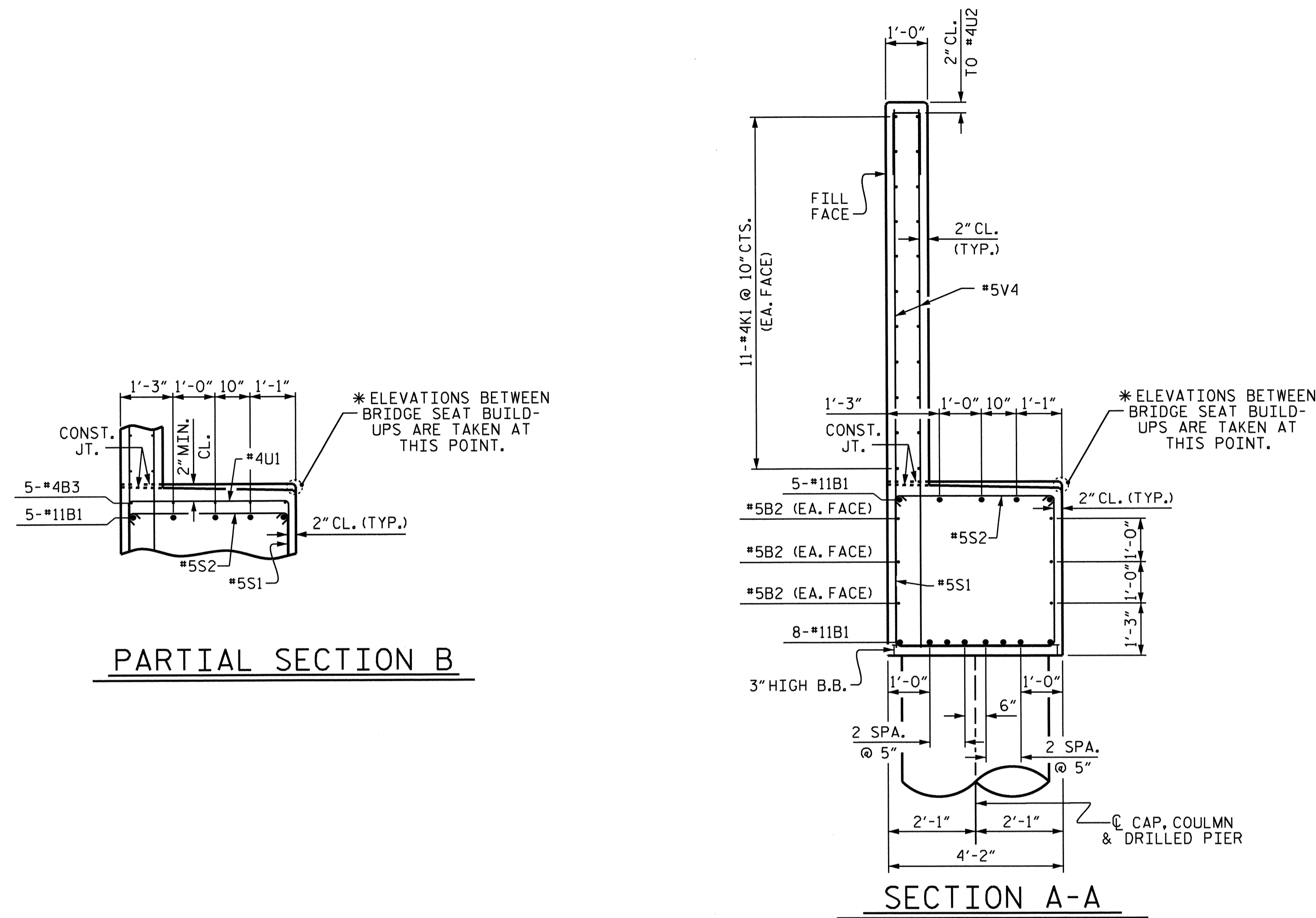
PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 2 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT #2
 (RIGHT LANE)



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-52	
1			3			TOTAL SHEETS	
2			4			56	

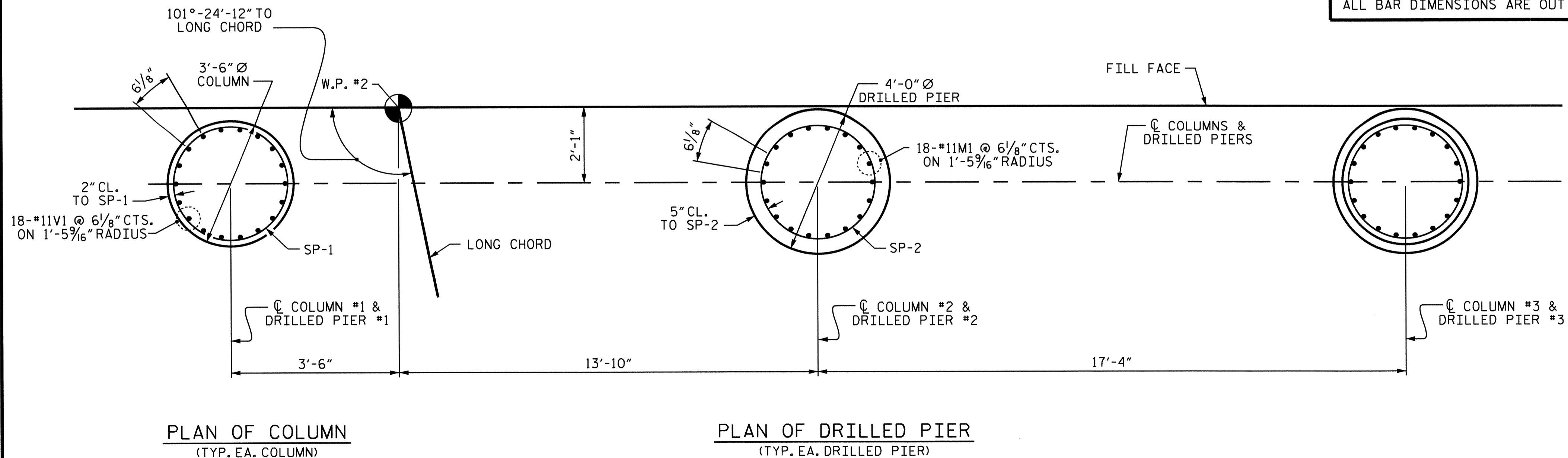
STR. #2



ALL BAR DIMENSIONS ARE OUT TO OUT.

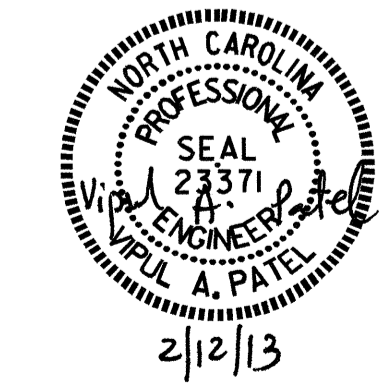
** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.
 *** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

BILL OF MATERIAL						
END BENT #2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	13	#11	1	54'-5"	3759	
B2	6	#5	STR.	51'-5"	322	
B3	5	#4	STR.	19'-11"	67	
B4	5	#4	STR.	10'-9"	36	
B5	10	#4	STR.	2'-8"	18	
H1	17	#5	2	16'-11"	300	
H2	17	#5	2	16'-9"	297	
K1	44	#4	STR.	26'-11"	791	
K2	4	#4	STR.	5'-10"	16	
K3	4	#4	STR.	2'-7"	7	
M1	54	#11	STR.	28'-1"	8057	
S1	54	#5	3	12'-0"	676	
S2	54	#5	4	4'-9"	268	
S3	3	#6	7	9'-11"	45	
S4	3	#6	8	5'-3"	24	
U1	28	#4	5	6'-10"	128	
U2	43	#4	5	3'-8"	105	
V1	54	#11	6	20'-2"	5786	
V2	16	#5	STR.	15'-7"	260	
V3	48	#5	STR.	14'-9"	738	
V4	86	#5	STR.	13'-0"	1166	
REINFORCING STEEL					22866 LBS.	
SP-1	3	**	9	672'-9"	1348	
SP-2	3	***	10	497'-1"	1555	
SPIRAL REINFORCING STEEL = 2903 LBS.						
CLASS A CONCRETE BREAKDOWN						
POUR #2 COLUMNS				17.6 C.Y.		
POUR #3 CAP & LOWER WING				38.3 C.Y.		
POUR #4 BACKWALL & UPPER WING				25.0 C.Y.		
TOTAL CLASS A CONCRETE				80.9 C.Y.		
DRILLED PIER CONCRETE						
POUR #1 DRILLED PIERS				29.3 C.Y.		
4'-0" Ø DRILLED PIER NOT IN SOIL						51 Lin. Ft.
4'-0" Ø DRILLED PIER IN SOIL						12 Lin. Ft.
CSL TUBES					270 Ft.	
HP 12X53 STEEL PILE NO. 1					25 Lin. Ft.	



DRAWN BY : J.P. ADAMS DATE : 10/18/12
 CHECKED BY : J. KHARVA DATE : 11/2012
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE : 7/2012

PLAN OF COLUMNS & DRILLED PIERS



PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-
 SHEET 3 OF 3
 DEPARTMENT OF TRANSPORTATION
 SUBSTRUCTURE
 END BENT #2
 (RIGHT LANE)

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

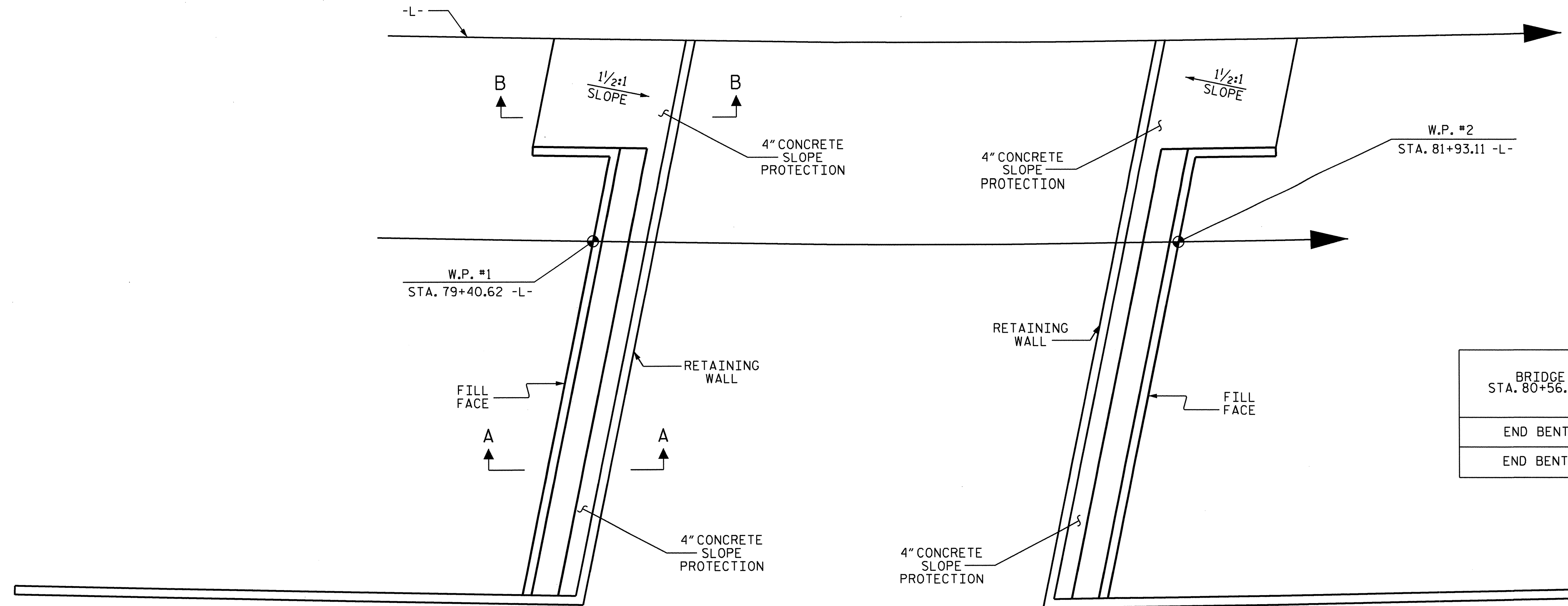
SHEET NO. S-53
 TOTAL SHEETS 56

NOTES

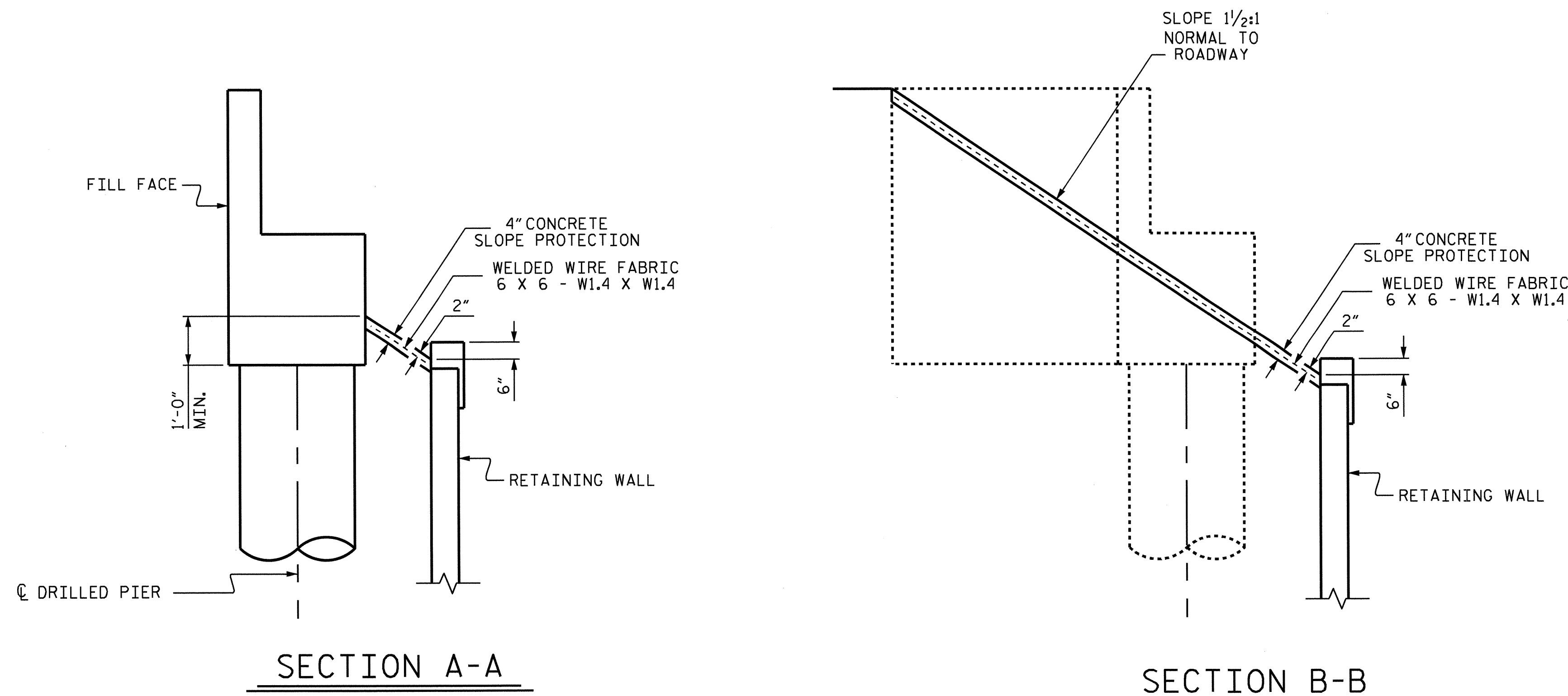
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

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 FINISHED TO THE SATISFACTION OF THE ENGINEER. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 20" WIDE. THE COST OF THE WELDED WIRE FABRIC SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

BRIDGE @ STA. 80+56.83 -L-	4" SLOPE PROTECTION	WELDED WIRE FABRIC 20 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT #1	60	115
END BENT #2	60	115



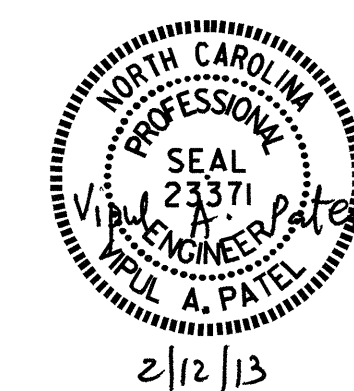
PLAN



SECTION A-A

SECTION B-B

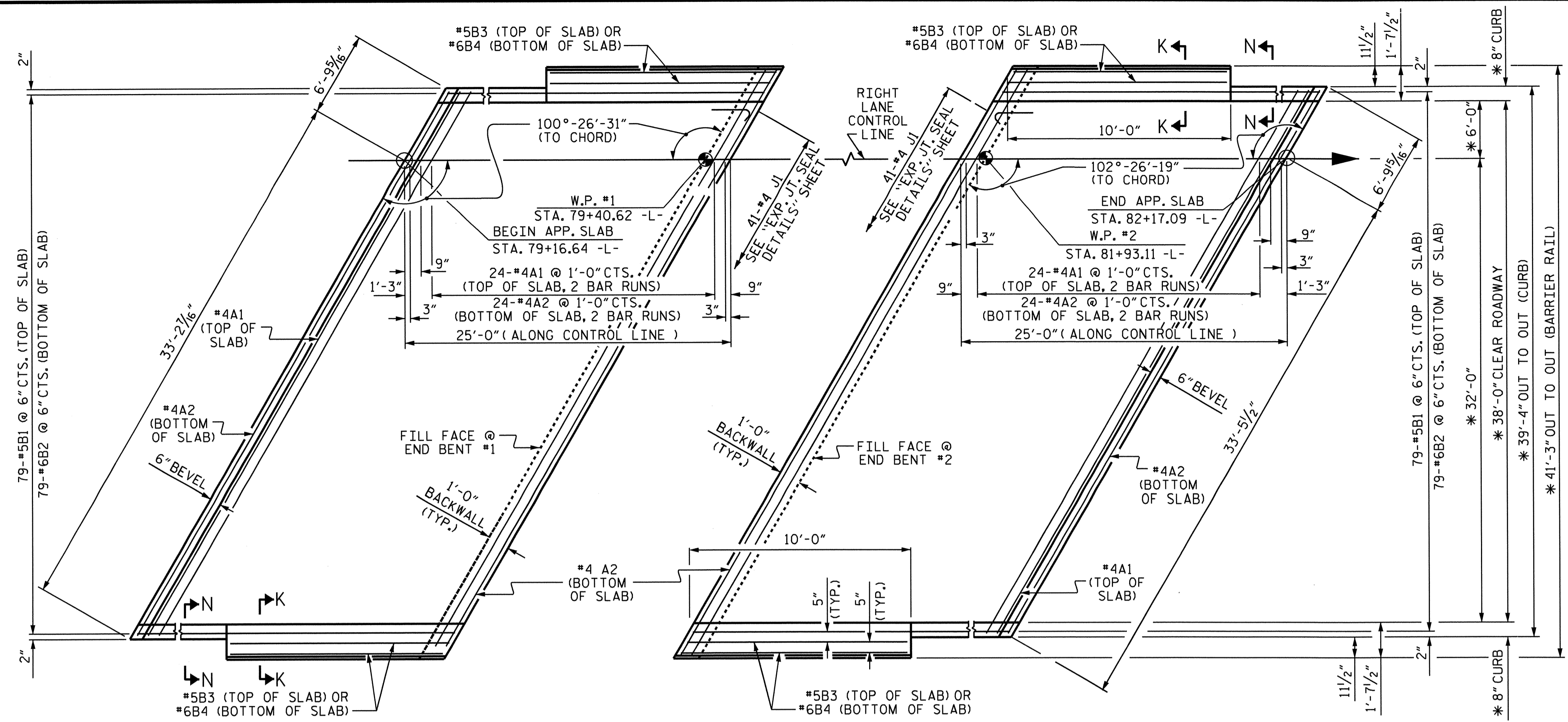
PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 80+56.83 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SLOPE PROTECTION DETAILS
 (RIGHT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-54
1			3			TOTAL SHEETS
2			4			56

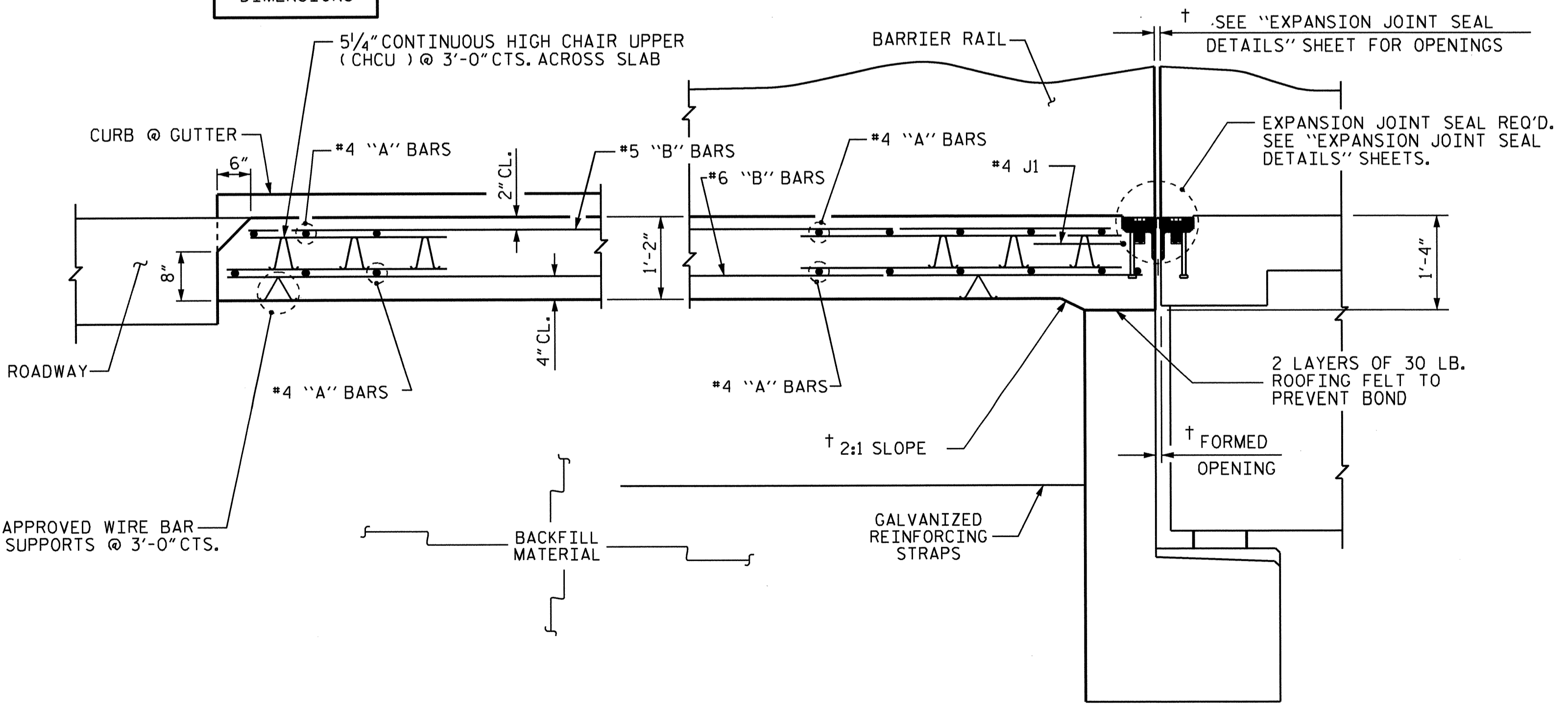
DRAWN BY: H.T. DIEU DATE: 9/11/12
 CHECKED BY: R.L. CHESSON DATE: 11/12



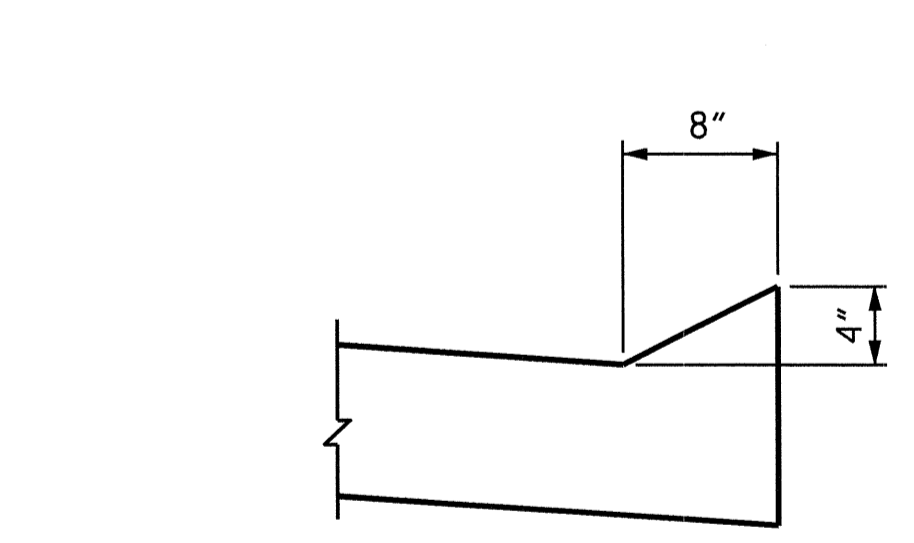
PLAN @ END BENT #1
 PLAN @ END BENT #2

* RADIAL DIMENSIONS

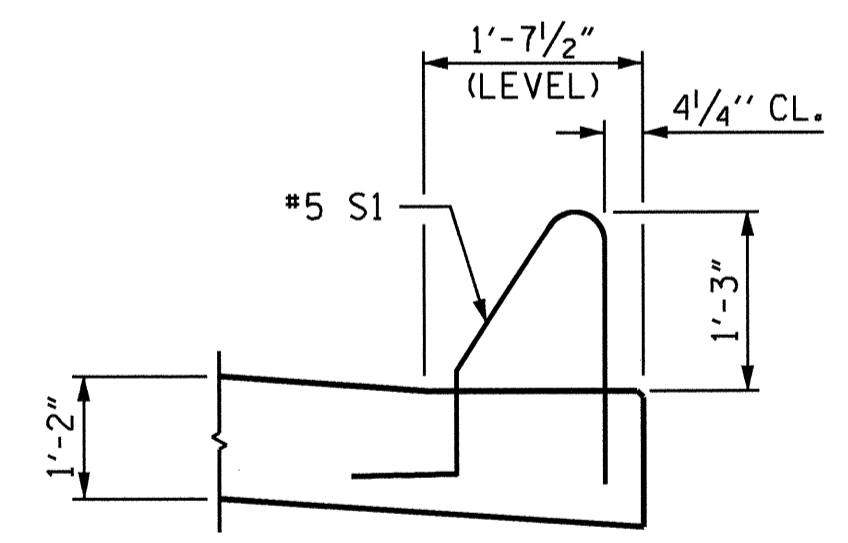
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



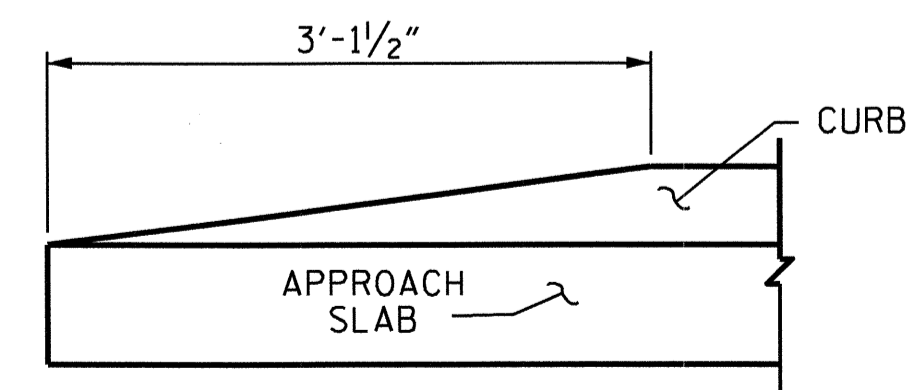
SECTION THRU SLAB



SECTION N-N



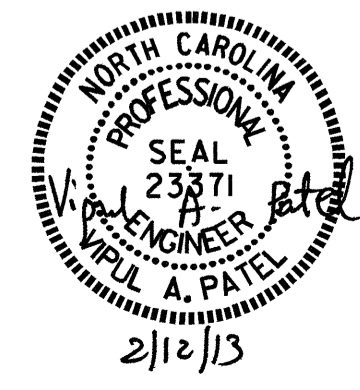
SECTION K-K



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

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



NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
 AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.
 FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
 ARC OFFSETS ARE NEGLIGIBLE AND THEREFORE NOT SHOWN.

BILL OF MATERIAL					
FOR ONE APPROACH SLAB (2 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	22'-0"	735
A2	52	#4	STR	21'-10"	758
*B1	79	#5	STR	24'-2"	1991
B2	79	#6	STR	24'-8"	2927
*B3	4	#5	STR	9'-7"	40
B4	4	#6	STR	9'-7"	58
*J1	41	#4	1	1'-5"	39
				REINFORCING STEEL **	LBS. 3743
				* EPOXY COATED REINFORCING STEEL **	LBS. 2805
				CLASS AA CONCRETE **	C. Y. 43.6
BAR TYPE					
ALL BAR DIMENSIONS ARE OUT TO OUT					

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 2 OF 2.

THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

ASSEMBLED BY : J.G. KHARVA	DATE : 10/22/12
CHECKED BY : R.L. CHESSON	DATE : 11/12
DRAWN BY : EEM 3/95	REV. 5/7/03R RWW/JTE
CHECKED BY : VAP 3/95	REV. 5/1/06RR KMM/GM
	REV. 10/1/11 MAA/GM

07-JAN-2013 11:57
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 jpadams

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 1 OF 2

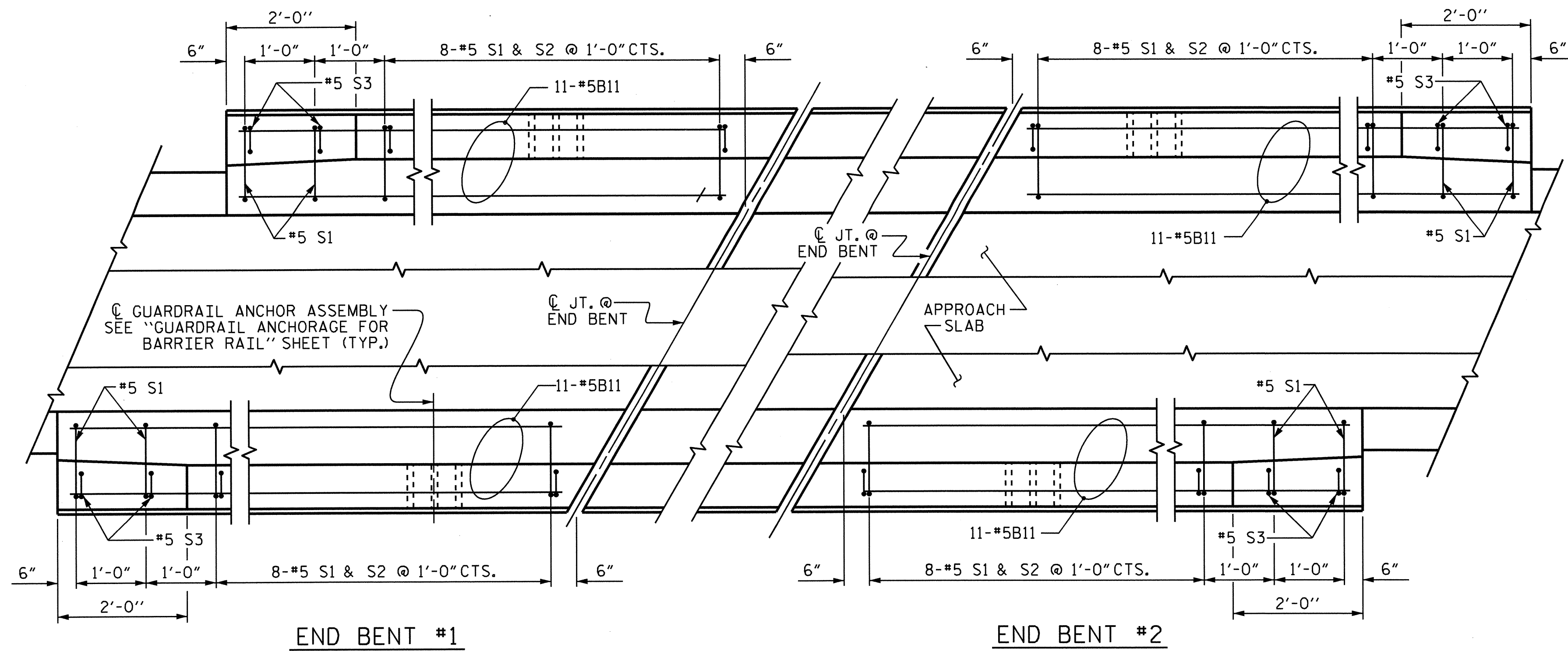
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT (RIGHT LANE)

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

SHEET NO. S-55
 TOTAL SHEETS 56

STR. #2

STD. NO. BAS2 (SHT 4B)

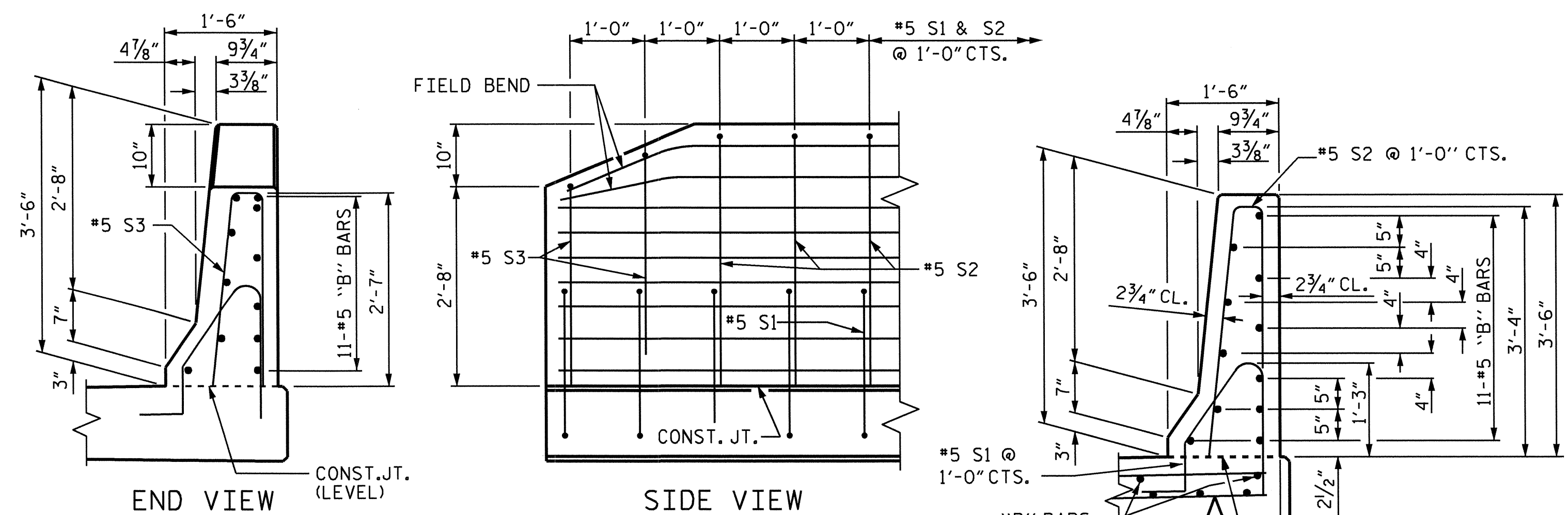


PLAN OF BARRIER RAIL

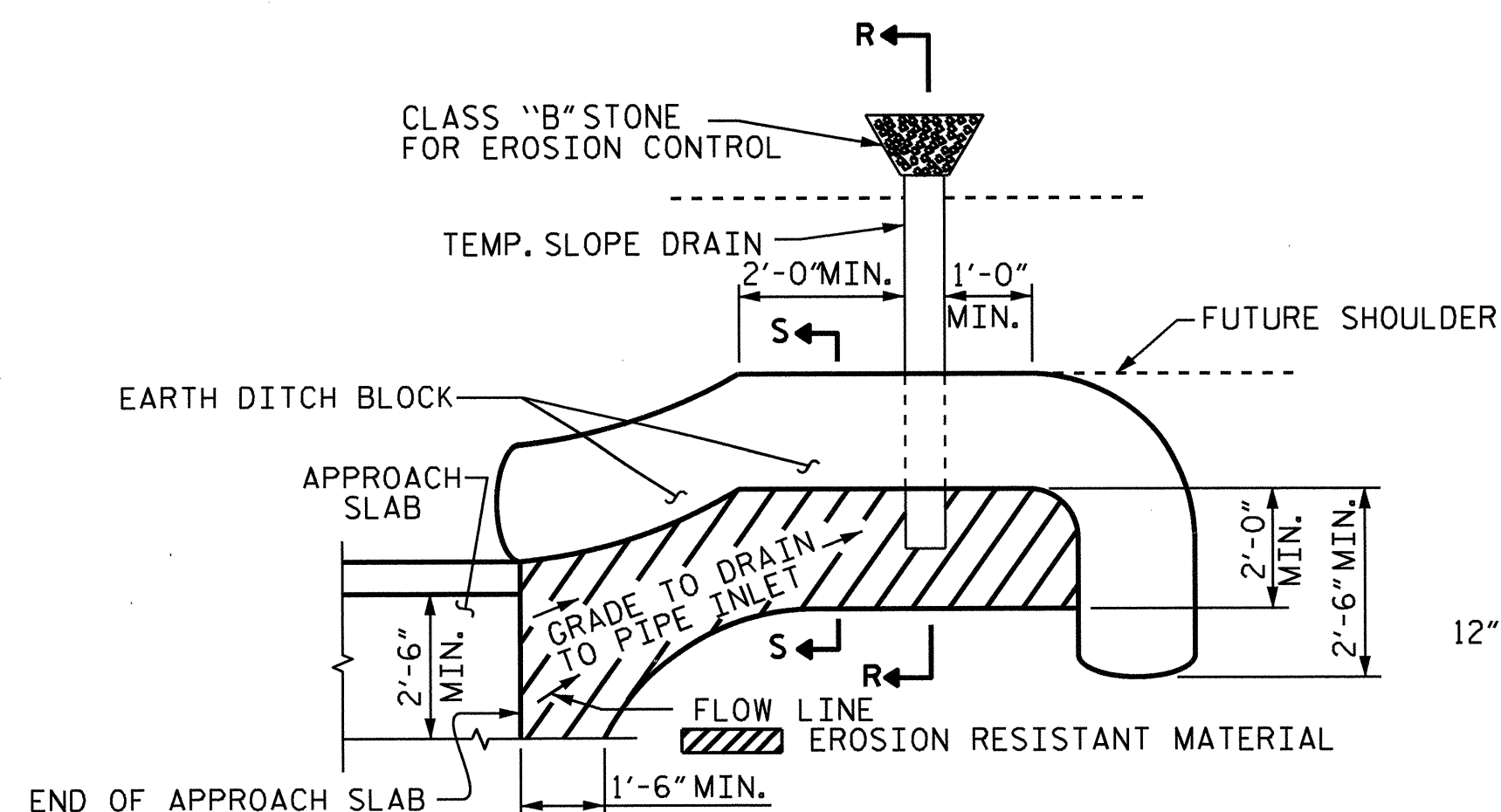
NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".
 THE BARRIER RAIL ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH 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.

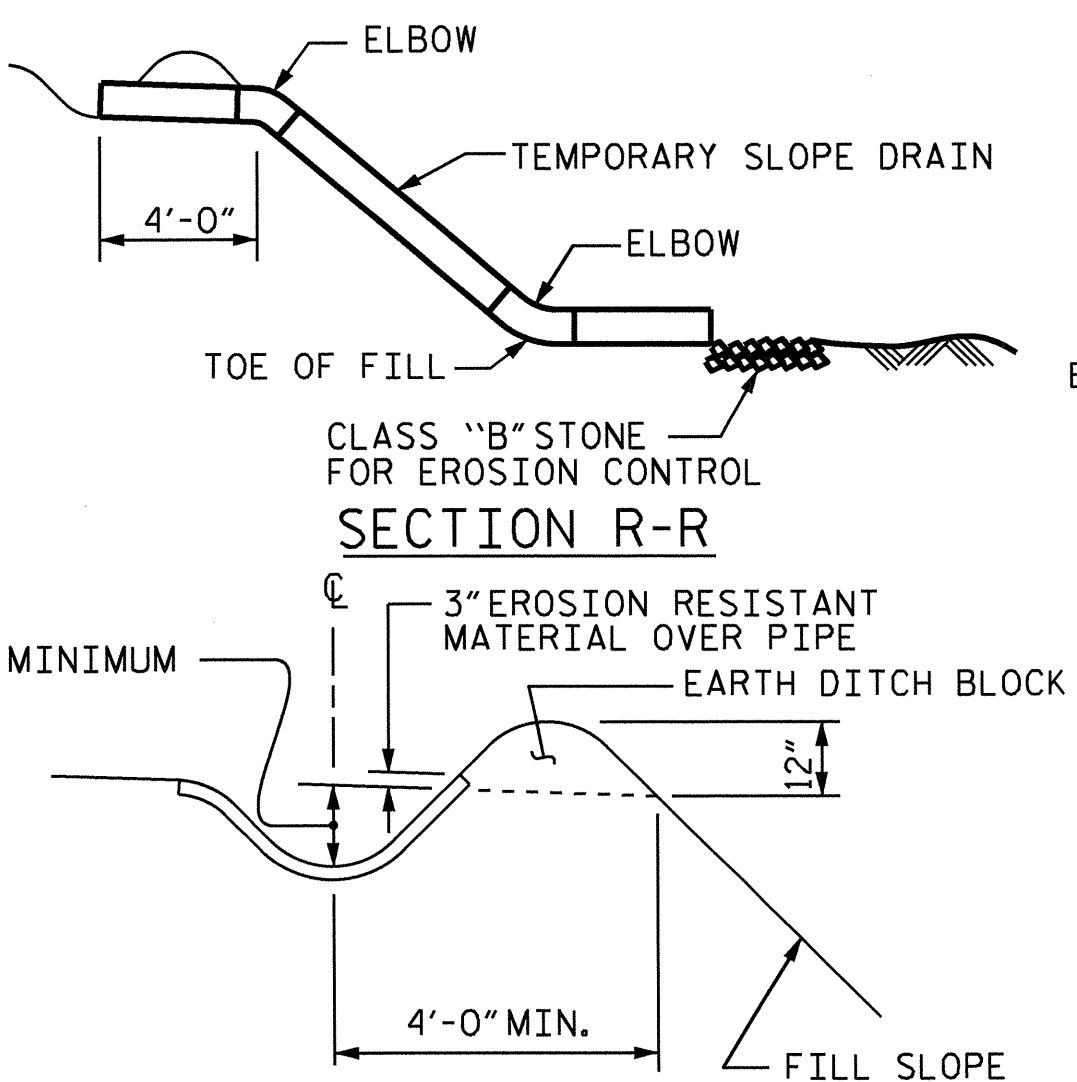
BILL OF MATERIAL					
BARRIER RAIL ONLY					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B11	44	#5	STR	9'-8"	444
*S1	40	#5	1	5'-1"	212
*S2	32	#5	2	7'-0"	234
*S3	8	#5	2	5'-6"	46
* EPOXY COATED REINFORCING STEEL				LBS.	936
CLASS AA CONCRETE				C. Y.	5.5
CONCRETE BARRIER RAIL				40.0 LIN. FT.	



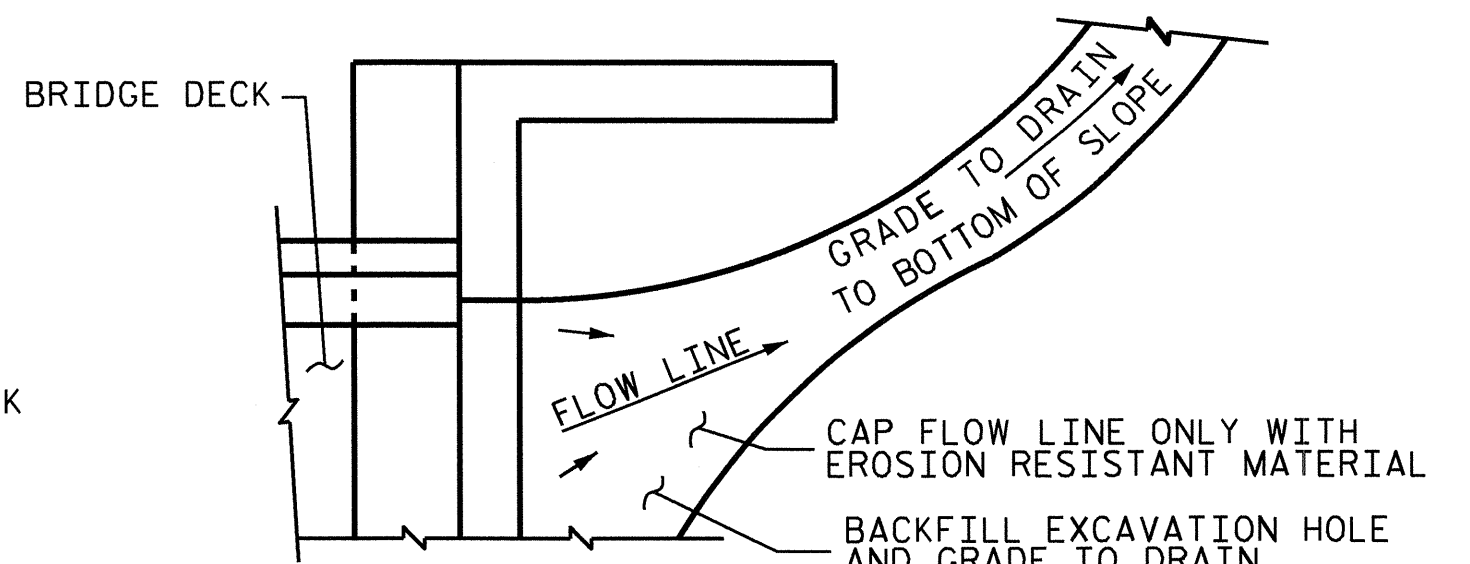
END OF RAIL DETAILS



PLAN VIEW



SECTION S-S



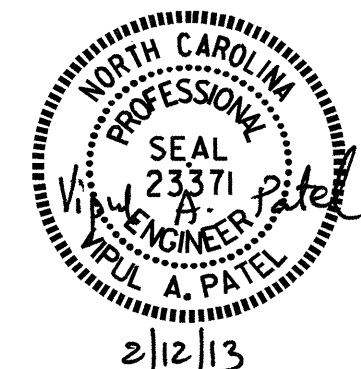
TEMPORARY DRAINAGE DETAIL

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.

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 80+56.83 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH
 SLAB DETAILS
 (RIGHT LANE)



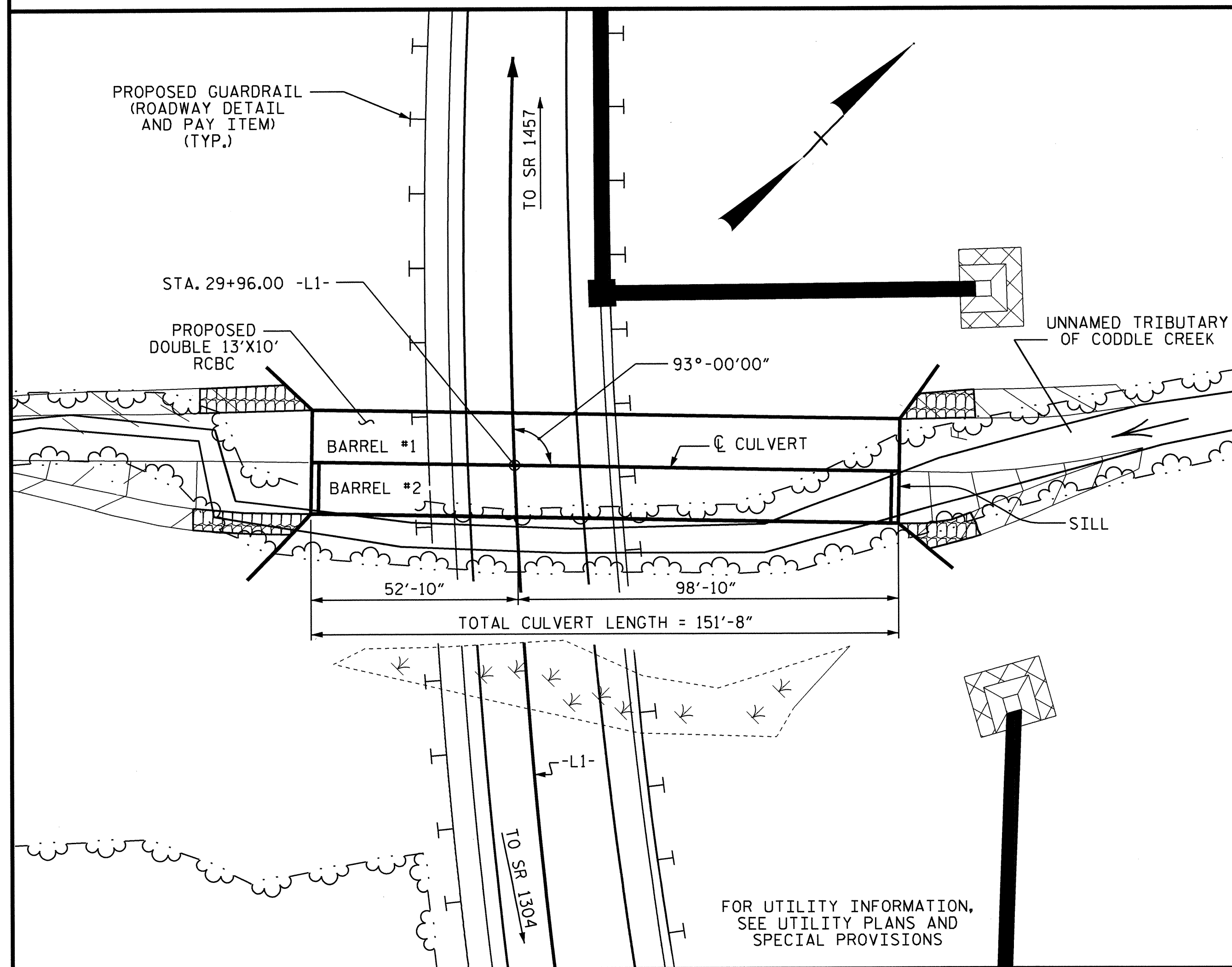
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-56
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2			4			56

ASSEMBLED BY : J. G. KHARVA	DATE : 10/4/12	
CHECKED BY : R. L. CHESSON	DATE : 11/12	
DRAWN BY : FCJ 11/88	REV. 10/1/11	MAA/GM
CHECKED BY : ARB 11/88	REV. 7/12	MAA/GM
	REV. 10/12	MAA/GM

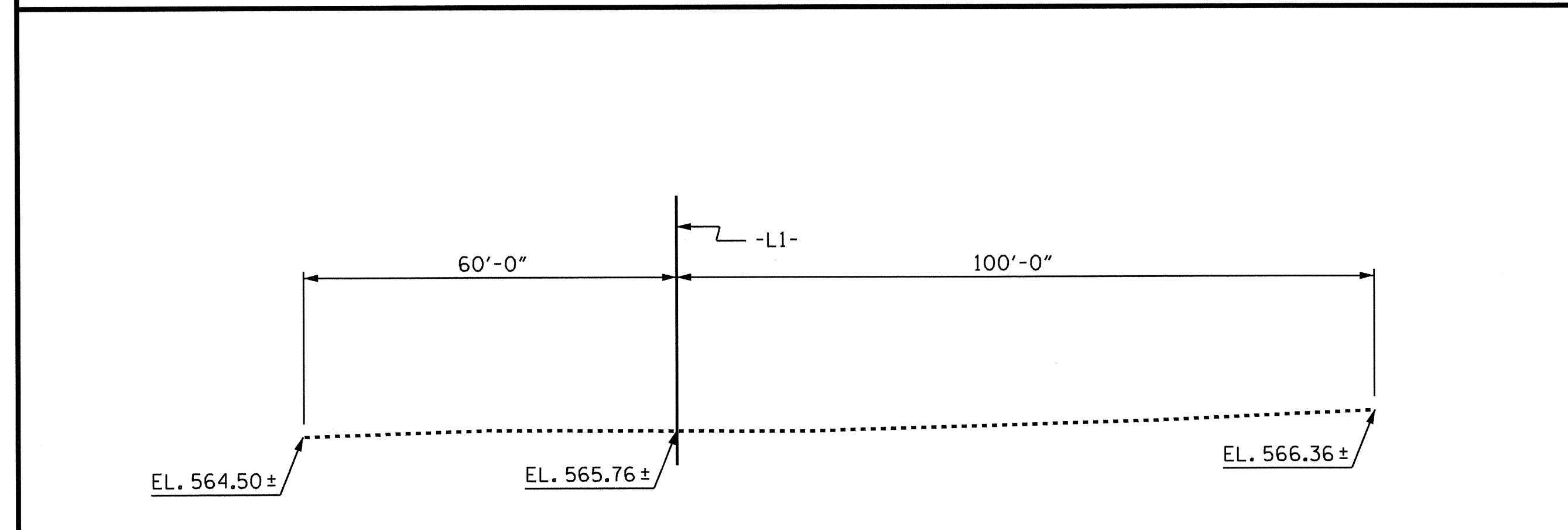
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

BM #16 R.R. SPIKE IN BASE OF 12" BOX ELDER 30' LT. AT STA. 16+94.00 -L1-, EL. 566.45



LOCATION SKETCH



PROFILE ALONG CULVERT

ADDED NOV. 1, 1990
 DRAWN BY: H.T. DIEU DATE: 9/4/12
 CHECKED BY: J. KHARVA DATE: 10/12
 DESIGN ENGINEER OF RECORD: H.T. DIEU DATE: 4/17/12

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ROADWAY DATA

GRADE PT. EL. @ STA. 29+96.00 -L1- = 586.08
 BED EL. @ STA. 29+96.00 -L1- = 561.50
 ROADWAY SLOPES @ STA. 29+9600 -L1- = 2:1

HYDRAULIC DATA

DESIGN DISCHARGE = 1150 C.F.S.
 FREQUENCY OF DESIGN FLOOD = 50 YR.
 DESIGN HIGH WATER ELEVATION = 571.40
 DRAINAGE AREA = 1.02 SQ. MI.
 BASE DISCHARGE (Q100) = 1300 C.F.S.
 BASE HIGH WATER ELEVATION = 574.00

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = +1800 C.F.S.
 FREQUENCY OF OVERTOPPING FLOOD = +200 YR.
 OVERTOPPING FLOOD ELEVATION = 583.30

STAGE 1	
CLASS A CONCRETE	
BARREL @ 1.422 CY/FT	215.7 C.Y.
WINGS ETC.	17.3 C.Y.
TOTAL	233.0 C.Y.
REINFORCING STEEL	
BARREL	29765 LBS.
WINGS ETC.	1214 LBS.
TOTAL	30979 LBS.
CULVERT EXCAVATION	= LUMP SUM
FOUNDATION COND. MAT'L.	= 185 TONS

STAGE 2	
CLASS A CONCRETE	
BARREL @ 2.511 CY/FT	380.8 C.Y.
SILL	2.0 C.Y.
WINGS ETC.	19.6 C.Y.
TOTAL	402.4 C.Y.
REINFORCING STEEL	
BARREL	48268 LBS.
WINGS ETC.	1214 LBS.
TOTAL	49482 LBS.
CULVERT EXCAVATION	= LUMP SUM
FOUNDATION COND. MAT'L.	= 160 TONS

TOTAL STRUCTURE QUANTITIES	
CLASS A CONCRETE	635.4 C.Y.
REINFORCING STEEL	80461 C.Y.
CULVERT EXCAVATION	= LUMP SUM
FOUNDATION COND. MAT'L.	= 345 TONS

NOTES

F. A. PROJECT NO. STP-1304(13)

- ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING.
 DESIGN FILL----- 16.03 FT.
 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 ALL VERTICAL WALLS OF STAGE 1.
 2. THE REMAINING PORTIONS OF STAGE 1 WALLS AND WINGS FULL HEIGHT.
 3. WING FOOTINGS & FLOOR SLAB INCLUDING 4" OF VERTICAL WALL OF STAGE 2.
 4. THE REMAINING PORTION OF STAGE 2 WALL, WINGS FULL HEIGHT, FOLLOWED BY ROOF SLAB AND HEADWALLS.

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.

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

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR 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.

- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, 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.

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.

BED MATERIAL PLACED BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL BETWEEN THE LOWER SILLS. THE MATERIAL SHALL BE NATURAL STONE WITH A GRADATION SIZE SIMILAR TO THAT OF CLASS I RIP RAP. STONES LARGER THAN 17 INCHES SHALL NOT BE PLACED WITHIN THE LOW FLOW CHANNEL. BED MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
 NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

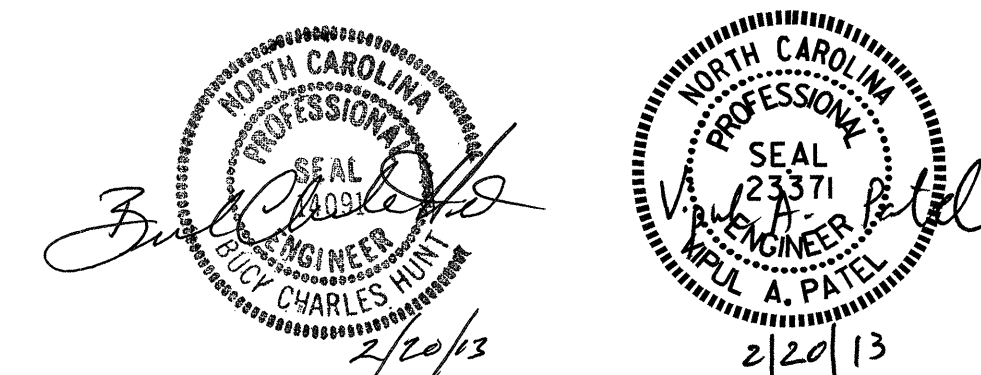
I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 29+96.00 -L1-

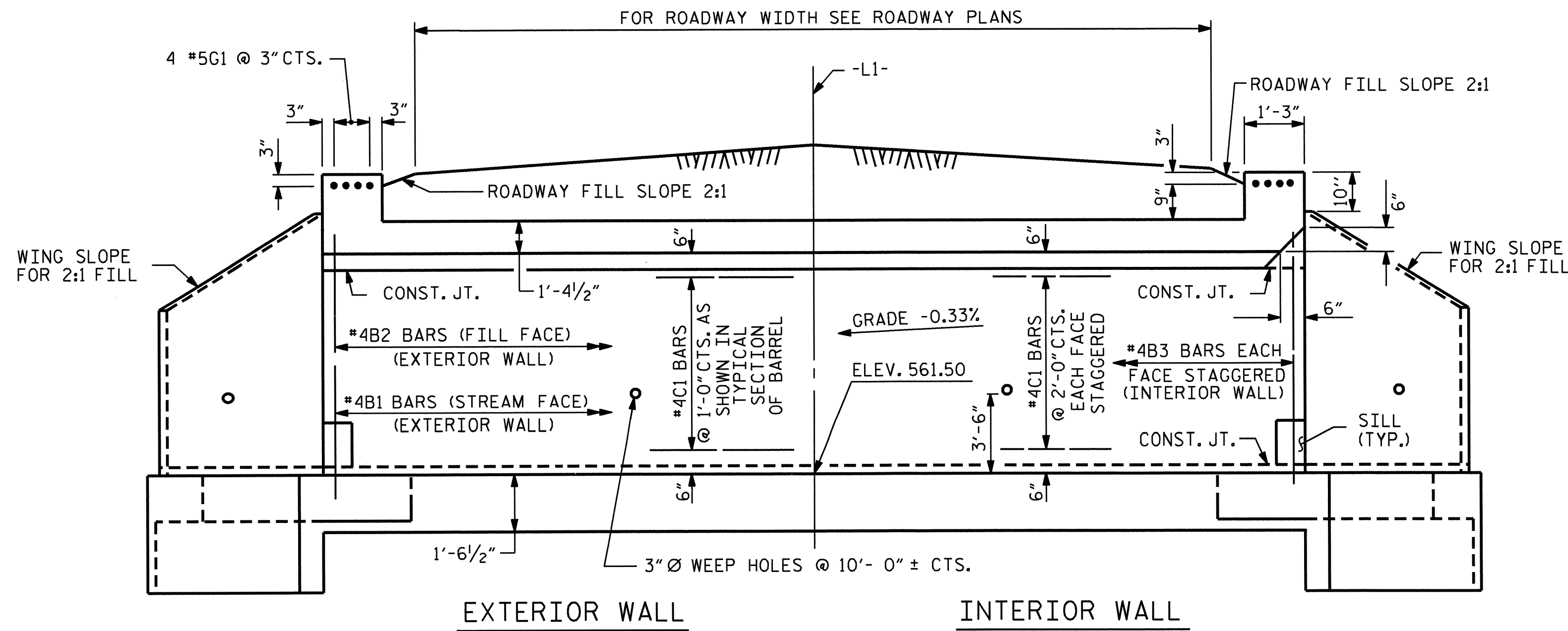
SHEET 1 OF 6 CULVERT #390

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE 13 FT. X 10 FT.
 CONCRETE BOX CULVERT
 (93° SKEW)

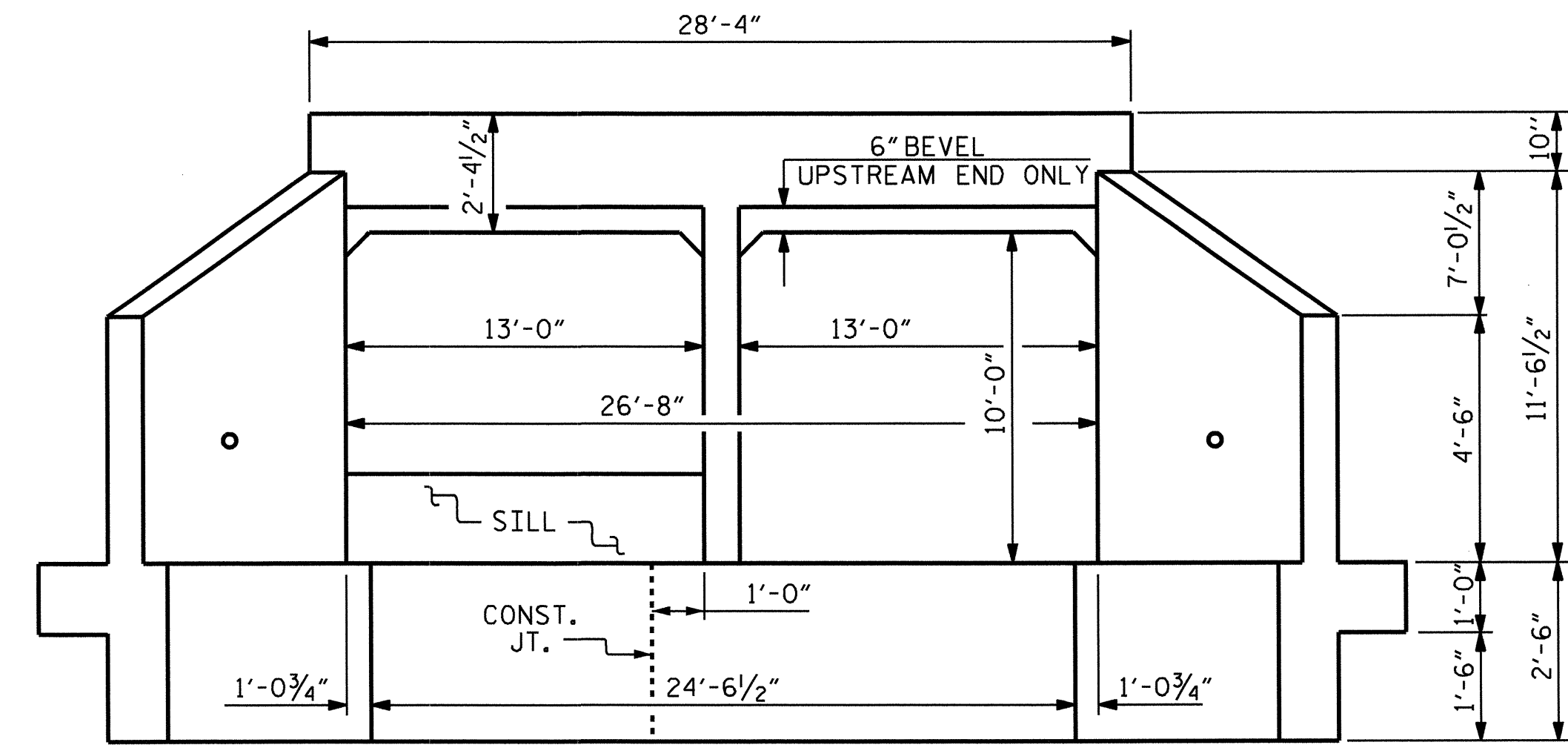
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2			4			12	



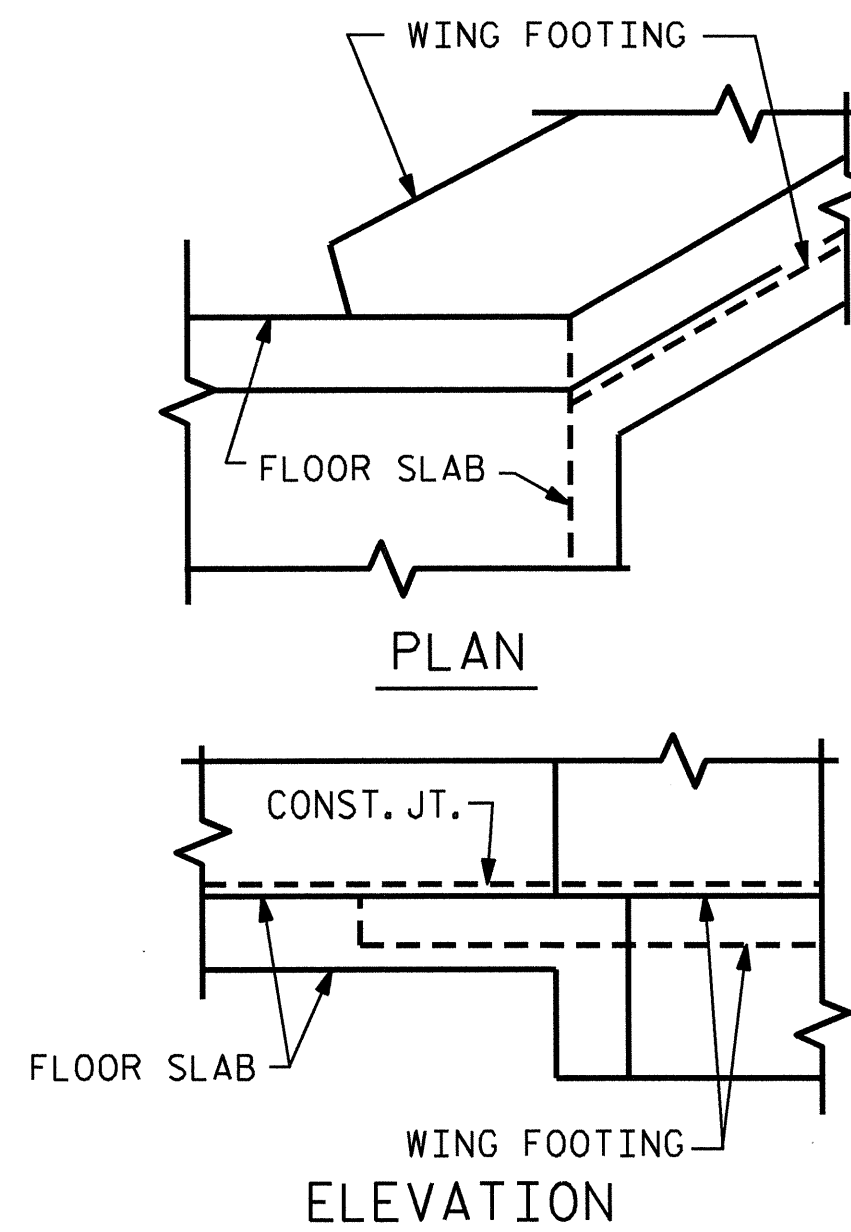
STR. #3 STD. NO. CB12A



CULVERT SECTION NORMAL TO ROADWAY



END ELEVATION
(FOR SILL DETAIL, SEE SHEET 4 OF 6)
(LOOKING DOWNSTREAM)



CONNECTION OF WING FOOTING
AND FLOOR SLAB WHEN SLAB
IS THICKER THAN FOOTING

REVISED 11-19-99 BY M.M. CHECKED BY R.M.W.
REDRAWN NOV. 1990 BY TSS. CHECKED BY ARB

DRAWN BY : H.T. DIEU DATE : 9/4/12
CHECKED BY : J. KHARVA DATE : 10/12
DESIGN ENGINEER OF RECORD: H.T. DIEU DATE : 4/17/12

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PROJECT NO. R-2246B
CABARRUS COUNTY
STATION: 29+96.00 -L1-

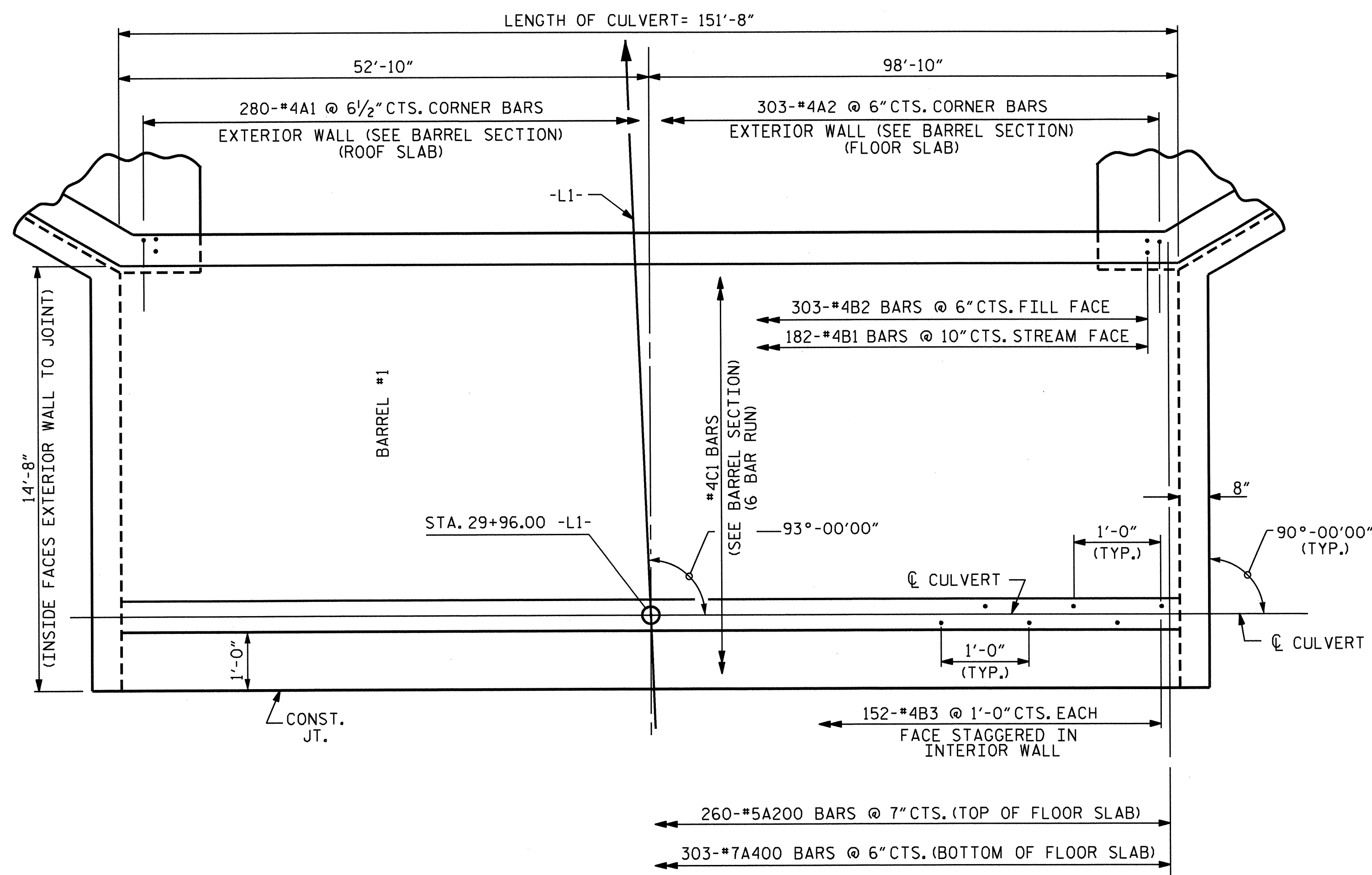
SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

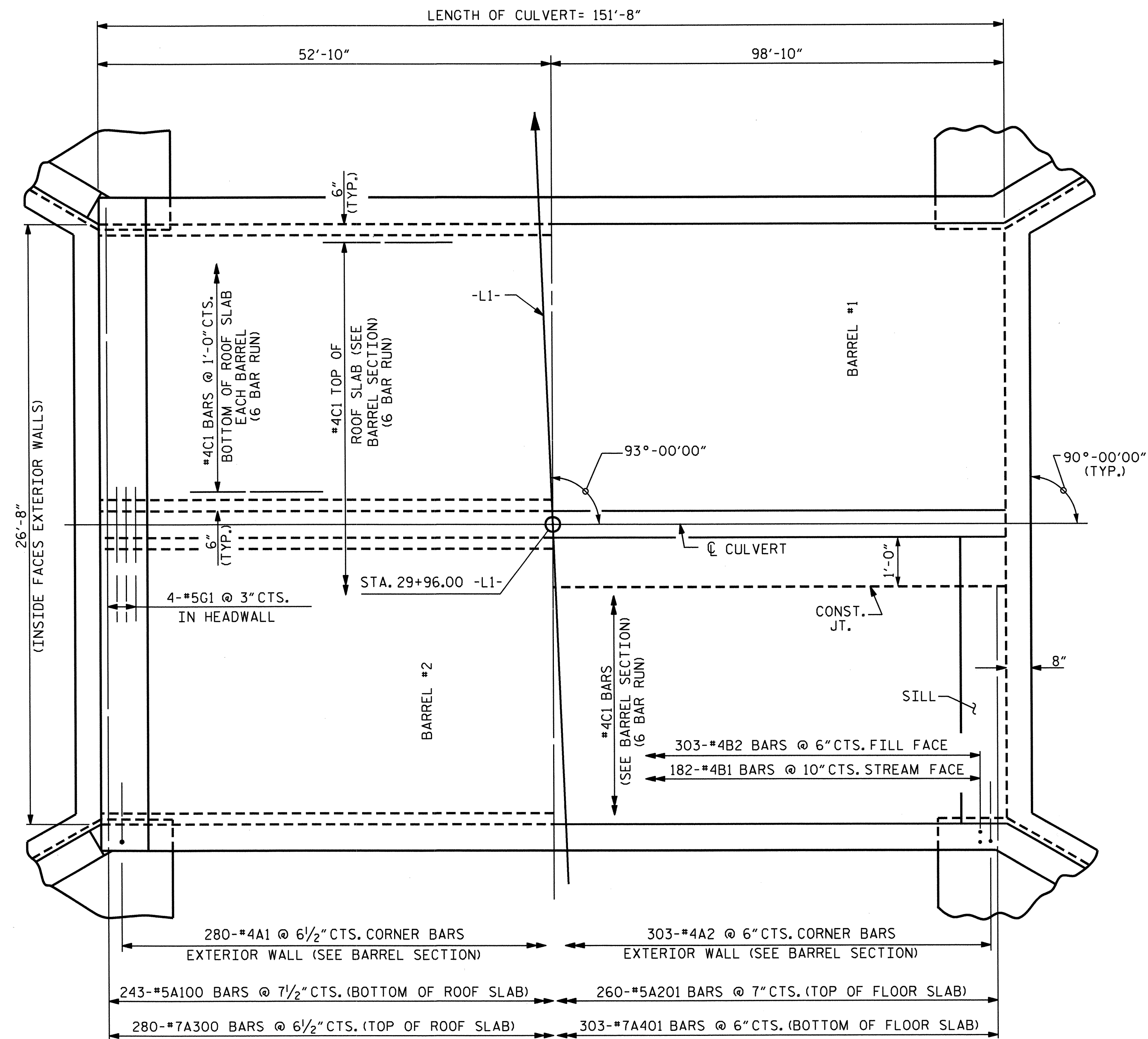
DOUBLE 13 FT. X 10 FT.
CONCRETE BOX CULVERT
(93° SKEW)

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

STR. #3



PART PLAN-FLOOR SLAB
(STAGE 1)

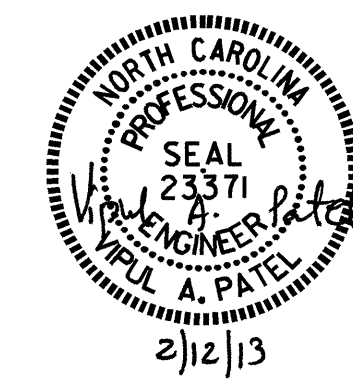


PART PLAN-ROOF SLAB
(STAGE 2)

PART PLAN-FLOOR SLAB
(STAGE 2)

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 29+96.00 -L1-

SHEET 3 OF 6



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 13 FT. X 10 FT.
 CONCRETE BOX CULVERT
 (93° SKEW)

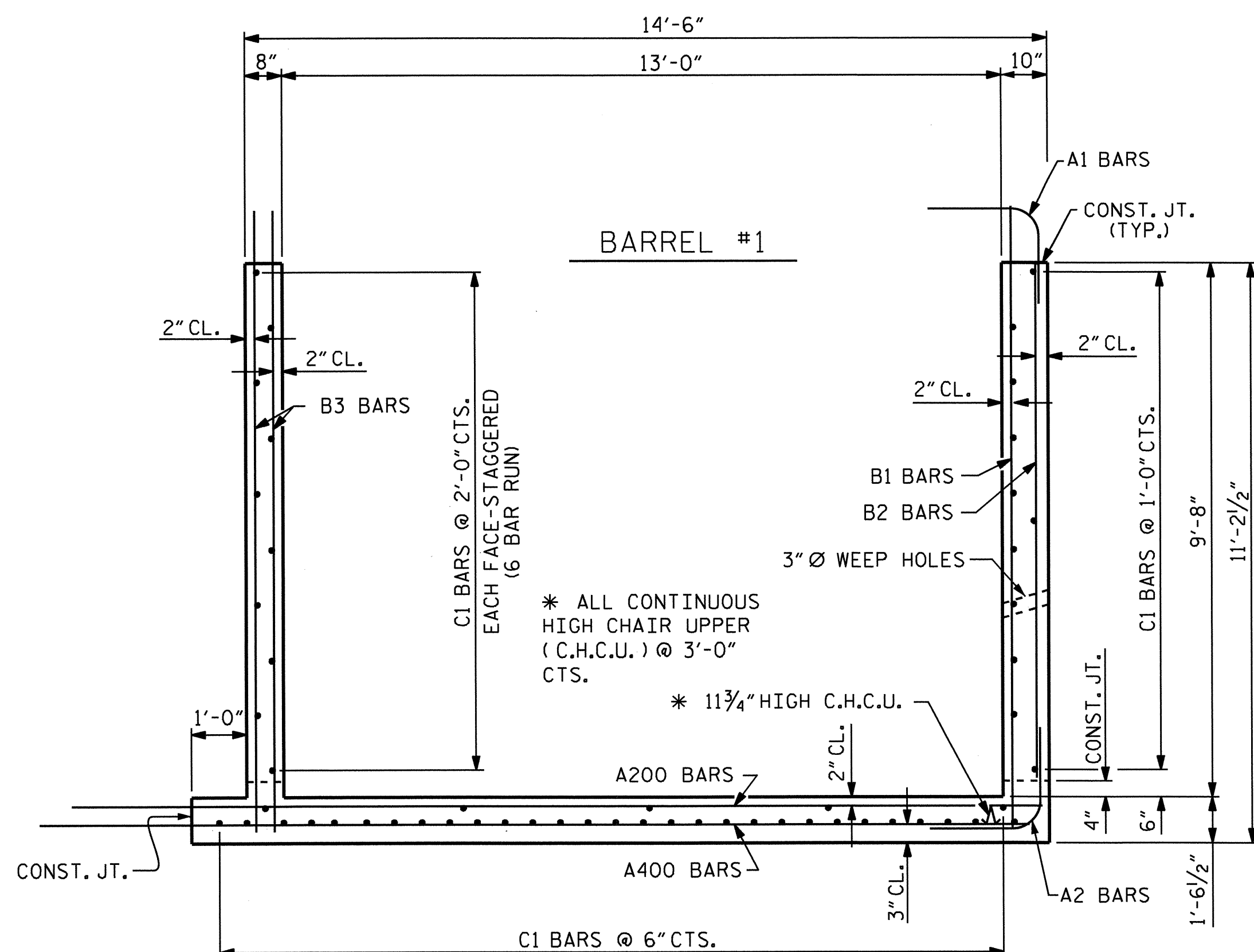
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-3
1			3			TOTAL SHEETS
2			4			12

STR. #3

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
 REDRAWN NOV. 1990 BY T.S.S. CHECKED BY ARB

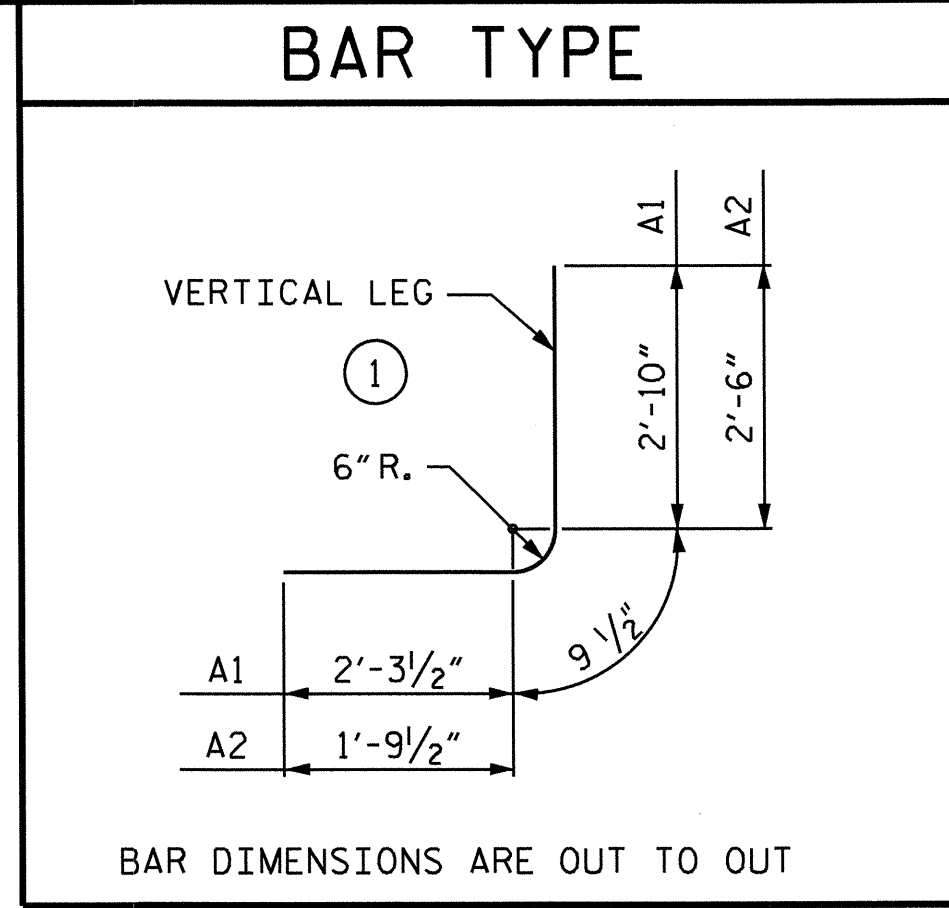
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 CHECKED BY: J. KHARVA DATE: 10/12
 DESIGN ENGINEER OF RECORD: H.T. DIEU DATE: 4/17/12

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RIGHT ANGLE SECTION OF BARREL

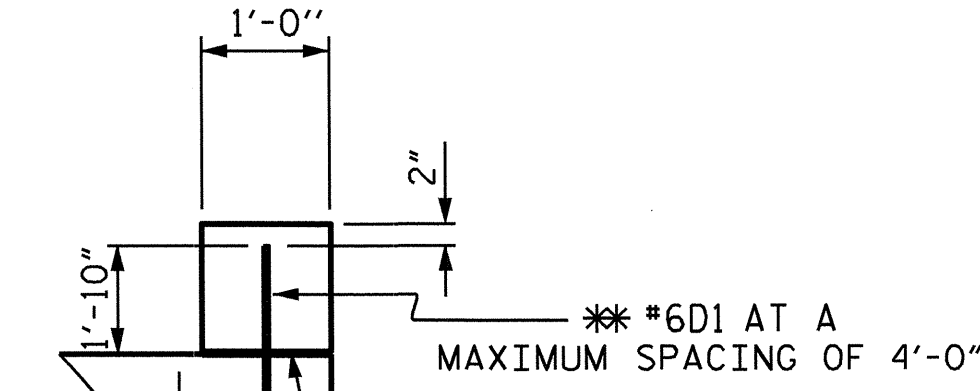
(THERE ARE 55 C1 BARS IN SECTION OF BARREL)
(STAGE 1)



BAR	SIZE	SPLICE LENGTH
A1	#4	1'-11"
A200	#5	2'-5"
A400	#7	2'-3"
C1	#4	1'-11"

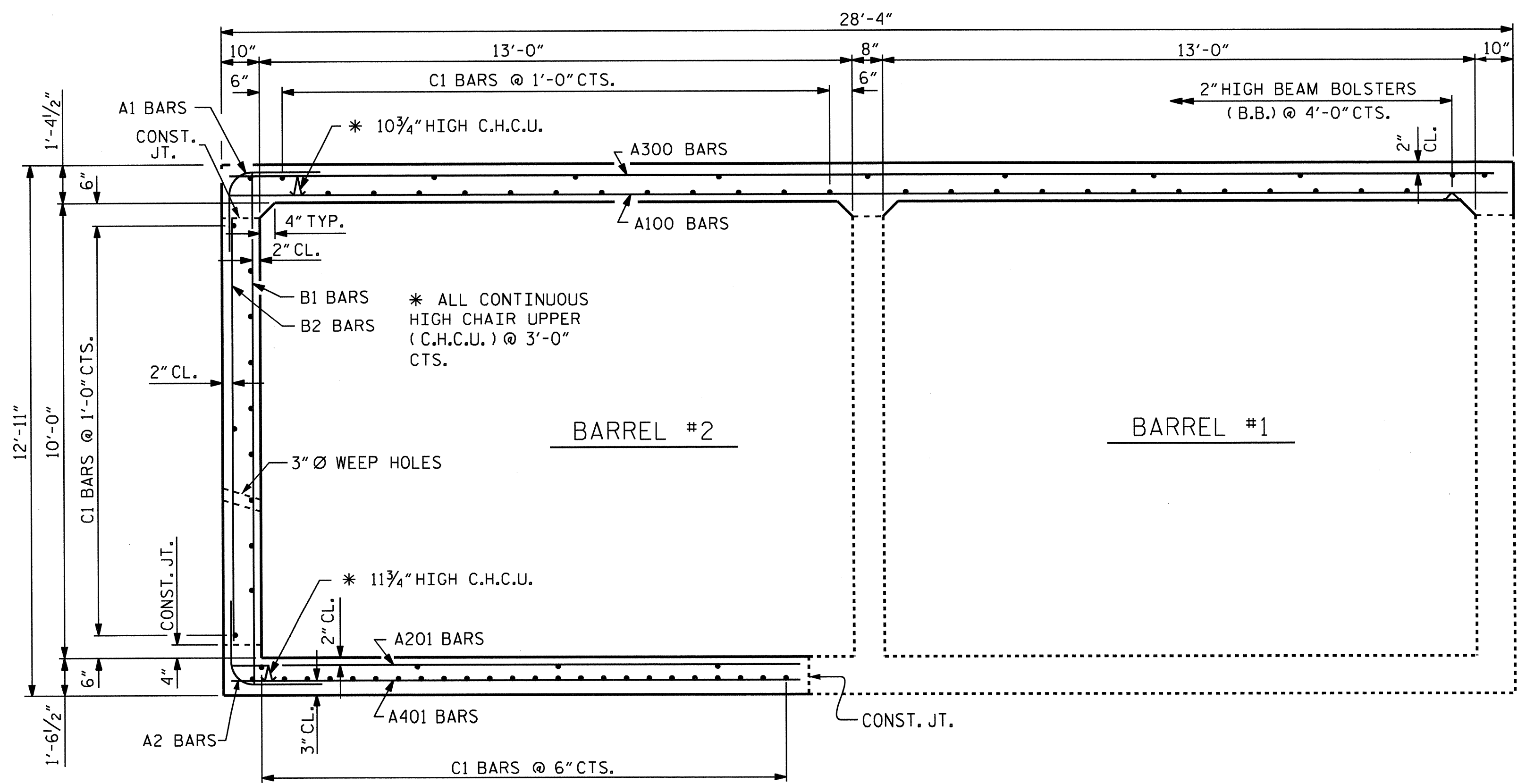
STAGE 1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
A200	260	#5	STR	17'-9"	4813	
A400	303	#7	STR	17'-7"	10890	
A1	280	#4	1	5'-11"	1107	
A2	303	#4	1	5'-1"	1029	
B1	182	#4	STR	12'-7"	1530	
B2	303	#4	STR	9'-4"	1889	
B3	304	#4	STR	12'-7"	2555	
C1	330	#4	STR	27'-0"	5952	
TOTAL REINFORCING STEEL					29765	

STAGE 2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
A100	243	#5	STR	28'-0"	7097	
A201	260	#5	STR	12'-7"	3412	
A300	280	#7	STR	28'-0"	16024	
A401	303	#7	STR	12'-7"	7793	
A1	280	#4	1	5'-11"	1107	
A2	303	#4	1	5'-1"	1029	
B1	182	#4	STR	12'-7"	1530	
B2	303	#4	STR	9'-4"	1889	
C1	450	#4	STR	27'-0"	8116	
D1	8	#6	STR	3'-1"	37	
G1	8	#5	STR	28'-0"	234	
TOTAL REINFORCING STEEL					48268	



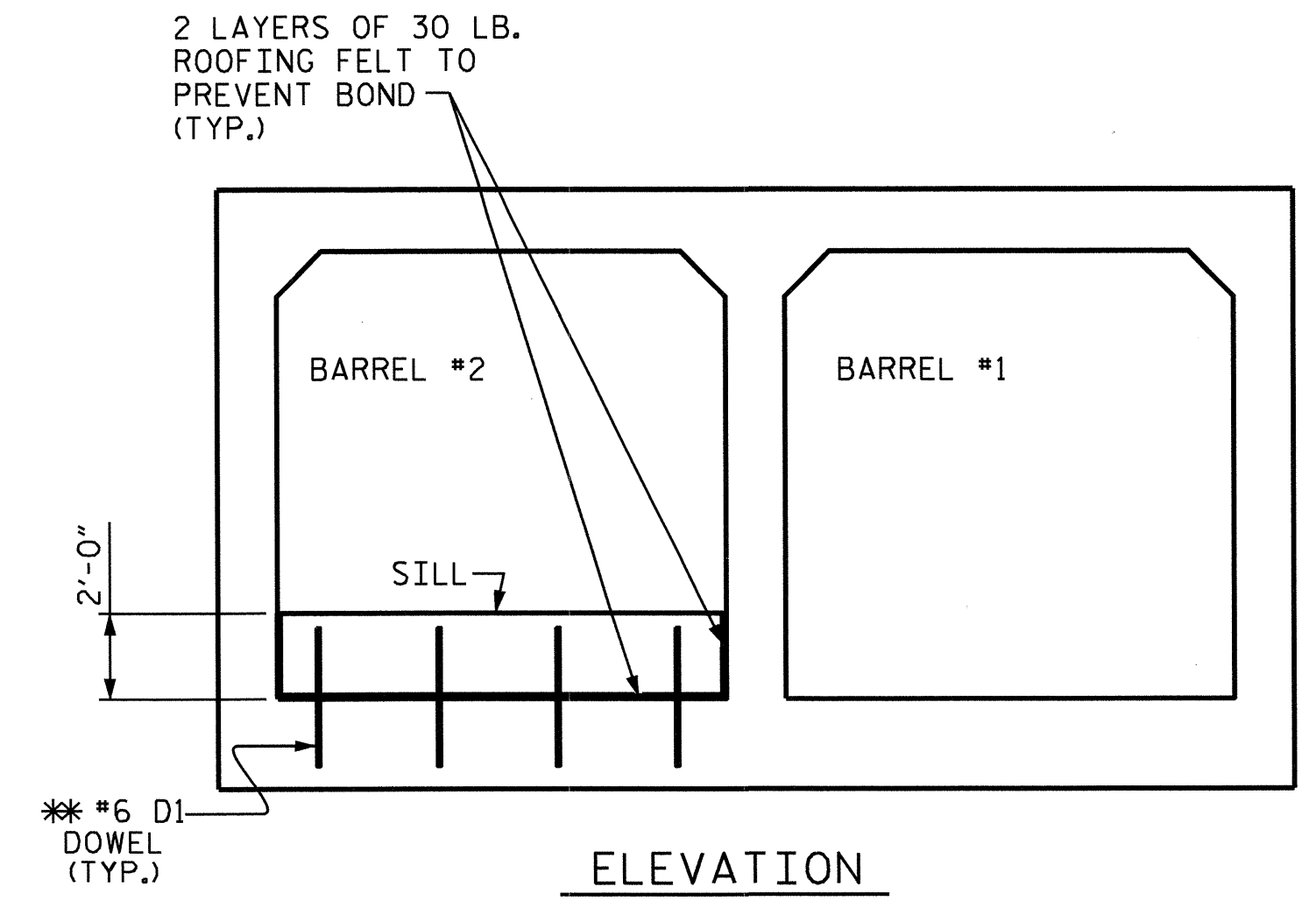
SECTION THROUGH SILL

* *DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.



RIGHT ANGLE SECTION OF BARREL

(THERE ARE 75 C1 BARS IN SECTION OF BARREL)
(STAGE 2)

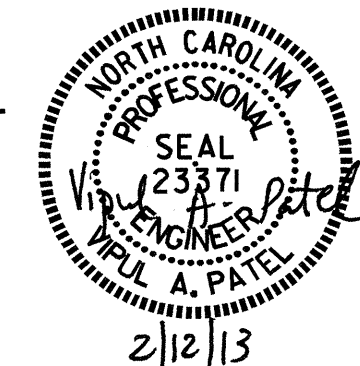


ELEVATION

CULVERT SILL DETAILS

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 29+96.00 -L1-
 SHEET 4 OF 6

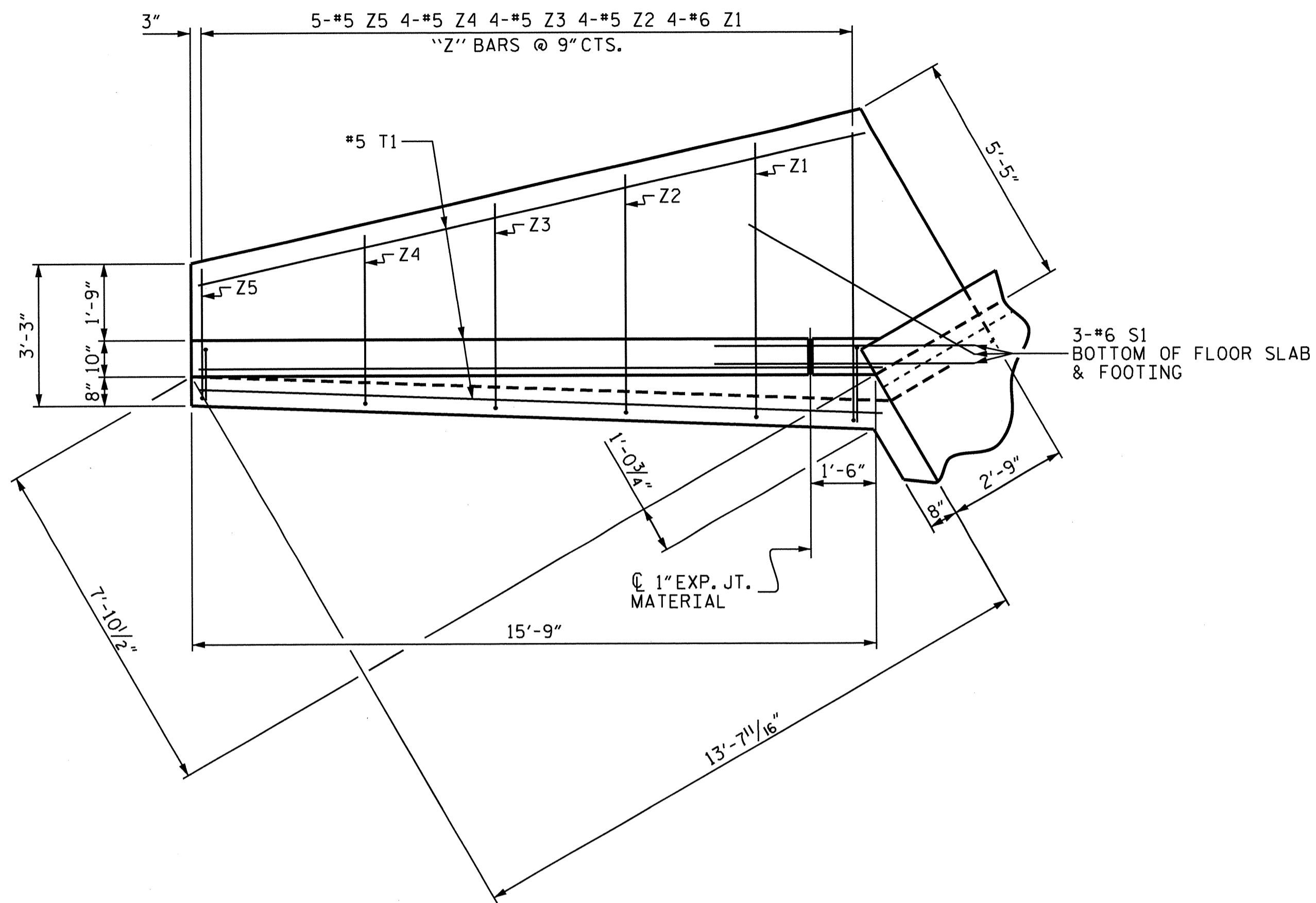
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE 13 FT. X 10 FT.
 CONCRETE BOX CULVERT
 93° SKEW



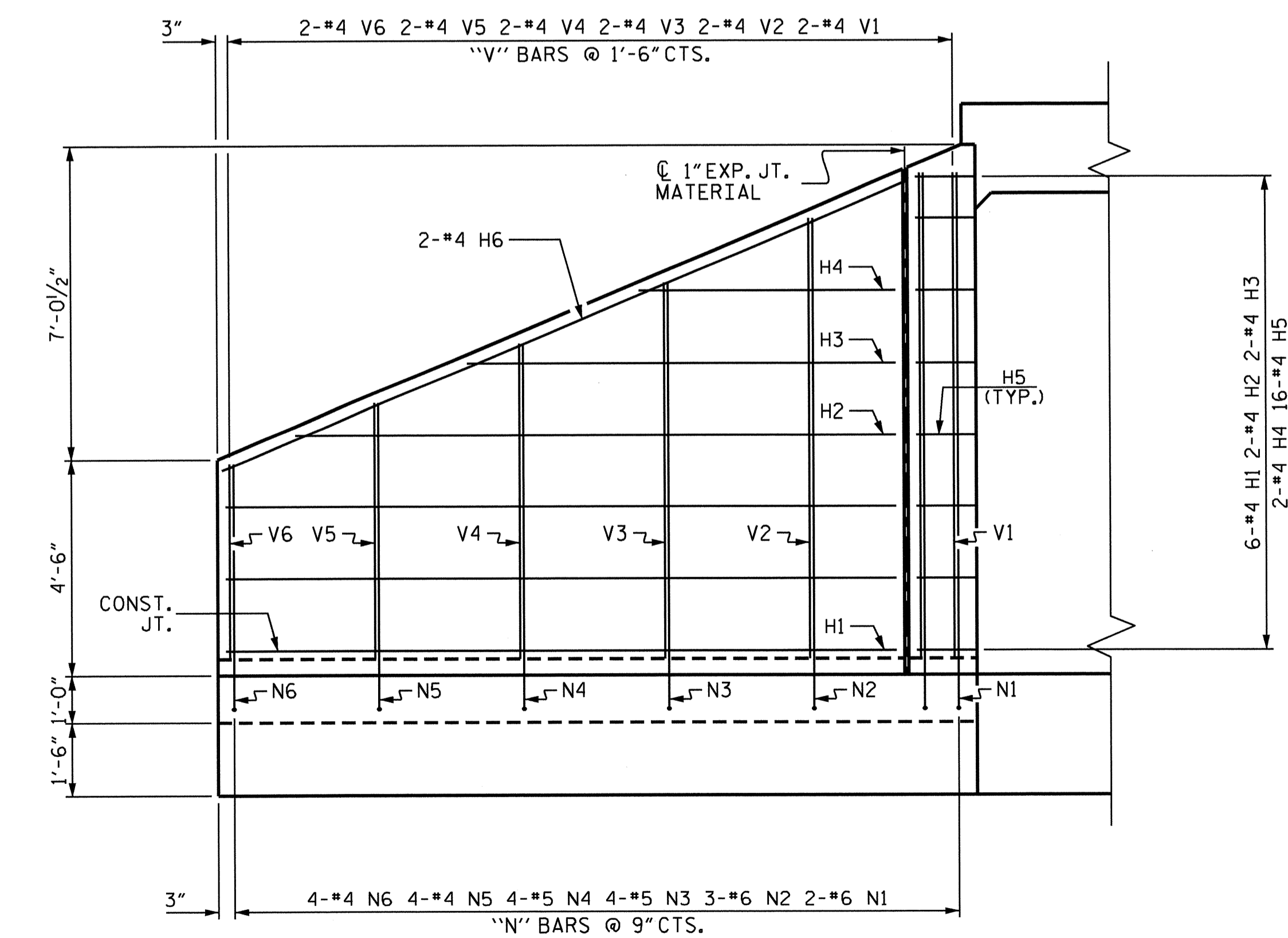
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-4
1			3			TOTAL SHEETS
2			4			12

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
 REDRAWN NOV. 1990 BY TSS CHECKED BY ARB

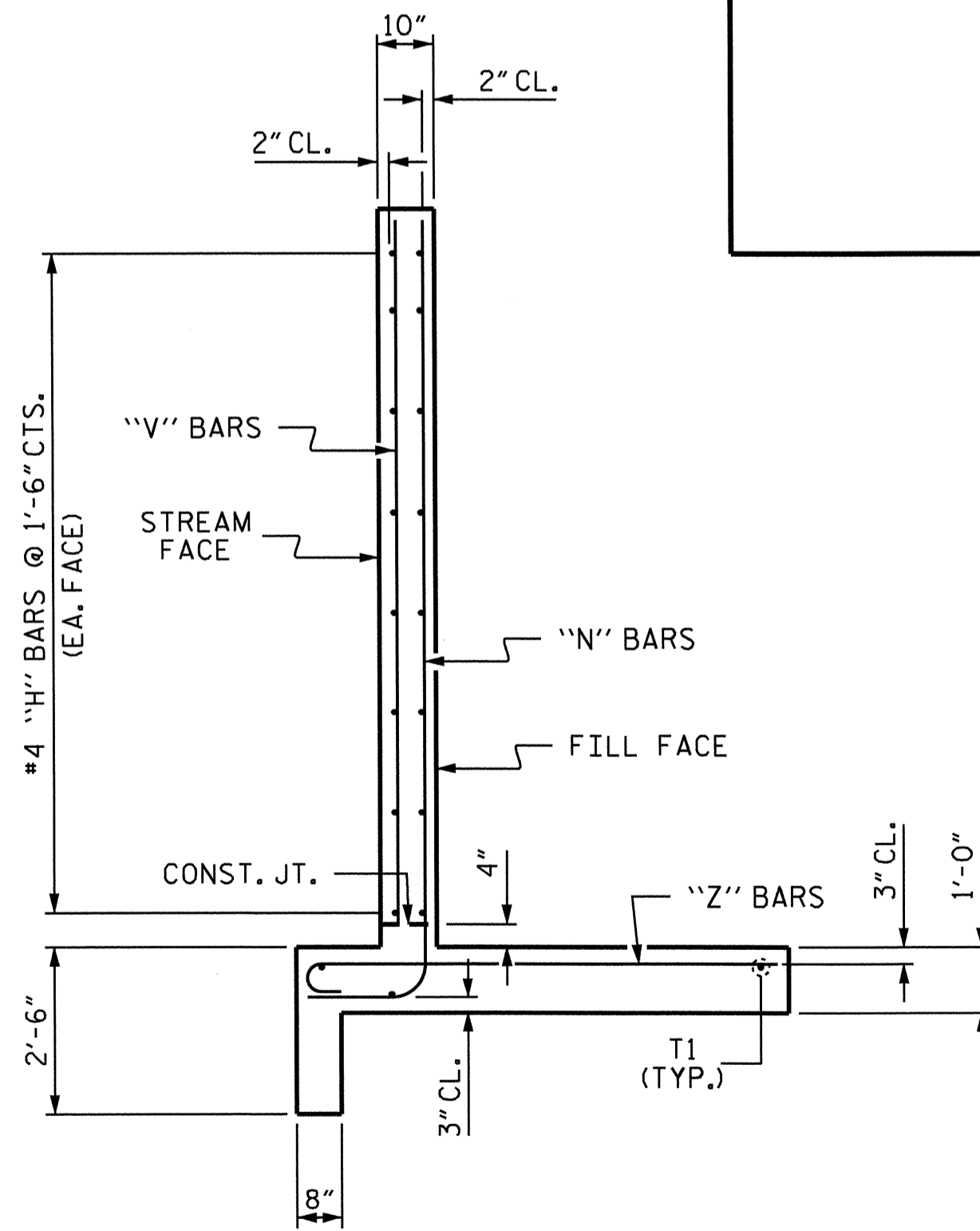
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 CHECKED BY: J. KHARVA DATE: 10/12
 DESIGN ENGINEER OF RECORD: H.T. DIEU DATE: 4/17/12



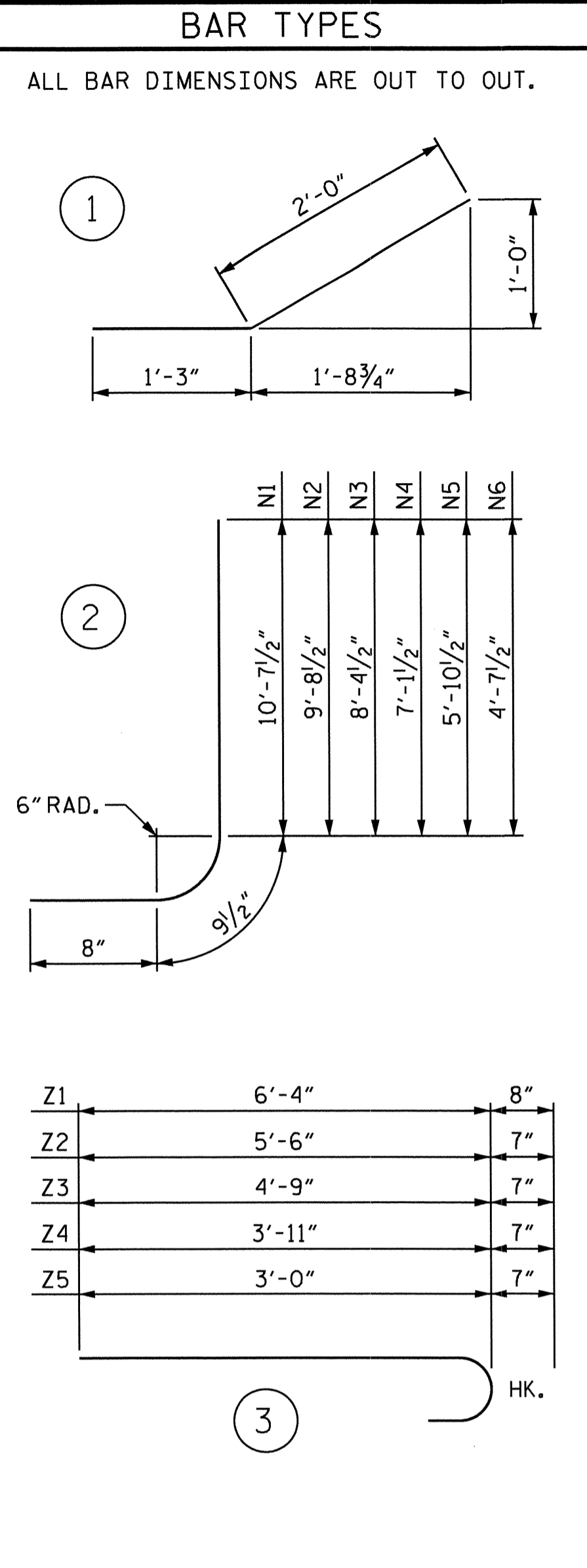
PLAN



ELEVATION



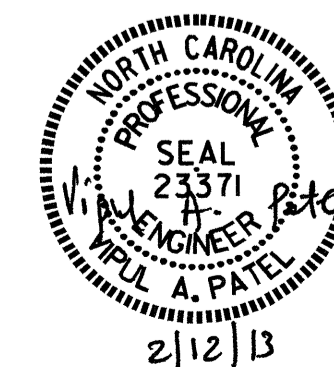
TYPICAL WING SECTION



BILL OF MATERIAL STAGE 1 FOR TWO WINGS						BILL OF MATERIAL STAGE 2 FOR TWO WINGS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR	13'-10"	111	H1	12	#4	STR	13'-10"	111
H2	4	#4	STR	12'-5"	33	H2	4	#4	STR	12'-5"	33
H3	4	#4	STR	8'-10"	24	H3	4	#4	STR	8'-10"	24
H4	4	#4	STR	5'-4"	14	H4	4	#4	STR	5'-4"	14
H5	32	#4	1	3'-3"	69	H5	32	#4	1	3'-3"	69
H6	4	#4	STR	15'-5"	41	H6	4	#4	STR	15'-5"	41
N1	4	#6	2	12'-1"	73	N1	4	#6	2	12'-1"	73
N2	6	#6	2	11'-2"	101	N2	6	#6	2	11'-2"	101
N3	8	#5	2	9'-10"	82	N3	8	#5	2	9'-10"	82
N4	8	#5	2	8'-7"	72	N4	8	#5	2	8'-7"	72
N5	8	#4	2	7'-4"	39	N5	8	#4	2	7'-4"	39
N6	8	#4	2	6'-1"	33	N6	8	#4	2	6'-1"	33
S1	6	#6	STR	6'-0"	54	S1	6	#6	STR	6'-0"	54
T1	6	#5	STR	15'-9"	99	T1	6	#5	STR	15'-9"	99
V1	4	#4	STR	10'-1"	27	V1	4	#4	STR	10'-1"	27
V2	4	#4	STR	9'-2"	24	V2	4	#4	STR	9'-2"	24
V3	4	#4	STR	7'-10"	21	V3	4	#4	STR	7'-10"	21
V4	4	#4	STR	6'-7"	18	V4	4	#4	STR	6'-7"	18
V5	4	#4	STR	5'-4"	14	V5	4	#4	STR	5'-4"	14
V6	4	#4	STR	4'-1"	11	V6	4	#4	STR	4'-1"	11
Z1	8	#6	3	7'-0"	84	Z1	8	#6	3	7'-0"	84
Z2	8	#5	3	6'-1"	51	Z2	8	#5	3	6'-1"	51
Z3	8	#5	3	5'-4"	44	Z3	8	#5	3	5'-4"	44
Z4	8	#5	3	4'-6"	38	Z4	8	#5	3	4'-6"	38
Z5	10	#5	3	3'-7"	37	Z5	10	#5	3	3'-7"	37
REINFORCING STEEL FOR 2 WINGS						REINFORCING STEEL FOR 2 WINGS					
						1214 LBS					
CLASS A CONCRETE 2 WINGS END CURTAIN WALLS						CLASS A CONCRETE 2 WINGS 2 HEADWALLS END CURTAIN WALLS					
						15.6 CY 2.6 CY 1.4 CY					
TOTAL						TOTAL					
						17.3 CY 19.6 CY					

ASSEMBLED BY : H.T. DIEU DATE : 9/4/12
 CHECKED BY : J. KHARVA DATE : 10/12
 DRAWN BY : CCJ 10/99
 CHECKED BY : RWW 03/00

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PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 29+96.00 -L1-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 10'-0" SLOPE = 2:1
 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS 12
2			4			

STR. #3

STD. NO. CW 9010

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						MOMENT				SHEAR						
						RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)			
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.12	--	1.75	1.74	1	TOP SLAB	5.84	1.12	1	TOP SLAB	12.36		
	HL-93 (OPERATING)	N/A		1.45	--	1.35	2.26	1	TOP SLAB	5.84	1.45	1	TOP SLAB	12.36		
	HS-20 (INVENTORY)	36.000	②	1.12	40.36	1.75	1.94	1	BOTTOM SLAB	13.75	1.12	1	TOP SLAB	12.36		
	HS-20 (OPERATING)	36.000		1.45	52.23	1.35	2.52	1	BOTTOM SLAB	13.70	1.45	1	TOP SLAB	12.36		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.88	38.85	1.40	3.24	1	TOP CORNER WALL	10.89	2.88	1	TOP SLAB	12.36	
		SNGARBS2	20.000		2.15	42.91	1.40	3.17	1	TOP CORNER WALL	10.89	2.15	1	TOP SLAB	12.36	
		SNAGRIS2	22.000		1.99	43.85	1.40	3.17	1	TOP CORNER WALL	10.89	1.99	1	TOP SLAB	12.36	
		SNCOTTS3	27.250		1.44	39.11	1.40	2.18	1	TOP SLAB	5.84	1.44	1	TOP SLAB	12.36	
		SNAGGRS4	34.925		1.26	44.12	1.40	2.09	1	TOP SLAB	5.84	1.26	1	TOP SLAB	12.36	
		SNS5A	35.550		1.22	43.28	1.40	1.93	1	TOP SLAB	5.84	1.22	1	TOP SLAB	12.36	
		SNS6A	39.950		1.17	46.71	1.40	1.96	1	BOTTOM SLAB	13.75	1.17	1	TOP SLAB	12.36	
		SNS7B	42.000		1.12	46.87	1.40	1.92	1	TOP SLAB	5.84	1.12	1	TOP SLAB	12.36	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.51	49.78	1.40	2.43	1	BOTTOM SLAB	13.75	1.51	1	TOP SLAB	12.36	
		TNT4A	33.075		1.45	48.07	1.40	2.40	1	BOTTOM SLAB	13.75	1.45	1	TOP SLAB	12.36	
		TNT6A	41.600		1.26	52.29	1.40	2.17	1	BOTTOM SLAB	13.75	1.26	1	TOP SLAB	12.36	
		TNT7A	42.000		1.29	54.08	1.40	2.07	1	BOTTOM SLAB	13.75	1.29	1	TOP SLAB	12.36	
		TNT7B	42.000		1.29	54.35	1.40	2.09	1	TOP SLAB	5.84	1.29	1	TOP SLAB	12.36	
		TNAGRIT4	43.000		1.23	52.81	1.40	1.91	1	BOTTOM SLAB	13.75	1.23	1	TOP SLAB	12.36	
TNAGT5A	45.000		1.15	51.68	1.40	1.92	1	BOTTOM SLAB	13.75	1.15	1	TOP SLAB	12.36			
TNAGT5B	45.000		③	1.08	48.65	1.40	1.82	1	BOTTOM SLAB	13.75	1.08	1	TOP SLAB	12.36		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS		
LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

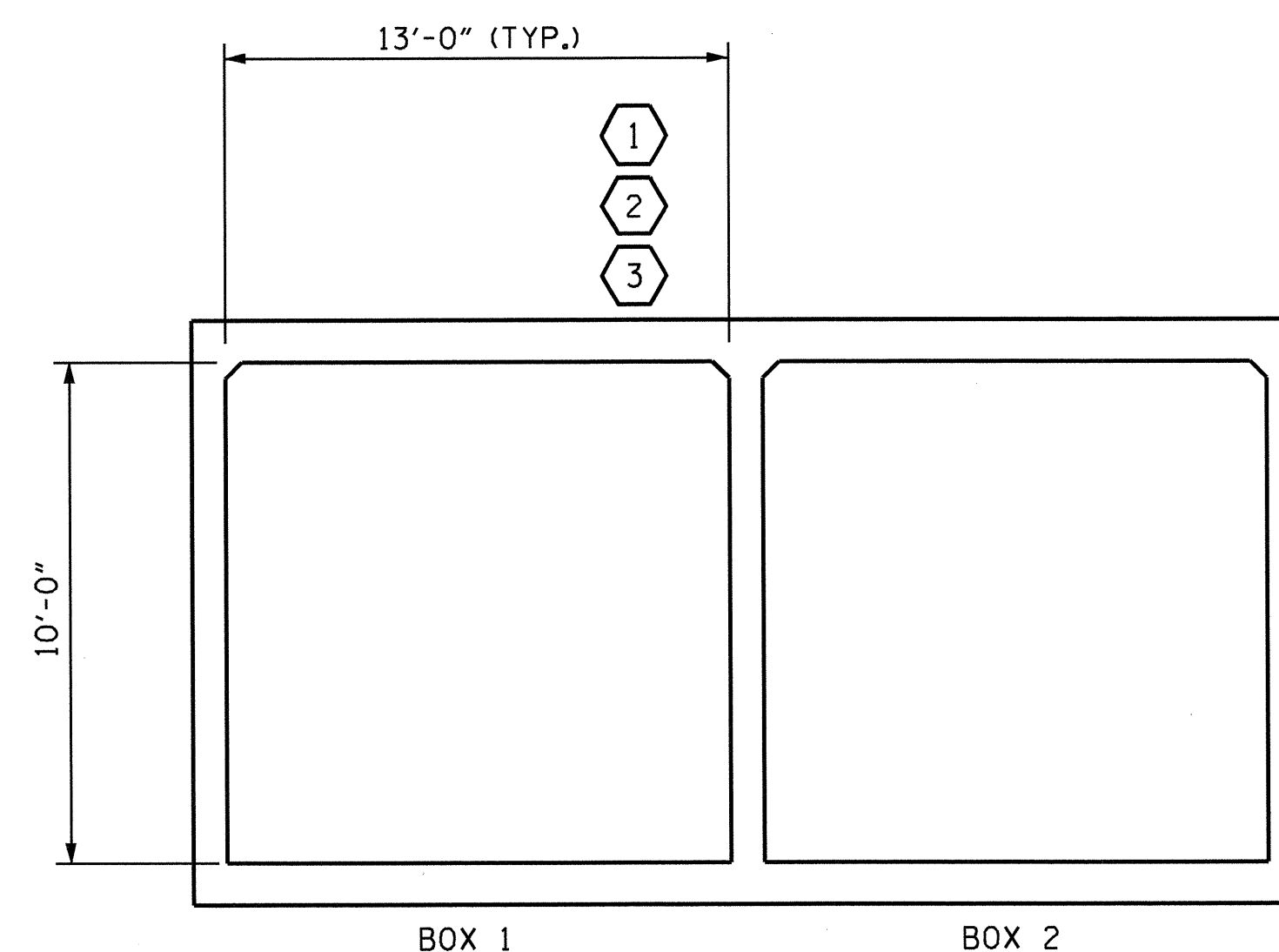
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

#	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	

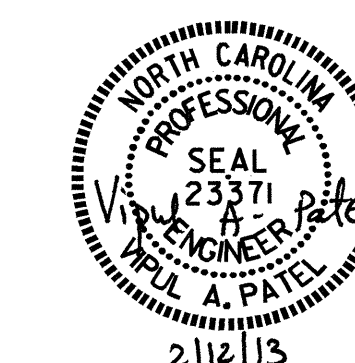


LRFR SUMMARY

(LOOKING DOWNSTREAM)

ASSEMBLED BY : H.T. DIEU	DATE : 11/1/12
CHECKED BY : H.A. LOCKLEAR	DATE : 11/12
DRAWN BY : WMC 7/11	REV. 10/1/11
CHECKED BY : GM 7/11	MAA/GM

07-JAN-2013 11:56
0:\Structures\Plans\Plans str*3R-2246B.SD.CU.03.dgn
jpadams



PROJECT NO. R-2246B
CABARRUS COUNTY
STATION: 29+96.00 -L-

SHEET 6 OF 6

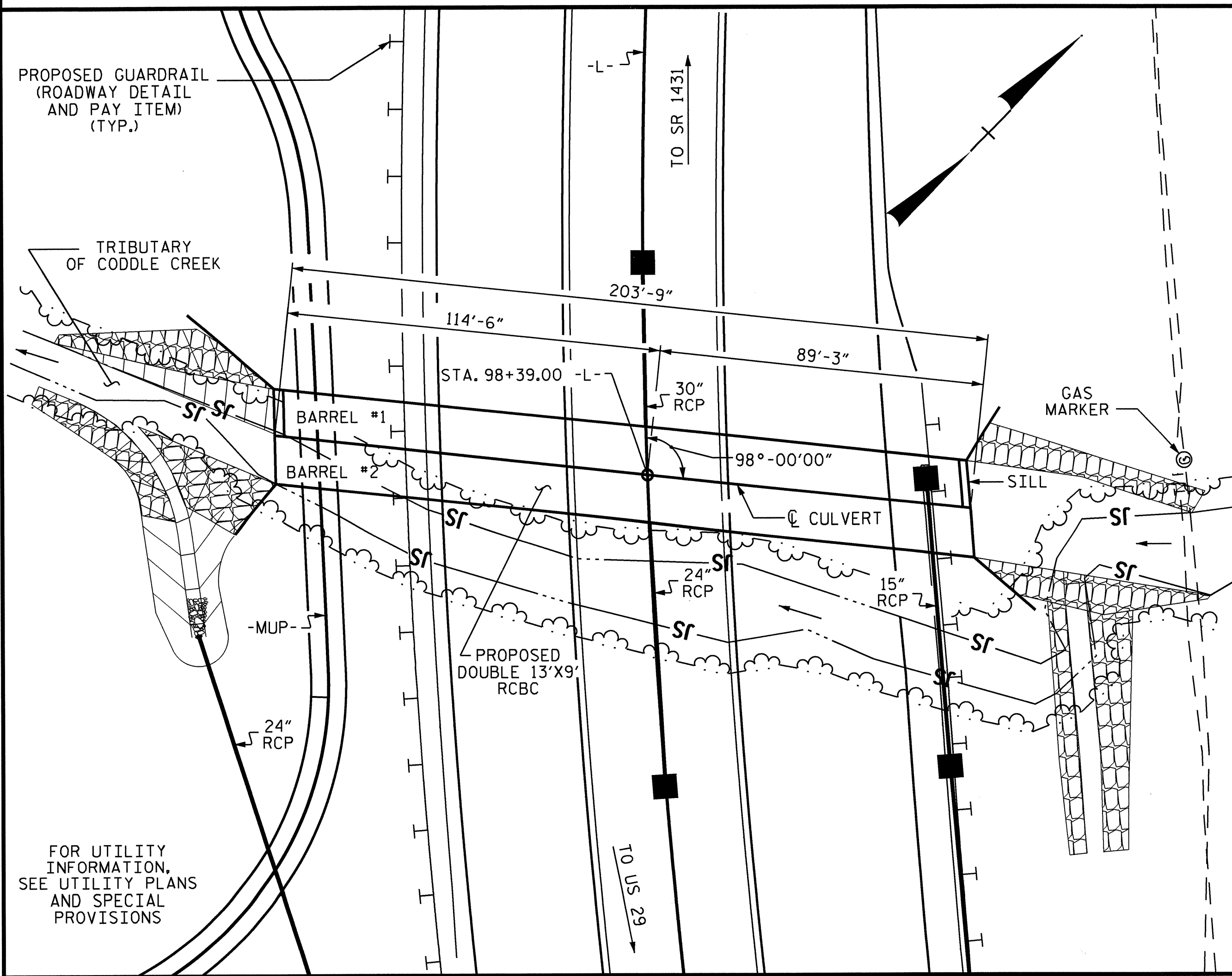
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
REINFORCED CONCRETE
BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS
2			4			12

STR. #3

STD. NO. LRFR5

BM #9: R.R. SPIKE SET IN THE BASE OF 48" OAK, 231' LEFT, STA. 97+48 -L-, EL. 599.99



LOCATION SKETCH

ROADWAY DATA

GRADE PT. EL. @ STA. 98+39.00 -L- = 599.90
 BED EL. @ STA. 98+39.00 -L- = 583.50
 ROADWAY SLOPES @ STA. 98+39.00 -L- = 2:1

HYDRAULIC DATA

DESIGN DISCHARGE = 1500 C.F.S.
 FREQUENCY OF DESIGN FLOOD = 50 YR.
 DESIGN HIGH WATER ELEVATION = 592.80
 DRAINAGE AREA = 2.00 SQ. MI.
 BASE DISCHARGE (0100) = 1700 C.F.S.
 BASE HIGH WATER ELEVATION = 593.70

OVERTOPPING FLOOD DATA

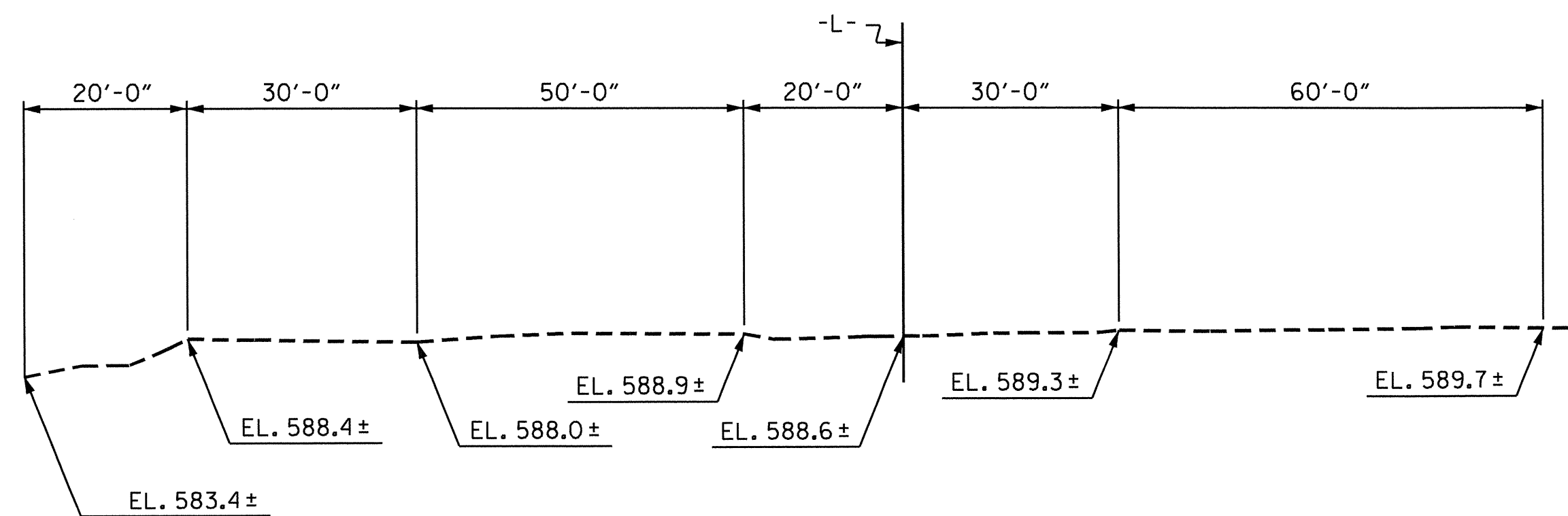
OVERTOPPING DISCHARGE = 2700 C.F.S.
 FREQUENCY OF OVERTOPPING FLOOD = +500 YR.
 OVERTOPPING FLOOD ELEVATION = 597.50

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL @	3,397 CY/FT	692.1 C.Y.
SILL	2.0	C.Y.
WING ETC.	33.6	C.Y.
TOTAL	727.7	C.Y.
REINFORCING STEEL		
BARREL	86363	LBS.
WINGS ETC.	1957	LBS.
TOTAL	88320	LBS.
CULVERT EXCAVATION	= LUMP SUM	
FOUNDATION COND. MAT'L.	= 460 TONS	

NOTES

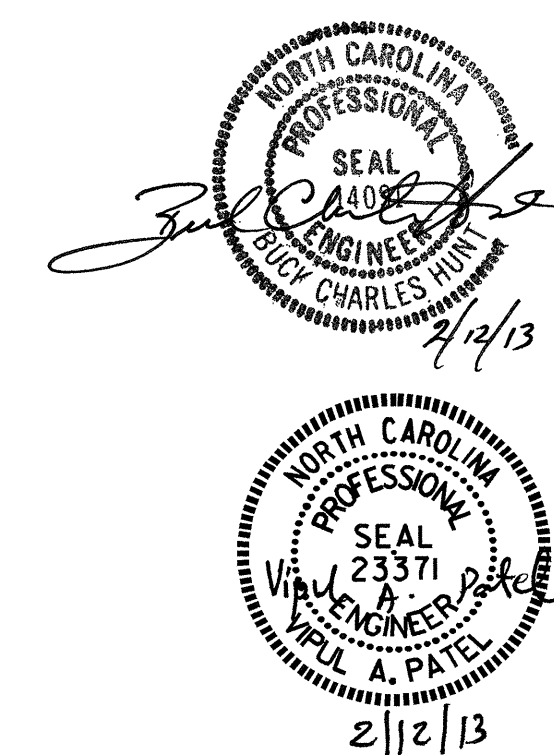
- ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING.
- DESIGN FILL----- 10.15 FT. MAX
- DESIGN FILL----- 3.19 FT. MIN.
- FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.
- 3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:
 1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
 2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
- 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.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
- STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION, EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.
- AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS 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.
- AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, 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.
- 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.
- BED MATERIAL PLACED BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL BETWEEN THE LOWER SILLS. THE MATERIAL SHALL BE NATURAL STONE WITH A GRADATION SIZE SIMILAR TO THAT OF CLASS I RIP RAP. STONES LARGER THAN 17 INCHES SHALL NOT BE PLACED WITHIN THE LOW FLOW CHANNEL. BED MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.



PROFILE ALONG CL CULVERT

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 98+39.00 -L-

SHEET 1 OF 6 CULVERT #391

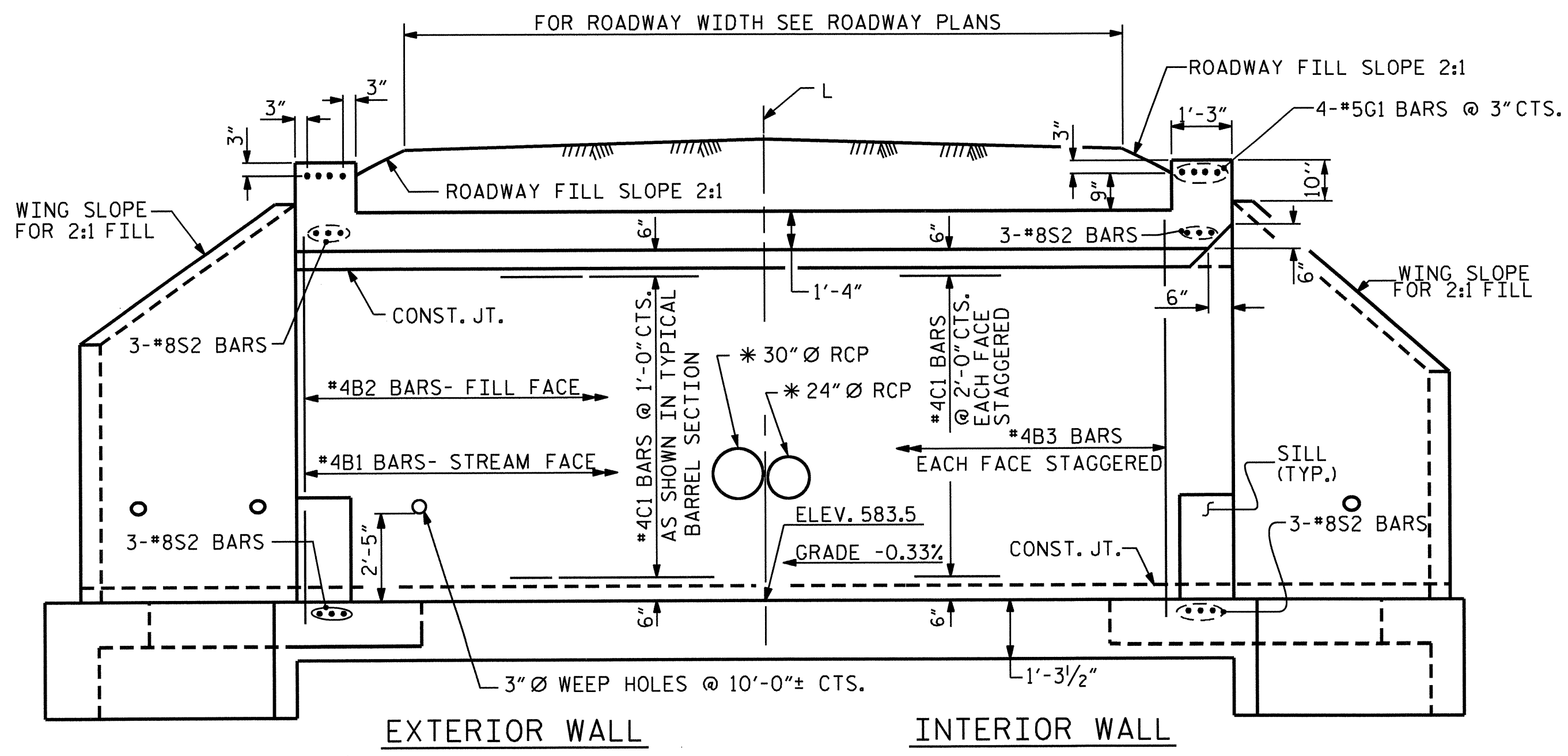


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 BARREL STANDARD
 DOUBLE 13 FT. X 9 FT.
 CONCRETE BOX CULVERT
 98° SKEW

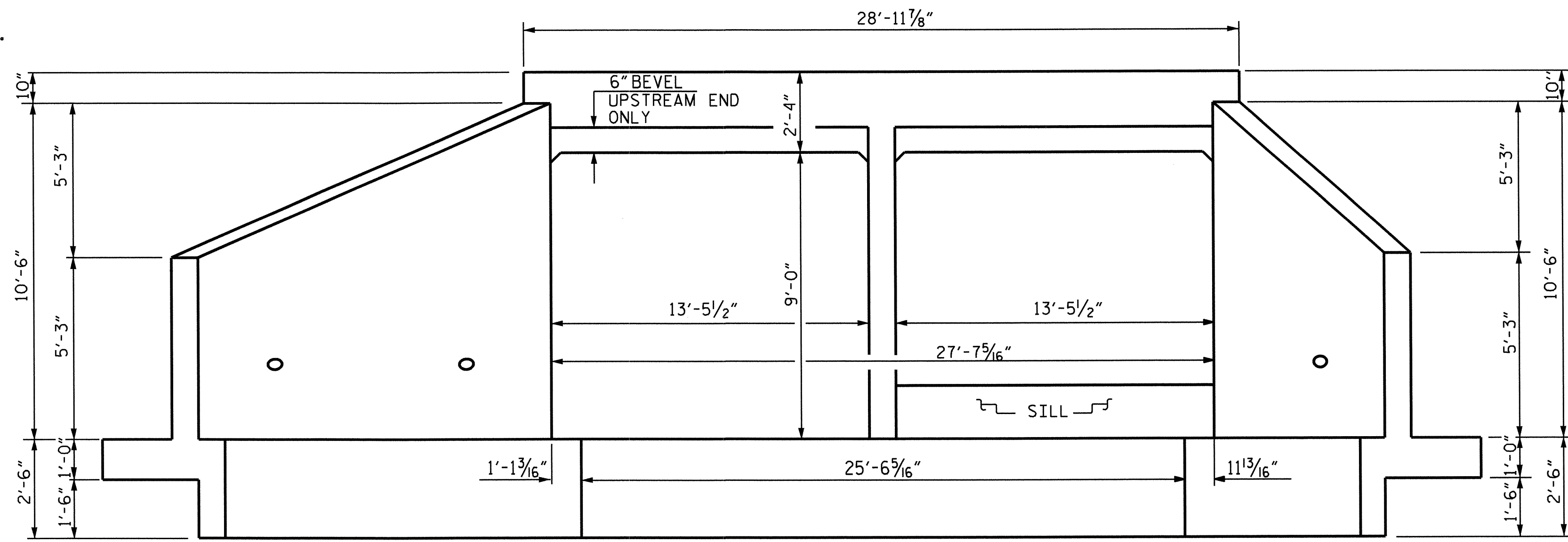
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7
1			3			TOTAL SHEETS
2			4			12

ADDED NOV. 1990

DRAWN BY : H.T. DIEU DATE : 10/17/12
 CHECKED BY : J. KHARVA DATE : 10/12
 DESIGN ENGINEER OF RECORD: H.T. DIEU DATE : 8/29/12

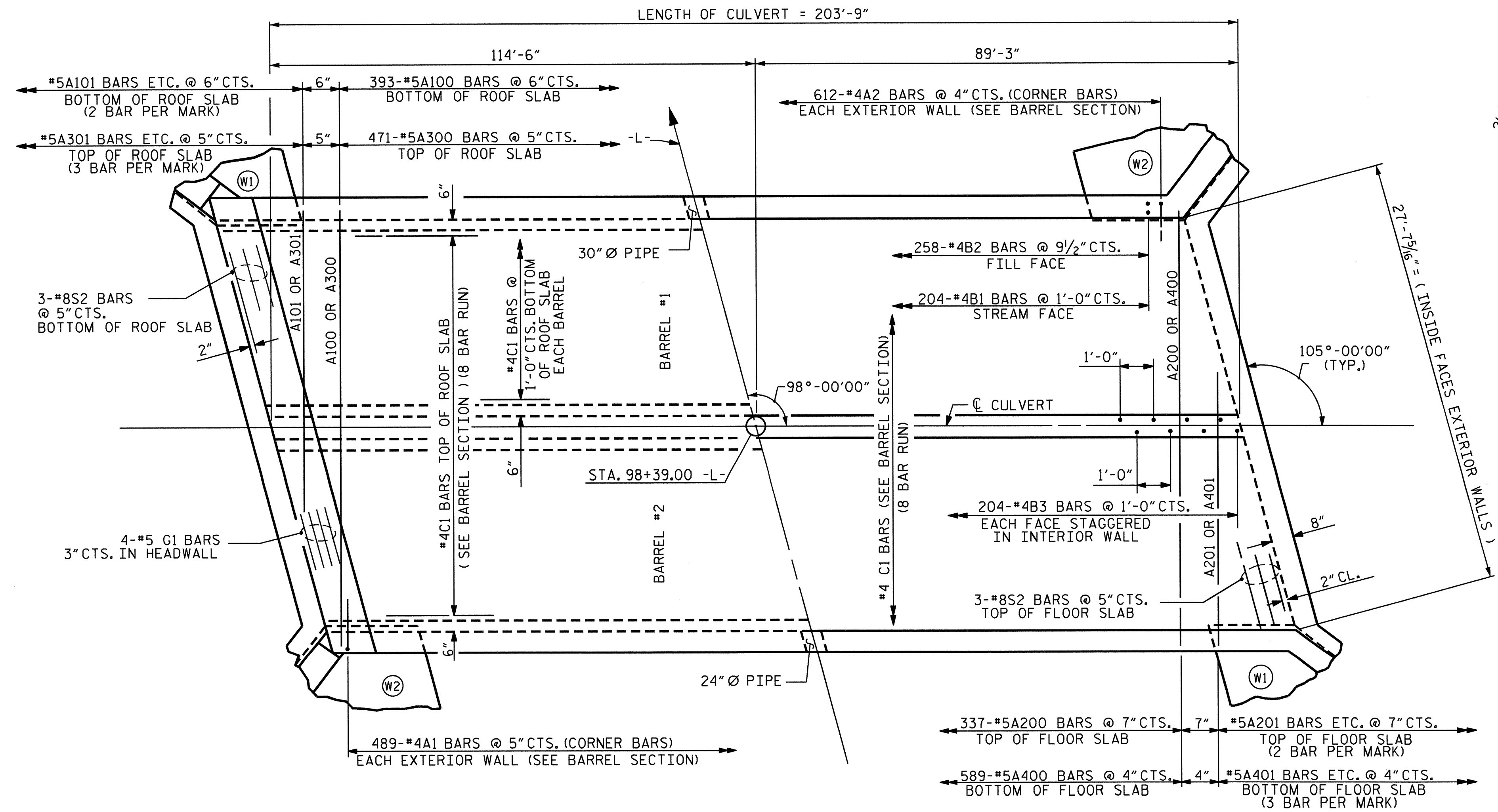


CULVERT SECTION NORMAL TO ROADWAY



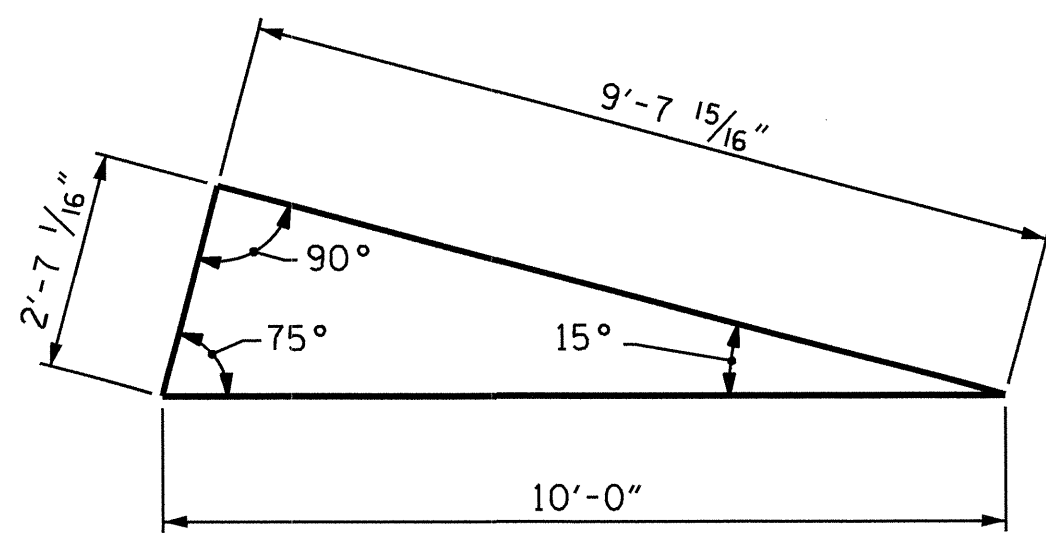
END ELEVATION NORMAL TO SKEW

(FOR SILL DETAIL, SEE SHEET 3 OF 6)
(LOOKING DOWNSTREAM)

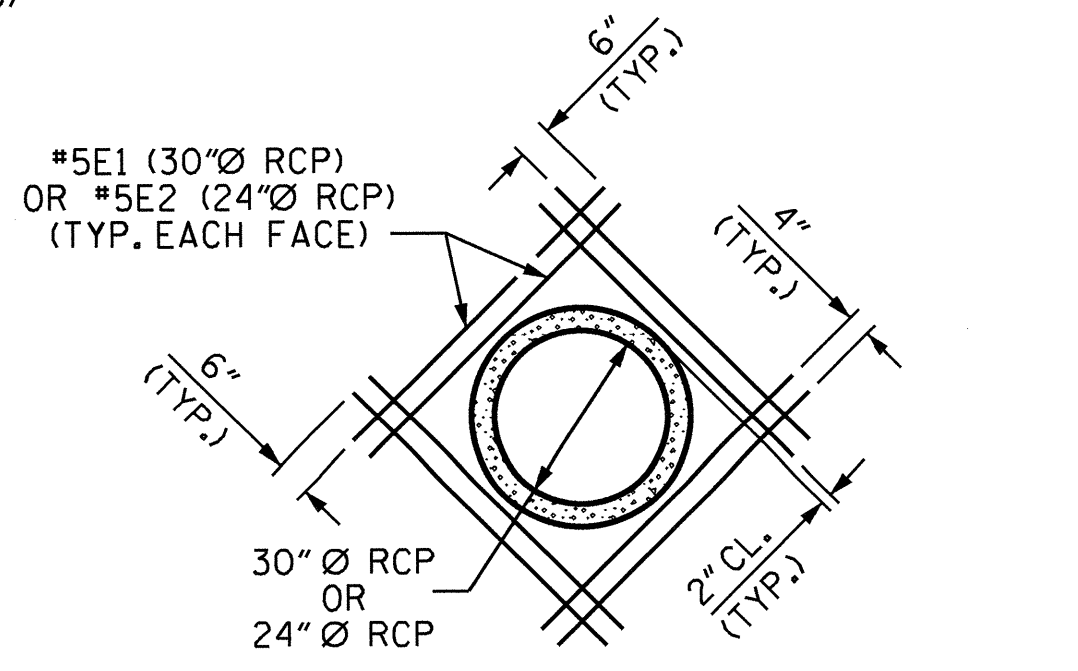


PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB

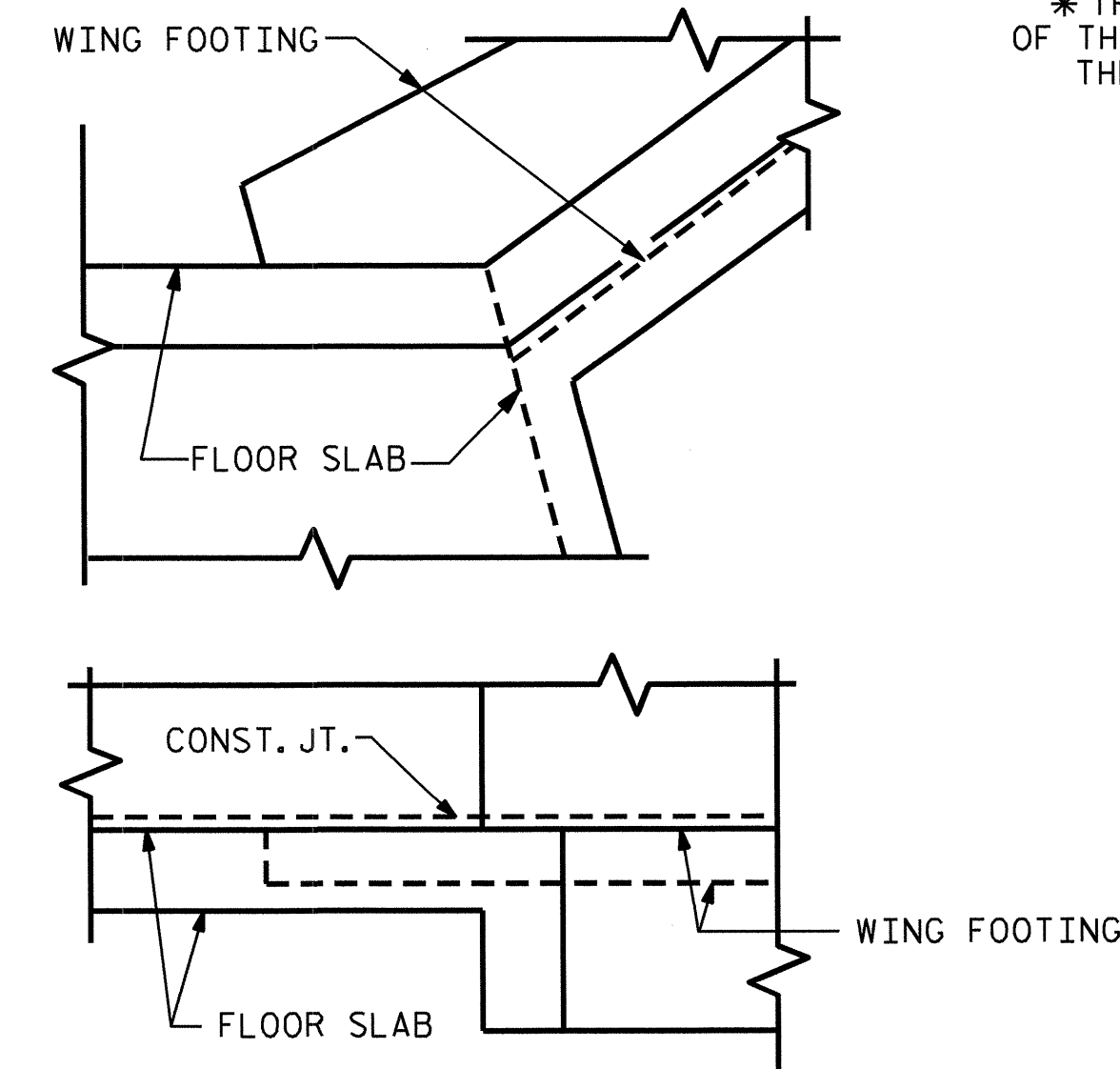


SKEW TRIANGLE



DETAIL OF REINFORCING AROUND RCP

* THE 30" RCP OR 24" RCP THROUGH THE SIDEWALL OF THE CULVERT WILL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT OR CUT AS NECESSARY TO CLEAR PIPE.



CONNECTION OF WING FOOTING AND FLOOR SLAB WHEN SLAB IS THICKER THAN FOOTING



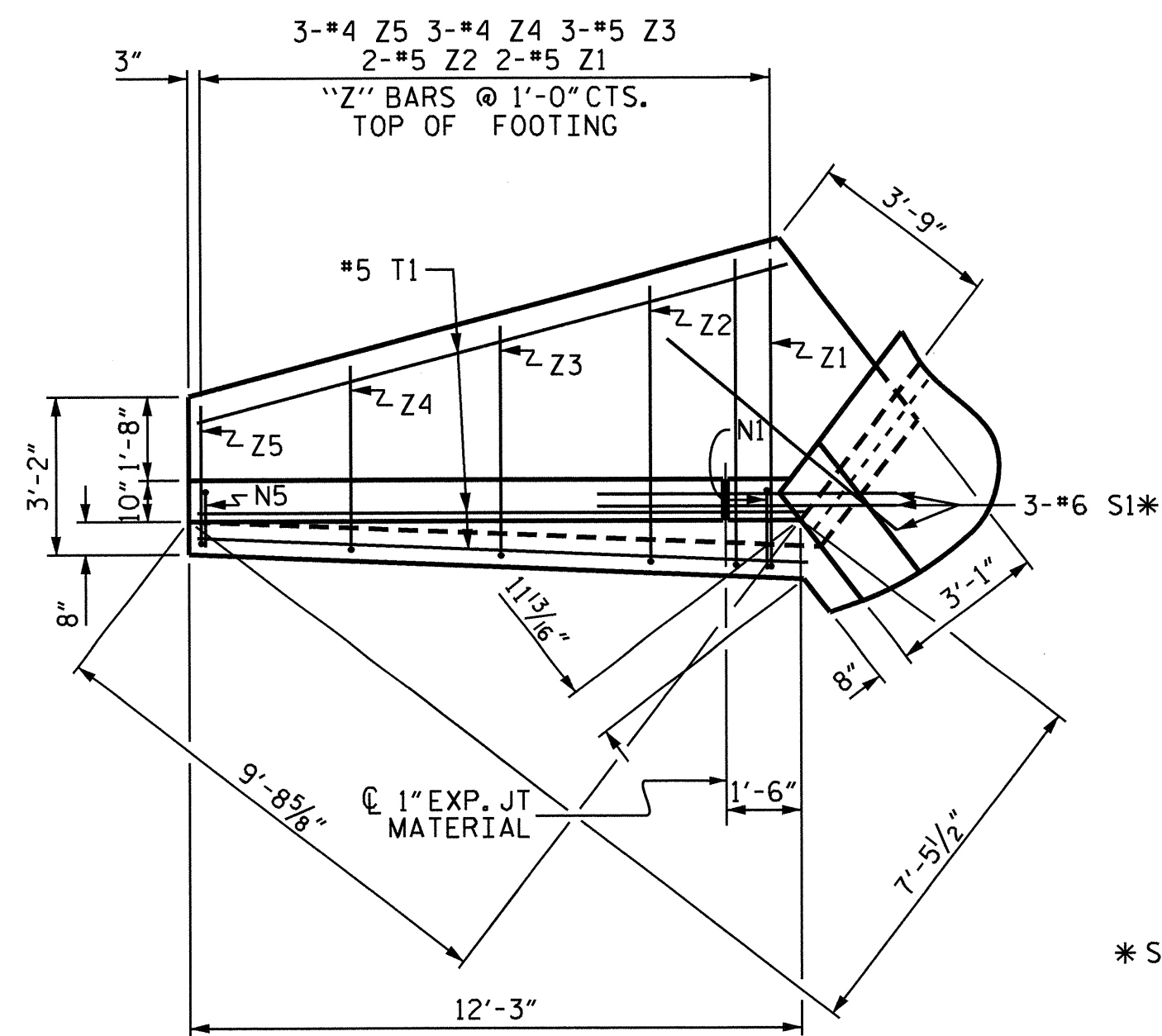
PROJECT NO. R-2246B
CABARRUS COUNTY
STATION: 98+39.00 -L-

SHEET 2 OF 6
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
BARREL STANDARD
DOUBLE 13 FT. X 9 FT.
CONCRETE BOX CULVERT
98° SKEW

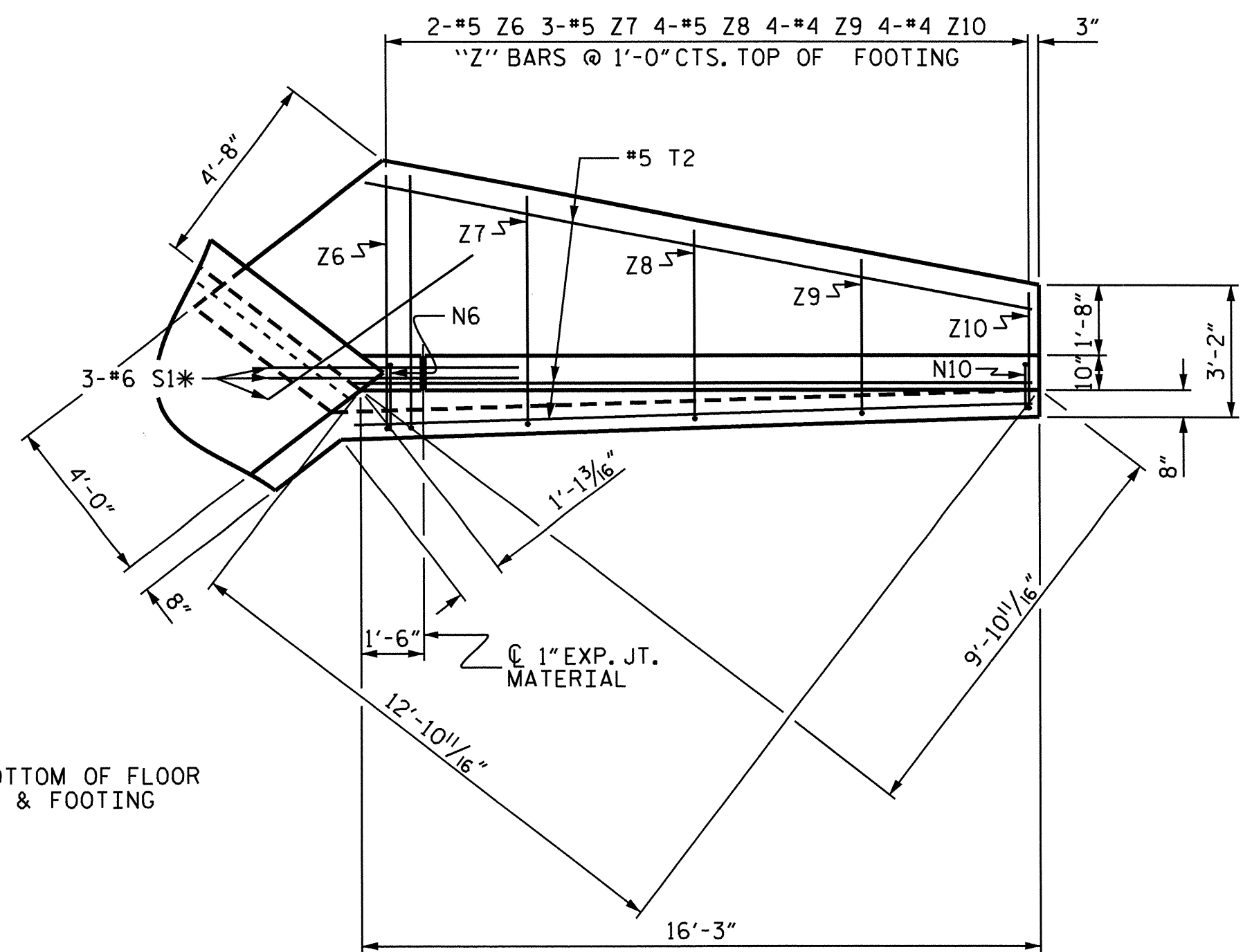
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-8	
1			3			TOTAL SHEETS	
2			4			12	

REVISED 11-9-99 BY M.M. CHECKED BY R.W.W.
REVISED 8-28-95 BY J.L.P. CHECKED BY G.R.P.
REDRAWN 11-30 BY A.R.E. CHECKED BY C.R.R.

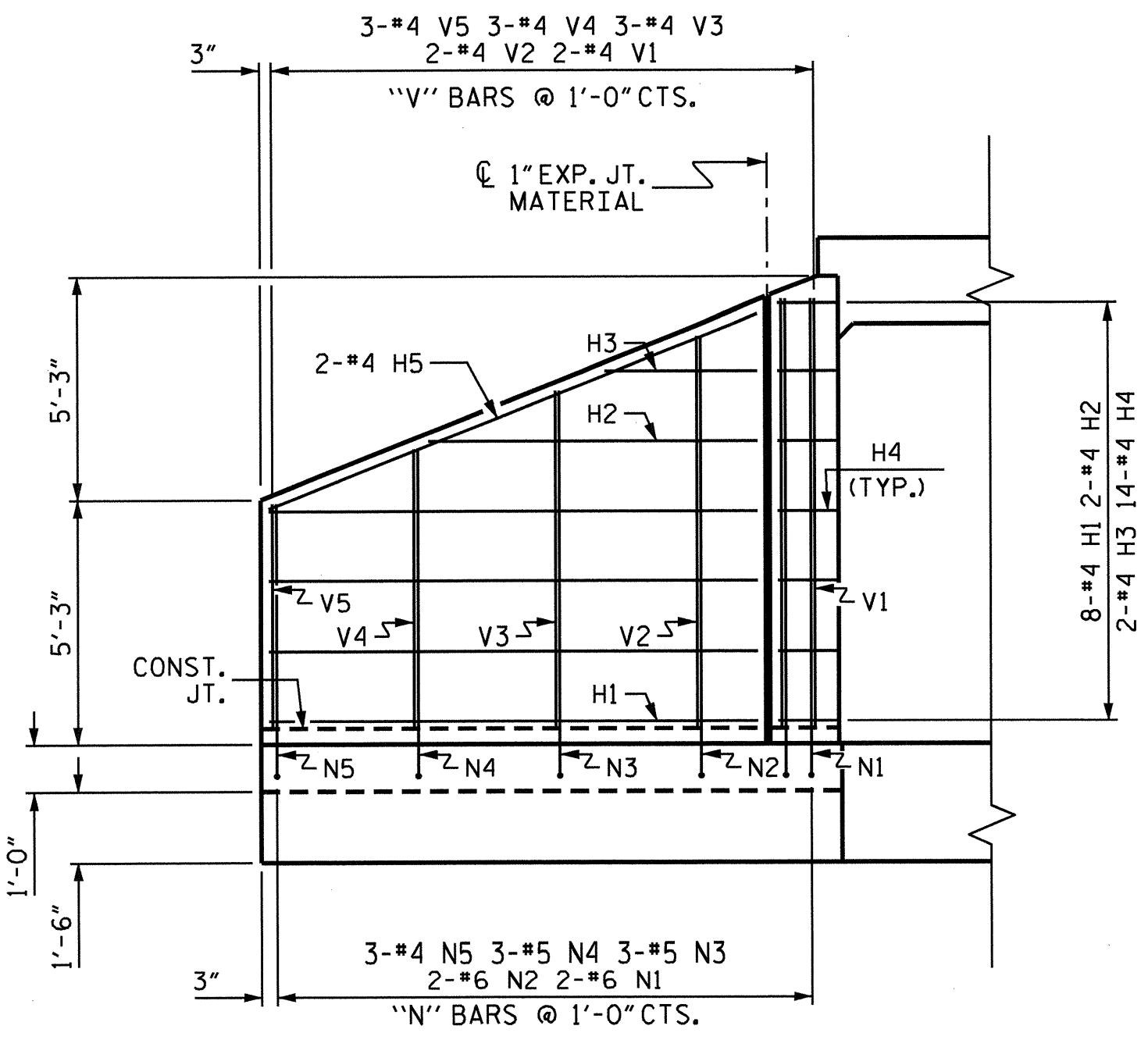
DRAWN BY: H.T. DIEU DATE: 10/17/12
CHECKED BY: J. KHARVA DATE: 10/12
DESIGN ENGINEER OF RECORD: H.T. DIEU DATE: 8/29/12



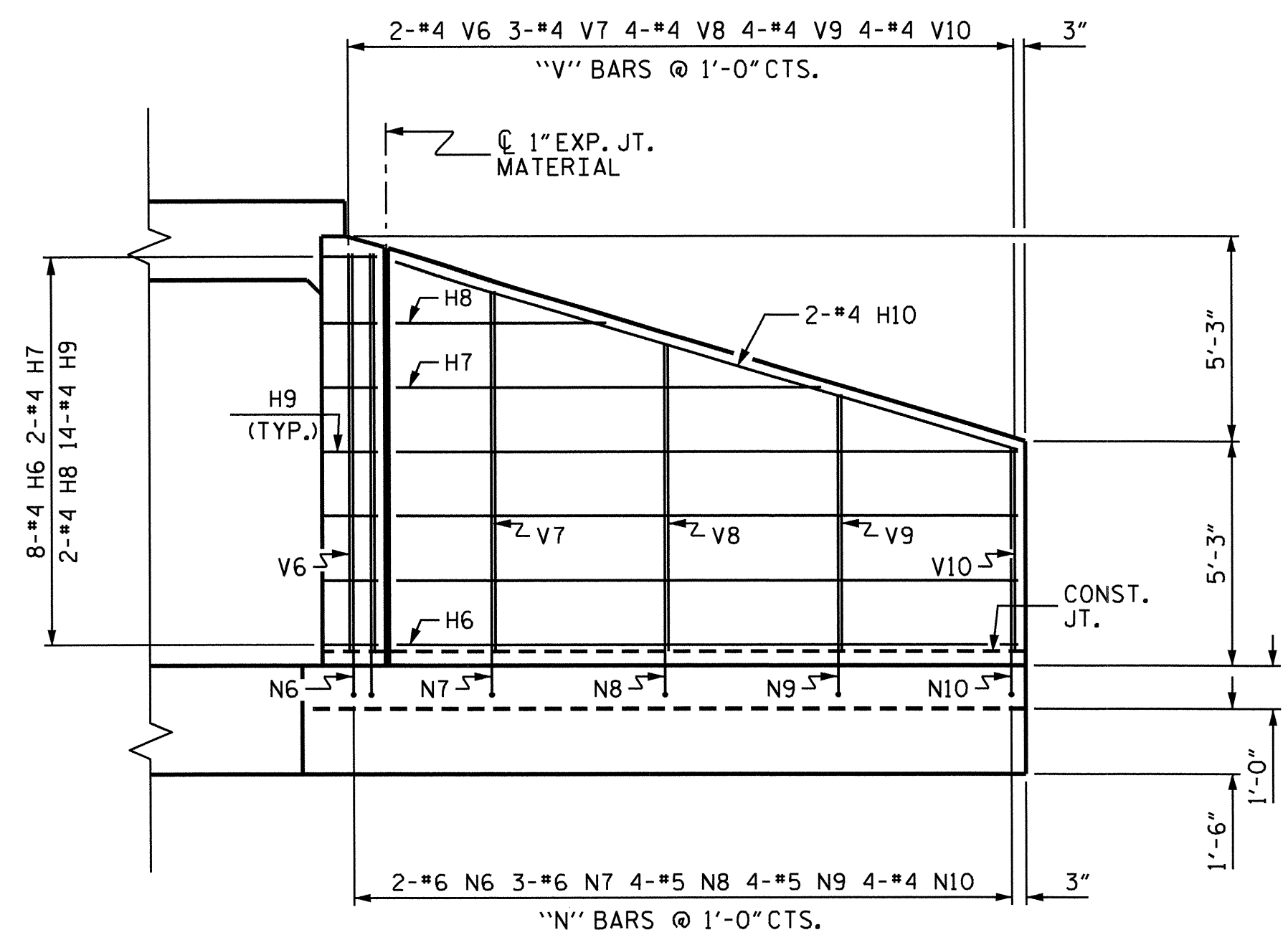
PLAN W2



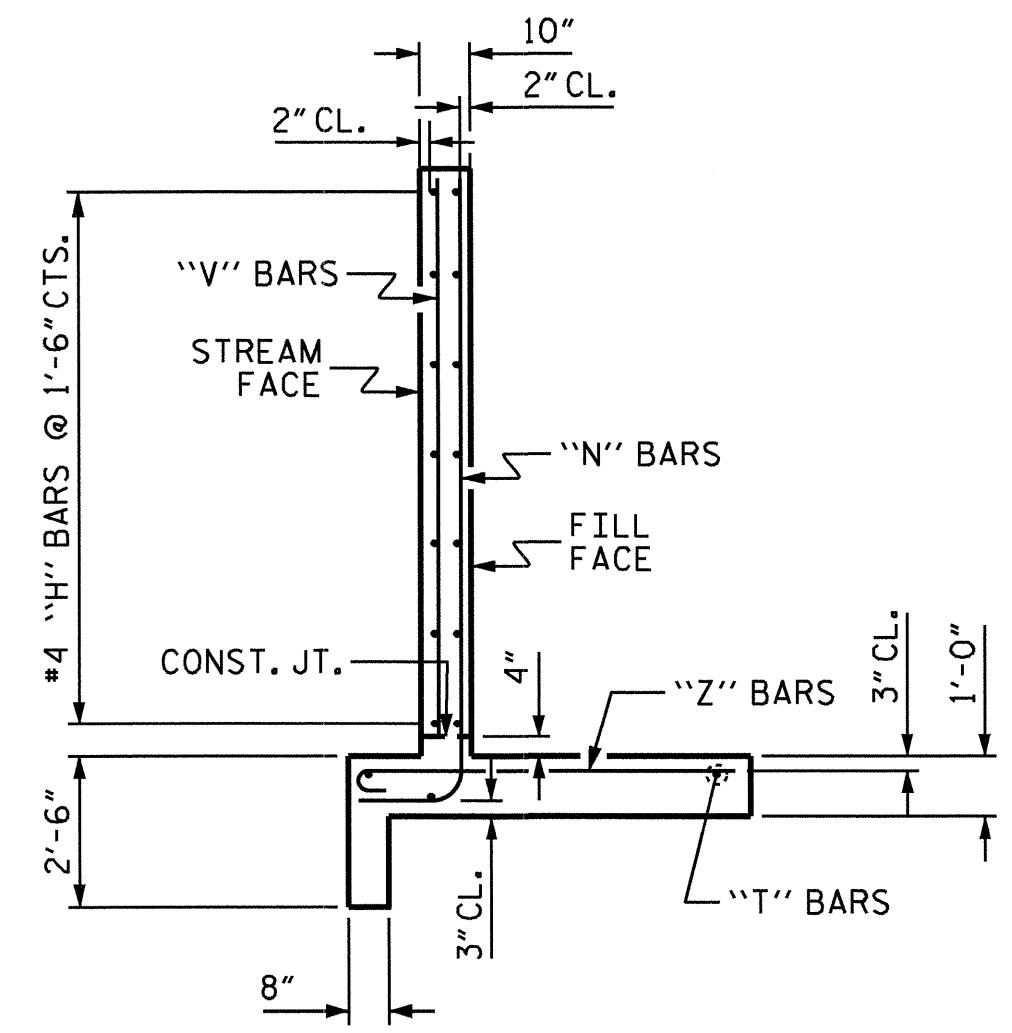
PLAN W1



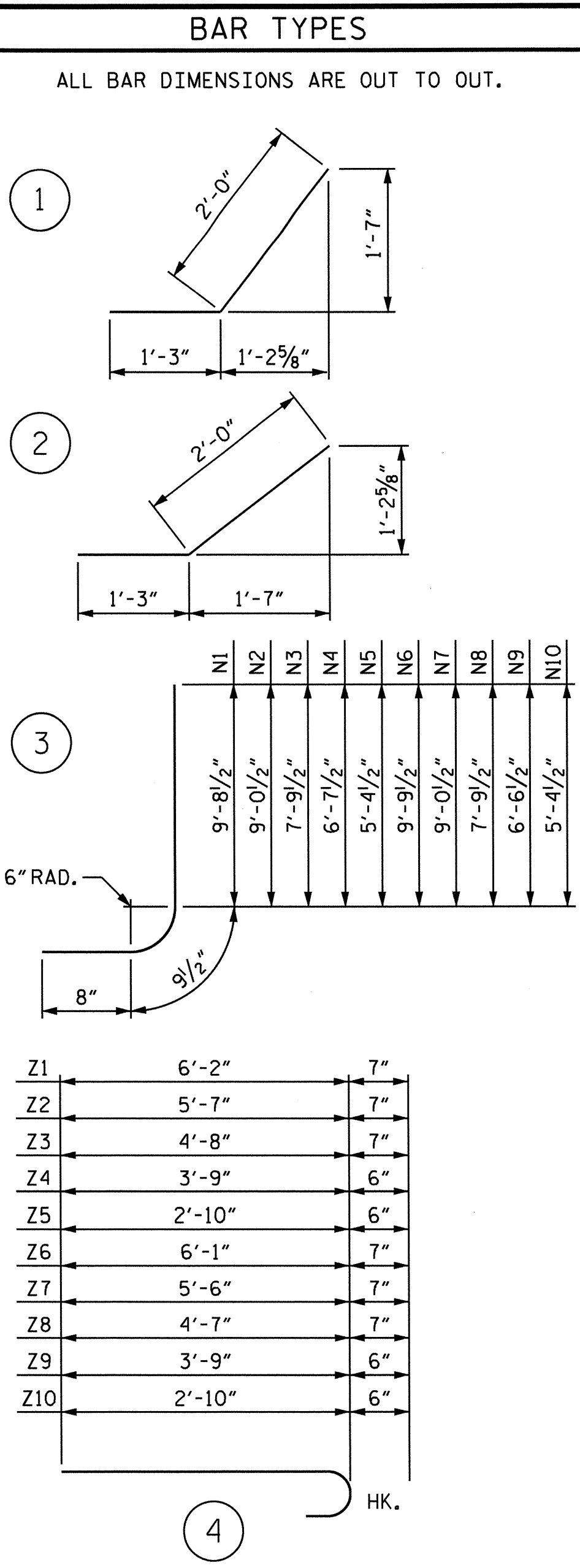
ELEVATION W2



ELEVATION W1



TYPICAL WING SECTION

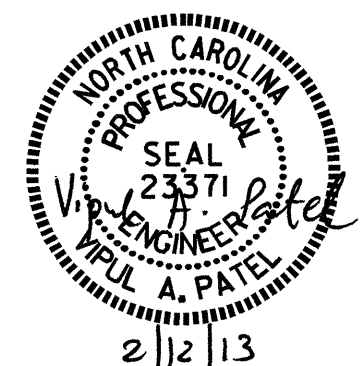


Z1	6'-2"	7"
Z2	5'-7"	7"
Z3	4'-8"	7"
Z4	3'-9"	6"
Z5	2'-10"	6"
Z6	6'-1"	7"
Z7	5'-6"	7"
Z8	4'-7"	7"
Z9	3'-9"	6"
Z10	2'-10"	6"

BILL OF MATERIAL					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	#4	STR	10'-4"	110
H2	4	#4	STR	6'-11"	18
H3	4	#4	STR	3'-3"	9
H4	28	#4	1	3'-3"	61
H5	4	#4	STR	11'-2"	30
H6	16	#4	STR	14'-4"	153
H7	4	#4	STR	9'-10"	26
H8	4	#4	STR	4'-10"	13
H9	28	#4	2	3'-3"	61
H10	4	#4	STR	15'-0"	40
N1	4	#6	3	11'-2"	67
N2	4	#6	3	10'-6"	63
N3	6	#5	3	9'-3"	58
N4	6	#5	3	8'-1"	51
N5	6	#4	3	6'-10"	27
N6	4	#6	3	11'-3"	68
N7	6	#6	3	10'-6"	95
N8	8	#5	3	9'-3"	77
N9	8	#5	3	8'-0"	67
N10	8	#4	3	6'-10"	37
S1	12	#6	STR	6'-0"	108
T1	6	#5	STR	12'-3"	77
T2	6	#5	STR	16'-3"	102
V1	4	#4	STR	9'-2"	24
V2	4	#4	STR	8'-5"	22
V3	6	#4	STR	7'-3"	29
V4	6	#4	STR	6'-0"	24
V5	6	#4	STR	4'-10"	19
V6	4	#4	STR	9'-3"	25
V7	6	#4	STR	8'-5"	34
V8	8	#4	STR	7'-2"	38
V9	8	#4	STR	6'-0"	32
V10	8	#4	STR	4'-9"	25
Z1	4	#5	4	6'-9"	28
Z2	4	#5	4	6'-2"	26
Z3	6	#5	4	5'-3"	33
Z4	6	#4	4	4'-3"	17
Z5	6	#4	4	3'-4"	13
Z6	4	#5	4	6'-8"	28
Z7	6	#5	4	6'-1"	38
Z8	8	#5	4	5'-2"	43
Z9	8	#4	4	4'-3"	23
Z10	8	#4	4	3'-4"	18
REINFORCING STEEL FOR 4 WINGS					1957 LBS
CLASS A CONCRETE					
4 WINGS					27.7 CY
2 HEADWALLS					2.7 CY
2 END CURTAIN WALLS					3.2 CY
TOTAL					33.6 CY

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 98+39.00 -L-

SHEET 4 OF 6
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 H = 9'-0" SLOPE = 2:1
 105° SKEW



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-10	
1			3			TOTAL SHEETS	
2			4			12	

ASSEMBLED BY : H.T. DIEU DATE : 10/17/12
 CHECKED BY : J. KHARVA DATE : 10/12
 DRAWN BY : CCJ 01/00
 CHECKED BY : RWW 03/00

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS 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 1/2".
- B. 4 - 1" 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 1" 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.)
- C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

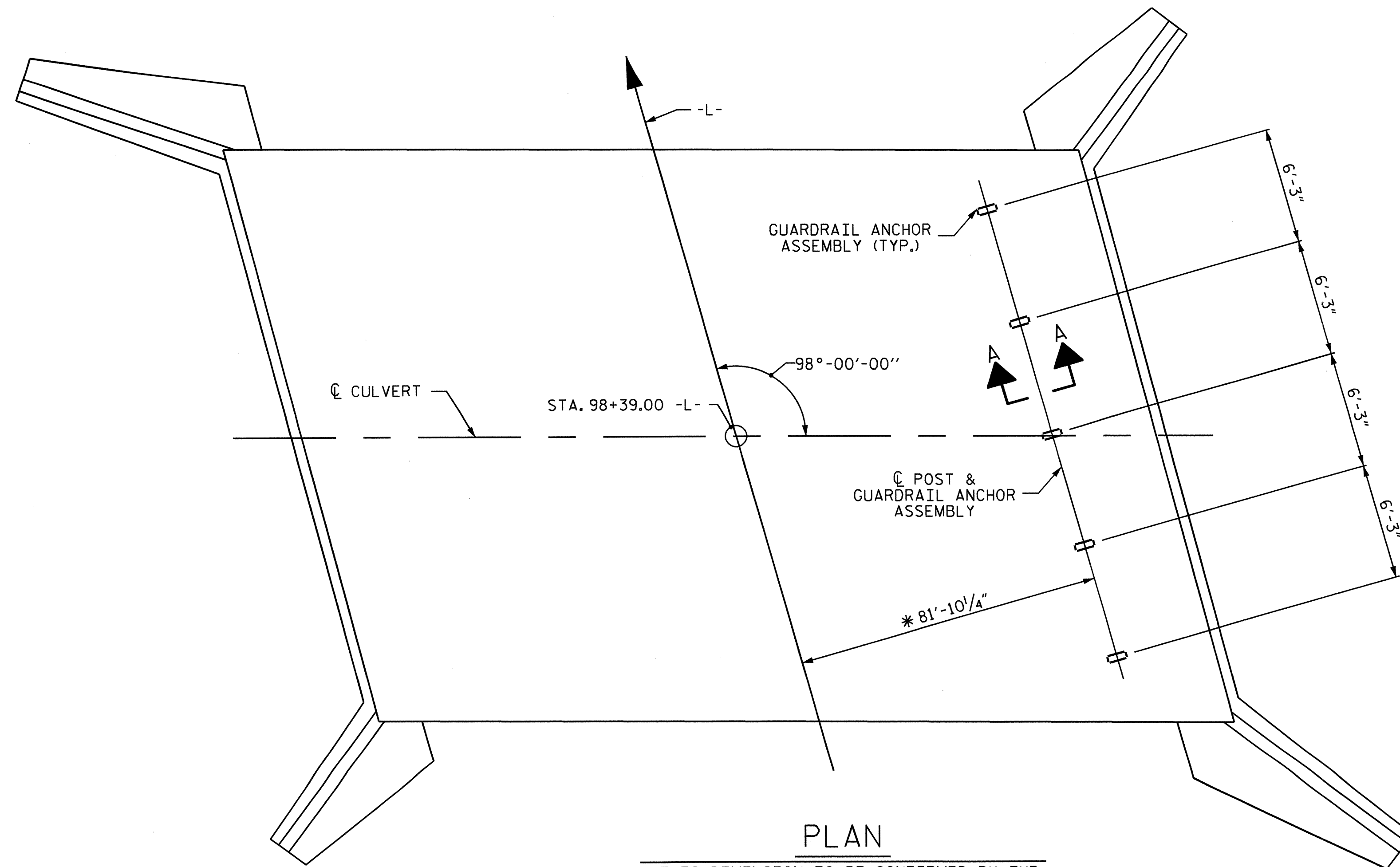
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

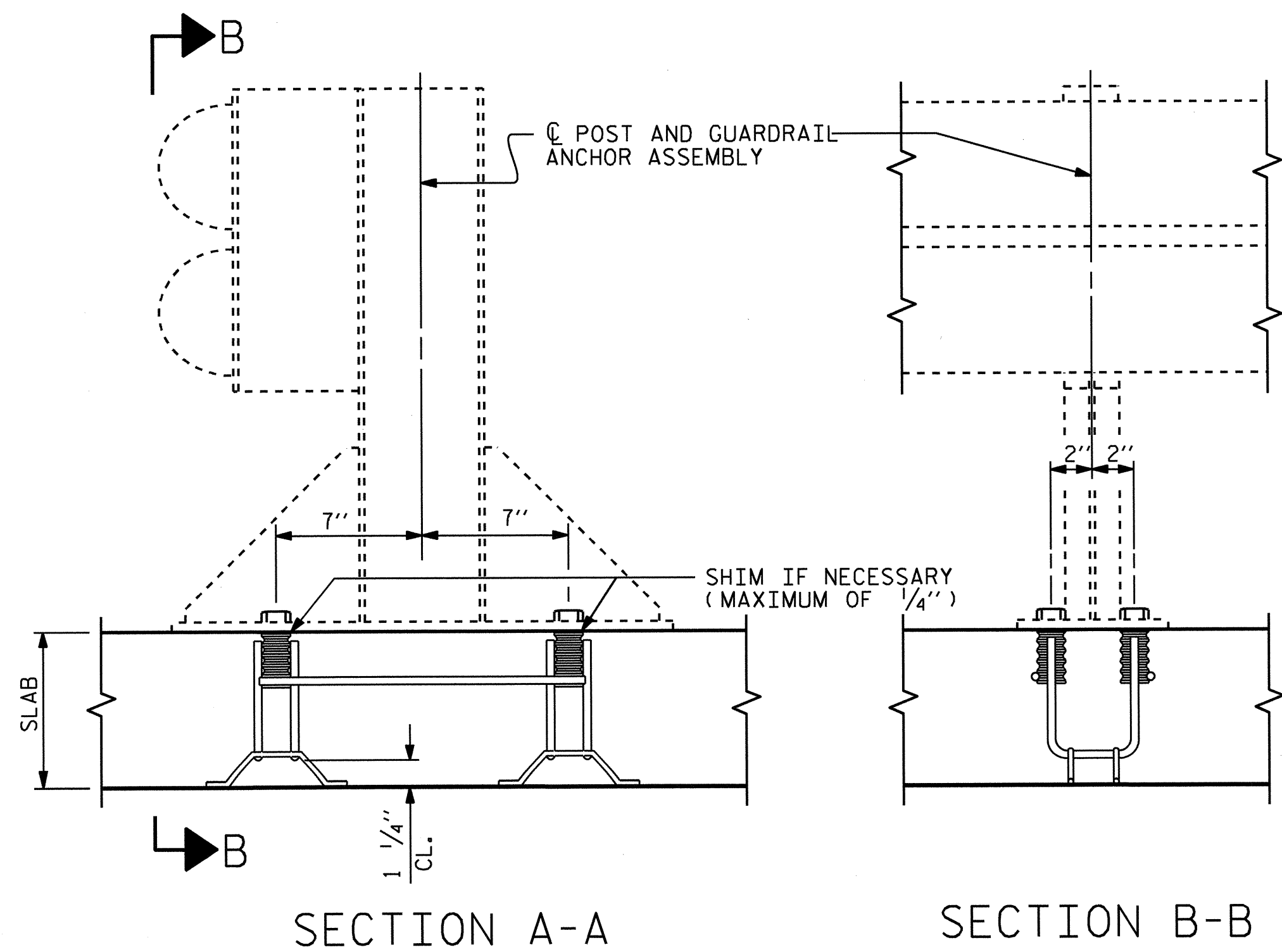
SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1" Ø BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.



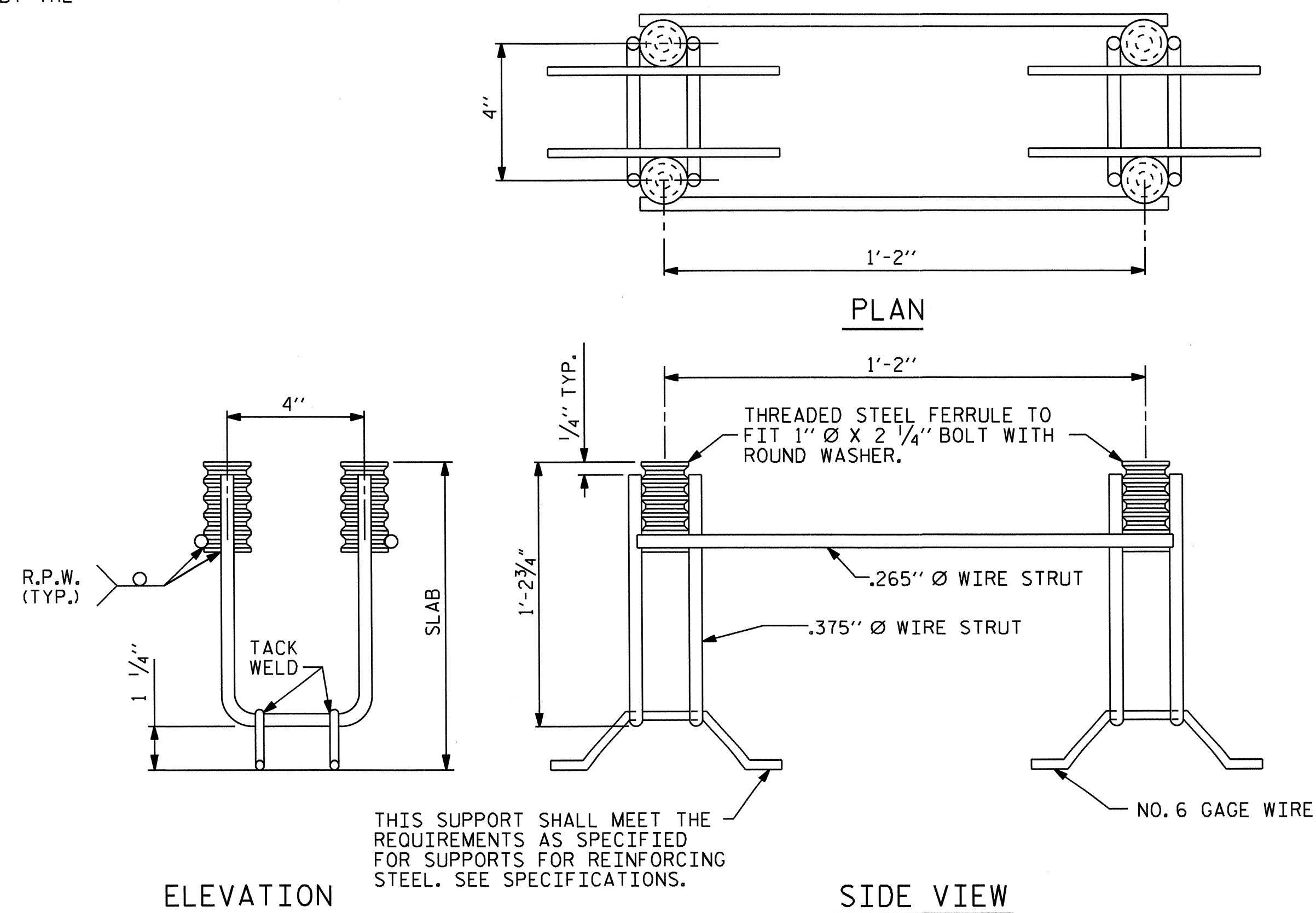
PLAN

* THIS DIMENSION TO BE CONFIRMED BY THE ENGINEER IN THE FIELD.



SECTION A-A

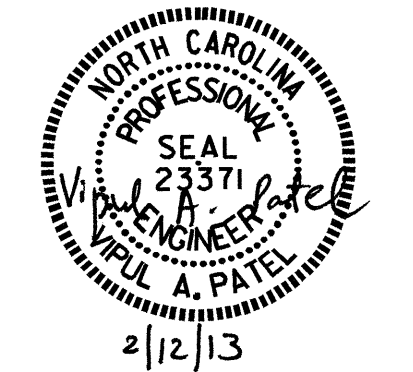
SECTION B-B



ELEVATION

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS



PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 98+39.00 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 ANCHORAGE DETAILS FOR
 GUARDRAIL ANCHOR ASSEMBLY
 FOR CULVERTS

ASSEMBLED BY : H.T. DIEU	DATE : 11/8/12
CHECKED BY : V.A. PATEL	DATE : 11/12
DRAWN BY : FCJ 6/88	REV. 5/7/03 RWW/JTE
CHECKED BY : ARB 6/88	REV. 5/1/06R KMM/GM
	REV. 10/1/11 MAA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-11
1			3			TOTAL SHEETS
2			4			12

**LOAD AND RESISTANCE FACTOR RATING (LRFR)
SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS**

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						MOMENT				SHEAR						
						LIVE-LOAD FACTORS (LL)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.31	--	1.75	1.31	1	BOTTOM SLAB	13.67	1.97	1	BOTTOM SLAB	12.40		
	HL-93 (OPERATING)	N/A		1.69	--	1.35	1.69	1	BOTTOM SLAB	13.67	2.56	1	BOTTOM SLAB	12.40		
	HS-20 (INVENTORY)	36,000	②	1.31	46.98	1.75	1.31	1	BOTTOM SLAB	13.67	1.97	1	BOTTOM SLAB	12.40		
	HS-20 (OPERATING)	36,000		1.69	60.90	1.35	1.69	1	BOTTOM SLAB	13.67	2.56	1	BOTTOM SLAB	12.40		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		3.25	43.90	1.40	3.62	1	EXTERIOR WALL	9.54	3.25	1	EXTERIOR WALL	9.19		
		SNGARBS2	20,000		2.58	51.60	1.40	2.58	1	BOTTOM SLAB	13.67	3.25	1	EXTERIOR WALL	9.19	
		SNAGRIS2	22,000		2.37	52.16	1.40	2.37	1	BOTTOM SLAB	13.67	3.25	1	EXTERIOR WALL	9.19	
		SNCOTTS3	27,250		1.83	49.87	1.40	1.83	1	BOTTOM SLAB	13.67	2.89	1	BOTTOM SLAB	12.40	
		SNAGGRS4	34,925		1.49	52.05	1.40	1.49	1	BOTTOM SLAB	13.67	2.30	1	BOTTOM SLAB	12.40	
		SNS5A	35,550		1.51	53.66	1.40	1.51	1	BOTTOM SLAB	13.67	2.33	1	BOTTOM SLAB	12.40	
		SNS6A	39,950		1.42	56.79	1.40	1.42	1	BOTTOM SLAB	13.67	2.19	1	BOTTOM SLAB	12.40	
	SNS7B	42,000		1.41	59.27	1.40	1.41	1	BOTTOM SLAB	13.67	2.16	1	BOTTOM SLAB	12.40		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		1.67	55.06	1.40	1.67	1	BOTTOM SLAB	13.67	2.53	1	BOTTOM SLAB	12.40	
		TNT4A	33,075		1.71	56.47	1.40	1.71	1	BOTTOM SLAB	13.67	2.65	1	BOTTOM SLAB	12.40	
		TNT6A	41,600		1.57	65.32	1.40	1.57	1	BOTTOM SLAB	13.67	2.33	1	BOTTOM SLAB	12.40	
		TNT7A	42,000		1.45	60.89	1.40	1.45	1	BOTTOM SLAB	13.67	2.18	1	BOTTOM SLAB	12.40	
		TNT7B	42,000		1.51	63.56	1.40	1.51	1	BOTTOM SLAB	13.67	2.34	1	BOTTOM SLAB	12.40	
		TNAGRIT4	43,000		1.37	59.12	1.40	1.37	1	BOTTOM SLAB	13.67	2.11	1	BOTTOM SLAB	12.40	
TNAGT5A		45,000		1.37	61.43	1.40	1.37	1	BOTTOM SLAB	13.67	2.08	1	BOTTOM SLAB	12.40		
TNAGT5B	45,000		③	1.26	56.80	1.40	1.26	1	BOTTOM SLAB	13.67	1.91	1	BOTTOM SLAB	12.40		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

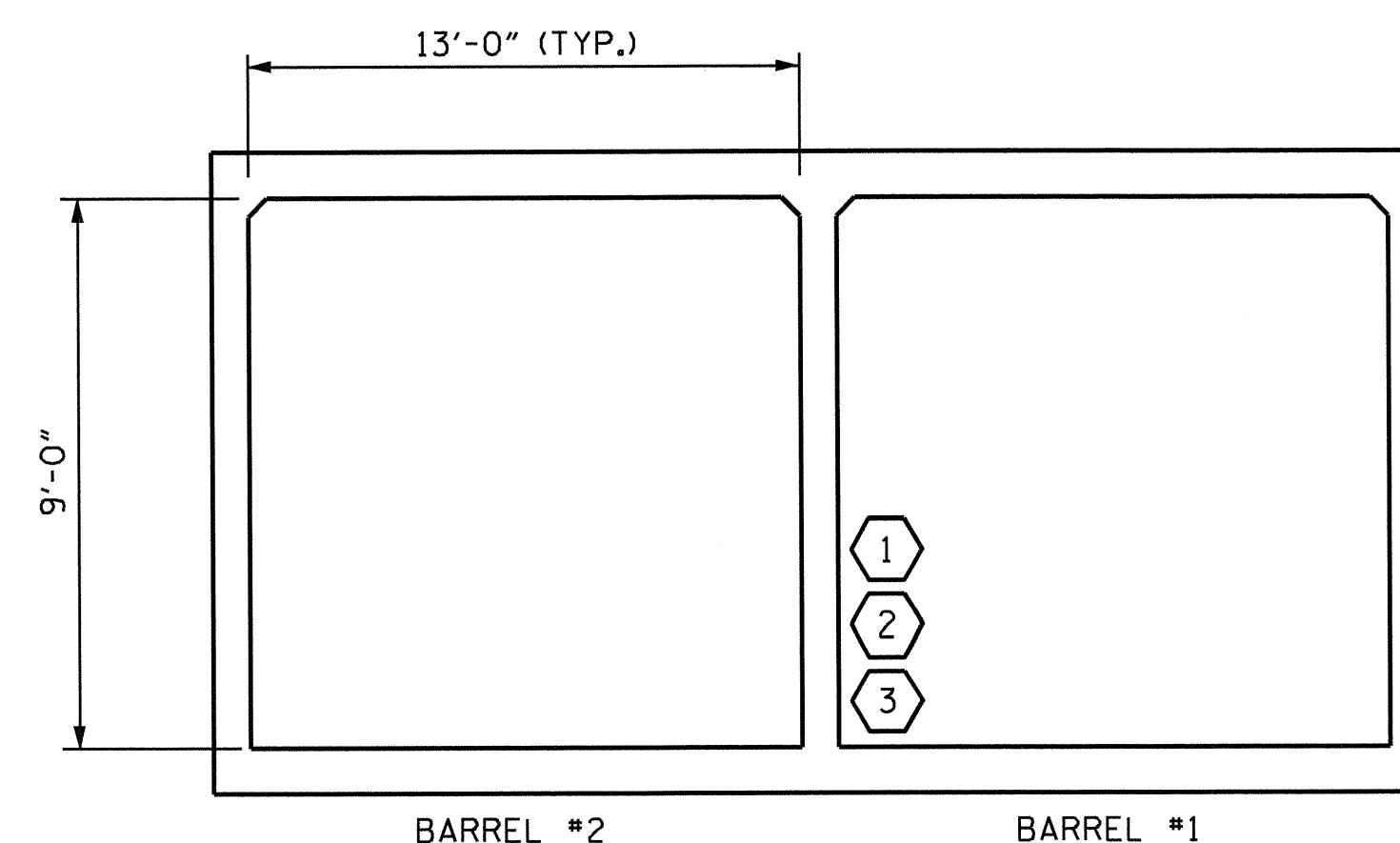
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

#	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



LRFR SUMMARY

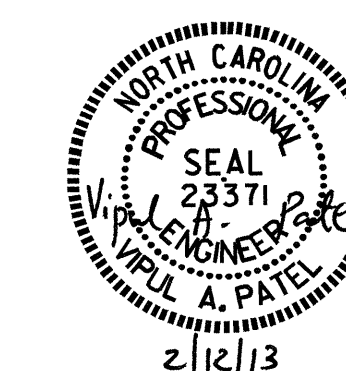
(LOOKING DOWNSTREAM)

DRAWN BY: H.T. DIEU DATE: 11/12
 CHECKED BY: V.A. PATEL DATE: 11/12
 DESIGN ENGINEER OF RECORD: H.T. DIEU DATE: 8/29/12

07-JAN-2013 11:56
 O:\Structures\Plans\Plans str#4\R-2246B.SD.CU.04.dgn
 jpdams

PROJECT NO. R-2246B
CABARRUS COUNTY
 STATION: 98+39.00 -L-

SHEET 6 OF 6



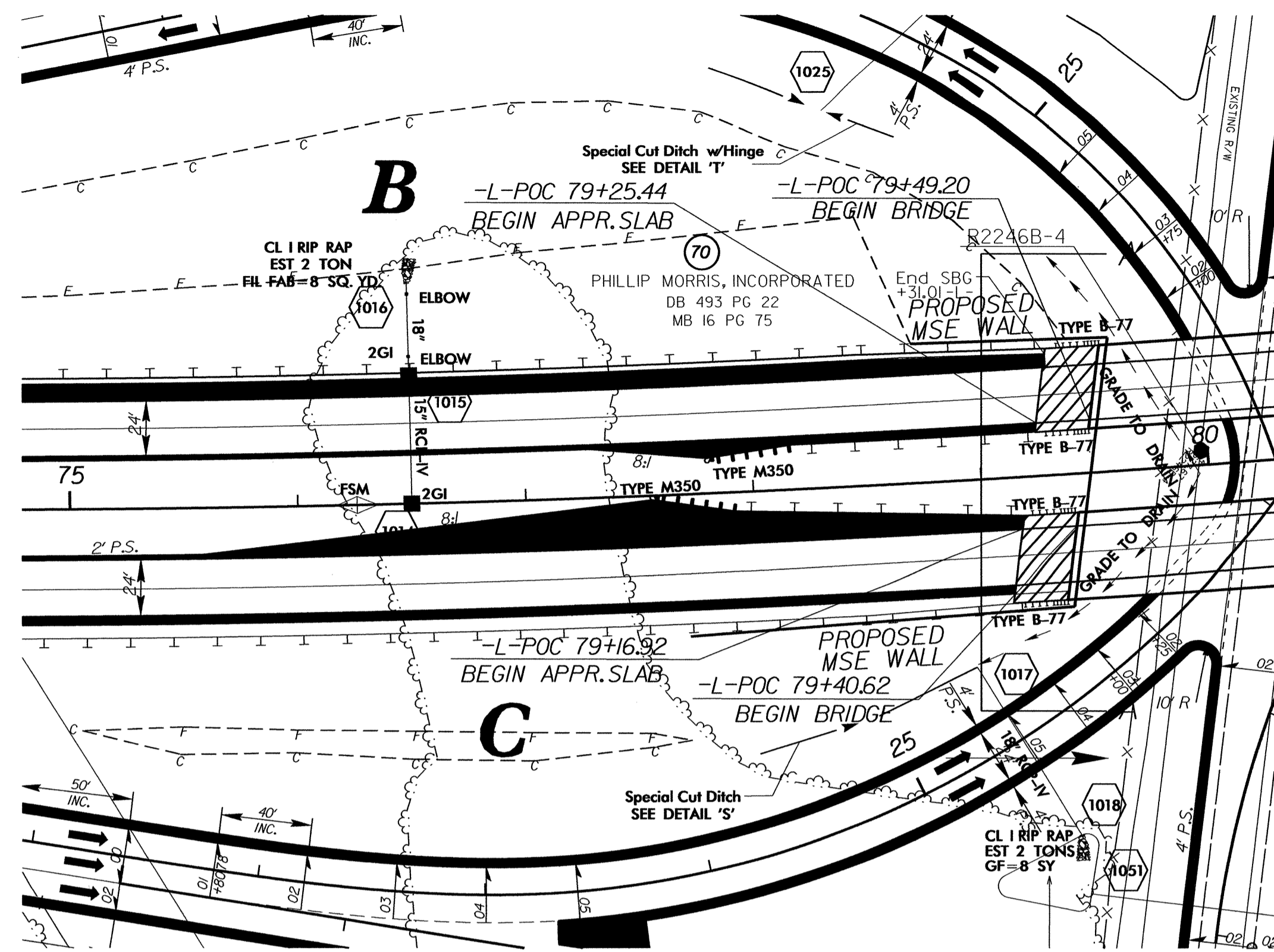
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS
 (NON-INTERSTATE TRAFFIC)

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

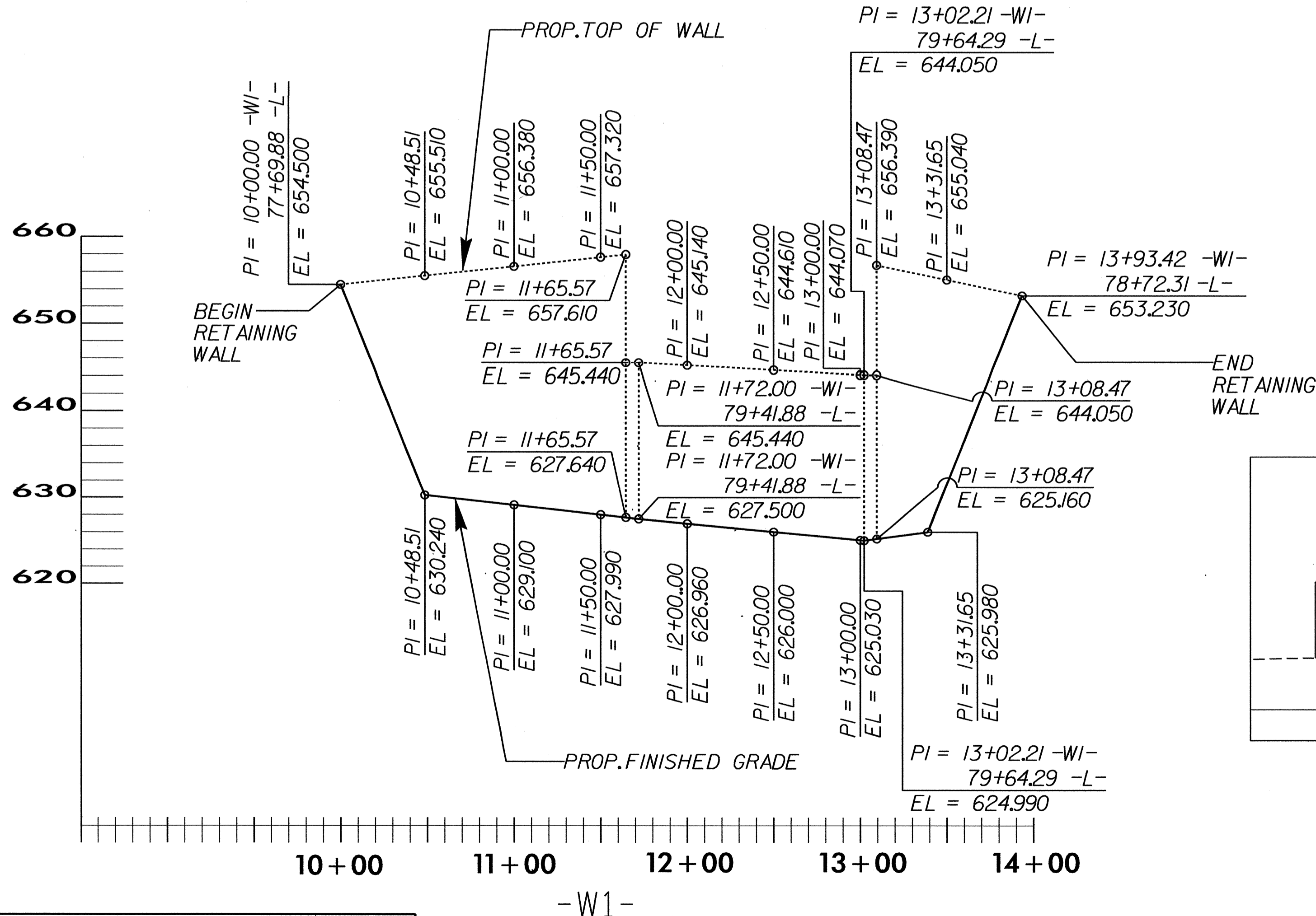
STR. #4

STD. NO. LRFR5

BM - 8 RR SPIKE IN THE BASE OF A 14" ASH STA. 87+39.00 -L- 250.00' LT.
 EL. = 618.91' N 598704 E 1508633



LOCATION SKETCH



ESTIMATED MSE WALL QUANTITIES (SQUARE FEET)	
MSE RETAINING WALL NO. 1	9478 SF

GEOTECHNICAL ENGINEER

ENGINEER

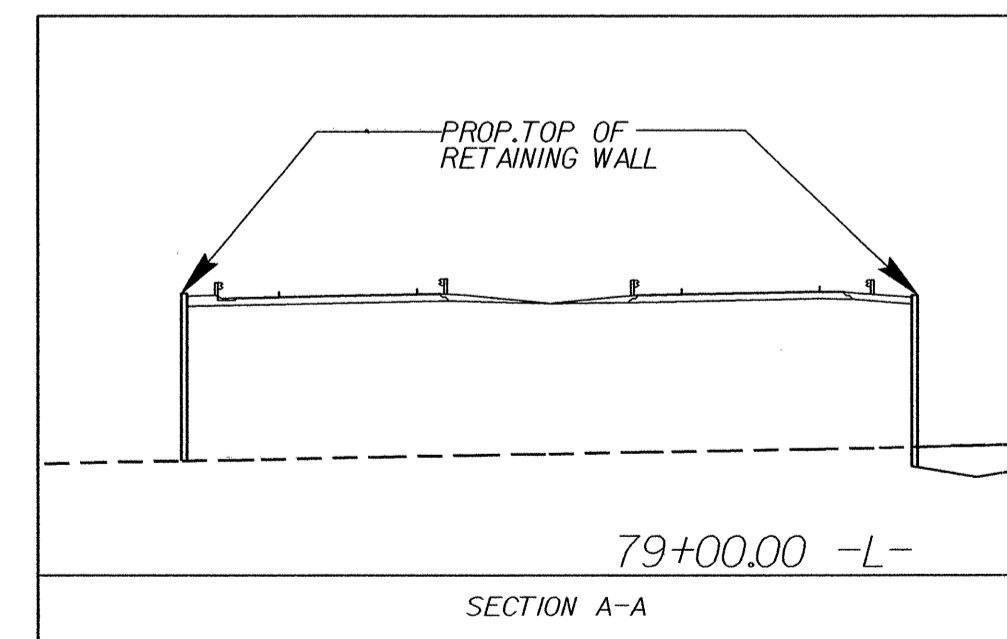
SEAL 29869

ENGINEER
SHANE C. CLARK

2/13/13

RETAINING WALL ELEVATIONS					
-W1- STA	OFFSET FROM CL	ELEV @ TOP OF WALL	* PROPOSED FINISHED GRADE	* EXPOSED WALL HEIGHT	** DESIGN WALL HEIGHT "H"
10+00.00	64.00 RT	654.500	654.500	0.000	0.000
10+48.51	61.00 RT	655.510	630.240	25.270	24.770
11+00.00	59.00 RT	656.380	629.100	27.280	26.780
11+50.00	58.00 RT	657.320	627.990	29.330	28.830
11+65.57	73.00 RT	657.610	627.640	29.970	29.470
11+65.57	73.00 RT	645.440	627.640	17.800	17.300
11+72.00	65.00 RT	645.440	627.500	17.940	17.440
12+00.00	37.00 RT	645.140	626.960	18.180	17.680
12+50.00	13.00 LT	644.610	626.000	18.610	18.110
13+00.00	63.00 LT	644.070	625.030	19.040	18.540
13+02.21	65.00 LT	644.050	624.990	19.060	18.560
13+08.47	72.00 LT	656.390	625.160	31.230	30.730
13+08.47	72.00 LT	644.050	625.160	18.890	18.390
13+31.65	59.00 LT	655.040	625.980	29.060	28.560
13+93.42	64.00 LT	653.230	653.230	0.000	0.000

* ELEVATION @ PROPOSED FINISHED GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH
 ** FOR DESIGN WALL HEIGHT "H", SEE THE MSE WALL DETAILS ON SHEETS 3 & 4 OF 4.



PROJECT NO.: R-2246B
 CABARRUS COUNTY
 STATION: 10+00.00 -W1- TO 13+93.42 -W1-
 SHEET 1 OF 4

GEOTECHNICAL ENGINEERING UNIT

EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE
 CONTRACT OFFICE

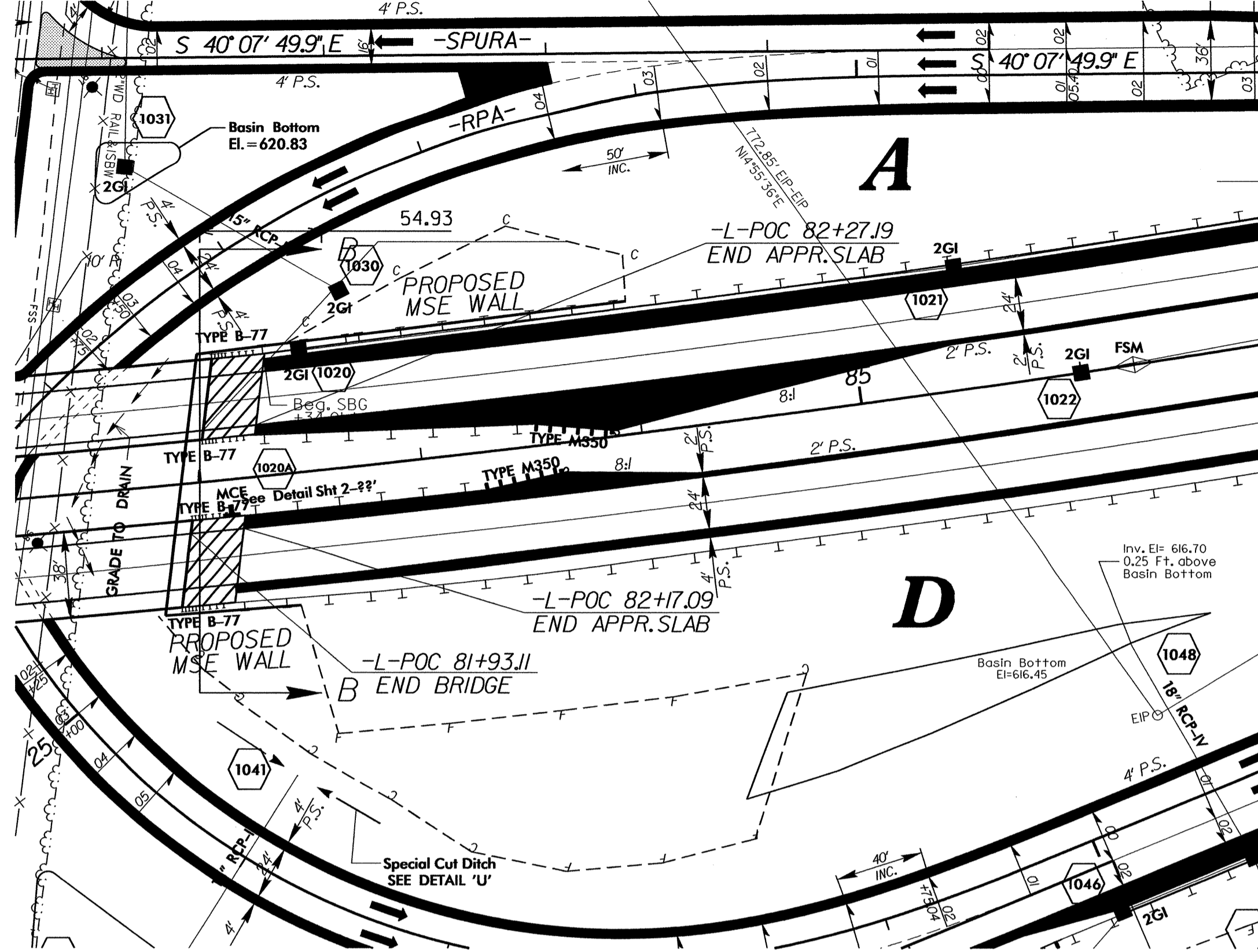
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALL NUMBER 1 AT END BENT 1

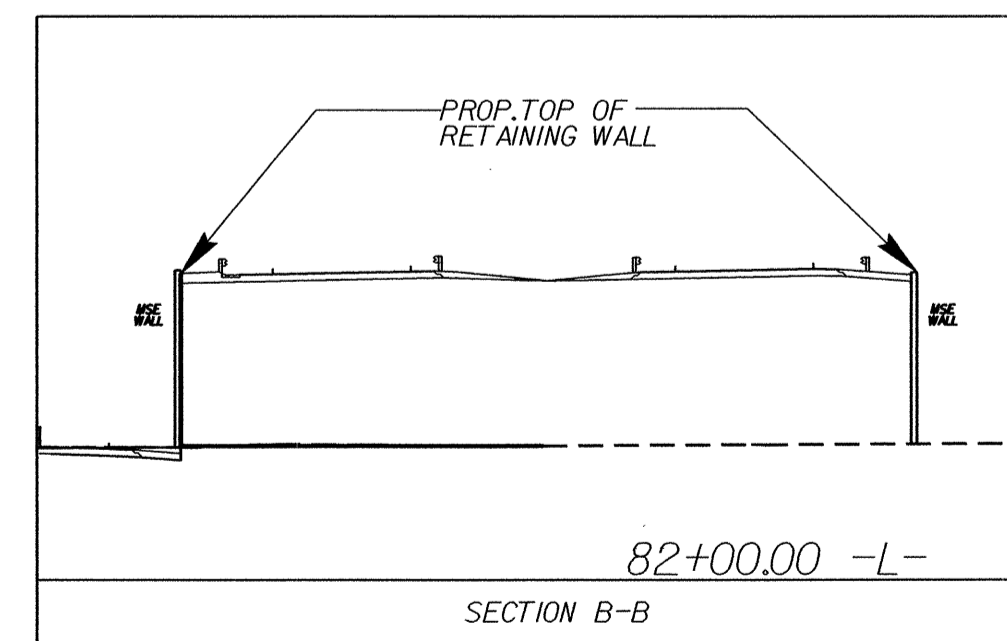
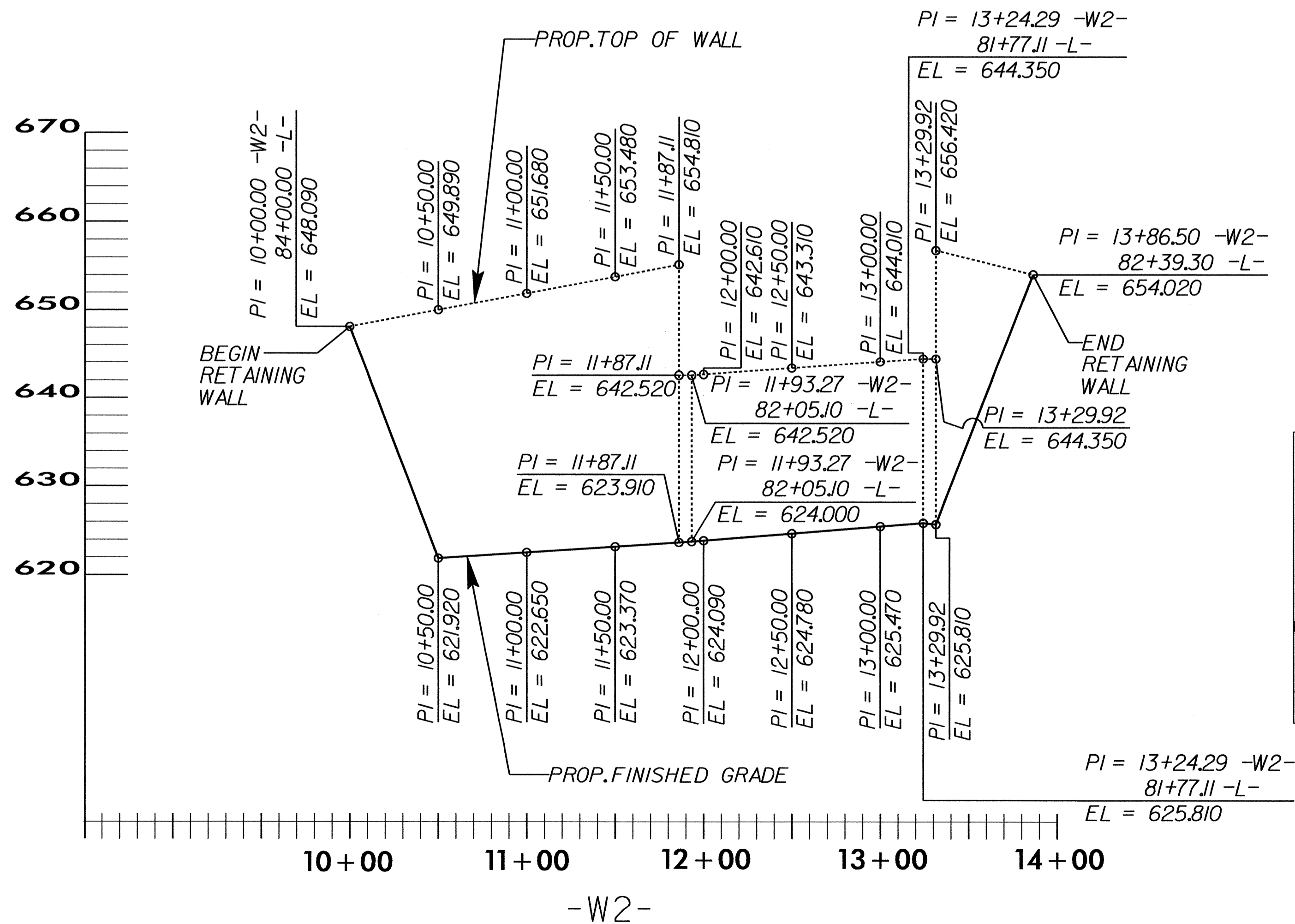
REVISIONS						SHEET NO. W-1
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS
2			4			7

PREPARED BY: J.T.W. DATE: 2.13
 REVIEWED BY: S.C.C. DATE: 2.13

BM - 8 RR SPIKE IN THE BASE OF A 14" ASH STA. 87+39.00 -L- 250.00' LT.
 EL. = 618.91' N 598704 E 1508633
 4 P.S.



LOCATION SKETCH



ESTIMATED MSE WALL QUANTITIES (SQUARE FEET)	
MSE RETAINING WALL NO. 2	9812 SF

GEOTECHNICAL ENGINEER

ENGINEER

STATE OF NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29869

Sheila 2/13/13

RETAINING WALL ELEVATIONS					
-W2- STA	OFFSET FROM CL	ELEV @ TOP OF WALL	* PROPOSED FINISHED GRADE	* EXPOSED WALL HEIGHT	* DESIGN WALL HEIGHT "H"
10+00.00	64.00 LT	648.090	648.090	0.000	0.000
10+50.00	60.00 LT	649.890	621.920	27.970	24.730
11+00.00	60.00 LT	651.680	622.650	29.030	28.530
11+50.00	59.00 LT	653.480	623.370	30.110	29.610
11+87.11	73.00 LT	654.810	623.910	30.900	30.400
11+87.11	73.00 LT	642.520	623.910	18.610	18.110
11+93.27	66.00 LT	642.520	624.000	18.520	18.020
12+00.00	59.00 LT	642.610	624.090	18.520	18.020
12+50.00	9.00 LT	643.310	624.780	18.530	18.030
13+00.00	41.00 RT	644.010	625.470	18.540	18.040
13+24.29	66.00 RT	644.350	625.810	18.540	18.040
13+29.92	73.00 RT	656.420	625.660	30.760	30.260
13+29.92	73.00 RT	644.350	625.660	18.690	18.190
13+86.50	64.00 RT	654.020	654.020	0.000	0.000

* ELEVATION @ PROPOSED FINISHED GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH
 * FOR DESIGN WALL HEIGHT "H", SEE THE MSE WALL DETAILS ON SHEETS 3 & 4 OF 4.

PROJECT NO.: R-2246B
 CABBARUS COUNTY
 STATION: 10+00.00 -W2- TO 13+86.50 -W2-
 SHEET 2 OF 4

GEOTECHNICAL ENGINEERING UNIT

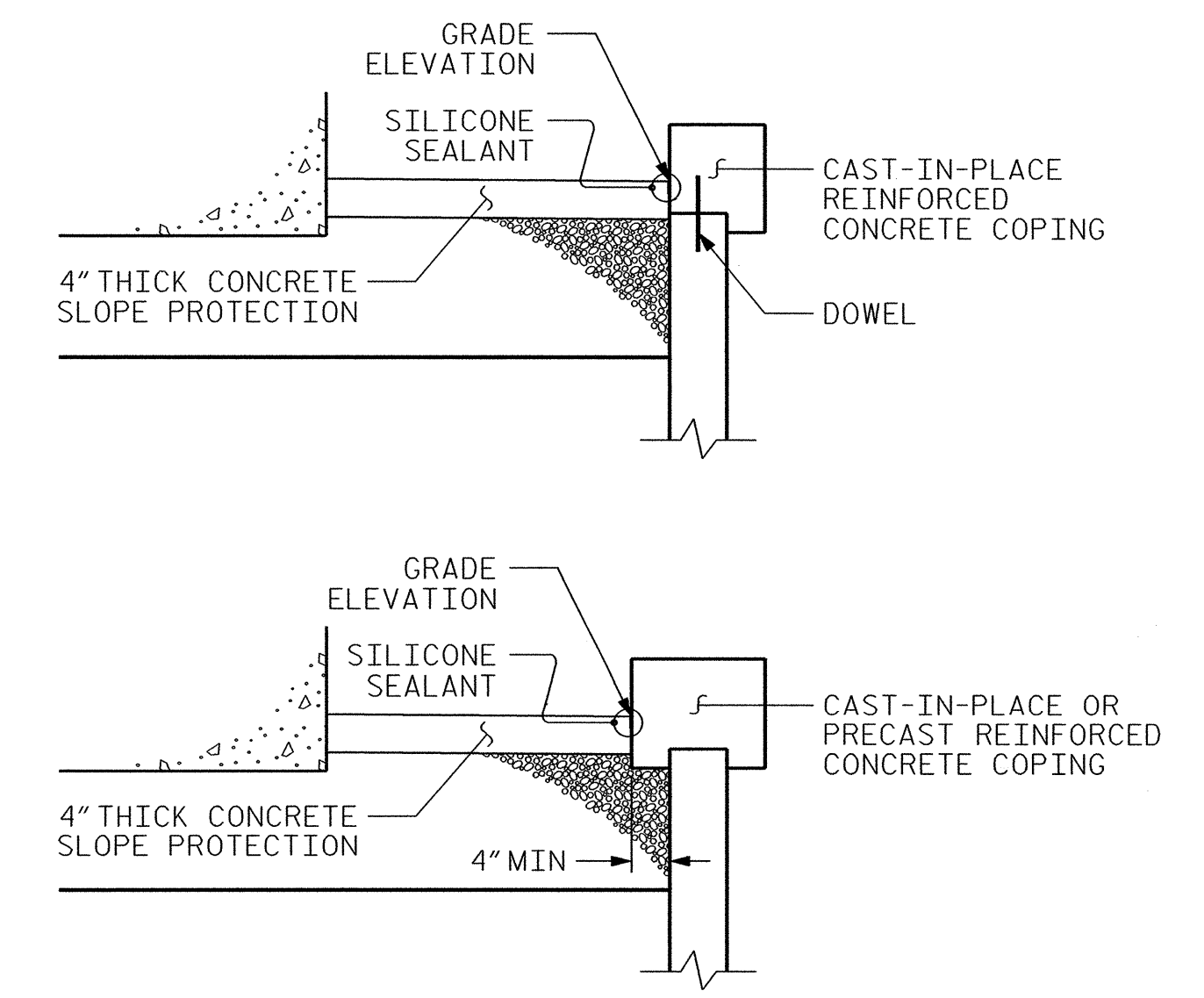
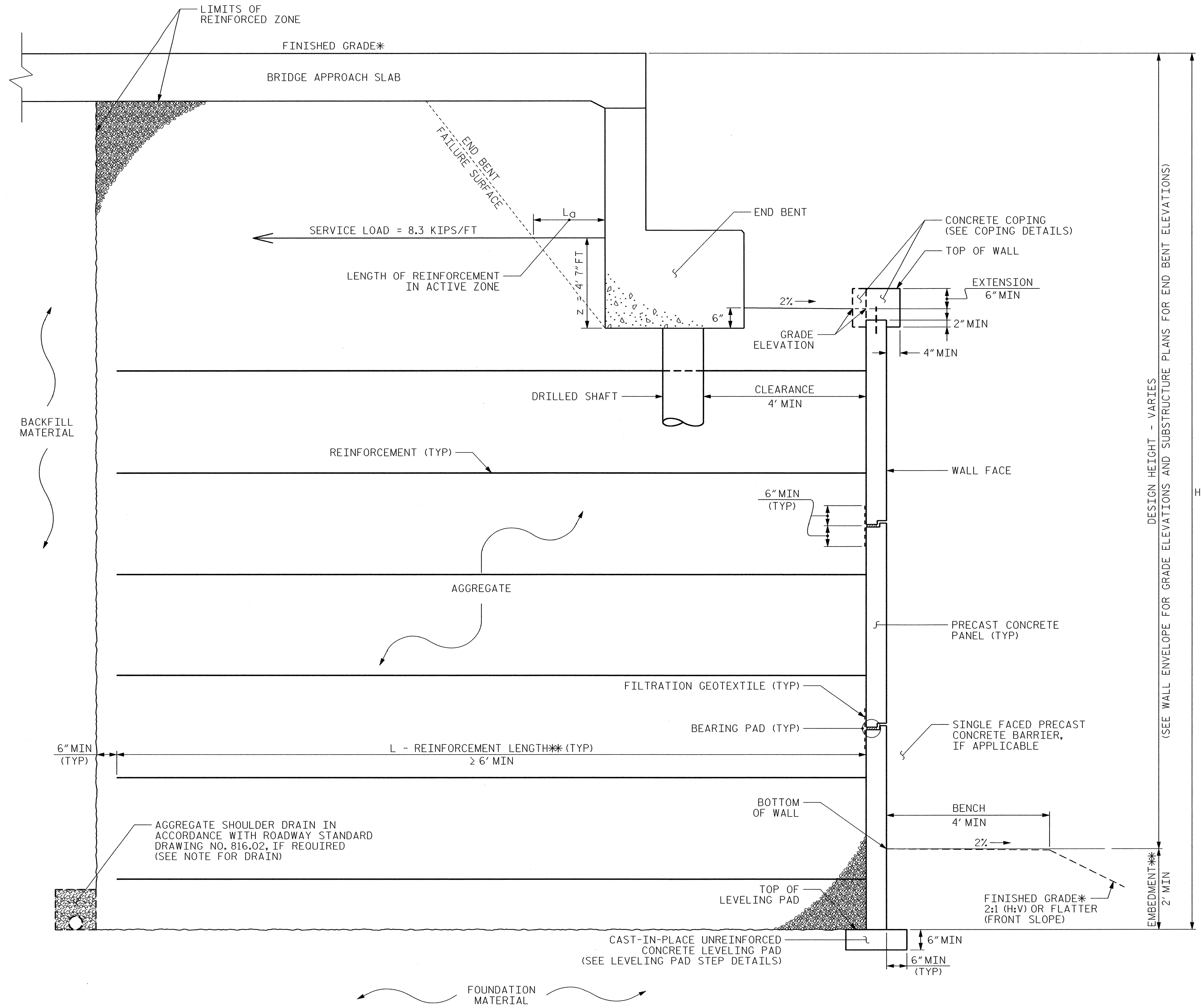
EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE
 CONTRACT OFFICE

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALL NUMBER 2 AT END BENT 2					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. W-2
 TOTAL SHEETS 7

PREPARED BY: J.T.W. DATE: 2.13
 REVIEWED BY: S.C.C. DATE: 2.13



COPING DETAILS
 AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
 **SEE MSE RETAINING WALLS PROVISION FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

PROJECT NO.: R-2246B
CABBARUS COUNTY
STATION: 10+00.00 -W1- TO 13+93.42 -W1-
 SHEET 3 OF 4 10+00.00 -W2- TO 13+86.50 -W2-

MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALL DETAILS

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

PREPARED BY: J.T.W. DATE: 2.13
 REVIEWED BY: S.C.C. DATE: 2.13

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

NOTES:

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.

USE AN MSE WALL SYSTEM WITH PRECAST CONCRETE PANELS THAT MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL AT END BENT NO.1 AND END BENT NO.2.

A DRAIN IS REQUIRED FOR RETAINING WALL AT END BENT NO.1 AND END BENT NO.2.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL AT END BENT NO.1 AND END BENT NO.2, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO. AT END BENT NO.1 AND END BENT NO.2 FOR THE FOLLOWING:

- 1) H = DESIGN HEIGHT + EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL STRESS ON FOUNDATION MATERIAL = 8300 LB/SF
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7 H
- 5) MINIMUM EMBEDMENT ELEVATION = HT/10 OR 2 FT BELOW FINISHED GRADE, WHICHEVER IS GREATER
- 6) AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (φ) DEGREES	COHESION (c) LB/SF
COARSE	110	38	0
FINE	125	34	0

*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (φ) DEGREES	COHESION (c) LB/SF
BACKFILL	110	32	0
FOUNDATION	120	34	0


DESIGN RETAINING WALL AT END BENT NO.1 AND END BENT NO.2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

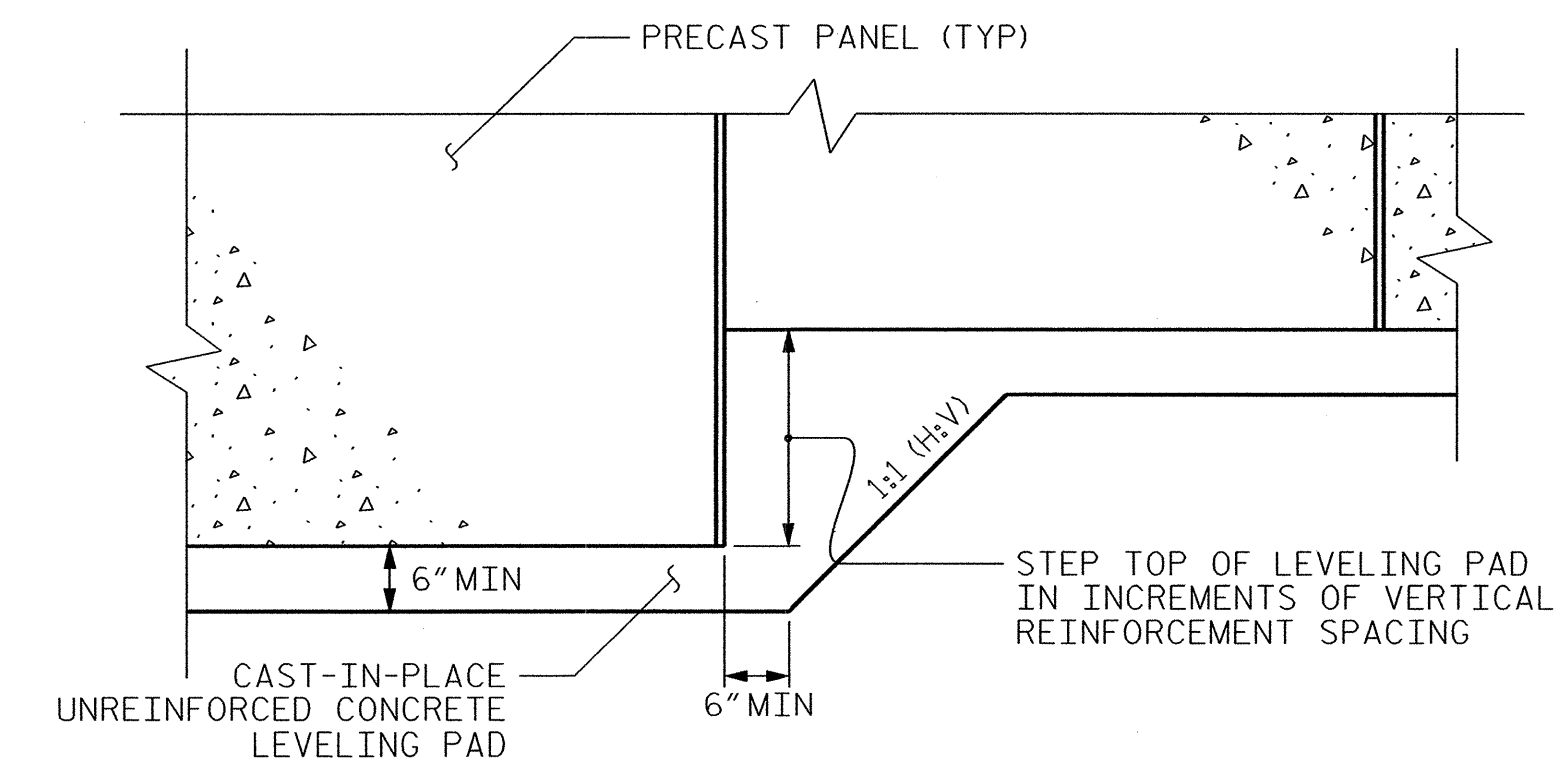
DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR SERVICE LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L_a) SHOWN. CAST REINFORCEMENT CONNECTORS INTO CAP BACKWALL FOR END BENT NO. LOCATED AT STATIONS 79+40.46 -L- AND 82+05.10 -L-. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN CONNECTORS AND REINFORCING STEEL IN CAP.

FOUNDATIONS FOR SIGNS MAY BE LOCATED BEHIND RETAINING WALL AT END BENT NO.1 AND END BENT NO.2 AND MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL AT END BENT NO.1 AND END BENT NO.2.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL AT AT END BENT NO.1 AND END BENT NO.2 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

GEOTECHNICAL ENGINEER  S.C.C. 2/13/18 SIGNATURE DATE	ENGINEER SIGNATURE DATE
--	--



PRECAST CONCRETE PANELS

LEVELING PAD STEP DETAILS

PROJECT NO.: R-2246B
CABBARUS COUNTY
STATION: 10+00.00 -W1- TO 13+93.42 -W1-
 SHEET 4 OF 4 10+00.00 -W2- TO 13+86.50 -W2-

GEOTECHNICAL ENGINEERING UNIT

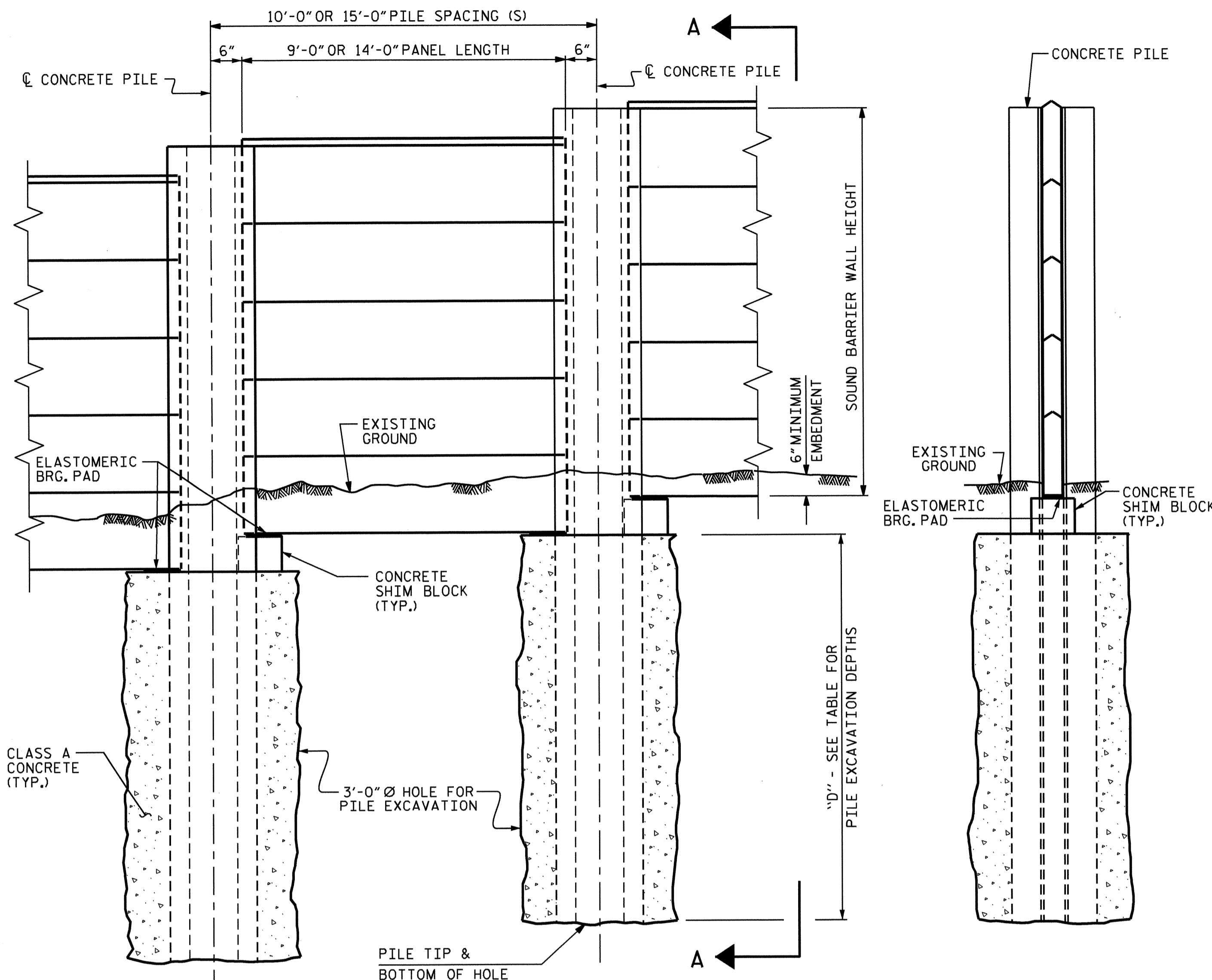
EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE
 CONTRACT OFFICE

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALL DETAILS

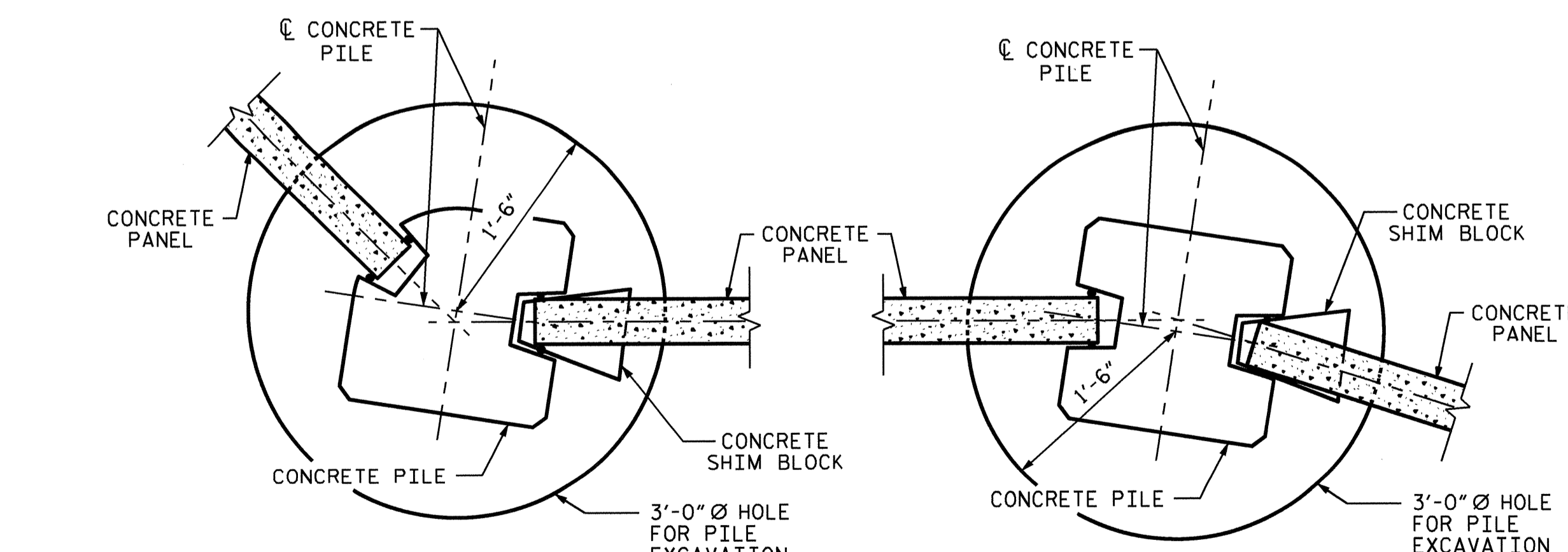
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-4
1			3			TOTAL SHEETS
2			4			7

PREPARED BY: J.T.W.	DATE: 2.13
REVIEWED BY: S.C.C.	DATE: 2.13



ELEVATION

SECTION A-A



15° TO 45° TURNS
(PILE TYPE III)

0° TO 15° TURNS
(PILE TYPE I)

TYPICAL WALL TURN DETAILS

ASSEMBLED BY : KEITH D. LAYNE DATE : 11-9-12
 CHECKED BY : V. A. PATEL DATE : 11-14-12
 DRAWN BY : MAA 6/11 ADDED 10/1/11
 CHECKED BY : CM 6/11

STANDARD SOUND BARRIER WALL FOUNDATION TABLES
 (PILE EXCAVATION DEPTHS, "D" FOR 36" Ø HOLE)

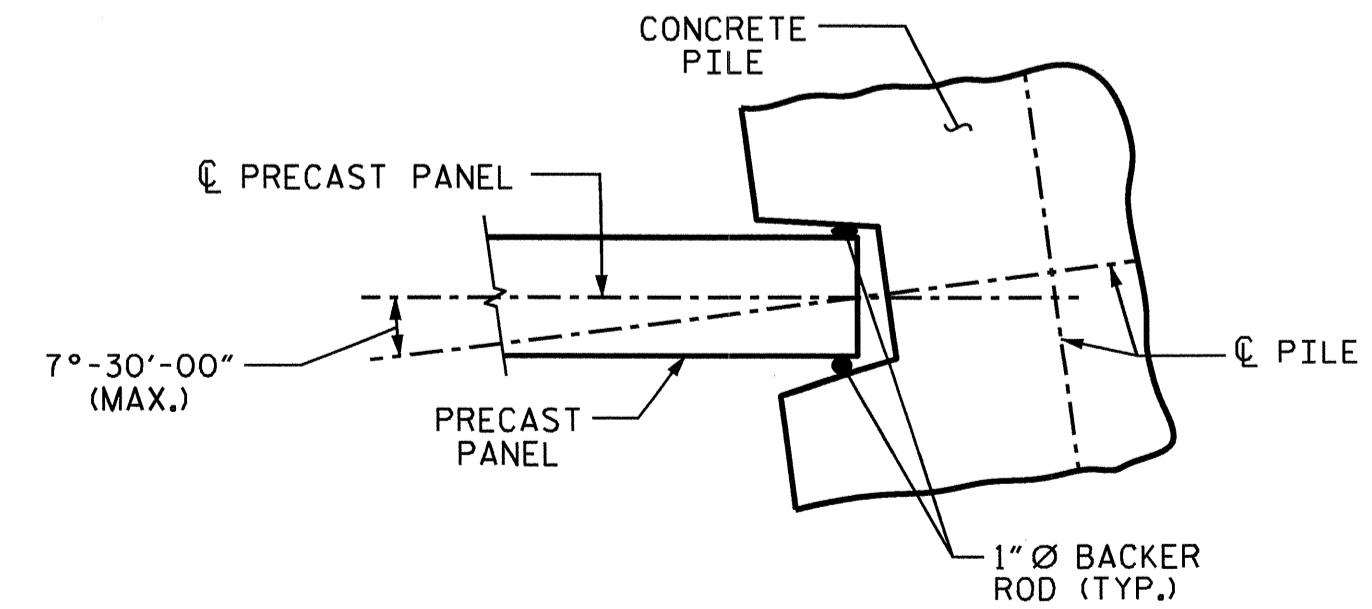
SOUND BARRIER WALL FOUNDATION TABLE No. 1 ($\phi = 30^\circ, c = 0 \text{ psf}, \gamma = 120 \text{ pcf}$, GROUNDWATER BETWEEN FINISHED GRADE AND BOTTOM OF HOLE WITH FRONT SLOPE/FINISHED GRADE 6:1 OR FLATTER OR GROUNDWATER BELOW BOTTOM OF HOLE WITH FRONT SLOPE/FINISHED GRADE 2:1 OR FLATTER AND STEEPER THAN 3:1)		SOUND BARRIER WALL FOUNDATION TABLE No. 2 ($\phi = 30^\circ, c = 0 \text{ psf}, \gamma = 120 \text{ pcf}$, GROUNDWATER BELOW BOTTOM OF HOLE WITH FRONT SLOPE/FINISHED GRADE 3:1 OR FLATTER STEEPER THAN 6:1)	
PILE SPACING (S)	DEPTH "D"	PILE SPACING (S)	DEPTH "D"
$S \leq 10 \text{ FT.}$	10 FT.	$S \leq 10 \text{ FT.}$	8 FT.
$10 \text{ FT.} < S \leq 15 \text{ FT.}$	11 FT.	$10 \text{ FT.} < S \leq 15 \text{ FT.}$	9 FT.

SOUND BARRIER WALL	BEGIN STATION & OFFSET	END STATION & OFFSET	ESTIMATED MAXIMUM WALL HEIGHT	STANDARD SOUND BARRIER WALL FOUNDATION TABLE
* No. 1	110+98.44 -L- & 70.42 RT.	118+78.20 -L- & 58.45 RT.	14 FT.	No. 2
No. 1	118+78.20 -L- & 58.45 RT.	125+50.00 -L- & 58.45 RT.	14 FT.	No. 1
No. 1	125+50.00 -L- & 58.45 RT.	129+50.00 -L- & 58.45 RT.	14 FT.	No. 2
* No. 1	129+50.00 -L- & 58.45 RT.	134+00.00 -L- & 58.44 RT.	14 FT.	No. 2
No. 1	134+00.00 -L- & 58.44 RT.	138+50.00 -L- & 58.44 RT.	14 FT.	No. 2
No. 1	138+50.00 -L- & 58.44 RT.	140+99.70 -L- & 58.44 RT.	14 FT.	No. 1

* FOUNDATIONS LOCATED BETWEEN STATIONS 112+50 TO 113+75, 114+50 TO 116+00 AND 131+00 TO 133+00 MAY REQUIRE PILE EXCAVATION TO REACH THE RECOMMENDED TIP DEPTHS. BASED ON THE SUBSURFACE INFORMATION, WE ESTIMATE THE PILE EXCAVATION NOT IN SOIL WILL AVERAGE 3 FEET PER FOUNDATION IN THESE AREAS.

EXPOSURE CATEGORY B - PILE REINFORCING STEEL

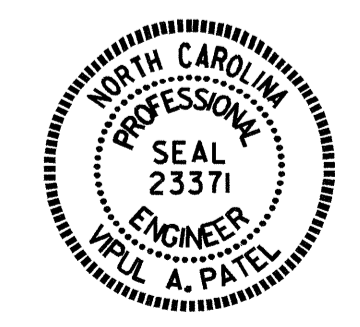
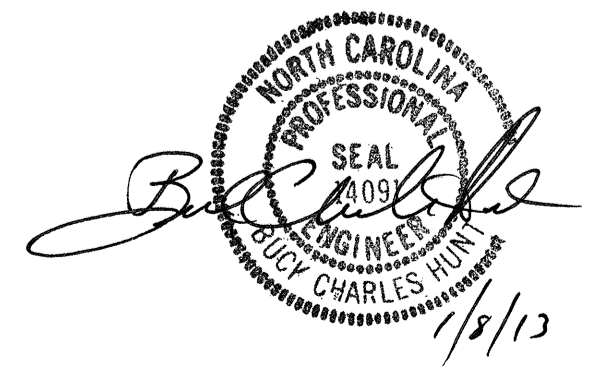
DESIGN WIND PRESSURE = 20 PSF ($0' < H \leq 14'$); 25 PSF ($14' < H \leq 25'$)							
PILE TYPE I				PILE TYPE III			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10'-0"	$H \leq 25'$	4 - #6 EA. FACE	#3 @ 1'-4"CTS.	10'-0"	$H \leq 25'$	3 - #7 SHORT FACE 4 - #7 LONG FACE	#3 @ 1'-4"CTS.
15'-0"	$H \leq 25'$	4 - #7 EA. FACE	#3 @ 1'-4"CTS.	15'-0"	$H \leq 25'$	3 - #8 SHORT FACE 4 - #8 LONG FACE	#3 @ 1'-4"CTS.
PILE TYPE II				PILE TYPE III ALT.			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10'-0"	$H \leq 25'$	4 - #6 EA. FACE	#3 @ 1'-4"CTS.	10'-0"	$H \leq 25'$	3 - #7 SHORT FACE 4 - #7 LONG FACE	#3 @ 1'-4"CTS.
15'-0"	$H \leq 25'$	4 - #6 EA. FACE	#3 @ 1'-4"CTS.	15'-0"	$H \leq 25'$	3 - #8 SHORT FACE 4 - #8 LONG FACE	#3 @ 1'-4"CTS.



PILE ROTATION LIMIT FOR WALL TURN

(ROTATE THE CONCRETE PILE $\pm 7^\circ-30'-00''$ TO ACCOMMODATE WALL TURN.)

BILL OF MATERIAL	
SOUND BARRIER WALL	= 40,600 Sq. Ft.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	

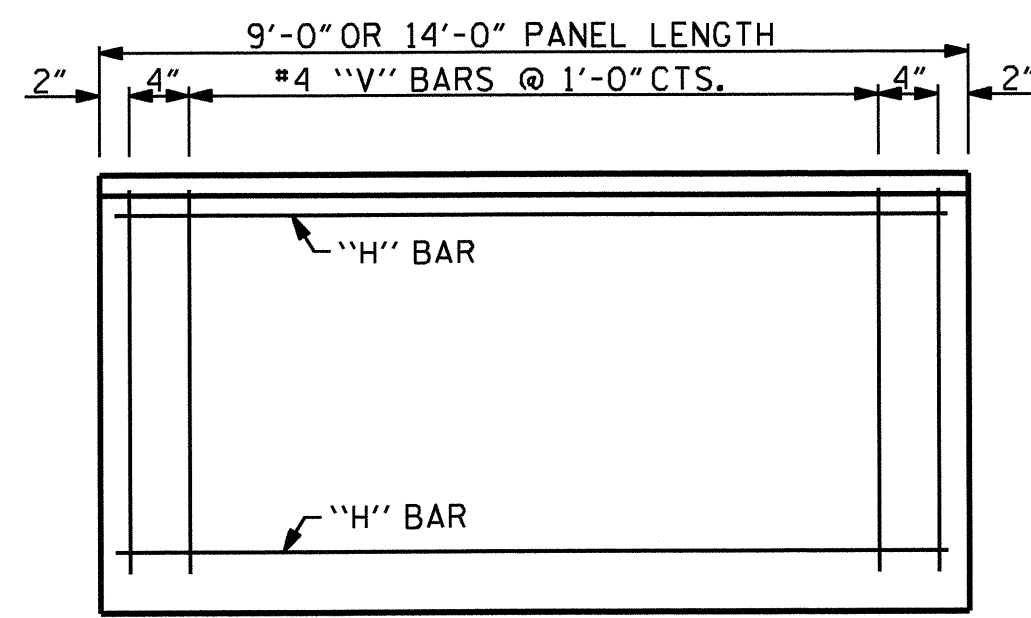


PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 110+98.44 -L-

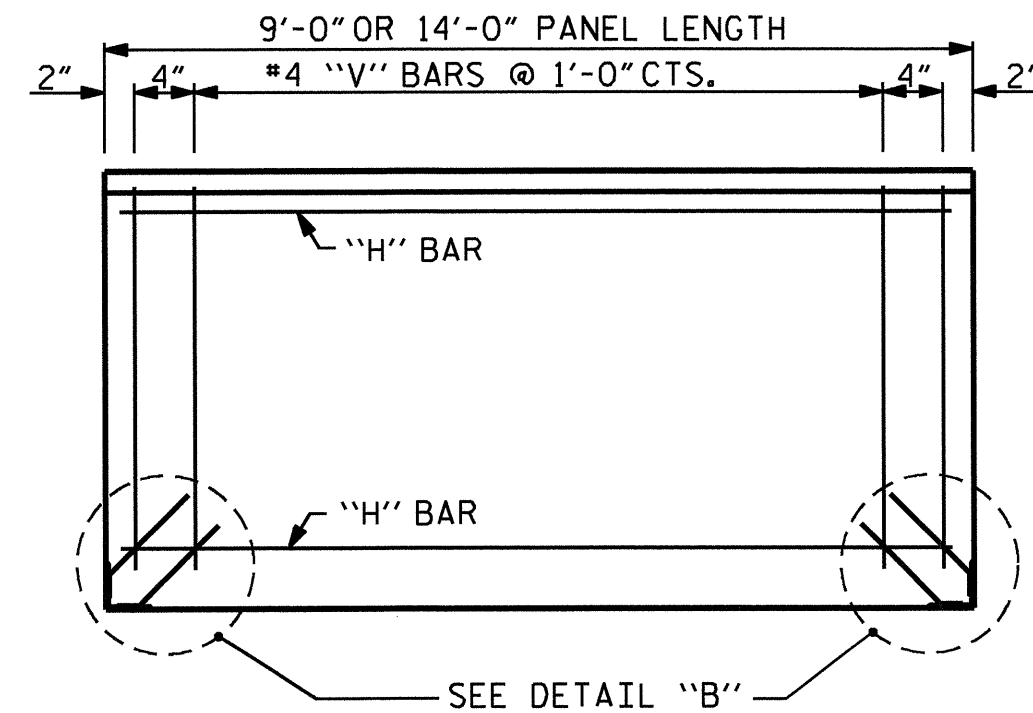
SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 SOUND BARRIER WALL

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



FRONT ELEVATION OF UPPER PRECAST PANELS



FRONT ELEVATION OF BOTTOM PRECAST PANEL

QUANTITIES FOR ONE PRECAST PANEL (FOR 10'-0" PILE SPACING)

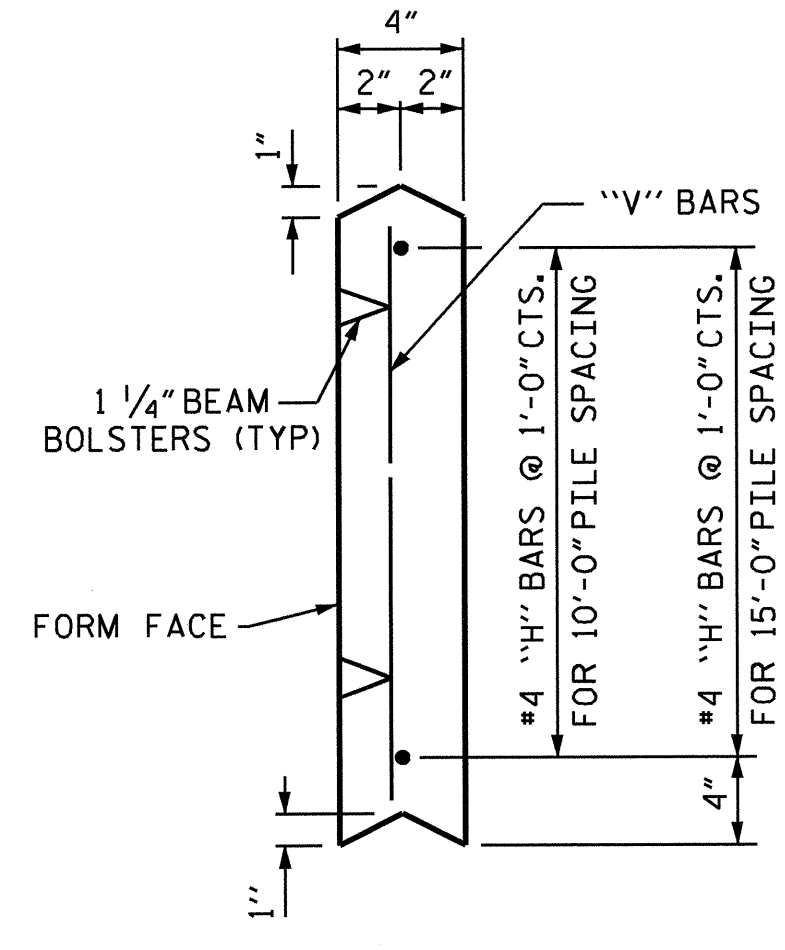
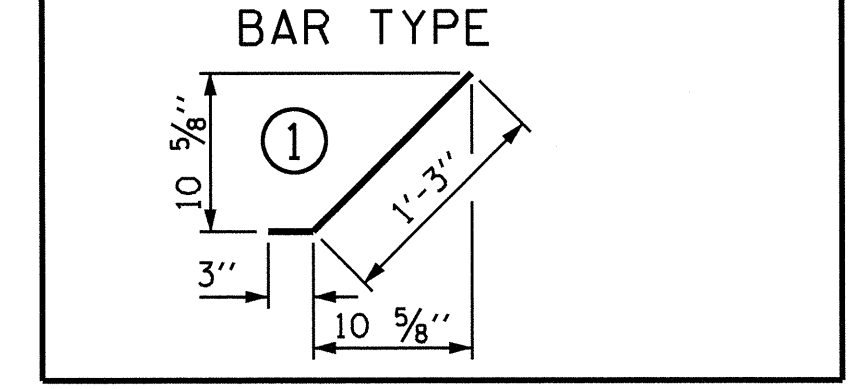
PANEL HEIGHT	CLASS AA CONCRETE	BAR TYPES											
		HORIZONTAL					VERTICAL						
		C.Y.	NO.	BAR SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR SIZE	TYPE	LENGTH	WEIGHT (lb)	
2'-0"	0.22	3	H1	#4	STR	8'-8"	17	11	V1	#4	STR	1'-8"	12
3'-0"	0.33	4	H2	#4	STR	8'-8"	23	11	V2	#4	STR	2'-8"	20
4'-0"	0.44	5	H3	#4	STR	8'-8"	29	11	V3	#4	STR	3'-8"	27

QUANTITIES FOR ONE PRECAST PANEL (FOR 15'-0" PILE SPACING)

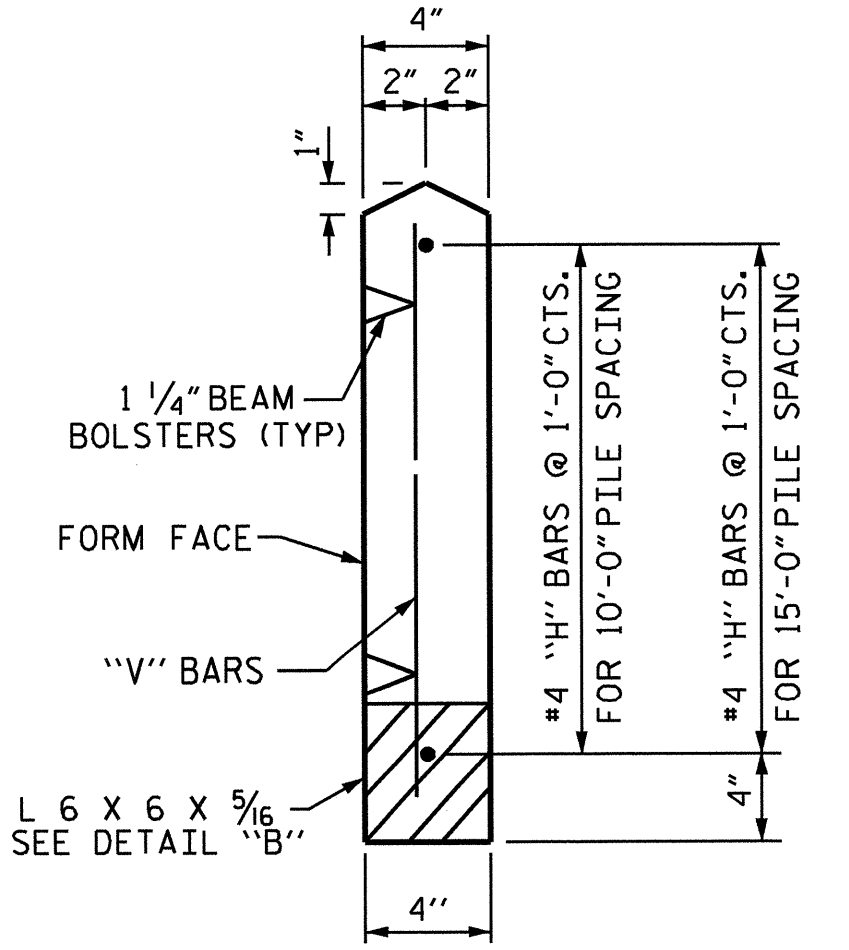
PANEL HEIGHT	CLASS AA CONCRETE	BAR TYPES											
		HORIZONTAL					VERTICAL						
		C.Y.	NO.	BAR SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR SIZE	TYPE	LENGTH	WEIGHT (lb)	
3'-0"	0.52	H1	H1	4	STR	13'-8"	37	16	V1	#4	STR	2'-8"	29
4'-0"	0.69	H2	H2	5	STR	13'-8"	46	16	V2	#4	STR	3'-8"	39
5'-0"	0.86	H3	H3	6	STR	13'-8"	55	16	V3	#4	STR	4'-8"	50
6'-0"	1.04	H4	H4	7	STR	13'-8"	64	16	V4	#4	STR	5'-8"	61

ADDITIONAL BARS FOR ONE BOTTOM PANEL

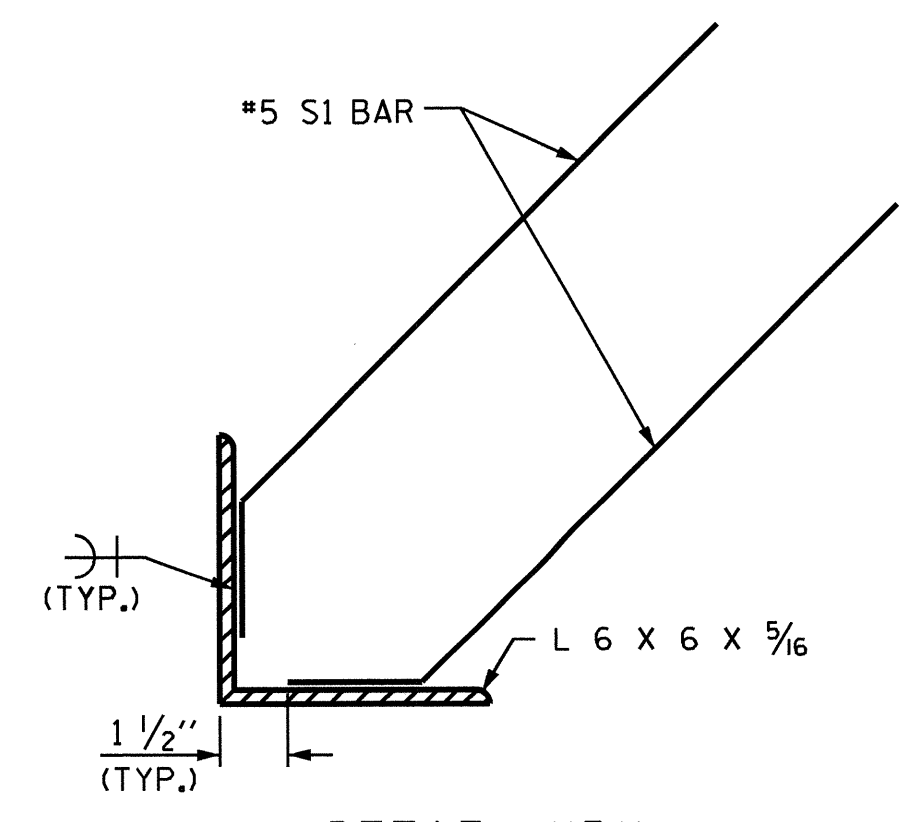
NO.	BAR SIZE	TYPE	LENGTH	WEIGHT (lb)
4	S1	#5	1'-6"	6



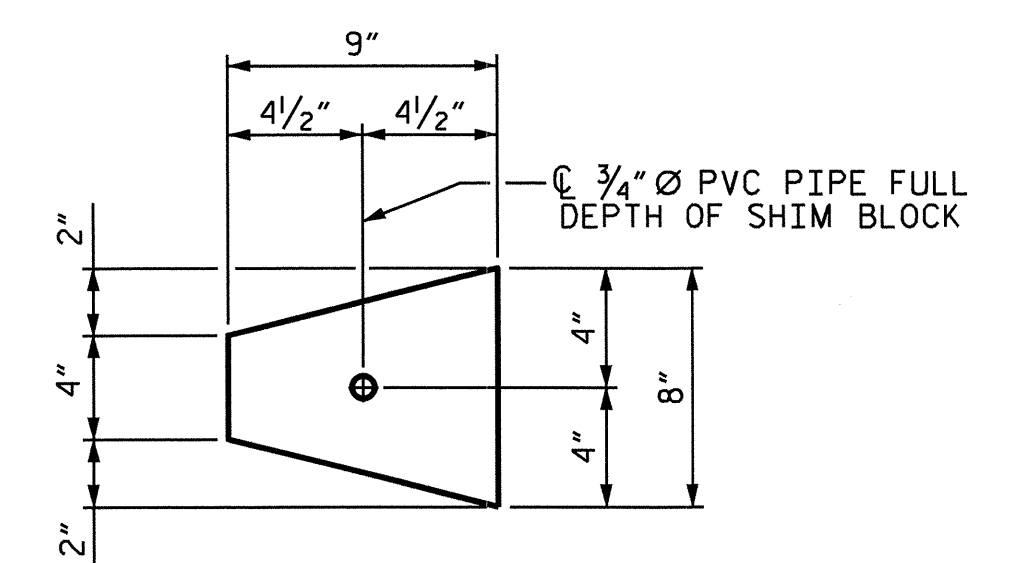
UPPER PANEL



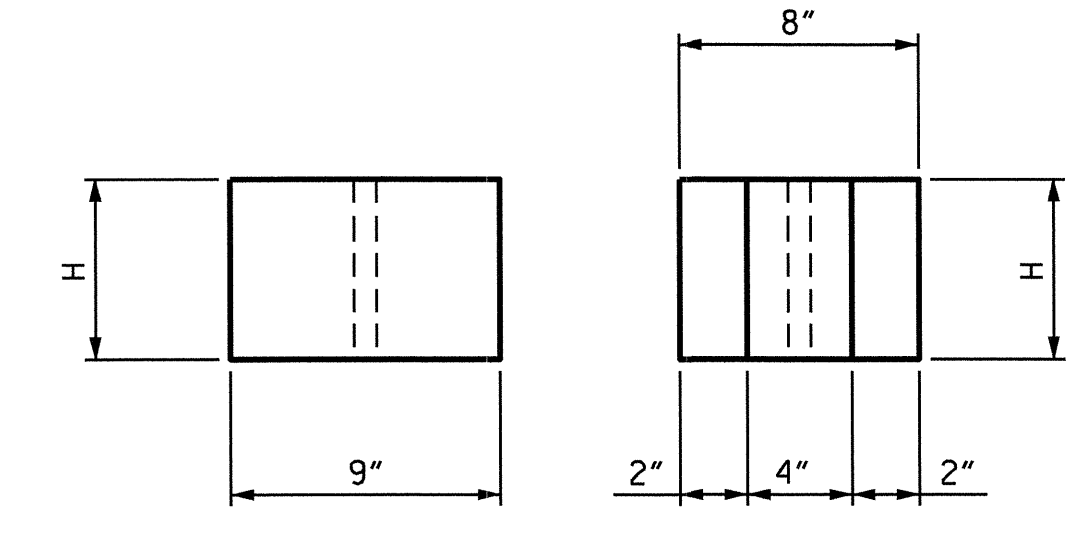
BOTTOM PANEL



DETAIL "B"



PLAN

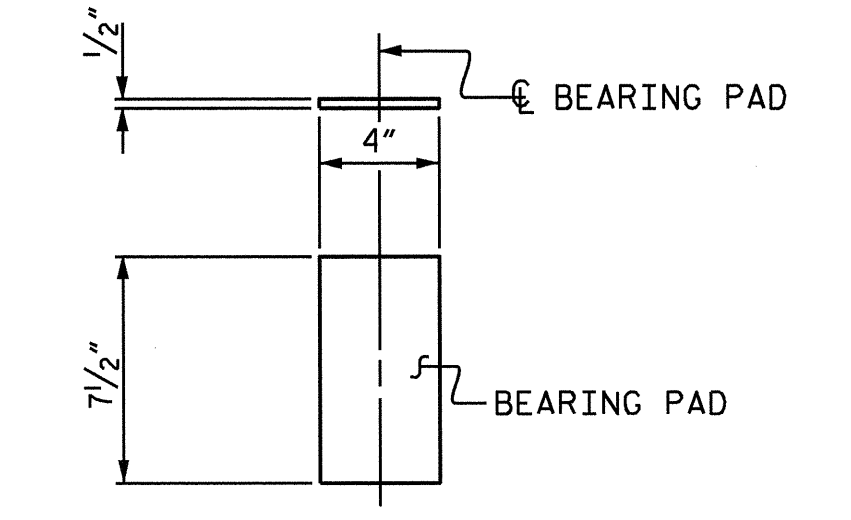


ELEVATION

END

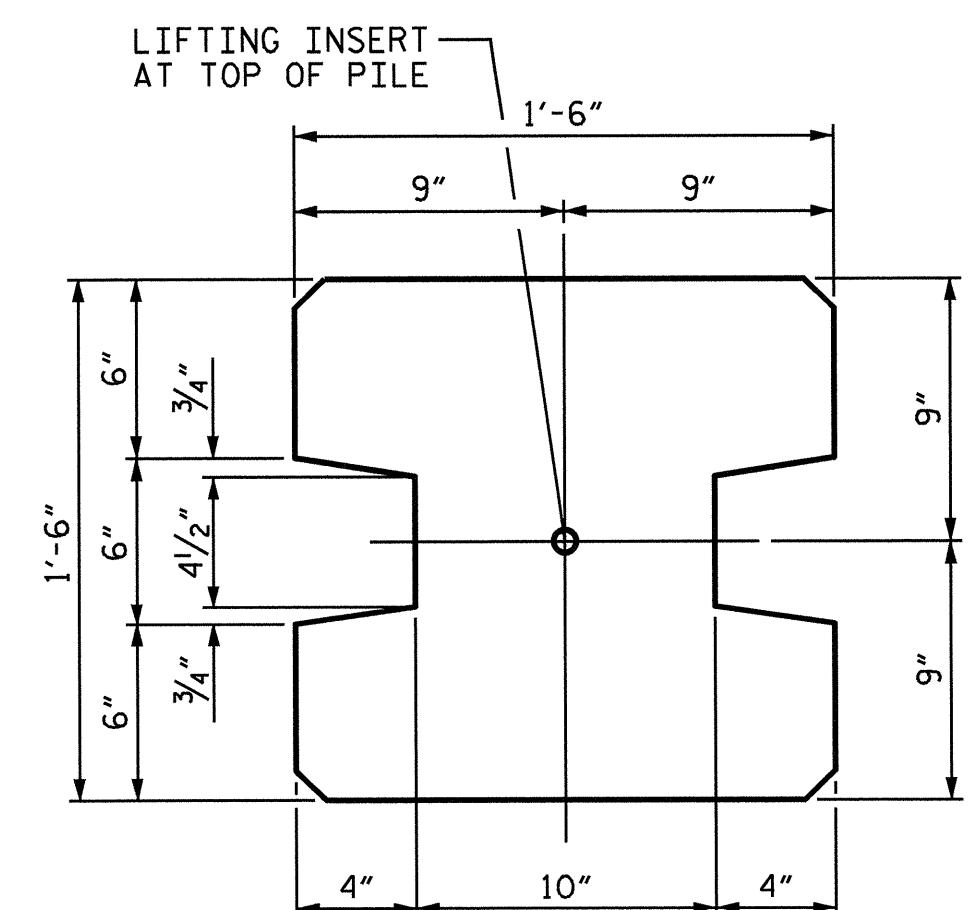
CONCRETE SHIM BLOCK

H = 3', 6" or 1'-0"

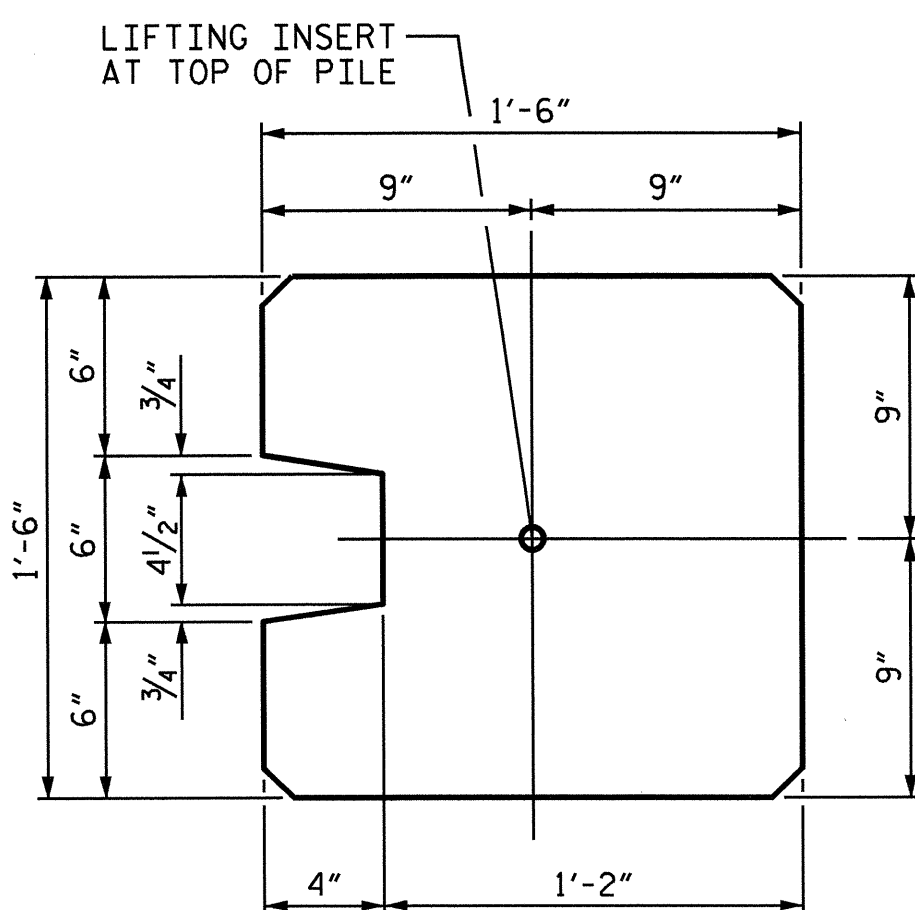


ELASTOMERIC BEARING DETAILS

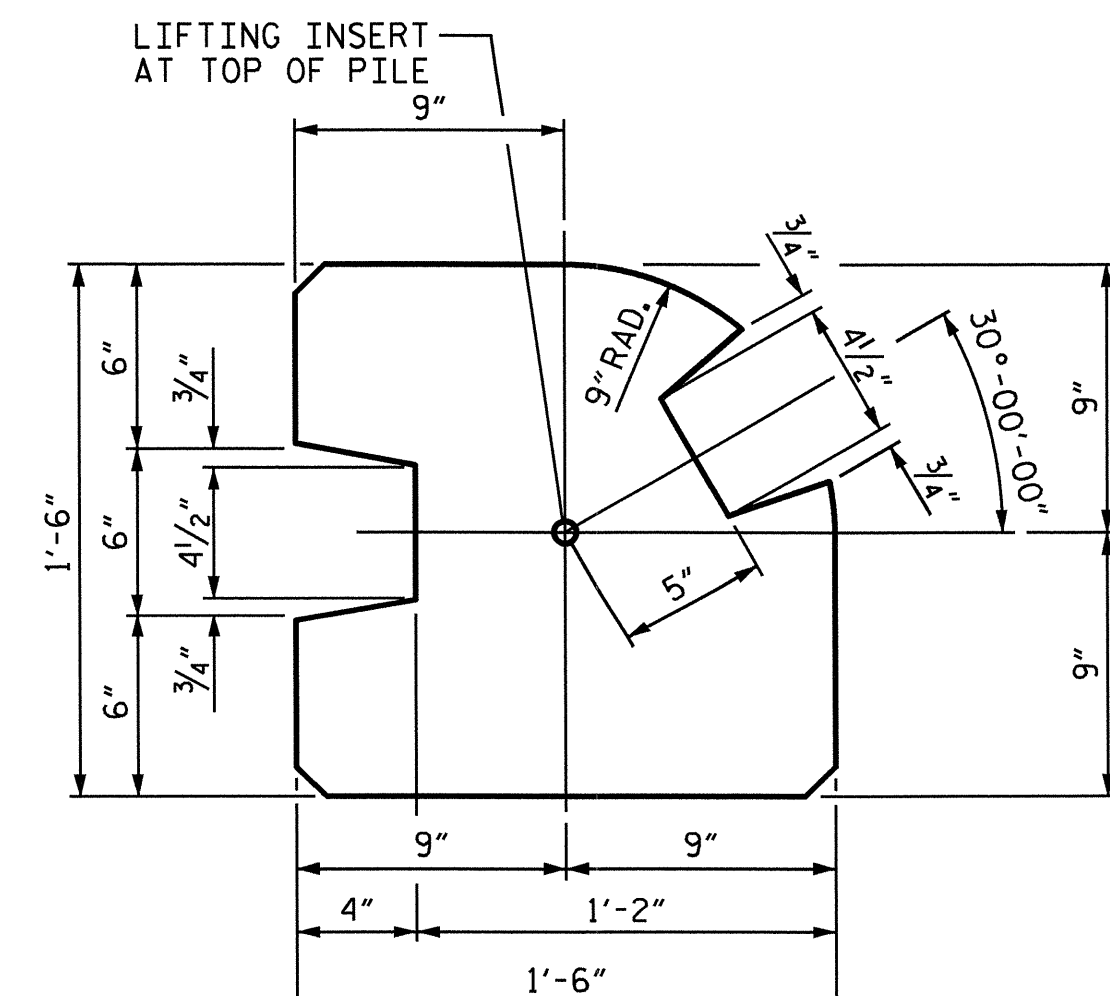
ELASTOMER IN BEARINGS SHALL BE 50 DUROMETER HARDNESS.



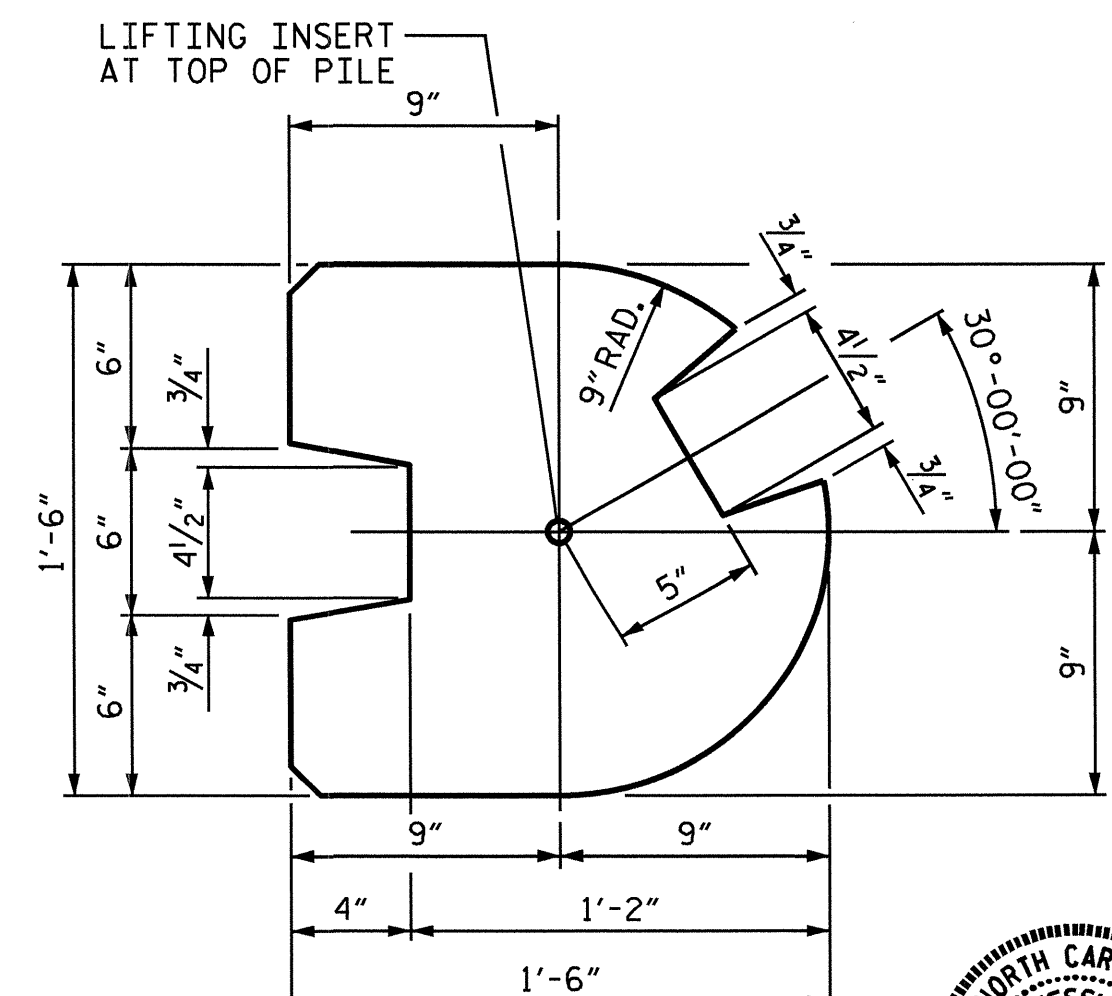
TYPE - I
(AREA = 1.9444 SQ. FT.)



TYPE - II
(AREA = 2.0903 SQ. FT.)



TYPE - III
(AREA = 1.8336 SQ. FT.)



TYPE - III (ALT.)
(AREA = 1.7163 SQ. FT.)

PILE DETAIL

(ALL CORNERS TO BE CHAMFERED 1")

ASSEMBLED BY : KEITH D. LAYNE	DATE : 11-09-12
CHECKED BY : V. A. PATEL	DATE : 11-14-12
DRAWN BY : MAA 6/11	ADDED 8/31/11
CHECKED BY : CM 6/11	

07-JAN-2013 11:56
D:\Structures\Plans\Plans Sound Barrier Wall\R-2246B.sd,SBL.dgn
jpodams

PROJECT NO. R-2246B
CABARRUS COUNTY
STATION: 110+98.44 -L-

SHEET 2 OF 3

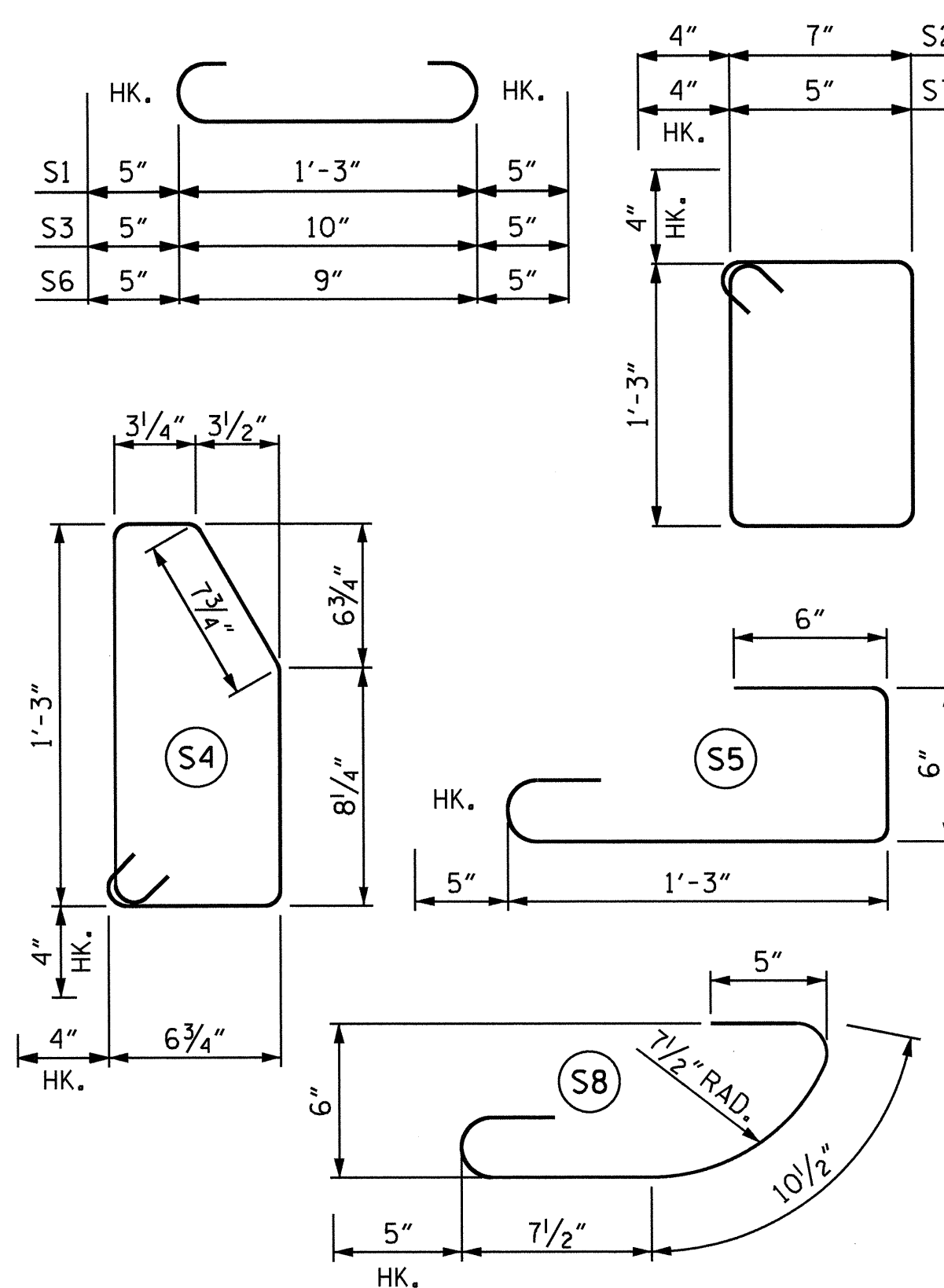
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
SOUND BARRIER WALL
DETAILS



REVISIONS						SHEET NO. W-6
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 7
2			4			

STD. NO. SBW2

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

NOTES

CONCRETE DESIGN DATA : $f'_c = 5,000$ PSI

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

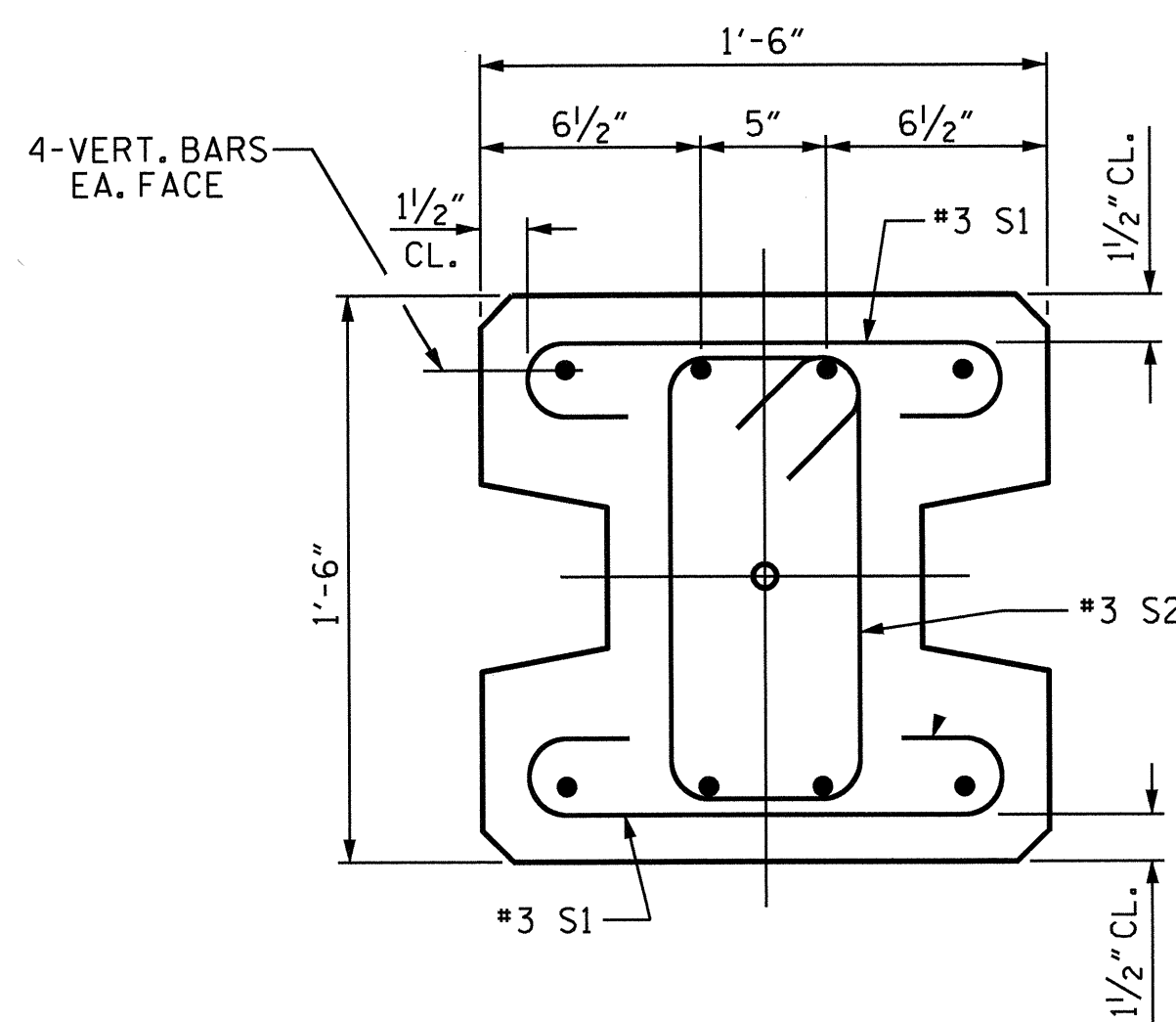
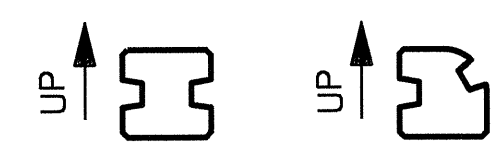
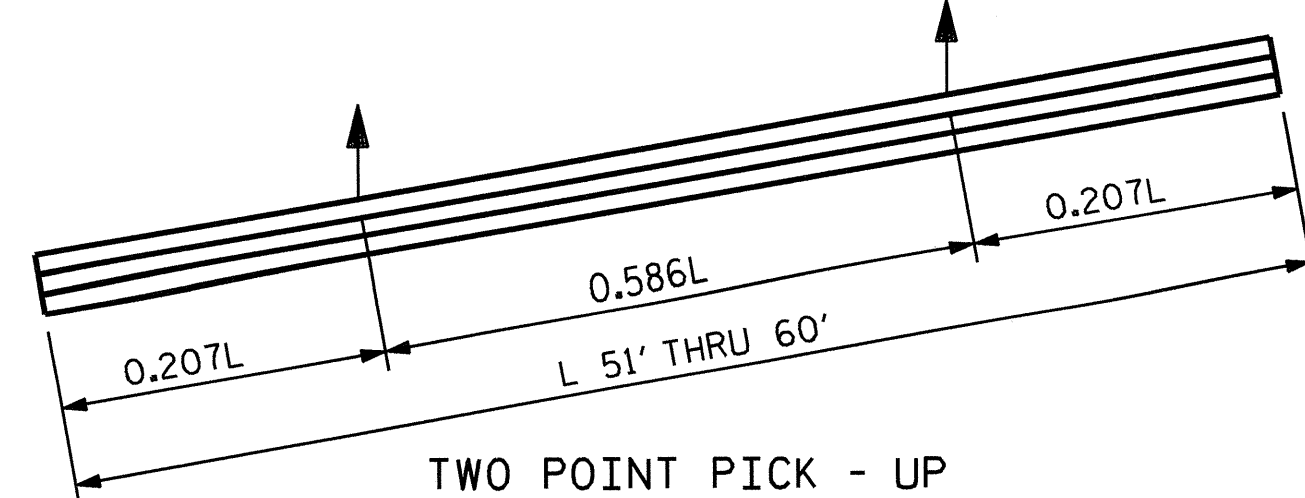
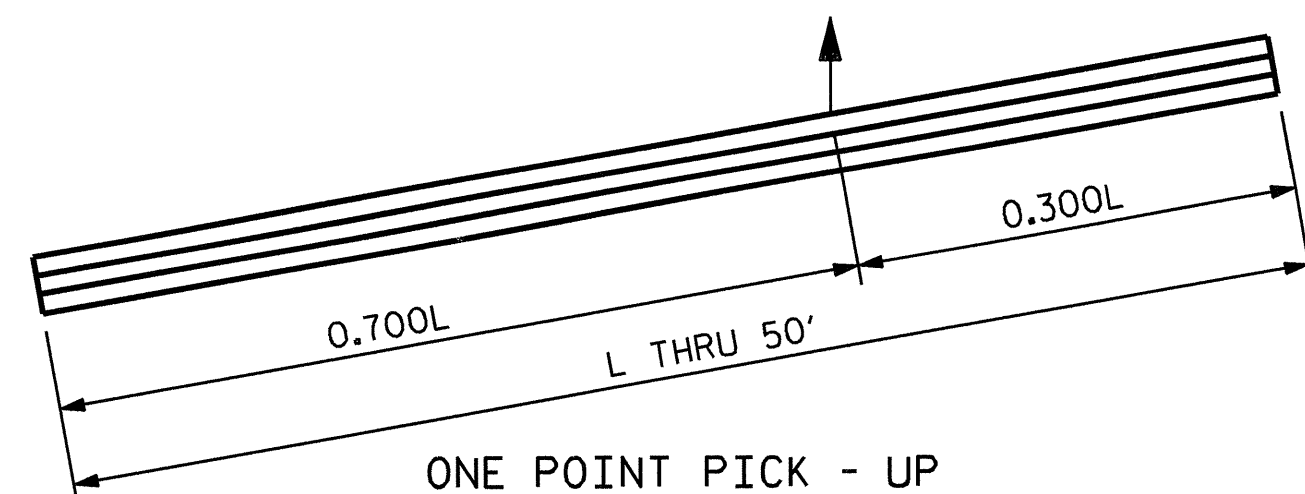
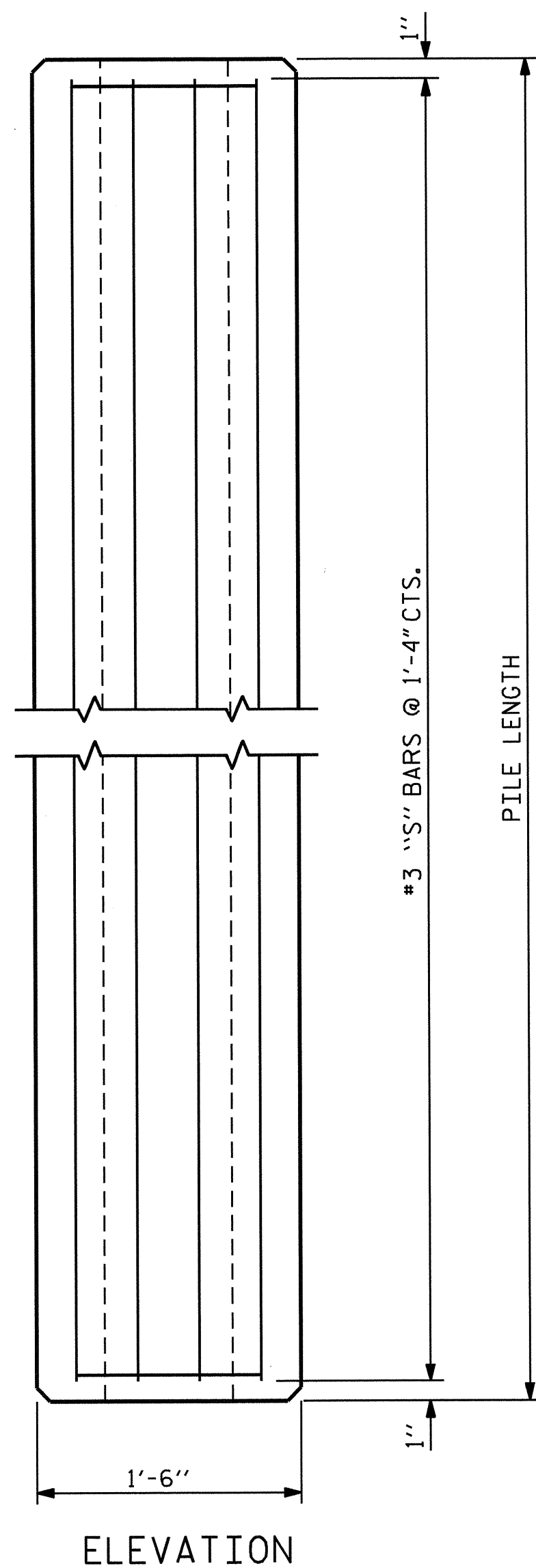
WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS TO BE INDICATED WITH A BLACK MARK 2" WIDE.

THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

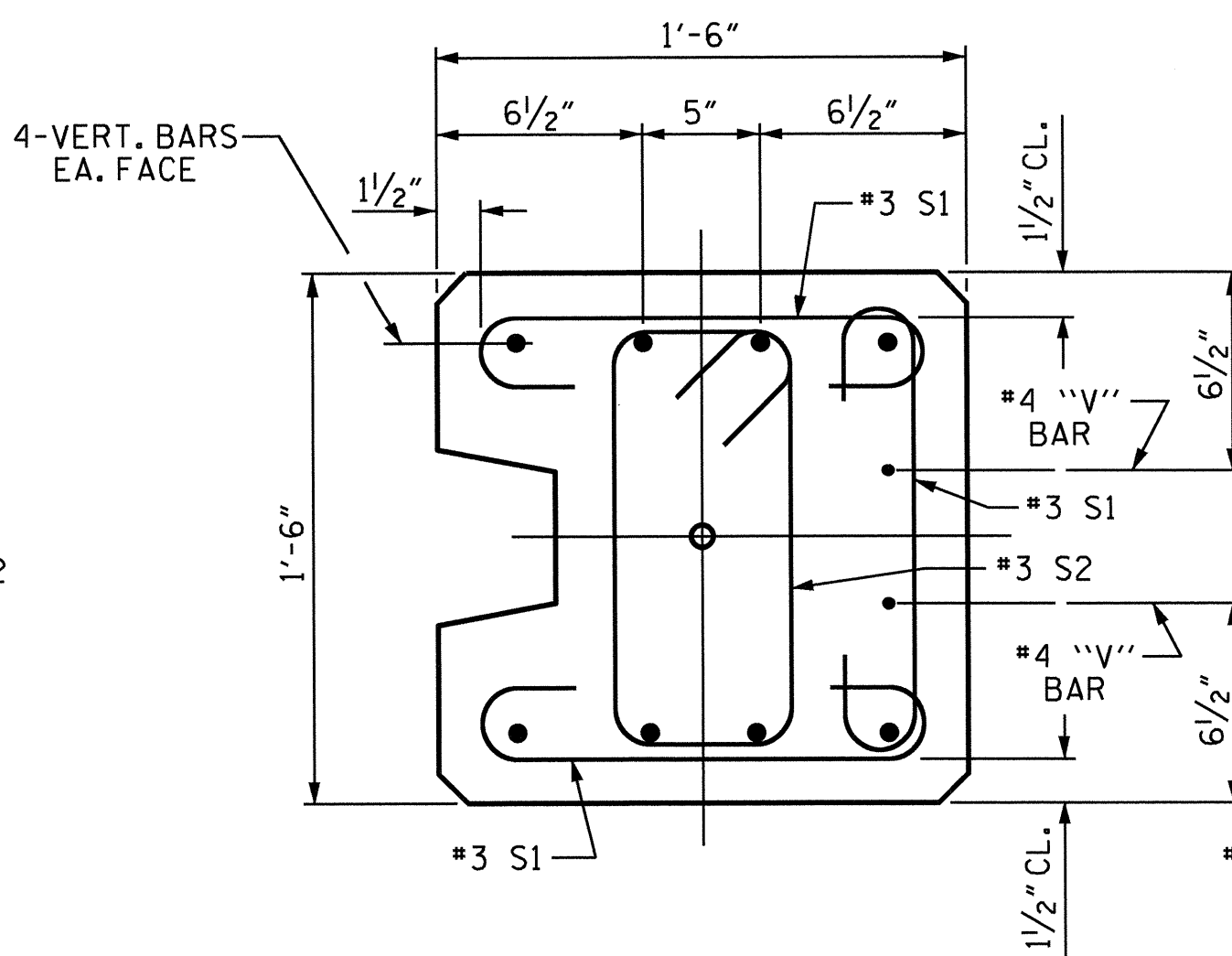
ALL CORNERS TO BE CHAMFERED 1".

QUANTITIES FOR ONE PRECAST CONCRETE PILE

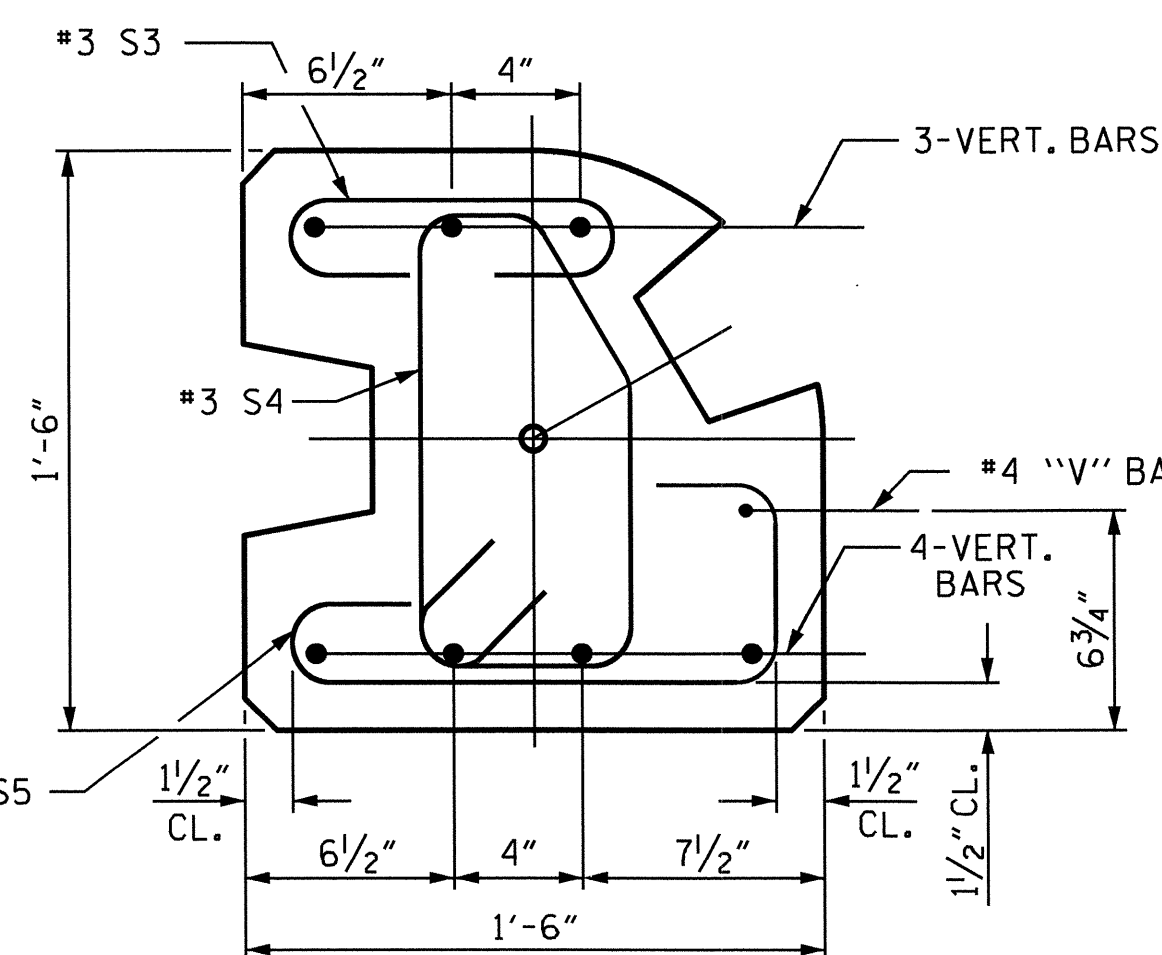
LENGTH	APPROX. PILE WT. TONS	ONE PICK-UP POINT		TWO PICK-UP POINT	
		0.300L	0.700L	0.207L	0.586L
10'-0"	1.56	3'-0"	7'-0"		
15'-0"	2.35	4'-6"	10'-6"		
20'-0"	3.14	6'-0"	14'-0"		
25'-0"	3.93	7'-6"	17'-6"		
30'-0"	4.70	9'-0"	21'-0"		
35'-0"	5.49	10'-6"	24'-6"		
40'-0"	6.28	12'-0"	28'-0"		
45'-0"	7.05	13'-6"	31'-6"		
50'-0"	7.84	15'-0"	35'-0"		
55'-0"	8.63			11'-4 1/2"	32'-3"
60'-0"	9.42			12'-5"	35'-2"



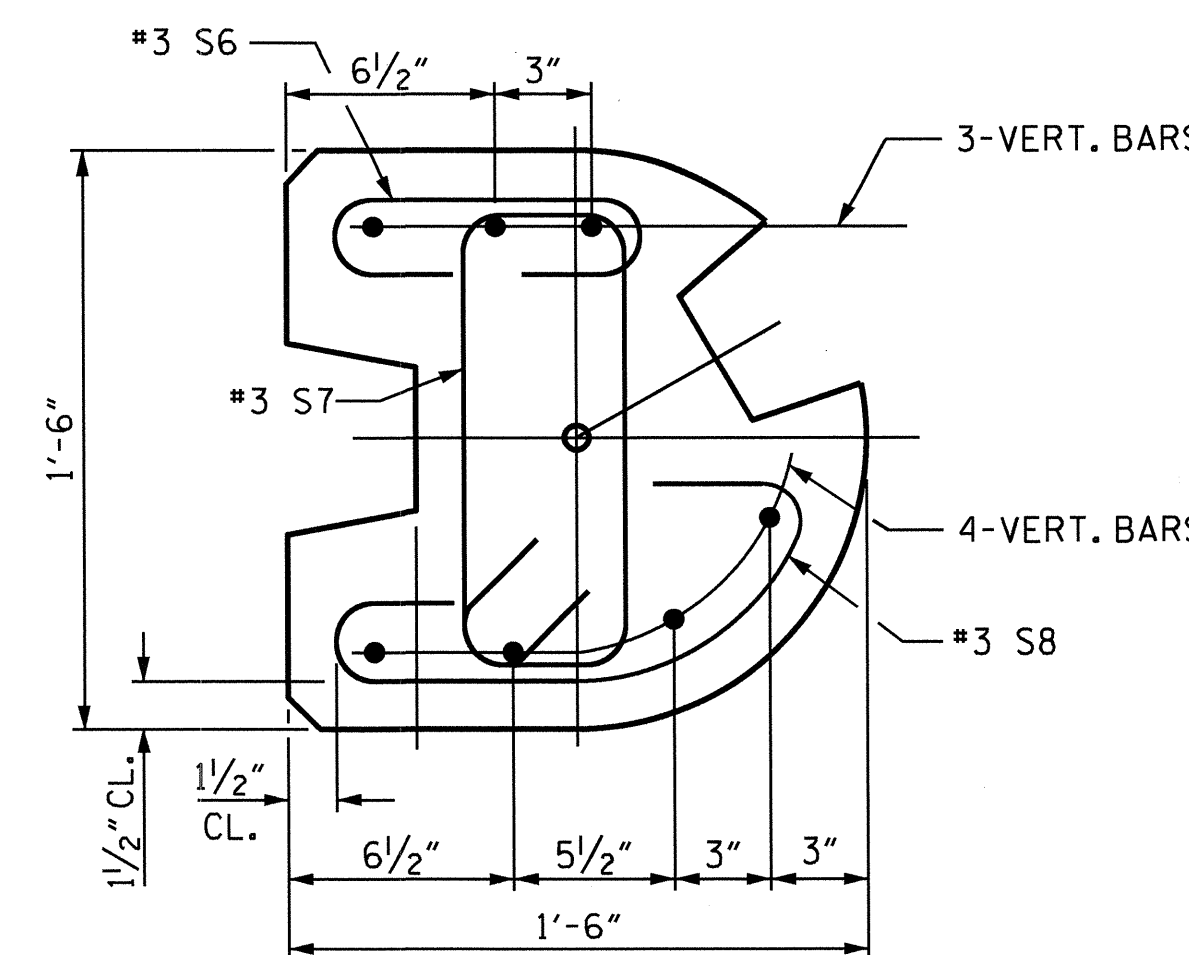
TYPE - I



TYPE - II



TYPE - III



TYPE - III (ALT.)

PILE DETAIL

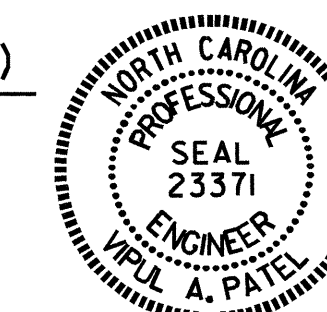
SEE EXPOSURE CATEGORY CHART FOR VERT. BAR PILE REINFORCING (SHEET 1 OF 3)

ASSEMBLED BY : KEITH D. LAYNE	DATE : 11-09-12
CHECKED BY : V. A. PATEL	DATE : 11-14-12
DRAWN BY : MAA 6/11	ADDED 8/31/11
CHECKED BY : GM 6/11	

PROJECT NO. R-2246B
 CABARRUS COUNTY
 STATION: 110+98.44 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 SOUND BARRIER WALL
 DETAILS



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

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 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990