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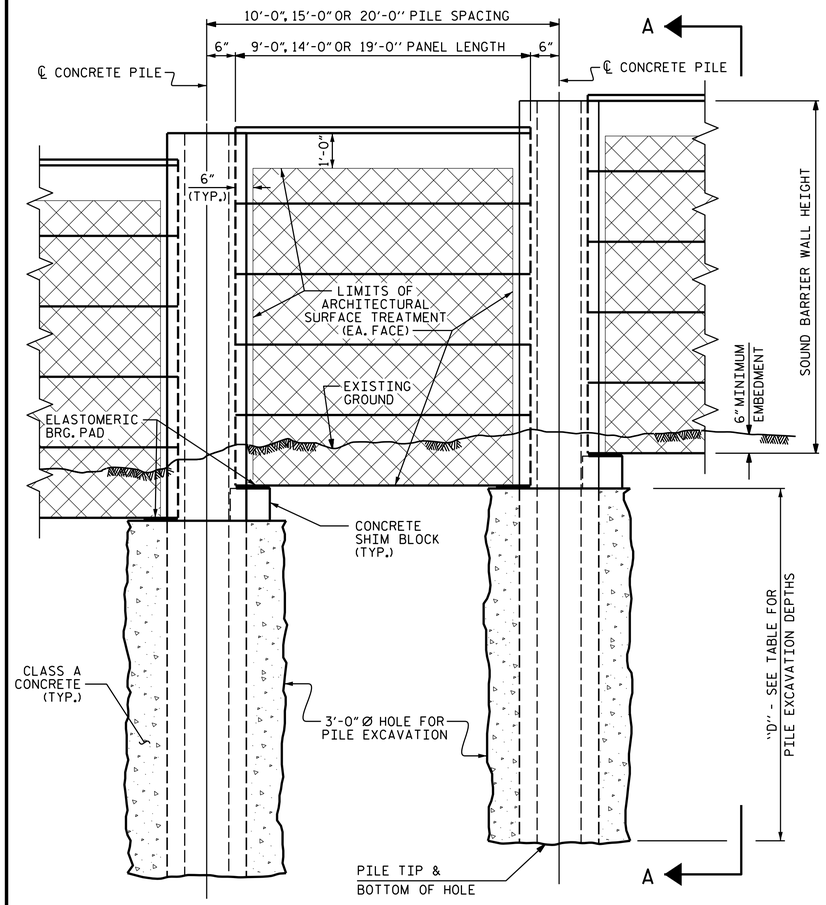
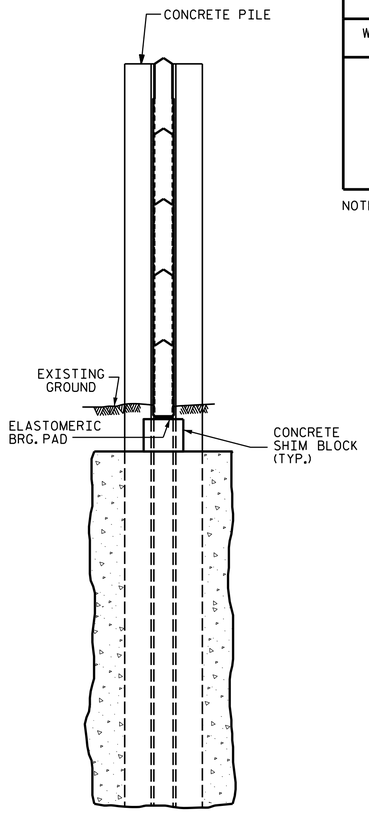


ELEVATION



SECTION A-A

PILE EXCAVATION DEPTHS "D"

WALL #1 FROM : STA. 53+26.30 -L-
TO : STA. 76+19.50 -L-

	PILE SPACING	WALL HEIGHT		
		H ≤ 15'	15' < H ≤ 20'	20' < H ≤ 25'
3'-0" Ø HOLE	10'-0"	10'-0"	12'-0"	13'-0"
	15'-0"	11'-0"	13'-0"	16'-0"
	20'-0"	12'-0"	15'-0"	18'-0"

NOTE: FOR 30" DIA. HOLES, ADD 1 FT. TO D.

NOTES

FOR SOUND BARRIER WALL, SEE SPECIAL PROVISIONS.

CONSTRUCT SOUND BARRIER WALL TO LINES AND GRADES SHOWN ON THE ROADWAY PLANS.

PROVIDE PANELS WITH A FLAT BOTTOM.

VERIFY THE LOCATION OF UNDERGROUND UTILITIES BEFORE DRILLING HOLES TO ENSURE SUFFICIENT CLEARANCE IS AVAILABLE.

ADJUST PILE EXCAVATION ELEVATIONS TO MAINTAIN 6" MINIMUM EMBEDMENT OF THE BOTTOM PANEL.

USE CLASS AA FOR PANELS AND CLASS A CONCRETE PILE EXCAVATION BACKFILL, IN ACCORDANCE WITH ARTICLE 1000-4 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, USE 10'-0", 15'-0", OR 20'-0" PILE SPACINGS. STANDARD PRECAST CONCRETE PANELS MAY BE USED WITH THE 10'-0" AND 15'-0" PILE SPACING. FOR 20'-0" PILE SPACING, PANELS DESIGNED AND MANUFACTURED BY A THIRD PARTY VENDER SHALL BE USED.

FOR SOUND BARRIER WALL STATIONS, OFFSETS, AND WALL ENVELOPE, SEE ROADWAY PLANS.

PLACE 1" Ø BACKER RODS FULL HEIGHT ON EACH SIDE OF THE PRECAST PANELS. SET AND SEAL THE BACKER ROD IN PLACE WITH SEALANT THAT CONFORMS WITH ARTICLE 1028-3 OF THE STANDARD SPECIFICATIONS.

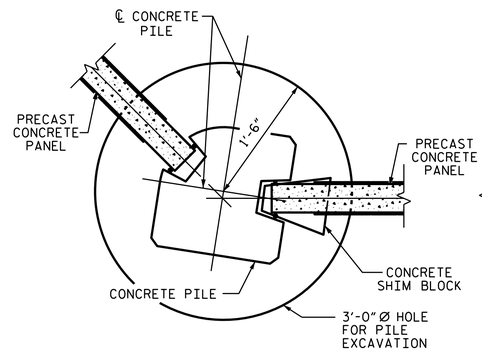
FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

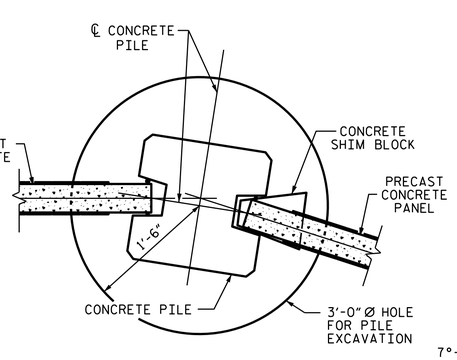
PILE REINFORCING STEEL
DESIGN WIND PRESSURE = 40 PSF

PILE TYPE I				PILE TYPE III			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10'-0"	H ≤ 25'	4 - #8 EA. FACE	#3 @ 1'-4" CTS.	10'-0"	H ≤ 25'	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1'-4" CTS.
15'-0"	H ≤ 20'	4 - #8 EA. FACE	#3 @ 1'-4" CTS.	15'-0"	H ≤ 20'	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1'-4" CTS.
	20'< H ≤ 25'	4 - #10 EA. FACE	#3 @ 1'-4" CTS.		20'< H ≤ 25'	3 - #11 SHORT FACE 4 - #11 LONG FACE	#3 @ 1'-4" CTS.
20'-0"	H ≤ 20'	4 - #9 EA. FACE	#3 @ 1'-4" CTS.	20'-0"	H ≤ 20'	3 - #10 SHORT FACE 4 - #10 LONG FACE	#3 @ 1'-4" CTS.
	20'< H ≤ 25'	4 - #11 EA. FACE	#3 @ 1'-4" CTS.				

PILE TYPE II				PILE TYPE III ALT.			
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES	PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	TIES
10'-0"	H ≤ 25'	4 - #6 EA. FACE	#3 @ 1'-4" CTS.	10'-0"	H ≤ 25'	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1'-4" CTS.
15'-0"	H ≤ 20'	4 - #6 EA. FACE	#3 @ 1'-4" CTS.	15'-0"	H ≤ 20'	3 - #9 SHORT FACE 4 - #9 LONG FACE	#3 @ 1'-4" CTS.
	20'< H ≤ 25'	4 - #7 EA. FACE	#3 @ 1'-4" CTS.		20'< H ≤ 25'	3 - #11 SHORT FACE 4 - #11 LONG FACE	#3 @ 1'-4" CTS.
20'-0"	H ≤ 20'	4 - #6 EA. FACE	#3 @ 1'-4" CTS.	20'-0"	H ≤ 20'	3 - #10 SHORT FACE 4 - #10 LONG FACE	#3 @ 1'-4" CTS.
	20'< H ≤ 25'	4 - #8 EA. FACE	#3 @ 1'-4" CTS.				

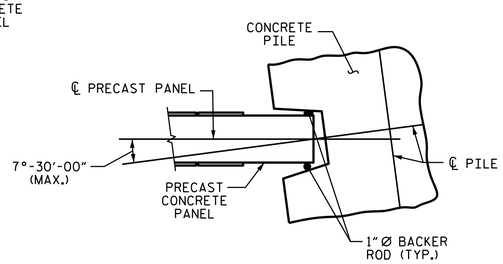


15° TO 45° TURNS
(PILE TYPE III)



0° TO 15° TURNS
(PILE TYPE I)

TYPICAL WALL TURN DETAILS



PILE ROTATION LIMIT FOR WALL TURN

(ROTATE THE CONCRETE PILE ±7°-30'-00" TO ACCOMMODATE WALL TURN.)

BILL OF MATERIAL

SOUND BARRIER WALL	29,793 S.F.
ARCHITECTURAL SURFACE TREATMENT	57,008 S.F.

QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.

ARCHITECTURAL SURFACE TREATMENT

TEXTURE OPTION:	ASHLAR STONE
STAIN OPTION:	GREY PALETTE COLOR #FS 36270

PROJECT NO. U-2579AA
FORSYTH COUNTY
STATION: 53+26.30 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
SOUND BARRIER WALL
-NW7-

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI
DocuSigned by: Krishna P. Sedai
EA6F7941508F4B7...
08/05/2022

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

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ASSEMBLED BY :	A. SORSENGINH	DATE :	3/2021
CHECKED BY :	E. BAYISSA	DATE :	4/2021
DRAWN BY : MAA 6/11	REV. 9/26/14		MAA/TMG
CHECKED BY : GM 6/11	REV. 10/17		MAA/THC
	REV. 5/18		MAA/THC

8/5/2022
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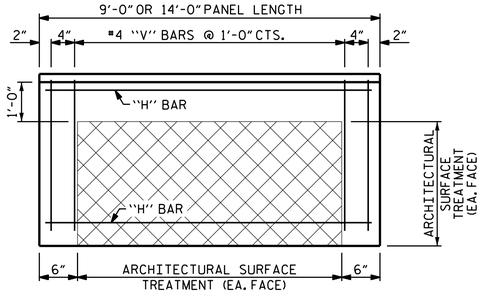
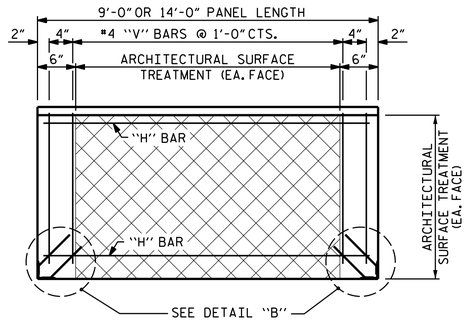
ksedai

STD. NO. SBW1





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

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

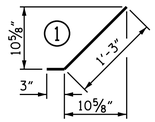
QUANTITIES FOR ONE PRECAST PANEL (FOR 15'-0" PILE SPACING)

PANEL HEIGHT	CLASS AA CONCRETE	BAR TYPES											
		HORIZONTAL						VERTICAL					
	C.Y.	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)
3'-0"	0.52	5	H1	#4	STR	13'-8"	46	16	V1	#4	STR	2'-8"	29
4'-0"	0.69	6	H2	#4	STR	13'-8"	55	16	V2	#4	STR	3'-8"	39
5'-0"	0.86	7	H3	#4	STR	13'-8"	64	16	V3	#4	STR	4'-8"	50
6'-0"	1.04	8	H4	#4	STR	13'-8"	73	16	V4	#4	STR	5'-8"	61

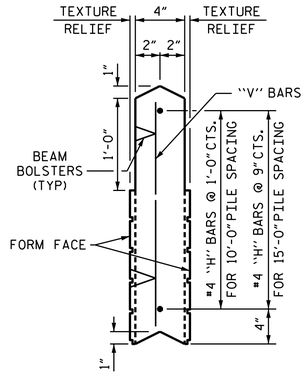
ADDITIONAL BARS FOR ONE BOTTOM PANEL

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

BAR TYPE

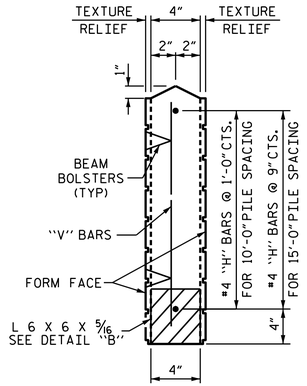


FRONT ELEVATION OF UPPER PRECAST PANEL

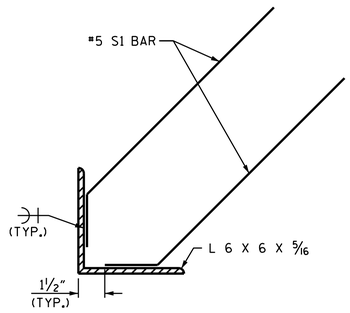


UPPER PANEL

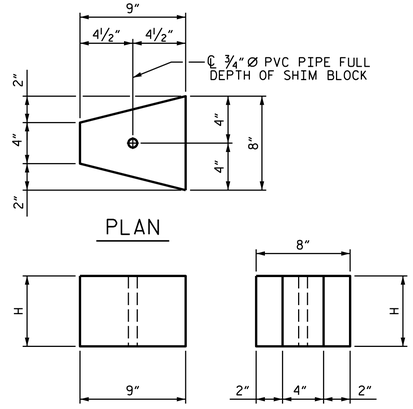
FRONT ELEVATION OF BOTTOM PRECAST PANEL



BOTTOM PANEL

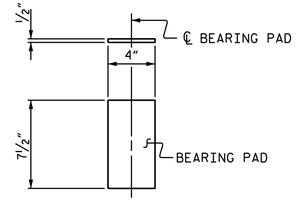


DETAIL "B"



PLAN

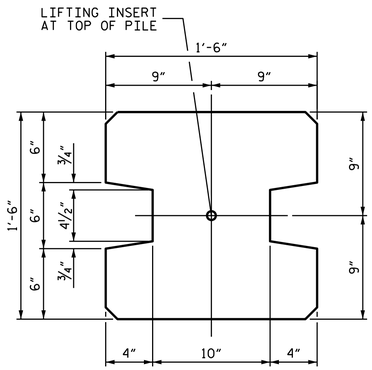
ELEVATION END



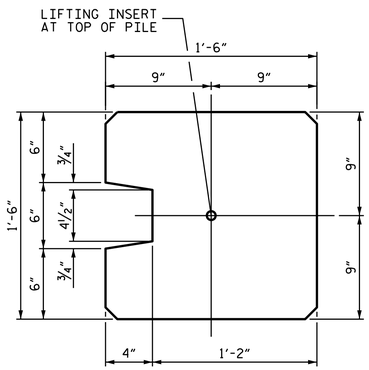
ELASTOMERIC BEARING DETAILS

ELASTOMER IN BEARINGS SHALL BE 50 DUROMETER HARDNESS.

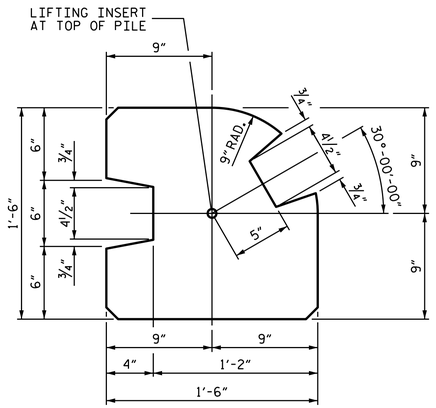
SECTION THROUGH PRECAST PANELS



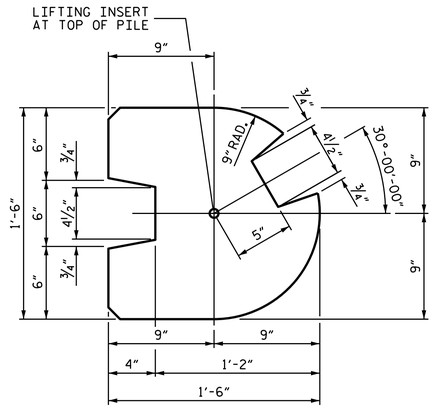
TYPE - I
(AREA = 1.9444 SQ. FT.)



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



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



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

CONCRETE SHIM BLOCK

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

PILE DETAIL

(ALL CORNERS TO BE CHAMFERED 1")

PROJECT NO. U-2579AA
FORSYTH COUNTY
STATION: 53+26.30 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

SOUND BARRIER WALL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI
Krishna P. Sedai
EA6F794150BF4B7...
08/05/2022

ASSEMBLED BY :	A. SORSENGINH	DATE :	3/2021
CHECKED BY :	E. BAYISSA	DATE :	4/2021
DRAWN BY : MAA 6/11	REV. 1/15/14		RWW/TMG
CHECKED BY : GM 6/11	REV. 10/17		MAA/THC
	REV. 5/18		MAA/THC

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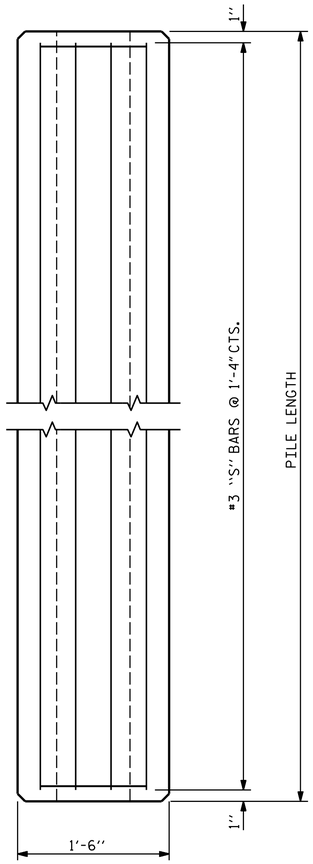
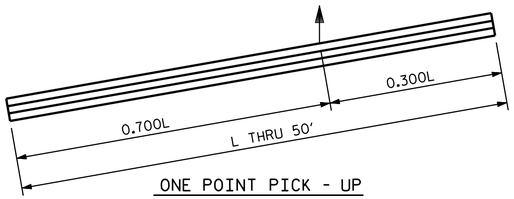
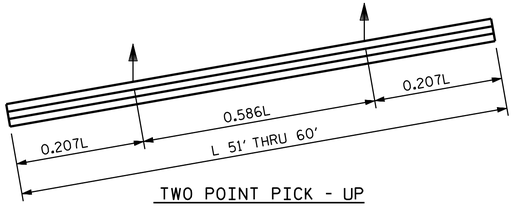


ELEVATION



ONE POINT PICK - UP



TWO POINT PICK - UP

PICK - UP POINTS

NOTES

CONCRETE DESIGN DATA : f'c = 5,000 PSI

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

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

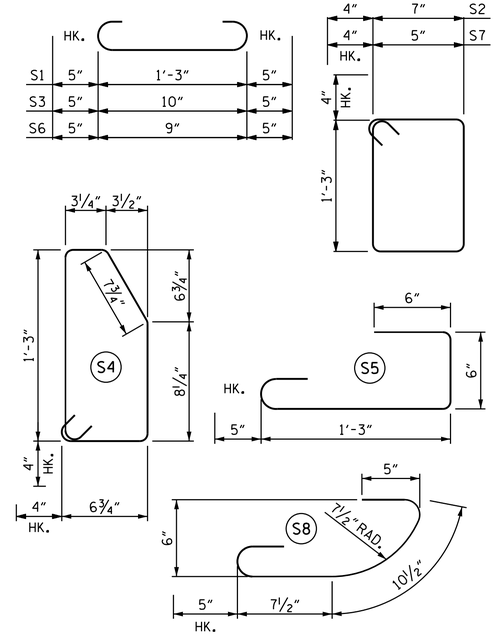
THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

ALL CORNERS TO BE CHAMFERED 1".

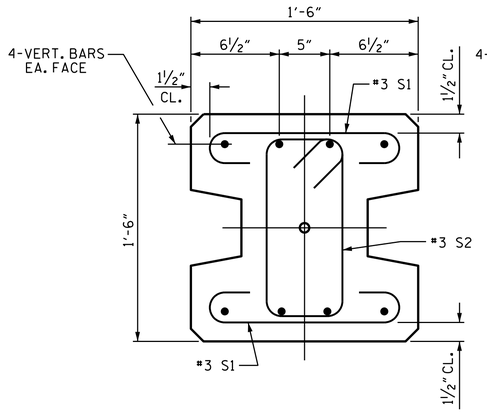
QUANTITIES FOR ONE PRECAST CONCRETE PILE

LENGTH	APPROX. PILE WT. TONS	ONE PICK-UP POINT		TWO PICK-UP POINT	
		0.300L	0.700L	0.207L	0.586L
10'-0''	1.56	3'-0''	7'-0''		
15'-0''	2.35	4'-6''	10'-6''		
20'-0''	3.14	6'-0''	14'-0''		
25'-0''	3.93	7'-6''	17'-6''		
30'-0''	4.70	9'-0''	21'-0''		
35'-0''	5.49	10'-6''	24'-6''		
40'-0''	6.28	12'-0''	28'-0''		
45'-0''	7.05	13'-6''	31'-6''		
50'-0''	7.84	15'-0''	35'-0''		
55'-0''	8.63			11'-4½''	32'-3''
60'-0''	9.42			12'-5''	35'-2''

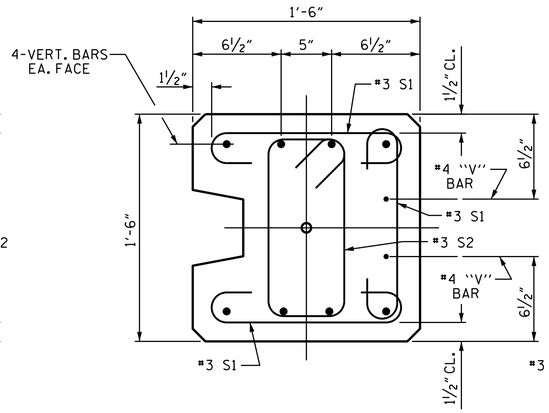
BAR TYPES



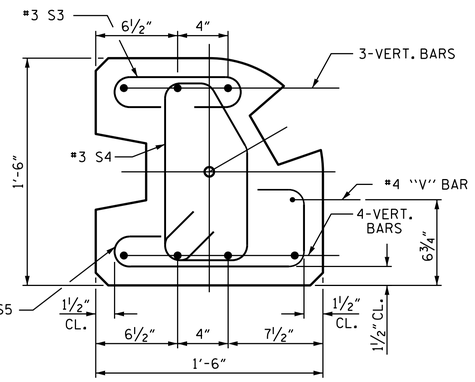
ALL BAR DIMENSIONS ARE OUT TO OUT.



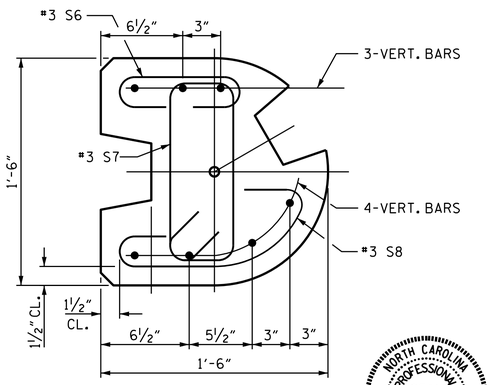
TYPE - I



TYPE - II



TYPE - III



TYPE - III (ALT.)

PILE DETAIL

FOR VERTICAL BAR PILE REINFORCING, SEE SHEET 1 OF 3

PROJECT NO. U-2579AA

FORSYTH COUNTY

STATION: 53+26.30 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SOUND BARRIER WALL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 031583 ENGINEER KRISHNA PRASAD SEDAI

DocuSigned by: Krishna P. Sedai EA6F7941508F4B7...

08/05/2022

ASSEMBLED BY :	A. SORSENGINH	DATE :	3/2021
CHECKED BY :	E. BAYISSA	DATE :	4/2021
DRAWN BY : MAA	6/11	REV. 1/15/14	RWW/TMG
CHECKED BY : GM	6/11	REV. 12/17	MAA/THC

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STD. NO. SBW3

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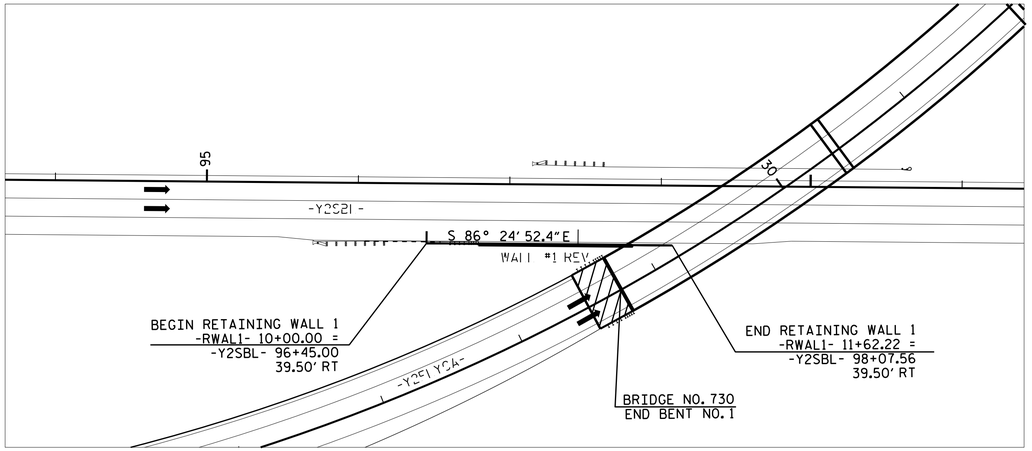
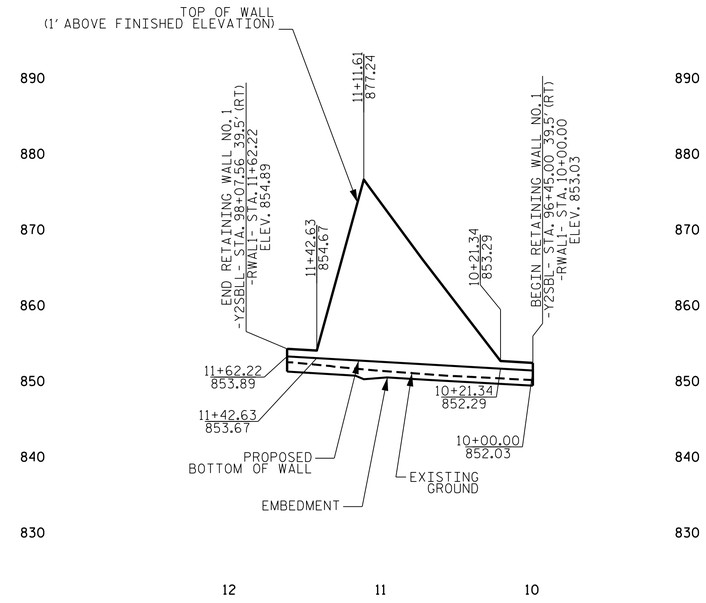


RETAINING WALL NO.1 - PLAN VIEW
NTS



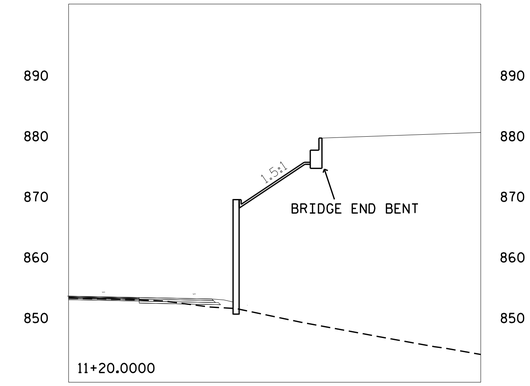
RETAINING WALL NO.1 - ELEVATION VIEW
NTS

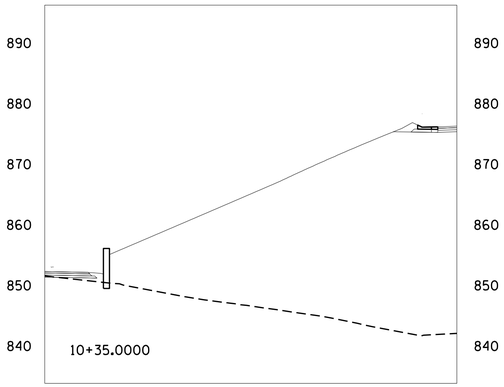
PREPARED BY: MHS	DATE: 6/1/22
REVIEWED BY: SCC	DATE: 6/1/22

ESTIMATED MSE WALL QUANTITIES
(SQUARE FEET)

MSE RETAINING WALL NO.1	1,875 SF

NOTES:
1) WALL AREA INCLUDES EMBEDMENT
2) FOR EMBEDMENT DEPTHS, SEE WALL EMBEDMENT TABLE





GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS

DocuSigned by: 06/01/2022
81963158C7E4...
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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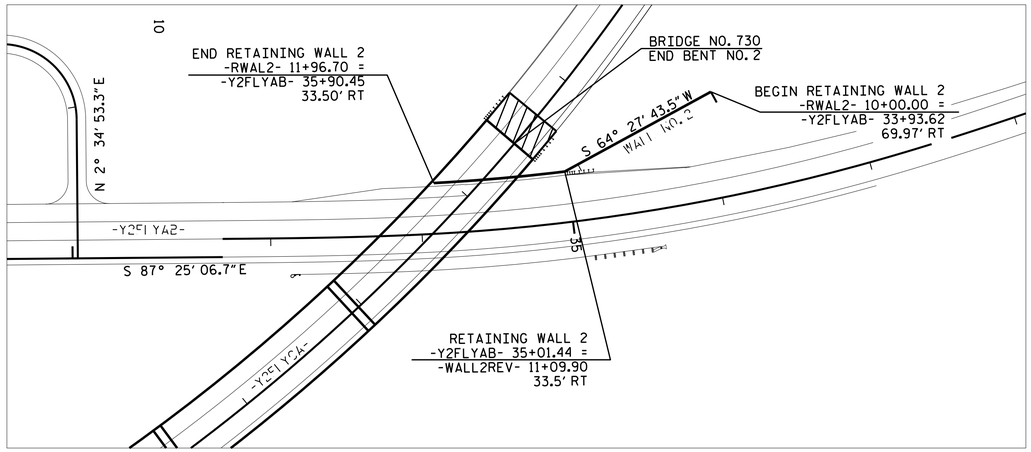
PROJECT NO.: 34839.1.1 (U-2579AA)
FORSYTH COUNTY
STATION: -Y2SBL- STA. 96+45.00
SHEET 1 OF 12 WALL NO. 1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

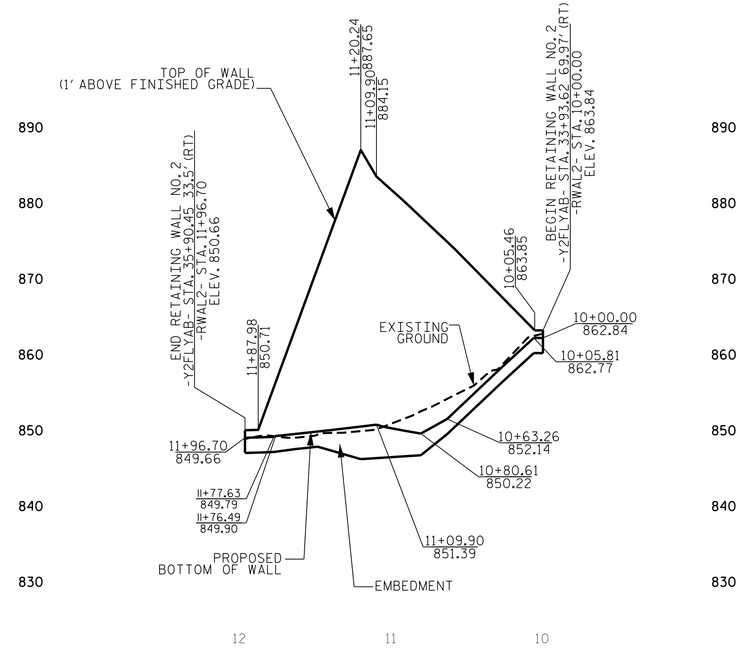
GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 1
MSE RETAINING WALL

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



RETAINING WALL NO. 2 - PLAN VIEW
NTS



RETAINING WALL NO. 2 - ELEVATION VIEW
NTS

ESTIMATED MSE WALL QUANTITIES
(SQUARE FEET)

MSE RETAINING WALL NO. 2	4,205 SF

NOTES:
1) WALL AREA INCLUDES EMBEDMENT
2) FOR EMBEDMENT DEPTHS, SEE WALL EMBEDMENT TABLE

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS

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ENGINEER

SIGNATURE DATE

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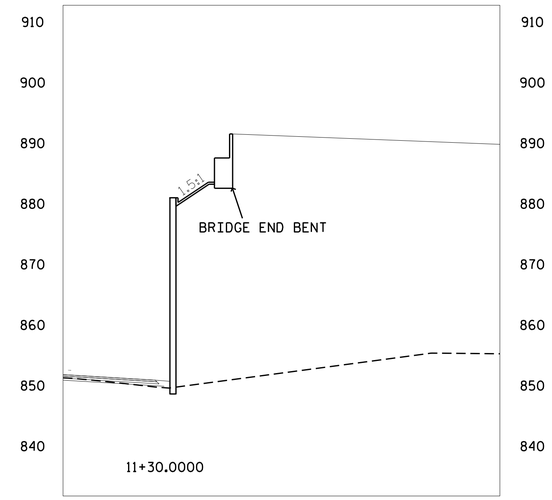
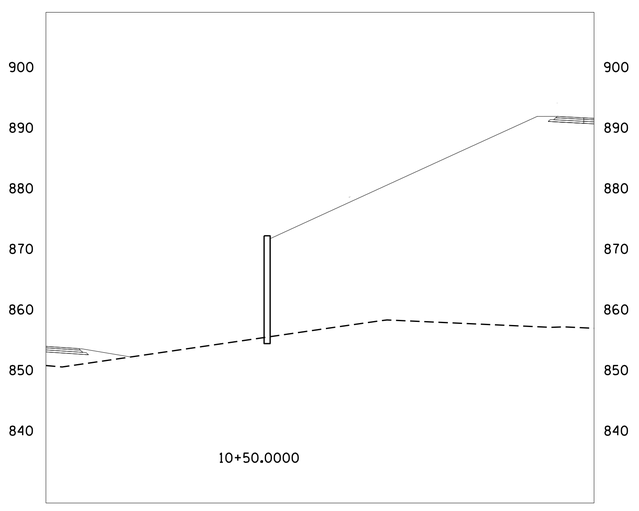




PROJECT NO.: 34839.1.1 (U-2579AA)
FORSYTH COUNTY
STATION: -Y2FLYAB- STA. 33+93.62
SHEET 2 OF 12 WALL NO. 2

PREPARED BY: MHS	DATE: 6/1/22
REVIEWED BY: SCC	DATE: 6/1/22

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

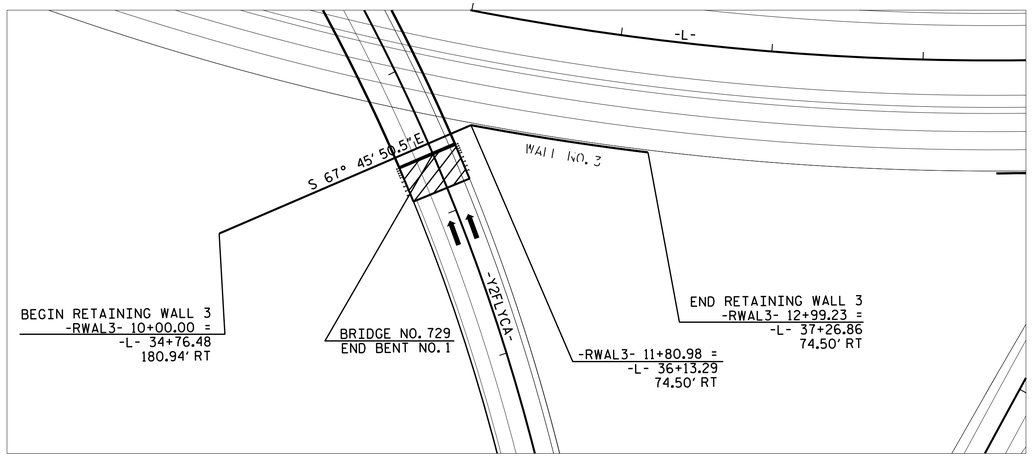
GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 2
MSE RETAINING WALL

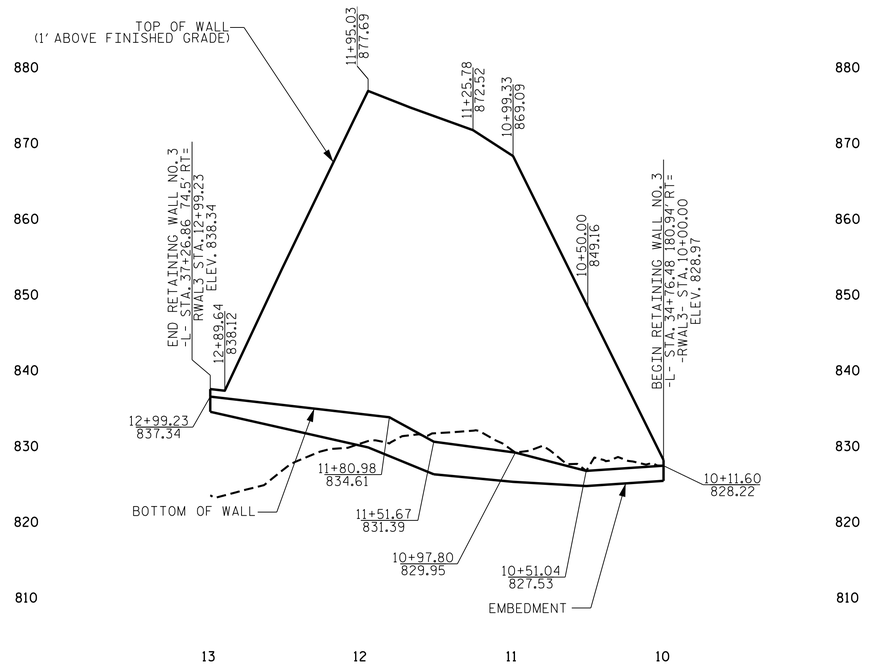
REVISIONS

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

SHEET NO. W-2



RETAINING WALL NO. 3 - PLAN VIEW
NTS



RETAINING WALL NO. 3 - ELEVATION VIEW
NTS

ESTIMATED MSE WALL QUANTITIES
(SQUARE FEET)

MSE RETAINING WALL NO. 3	9,155 SF

NOTES:
1) WALL AREA INCLUDES EMBEDMENT
2) FOR EMBEDMENT DEPTHS, SEE WALL EMBEDMENT TABLE

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS

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SIGNATURE DATE

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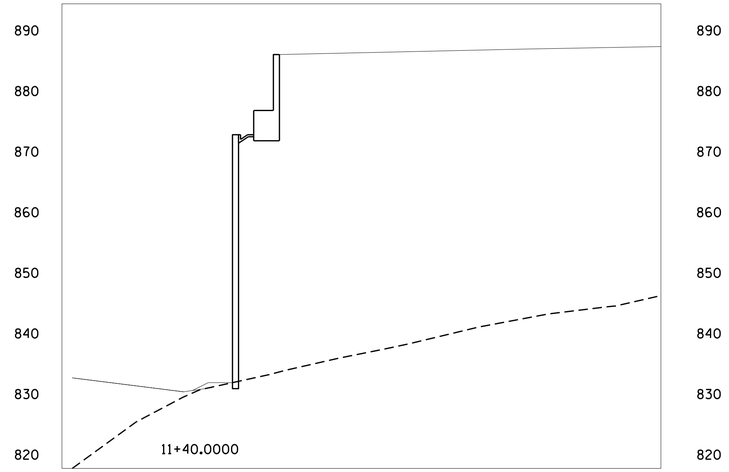

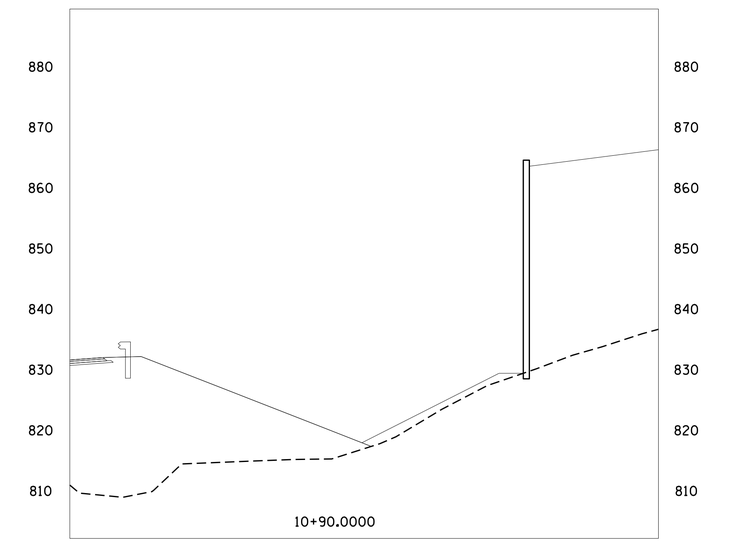

PROJECT NO.: 34839.1.1 (U-2579AA)
FORSYTH COUNTY
STATION: -L- STA. 34+76.48
SHEET 3 OF 12 WALL NO. 3

PREPARED BY: MHS	DATE: 6/1/22
REVIEWED BY: SCC	DATE: 6/1/22

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 3 MSE RETAINING WALL

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

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

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ENGINEER

SIGNATURE DATE

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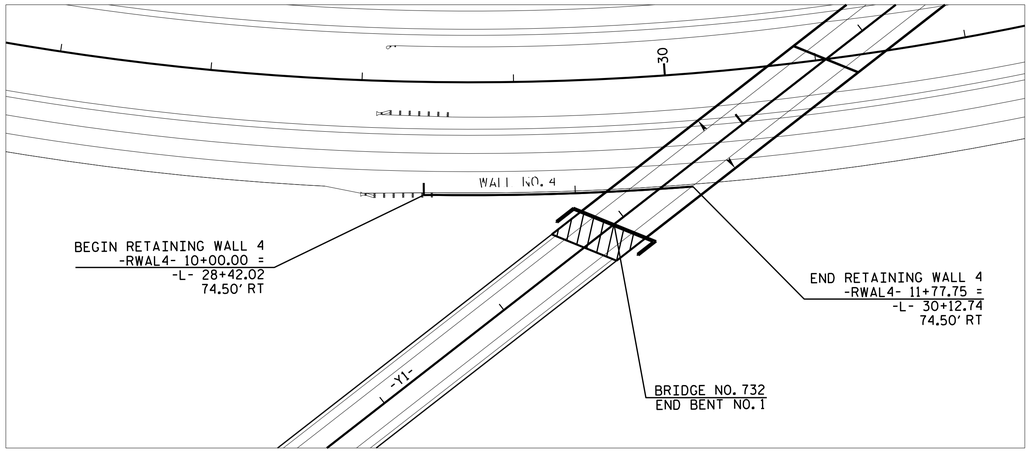
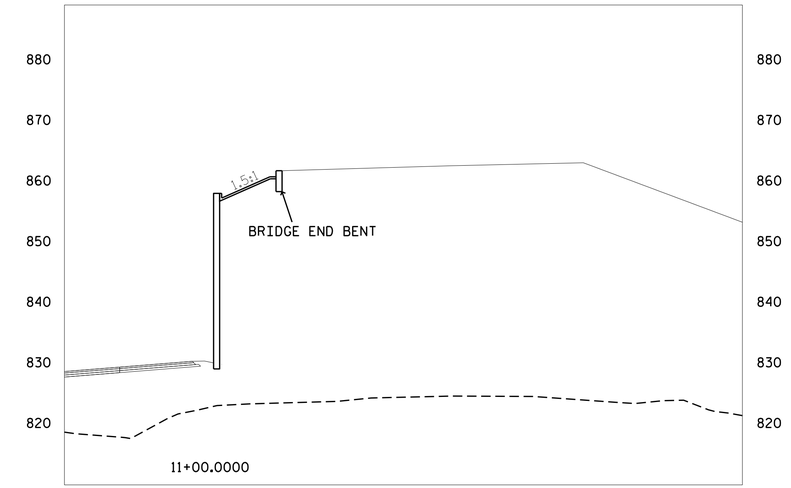


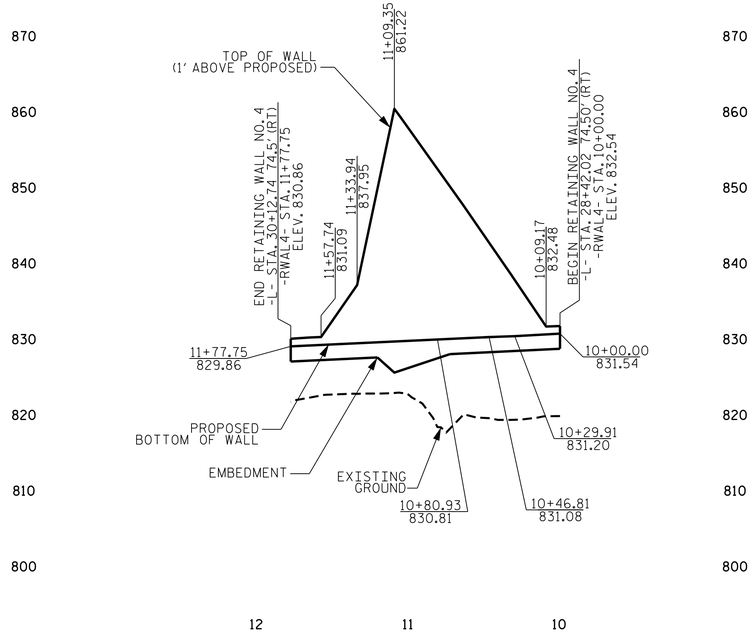
RETAINING WALL NO. 4 - PLAN VIEW
NTS

ESTIMATED MSE WALL QUANTITIES
(SQUARE FEET)

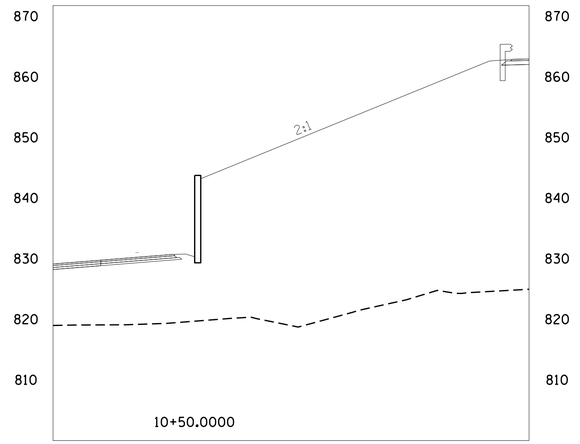
MSE RETAINING WALL NO. 4	2,625 SF

NOTES:
1) WALL AREA INCLUDES EMBEDMENT
2) FOR EMBEDMENT DEPTHS, SEE WALL EMBEDMENT TABLE





RETAINING WALL NO. 4 - ELEVATION VIEW
NTS



PROJECT NO.: 34839.1.1 (U-2579AA)
FORSYTH COUNTY
STATION: -L- STA. 28+42.02
SHEET 4 OF 12 WALL NO. 4

PREPARED BY: MHS	DATE: 6/1/22
REVIEWED BY: SCC	DATE: 6/1/22

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 4 MSE RETAINING WALL

REVISIONS

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

SHEET NO. W-4

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS

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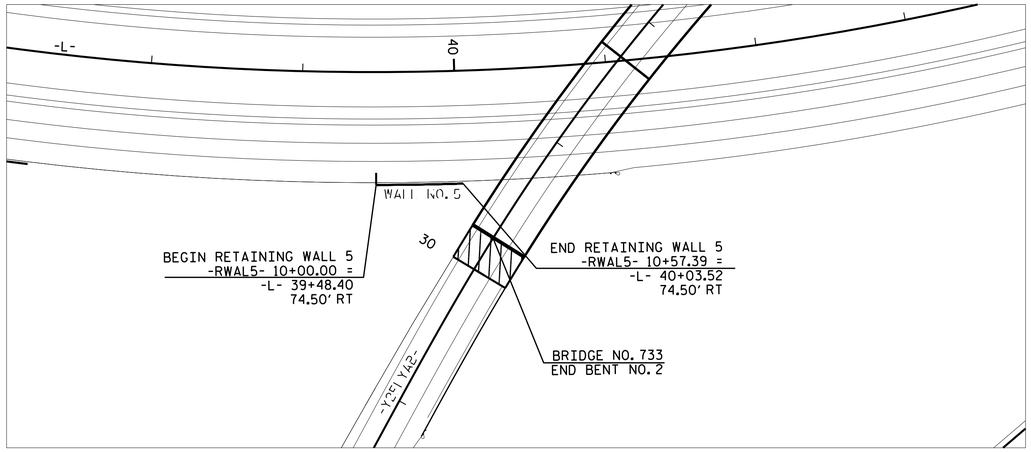
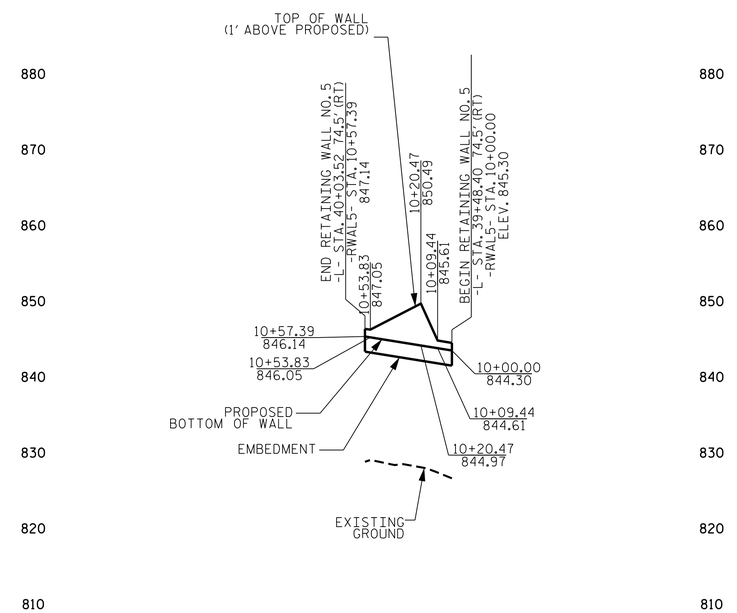


RETAINING WALL NO. 5 - PLAN VIEW
NTS

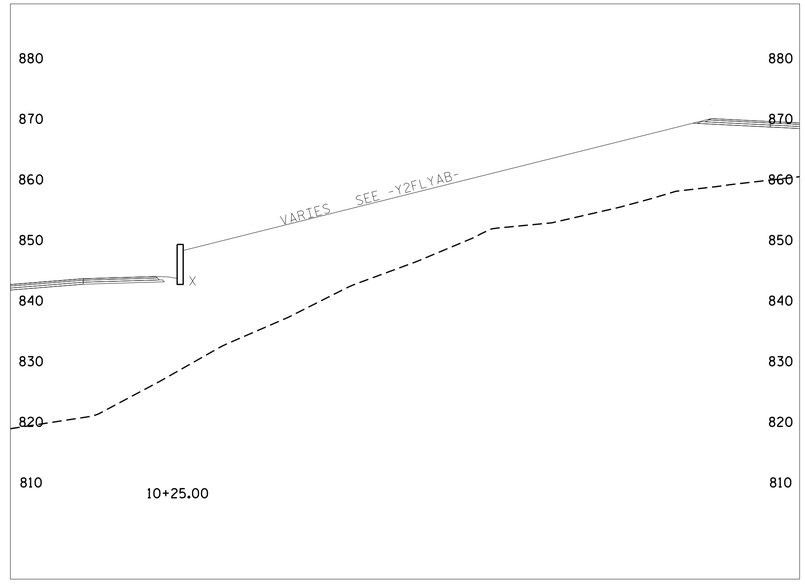
ESTIMATED MSE WALL QUANTITIES
(SQUARE FEET)

MSE RETAINING WALL NO. 5	275 SF

NOTES:
1) WALL AREA INCLUDES EMBEDMENT
2) FOR EMBEDMENT DEPTHS, SEE WALL EMBEDMENT TABLE



RETAINING WALL NO. 5 - ELEVATION VIEW
NTS



PROJECT NO.: 34839.1.1 (U-2579AA)
FORSYTH COUNTY
STATION: -L- STA. 39+48.40
SHEET 5 OF 12 WALL NO. 5

PREPARED BY: MHS	DATE: 6/1/22
REVIEWED BY: SCC	DATE: 6/1/22

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 5 MSE RETAINING WALL

REVISIONS

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

SHEET NO. W-5

ESTIMATED SOIL NAIL WALL QUANTITIES			
RETAINING WALL NO.	SOIL NAIL RETAINING WALLS (SQUARE FEET)	SOIL NAIL VERIFICATION TESTS	SOIL NAIL PROOF TESTS
6	1,650	1	5

NOTES:
1) WALL AREA INCLUDES EMBEDMENT

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS

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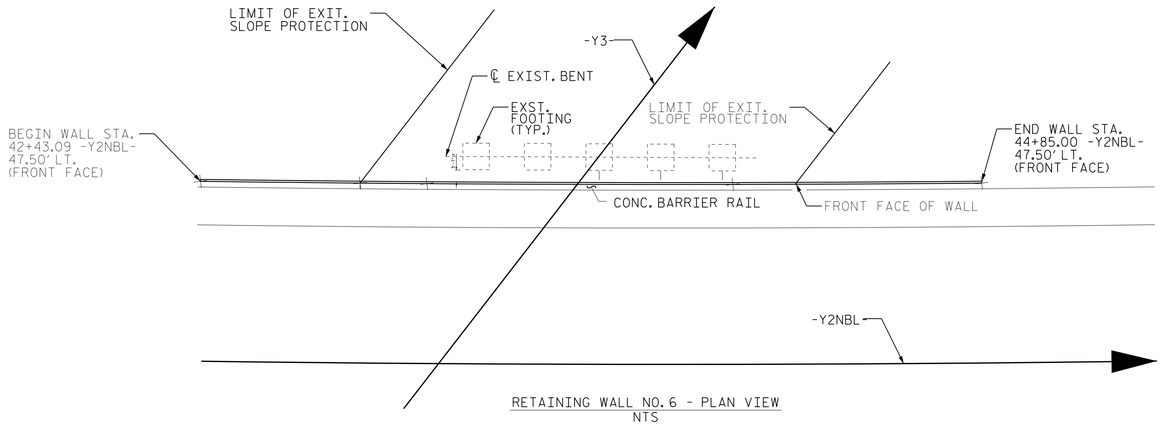
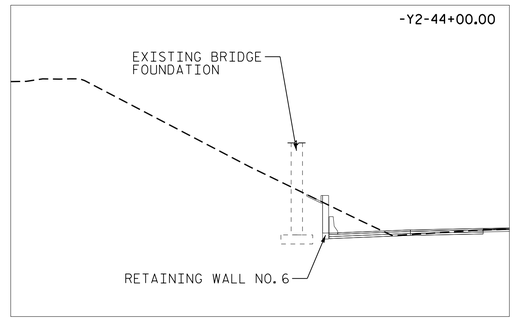
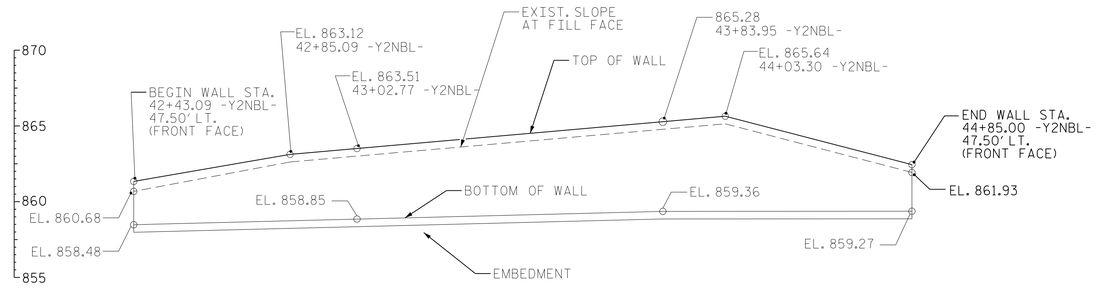


RETAINING WALL NO. 6 - PLAN VIEW
NTS





RETAINING WALL NO. 6 - ELEVATION VIEW
NTS

PROJECT NO.: 34839.1.1 (U-2579AA)
FORSYTH COUNTY
STATION: 42+43.09 -Y2NBL-
SHEET 6 OF 12 WALL NO. 6

PREPARED BY: MHS	DATE: 6/1/22
REVIEWED BY: SCC	DATE: 6/1/22

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 6 SOIL NAIL RETAINING WALL

REVISIONS

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

SHEET NO. W-6

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS DocuSigned by: 06/01/2022 8196315B3C7046C...	
SIGNATURE DATE	SIGNATURE DATE

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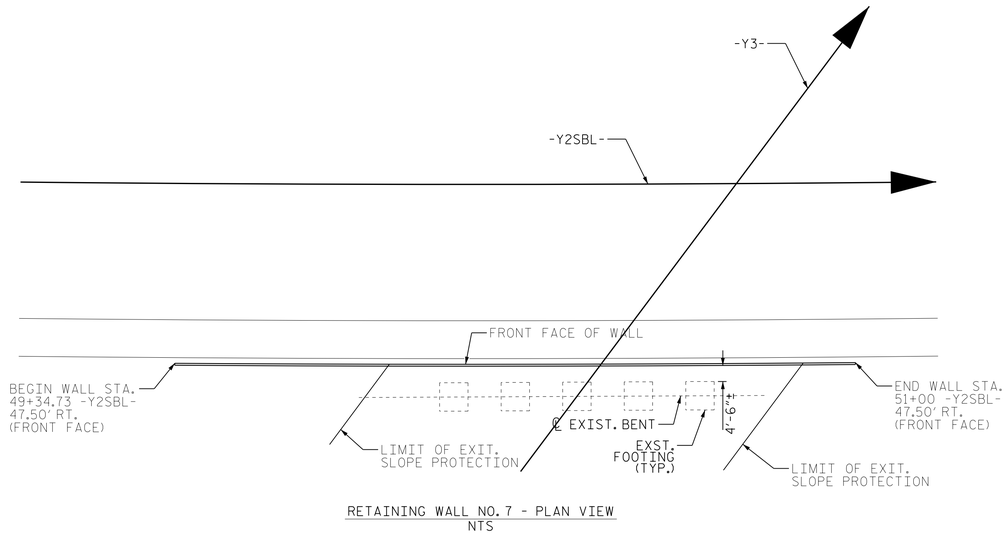
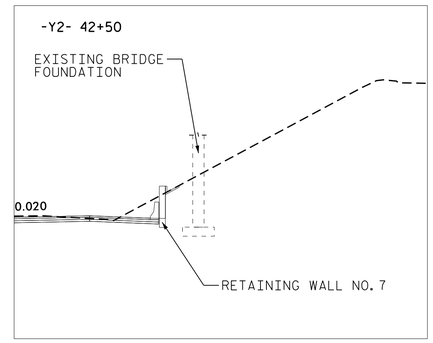
ESTIMATED SOIL NAIL WALL QUANTITIES

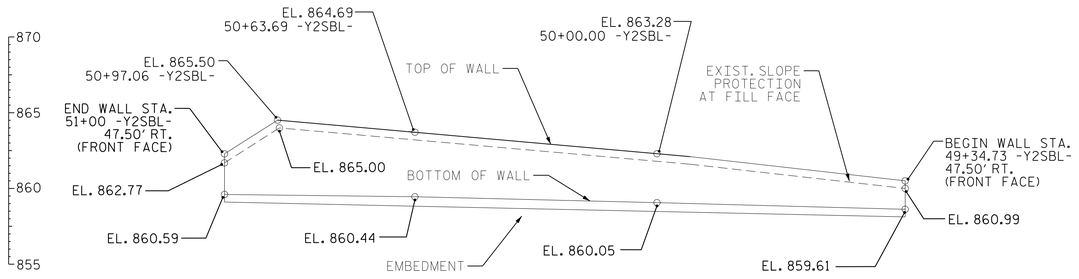
RETAINING WALL NO.	SOIL NAIL RETAINING WALLS (SQUARE FEET)	SOIL NAIL VERIFICATION TESTS	SOIL NAIL PROOF TESTS
7	910	1	3

NOTES:
1) WALL AREA INCLUDES EMBEDMENT



RETAINING WALL NO. 7 - PLAN VIEW
NTS





RETAINING WALL NO. 7 - ELEVATION VIEW
NTS

PROJECT NO.: 34839.1.1 (U-2579AA)
FORSYTH COUNTY
STATION: 49+34.73 -Y2SBL-
SHEET 7 OF 12 WALL NO. 7

PREPARED BY: MHS	DATE: 6/1/22
REVIEWED BY: SCC	DATE: 6/1/22

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 7 SOIL NAIL RETAINING WALL

REVISIONS

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

SHEET NO. W-7

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS

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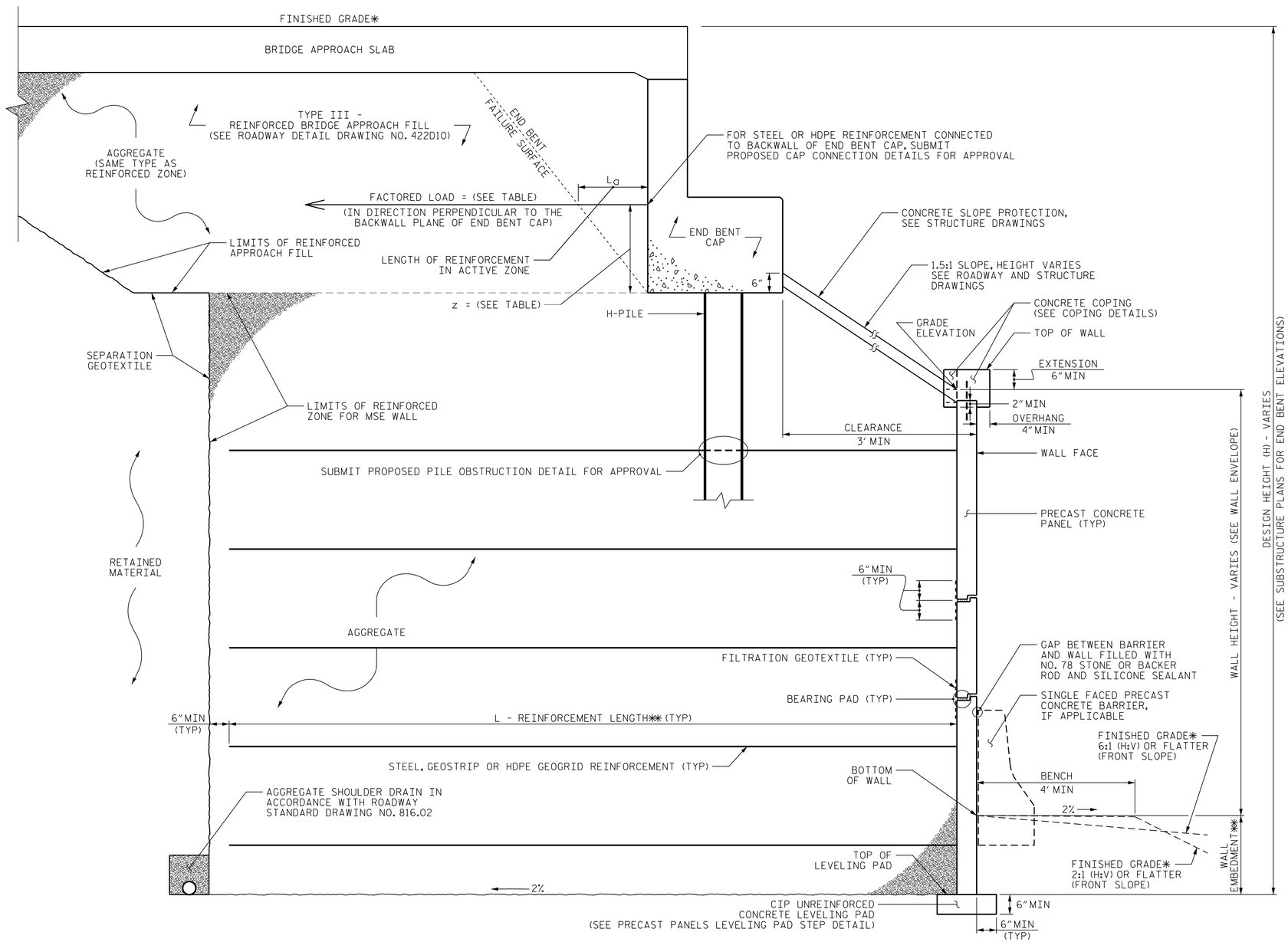
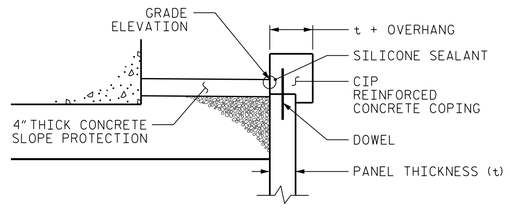


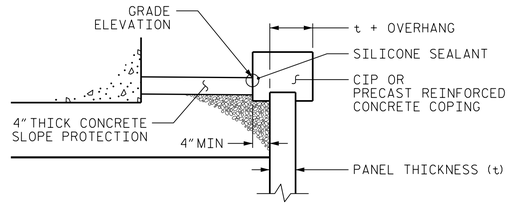
RETAINING WALL NOS. 1, 2, AND 4
MSE ABUTMENT WALL WITH TOP SLOPE - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR WALL EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

END BENT STRAP LOADS

RETAINING WALL NO.	BRIDGE NO.	END BENT NO.	STRAP FACTORED LOAD, (KIP/FT)	Z (FT)
1	730	END BENT NO. 1	4.3	4.25
2	730	END BENT NO. 2	4.3	4.25
4	732	END BENT NO. 1	8.3	5





COPING DETAILS

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

PROJECT NO.: 34839.1.1 (U-2579AA)
FORSYTH COUNTY
STATION:
SHEET 8 OF 12 WALL NO. 1, 2, AND 4

PREPARED BY: MHS	DATE: 6/1/22
REVIEWED BY: SCC	DATE: 6/1/22

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NOS. 1, 2, AND 4
MSE RETAINING ABUTMENT WALL TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-8
2			4			

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS

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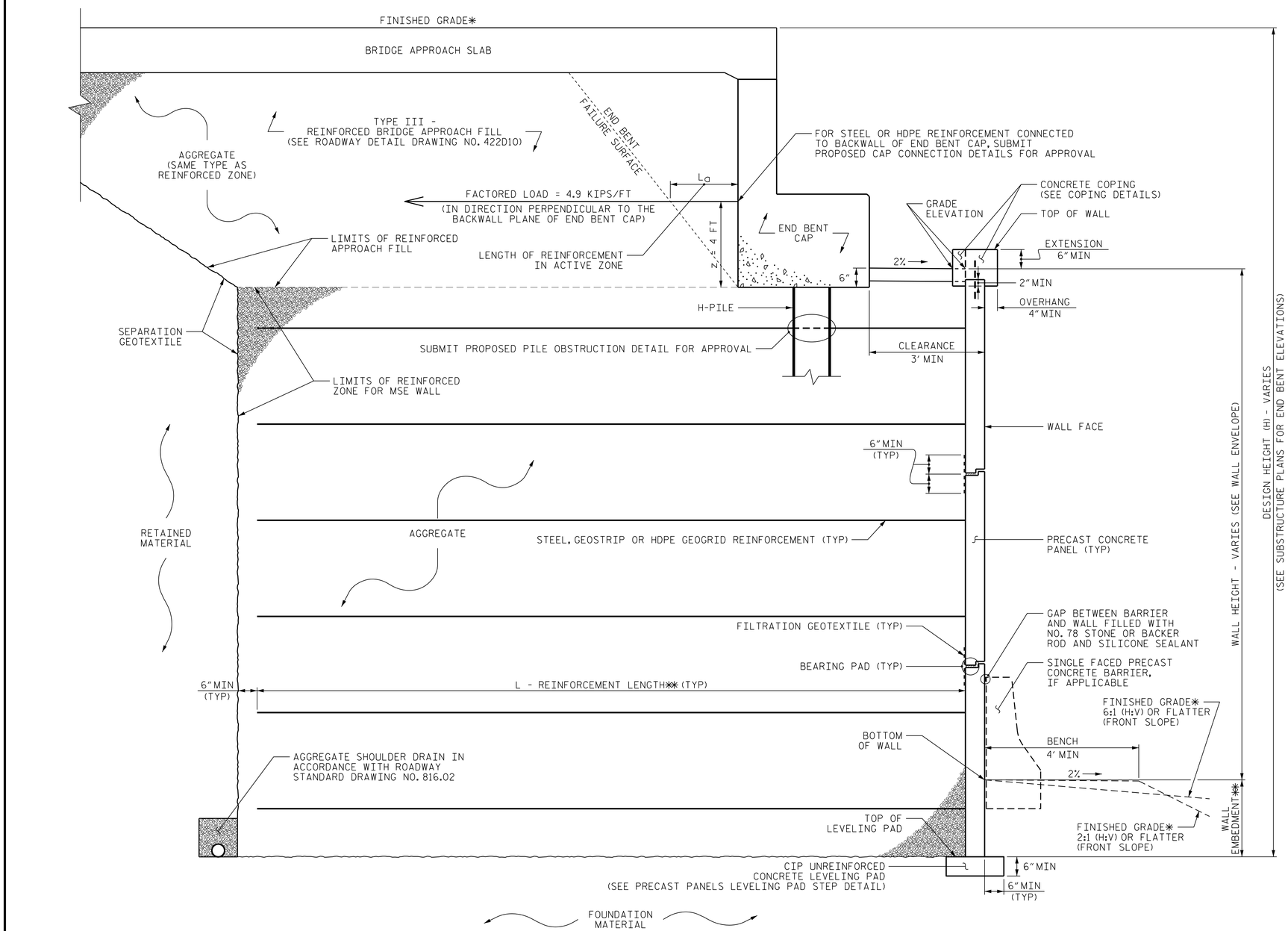

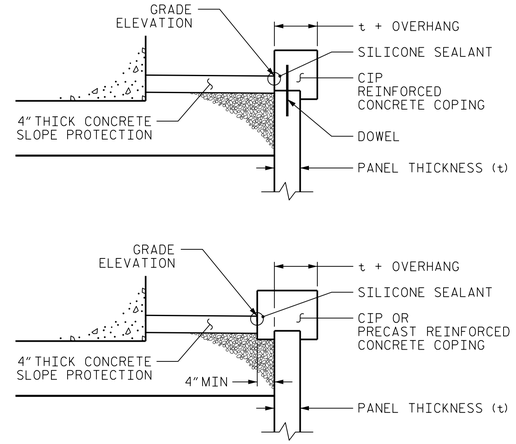

COPING DETAILS

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

RETAINING WALL NO. 3
MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR WALL EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

PROJECT NO.: 34839.1.1 (U-2579AA)

FORSYTH COUNTY

STATION:

SHEET 9 OF 12 WALL NO. 3

PREPARED BY: MHS	DATE: 6/1/22
REVIEWED BY: SCC	DATE: 6/1/22

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NO. 3
MSE RETAINING ABUTMENT WALL
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-9
2			4			

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

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SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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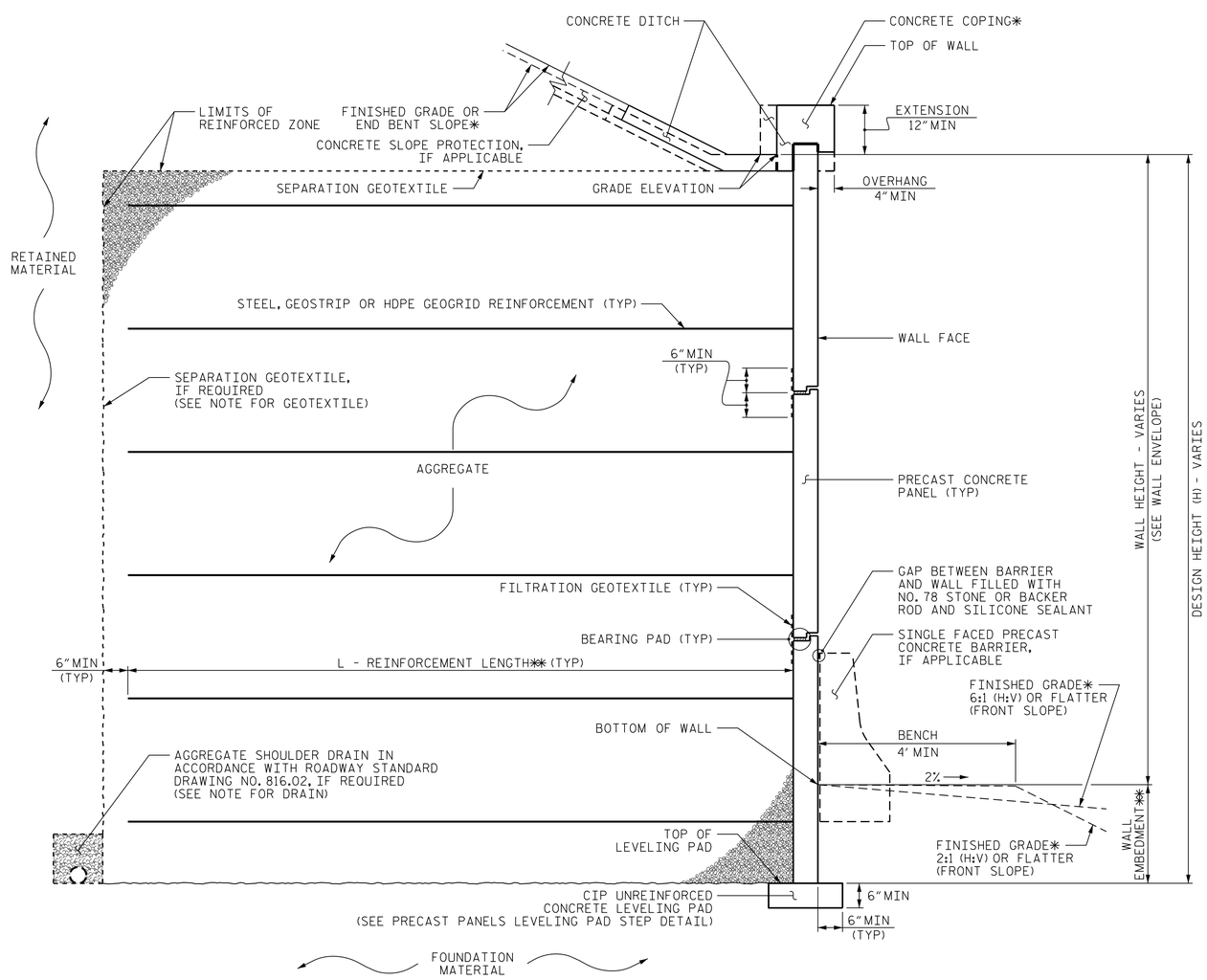
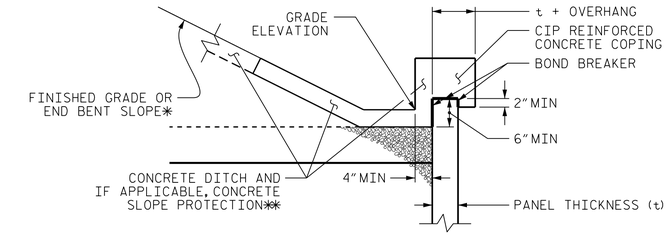
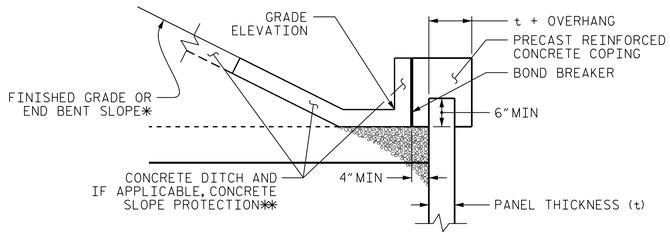


RETAINING WALL NO. 1, 2, 3, 4, AND 5
MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE COPING DETAILS AND PLANS FOR FINISHED GRADE OR END BENT SLOPE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR WALL EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.





COPING DETAILS

*SEE PLANS FOR FINISHED GRADE OR END BENT SLOPE DETAILS.
**SEE CONCRETE DITCH BEHIND WALL DETAILS.

PROJECT NO.: 34839.1.1 (U-2579AA)

FORSYTH COUNTY

STATION:

SHEET 10 OF 12 WALL NO. 1, 2, 3, 4, AND 5

PREPARED BY: MHS	DATE: 6/1/22
REVIEWED BY: SCC	DATE: 6/1/22

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NOS. 1, 2, 3, 4, AND 5
MSE RETAINING WALL
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	W-10
1			3			
2			4			

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H STEPHENS

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S19631SB3C7046C...
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

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NOTES:

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

FOR TYPE III REINFORCED BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY DETAIL DRAWING NO. 422D10.

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

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NOS. 1 THRU 5.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NOS. 1 THRU 5.

A DRAIN IS REQUIRED FOR RETAINING WALL NOS. 1 THRU 5.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NOS. 1 THRU 5, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NOS. 1 THRU 5 FOR THE FOLLOWING:
1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = (SEE TABLE)
4) MINIMUM REINFORCEMENT LENGTH (L) = (SEE TABLE)
5) MINIMUM EMBEDMENT ELEVATION = (SEE TABLE)
7) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (g) PCF	FRICTION ANGLE (f) DEGREES	COHESION (c) PSF
COARSE	110	38	0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (g) PCF	FRICTION ANGLE (f) DEGREES	COHESION (c) PSF
RETAINED	120	30	0
FOUNDATION	120	30	0

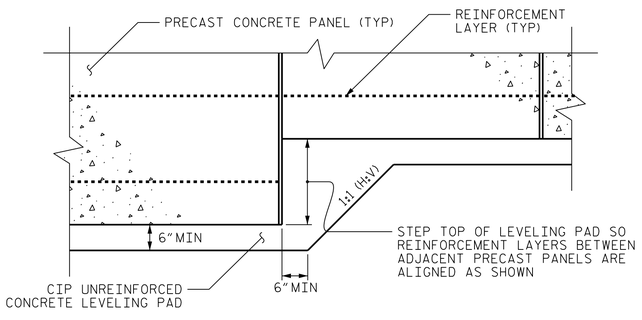
THE WALL SITE FOR RETAINING WALL NOS. 1 THRU 5 IS CLASSIFIED AS AASHTO SITE CLASS D.

DESIGN RETAINING WALL NOS. 1 THRU 5 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L_a) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR BRIDGE NO. 729 AT END BENT NO. 1, BRIDGE NO. 730 AT END BENT NOS. 1 AND 2 AND BRIDGE NO. 732 AT END BENT NO. 1. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

FOUNDATIONS FOR BRIDGE NO. 729 AT END BENT NO. 1, BRIDGE NO. 730 AT END BENT NOS. 1 AND 2 AND BRIDGE NO. 732 AT END BENT NO. 1 WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NOS. 1 THRU 6. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NOS. 1 THRU 5 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



PRECAST PANELS
LEVELING PAD STEP DETAIL

RETAINING WALL DESIGN PARAMETERS

RETAINING WALL NO.	FACTORED BEARING PRESSURE (PSF)	MINIMUM REINFORCEMENT LENGTH (FT)
1	5,800	1.0*H OR 6 FT, WHICHEVER IS GREATER
2	7,000	1.2*H OR 6 FT, WHICHEVER IS GREATER
3	10,500	1.0*H OR 6 FT, WHICHEVER IS GREATER
4	5,600	1.3*H OR 6 FT, WHICHEVER IS GREATER
5	1,500	0.8*H OR 6 FT, WHICHEVER IS GREATER

NOTES:
1) FACTORER BEARING PRESSURES WILL VARY DEPENDING ON WALL HEIGHT. FACTORER BEARING PRESSURE INCDICATED IS THE THE MAXIMUM FACTORED BEARING PRESSURE FOR THE WALL.

WALL EMBEDMENT

SLOPE IN FRONT OF STRUCTURES		MINIMUM EMBEDMENT DEPTH
HORIZONTAL	FOR WALLS	H/20
	FOR ABUTMENTS	H/10
3.0H:1.0V	WALLS	H/10
2.5H:1.0V	WALLS	H/8.5
2.0H:1.0V	WALLS	H/7
1.5H:1.0V	WALLS	H/5
1.25H:1.0V	WALLS	H/4
1.0H:1.0V	WALLS	H/3

NOTE:
1) MAINTAIN A MINIMUM BENCH WIDTH OF 4.0 IN FRONT OF THE WALL FOR ITS ENTIRE LENGTH.
2) MINIMUM EMBEDMENT DEPTH OF 2 FT, UNLESS LARGER DEPTHS DICTATED BY THE ABOVE TABLE.
3) MAXIMUM SLOPE OF 1H:1V WILL BE MAINTAINED ON FRONT SLOPES FOR THE ENTIRE LENGTH OF THE WALL.
4) SUBMITT WITH THE WALL DESIGN INTERNAL, EXTERNAL, AND GLOBAL STABILITY ANALYSISES.

PROJECT NO.: 34839.1.1 (U-2579AA)
FORSYTH COUNTY
STATION:
SHEET 11 OF 12 WALL NOS. 1, 2, 3, 4, AND 5

PREPARED BY: MHS	DATE: 6/1/22
REVIEWED BY: SCC	DATE: 6/1/22

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

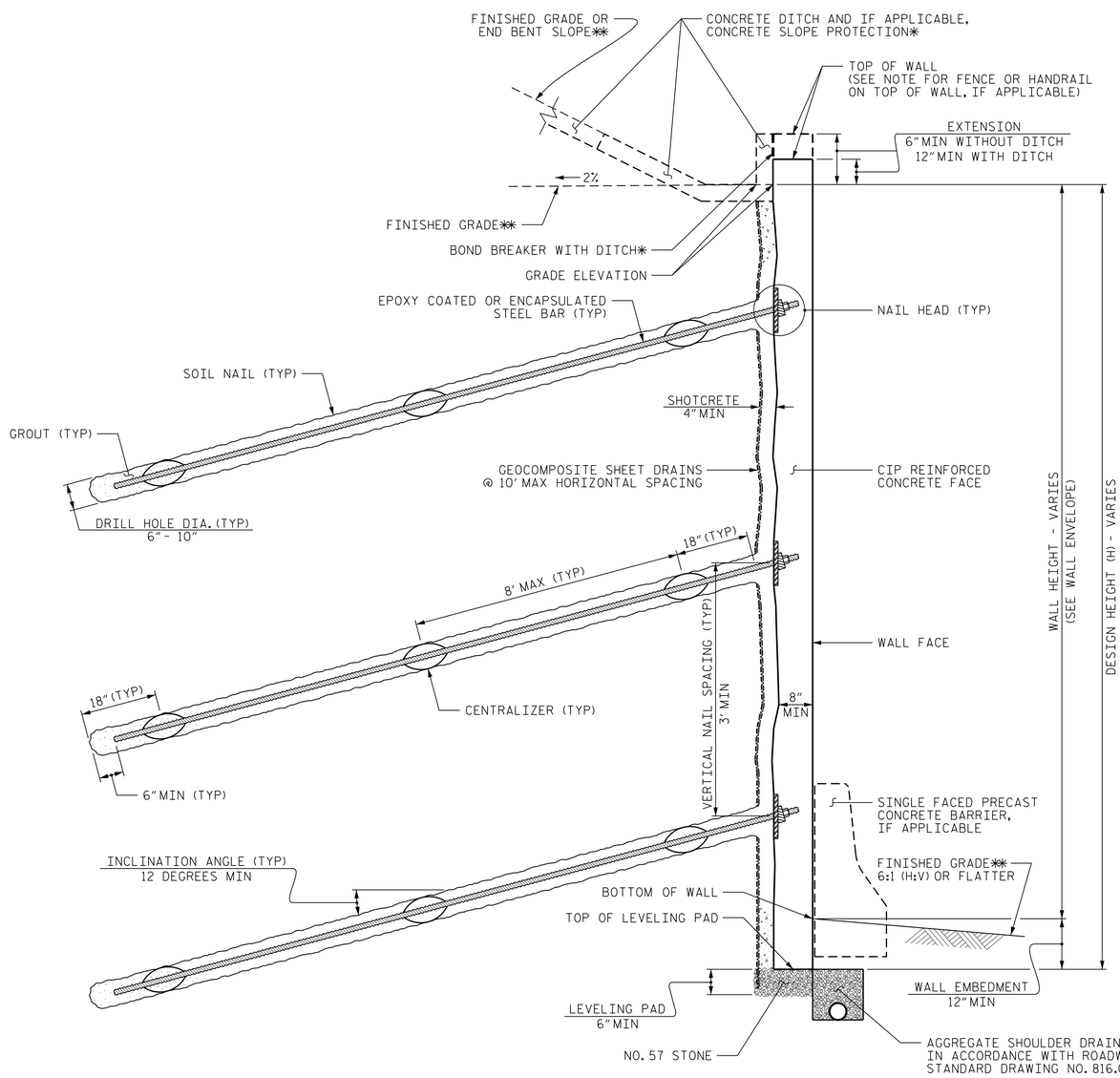
GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NOS. 1, 2, 3, 4 AND 5 MSE RETAINING WALL NOTES AND DETAILS

REVISIONS

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

SHEET NO. W-11



SOIL NAIL WALL - TYPICAL SECTION

*SEE CONCRETE DITCH BEHIND WALL DETAILS.
**SEE PLANS FOR FINISHED GRADE OR END BENT SLOPE DETAILS.

NOTES:

FOR SOIL NAIL RETAINING WALLS, SEE SOIL NAIL RETAINING WALLS PROVISION.

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

BEFORE BEGINNING SOIL NAIL WALL DESIGN FOR RETAINING WALL NOS. 6 AND 7, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NOS. 6 AND 7 FOR THE FOLLOWING:
1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MINIMUM SOIL NAIL REINFORCEMENT LENGTH = 2.5*H OR 10 FT, WHICHEVER IS GREATER
4) MINIMUM WALL EMBEDMENT ELEVATION = 1 FT
5) IN-SITU ASSUMED MATERIAL PARAMETERS:
UNIT WEIGHT, γ = 120 PCF
FRICTION ANGLE, f = 30 DEGREES
COHESION, c = 0 PSF

THE WALL SITE FOR RETAINING WALL NOS. 6 AND 7 ARE CLASSIFIED AS AASHTO SITE CLASS D.

DESIGN RETAINING WALL NOS. 6 AND 7 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

FOUNDATIONS FOR BRIDGE 394 WILL INTERFERE WITH SOIL NAILS FOR RETAINING WALL NOS. 6 AND 7. FIELD VERIFY EXISTING BRIDGE FOUNDATIONS PRIOR TO SOIL NAIL WALL DESIGN AND ADJUST NAIL LOCATIONS AS NEEDED.

GEOTECHNICAL ENGINEER	ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 028893 ENGINEER MICHAEL H. STEPHENS	
DocuSigned by: 819631SB3C7046C... 06/01/2022	
SIGNATURE DATE	SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO.: 34839.1.1 (U-2579AA)
FORSYTH COUNTY
STATION:
SHEET 12 OF 12 WALL NOS. 6 AND 7

PREPARED BY: MHS	DATE: 6/1/22
REVIEWED BY: SCC	DATE: 6/1/22

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

RETAINING WALL NOS. 6 AND 7
SOIL NAIL RETAINING WALLS
TYPICAL SECTION AND NOTES

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			W-12
2			4			