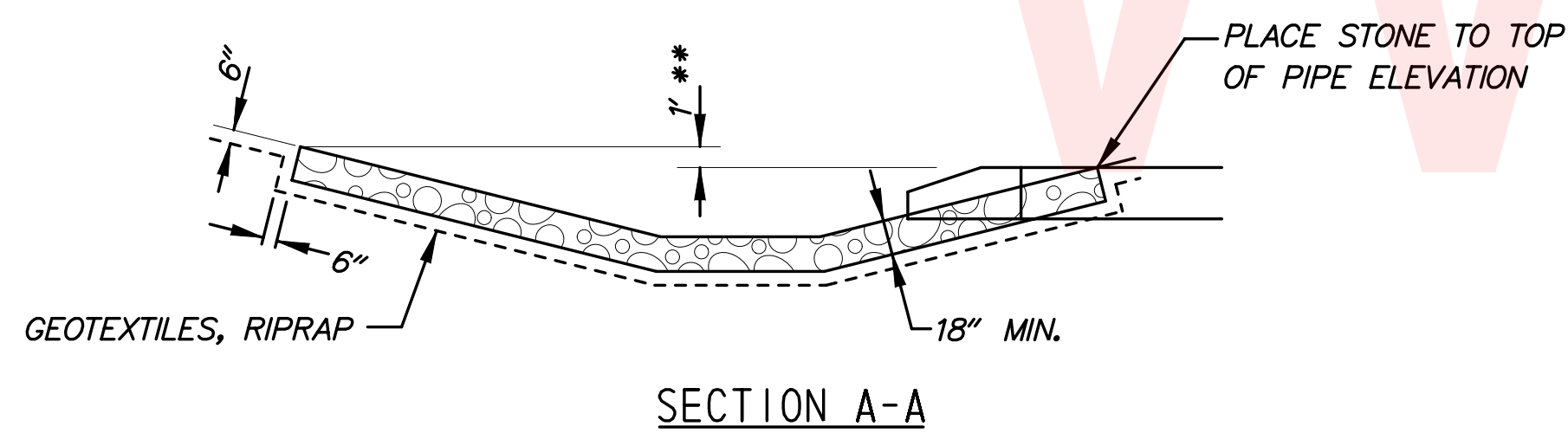
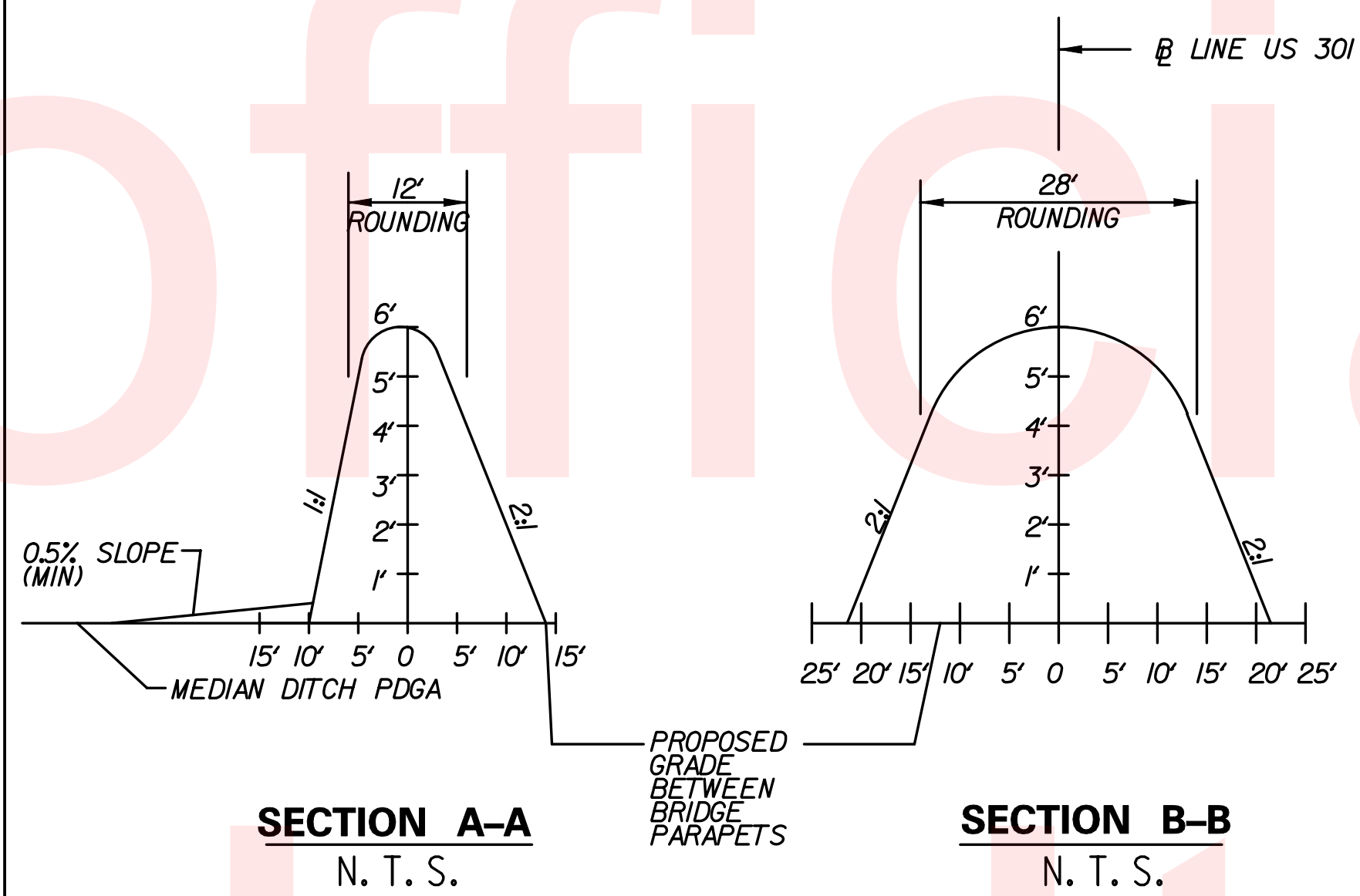


\*\* OR TO TOP OF BERM, WHICHEVER ELEVATION IS LOWER

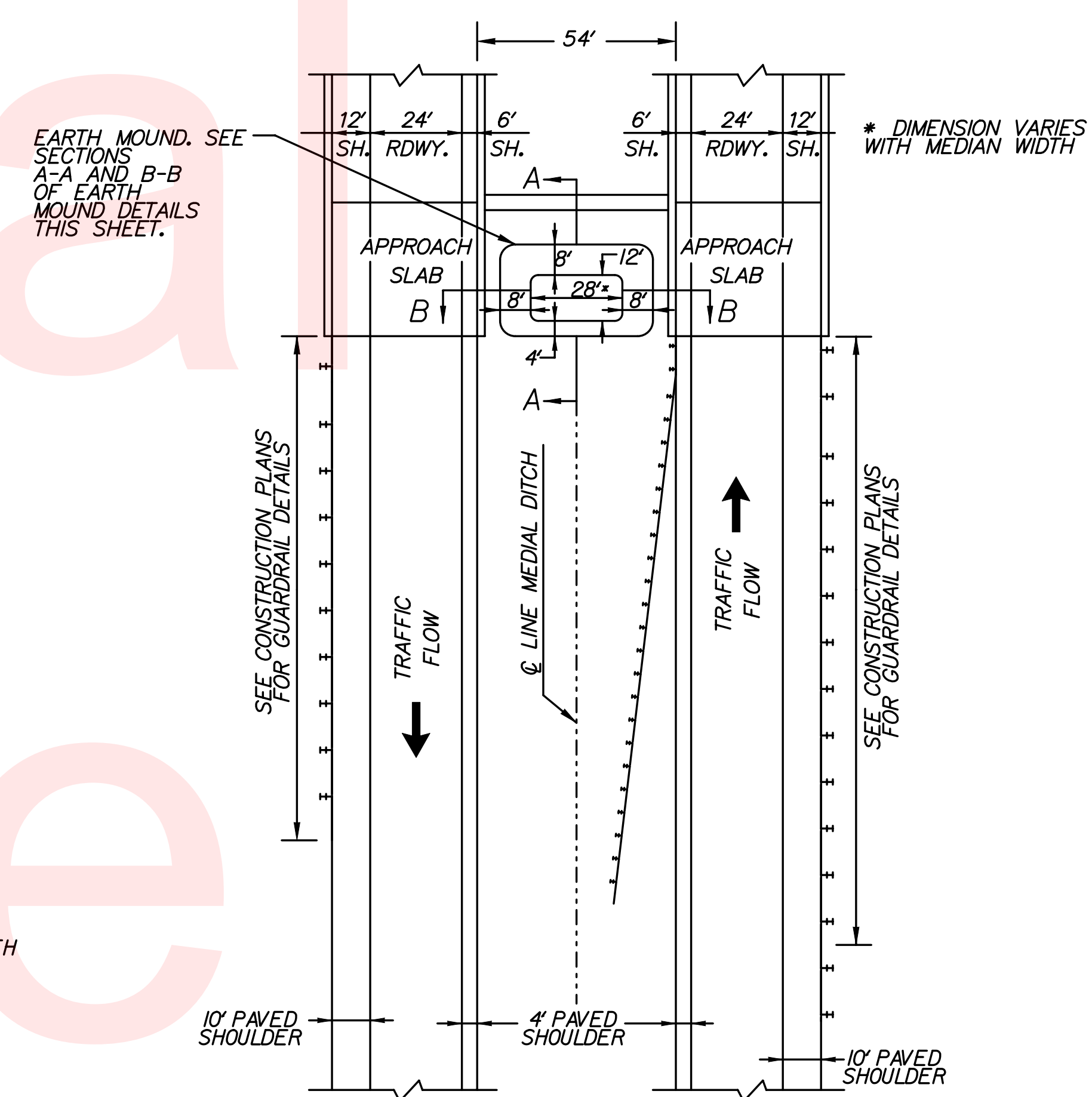


**PIPE OUTLET TO DITCH PROTECTION**  
NOT TO SCALE



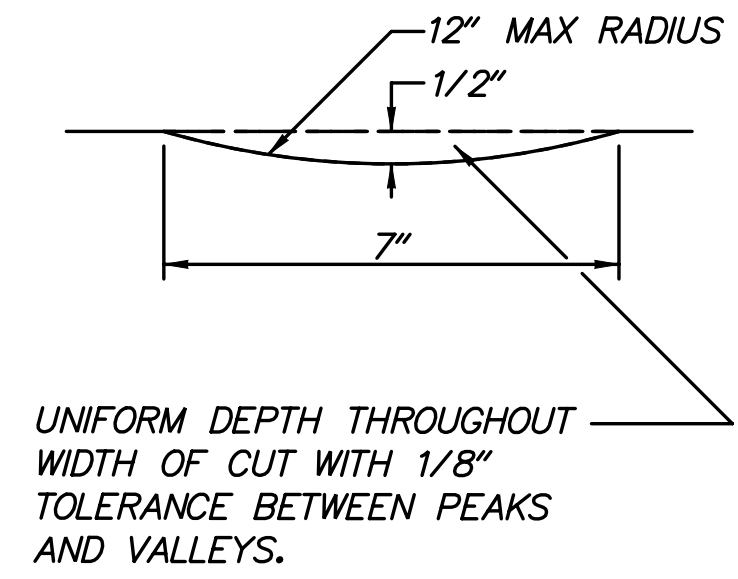
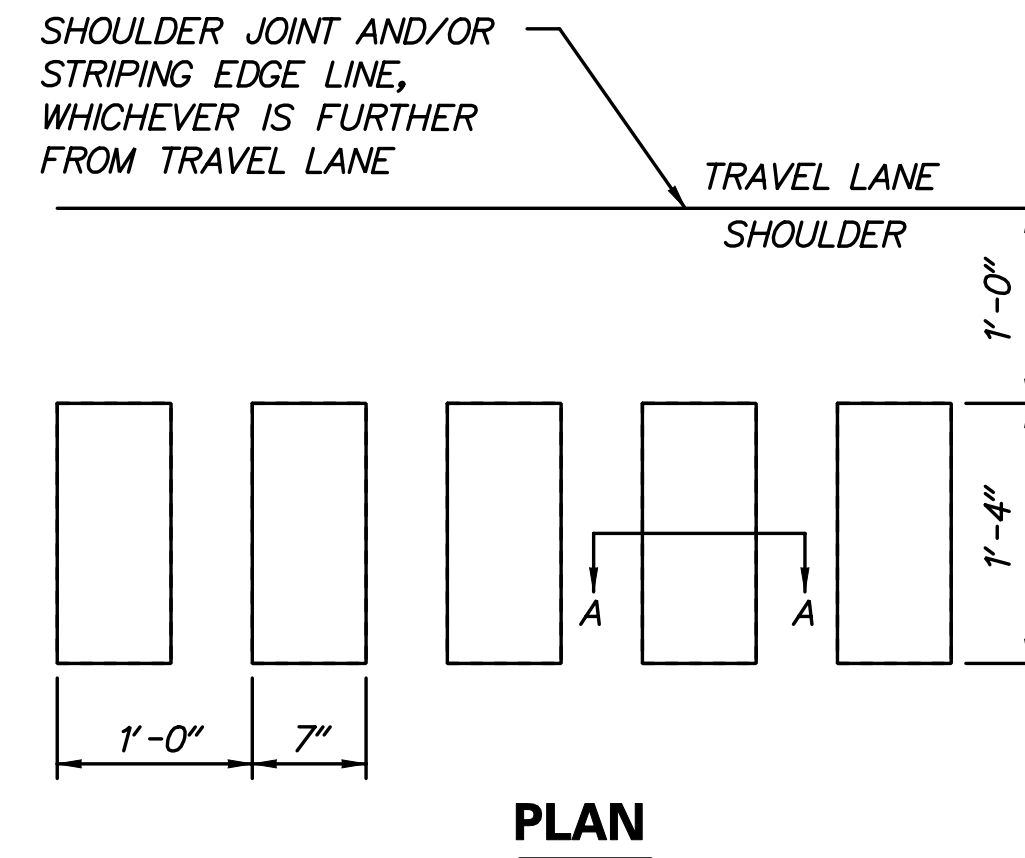
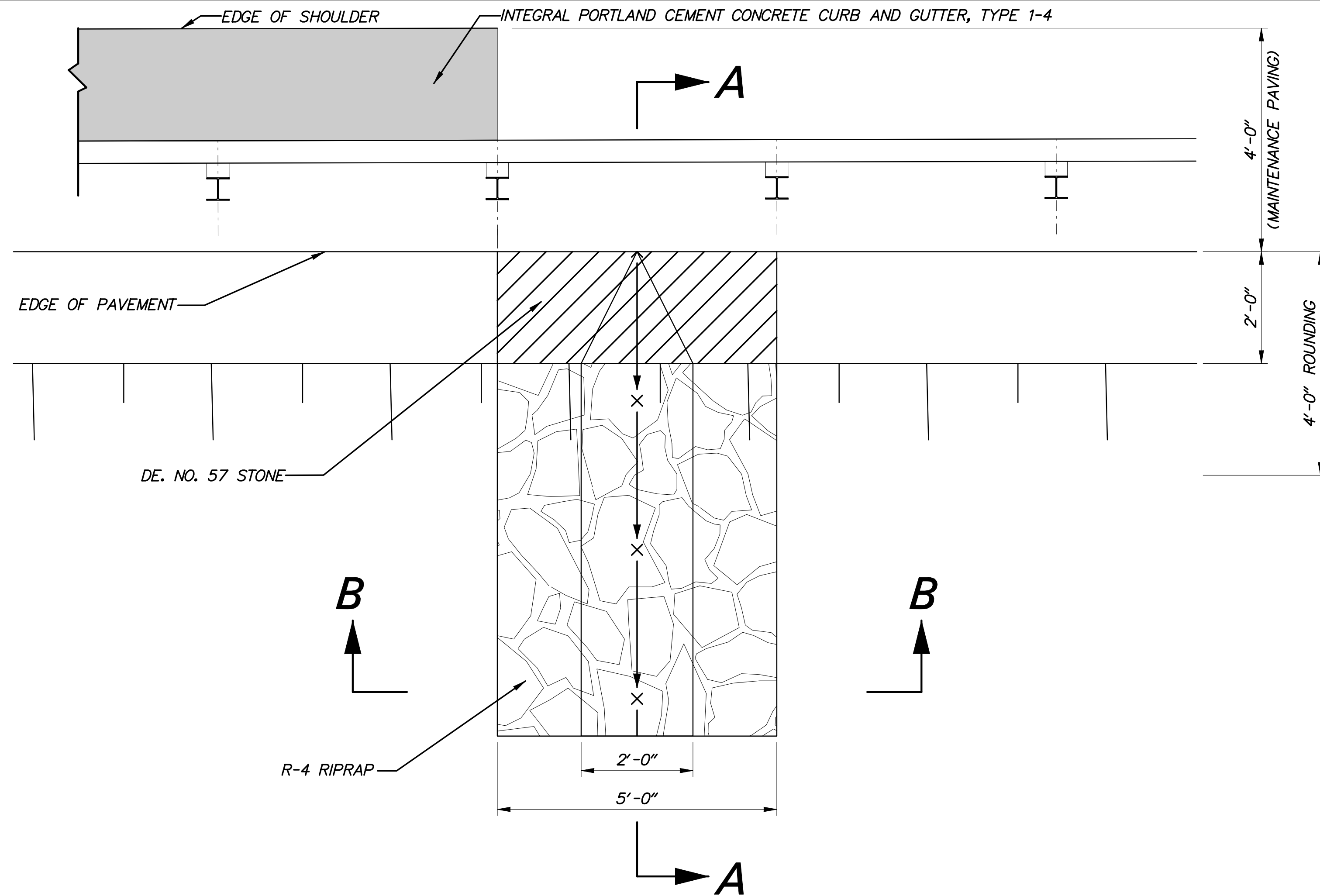
- NOTES:**
- DISTANCE BETWEEN THE OUTSIDE FACE OF BRIDGE PARAPET AND THE TOE OF SLOPE FOR THE EARTH MOUND SHALL NOT EXCEED FOUR (4) FEET.
  - SEE PLAN SHEETS AND BRIDGE PLANS FOR THE LOCATIONS OF EARTH MOUNDS AT BRIDGE APPROACHES.
  - EARTH MOUND SHALL BE CONSTRUCTED OF MATERIALS MEETING THE REQUIREMENTS OF BORROW, TYPE F AND COMPACTED IN ACCORDANCE WITH SECTION 202.
  - STABILIZE MOUND SURFACE WITH TOPSOIL, SEED AND MULCH PER ROADWAY TYPICAL SECTIONS.

**EARTH MOUND DETAILS AT BRIDGE APPROACHES**  
NOT TO SCALE



**BRIDGE PROTECTION SYSTEM MAINLINE BRIDGE PARAPET AND MEDIAN OPENING PROTECTION PLAN**  
NOT TO SCALE

\$DATES \$FILES



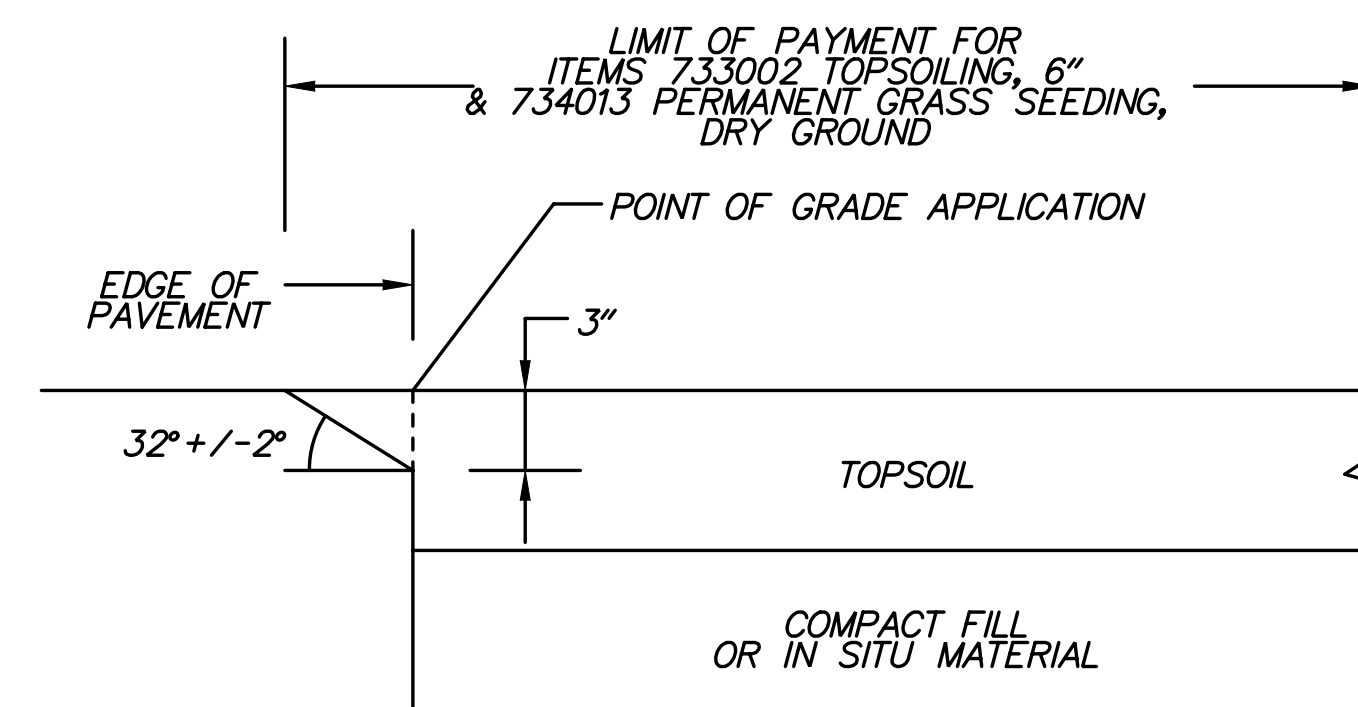
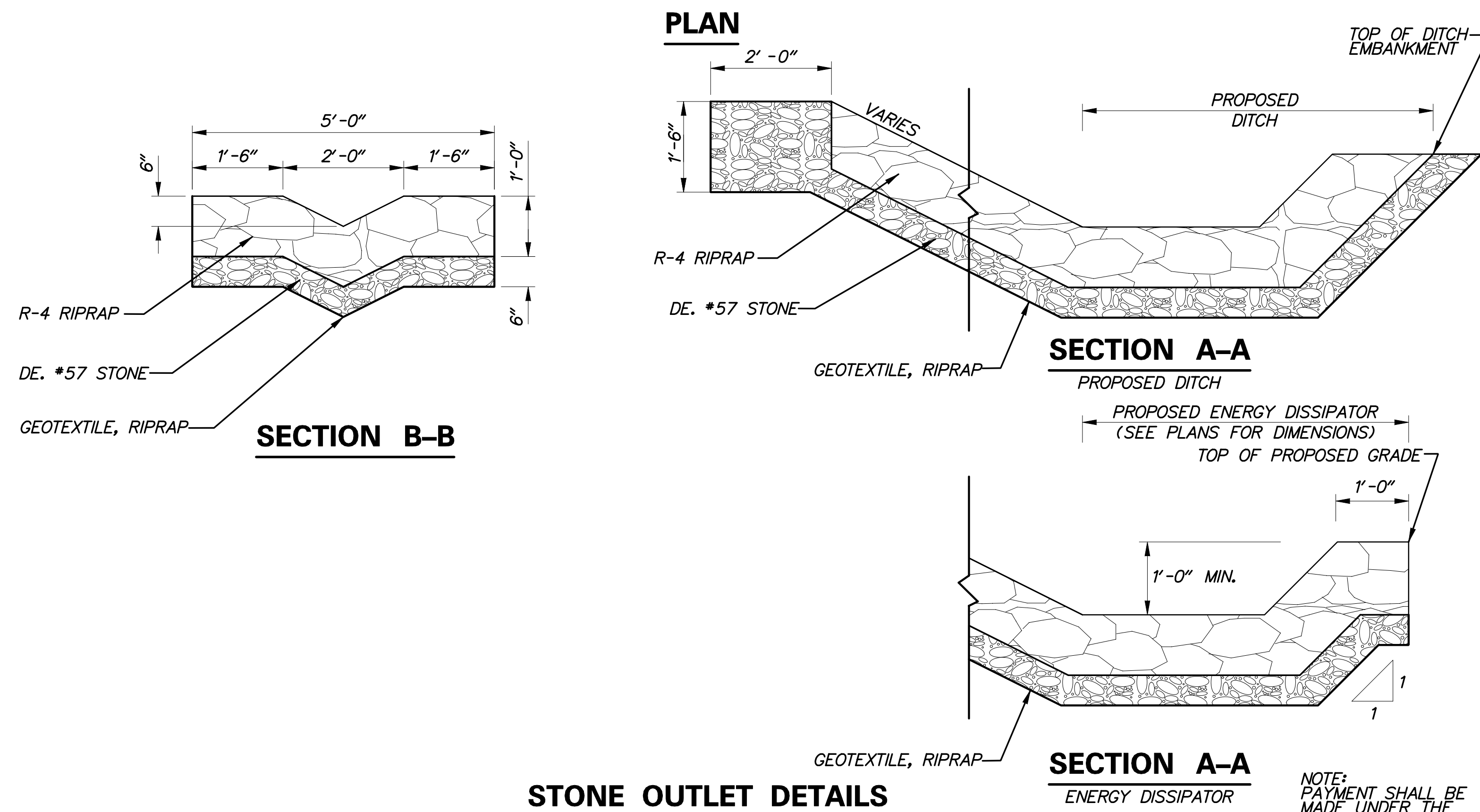
SECTION A-A

**EDGE LINE RUMBLE STRIPS DETAIL**

NOT TO SCALE

NOTES:

- ALL WORK REQUIRED TO COMPLETE THE INSTALLATION OF EDGE LINE RUMBLE STRIPS SHALL BE INCIDENTAL TO ITEM 760017 - RUMBLE STRIPS, CONCRETE.
- RUMBLE STRIPS ARE NOT TO BE INSTALLED ON BRIDGE 2-1 AND BRIDGE 1-10 (INCLUDING MOMENT SLABS AND APPROACH SLABS).
- EDGE LINE RUMBLE STRIPS SHALL BE INSTALLED ALONG ALL INSIDE AND OUTSIDE SHOULDERS OF THE US 301 MAINLINE, AS PER THIS DETAIL, THROUGHOUT THE PROJECT UNLESS OTHERWISE NOTED BELOW:  
-BRIDGE 1-467 AND BRIDGE 1-468: RUMBLE STRIPS SHALL NOT BE PLACED ON THE STRUCTURE, APPROACH SLABS OR MOMENT SLABS.



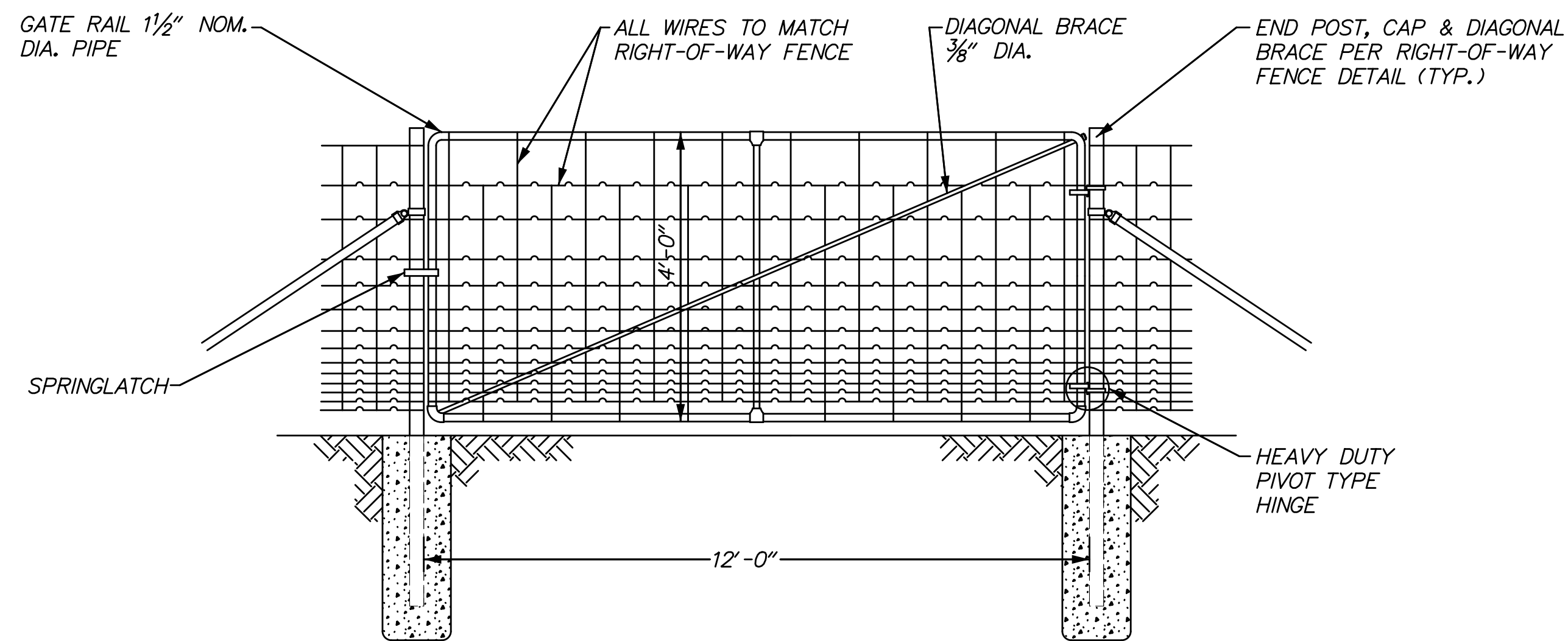
NOTES:

1. FOR ADDITIONAL INFORMATION, SEE ITEM 401752 - SAFETY EDGE FOR ROADWAY PAVEMENT.
2. THE SAFETY EDGE SHALL NOT BE CONSTRUCTED ADJACENT TO OTHER PAVEMENTS, CURB, CURB & GUTTER, CONCRETE SAFETY BARRIER OR MAINTENANCE PAVEMENT UNDER GUARDRAIL. THE CONTRACTOR SHALL STAKE OUT THE LIMITS OF THE AREAS NOT TO RECEIVE THE SAFETY EDGE FOR APPROVAL BY THE ENGINEER PRIOR TO BEGINNING PAVEMENT OPERATIONS.

**SAFETY EDGE - CONCRETE PAVEMENT**

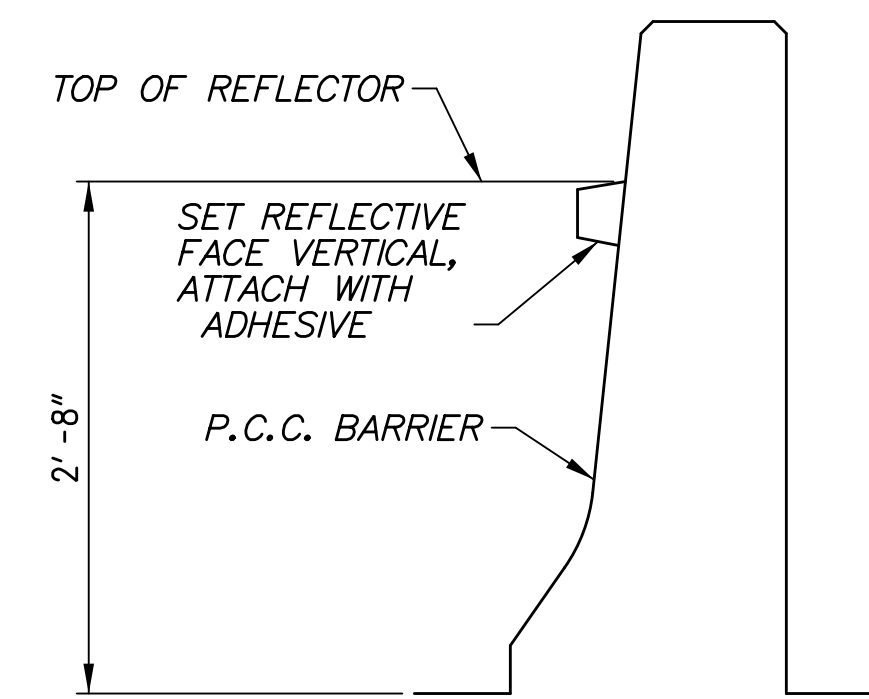
NOT TO SCALE

\$FILES \$DATES



**ITEM 727001 – RIGHT-OF-WAY FENCE GATE**

NOT TO SCALE



**REFLECTOR DETAIL**

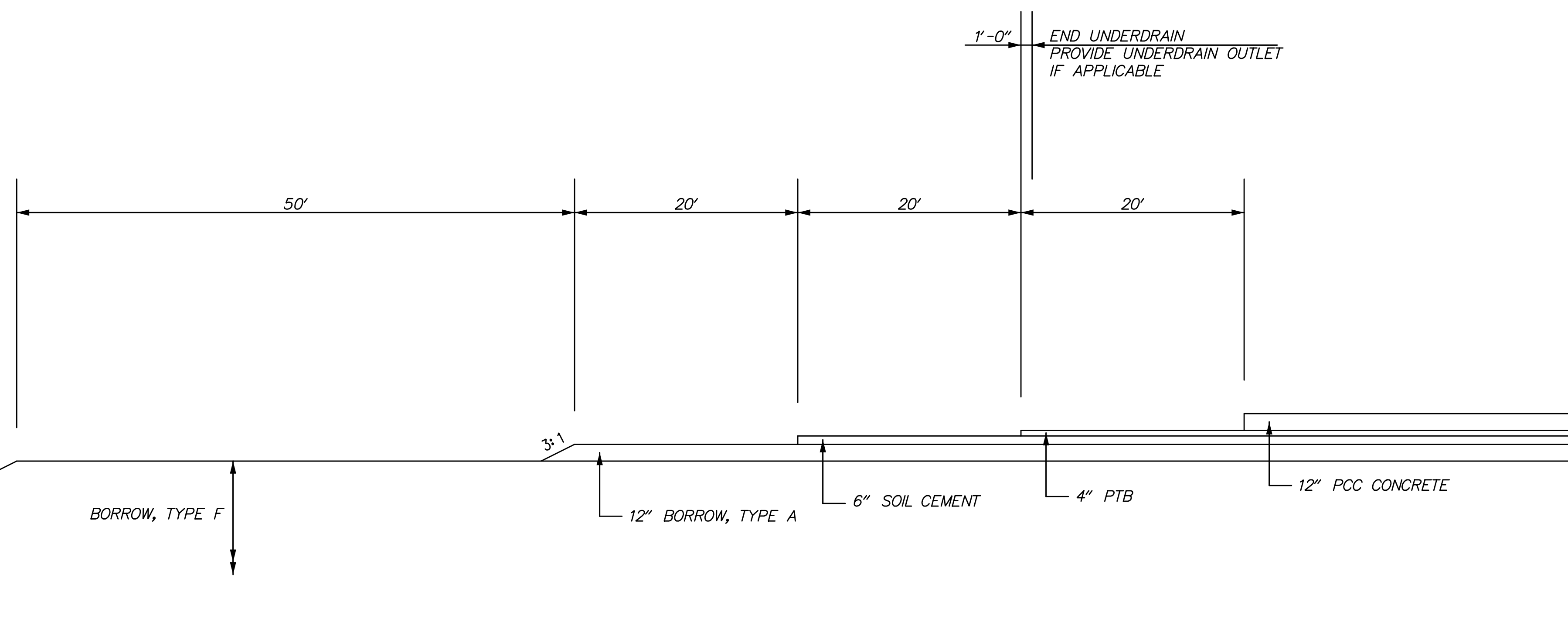
NOT TO SCALE

**REFLECTOR DETAIL NOTES:**

1. COLOR OF REFLECTOR ON TRAFFIC SIDE SHALL MATCH ADJACENT LANE LINE COLOR. BACK SIDE OF ALL REFLECTORS SHALL BE RED.
2. THE SPACING OF REFLECTORS ON PERMANENT P.C.C. BARRIER SHALL BE COORDINATED WITH THE DELINEATORS AT THE APPROACHES TO THE BARRIER SUCH THAT THE SPACING OF DELINEATORS/REFLECTORS DOES NOT EXCEED 100 FT.
3. ALL COST SHALL BE INCLUDED IN ITEM 720544 - REFLECTORS, WHITE, CONCRETE AND 720545 - REFLECTORS, YELLOW, CONCRETE.

**NOTES**

1. THIS DETAIL SHALL APPLY TO PAVEMENT CONSTRUCTED BY THE FIRST CONTRACTOR TO PERFORM WORK IN THIS AREA. SELECTION OF WHICH CONTRACT WILL CONSTRUCT THIS DETAIL WILL BE BASED UPON FIELD CONDITIONS AND WILL BE AT THE DIRECTION OF THE ENGINEER. PAYMENT SHALL BE MADE UNDER THE APPLICABLE CONTRACT PAY ITEMS.
2. THE FIRST CONTRACTOR SHALL COVER THE EXPOSED PERMEABLE TREATED BASE COURSE AND SOIL CEMENT BASE COURSE, INCLUDING SIDES AND ENDS, WITH POLYETHYLENE SHEETING, PROPERLY ANCHORED AND LAPPED AT LEAST 18". NO CONSTRUCTION TRAFFIC OF ANY KIND SHALL BE PERMITTED TO TRAVERSE OVER THE PTB OR SOIL CEMENT AT ANY TIME, EITHER COVERED OR UNCOVERED WITH POLYETHYLENE, EXCEPT FOR NECESSARY EQUIPMENT UTILIZED DURING PAVING OPERATIONS. ALL COSTS FOR FURNISHING, INSTALLING AND MAINTAINING THE POLYETHYLENE SHALL BE INCIDENTAL TO THE UNIT PRICE BID FOR THE PTB AND SOIL CEMENT BASE COURSE PAY ITEMS.
3. THE SECOND CONTRACTOR TO PERFORM OPERATIONS IN THIS AREA SHALL REMOVE AND PROPERLY DISPOSE OF THE POLYETHYLENE AND ANCHORING IMMEDIATELY PRIOR TO BEGINNING PAVEMENT OPERATIONS WITH ALL COSTS INCIDENTAL TO THE UNIT PRICE BID FOR THE PTB AND SOIL CEMENT BASE COURSE PAY ITEMS.
4. THE SECOND CONTRACTOR SHALL ALSO SAW CUT THE ENDS OF THE PTB AND SOIL CEMENT BASE COURSE A MINIMUM OF 6" FROM THE END FINISHED BY THE FIRST CONTRACTOR OR AS DIRECTED BY THE ENGINEER. COSTS FOR SAWCUTTING THE PTB SHALL BE MEASURED FOR PAYMENT UNDER ITEM 762001 SAWCUTTING, HOT MIX. COSTS FOR SAWCUTTING THE SOIL CEMENT BASE COURSE SHALL BE MEASURED FOR PAYMENT UNDER ITEM 762002 SAWCUTTING, CONCRETE, FULL DEPTH.
5. THE FIRST CONTRACTOR SHALL CONSTRUCT AND MAINTAIN EDGE BERMS AND TEMPORARY SLOPE DRAINS ALONG THE TOP OF ALL SIDE AND END SLOPES PER THE INCREMENTAL STABILIZATION DETAILS (STANDARD NO. E-1). WHEN THE FIRST CONTRACTOR'S WORK IN THIS AREA IS COMPLETE AND ACCEPTED BY THE ENGINEER, THE FIRST CONTRACTOR SHALL LEAVE ANY EROSION AND SEDIMENT CONTROL MATERIALS ON THE SITE NEEDED TO PROVIDE PROTECTION FOR AREAS WHERE THE SECOND CONTRACTOR IS TO PERFORM WORK WITH COSTS INCIDENTAL TO THE RESPECTIVE PAY ITEM.
6. THE SECOND CONTRACTOR SHALL TAKE POSSESSION AND BE RESPONSIBLE FOR MAINTAINING, REPLACING AS NEEDED, REMOVING THE EROSION AND SEDIMENT CONTROL MATERIALS AND MEASURES LEFT IN PLACE BY THE FIRST CONTRACTOR AND RESTORATION OF THE AREAS WITH ALL COSTS INCIDENTAL TO ITEM 202000.
7. THE CONTRACTOR FOR CONTRACT T200911301 IS EXPECTED TO BE THE FIRST CONTRACTOR DESCRIBED IN THE ABOVE NOTES.



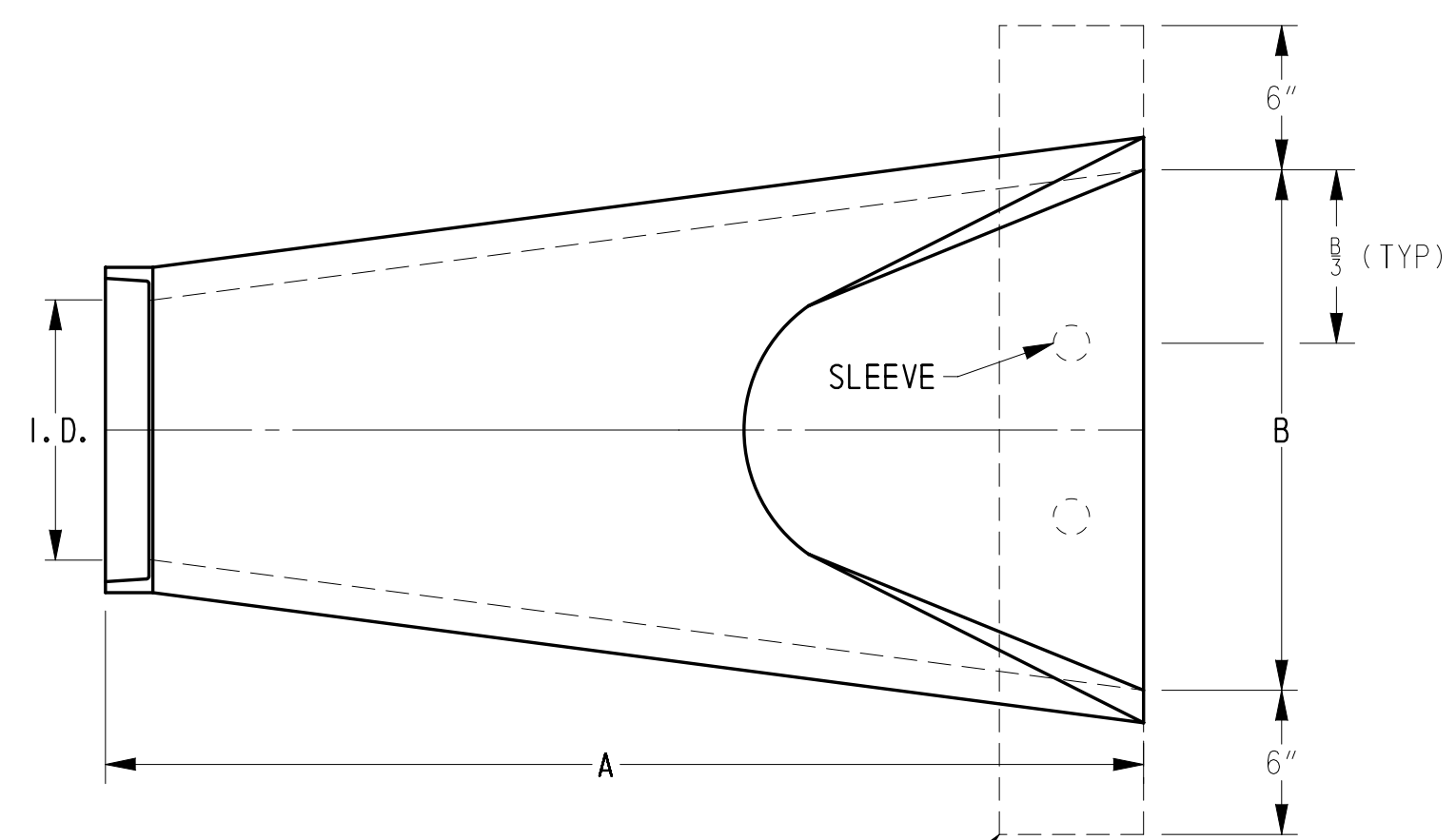
**PAVEMENT DETAIL AT LIMIT OF CONSTRUCTION (STA. 682+00)**

NOT TO SCALE

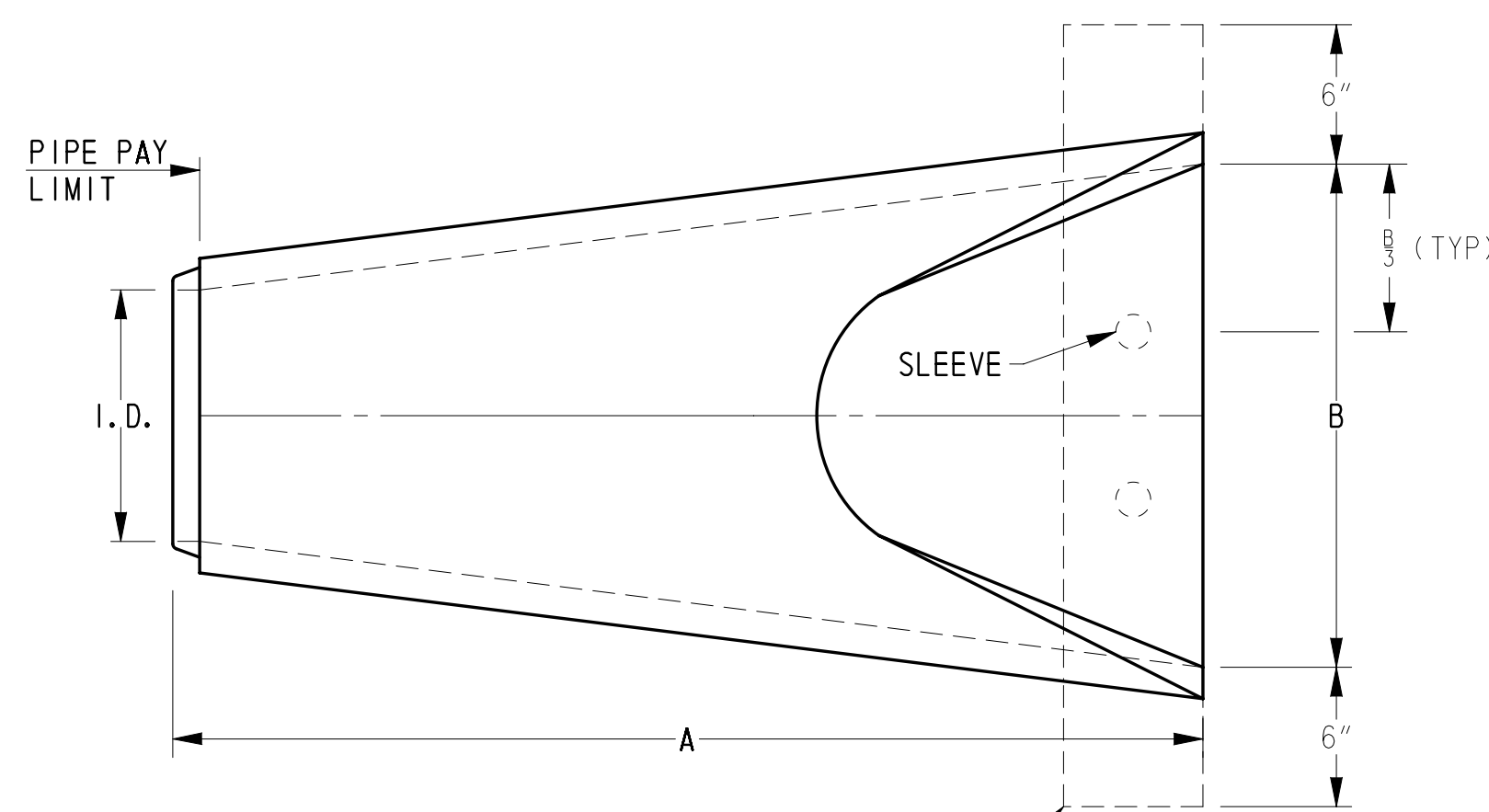
NOTE: SEE BRIDGE 1-468 FOR DETAIL OF SOUTH LIMIT OF PROJECT

\$FILES \$DATES

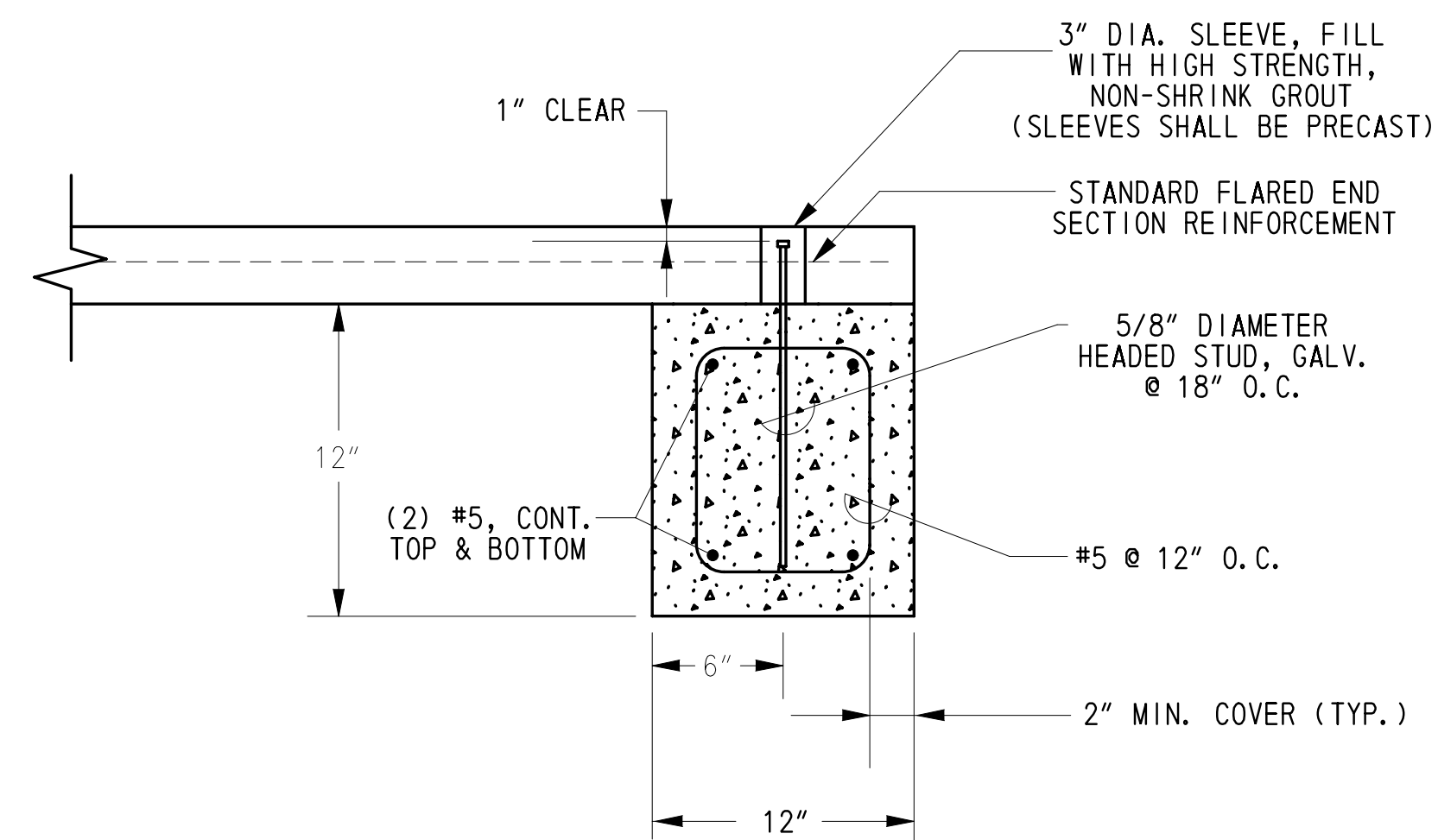
REINFORCED CONCRETE FLARED END SECTION  
12" - 33" DIAMETER



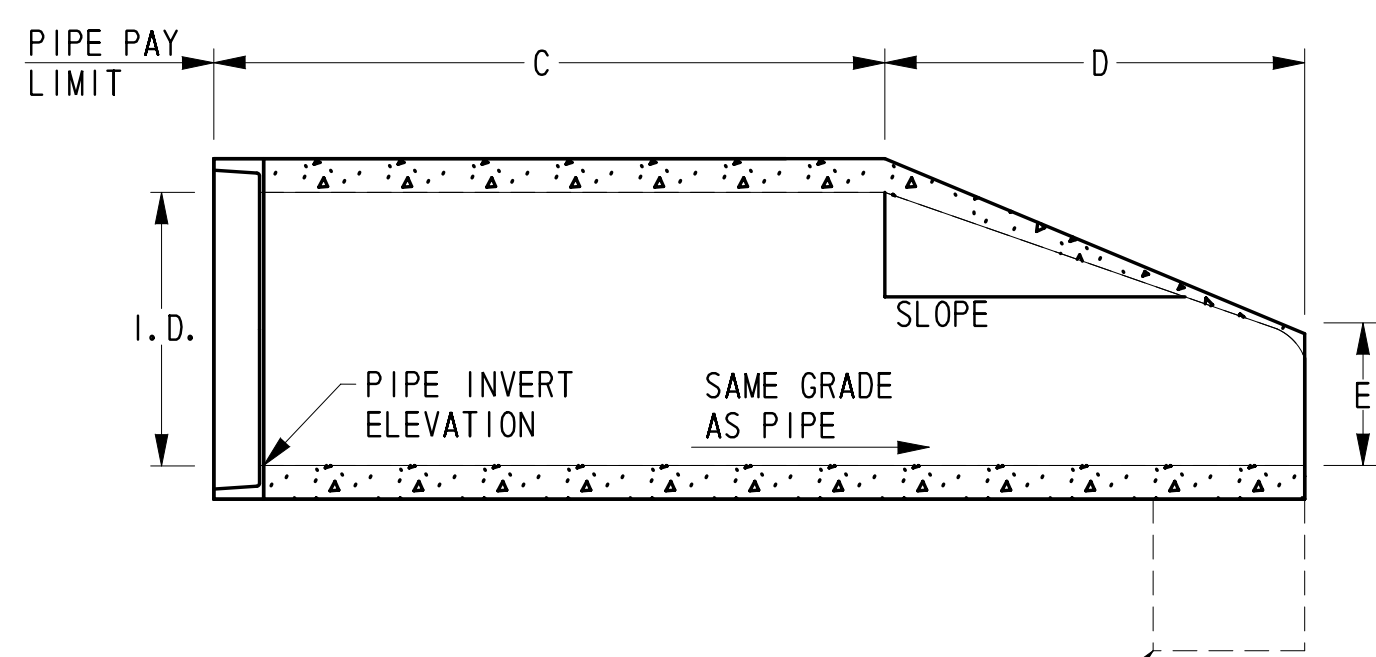
SEE CUTOFF WALL DETAIL  
PLAN VIEW



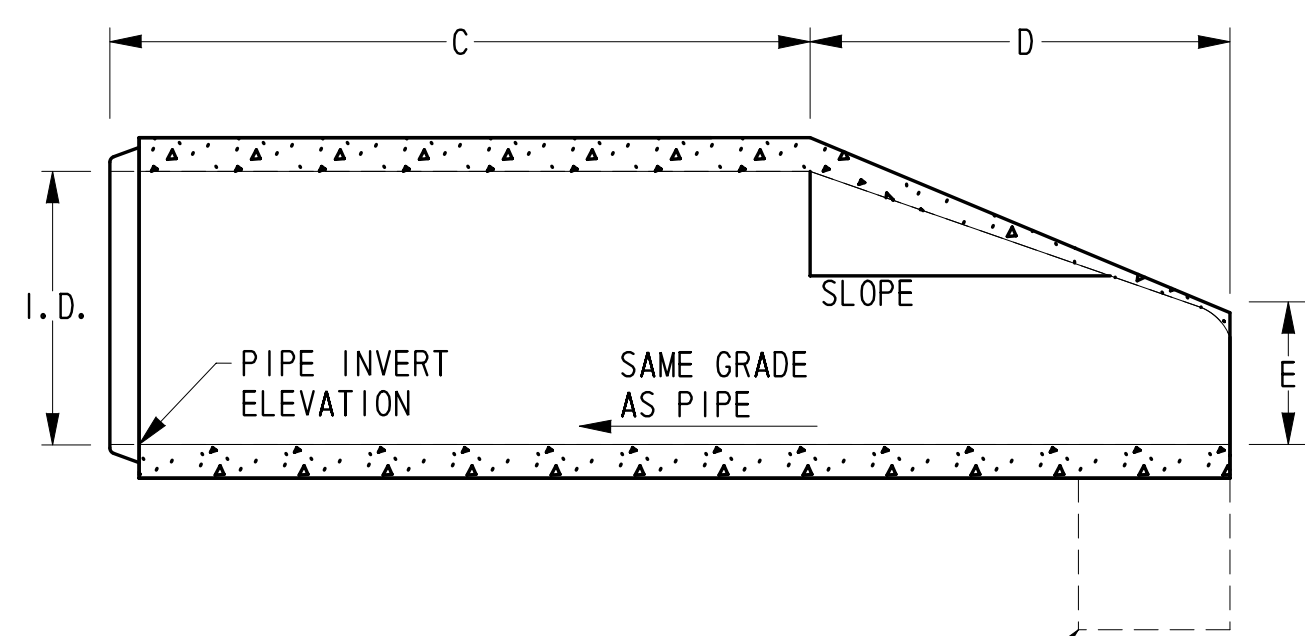
SEE CUTOFF WALL DETAIL  
PLAN VIEW



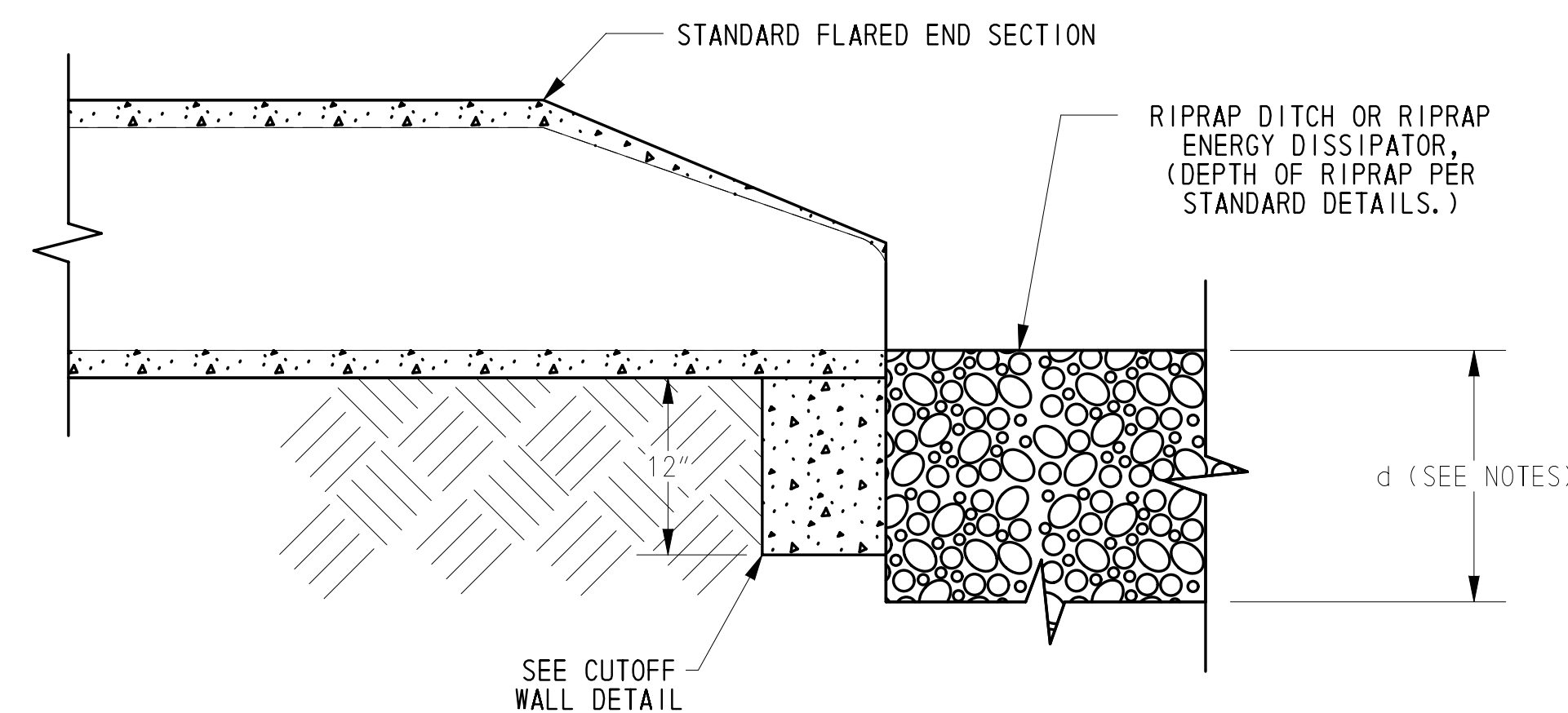
CUTOFF WALL DETAIL  
N. T. S.



FLARED END SECTION - OUTLET  
N. T. S.



FLARED END SECTION - INLET  
N. T. S.



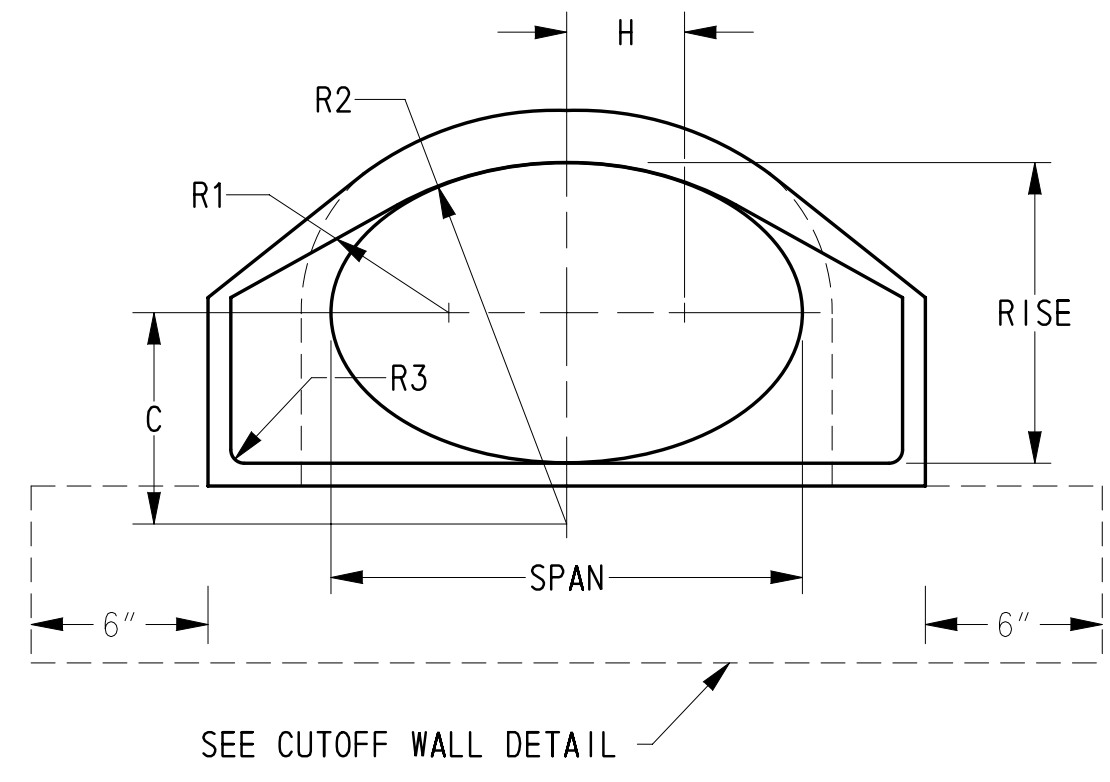
SIDE VIEW WITH OUTLET PROTECTION  
N. T. S.

PIPE I.D.	SLOPE	WALL	A (INCHES)	B (INCHES)	C (INCHES)	D (INCHES)	E (INCHES)
12	3:1	2	69	24	48	21	5
15	3:1	2 1/4	73	30	46	27	6
18	3:1	2 1/2	73	36	46	27	9
21	3:1	2 3/4	74	42	38	36	9
24	3:1	3	72 1/2	48	29	43 1/2	9 1/2
27	3:1	3 1/4	75	54	25 1/2	49 1/2	10 1/2
30	3:1	3 1/2	73 3/4	60	19 3/4	54	12
33	3:1	3 3/4	81	66	26	55	14

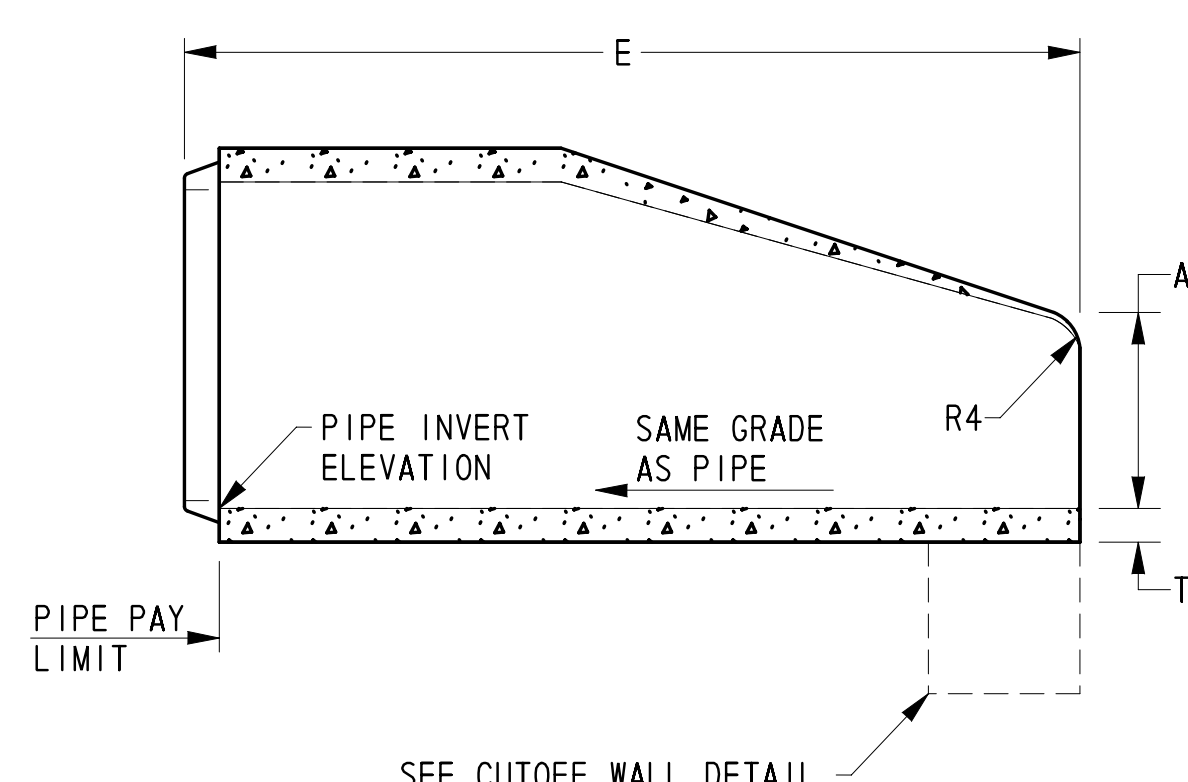
NOTES:

- FLARED END SECTIONS SHALL BE MANUFACTURED TO ASTM C-76 AND AASHTO M-170 WITH CLASS III REINFORCEMENT.
- FLARED END SECTIONS SHALL BE BEDDED IN ACCORDANCE WITH DELDOT STANDARD SPECIFICATION 612, REINFORCED CONCRETE PIPE.
- FLARED END SECTIONS 27 INCHES AND LARGER SHALL INCLUDE A 12 INCH WIDE CUTOFF WALL CONSTRUCTED AS SHOWN. CUTOFF WALL MAY BE CAST-IN-PLACE OR PRECAST CLASS B CONCRETE. ALL COSTS FOR THE CUTOFF WALL SHALL BE INCIDENTAL TO THE FLARED END SECTION.
- DEPTH OF RIPRAP (d) PER STANDARD DETAILS.

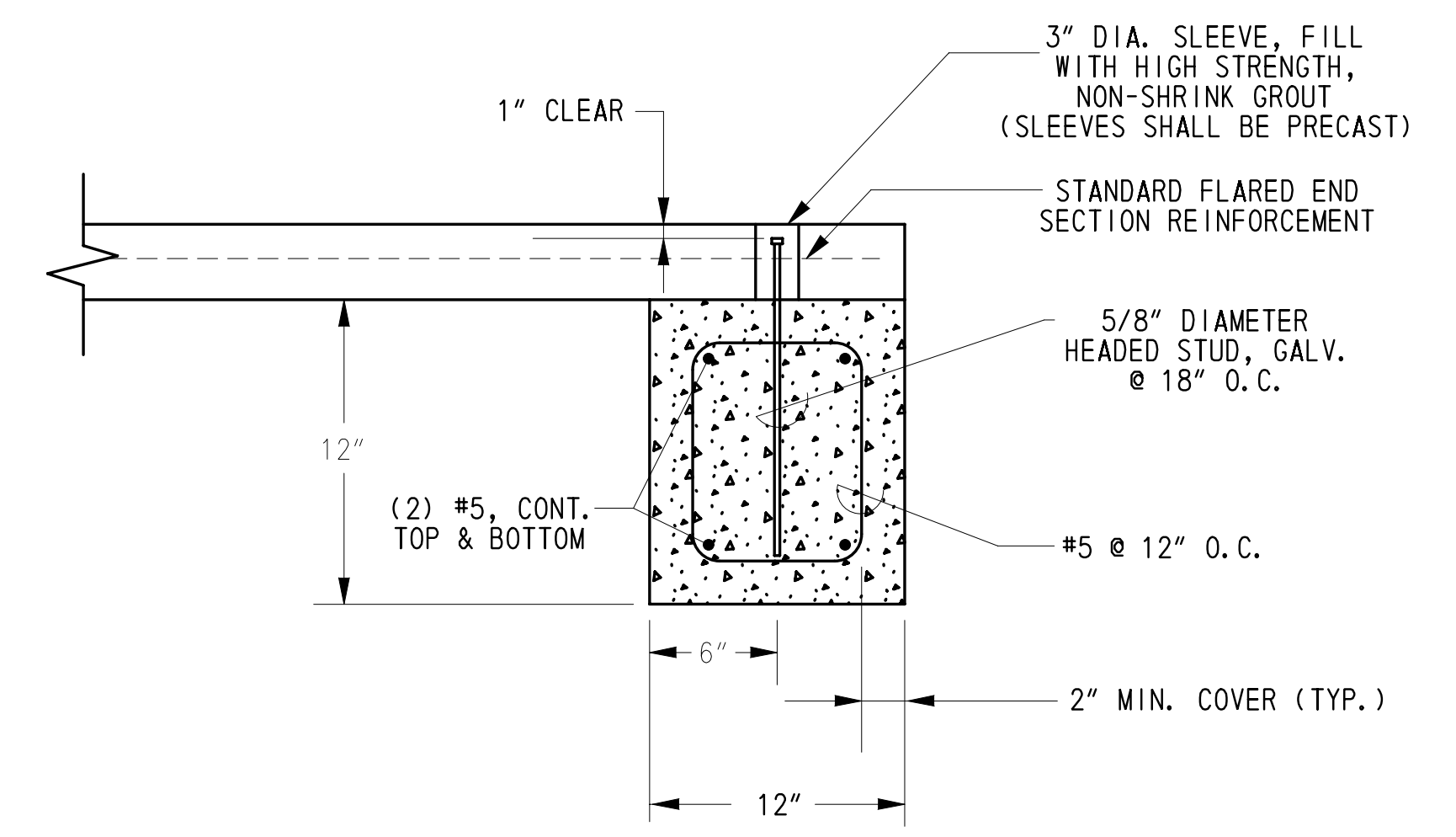
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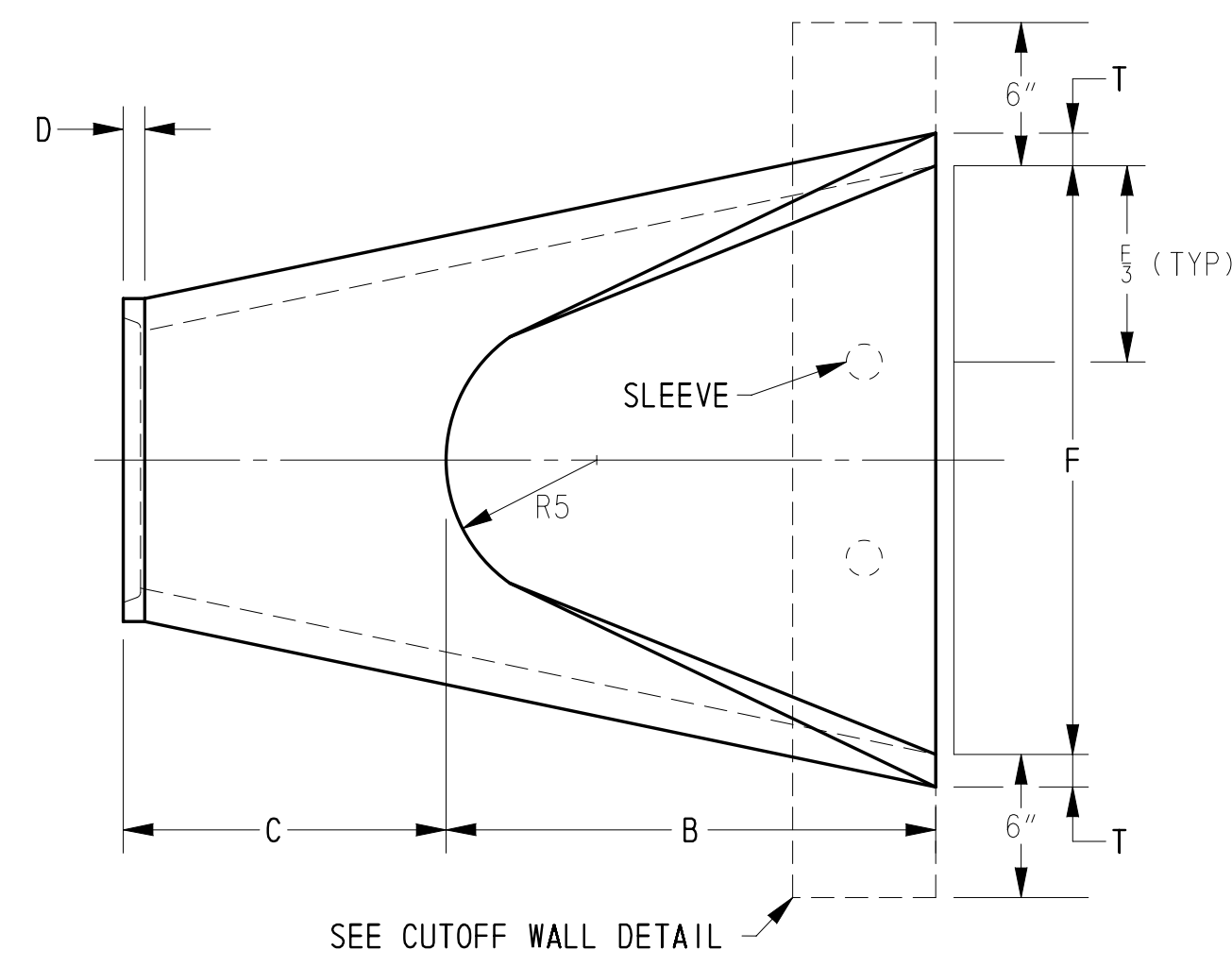
FRONT VIEW



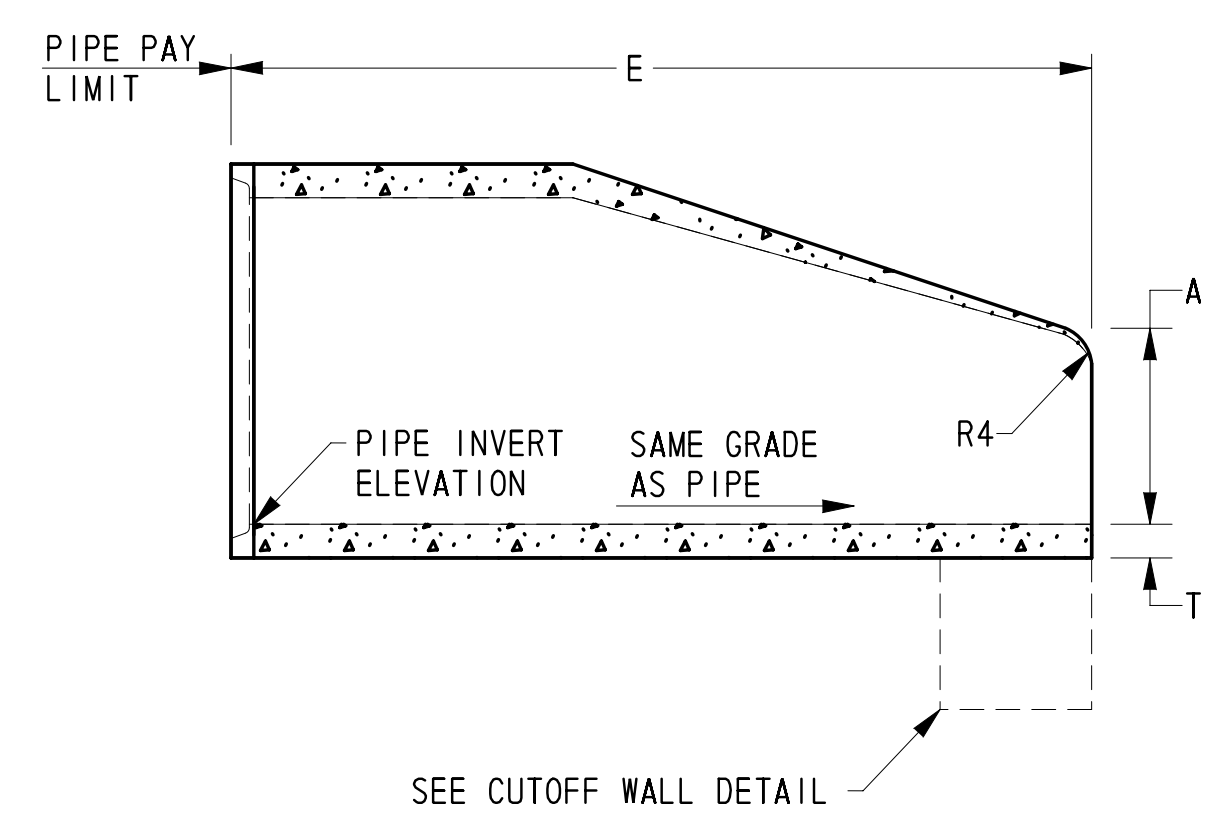
INLET SIDE VIEW



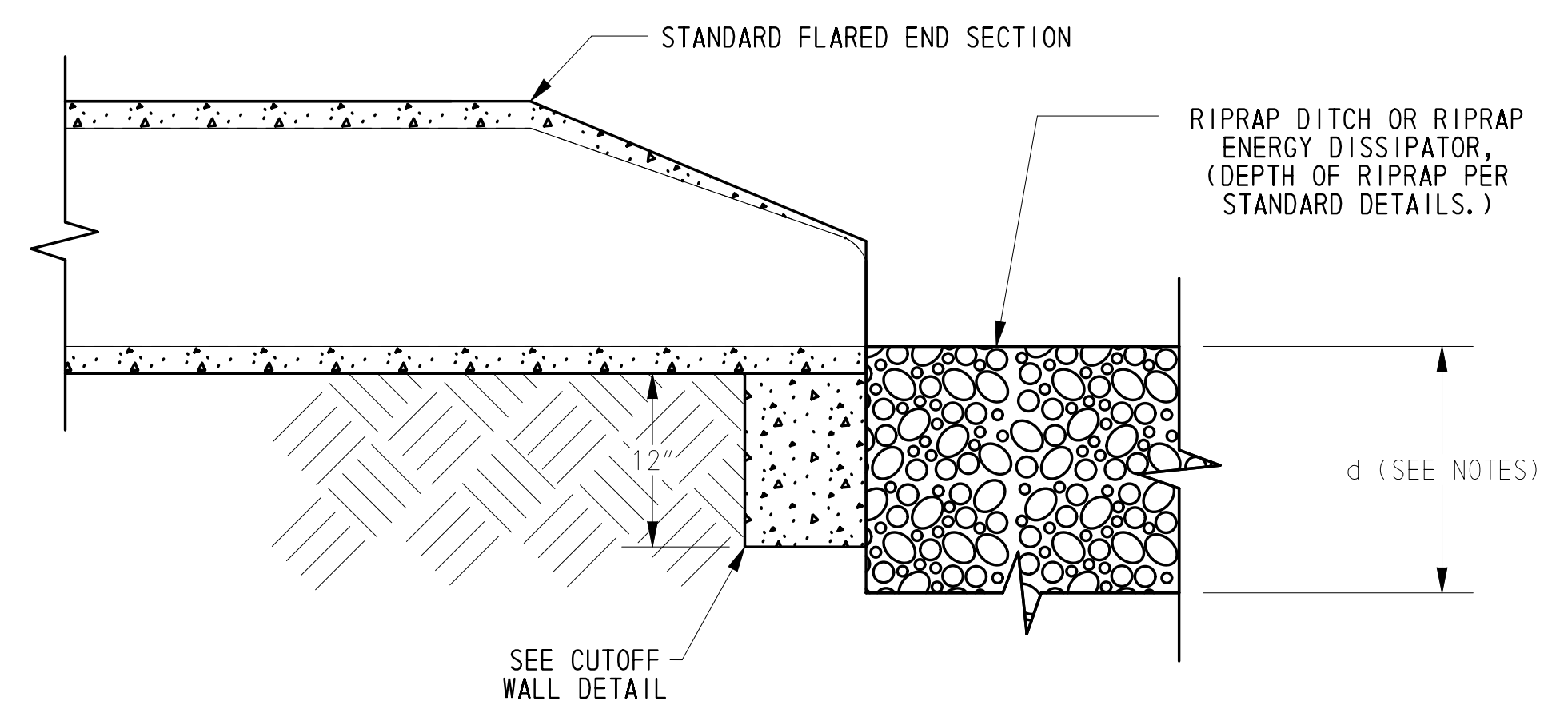
CUTOFF WALL DETAIL  
N. T. S.



TOP VIEW



OUTLET SIDE VIEW



SIDE VIEW WITH OUTLET PROTECTION  
N. T. S.

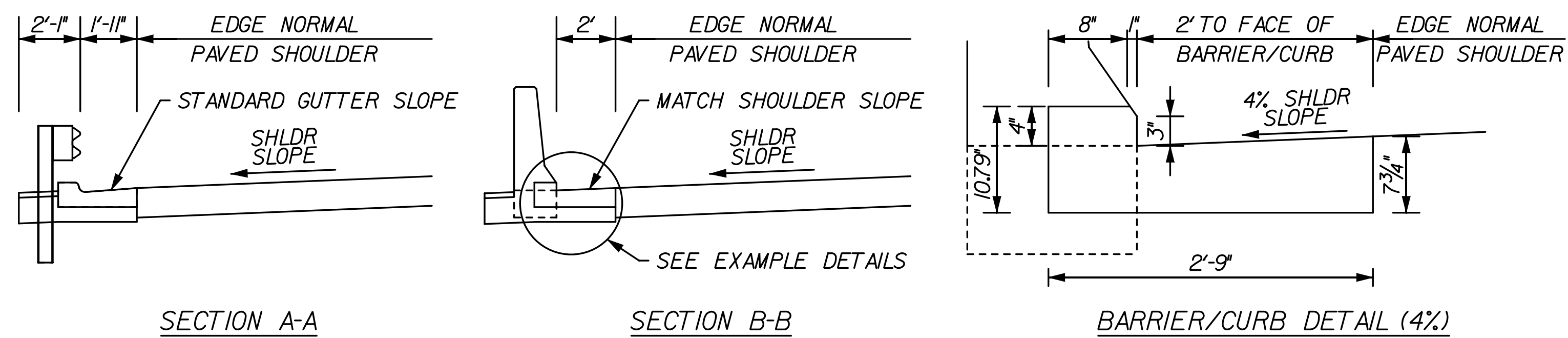
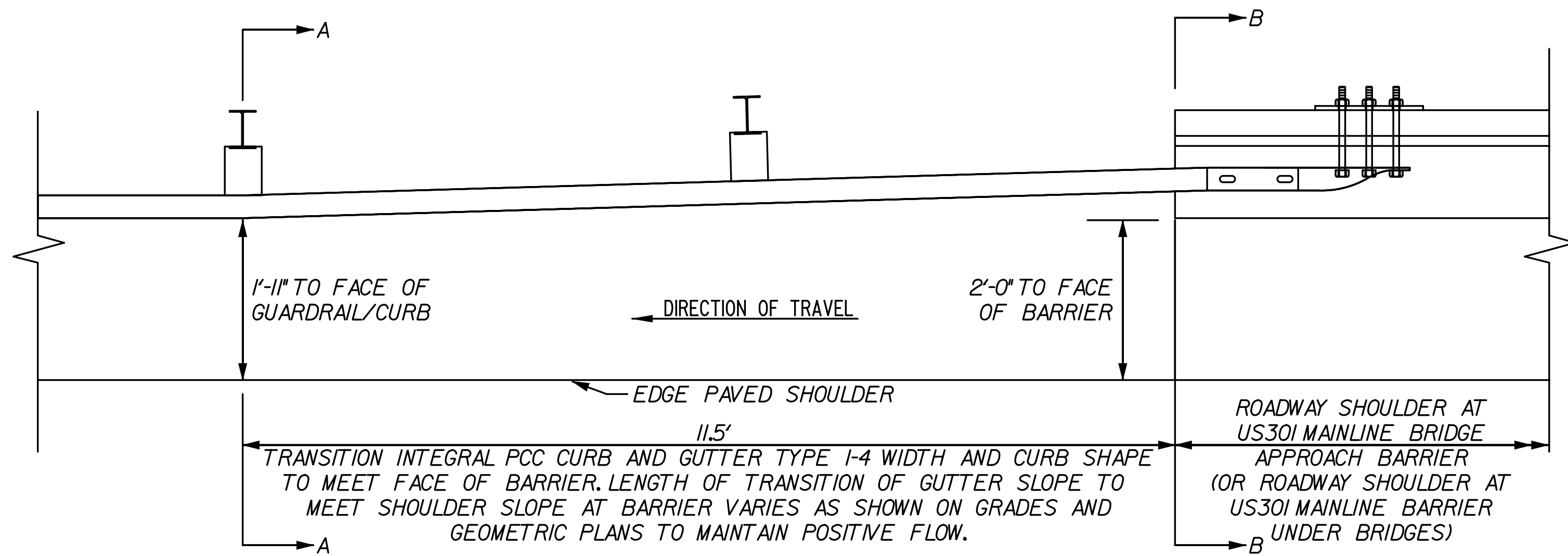
FLARED END SECTION - ELLIPTICAL  
N. T. S.

ELLIPTICAL FLARED END SECTIONS TABLE OF DIMENSIONS																		
NOMINAL RISE	EQUIVALENT SPAN	EQUIVALENT DIA.	ACTUAL		T (INCHES)	A (INCHES)	B	C	D (INCHES)	E	F (INCHES)	G (INCHES)	H (INCHES)	R1 (INCHES)	R2 (INCHES)	R3 (INCHES)	R4 (INCHES)	R5 (INCHES)
			RISE	SPAN														
14	23	18	14 5/8	22 7/8	2 3/4	6	2'-2"	3'-11"	2	6'-1"	36	12 25/32	5 11/32	8 27/32	20 11/16	1 1/2	3	12
19	30	24	19 1/8	30 1/8	3 1/4	9	2'-7"	3'-6"	2	6'-1"	48	16 11/16	6 27/32	11 15/32	29 1/2	1 1/2	3	14
22	34	27	21 9/16	34	3 1/2	10 1/2	2'-9"	3'-4"	2 1/4	6'-1"	54	18 3/4	7 3/4	12 3/4	33 1/32	1 1/2	3	14 1/2
24	38	30	24	37 7/8	3 3/4	12	4'-6"	1'-6"	2 1/2	6'-0"	60	20 13/16	8 11/16	14	36 9/16	1 1/2	3	15
27	42	33	26 23/32	41 15/16	4 1/2	11	5'-3"	2'-9"	3	8'-0"	72	24 31/32	10 5/16	16 13/16	43 7/8	1 1/2	4	18

NOTES:

- FLARED END SECTIONS SHALL BE MANUFACTURED TO ASTM C-76 AND AASHTO M-170 WITH CLASS III REINFORCEMENT.
- FLARED END SECTIONS SHALL BE BEDDED IN ACCORDANCE WITH DELDOT STANDARD SPECIFICATION 612, REINFORCED CONCRETE PIPE.
- FLARED END SECTIONS WITH A RISE OF 27 INCHES AND LARGER SHALL INCLUDE A 12 INCH WIDE CUTOFF WALL CONSTRUCTED AS SHOWN. CUTOFF WALL MAY BE CAST-IN-PLACE OR PRECAST CLASS B CONCRETE. ALL COSTS FOR THE CUTOFF WALL SHALL BE INCIDENTAL TO THE FLARED END SECTION.
- DEPTH OF RIPRAP (d) PER STANDARD DETAILS.

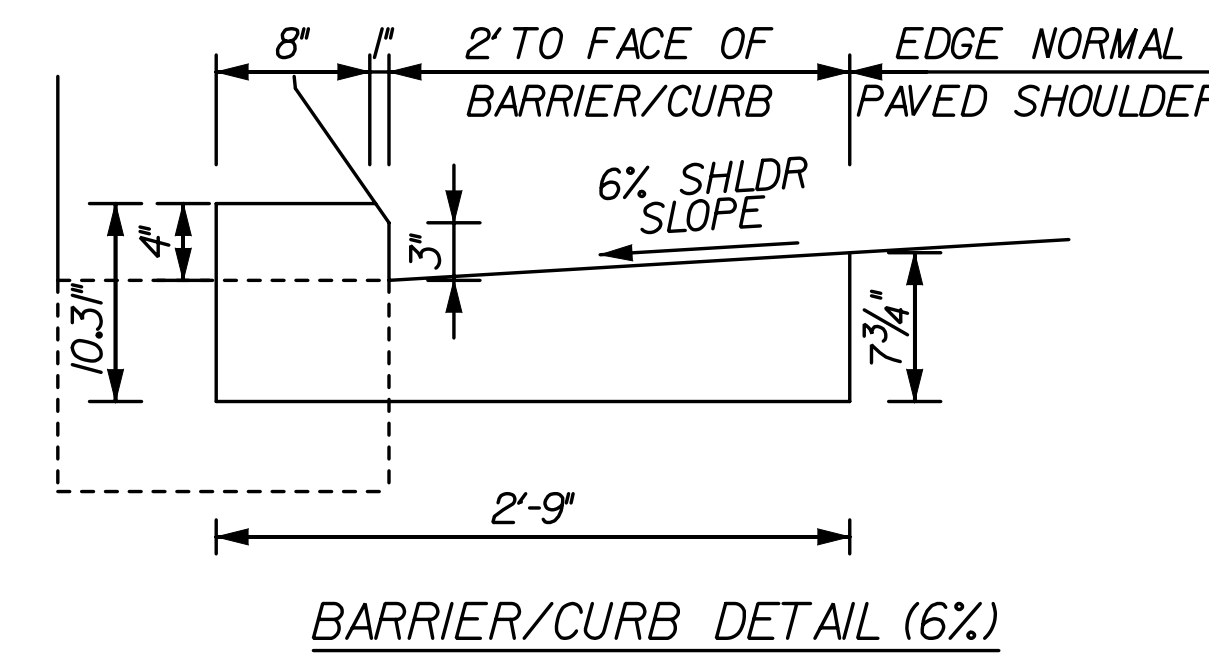
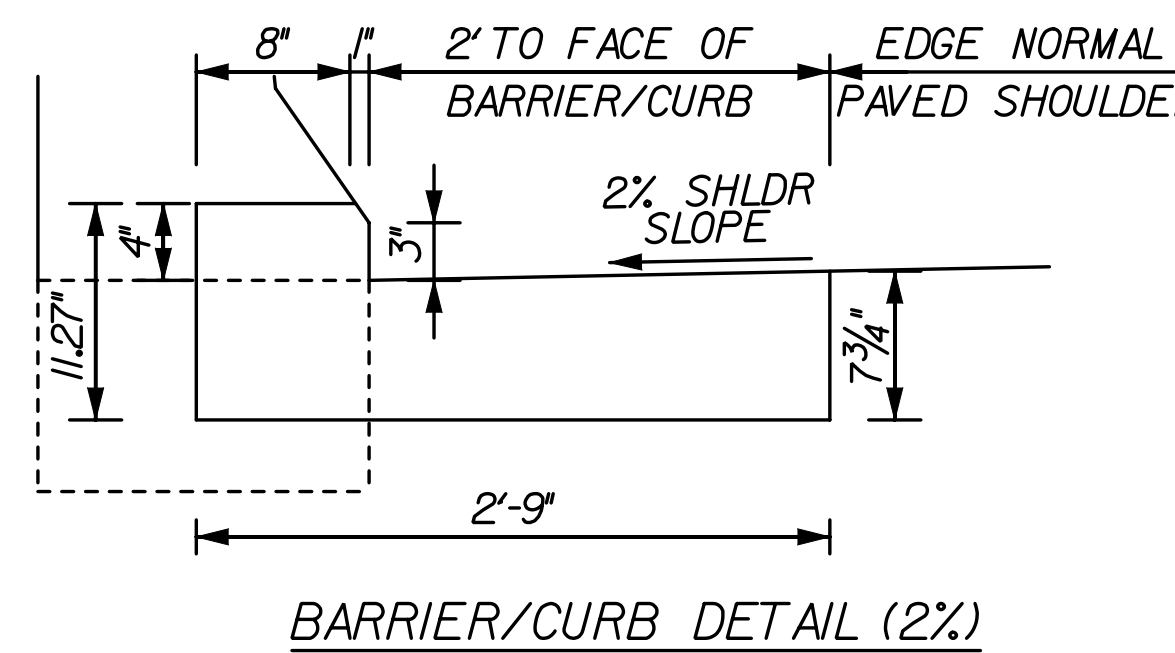
\$DATES \$FILES



SECTION A-A

SECTION B-B

BARRIER/CURB DETAIL (4%)



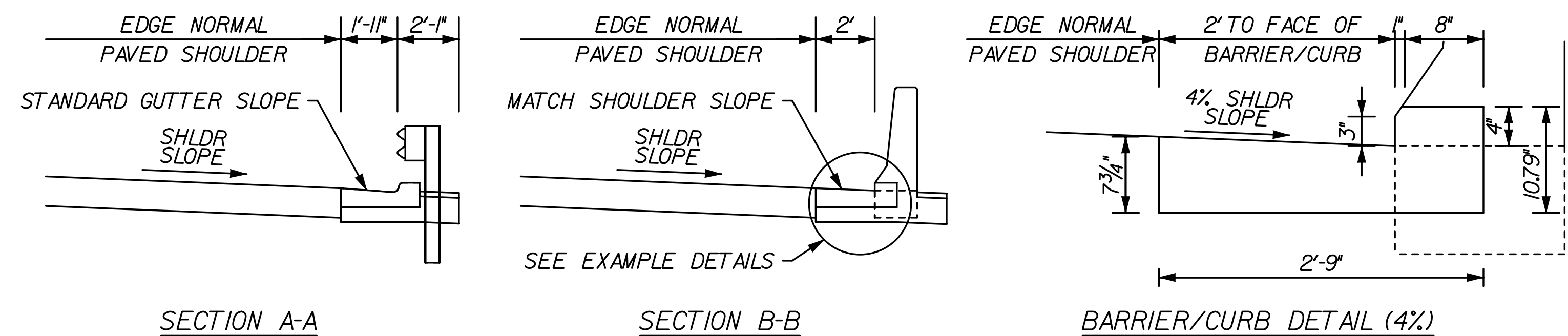
BARRIER/CURB DETAIL (2%)

BARRIER/CURB DETAIL (6%)

- NOTES:
1. PLACE PREFORMED EXPANSION JOINT MATERIAL BETWEEN END OF CURB AND BARRIER PER SECTION 701.03.
  2. TRANSITION LIMITS TO BE MEASURED FOR PAYMENT UNDER ITEM 701016 WITH ALL COSTS FOR TRANSITION INCLUDED IN ITEM 701016.

**CURB TRANSITION DETAILS AT GUARDRAIL TO BARRIER CONNECTION (EXIT TYPE)**

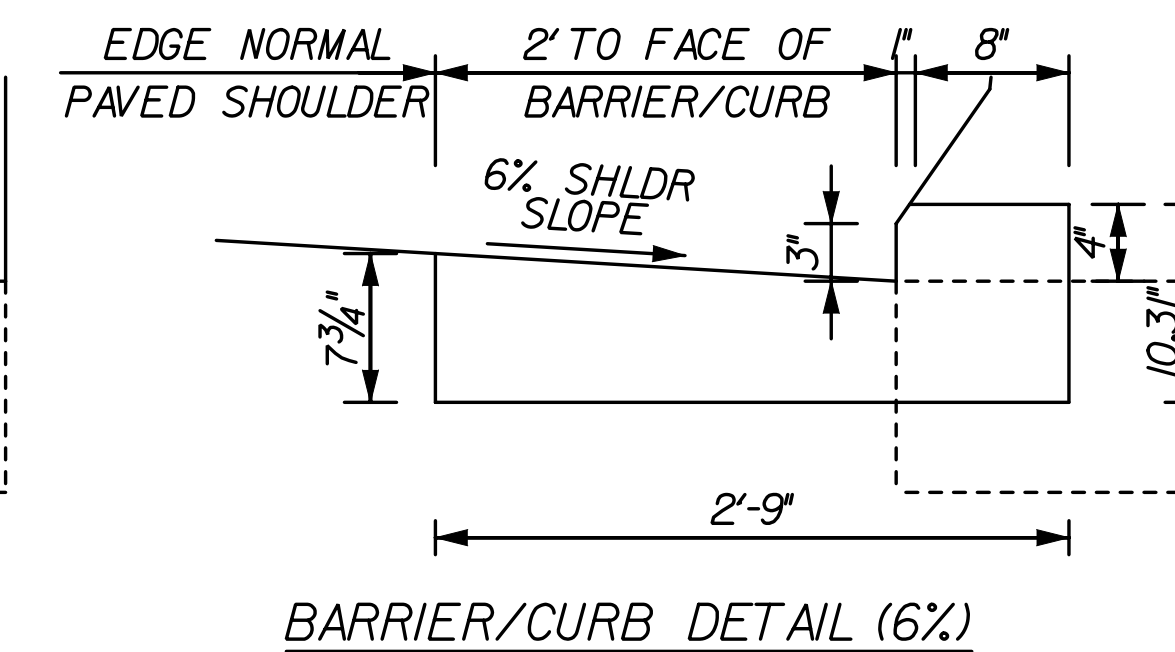
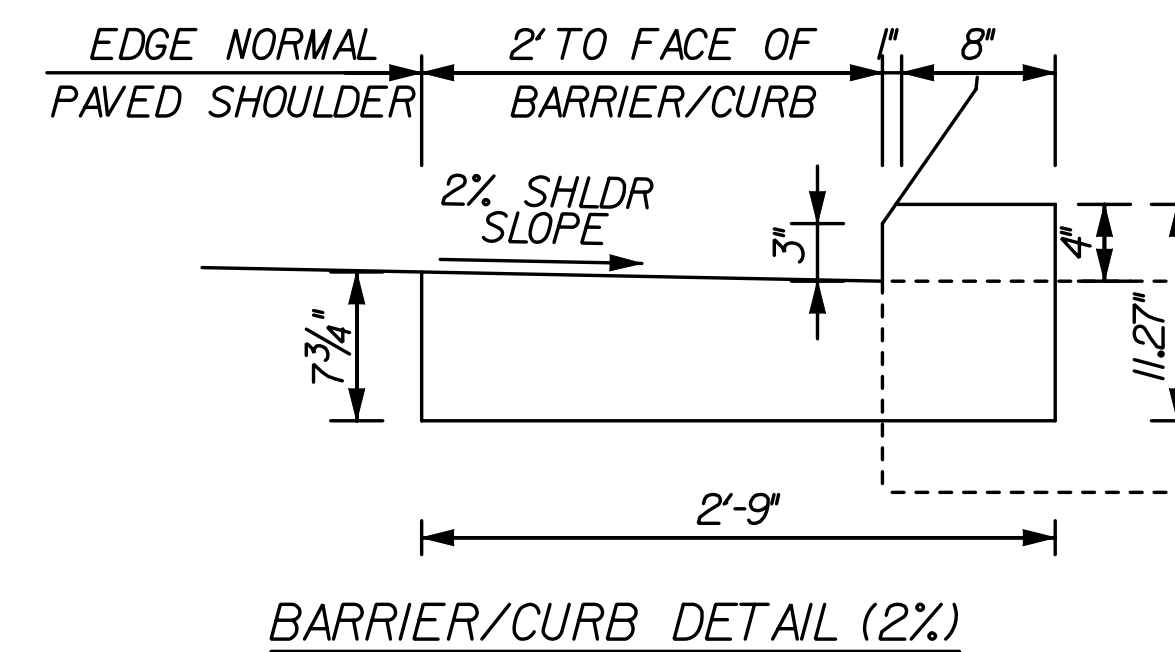
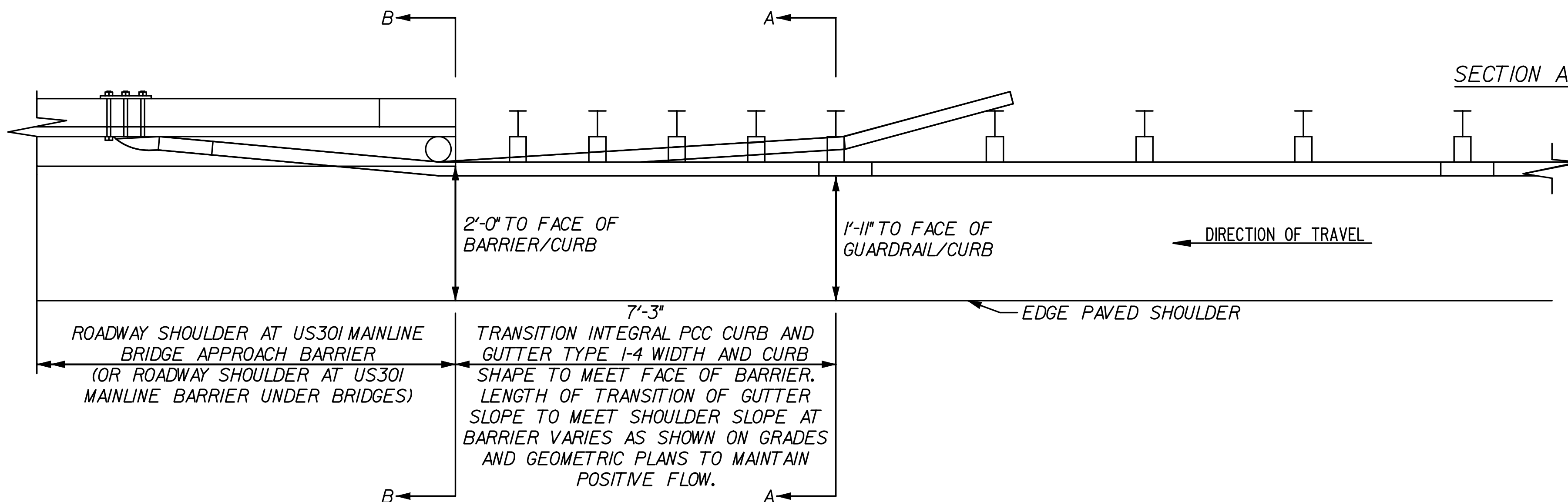
NOT TO SCALE



SECTION A-A

SECTION B-B

BARRIER/CURB DETAIL (4%)



BARRIER/CURB DETAIL (2%)

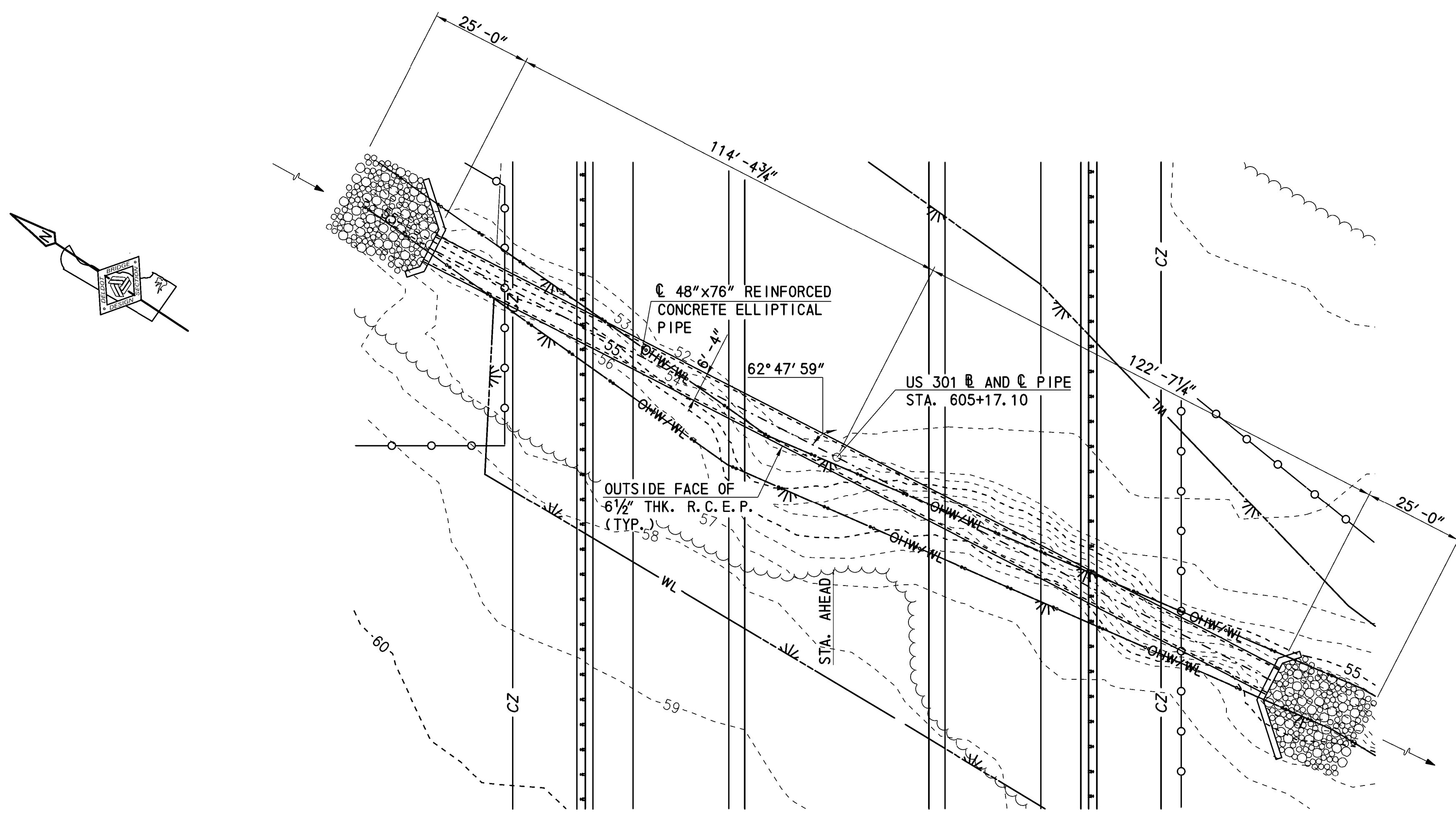
BARRIER/CURB DETAIL (6%)

- NOTES:
1. PLACE PREFORMED EXPANSION JOINT MATERIAL BETWEEN END OF CURB AND BARRIER PER SECTION 701.03.
  2. TRANSITION LIMITS TO BE MEASURED FOR PAYMENT UNDER ITEM 701016 WITH ALL COSTS FOR TRANSITION INCLUDED IN ITEM 701016.

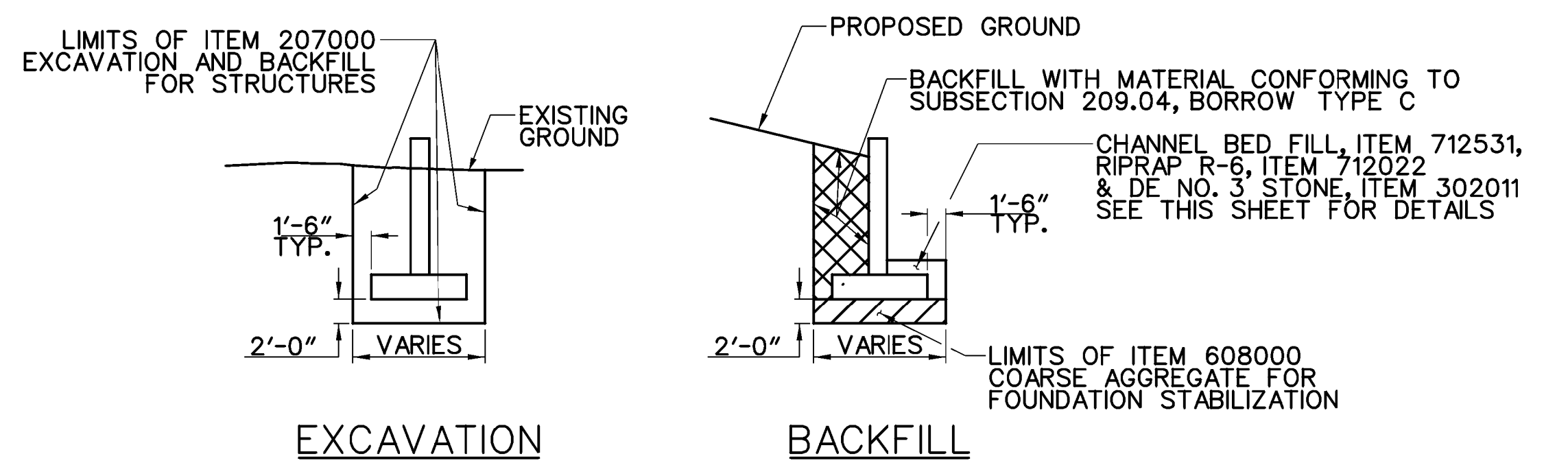
**CURB TRANSITION DETAILS AT GUARDRAIL TO BARRIER CONNECTION (APPROACH TYPE 1)**

NOT TO SCALE

INDEX OF SHEETS PIPE CULVERT AT STA 605+17.10		
SHEET NO.	DWG. NO.	TITLE
72	DT-07	SITE PLAN AND ELEVATION
73	DT-08	STAKE OUT PLAN AND INLET PLAN AND ELEVATION
74	DT-09	STAKE OUT PLAN AND OUTLET PLAN AND ELEVATION
75	DT-10	INLET AND OUTLET WALL SECTIONS
76	DT-11	REINFORCEMENT BAR LIST (1 OF 2)
77	DT-12	REINFORCEMENT BAR LIST (2 OF 2)



PLAN  
SCALE: 1"=20'

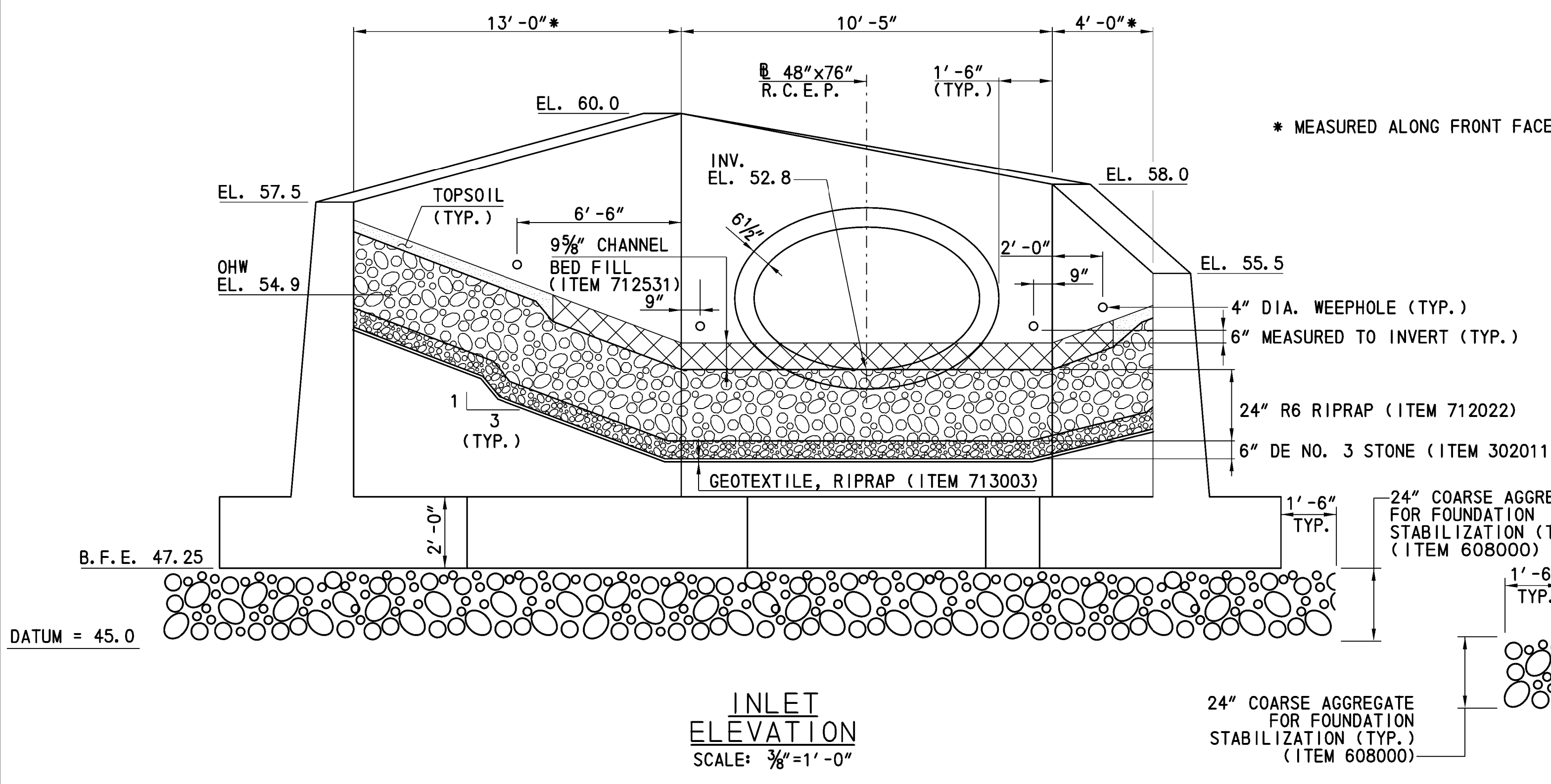


NOTES:

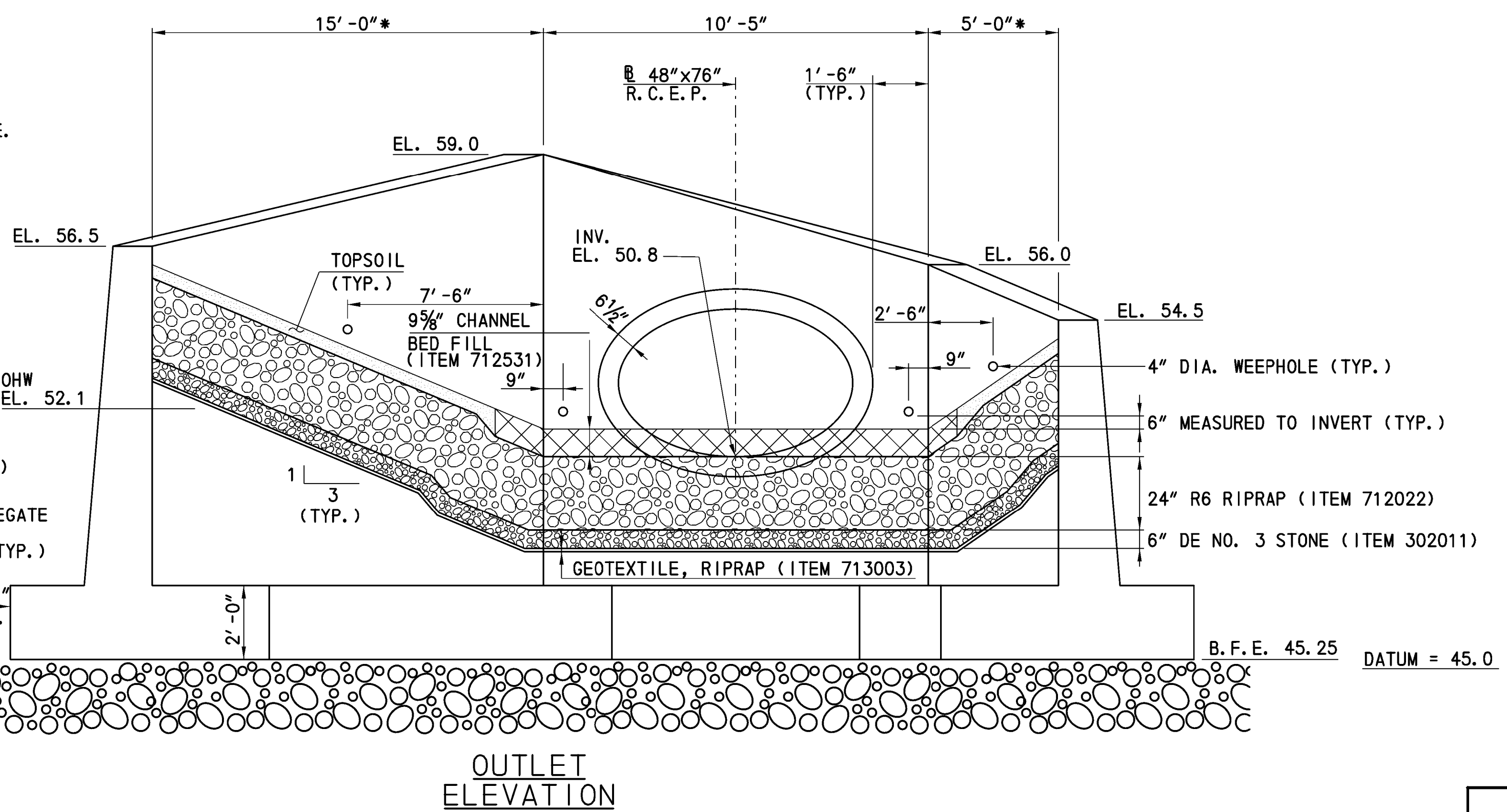
- BELOW ORDINARY HIGH WATER LINE:  
RIPRAP PER PLANS. PLACE TOP OF RIPRAP TO MATCH INVERT OF PIPE. CHOKe RIPRAP VOIDS WITH BORROW, TYPE B. PLACE CHANNEL BED FILL TO MATCH CHANNEL BED ELEVATIONS.
- ABOVE ORDINARY HIGH WATER LINE:  
RIPRAP PER PLANS. CHOKe RIPRAP VOIDS WITH ITEM 302012-DELAWARE NO. 57 STONE. FILL REMAINING VOIDS WITH TOPSOIL SO THAT THE RIPRAP IS BARELY VISIBLE. REGARDLESS OF DEPTH, THIS SHALL BE PAID FOR UNDER ITEM 733001-TOPSOILING, 4" DEPTH.
- SEE ENVIRONMENTAL COMPLIANCE SHEETS FOR ADDITIONAL DETAILS.

HYDRAULIC DATA

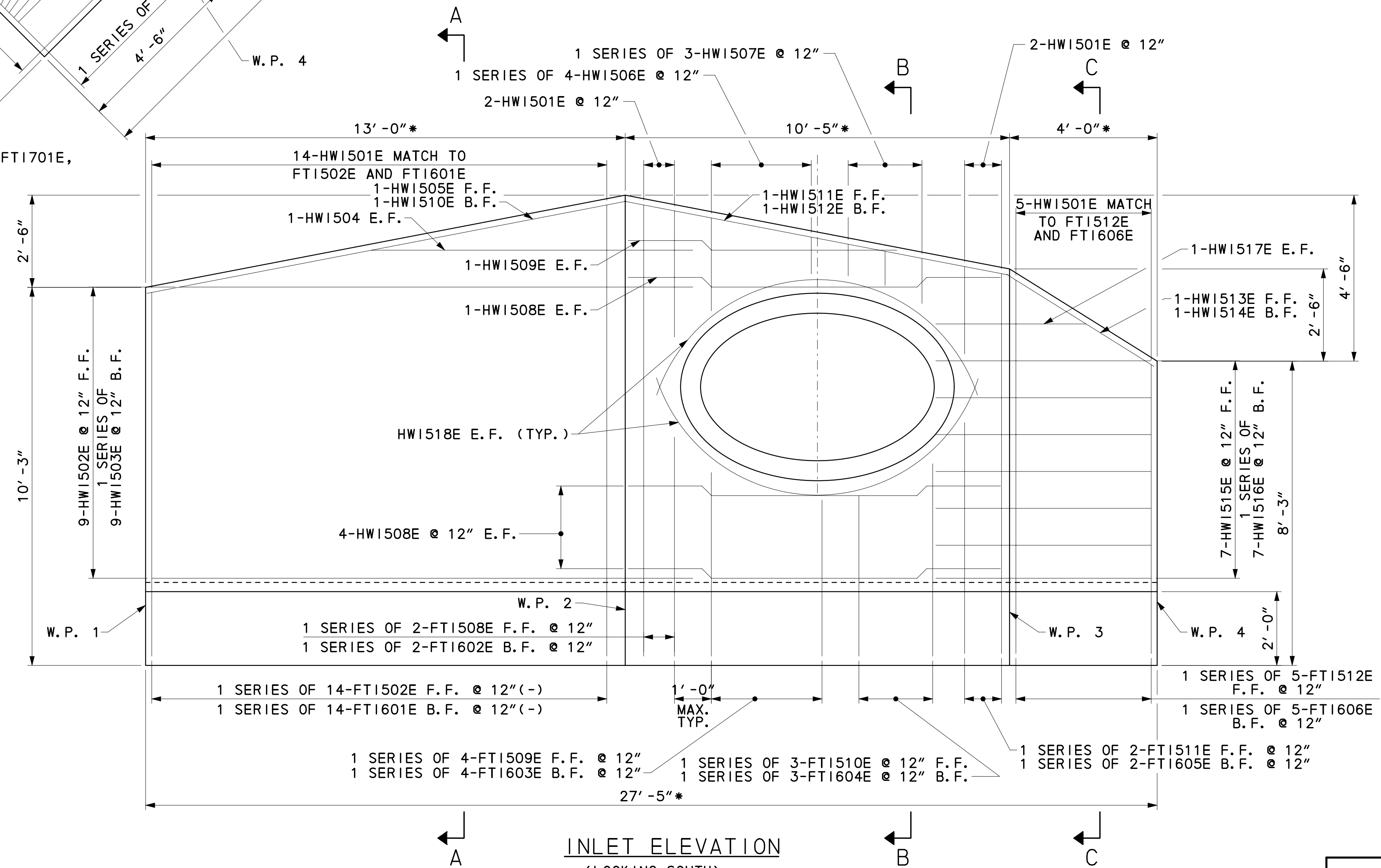
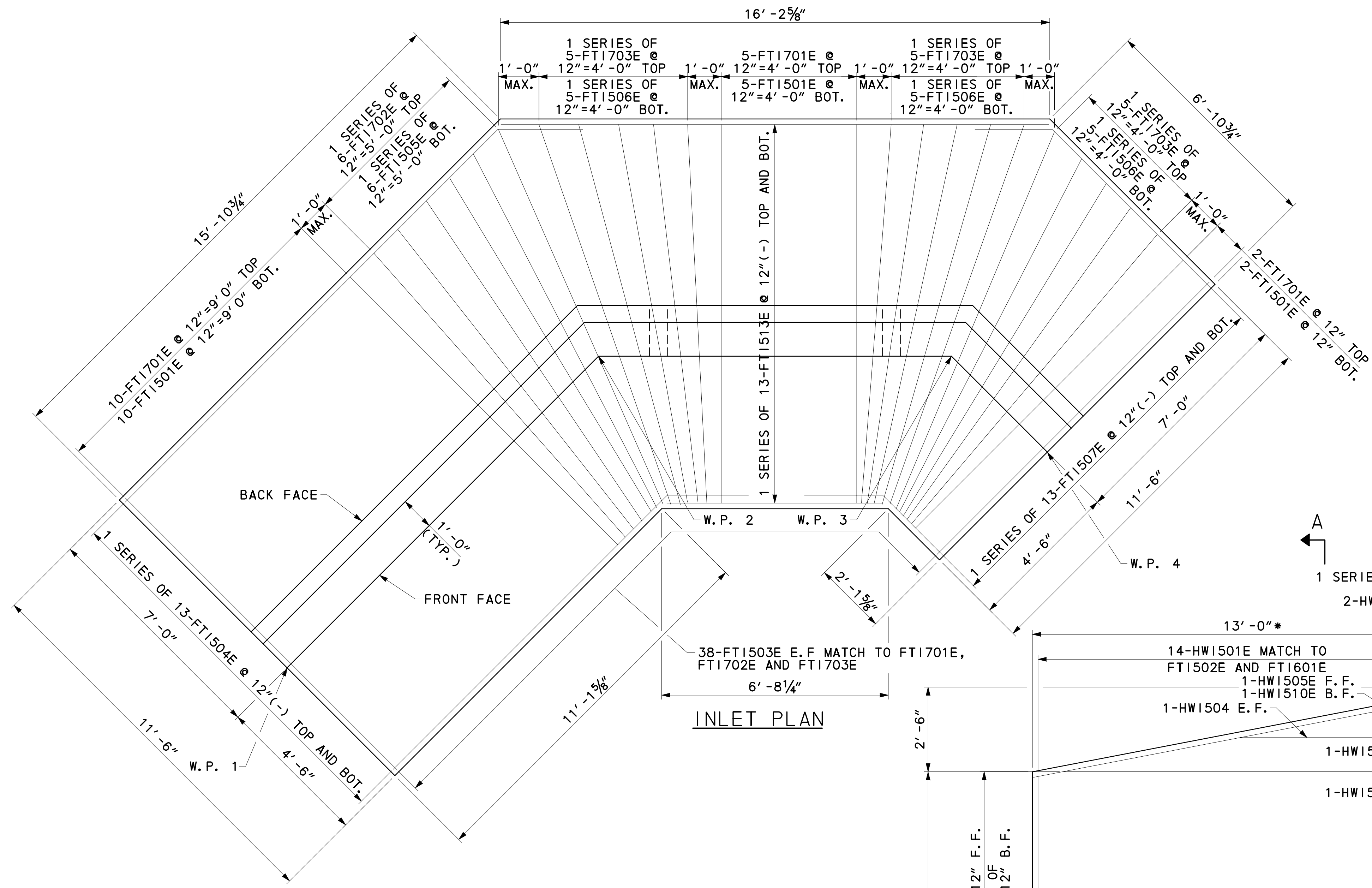
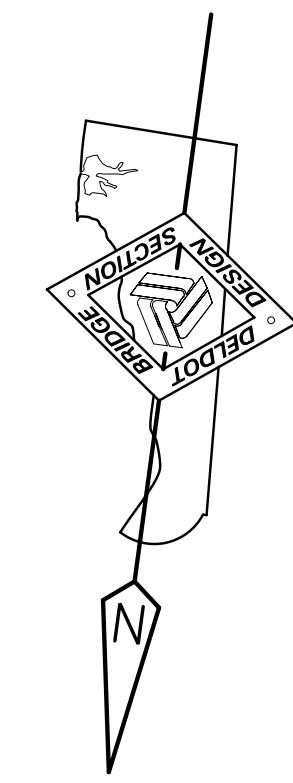
DRAINAGE AREA = 0.067 SQUARE MILES  
 50 YEAR FLOOD ELEVATION = 57.42  
 50 YEAR DESIGN DISCHARGE = 122.00 C.F.S.  
 VELOCITY AT Q 50 = 6.70 F.P.S.  
 100 YEAR FLOOD ELEVATION = 58.66  
 100 YEAR DESIGN DISCHARGE = 149.00 C.F.S.  
 VELOCITY AT Q 100 = 8.10 F.P.S.  
 PROPOSED OPENING = 18.31 S.F.



INLET  
ELEVATION  
SCALE: 3/8"=1'-0"



OUTLET  
ELEVATION  
SCALE: 3/8"=1'-0"



**NOTES**

1. VERTICAL WALL REINFORCING IN FOOTING PLAN NOT SHOWN FOR CLARITY.
2. FOR SECTIONS A-A, B-B, AND C-C, SEE SHEET DT-08.
3. FIELD BEND BARS TO AVOID R.C.E.P. AS REQUIRED
4. FOR WEEP HOLE LOCATIONS, SEE SHEET DT-05.
5. STEM CONCRETE SHALL BE CLASS A CONCRETE AND FOOTING CONCRETE SHALL BE CLASS B CONCRETE.

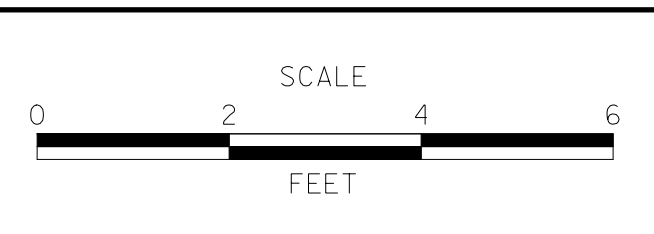
WORK POINT COORDINATES		
W. P.	CONSTRUCTION US 301 MAINLINE	
	STATION	OFFSET
1	605+86.40	103.34' L
2	605.74.02	99.37' L
3	605+64.75	104.13' L
4	605.63.53	107.94' L

\* MEASURED ALONG FRONT FACE

(BARS IN FOOTING NOT EXTENDING INTO STEM NOT SHOWN FOR CLARITY)



ADDENDUMS / REVISIONS	



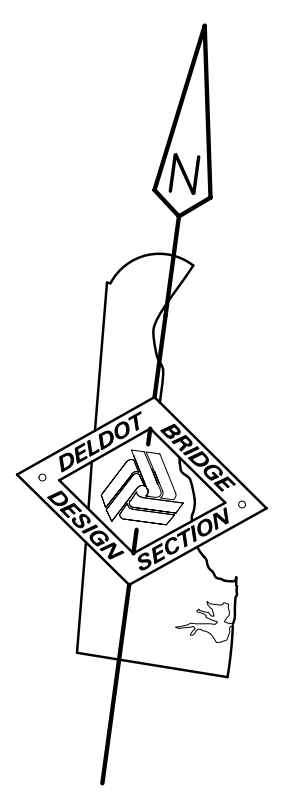
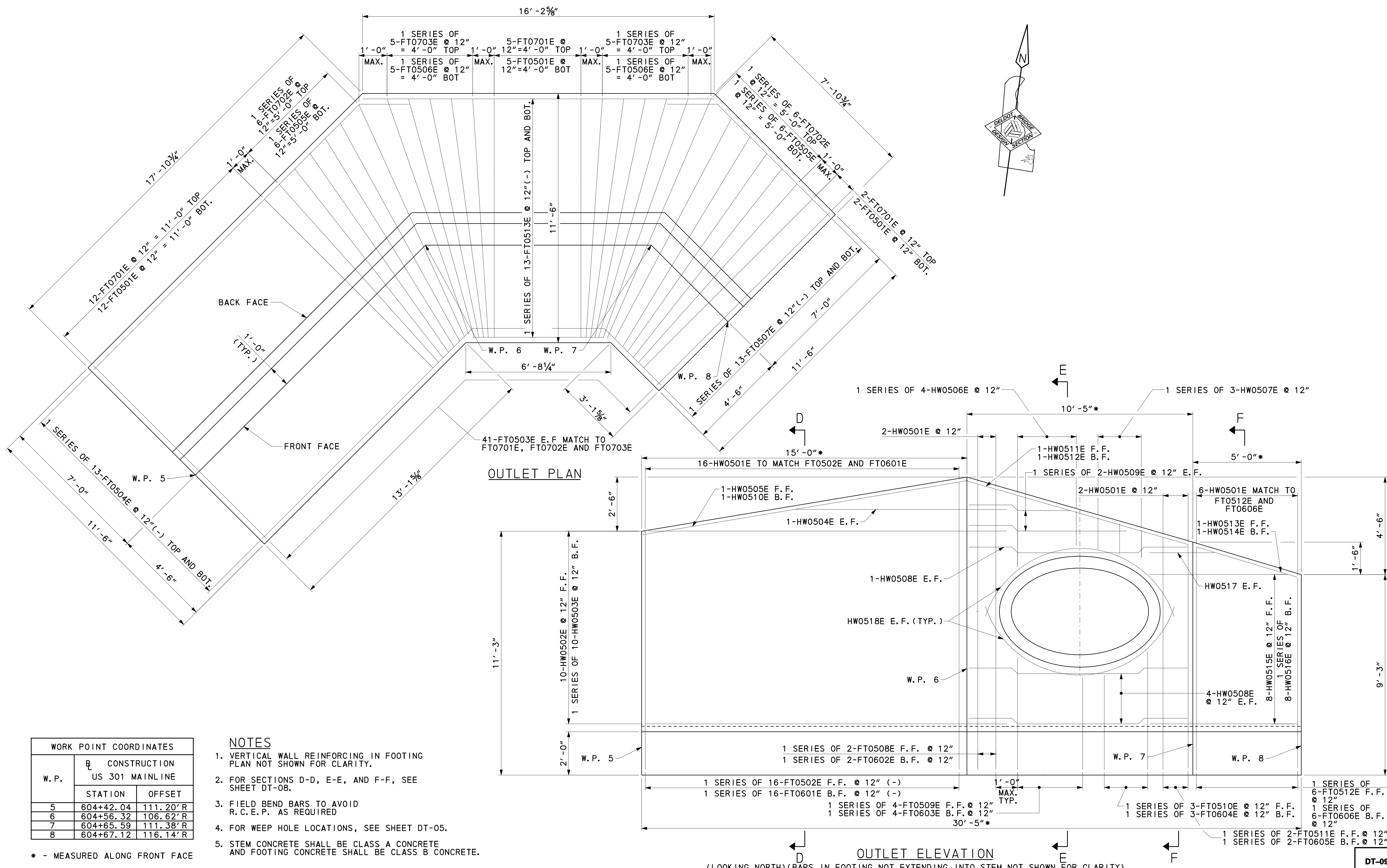
**US 301,  
NORFOLK SOUTHERN RR TO SR 896**

CONTRACT T200911301	BRIDGE NO.
COUNTY NEW CASTLE	DESIGNED BY: CCJ
	CHECKED BY: JFM

**STAKE OUT PLAN AND  
INLET PLAN AND ELEV.**

<b>DT-08</b>
SHEET NO. 73
TOTAL SHTS. 240





**OUTLET PLAN**

**OUTLET ELEVATION**

WORK POINT COORDINATES		
W. P.	STATION	OFFSET
5	604+42.04	111.20' R
6	604+56.32	106.62' R
7	604+65.59	111.38' R
8	604+67.12	116.14' R

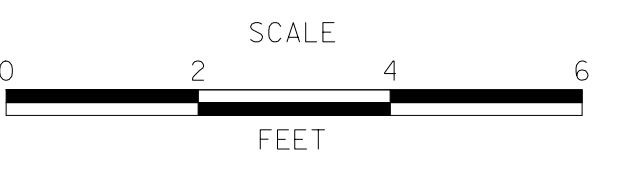
- NOTES**
- VERTICAL WALL REINFORCING IN FOOTING PLAN NOT SHOWN FOR CLARITY.
  - FOR SECTIONS D-D, E-E, AND F-F, SEE SHEET DT-08.
  - FIELD BEND BARS TO AVOID R.C.E.P. AS REQUIRED
  - FOR WEEP HOLE LOCATIONS, SEE SHEET DT-05.
  - STEM CONCRETE SHALL BE CLASS A CONCRETE AND FOOTING CONCRETE SHALL BE CLASS B CONCRETE.

\* - MEASURED ALONG FRONT FACE

(LOOKING NORTH) (BARS IN FOOTING NOT EXTENDING INTO STEM NOT SHOWN FOR CLARITY)



ADDENDUMS / REVISIONS

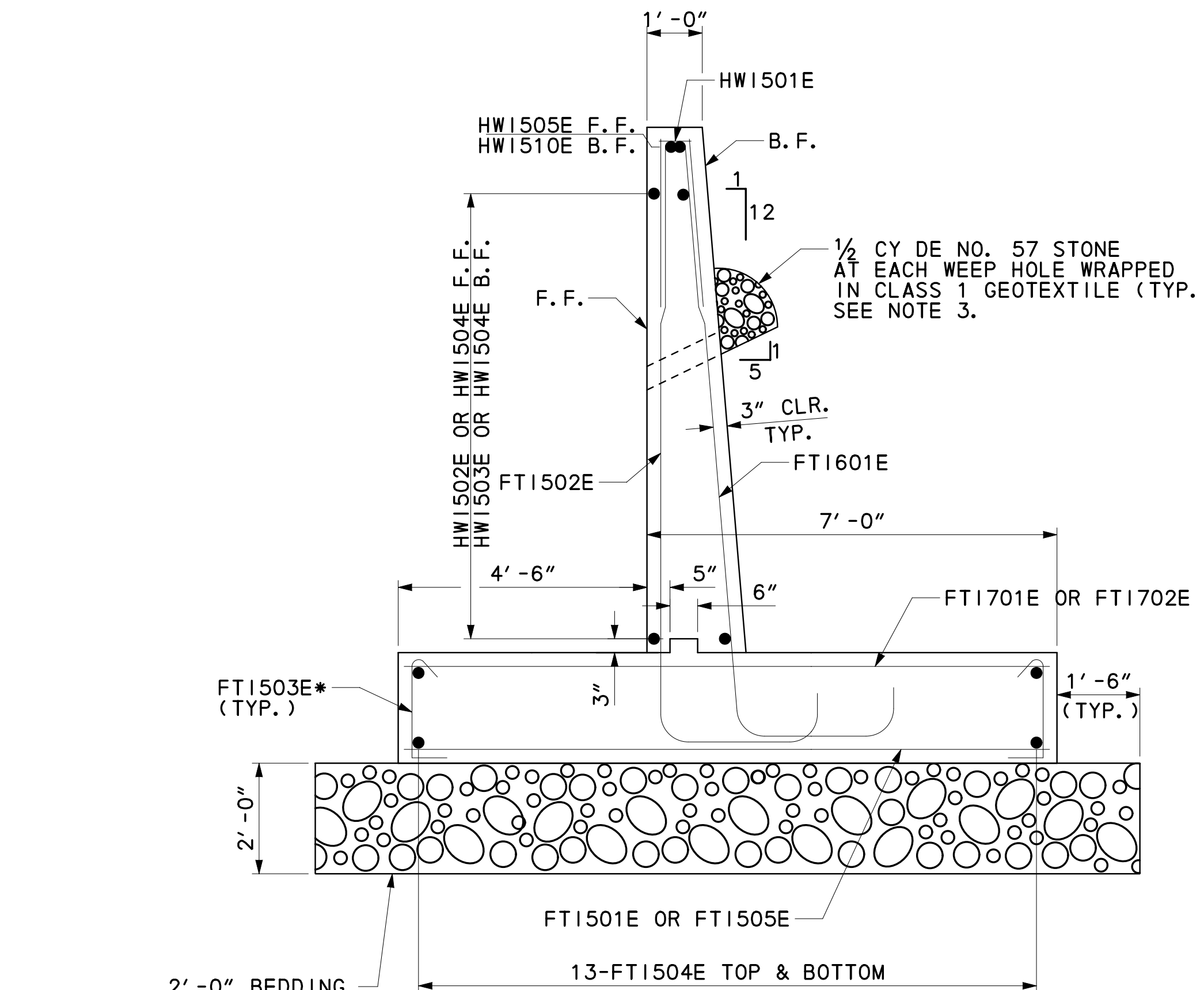


**US 301,  
NORFOLK SOUTHERN RR TO SR 896**

CONTRACT T200911301	BRIDGE NO.
COUNTY NEW CASTLE	DESIGNED BY: CCJ
	CHECKED BY: JFM

**STAKE OUT PLAN AND  
OUTLET PLAN AND ELEV.**

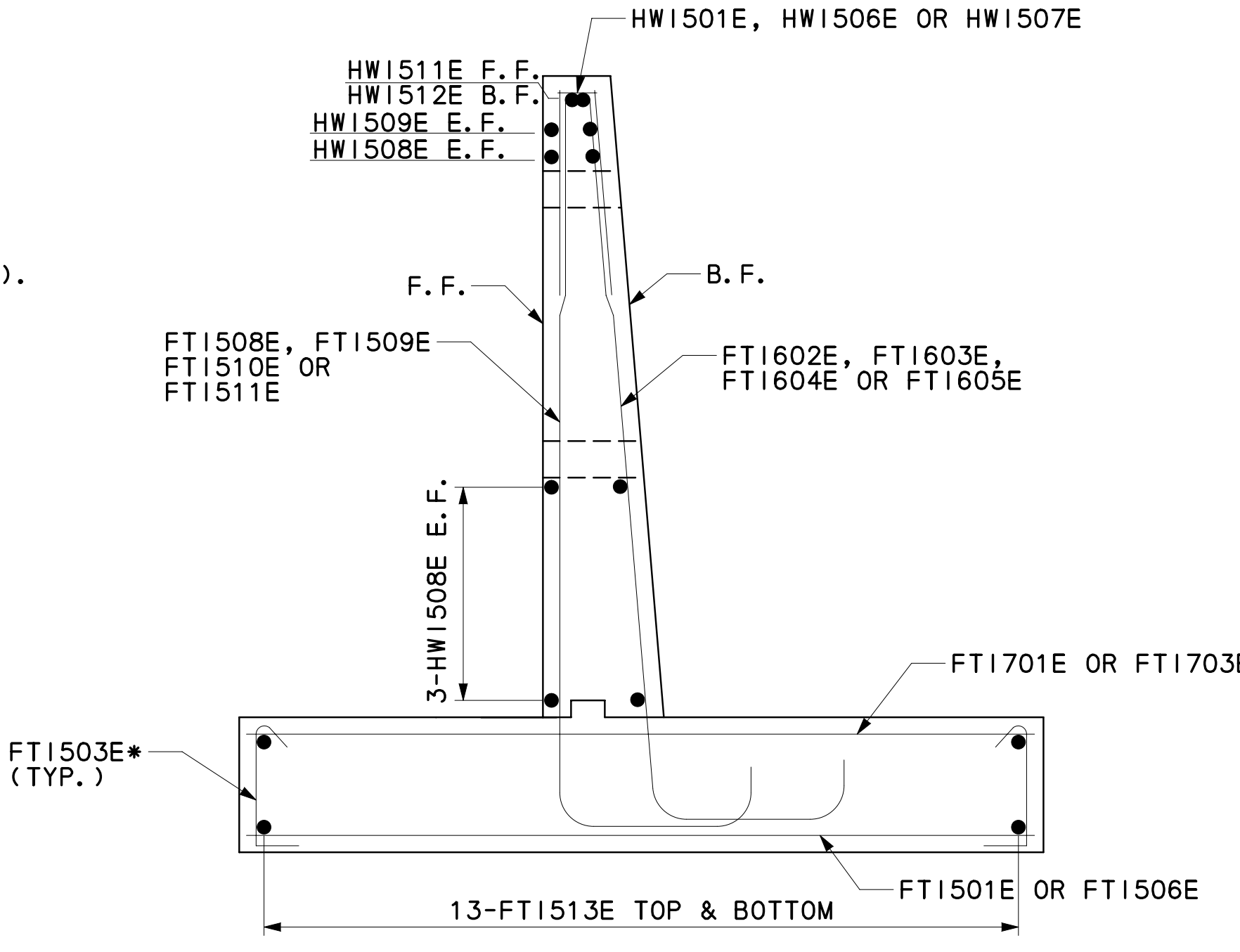
<b>DT-09</b>
SHEET NO. 74
TOTAL SHTS. 240



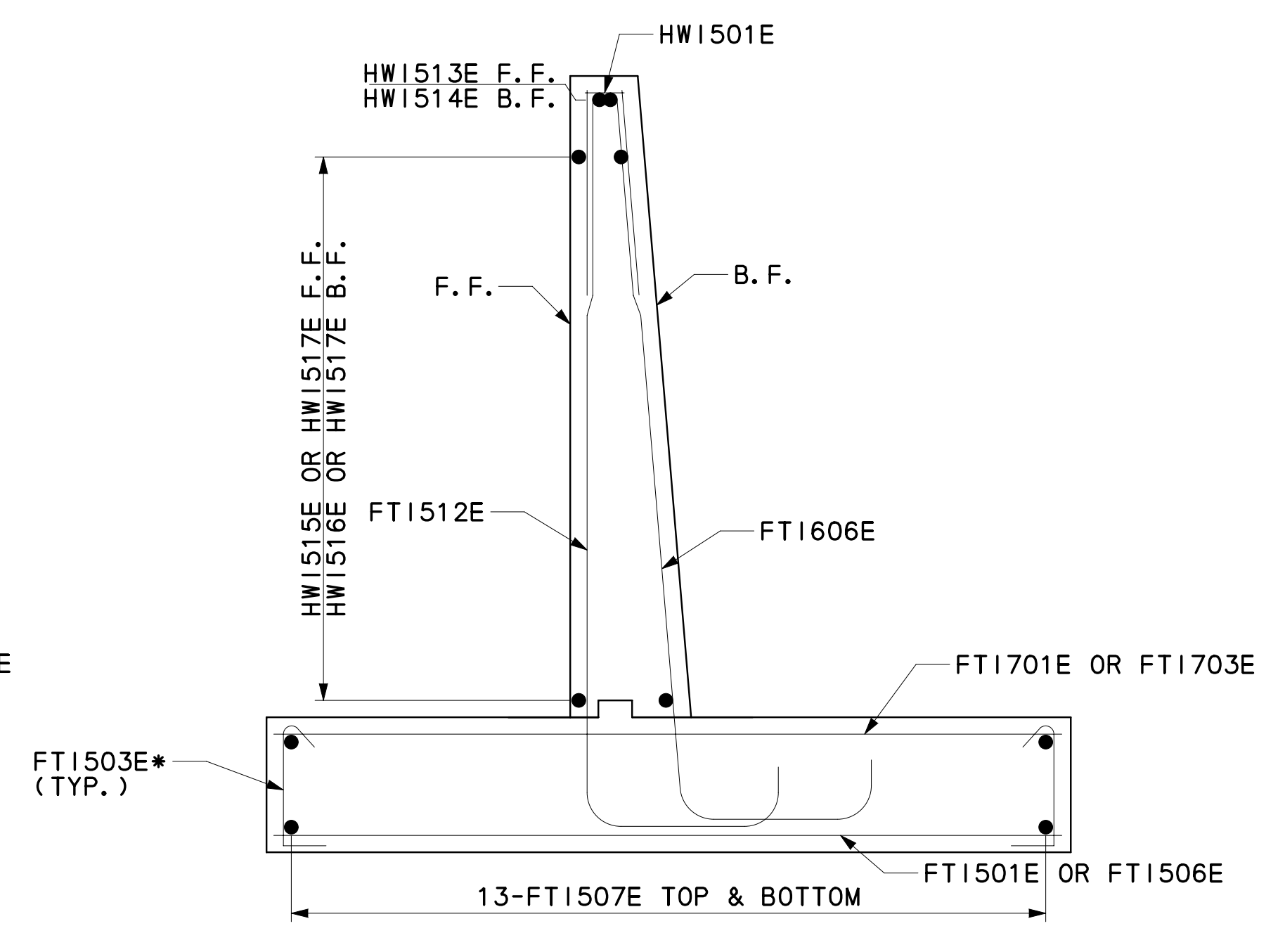
SECTION A-A

THE DETAILS SHOWN IN SECTION A-A THAT ARE NOT SHOWN IN OTHER SECTIONS ON SHEET ARE TYP. UNLESS NOTED OTHERWISE

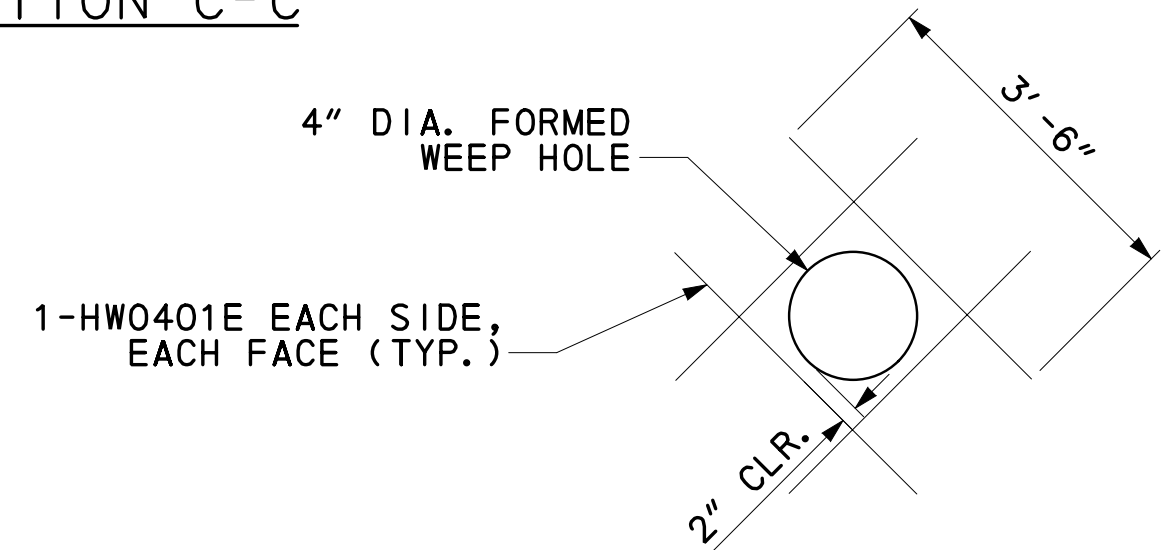
2'-0" BEDDING (COARSE AGGREGATE FOR FOUNDATION STABILIZATION)



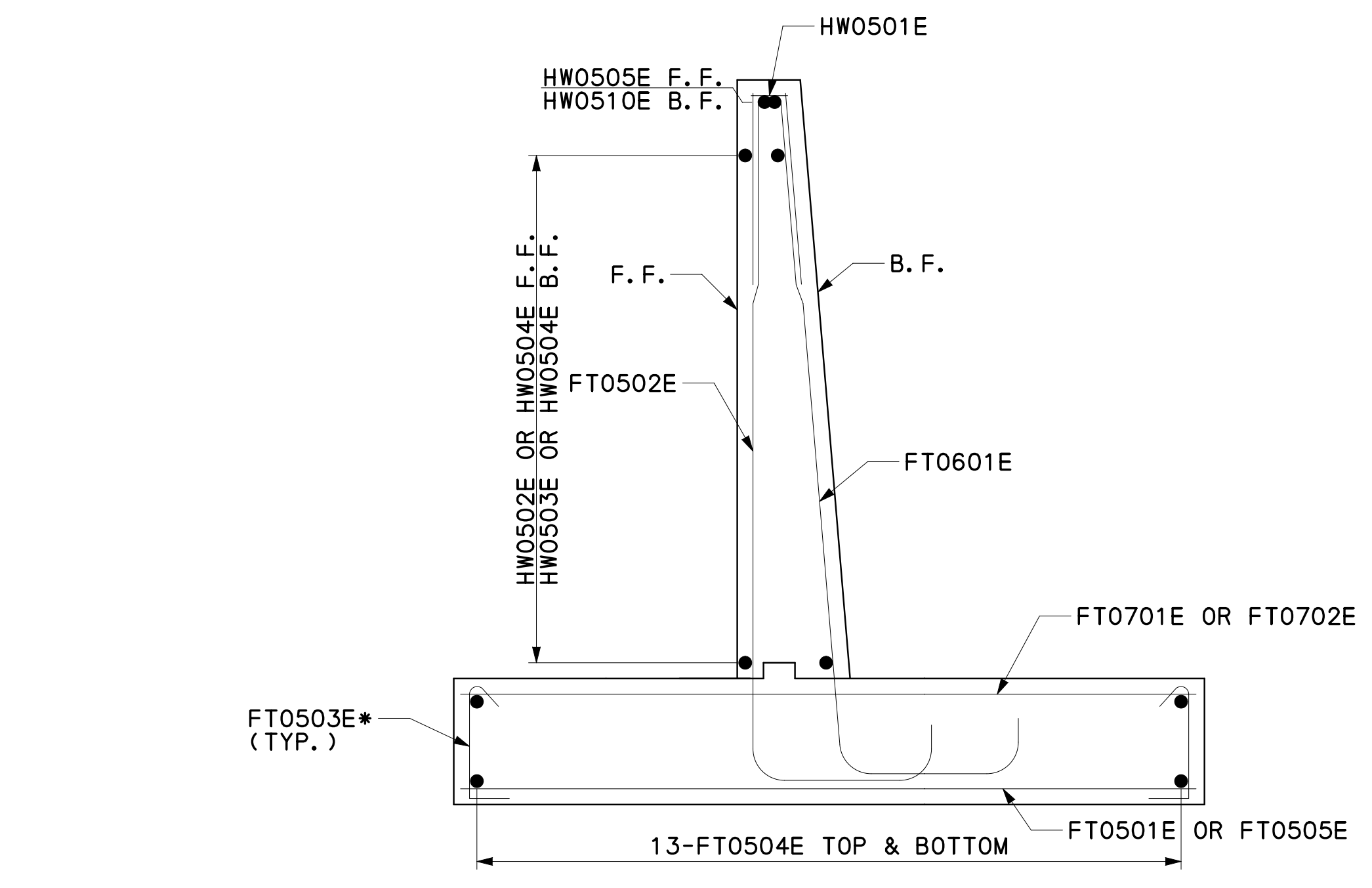
SECTION B-B



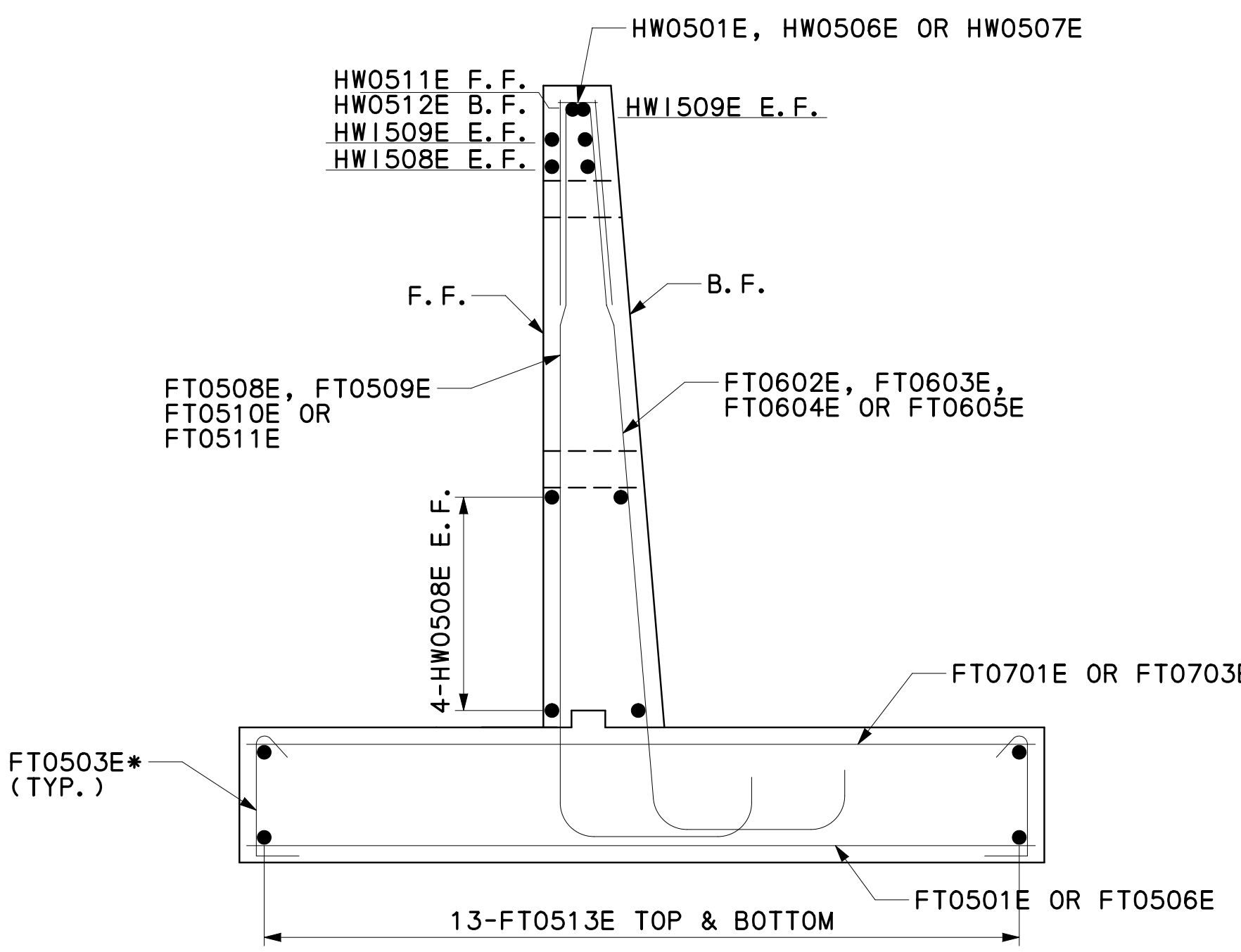
SECTION C-C



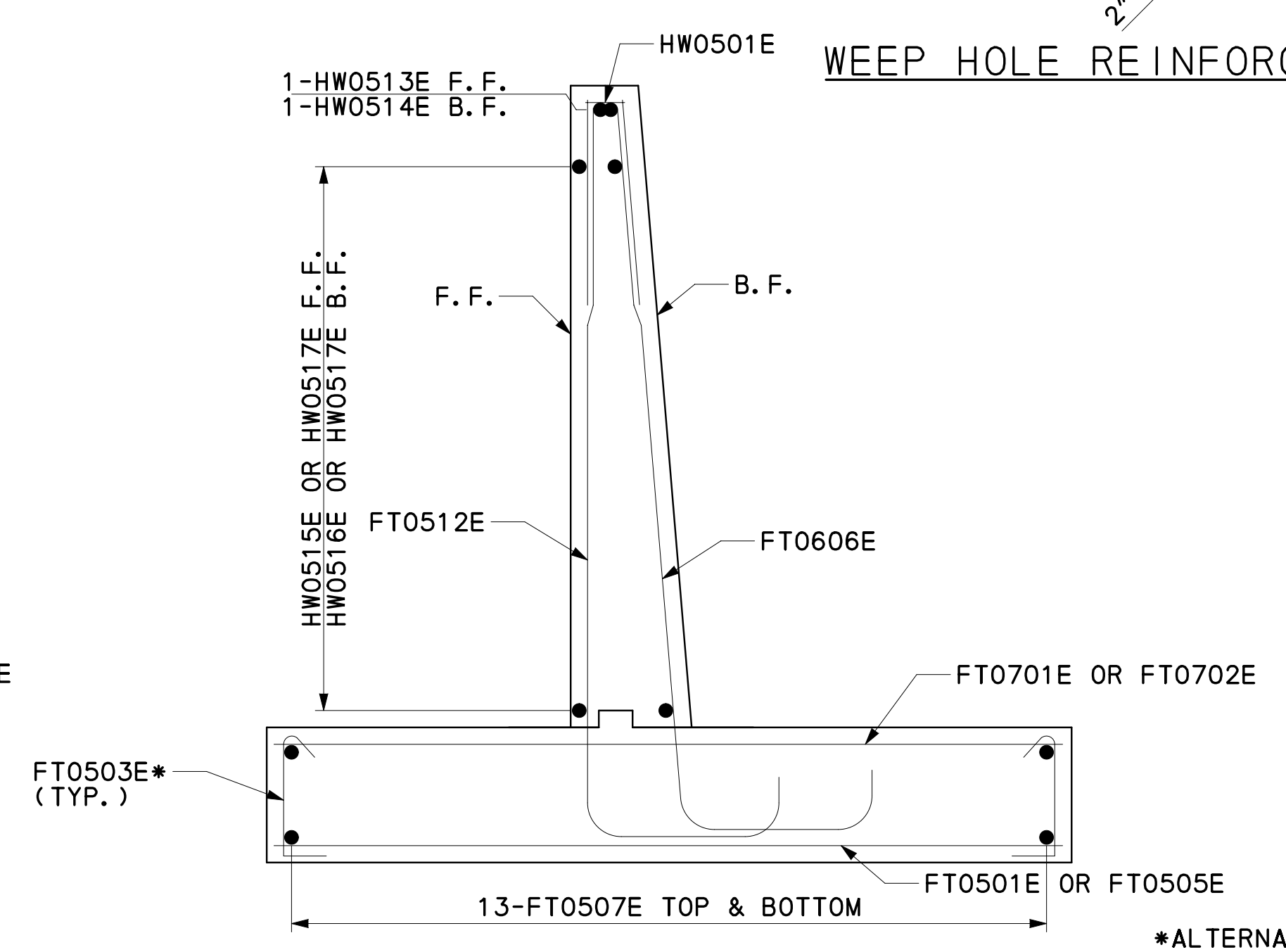
WEEP HOLE REINFORCEMENT DETAIL



SECTION D-D



SECTION E-E



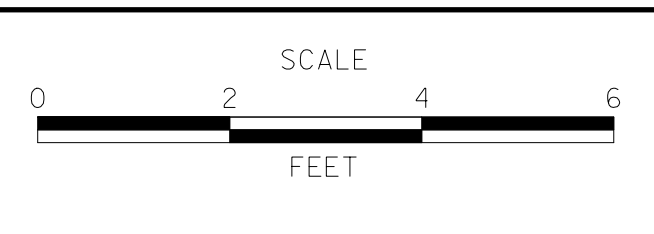
SECTION F-F

\*ALTERNATE 135° HOOK UP AND DOWN BETWEEN THE TOP AND BOT. MATS OF REINFORCING

NOTES

1. FOR SECTION LOCATIONS SEE SHEETS DT-06 AND DT-07.
2. FOR WEEP HOLE LOCATIONS, SEE SHEET DT-05.
3. COST FOR CLASS 1 GEOTEXTILE INCIDENTAL TO COST FOR DE NO. 57 STONE.

ADDENDUMS / REVISIONS



CONTRACT T200911301	BRIDGE NO.
COUNTY NEW CASTLE	DESIGNED BY: CCJ
	CHECKED BY: JFM

- ① ANY MARK NUMBER WITH SUFFIX 'E' DENOTES EPOXY COATED REINFORCING STEEL.  
 ② ALL MARK 'LOCATION PREFIXES' SHALL CONSIST OF TWO LETTERS AND ARE AS FOLLOWS: AB = ABUTMENT, AS = APPROACH SLAB, BC = BOX CULVERT, BW = BACKWALL, CL = COLUMN, DK = DECK, DL = DOWEL, FT = FOOTING, HW = HEADWALL, MS = MISC. BARS, PA = PARAPET, PR = PIER, SC = SHEETPILE CAP, SL = SLAB, TW = TOEWALL, WL = WALL (UNIQUE LOCATION), WW = WINGWALL

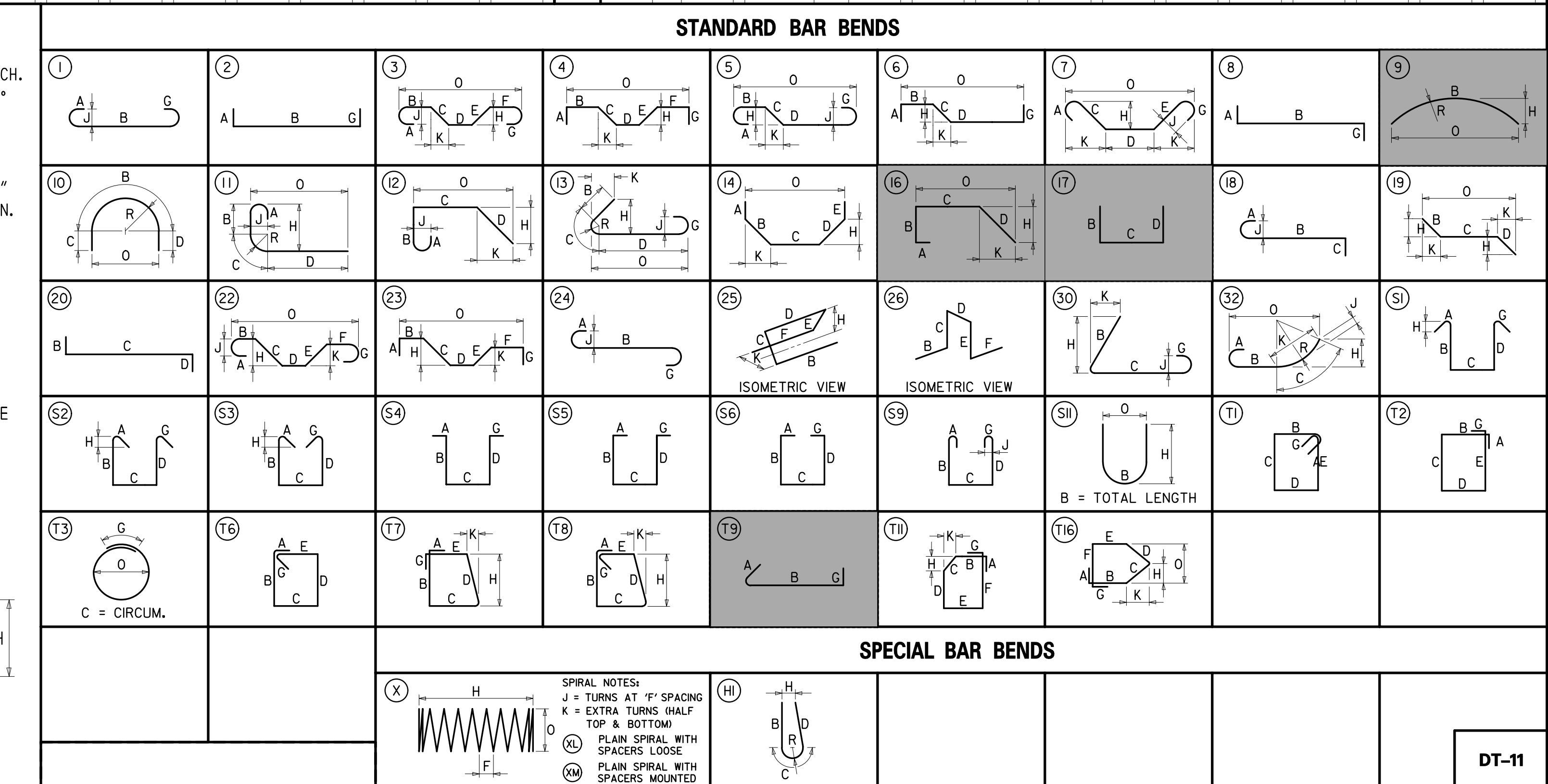
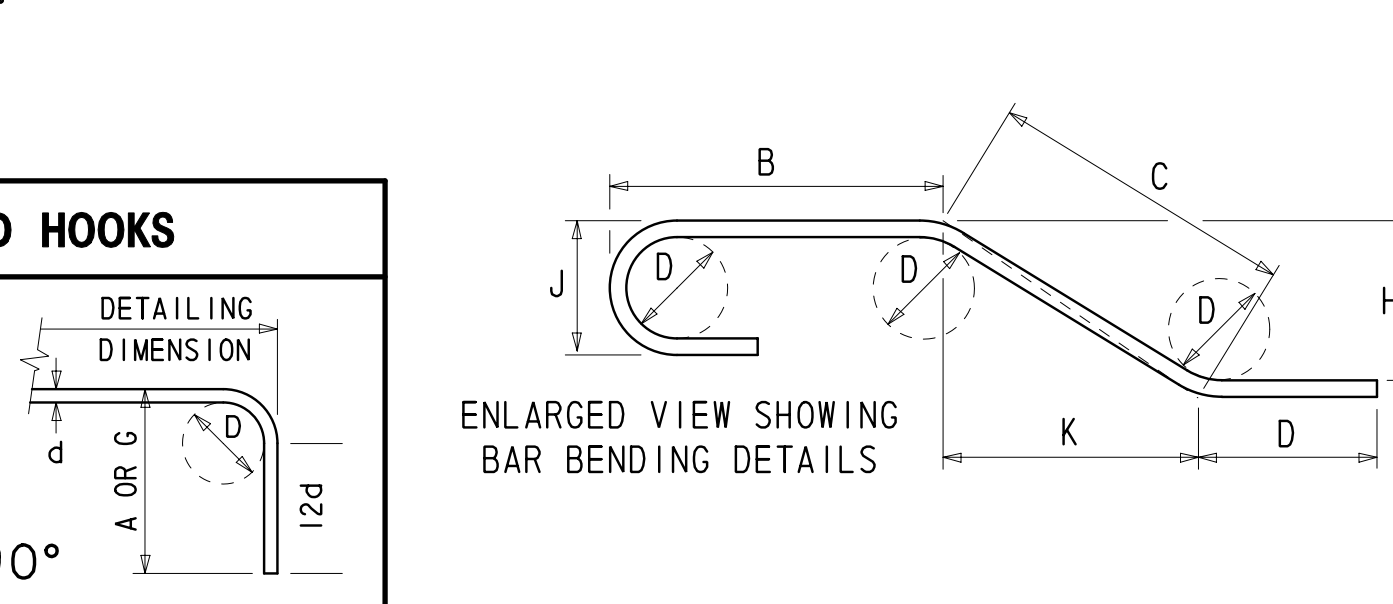
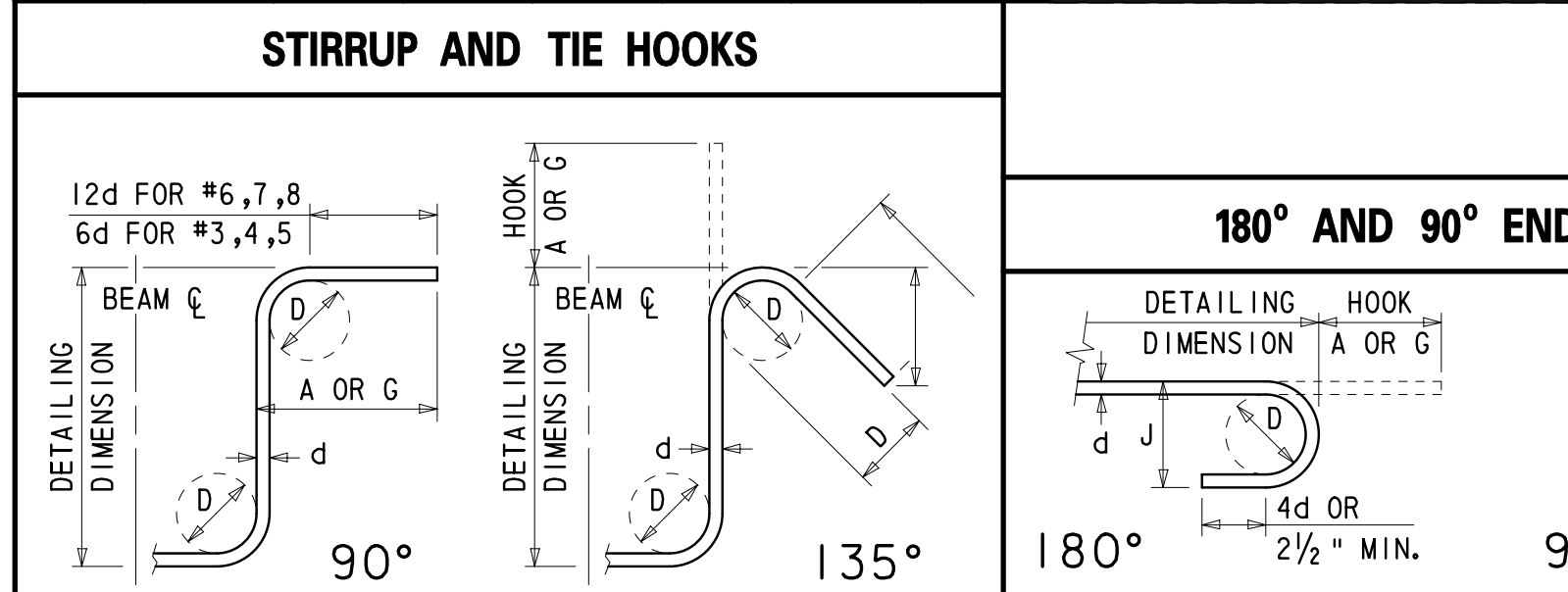
SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES /QUARTER INCH)										
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F/R	G	H	J	K	O
17	5	11-00	FT1501E	STR		11-00									
1X14	5	11-110	FT1502E	17		0-100	1-30	9-100							
		14-30				0-100	1-30	12-20							
76	5	2-52	FT1503E	T9	0-52	1-60					0-60				
2X13	5	13-70	FT1504E	16			11-20	2-50				1-82	1-82	12-102	
		18-20			TO	TO	TO	TO				TO	TO	TO	
1X6	5	11-00	FT1505E	STR		11-00						1-82	1-82	17-52	
		11-100				11-100									
3X5	5	11-00	FT1506E	STR		11-00									
		11-90				11-90									
2X13	5	4-50	FT1507E	16			2-00	2-50				1-82	1-82	3-82	
		8-110			TO	TO	TO	TO				1-82	1-82	8-22	
1X2	5	14-00	FT1508E	17		0-100	1-30	11-110							
		14-30				0-100	1-30	12-20							
1X4	5	6-80	FT1509E	17		0-100	1-30	4-70							
		7-70				0-100	1-30	5-60							
1X3	5	6-90	FT1510E	17		0-100	1-30	4-80							
		7-70				0-100	1-30	5-60							
1X2	5	12-50	FT1511E	17		0-100	1-30	10-40							
		12-70				0-100	1-30	10-60							
1X5	5	12-40	FT1512E	17		0-100	1-30	10-30							
		9-110				0-100	1-30	7-100							
2X13	5	6-80	FT1513E	STR		6-80									
		16-20				16-20									
1X14	6	12-32	FT1601E	16		1-00	1-50	9-102				9-100	0-100	2-30	
		14-72			TO	TO	TO	TO				TO	TO	TO	
1X2	6	14-42	FT1602E	16		1-00	1-50	11-112				12-20	1-00	2-50	
						1-00	1-50	11-112				12-20	1-00	2-50	

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES /QUARTER INCH)										
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F/R	G	H	J	K	O
		TO			TO	TO	TO	TO				TO	TO	TO	
		14-72			TO	1-00	1-50	12-22				12-20	1-00	2-50	
1X4	6	7-01	FT1603E	16		1-00	1-50	4-71				4-70	0-50	1-100	
		7-111			TO	TO	TO	TO				TO	TO	TO	
1X3	6	7-11	FT1604E	16		1-00	1-50	5-61				5-60	0-60	1-100	
		7-111			TO	TO	TO	TO				TO	TO	TO	
1X2	6	12-92	FT1605E	16		1-00	1-50	10-42				10-40	0-100	2-30	
		12-112			TO	TO	TO	TO				TO	TO	TO	
1X5	6	10-31	FT1606E	16		1-00	1-50	7-101				10-60	0-110	2-30	
		12-81			TO	TO	TO	TO				10-60	0-110	2-30	
		11-90				11-90						10-30	0-100	2-10	
17	7	11-00	FT1701E	STR		11-00									
1X6	7	11-00	FT1702E	STR		11-00									
		11-100				11-100									
3X5	7	11-00	FT1703E	STR		11-00									
		11-90				11-90									
16	4	3-60		STR		3-60									
23	5	5-40	HW1501E	16		2-40	0-80	2-40				2-40	0-20	0-100	
9	5	15-33	HW1502E	16			12-100	2-53				1-90	1-90	14-70	
1X9	5	16-03	HW1503E	16			13-00	3-03				2-20	2-20	15-20	
		16-53			TO	TO	TO	TO				TO	TO	TO	
2	5	8-93	HW1504E	16			13-50	3-03				2-20	2-20	15-70	
1	5	12-100	HW1505E	STR		12-100						1-90	1-90	8-10	
1X4	5	6-21	HW1506E	16		2-90	0-80	2-91				2-90	0-30	0-110	
		3-41			TO	TO	0-80	1-41				TO	0-10	0-110	
1X3	5	2-100	HW1507E	16		1-10	0-80	1-10				1-10	0-10	0-90	
		4-40			TO	TO	0-80	1-100				TO	0-20	0-90	
10	5	10-00	HW1508E	STR		10-00									
2	5	6-100	HW1509E	STR		6-100									
1	5	13-20	HW1510E	STR		13-20									

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES /QUARTER INCH)										
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F/R	G	H	J	K	O
1	5	10-40	HW1511E	STR		10-40									
1	5	11-10	HW1512E	STR		11-10									
1	5	4-40	HW1513E	STR		4-40									
1	5	4-80	HW1514E	STR		4-80									
7	5	6-33	HW1515E	16			3-100	2-53					1-90	1-90	5-70
1X7	5	7-33	HW1516E	16			4-30	3-03					2-20	2-20	6-50
		7-53			TO	TO	TO	TO					TO	TO	TO
		4-53	HW1517E	16			4-50	3-03					2-20	2-20	6-70
2	5	11-00	HW1518E	9			2-00	2-53					1-90	1-90	3-90
4	5	11-00	HW1518E	9		11-00				4-90			2-101		8-82

ASTM STANDARD ENGLISH REINFORCING BARS				RECOMMENDED END HOOKS, APPLICABLE TO ALL GRADES				STIRRUP AND TIE HOOKS, APPLICABLE TO ALL GRADES			
BAR SIZE	NOMINAL DIMENSIONS			180° HOOKS		90° HOOKS		90° HOOK		135° HOOK	
	DIAMETER (INCHES)	AREA (INCHES <sup>2</sup> )	WEIGHT (LBS./FT.)	D	A OR G	J	A OR G	D	A OR G	A OR G	A OR G
3	0.375	0.110	0.376	2 1/4"	5"	3"	6"	1 1/2"	4"	4"	2 1/2"
4	0.500	0.200	0.668	3"	6"	4"	8"	2"	4 1/2"	4 1/2"	3"
5	0.625	0.310	1.043	3 3/4"	7"	5"	10"	2 1/2"	6"	5 1/2"	3 3/4"
6	0.750	0.440	1.502	4 1/2"	8"	6"	1-0"	4 1/2"	1-0"	8"	4 1/2"
7	0.875	0.600	2.044	5 1/4"	10"	7"	1-2"	5 1/4"	1-2"	9"	5 1/4"
8	1.000	0.790	2.670	6"	11"	8"	1-4"	6"	1-4"	10 1/2"	6"
9	1.128	1.000	3.400	9 1/2"	1-3"	11 3/4"	1-7"				
10	1.270	1.270	4.303	10 3/4"	1-5"	1-1 1/4"	1-10"				
11	1.410	1.560	5.313	1-0"	1-7"	1-2 3/4"	2-0"				
14	1.693	2.250	7.650	1-6 1/4"	2-3"	1-9 3/4"	2-7"				
18	2.257	4.000	13.600	2-0"	3-0"	2-4 1/2"	3-5"				

- NOTES:  
 1. FIGURES SHOWN IN CIRCLES REPRESENT BAR BEND TYPES.  
 2. STANDARD BAR BENDS INCLUDE ONLY THOSE TYPES BELOW, INDICATED AS SUCH.  
 3. ALL DIMENSIONS OUT-TO-OUT, EXCEPT "A" AND "C" ON STD. 180° AND 135° HOOKS.  
 4. "J" DIMENSIONS ON 180° HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE, OTHERWISE STANDARD 'ACI' HOOKS ARE TO BE USED.  
 5. WHERE "J" IS NOT SHOWN, "J" WILL BE KEPT EQUAL TO OR LESS THAN "H" ON TYPES 3, 5 AND 22. WHERE "J" CAN EXCEED "H", IT SHALL BE SHOWN.  
 6. "H" DIMENSIONS OF STIRRUPS TO BE SHOWN AS NEEDED TO FIT WITHIN THE CONCRETE.  
 7. UNLESS OTHERWISE NOTED, DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR (EXCEPT FOR BEND TYPES 11 AND 13).  
 8. WHERE SLOPE DIFFERS FROM 45° OFFSET, "H" AND "K" MUST BE SHOWN.  
 9. WHERE BARS ARE TO BE BENT MORE ACCURATELY THAN STANDARD BENDING TOLERANCES, BENDING DIMENSIONS REQUIRING CLOSER FABRICATION SHOULD HAVE LIMITS INDICATED.  
 10. FOR RECOMMENDED DIAMETER "D", OF BENDS, HOOKS, ETC., REFER TO TABLE ABOVE, 'CRS1' OR 'ACI' TABLES WHERE APPLICABLE AND REQUIRED.  
 11. TYPE S1-S6, S11, T1-T3 AND T6-T9 APPLICABLE TO BAR SIZES #3 THROUGH #8.



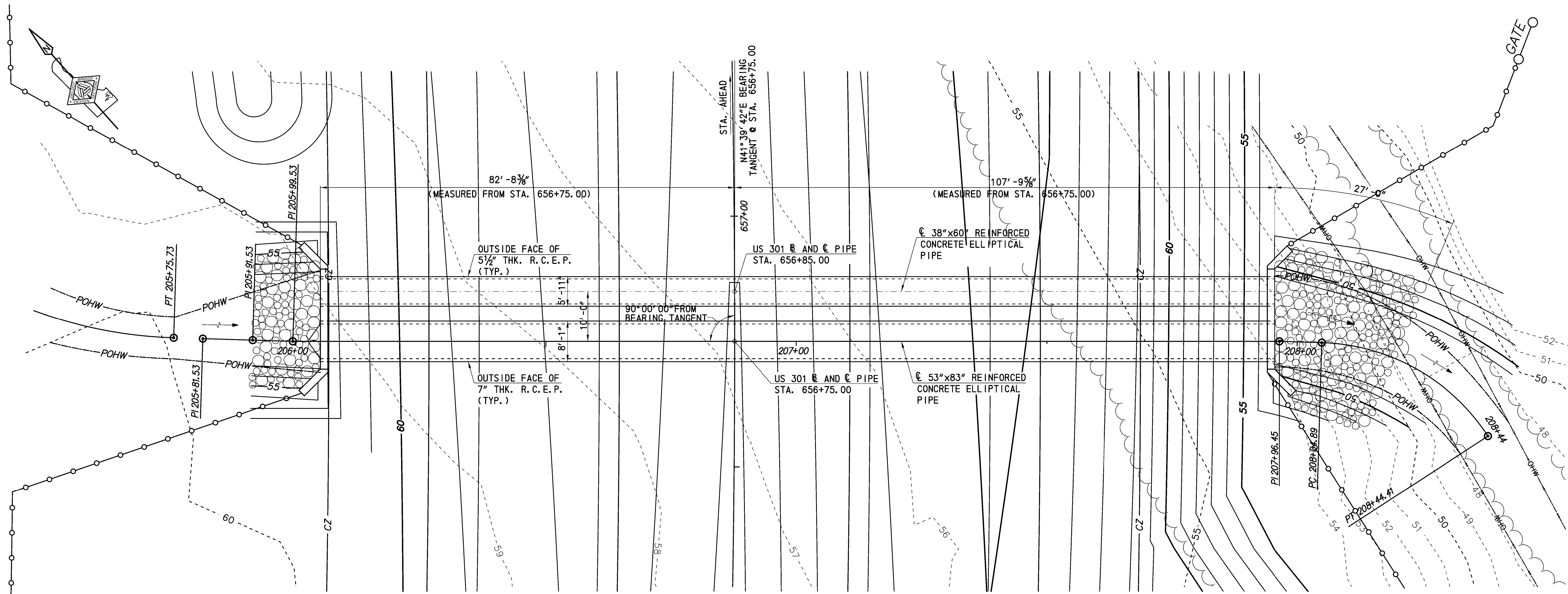
- ① ANY MARK NUMBER WITH SUFFIX 'E' DENOTES EPOXY COATED REINFORCING STEEL.  
 ② ALL MARK 'LOCATION PREFIXES' SHALL CONSIST OF TWO LETTERS AND ARE AS FOLLOWS: AB = ABUTMENT, AS = APPROACH SLAB, BC = BOX CULVERT, BW = BACKWALL, CL = COLUMN, DK = DECK, DL = DOWEL, FT = FOOTING, HW = HEADWALL, MS = MISC. BARS, PA = PARAPET, PR = PIER, SC = SHEETPILE CAP, SL = SLAB, TW = TOEWALL, WL = WALL (UNIQUE LOCATION), WW = WINGWALL

QTY.	SIZE	LENGTH	BENDING DIMENSIONS (FEET-INCHES /QUARTER INCH)																	
			MARK	TYPE	A	B	C	D	E	F/R	G	H	J	K	O					
19	5	11-00	FT0501E	STR		11-00														
1X16	5	12-110	FT0502E	17		0-100	1-30	10-100												
		TO			TO	TO	TO													
		15-40			0-100	1-30	13-30													
82	5	2-52	FT0503E	T9	0-52	1-60														
2X13	5	15-50	FT0504E	16			13-00	2-50					1-82		1-82		14-82			
		TO		TO	TO	TO						TO		TO		TO				
		20-10			17-80	2-50							1-82		1-82		19-42			
2X6	5	11-00	FT0505E	STR		11-00														
		TO			TO	TO	TO													
		11-90			11-90															
2X5	5	11-00	FT0506E	STR		11-00														
		TO			TO	TO	TO													
		11-70			11-70															
2X13	5	5-50	FT0507E	16			3-00	2-50					1-82		1-82		4-82			
		TO		TO	TO	TO						TO		TO		TO				
		9-110			7-60	2-50							1-82		1-82		9-22			
1X2	5	15-00	FT0508E	17		0-100	1-30	12-110												
		TO			TO	TO	TO													
		15-30			0-100	1-30	13-20													
1X4	5	6-80	FT0509E	17		0-100	1-30	4-70												
		TO			TO	TO	TO													
		7-70			0-100	1-30	5-60													
1X3	5	6-90	FT0510E	17		0-100	1-30	4-80												
		TO			TO	TO	TO													
		7-70			0-100	1-30	5-60													
1X2	5	12-50	FT0511E	17		0-100	1-30	10-40												
		TO			TO	TO	TO													
		12-80			0-100	1-30	10-70													
1X6	5	12-50	FT0512E	17		0-100	1-30	10-40												
		TO			TO	TO	TO													
		10-110			0-100	1-30	8-100													
2X13	5	6-80	FT0513E	STR		6-80														
		TO			TO	TO	TO													
		16-20			16-20															
1X16	6	13-32	FT0601E	16		1-00	1-50	10-102				10-100		100		2-30				
		TO		TO	TO	TO						TO		TO		TO				
		15-82			1-00	1-50	13-32						13-30		1-00		2-50			
1X2	6	15-42	FT0602E	16		1-00	1-50	12-112				12-110		1-00		2-50				
		TO			1-00	1-50	12-112						1-00		2-50					

QTY.	SIZE	LENGTH	BENDING DIMENSIONS (FEET-INCHES /QUARTER INCH)																			
			MARK	TYPE	A	B	C	D	E	F/R	G	H	J	K	O							
		TO			TO	TO	TO	TO														
		15-72			1-00	1-50	13-22															
1X4	6	7-01	FT0603E	16		1-00	1-50	4-71				4-70		0-50	1-100							
		TO		TO	TO	TO	TO				TO		TO		TO							
		7-111			1-00	1-50	5-61															
1X3	6	7-11	FT0604E	16		1-00	1-50	4-81				4-80		0-50	1-100							
		TO		TO	TO	TO	TO				TO		TO		TO							
		7-111			1-00	1-50	5-61															
1X2	6	12-92	FT0605E	16		1-00	1-50	10-42				10-40		0-100	2-30							
		TO		TO	TO	TO	TO				TO		TO		TO							
		13-02			1-00	1-50	10-72															
1X6	6	11-31	FT0606E	16		1-00	1-50	8-101				8-100		0-80	2-10							
		TO		TO	TO	TO	TO				TO		TO		TO							
		12-91			1-00	1-50	10-41															
19	7	11-00	FT0701E	STR		11-00																
2X6	7	11-00	FT0702E	STR		11-00																
		TO			TO	TO	TO															
		11-90			11-90																	
2X5	7	11-00	FT0703E	STR		11-00																
		TO			TO	TO	TO															
		11-70			11-70																	
16	4	3-60	HW0401E	STR		3-60																
26	5	5-40	HW0501E	16		2-40	0-80	2-40				2-40		0-20	0-100							
10	5	17-33	HW0502E	16			14-100	2-53				1-90		1-90	16-70							
1X10	5	18-13	HW0503E	16			15-10	3-03				2-20		2-20	17-30							
		TO		TO	TO	TO	TO				TO		TO		TO							
		18-83			15-80	3-03						2-20		2-20	17-100							
2	5	9-93	HW0504E	16			7-40	2-53				1-90		1-90	9-10							
		1	5	14-100	HW0505E	STR		14-100														
		1X4	5	7-60	HW0506E	16		3-50	0-80	3-50			3-50		0-30	0-110						
TO			TO	TO	TO	TO					TO		TO		TO							
4-61			1-110	0-80	1-111						1-110		0-20	0-110								
1X3	5	4-00	HW0507E	16		1-80	0-80	1-80				1-80		0-10	0-90							
		TO		TO	TO	TO	TO				TO		TO		TO							
		4-60			1-110	0-80	1-110					1-110		0-20	0-90							
10	5	10-00	HW0508E	STR		10-00																

QTY.	SIZE	LENGTH	BENDING DIMENSIONS (FEET-INCHES /QUARTER INCH)																			
			MARK	TYPE	A	B	C	D	E	F/R	G	H	J	K	O							
2X2	5	4-90	HW0509E	STR		4-90																
TO																						
7-40																						
1	5	15-30	HW0510E	STR		15-30																
1	5	10-70	HW0511E	STR		10-70																
1	5	11-30	HW0512E	STR		11-30																
1	5	5-30	HW0513E	STR		5-30																
1	5	5-70	HW0514E	STR		5-70																
8	5	7-33	HW0515E	16			4-100	2-53				1-90		1-90	6-70							
1X8	5	7-103	HW0516E	16			4-100	3-03				2-20		2-20	7-00							
		TO		TO	TO	TO	TO				TO		TO		TO							
		8-53			5-50	3-03						2-20		2-20	7-70							
2	5	3-53	HW0517E	16			1-00	2-53				1-90		1-90	2-90							
4	5	11-00	HW0518E	9		11-00		4-90				2-101										

BAR SIZE	NOMINAL DIMENSIONS			180° HOOKS				90° HOOKS			
	DIAMETER (INCHES)	AREA (INCHES <sup>2</sup> )	WEIGHT (LBS./FT.)	D		A OR G		D		A OR G	
	D	A OR G	J	A OR G	D	A OR G	A OR G	A OR G			
3	0.375	0.110	0.376	2 1/4"	5"	3"	6"	1 1/2"	4"	4"	2 1/2"
4	0.500	0.200	0.668	3"	6"	4"	8"	2"	4 1/2"	4 1/2"	3"
5	0.625	0.310	1.043	3 3/4"	7"	5"	10"	2 1/2"	6"	5 1/2"	3 3/4"
6	0.750	0.440	1.502	4 1/2"	8"	6"	1-0"	4 1/2"	1-0"	8"	4 1/2"
7	0.875	0.600	2.044	5 1/4"	10"	7"	1-2"	5 1/4"	1-2"	9"	5 1/4"
8	1.000	0.790	2.670	6"	11"	8"	1-4"	6"	1-4"	10 1/2"	6"
9	1.128	1.000	3.400	9 1/2"	1-3"	11 3/4"	1-7"				



PLAN  
SCALE: 1"=10'

**HYDRAULIC DATA**  
**38"x60" R.C.E.P**

DRAINAGE AREA = 0.17 SQUARE MILES  
 50 YEAR FLOOD ELEVATION = 55.6  
 50 YEAR DESIGN DISCHARGE = 67 C.F.S.  
 VELOCITY AT Q 50 = 10.3 F.P.S.  
 100 YEAR FLOOD ELEVATION = 56.4  
 100 YEAR DESIGN DISCHARGE = 88 C.F.S.  
 VELOCITY AT Q 100 = 12.3 F.P.S.  
 PROPOSED OPENING = 12.4 S.F.

**HYDRAULIC DATA**  
**53"x83" R.C.E.P**

DRAINAGE AREA = 0.17 SQUARE MILES  
 50 YEAR FLOOD ELEVATION = 55.6  
 50 YEAR DESIGN DISCHARGE = 128 C.F.S.  
 VELOCITY AT Q 50 = 5.8 F.P.S.  
 100 YEAR FLOOD ELEVATION = 56.4  
 100 YEAR DESIGN DISCHARGE = 153 C.F.S.  
 VELOCITY AT Q 100 = 6.9 F.P.S.  
 PROPOSED OPENING = 22 S.F.

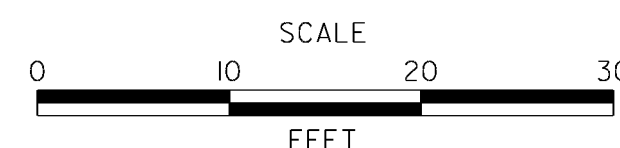
INDEX OF SHEETS PIPE CULVERT AT 656+75.00		
SHEET NO.	DWG. NO.	TITLE
78	BRI-444A-01	SITE PLAN
79	BRI-444A-02	ELEVATION AND QUANTITIES
80	BRI-444A-03	STAKE OUT PLAN AND INLET PLAN AND ELEVATION
81	BRI-444A-04	STAKE OUT PLAN AND OUTLET PLAN AND ELEVATION
82	BRI-444A-05	INLET AND OUTLET WALL SECTIONS
83	BRI-444A-06	REINFORCEMENT BAR LIST (1 OF 2)
84	BRI-444A-07	REINFORCEMENT BAR LIST (2 OF 2)

**NOTES:**

- BELOW ORDINARY HIGH WATER LINE: RIPRAP AND RIFFLE GRADE CONTROL MATERIAL PER PLANS. PLACE TOP OF RIPRAP TO MATCH INVERT OF PIPE. CHOKe RIPRAP OR RIFFLE GRADE MATERIAL VOIDS WITH BORROW, TYPE B. PLACE CHANNEL BED FILL TO MATCH CHANNEL BED ELEVATIONS. DO NOT PLACE CHANNEL BED FILL INSIDE PIPE.
- ABOVE ORDINARY HIGH WATER LINE: RIPRAP PER PLANS. CHOKe RIPRAP VOIDS WITH ITEM 302012-DELAWARE NO. 57 STONE. FILL REMAINING VOIDS WITH TOPSOIL SO THAT THE RIPRAP IS BARELY VISIBLE. REGARDLESS OF DEPTH, THIS SHALL BE PAID FOR UNDER ITEM 733001-TOPSOILING, 4" DEPTH. PLACE ADDITIONAL 4" TOPSOIL, STREAM BANK SEED MIX AND SOIL RETENTION BLANKET MULCH, TYPE 5. TOPSOIL DEPTH TRANSITION TO BE INCIDENTAL TO TOPSOIL/TOPSOILING ITEM.
- SEE ENVIRONMENTAL COMPLIANCE SHEETS FOR ADDITIONAL DETAILS.
- FOR QUANTITIES, SEE SHEET 2 OF 7.
- FOR EXCAVATION AND BACKFILL SECTIONS, SEE SHEET 3 OF 7.



ADDENDUMS / REVISIONS

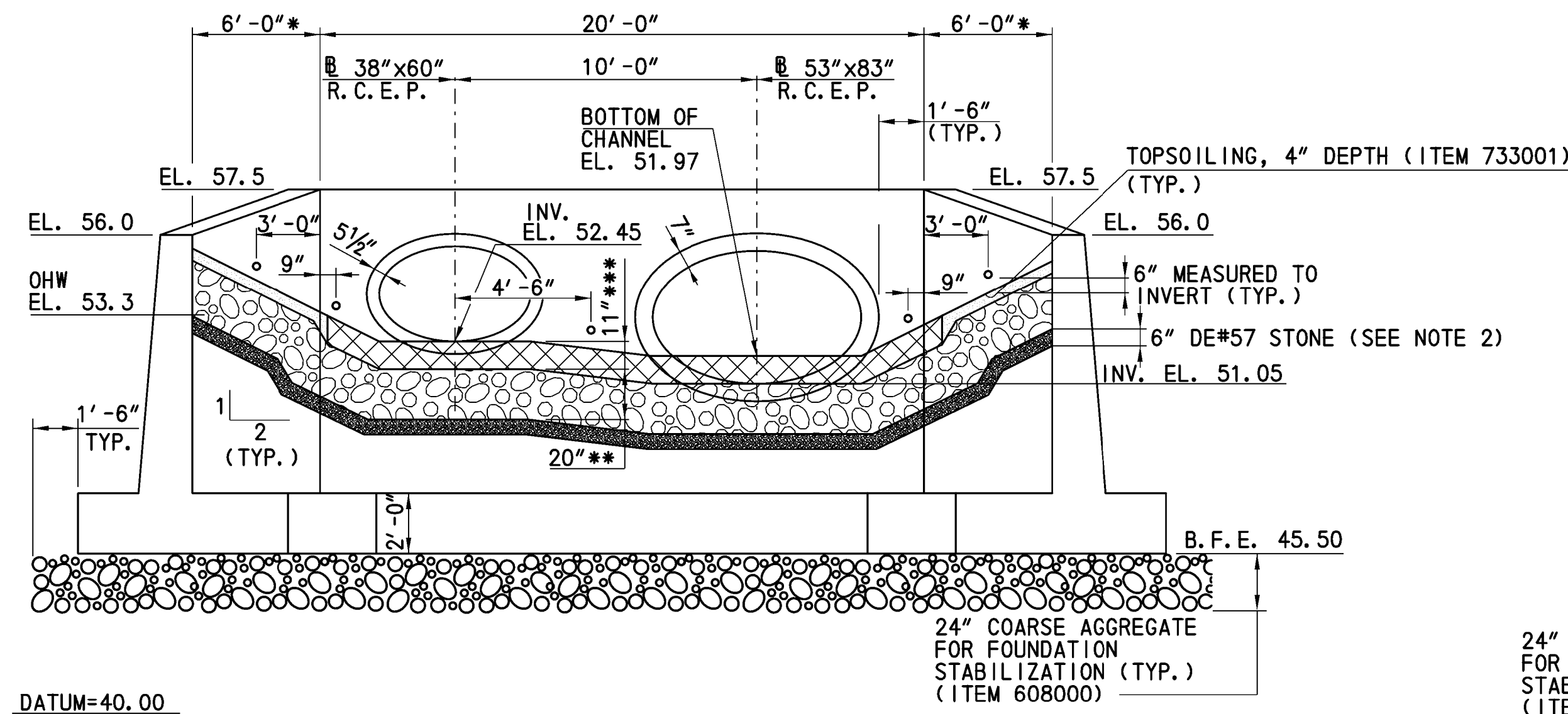


US 301  
NORFOLK SOUTHERN RR TO SR 896

CONTRACT T200911301	BRIDGE NO. 1-444A
COUNTY NEW CASTLE	DESIGNED BY: CCJ
	CHECKED BY: JFM

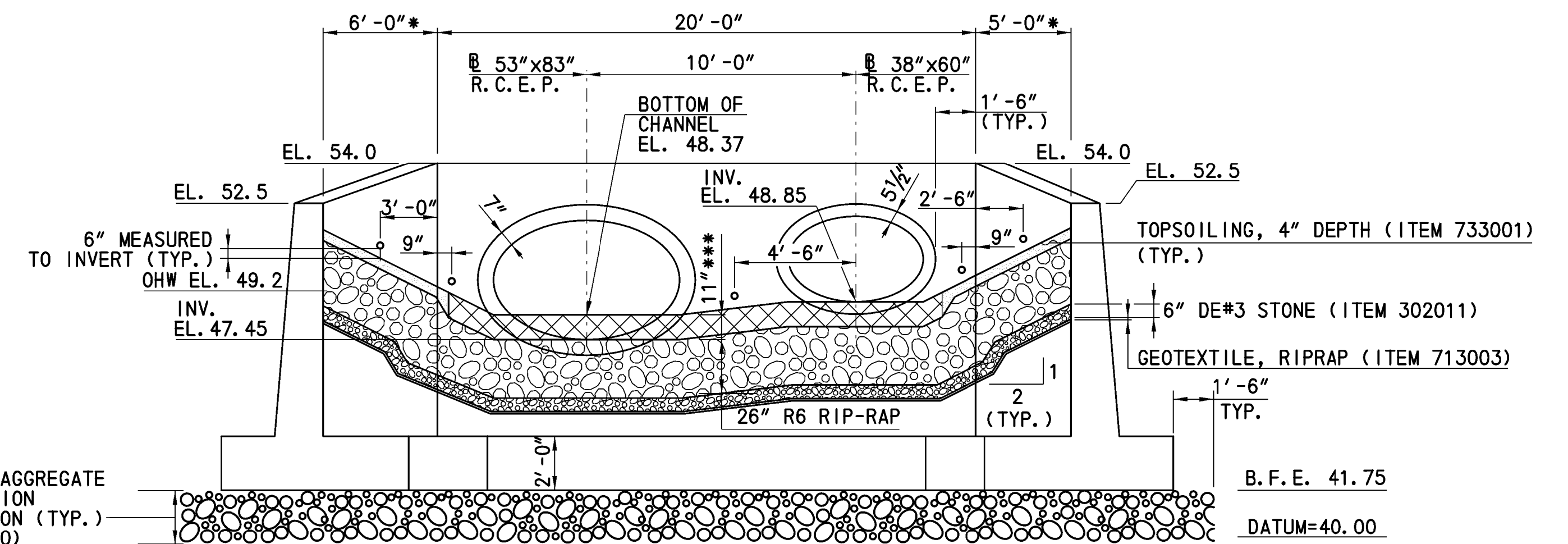
SITE PLAN PIPE CULVERT STA. 656 + 75.00	SHEET NO. 78
	TOTAL SHTS. 240

QUANTITIES			
ITEM NO.	NAME	UNITS	QUANTITY
612215	REINFORCED CONCRETE ELLIPTICAL PIPE, 38"x60", CLASS IV	L.F.	190
612229	REINFORCED CONCRETE ELLIPTICAL PIPE, 53"x83", CLASS IV	L.F.	190
207000	EXCAVATION AND BACKFILL FOR STRUCTURES	C.Y.	470
208000	EXCAVATION AND BACKFILL FOR PIPE TRENCHES	C.Y.	720
	BORROW, TYPE C (AVAILABLE FROM BORROW SITE EXCAVATION)	C.Y.	740
302011	DELAWARE No. 3 STONE	TON	31
602001	PORTLAND CEMENT CONCRETE MASONRY, CLASS A	C.Y.	31
602002	PORTLAND CEMENT CONCRETE MASONRY, CLASS B	C.Y.	58
604000	BAR REINFORCEMENT, EPOXY COATED	L.B.	9,000
608000	COARSE AGGREGATE FOR FOUNDATION STABILIZATION AND SUBFOUNDATION BACKFILL	TON	162
713003	GEOTEXTILES, RIPRAP	S.Y.	87
712022	RIPRAP, CLASS R-6	TON	128
712531	CHANNEL BED FILL	C.Y.	25
733001	TOPSOILING (4" DEPTH)	S.Y.	7
302012	DELAWARE NO. 57 STONE	TON	11



**INLET  
ELEVATION**  
SCALE: 1/4"=1'-0"

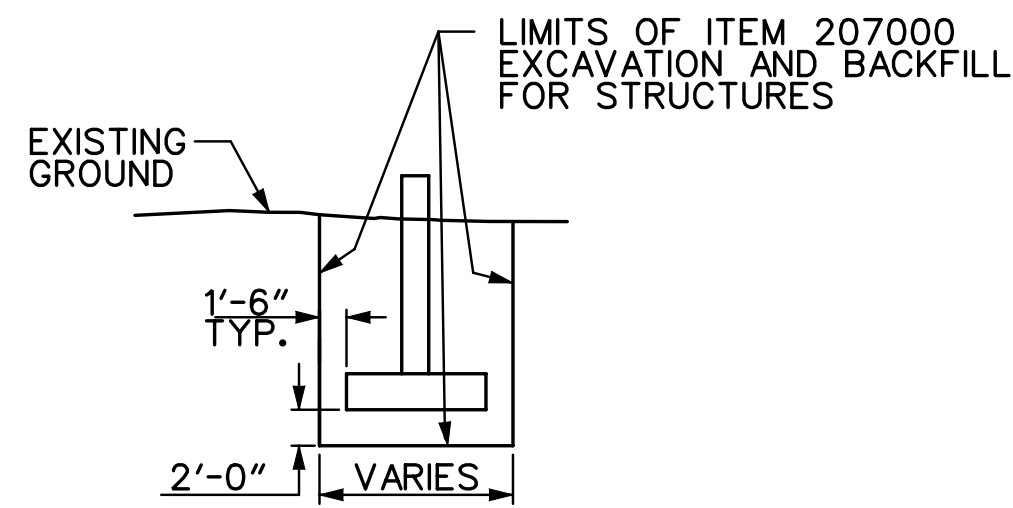
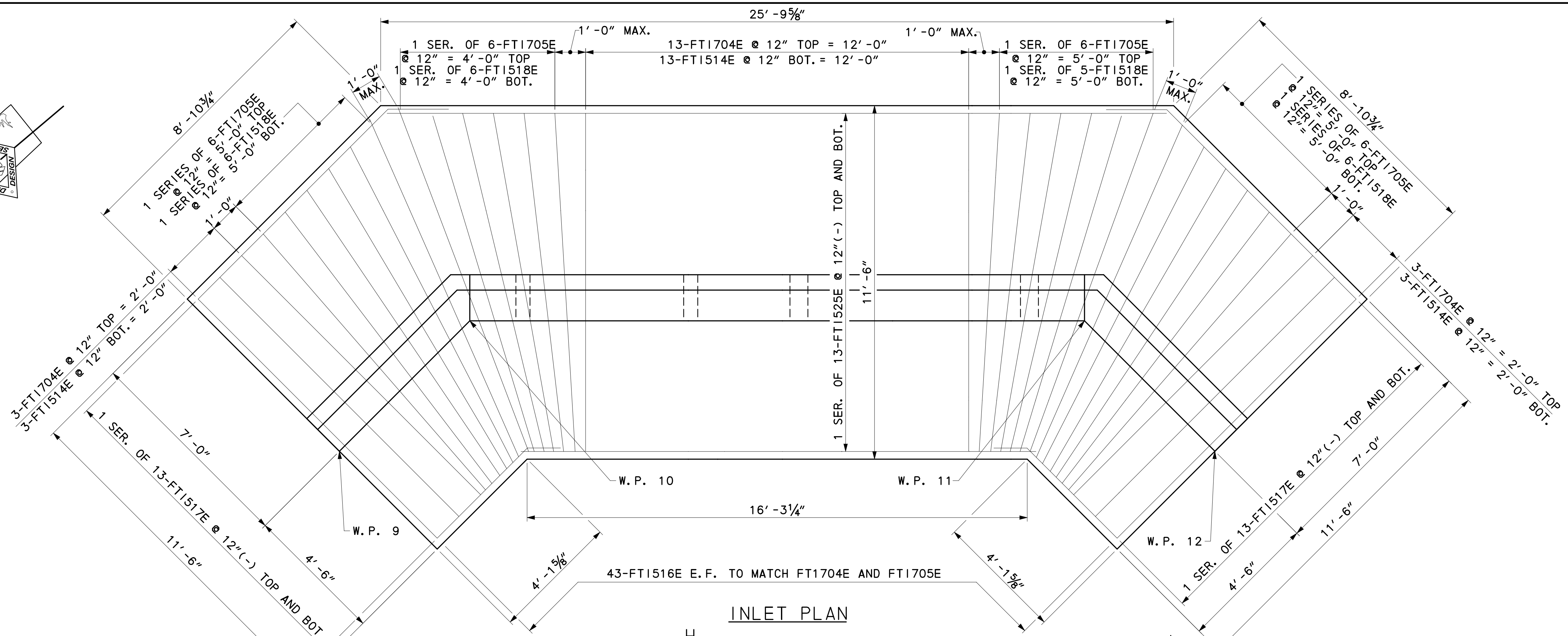
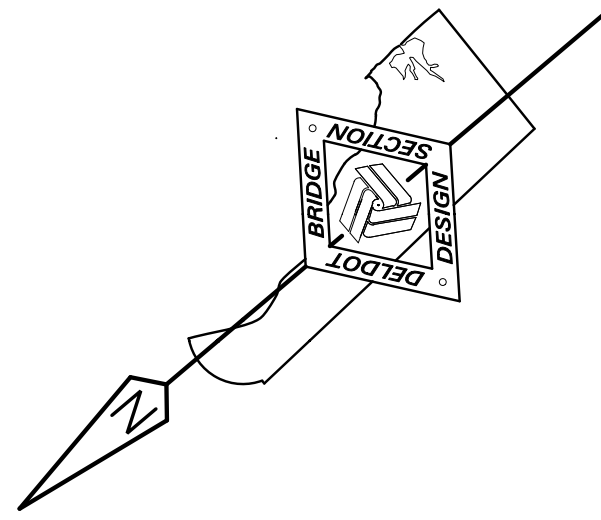
\* MEASURED ALONG FRONT FACE.  
\*\* RIFFLE GRADE CONTROL MATERIAL-SEE STREAM RELOCATION DETAILS.  
\*\*\* CHANNEL BED FILL



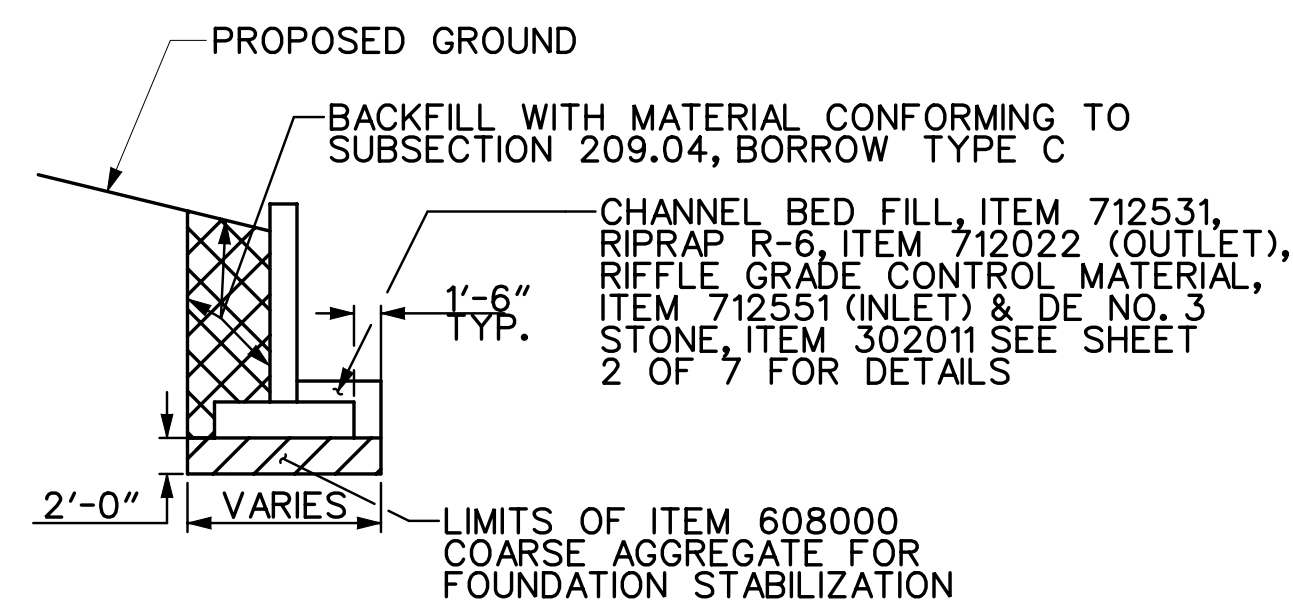
**OUTLET  
ELEVATION**  
SCALE: 1/4"=1'-0"

**NOTES:**

- FOR EXCAVATION AND BACKFILL SECTIONS, SEE SHEET 3 OF 7.
- QUANTITIES FOR DE NO. 57 STONE, ITEM 302011, CHANNEL BED FILL, ITEM 712531 AND RIFFLE GRADE CONTROL MATERIAL, ITEM 712531 AT THE INLET HAVE BEEN INCLUDED WITH THE STREAM RELOCATION DETAILS AND ARE NOT INCLUDED IN THE QUANTITIES SHOWN ON THIS SHEET.



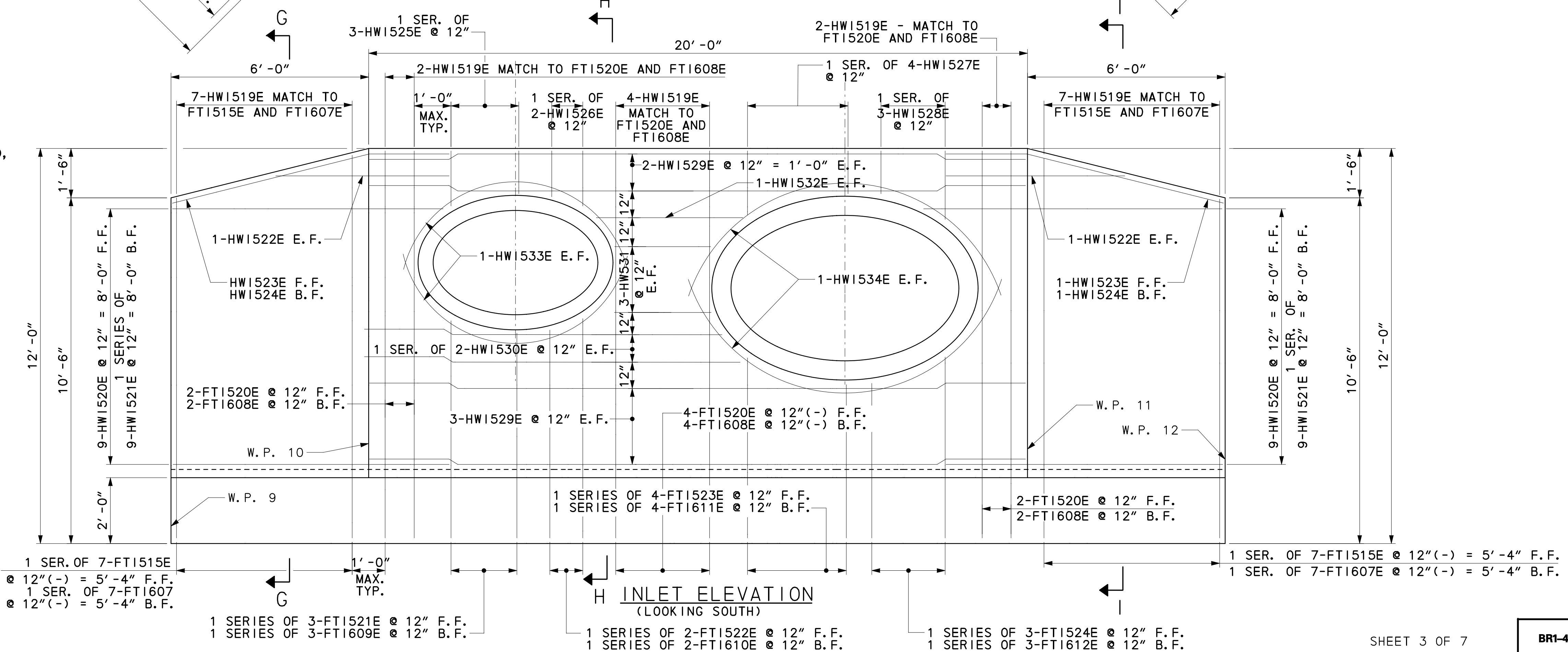
EXCAVATION



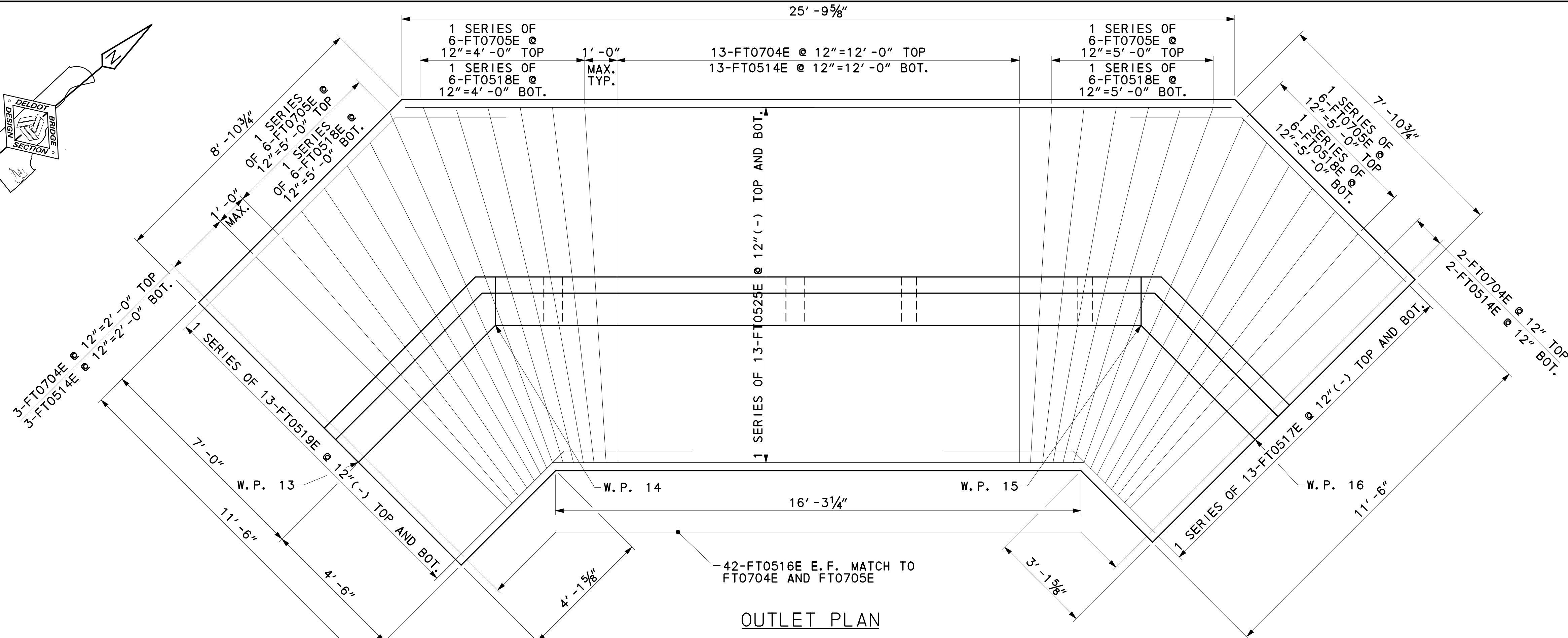
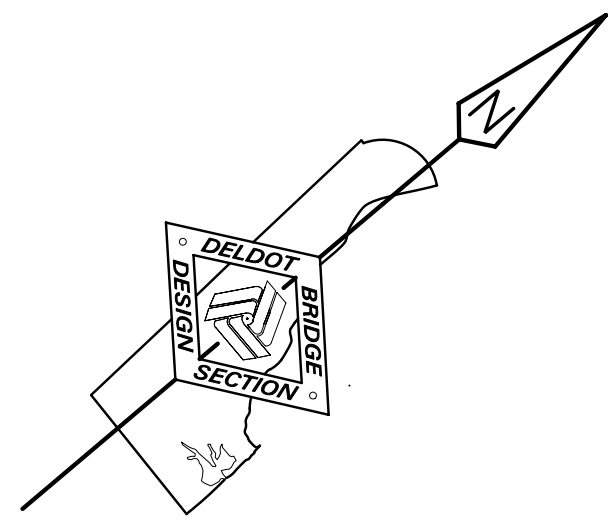
BACKFILL

WORK POINT COORDINATES		
W. P.	CONSTRUCTION US 301 MAINLINE	
	STATION	OFFSET
9	656+94.26	86.87' L
10	656+89.87	82.65' L
11	656+69.30	82.68' L
12	656+64.92	86.92' L

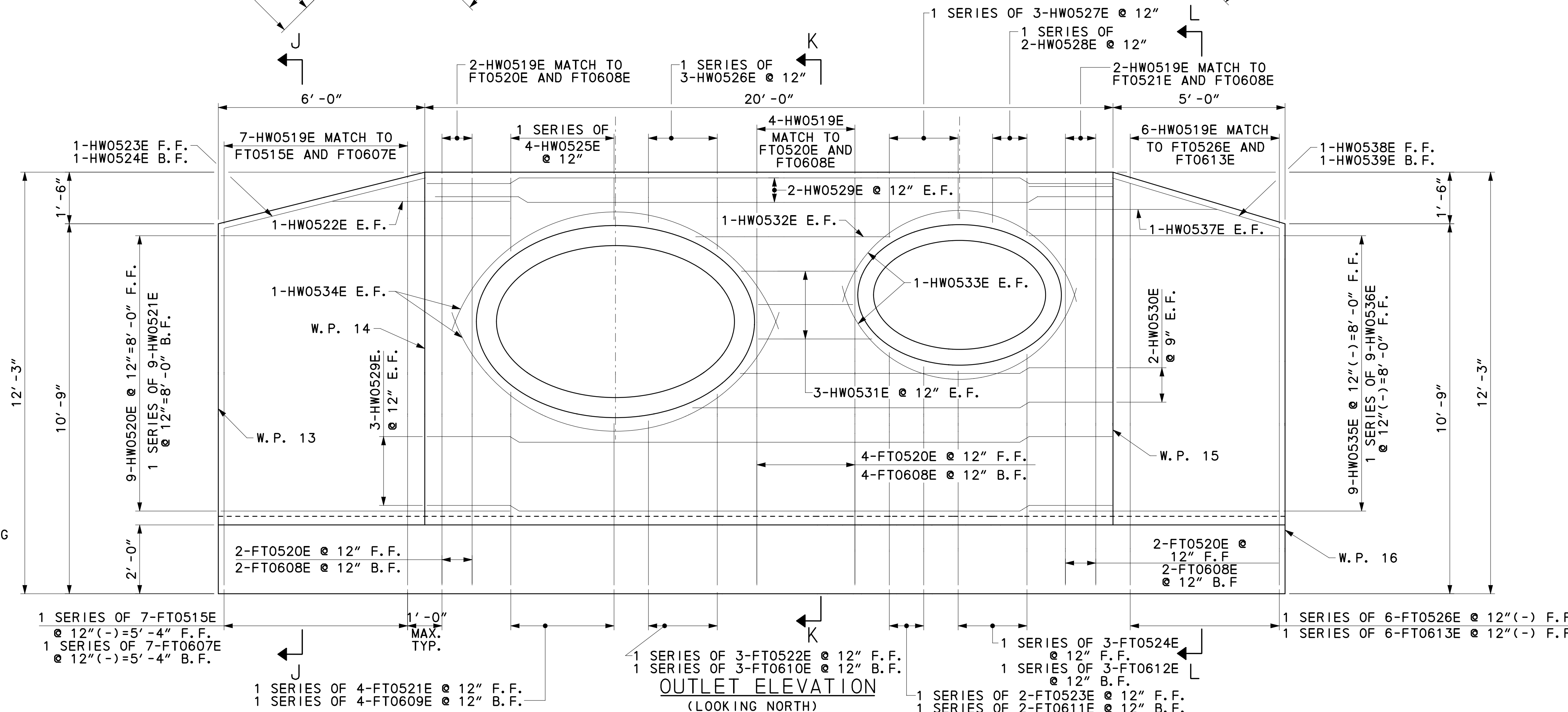
- NOTES**
- VERTICAL WALL REINFORCING IN FOOTING NOT SHOWN FOR CLARITY.
  - FOR SECTIONS G-G, H-H, AND I-I, SEE SHEET 5 OF 7.
  - FOR WEEP HOLE LOCATIONS, SEE SHEET 2 OF 7.
  - STEM CONCRETE SHALL BE CLASS A CONCRETE AND FOOTING CONCRETE SHALL BE CLASS B CONCRETE.



H INLET ELEVATION (LOOKING SOUTH)



OUTLET PLAN



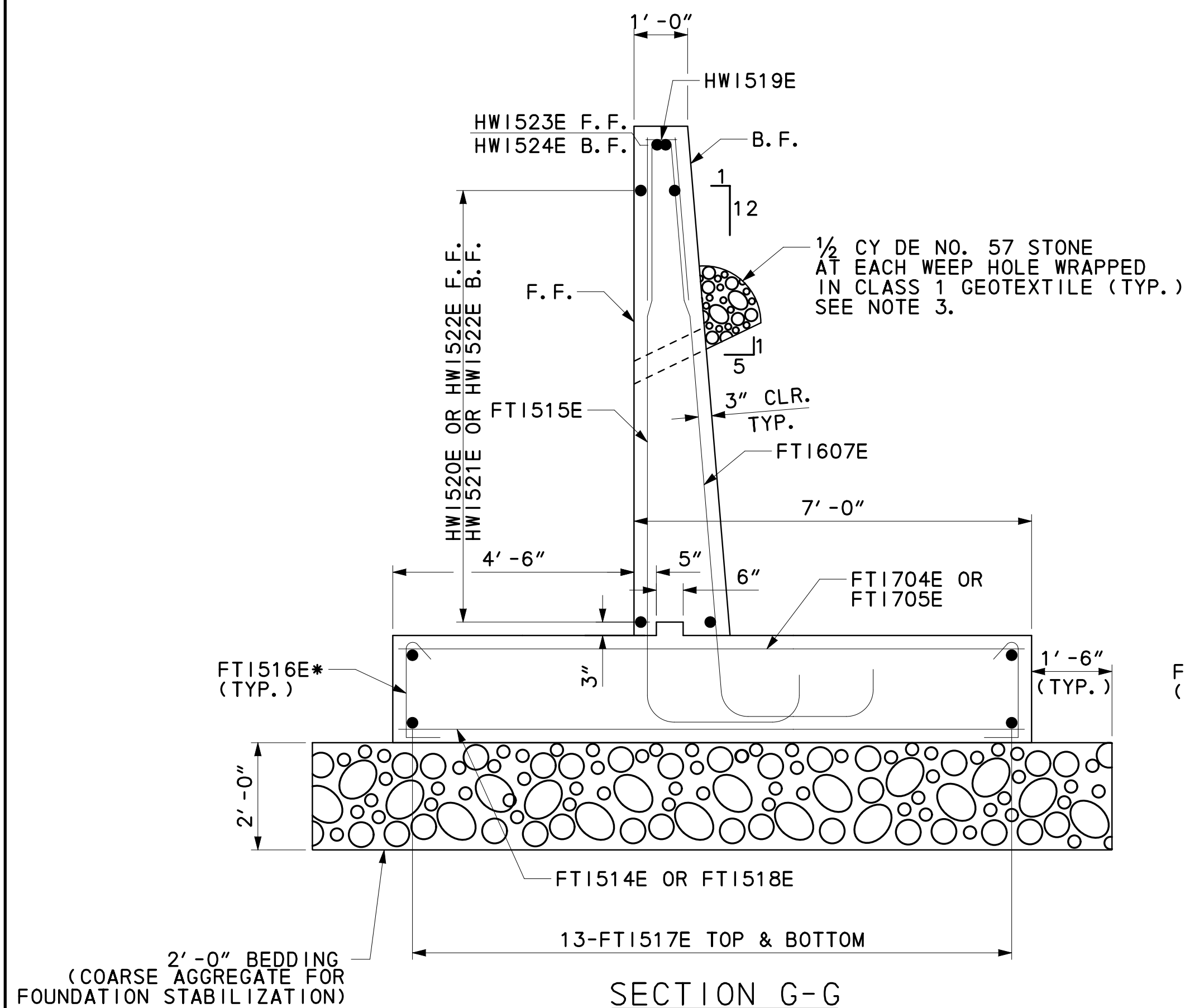
OUTLET ELEVATION  
(LOOKING NORTH)

WORK POINT COORDINATES		
W. P.	CONSTRUCTION US 301 MAINLINE	
	STATION	OFFSET
13	656+65.57	112.07' R
14	656+69.65	107.82' R
15	656+88.96	107.84' R
16	656+92.35	111.40' R

NOTES

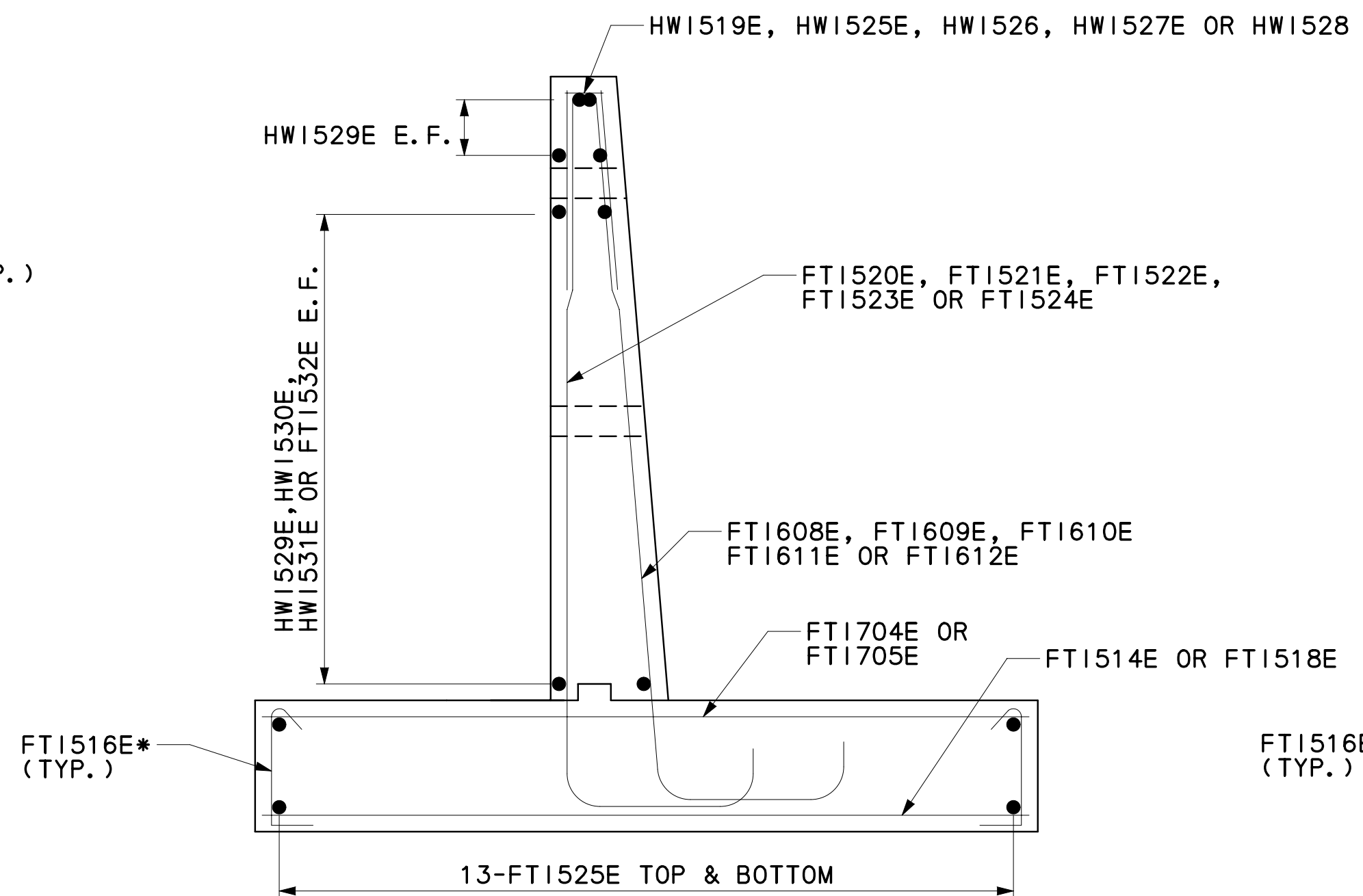
1. VERTICAL WALL REINFORCING IN FOOTING NOT SHOWN FOR CLARITY.
2. FOR SECTIONS J-J, K-K, AND L-L, SEE SHEET 5 OF 7.
3. FOR WEEP HOLE LOCATIONS, SEE SHEET 2 OF 7.
4. STEM CONCRETE SHALL BE CLASS A CONCRETE AND FOOTING CONCRETE SHALL BE CLASS B CONCRETE.



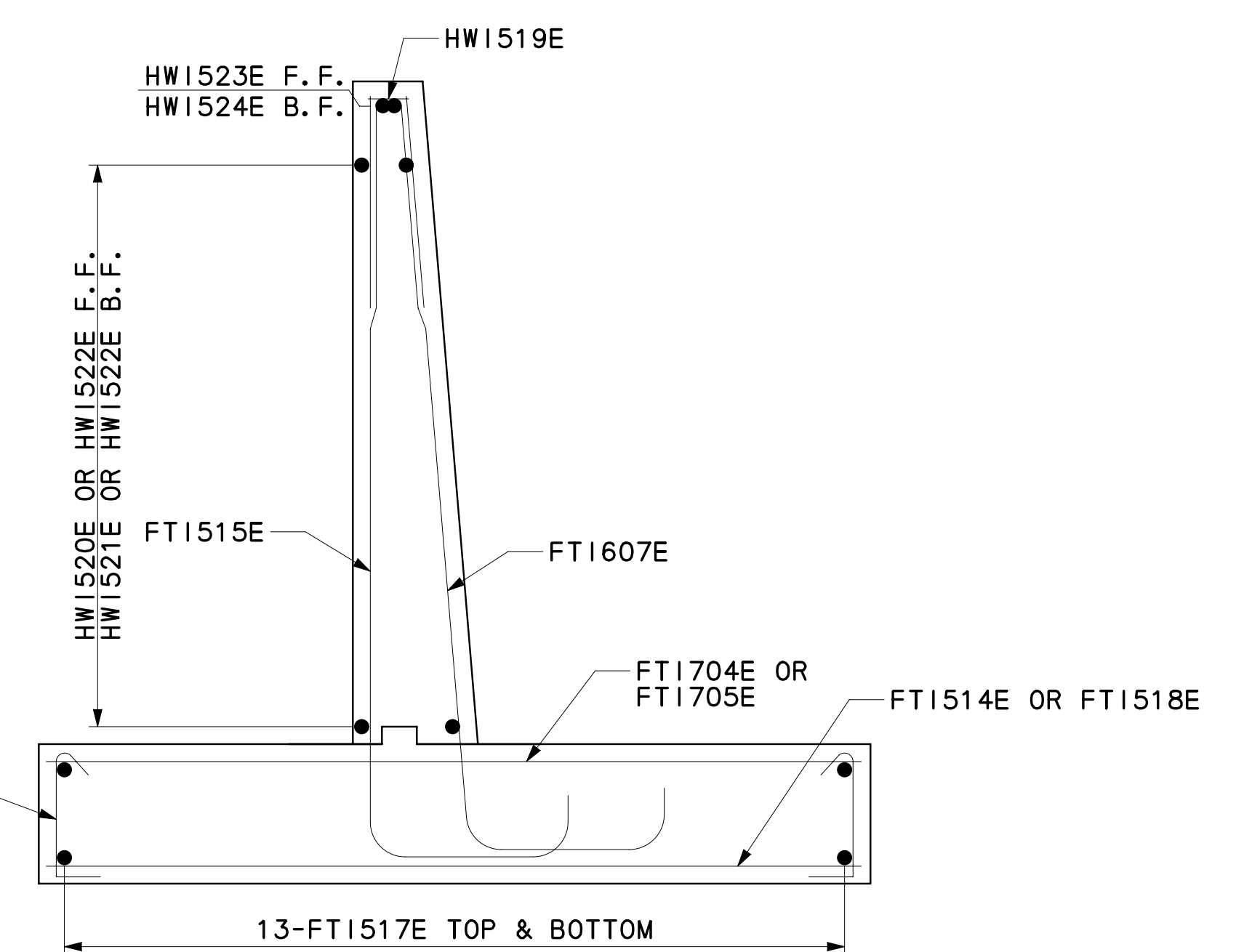


SECTION G-G

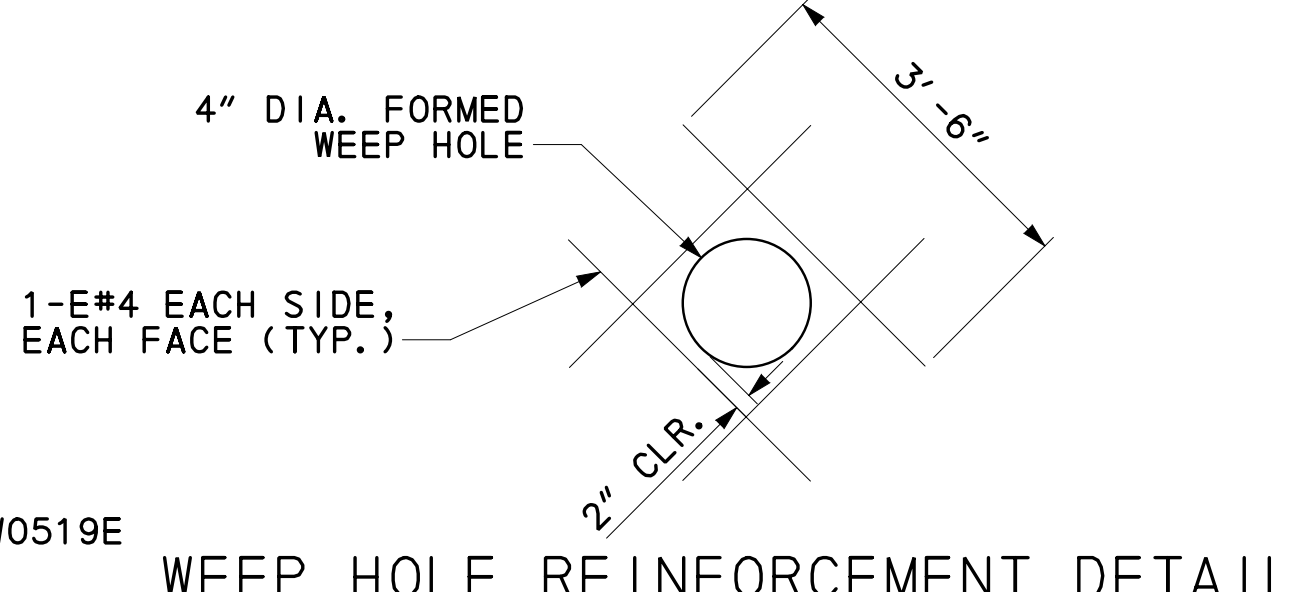
THE DETAILS SHOWN IN SECTION G-G THAT ARE NOT SHOWN IN OTHER SECTIONS ON SHEET ARE TYP. UNLESS NOTED OTHERWISE



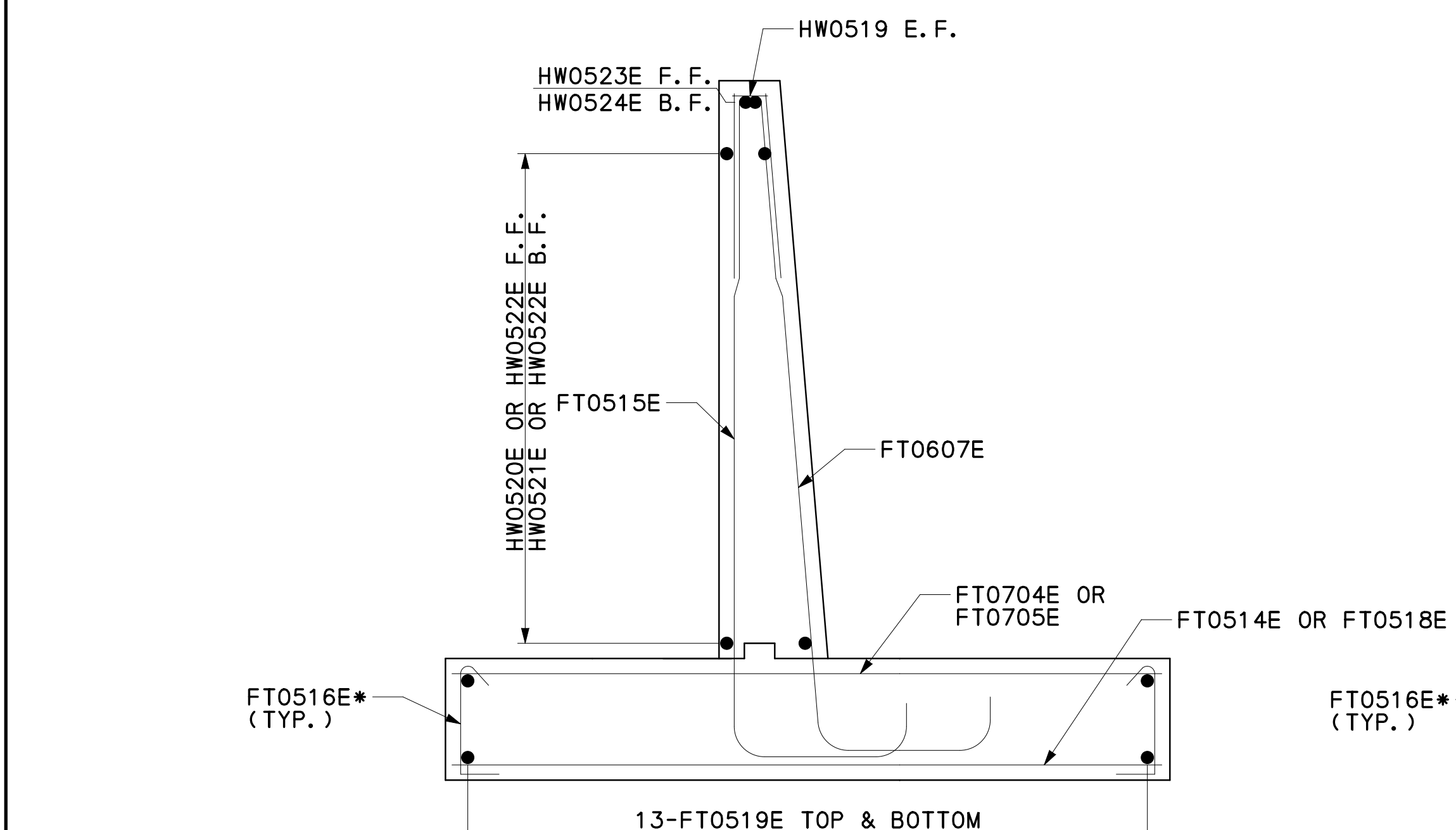
SECTION H-H



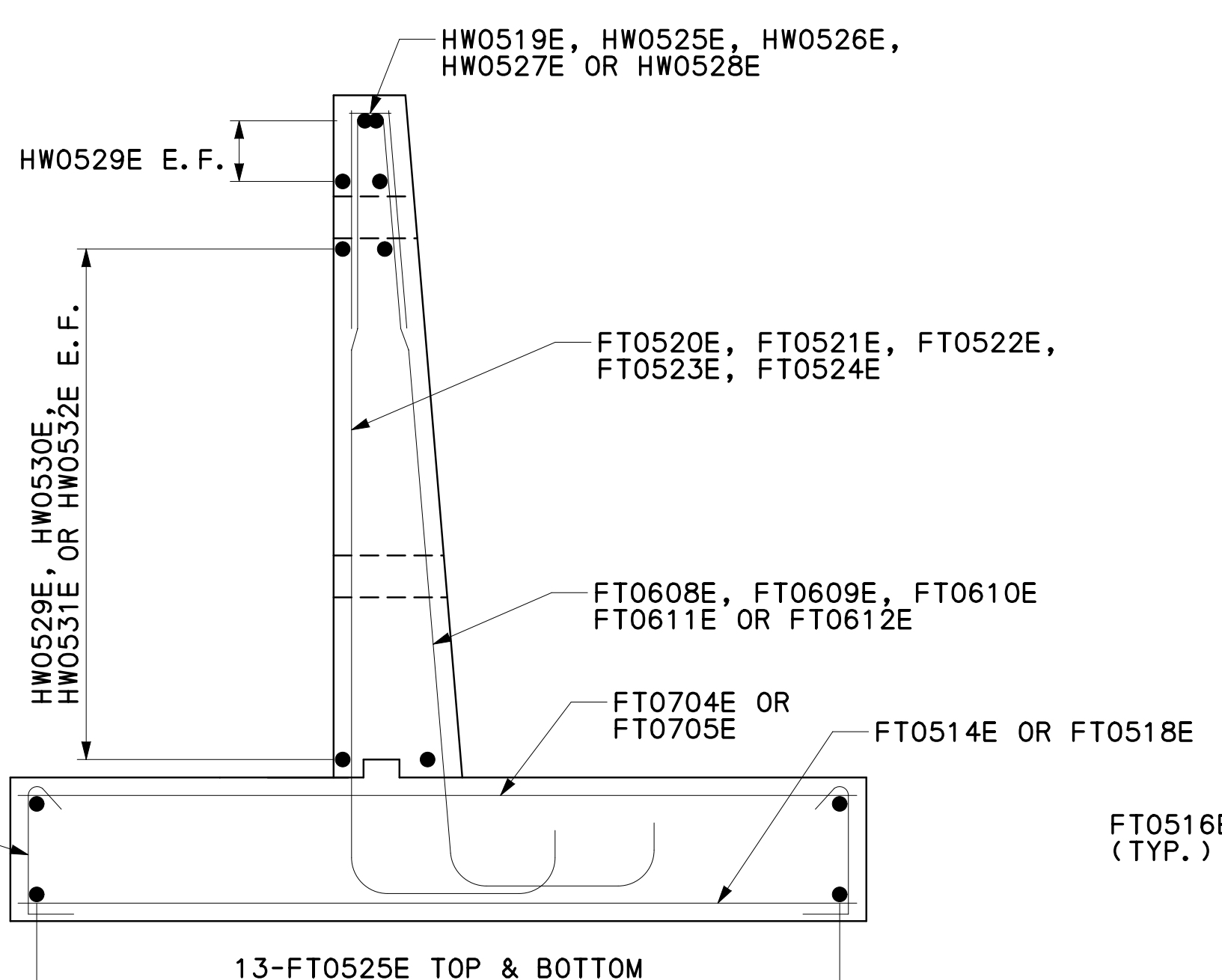
SECTION I-I



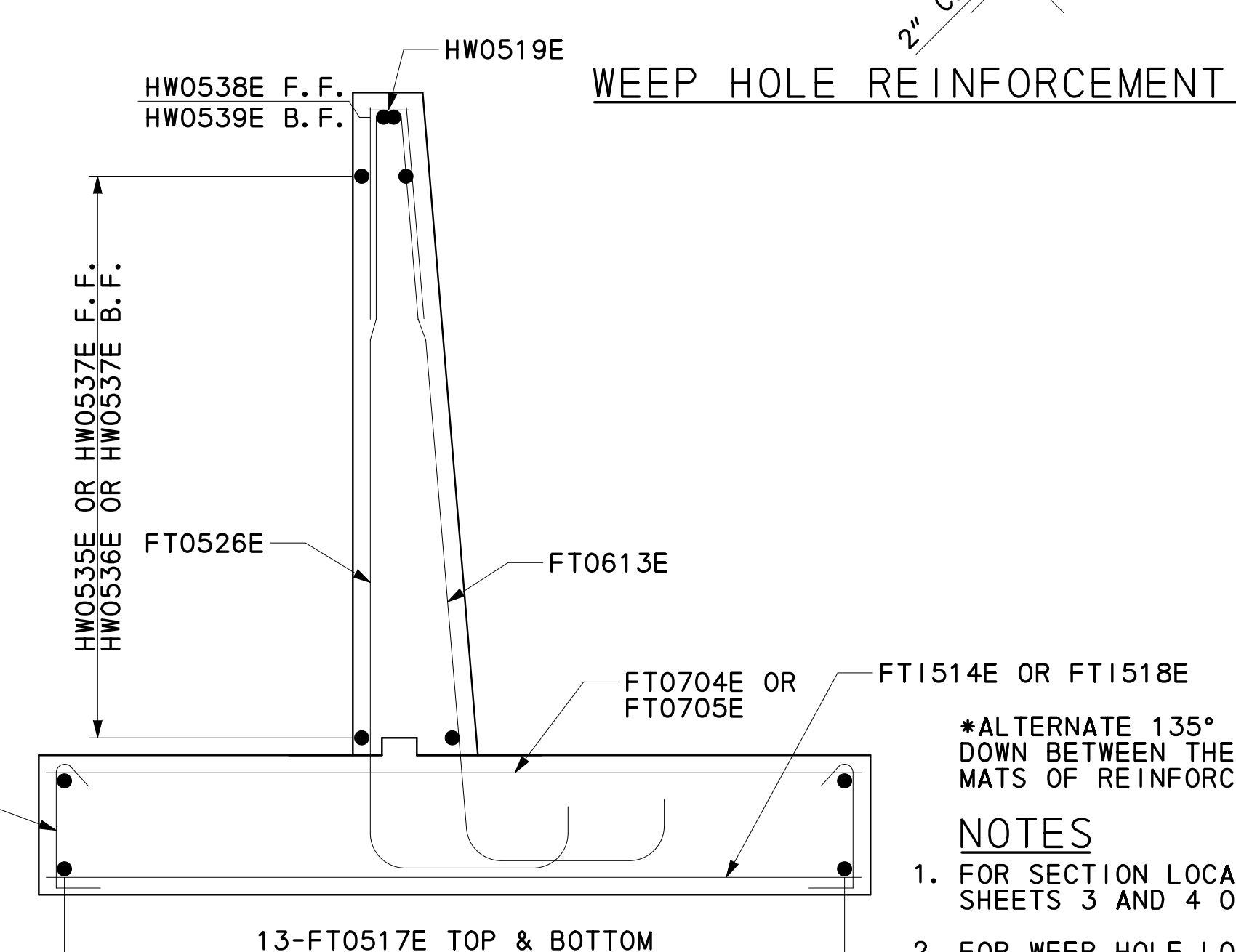
WEEP HOLE REINFORCEMENT DETAIL



SECTION J-J



SECTION K-K



SECTION L-L

- NOTES**
- \*ALTERNATE 135° HOOK UP AND DOWN BETWEEN THE TOP AND BOT. MATS OF REINFORCING
  - 1. FOR SECTION LOCATIONS SEE SHEETS 3 AND 4 OF 7.
  - 2. FOR WEEP HOLE LOCATIONS, SEE SHEET 2 OF 7.
  - 3. COST FOR CLASS 1 GEOTEXTILE INCIDENTAL TO COST FOR DE NO. 57 STONE.



① ANY MARK NUMBER WITH SUFFIX 'E' DENOTES EPOXY COATED REINFORCING STEEL.

② ALL MARK 'LOCATION PREFIXES' SHALL CONSIST OF TWO LETTERS AND ARE AS FOLLOWS: AB = ABUTMENT, AS = APPROACH SLAB, BC = BOX CULVERT, BW = BACKWALL, CL = COLUMN, DK = DECK, DL = DOWEL, FT = FOOTING, HW = HEADWALL, MS = MISC. BARS, PA = PARAPET, PR = PIER, SC = SHEETPILE CAP, SL = SLAB, TW = TOEWALL, WL = WALL (UNIQUE LOCATION), WW = WINGWALL

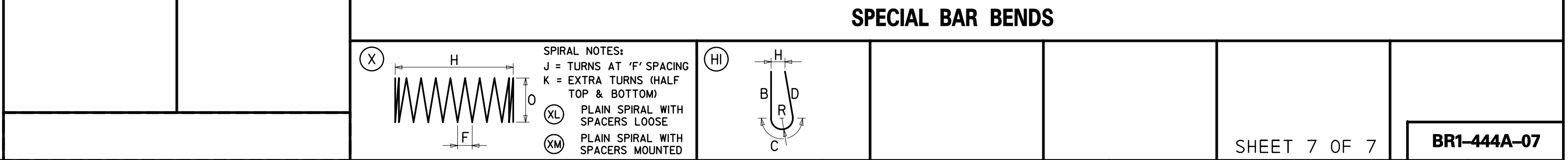
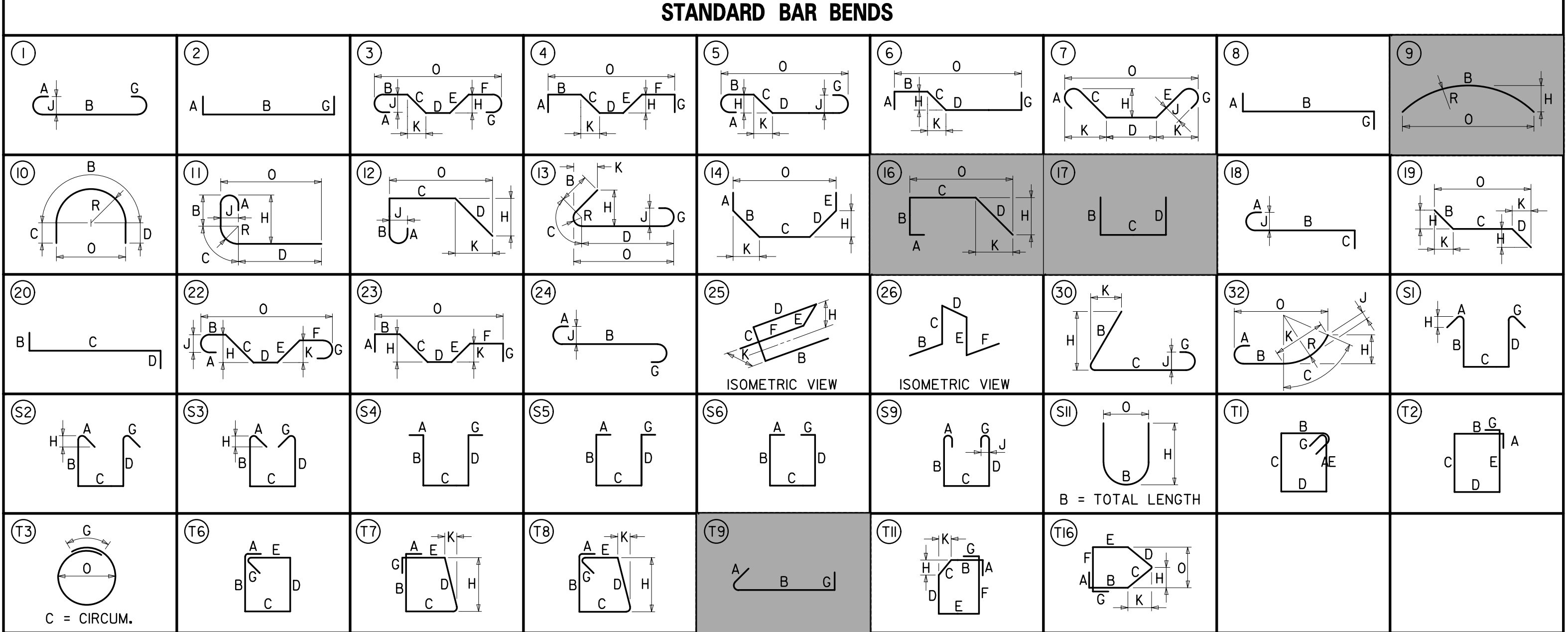
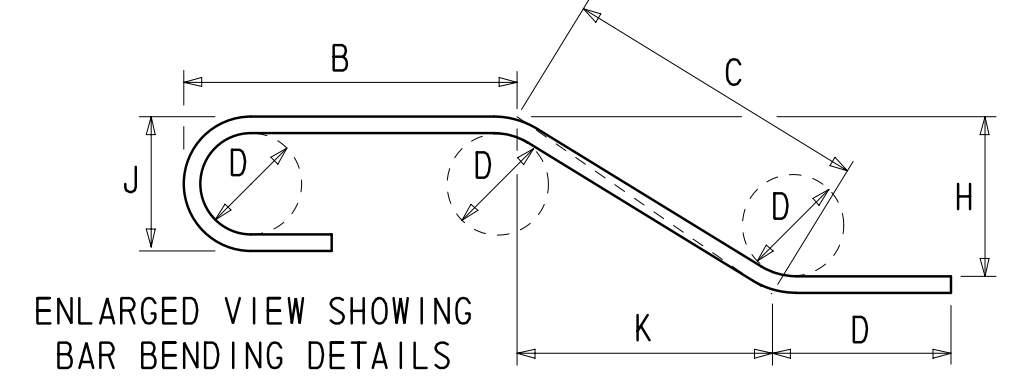
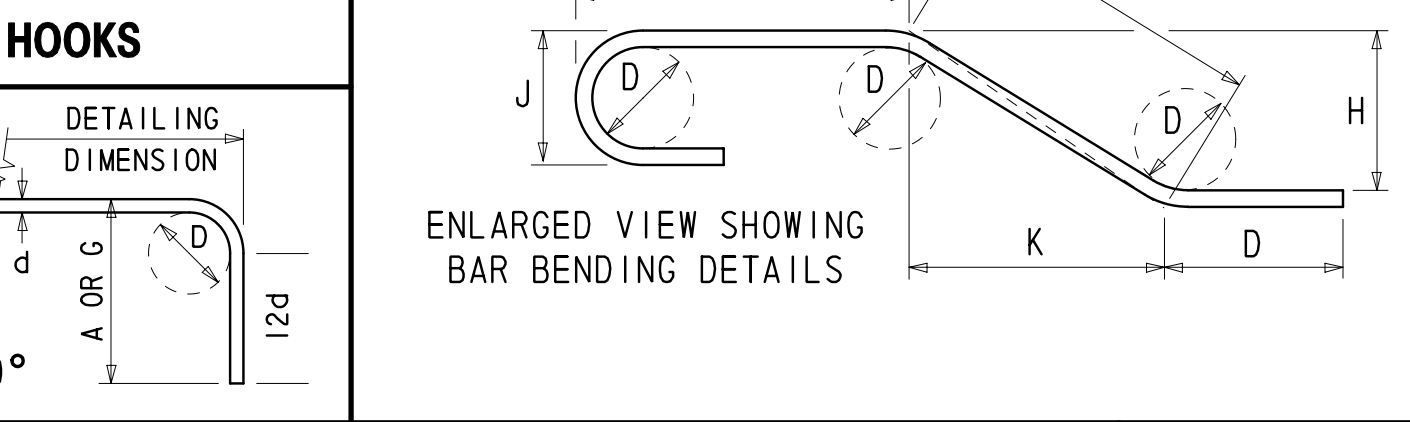
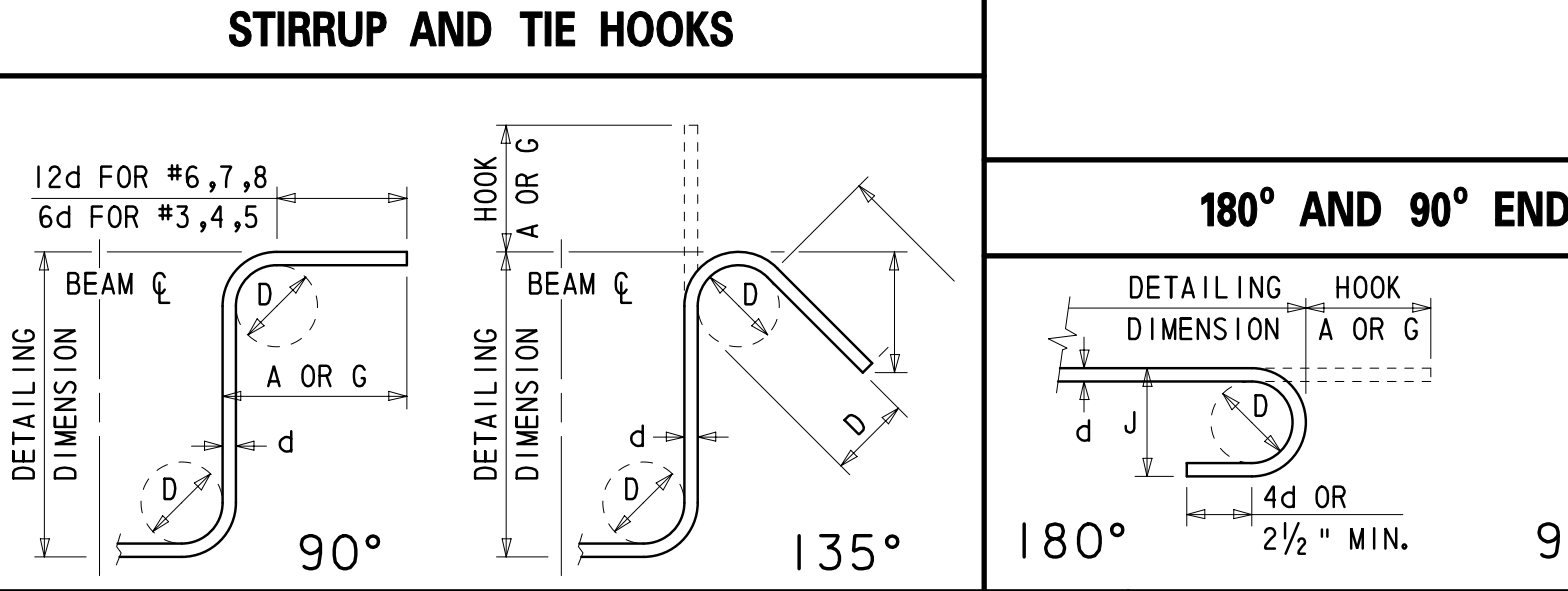
SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES /QUARTER INCH)										
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F/R	G	H	J	K	O
18	5	11-00	FT0514E	STR		11-00									
1X7	5	12-50	FT0515E	17		0-100	1-30	10-40							
		13-90				0-100	1-30	11-80							
84	5	2-52	FT0516E	T9	0-52	1-60					0-60				
2X13	5	5-40	FT0517E	16			3-00	2-40				1-80			4-80
		9-100			TO	TO	TO	TO				TO	TO	TO	
4X6	5	11-00	FT0518E	STR		11-00						1-80			9-20
		11-90				11-90									
2X13	5	6-41	FT0519E	16			4-00	2-41				1-80		1-80	5-80
		10-101			TO	TO	TO	TO				TO	TO	TO	
8	5	13-110	FT0520E	17		0-100	1-30	11-100							
1X4	5	6-90	FT0521E	17		0-100	1-30	4-80							
		7-80				0-100	1-30	5-70							
1X3	5	6-100	FT0522E	17		0-100	1-30	4-90							
		7-70				0-100	1-30	5-60							
1X2	5	8-50	FT0523E	17		0-100	1-30	6-40							
		8-100				0-100	1-30	6-90							
1X3	5	8-30	FT0524E	17		0-100	1-30	6-20							
		8-90				0-100	1-30	6-80							
2X13	5	16-40	FT0525E	STR		16-40									
		25-70				25-70									
1X6	5	12-50	FT0526E	17		0-10	1-30	10-40							
		13-90				0-10	1-30	11-80							
1X7	6	12-91	FT0607E	16		1-00	1-50	10-41				10-40		0-90	2-20
		14-11				1-00	1-50	11-81				11-80		0-110	2-40
8	6	14-30	FT0608E	16		1-00	1-50	11-100				11-100			1-50
1X4	6	7-11	FT0609E	16		1-00	1-50	4-81				4-80			1-100
					TO	TO	TO	TO				TO	TO	TO	

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES /QUARTER INCH)										
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F/R	G	H	J	K	O
		8-01				1-00	1-50	5-71				5-70			1-100
1X3	6	7-21	FT0610E	16		1-00	1-50	4-91				4-90			1-100
		7-111				1-00	1-50	5-61				5-60			1-100
1X2	6	8-91	FT0611E	16		1-00	1-50	6-41				6-40			1-110
		9-21				1-00	1-50	6-91				6-90			1-110
1X3	6	8-71	FT0612E	16		1-00	1-50	6-21				6-20			1-110
		9-11				1-00	1-50	6-81				6-80			1-110
1X6	6	12-92	FT0613E	16		1-000	1-50	10-42				10-40		0-100	2-30
		14-12				1-000	1-50	11-82				11-80		1-00	2-50
18	7	11-00	FT0704E	STR		11-00									
4X6	7	11-00	FT0705E	STR		11-00									
		11-90				11-90									
40	4	3-60	HW0401E	STR		3-60									
21	5	5-40	HW0519E	16		2-40	0-80	2-40				2-40			0-100
9	5	8-23	HW0520E	16			5-90	2-53				1-90			7-60
1X9	5	9-13	HW0521E	16			6-10	3-03				2-20		2-20	8-30
		9-43					6-40	3-03				2-20		2-20	8-60
2	5	5-03	HW0522E	16			2-70	2-53				1-90			4-40
1	5	5-100	HW0523E	STR		5-100									
1	5	6-30	HW0524E	STR		6-30									
1X4	5	3-00	HW0525E	16		1-20	0-80	1-20				1-20		0-10	0-90
		4-100				2-10	0-80	2-10				2-10		0-20	0-90
1X3	5	3-20	HW0526E	16		1-30	0-80	1-30				1-30			0-80
		4-100				2-10	0-80	2-10				2-10			0-80
1X3	5	3-00	HW0527E	16		1-20	0-80	1-20				1-20			0-80
		4-20				1-90	0-80	1-90				1-90			0-80
1X2	5	3-20	HW0528E	16		1-30	0-80	1-30				1-30			0-80

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES /QUARTER INCH)										
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F/R	G	H	J	K	O
		TO			TO	TO	TO	TO					TO	TO	TO
		4-00				1-80	0-80	1-80					1-80		0-80
10	5	19-80	HW0529E	STR		19-80									
2X2	5	10-80	HW0530E	STR		10-80									
		12-00				12-00									
6	5	2-90	HW0531E	STR		2-90									
2	5	5-80	HW0532E	STR		5-80									
4	5	8-100	HW0533E	9		8-100				3-60		2-51			6-80
4	5	12-00	HW0534E	9		12-00				5-00		3-21			9-33
9	5	7-23	HW0535E	16			4-90	2-53				1-90		1-90	6-60
1X9	5	8-13	HW0536E	16			5-10	3-03				2-20		2-20	7-30
		8-43			TO	TO	TO	TO				TO	TO	TO	TO
2	5	5-63	HW0537E	16			5-40	3-03				2-20		2-20	7-60
1	5	4-100	HW0538E	STR		4-100						1-90		1-90	4-100
1	5	5-30	HW0539E	STR		5-30									

ASTM STANDARD ENGLISH REINFORCING BARS				RECOMMENDED END HOOKS, APPLICABLE TO ALL GRADES				STIRRUP AND TIE HOOKS, APPLICABLE TO ALL GRADES			
BAR SIZE	NOMINAL DIMENSIONS			180° HOOKS		90° HOOKS		90° HOOK		135° HOOK	
	DIAMETER (INCHES)	AREA (INCHES <sup>2</sup> )	WEIGHT (LBS./FT.)	D	A OR G	J	A OR G	D	A OR G	A OR G	A OR G
3	0.375	0.110	0.376	2 1/4"	5"	3"	6"	1 1/2"	4"	4"	2 1/2"
4	0.500	0.200	0.668	3"	6"	4"	8"	2"	4 1/2"	4 1/2"	3"
5	0.625	0.310	1.043	3 3/4"	7"	5"	10"	2 1/2"	6"	5 1/2"	3 3/4"
6	0.750	0.440	1.502	4 1/2"	8"	6"	1-0"	4 1/2"	1-0"	8"	4 1/2"
7	0.875	0.600	2.044	5 1/4"	10"	7"	1-2"	5 1/4"	1-2"	9"	5 1/4"
8	1.000	0.790	2.670	6"	11"	8"	1-4"	6"	1-4"	10 1/2"	6"
9	1.128	1.000	3.400	9 1/2"	1-3"	11 3/4"	1-7"				
10	1.270	1.270	4.303	10 3/4"	1-5"	1-1 1/4"	1-10"				
11	1.410	1.560	5.313	1-0"	1-7"	1-2 3/4"	2-0"				
14	1.693	2.250	7.650	1-6 1/4"	2-3"	1-9 3/4"	2-7"				
18	2.257	4.000	13.600	2-0"	3-0"	2-4 1/2"	3-5"				

- NOTES:
- FIGURES SHOWN IN CIRCLES REPRESENT BAR BEND TYPES.
  - STANDARD BAR BENDS INCLUDE ONLY THOSE TYPES BELOW, INDICATED AS SUCH.
  - ALL DIMENSIONS OUT-TO-OUT, EXCEPT "A" AND "C" ON STD. 180° AND 135° HOOKS.
  - "J" DIMENSIONS ON 180° HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE, OTHERWISE STANDARD 'ACI' HOOKS ARE TO BE USED.
  - WHERE "J" IS NOT SHOWN, "J" WILL BE KEPT EQUAL TO OR LESS THAN "H" ON TYPES 3, 5 AND 22. WHERE "J" CAN EXCEED "H", IT SHALL BE SHOWN.
  - "H" DIMENSIONS OF STIRRUPS TO BE SHOWN AS NEEDED TO FIT WITHIN THE CONCRETE.
  - UNLESS OTHERWISE NOTED, DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR (EXCEPT FOR BEND TYPES 11 AND 13).
  - WHERE SLOPE DIFFERS FROM 45° OFFSET, "H" AND "K" MUST BE SHOWN.
  - WHERE BARS ARE TO BE BENT MORE ACCURATELY THAN STANDARD BENDING TOLERANCES, BENDING DIMENSIONS REQUIRING CLOSER FABRICATION SHOULD HAVE LIMITS INDICATED.
  - FOR RECOMMENDED DIAMETER "D", OF BENDS, HOOKS, ETC., REFER TO TABLE ABOVE, 'CRS1' OR 'AC1' TABLES WHERE APPLICABLE AND REQUIRED.
  - TYPE S1-S6, S11, T1-T3 AND T6-T9 APPLICABLE TO BAR SIZES #3 THROUGH #8.



**PROJECT NOTES:**

- LOCATION**  
PROPOSED NEW STRUCTURE CARRYING US301 OVER DRAWYER CREEK IN NEW CASTLE COUNTY, DELAWARE.
- ELEVATIONS**  
VERTICAL DATUM IS REFERENCED TO NAVD 88.
- DESIGN CRITERIA**  
2007 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, INCLUDING 2008 AND 2009 INTERIMS, AND SUPPLEMENTED BY THE DELAWARE DEPARTMENT OF TRANSPORTATION 2005 BRIDGE DESIGN MANUAL, INCLUDING REVISIONS THROUGH 2009.
- LOADING**  
LIVE LOAD: AASHTO HL-93 AND DELAWARE LEGAL LOADS.  
FUTURE OVERLAY = 25 P.S.F.  
S. I. P. DECK FORMS = 15 P.S.F.  
FILL SOIL = 120 P.C.F.
- CONCRETE**  
ALL CONCRETE PROPERTIES SHALL BE IN ACCORDANCE WITH SECTION 812 OF THE DELAWARE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.  
CLASS A - EXPOSED ABUTMENTS, STEMS, BACKWALLS, WINGWALLS AND PARAPETS (f'c = 4,500 PSI).  
CLASS B - ABUTMENT AND WINGWALL FOOTINGS NOT EXPOSED (f'c = 3,000 PSI).  
CLASS D - CONCRETE DECK SLAB, APPROACH SLAB, MOMENT SLAB, SLEEPER SLAB, HEADER SLAB, SHEAR BLOCKS, PEDESTALS, AND DIAPHRAGMS (F'c = 4,500 PSI).  
CLASS A - M.S.E. WALL PANELS AND M.S.E. WALL COPING (F'c = 4,500 PSI).  
CLASS B - M.S.E. WALL LEVELING PADS (f'c = 3,000 PSI)  
ALL EXPOSED EDGES SHALL BE CHAMFERED 3/4" UNLESS NOTED OTHERWISE.
- REINFORCING STEEL**  
ALL REINFORCING STEEL SHALL BE AASHTO M31 (ASTM A615), GRADE 60 AND UNLESS NOTED OTHERWISE SHALL BE PROTECTED WITH FUSION BONDED EPOXY, CONFORMING TO AASHTO M284 (ASTM D3963). MINIMUM CONCRETE COVER FOR REINFORCING STEEL SHALL BE:  
FOUNDATION ELEMENTS: 3"  
DECK SLABS: 2 1/2" TOP OF SLAB (INCLUDES 1/2" INTEGRAL WEARING SURFACE)  
1" BOTTOM OF SLAB WHEN STAY-IN-PLACE FORMS ARE USED  
MINIMUM CONCRETE COVER FOR REINFORCING STEEL SHALL BE 2" UNLESS NOTED OTHERWISE.
- PRESTRESSED REINFORCED CONCRETE MEMBERS**  
PRESTRESSED CONCRETE DESIGN: DESIGN CONSISTENT WITH 2007 AASHTO LRFD, WITH 2008 AND 2009 INTERIMS. THE PRECAST CONCRETE BEAMS ARE DESIGNED AS COMPOSITE FOR LIVE LOAD, PARAPET AND FUTURE WEARING SURFACE. THE PRECAST CONCRETE BEAMS ARE DESIGNED AS NON-COMPOSITE FOR ALL OTHER DEAD LOADS.  
PRESTRESSED CONCRETE: THE MINIMUM COMPRESSIVE STRENGTH FOR PRESTRESSED CONCRETE AT THE AGE OF 28 DAYS SHALL BE f'c = 8,000 PSI. THE MINIMUM COMPRESSIVE STRENGTH AT THE TRANSFER OF PRESTRESS SHALL BE f'ci = 6,800 PSI.  
PRETENSIONING STEEL: PRETENSIONING STEEL SHALL CONSIST OF 6/10" DIAMETER 7-WIRE BRIGHT LOW RELAXATION STRANDS CONFORMING TO THE REQUIREMENTS OF AASHTO M203 GRADE 270. EACH 6/10" STRAND SHALL BE PRETENSIONED TO 43,950 LBS (0.75 f's). AFTER ESTIMATED LOSSES OF 59.2 PSI, THE FINAL EFFECTIVE PRESTRESS FORCE PER STRAND IS 31,089 LBS. CAMBER GROWTH IN PRETENSIONED BEAMS BETWEEN THE TIME OF STRESSING AND THE TIME OF SLAB PLACEMENT IS ASSUMED TO BE 80% FOR CAMBER CALCULATIONS.
- ELASTOMERIC BEARINGS**  
ELASTOMERIC BEARINGS SHALL CONFORM TO AASHTO M251. ELASTOMER SHALL BE 50 DUROMETER. SHIMS SHALL BE 11 GAGE MILD STEEL CONFORMING TO AASHTO M270, GRADE 36.
- CONSTRUCTION JOINTS**  
KEYED CONSTRUCTION JOINTS SHALL BE 2" X 4" OR AS NOTED. ALL EXPOSED CONSTRUCTION JOINT EDGES SHALL HAVE A 3/4" V-NOTCH UNLESS NOTED OTHERWISE.
- MISCELLANEOUS**  
ALL AREAS DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE GRADED BACK TO THE ORIGINAL EXISTING GRADE, TOP SOILED, SEEDED AND MULCHED. PAYMENT SHALL BE INCIDENTAL TO THE CONTRACT, AS DIRECTED BY THE ENGINEER. ALL AREAS DISTURBED BY THE CONTRACTOR'S OPERATION OUTSIDE THE LIMIT OF CONSTRUCTION SHALL BE TOP SOILED, SEEDED, AND MULCHED AT THE CONTRACTOR'S EXPENSE. SEE SHEET PN-02 FOR ADDITIONAL REQUIREMENTS.
- STABILIZING STRUCTURAL EXCAVATIONS**  
SLOPING AND SHORING, SHALL CONFORM TO CURRENT OSHA AND LOCAL STANDARDS. A QUALIFIED THE CONTRACTOR IS RESPONSIBLE FOR STABILITY OF EXCAVATED SLOPES. DIRECT SURFACE RUNOFF AWAY FROM THE EXCAVATION. ALL EXCAVATION SAFETY MEASURES, INCLUDING ENGINEER REGISTERED IN THE STATE OF DELAWARE SHALL DESIGN ALL TEMPORARY SHEETING AND SHORING.  
THE CONTRACTOR IS ALSO RESPONSIBLE FOR PROVIDING DEWATERING OF THE EXCAVATION TO ALLOW FOR INSPECTION AND CONSTRUCTION. ANY DEWATERING SUMPS OR WELLS SHALL BE LOCATED AT LEAST 3-ft AWAY FROM THE FOOTING EXCAVATION.
- PILE FOUNDATIONS**  
PRESTRESSED CONCRETE PILES SHALL CONFORM TO THE REQUIREMENTS OF SECTION 618 OF THE DELAWARE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS EXCEPT THAT LOW RELAXATION STRANDS SHALL BE USED.  
STEEL H-PILES ALTERNATE SHALL BE AASHTO M270, GRADE 50.  
PERFORM WAVE EQUATION ANALYSIS TO SIZE THE PILE HAMMER USING NOMINAL RESISTANCE. CONTROL PILE DRIVING USING HIGH STRAIN DYNAMIC TESTING WITH SIGNAL MATCHING.

THE CONTRACTOR IS TO CONDUCT THE HIGH STRAIN DYNAMIC TESTING WITH SIGNAL MATCHING DURING CONSTRUCTION AND IS ALSO RESPONSIBLE FOR DEVELOPING THE DRIVING CRITERIA WITH THE APPROVAL OF THE ENGINEER.  
PERFORM DYNAMIC PILE MONITORING ON THE TEST PILES AND IF DIRECTED, ON SELECTED PRODUCTION PILES, AT THE LOCATIONS DETERMINED BY THE ENGINEER. DRIVE PRODUCTION PILES TO SATISFY THE DRIVING CRITERIA DEVELOPED FROM THE TEST PILES AND THE MINIMUM TIP ELEVATION REQUIREMENTS.

**13. HYDRAULIC DATA**  
DRAINAGE AREA = 0.90 SQ. MILES  
DESIGN FREQUENCY = 25 YEARS  
DESIGN DISCHARGE = 521 CFS  
DESIGN HEADWATER ELEV. = 43.9 Ft. (SB)/43.3 Ft. (NB)  
OUTLET VELOCITY = 3.0 FPS (SB)/5.0 FPS (NB)  
PROPOSED OPENING = 2449 SF (SB)  
2427 SF (NB)

DRAINAGE AREA = 0.90 SQ. MILES  
DESIGN FREQUENCY = 50 YEARS (DESIGN)  
DESIGN DISCHARGE = 642 CFS  
DESIGN HEADWATER ELEV. = 44.2 Ft. (SB)/43.7 Ft. (NB)  
OUTLET VELOCITY = 3.0 FPS (SB)/4.4 FPS (NB)

DRAINAGE AREA = 0.90 SQ. MILES  
DESIGN FREQUENCY = 100 YEARS  
DESIGN DISCHARGE = 787 CFS  
DESIGN HEADWATER ELEV. = 44.5 Ft. (SB)/44.0 Ft. (NB)  
OUTLET VELOCITY = 3.1 FPS (SB)/4.5 FPS (NB)

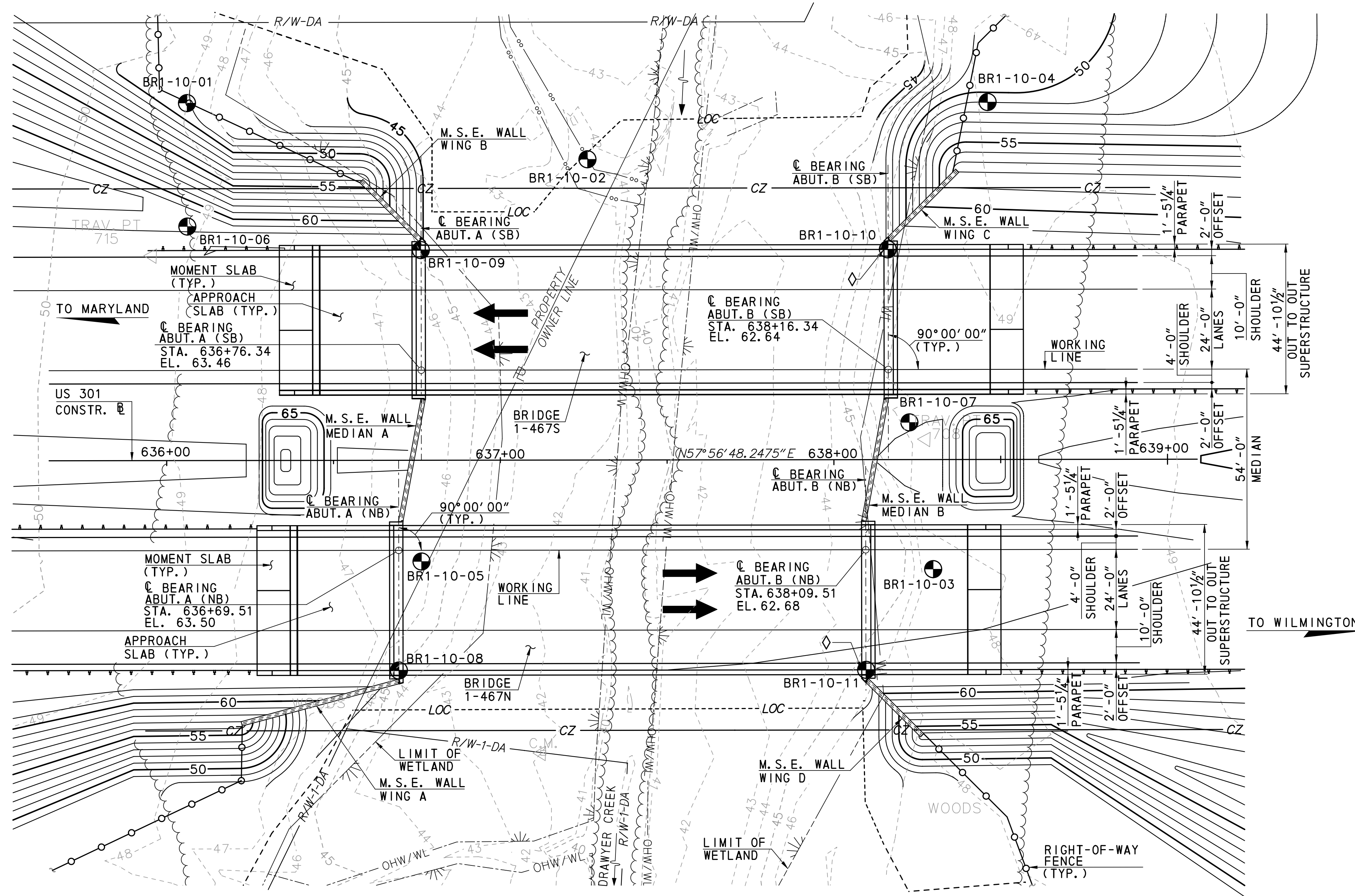
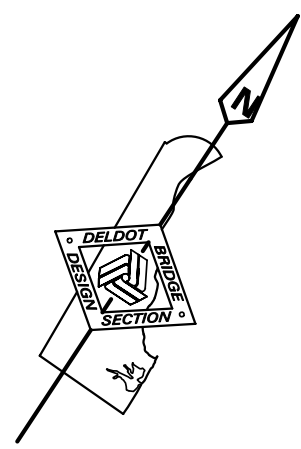
- 14. LOAD RATINGS**  
LOAD AND RESISTANCE FACTOR RATING METHOD

BRIDGE NO. 1-467 N&S LOAD RATINGS							
RATING VEHICLE	RATING TYPE	CONTROLLING UNIT/SPAN/MEMBER	CONTROLLING POINT (FT.)	LOAD EFFECT	LIMIT STATE	LOAD RATING FACTOR	LOAD RATING (TONS)
HL-93 TRUCK	INVENTORY	1ST INT.	105.00	CONCRETE STRESS	SERVICE III	1.07	N/A
HL-93 TANDEM	OPERATING	1ST INT.	105.00	CONCRETE STRESS	SERVICE III	1.27	N/A
HL-93 TRUCK	OPERATING	1ST INT.	105.00	LONG. REINFORCEMENT	STRENGTH I	2.34	N/A
HL-93 TANDEM	OPERATING	1ST INT.	105.00	LONG. REINFORCEMENT	STRENGTH I	2.80	N/A
S220	LEGAL	1ST INT.	105.00	CONCRETE STRESS	SERVICE III	2.87	57.40
S335	LEGAL	1ST INT.	105.00	CONCRETE STRESS	SERVICE III	1.62	56.70
S437	LEGAL	1ST INT.	105.00	CONCRETE STRESS	SERVICE III	1.54	56.43
T330	LEGAL	1ST INT.	105.00	CONCRETE STRESS	SERVICE III	2.08	62.40
T435	LEGAL	1ST INT.	105.00	CONCRETE STRESS	SERVICE III	1.81	63.35
T540	LEGAL	1ST INT.	105.00	CONCRETE STRESS	SERVICE III	1.59	63.60

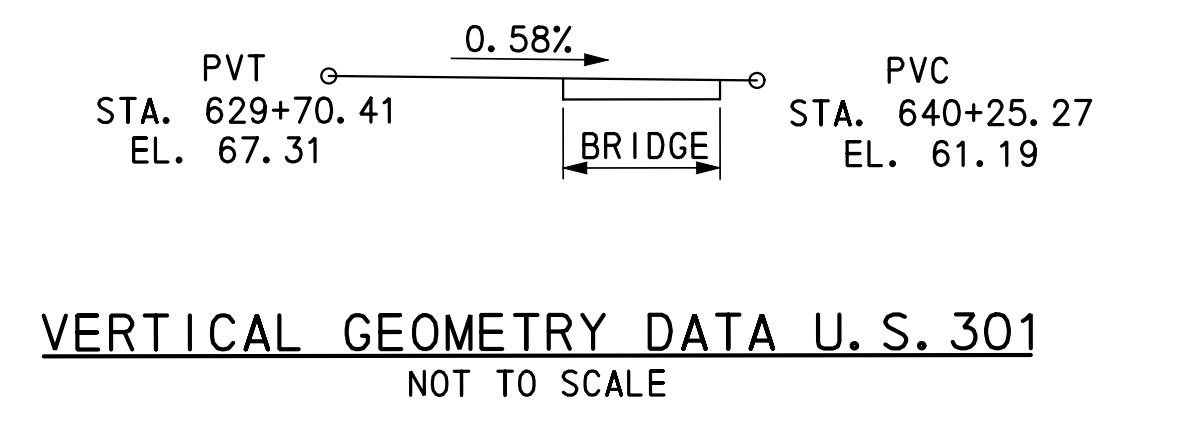
- 15. UTILITIES**  
BEFORE BEGINNING WORK, THE CONTRACTOR SHALL GIVE NOTIFICATION BY TELEPHONE BY CALLING "MISS UTILITY" AT 1-800-282-8555 A MINIMUM OF 2 WORKING DAYS PRIOR TO START OF WORK. VERIFY AND LOCATE ALL UTILITIES PRIOR TO STARTING WORK.  
COORDINATE THE REQUIREMENTS FOR PROTECTION OF ANY UTILITY WITH THE UTILITY OWNER PRIOR TO STARTING WORK.  
CONDUCT OPERATIONS IN A MANNER WHICH ENSURES THAT THE UTILITIES WILL NOT BE DISTURBED OR ENDANGERED. ANY DAMAGE INCURRED TO THESE UTILITIES OR ANY OTHER UTILITIES, SHOWN OR NOT SHOWN ON THE PLANS, DUE TO THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE APPROPRIATE UTILITY COMPANY. THE DEPARTMENT DOES NOT ASSUME RESPONSIBILITY FOR REIMBURSEMENT, PARTICIPATION IN DESIGN AND/OR REVISIONS, OR LIABILITY FOR ACCURACY OF TYPE, SIZE AND LOCATION OF ANY UTILITY.  
THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARILY SUPPORTING, PROTECTING, OR RELOCATING ANY UTILITIES DURING CONSTRUCTION. WHERE NECESSARY, THE COST FOR THIS WORK WILL BE INCIDENTAL TO THE CONTRACT.
- 16. STAGING AREAS**  
PROPER EROSION AND SEDIMENT CONTROL MEASURES AS DETERMINED BY THE ENGINEER SHALL BE INSTALLED IN ALL STAGING AREAS.  
ALL AREAS USED BY THE CONTRACTOR FOR STAGING OPERATIONS SHALL BE FULLY RESTORED BY THE CONTRACTOR UPON COMPLETION OF THE PROJECT. IF THE STAGING AREA IS PAVED, IT SHALL BE RESTORED TO ITS ORIGINAL CONDITION. IF THE STAGING AREA IS UNPAVED, IT SHALL BE RE-GRADED, TOP SOILED, SEEDED AND MULCHED IN ACCORDANCE WITH DELAWARE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS SECTIONS 732, 734 AND 735, FOR TOP SOIL, SEED, AND MULCH, RESPECTIVELY, TO THE SATISFACTION OF THE ENGINEER. THE SEED SHALL ADHERE TO THE SPECIFICATIONS OF SECTION 734 FOR PERMANENT GRASS SEEDING-DRY GROUND. ALL COSTS ASSOCIATED WITH RESTORATION OF THE STAGING AREA SHALL BE AT THE CONTRACTOR'S EXPENSE. IF THE ENGINEER DETERMINES THAT A SATISFACTORY STAND OF GRASS DOES NOT EXIST AT THE TIME OF FINAL INSPECTION, ALL COSTS ASSOCIATED WITH RE-ESTABLISHING A SATISFACTORY STAND OF GRASS SHALL ALSO BE AT THE CONTRACTOR'S EXPENSE.
- 17. PERFORM WORK IN ACCORDANCE WITH DELAWARE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS AND CONSTRUCTION DETAILS AND CONTRACT SPECIAL PROVISIONS.**  
DELDOT STANDARD SPECIFICATION 619.11(a)(6) SHALL BE MODIFIED BY REFERENCE TO SPECIAL PROVISIONS 619519 AND 619539.

INDEX OF DRAWINGS		
SHEET NO.	DRAWING NO.	TITLE
85	BR1-467PN-01	PROJECT NOTES AND QUANTITIES
86	BR1-467PE-01	BRIDGE PLAN AND ELEVATION
87	BR1-467GL-01	GEOMETRIC LAYOUT PLAN
88	BR1-467TS-01	TYPICAL SECTION
89	BR1-467DT-01	TEMPORARY SURCHARGE
90	BR1-467FT-01	ABUTMENT A (NB)-FOOTING PLAN
91	BR1-467AB-01	ABUTMENT A (NB)-PLAN, ELEVATION AND SECTION
92	BR1-467FT-02	ABUTMENT B (NB)-FOOTING PLAN
93	BR1-467AB-02	ABUTMENT B (NB)-PLAN, ELEVATION AND SECTION
94	BR1-467BR-01	ABUTMENT REINFORCEMENT BAR LIST (NB)
95	BR1-467FT-03	ABUTMENT A (SB)-FOOTING PLAN
96	BR1-467AB-03	ABUTMENT A (SB)-PLAN, ELEVATION AND SECTION
97	BR1-467FT-04	ABUTMENT B (SB)-FOOTING PLAN
98	BR1-467AB-04	ABUTMENT B (SB)-PLAN, ELEVATION AND SECTION
99	BR1-467BR-02	ABUTMENT REINFORCEMENT BAR LIST (SB)
100	BR1-467WW-01	M.S.E. WINGWALLS
101	BR1-467DT-02	MISCELLANEOUS DETAILS
102	BR1-467FD-01	FINISHED BRIDGE DECK ELEVATIONS
103	BR1-467FR-01	FRAMING PLAN
104	BR1-467BM-01	BEAM PLAN AND BEARING DETAILS
105	BR1-467BM-02	BEAM ELEVATION AND SECTIONS
106	BR1-467DK-01	DECK PLAN, SECTION AND DETAILS (NB)
107	BR1-467DPH-01	DIAPHRAGM DETAILS - 1 (NB)
108	BR1-467DPH-02	DIAPHRAGM DETAILS - 2 (NB)
109	BR1-467AS-01	APPROACH SLAB - 1 (NB)
110	BR1-467AS-02	APPROACH SLAB - 2 (NB)
111	BR1-467AS-03	APPROACH SLAB - 3 (NB)
112	BR1-467BR-03	SUPERSTRUCTURE REINFORCEMENT BAR LIST (NB)
113	BR1-467DK-02	DECK PLAN, SECTION AND DETAILS (SB)
114	BR1-467DPH-03	DIAPHRAGM DETAILS - 1 (SB)
115	BR1-467DPH-04	DIAPHRAGM DETAILS - 2 (SB)
116	BR1-467AS-04	APPROACH SLAB - 1 (SB)
117	BR1-467AS-05	APPROACH SLAB - 2 (SB)
118	BR1-467AS-06	APPROACH SLAB - 3 (SB)
119	BR1-467BR-04	SUPERSTRUCTURE REINFORCEMENT BAR LIST (SB)
120	BR1-467EX-01	EXPANSION JOINT DETAILS
121	BR1-467B0-01	SOIL BORINGS-1
122	BR1-467B0-02	SOIL BORINGS-2
123	BR1-467B0-03	SOIL BORINGS-3
124	BR1-467B0-04	SOIL BORINGS-4

QUANTITIES			
ITEM NO.	ITEM TITLE	UNIT	QUANTITY
202505	SETTLEMENT PLATFORM	EACH	8
207000	EXCAVATION AND BACKFILL FOR STRUCTURES	C. Y.	2,980
	BORROW TYPE C (AVAILABLE FROM BORROW SITE EXCAVATION)	C. Y.	1,295
302007	GRADED AGGREGATE BASE COURSE, TYPE B	C. Y.	342
602004	P.C.C. MASONRY, ABUTMENT, FOOTING, CLASS B	C. Y.	278
602013	P.C.C. MASONRY, SUPERSTRUCTURE, CLASS D	C. Y.	509
602014	P.C.C. MASONRY, APPROACH SLAB, CLASS D	C. Y.	428
602015	P.C.C. MASONRY, ABUTMENT, ABOVE FOOTING, CLASS A	C. Y.	410
602017	P.C.C. MASONRY, PARAPET, CLASS A	C. Y.	109
602772	MECHANICALLY STABILIZED EARTH WALLS	L.S.	1
603000	BAR REINFORCEMENT	LB	36,900
604000	BAR REINFORCEMENT, EPOXY COATED	LB	265,150
605512	PREFABRICATED EXPANSION JOINT SYSTEM 4"	L.F.	90
618062 (ALTERNATE)	STEEL H PILES, HP 14X73	L.F.	5,220
618065 (ALTERNATE)	STEEL H TEST PILES, HP 14X73	L.F.	220
618081	FURNISH PRECAST PRESTRESSED CONCRETE PILE, 14X14	L.F.	3,480
618091	FURNISH PRECAST PRESTRESSED CONCRETE TEST PILE, 14X14	L.F.	160
619042 (ALTERNATE)	INSTALL STEEL H PILES, HP 14X73	L.F.	5,220
619045 (ALTERNATE)	INSTALL STEEL H TEST PILES, HP 14X73	L.F.	220
619061	INSTALL PRECAST PRESTRESSED CONCRETE PILE, 14X14	L.F.	3,480
619067	INSTALL PRECAST PRESTRESSED CONCRETE TEST PILE, 14X14	L.F.	160
619501	PRODUCTION PILE RESTRIKE	EACH	1
619502	TEST PILE RESTRIKE	EA. DAY	1
619519	DYNAMIC PILE TESTING BY CONTRACTOR	EACH	8
619539	SIGNAL MATCHING ANALYSIS BY CONTRACTOR	EACH	8
623003	PRESTRESSED REINFORCED CONCRETE MEMBERS, BULB-TEE BEAMS	L.S.	1
713002	GEOTEXTILES, SEPARATION	S. Y.	1000
715001	PERFORATED PIPE UNDERDRAIN	L.F.	212



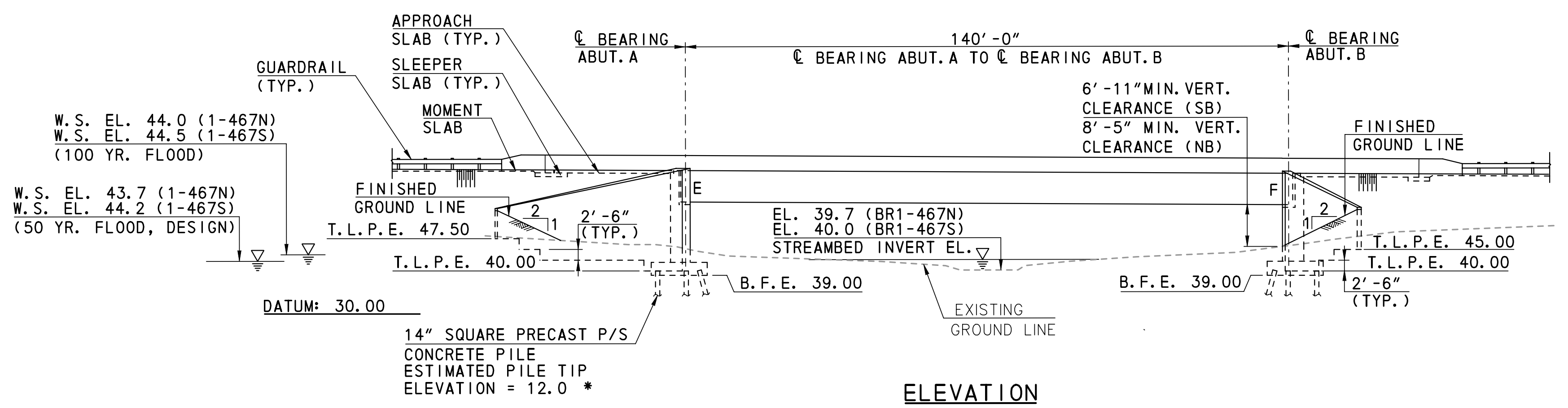
**PLAN**  
SCALE: 1" = 20'-0"



**VERTICAL GEOMETRY DATA U.S. 301**  
NOT TO SCALE

- NOTES:**
- ELEVATION VIEW IS SHOWN FOR NORTHBOUND BRIDGE. SOUTHBOUND BRIDGE IS SIMILAR. FOR ADDITIONAL TOP OF LEVELING PAD ELEVATIONS, SEE SHEET 16 OF 40.
  - FOR TEMPORARY ACCESS ROAD LOCATION, SEE SHEET 5 OF 40.
  - FOR PLACEMENT OF RIGHT-OF-WAY FENCE, SEE CP-07.

- LEGEND:**
- ABUT. = ABUTMENT
  - B.F.E. = BOTTOM FOOTING ELEVATION
  - APPROX. = APPROXIMATE
  - CONSTR. = CONSTRUCTION
  - CLR. = CLEAR
  - CZ = CLEAR ZONE
  - DA = DENIAL OF ACCESS
  - E = EXPANSION
  - EL. = ELEVATION
  - F = FIXED
  - MIN. = MINIMUM
  - LOC = LIMIT OF CONSTRUCTION
  - NB = NORTHBOUND
  - P/S = PRESTRESSED
  - R/W = RIGHT-OF-WAY
  - SB = SOUTHBOUND
  - STA. = STATION
  - TYP. = TYPICAL
  - T.L.P.E. = TOP OF LEVELING PAD ELEVATION
  - VERT. = VERTICAL
  - W.S. = WATER SURFACE
  - YR. = YEAR
  - ⊙ = BORING



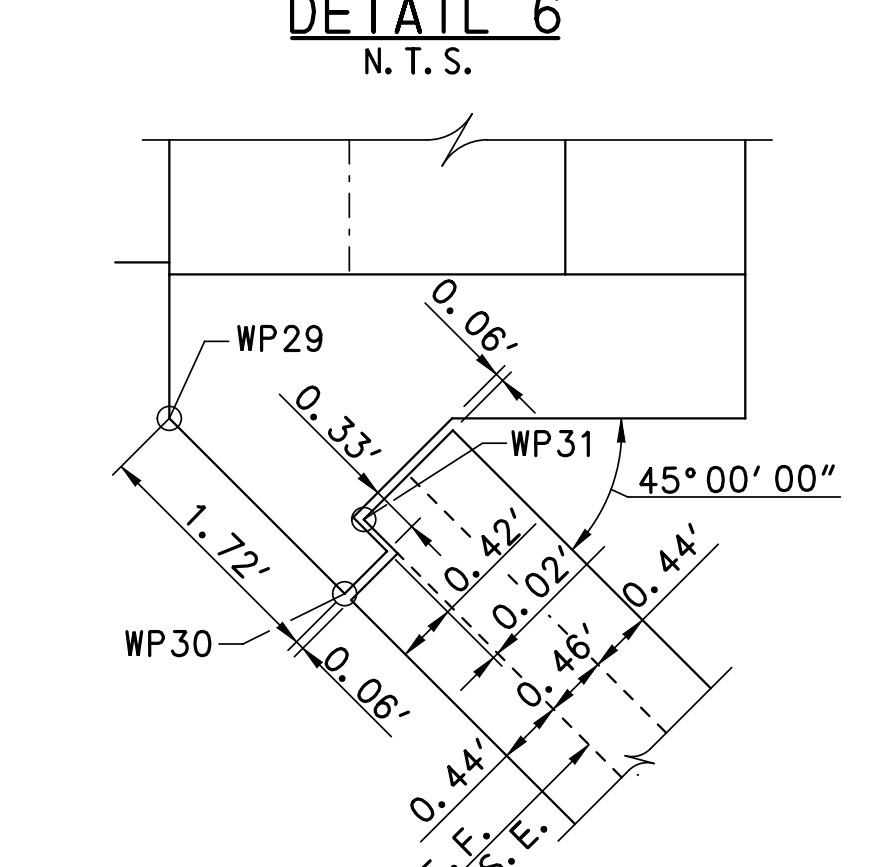
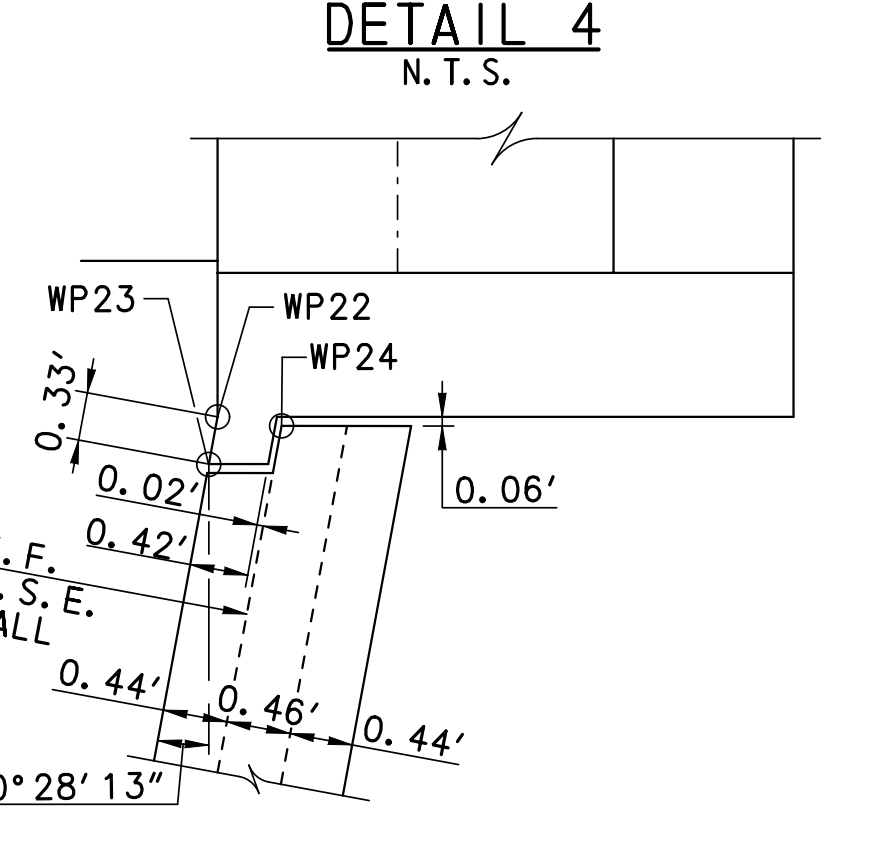
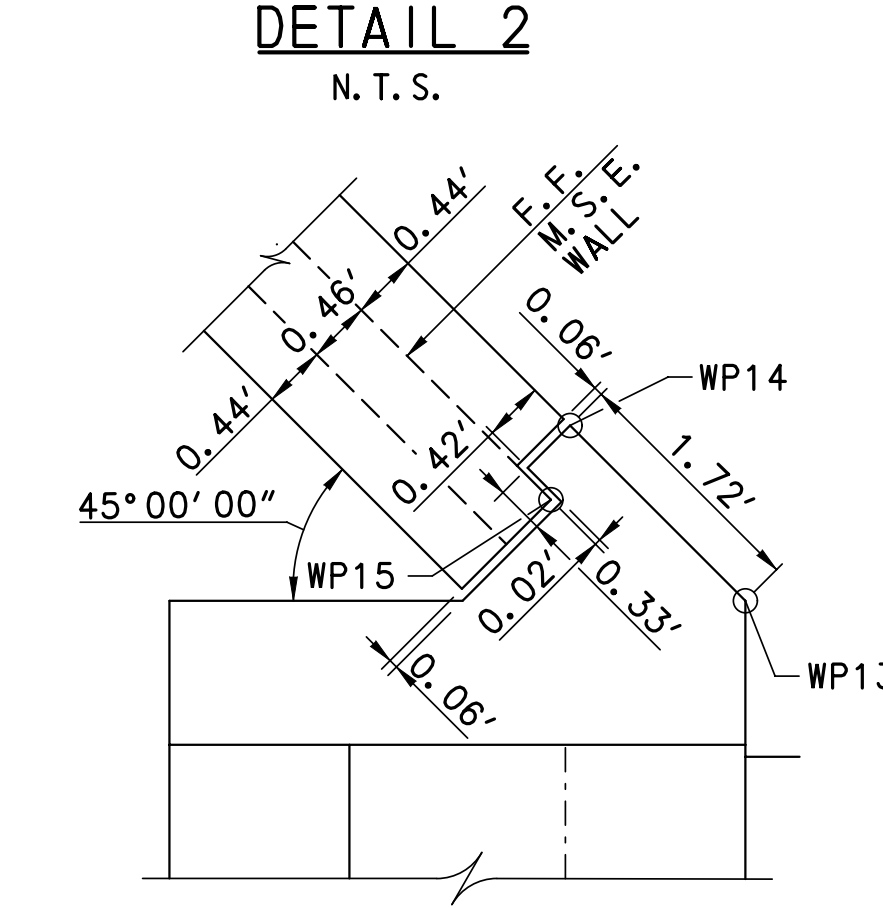
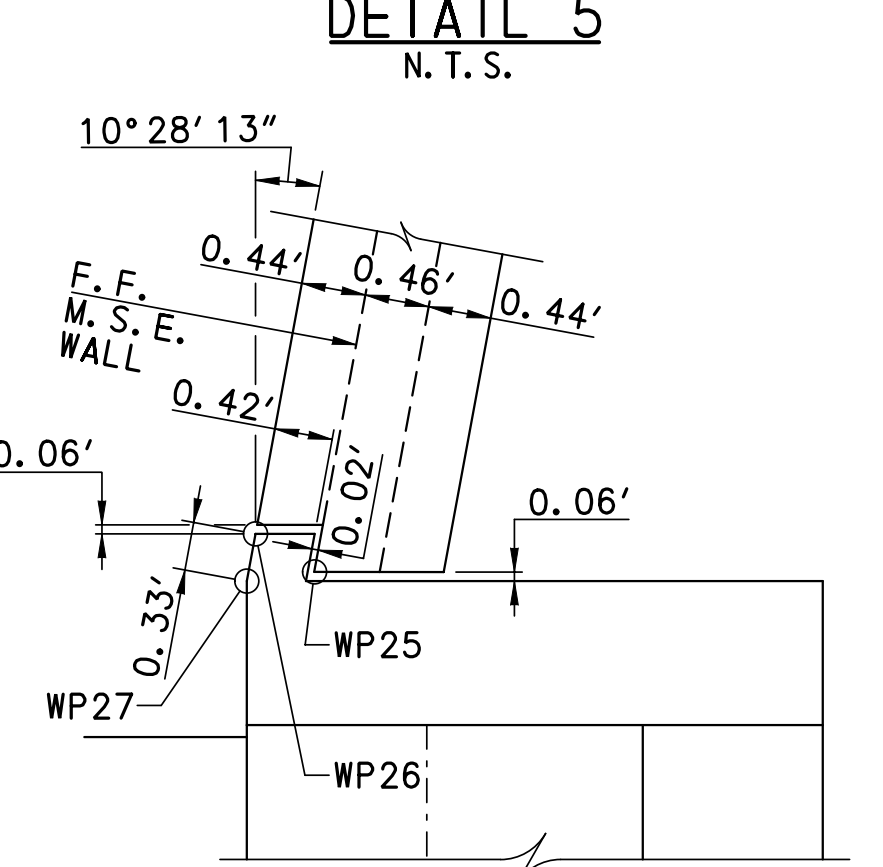
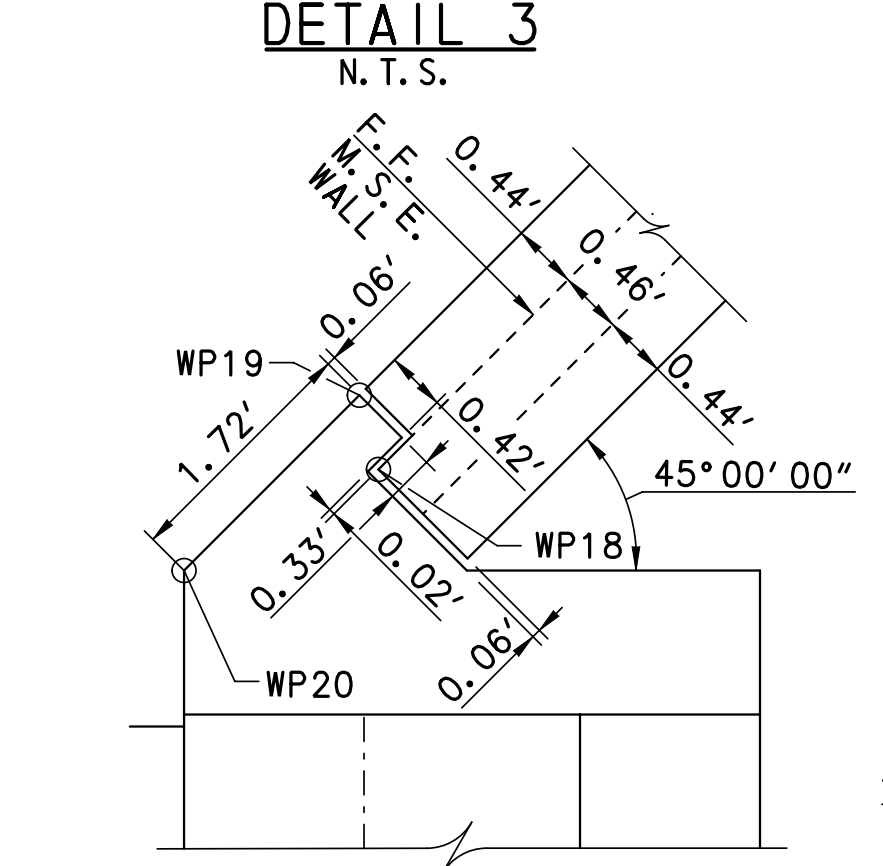
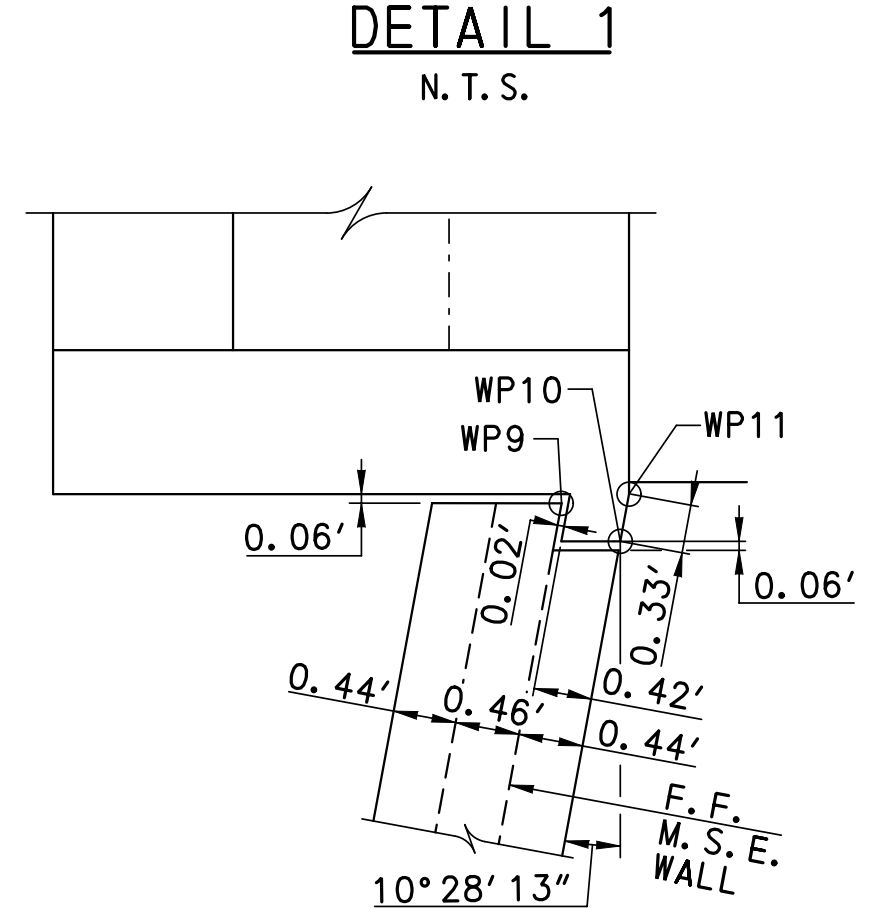
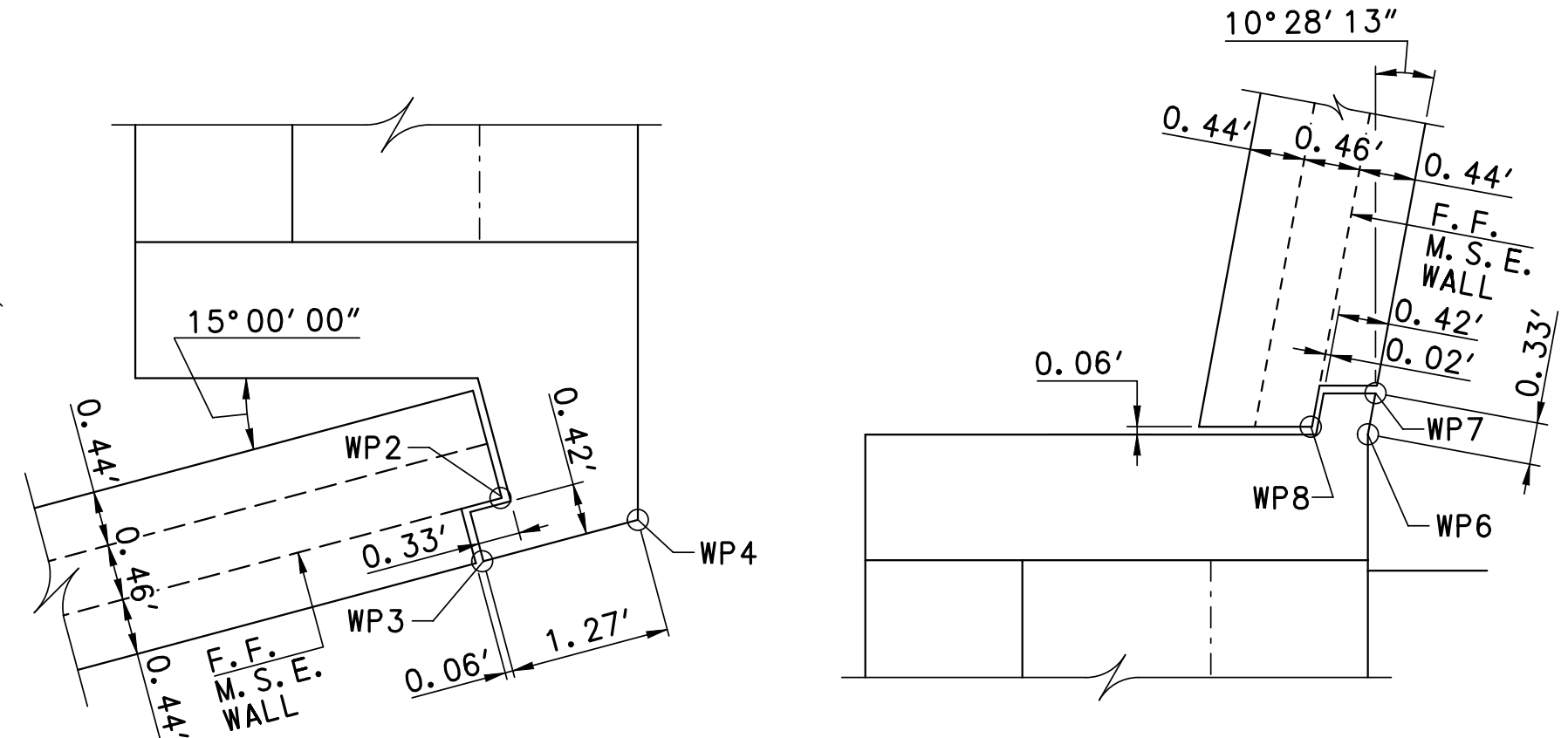
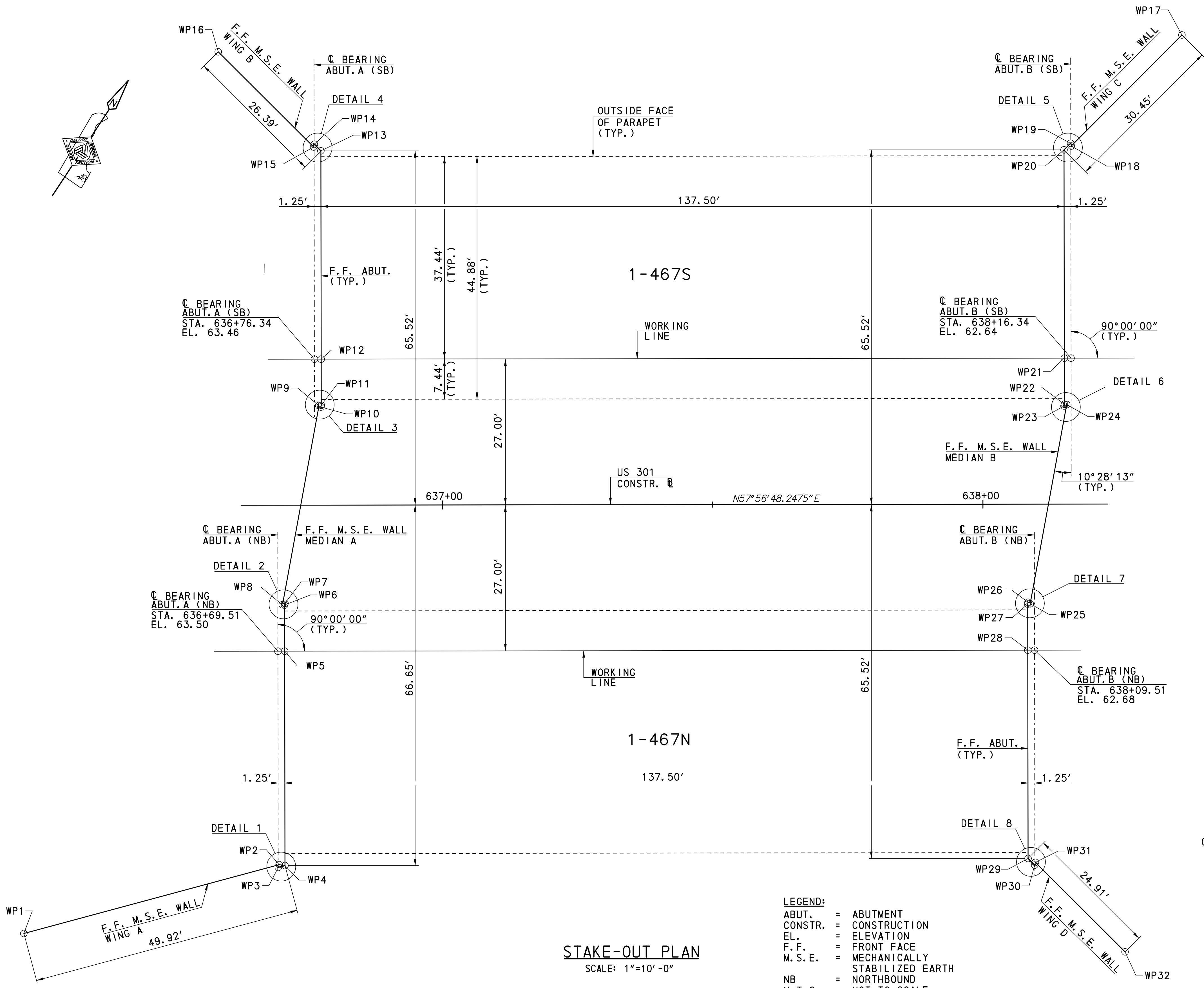
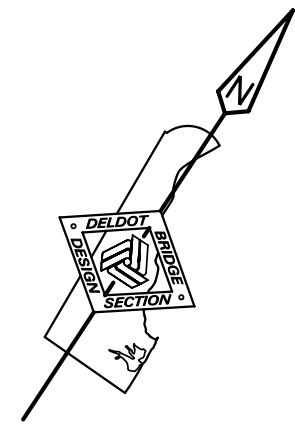
**ELEVATION**  
SCALE: 1" = 20'-0"

\* ELEVATION = -3.0 FOR HP14X73 STEEL PILE ALTERNATE

ADDENDUMS / REVISIONS

CONTRACT T200911301	BRIDGE NO. <b>1-467 N&amp;S</b>
COUNTY NEW CASTLE	DESIGNED BY: BK CHECKED BY: ZAA

SHEET NO. 86
TOTAL SHTS. 240



**STAKE-OUT PLAN**  
SCALE: 1"=10'-0"

- LEGEND:**
- ABUT. = ABUTMENT
  - CONSTR. = CONSTRUCTION
  - EL. = ELEVATION
  - F.F. = FRONT FACE
  - M.S.E. = MECHANICALLY STABILIZED EARTH
  - NB = NORTHBOUND
  - N.T.S. = NOT TO SCALE
  - SB = SOUTHBOUND
  - STA. = STATION
  - TYP. = TYPICAL
  - WP = WORK POINT

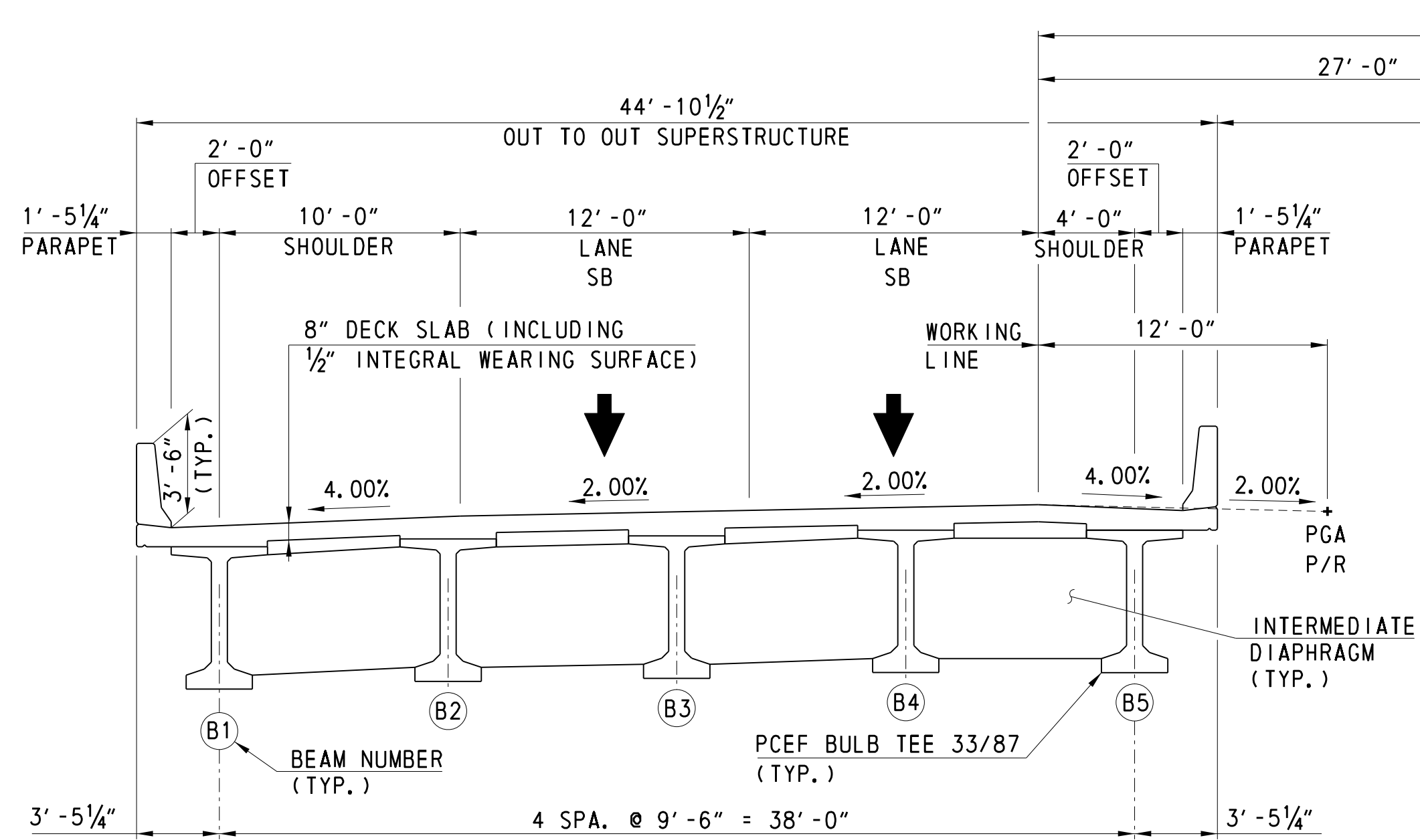
**NOTE:**  
1. FOR WORK POINT (WP) COORDINATES, SEE SHEET 4 OF 40.

ADDENDUMS / REVISIONS

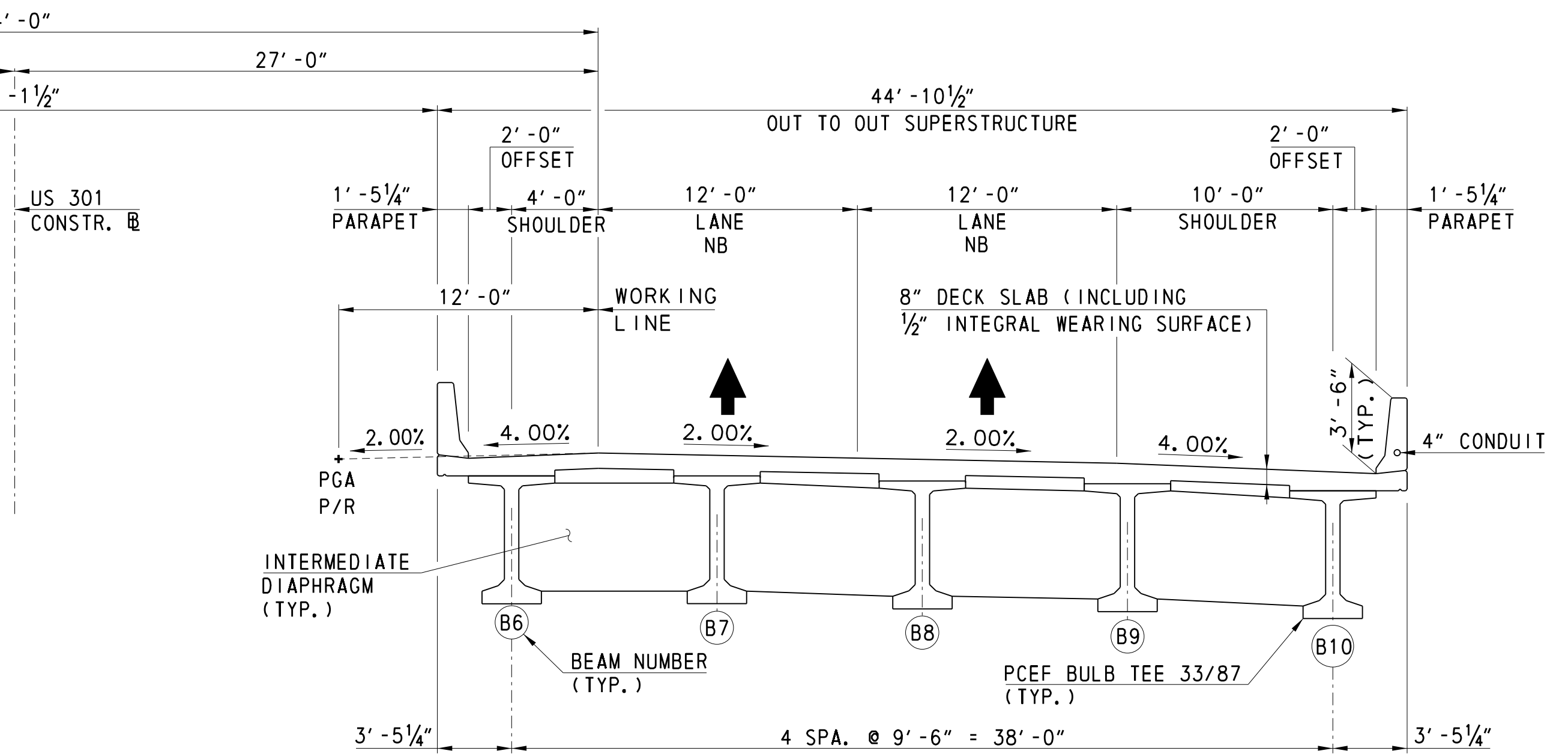
SCALE: AS NOTED

CONTRACT T200911301	BRIDGE NO. <b>1-467 N&amp;S</b>
COUNTY NEW CASTLE	DESIGNED BY: ZAA
	CHECKED BY: BJH

<b>GEOMETRIC LAYOUT PLAN</b>	SHEET NO. 87
	TOTAL SHTS. 240

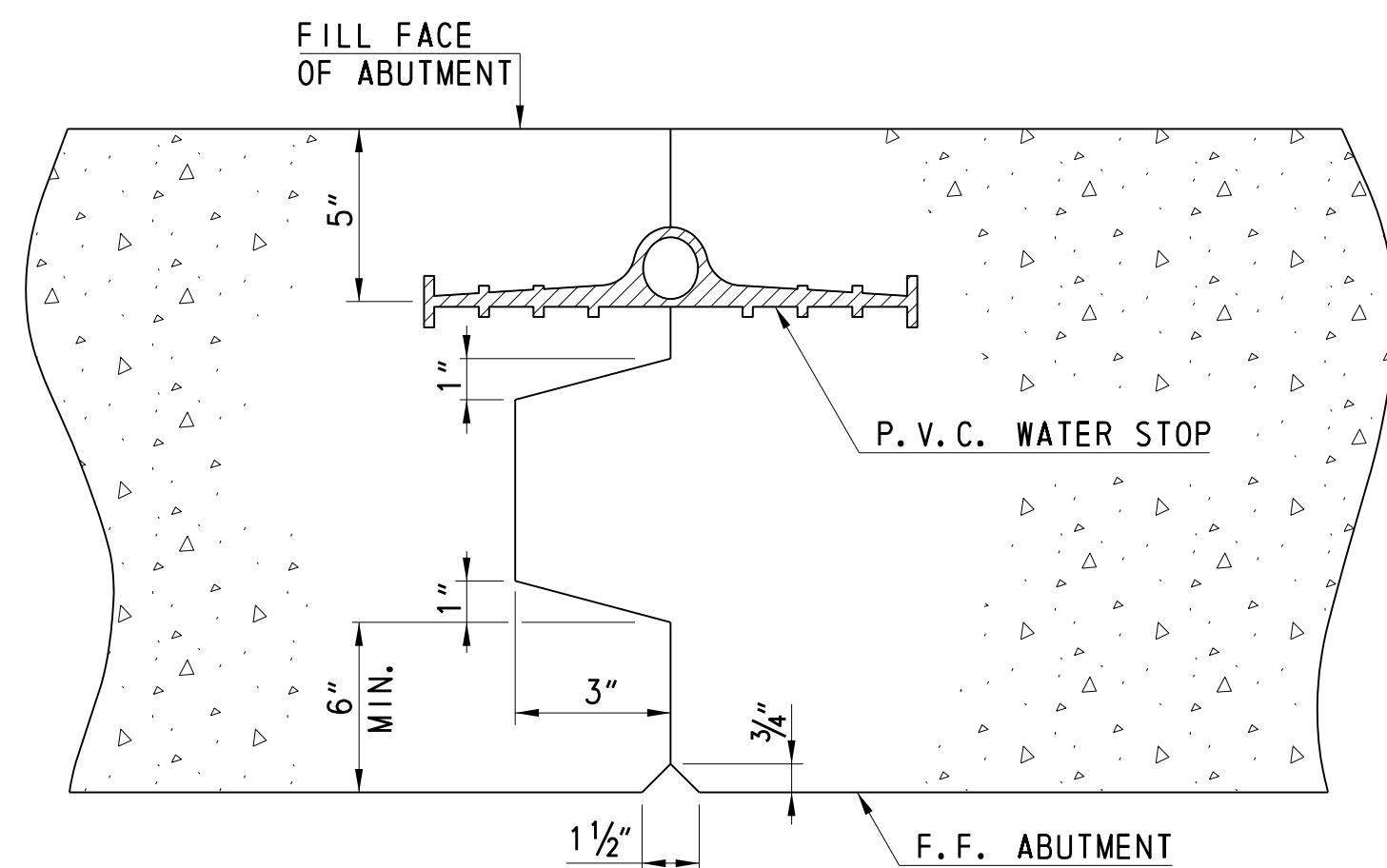


1-467S



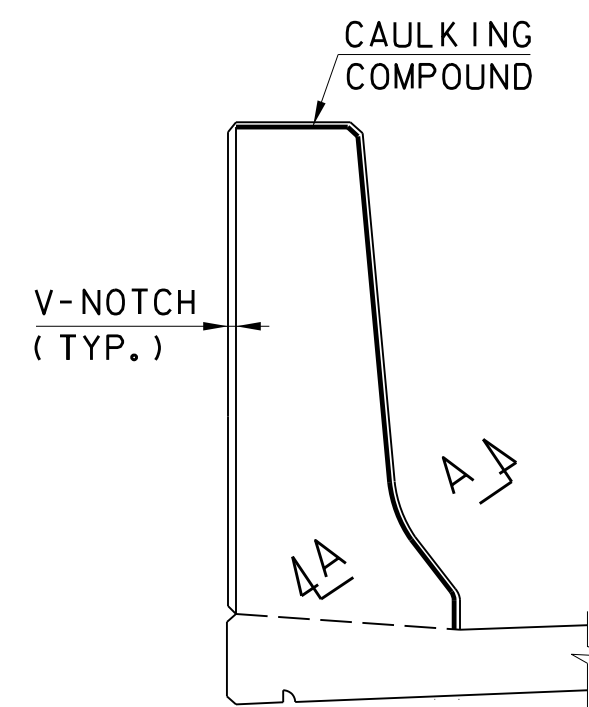
1-467N

TYPICAL SECTION  
SCALE: 3/16" = 1'-0"



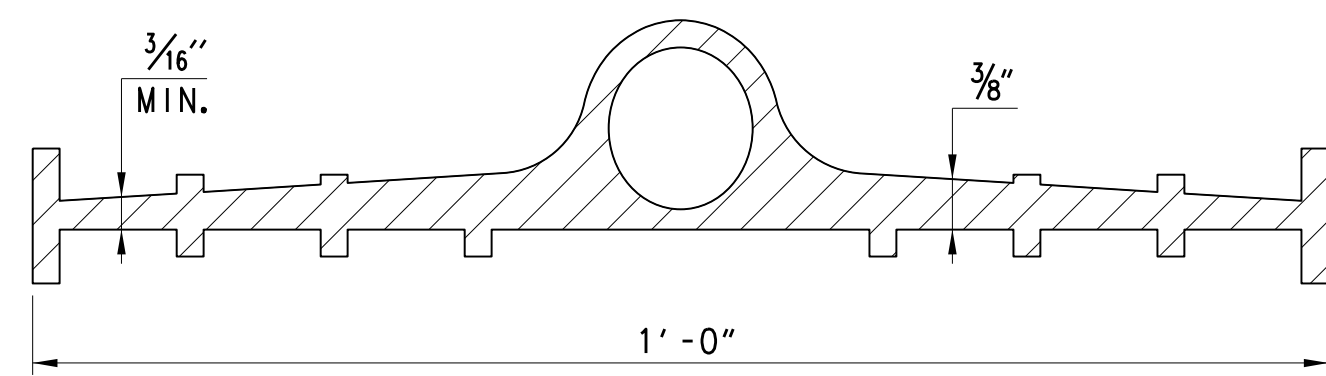
NOTE:  
REINFORCING SHALL PASS THROUGH CONSTRUCTION JOINT.

CONSTRUCTION JOINT DETAIL  
NOT TO SCALE



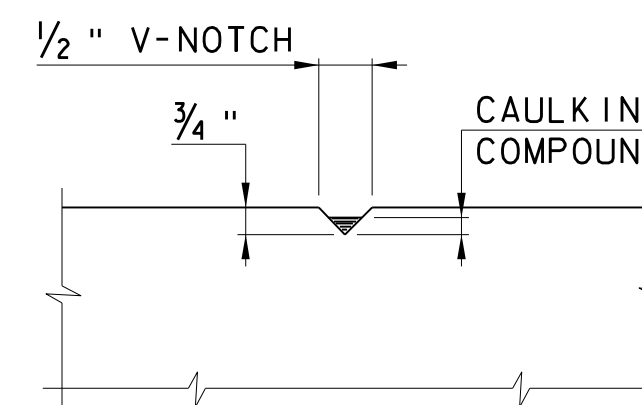
NOTES:  
• LONGITUDINAL REINFORCEMENT IS CONTINUOUS THROUGH THE JOINT.  
• PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH ASTM C834 OR C920.

MODIFIED DEFLECTION  
JOINT DETAIL  
NOT TO SCALE



P.V.C. WATER STOP  
NOT TO SCALE

NOTE:  
1. FOR LOCATION OF MODIFIED DEFLECTION JOINTS, SEE SHEETS 22 AND 29 OF 40.  
2. REFLECTORS SHALL BE INSTALLED ALONG EACH PARAPET. SEE CONSTRUCTION DETAILS, DT-03 FOR DETAILS.

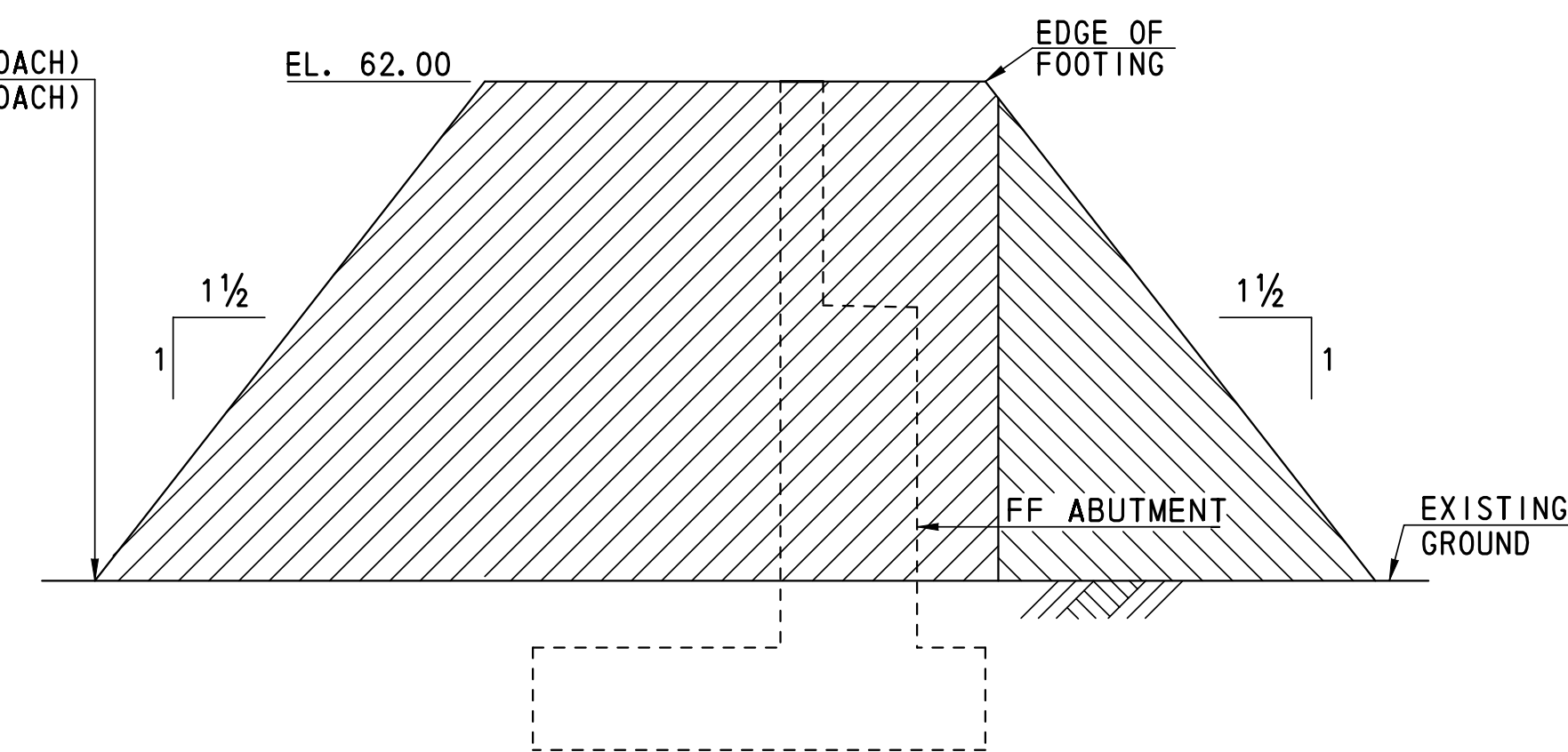


SECTION A-A

WORK POINT COORDINATES				
WP	NORTHING	EASTING	STATION	OFFSET (FT)
1	575475.9724	545150.6448	636+22.43	79.14 RT.
2	575522.7384	545164.9901	636+69.68	66.48 RT.
3	575522.3512	545165.3290	636+69.53	66.97 RT.
4	575523.5661	545165.7016	636+70.76	66.65 RT.
5	575544.6064	545132.0996	636+70.76	27.00 RT.
6	575549.1285	545124.8778	636+70.76	18.48 RT.
7	575549.3537	545124.6321	636+70.82	18.15 RT.
8	575548.7943	545124.5948	636+70.33	18.42 RT.
9	575574.1113	545096.9890	636+77.13	18.42 LT.
10	575574.3061	545097.4239	636+77.53	18.15 LT.
11	575574.5314	545097.1782	636+77.59	18.48 LT.
12	575579.0534	545089.9564	636+77.59	27.00 LT.
13	575599.4967	545057.3079	636+77.59	65.52 LT.
14	575599.1116	545055.6328	636+76.37	66.74 LT.
15	575598.7459	545055.9947	636+76.26	66.24 LT.
16	575593.1588	545031.6913	636+58.62	83.87 LT.
17	575745.8074	545123.8848	638+36.93	86.74 LT.
18	575717.5447	545130.3821	638+16.42	66.24 LT.
19	575717.7106	545129.8950	638+16.31	66.74 LT.
20	575716.0355	545130.2801	638+15.09	65.52 LT.
21	575695.5922	545162.9286	638+15.09	27.00 LT.
22	575691.0702	545170.1505	638+15.09	18.48 LT.
23	575690.8449	545170.3961	638+15.03	18.15 LT.
24	575691.4043	545170.4334	638+15.52	18.42 LT.
25	575666.0873	545198.0393	638+08.72	18.42 RT.
26	575665.8926	545197.6044	638+08.32	18.15 RT.
27	575665.6673	545197.8500	638+08.26	18.48 RT.
28	575661.1453	545205.0719	638+08.26	27.00 RT.
29	575640.7020	545237.7204	638+08.26	65.52 RT.
30	575641.0871	545239.3955	638+09.48	66.74 RT.
31	575641.4528	545239.0336	638+09.59	66.24 RT.
32	575646.7085	545261.8955	638+26.18	82.82 RT.

LEGEND:  
CONSTR. = CONSTRUCTION  
F.F. = FRONT FACE  
L.T. = LEFT  
MIN. = MINIMUM  
NB = NORTHBOUND  
PGA = PROFILE GRADE APPLICATION  
P/R = POINT OF ROTATION  
RT. = RIGHT  
SB = SOUTHBOUND  
SPA. = SPACES  
TYP. = TYPICAL

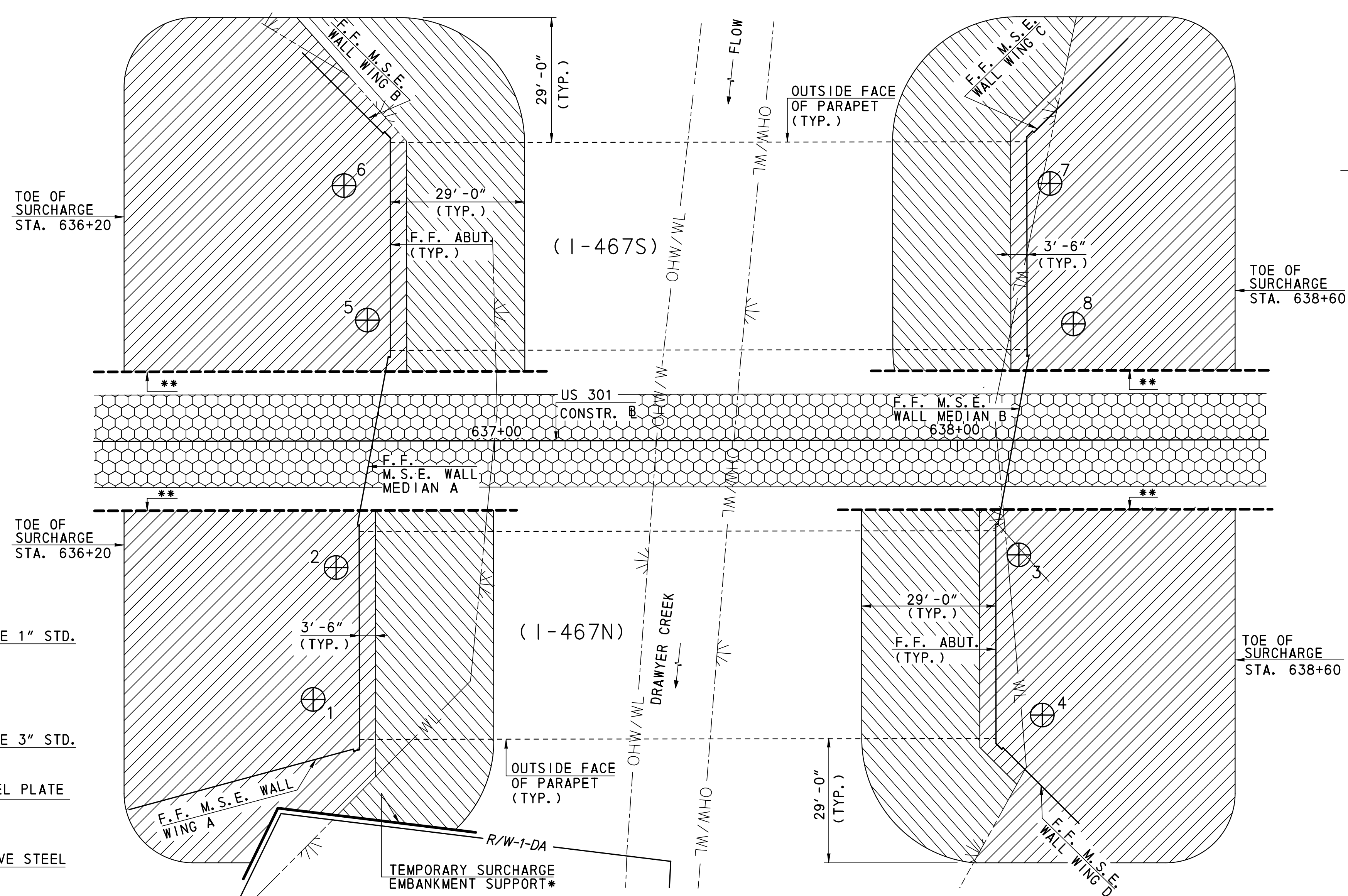
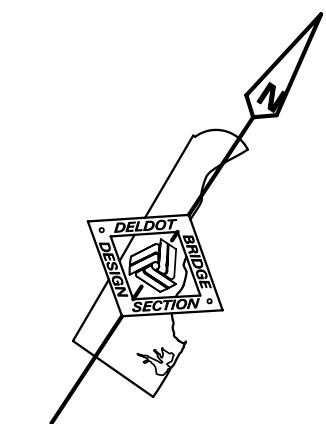
STA. 636+20 (SOUTH APPROACH)  
 STA. 638+60 (NORTH APPROACH)



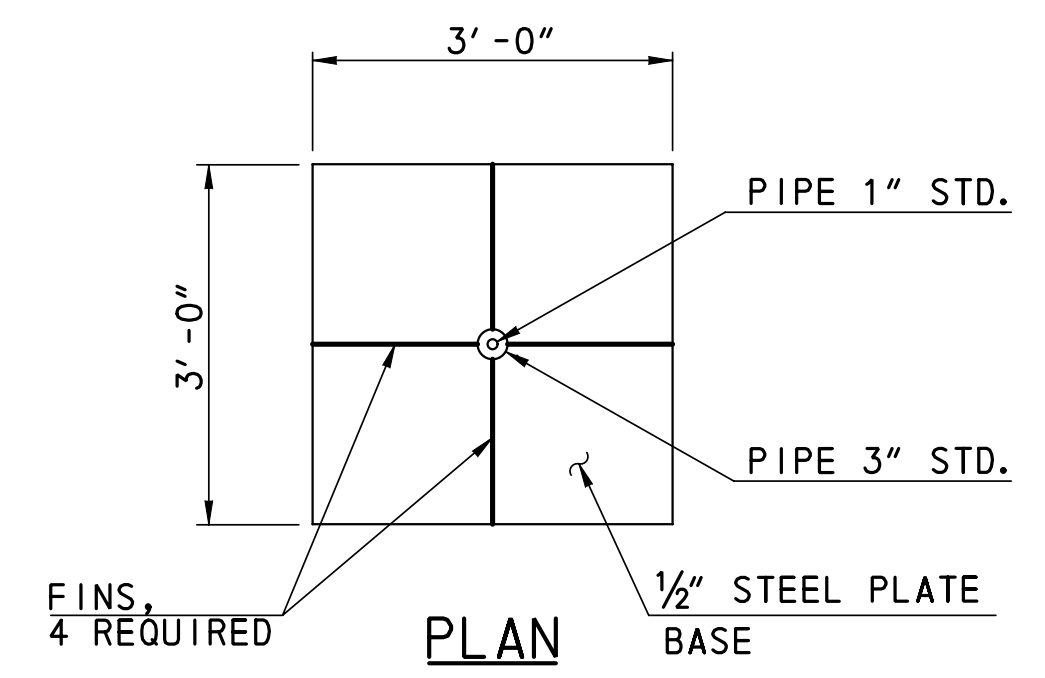
**TEMPORARY SURCHARGE LIMITS**  
 NOT TO SCALE

- CONSTRUCTION SEQUENCE:**
1. CLEAR AND GRUB AREA. DO NOT GRUB WITHIN WETLANDS LIMITS.
  2. PLACE TEMPORARY SHORING, TEMPORARY SURCHARGE EMBANKMENT SUPPORT, AND GEOTEXTILE WITHIN THE LIMITS AS SHOWN.
  3. INSTALL SETTLEMENT PLATFORMS. PLACE TEMPORARY SURCHARGE, SEE ITEM 202000 - EXCAVATION AND EMBANKMENT.
  4. MONITOR TEMPORARY SURCHARGE UNTIL SETTLEMENT IS COMPLETE AS DIRECTED BY THE ENGINEER.
  5. REMOVE TEMPORARY SURCHARGE UNDER APPROPRIATE ITEMS. SEE SHEET 17 OF 40 FOR DETAILS.
  6. CONSTRUCT BRIDGE BR1-467. FOR INSTALLATION OF TEST PILES AND PRODUCTION PILES, SEE SHEET 17 OF 40 PILE NOTES 6g AND 6b.

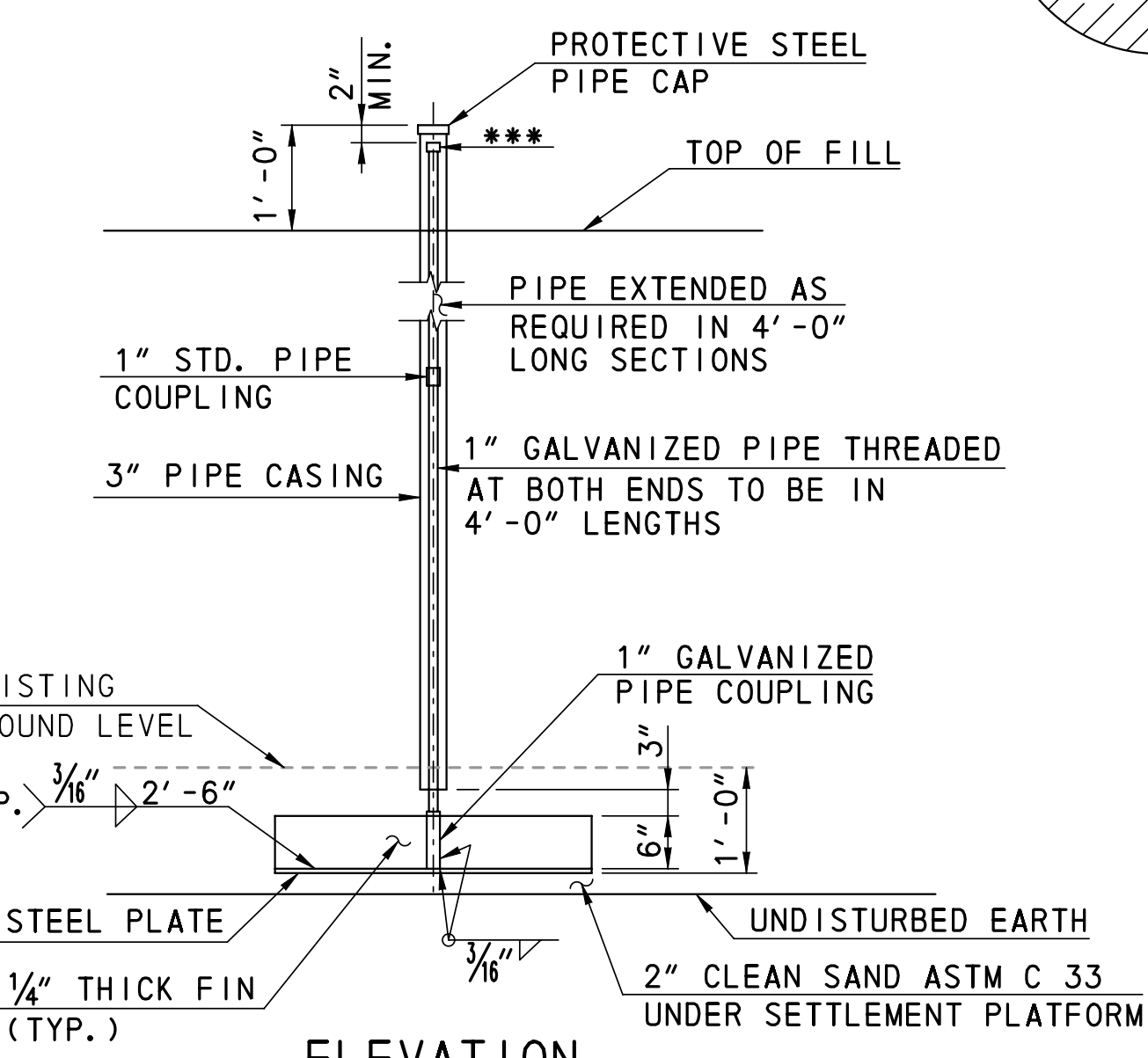
- NOTES:**
1. EMBANKMENT SETTLEMENT IS ANTICIPATED.
  2. ESTIMATE 60 DAYS QUARANTINE PERIOD FOR SCHEDULING PURPOSES, SEE SPECIAL PROVISION 202505 FOR SETTLEMENT PLATFORMS.
  3. BEGIN THE QUARANTINE PERIOD WHEN THE EMBANKMENT IS AT FINAL SUBGRADE AND THE SETTLEMENT PLATFORMS ARE COMPLETELY CONSTRUCTED. THE ENGINEER WILL DETERMINE THE DURATION OF THE QUARANTINE PERIOD BASED ON THE SETTLEMENT PLATFORM READINGS.
  4. THE ENGINEER WILL NOTIFY THE CONTRACTOR, IN WRITING, WHEN THE QUARANTINE PERIOD CAN BE LIFTED AND WILL BE BASED ON THE RESULTS OF THE SETTLEMENT READINGS.
  5. THIS PROJECT INCLUDES THE INSTALLATION OF SETTLEMENT PLATFORMS IN EMBANKMENT AREAS. SEE SPECIAL PROVISION 202505. THE CONTRACTOR IS REQUIRED TO MONITOR THESE SETTLEMENT PLATFORMS. THIS WORK CONSISTS OF OBTAINING, RECORDING, COMPILING AND ANALYZING THE SETTLEMENT PLATFORM READINGS.
  6. PROVIDE QUALIFIED PERSONNEL WITH EXPERIENCE IN SETTLEMENT MONITORING AND THE NECESSARY EQUIPMENT AND MATERIALS TO OBTAIN, RECORD, COMPIL AND ANALYZE THE VERTICAL SETTLEMENT READINGS AS SPECIFIED OR DIRECTED.
  7. OBTAIN WRITTEN APPROVAL OF THE ENGINEER BEFORE FIRST (INITIAL) SETTLEMENT PLATFORM READING AND COORDINATE SUBSEQUENT PLATFORM READINGS. PROVIDE THE RESULTS WITHIN 24 HOURS AFTER THE READINGS ARE OBTAINED IN A FORMAT SUCH THAT IMMEDIATE EVALUATION OF THE CONDITIONS CAN BE MADE.
  8. READINGS ON THE SETTLEMENT PLATFORMS SHALL BE MADE AFTER THE INITIAL INSTALLATION OF THE RISER AND CASING PIPES AND INSTALLATION RECORD SHEETS ARE APPROVED BY THE ENGINEER AND PRIOR TO FILL PLACEMENT. DURING FILL PLACEMENT, READINGS ON ALL SETTLEMENT PLATFORMS SHALL BE TAKEN AT A MINIMUM OF 3 CALENDAR DAY INTERVALS. AFTER COMPLETION OF THE FILL AND SURCHARGE PLACEMENT, INSTALL SETTLEMENT MONUMENTS AND TAKE INITIAL READINGS. READINGS ON ALL SETTLEMENT MONITORING DEVICES SHALL THEN BE TAKEN AT A MINIMUM OF 3 CALENDAR DAY INTERVALS. IF THE SETTLEMENT HAS CEASED BY CALENDAR DAY 6 THAT IS THREE READINGS, AFTER THE COMPLETION OF THE FILL, SURCHARGE AND SETTLEMENT MONUMENT PLACEMENT, THE SUBSTRUCTURE WILL BE RELEASED BY THE ENGINEER FOR REMOVAL OF THE SURCHARGE AND INSTALLATION OF PRODUCTION PILES WITHIN THREE WORKING DAYS OF RECEIPT OF SETTLEMENT MONITORING RESULTS. AFTER COMPLETION OF THE ABUTMENT AND MSE WALL PANEL PLACEMENT, THE CONTRACTOR SHALL ESTABLISH REFERENCE POINTS TO MONITOR SETTLEMENT ON TOP OF THE ABUTMENT SEAT AND EITHER ON TOP OF THE MSE WALL PANELS OR ON TOP OF THE MSE WALL LEVELING PAD AT POINTS WITHIN FIVE FEET OF ALL ENDS AND CORNERS AND AT THE CENTER OF BRIDGES AND THE CENTERLINE OF US301. AFTER THE CONCRETE ABUTMENTS HAVE BEEN CONSTRUCTED AND THE MSE WALL PANELS HAVE BEEN PLACED, READINGS ON ALL SETTLEMENT MONITORING DEVICES AND REFERENCE POINTS SHALL CONTINUE TO BE TAKEN AT A MINIMUM OF 30-DAY INTERVALS FOR THE NEXT 6 MONTHS OR AS DIRECTED BY THE ENGINEER.
  9. DO NOT ALLOW CONSTRUCTION ACTIVITY, OTHER THAN MONITORING, WITHIN THE QUARANTINE AREAS DURING THE QUARANTINE TIME PERIOD, EXCEPT AS PERMITTED BY THE ENGINEER IN THE AREA OF THE TEMPORARY ACCESS ROAD.
  10. LOCATE SETTLEMENT PLATFORMS HORIZONTALLY AND VERTICALLY AT THE DIRECTION OF THE ENGINEER. PROVIDE A TEMPORARY BENCHMARK FOR THE MONITORING OF THIS WORK. THE BENCHMARK SHALL BE LOCATED IN A PROTECTED AREA OUTSIDE OF THE AREA OF ANTICIPATED SETTLEMENT.
  11. SEE EC SHEET GENERAL NOTES AND MOT SHEET FOR TEMPORARY IMPACT RESTORATION REQUIREMENTS.



**TEMPORARY SURCHARGE LIMITS - PLAN**  
 NOT TO SCALE



**PLAN**



**ELEVATION**

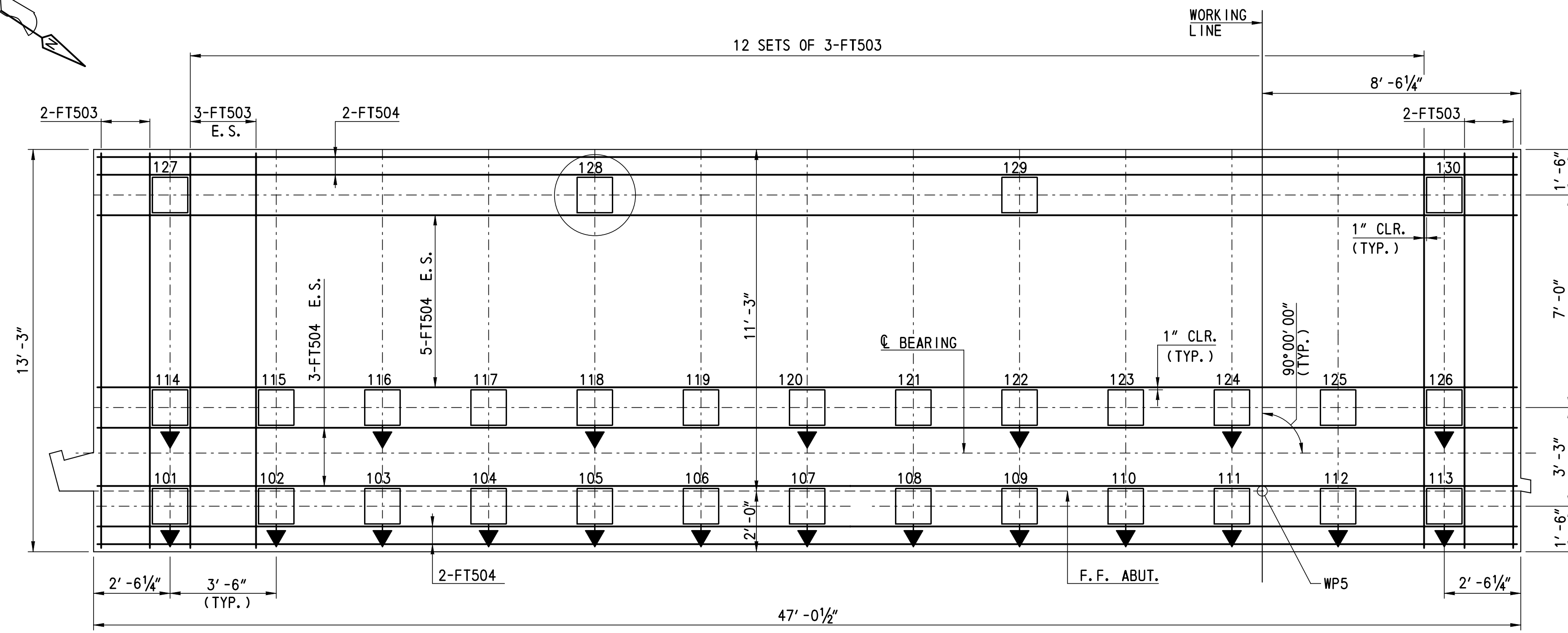
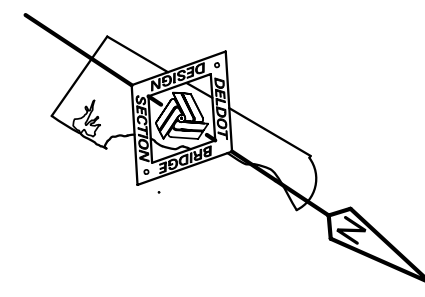
**SETTLEMENT PLATFORM DETAIL**  
 NOT TO SCALE

- \* INCIDENTAL TO ITEM 202000 - EXCAVATION AND EMBANKMENT. SUBMIT DESIGN CALCULATIONS FOR APPROVAL. NO TEMPORARY OR PERMANENT IMPACTS ALLOWED TO THE CULTURAL RESOURCE BOUNDARY.
- \*\* TEMPORARY SHORING AS NEEDED TO CONSTRUCT TEMPORARY ACCESS ROAD. TEMPORARY SHORING IS INCIDENTAL TO ITEM 202000 - EXCAVATION AND EMBANKMENT. SEE SHEET CS-03 FOR DETAILS OF TEMPORARY ACCESS ROAD.
- \*\*\* PIPE CAP WITH 1/4" DIA. ROUND HEAD STAINLESS STEEL BOLT SET SECURELY IN CAP. TACK WELD CAP TO PIPE.

SETTLEMENT PLATFORM LOCATION		
	STATION	OFFSET (FT.)
NB	1	636+61 56.0 RT.
	2	636+66 27.0 RT.
	3	638+13 25.0 RT.
	4	638+18 59.0 RT.
SB	5	636+73 26.0 LT.
	6	636+68 55.0 LT.
	7	638+20 55.0 LT.
	8	638+25 25.0 LT.

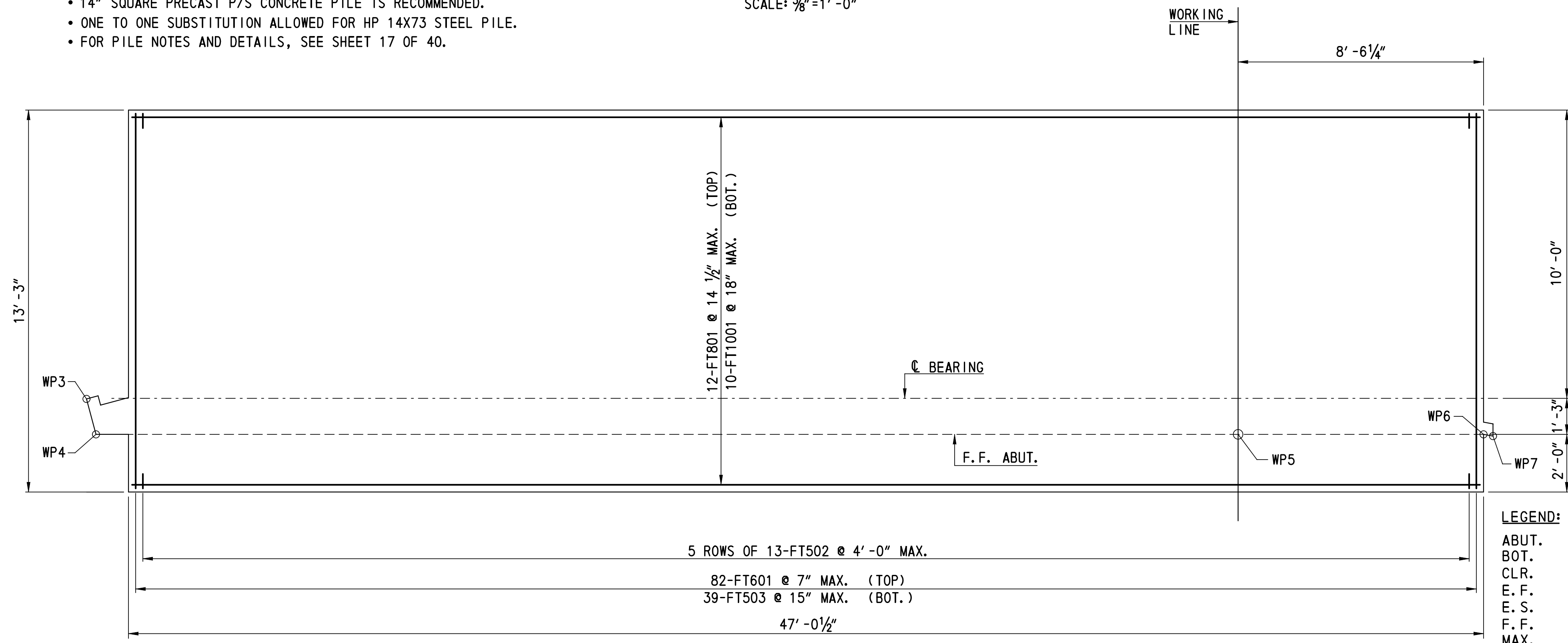
- LEGEND**
- ABUT. = ABUTMENT
  - CONSTR. = CONSTRUCTION
  - DA = DENIAL OF ACCESS
  - DIA. = DIAMETER
  - EL. = ELEVATION
  - F.F. = FRONT FACE
  - LT. = LEFT
  - M.S.E. = MECHANICALLY STABILIZED EARTH
  - RT. = RIGHT
  - R/W = RIGHT-OF-WAY
  - STA. = STATION
  - STD. = STANDARD
  - WL = WETLAND
  - [Hatched Area] = TEMPORARY SURCHARGE
  - [Hatched Area] = TEMPORARY SURCHARGE ON GEOTEXTILE
  - [Circle with Cross] = SETTLEMENT PLATFORM
  - [Hatched Area] = TEMPORARY ACCESS ROAD



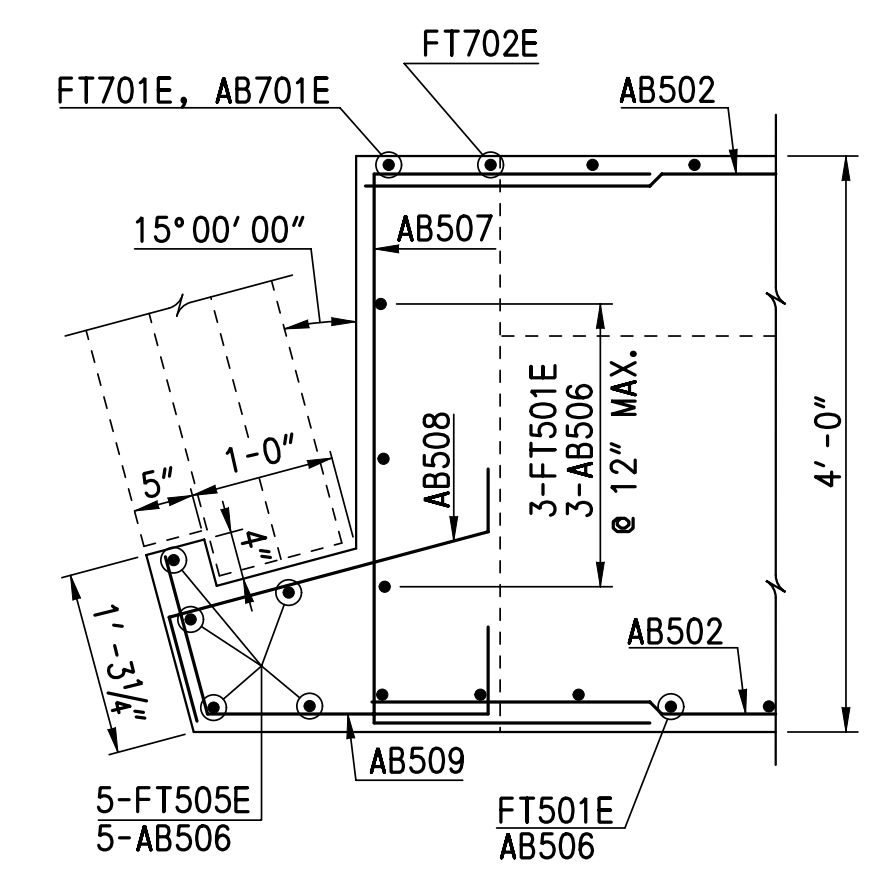


**PILE LAYOUT PLAN-WITH SUPPLEMENTAL REINFORCEMENT**  
SCALE: 3/8" = 1' - 0"

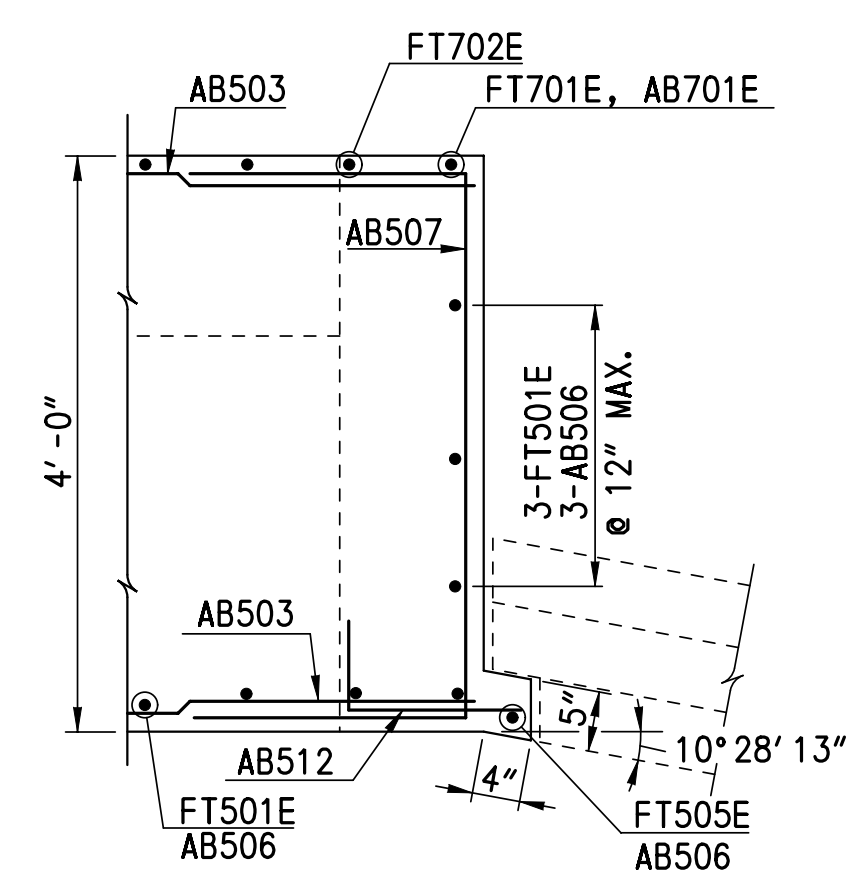
- NOTES:**
- 14" SQUARE PRECAST P/S CONCRETE PILE IS RECOMMENDED.
  - ONE TO ONE SUBSTITUTION ALLOWED FOR HP 14X73 STEEL PILE.
  - FOR PILE NOTES AND DETAILS, SEE SHEET 17 OF 40.



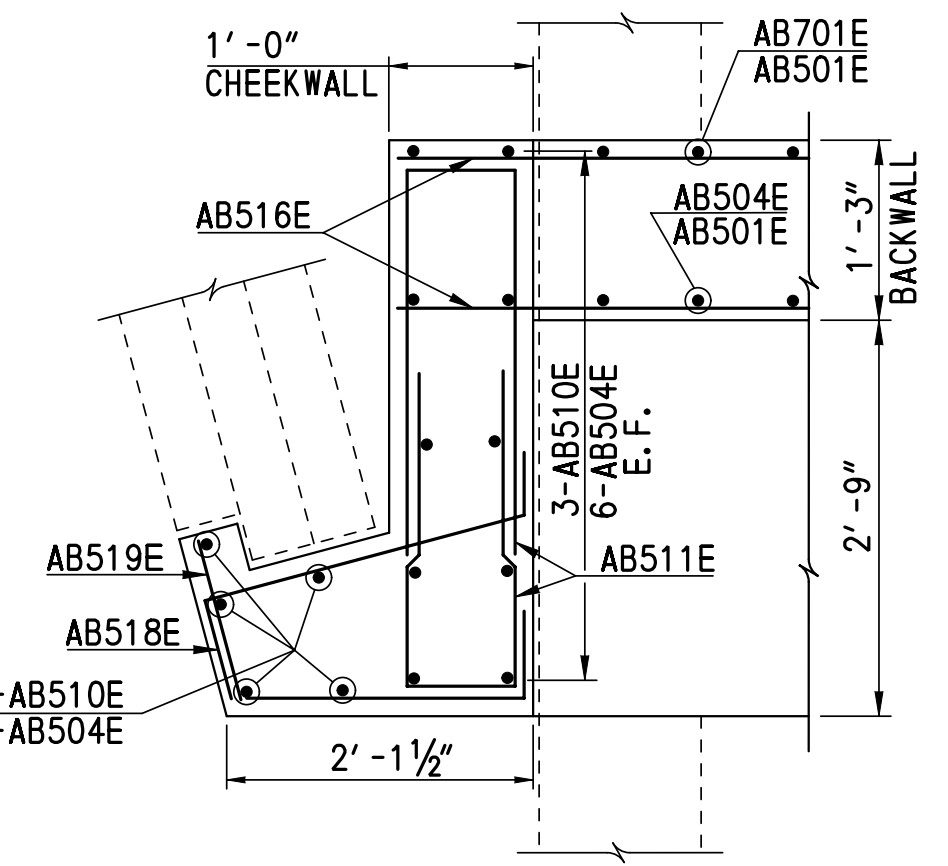
**PLAN TOP AND BOTTOM REINFORCEMENT**  
SCALE: 3/8" = 1' - 0"



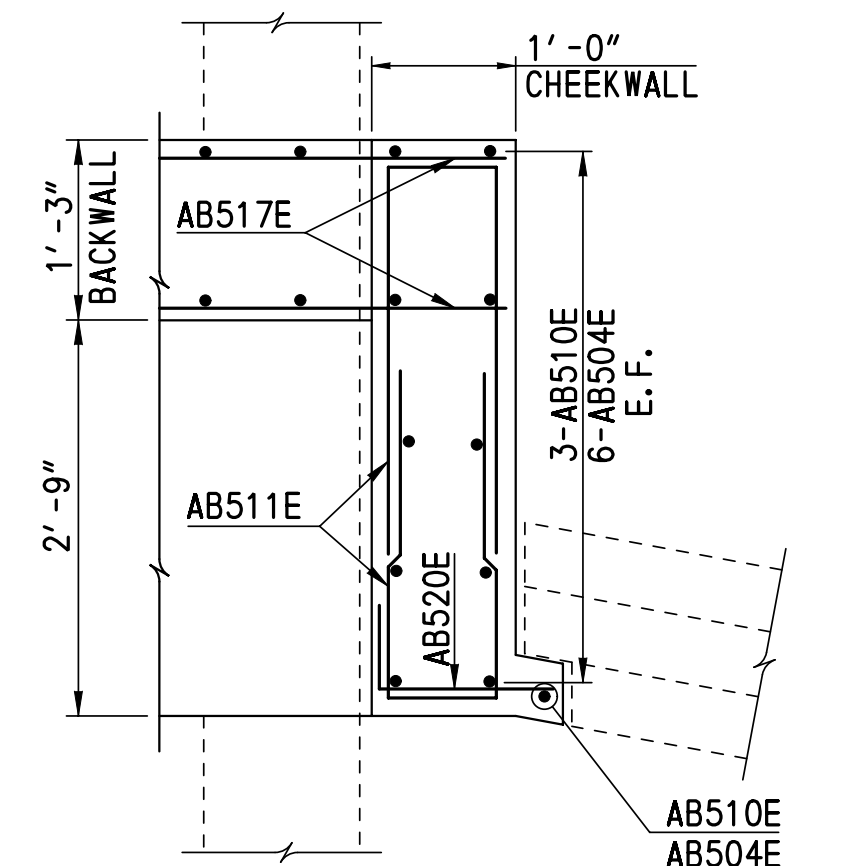
**SECTION NA1-NA1**  
SCALE: 3/4" = 1' - 0"



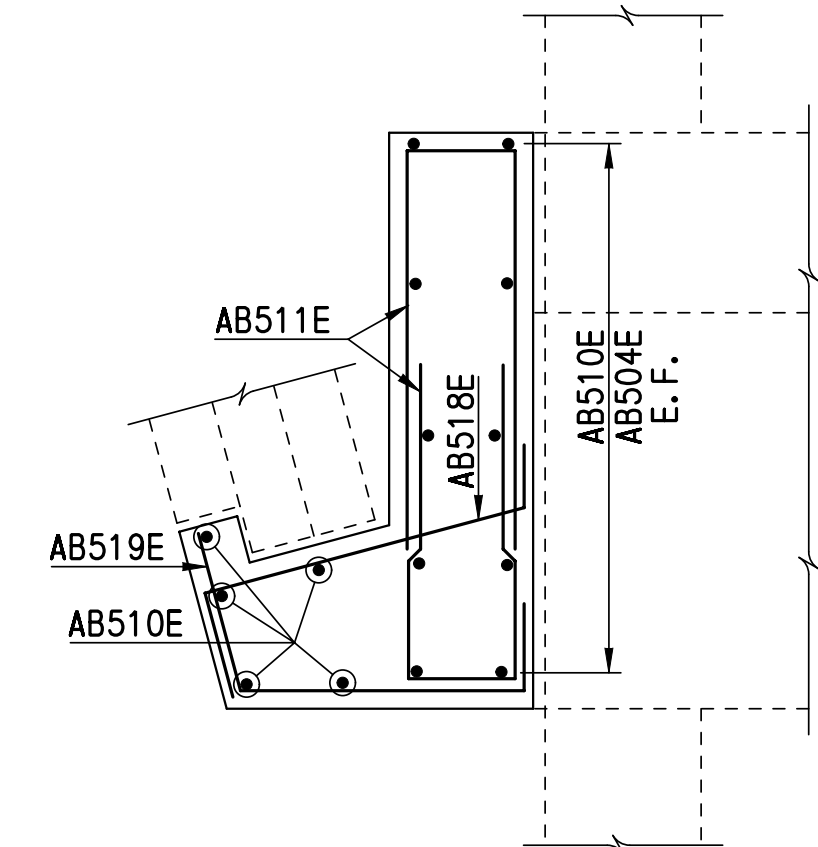
**SECTION NA4-NA4**  
SCALE: 3/4" = 1' - 0"



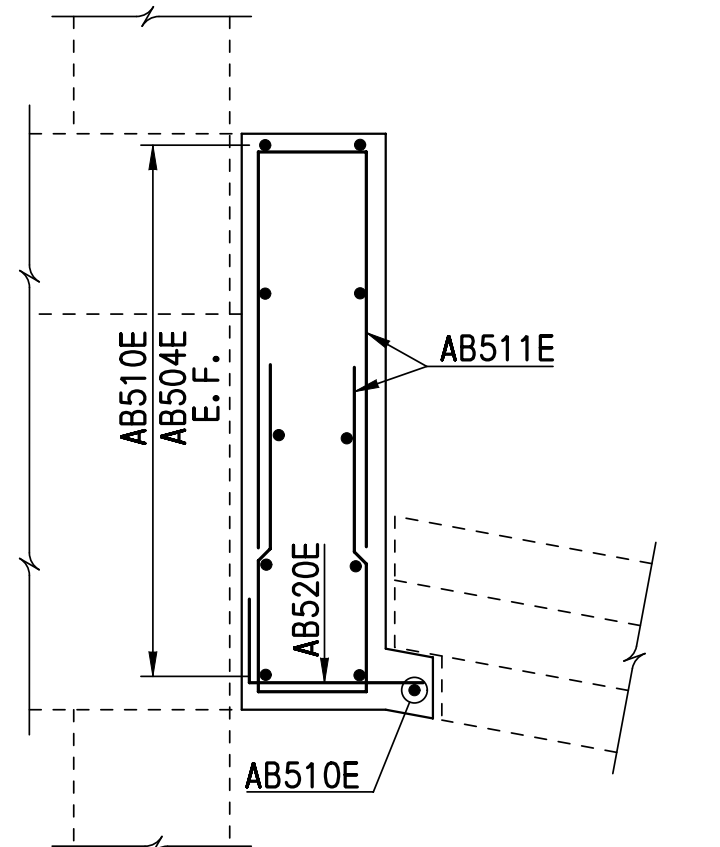
**SECTION NA2-NA2**  
SCALE: 3/4" = 1' - 0"



**SECTION NA5-NA5**  
SCALE: 3/4" = 1' - 0"



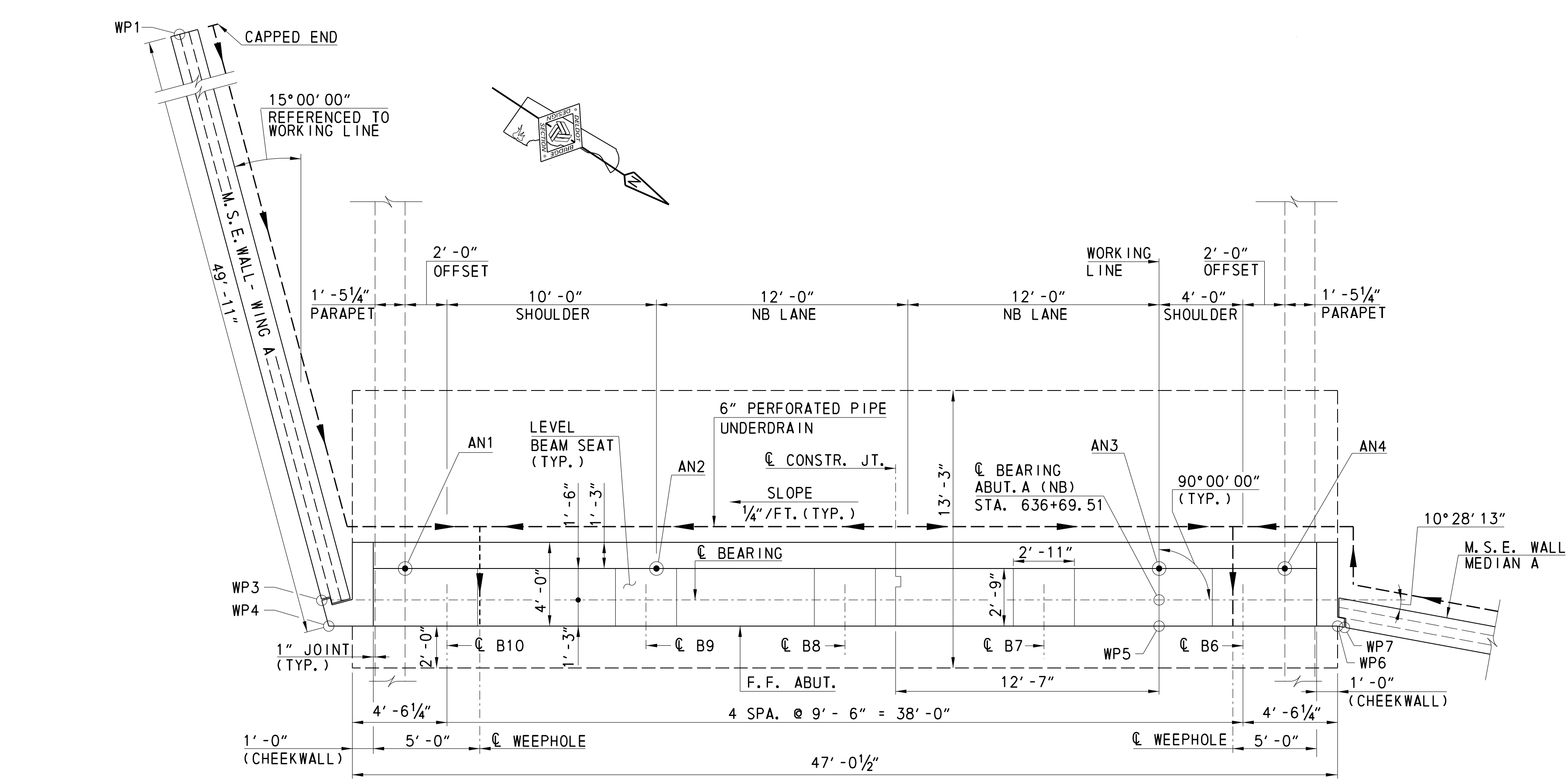
**SECTION NA3-NA3**  
SCALE: 3/4" = 1' - 0"



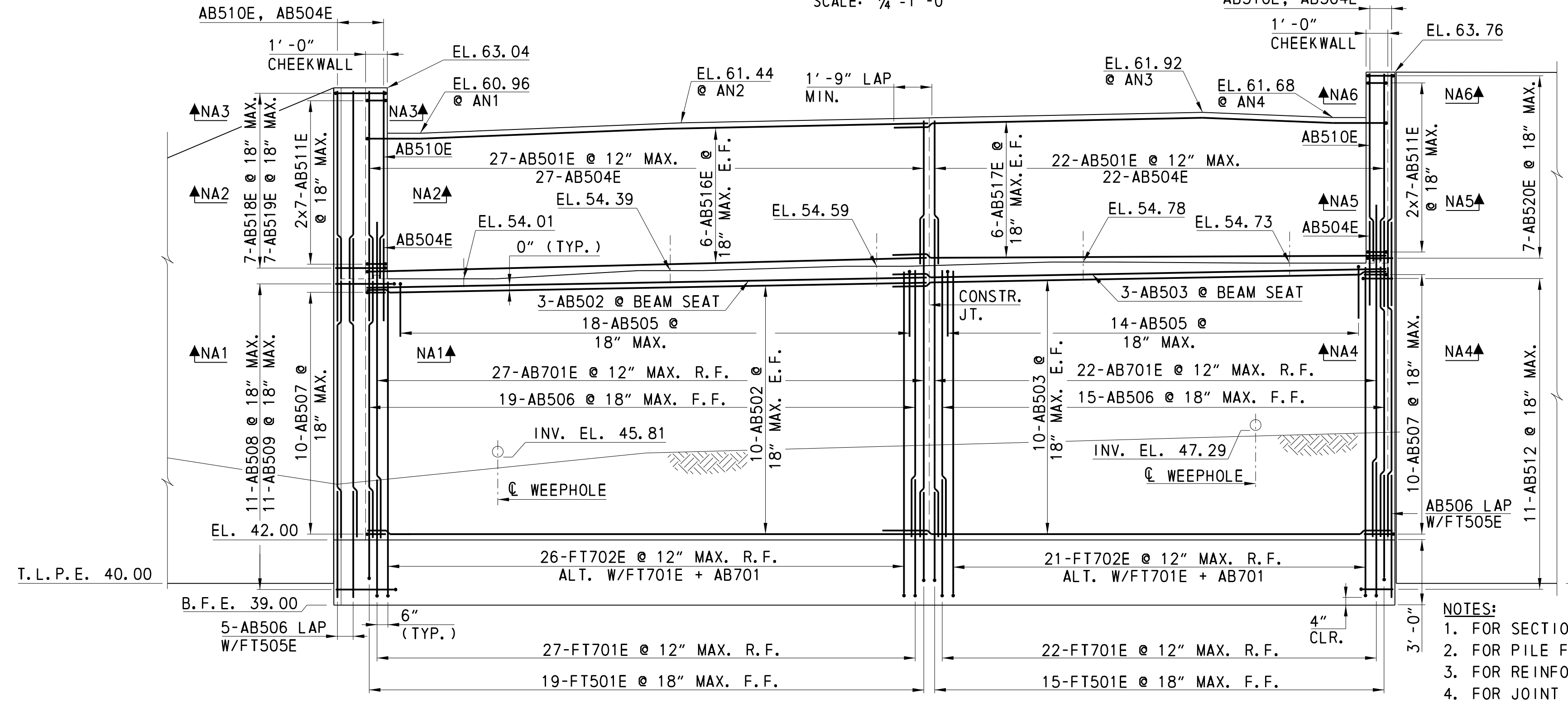
**SECTION NA6-NA6**  
SCALE: 3/4" = 1' - 0"

- LEGEND:**
- ABUT. = ABUTMENT
  - BOT. = BOTTOM
  - CLR. = CLEAR
  - E. F. = EACH FACE
  - E. S. = EQUAL SPACING
  - F. F. = FRONT FACE
  - MAX. = MAXIMUM
  - P/S = PRESTRESSED
  - TYP. = TYPICAL
  - WP = WORK POINT
  - (Symbol with arrow) = DENOTES BATTER PILE, 1 HORIZONTAL ON 3 VERTICAL
  - (Symbol with circle) = DENOTES TEST PILE

- NOTES:**
1. FOR LOCATION OF SECTIONS NA1-NA1 TO NA6-NA6, SEE SHEET 7 OF 40.
  2. FOR REINFORCEMENT BAR LIST, SEE SHEET 10 OF 40.



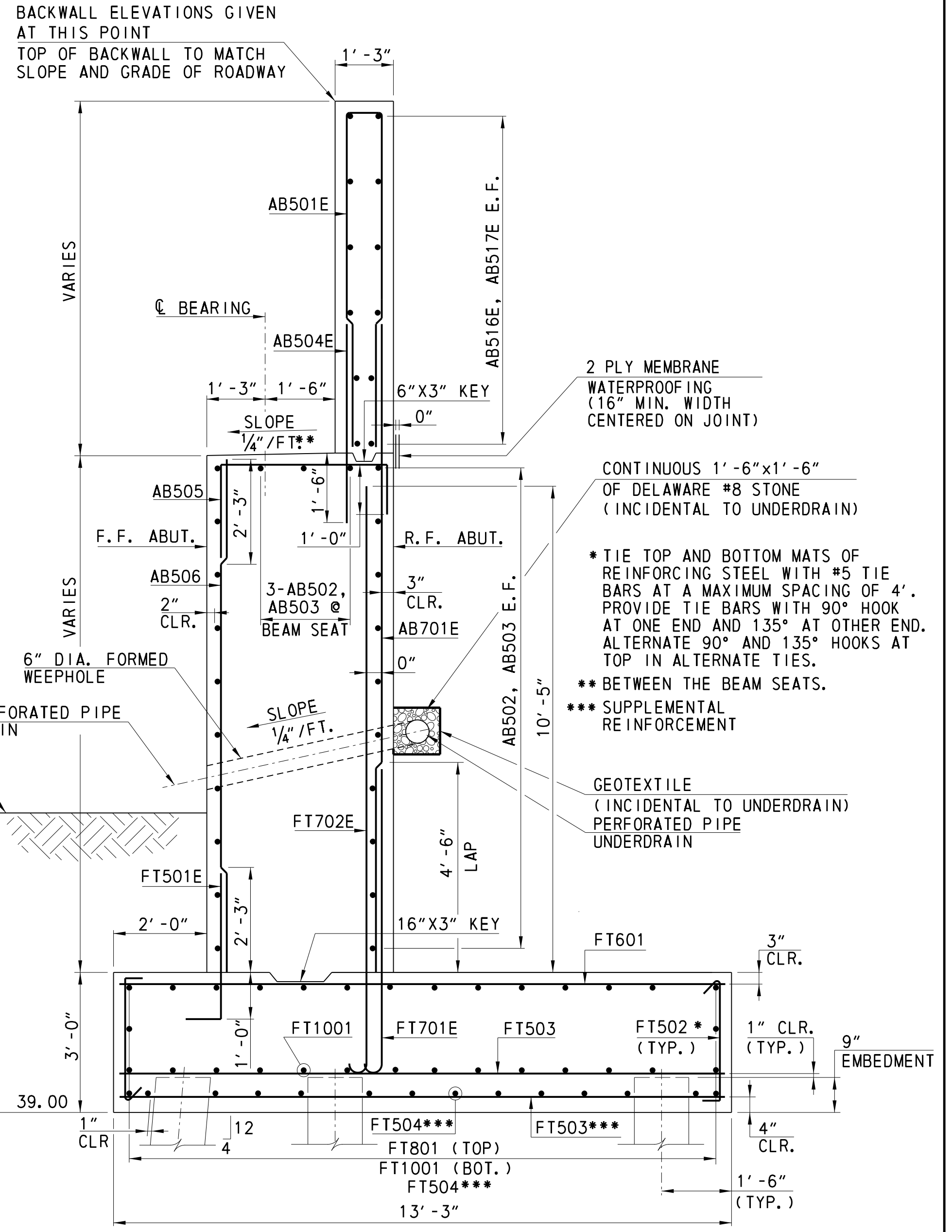
**PLAN**  
SCALE: 1/4" = 1'-0"



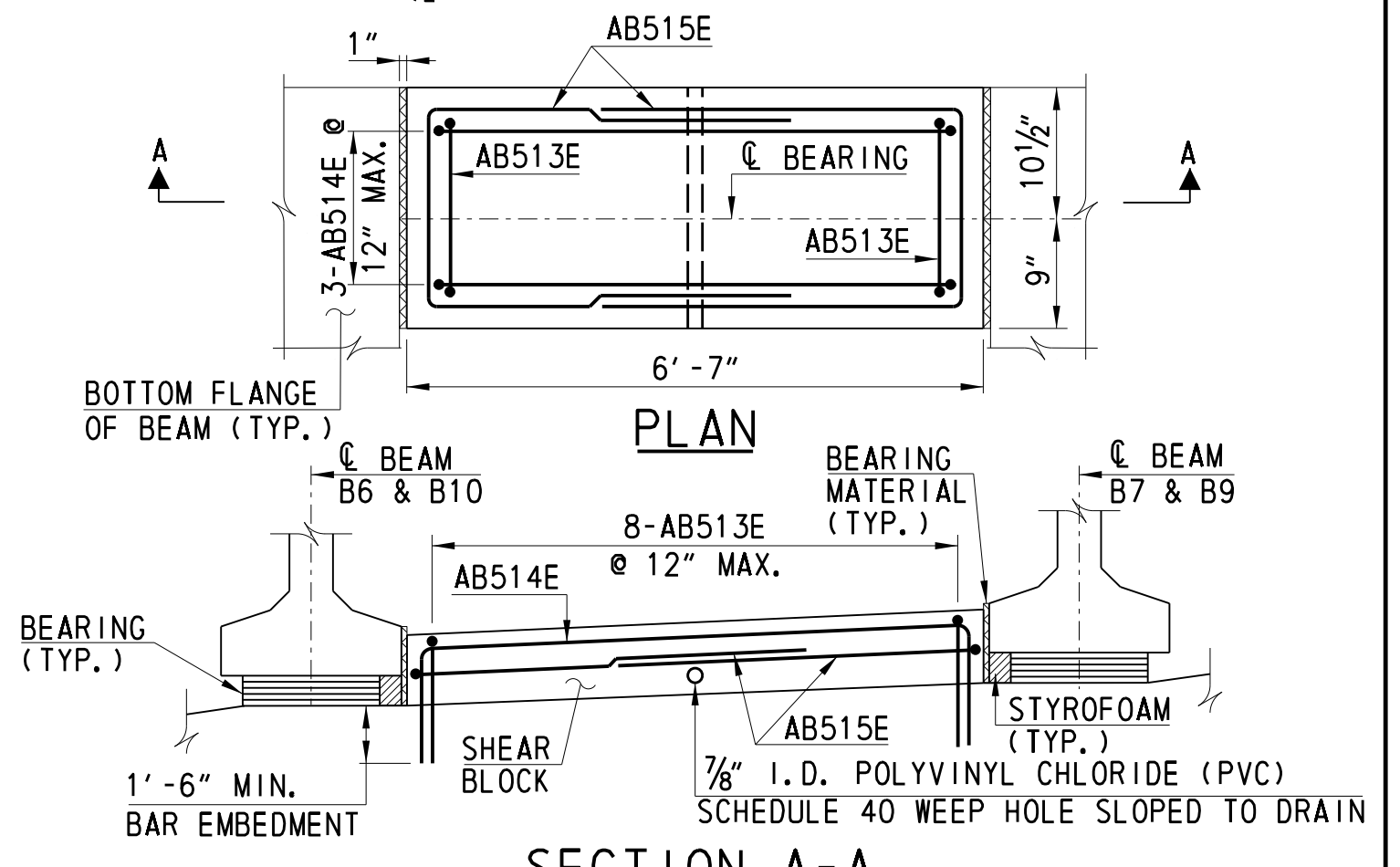
**ELEVATION**  
SCALE: 1/4" = 1'-0"

- LEGEND:**
- ABUT. = ABUTMENT
  - ALT. = ALTERNATE
  - B. F. E. = BOTTOM OF FOOTING ELEVATION
  - BOT. = BOTTOM
  - CLR. = CLEAR
  - CONSTR. = CONSTRUCTION
  - DIA. = DIAMETER
  - E. F. = EACH FACE
  - EL. = ELEVATION
  - F. F. = FRONT FACE
  - FT. = FEET
  - I. D. = INSIDE DIAMETER
  - INV. = INVERT
  - JT. = JOINT
  - MAX. = MAXIMUM
  - MIN. = MINIMUM
  - M. S. E. = MECHANICALLY STABILIZED EARTH
  - NB = NORTHBOUND
  - R. F. = REAR FACE
  - SPA. = SPACES
  - STA. = STATION
  - TYP. = TYPICAL
  - T. L. P. E. = TOP OF LEVELING PAD ELEVATION
  - W/ = WITH
  - WP = WORK POINT

- NOTES:**
1. FOR SECTIONS NA1-NA1 TO NA6-NA6, SEE SHEET 6 OF 40.
  2. FOR PILE FOOTING PLAN, SEE SHEET 6 OF 40.
  3. FOR REINFORCEMENT BAR LIST, SEE SHEET 10 OF 40.
  4. FOR JOINT AND WATER STOP DETAIL, SEE SHEET 4 OF 40.
  5. FOR ADDITIONAL 6" PERFORATED PIPE UNDERDRAIN INFORMATION, SEE SHEET 16 OF 40.
  6. STYROFOAM AND P.V.C. SCHEDULE 40 WEEP HOLE PAYMENT SHALL BE INCIDENTAL TO CONCRETE CONSTRUCTION.
  7. BEARING MATERIAL SHALL BE NEOPRENE WITH A DUROMETER OF 50±5. PAYMENT SHALL BE INCIDENTAL TO CONCRETE CONSTRUCTION.
  8. MEMBRANE WATERPROOFING SHALL BE INCIDENTAL TO ITEM 602015 - PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT ABOVE FOOTING, CLASS A. SEE SPECIAL PROVISION ITEM 602616 - WATERPROOFING P.C.C. MASONRY SURFACES FOR ADDITIONAL REQUIREMENTS.

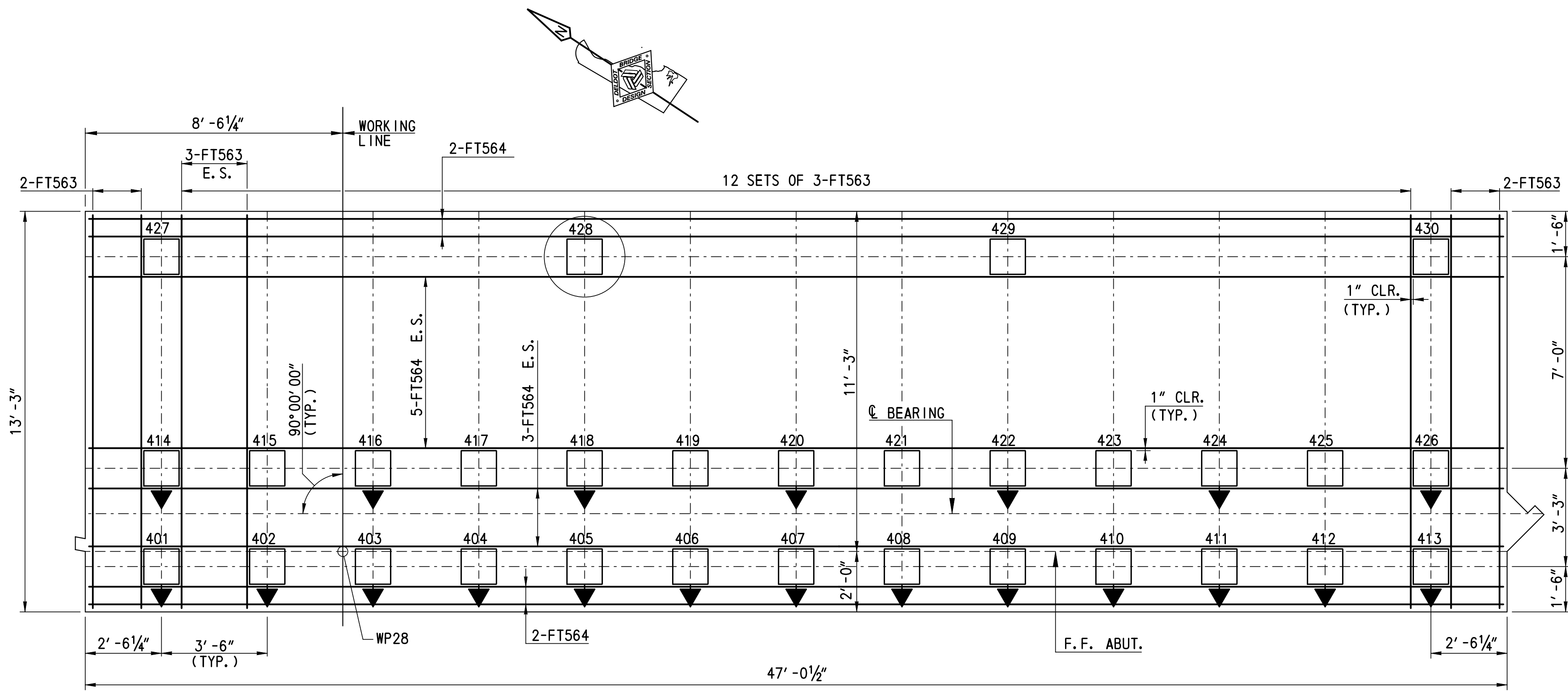


**TYPICAL SECTION**  
SCALE: 1/2" = 1'-0"



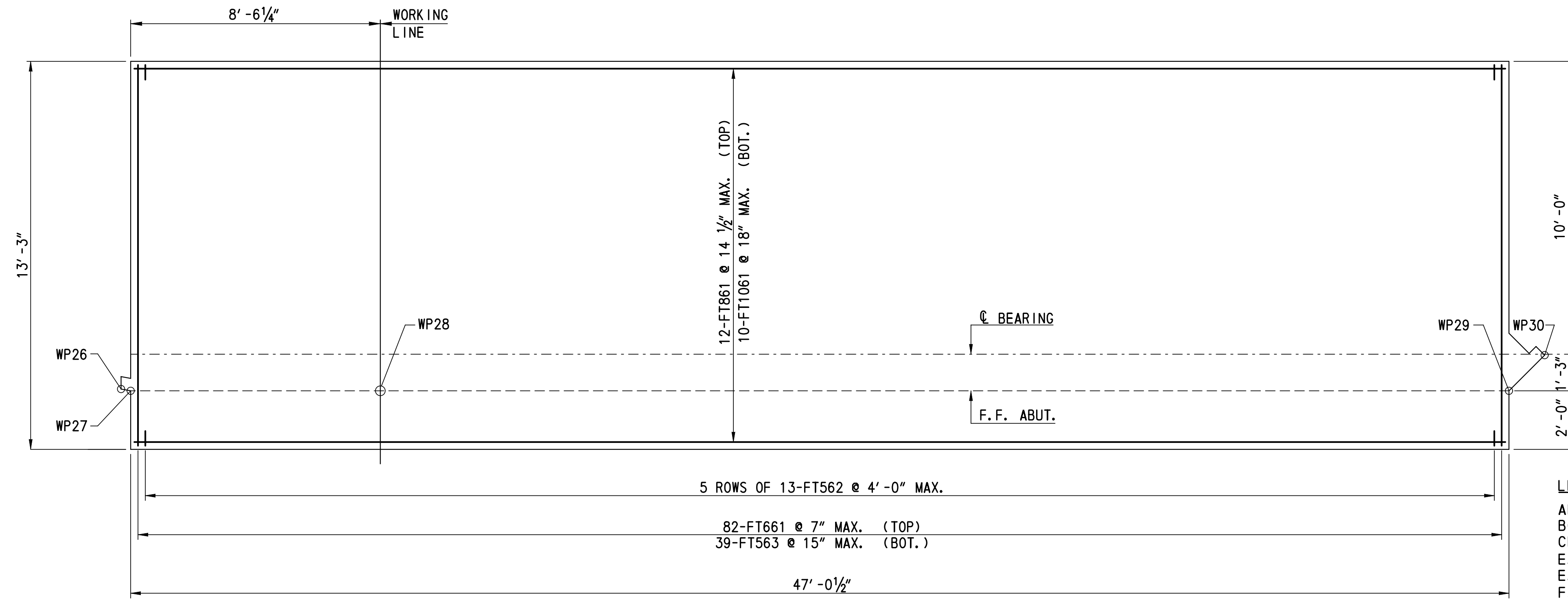
**SECTION A-A**  
**TYPICAL SHEAR BLOCK DETAIL**  
NOTE: EXTEND SHEAR BLOCK 8" ABOVE BOTTOM OF BEAMS.  
NOT TO SCALE

DATUM 30.00

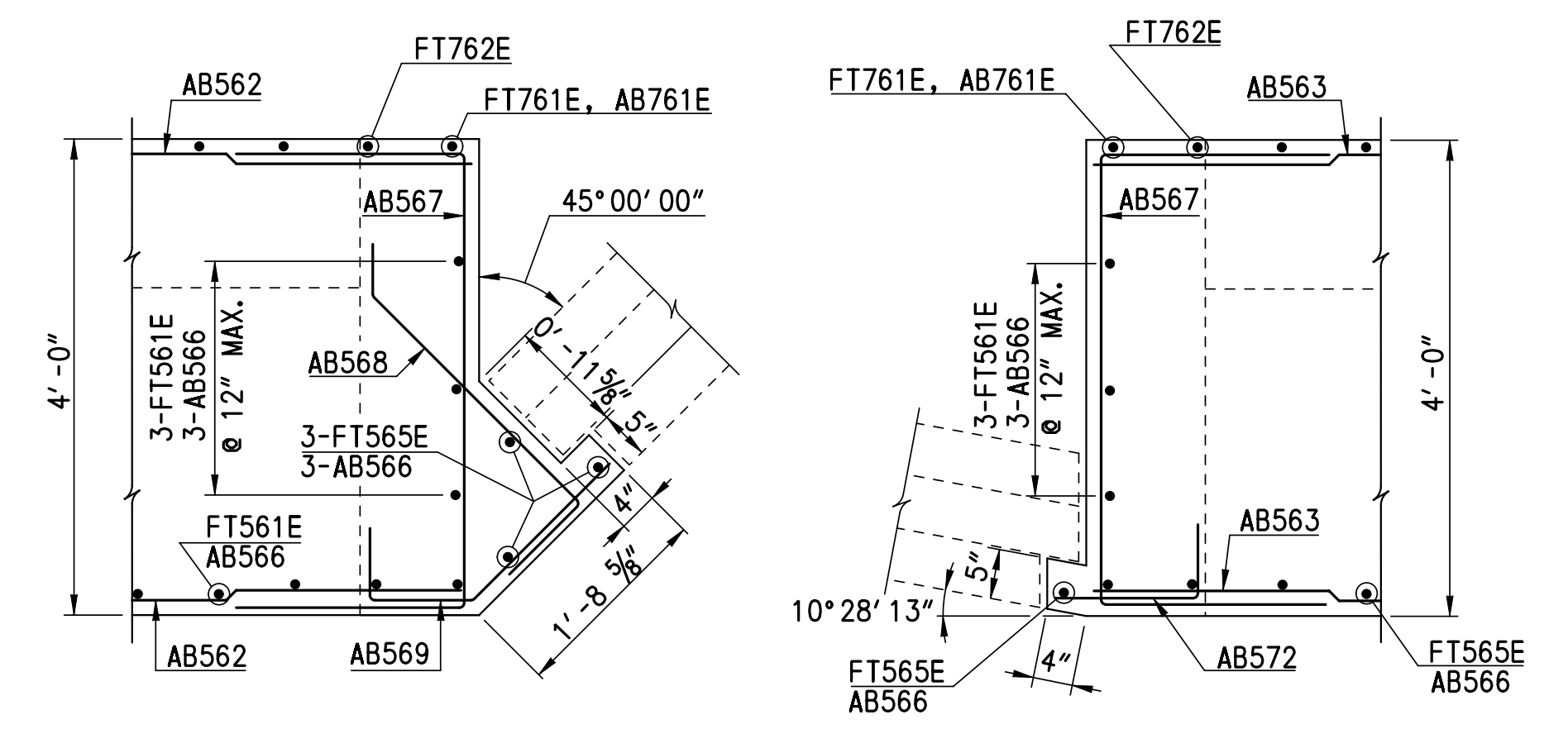


**PILE LAYOUT PLAN - WITH SUPPLEMENTAL REINFORCEMENT**  
SCALE: 3/8"=1'-0"

- NOTES:**
- 14" SQUARE PRECAST P/S CONCRETE PILE IS RECOMMENDED.
  - ONE TO ONE SUBSTITUTION ALLOWED FOR HP 14X73 STEEL PILE.
  - FOR PILE NOTES AND DETAILS, SEE SHEET 17 OF 40.

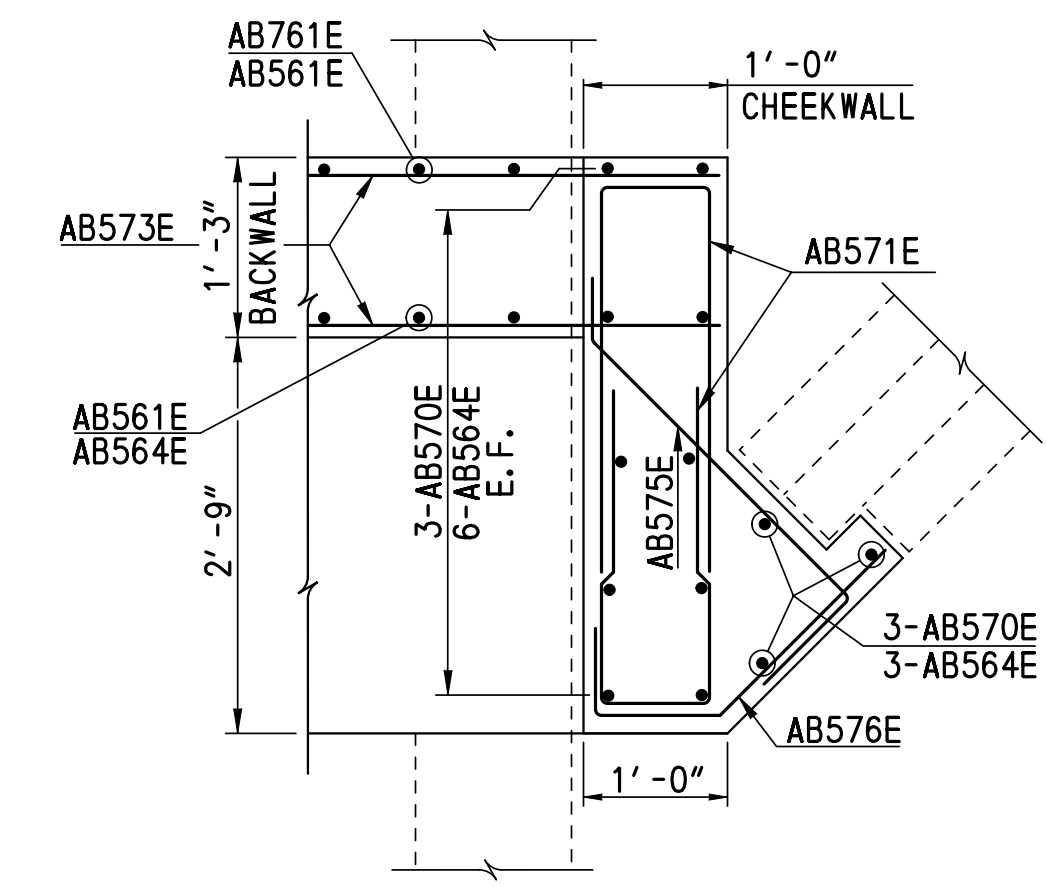


**PLAN TOP AND BOTTOM REINFORCEMENT**  
SCALE: 3/8"=1'-0"

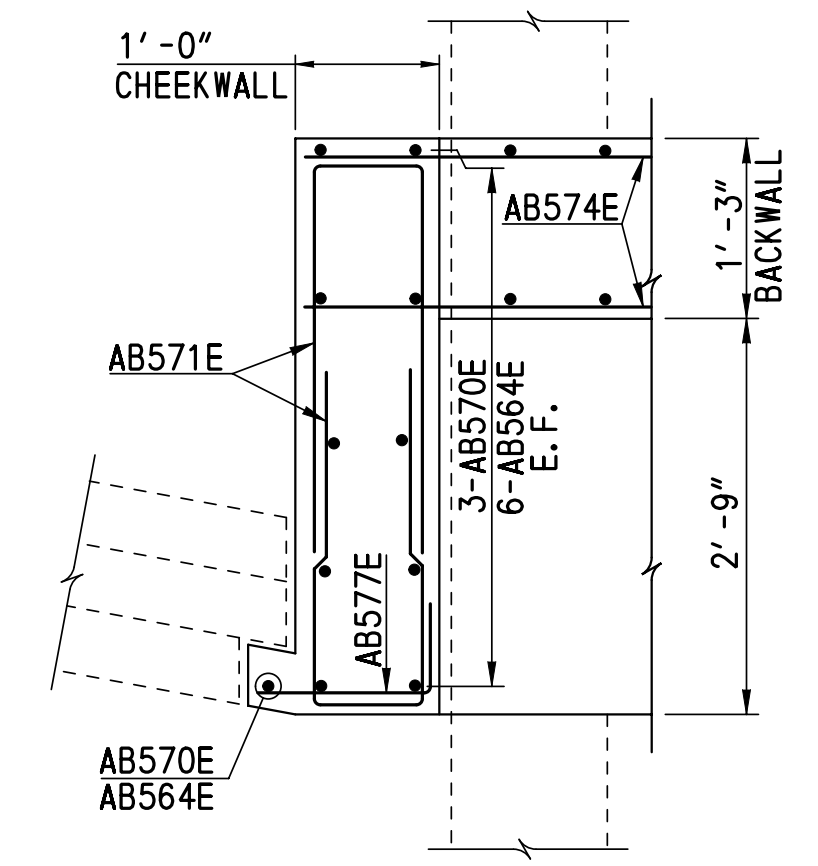


**SECTION NB1-NB1**  
SCALE: 3/4"=1'-0"

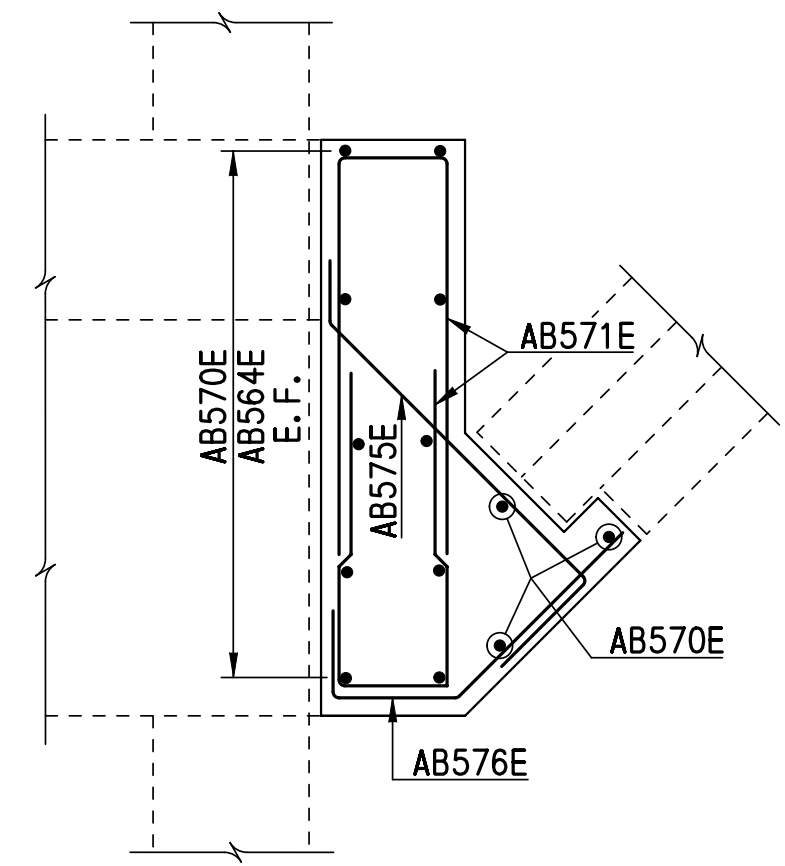
**SECTION NB4-NB4**  
SCALE: 3/4"=1'-0"



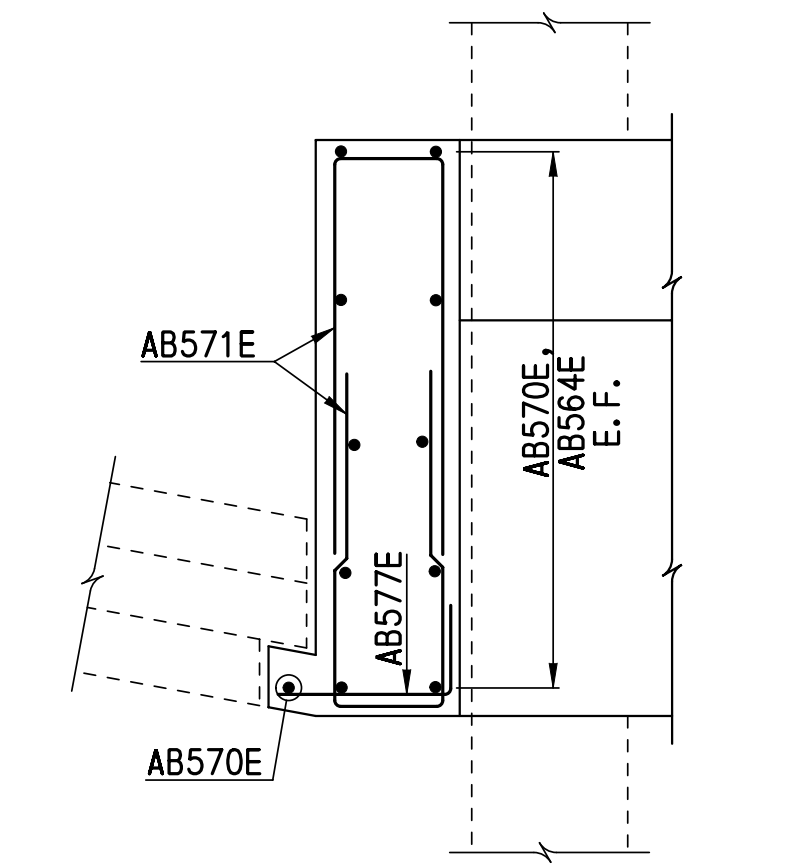
**SECTION NB2-NB2**  
SCALE: 3/4"=1'-0"



**SECTION NB5-NB5**  
SCALE: 3/4"=1'-0"



**SECTION NB3-NB3**  
SCALE: 3/4"=1'-0"



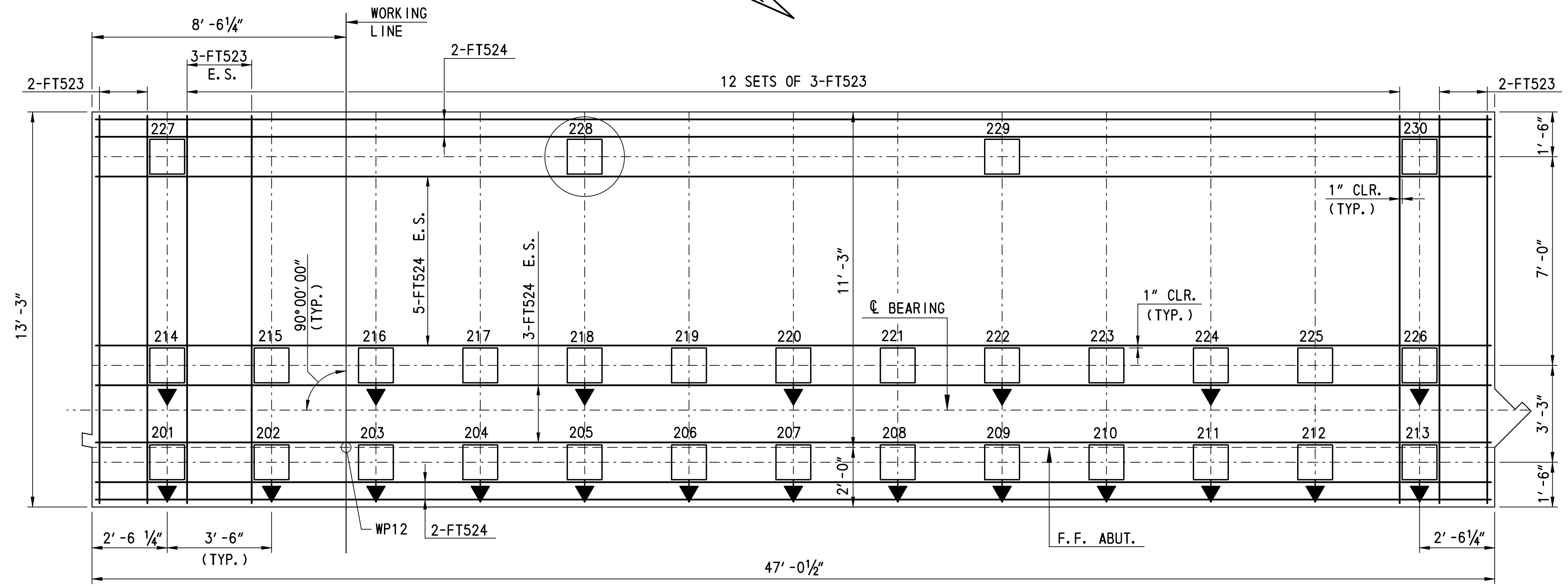
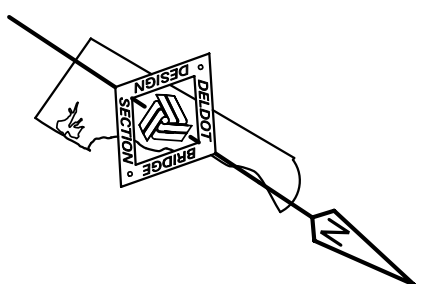
**SECTION NB6-NB6**  
SCALE: 3/4"=1'-0"

- LEGEND:**
- ABUT. = ABUTMENT
  - BOT. = BOTTOM
  - CLR. = CLEAR
  - E.F. = EACH FACE
  - E.S. = EQUAL SPACING
  - F.F. = FRONT FACE
  - MAX. = MAXIMUM
  - P/S = PRESTRESSED
  - TYP. = TYPICAL
  - WP = WORK POINT
  - = DENOTES BATTER PILE, 1 HORIZONTAL ON 3 VERTICAL
  - = DENOTES TEST PILE

- NOTES:**
1. FOR LOCATION OF SECTIONS NB1-NB1 TO NB6-NB6, SEE SHEET 9 OF 40.
  2. FOR REINFORCEMENT BAR LIST, SEE SHEET 10 OF 40.

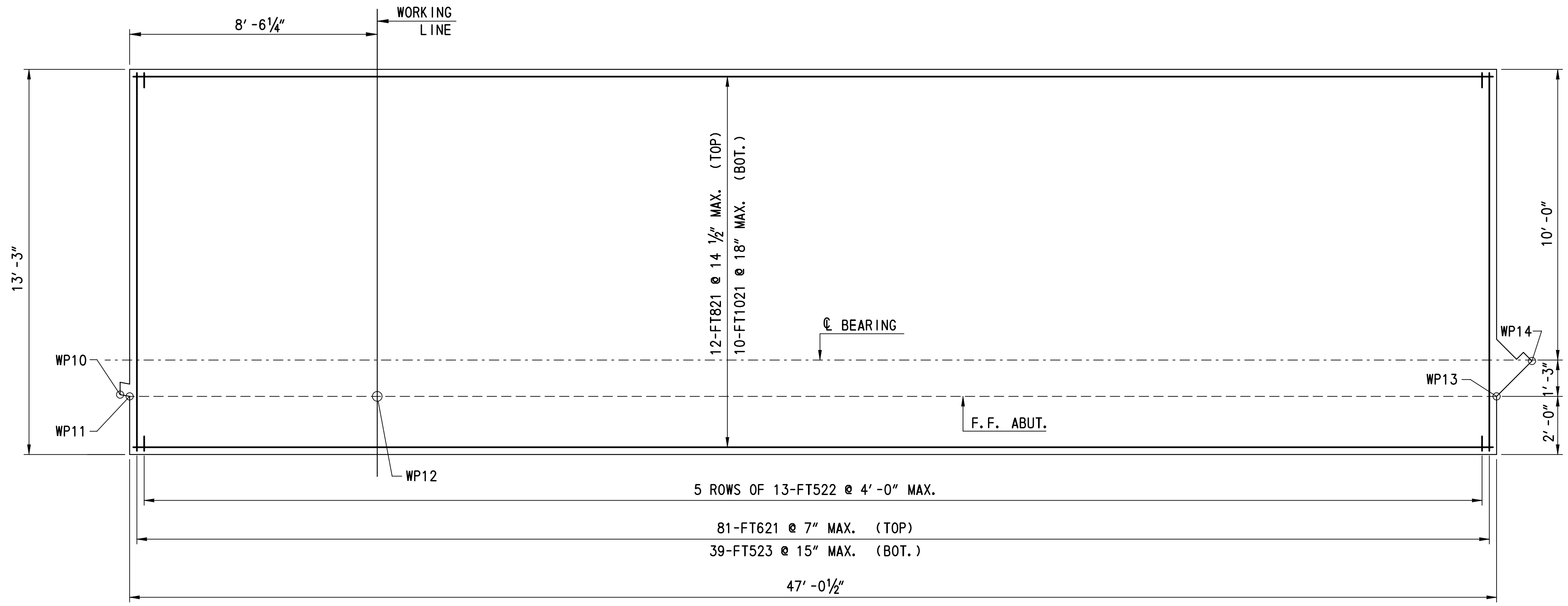




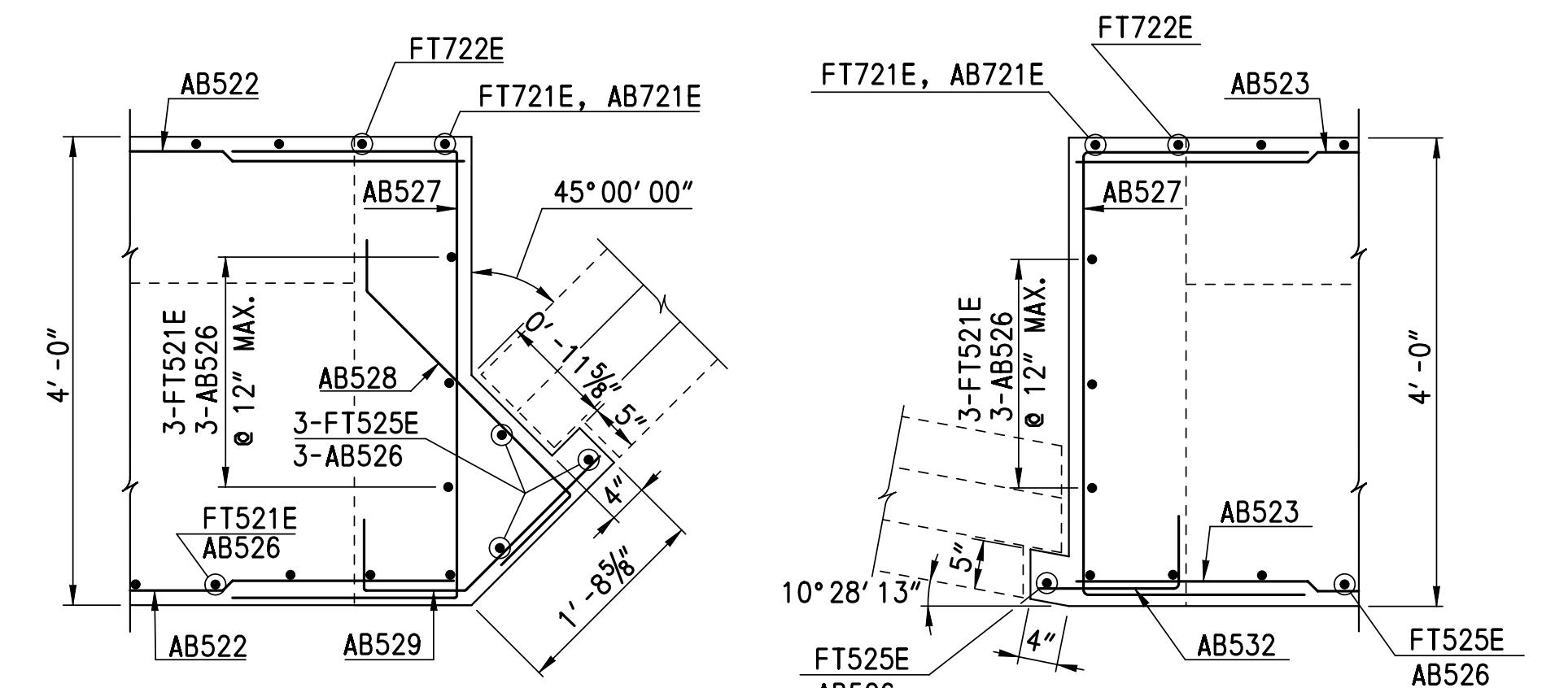


- NOTES:
- 14" SQUARE PRECAST P/S CONCRETE PILE IS RECOMMENDED.
  - ONE TO ONE SUBSTITUTION ALLOWED FOR HP 14X73 STEEL PILE.
  - FOR PILE NOTES AND DETAILS, SEE SHEET 17 OF 40.

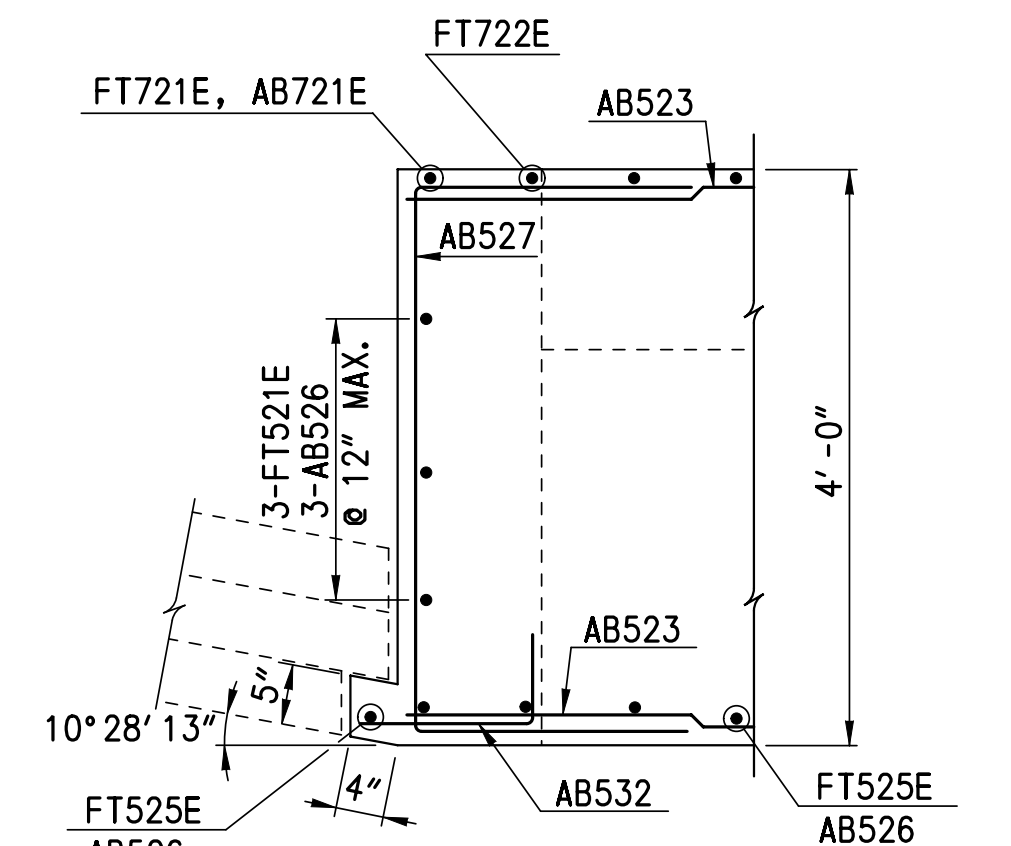
**PILE LAYOUT PLAN-WITH SUPPLEMENTAL REINFORCEMENT**  
SCALE: 3/8" = 1' - 0"



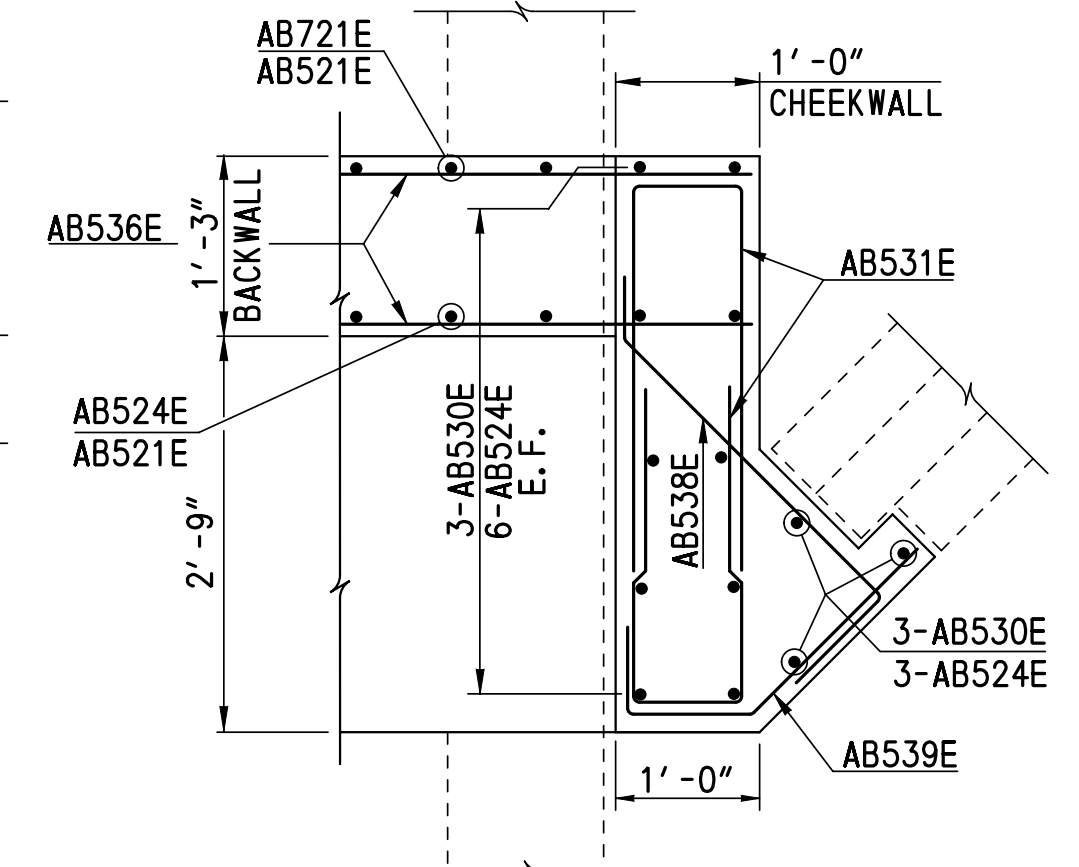
**PLAN TOP AND BOTTOM REINFORCEMENT**  
SCALE: 3/8" = 1' - 0"



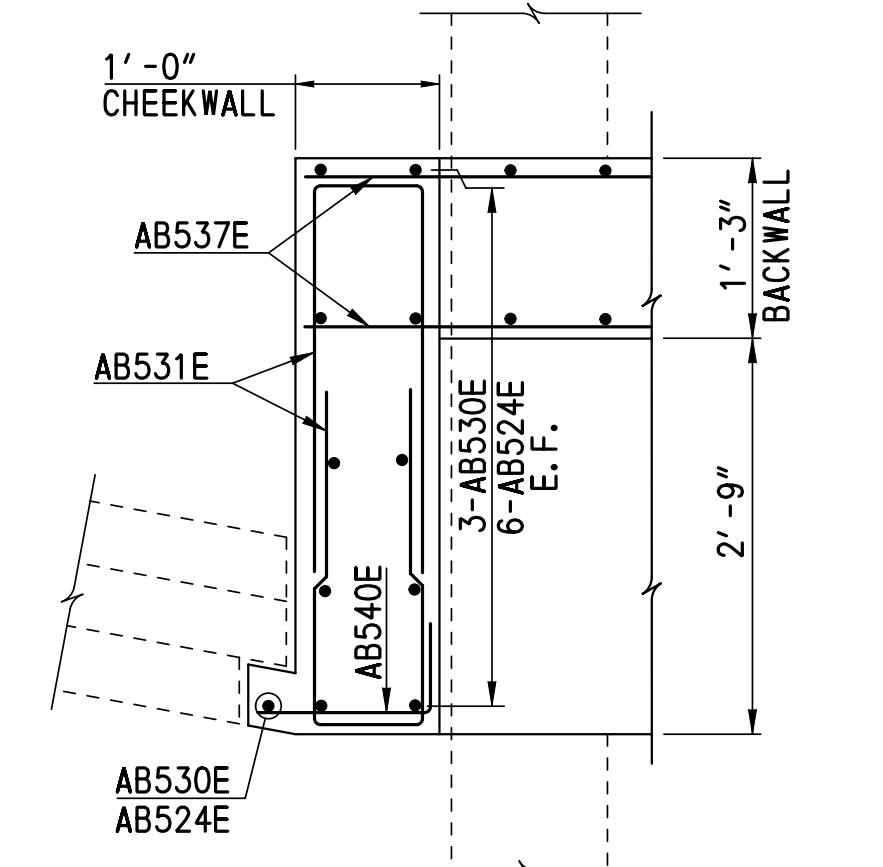
**SECTION SA1-SA1**  
SCALE: 3/4" = 1' - 0"



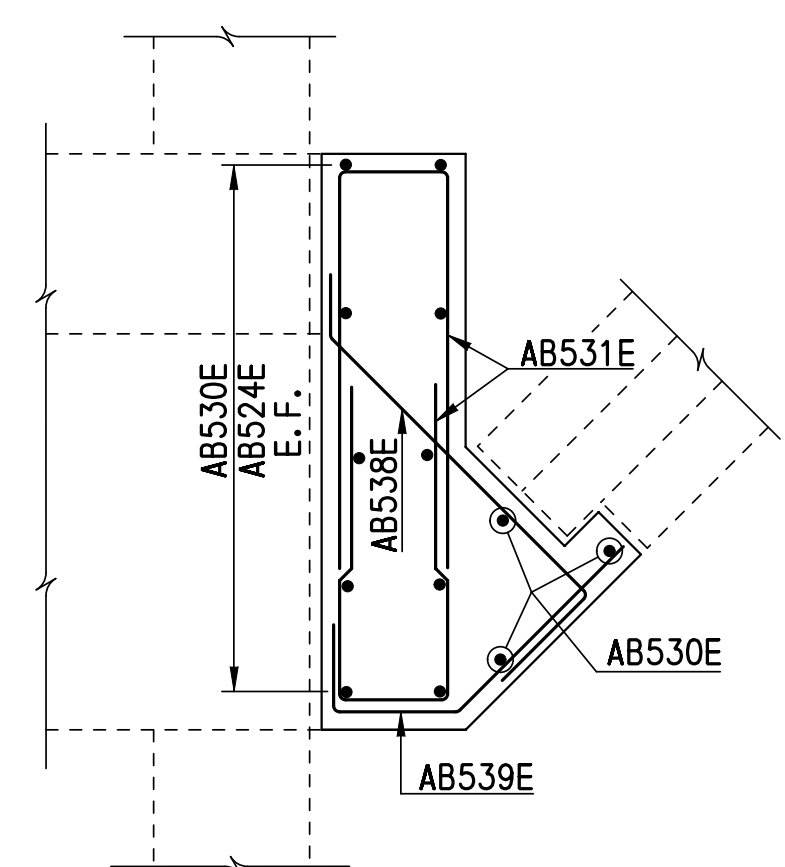
**SECTION SA4-SA4**  
SCALE: 3/4" = 1' - 0"



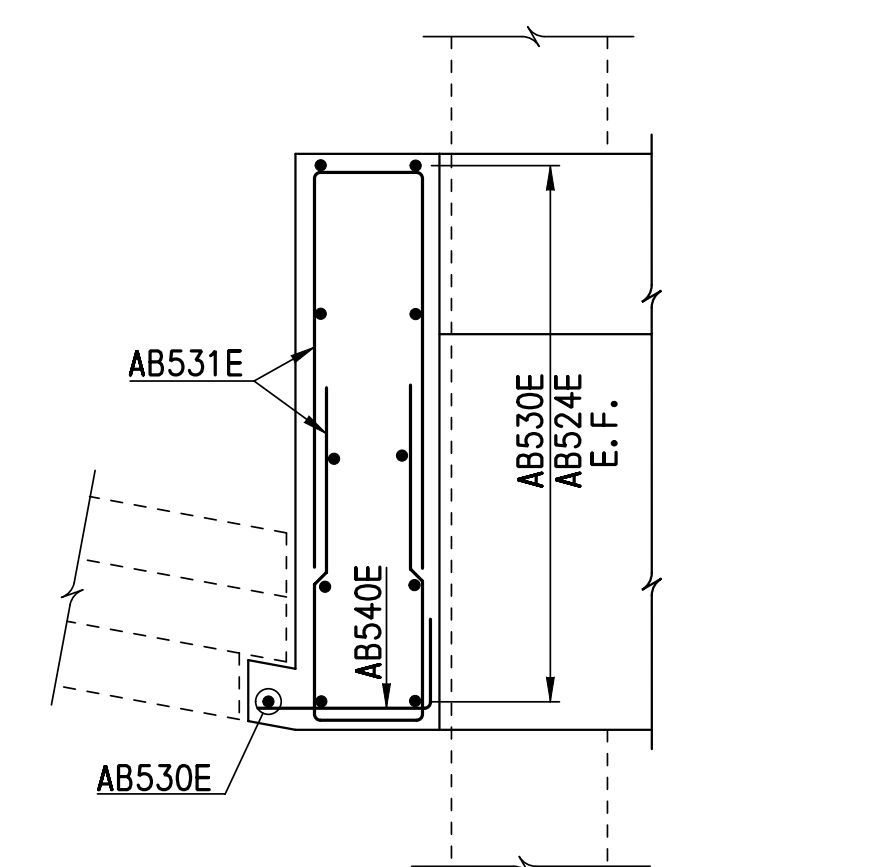
**SECTION SA2-SA2**  
SCALE: 3/4" = 1' - 0"



**SECTION SA5-SA5**  
SCALE: 3/4" = 1' - 0"



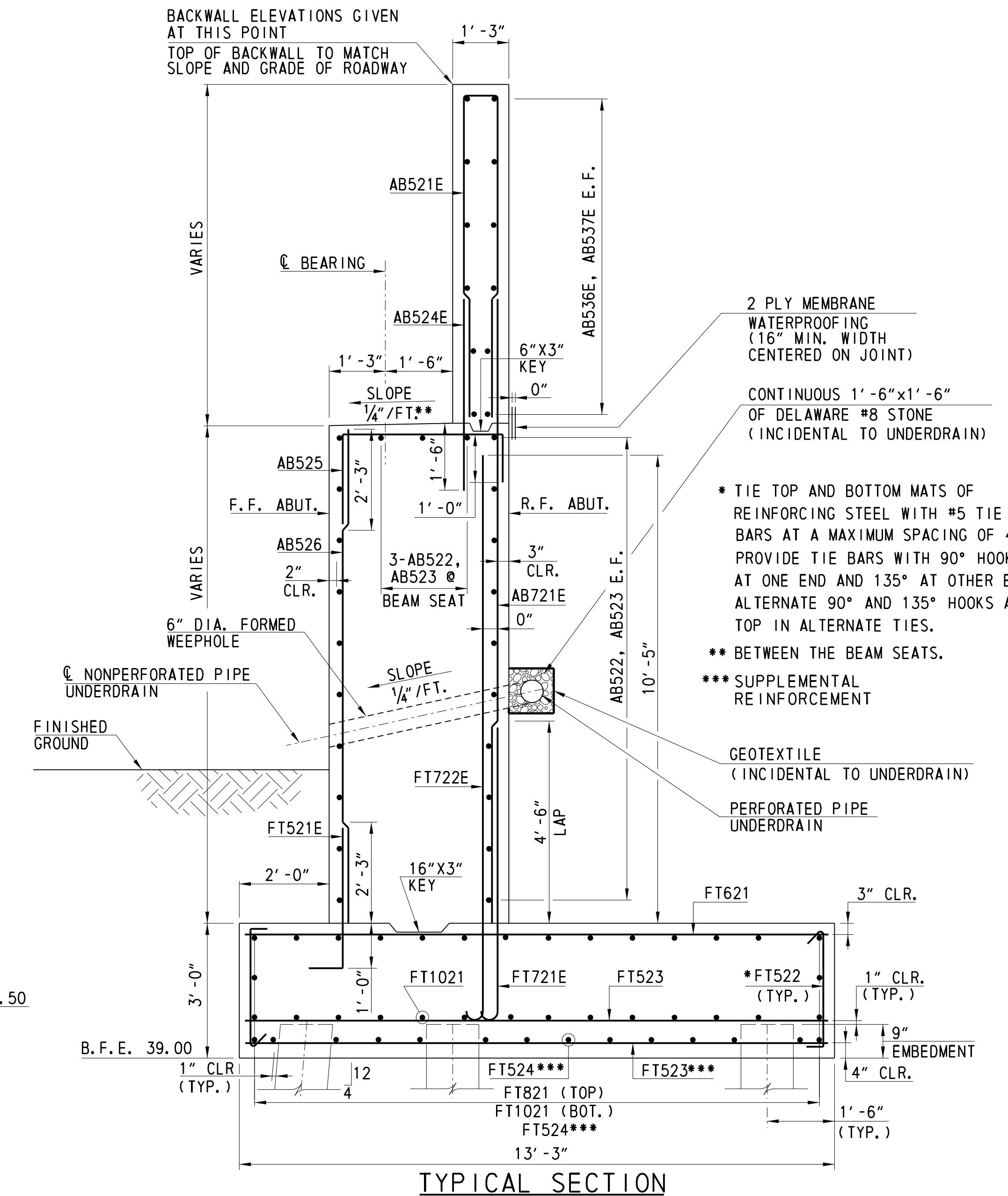
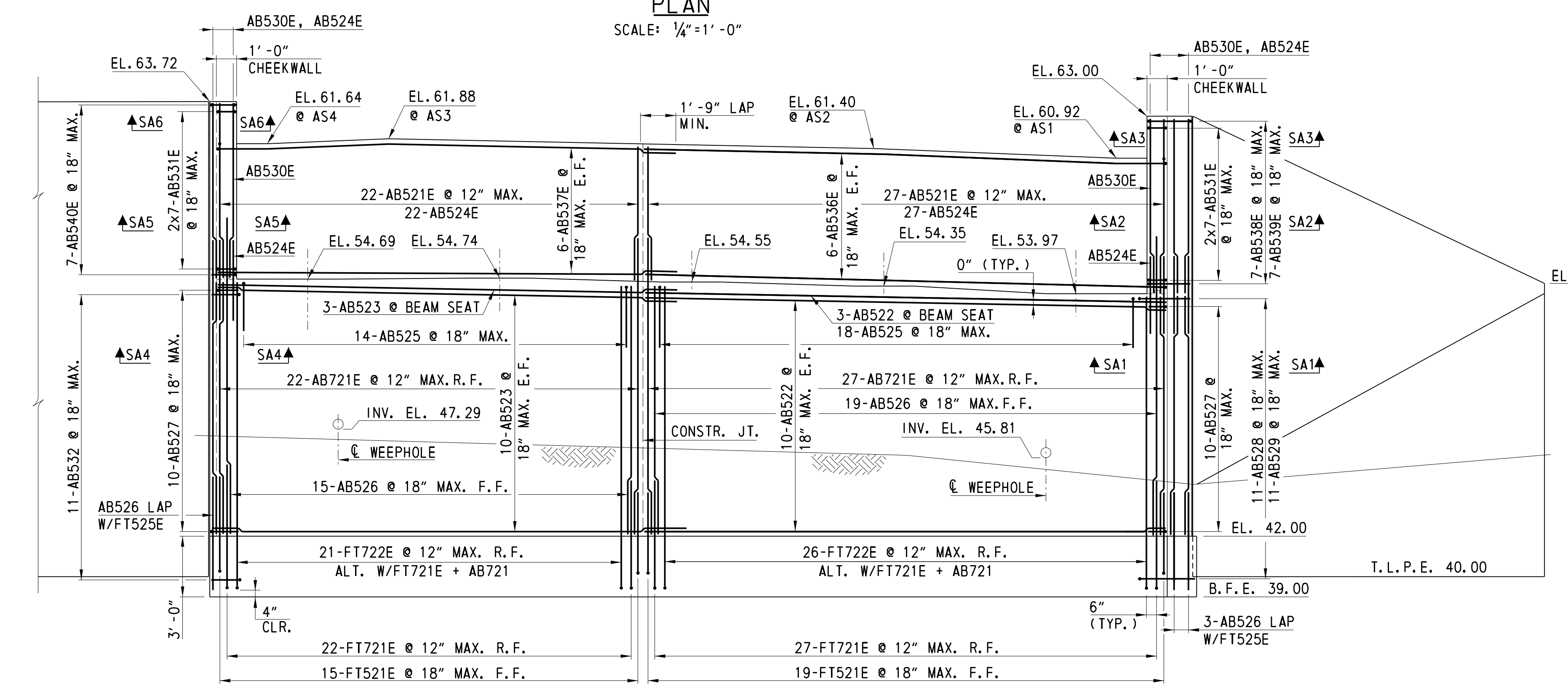
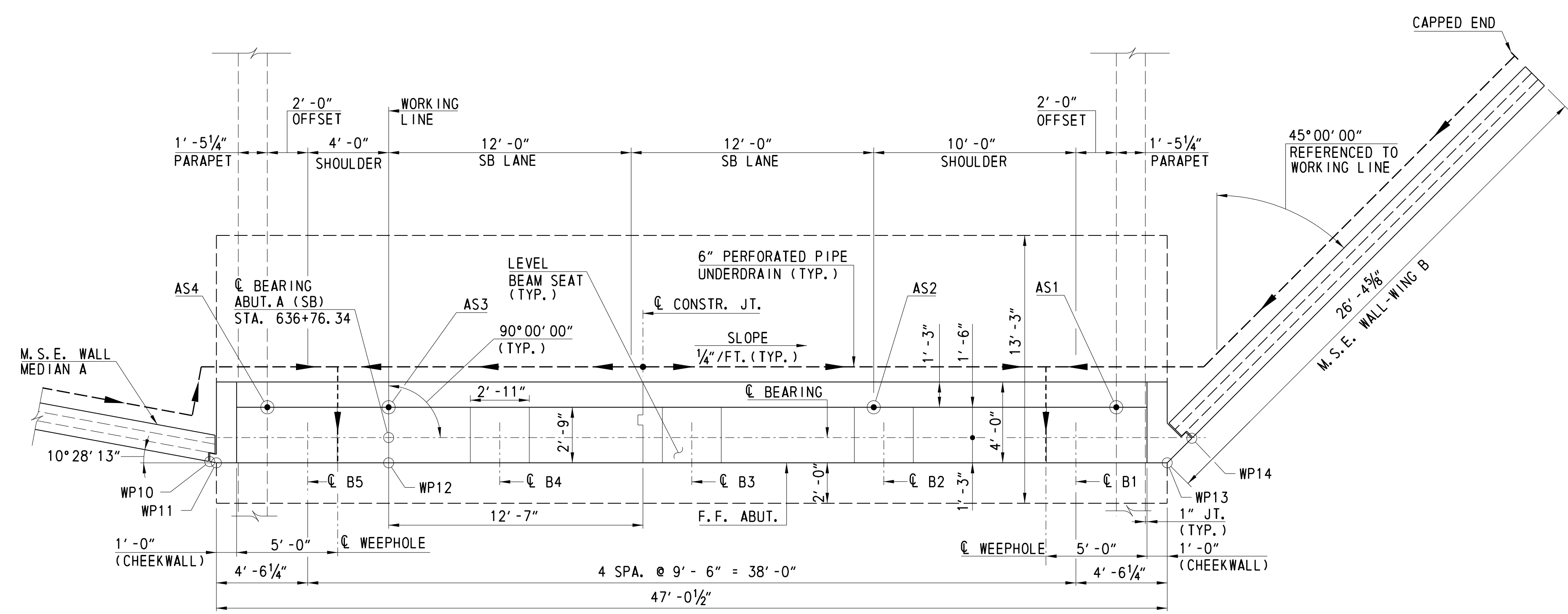
**SECTION SA3-SA3**  
SCALE: 3/4" = 1' - 0"



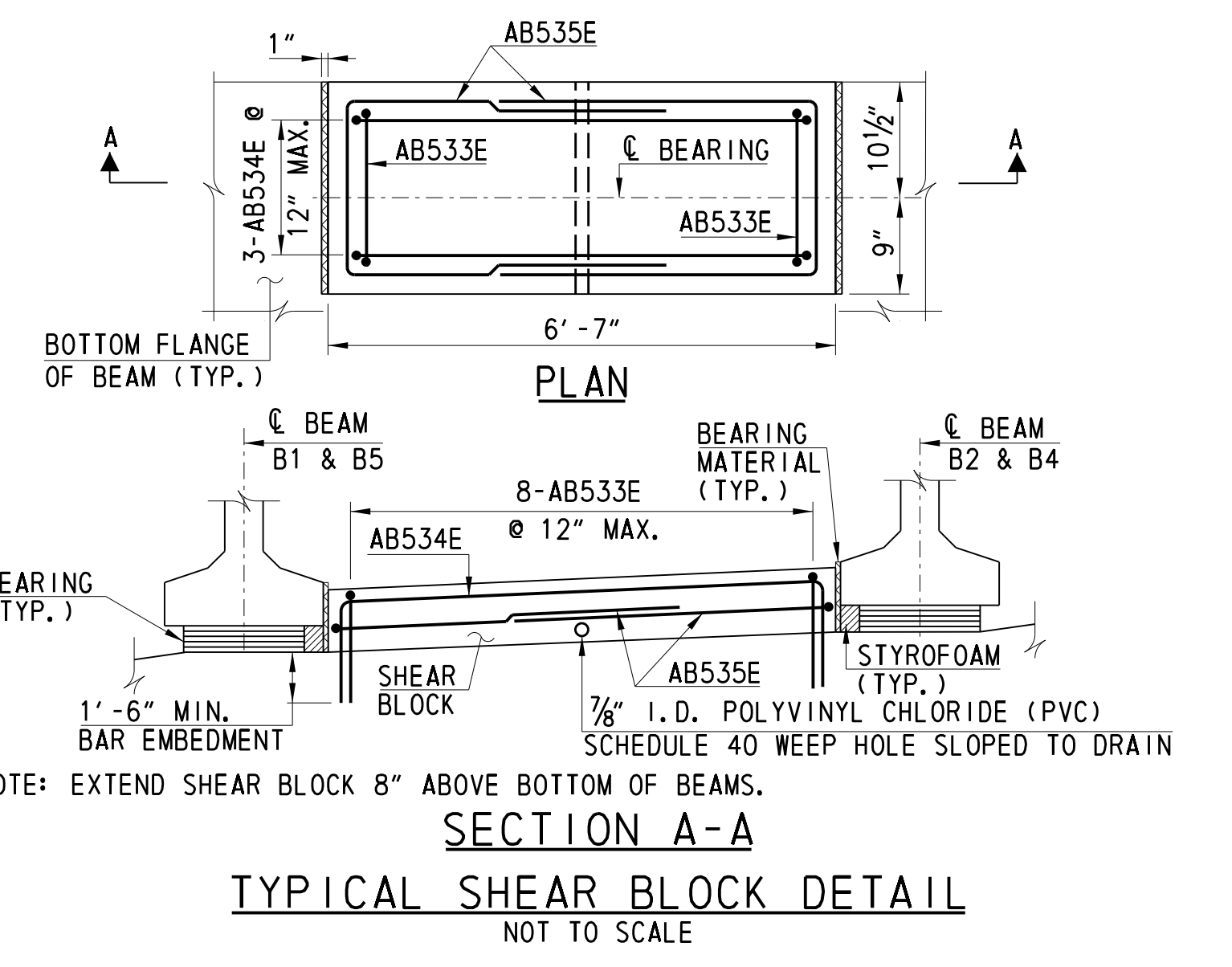
**SECTION SA6-SA6**  
SCALE: 3/4" = 1' - 0"

- LEGEND:**
- ABUT. = ABUTMENT
  - BOT. = BOTTOM
  - CLR. = CLEAR
  - E. F. = EACH FACE
  - E. S. = EQUAL SPACING
  - F. F. = FRONT FACE
  - MAX. = MAXIMUM
  - P/S = PRESTRESSED
  - TYP. = TYPICAL
  - WP = WORK POINT
  - = DENOTES BATTER PILE, 1 HORIZONTAL ON 3 VERTICAL
  - = DENOTES TEST PILE

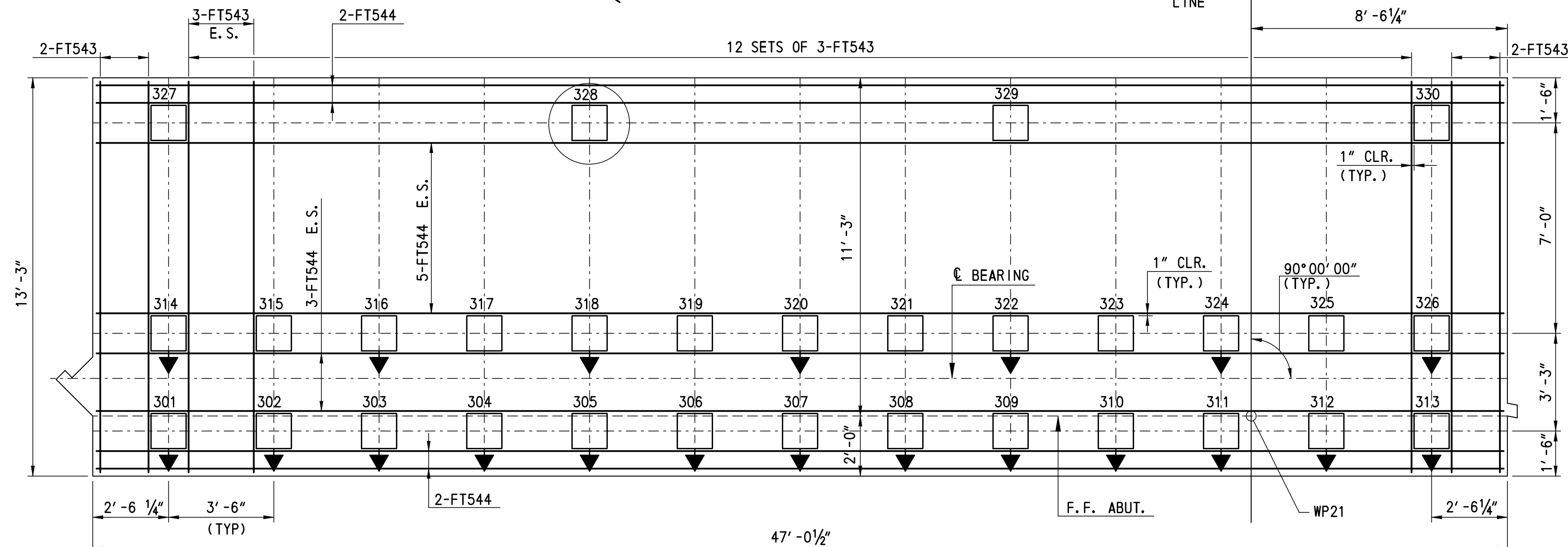
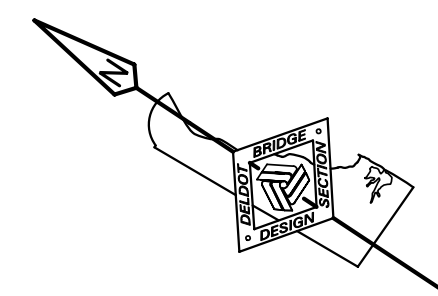
- NOTES:**
1. FOR LOCATION OF SECTIONS SA1-SA1 TO SA6-SA6, SEE SHEET 12 OF 40.
  2. FOR REINFORCEMENT BAR LIST, SEE SHEET 15 OF 40.



- LEGEND:**
- ABUT. = ABUTMENT
  - ALT. = ALTERNATE
  - B. F. E. = BOTTOM OF FOOTING ELEVATION
  - BOT. = BOTTOM
  - CLR. = CLEAR
  - CONSTR. = CONSTRUCTION
  - DIA. = DIAMETER
  - E. F. = EACH FACE
  - EL. = ELEVATION
  - F. F. = FRONT FACE
  - FT. = FEET
  - I. D. = INSIDE DIAMETER
  - INV. = INVERT
  - JT. = JOINT
  - MAX. = MAXIMUM
  - MIN. = MINIMUM
  - M. S. E. = MECHANICALLY STABILIZED EARTH
  - NB = NORTHBOUND
  - R. F. = REAR FACE
  - SPA. = SPACES
  - STA. = STATION
  - TYP. = TYPICAL
  - T. L. P. E. = TOP OF LEVELING PAD ELEVATION
  - W/ = WITH
  - WP = WORK POINT

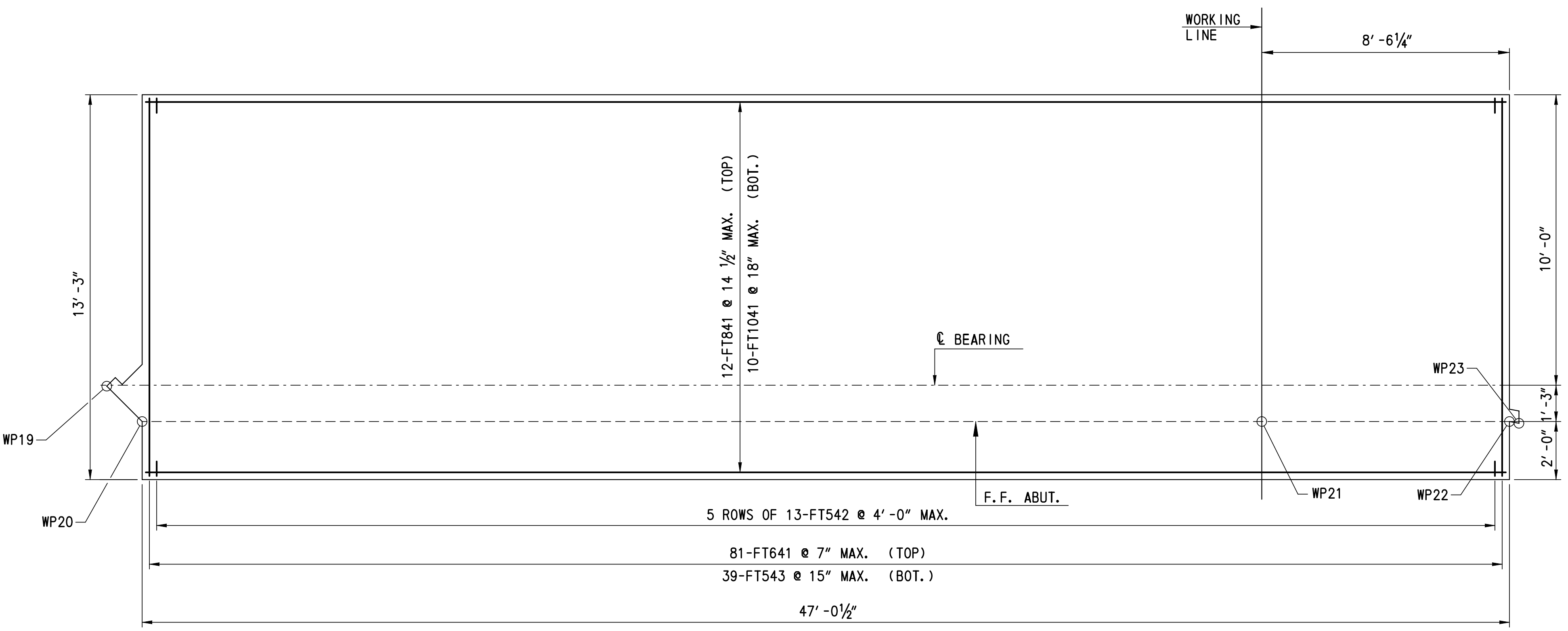


- NOTES:**
- FOR SECTIONS SA1-SA1 TO SA6-SA6, SEE SHEET 11 OF 40.
  - FOR PILE FOOTING PLAN, SEE SHEET 11 OF 40.
  - FOR REINFORCEMENT BAR LIST, SEE SHEET 15 OF 40.
  - FOR JOINT AND WATER STOP DETAIL, SEE SHEET 4 OF 40.
  - FOR ADDITIONAL 6" PERFORATED PIPE UNDERDRAIN INFORMATION, SEE SHEET 16 OF 40.
  - STYROFOAM AND P.V.C. SCHEDULE 40 WEEP HOLE PAYMENT SHALL BE INCIDENTAL TO CONCRETE CONSTRUCTION.
  - BEARING MATERIAL SHALL BE NEOPRENE WITH A DUROMETER OF 50±5. PAYMENT SHALL BE INCIDENTAL TO CONCRETE CONSTRUCTION.
  - MEMBRANE WATERPROOFING SHALL BE INCIDENTAL TO ITEM 602015 - PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT ABOVE FOOTING, CLASS A. SEE SPECIAL PROVISION ITEM 602616 - WATERPROOFING P.C.C. MASONRY SURFACES FOR ADDITIONAL REQUIREMENTS.

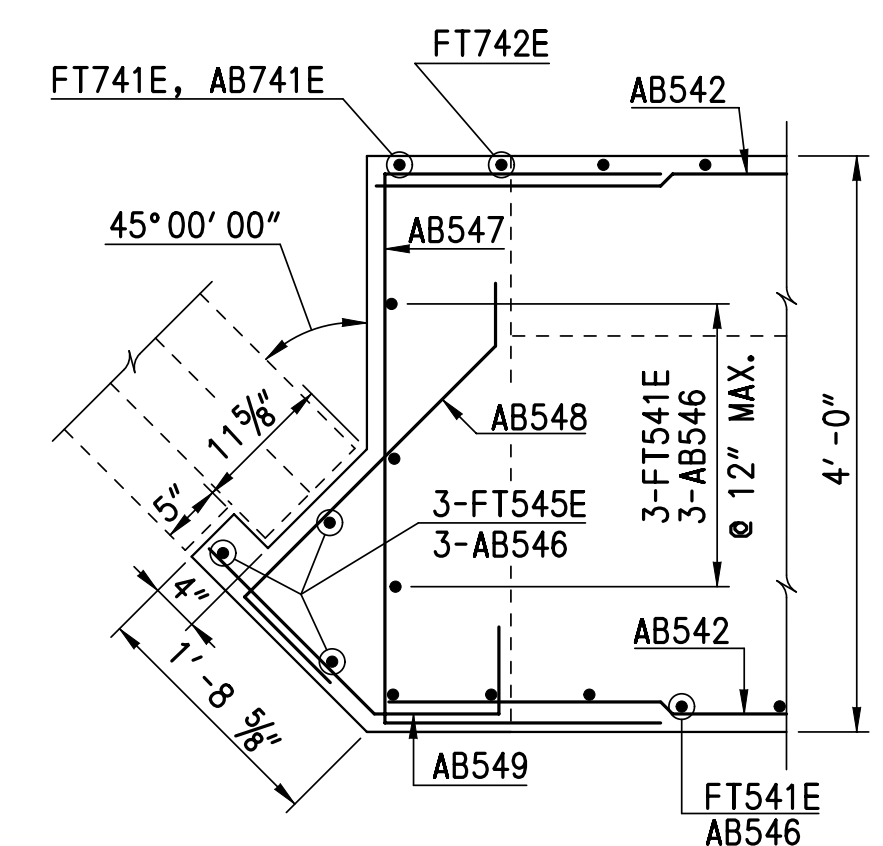


- NOTES:
- 14" SQUARE PRECAST P/S CONCRETE PILE IS RECOMMENDED.
  - ONE TO ONE SUBSTITUTION ALLOWED FOR HP 14X73 STEEL PILE.
  - FOR PILE NOTES AND DETAILS, SEE SHEET 17 OF 40.

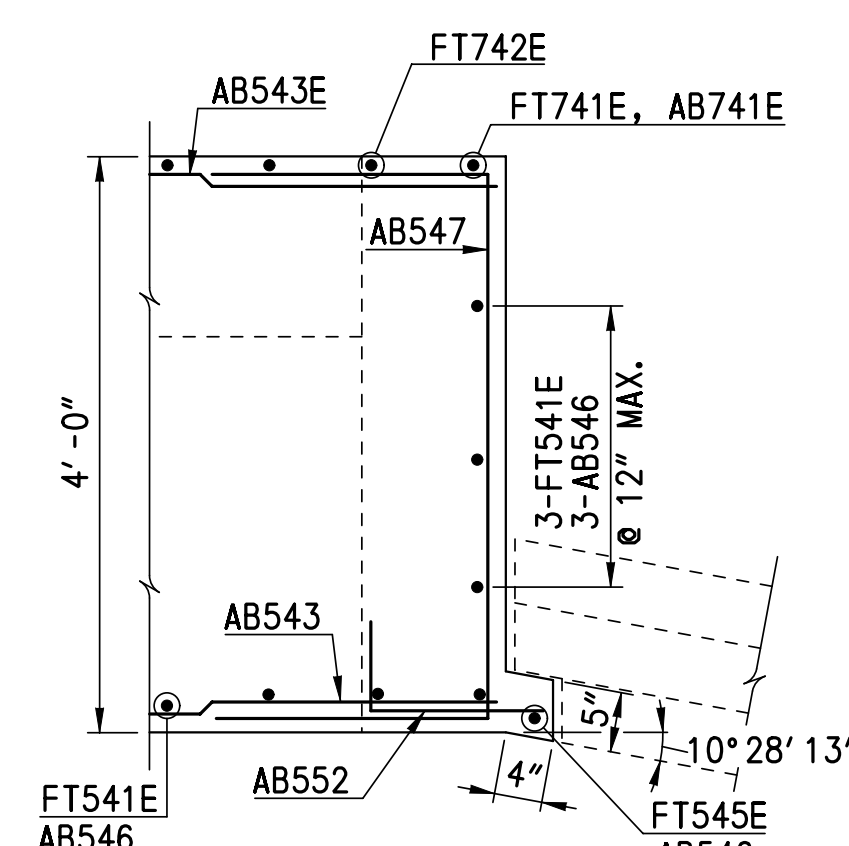
**PILE LAYOUT PLAN-WITH SUPPLEMENTAL REINFORCEMENT**  
SCALE: 3/8"=1'-0"



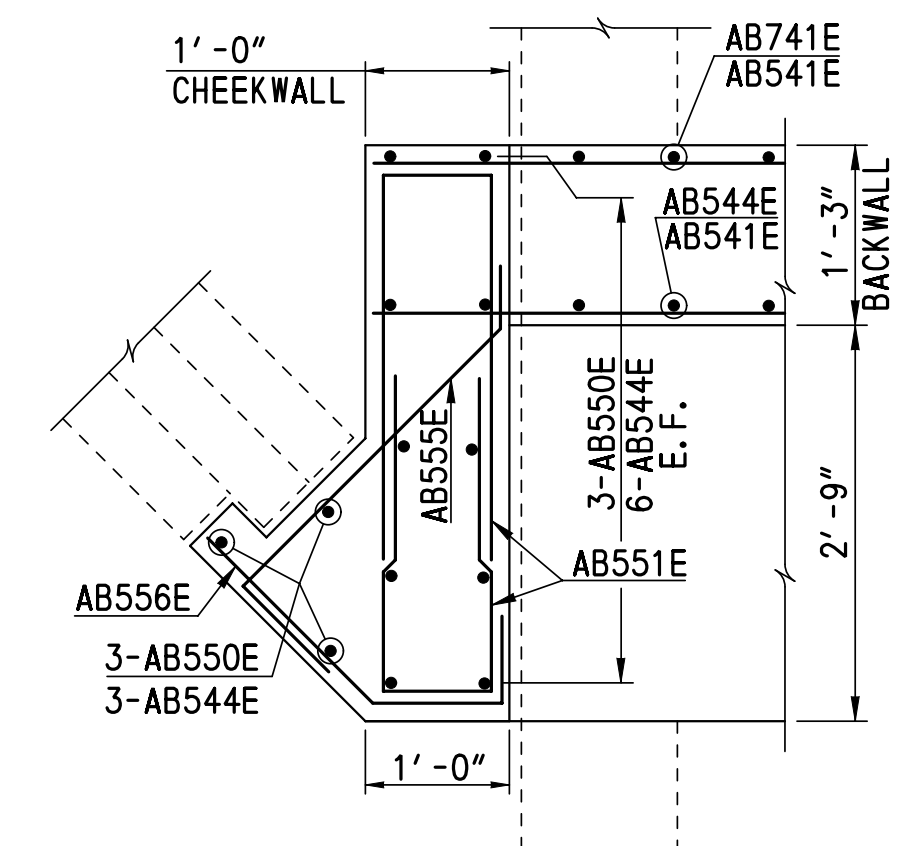
**PLAN TOP AND BOTTOM REINFORCEMENT**  
SCALE: 3/8"=1'-0"



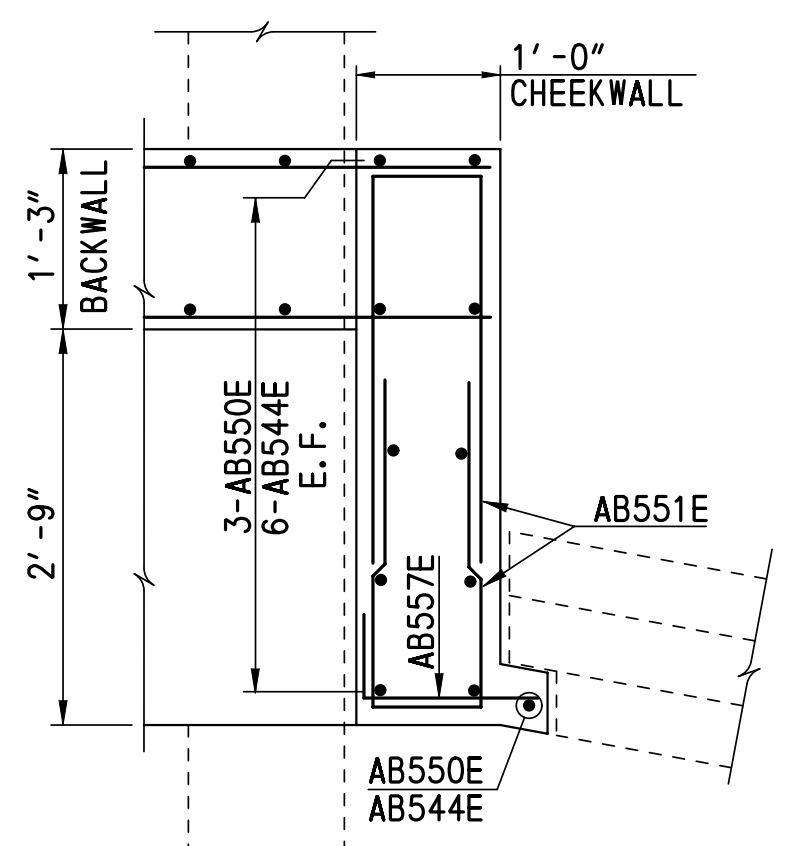
**SECTION SB1-SB1**  
SCALE: 3/4"=1'-0"



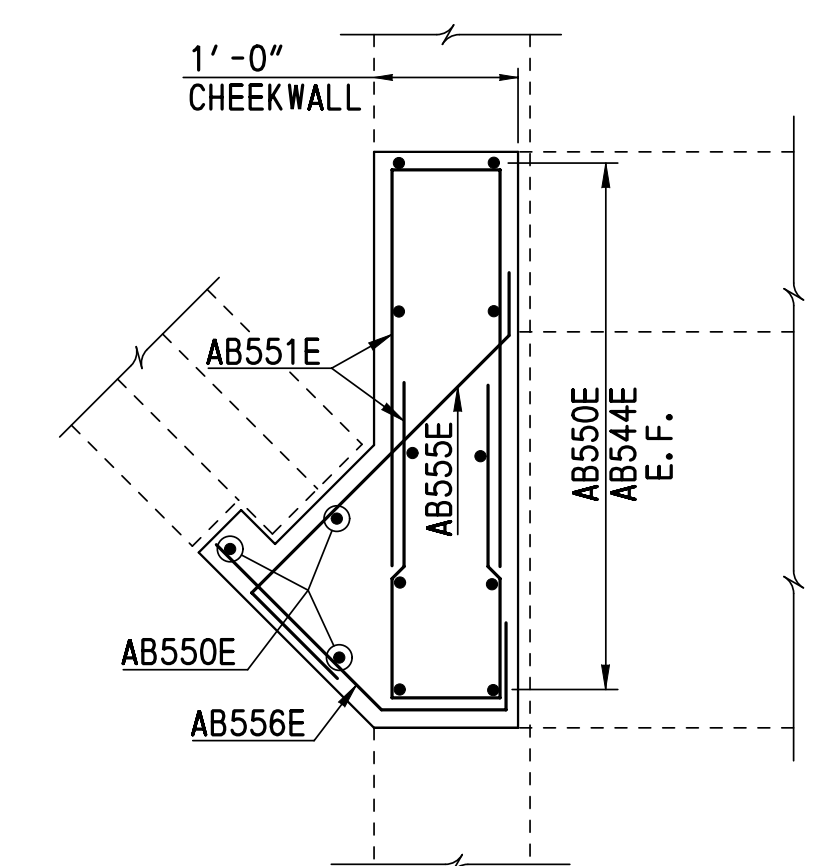
**SECTION SB4-SB4**  
SCALE: 3/4"=1'-0"



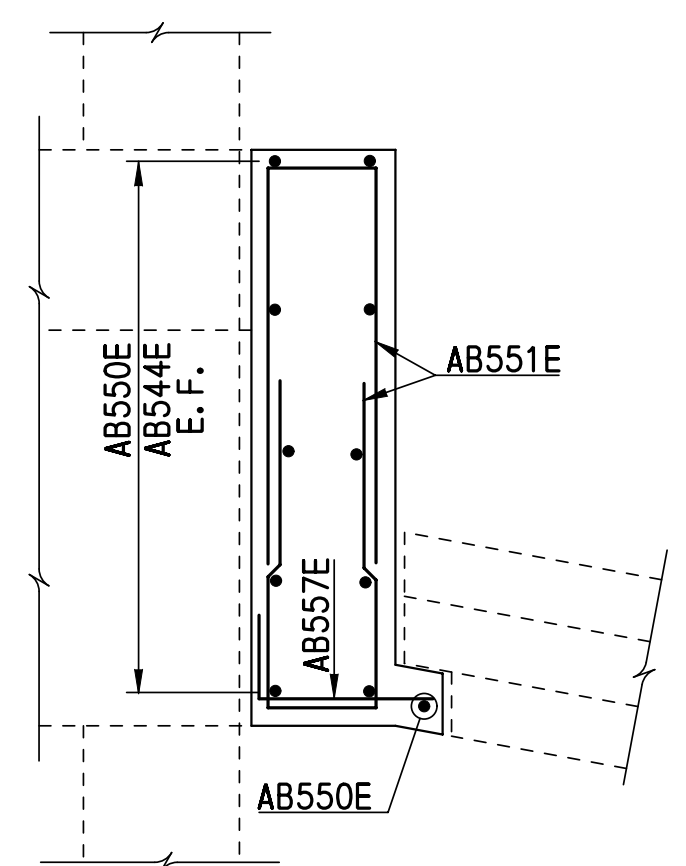
**SECTION SB2-SB2**  
SCALE: 3/4"=1'-0"



**SECTION SB5-SB5**  
SCALE: 3/4"=1'-0"



**SECTION SB3-SB3**  
SCALE: 3/4"=1'-0"

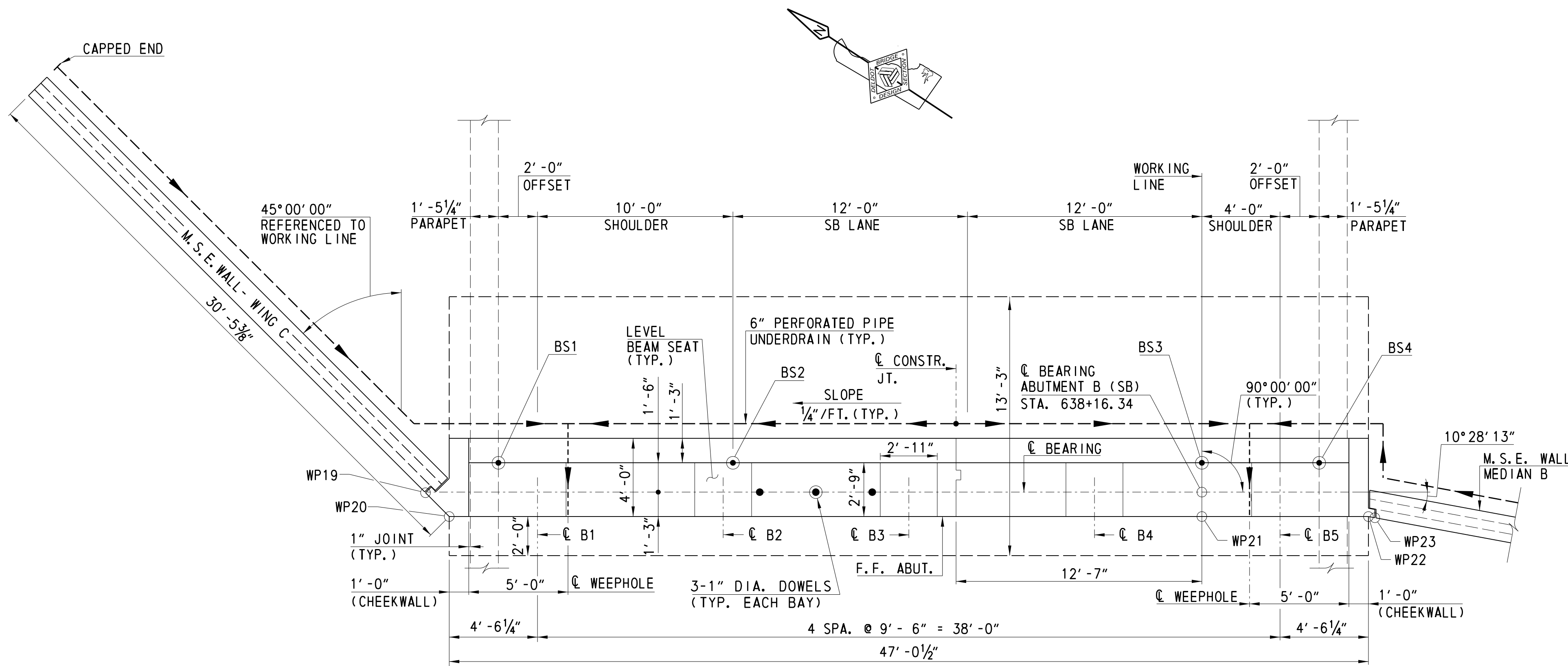


**SECTION SB6-SB6**  
SCALE: 3/4"=1'-0"

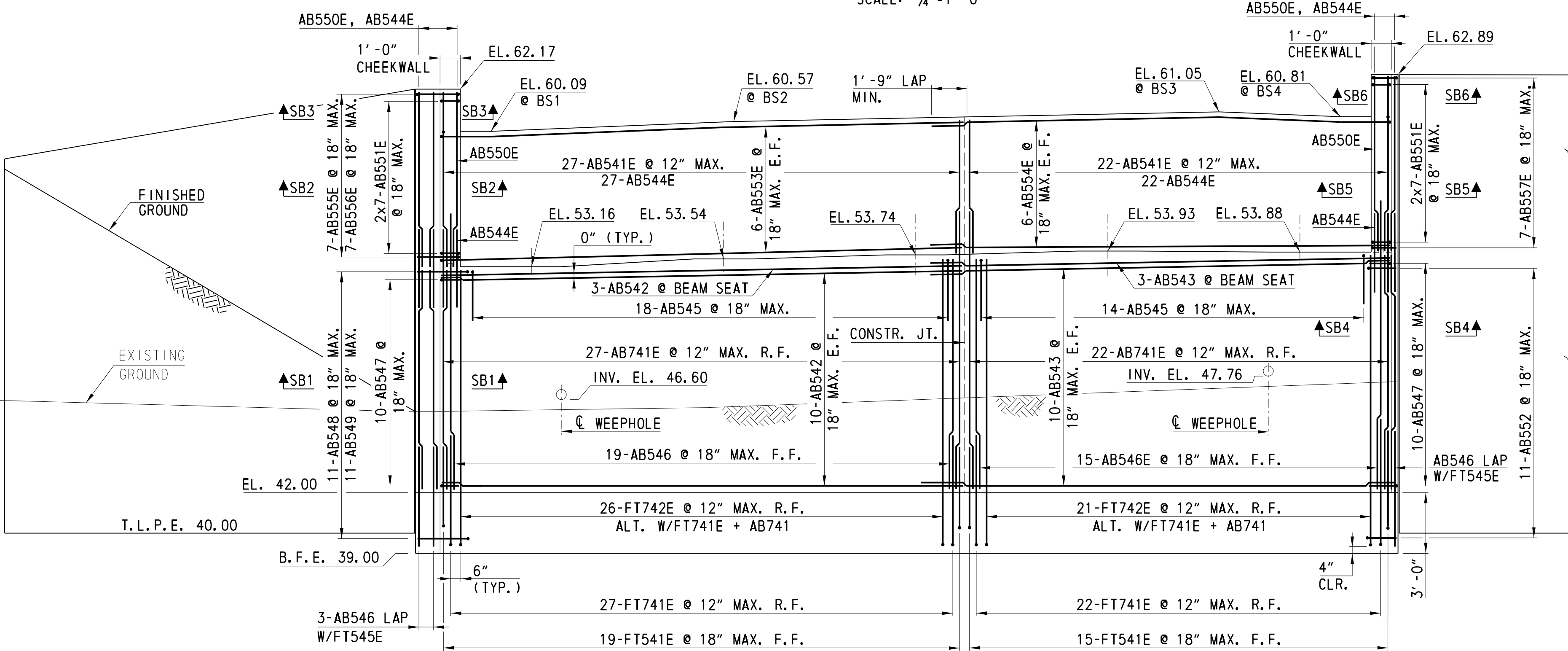
- LEGEND:**
- ABUT. = ABUTMENT
  - BOT. = BOTTOM
  - CLR. = CLEAR
  - E. F. = EACH FACE
  - E. S. = EQUAL SPACING
  - F. F. = FRONT FACE
  - MAX. = MAXIMUM
  - P/S = PRESTRESSED
  - TYP. = TYPICAL
  - WP = WORK POINT
  - = DENOTES BATTER PILE, 1 HORIZONTAL ON 3 VERTICAL
  - = DENOTES TEST PILE

- NOTES:**
1. FOR LOCATION OF SECTIONS SB1-SB1 TO SB6-SB6, SEE SHEET 14 OF 40.
  2. FOR REINFORCEMENT BAR LIST, SEE SHEET 15 OF 40.

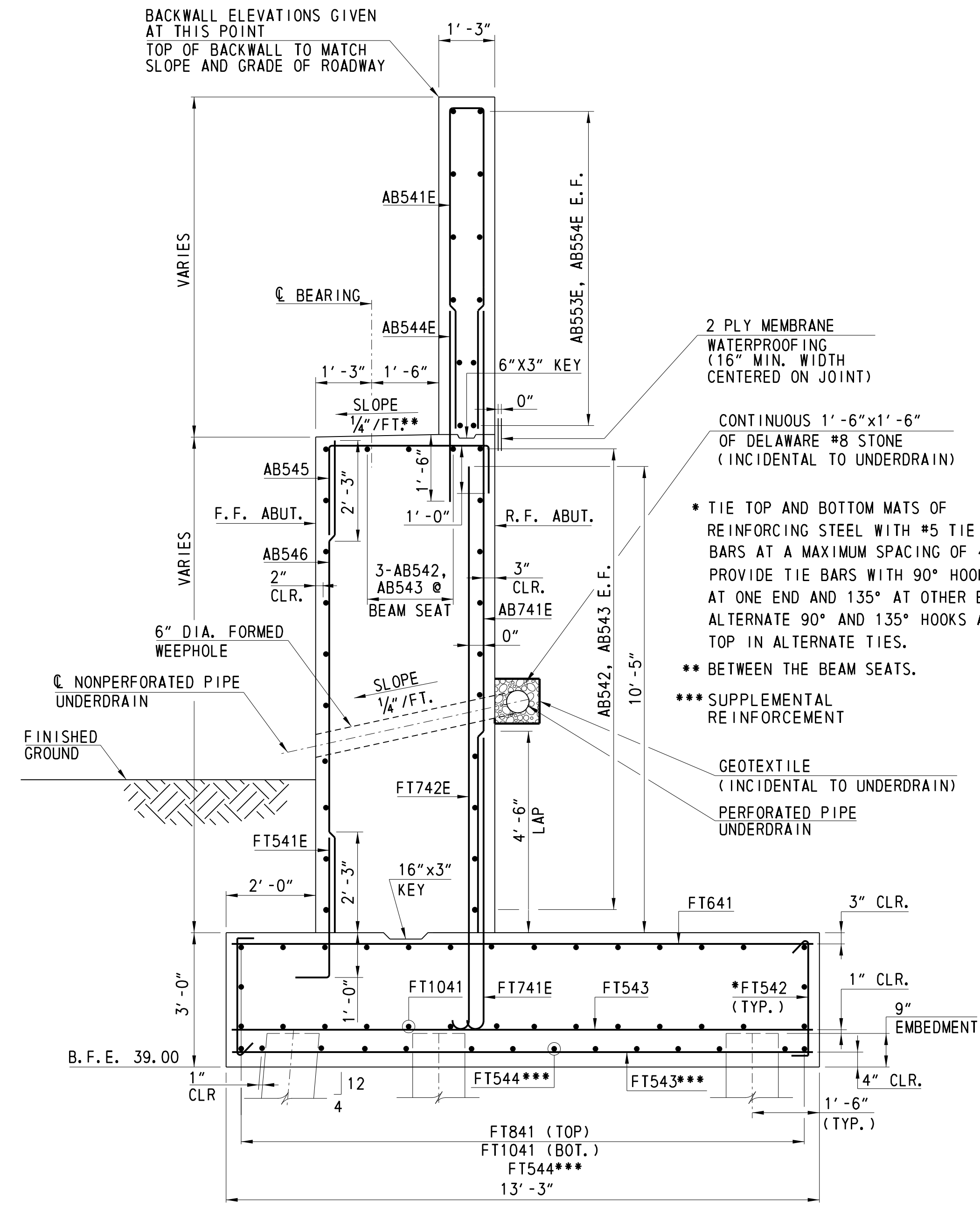




PLAN  
SCALE: 1/4" = 1'-0"



ELEVATION  
SCALE: 1/4" = 1'-0"

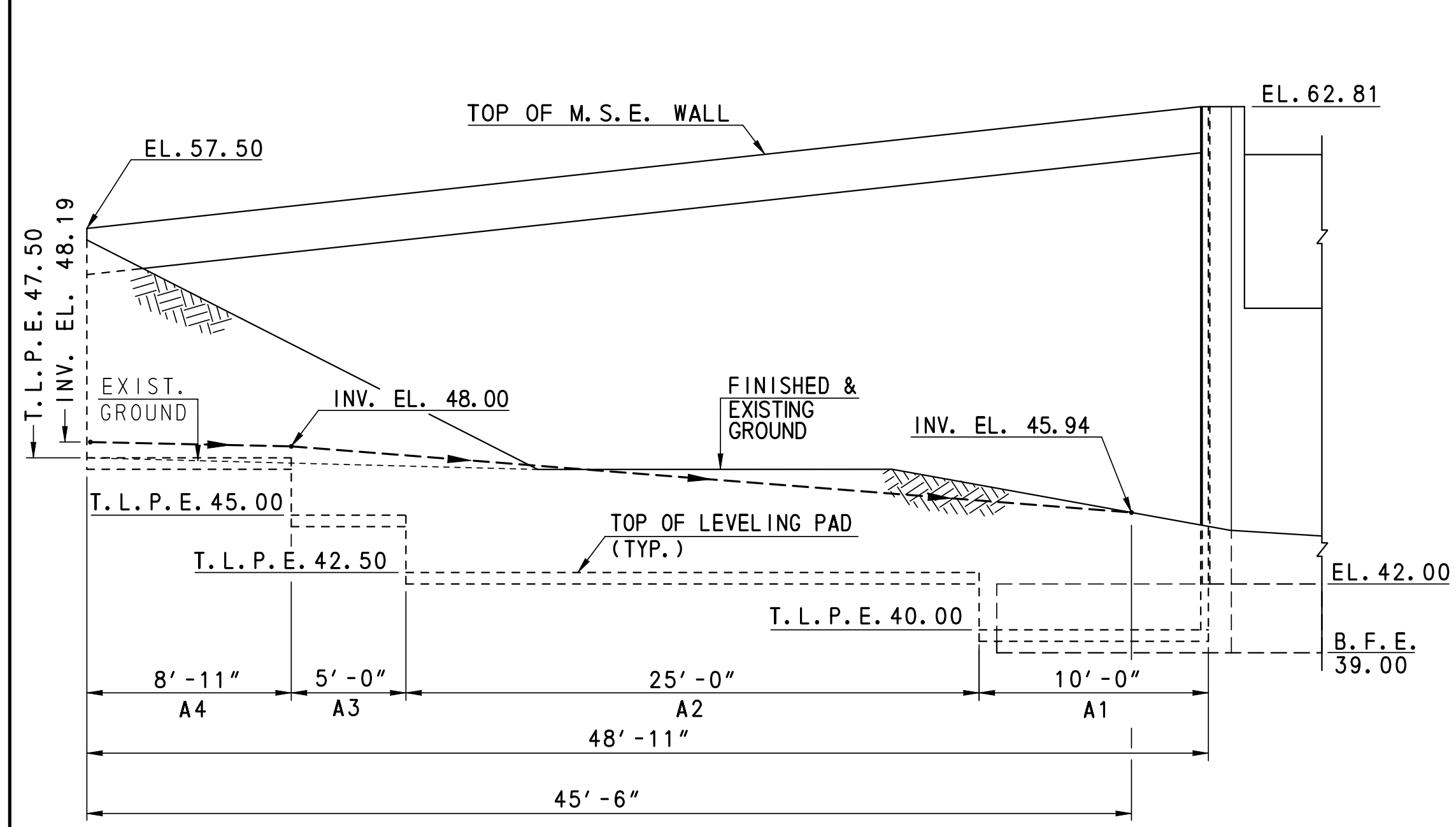


TYPICAL SECTION  
SCALE: 1/2" = 1'-0"

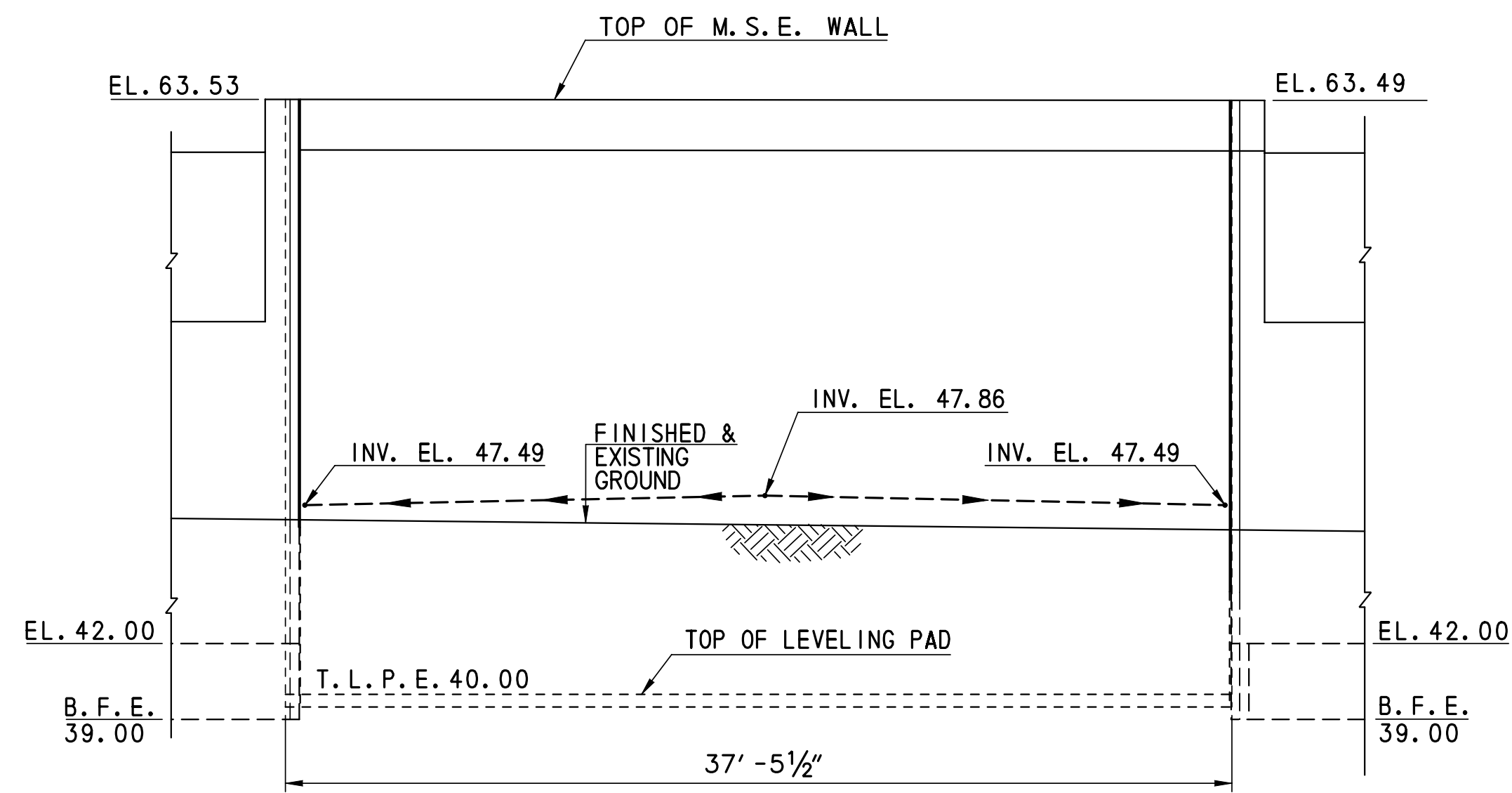
- LEGEND:**
- ABUT. = ABUTMENT
  - ALT. = ALTERNATE
  - B. F. E. = BOTTOM OF FOOTING ELEVATION
  - BOT. = BOTTOM
  - CIP = CAST-IN-PLACE
  - CLR. = CLEAR
  - CONSTR. = CONSTRUCTION
  - DIA. = DIAMETER
  - E. F. = EACH FACE
  - EL. = ELEVATION
  - F. F. = FRONT FACE
  - FT. = FEET
  - INV. = INVERT
  - JT. = JOINT
  - MAX. = MAXIMUM
  - MIN. = MINIMUM
  - M. S. E. = MECHANICALLY STABILIZED EARTH
  - NB = NORTHBOUND
  - R. F. = REAR FACE
  - SPA. = SPACES
  - STA. = STATION
  - TYP. = TYPICAL
  - T. L. P. E. = TOP OF LEVELING PAD ELEVATION
  - W/ = WITH
  - WP = WORK POINT

- NOTES:**
1. FOR SECTIONS SB1-SB1 TO SB6-SB6, SEE SHEET 13 OF 40.
  2. FOR PILE FOOTING PLAN, SEE SHEET 13 OF 40.
  3. FOR REINFORCEMENT BAR LIST, SEE SHEET 15 OF 40.
  4. FOR DIAPHRAGM DETAILS, SEE SHEETS 30 AND 31 OF 40.
  5. FOR JOINT AND WATER STOP DETAIL, SEE SHEET 4 OF 40.
  6. FOR ADDITIONAL 6" PERFORATED PIPE UNDERDRAIN INFORMATION, SEE SHEET 16 OF 40.
  7. DOWEL PAYMENT SHALL BE INCIDENTAL TO CONCRETE CONSTRUCTION.
  8. SEE DELDOT STANDARD SPECIFICATIONS 824.02 (g) FOR CIP DOWEL MATERIAL REQUIREMENTS. FOR DOWEL DETAILS, SEE SHEET 30 OF 40.
  9. MEMBRANE WATERPROOFING SHALL BE INCIDENTAL TO ITEM 602015 - PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT ABOVE FOOTING, CLASS A. SEE SPECIAL PROVISION ITEM 602616 - WATERPROOFING P. C. C. MASONRY SURFACE FOR ADDITIONAL REQUIREMENTS.

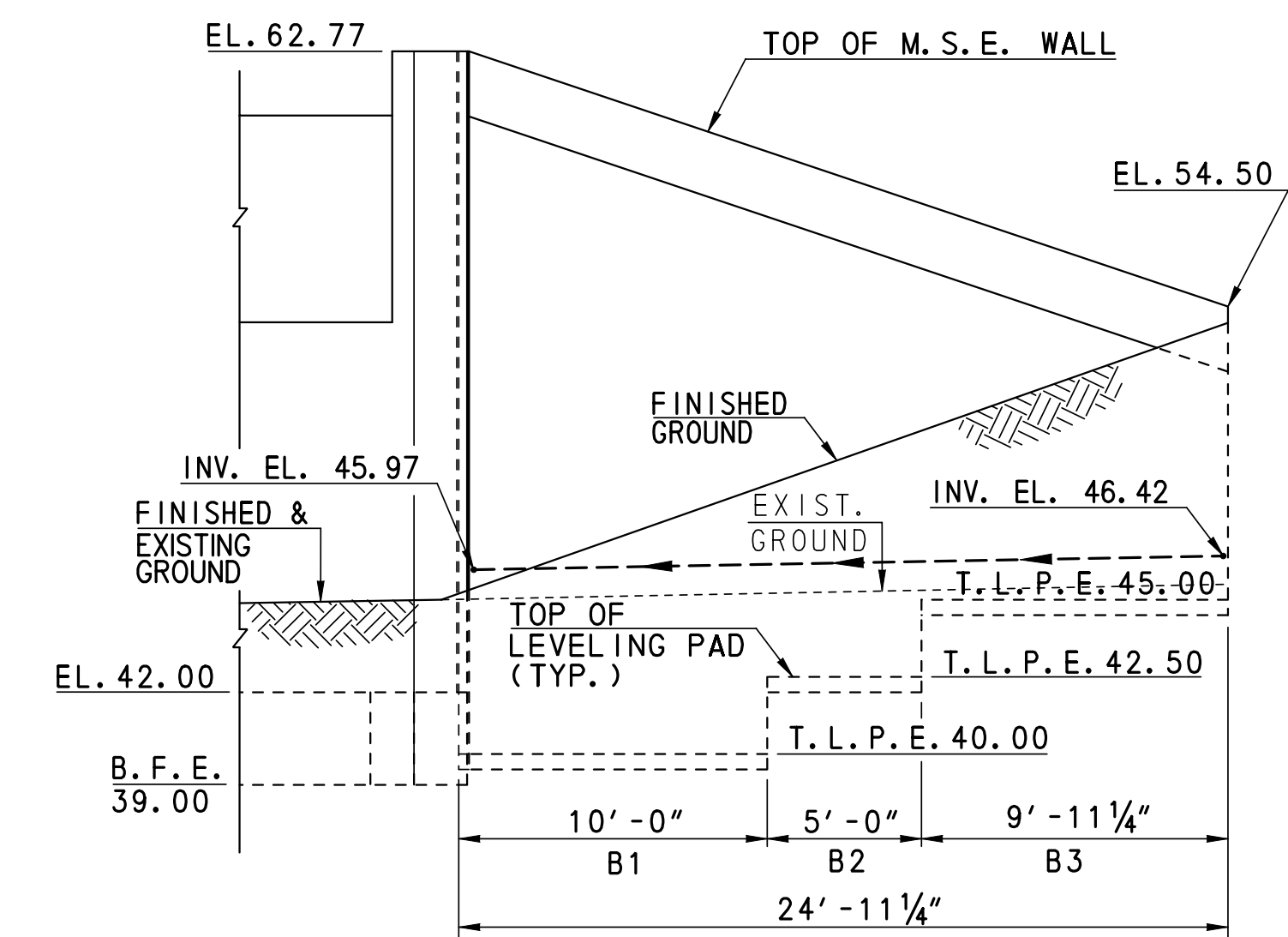




**M. S. E. WALL-WING A**  
SCALE: 3/16" = 1' 0"

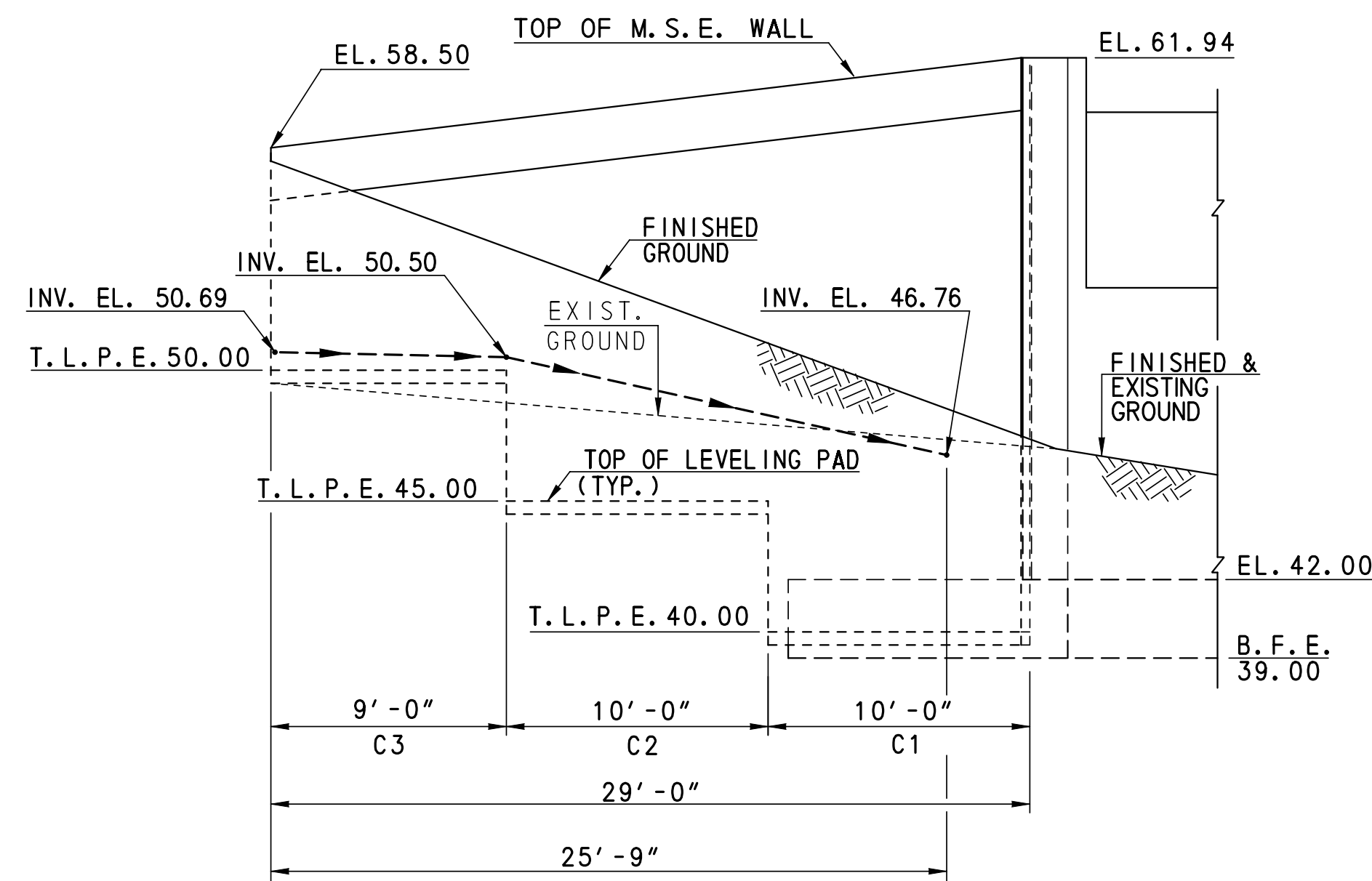


**M. S. E. WALL-MEDIAN A**  
SCALE: 3/16" = 1' 0"

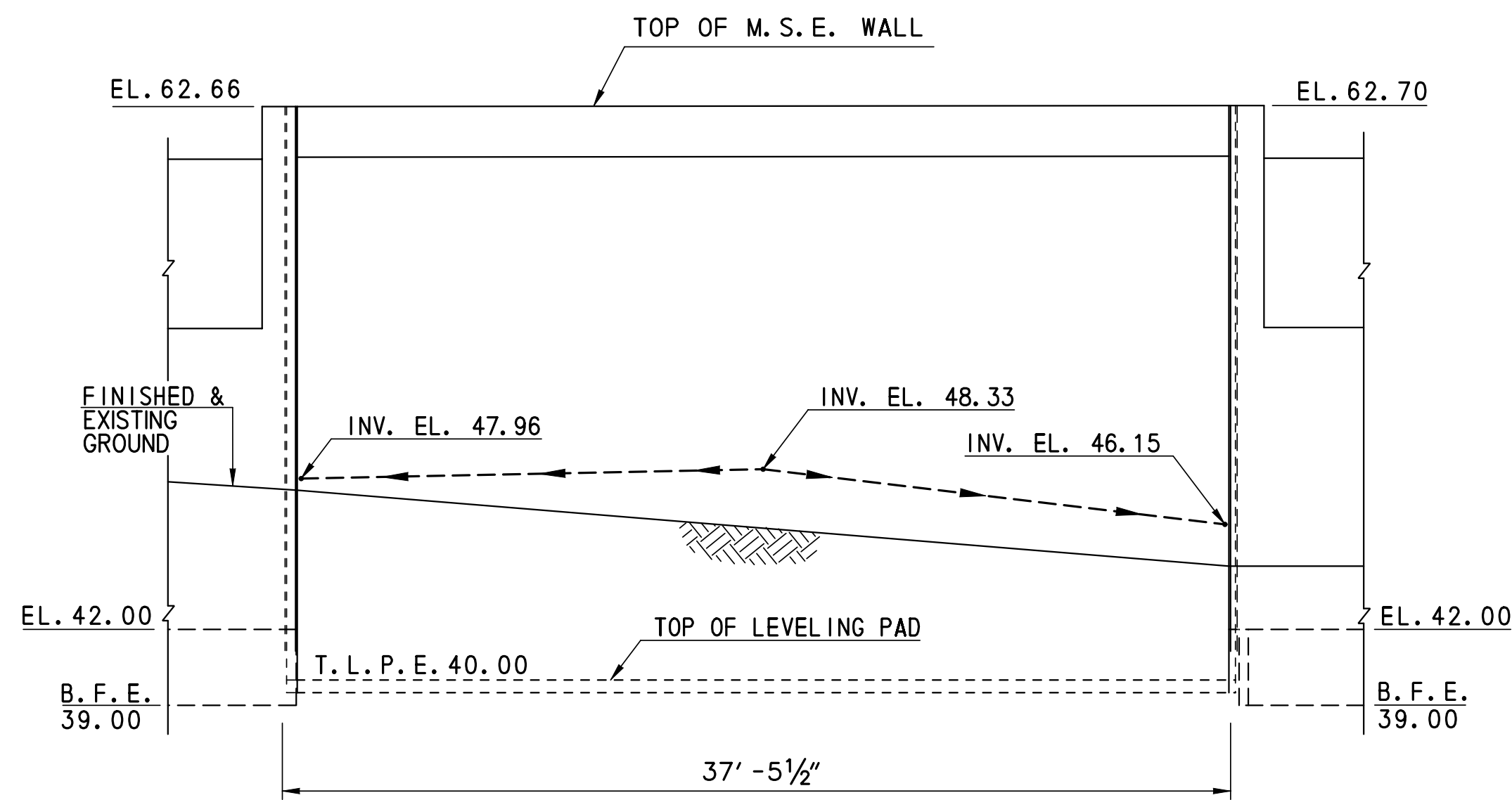


**M. S. E. WALL-WING B**  
SCALE: 3/16" = 1' 0"

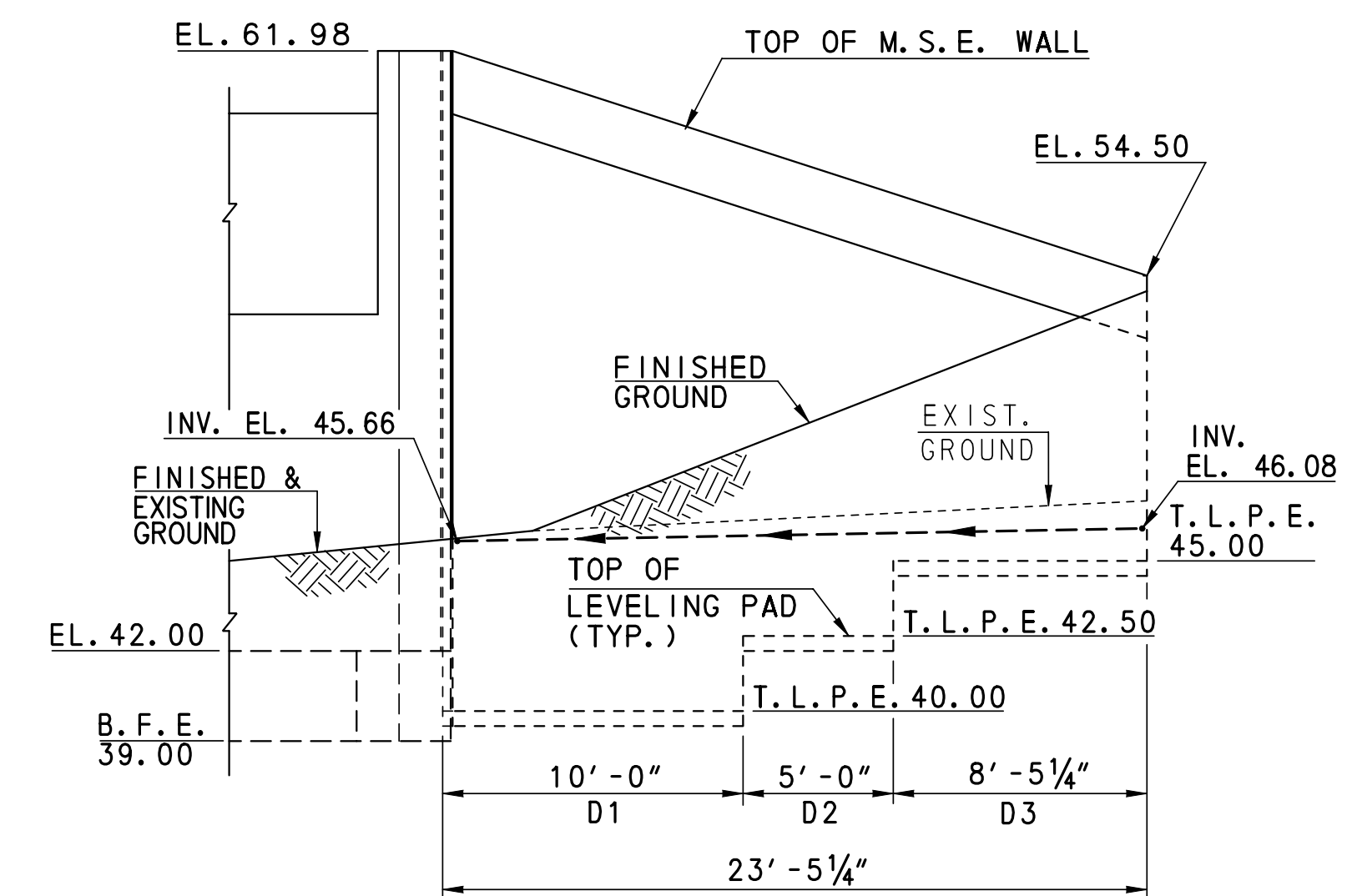
DATUM EL. 25.00



**M. S. E. WALL-WING C**  
SCALE: 3/16" = 1' 0"



**M. S. E. WALL-MEDIAN B**  
SCALE: 3/16" = 1' 0"

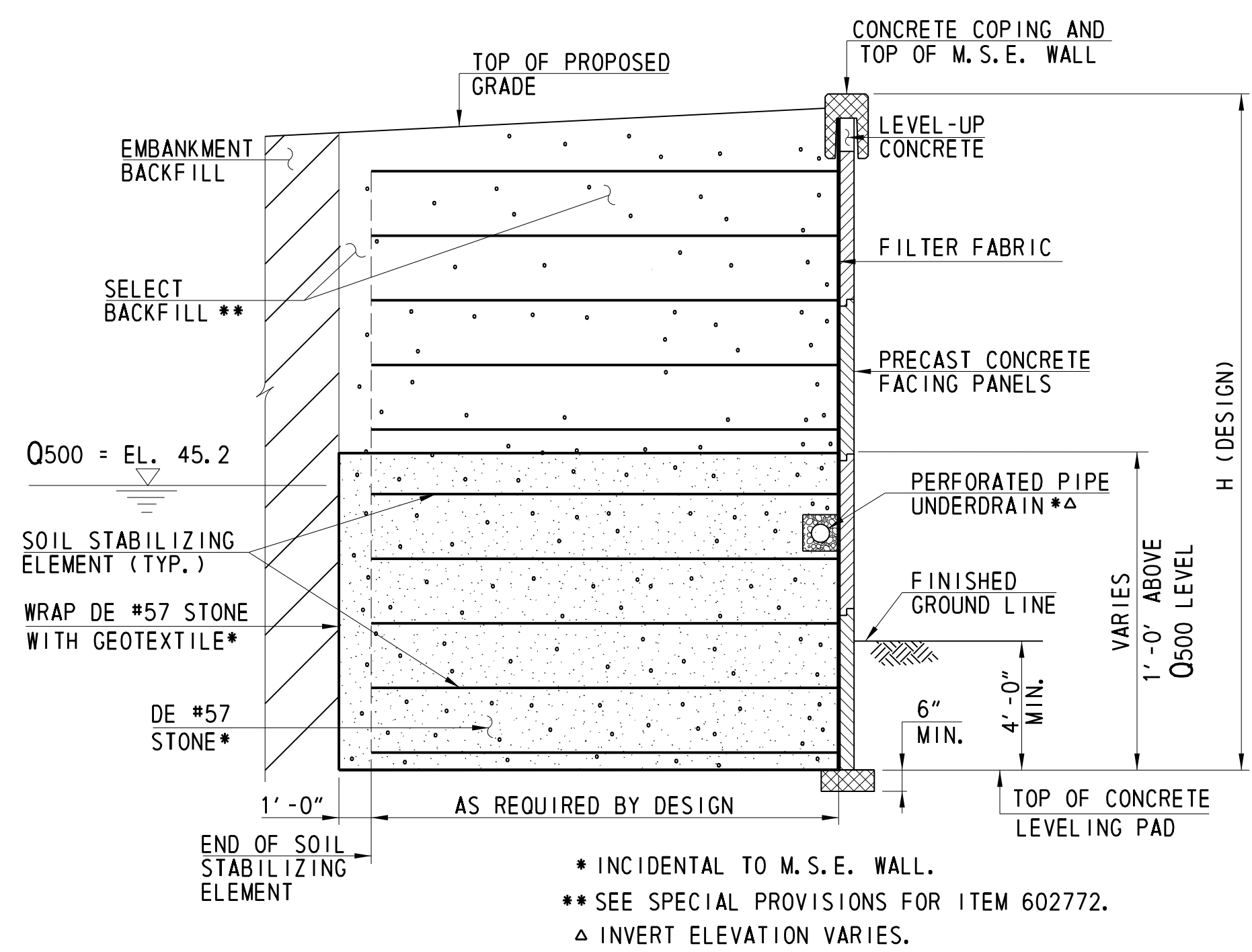


**M. S. E. WALL-WING D**  
SCALE: 3/16" = 1' 0"

DATUM EL. 25.00

- LEGEND:**
- B. F. E. = BOTTOM OF FOOTING ELEVATION
  - EL. = ELEVATION
  - EXIST. = EXISTING
  - INV. = INVERT
  - M. S. E. = MECHANICALLY STABILIZED EARTH
  - TYP. = TYPICAL
  - T. L. P. E. = TOP OF LEVELING PAD ELEVATION
  - - - - = 6" PERFORATED PIPE UNDERDRAIN

- NOTES:**
1. FOR TYPICAL M.S.E. WALL SECTION, SEE SHEET 17 OF 40.
  2. FOR M.S.E. WALL MINIMUM STRAP LENGTH TABLE, SEE SHEET 17 OF 40.



**MECHANICALLY STABILIZED EARTH WALL - SECTION**  
SCALE: 1/4"=1'-0"

\* INCIDENTAL TO M.S.E. WALL.  
\*\* SEE SPECIAL PROVISIONS FOR ITEM 602772.  
▲ INVERT ELEVATION VARIES.

**M. S. E. WALL NOTES**

1. PROVIDE MECHANICALLY STABILIZED EARTH WALLS IN ACCORDANCE WITH SPECIAL PROVISION 602772.
2. DESIGN CRITERIA: SEE SPECIAL PROVISION FOR ITEM 602772.
3. ALL EXPOSED CORNERS OF CONCRETE SHALL BE CHAMFERED WITH 3/4"x3/4" MILLED CHAMFER STRIPS, UNLESS OTHERWISE NOTED, EXCEPT ON UNEXPOSED FOOTINGS OR WHERE INDICATED BY THE FOLLOWING NOTATION ON THE PLANS: "DO NOT CHAMFER".
4. THE PROPRIETARY WALL MANUFACTURER MAY RELOCATE THE LEVELING PAD STEPS AT THEIR DISCRETION PROVIDED THAT THE MINIMUM EMBEDMENT IS MAINTAINED. ANY CHANGE TO THE STEP LOCATIONS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
5. THE PROPRIETARY WALL MANUFACTURER SHALL ASSURE THAT PROPOSED PROPRIETARY WALL COMPONENTS ARE POSITIONED SUCH THAT THE DESIGNATED ROADWAY LIMITS ARE NOT ENCRUCHEED UPON.
6. CONTRACTOR AND PROPRIETARY WALL MANUFACTURER SHALL COORDINATE LOCATIONS OF ALL APPURTENANCES WITH LOCATIONS OF PROPRIETARY WALL TIE BACK SYSTEM.
7. ALL RETAINING WALL COMPONENTS SHALL BE DESIGNED FOR A MINIMUM SERVICE LIFE OF 100 YEARS.
8. ONLY ONE M.S.E. WALL SYSTEM MAY BE USED ON THIS PROJECT.
9. WAIT A MINIMUM OF 30 DAYS AFTER COMPLETING M.S.E. WALL PLACEMENT BEFORE INSTALLING C.I.P. LEVEL-UP CONCRETE AND COPING.
10. PLACE TOE OF EARTH MOUND IN THE MEDIAN ON THE WALL SIDE, A MINIMUM OF 20' FROM THE FACE OF THE M.S.E. WALL.

**PILE NOTES**

1. ALL PILES SHALL BE EITHER 14" SQUARE PRECAST PRESTRESSED CONCRETE PILES OR HP 14X73 STEEL PILES.
2. ALL PILES SHALL BE DRIVEN TO THE NOMINAL PILE DRIVING RESISTANCE (R<sub>ndr</sub>), LISTED IN THE PILE INSTALLATION DATA TABLE, OR REFUSAL AS DEFINED IN SECTION 619 OF SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, DELAWARE DEPARTMENT OF TRANSPORTATION, AUGUST 2001, AND ADDENDUMS. THE CONTRACTOR SHALL ORDER THE PILE LENGTHS BASED ON THE TEST PILES DRIVEN AT EACH ABUTMENT.
3. TEST PILES SHALL BE DYNAMICALLY TESTED BY THE CONTRACTOR IN ACCORDANCE WITH SPECIAL PROVISIONS 619519 AND 619539. THE NEED TO RESTRIKE EITHER A TEST PILE OR A PRODUCTION PILE SHALL BE THE SOLE DECISION OF THE ENGINEER.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING A WAVE EQUATION ANALYSIS AND ALL OTHER INCIDENTALS IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS. THE WAVE EQUATION AND HIGH-STRAIN DYNAMIC PILE TESTING MUST BE SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF DELAWARE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
5. UPON COMPLETION OF THE HIGH-STRAIN DYNAMIC PILE TESTING THE CONTRACTOR SHALL SUBMIT A SIGNAL MATCHING ANALYSIS TO THE ENGINEER FOR REVIEW AND APPROVAL IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
- 6a. A QUARANTINE PERIOD IS REQUIRED AFTER THE CONSTRUCTION OF THE FULL HEIGHT OF THE FILL AT THE ABUTMENTS IS ACHIEVED (SEE SHEET 5 OF 40). PILES MAY NOT BE DRIVEN UNTIL AFTER COMPLETION OF THE QUARANTINE PERIOD.
- 6b. TEST PILES MAY BE DRIVEN PRIOR TO PLACING EMBANKMENT AND SURCHARGE MATERIAL. RESTRIKES OF THESE TEST PILES SHALL BE PERFORMED PRIOR TO PLACING EMBANKMENT IN ACCORDANCE WITH ITEM 619502-TEST PILE RESTRIKE. AFTER THE SETTLEMENT HAS BEEN ACHIEVED AND THE SUBSTRUCTURE HAS BEEN RELEASED BY THE ENGINEER, PRODUCTION PILES MAY BE INSTALLED. AT THIS POINT, THE TEST PILE SHALL BE ACTING AS A PRODUCTION PILE AND IT SHALL BE RE-STRUCK PRIOR TO PLACING ANY OTHER PRODUCTION PILES WITH PAYMENT UNDER ITEM 619501-PRODUCTION PILE RESTRIKE.
7. PILE LENGTHS FOR ORDERING PURPOSES SHALL BE DETERMINED BY TEST PILES. A MINIMUM OF ONE (1) PILE PER SUBSTRUCTURE, AS SHOWN ON THE PLANS, SHALL BE DYNAMICALLY TESTED WITH SIGNAL MATCHING ANALYSIS BY THE CONTRACTOR IN ACCORDANCE WITH SPECIAL PROVISIONS 619519 AND 619539. TEST AND PRODUCTION PILE RESTRIKES WILL BE PAID AS FOLLOWS:
  - a). ALL TEST PILE(S) WILL BE RE-STRUCK AFTER A WAITING PERIOD OF AT LEAST 48 HOURS. TEST PILE RESTRIKES SHALL BE INCIDENTAL TO THE INITIAL INSTALLATION OF THE PILE PROVIDED THEY ARE REQUESTED WITHIN FIVE WORKING DAYS FROM THE COMPLETION OF THE INITIAL DRIVE. IF TEST PILE RESTRIKES ARE REQUESTED AFTER THE FIVE WORKING DAYS FROM THE COMPLETION OF THE INITIAL DRIVE THEN THE TEST PILE RESTRIKE SHALL BE PAID AS NOTED IN SPECIAL PROVISION 619502.
  - b). IF DIRECTED BY THE ENGINEER TO RESTRIKE A PRODUCTION PILE, THE RESTRIKE OF THE PRODUCTION PILE SHALL BE PAID SEPARATELY UNDER ITEM 619501.
  - c). RESTRIKES ON PRODUCTION PILES WHICH ARE DESIGNATED TO BE DYNAMICALLY TESTED WILL NOT BE PAID UNDER ITEM 619501-PRODUCTION PILE RESTRIKE. THESE PRODUCTION PILE RESTRIKES ARE INCIDENTAL TO ITEM 619519-DYNAMIC PILE TESTING BY CONTRACTOR.
  - d). THE FIRST TEN (10) PRODUCTION PILE RESTRIKES FOR THE BRIDGE SHALL BE PERFORMED AT NO COST TO THE DEPARTMENT. SUBSEQUENT RESTRIKES SHALL BE PAID UNDER ITEM 619501-PRODUCTION PILE RESTRIKES AT THE FIXED PRICE OF \$ 500.00 EACH.
8. THE DEPARTMENT RESERVES THE RIGHT TO PERFORM DYNAMIC TESTING OF RESTRIKES.

**14" SQUARE PRECAST PRESTRESSED CONCRETE PILES**

- A. THE ESTIMATED PILE LENGTH = 30'-0"
- B. THE ESTIMATED TEST PILE LENGTH = 40'-0"
- C. THE ESTIMATED RATED HAMMER ENERGY RANGE REQUIRED TO DRIVE THE PILES IS BETWEEN 27.09 AND 71.45 kip-ft.
- D. MINIMUM GROUT COMPRESSIVE STRENGTH F'<sub>c</sub> = 6,000 psi. DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN 1" CLEAR TO ALL PRESTRESSING STRANDS IN THE CONCRETE PILE. PREFORMED HOLES SHALL BE FREE OF ANY OBSTRUCTIONS BEFORE GROUTING WITH AN APPROVED NON-SHRINK GROUT. HOLES SHALL ALSO BE GROUTED WHEN PILE BUILD-UP IS NOT NEEDED.
- E. THE CAST-IN-PLACE CONCRETE PILE BUILD-UP SHALL BE USED WHERE PILES MUST BE DRIVEN TO AN ELEVATION WHICH RESULTS IN THE TOP OF PILE BEING LOWER THAN THE BOTTOM OF CAP TO ACHIEVE THE REQUIRED NOMINAL RESISTANCE. PILE BUILD-UP WILL BE MEASURED AND PAID FOR IN CONFORMANCE WITH SECTION 618 OF THE DELAWARE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS. MINIMUM CONCRETE COMPRESSIVE STRENGTH F'<sub>c</sub> = 6,000 psi.

**HP 14X73 STEEL PILES**

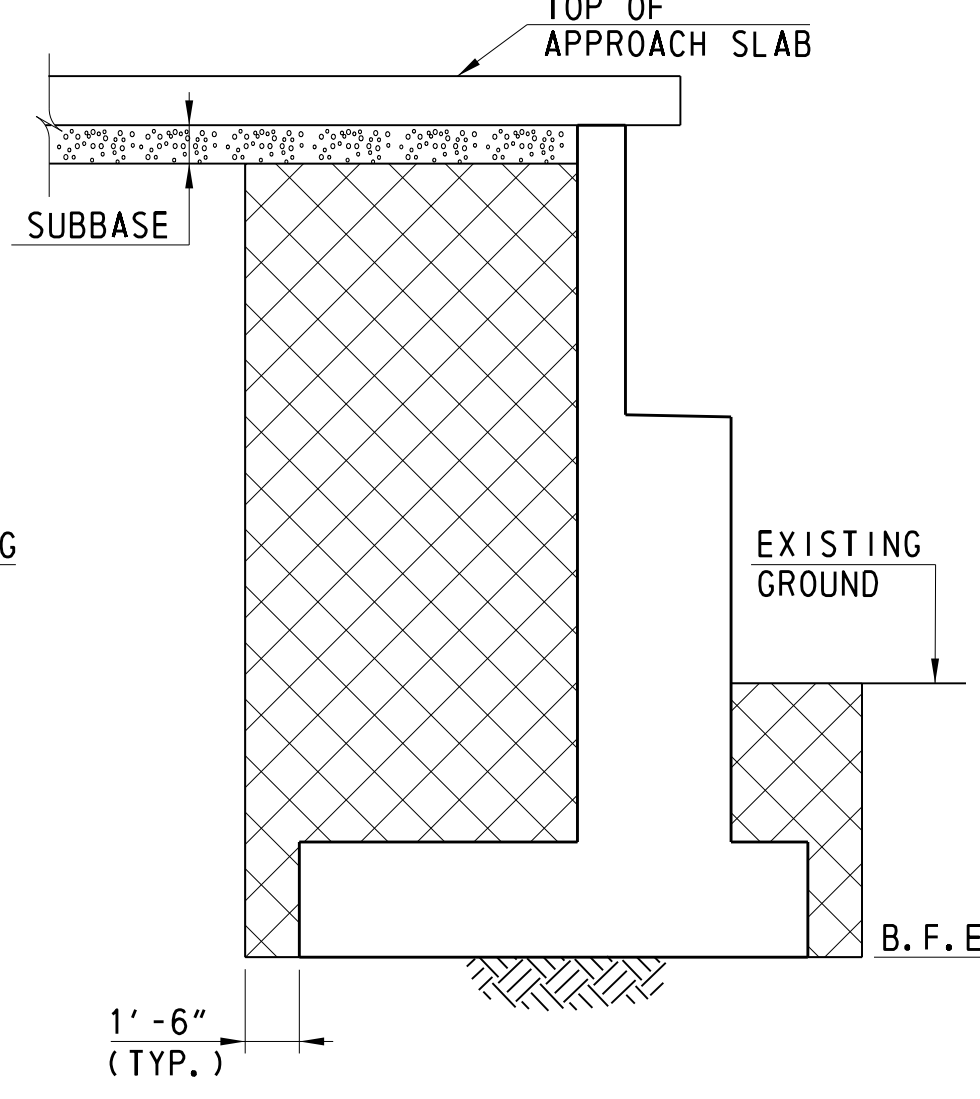
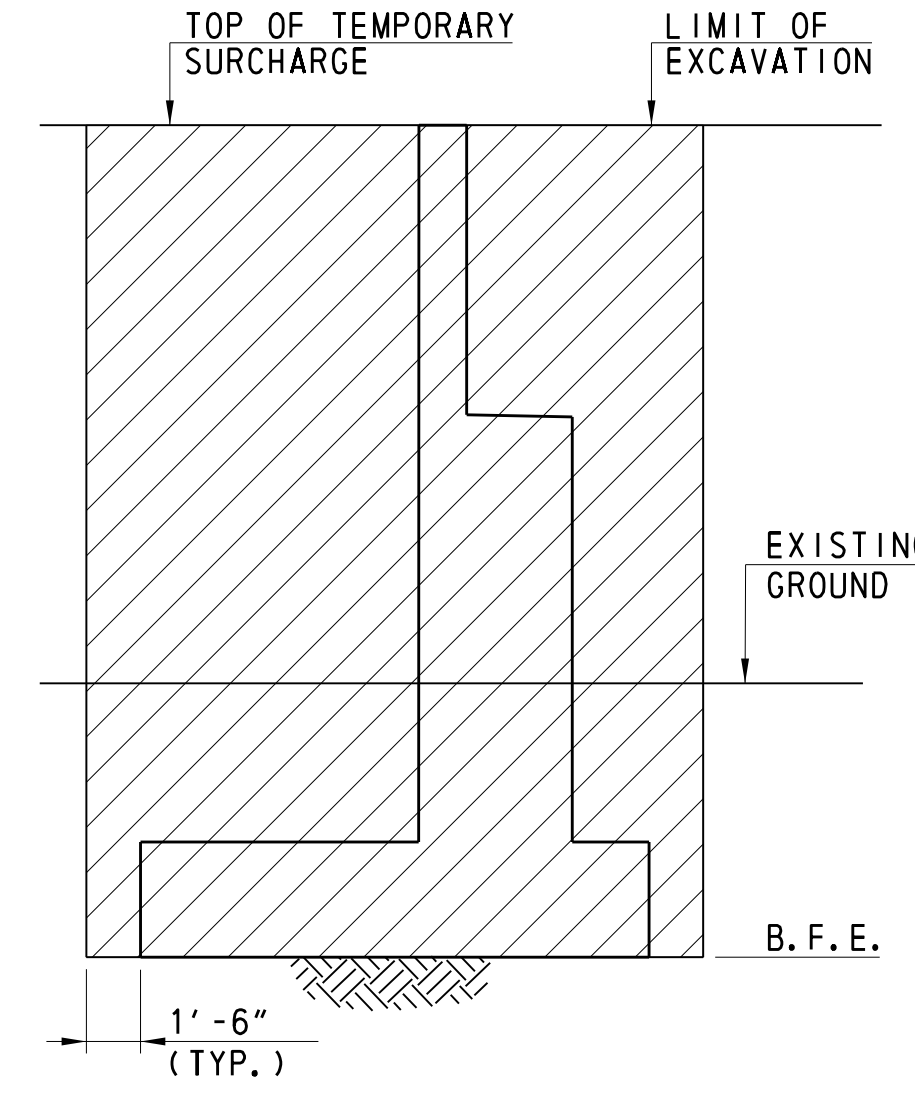
- A CONTRACTOR'S ALTERNATE USING AN HP14X73 STEEL PILE IS ALLOWED. ASSUME A ONE TO ONE PILE SUBSTITUTION. STEEL H-PILES SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 50. ORIENT STRONG AXIS OF STEEL H-PILES PARALLEL TO CENTERLINE OF BEARINGS.
- A. THE ESTIMATED PILE LENGTH = 45'-0"
  - B. THE ESTIMATED TEST PILE LENGTH = 55'-0"
  - C. USE A HAMMER ENERGY RANGE BETWEEN 22.61 AND 51.22 kip-ft.

**M. S. E. WALL SOIL PARAMETERS**

RETAINED ZONE	
IN-SITU SOIL DENSITY, (lb/ft <sup>3</sup> )	130
IN-SITU SOIL COHESION, (psf)	0
IN-SITU SOIL FRICTION ANGLE, (deg)	34
FOUNDATION ZONE	
IN-SITU SOIL DENSITY, (lb/ft <sup>3</sup> )	115
IN-SITU SOIL COHESION, (psf)	0
IN-SITU SOIL FRICTION ANGLE, (deg)	30
BEARING RESISTANCE FACTOR	0.65
ALLOWABLE SETTLEMENT (Inch)	1.0

**M. S. E. WALL MINIMUM STRAP LENGTH**

LOCATION	SEGMENT	REINFORCEMENT LENGTH (ft)
M. S. E. WALL-WING A	A1	20.0
	A2	17.0
	A3	15.0
	A4	12.0
M. S. E. WALL-WING B	B1	20.0
	B2	15.0
	B3	12.0
M. S. E. WALL-WING C	C1	20.0
	C2	15.0
	C3	12.0
M. S. E. WALL-WING D	D1	20.0
	D2	15.0
	D3	12.0
M. S. E. WALL-MEDIAN A		21.0
M. S. E. WALL-MEDIAN B		21.0



EXCAVATION AND BACKFILL FOR STRUCTURES ITEM 207000  
BORROW TYPE C

**EXCAVATION AND BACKFILL**

NOTE: PAYMENT FOR EXCAVATION BEYOND THE LIMITS SHOWN ABOVE SHALL BE MADE UNDER ITEM 202000 EXCAVATION AND EMBANKMENT.

**PAY LIMITS FOR ABUTMENT WITH SOIL EXCAVATION (PILE FOOTING)**

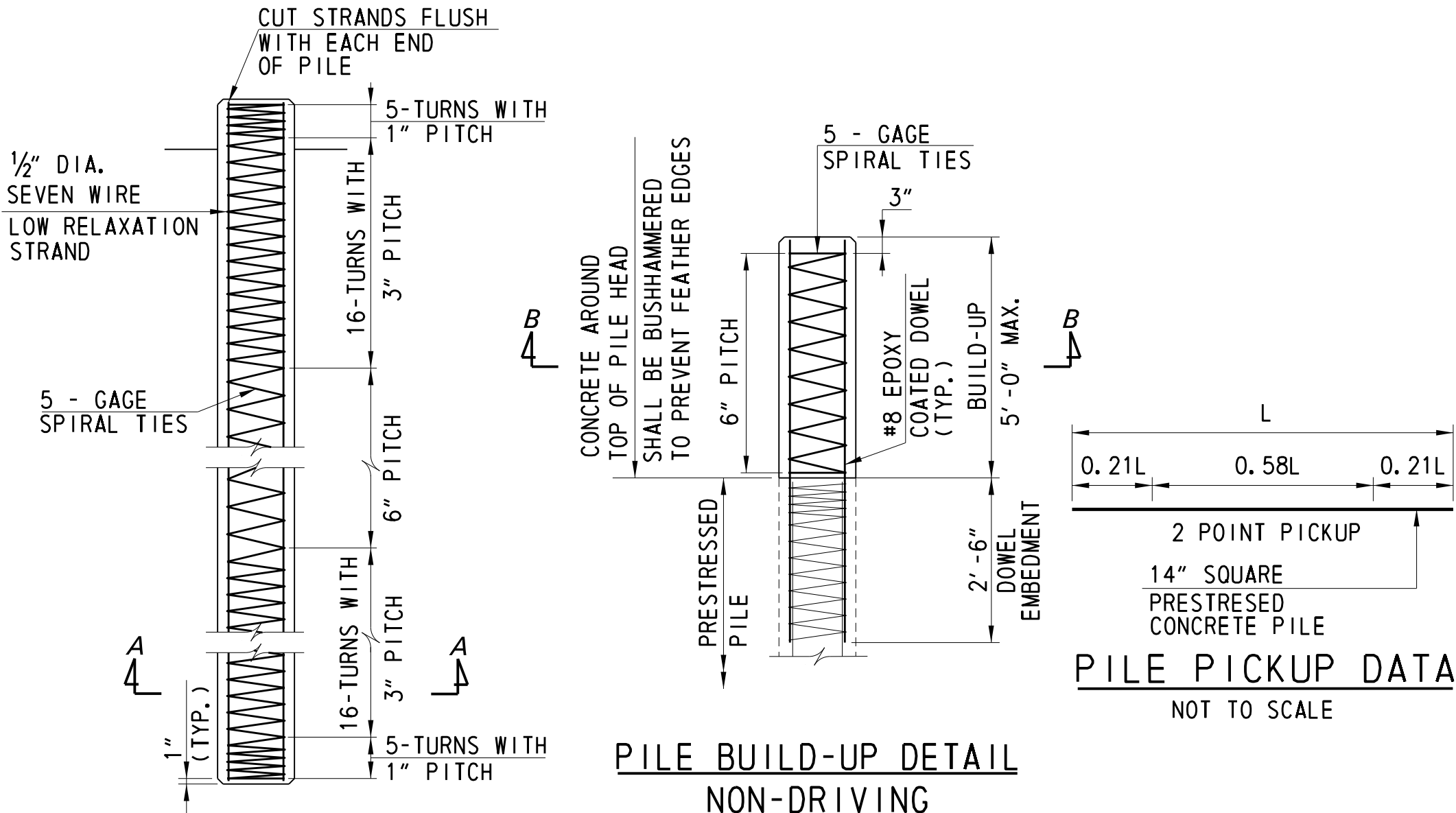
NOT TO SCALE

PILE INSTALLATION DATA***						
SUBSTR. UNIT	PILE TYPE	NOMINAL PILE DRIVING RESISTANCE (R <sub>ndr</sub> ) (KIPS)	ESTIMATED TIP ELEVATION	MINIMAL TIP ELEVATION	AVERAGE ACTUAL MINIMUM TIP ELEVATION	AVERAGE ACTUAL MINIMUM TIP ELEVATION
ABUT. A	14" S.P.P.C.P.	250	12.00	12.00		
	HP 14X73		-3.00	-3.00		
ABUT. B	14" S.P.P.C.P.	250	12.00	12.00		
	HP 14X73		-3.00	-3.00		

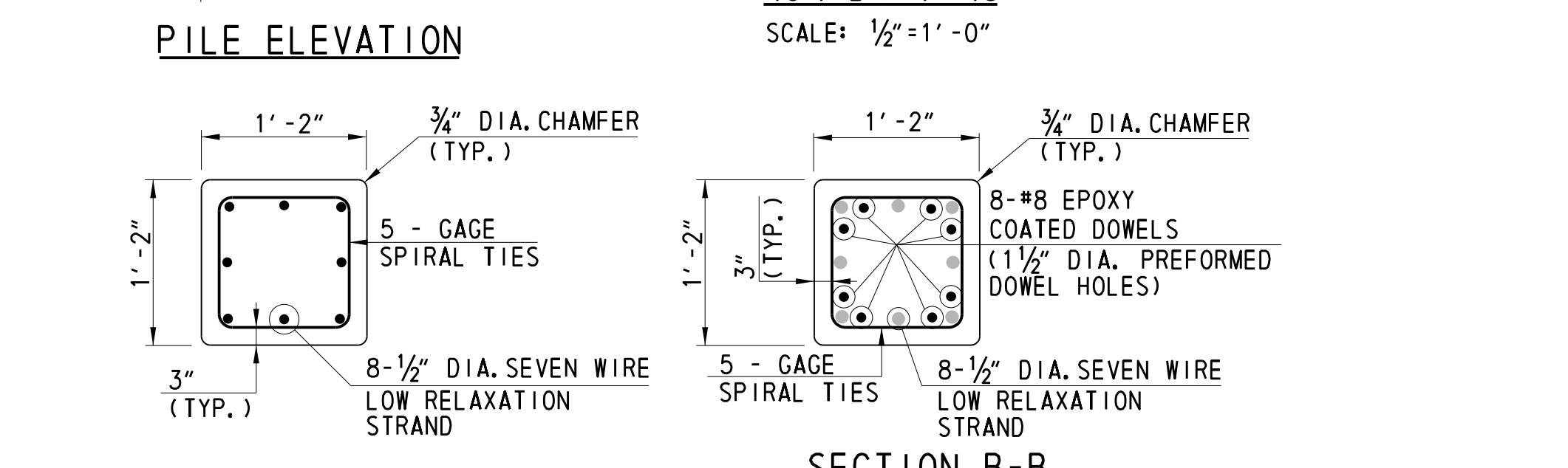
PILE DRIVING INFORMATION***		
PILE SIZE AND TYPE		
	14" S.P.P.C.P.	HP 14X73
ACTUAL BEARING OBTAINED	ABUT. A	
	ABUT. B	
HAMMER TYPE	ABUT. A	
	ABUT. B	
PILE HAMMER ENERGY	ABUT. A	
	ABUT. B	
SPECIAL DRIVING CONDITIONS AND COMMENTS	ABUT. A	
	ABUT. B	

**LEGEND:**  
B.F.E. = BOTTOM OF FOOTING ELEVATION  
ABUT. DIA. EL. = ABUTMENT DIAMETER ELEVATION  
M.S.E. = MECHANICALLY STABILIZED EARTH  
S.P.P.C.P. = SQUARE PRECAST PRESTRESSED CONCRETE PILE  
SUBSTR. TYP. Q500 = SUBSTRUCTURE TYPICAL 500 YEAR FLOOD

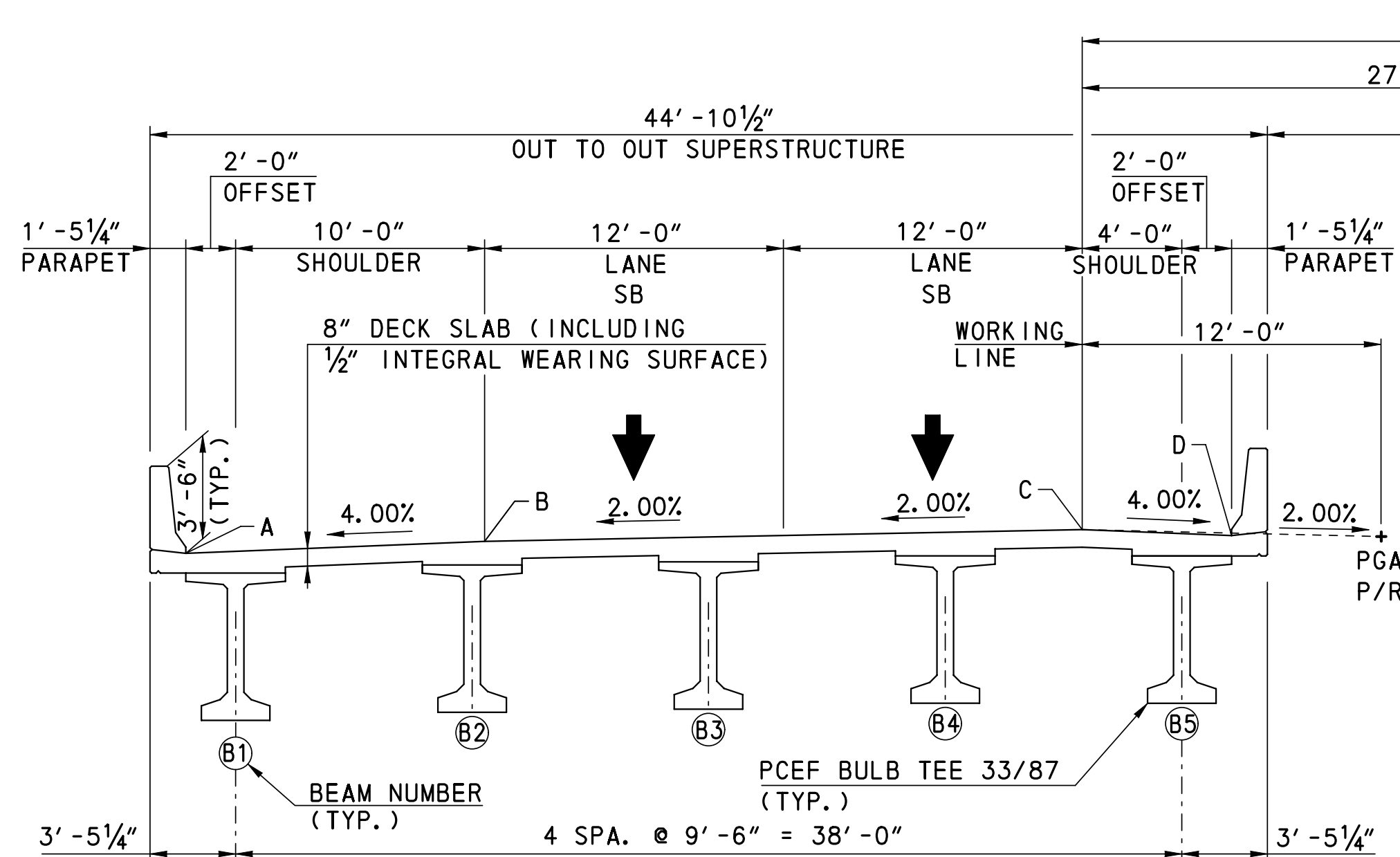
\*\*\*CONTRACTOR SHALL PROVIDE DATA FOR BOTH NB AND SB BRIDGES



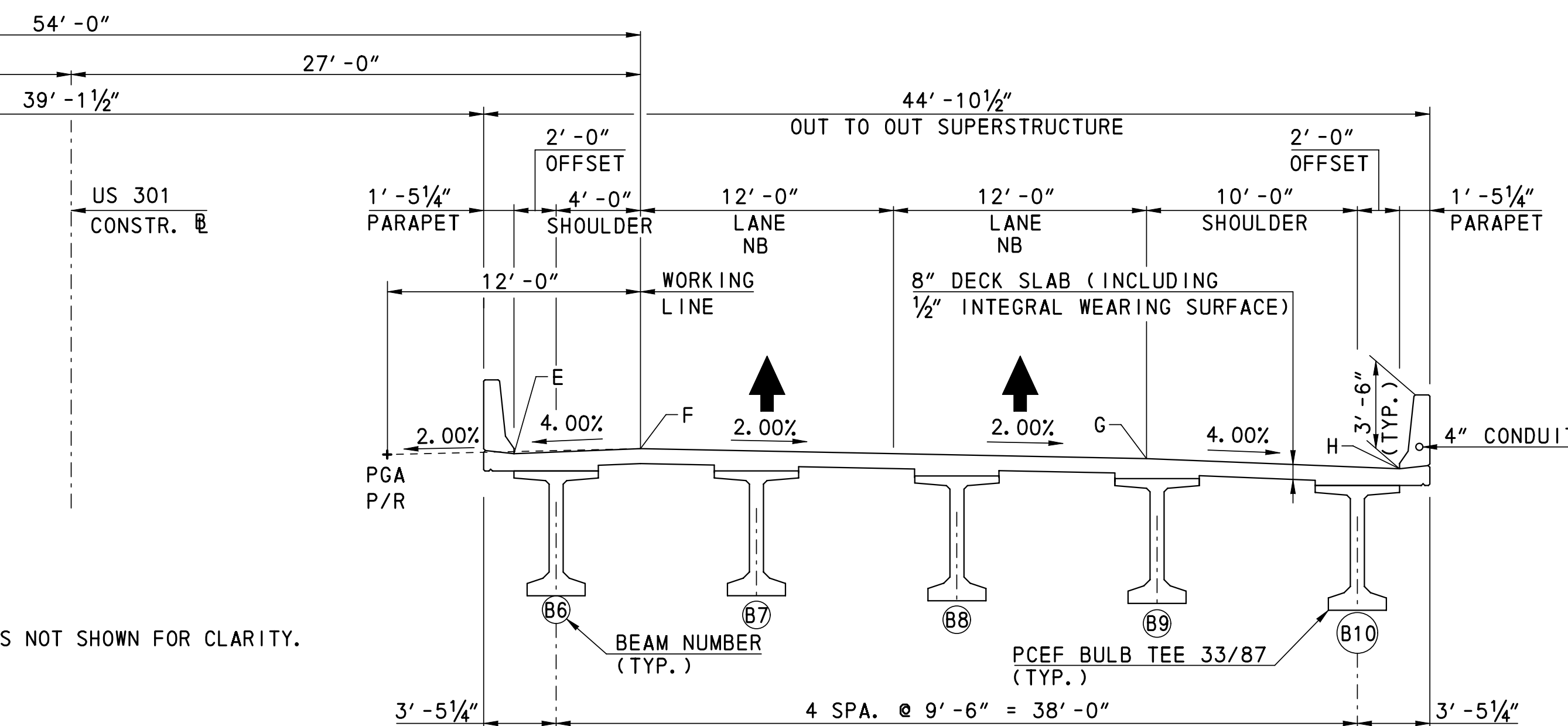
**PILE PICKUP DATA**  
NOT TO SCALE



**SECTION A-A SECTION B-B PRECAST PRESTRESSED CONCRETE PILE DETAILS**  
NOT TO SCALE



1-467S



1-467N

NOTE:  
1. DIAPHRAGMS NOT SHOWN FOR CLARITY.

TYPICAL SECTION

SCALE: 1/8" = 1'-0"

TOP OF DECK ELEVATIONS AT 10 FT. INTERVALS					
BRIDGE 1-467S					
STATION	PGL ELEVATION AT CONSTR. @	DECK ELEVATION @ A (GUTTER)	DECK ELEVATION @ B	DECK ELEVATION @ C (WORKING LINE SB)	DECK ELEVATION @ D (GUTTER)
636+30.00	63.48	62.76	63.24	63.72	63.48
636+40.00	63.43	62.71	63.19	63.67	63.43
636+50.00	63.37	62.65	63.13	63.61	63.37
636+60.00	63.31	62.59	63.07	63.55	63.31
636+70.00	63.25	62.53	63.01	63.49	63.25
*636+76.34	63.22	62.50	62.98	63.46	63.22
636+80.00	63.19	62.47	62.95	63.43	63.19
636+90.00	63.14	62.42	62.90	63.38	63.14
637+00.00	63.08	62.36	62.84	63.32	63.08
637+10.00	63.02	62.30	62.78	63.26	63.02
637+20.00	62.96	62.24	62.72	63.20	62.96
637+30.00	62.90	62.18	62.66	63.14	62.90
637+40.00	62.85	62.13	62.61	63.09	62.85
637+50.00	62.79	62.07	62.55	63.03	62.79
637+60.00	62.73	62.01	62.49	62.97	62.73
637+70.00	62.67	61.95	62.43	62.91	62.67
637+80.00	62.61	61.89	62.37	62.85	62.61
637+90.00	62.56	61.84	62.32	62.80	62.56
638+00.00	62.50	61.78	62.26	62.74	62.50
638+10.00	62.44	61.72	62.20	62.68	62.44
**638+16.34	62.40	61.68	62.16	62.64	62.40
638+20.00	62.38	61.66	62.14	62.62	62.38
638+30.00	62.32	61.60	62.08	62.56	62.32
638+40.00	62.27	61.55	62.03	62.51	62.27
638+50.00	62.21	61.49	61.97	62.45	62.21

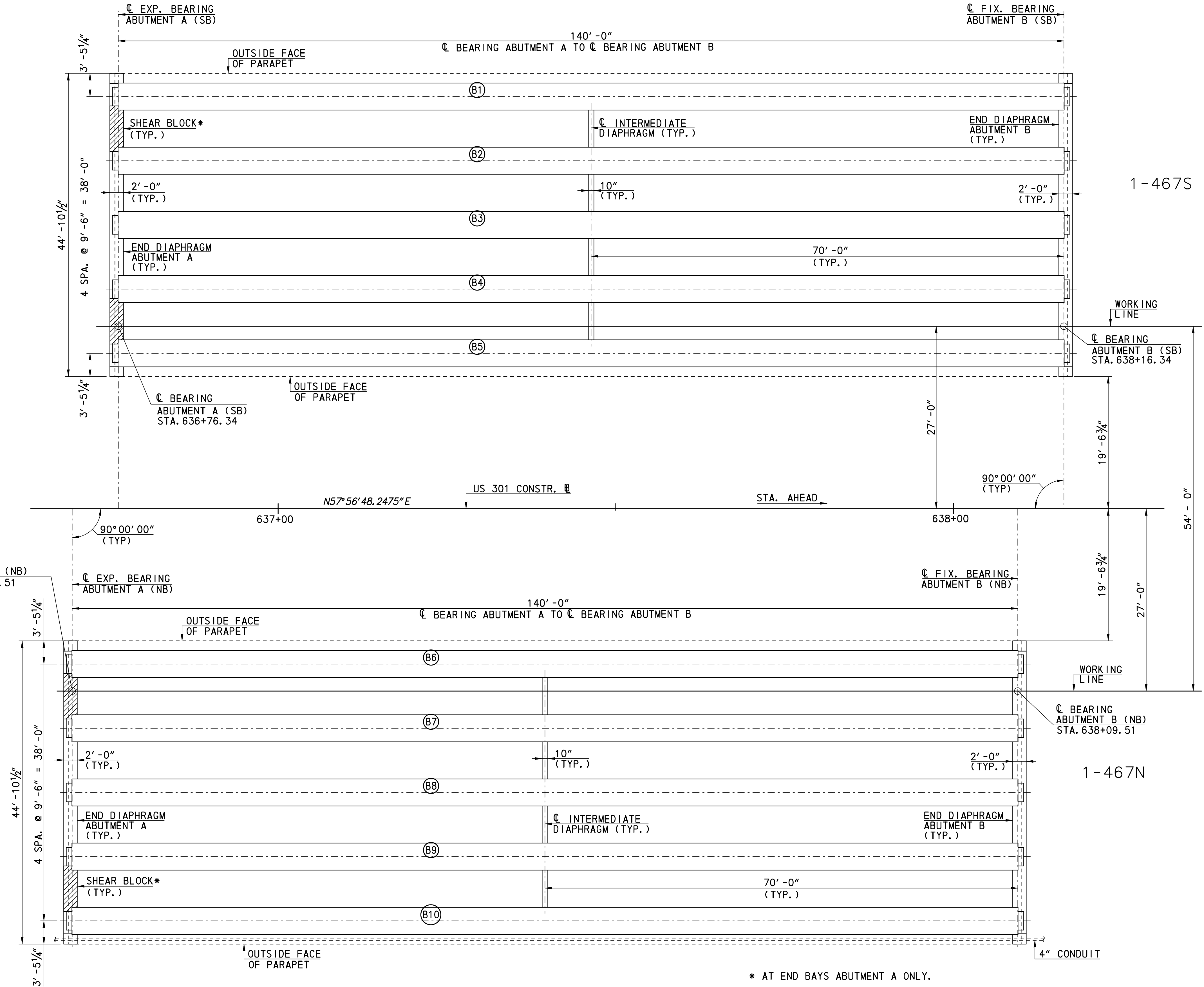
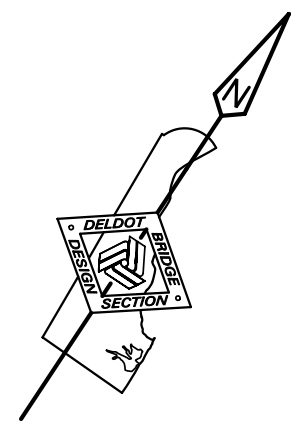
TOP OF DECK ELEVATIONS ALONG @ BEAM					
BRIDGE 1-467S					
STATION	ELEVATION				
	BEAM B1	BEAM B2	BEAM B3	BEAM B4	BEAM B5
*636+76.34	62.58	62.96	63.16	63.35	63.30
636+86.34	62.52	62.90	63.10	63.29	63.24
636+96.34	62.46	62.84	63.04	63.23	63.18
637+06.34	62.40	62.78	62.98	63.17	63.12
637+16.34	62.34	62.72	62.92	63.11	63.06
637+26.34	62.29	62.67	62.87	63.06	63.01
637+36.34	62.23	62.61	62.81	63.00	62.95
637+46.34	62.17	62.55	62.75	62.94	62.89
637+56.34	62.11	62.49	62.69	62.88	62.83
637+66.34	62.05	62.43	62.63	62.82	62.77
637+76.34	62.00	62.38	62.58	62.77	62.72
637+86.34	61.94	62.32	62.52	62.71	62.66
637+96.34	61.88	62.26	62.46	62.65	62.60
638+06.34	61.82	62.20	62.40	62.59	62.54
**638+16.34	61.76	62.14	62.34	62.53	62.48

TOP OF DECK ELEVATIONS AT 10 FT. INTERVALS					
BRIDGE 1-467N					
STATION	PGL ELEVATION AT CONSTR. @	DECK ELEVATION @ E (GUTTER)	DECK ELEVATION @ F (WORKING LINE NB)	DECK ELEVATION @ G	DECK ELEVATION @ H (GUTTER)
636+30.00	63.48	63.48	63.72	63.24	62.76
636+40.00	63.43	63.43	63.67	63.19	62.71
636+50.00	63.37	63.37	63.61	63.13	62.65
636+60.00	63.31	63.31	63.55	63.07	62.59
*636+69.51	63.26	63.26	63.50	63.02	62.54
636+70.00	63.25	63.25	63.49	63.01	62.53
636+80.00	63.19	63.19	63.43	62.95	62.47
636+90.00	63.14	63.14	63.38	62.90	62.42
637+00.00	63.08	63.08	63.32	62.84	62.36
637+10.00	63.02	63.02	63.26	62.78	62.30
637+20.00	62.96	62.96	63.20	62.72	62.24
637+30.00	62.90	62.90	63.14	62.66	62.18
637+40.00	62.85	62.85	63.09	62.61	62.13
637+50.00	62.79	62.79	63.03	62.55	62.07
637+60.00	62.73	62.73	62.97	62.49	62.01
637+70.00	62.67	62.67	62.91	62.43	61.95
637+80.00	62.61	62.61	62.85	62.37	61.89
637+90.00	62.56	62.56	62.80	62.32	61.84
638+00.00	62.50	62.50	62.74	62.26	61.78
**638+09.51	62.44	62.44	62.68	62.20	61.72
638+10.00	62.44	62.44	62.68	62.20	61.72
638+20.00	62.38	62.38	62.62	62.14	61.66
638+30.00	62.32	62.32	62.56	62.08	61.60
638+40.00	62.27	62.27	62.51	62.03	61.55
638+50.00	62.21	62.21	62.45	61.97	61.49

TOP OF DECK ELEVATIONS ALONG @ BEAM					
BRIDGE 1-467N					
STATION	ELEVATION				
	BEAM B6	BEAM B7	BEAM B8	BEAM B9	BEAM B10
*636+69.51	63.34	63.39	63.20	63.00	62.62
636+79.51	63.28	63.33	63.14	62.94	62.56
636+89.51	63.22	63.27	63.08	62.88	62.50
636+99.51	63.16	63.21	63.02	62.82	62.44
637+09.51	63.10	63.15	62.96	62.76	62.38
637+19.51	63.05	63.10	62.91	62.71	62.33
637+29.51	62.99	63.04	62.85	62.65	62.27
637+39.51	62.93	62.98	62.79	62.59	62.21
637+49.51	62.87	62.92	62.73	62.53	62.15
637+59.51	62.81	62.86	62.67	62.47	62.09
637+69.51	62.76	62.81	62.62	62.42	62.04
637+79.51	62.70	62.75	62.56	62.36	61.98
637+89.51	62.64	62.69	62.50	62.30	61.92
637+99.51	62.58	62.63	62.44	62.24	61.86
**638+09.51	62.52	62.57	62.38	62.18	61.80

LEGEND  
 CONSTR. = CONSTRUCTION  
 NB = NORTHBOUND  
 PGA = PROFILE GRADE APPLICATION  
 P/R = POINT OF ROTATION  
 SB = SOUTHBOUND  
 SPA. = SPACES  
 TYP. = TYPICAL

\* @ BRG. ABUT. A  
 \*\* @ BRG. ABUT. B



1-467S

1-467N

- NOTES:**
1. FOR TYPICAL SECTION, SEE SHEETS 4 AND 18 OF 40.
  2. FOR BEAM DETAILS, SEE SHEETS 20 AND 21 OF 40.
  3. FOR DIAPHRAGM DETAILS, SEE SHEETS 23, 24, 30 AND 31 OF 40.
  4. FOR SHEAR BLOCK DETAILS, SEE SHEETS 7 AND 12 OF 40.

- LEGEND**
- EXP. = EXPANSION
  - FIX. = FIXED
  - NB = NORTHBOUND
  - SB = SOUTHBOUND
  - SPA. = SPACES
  - STA. = STATION
  - TYP. = TYPICAL

\* AT END BAYS ABUTMENT A ONLY.

**PLAN**  
SCALE: 1/8" = 1' - 0"



ADDENDUMS / REVISIONS	

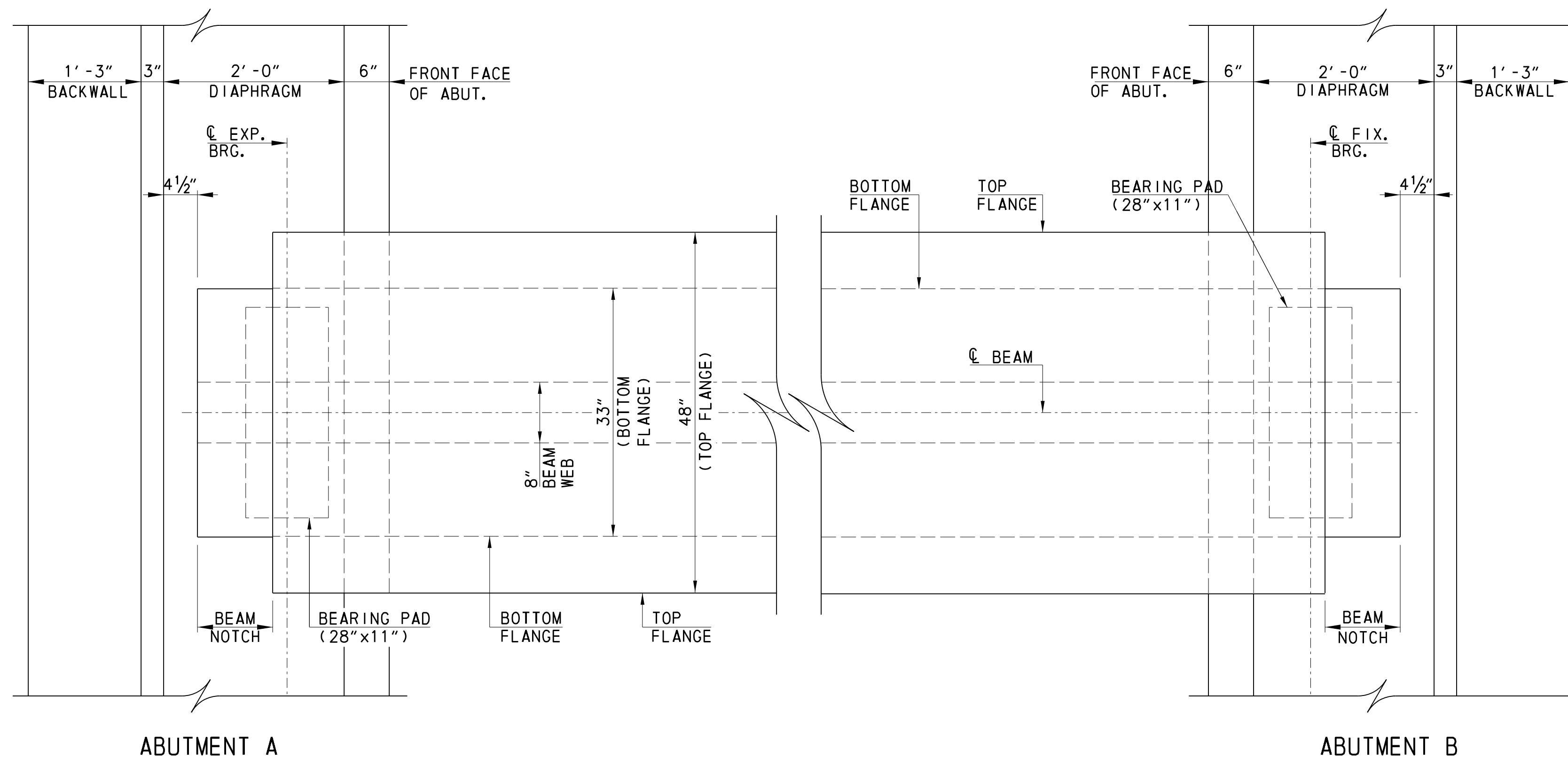
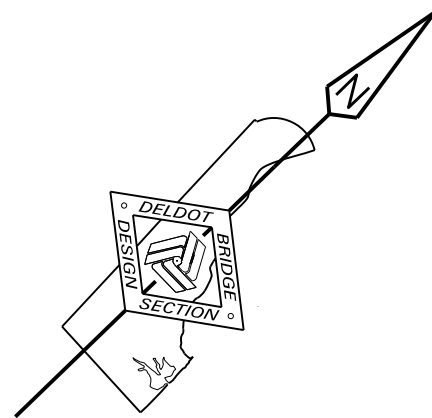
SCALE: AS NOTED

**US 301,  
NORFOLK SOUTHERN RR TO SR 896**

CONTRACT T200911301	BRIDGE NO. <b>1-467 N&amp;S</b>
COUNTY NEW CASTLE	DESIGNED BY: ZAA
	CHECKED BY: BK

**FRAMING PLAN**

SHEET NO. 103
TOTAL SHTS. 240



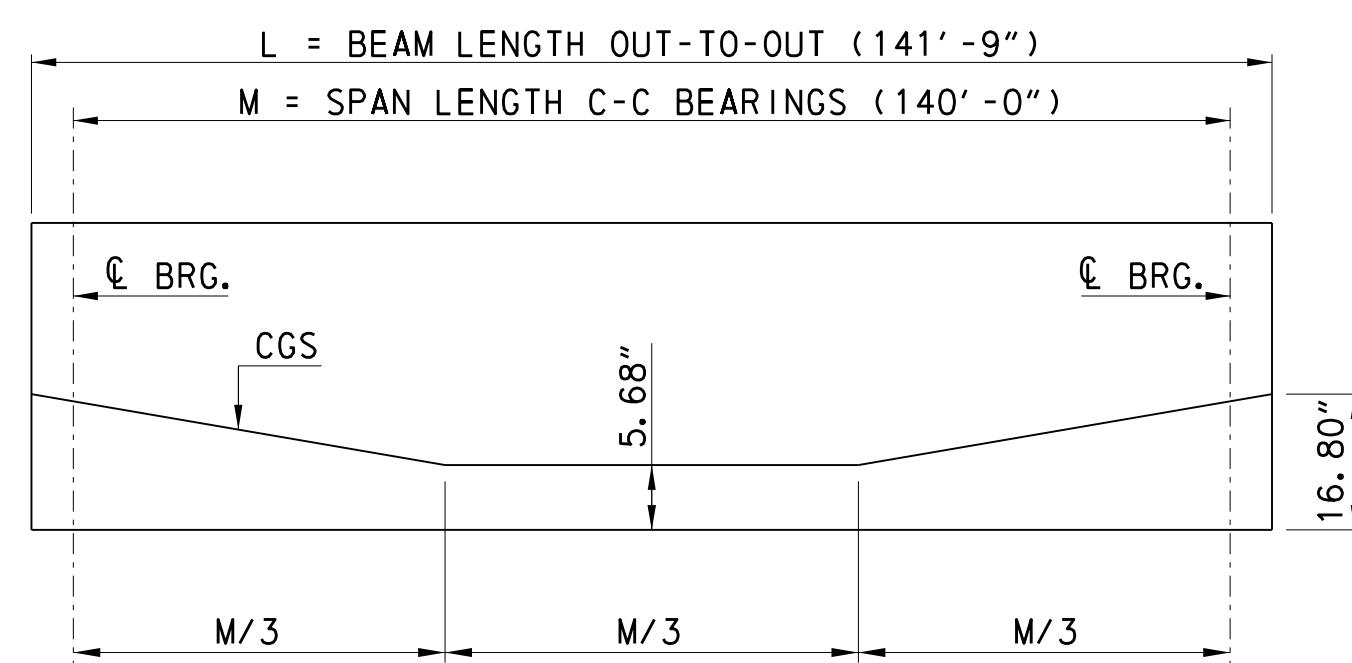
**PLAN**  
**STRUCTURE AT ENDS OF BEAM**  
 SCALE: 1"=1'-0"

**BEARING PAD NOTES**

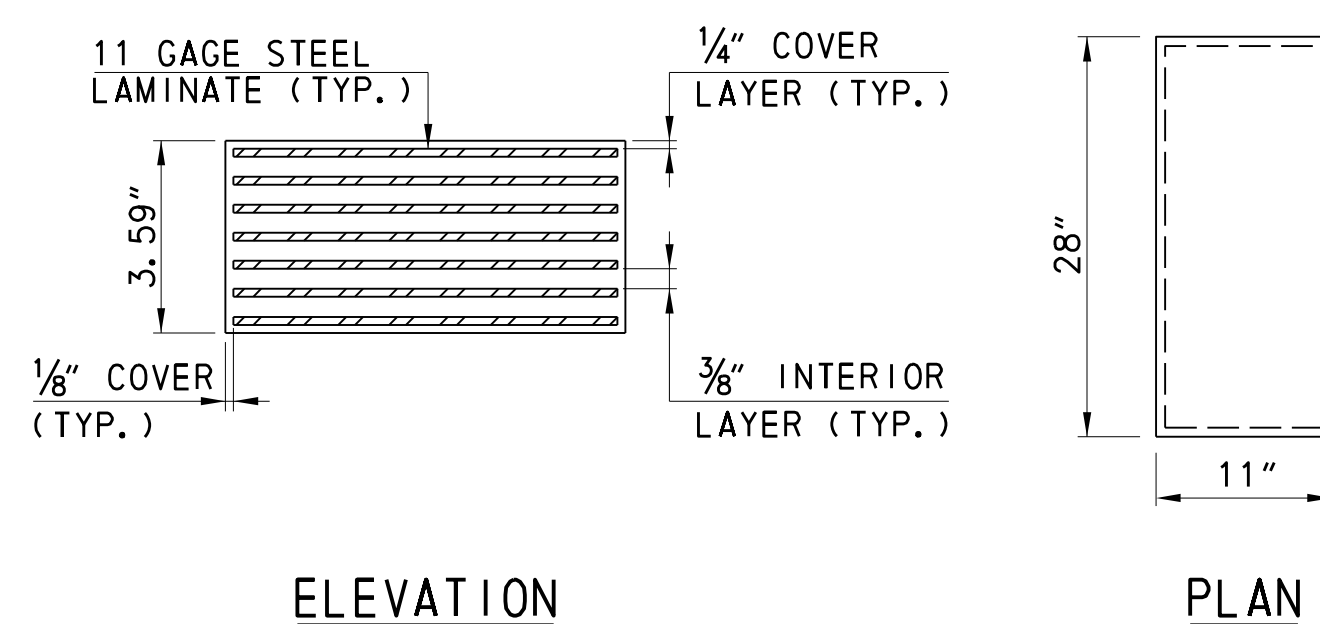
- THE MAXIMUM DESIGN LOAD FOR THE FIXED BEARINGS = 306 KIPS.
- THE MAXIMUM DESIGN LOAD FOR THE EXPANSION BEARINGS = 306 KIPS
- SMOOTH CUT AND DEBURR METAL SHIMS.
- GRIT BLAST AND DEGREASE METAL SHIMS.
- ALL BEARING PADS ARE TO BE MOLDED TO DESIGN DIMENSIONS. CUTTING TO SIZE AFTER FABRICATION IS PROHIBITED.
- MEET THE MATERIAL SPECIFICATIONS FOR ELASTOMERIC BEARING REQUIREMENTS OF AASHTO M251. BEARING PADS SHALL BE SAMPLED FOR TESTING ACCORDING TO AASHTO M251, AS DIRECTED.
- PROVIDE NEOPRENE 50 ±5 DUROMETER.
- PROVIDE INTERNAL SHIMS PER AASHTO M270, GRADE 36.
- VULCANIZE PATCH PIN GROOVES.
- SANDBLAST CLEAN THE CONCRETE BEARING SURFACES TO ACHIEVE A ROUGH TEXTURE. DO NOT EPOXY COAT BEARING SURFACES.

**BEAM NOTES**

- GIRDERS ARE BULB TEE TYPE PCEF (33/87).
- CONCRETE STRENGTH AT STRAND RELEASE ( $f'c$ ) = 6.8 Ks1
- CONCRETE STRENGTH AT 28 DAYS ( $f'c$ ) = 8.0 Ks1
- JACKING PRESTRESS STRESS ( $f_{pj}$ ) PER STRAND = 202.50 Ks1
- USE LOW RELAXATION 270 Ks1, 0.6" DIAMETER STRANDS ( $A = 0.217 \text{ in}^2$ )
- MINIMUM COVER ON REINFORCEMENT BARS:  
 STIRRUPS - 1" MIN.  
 ALL OTHERS - 1 1/2" MIN. UNLESS OTHERWISE NOTED
- PROVIDE MILD STEEL REINFORCEMENT CONFORMING TO AASHTO M31, GRADE 60.
- END ZONE REINFORCEMENT MAY BE INCREASED BY FABRICATOR TO REFLECT FABRICATOR'S EXPERIENCE AND/OR TO CONTROL CRACKING. WIRE MESH OF EQUIVALENT AREA IS PERMISSIBLE FOR CRACK CONTROL REINFORCEMENT.
- CAST ENDS OF BEAMS TO BE TRULY VERTICAL WHEN ERECTED.
- CLEAN TOP OF BEAMS BEFORE DECK SLAB IS PLACED.
- SHOW PLAN, ELEVATION, SECTIONS AND ALL REINFORCEMENT DETAILS ON SHOP DRAWINGS.
- SHOW DESIGN LENGTH AND CASTING LENGTH ON SHOP DRAWINGS.
- SHOW DETAILS OF GIRDER LIFTING DEVICES WITH ITS TYPE, SIZE AND LOCATION ON THE SHOP DRAWINGS.
- AT THE SHOP DRAWING STAGE PROVIDE CRACK CONTROL DEBONDING.
- SHOW ON THE SHOP DRAWINGS THE TYPE AND LOCATION OF TEMPORARY STORAGE SUPPORT AND THE TYPE AND LOCATION OF TEMPORARY TRANSPORTATION BRACING AND SUPPORTS.
- SHOW ANY MODIFICATIONS TO REINFORCEMENT SPLICE AND BENDING DETAILS ON SHOP DRAWINGS.
- ALL MILD STEEL REINFORCEMENT IN GIRDERS SHALL BE EPOXY COATED.
- GIRDER LENGTHS IN CASTING BED SHALL BE DETERMINED AND DEPICTED IN SHOP DRAWINGS TO COMPENSATE FOR GRADE SHORTENING DUE TO PRESTRESS EFFECT.



**STRAND PROFILE, CGS**  
 NOT TO SCALE

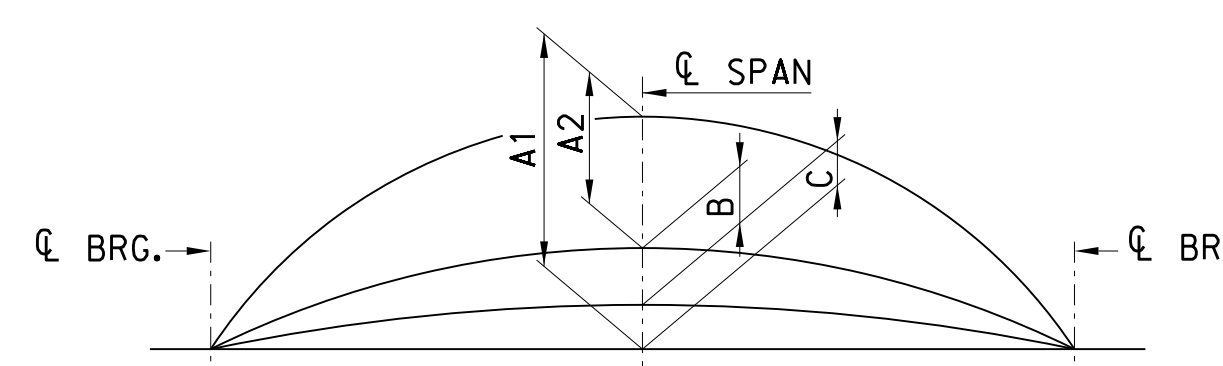


**ELEVATION**  
**BEARING PAD DETAILS**  
 (EXP. AND FIX. BEARINGS)  
 NOT TO SCALE

NOTE:  
 11"x28"x3.59" LAMINATED BEARING PAD  
 20 REQUIRED FOR STRUCTURE.

- LEGEND**
- ABUT. = ABUTMENT
  - BRG. = BEARING
  - CGS = CENTER OF GRAVITY, STRANDS
  - EXP. = EXPANSION
  - FIX. = FIXED
  - MIN. = MINIMUM
  - TYP. = TYPICAL

CAMBER TABLE				
BEAM	A1 (in)	A2 (in)	B (in)	C (in)
B1, B5, B6, B10	7 5/8"	2 3/4"	1 1/16"	3 3/16"
B2, B4, B7, B9	7 5/8"	2 3/4"	1 1/16"	2 1/16"
B3, B8	7 5/8"	2 3/4"	1 3/4"	3 1/8"



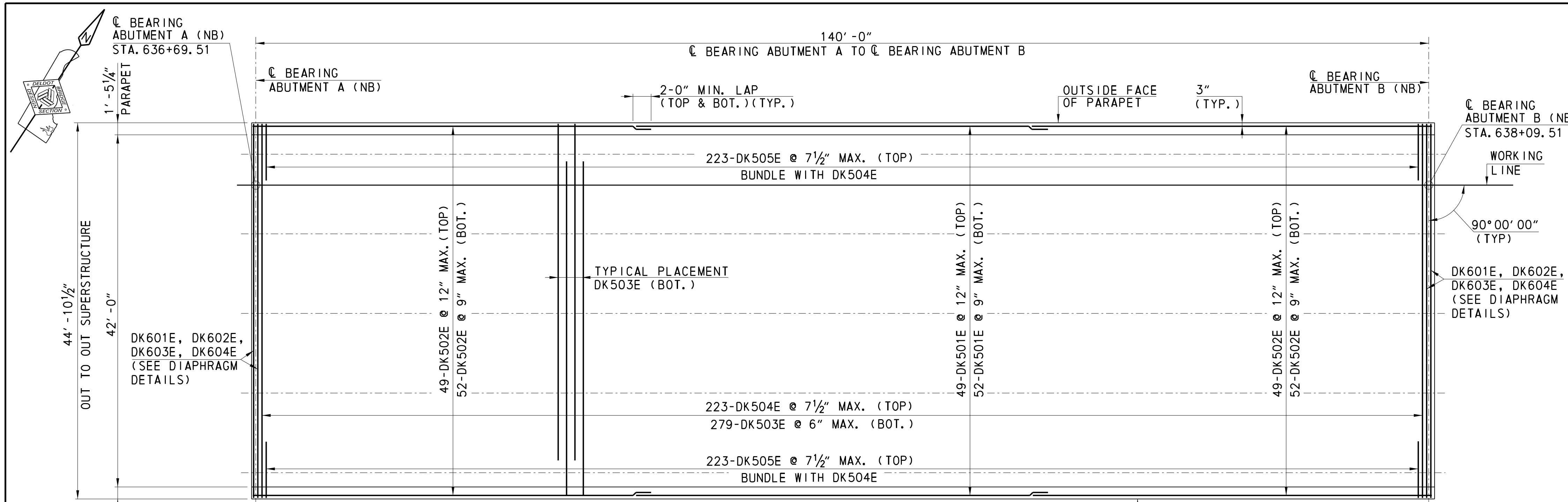
**BEAM CAMBER DESIGN**  
 NOT TO SCALE

**CAMBER NOTES**

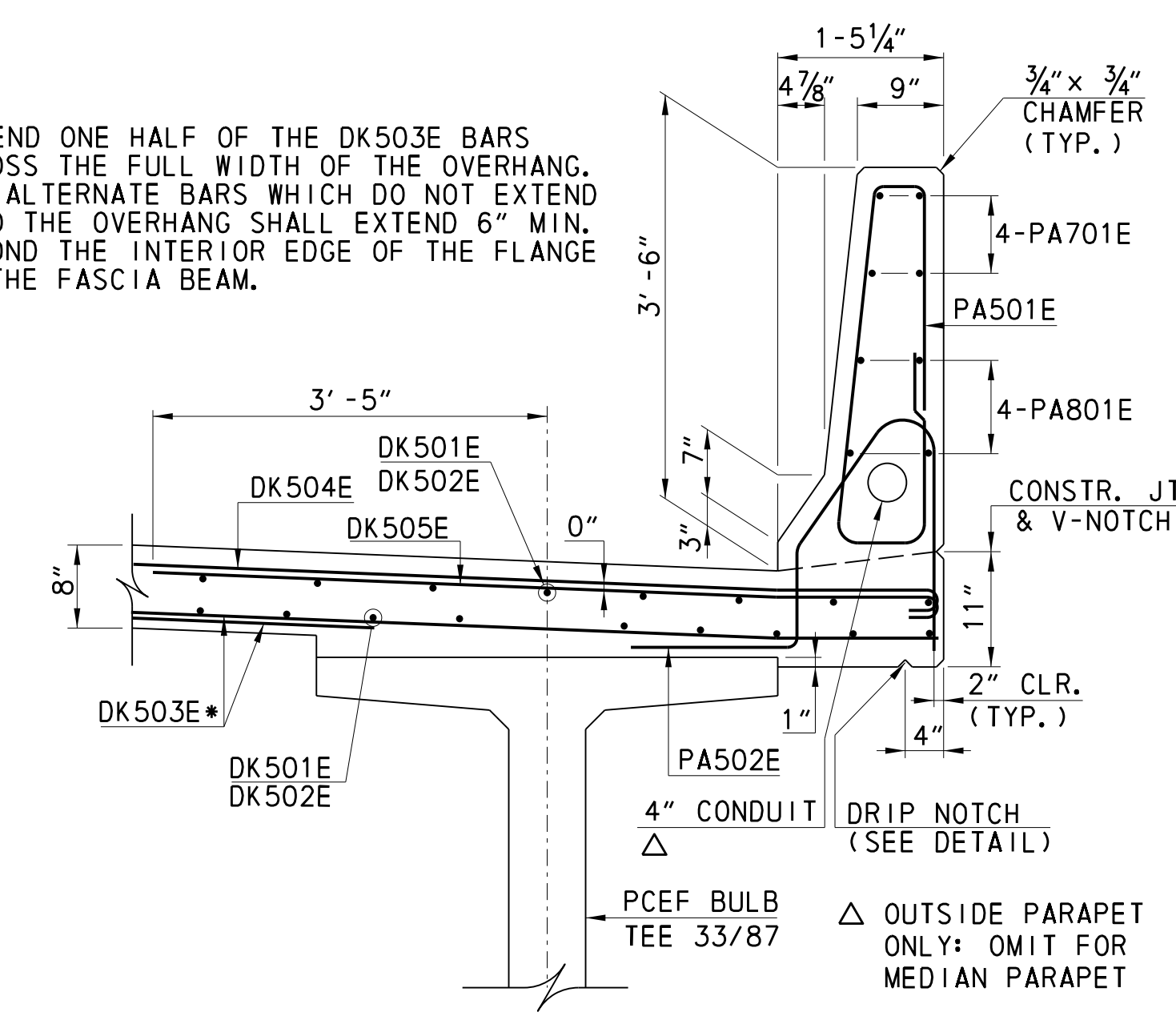
- A1 = ESTIMATED PRESTRESS CAMBER TIMES CREEP FACTOR OF 1.6 AND INITIAL P/S LOSS OF 10%.
- A2 = DEFLECTION DUE TO DEAD LOAD TIMES CREEP FACTOR OF 1.6.
- A = A1-A2
- B = DEFLECTION DUE TO DEAD LOAD OF SLAB, PERMANENT METAL FORMS AND SUPERIMPOSED DEAD LOAD.
- C = NET FINAL CAMBER ( A-B ).
- CAMBER VALUES ARE THEORETICAL AND MAY VARY WITH ACTUAL CONCRETE STRENGTH (AGE), VARIOUS PRESTRESSING CONDITIONS, CREEP FACTOR AND PRESTRESS LOSSES.
- BEARING SEAT ELEVATIONS AND HAUNCH THICKNESS HAVE BEEN CALCULATED USING THE NET FINAL CAMBER "C".



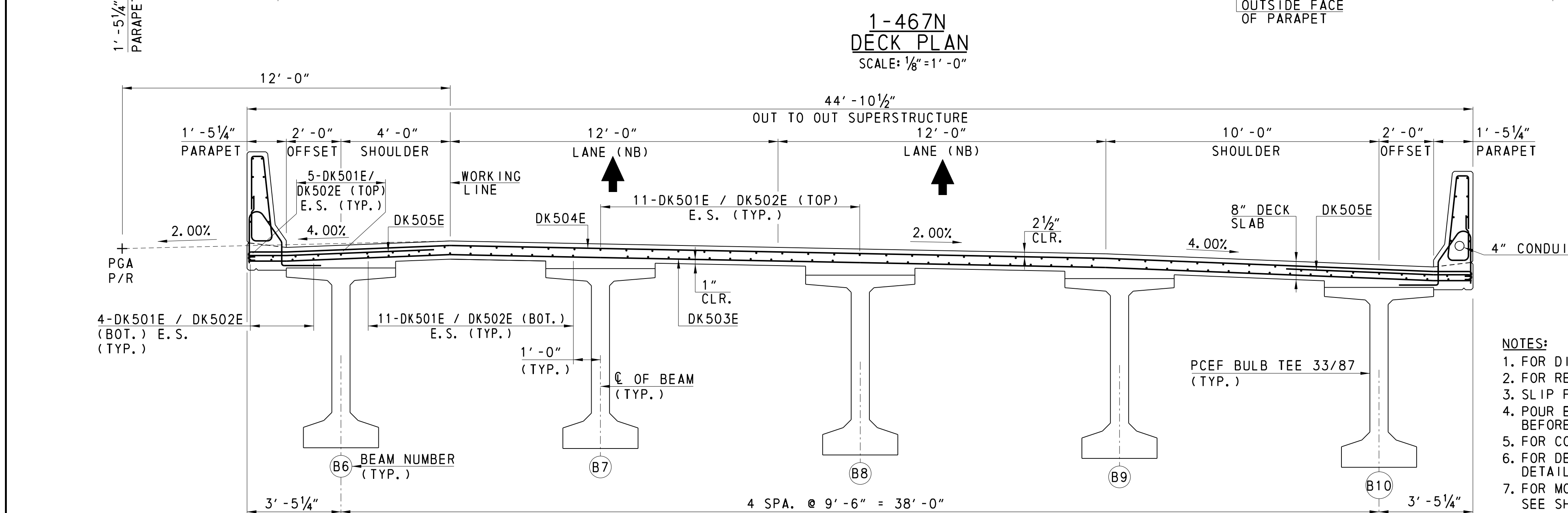




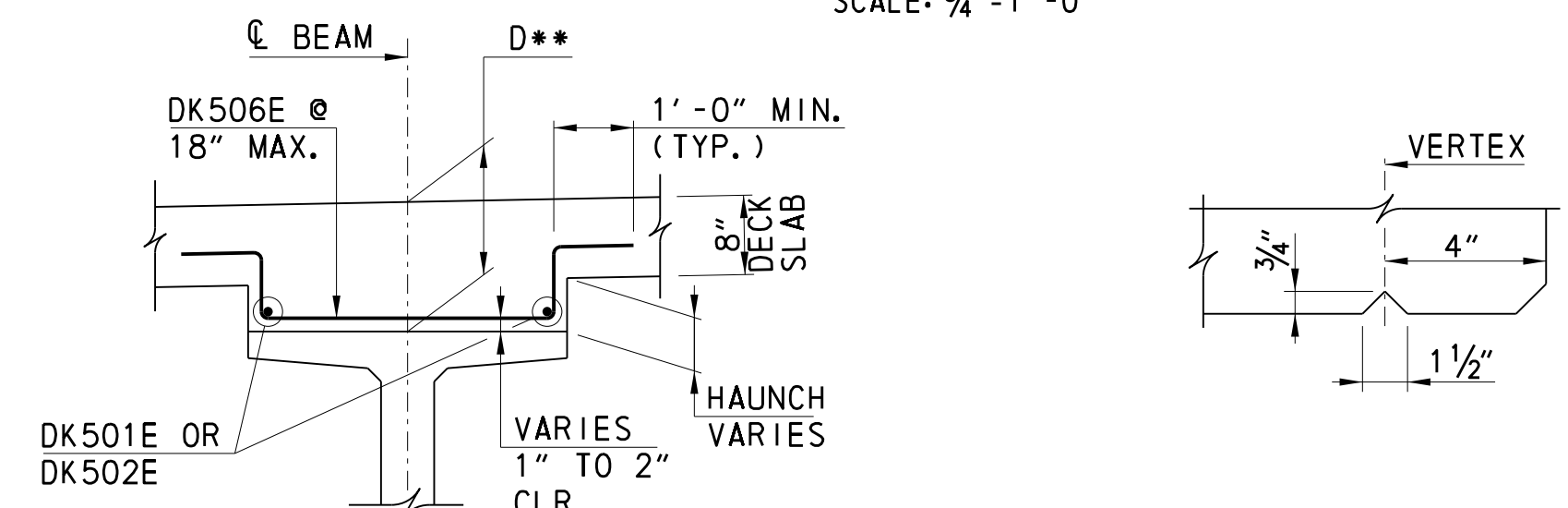
\* EXTEND ONE HALF OF THE DK503E BARS ACROSS THE FULL WIDTH OF THE OVERHANG. THE ALTERNATE BARS WHICH DO NOT EXTEND INTO THE OVERHANG SHALL EXTEND 6" MIN. BEYOND THE INTERIOR EDGE OF THE FLANGE OF THE FASCIA BEAM.



PARAPET DETAIL (NB)  
SCALE: 3/4"=1'-0"

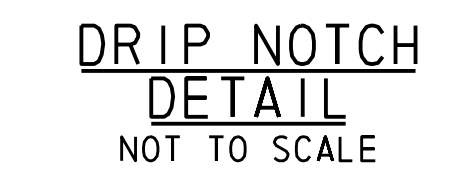


1-467N  
DECK PLAN  
SCALE: 1/8"=1'-0"

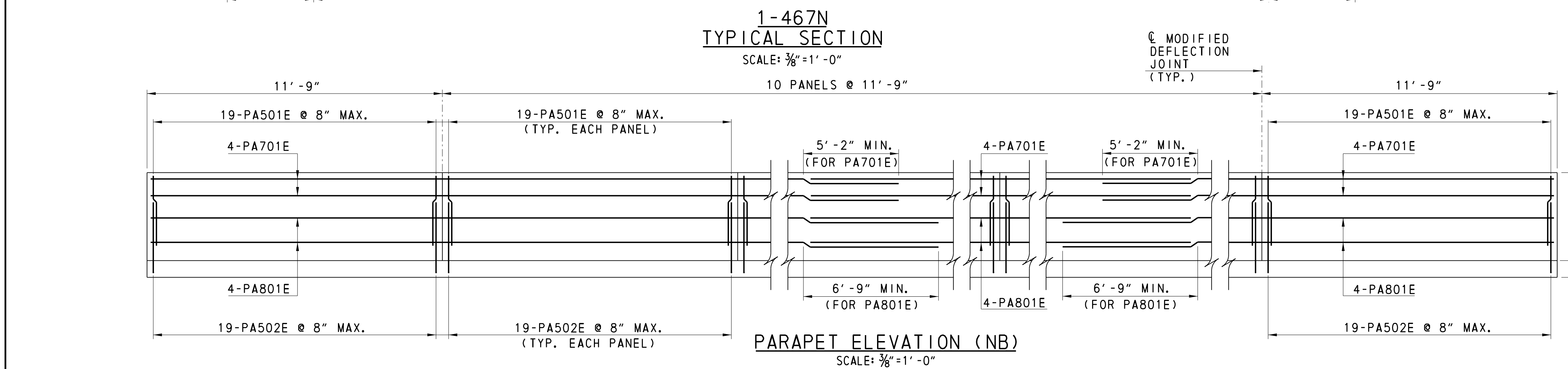


NOTES:  
• DECK SLAB REINFORCEMENT NOT SHOWN FOR CLARITY.  
• FIELD VERIFY ACTUAL HAUNCH DIMENSIONS.  
\*\* DECK THICKNESS @ C/C OF BRG. AND C/C OF BEAM, D = 1'-0 5/8"

HAUNCH REINFORCEMENT  
NOT TO SCALE



DRIP NOTCH  
DETAIL  
NOT TO SCALE



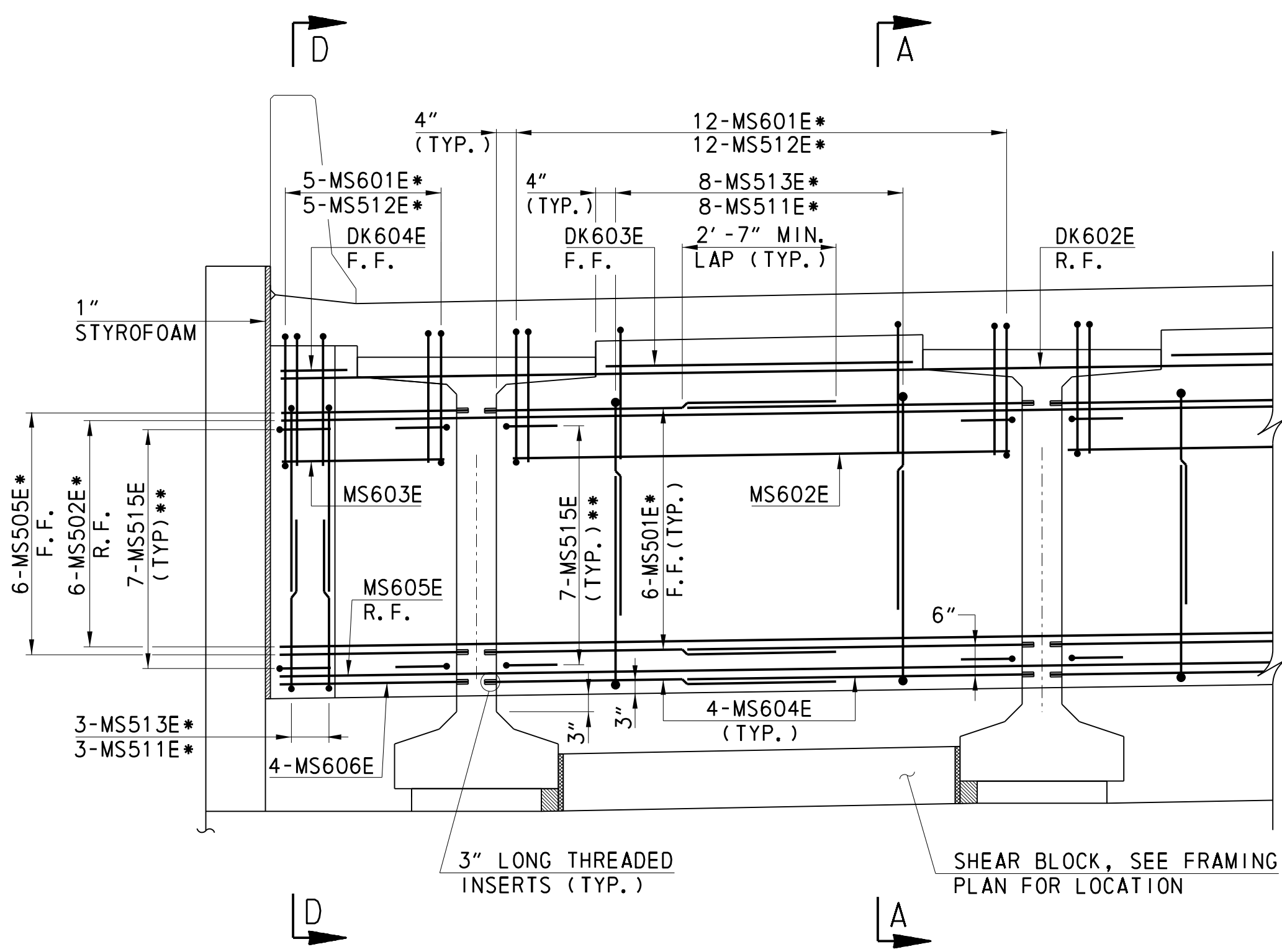
1-467N  
TYPICAL SECTION  
SCALE: 3/8"=1'-0"

PARAPET ELEVATION (NB)  
SCALE: 3/8"=1'-0"

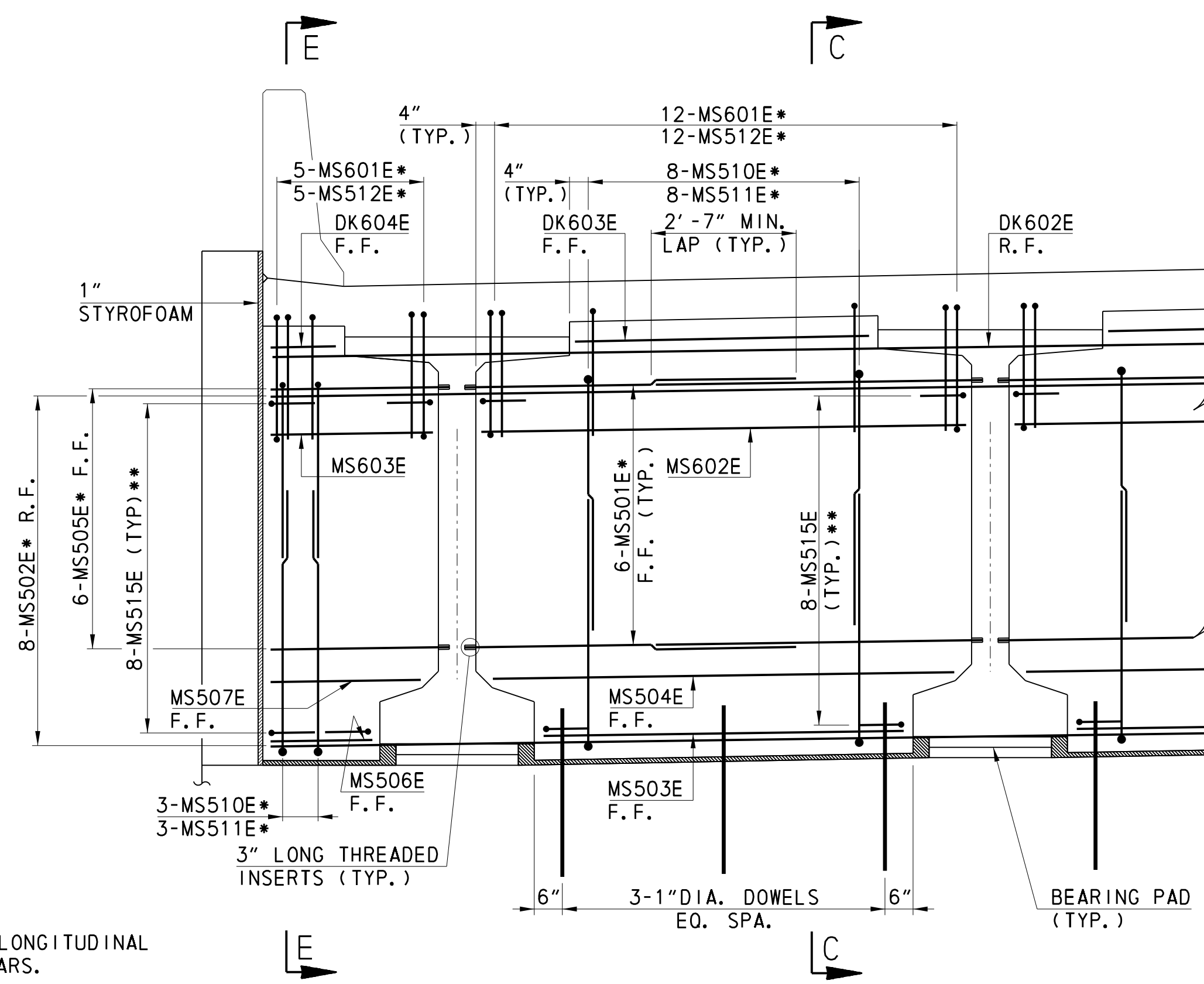
NOTES:  
• SHOP DRAWINGS SHALL BE SUBMITTED FOR REVIEW AND APPROVAL BY THE ENGINEER. METAL FORMS MUST BE GALVANIZED, MORTAR TIGHT AND STEEL METAL SCREWS MUST BE NON-CORROSIVE. SELF TAPPING SCREWS SHALL BE INSTALLED AT THE SIDE LAP OF THE SHEETS AT MID-SPAN BETWEEN SUPPORTS. NO WELD WILL BE PERMITTED AT NEGATIVE MOMENT ZONE.  
• FOR ADDITIONAL NOTES, SEE SHEET 20 OF 40.

STAY-IN-PLACE FORM CONNECTION  
NOT TO SCALE

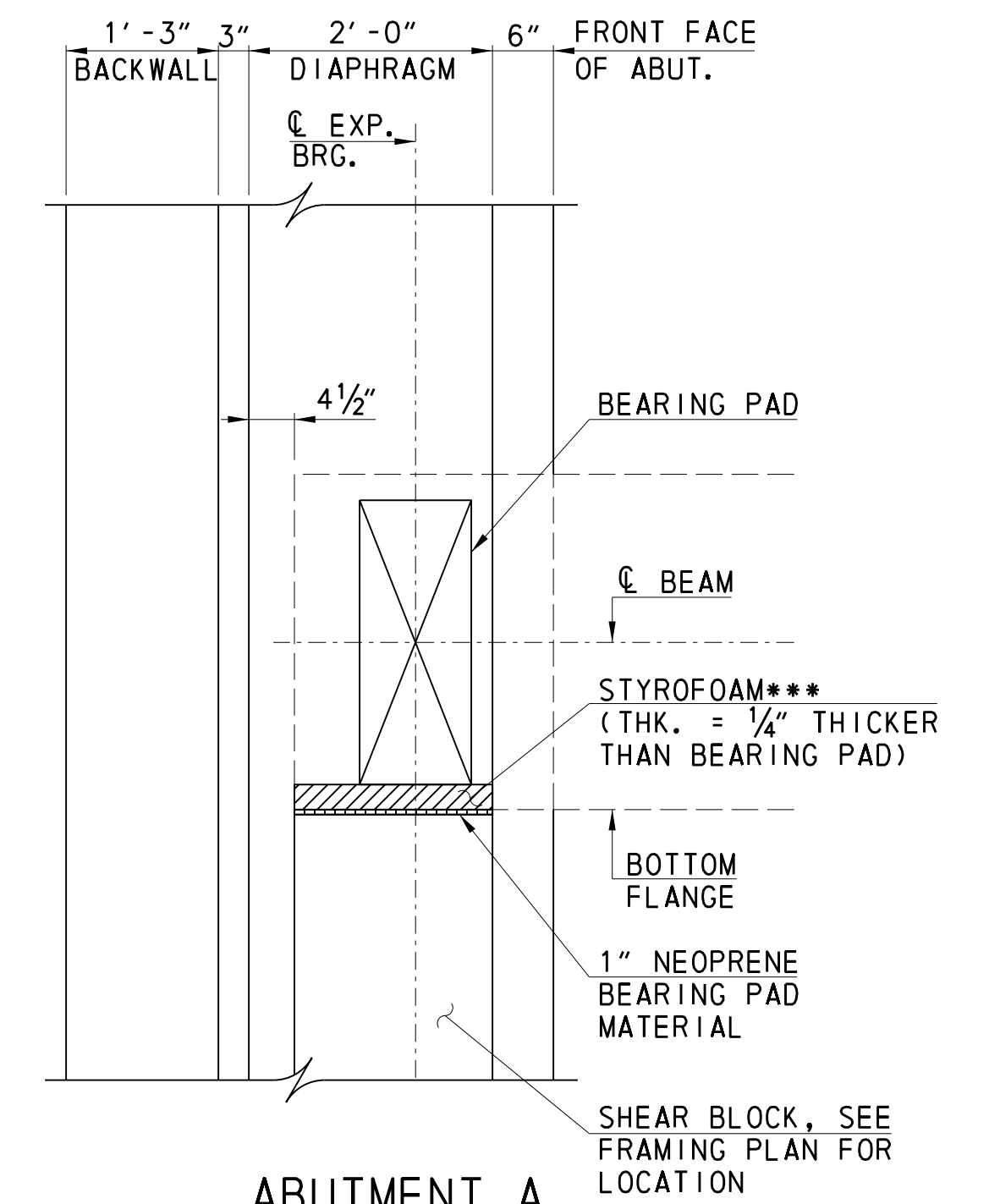
- LEGEND:
- CLR. = CLEAR
  - CONSTR. = CONSTRUCTION
  - BOT. = BOTTOM
  - BRG. = BEARING
  - E. S. = EQUAL SPACING
  - GALV. = GALVANIZED
  - JT. = JOINT
  - MAX. = MAXIMUM
  - MIN. = MINIMUM
  - NB = NORTHBOUND
  - PGA = PROFILE GRADE APPLICATION
  - P/R = POINT OF ROTATION
  - SPA. = SPACE
  - TYP. = TYPICAL



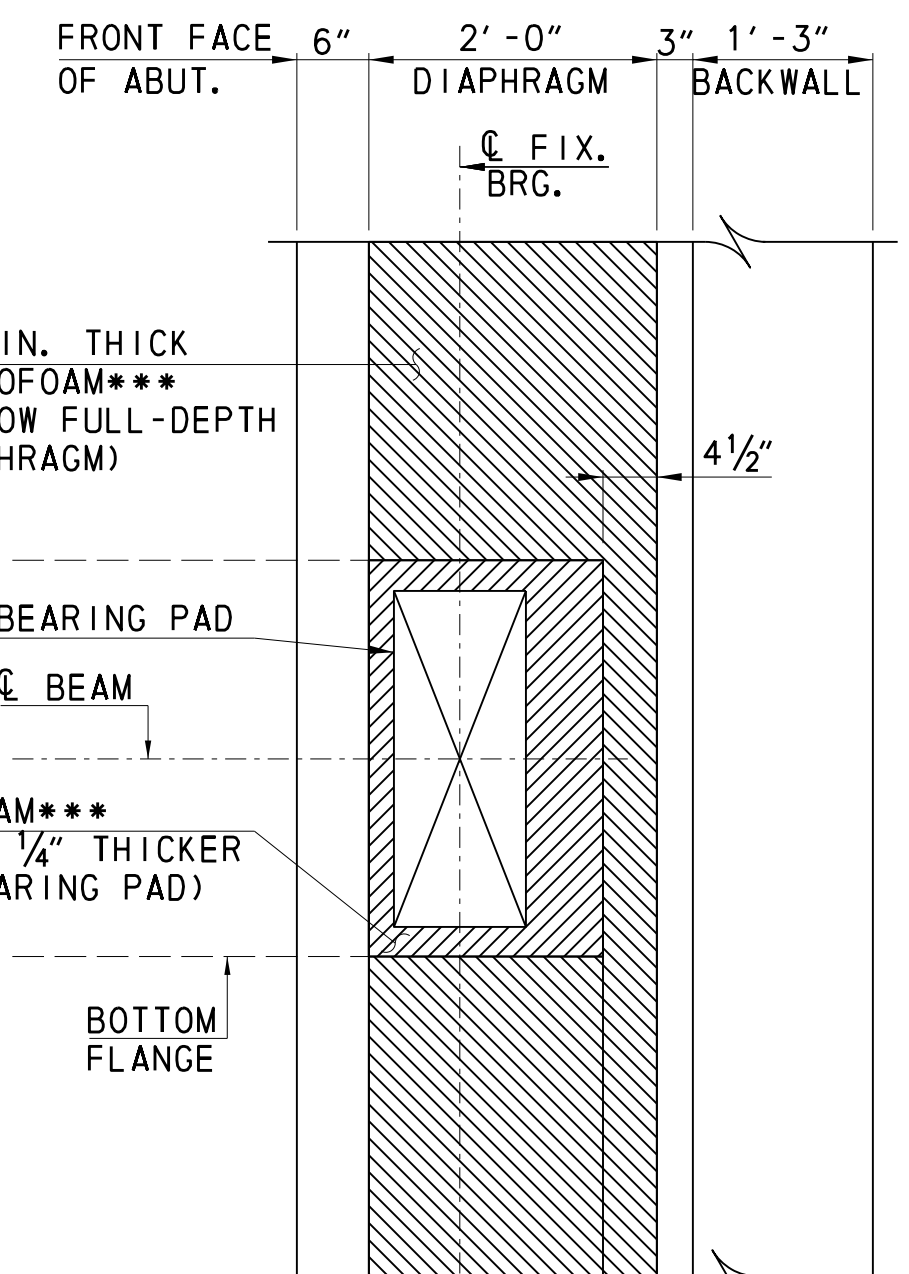
**ABUTMENT A (NB)  
DIAPHRAGM ELEVATION**  
SCALE: 1/2"=1'-0"



**ABUTMENT B (NB)  
DIAPHRAGM ELEVATION**  
SCALE: 1/2"=1'-0"



**ABUTMENT A**



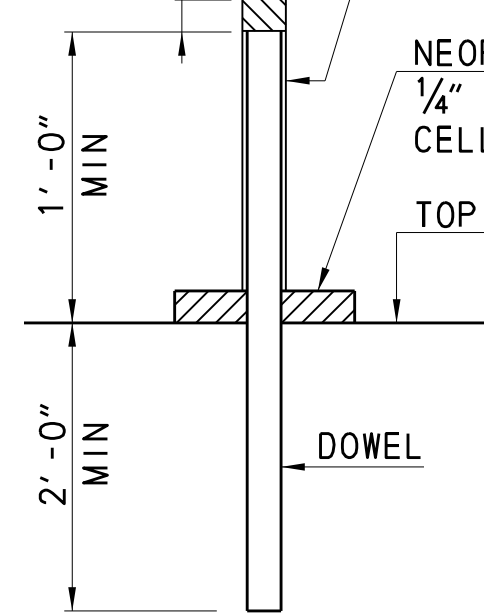
**ABUTMENT B  
WATERPROOFING LIMITS PLAN**  
SCALE: 3/4"=1'-0"

\* EQUAL SPACE  
\*\* MATCH WITH LONGITUDINAL  
DIAPHRAGM BARS.

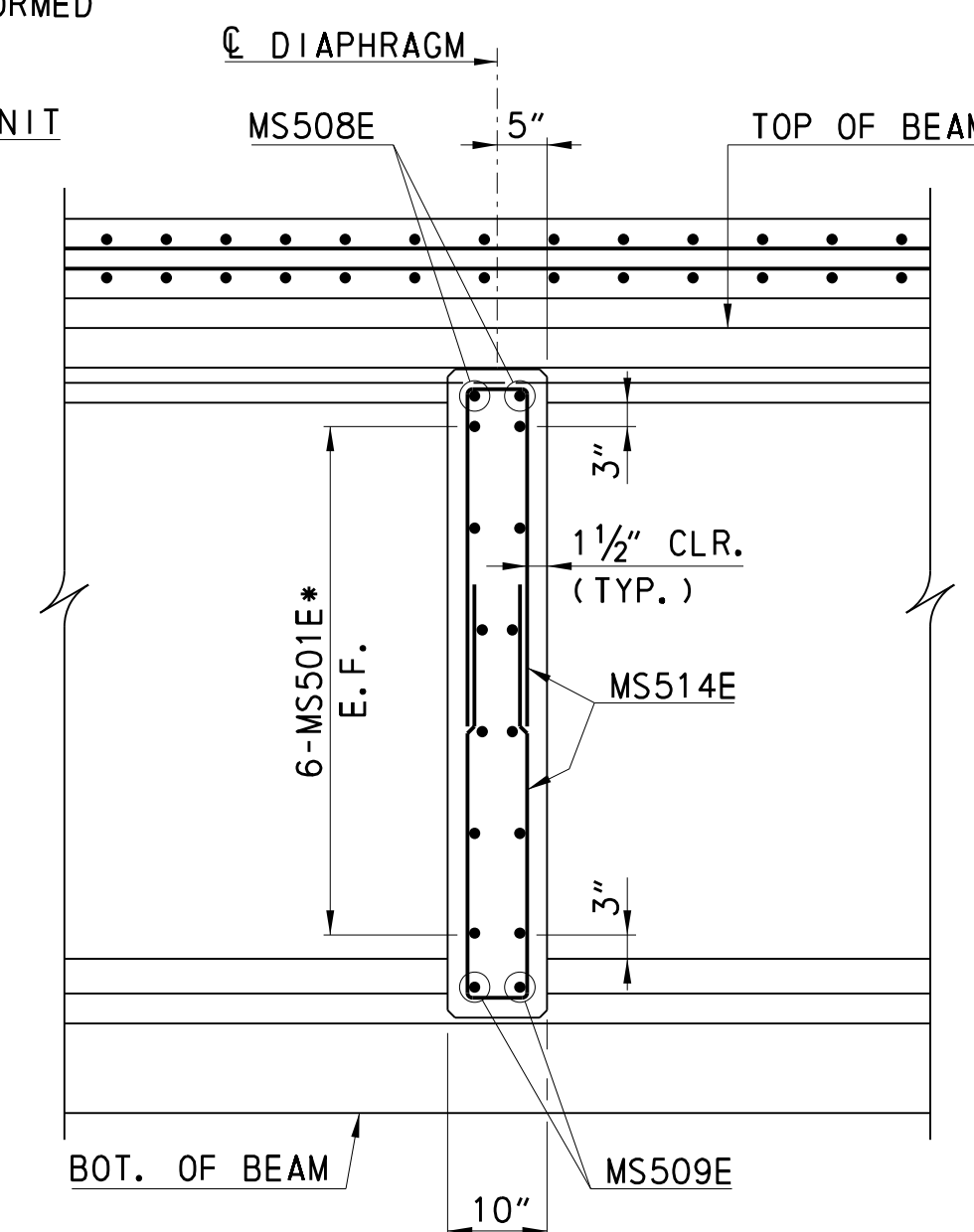
WRAP 2" THICK PREFORMED  
CELLULAR POLYSTYRENE  
CAP WITH 24 GAGE METAL  
SLEEVE

WRAP 24 GAGE METAL  
SLEEVE OR SLEEVE WITH  
SCHEDULE 40 PVC PIPE  
AROUND THE DOWEL (DO NOT  
USE ALUMINUM SLEEVE)

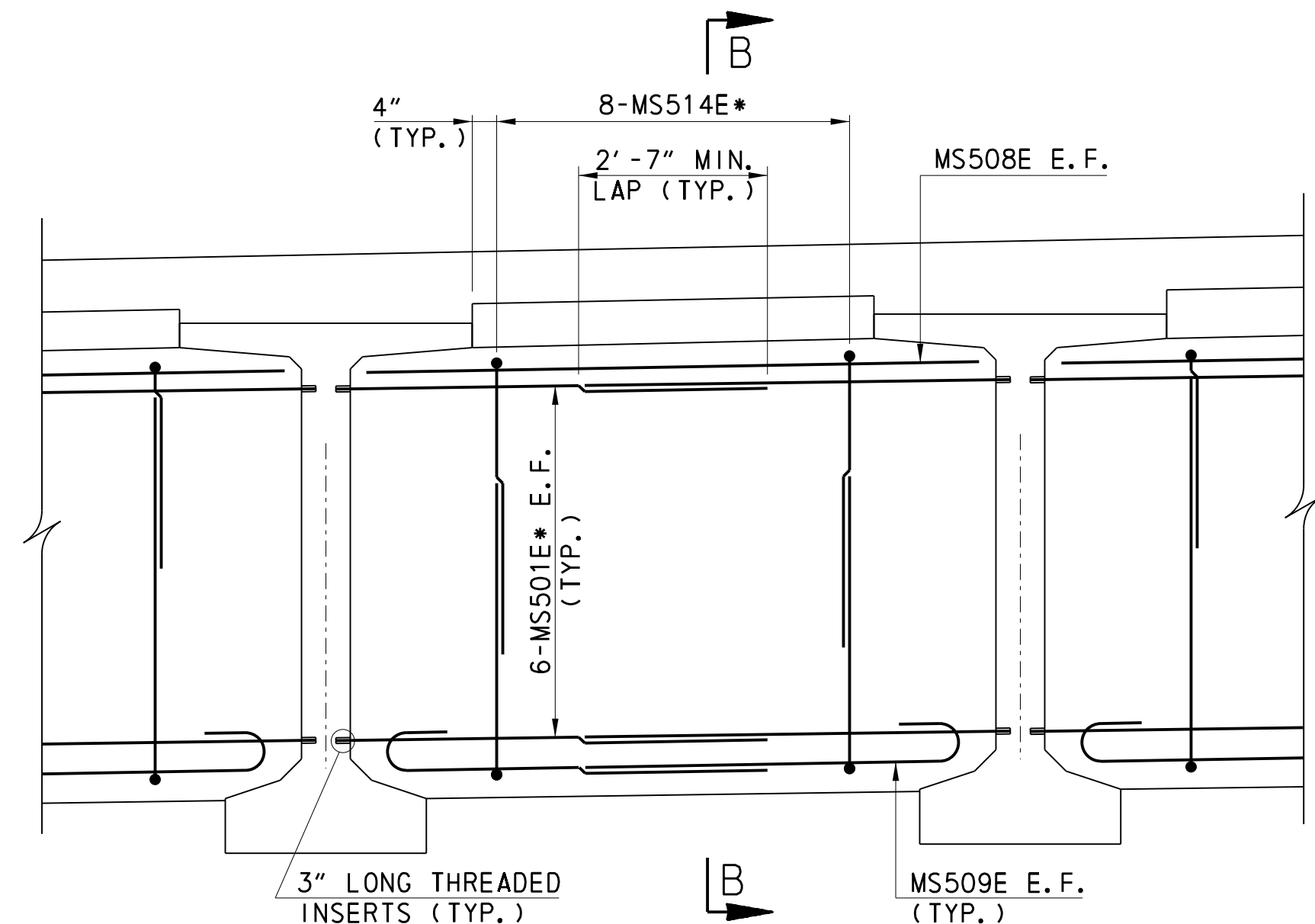
NEOPRENE SPONGE WASHER  
1/4" THICKER THAN PREFORMED  
CELLULAR POLYSTYRENE



**DOWEL DETAIL**  
NOT TO SCALE



**SECTION B-B (NB)**  
SCALE: 3/4"=1'-0"



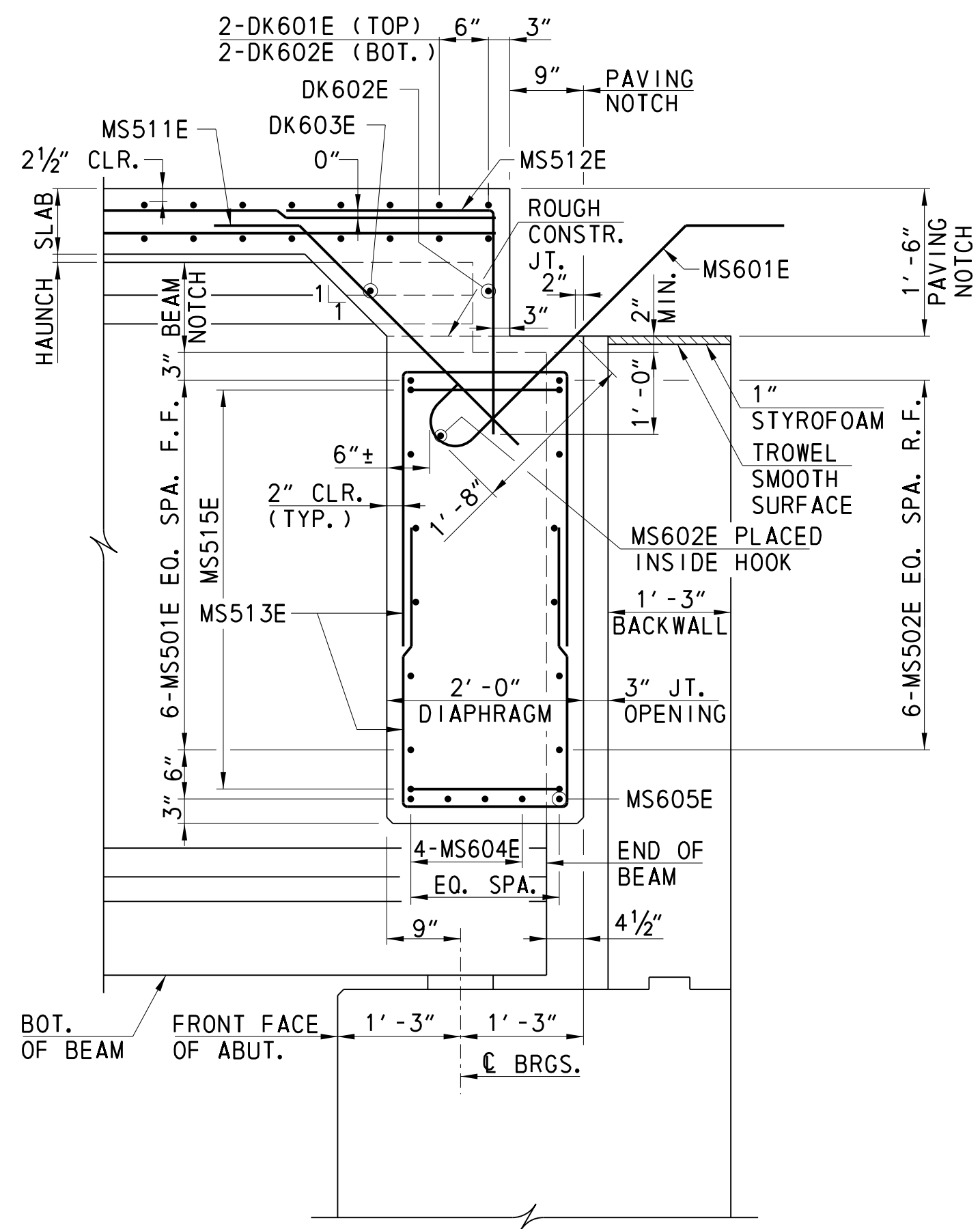
**INTERMEDIATE DIAPHRAGM (NB)  
ELEVATION**  
SCALE: 1/2"=1'-0"

**LEGEND**

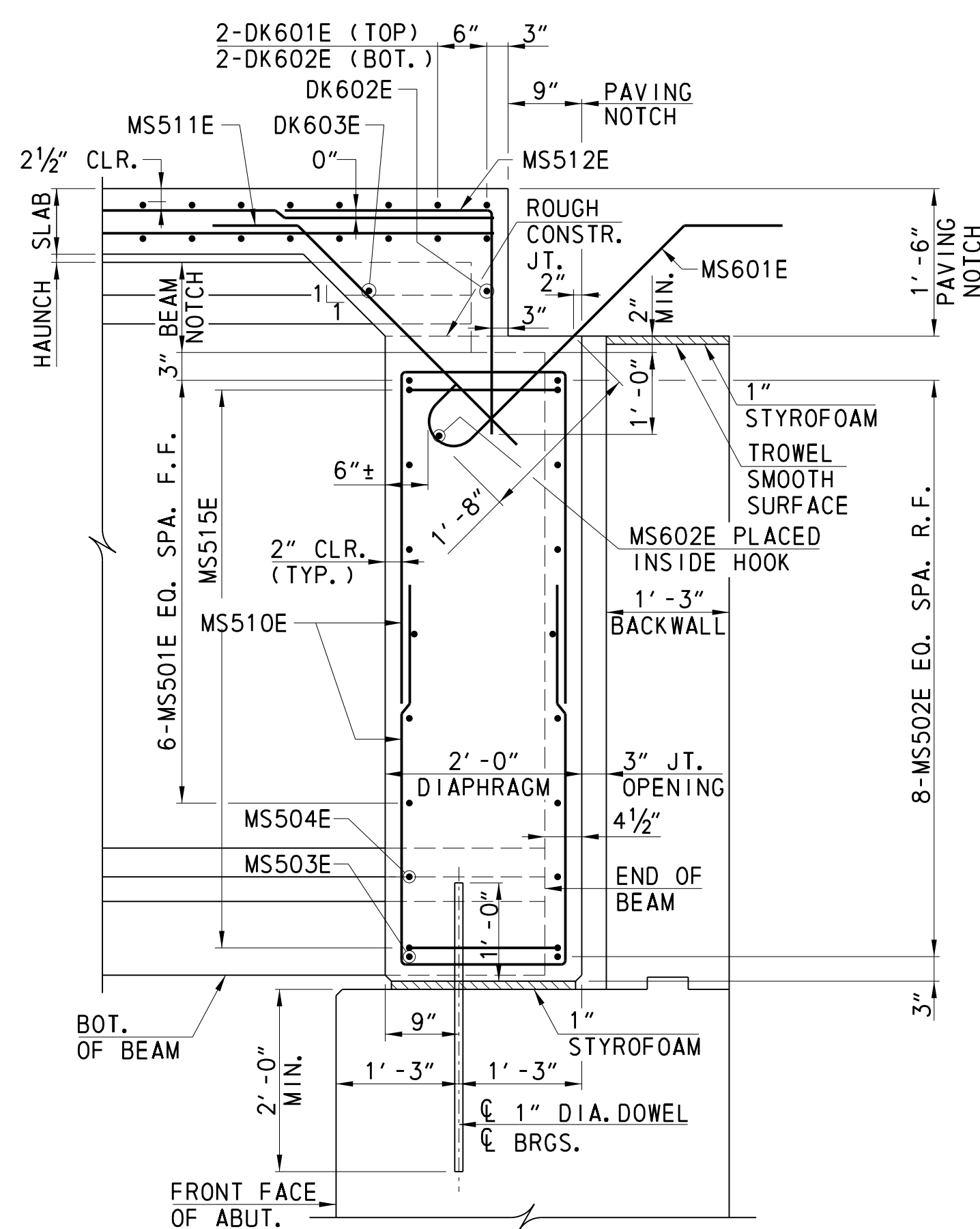
- ABUT. = ABUTMENT
- BOT. = BOTTOM
- CLR. = CLEAR
- DIA. = DIAMETER
- E.F. = EACH FACE
- EQ. = EQUAL
- EXP. = EXPANSION
- FIX. = FIXED
- F.F. = FRONT FACE
- MIN. = MINIMUM
- R.F. = REAR FACE
- SPA. = SPACES
- THK. = THICKNESS
- TYP. = TYPICAL

**NOTES:**

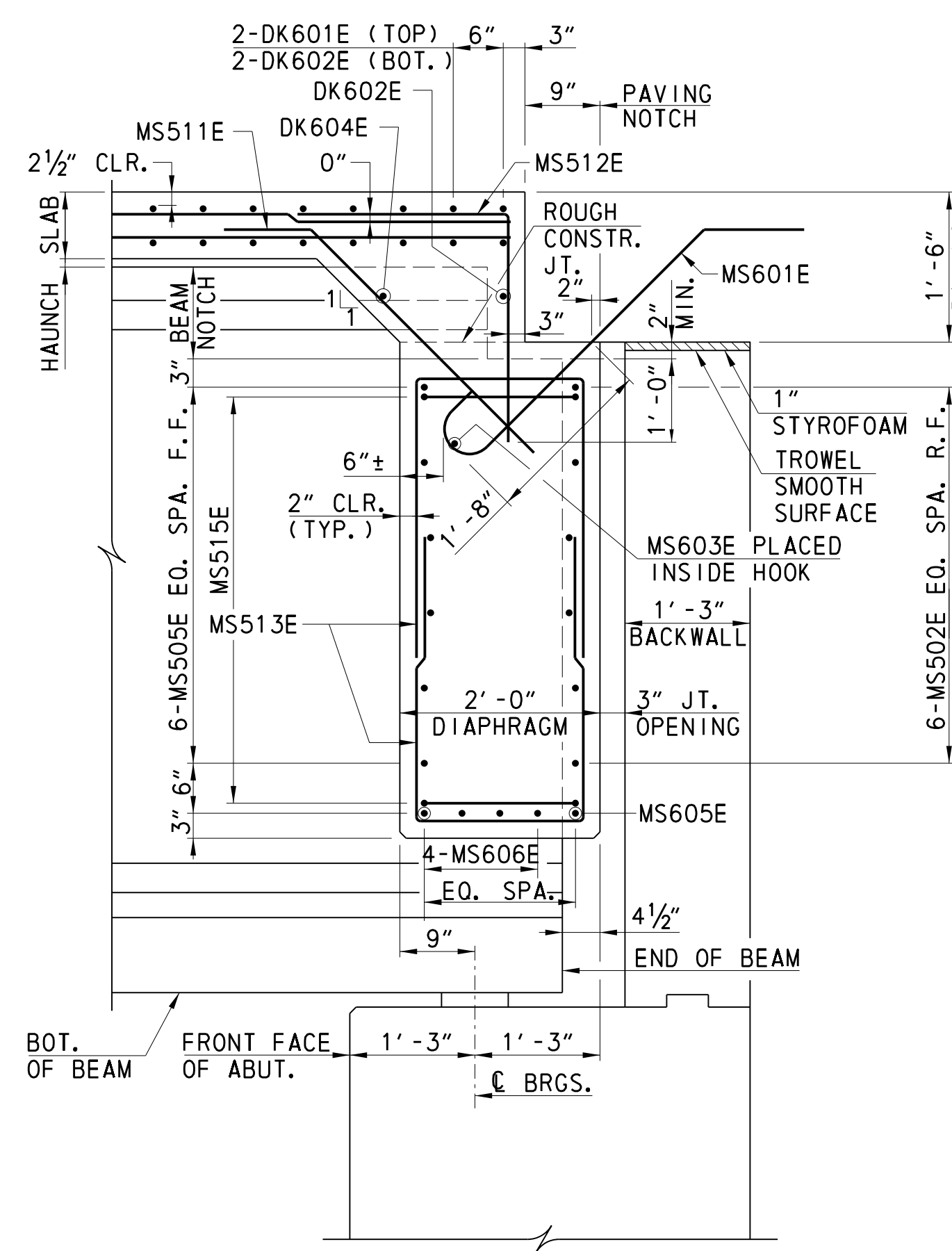
1. FOR SECTIONS A-A, C-C, D-D, AND E-E, SEE SHEET 24 OF 40.
2. FOR SHEAR BLOCK DETAILS, SEE SHEET 7 OF 40.
3. FOR FRAMING PLAN, SEE SHEET 19 OF 40.
4. FOR BEARING PAD DETAILS, SEE SHEET 20 OF 40.
5. FOR BEAM DETAILS, SEE SHEET 21 OF 40.
6. FOR REINFORCEMENT BAR LIST, SEE SHEET 28 OF 40.
7. FOR LAYOUT OF DOWELS AND DOWEL REQUIREMENTS, SEE SHEET 9 OF 40.
8. BITUMINOUS TAR PAPER OR SCHEDULE 40 PVC PIPE ARE PERMITTED TO BE USED AS ALTERNATIVE BOND BREAKER MATERIALS IN LIEU OF THE METAL SLEEVE. OTHER BOND BREAKER MATERIALS MAY BE USED AROUND THE DOWEL ONLY WITH THE APPROVAL OF THE ENGINEER.



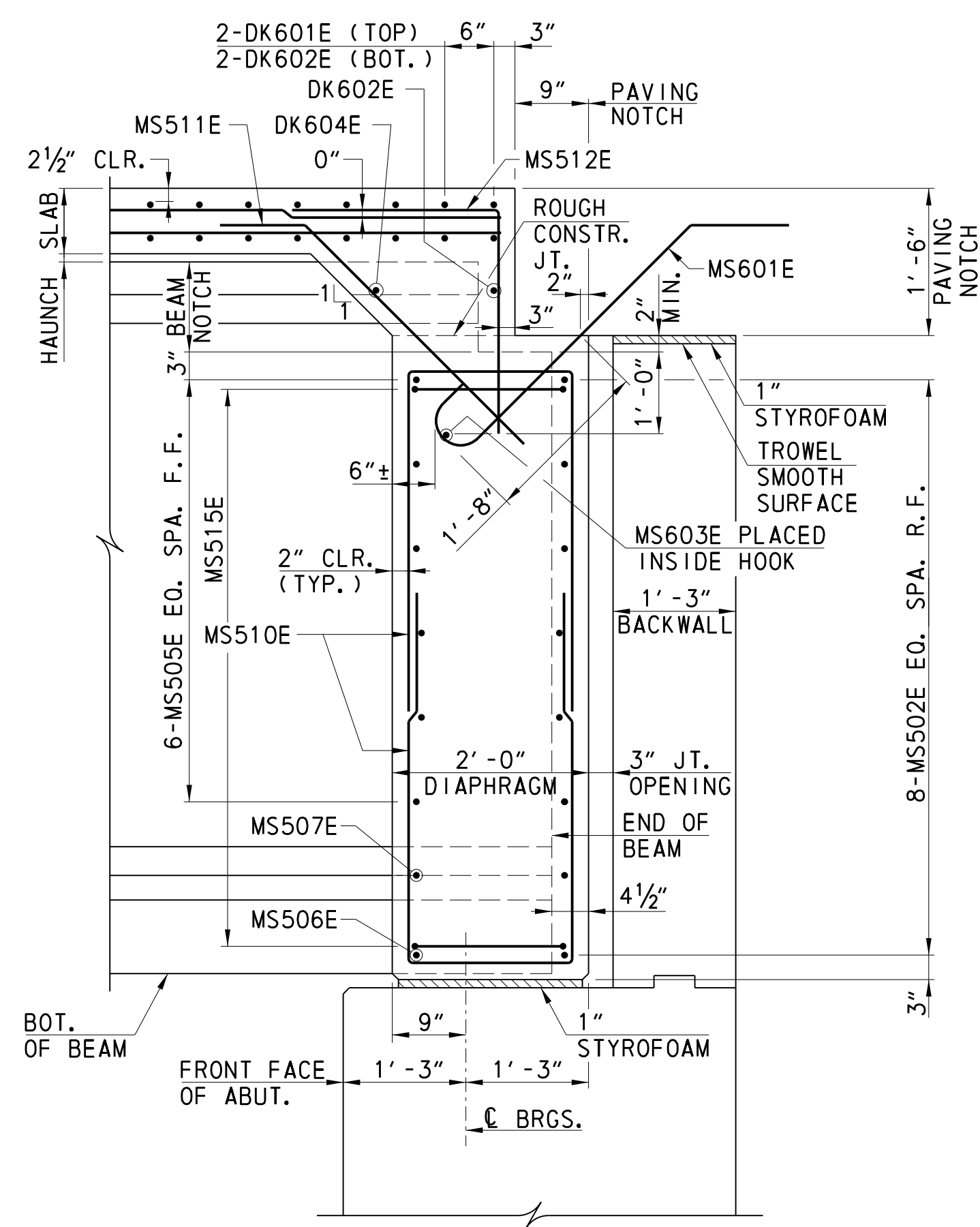
SECTION A-A (NB)  
SCALE: 3/4" = 1'-0"



SECTION C-C (NB)  
SCALE: 3/4" = 1'-0"



SECTION D-D (NB)  
SCALE: 3/4" = 1'-0"



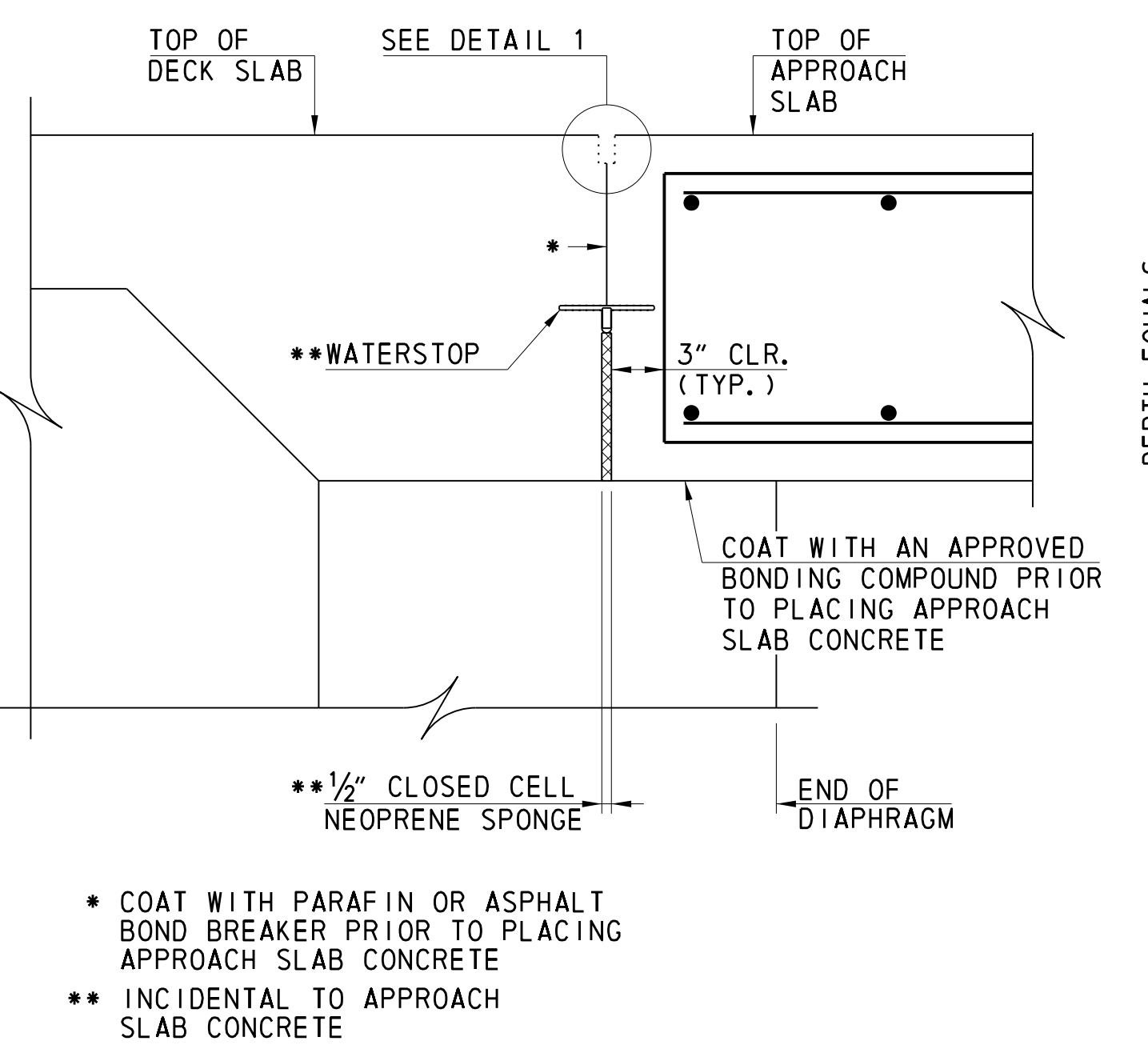
SECTION E-E (NB)  
SCALE: 3/4" = 1'-0"

- NOTES:**
- FOR LOCATION OF SECTIONS A-A, C-C, D-D AND E-E, SEE SHEET 23 OF 40.
  - FOR DECK DETAILS, SEE SHEET 22 OF 40.
  - FOR REINFORCEMENT BAR LIST, SEE SHEET 28 OF 40.
  - FOR APPROACH SLAB DETAILS, SEE SHEETS 25 AND 26 OF 40.
  - FOR DOWEL DETAIL, SEE SHEET 23 OF 40.

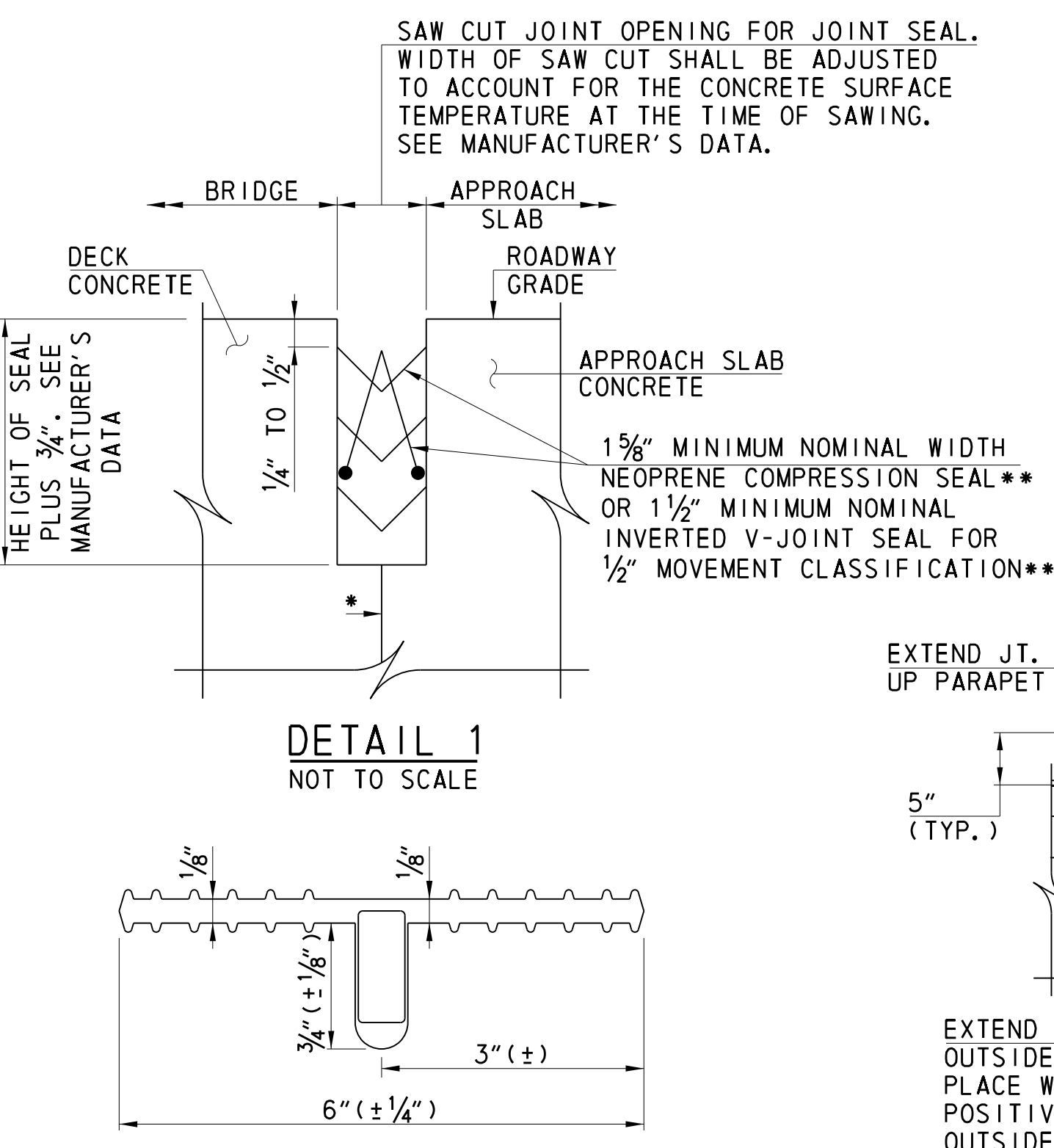
- JOINT PREPARATION NOTES:**
- THE JOINT OPENING IS TO BE FORMED BY A TWO-STAGE SAWING OPERATION WHERE ACCESSIBLE AND FORMED ELSEWHERE. THE FIRST SAW CUT IS DESIGNED TO CONTROL CRACKING. THE SECOND SAW CUT IS MADE USING A DOUBLE-BLADED WATER-COOLED SAW CAPABLE OF HOLDING A TOLERANCE OF  $\pm 1/16"$  TO CREATE THE PROPER OPENING FOR THE PREFORMED NEOPRENE COMPRESSION SEAL OR INVERTED V-JOINT SEAL.
  - WATER BLAST OPENING IMMEDIATELY FOLLOWING SAW CUTTING OPERATION TO REMOVE ANY RESIDUAL SLURRY BEFORE IT DRIES.
  - THE DEPTH OF THE SEAL OPENING EQUALS THE HEIGHT OF THE SEAL PLUS  $3/4"$ . THE WIDTH OF THE SECOND SAW CUT SHALL BE ADJUSTED TO ACCOUNT FOR THE CONCRETE SURFACE TEMPERATURE AT THE TIME OF SAWING, SEE MANUFACTURER'S PRODUCT INFORMATION.
  - BEFORE INSTALLING THE SEAL, ABRASIVE BLAST THE BONDING SURFACES TO THOROUGHLY CLEAN THE JOINT OPENING AND REMOVE FOREIGN MATERIAL, INCLUDING BROKEN CONCRETE. USE WATER AND OIL FREE COMPRESSED AIR TO BLOW OUT RESIDUE FROM THE SEAL GROOVE OPENING.
  - PREPARE BONDING SURFACES AND INSTALL JOINT SEAL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
  - DO NOT EXCEED 3% ELONGATION OF SEAL, IF STRETCHING OCCURS.

**LEGEND**

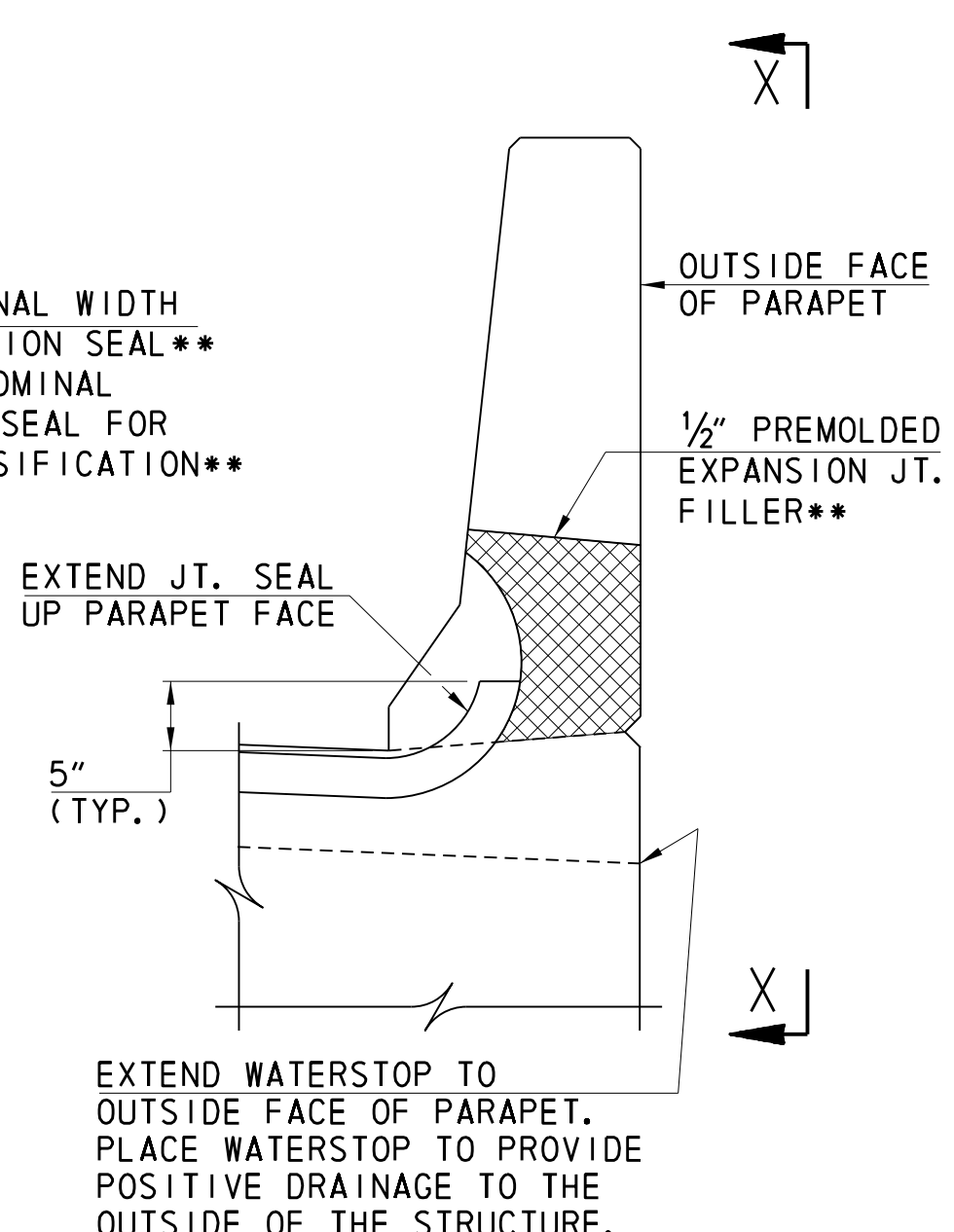
ABUT.	=	ABUTMENT	F.F.	=	FRONT FACE
BOT.	=	BOTTOM	JT.	=	JOINT
BRG.	=	BEARING	MIN.	=	MINIMUM
CLR.	=	CLEAR	R.F.	=	REAR FACE
CONSTR.	=	CONSTRUCTION	SPA.	=	SPACES
DIA.	=	DIAMETER	TYP.	=	TYPICAL
EQ.	=	EQUAL			



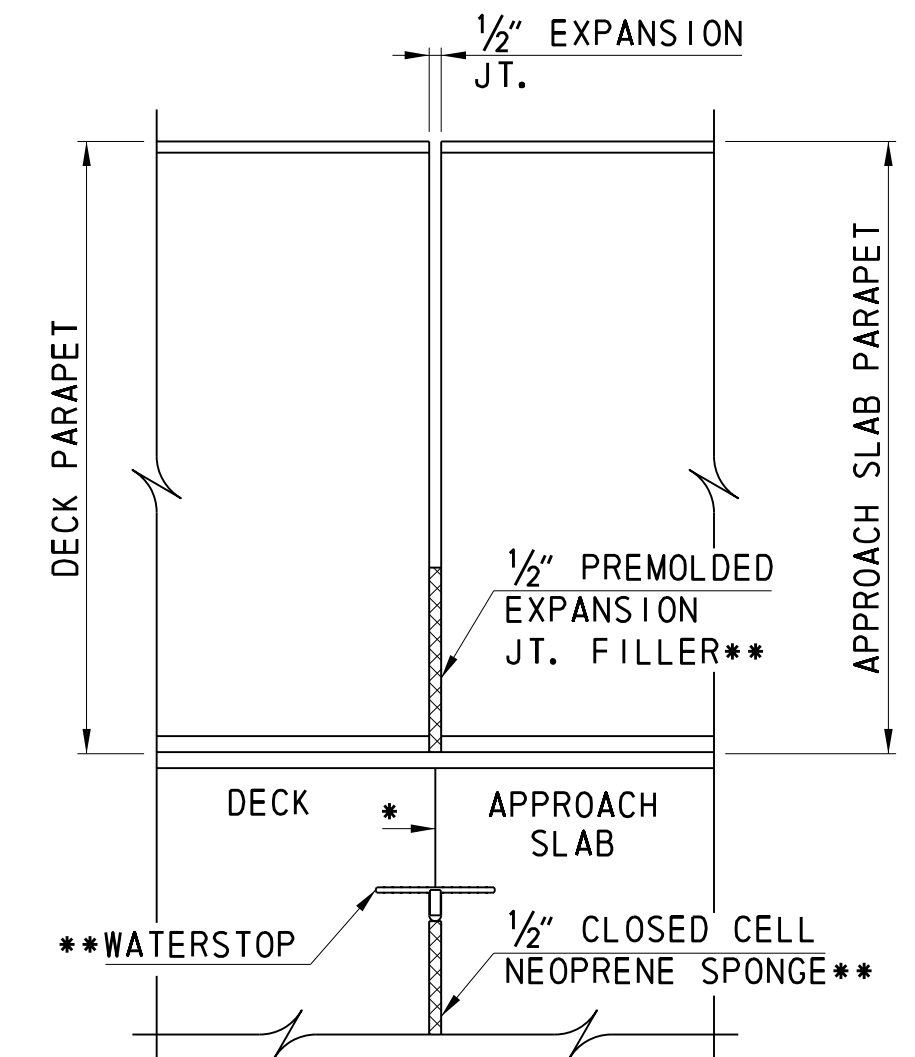
APPROACH SLAB JOINT DETAIL  
NOT TO SCALE



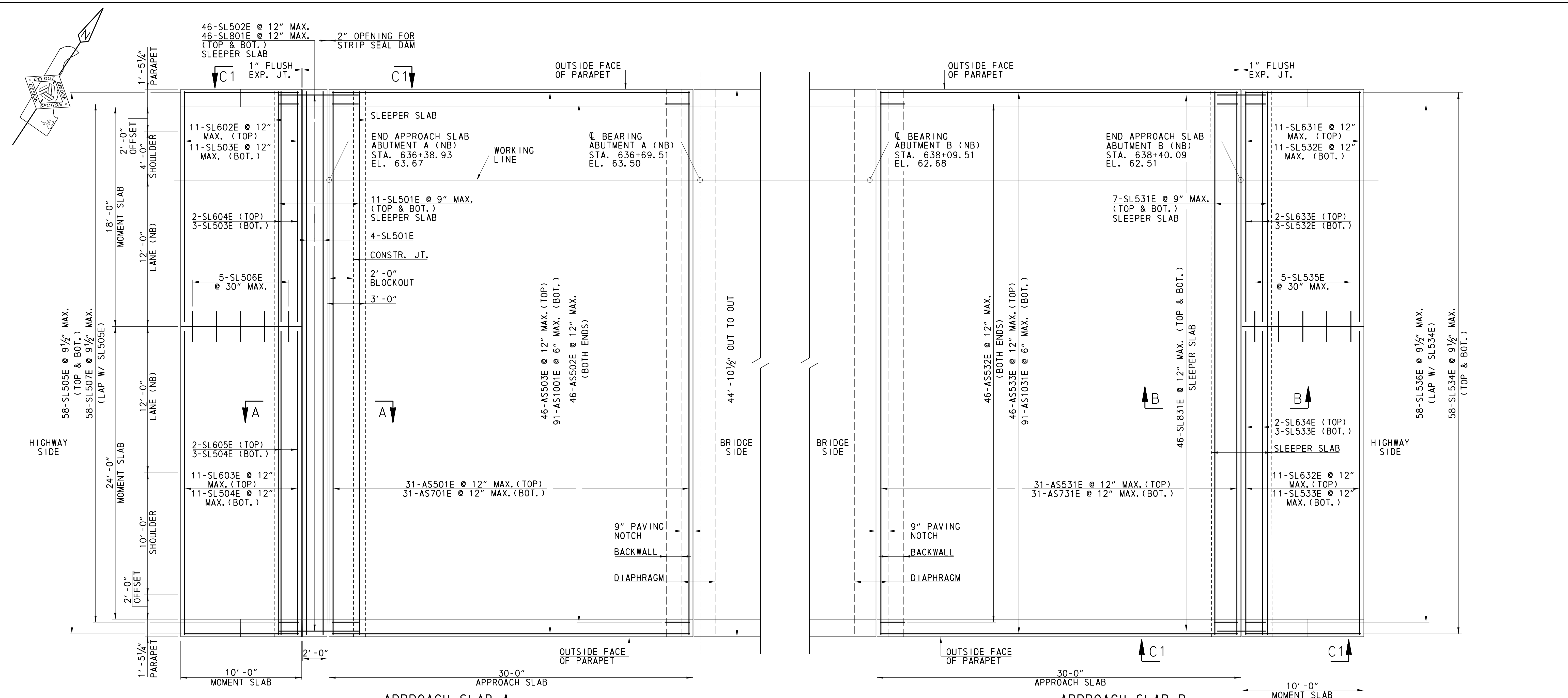
WATERSTOP DETAIL  
NOT TO SCALE



ELEVATION  
JOINT SEAL AND WATERSTOP TERMINATION DETAIL  
NOT TO SCALE



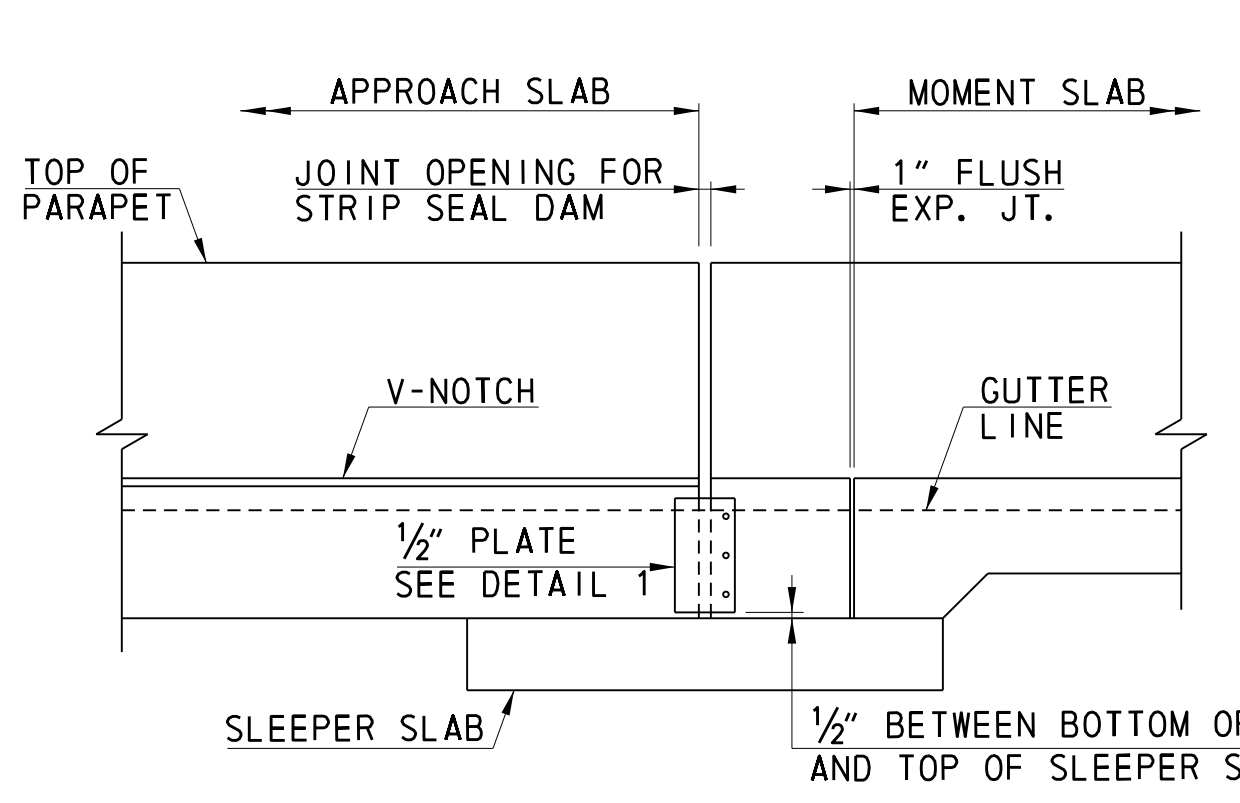
SECTION X-X



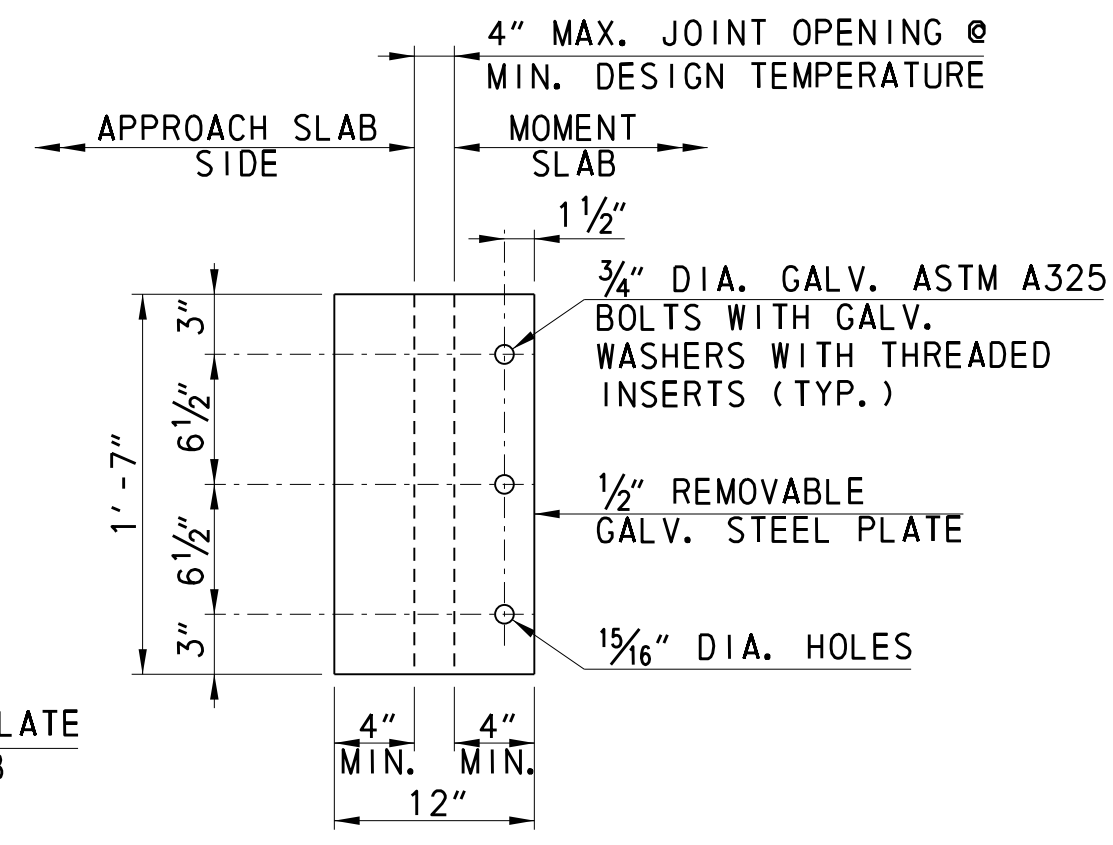
APPROACH SLAB A

APPROACH SLABS - PLAN (NB)

APPROACH SLAB B



SECTION C1-C1 NOT TO SCALE



DETAIL 1 NOT TO SCALE

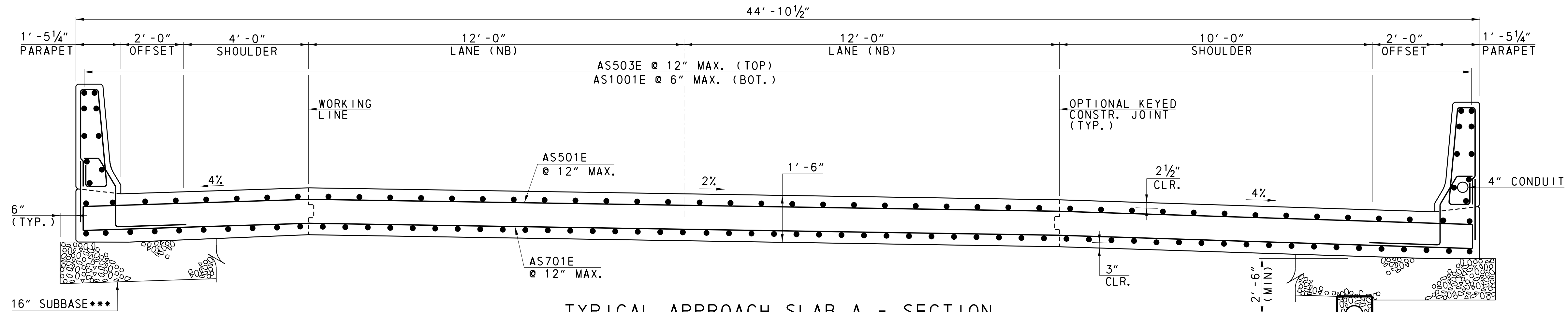
- LEGEND**
- BOT. = BOTTOM
  - GALV. = GALVANIZED
  - CONSTR. = CONSTRUCTION
  - DIA. = DIAMETER
  - EL. = ELEVATION
  - EXP. = EXPANSION
  - JT. = JOINT
  - MAX. = MAXIMUM
  - MIN. = MINIMUM
  - NB = NORTHBOUND
  - STA. = STATION
  - TYP. = TYPICAL
  - W/ = WITH

**APPROACH SLAB NOTES**

- PROVIDE CLASS D CONCRETE IN APPROACH SLAB, HEADER SLAB, SLEEPER SLAB AND MOMENT SLAB.
- PROVIDE CLASS A CONCRETE IN PARAPETS.
- A HIGHER CLASS OF CONCRETE MAY BE SUBSTITUTED FOR A LOWER CLASS OF CONCRETE AT NO ADDITIONAL COST TO THE DEPARTMENT.
- PLACE APPROACH SLAB CONCRETE WITH A MOTORIZED, MECHANICAL FINISHING MACHINE.
- PLACE CONCRETE IN ONE CONTINUOUS OPERATION, UNLESS OTHERWISE INDICATED OR DIRECTED.
- LONGITUDINAL KEYED CONSTRUCTION JOINTS ARE PERMITTED IN THE APPROACH SLAB BETWEEN THE SHOULDER AND THE LANE LINE.
- CONSTRUCT BRIDGE APPROACH SLAB AFTER THE BRIDGE DECK SLAB IS CONSTRUCTED.
- PROVIDE GRADE 60 DEFORMED REINFORCING BARS THAT MEET THE REQUIREMENTS OF AASHTO M31.
- EPOXY COAT ALL REINFORCEMENT BARS.

**NOTES:**

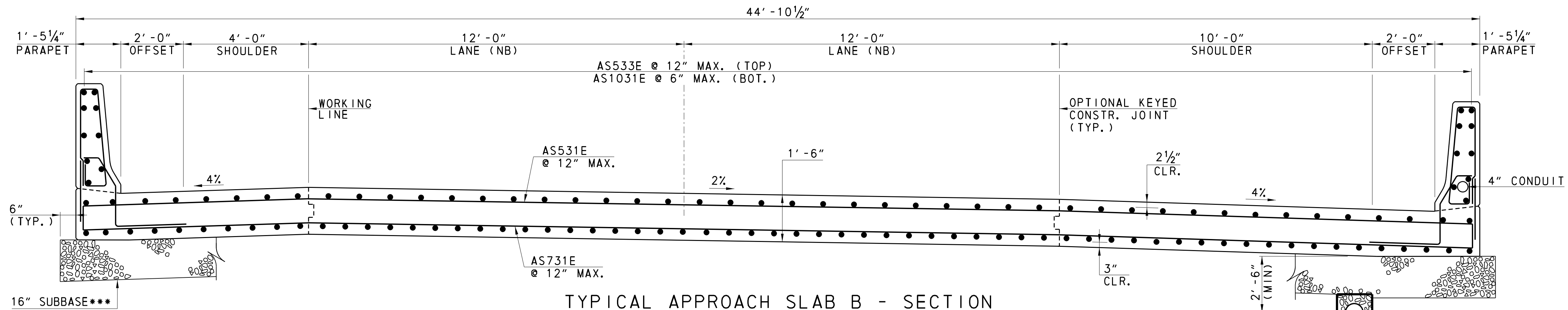
1. FOR SECTIONS A-A AND B-B, SEE SHEET 26 OF 40.
2. FOR REINFORCEMENT BAR LIST, SEE SHEET 28 OF 40.
3. FOR APPROACH SLAB JOINT DETAILS AT END OF BRIDGE DECK, SEE SHEET 24 OF 40.
4. FOR TYPICAL APPROACH SLAB SECTIONS, SEE SHEET 26 OF 40.
5. PAYMENT FOR GALVANIZED STEEL PLATE AND HARDWARE SHALL BE INCIDENTAL TO APPROACH SLAB CONSTRUCTION.



TYPICAL APPROACH SLAB A - SECTION

(NB)

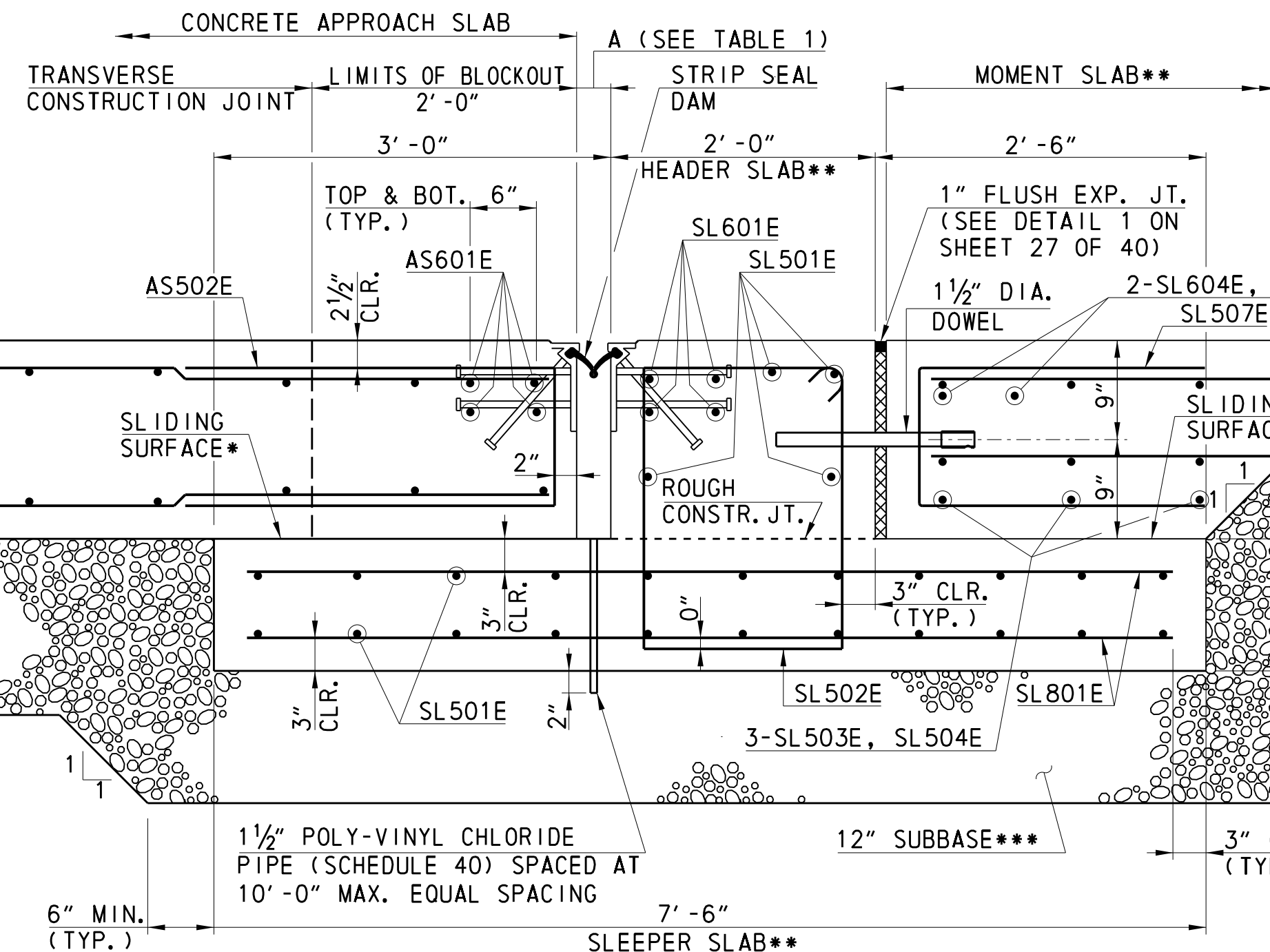
SCALE: 1/2" = 1' - 0"



TYPICAL APPROACH SLAB B - SECTION

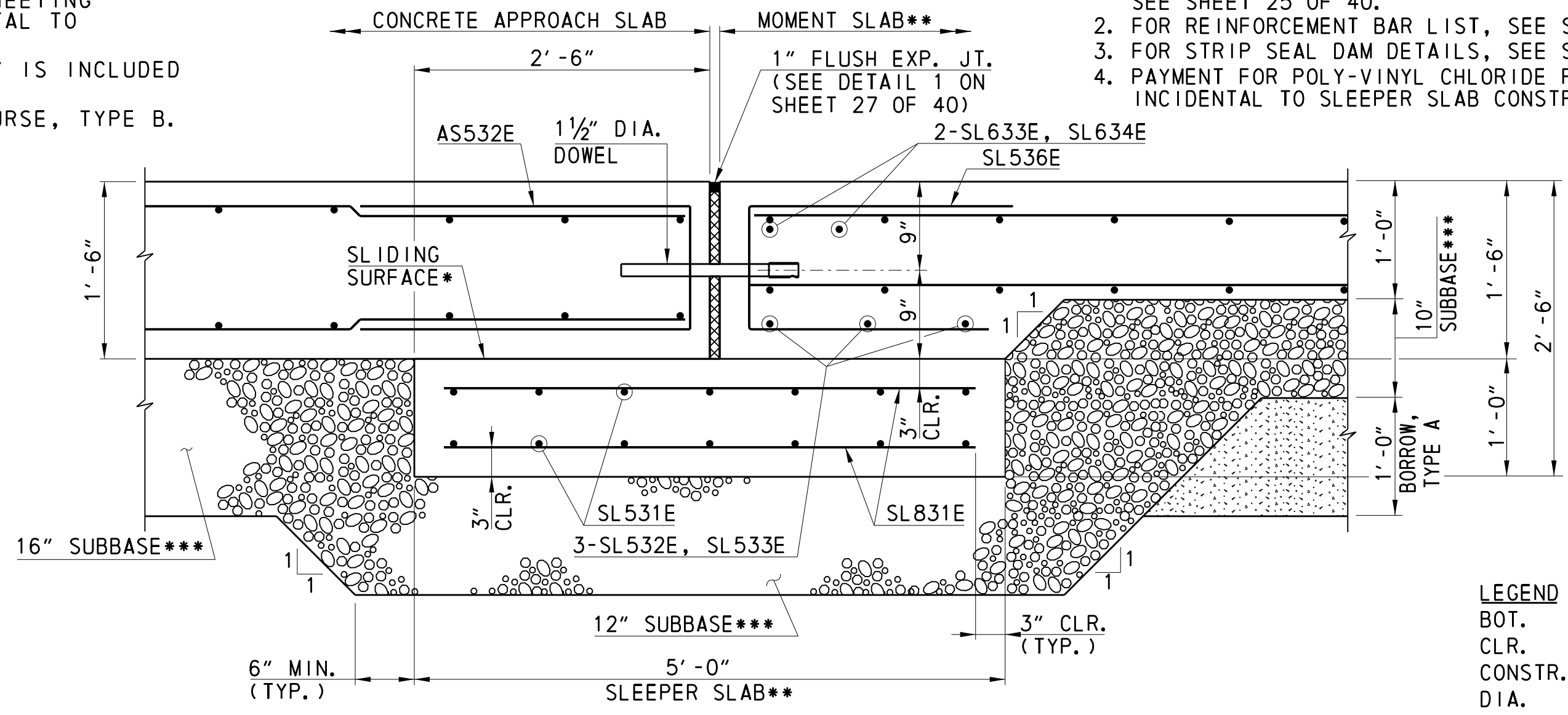
(NB)

SCALE: 1/4" = 1' - 0"



SECTION A-A  
SCALE: 3/4" = 1' - 0"

- \* TROWEL SMOOTH AND PLACE 2 LAYERS OF 4 MIL. POLYETHYLENE SHEETING AS BOND BREAKER. INCIDENTAL TO APPROACH SLAB PAYMENT.
- \*\* CLASS D CONCRETE QUANTITY IS INCLUDED UNDER 602014.
- \*\*\* GRADED AGGREGATE BASE COURSE, TYPE B.



SECTION B-B  
SCALE: 3/4" = 1' - 0"

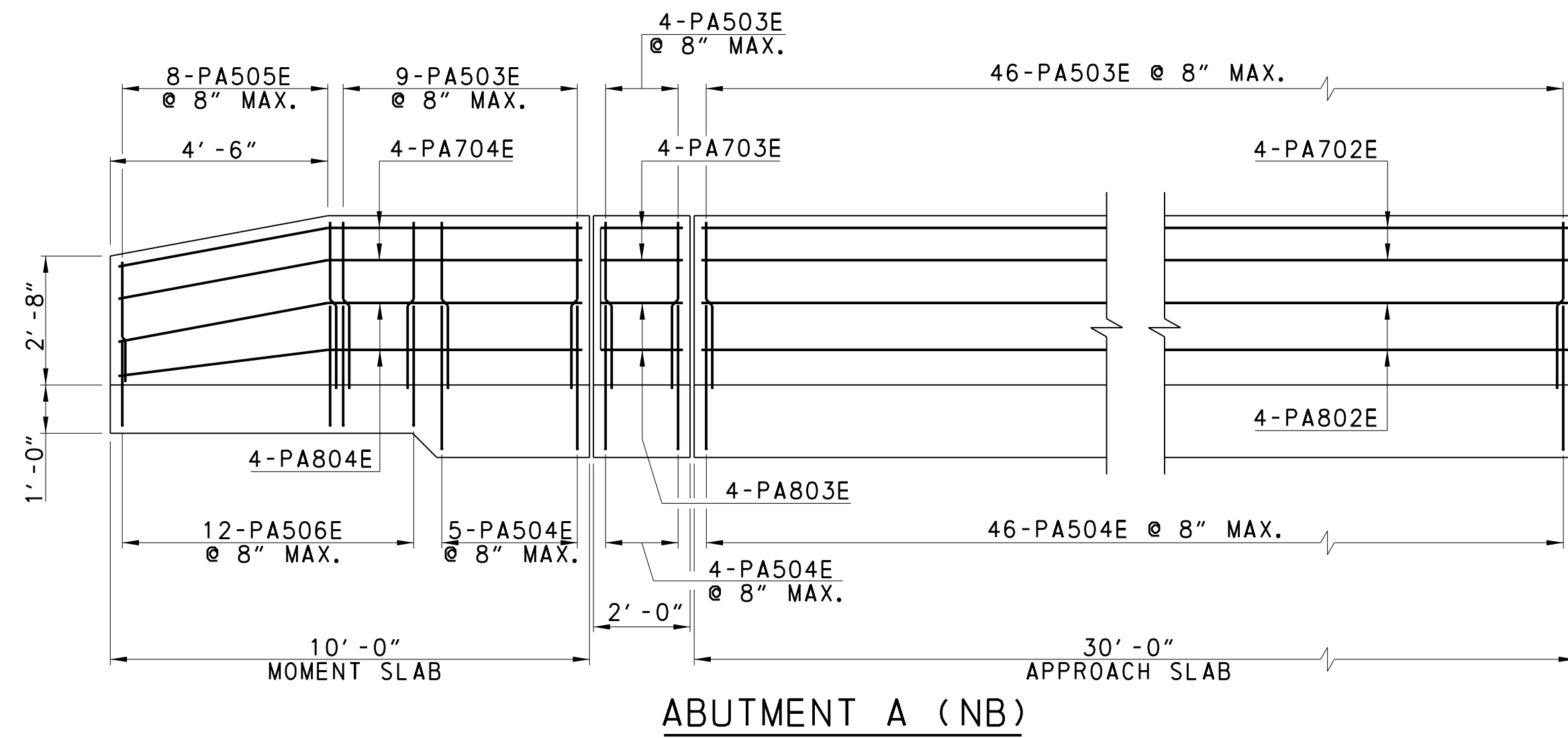
- NOTES:
1. FOR LOCATION OF SECTIONS A-A AND B-B, SEE SHEET 25 OF 40.
  2. FOR REINFORCEMENT BAR LIST, SEE SHEET 28 OF 40.
  3. FOR STRIP SEAL DAM DETAILS, SEE SHEET 36 OF 40.
  4. PAYMENT FOR POLY-VINYL CHLORIDE PIPE SHALL BE INCIDENTAL TO SLEEPER SLAB CONSTRUCTION.

LEGEND

BOT.	=	BOTTOM
CLR.	=	CLEAR
CONSTR.	=	CONSTRUCTION
DIA.	=	DIAMETER
EXP.	=	EXPANSION
JT.	=	JOINT
MAX.	=	MAXIMUM
MIN.	=	MINIMUM
NB	=	NORTHBOUND
TYP.	=	TYPICAL

TABLE - 1  
INSTALLATION OPENING "A" @ VARIOUS TEMPERATURES (°F)

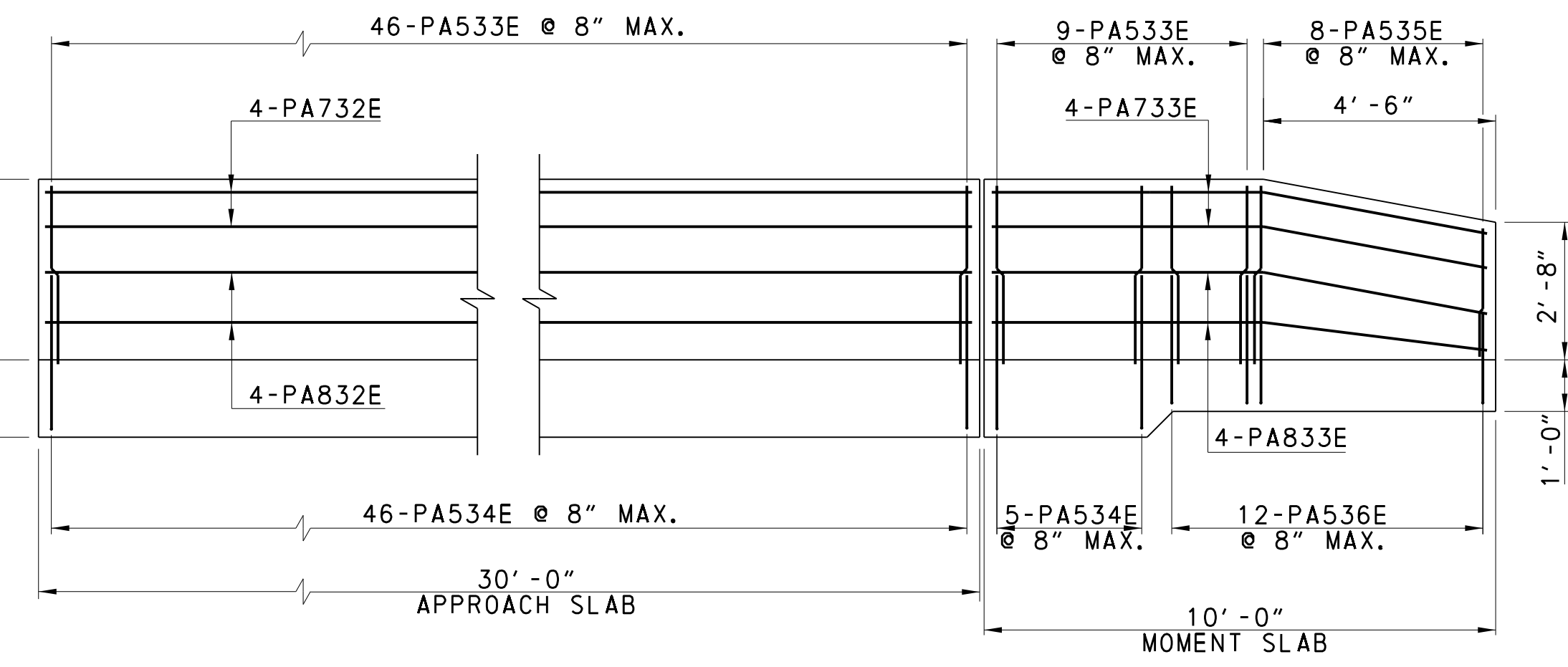
10	20	30	32	40	50	60	68	70	80	90	100
0' - 2 1/16"	0' - 2 3/16"	0' - 2 1/8"	0' - 2 1/16"	0' - 2 1/8"	0' - 2 1/4"	0' - 2 1/8"	0' - 2"	0' - 2"	0' - 1 7/8"	0' - 1 3/4"	0' - 1 5/8"



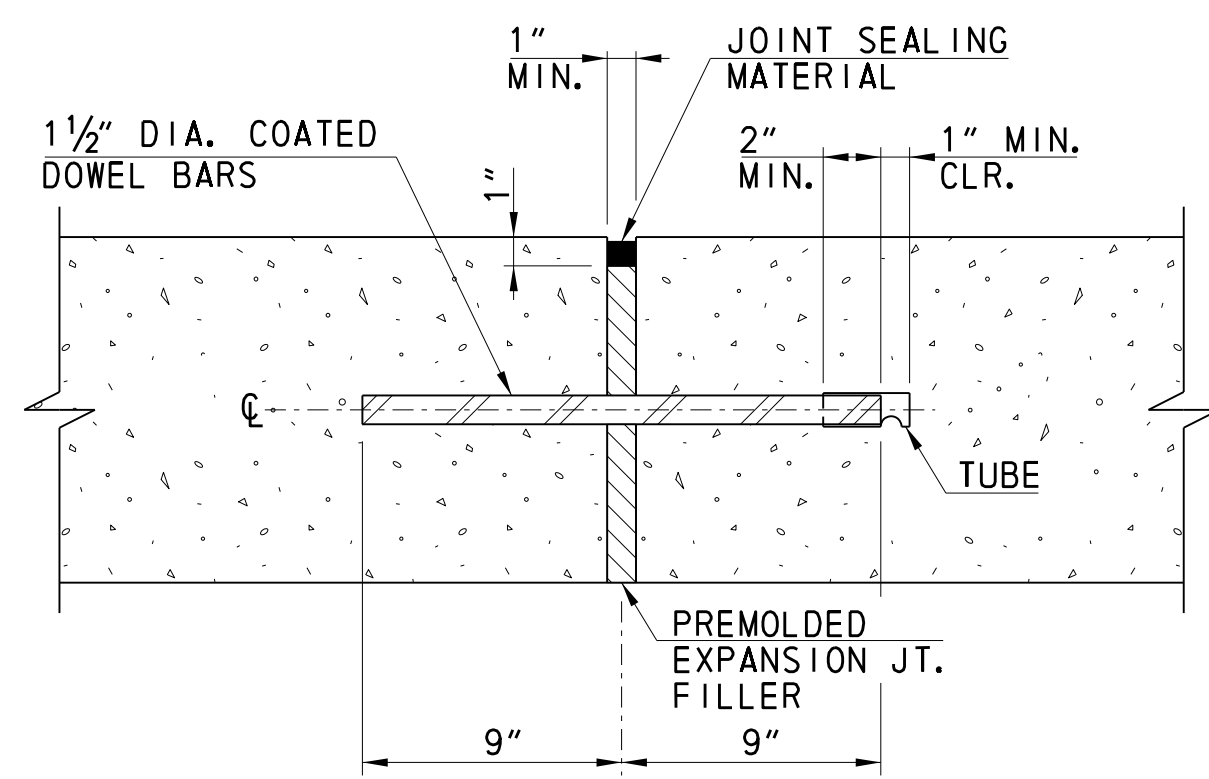
ABUTMENT A (NB)

PARAPET ELEVATION

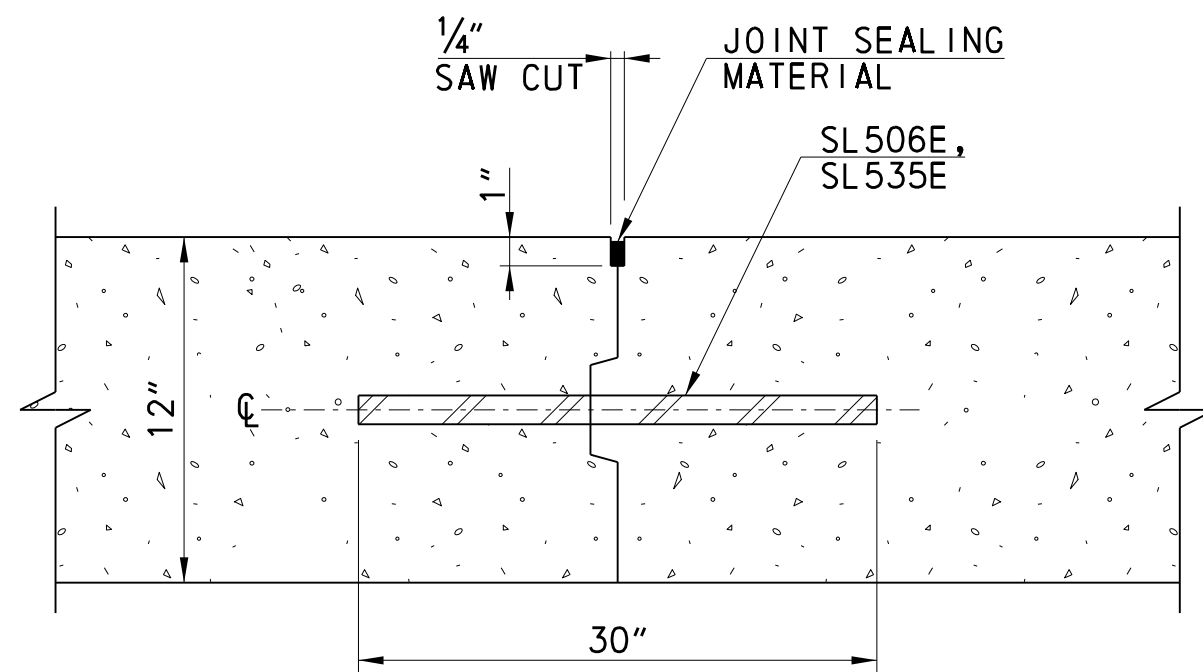
SCALE: 3/8" = 1' - 0"



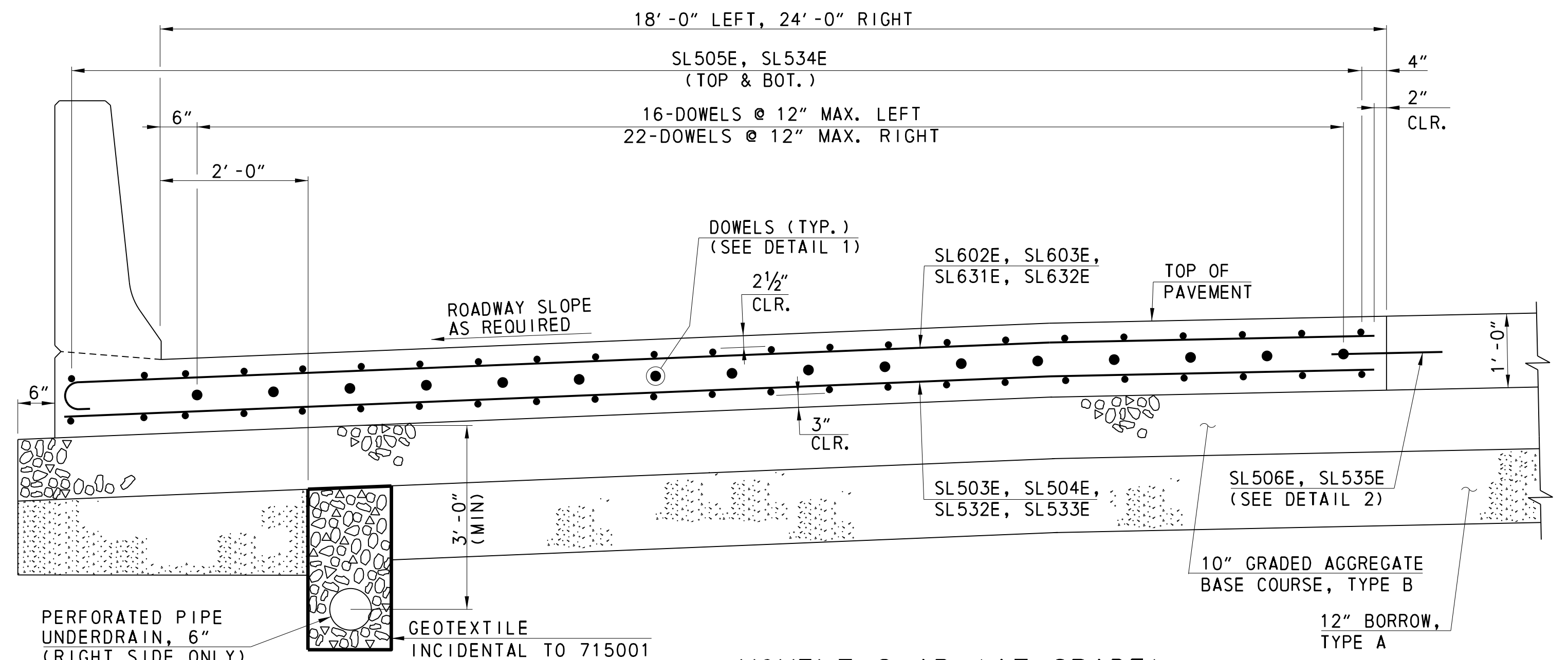
ABUTMENT B (NB)



DETAIL 1  
NOT TO SCALE



DETAIL 2  
NOT TO SCALE



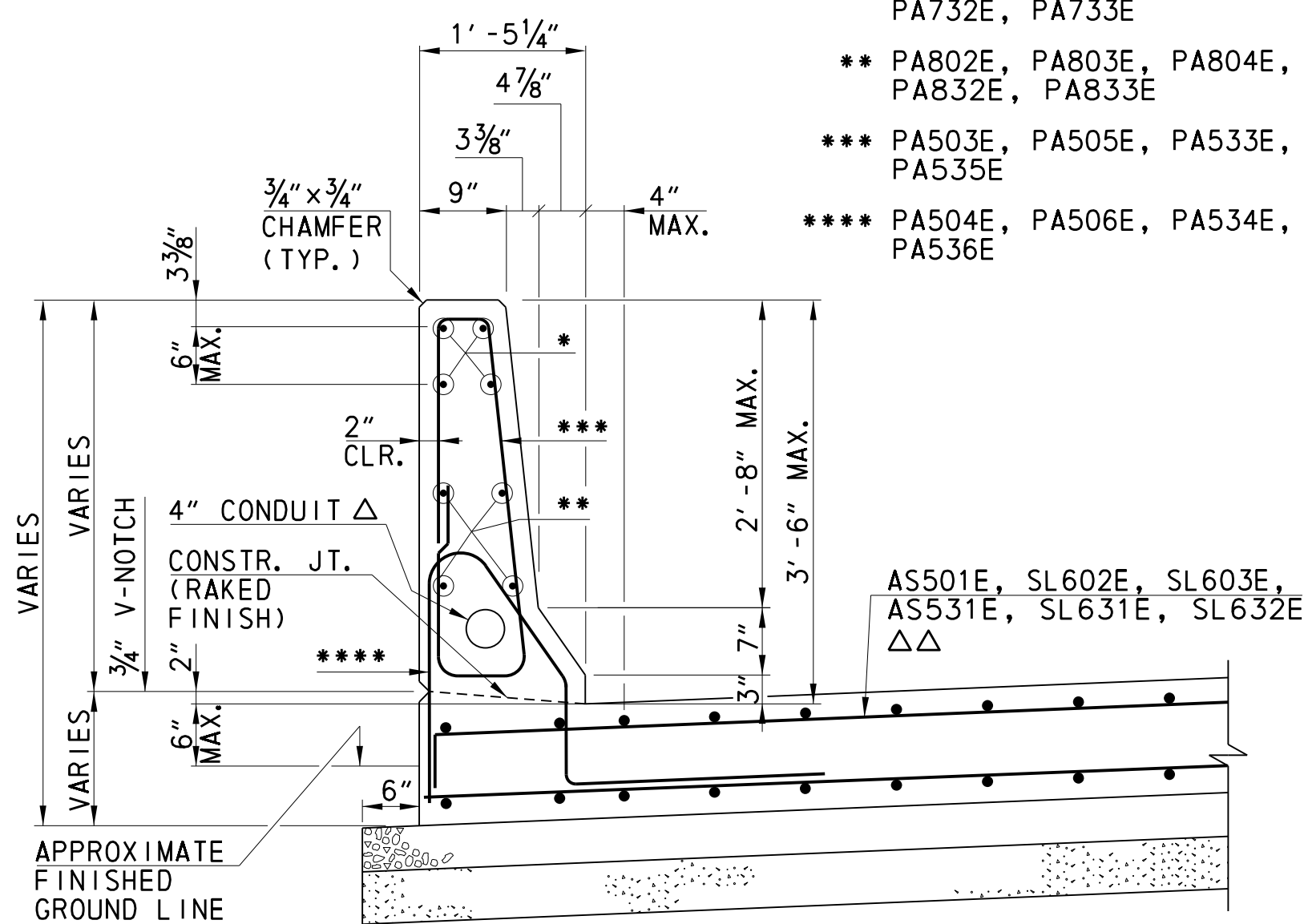
MOMENT SLAB (AT GRADE)  
WITH TYPICAL C. I. P. BARRIER

SCALE: 3/4" = 1' - 0"

NOTES:

1. PROVIDE DOWELS AT EXPANSION JOINTS.
2. PLACE A TUBE FROM AN APPROVED MANUFACTURER OVER THE LUBRICATED END OF ALL DOWEL BARS AND PROVIDE A MINIMUM 1" CLEARANCE POCKET ASSURED BY MEANS OF A POSITIVE SPACING DEVICE.
3. CUT EXPANSION JOINT FILLER MATERIAL TO CONFORM TO CROSS SECTION OF THE PAVEMENT AND FURNISH IN STRIPS EQUAL TO THE WIDTH OF THE PAVEMENT SLAB. MAKE THE TOP SURFACE SMOOTH AND HAVE HOLES PUNCHED FOR THE DOWEL BARS. PROVIDE A SNUG FIT WITHOUT LOSS IN THICKNESS OF THE MATERIAL. PAYMENT SHALL BE INCIDENTAL TO APPROACH SLAB CONSTRUCTION.
4. CONSTRUCT ALL TRANSVERSE JOINTS PERPENDICULAR TO THE CENTERLINE.
5. USE 1 1/2" DIA. x 18" LONG DOWEL BARS. APPROVED ALTERNATE DOWEL BARS HAVING EQUIVALENT PROPERTIES TO CONVENTIONAL ROUND DOWEL BARS MAY BE USED. COATED DOWEL BARS SHALL CONFORM TO DELDOT STANDARD SPECIFICATION 824.02 (g). PAYMENT SHALL BE INCIDENTAL TO APPROACH SLAB CONSTRUCTION.
6. PLACE DOWEL BARS PARALLEL TO THE CENTERLINE AND SURFACE OF THE SLAB.
7. MAKE THE TOP OF THE JOINT SEALING MATERIAL FROM 1/8" TO 1/4" BELOW THE SURFACE OF THE PAVEMENT. USE HEAT RESISTANT JOINT BACKING MATERIAL FOR HOT Poured JOINTS. PAYMENT SHALL BE INCIDENTAL TO APPROACH SLAB AND MOMENT SLAB CONSTRUCTION.
8. FOR REINFORCEMENT BAR LIST, SEE SHEET 28 OF 40.
9. SLIP FORMING FOR PARAPETS IS NOT PERMITTED.

- \* PA702E, PA703E, PA704E, PA732E, PA733E
- \*\* PA802E, PA803E, PA804E, PA832E, PA833E
- \*\*\* PA503E, PA505E, PA533E, PA535E
- \*\*\*\* PA504E, PA506E, PA534E, PA536E



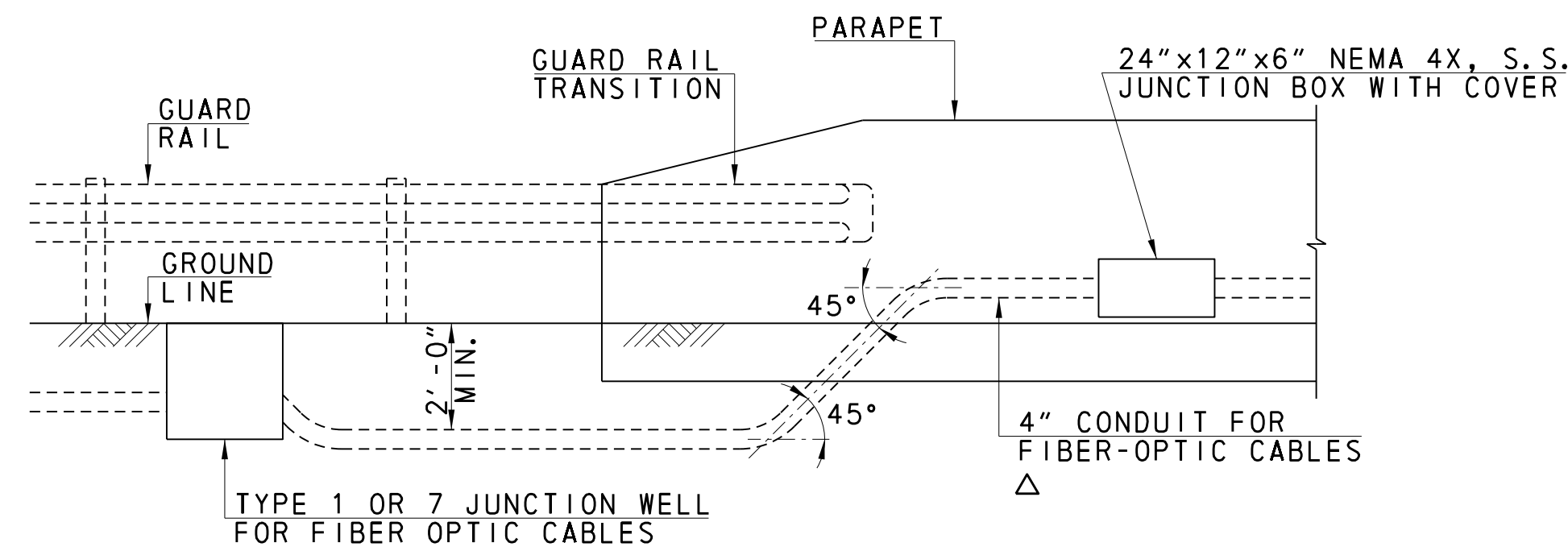
NOTE:  
UNDERDRAIN NOT SHOWN

PARAPET DETAIL

SCALE: 1/4" = 1' - 0"

△ OUTSIDE PARAPET ONLY; OMIT FOR MEDIAN PARAPET.

△△ USE 90° BEND AT APPROACH SLABS.  
USE 180° BEND AT MOMENT SLABS.



CONDUIT TRANSITION  
FROM BRIDGE END

NOT TO SCALE

NOTES:

- FOR CONDUIT, JUNCTION BOX AND JUNCTION WELL DETAILS AND PAYMENT, SEE SHEET SS-06.
- USE FLEXIBLE COUPLING AT BRIDGE EXPANSION JOINTS.

LEGEND

- BOT. = BOTTOM
- C. I. P. = CAST-IN-PLACE
- CLR. = CLEAR
- DIA. = DIAMETER
- JT. = JOINT
- MAX. = MAXIMUM
- MIN. = MINIMUM
- NB = NORTHBOUND
- TYP. = TYPICAL

① ANY MARK NUMBER WITH SUFFIX 'E' DENOTES EPOXY COATED REINFORCING STEEL.

② ALL MARK 'LOCATION PREFIXES' SHALL CONSIST OF TWO LETTERS AND ARE AS FOLLOWS: AB = ABUTMENT, AS = APPROACH SLAB, BC = BOX CULVERT, BW = BACKWALL, CL = COLUMN, DK = DECK, DL = DOWEL, FT = FOOTING, HW = HEADWALL, MS = MISC. BARS, PA = PARAPET, PR = PIER, SC = SHEETPILE CAP, SL = SLAB, TW = TOEWALL, WL = WALL (UNIQUE LOCATION), WW = WINGWALL

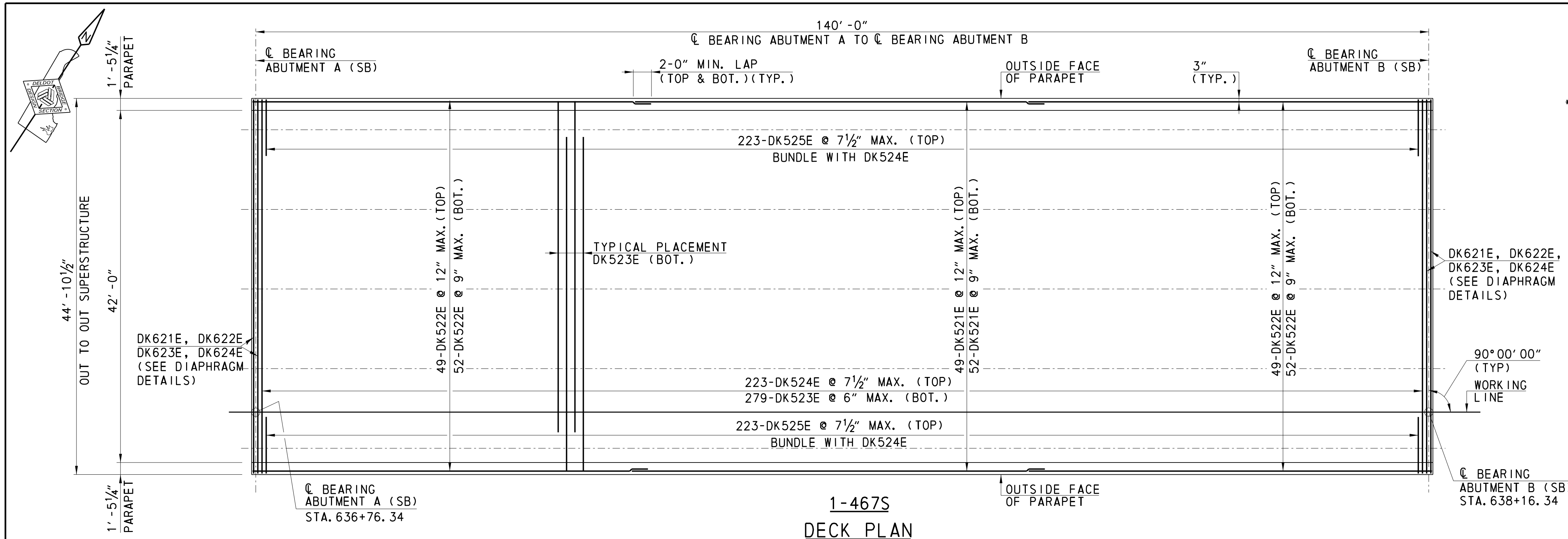
\* VARY AT EQUAL INCREMENTS.

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES /QUARTER INCH)										
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F/R	G	H	J	K	O
DECK, DIAPHRAGM, BRIDGE PARAPET (NB)															
111	5	60-00	DK501E	STR		60-00									
222	5	42-40	DK502E	STR		42-40									
279	5	39-100	DK503E	STR		39-100									
223	5	45-82	DK504E	1	0-70	44-62				0-70					
446	5	7-40	DK505E	1	0-00	6-90				0-70					
475	5	6-60	DK506E	S4	1-00	0-50	3-80	0-50		1-00					
4	6	45-102	DK601E	1	0-80	44-62				0-80					
6	6	44-62	DK602E	STR		44-62									
8	6	5-20	DK603E	STR		5-20									
4	6	1-11	DK604E	STR		1-11									
192	5	6-00	MS501E	STR		6-00									
14	5	44-62	MS502E	STR		44-62									
4	5	6-50	MS503E	STR		6-50									
4	5	7-60	MS504E	STR		7-60									
24	5	3-20	MS505E	STR		3-20									
2	5	1-83	MS506E	STR		1-83									
2	5	2-40	MS507E	STR		2-40									
8	5	5-60	MS508E	STR		5-60									
16	5	5-100	MS509E	1	0-70	5-30				0-00					
76	5	9-40	MS510E	17		3-100	1-80	3-100							
76	5	4-60	MS511E	16	0-00	0-00	1-00	3-60				2-53		2-53	3-53
116	5	5-00	MS512E	17		2-30	2-90	0-00							
76	5	7-80	MS513E	17		3-00	1-80	3-00							
64	5	8-20	MS514E	17		3-100	0-60	3-100							
180	5	3-63	MS515E	17		1-00	1-63	1-00							
116	6	5-20	MS601E	30		1-00	3-60				0-80	0-82	0-60	0-82	
8	6	8-60	MS602E	STR		8-60									
4	6	2-91	MS603E	STR		2-91									
32	6	6-00	MS604E	STR		6-00									
1	6	44-62	MS605E	STR		44-62									
8	6	3-20	MS606E	STR		3-20									
456	5	7-72	PA501E	28		2-91	0-12	2-92							
456	5	5-22	PA502E	29		0-63	1-72								
24	7	50-40	PA701E	STR		50-40									
24	8	51-50	PA801E	STR		51-50									

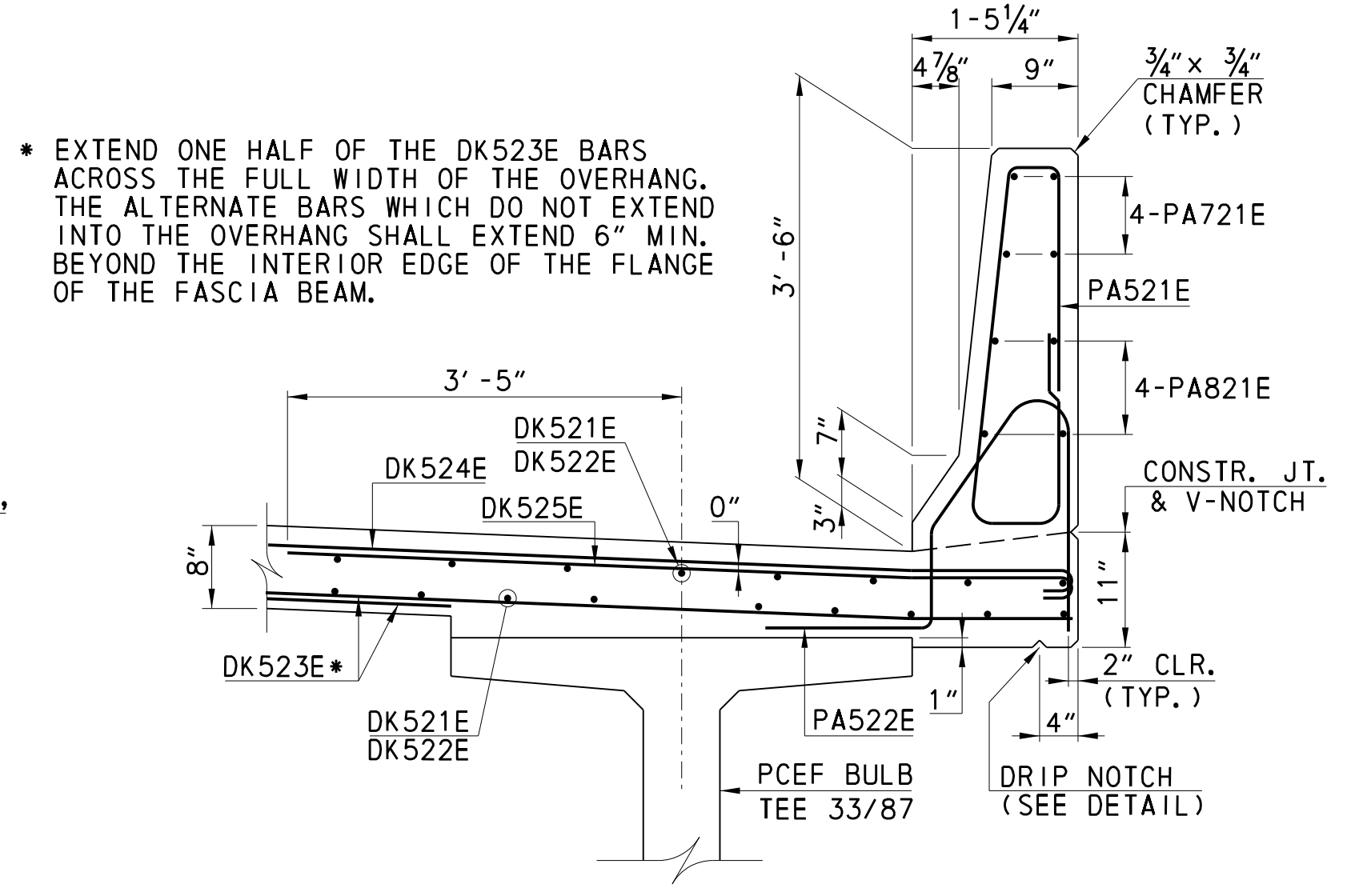
SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES /QUARTER INCH)										
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F/R	G	H	J	K	O
APPROACH SLAB, MOMENT SLAB, HEADER SLAB, SLEEPER SLAB, PARAPET AT ABUTMENT A (NB)															
31	5	46-62	AS501E	17		1-00	44-62	1-00							
92	5	6-62	AS502E	17		2-90	1-02	2-90							
46	5	29-70	AS503E	STR		29-70									
4	6	44-62	AS601E	STR		44-62									
31	7	44-62	AS701E	STR		44-62									
91	10	29-70	AS1001	STR		29-70									
26	5	44-62	SL501E	STR		44-62									
46	5	8-00	SL502E	T1	0-52	1-60	2-02	1-60	2-02		0-52				
14	5	19-11	SL503E	STR		19-11									
14	5	25-11	SL504E	STR		25-11									
116	5	9-80	SL505E	STR		9-80									
5	5	2-60	SL506E	STR		2-60									
58	5	5-22	SL507E	17		2-10	1-02	2-10							
4	6	44-62	SL601E	STR		44-62									
11	6	19-91	SL602E	1	0-80	19-11				0-00					
11	6	25-91	SL603E	1	0-80	25-11				0-00					
2	6	19-11	SL604E	STR		19-11									
2	6	25-11	SL605E	STR		25-11									
92	8	7-00	SL801E	STR		7-00									
118	5	7-72	PA503E	28		2-91	0-12	2-92							
110	5	6-102	PA504E	29		1-43	2-52								
2X8	5	*5-02	PA505E	28		*1-111	*0-22	*1-112							
		TO				TO	TO	TO							
		*7-72				*2-91	*0-12	*2-92							
24	5	5-102	PA506E	29		0-103	1-112								9-70
8	7	29-80	PA702E	STR		29-80									
8	7	1-80	PA703E	STR		1-80									
8	7	9-80	PA704E	16	0-00	0-00	5-30	4-50			0-80		4-40	9-70	
8	8	29-80	PA802E	STR		29-80									
8	8	1-80	PA803E	STR		1-80									
8	8	9-80	PA804E	16	0-00	0-00	5-30	4-50			0-80		4-40		
38	1 1/2"	DIA.	3-60	DOWELS	STR										

SPECIFICATIONS					BENDING DIMENSIONS (FEET-INCHES /QUARTER INCH)										
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F/R	G	H	J	K	O
APPROACH SLAB, MOMENT SLAB, SLEEPER SLAB, PARAPET AT ABUTMENT B (NB)															
31	5	46-62	AS531E	17		1-00	44-62	1-00							
92	5	6-62	AS532E	17		2-90	1-02	2-90							
46	5	29-70	AS533E	STR		29-70									
31	7	44-62	AS731E	STR		44-62									
91	10	29-70	AS1031	STR		29-70									
14	5	44-62	SL531E	STR		44-62									
14	5	19-11	SL532E	STR		19-11									
14	5	25-11	SL533E	STR		25-11									
116	5	9-80	SL534E	STR		9-80									
5	5	2-60	SL535E	STR		2-60									
58	5	5-22	SL536E	17		2-10	1-02	2-10							
11	6	19-91	SL631E	1	0-80	19-11				0-00					
11	6	25-91	SL632E	1	0-80	25-11				0-00					
2	6	19-11	SL633E	STR		19-11									
2	6	25-11	SL634E	STR		25-11									
92	8	4-60	SL831E	STR		4-60									
110	5	7-72	PA533E	28		2-91	0-12	2-92							
102	5	6-102	PA534E	29		1-43	2-52								
2X8	5	*5-02	PA535E	28		*1-111	*0-22	*1-112							
		TO				TO	TO	TO							
		*7-72				*2-91	*0-12	*2-92							
24	5	5-102	PA536E	29		0-103	1-112								
8	7	29-80	PA732E	STR		29-80									
8	7	9-80	PA733E	16	0-00	0-00	5-30	4-50			0-80		4-40	9-70	
8	8	29-80	PA832E	STR		29-80									
8	8	9-80	PA833E	16	0-00	0-00	5-30	4-50			0-80		4-40	9-70	
38	1 1/2"	DIA.	3-60	DOWELS	STR										

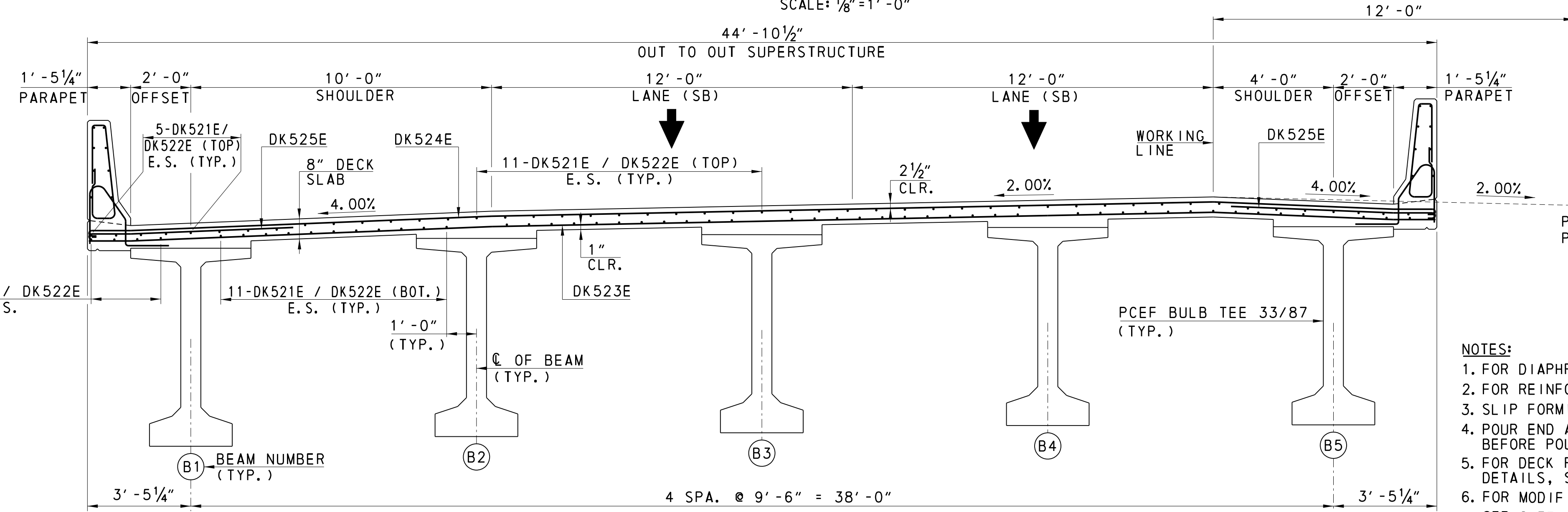
ASTM STANDARD ENGLISH REINFORCING BARS				RECOMMENDED END HOOKS, APPLICABLE TO ALL GRADES				STIRRUP AND TIE HOOKS, APPLICABLE TO ALL GRADES			
BAR SIZE	NOMINAL DIMENSIONS			180° HOOKS		90° HOOKS		90° HOOK		135° HOOK	
	DIAMETER (INCHES)	AREA (INCHES <sup>2</sup> )	WEIGHT (LBS./FT.)	D	A OR G	J	A OR G	D	A OR G	A OR G	A OR G
3	0.375	0.110	0.376	2 1/4"	5"	3"	6"	1 1/2"	4"	4"	2 1/2"
4	0.500	0.200									



**1-467S  
DECK PLAN**  
SCALE: 1/8" = 1'-0"



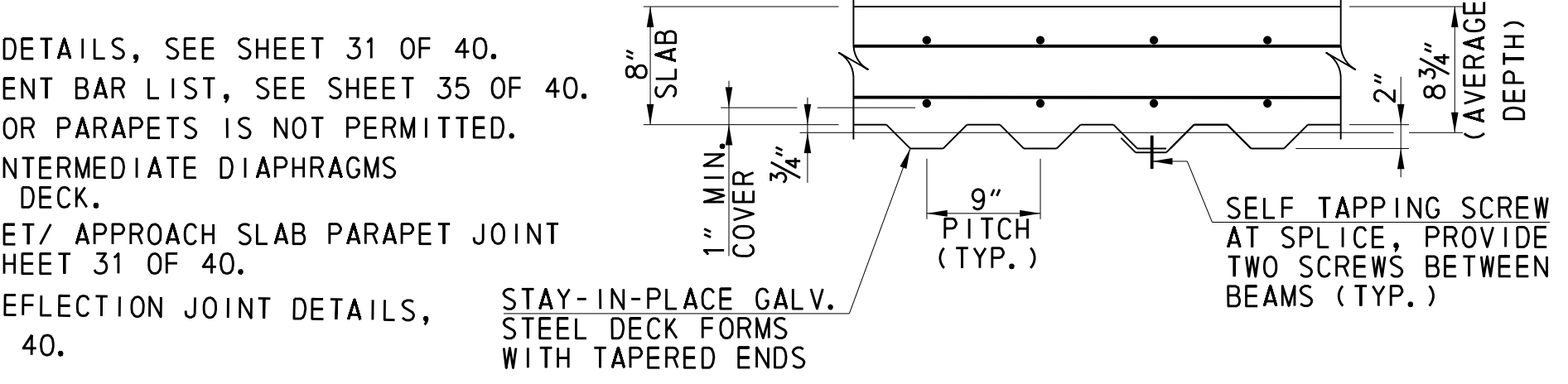
**PARAPET DETAIL (SB)**  
SCALE: 3/4" = 1'-0"



**1-467S  
TYPICAL SECTION**  
SCALE: 3/8" = 1'-0"

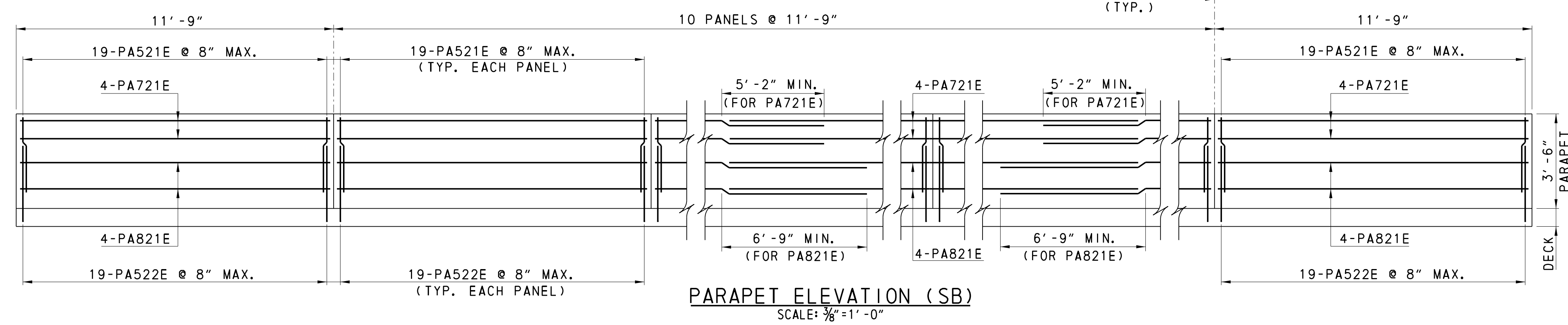
- NOTES:
- DECK SLAB REINFORCEMENT NOT SHOWN FOR CLARITY.
  - FIELD VERIFY ACTUAL HAUNCH BEFORE POURING DECK.
  - DECK THICKNESS @ C OF BRG. AND C OF BEAM, D = 1'-0 5/8"

**HAUNCH REINFORCEMENT**  
NOT TO SCALE



- NOTES:
- SHOP DRAWINGS SHALL BE SUBMITTED FOR REVIEW AND APPROVAL BY THE ENGINEER. METAL FORMS MUST BE GALVANIZED, MORTAR TIGHT AND STEEL METAL SCREWS MUST BE NON-CORROSIVE. SELF TAPPING SCREWS SHALL BE INSTALLED AT THE SIDE LAP OF THE SHEETS AT MID-SPAN BETWEEN SUPPORTS. NO WELD WILL BE PERMITTED AT NEGATIVE MOMENT ZONE.
  - FOR ADDITIONAL NOTES, SEE SHEET 20 OF 40.

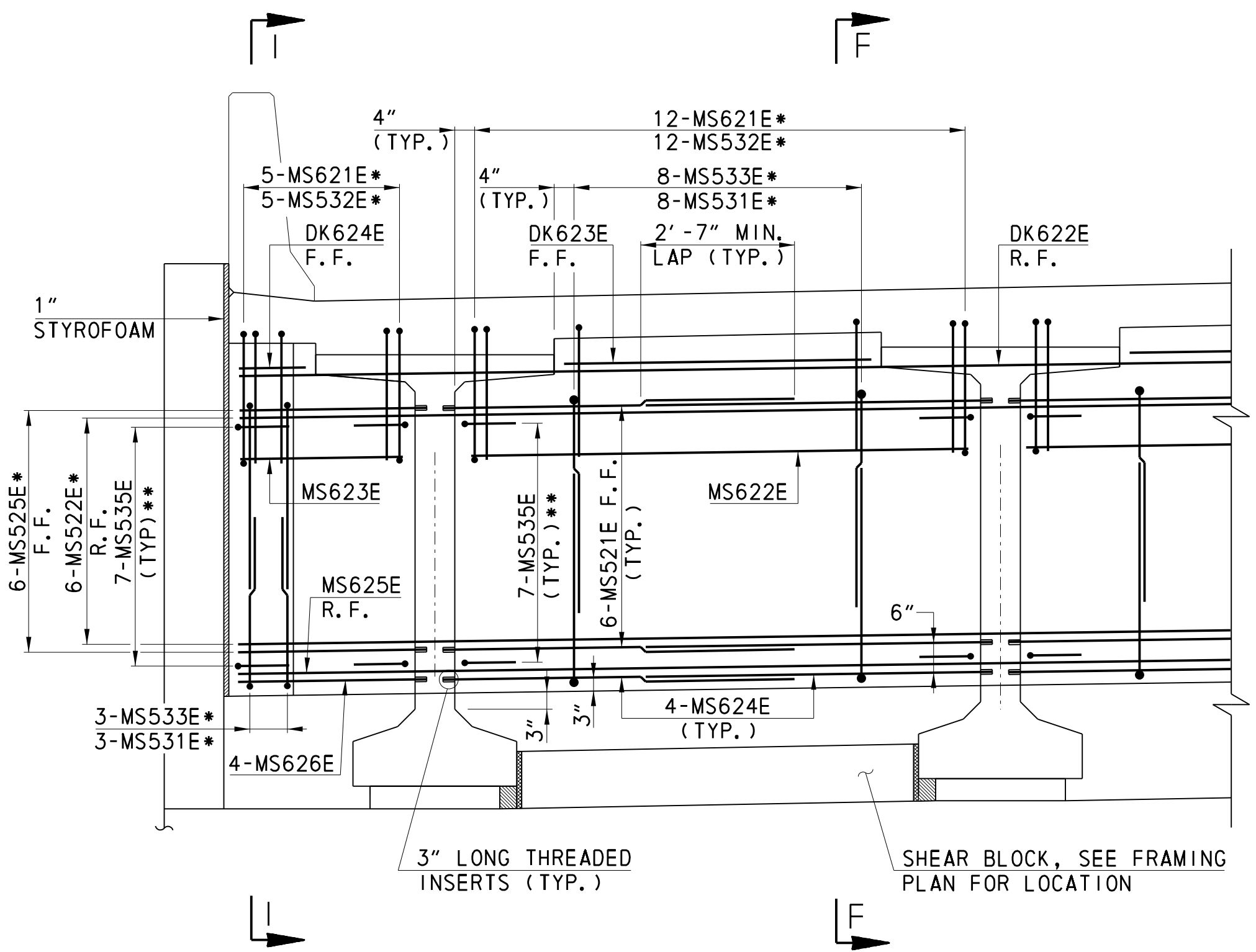
**STAY-IN-PLACE FORM CONNECTION**  
NOT TO SCALE



**PARAPET ELEVATION (SB)**  
SCALE: 3/8" = 1'-0"

- LEGEND:
- CLR. = CLEAR
  - CONSTR. = CONSTRUCTION
  - BOT. = BOTTOM
  - BRG. = BEARING
  - E. S. = EQUAL SPACING
  - GALV. = GALVANIZED
  - JT. = JOINT
  - MAX. = MAXIMUM
  - MIN. = MINIMUM
  - NB = NORTHBOUND
  - PGA = PROFILE GRADE APPLICATION
  - P/R = POINT OF ROTATION
  - SPA. = SPACE
  - TYP. = TYPICAL





**ABUTMENT A (SB)  
DIAPHRAGM ELEVATION**  
SCALE: 1/2" = 1'-0"

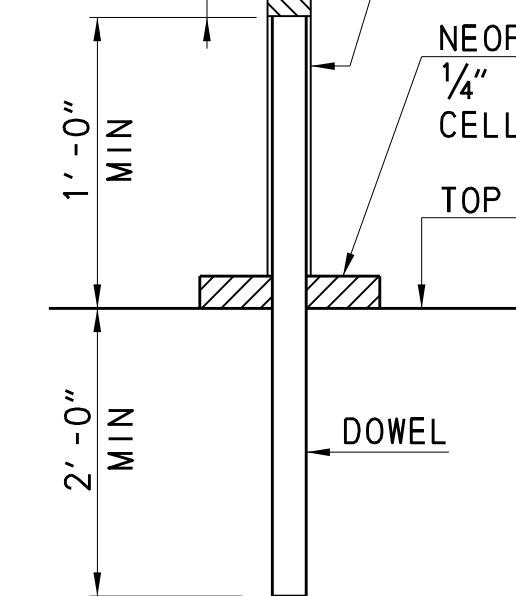
\* EQUAL SPACE  
\*\* MATCH WITH LONGITUDINAL  
DIAPHRAGM BARS.

WRAP 2" THICK PREFORMED  
CELLULAR POLYSTYRENE  
CAP WITH 24 GAGE METAL  
SLEEVE

WRAP 24 GAGE METAL  
SLEEVE OR SLEEVE WITH  
SCHEDULE 40 PVC PIPE  
AROUND THE DOWEL (DO NOT  
USE ALUMINUM SLEEVE)

NEOPRENE SPONGE WASHER  
1/4" THICKER THAN PREFORMED  
CELLULAR POLYSTYRENE

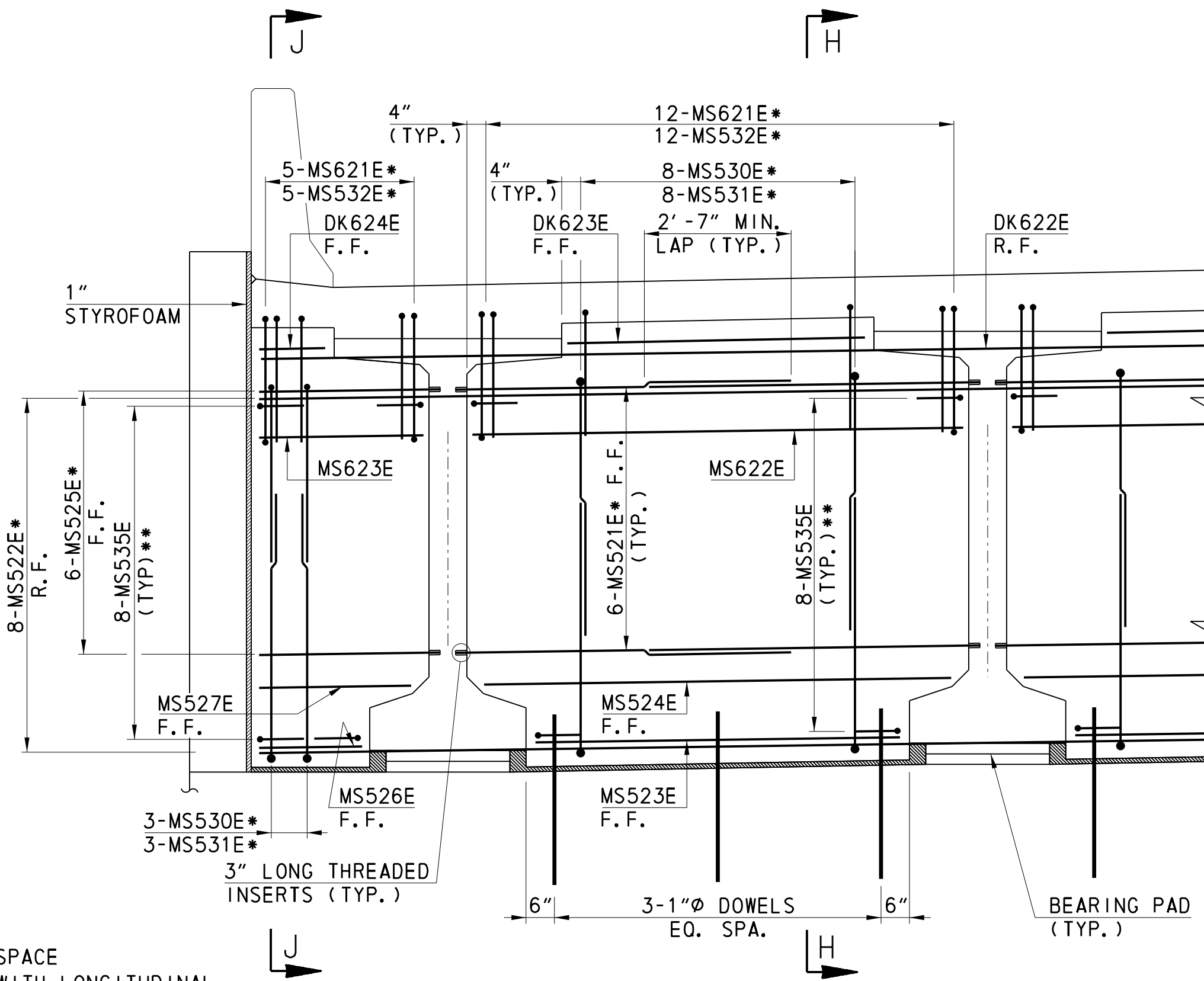
TOP OF SUBSTRUCTURE UNIT



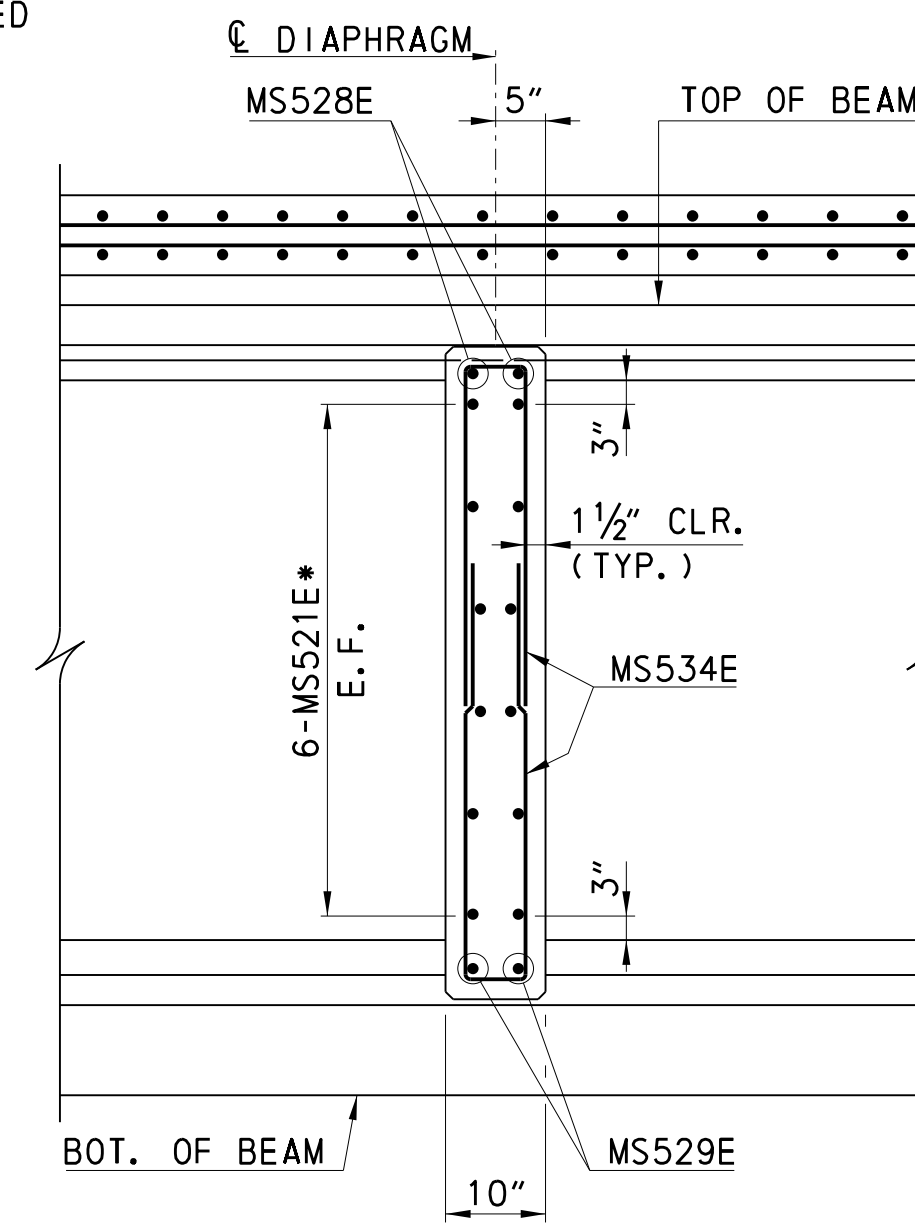
**DOWEL DETAIL**  
NOT TO SCALE

**LEGEND**

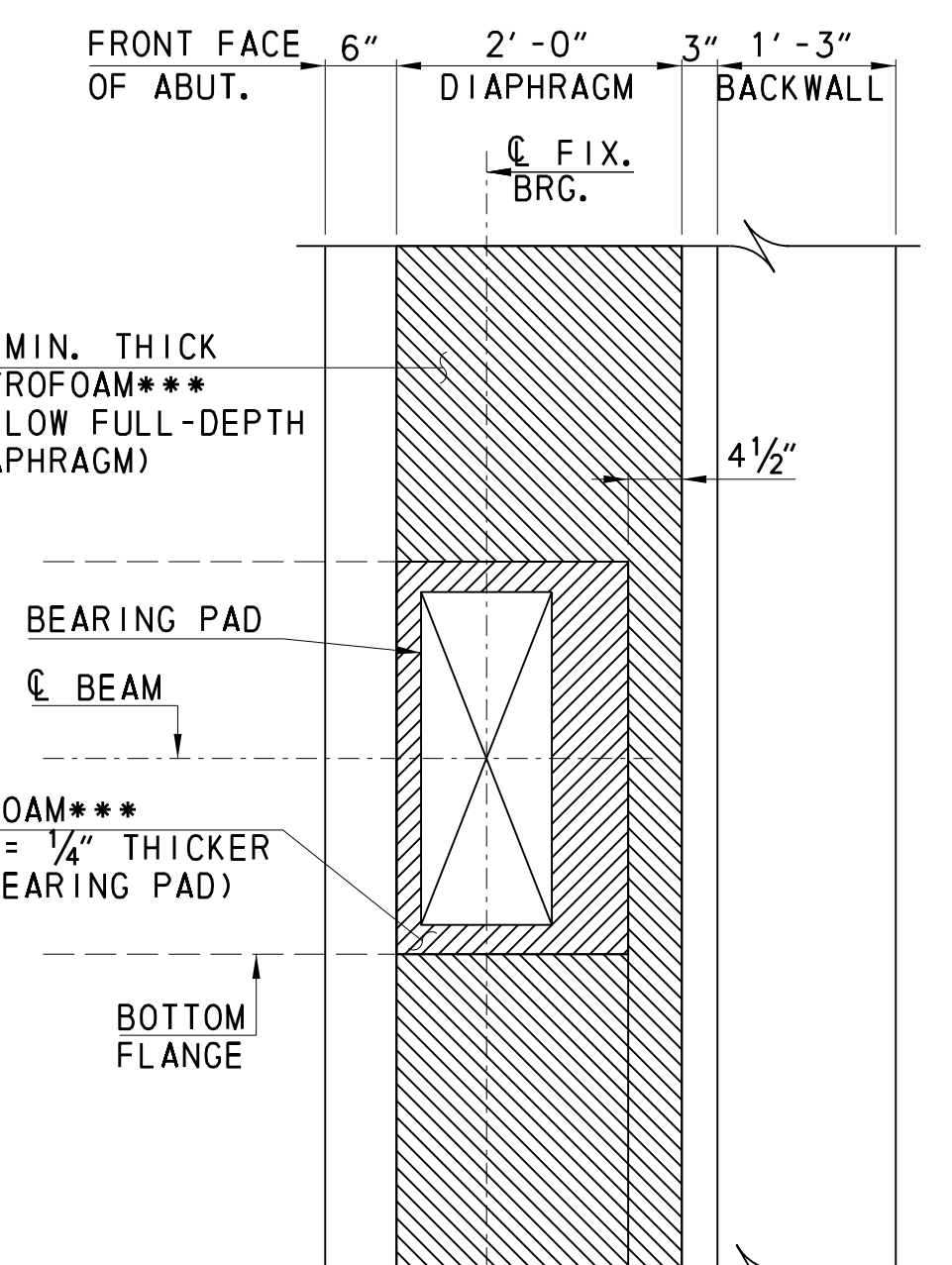
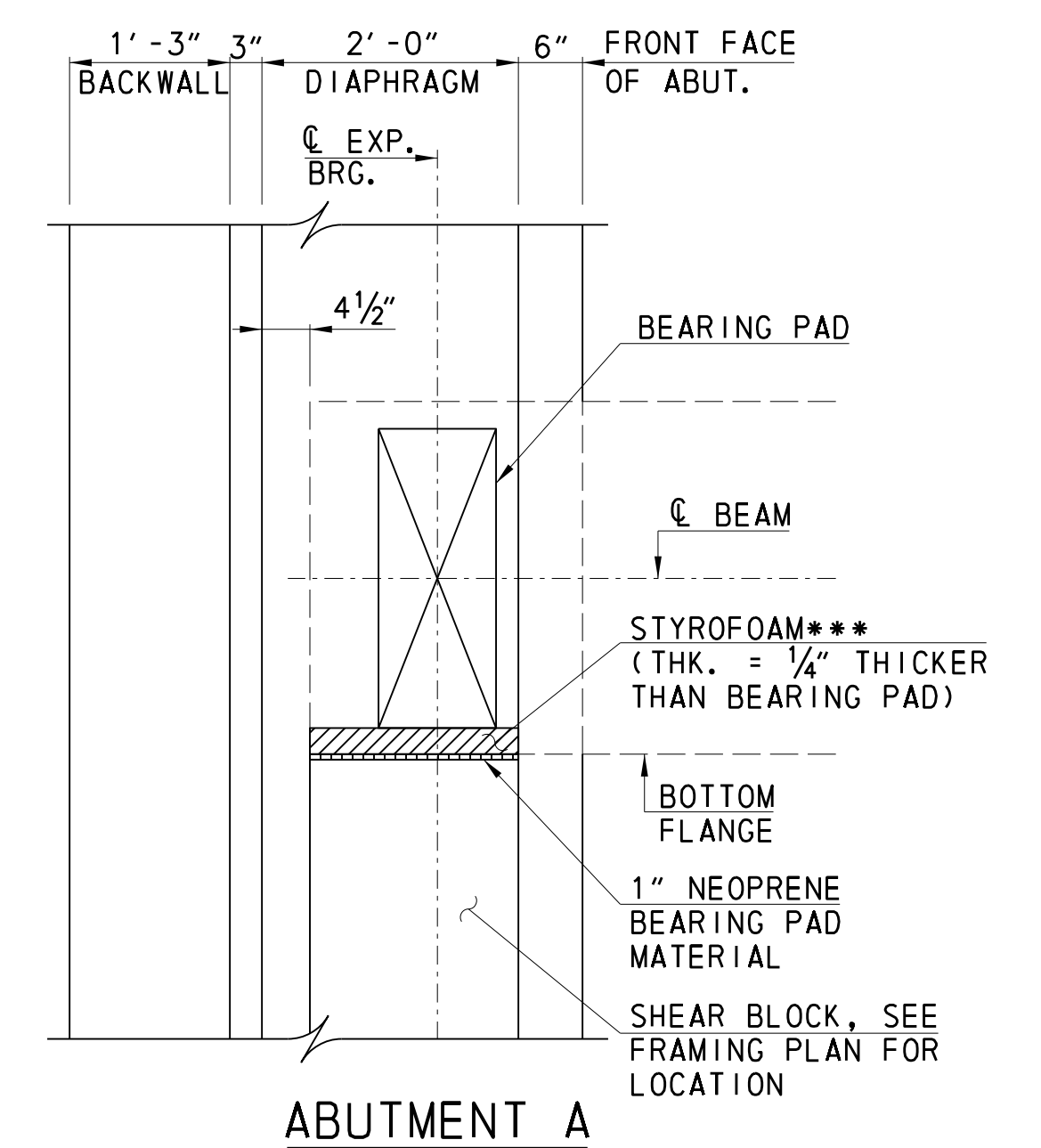
ABUT. = ABUTMENT  
BOT. = BOTTOM  
CLR. = CLEAR  
DIA. = DIAMETER  
E.F. = EACH FACE  
EQ. = EQUAL  
EXP. = EXPANSION  
FIX. = FIXED  
F.F. = FRONT FACE  
MIN. = MINIMUM  
R.F. = REAR FACE  
SPA. = SPACES  
THK. = THICKNESS  
TYP. = TYPICAL



**ABUTMENT B (SB)  
DIAPHRAGM ELEVATION**  
SCALE: 1/2" = 1'-0"

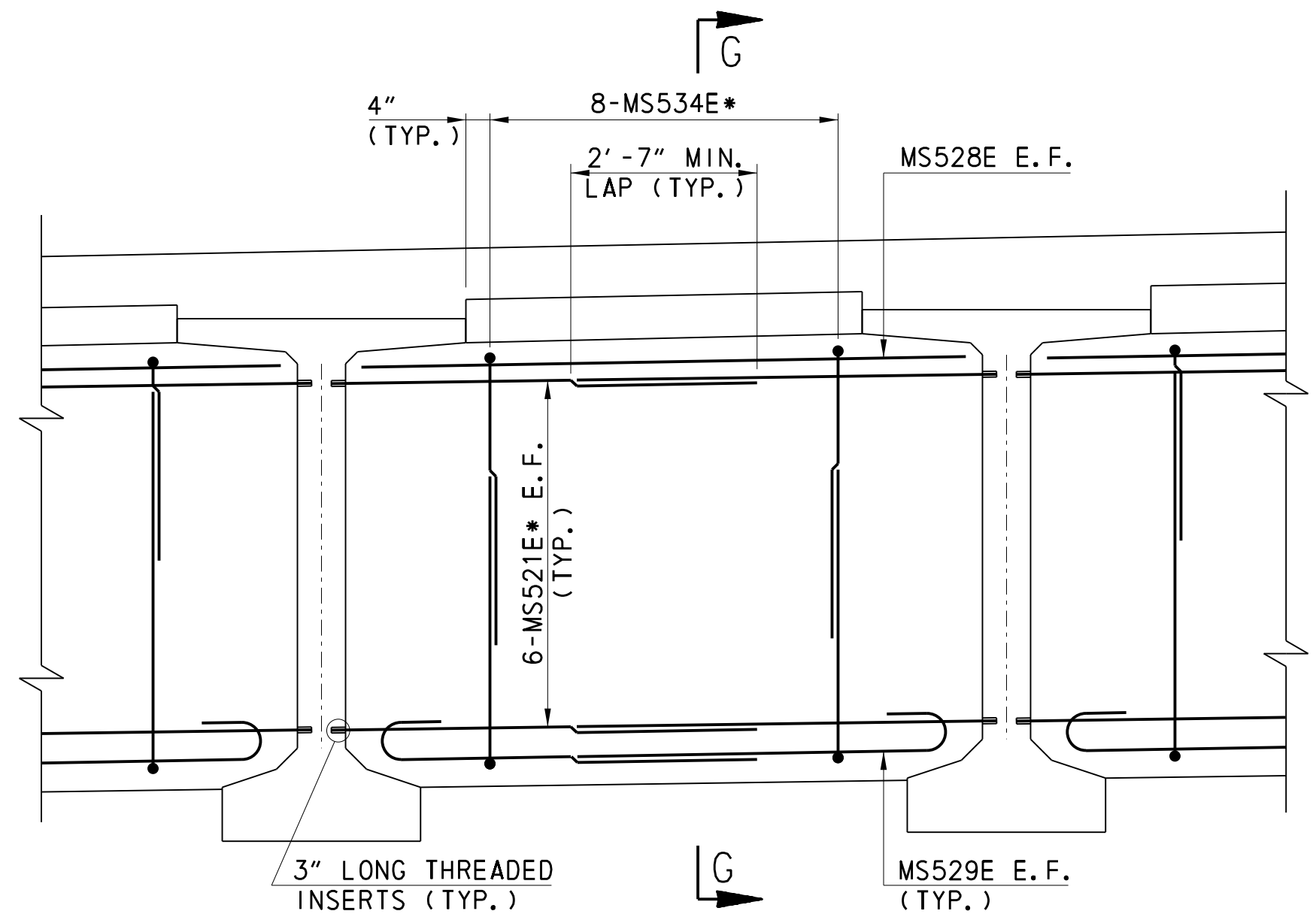


**SECTION G-G (SB)**  
SCALE: 3/4" = 1'-0"



\*\*\* STYROFOAM SHALL MEET ASTM C-578  
TYPE 1 MATERIAL REQUIREMENTS,  
EXCEPT THE MAXIMUM ALLOWABLE WATER  
ABSORPTION SHALL BE 2%.

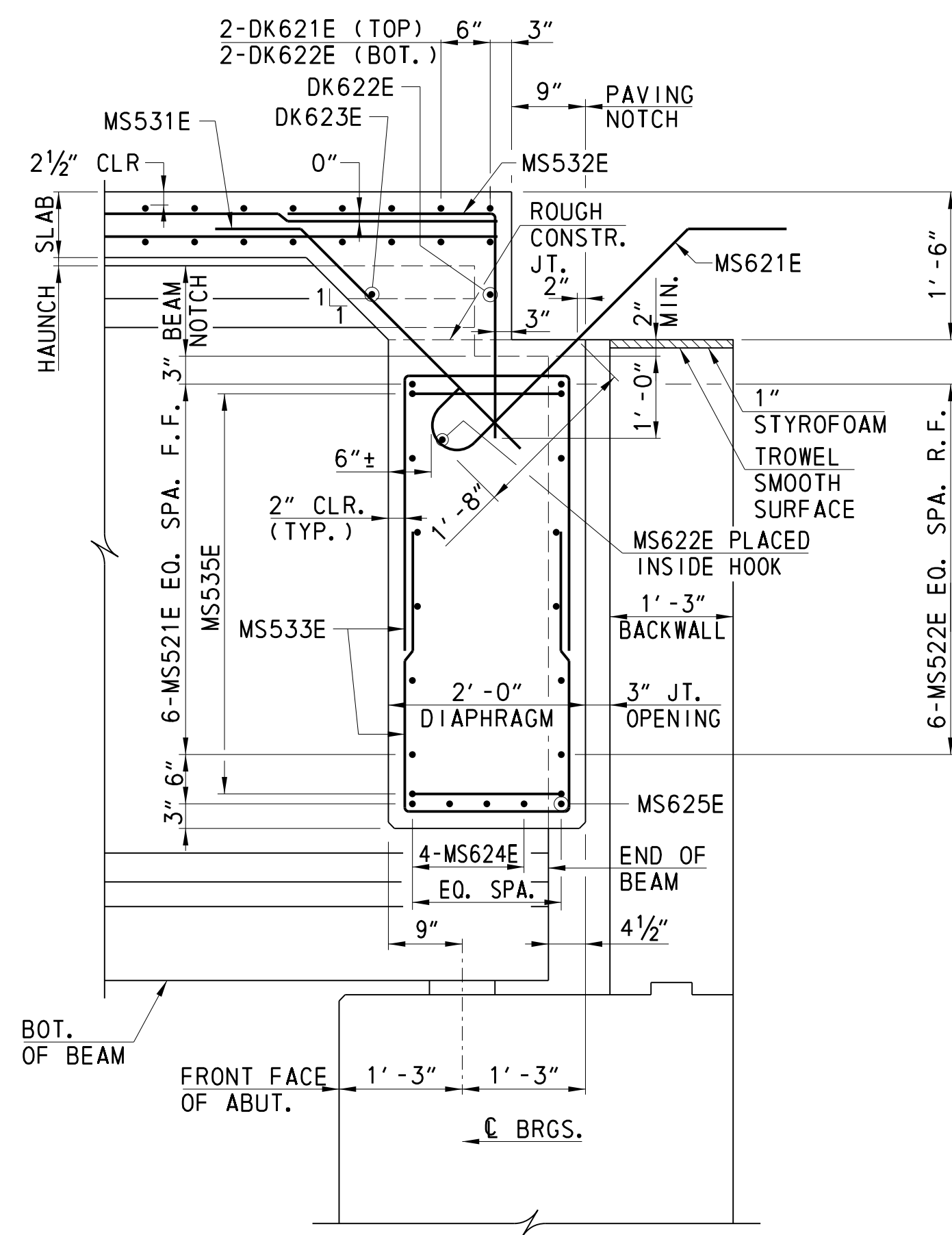
**ABUTMENT B  
WATERPROOFING LIMITS PLAN**  
SCALE: 3/4" = 1'-0"



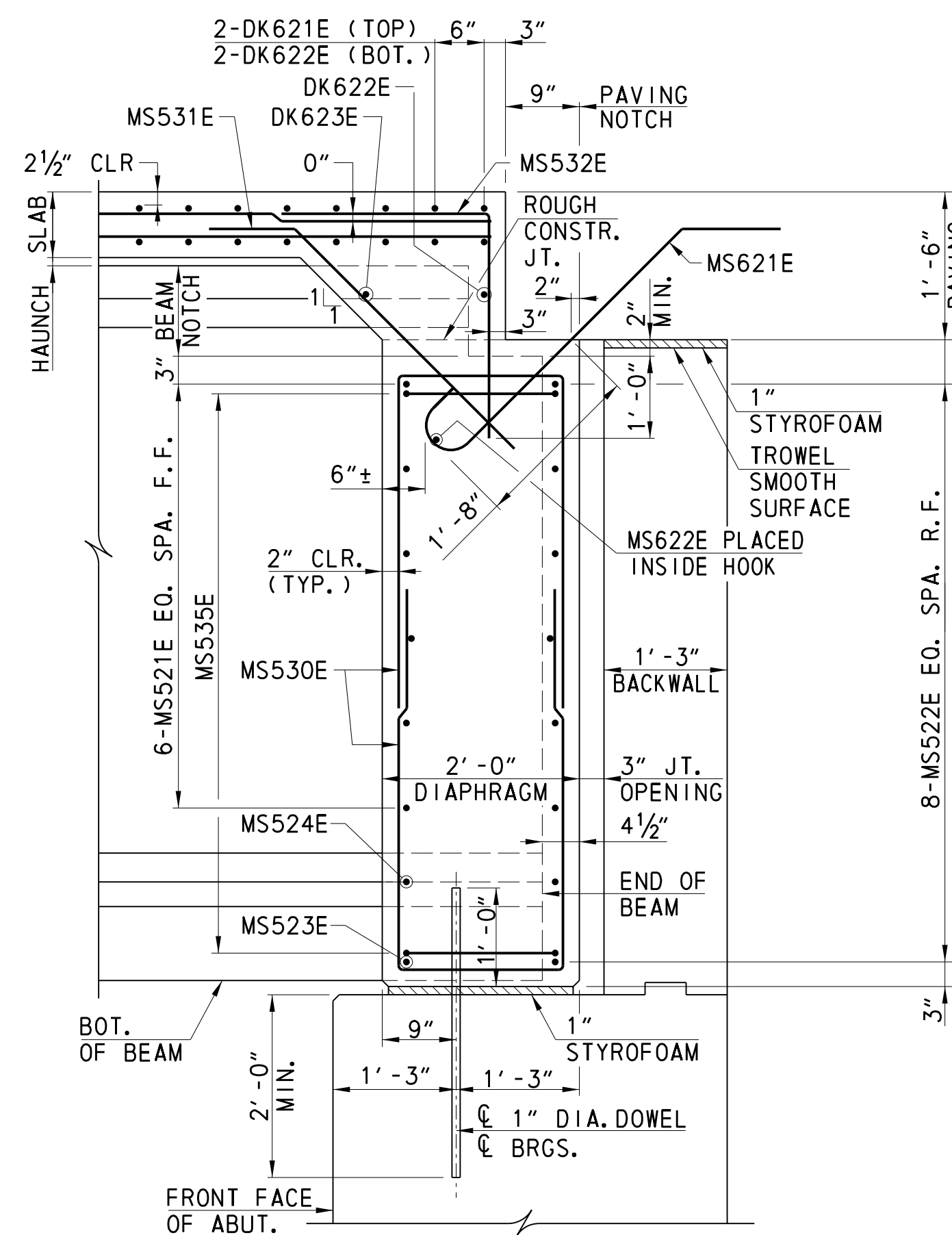
**INTERMEDIATE DIAPHRAGM (SB)  
ELEVATION**  
SCALE: 1/2" = 1'-0"

**NOTES:**

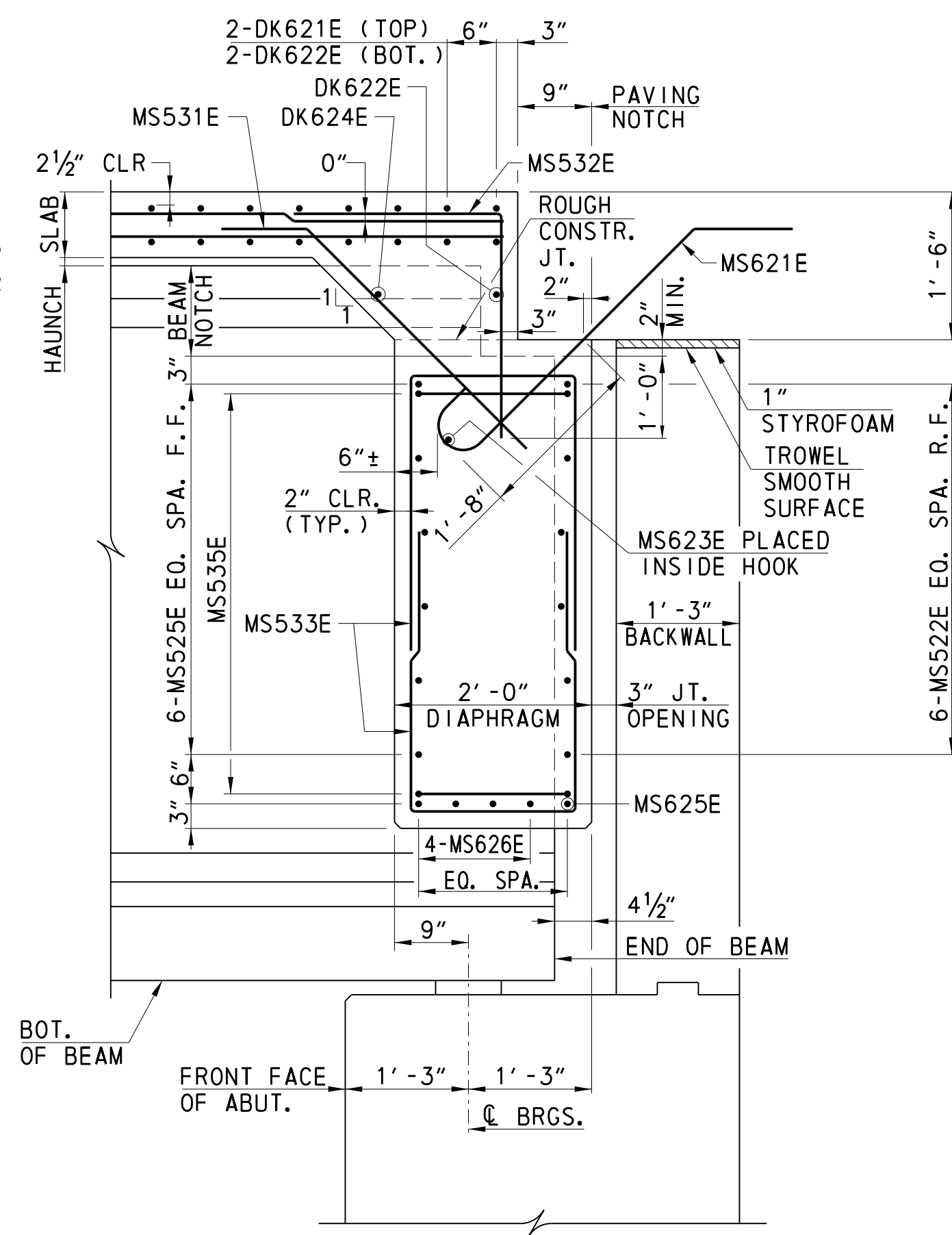
- FOR SECTIONS F-F, H-H, I-I, AND J-J, SEE SHEET 31 OF 40.
- FOR SHEAR BLOCK DETAILS, SEE SHEET 12 OF 40.
- FOR FRAMING PLAN, SEE SHEET 19 OF 40.
- FOR BEARING PAD DETAILS, SEE SHEET 20 OF 40.
- FOR BEAM DETAILS, SEE SHEET 21 OF 40.
- FOR REINFORCEMENT BAR LIST, SEE SHEET 35 OF 40.
- FOR LAYOUT OF DOWELS AND DOWEL REQUIREMENTS, SEE SHEET 14 OF 40.
- BITUMINOUS TAR PAPER OR SCHEDULE 40 PVC PIPE ARE PERMITTED TO BE USED AS ALTERNATIVE BOND BREAKER MATERIALS IN LIEU OF THE METAL SLEEVE. OTHER BOND BREAKER MATERIALS MAY BE USED AROUND THE DOWEL ONLY WITH THE APPROVAL OF THE ENGINEER.



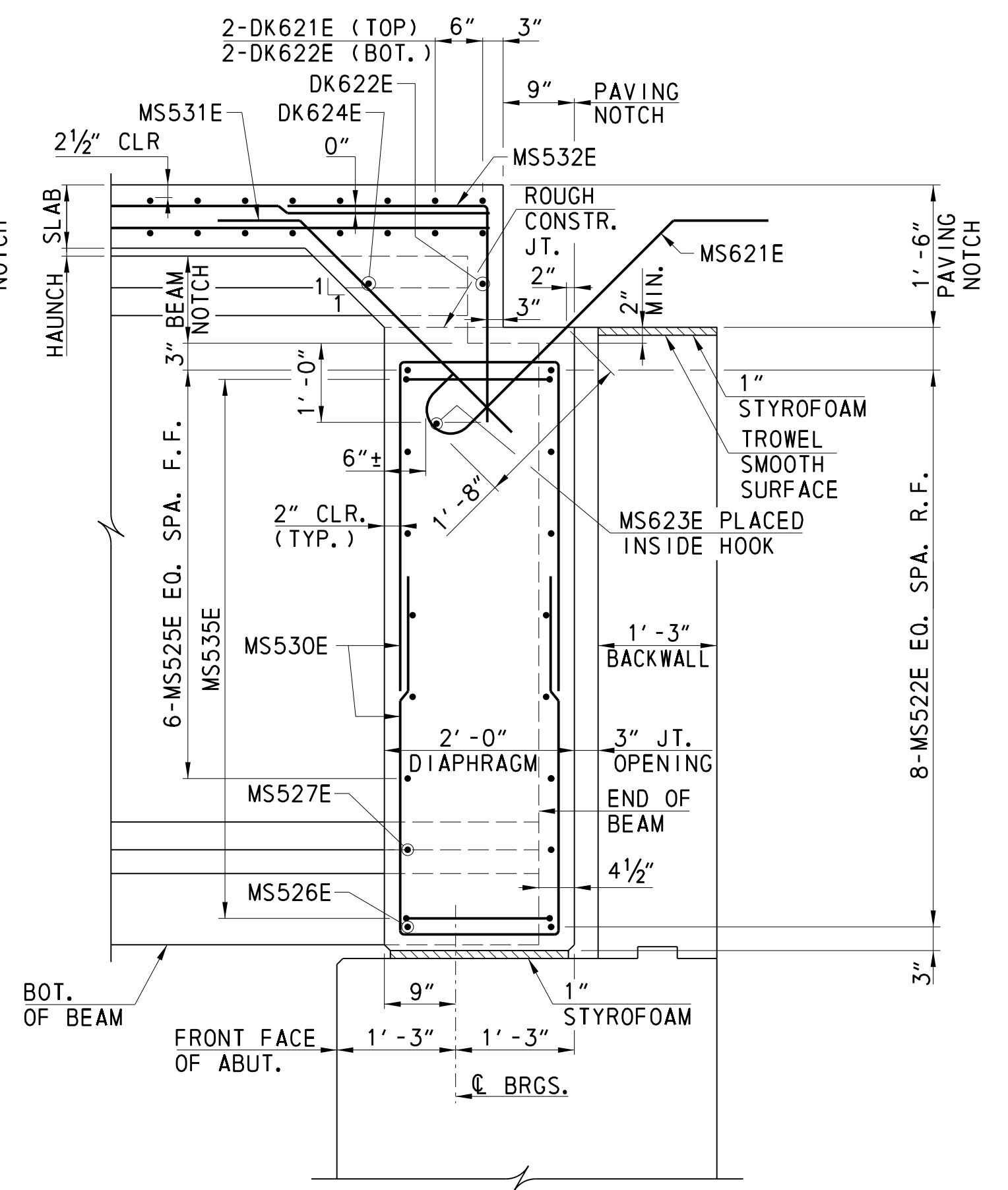
SECTION F-F (SB)  
SCALE: 3/4" = 1'-0"



SECTION H-H (SB)  
SCALE: 3/4" = 1'-0"



SECTION I-I (SB)  
SCALE: 3/4" = 1'-0"



SECTION J-J (SB)  
SCALE: 3/4" = 1'-0"

NOTES:

- FOR LOCATION OF SECTIONS F-F, H-H, I-I AND J-J, SEE SHEET 30 OF 40.
- FOR DECK DETAILS, SEE SHEET 29 OF 40.
- FOR REINFORCEMENT BAR LIST, SEE SHEET 35 OF 40.
- FOR APPROACH SLAB DETAILS, SEE SHEETS 32 AND 33 OF 40.
- FOR DOWEL DETAIL, SEE SHEET 30 OF 40.

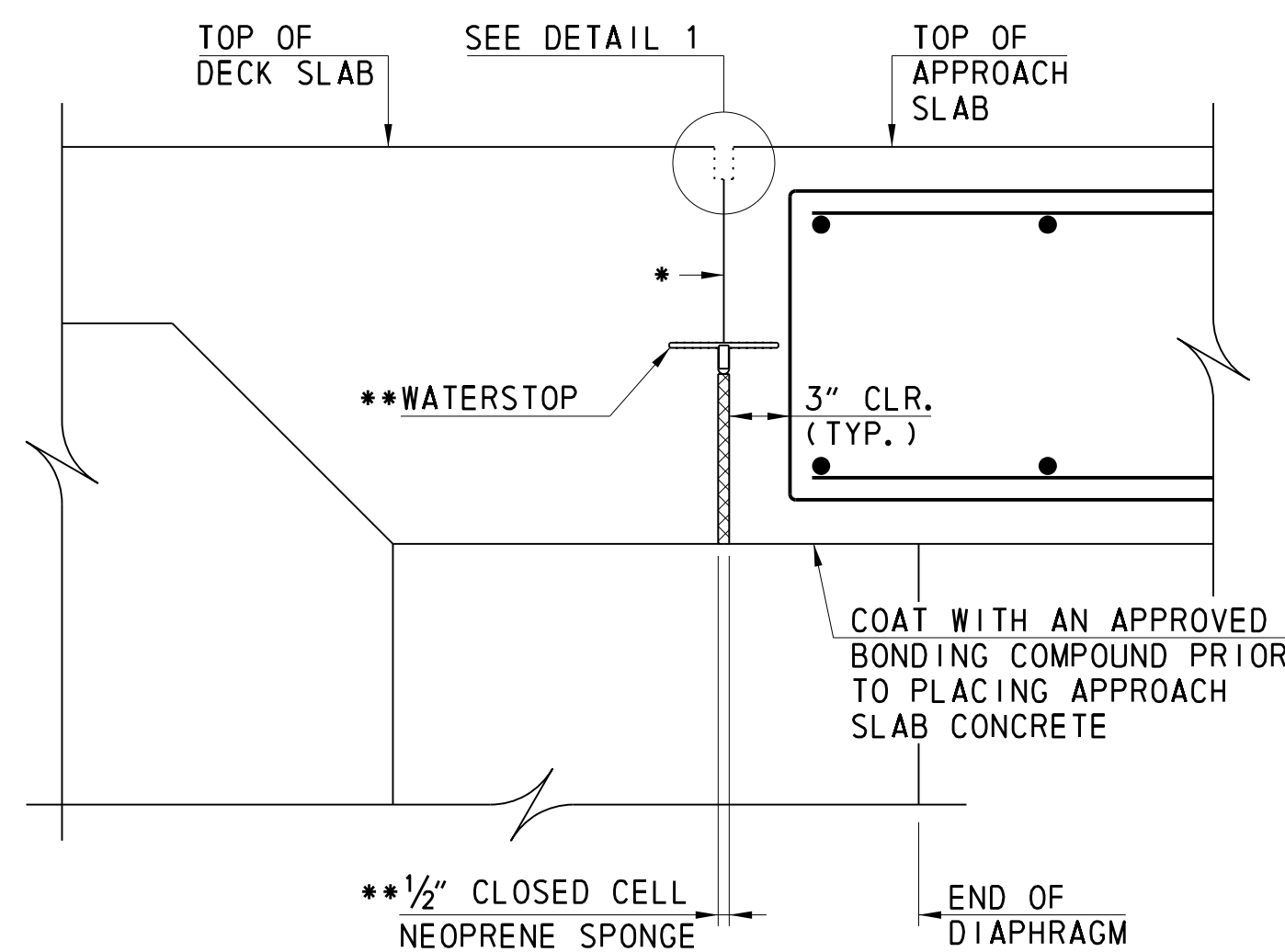
JOINT PREPARATION NOTES:

- THE JOINT OPENING IS TO BE FORMED BY A TWO-STAGE SAWING OPERATION WHERE ACCESSIBLE AND FORMED ELSEWHERE. THE FIRST SAW CUT IS DESIGNED TO CONTROL CRACKING. THE SECOND SAW CUT IS MADE USING A DOUBLE-BLADED WATER-COOLED SAW CAPABLE OF HOLDING A TOLERANCE OF  $\pm 1/16"$  TO CREATE THE PROPER OPENING FOR THE PREFORMED NEOPRENE COMPRESSION SEAL OR INVERTED V-JOINT SEAL.
- WATER BLAST OPENING IMMEDIATELY FOLLOWING SAW CUTTING OPERATION TO REMOVE ANY RESIDUAL SLURRY BEFORE IT DRIES.
- THE DEPTH OF THE SEAL OPENING EQUALS THE HEIGHT OF THE SEAL PLUS  $3/4"$ . THE WIDTH OF THE SECOND SAW CUT SHALL BE ADJUSTED TO ACCOUNT FOR THE CONCRETE SURFACE TEMPERATURE AT THE TIME OF SAWING, SEE MANUFACTURER'S PRODUCT INFORMATION.
- BEFORE INSTALLING THE SEAL, ABRASIVE BLAST THE BONDING SURFACES TO THOROUGHLY CLEAN THE JOINT OPENING AND REMOVE FOREIGN MATERIAL, INCLUDING BROKEN CONCRETE. USE WATER AND OIL FREE COMPRESSED AIR TO BLOW OUT RESIDUE FROM THE SEAL GROOVE OPENING.
- PREPARE BONDING SURFACES AND INSTALL JOINT SEAL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- DO NOT EXCEED 3% ELONGATION OF SEAL, IF STRETCHING OCCURS.

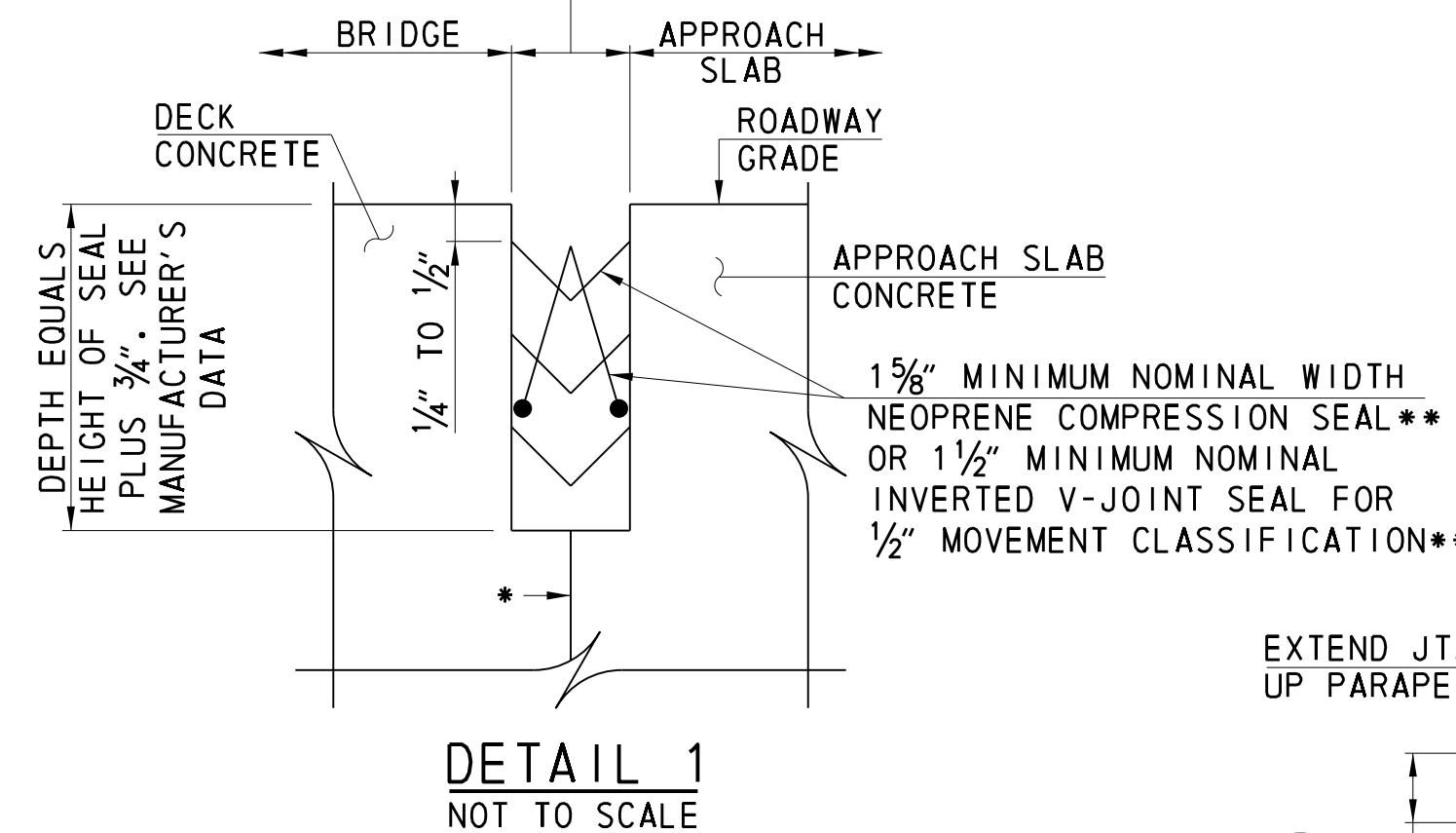
LEGEND

ABUT.	=	ABUTMENT	F.F.	=	FRONT FACE
BOT.	=	BOTTOM	JT.	=	JOINT
BRG.	=	BEARING	MIN.	=	MINIMUM
CLR.	=	CLEAR	R.F.	=	REAR FACE
CONSTR.	=	CONSTRUCTION	SPA.	=	SPACES
DIA.	=	DIAMETER	TYP.	=	TYPICAL
EQ.	=	EQUAL			

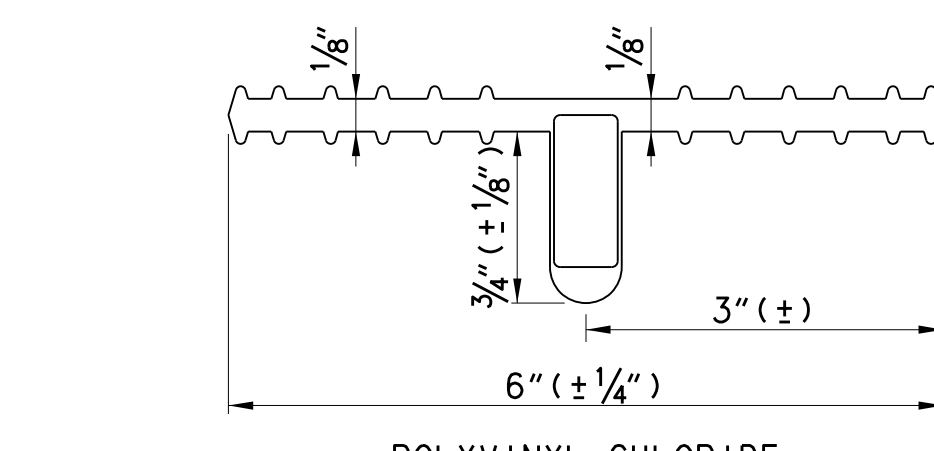
SAW CUT JOINT OPENING FOR JOINT SEAL. WIDTH OF SAW CUT SHALL BE ADJUSTED TO ACCOUNT FOR THE CONCRETE SURFACE TEMPERATURE AT THE TIME OF SAWING. SEE MANUFACTURER'S DATA.



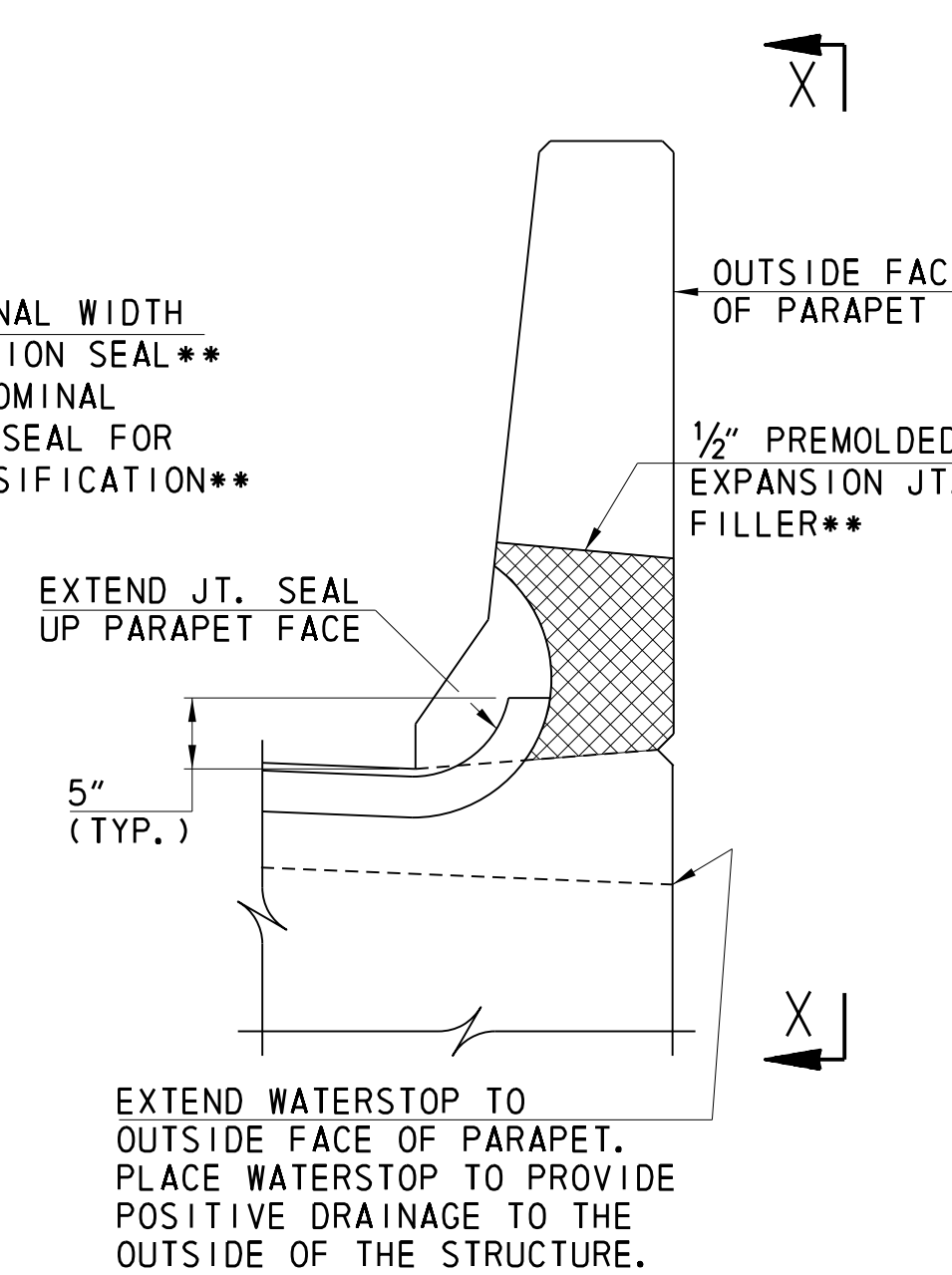
APPROACH SLAB JOINT DETAIL  
NOT TO SCALE



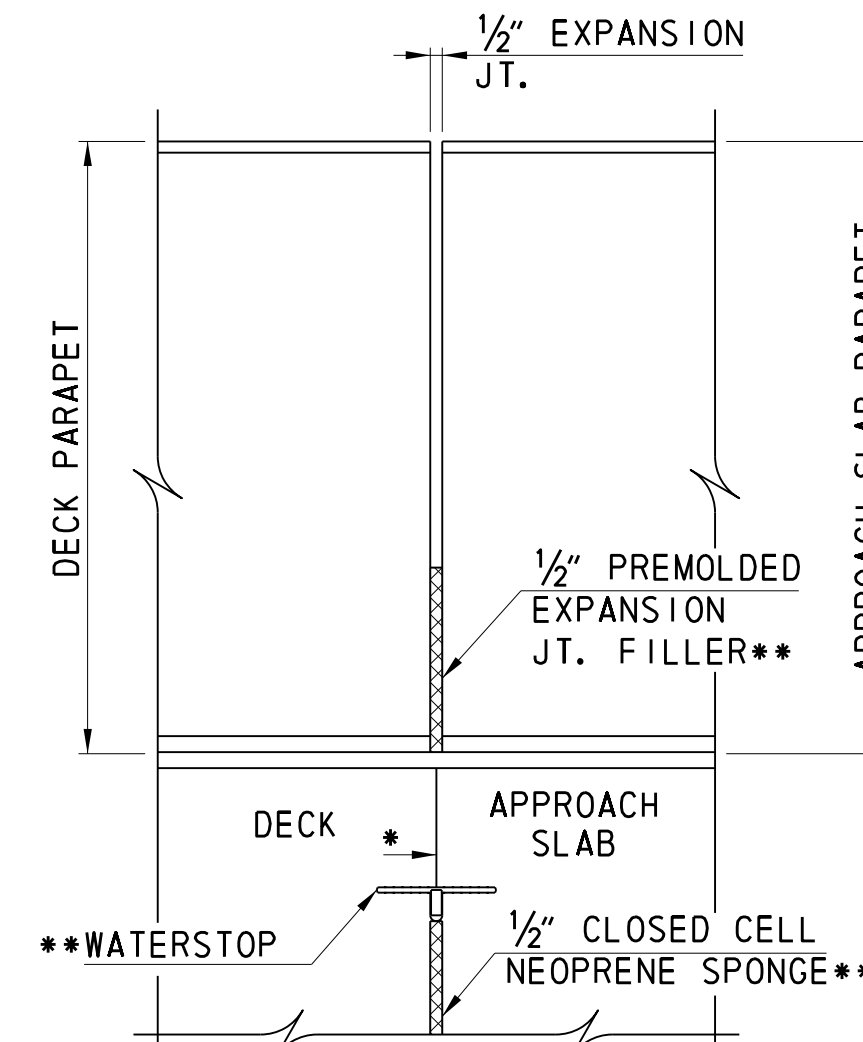
DETAIL 1  
NOT TO SCALE



POLYVINYL CHLORIDE  
WATERSTOP DETAIL  
NOT TO SCALE

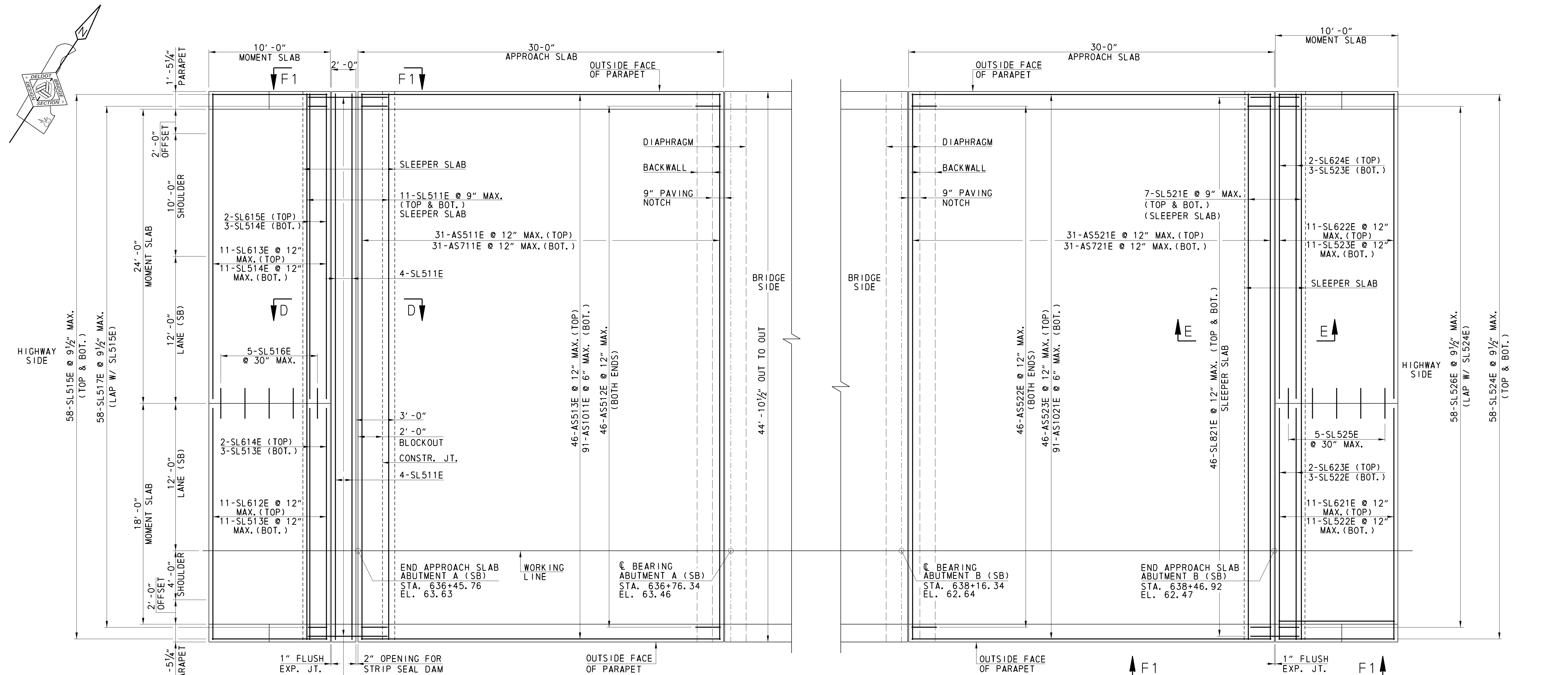
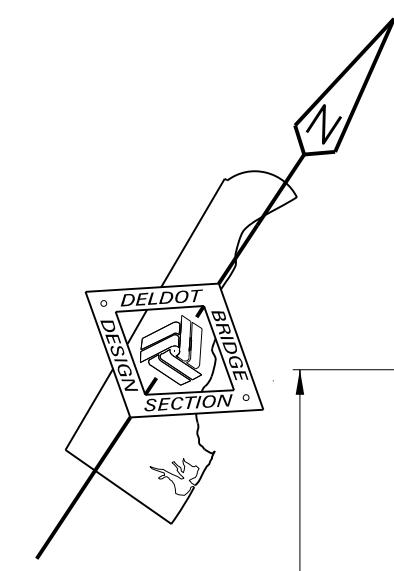


ELEVATION



SECTION X-X

JOINT SEAL AND WATERSTOP TERMINATION DETAIL  
NOT TO SCALE

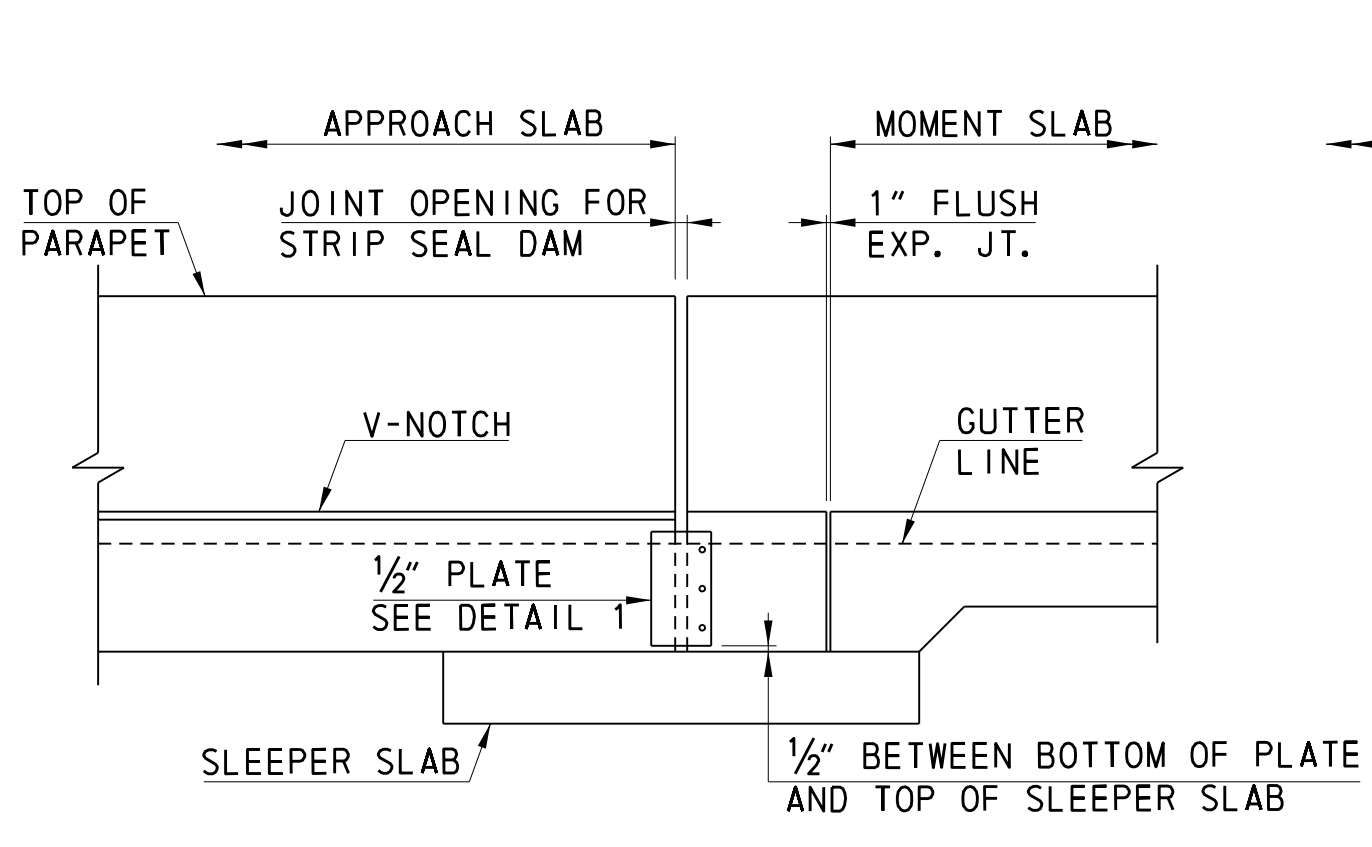


APPROACH SLAB A

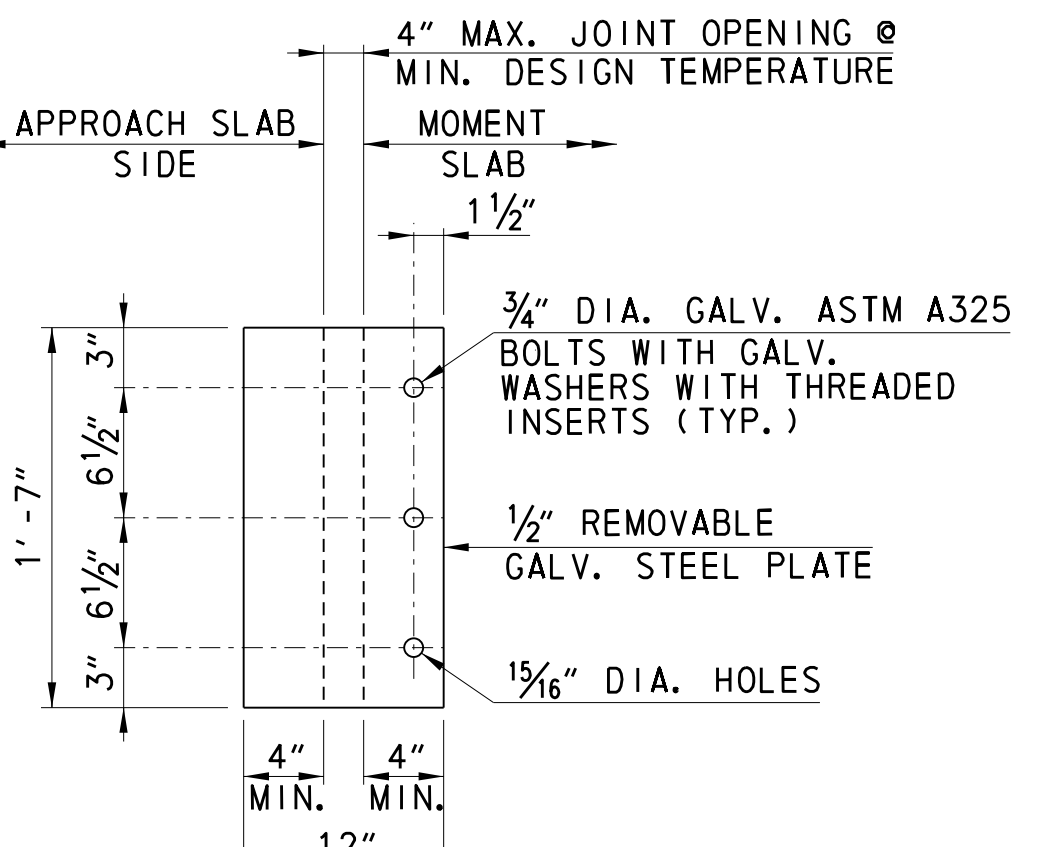
APPROACH SLABS - PLAN (SB)

APPROACH SLAB B

SCALE: 1/4" = 1' - 0"



SECTION F1-F1  
NOT TO SCALE



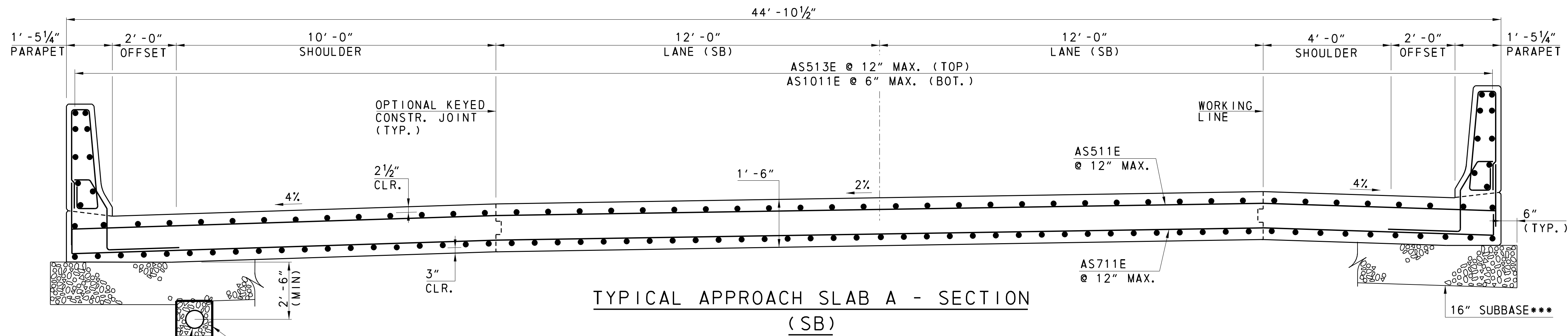
DETAIL 1  
NOT TO SCALE

APPROACH SLAB NOTES

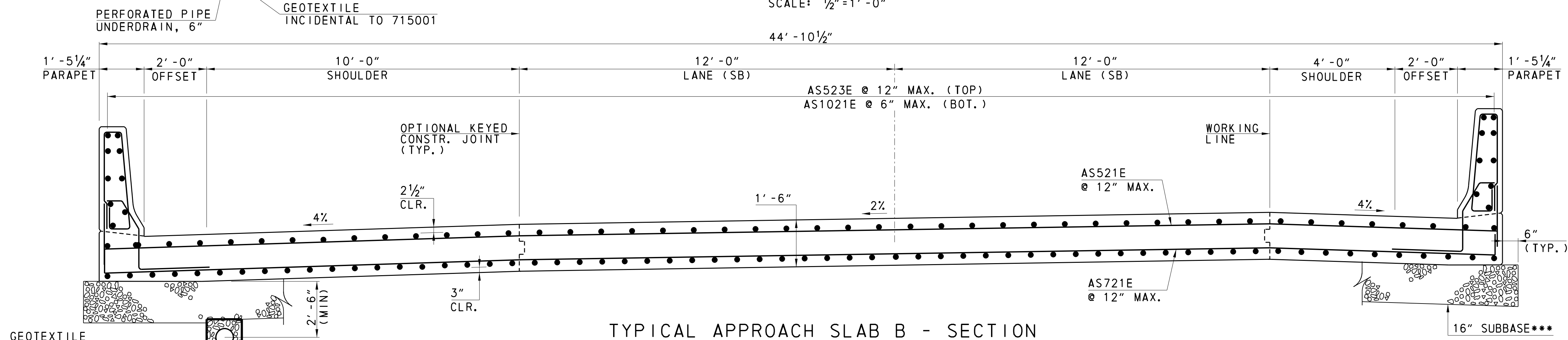
- PROVIDE CLASS D CONCRETE IN APPROACH SLAB, HEADER SLAB, SLEEPER SLAB AND MOMENT SLAB.
- PROVIDE CLASS A CONCRETE IN PARAPETS.
- A HIGHER CLASS OF CONCRETE MAY BE SUBSTITUTED FOR A LOWER CLASS OF CONCRETE AT NO ADDITIONAL COST TO THE DEPARTMENT.
- PLACE APPROACH SLAB CONCRETE WITH A MOTORIZED, MECHANICAL FINISHING MACHINE.
- PLACE CONCRETE IN ONE CONTINUOUS OPERATION, UNLESS OTHERWISE INDICATED OR DIRECTED.
- LONGITUDINAL KEYED CONSTRUCTION JOINTS ARE PERMITTED IN THE APPROACH SLAB BETWEEN THE SHOULDER AND THE LANE LINE.
- CONSTRUCT BRIDGE APPROACH SLAB AFTER THE BRIDGE DECK SLAB IS CONSTRUCTED.
- PROVIDE GRADE 60 DEFORMED REINFORCING BARS THAT MEET THE REQUIREMENTS OF AASHTO M31.
- EPOXY COAT ALL REINFORCEMENT BARS.

NOTES:

1. FOR SECTIONS D-D AND E-E, SEE SHEET 33 OF 40.
2. FOR REINFORCEMENT BAR LIST, SEE SHEET 35 OF 40.
3. FOR APPROACH SLAB JOINT DETAILS AT END OF BRIDGE DECK, SEE SHEET 31 OF 40.
4. FOR TYPICAL APPROACH SLAB SECTIONS, SEE SHEET 33 OF 40.
5. PAYMENT FOR GALVANIZED STEEL PLATE AND HARDWARE SHALL BE INCIDENTAL TO APPROACH SLAB CONSTRUCTION.

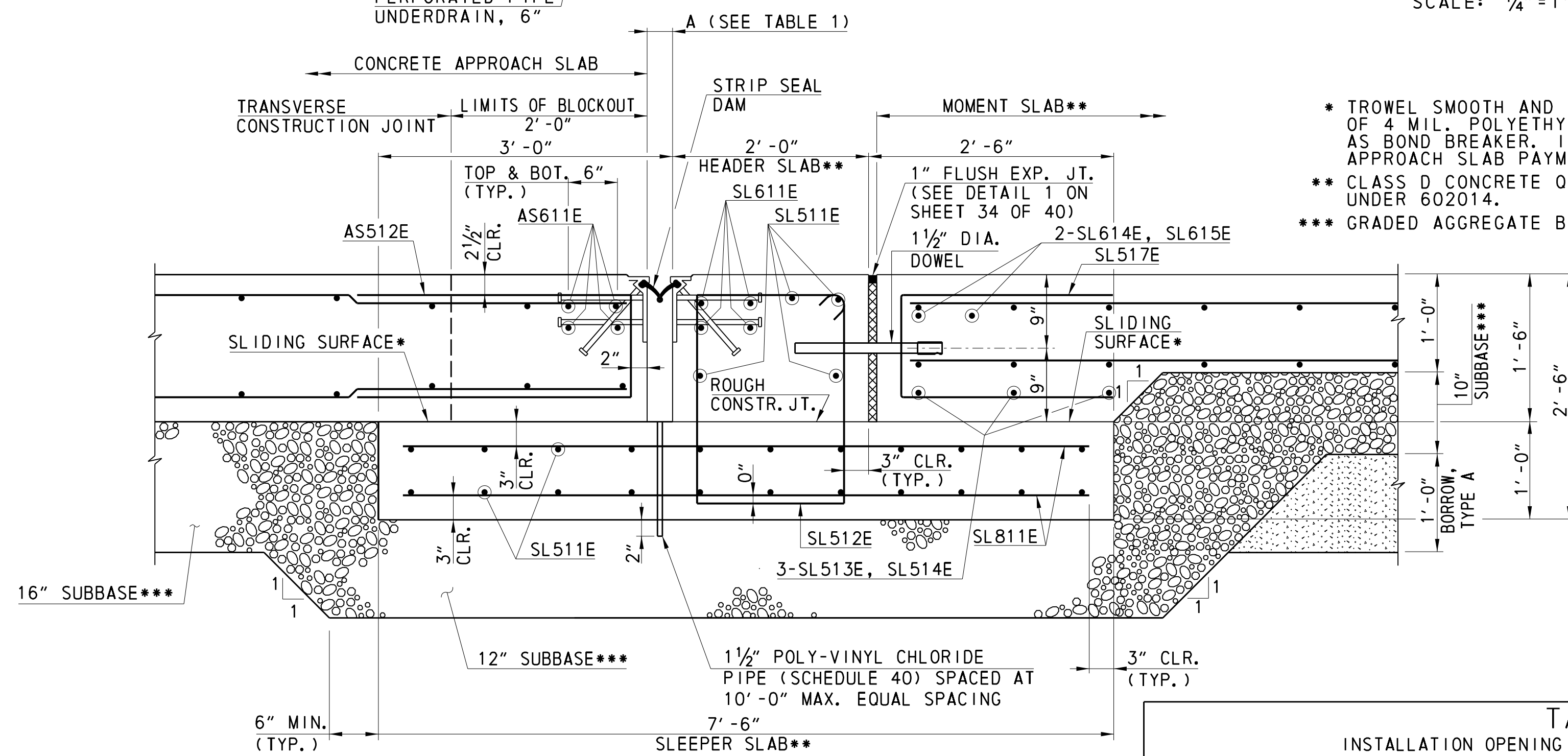


TYPICAL APPROACH SLAB A - SECTION  
(SB)  
SCALE: 1/2" = 1'-0"

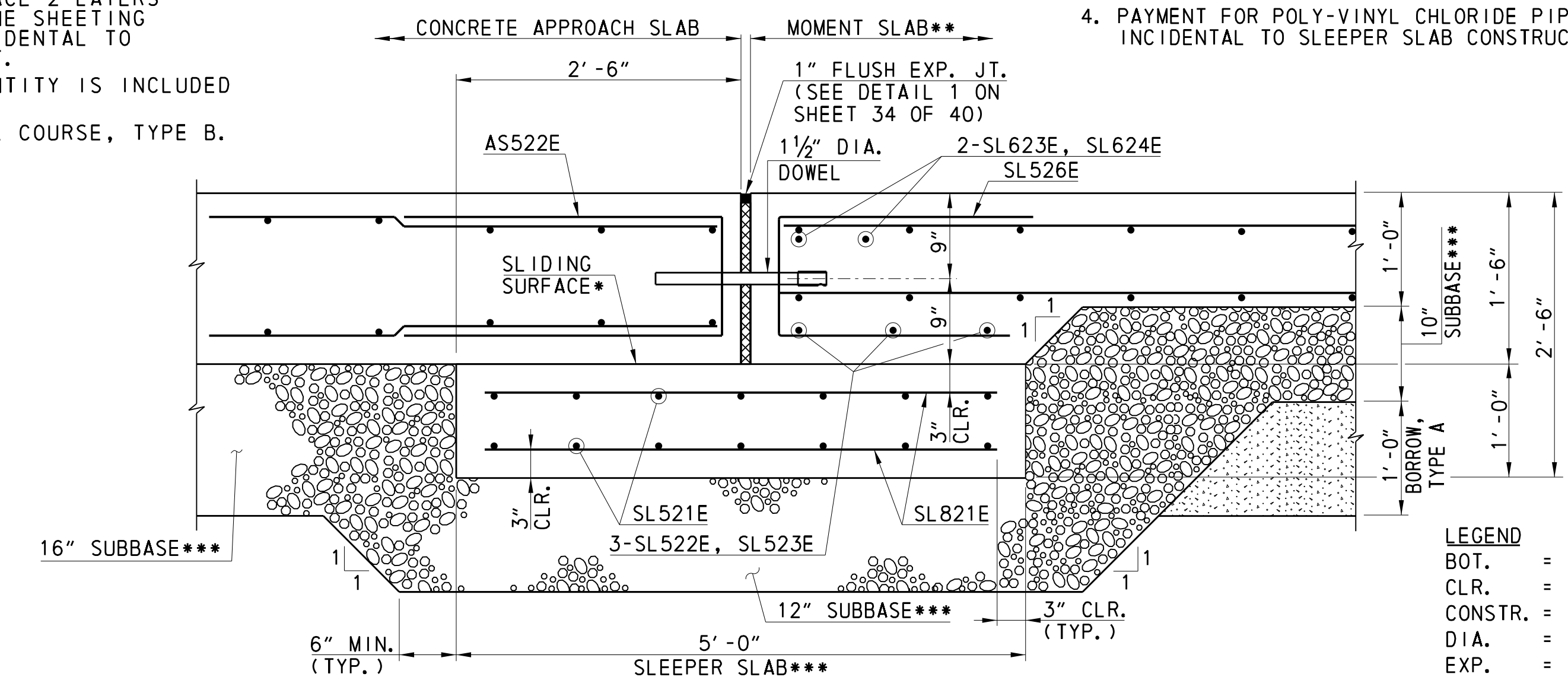


TYPICAL APPROACH SLAB B - SECTION  
(SB)  
SCALE: 1/4" = 1'-0"

- NOTES:
- FOR LOCATION OF SECTIONS D-D AND E-E, SEE SHEET 32 OF 40.
  - FOR REINFORCEMENT BAR LIST, SEE SHEET 35 OF 40.
  - FOR STRIP SEAL DAM DETAILS, SEE SHEET 36 OF 40.
  - PAYMENT FOR POLY-VINYL CHLORIDE PIPE SHALL BE INCIDENTAL TO SLEEPER SLAB CONSTRUCTION.



SECTION D-D  
SCALE: 3/4" = 1'-0"



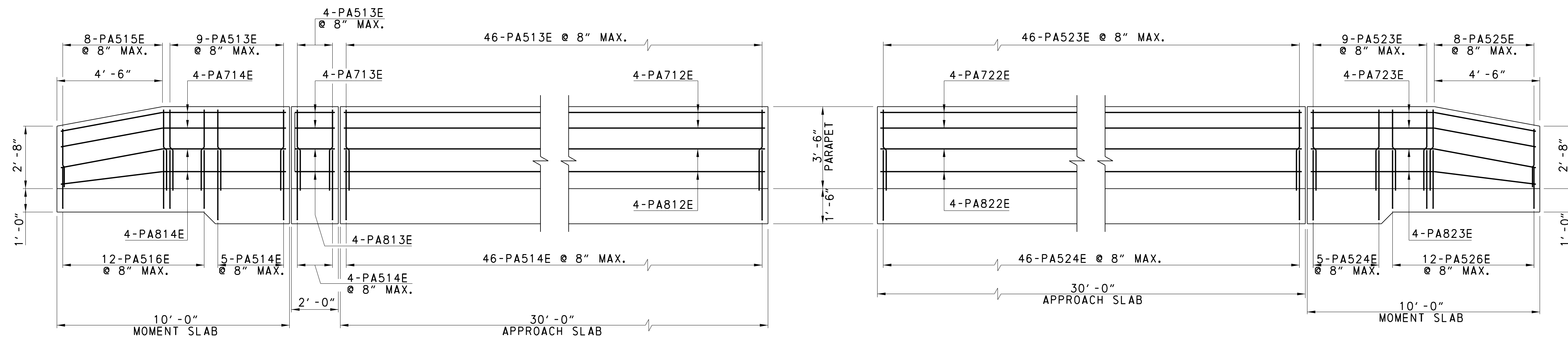
SECTION E-E  
SCALE: 3/4" = 1'-0"

\* TROWEL SMOOTH AND PLACE 2 LAYERS OF 4 MIL. POLYETHYLENE SHEETING AS BOND BREAKER, INCIDENTAL TO APPROACH SLAB PAYMENT.  
\*\* CLASS D CONCRETE QUANTITY IS INCLUDED UNDER 602014.  
\*\*\* GRADED AGGREGATE BASE COURSE, TYPE B.

TABLE - 1  
INSTALLATION OPENING "A" @ VARIOUS TEMPERATURES (°F)

10	20	30	32	40	50	60	68	70	80	90	100
0' - 2 1/16"	0' - 2 3/16"	0' - 2 1/4"	0' - 2 1/8"	0' - 2 1/4"	0' - 2 1/8"	0' - 2 1/8"	0' - 2"	0' - 2"	0' - 1 7/8"	0' - 1 3/4"	0' - 1 1/2"

- LEGEND
- BOT. = BOTTOM
  - CLR. = CLEAR
  - CONSTR. = CONSTRUCTION
  - DIA. = DIAMETER
  - EXP. = EXPANSION
  - JT. = JOINT
  - MAX. = MAXIMUM
  - MIN. = MINIMUM
  - SB = SOUTHBOUND
  - TYP. = TYPICAL

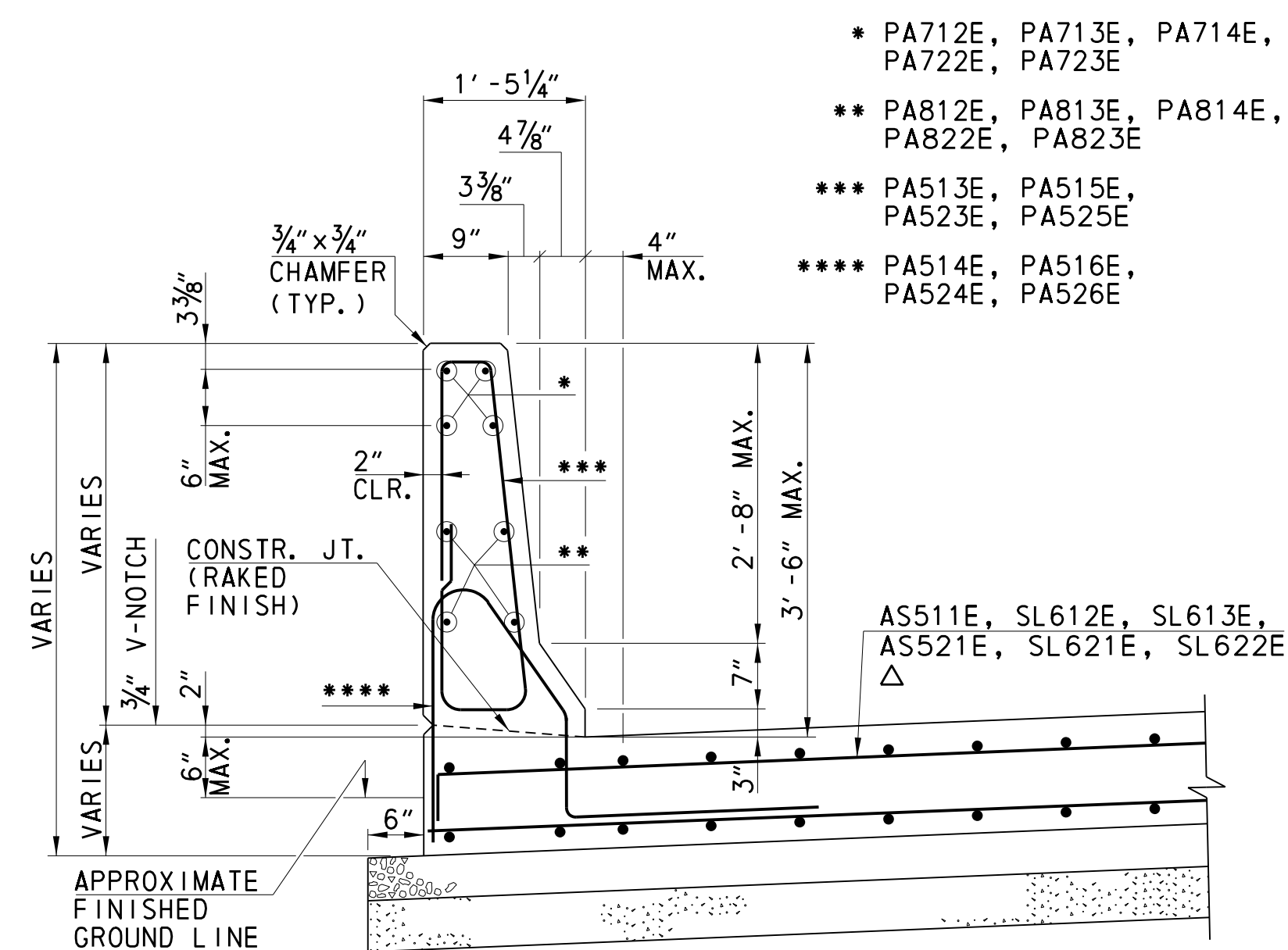


ABUTMENT A (SB)

ABUTMENT B (SB)

PARAPET ELEVATION

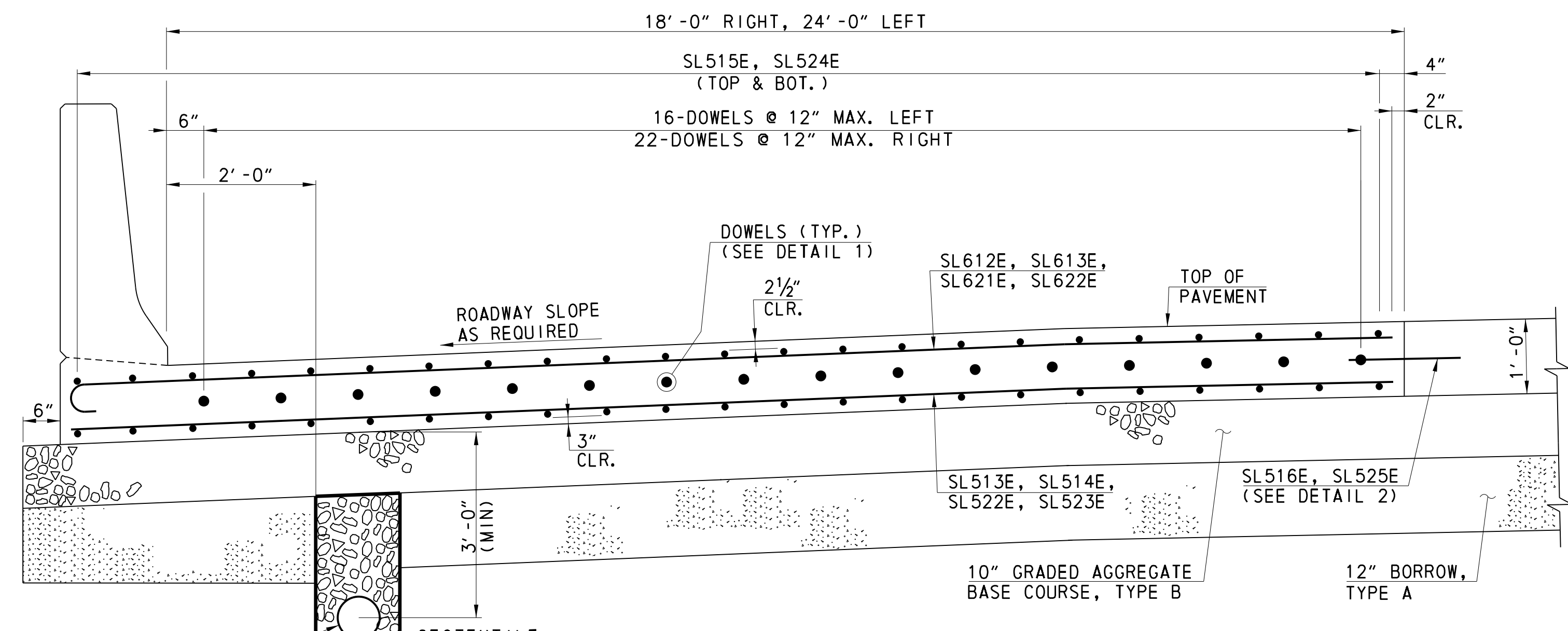
SCALE: 3/8" = 1'-0"



NOTE: UNDERDRAIN NOT SHOWN  
 △ USE 90° BEND AT APPROACH SLABS.  
 USE 180° BEND AT MOMENT SLABS.

PARAPET DETAIL

SCALE: 1/4" = 1'-0"

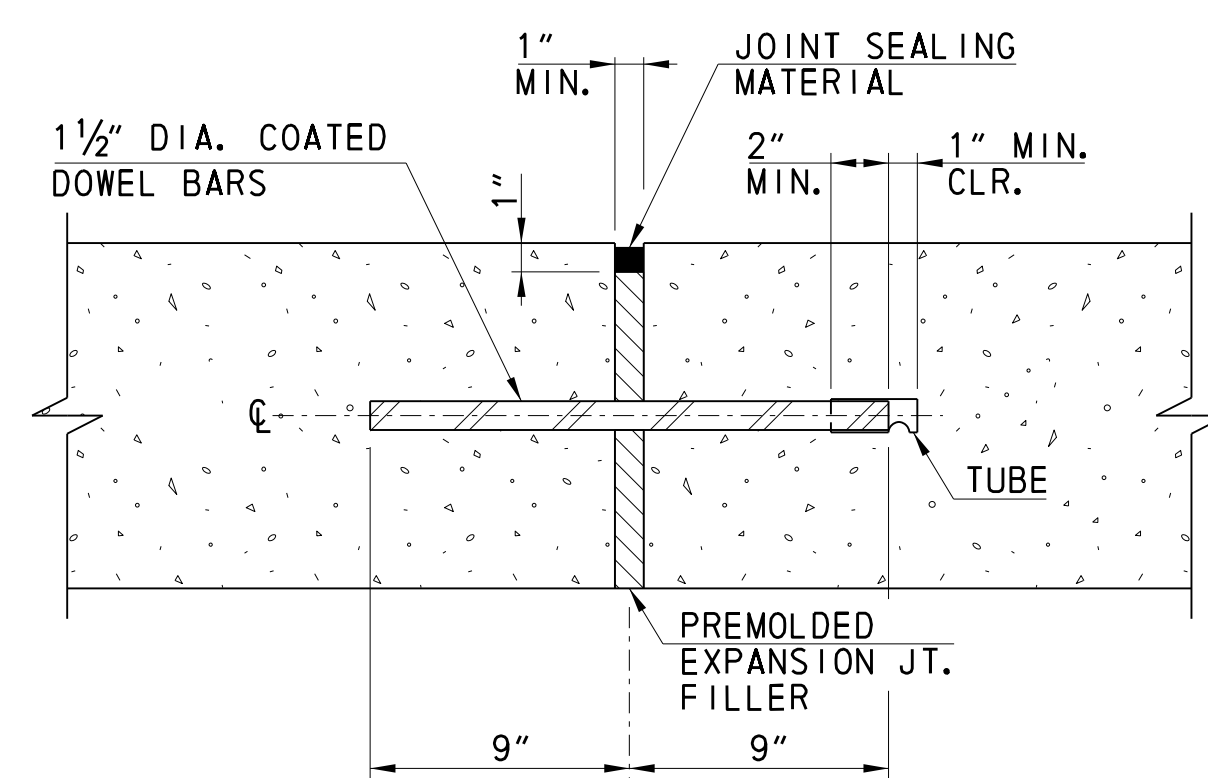


MOMENT SLAB (AT GRADE)  
 WITH TYPICAL C.I.P. BARRIER

SCALE: 3/4" = 1'-0"

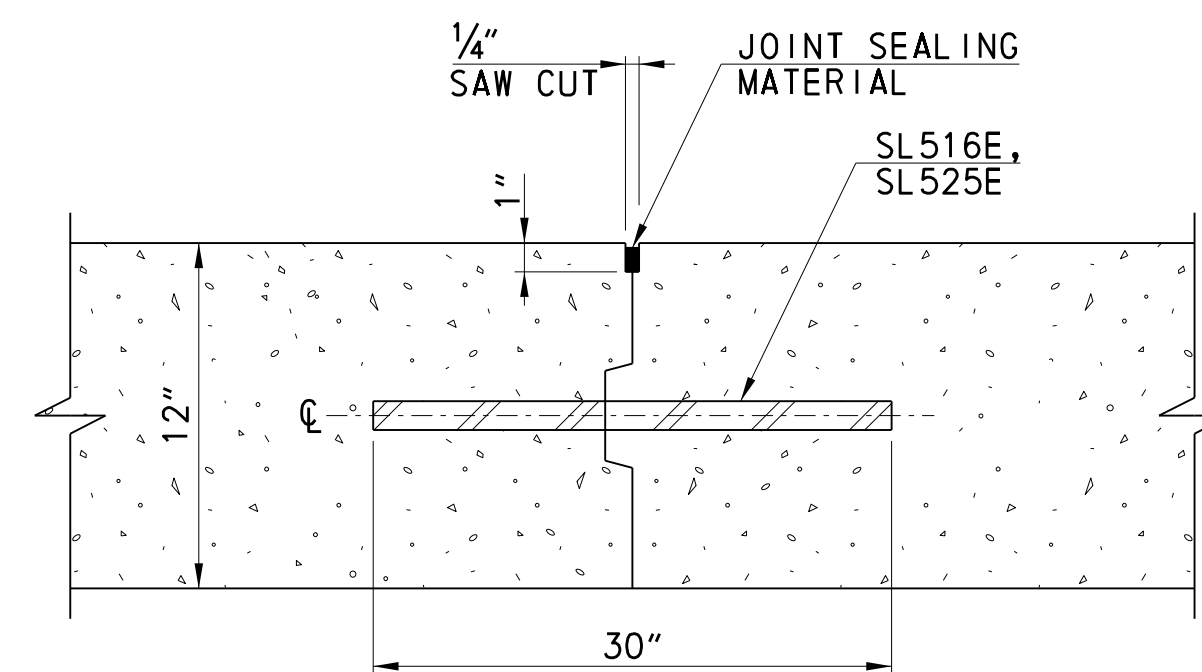
NOTES:

1. PROVIDE DOWELS AT EXPANSION JOINTS.
2. PLACE A TUBE FROM AN APPROVED MANUFACTURER OVER THE LUBRICATED END OF ALL DOWEL BARS AND PROVIDE A MINIMUM 1" CLEARANCE POCKET ASSURED BY MEANS OF A POSITIVE SPACING DEVICE.
3. CUT EXPANSION JOINT FILLER MATERIAL TO CONFORM TO CROSS SECTION OF THE PAVEMENT AND FURNISH IN STRIPS EQUAL TO THE WIDTH OF THE PAVEMENT SLAB. MAKE THE TOP SURFACE SMOOTH AND HAVE HOLES PUNCHED FOR THE DOWEL BARS. PROVIDE A SNUG FIT WITHOUT LOSS IN THICKNESS OF THE MATERIAL. PAYMENT SHALL BE INCIDENTAL TO APPROACH SLAB CONSTRUCTION.
4. CONSTRUCT ALL TRANSVERSE JOINTS PERPENDICULAR TO THE CENTERLINE.
5. USE 1 1/2" DIA. x 18" LONG DOWEL BARS. APPROVED ALTERNATE DOWEL BARS HAVING EQUIVALENT PROPERTIES TO CONVENTIONAL ROUND DOWEL BARS MAY BE USED. COATED DOWEL BARS SHALL CONFORM TO DELDOT STANDARD SPECIFICATION 824.02 (g). PAYMENT SHALL BE INCIDENTAL TO APPROACH SLAB CONSTRUCTION.
6. PLACE DOWEL BARS PARALLEL TO THE CENTERLINE AND SURFACE OF THE SLAB.
7. MAKE THE TOP OF THE JOINT SEALING MATERIAL FROM 1/8" TO 1/4" BELOW THE SURFACE OF THE PAVEMENT. USE HEAT RESISTANT JOINT BACKING MATERIAL FOR HOT Poured JOINTS. PAYMENT SHALL BE INCIDENTAL TO APPROACH SLAB AND MOMENT SLAB CONSTRUCTION.
8. FOR REINFORCEMENT BAR LIST, SEE SHEET 35 OF 40.
9. SLIP FORMING FOR PARAPETS IS NOT PERMITTED.



DETAIL 1

NOT TO SCALE

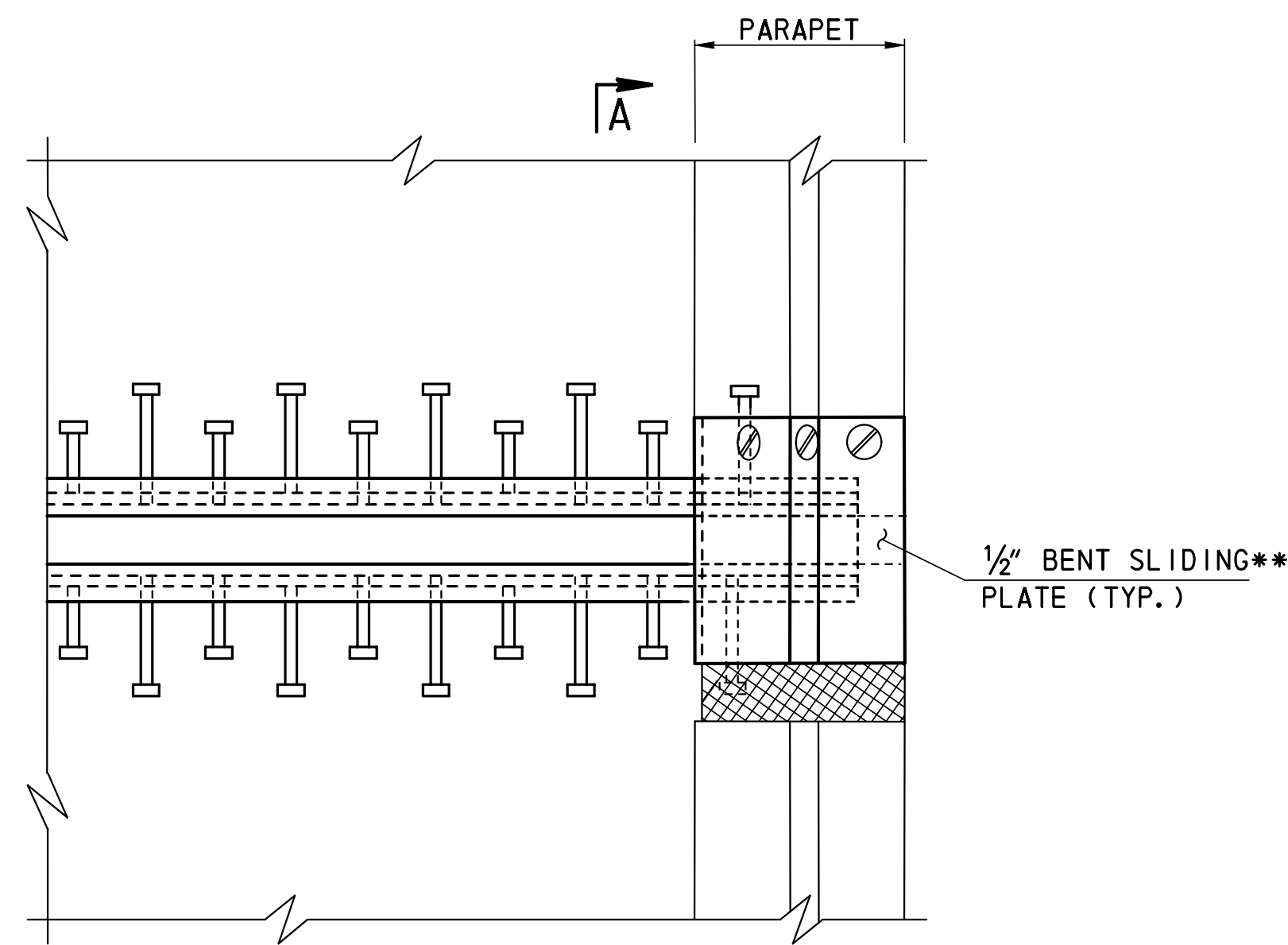


DETAIL 2

NOT TO SCALE

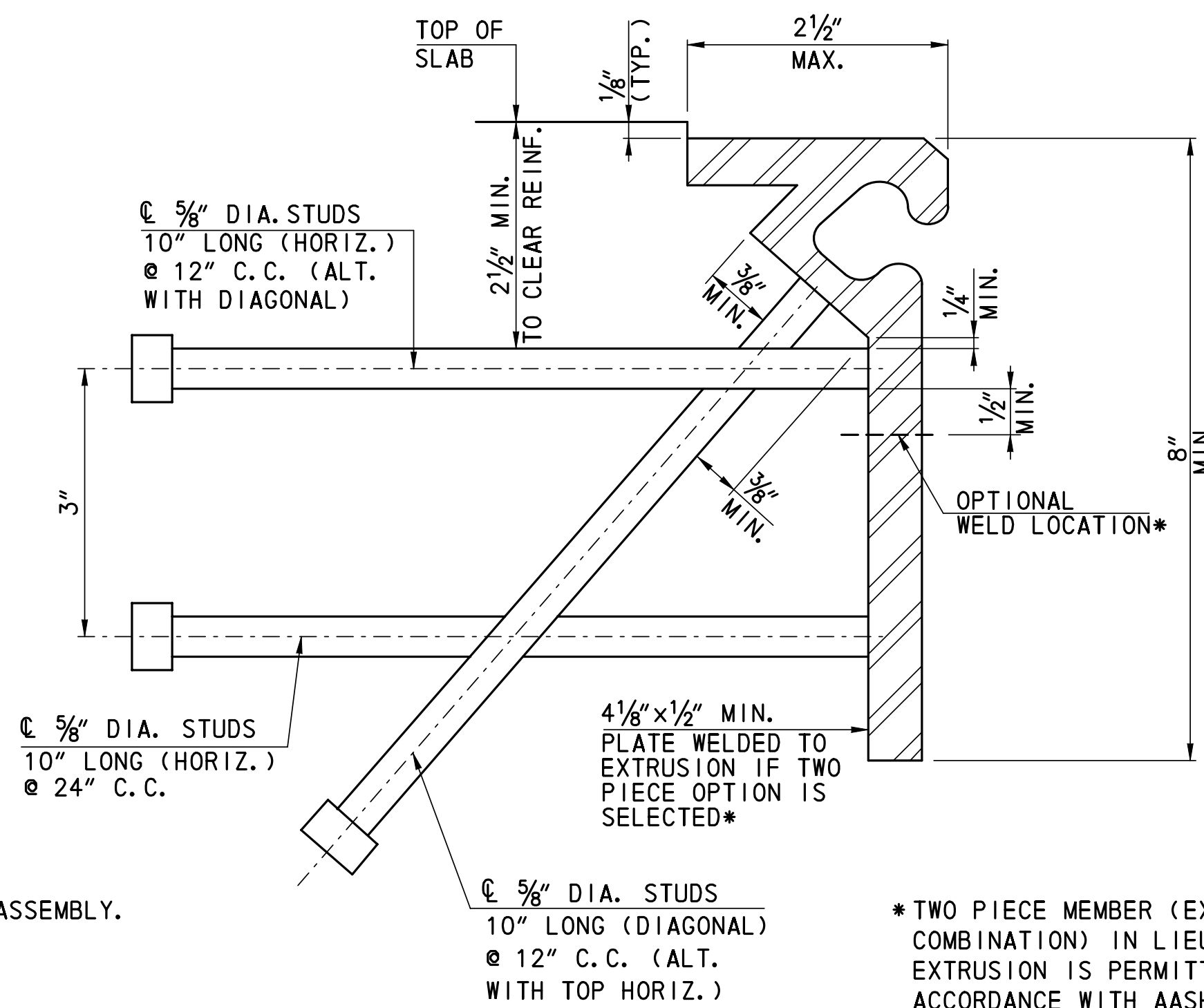
LEGEND  
 BOT. = BOTTOM  
 C. I. P. = CAST-IN-PLACE  
 CLR. = CLEAR  
 DIA. = DIAMETER  
 JT. = JOINT  
 MAX. = MAXIMUM  
 MIN. = MINIMUM  
 TYP. = TYPICAL





**PLAN AT PARAPET**  
SCALE: 1 1/2" = 1' - 0"

\*\* INCIDENTAL TO STRIP SEAL ASSEMBLY.



NOTE:  
• EXTRUSION THICKNESS IS 1/2".

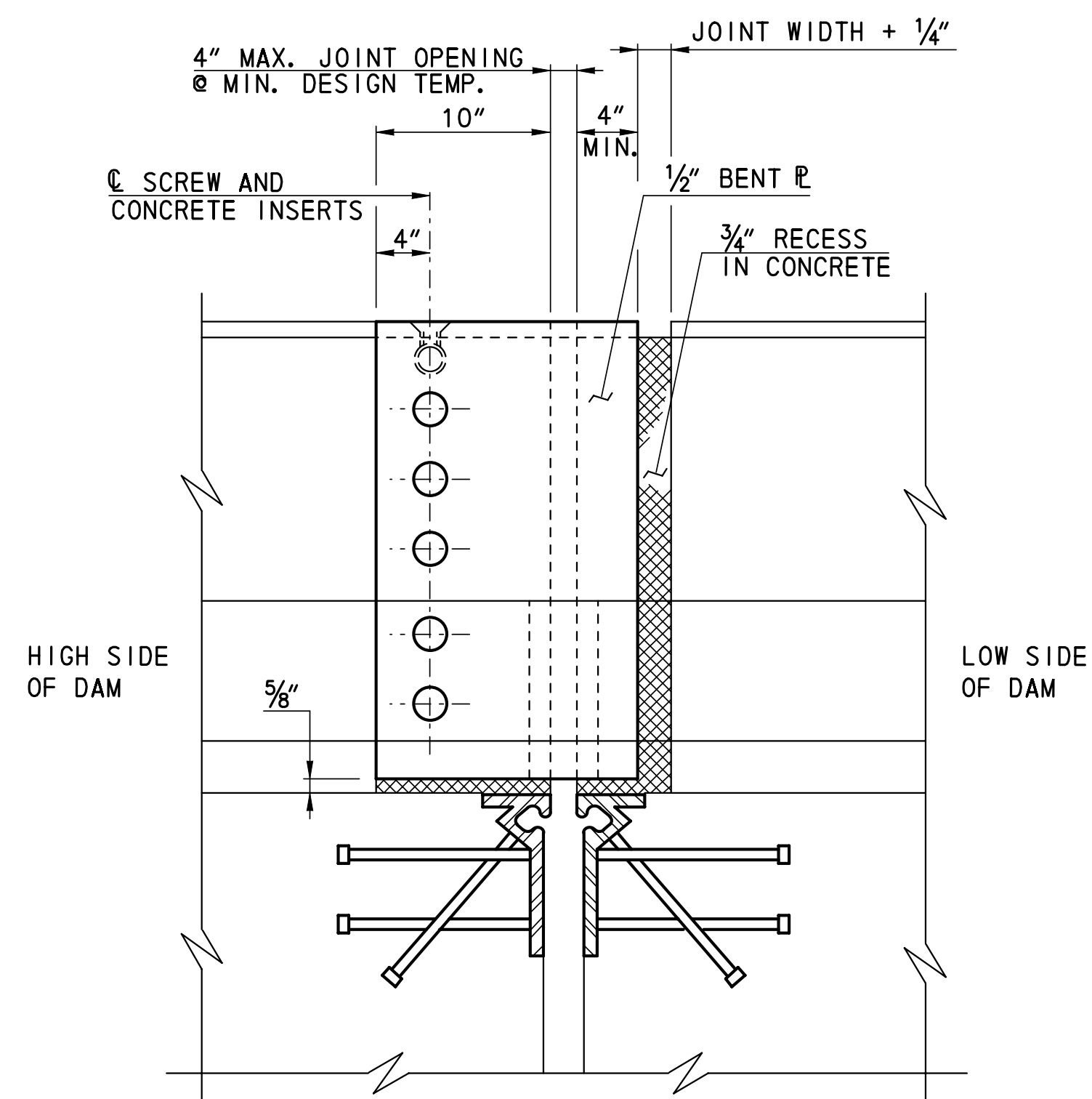
**EXTRUSION SCHEMATIC**  
NOT TO SCALE

**STRIP SEAL INSTALLATION NOTES**

- THE FRAME RAILS SHALL BE CLEANED THOROUGHLY AND SEAL CHANNELS SHALL BE INSPECTED TO ASCERTAIN THE ABSENCE OF CONCRETE AND DEBRIS. THE SEAL CHANNEL SHALL ALSO BE INSPECTED AT ALL FIELD SPLICES, AND ALL WELD SPLATTER AND/OR SHARP EDGES SHALL BE REMOVED.
- LIBERALLY COAT THE STRIP SEAL LUGS WITH LUBRICANT ADHESIVE. COAT ONLY 3'-0" TO 4'-0" PRECEDING THE INSTALLATION.
- COLLAPSE THE STRIP SEAL INTO THE THE JOINT OPENING UNTIL THE LUG IS ALIGNED WITH THE FRAME RAIL CHANNEL. (SEE FIGURE 1)
- PUSH THE LUG INTO THE CHANNEL AND THEN USE A BENT BAR TO FORCE THE LUG INTO THE CHANNEL (MAKE SURE THAT THE BAR IS DULL TO PREVENT PUNCTURING OF THE SEAL) (SEE FIGURE 2)
- AFTER THE SEAL LOCKS INTO PLACE, PUSH THE TOP OF THE LUG AGAINST THE FRAME RAIL TO INSURE PROPER SEATING. (SEE FIGURE 3)
- AS THE WORK PROGRESSES DOWN THE LENGTH OF THE JOINT, WORK BOTH SIDES OF THE STRIP SEAL INTO THE RAIL CHANNEL.

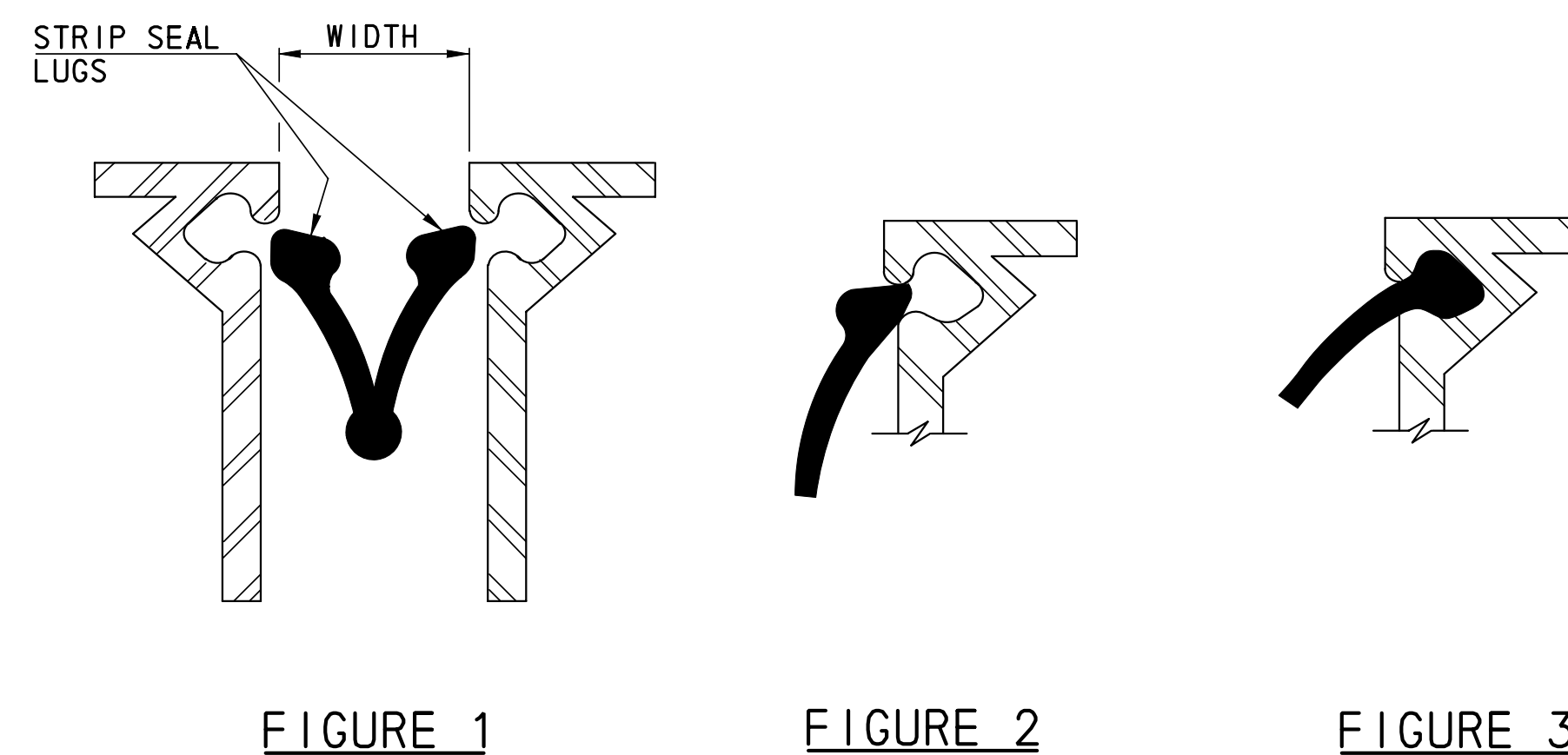
**NOTES:**

1. INSTALL CONTINUOUS NEOPRENE STRIP SEAL IN THE FIELD. SPLICING OF SEAL IS NOT PERMITTED. TEMPORARY SEAL MAY BE REQUIRED DEPENDING ON STAGES OF CONSTRUCTION.
2. CONSTRUCT EXPANSION DAM TO MATCH ROADWAY GRADE AND CROSS SLOPE.
3. FABRICATOR TO PROVIDE A CHART SHOWING JOINT OPENING FOR TEMPERATURES BETWEEN 10°F TO 100°F IN 10° INTERVALS ON SHOP DRAWINGS. SET WIDTH @ 68°F.
4. BOND NEOPRENE STRIP SEAL TO EXTRUSION WITH APPROVED ADHESIVE.
5. GRIND ALL STEEL EDGES EXPOSED TO TRAFFIC OR PEDESTRIANS TO 3/16" MIN. RADIUS.
6. FOR ADDITIONAL DETAILS AND LOCATION OF EXPANSION JOINT, SEE SHEETS 25, 26, 32 AND 33 OF 40.
7. FOR JOINT OPENING TABLE, SEE SHEETS 26 AND 33 OF 40.



NOTE:  
FORM CONCRETE RECESS AREA IN BARRIER AND GRIND TO PROVIDE SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT OR PERFORMANCE GRADED ASPHALT CEMENT PG 64-22 TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.

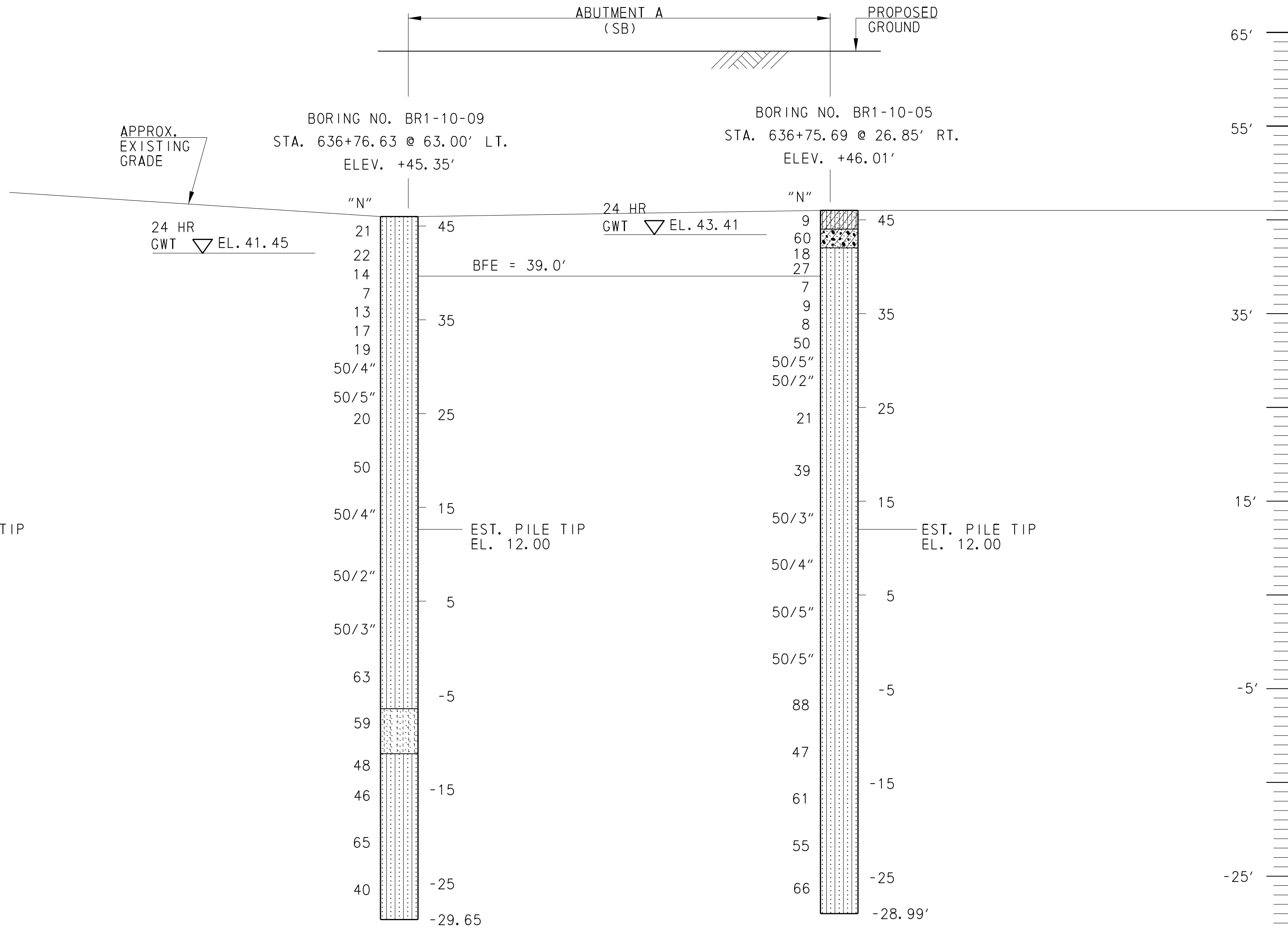
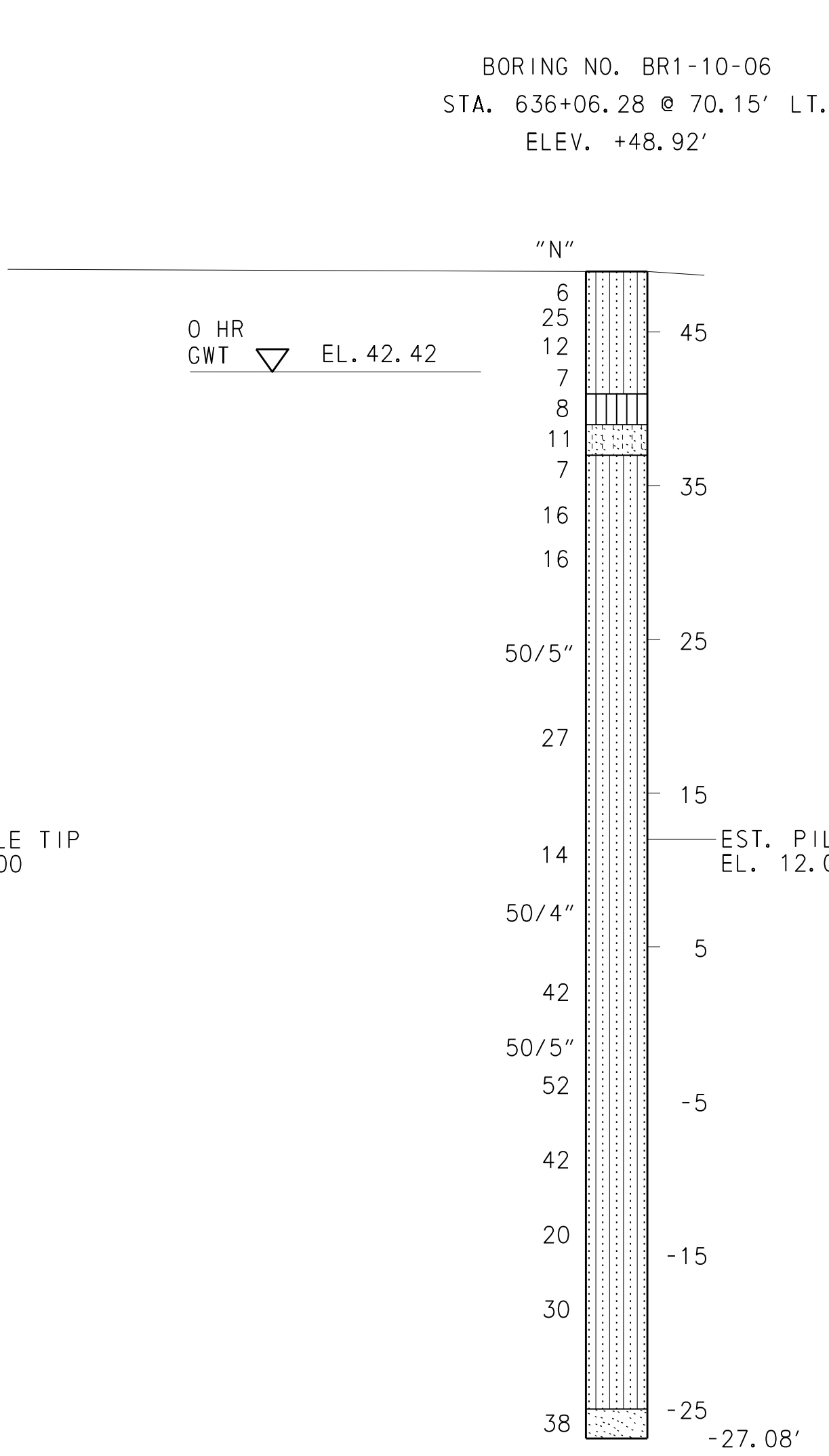
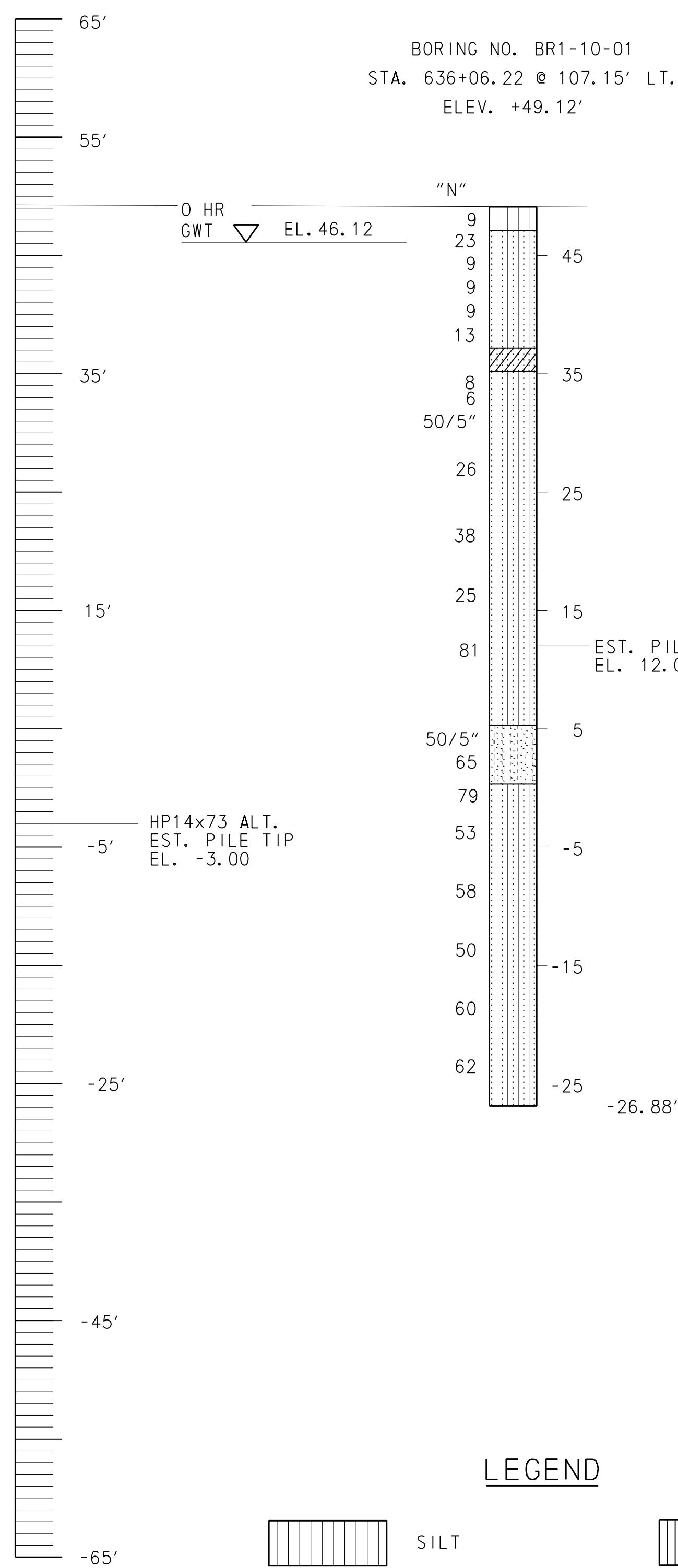
**SECTION A-A**  
SCALE: 1 1/2" = 1' - 0"



**STRIP SEAL INSTALLATION PROCEDURE**  
NOT TO SCALE

**LEGEND**

- ALT. = ALTERNATE
- C. C. = CENTER TO CENTER
- DIA. = DIAMETER
- HORIZ. = HORIZONTAL
- MAX. = MAXIMUM
- MIN. = MINIMUM
- N. D. T. = NONDESTRUCTIVE TESTING
- RE INF. = REINFORCEMENT
- TYP. = TYPICAL



**LEGEND**

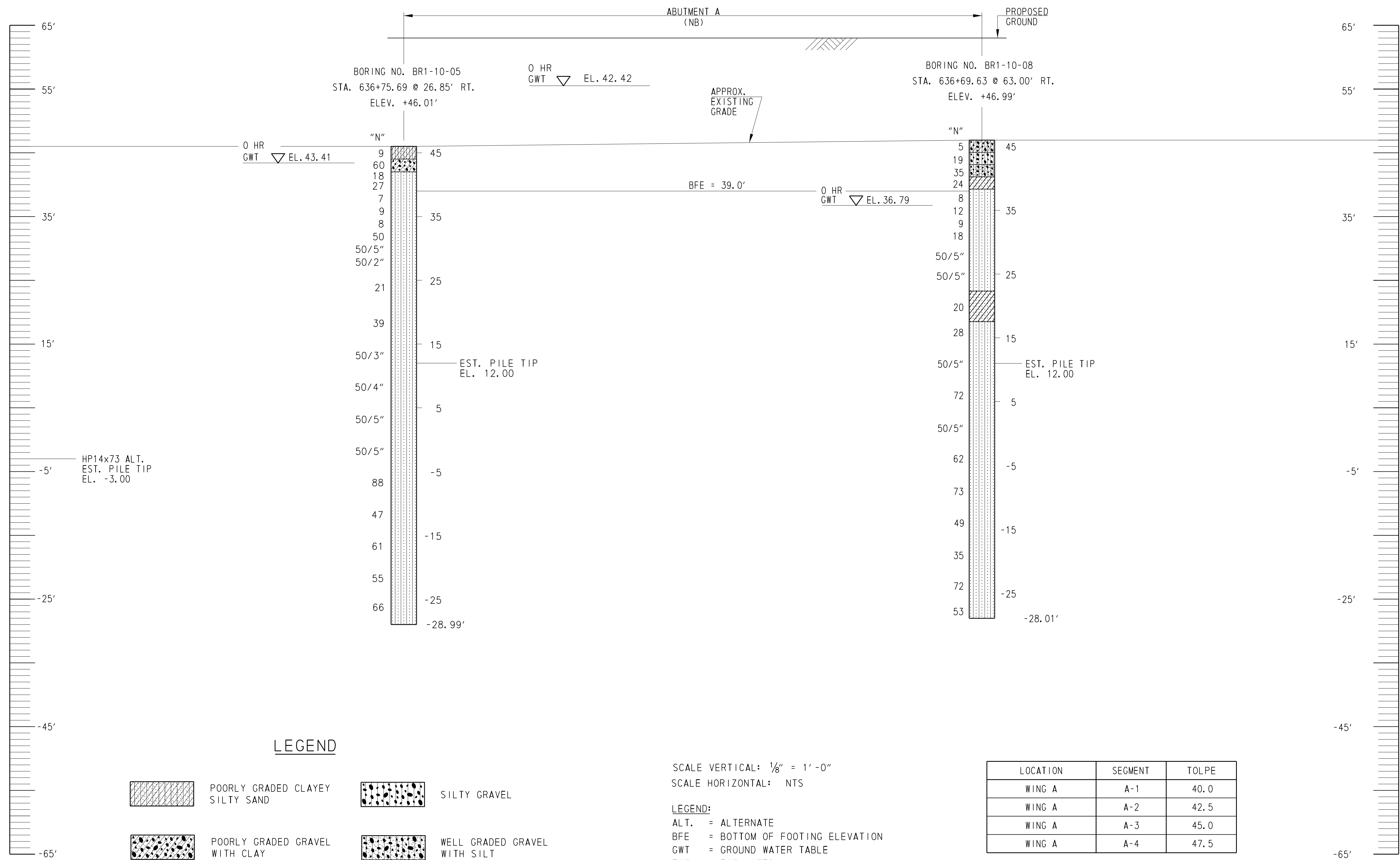
	SILT		ELASTIC SILT
	SILTY SAND		POORLY GRADED SAND
	CLAYEY SAND		POORLY GRADED CLAYEY SILTY SAND
	POORLY GRADED SAND WITH SILT		POORLY GRADED GRAVEL WITH CLAY

SCALE VERTICAL: 1/8" = 1' - 0"  
SCALE HORIZONTAL: NTS

**LEGEND:**  
ALT. = ALTERNATE  
BFE = BOTTOM OF FOOTING ELEVATION  
GWT = GROUND WATER TABLE  
EST. = ESTIMATED  
TOLPE = TOP OF LEVELING PAD ELEVATION  
SB = SOUTHBOUND  
STA. = STATION  
▽ = TOP OF GROUND WATER

LOCATION	SEGMENT	TOLPE
WING B	B1	40.0
WING B	B2	42.5
WING B	B3	45.0
MEDIAN A WALL	MA	40.0





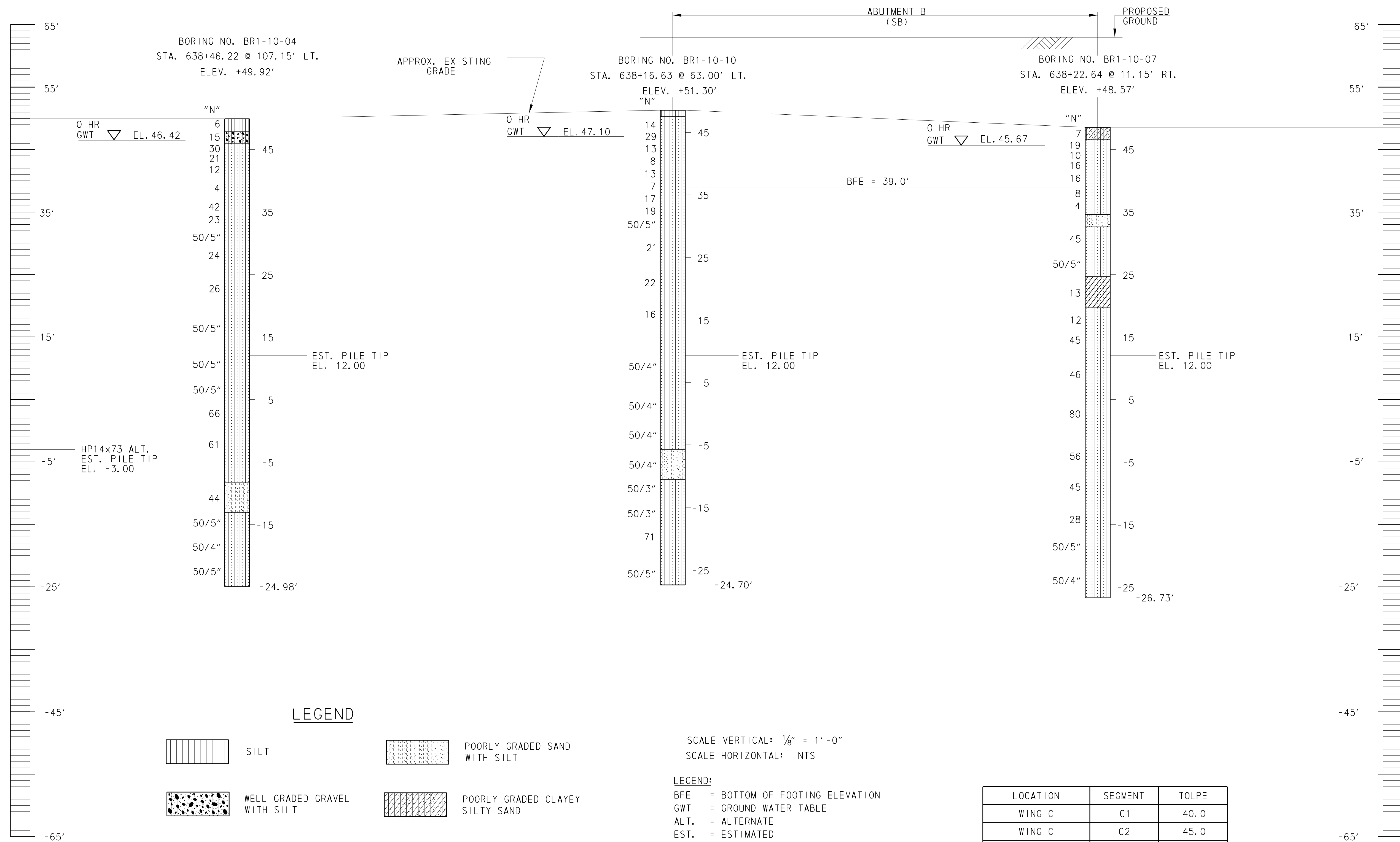
ADDENDUMS / REVISIONS

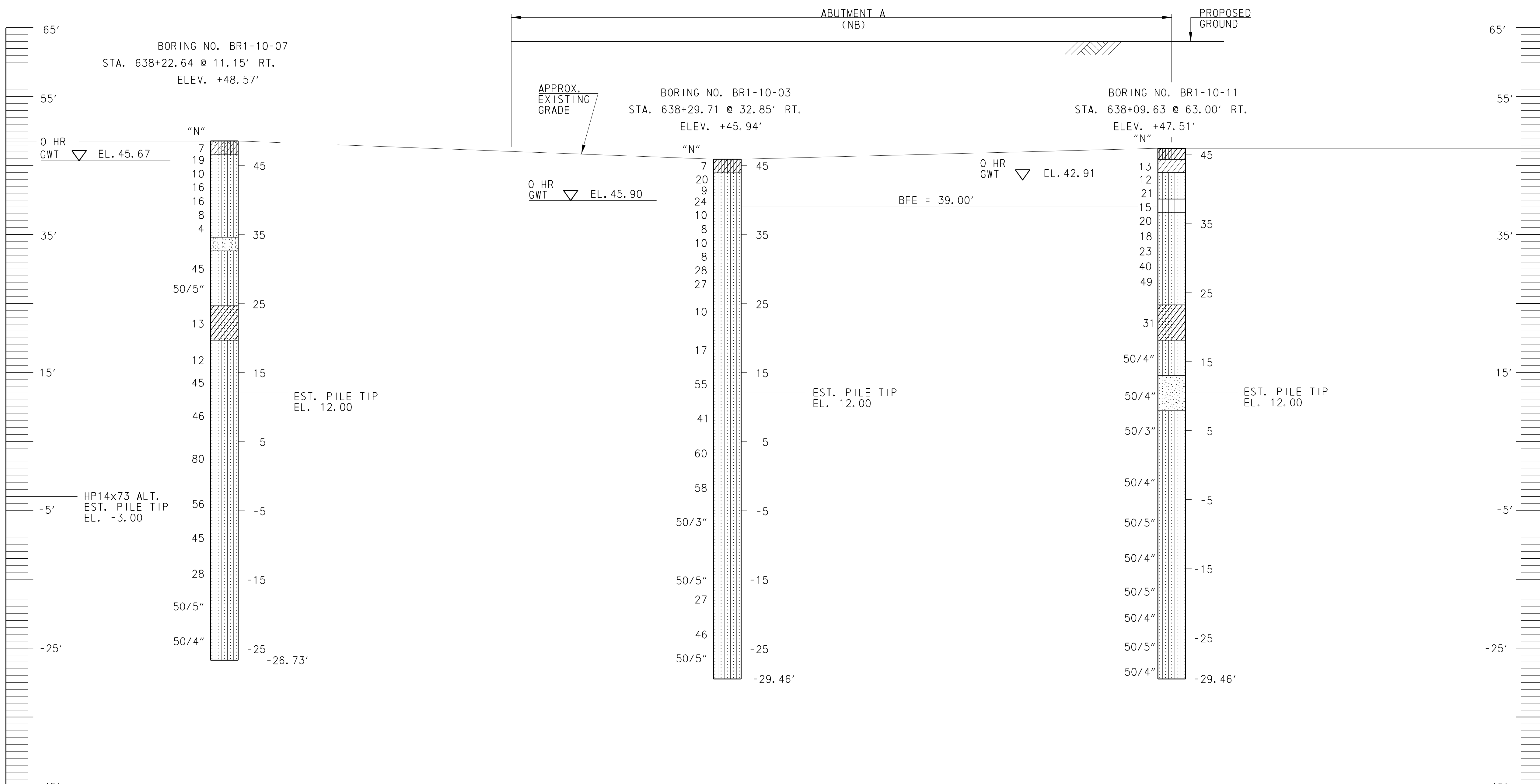
SCALE: AS NOTED

**US 301,  
 NORFOLK SOUTHERN RR TO SR 896**

CONTRACT	BRIDGE NO.	<b>1-467 N&amp;S</b>
T200911301	DESIGNED BY:	SJM
COUNTY	CHECKED BY:	ZAA
NEW CASTLE		

<b>SOIL BORINGS - 2</b>	SHEET NO.	122
	TOTAL SHTS.	240





**LEGEND**

- |  |                                 |  |                           |
|--|---------------------------------|--|---------------------------|
|  | POORLY GRADED CLAYEY SILTY SAND |  | SILTY LOW PLASTICITY CLAY |
|  | SILTY SAND                      |  | LOW PLASTICITY CLAY       |
|  | POORLY GRADED SAND WITH SILT    |  | SILT                      |
|  | CLAYEY SAND                     |  | POORLY GRADED SAND        |

SCALE VERTICAL: 1/8" = 1'-0"  
SCALE HORIZONTAL: NTS

- LEGEND:**  
 BFE = BOTTOM OF FOOTING ELEVATION  
 GW = GROUND WATER TABLE  
 ALT. = ALTERNATE  
 EST. = ESTIMATED  
 TOLPE = TOP OF LEVELING PAD ELEVATION  
 SB = SOUTHBOUND  
 STA. = STATION  
 ▽ = TOP OF GROUND WATER

LOCATION	SEGMENT	TOLPE
WING D	D1	40.0
WING D	D2	42.5
WING D	D3	45.0

# BRIDGE LEGAL LOAD RATINGS (TONS) US 301 OVER NORFOLK SOUTHERN RAILROAD

RATING VEHICLE	RATING TYPE	CONTROLLING UNIT/SPAN/MEMBER	CONTROLLING POINT	LOAD EFFECT	LIMIT STATE	LOAD RATING FACTOR	LOAD RATING (TONS)																																																
HL-93 TRUCK	INVENTORY	1S & 5N	105.000	LONG. REINF. MAX. EFFECTS MAX. MOMENT W/ CONCURRENT SHEAR	STRENGTH I	1.14	N/A																																																
HL-93 TANDEM	INVENTORY	1S & 5N	105.000	LONG. REINF. MAX. EFFECTS MAX. MOMENT W/ CONCURRENT SHEAR	STRENGTH I	1.33	N/A																																																
HL-93 TRUCK	OPERATING	1S & 5N	105.000	LONG. REINF. MAX. EFFECTS MAX. MOMENT W/ CONCURRENT SHEAR	STRENGTH I-0	1.47	N/A																																																
HL-93 TANDEM	OPERATING	1S & 5N	105.000	LONG. REINF. MAX. EFFECTS MAX. MOMENT W/ CONCURRENT SHEAR	STRENGTH I-0	1.70	N/A </tr <tr> <td>S220</td> <td>LEGAL</td> <td>1S &amp; 5N</td> <td>106.000</td> <td>LONG. REINFORCEMENT MIN. EFFECTS MAX. SHEAR W/ CONCURRENT MOMENT</td> <td>STRENGTH I</td> <td>2.36</td> <td>47.26</td> </tr> <tr> <td>S335</td> <td>LEGAL</td> <td>1S &amp; 5N</td> <td>105.000</td> <td>CONC. STRESS MAX. EFFECTS DL+PS+LL BOT. OF BEAM</td> <td>SERVICE III</td> <td>1.34</td> <td>46.83</td> </tr> <tr> <td>S437</td> <td>LEGAL</td> <td>1S &amp; 5N</td> <td>105.000</td> <td>CONC. STRESS MAX. EFFECTS DL+PS+LL BOT. OF BEAM</td> <td>SERVICE III</td> <td>1.27</td> <td>46.66</td> </tr> <tr> <td>T330</td> <td>LEGAL</td> <td>1S &amp; 5N</td> <td>105.000</td> <td>CONC. STRESS MAX. EFFECTS DL+PS+LL BOT. OF BEAM</td> <td>SERVICE III</td> <td>1.80</td> <td>53.86</td> </tr> <tr> <td>T435</td> <td>LEGAL</td> <td>1S &amp; 5N</td> <td>105.000</td> <td>CONC. STRESS MAX. EFFECTS DL+PS+LL BOT. OF BEAM</td> <td>SERVICE III</td> <td>1.57</td> <td>54.78</td> </tr> <tr> <td>T540</td> <td>LEGAL</td> <td>1S &amp; 5N</td> <td>105.000</td> <td>CONC. STRESS MAX. EFFECTS DL+PS+LL BOT. OF BEAM</td> <td>SERVICE III</td> <td>1.38</td> <td>55.26</td> </tr>	S220	LEGAL	1S & 5N	106.000	LONG. REINFORCEMENT MIN. EFFECTS MAX. SHEAR W/ CONCURRENT MOMENT	STRENGTH I	2.36	47.26	S335	LEGAL	1S & 5N	105.000	CONC. STRESS MAX. EFFECTS DL+PS+LL BOT. OF BEAM	SERVICE III	1.34	46.83	S437	LEGAL	1S & 5N	105.000	CONC. STRESS MAX. EFFECTS DL+PS+LL BOT. OF BEAM	SERVICE III	1.27	46.66	T330	LEGAL	1S & 5N	105.000	CONC. STRESS MAX. EFFECTS DL+PS+LL BOT. OF BEAM	SERVICE III	1.80	53.86	T435	LEGAL	1S & 5N	105.000	CONC. STRESS MAX. EFFECTS DL+PS+LL BOT. OF BEAM	SERVICE III	1.57	54.78	T540	LEGAL	1S & 5N	105.000	CONC. STRESS MAX. EFFECTS DL+PS+LL BOT. OF BEAM	SERVICE III	1.38	55.26
S220	LEGAL	1S & 5N	106.000	LONG. REINFORCEMENT MIN. EFFECTS MAX. SHEAR W/ CONCURRENT MOMENT	STRENGTH I	2.36	47.26																																																
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T540	LEGAL	1S & 5N	105.000	CONC. STRESS MAX. EFFECTS DL+PS+LL BOT. OF BEAM	SERVICE III	1.38	55.26																																																

### LEGEND

- - SETTLEMENT PLATFORMS
- ▲ - SETTLEMENT MONUMENTS

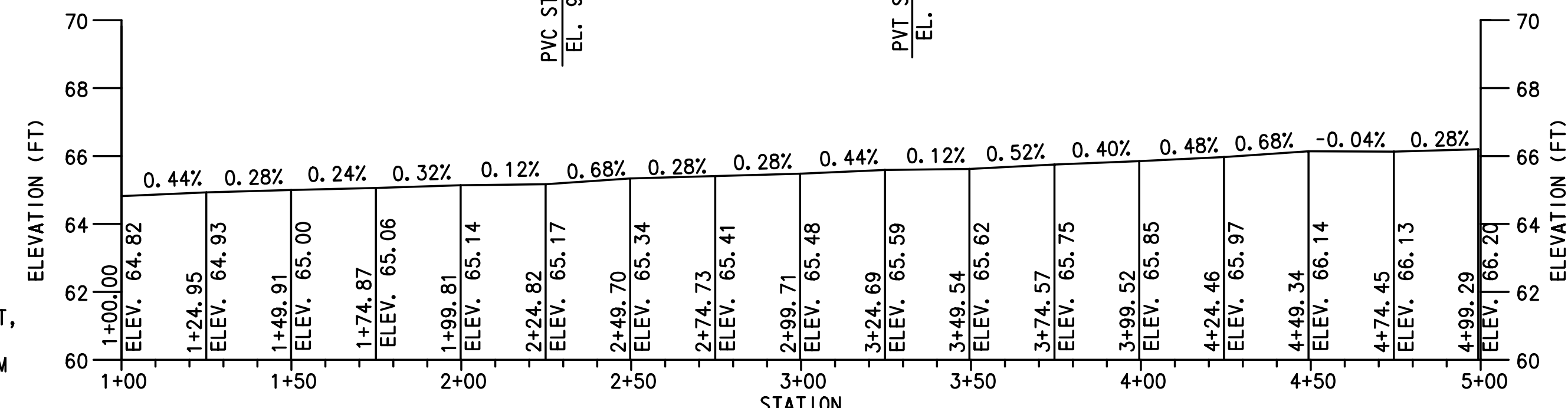
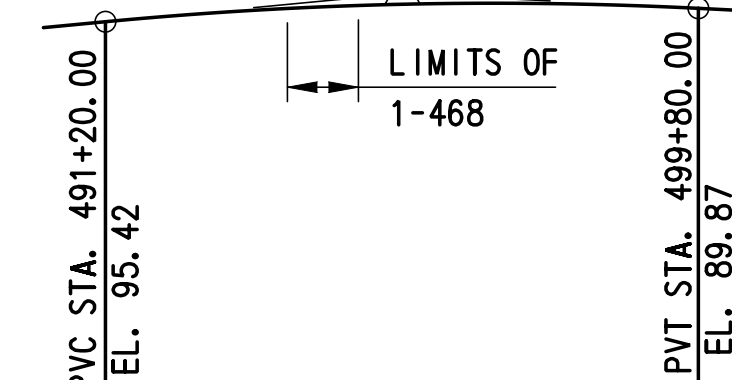
### US 301 GEOMETRY

#### VERTICAL DATA

PVI STA. 495+50.00  
 EL. 99.12  
 VC = 860.00'  
 MO = -3.24'  
 SSD = 785.31'  
 +0.86% -2.15%

#### HORIZONTAL DATA

TANGENT



**NORFOLK SOUTHERN RAILROAD - PROFILE OF EXISTING TOP OF RAIL**

NOT TO SCALE

#### CROSS REFERENCE NOTES:

1. FOR SETTLEMENT PLATFORM AND MONUMENT STATIONS AND OFFSETS, SEE DWG. 1-468 DT-2.

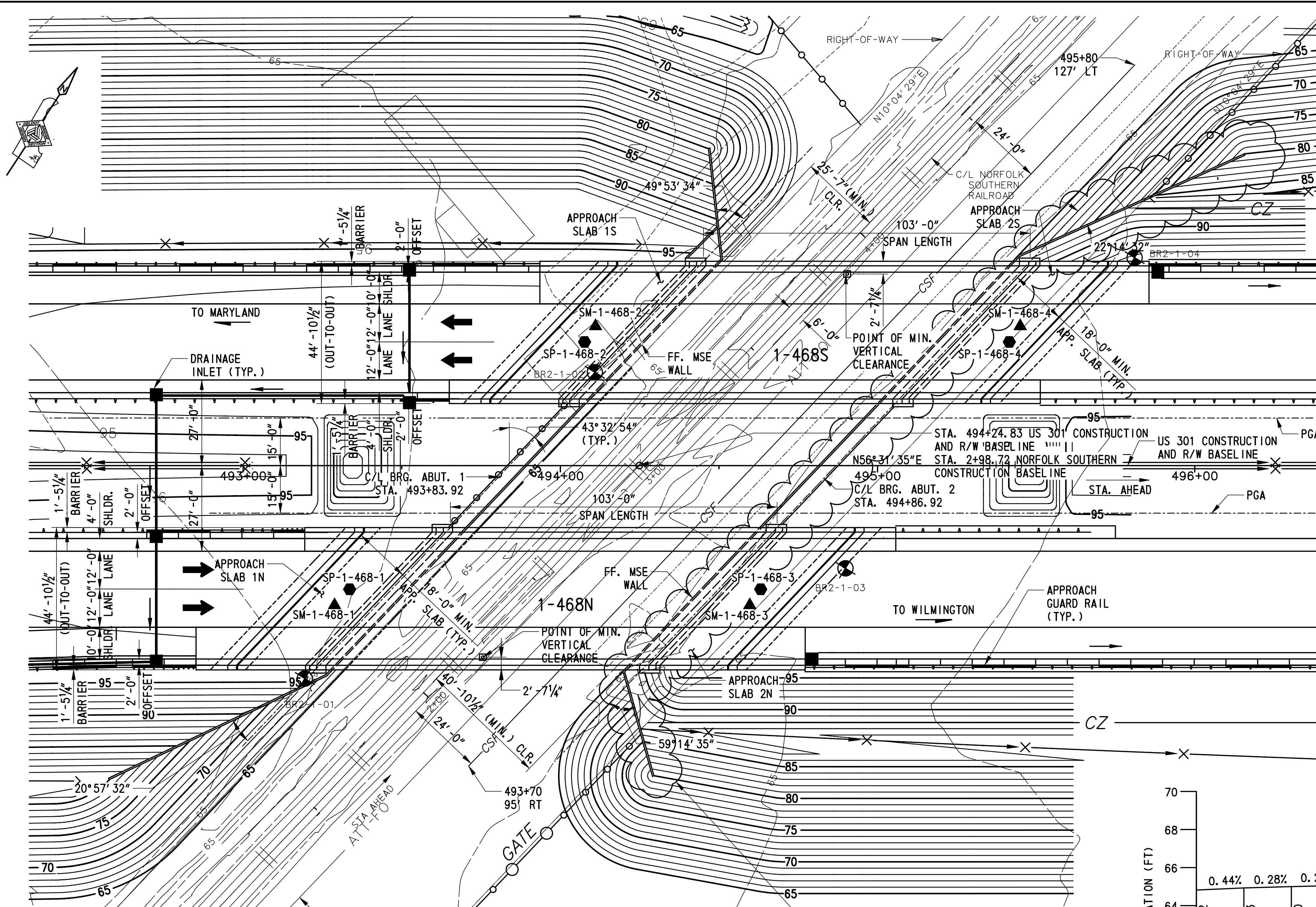
2. FOR SETTLEMENT PLATFORM DETAILS, SEE DWG. BR1-467 DT-01.

#### NOTES:

1. ABUTMENTS 1, ABUTMENTS 2 AND SUPERSTRUCTURES TO BE CONSTRUCTED UNDER CONTRACT T200911303.

2. THE ELEVATION OF EXISTING TOP-OF-RAIL PROFILE SHALL BE VERIFIED BEFORE BEGINNING CONSTRUCTION. ALL DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE NORFOLK SOUTHERN CHIEF ENGINEER BRIDGES AND STRUCTURES.

SETTLEMENT PLATFORM	STATION	OFFSET	SETTLEMENT MONUMENT	STATION	OFFSET
SP-1-468-1	493+33.57	39.00' RT	SM-1-468-1	493+28.81	44.00' RT
SP-1-468-2	494+07.64	39.00' LT	SM-1-468-2	494+11.09	44.00' LT
SP-1-468-3	494+63.17	39.00' RT	SM-1-468-3	494+59.73	44.00' RT
SP-1-468-4	495+37.24	39.00' LT	SM-1-468-4	495+42.24	44.00' LT



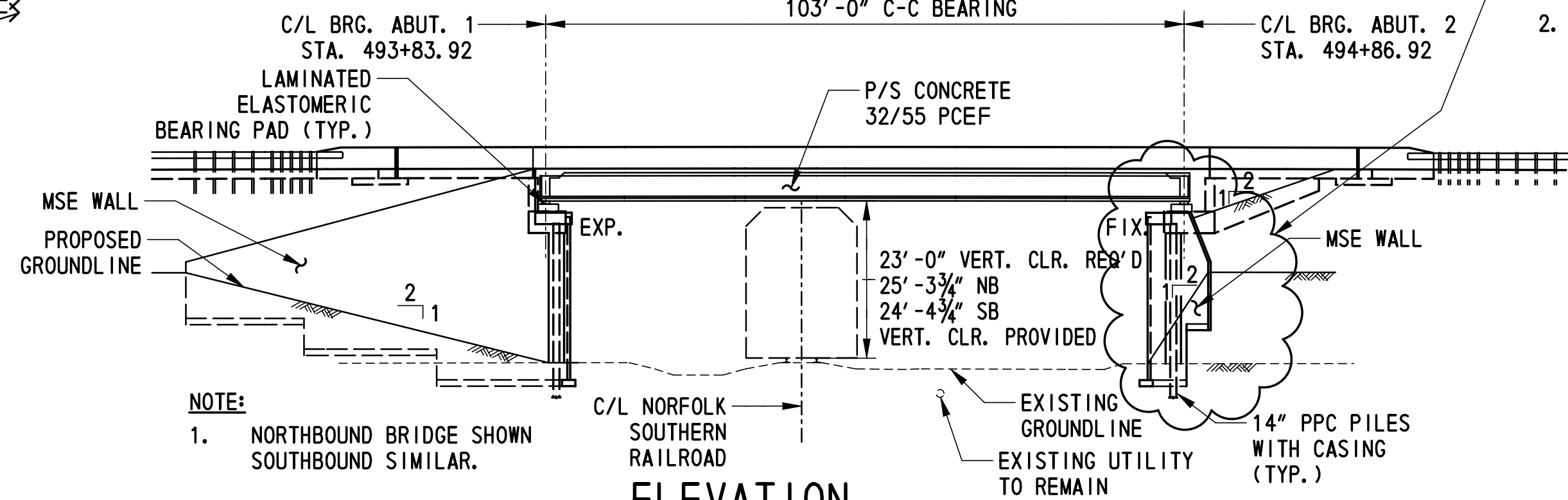
### PLAN

SCALE: 1" = 20'-0"

#### CONTRACT T200911301 ITEMS OF WORK:

- CONSTRUCT ABUTMENT 2 MSE WALL AND EMBANKMENT, NORTHBOUND AND SOUTHBOUND.
- INSTALL PILE CASINGS AND SETTLEMENT PLATFORM AND MONUMENTS, NORTHBOUND AND SOUTHBOUND.

100.00  
 90.00  
 80.00  
 70.00  
 DATUM 60.00



### ELEVATION

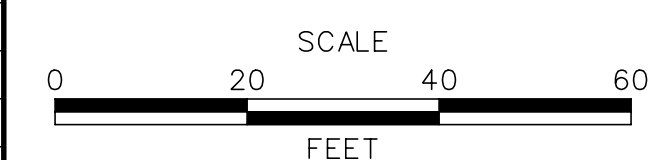
SCALE: 1" = 20'-0"

NOTE:  
 1. NORTHBOUND BRIDGE SHOWN SOUTHBOUND SIMILAR.

G:\6004\9040 US301\STRUCTURE\PLANS\FINAL\BR2-1NS\BR2-1 CONTRACT 1C\PE01-B2-1NS-AB2.DGN



ADDENDUMS / REVISIONS



**US 301  
 NORFOLK SOUTHERN RR  
 TO SR896**

CONTRACT	BRIDGE NO.	<b>1-468N&amp;S</b>
T200911301	DESIGNED BY:	ADH
COUNTY	CHECKED BY:	DHG
NEW CASTLE		

**US 301 MAINLINE OVER  
 NORFOLK SOUTHERN  
 RAILROAD  
 BRIDGE PLAN  
 AND ELEVATION**

1-468 PE-1
SHEET NO.
125
TOTAL SHTS.
240

**GENERAL NOTES**

1. DESIGN SPECIFICATIONS:

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 4TH EDITION, 2007, INCLUDING 2008 AND 2009 INTERIM REVISIONS, AND AS SUPPLEMENTED BY DELAWARE DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN MANUAL, MAY 2005, INCLUDING LATEST REVISIONS.

PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH THE DELAWARE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS AND CONSTRUCTION DETAILS, AASHTO/AWS D1.5M/D1.5 BRIDGE WELDING CODE, AND CONTRACT SPECIAL PROVISIONS.

LIVE LOAD DISTRIBUTION TO BEAMS IS BASED UPON AASHTO DISTRIBUTION FACTORS.

2. LOADING:

UNIT WEIGHTS OF MATERIALS SHALL BE IN ACCORDANCE WITH THE DELAWARE DESIGN MANUAL.

FUTURE OVERLAY ALLOWANCE SHALL BE 25 LBS/SQ FT.

STEEL BRIDGE DECK FORMS WHICH STAY IN PLACE (INCLUDING CONCRETE IN FORM CORRUGATIONS) SHALL BE 15 LBS/SQ FT.

VEHICLE LIVE LOAD SHALL BE AASHTO HL-93 DESIGN VEHICLE, WHICH CONSISTS OF A DESIGN TRUCK OR TANDEM WITH DYNAMIC LOAD ALLOWANCE AND A LANE LOAD. RATINGS SHALL USE ALL DELAWARE LEGAL LOADS SPECIFIED IN THE BRIDGE DESIGN MANUAL.

BARRIER HAS BEEN DESIGNED FOR TEST LEVEL FOUR (TL-4).

FATIGUE DESIGN IS BASED ON THE FOLLOWING:  
ADTT 3,045 (2030 ONE-DIRECTIONAL).

FOR THERMAL LOADS, CONSIDER THE MODERATE TEMPERATURE RANGE AS STIPULATED IN THE AASHTO LRFD DESIGN SPECIFICATIONS, THE NORMAL TEMPERATURE SHALL BE CONSIDERED TO BE 68F.

FOR SEISMIC LOADS, CONSIDER SEISMIC PERFORMANCE ZONE 1, WITH A SITE CLASS = D AND IMPORTANCE CATEGORY - ESSENTIAL.

SEISMIC FORCES WERE CONSIDERED FOR ACCELERATION COEFFICIENT OF 0.08.

3. STRUCTURAL EXCAVATIONS:

EXCAVATION REQUIRED TO ATTAIN THE GRADE FOR INSTALLATION OF MSE WALLS SHALL BE INCIDENTAL TO ITEM NO. 602772 - MECHANICALLY STABILIZED EARTH WALLS.

4. STRUCTURAL BACKFILL:

MSE WALL BACKFILL SHALL BE AS SPECIFIED ON THE PLANS.

5. TEMPORARY RAILROAD CLEARANCES:

A MINIMUM VERTICAL CLEARANCE OF 22'-0" ABOVE TOP OF HIGHEST RAIL SHALL BE MAINTAINED AT ALL TIMES.

A MINIMUM HORIZONTAL CLEARANCE OF 15'-0" FROM CENTERLINE OF TRACK SHALL BE MAINTAINED AT ALL TIMES.

CONTRACTOR TO COORDINATE ALL WORK WITH NORFOLK SOUTHERN RAILROAD IN ACCORDANCE WITH NORFOLK SOUTHERN SPECIAL PROVISIONS FOR PROTECTION OF RAILWAY INTERESTS.

6. UTILITIES:

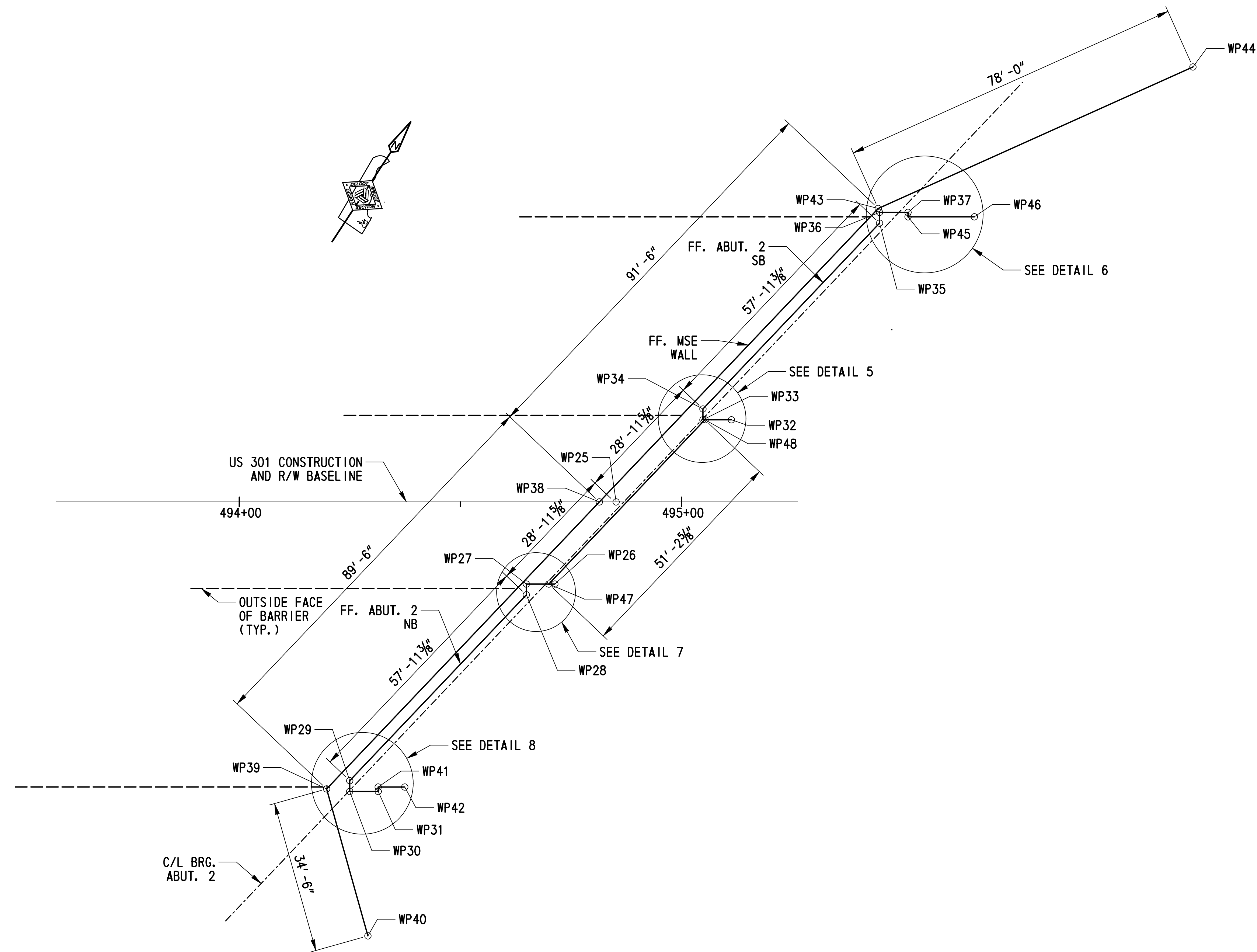
COORDINATE ALL WORK RELATED TO PUBLIC AND PRIVATE UTILITIES IN ACCORDANCE WITH SECTION 107.04 OF THE STANDARD SPECIFICATIONS.

VERIFY AND LOCATE ALL EXISTING UTILITIES PRIOR TO STARTING WORK. CONDUCT OPERATIONS IN A MANNER WHICH ENSURES THAT THE UTILITIES WILL NOT BE DISTURBED OR ENDANGERED AND ASSUME FULL RESPONSIBILITY FOR ANY DAMAGE TO UTILITIES DURING CONSTRUCTION. THE DEPARTMENT DOES NOT ASSUME RESPONSIBILITY FOR REIMBURSEMENT, PARTICIPATION IN DESIGN AND/OR REVISION, OR LIABILITY FOR ACCURACY OF TYPE, SIZE AND LOCATION OF ANY UTILITY.

INDEX OF DRAWINGS		
SHEET NO.	DRAWING NO.	TITLE
125	1-468 PE-1	BRIDGE PLAN AND ELEVATION
126	1-468 GN-1	GENERAL NOTES AND INDEX OF DRAWINGS
127	1-468 GG-1	GEOMETRIC LAYOUT
128	1-468 TS-1	TYPICAL SECTION AND QUANTITIES
129	1-468 PL-1	ABUTMENT 2 - PILE PLAN
130	1-468 WW-2	MEDIAN AND WINGWALL ELEVATIONS - ABUTMENT 2
131	1-468 WW-3	MSE WALL DETAILS
132	1-468 BO-1	TEST BORINGS
133	1-468 DT-1	CONSTRUCTION SEQUENCE ABUTMENT 2

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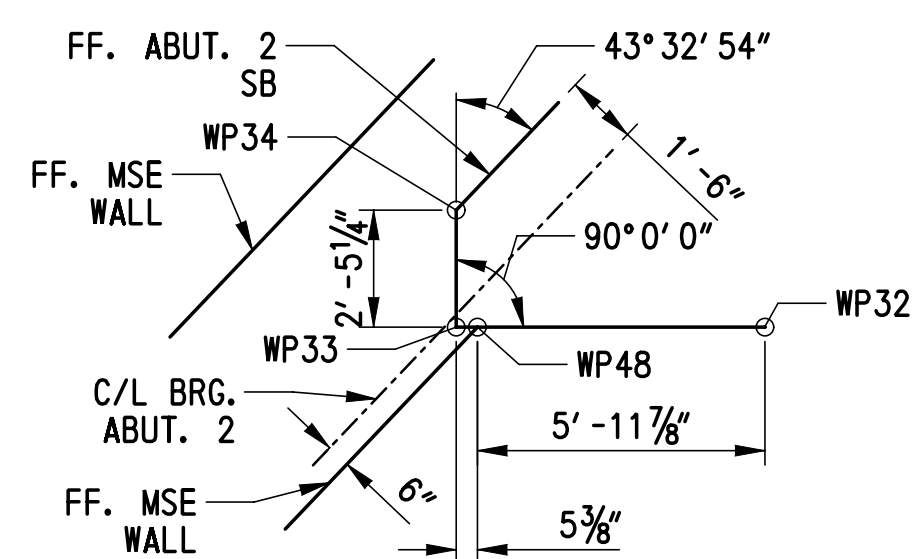
 <b>DELAWARE DEPARTMENT OF TRANSPORTATION</b>	ADDENDUMS / REVISIONS		<b>US 301 NORFOLK SOUTHERN RR TO SR896</b>	CONTRACT	BRIDGE NO.	<b>1-468N&amp;S</b>	<b>US 301 MAINLINE OVER NORFOLK SOUTHERN RAILROAD GENERAL NOTES AND INDEX OF DRAWINGS</b>	1-468 GN-1
	T200911301	DESIGNED BY: ADH		SHEET NO.				
	COUNTY	CHECKED BY: DHG		126				
	NEW CASTLE			TOTAL SHTS.				
								240



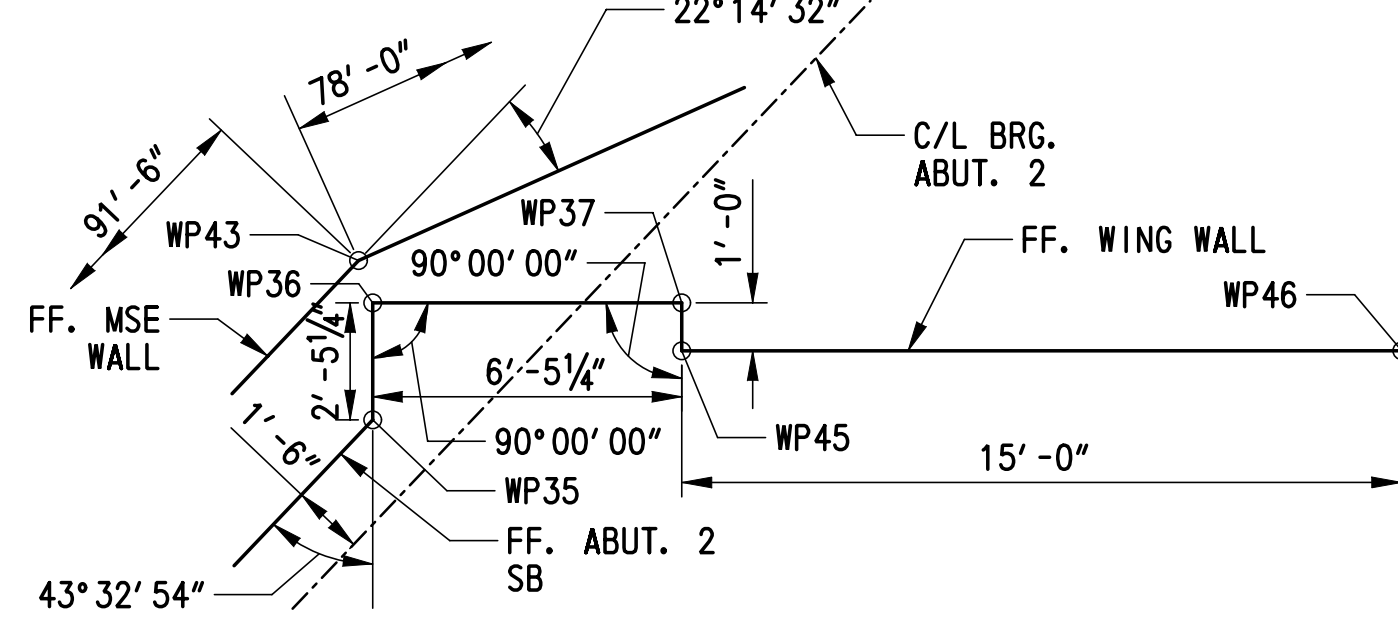
**GEOMETRIC LAYOUT**

SCALE: 1/16" = 1'-0"

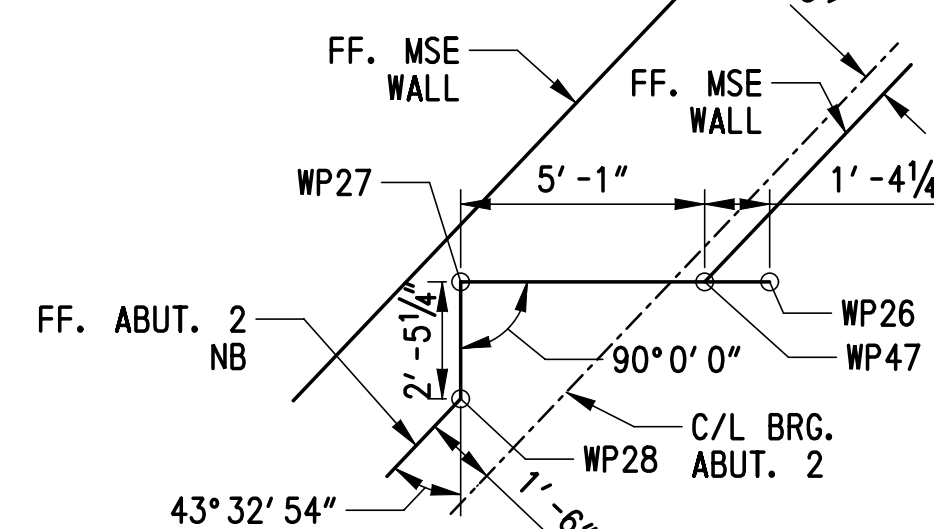
WORKING POINTS				
WORK PT.	STATION	OFFSET	COORDINATES	
			NORTHING	EASTING
WP25	494+84.85	0.00	542803.2443	572001.9347
WP26	494+71.33	18.56	542780.3011	572000.8916
WP27	494+64.89	18.56	542776.7505	571995.5218
WP28	494+64.89	21.00	542774.7173	571996.8662
WP29	494+24.96	63.00	542717.6632	571986.7293
WP30	494+24.96	65.44	542715.6300	571988.0738
WP31	494+31.40	65.44	542719.1806	571993.4435
WP32	495+11.25	-18.56	542833.2887	572013.7173
WP33	495+04.81	-18.56	542829.7381	572008.3476
WP34	495+04.81	-21.00	542831.7713	572007.0031
WP35	495+44.74	-63.00	542888.8253	572017.1400
WP36	495+44.74	-65.44	542890.8585	572015.7956
WP37	495+51.17	-65.44	542894.4091	572021.1654
WP38	494+81.40	0.00	542801.3418	571999.0575
WP39	494+19.74	64.87	542713.2219	571983.4011
WP40	494+29.07	98.08	542690.6644	572009.5050
WP41	494+31.40	64.44	542720.0148	571992.8920
WP42	494+37.40	64.44	542723.3241	571997.8968
WP43	495+44.44	-66.32	542891.4309	572015.0638
WP44	496+15.58	-98.30	542957.3490	572056.7628
WP45	495+51.17	-64.44	542893.5750	572021.7170
WP46	495+66.17	-64.44	542901.8483	572034.2291
WP47	494+69.96	18.56	542779.5504	571999.7563
WP48	495+05.25	-18.56	542829.9821	572008.7166



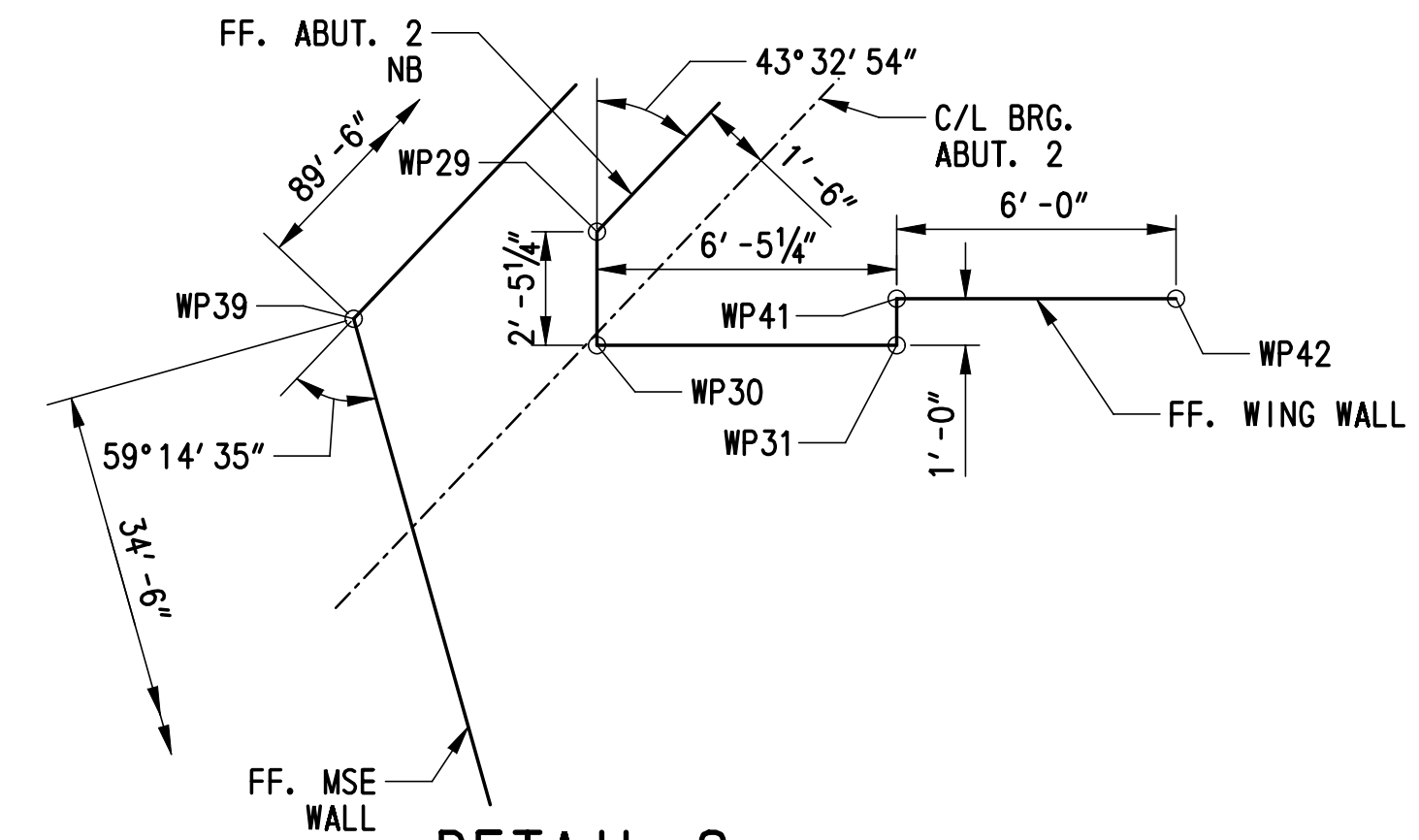
**DETAIL 5**  
SCALE: 1/4" = 1'-0"



**DETAIL 6**  
SCALE: 1/4" = 1'-0"



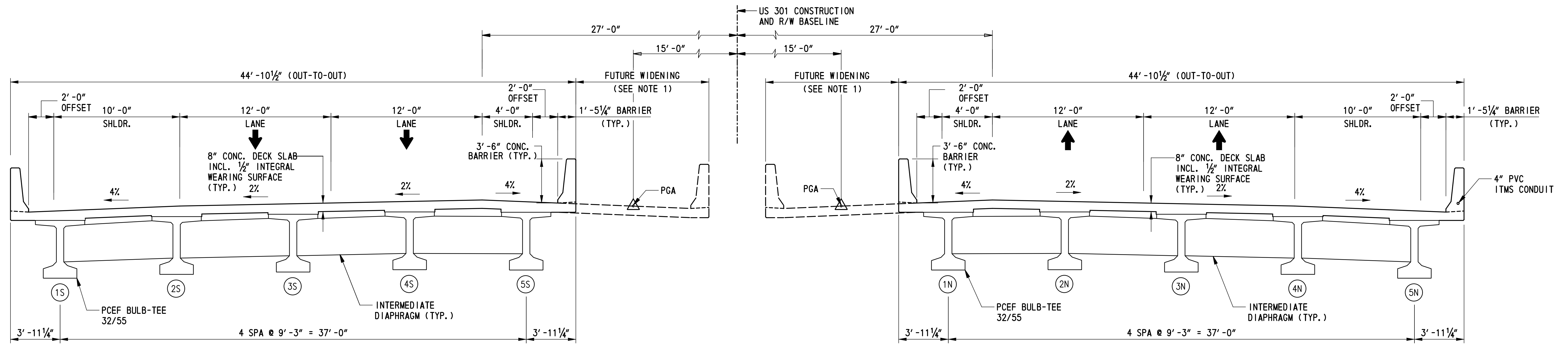
**DETAIL 7**  
SCALE: 1/4" = 1'-0"



**DETAIL 8**  
SCALE: 1/4" = 1'-0"

ADDENDUMS / REVISIONS

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SOUTHBOUND

TYPICAL SECTION

STATIONS AHEAD  
SCALE: 1/4" = 1'-0"

NORTHBOUND

ESTIMATED BRIDGE QUANTITIES

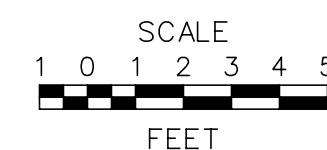
ITEM NO.	DESCRIPTION	UNIT	NORTHBOUND QUANTITIES	SOUTHBOUND QUANTITIES	TOTAL
202505	SETTLEMENT PLATFORM	EA	1	1	2
202518	SETTLEMENT MONUMENT	EA	1	1	2
602772	MECHANICALLY STABILIZED EARTH WALL	LS	-	-	-

NOTE:  
1. CROSS SLOPE OF FUTURE LANE SLOPES AT 2% DOWN TO PGA. THE CURRENT FASCIA BEAM HAUNCH WOULD NEED TO BE INCREASED TO ACCOUNT FOR CHANGE IN ELEVATION OF DECK SLAB.

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ADDENDUMS / REVISIONS	



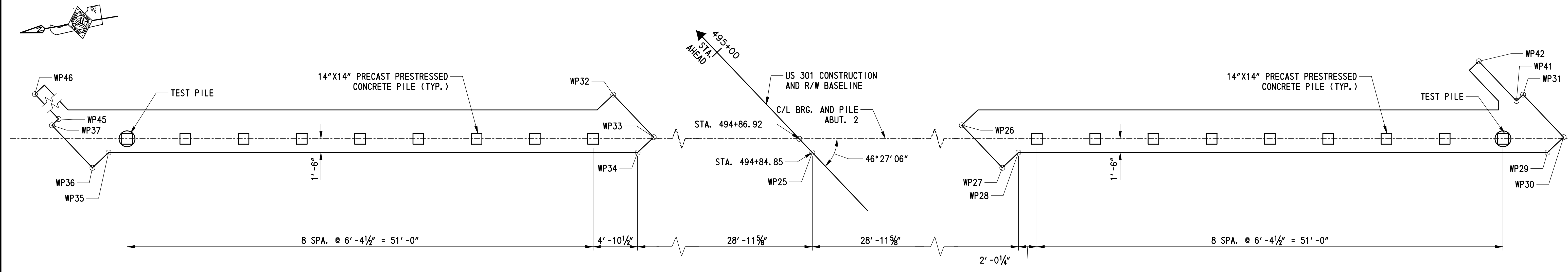
**US 301  
NORFOLK SOUTHERN RR  
TO SR896**

CONTRACT	BRIDGE NO.	<b>1-468N&amp;S</b>
T200911301	DESIGNED BY:	ADH
COUNTY	CHECKED BY:	DHG
NEW CASTLE		

**US 301 MAINLINE OVER  
NORFOLK SOUTHERN  
RAILROAD  
TYPICAL SECTION  
AND QUANTITIES**

1-468 TS-1
SHEET NO.
128
TOTAL SHTS.
240

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**ABUTMENT 2 PILE PLAN**  
SCALE: 3/16" = 1' - 0"

- NOTES:**
1. PILE PLAN IS PROVIDED FOR LOCATING PILE CASINGS.
  2. PILE CASINGS SHALL BE FURNISHED IN ACCORDANCE WITH ITEM 602772 AND ARE INCIDENTAL TO THE MSE WALL CONSTRUCTION.

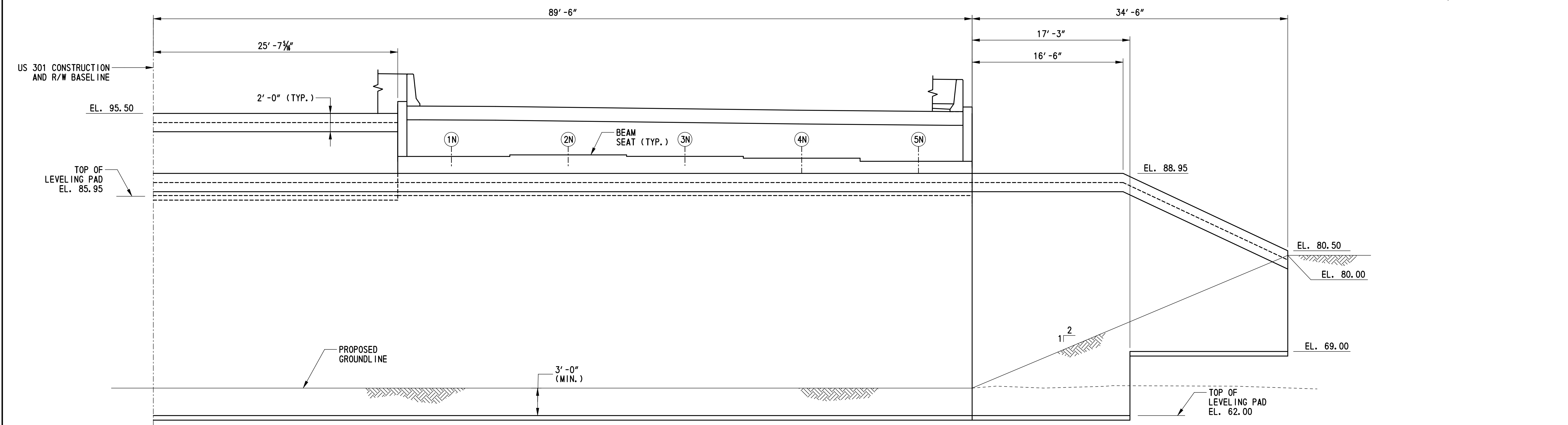
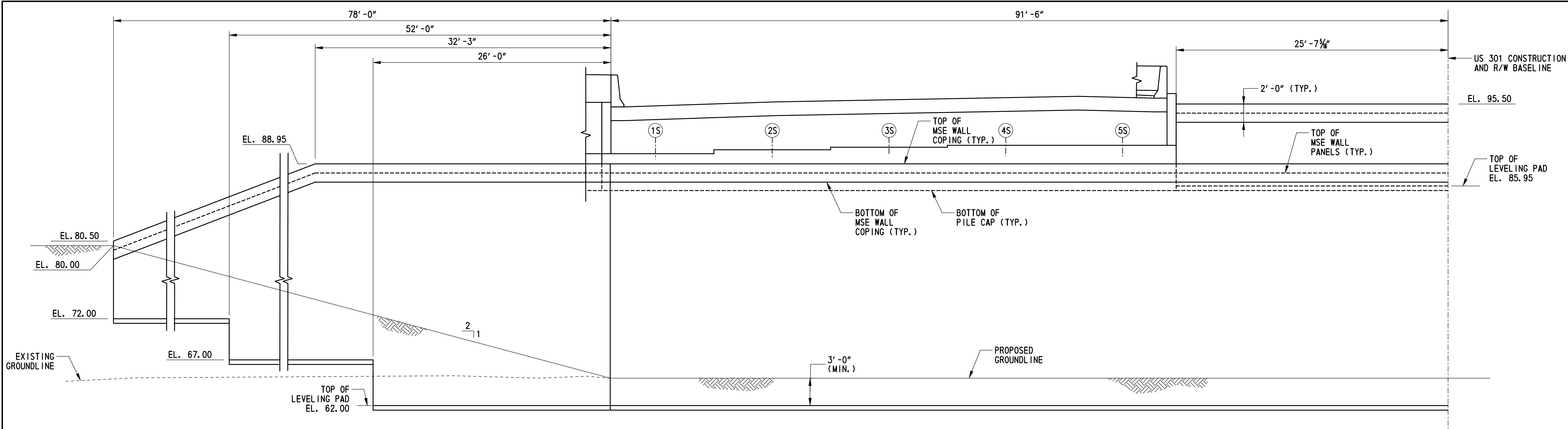
- CROSS REFERENCE NOTE:**
1. FOR PILE DETAILS AND NOTES, SEE DWG. 1-468 PL-2.

<p><b>DELAWARE DEPARTMENT OF TRANSPORTATION</b></p>	ADDENDUMS / REVISIONS		<p align="center"><b>US 301 NORFOLK SOUTHERN RR TO SR896</b></p>	CONTRACT	BRIDGE NO.	<b>1-468N&amp;S</b>	<p align="center"><b>US 301 MAINLINE OVER NORFOLK SOUTHERN RAILROAD ABUTMENT 2 - PILE PLAN</b></p>	SHEET NO.	129
	T200911301	DESIGNED BY:		ADH	TOTAL SHTS.	240			
	COUNTY	CHECKED BY:		DHG					
	NEW CASTLE								

1-468 PL-1



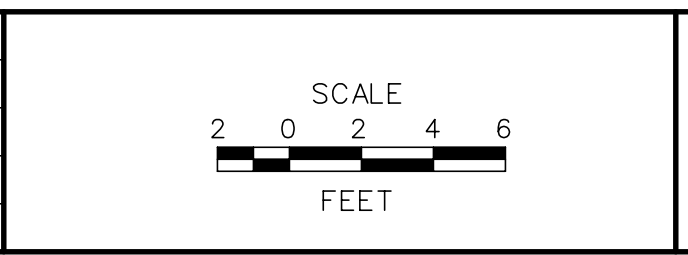
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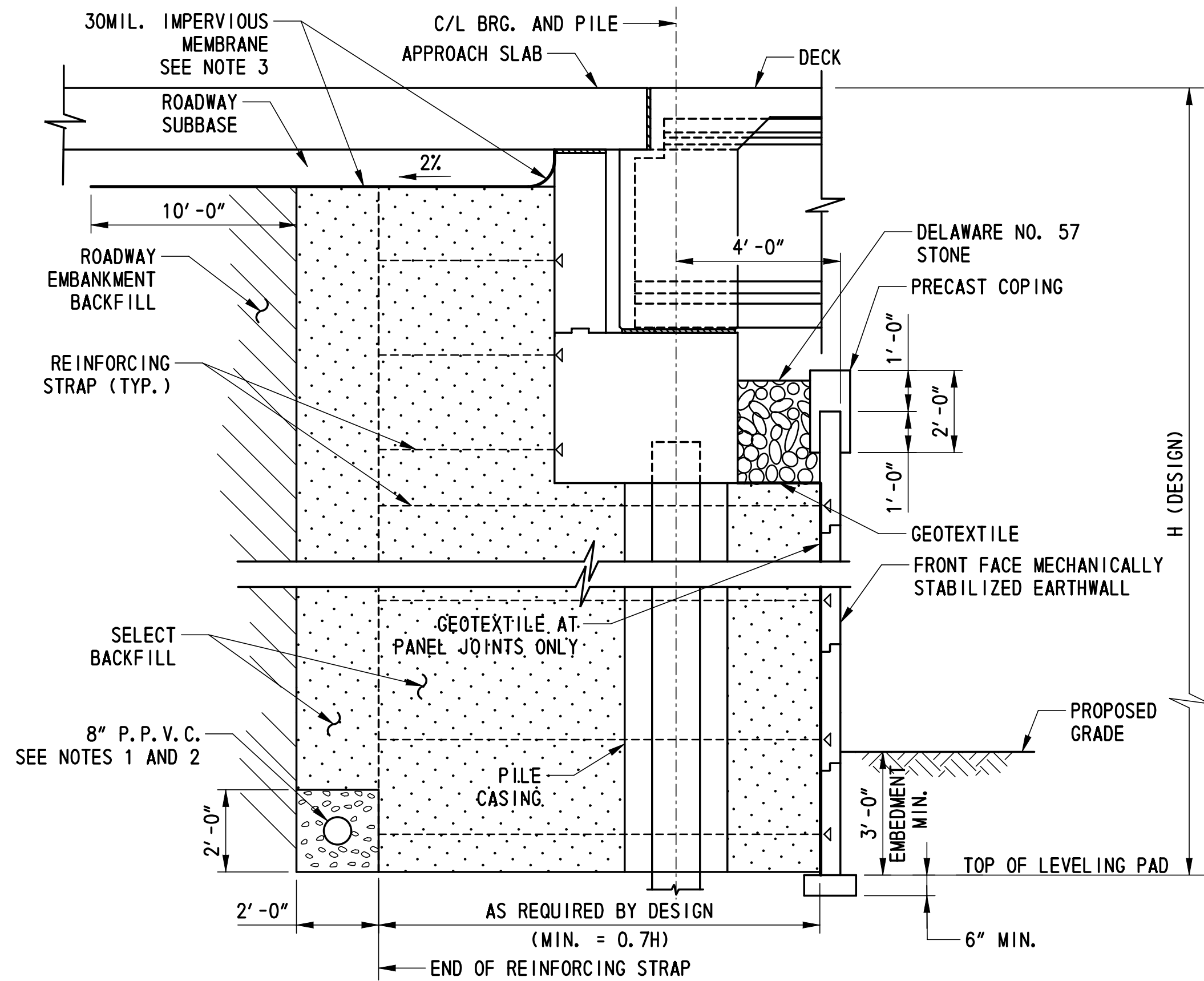
- CROSS REFERENCE NOTES:**
- FOR GENERAL NOTES, SEE DWG. 1-468 GN-1.
  - FOR GEOMETRIC LAYOUT, SEE DWG. 1-468 GG-1.
  - FOR MSE WALL SECTIONS AND DETAILS, SEE DWG. 1-468 WW-3.

**MEDIAN AND WINGWALL ELEVATIONS - ABUTMENT 2**  
SCALE: 3/16" = 1'-0"

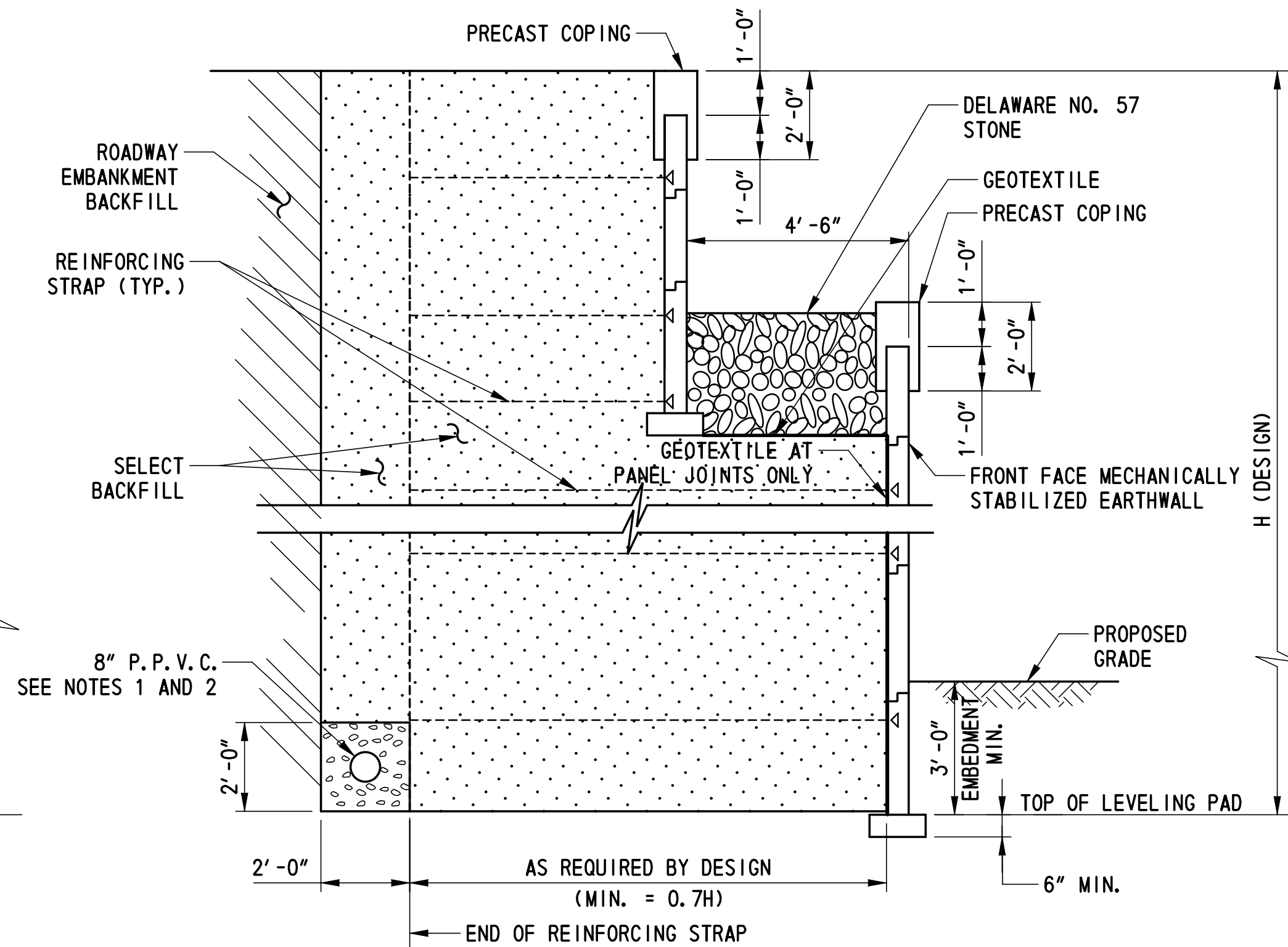
ADDENDUMS / REVISIONS	



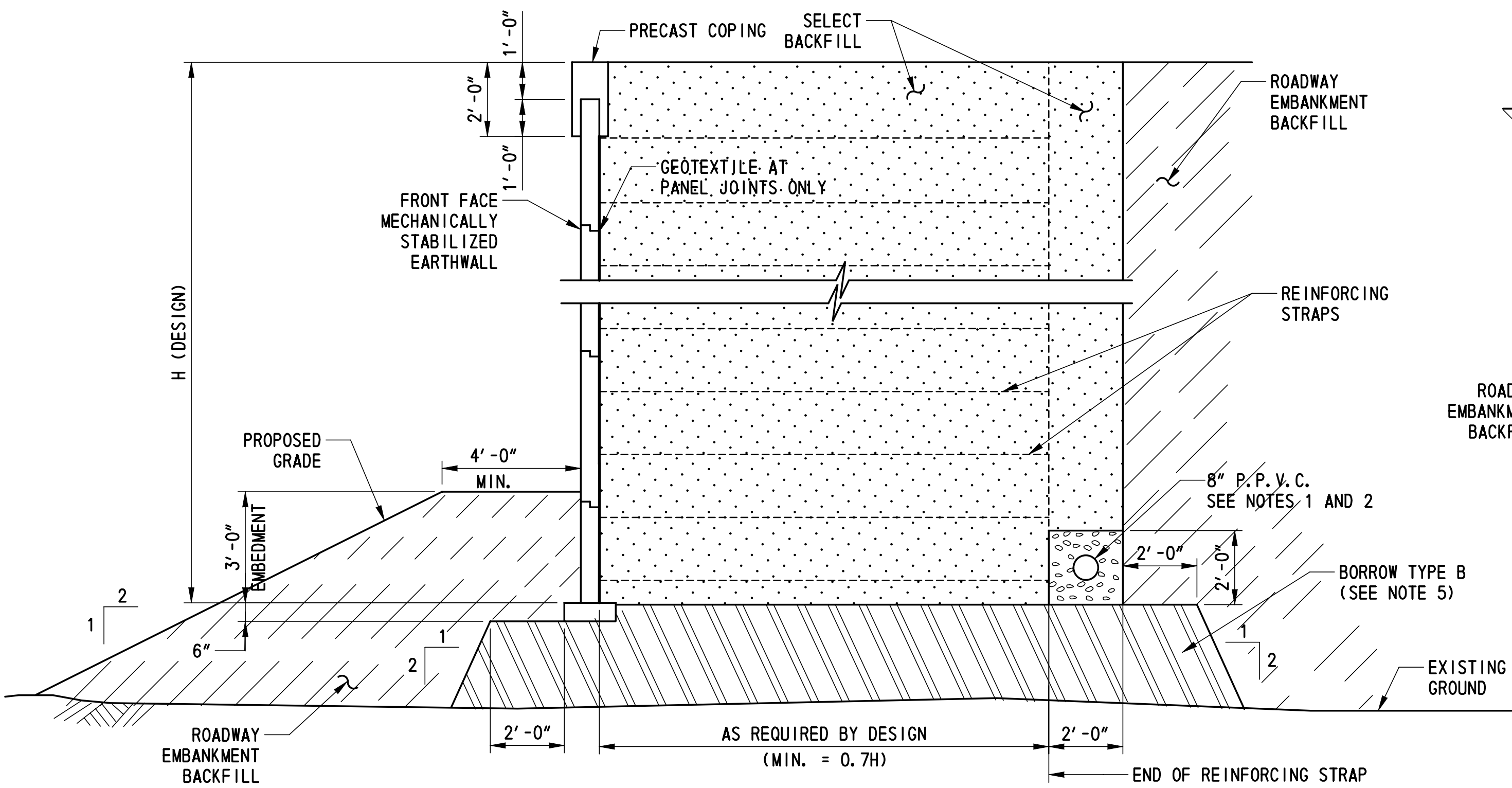
CONTRACT	BRIDGE NO.	<b>1-468N&amp;S</b>
T200911301	DESIGNED BY:	ADH
COUNTY	CHECKED BY:	DHG
NEW CASTLE		



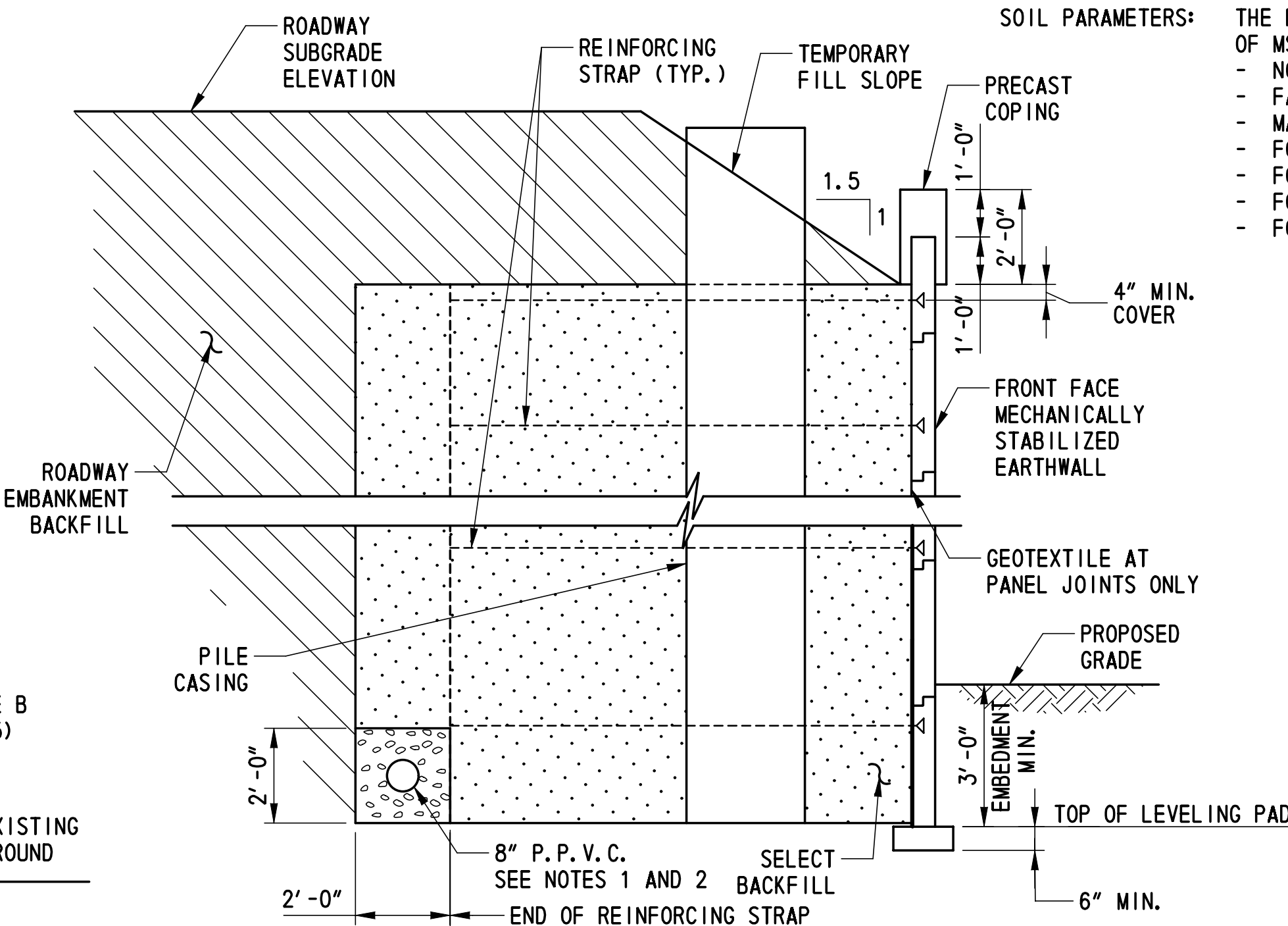
**TYPICAL MSE WALL SECTION AT ABUTMENT**  
SCALE: 3/8" = 1'-0"



**TYPICAL MSE WALL SECTION AT MEDIAN**  
SCALE: 3/8" = 1'-0"



**TYPICAL MSE WALL SECTION WINGWALL ON FILL**  
SCALE: 3/8" = 1'-0"



**FILL PLACEMENT DURING QUARANTINE PERIOD**  
SCALE: 3/8" = 1'-0"

**MSE WALL NOTES:**

- SPECIFICATIONS:** PROPRIETARY MSE WALLS SHALL BE DESIGNED IN ACCORDANCE WITH THE FOLLOWING:  
 - AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 4TH EDITION WITH ALL CURRENT REVISIONS.  
 - FEDERAL HIGHWAY ADMINISTRATION PUBLICATION NOS. FHWA-NHI-10-024 AND FHWA-NHI-10-025, "DESIGN AND CONSTRUCTION OF MECHANICALLY STABILIZED EARTH WALLS AND REINFORCED SOIL SLOPES", VOLUME I AND VOLUME II.
- CONCRETE:** LEVELING PAD CONCRETE SHALL BE 3,000 PSI. MIX REQUIREMENTS SHALL CONFORM TO SECTION 812 OF THE DELAWARE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.
- CHAMFERS:** ALL EXPOSED CORNERS OF CONCRETE SHALL BE CHAMFERED WITH 3/4" x 3/4" MILLED CHAMFER STRIPS, UNLESS OTHERWISE NOTED, EXCEPT ON UNEXPOSED FOOTINGS OR WHERE INDICATED BY THE FOLLOWING NOTATION ON THE PLANS: "DO NOT CHAMFER".
- REINFORCING STEEL:** REINFORCING STEEL SHALL CONFORM TO AASHTO M31 (ASTM A 615), GRADE 60. ALL SPLICES, NOT SHOWN, SHALL BE LAPPED AS PER THE LRFD BRIDGE DESIGN SPECIFICATIONS. MINIMUM COVER FOR ANY BAR SHALL BE 2" UNLESS OTHERWISE NOTED.
- FOR TIES AND STIRRUPS, STANDARD ACI BENDING TOLERANCES ARE MODIFIED TO PLUS (+) ZERO INCHES, MINUS (-) NORMAL ACI BENDING TOLERANCE.
- LEVELING PAD:** THE PROPRIETARY WALL MANUFACTURER MAY RELOCATE THE LEVELING PAD STEPS AT THEIR DISCRETION PROVIDED THAT THE MINIMUM EMBEDMENT IS MAINTAINED. ANY CHANGE TO THE STEP LOCATIONS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
- ROADWAY LIMITS:** THE PROPRIETARY WALL MANUFACTURER SHALL ASSURE THAT PROPOSED PROPRIETARY WALL COMPONENTS ARE POSITIONED SUCH THAT THE DESIGNATED ROADWAY LIMITS ARE NOT ENCRONCHED UPON.
- COORDINATION:** CONTRACTOR AND PROPRIETARY WALL MANUFACTURER SHALL COORDINATE LOCATIONS OF INLETS AND PIPES WITH LOCATIONS OF PROPRIETARY WALL TIE BACK SYSTEM.
- SERVICE LIFE:** ALL RETAINING WALL COMPONENTS SHALL BE DESIGNED FOR A MINIMUM SERVICE LIFE OF 100 YEARS.
- WALL SYSTEM:** RETAINING WALL TYPE SHALL BE MECHANICALLY STABILIZED EARTH (MSE) WALLS. NO OTHER WALL TYPE MAY BE SUBSTITUTED.
- MSE WALL BACKFILL:** MSE WALL BACKFILL SHALL BE SELECT BACKFILL IN ACCORDANCE WITH SPECIAL PROVISION 602772 WITH MINIMUM ANGLE OF INTERNAL FRICTION OF 34 DEGREES AND A MOIST UNIT WEIGHT OF 125 LB/FT<sup>3</sup>.
- REINFORCING STRAPS:** SET REINFORCING STRAPS TO CLEAR PILE CASING, 2" MIN. CLEARANCE. MAXIMUM IN-FIELD SKEW OF 15 DEGREES. IF GREATER SKEW ANGLE IS REQUIRED, CONTACT MSE WALL FIELD REPRESENTATIVE PRIOR TO INSTALLATION.
- SOIL PARAMETERS:** THE FOLLOWING ARE RECOMMENDED SOIL PARAMETERS TO BE USED FOR THE DESIGN OF MSE ABUTMENT AND WINGWALLS:  
 - NOMINAL BEARING RESISTANCE = 16.6 KIP/FT  
 - FACTORED BEARING RESISTANCE = 10.8 KIP/FT  
 - MAXIMUM ANTICIPATED SETTLEMENT = 4.5 IN  
 - FOR RETAINED SOIL, MOIST UNIT WEIGHT = 120 LB/FT<sup>3</sup>  
 - FOR RETAINED SOIL, ANGLE OF INTERNAL FRICTION = 30 DEGREES  
 - FOR FOUNDATION SOIL, MOIST UNIT WEIGHT = 120 LB/FT<sup>3</sup>  
 - FOR FOUNDATION SOIL, ANGLE OF INTERNAL FRICTION = 30 DEGREES

**NOTES:**

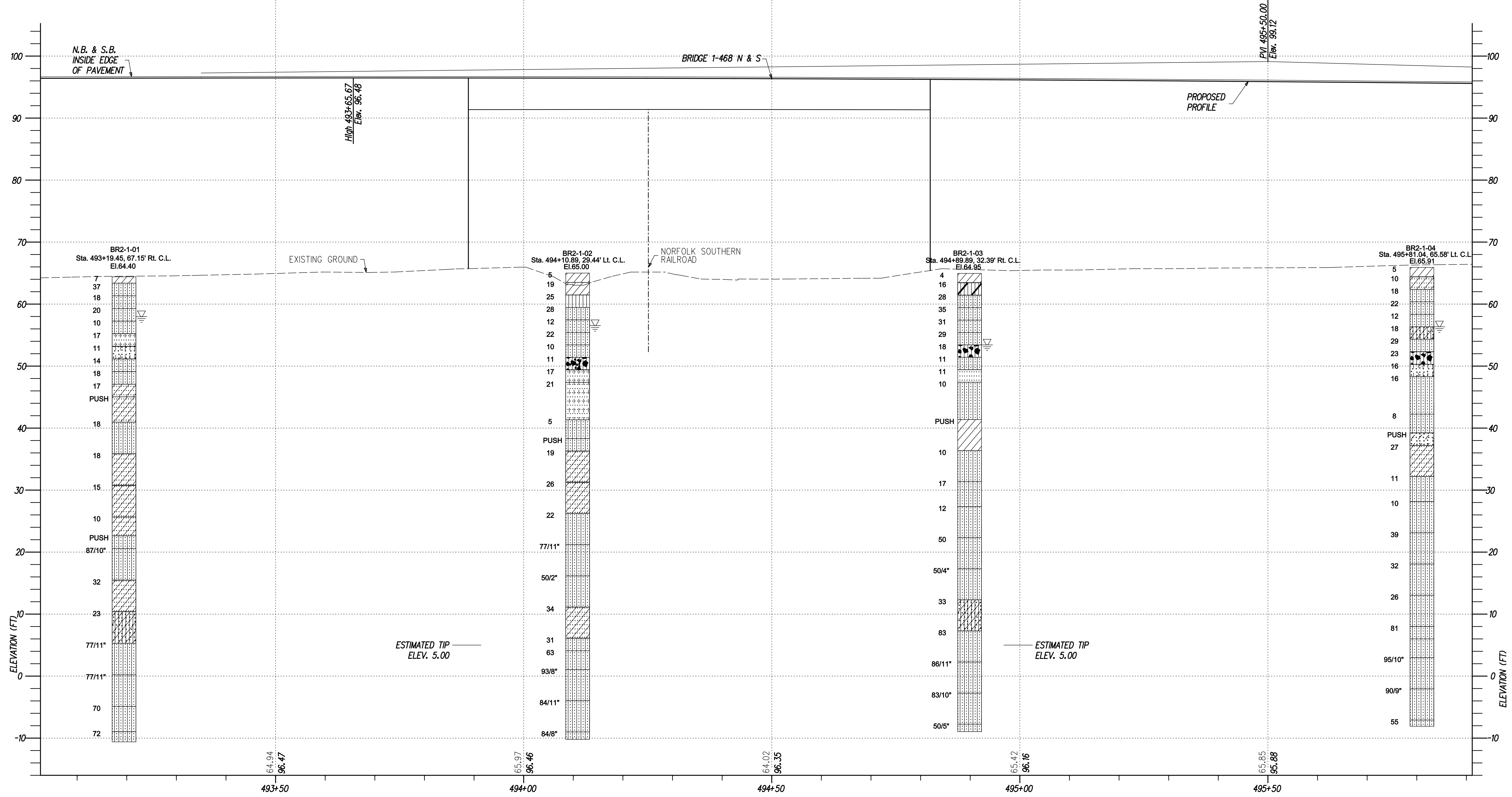
- DRAIN PERFORATED POLYVINYL CHLORIDE PIPE (P.P.V.C.) TO DAYLIGHT.
- SURROUND P.P.V.C. WITH A CONTINUOUS 2'-0"x2'-0" OF DELAWARE NO. 57 STONE ENCLOSED IN GEOTEXTILE.
- SLOPE MEMBRANE A MINIMUM OF 2% AWAY FROM BACKWALL.
- CONTRACTOR TO PROVIDE PROTECTION TO THE PILE CASING DURING QUARANTINE PERIOD TO PREVENT MATERIAL FROM ENTERING CASING.
- BORROW TYPE B IS INCIDENTAL TO ITEM 602772 AND SHALL MEET THE REQUIREMENTS OF SECTION 209 OF THE STANDARD SPECIFICATIONS.

**CROSS REFERENCE NOTES:**

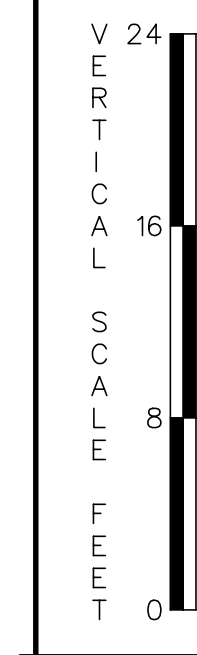
- FOR GENERAL NOTES, SEE SHEET 1-468 GN-1.
- FOR MEDIAN & WINGWALL ELEVATION, SEE SHEET 1-468 WW-2.
- FOR GEOMETRIC LAYOUT, SEE SHEET 1-468 GG-1.

G:\60049040 US301\Structure\Plans\FINAL\B2-INS\BR2-1 Contract IC:BR2-MSE-01-AB2.dgn

	ADDENDUMS / REVISIONS		SCALE 	<b>US 301 NORFOLK SOUTHERN RR TO SR896</b>	CONTRACT	BRIDGE NO.	<b>US 301 MAINLINE OVER NORFOLK SOUTHERN RAILROAD MSE WALL DETAILS</b>	SHEET NO.
					T200911301	1-468N&S		131
					COUNTY	DESIGNED BY: ADH		TOTAL SHTS.
					NEW CASTLE	CHECKED BY: DHG		240

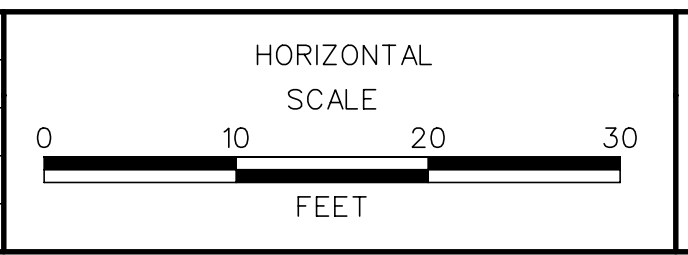


KEY TO SYMBOLS			
SYMBOL DESCRIPTION	SYMBOL DESCRIPTION	SYMBOL DESCRIPTION	SYMBOL DESCRIPTION
<b>STRATA SYMBOLS</b>			
LOW PLASTICITY CLAY	WELL GRADED GRAVEL WITH SILT	POORLY GRADED SAND WITH SILT	WELL GRADED SAND
SILTY SAND	SILTY LOW PLASTICITY CLAY	CLAYEY SAND	POORLY GRADED SAND WITH CLAY
WELL GRADED SAND WITH SILT	SILTY GRAVEL	POORLY GRADED CLAYEY SILTY SAND	<b>MISC. SYMBOLS</b>
	SILT	WATER TABLE DURING DRILLING	

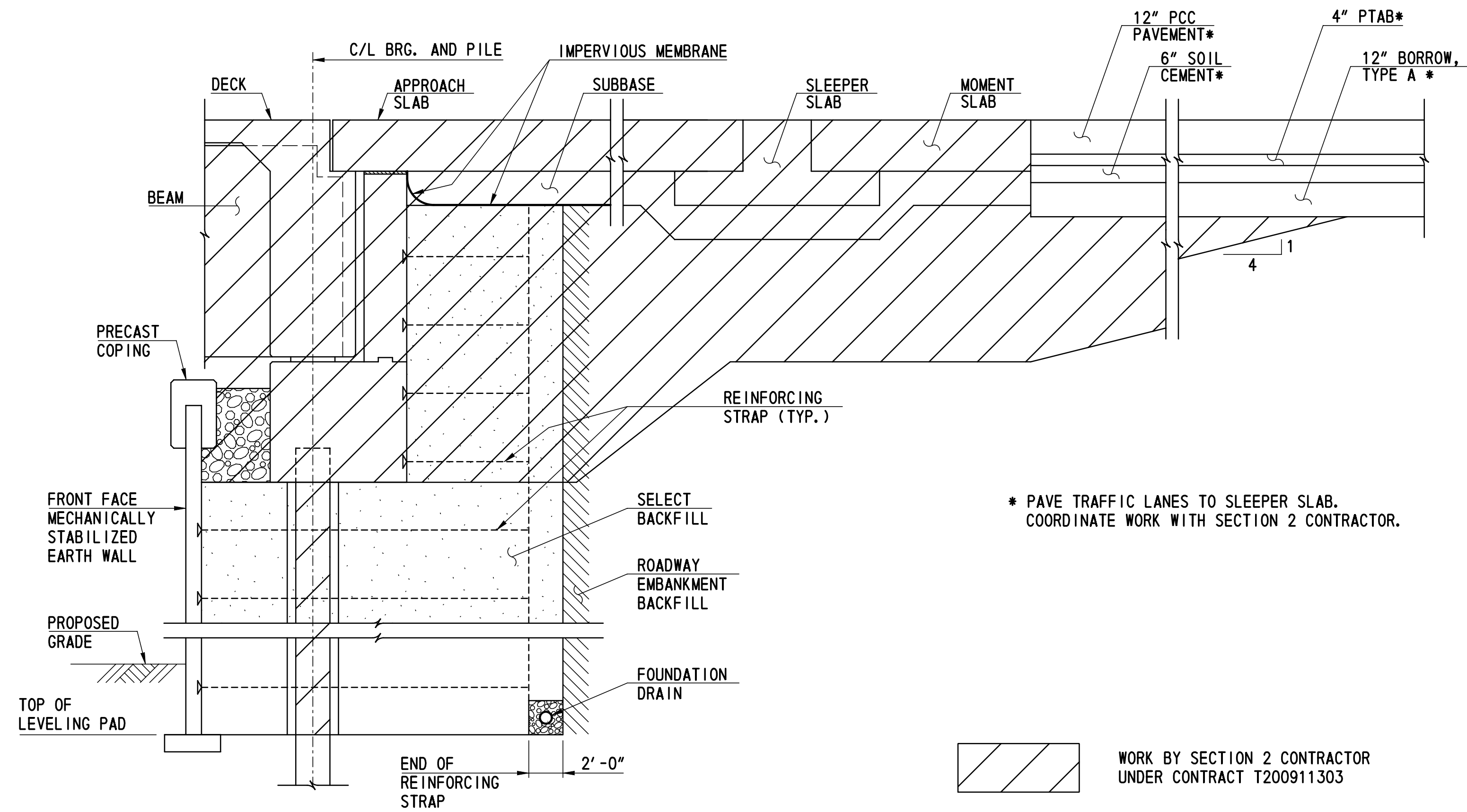


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ADDENDUMS / REVISIONS

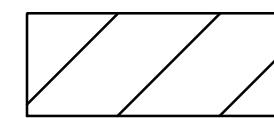


CONTRACT	BRIDGE NO.	<b>1-468N&amp;S</b>
T200911301	DESIGNED BY:	ZH
COUNTY	CHECKED BY:	RDB
NEW CASTLE		

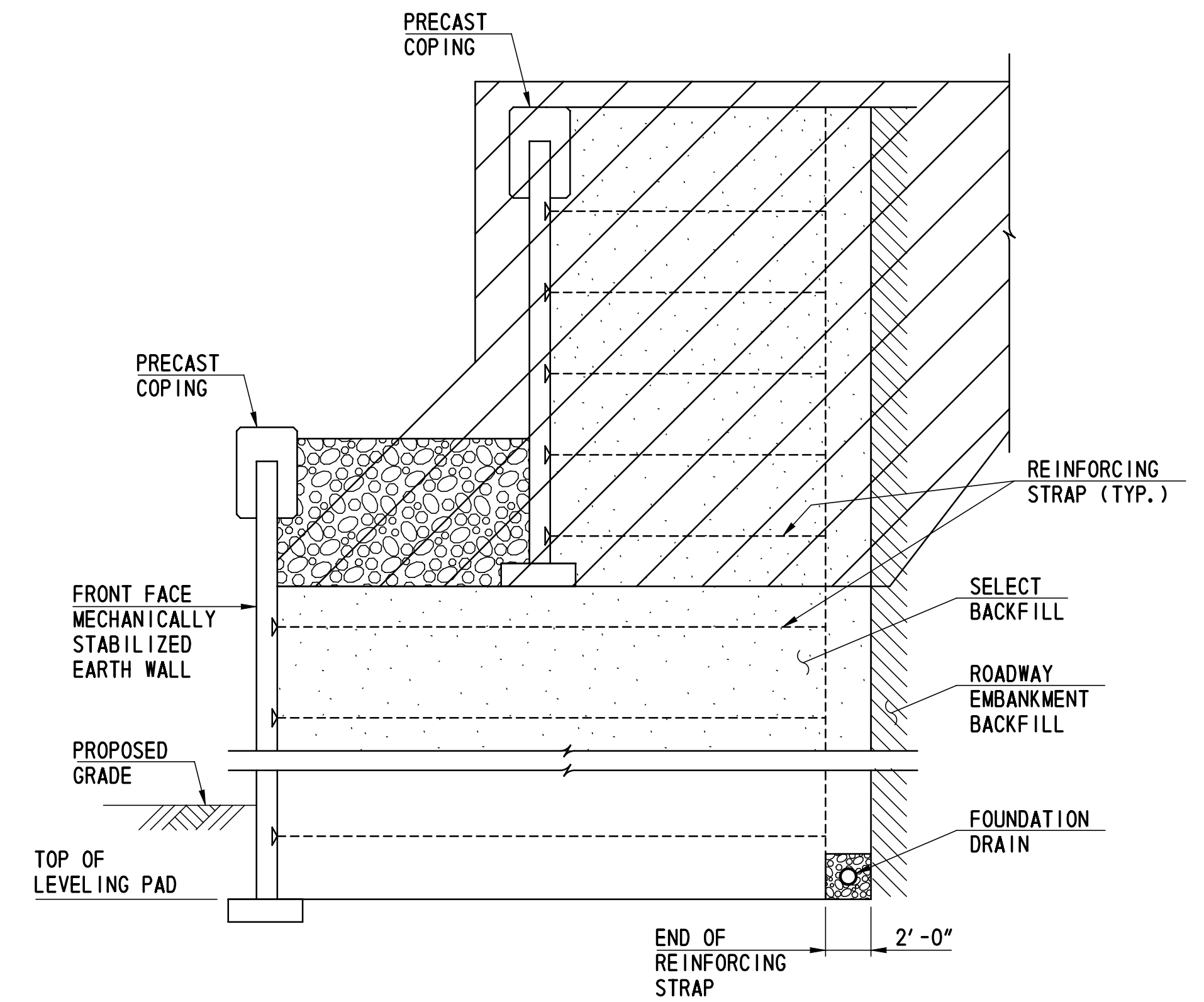


**MSE WALL SECTION  
AT ABUTMENT**

\* PAVE TRAFFIC LANES TO SLEEPER SLAB.  
COORDINATE WORK WITH SECTION 2 CONTRACTOR.



WORK BY SECTION 2 CONTRACTOR  
UNDER CONTRACT T200911303



**MSE WALL SECTION  
AT MEDIAN**

**ABUTMENT 2  
BRIDGE 1 - 468 N & S**

**SEQUENCE OF CONSTRUCTION AT ABUTMENT 2 - CONTRACT T200911301**

1. CONSTRUCT MSE WALLS AT ABUTMENTS AND AT MEDIAN, AND CONSTRUCT EMBANKMENT, TO THE APPROXIMATE LIMITS SHOWN.
2. PILE CASINGS SHALL BE INSTALLED AT THE PROPOSED PILE LOCATIONS DURING THE ABUTMENT MSE WALL CONSTRUCTION.

**NOTES:**

1. FOR BRIDGE 1-468 N & S CONSTRUCTION DETAILS, SEE SHEETS 123 TO 132.
2. ABUTMENT 1 AND ABUTMENT 2 TO BE BUILT UNDER CONTRACT T200911303.

**LEGEND**

- BRG. = BEARING  
N = NORTHBOUND  
S = SOUTHBOUND  
TYP. = TYPICAL

ADDENDUMS / REVISIONS



**US 301  
NORFOLK SOUTHERN RR  
TO SR896**

CONTRACT	BRIDGE NO.	<b>1-468N&amp;S</b>
T200911301	DESIGNED BY:	ADH
COUNTY	CHECKED BY:	DHG
NEW CASTLE		

**US 301 MAINLINE OVER  
NORFOLK SOUTHERN  
RAILROAD  
CONSTRUCTION SEQUENCE  
ABUTMENT 2**

1-468 DT-1
SHEET NO. 133
TOTAL SHTS. 240

CIRCULAR CURVE NO. (13)

	STATION	NORTHING	EASTING
PC ( 10005)	203+56.27	546535.4667	577140.3587
PI ( 10204)	203+82.03	546510.1319	577135.6813
CC ( 10205)		546551.8065	577051.8544
PT ( 10006)	204+06.45	546491.1096	577118.3065
Radius: 90.0000			
Delta: 31° 56' 53.1225" Right			
Degree of Curvature(Arc): 63° 39' 43.1181"			
Length: 50.1839			
Tangent: 25.7630			
Chord: 49.5363			
Middle Ordinate: 3.4752			
External: 3.6148			
Tangent Direction: S 10° 27' 36.8296" W			
Radial Direction: N 79° 32' 23.1704" W			
Chord Direction: S 26° 26' 03.3908" W			
Radial Direction: N 47° 35' 30.0479" W			
Tangent Direction: S 42° 24' 29.9521" W			

CIRCULAR CURVE NO. (12)

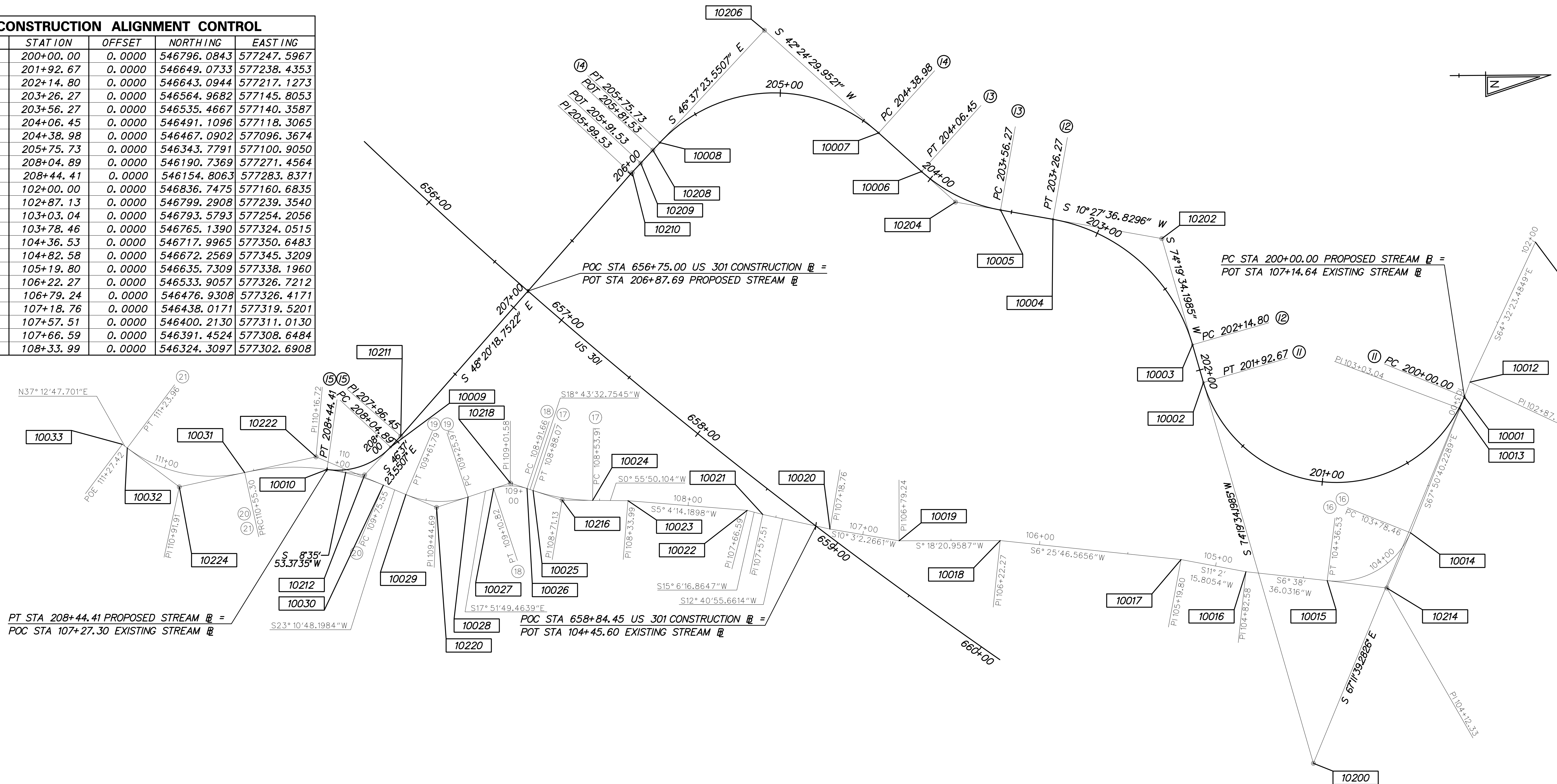
	STATION	NORTHING	EASTING
PC ( 10003)	202+14.80	546643.0944	577217.1273
PI ( 10202)	202+77.13	546626.2568	577157.1204
CC ( 10203)		546546.8129	577244.1434
PT ( 10004)	203+26.27	546564.9682	577145.8053
Radius: 100.0000			
Delta: 63° 51' 57.3689" Left			
Degree of Curvature(Arc): 57° 17' 44.8062"			
Length: 111.4671			
Tangent: 62.3244			
Chord: 105.7853			
Middle Ordinate: 15.1333			
External: 17.8318			
Tangent Direction: S 74° 19' 34.1985" W			
Radial Direction: N 15° 40' 25.8015" W			
Chord Direction: S 42° 23' 35.5140" W			
Radial Direction: N 79° 32' 23.1704" W			
Tangent Direction: S 10° 27' 36.8296" W			

CIRCULAR CURVE NO. (11)

	STATION	NORTHING	EASTING
PC ( 10001)	200+00.00	546796.0843	577247.5967
PI ( 10200)	202+23.50	546709.4541	577453.6240
CC ( 10201)		546724.1775	577217.3614
PT ( 10002)	201+92.67	546649.0733	577238.4353
Radius: 78.0048			
Delta: 141° 31' 13.4811" Right			
Degree of Curvature(Arc): 73° 27' 05.6356"			
Length: 192.6717			
Tangent: 223.4995			
Chord: 147.2962			
Middle Ordinate: 52.3005			
External: 158.7160			
Tangent Direction: S 67° 11' 39.2826" E			
Radial Direction: S 22° 48' 20.7174" W			
Chord Direction: S 3° 33' 57.4579" W			
Radial Direction: N 15° 40' 25.8015" W			
Tangent Direction: S 74° 19' 34.1985" W			

**CONSTRUCTION ALIGNMENT CONTROL**

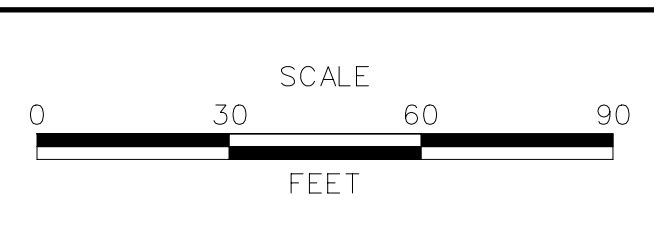
POINT	STATION	OFFSET	NORTHING	EASTING
10001	200+00.00	0.0000	546796.0843	577247.5967
10002	201+92.67	0.0000	546649.0733	577238.4353
10003	202+14.80	0.0000	546643.0944	577217.1273
10004	203+26.27	0.0000	546564.9682	577145.8053
10005	203+56.27	0.0000	546535.4667	577140.3587
10006	204+06.45	0.0000	546491.1096	577118.3065
10007	204+38.98	0.0000	546467.0902	577096.3674
10008	205+75.73	0.0000	546343.7791	577100.9050
10009	208+04.89	0.0000	546190.7369	577271.4564
10010	208+44.41	0.0000	546154.8063	577283.8371
10011	102+00.00	0.0000	546836.7475	577160.6835
10012	102+87.13	0.0000	546799.2908	577239.3540
10013	103+03.04	0.0000	546793.5793	577254.2056
10014	103+78.46	0.0000	546765.1390	577324.0515
10015	104+36.53	0.0000	546717.9965	577350.6483
10016	104+82.58	0.0000	546672.2569	577345.3209
10017	105+19.80	0.0000	546635.7309	577338.1960
10018	106+22.27	0.0000	546533.9057	577326.7212
10019	106+79.24	0.0000	546476.9308	577326.4171
10020	107+18.76	0.0000	546438.0171	577319.5201
10021	107+57.51	0.0000	546400.2130	577311.0130
10022	107+66.59	0.0000	546391.4524	577308.6484
10023	108+33.99	0.0000	546324.3097	577302.6908



\$FILES \$DATES



ADDENDUMS / REVISIONS	



**US 301,  
NORFOLK SOUTHERN RR TO SR 896**

CONTRACT T200911301	BRIDGE NO.
COUNTY NEW CASTLE	DESIGNED BY: MRM
	CHECKED BY: DJG

**UNT TO DRAWYER CREEK  
HORIZONTAL AND  
VERTICAL CONTROL**

ST-01
SHEET NO. 134
TOTAL SHTS. 240

**CONSTRUCTION ALIGNMENT CONTROL**

POINT	STATION	OFFSET	NORTHING	EASTING
10024	108+53.91	0.0000	546304.3958	577302.3674
10025	108+88.07	0.0000	546270.8681	577296.5591
10026	108+91.66	0.0000	546267.4682	577295.4066
10027	109+10.82	0.0000	546248.6344	577295.2650
10028	109+25.97	0.0000	546234.2113	577299.9134
10029	109+61.79	0.0000	546199.1925	577298.2876
10030	109+75.55	0.0000	546186.5417	577292.8707
10031	110+55.30	0.0000	546108.4184	577285.2007
10032	111+23.96	0.0000	546042.3683	577270.8789
10033	111+27.42	0.0000	546039.6149	577268.7880
10200	200+96.34	-158.7160	546709.4541	577453.6240
10202	202+70.54	17.8318	546626.2568	577157.1204
10204	203+81.36	-3.6148	546510.1319	577135.6813
10206	205+07.36	35.4122	546403.2039	577038.0141
10208	205+81.53	0.0000	546339.7923	577105.1244
10209	205+91.53	0.0000	546332.9244	577112.3929
10210	205+99.53	0.0000	546327.4300	577118.2077
10211	207+96.45	0.0000	546196.5361	577265.3190
10212	208+24.65	-5.2693	546176.0093	577287.0431
10214	104+07.50	-11.3250	546751.5784	577355.0937
10216	108+70.99	-1.3398	546287.1773	577302.0877
10218	109+01.24	1.5971	546258.0748	577292.2224
10220	109+43.88	-3.3881	546216.3977	577305.6546
10222	110+15.43	6.3636	546148.6945	577276.6649
10224	110+89.63	-7.9786	546071.5239	577293.0198

**CIRCULAR CURVE NO. 15**

	STATION	NORTHING	EASTING
PC ( 10009)	208+04.89	546190.7369	577271.4564
PI ( 10212)	208+26.33	546176.0093	577287.0431
CC ( 10213)		546160.9360	577243.2979
PT ( 10010)	208+44.41	546154.8063	577283.8371
Radius:		41.0000	
Delta:		55° 13' 16.9242" Right	
Degree of Curvature(Arc):		139° 44' 44.8933"	
Length:		39.5156	
Tangent:		21.4440	
Chord:		38.0038	
Middle Ordinate:		4.6692	
External:		5.2693	
Tangent Direction:		S 46° 37' 23.5507" E	
Radial Direction:		S 43° 22' 36.4493" W	
Chord Direction:		S 19° 00' 45.0886" E	
Radial Direction:		N 81° 24' 06.6265" W	
Tangent Direction:		S 8° 35' 53.3735" W	

**CIRCULAR CURVE NO. 14**

	STATION	NORTHING	EASTING
PC ( 10007)	204+38.98	546467.0902	577096.3674
PI ( 10206)	205+25.51	546403.2039	577038.0141
CC ( 10207)		546407.7422	577161.3428
PT ( 10008)	205+75.73	546343.7791	577100.9050
Radius:		88.0000	
Delta:		89° 01' 53.5028" Left	
Degree of Curvature(Arc):		65° 06' 31.8253"	
Length:		136.7426	
Tangent:		86.5250	
Chord:		123.3946	
Middle Ordinate:		25.2509	
External:		35.4122	
Tangent Direction:		S 42° 24' 29.9521" W	
Radial Direction:		N 47° 35' 30.0479" W	
Chord Direction:		S 2° 06' 26.7993" E	
Radial Direction:		S 43° 22' 36.4493" W	
Tangent Direction:		S 46° 37' 23.5507" E	

**CIRCULAR CURVE NO. 18**

	STATION	NORTHING	EASTING
PC ( 10026)	108+91.66	546267.4682	577295.4066
PI ( 10218)	109+01.58	546258.0748	577292.2224
CC ( 10219)		546257.8371	577323.8186
PT ( 10027)	109+10.82	546248.6344	577295.2650
Radius:		30.0000	
Delta:		36° 35' 22.2184" Left	
Degree of Curvature(Arc):		190° 59' 09.3542"	
Length:		19.1582	
Tangent:		9.9185	
Chord:		18.8343	
Middle Ordinate:		1.5164	
External:		1.5971	
Tangent Direction:		S 18° 43' 32.7545" W	
Radial Direction:		N 71° 16' 27.2455" W	
Chord Direction:		S 0° 25' 51.6453" W	
Radial Direction:		S 72° 08' 10.5361" W	
Tangent Direction:		S 17° 51' 49.4639" E	

**CIRCULAR CURVE NO. 17**

	STATION	NORTHING	EASTING
PC ( 10024)	108+53.91	546304.3958	577302.3674
PI ( 10216)	108+71.13	546287.1773	577302.0877
CC ( 10217)		546306.1824	577192.3819
PT ( 10025)	108+88.07	546270.8681	577296.5591
Radius:		110.0000	
Delta:		17° 47' 42.6505" Right	
Degree of Curvature(Arc):		52° 05' 13.4602"	
Length:		34.1643	
Tangent:		17.2208	
Chord:		34.0271	
Middle Ordinate:		1.3237	
External:		1.3398	
Tangent Direction:		S 0° 55' 50.1040" W	
Radial Direction:		N 89° 04' 09.8960" W	
Chord Direction:		S 9° 49' 41.4293" W	
Radial Direction:		N 71° 16' 27.2455" W	
Tangent Direction:		S 18° 43' 32.7545" W	

**CIRCULAR CURVE NO. 16**

	STATION	NORTHING	EASTING
PC ( 10014)	103+78.46	546765.1390	577324.0515
PI ( 10214)	104+12.33	546751.5784	577355.0937
CC ( 10215)		546723.9019	577306.0374
PT ( 10015)	104+36.53	546717.9965	577350.6483
Radius:		45.0000	
Delta:		73° 56' 34.7206" Right	
Degree of Curvature(Arc):		127° 19' 26.2361"	
Length:		58.0747	
Tangent:		33.8748	
Chord:		54.1276	
Middle Ordinate:		9.0479	
External:		11.3250	
Tangent Direction:		S 66° 24' 07.9727" E	
Radial Direction:		S 23° 35' 52.0273" W	
Chord Direction:		S 29° 25' 50.6123" E	
Radial Direction:		N 82° 27' 33.2520" W	
Tangent Direction:		S 7° 32' 26.7480" W	

**CIRCULAR CURVE NO. 21**

	STATION	NORTHING	EASTING
PRC ( 10031)	110+55.30	546107.3376	577285.4298
PI ( 10224)	110+91.91	546071.5239	577293.0198
CC ( 10225)		546090.7514	577207.1680
PT ( 10032)	111+23.96	546042.3688	577270.8793
Radius:		80.0000	
Delta:		49° 10' 44.3719" Right	
Degree of Curvature(Arc):		71° 37' 11.0078"	
Length:		68.6668	
Tangent:		36.6091	
Chord:		66.5783	
Middle Ordinate:		7.2550	
External:		7.9786	
Tangent Direction:		S 11° 57' 56.6710" E	
Radial Direction:		S 78° 02' 03.3290" W	
Chord Direction:		S 12° 37' 25.5150" W	
Radial Direction:		N 52° 47' 12.2990" W	
Tangent Direction:		S 37° 12' 47.7010" W	

**CIRCULAR CURVE NO. 20**

	STATION	NORTHING	EASTING
PC ( 10030)	109+75.55	546186.5417	577292.8706
PI ( 10222)	110+16.72	546148.6945	577276.6649
CC ( 10223)		546135.3708	577412.3761
PRC ( 10031)	110+55.30	546108.4184	577285.2007
Radius:		130.0000	
Delta:		35° 08' 44.8694" Left	
Degree of Curvature(Arc):		44° 04' 25.2356"	
Length:		79.7433	
Tangent:		41.1708	
Chord:		78.4989	
Middle Ordinate:		6.0666	
External:		6.3636	
Tangent Direction:		S 23° 10' 48.1984" W	
Radial Direction:		N 66° 49' 11.8016" W	
Chord Direction:		S 5° 36' 25.7637" W	
Radial Direction:		S 78° 02' 03.3290" W	
Tangent Direction:		S 11° 57' 56.6710" E	

**CIRCULAR CURVE NO. 19**

	STATION	NORTHING	EASTING
PC ( 10028)	109+25.97	546234.2113	577299.9134
PI ( 10220)	109+44.69	546216.3977	577305.6546
CC ( 10221)		546218.8736	577252.3240
PT ( 10029)	109+61.79	546199.1925	577298.2876
Radius:		50.0000	
Delta:		41° 02' 37.6623" Right	
Degree of Curvature(Arc):		114° 35' 29.6125"	
Length:		35.6175	
Tangent:		18.7160	
Chord:		35.0565	
Middle Ordinate:		3.1731	
External:		3.3881	
Tangent Direction:		S 17° 51' 49.4639" E	
Radial Direction:		S 72° 08' 10.5361" W	
Chord Direction:		S 2° 39' 29.3672" W	
Radial Direction:		N 66° 49' 11.8016" W	
Tangent Direction:		S 23° 10' 48.1984" W	

SDATES \$FILEAS



ADDENDUMS / REVISIONS	

**NOT TO SCALE**

**US 301,  
NORFOLK SOUTHERN RR TO SR 896**

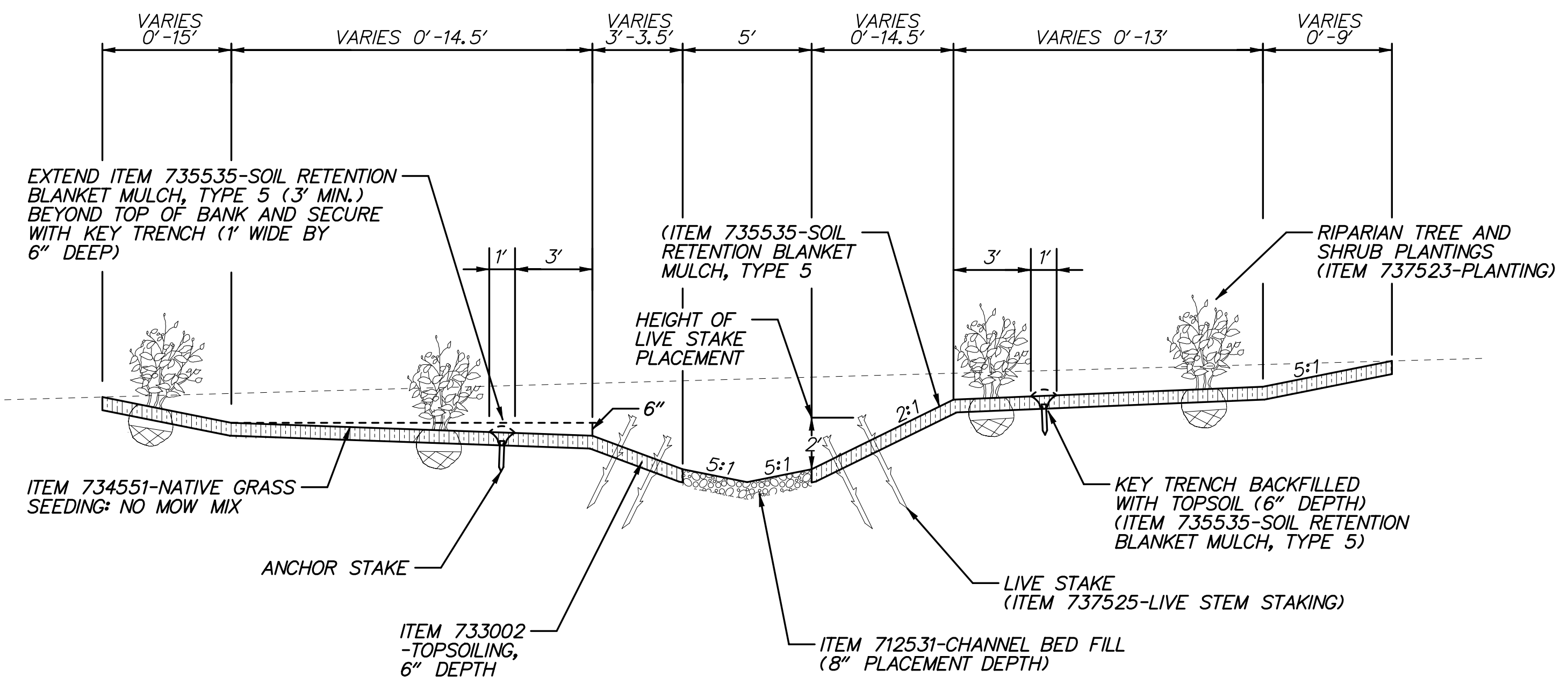
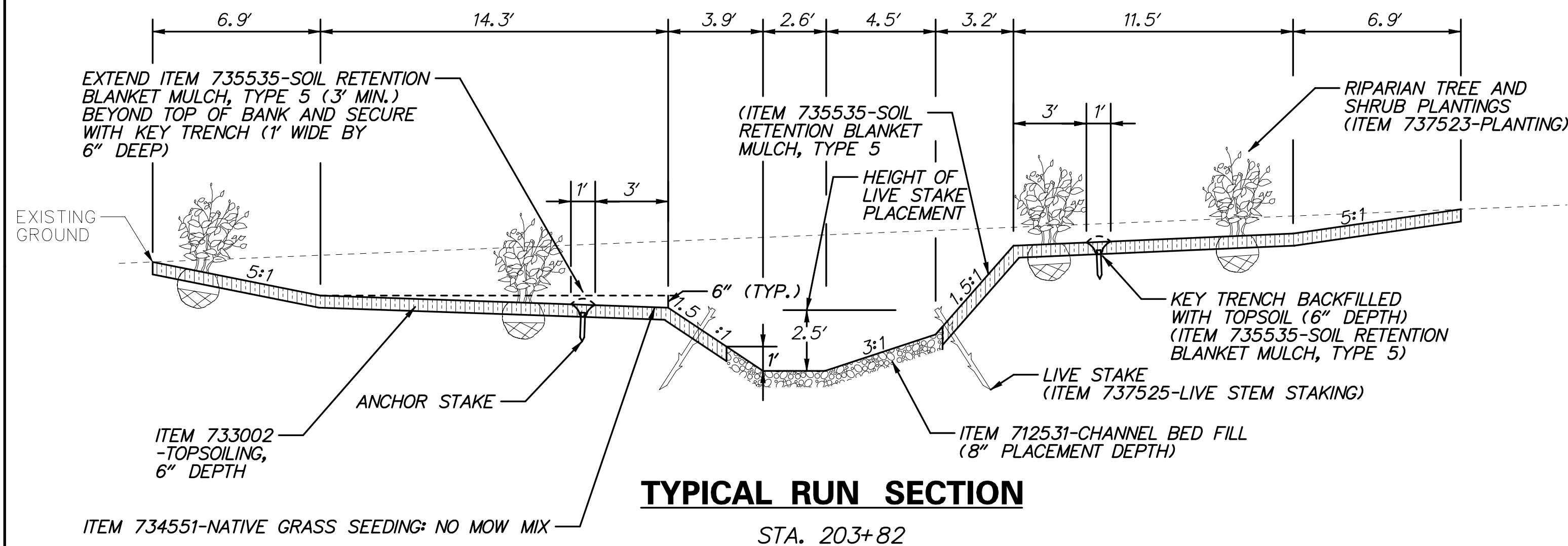
CONTRACT	BRIDGE NO.
T20091301	
COUNTY	DESIGNED BY: MRM
NEW CASTLE	CHECKED BY: DJG

**UNT TO DRAWYER CREEK  
HORIZONTAL AND  
VERTICAL CONTROL**

ST-02
SHEET NO.
135
TOTAL SHTS.
240

**ITEM 712531-CHANNEL BED FILL**

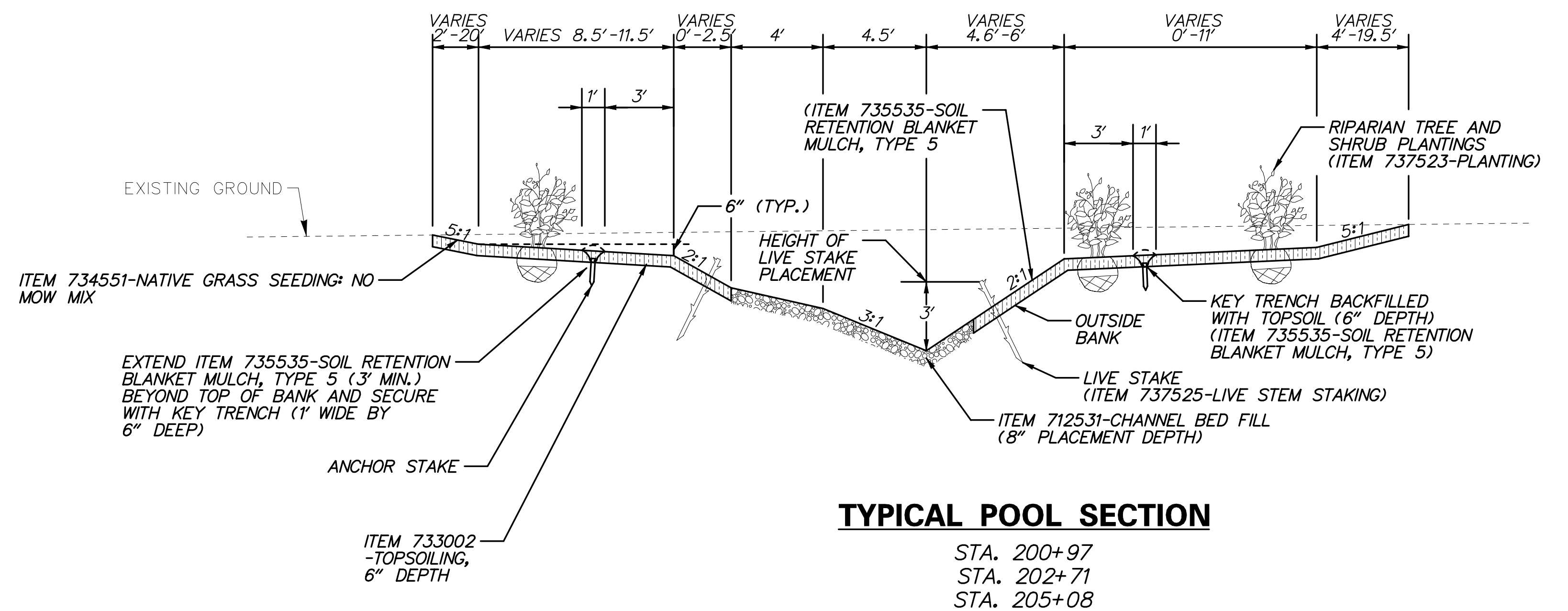
PARTICLE SIZE CLASS	SIZE (INCHES)
D5	0.05
D15	0.75
D30	1.5
D50	2
D90	4.5
D100	8



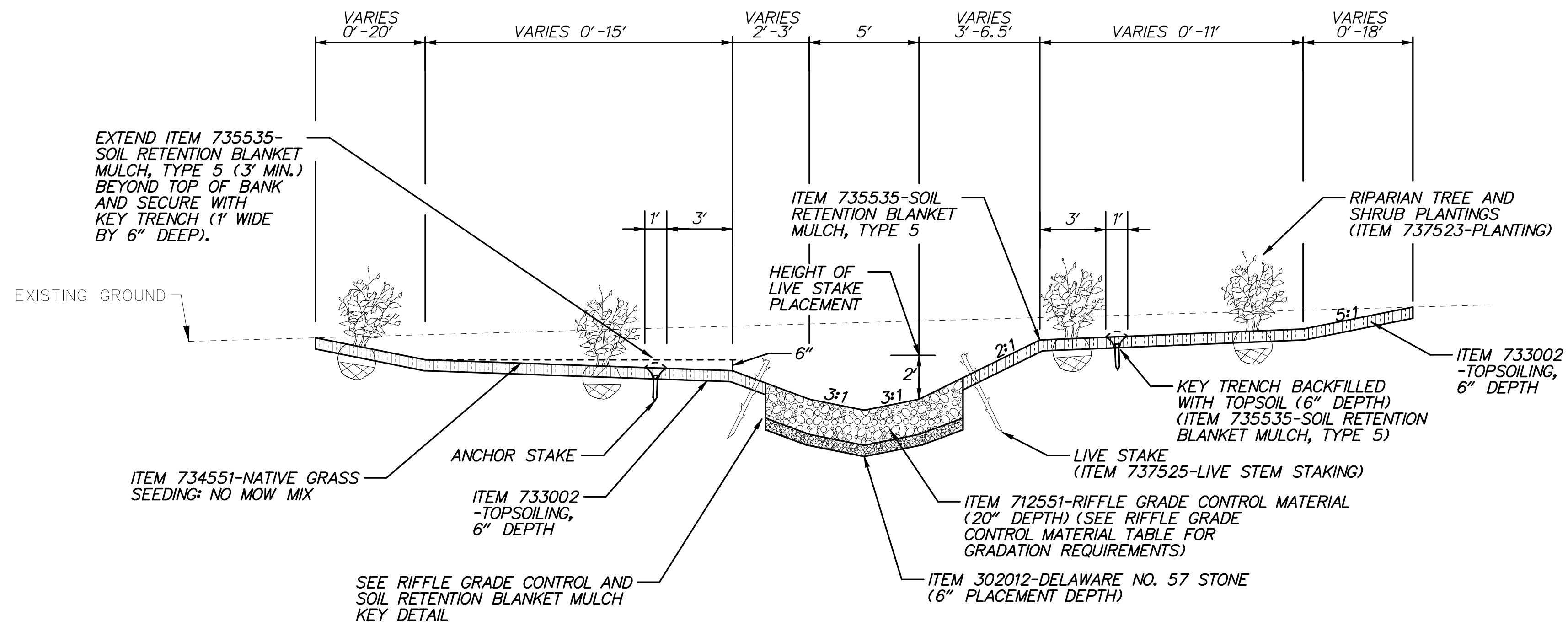
**NOTES:**

- SEE UNIT TO DRAWYER CREEK CROSS SECTIONS FOR DETAILED INFORMATION OF PROPOSED GRADE.
- THE TYPICAL POOL AND RUN SECTIONS REPRESENT THE PROPOSED CHANNEL GEOMETRY TO BE CONSTRUCTED AT THE SPECIFIED STATIONS. THE PROPOSED POOL/RUN GEOMETRY TRANSITIONS INTO THE CHANNEL GEOMETRY (RIFFLES AND EXISTING) LOCATED UPSTREAM AND DOWNSTREAM OF THE PROPOSED POOL/RUN SECTION. SEE THE UNIT TO DRAWYER CREEK CROSS SECTIONS FOR DETAILED DEPICTION OF PROPOSED GRADE AND CROSS SECTIONS REPRESENTING THE CHANNEL TRANSITIONING BETWEEN POOL/RUN SECTIONS AND RIFFLES/EXISTING GEOMETRY.
- SEE SOIL RETENTION BLANKET MULCH AND BIOENGINEERING STABILIZATION WITH TOE ANCHOR TRENCH DETAIL FOR DETAILS ON HOW TO SECURE THE SOIL RETENTION BLANKET MULCH, TYPE 5 ALONG THE TOP-OF-BANK AND BOTTOM-OF-BANK AREAS.
- ROCK TOE PROTECTION IS PROPOSED FROM STA. 200+00 TO STA. 201+93, LT; FROM STA. 204+39 TO STA. 205+76, RT; AND FROM STA. 208+20 TO STA. 208+44, LT. SEE UNIT TO DRAWYER CREEK CROSS SECTIONS FOR OFFSETS AND ELEVATIONS OF THE TOP OF ROCK TOE PROTECTION FACE.
- SEE ROCK TOE PROTECTION WITH SOIL RETENTION BLANKET MULCH AND BIOENGINEERING STABILIZATION DETAIL FOR DETAILS ON HOW TO SECURE THE SOIL RETENTION BLANKET MULCH, TYPE 5 ALONG THE TOP-OF-BANK AND BOTTOM-OF-BANK AREAS.
- FILL ABANDONED LENGTH OF UNIT TO DRAWYER CREEK BY EXCAVATING A MINIMUM DEPTH OF 2' ALONG THE PERIMETER OF THE EXISTING CHANNEL AND BACKFILL WITH ITEM 209002 - BORROW, TYPE B. BACKFILL REMAINING EXISTING CHANNEL AREA WITH ITEM 209006 - BORROW, TYPE F.
- DIVERT STREAM FLOW INTO THE NEWLY CONSTRUCTED CHANNEL AND PIPE UPON COMPLETION AND STABILIZATION OF ALL PROPOSED WORK AND FOLLOWING APPROVAL BY THE ENGINEER. IMMEDIATELY STABILIZE ANY DISTURBANCE RESULTING FROM THE REMOVAL OF TEMPORARY SEDIMENT AND EROSION CONTROL PRACTICES.
- THE DEPARTMENT WILL PROVIDE A STREAM RESTORATION SPECIALIST TO CONDUCT GENERAL CONSTRUCTION OVERSIGHT DURING CRITICAL PHASES OF CONSTRUCTION INVOLVING THE STREAM GRADING ALONG THE UNNAMED TRIBUTARY TO DRAWYER CREEK. THE CONTRACTOR IS REQUIRED TO COORDINATE WITH THE ENGINEER AND HIS STREAM RESTORATION SPECIALIST A MINIMUM OF TWO WEEKS PRIOR TO BEGINNING WORK IN THE UNNAMED TRIBUTARY TO DRAWYER CREEK.
- PRIOR TO PERFORMING ANY WORK ALONG THE STREAM REALIGNMENT OF THE UNNAMED TRIBUTARY TO DRAWYER CREEK, THE CONTRACTOR SHALL PERFORM SUFFICIENT FIELD SURVEYS TO VERIFY THE PRECONSTRUCTION GROUND SURFACE WITHIN THE GRADING LIMITS OF THE STREAM REALIGNMENT. THE CONTRACTOR IS REQUIRED TO COORDINATE RESULTS OF THE SURVEY WITH THE ENGINEER AND HIS STREAM RESTORATION SPECIALIST A MINIMUM OF TWO WEEKS PRIOR TO BEGINNING WORK IN THE UNNAMED TRIBUTARY TO DRAWYER CREEK. THIS WORK IS INCIDENTAL TO ITEM 763501 - CONSTRUCTION ENGINEERING.
- ANY TOPSOIL BEING PLACED IN ACCORDANCE WITH THE UNIT TO DRAWYER CREEK STREAM RESTORATION PLANS, INCLUDING ITEM 733002-TOPSOILING, 6" DEPTH, SHALL HAVE A MINIMUM ORGANIC MATTER CONTENT OF 10% IN ACCORDANCE WITH AASHTO T194. NO ADDITIONAL PAYMENT WILL BE MADE FOR ACTIONS NECESSARY TO MEET THIS REQUIREMENT.

- SOW ITEM 734551-NATIVE GRASS SEEDING: NO MOW MIX INTO TOPSOIL PRIOR TO INSTALLING ITEM 735535-SOIL RETENTION BLANKET MULCH, TYPE 5.
- LOCATION OF THE OUTSIDE BANK ALONG TYPICAL POOL SECTIONS VARIES BETWEEN THE LEFT AND RIGHT BANK (FACING DOWNSTREAM/UPSTREAM). SEE THE CROSS SECTIONS FOR THE LOCATION OF THE OUTSIDE BANK (SHEETS ST-13 TO ST-18).



\$FILES& \$DATES

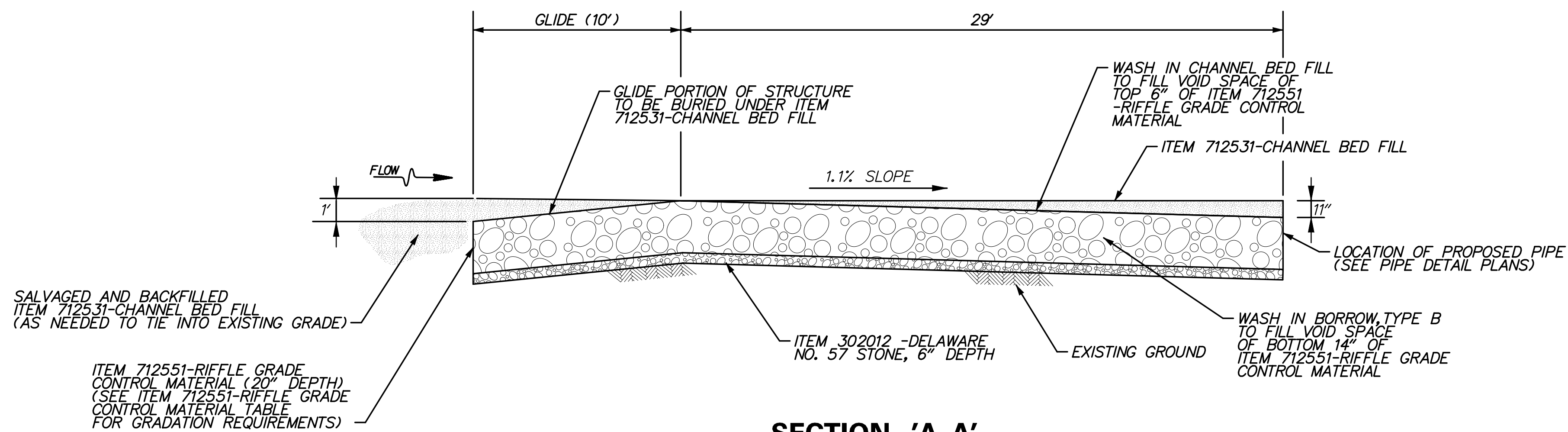


**SECTION 'B-B'  
RIFFLE GRADE CONTROL**

STA. 205+76  
STA. 201+93 TO STA. 202+14 (SEE ST-05)

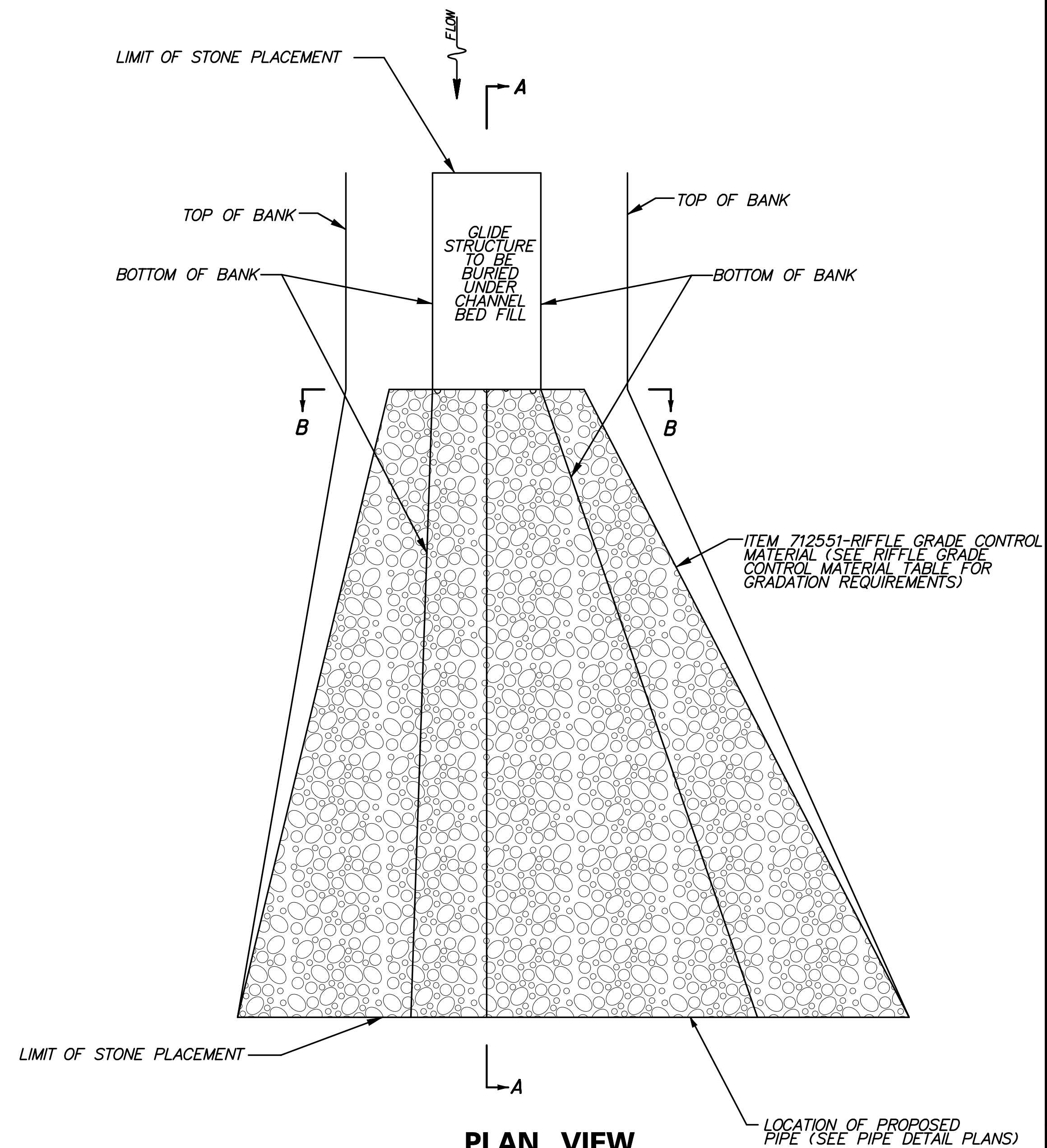
**NOTES:**

1. MINIMIZE PROTRUSIONS OF ITEM 712551-RIFFLE GRADE CONTROL MATERIAL ABOVE PROPOSED CHANNEL GRADE.
2. STATION 206+05 REPRESENTS THE LOCATION OF THE PROPOSED PIPE. THE TYPICAL RIFFLE GEOMETRY WILL TRANSITION INTO THE PROPOSED ROADWAY AND PIPE GRADING AT THIS POINT. SEE THE BR1-444A DETAILS FOR THE PROPOSED CHANNEL GEOMETRY AT THE PROPOSED PIPE INLET.
3. WASH IN BORROW, TYPE B TO FILL VOID SPACE OF BOTTOM 14" OF ITEM 712551-RIFFLE GRADE CONTROL MATERIAL. WASH IN ITEM 712531-CHANNEL BED FILL TO FILL VOID SPACE OF TOP 6" OF ITEM 712551-RIFFLE GRADE CONTROL MATERIAL. PAYMENT OF BORROW TYPE B AND CHANNEL BED FILL WASHED INTO THE VOID SPACE IS INCIDENTAL TO PAYMENT OF ITEM 712551-RIFFLE GRADE CONTROL MATERIAL.
4. CROSS SECTION DIMENSIONS OF THE RIFFLE GRADE CONTROL ARE VARIABLE. SEE UNIT TO DRAWYER CREEK CROSS-SECTIONS (SHEETS ST-13 TO ST-18) FOR DIMENSIONS.
5. STATION LIMITS PROVIDED WITH THE RIFFLE CONTROL DETAILS REPRESENT THE "AT GRADE" PORTION OF THE RIFFLE GRADE CONTROL. ADDITIONAL RIFFLE CONTROL MATERIAL IS PLACED ALONG THE GLIDE AND RUN AREAS, AS SHOWN ON THE DETAILS, UNLESS OTHERWISE NOTED.



**SECTION 'A-A'  
RIFFLE GRADE CONTROL**

STA. 205+76 TO STA. 206+05



**PLAN VIEW  
RIFFLE GRADE CONTROL**

STA. 205+76 TO STA. 206+05

**ITEM 712551-RIFFLE GRADE CONTROL MATERIAL**

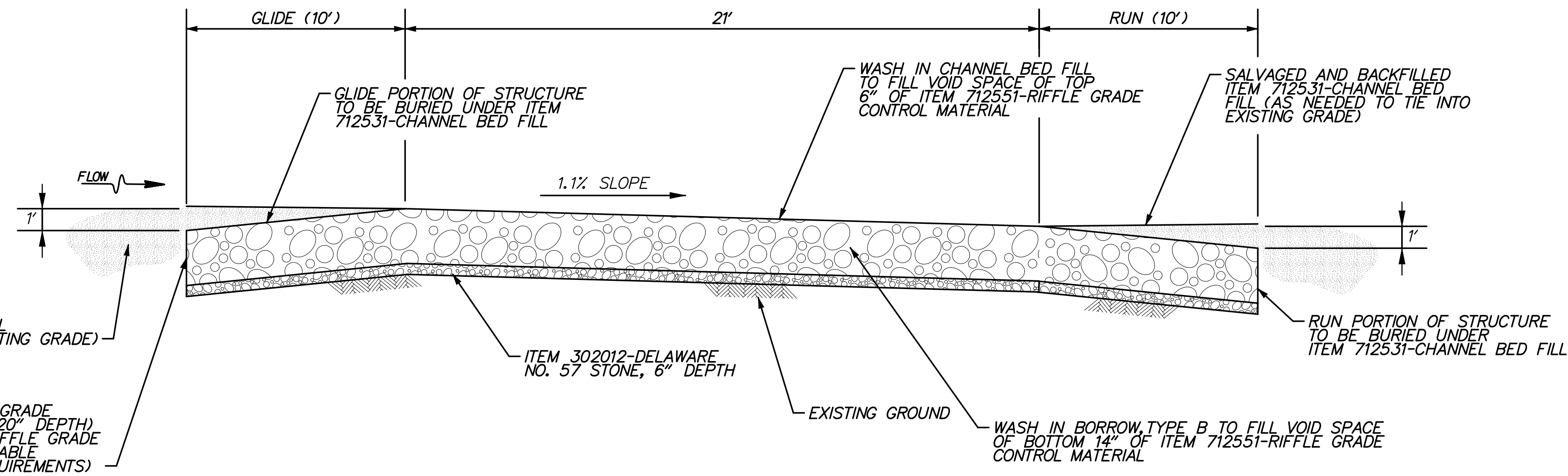
PARTICLE SIZE CLASS	SIZE (INCHES)
D5	0.5
D15	1.5
D30	2.0
D50	7.0
D90	12.0
D100	14.0

MEETING THE REQUIREMENTS OF THE RIFFLE GRADE CONTROL MATERIAL CAN BE ACCOMPLISHED BY A MIX CONSISTING OF 60% RIPRAP, R-5, 20% RIPRAP, R-4, AND 20% DELAWARE NO. 1 STONE SHALL CONFORM TO REQUIREMENTS IN SECTION 712.04 AND 813.

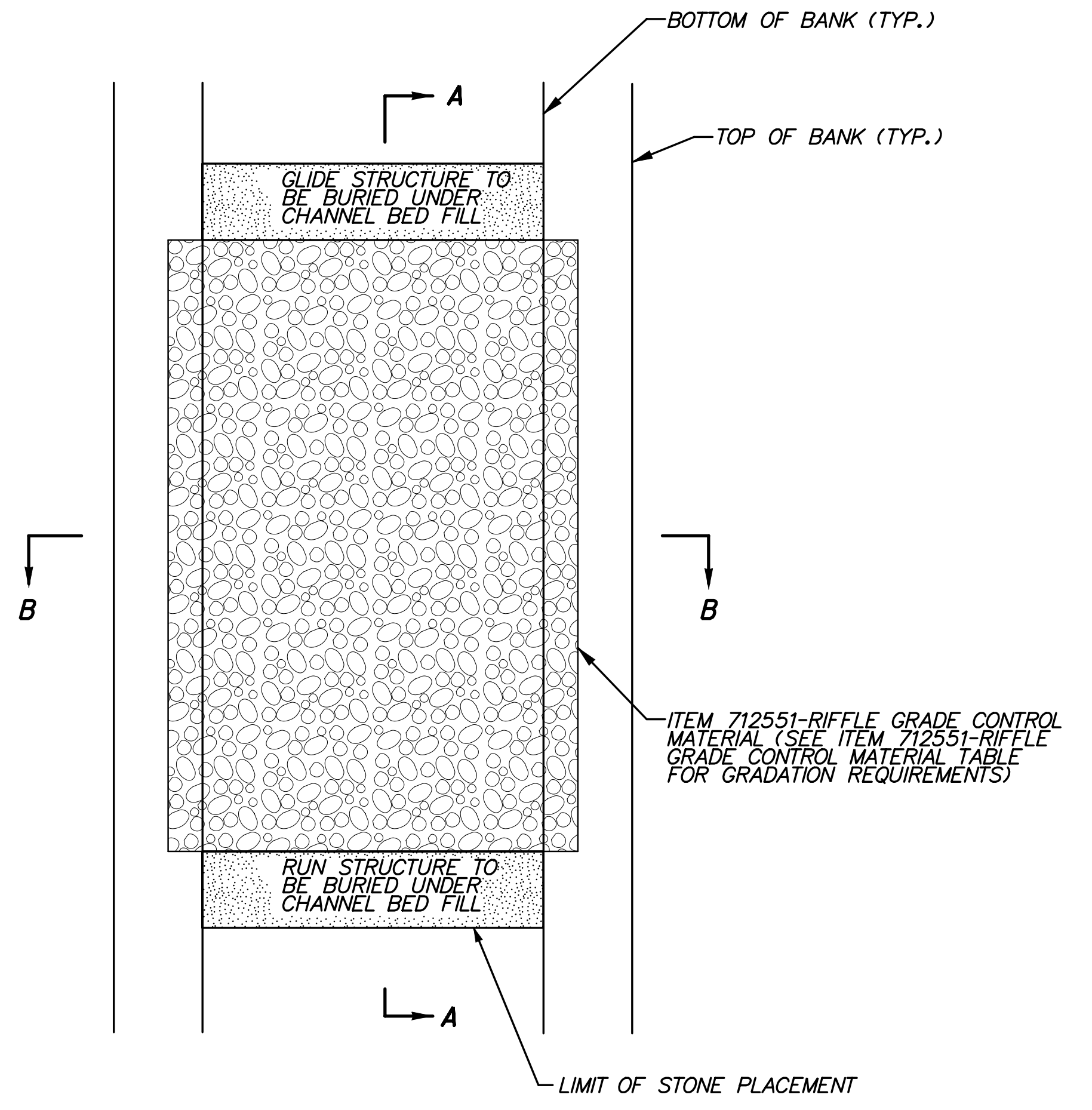
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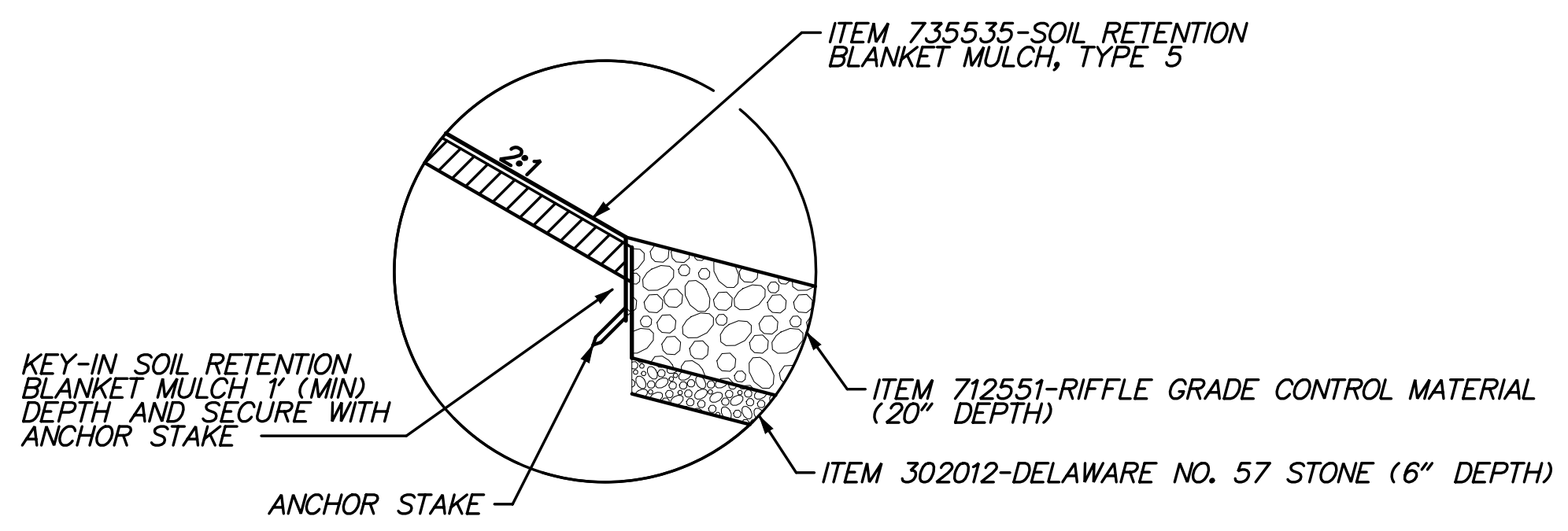
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**SECTION 'A-A'**  
**RIFFLE GRADE CONTROL**  
 STA. 201+93 TO STA. 202+14

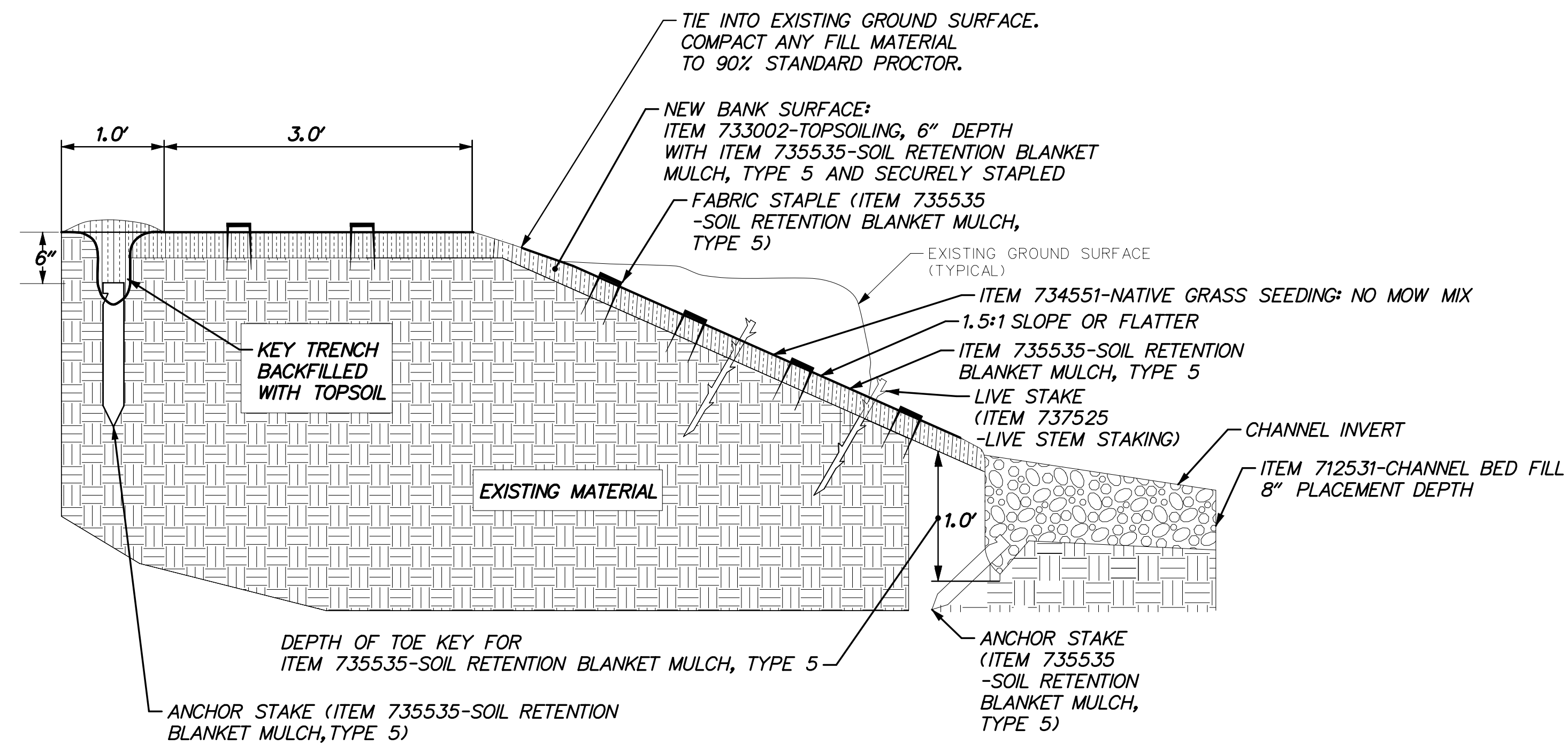


**PLAN VIEW**  
**RIFFLE GRADE CONTROL**  
 STA. 201+93 TO STA. 202+14

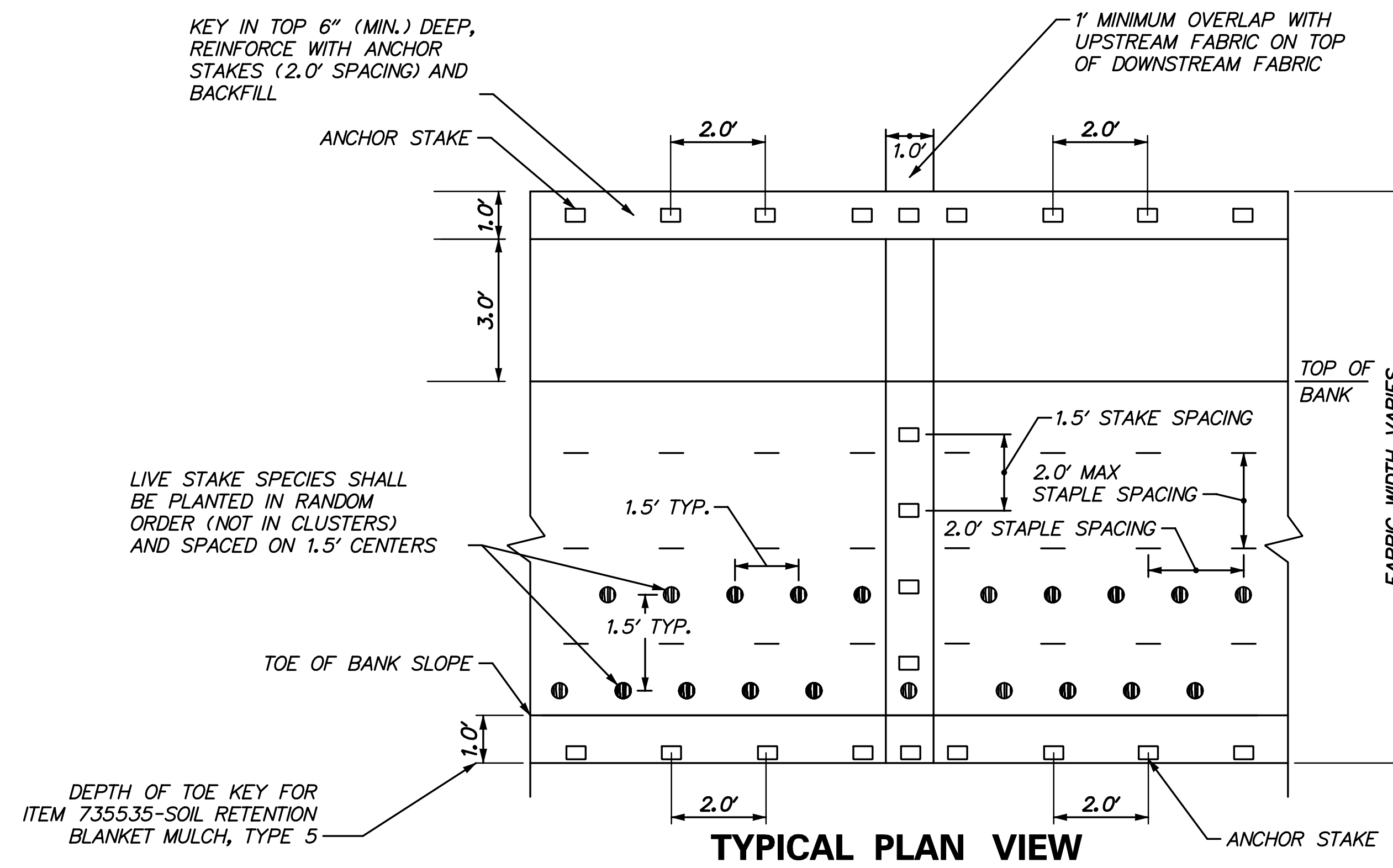


**RIFFLE GRADE CONTROL AND SOIL RETENTION**  
**BLANKET MULCH KEY DETAIL**

NOTE:  
 SEE SHEET ST-04 UNT TO DRAWYER CREEK  
 CONSTRUCTION DETAILS FOR SECTION 'B-B'  
 RIFFLE GRADE CONTROL



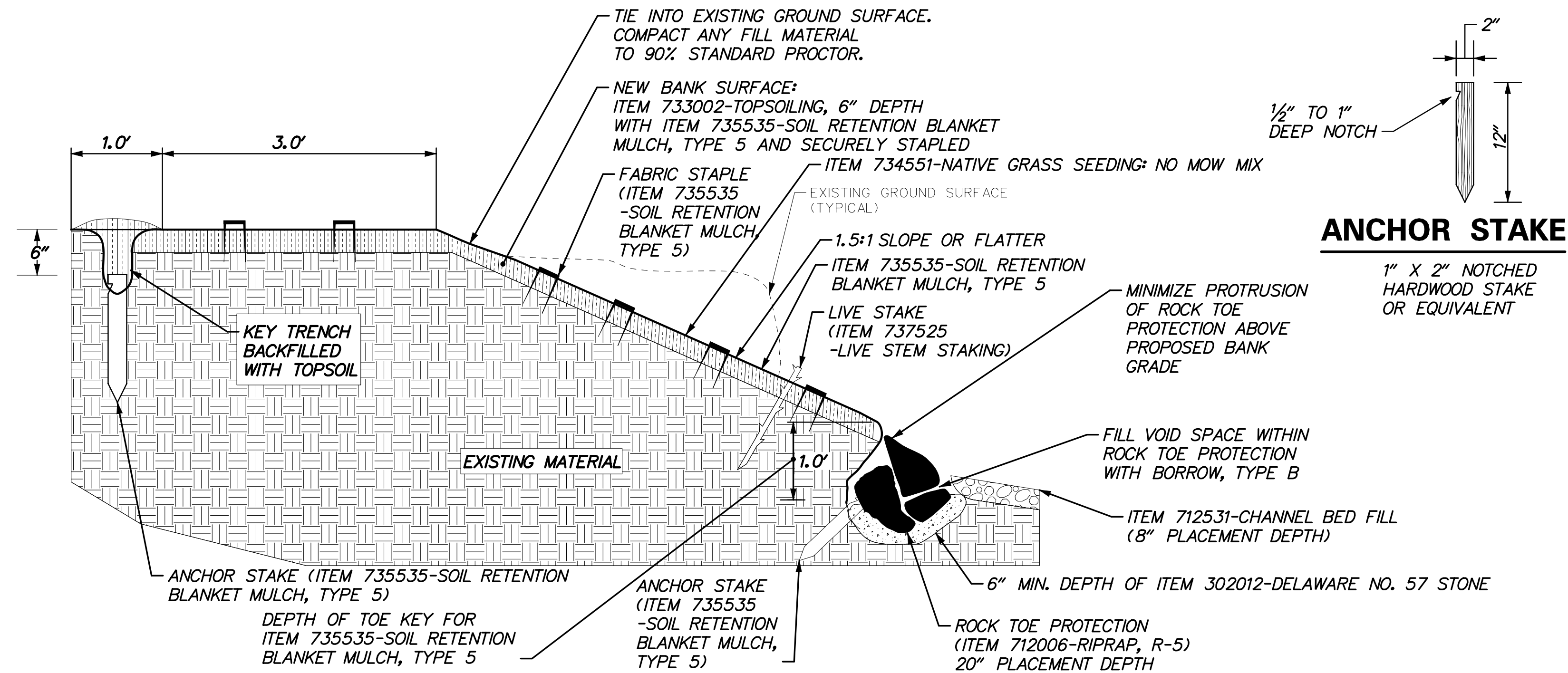
**SOIL RETENTION BLANKET MULCH AND BIOENGINEERING  
STABILIZATION WITH TOE ANCHOR TRENCH**



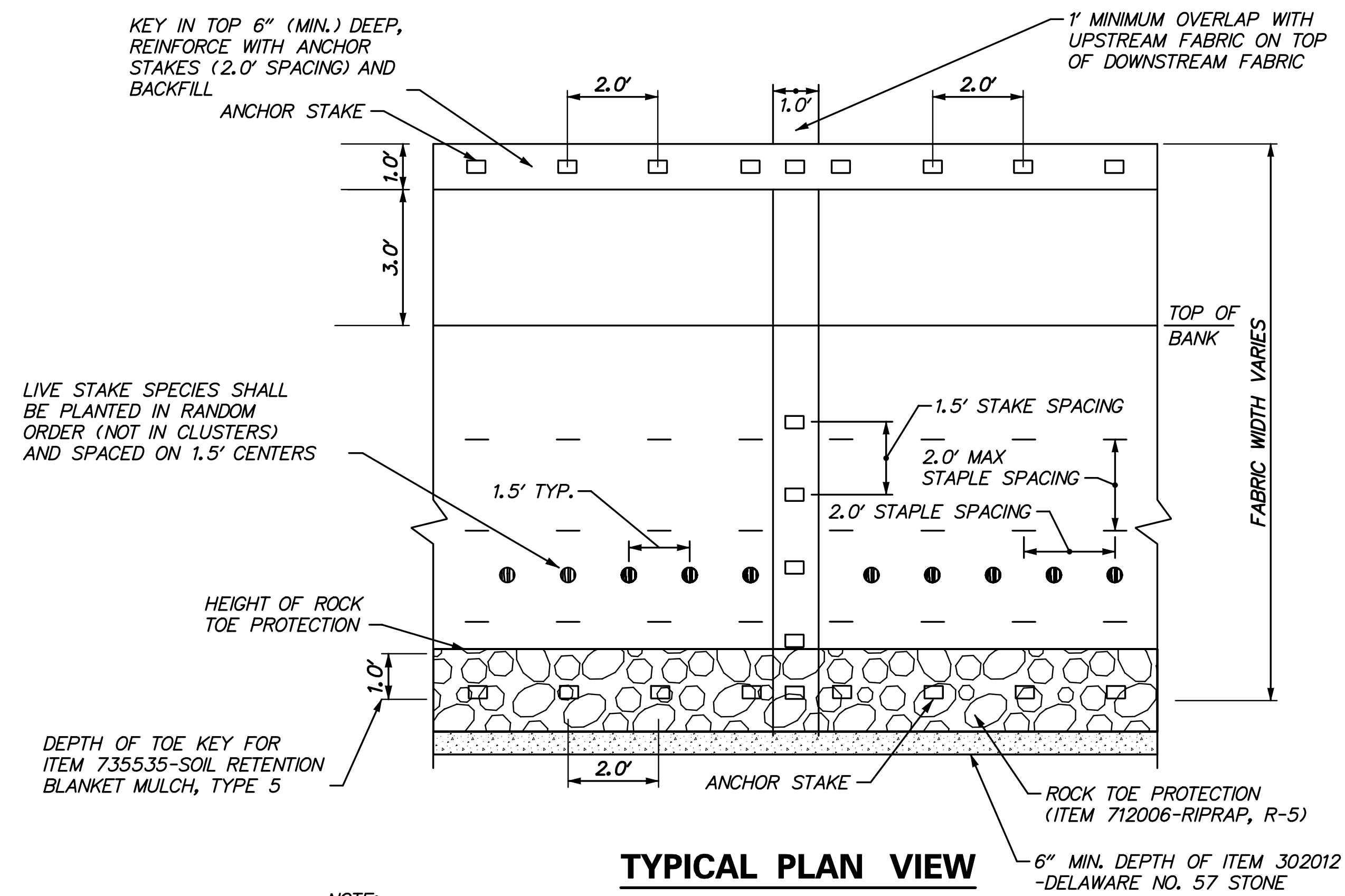
**NOTE:**  
BLANKET MULCH TO BE ROLLED LENGTHWISE ALONG STREAMBANK EXTENDING BELOW THE TOE ANCHOR TRENCH AND A MINIMUM OF 1.0' OVER TOP OF BANK. IF MORE THAN ONE ROLL IS REQUIRED, MID-BANK OVERLAP SHOULD BE A MINIMUM OF 1.0' AND SECURELY FASTENED WITH ANCHOR STAKES. TOP EDGE OF BLANKET MULCH SHALL BE KEYED INTO EXISTING GROUND SURFACE AT A MINIMUM DEPTH OF 6" AND FASTENED W/ANCHOR STAKES SPACED EVERY 2.0'.

**PLAN VIEW OF SOIL RETENTION BLANKET MULCH AND BIOENGINEERING  
STABILIZATION WITH TOE ANCHOR TRENCH**

\$FILES \$DATES



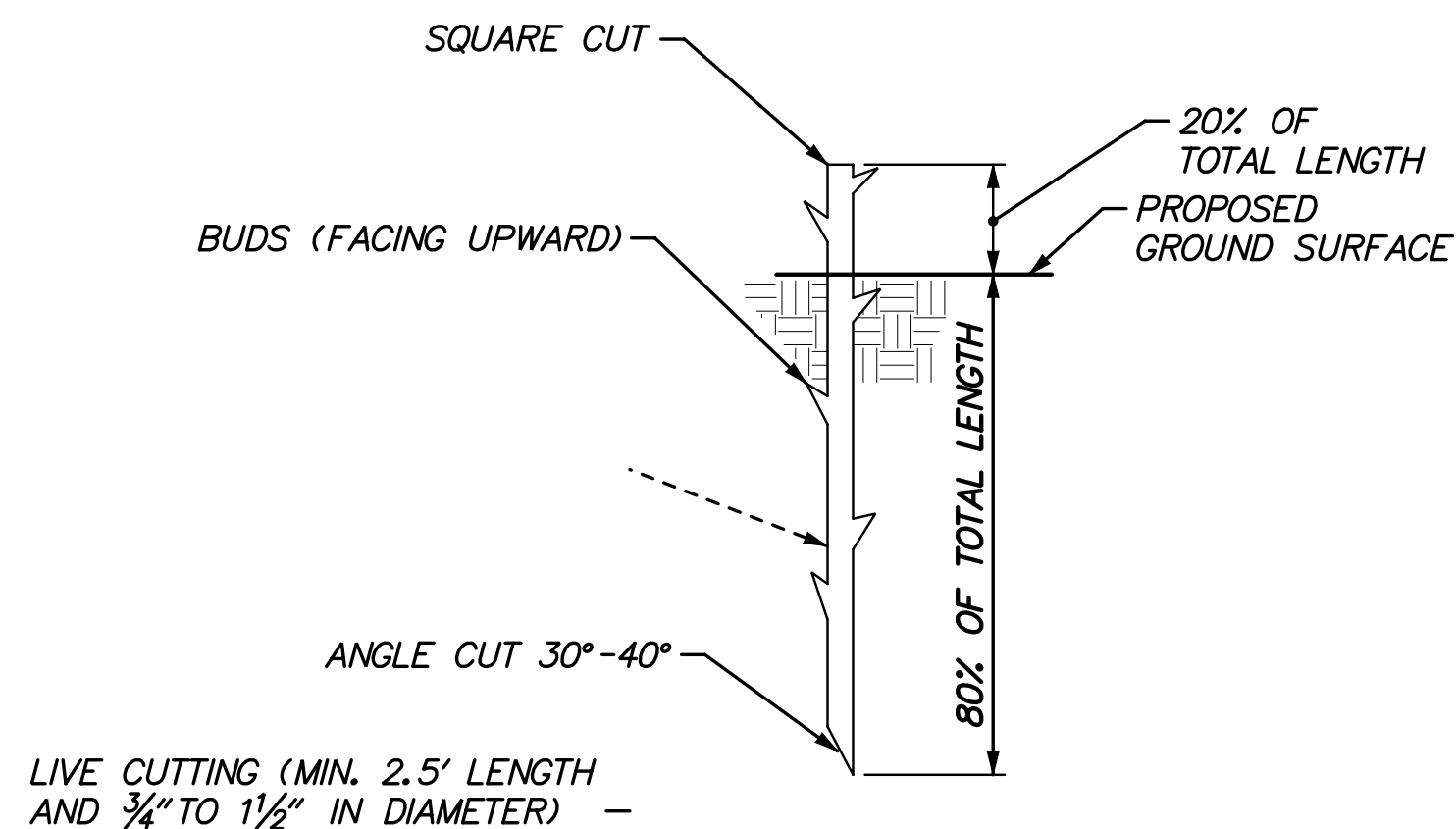
**ROCK TOE PROTECTION WITH SOIL RETENTION BLANKET  
MULCH AND BIOENGINEERING STABILIZATION**



NOTE:  
BLANKET MULCH TO BE ROLLED LENGTHWISE ALONG STREAMBANK EXTENDING BELOW THE TOE ANCHOR TRENCH AND A MINIMUM OF 1.0' OVER TOP OF BANK. IF MORE THAN ONE ROLL IS REQUIRED, MID-BANK OVERLAP SHOULD BE A MINIMUM OF 1.0' AND SECURELY FASTENED WITH ANCHOR STAKES. TOP EDGE OF BLANKET MULCH SHALL BE KEYED INTO EXISTING GROUND SURFACE AT A MINIMUM DEPTH OF 6" AND FASTENED W/ANCHOR STAKES SPACED EVERY 2.0'.

**PLAN VIEW OF ROCK TOE PROTECTION WITH SOIL RETENTION  
BLANKET MULCH AND BIOENGINEERING STABILIZATION**

\$FILES \$DATES



NOTE:  
LIVE STAKES SHALL BE INSTALLED WHILE DORMANT  
(LATE FALL TO EARLY SPRING).

**LIVE STAKE**

**LIVE STAKE NOTES**

1. HARVESTING AND INSTALLATION OF LIVE STAKE MATERIALS SHALL TAKE PLACE DURING THE DORMANT PERIOD OF THE YEAR; GENERALLY NOVEMBER 1 THROUGH MARCH 31. IF COMPLETION OF GRADING DOES NOT OCCUR WITHIN THIS WINDOW; THAT IS, IF THE CONTRACTOR HAS NOT COMPLETED HARVESTING AND INSTALLATION ON OR BEFORE MARCH 31, THE CONTRACTOR SHALL WAIT UNTIL THE DORMANT PERIOD THAT BEGINS ON THE FOLLOWING NOVEMBER 1 TO HARVEST AND INSTALL THE REMAINING LIVE STAKES.
2. LIVE STAKE MATERIALS SHALL BE PURCHASED FROM A NURSERY SPECIALIZING IN THE PRODUCTION OF SIMILAR MATERIALS AND SHALL INCLUDE CONFIRMATION OF SPECIES. EACH LIVE STAKE SHALL CONFORM TO THE RANGE OF DIMENSIONS SPECIFIED IN THE DETAIL.
3. LIVE STAKES SHALL BE TRANSPORTED IN CLIMATE-CONTROLLED CONDITIONS TO INSURE AGAINST TEMPERATURES GREATER THAN 50 DEGREES FAHRENHEIT. LIVE STAKES STORED ON SITE SHALL BE KEPT MOIST, SHADED, AND PROTECTED AGAINST DESICCATION. MATERIALS STORED OFFSITE SHALL BE REFRIGERATED AND KEPT MOIST. IN NO CASE SHALL NON-REFRIGERATED MATERIALS BE STORED LONGER THAN FIVE (5) CALENDAR DAYS.
4. DURING INSTALLATION, LIVE STAKES SHALL BE KEPT DAMP BY EITHER COVERING WITH WET BURLAP OR HEELING INTO MOIST MULCH UNTIL READY FOR USE. STAKES SHALL BE INSPECTED FOR SIGNS OF DESICCATION, INCLUDING BUT NOT LIMITED TO BLACKENING OF CUT ENDS AND LENGTHWISE WRINKLING OF BARK, AND ALL UNSUITABLE MATERIALS SHALL BE APPROPRIATELY DISCARDED.
5. THE CONTRACTOR SHALL REMOVE ALL SIDE BRANCHES FROM ALL LIVE STAKES, CLEANLY AND WITHOUT CAUSING DAMAGE TO BARK. BUDS SHALL BE ORIENTED TOWARD THE TOP OF EACH STAKE. WITHIN TWO (2) HOURS PRIOR TO INSTALLATION, USING PRUNING SHEARS OR A POWER SAW, THE CONTRACTOR SHALL CUT EACH STAKE AT AN ANGLE ON THE BOTTOM END AS INDICATED IN THE DETAIL.
6. LIVE STAKES SHALL BE INSTALLED AT APPROXIMATE EIGHTEEN (18)-INCH SPACING THROUGHOUT THE PLANTING ZONE. WITH THE APPROVAL OF THE ENGINEER, THE CONTRACTOR SHALL ACHIEVE SUCH SPACING BY PREPARING HOLES USING A POINTED DIGGING BAR, REBAR, OR OTHER SIMILAR IMPLEMENTS TO ACHIEVE BOTH THE DEPTH AND THE DIAMETER REQUIRED FOR EACH STAKE. LIVE STAKES SHALL BE DRIVEN INTO THE PREPARED HOLE USING A DEAD BLOW HAMMER UNTIL THE STAKE HAS BEEN FIRMLY PLACED AS APPROVED BY THE ENGINEER. DO NOT SPLIT THE LIVE STAKES DURING INSTALLATION. DISCARD AND REPLACE ANY LIVE STAKES THAT SHATTER DURING INSTALLATION.
7. THE CONTRACTOR SHALL FIRMLY BACKFILL ALL VOIDS SURROUNDING ALL LIVE STAKES BY HAND TAMPING THE SOIL TIGHTLY AGAINST EACH STAKE WITHOUT SCARRING THE STAKE.

\$FILES \$DATES

B-7-03

ROCK TOE PROTECTION	
STATION FROM	STATION TO
200+00, LT	201+93, LT
204+39, RT	205+76, RT

RIFFLE GRADE CONTROL	
STATION FROM	STATION TO
201+93	202+14
205+76	206+05

**NOTES:**

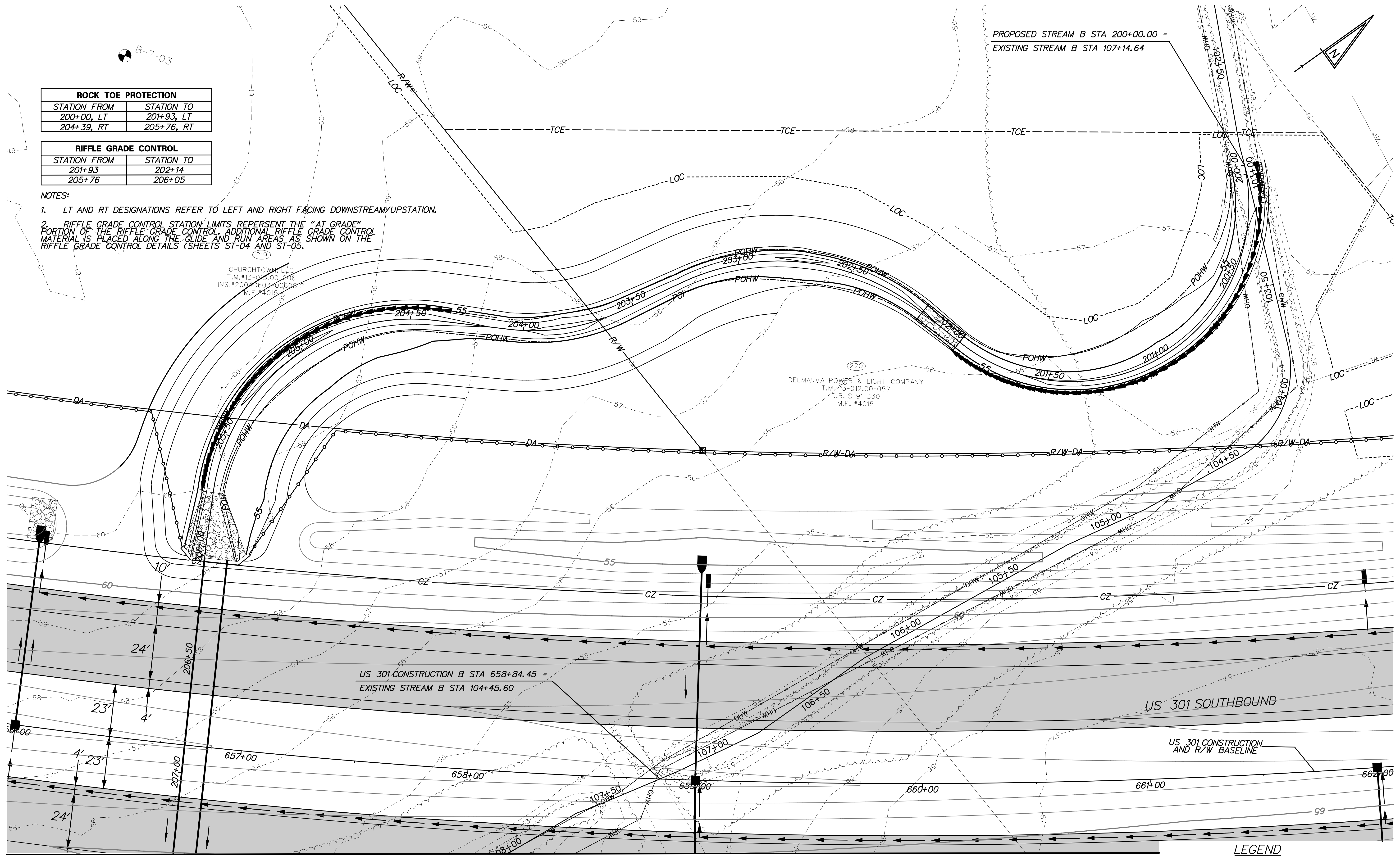
1. LT AND RT DESIGNATIONS REFER TO LEFT AND RIGHT FACING DOWNSTREAM/UPSTATION.
2. RIFFLE GRADE CONTROL STATION LIMITS REPERSENT THE "AT GRADE" PORTION OF THE RIFFLE GRADE CONTROL. ADDITIONAL RIFFLE GRADE CONTROL MATERIAL IS PLACED ALONG THE GLIDE AND RUN AREAS AS SHOWN ON THE RIFFLE GRADE CONTROL DETAILS (SHEETS ST-04 AND ST-05).

CHURCHTOWN, LLC  
 T.M.#13-013.00-206  
 INS.#200-0603-0060012  
 M.F.#4015

DELMARVA POWER & LIGHT COMPANY  
 T.M.#13-012.00-057  
 D.R.S-91-330  
 M.F.#4015

PROPOSED STREAM B STA 200+00.00 =  
 EXISTING STREAM B STA 107+14.64

\$FILES \$DATES



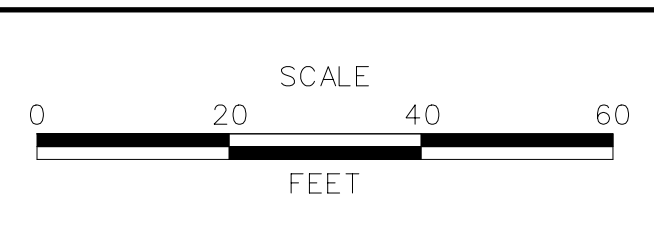
**MATCH LINE SHEET ST-10**

**LEGEND**

- ←←←←← ROCK TOE PROTECTION
- ▒ RIFFLE GRADE CONTROL

**DELAWARE**  
 DEPARTMENT OF TRANSPORTATION

ADDENDUMS / REVISIONS

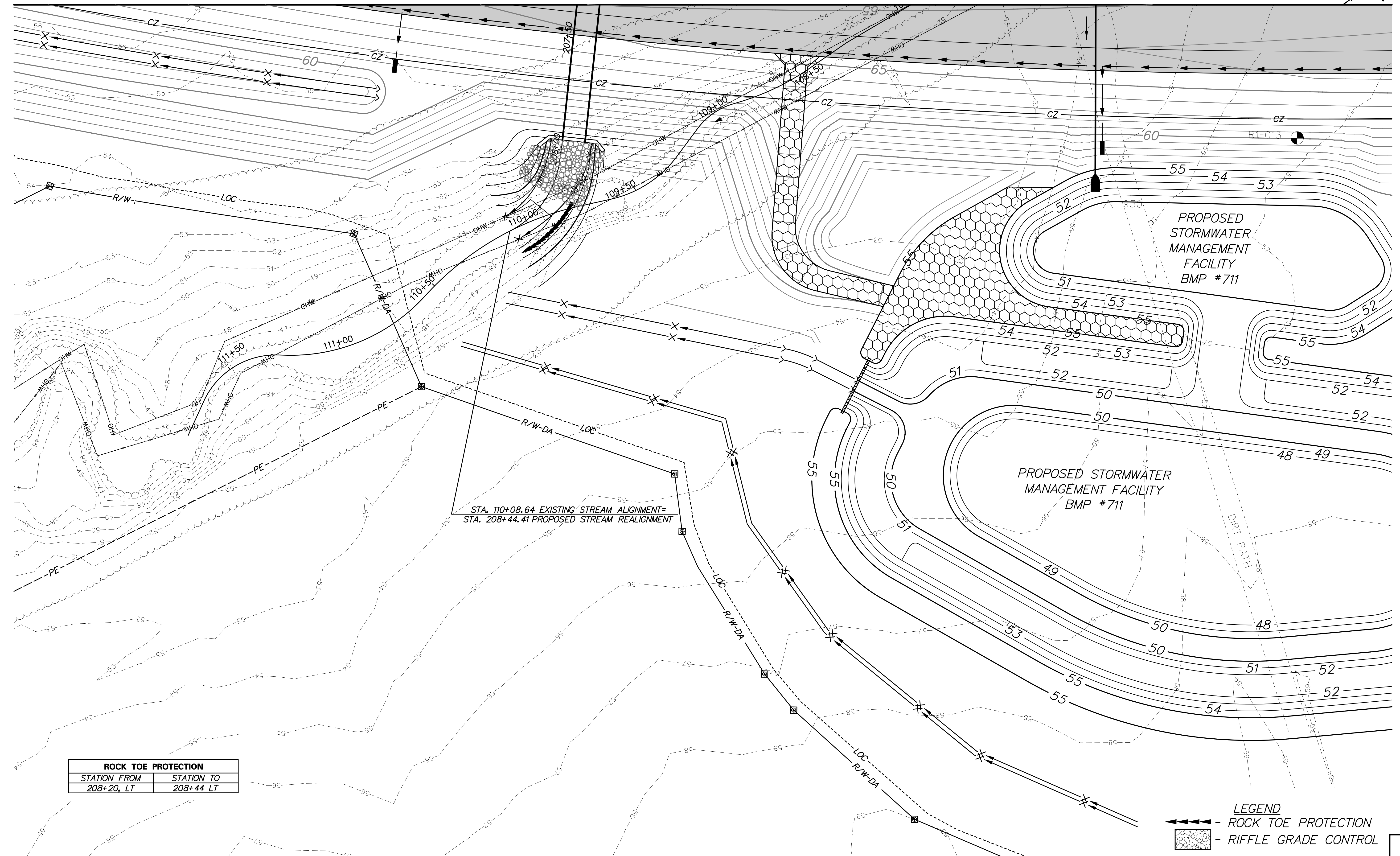
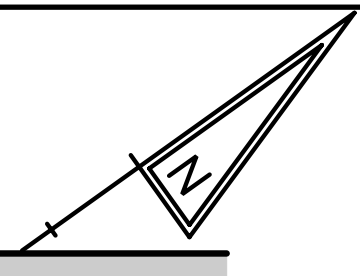


**US 301,**  
 NORFOLK SOUTHERN RR TO SR 896

CONTRACT	BRIDGE NO.
T200911301	
COUNTY	DESIGNED BY: M.R.M.
NEW CASTLE	CHECKED BY: D.J.G.

**STREAM RESTORATION**  
 UNIT TO DRAWYER CREEK  
 CONSTRUCTION PLAN

<b>ST-09</b>
SHEET NO.
142
TOTAL SHTS.
240



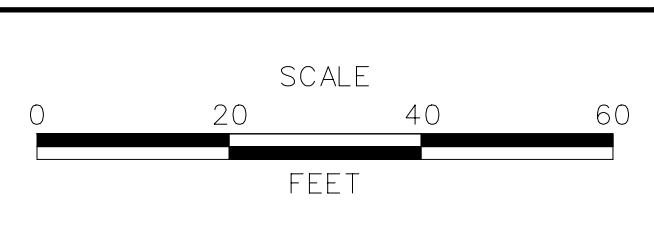
STA. 110+08.64 EXISTING STREAM ALIGNMENT=  
STA. 208+44.41 PROPOSED STREAM REALIGNMENT

ROCK TOE PROTECTION	
STATION FROM	STATION TO
208+20, LT	208+44 LT

- LEGEND**
- ROCK TOE PROTECTION
  - RIFFLE GRADE CONTROL

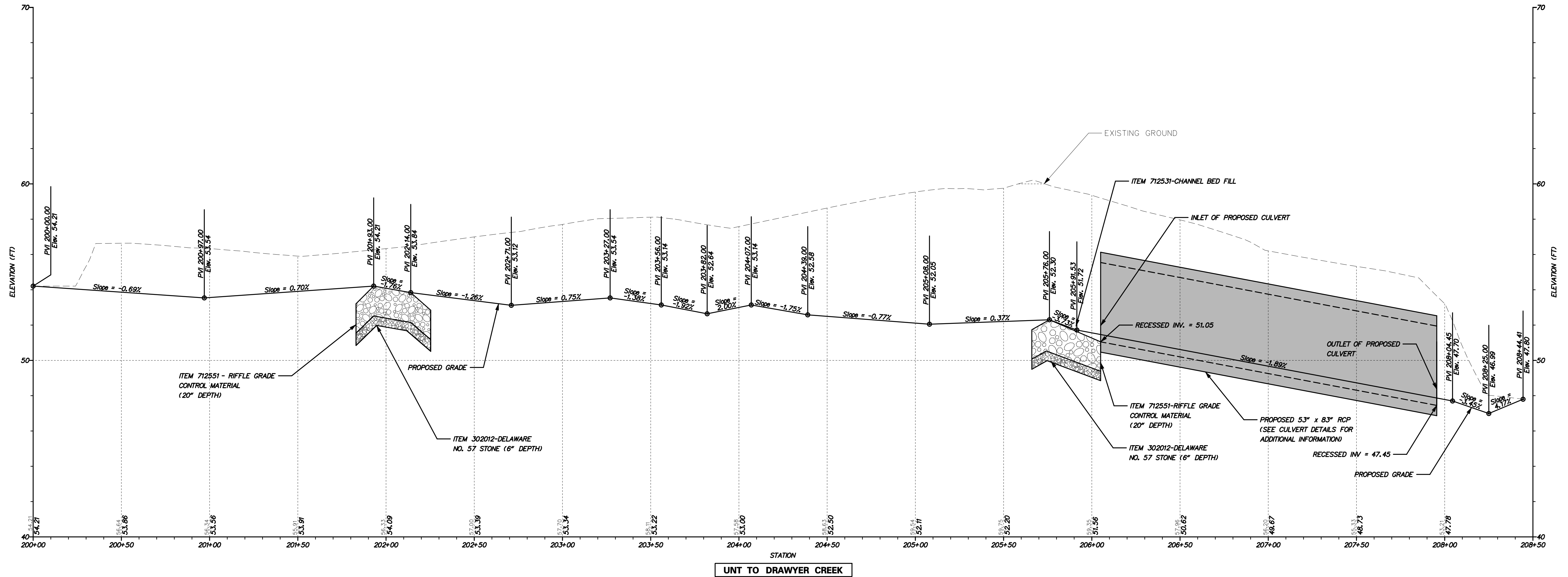
\$FILES \$DATES

ADDENDUMS / REVISIONS	



CONTRACT T200911301	BRIDGE NO.
COUNTY NEW CASTLE	DESIGNED BY: M.R.M. CHECKED BY: D.J.G.

\$FILES \$DATES



UNT TO DRAWYER CREEK



ADDENDUMS / REVISIONS

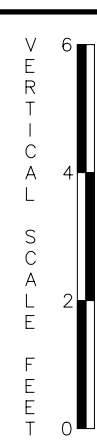


US 301,  
NORFOLK SOUTHERN RR TO SR 896

CONTRACT T200911301	BRIDGE NO.	
COUNTY NEW CASTLE	DESIGNED BY:	M.R.M.
	CHECKED BY:	D.J.G.

STREAM RESTORATION  
UNT TO DRAWYER CREEK  
PROFILE

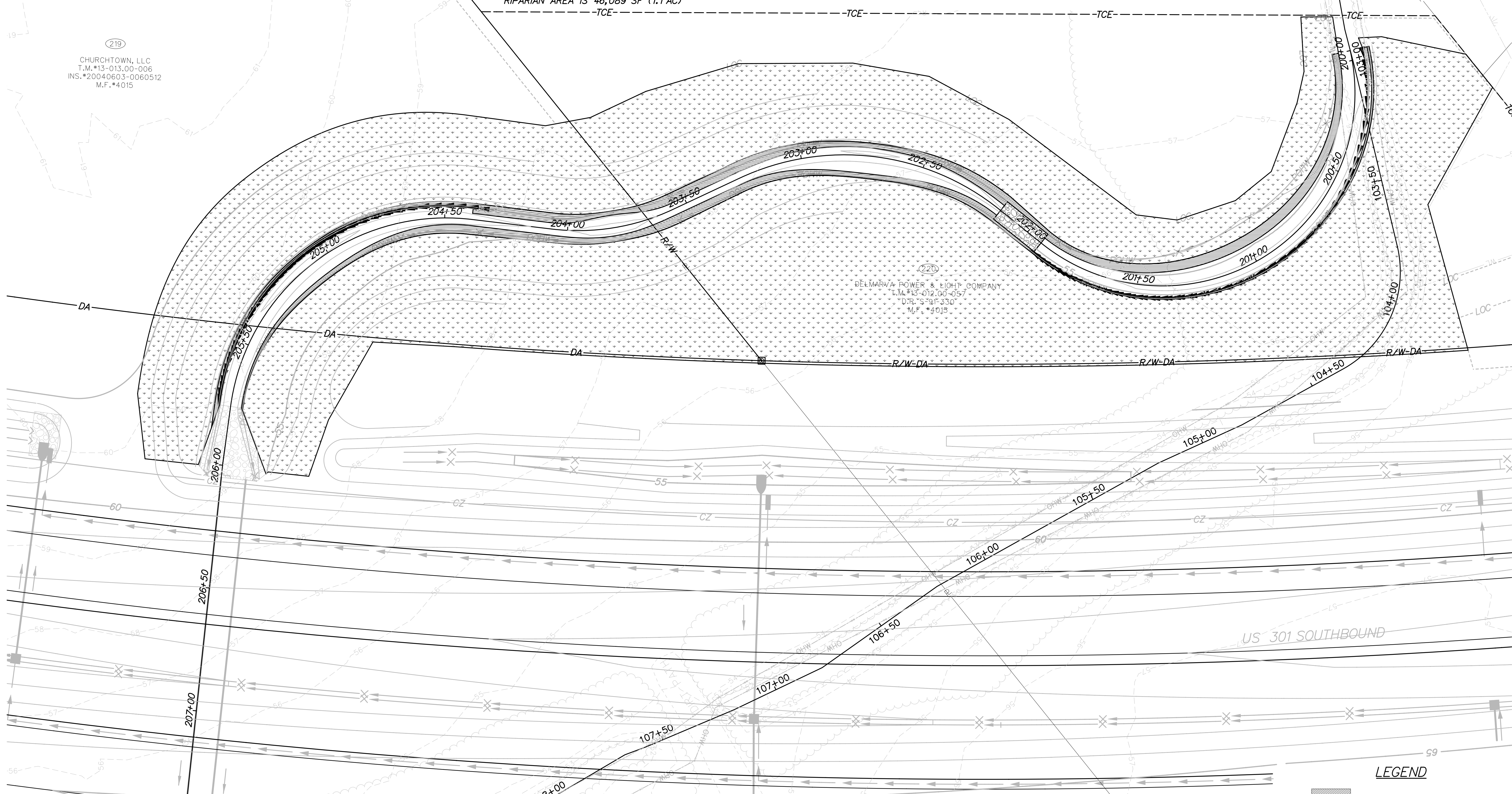
ST-11
SHEET NO. 144
TOTAL SHTS. 240



LIVE STAKE SCHEDULE (ITEM 737525-LIVE STEM STAKING)						
ZONE	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	COMMENTS
LIVE STAKE	591	CORNUS AMOMUM	SILKY DOGWOOD	2.5' MIN. LENGTH	LIVE STAKE	PLANT 18" O.C.
LIVE STAKE	590	SALIX NIGRA	BLACK WILLOW	2.5' MIN. LENGTH	LIVE STAKE	PLANT 18" O.C.

RIPARIAN PLANTING SCHEDULE (ITEM 737523-PLANTING)						
ZONE	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	COMMENTS
RIPARIAN	77	PLATANUS OCCIDENTALIS	SYCAMORE	6' - 8' HT.	BB	PLANT 10' O.C.
RIPARIAN	77	NYSSA SYLVATICA	BLACK GUM	5' - 6' HT.	BB	PLANT 10' O.C.
RIPARIAN	77	CORNUS AMOMUM	SILKY DOGWOOD	3' - 4' HT.	BB / CONT.	PLANT 10' O.C.
RIPARIAN	77	ILEX VERTICILLATA	WINTERBERRY	4' - 5' HT.	BB / CONT.	PLANT 10' O.C.
RIPARIAN	77	VIBURNUM DENTATUM	ARROWWOOD	3' - 3 1/2' HT.	BB / CONT.	PLANT 10' O.C.
RIPARIAN	76	CORYLUS AMERICANA	HAZELNUT	3' - 4' HT.	BB / CONT.	PLANT 10' O.C.

NOTE: LIVE STAKE AND RIPARIAN ZONE TO BE SEEDED WITH ITEM 734551-NATIVE GRASS SEEDING: NO MOW MIX AT A RATE OF 150 LBS./ACRE  
 NATIVE GRASS SEEDING: NO MOW MIX QUANTITY IS 5,417 SY  
 LIVE STAKE AREA IS 2,657 SF (0.06 AC)  
 RIPARIAN AREA IS 46,089 SF (1.1 AC)



219  
 CHURCHTOWN, LLC  
 T.M.#13-013.00-006  
 INS.#20040603-0060512  
 M.F.#4015

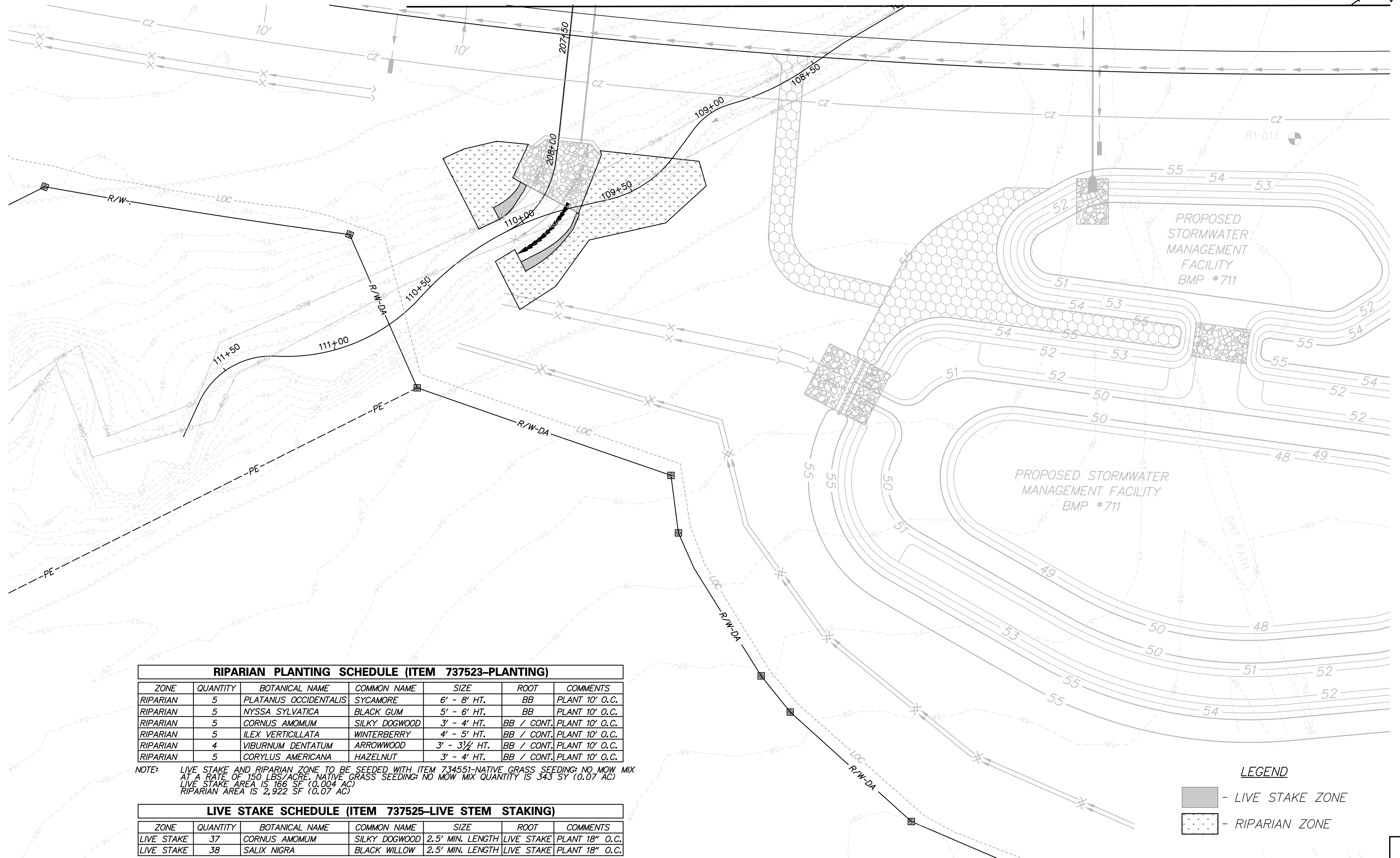
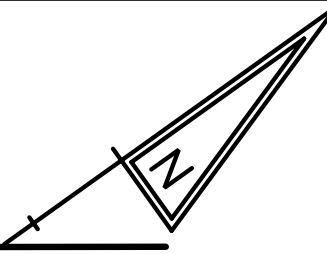
220  
 DELMARVA POWER & LIGHT COMPANY  
 T.M.#13-012.00-057  
 D.R.#91-330  
 M.F.#4019

MATCH LINE SHEET ST-13

**LEGEND**

- LIVE STAKE ZONE
- RIPARIAN ZONE





**RIPARIAN PLANTING SCHEDULE (ITEM 737523-PLANTING)**

ZONE	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	COMMENTS
RIPARIAN	5	PLATANUS OCCIDENTALIS	SYCAMORE	6' - 8' HT.	BB	PLANT 10' O.C.
RIPARIAN	5	NYSSA SYLVATICA	BLACK GUM	5' - 6' HT.	BB	PLANT 10' O.C.
RIPARIAN	5	CORNUS AMOMUM	SILKY DOGWOOD	3' - 4' HT.	BB / CONT.	PLANT 10' O.C.
RIPARIAN	5	ILEX VERTICILLATA	WINTERBERRY	4' - 5' HT.	BB / CONT.	PLANT 10' O.C.
RIPARIAN	4	VIBURNUM DENTATUM	ARROWWOOD	3' - 3 1/2' HT.	BB / CONT.	PLANT 10' O.C.
RIPARIAN	5	CORYLUS AMERICANA	HAZELNUT	3' - 4' HT.	BB / CONT.	PLANT 10' O.C.

NOTE: LIVE STAKE AND RIPARIAN ZONE TO BE SEEDED WITH ITEM 734551-NATIVE GRASS SEEDING; NO MOW MIX AT A RATE OF 150 LBS/ACRE. NATIVE GRASS SEEDING; NO MOW MIX QUANTITY IS 343 SY (0.07 AC)  
 LIVE STAKE AREA IS 166 SF (0.004 AC)  
 RIPARIAN AREA IS 2,922 SF (0.07 AC)

**LIVE STAKE SCHEDULE (ITEM 737525-LIVE STEM STAKING)**

ZONE	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	COMMENTS
LIVE STAKE	37	CORNUS AMOMUM	SILKY DOGWOOD	2.5' MIN. LENGTH	LIVE STAKE	PLANT 18" O.C.
LIVE STAKE	38	SALIX NIGRA	BLACK WILLOW	2.5' MIN. LENGTH	LIVE STAKE	PLANT 18" O.C.

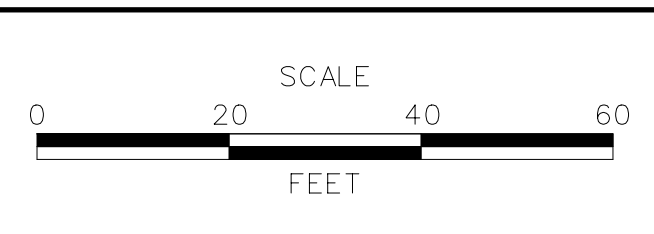
**LEGEND**

- LIVE STAKE ZONE
- RIPARIAN ZONE

\$FILES \$DATES



ADDENDUMS / REVISIONS	

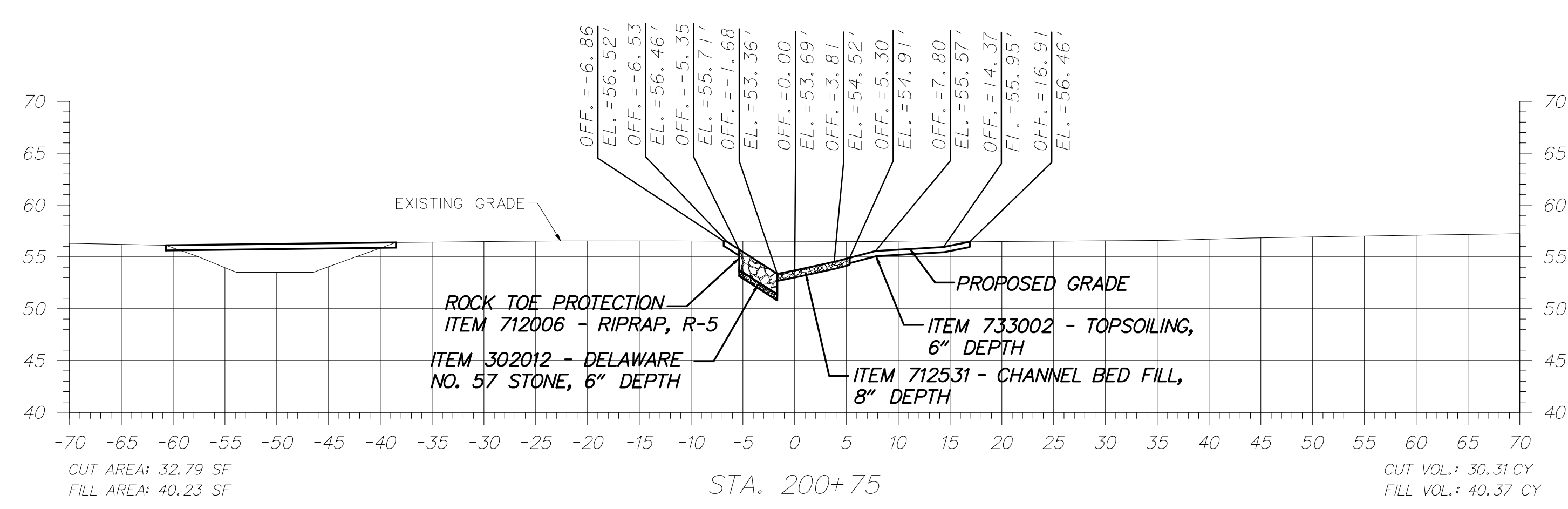
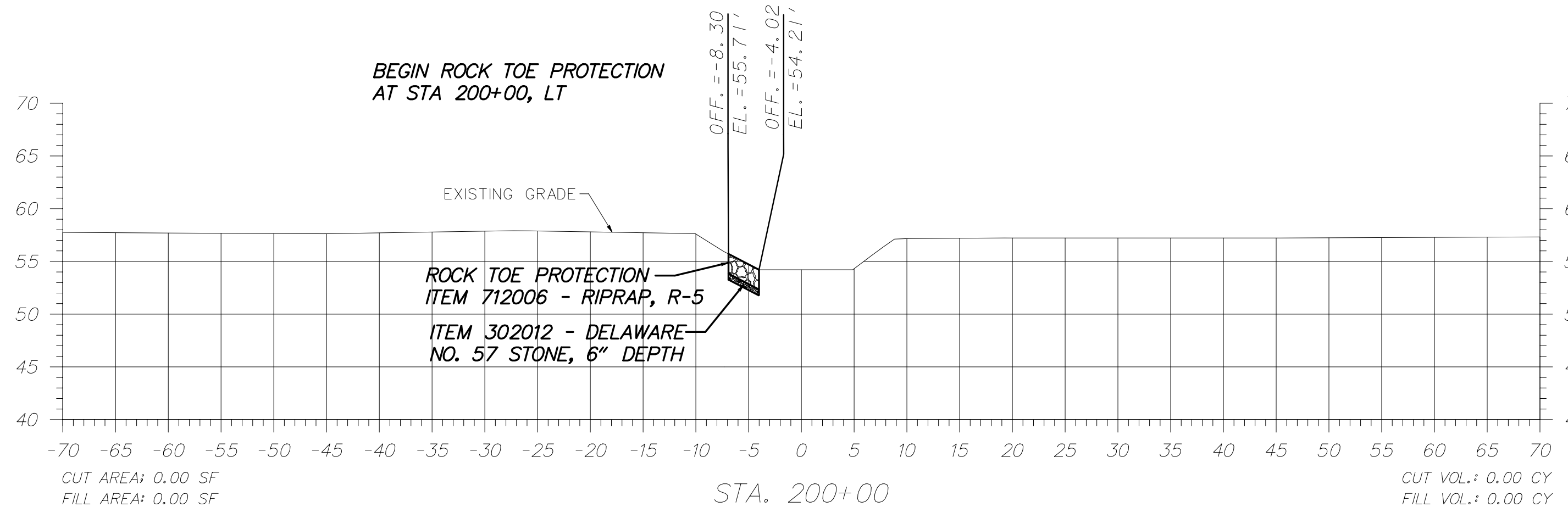
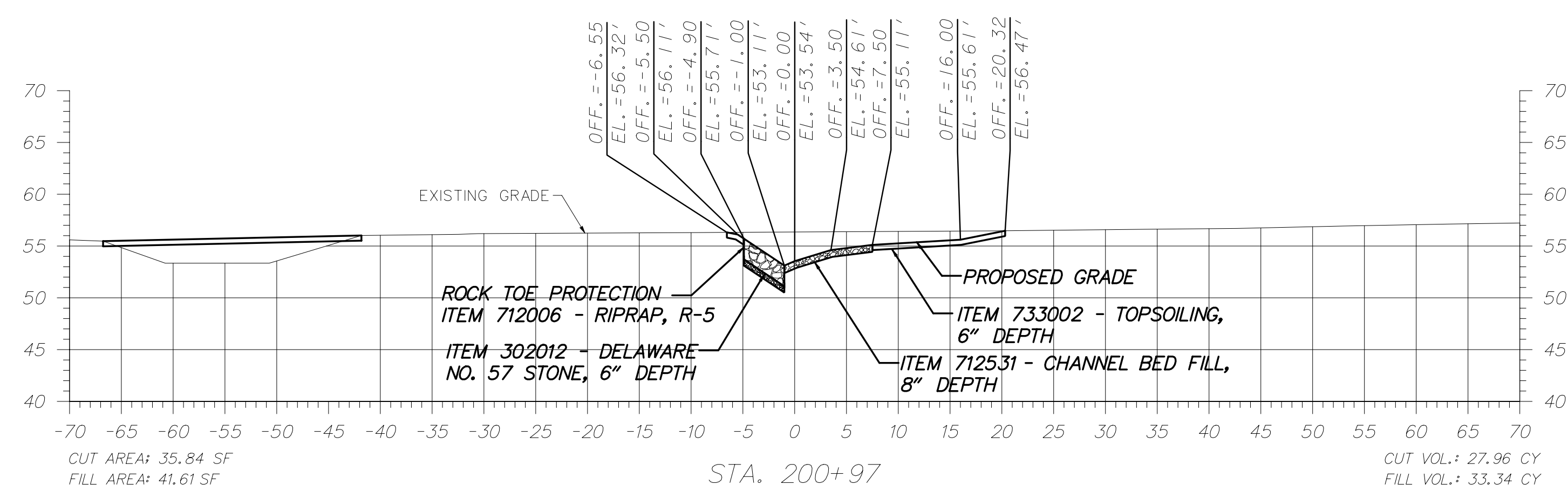
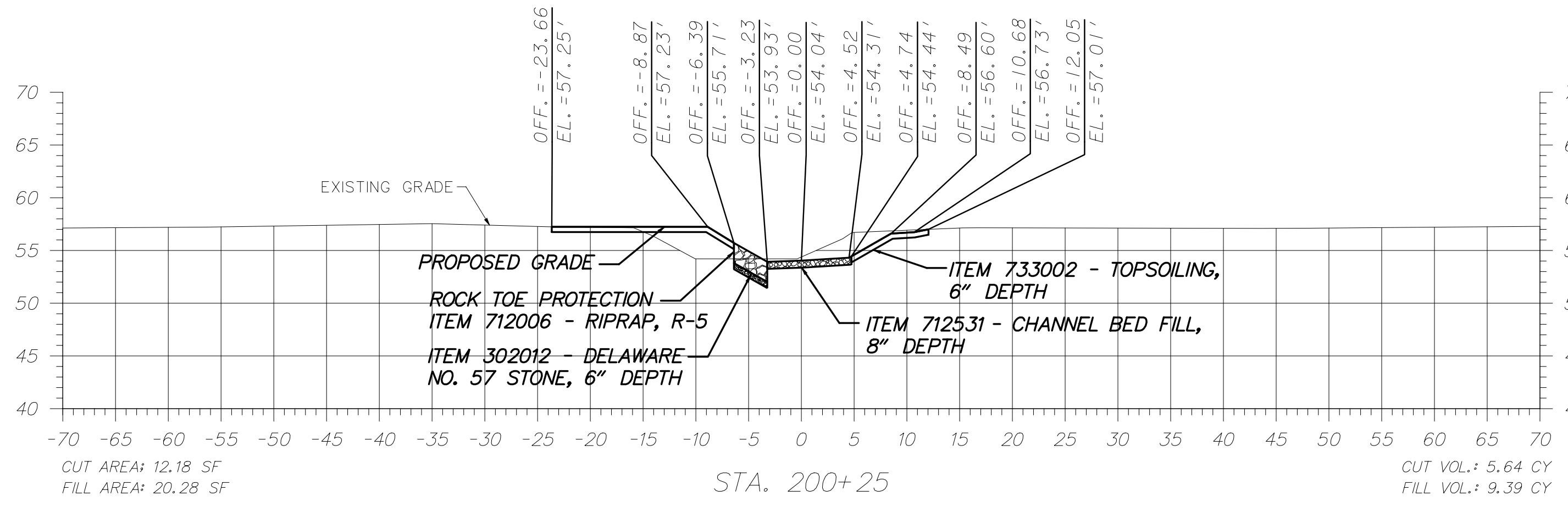
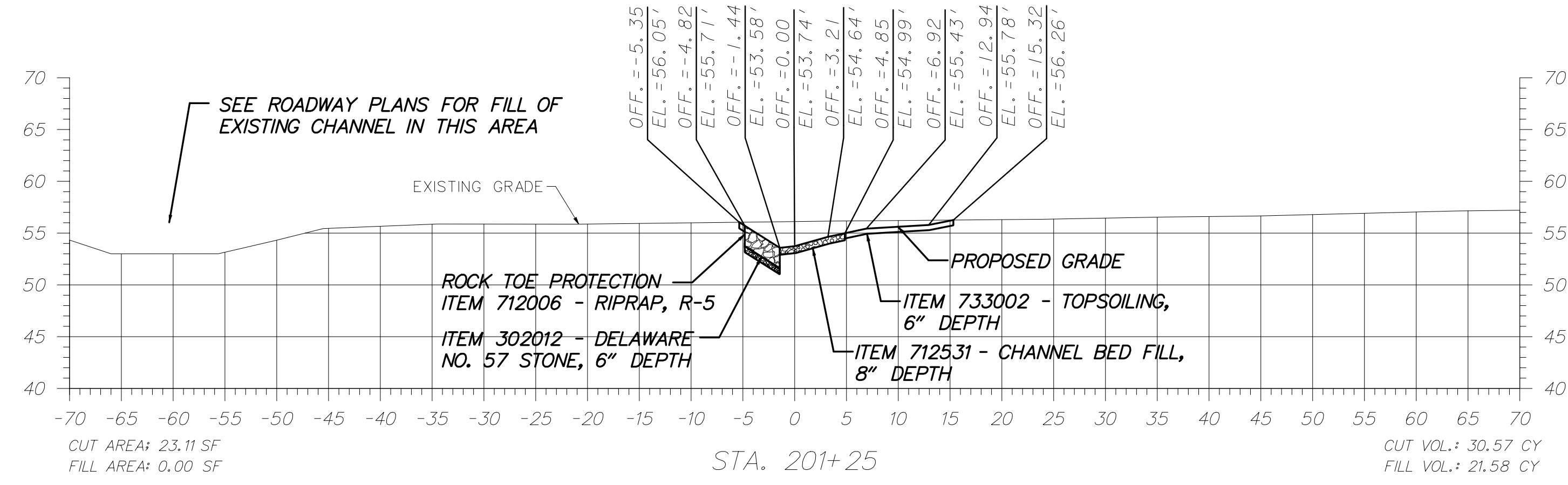
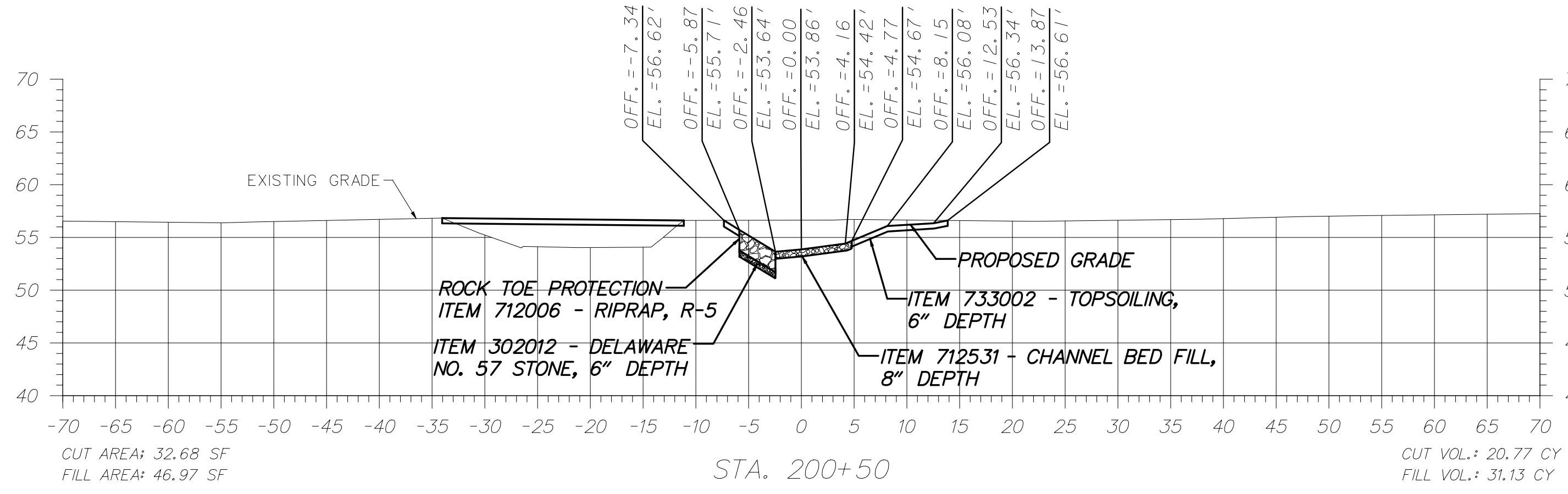


**US 301,  
NORFOLK SOUTHERN RR TO SR 896**

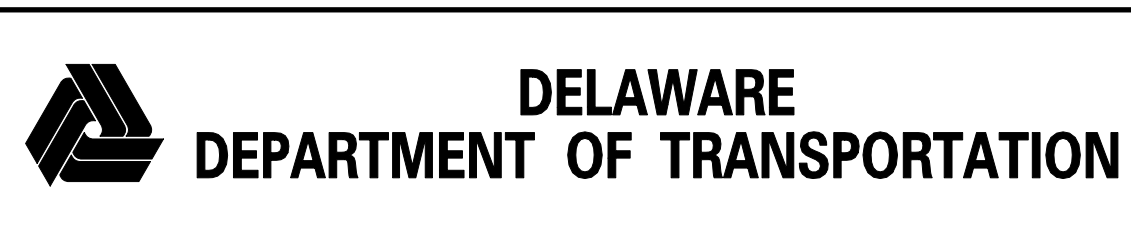
CONTRACT T200911301	BRIDGE NO.
COUNTY NEW CASTLE	DESIGNED BY: D.A.F. CHECKED BY: M.R.M.

**STREAM RESTORATION  
UNT TO DRAWYER CREEK  
LANDSCAPE PLAN**

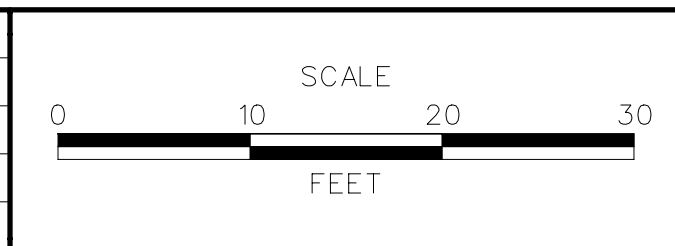
<b>ST-13</b>
SHEET NO. 146
TOTAL SHTS. 240



\$DATES  
\$FILES



ADDENDUMS / REVISIONS	



**US 301,**  
**NORFOLK SOUTHERN RR TO SR 896**

CONTRACT T200911301	BRIDGE NO.
COUNTY NEW CASTLE	DESIGNED BY: D.A.F
	CHECKED BY: M.R.M

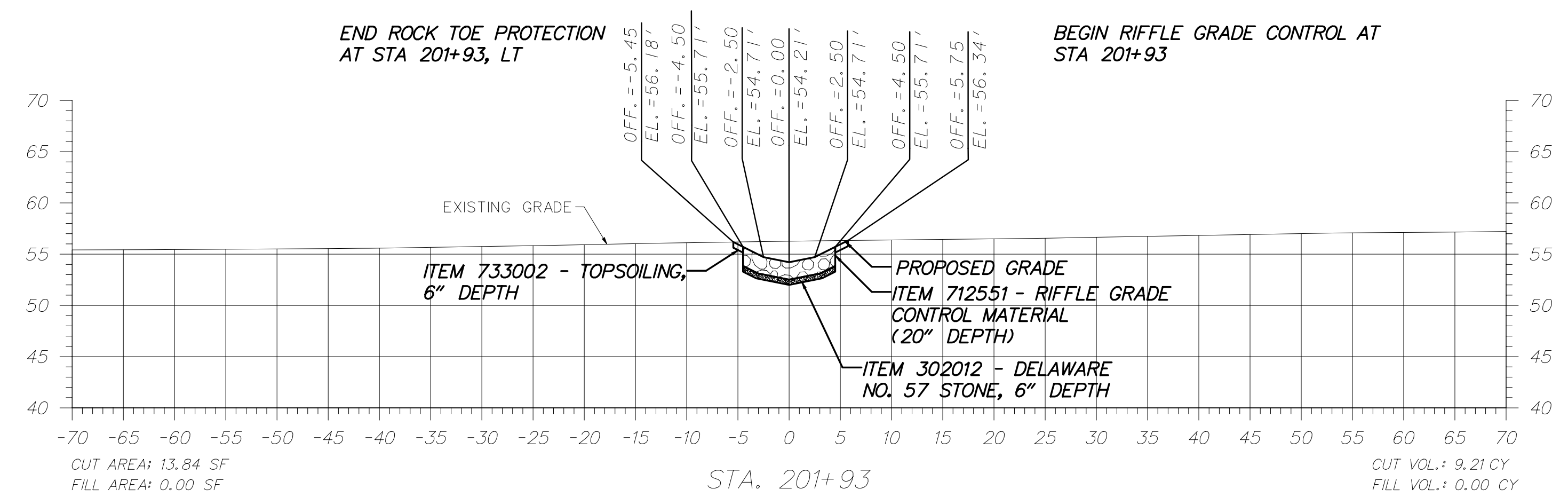
**STREAM RESTORATION  
UNT TO DRAWYER CREEK  
CROSS-SECTIONS**

<b>ST-14</b>
SHEET NO. 147
TOTAL SHTS. 240

\$DATES  
\$FILES

END ROCK TOE PROTECTION  
AT STA 201+93, LT

BEGIN RIFFLE GRADE CONTROL AT  
STA 201+93

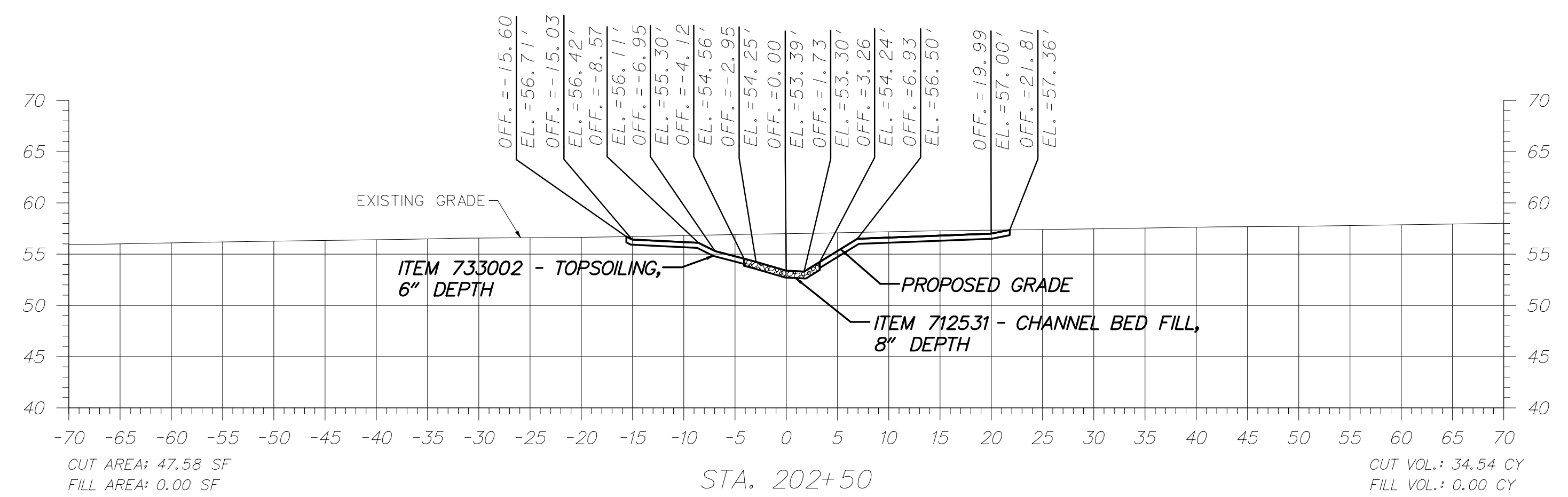


EXISTING GRADE

ITEM 733002 - TOPSOILING,  
6" DEPTH

PROPOSED GRADE

ITEM 712531 - CHANNEL BED FILL,  
8" DEPTH



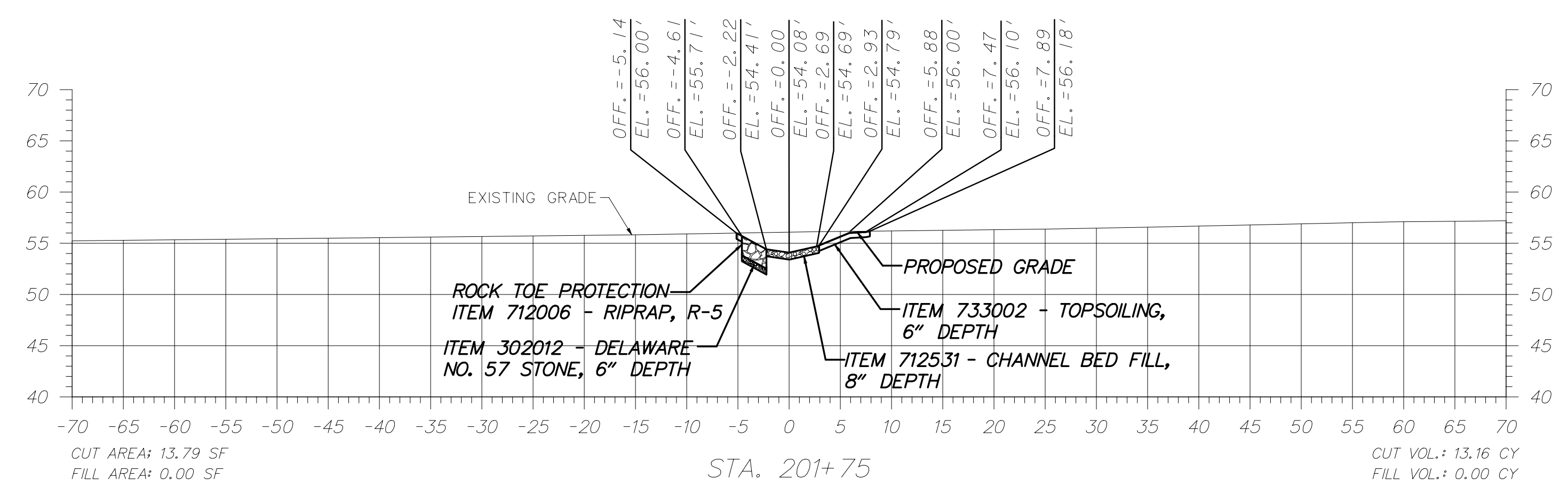
ROCK TOE PROTECTION  
ITEM 712006 - RIPRAP, R-5

ITEM 302012 - DELAWARE  
NO. 57 STONE, 6" DEPTH

PROPOSED GRADE

ITEM 733002 - TOPSOILING,  
6" DEPTH

ITEM 712531 - CHANNEL BED FILL,  
8" DEPTH

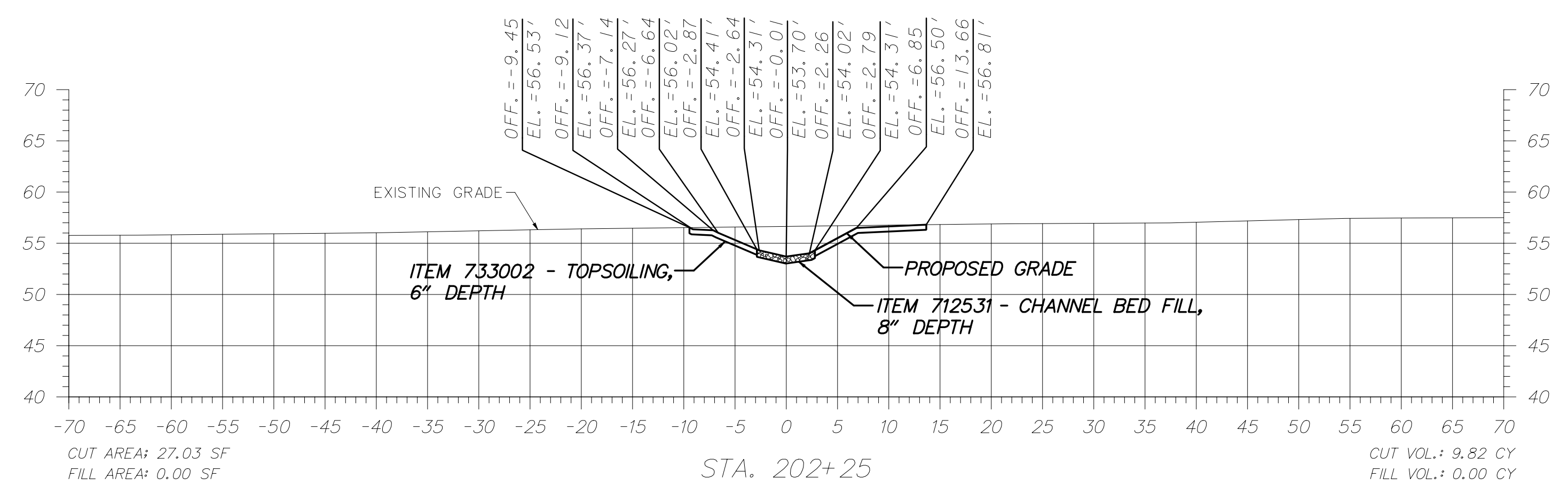


EXISTING GRADE

ITEM 733002 - TOPSOILING,  
6" DEPTH

PROPOSED GRADE

ITEM 712531 - CHANNEL BED FILL,  
8" DEPTH



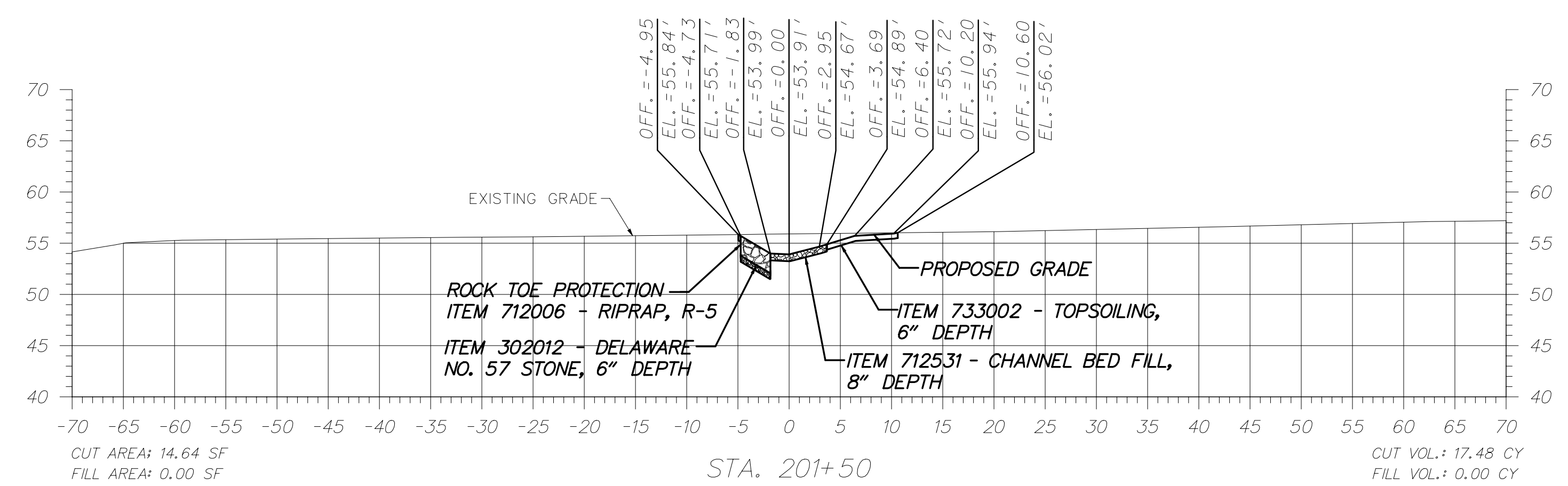
ROCK TOE PROTECTION  
ITEM 712006 - RIPRAP, R-5

ITEM 302012 - DELAWARE  
NO. 57 STONE, 6" DEPTH

PROPOSED GRADE

ITEM 733002 - TOPSOILING,  
6" DEPTH

ITEM 712531 - CHANNEL BED FILL,  
8" DEPTH



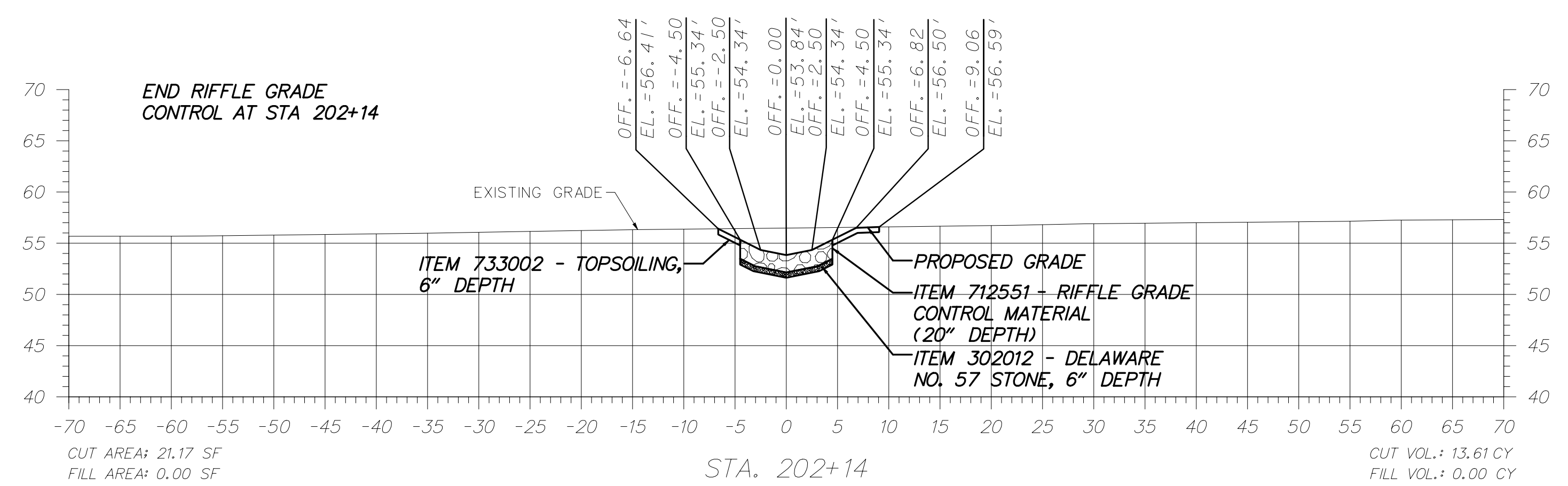
END RIFFLE GRADE  
CONTROL AT STA 202+14

ITEM 733002 - TOPSOILING,  
6" DEPTH

PROPOSED GRADE

ITEM 712551 - RIFFLE GRADE  
CONTROL MATERIAL  
(20" DEPTH)

ITEM 302012 - DELAWARE  
NO. 57 STONE, 6" DEPTH



ADDENDUMS / REVISIONS

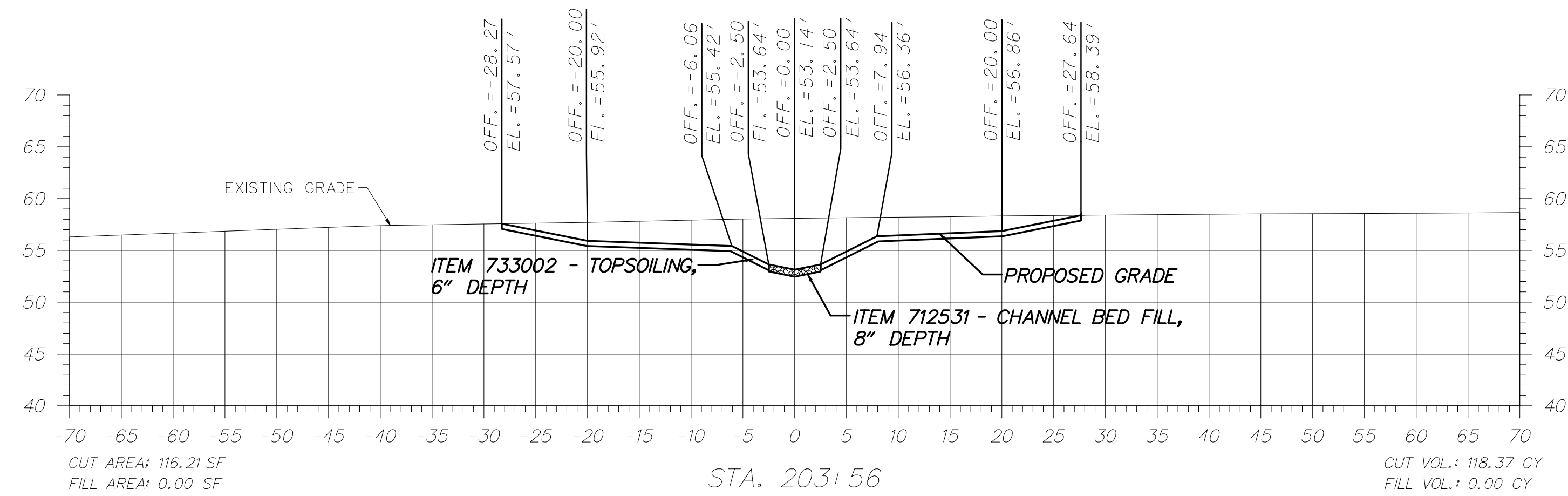
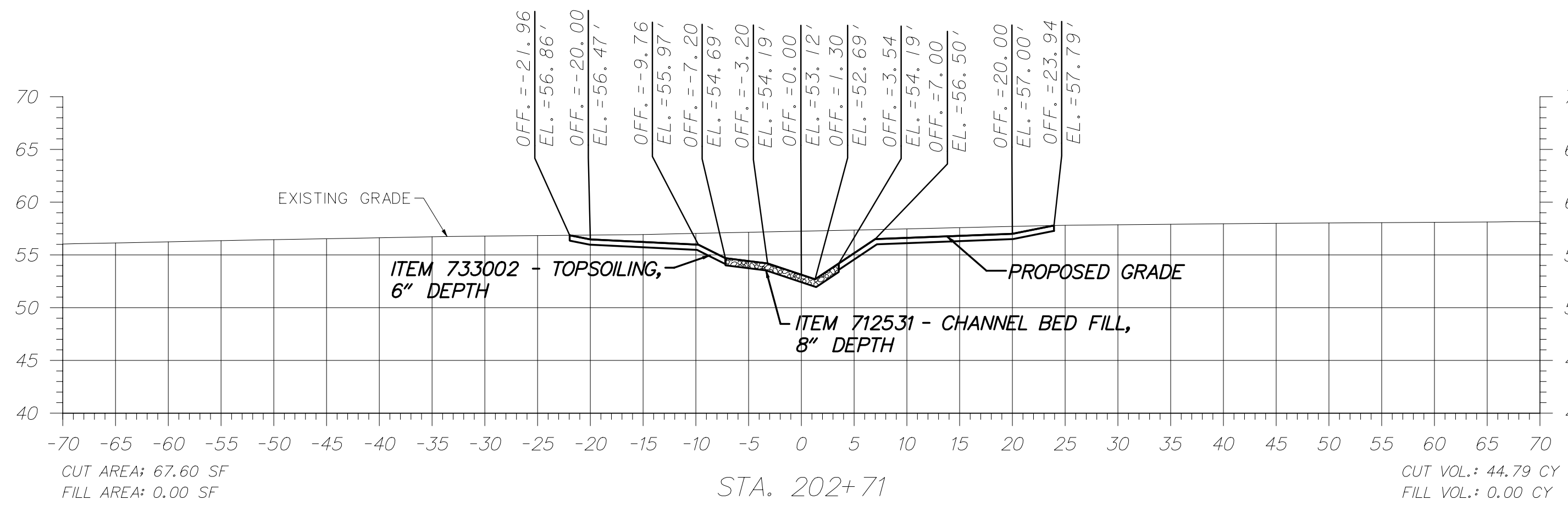
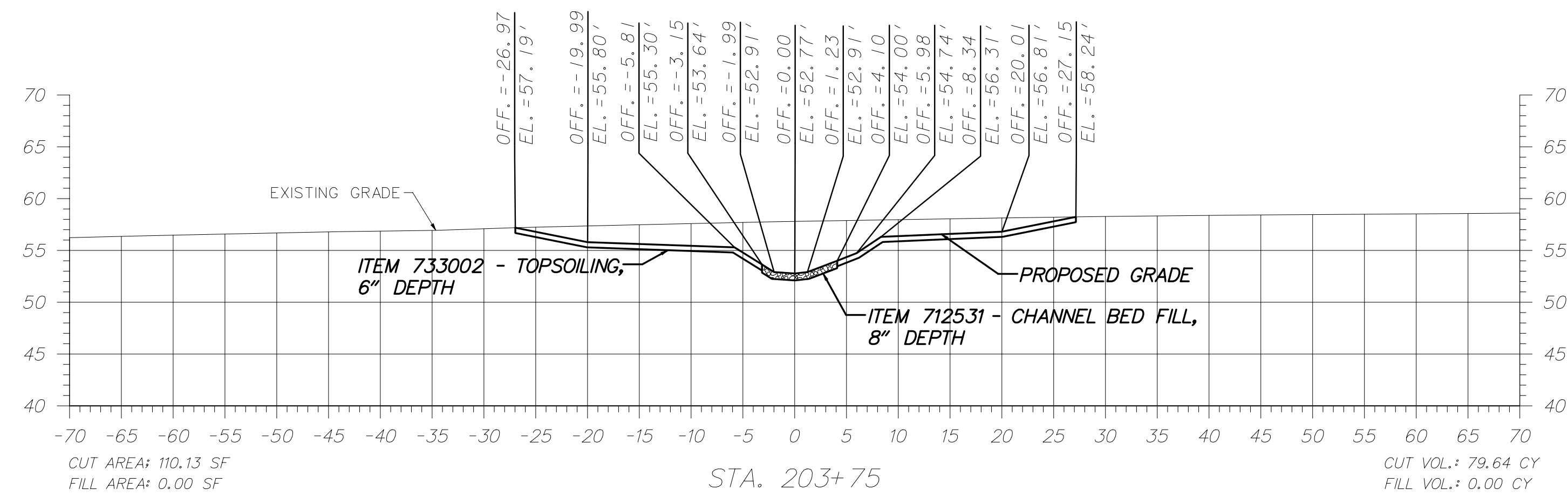
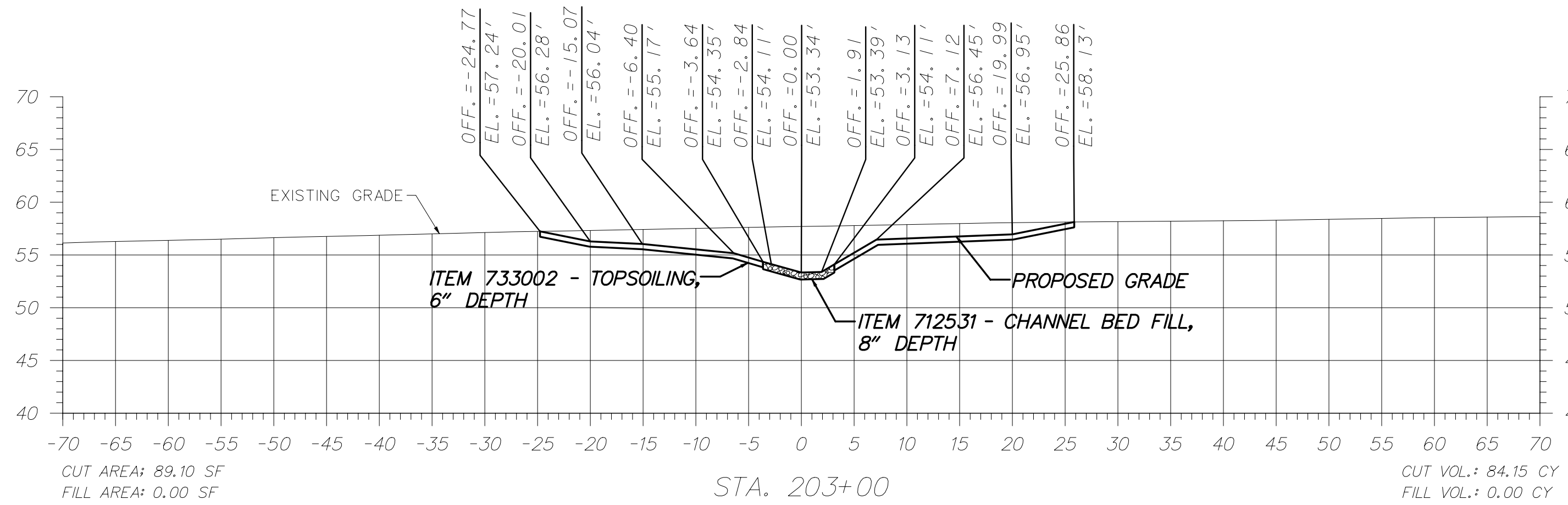
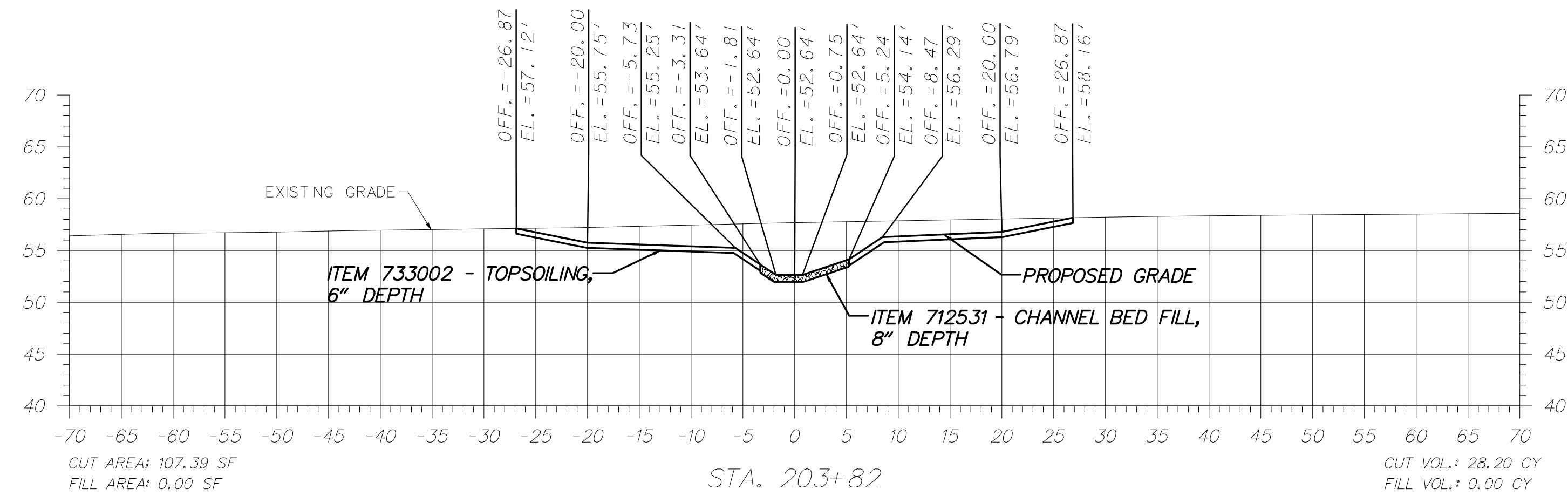
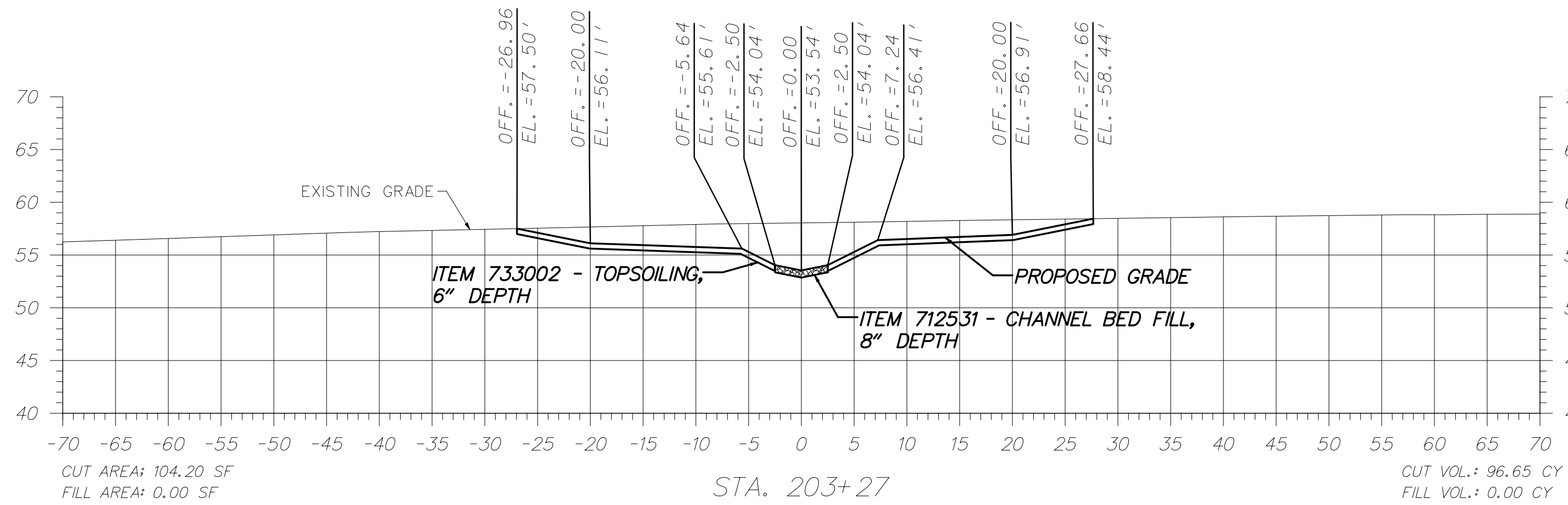


US 301,  
NORFOLK SOUTHERN RR TO SR 896

CONTRACT	BRIDGE NO.	
T200911301	DESIGNED BY:	D.A.F
COUNTY	CHECKED BY:	M.R.M
NEW CASTLE		

STREAM RESTORATION  
UNT TO DRAWYER CREEK  
CROSS-SECTIONS

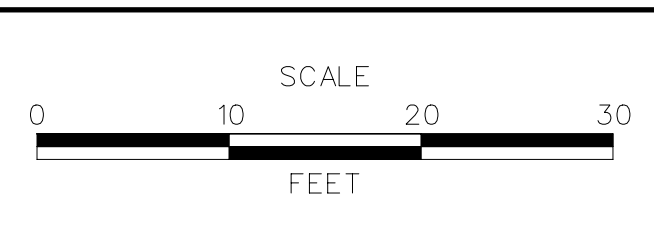
ST-15
SHEET NO.
148
TOTAL SHTS.
240



\$DATES  
\$FILES



ADDENDUMS / REVISIONS	

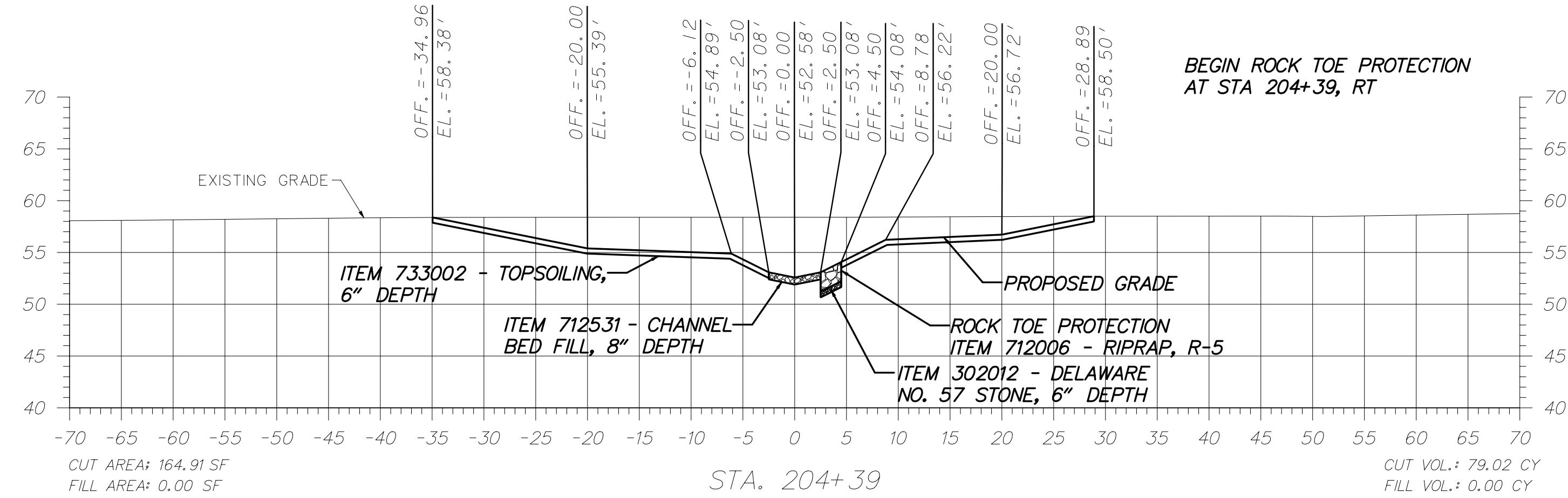
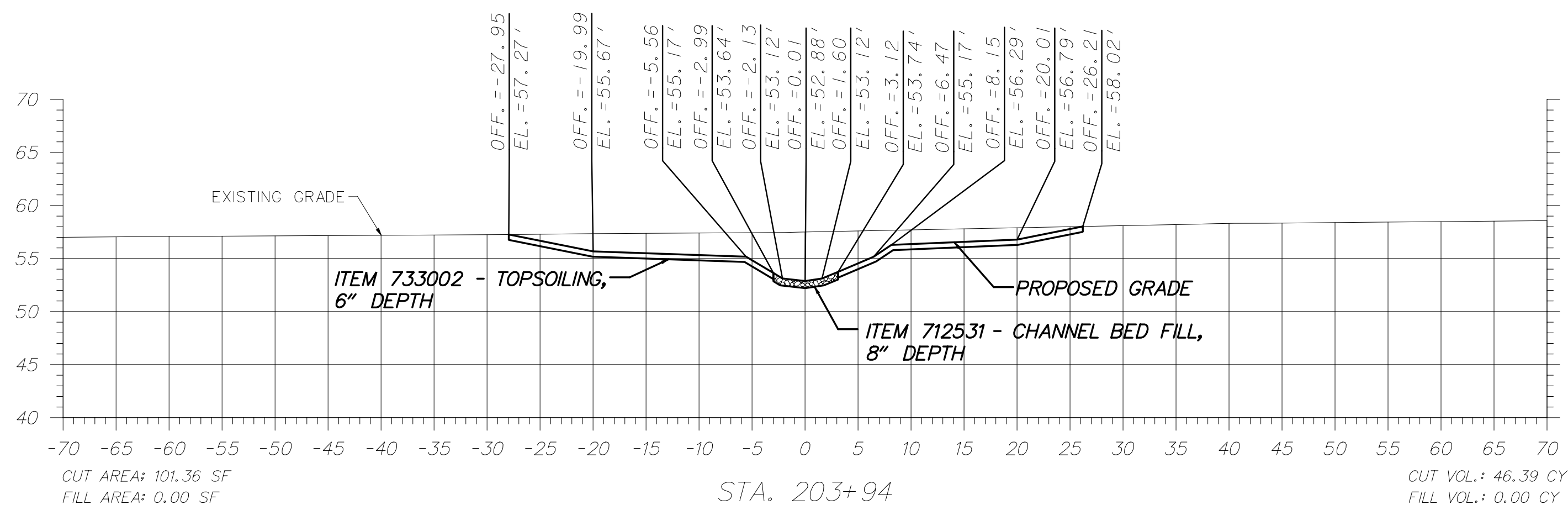
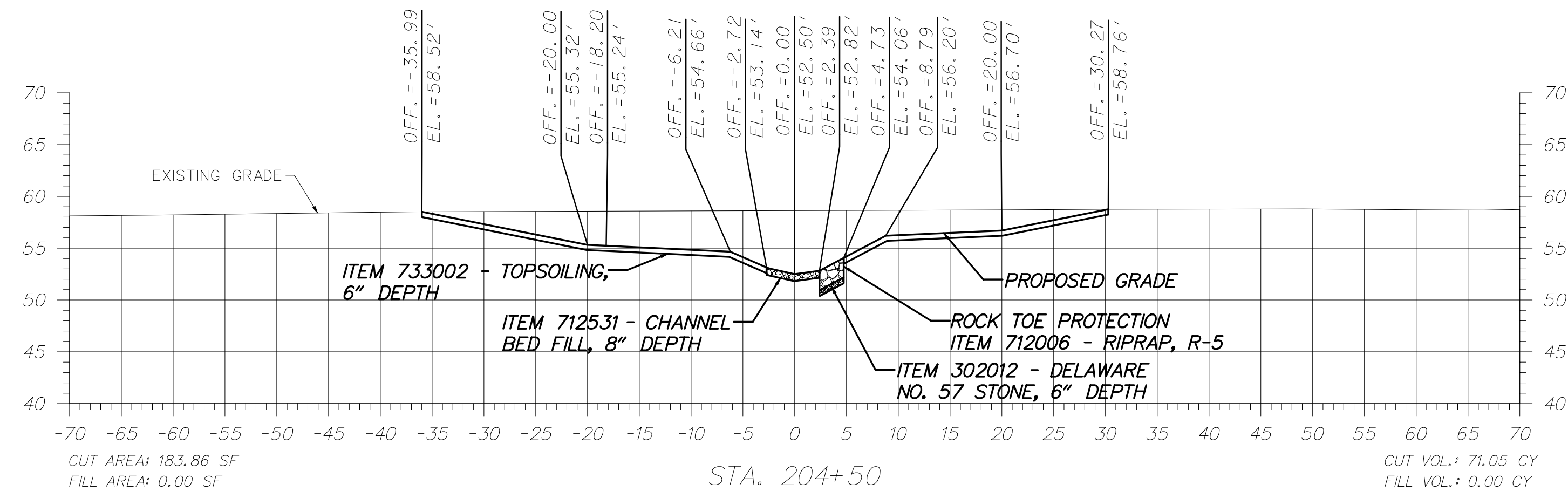
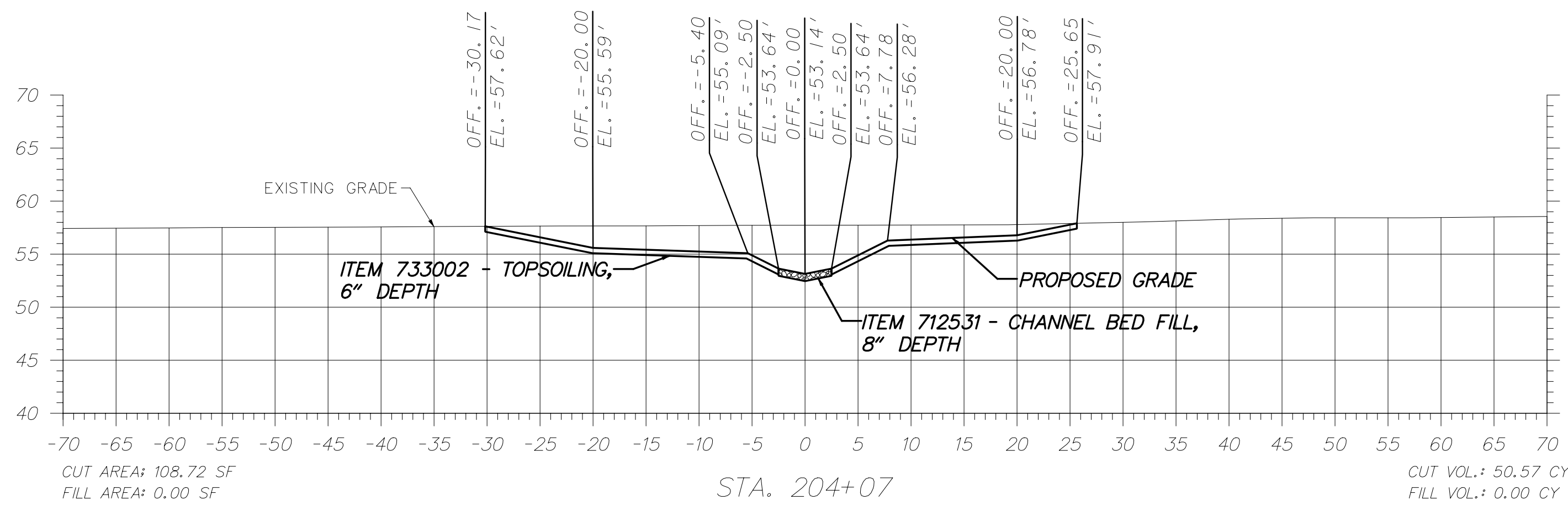
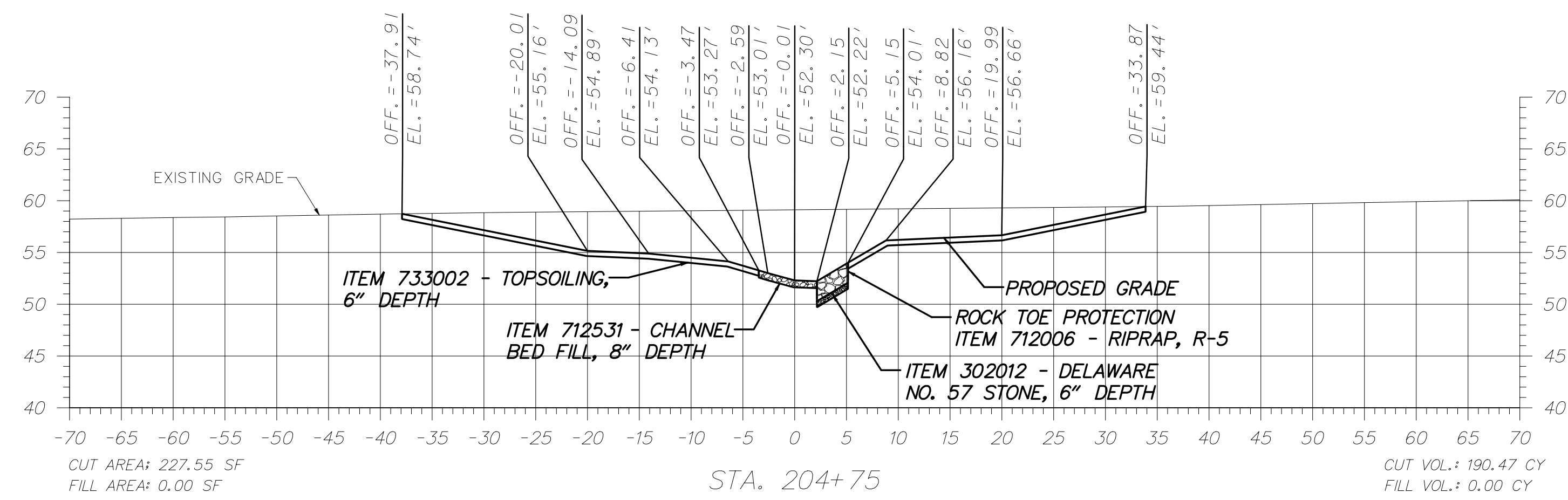
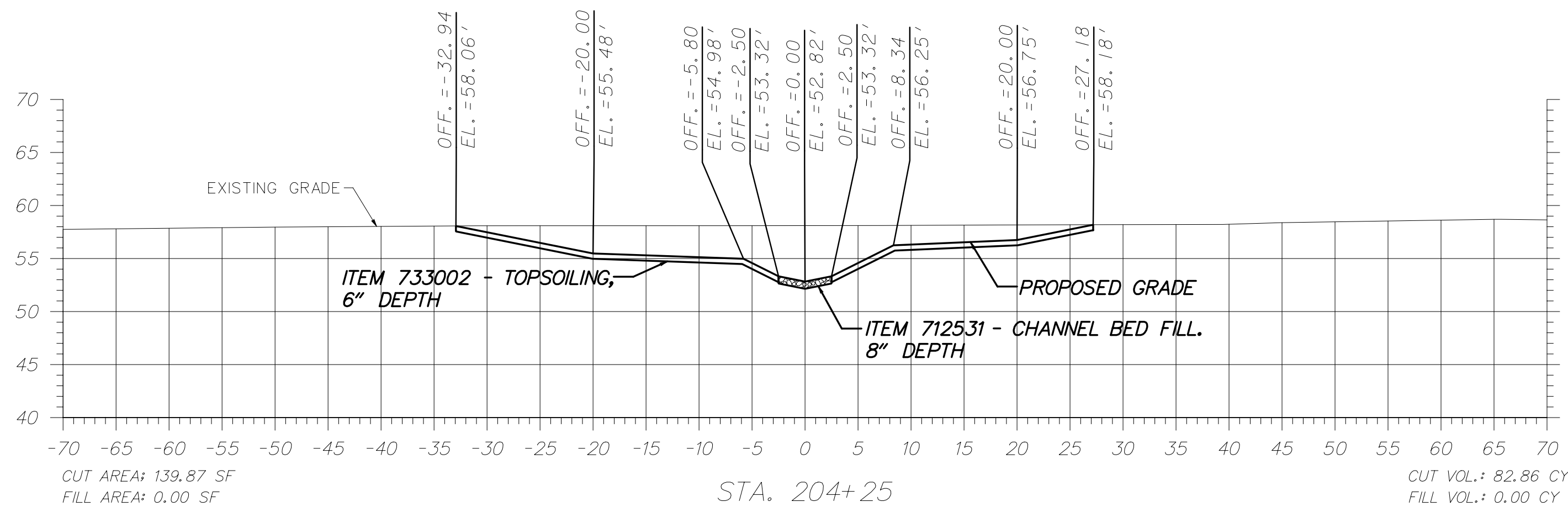


**US 301,**  
**NORFOLK SOUTHERN RR TO SR 896**

CONTRACT	BRIDGE NO.
T200911301	
COUNTY	DESIGNED BY: D.A.F
NEW CASTLE	CHECKED BY: M.R.M

**STREAM RESTORATION**  
**UNT TO DRAWYER CREEK**  
**CROSS-SECTIONS**

<b>ST-16</b>
SHEET NO.
149
TOTAL SHTS.
240



BEGIN ROCK TOE PROTECTION  
AT STA 204+39, RT

\$DATES  
\$FILES



ADDENDUMS / REVISIONS

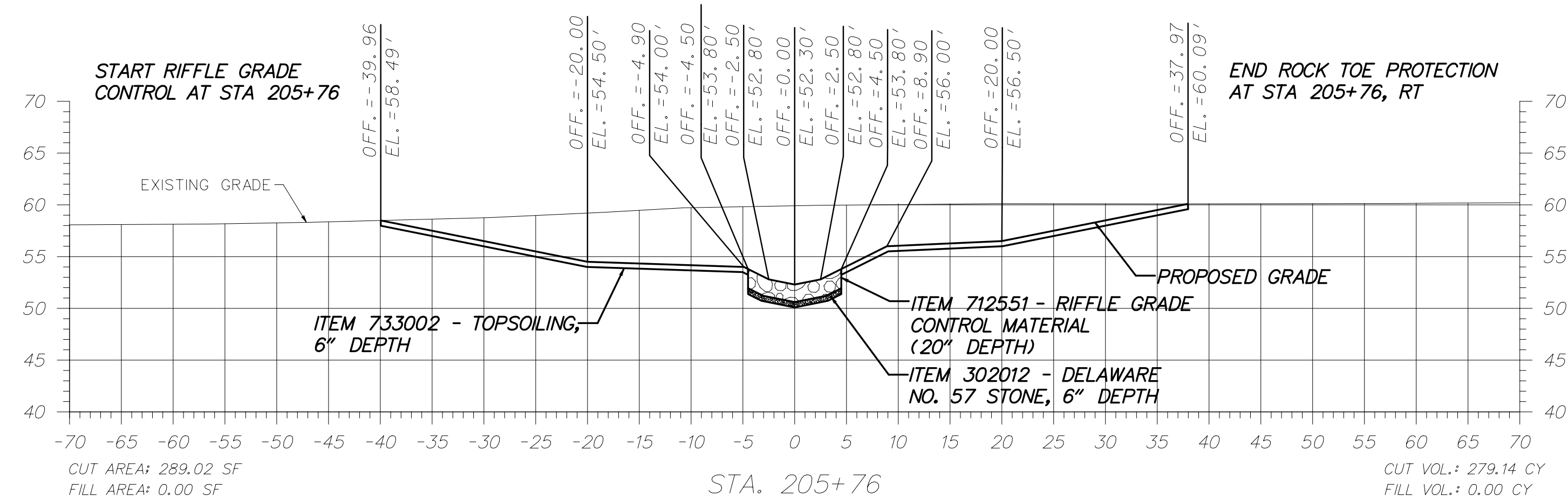
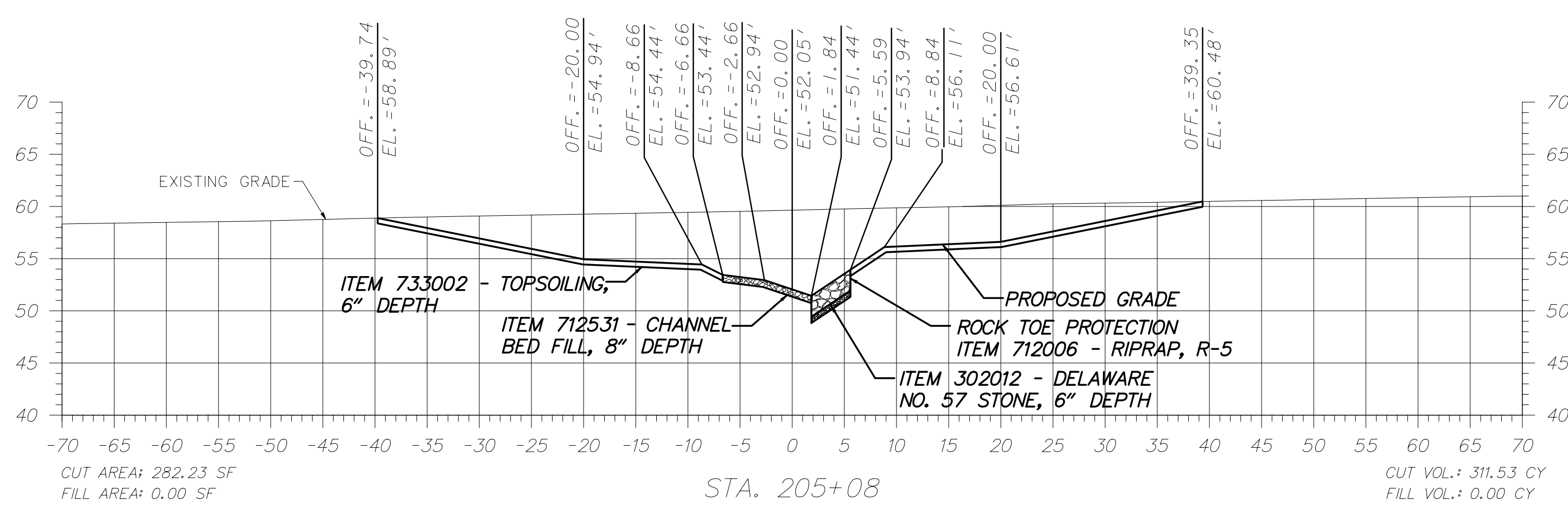
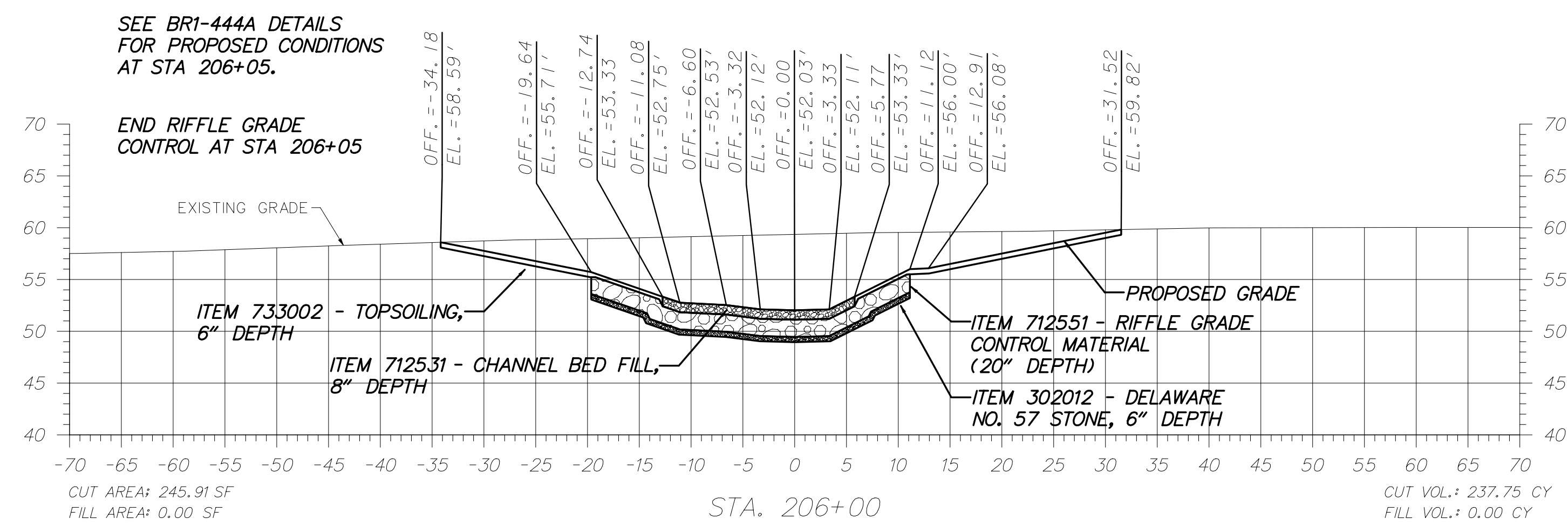
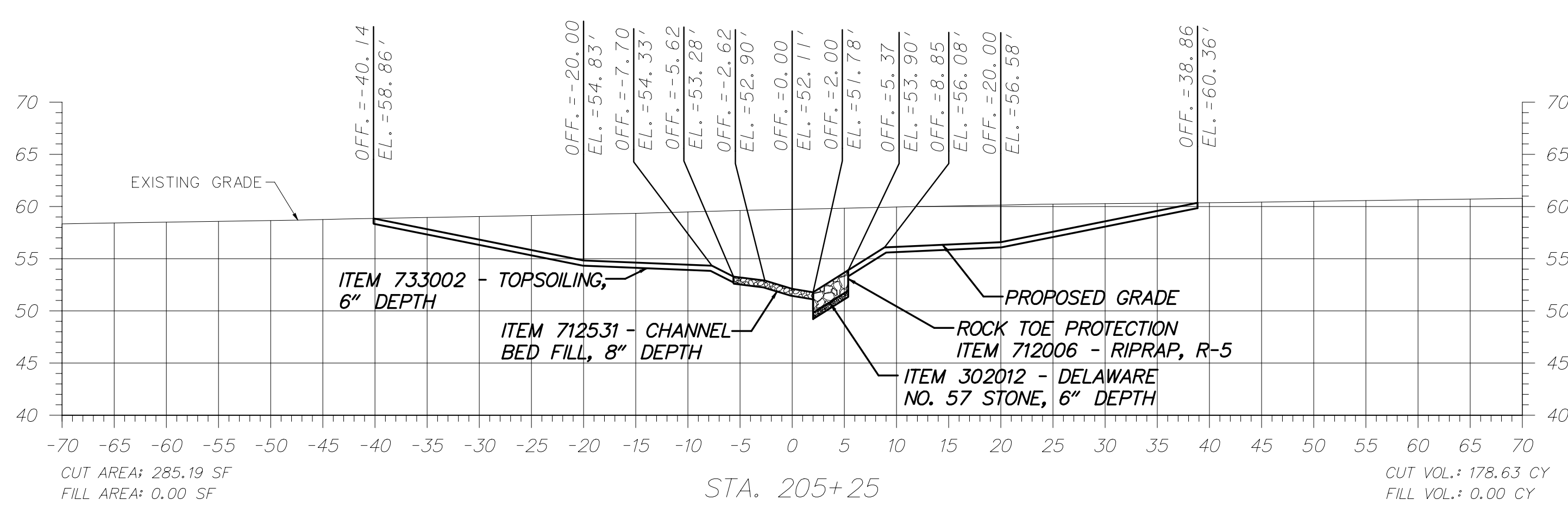
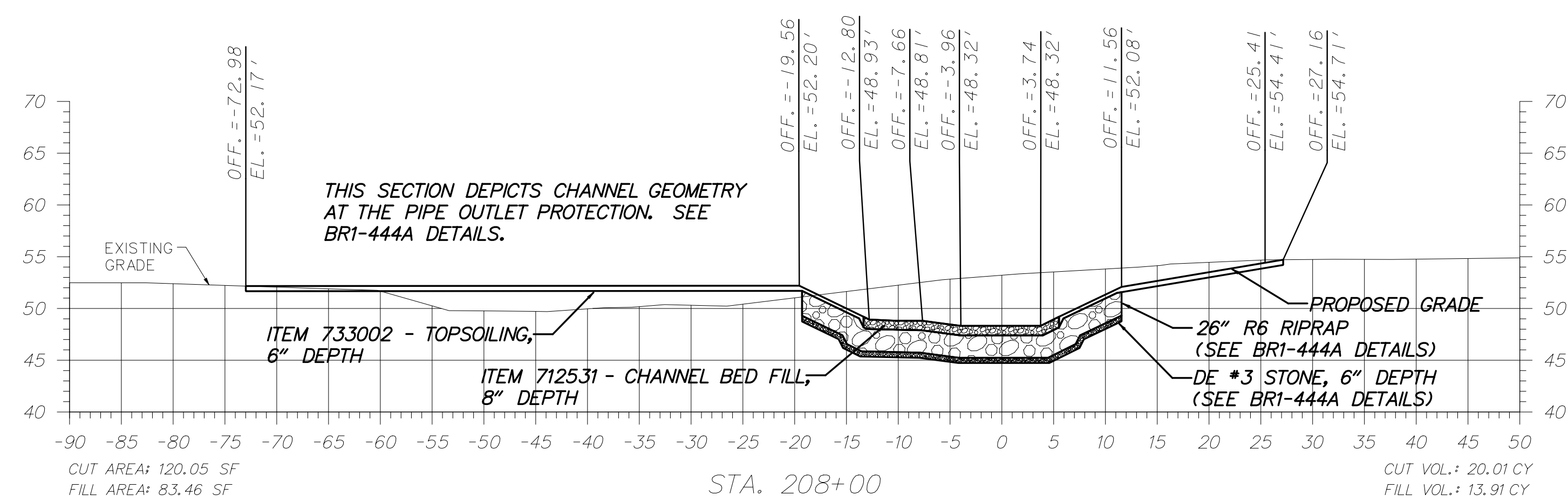
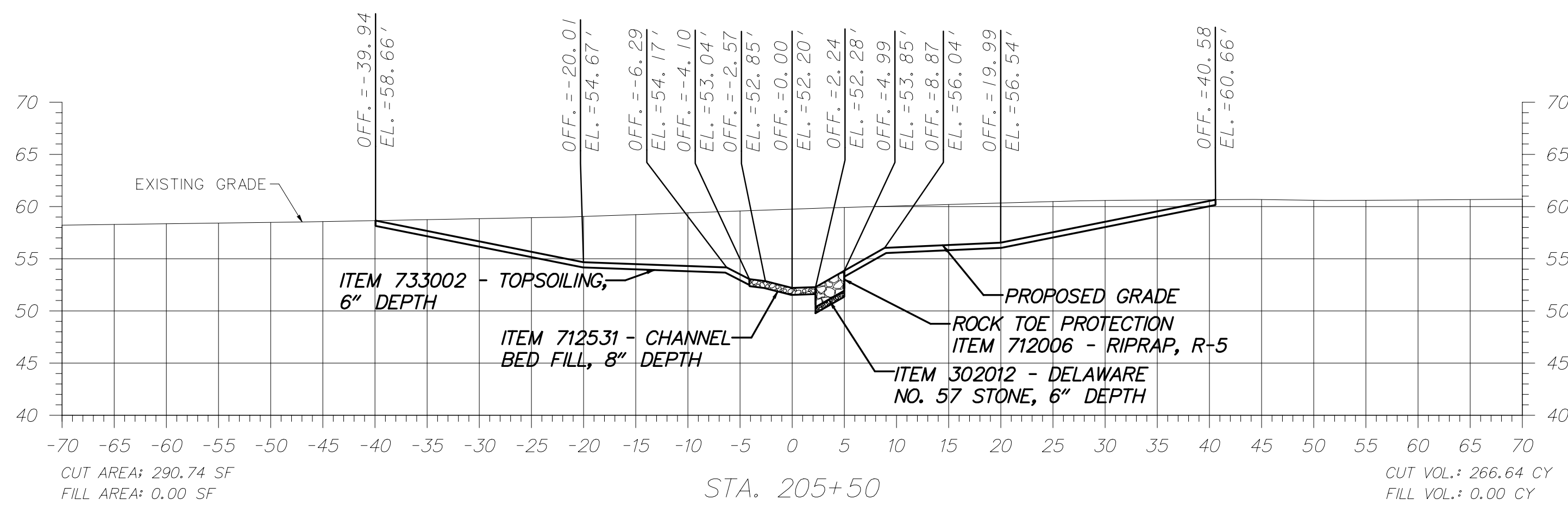


US 301,  
NORFOLK SOUTHERN RR TO SR 896

CONTRACT	BRIDGE NO.
T200911301	
COUNTY	DESIGNED BY: D.A.F
NEW CASTLE	CHECKED BY: M.R.M

STREAM RESTORATION  
UNT TO DRAWYER CREEK  
CROSS-SECTIONS

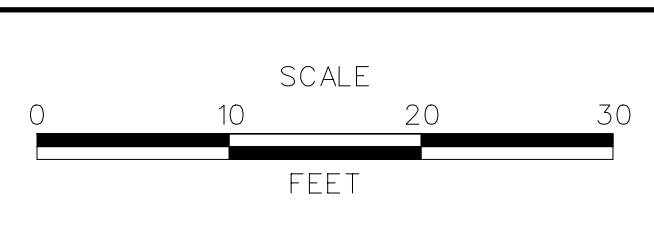
ST-17
SHEET NO.
150
TOTAL SHTS.
240



\$DATES  
\$FILES



ADDENDUMS / REVISIONS	

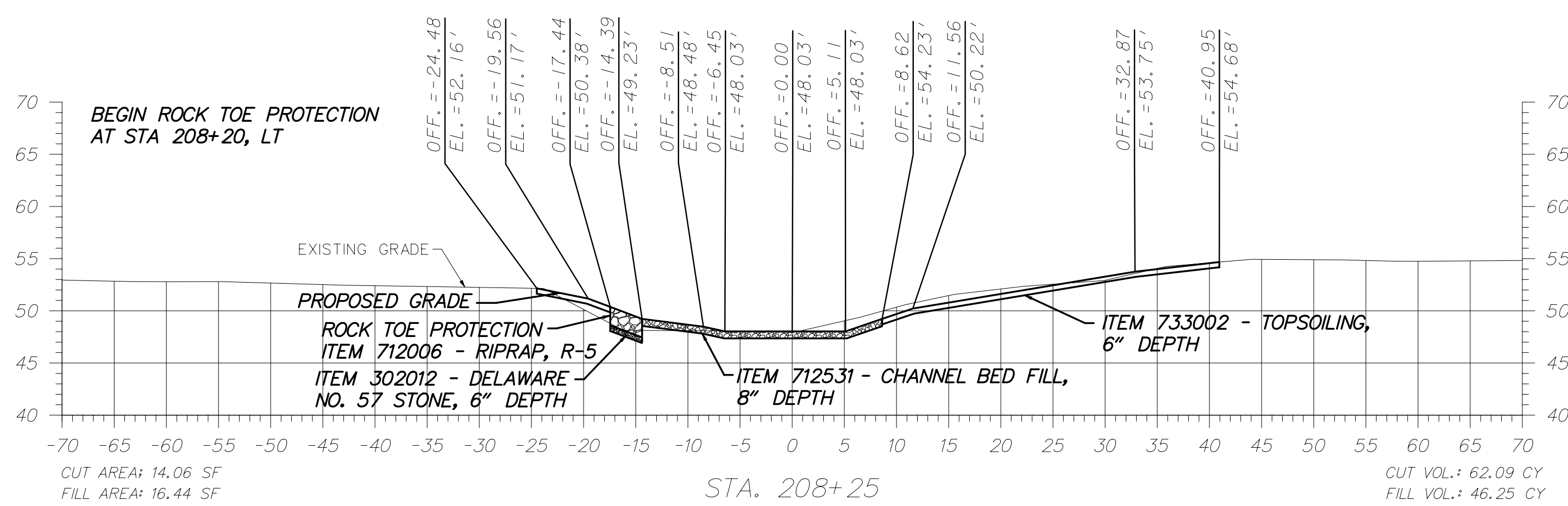
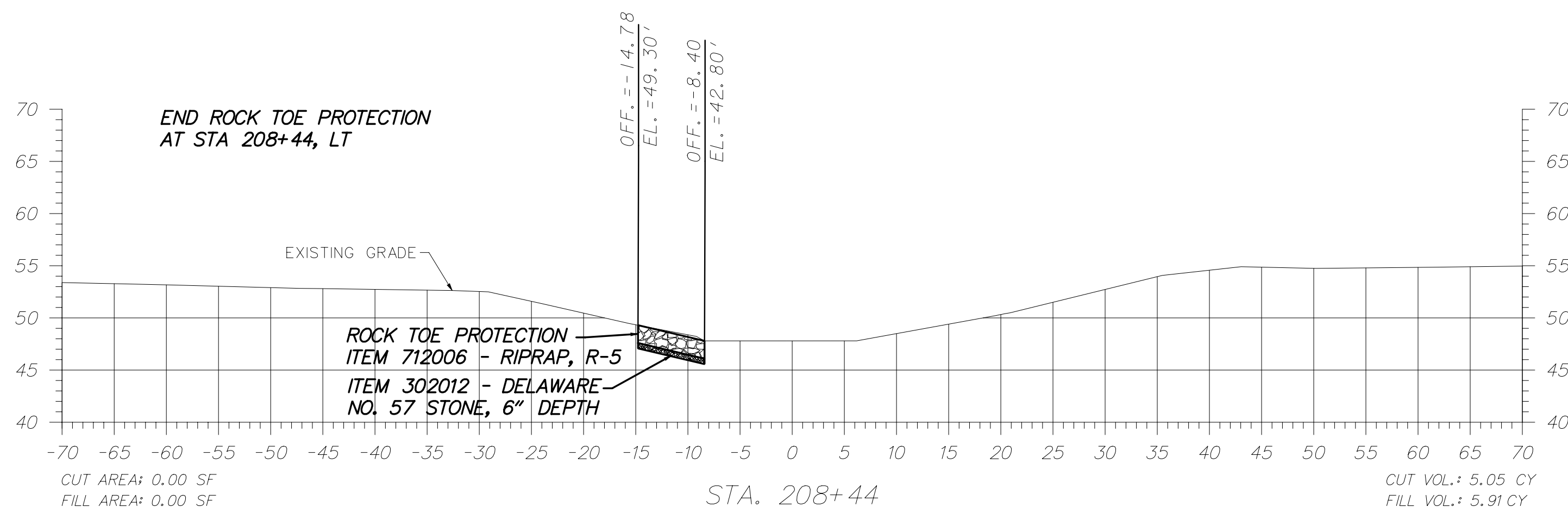


**US 301,**  
**NORFOLK SOUTHERN RR TO SR 896**

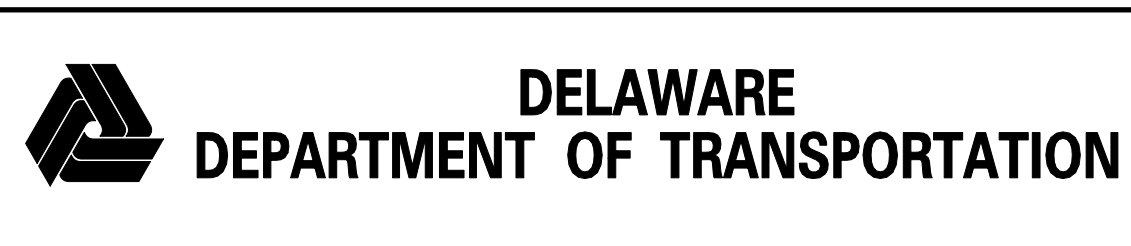
CONTRACT T200911301	BRIDGE NO.
COUNTY NEW CASTLE	DESIGNED BY: D.A.F
	CHECKED BY: M.R.M

**STREAM RESTORATION**  
**UNT TO DRAWYER CREEK**  
**CROSS-SECTIONS**

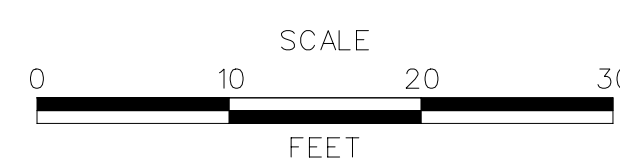
ST-18
SHEET NO. 151
TOTAL SHTS. 240



\$DATES  
\$FILES



ADDENDUMS / REVISIONS



**US 301,  
NORFOLK SOUTHERN RR TO SR 896**

CONTRACT T200911301	BRIDGE NO.
COUNTY NEW CASTLE	DESIGNED BY: D.A.F.
	CHECKED BY: M.R.M.

**STREAM RESTORATION  
UNT TO DRAWYER CREEK  
CROSS-SECTIONS**

<b>ST-19</b>
SHEET NO. 152
TOTAL SHTS. 240