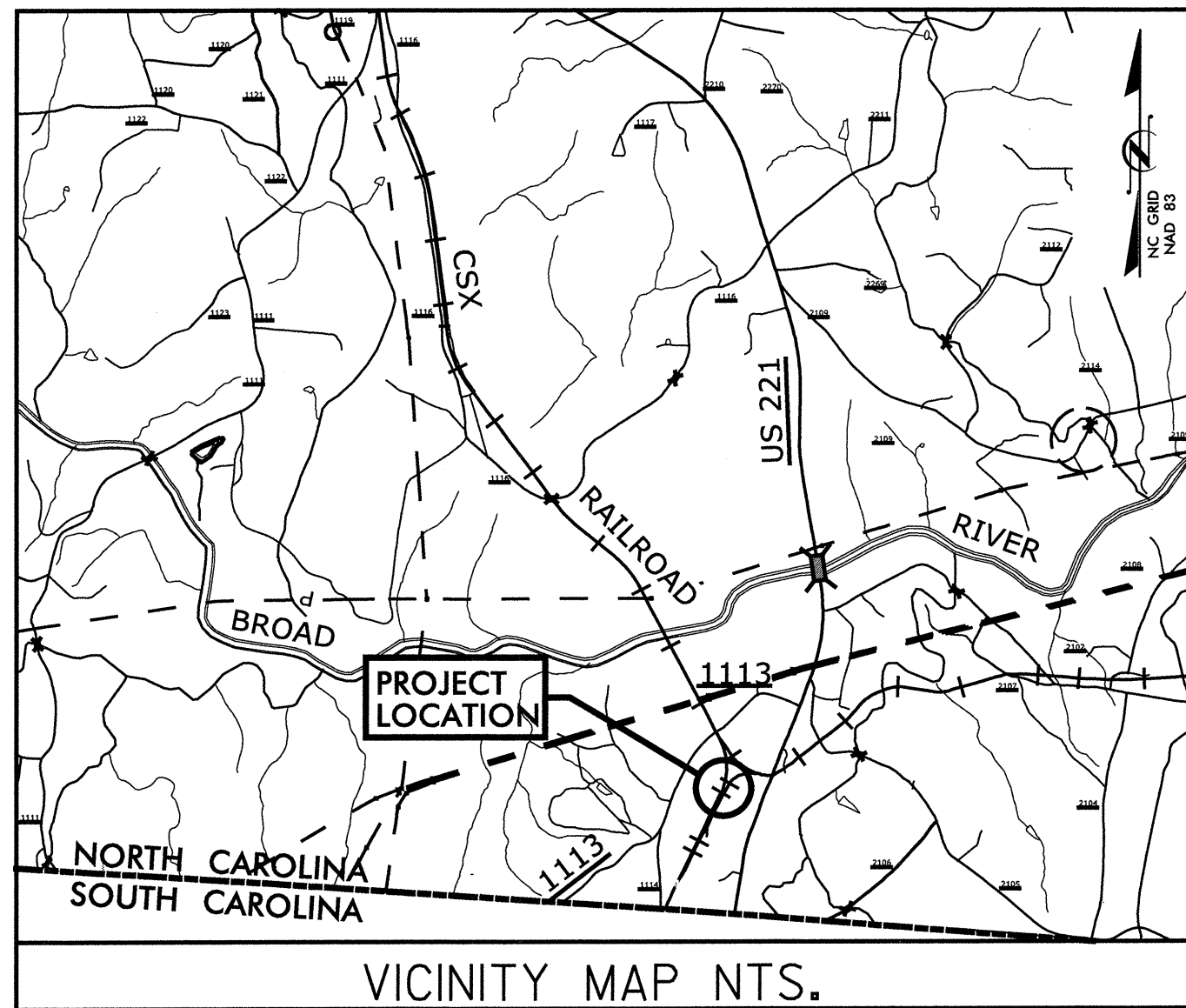


**CONTRACT: C203044**      **TIP PROJECT: R-5522**

**STRUCTURE**

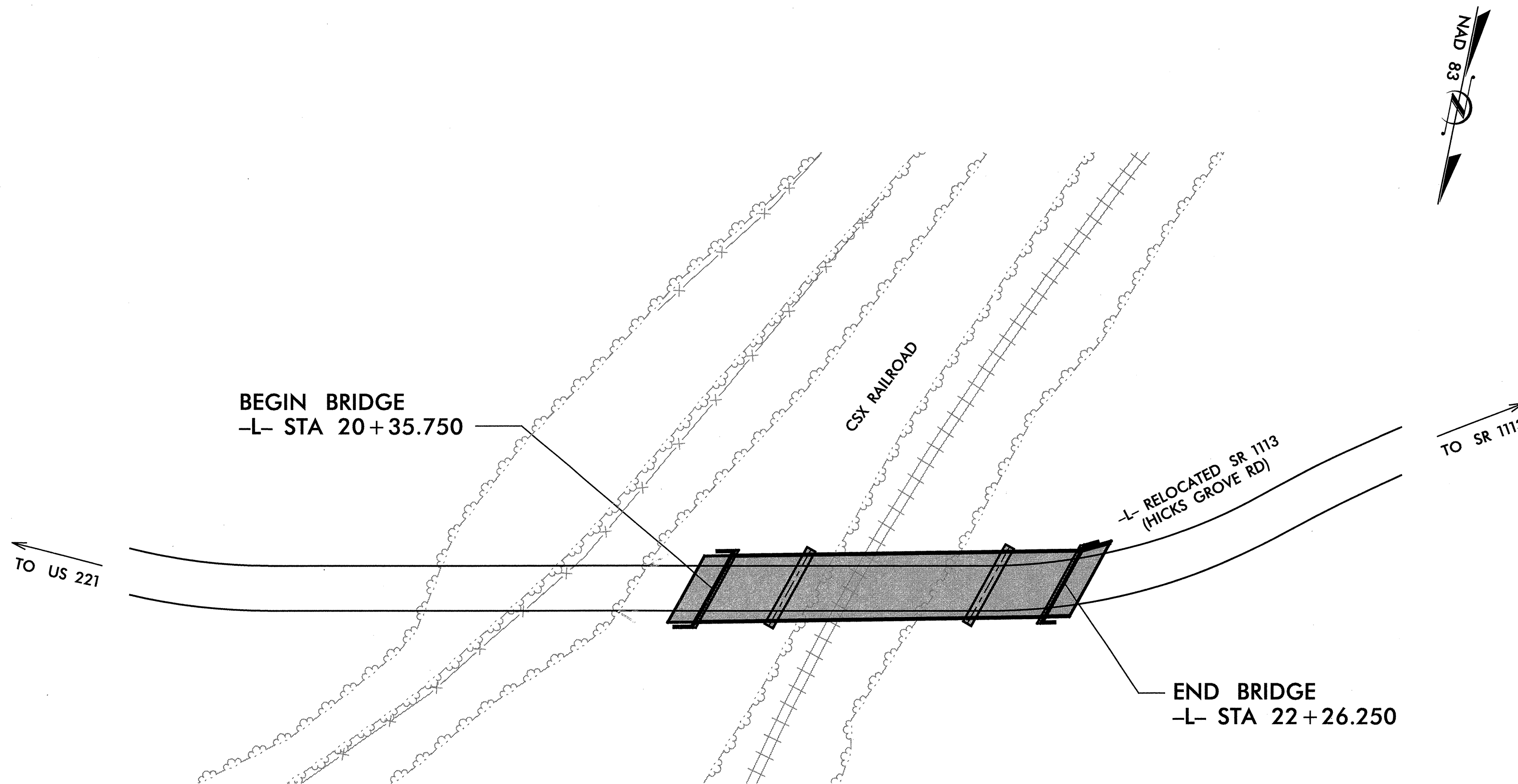


STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

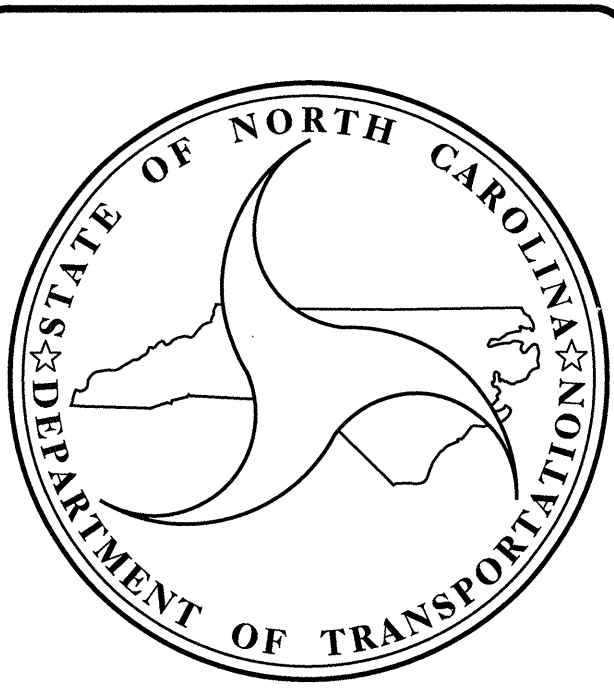
# RUTHERFORD COUNTY

**LOCATION: BRIDGE OVER CSX RAILROAD ON  
 RELOCATED SR 1113 (HICKS GROVE ROAD)  
 BETWEEN US 221 & EXIST. SR 1113**

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



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5522		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45547.1.1	APD-1113(9)	PE	
45547.2.1	APD-1113(9)	R / W	
45547.3.1	APD-1113(9)	CONST.	



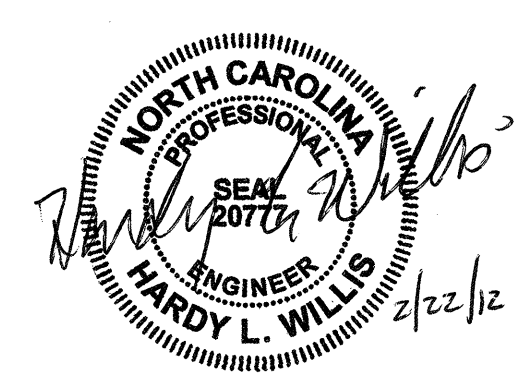
DESIGN DATA
ADT 2005 = 500
ADT 2030 = 1600
DHV
D
T = 6 %
V = 35 MPH
FUNC CLASS = RURAL LOCAL

PROJECT LENGTH
LENGTH ROADWAY PROJECT TIP R-5522 = 0.436 MI
LENGTH STRUCTURE PROJECT TIP R-5522 = 0.036 MI
TOTAL LENGTH OF PROJECT TIP R-5522 = 0.472 MI

Prepared in the Office of: <b>VAUGHN &amp; MELTON</b> 1318-F PATTON AVE. ASHEVILLE NC, 28806 FOR THE NORTH CAROLINA DIVISION OF HIGHWAYS	
2012 STANDARD SPECIFICATIONS  LETTING DATE : MAY 15, 2012	REECE SCHULER, P.E. <small>PROJECT ENGINEER</small>  HARDY WILLIS, P.E. <small>PROJECT DESIGN ENGINEER</small>

<b>STRUCTURES MANAGEMENT UNIT</b> 1000 BIRCH RIDGE DR. RALEIGH, N.C. 27610
--

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA  <small>STATE DESIGN ENGINEER</small> DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION  <small>APPROVED</small> DIVISION ADMINISTRATOR      DATE
--



**V&M**  
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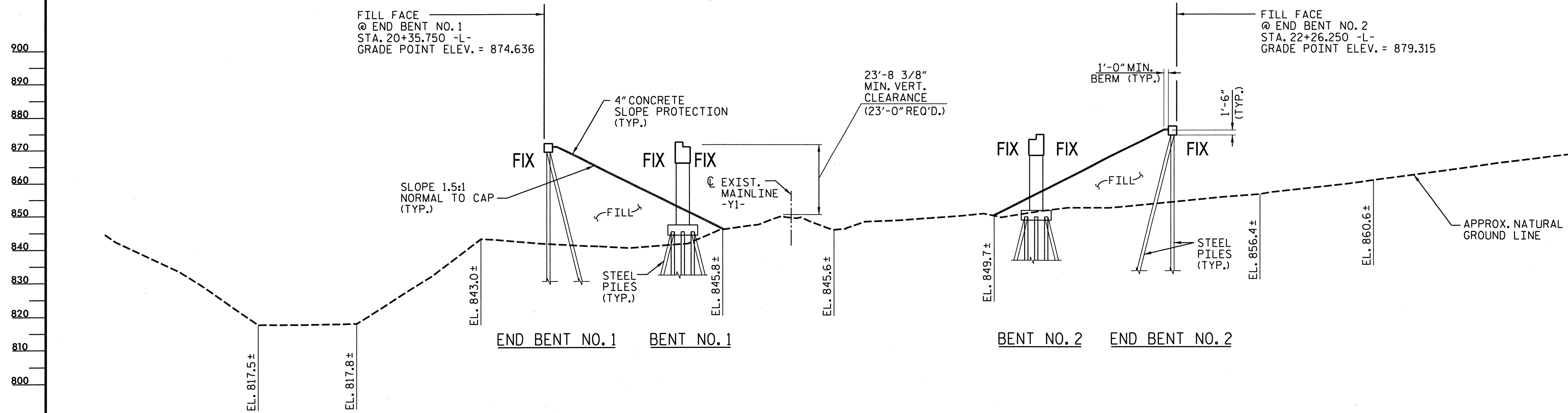
Charlotte, North Carolina 704-899-8900  
 Tri-Cities, Tennessee 423-467-8400  
 Knoxville, Tennessee 865-546-5800  
 Middleboro, Kentucky 606-248-6600  
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 Spartanburg, South Carolina 864-574-4775

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SPAN A

SPAN B

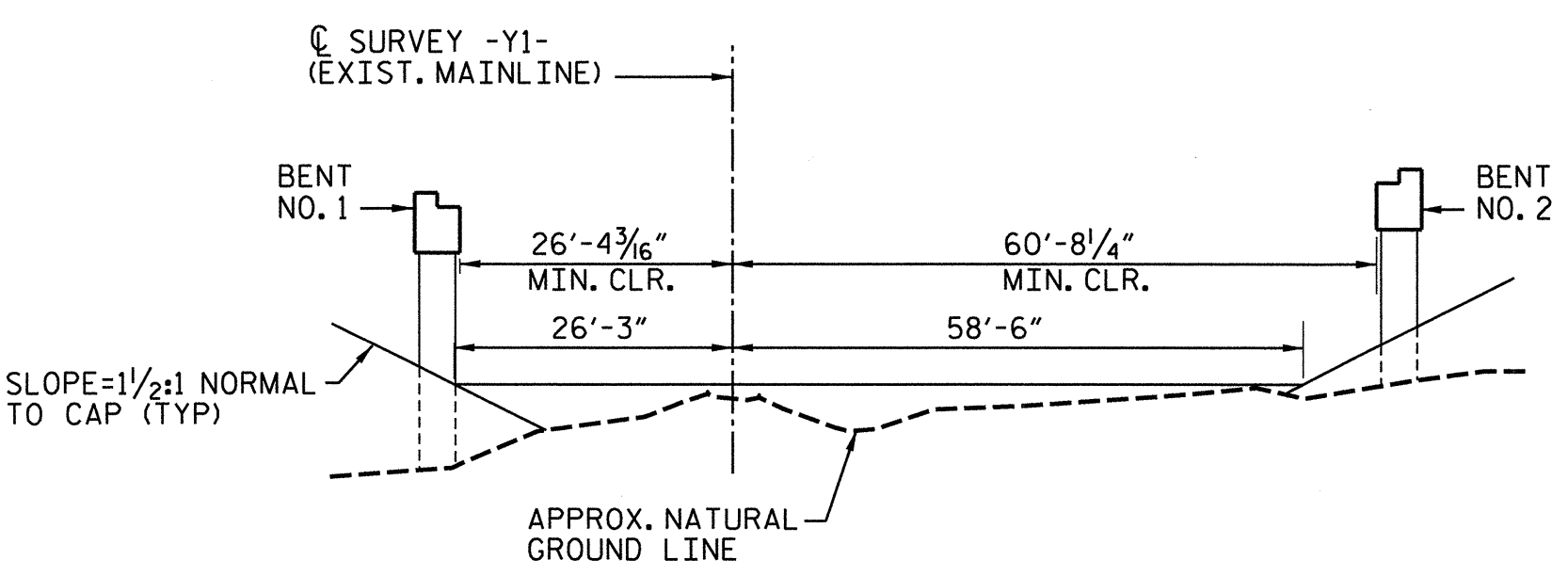
SPAN C



**TOP OF RAIL ELEVATIONS  
MAINLINE TRACK -Y1-  
(MILEPOST / STATIONS AHEAD)**

TRACK STATION	LEFT RAIL	RIGHT RAIL
693+41.84	849.400	848.988
693+87.16	849.544	849.140
694+32.63	849.635	849.245
694+82.94	849.725	849.347
695+28.49	849.778	849.374
695+75.36	849.795	849.397
696+20.79	849.779	849.431
696+64.96	849.770	849.481
697+08.58	849.776	849.517
697+52.54	849.805	849.592

NOTES:  
LEFT RAIL FACING AHEAD MILEPOST IS HIGH RAIL.  
STATIONS INCREASE WITH MILEPOSTS.



**MINIMUM CLEARANCE - RAILROAD**  
(LOOKING STATION AHEAD ALONG RAILROAD)  
SPAN LENGTHS BASED ON THIS SECTION

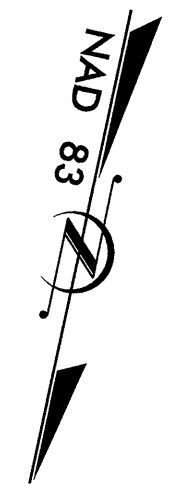
PI = 19+50.00  
EL = 874.079'  
VC = 395'

PI = 23+00.00  
EL = 881.448'  
VC = 300'

(+10.0000%    +2.052%    -3.8800%)

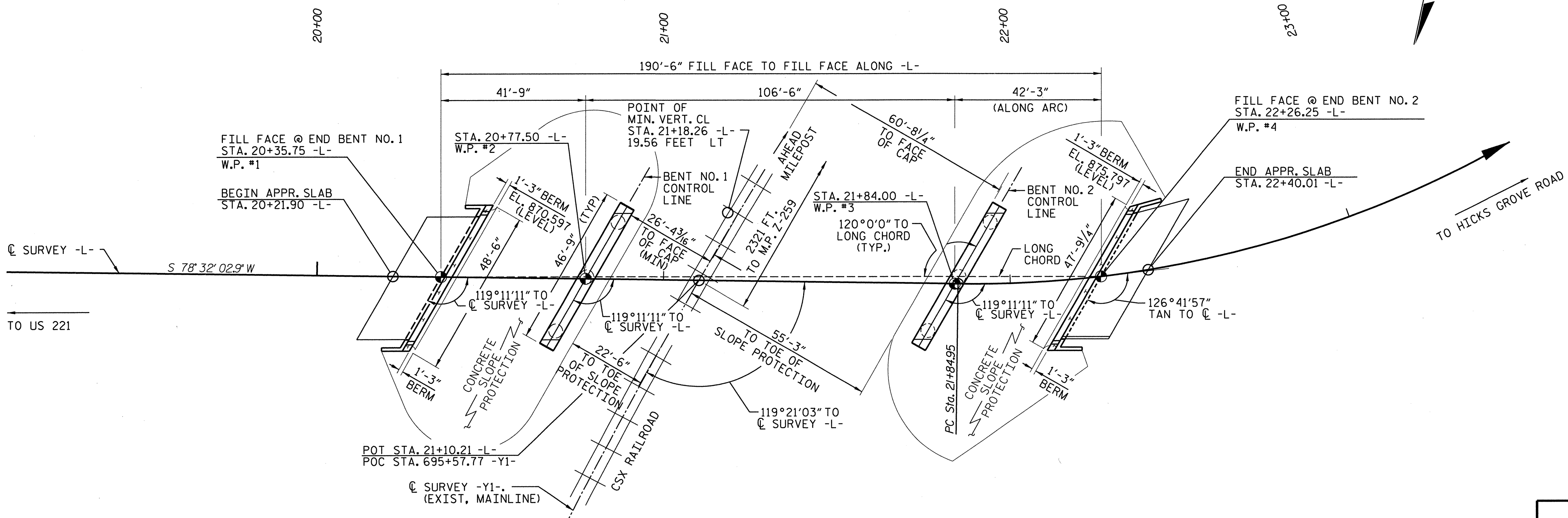
**GRADE DATA -L-**

**SECTION ALONG C-L**  
SECTIONS AT BENTS AND END BENTS ARE AT RIGHT ANGLES.



PI Sta 22+66.70  
Δ = 29'05" 59.6' (LT)  
D = 18" 11' 20.9"  
L = 159.99'  
T = 81.76'  
R = 315.00'

**HORIZONTAL CURVE DATA**



**PLAN ALONG C-L**  
PILES NOT SHOWN IN PLAN VIEW.  
NOTE: ALL BENTS AND END BENTS ARE PARALLEL.

PROJECT NO. R-5522  
RUTHERFORD COUNTY  
STATION: 21+10.21 -L-  
695+57.77 -Y1-  
SHEET 1 OF 4 MILE POST Z-259

**V&M**  
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Knoxville, Tennessee  
865-546-5800  
Middlesboro, Kentucky  
606-248-6600  
Spartanburg, South Carolina  
864-514-4175

Asheville, North Carolina  
828-293-2796

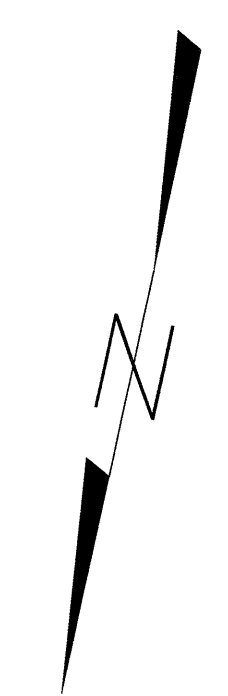
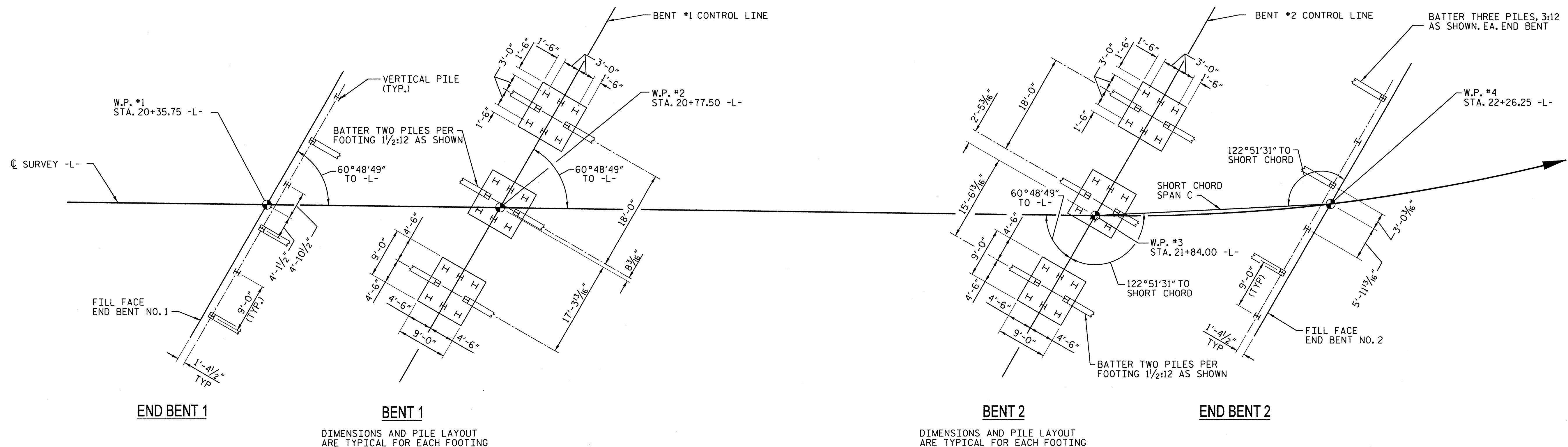
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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**GENERAL DRAWING**  
BRIDGE OVER CSX RAILROAD  
ON RELOCATED SR 1113  
(HICKS GROVE ROAD)  
BETWEEN US 221 & EXIST. SR 1113

DWN. BY: MAF		DATE: JAN. 2012		SHEET NO.	
CHKD. BY: HLW		DATE: JAN. 2012		S-1	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					30



**FOUNDATION NOTES:**

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT BOTH END BENTS ARE DESIGNED FOR A FACTORED RESISTANCE OF 62 TONS PER PILE. DRIVE PILES AT BOTH END BENTS TO A REQUIRED DRIVING RESISTANCE OF 104 TONS PER PILE.

PILES AT BOTH BENTS ARE DESIGNED FOR A FACTORED RESISTANCE OF 93 TONS PER PILE. DRIVE PILES AT BOTH BENTS TO A REQUIRED DRIVING RESISTANCE OF 156 TONS PER PILE.

STEEL PILE POINTS ARE REQUIRED ON ALL PILES.

**FOUNDATION LAYOUT PLAN**

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINES OF THE PILES.

ALL PILES ARE HP 12x53 STEEL PILES.

PROJECT NO. R-5522

RUTHERFORD COUNTY

STATION: 21+10.21 -L-  
695+57.77 -Y1-

SHEET 2 OF 4 MILE POST Z-259



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Asheville, North Carolina 828-253-2796

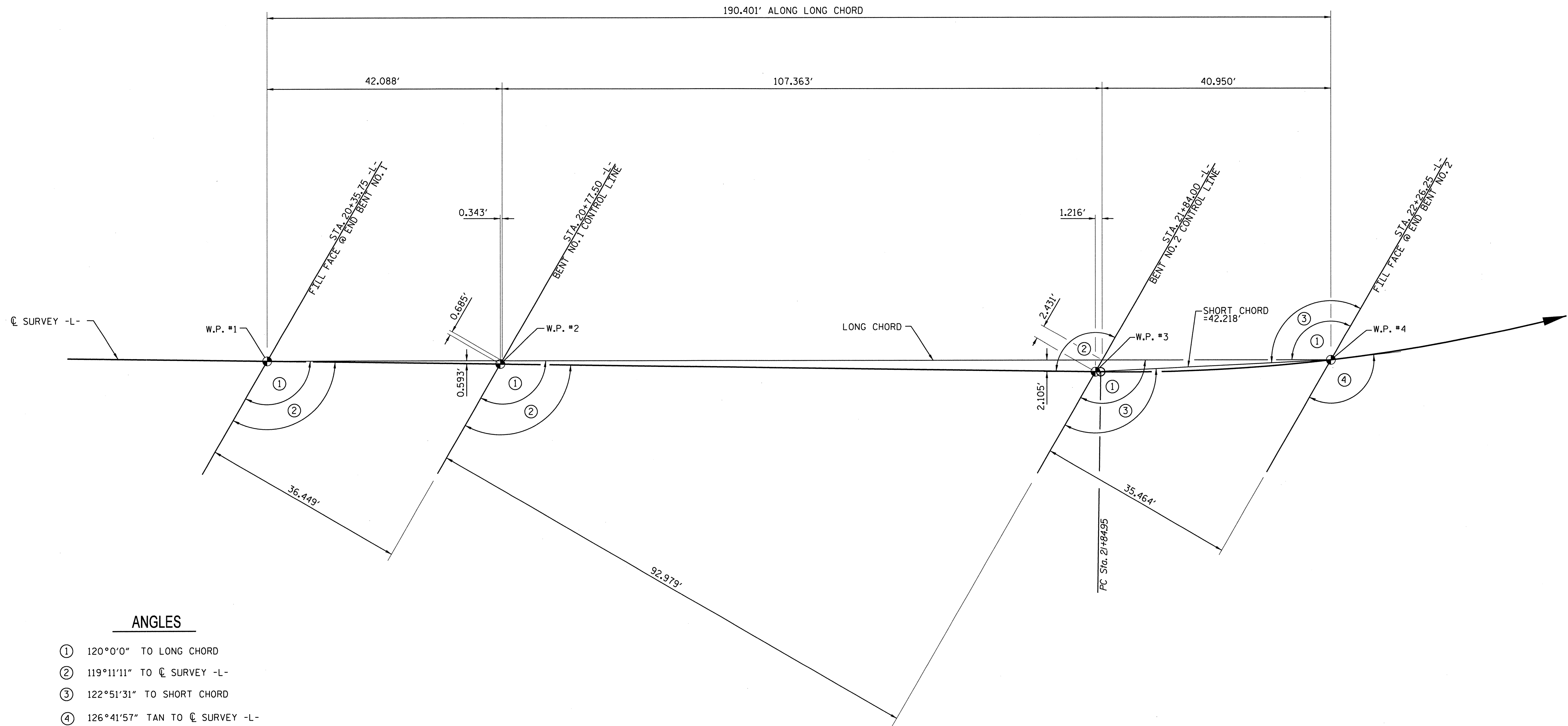
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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**GENERAL DRAWING  
FOUNDATION LAYOUT**

JAN 2012

DWN. BY: MAF		DATE: JAN. 2012				
CHKD. BY: HLW		DATE: JAN. 2012				
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-2
2			4			TOTAL SHEETS 30



**ANGLES**

- ① 120°0'0" TO LONG CHORD
- ② 119°11'11" TO  $\text{C SURVEY -L-}$
- ③ 122°51'31" TO SHORT CHORD
- ④ 126°41'57" TAN TO  $\text{C SURVEY -L-}$

**LONG CHORD LAYOUT**

NOTE: ALL BENTS AND END BENTS ARE PARALLEL.

PROJECT NO. R-5522  
RUTHERFORD COUNTY  
 STATION: 21+10.21 -L-  
695+57.77 -Y1-  
 SHEET 3 OF 4 MILE POST Z-259

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 LONG CHORD LAYOUT

JAN 2012

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

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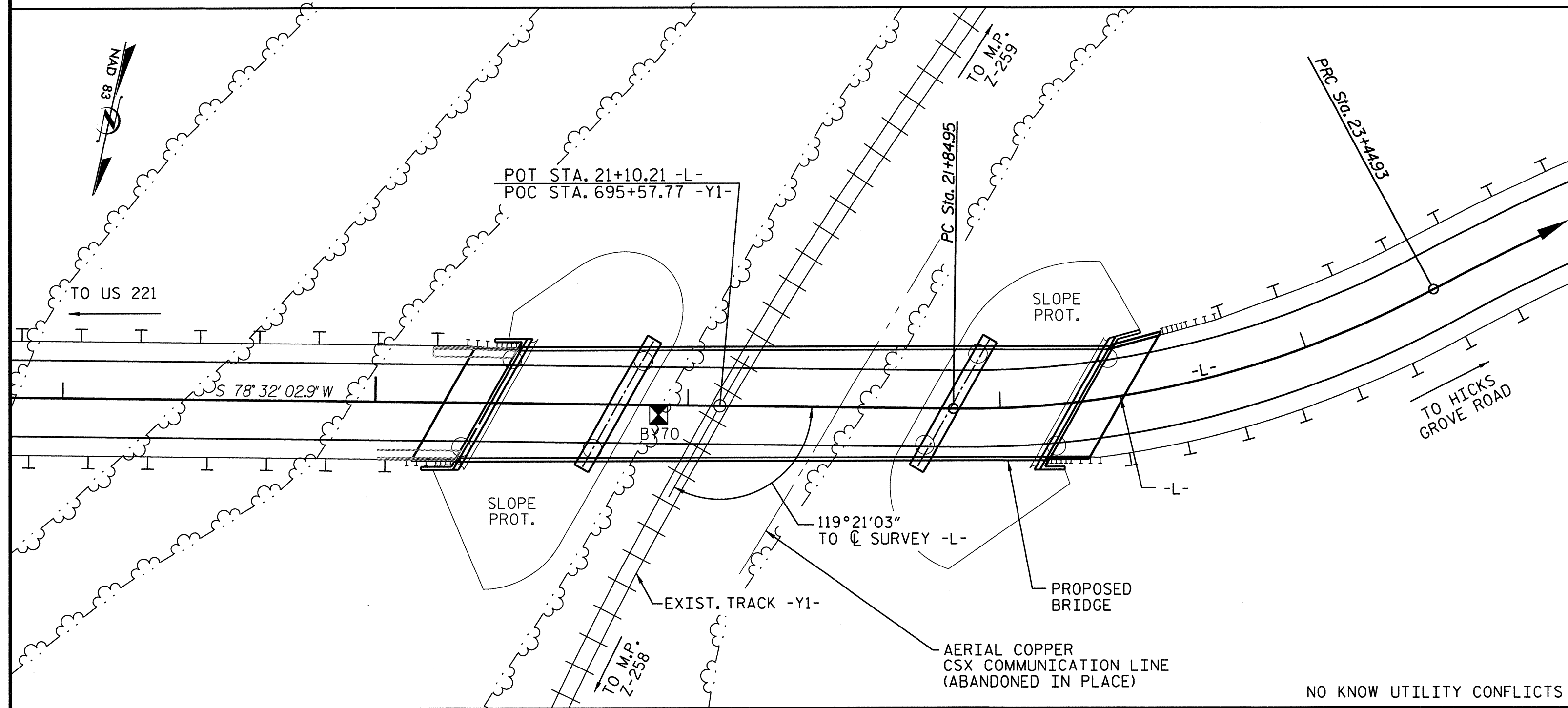
Asheville, North Carolina 828-253-2796

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DWN. BY: MAF DATE: JAN. 2012  
 CHKD. BY: HLW DATE: JAN. 2012

-BY70- N 536734.0938 E 1150087.5103 ELEV. = 846.03' -L- STATION 20+90.69 3.00' RT PINC STA. 26+86.35



LOCATION SKETCH

GENERAL NOTES:

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. THE BRIDGE IS LOCATED IN SEISMIC PERFORMANCE ZONE 1. NO DETAILED SEISMIC DESIGN IS REQUIRED.

THE RAILROAD TRACK TOP OF RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE "STANDARD NOTES" SHEET.

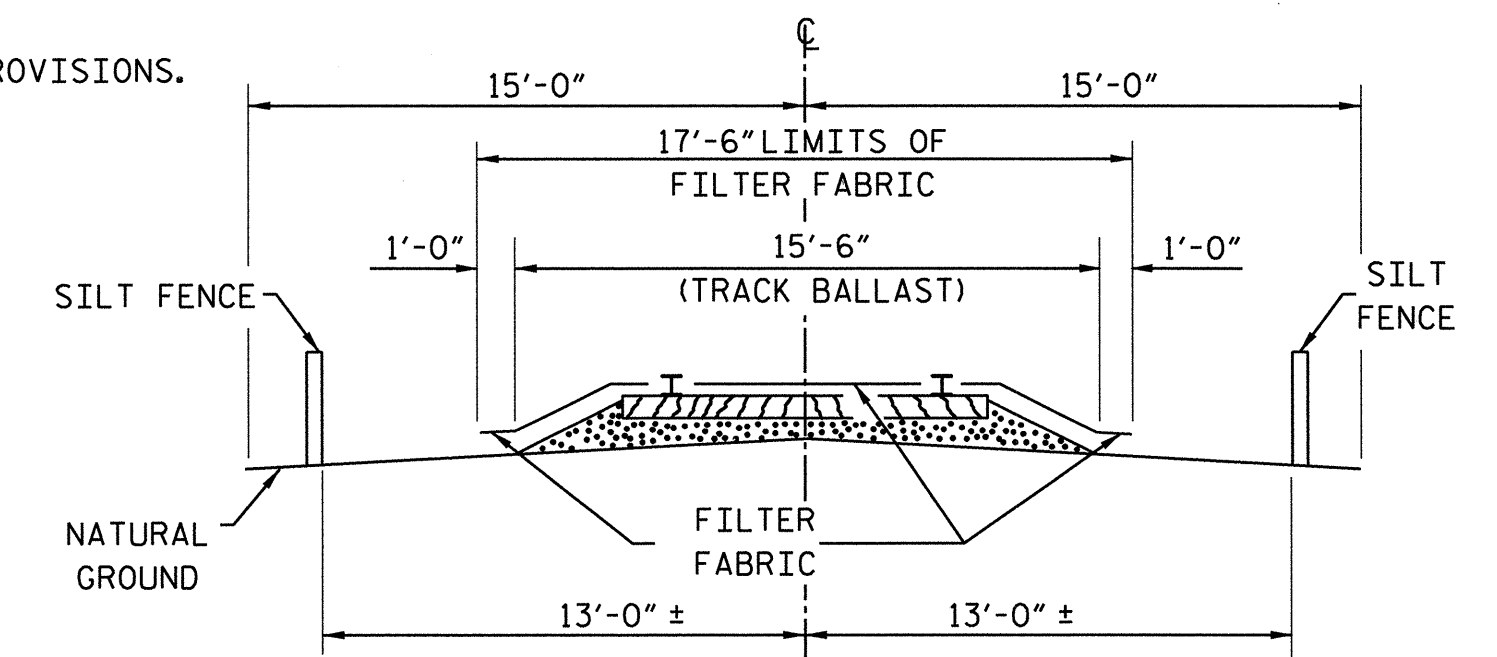
FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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.



NOTES:

RAILROAD EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO PERFORMING ANY WORK IN THE RAILROAD RIGHT-OF-WAY

ADDITIONAL EROSION CONTROL MEASURES FOR PROTECTION OF RAILROAD DITCHES MAY BE REQUIRED AS DIRECTED BY THE ENGINEER.

NO SEPARATE PAYMENT WILL BE MADE FOR RAILROAD EROSION CONTROL MEASURES.

LIMITS OF SILT FENCE AND FILTER FABRIC PARALLEL TO RAILROAD SHALL EXTEND A MINIMUM OF 10'-0" OUTSIDE EDGE OF SUPERSTRUCTURE OR TOE OF SLOPE ON CONSTRUCTION. A GREATER LENGTH OF SILT FENCE OR FILTER FABRIC MAY BE REQUIRED IF SO DIRECTED BY THE ENGINEER.

FILTER FABRIC TO BE NAILED TO TIMBER RAIL TIES WITH PRIME SOURCE "GRIP CAP" OR EQUIVALENT. FILTER FABRIC ON SHOULDER TO BE SECURED AS DIRECTED BY THE ENGINEER AND RAILROAD.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION	3'-0" x 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT		3'-0" x 3'-3" PRESTRESSED CONCRETE BOX BEAM UNIT		CLASS "A" CONCRETE	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	HP 12 X 53 STEEL PILES		STEEL PILE POINTS	4 INCH CONCRETE SLOPE PROTECTION	ELASTOMERIC BEARINGS	VERTICAL CONCRETE BARRIER RAIL	BRIDGE APPROACH SLABS	CHAIN LINK FENCE	
		NO.	LINEAR FEET	NO.	LINEAR FEET				CU. YARDS	LBS.							LBS.
SUPERSTRUCTURE		24	963.50	12	1286.63												
END BENT 1						16.0	2610		6	384	6	565					
BENT 1						103.3	13,399	1986	24	1080	24						
BENT 2	LUMP SUM					101.2	13,044	1804	24	1320	24						
END BENT 2						16.7	2885		6	360	6	535					
TOTAL	LUMP SUM	24	963.50	12	1286.63	237.2	31,938	3790	60	3144	60	1100	LUMP SUM	375.90	LUMP SUM	371.90	

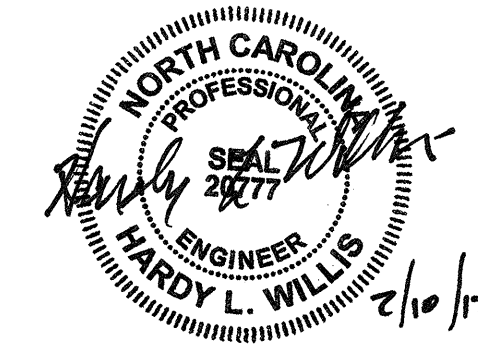
PROJECT NO. R-5522

RUTHERFORD COUNTY

STATION: 21+10.21 -L-

695+57.77 -Y1-

SHEET 4 OF 4 MILE POST Z-259



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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

GENERAL DRAWING  
LOCATION SKETCH AND  
TOTAL BILL OF MATERIALS

JAN 2012

DWN. BY: MAF DATE: JAN. 2012  
CHKD. BY: HLW DATE: JAN. 2012

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

TOTAL SHEETS 30

SPAN A

LOAD FACTORS:

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

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	-	①	1.02	-	1.75	0.46	1.02	A	-	20.4 FT	0.71	1.93	A	-	2.1 FT	0.80	0.46	1.27	A	-	20.4 FT	-	
	HL-93 (OPERATING)	-	-	1.32	-	1.35	0.46	1.32	A	-	20.4 FT	0.71	2.50	A	-	2.1 FT	-	-	-	-	-	-	-	-
	HS-20 (INVENTORY)	36.00	②	1.26	45.31	1.75	0.46	1.26	A	-	20.4 FT	0.71	2.25	A	-	2.1 FT	0.80	0.46	1.57	A	-	20.4 FT	-	
	HS-20 (OPERATING)	36.00	-	1.63	58.73	1.35	0.46	1.63	A	-	20.4 FT	0.71	2.91	A	-	2.1 FT	-	-	-	-	-	-	-	-
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.50	-	2.96	39.93	1.40	0.46	2.97	A	-	20.4 FT	0.71	6.06	A	-	2.1 FT	0.80	0.46	2.96	A	-	20.4 FT	-
		SNGAR BS2	20.00	-	2.39	47.75	1.40	0.46	2.40	A	-	20.4 FT	0.71	4.50	A	-	2.1 FT	0.80	0.46	2.39	A	-	20.4 FT	-
		SNAG RIS2	22.00	-	2.33	51.28	1.40	0.46	2.34	A	-	20.4 FT	0.71	4.25	A	-	2.1 FT	0.80	0.46	2.33	A	-	20.4 FT	-
		SNCOT TS3	27.25	-	1.48	40.30	1.40	0.46	1.48	A	-	20.4 FT	0.71	3.07	A	-	2.1 FT	0.80	0.46	1.48	A	-	20.4 FT	-
		SNAG GRS4	34.93	-	1.33	46.38	1.40	0.46	1.33	A	-	20.4 FT	0.71	2.68	A	-	2.1 FT	0.80	0.46	1.33	A	-	20.4 FT	-
		SNS5A	35.55	-	1.29	45.91	1.40	0.46	1.30	A	-	20.4 FT	0.71	2.79	A	-	2.1 FT	0.80	0.46	1.29	A	-	20.4 FT	-
		SNS6A	39.95	-	1.23	49.02	1.40	0.46	1.23	A	-	20.4 FT	0.71	2.60	A	-	2.1 FT	0.80	0.46	1.23	A	-	20.4 FT	-
	TRUCK TRACTOR SEMI-TRAILER (T/S/T)	SNS7B	42.00	③	1.17	49.14	1.40	0.46	1.17	A	-	20.4 FT	0.71	2.64	A	-	2.1 FT	0.80	0.46	1.17	A	-	20.4 FT	-
		TNAG RIT3	33.00	-	1.51	49.80	1.40	0.46	1.52	A	-	20.4 FT	0.71	3.03	A	-	2.1 FT	0.80	0.46	1.51	A	-	20.4 FT	-
		TNT4A	33.08	-	1.53	50.55	1.40	0.46	1.53	A	-	20.4 FT	0.71	2.89	A	-	2.1 FT	0.80	0.46	1.53	A	-	20.4 FT	-
		TNAG RIT4	43.00	-	1.30	55.84	1.40	0.46	1.30	A	-	20.4 FT	0.71	2.40	A	-	2.1 FT	0.80	0.46	1.30	A	-	20.4 FT	-
		TNAG RT5A	45.00	-	1.22	54.95	1.40	0.46	1.23	A	-	20.4 FT	0.71	2.49	A	-	2.1 FT	0.80	0.46	1.22	A	-	20.4 FT	-
		TNAG RT5B	45.00	-	1.19	53.44	1.40	0.46	1.19	A	-	20.4 FT	0.71	2.27	A	-	2.1 FT	0.80	0.46	1.19	A	-	20.4 FT	-
		TNT6A	41.60	-	1.29	53.86	1.40	0.46	1.30	A	-	20.4 FT	0.71	2.85	A	-	2.1 FT	0.80	0.46	1.29	A	-	20.4 FT	-
TNT7A	42.00	-	1.33	55.70	1.40	0.46	1.33	A	-	20.4 FT	0.71	2.61	A	-	2.1 FT	0.80	0.46	1.33	A	-	20.4 FT	-		
TNT7B	42.00	-	1.35	56.75	1.40	0.46	1.36	A	-	20.4 FT	0.71	2.52	A	-	2.1 FT	0.80	0.46	1.35	A	-	20.4 FT	-		

NOTES:

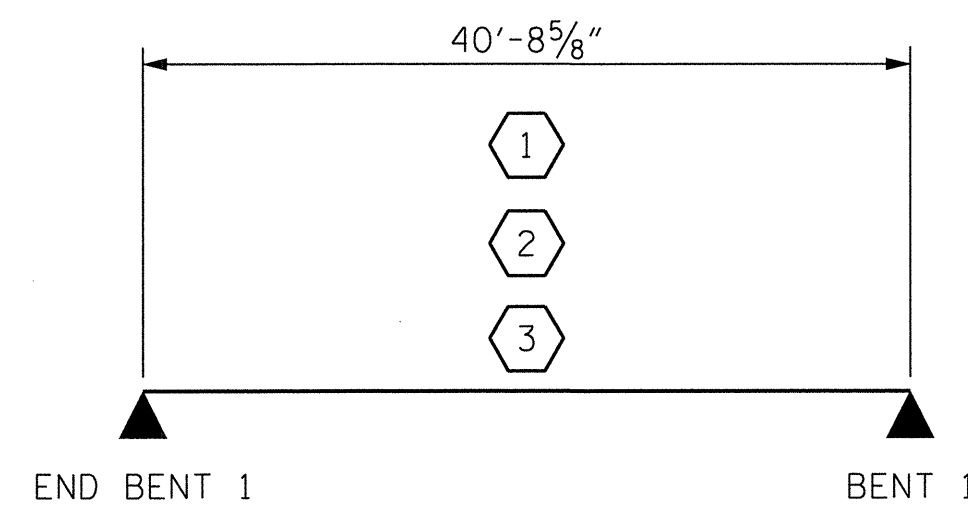
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III 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-5522  
RUTHERFORD COUNTY  
 STATION: 21+10.210 -L-

SHEET 1 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 LRFR SUMMARY FOR  
 PRESTRESSED  
 CONCRETE CORED SLABS  
 120° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			30

STD. NO. LRFR1

ASSEMBLED BY : MAF	DATE : 12/23/11
CHECKED BY : HLW	DATE : 12/23/11
DRAWN BY : MAA 1/08	REV. 11/12/08RRR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM

SPAN B

LOAD FACTORS:

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

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER				
						MOMENT					SHEAR					MOMENT									
						LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		
DESIGN LOAD RATING	HL-93 (INVENTORY)	-	①	1.15	-	1.75	0.203	1.15	B	-	53.6 FT	0.384	2.96	B	-	3.3 FT	0.80	0.68	1.42	B	-	53.6 FT	-		
	HL-93 (OPERATING)	-	-	1.49	-	1.35	0.203	1.49	B	-	53.6 FT	0.384	3.84	B	-	3.3 FT	--	--	--	B	-	53.6 FT	-		
	HS-20 (INVENTORY)	36.00	②	1.63	58.53	1.75	0.203	1.63	B	-	53.6 FT	0.384	4.08	B	-	3.3 FT	0.80	0.68	2.01	B	-	53.6 FT	-		
	HS-20 (OPERATING)	36.00	-	2.11	75.87	1.35	0.203	2.11	B	-	53.6 FT	0.384	5.29	B	-	3.3 FT	--	--	--	B	-	53.6 FT	-		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.50	-	4.82	65.09	1.40	0.203	4.87	B	-	53.6 FT	0.384	12.69	B	-	3.3 FT	0.80	0.68	4.82	B	-	53.6 FT	-	
		SNGAR BS2	20.00	-	3.48	69.51	1.40	0.203	3.50	B	-	53.6 FT	0.384	8.84	B	-	3.3 FT	0.80	0.68	3.48	B	-	53.6 FT	-	
		SNAG RIS2	22.00	-	3.24	71.24	1.40	0.203	3.27	B	-	53.6 FT	0.384	8.15	B	-	3.3 FT	0.80	0.68	3.24	B	-	53.6 FT	-	
		SNCOT TS3	27.25	-	2.40	65.28	1.40	0.203	2.42	B	-	53.6 FT	0.384	6.32	B	-	3.3 FT	0.80	0.68	2.40	B	-	53.6 FT	-	
		SNAG GRS4	34.93	-	1.95	68.28	1.40	0.203	1.97	B	-	53.6 FT	0.384	5.11	B	-	3.3 FT	0.80	0.68	1.95	B	-	53.6 FT	-	
		SNS5A	35.55	-	1.92	68.09	1.40	0.203	1.93	B	-	53.6 FT	0.384	5.11	B	-	3.3 FT	0.80	0.68	1.92	B	-	53.6 FT	-	
		SNS6A	39.95	-	1.74	69.50	1.40	0.203	1.75	B	-	53.6 FT	0.384	4.63	B	-	3.3 FT	0.80	0.68	1.74	B	-	53.6 FT	-	
	TRUCK TRACTOR SEMI-TRAILER (T/S/T)	TNAG RIT3	33.00	-	2.12	69.80	1.40	0.203	2.13	B	-	53.6 FT	0.384	5.54	B	-	3.3 FT	0.80	0.68	2.12	B	-	53.6 FT	-	
		TNT4A	33.08	-	2.12	70.07	1.40	0.203	2.14	B	-	53.6 FT	0.384	5.45	B	-	3.3 FT	0.80	0.68	2.12	B	-	53.6 FT	-	
		TNAG RIT4	43.00	-	1.68	72.40	1.40	0.203	1.70	B	-	53.6 FT	0.384	4.29	B	-	3.3 FT	0.80	0.68	1.68	B	-	53.6 FT	-	
		TNAG RT5A	45.00	-	1.60	71.79	1.40	0.203	1.61	B	-	53.6 FT	0.384	4.20	B	-	3.3 FT	0.80	0.68	1.60	B	-	53.6 FT	-	
		TNAG RT5B	45.00	-	③	1.58	71.19	1.40	0.203	1.60	B	-	53.6 FT	0.384	4.09	B	-	3.3 FT	0.80	0.68	1.58	B	-	53.6 FT	-
		TNT6A	41.60	-	1.72	71.39	1.40	0.203	1.73	B	-	53.6 FT	0.384	4.67	B	-	3.3 FT	0.80	0.68	1.72	B	-	53.6 FT	-	
		TNT7A	42.00	-	1.71	71.99	1.40	0.203	1.73	B	-	53.6 FT	0.384	4.59	B	-	3.3 FT	0.80	0.68	1.71	B	-	53.6 FT	-	
TNT7B	42.00	-	1.75	73.57	1.40	0.203	1.77	B	-	53.6 FT	0.384	4.42	B	-	3.3 FT	0.80	0.68	1.75	B	-	53.6 FT	-			

NOTES:

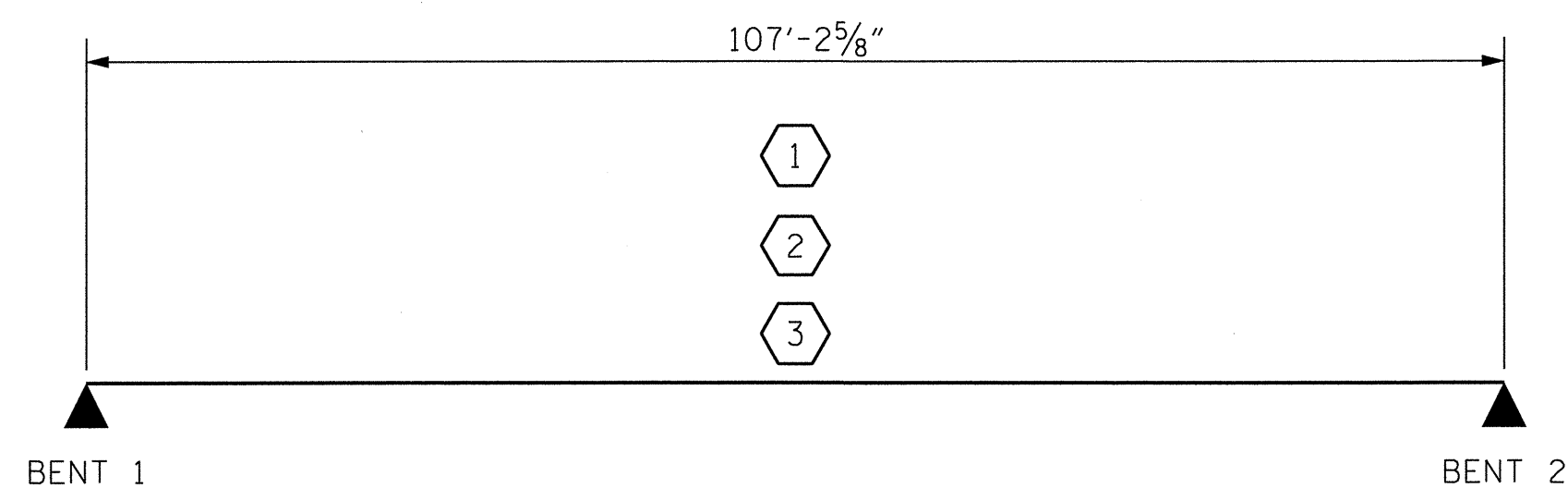
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

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

①	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-5522  
RUTHERFORD COUNTY  
STATION: 21+10.210 -L-

SHEET 2 OF 3



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
LRFR SUMMARY FOR  
PRECAST CONCRETE  
BOX BEAMS  
120° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			30

STD. NO. LRFR1

ASSEMBLED BY: MAF	DATE: 12/23/11
CHECKED BY: HLW	DATE: 12/23/11
DRAWN BY: MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY: GM/DI 2/08	REV. 10/1/11 MAA/GM

\*\*\*\*\*SYSTEM\*\*\*\*\*  
\*\*\*\*\*DCN\*\*\*\*\*  
\*\*\*\*\*USERNAME\*\*\*\*\*

SPAN C

LOAD FACTORS:

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

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	LIVE-LOAD FACTORS ( $\gamma_{LL}$ )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	-	①	1.08	-	1.75	0.46	1.08	C	-	19.8 FT	0.71	1.98	C	-	2.1 FT	0.80	0.46	1.35	C	-	19.8 FT	-	
	HL-93 (OPERATING)	-	-	1.39	-	1.35	0.46	1.39	C	-	19.8 FT	0.71	2.56	C	-	2.1 FT	-	-	-	-	-	-	-	
	HS-20 (INVENTORY)	36.00	②	1.34	48.23	1.75	0.46	1.34	C	-	19.8 FT	0.71	2.30	C	-	2.1 FT	0.80	0.46	1.68	C	-	19.8 FT	-	
	HS-20 (OPERATING)	36.00	-	1.74	62.53	1.35	0.46	1.74	C	-	19.8 FT	0.71	2.98	C	-	2.1 FT	-	-	-	-	-	-	-	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.50	-	3.12	42.11	1.40	0.46	3.12	C	-	19.8 FT	0.71	6.13	C	-	2.1 FT	0.80	0.46	3.12	C	-	19.8 FT	-
		SNGAR BS2	20.00	-	2.53	50.64	1.40	0.46	2.53	C	-	19.8 FT	0.71	4.56	C	-	2.1 FT	0.80	0.46	2.54	C	-	19.8 FT	-
		SNAG RIS2	22.00	-	2.47	54.42	1.40	0.46	2.47	C	-	19.8 FT	0.71	4.31	C	-	2.1 FT	0.80	0.46	2.48	C	-	19.8 FT	-
		SNCOT TS3	27.25	-	1.56	42.50	1.40	0.46	1.56	C	-	19.8 FT	0.71	3.09	C	-	2.1 FT	0.80	0.46	1.56	C	-	19.8 FT	-
		SNAG GRS4	34.93	-	1.41	49.13	1.40	0.46	1.41	C	-	19.8 FT	0.71	2.71	C	-	2.1 FT	0.80	0.46	1.41	C	-	19.8 FT	-
		SNS5A	35.55	-	1.37	48.58	1.40	0.46	1.37	C	-	19.8 FT	0.71	2.82	C	-	2.1 FT	0.80	0.46	1.37	C	-	19.8 FT	-
		SNS6A	39.95	-	1.30	51.95	1.40	0.46	1.30	C	-	19.8 FT	0.71	2.64	C	-	2.1 FT	0.80	0.46	1.31	C	-	19.8 FT	-
		SNS7B	42.00	③	1.24	52.10	1.40	0.46	1.24	C	-	19.8 FT	0.71	2.69	C	-	2.1 FT	0.80	0.46	1.24	C	-	19.8 FT	-
	TRUCK TRACTOR SEMI-TRAILER (T/S/T)	TNAG RIT3	33.00	-	1.60	52.80	1.40	0.46	1.60	C	-	19.8 FT	0.71	3.10	C	-	2.1 FT	0.80	0.46	1.61	C	-	19.8 FT	-
		TNT4A	33.08	-	1.62	53.73	1.40	0.46	1.62	C	-	19.8 FT	0.71	2.95	C	-	2.1 FT	0.80	0.46	1.63	C	-	19.8 FT	-
		TNAG RIT4	43.00	-	1.38	59.51	1.40	0.46	1.38	C	-	19.8 FT	0.71	2.46	C	-	2.1 FT	0.80	0.46	1.39	C	-	19.8 FT	-
		TNAG RT5A	45.00	-	1.30	58.69	1.40	0.46	1.30	C	-	19.8 FT	0.71	2.54	C	-	2.1 FT	0.80	0.46	1.31	C	-	19.8 FT	-
		TNAG RT5B	45.00	-	1.27	56.97	1.40	0.46	1.27	C	-	19.8 FT	0.71	2.32	C	-	2.1 FT	0.80	0.46	1.27	C	-	19.8 FT	-
		TNT6A	41.60	-	1.38	57.39	1.40	0.46	1.38	C	-	19.8 FT	0.71	2.88	C	-	2.1 FT	0.80	0.46	1.38	C	-	19.8 FT	-
TNT7A	42.00	-	1.42	59.47	1.40	0.46	1.42	C	-	19.8 FT	0.71	2.66	C	-	2.1 FT	0.80	0.46	1.42	C	-	19.8 FT	-		
TNT7B	42.00	-	1.44	60.46	1.40	0.46	1.44	C	-	19.8 FT	0.71	2.56	C	-	2.1 FT	0.80	0.46	1.44	C	-	19.8 FT	-		

NOTES:

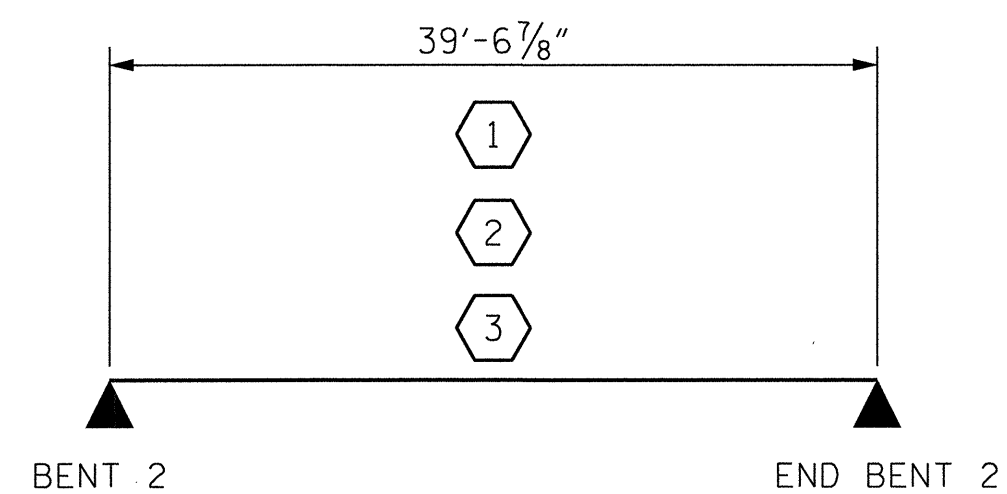
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III 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-5522  
RUTHERFORD COUNTY  
 STATION: 21+10.210 -L-

SHEET 3 OF 3



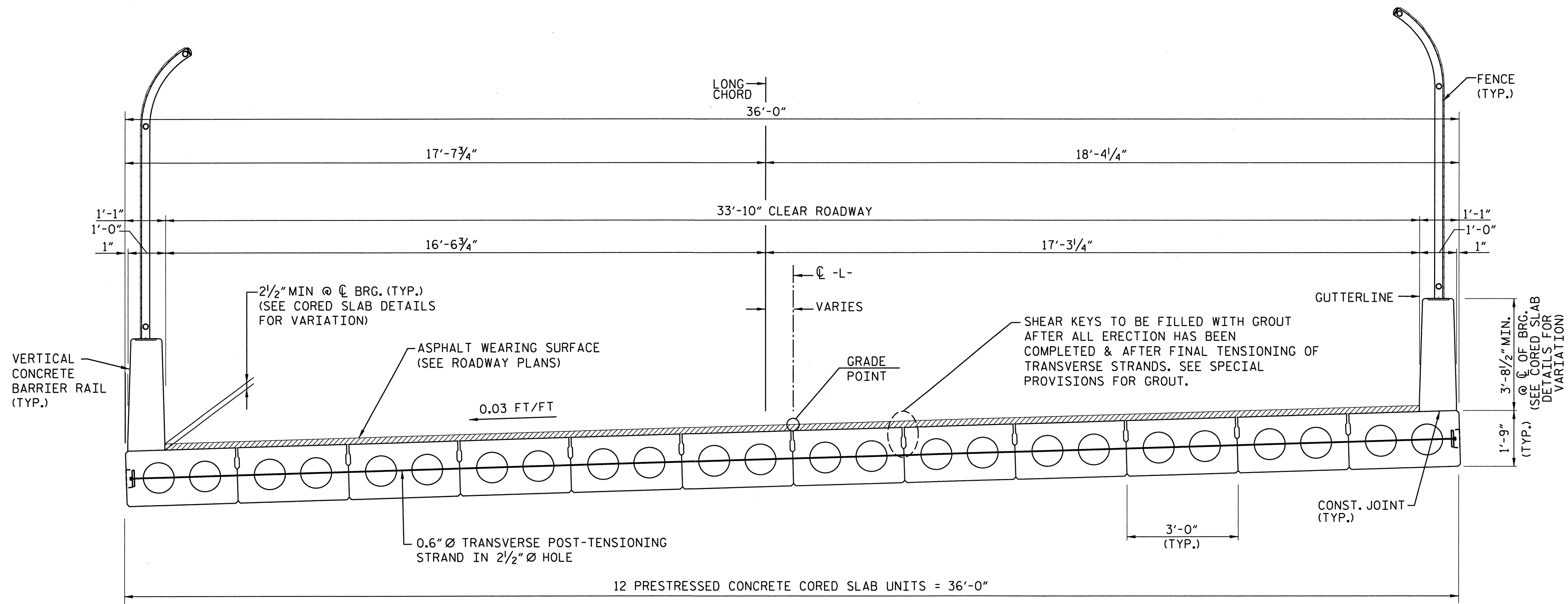
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 LRFR SUMMARY FOR  
 PRESTRESSED  
 CONCRETE CORED SLABS  
 120° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			30

STD. NO. LRFR1

ASSEMBLED BY : MAF	DATE : 12/23/11
CHECKED BY : HLW	DATE : 12/23/11
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM





NOTE: CORED SLAB UNITS ALIGNED PARALLEL TO LONG CHORD.

TYPICAL SECTION - SPANS A & C

CHAIN LINK FENCE	
LEFT FENCE	185.95 LF
RIGHT FENCE	185.95 LF
TOTAL	371.90 LF

**FENCE NOTES**

UNLESS NOTED OTHERWISE, VINYL COAT ALL MATERIALS USED IN THE FABRICATION OF THE CHAIN LINK FENCE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATION M18.1.

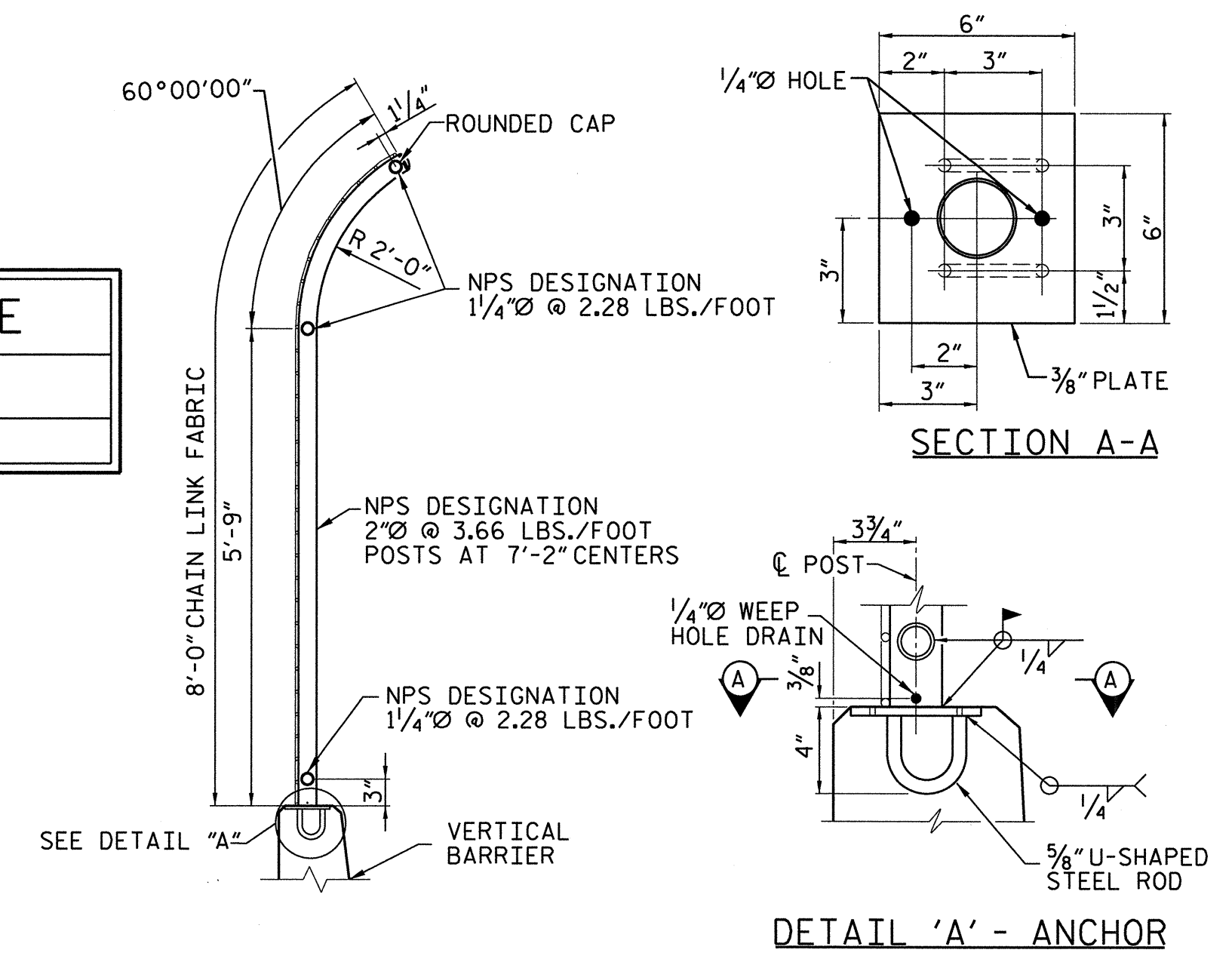
POSTS SHALL BE NPS DESIGNATION 2-INCH DIAMETER, 3.66 LBS./FT, GRADE 1. RAILS SHALL BE NPS DESIGNATION 1 1/4-INCH DIAMETER, 2.28 LBS./FT, GRADE 1.

CHAIN LINK FABRIC SHALL BE 0.148-INCH NOMINAL DIAMETER 2-INCH MESH POLYVINYL CHLORIDE (PVC) COATED STEEL FENCE TYPE IV. COLOR OF PVC COATING TO BE BLACK. TOP SELVAGES SHALL BE KNUCKLED. BOTTOM SELVAGES SHALL BE EITHER KNUCKLED OR TWISTED AND BARBED. TIE FABRIC TO POSTS AND RAILS AT 2 FOOT CENTERS MAXIMUM.

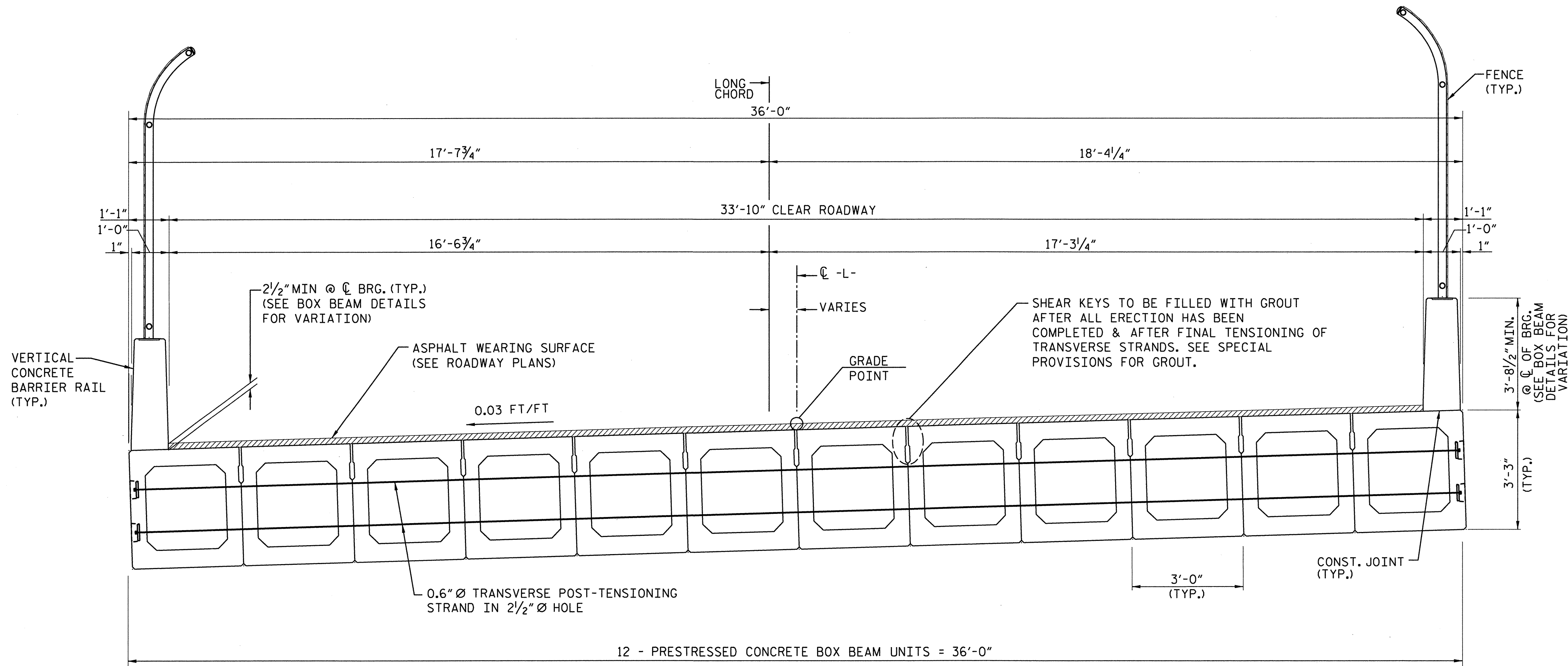
PLACE ANCHOR PLATES PRIOR TO POURING BARRIER CONCRETE. DRILLING OF CONCRETE TO PLACE ANCHOR PLATES IS NOT PERMITTED. ANCHOR PLATES AND U-SHAPED RODS SHALL BE AASHTO M183 OR SAE M 1020 AND GALVANIZED IN ACCORDANCE WITH AASHTO A153. APPLY A VINYL FINISH COAT ON ALL EXPOSED SURFACES OF THE ANCHOR PLATES AFTER THE POSTS ARE IN PLACE.

AFTER INSTALLATION OF THE CHAIN LINK FABRIC, CLEAN ANY DAMAGED AREAS OF THE FENCE COMPONENTS BY WASHING WITH A MINERAL SPIRIT SOLVENT SUFFICIENT TO REMOVE ANY CONTAMINANTS. AFTER CLEANING, APPLY A VINYL WASHING PRIMER TO THE SURFACES WITH DRY FILM THICKNESS OF 0.3 TO 0.5 MIL BEFORE FINAL FINISH COAT APPLICATION.

PAYMENT WILL BE MADE UNDER THE ITEM TITLED "CHAIN LINK FENCE", PER LINEAR FOOT, MEASURED FROM CENTERLINE TO CENTERLINE OF END POSTS. THIS SHALL INCLUDE THE FABRICATION, INSTALLATION AND ALL LABOR, TOOLS, MATERIALS AND INCIDENTALS REQUIRED TO INSTALL THE FENCE IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS.



FENCE DETAILS  
SEE PLAN OF SPAN SHEETS FOR POST LOCATIONS



NOTE: BOX BEAM UNITS ALIGNED PARALLEL TO LONG CHORD.

TYPICAL SECTION - SPAN B



PROJECT NO. R-5522  
RUTHERFORD COUNTY  
STATION: 21+10.21 -L-

**V&M**  
Vaughn & Melton  
Consulting Engineers

Charlotte, North Carolina 704-895-9051  
Tri-Cities, Tennessee 615-546-9800  
Knoxville, Tennessee 615-546-9800  
Middlesboro, Kentucky 606-248-6600  
Asheville, North Carolina 828-253-2796  
Spartanburg, South Carolina 864-574-4775

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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

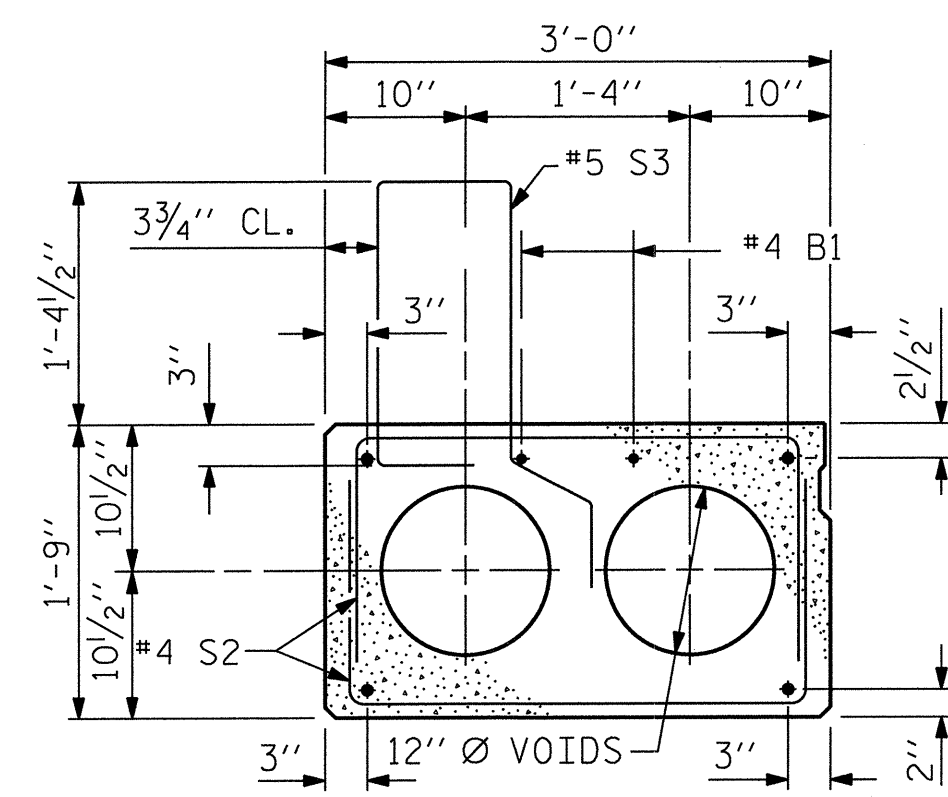
TYPICAL SECTIONS

JAN 2012

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

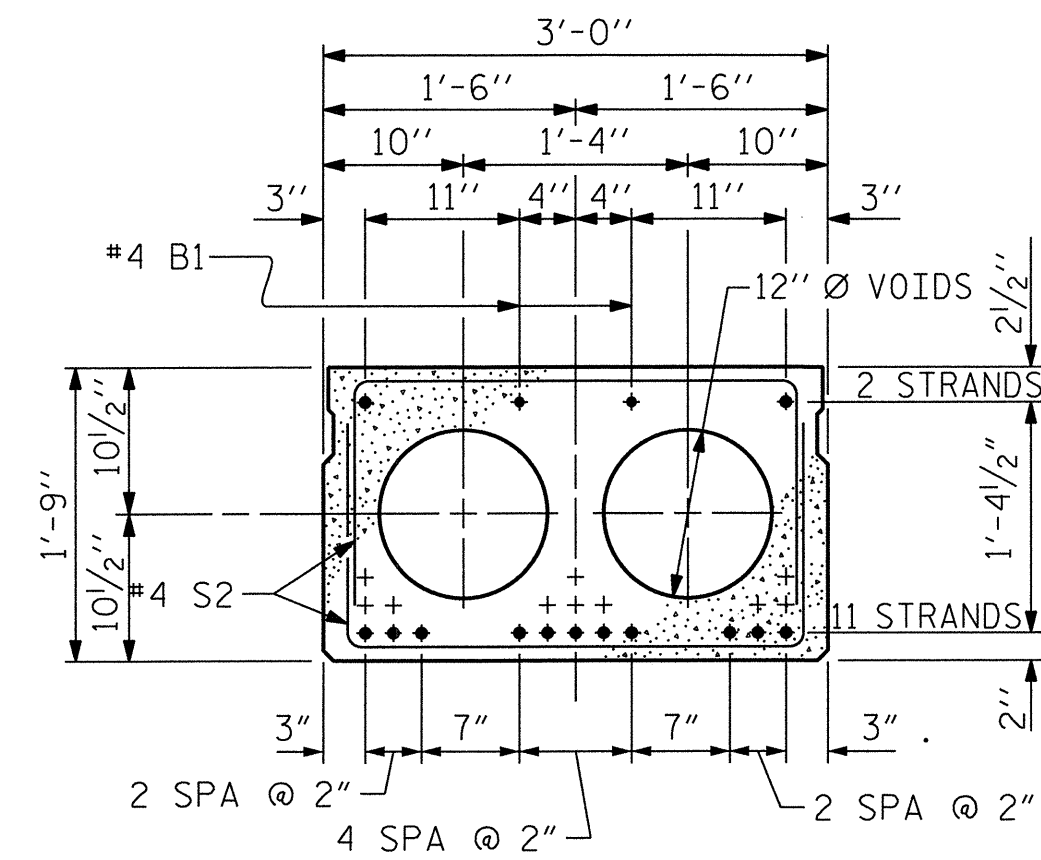
SHEET NO. S-8  
TOTAL SHEETS 30

DWN. BY: MAF DATE: JAN. 2012  
CHKD. BY: HLW DATE: JAN. 2012



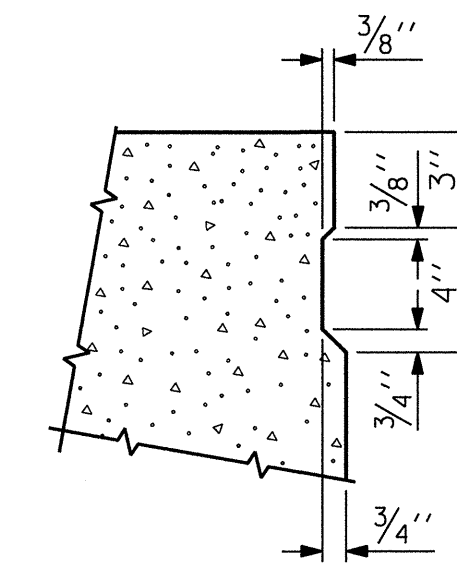
**EXTERIOR SLAB SECTION**

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)



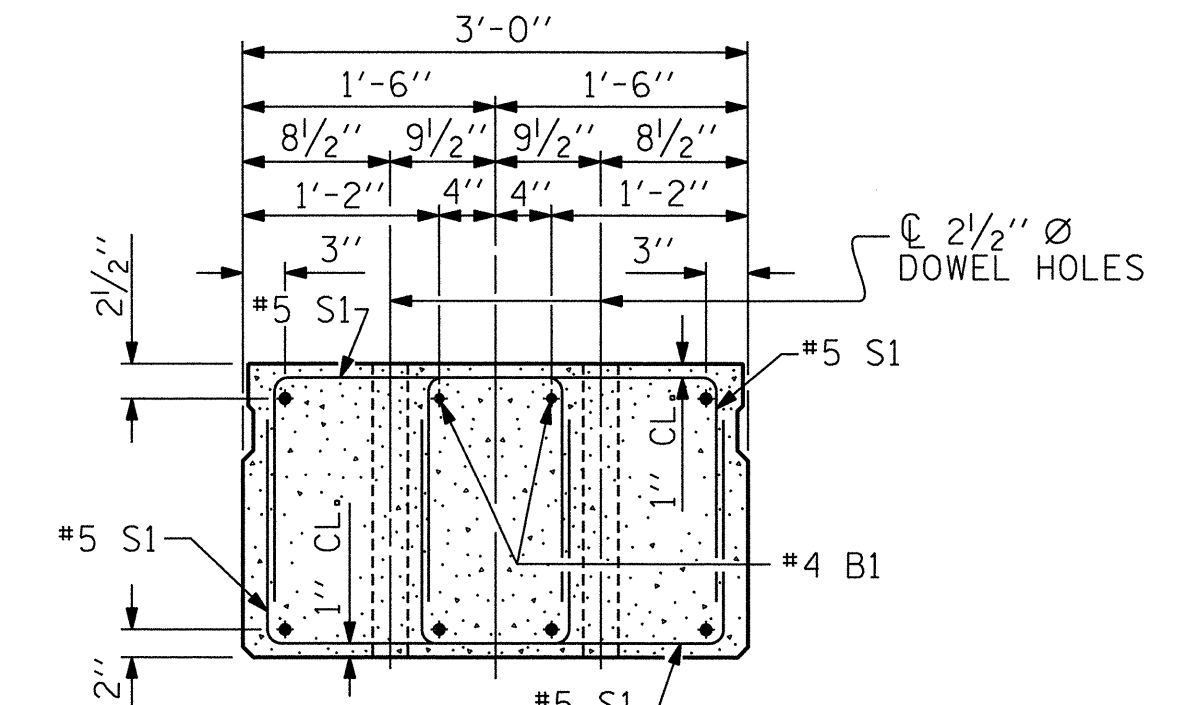
**INTERIOR SLAB SECTION**  
0.6" Ø LOW RELAXATION STRAND LAYOUT

13 STRANDS REQUIRED



**SHEAR KEY DETAIL**

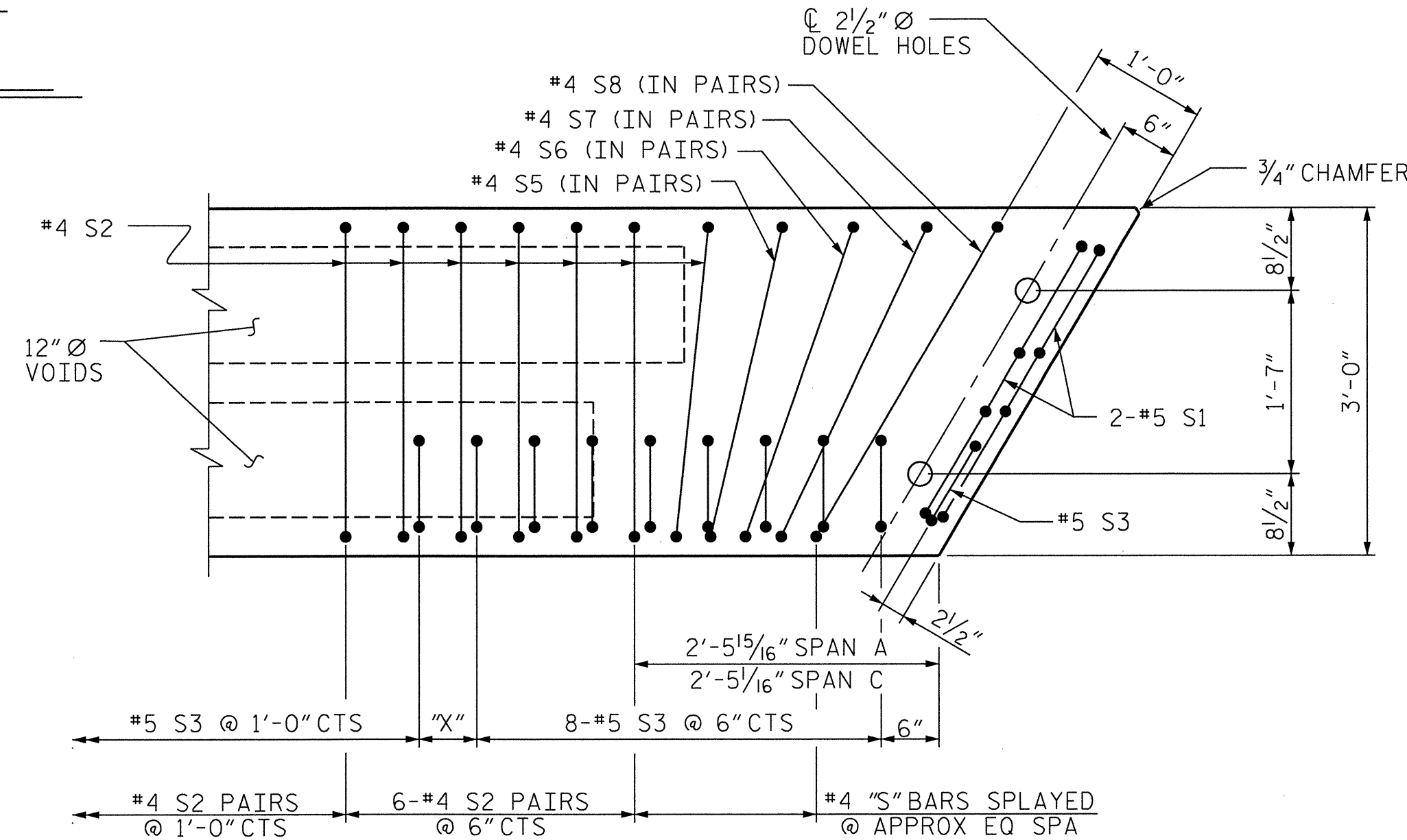
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.



**END ELEVATION**

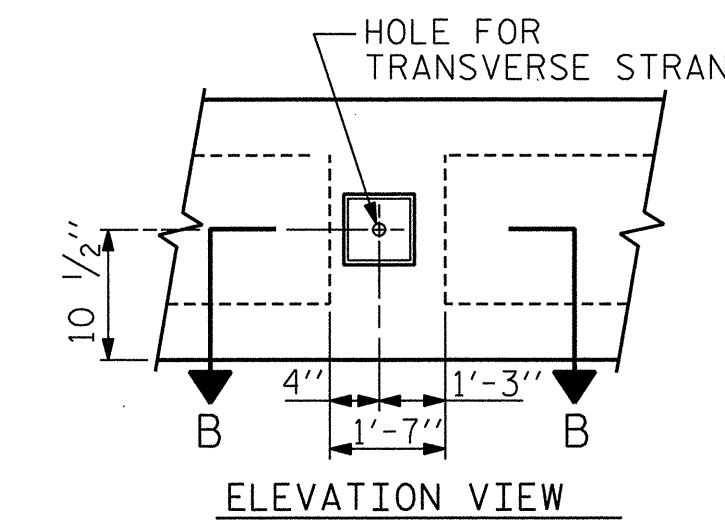
SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB SECTION SHOWN-EXTERIOR SLAB SECTION SIMILAR EXCEPT SHEAR KEY LOCATION.

**TYPICAL CORED SLAB UNIT SECTION**

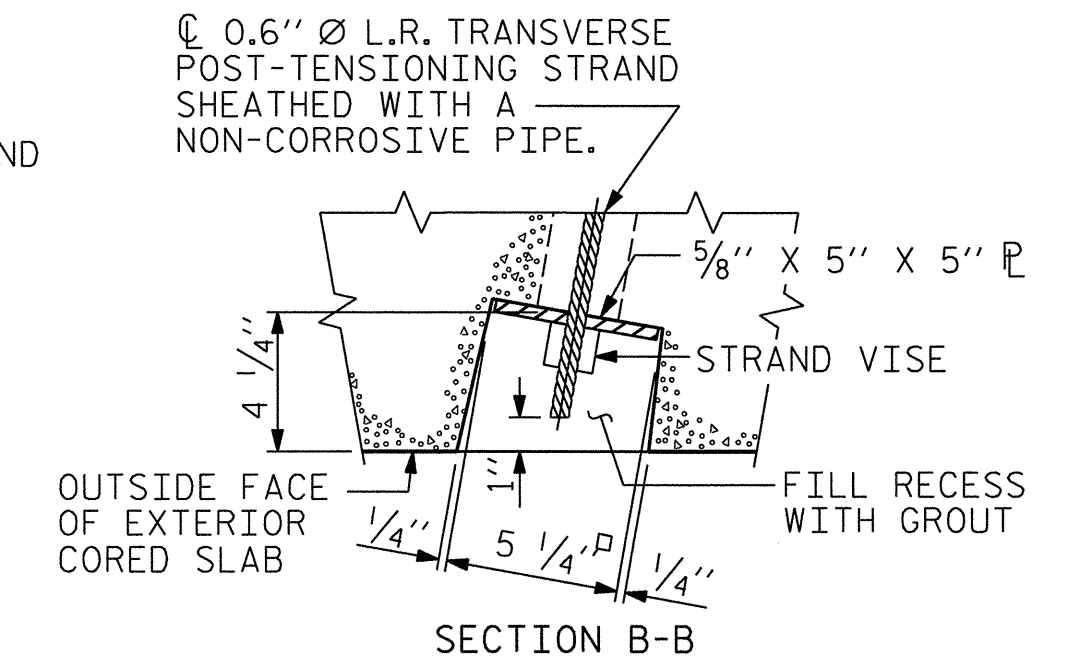


**DETAIL "A"**

NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS  
"X" = 10 5/16" SPAN A, 9 7/16" SPAN C

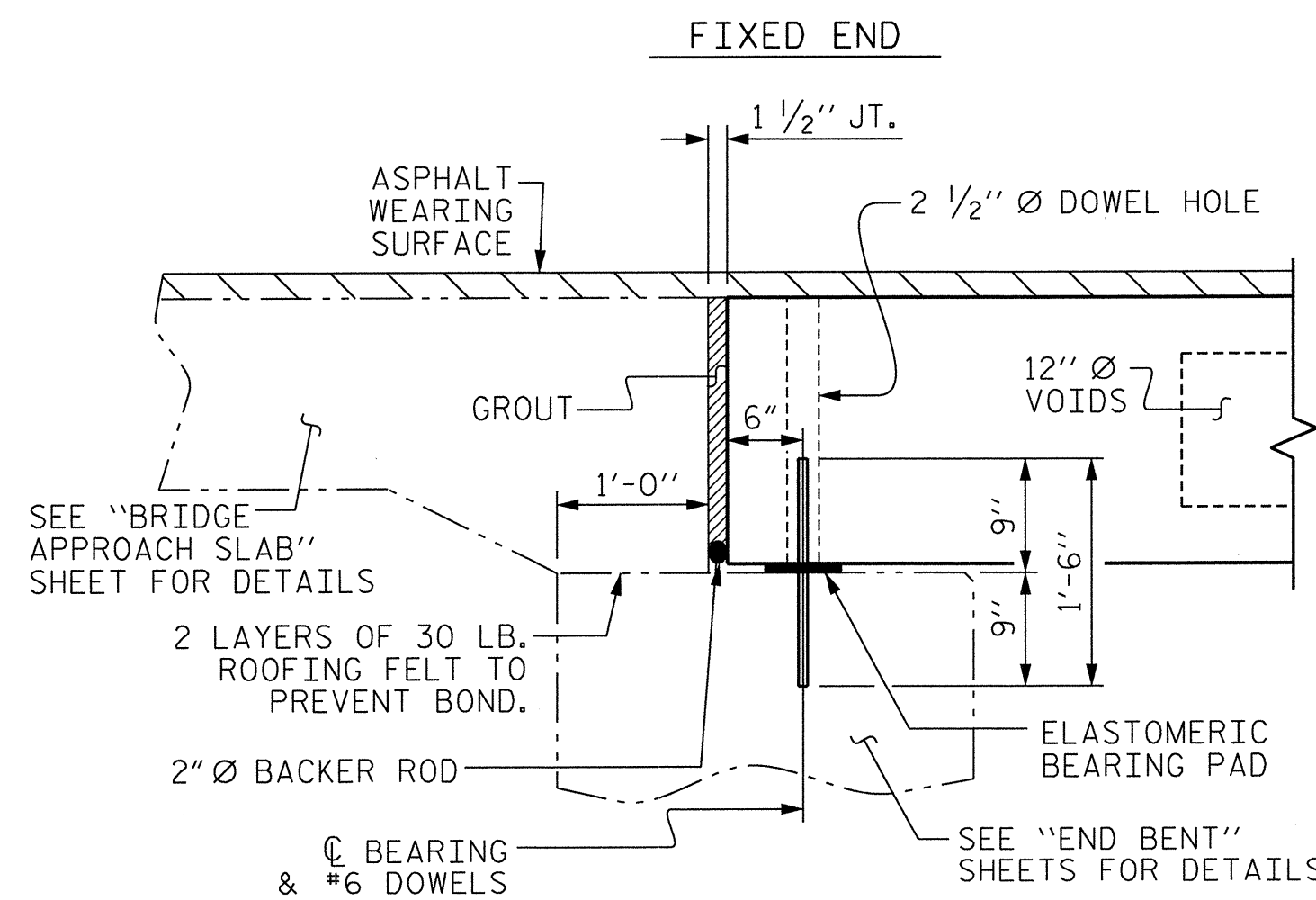


**ELEVATION VIEW**

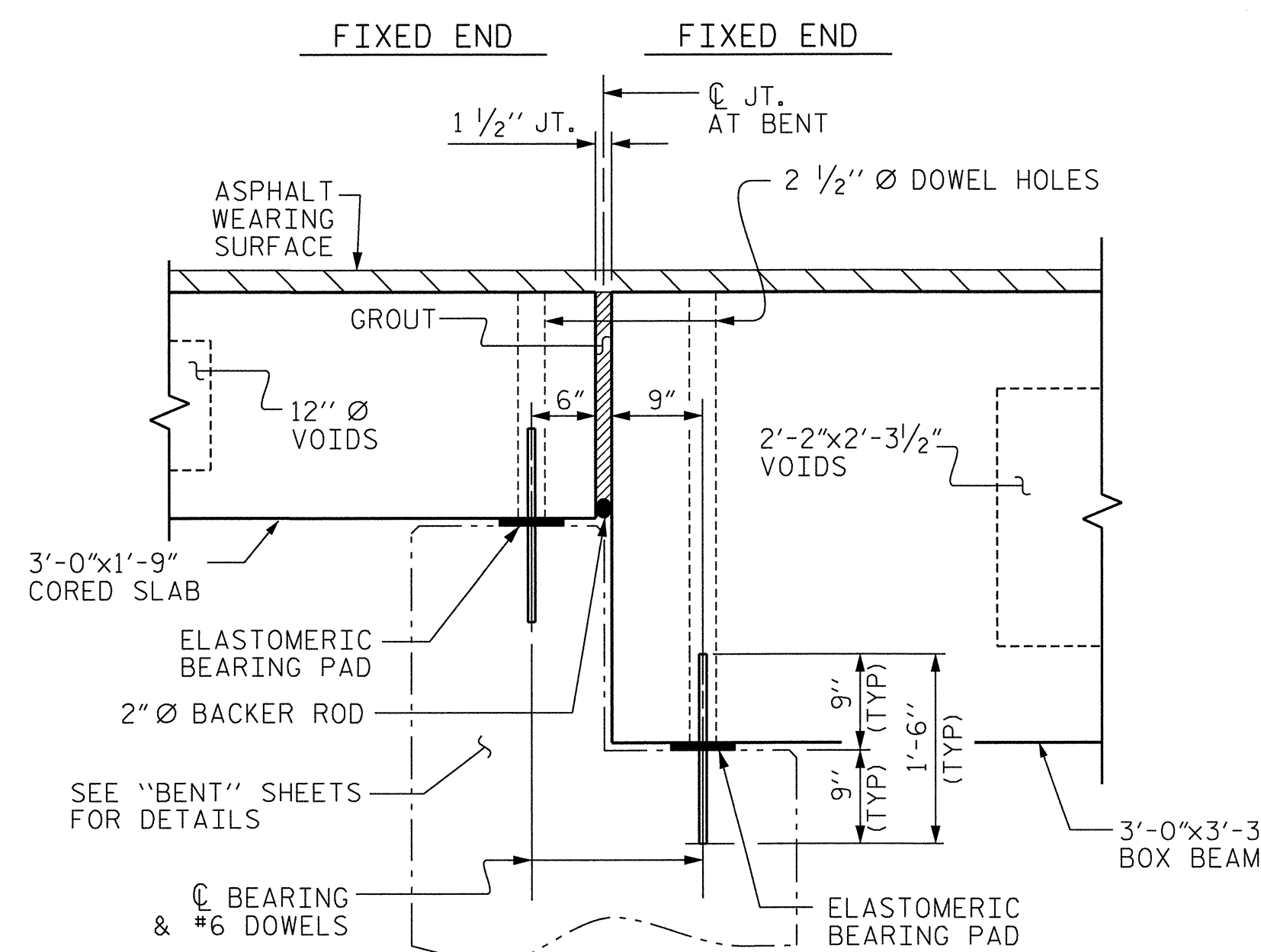


**SECTION B-B**

**GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS**



**SECTION AT END BENT**



**SECTION AT BENT**

ASSEMBLED BY : FRJ	DATE : 12/2011
CHECKED BY : HLW	DATE : 12/2011
DRAWN BY : WJH 4/89	REV. 7/10/01RR RWW/LES
CHECKED BY : FCJ 5/89	REV. 5/1/06R TLA/GM
	REV. 10/1/11 MAA/GM



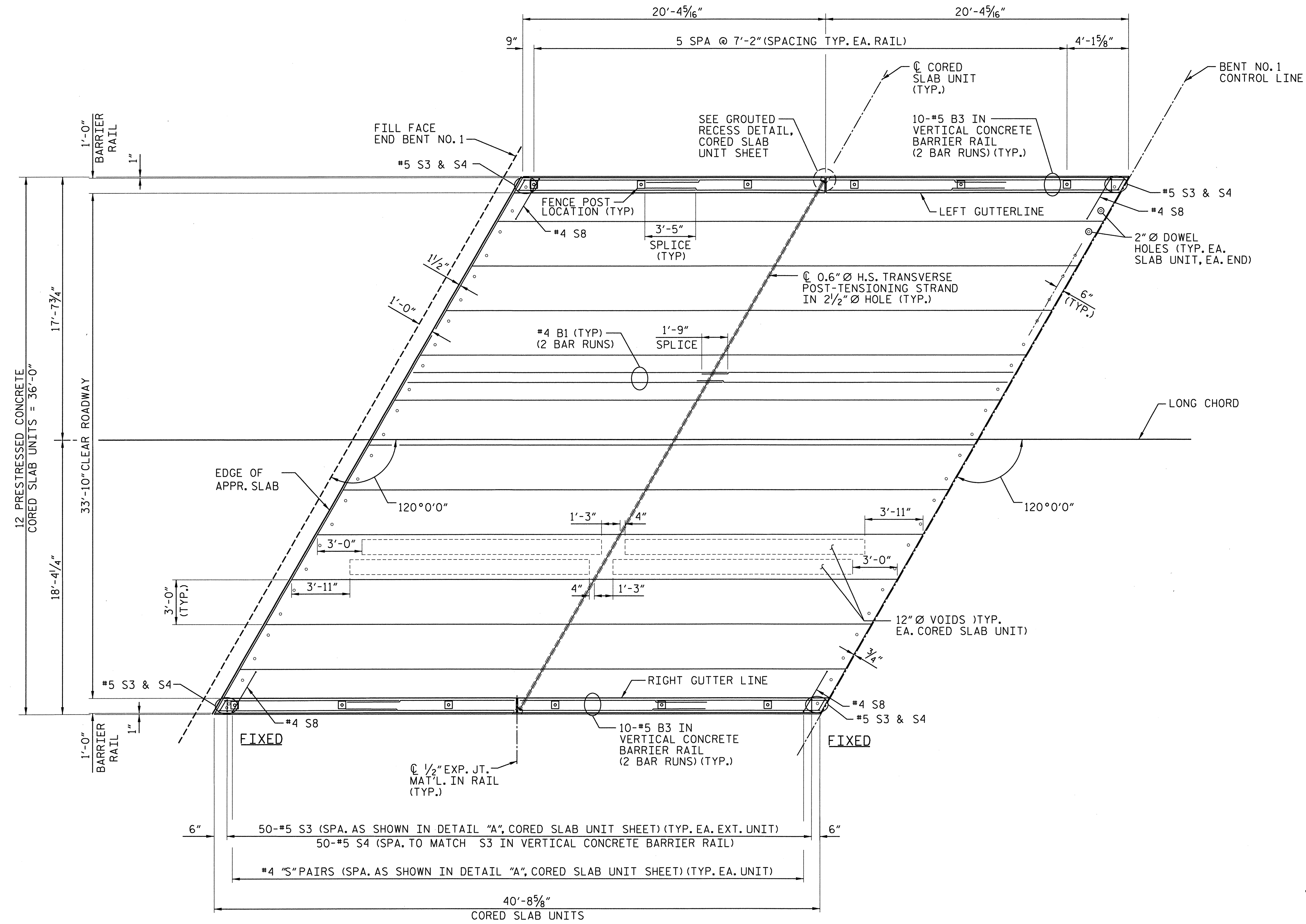
PROJECT NO. R-5522  
RUTHERFORD COUNTY  
STATION: 21+10.21 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 1'-9"  
PRESTRESSED CONCRETE  
CORED SLAB UNIT  
SPANS A & C

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS 30
2			4			

STD. NO. PCS2



**PLAN OF SPAN A**  
 NOTE: CORED SLAB UNITS ARE PARALLEL TO LONG CHORD.



PROJECT NO. R-5522  
RUTHERFORD COUNTY  
 STATION: 21+10.21 -L-

SHEET 2 OF 4

**V&M**  
**Vaughn & Melton**  
 Consulting Engineers

Charlotte, North Carolina 704-899-9051  
 Tri-Cities, Tennessee 423-467-8401  
 Knoxville, Tennessee 606-248-6600  
 Middlesboro, Kentucky 606-248-6600  
 Asheville, North Carolina 828-253-2796  
 Spartanburg, South Carolina 864-574-4775

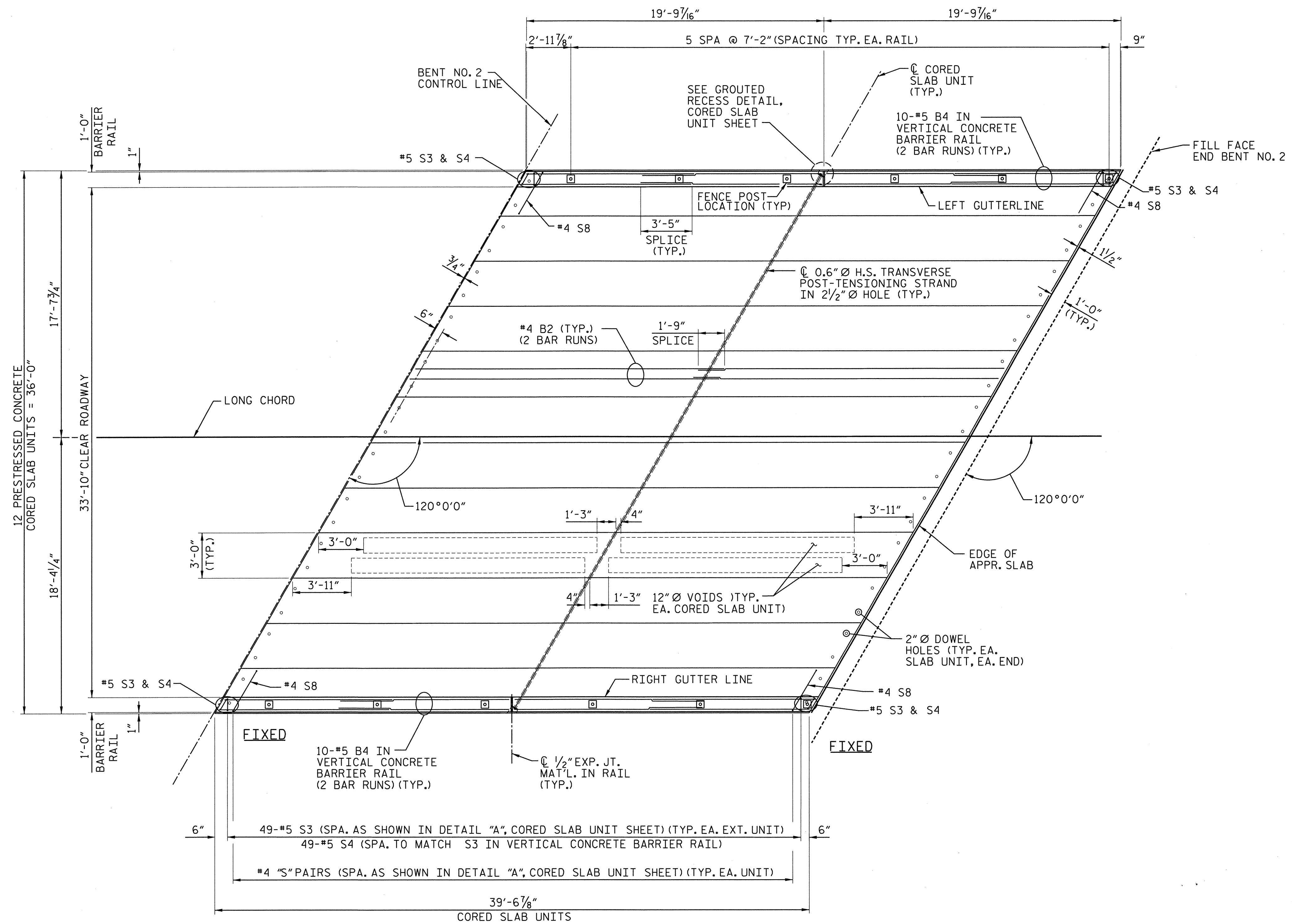
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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**PLAN OF SPAN**  
**33'-10" CLEAR ROADWAY**  
**120° SKEW**  
**SPAN A**

JAN 2012

DWN. BY: MAF		DATE: JAN. 2012				
CHKD. BY: HLW		DATE: JAN. 2012				
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-10
2			4			TOTAL SHEETS 30



**PLAN OF SPAN C**

NOTE: CORED SLAB UNITS ARE PARALLEL TO LONG CHORD.

PROJECT NO. R-5522  
RUTHERFORD COUNTY  
 STATION: 21+10.21 -L-  
 SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

PLAN OF SPAN  
 33'-10" CLEAR ROADWAY  
 120° SKEW  
 SPAN C

JAN 2012

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

S-11  
TOTAL SHEETS 30

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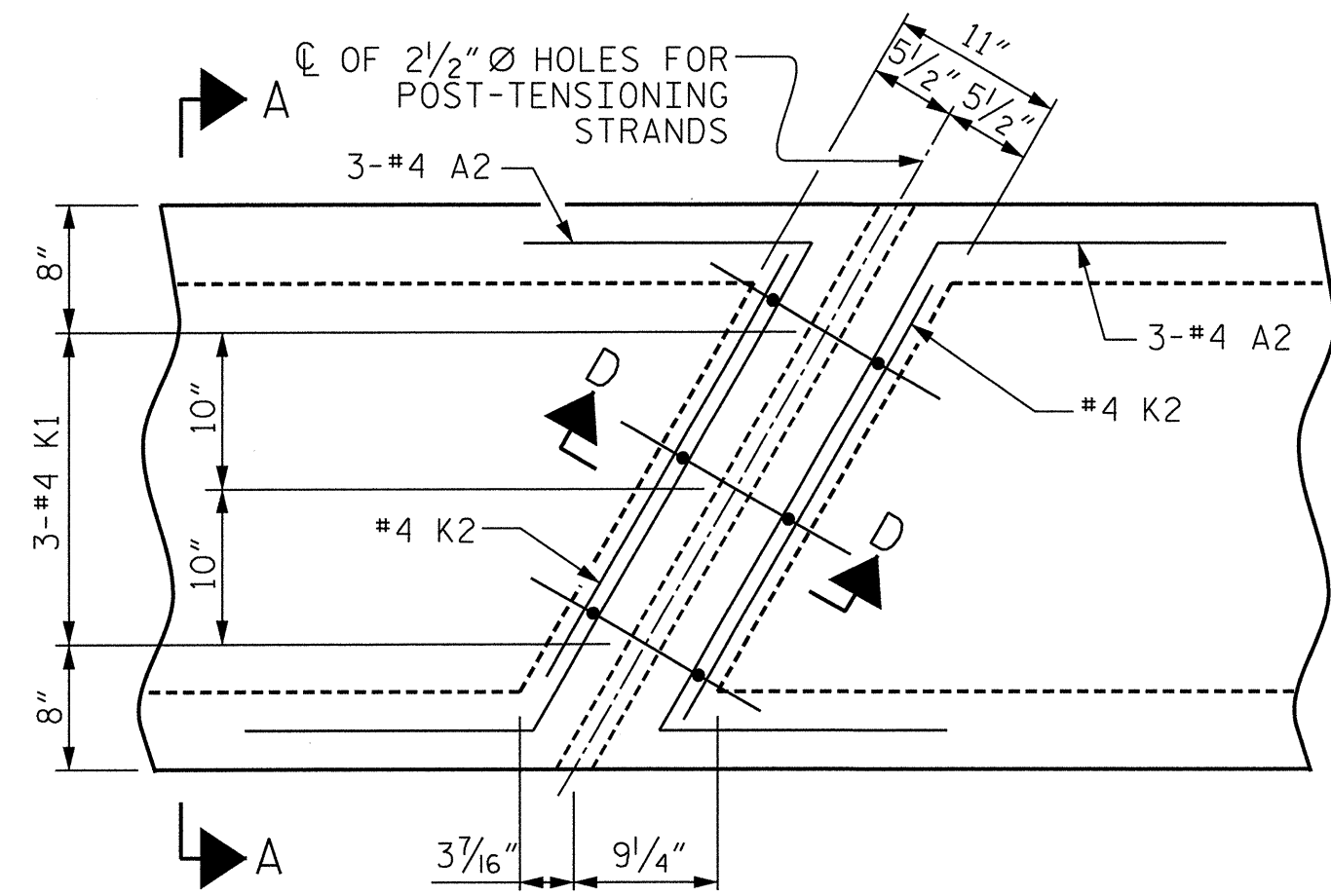
DWN. BY: MAF  
 CHKD. BY: HLW

DATE: JAN. 2012  
 DATE: JAN. 2012

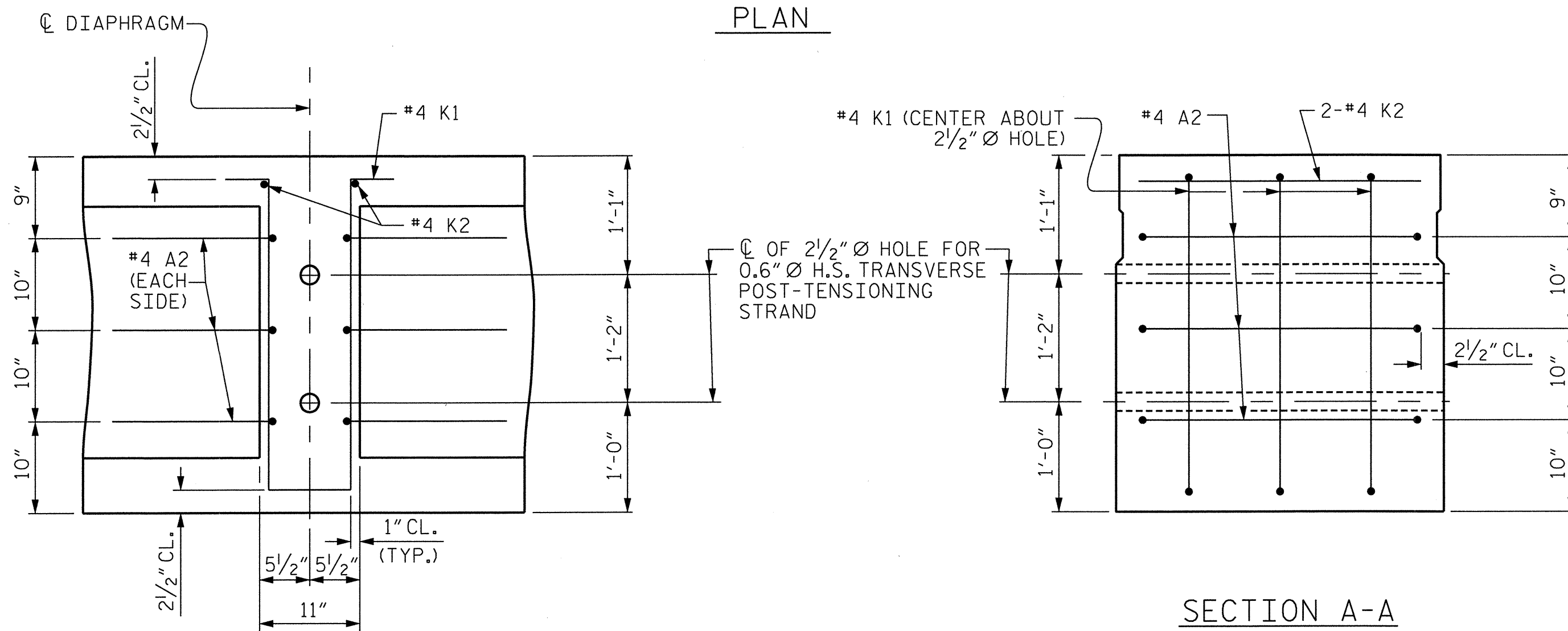








PLAN

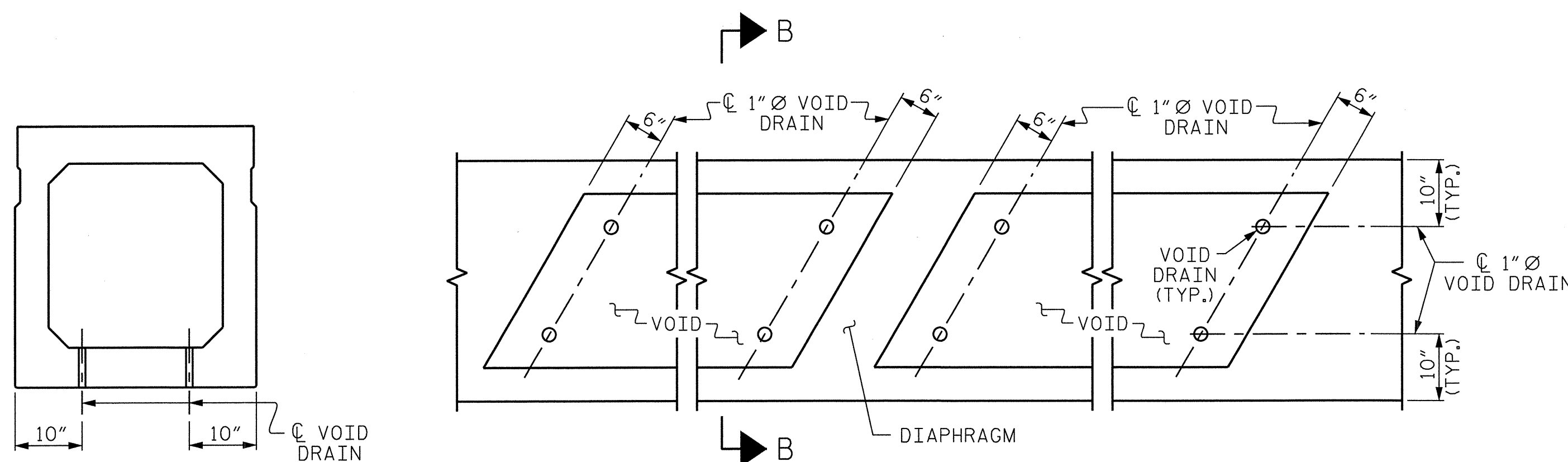


SECTION A-A  
VOIDS NOT SHOWN

SECTION D-D

DOUBLE DIAPHRAGM DETAILS

\*4 "S" BARS NOT SHOWN. \*4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2 1/2" Ø HOLE.

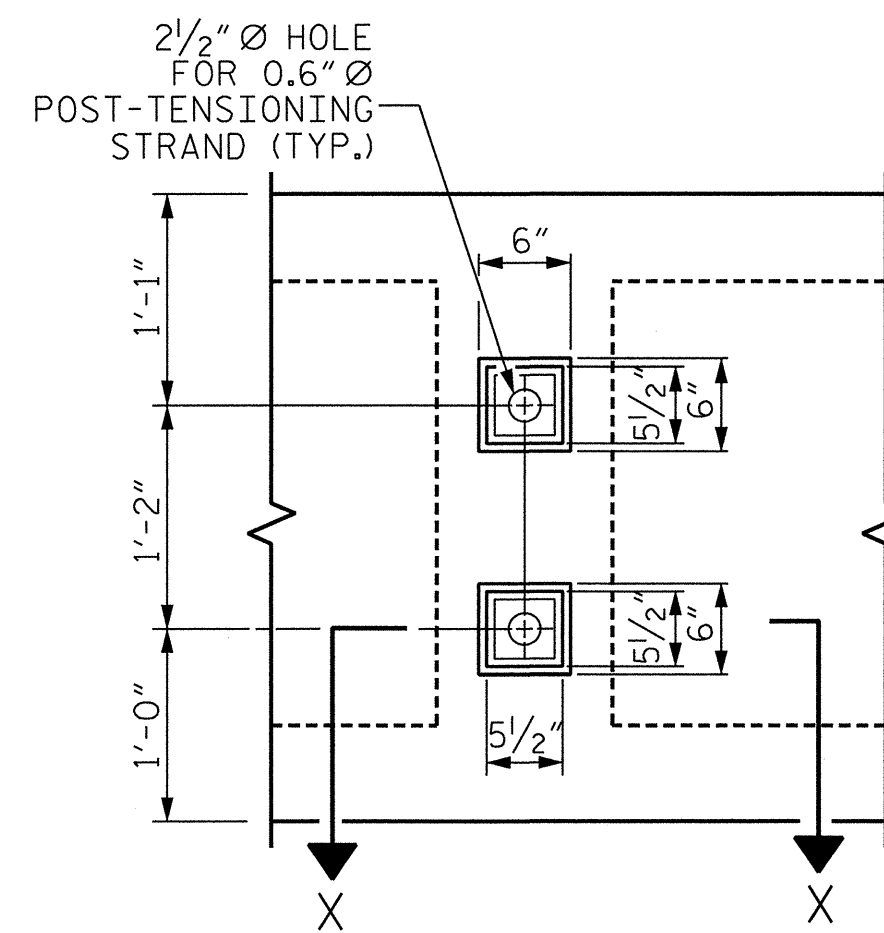


SECTION B-B

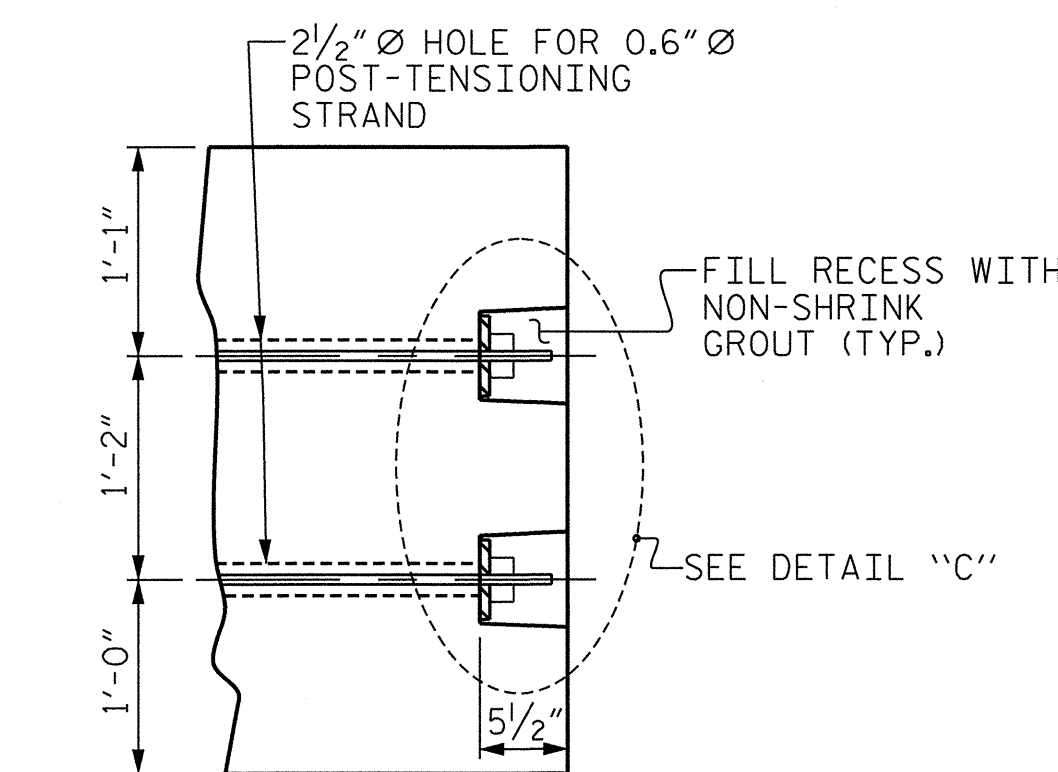
PART PLAN

VOID DRAIN DETAILS

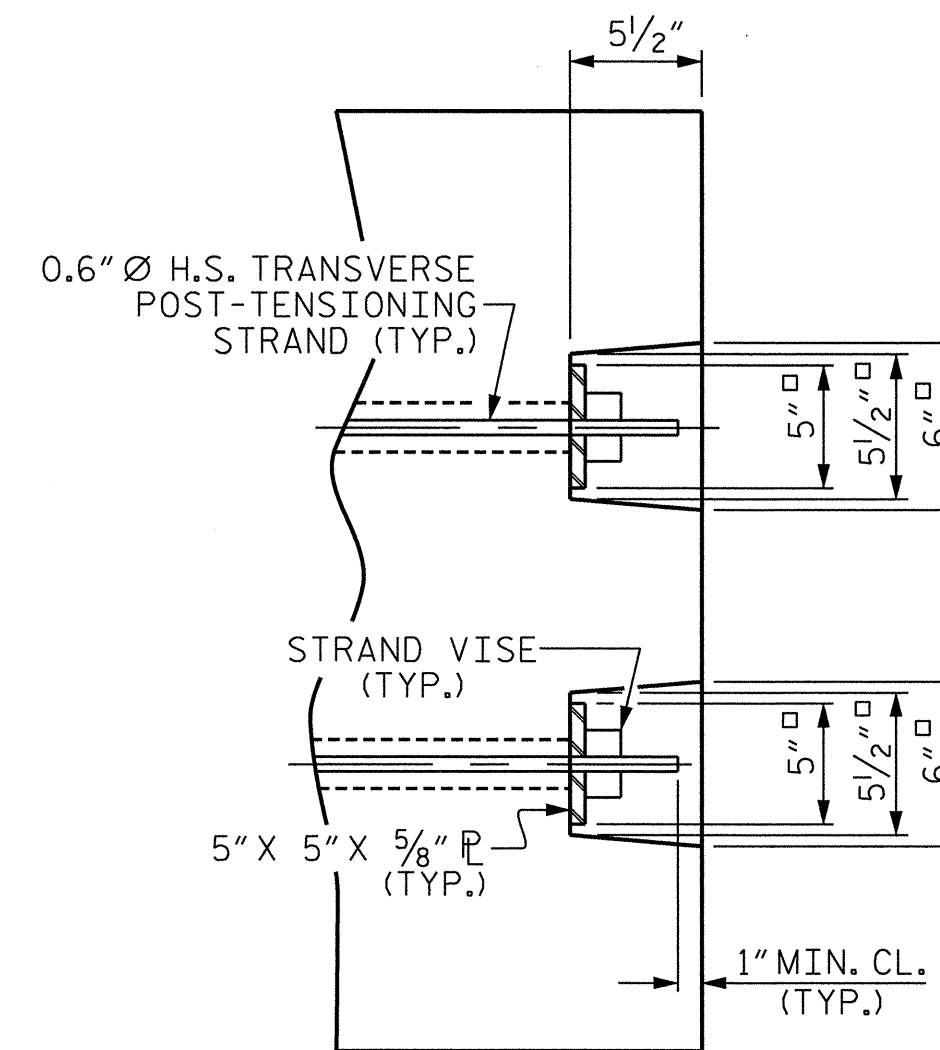
(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)



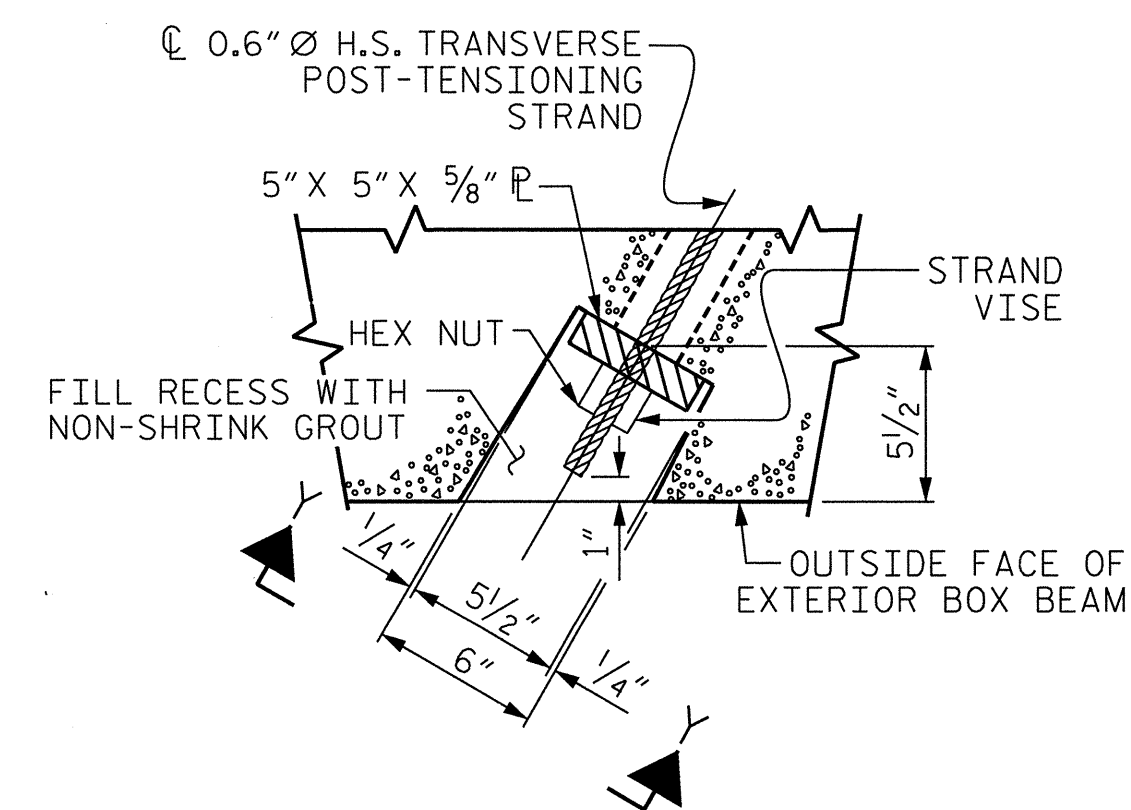
VIEW Y-Y  
SHOWING ELEVATION VIEW OF GROUDED RECESS



PART SECTION AT RECESS



DETAIL "C"



SECTION X-X

GROUDED RECESS DETAIL AT  
END OF POST-TENSIONED STRANDS  
OF EXTERIOR BOX BEAM

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 3'-3"
	0.6" Ø L.R. STRAND
	SPAN "B"
CAMBER (BEAM ALONE IN PLACE)	2 1/4" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD **	1 7/16" ↓
FINAL CAMBER	1 3/16" ↑

\*\* INCLUDES FUTURE WEARING SURFACE

PROJECT NO. R-5522  
RUTHERFORD COUNTY  
STATION: 21+10.210 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 3'-3"  
PRESTRESSED CONCRETE  
BOX BEAM UNIT  
SPAN B



ASSEMBLED BY : FRJ	DATE : 12/2011
CHECKED BY : HLW	DATE : 12/2011
DRAWN BY : TLA 5/05	ADDED 7/11/05
CHECKED BY : GM 6/05	REV. 5/1/06
	REV. 10/1/11
	TLA/GM
	MAA/GM

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2			4			30



NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR BOX BEAM.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH GROUT.

THE 2" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6500 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.

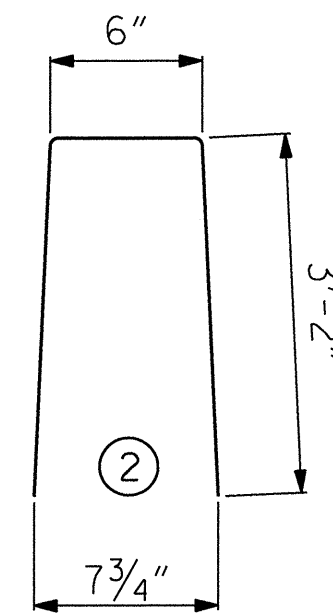
APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

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. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.

THE HEIGHT OF THE BARRIER RAIL VARIES WHILE THE TOP OF THE RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE.

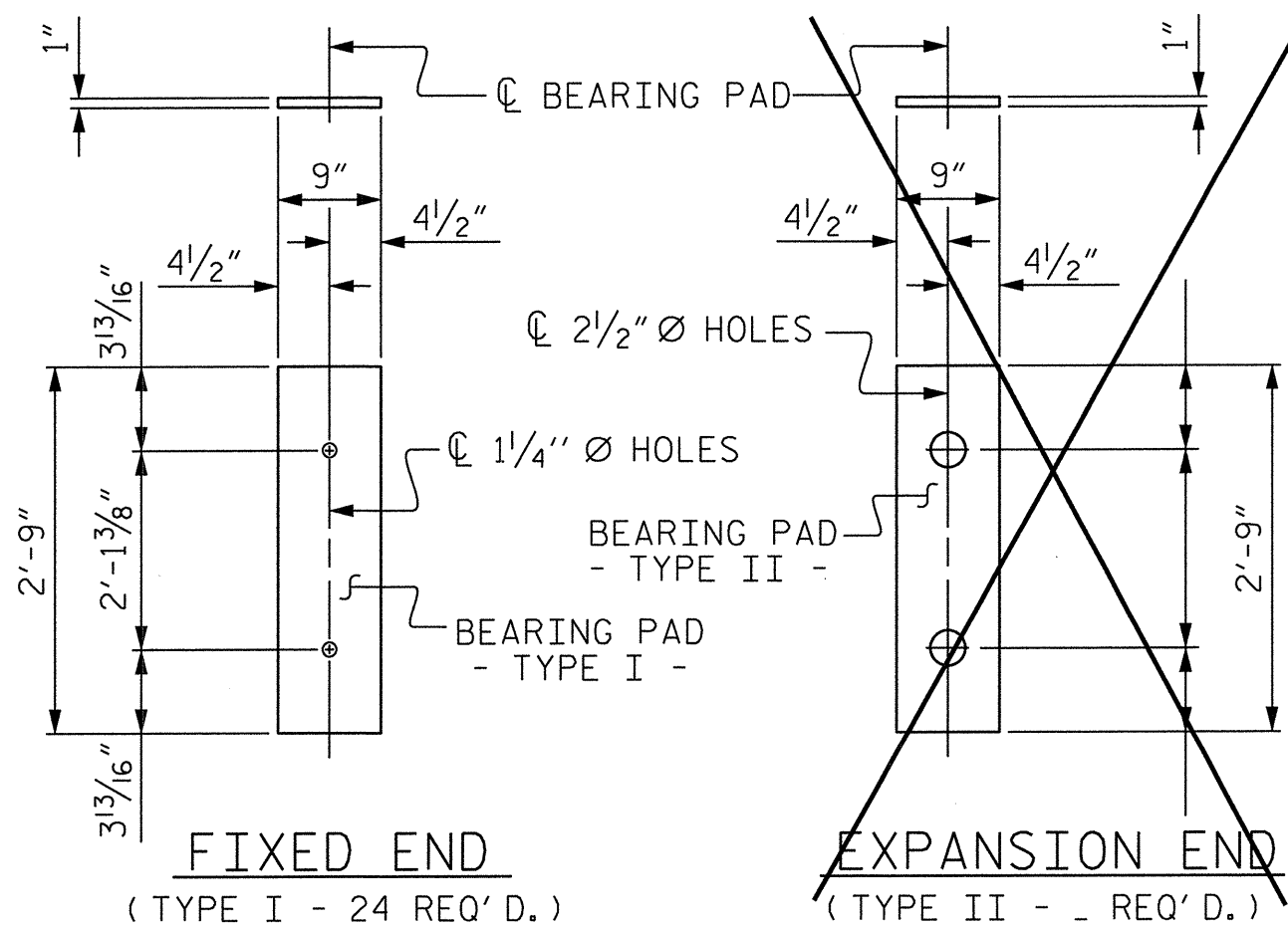
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF RAILS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
SPAN B						
* B10	200	200	#5	STR	13'-3"	2764
* S9	286	286	#5	2	6'-10"	2038
* EPOXY COATED REINFORCING STEEL LBS.						4802
CLASS AA CONCRETE CU.YDS.						27.6
TOTAL LIN. FT. OF VERTICAL CONCRETE BARRIER RAIL						214.73



ELASTOMERIC BEARING DETAILS

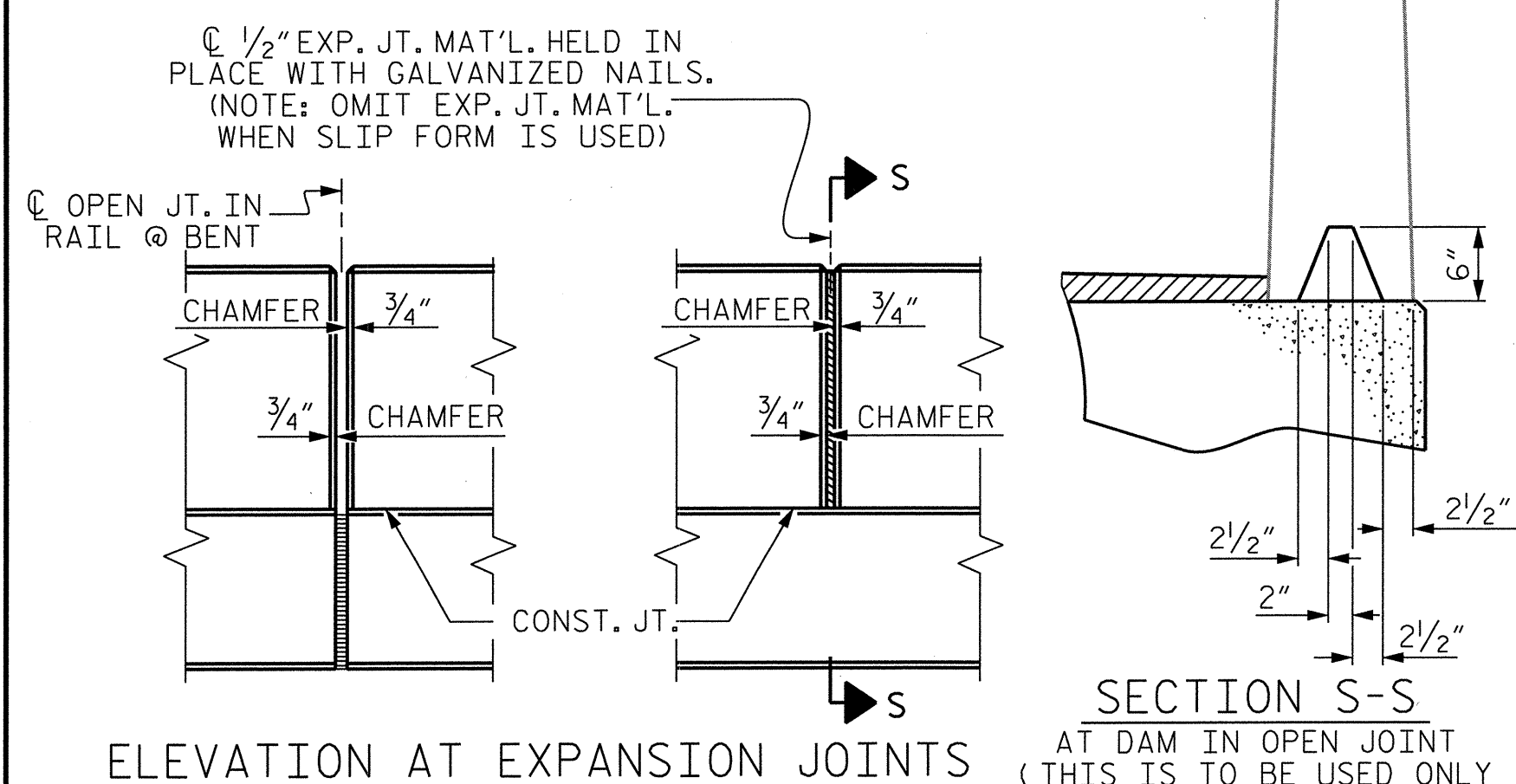
ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

SPAN B BOX BEAMS REQUIRED

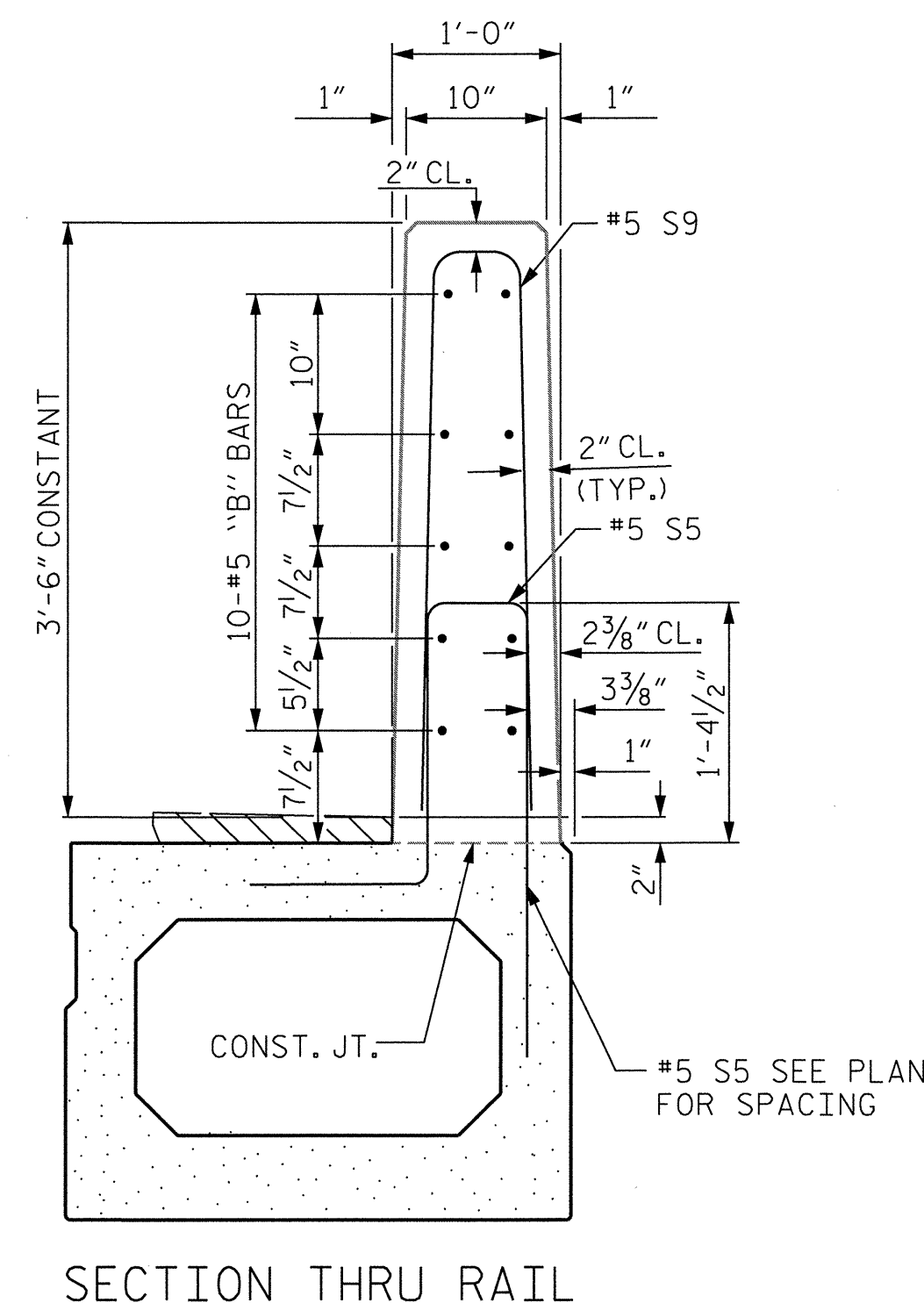
	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR	2	107'-2 5/8"	214'-5 1/4"
INTERIOR	10	107'-2 5/8"	1072'-2 1/4"
TOTAL	12		1286'-7 1/2"

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

	@ BENT 1 CL BRG	@ MIDSPAN	@ BENT 2 CL BRG
SPAN B, LEFT			
ASPHALT OVERLAY THICKNESS	4 5/16"	2 15/16"	2 1/2"
RAIL HEIGHT	3'-10 15/16"	3'-8 15/16"	3'-8 1/2"
SPAN B, RIGHT			
ASPHALT OVERLAY THICKNESS	2 1/2"	2 15/16"	4 5/16"
RAIL HEIGHT	3'-8 1/2"	3'-8 15/16"	3'-10 15/16"



ELEVATION AT EXPANSION JOINTS



SECTION THRU RAIL

BARRIER RAIL DETAILS

ASSEMBLED BY : FRJ	DATE : 12/2011
CHECKED BY : HLW	DATE : 12/2011
DRAWN BY : TLA 5/05	ADDED 7/11/05R
CHECKED BY : GM 6/05	REV. 5/1/06RR TLA/GM
	REV. 10/1/11 MAA/GM

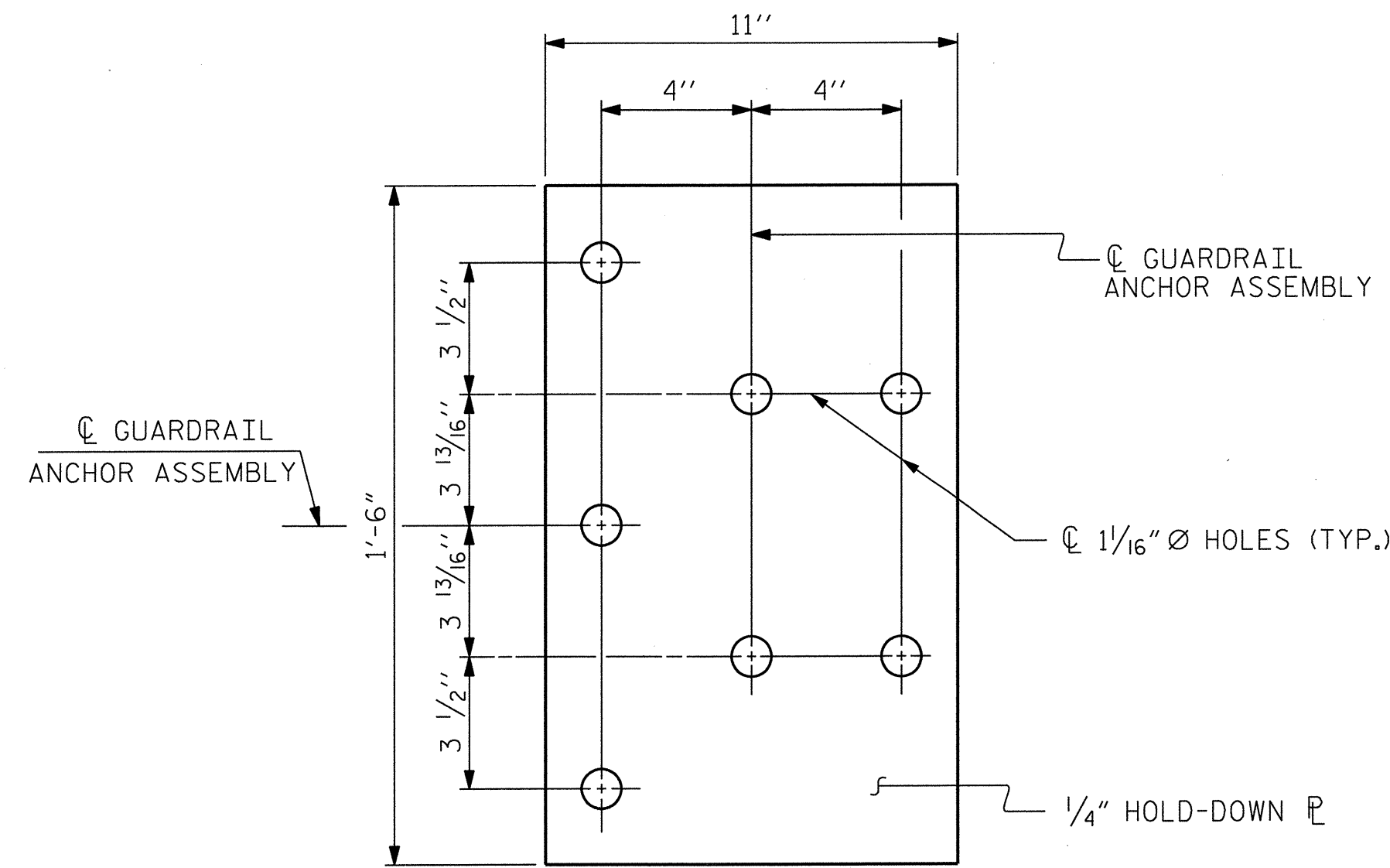
\*\*\*\*\*SYSTEM\*\*\*\*\*  
\*\*\*\*\*DGN\*\*\*\*\*  
\*\*\*\*\*FRNAME\*\*\*\*\*

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STATION: 21+10.210 -L-

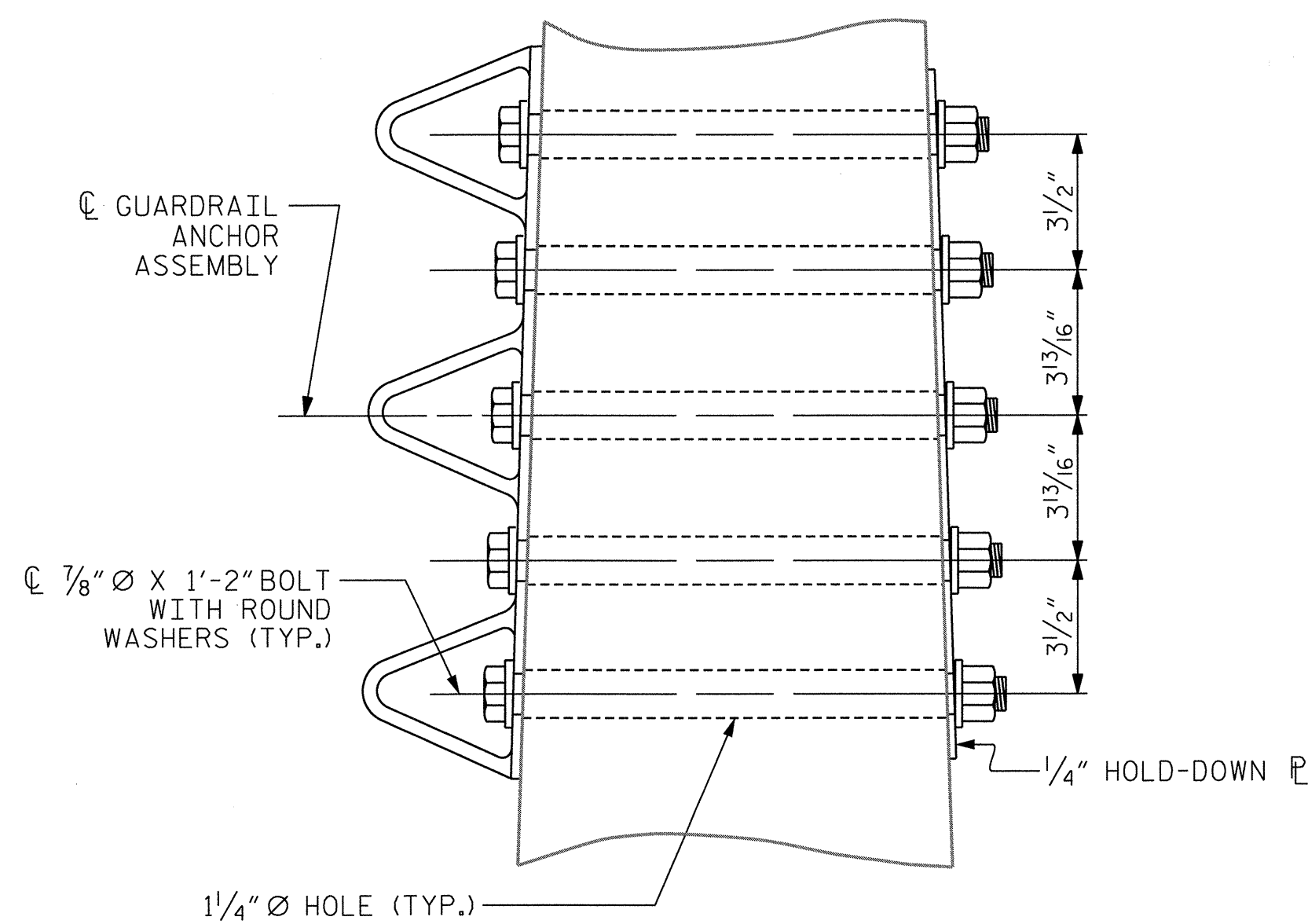
SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 3'-3"  
PRESTRESSED CONCRETE  
BOX BEAM UNIT DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			30



PLAN

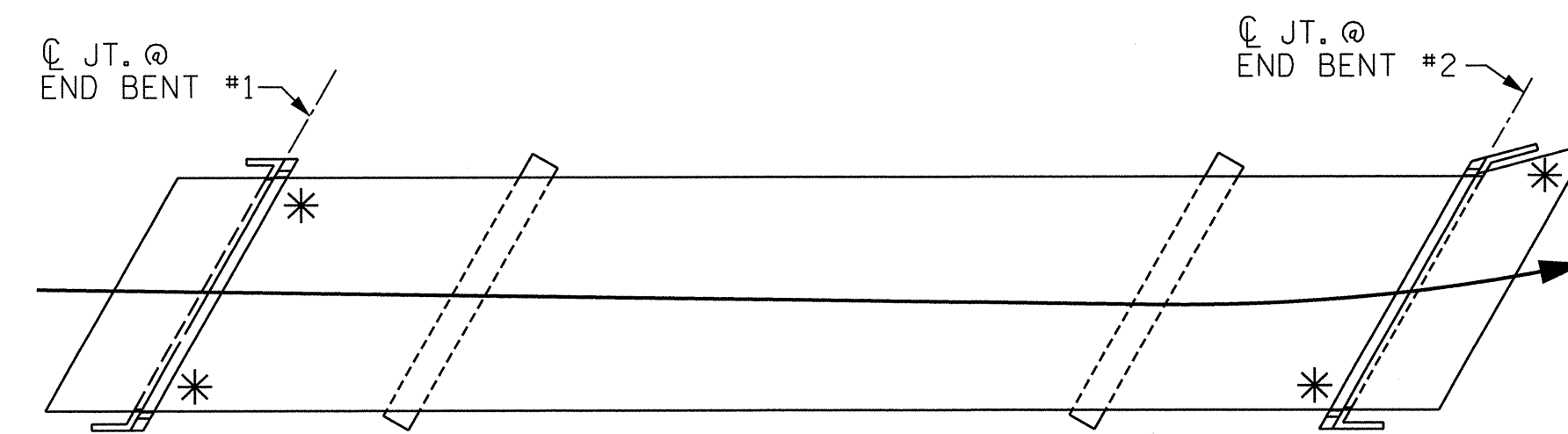


END VIEW - SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

- THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.
- THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.
- BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
- 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 VERTICAL CONCRETE BARRIER RAIL.
- THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.
- THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SKETCH SHOWING POINTS OF ATTACHMENT

\* LOCATION OF GUARDRAIL ATTACHMENT

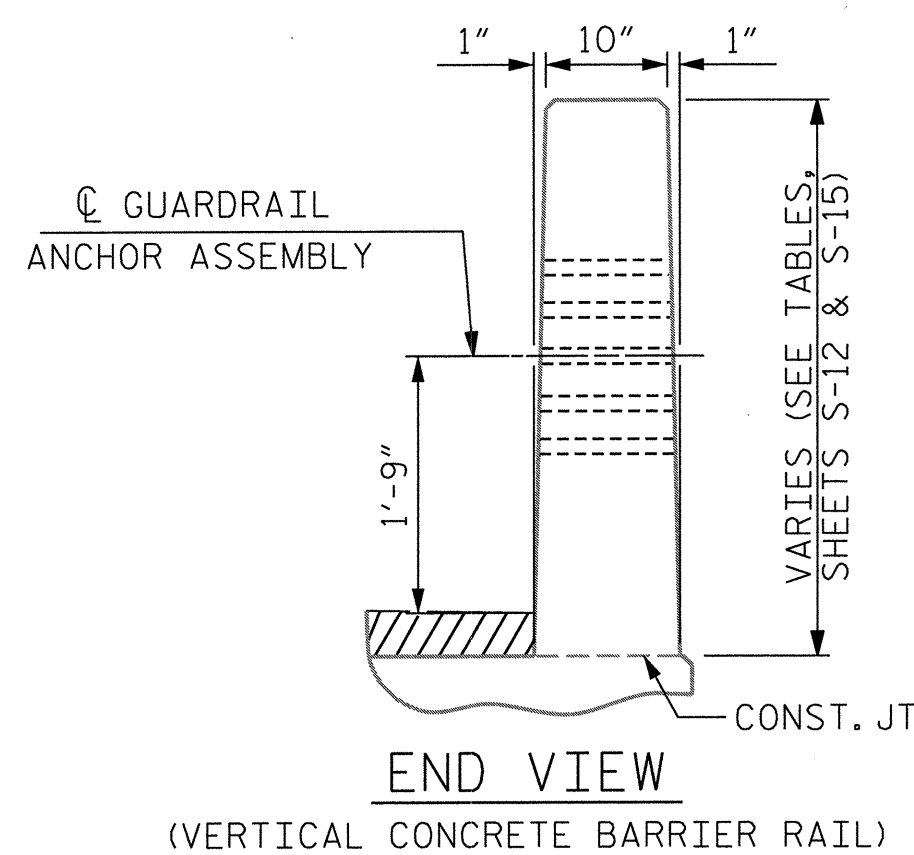


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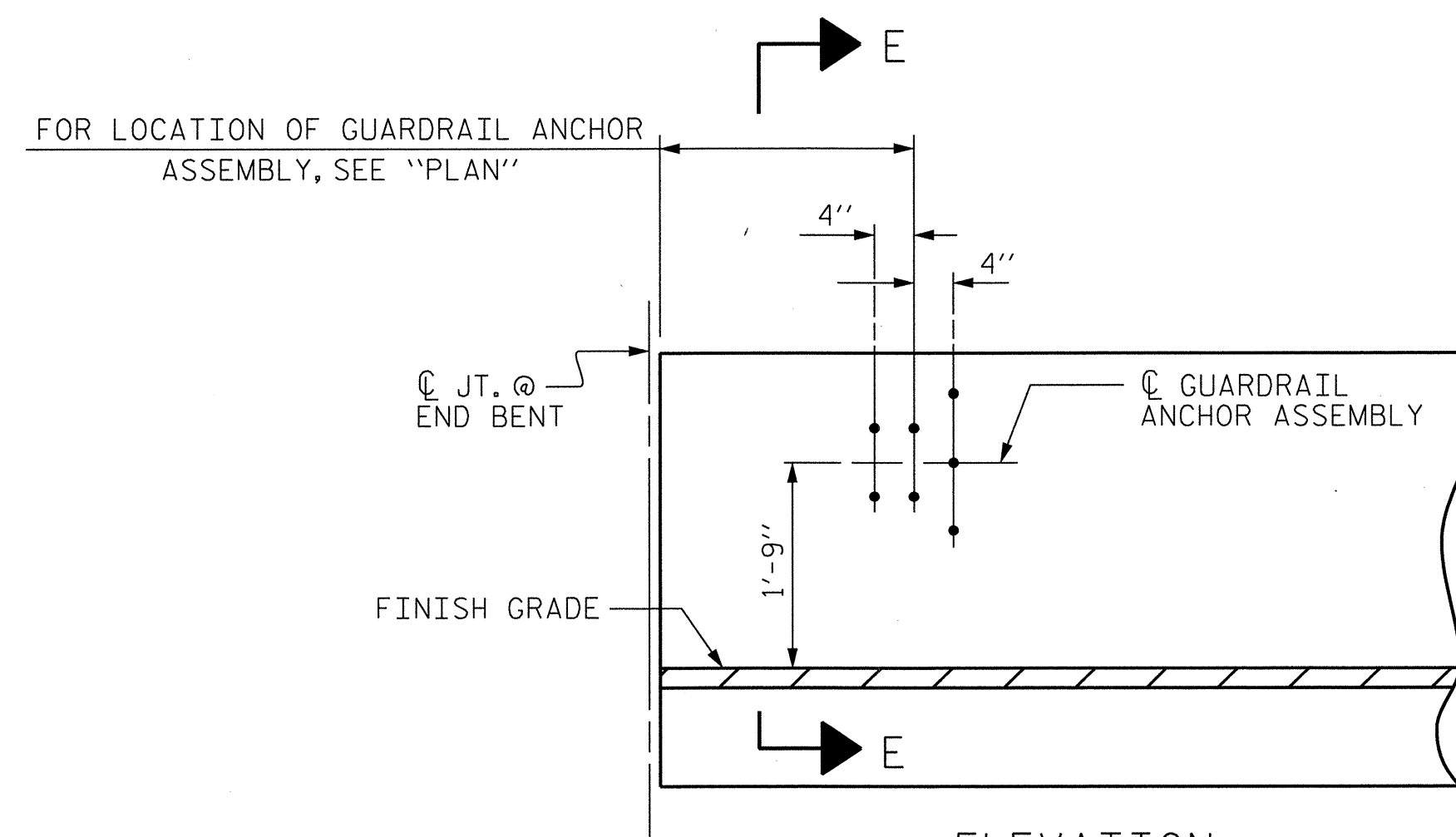
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 GUARDRAIL ANCHORAGE  
 DETAILS FOR METAL  
 RAILS & VERTICAL  
 CONCRETE BARRIER RAIL

REVISIONS						SHEET NO. S-17
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2			4			

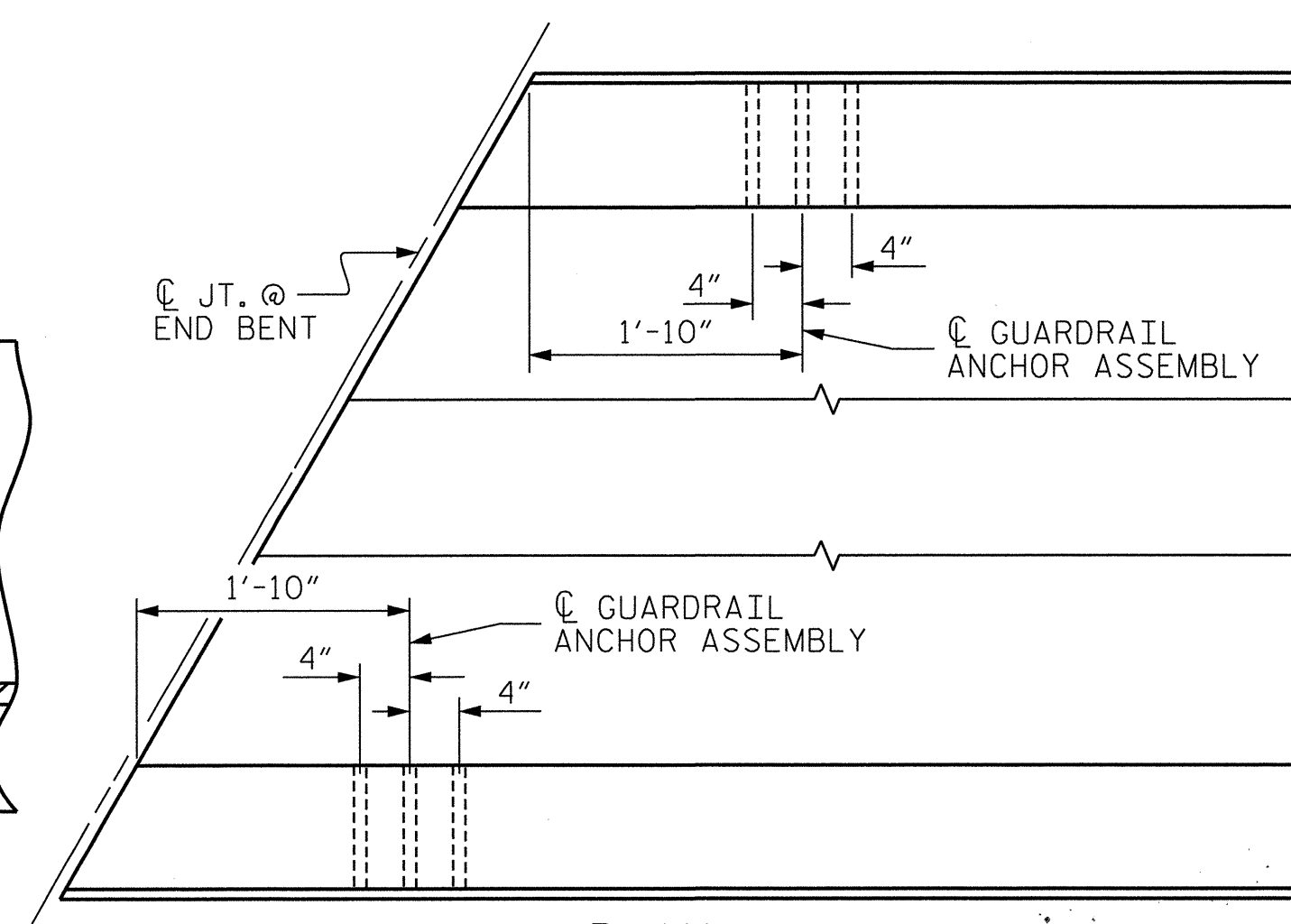
STD. NO. GRA3



LOCATION OF GUARDRAIL ANCHOR AT END POST



ELEVATION



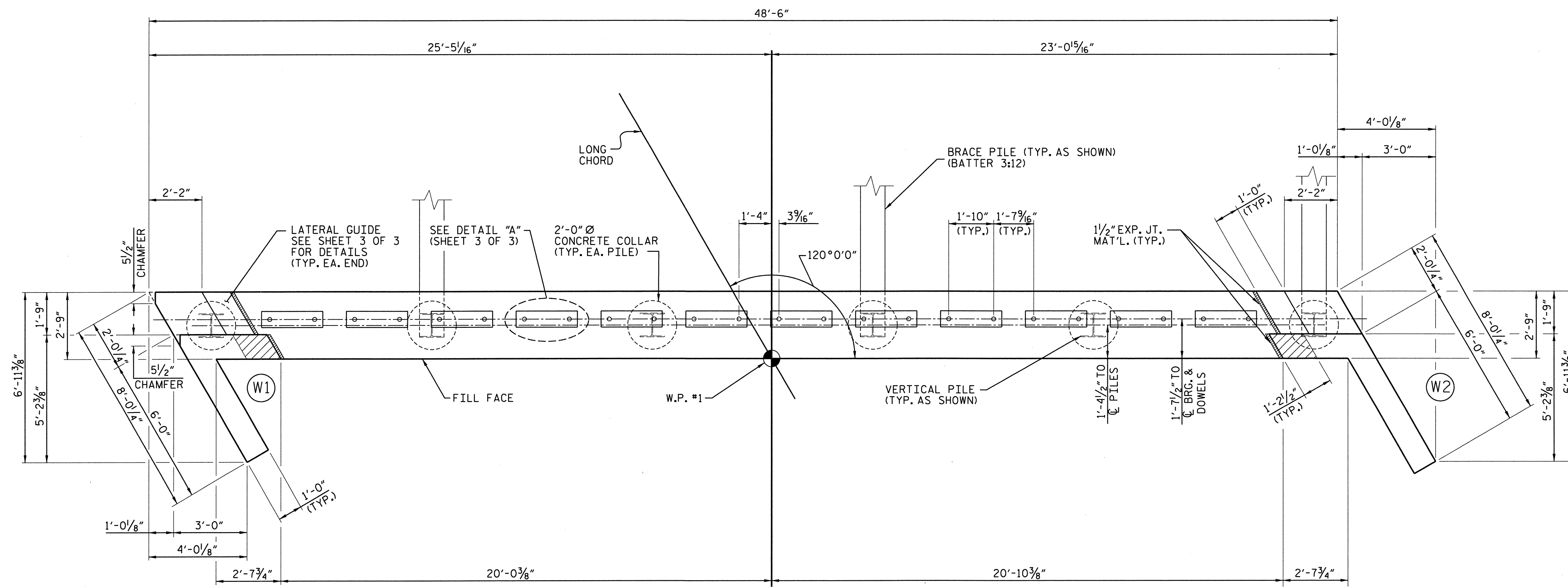
PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

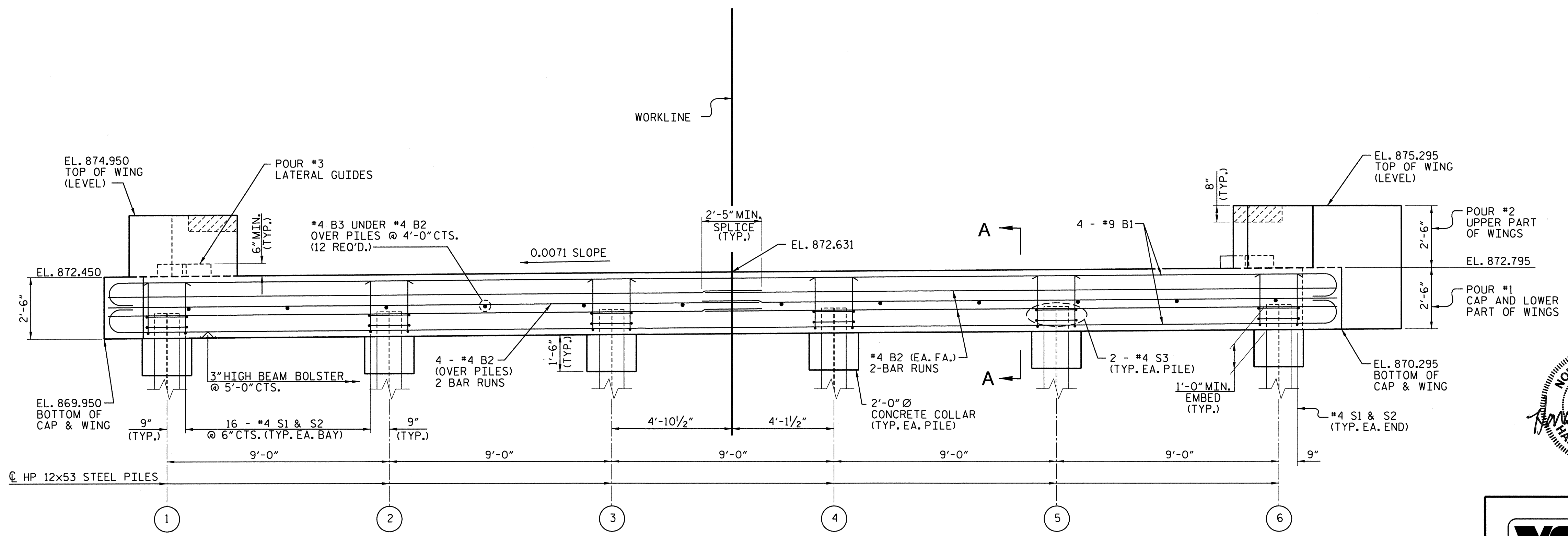
END BENT #1 SHOWN, END BENT #2 SIMILAR.

ASSEMBLED BY : FRJ	DATE : 12/2011
CHECKED BY : HLW	DATE : 12/2011
DRAWN BY : MAA 5/10	ADDED 5/6/10
CHECKED BY : GM 5/10	REV. 10/1/11
	REV. 12/5/11

\*\*\*\*\*SYTIME\*\*\*\*\*  
 \*\*\*\*\*DGN\*\*\*\*\*  
 \*\*\*\*\*USERNAME\*\*\*\*\*



PLAN



ELEVATION  
WINGS NOT SHOWN FOR CLARITY.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WING DETAILS, SEE SHEET 2 OF 3.

THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDE IF APPROVED BY THE ENGINEER.

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS. SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

TOP OF PILE ELEVATIONS	
1	870.969
2	871.032
3	871.096
4	871.160
5	871.224
6	871.288



PROJECT NO. R-5522  
 RUTHERFORD COUNTY  
 STATION: 21+10.21 -L-

SHEET 1 OF 3  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

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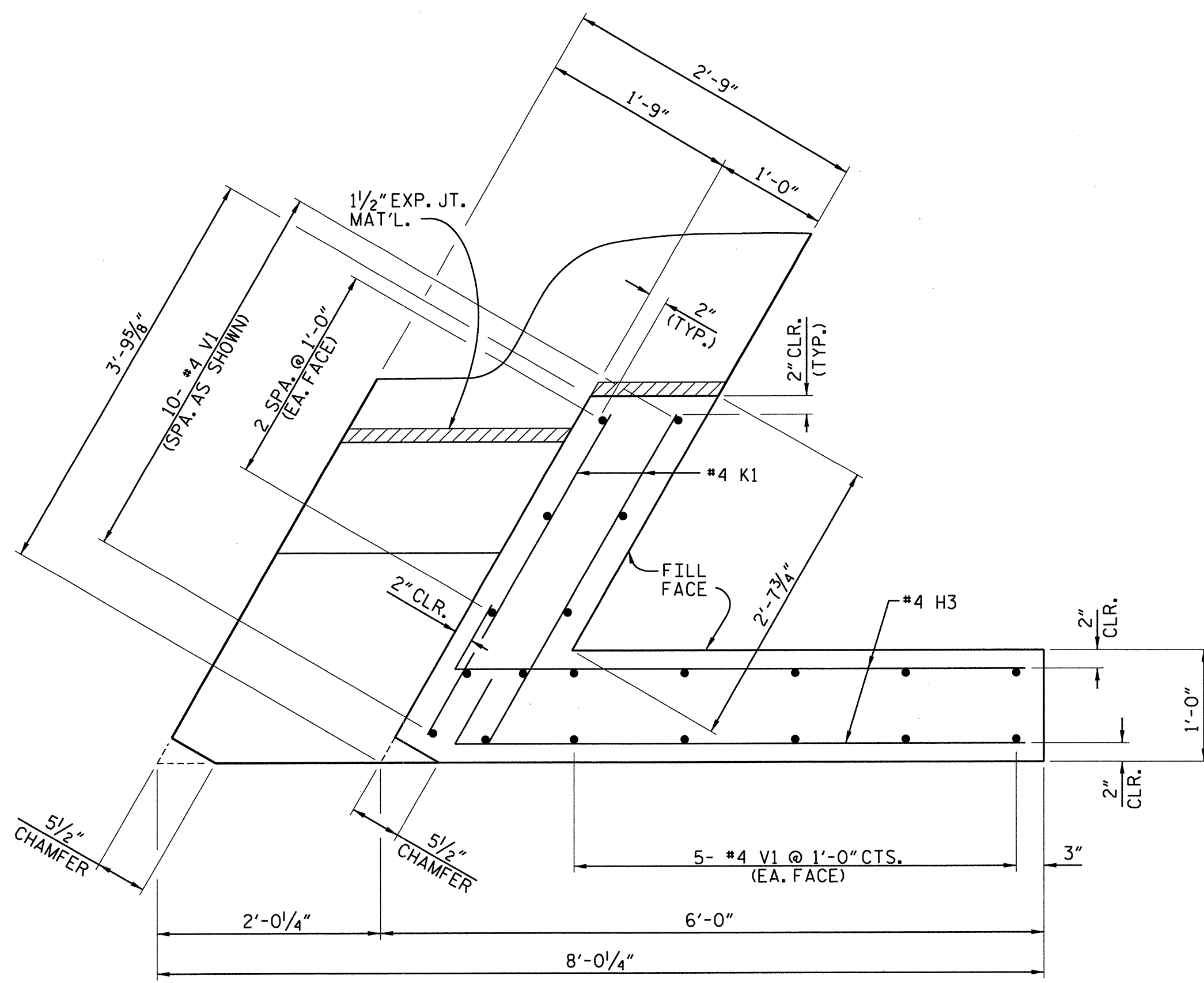
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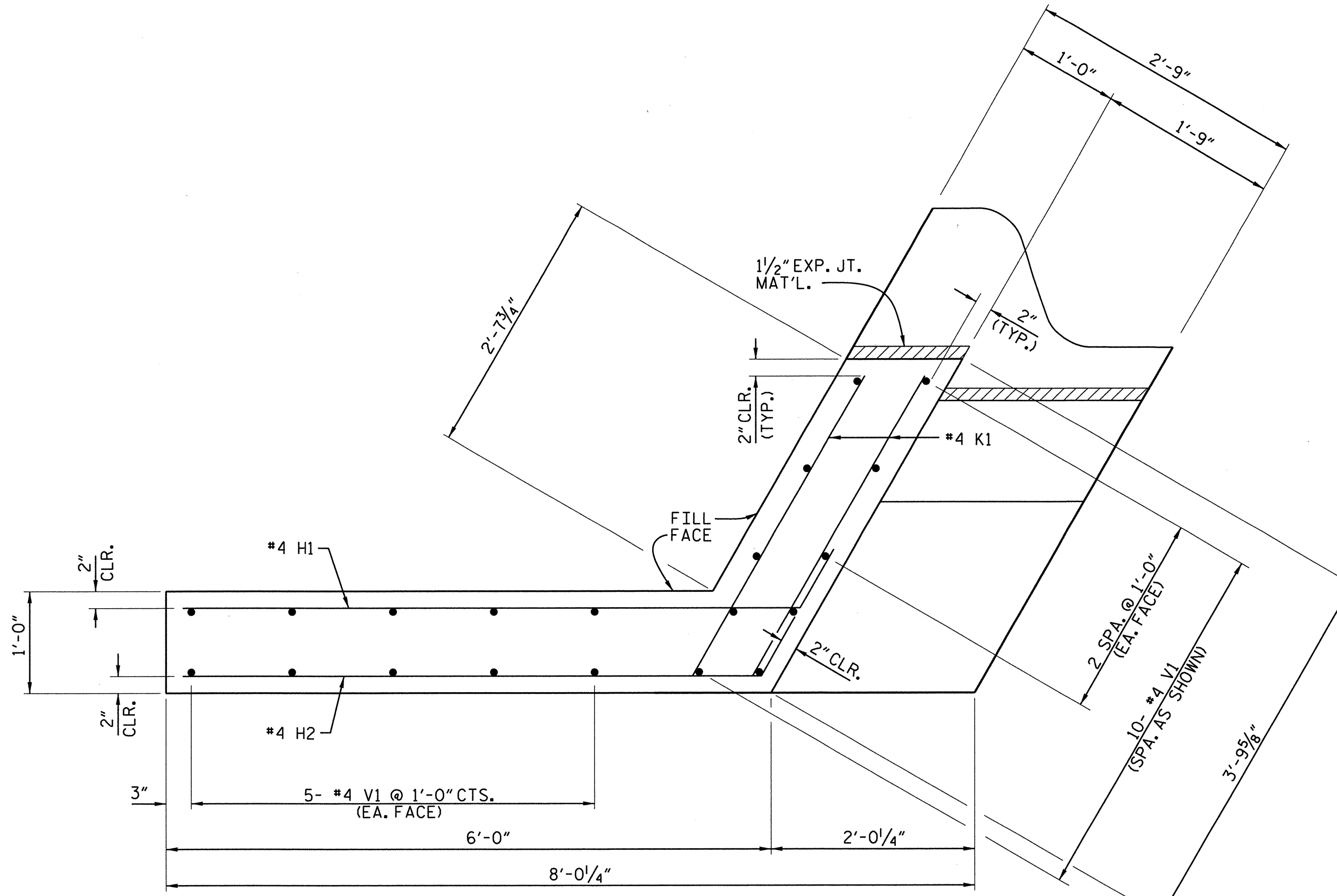
SUBSTRUCTURE  
 END BENT NO. 1

DWN. BY: MAF	DATE: JAN. 2012	NO.	BY:	DATE:	NO.	BY:	DATE:
CHKD. BY: HLW	DATE: JAN. 2012	1			3		
		2			4		

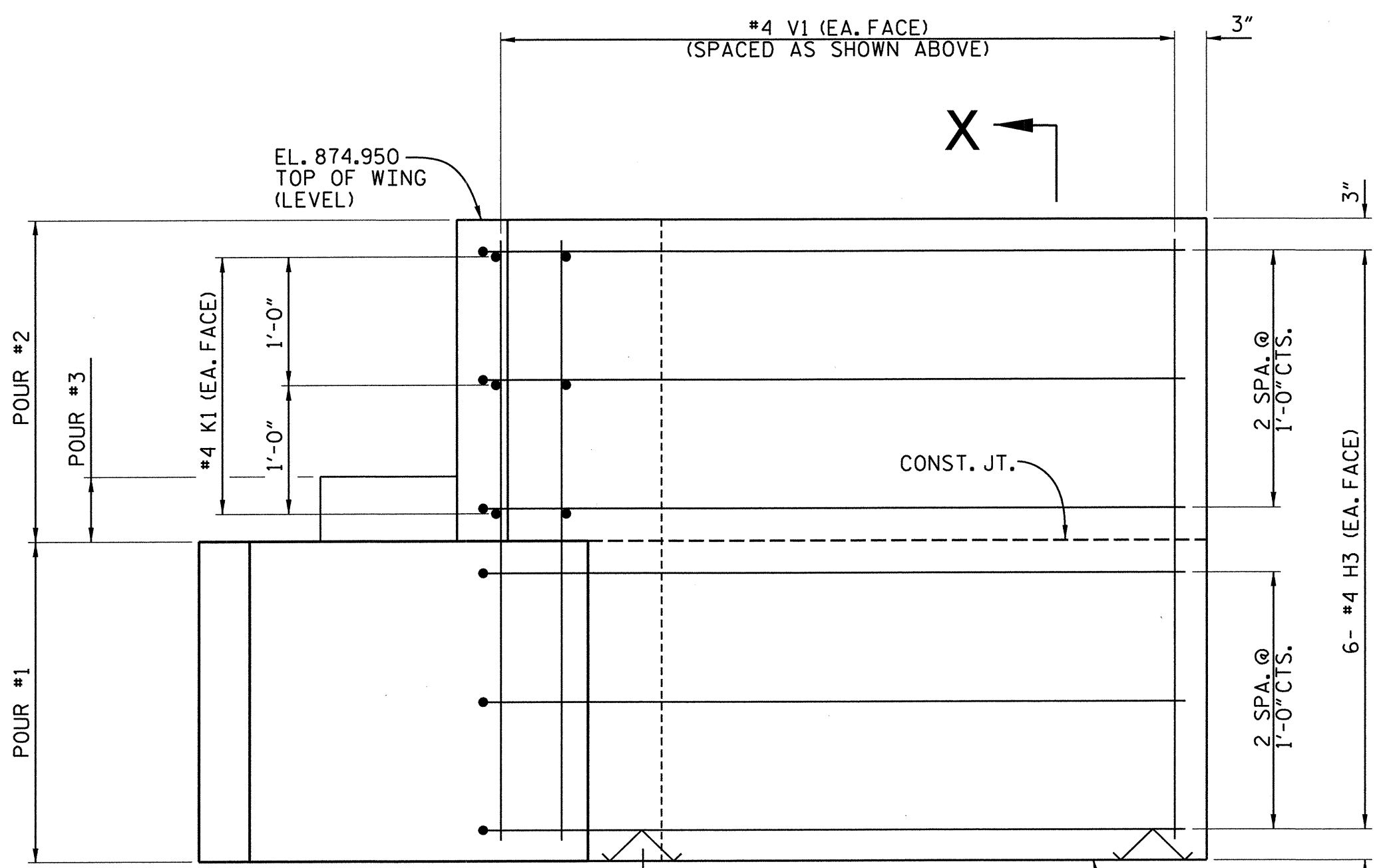
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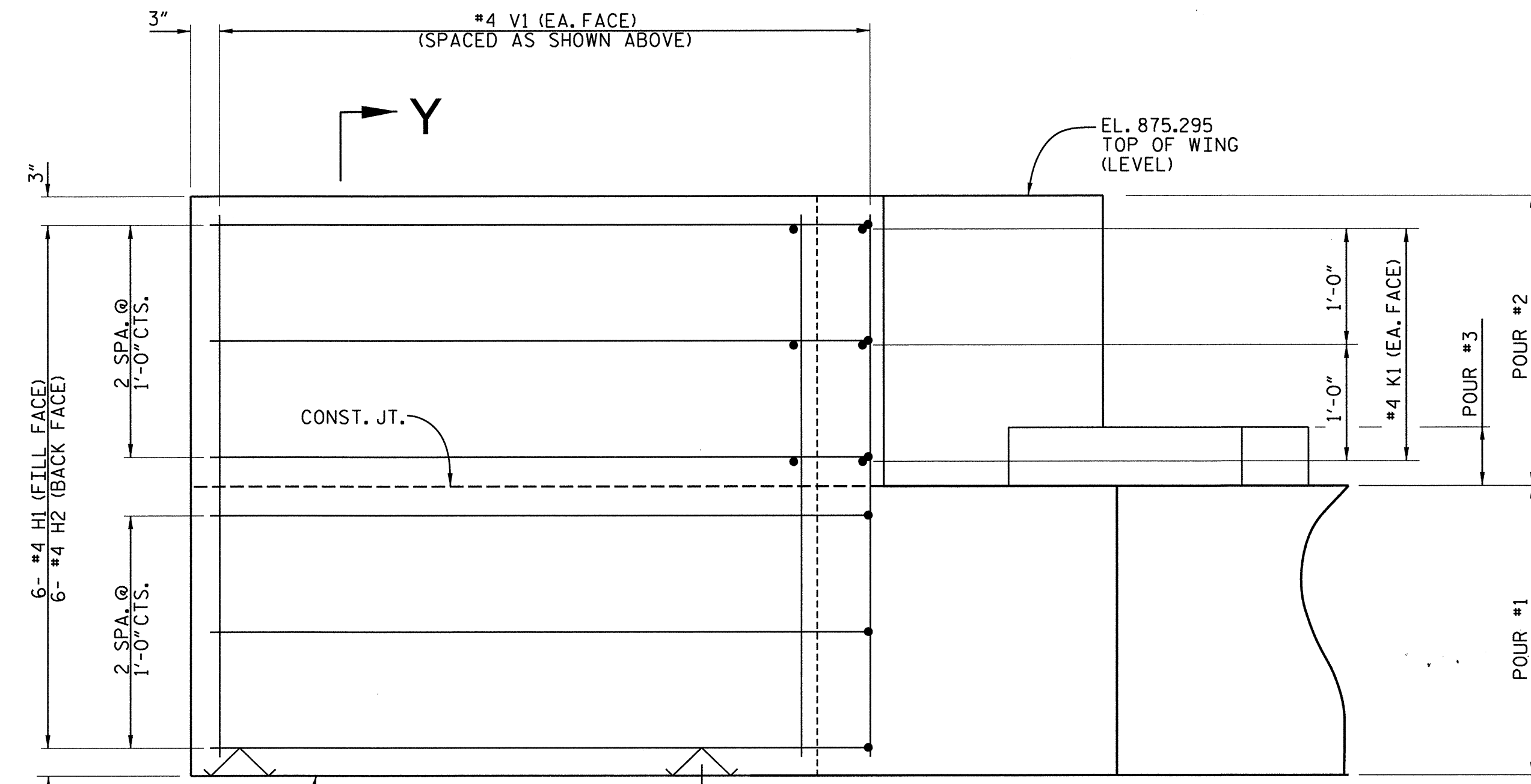
PLAN - WING (W1)



PLAN - WING (W2)

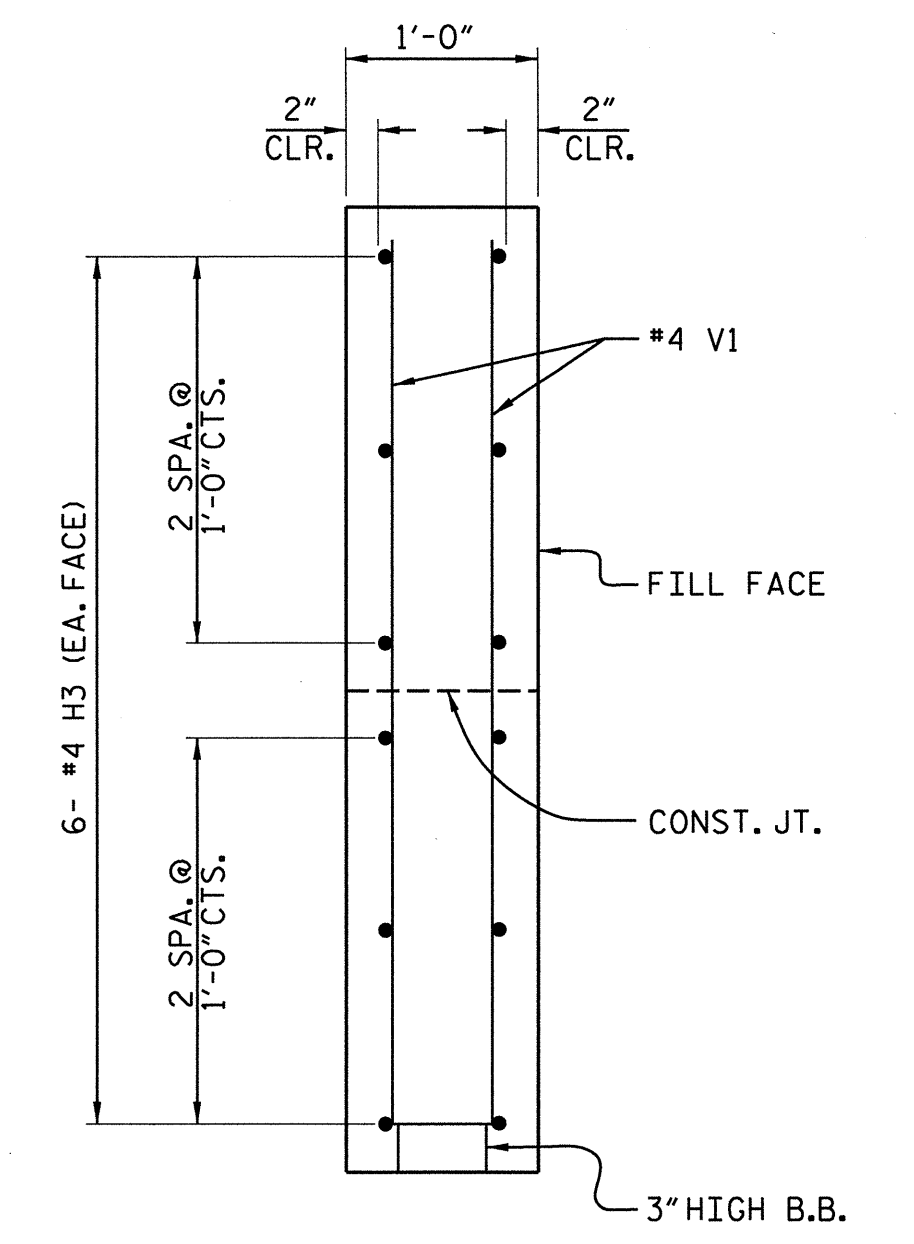


ELEVATION - WING (W1)

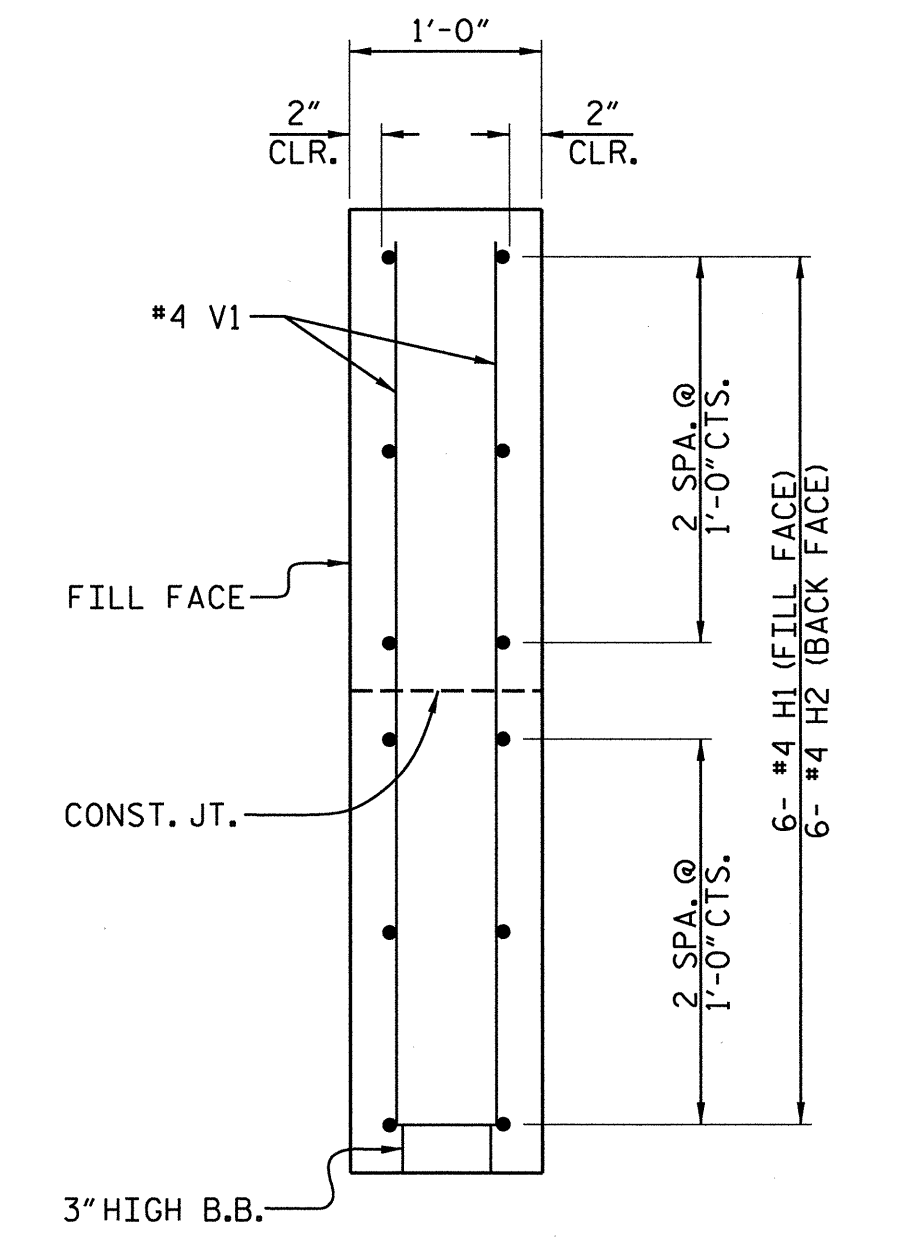


ELEVATION - WING (W2)

WING DETAILS



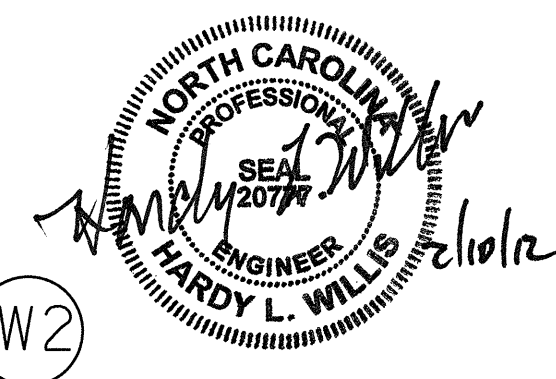
SECTION X-X



SECTION Y-Y

PROJECT NO. R-5522  
 RUTHERFORD COUNTY  
 STATION: 21+10.21 -L-

SHEET 2 OF 3



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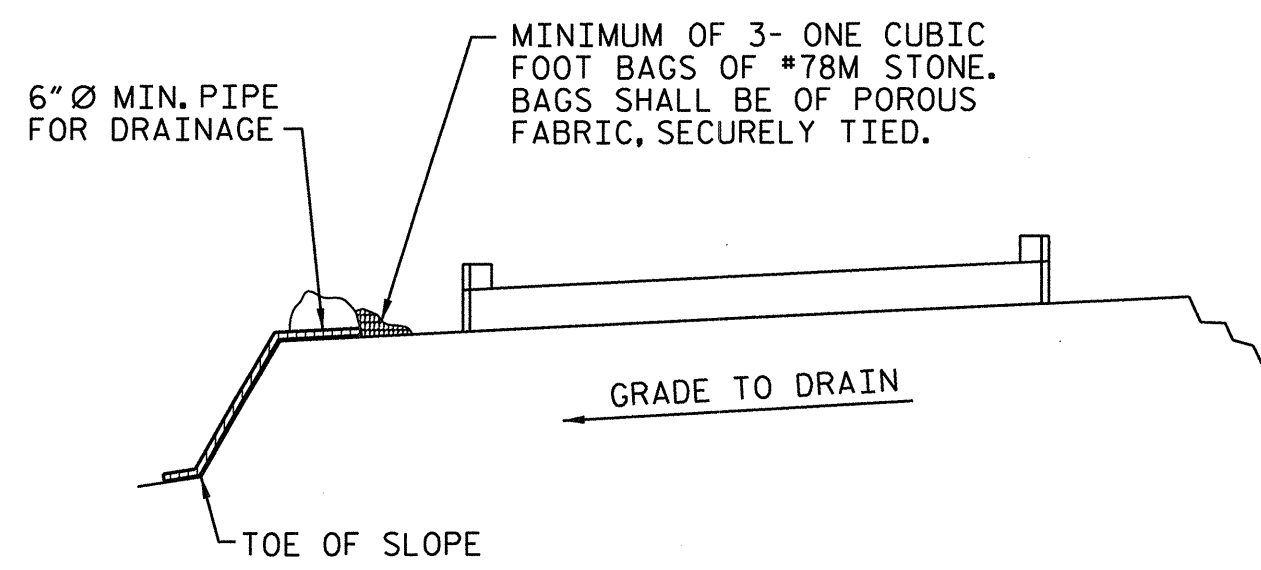
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<b>SUBSTRUCTURE END BENT NO. 1</b>					
JAN 2012					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-19					TOTAL SHEETS 30

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 CHKD. BY: HLW

DATE: JAN. 2012  
 DATE: JAN. 2012

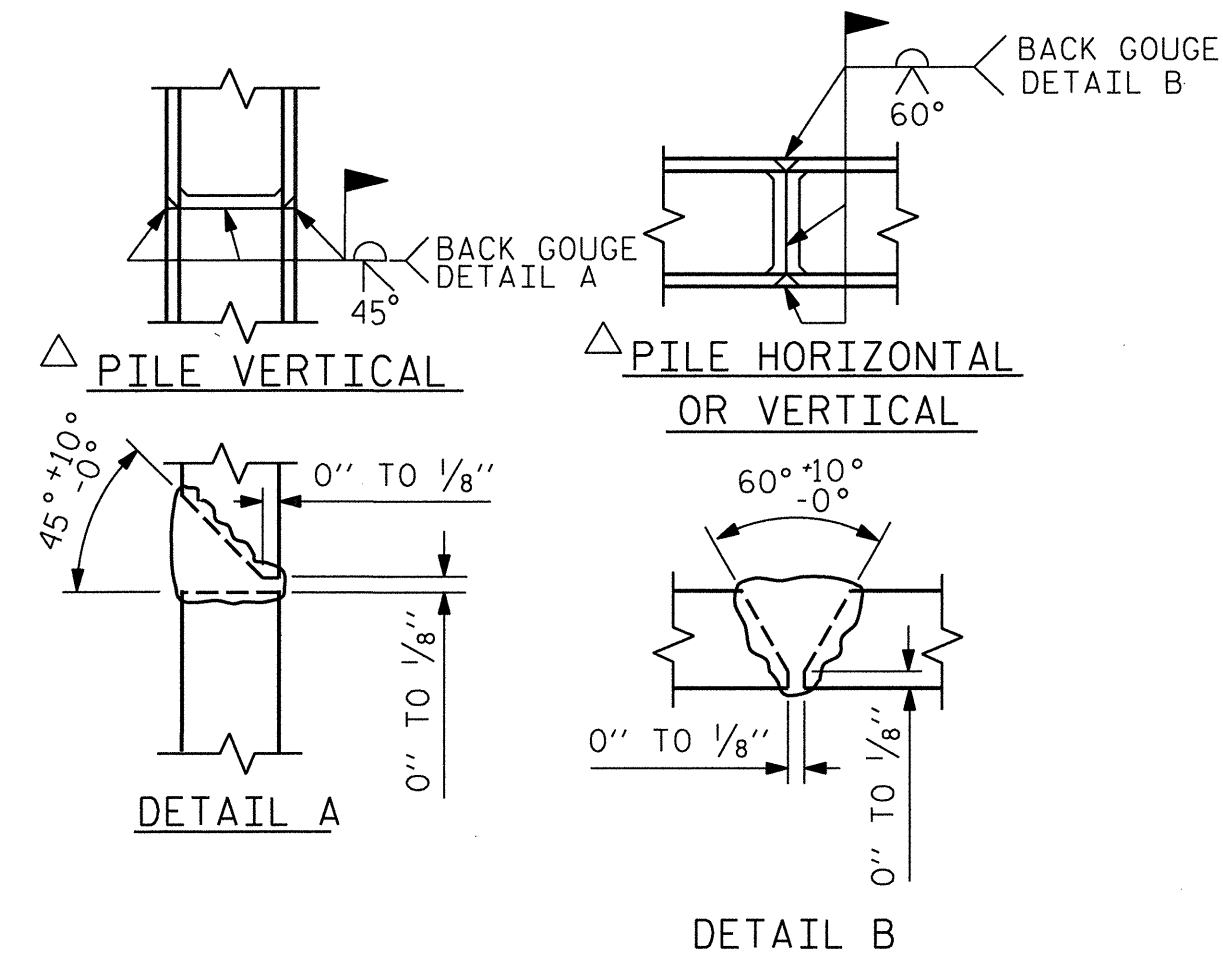


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

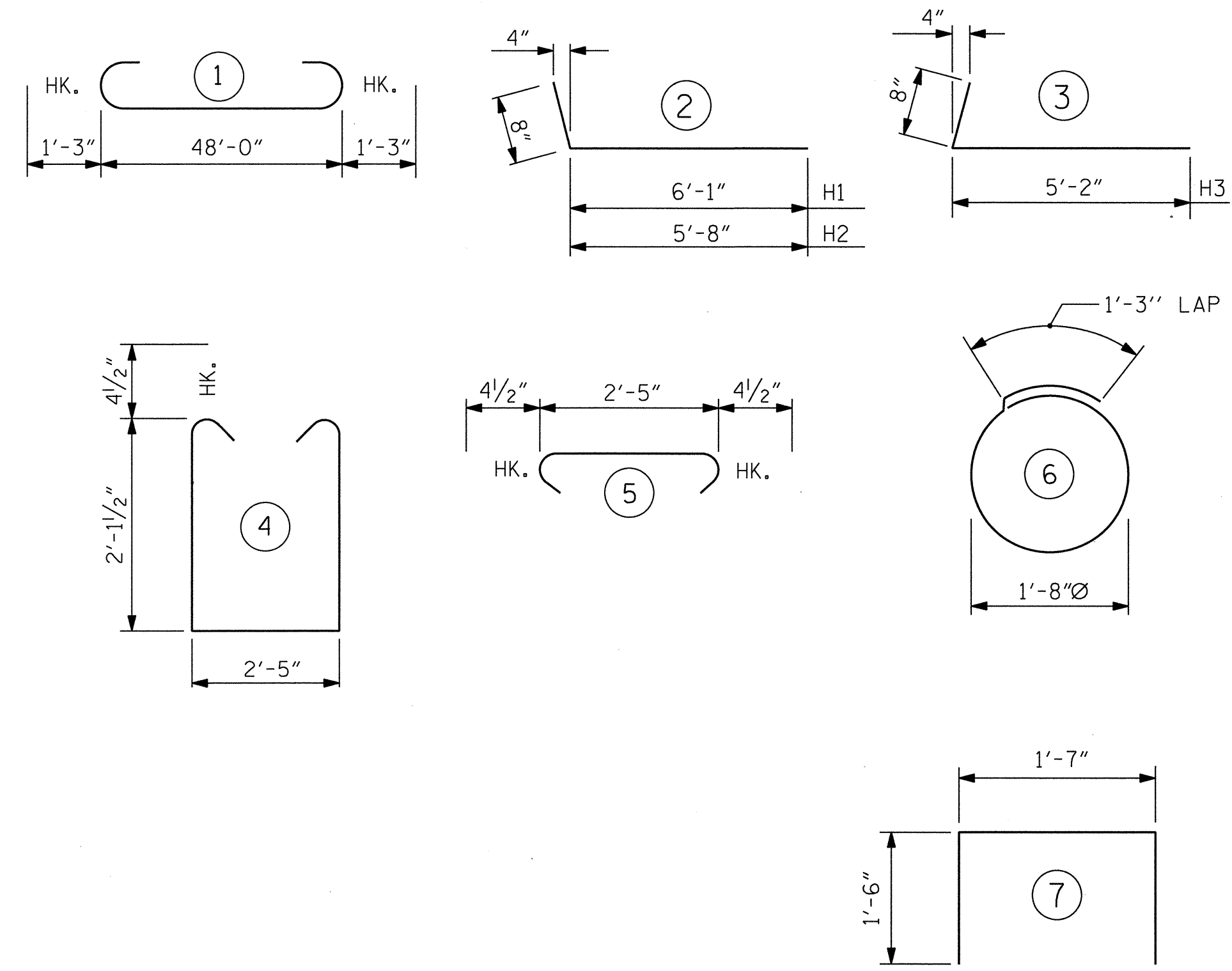
### TEMPORARY DRAINAGE AT END BENT



POSITION OF PILE DURING WELDING.

### PILE SPLICE DETAILS

### BAR TYPES



### BILL OF MATERIAL FOR END BENT NO. 1

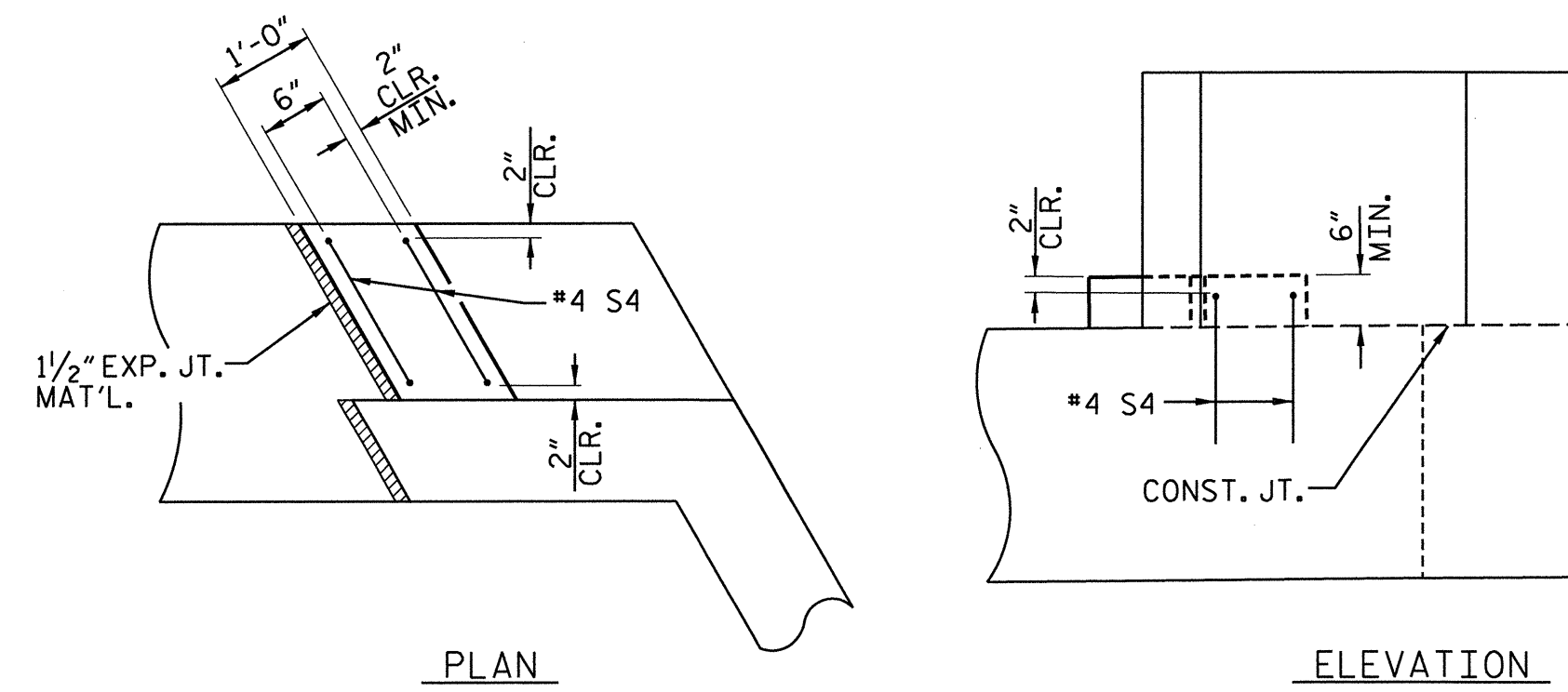
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	50'-6"	1374
B2	16	#4	STR	25'-4"	271
B3	12	#4	STR	2'-5"	19
D1	24	#6	STR	1'-6"	54
H1	6	#4	2	6'-9"	27
H2	6	#4	2	6'-4"	25
H3	12	#4	3	5'-10"	47
K1	12	#4	STR	3'-2"	25
S1	82	#4	4	7'-5"	406
S2	82	#4	5	3'-2"	173
S3	12	#4	6	6'-6"	52
S4	4	#4	7	4'-7"	12
V1	40	#4	STR	4'-8"	125

REINFORCING STEEL (FOR END BENT #1) 2610 LBS.

CLASS A CONCRETE BREAKDOWN (FOR END BENT NO. 1)	
POUR #1 CAP, LOWER PART OF WINGS, AND CONCRETE COLLARS	14.3 C.Y.
POUR #2 UPPER PART OF WINGS	1.6 C.Y.
POUR #3 LATERAL GUIDES	0.1 C.Y.
<b>TOTAL CLASS A CONCRETE</b>	<b>16.0 C.Y.</b>

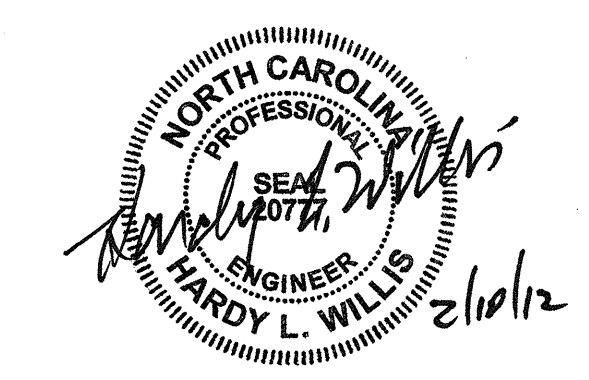
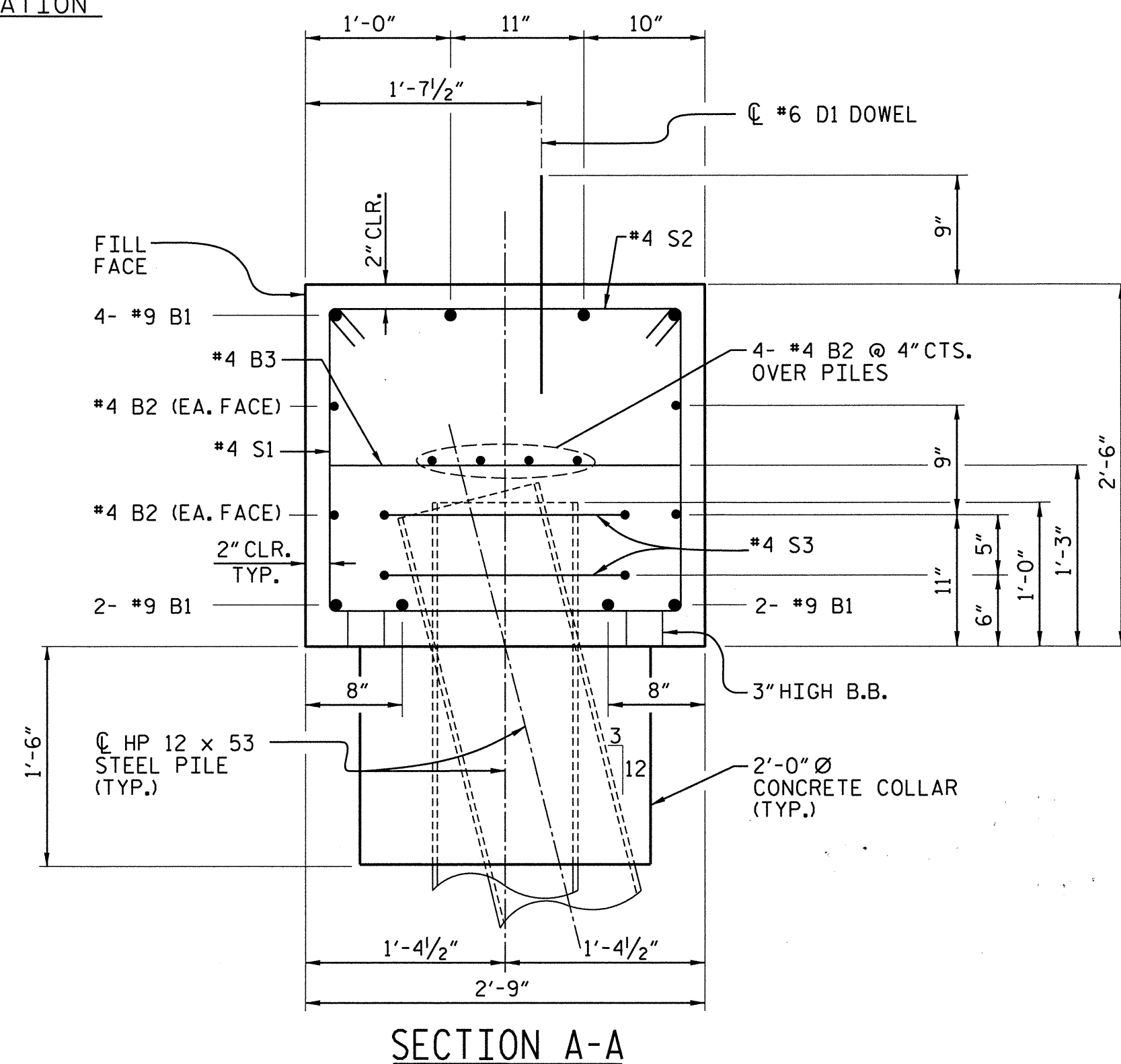
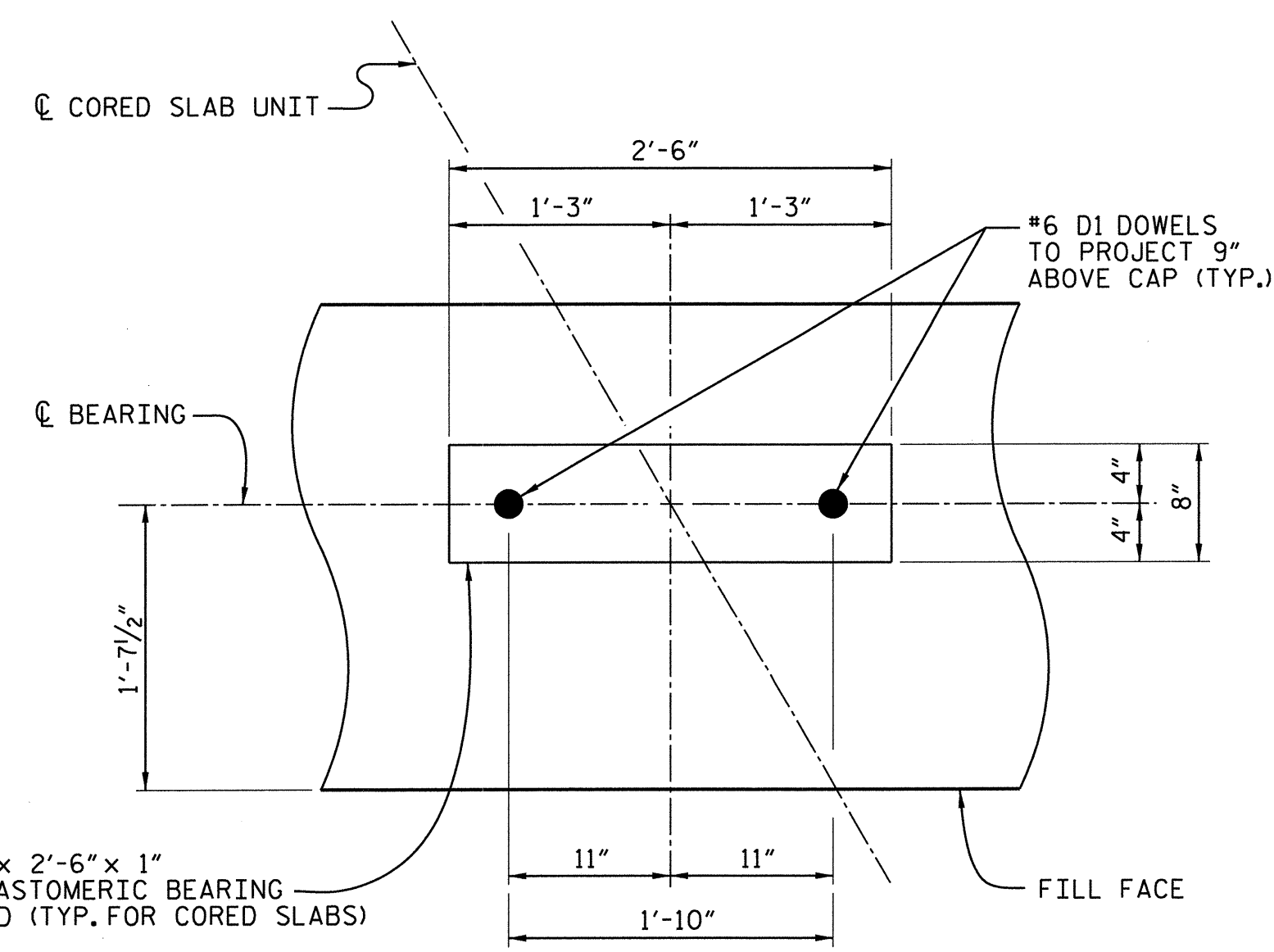
END BENT NO. 1  
 HP 12 x 53 STEEL PILES  
 NO: 6 LIN. FT. = 384

STEEL PILE POINTS  
 NO: 6



### LATERAL GUIDE DETAILS

RIGHT LATERAL GUIDE SHOWN, LEFT END SIMILAR.



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 RUTHERFORD COUNTY  
 STATION: 21+10.21 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT NO. 1

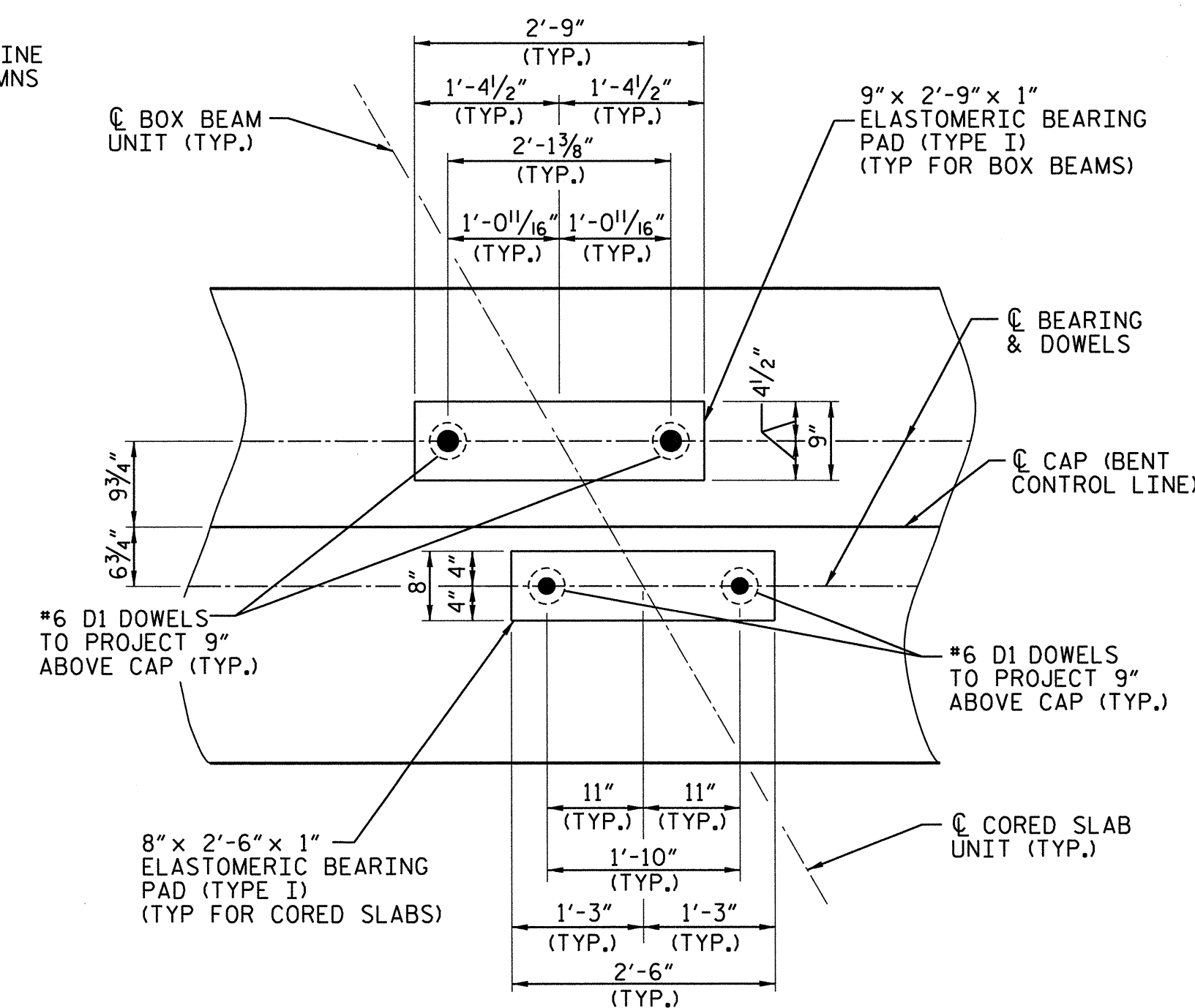
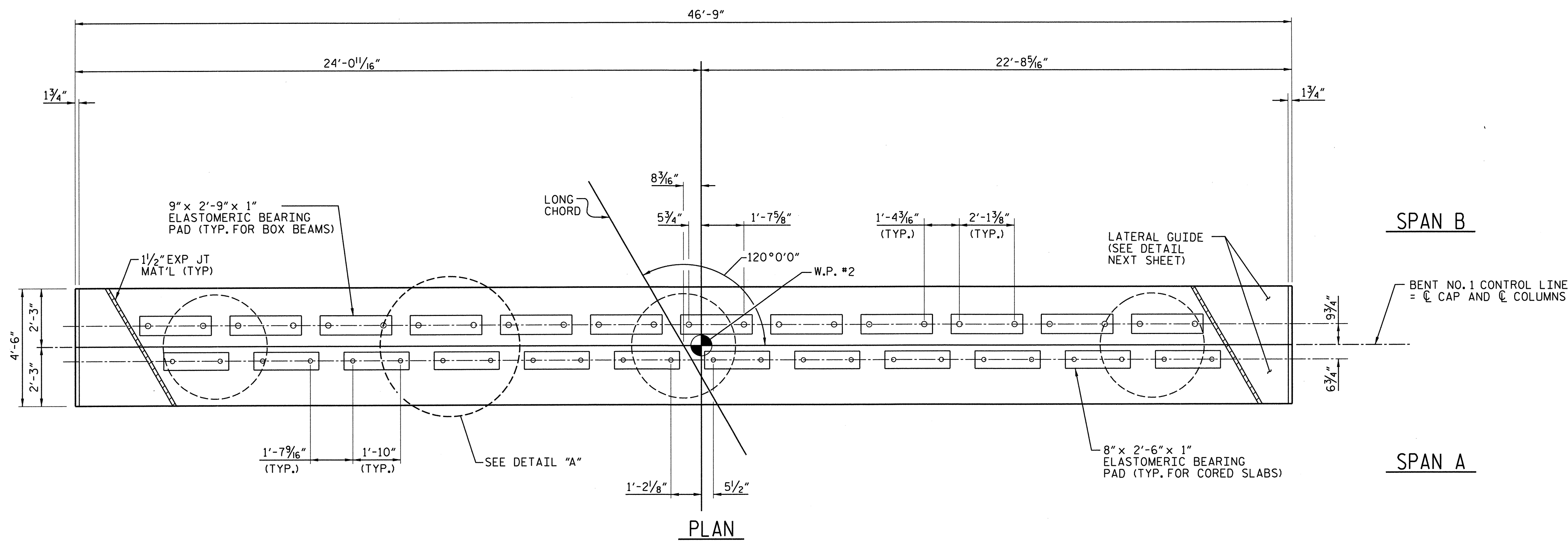
REVISIONS				2012	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-20  
 TOTAL SHEETS 30

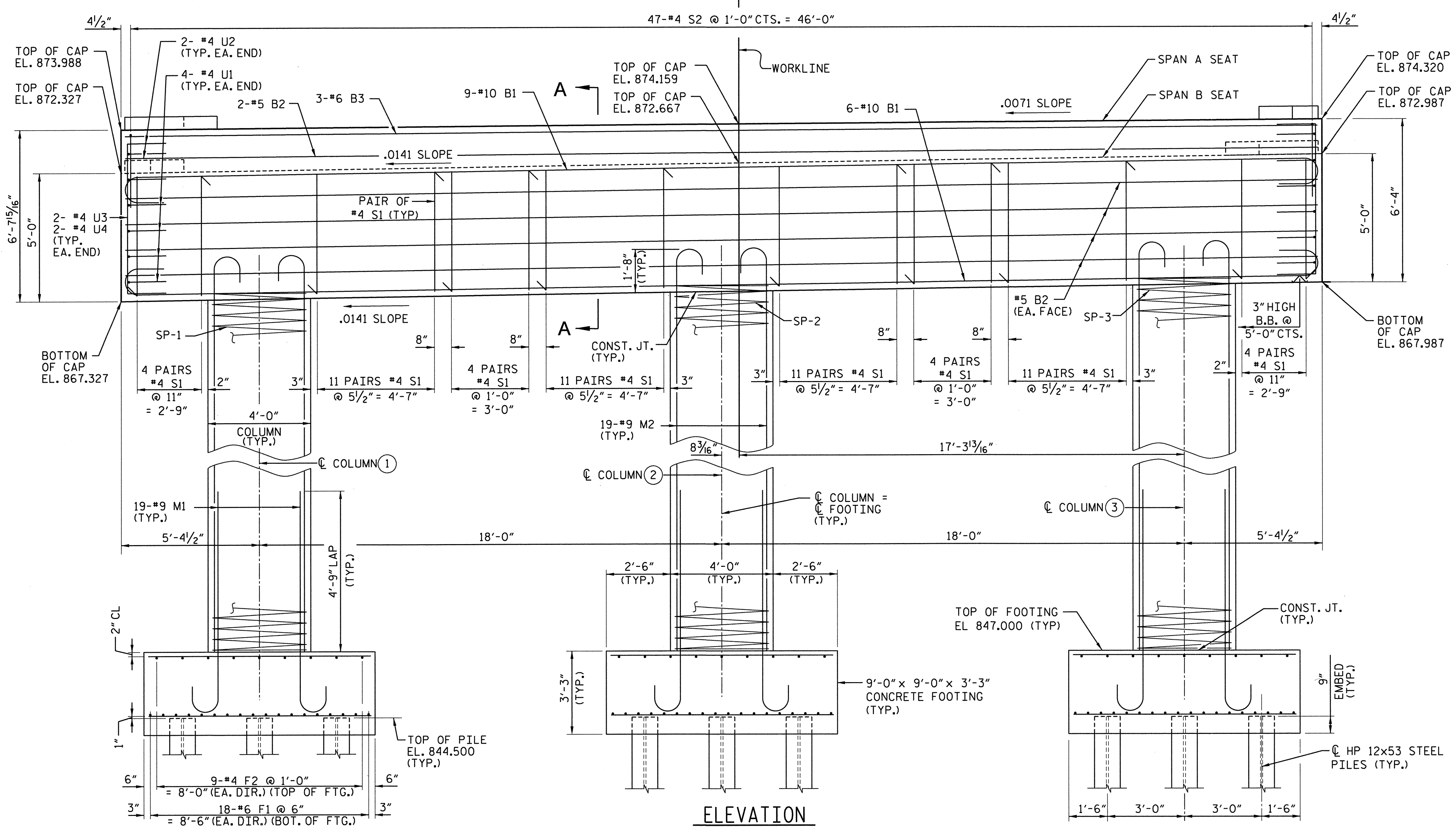
DWN. BY: MAF DATE: JAN. 2012  
 CHKD. BY: HLW DATE: JAN. 2012

**NOTES:**

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.
- HOOKS ON "M" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- INVERT ALTERNATE PAIRS OF STIRRUPS.
- THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDE IF APPROVED BY THE ENGINEER.

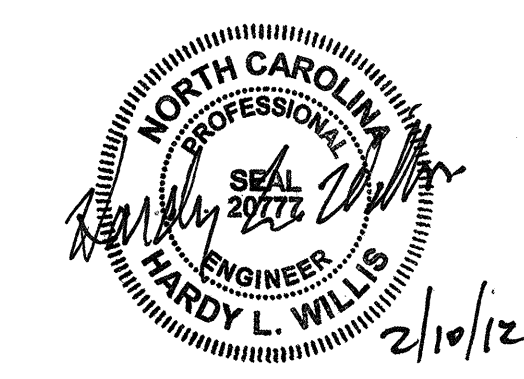


**DETAIL "A"**  
DIMENSIONS ARE TYPICAL, EACH BEARING.



COLUMN DIMENSIONS			
COLUMN DESIGNATION	①	②	③
TOP OF COLUMN ELEV *	867.403	867.657	867.911
COLUMN HEIGHT *	20'-4 13/16"	20'-7 7/8"	20'-10 5/16"

\* AT C COLUMN



PROJECT NO. R-5522  
RUTHERFORD COUNTY  
 STATION: 21+10.21 -L-  
 SHEET 1 OF 2

**V&M**  
**Vaughn & Melton**  
 Consulting Engineers

Charlotte, NC  
 Knoxville, TN  
 Middleboro, KY  
 Asheville, NC  
 North Carolina  
 South Carolina

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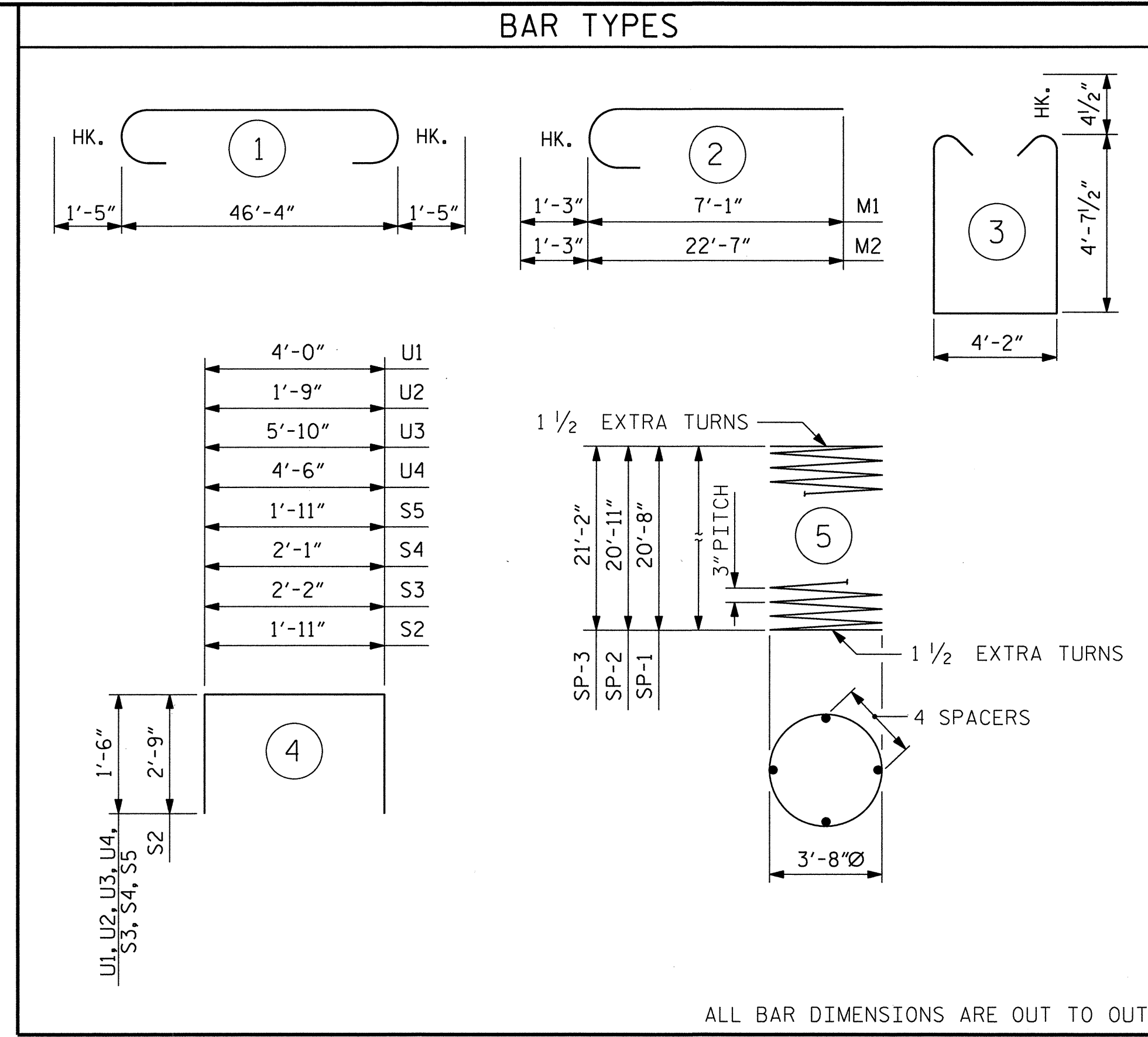
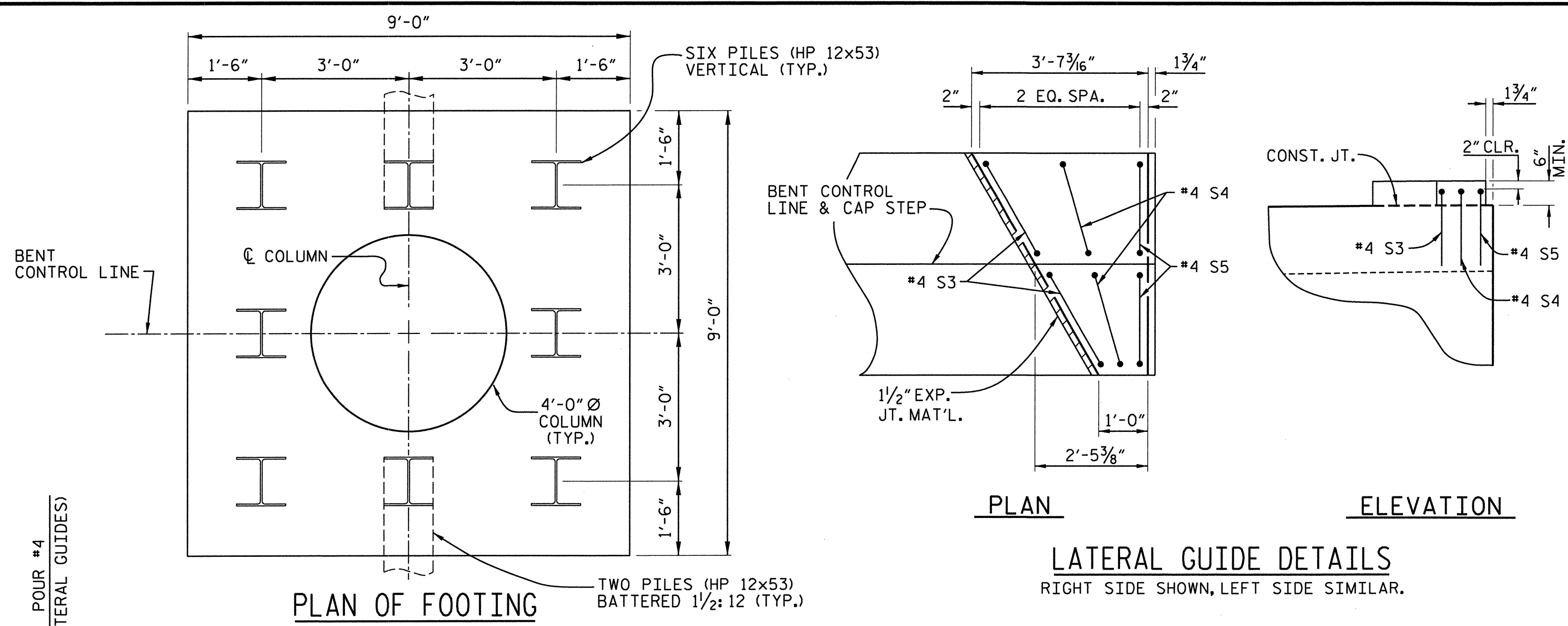
**SUBSTRUCTURE BENT NO. 1**

JAN 2012

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1	MAF	JAN, 2012	3		
2	HLW	JAN, 2012	4		

SHEET NO. S-21  
 TOTAL SHEETS 30

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND FOOTING UNLESS OTHERWISE NOTED.



**BILL OF MATERIAL FOR BENT NO. 1**

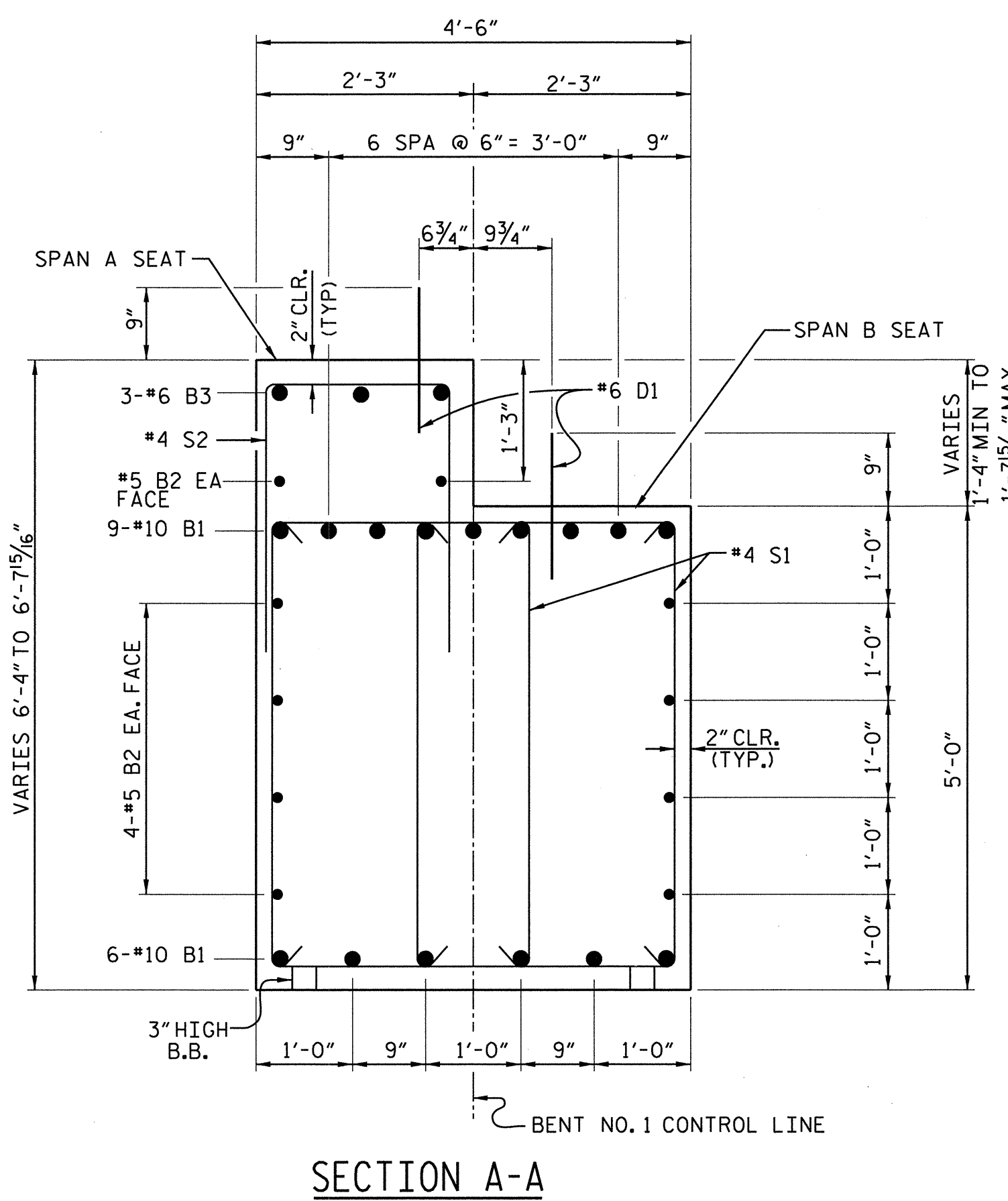
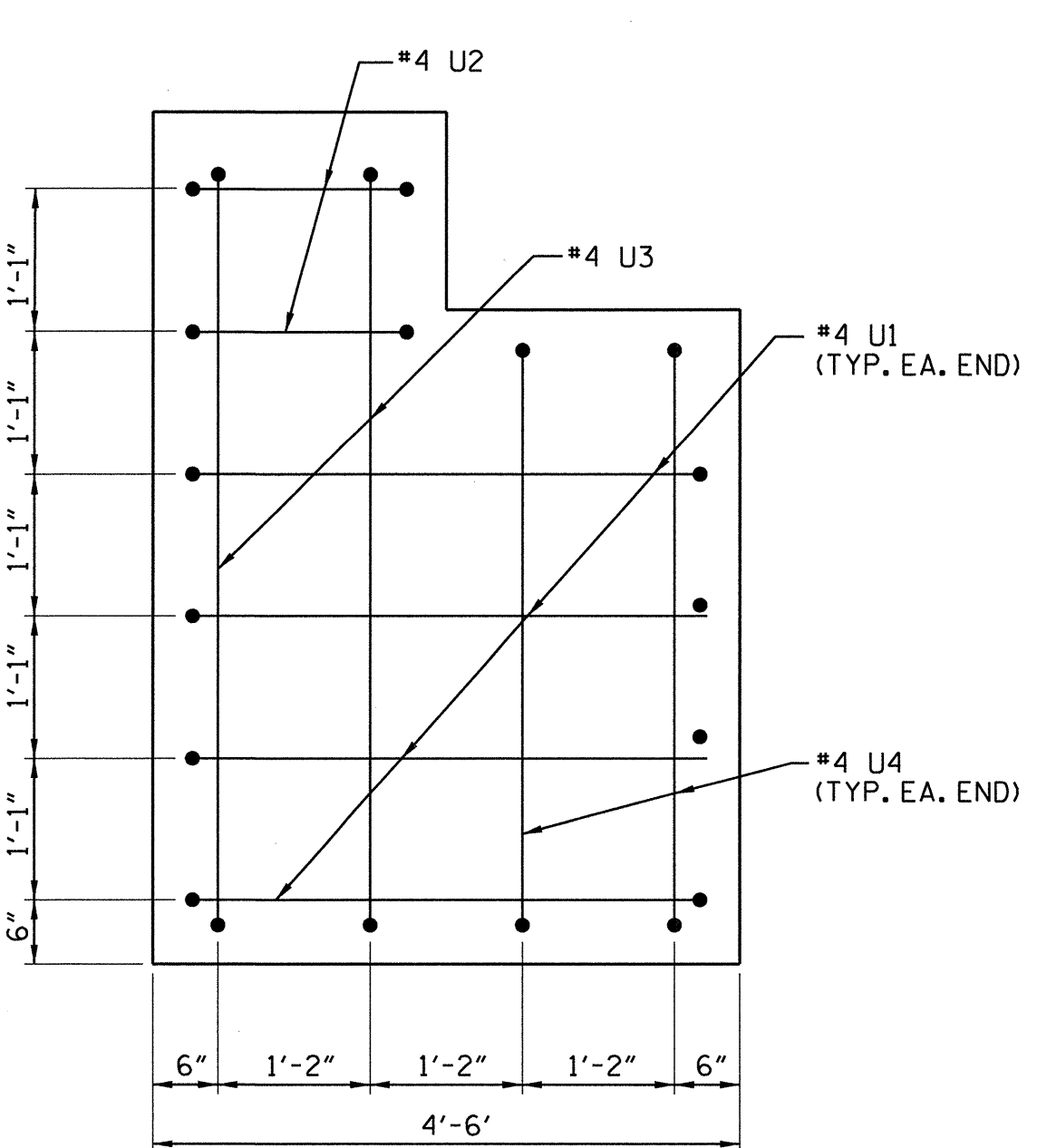
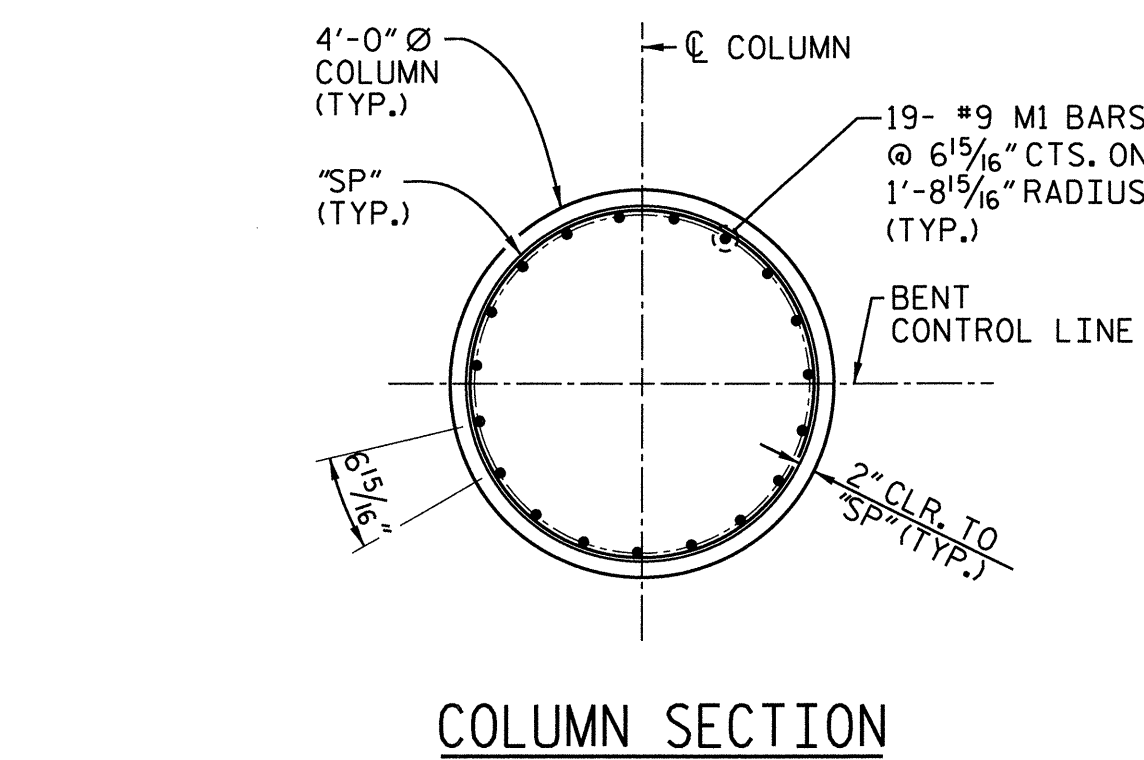
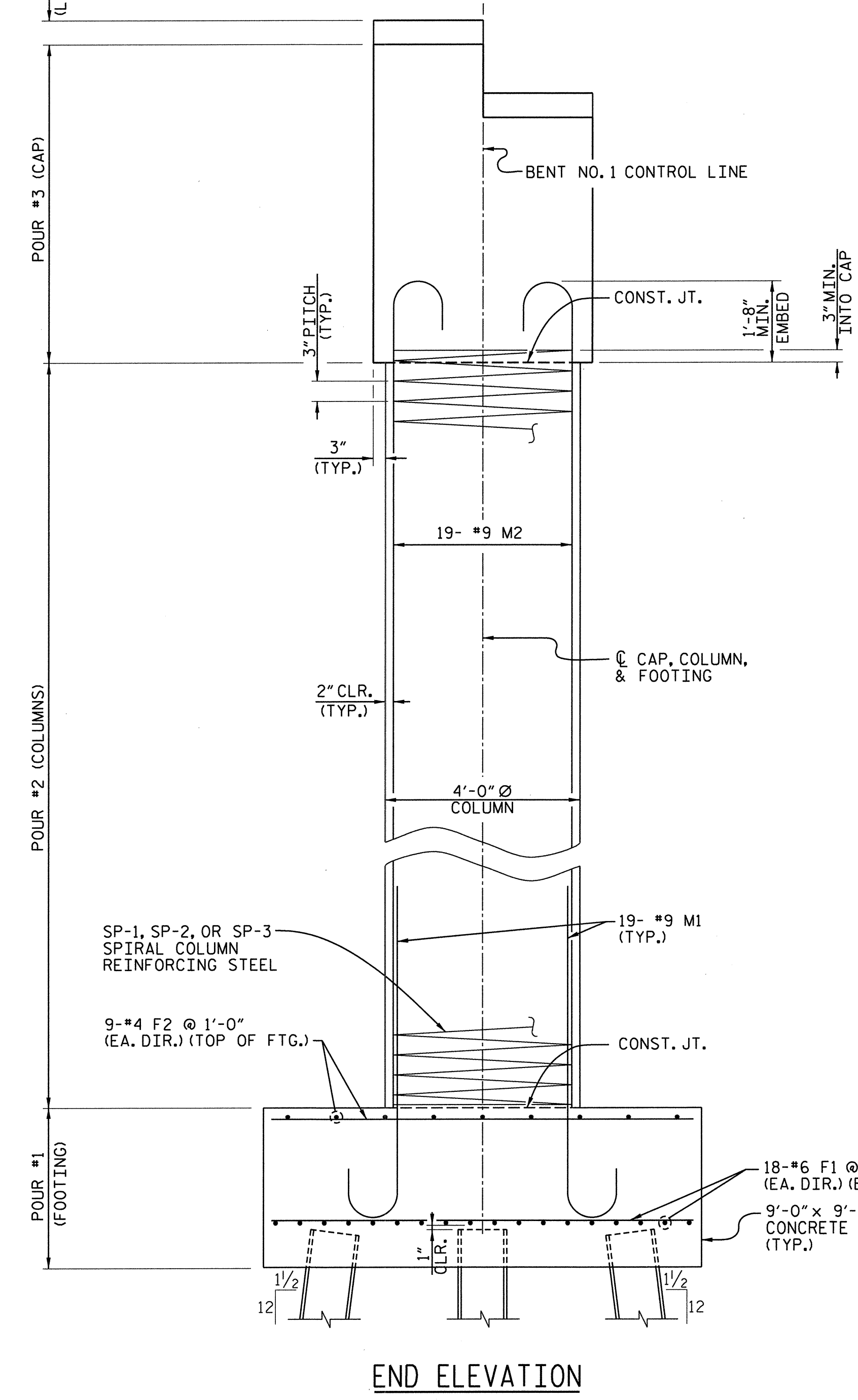
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	15	#10	1	49'-2"	3174
B2	10	#5	STR	46'-5"	484
B3	3	#6	STR	46'-5"	209
D1	48	#6	STR	1'-6"	108
F1	108	#6	STR	8'-6"	1379
F2	54	#4	STR	8'-6"	307
M1	57	#9	2	8'-4"	1615
M2	57	#9	2	23'-10"	4619
S1	120	#4	3	14'-2"	1136
S2	47	#4	4	7'-5"	233
S3	4	#4	4	5'-2"	14
S4	4	#4	4	5'-1"	14
S5	4	#4	4	4'-11"	13
U1	8	#4	4	7'-0"	37
U2	4	#4	4	4'-9"	13
U3	4	#4	4	8'-10"	24
U4	4	#4	4	7'-6"	20

**REINFORCING STEEL (FOR BENT NO. 1)** 13,399 LBS.

SP1	1	*	5	979'-8"	654
SP2	1	*	5	991'-1"	662
SP3	1	*	5	1002'-5"	670

**SPIRAL COLUMN REINFORCING STEEL (FOR BENT NO. 1)** 1986 LBS.

\* ALL SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.



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**CLASS A CONCRETE BREAKDOWN (FOR BENT NO. 1)**

POUR #1 (FOOTINGS)	29.3 C.Y.
POUR #2 (COLUMNS)	28.8 C.Y.
POUR #3 (CAP)	44.8 C.Y.
POUR #4 (LATERAL GUIDES)	0.4 C.Y.
<b>TOTAL CLASS A CONCRETE</b>	<b>103.3 C.Y.</b>

BENT NO. 1  
HP 12 x 53 STEEL PILES  
NO: 24  
LIN. FT. = 1080

STEEL PILE POINTS  
NO: 24

PROJECT NO. R-5522  
RUTHERFORD COUNTY  
STATION: 21+10.21 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SUBSTRUCTURE BENT NO. 1**

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

JAN 2012

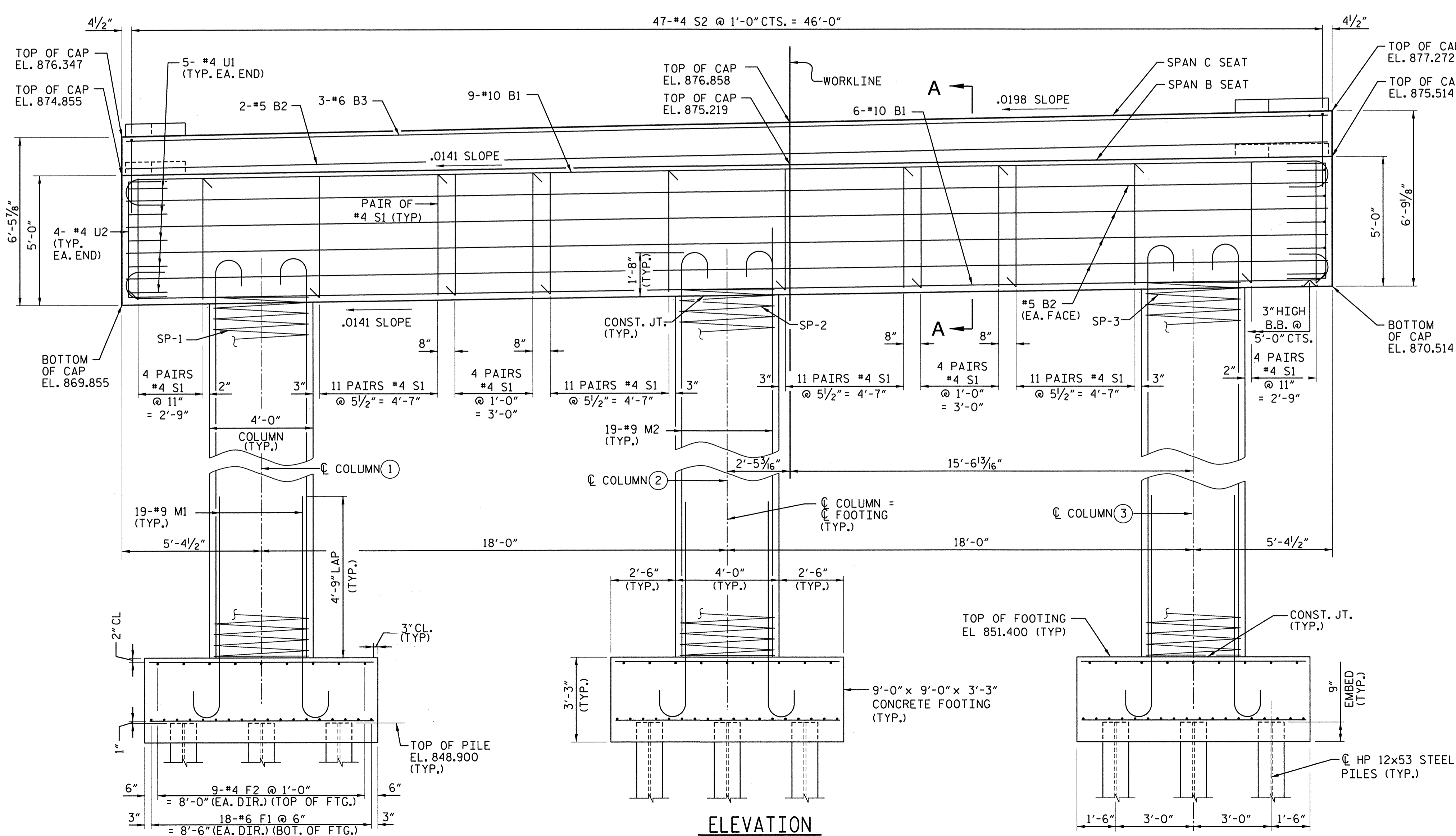
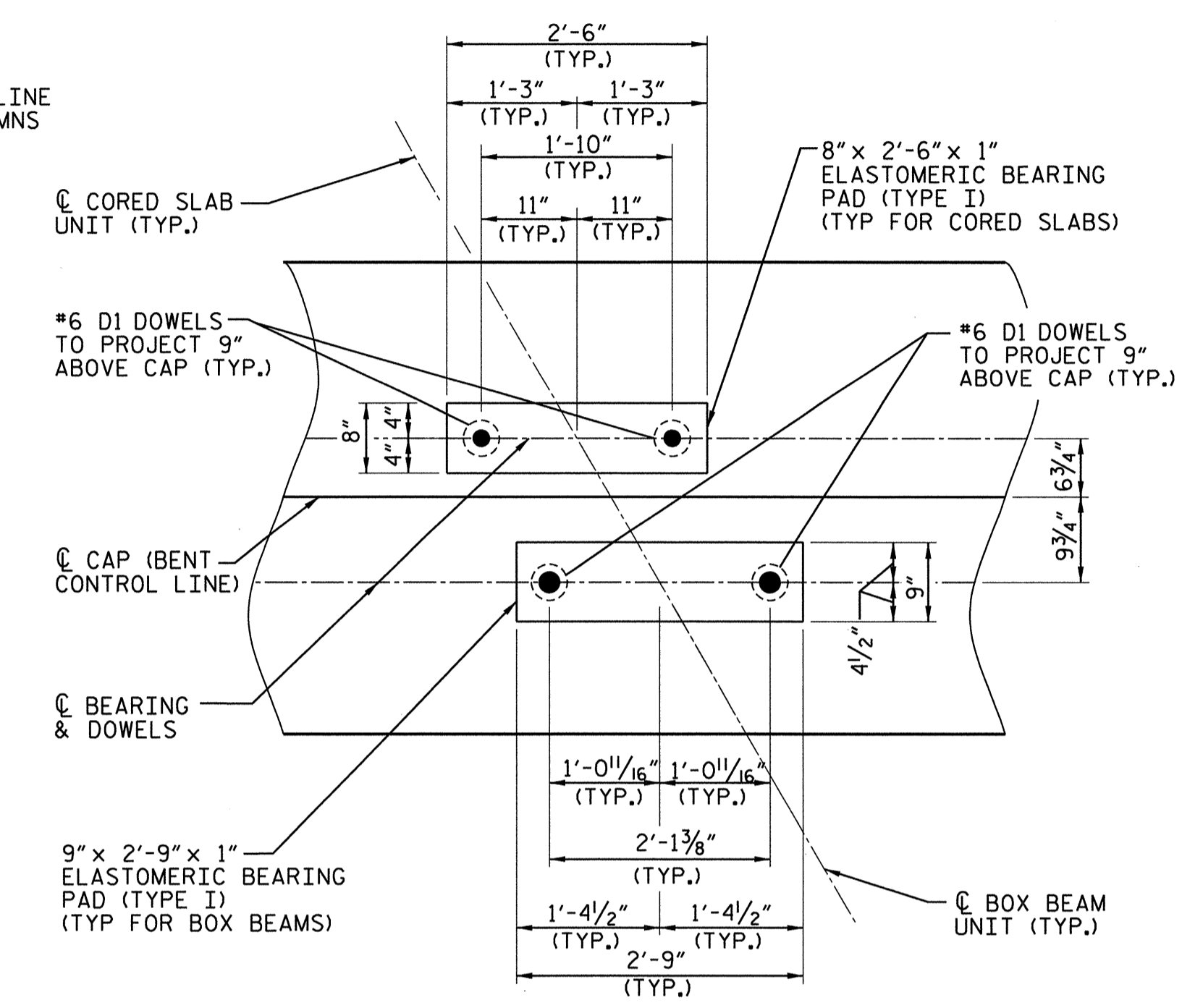
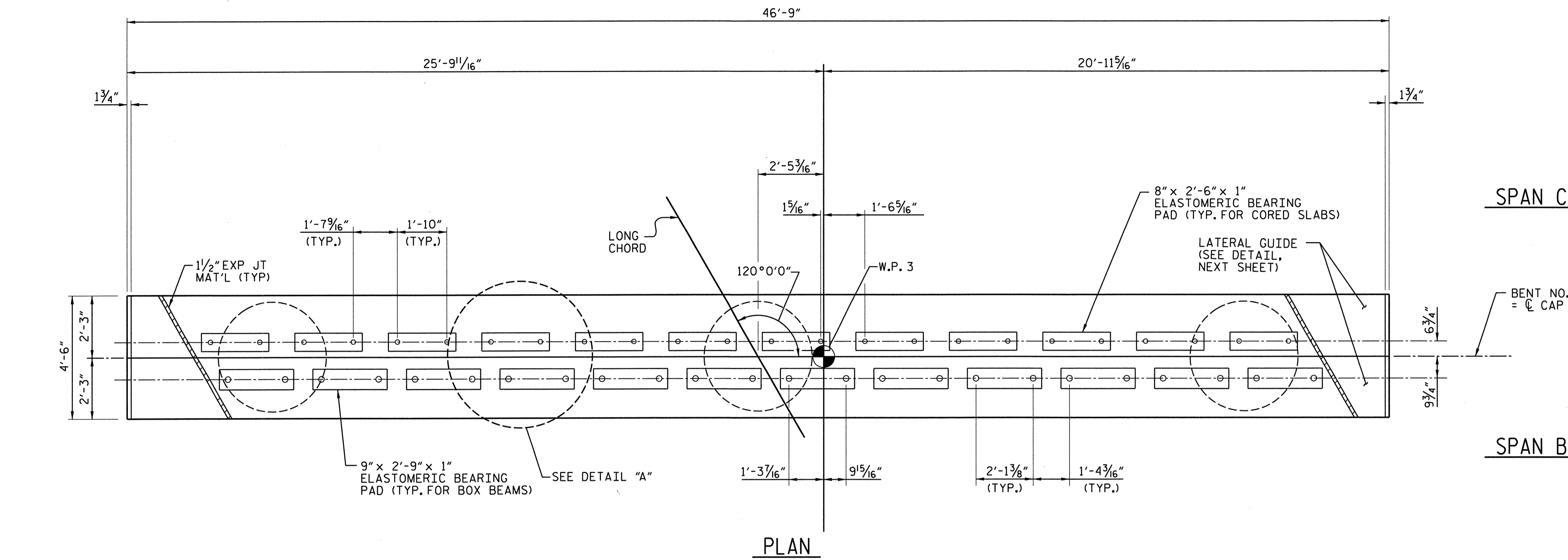
SHEET NO. S-22  
TOTAL SHEETS 30

DWN. BY: MAF  
CHKD. BY: HLW

DATE: JAN. 2012  
DATE: JAN. 2012

**NOTES:**

- STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.
- HOOKS ON "M" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.
- INVERT ALTERNATE PAIRS OF STIRRUPS.
- THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDE IF APPROVED BY THE ENGINEER.



COLUMN DIMENSIONS			
COLUMN DESIGNATION	①	②	③
TOP OF COLUMN ELEV *	869.931	870.185	870.438
COLUMN HEIGHT *	18'-6 3/8"	18'-9 1/16"	19'-0 7/16"

\* AT C COLUMN



PROJECT NO. R-5522  
 RUTHERFORD COUNTY  
 STATION: 21+10.21 -L-

SHEET 1 OF 2

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 828-253-2795

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**SUBSTRUCTURE BENT NO. 2**

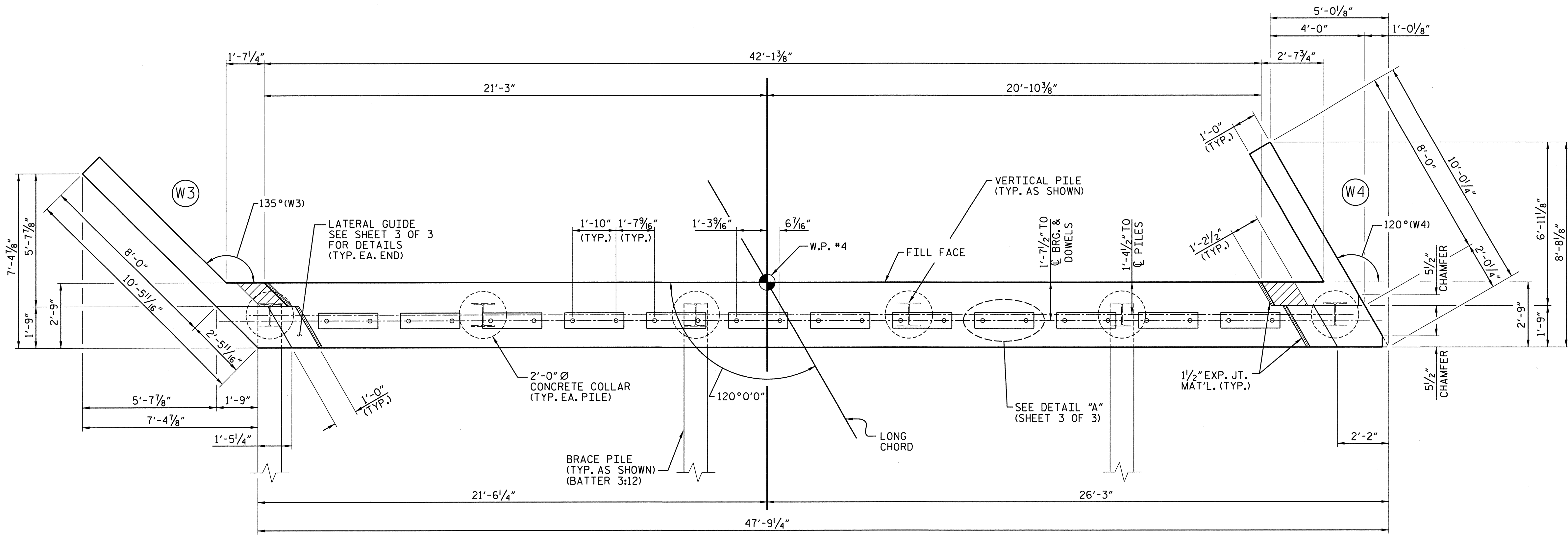
JAN 2012

NO.	BY:	DATE:	REVISIONS		SHEET NO.
			NO.	DATE:	
1	MAF	JAN. 2012	3		S-23
2	HLW	JAN. 2012	4		TOTAL SHEETS 30

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND FOOTING UNLESS OTHERWISE NOTED.







PLAN

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

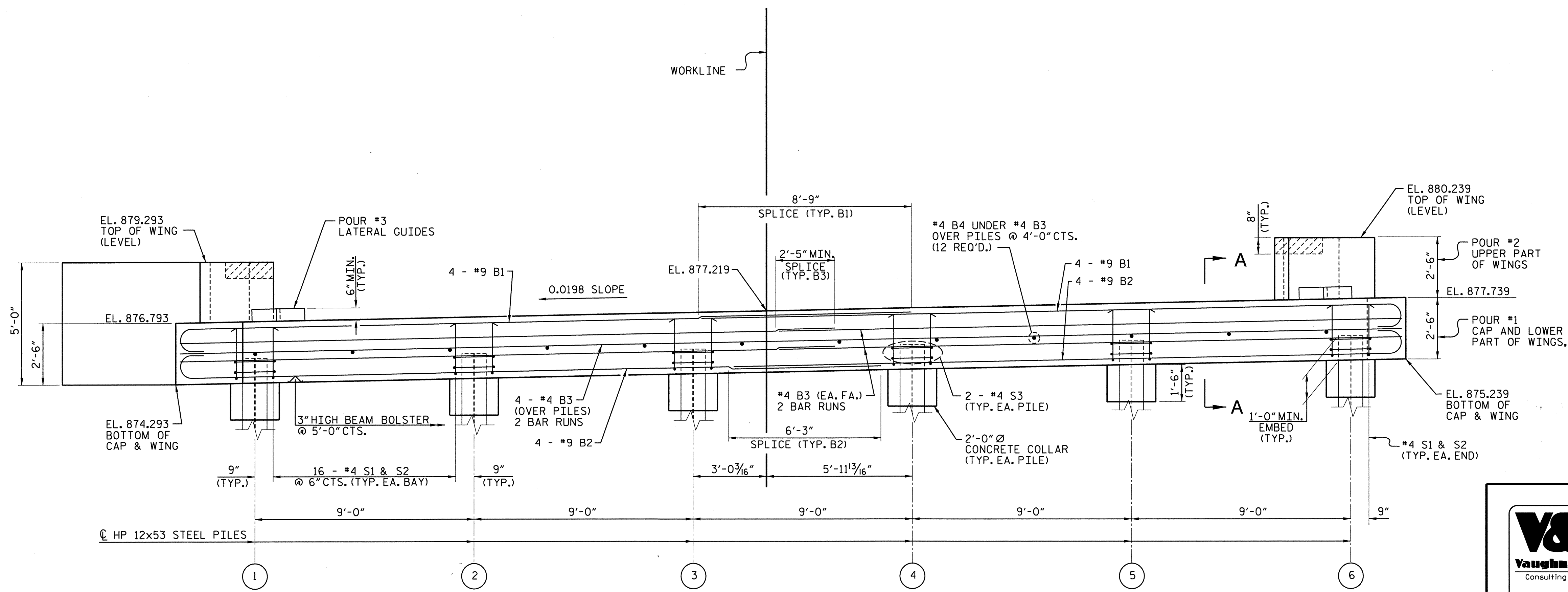
FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WING DETAILS, SEE SHEET 2 OF 3.

THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDE IF APPROVED BY THE ENGINEER.

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS, REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

TOP OF PILE ELEVATIONS	
1	875.303
2	875.481
3	875.659
4	875.838
5	876.016
6	876.194



ELEVATION  
WINGS NOT SHOWN FOR CLARITY.



PROJECT NO. R-5522  
 RUTHERFORD COUNTY  
 STATION: 21+10.21 -L-  
 SHEET 1 OF 3

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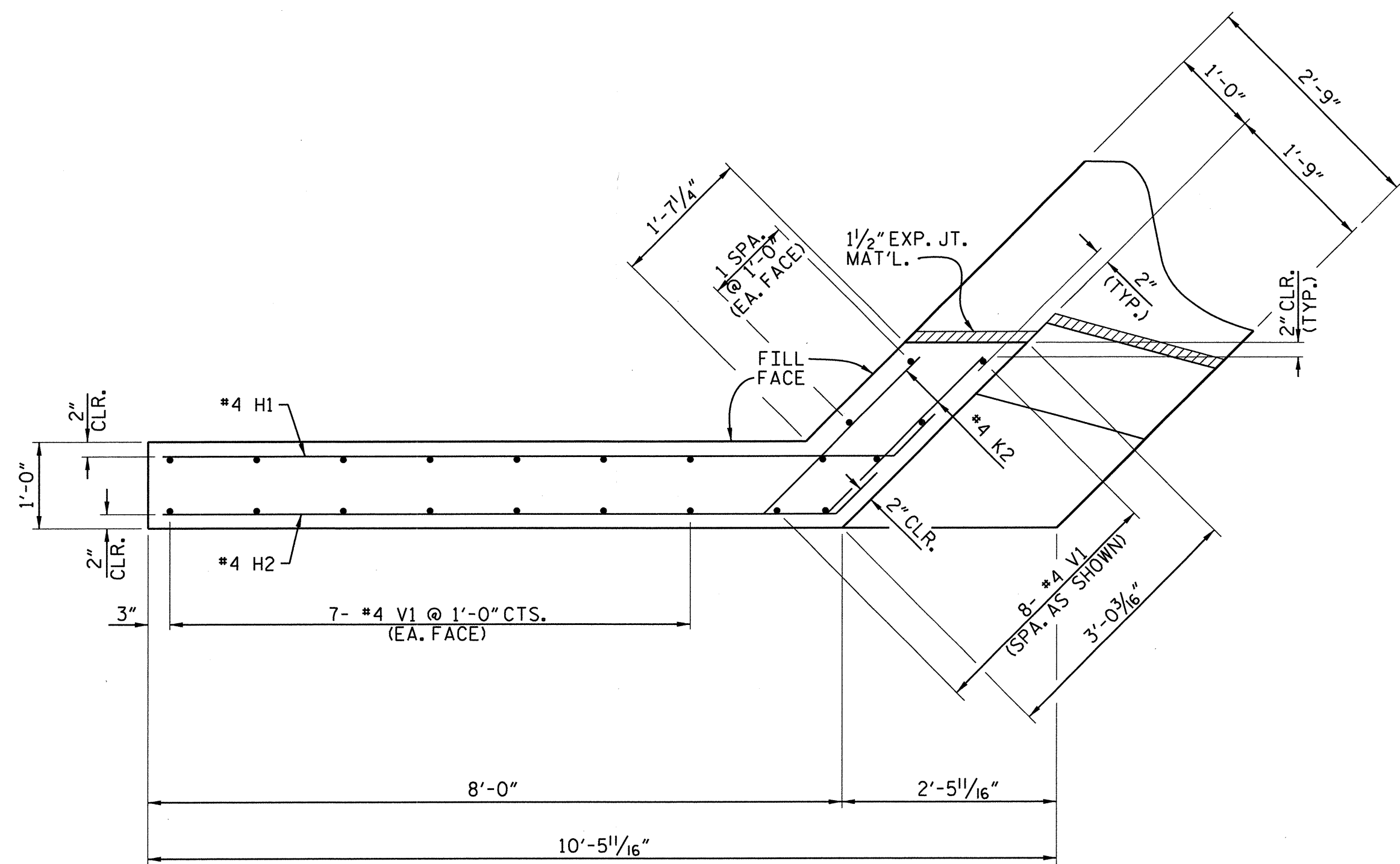
**SUBSTRUCTURE  
 END BENT NO. 2**

JAN 2012

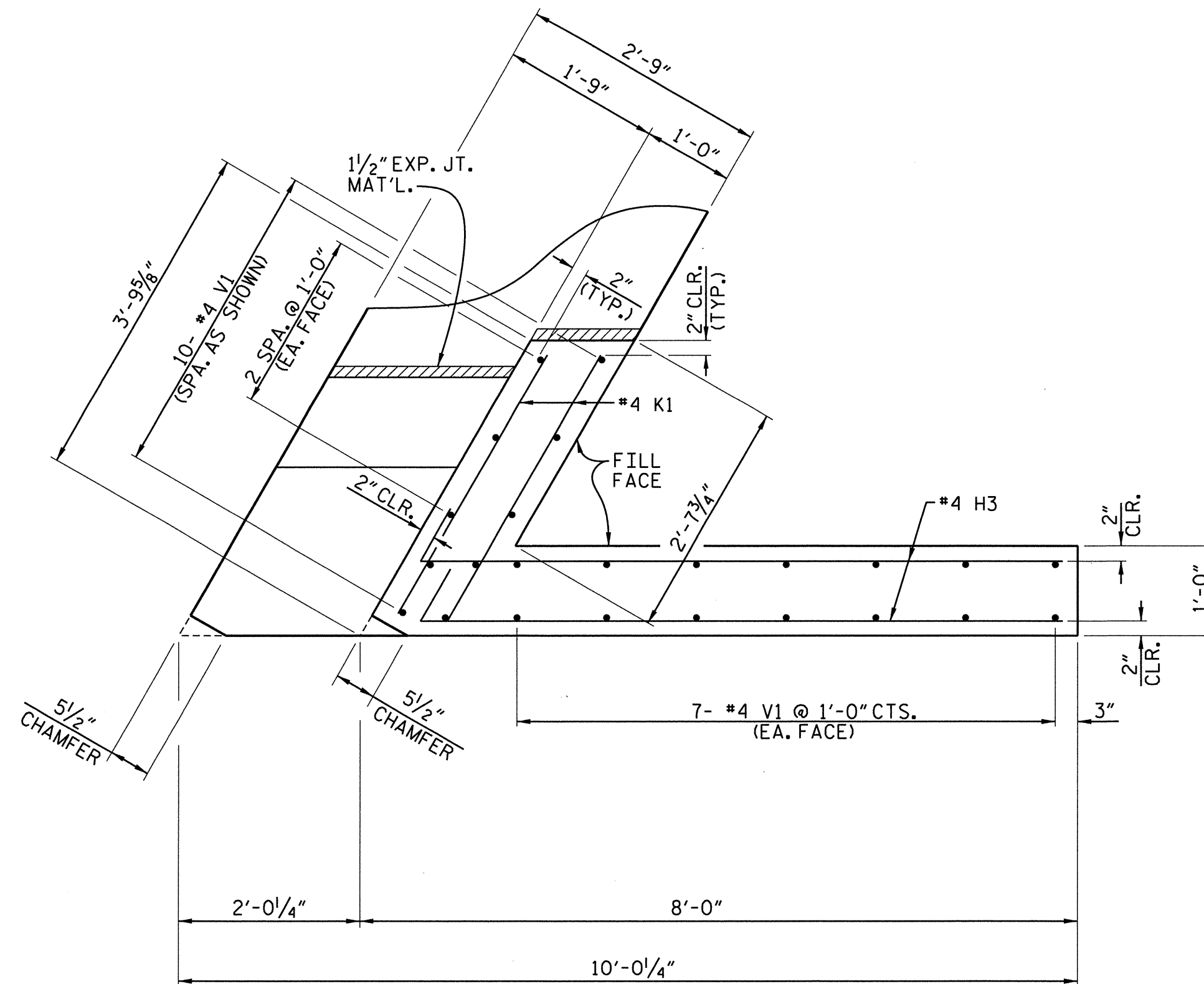
REVISIONS			
NO.	BY:	DATE:	DATE:
1			
2			
3			
4			

SHEET NO. S-25  
 TOTAL SHEETS 30

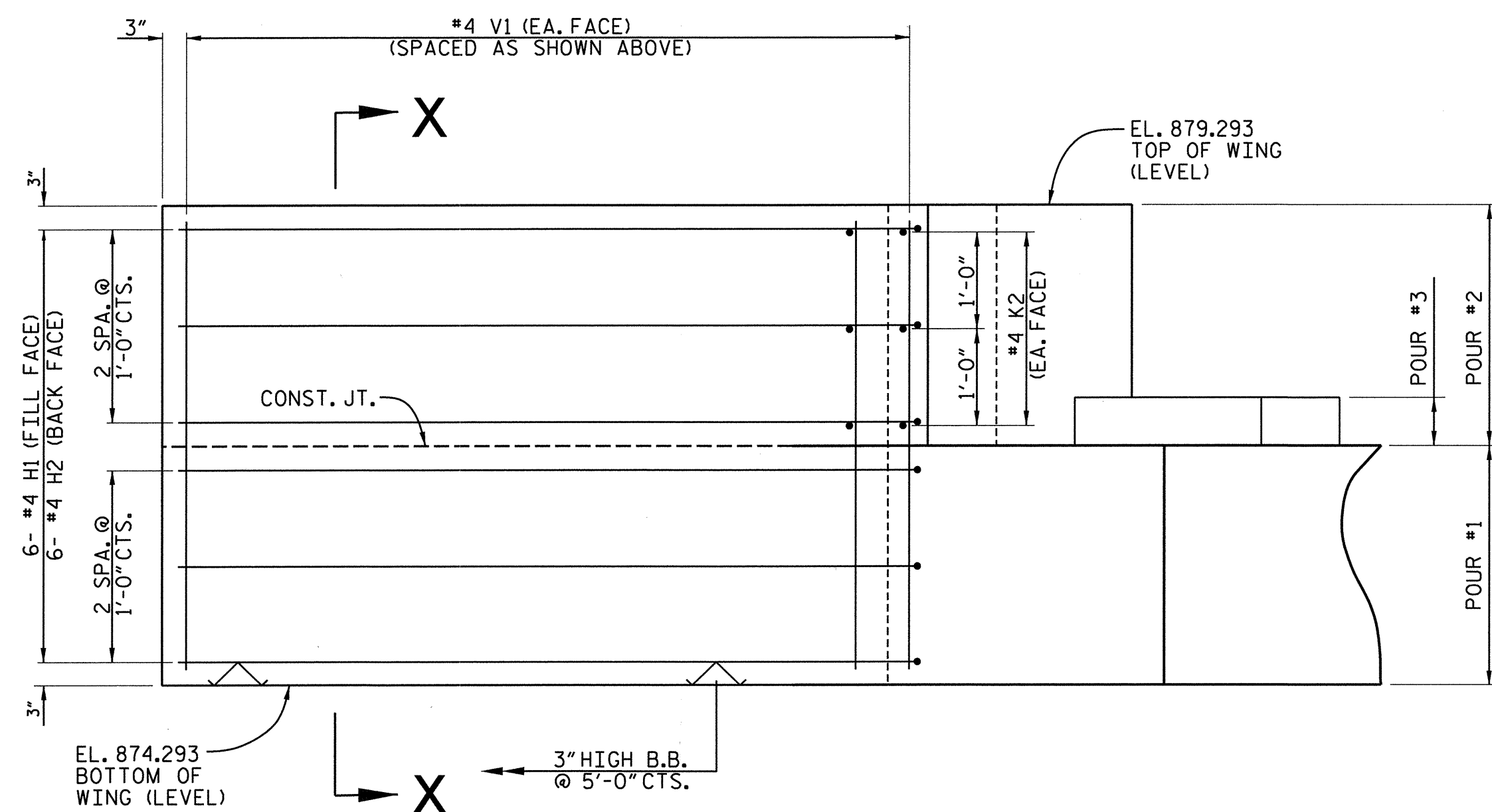
DWN. BY: MAF DATE: JAN. 2012  
 CHKD. BY: HLW DATE: JAN. 2012



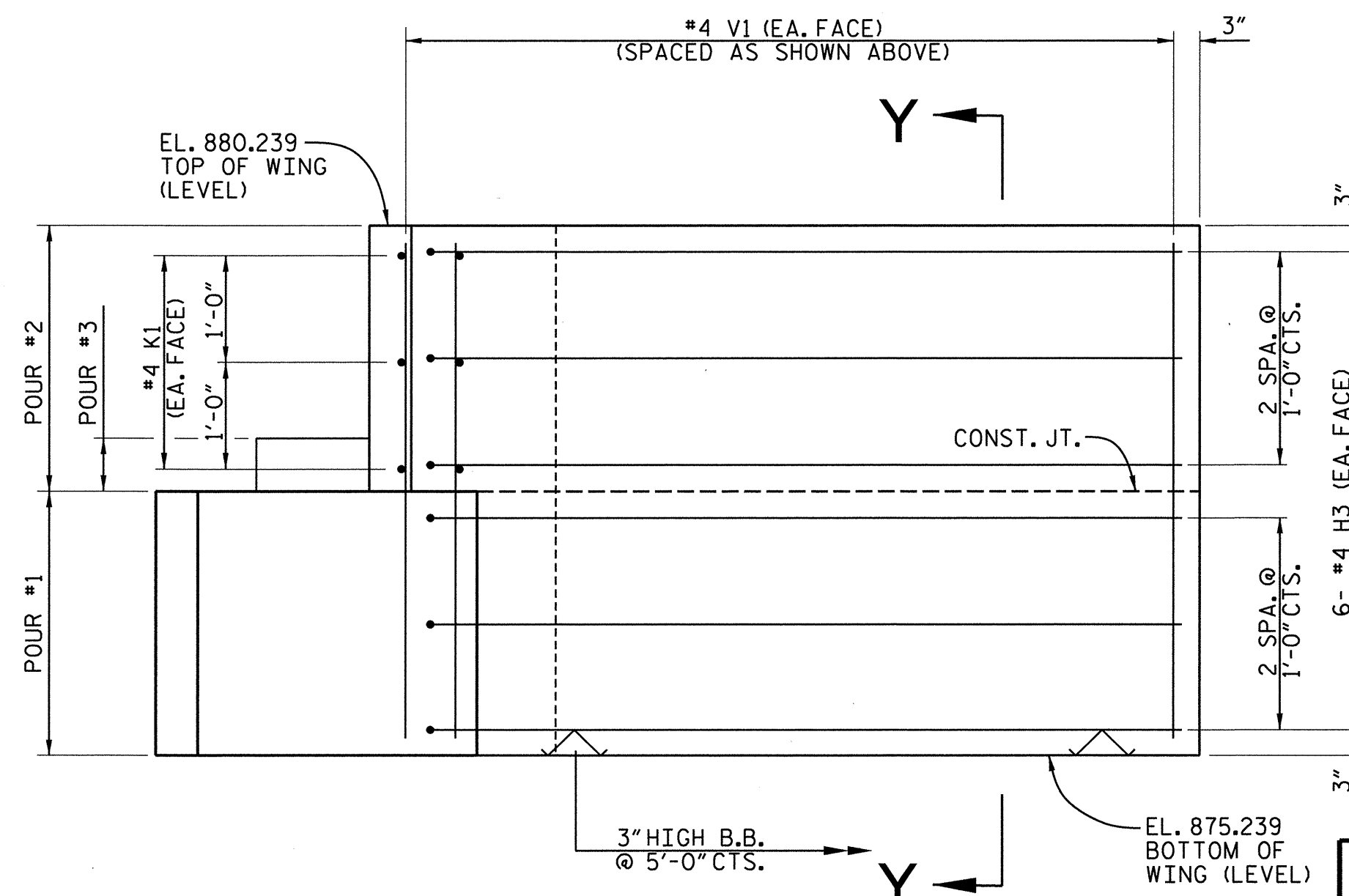
PLAN - WING (W3)



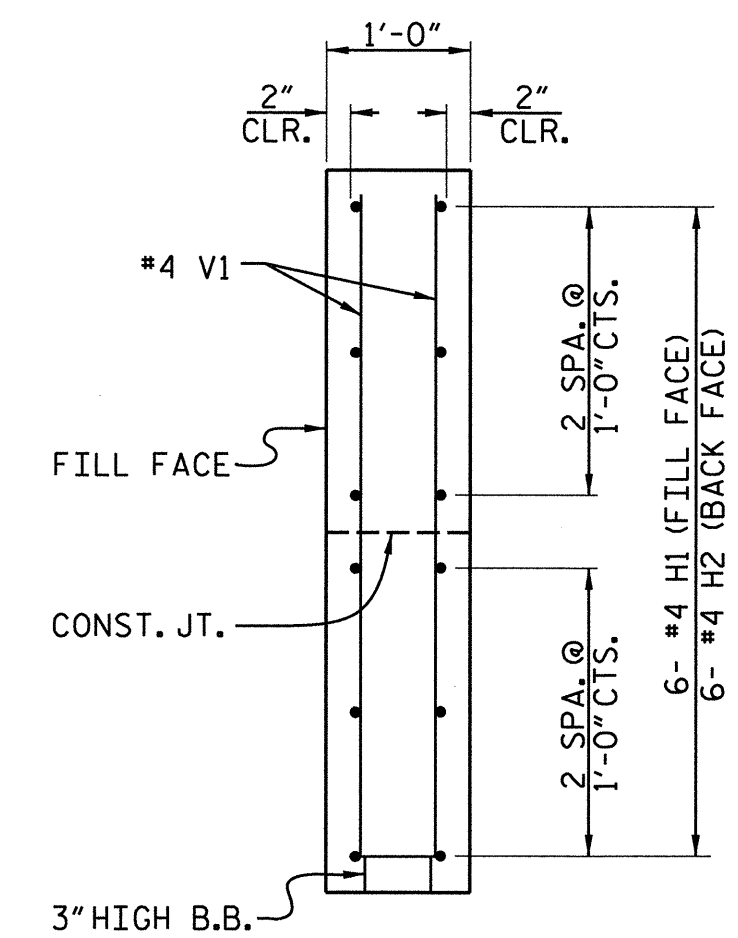
PLAN - WING (W4)



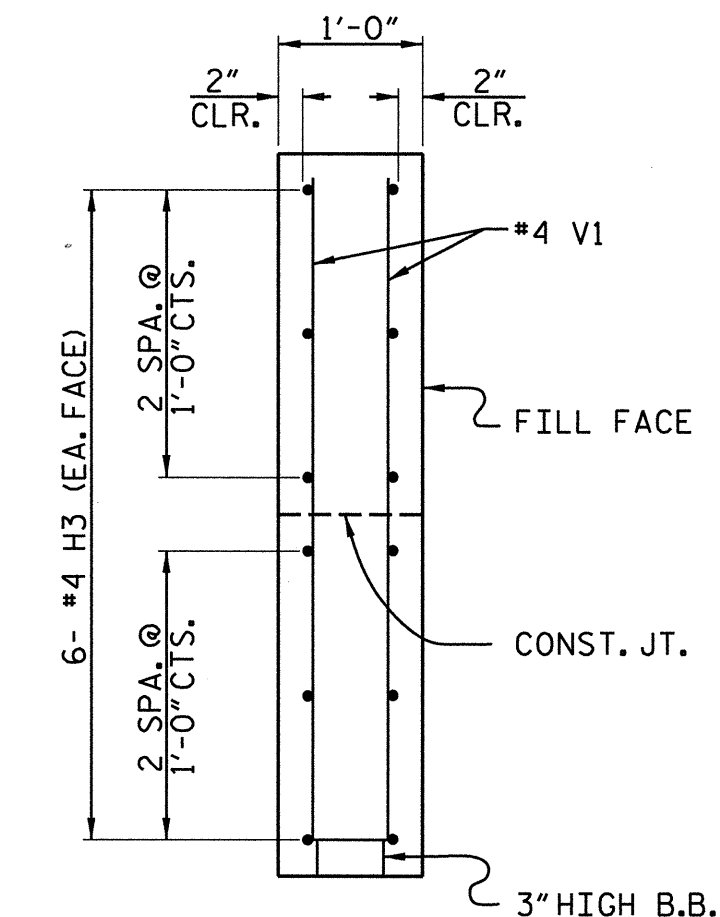
ELEVATION - WING (W3)



ELEVATION - WING (W4)



SECTION X-X



SECTION Y-Y

WING DETAILS



PROJECT NO. R-5522  
 RUTHERFORD COUNTY  
 STATION: 21+10.21 -L-

SHEET 2 OF 3

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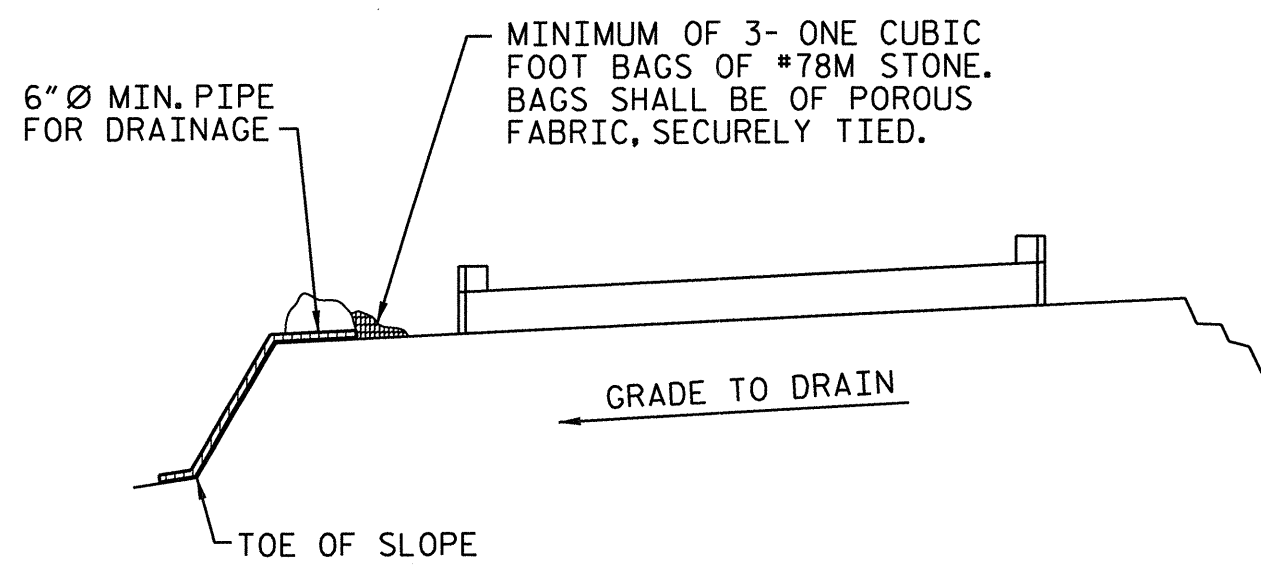
SUBSTRUCTURE  
 END BENT NO. 2

DWN. BY: MAF  
 CHKD. BY: HLW

DATE: JAN. 2012  
 DATE: JAN. 2012

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

JAN 2012  
 SHEET NO. S-26  
 TOTAL SHEETS 30

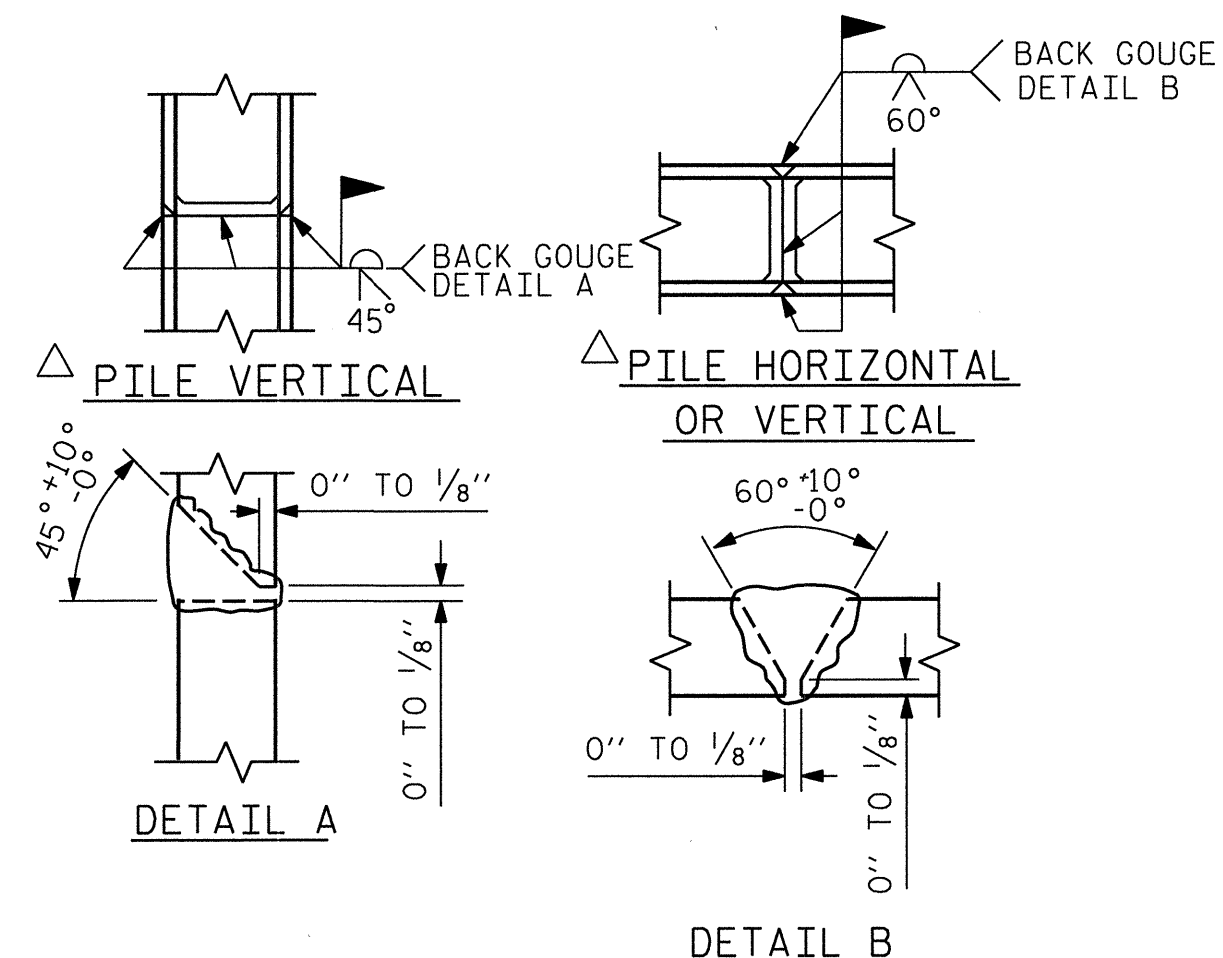


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

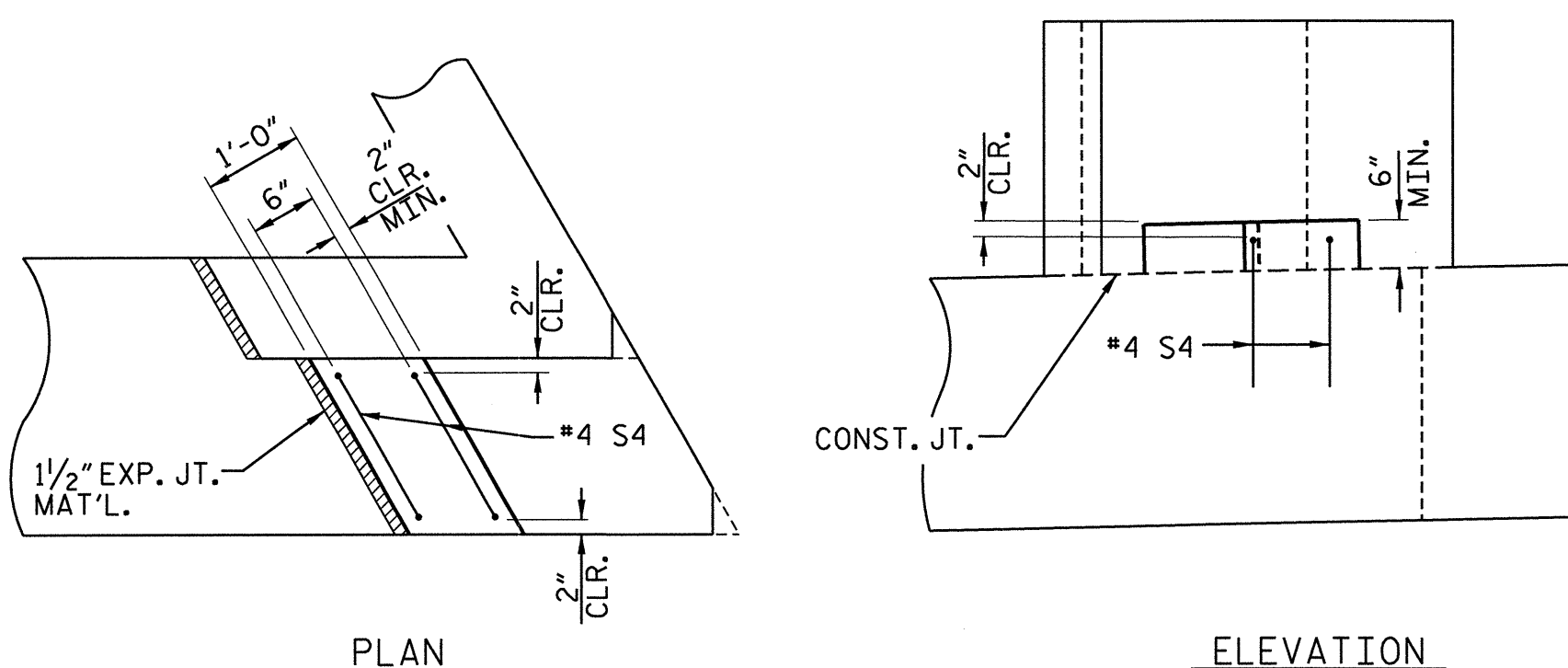
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

### TEMPORARY DRAINAGE AT END BENT



POSITION OF PILE DURING WELDING.

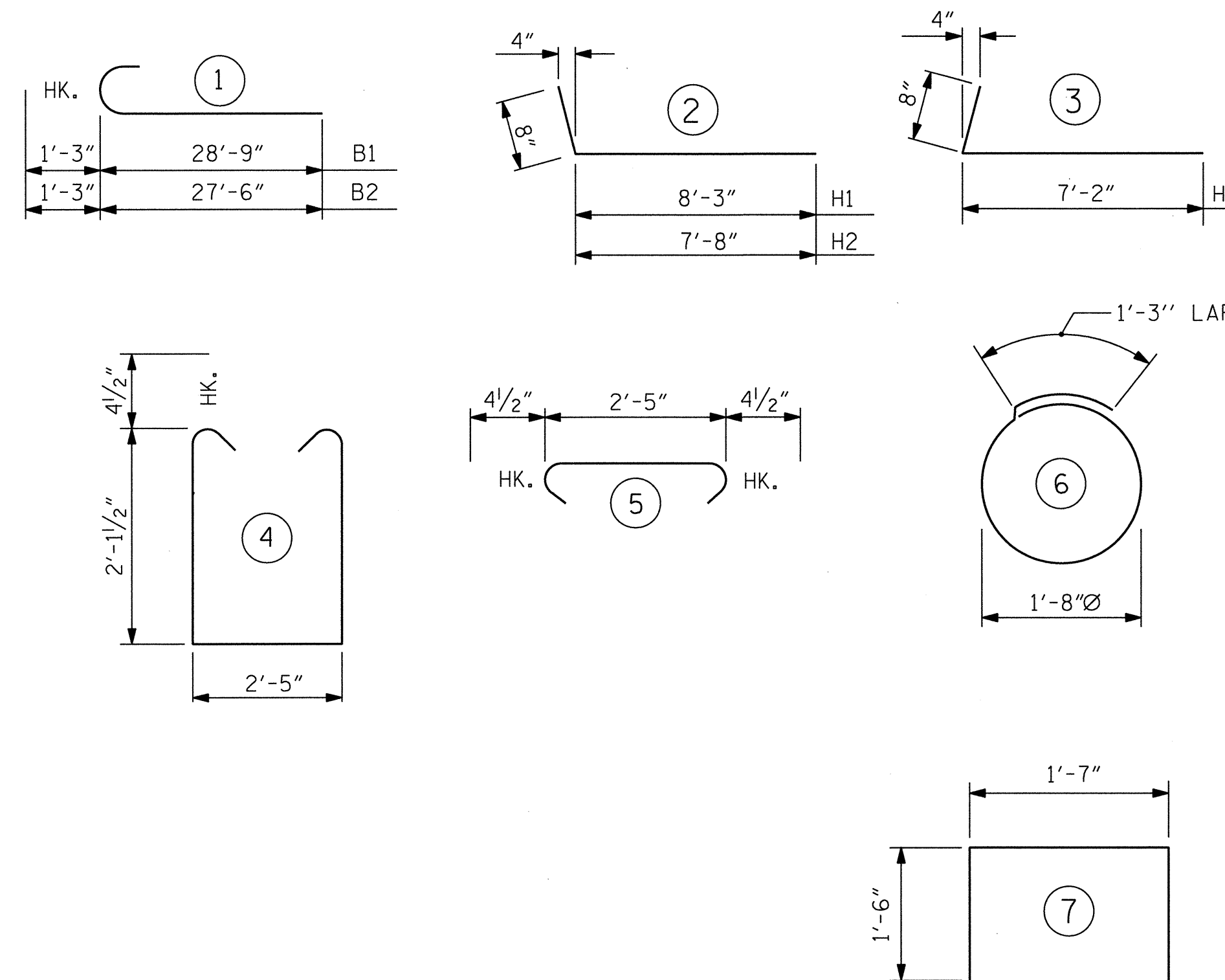
### PILE SPLICE DETAILS



### LATERAL GUIDE DETAILS

RIGHT LATERAL GUIDE SHOWN, LEFT END SIMILAR.

### BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

### BILL OF MATERIAL FOR END BENT NO. 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	30'-0"	816
B2	8	#9	1	28'-9"	782
B3	16	#4	STR	25'-7"	273
B4	12	#4	STR	2'-5"	19
D1	24	#6	STR	1'-6"	54
H1	6	#4	2	8'-11"	36
H2	6	#4	2	8'-4"	33
H3	12	#4	3	7'-10"	63
K1	6	#4	STR	3'-2"	13
K2	6	#4	STR	2'-5"	10
S1	82	#4	4	7'-5"	406
S2	82	#4	5	3'-2"	173
S3	12	#4	6	6'-6"	52
S4	4	#4	7	4'-7"	12
V1	46	#4	STR	4'-8"	143

REINFORCING STEEL (FOR END BENT #2) 2885 LBS.

### CLASS A CONCRETE BREAKDOWN (FOR END BENT NO. 2)

POUR #1 CAP, LOWER PART OF WINGS, AND CONCRETE COLLARS	14.5 C.Y.
POUR #2 UPPER PART OF WINGS	2.1 C.Y.
POUR #3 LATERAL GUIDES	0.1 C.Y.
<b>TOTAL CLASS A CONCRETE</b>	<b>16.7 C.Y.</b>

END BENT NO. 2  
HP 12 x 53 STEEL PILES  
NO: 6 LIN. FT. = 360  
STEEL PILE POINTS  
NO: 6



PROJECT NO. R-5522

RUTHERFORD COUNTY

STATION: 21+10.21 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

### SUBSTRUCTURE END BENT NO. 2

JAN 2012

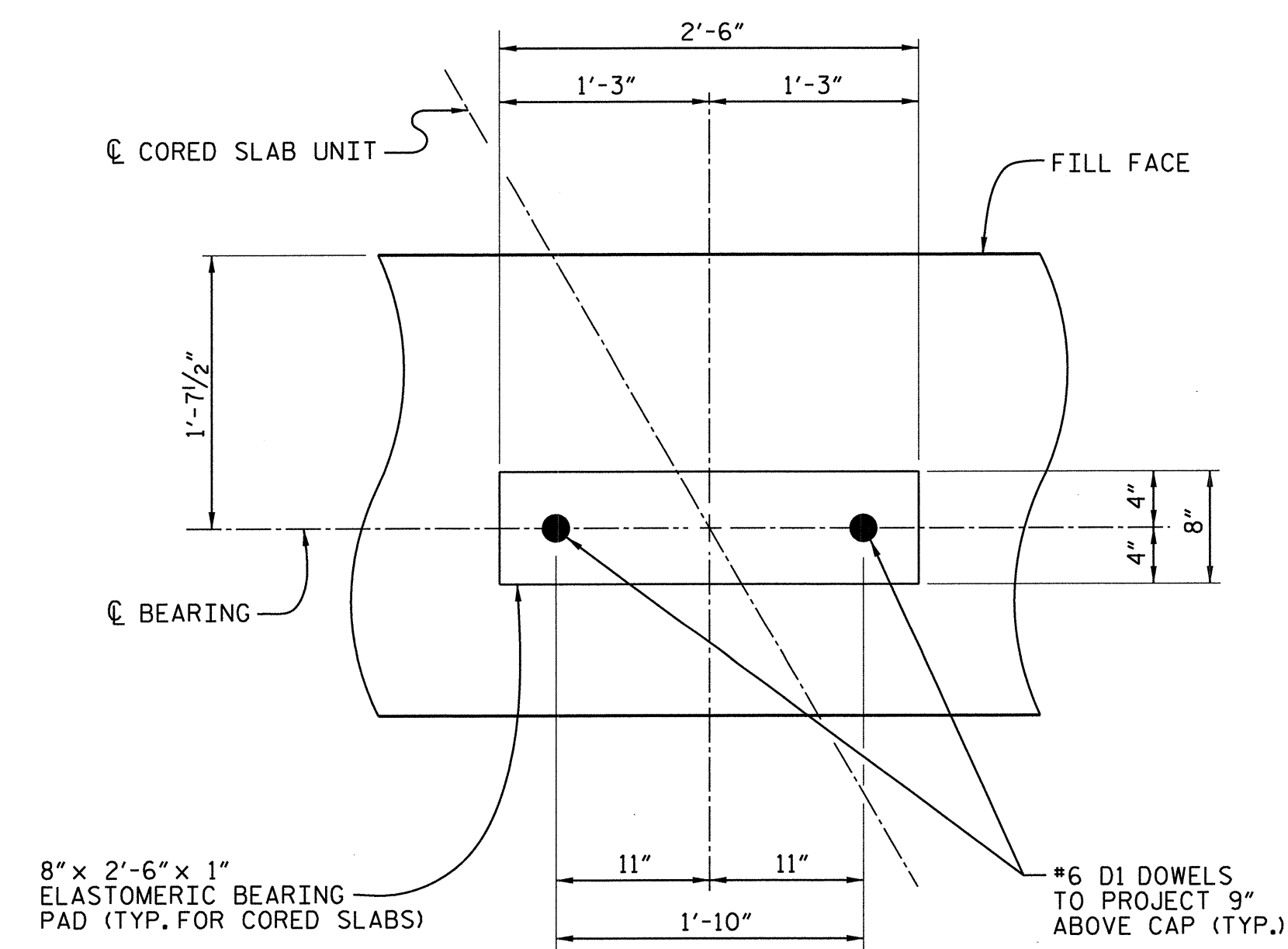
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-27
2			4			TOTAL SHEETS 30

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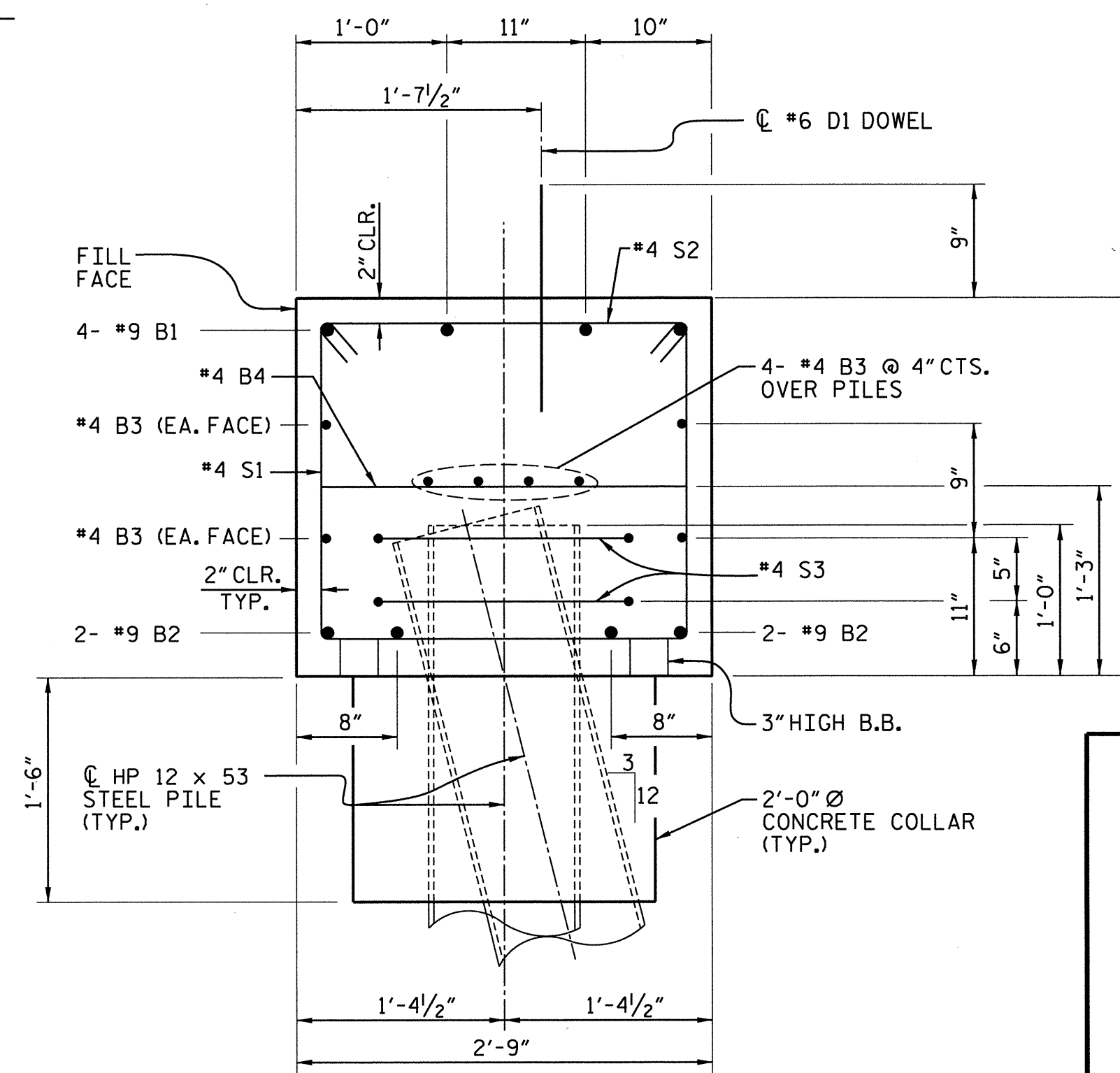
Charlotte, North Carolina 704 895 9051  
Tri-Cities, Tennessee 423 467 8401  
Knoxville, Tennessee 615 546 5800  
Middlesboro, Kentucky 606 248 6600  
Asheville, North Carolina 828 253 2796  
Spartanburg, South Carolina 864 574 4775

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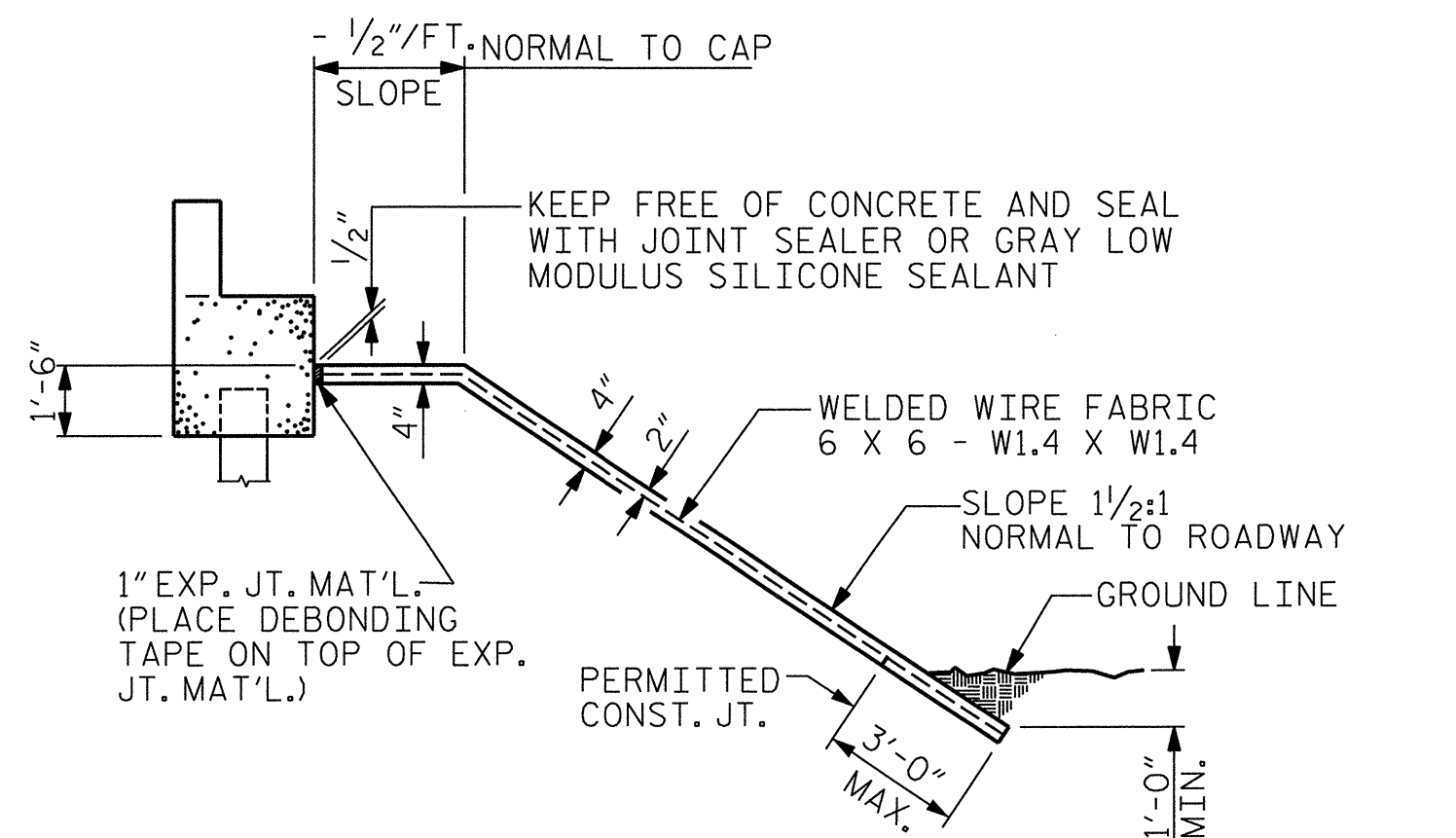
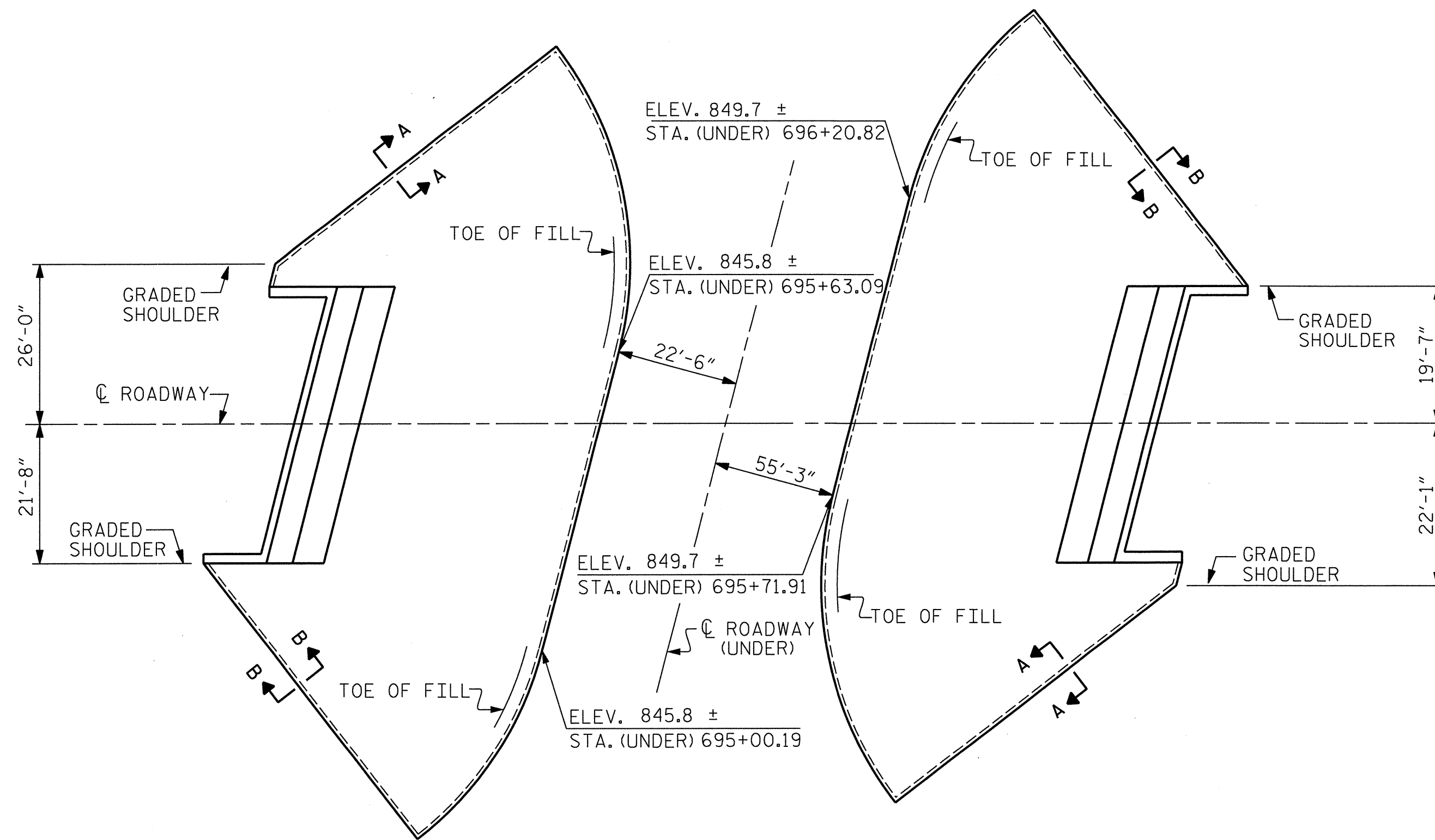
DWN. BY: MAF DATE: JAN. 2012  
CHKD. BY: HLW DATE: JAN. 2012



### DETAIL "A"

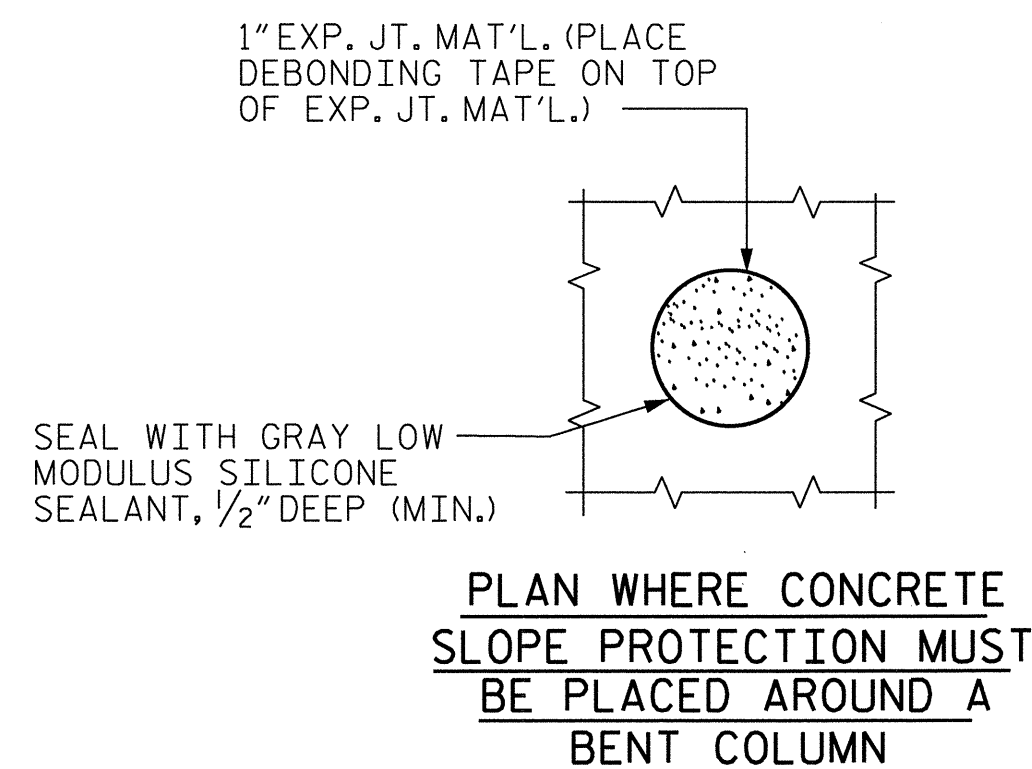


### SECTION A-A



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

DETAILS FOR ALTERNATE "A"

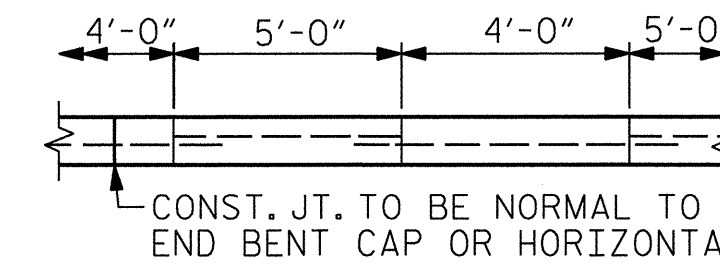


GENERAL NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

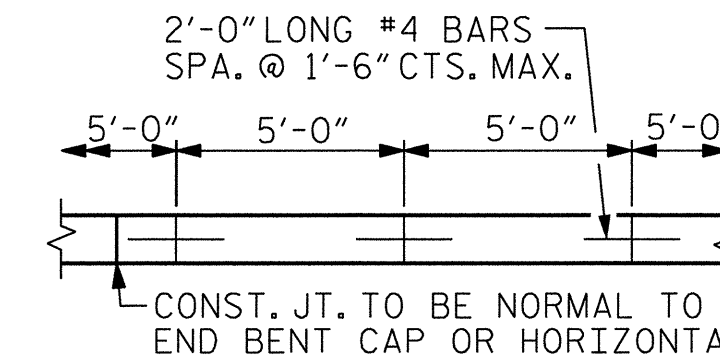
ALTERNATE "A"

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



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

OPTIONAL POURING DETAIL

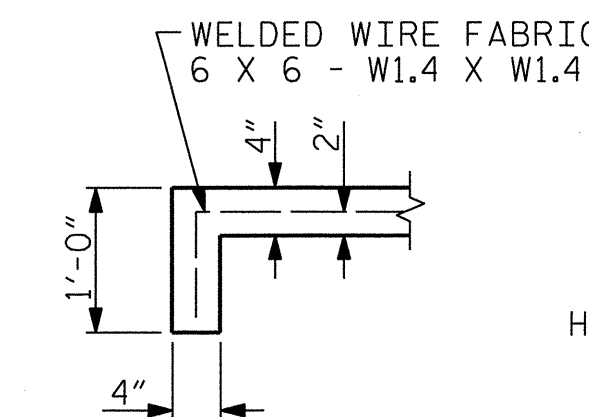


STRIP WIDTHS MAY VARY IN CURVED PORTION.

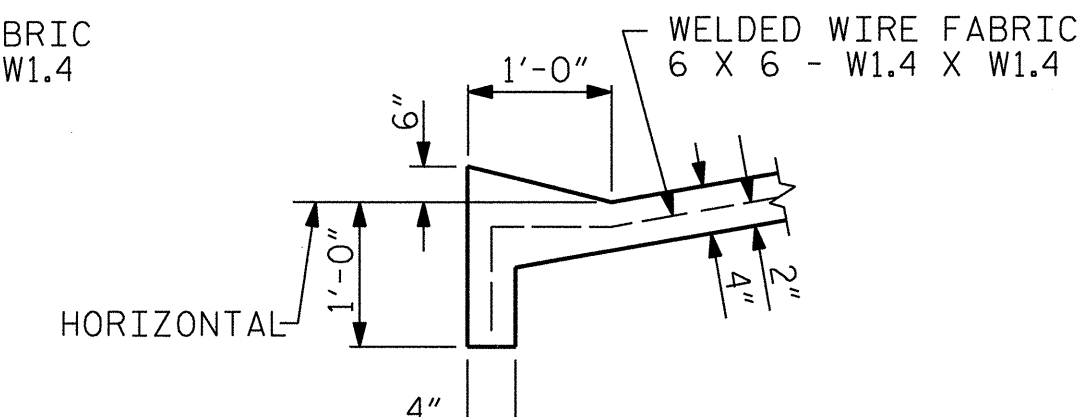
POURING DETAIL

BRIDGE @ STA. 21+10.21	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	565	1017
END BENT 2	535	963

\* QUANTITY SHOWN IS BASED ON 5' POURS.



SECTION A-A



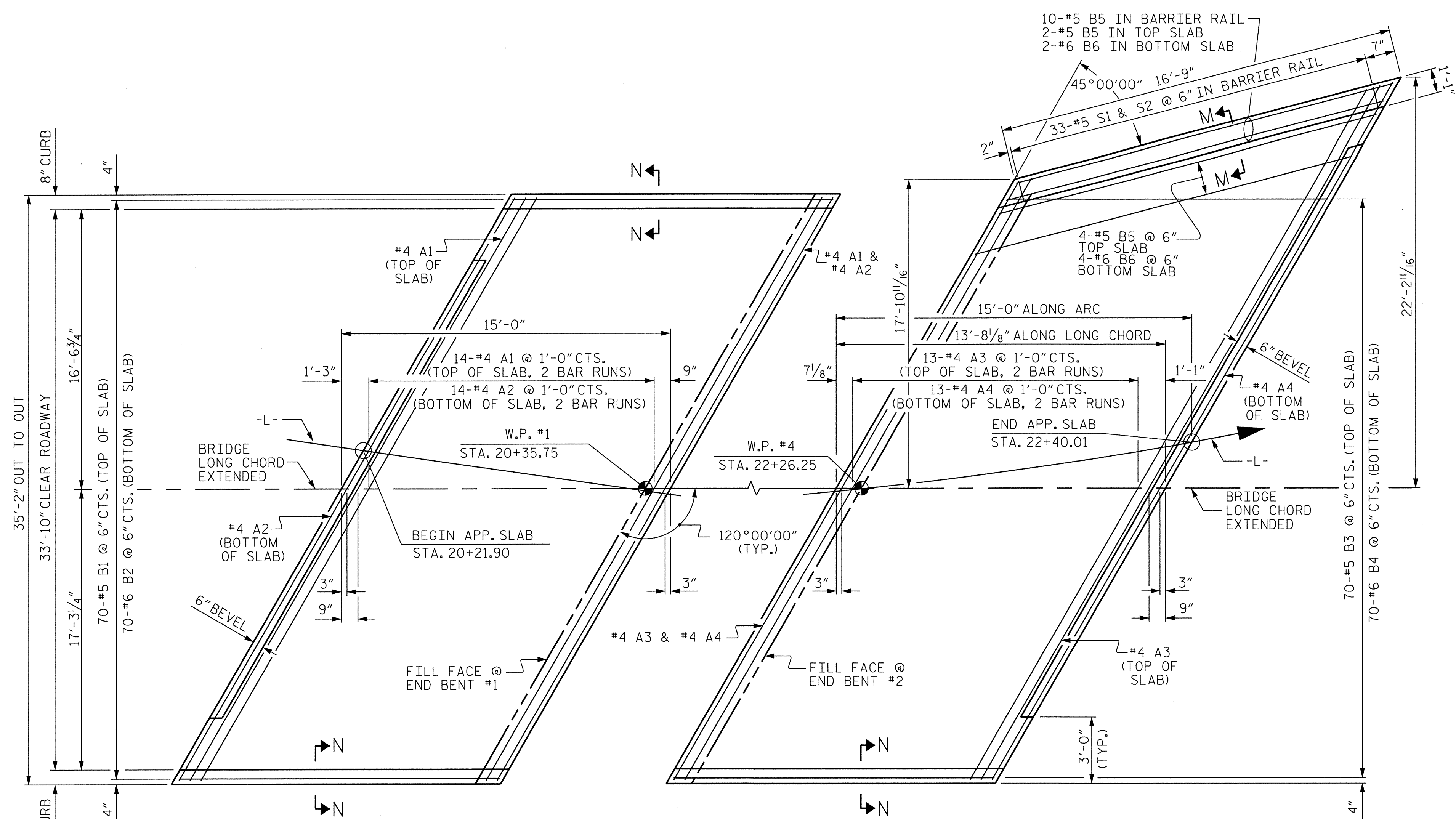
SECTION B-B

PROJECT NO. R-5522  
 RUTHERFORD COUNTY  
 STATION: 21+10.21 -L-

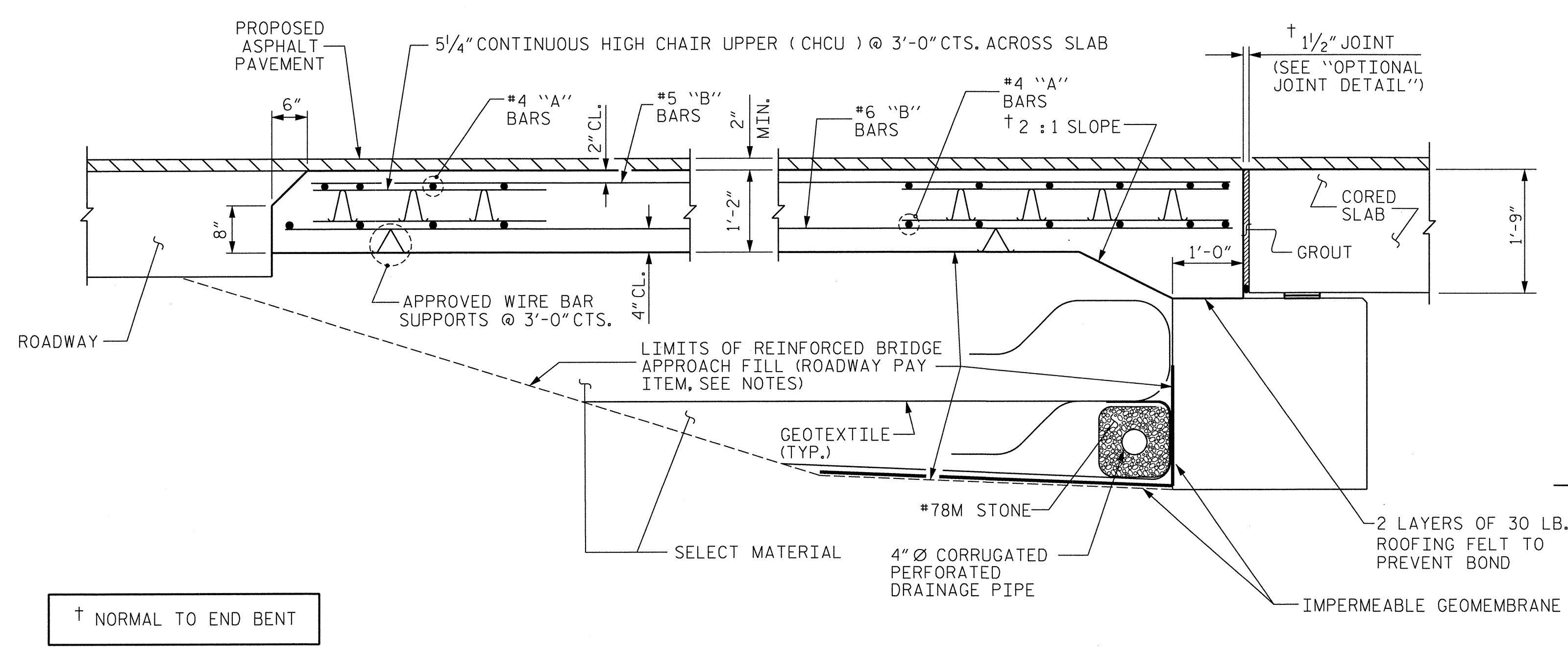
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-28
STANDARD SLOPE PROTECTION DETAILS						
REVISIONS						TOTAL SHEETS 30
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

NORTH CAROLINA PROFESSIONAL ENGINEER  
 HARDY L. WILLIS  
 2/10/12

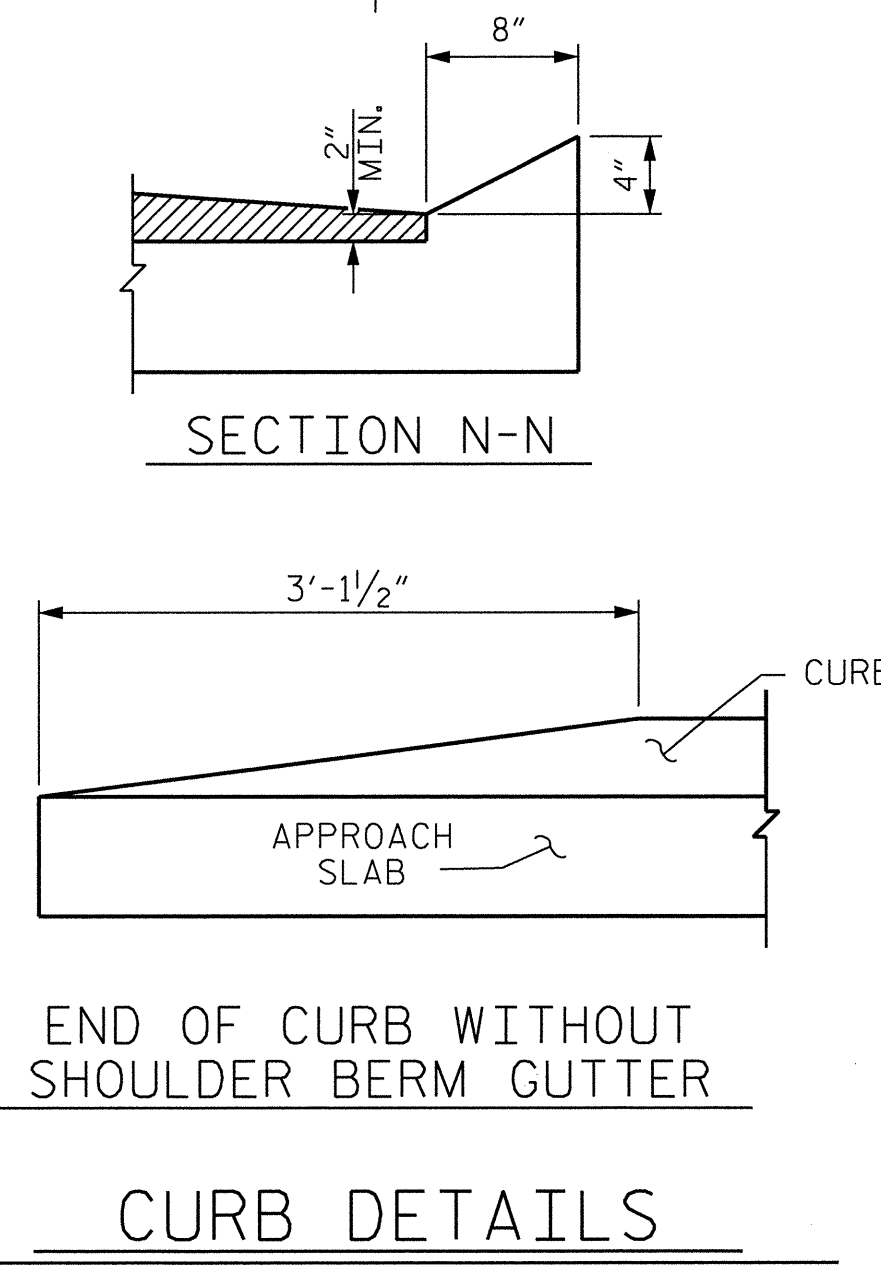
ASSEMBLED BY : MAF	DATE : 1/20/12
CHECKED BY : HLW	DATE : 1/20/12
DRAWN BY : ELR 5/92	REV. 5/7/03 RWW/JTE
CHECKED BY : GRP 6/92	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM



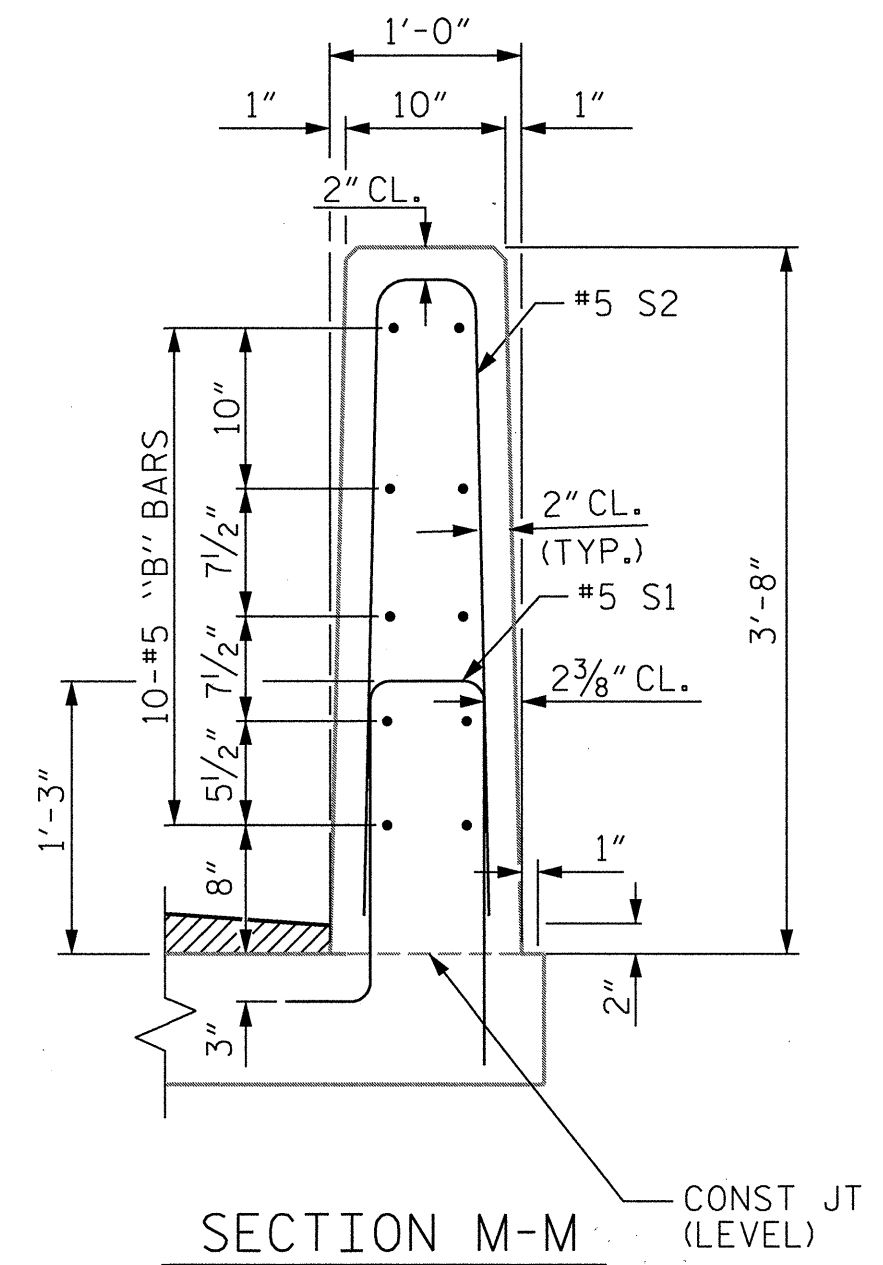
PLAN @ END BENT #1  
 PLAN @ END BENT #2  
 DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS UNLESS OTHERWISE NOTED



SECTION THRU SLAB



CURB DETAILS



SECTION M-M

**NOTES**

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4\"/>

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 JOINT DETAILS, SEE "PRESTRESSED CONCRETE CORED SLAB UNIT" SHEETS.

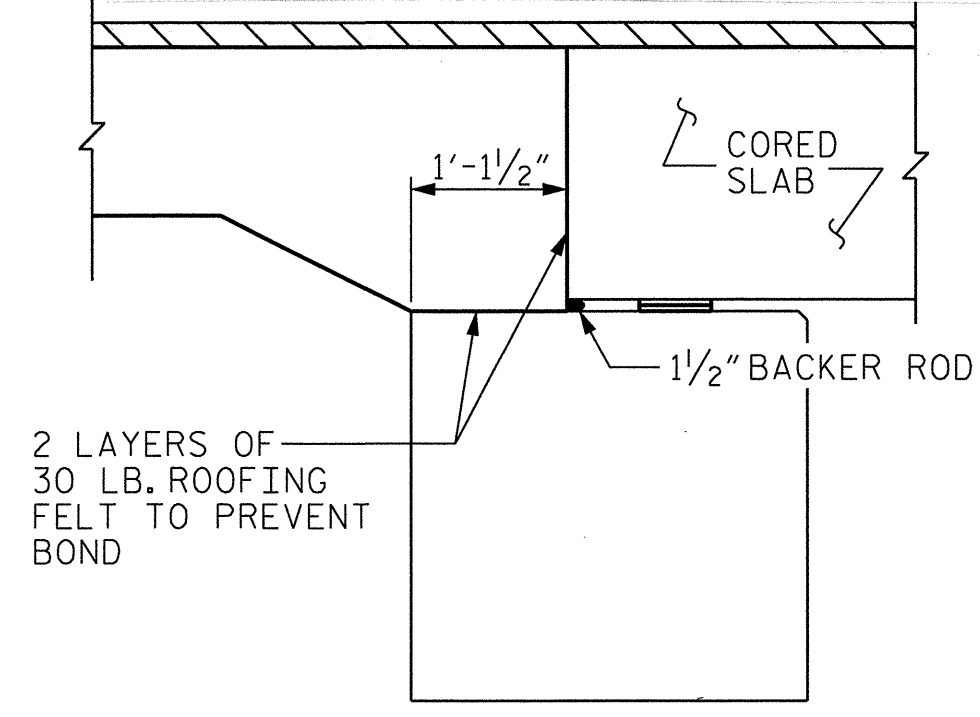
THE JOINT AT THE END BENT SHALL BE GROUTED AS SOON AS PRACTICAL AFTER THE CONSTRUCTION OF THE APPROACH SLABS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

THE CONTRACTOR HAS THE OPTION TO OMIT GROUT BETWEEN THE APPROACH SLAB AND THE CORED SLAB UNITS AND POUR THE APPROACH SLAB DIRECTLY AGAINST THE CORED SLAB UNITS. SEE "OPTIONAL JOINT DETAIL".

BARS A1 & A3 SHALL HAVE A 2'-0\"/>

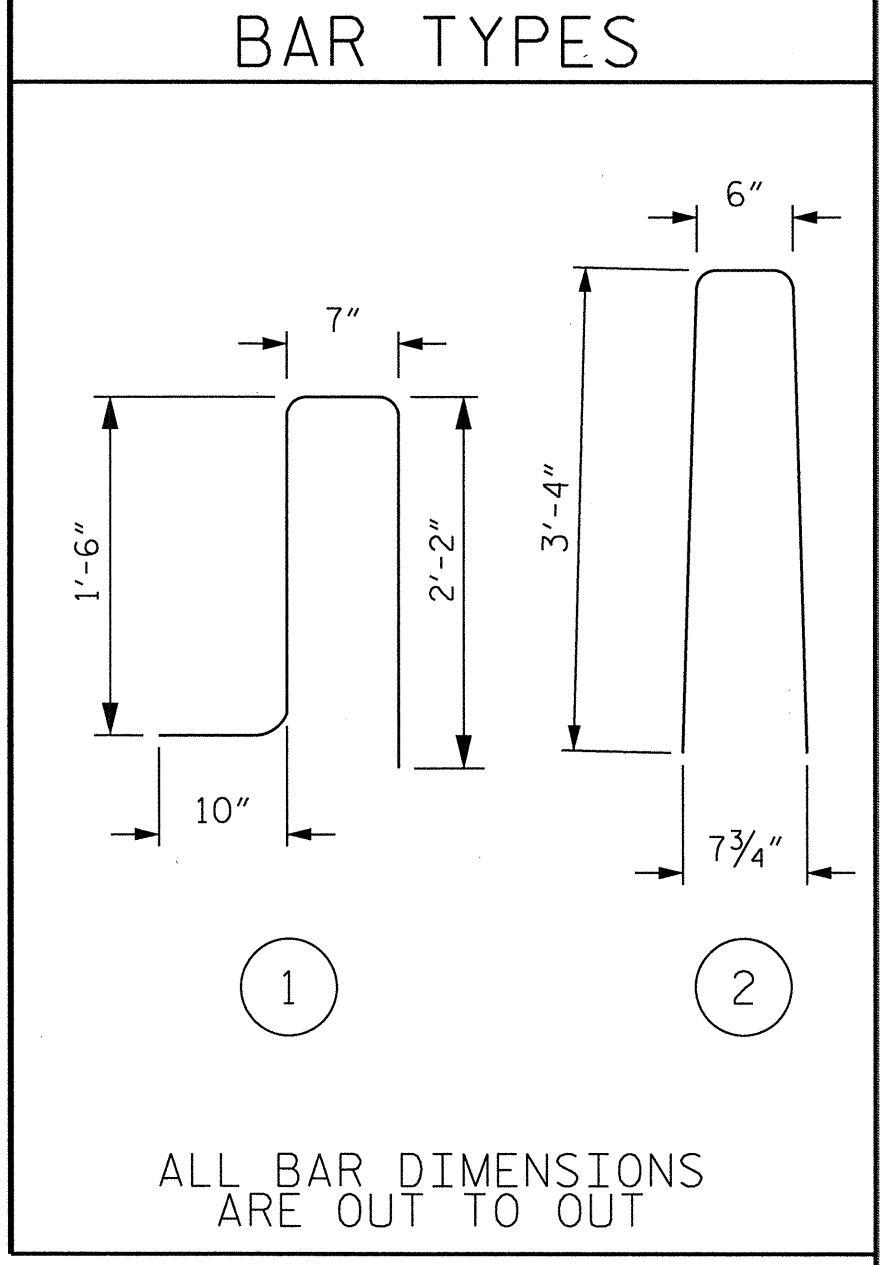
THE BARRIER RAIL ON THE APPROACH SLAB AT END BENT 2 IS INCLUDED IN LUMP SUM PAY ITEM FOR BRIDGE APPROACH SLABS.



OPTIONAL JOINT DETAIL

BILL OF MATERIAL					
APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	32	#4	STR	21'-2"	452
A2	32	#4	STR	21'-0"	449
*B1	70	#5	STR	14'-3"	1040
B2	70	#6	STR	14'-8"	1542
REINFORCING STEEL				LBS.	1991
*EPOXY COATED REINFORCING STEEL				LBS.	1492
CLASS AA CONCRETE				C.Y.	23.9

APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A3	30	#4	STR	24'-3"	486
A4	30	#4	STR	24'-10"	498
*B3	70	#5	STR	12'-11"	943
B4	70	#6	STR	13'-4"	1402
*B5	16	#5	STR	16'-3"	271
B6	6	#6	STR	16'-3"	146
*S1	33	#5	1	5'-1"	175
*S2	33	#5	2	7'-2"	247
REINFORCING STEEL				LBS.	2046
*EPOXY COATED REINFORCING STEEL				LBS.	2122
CLASS AA CONCRETE				C.Y.	27.7



PROJECT NO. R-5522  
RUTHERFORD COUNTY  
 STATION: 21+10.21 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

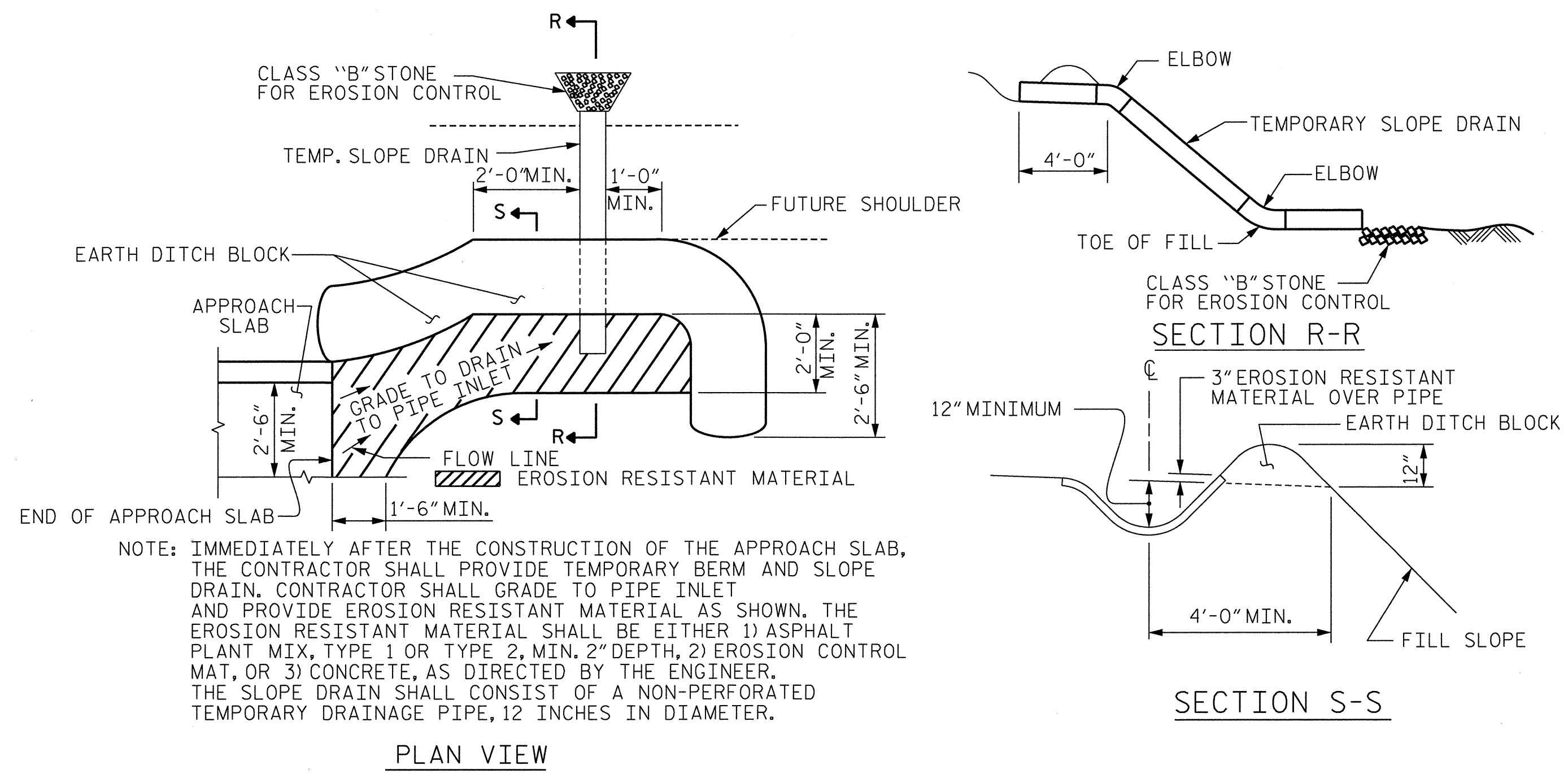
STANDARD  
 BRIDGE APPROACH SLAB  
 FOR PRESTRESSED CONCRETE  
 CORED SLAB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			30

ASSEMBLED BY : FRJ  
 CHECKED BY : HLW  
 DATE : 12/2011

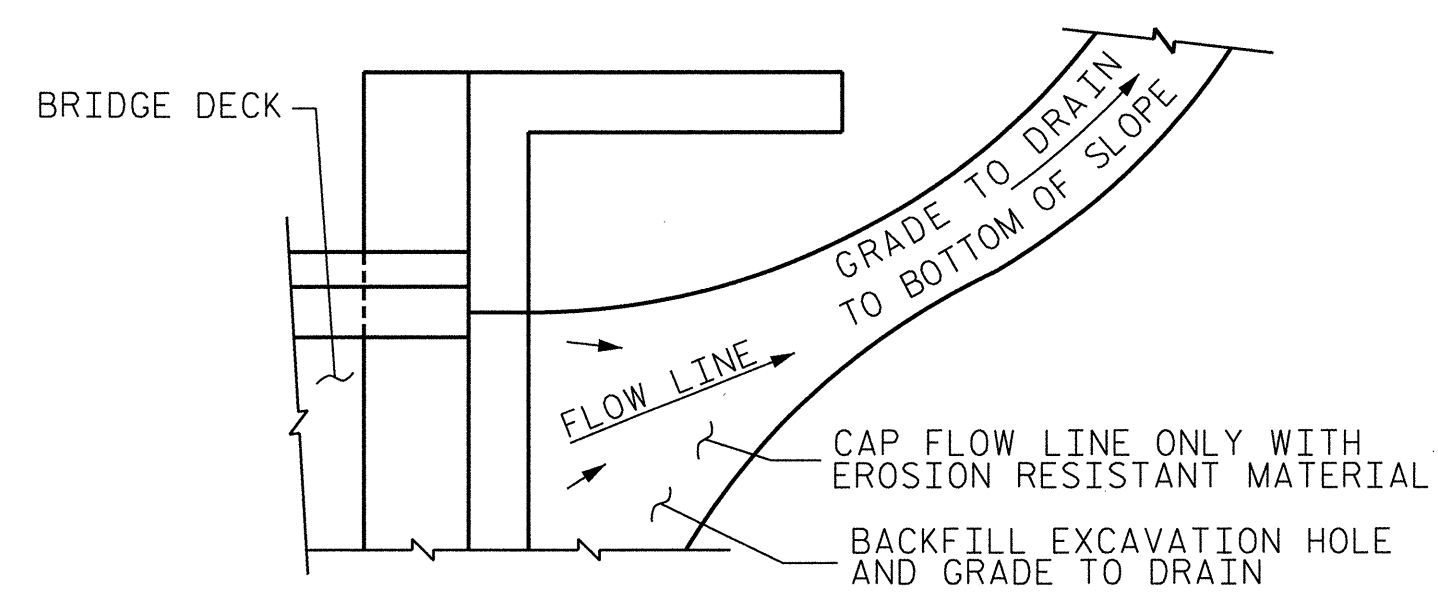
DRAWN BY : FCJ 6/87  
 CHECKED BY : EGA 6/87  
 REV. 5/7/03R RWW/JTE  
 REV. 5/1/06RR KMM/GM  
 REV. 10/1/11 MAA/GM





**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



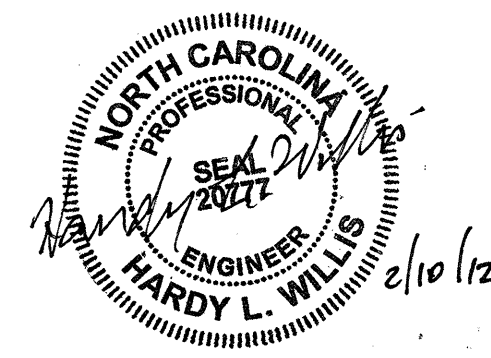
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

**TEMPORARY DRAINAGE DETAIL**

PROJECT NO. R-5522  
RUTHERFORD COUNTY  
 STATION: 21+10.210 -L-

SHEET 2 OF 2

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



ASSEMBLED BY : FRJ	DATE : 12/2011
CHECKED BY : HLW	DATE : 12/2011
DRAWN BY : FCJ 11/88	REV. 5/7/03 RWW/JTE
CHECKED BY : ARB 11/88	REV. 5/1/06RRR MAA/KMM
	REV. 10/1/11 MAA/GM

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

STD. NO. BAS4

## 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