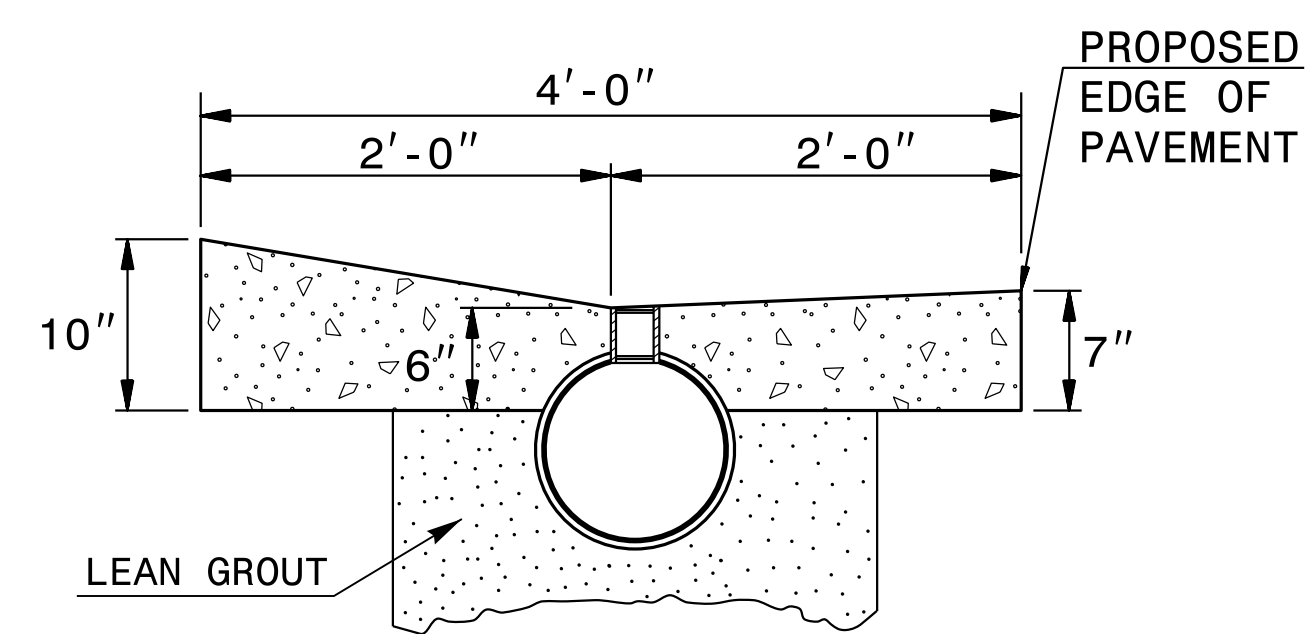
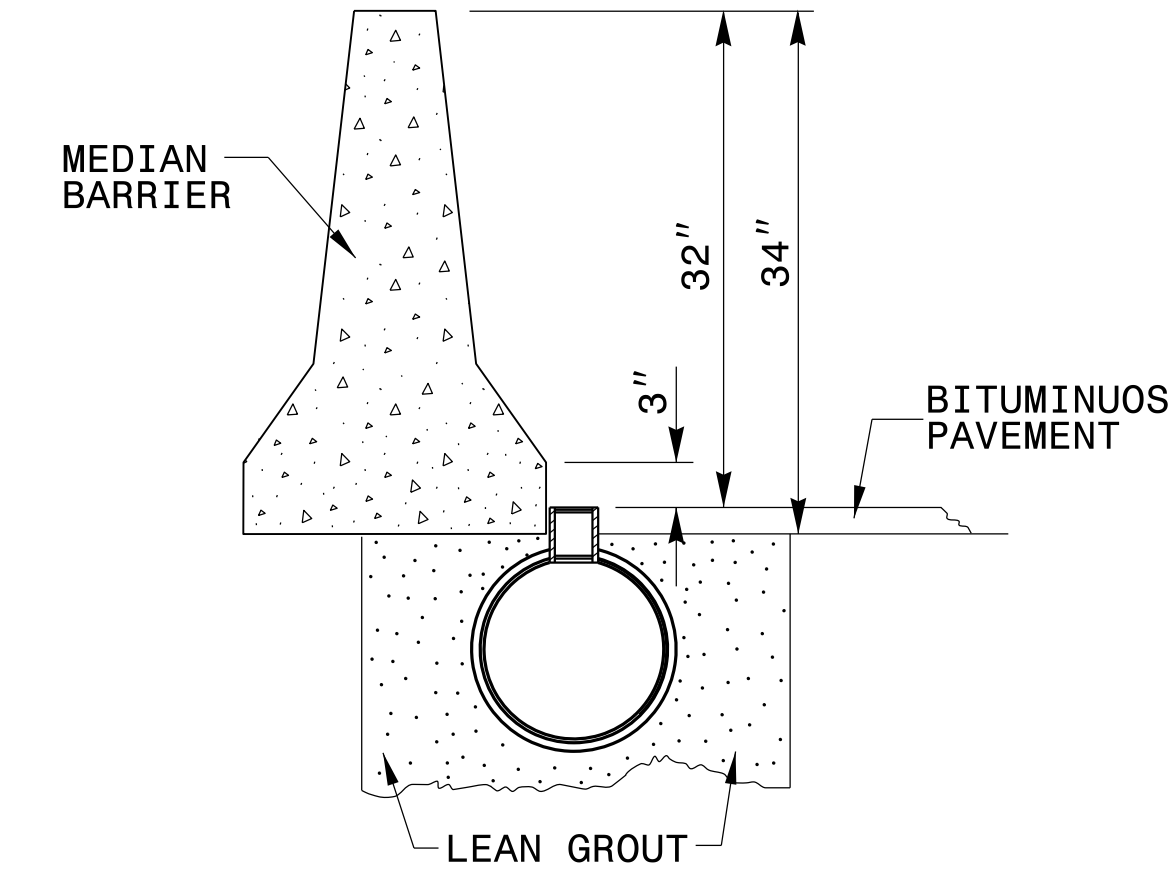


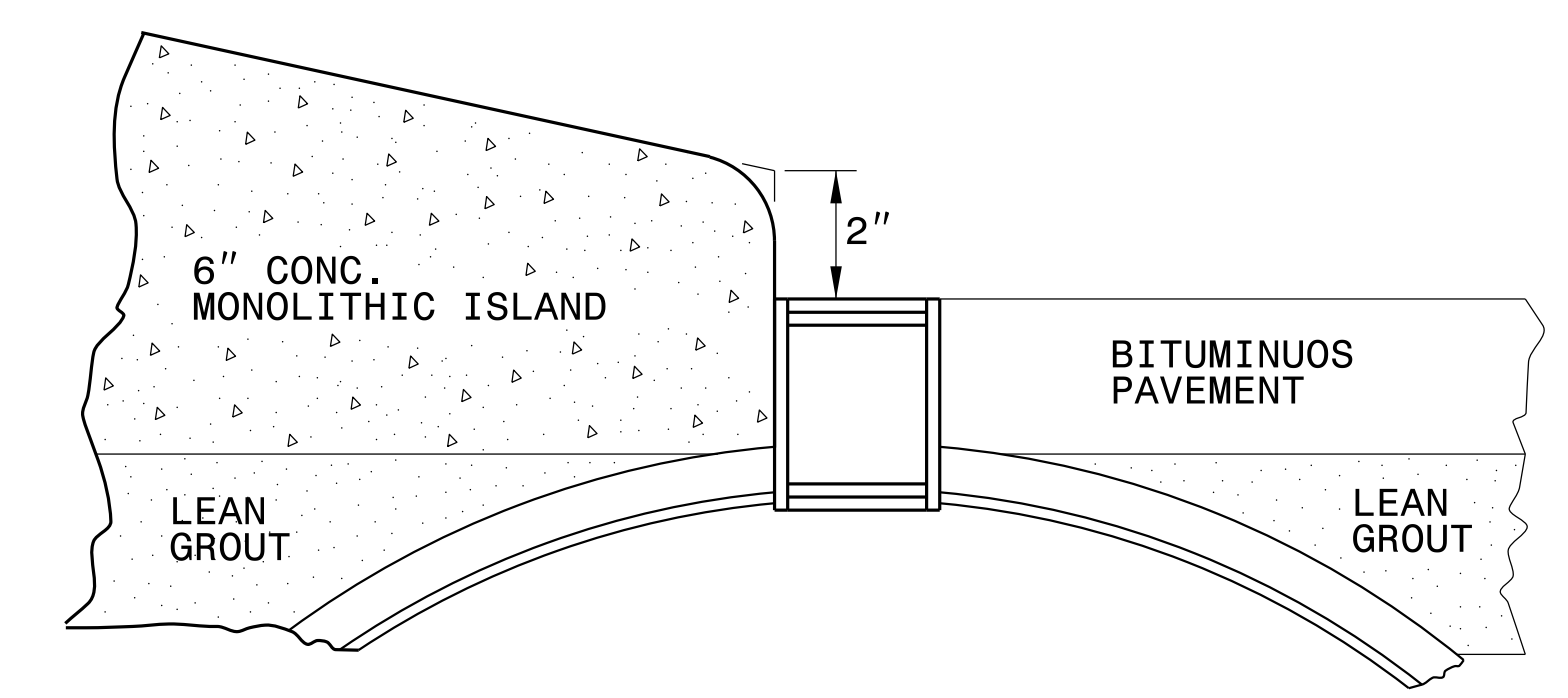
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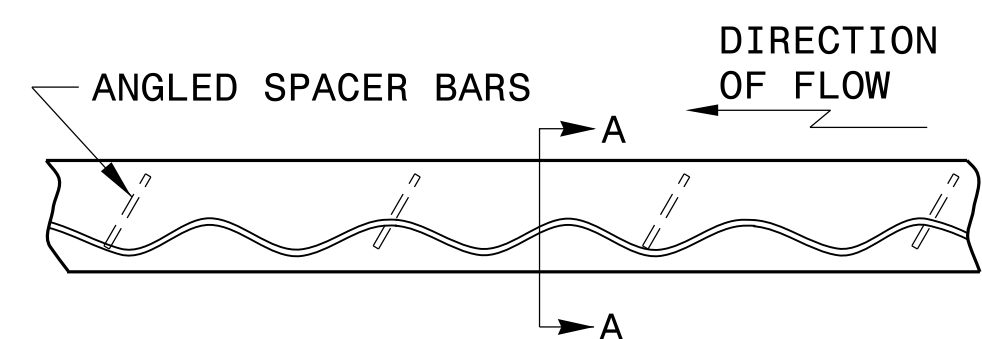
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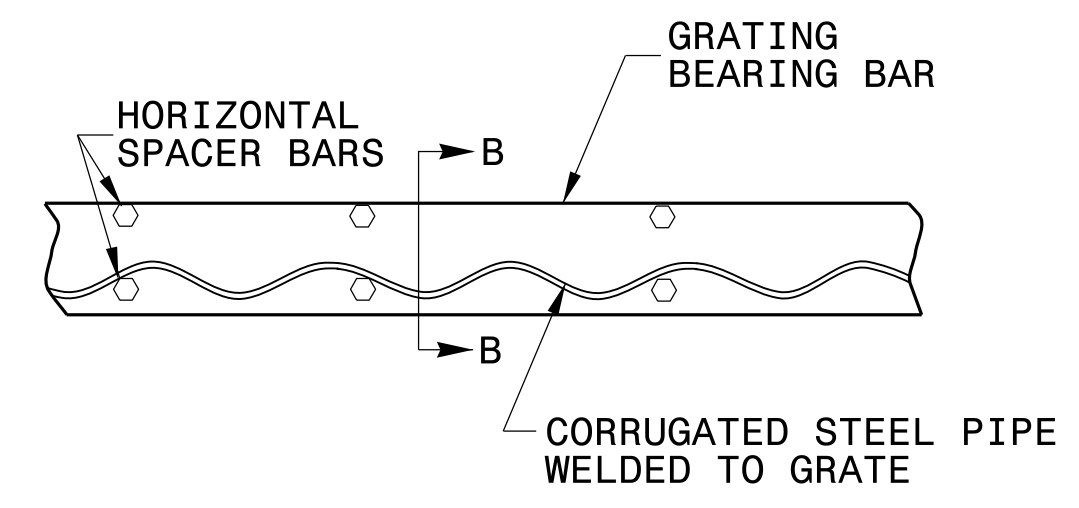
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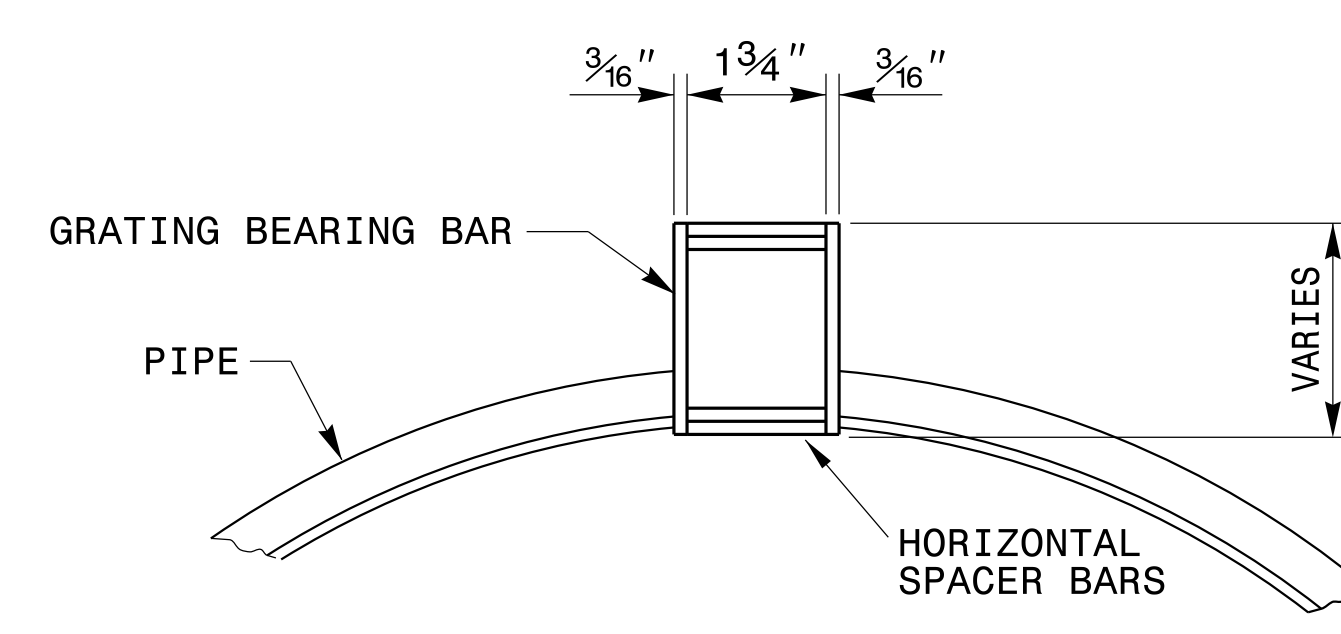
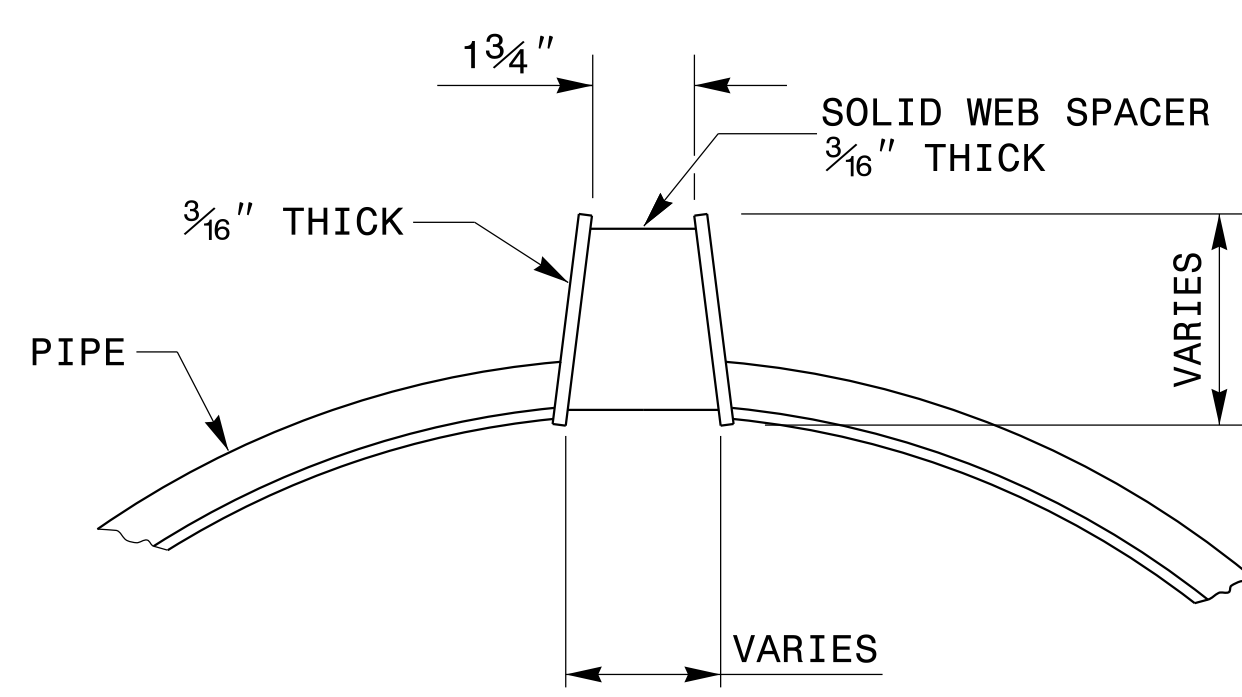
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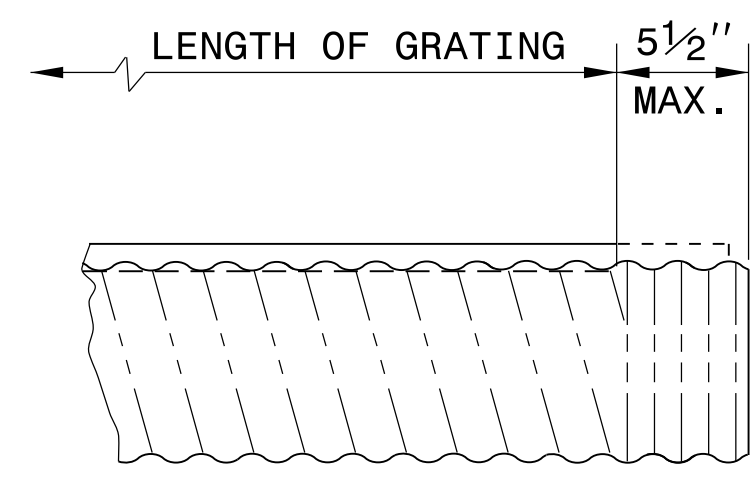
SECTION A-A



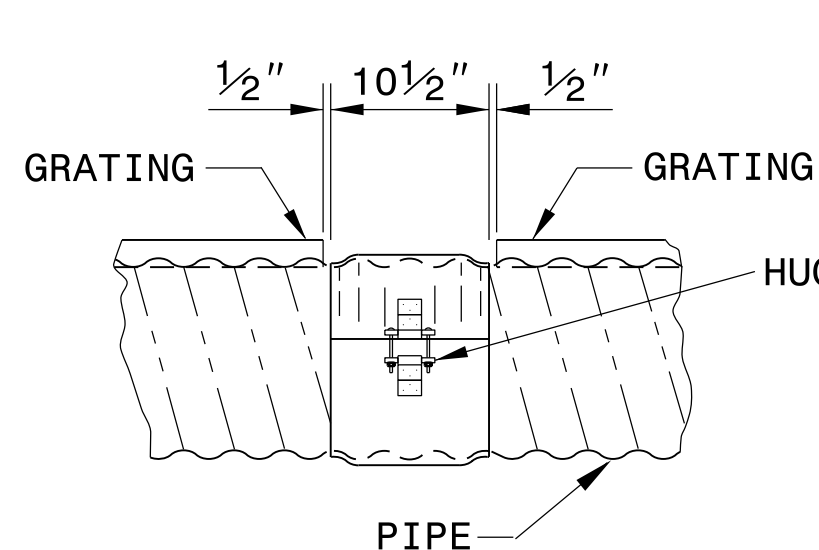
SECTION B-B



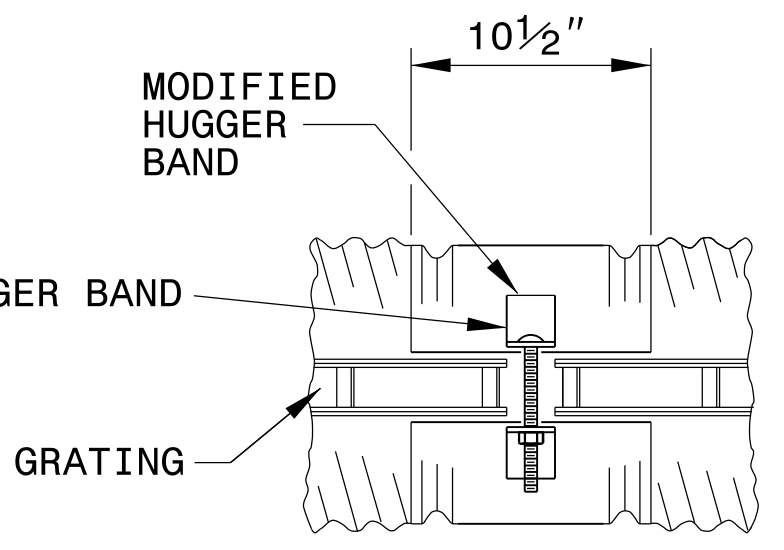
TYPICAL GRATE DETAILS



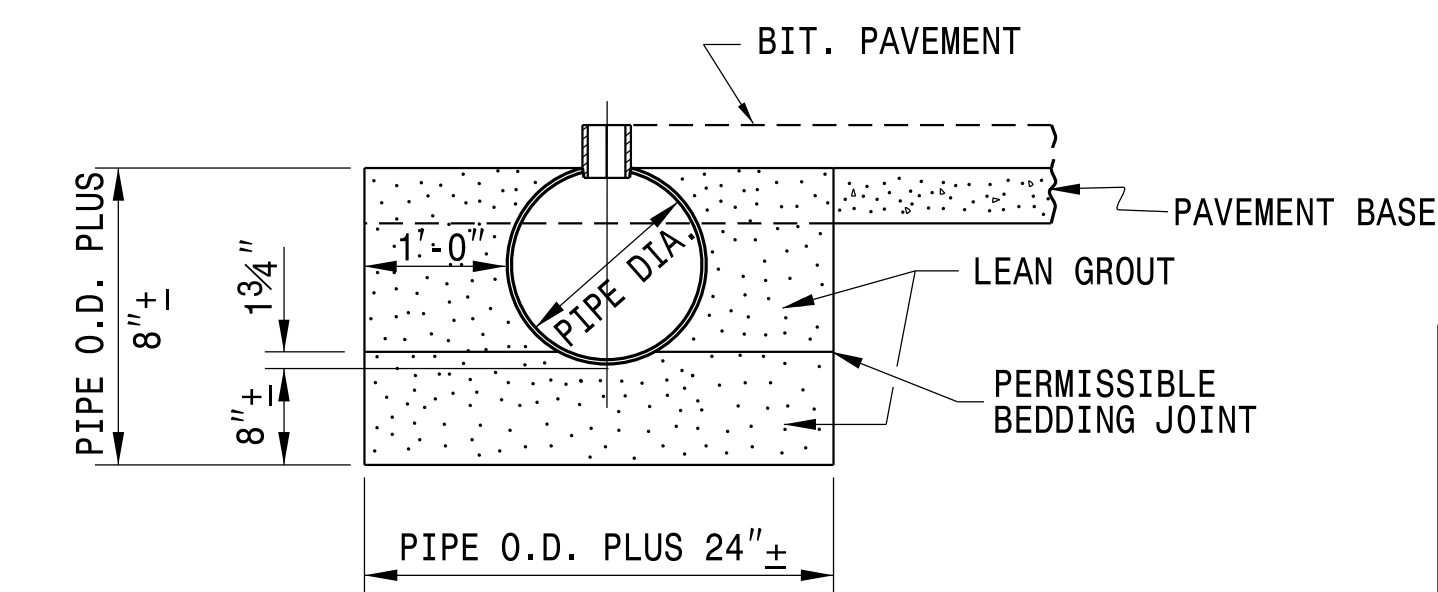
DETAIL AT END OF PIPE



TYPICAL COUPLING BAND



MODIFIED COUPLING BAND



SLOTTED DRAIN PIPE INSTALLATION

NOTES:

USE GRATE ASSEMBLIES FABRICATED FROM STRUCTURAL STEEL MEETING THE REQUIREMENTS OF ASTM A 570, GRADE 36 OR ASTM A 36.

HOT-DIP GALVANIZE GRATES AFTER FABRICATION TO MEET ASTM A123.

USE SLOTTED DRAIN PIPE THAT IS ADEQUATE FOR AASHTO H20 LOADING WHEN INSTALLED AS SHOWN.

USE SLOTTED DRAIN PIPE FABRICATED FROM ALUMINIZED CORRUGATED STEEL PIPE MEETING THE REQUIREMENTS OF AASHTO M274 TYPE 2.

NCDOT ALLOWS THE USE OF SIMILAR GRATE CONFIGURATIONS MEETING THE REQUIREMENTS OF THIS DETAIL, THE REQUIREMENTS OF THE SPECIAL PROVISIONS, AND THE APPROVAL OF THE ENGINEER.



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CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

DETAILS OF SLOTTED DRAIN 12" THRU 36" DIAMETER PIPE

ORIGINAL BY: I.Spell DATE: 5-21-99
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: s:\usr\details\stand\slottedrain.dgn

I:\JUL-2018 07140 S:\Contracts\Contract\Special Details\tspe11\stand\slottedrain.dgn J:\power\ton AT_CSD-292595

09-JAN-2019 07:36 S:\Contracts\Special Details\Jhove-ton\838d02 15in thru 48in 60deg skew.dgn Jhove-ton AT USD-292595

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
**CONCRETE ENDWALL FOR SINGLE AND
DOUBLE PIPE CULVERTS**
15" THRU 48" PIPE

SHEET 2 OF 2
838d02s1

GENERAL NOTES:

- * ALL CORNERS TO BE CHAMFERED 1".
- * THE CONTRACTOR WILL BE REQUIRED TO PLACE 2 - #6 BARS "Y" IN THE TOP OF ALL ENDWALLS FOR PIPE CULVERTS 42" AND OVER WITH A MINIMUM OF 3" COVER AND A LENGTH OF 6" LESS THAN ENDWALL.
- * FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
- * WALL THICKNESS (T) SHOWN IS NOT TO BE INTERPRETED TO MEAN THE THICKNESS ACCEPTABLE, BUT ARE USED ONLY IN COMPUTING ENDWALL QUANTITIES.
- * IF CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE, BAR X (DOWELS SHALL BE PLACED IN THE BASE AS SHOWN ON PLANS. SPACING OF BARS TO BE APPROXIMATELY 12" CENTERS UNLESS ENGINEER DIRECTS OTHERWISE.
- * WHEN CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE AND POURS BASE SEPARATELY, THE TOP BASE SHALL BE LEFT ROUGH.
- * WHEN SKEW ANGLE OF PIPE IS OVER/UNDER 30° USE G-1 DIMENSION FOR 30° PLUS/MINUS 3" FOR EACH 5° OVER/UNDER 30°.
- G2 DIMENSION WILL BE THE NEW DIMENSION DIVIDED BY THE COSINE OF THE ANGLE OF PIPE SKEW.
- * CLASS "B" CONCRETE SHALL BE USED.

STATE OF NORTH CAROLINA
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RALEIGH, N.C.

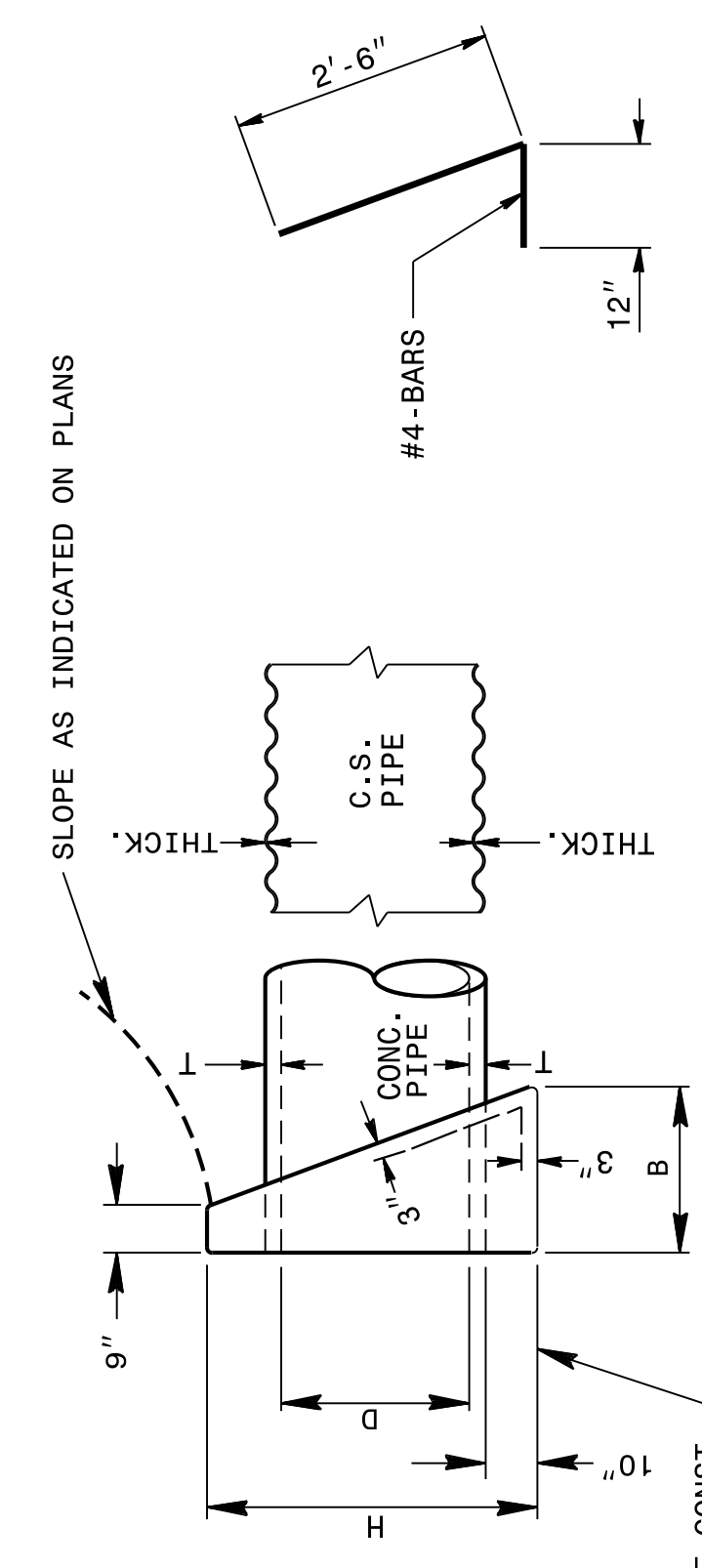
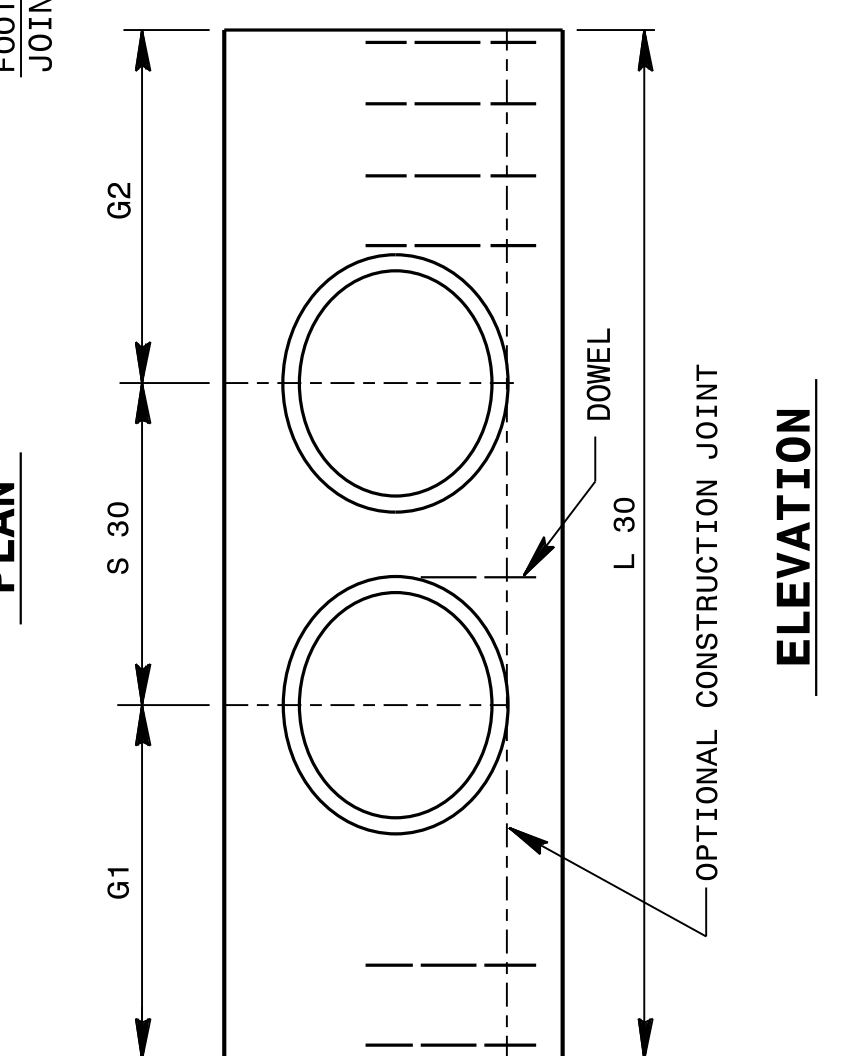
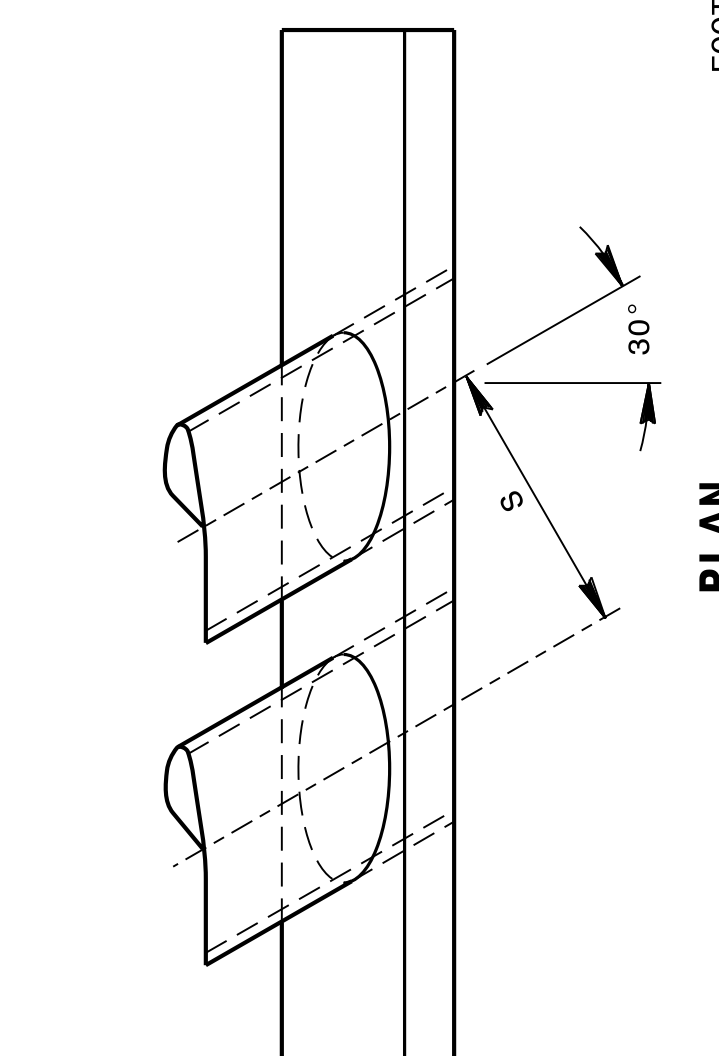
ENGLISH DETAIL DRAWING FOR
**CONCRETE ENDWALL FOR SINGLE AND
DOUBLE PIPE CULVERTS**
15" THRU 48" PIPE

SHEET 2 OF 2
838p02s1

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
**CONCRETE ENDWALL FOR SINGLE AND
DOUBLE PIPE CULVERTS**
15" THRU 48" PIPE 60° OR 120° SKEW

SHEET 1 OF 2
838d02s1



DIMENSIONS AND CONCRETE QUANTITIES											
USING CONCRETE PIPE			DOUBLE PIPE			COMMON DIMS.			SINGLE PIPE		
D	H	B	T	G1	G2	S	S 30	L	L 30	YD ³	YD ³
15"	3'-4"	1'-6"	1 7/8"	2'-9"	3'-2"	2'-9"	3'-2"	2'-9"	3'-2"	5'-11"	0.792
18"	3'-7"	1'-10"	2"	3'-2"	3'-8 1/4"	2'-7"	2'-11 3/4"	9'-10"	1.390	1.023	1.023
24"	4'-2"	2'-1"	2 1/2"	4'-0"	4'-8"	3'-5"	3'-11 1/2"	12'-8"	2.207	3'-9"	1'-11"
30"	4'-9"	2'-5"	2 3/4"	4'-7"	5'-4"	4'-3"	4'-10 3/4"	14'-10"	3.186	4'-3"	2'-2"
36"	5'-3"	2'-8"	3"	5'-6"	6'-4"	5'-0"	5'-9 1/4"	17'-8"	4.447	6'-0"	1'-2"
42"	5'-10"	2'-11"	3 1/2"	6'-4"	7'-4"	5'-10"	6'-8 3/4"	20'-5"	6.012	5'-3"	2'-8"
48"	6'-5"	3'-3"	4"	7'-2"	8'-3 1/4"	6'-8"	7'-8 1/4"	23'-2"	8.062	5'-9"	2'-11"
											80.7
											11.7
											13.9
											16.3
											20.9
											25.6
											85.3
											102.1

DIMENSIONS AND CONCRETE QUANTITIES											
USING CONCRETE PIPE			DOUBLE PIPE			COMMON DIMS.			SINGLE PIPE		
D	H	B	T	G1	G2	S	S 30	L	L 30	YD ³	YD ³
15"	3'-4"	1'-6"	1 7/8"	2'-9"	3'-2"	2'-9"	3'-2"	2'-9"	3'-2"	5'-11"	0.792
18"	3'-7"	1'-10"	2"	3'-2"	3'-8 1/4"	2'-7"	2'-11 3/4"	9'-10"	1.390	1.023	1.023
24"	4'-2"	2'-1"	2 1/2"	4'-0"	4'-8"	3'-5"	3'-11 1/2"	12'-8"	2.207	3'-9"	1'-11"
30"	4'-9"	2'-5"	2 3/4"	4'-7"	5'-4"	4'-3"	4'-10 3/4"	14'-10"	3.186	4'-3"	2'-2"
36"	5'-3"	2'-8"	3"	5'-6"	6'-4"	5'-0"	5'-9 1/4"	17'-8"	4.447	6'-0"	1'-2"
42"	5'-10"	2'-11"	3 1/2"	6'-4"	7'-4"	5'-10"	6'-8 3/4"	20'-5"	6.012	5'-3"	2'-8"
48"	6'-5"	3'-3"	4"	7'-2"	8'-3 1/4"	6'-8"	7'-8 1/4"	23'-2"	8.062	5'-9"	2'-11"
											80.7
											11.7
											13.9
											16.3
											20.9
											25.6
											85.3
											102.1

*SEE SHEET 2

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ORIGINAL BY: STD.NO.838.01 DATE: 4-17-99
MODIFIED BY: T.S. SPELL DATE: 12-10-08
CHECKED BY: DATE:
FILE SPEC.: s:user/details/metric/stand/838d02s1.dgn



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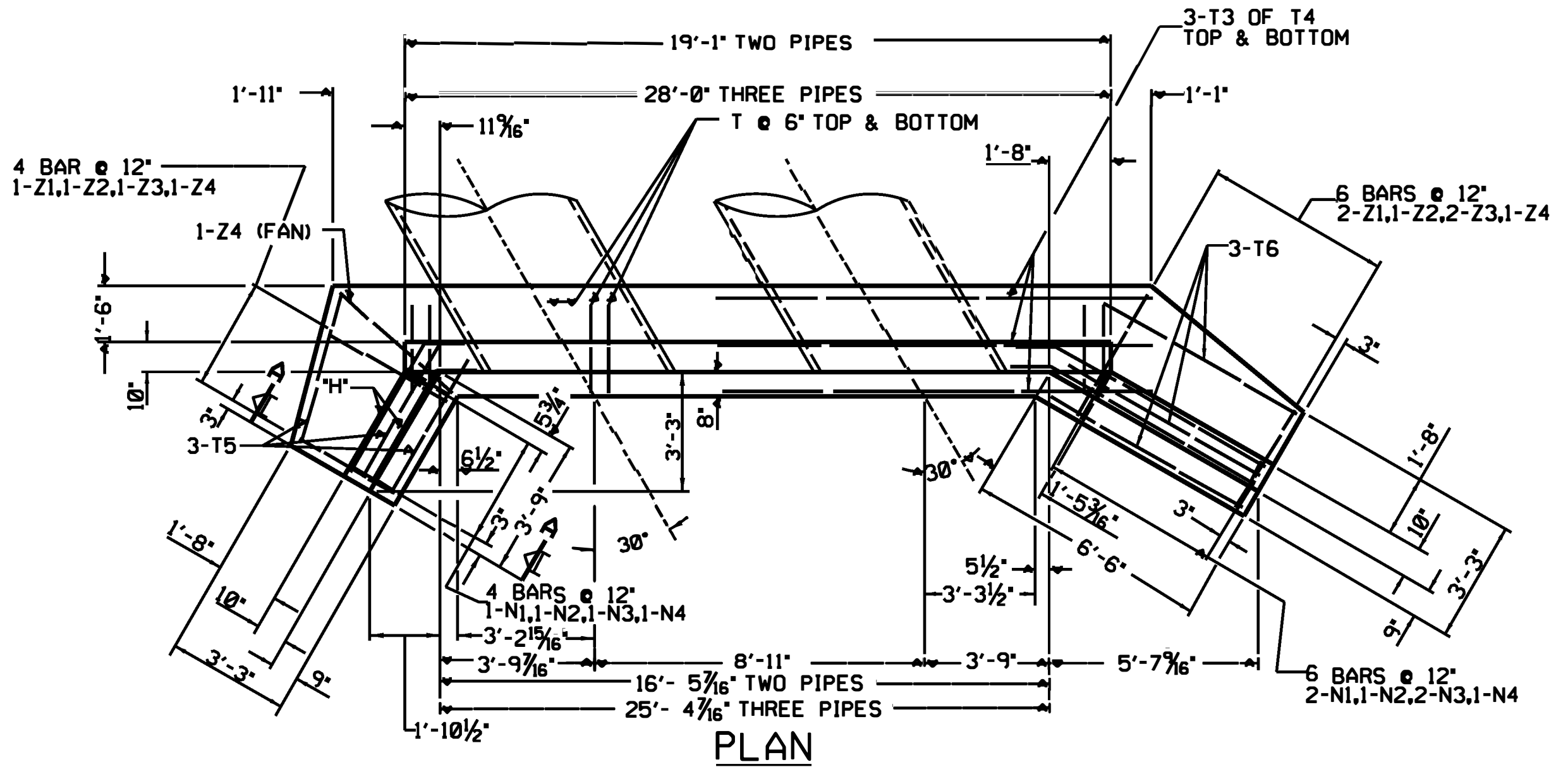
ENGLISH DETAIL DRAWING FOR REINFORCED CONCRETE ENDWALL FOR DOUBLE & TRIPLE 54" PIPE 60° OR 120° SKEW

SHEET 1 OF 838D24

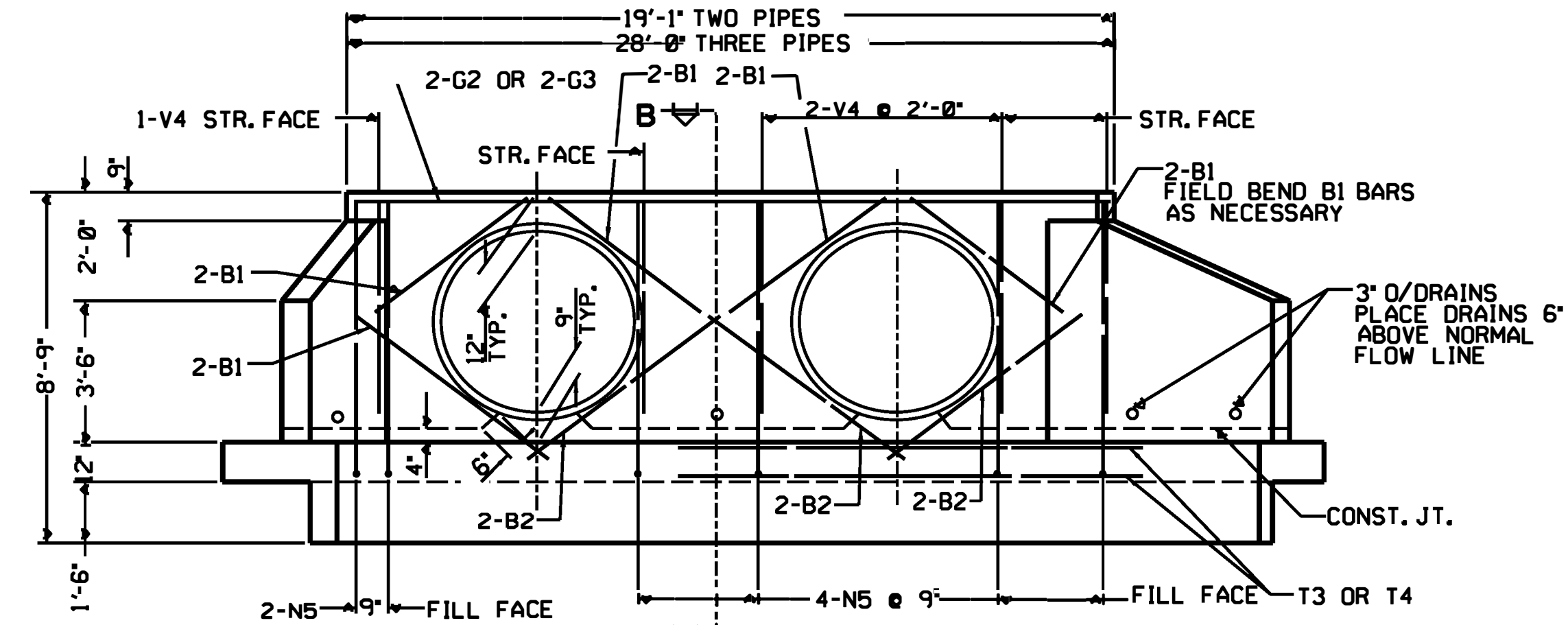
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ENGLISH DETAIL DRAWING FOR REINFORCED CONCRETE ENDWALL FOR DOUBLE & TRIPLE 54" PIPE 60° OR 120° SKEW

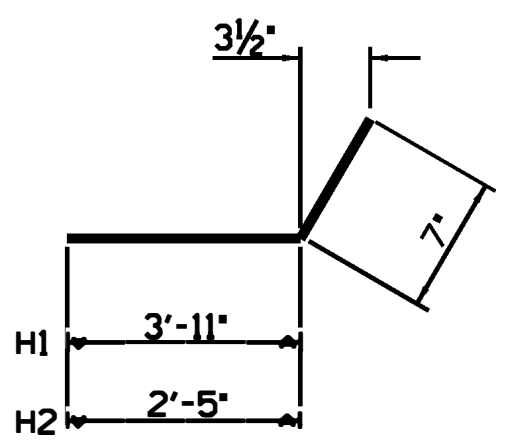
SHEET 1 OF 838D24



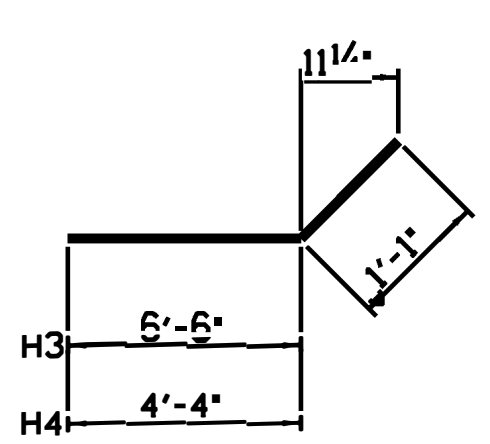
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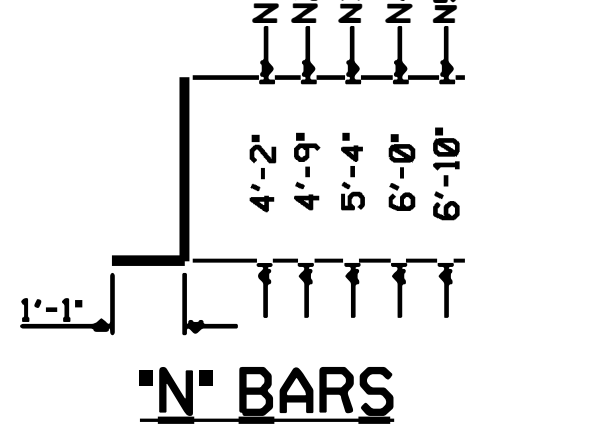
ELEVATION



"H" BARS

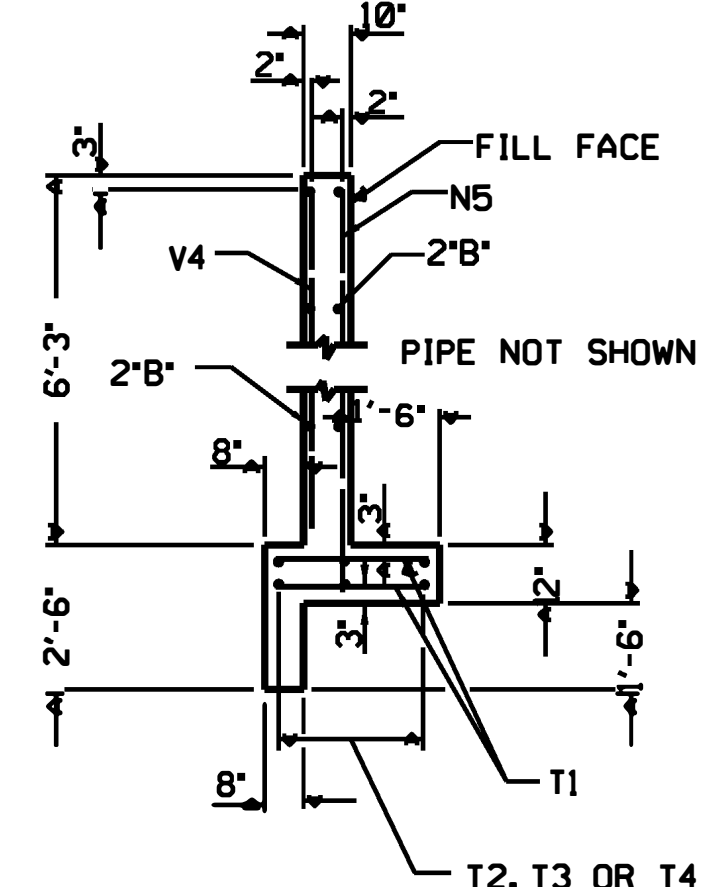


"N" BARS

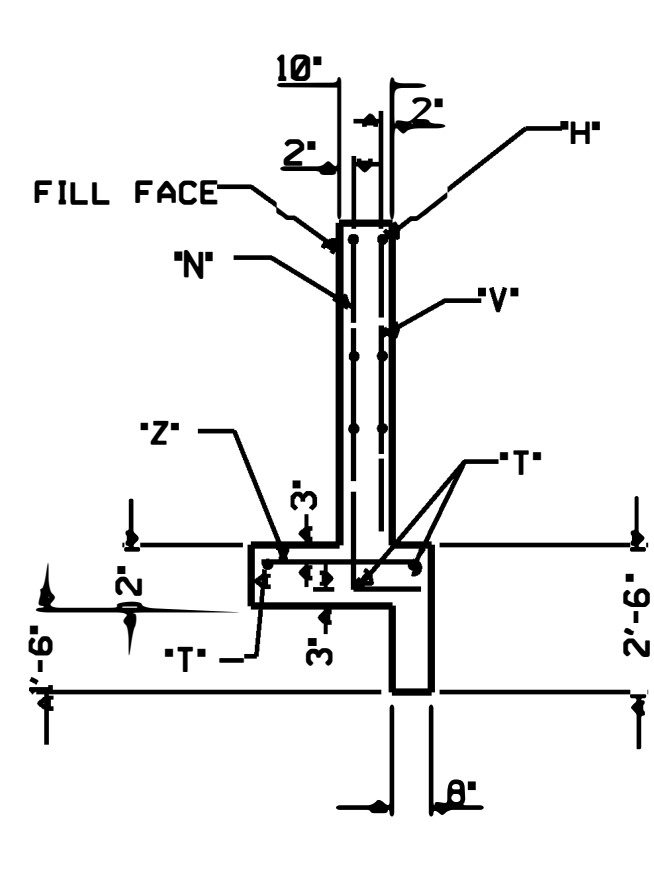


"Z" BARS

"H", "N", & "Z" BAR DIMENSIONS ARE OUT TO OUT.

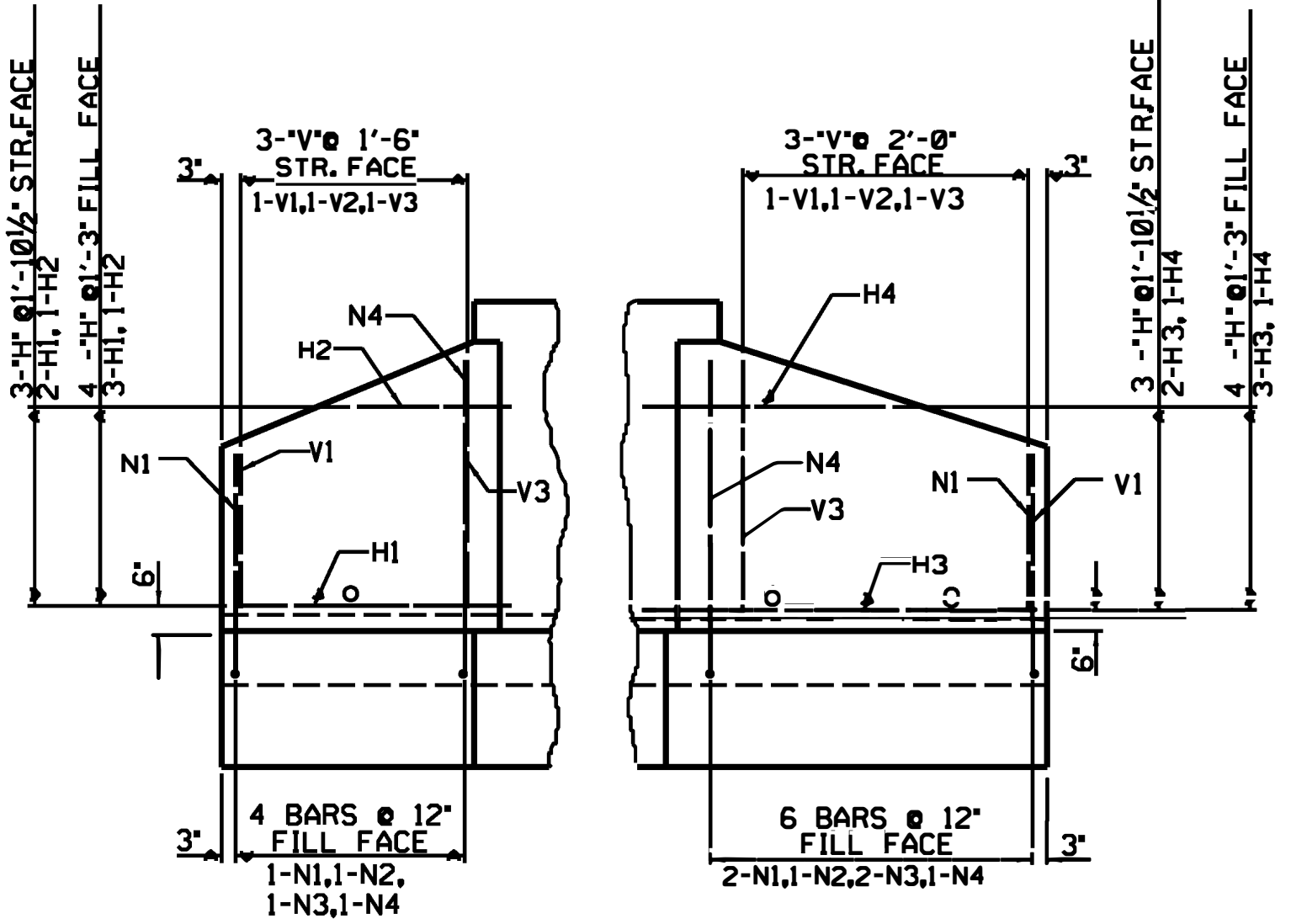


SECTION - BB



SECTION - AA

SEE STD. NO. 838.45 FOR GENERAL NOTES.



WING ELEVATION

BILL OF MATERIAL FOR ENDWALLS							
REINF. STEEL			2 - PIPES		3 - PIPES		
BAR	SIZE	LENGTH	NO.	WEIGHT	NO.	WEIGHT	
Z1	#4	3'-4"	3	7	3	7	
Z2	#4	3'-7"	2	5	2	5	
Z3	#5	3'-11"	3	12	3	12	
Z4	#5	4'-3"	3	13	3	13	
N1	#4	5'-3"	3	11	3	11	
N2	#4	5'-10"	2	8	2	8	
N3	#4	6'-5"	3	13	3	13	
N4	#5	7'-1"	2	15	2	15	
N5	#4	7'-11"	10	53	14	74	
V1	#4	3'-0"	2	4	2	4	
V2	#4	3'-10"	2	5	2	5	
V3	#4	4'-8"	2	6	2	6	
V4	#4	5'-9"	5	19	7	27	
H1	#4	4'-6"	5	15	5	15	
H2	#4	3'-0"	2	4	2	4	
H3	#4	7'-7"	5	25	5	25	
H4	#4	5'-5"	2	7	2	7	
G2	#7	18'-9"	2	77	-	-	
G3	#7	27'-8"	-	-	2	113	
T1	#4	2'-6"	76	127	112	187	
T3	#4	21'-9"	6	87	-	-	
T4	#4	16'-0"	-	-	12	128	
T5	#4	4'-2"	3	8	3	8	
T6	#4	6'-0"	3	12	3	12	
B1	#4	4'-9"	10	32	14	44	
B2	#4	6'-0"	6	24	10	40	
REINF. STEEL LBS.			589		783		
CONC./C.M. CU. YDS.			8.3		10.7		
CONC./R.C. CU. YDS.			7.8		10.0		

SYSTEMS TIME \$\$\$\$\$\$ USER NAME \$\$\$\$\$\$

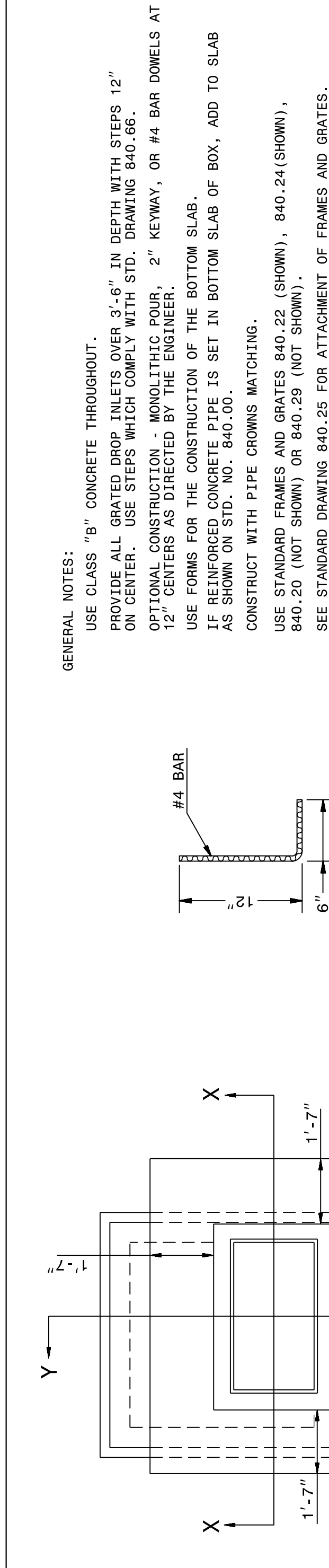


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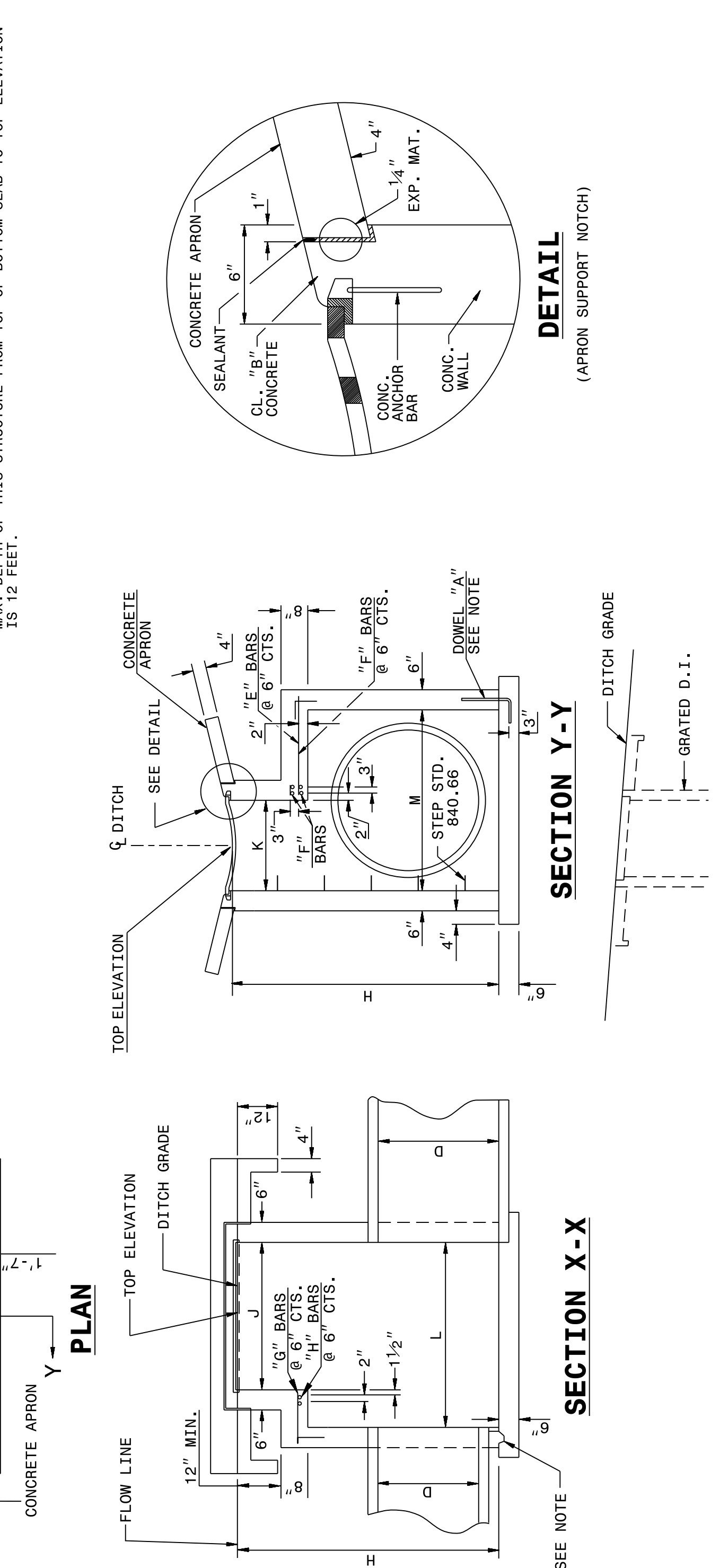
STATE OF
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE

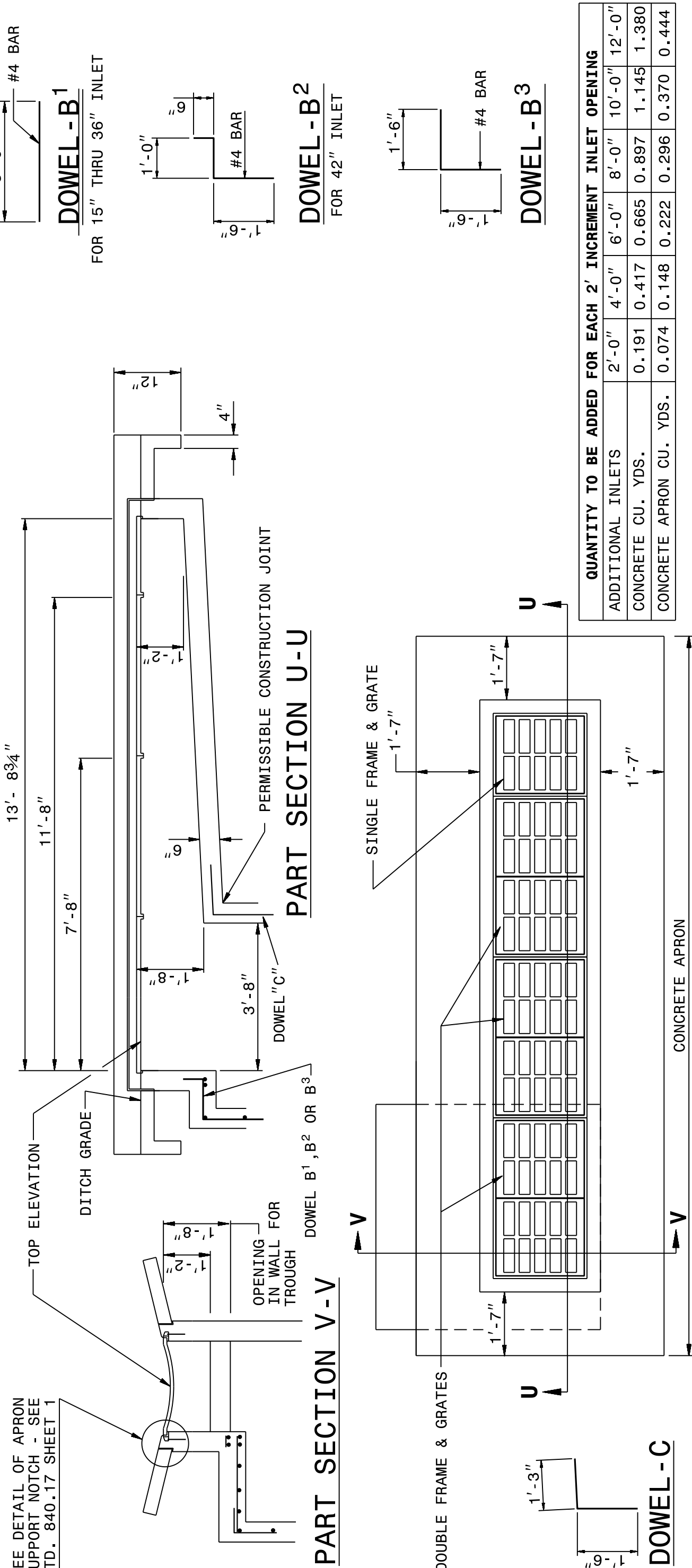
SHEET 1 OF 2
840d17



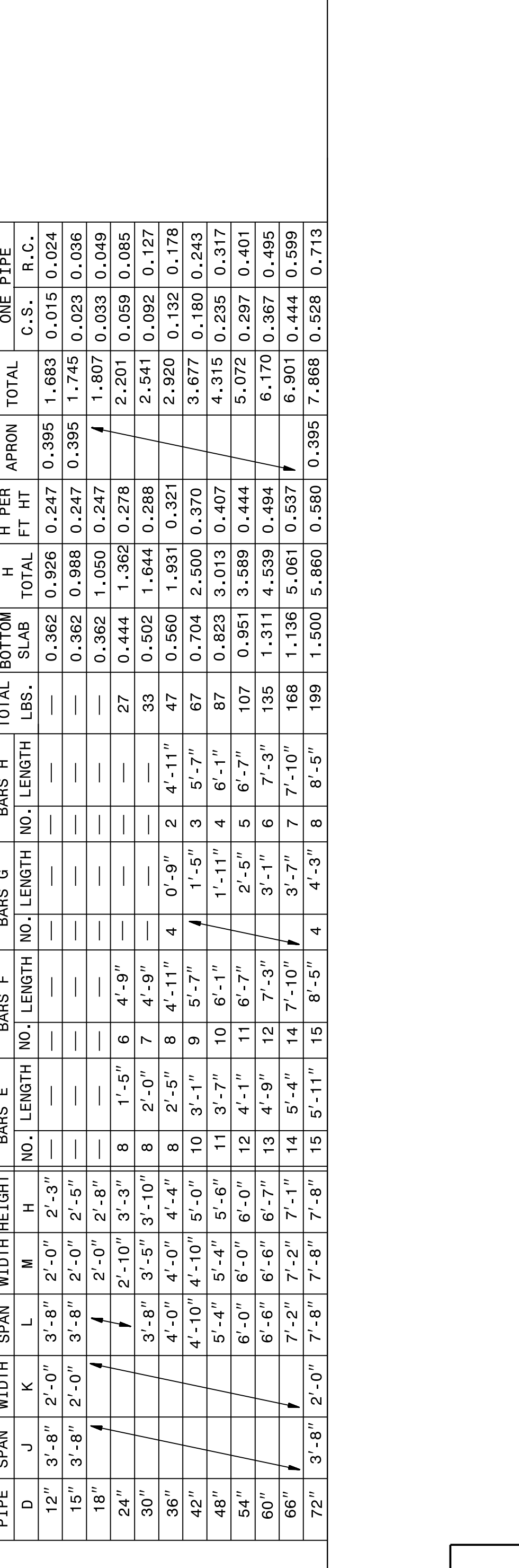
SECTION X-X



SECTION Y-Y



SECTION Y-Y



SECTION Y-Y

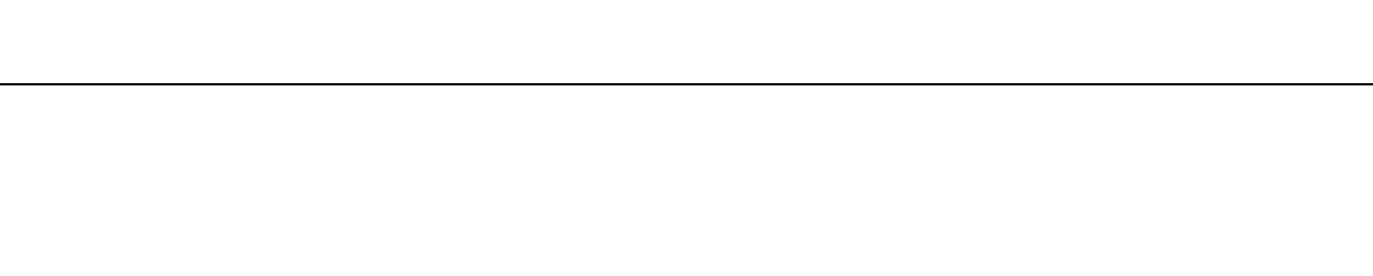
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ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE

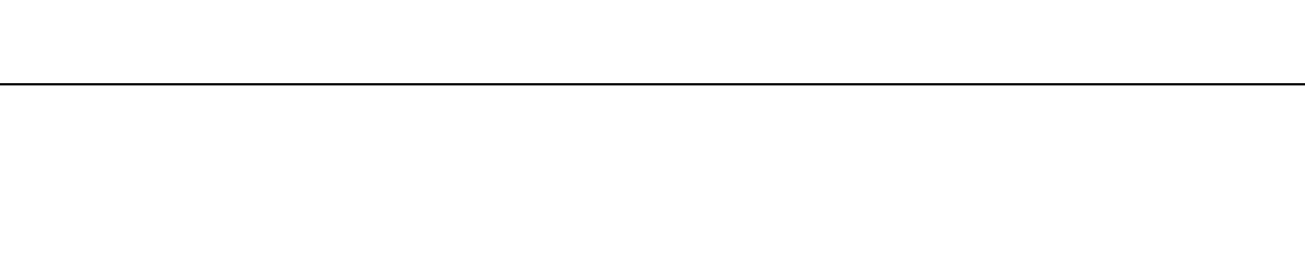
SHEET 1 OF 2
840d17

GENERAL NOTES:
USE CLASS "B" CONCRETE THROUGHOUT.
PROVIDE ALL GRATED DROP INLETS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
CONSTRUCT WITH PIPE CROWNS MATCHING.
USE STANDARD FRAMES AND GRATES 840.22 (SHOWN), 840.24 (SHOWN), 840.20 (NOT SHOWN) OR 840.29 (NOT SHOWN).
SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES.
CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.
MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12 FEET.

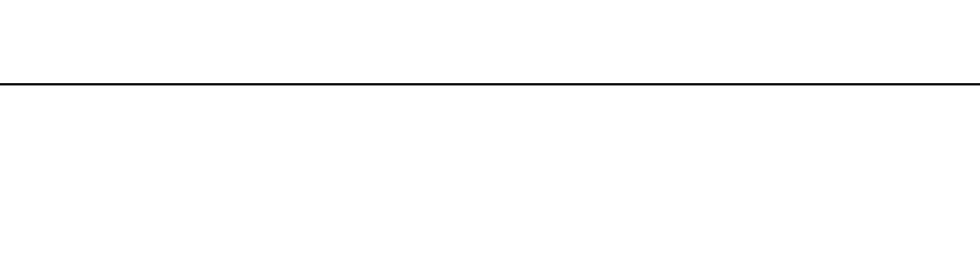
DOWEL - A



DOWEL - B



DOWEL - C

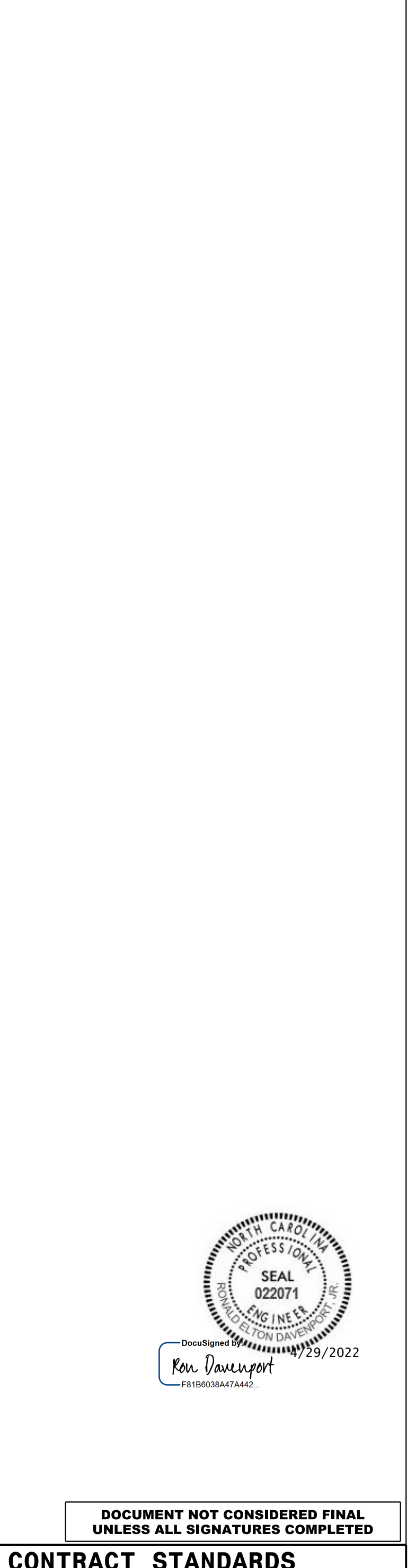


DOWEL - B

STATE OF
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ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE

SHEET 2 OF 2
840d17



PART SECTION U-U



PART SECTION V-V

PIPE	DIMENSIONS OF BOX AND PIPE		REINFORCING STEEL - NO. 4 BARS										MIN. DIMENSIONS AND QUANTITIES FOR CONCRETE GRATED DROP INLET (BASED ON MIN. HEIGHT, H)		DEDUCTIONS FOR ONE PIPE										
	SPAN	WIDTH	D	J	K	L	M	H	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	H	PER	TOTAL	C.S.	R.C.		
12"	3'-8"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	0.362	0.926	0.247	0.395	1.683	0.015	0.024
15"	3'-8"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	0.362	0.988	0.247	0.395	1.745	0.023	0.036
18"	3'-8"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	0.362	1.050	0.247	1.807	0.033	0.049	
24"	3'-8"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	0.444	1.362	0.278	2.201	0.059	0.085	
30"	3'-8"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	0.502	1.644	0.288	2.541	0.082	0.127	
36"	4'-0"	4'-0"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	0.560	1.931	0.321	2.920	0.132	0.178	
42"	4'-0"	4'-0"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	4'-4"	0.704	2.500	0.370	3.677	0.180	0.243	
48"	5'-4"	5'-4"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	5'-6"	0.823	3.013	0.407	4.315	0.235	0.317	
54"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	6'-0"	0.951	3.589	0.444	5.072	0.287	0.401	
60"	6'-6"	6'-6"	6'-7"	6'-7"	6'-7"	6'-7"	6'-7"	6'-7"	6'-7"	6'-7"	6'-7"	6'-7"	6'-7"	6'-7"	6'-7"	6'-7"	6'-7"	6'-7"	1.311	4.539	0.494	6.170	0.367	0.495	
66"	7'-2"	7'-2"	7'-1"	7'-1"	7'-1"	7'-1"	7'-1"	7'-1"	7'-1"	7'-1"	7'-1"	7'-1"	7'-1"	7'-1"	7'-1"	7'-1"	7'-1"	7'-1"	1.136	5.061	0.537	6.901	0.444	0.599	
72"	3'-8"	2'-0"	7'-8"	7'-8"	7'-8"	7'-8"	7'-8"	7'-8"	7'-8"	7'-8"	7'-8"	7'-8"	7'-8"	7'-8"	7'-8"	7'-8"	7'-8"	7'-8"	1.500	5.860	0.580	0.395	7.868	0.528	0.713

QUANTITY TO BE ADDED FOR EACH 2' INCREMENT INLET OPENING

ADDITIONAL INLETS	2'-0"	4'-0"	6'-0"	8'-0"	10'-0"	12'-0"
CONCRETE CU. YDS.	0.191	0.417	0.665	0.897	1.145	1.380
CONCRETE APRON CU. YDS.	0.074	0.148	0.222	0.296	0.370	0.444

I:\SEP-2017\1155\port\assets\Special Details\jhowerton\840d17 Minimum Depth Type A.dgn
jhowerton At CSD 2/25/22



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UNLESS ALL SIGNATURES COMPLETED

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AND DEVELOPMENT UNIT**
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ORIGINAL BY: J. Howerton DATE: 1/22/14
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: jhowerton\minimum depth type A.dgn

01-MAR-2018 07:39
 S:\Contracts\Special Details\Vericard\usr\stand\840d17 Extra Depth 2GI.dgn
 J:\over ton AT_CSD-292595

STATE OF
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE MEDIAN DROP INLET TYPE 'A'
EXTRA DEPTH OVER 12' TO 25'
12" THRU 72" PIPE

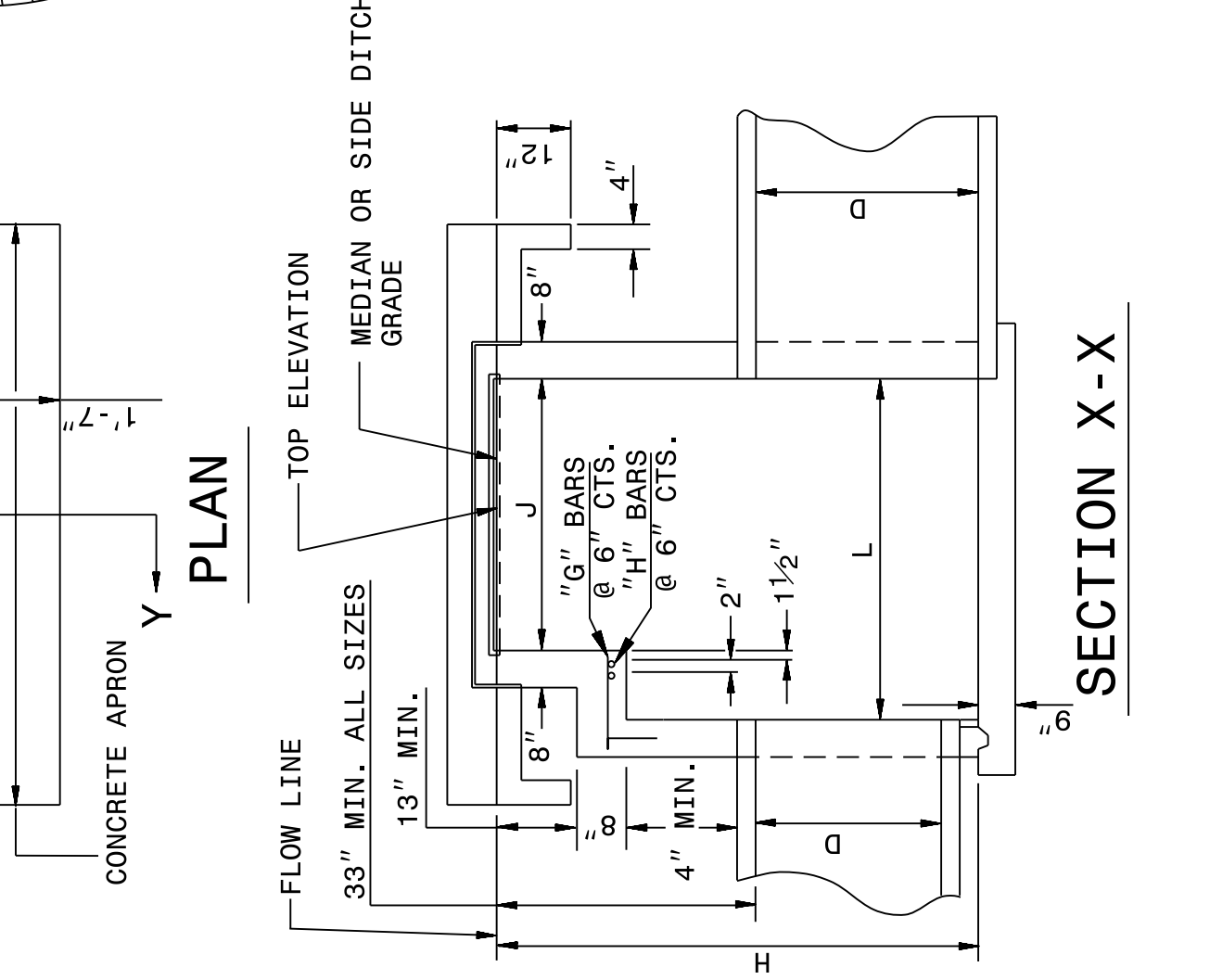
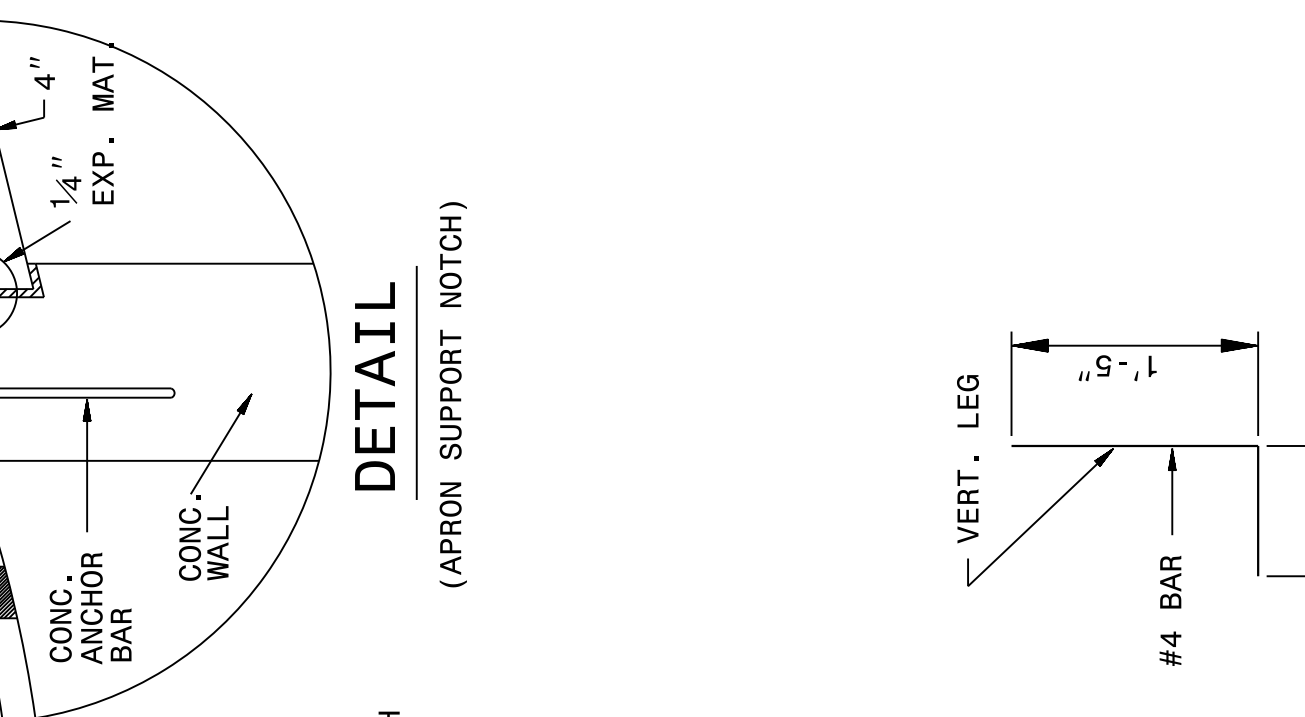
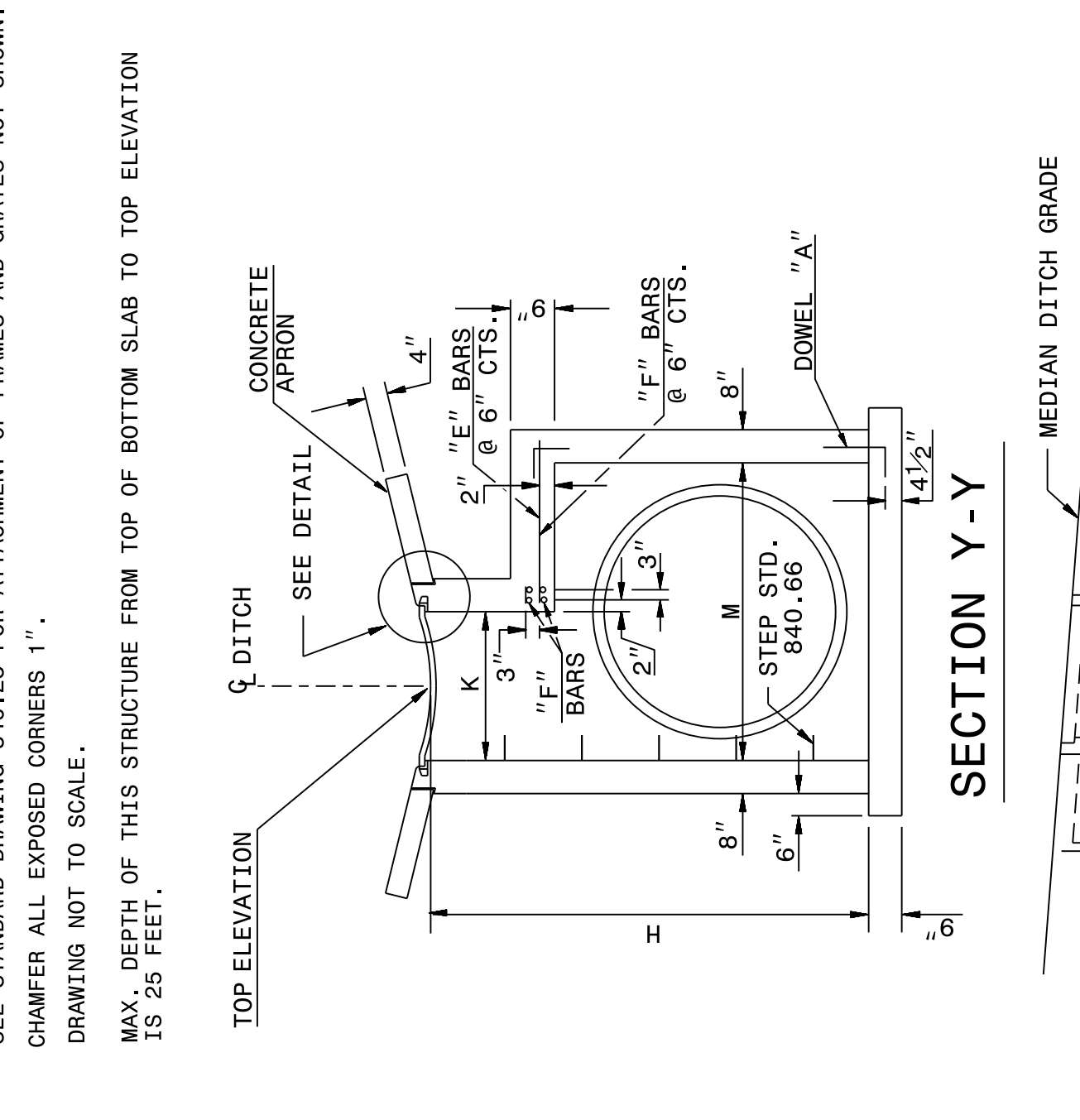
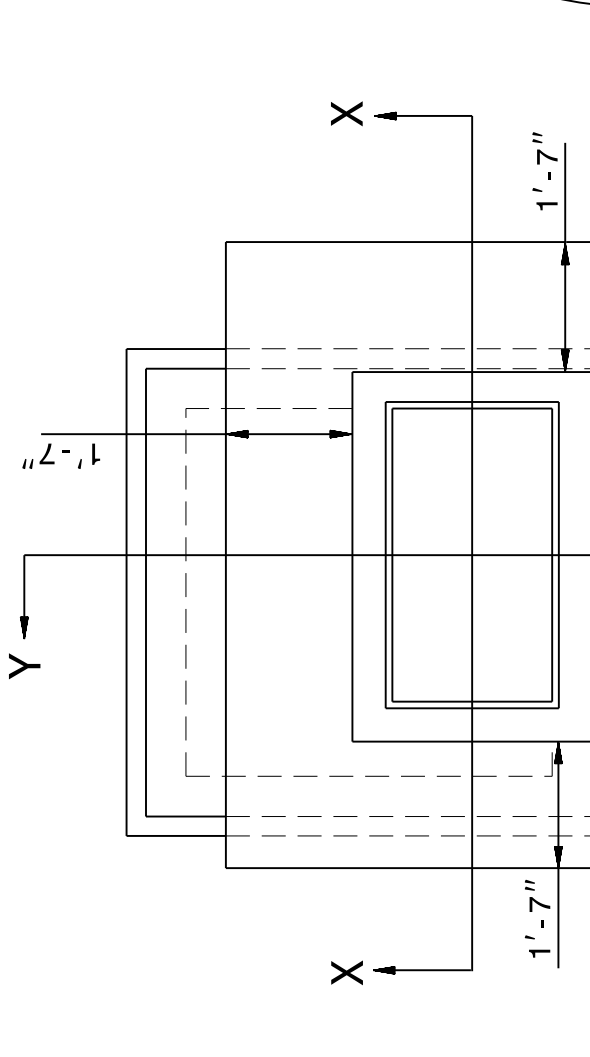
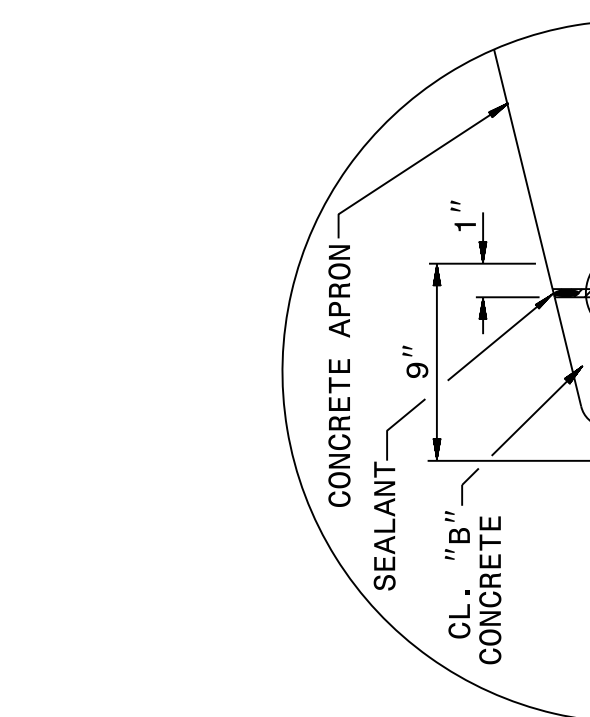
SHEET 1 OF 2
840D17

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE MEDIAN DROP INLET TYPE 'A'
EXTRA DEPTH OVER 12' TO 25'
12" THRU 72" PIPE

SHEET 1 OF 2
840D17

GENERAL NOTES:
 USE CLASS "B" CONCRETE THROUGHOUT.
 PROVIDE DROP INLETS WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
 OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
 USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
 IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
 WHEN PAYMENT FOR THE DROP INLET IS MADE ON A PER EACH BASIS, THE CONCRETE APRON WILL BE CONSIDERED PART OF THE DROP INLET.
 CONSTRUCT WITH PIPE CROWNS MATCHING.
 USE STANDARD FRAMES AND GRATES 840.22 (SHOWN), 840.24 (SHOWN), 840.20, 840.29, AND 840.33.
 SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES NOT SHOWN.
 CHAMFER ALL EXPOSED CORNERS 1".
 DRAWING NOT TO SCALE.
 MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 25 FEET.



STATE OF
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ENGLISH DETAIL DRAWING FOR
CONCRETE MEDIAN DROP INLET TYPE 'A'
EXTRA DEPTH OVER 12' TO 25'
12" THRU 72" PIPE

SHEET 1 OF 2
840D17

STATE OF
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DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

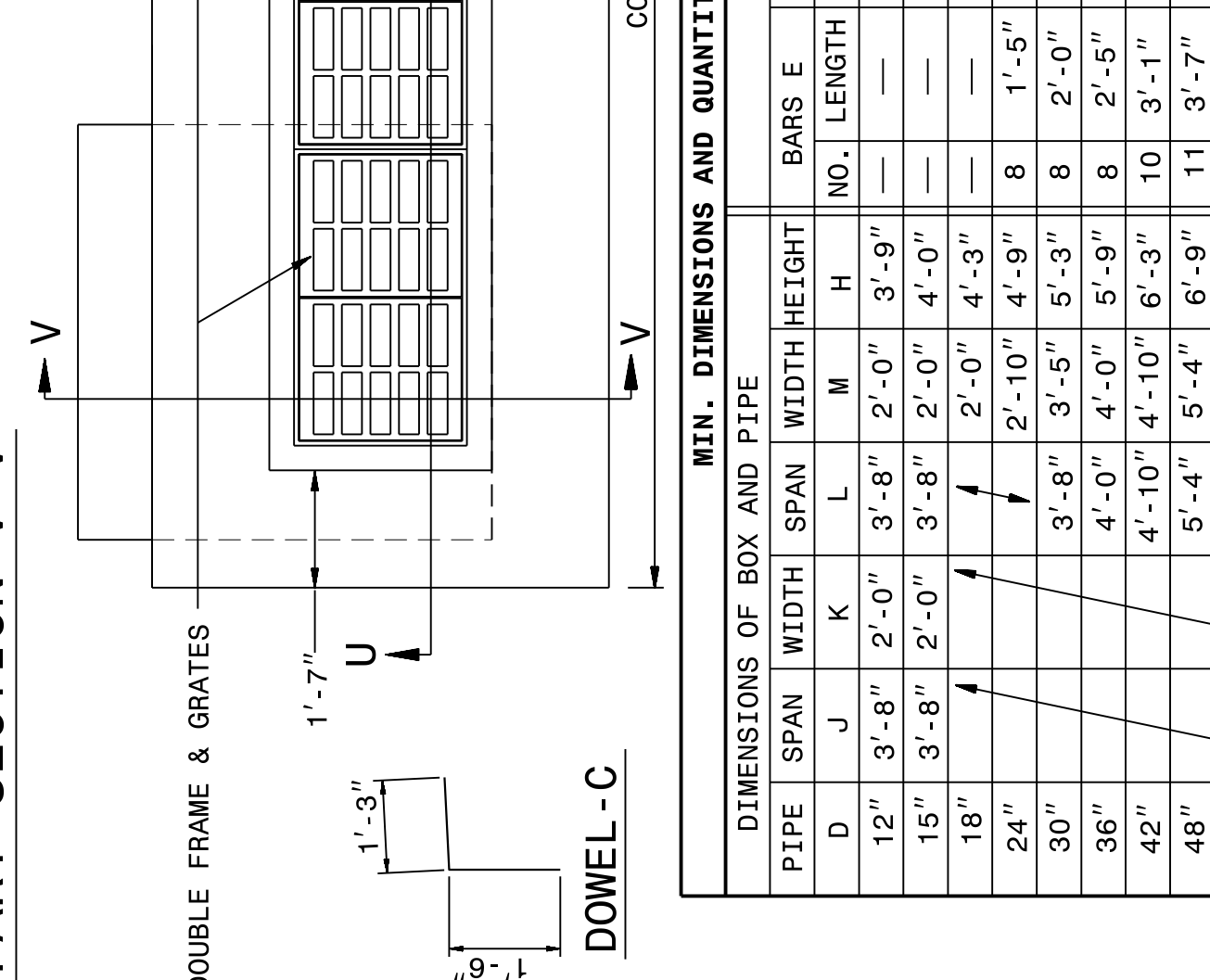
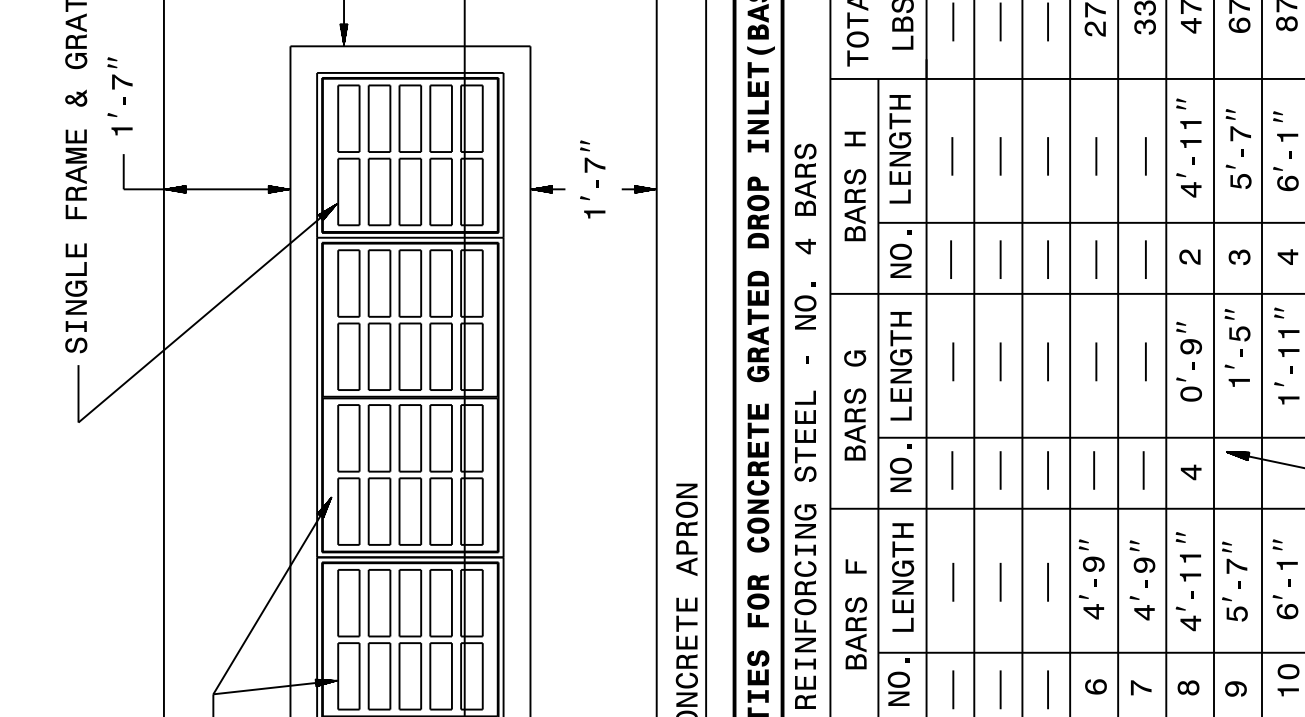
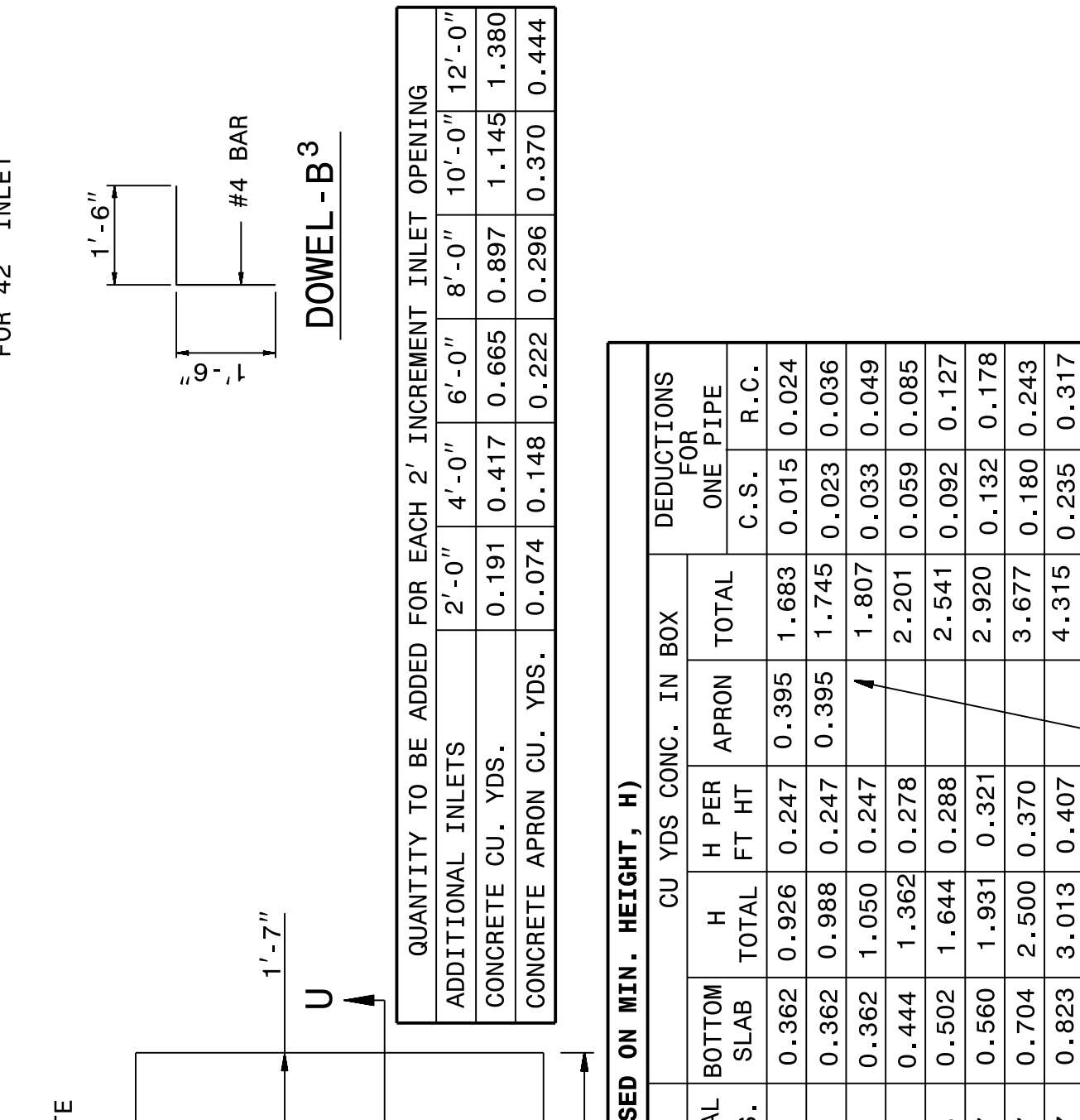
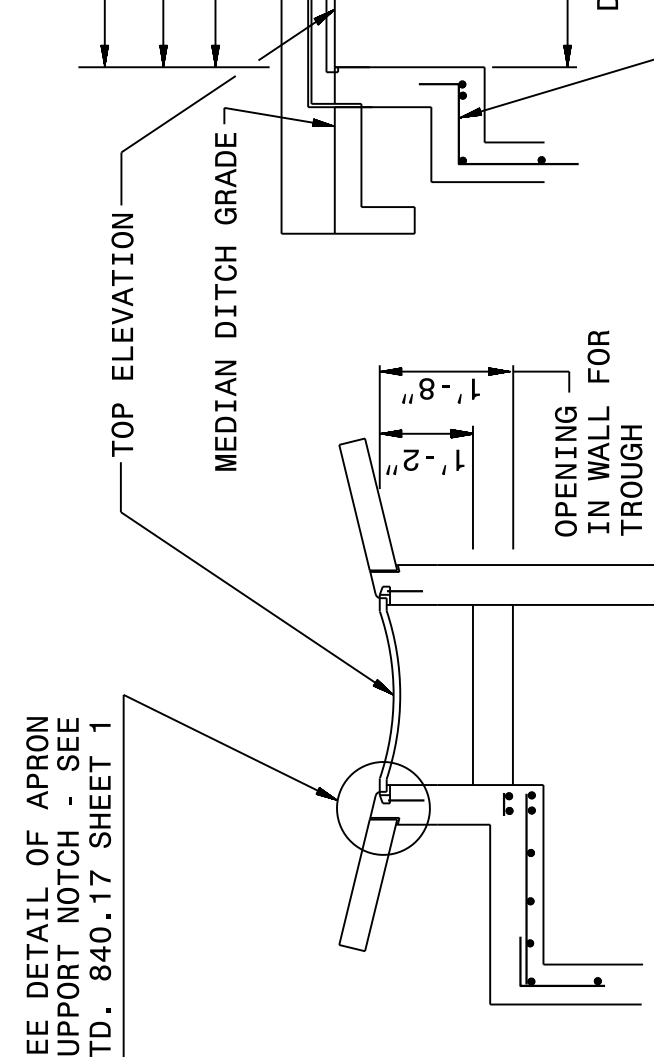
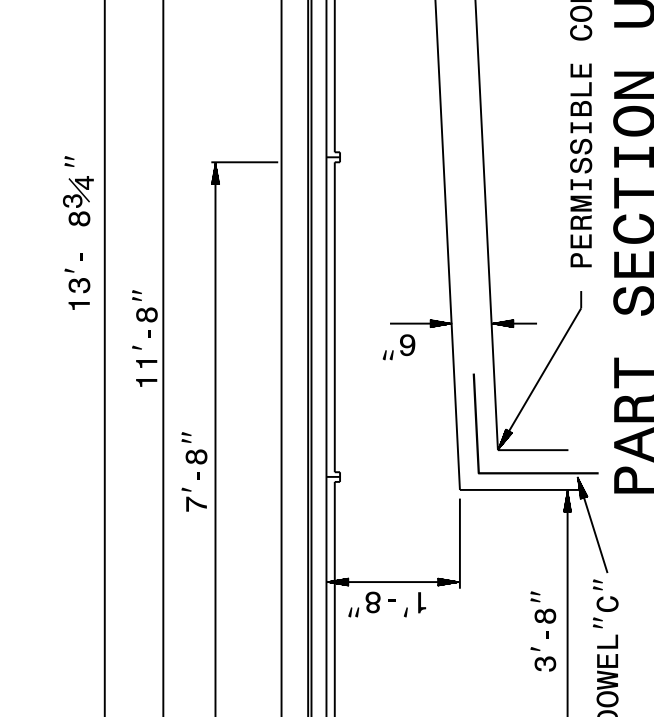
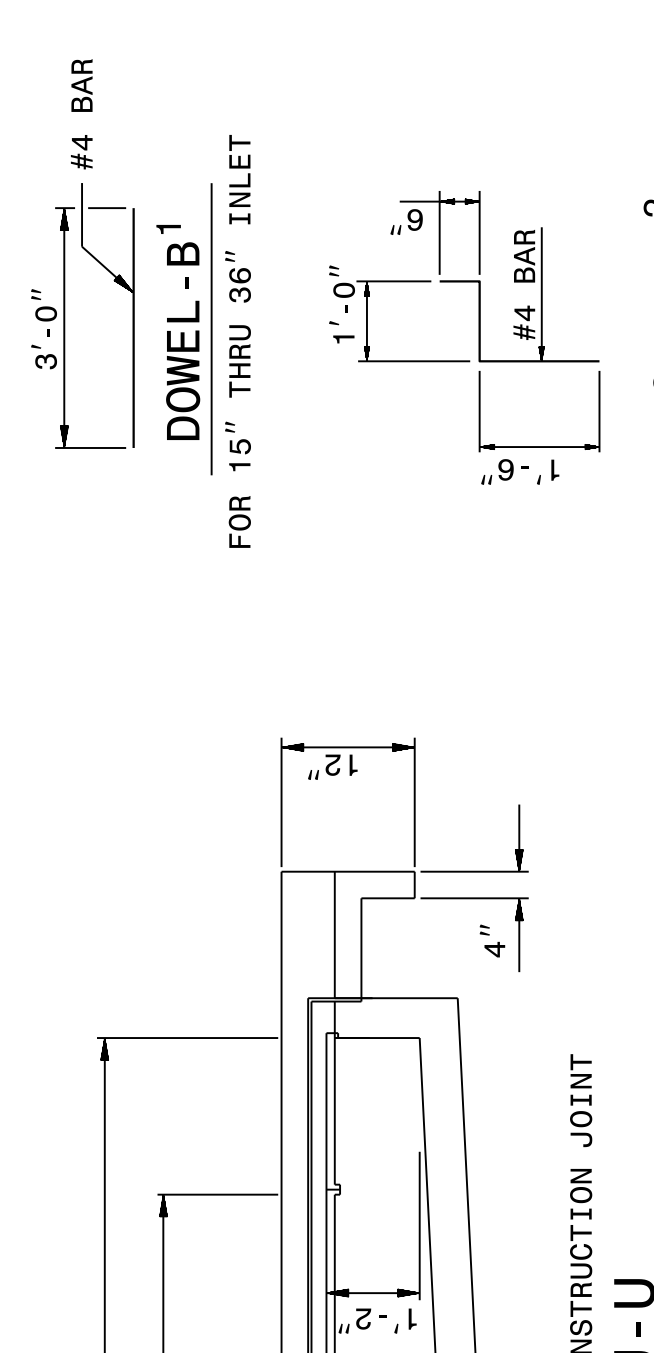
ENGLISH DETAIL DRAWING FOR
CONCRETE MEDIAN DROP INLET TYPE 'A'
EXTRA DEPTH OVER 12' TO 25'
12" THRU 72" PIPE

SHEET 2 OF 2
840D17

STATE OF
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE MEDIAN DROP INLET TYPE 'A'
EXTRA DEPTH OVER 12' TO 25'
12" THRU 72" PIPE

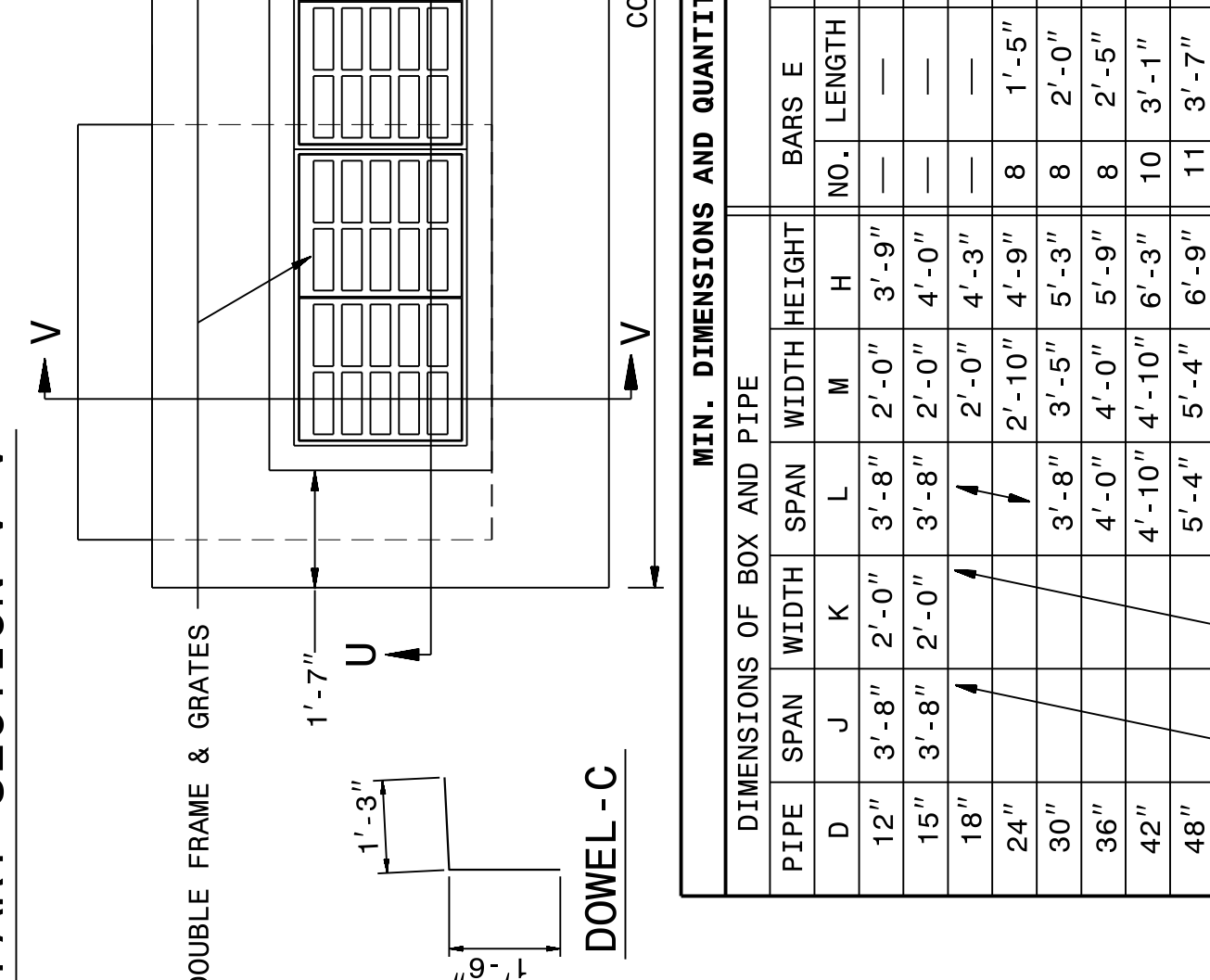
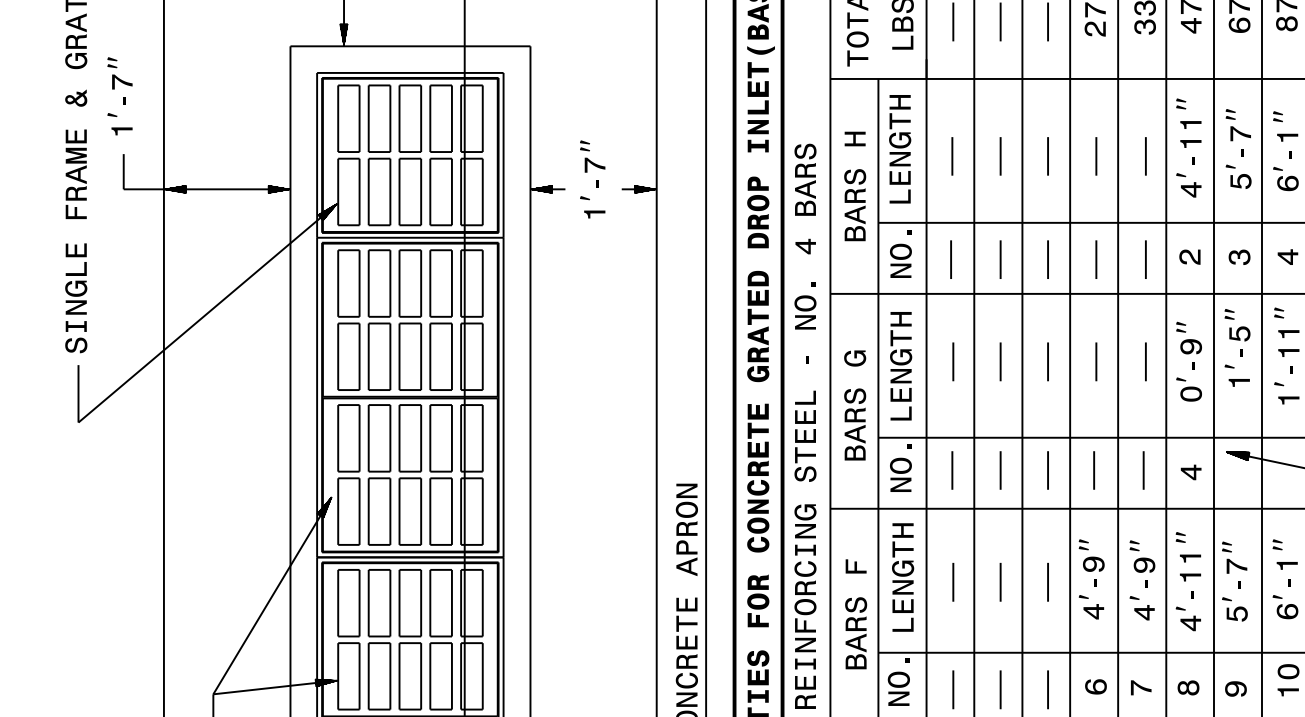
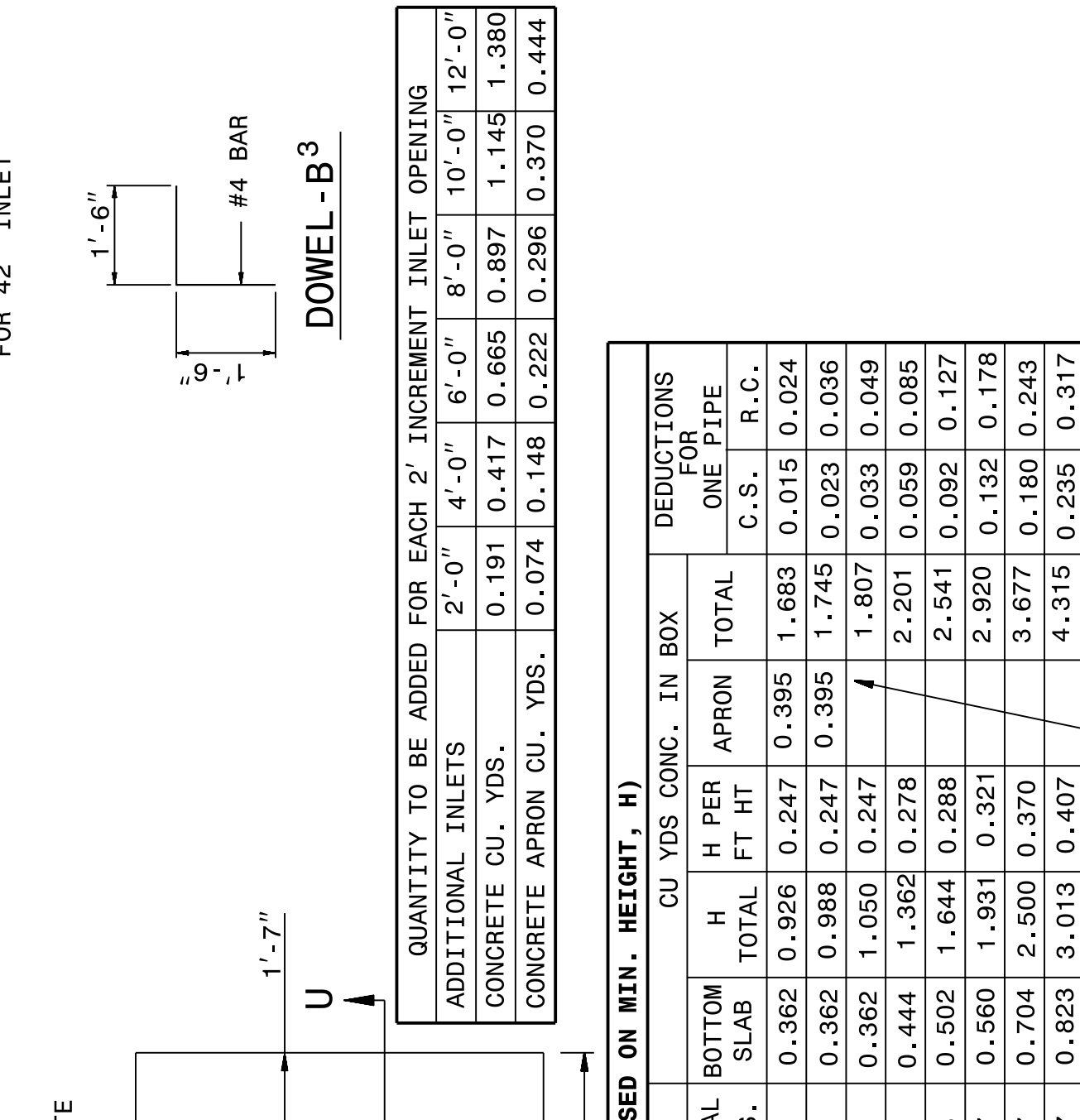
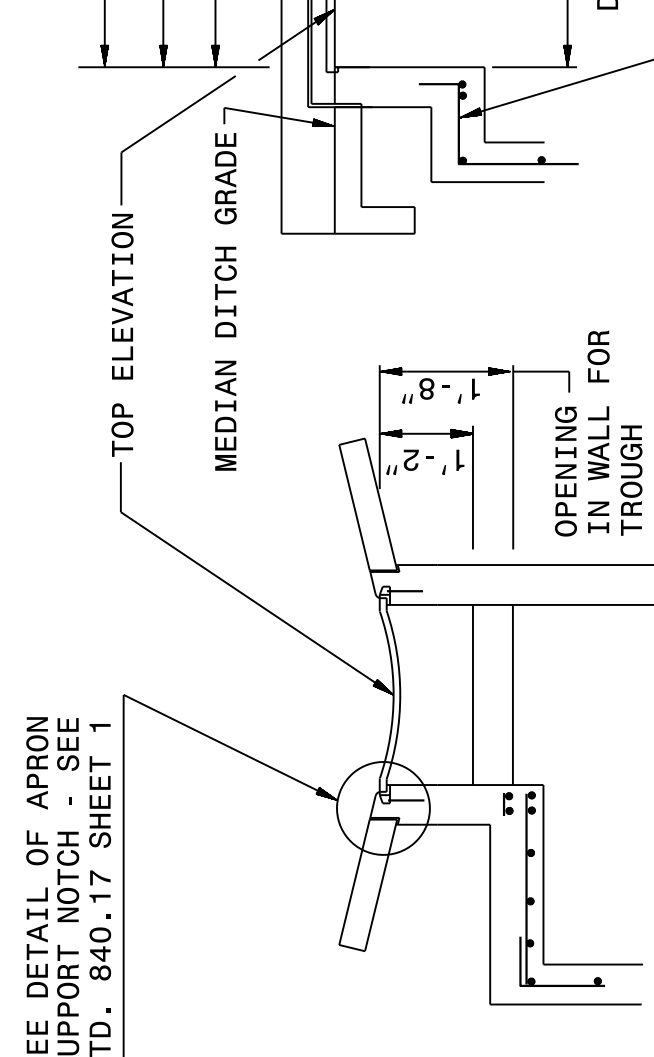
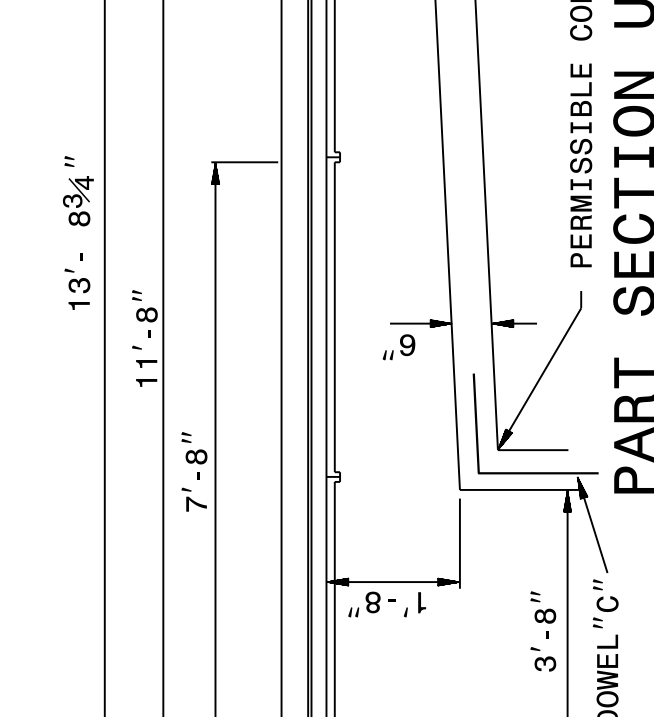
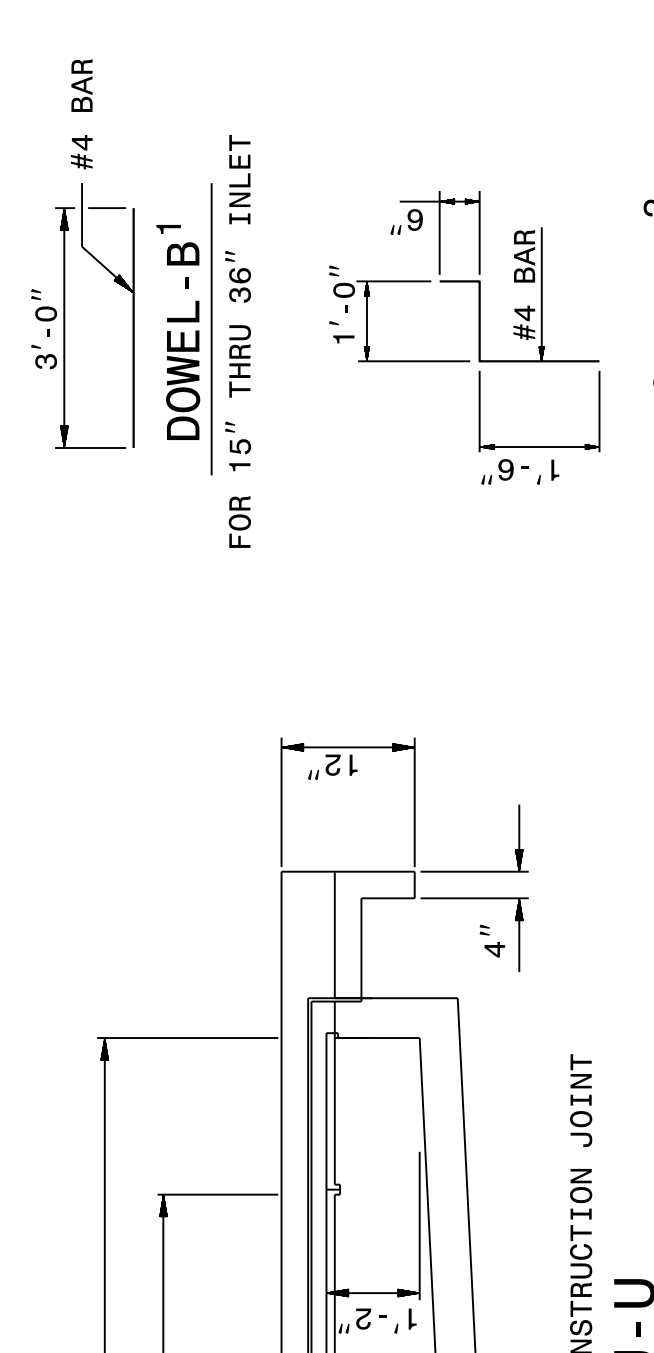
SHEET 2 OF 2
840D17



STATE OF
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE MEDIAN DROP INLET TYPE 'A'
EXTRA DEPTH OVER 12' TO 25'
12" THRU 72" PIPE

SHEET 2 OF 2
840D17



QUANTITY TO BE ADDED FOR EACH 2' INCREMENT INLET OPENING

ADDITIONAL INLETS	2'-0"	4'-0"	6'-0"	8'-0"	10'-0"	12'-0"
CONCRETE CU. YDS.	0.191	0.417	0.665	0.897	1.145	1.380
CONCRETE APRON CU. YDS.	0.074	0.148	0.222	0.296	0.370	0.444

PIPE	DIMENSIONS OF BOX AND PIPE		REINFORCING STEEL - NO. 4 BARS								CU YDS CONC. IN BOX		DEDUCTIONS FOR ONE PIPE								
	SPAN	WIDTH	D	J	K	L	M	H	NO.	LENGTH	BARS E	BARS F	BARS G	BARS H	TOTAL SLAB	H PER FT	APRON	TOTAL	C.S.	R.C.	
12"	3'-8"	2'-0"	2'-0"	3'-8"	2'-0"	2'-0"	3'-9"	3'-9"	4'-0"	—	—	—	—	—	0.362	0.926	0.247	0.395	1.683	0.015	0.024
15"	3'-8"	2'-0"	2'-0"	3'-8"	2'-0"	2'-0"	4'-0"	4'-0"	—	—	—	—	—	—	0.362	0.988	0.247	0.395	1.745	0.023	0.036
18"	3'-8"	2'-0"	2'-0"	3'-8"	2'-0"	2'-0"	4'-3"	4'-3"	—	—	—	—	—	—	0.362	1.050	0.247	0.395	1.807	0.033	0.049
24"	3'-8"	2'-0"	2'-0"	3'-8"	2'-0"	2'-0"	4'-9"	4'-9"	8	1'-5"	6	4'-9"	—	—	0.444	1.362	0.278	0.420	2.201	0.059	0.085
30"	3'-8"	2'-0"	2'-0"	3'-8"	2'-0"	2'-0"	5'-3"	5'-3"	8	2'-0"	7	4'-9"	—	—	0.502	1.644	0.288	0.430	2.541	0.092	0.127
36"	3'-8"	2'-0"	2'-0"	3'-8"	2'-0"	2'-0"	5'-9"	5'-9"	8	2'-5"	8	4'-11"	4	0'-9"	0.560	1.931	0.321	0.480	2.920	0.132	0.178
42"	3'-8"	2'-0"	2'-0"	3'-8"	2'-0"	2'-0"	6'-3"	6'-3"	10	3'-1"	9	5'-7"	3	1'-5"	0.704	2.500	0.370	0.540	3.677	0.180	0.243
48"	3'-8"	2'-0"	2'-0"	3'-8"	2'-0"	2'-0"	6'-9"	6'-9"	11	3'-7"	10	6'-1"	4	1'-11"	0.823	3.013	0.407	0.587	4.315	0.235	0.317
54"	3'-8"	2'-0"	2'-0"	3'-8"	2'-0"	2'-0"	7'-3"	7'-3"	12	4'-1"	11	6'-7"	5	2'-5"	0.951	3.589	0.444	0.633	5.072	0.297	0.401
60"	3'-8"	2'-0"	2'-0"	3'-8"	2'-0"	2'-0"	7'-9"	7'-9"	13	4'-9"	12	7'-3"	6	3'-1"	1.311	4.539	0.494	0.720	6.170	0.367	0.495
66"	3'-8"	2'-0"	2'-0"	3'-8"	2'-0"	2'-0"	8'-3"	8'-3"	14	5'-4"	14	7'-10"	7	4'-3"	1.136	5.061	0.537	0.800	6.901	0.444	0.599
72"	3'-8"	2'-0"	2'-0"	3'-8"	2'-0"	2'-0"	8'-9"	8'-9"	15	5'-11"	15	8'-5"	8	4'-3"	1.500	5.860	0.560	0.860	7.868	0.528	0.713

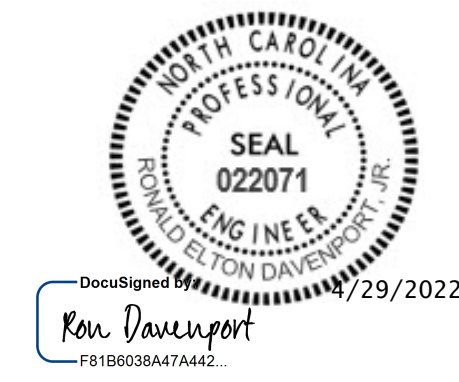
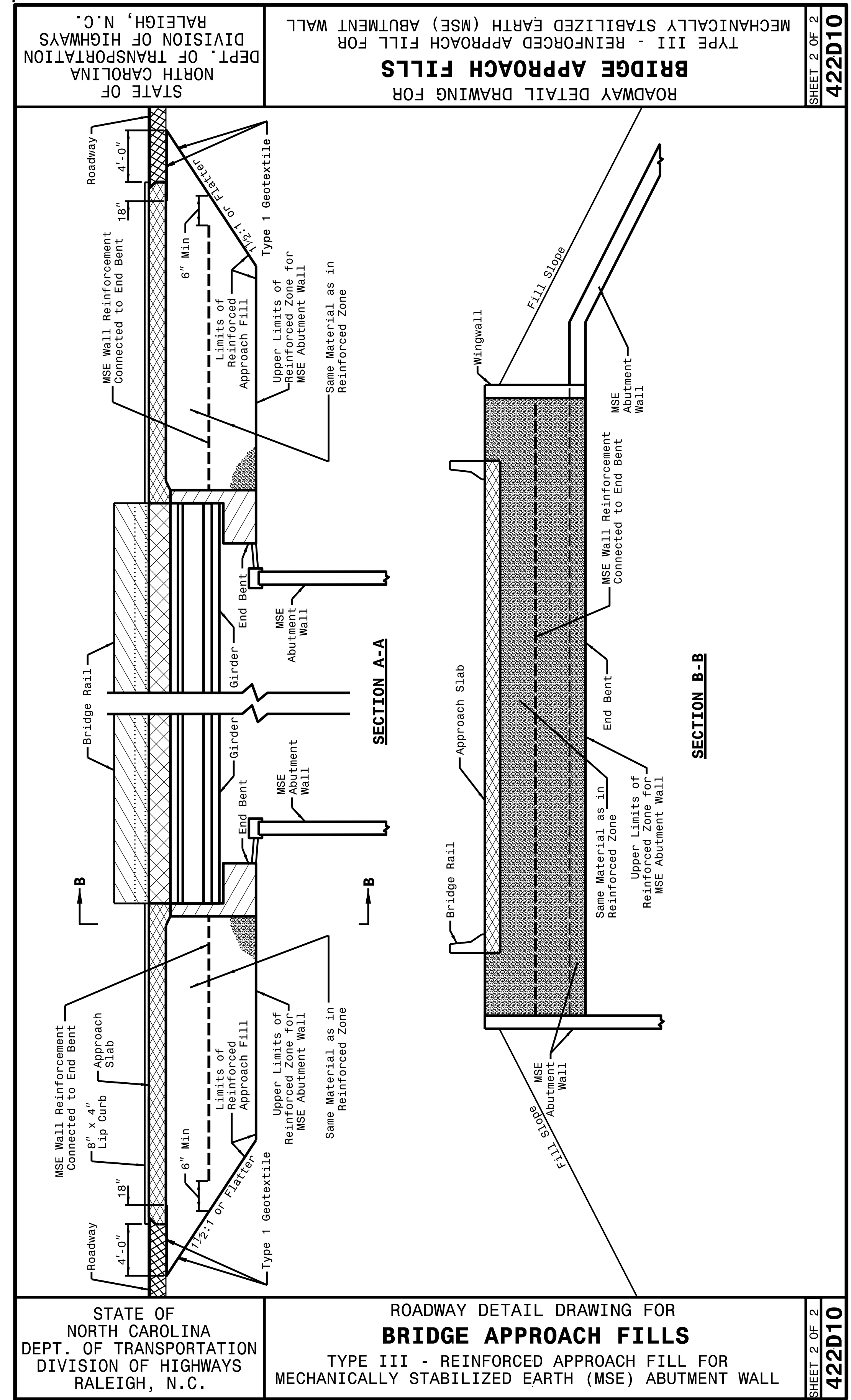
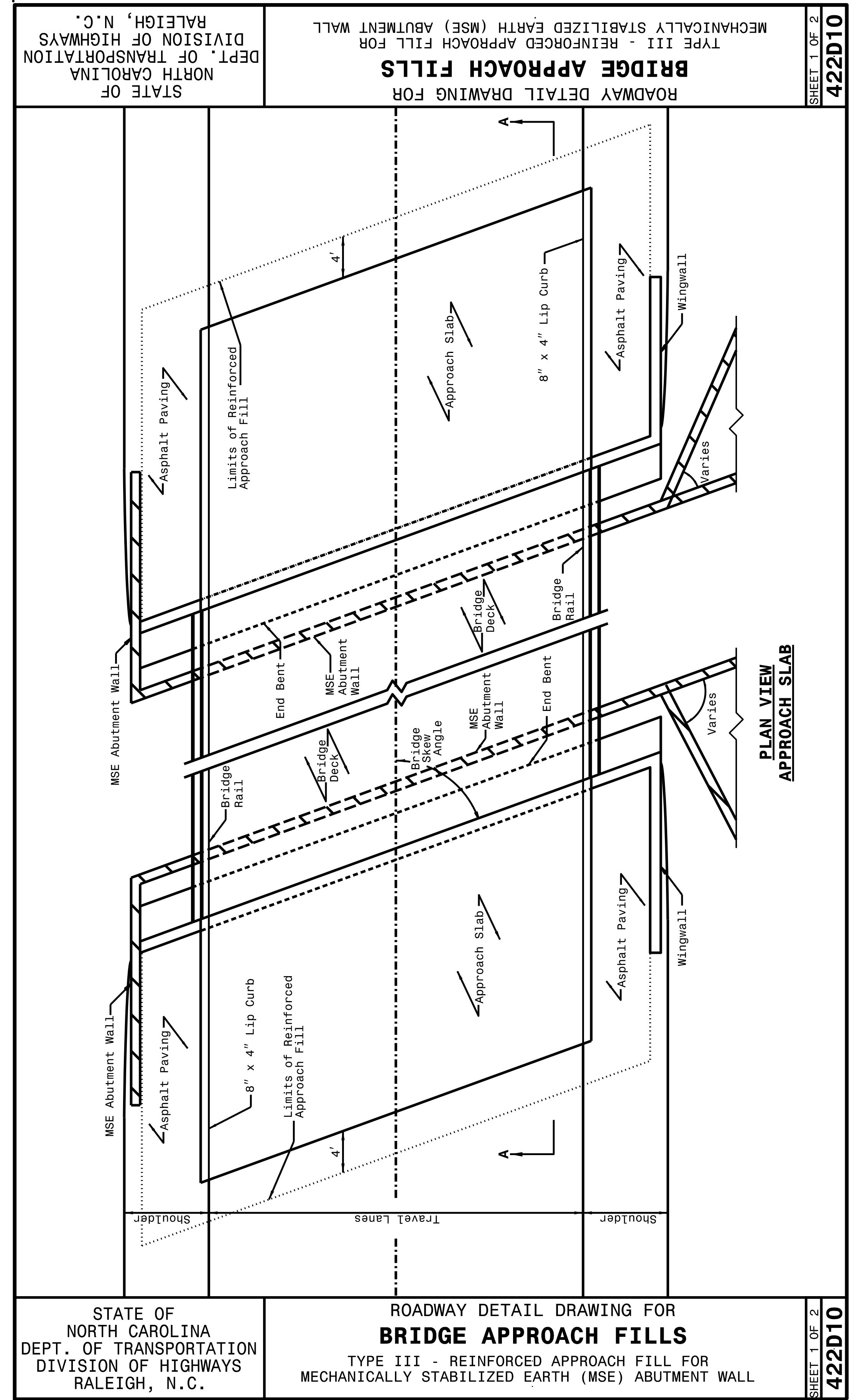
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ORIGINAL BY: 2002 STD.840.17 DATE: _____
 MODIFIED BY: K.A. KEMPF DATE: 07-06-09
 CHECKED BY: _____ DATE: _____
 FILE SPEC.: /stand/840d17 Extra Depth 2GI.dgn



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**TYPE III
REINFORCED
APPROACH FILLS**

ORIGINAL BY: K. A. KEMPF DATE: JULY 2017
 MODIFIED BY: DATE: _____
 CHECKED BY: DATE: _____
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STATE OF NORTH CAROLINA
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

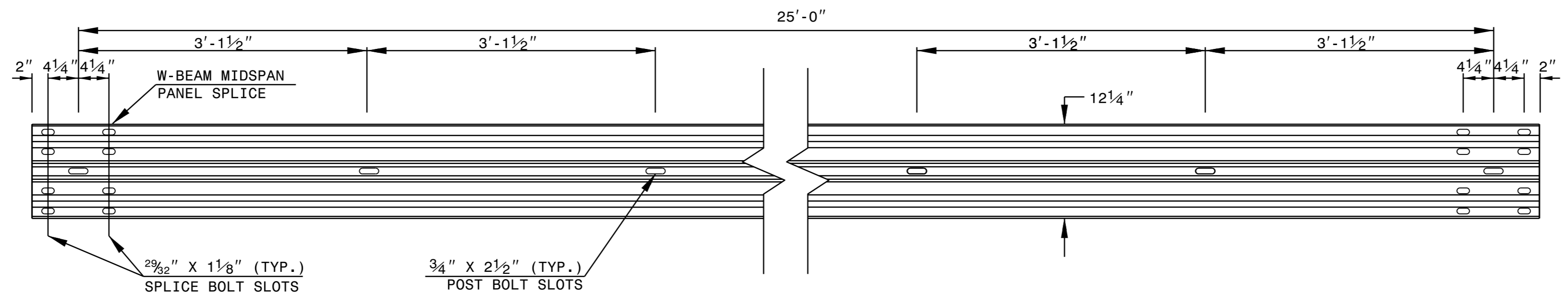
ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02

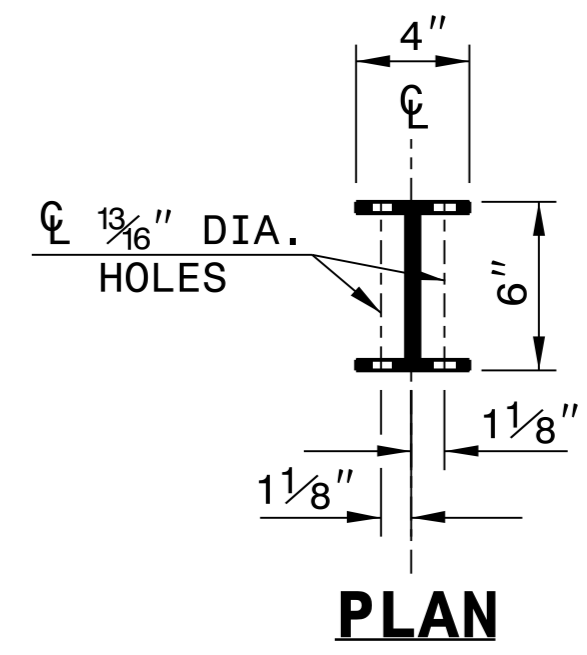
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DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

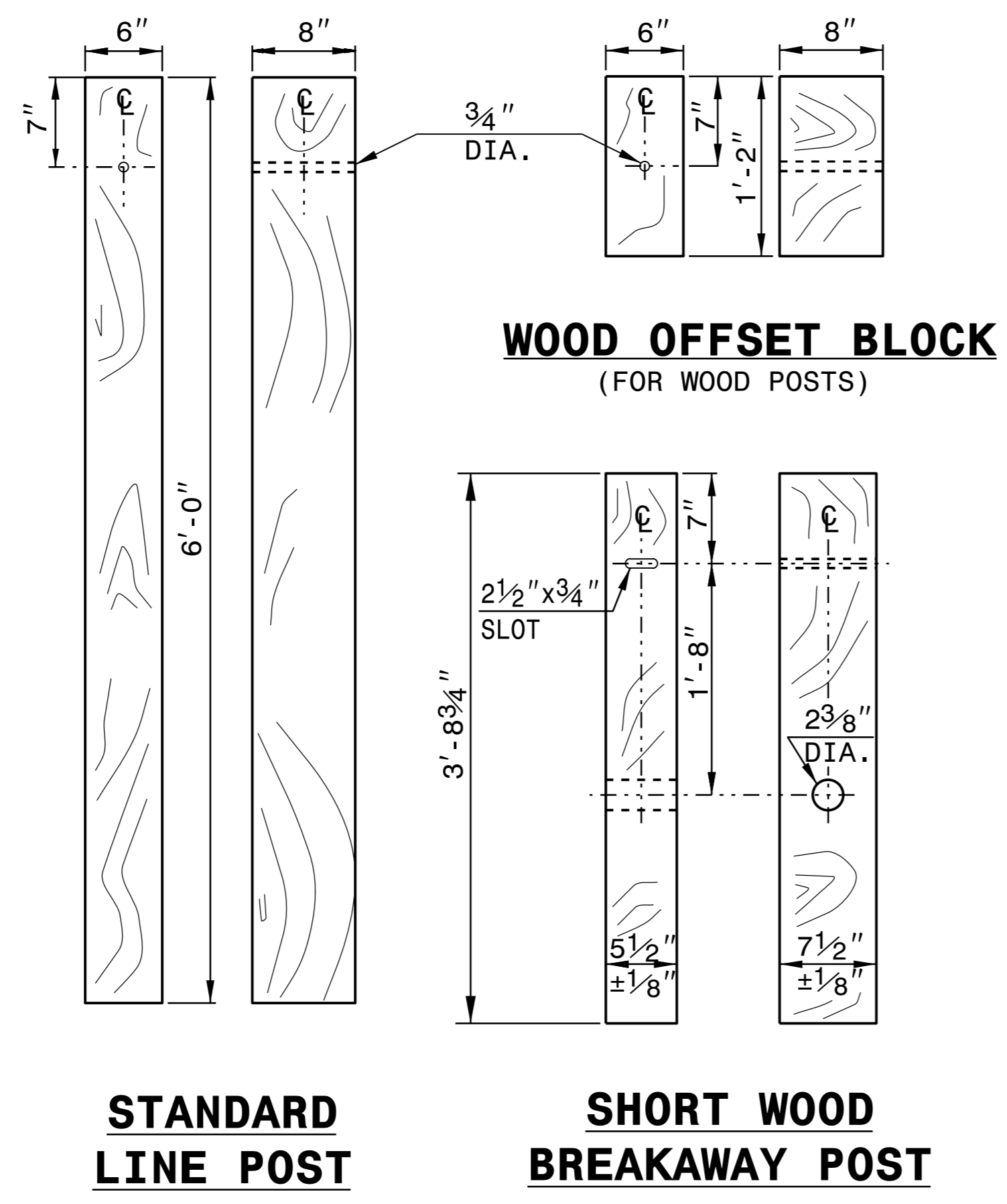
SHEET 6 OF 8
862D02



STANDARD W-BEAM GUARDRAIL

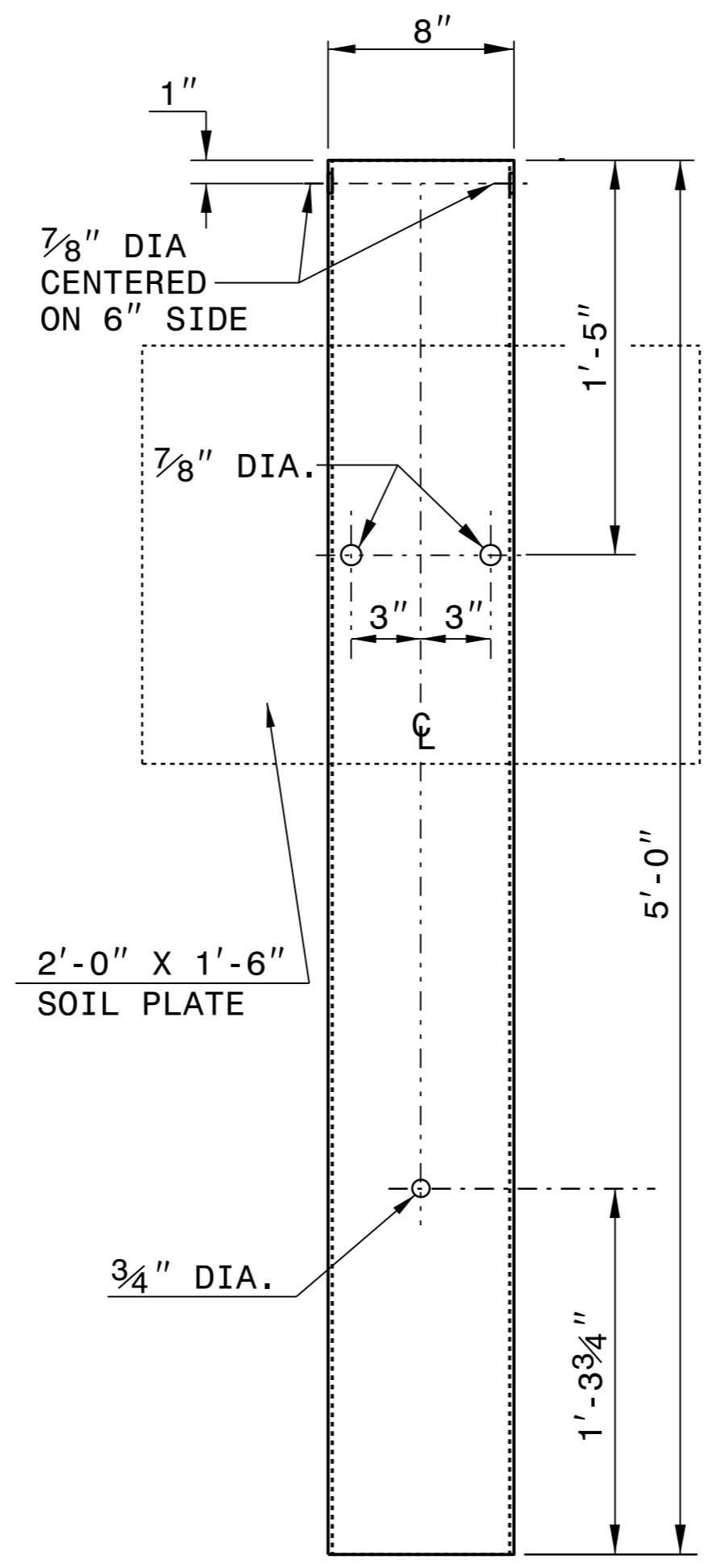


PLAN

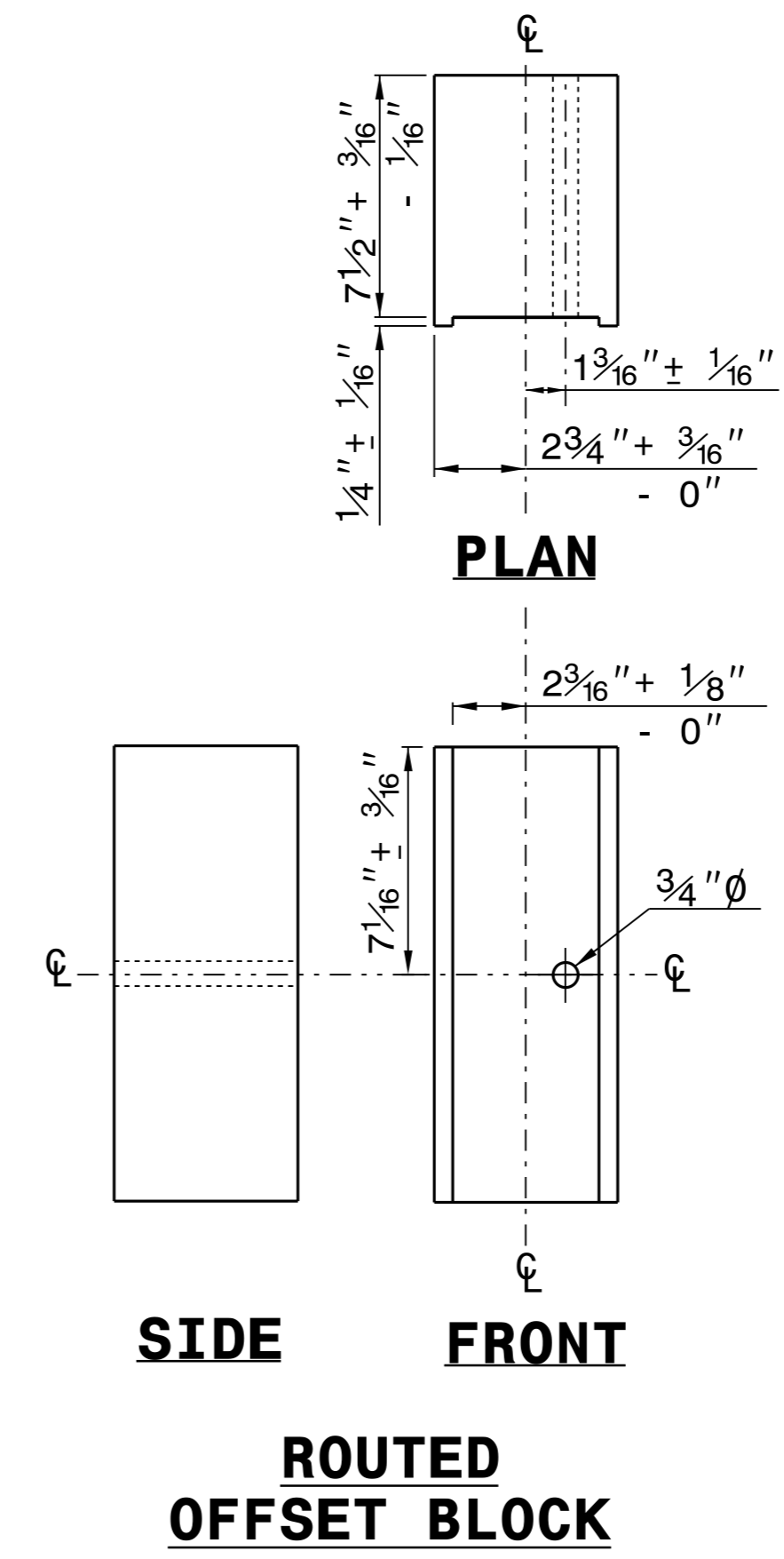


STANDARD LINE POST

SHORT WOOD BREAKAWAY POST



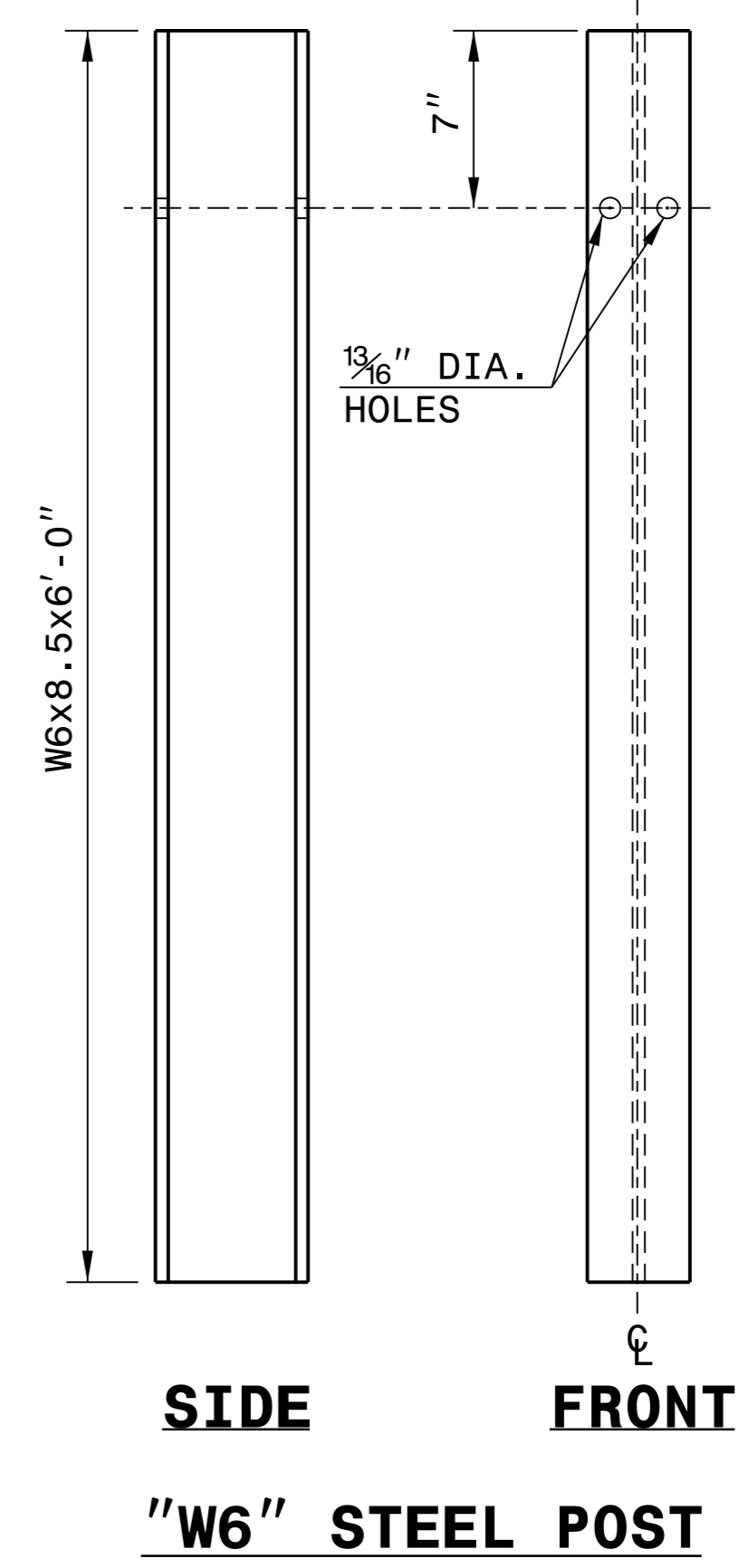
STEEL TUBE
TS 6"x8"x0.1875"



SIDE

FRONT

ROUTED OFFSET BLOCK



SIDE

FRONT

"W6" STEEL POST

SYSTEM PARTS



CONTRACTS STANDARDS AND DEVELOPMENT UNIT
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ORIGINAL BY: J. HOWERTON	DATE: 3-7-2018
MODIFIED BY:	DATE:
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FILE SPEC.:	

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DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

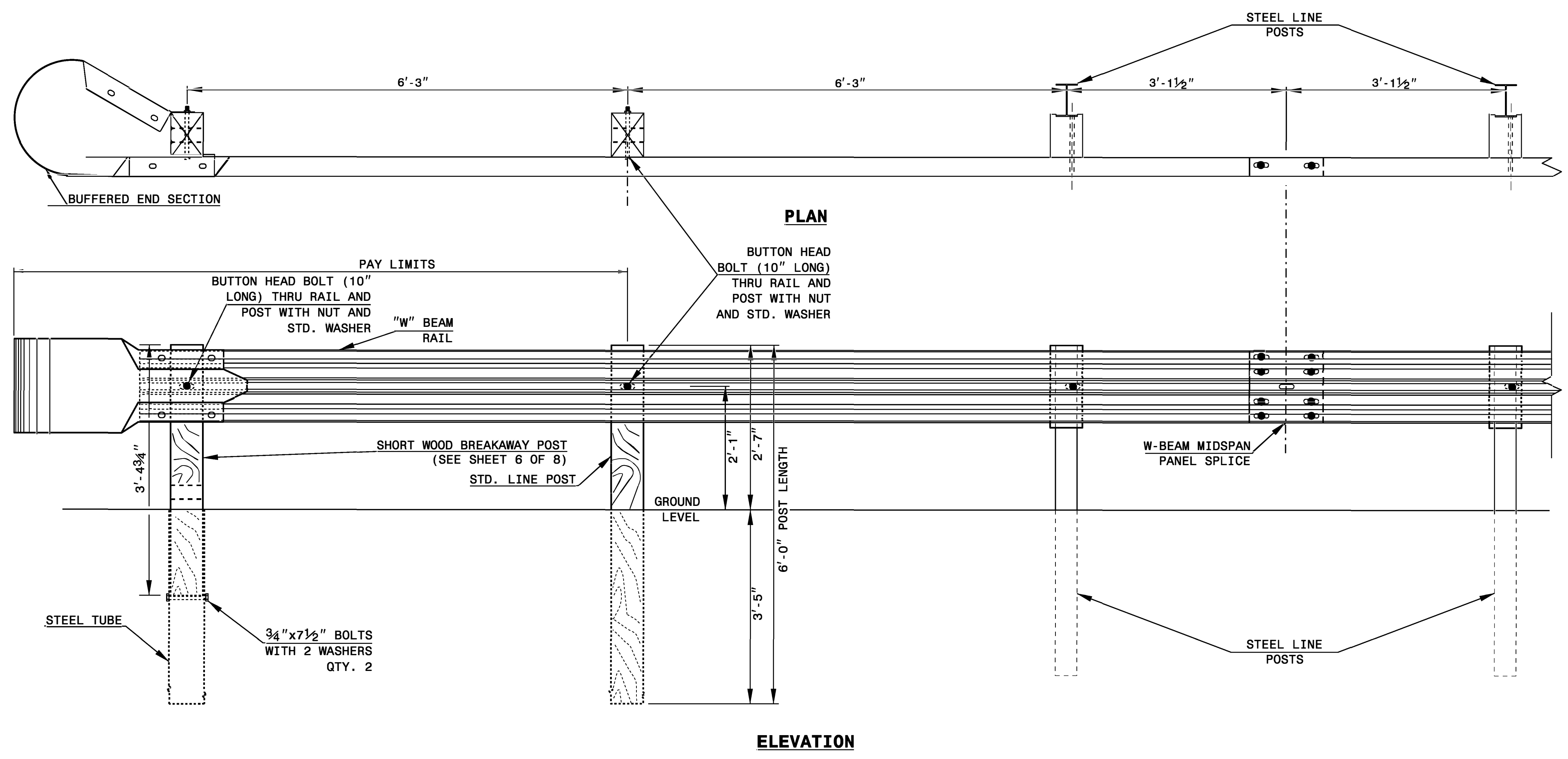
ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET OF

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DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET OF



TRAILING END UNIT ASSEMBLY
A.T. - 1 SYSTEM



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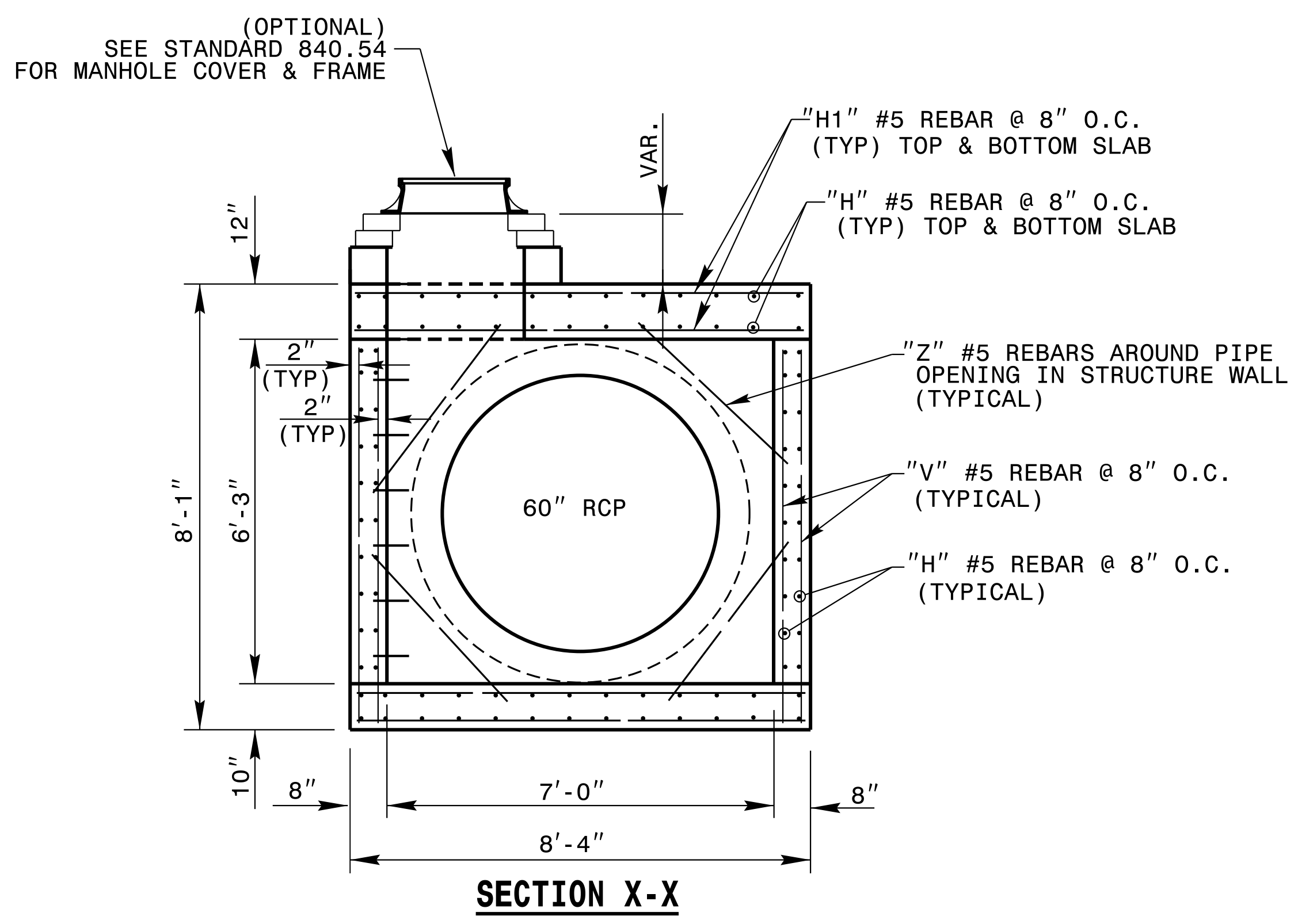
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AND DEVELOPMENT UNIT**
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A.T. - 1 SYSTEM

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MODIFIED BY: _____ DATE: _____
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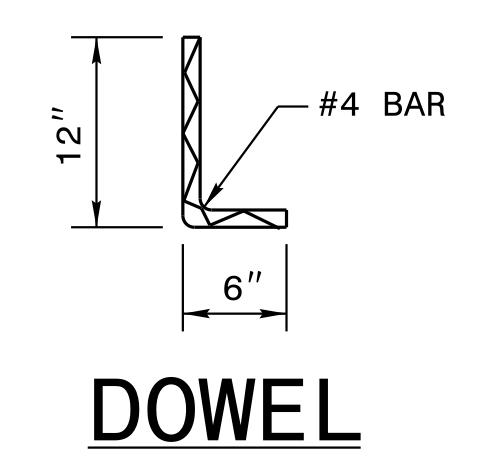
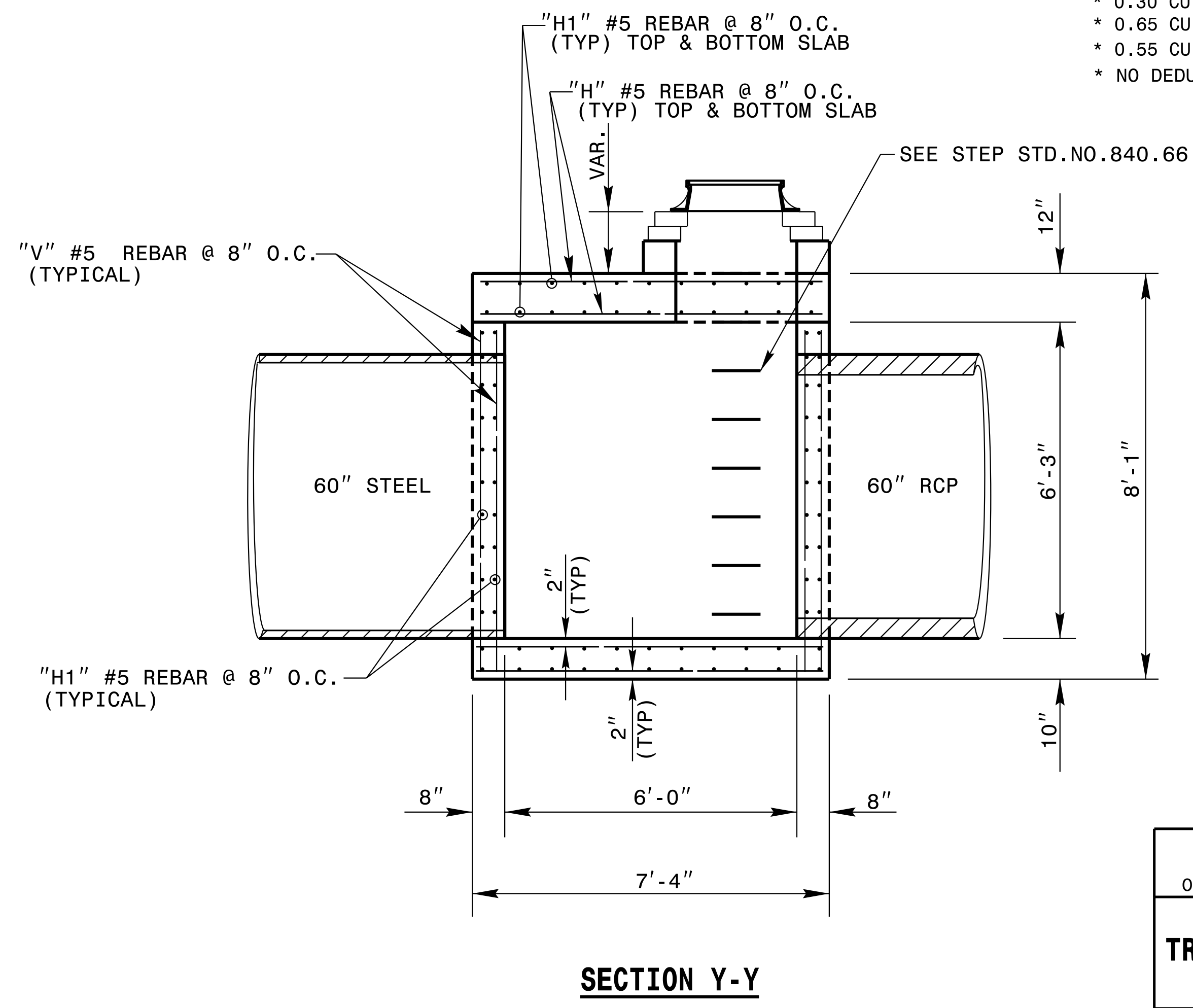
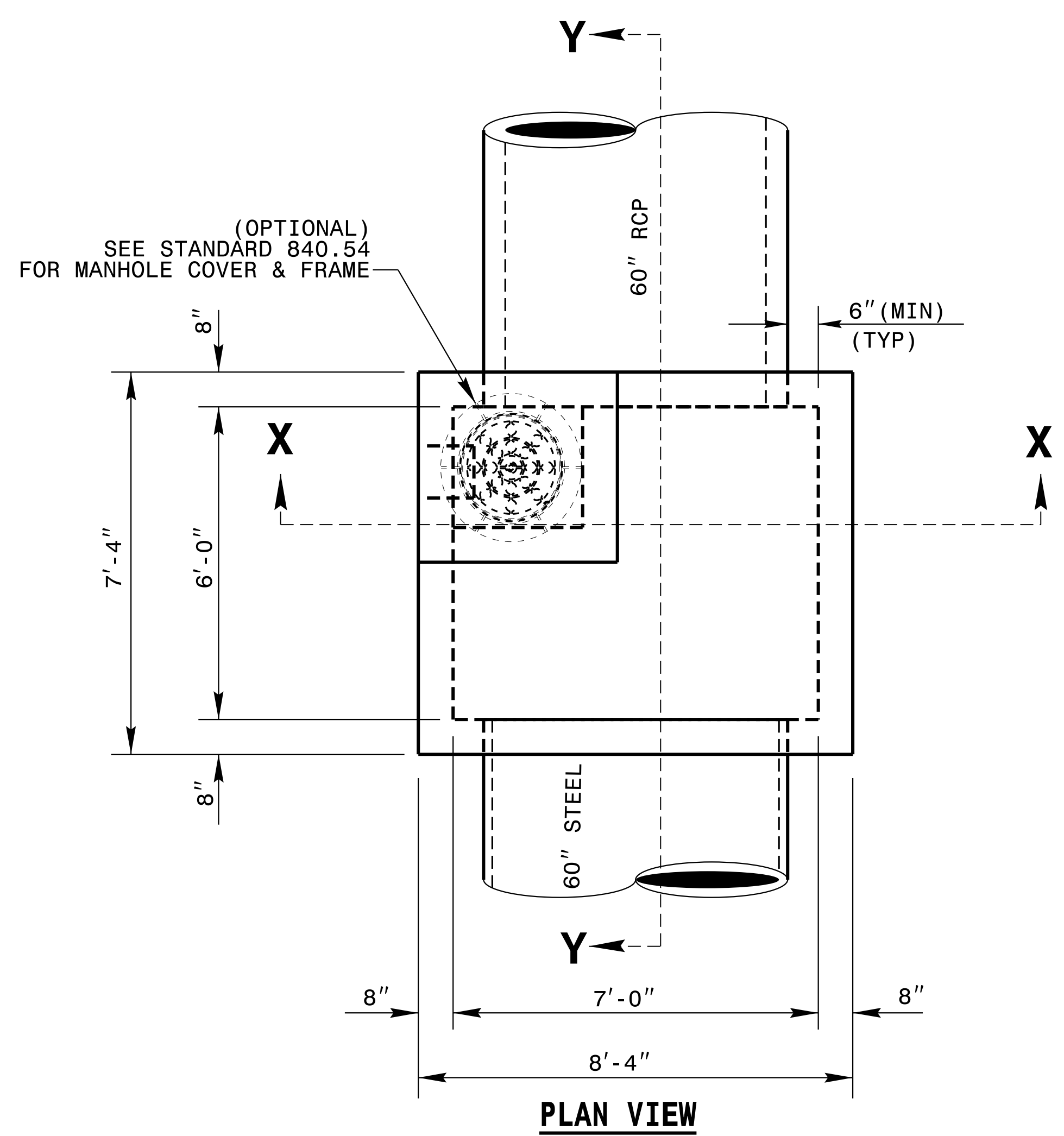
GENERAL NOTES:
 USE CLASS "AA" CONCRETE THROUGHOUT.
 PROVIDE ALL JUNCTION BOXES OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
 OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
 USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
 INSTALL MANHOLE IN POSITION AS DIRECTED BY THE ENGINEER. CUT AND BEND ALL REBAR CROSSING THIS OPENING TO ALLOW 2" MINIMUM CONCRETE COVERAGE.
 CHAMFER ALL EXPOSED CORNERS 1".
 2" MINIMUM CONCRETE COVERAGE ON ALL REBAR.



BILL OF MATERIALS

BAR	NO.	SIZE	LENGTH	WEIGHT
H	92	#5	7'-0"	672
H1	84	#5	8'-0"	701
V	92	#5	6'-9"	648
Z	16	#5	4'-0"	67
TOTAL REINF. STEEL (LBS.)				2088
TOTAL CONC. (CU. YDS.)				8.8

* 0.30 CU. YD. PER FOOT OF RISER HEIGHT
 * 0.65 CU. YD. DEDUCTION FOR 1-60" RC PIPE
 * 0.55 CU. YD. DEDUCTION FOR 1-60" STEEL PIPE
 * NO DEDUCTION HAS BEEN MADE FOR PIPES



**CONTRACT, STANDARDS
AND DEVELOPMENT UNIT**
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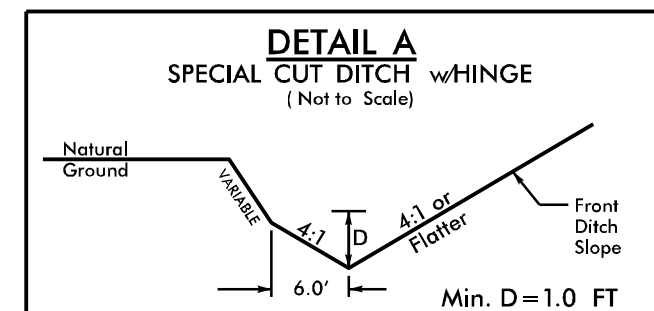
TRAFFIC BEARING JUNCTION BOX

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 CHECKED BY: DATE:
 FILE SPEC.: detail/kkempf/english/A-0011C 60 tbjb.dgn

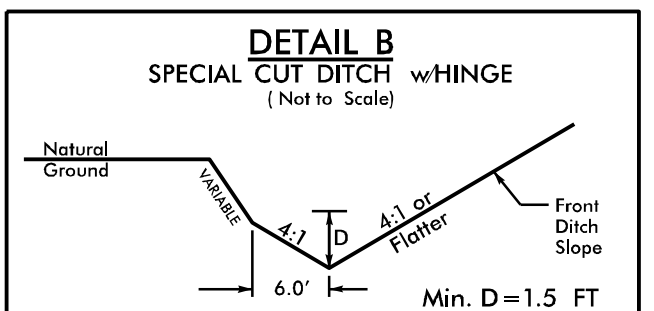
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 kkempf AT CSD-2925%

5/14/99

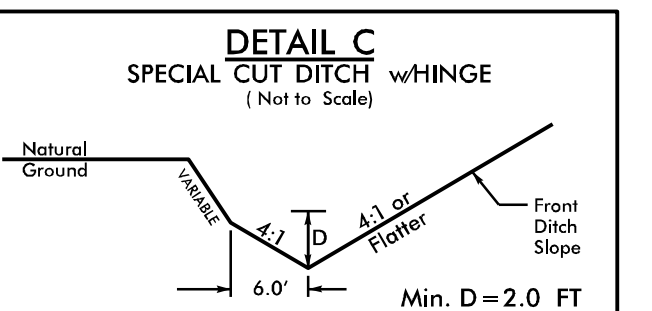
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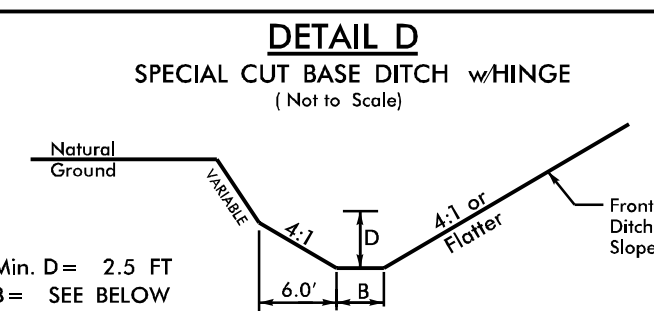
FROM STA. 522+00 TO STA. 527+00 -L- RT
 FROM STA. 558+00 TO STA. 564+00 -L- LT
 FROM STA. 562+00 TO STA. 566+00 -L- RT
 FROM STA. 875+00 TO STA. 878+00 -L- RT
 FROM STA. 20+50 TO STA. 27+00 -Y1BRPB- RT
 FROM STA. 15+00 TO STA. 18+00 -Y1BRPB- RT
 FROM STA. 19+50 TO STA. 21+25 -Y7- RT



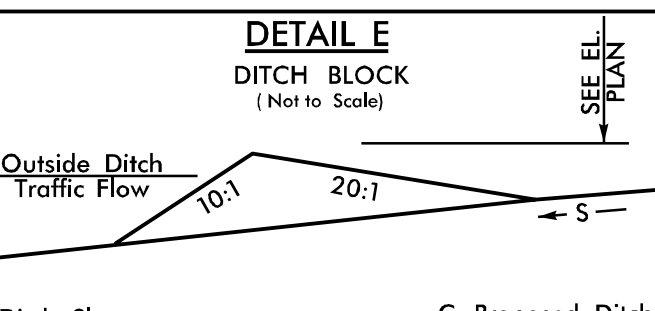
FROM STA. 497+80 TO STA. 506+00 -L- RT
 FROM STA. 571+50 TO STA. 572+50 -L- LT
 FROM STA. 772+50 TO STA. 789+00 -L- RT
 FROM STA. 839+00 TO STA. 851+00 -L- LT
 FROM STA. 851+00 TO STA. 864+83 -L- RT
 FROM STA. 892+00 TO STA. 895+00 -L- LT



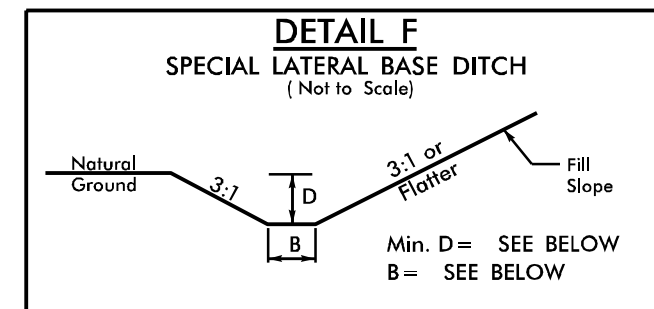
FROM STA. 543+50 TO STA. 551+50 -L- RT
 FROM STA. 851+00 TO STA. 863+00 -L- LT
 FROM STA. 868+00 TO STA. 878+00 -L- LT



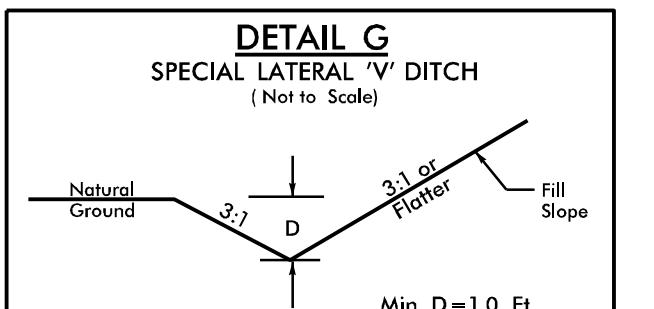
FROM STA. 816+50 TO STA. 851+00 -L- RT, B=4'



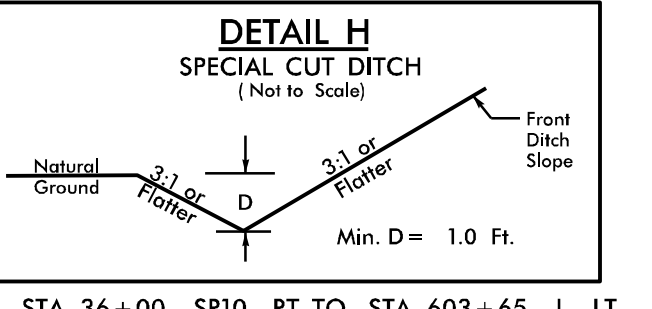
STA. 534+88 -L- LT
 STA. 536+70 -L- LT
 STA. 563+62 -L- RT
 STA. 563+62 -L- LT
 STA. 568+12 -L- RT
 STA. 568+12 -L- LT
 STA. 592+62 -L- LT
 STA. 595+13 -L- LT
 STA. 599+88 -L- LT
 STA. 610+12 -L- LT
 STA. 610+12 -L- RT
 STA. 612+37 -L- LT
 STA. 613+12 -L- LT
 STA. 615+12 -L- RT
 STA. 619+80 -L- RT
 STA. 622+37 -L- LT
 STA. 771+62 -L- RT
 STA. 839+00 -L- LT
 STA. 35+09 -SR10- LT



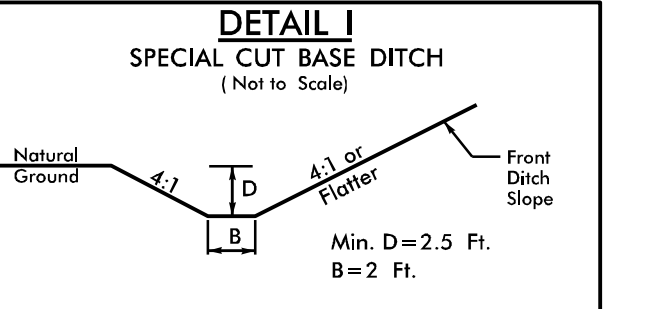
FROM STA. 495+00 TO STA. 506+50 -L- RT, D=1.5', B=6'
 FROM STA. 495+00 TO STA. 497+80 -L- LT, D=1.0', B=6'
 FROM STA. 497+80 TO STA. 502+00 -L- LT, D=1.0', B=4'
 FROM STA. 507+00 TO STA. 513+95 -L- RT, D=1.0', B=4'
 FROM STA. 514+13 TO STA. 518+33 -L- RT, D=5.0', B=8'
 FROM STA. 518+33 TO STA. 520+00 -L- RT, D=1.0', B=6'
 FROM STA. 536+85 TO STA. 543+50 -L- RT, D=1.0', B=4'
 FROM STA. 556+00 TO STA. 556+10 -L- RT, D=1.5', B=4'
 FROM STA. 577+00 TO STA. 585+00 -L- LT, D=3.0', B=6'
 FROM STA. 593+30 TO STA. 595+00 -L- RT, D=2.25', B=6'
 FROM STA. 601+50 TO STA. 607+00 -L- RT, D=3.0', B=4'
 FROM STA. 618+50 TO STA. 621+12 -L- RT, D=1.5', B=4'
 FROM STA. 632+00 TO STA. 634+39 -L- RT, D=1.5', B=6'
 FROM STA. 634+39 TO STA. 638+00 -L- RT, D=1.0', B=2'
 FROM STA. 626+00 TO STA. 634+50 -L- LT, D=2.25', B=6'
 FROM STA. 634+50 TO STA. 639+00 -L- LT, D=1.5', B=4'
 FROM STA. 639+00 TO STA. 642+25 -L- RT, D=1.0', B=2'
 FROM STA. 884+50 TO STA. 898+50 -L- RT, D=2.5', B=3'
 FROM STA. 73+50 TO STA. 79+00 -SR4- LT, D=1.5', B=4'
 FROM STA. 19+00 TO STA. 21+21 -SR10- RT, D=1.0', B=2'
 FROM STA. 27+50 TO STA. 30+00 -SR10- LT, D=1.25', B=4'
 FROM STA. 30+00 TO STA. 33+00 -SR10- LT, D=1.75', B=4'
 FROM STA. 35+50 TO STA. 36+25 -Y5- RT, D=2.0', B=2'
 FROM STA. 37+00 TO STA. 41+28 -Y6- LT, D=2.5', B=6'
 FROM STA. 38+50 TO STA. 45+00 -Y7- RT, D=2.5', B=3'
 FROM STA. 45+00 -Y7- RT TO XPIPE SR 1904 RT, D=2.5', B=3'



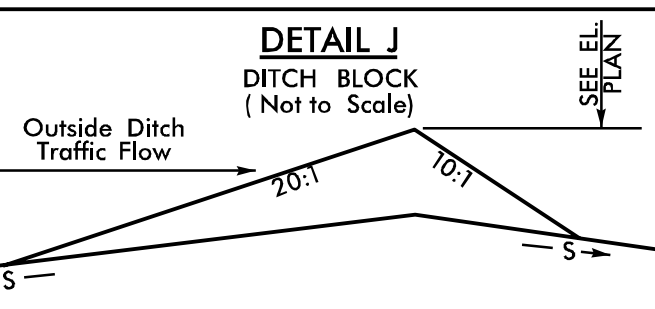
FROM STA. 502+00 TO STA. 503+00 -L- LT
 FROM STA. 527+50 TO STA. 529+50 -L- RT
 FROM STA. 531+00 TO STA. 532+00 -L- RT
 FROM STA. 534+00 TO STA. 536+80 -L- RT
 FROM STA. 551+50 TO STA. 553+50 -L- RT
 FROM STA. 555+90 TO STA. 558+00 -L- LT
 FROM STA. 564+00 TO STA. 565+00 -L- LT
 FROM STA. 556+10 TO STA. 562+00 -L- RT
 FROM STA. 599+00 TO STA. 600+00 -L- LT
 FROM STA. 607+00 TO STA. 610+00 -L- RT
 FROM STA. 617+15 TO STA. 617+56 -L- RT
 FROM STA. 638+00 TO STA. 639+50 -L- RT
 FROM STA. 642+25 TO STA. 650+00 -L- RT
 FROM STA. 639+50 TO STA. 650+00 -L- LT
 FROM STA. 650+00 TO STA. 654+98 -L- LT
 FROM STA. 650+00 TO STA. 655+60 -L- RT
 FROM STA. 700+50 TO STA. 702+50 -L- LT
 FROM STA. 74+00 TO STA. 76+50 -SR4- RT
 FROM STA. 10+50 TO STA. 12+50 -SR10- LT
 FROM STA. 10+50 TO STA. 11+50 -SR10- RT
 FROM STA. 12+50 TO STA. 15+00 -SR10- RT
 FROM STA. 19+50 TO STA. 27+50 -SR10- LT
 FROM STA. 21+21 TO STA. 36+00 -SR10- RT
 FROM STA. 19+00 TO STA. 20+15 -Y1BRPB- LT
 FROM STA. 33+50 TO STA. 36+00 -Y4- RT
 FROM STA. 36+60 TO STA. 38+00 -Y5- RT
 FROM STA. 43+08 TO STA. 43+50 -Y5- LT
 FROM STA. 15+00 TO STA. 23+30 -Y6- LT
 FROM STA. 36+50 TO STA. 44+00 -Y6- RT
 FROM STA. 41+50 TO STA. 44+00 -Y6- LT
 FROM STA. 45+00 TO STA. 46+00 -Y6- LT



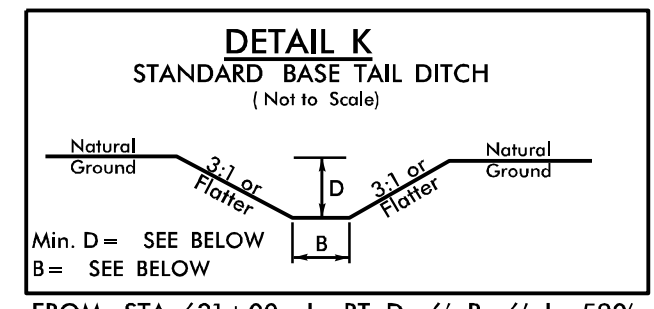
FROM STA. 36+00 -SR10- RT TO STA. 603+65 -L- LT
 FROM STA. 879+00 TO STA. 883+00 -L- LT
 FROM STA. 879+00 TO STA. 882+50 -L- RT
 FROM STA. 36+50 TO STA. 38+50 -Y4- LT
 FROM STA. 37+00 TO STA. 38+00 -Y4- RT
 FROM STA. 22+09 TO STA. 26+60 -YSRPB- LT
 FROM STA. 10+20 -Y21- LT TO STA. 10+25 -Y21- RT



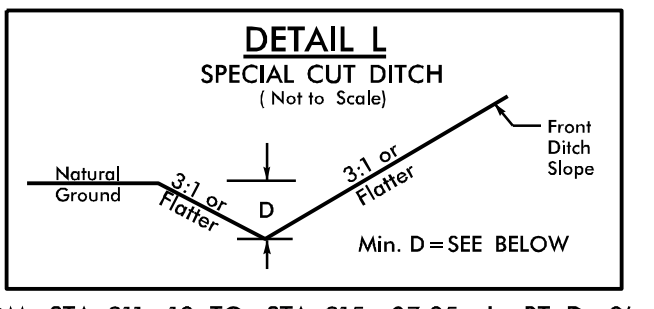
FROM STA. 907+50 TO STA. 913+00 -L- LT
 FROM STA. 906+77 TO STA. 911+18 -L- RT
 FROM STA. 10+50 TO STA. 15+50 -Y5- RT



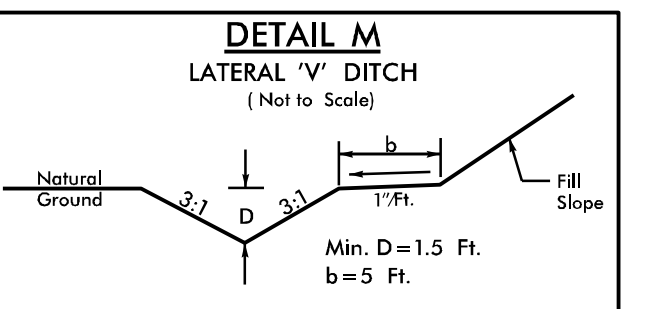
STA. 895+00 -L- LT



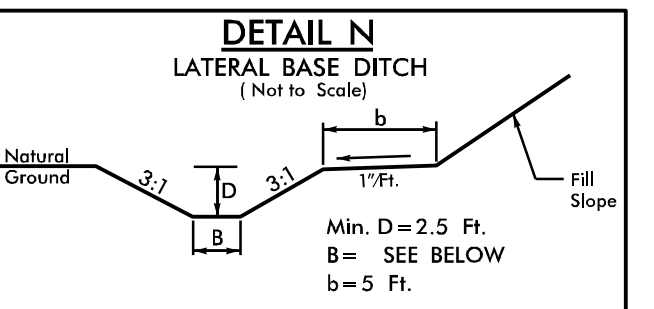
FROM STA. 621+00 -L- RT, D=6', B=6', L=590', S=0.02%, BEG. EL.=153.25', END EL.=153.00'
 FROM STA. 895+14 TO STA. 895+72 -L- RT, D=2.5', B=3'
 FROM STA. 15+50 TO STA. 18+00 -Y5- RT, D=1.6', B=4'
 FROM STA. 48+50 -Y5- LT, D=6', B=6', L=150', S=0.02%, BEG. EL.=154.30', END EL.=154.27'



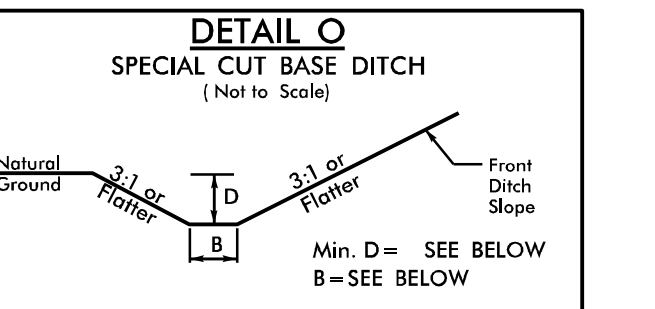
FROM STA. 911+18 TO STA. 915+07.85 -L- RT, D=2'
 FROM STA. 913+00 TO STA. 915+07.85 -L- LT, D=2'
 FROM STA. 12+50 TO STA. 14+00 -Y4- LT, D=1.25'
 FROM STA. 30+50 TO STA. 33+50 -Y5- RT, D=1.5'



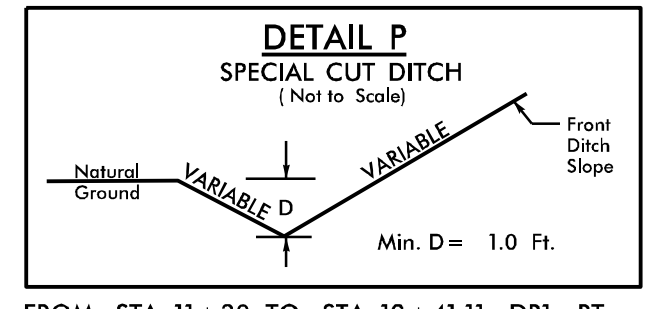
FROM STA. 503+00 TO STA. 507+00 -L- LT
 FROM STA. 552+00 TO STA. 555+90 -L- LT
 FROM STA. 721+00 TO STA. 724+50 -L- LT
 FROM STA. 10+90 TO STA. 16+50 -SR3- LT
 FROM STA. 76+50 TO STA. 81+00 -SR4- RT
 FROM STA. 14+00 TO STA. 17+00 -Y4- LT
 FROM STA. 32+50 TO STA. 36+50 -Y4- LT
 FROM STA. 21+25 TO STA. 29+00 -Y7- RT



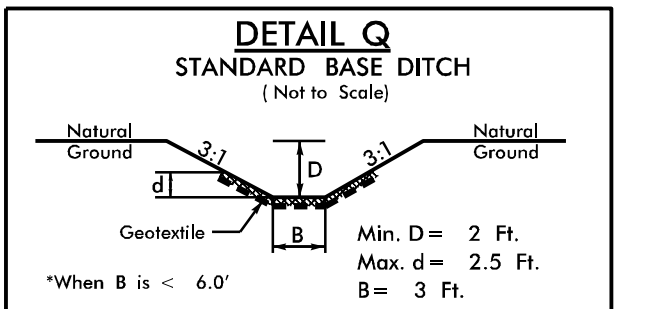
FROM STA. 553+50 TO STA. 556+00 -L- RT, B=4'
 FROM STA. 574+90 TO STA. 577+00 -L- LT, B=6'
 FROM STA. 621+00 TO STA. 628+00 -L- RT, B=6'
 FROM STA. 628+00 TO STA. 632+00 -L- RT, B=6'
 FROM STA. 79+00 TO STA. 80+88 -SR4- LT, B=4'
 FROM STA. 13+25 TO STA. 19+80 -Y1BRPB- RT, B=4'



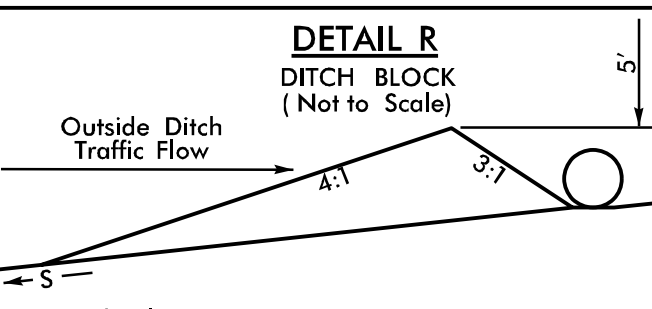
FROM STA. 520+00 TO STA. 522+00 -L- RT, D=1.0', B=4'
 FROM STA. 10+58.30 TO STA. 15+21 -DR1- LT, D=1.5', B=3'
 FROM STA. 12+50 TO STA. 14+00 -Y4- RT, D=2.0', B=4'



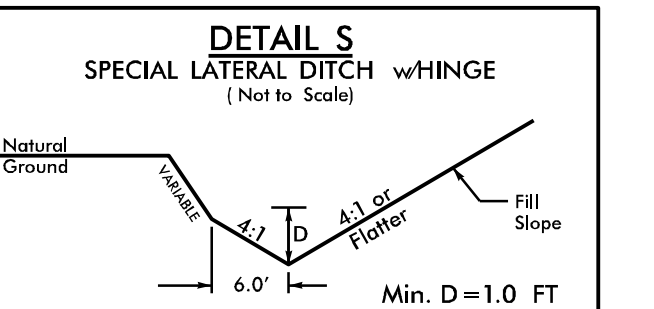
FROM STA. 11+30 TO STA. 12+41.11 -DR1- RT



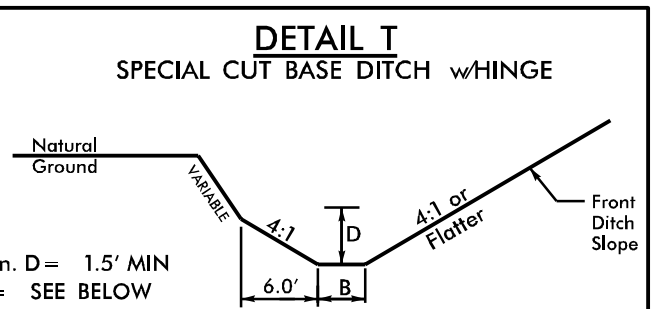
FROM STA. 30+55 TO STA. 31+06 -Y7- LT, L=51', S=5.39%
 BEG. EL.=1565.10', END EL.=162.35'



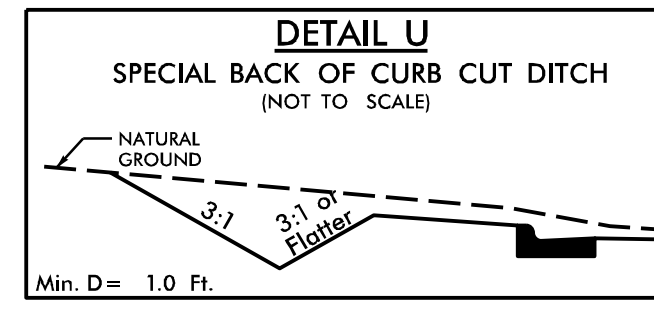
FROM STA. 914+99 -L- RT



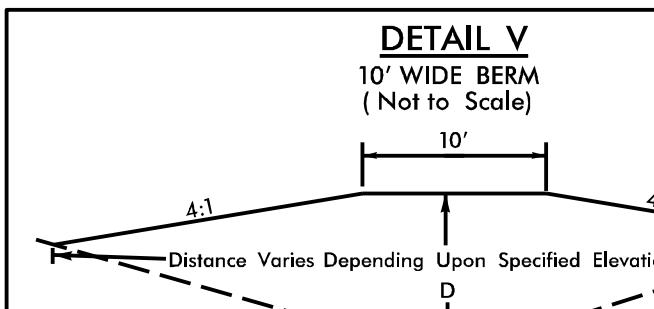
FROM STA. 565+00 TO STA. 566+00 -L- LT
 FROM STA. 727+00 TO STA. 730+00 -L- LT
 FROM STA. 726+50 TO STA. 730+00 -L- RT



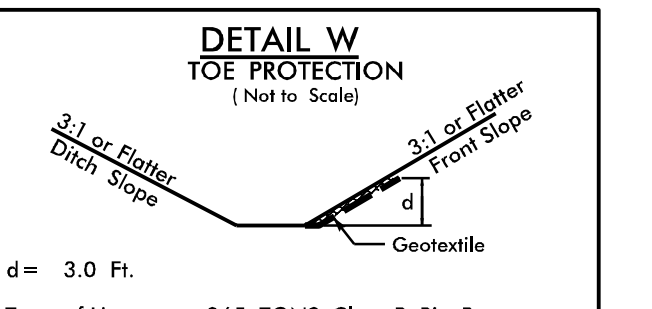
FROM STA. 595+00 TO STA. 597+00 -L- RT, B=6'



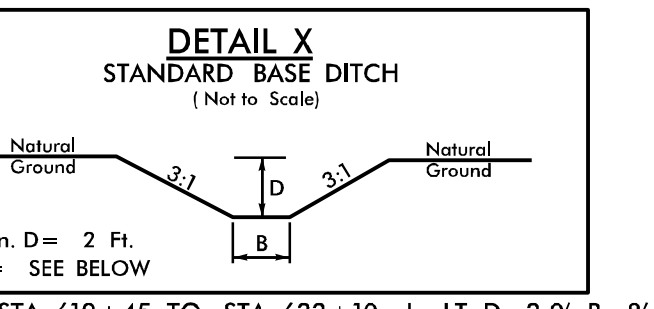
FROM STA. 34+00 TO STA. 34+75 -Y5- LT
 FROM STA. 24+27.14 TO STA. 25+27.35 -YSRPC- RT



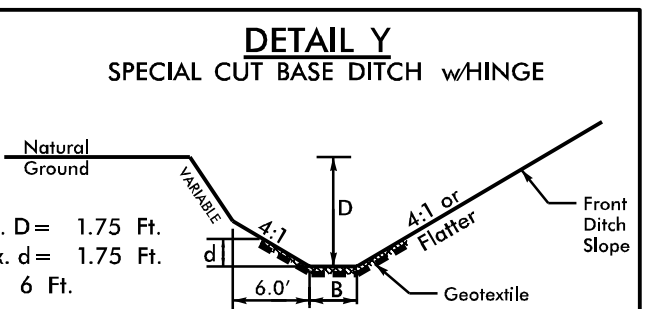
FROM STA. 639+50 RT, TOP ELEV.=164.0'
 FROM STA. 667+00 LT, TOP ELEV.=168.0'
 FROM STA. 21+71 RT, TOP ELEV.=158.0'



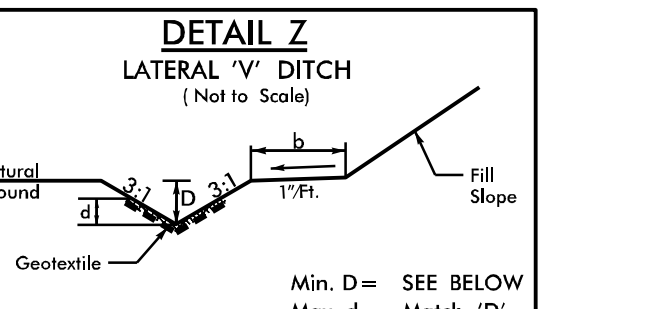
FROM STA. 577+00 TO STA. 585+00 -L- LT



FROM STA. 619+45 TO STA. 622+10 -L- LT, D=2.0', B=8'
 FROM STA. 622+10 TO STA. 626+00 -L- LT, D=2.25', B=8'



FROM STA. 597+00 TO STA. 601+50 -L- RT

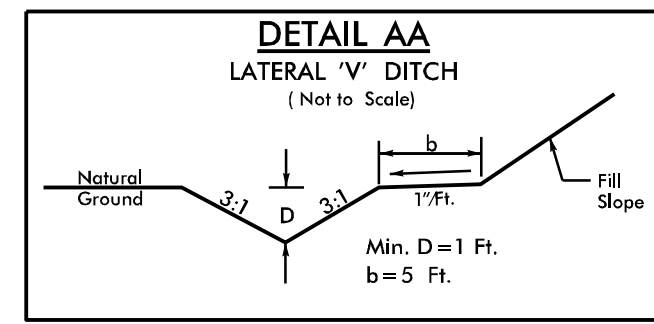


FROM STA. 22+14 -Y1B- LT TO STA. 23+14 -Y1BRPA- RT, D=1.0 FT, Class B Rip-Rap

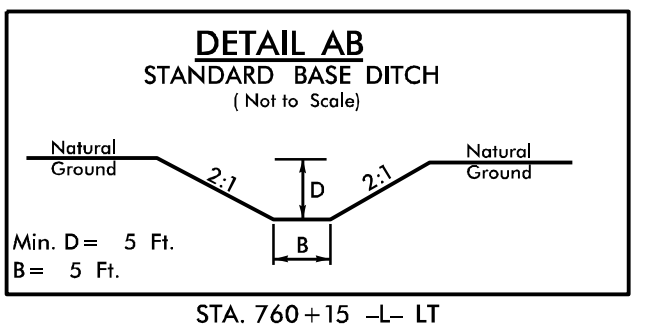
PROJECT REFERENCE NO. 1-5897B	SHEET NO. 2D-1
RW SHEET NO.	
ROADWAY DESIGN ENGINEER DAVID C. WALLER SEAL 22606 MOTT MACDONALD I & E LLC LICENSE NO. F-0669	HYDRAULICS ENGINEER WILEY M. INGLE SEAL 036821 MOTT MACDONALD I & E LLC LICENSE NO. F-0669
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared in the Office of: MOTT MACDONALD	7621 Purfoy Road, Suite 115 Fuquay-Varina, NC 27526 (919) 552-2253 www.mottmac.com NC License No. F-0669
ETHERILL ENGINEERING 1223 Jones Franklin Rd. Raleigh, NC 27606 License No. F-4377 Bldg. 519-851-8077 Fax: 919-851-8107	

4/28/2022 R:\Drawings\15987B-hyd_psh-2D-Ditch-Detail.sxdm

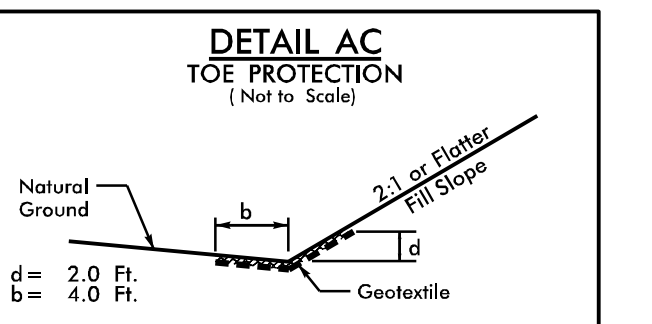
5/14/99



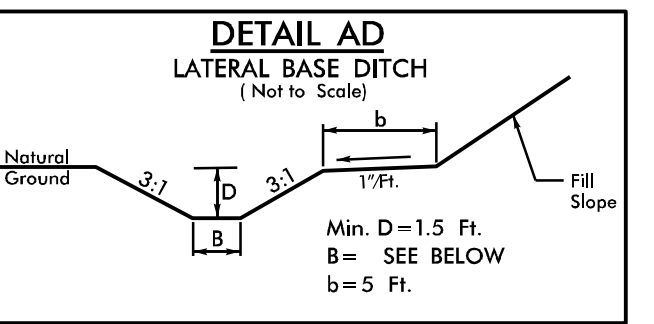
FROM STA. 698+50 TO STA. 700+50 -L- RT
 FROM STA. 703+50 TO STA. 707+50 -L- RT
 FROM STA. 23+09 TO STA. 23+59 -Y1B- LT
 FROM STA. 37+50 TO STA. 38+50 -Y1B- RT
 FROM STA. 19+50 TO STA. 20+93 -Y1BRPC- RT
 FROM STA. 18+45 TO STA. 23+50 -Y1BRPD- RT
 FROM STA. 24+00 TO STA. 28+00 -Y7- LT
 FROM STA. 31+50 TO STA. 32+93 -Y7- RT



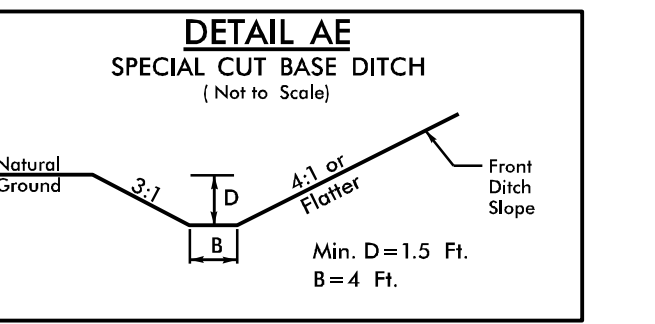
STA. 760+15 -L- LT



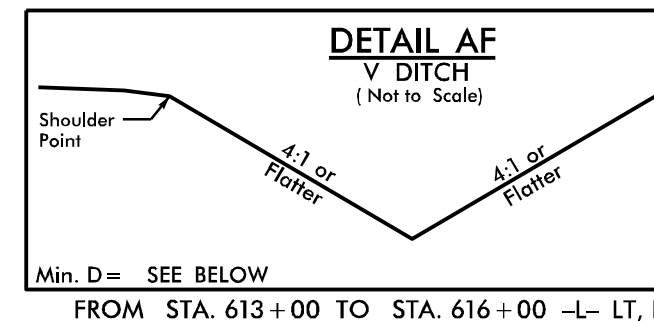
Type of Liner = CL B Rip-Rap
 FROM STA. 592+52 TO STA. 599+00 -L- LT
 FROM STA. 796+91 TO STA. 801+88 -L- LT
 FROM STA. 791+87 TO STA. 801+87 -L- RT
 FROM STA. 804+68 TO STA. 816+77 -L- LT
 FROM STA. 804+17 TO STA. 815+20 -L- RT
 FROM STA. 898+38 TO STA. 902+09 -L- LT
 FROM STA. 902+58 TO STA. 906+96 -L- LT
 FROM STA. 897+99 TO STA. 902+08 -L- RT
 FROM STA. 902+58 TO STA. 906+73 -L- RT
 FROM STA. 18+67 TO STA. 20+87 -SR3- RT
 FROM STA. 16+90 TO STA. 15+15 -Y4- RT
 FROM STA. 29+00 TO STA. 32+40 -Y4- RT



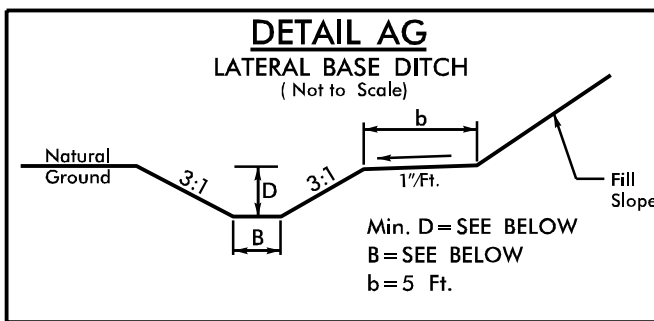
FROM STA. 677+25 TO STA. 684+50 -L- RT, B=4'
 FROM STA. 20+50 TO STA. 22+50 -Y1B- RT, B=3'
 FROM STA. 34+87 TO STA. 37+50 -Y1B- RT, B=2'
 FROM STA. 31+50 TO STA. 37+00 -Y6- LT, B=2'



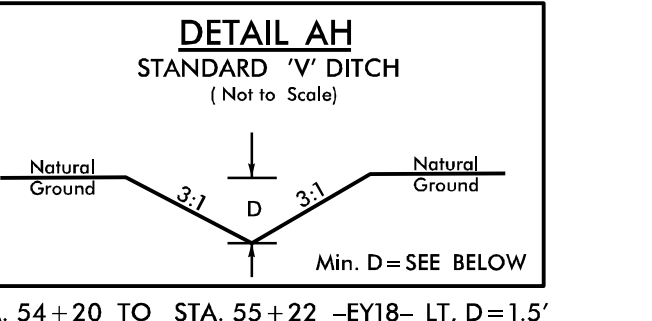
FROM STA. 684+50 -L- RT TO STA. 15+00 -Y1BRPC- RT



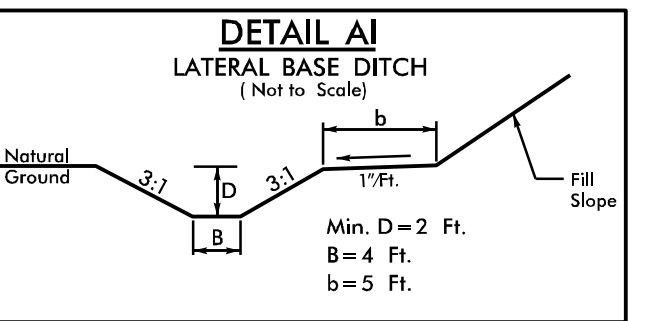
FROM STA. 613+00 TO STA. 616+00 -L- LT, D=1.0'
 FROM STA. 626+50 TO STA. 627+00 -L- RT, D=1.25'
 FROM STA. 627+50 TO STA. 628+00 -L- LT, D=2.0'
 FROM STA. 694+00 TO STA. 698+50 -L- RT, D=1.0'
 FROM STA. 707+50 TO STA. 709+00 -L- RT, D=1.0'
 FROM STA. 706+00 TO STA. 710+50 -L- LT, D=1.0'
 FROM STA. 724+00 TO STA. 726+50 -L- RT, D=1.0'
 TEMP FROM STA. 587+00 TO STA. 592+92 -L- LT, D=1.50'
 BEG. EL.=150.58', END EL.=149.40, 3:1 SLOPES, L=592', S=0.20%
 TEMP FROM STA. 14+06 TO STA. 19+55 -DET L2- LT, D=1.25'
 BEG. EL.=150.48', END EL.=149.75', 3:1 SLOPES, L=549', S=0.13%
 TEMP FROM STA. 19+55 TO STA. 20+67 -DET L2- LT, D=1.0'



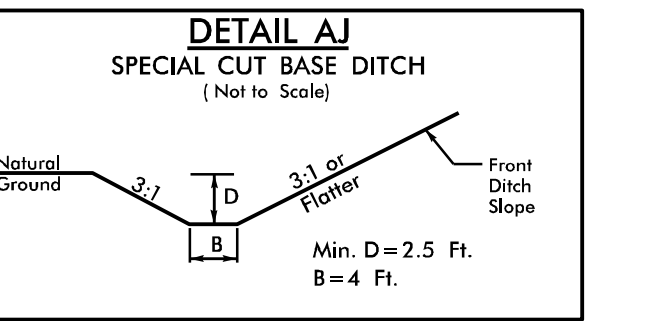
FROM STA. 529+50 TO STA. 530+15 -L- RT, B=4', D=1'
 FROM STA. 530+15 TO STA. 531+00 -L- RT, B=4', D=4'
 FROM STA. 19+86 TO STA. 22+14 -Y1BRPA- RT, B=6', D=3'



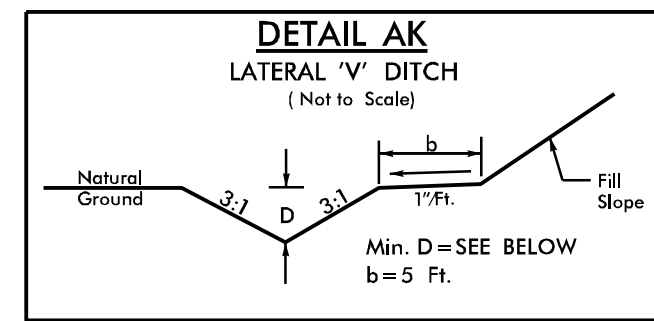
STA. 54+20 TO STA. 55+22 -EY1B- LT, D=1.5'
 FROM STA. 36+12 TO STA. 36+50 -Y1B- LT, D=1.0'



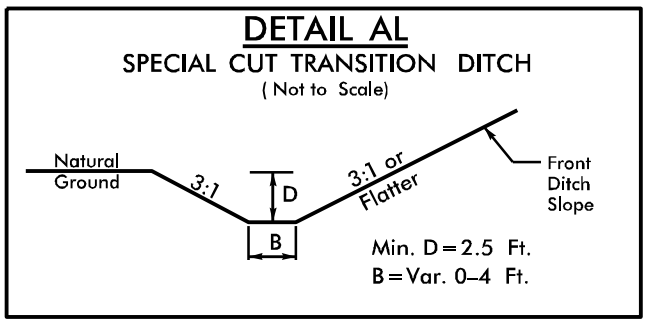
FROM STA. 10+50 TO STA. 12+38 -SR3- RT
 FROM STA. 20+95 TO STA. 25+50 -SR3- RT
 FROM STA. 14+00 TO STA. 16+50 -Y4- RT
 FROM STA. 17+00 TO STA. 18+75 -Y4- LT



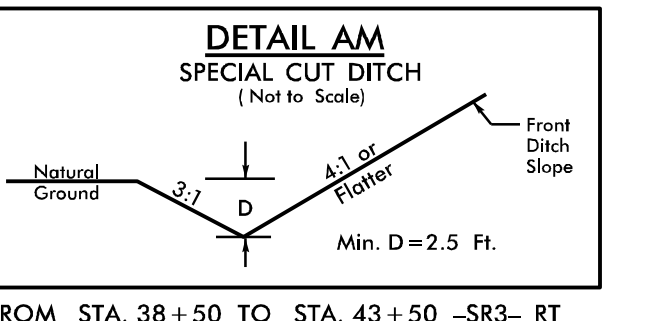
FROM STA. 25+50 TO STA. 37+00 -SR3- RT



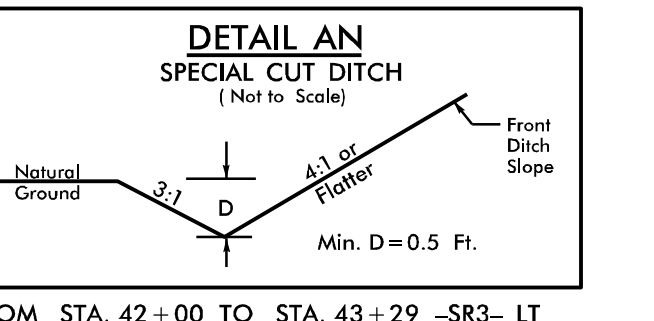
FROM STA. 600+00 TO STA. 604+64 -L- LT, D=2.5'
 FROM STA. 10+00 TO STA. 13+25 -Y1BRPA- RT, D=2.0'



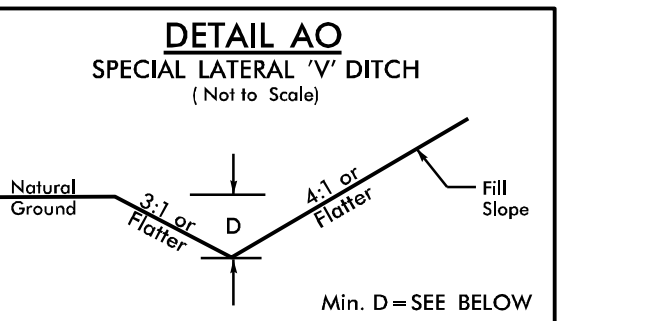
FROM STA. 37+00 TO STA. 38+50 -SR3- RT



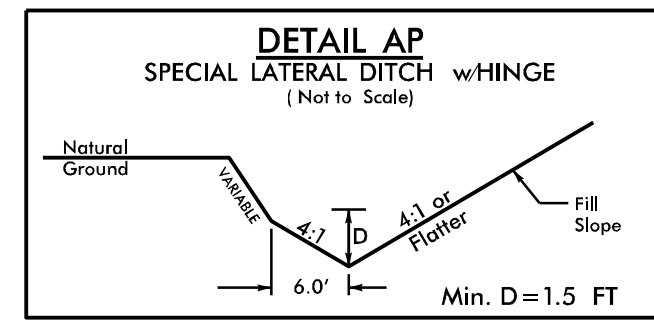
FROM STA. 38+50 TO STA. 43+50 -SR3- RT
 FROM STA. 36+13 TO STA. 36+50 -Y1B- LT



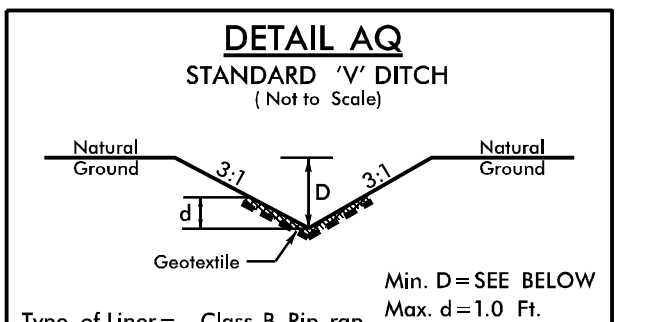
FROM STA. 42+00 TO STA. 43+29 -SR3- LT
 FROM STA. 45+00 TO STA. 46+50 -SR3- LT



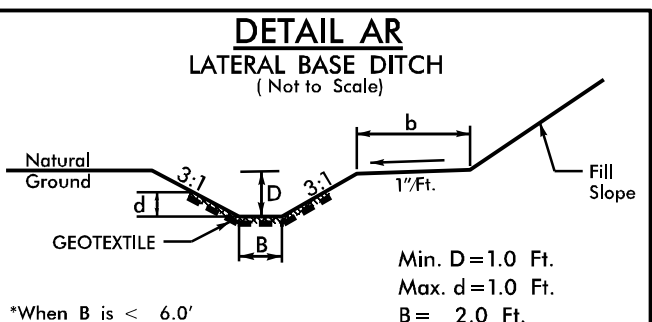
FROM STA. 696+50 TO STA. 702+50 -L- LT, D=1.5'
 FROM STA. 34+00 TO STA. 35+00 -Y5- RT, D=1.5'



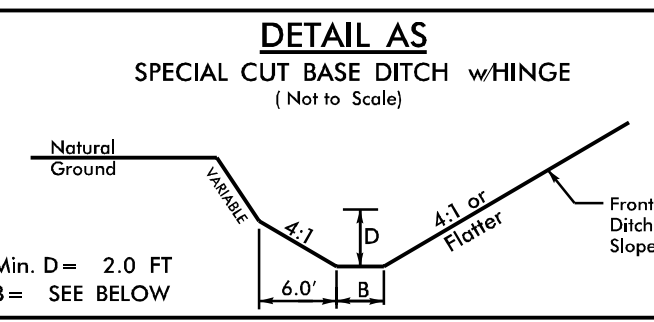
FROM STA. 755+50 TO STA. 759+00 -L- RT
 FROM STA. 762+00 TO STA. 771+60 -L- RT
 FROM STA. 762+50 TO STA. 771+65 -L- LT
 FROM STA. 864+83 TO STA. 871+00 -L- RT



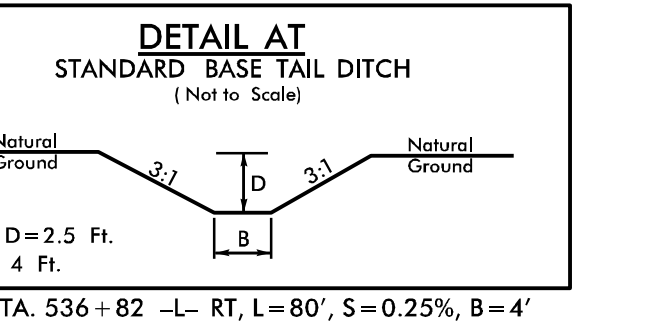
Type of Liner = Class B Rip-Rap
 STA. 771+52 TO STA. 771+72 -L- LT, D=1.5'
 STA. 47+08 TO STA. 48+59 -EY1B- LT, D=1.25'
 STA. 28+80 TO STA. 29+20 -Y5- RT, D=1.25'
 STA. 43+85 -Y5- LT, L=20', S=8.5%, D=1.00'
 BEG. EL. = 162.99, END EL. = 160.69
 STA. 10+20 -Y21- LT TO STA. 599+50 -L- RT, D=1.25'



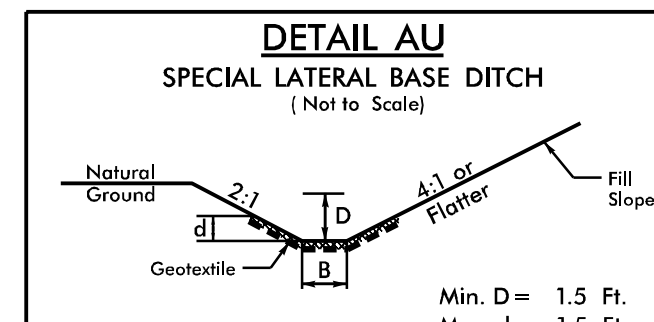
FROM STA. 26+25 TO STA. 28+89 -Y1B- RT
 FROM STA. 30+75 TO STA. 31+00 -Y4- LT



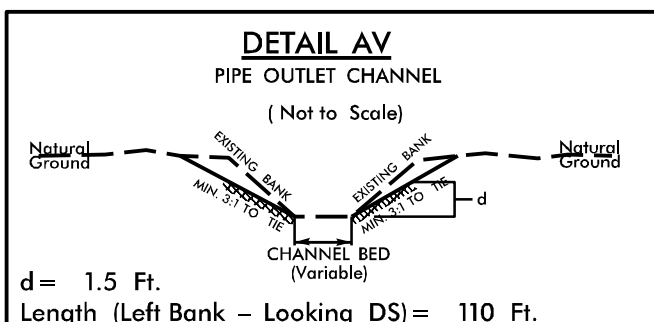
FROM STA. 775+00 TO STA. 797+00 -L- LT, B=4'
 FROM STA. 817+50 TO STA. 838+00 -L- LT, B=4'



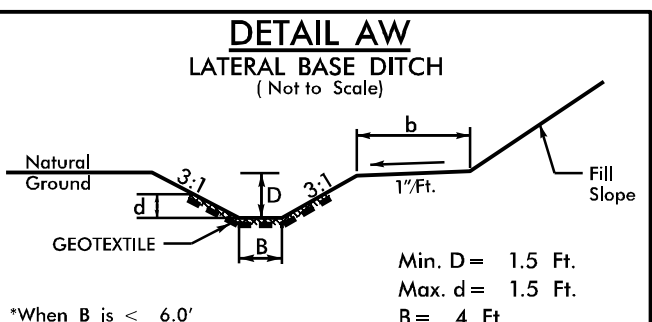
STA. 536+82 -L- RT, L=80', S=0.25%, B=4'
 BEG. EL.=158.95', END EL.=158.75'



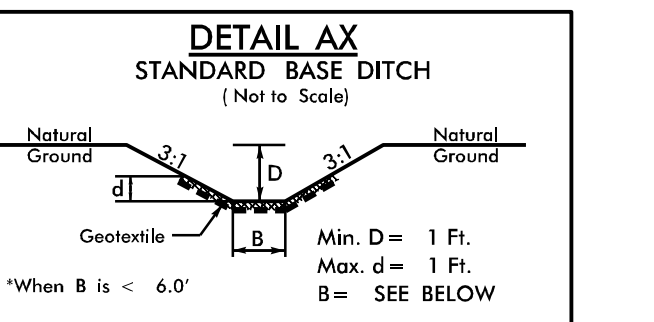
FROM STA. TO STA.



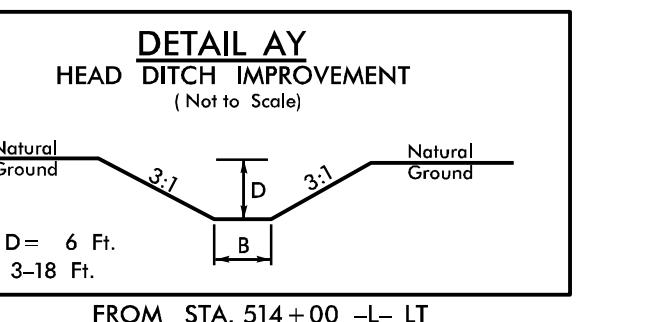
Length (Left Bank - Looking DS) = 110 Ft.
 Length (Right Bank - Looking DS) = 110 Ft.
 Est. = 220 Tons Class I Rip-Rap, 285 SY Geotextile
 STA. 530+15 -L- RT



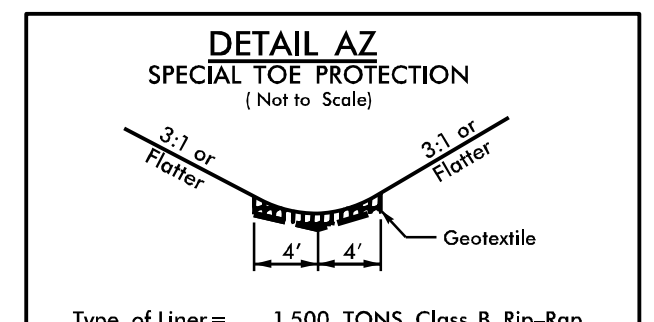
FROM STA. 574+80 TO STA. 575+70 -L- RT



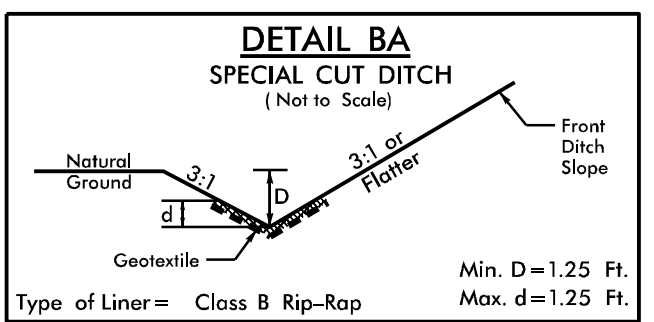
FROM STA. 21+21 -SR10- RT, L=20', S=2.5%, B=2', CL B RIPRAP
 BEG. EL.=155.5', END EL.=155.0'
 STA. 20+50 -Y1B RPB- RT, D=1.0', B=2', CL I RIPRAP
 FROM STA. 18+75 TO STA. 19+50 -Y4- RT, B=4', CL B RIPRAP



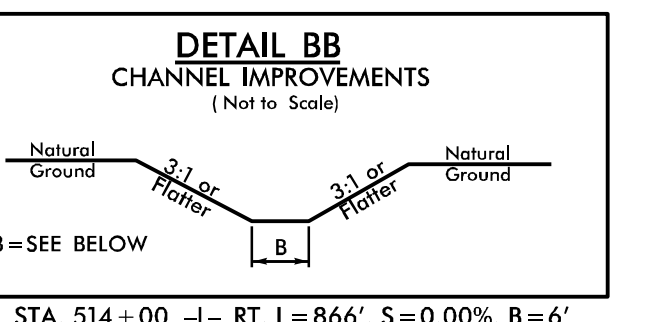
FROM STA. 514+00 -L- LT
 FROM STA. 529+35 -L- LT



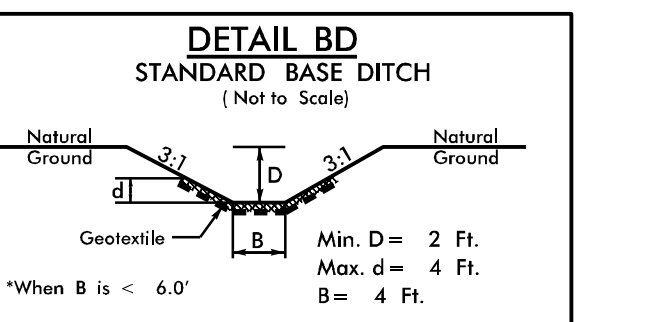
FROM STA. 508+00 TO STA. 552+00 -L- LT



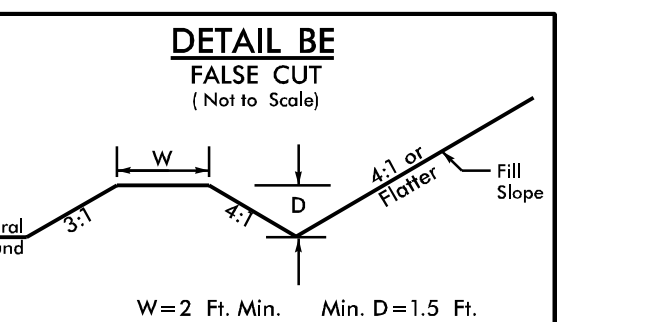
FROM STA. 10+20 TO STA. 11+25 -Y21- LT



STA. 514+00 -L- RT, L=866', S=0.00%, B=6'
 BEG. EL.=161.2', END EL.=161.2'
 STA. 531+00 -L- RT, L=500', S=0.00%, B=4'
 BEG. EL.=159.5', END EL.=159.5'
 STA. 18+75 -Y4- LT, L=140', S=0.51%, B=6'
 BEG. EL.=151.5', END EL.=150.8'



FROM STA. 591+50 TO STA. 592+50 -L- LT, L=115', S=0.39%
 BEG. EL.=143.95', END EL.=143.50'

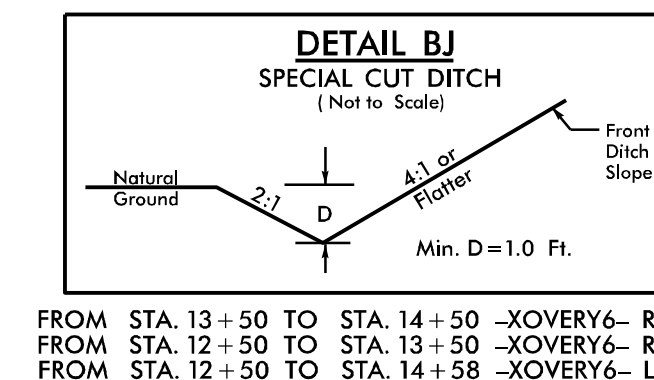
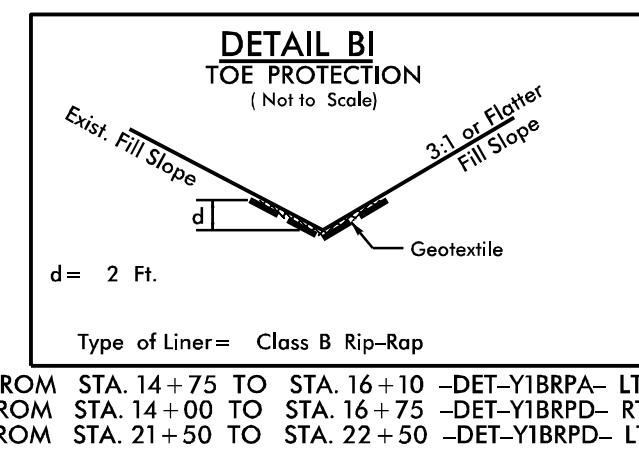
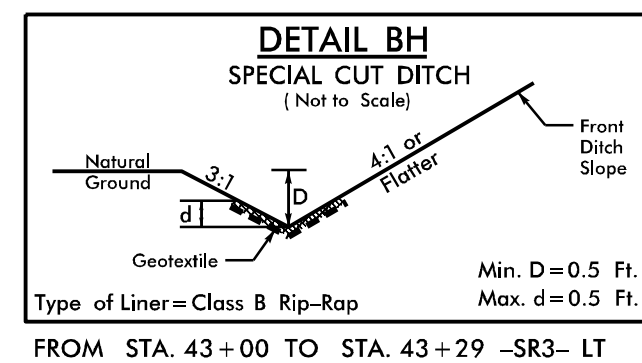
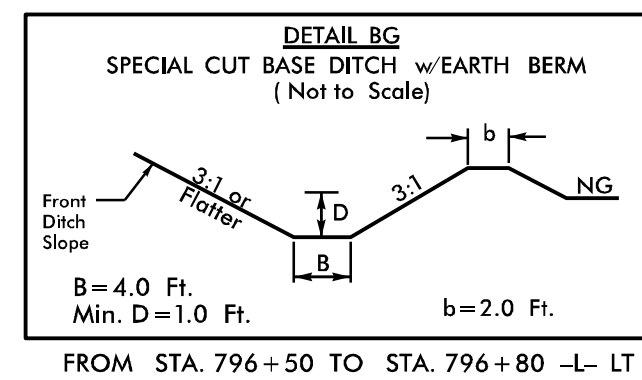
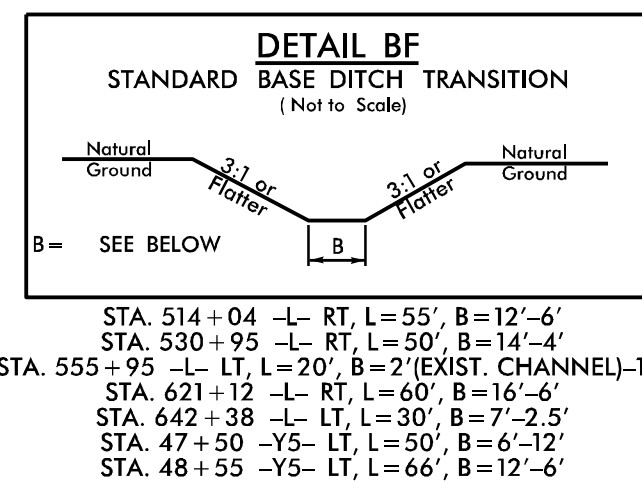
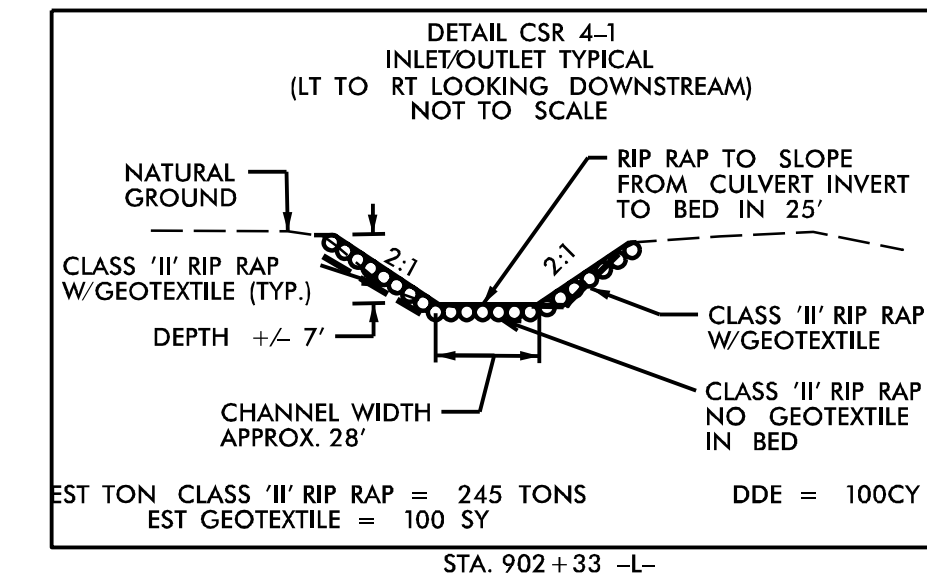
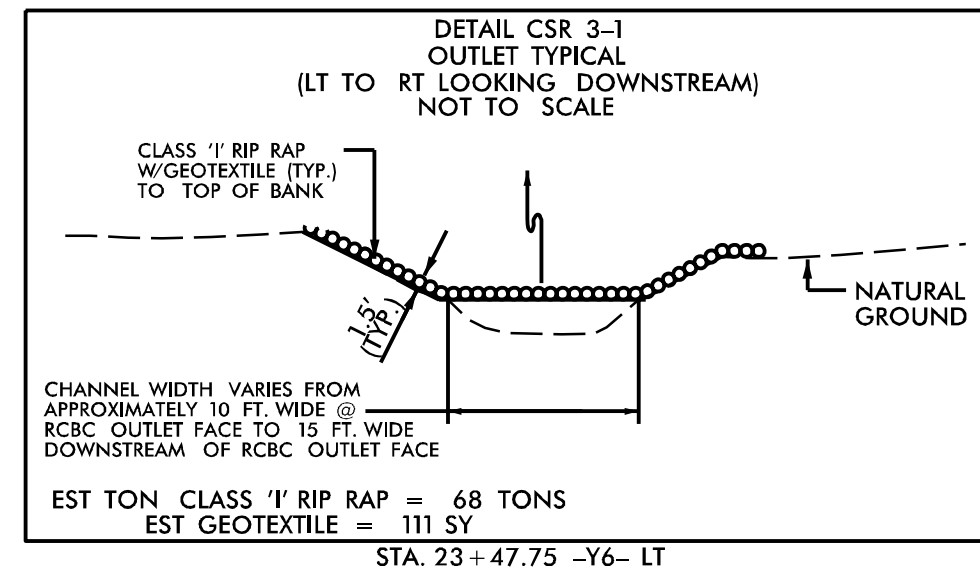
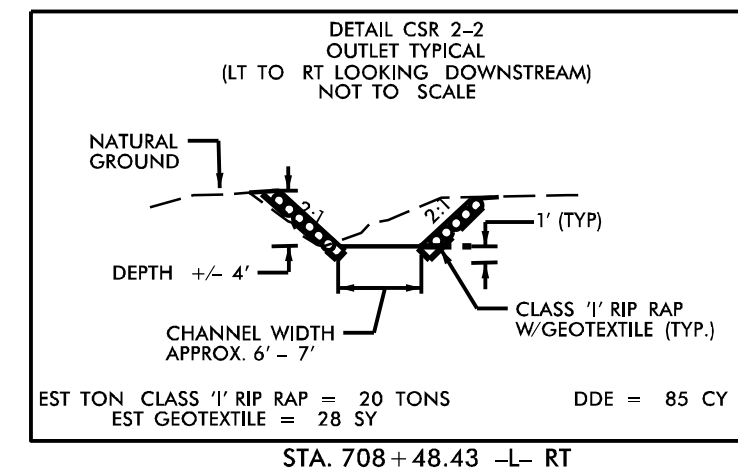
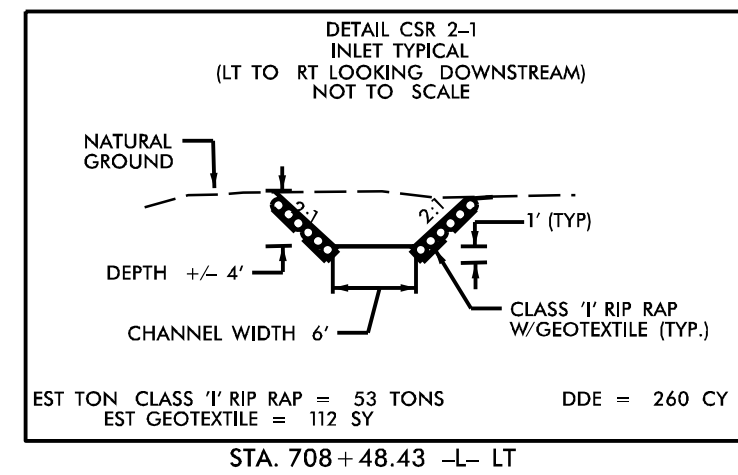
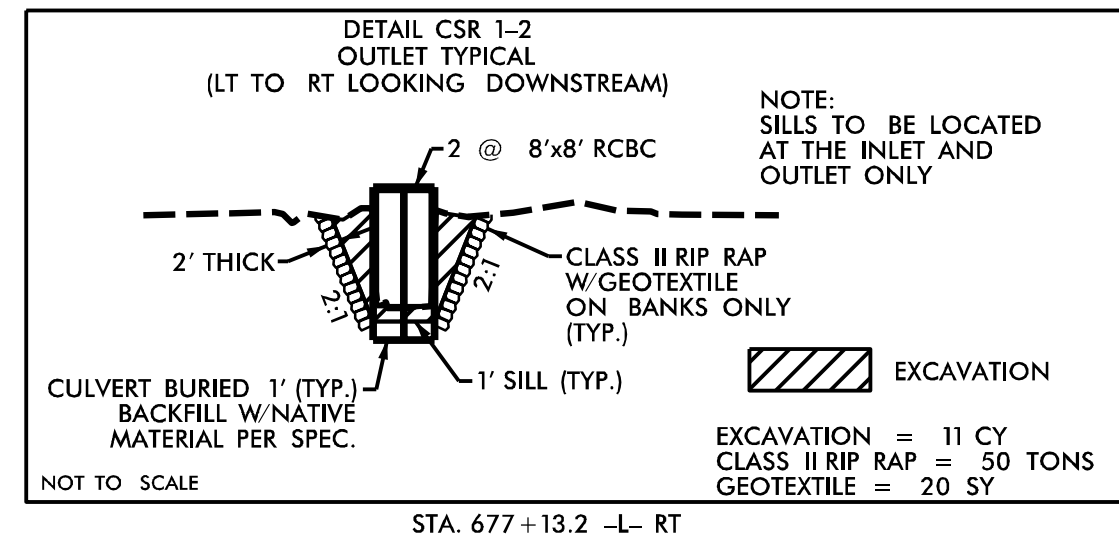
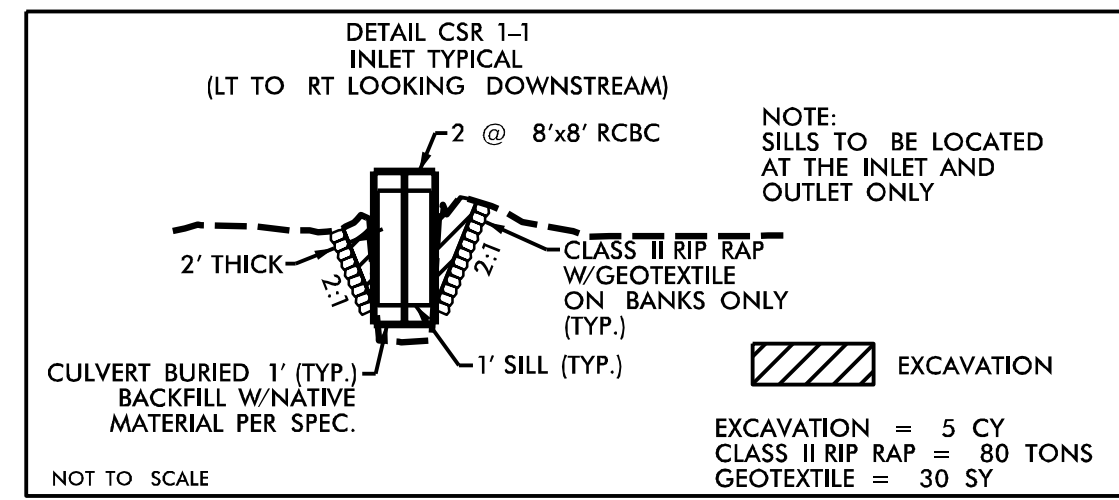


FROM STA. 592+50 TO STA. 599+00 -L- LT

PROJECT REFERENCE NO. 1-5897B	SHEET NO. 2D-2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
MOTT MACDONALD, I & E, LLC LICENSE NO. F-0669	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared in the Office of:	MOTT MACDONALD, I & E, LLC 7621 Purfoy Road, Suite 115 Fuquay-Varina, NC 27526 (919) 552-2253 www.mottmac.com
1223 Jones Franklin Rd. Raleigh, NC 27606 License No. F-4377 Bus: 919 851 8077 Fax: 919 851 8107	

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5/14/99

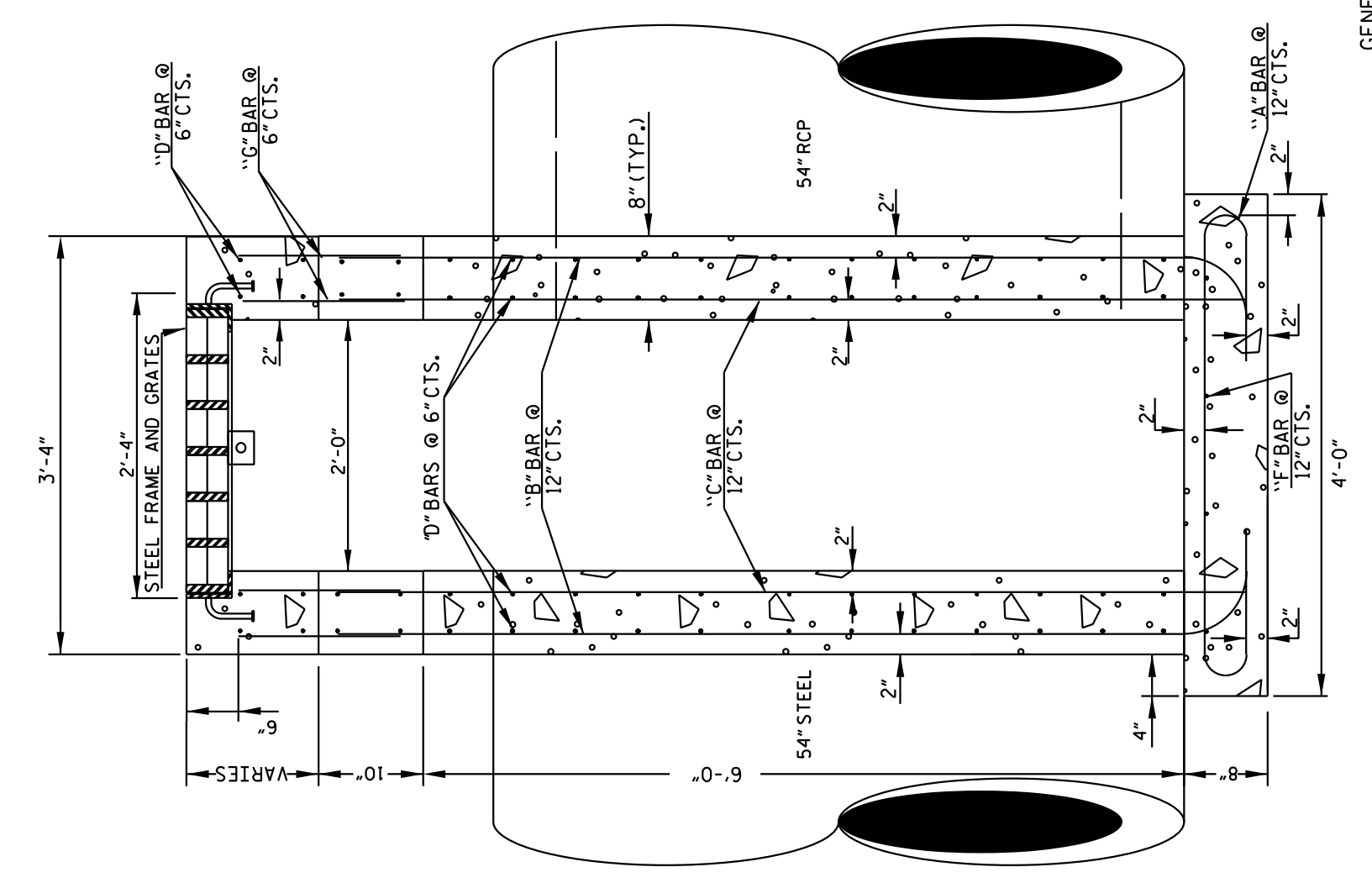


PROJECT REFERENCE NO. 1-5897B	SHEET NO. 2D-3
RW SHEET NO.	
ROADWAY DESIGN ENGINEER DAVID C. WALKER SEAL 22606 MOTT MACDONALD I & E, LLC LICENSE NO. F-0669	HYDRAULICS ENGINEER DAVID M. WEGG SEAL 036821 MOTT MACDONALD I & E, LLC LICENSE NO. F-0669
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
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MOTT MACDONALD I & E, LLC	

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 8/17/99

STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.



SECTION Y-Y

- GENERAL NOTES:
- BUILD WITH CLASS 'AA' CONCRETE CORNERS 3"
 - CHAMFER ALL CORNERS OF CONCRETE
 - USE WEDGES TO CONSIDER THE BOTTOM BAR
 - IF PIPES ARE SET IN THE BASE, FOLLOW CONSTRUCTION PROCEDURES SHOWN BY STD. DWG. 840.00.
 - PRECAST UNITS CONCRETE MAY BE USED
 - USE ANGLE IRON FOR FRAME ANCHORAGE
 - PROVIDE STD. DWG. 840.31 FOR FRAME ANCHORAGE
 - PROVIDE DROP INLETS OVER 3'-6" DEEP WITH STEPS AS DIRECTED BY STD. DWG. 840.66.
 - FRAME AND GRATES ARE SEPARATE CONTRACT ITEM.

- NOTES:
- HORIZONTAL (UP TO 10" MAX. IN BOTH DIRECTIONS) AND VERTICAL (UP TO 14" MAX.) DIMENSIONS MAY BE ADJUSTED AS THE FIELD CONDITIONS AND/OR ALTERNATE DESIGNS REQUIRE.
 - ALL ADJUSTMENTS ARE TO BE MADE AS DIRECTED BY THE ENGINEER.

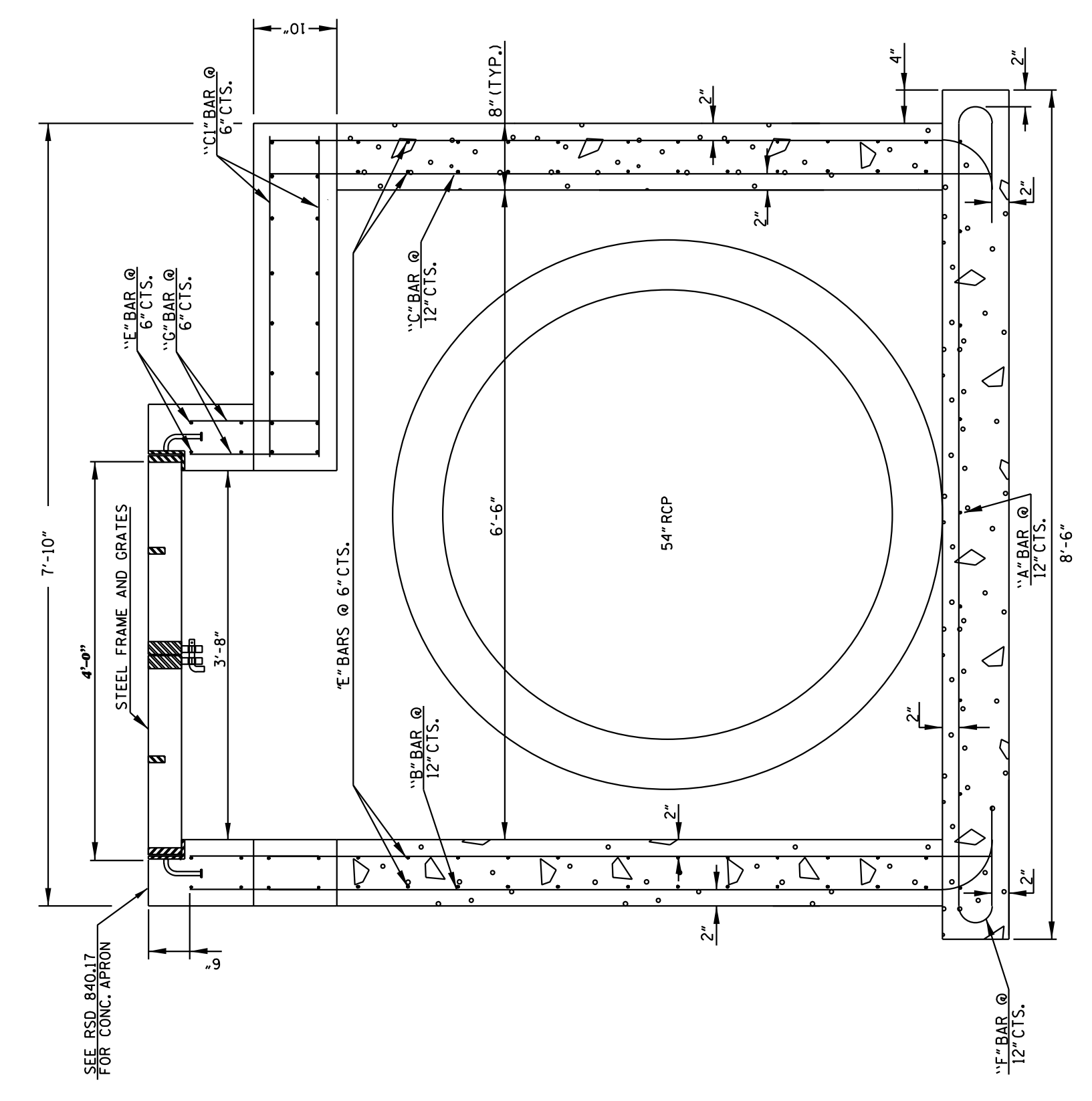
SHEET 1 OF 2
 840D36

ENGLISH DETAIL DRAWING FOR
 TRAFFIC BEARING GRATED INLET
 FOR PIPES UP TO 54"

STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
 TRAFFIC BEARING GRATED INLET
 FOR 54" PIPES

SHEET 1 OF 2
 840D36



SECTION X-X

SHEET 1 OF 2
 840D36

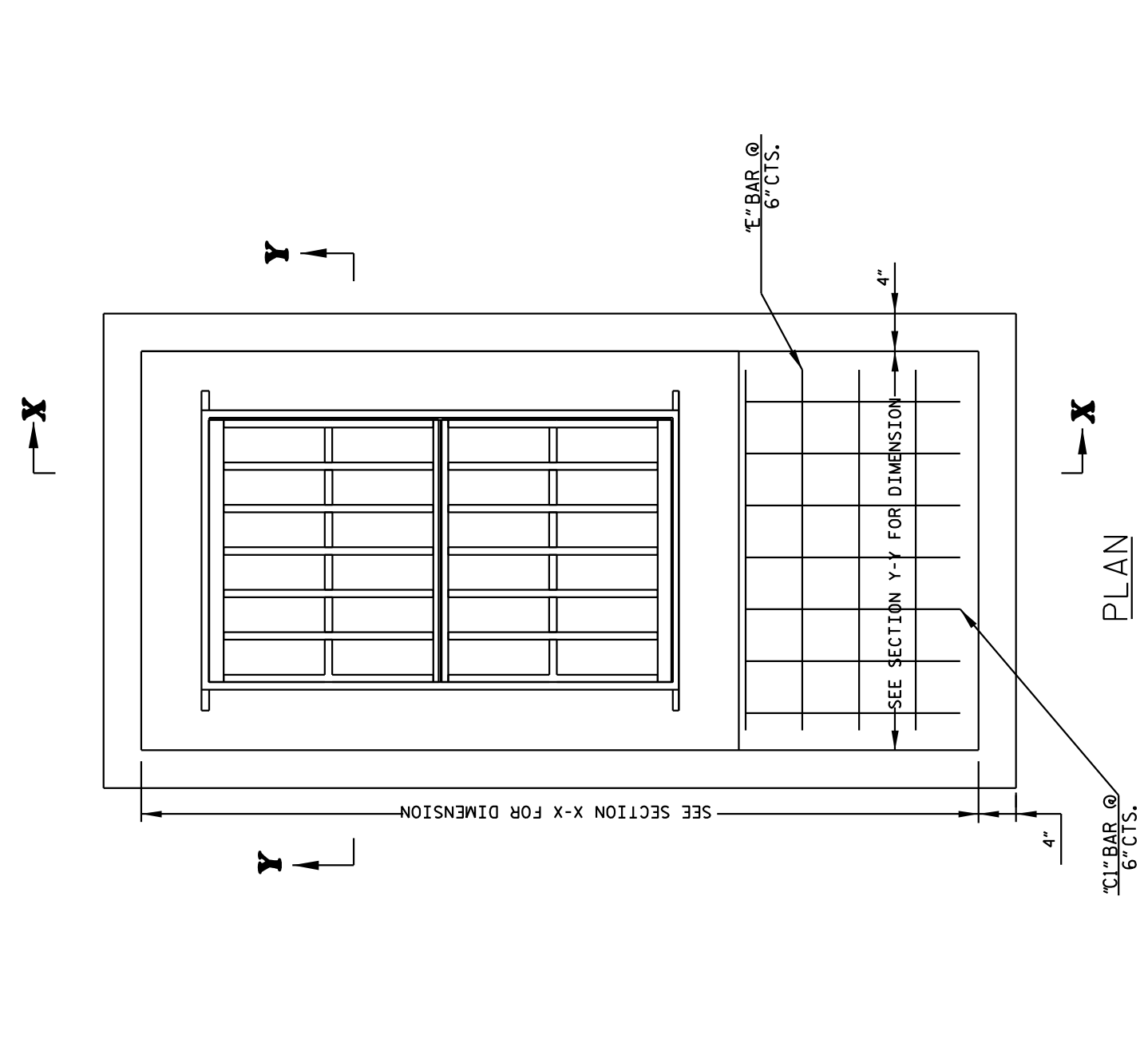
STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
 TRAFFIC BEARING GRATED INLET
 FOR PIPES UP TO 54"

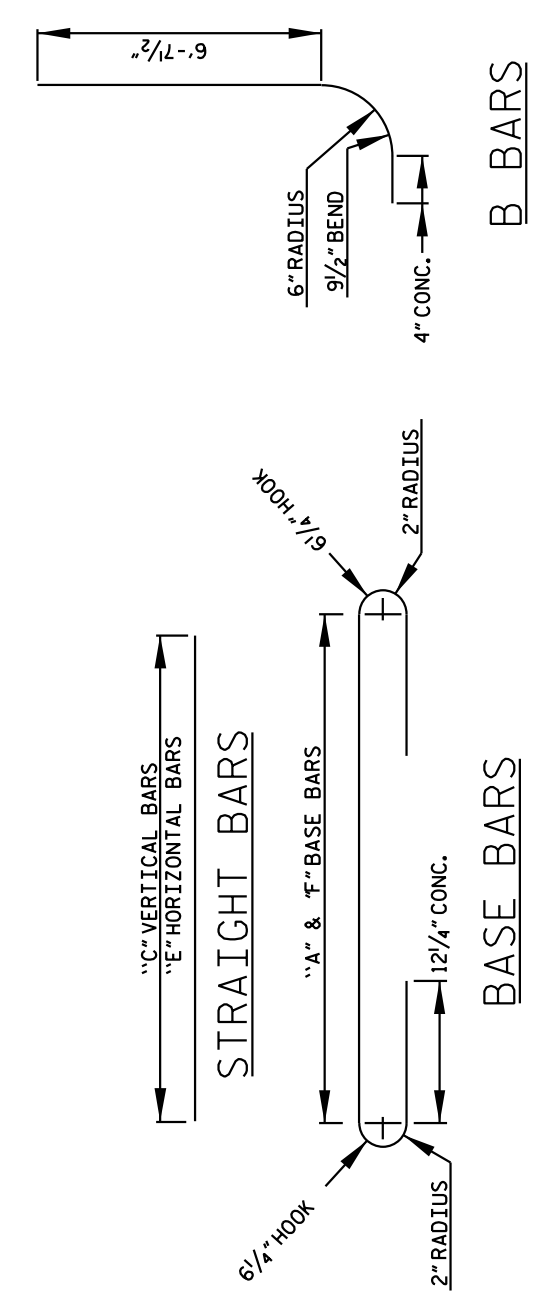
STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
 TRAFFIC BEARING GRATED INLET
 FOR 54" PIPES

SHEET 2 OF 2
 840D36



PLAN



BILL OF MATERIALS

BAR	SIZE	LENGTH	QUANTITY	WEIGHT
A	#5	6'-5"	9	60
B	#5	7'-9"	22	178
C	#5	7'-2"	22	164
D	#5	3'-2"	7	23
E	#5	7'-6"	64	501
F	#5	3'-0"	76	238
G	#5	1'-7"	4	46
REINF. STEEL (TOTAL WEIGHT LBS.)				1309
CONCRETE (TOTAL CU.YDS.) CLASS 'AA'				5.1

NO DEDUCTIONS HAVE BEEN MADE TO ACCOMMODATE PIPES
 FOR EVERY 1 FOOT OF RISER USE 0.41 CU.YDS
 CONCRETE AND 151 LBS STEEL.

SHEET 2 OF 2
 840D36

PROJECT REFERENCE NO. 1-5987B SHEET NO. 2D-4

STRUCTURE DESIGN ENGINEER

North Carolina Professional Engineer
 Kevin Austin
 License No. 75782-00000
 4/29/2022

DOCUMENT NOT CONSIDERED FINAL
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MOTT MACDONALD
 7621 Purfoy Rd, Suite 115
 Fuquay-Varina, NC 27526
 www.mottmac.com/americas

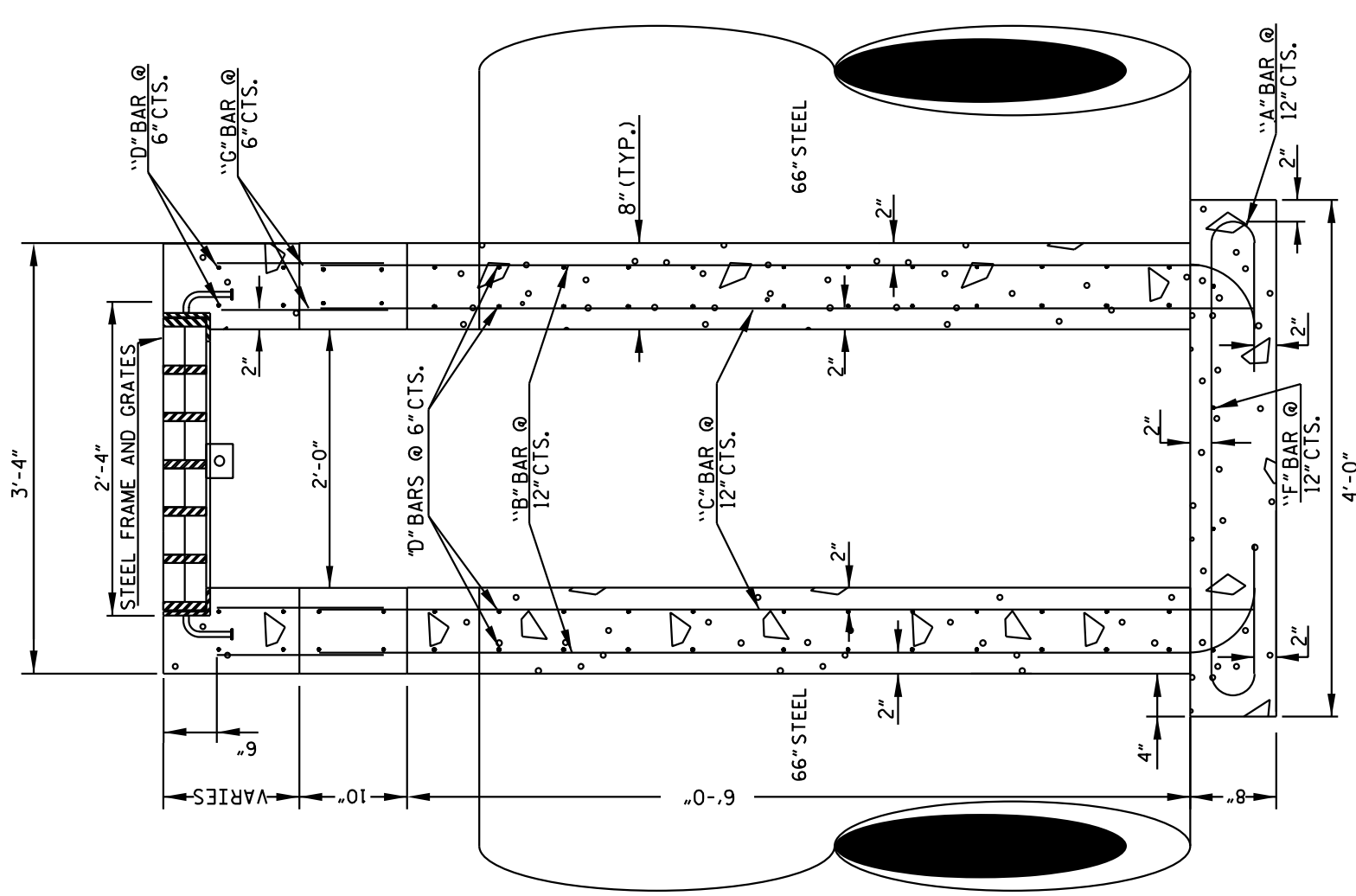
NV5 NV5 ENGINEERS & CONSULTANTS, INC.
 7500 E. INDEPENDENCE BLVD, STE 100
 CHARLOTTE, NC 28227
 P: 704.537.7300 www.NV5.com
 NC License # F-1333

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STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR TRAFFIC BEARING GRATED INLET FOR 66" STEEL PIPES

SHEET 1 OF 2 840D36



SECTION Y-Y

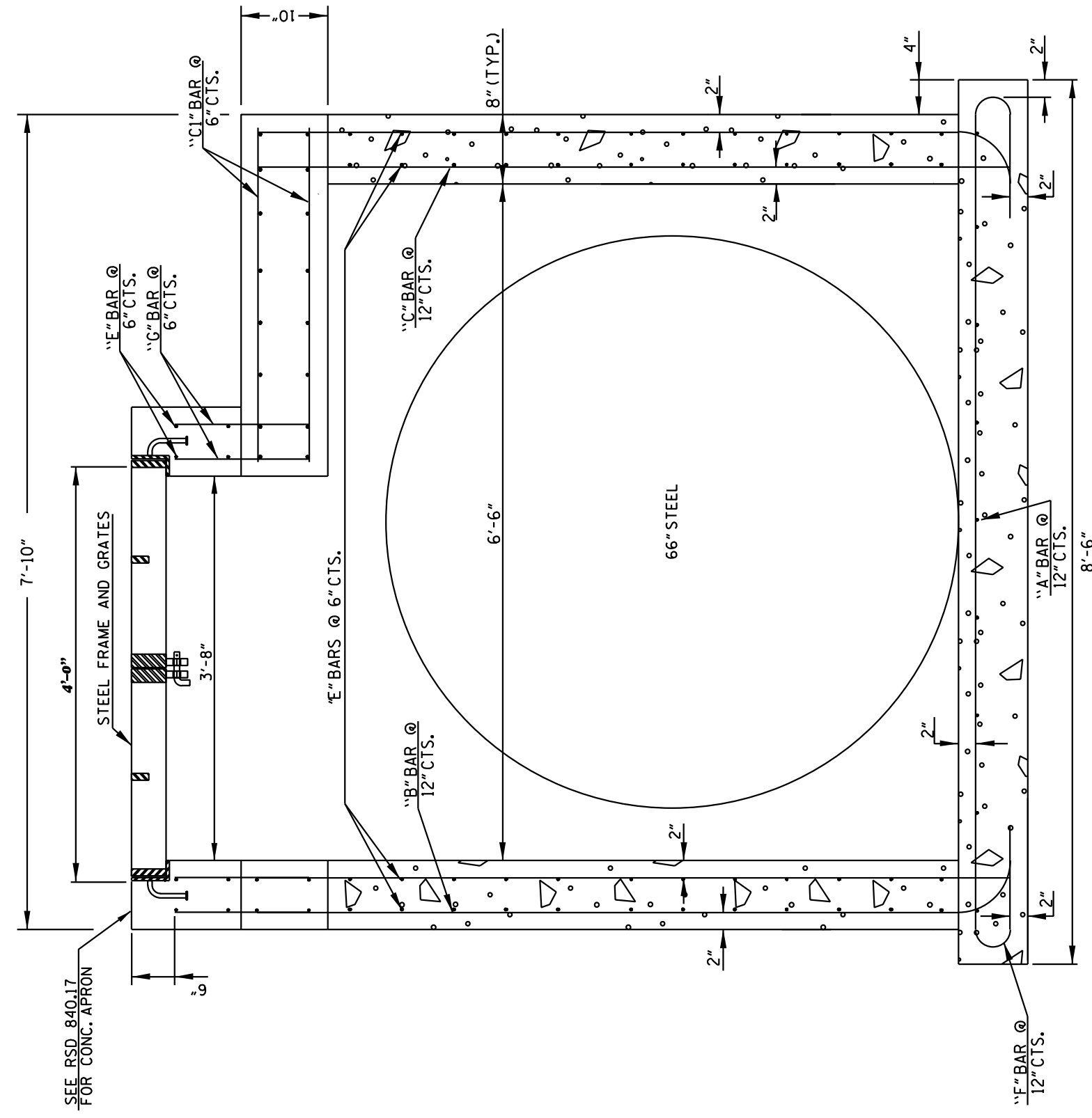
- GENERAL NOTES: -BUILD WITH CLASS 'AA' CONCRETE CORNERS 3" CHAMFERED ALL CORNERS. -USE WEDGES TO CONSIDER CORNER BOTTOM BAR. -IF PIPES ARE SET IN THE BASE, FOLLOW CONSTRUCTION PROCEDURES SHOWN BY STD. DWG. 840.00. -PRECAST UNITS CONCRETE MAY BE USED. -USE ANGLE IRON FOR FRAME ANCHORAGE. -PROVIDE DROP INLETS OVER 3'-6" DEEP WITH STEPS AS DIRECTED BY STD. DWG. 840.66. -FRAME AND GRATES ARE SEPARATE CONTRACT ITEM.

- NOTES: -HORIZONTAL (UP TO 10" MAX. IN BOTH DIRECTIONS) AND VERTICAL (UP TO 14" MAX.) DIMENSIONS MAY BE ADJUSTED AS THE FIELD CONDITIONS AND/OR ALTERNATE DESIGNS REQUIRE. -ALL ADJUSTMENTS ARE TO BE MADE AS DIRECTED BY THE ENGINEER.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR TRAFFIC BEARING GRATED INLET FOR 66" STEEL PIPES

SHEET 1 OF 2 840D36

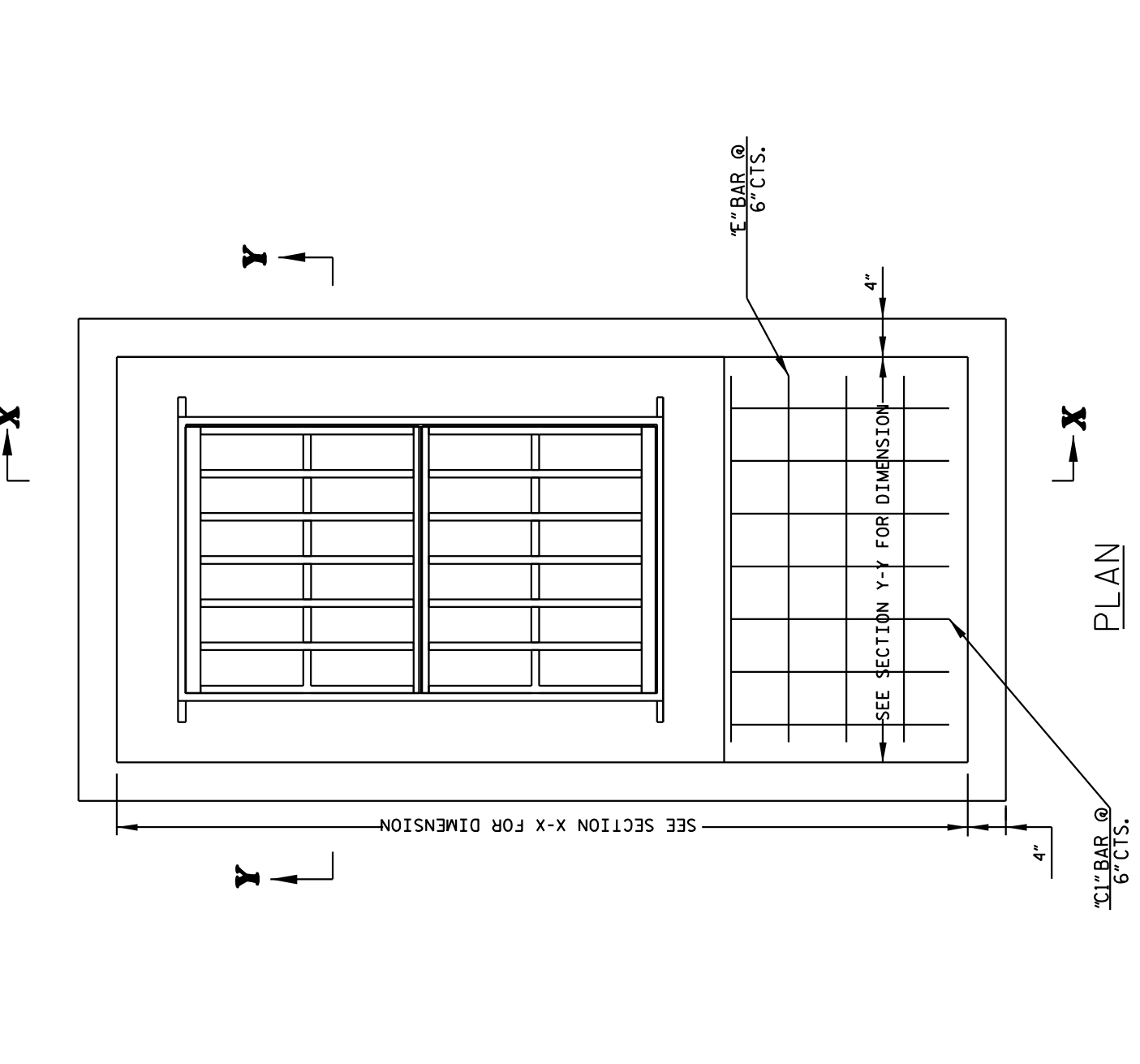


SECTION X-X

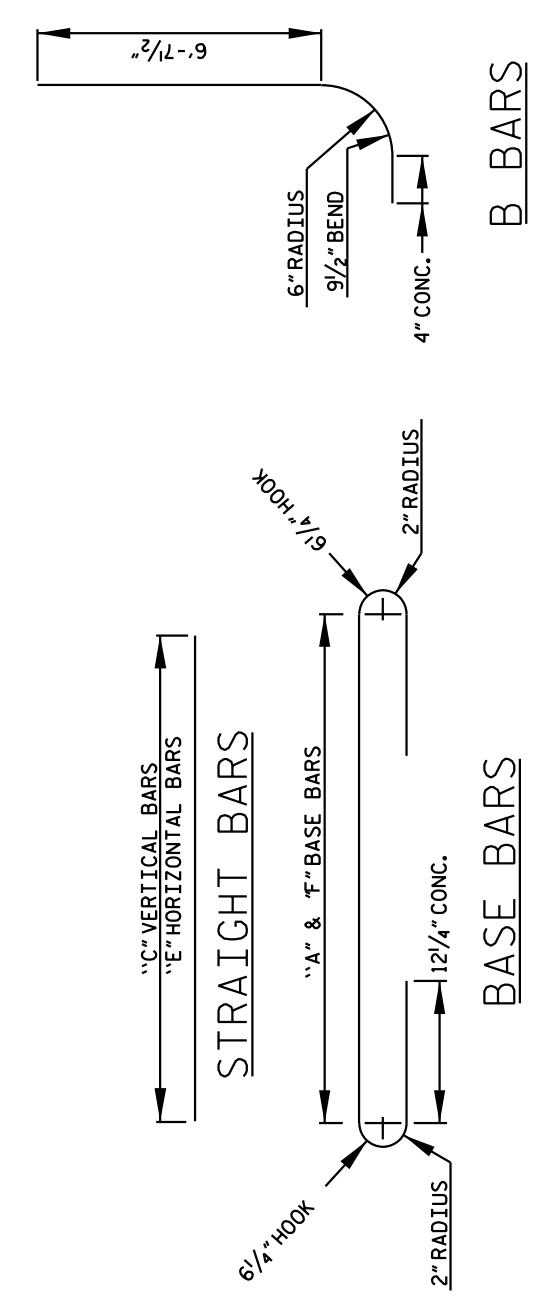
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR TRAFFIC BEARING GRATED INLET FOR 66" STEEL PIPES

SHEET 2 OF 2 840D36



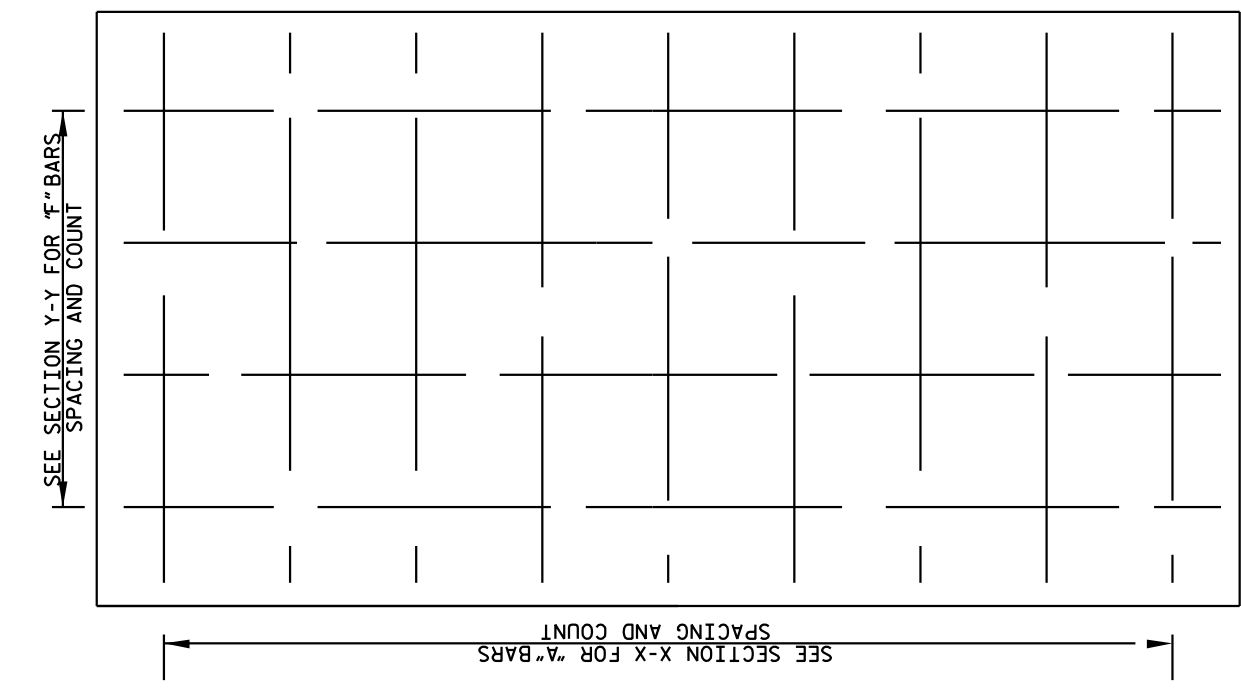
PLAN



STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR TRAFFIC BEARING GRATED INLET FOR 66" STEEL PIPES

SHEET 2 OF 2 840D36



PLAN OF BASE

Table with columns: BAR, SIZE, LENGTH, QUANTITY, WEIGHT. Rows A through G. Includes summary rows for REINF. STEEL TOTAL WEIGHT (LBS.) and CONCRETE TOTAL CUYDS. CLASS 'AA'. NO DEDUCTIONS HAVE BEEN MADE TO ACCOMMODATE PIPES.

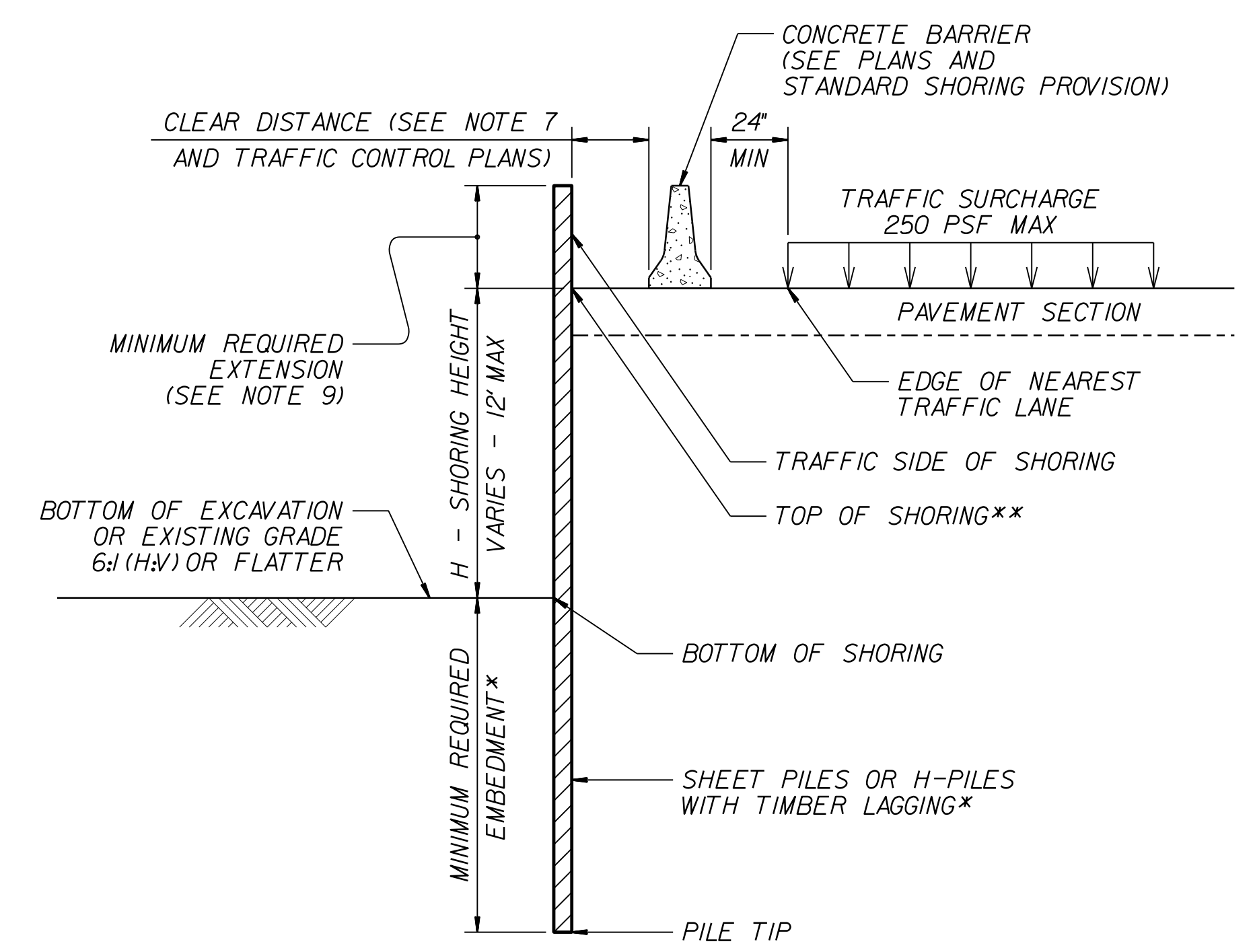
FOR EVERY 1 FOOT OF RISER USE 0.41 CUYDS CONCRETE AND 151 LBS STEEL.

PROJECT REFERENCE NO. 1-5987B SHEET NO. 2D-6. STRUCTURE DESIGN ENGINEER. NORTH CAROLINA PROFESSIONAL ENGINEERS. L. Kevin Austin, Kevin Austin. 4/29/2022. DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED. Prepared in the Office of: MOTT MACDONALD. NV5 ENGINEERS & CONSULTANTS, INC. 7500 E. INDEPENDENCE BLVD, STE 100 CHARLOTTE, NC 28227 P: 704.537.7300 www.NV5.com NC License # F-1333

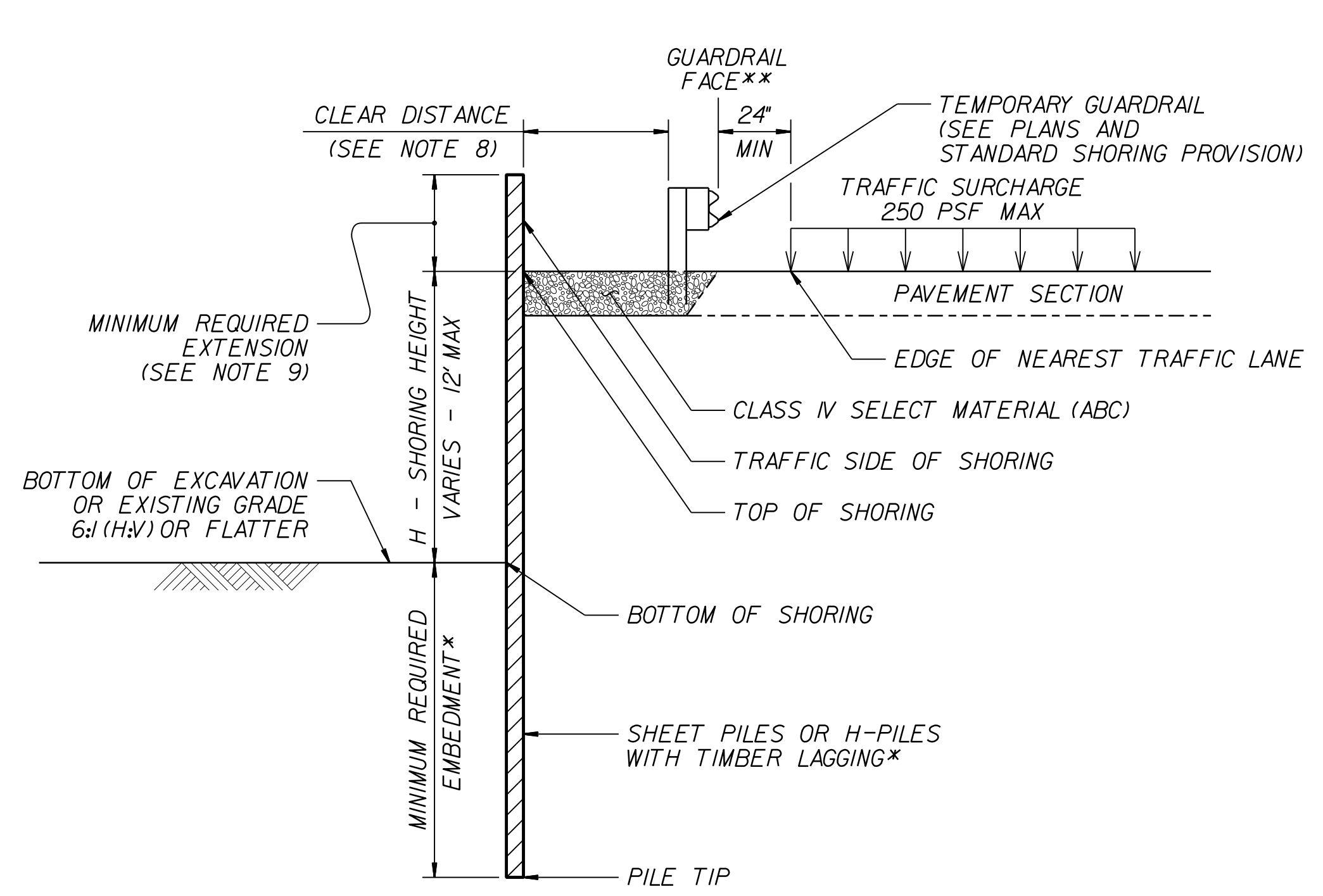
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN ³ /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN ³ /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
			HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73	
GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5	
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5	

- NOTES:**
- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
 - FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
 - STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF
 - DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
 - DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
 - USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
 - AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
 - AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
 - MINIMUM REQUIRED EXTENSION IS 6' FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32' FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
 - MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
 - SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM:
connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
 - CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.

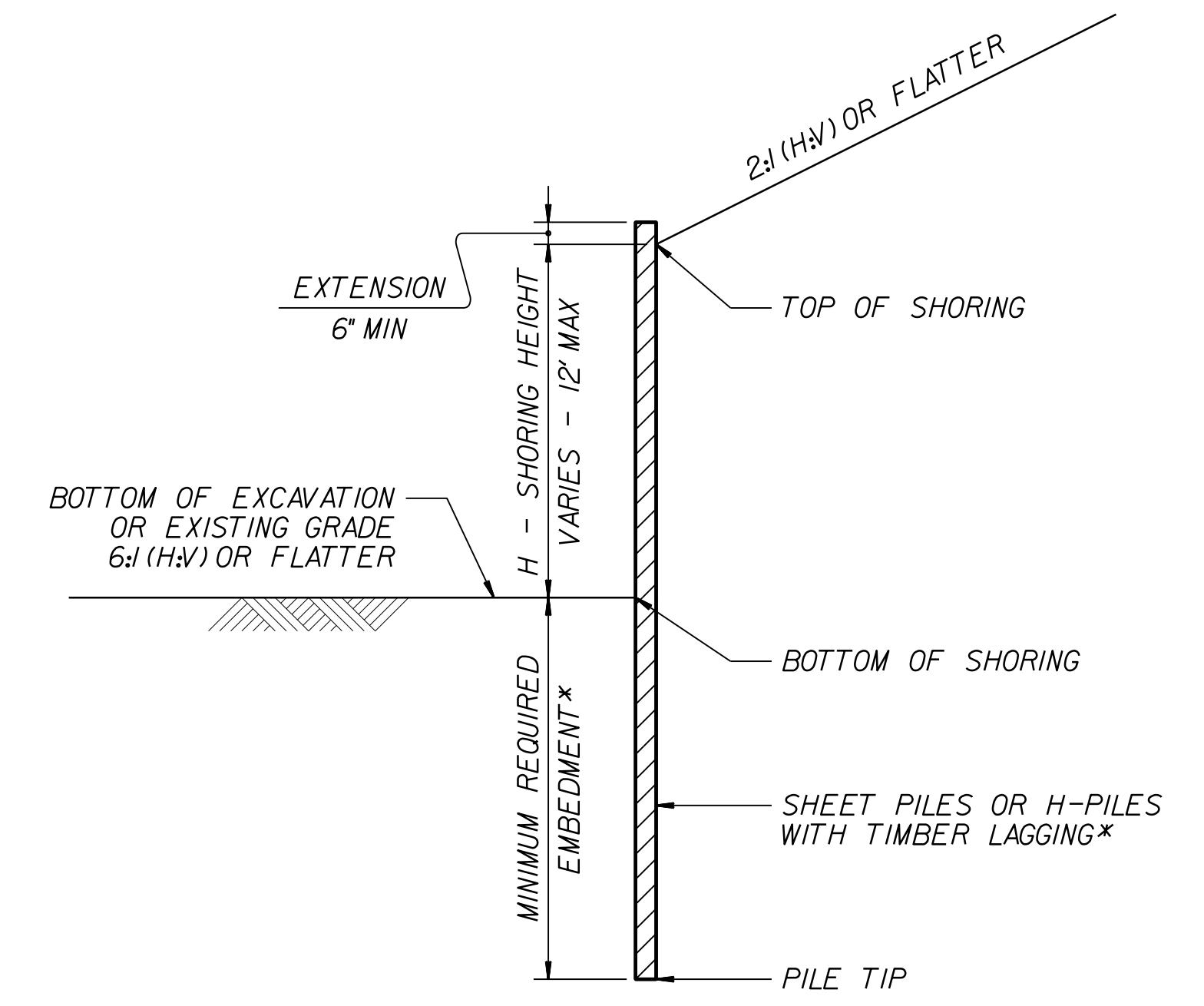
MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS
***DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".**



CONCRETE BARRIER
****TOP OF SHORING = EDGE OF PAVEMENT**

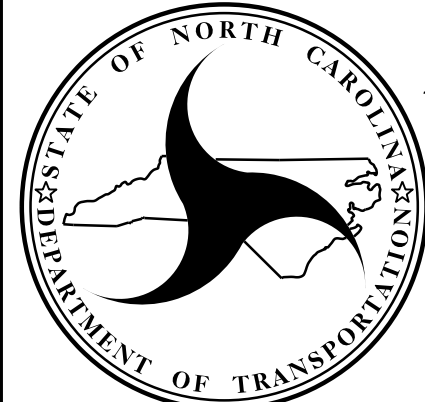


TEMPORARY GUARDRAIL
****GUARDRAIL FACE = EDGE OF PAVEMENT**



STANDARD TEMPORARY SHORING (SLOPE CASE)
***SEE TABLE ABOVE.**

STANDARD TEMPORARY SHORING (SURCHARGE CASE)
***SEE TABLE ABOVE.**



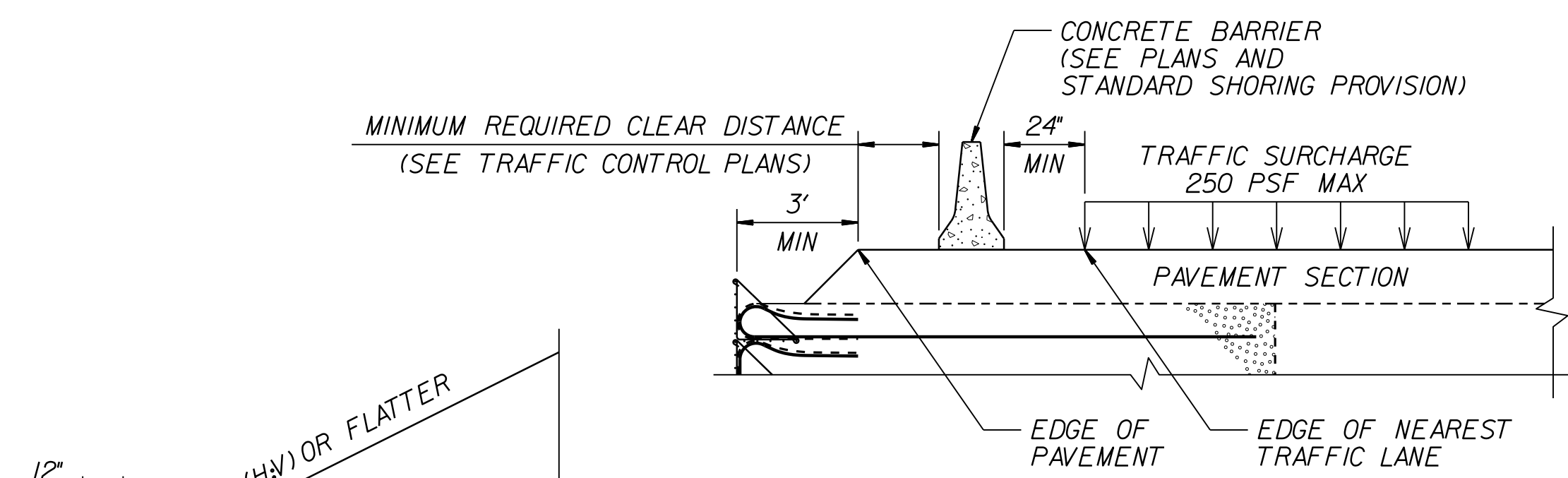
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

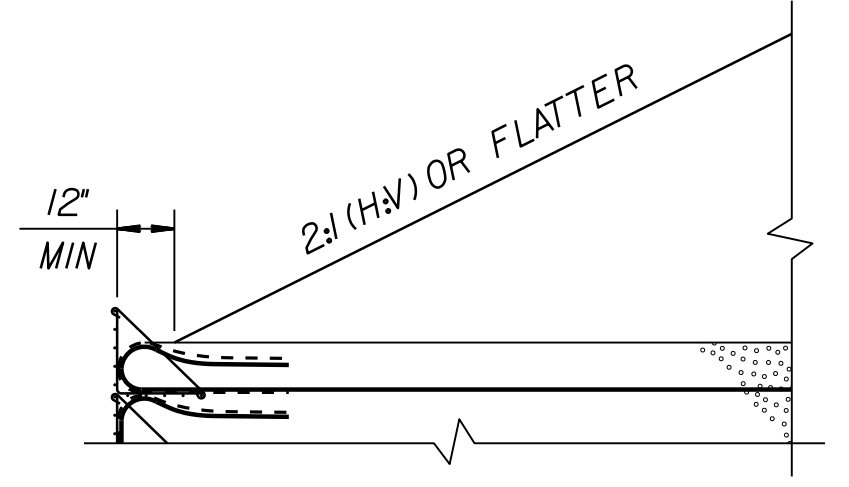
STANDARD DETAIL NO. 1801.01

STANDARD TEMPORARY SHORING

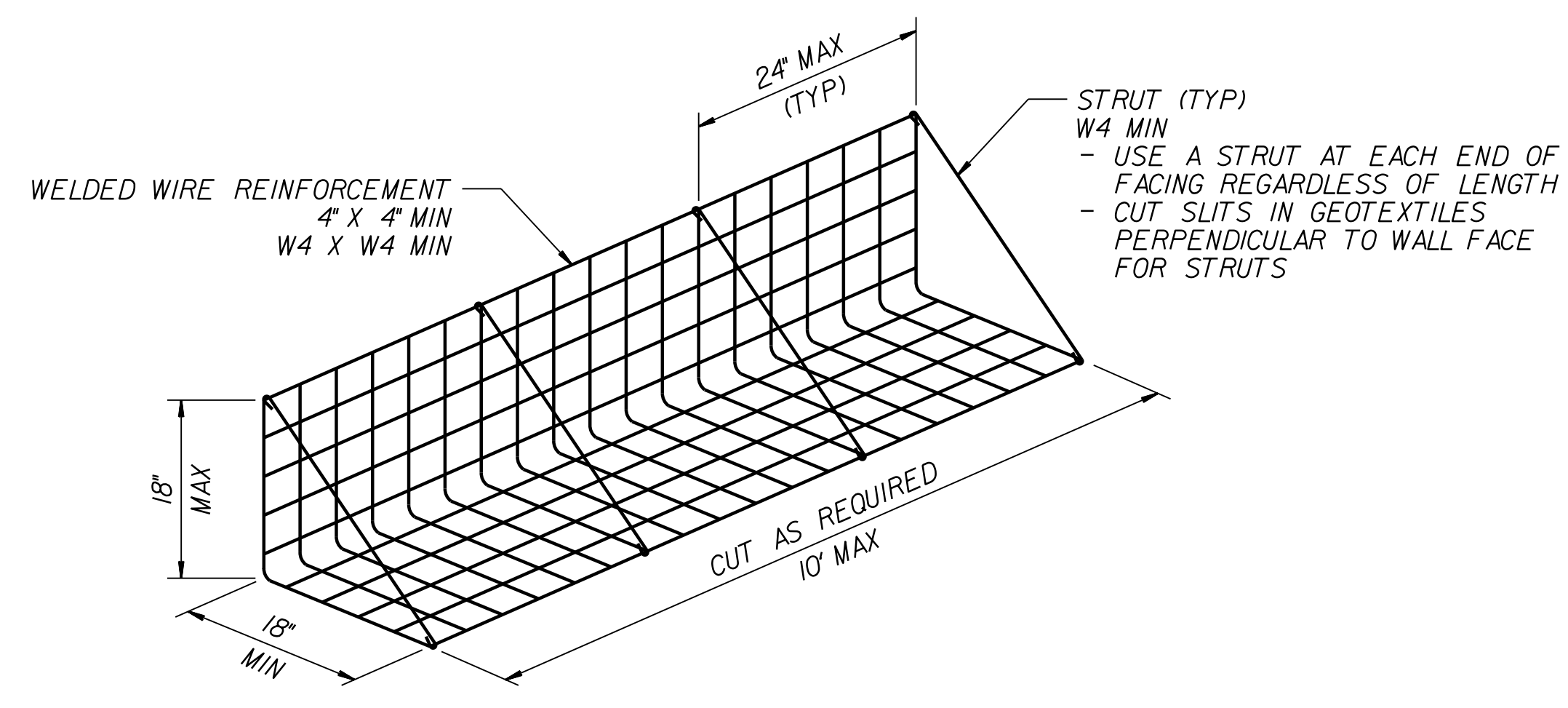
DATE: 11-19-13



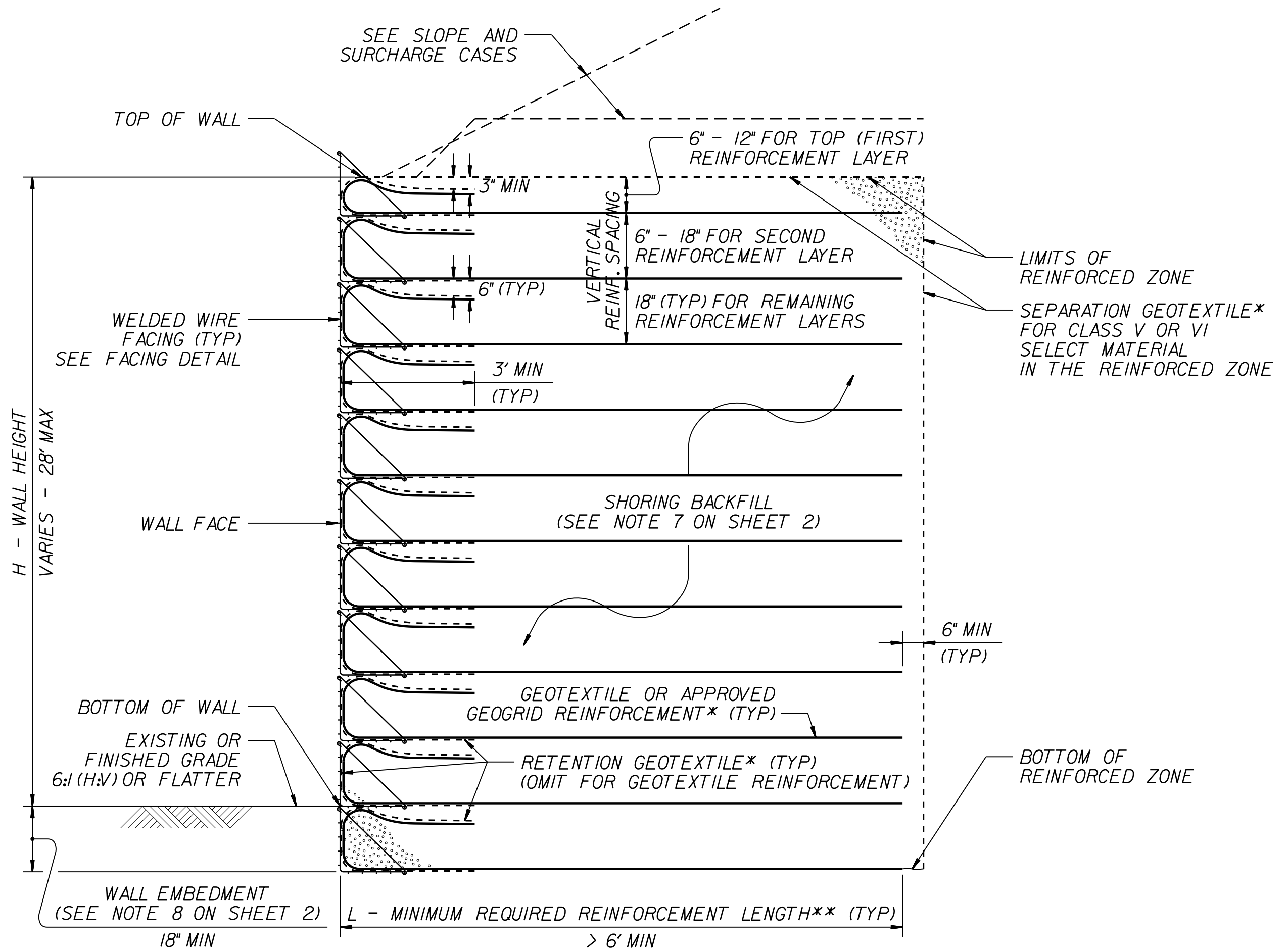
SURCHARGE CASE



SLOPE CASE

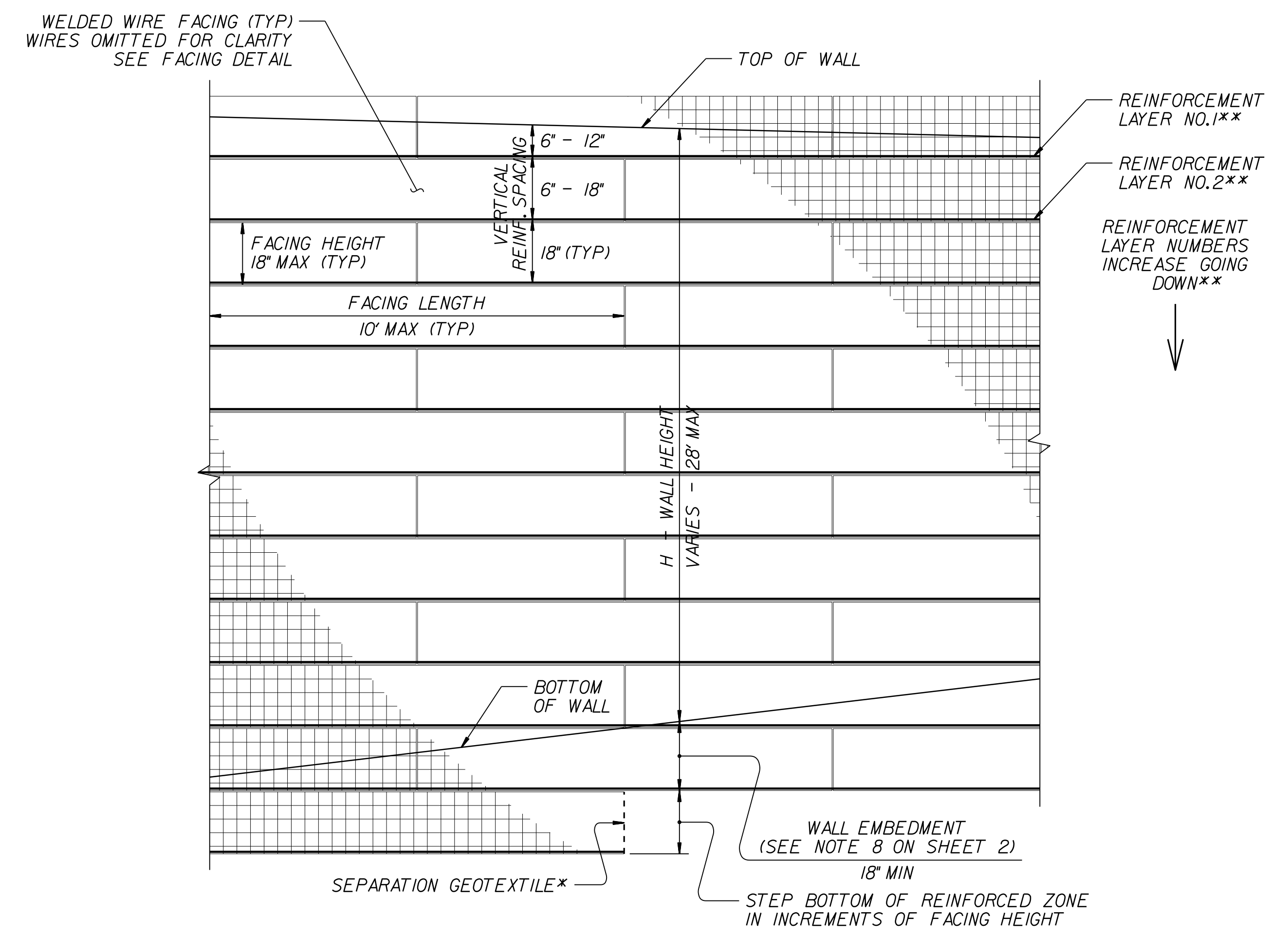


FACING DETAIL



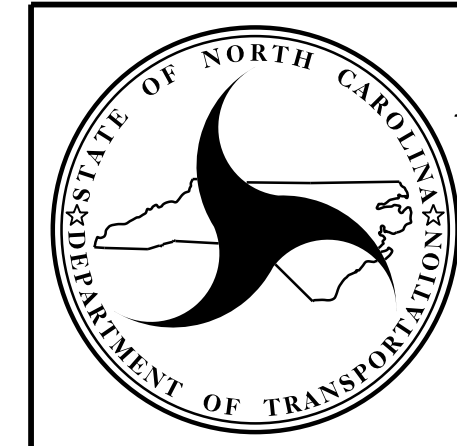
STANDARD TEMPORARY WALL

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)
 *SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
 **SEE REINFORCEMENT TABLES ON SHEET 3.



STANDARD TEMPORARY WALL - PARTIAL ELEVATION

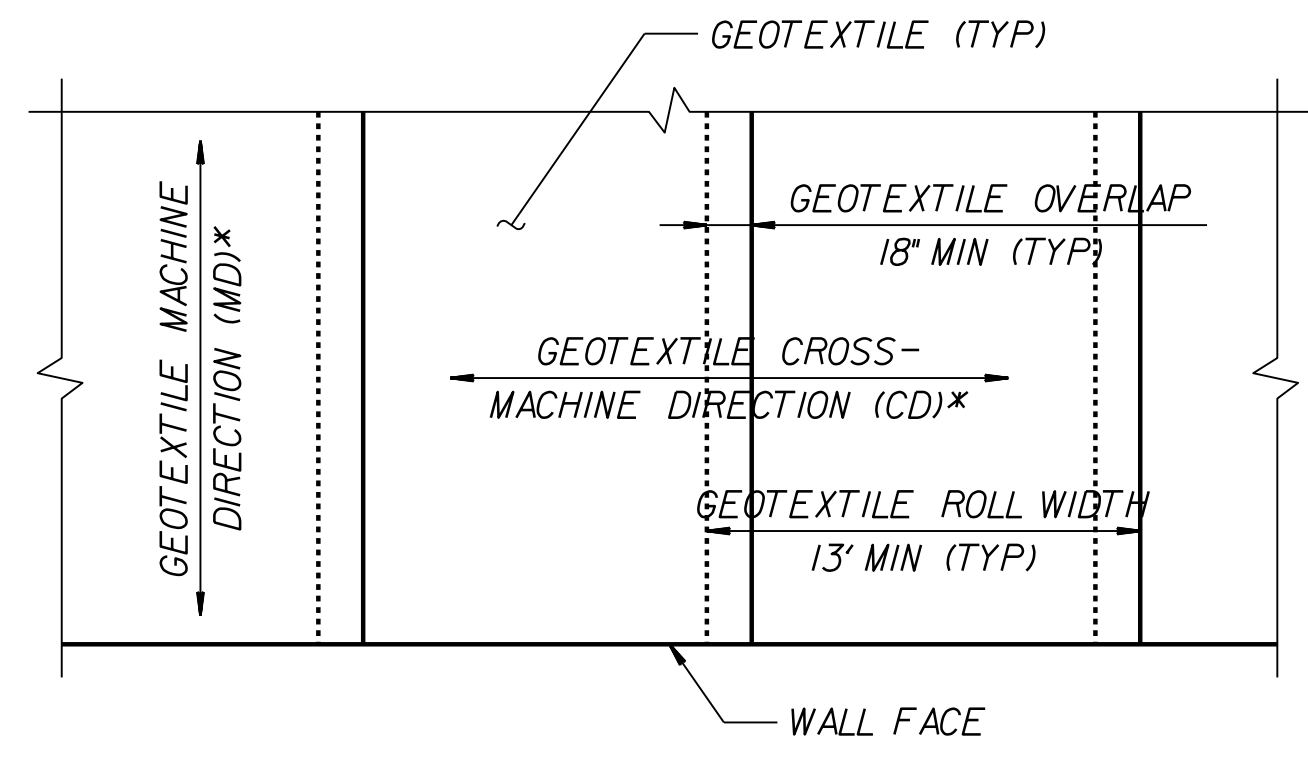
*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
 **SEE REINFORCEMENT TABLES ON SHEET 3.



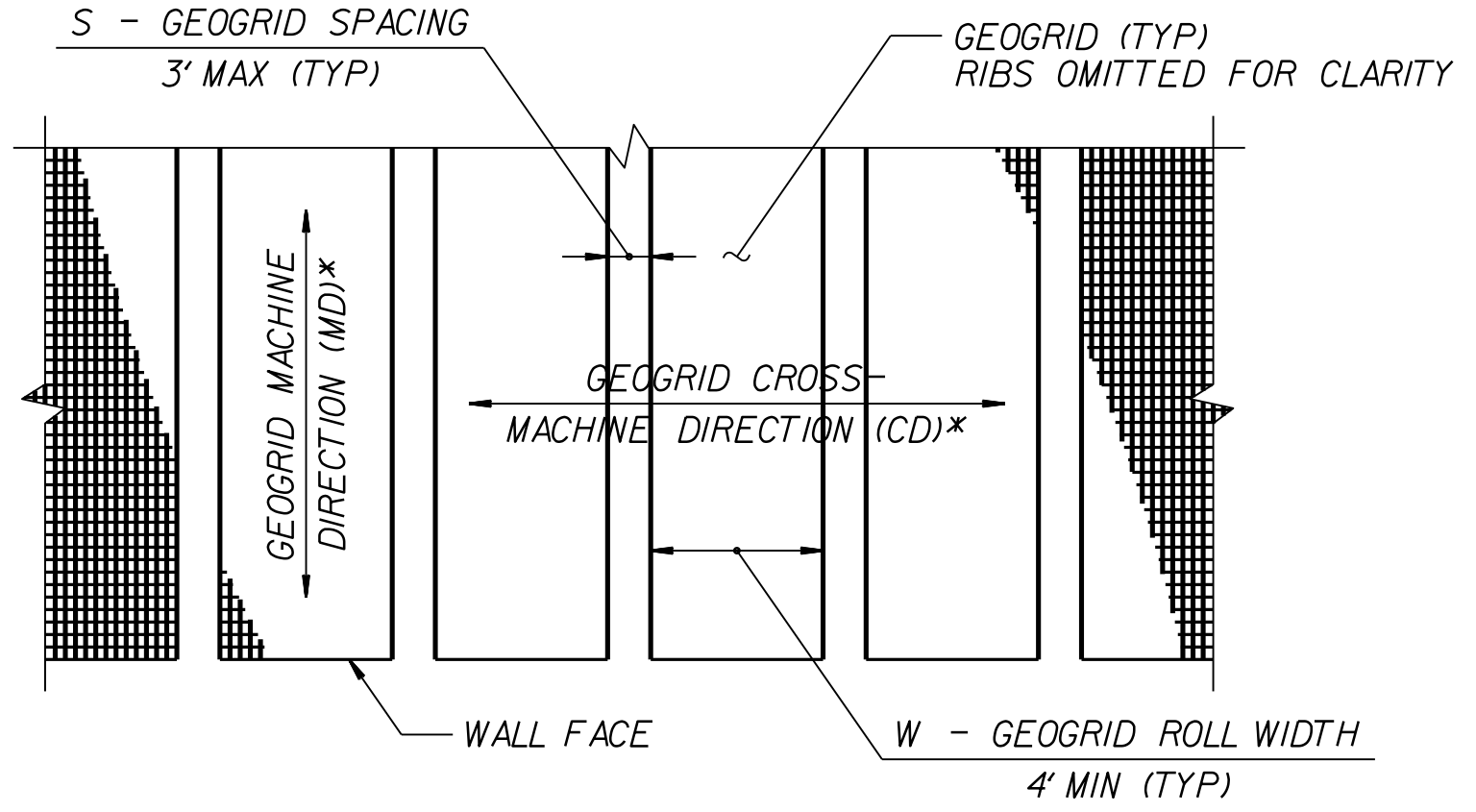
NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
**GEOTECHNICAL
 ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.02

STANDARD
 TEMPORARY WALL
 SHEET 1 OF 3

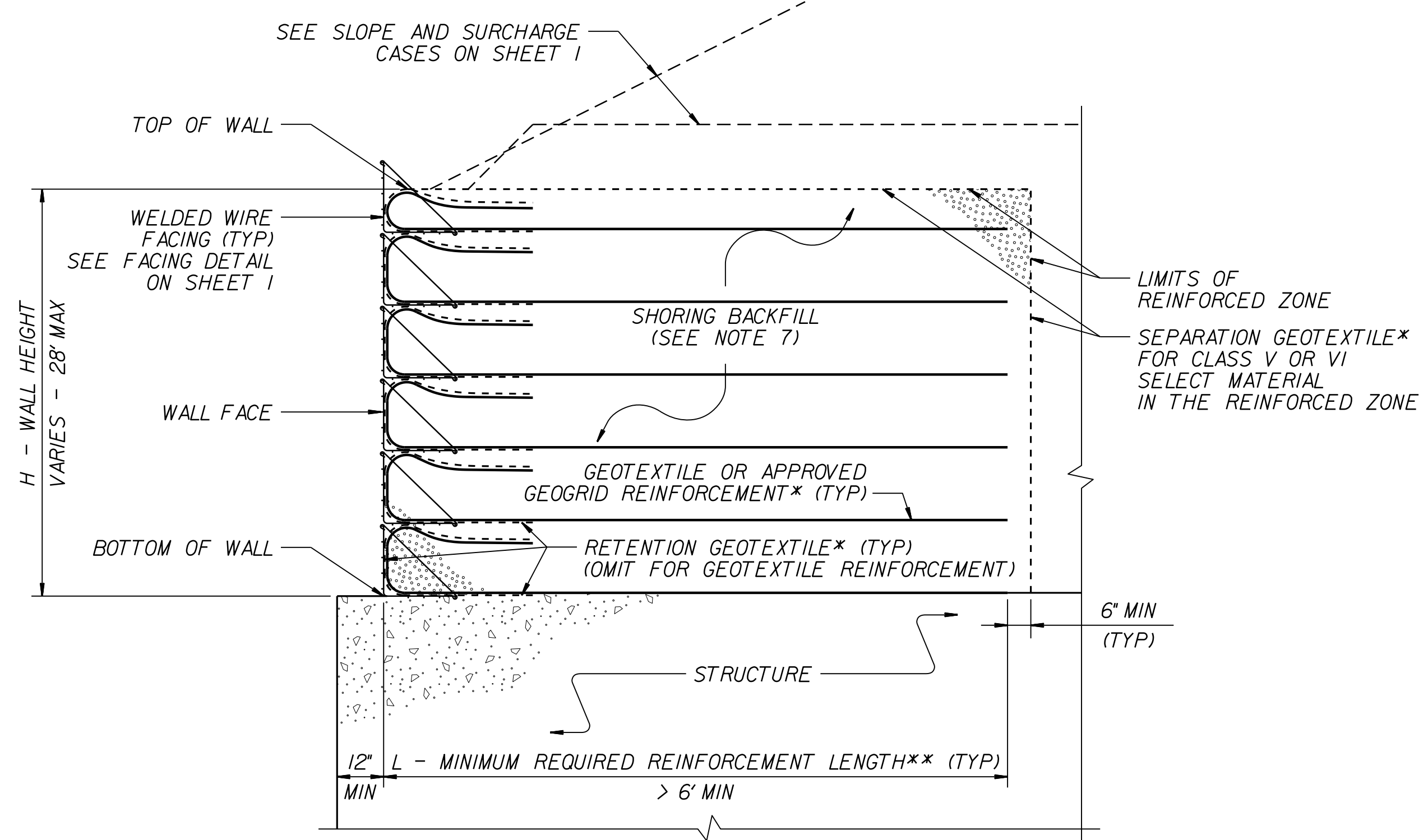


GEOTEXTILE PLACEMENT
(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)



GEOGRID PLACEMENT
(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT - $\frac{W}{W+S} \times 100 \geq 80\%$, SEE NOTE 11)

GEOSYNTHETIC PLACEMENT DETAILS
(PLAN VIEW)
*SEE NOTE 12.



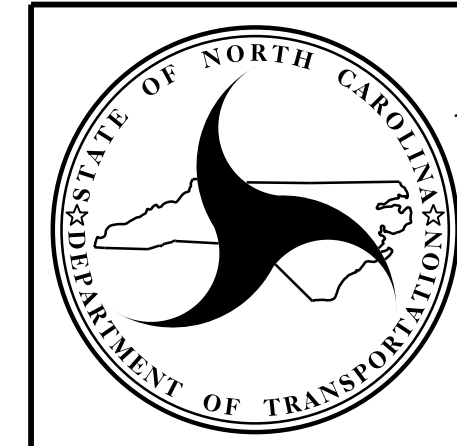
TEMPORARY WALL ON STRUCTURE DETAIL
*SEE GEOSYNTHETIC PLACEMENT DETAILS.
**SEE REINFORCEMENT TABLES ON SHEET 3.

NOTES:

- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF
- DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
- USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER OR FLOOD ELEVATION IS ABOVE BOTTOM OF REINFORCED ZONE.
- DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
- WALL EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
- DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
- GEOGRIDS FOR GEOGRID REINFORCEMENT ARE APPROVED FOR SHORT TERM DESIGN STRENGTHS (3-YEAR DESIGN LIFE) IN THE MD AND CD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Products.aspx
DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

- FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
- AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:
- W (REINFORCEMENT ROLL WIDTH) \geq (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
- REINFORCEMENT STRENGTH IN CD \geq MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
- SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
- DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
- FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
- DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
- CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
- FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
- FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.




NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 2 OF 3

PROJECT REFERENCE NO. I-5987B	SHEET NO. 2G-4
GEOTECHNICAL ENGINEER  ENGINEER	ENGINEER
DocuSigned by: Scott A. Holden 02/15/2022	DATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H - WALL HEIGHT (FT)																									
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
SLOPE CASE	> 0	CLASS II, TYPE I, CLASS III, CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27	
SURCHARGE CASE	> 0 TO 7 FOR H < 20' > 0 TO 10 FOR H ≥ 20'	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	17	17	18	19	19	20	21	22	
		A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21	
		CLASS II, TYPE I OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	14	15	15	16	16	17	17	18	18	19	20	
	> 7 FOR H < 20' > 10 FOR H ≥ 20'	CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	8	8	9	9	10	10	11	12	13	13	14	14	15	15	16	17	17	18	19	19		

L - MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)
(FOR ALL REINFORCEMENT TYPES)

WALL HEIGHT (H) + WALL EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 - 4	3
4 - 5.5	4
5.5 - 7	5
7 - 8.5	6
8.5 - 10	7
10 - 11.5	8
11.5 - 13	9
13 - 14.5	10
14.5 - 16	11
16 - 17.5	12
17.5 - 19	13
19 - 20.5	14
20.5 - 22	15
22 - 23.5	16
23.5 - 25	17
25 - 26.5	18
26.5 - 28	19
28 - 29.5	20

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

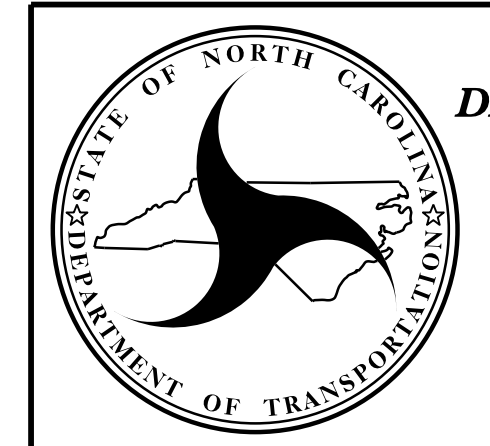
REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

GEOTEXTILE REINFORCEMENT
ULTIMATE TENSILE STRENGTH (LB/FT)

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

GEOGRID REINFORCEMENT
SHORT-TERM DESIGN STRENGTH (LB/FT)
(SEE NOTE 10 ON SHEET 2.)


MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD
(SEE NOTE 9 ON SHEET 2.)
*SEE PARTIAL ELEVATION ON SHEET 1 FOR REINFORCEMENT LAYER NUMBERING.



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

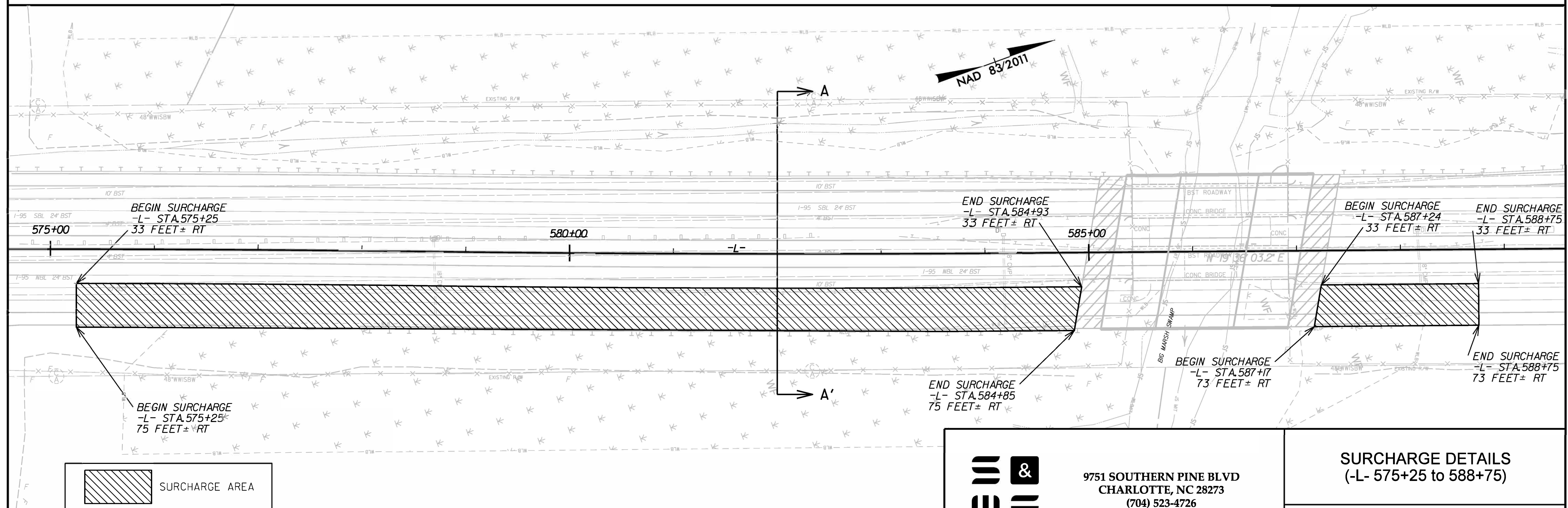
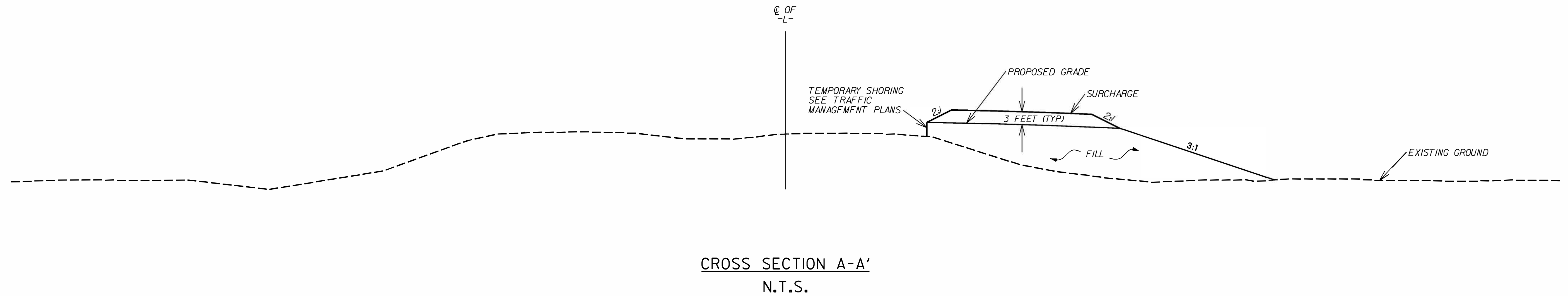
**GEOTECHNICAL
ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.02
STANDARD TEMPORARY WALL SHEET 3 OF 3
DATE: 11-19-13


PROJECT REFERENCE NO. I-5987B		SHEET NO. 2G-5
GEOTECHNICAL ENGINEER  Stacie E. Mitchell SIGNATURE		ENGINEER DATE 03/31/2022

NOTES:
 1. WAITING PERIOD BEGINS AFTER INSTALLING EMBANKMENT AND SURCHARGE.
 2. FOR SURCHARGE, SEE SECTION 235-3 (E) OF STANDARD SPECIFICATIONS

SURCHARGE CONFIGURATION					
STATIONS		OFFSET RANGE	LINE	SURCHARGE HEIGHT	ESTIMATED WAITING PERIOD
FROM	TO				
575+25	584+93	33 FEET± RT TO 75 FEET± RT	-L-	3 FEET	8 MONTHS
587+17	588+75	33 FEET± RT TO 73 FEET± RT	-L-	3 FEET	8 MONTHS




 SURCHARGE AREA

 9751 SOUTHERN PINE BLVD
 CHARLOTTE, NC 28273
 (704) 523-4726

SURCHARGE DETAILS
(-L- 575+25 to 588+75)

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

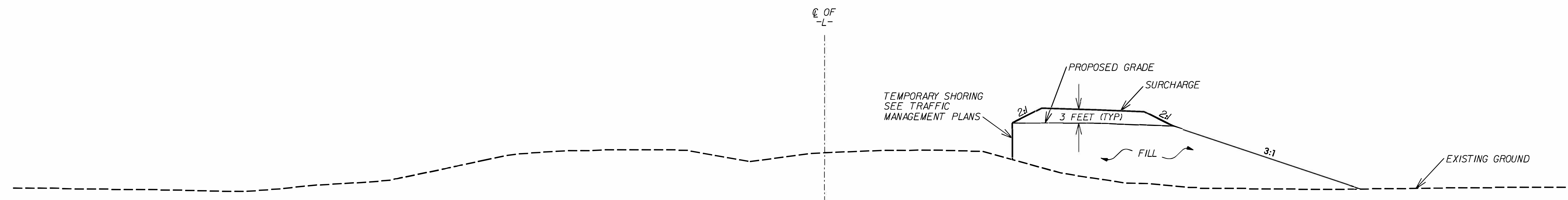
PREPARED BY: N. BRADLEY DATE: 02/2022
 REVIEWED BY: S. MITCHELL DATE: 02/2022

PROJECT REFERENCE NO. I-5987B		SHEET NO. 2G-6
GEOTECHNICAL ENGINEER  Stacie E. Mitchell <small>03/31/2022</small>		ENGINEER
<small>DATE</small>		<small>DATE</small>

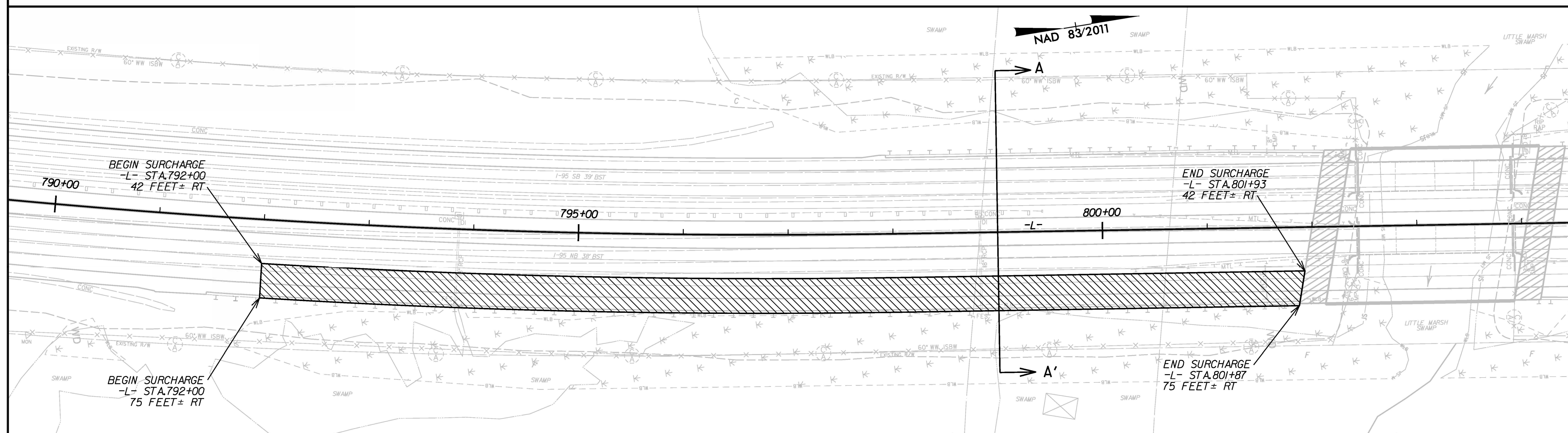
NOTES:

1. WAITING PERIOD BEGINS AFTER INSTALLING EMBANKMENT AND SURCHARGE.
2. FOR SURCHARGE, SEE SECTION 235-3 (E) OF STANDARD SPECIFICATIONS

SURCHARGE CONFIGURATION					
STATIONS		OFFSET RANGE	LINE	SURCHARGE HEIGHT	ESTIMATED WAITING PERIOD
FROM	TO				
792+00	801+93	42 FEET± RT TO 75 FEET± RT	-L-	3 FEET	7 MONTHS



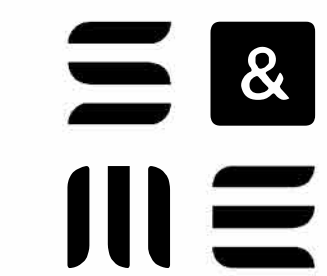
CROSS SECTION A-A'
N.T.S.



	SURCHARGE AREA
---	----------------

PREPARED BY: N. BRADLEY DATE: 02/2022
 REVIEWED BY: S. MITCHELL DATE: 02/2022


PLAN VIEW FOR SURCHARGE



9751 SOUTHERN PINE BLVD
 CHARLOTTE, NC 28273
 (704) 523-4726

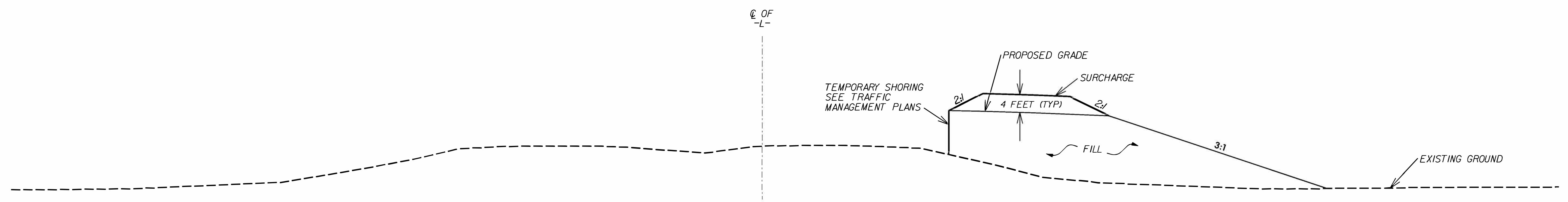
SURCHARGE DETAILS
(-L- 792+00 to 801+93)

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

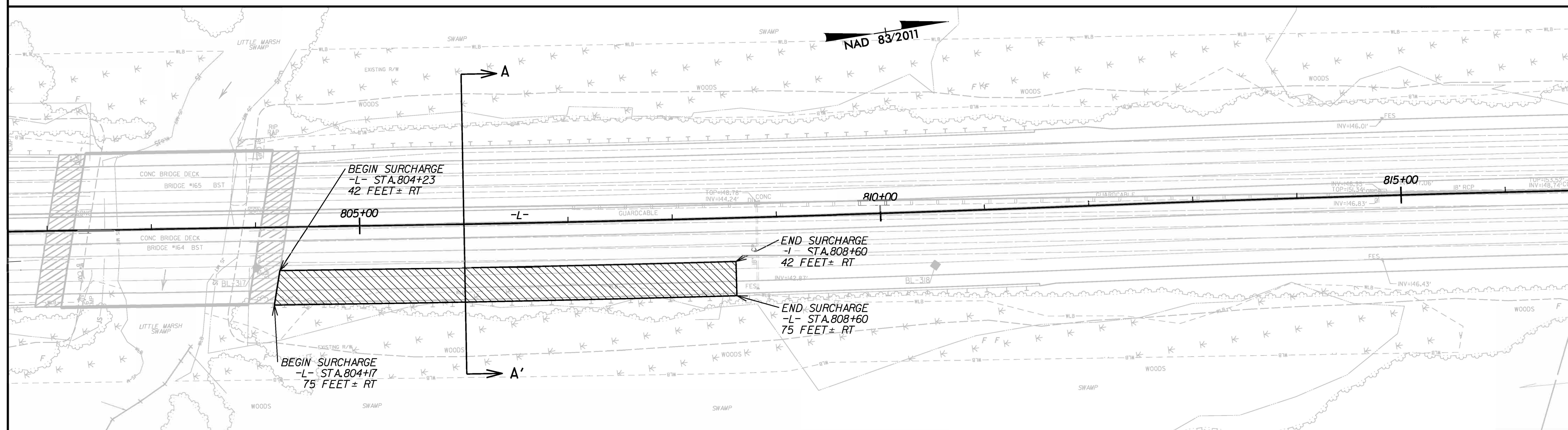
PROJECT REFERENCE NO. I-5987B	SHEET NO. 2G-7
GEOTECHNICAL ENGINEER  State E. Mitchell 03/31/2022	ENGINEER

NOTES:
 1. WAITING PERIOD BEGINS AFTER INSTALLING EMBANKMENT AND SURCHARGE.
 2. FOR SURCHARGE, SEE SECTION 235-3 (E) OF STANDARD SPECIFICATIONS

SURCHARGE CONFIGURATION					
STATIONS		OFFSET RANGE	LINE	SURCHARGE HEIGHT	ESTIMATED WAITING PERIOD
FROM	TO				
804+17	808+60	42 FEET± RT TO 75 FEET± RT	-L-	4 FEET	12 MONTHS




CROSS SECTION A-A'
N.T.S.



 SURCHARGE AREA

PLAN VIEW FOR SURCHARGE




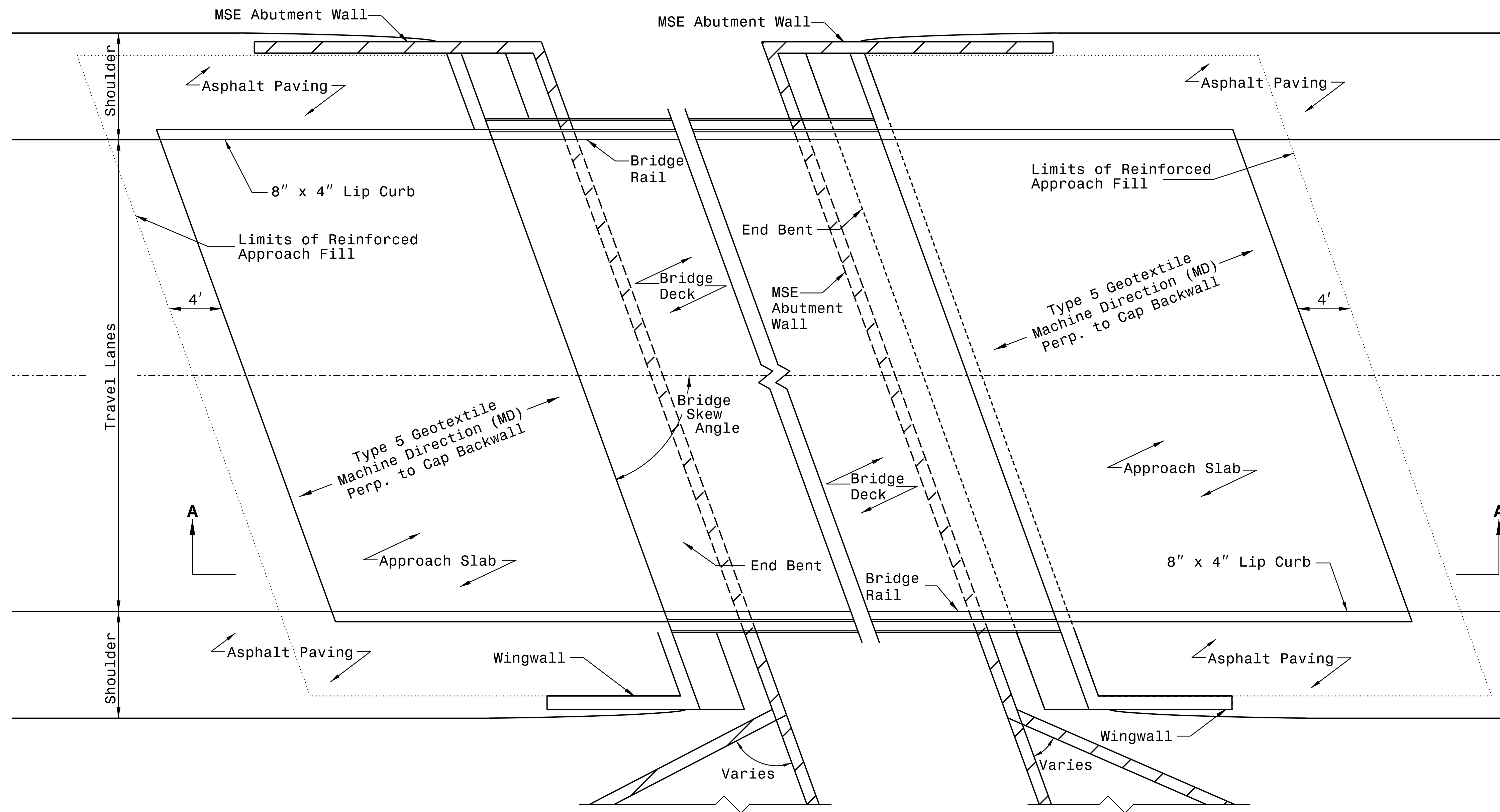
9751 SOUTHERN PINE BLVD
 CHARLOTTE, NC 28273
 (704) 523-4726

SURCHARGE DETAILS
(-L- 804+17 to 808+60)

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

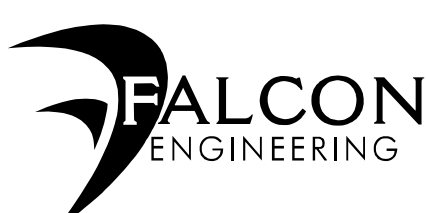
PREPARED BY: N. BRADLEY DATE: 02/2022
 REVIEWED BY: S. MITCHELL DATE: 02/2022

PROJECT REFERENCE NO. I-5987B	SHEET NO. 2G-8
GEOTECHNICAL ENGINEER  SEAL 048207 ENGINEER	ENGINEER
Designed by: <i>Stephen C. Crockett</i> DATE: 04/06/2022	SIGNATURE: _____ DATE: _____
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

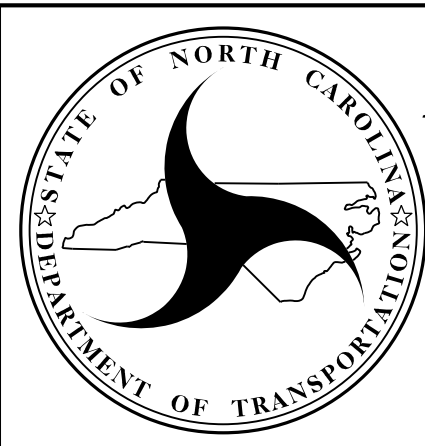


**PLAN VIEW
APPROACH SLAB**

PREPARED BY: S. CROCKETT	DATE: 03/2022
REVIEWED BY: J. HAMM	DATE: 03/2022



FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
CARY, NC 27513
PHONE: 919.871.0800
www.falconengineers.com



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

**SPECIAL BRIDGE APPROACH FILLS
SHEET 1 OF 3**

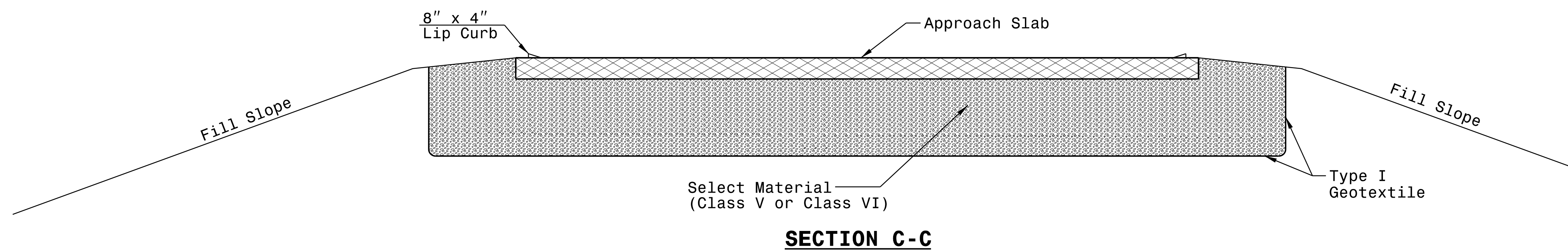
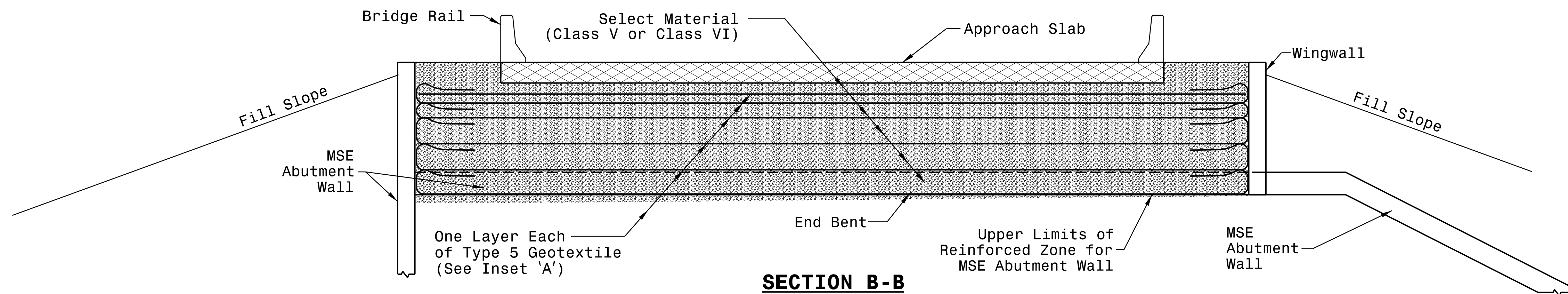
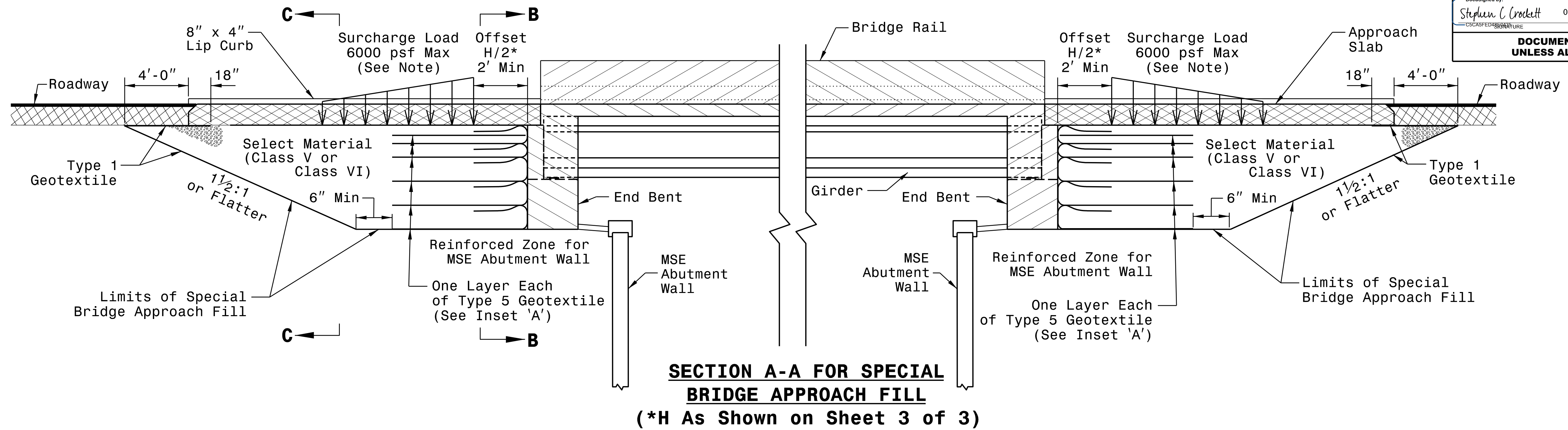
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		



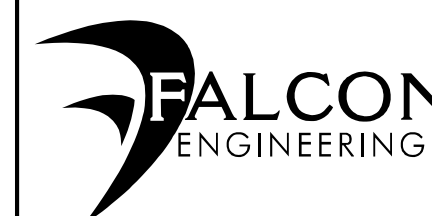
Designed by: Stephen C. Crockett 04/06/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

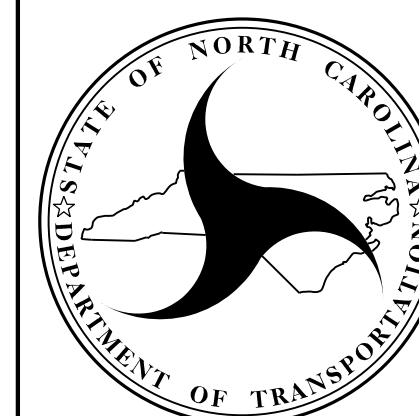
NOTE: Temporary geotextile walls are designed for a maximum eccentric surcharge pressure of 6000 psf for the offset shown. Surcharge loads from construction equipment, e.g., cranes that exceed 6000 psf are the Contractor's responsibility.



PREPARED BY: S. CROCKETT DATE: 03/2022
REVIEWED BY: J. HAMM DATE: 03/2022



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PHONE: 919.871.0800
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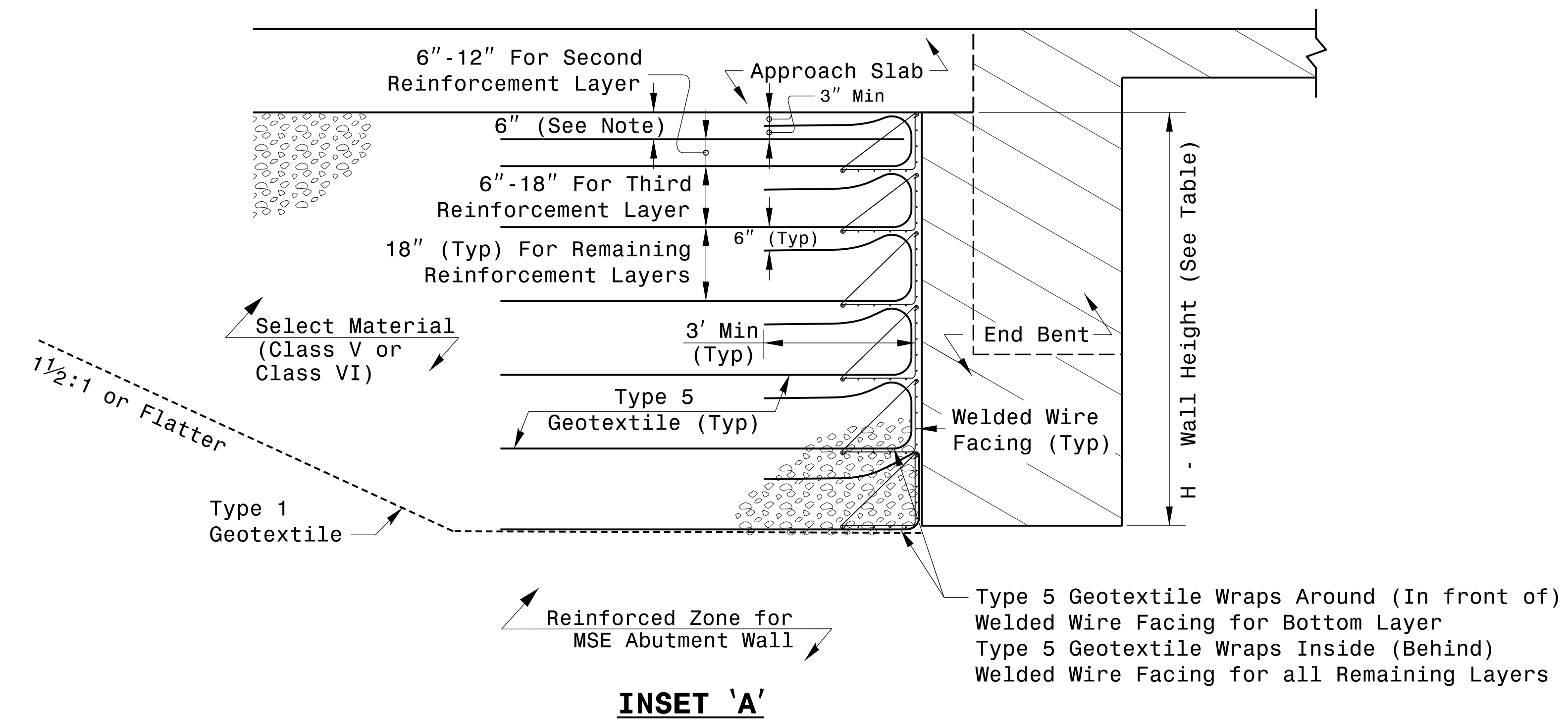


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
**GEOTECHNICAL
ENGINEERING UNIT**

SPECIAL BRIDGE APPROACH FILLS
SHEET 2 OF 3

REVISIONS

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



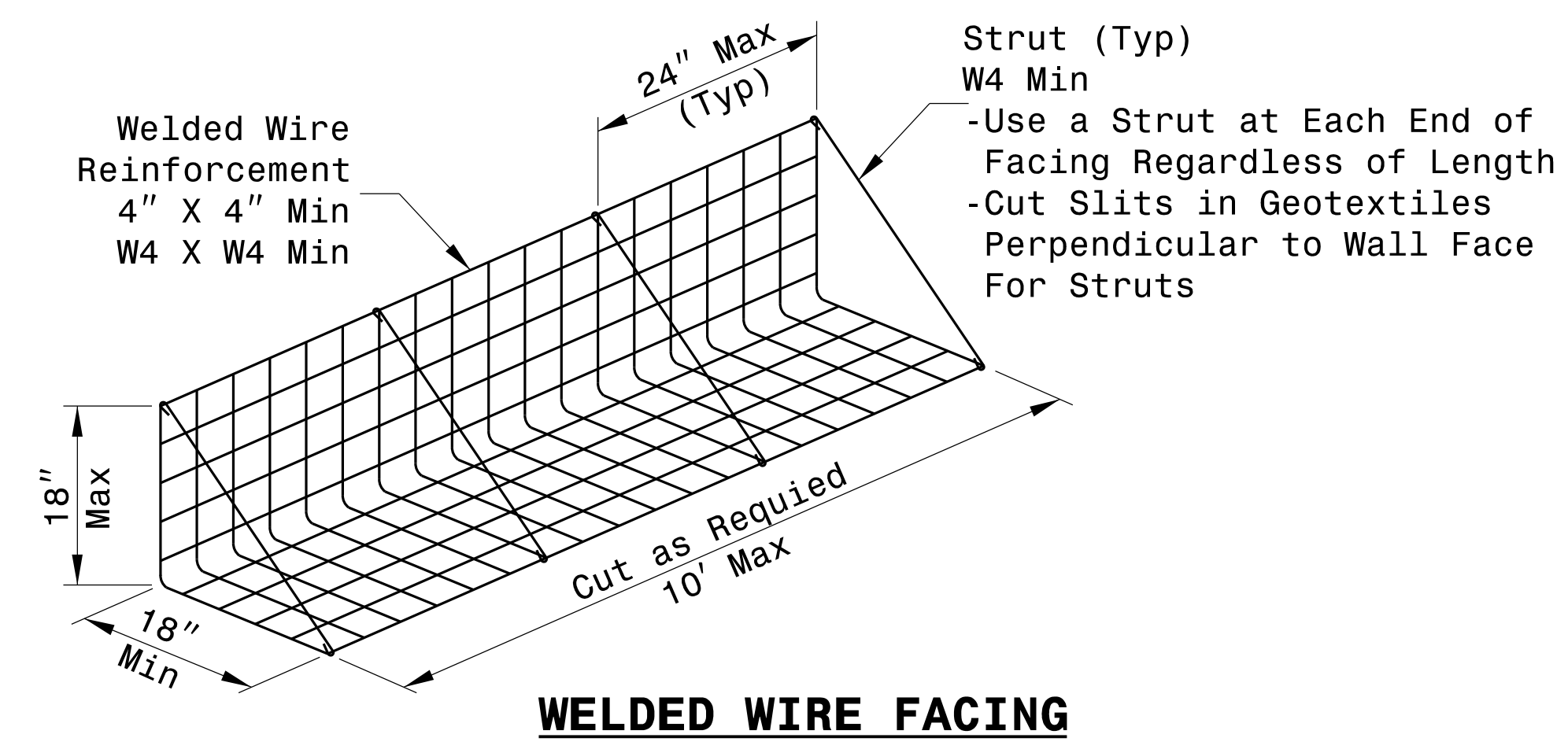
INSET 'A'

NOTE: Place top (first) reinforcement layer 6" below top of wall regardless of vertical spacing for underlying reinforcement layers. As shown in insets above, it is not necessary to wrap the top layer of geotextile reinforcement at the wall face.

NOTE: Use temporary geotextile wall to construct approach embankments to finished grade before observing waiting periods, driving bridge foundation piles, or constructing end bent caps.

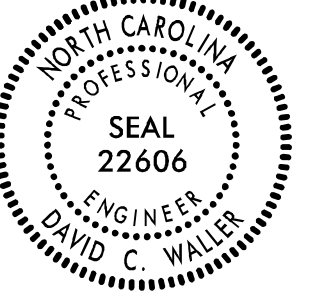
TEMPORARY GEOTEXTILE WALL DETAILS

GEOTEXTILE REINFORCEMENT (TYPE 5 GEOTEXTILE)		
WALL HEIGHT H (ft)	REINF. LENGTH L (ft)	WIDE WIDTH TENSILE STRENGTH @ ULTIMATE (MD) (lb/ft)
< 8	8	5000
8 TO 12	= H	

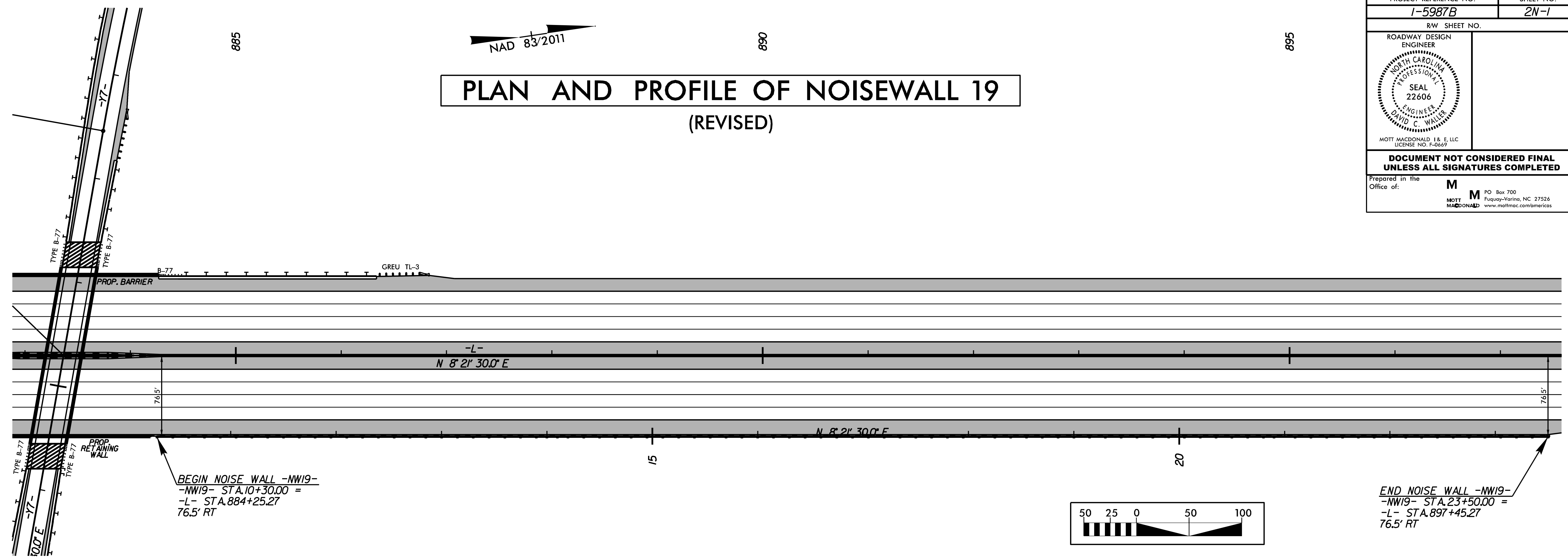


WELDED WIRE FACING

8/17/99
 4/28/2002
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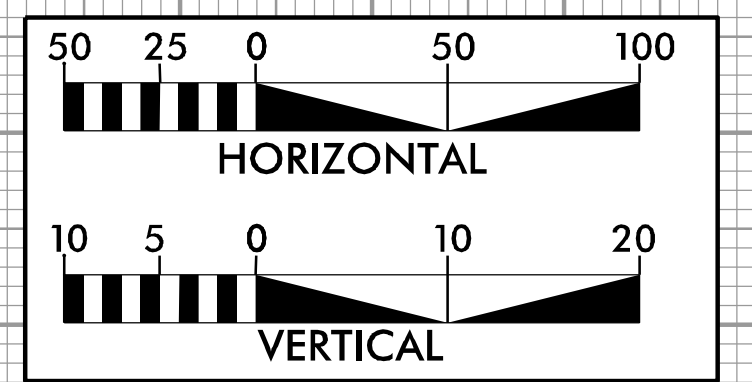
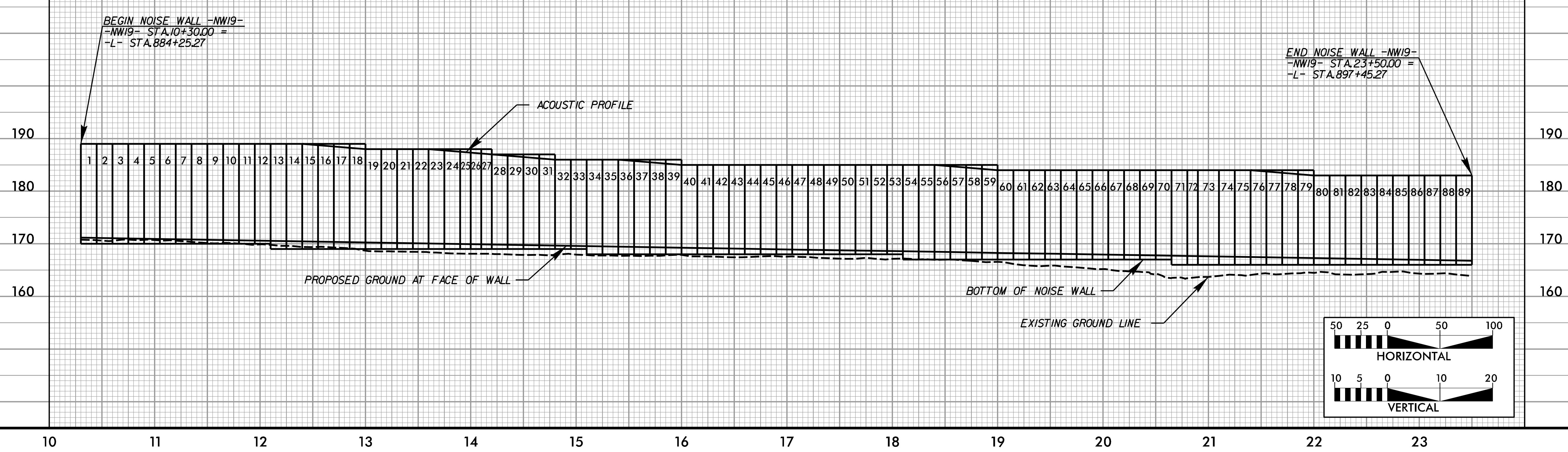
PROJECT REFERENCE NO. 1-5987B	SHEET NO. 2N-1
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
	
MOTT MACDONALD I & E, LLC LICENSE NO. F-0669	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared in the Office of:	M PO Box 700 Fuquay-Varina, NC 27526 MOTT MACDONALD www.mottmac.com/america

NAD 83/2011
PLAN AND PROFILE OF NOISEWALL 19
 (REVISED)



NOISE WALL 19 DESIGN DATA (REVISED)

PANEL NUMBER	1-18	19-24	25-27	28-31	32-39	40-59	60-71	72	73	74-79	80-89
TOP ELEVATION	189'	188'	188'	187'	186'	185'	184'	184'	184'	184'	183'
PANEL WIDTH	15'	15'	10'	15'	15'	15'	15'	10'	20'	15'	15'



DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK
 IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
PHASE I LEFT					
-L- SBL 495+00.00 TO 518+00.00	994		5,385	4,391	
-L- SBL 575+43.00 TO 585+24.00	601	6,260	12,885	12,704	6,680
-L- SBL 587+04.00 TO 590+00.00			2,153		2,153
-Y4- 20+00.00 TO 23+94.11			29,404	29,404	
-SR10- 10+18.00 TO 36+29.49	4,784		2,199		2,585
-Y1BRPADET- 13+47.77 TO 18+55.00	316		2,865	2,549	
-L- SBL 714+58.00 TO 724+00.00	51		2,355	2,304	
-Y1B- 18+00.00 TO 24+00.00	120		2,163	2,043	
-Y1B- 25+60.00 TO 26+25.00	3		515	512	
-Y1B- 26+25.00 TO 28+32.95	1		17,130	17,129	
-Y1BRPA- 10+00.00 TO 16+48.00			3,630	3,630	
-Y1BRPA- 16+48.00 TO 21+00.00			8,344	8,344	
-Y1BRPA- 21+00.00 TO 24+79.50	4		6,321	6,317	
-Y1BRPB- 10+00.00 TO 15+44.00			5,520	5,520	
-Y1BRPB- 15+44.00 TO 28+06.34	2,885		33,614	30,729	
-Y1BRAB1- 10+00.00 TO 13+89.50	106		8,983	8,877	
-Y6- 14+50.00 TO 29+32.44	685		32,336	31,651	
-XOVER_Y6- 11+59.74 TO 18+15.61	829		2,960	2,131	
-Y7- 18+00.00 TO 28+85.72	1,275		33,939	32,664	
SUBTOTAL	12,654	6,260	212,701	203,052	9,265
PHASE I RIGHT					
-L- NBL 495+00.00 TO 525+00.00	5,822		6,061	1,767	1,528
-L- NBL 525+00.00 TO 555+00.00	6,555		5,218		1,337
-L- NBL 555+00.00 TO 561+00.00	224		929	705	
-L- NBL 573+50.00 TO 585+24.00	185	8,394	22,229	22,044	8,394
-L- NBL 587+04.00 TO 599+00.00	1,433	1,424	15,733	14,300	1,424
-L- NBL 611+00.00 TO 616+14.60	44		19,198	19,154	
-L- NBL 618+31.89 TO 619+00.00	8		1,959	1,951	
-Y4- 25+59.61 TO 31+37.00			32,445	32,445	
-Y21- 10+00.00 TO 11+40.00	511				511
-Y1BRPDDET- 12+66.03 TO 22+71.92	170		11,959	11,789	
-L- NBL 683+29.00 TO 694+87.00	1,073		1,558	485	
-L- NBL 716+00.00 TO 726+81.00	2,816		8,370	5,554	
-Y1B- 30+69.12 TO 33+20.00			22,579	22,579	
-Y1B- 34+80.00 TO 42+00.00	106		13,934	13,828	
-SR3- 10+00.00 TO 11+00.00			1,123	1,123	
-SR3- 11+00.00 TO 18+00.00			21,880	21,880	
-SR3- 18+00.00 TO 25+00.00	72		5,380	5,308	
-SR3- 25+00.00 TO 41+00.00	4,585		4,190		395
-SR3- 41+00.00 TO 46+50.00	561		415		146
-Y1BRPC- 10+00.00 TO 15+67.00	5,252		889		4,174
-Y1BRPC- 15+67.00 TO 22+00.00	2,282		10,661	8,379	
-Y1BRPC- 22+00.00 TO 24+13.94			10,828	10,828	
-Y1BRPD- 10+00.00 TO 14+61.00	1,901		2,550	649	
-Y1BRPD- 14+61.00 TO 25+70.00	2,990		17,320	14,330	
-Y1BRPD- 25+70.00 TO 26+17.63			244	244	
-Y1BRAB2- 10+00.00 TO 13+89.50			20,993	20,993	
-L- NBL 797+00.00 TO 802+24.93		6,445	16,138	16,138	6,445
-L- NBL 804+04.93 TO 808+60.00		6,147	17,133	17,133	6,147
-Y6- 31+23.77 TO 46+50.00	1,372		61,481	60,685	576
-Y7- 30+55.72 TO 47+00.00	2,190		53,116	50,926	
SUBTOTAL	40,152	22,410	406,513	375,217	31,077
PHASE I MEDIAN					
-L- MED 634+15.00 TO 650+00.00	124		7,046	6,922	
SUBTOTAL	124	0	7,046	6,922	0

**DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA**

**SUMMARY OF EARTHWORK
 IN CUBIC YARDS**

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
PHASE II LEFT					
-L- SBL 518+00.00 TO 548+00.00	1,398		10,905	9,507	
-L- SBL 548+00.00 TO 575+43.00	4,645		9,708	5,063	
-L- SBL 596+52.00 TO 600+00.00	114		1,091	977	
-L- SBL 633+61.00 TO 643+00.00	855		2,675	1,820	
-Y4- 13+00.00 TO 22+00.00	82		11,104	11,022	
-Y4DR1- 10+12.74 TO 11+00.00	7		616	609	
-Y4DR2- 10+12.74 TO 11+00.00	9		120	111	
-Y5- RT 29+50.00 TO 39+51.18	314		390	76	
-Y5- LT 29+50.00 TO 38+63.19	68		1,839	1,771	
-Y5RPB- 10+00.00 TO 27+14.40	1,698	104	16,146	14,552	208
-SR4- 74+00.00 TO 81+77.38	434		5,468	5,034	
-SR4DR1- 10+15.00 TO 10+88.00	7		133	126	
SUBTOTAL	9,631	104	60,195	50,668	208
PHASE II RIGHT					
-L- NBL 561+00.00 TO 573+50.00	3,323		645		2,678
-L- NBL 599+00.00 TO 611+00.00	1,063		25,215	24,152	
-L- NBL 619+00.00 TO 627+30.00	27		57,795	57,768	
-L- NBL 627+30.00 TO 650+00.00	1,026		25,814	24,788	
-Y4- 28+00.00 TO 38+02.70	262		17,439	17,177	
-Y5- RT 41+47.80 TO 48+54.36	806		310		496
-Y5- LT 41+10.00 TO 48+54.36	131		1,094	963	
-Y5RPC- 16+31.15 TO 25+86.38	1,166		13,148	11,982	
-Y5RPD- 14+72.31 TO 25+33.54	3,039		66,969	65,923	1,993
-SR5- 10+12.07 TO 16+00.00	10		14,161	14,151	
-L- NBL 785+00.00 TO 797+00.00	1,625	2,047	15,020	13,395	2,047
-L- NBL 808+60.00 TO 838+50.00	17,487		14,425	1,995	8,119
-L- NBL 838+50.00 TO 868+50.00	8,158		7,125		1,033
-L- NBL 868+50.00 TO 898+50.00	14,021		4,239		9,782
-L- NBL 898+50.00 TO 915+00.00	4,193	2,768	6,238	2,045	2,768
SUBTOTAL	56,337	4,815	269,637	234,339	28,916
PHASE II MEDIAN					
-L- MED 650+00.00 TO 680+00.00	178		38,515	38,337	
-L- MED 680+00.00 TO 710+00.00	472		8,223	7,751	
-L- MED 710+00.00 TO 740+00.00	255		16,151	15,896	
-L- MED 740+00.00 TO 755+00.00	17		16,589	16,572	
-L- MED 755+00.00 TO 785+00.00	357		10,350	9,993	
SUBTOTAL	1,279	0	89,828	88,549	0
PHASE III LEFT					
-L- SBL 643+00.00 TO 650+00.00	449		1,610	1,161	
-L- SBL 650+00.00 TO 689+00.00	2,623		10,996	8,373	
-L- SBL 689+00.00 TO 694+33.00	3		655	652	
-L- SBL 694+33.00 TO 714+58.00	4,773		8,730	3,957	
-L- SBL 724+00.00 TO 755+00.00	1,526		1,153		373
-L- SBL 755+00.00 TO 774+50.00	2,385		1,548		837
SUBTOTAL	11,759	0	24,692	14,143	1,210

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK
 IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
PHASE III RIGHT					
-L- NBL 583+05.00 TO 585+24.00	0		689	689	
-L- NBL 587+04.00 TO 587+60.00	0		248	248	
-L- NBL 650+00.00 TO 683+29.00	2,450		1,264		1,186
-L- NBL 694+97.00 TO 716+00.00	2,297		8,416	6,119	
-L- NBL 726+81.00 TO 755+00.00	1,107		3,455	2,348	
-L- NBL 755+00.00 TO 785+00.00	8,385		3,099		7,360
-L- NBL MED 785+00.00 TO 802+24.93	112		6,653	6,541	
-L- NBL MED 804+04.93 TO 834+00.00	523		8,628	8,105	
-L- NBL MED 834+00.00 TO 864+00.00	481		1,363	882	
-L- NBL MED 864+00.00 TO 894+00.00	1,313		1,705	392	
-L- NBL MED 894+00.00 TO 915+00.00	688		364		324
SUBTOTAL	17,356	0	35,884	25,324	8,870
PHASE III MEDIAN					
-L- MED 495+00.00 TO 525+00.00	222		15,000	14,778	
-L- MED 525+00.00 TO 555+00.00	329		9,141	8,812	
-L- MED 555+00.00 TO 583+05.00	694		3,134	2,440	
-L- MED 587+60.00 TO 616+14.60	378		19,221	18,843	
-L- MED 618+31.89 TO 634+15.00	30		27,961	27,931	
SUBTOTAL	1,653	0	74,457	72,804	0
PHASE IV LEFT					
-L- SBL 495+00.00 TO 518+00.00	388		1,649	1,261	
-L- SBL 575+43.00 TO 585+24.00	197		3,158	2,961	
-L- SBL 587+04.00 TO 616+14.60	3,567		36,599	33,032	
-L- SBL 618+31.89 TO 634+15.00	2,831		41,884	39,053	
-Y5RPA-14+41.41 TO 23+82.07	1,225	169	17,100	16,937	1,231
-Y5-38+63.19 TO 41+34.64	6,701		1,280		5,421
-Y1BRPADET-13+47.77 TO 18+55.00	2,292		395		1,897
-L- SBL 774+50.00 TO 802+24.93	4,708	4,193	24,693	20,242	4,450
-L- SBL 804+04.93 TO 834+00.00	7,577	4,301	31,708	24,131	4,301
-L- SBL 834+00.00 TO 864+00.00	9,205		5,538		3,667
-L- SBL 864+00.00 TO 894+00.00	7,713		7,629		84
-L- SBL 894+00.00 TO 915+00.00	4,516	2,926	8,043	3,527	2,926
SUBTOTAL	50,920	11,589	179,676	141,144	23,977
PHASE IV RIGHT					
-L- NBL 495+00.00 TO 525+00.00	874		2,014	1,140	
-L- NBL 525+00.00 TO 555+00.00	1,031		1,100	69	
-L- NBL 555+00.00 TO 561+00.00	53		968	915	
-Y5- MED 41+34.64 TO 43+51.16	14		1,516	1,502	
-Y1BRPADET- 13+47.77 TO 18+55.00	1,103		395		708
(REMOVAL)					
-Y1BRPDDDET- 12+66.03 TO 22+71.92	3,883		213		3,670
(REMOVAL)					
-XOVER_Y6- 11+59.74 TO 18+15.61	21				21
(REMOVAL)					
SUBTOTAL	6,979	0	6,206	3,626	4,399
PROJECT SUBTOTAL	208,844	45,178	1,366,835	1,215,788	107,922
ADDITIONAL UNDERCUT		6,000	7,500	7,500	6,000
MATERIAL FOR SHOULDER CONSTRUCTION			34,099	34,099	
WASTE IN LIEU OF BORROW				-54,628	-54,628
LOSS DUE TO CLEARING & GRUBBING	-23,000			23,000	
SELECT GRANULAR IN LIEU OF BORROW			-100,875	-100,875	
SURCHARGE	19,000		19,000	19,000	19,000
PROJECT TOTAL	204,844	51,178	1,326,559	1,143,884	78,294
5% TO REPLACE BORROW				57,220	
GRAND TOTAL	204,844	51,178	1,326,559	1,201,104	78,294
SAY	216,000	54,000		1,262,000	

NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGNER. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

PAVEMENT STRUCTURE VOLUME 139,750 CY

EST. DDE = 26,230 CY

EST. SHALLOW UNDERCUT = 1,000 CY

CLASS IV SUBGRADE STABILIZATION = 1,900 TONS

SELECT GRANULAR MATERIAL, CLASS III (TO REPLACE UNDERCUT) = 80,700 CY

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

SUMMARY OF
 SHOULDER BERM GUTTER

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LENGTH
-L-	511+90.00	514+27.50	RT	237.50
-L-	513+73.00	516+10.50	LT	237.50
-L-	528+65.00	531+02.50	RT	237.50
-L-	529+70.00	532+07.50	LT	237.50
-L-	545+39.00	547+14.00	LT	175.00
-L-	546+35.00	548+10.00	RT	175.00
-L-	553+90.46	556+27.50	RT	237.04
-L-	555+88.00	558+25.50	LT	237.50
-L-	570+54.37	572+91.87	RT	237.50
-L-	574+39.73	585+11.08	LT	1071.35
-L-	577+98.76	584+85.74	RT	686.98
-L-	587+16.52	587+97.38	RT	80.86
-L-	587+42.26	590+04.37	LT	262.11
-L-	599+17.50	600+90.00	RT	172.50
-L-	631+85.00	633+57.50	LT	172.50
-Y4-	21+50.00	23+77.24	RT	227.24
-Y4-	23+65.24	23+77.24	LT	12.00
-Y4-	25+71.08	25+94.00	LT	22.92
-Y4-	25+71.08	32+74.15	RT	703.07
-Y5RPB-	12+50.00	17+00.00	LT	450.00
-Y5RPD-	11+56.31	17+12.38	LT	556.07
-Y5RPD-	20+05.15	22+50.00	LT	244.85
-L-	677+32.00	679+25.00	LT	389.00
-L-	675+10.00	676+94.00	RT	184.00
-Y1B-	26+22.00	28+31.00	RT	259.00
-Y1B-	31+16.00	32+83.00	RT	167.00
-Y1B-	35+04.00	36+68.00	RT	157.00
-Y1BRPA-	20+94.00	23+69.00	RT	275.00
-Y1BRPB-	23+96.00	27+11.00	LT	325.00
-Y1BRPC-	20+00.00	22+98.00	RT	298.00
-SR3-	18+46.00	22+50.00	RT	404.00
-L-	658+10.00	660+35.00	LT	225.00
-Y1BRPA-	10+41.00	11+34.00	RT	93.00
-Y1BRPC-	10+55.00	11+47.00	RT	92.00
-Y1B-	26+20.00	27+86.00	LT	166.00
-Y1B-	35+11.00	36+68.00	RT	157.00
-L-	757+95.53	760+05.90	RT	210.37
-L-	762+36.03	764+45.90	LT	209.87
-L-	791+49.35	801+93.31	RT	1043.96
-L-	797+93.83	802+19.05	LT	425.22
-L-	804+10.86	811+50.00	RT	739.14
-L-	804+36.55	811+50.64	LT	714.09
-L-	829+12.50	830+75.00	RT	162.50
-L-	867+90.00	869+52.50	LT	162.50
-L-	880+44.51	882+50.77	RT	206.26
-L-	884+22.42	886+29.18	LT	206.76
-L-	900+02.82	902+65.32	RT	262.50
-L-	902+01.54	904+64.04	LT	262.50
-L-	908+77.50	910+40.00	RT	162.50
-Y6-	22+06.00	23+76.54	RT	170.54
-Y6-	22+67.52	24+38.79	RT	171.27
-Y6-	25+20.90	29+10.06	LT	389.16
-Y6-	27+18.16	29+27.08	RT	208.92
-Y6-	31+29.13	38+74.61	LT	745.48
-Y6-	31+51.03	39+30.88	RT	779.85
-Y7-	23+28.84	28+64.39	RT	535.55
-Y7-	27+80.00	28+58.75	LT	78.75
-Y7-	30+77.05	33+03.00	LT	225.95
-Y7-	30+82.69	37+70.44	RT	687.75
I-5987B			TOTAL	18626.88
I-5987B			SAY	18820

SUMMARY OF
 CONCRETE BARRIER, TYPE T, T1

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LENGTH, TYPE T	LENGTH, TYPE T1
-L-	495+00.00	524+50.00	CL	2950.00	
-L-	524+50.00	564+00.00	CL		3950.00
-L-	564+00.00	573+06.41	CL	906.41	
-L-	574+25.33	585+00.02	CL	1074.69	
-L-	587+27.98	615+91.27	CL	2863.29	
-L-	618+55.30	650+00.00	CL		3144.70
-L-	650+00.00	655+00.00	CL	500.00	
-L-	655+00.00	701+92.00	CL		4692.00
-L-	703+60.71	746+50.00	CL		4289.29
-L-	746+50.00	760+56.29	CL	1406.29	
-L-	761+85.31	778+00.00	CL	1614.69	
-L-	778+00.00	800+00.00	CL		2200.00
-L-	800+00.00	802+01.02	CL	201.02	
-L-	804+28.98	882+75.29	CL	7846.31	
-L-	883+98.51	910+50.00	CL	2651.49	
-L-	910+50.00	915+07.00	CL		457.00
I-5987B			TOTAL	22014.19	18732.99
I-5987B			SAY	22235	18925

SUMMARY OF
 MILLING, 1.5"

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SQUARE YARDS
Y1B	18+00.00	25+60.00	CL	3994.06
Y1B	38+00.00	42+00.00	CL	1551.94
-Y5-	29+50.00	39+83.21	CL	5370.48
-Y5-	40+50.00	41+99.55	RT	147.40
-Y5-	42+38.42	48+54.36	CL	4039.06
-Y- U-2519AAAB (Milling out Already Constructed Rumble Strips)	22+89.87	238+65.00	LT	9588.95
-Y- U-2519AAAB (Milling out Already Constructed Rumble Strips)	22+89.87	238+65.00	LT	9588.95
I-5987B			TOTAL	34280.83
I-5987B			SAY	34630

SUMMARY OF
 CONCRETE BARRIER, SINGLE FACED

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LENGTH
-L-	572+91.87	574+39.73	LT	148.00
-L-	572+91.87	574+39.87	RT	148.00
-L-	701+05.00	702+90.00	RT	185.00
-L-	702+60.00	704+50.00	LT	190.00
-L-	760+87.78	762+36.02	LT	148.00
-L-	760+05.90	761+54.14	RT	148.00
-L-	882+77.93	884+22.42	LT	144.00
-L-	882+50.77	897+45.27	RT	1495.00
I-5987B			TOTAL	2606.00
I-5987B			SAY	2640

SUMMARY OF BREAKING
 EXISTING ASPHALT PAVEMENT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SQUARE YARDS
-L-	578+50.00	585+34.55	LT	1728.92
-L-	580+50.00	585+23.93	RT	1144.26
-L-	587+10.58	616+15.96	LT	8246.28
-L-	587+00.08	594+00.00	RT	1692.18
-L-	600+00.00	615+91.11	RT	5040.63
-L-	618+46.50	632+50.00	RT	4678.45
-L-	618+71.41	633+75.00	LT	4637.51
-L-	643+00.00	650+00.00	LT	1817.65
-Y5RPA-	20+47.33	21+50.00	RT	64.17
-Y5RPB-	19+01.28	22+50.00	CL	789.81
-Y5RPC-	19+04.40	23+00.00	CL	646.49
-Y5RPD-	19+11.01	24+00.00	CL	1092.18
-SR4-	79+82.56	81+40.71	CL	459.07
-Y4-	16+00.00	18+06.60	CL	499.84
-Y4-	30+31.75	36+00.00	CL	1837.13
-SR5-	10+12.07	14+25.00	CL	1180.69
L	794+50.00	801+42.00	LT	1803.52
L	794+50.00	801+42.00	RT	1781.17
L	804+90.00	812+00.00	LT	1804.94
L	804+94.00	812+00.00	RT	1832.36
I-5987B			TOTAL	42777.24
I-5987B			SAY	43210

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

SUMMARY OF REMOVAL
 EXISTING ASPHALT PAVEMENT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SQUARE YARDS
-L-	495+00.00	585+41.12	RT	10837.42
-L-	495+00.00	585+41.06	RT	3831.63
-L-	495+00.00	585+41.55	LT	3555.55
-L-	495+00.00	585+40.66	LT	10634.40
-L-	585+20.14	585+41.10	RT	45.67
-L-	585+30.57	585+41.47	LT	21.38
-L-	586+92.62	587+03.82	RT	22.83
-L-	586+92.97	587+14.57	LT	49.44
-L-	586+91.94	606+58.78	RT	1946.85
-L-	586+92.16	616+17.11	RT	1177.95
-L-	586+93.00	616+28.78	LT	1060.71
-L-	586+92.97	604+89.52	LT	1332.62
-L-	604+67.73	616+04.70	RT	1398.03
-L-	604+68.22	616+40.01	LT	1257.18
-L-	615+80.62	616+04.70	RT	70.10
-L-	616+15.96	616+39.02	LT	57.90
-L-	617+88.11	618+46.50	RT	140.36
-L-	618+21.52	618+80.96	LT	150.27
-L-	618+21.52	630+02.27	LT	1376.32
-L-	618+10.36	650+00.00	LT	1250.03
-L-	617+97.76	650+00.00	RT	1273.90
-L-	617+87.03	628+75.63	RT	1396.28
-L-	629+79.55	650+00.00	LT	2242.30
-L-	625+98.87	650+00.00	RT	2113.34
-Y4-	15+42.21	23+75.88	RT	1560.79
-Y4-	25+65.17	31+45.75	RT	1103.60
-Y4-	37+01.64	37+06.37	RT	20.09
-SR4-	76+43.42	81+38.34	LT	709.33
-SR4-	80+75.24	81+44.86	RT	74.38
-SR5-	10+28.31	10+59.13	RT	2.64
-SR5-	10+32.30	10+52.35	LT	1.33
-SR5-	10+67.37	11+56.21	RT	26.18
-SR5-	10+60.16	11+58.02	LT	31.90
-Y5-	32+03.83	36+27.70	RT	269.65
-Y5-	36+97.47	38+71.07	RT	141.28
-Y5-	36+82.92	38+50.05	LT	86.07
-Y5-	43+79.69	44+75.60	LT	79.85
-Y5-	45+30.44	45+65.90	RT	14.88
-Y5-	46+21.72	46+37.64	RT	2.44
-Y5RAB-	10+00.00	20+19.26	LT	2487.83
-Y5RPA-	12+72.47	23+82.07	CL	3049.94
-Y5RPB-	14+89.60	20+36.68	RT	1077.64
-Y5RPB-	20+56.86	27+07.94	CL	1746.78
-Y5RPC-	16+63.67	25+86.38	CL	2310.90
-Y5RPC-	15+88.56	25+14.14	RT	1291.22
L	650+00	696+77	LT	9955.50
L	695+90	713+49	LT	2209.01
L	712+26	755+00	LT	5188.38
L	650+00	755+00	MED LT	4272.81
L	650+00	755+00	MED RT	6718.99
L	650+00	693+52	RT	5188.47
Y1RPA	18+39	24+33	CL	1533.23
SR3	23+75	41+75	CL	3821.97
L	692+43	713+59	RT	2618.74
L	713+69	755+00	RT	4289.54
L	696+46	Y1B 25+60.00	LT	3319.05
I-5987B	COLUMN 1			112446.87

SUMMARY OF WOVEN WIRE FENCE, 47" FABRIC

STATION TO STATION	LT or RT	FABRIC (LF)	END BRACE	CORNER BRACE	LINE BRACE	4" POSTS (EA)	5" POSTS (EA)
-SR4- 75+15 TO 80+90	LT	578.00	2		1	38	7
-L- 572+63 TO 573+46	LT	86.00	2			4	4
-L- 573+85 TO 574+86	LT	110.00	2			6	4
-L- 585+37 TO 585+38	LT	70.00	2		1	1	7
-L- 587+17 TO 587+40	LT	74.00	2			3	4
-Y5RPB- 11+25 TO 19+00	LT.	27.00	2			0	4
-L- 530+90 TO 538+08	RT.	847.46	2		2	55	10
-L- 572+69 TO 573+46	RT.	78.00	2			3	4
-L- 573+85 TO 585+11	RT.	1,193.00	2	1	3	77	16
-L- 586+91 TO -Y5RPC- 21+06	RT.	2,445.00	2	1	8	158	31
-L- 617+96 TO 634+70	RT.	1,756.00	2		6	113	22
-Y5- 38+38 TO 38+98	RT.	50.00	2			1	4
-L- 677+15 TO 677+52	LT	75.00	2			3	4
-L- 677+83.23 TO 67880	LT	120.00	2			6	4
-L- 675+15 TO 674+47.57	RT.	150.00	2			9	4
-L- 676+80.19 TO 677+25	RT.	80.87	2			4	4
-L- 688+28 TO Y1B 23+38	LT	1,796.12	2	2	4	116	22
-Y1B- 20+40 TO 23+09	RT.	293.17	2	1	2	14	13
-Y1B- 23+00 TO L 724+70	LT	1,668.48	2	1	4	109	19
-L- 689+00 TO Y1B 23+34	LT	1,844.69	2	2	4	120	22
-Y1B- 36+72 TO L 727+14	RT.	3,035.43	3		8	200	30
-SR3- 10+23 TO 11+00	RT.	76.70	2			3	4
-L- 759+12.95 TO 760+56.23	RT.	158.01		1		10	3
-L- 760+95.87 TO 761+81.52	RT.	109.18		1		6	3
-L- 760+76.55 TO 761+45.52	LT	97.07		1		5	3
-L- 761+85.16 TO 763+12.50	LT	148.32		1		9	3
-L- 793+50 TO 802+11.79	RT.	912.12		3	2	57	15
-L- 802+43.88 TO 802+38.07	LT	48.12		1		2	3
-L- 804+18.07 TO 810+25	RT.	692.47		3	2	41	15
-L- 803+91.79 TO 804+88.35	LT	97.12		1		5	3
-L- 820+50 TO 841+00	RT.	2,093.29		4	7	131	33
-L- 881+90 TO 883+04.07	RT.	122.81		2	0	5	6
-L- 882+32.25 TO 883+33.59	LT	110.62		1		6	3
-L- 883+39.61 TO 894+50	RT.	1,147.41		3	3	72	18
-L- 883+69.13 TO 884+68.51	LT	108.96		1		6	3
SUBTOTAL		22300				1400	354
I-5987B	SAY	22525				1415	360

SUMMARY OF
 CONCRETE BARRIER TRANSITION SECTIONS

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	EACH
-L-	573+06.41	573+49.12	CL	1
-L-	573+82.62	574+25.33	CL	1
-L-	701+92.29	702+35.00	CL	1
-L-	703+18.00	703+60.71	CL	1
-L-	760+56.29	760+99.00	CL	1
-L-	761+42.60	761+85.31	CL	1
-L-	882+75.29	883+18.00	CL	1
-L-	883+55.80	883+98.51	CL	1
I-5987B TOTAL				8.00
I-5987B SAY				8

SUMMARY OF
 MILLING, 2"

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SQUARE YARDS
-L-	495+00.00	497+25.00	LT	570.38
-L-	517+75.00	527+75.00	LT	2553.28
-L-	531+75.00	536+75.00	LT	1302.00
-L-	595+25.00	597+75.00	LT	645.24
-L-	633+75.00	640+75.00	LT	1827.38
-L-	495+00.00	497+25.00	RT	563.17
-L-	517+75.00	520+25.00	RT	630.02
-L-	523+25.00	527+75.00	RT	1138.99
-L-	530+75.00	535+75.00	RT	1247.40
-L-	548+25.00	551+75.00	RT	870.71
-L-	565+25.00	565+75.00	RT	124.65
-L-	634+25.00	637+25.00	RT	1092.69
L	654+77.37	658+43.96	RT	636.61
L	693+44.28	694+09.89	RT	167.75
L	654+39.24	656+88.56	LT	956.12
-L-	766+00.00	769+00.00	LT	1283.78
-L-	766+00.00	769+00.00	RT	1266.00
-L-	816+50.00	837+00.00	LT	8580.27
-L-	816+50.00	837+00.00	RT	8628.84
-L-	844+00.00	861+00.00	LT	7079.02
-L-	844+00.00	861+00.00	RT	7110.66
-L-	871+00.00	881+50.00	LT	4419.54
-L-	871+00.00	881+50.00	RT	4409.85
-L-	886+50.00	901+00.00	LT	6122.85
-L-	886+50.00	901+00.00	RT	6038.19
-L-	907+50.00	915+00.00	LT	3175.86
-L-	907+50.00	915+00.00	RT	3126.13
I-5987B TOTAL				75567.38
I-5987B SAY				76330

SUMMARY OF REMOVAL
 EXISTING ASPHALT PAVEMENT
 CONTINUED

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	SQUARE YARDS
L	693+27	713+69	RT	10935.54
L	791+50	794+50	LT	791.33
L	791+50	794+50	RT	774.78
L	801+42	802+42	LT	246.36
L	801+42	802+42	RT	250.51
L	803+94	804+94	LT	246.20
L	803+94	804+94	RT	243.97
L	812+00	814+25	LT	592.77
L	812+00	814+25	RT	586.86
L	863+75	869+00	LT	1406.46
L	863+75	869+00	RT	1368.22
Y6	24+23.86	24+93.85	RT	35.84
Y6	28+62.32	29+27.75	RT	105.82
Y6	33+56.03	35+34.82	RT	125.99
Y7	23+06.64	28+13.65	LT	821.53
Y7	34+69.21	35+21.35	LT	22.95
SUBTOTAL			COLUMN 1	112446.87
			TOTAL	131002.01
I-5987B			SAY	132315

COMPUTED BY: MLH DATE: 09-13-21 Rev 4-20-22
CHECKED BY: KBA DATE: 3-15-22 Rev 4-28-22
WHT

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO. I-5987B SHEET NO. 3D-15

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

Main data table with columns for Line & Station, Offset, Structure Number, Invert Elevations, Pipe Specifications, Quantities for Drainage Structures, Frame, Grates, and Hoop, and Remarks. Includes a SHEET TOTALS row at the bottom.

