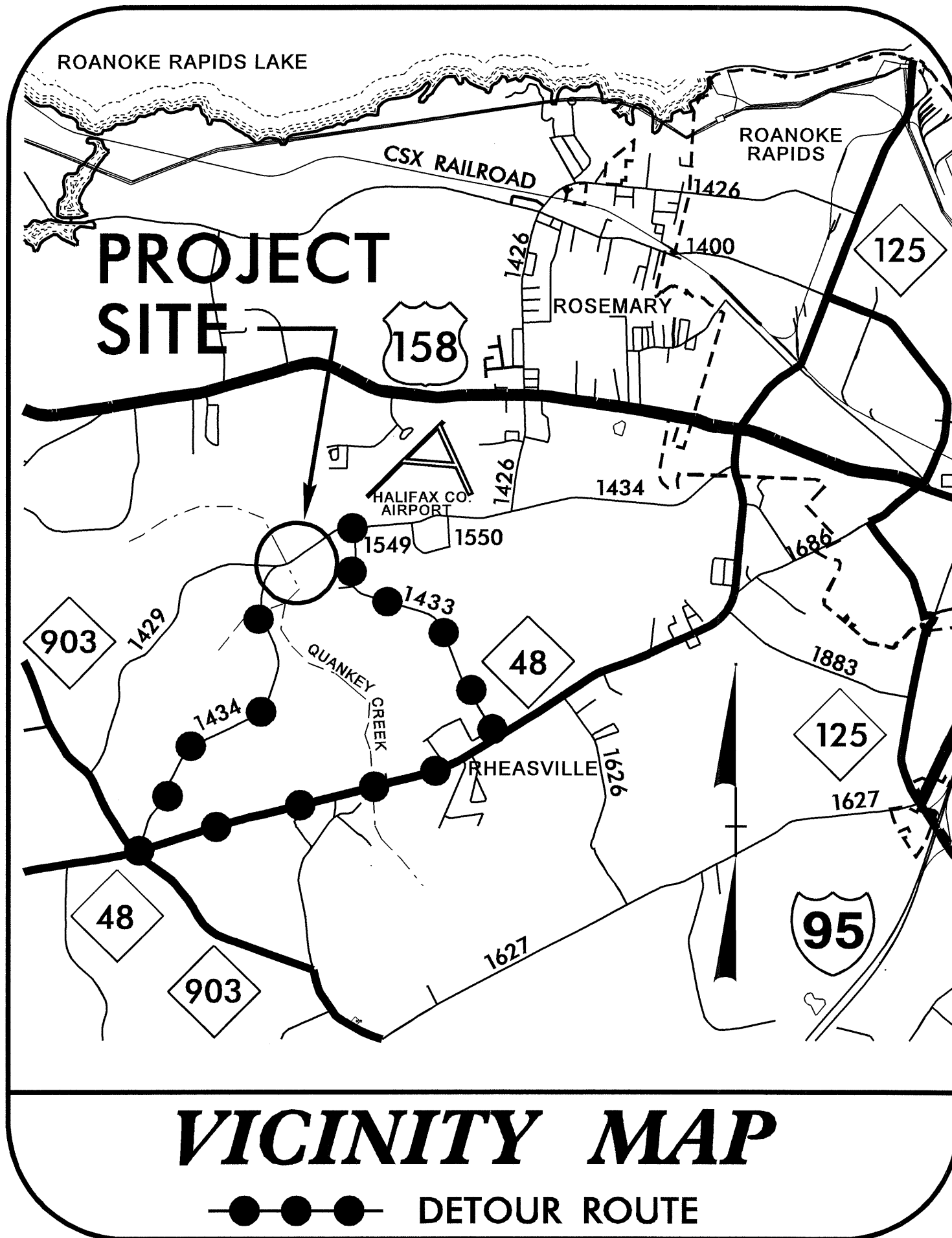


**CONTRACT: C202234 TIP PROJECT: B-4541**



NEAREST SHIPPING POINT: ROANOKE RAPIDS ON CSX RR  
APPROX. 4.3 MILES FROM PROJECT

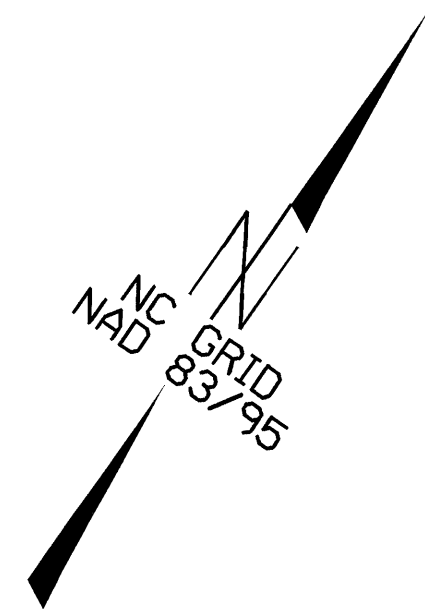
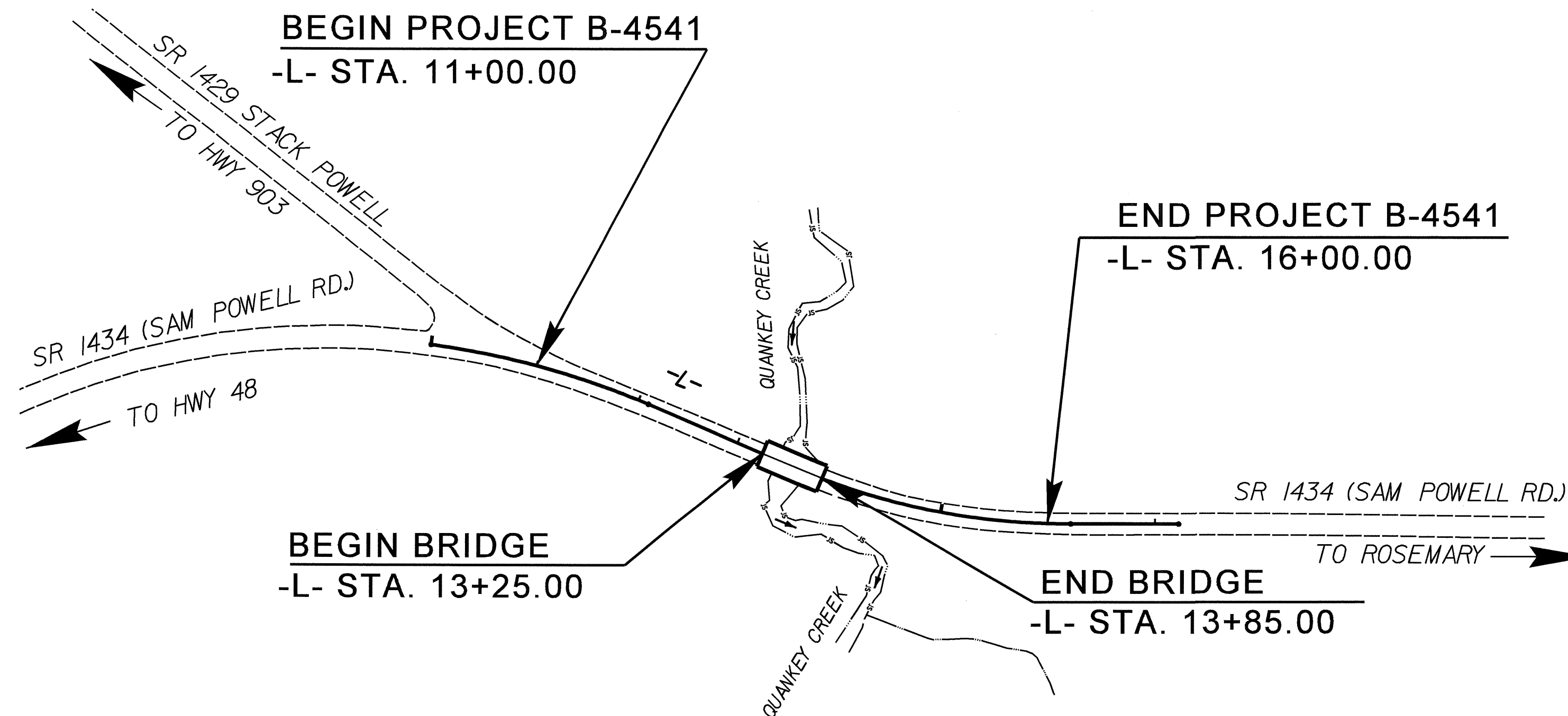
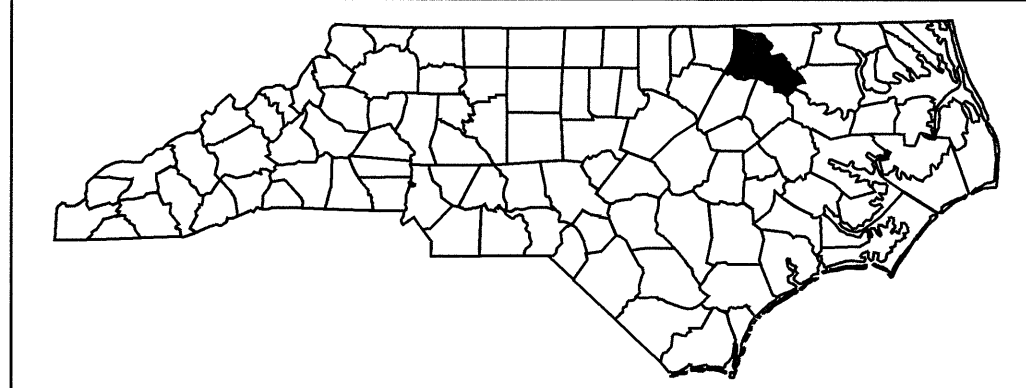
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**HALIFAX COUNTY**

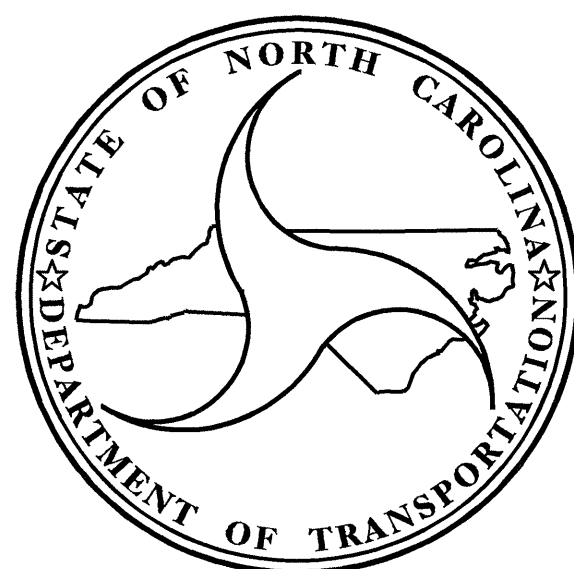
**LOCATION : BRIDGE No. 24 ON SR 1434 (SAM POWELL RD.)  
OVER QUANKEY CREEK**

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4541		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33756.1.1	BRZ-1434 (3)	PE	
33756.2.1	BRZ-1434 (3)	RW & UTIL.	
33756.3.STI	STM-1434 (4)	CONST.	



**STRUCTURE**



**DESIGN DATA**

ADT 2008 = 1,385  
ADT 2030 = 2,200  
DHV = 10 %  
D = 60 %  
T = 3 % \*  
V = 50 MPH  
\* TTST 1% DUAL 2 %  
FUNC CLASS = LOCAL

**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT B-4541 = 0.084 MI.  
LENGTH OF STRUCTURE TIP PROJECT B-4541 = 0.011 MI.  
TOTAL LENGTH OF TIP PROJECT B-4541 = 0.095 MI.

Prepared in the Office of:

**DIVISION OF HIGHWAYS**  
1000 BIRCH RIDGE DR. RALEIGH, NC 27610

2006 STANDARD SPECIFICATIONS

**LETTING DATE:**  
NOVEMBER 17, 2009

**N. N. BULLOCK, PE**  
PROJECT ENGINEER

**D. R. CALHOUN, PE**  
PROJECT DESIGN ENGINEER

**STRUCTURE DESIGN UNIT**

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER  
**DEPARTMENT OF TRANSPORTATION**  
FEDERAL HIGHWAY ADMINISTRATION

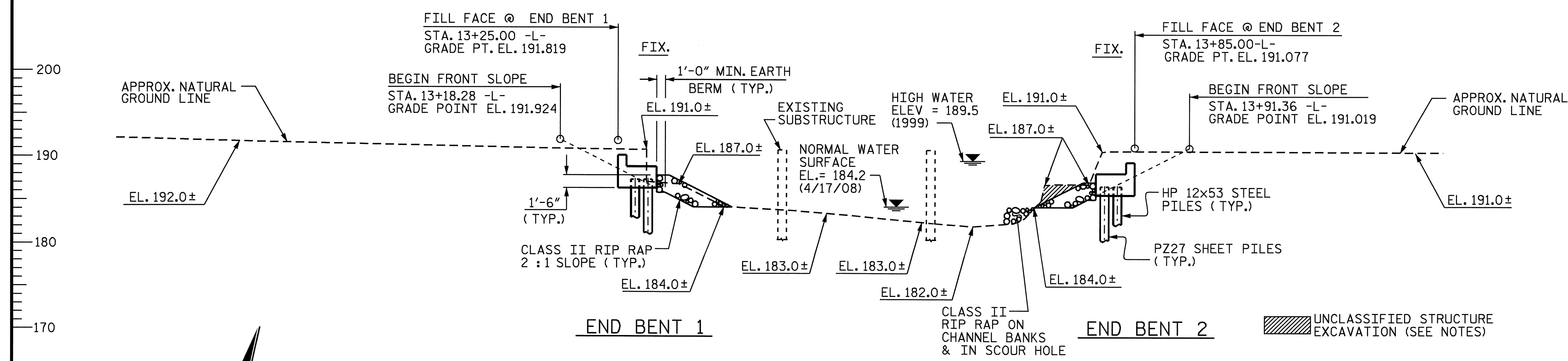
APPROVED  
DIVISION ADMINISTRATOR  
DATE

**GRADE DATA**

-3.8205 %    +0.1311 %  
 PI= 12+95.00 -L-  
 EL= 190.40  
 VC= 390 FT.

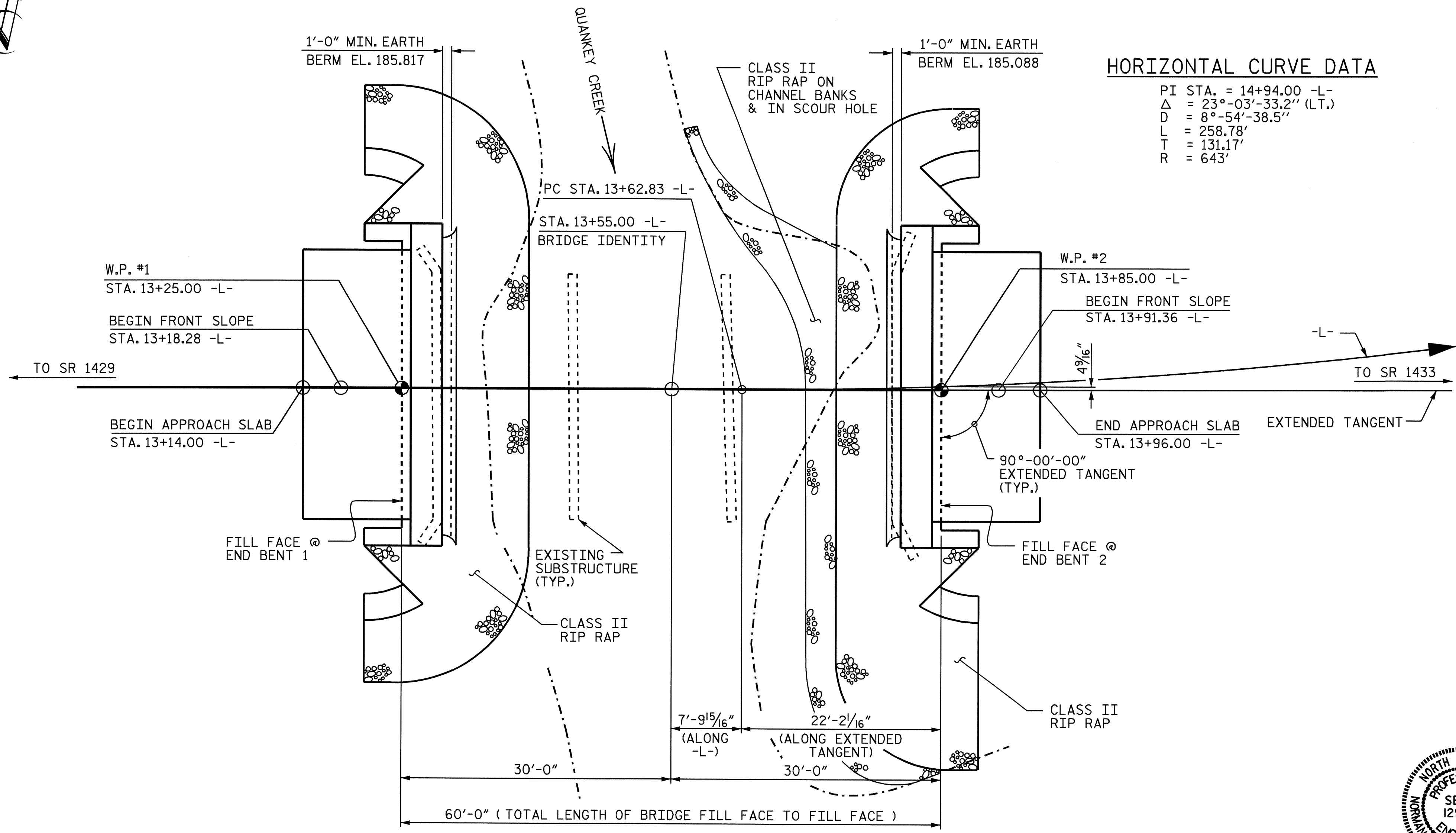
**NOTES:**

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.  
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.  
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.  
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.  
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR SEISMIC DESIGN FOR SEISMIC PERFORMANCE ZONE 1.  
 THE EXISTING STRUCTURE CONSISTING OF THREE (1 @ 17'-0", 1 @ 17'-3", 1 @ 18'-0") REINFORCED CONCRETE FLOOR WITH A CLEAR ROADWAY WIDTH OF 24'-0" ON TIMBER JOIST SUPPORTED BY TIMBER END BENT AND BENT CAPS WITH TIMBER PILES AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED.  
 REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.  
 THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.  
 ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.  
 THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 30 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.  
 THE 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.  
 THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY, 2001.  
 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.  
 FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.  
 FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.  
 FOR SHEET PILES, SEE SPECIAL PROVISIONS.



**HORIZONTAL CURVE DATA**

PI STA. = 14+94.00 -L-  
 Δ = 23°-03'-33.2" (LT.)  
 D = 8°-54'-38.5"  
 L = 258.78'  
 T = 131.17'  
 R = 643'

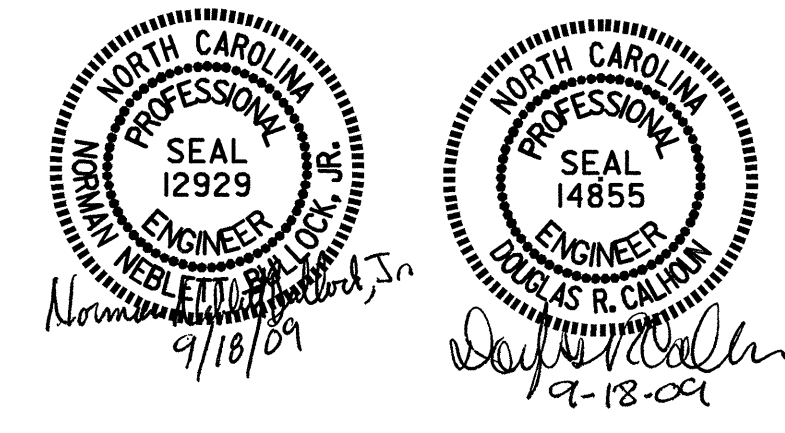


PROJECT NO. B-4541  
HALIFAX COUNTY  
 STATION: 13+55.00 -L-

SHEET 1 OF 3    REPLACES BRIDGE No. 24

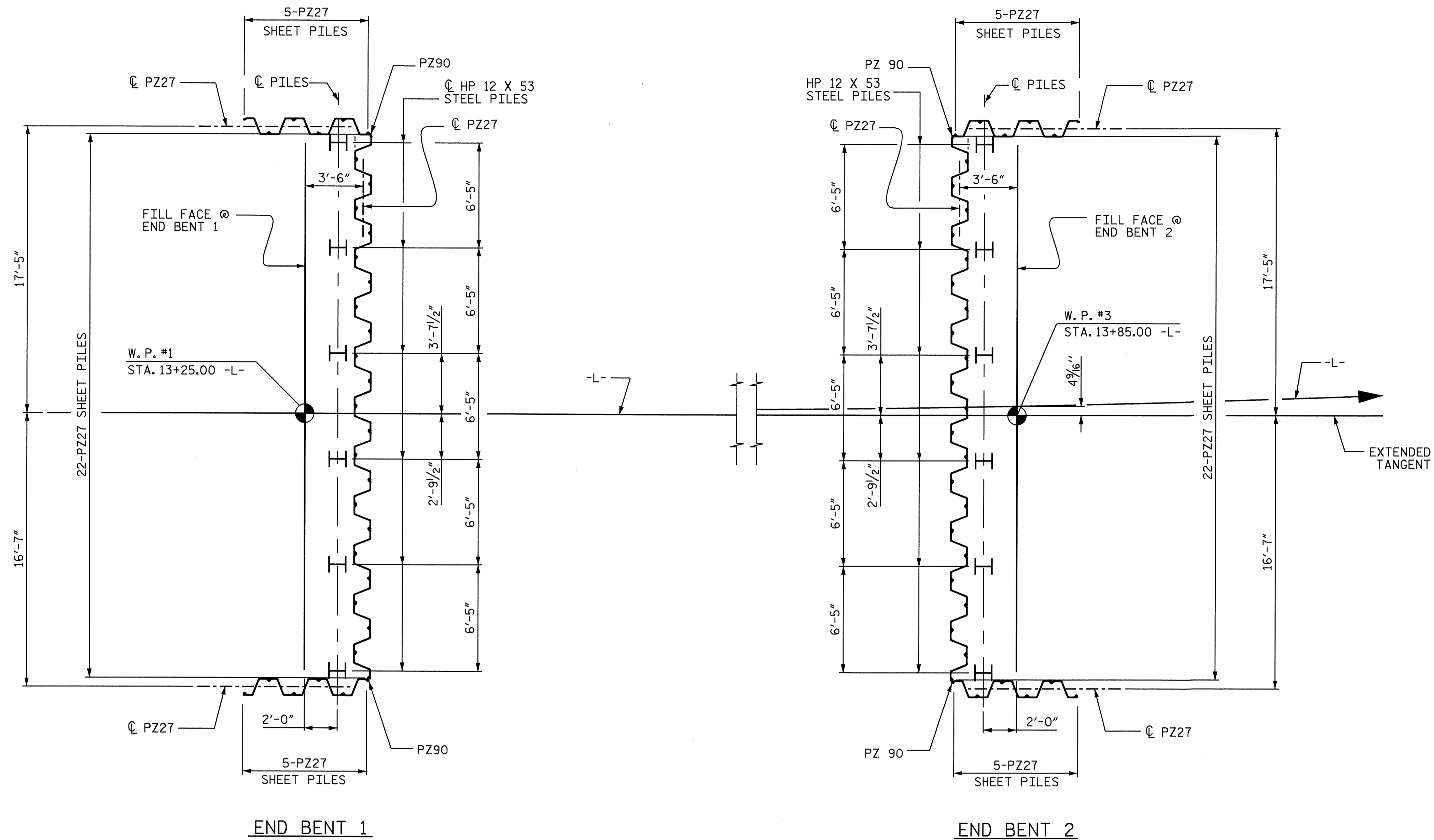
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**GENERAL DRAWING**  
 FOR BRIDGE ON SR 1434  
 OVER QUANKEY CREEK  
 BETWEEN SR 1429 AND SR 1433



DRAWN BY: J. MYA    DATE: 3-12-09  
 CHECKED BY: J. L. WALTON    DATE: 5-18-09

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



### FOUNDATION LAYOUT

( DIMENSIONS LOCATING END BENT PILES ARE SHOWN TO CENTERLINE OF PILES )

#### FOUNDATION NOTES:

FOR PILES, SEE SPECIAL PROVISIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 190 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 205 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

INSTALL PILES AT END BENT 1 TO A TIP ELEVATION NO HIGHER THAN 152.0 FT.

INSTALL PILES AT END BENT 2 TO A TP ELEVATION NO HIGHER THAN 151.0 FT.

THE SCOUR CRITICAL ELEVATION FOR END BENT 1 AND 2 IS ELEVATION 168.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

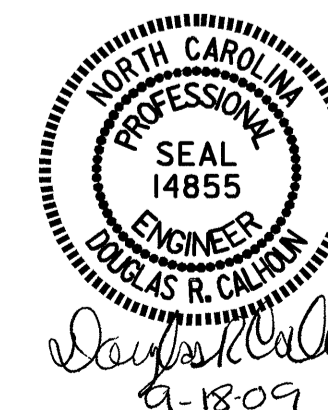
IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 30 TO 60 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 1 AND 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH THE PILES PROVISION.

INSTALL PZ27 SHEET PILES AT END BENT 1 AND 2 TO A TIP ELEVATION NO HIGHER THAN 167.0 FT.

PROJECT NO. B-4541  
HALIFAX COUNTY  
 STATION: 13+55.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GENERAL DRAWING  
 FOR BRIDGE ON SR 1434  
 OVER QUANKEY CREEK  
 BETWEEN SR 1429 AND SR 1433



DRAWN BY : J. MYA DATE : 3-12-09  
 CHECKED BY : J. L. WALTON DATE : 5-18-09

11-AUG-2009 15:21  
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 jmya

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

TOTAL BILL OF MATERIAL														
	REMOVAL OF EXISTING STRUCTURE	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	HP 12 X 53 STEEL PILES		18" STEEL SHEET PILES	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 2'-3" PRESTRESSED CONCRETE BOX BEAMS	
	LUMP SUM	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	SQ. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE				LUMP SUM					115.50			LUMP SUM	10	577.50
END BENT 1			19.6		2799	6	210	985		88	98			
END BENT 2		LUMP SUM	19.6		2799	6	270	950		117	130			
TOTAL	LUMP SUM	LUMP SUM	39.2	LUMP SUM	5598	12	480	1935	115.50	205	228	LUMP SUM	10	577.50

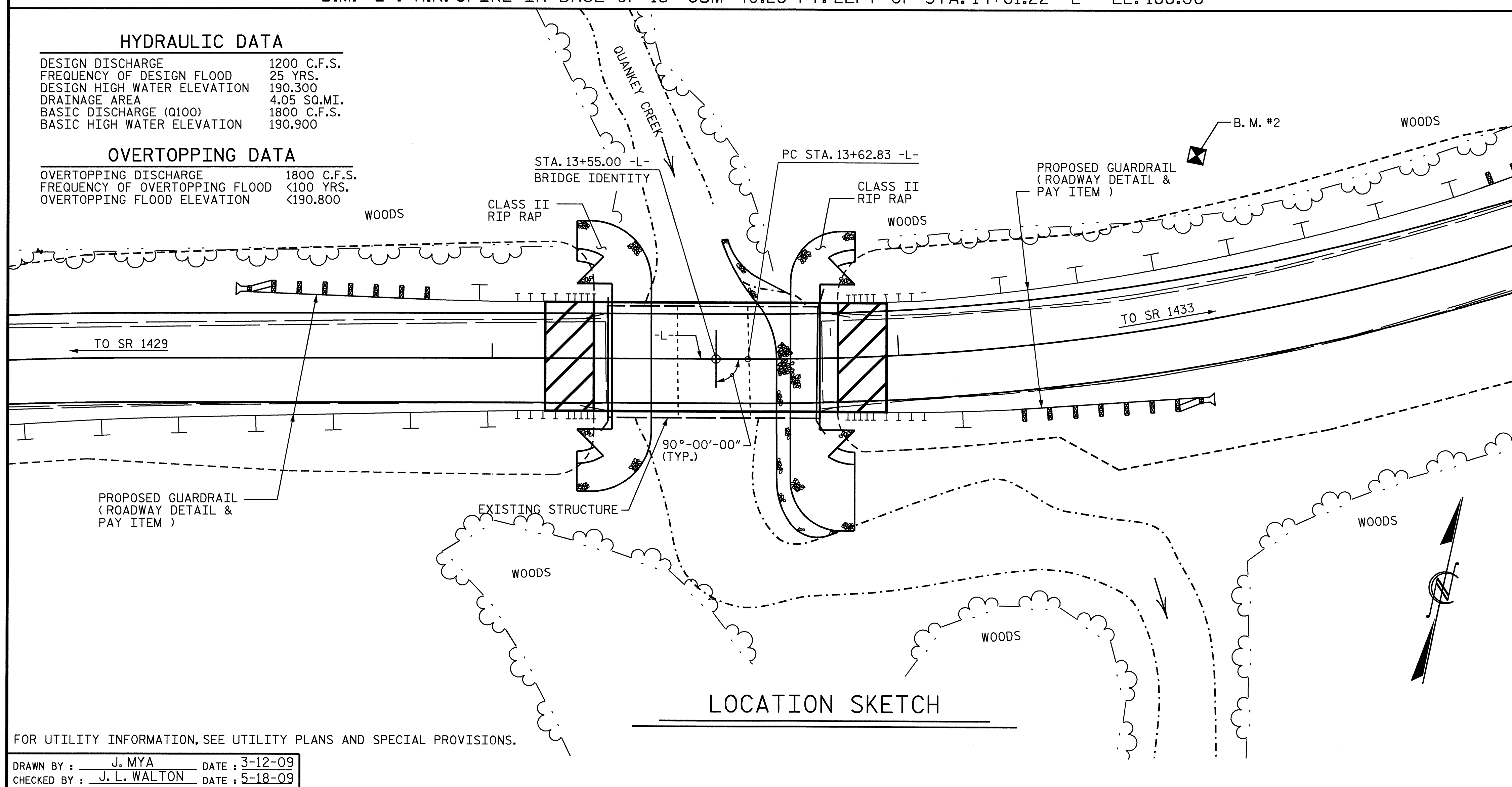
B.M. #2 : R.R. SPIKE IN BASE OF 15" GUM 40.25 FT. LEFT OF STA. 14+81.22 -L- EL. 188.08

**HYDRAULIC DATA**

DESIGN DISCHARGE 1200 C.F.S.  
 FREQUENCY OF DESIGN FLOOD 25 YRS.  
 DESIGN HIGH WATER ELEVATION 190.300  
 DRAINAGE AREA 4.05 SQ.MI.  
 BASIC DISCHARGE (Q100) 1800 C.F.S.  
 BASIC HIGH WATER ELEVATION 190.900

**OVERTOPPING DATA**

OVERTOPPING DISCHARGE 1800 C.F.S.  
 FREQUENCY OF OVERTOPPING FLOOD <100 YRS.  
 OVERTOPPING FLOOD ELEVATION <190.800



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

DRAWN BY : J. MYA DATE : 3-12-09  
 CHECKED BY : J. L. WALTON DATE : 5-18-09

17-SEP-2009 14:57  
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 jmya

PROJECT NO. B-4541  
HALIFAX COUNTY  
 STATION: 13+55.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 FOR BRIDGE ON SR 1434  
 OVER QUANKEY CREEK  
 BETWEEN SR 1429 AND SR 1433



*Douglas R. Calahan*  
 2-18-09

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

# 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 (γ <sub>LL</sub> )	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 <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.009	--	1.75	0.272	1.35	A	ER	28.125	0.513	1.01	A	ER	2.813	0.80	0.272	1.10	A	ER	28.125		
	HL-93 (OPERATING)	N/A	1	1.308	--	1.35	0.272	1.75	A	ER	28.125	0.513	1.31	A	ER	2.813	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.198	43.128	1.80	0.272	1.65	A	ER	28.125	0.513	1.20	A	ER	2.813	1.00	0.272	1.11	A	ER	28.125		
	HS-20 (OPERATING)	36.000	2	1.597	57.492	1.35	0.272	2.21	A	ER	28.125	0.513	1.60	A	ER	2.813	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.562	48.087	1.40	0.272	4.52	A	ER	28.125	0.513	3.56	A	ER	2.813	1.00	0.272	2.36	A	ER	28.125	
		SNGARBS2	20.000		2.565	51.300	1.40	0.272	3.49	A	ER	28.125	0.513	2.57	A	ER	2.813	1.00	0.272	1.82	A	ER	28.125	
		SNAGRIS2	22.000		2.393	52.646	1.40	0.272	3.35	A	ER	28.125	0.513	2.39	A	ER	2.813	1.00	0.272	1.75	A	ER	28.125	
		SNCOTTS3	27.250		1.782	48.560	1.40	0.272	2.25	A	ER	28.125	0.513	1.78	A	ER	2.813	1.00	0.272	1.18	A	ER	28.125	
		SNAGGRS4	34.925		1.501	52.422	1.40	0.272	1.93	A	ER	28.125	0.513	1.50	A	ER	2.813	1.00	0.272	1.01	A	ER	28.125	
		SNS5A	35.550		1.532	54.463	1.40	0.272	1.88	A	ER	28.125	0.513	1.53	A	ER	2.813	1.00	0.272	0.98	A	ER	28.125	
		SNS6A	39.950		1.408	56.250	1.40	0.272	1.75	A	ER	28.125	0.513	1.41	A	ER	2.813	1.00	0.272	0.91	A	ER	28.125	
	SNS7B	42.000		1.395	58.590	1.40	0.272	1.66	A	ER	28.125	0.513	1.40	A	ER	2.813	1.00	0.272	0.87	A	ER	28.125		
	TRUCK TRACTOR SEMI-TRAILER (TTS1)	TNAGRIT3	33.000		1.667	55.011	1.40	0.272	2.13	A	ER	28.125	0.513	1.67	A	ER	2.813	1.00	0.272	1.11	A	ER	28.125	
		TNT4A	33.075		1.615	53.416	1.40	0.272	2.15	A	ER	28.125	0.513	1.62	A	ER	2.813	1.00	0.272	1.12	A	ER	28.125	
		TNT6A	41.600		1.510	62.816	1.40	0.272	1.78	A	ER	28.125	0.513	1.51	A	ER	2.813	1.00	0.272	0.93	A	ER	28.125	
		TNT7A	42.000		1.442	60.564	1.40	0.272	1.80	A	ER	28.125	0.513	1.44	A	ER	2.813	1.00	0.272	0.94	A	ER	28.125	
		TNT7B	42.000		1.353	56.826	1.40	0.272	1.87	A	ER	28.125	0.513	1.35	A	ER	2.813	1.00	0.272	0.98	A	ER	28.125	
		TNAGRIT4	43.000		1.307	56.201	1.40	0.272	1.77	A	ER	28.125	0.513	1.31	A	ER	2.813	1.00	0.272	0.93	A	ER	28.125	
TNAGT5A		45.000		1.313	59.085	1.40	0.272	1.66	A	ER	28.125	0.513	1.31	A	ER	2.813	1.00	0.272	0.87	A	ER	28.125		
TNAGT5B	45.000	3	1.241	55.845	1.40	0.272	1.63	A	ER	28.125	0.513	1.24	A	ER	2.813	1.00	0.272	0.85	A	ER	28.125			

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

LEGAL LOAD RATING FACTORS	YEAR	ADTT	γ <sub>L</sub>
	2009	25	N/A
	2029	40	1.40

NOTES:

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

MINIMUM RATING FACTORS FOR LEGAL LOAD RATING ARE BASED ON THE STRENGTH I LIMIT STATE.

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

COMMENTS:

1. THIS BRIDGE HAS BEEN DESIGNED USING SIMPLE SPAN ANALYSIS.

- 2.
- 3.
- 4.

# CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

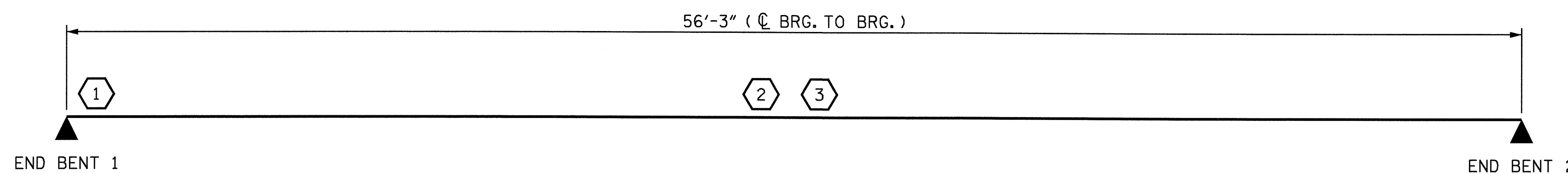
③ LEGAL LOAD RATING \*\*\*

\*\*\* SEE CHART FOR VEHICLE TYPE

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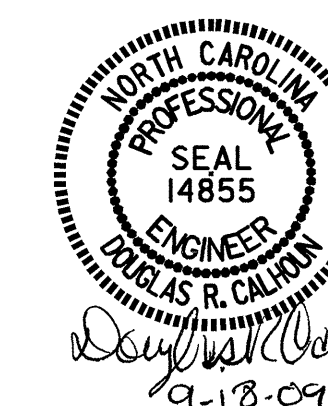
GIRDER LOCATION

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



## LRFR SUMMARY

PROJECT NO. B-4541  
HALIFAX COUNTY  
 STATION: 13+55.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 LRFR SUMMARY FOR  
 PRESTRESSED  
 CONCRETE GIRDERS  
 (NON-INTERSTATE TRAFFIC)

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

ASSEMBLED BY : J. MYA      DATE : 3-12-09  
 CHECKED BY : D. R. CALHOUN      DATE : 5-18-09  
 DRAWN BY : MAA 1/08      REV. 11/12/08RR      MAA/GM  
 CHECKED BY : GM/DI 2/08

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 PRESTRESSED CONCRETE BOX BEAMS.

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 4000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

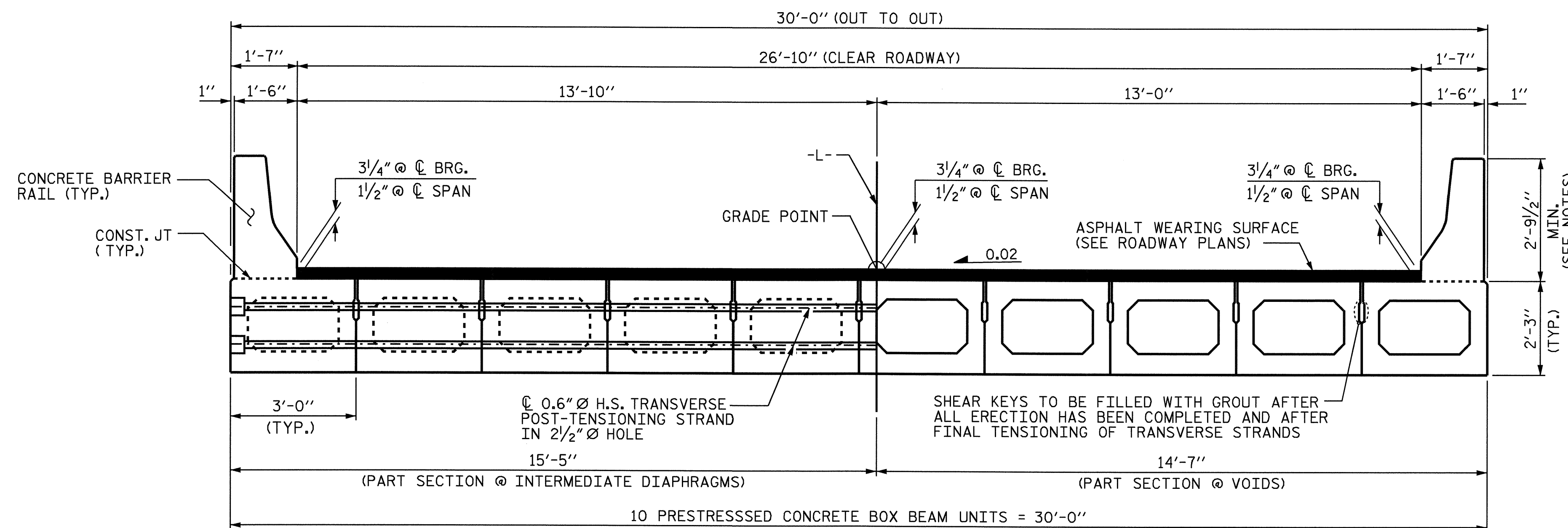
APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

VERTICAL GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A VERTICAL 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.

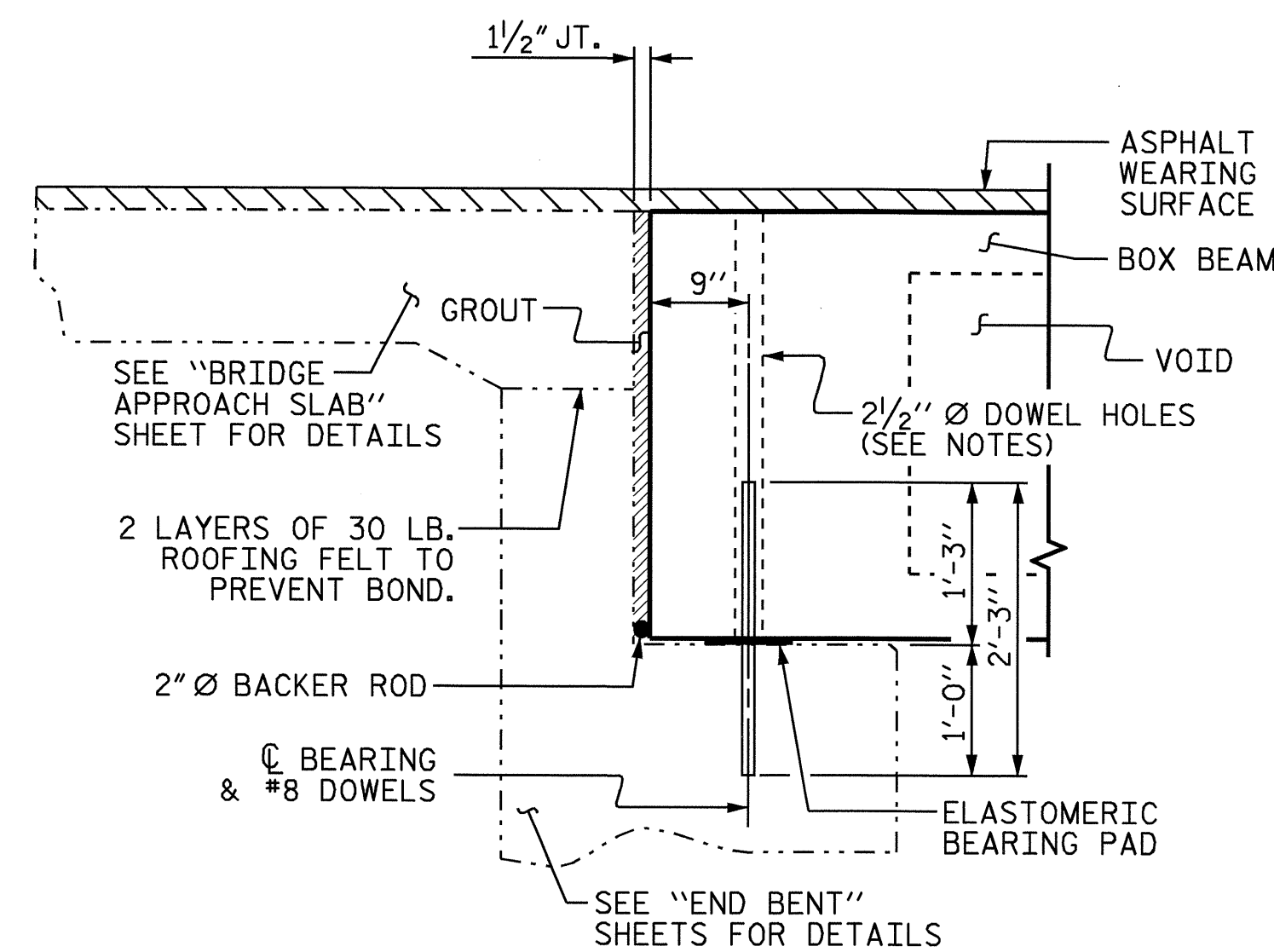
FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

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



TYPICAL SECTION

FIXED END



SECTION AT END BENT

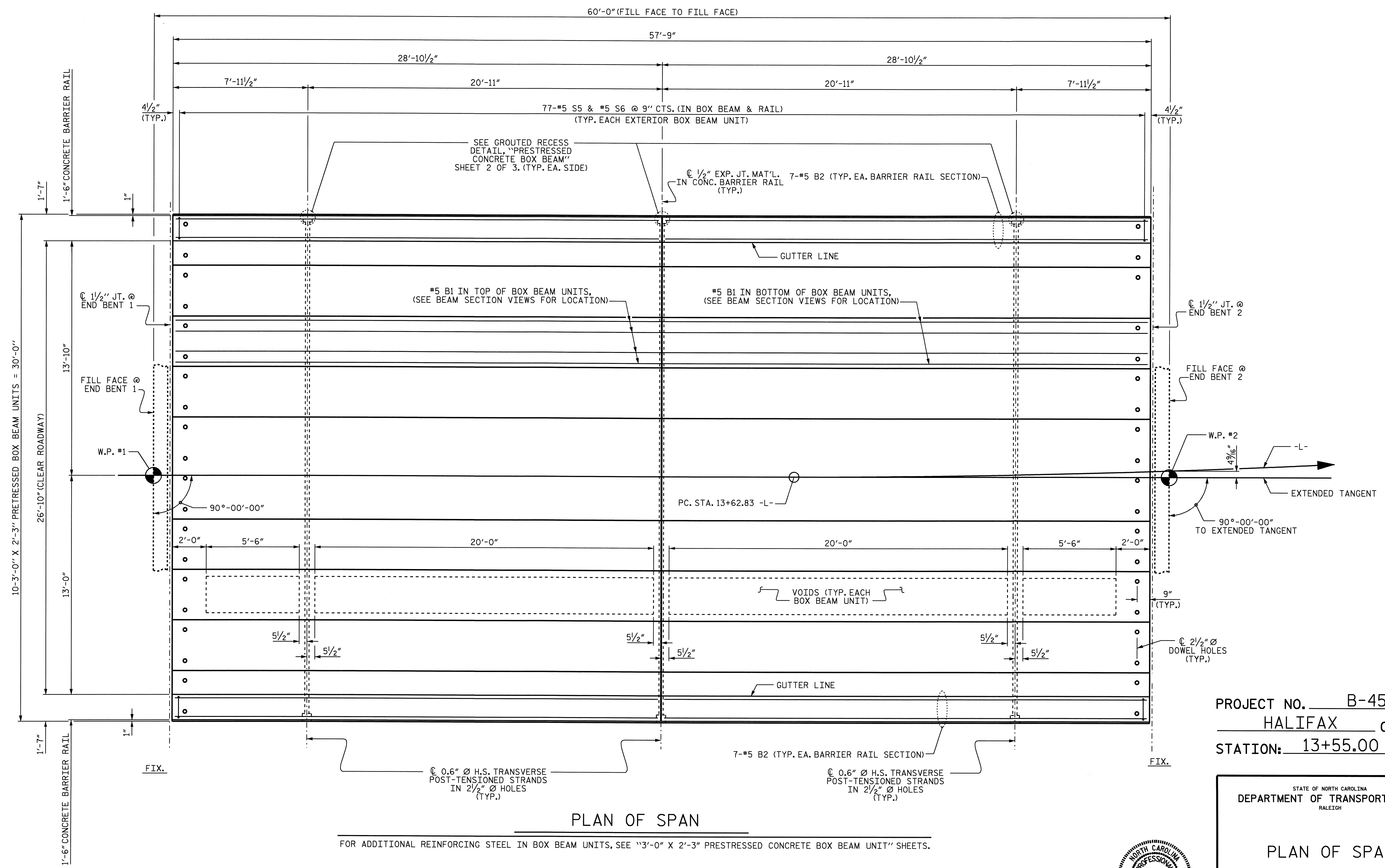
PROJECT NO. B-4541  
HALIFAX COUNTY  
 STATION: 13+55.00 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
3'-0" X 2'-3" PRESTRESSED CONCRETE BOX BEAM UNIT					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-5 TOTAL SHEETS 19



*Douglas R. Calhoun*  
02.18.09

ASSEMBLED BY : J. MYA	DATE : 3-2-09
CHECKED BY : J.L. WALTON	DATE : 3-31-09
DRAWN BY : TLA 5/05	ADDED 7/11/05R
CHECKED BY : GM 6/05	REV. 5/1/06R KMM/GM



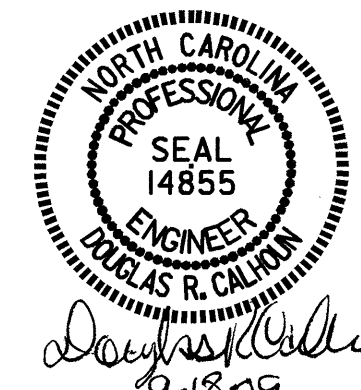
PLAN OF SPAN

FOR ADDITIONAL REINFORCING STEEL IN BOX BEAM UNITS, SEE "3'-0" X 2'-3" PRESTRESSED CONCRETE BOX BEAM UNIT" SHEETS.

PROJECT NO. B-4541  
HALIFAX COUNTY  
 STATION: 13+55.00 -L-

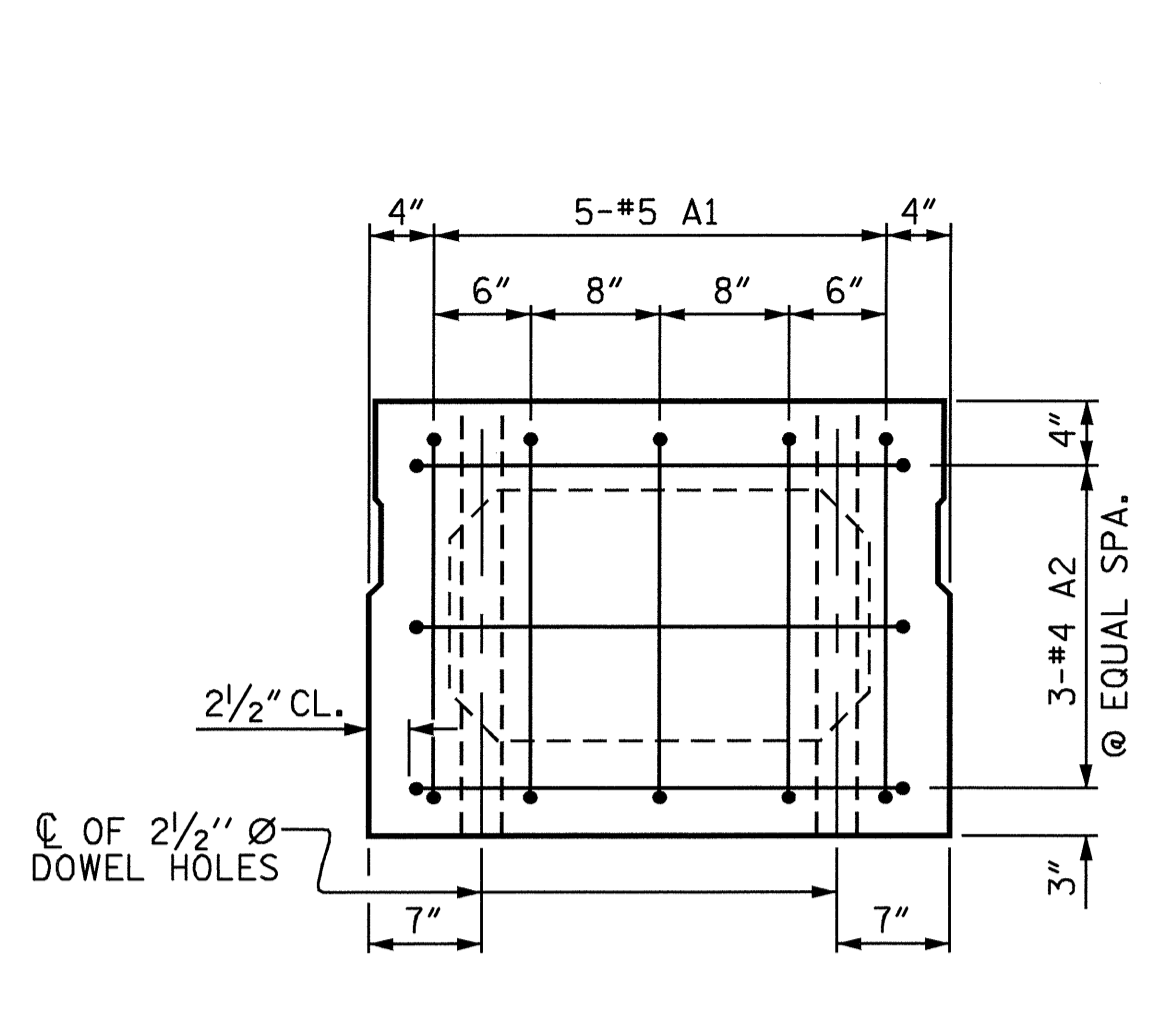
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

PLAN OF SPAN



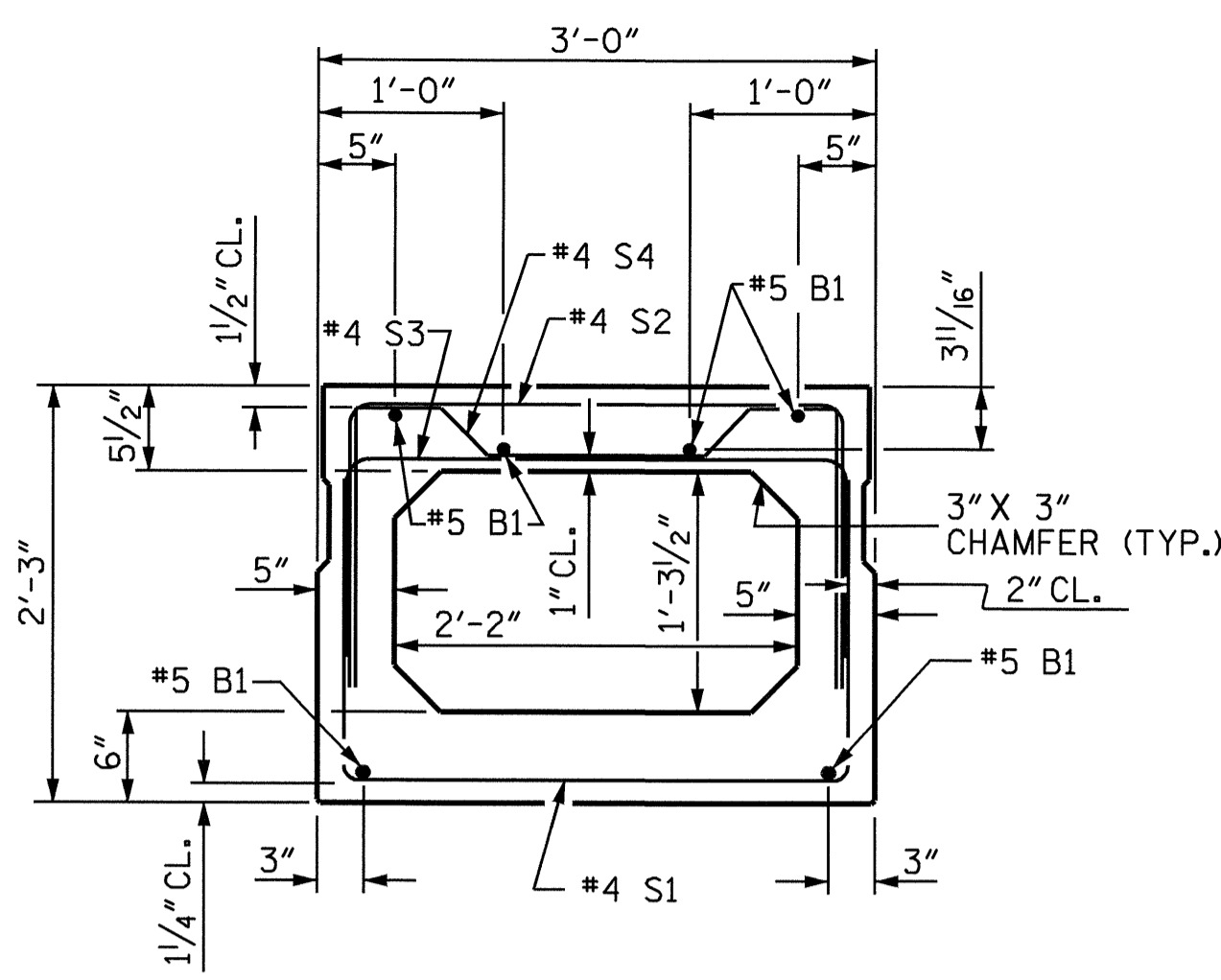
DRAWN BY : J. MYA DATE : 3-2-09  
 CHECKED BY : J.L. WALTON DATE : 3-31-09

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS	
1			3			S-6	
2			4			19	



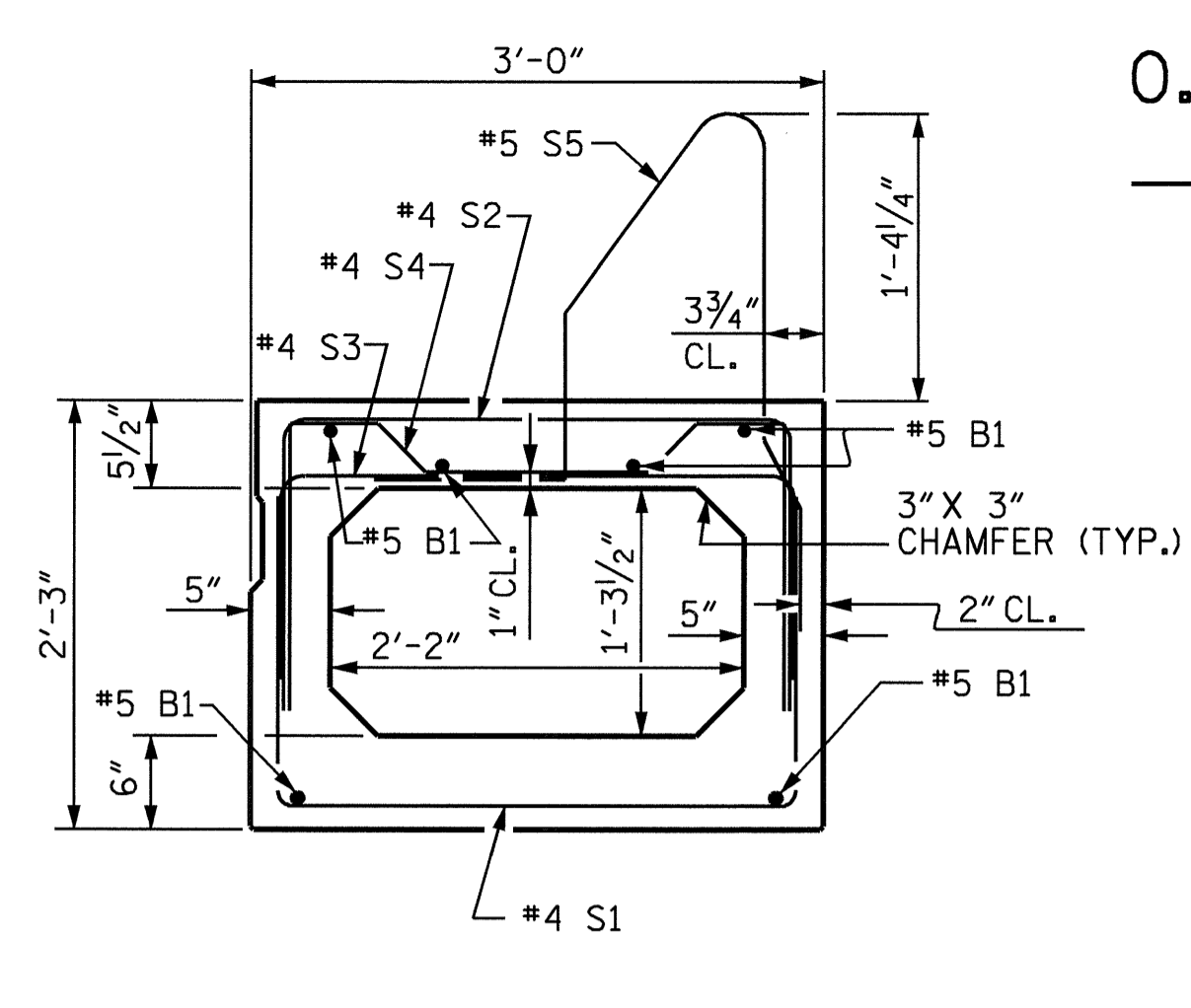
**END ELEVATION**

SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES. (INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)



**INTERIOR BOX BEAM SECTION**

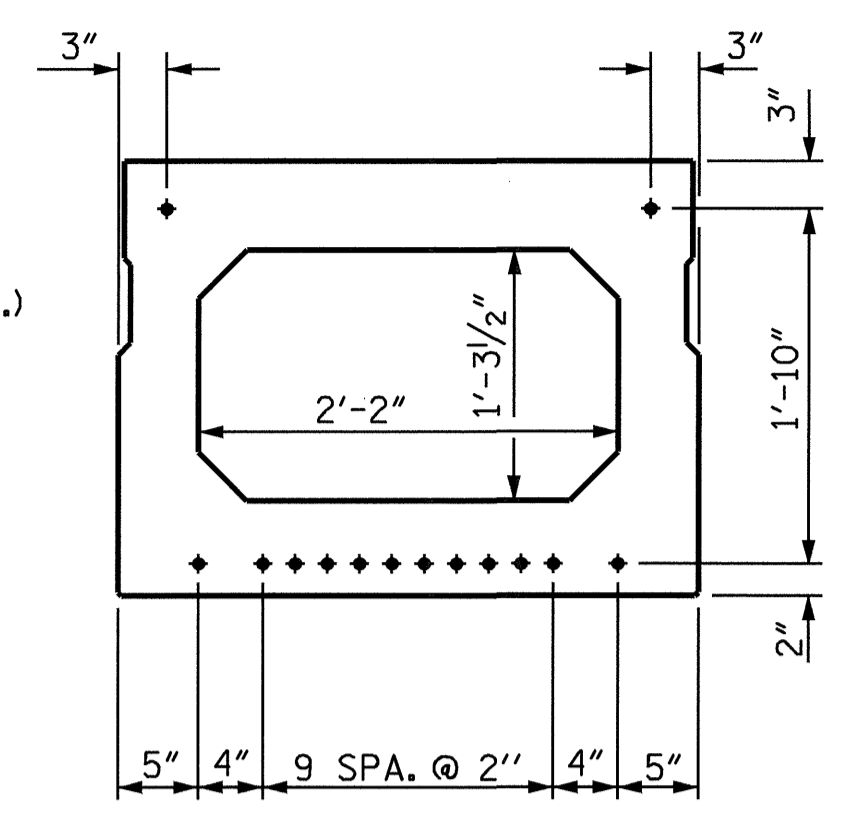
(STRAND LAYOUT NOT SHOWN)



**EXTERIOR BOX BEAM SECTION**

(STRAND LAYOUT NOT SHOWN)

**0.6" Ø LOW RELAXATION STRAND LAYOUT**



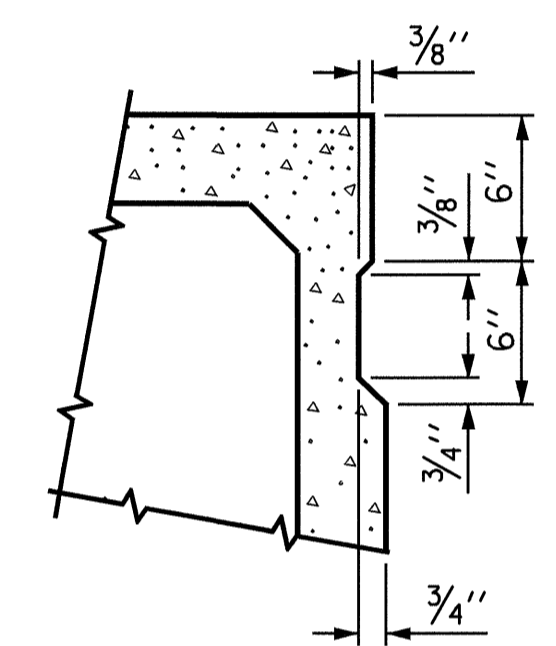
**TYPICAL STRAND LOCATION**

(14 STRANDS REQUIRED)  
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION)

**DEBONDING LEGEND**

- FULLY BONDED STRANDS

GRADE 270 STRANDS	
	0.6" Ø L.R.
AREA ( SQUARE INCHES )	0.217
ULTIMATE STRENGTH ( LBS. PER STRAND )	58,600
APPLIED PRESTRESS ( LBS. PER STRAND )	43,950



**SHEAR KEY DETAIL**

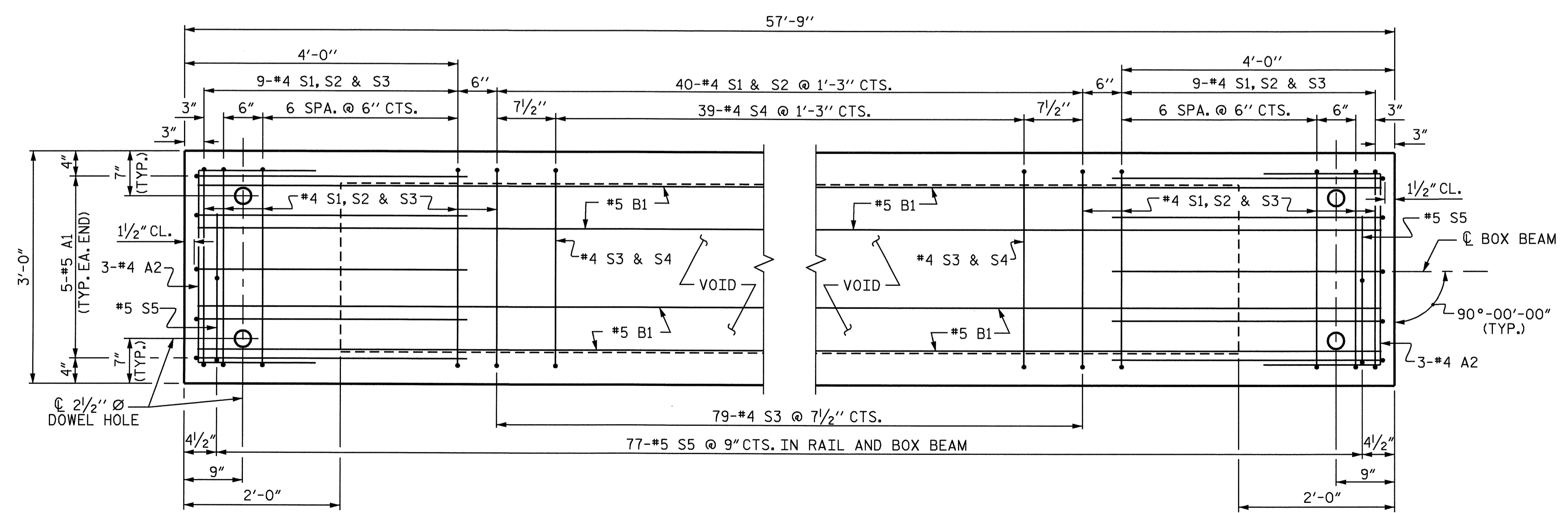
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.

**BAR TYPES**

ALL BAR DIMENSIONS ARE OUT TO OUT

**BILL OF MATERIAL FOR ONE BOX BEAM SECTION**

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	6'-2"	64	6'-2"	64
A2	18	#4	2	5'-7"	67	5'-7"	67
B1	6	#5	STR	57'-5"	359	57'-5"	359
K1	9	#4	6	5'-2"	31	5'-2"	31
K2	6	#4	STR	2'-7"	10	2'-7"	10
S1	58	#4	3	6'-6"	252	6'-6"	252
S2	58	#4	3	5'-8"	220	5'-8"	220
S3	97	#4	3	4'-10"	313	4'-10"	313
S4	39	#4	4	5'-10"	152	5'-10"	152
*S5	77	#5	5	5'-9"	462	--	--
REINFORCING STEEL				1468 LBS.		1468 LBS.	
* EPOXY COATED REINF. STEEL				462 LBS.			
5000 P.S.I. CONCRETE				9.3 CU. YDS.		9.2 CU. YDS.	
0.6" Ø L.R. STRANDS				No. 14		No. 14	



**PLAN OF BOX BEAM**

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS. FOR LOCATION OF DIAPHRAGMS, SEE PLAN OF SPANS. FOR REINFORCING STEEL IN DIAPHRAGMS, SEE DIAPHRAGM DETAILS, SHEET 2 OF 3.

PROJECT NO. B-4541  
HALIFAX COUNTY  
 STATION: 13+55.00 -L-  
 SHEET 1 OF 3

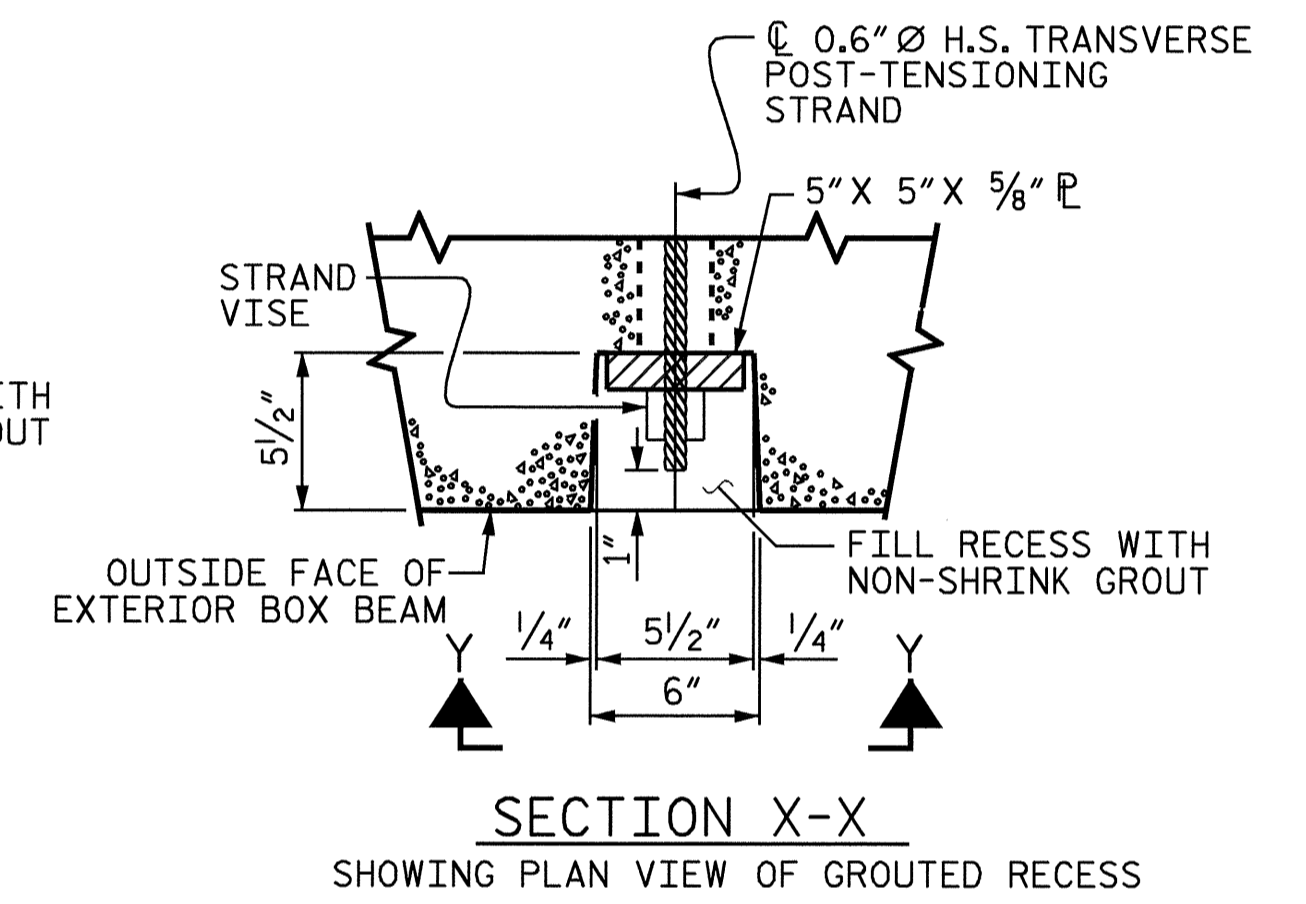
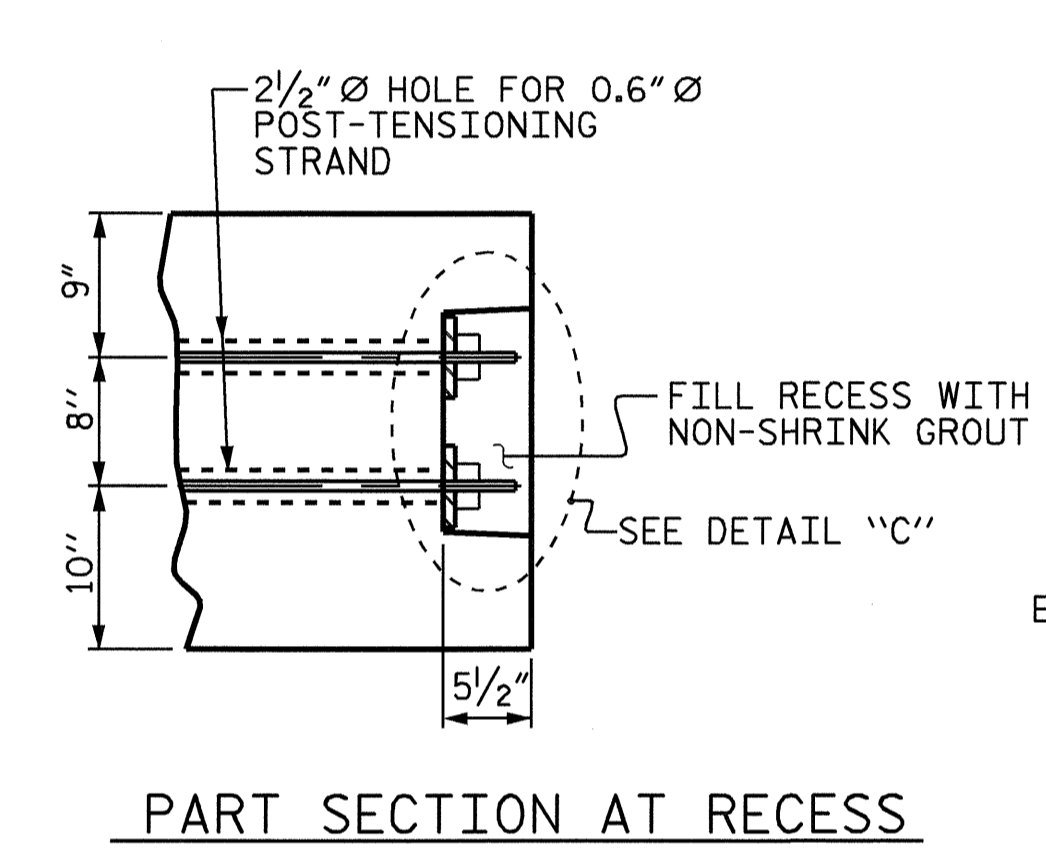
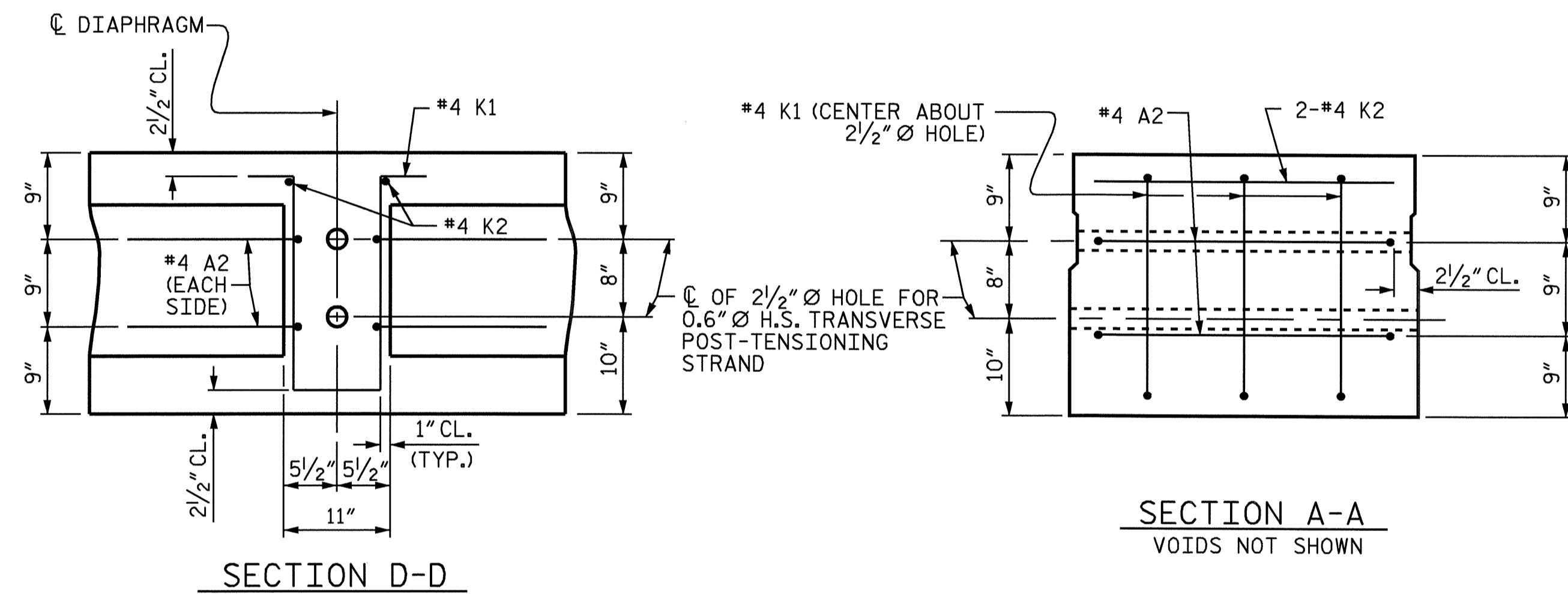
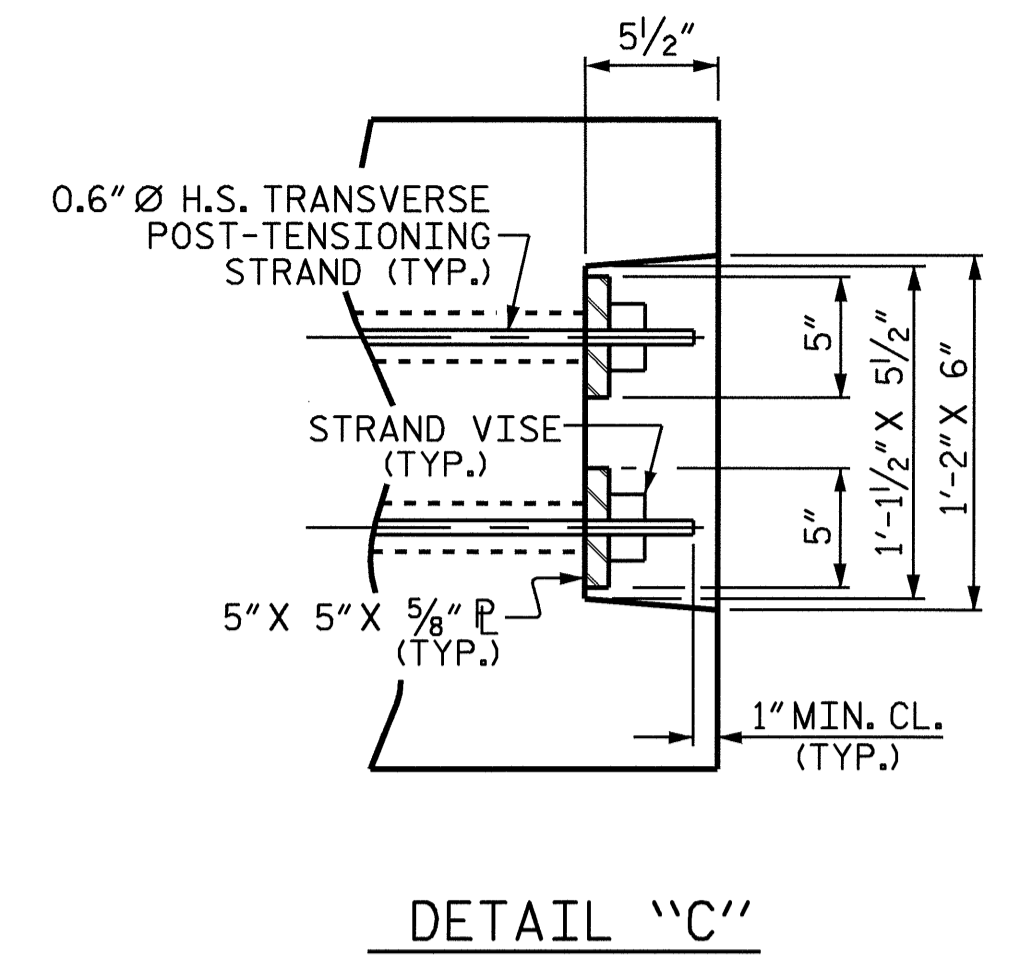
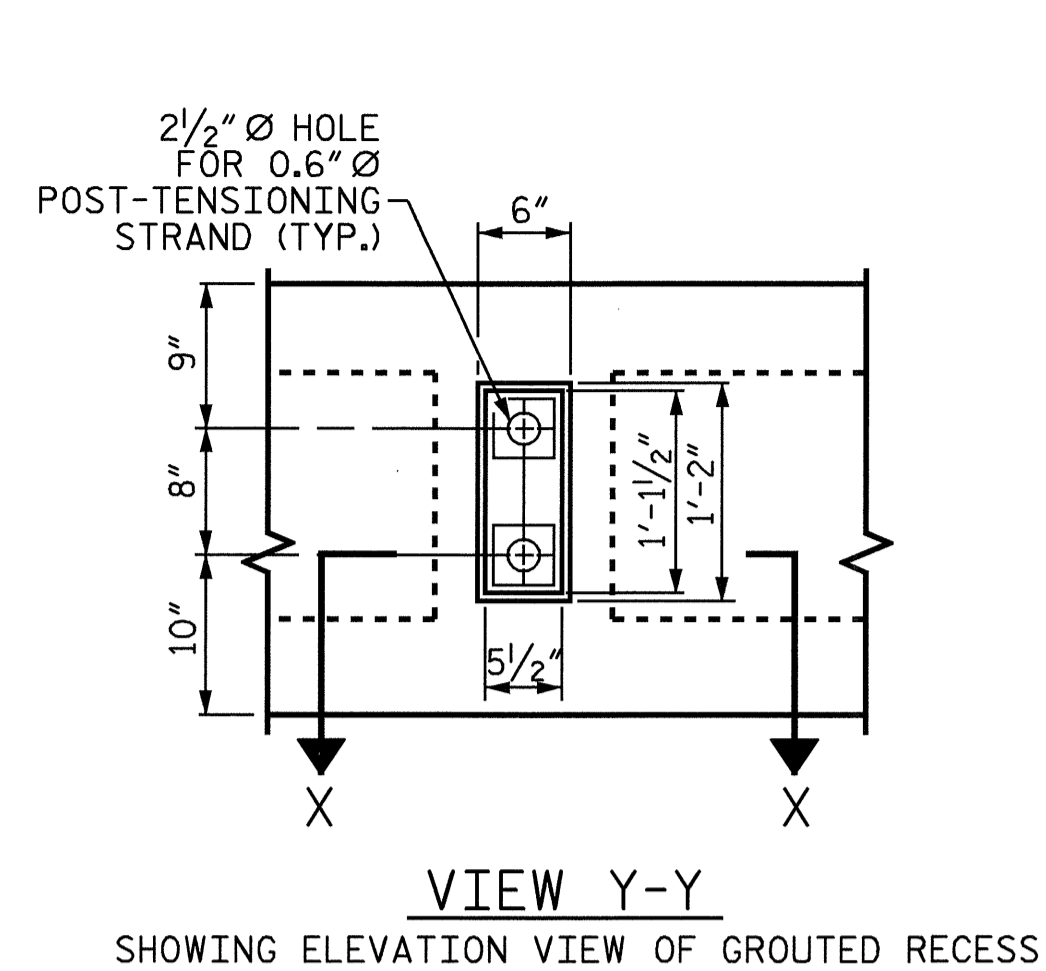
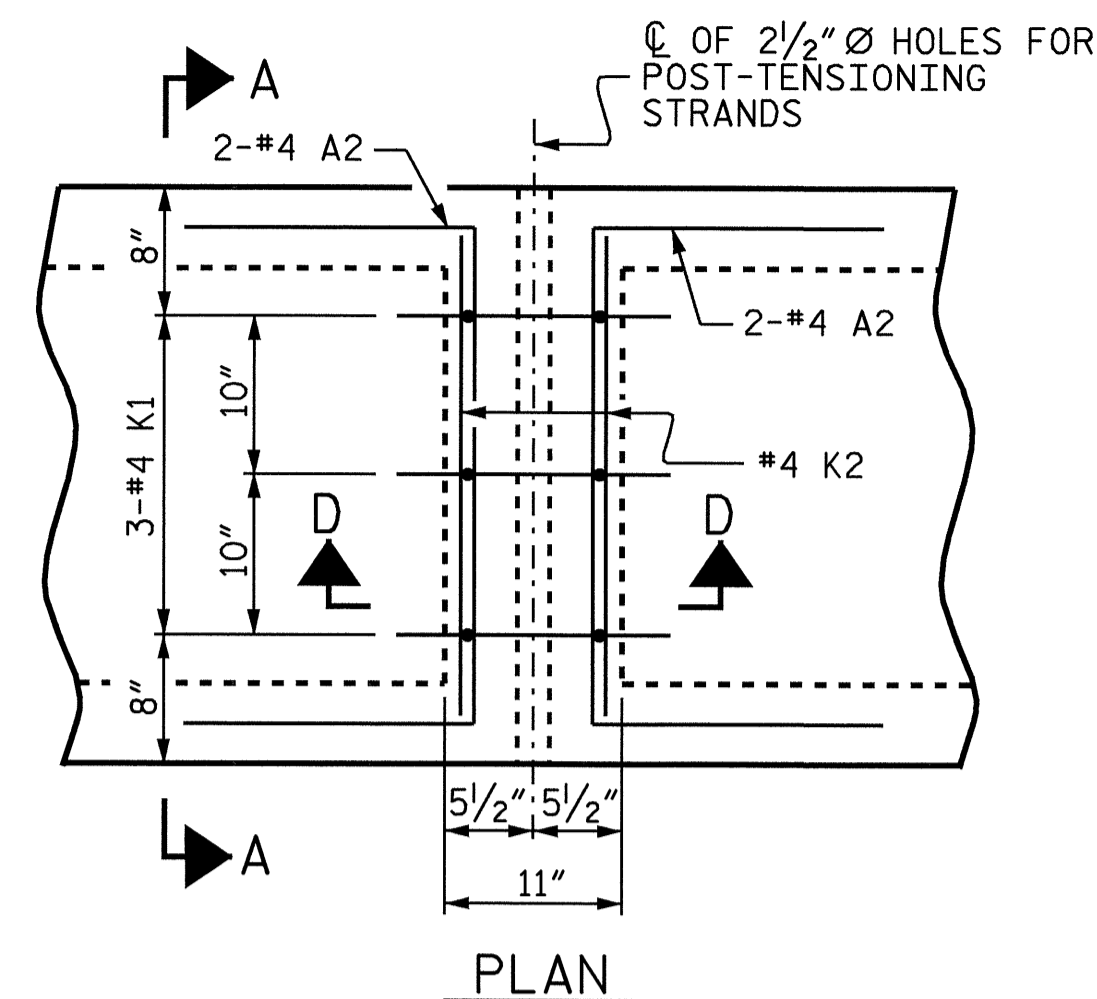


STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 3'-0" X 2'-3"  
 PRESTRESSED CONCRETE  
 BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS 19
2			4			

ASSEMBLED BY : J. MYA	DATE : 3-2-09
CHECKED BY : J.L. WALTON	DATE : 3-31-09
DRAWN BY : TLA 5/05	ADDED 7/11/05
CHECKED BY : GM 6/05	REV. 5/1/06R TLA/GM

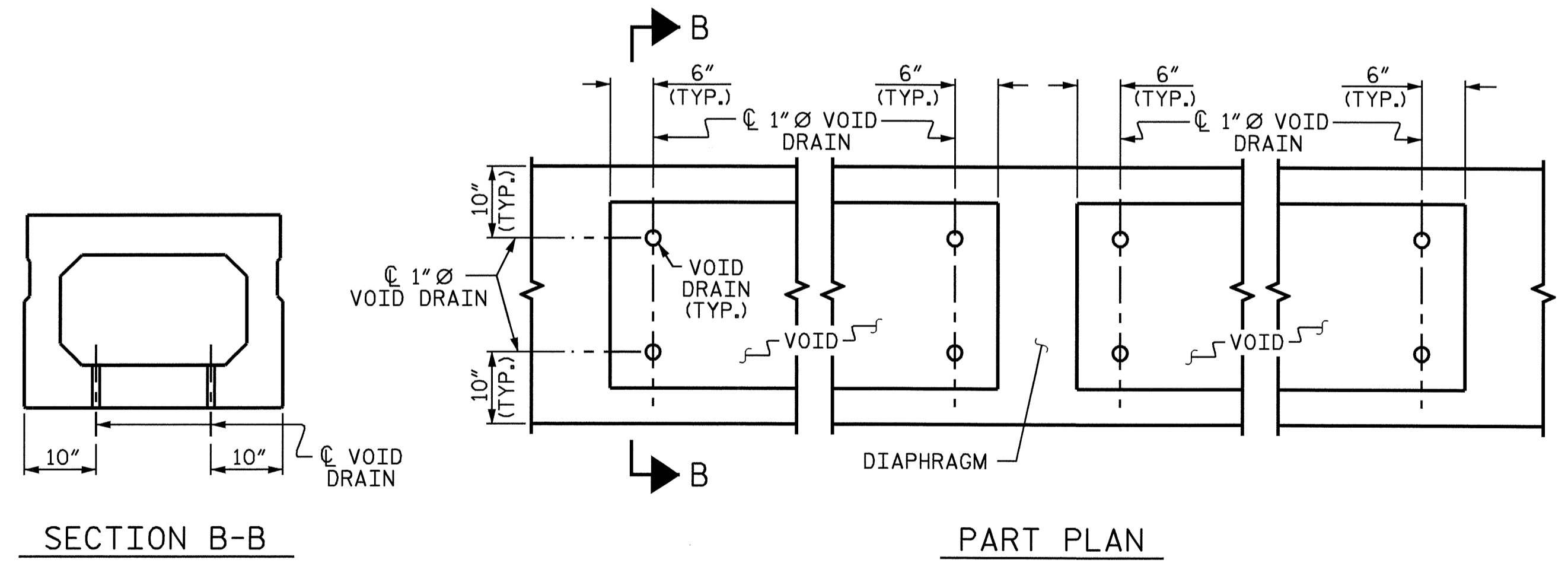




**DOUBLE DIAPHRAGM DETAILS**

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

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



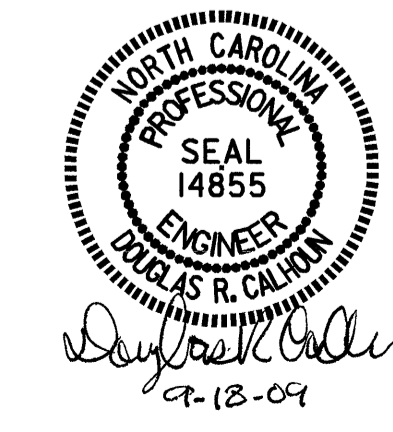
**VOID DRAIN DETAILS**  
(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0" x 2'-3"
	0.6" Ø L.R. STRAND
CAMBER (BEAM ALONE IN PLACE)	↑ 1 3/8"
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD **	↓ 1/4"
FINAL CAMBER	↑ 1 1/8"

\*\* INCLUDES FUTURE ASPHALT WEARING SURFACE

PROJECT NO. B-4541  
HALIFAX COUNTY  
 STATION: 13+55.00 -L-

SHEET 2 OF 3



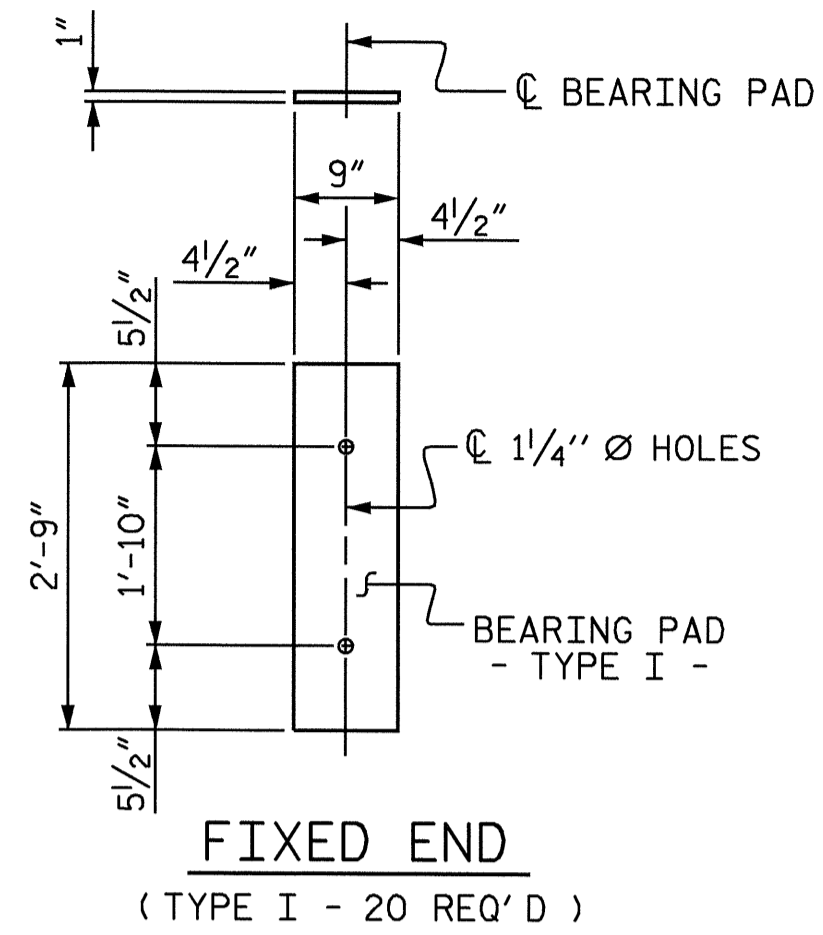
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 3'-0" X 2'-3"  
 PRESTRESSED CONCRETE  
 BOX BEAM UNIT

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

ASSEMBLED BY : J.MYA DATE : 3-2-09  
 CHECKED BY : J.L.WALTON DATE : 3-31-09  
 DRAWN BY : TLA 5/05  
 CHECKED BY : GM 6/05

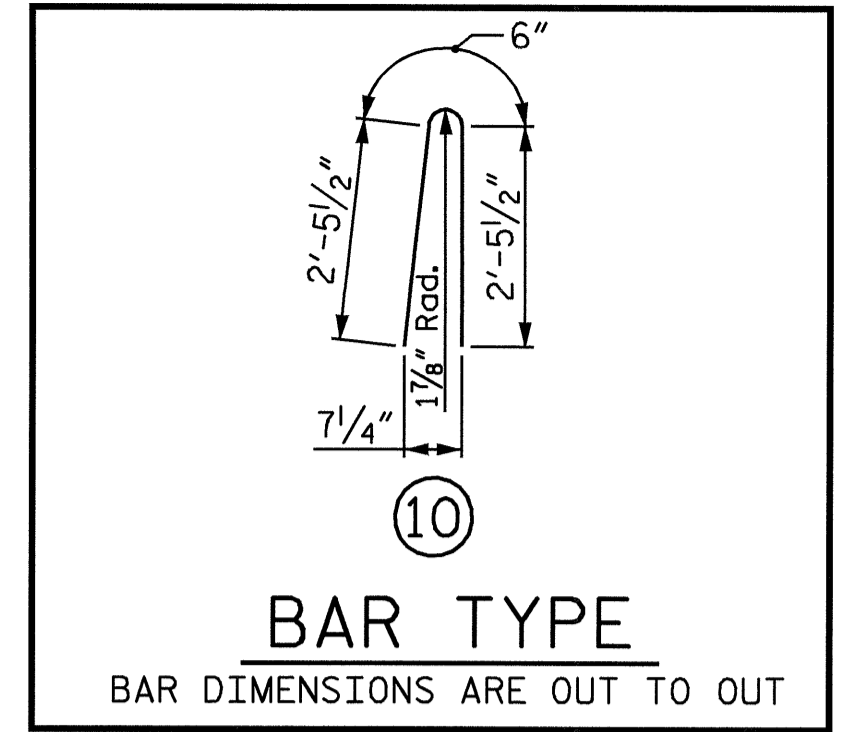
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STD. NO. PCBB3



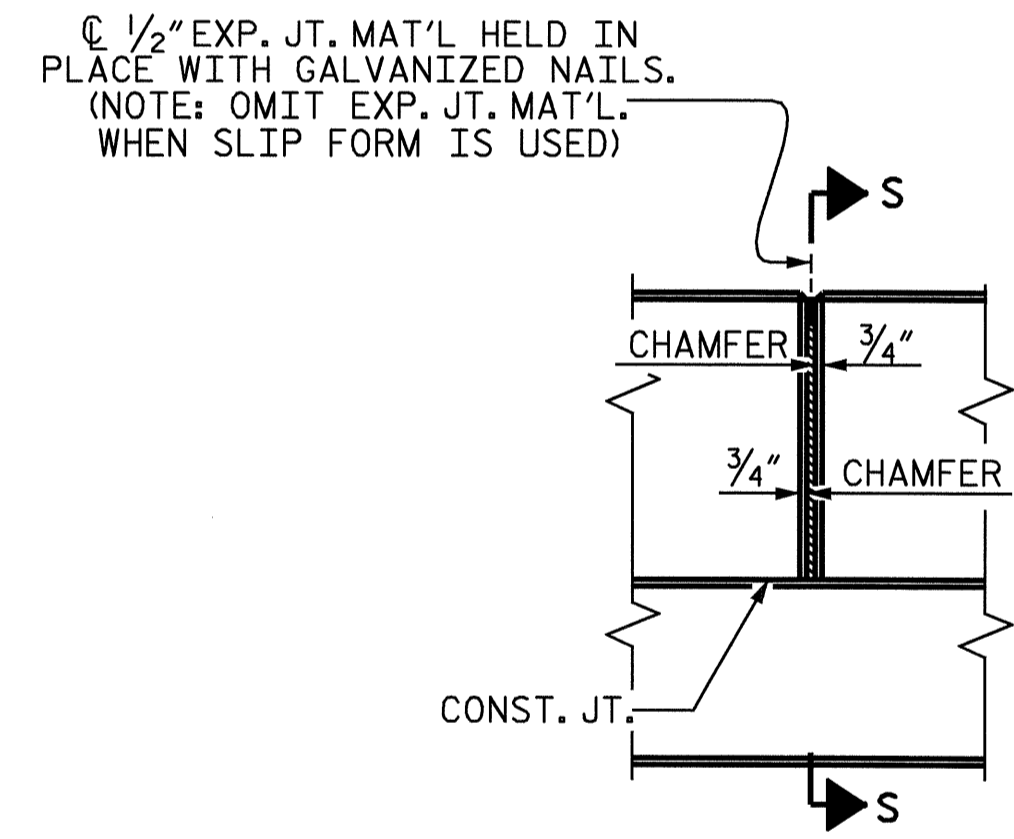
**FIXED END**  
(TYPE I - 20 REQ'D)  
**ELASTOMERIC BEARING DETAILS**  
(60 DUROMETER HARDNESS)

BOX BEAM UNITS REQUIRED			
UNIT TYPE	NUMBER	LENGTH	TOTAL
INTERIOR	8	57'-9"	462'-0"
EXTERIOR	2	57'-9"	115'-6"
TOTAL	10		577'-6"

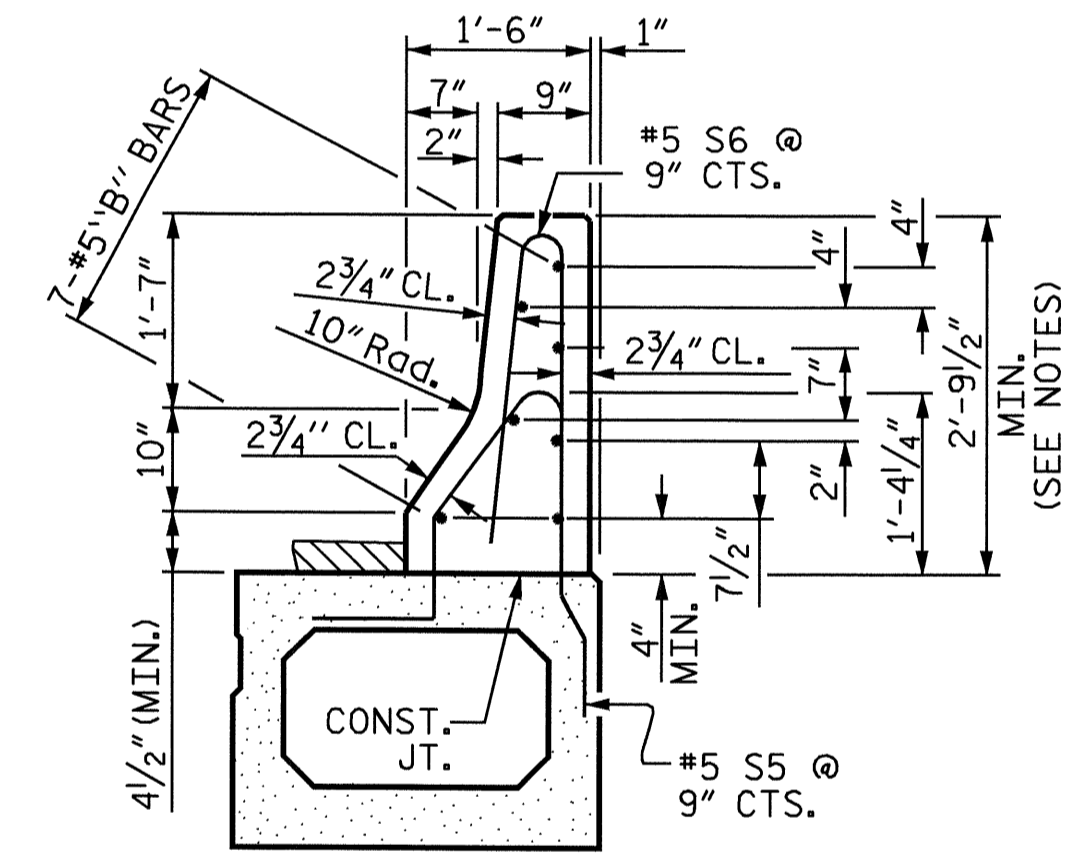


BILL OF MATERIAL FOR CONCRETE BARRIER RAIL					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
*B2	28	#5	STR	28'-6"	832
*S6	154	#5	10	5'-5"	870
* EPOXY COATED REINFORCING STEEL					1702 LBS.
CLASS AA CONCRETE					13.0 CU.YDS.
TOTAL LIN. FT. OF CONCRETE BARRIER RAIL =					115.5

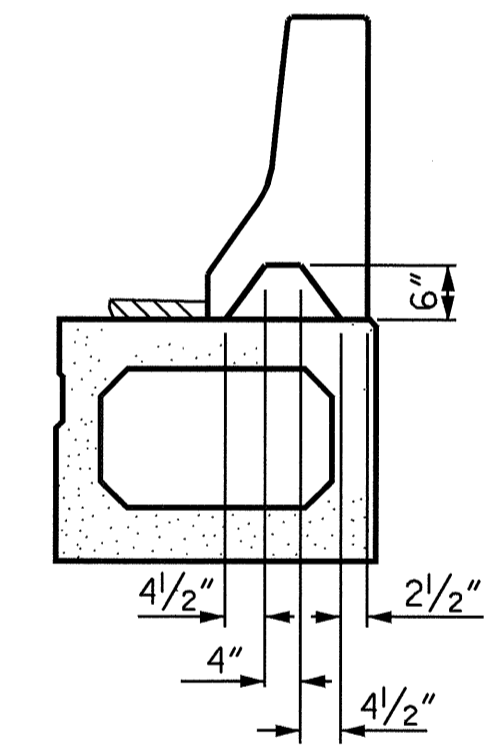
NOTE: THE MINIMUM HEIGHT OF THE BARRIER RAIL IS SHOWN. THE HEIGHT OF THE BARRIER RAIL VARIES WHILE THE TOP OF THE RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE.



ELEVATION AT EXPANSION JOINTS



SECTION THRU RAIL



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

**BARRIER RAIL DETAILS**

PROJECT NO. B-4541  
HALIFAX COUNTY  
STATION: 13+55.00 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
3'-0" X 2'-3"  
PRESTRESSED CONCRETE  
BOX BEAM UNIT

ASSEMBLED BY : J. MYA	DATE : 3-2-09
CHECKED BY : J. L. WALTON	DATE : 3-31-09
DRAWN BY : TLA 5/05	ADDED 7/11/05R
CHECKED BY : GM 6/05	REV. 5/1/06R TLA/GM

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

TOTAL SHEETS 19

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jmya

NOTES

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

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

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

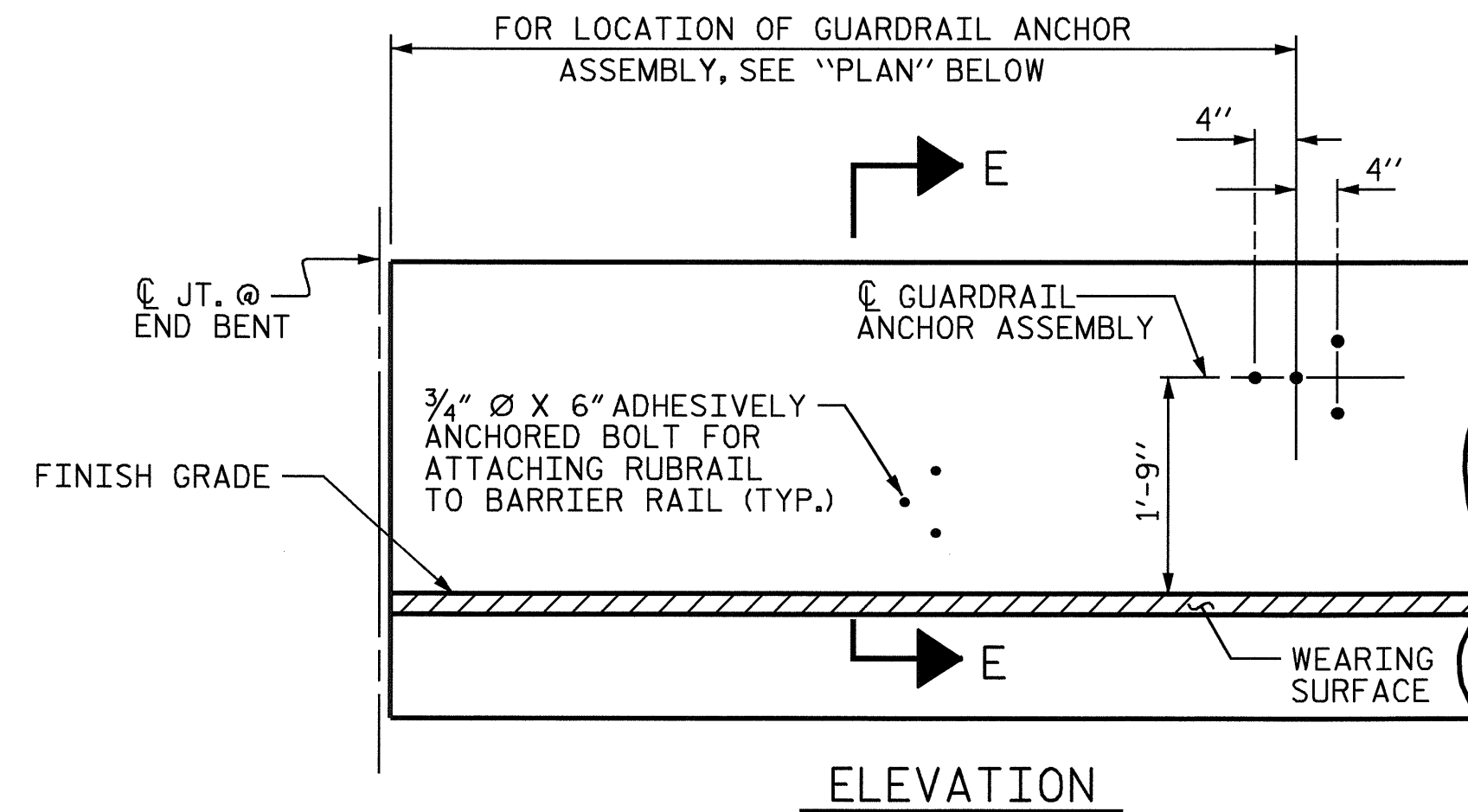
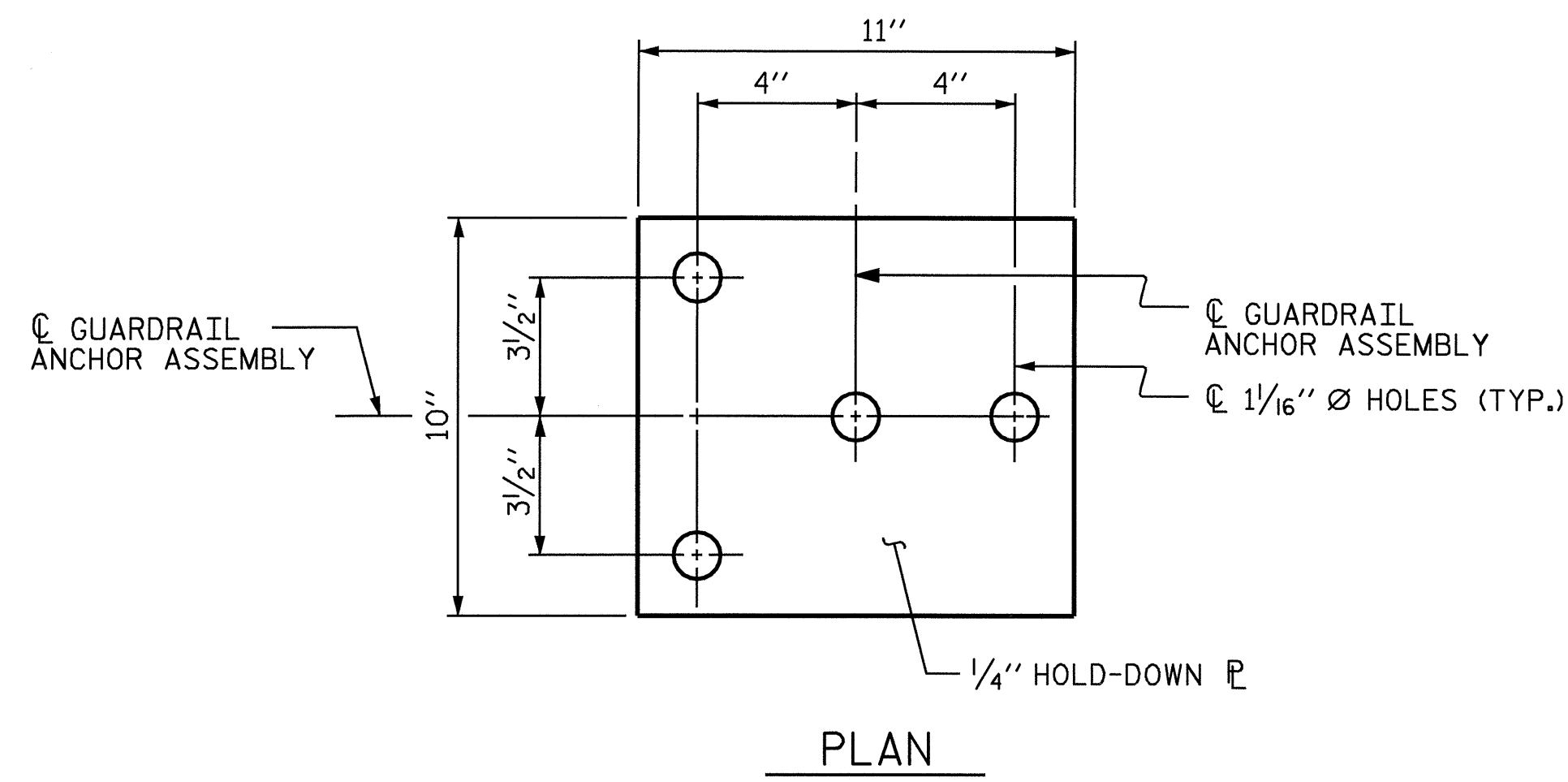
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

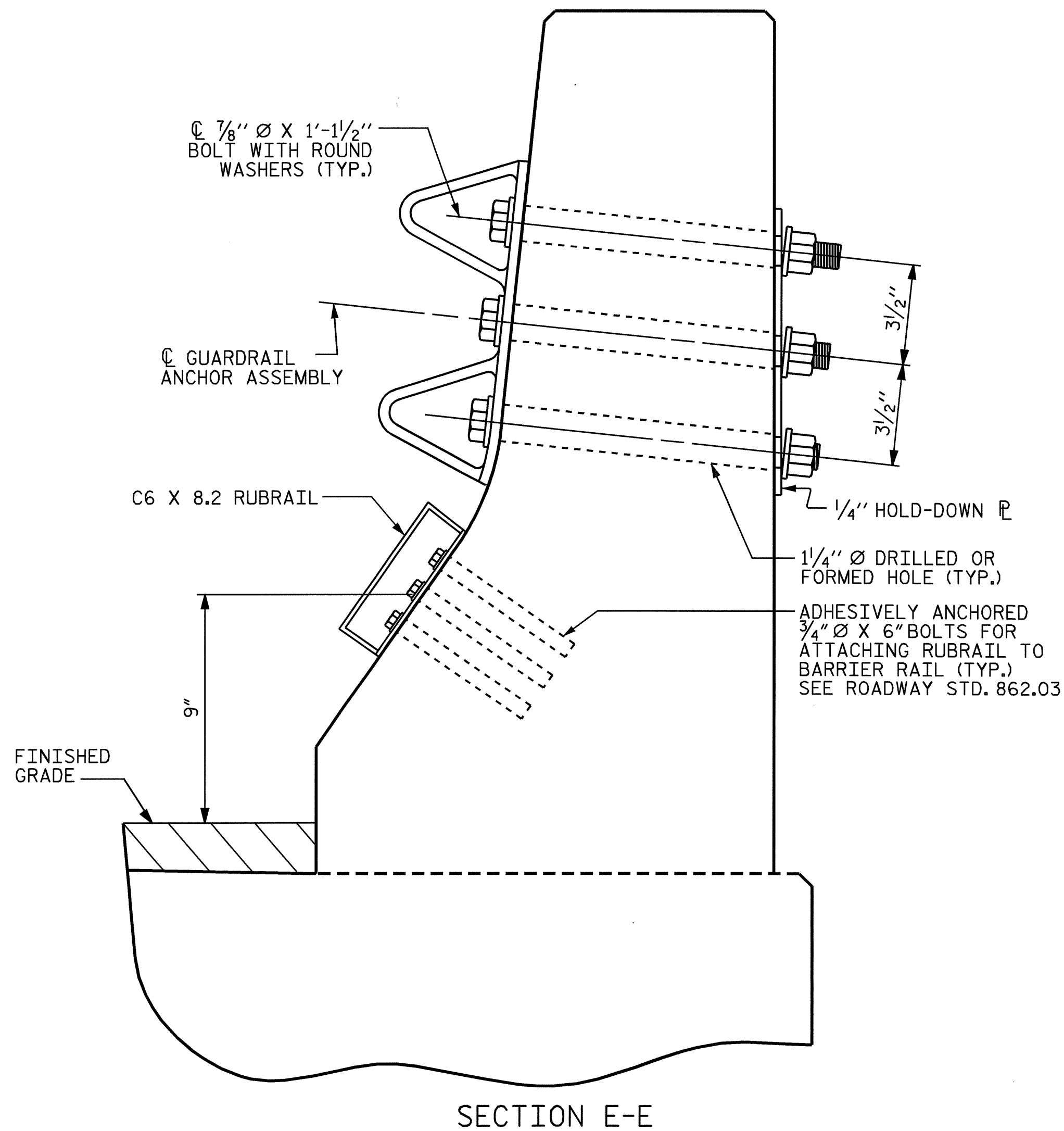
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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

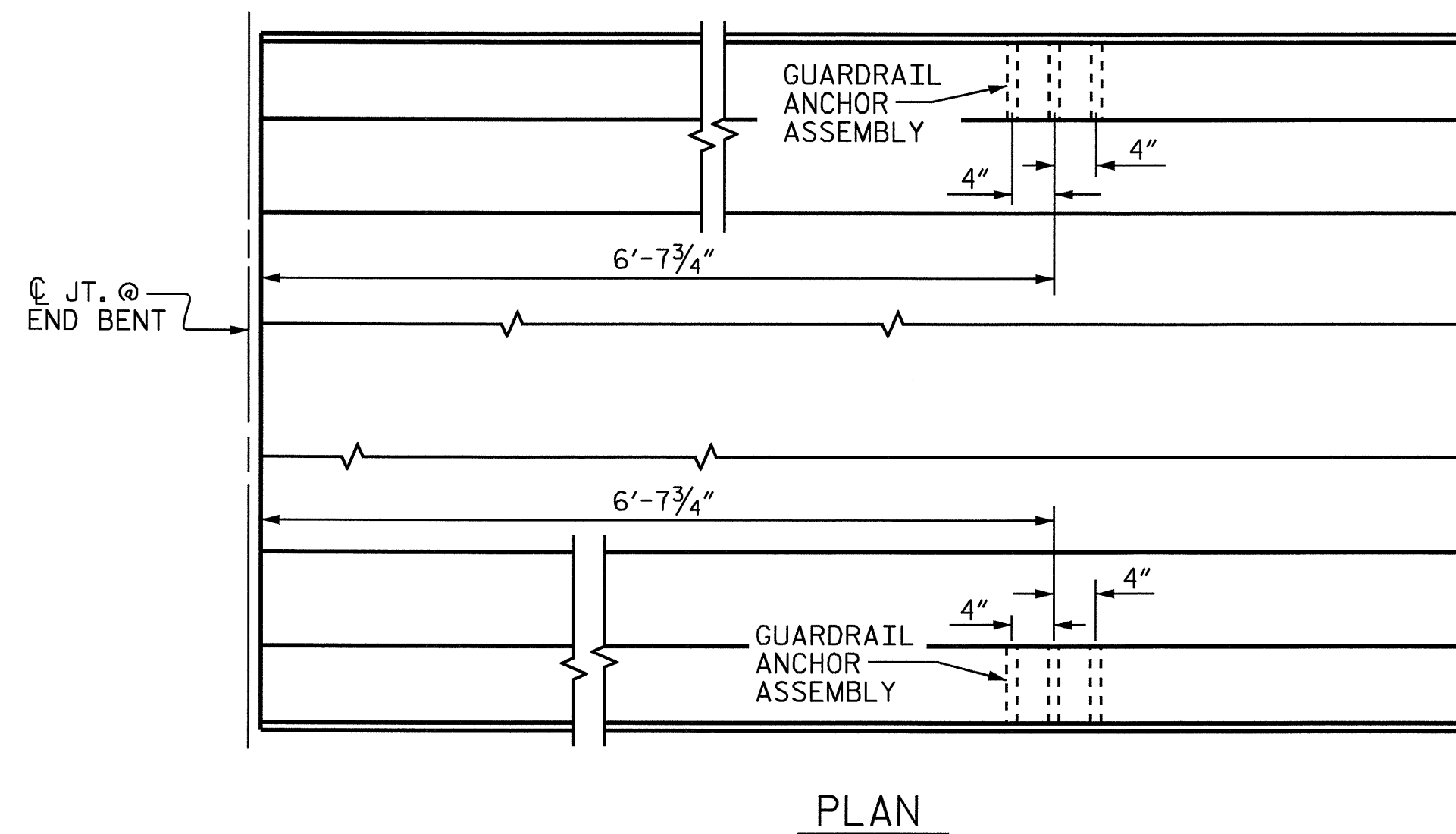
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS; SEE SPECIAL PROVISIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS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



FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03

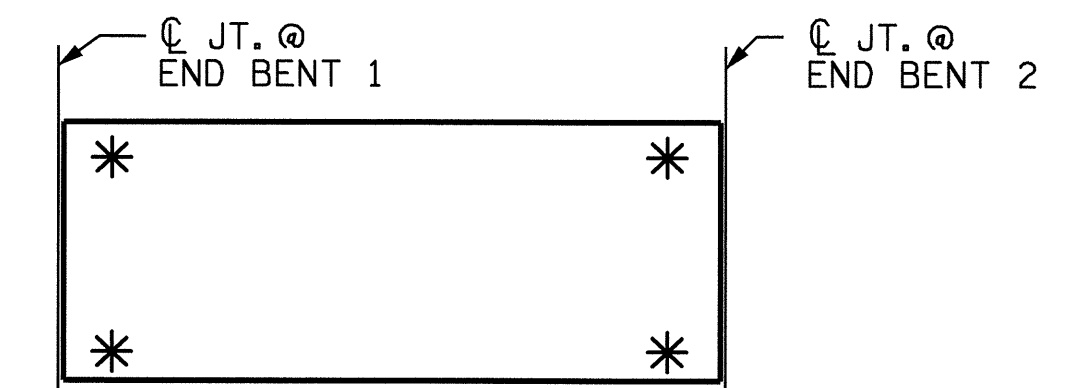


GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.

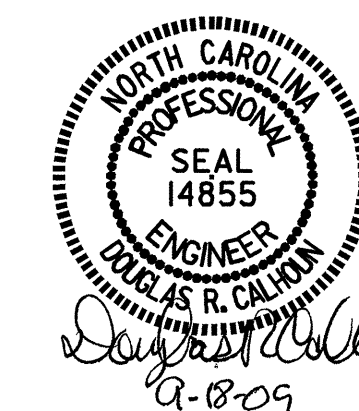


SKETCH SHOWING POINTS OF ATTACHMENTS

\* DENOTES GUARDRAIL ANCHOR ASSEMBLY

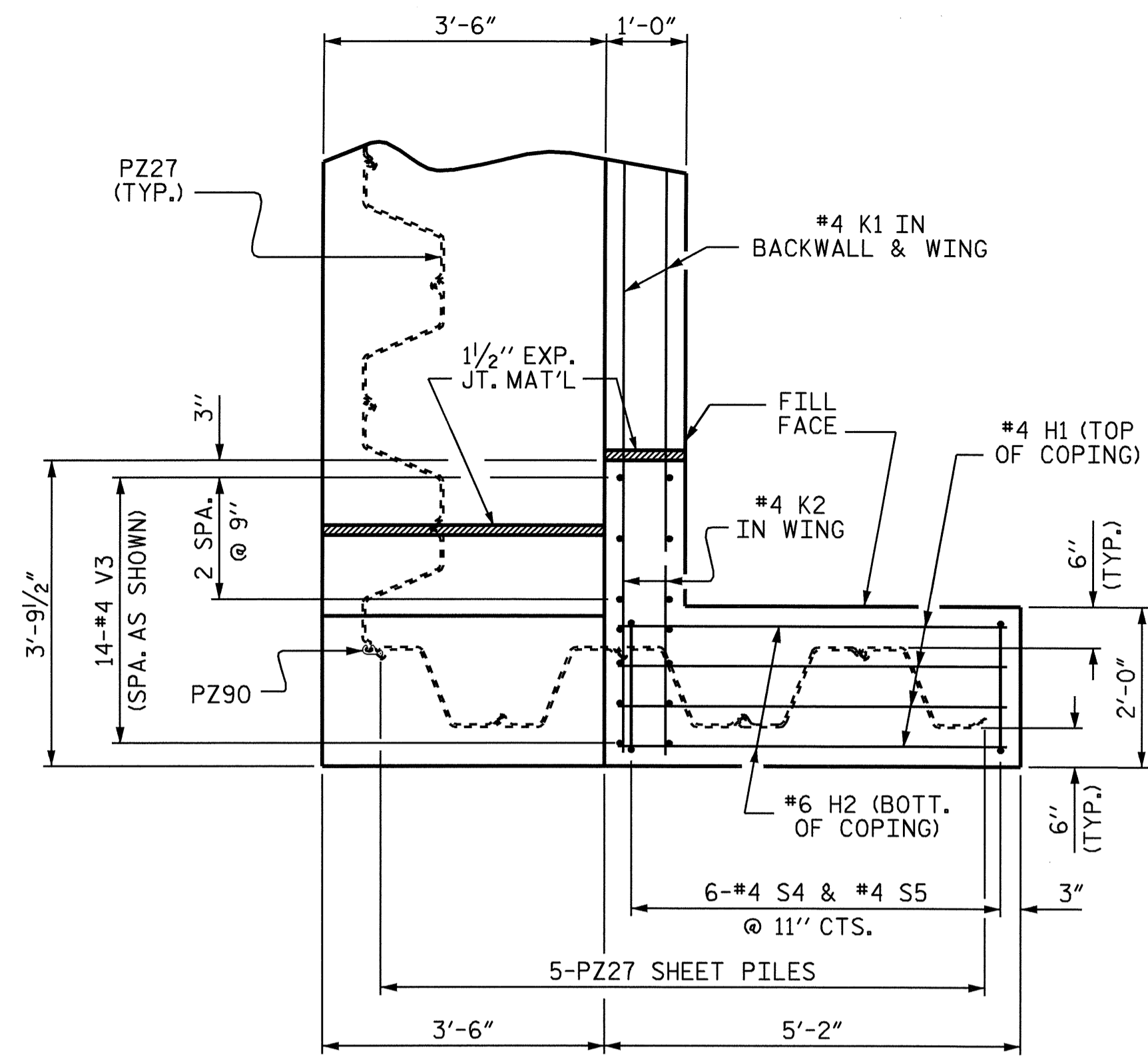
PROJECT NO. B-4541  
HALIFAX COUNTY  
 STATION: 13+55.00 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
STANDARD GUARDRAIL ANCHORAGE FOR BARRIER RAIL						S-10
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	19
1			3			
2			4			



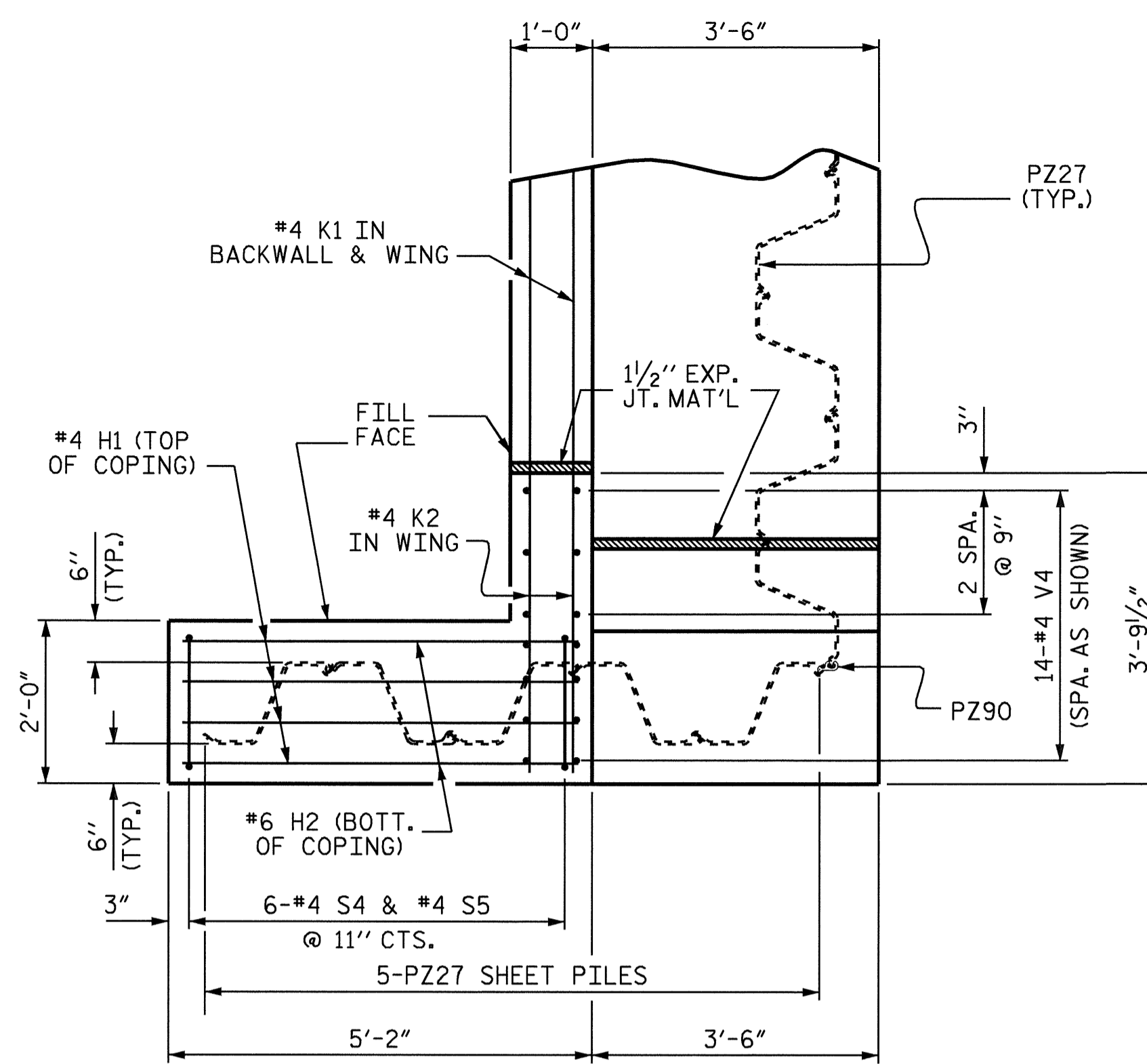
ASSEMBLED BY : J. MYA	DATE : 3-2-09
CHECKED BY : J.L. WALTON	DATE : 3-31-09
DRAWN BY : TLA 5/06	ADDED 5/1/06R KMM/GM
CHECKED BY : GM 5/06	





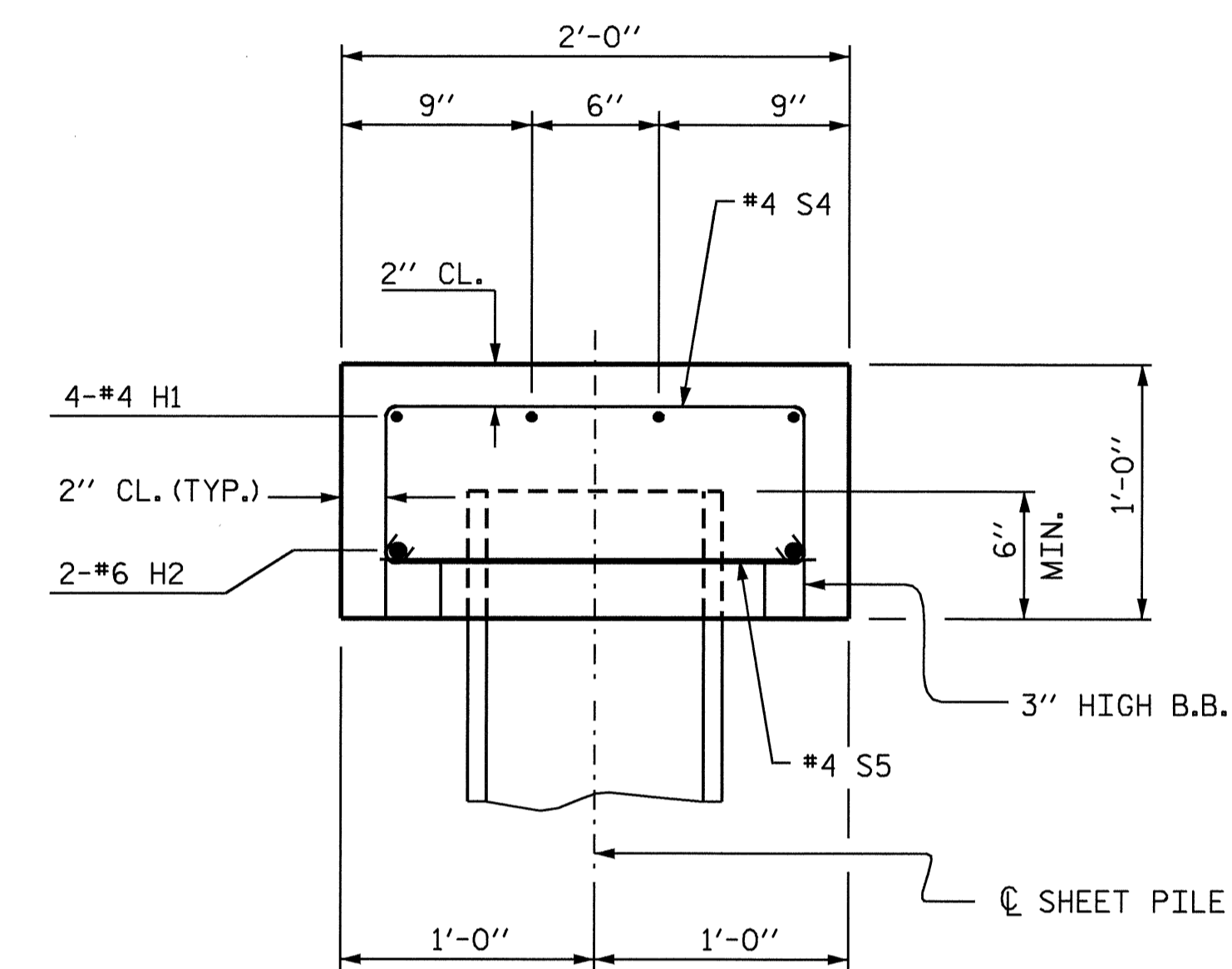
PLAN - COPING (W1)

BURN 1/2" Ø MAX. HOLE IN SHEET PILE FOR #9 B1, #5 B2, #4 K1, #4 K2 AND #4 S5 BARS (TYP.)



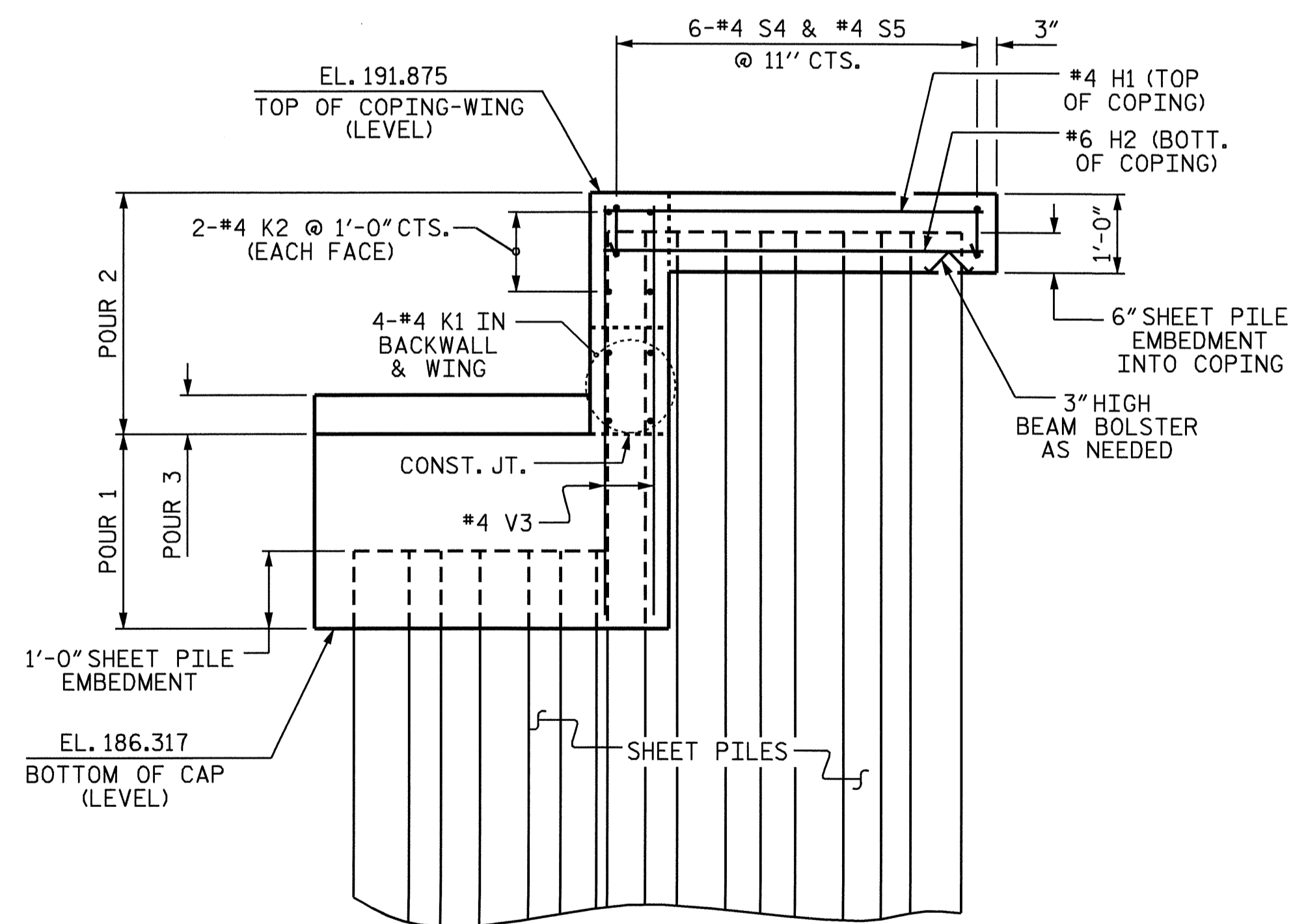
PLAN - COPING (W2)

BURN 1/2" Ø MAX. HOLE IN SHEET PILE FOR #9 B1, #5 B2, #4 K1, #4 K2 AND #4 S5 BARS (TYP.)



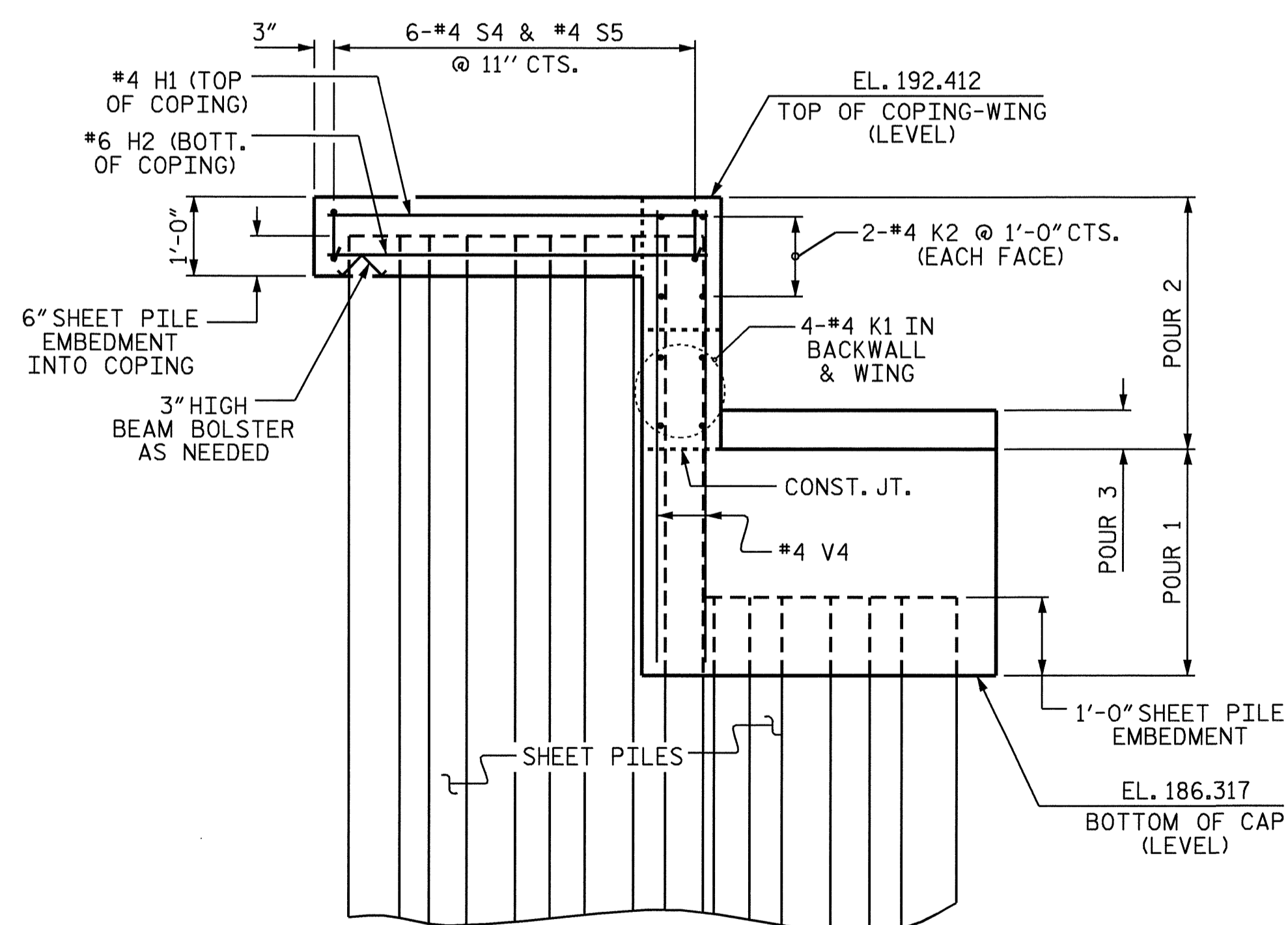
SECTION THRU COPING

BURN 1/2" Ø MAX HOLE IN SHEET PILES FOR #4 S5 BAR (TYP.)



ELEVATION - COPING (W1)

BURN 1/2" Ø MAX. HOLE IN SHEET PILE FOR #9 B1, #5 B2, #4 K1, #4 K2 AND #4 S5 BARS (TYP.)  
"V" BARS MAY BE SHIFTED SLIGHTLY TO AVOID SHEET PILES



ELEVATION - COPING (W2)

BURN 1/2" Ø MAX. HOLE IN SHEET PILE FOR #9 B1, #5 B2, #4 K1, #4 K2 AND #4 S5 BARS (TYP.)  
"V" BARS MAY BE SHIFTED SLIGHTLY TO AVOID SHEET PILES

PROJECT NO. B-4541  
HALIFAX COUNTY  
STATION: 13+55.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT 1

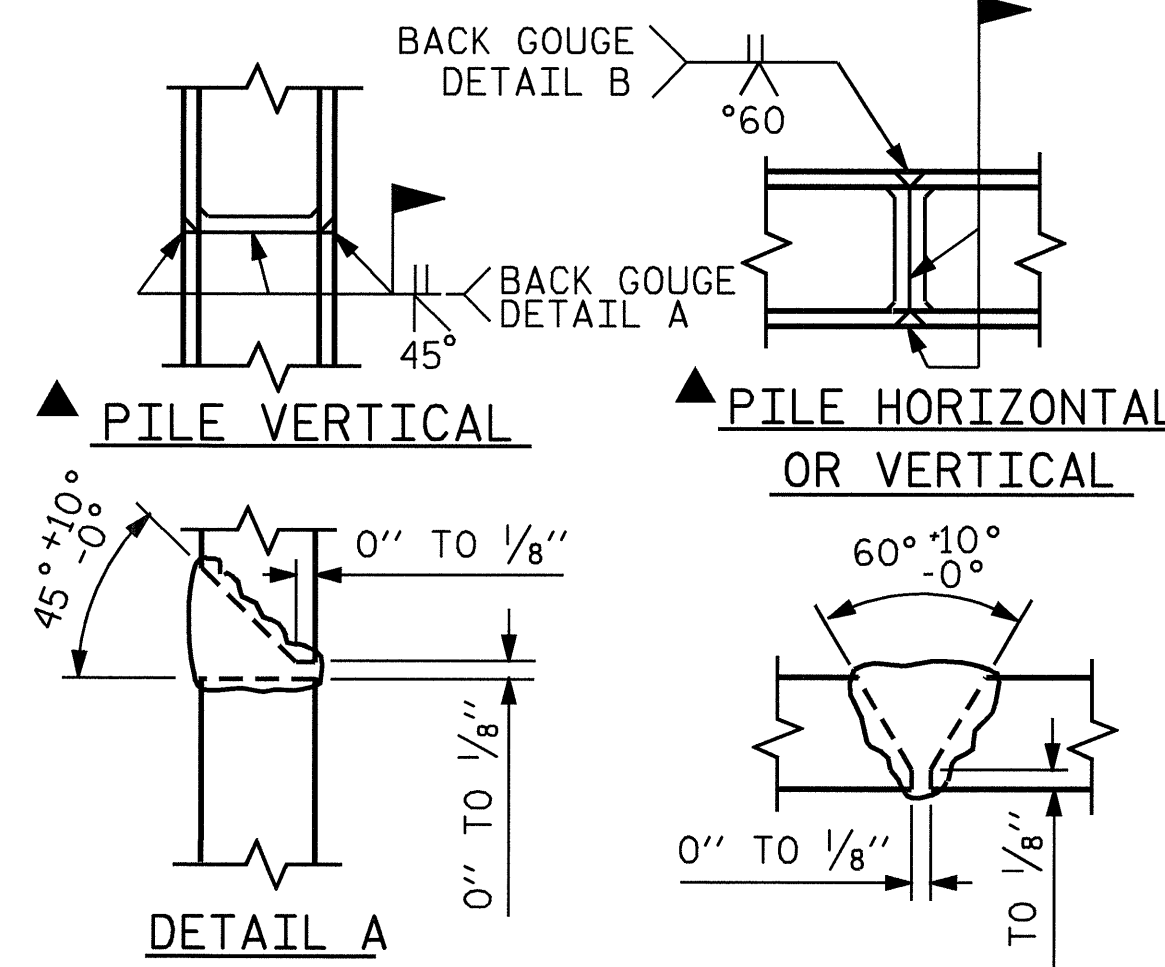
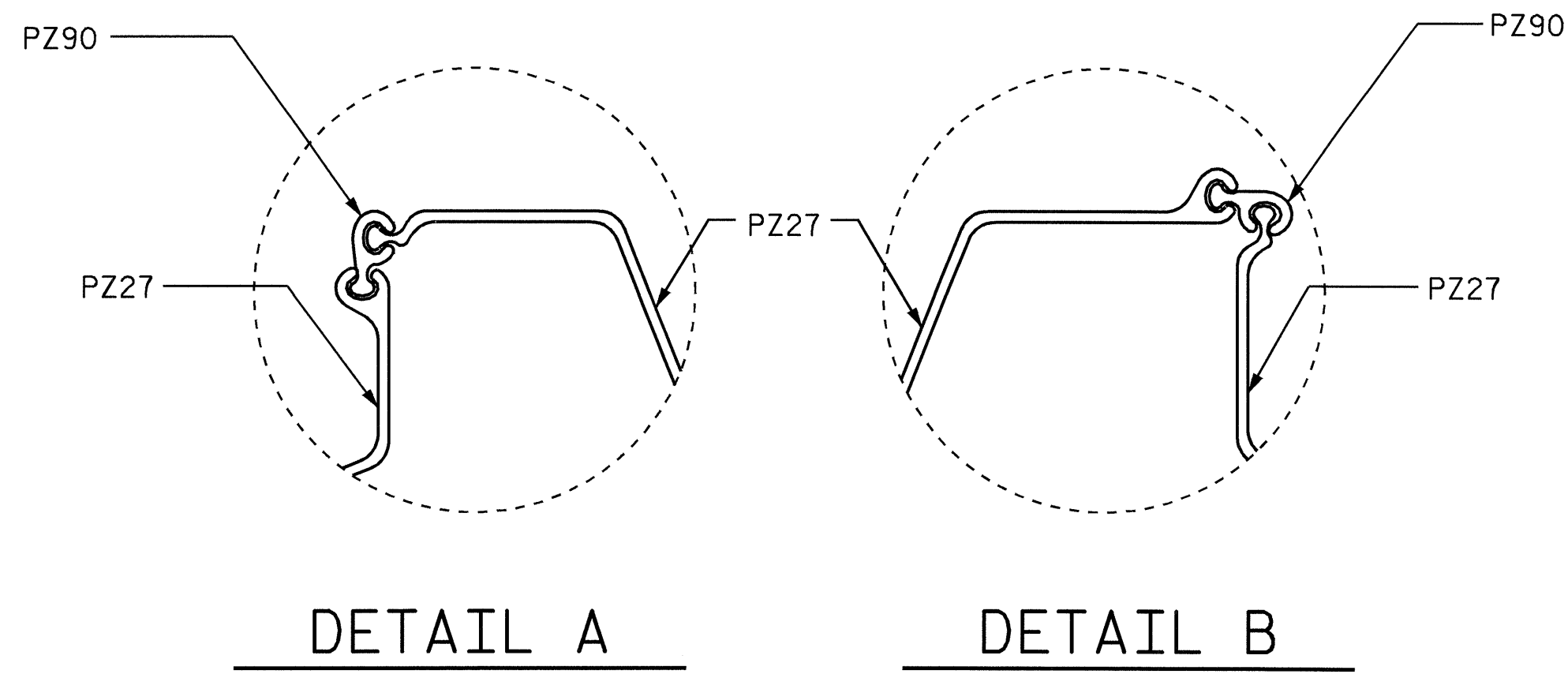


*Douglas R. Calton*  
12-18-09

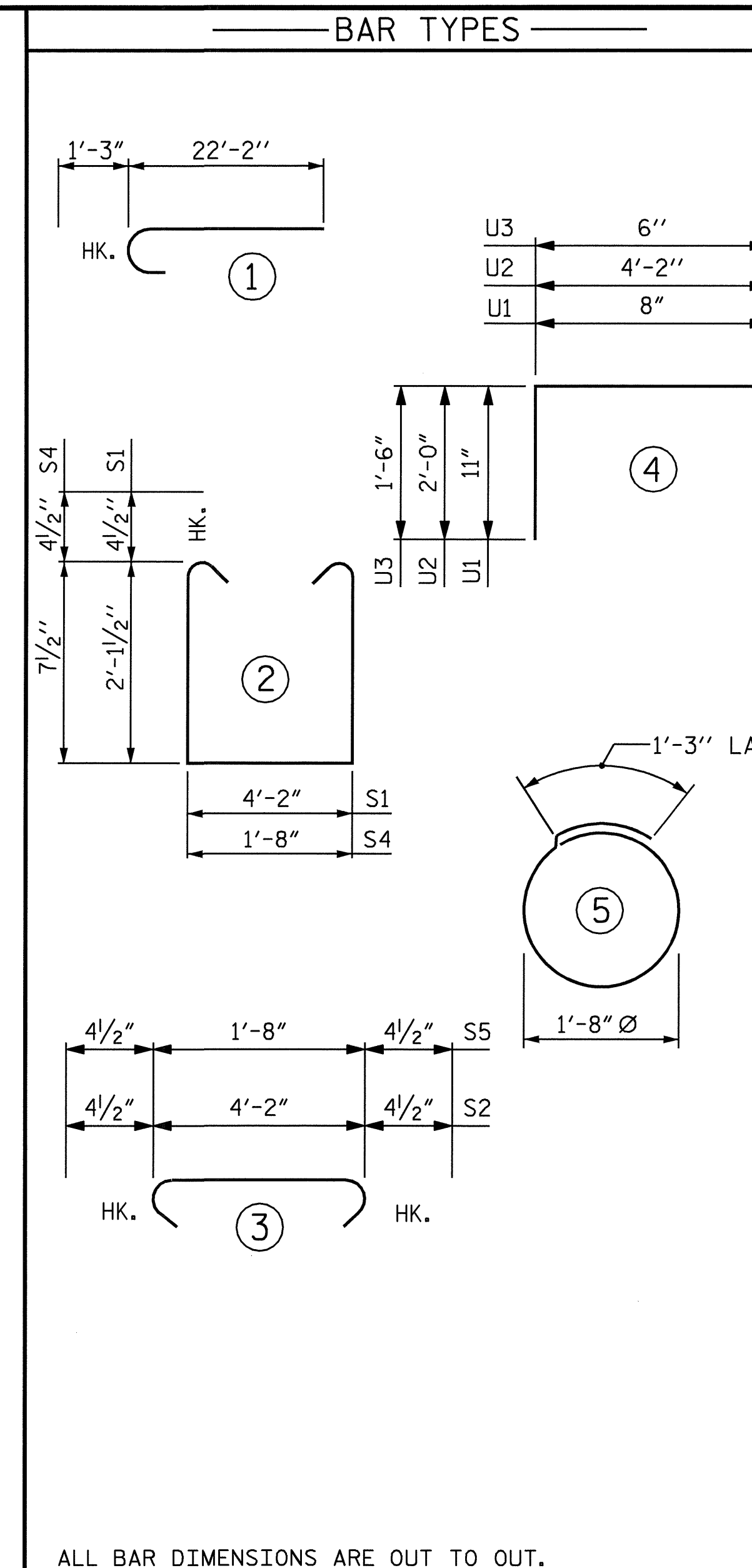
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			19
2			4			

DRAWN BY: J. MYA DATE: 3-17-09  
CHECKED BY: J. L. WALTON DATE: 5-12-09

17-SEP-2009 14:58  
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jmya



▲ POSITION OF PILE DURING WELDING. **PILE SPLICING DETAILS**



BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#9	1	23'-5"	1274
B2	2	#5	STR	35'-8"	74
B3	8	#4	STR	19'-1"	102
B4	4	#4	STR	24'-0"	64
B5	9	#4	STR	4'-2"	25
B6	4	#4	STR	3'-2"	8
D1	20	#8	STR	2'-3"	120
H1	8	#4	STR	4'-10"	26
H2	4	#6	STR	4'-10"	29
K1	8	#4	STR	19'-1"	102
K2	8	#4	STR	3'-5"	18
S1	49	#4	2	9'-2"	300
S2	49	#4	3	4'-11"	161
S3	12	#4	5	6'-6"	52
S4	12	#4	2	3'-8"	29
S5	12	#4	3	2'-5"	19
U1	29	#4	4	2'-6"	48
U2	16	#4	4	8'-2"	87
U3	8	#4	4	3'-6"	19
V1	22	#4	STR	3'-10"	56
V2	36	#4	STR	3'-6"	84
V3	14	#4	STR	5'-2"	48
V4	14	#4	STR	5'-9"	54

REINFORCING STEEL LBS 2799

CLASS A CONCRETE  
POUR 1 : CAP C.Y. 17.2

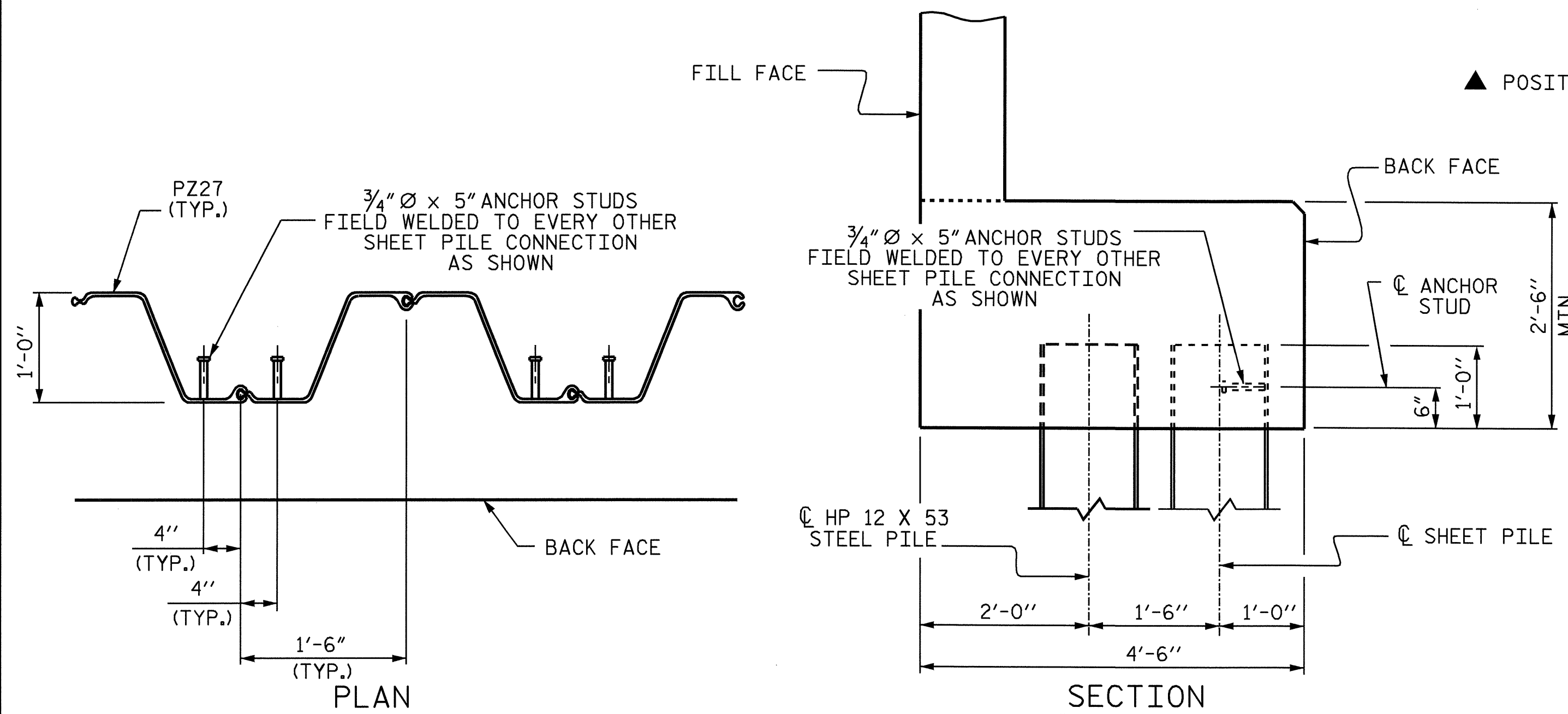
POUR 2 : (BACKWALL, UPPER PART OF WINGS & COPINGS) C.Y. 2.3

POUR 3 : (LATERAL GUIDES) C.Y. 0.1

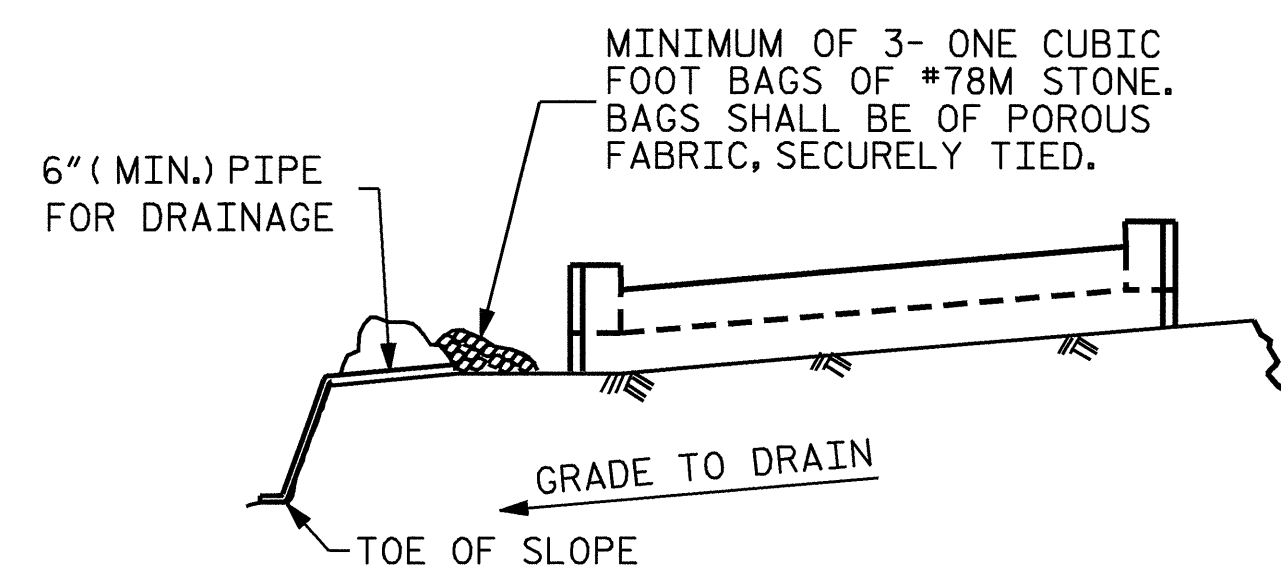
TOTAL C.Y. 19.6

HP 12 X 53 STEEL PILES  
NO. : 6 210 FT.

18" STEEL SHEET PILES  
No. PZ27 = 32 SQ. FT. 975  
No. PZ90 = 2 SQ. FT. 10  
TOTAL NO. = 34 SQ. FT. 985



**SHEET PILE ANCHOR STUD DETAILS**

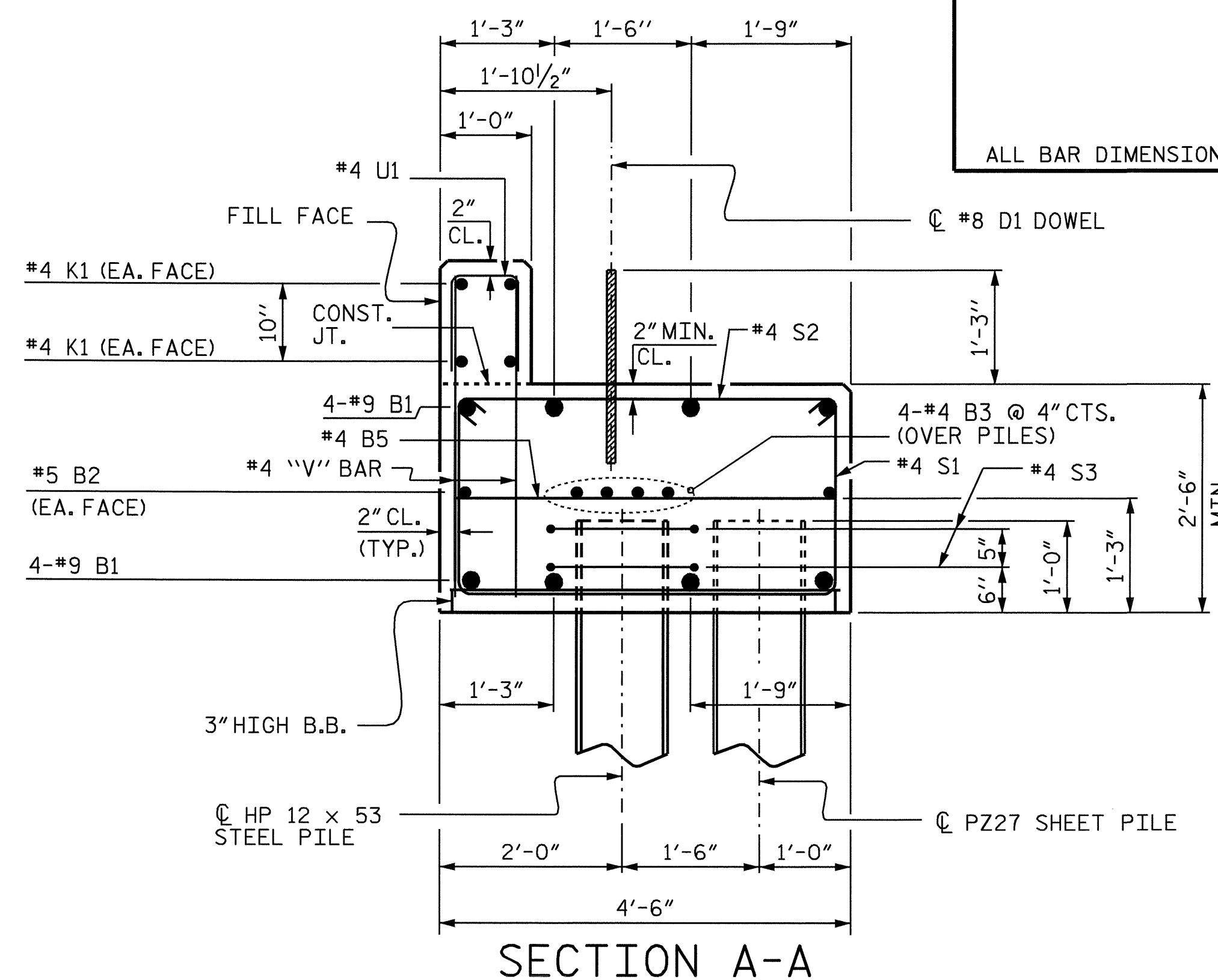


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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**



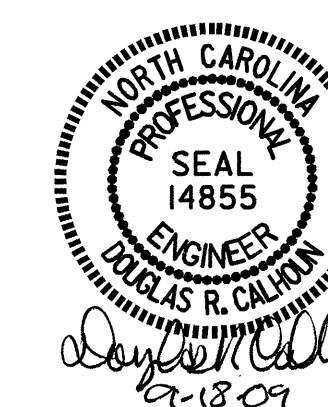
BURN 1/2" Ø MAX. HOLE IN SHEET PILE FOR #9 B1, #5 B2, #4 K1, #4 K2 AND #4 S1 BARS (TYP.)  
"V" BARS MAY BE SHIFTED SLIGHTLY TO AVOID SHEET PILES

PROJECT NO. **B-4541**  
**HALIFAX** COUNTY  
STATION: **13+55.00 -L-**

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**SUBSTRUCTURE  
END BENT 1**

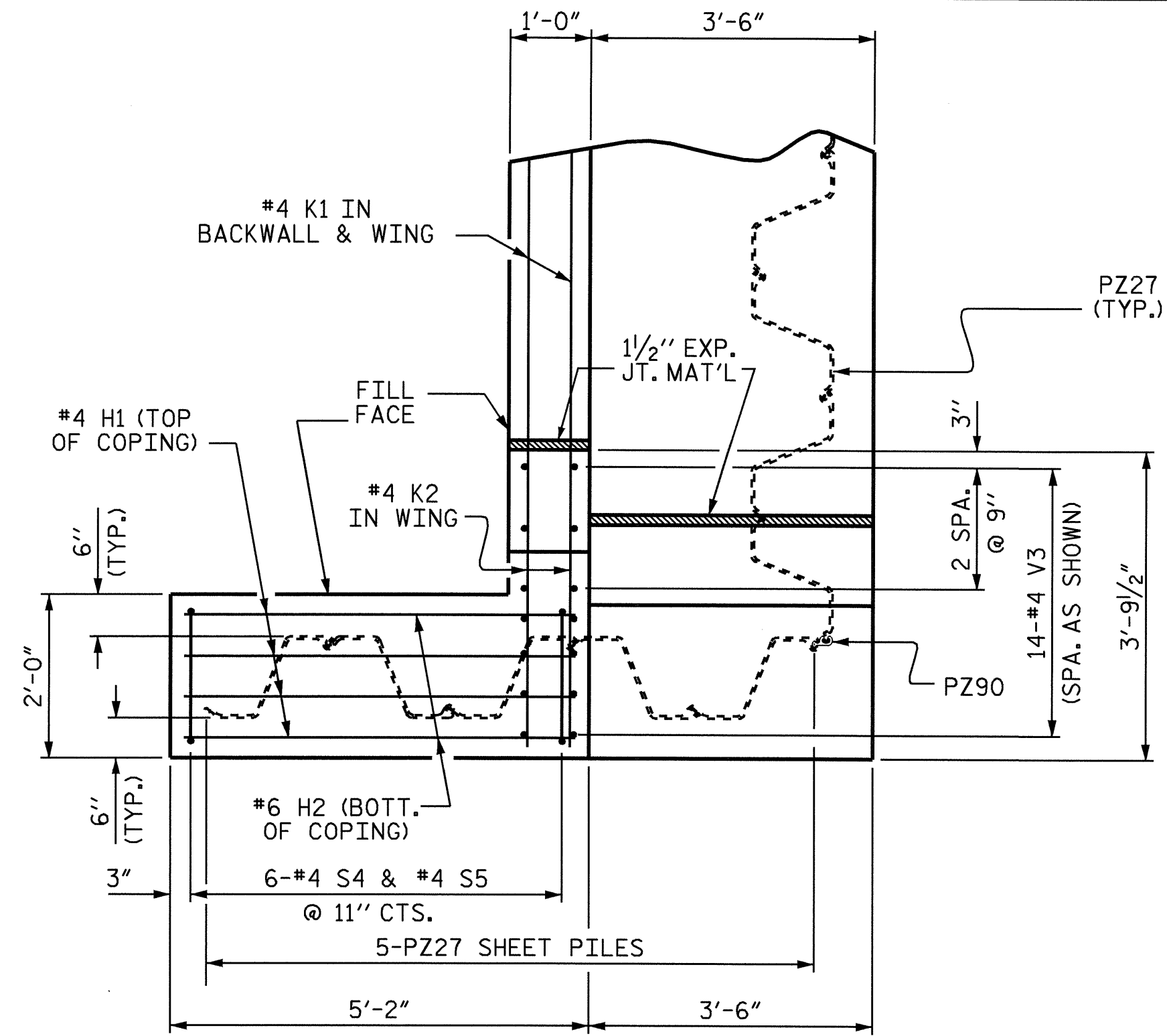


REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.  
**S-13**  
TOTAL SHEETS  
**19**

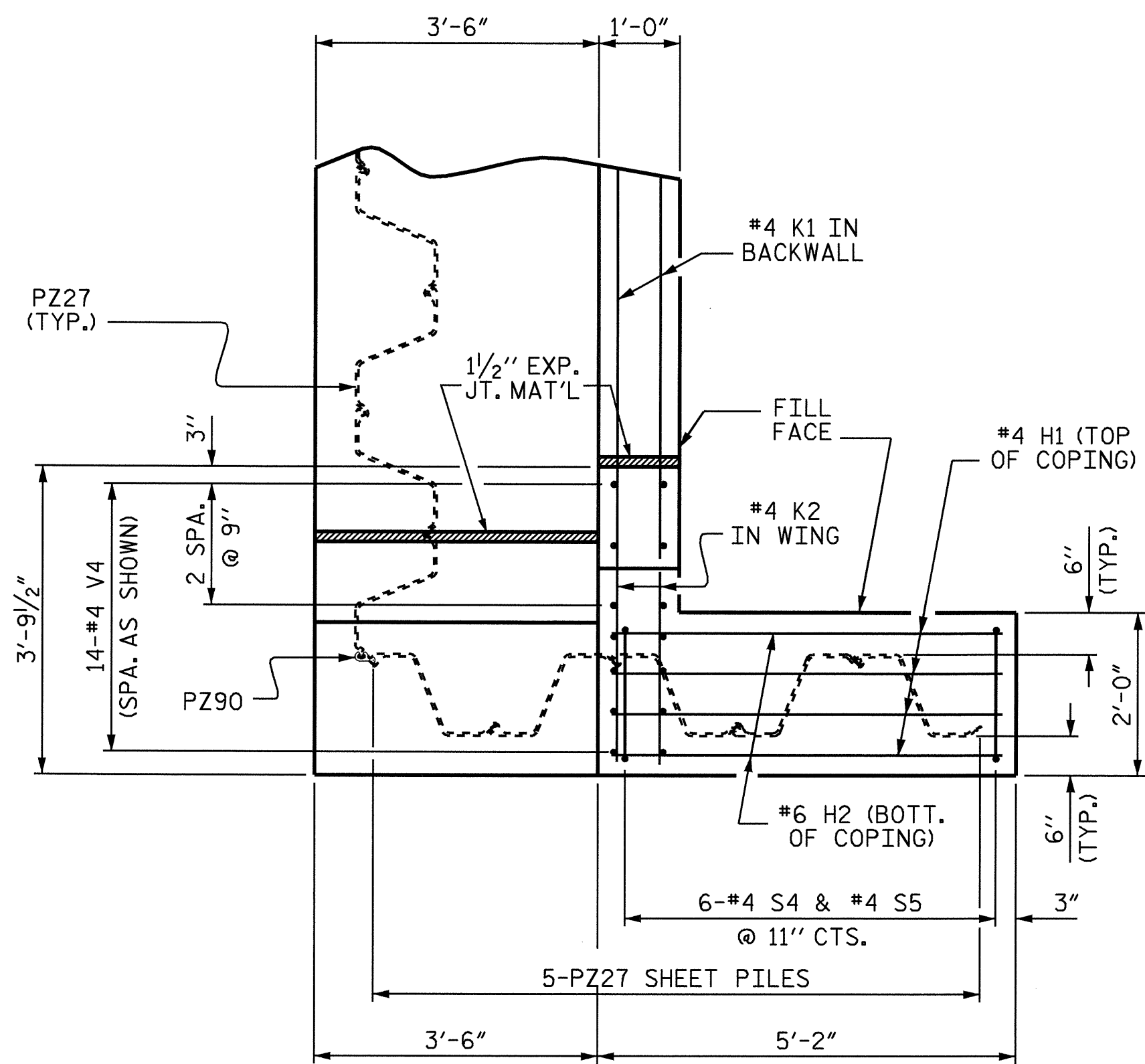
DRAWN BY : **J. MYA** DATE : **3-17-09**  
CHECKED BY : **J. L. WALTON** DATE : **5-12-09**





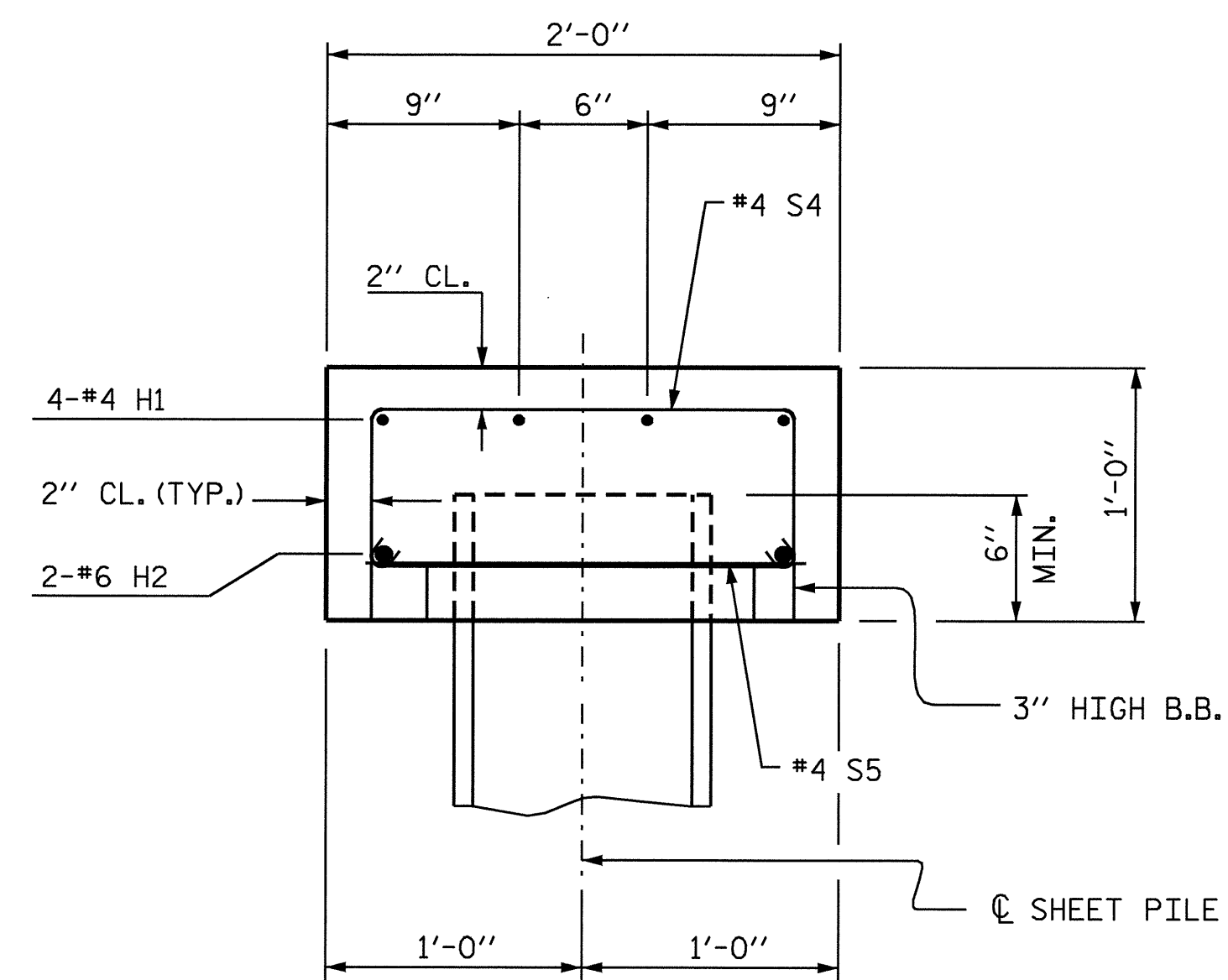
PLAN - COPING (W1)

BURN 1/2" Ø MAX. HOLE IN SHEET PILE FOR #9 B1, #5 B2, #4 K1, #4 K2 AND #4 S5 BARS (TYP.)



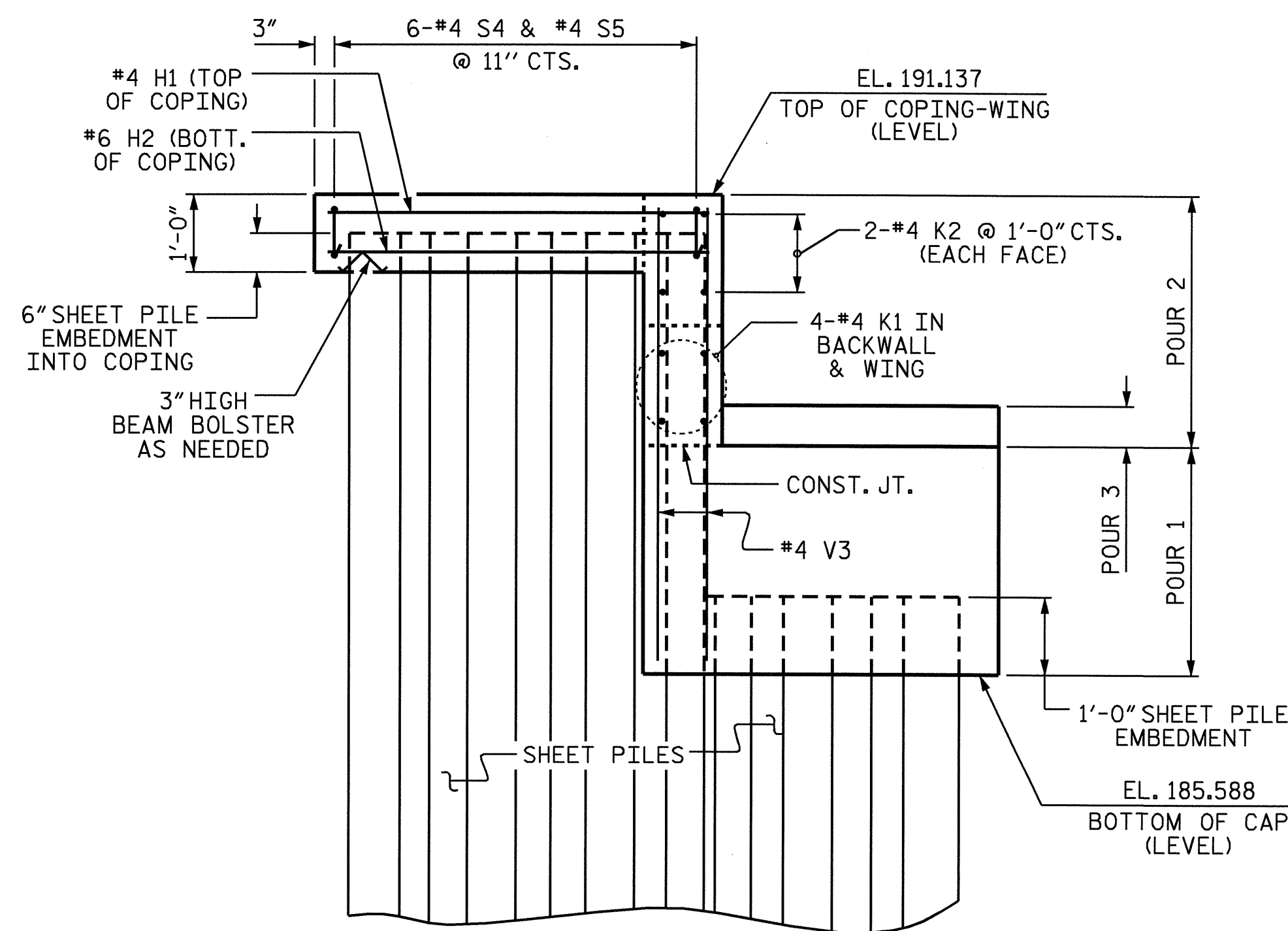
PLAN - COPING (W2)

BURN 1/2" Ø MAX. HOLE IN SHEET PILE FOR #9 B1, #5 B2, #4 K1, #4 K2 AND #4 S5 BARS (TYP.)



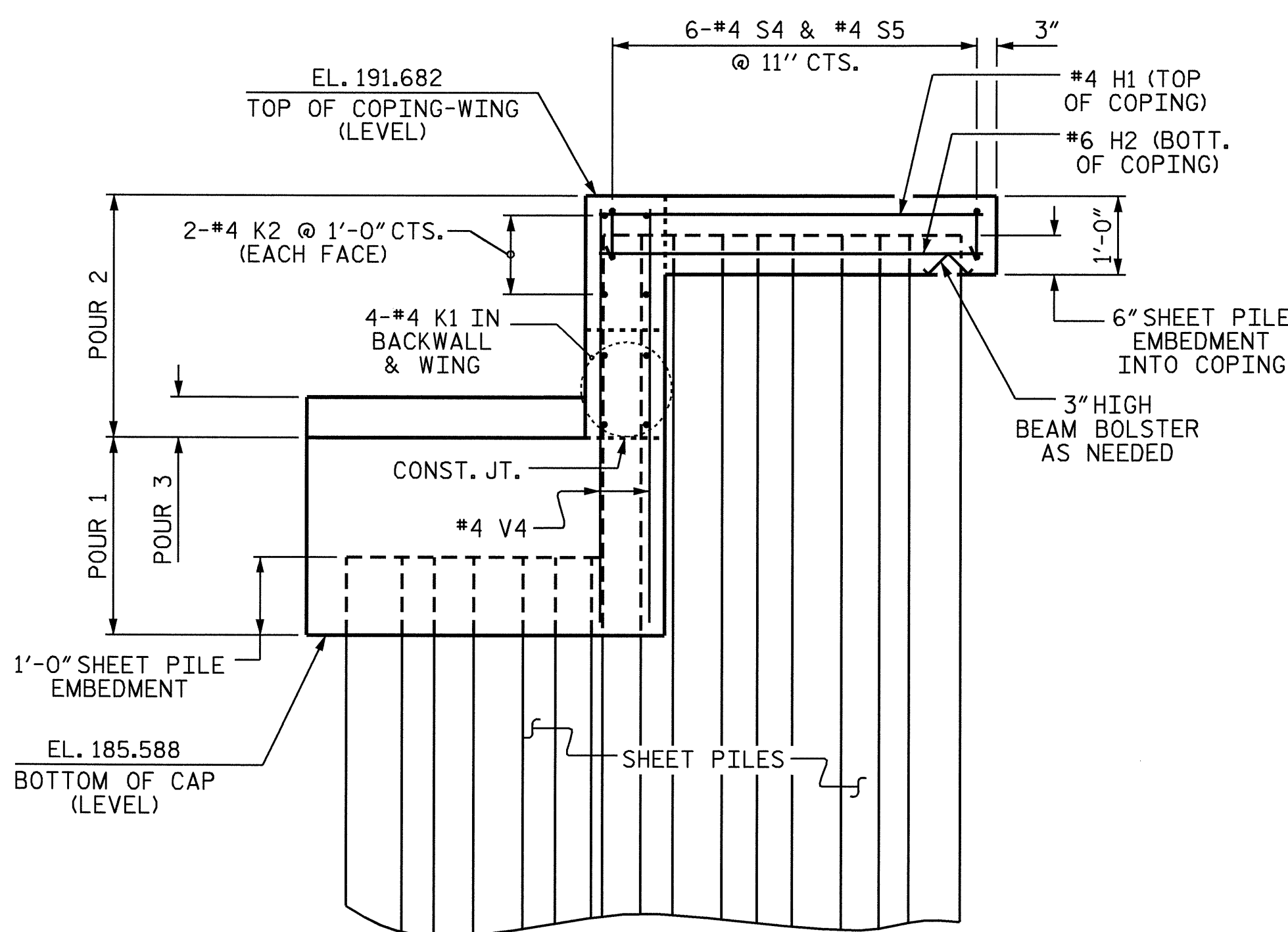
SECTION THRU COPING

BURN 1" Ø MAX HOLE IN SHEET PILES FOR #4 S5 BAR (TYP.)



ELEVATION - COPING (W1)

BURN 1/2" Ø MAX. HOLE IN SHEET PILE FOR #9 B1, #5 B2, #4 K1, #4 K2 AND #4 S5 BARS (TYP.)  
"V" BARS MAY BE SHIFTED SLIGHTLY TO AVOID SHEET PILES



ELEVATION - COPING (W2)

BURN 1/2" Ø MAX. HOLE IN SHEET PILE FOR #9 B1, #5 B2, #4 K1, #4 K2 AND #4 S5 BARS (TYP.)  
"V" BARS MAY BE SHIFTED SLIGHTLY TO AVOID SHEET PILES

PROJECT NO. B-4541  
HALIFAX COUNTY  
STATION: 13+55.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT 2

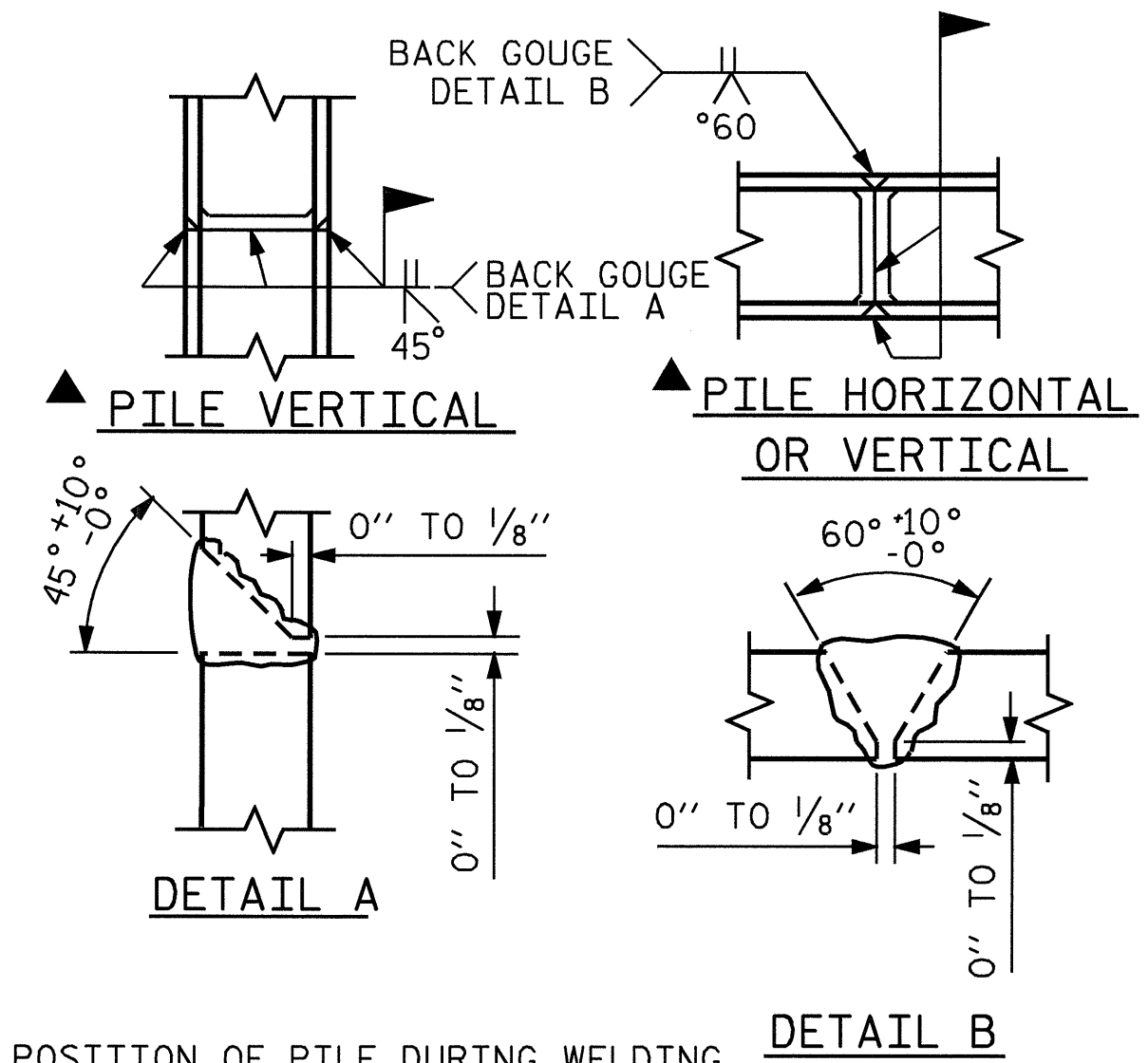
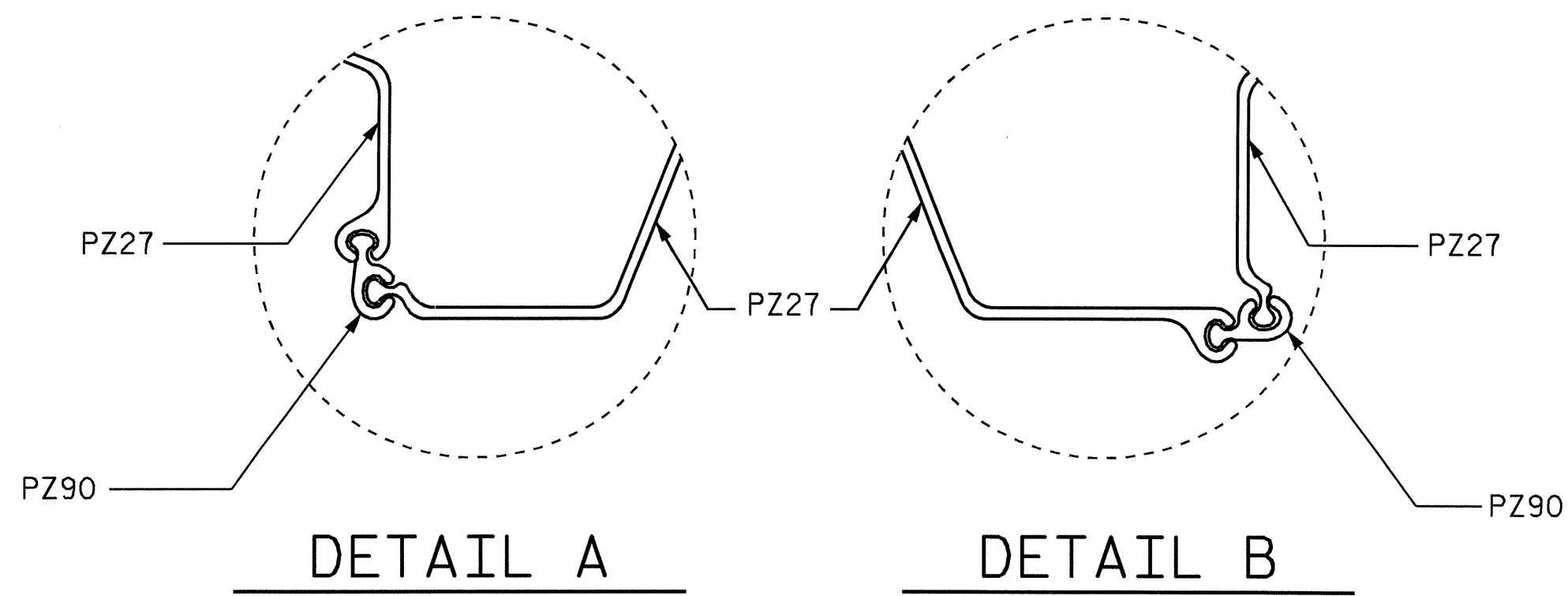


DRAWN BY: J. MYA DATE: 3-17-09  
CHECKED BY: J. L. WALTON DATE: 5-12-09

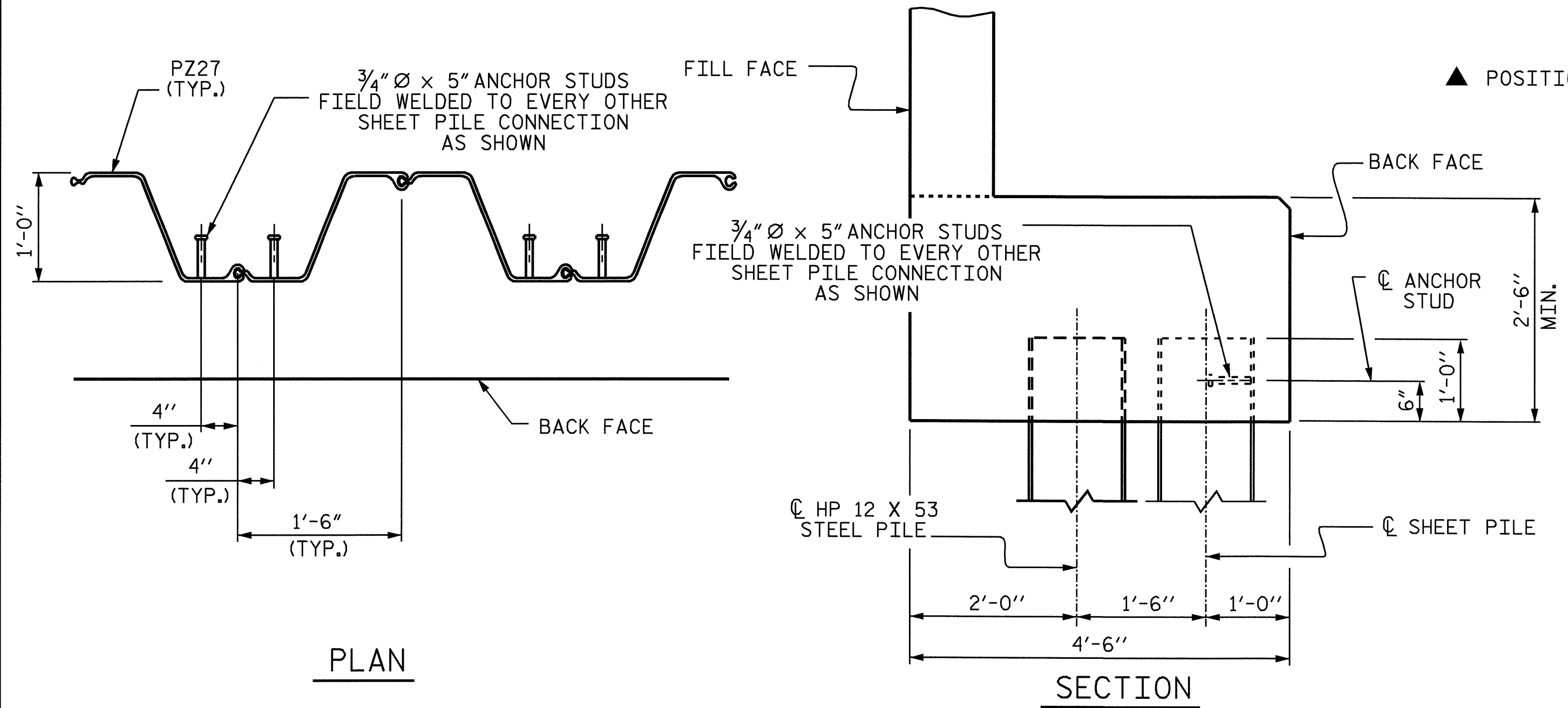
17-SEP-2009 14:59  
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jmyg

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

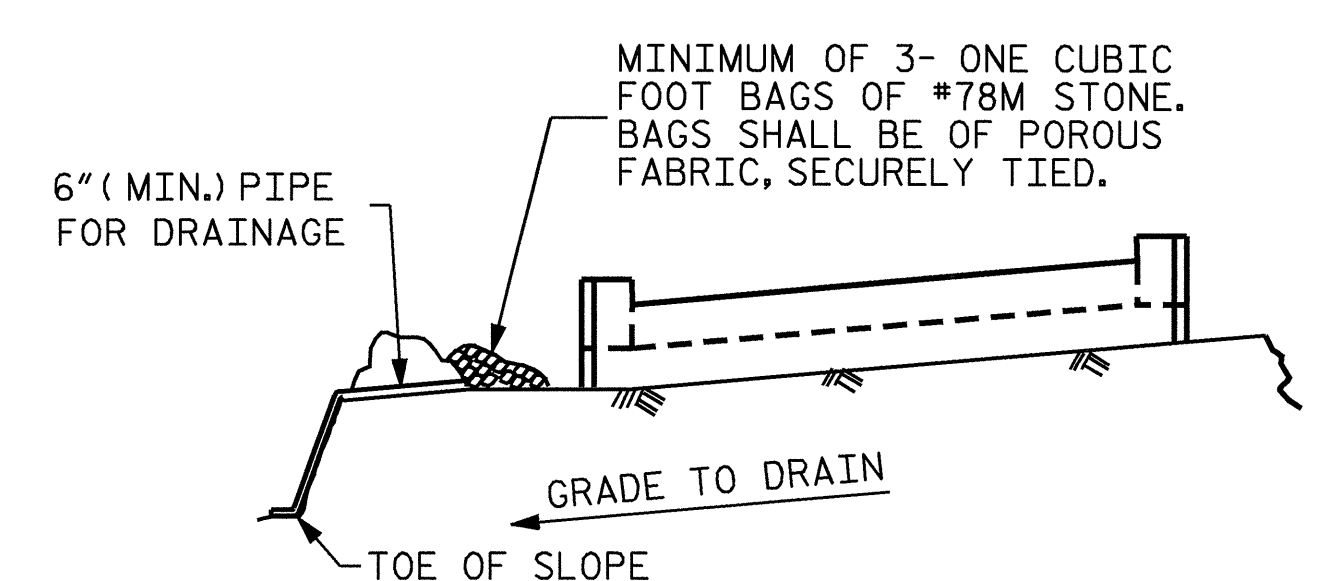




▲ POSITION OF PILE DURING WELDING. **PILE SPLICE DETAILS**



**SHEET PILE ANCHOR STUD DETAILS**



MINIMUM OF 3- ONE CUBIC FOOT BAGS OF #78M STONE. BAGS SHALL BE OF POROUS FABRIC, SECURELY TIED.

6" (MIN.) PIPE FOR DRAINAGE

GRADE TO DRAIN

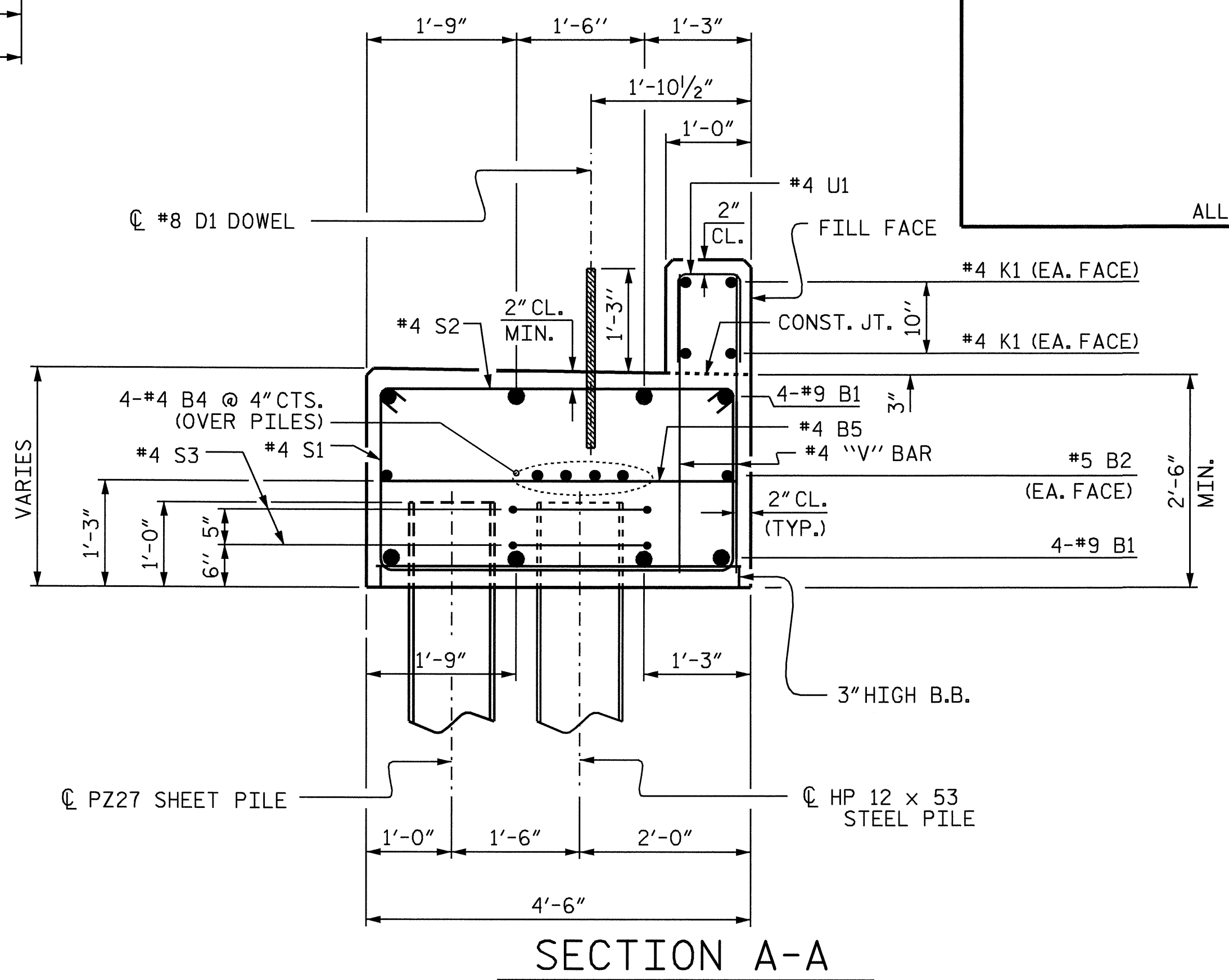
TOE OF SLOPE

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

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

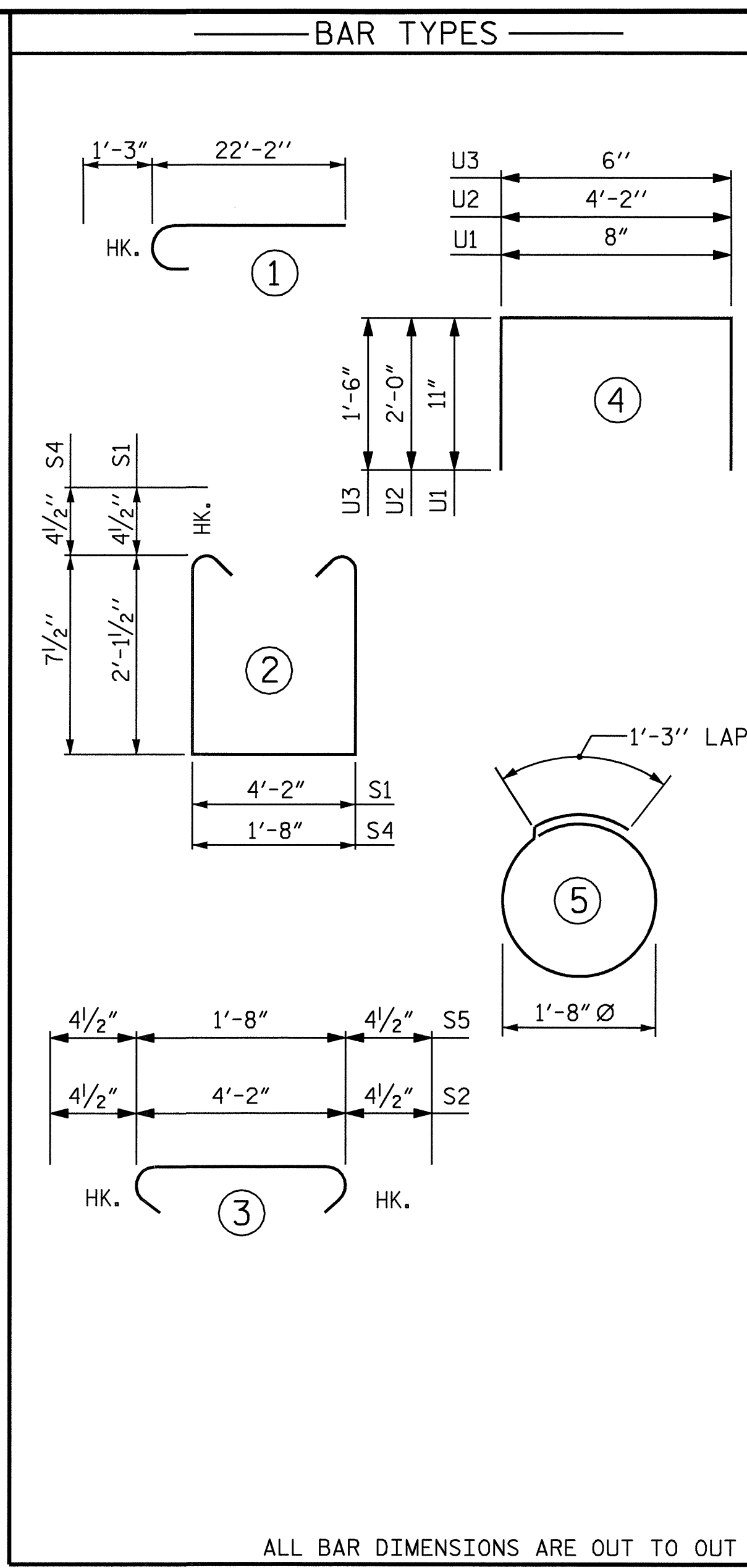
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**



**SECTION A-A**

BURN 1/2" Ø MAX. HOLE IN SHEET PILE FOR #9 B1, #5 B2, #4 K1, #4 K2 AND #4 S1 BARS (TYP.)  
 "V" BARS MAY BE SHIFTED SLIGHTLY TO AVOID SHEET PILES



BILL OF MATERIAL					
END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#9	1	23'-5"	1274
B2	2	#5	STR	35'-8"	74
B3	8	#4	STR	19'-1"	102
B4	4	#4	STR	24'-0"	64
B5	9	#4	STR	4'-2"	25
B6	4	#4	STR	3'-2"	8
D1	20	#8	STR	2'-3"	120
H1	8	#4	STR	4'-10"	26
H2	4	#6	STR	4'-10"	29
K1	8	#4	STR	19'-1"	102
K2	8	#4	STR	3'-5"	18
S1	49	#4	2	9'-2"	300
S2	49	#4	3	4'-11"	161
S3	12	#4	5	6'-6"	52
S4	12	#4	2	3'-8"	29
S5	12	#4	3	2'-5"	19
U1	29	#4	4	2'-6"	48
U2	16	#4	4	8'-2"	87
U3	8	#4	4	3'-6"	19
V1	22	#4	STR	3'-10"	56
V2	36	#4	STR	3'-6"	84
V3	14	#4	STR	5'-2"	48
V4	14	#4	STR	5'-9"	54
REINFORCING STEEL					LBS 2799
CLASS A CONCRETE					
POUR 1 : CAP					C.Y. 17.2
POUR 2 : (BACKWALL, UPPER PART OF WINGS & COPINGS)					C.Y. 2.3
POUR 3 : (LATERAL GUIDES)					C.Y. 0.1
TOTAL					C.Y. 19.6
HP 12 X 53 STEEL PILES					270 FT.
18" STEEL SHEET PILES					
No. PZ27 = 32					SQ. FT. 940
No. PZ90 = 2					SQ. FT. 10
TOTAL NO. = 34					SQ. FT. 950

PROJECT NO. B-4541  
HALIFAX COUNTY  
 STATION: 13+55.00 -L-  
 SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

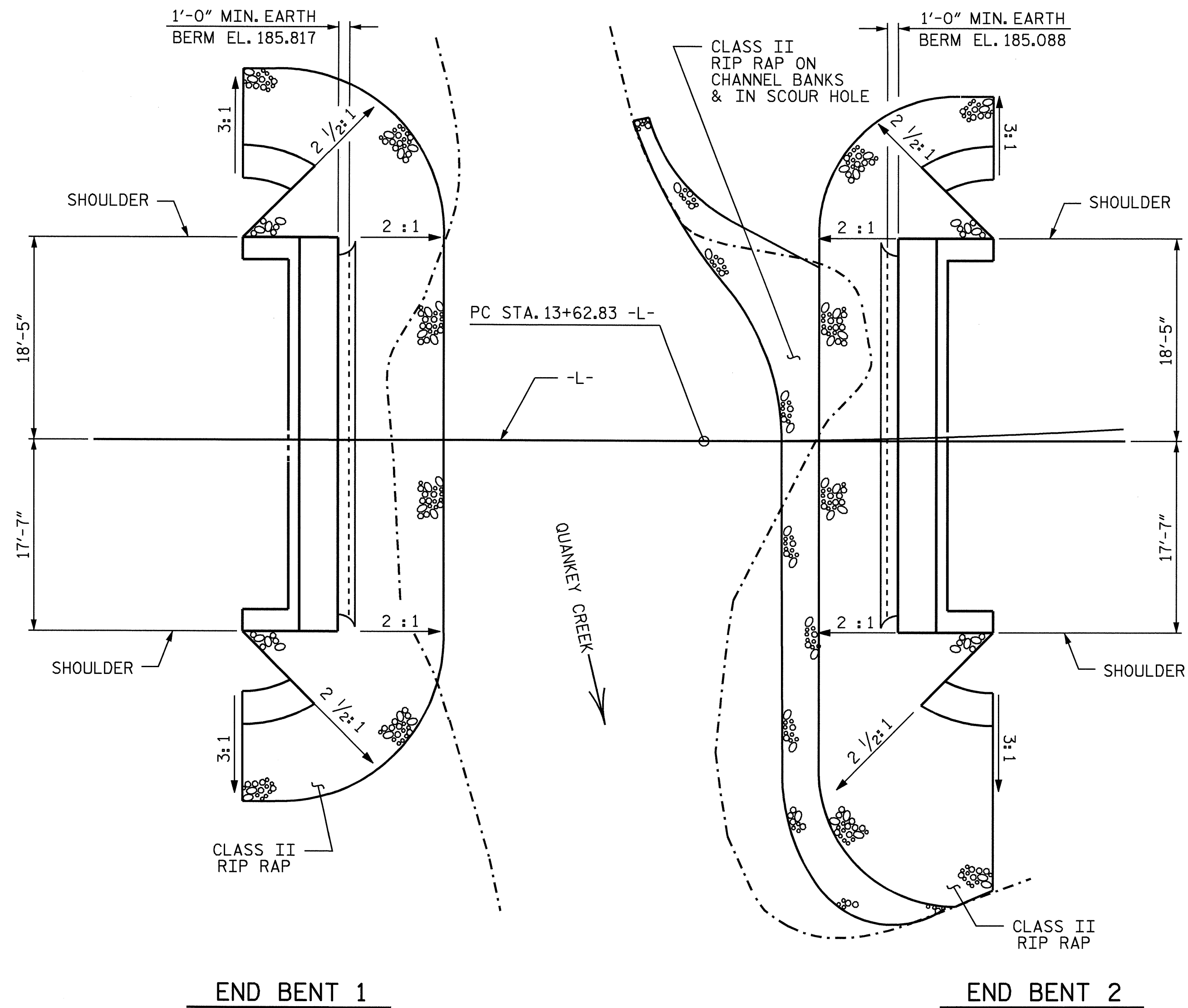
**SUBSTRUCTURE  
 END BENT 2**

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

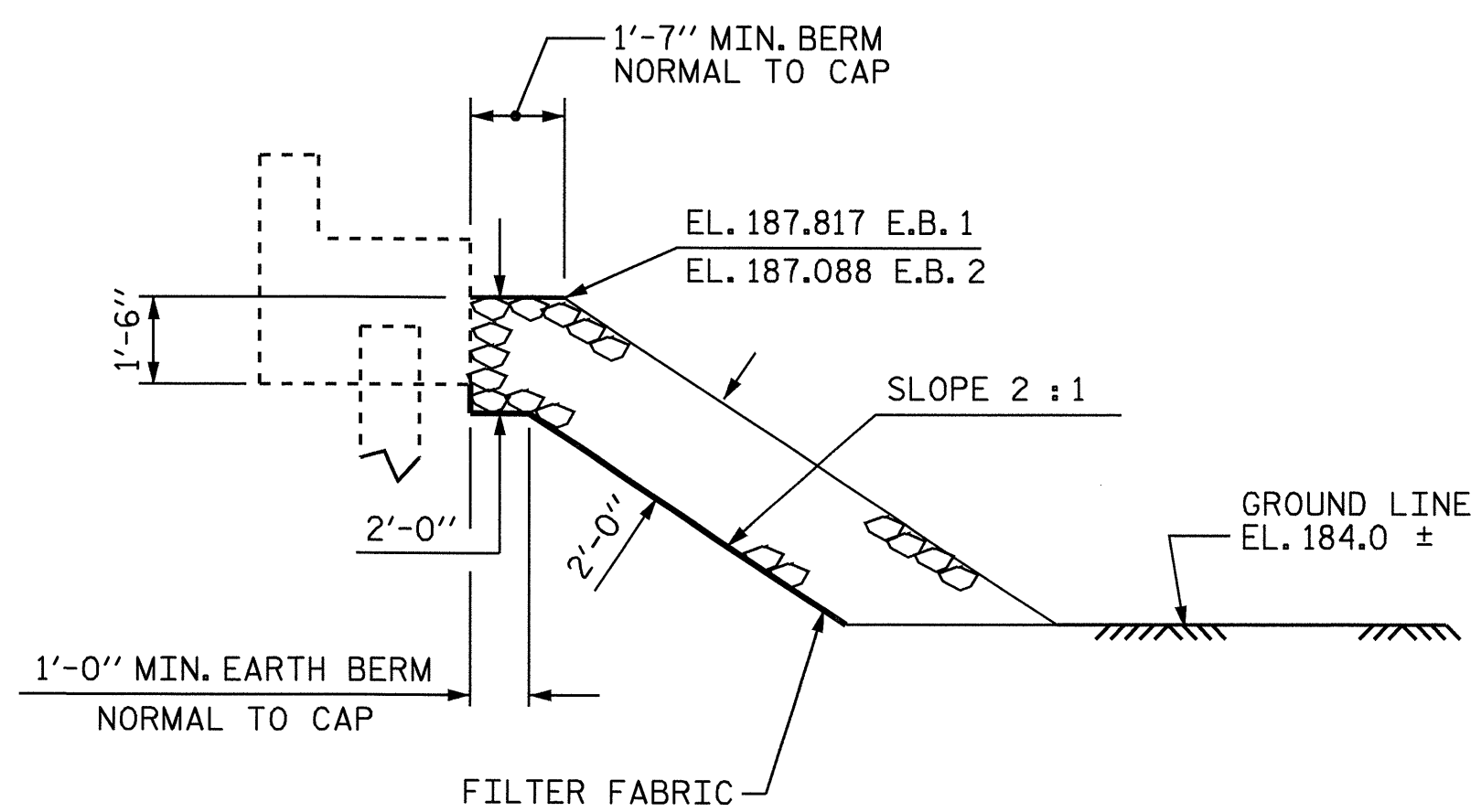
TOTAL SHEETS 19



DRAWN BY : J. MYA DATE : 3-17-09  
 CHECKED BY : J. L. WALTON DATE : 5-12-09



PLAN



NOTE : DO NOT KEY IN RIP RAP BELOW GROUND LINE DUE TO WATER SURFACE ELEVATION.

SECTION BERM RIP RAPPED

ESTIMATED QUANTITIES		
BRIDGE @ STA. 13+55.00 -L-	RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	88	98
END BENT 2	117	130

PROJECT NO. B-4541  
HALIFAX COUNTY  
 STATION: 13+55.00 -L-

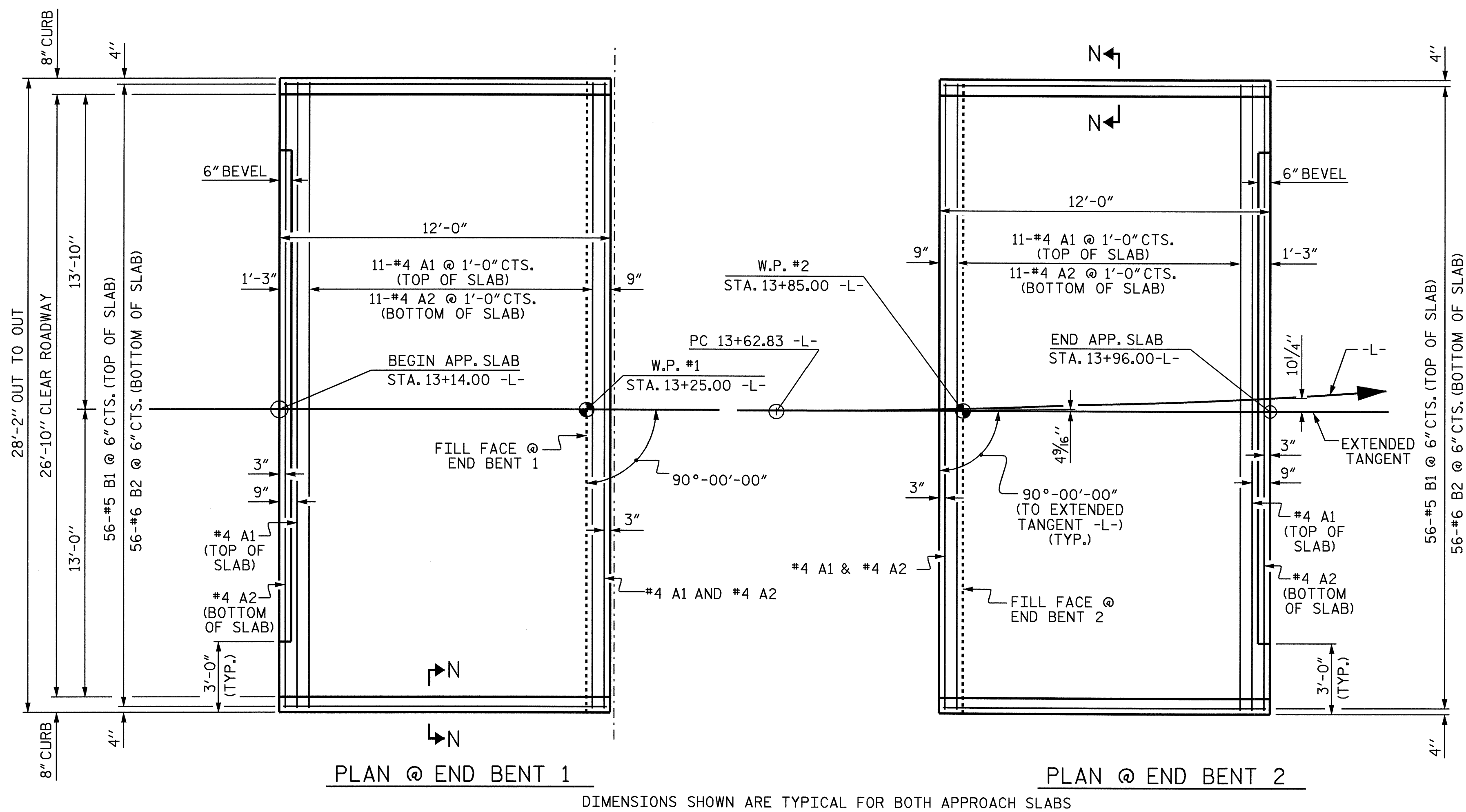
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			19



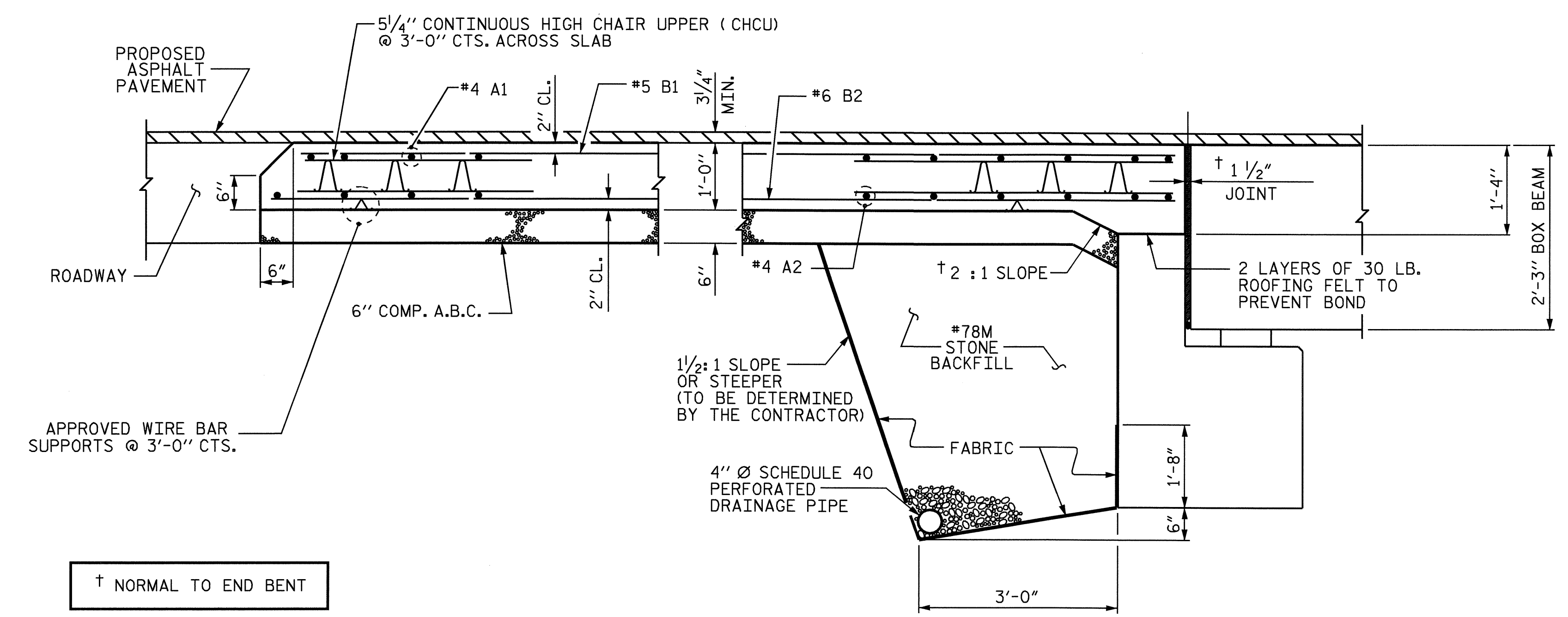
ASSEMBLED BY : J. MYA	DATE : 6-2-09
CHECKED BY : E.G. ALLEN	DATE : 7-22-09
DRAWN BY : FCJ 2/88	REV. 8/16/99 RWW/LES
CHECKED BY : ARB 8/88	REV. 10/17/00 RWW/LES
	REV. 5/1/06 TLA/GM



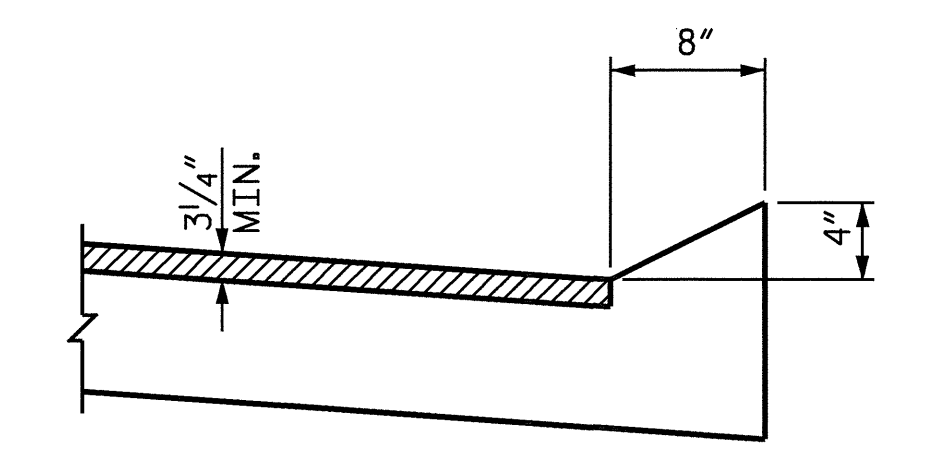
PLAN @ END BENT 1

PLAN @ END BENT 2

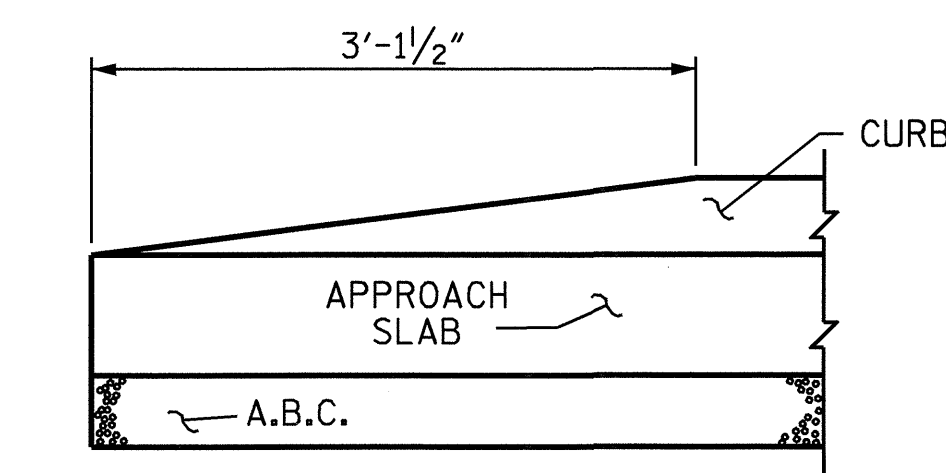
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER (OMIT TAPER WHEN SHOULDER BERM GUTTER IS REQUIRED)

CURB DETAILS

NOTES

FOR BRIDGE APPROACH FILL INCLUDING FABRIC, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.

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

FABRIC SHALL BE TYPE 1 ENGINEERING FABRIC IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

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

THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

FOR JOINT DETAILS, SEE "PRESTRESSED CONCRETE BOX BEAM UNIT" SHEETS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

BILL OF MATERIAL

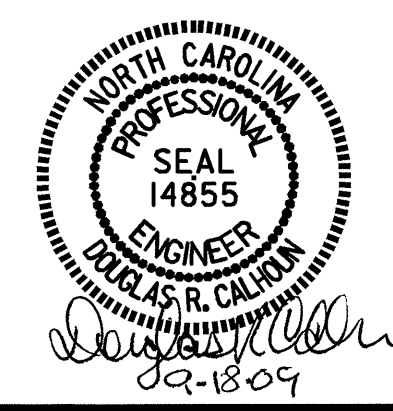
FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	13	#4	STR	27'-10"	242
A2	13	#4	STR	27'-10"	242
*B1	56	#5	STR	11'-2"	652
B2	56	#6	STR	11'-8"	981
REINFORCING STEEL				LBS.	1223
*EPOXY COATED REINFORCING STEEL				LBS.	894
CLASS AA CONCRETE				C. Y.	13.0

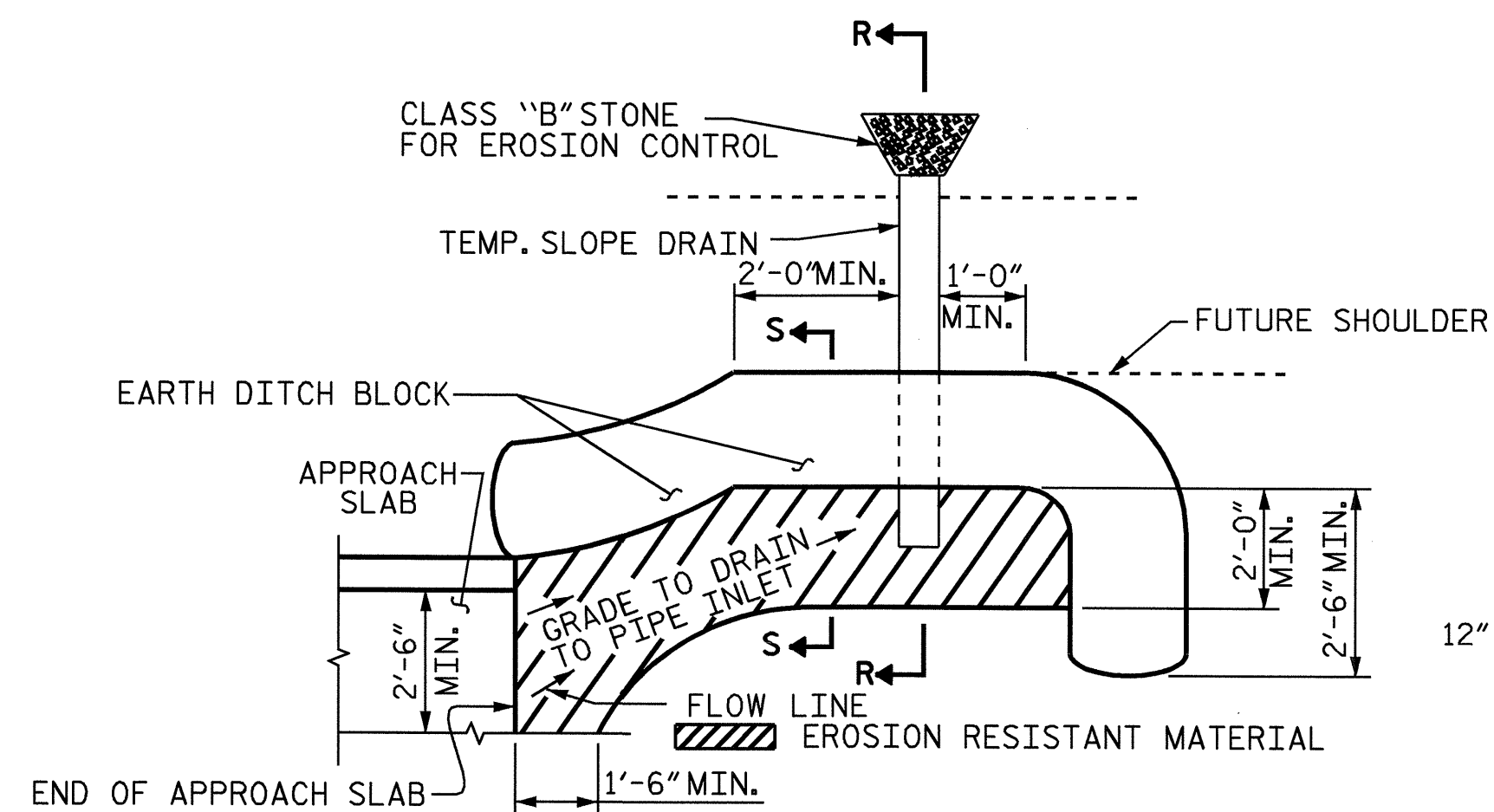
PROJECT NO. B-4541  
 HALIFAX COUNTY  
 STATION: 13+55.00 -L-  
 SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR PRESTRESSED CONCRETE  
 BOX BEAM UNIT  
 (SUB-REGIONAL TIER)

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18	
1			3			TOTAL SHEETS 19	
2			4				

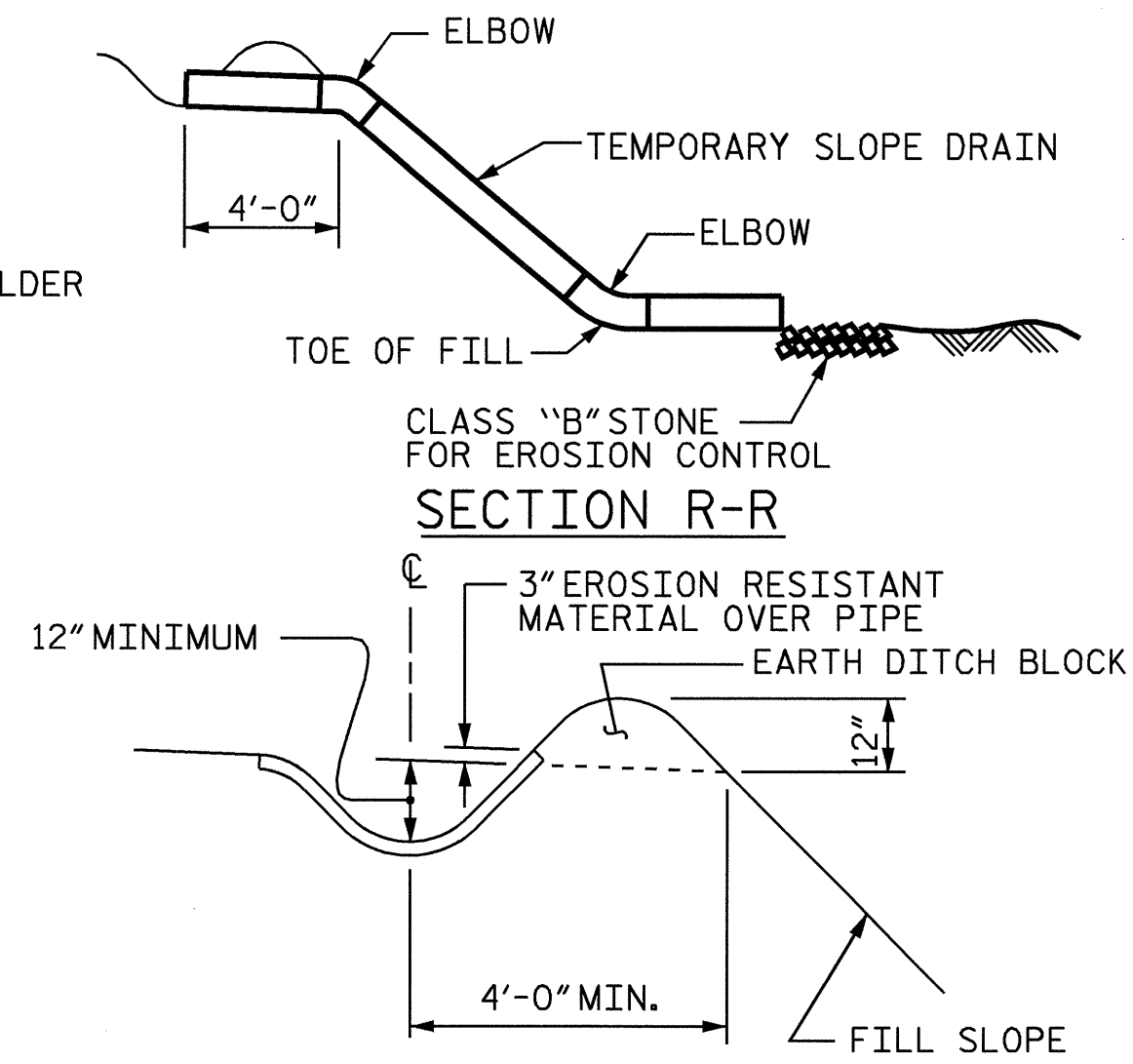


ASSEMBLED BY : J. MYA  
 CHECKED BY : J. L. WALTON  
 DATE : 6-10-09  
 DATE : 6-16-09  
 DRAWN BY : KMM 3-08  
 CHECKED BY : GM 3-08



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

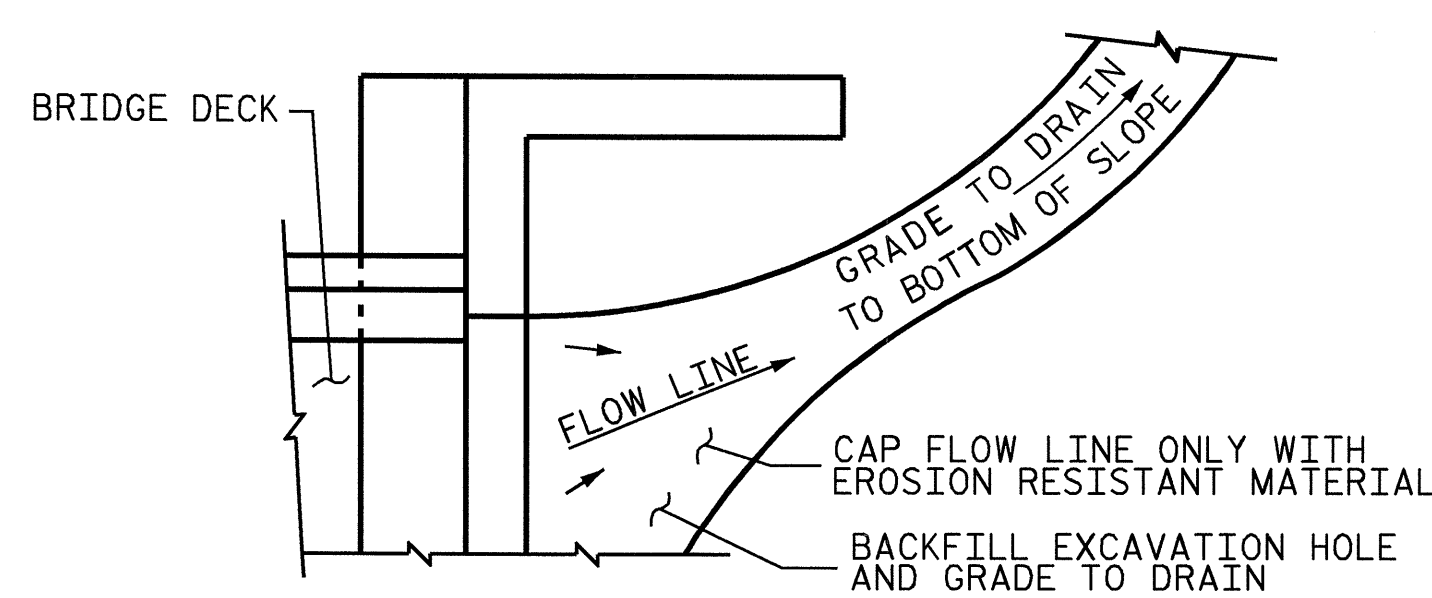
PLAN VIEW



SECTION S-S

### 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. B-4541  
HALIFAX COUNTY  
 STATION: 13+55.00 -L-

SHEET 2 OF 2



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

ASSEMBLED BY : J. MYA	DATE : 6-10-09
CHECKED BY : J. L. WALTON	DATE : 6-16-09
DRAWN BY : FCJ 11/88	REV. 10/17/00 RWW/LES
CHECKED BY : ARB 11/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06R MAA/KMM

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

## STANDARD NOTES

### DESIGN DATA:

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

### MATERIAL AND WORKMANSHIP:

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

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

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

### DOWELS:

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

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

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

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

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

### REINFORCING STEEL:

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

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

### STRUCTURAL STEEL:

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

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

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

### HANDRAILS AND POSTS:

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

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

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