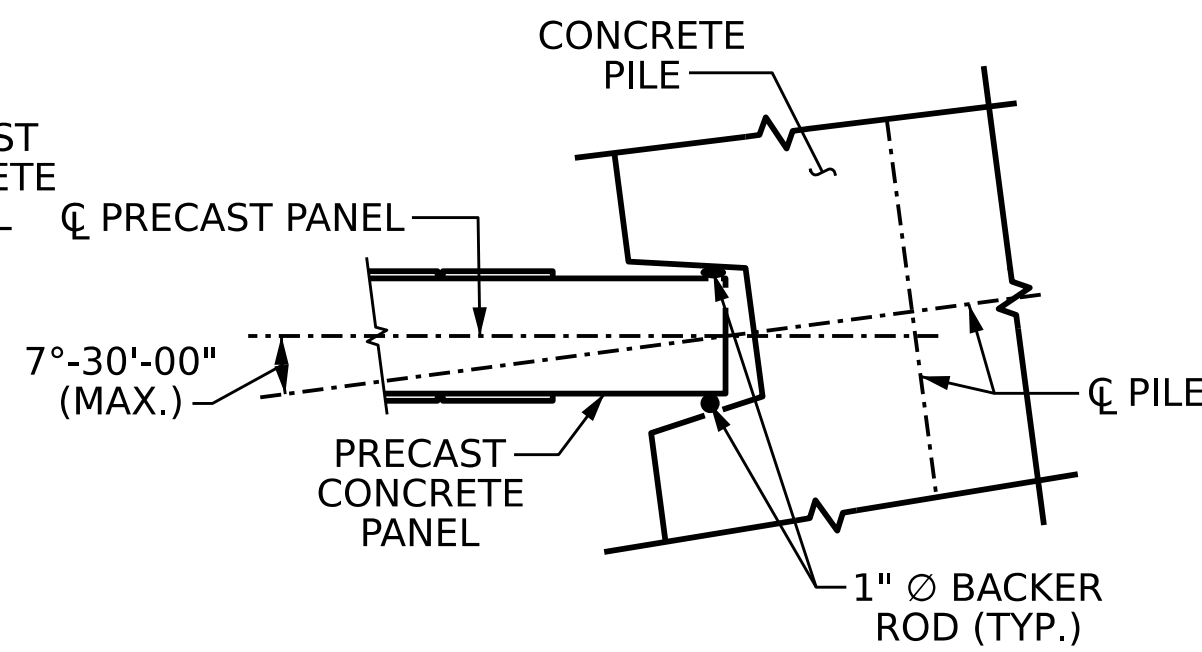
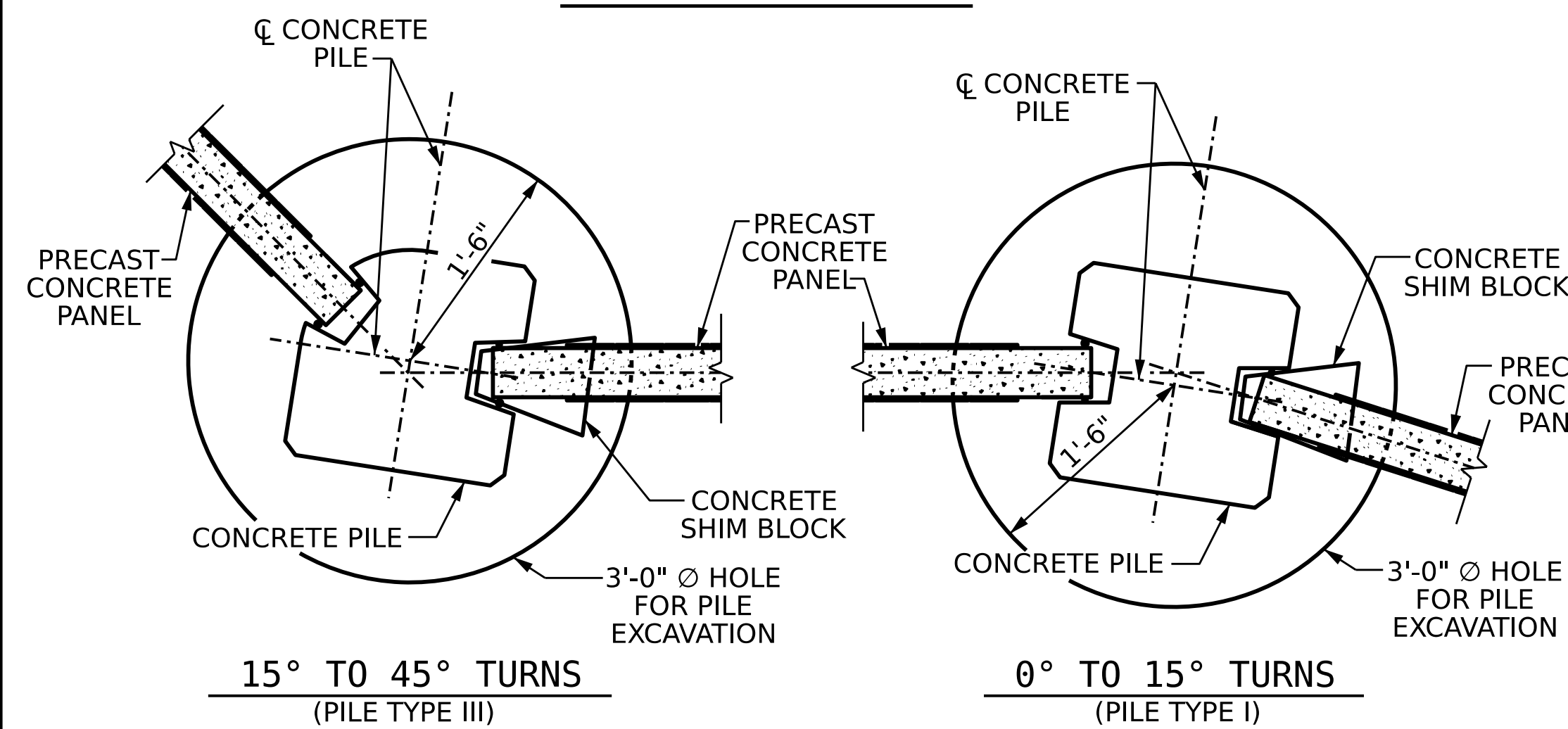
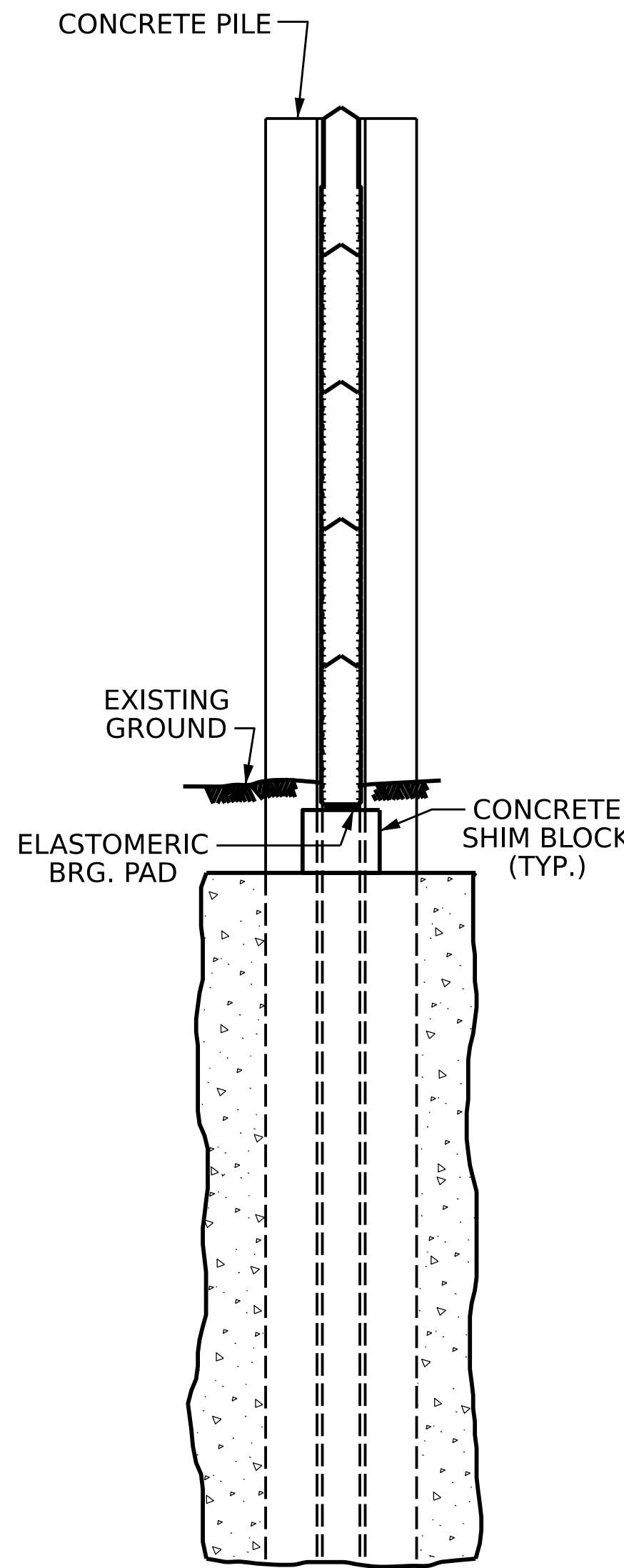
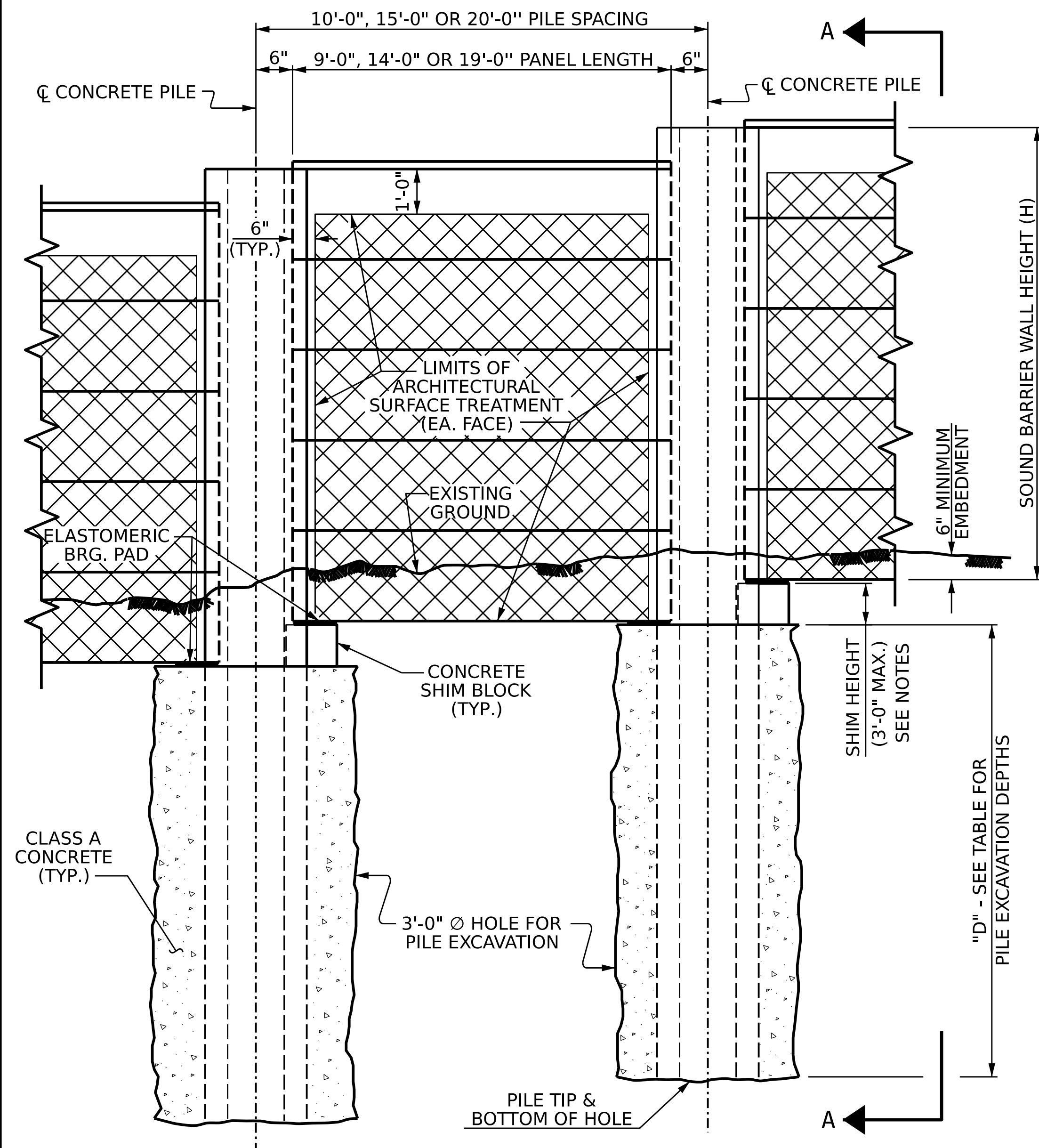




PILE REINFORCING STEEL WIND EXPOSURE CATEGORY B, DESIGN WIND PRESSURE = 27 PSF					
		PILE TYPE I	PILE TYPE II	PILE TYPE III	PILE TYPE III ALT.
PILE SPACING	MAXIMUM WALL HEIGHT (H)	VERTICAL REINFORCING STEEL	VERTICAL REINFORCING STEEL	VERTICAL REINFORCING STEEL	VERTICAL REINFORCING STEEL
10' - 0"	H ≤ 20'	4 - #5 EA. FACE	4 - #5 EA. FACE	3 - #5 SHORT FACE 4 - #5 LONG FACE	3 - #5 SHORT FACE 4 - #5 LONG FACE
	20' < H ≤ 25'	4 - #6 EA. FACE	4 - #5 EA. FACE	3 - #7 SHORT FACE 4 - #7 LONG FACE	3 - #7 SHORT FACE 4 - #7 LONG FACE
	25' < H ≤ 30'	4 - #7 EA. FACE	4 - #7 EA. FACE	3 - #8 SHORT FACE 4 - #8 LONG FACE	3 - #8 SHORT FACE 4 - #8 LONG FACE
15' - 0"	H ≤ 20'	4 - #6 EA. FACE	4 - #5 EA. FACE	3 - #6 SHORT FACE 4 - #6 LONG FACE	3 - #6 SHORT FACE 4 - #6 LONG FACE
	20' < H ≤ 25'	4 - #7 EA. FACE	4 - #7 EA. FACE	3 - #8 SHORT FACE 4 - #8 LONG FACE	3 - #8 SHORT FACE 4 - #8 LONG FACE
	25' < H ≤ 30'	4 - #8 EA. FACE	4 - #8 EA. FACE	3 - #10 SHORT FACE 4 - #10 LONG FACE	3 - #10 SHORT FACE 4 - #10 LONG FACE
20' - 0"	H ≤ 20'	4 - #6 EA. FACE	4 - #6 EA. FACE	3 - #7 SHORT FACE 4 - #7 LONG FACE	3 - #7 SHORT FACE 4 - #7 LONG FACE
	20' < H ≤ 25'	4 - #8 EA. FACE	4 - #8 EA. FACE	3 - #9 SHORT FACE 4 - #9 LONG FACE	3 - #9 SHORT FACE 4 - #9 LONG FACE
	25' < H ≤ 30'	4 - #10 EA. FACE	4 - #10 EA. FACE	3 - #11 SHORT FACE 4 - #11 LONG FACE	3 - #11 SHORT FACE 4 - #11 LONG FACE

NOTES

SOUND ABSORPTIVE WALL PANELS ARE REQUIRED FOR -NW6/8-, -NW7B- PANEL NUMBERS 56-99, AND -NW7C-. FOR SOUND ABSORPTIVE BARRIER WALL, SEE SPECIAL PROVISIONS.

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 CONCRETE FOR PANELS AND CLASS A CONCRETE FOR PILE
EXCAVATION BACKFILL, IN ACCORDANCE WITH ARTICLE 1000-3 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 VENDOR 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.

FOR LAYOUT AND DETAILS OF #3 TIE BARS, SEE STD. SBW3.

THE MAXIMUM HEIGHT OF THE SHIM BLOCKS SHALL NOT EXCEED 3'-0". AT LOCATIONS WHERE THE DROP OR RISE AT THE BOTTOM OF THE CONCRETE PANELS EXCEED 3'-0", THE CONTRACTOR SHALL SUBMIT PLANS FOR REVIEW AND APPROVAL FOR AN ALTERNATE METHOD FOR SUPPORTING THE PANELS.

LIGHTWEIGHT SOUND ABSORPTIVE WALL PANELS SHALL BE INSTALLED AT BRIDGE LOCATION. SEE BRIDGE PLANS FOR INSTALLATION DETAILS AND PILE TYPE/SPACING. FOR SOUND ABSORPTIVE BARRIER WALL (BRIDGE-MOUNTED), SEE SPECIAL PROVISIONS.

PROJECT NO. I-2513AC
BUNCOMBE COUNTY
 STATION: VARIES

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SOUND BARRIER WALL
(CONCRETE PILES)

ASSEMBLED BY : _____		J. MYA	DATE : <u>1/2026</u>
CHECKED BY : _____		R. FISHER	DATE : <u>1/2026</u>
DESIGN ENGINEER OF RECORD : _____		R. FISHER	DATE : <u>1/2026</u>
DRAWN BY : MAA		6/11	REV. 10/17 MAA/THC
CHECKED BY : GM		6/11	REV. 05/18 MAA/THC
			REV. 12/23 BNB/AYG

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REVISIONS					
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1			3		
2			4		

SHEET NO.	SBW-1
TOTAL SHEETS	6

GFT

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919-420-7660
NC Lic. No. F-0270

STD. NO. SBW1

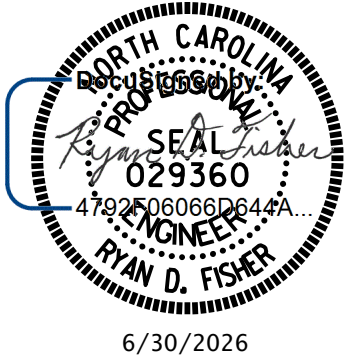
PILE EXCAVATION DEPTH "D"								
PANEL NO.	BEGIN WALL STATION	END WALL STATION	FRONT SLOPE CONDITION	PANEL HEIGHT (FT.)	STANDARD NOISE WALL FOUNDATION TABLES	PILE EXCAVATION DEPTH "D" (FT.)		
						S= 10 FT.	S= 15 FT.	S= 20 FT.
NOISE WALL 7A (-NW7A- 10+00 TO -NW7A- 13+75)								
1-24	10+00	13+75	FLAT	29-30	27-4	10	11	12
NOISE WALL 7B (-NW7B- 10+00 TO -NW7B- 24+77.94)								
1-20	10+00	13+00	2: 1	23-25	27-2	12	14	15
21-31	13+00	14+60	2: 1	25-26	27-2	13	15	17
32-37	14+60	15+50	2: 1	21-25	27-2	12	14	15
38-42	15+50	16+10	SEE AMBOY ROAD LEFT BRIDGE (B898) PLANS FOR NOISE WALL PANEL TO CONCRETE BARRIER CONNECTION					
42-52	16+10	17+75	SEE AMBOY ROAD LEFT BRIDGE (B898) PLANS FOR NOISE WALL PANEL TO BRIDGE CONNECTION DETAILS					
53-55	17+75	18+22.94	SEE AMBOY ROAD LEFT BRIDGE (B898) PLANS FOR NOISE WALL PANEL TO CONCRETE BARRIER CONNECTION					
56-62	18+22.94	19+27.94	FLAT	17-19	27-4	--	9	--
63-79	19+27.94	21+82.94	2: 1	15-18	27-2	--	12	--
80-99	21+82.94	24+77.94	2: 1	13-15	27-2	9	10	--
NOISE WALL 7C (-NW7C- 10+60 TO -NW7C- 20+05)								
1-3	10+60	11+05	2: 1	16-18	27-2	--	12	--
4-8	11+05	11+80	2: 1	14-15	27-2	--	10	--
9-28	11+80	14+80	2: 1	16-20	27-2	--	12	--
29-31	14+80	15+25	2: 1	21-22	27-2	--	14	--
32-34	15+25	15+70	2: 1	17-20	27-2	--	12	--
35-52	15+70	18+35	2: 1	7-15	27-2	9	10	--
53-55	18+35	18+70	2: 1	16-20	27-2	10	12	--
56-57	18+70	19+00	2: 1	22-25	27-2	--	14	--
58-62	19+00	19+75	2: 1	26-27	27-2	--	15	--
63-64	19+75	20+05	2: 1	25	27-2	--	14	--
NOISE WALL 7C (-NW7C- 20+05 TO -NW7C- 28+85)								
65-67	20+05	20+45	3: 1 TO 6: 1	22-24	27-2	12	14	--
68-79	20+45	22+00	3: 1 TO 6: 1	16-20	27-2	10	12	13
80-82	22+00	22+45	3: 1 TO 6: 1	15	27-2	--	10	--
83-89	22+45	23+50	3: 1 TO 6: 1	16	27-2	--	12	--
90-92	23+50	23+95	2: 1 TO 3: 1	15	27-2	--	10	--
93-99	23+95	25+05	2: 1 TO 3: 1	16-17	27-2	--	12	13
100-101	25+05	25+35	2: 1 TO 3: 1	13-15	27-2	--	10	--
102-112	25+35	27+00	SEE STATE STREET LEFT BRIDGE PLANS FOR PANEL SPACING AND ELEVATIONS					
113-116	27+00	27+55	NOISE WALL WITHIN MSE WALL NO. 25-SEE WALL DETAIL FOR PANEL SPACING AND ELEVATIONS					
117-121	27+55	28+30	2: 1	14-15	27-2	--	10	--
122-125	28+30	28+85	3: 1 TO 6: 1	13-14	27-2	9	10	--

NOTES: STANDARD SOUND BARRIER WALL FOUNDATION FOR A WIND LOAD OF 27 PSF WERE USED FOR ALL CASES EXCEPT FOR THOSE LISTED N/A
 PILE EXCAVATION DEPTHS ARE BASED ON A 36-INCH DIAMETER EXCAVATION
 S = PANEL SPACING
 USE MIN. EXCAVATION DEPTH IN STANDARD TABLES FOR A SIMILAR DESIGN CASE

BILL OF MATERIAL	
SOUND BARRIER WALL NO. -NW3-	45,906 S.F.
ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)	76,348 S.F.
SOUND BARRIER WALL NO. -NW5A-	24,964 S.F.
ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)	41,288 S.F.
SOUND ABSORPTIVE BARRIER WALL NO. -NW6/8-	26,683 S.F.
ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)	47,768 S.F.
SOUND BARRIER WALL NO. -NW7A-	11,099 S.F.
ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)	18,624 S.F.
SOUND BARRIER WALL NO. -NW7B-	13,552 S.F.
ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)	22,470 S.F.
SOUND ABSORPTIVE BARRIER WALL NO. -NW7B-	10,310 S.F.
ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)	16,702 S.F.
SOUND ABSORPTIVE BARRIER WALL NO. -NW7C-	26,523 S.F.
ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)	42,958 S.F.
QUANTITIES PROVIDED ARE APPROXIMATE AND ARE FOR BID PURPOSES ONLY.	
ARCHITECTURAL SURFACE TREATMENT	
TEXTURE OPTION:	DRystack
STAIN OPTION:	FS 33522 OR FS 30372

PROJECT NO. I-2513AC
BUNCOMBE COUNTY
 STATION: VARIES

SHEET 3 OF 6

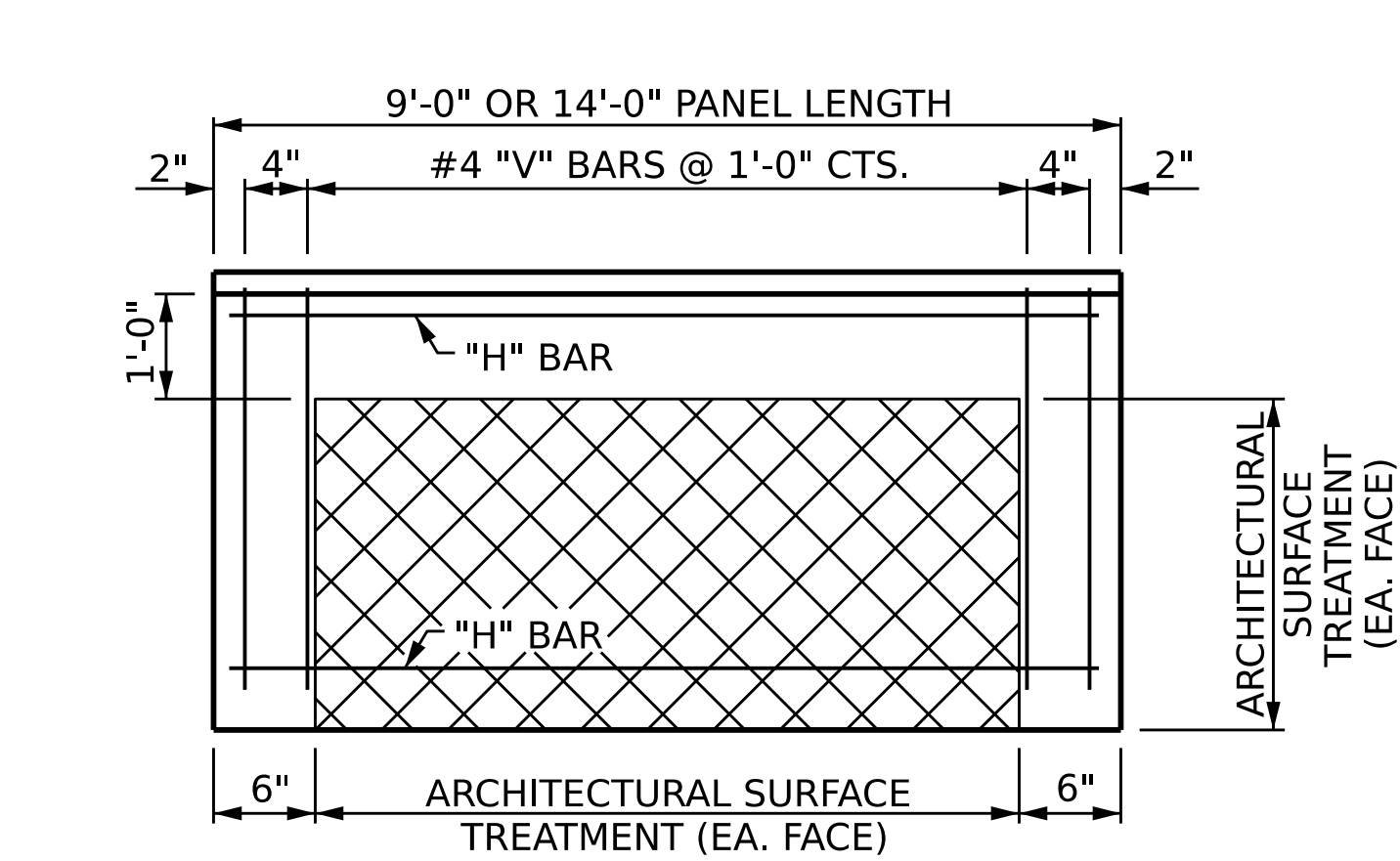


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SOUND BARRIER WALL (CONCRETE PILES)					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED					SBW-3 TOTAL SHEETS 6

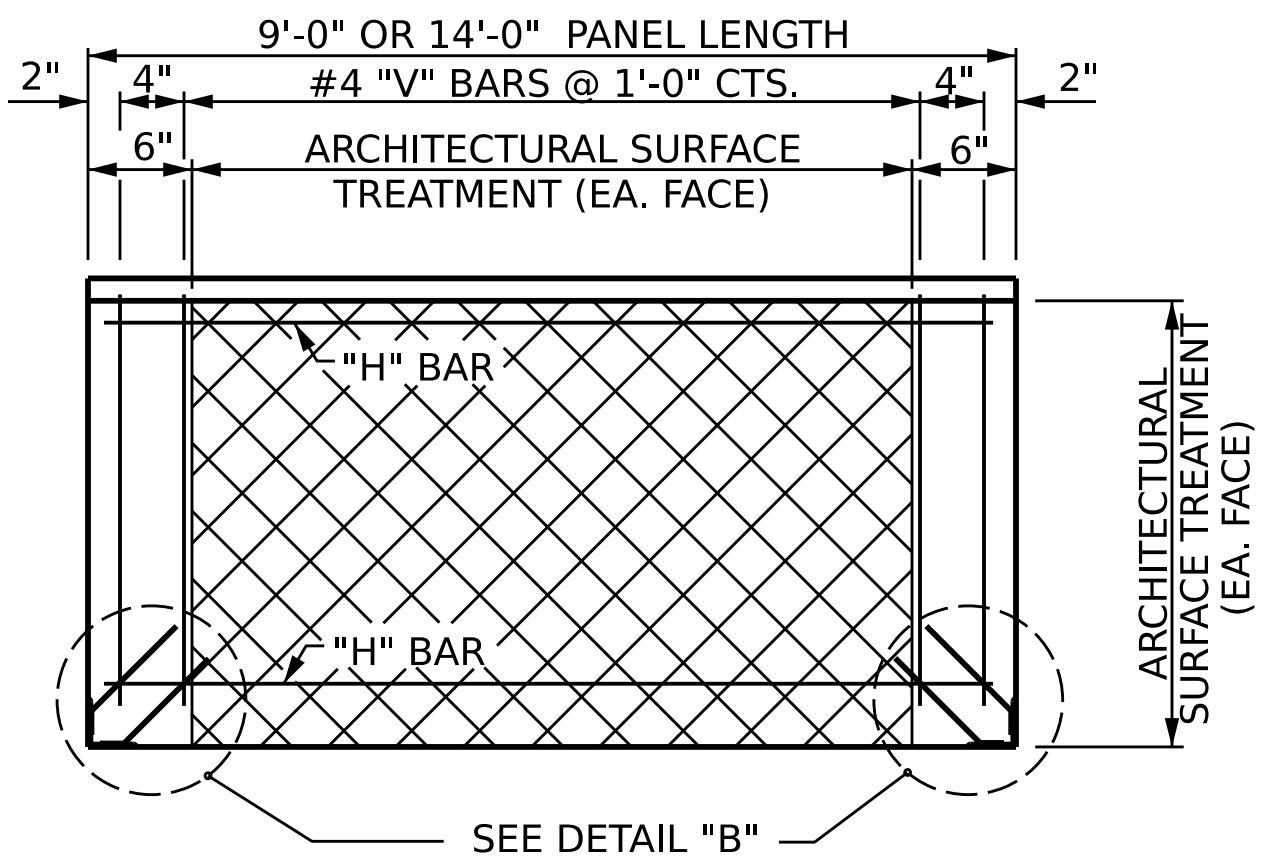


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 919-420-7660
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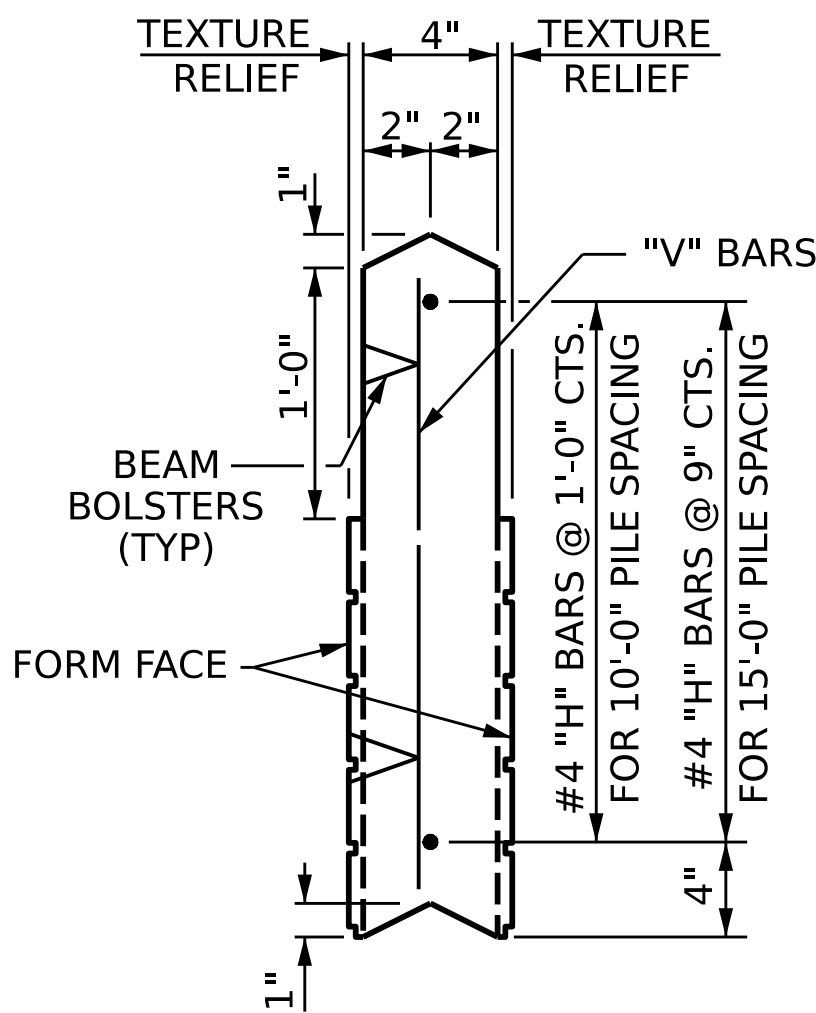
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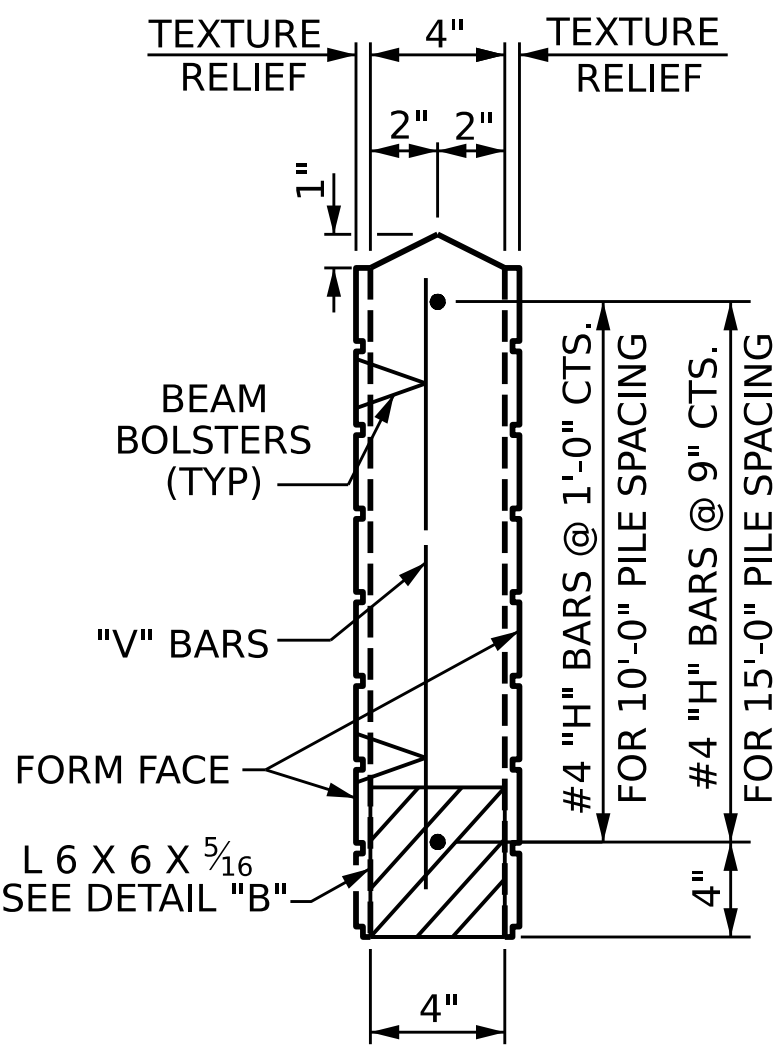
FRONT ELEVATION
OF UPPER PRECAST PANEL



FRONT ELEVATION
OF BOTTOM PRECAST PANEL

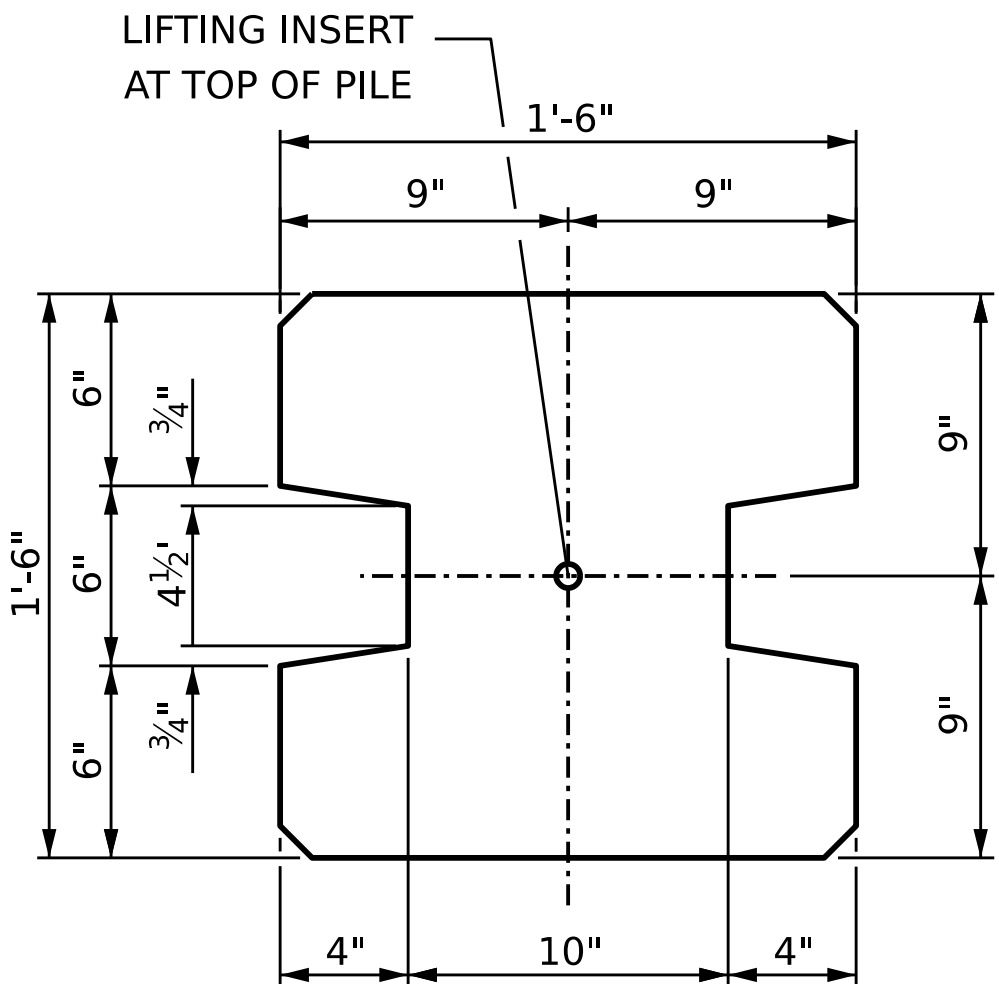


UPPER PANEL

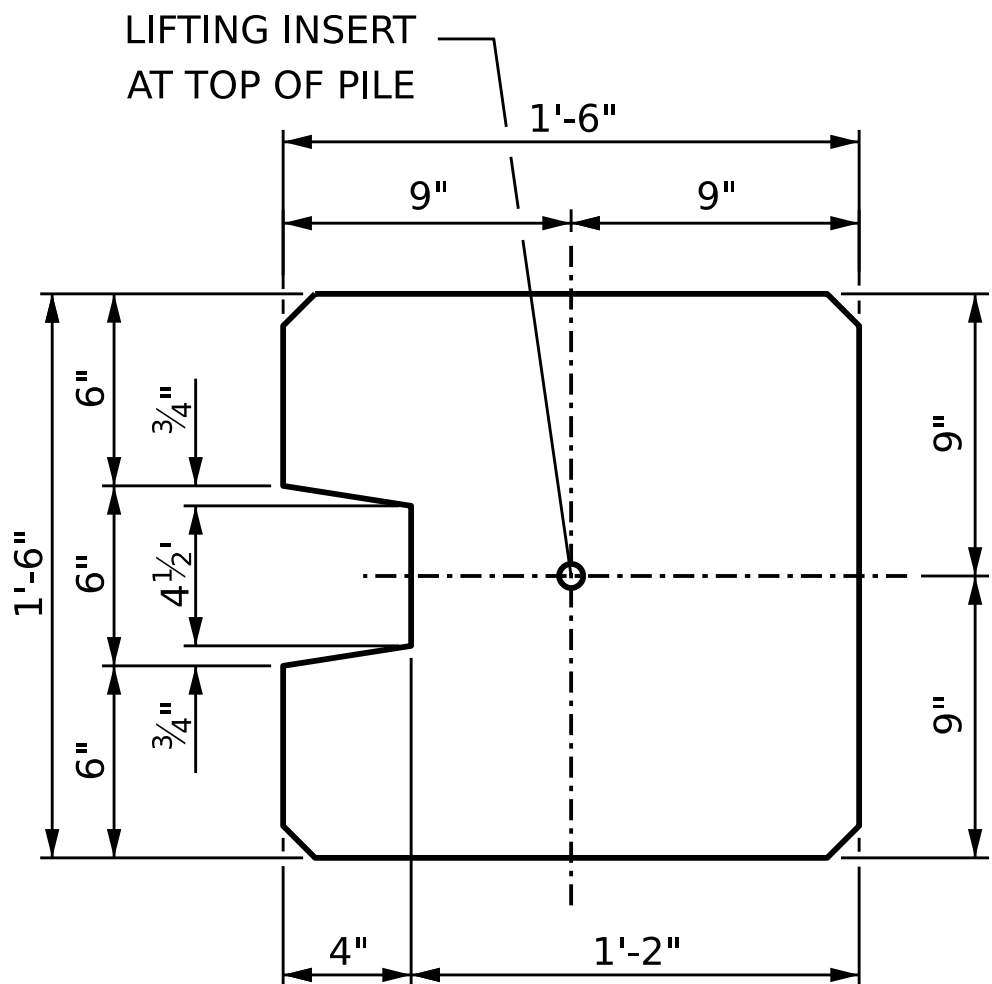


BOTTOM PANEL

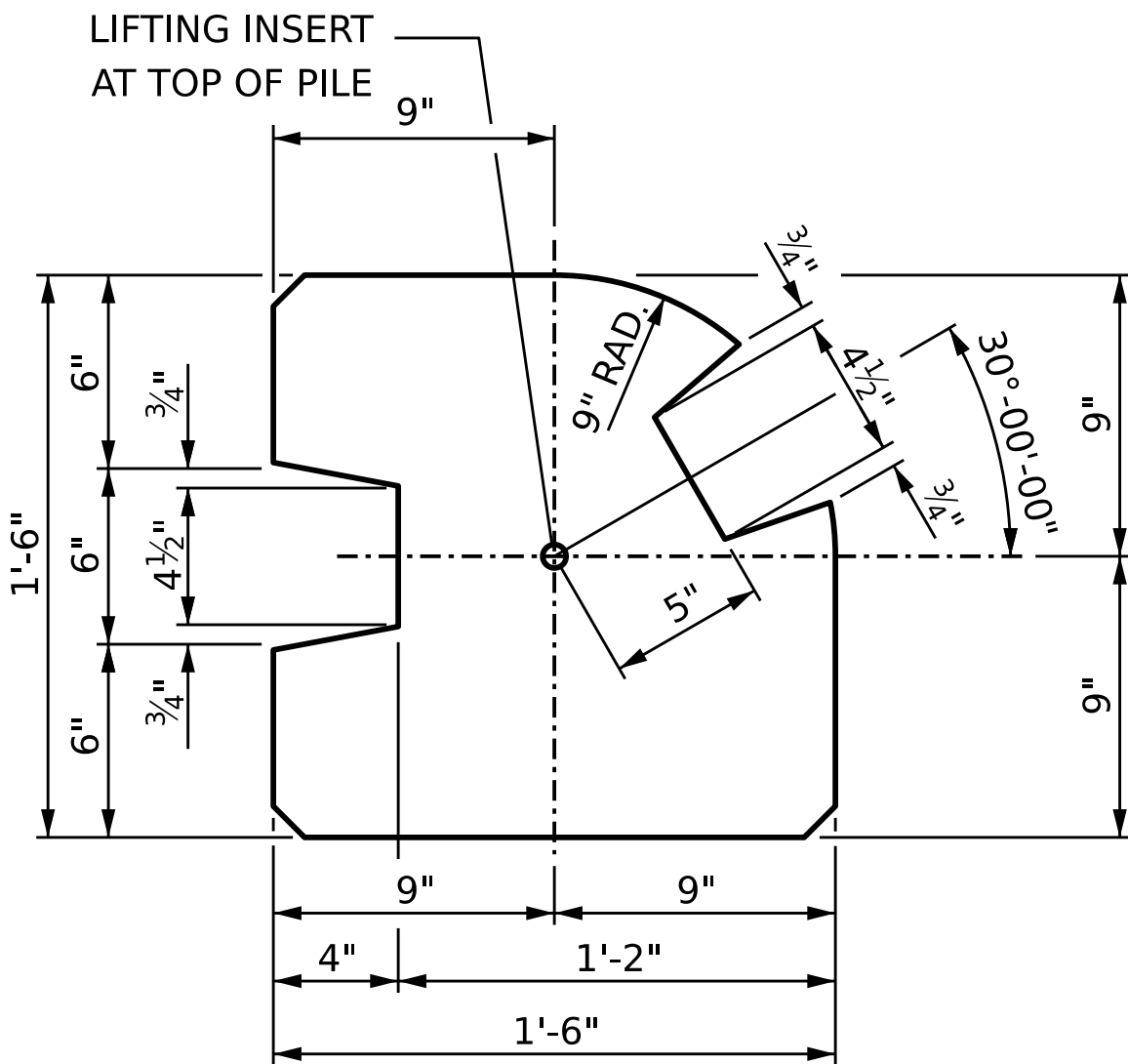
SECTION THROUGH PRECAST PANELS



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



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



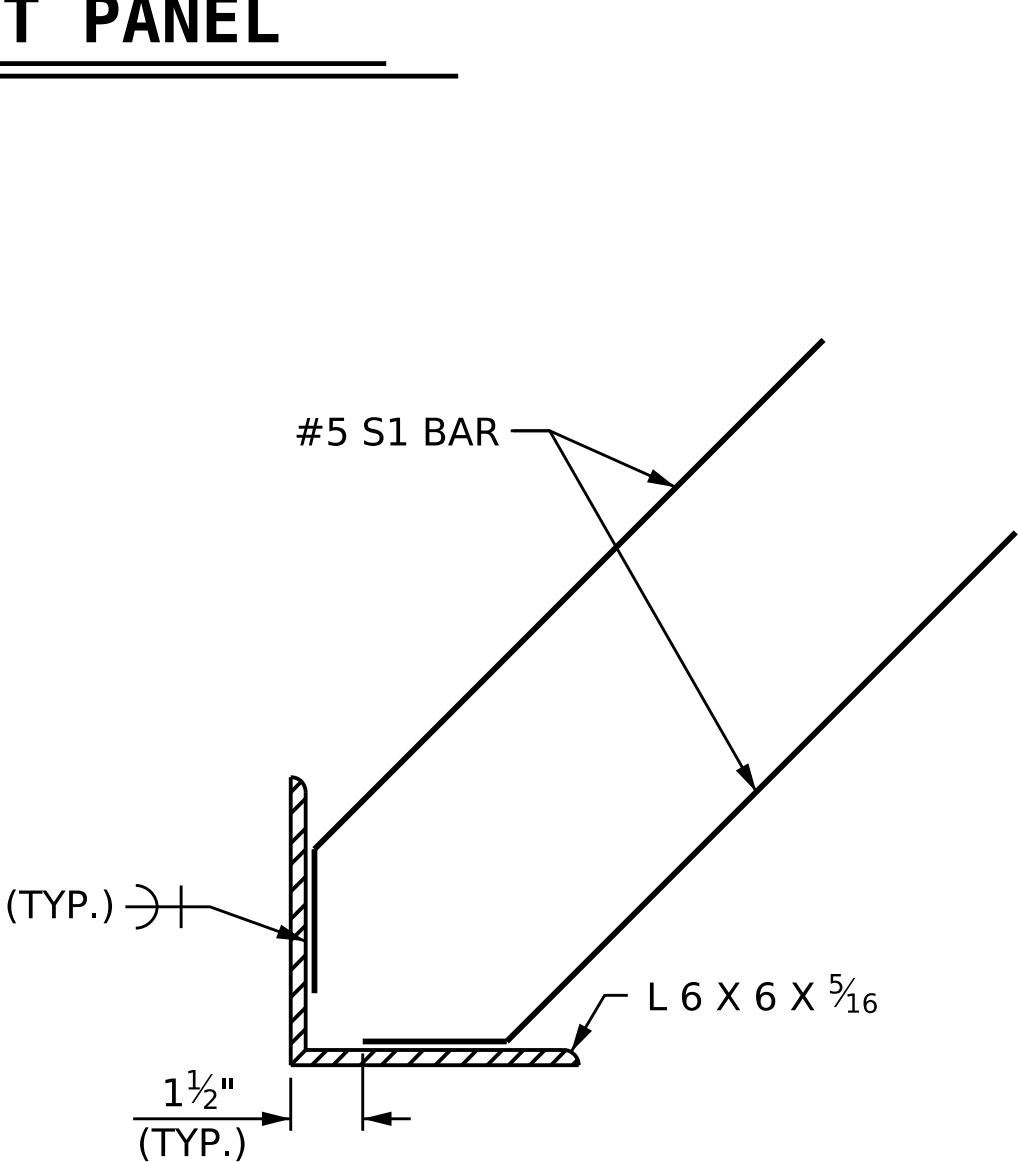
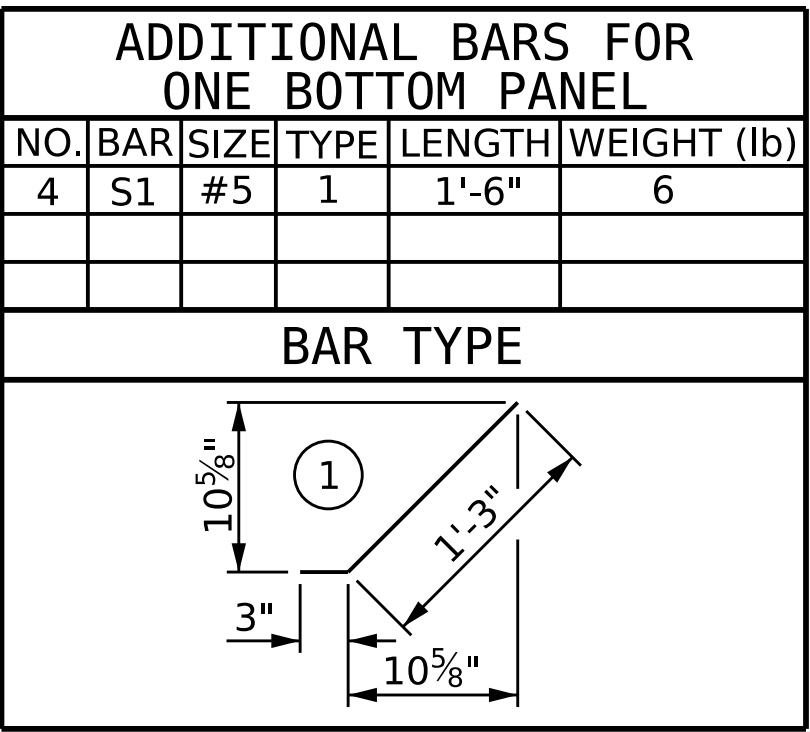
TYPE - III
(AREA = 1.8336 SQ. FT.)

PILE DETAIL

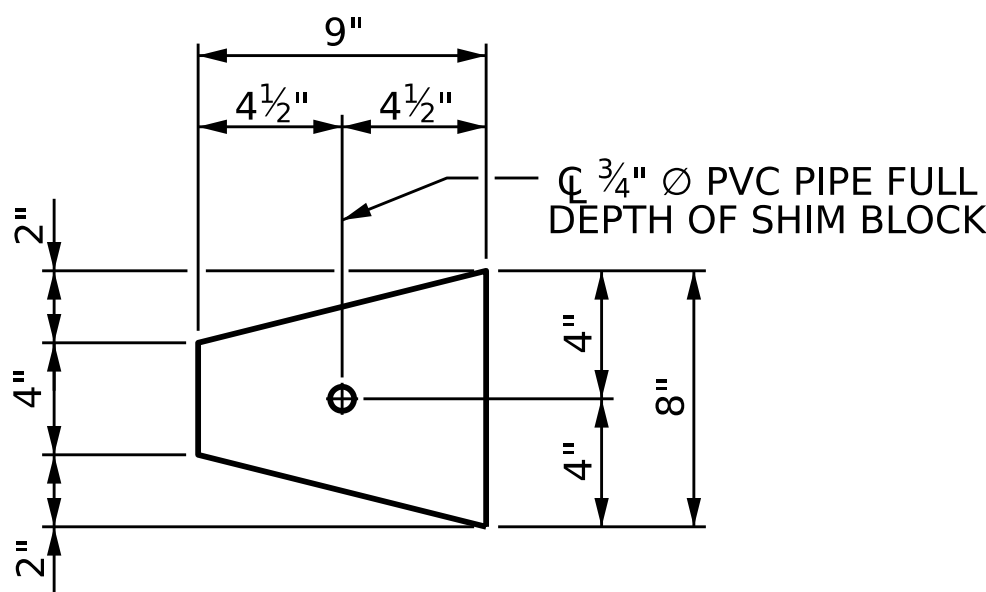
(ALL CORNERS TO BE CHAMFERED 1")

QUANTITIES FOR ONE PRECAST PANEL (FOR 10'-0" PILE SPACING)											
PANEL HEIGHT	CLASS AA CONCRETE	BAR TYPES									
	C.Y.	HORIZONTAL					VERTICAL				
		NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE
2'-0"	0.22	3	H1	#4	STR	8'-8"	17	11	V1	#4	STR
3'-0"	0.33	4	H2	#4	STR	8'-8"	23	11	V2	#4	STR
4'-0"	0.44	5	H3	#4	STR	8'-8"	29	11	V3	#4	STR

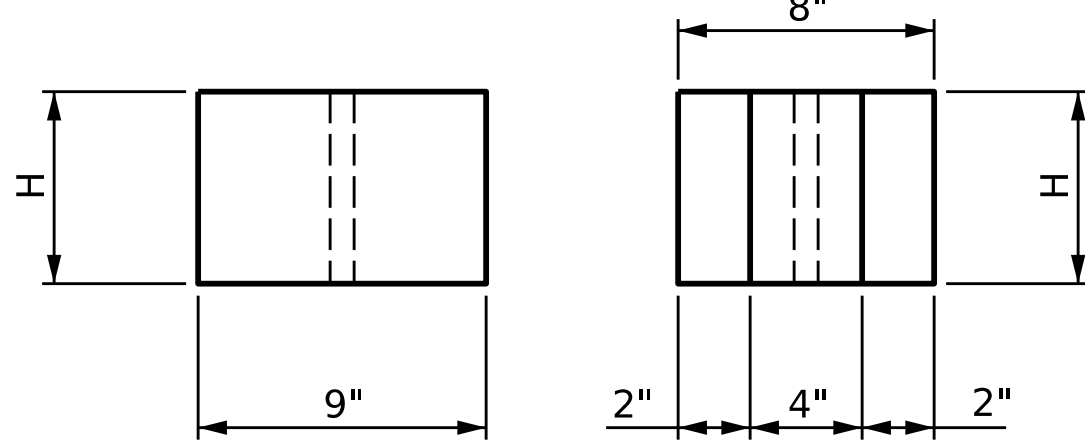
QUANTITIES FOR ONE PRECAST PANEL (FOR 15'-0" PILE SPACING)											
PANEL HEIGHT	CLASS AA CONCRETE	BAR TYPES									
	C.Y.	HORIZONTAL					VERTICAL				
		NO.	BAR	SIZE	TYPE	LENGTH	WEIGHT (lb)	NO.	BAR	SIZE	TYPE
3'-0"	0.52	5	H1	#4	STR	13'-8"	46	16	V1	#4	STR
4'-0"	0.69	6	H2	#4	STR	13'-8"	55	16	V2	#4	STR
5'-0"	0.86	7	H3	#4	STR	13'-8"	64	16	V3	#4	STR
6'-0"	1.04	8	H4	#4	STR	13'-8"	73	16	V4	#4	STR



DETAIL "B"



PLAN

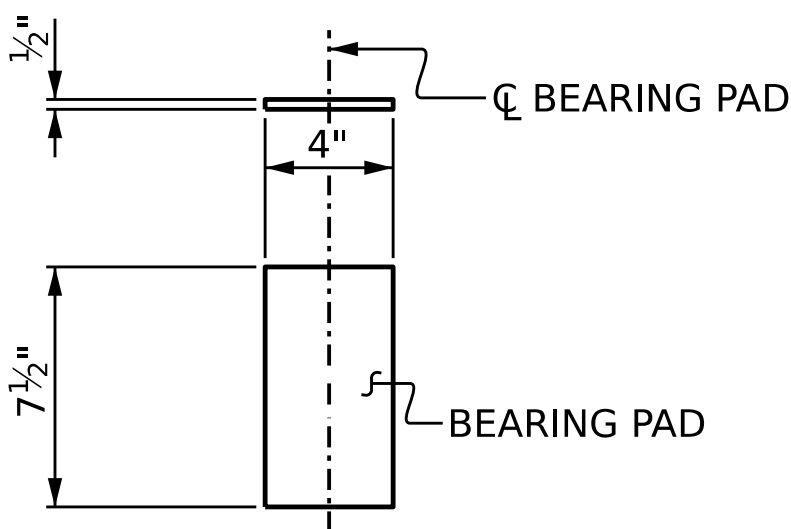


ELEVATION

END

CONCRETE SHIM BLOCK

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



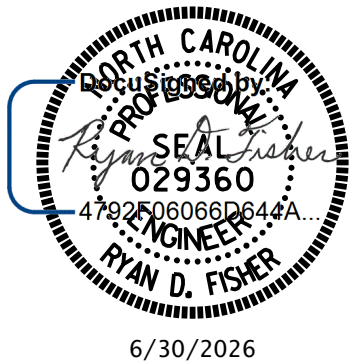
ELASTOMERIC BEARING DETAILS

ELASTOMER IN BEARINGS SHALL BE 50 DUROMETER HARDNESS.

PROJECT NO. **I-2513AC**
BUNCOMBE COUNTY
STATION: **VARIES**

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
**SOUND BARRIER WALL
DETAILS**
(CONCRETE PILES)



ASSEMBLED BY :	J. MYA	DATE :	1/2026
CHECKED BY :	R. FISHER	DATE :	1/2026
DESIGN ENGINEER OF RECORD :	R. FISHER	DATE :	1/2026
DRAWN BY :	MAA	6/11	REV. 10/17 MAA/THC
CHECKED BY :	GM	6/11	REV. 05/18 MAA/THC
			REV. 12/23 BNB/AYG

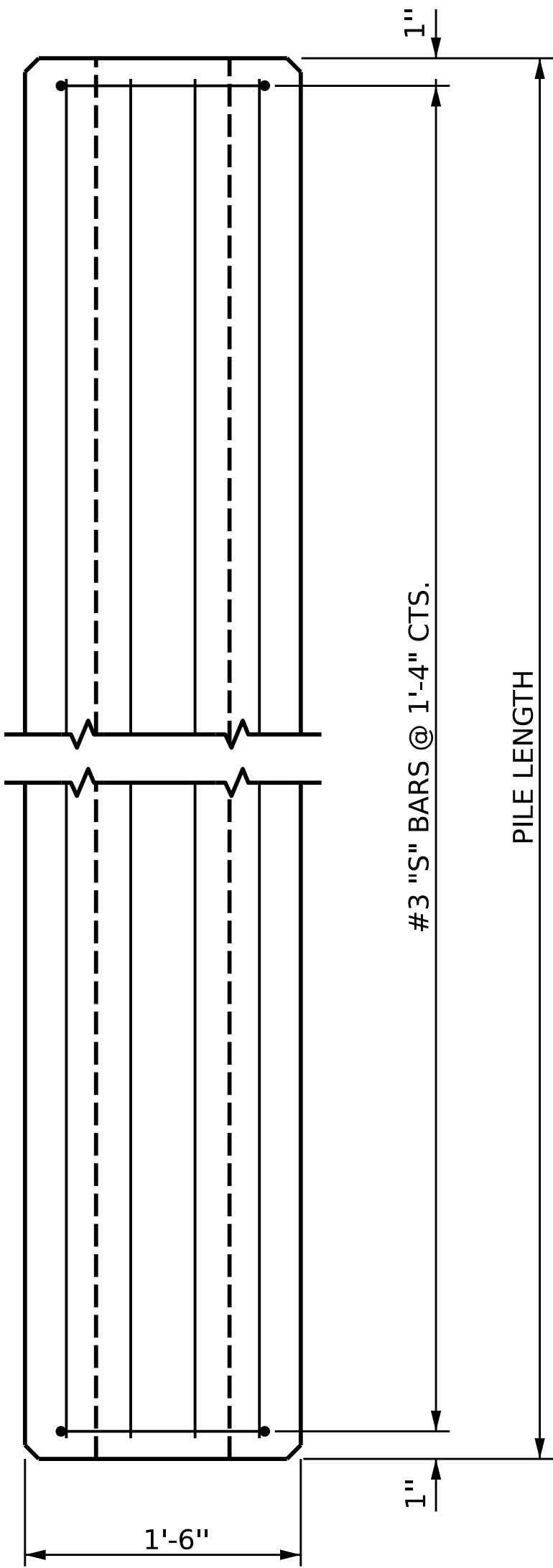


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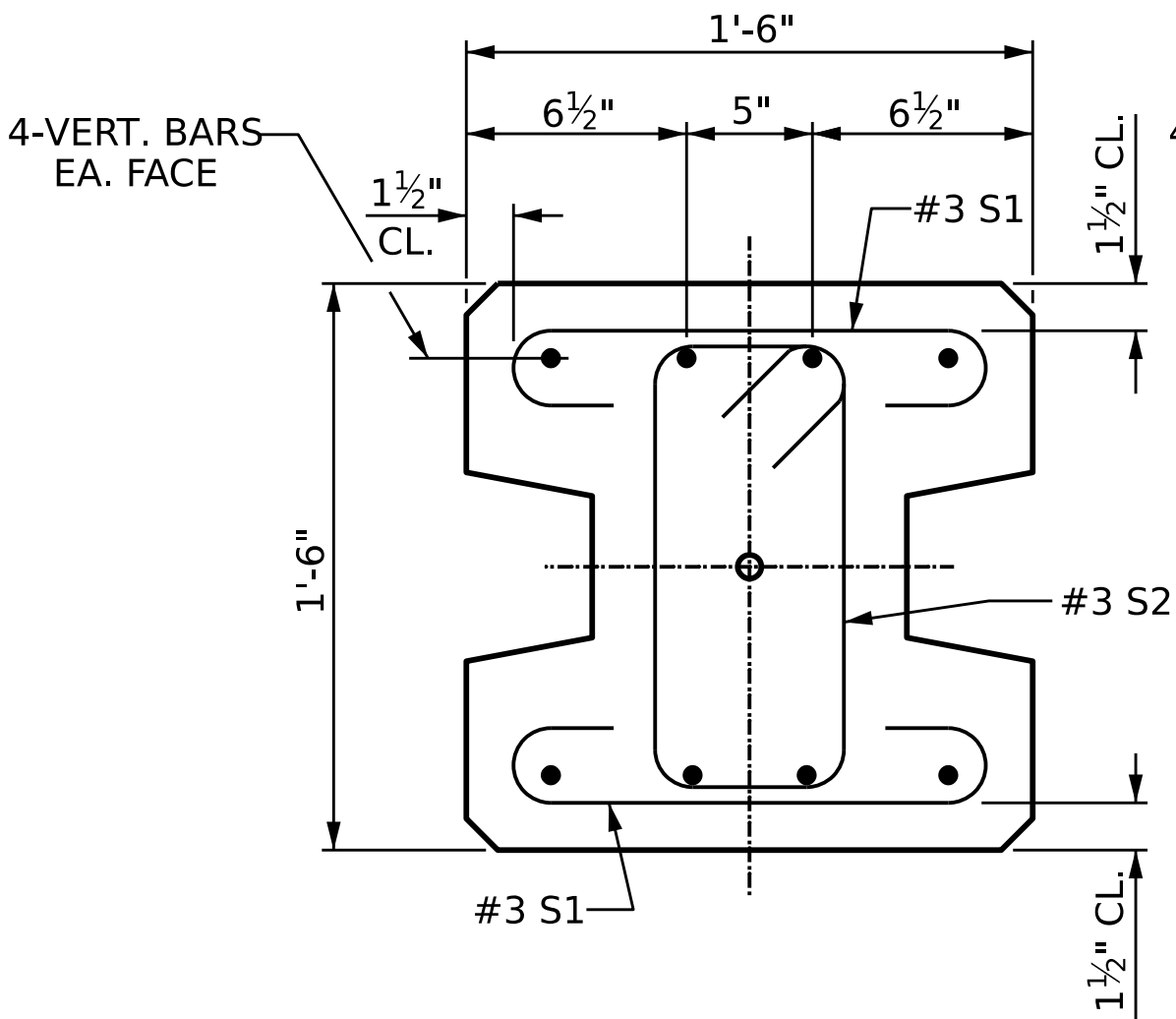
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REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	
1			3	TOTAL SHEETS
2			4	6

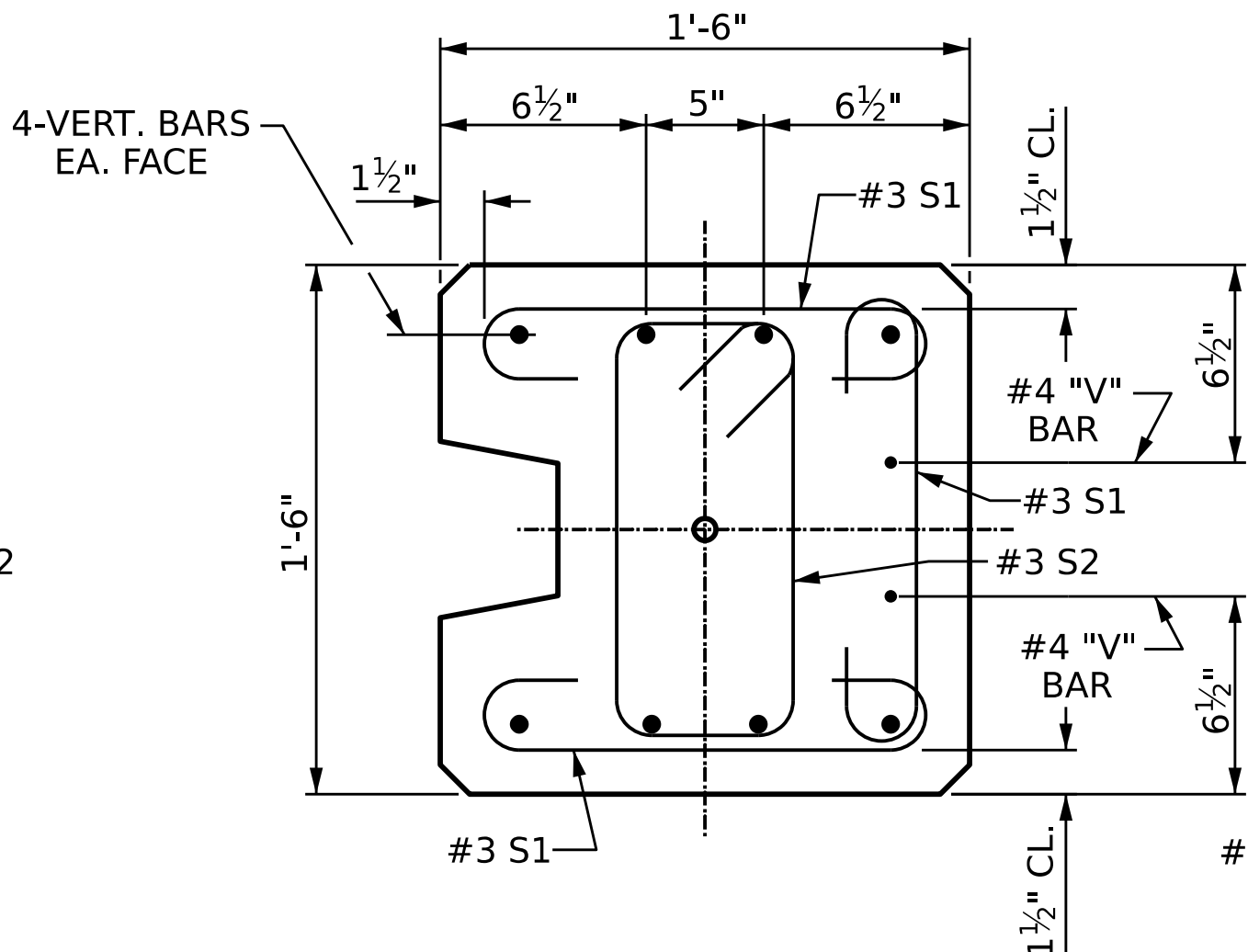
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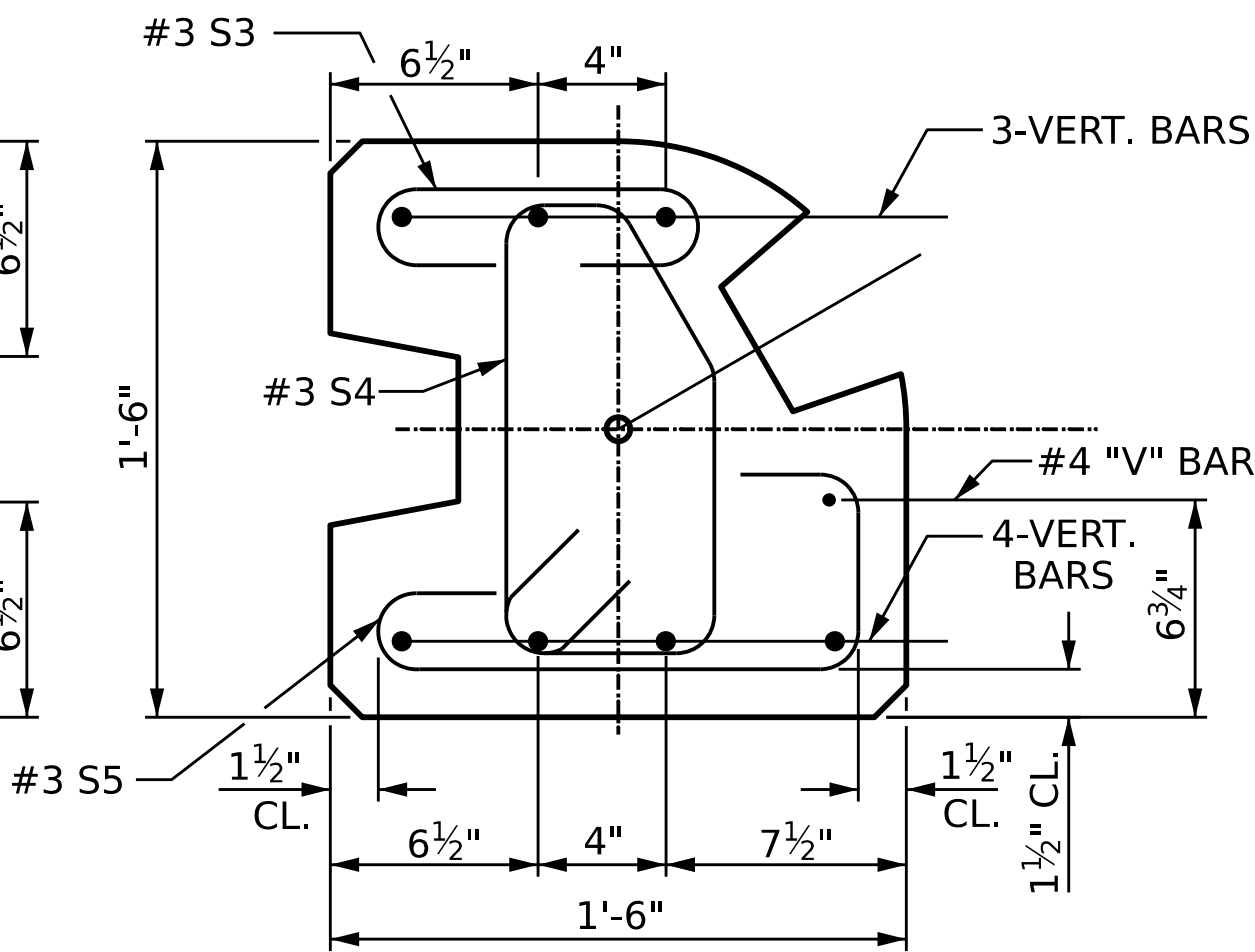
ELEVATION



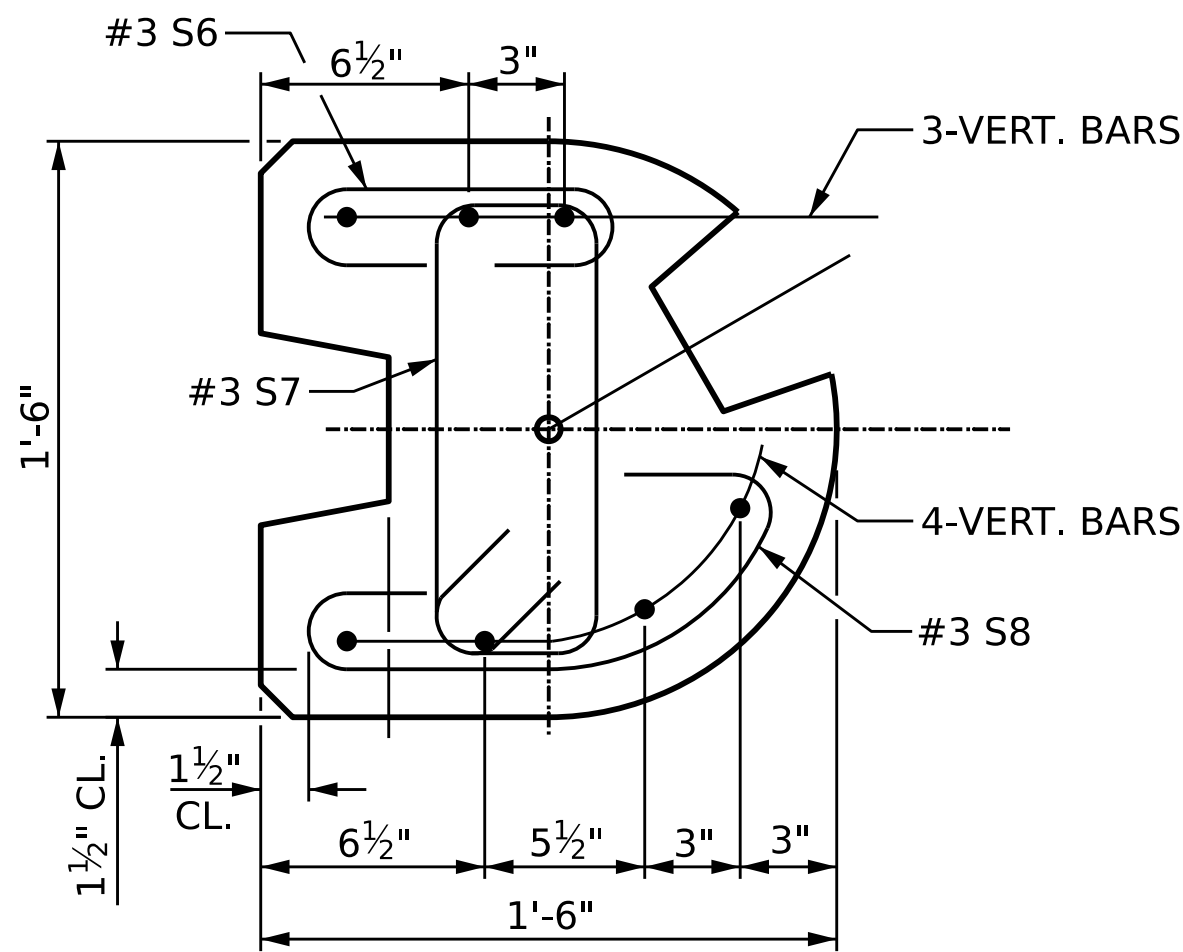
TYPE - I



TYPE - II



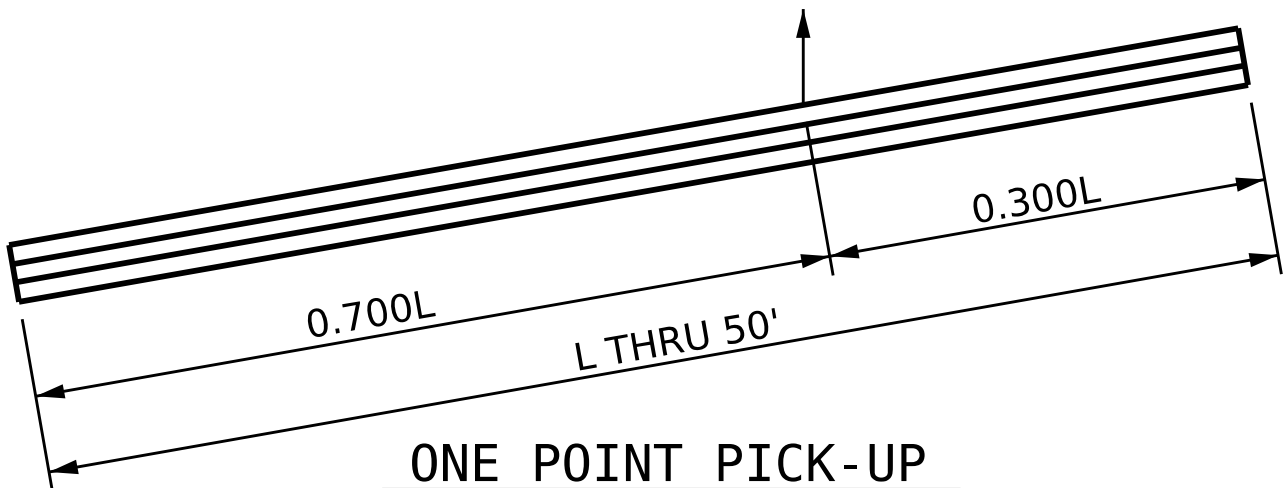
TYPE - III



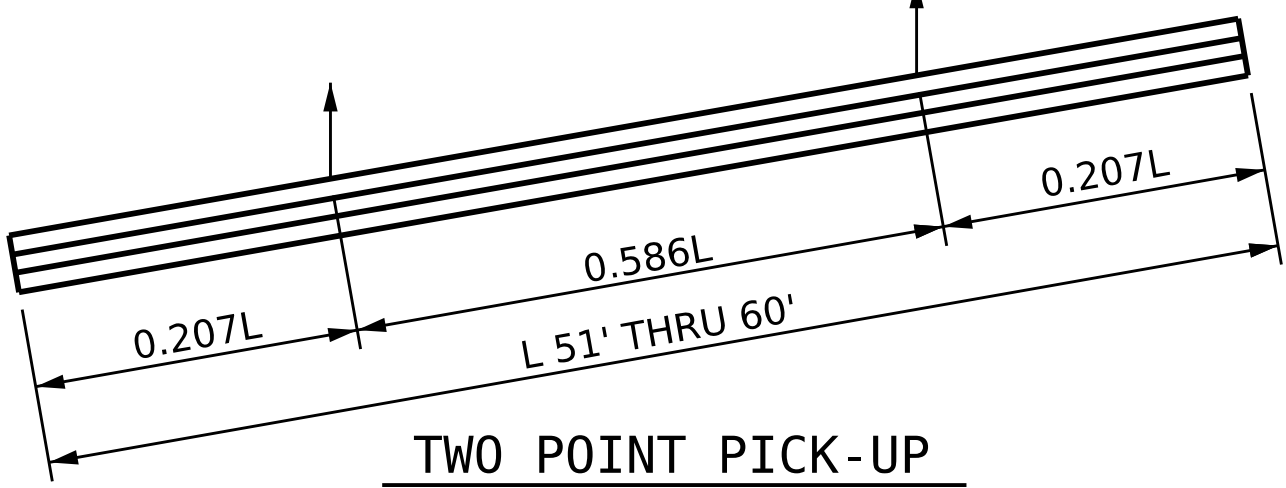
TYPE - III (ALT.)

PILE DETAIL

FOR VERTICAL BAR PILE REINFORCING, SEE SHEET 1 OF 3



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.

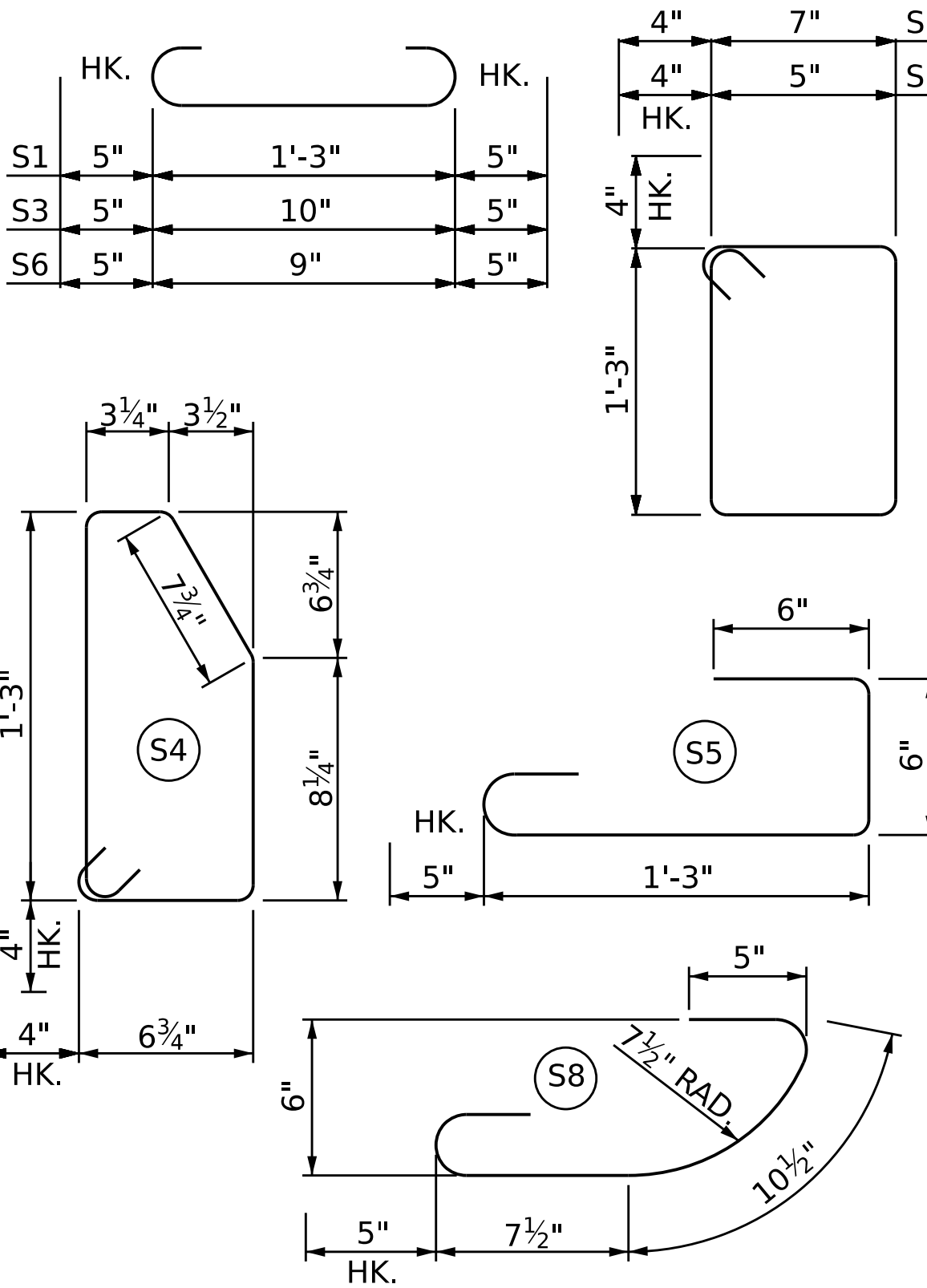
ALL CORNERS TO BE CHAMFERED 1".

#3 @ 1'-4" CTS. TIES TO BE USED WITH ALL PILE TYPES.

QUANTITIES FOR ONE PRECAST CONCRETE PILE

LENGTH	APPROX. PILE WT. TONS	ONE PICK-UP POINT		TWO PICK-UP POINTS	
		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'-4 1/2"	32'-3"
60'-0"	9.42			12'-5"	35'-2"

BAR TYPES



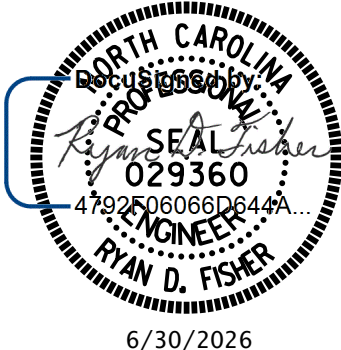
ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. **I-2513AC**
BUNCOMBE COUNTY
STATION: **VARIES**

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
**SOUND BARRIER WALL
DETAILS**
(CONCRETE PILES)



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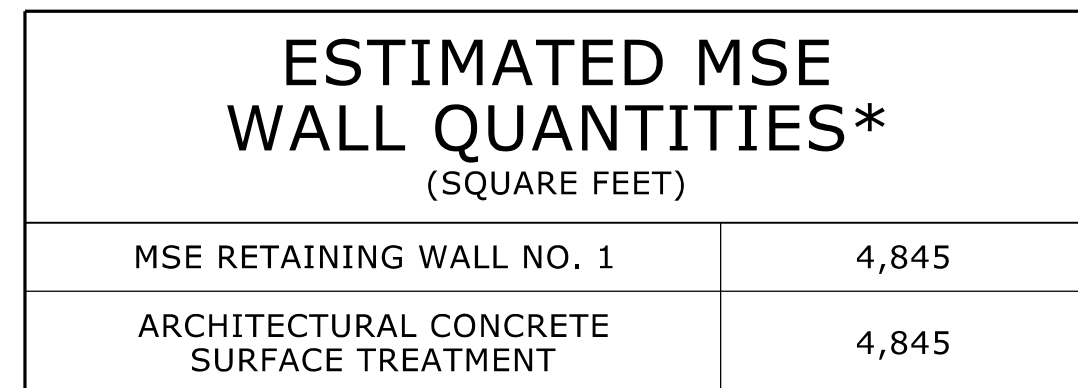
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	
1			3		SBW-5
2			4		TOTAL SHEETS 6



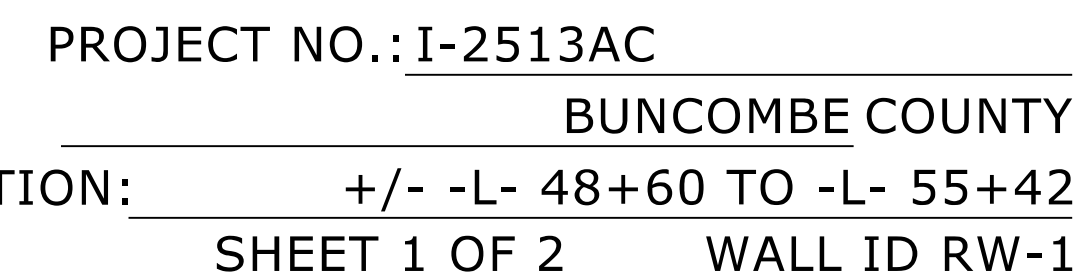
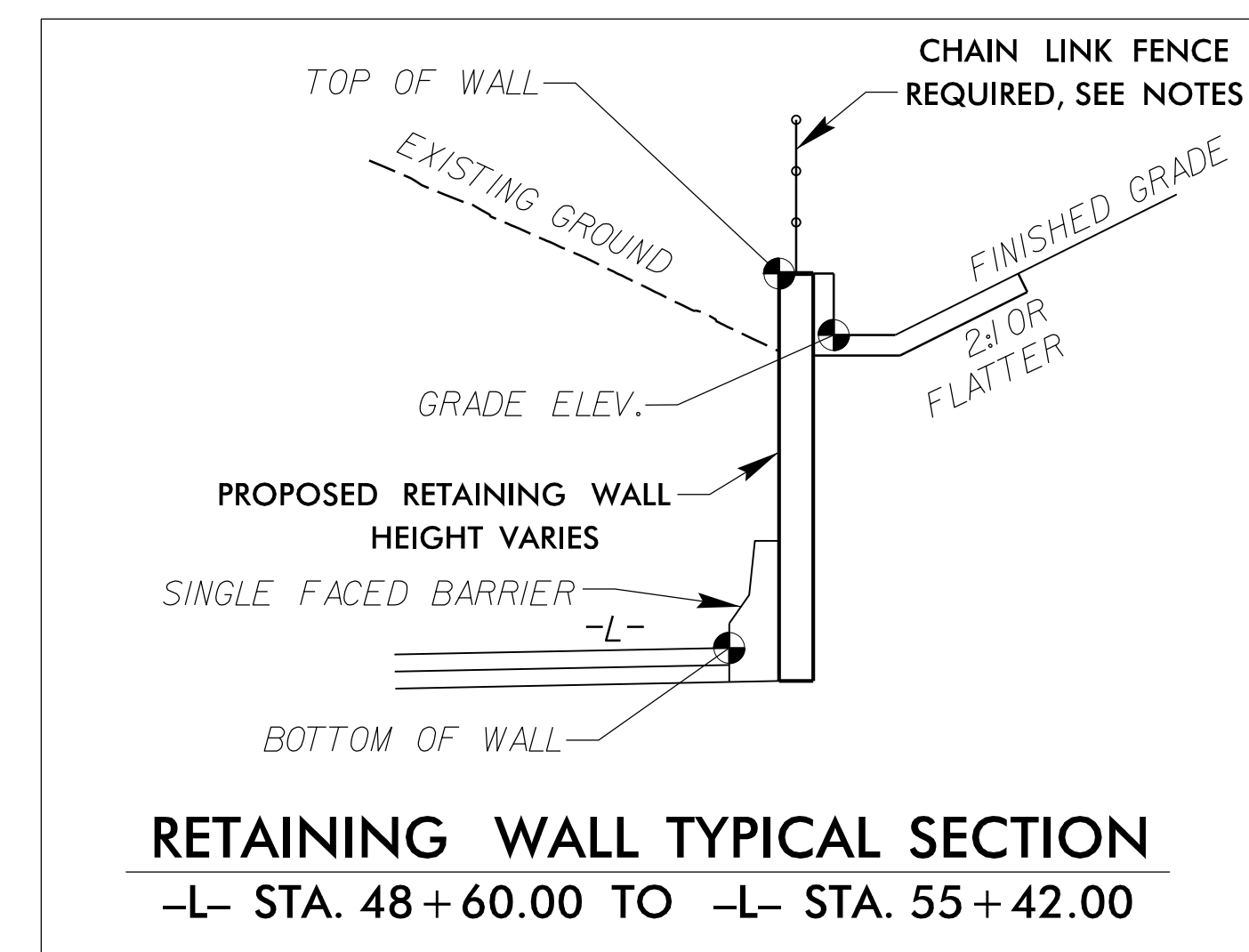
GFT Infrastructure, Inc.
One Glenwood Avenue, Suite 900
Raleigh, NC 27603
919-420-7660
NC Lic. No. F-0270

STD. NO. SBW3

GEOTECHNICAL ENGINEER	ENGINEER
7/20/2026	
SIGNATURE	SIGNATURE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

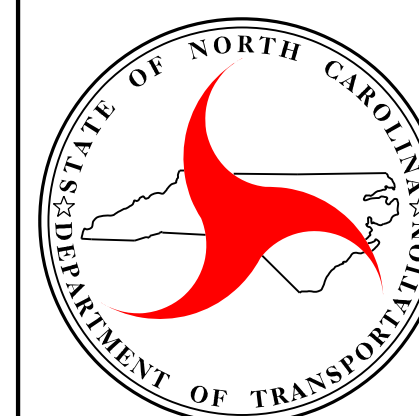


- END RETAINING WALL #1 * = ESTIMATED WALL QUANTITIES INCLUDE
 - WALL I - POT STA. 18+97.35 = ESTIMATED WALL EMBEDMENT AREA
 - L - STA. 55+42.00 (65.00' RT)



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 ECS SOUTHEAST, LLC
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1519



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

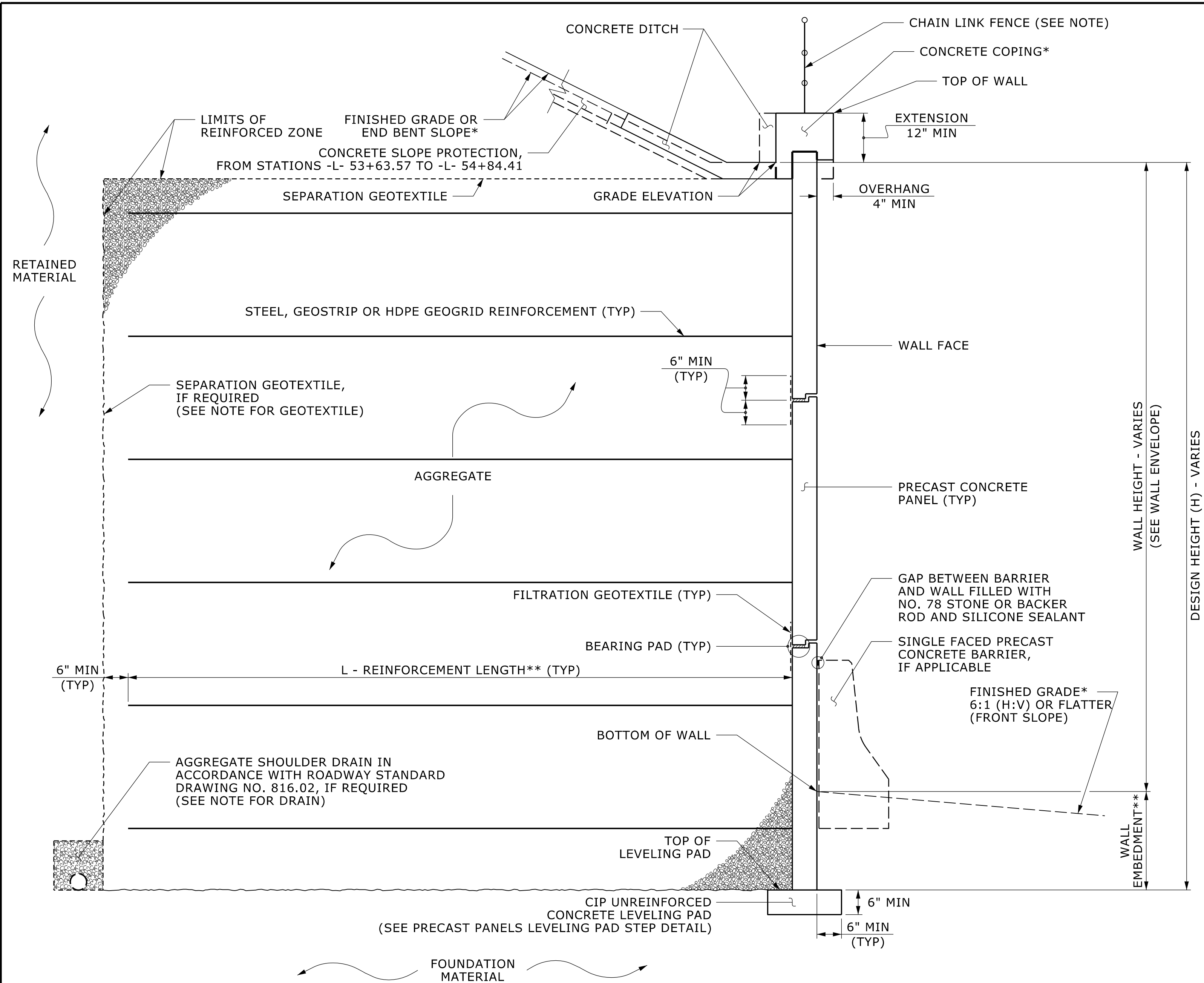
**GEOTECHNICAL
ENGINEERING UNIT**

RETAINING WALL NO. 1 MSE WALL PLAN AND ENVELOPE

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

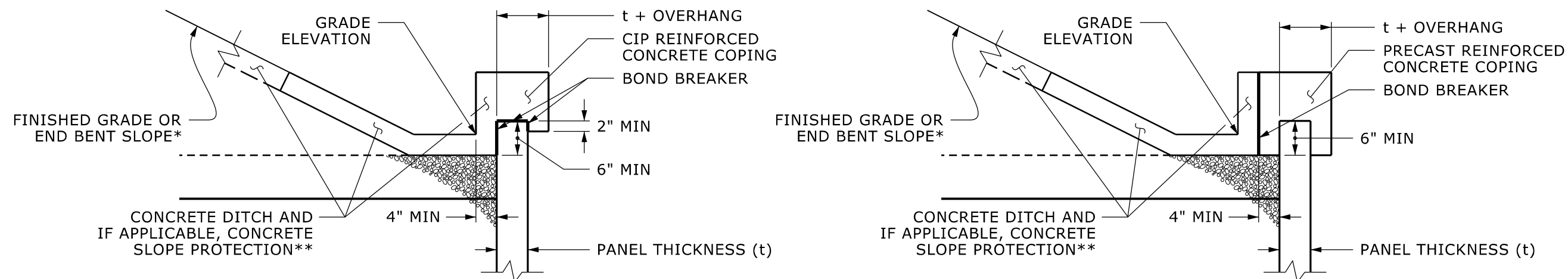
SHEET
NO.
W-1

I:\JUN-2026 21227
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Structures\CADD\GEOTECH\PlanProf\I-2513AC_Typical_sheets_EM.dgn



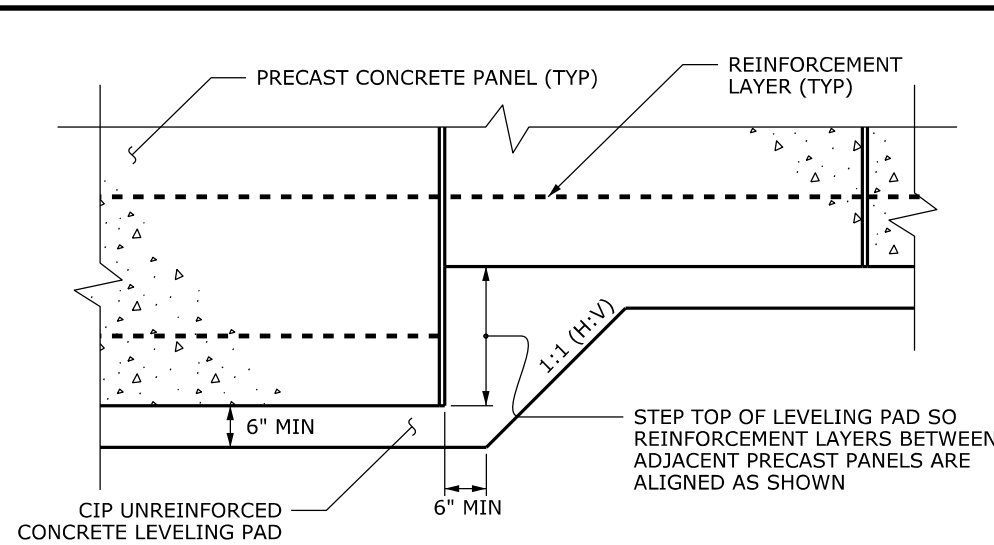
MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*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.



PRECAST PANELS LEVELING PAD STEP DETAIL

NOTES:

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

A 48" BLACK VINYL COATED CHAIN LINK FENCE IS REQUIRED FOR RETAINING WALL NO. 1. SEE ROADWAY STANDARD 866.06 (ROADWAY DETAIL AND PAY ITEM).

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 NO. 1.

CIP REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALL NO. 1

AN ARCHITECTURAL CONCRETE SURFACE TREATMENT IS REQUIRED FOR RETAINING WALL NO. 1. SEE "ARCHITECTURAL CONCRETE SURFACE TREATMENT" SPECIAL PROVISION.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 1.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 1.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 1, 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 NO. 1 FOR THE FOLLOWING:

- 1) H = WALL HEIGHT + WALL EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 4,000 PSF
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 1.0 H OR 6 FT., WHICHEVER IS LONGER
- 5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
COARSE	110	38	0
FINE	115	34	0

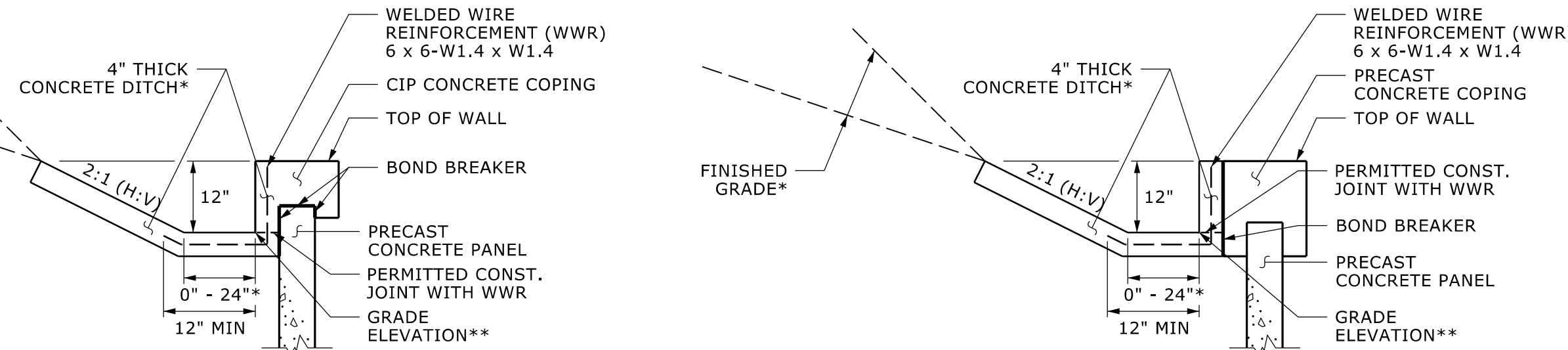
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.

6) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
RETAINED	120	30	0
FOUNDATION	120	32	0

DESIGN RETAINING WALL NO. 1 TO INCORPORATE DRAIN DROP INLET STRUCTURE 6031 LOCATED NEAR -WALL1- STA. 15+02.93, AT THE TOE OF THE WALL. INCLUDE DETAILS IN MSE WALL DESIGN SUBMITTAL.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 1 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



CONCRETE DITCH BEHIND WALL WITH CONCRETE COPING

*SEE ROADWAY PLANS FOR CONCRETE DITCH AND FINISHED GRADE DETAILS.
**SEE WALL ENVELOPE FOR GRADE ELEVATIONS.

PROJECT NO.: I-2513AC

BUNCOMBE COUNTY

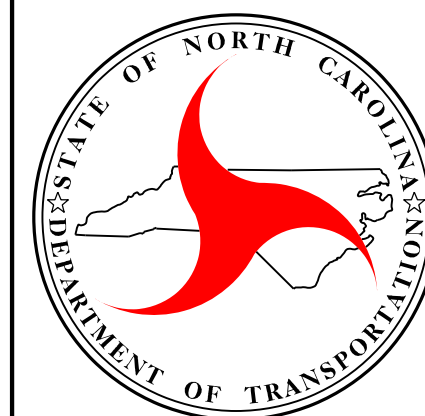
STATION: +/- -L- 48+60 TO -L- 55+42

SHEET 2 OF 2 WALL ID RW-1

Prepared in the Office of:



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1812 CENTER PARK DRIVE, SUITE D
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(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1519



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

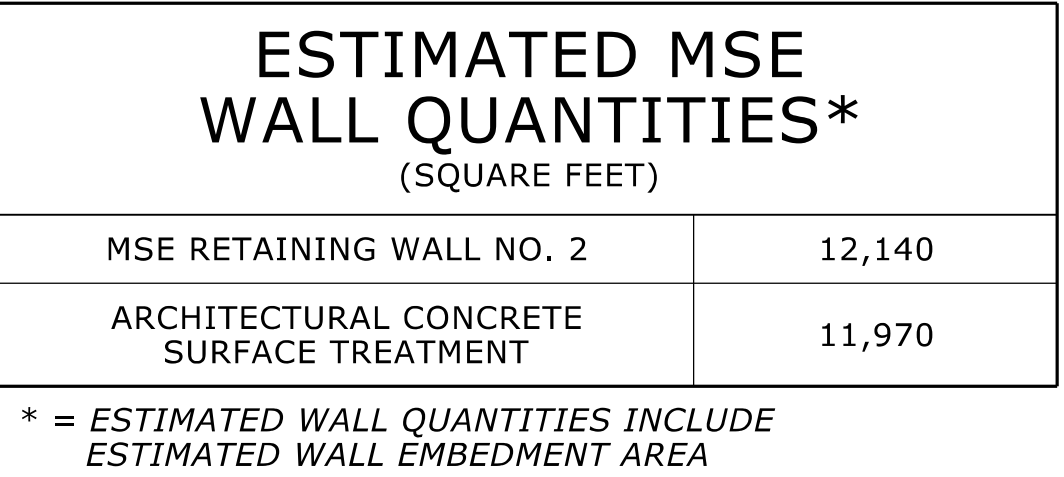
GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 1
MSE WALL WITH PRECAST PANELS
TYPICAL SECTION AND NOTES

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

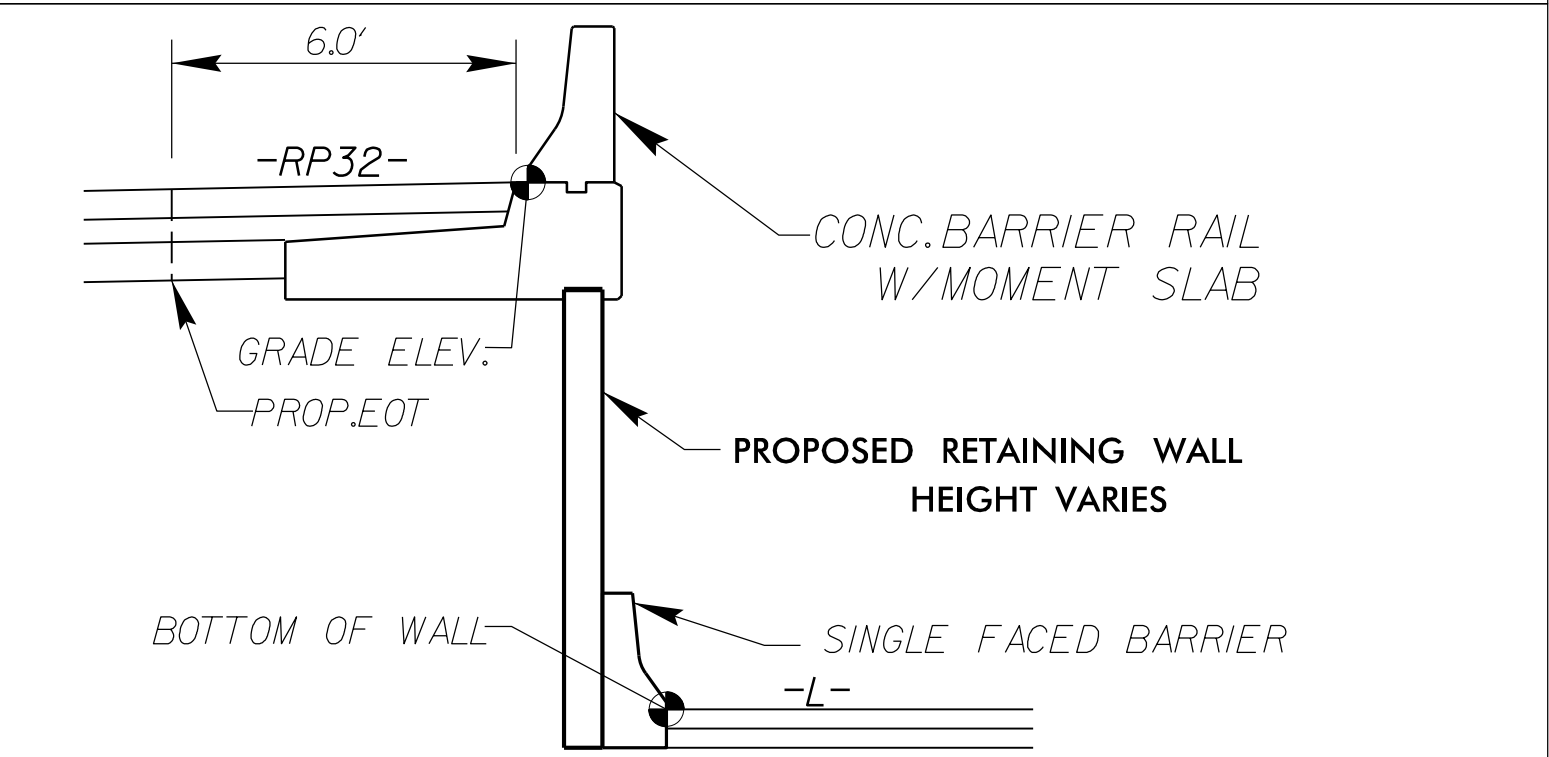
PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

GEOTECHNICAL ENGINEER 7/20/2026 SIGNATURE DATE	ENGINEER SIGNATURE DATE
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A technical cross-section diagram of a retaining wall. The wall is a vertical structure with a single-faced barrier at its base. Labels with leader lines point to various parts: 'CHAIN LINK FENCE REQUIRED, SEE NOTES' points to a fence on top of the wall; 'TOP OF WALL' points to the top edge of the wall; 'PROPOSED RETAINING WALL HEIGHT VARIES' points to the vertical face of the wall; 'SINGLE FACED BARRIER' points to the base of the wall; 'BOTTOM OF WALL' points to the bottom edge of the wall; 'FINISHED GRADE' points to the ground surface on the left; '2:1 OR FLATTER' points to the slope of the finished grade; 'GRADE ELEV.' points to a specific elevation point on the finished grade; and '-L-' points to the base of the wall on the right side.

-L- STA. 53+86.08 TO STA. 62+11.02



—L— STA. 62+11.02 TO STA. 63+81.0

BUNCOMBE COUNTY

SHEET 1 OF 5 WALL ID RW-2



GEOTECHNICAL ENGINEERING UNIT

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
	-	-	3	-	-
	-	-	4	-	-

SHEET
NO.

W-3

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

RETAINING WALL #2 DETAIL SHEET

GEOTECHNICAL
ENGINEER

SEAL
018979

ENGINEER

MOHAMMED A. MULLA

7/20/2026

SIGNATURE

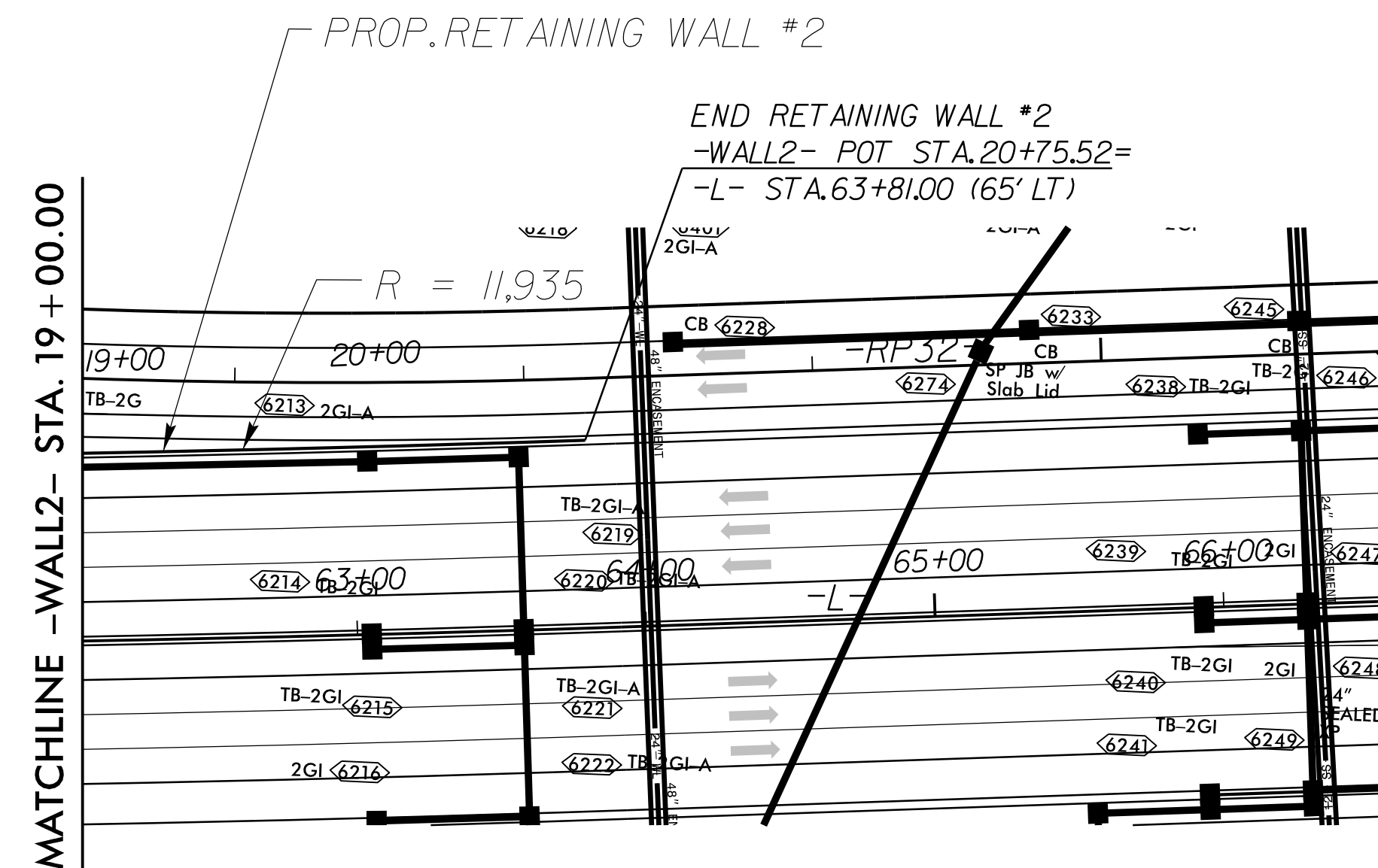
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ENGINEER

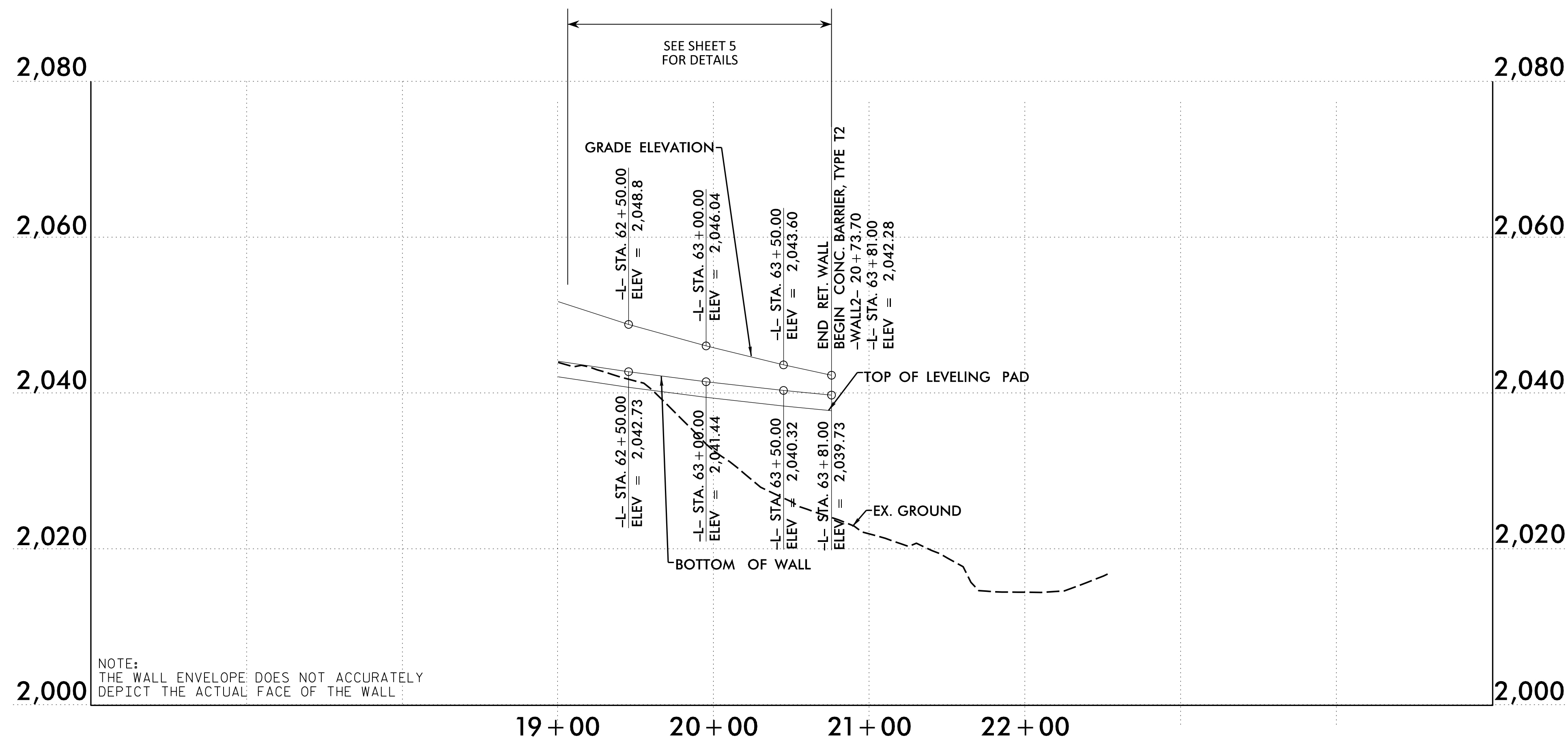
SIGNATURE

DATE

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RETAINING WALL NO. 2 – PLAN VIEW

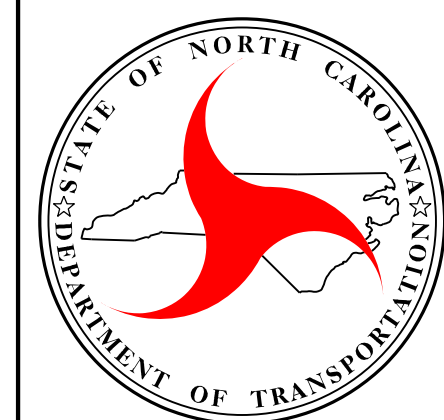


RETAINING WALL NO. 2 – ENVELOPE VIEW

PROJECT NO.: I-2513AC
BUNCOMBE COUNTY
STATION: +/- -L- 53+86.08 TO -L- 63+81
SHEET 2 OF 5 WALL ID RW-2

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

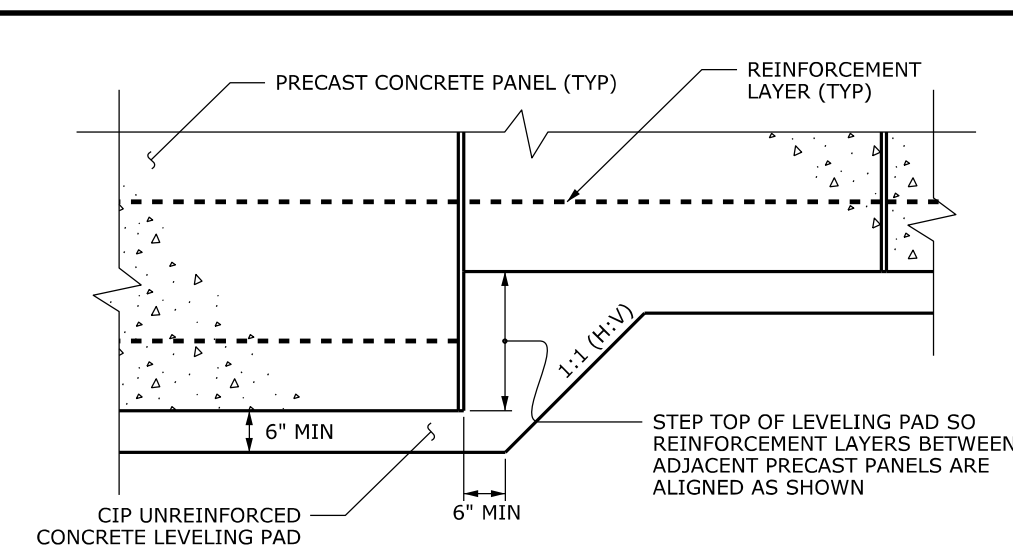
Prepared in the Office of:
ECS
ECS SOUTHEAST, LLC
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CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1519



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**GEOTECHNICAL
ENGINEERING UNIT**

RETAINING WALL NO. 2
MSE WALL
PLAN AND ENVELOPE

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



GEOTECHNICAL
ENGINEER

NORTH CAROLINA
PROFESSIONAL
SEAL
018979
ENGINEER
Mohammed A. Mulla

SIGNATURE	DATE
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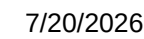
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GEOTECHNICAL
ENGINEERING UNIT

NO.	BY	DATE	NO.	BY	DATE
			3		
			4		

SHEET
NO.
W-5



SIGNATURE	DATE
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SIGNATURE	DATE
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*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.

-L- STA. 54+48.94 TO 55+64.76

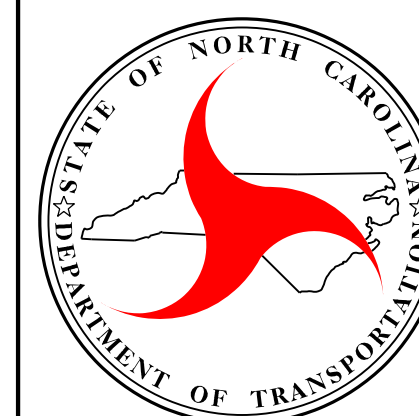
NOTES:

DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OR REINFORCEMENT IN ACTIVE ZONE SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO. 1. MAINTAIN A CLEARANCE OF AT LEAST 3 INCHES BETWEEN REINFORCEMENT OR CONNECTOR AND REINFORCING STEEL IN CAP.

FOUNDATIONS FOR END BENT NO. 1 WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 2. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.



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ENGINEERING
FIRM # F-1519



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

PROJECT NO.: I-2513AC

BUNCOMBE COUNTY

STATION: +/- -L- 53+86.08 TO -L- 63+81

SHEET 4 OF 5 WALL ID RW-2

RETAINING WALL NO. 2
MSE ABUTMENT WALL
WITH PRECAST PANELS
TYPICAL SECTION AND NOTES

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
			3			W-6
			4			



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A CONCRETE BARRIER RAIL WITH MOMENT SLAB IS REQUIRED ABOVE RETAINING WALL NO. 2. SEE PLANS FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS.

*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.

-L- STA. 62+11.02 TO 63+81.00

PROJECT NO.: I-2513AC

BUNCOMBE COUNTY

STATION: +/- -L- 53+86.08 TO -L- 63+81

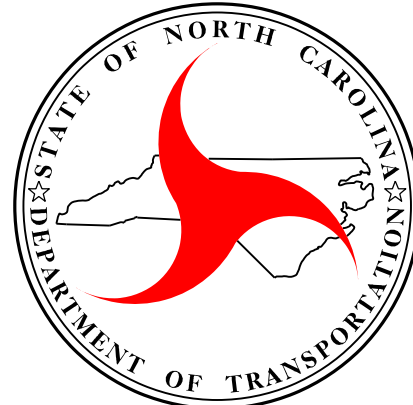
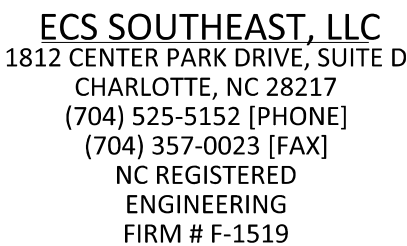
SHEET 5 OF 5 WALL ID RW-2

RETAINING WALL NO. 2
MSE WALL WITH PRECAST PANELS
TYPICAL SECTION AND NOTES

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
			3			W-7
			4			

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

Prepared in the Office of:



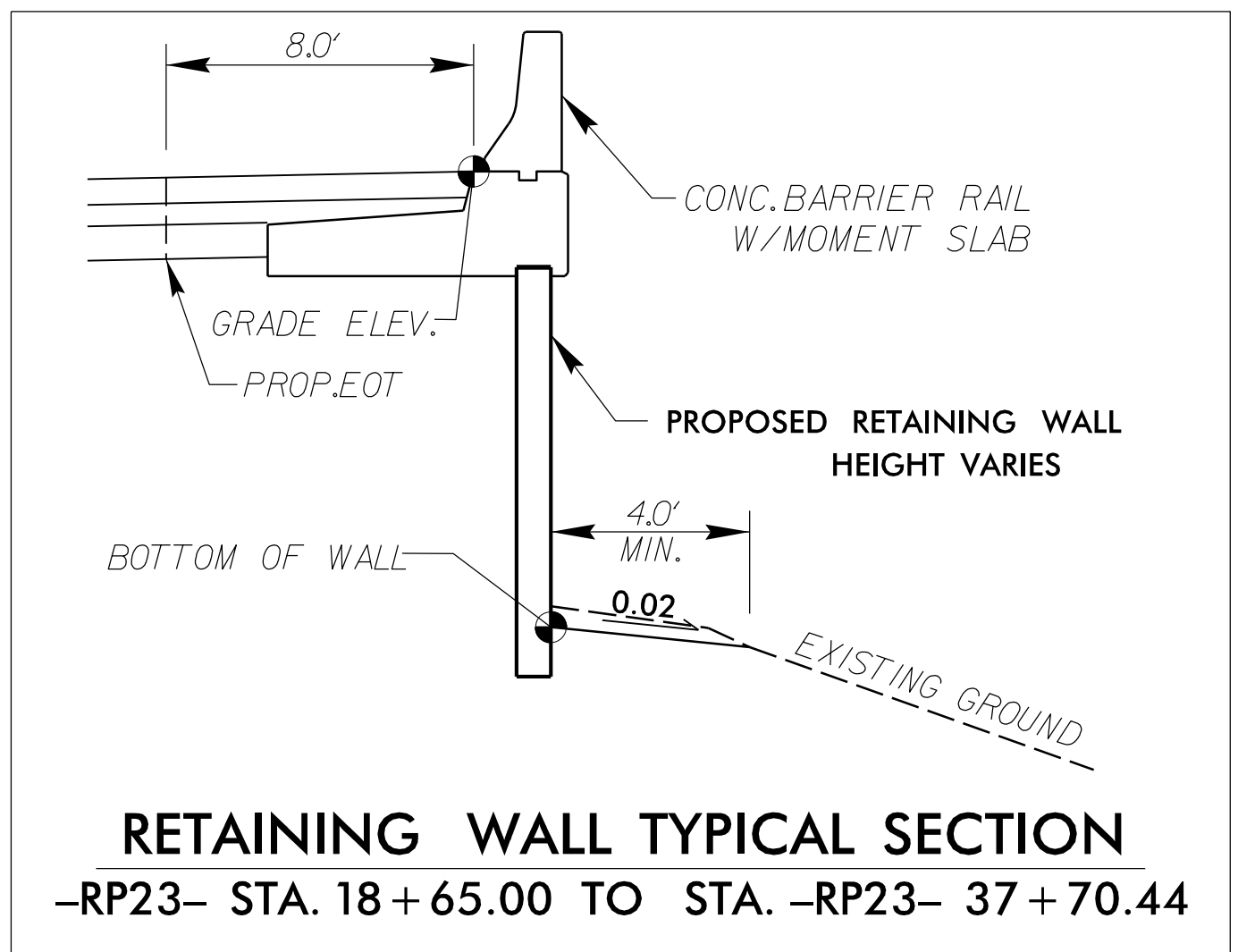
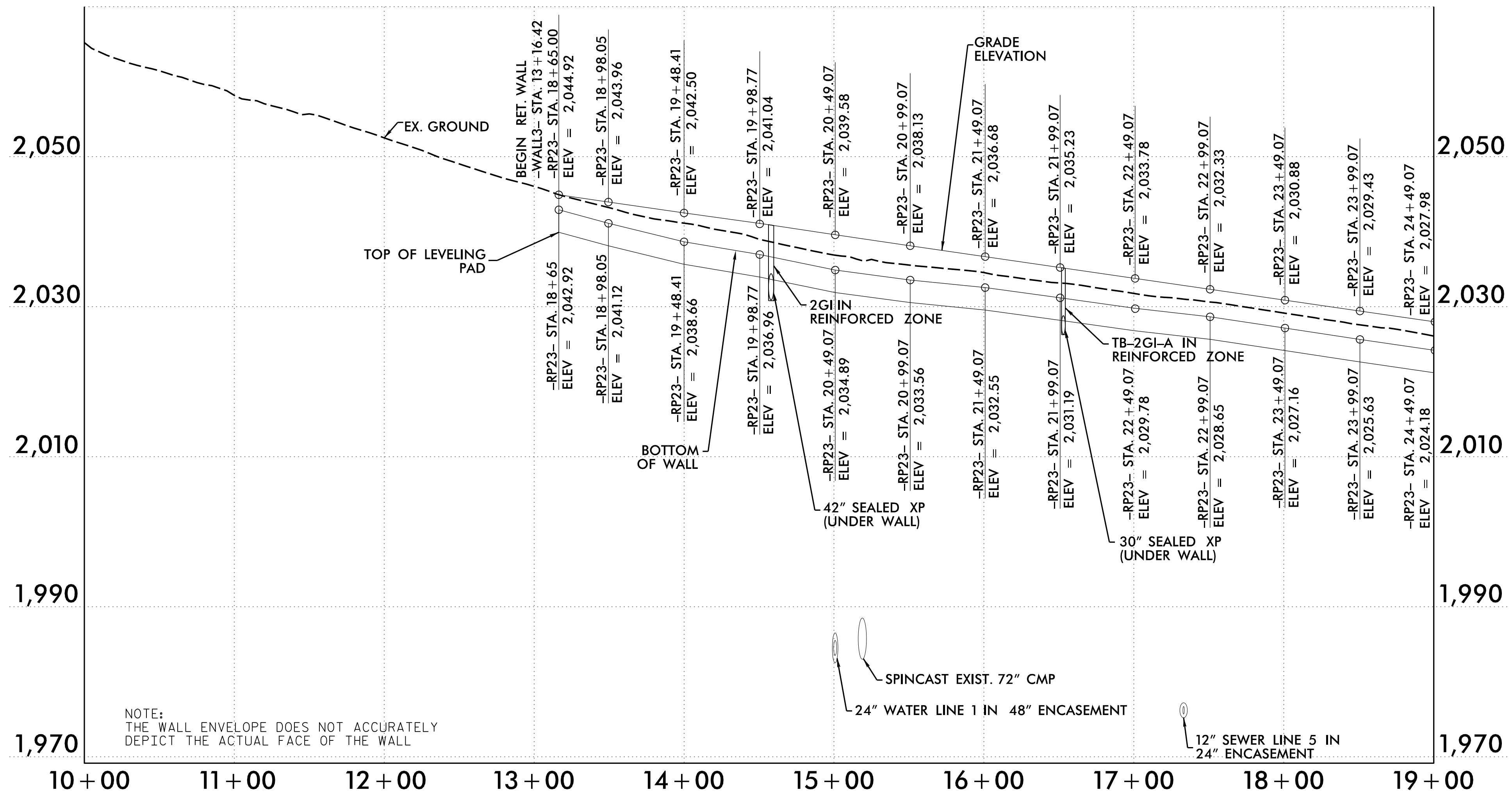
NORTH CAROLINA
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GEOTECHNICAL ENGINEERING UNIT

GEOTECHNICAL ENGINEER 7/20/2026 SIGNATURE _____ DATE _____	ENGINEER _____ SIGNATURE _____ DATE _____
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ESTIMATED MSE WALL QUANTITIES* (SQUARE FEET)	
MSE RETAINING WALL NO. 3	17,495
ARCHITECTURAL CONCRETE SURFACE TREATMENT	15,590

* = ESTIMATED WALL QUANTITIES INCLUDE
ESTIMATED WALL EMBEDMENT AREA



PROJECT NO.: I-2513AC

BUNCOMBE COUNTY

STATION: +/- -RP23- 18+65 TO -RP23- 37+74

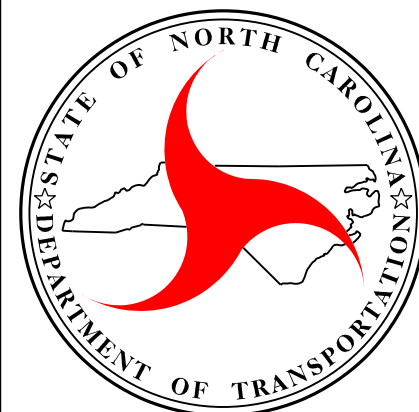
SHEET 1 OF 4 WALL ID RW-3

RETAINING WALL NO. 3 – ENVELOPE VIEW

Prepared in the Office of:



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1812 CENTER PARK DRIVE, SUITE D
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(704) 357-0023 [FAX]
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NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

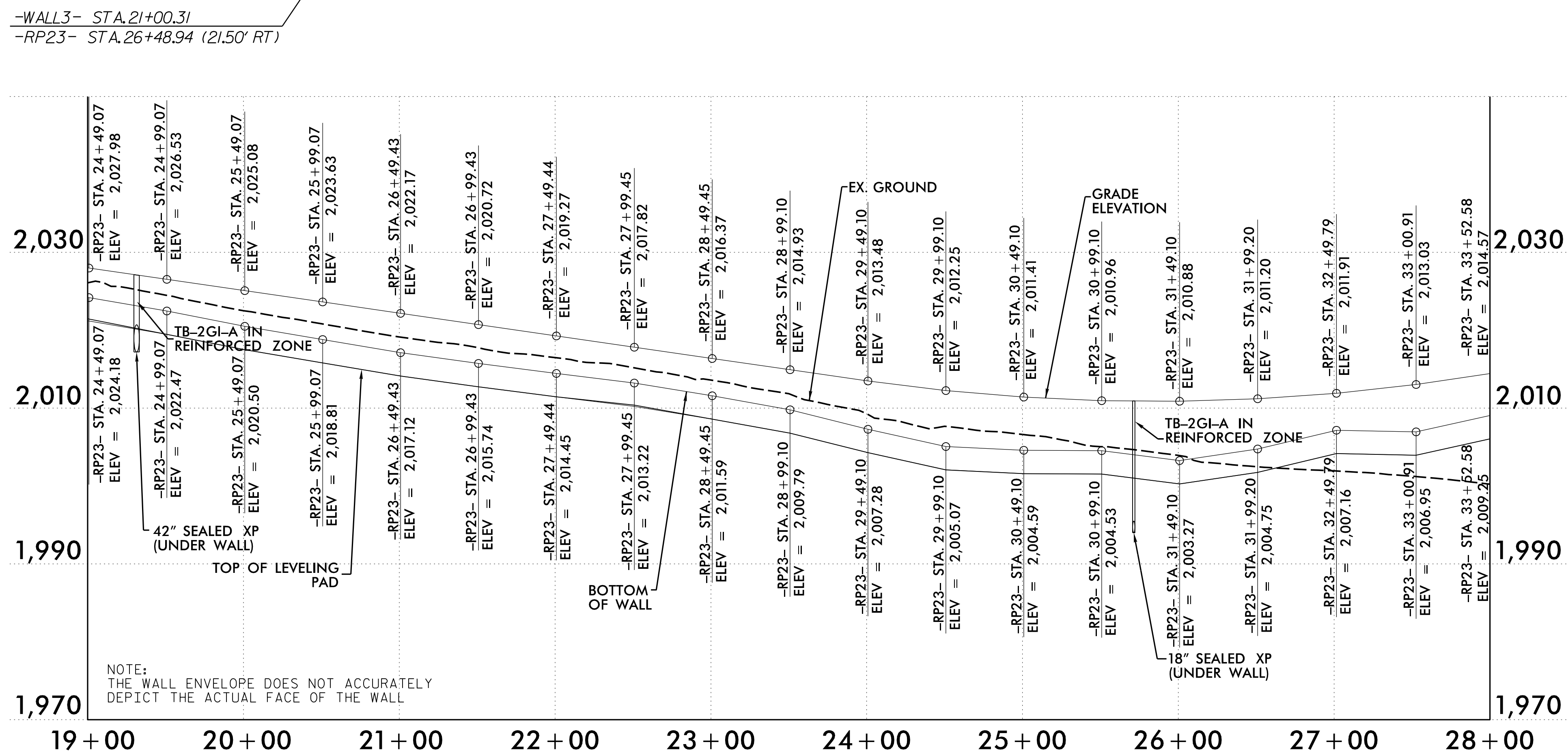
GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 3
MSE WALL WITH PRECAST PANELS
PLAN AND ENVELOPE

REVISIONS						SHEET NO. W-8
NO.	BY	DATE	NO.	BY	DATE	
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SHEET
NO.
W-8

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DIVISION OF HIGHWAYS

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ENGINEERING UNIT

RETAINING WALL NO. 3
MSE WALL WITH PRECAST PANELS
PLAN AND ENVELOPE

REVISIONS						SHEET NO. W-9
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W-9

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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

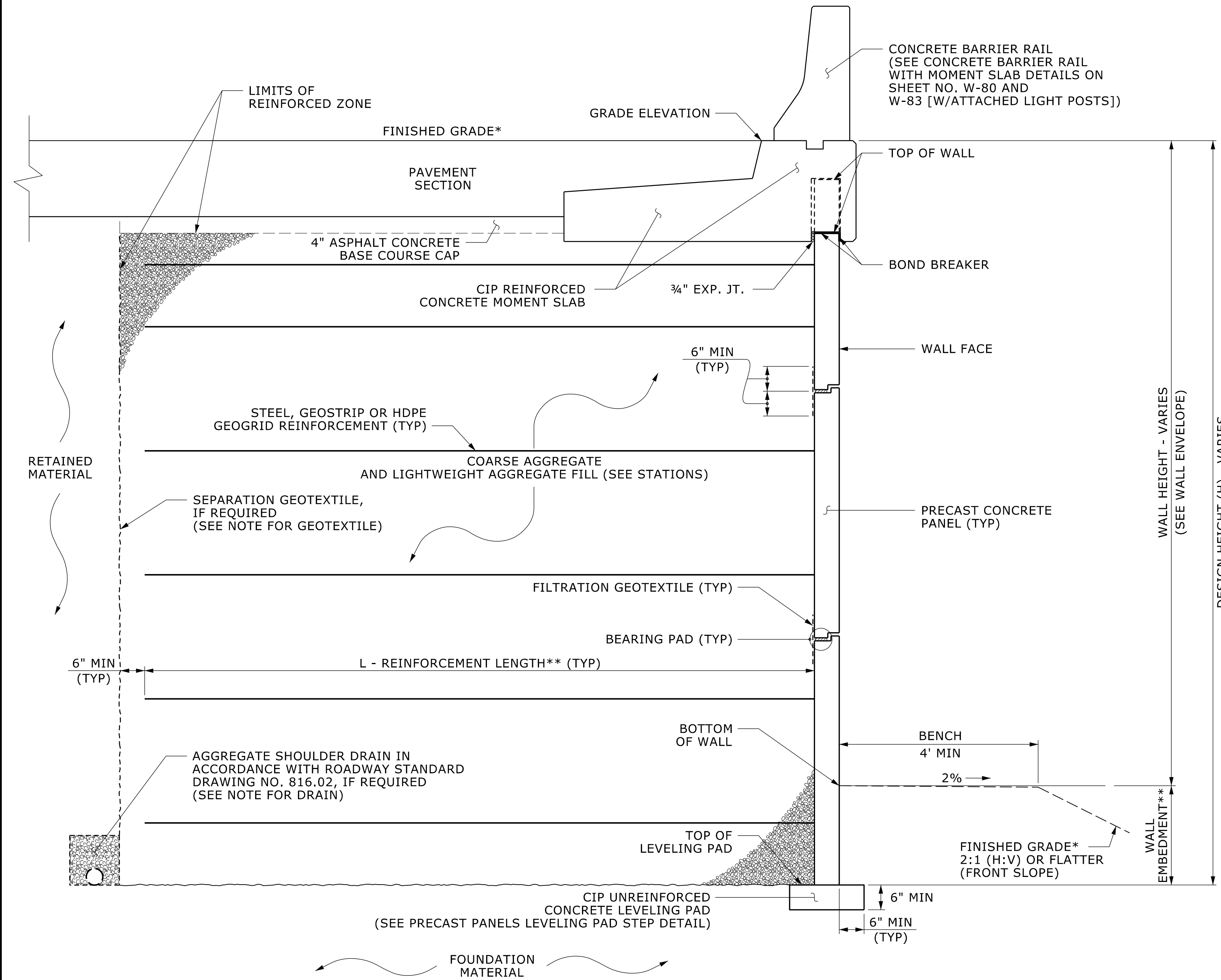


REVISIONS						SHEET NO.
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	-	-	4	-	-	

SHEET 3 OF 4 WALL ID RW-3

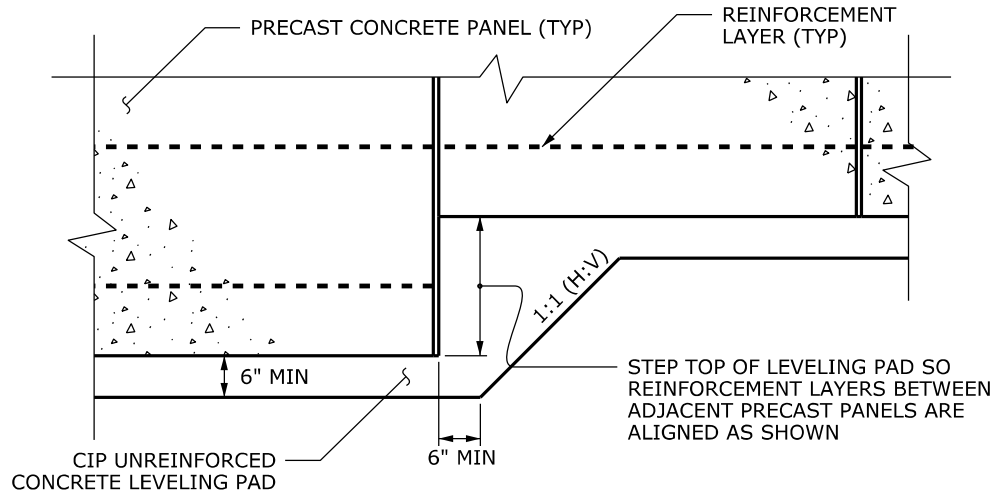
PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

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MSE 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.



PRECAST PANELS LEVELING PAD STEP DETAIL

NOTES:

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

A CONCRETE BARRIER RAIL WITH MOMENT SLAB IS REQUIRED ABOVE RETAINING WALL NO. 3. SEE PLANS FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS.

DO NOT USE FINE AGGREGATE IN REINFORCEMENT ZONE FOR MSE WALL NO. 3.

AN ARCHITECTURAL CONCRETE SURFACE TREATMENT IS REQUIRED FOR RETAINING WALL NO. 3. SEE "ARCHITECTURAL CONCRETE SURFACE TREATMENT" SPECIAL PROVISION.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 3.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 3.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 3, 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 NO. 3 FOR THE FOLLOWING:

- 1) H = WALL HEIGHT + WALL EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 4,500 PSF (2,650 PSF IN LIGHTWEIGHT AGGREGATE FILL FROM -WALL3- STA 28+57 TO 31+40 (-RP23- STA. 34+07.41 TO 36+90.48)
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 1.2 H OR 6 FT., WHICHEVER IS LONGER
- 5) MINIMUM EMBEDMENT DEPTH = H/7 OR 3 FT., WHICHEVER IS LONGER
- 6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
COARSE	110	38	0
LIGHTWEIGHT AGGREGATE FILL**	65	40	0

*SEE MSE RETAINING WALLS PROVISION FOR COARSE AGGREGATE MATERIAL REQUIREMENTS.

****FOR WALL NO. 3 STA. 28+57 TO 31+40 (-RP23- STA. 34+07.41 TO 36+90.48). SEE LIGHTWEIGHT AGGREGATE DETAILS AND SURCHARGE DETAILS FOR MORE INFORMATION.**

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

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

DESIGN RETAINING WALL NO. 3 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN RETAINING WALL NO. 3 FOR A PIPE EXTENDING THROUGH AND BEHIND THE WALL AS SHOWN. VERIFY PIPE LOCATION AND ELEVATION BEFORE BEGINNING MSE WALL DESIGN OR CONSTRUCTION.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 3.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 3 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

-WALL3- STA. 28+57 TO 31+40 REQUIRES SURCHARGING PRIOR TO WALL CONSTRUCTION. SEE SURCHARGE DETAILS FOR MORE INFORMATION.

FOR WALL NO. 3 STA. 28+57 TO 31+40 (-RP23- STA. 34+07.41 TO 36+90.48). SEE LIGHTWEIGHT AGGREGATE DETAILS AND SURCHARGE DETAILS FOR MORE INFORMATION.

GEOTECHNICAL
ENGINEER



7/20/2026

SIGNATURE

DATE

ENGINEER

SIGNATURE

DATE

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PROJECT NO.: I-2513AC

BUNCOMBE COUNTY

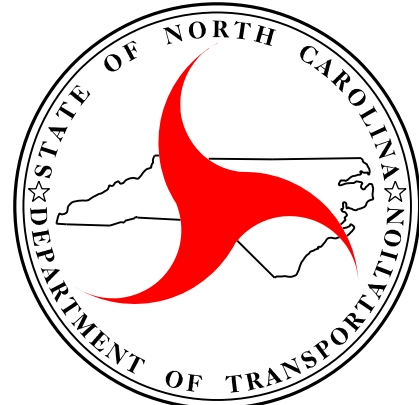
STATION: +/- -RP23- 18+65 TO -RP23- 37+74

SHEET 4 OF 4 WALL ID RW-3

Prepared in the Office of:



ECS SOUTHEAST, LLC
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1519



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 3
MSE WALL WITH PRECAST PANELS
TYPICAL SECTION AND NOTES

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
			3		
			4		

SHEET
NO.

W-11

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

GEOTECHNICAL ENGINEER 7/20/2026 _____ SIGNATURE DATE	ENGINEER _____ SIGNATURE DATE
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ESTIMATED MSE WALL QUANTITIES* (SQUARE FEET)	
MSE RETAINING WALL NO. 4	2,175
ARCHITECTURAL CONCRETE SURFACE TREATMENT	2,175

RETAINING WALL NO. 4 – ENVELOPE VIEW

Prepared in the Office of:

ENCLAVE NORTH

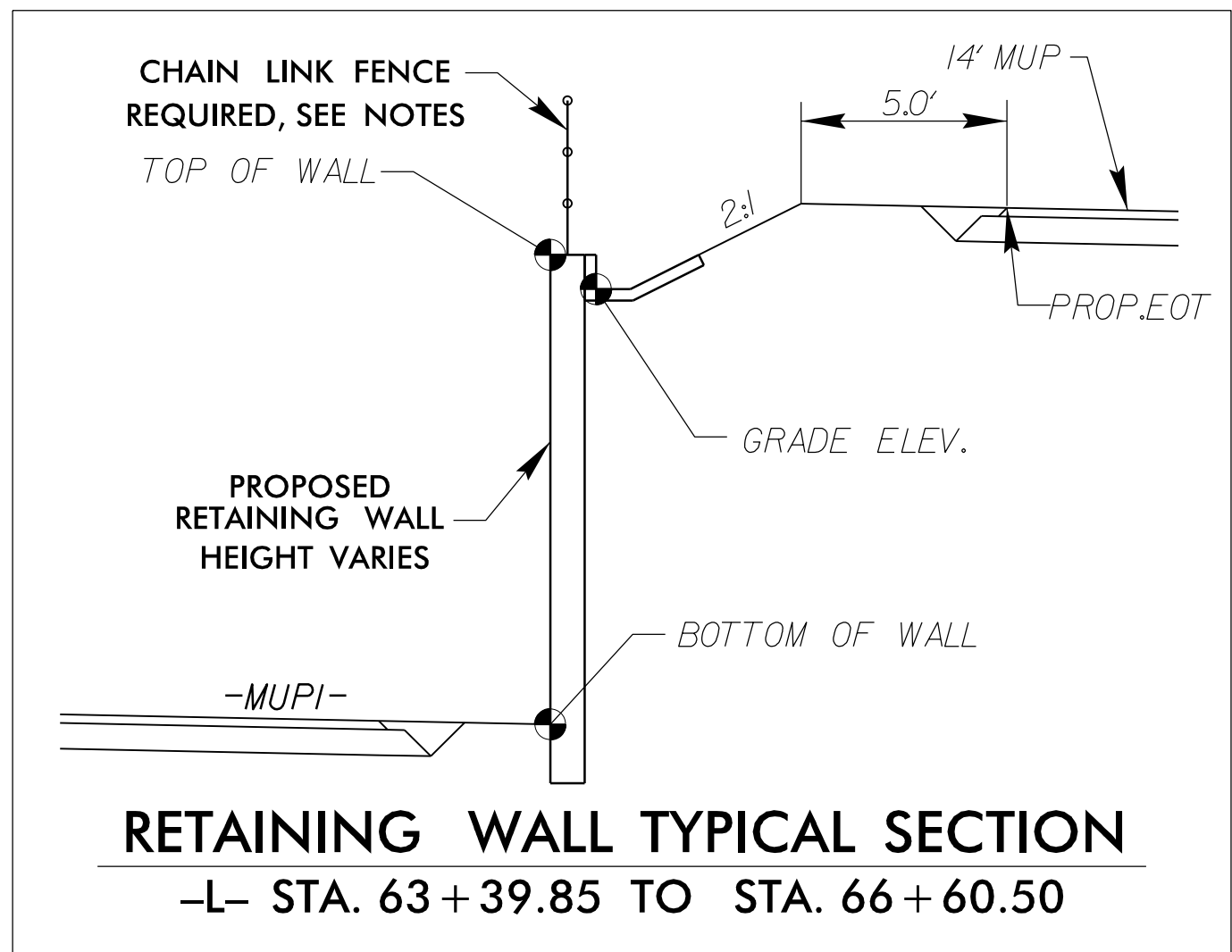
The diagram illustrates the envelope view of Retaining Wall No. 4, showing the relationship between the existing ground, the retaining wall structure, and the proposed reinforced zone. The vertical axis represents elevation in feet, ranging from 1,980 to 2,060. The horizontal axis represents stationing, ranging from 16+00 to 10+00.

Key features and data points include:

- EXISTING GROUND (EX. GROUND):** Indicated by a dashed line.
- TOP OF LEVELING PAD:** Indicated by a solid line.
- 24" SEALED XP (UNDER WALL):** Indicated by a solid line.
- 2GI IN REINFORCED ZONE:** Indicated by a solid line.
- 66" RCP-III:** Indicated by a solid line.
- 12" SEWER LINE 5 IN 24" ENCASEMENT:** Indicated by a solid line.
- 24" WATER LINE 1 IN 48" ENCASEMENT:** Indicated by a solid line.
- GRADE ELEVATION:** Indicated by a solid line.
- END RET. WALL:** Indicated by a solid line.
- BEGIN RET. WALL:** Indicated by a solid line.

Stationing and Elevation Data:

Station	Elevation (ft)
14+00	2,028.75
13+00	2,026.42
12+00	2,025.64
11+00	2,027.13
10+00	2,032.31
14+00	2,029.35
13+00	2,029.72
12+00	2,030.42
11+00	2,034.59
10+00	2,036.78



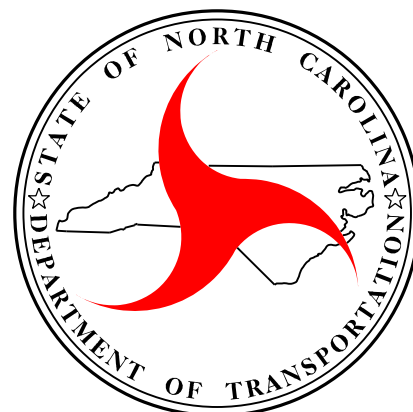
RETAINING WALL NO. 4
MSE WALL WITH PRECAST PANELS
PLAN AND ENVELOPE

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
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	-	-	4	-	-

SHEET
NO.
W-12



ECS SOUTHEAST, LLC
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
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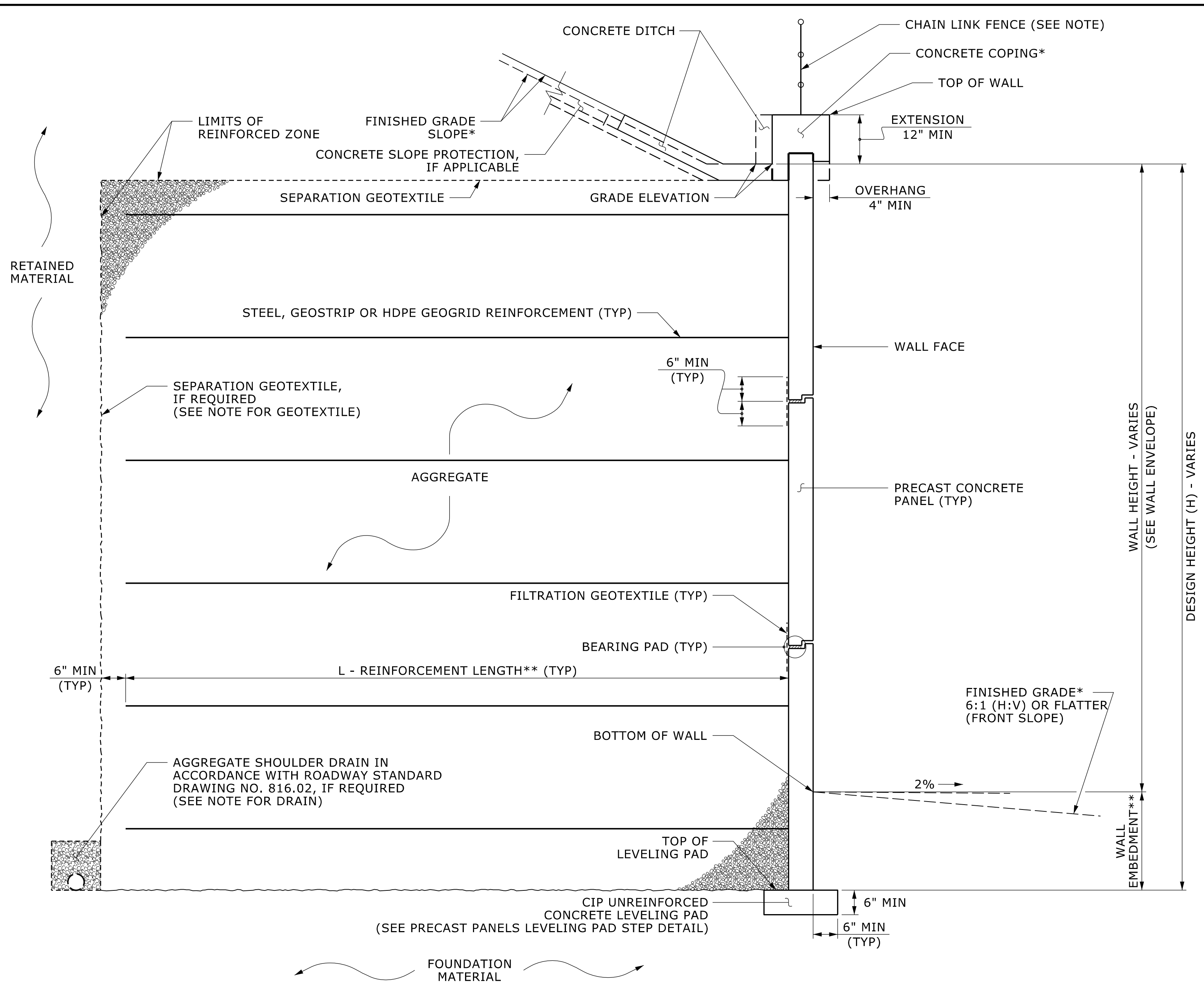
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

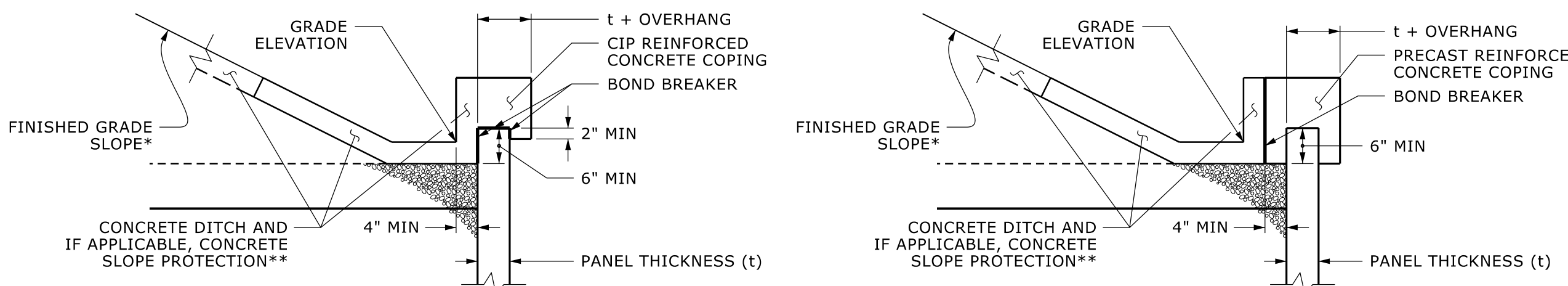
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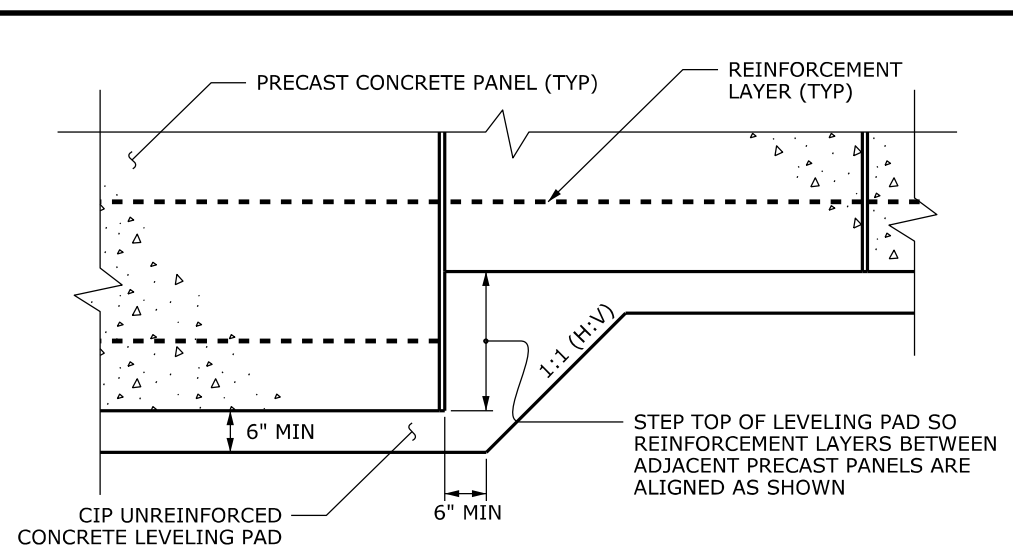
MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE COPING DETAILS AND PLANS FOR FINISHED GRADE 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 SLOPE DETAILS.
**SEE CONCRETE DITCH BEHIND WALL DETAILS.



PRECAST PANELS LEVELING PAD STEP DETAIL

NOTES:

- FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.
- FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.
- A 48" BLACK VINYL COATED CHAIN LINK FENCE IS REQUIRED FOR RETAINING WALL NO. 4. SEE ROADWAY STANDARD 866.06 (ROADWAY DETAIL AND PAY ITEM).
- AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NO. 4.
- CIP REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALL NO 4.
- AN ARCHITECTURAL CONCRETE SURFACE TREATMENT IS REQUIRED FOR RETAINING WALL NO. 4. SEE "ARCHITECTURAL CONCRETE SURFACE TREATMENT" SPECIAL PROVISION.
- A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 4.
- A DRAIN IS REQUIRED FOR RETAINING WALL NO. 4.
- BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 4, 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 NO. 4 FOR THE FOLLOWING:
- 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
 - 2) DESIGN LIFE = 100 YEARS
 - 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 3,000 PSF
 - 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.75 H OR 6 FT, WHICHEVER IS LONGER
 - 5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
COARSE	110	38	0
FINE	115	34	0

*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.

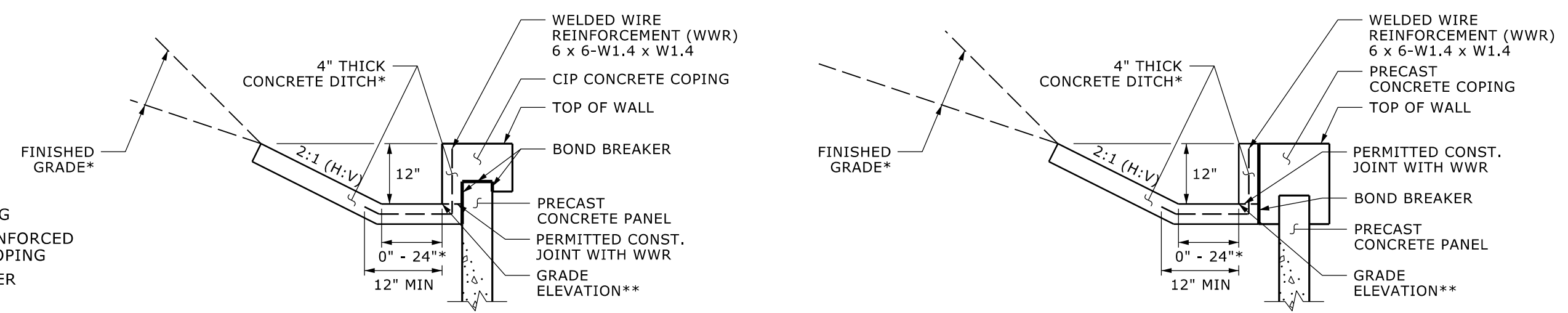
6) IN-SITU ASSUMED MATERIAL PARAMETERS:

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

DESIGN RETAINING WALLS NO. 4 TO INCORPORATE DRAIN DROP INLET STRUCTURES AND PIPES WITHIN REINFORCED ZONE AND ALONG TOE OF WALL 4. INCLUDE DETAILS IN MSE WALL DESIGN SUBMITTAL.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 4.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 4 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



CONCRETE DITCH BEHIND WALL WITH CONCRETE COPING

*SEE ROADWAY PLANS FOR CONCRETE DITCH AND FINISHED GRADE DETAILS.
**SEE WALL ENVELOPE FOR GRADE ELEVATIONS.

PROJECT NO.: I-2513AC

BUNCOMBE COUNTY

STATION: +/- -L- 63+39.85 TO -L- 66+60.50

SHEET 2 OF 2 WALL ID RW-4

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

Prepared in the Office of:

ECS

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(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1519

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

REVISIONS						SHEET NO. W-13
NO.	BY	DATE	NO.	BY	DATE	
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			4			

RETAINING WALL #5 DETAIL SHEET

GEOTECHNICAL ENGINEER



7/20/2026

SIGNATURE

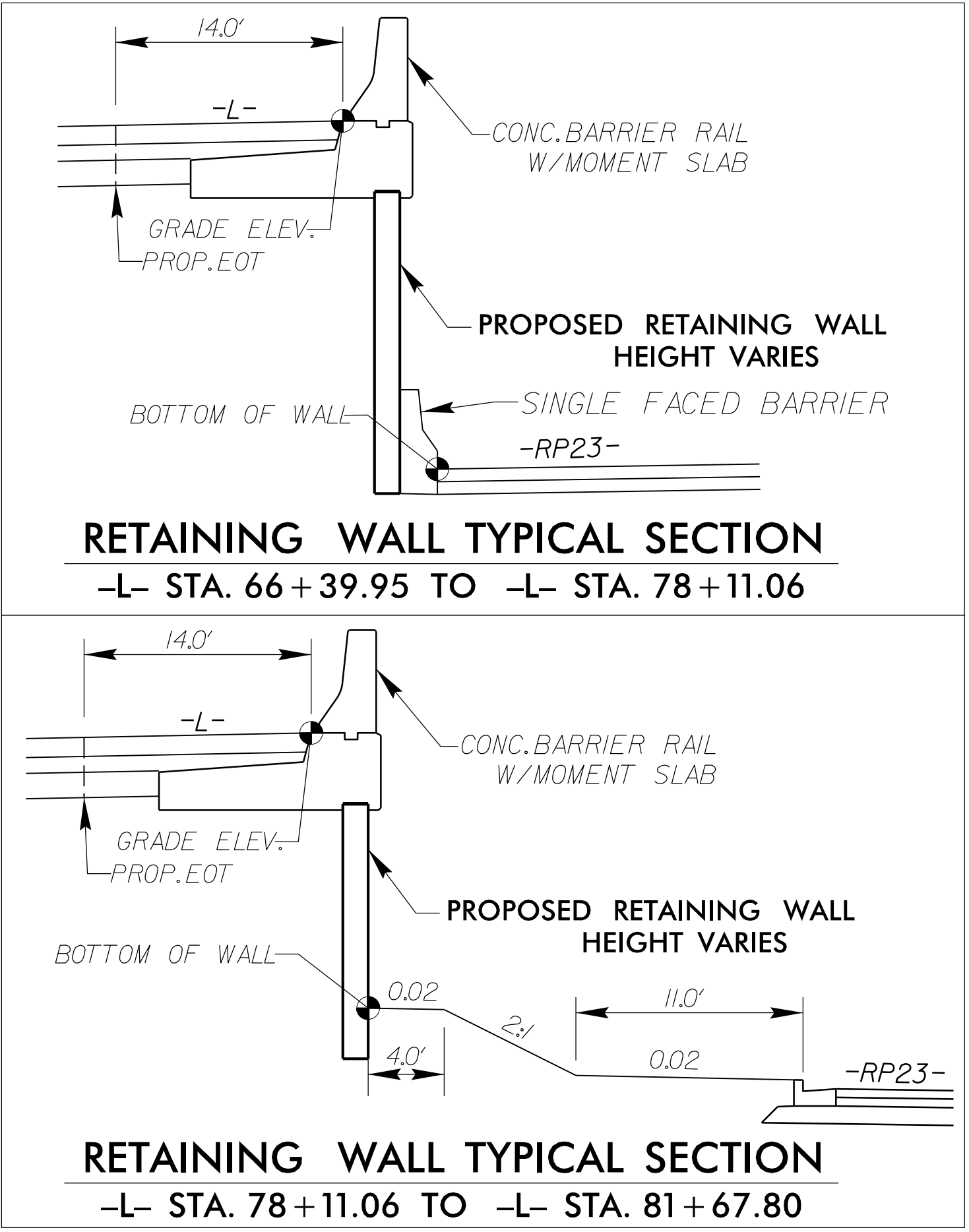
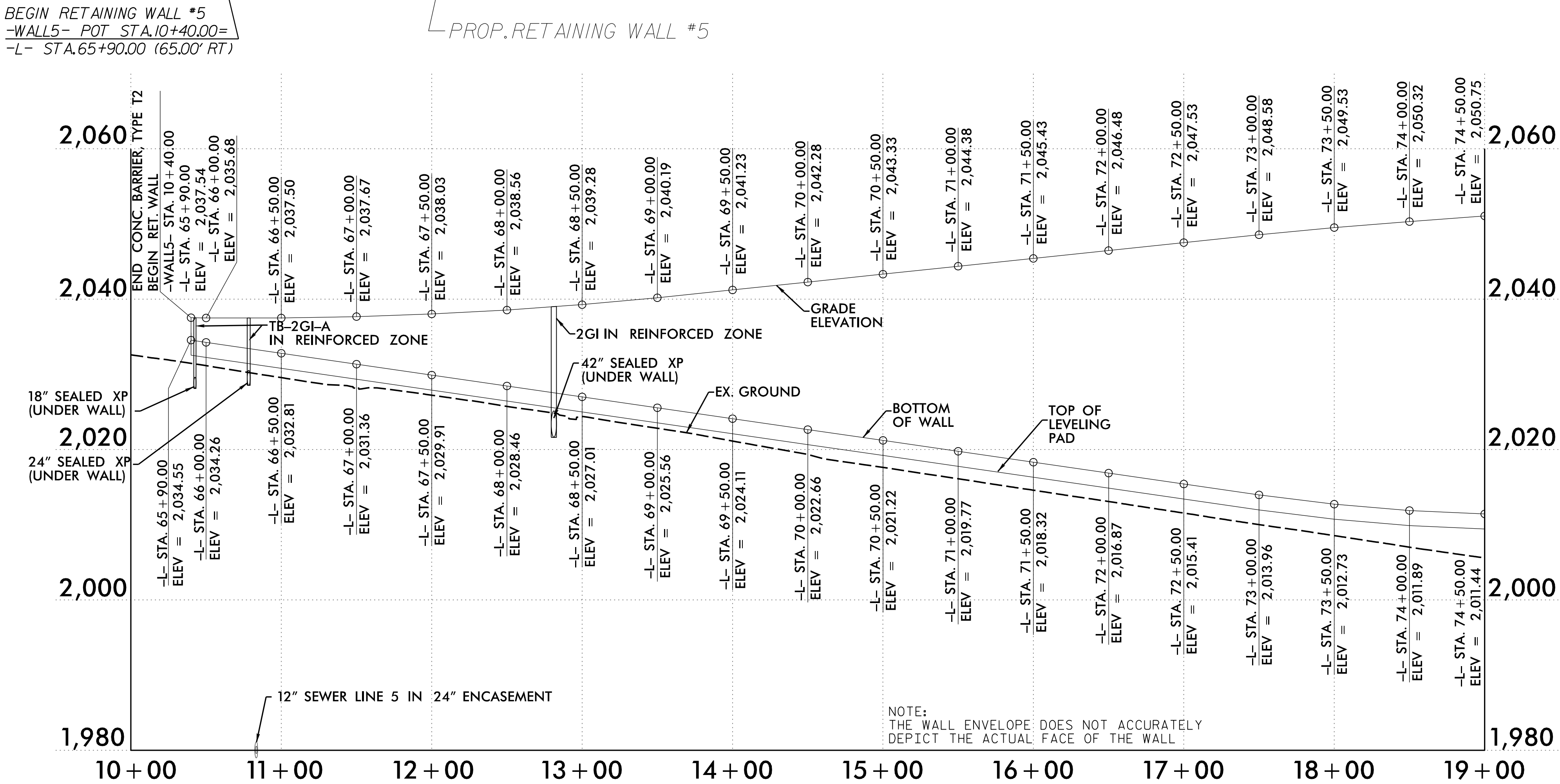
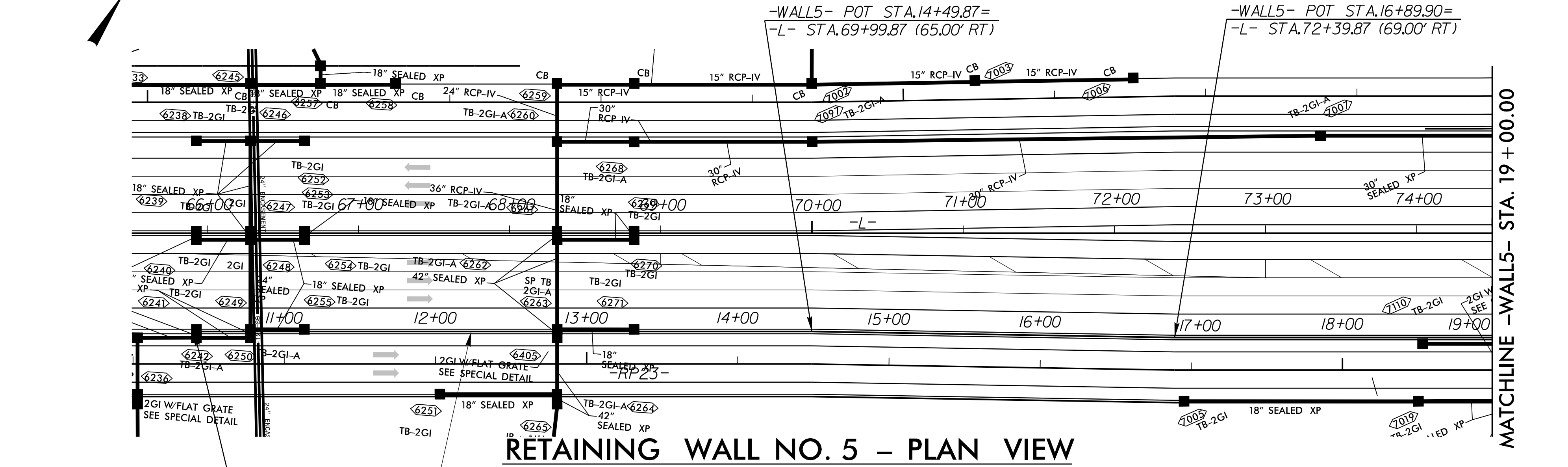
ENGINEER

SIGNATURE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ESTIMATED MSE WALL QUANTITIES* (SQUARE FEET)	
MSE RETAINING WALL NO. 5	44,945
ARCHITECTURAL CONCRETE SURFACE TREATMENT	43,350

* = ESTIMATED WALL QUANTITIES INCLUDE ESTIMATED WALL EMBEDMENT AREA



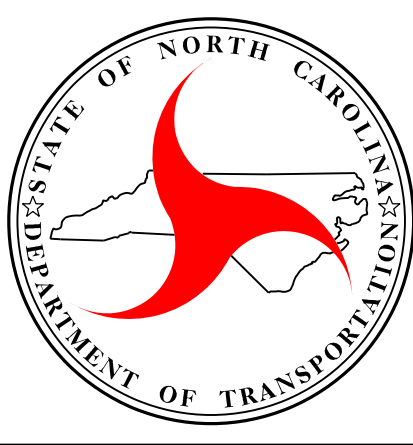
PROJECT NO.: I-2513AC
BUNCOMBE COUNTY
STATION: +/- -L- 65+90 TO -L- 81+68
SHEET 1 OF 3 WALL ID RW-5

PREPARED BY: E. A. MCINTOSH, P.E. DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E. DATE: 06/26

Prepared in the Office of:



ECS SOUTHEAST, LLC
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED ENGINEERING FIRM # F-1519

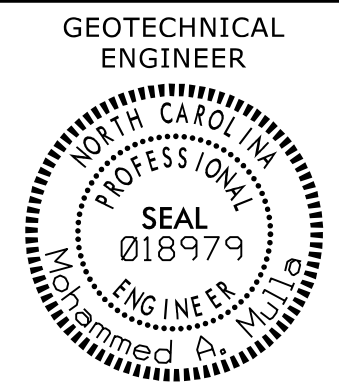


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
			3			W-14
			4			

RETAINING WALL #5 DETAIL SHEET

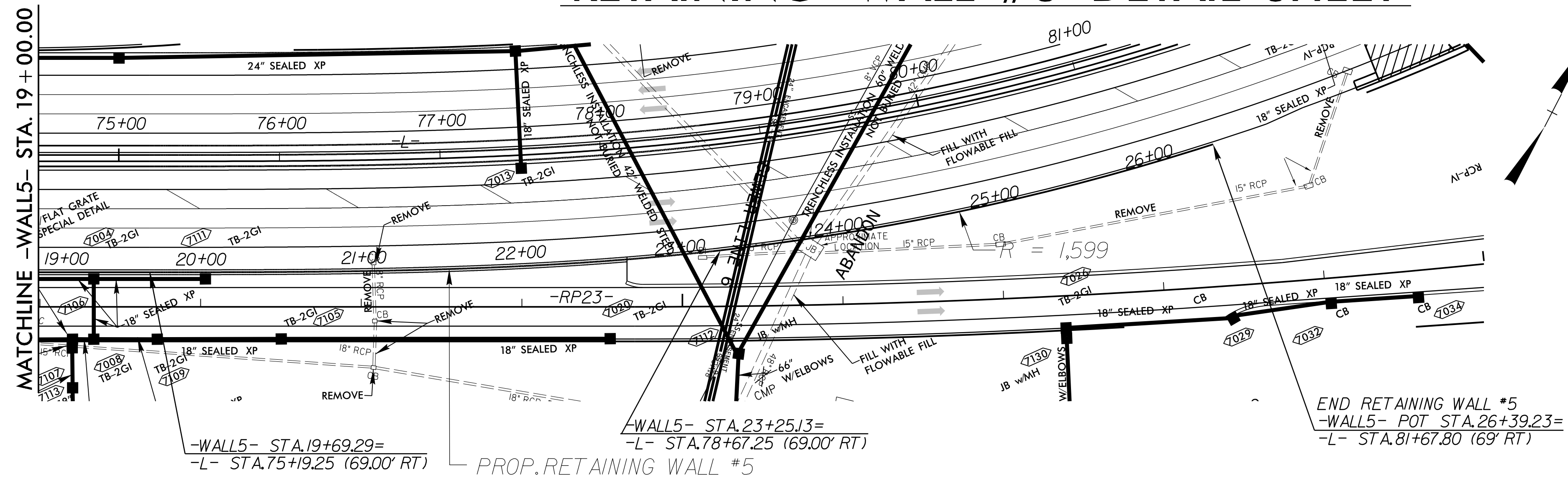


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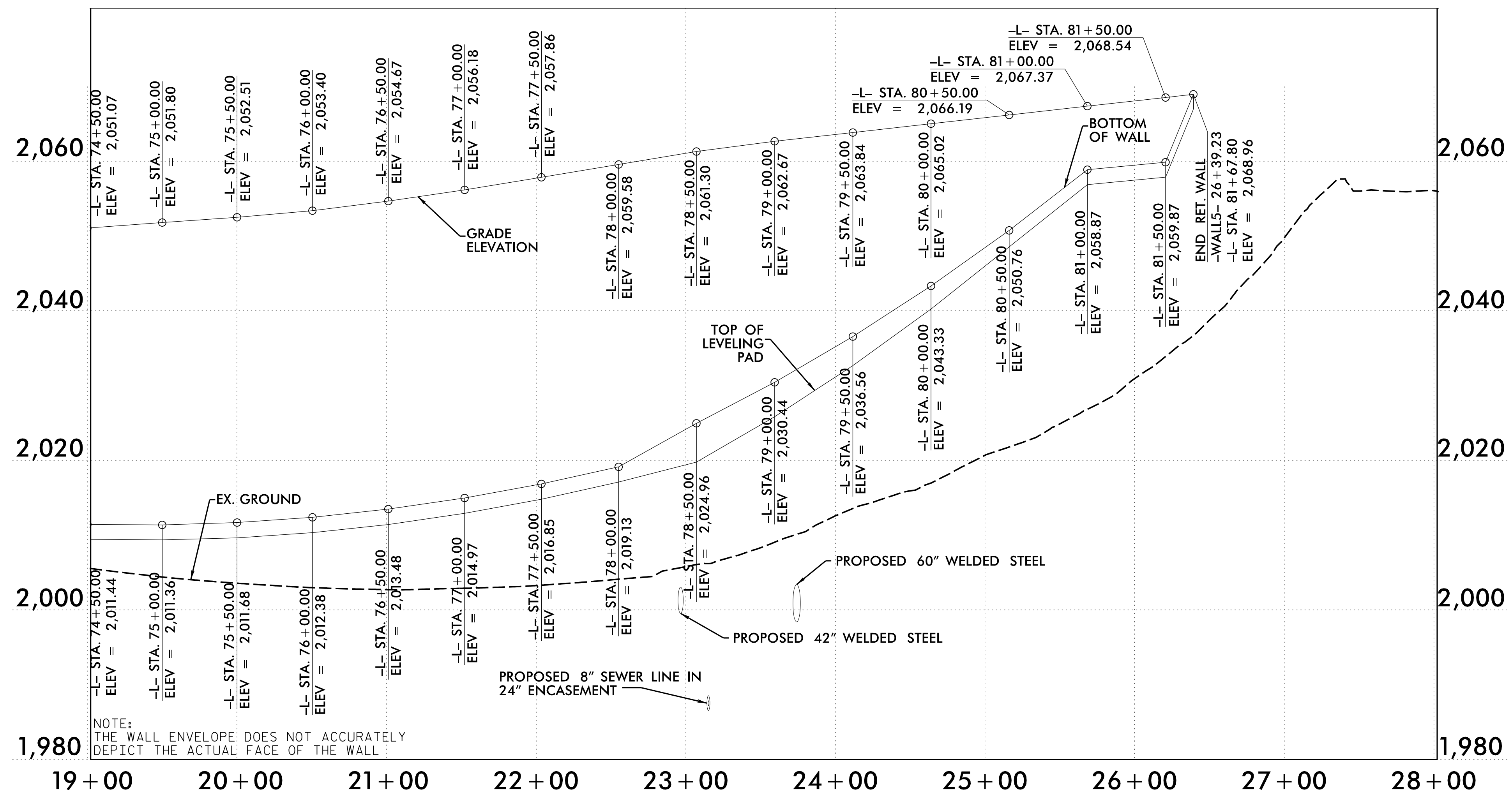
7/20/2026

SIGNATURE DATE SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
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RETAINING WALL NO. 5 – PLAN VIEW



RETAINING WALL NO. 5 – ENVELOPE VIEW

PROJECT NO.: I-2513AC

BUNCOMBE COUNTY

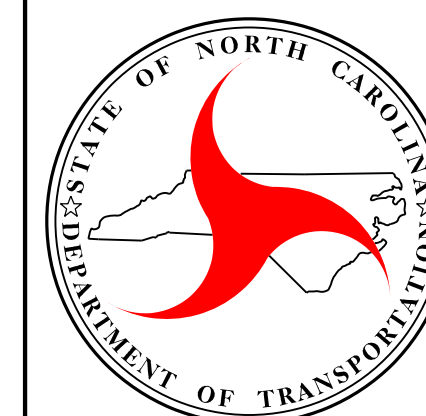
STATION: +/- -L- 65+90 TO -L- 81+68

SHEET 2 OF 3 WALL ID RW-5

Prepared in the Office of:



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(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1519



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

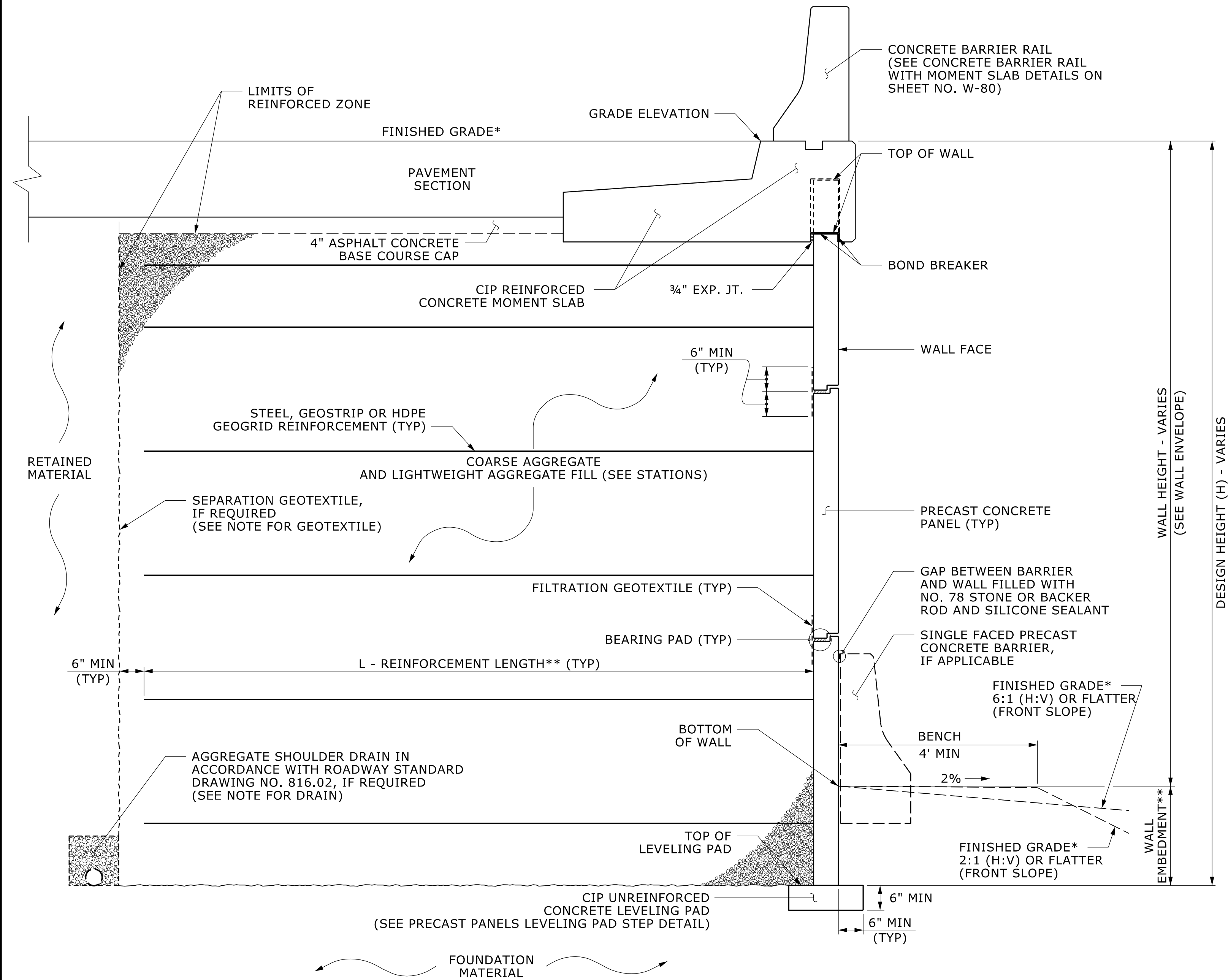
RETAINING WALL NO. 5
MSE WALL
PLAN AND ENVELOPE

REVISIONS

NO.	BY	DATE	NO.	BY	DATE	SHEET NO.
-	-	-	3	-	-	W-15
-	-	-	4	-	-	

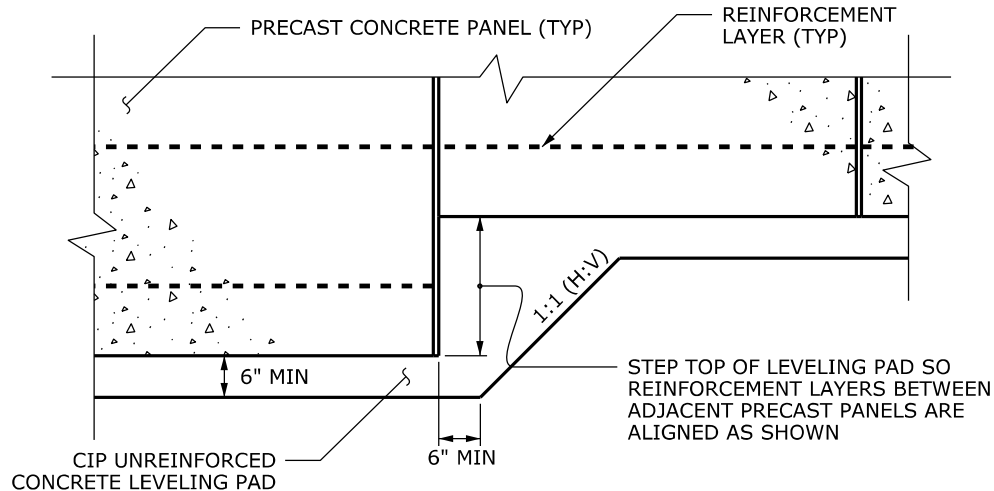
PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

J:\JUN-2026 2146
E:\Users\emcintosh\OneDrive - ECS Corporate Services\31-4489 I-25134C I-25134C Typical sheets_EM.dgn
E:\Users\emcintosh\OneDrive - ECS Corporate Services\31-4489 I-25134C I-25134C Typical sheets_EM.dgn



MSE 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.



PRECAST PANELS
LEVELING PAD STEP DETAIL

NOTES:

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

FOR SINGLE FACED PRECAST CONCRETE BARRIER, -WALL5- STA. 10+89.95 TO 22+66.61 (-L- STA. 66+39.95 TO 78+11.06), SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

A CONCRETE BARRIER RAIL WITH MOMENT SLAB IS REQUIRED ABOVE RETAINING WALL NO. 5. SEE PLANS FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS.

DO NOT USE FINE AGGREGATE IN REINFORCEMENT ZONE FOR MSE WALL NO. 5.

AN ARCHITECTURAL CONCRETE SURFACE TREATMENT IS REQUIRED FOR RETAINING WALL NO. 5. SEE "ARCHITECTURAL CONCRETE SURFACE TREATMENT" SPECIAL PROVISION.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 5.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 5.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 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 NO. 5 FOR THE FOLLOWING:

- 1) H = WALL HEIGHT + WALL EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 8,650 PSF (4,650 PSF IN LIGHTWEIGHT AGGREGATE FILL FROM -WALL5- STA. 22+03 TO 24+75)
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8 H OR 6 FT., WHICHEVER IS LONGER, UNLESS NOTED OTHERWISE (SEE #5 BELOW)
- 5) MINIMUM REINFORCEMENT LENGTH (L) = 1.2 H FOR -WALL5- STA. 22+03 TO 24+75
- 6) MINIMUM EMBEDMENT DEPTH = 2 FT OR H/20 FOR -WALL 5- STA. 10+89.95 TO 22+66.61 AND H/7 FOR -WALL 5- STA. 22+66.61 TO 26+39.23, WHICHEVER IS GREATER
- 7) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
COARSE	110	38	0
LIGHTWEIGHT AGGREGATE FILL**	65	40	0

*SEE MSE RETAINING WALLS PROVISION FOR COARSE AGGREGATE MATERIAL REQUIREMENTS.

****FOR WALL NO. 5 STA. 22+03 TO 24+75 (-L- STA. 77+50 TO 80+11). SEE LIGHTWEIGHT AGGREGATE DETAILS AND SURCHARGE DETAILS FOR MORE INFORMATION.**

8) IN-SITU ASSUMED MATERIAL PARAMETERS:

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

DESIGN RETAINING WALL NO. 5 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN RETAINING WALL NO. 5 FOR A PIPE EXTENDING THROUGH THE WALL AS SHOWN. VERIFY PIPE LOCATION AND ELEVATION BEFORE BEGINNING MSE WALL DESIGN OR CONSTRUCTION.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 5.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 5 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

-WALL5- STA. 22+03 TO 24+75 REQUIRES SURCHARGING PRIOR TO WALL CONSTRUCTION. SEE SURCHARGE DETAILS FOR MORE INFORMATION.

FOR WALL NO. 5 STA. 22+03 TO 24+75 (-L- STA. 77+50 TO 80+11). SEE LIGHTWEIGHT AGGREGATE DETAILS AND SURCHARGE DETAILS FOR MORE INFORMATION.

PROJECT NO.: I-25134C

BUNCOMBE COUNTY

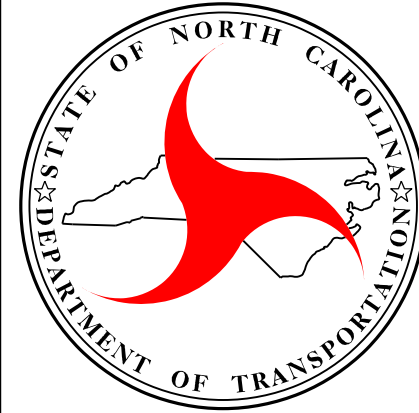
STATION: +/- -L- 65+90 TO -L- 81+68

SHEET 3 OF 3 WALL ID RW-5

Prepared in the Office of:



ECS SOUTHEAST, LLC
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1519



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 5
MSE WALL WITH PRECAST PANELS
TYPICAL SECTION AND NOTES

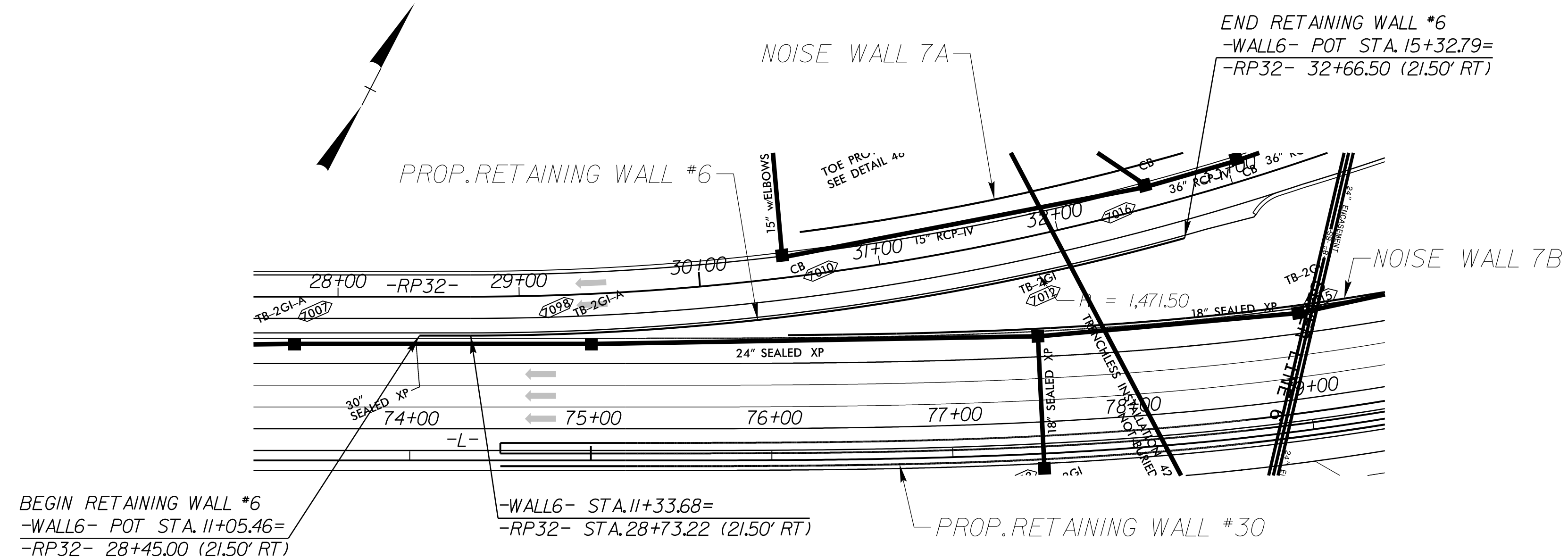
REVISIONS

NO.	BY	DATE	NO.	BY	DATE
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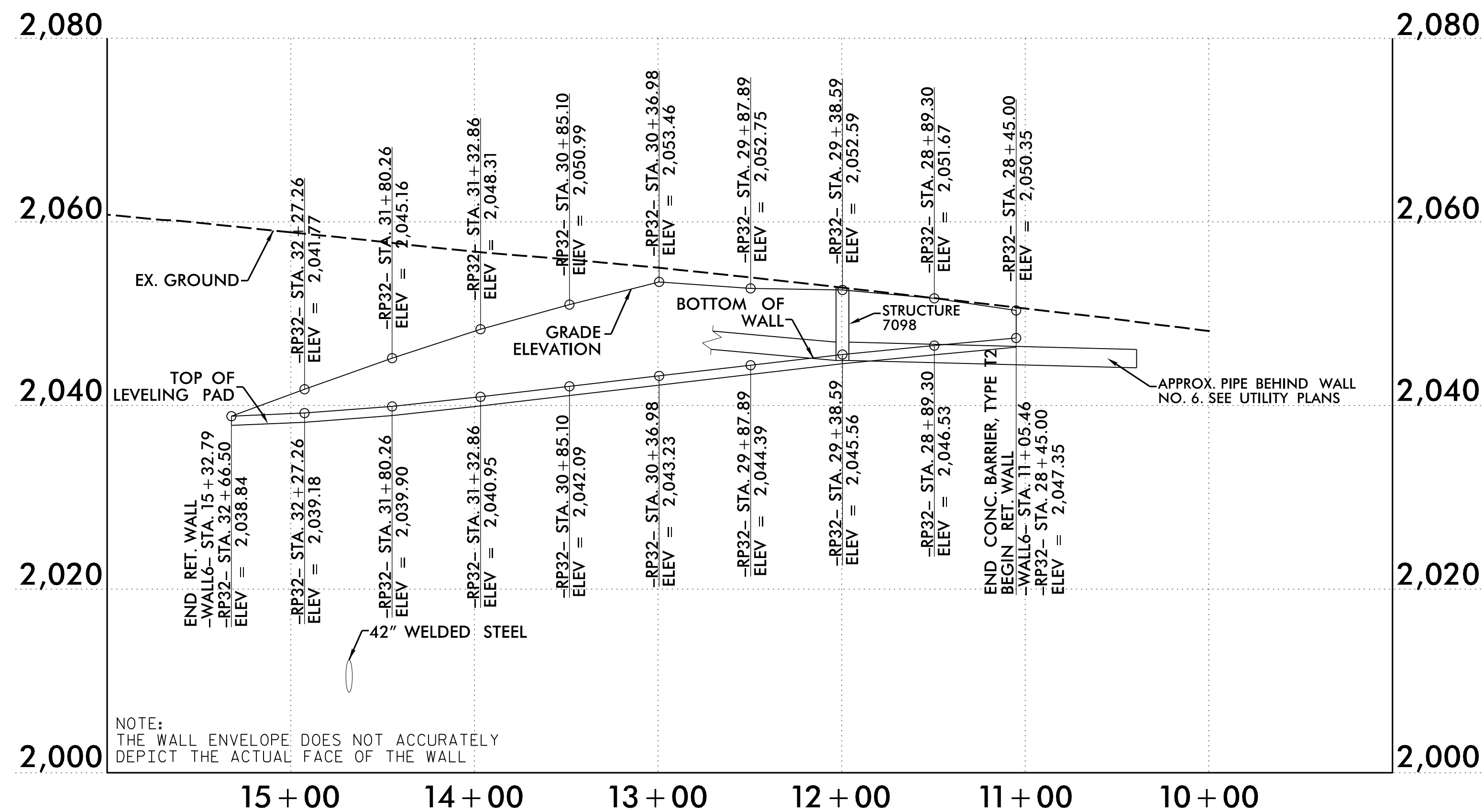
SHEET
NO.
W-16

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

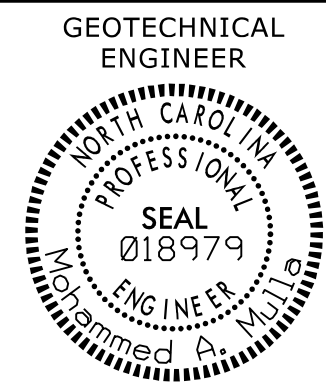
RETAINING WALL #6 DETAIL SHEET



RETAINING WALL NO. 6 – PLAN VIEW



RETAINING WALL NO. 6 – ENVELOPE VIEW



ENGINEER

7/20/2026

SIGNATURE

DATE

SIGNATURE

DATE

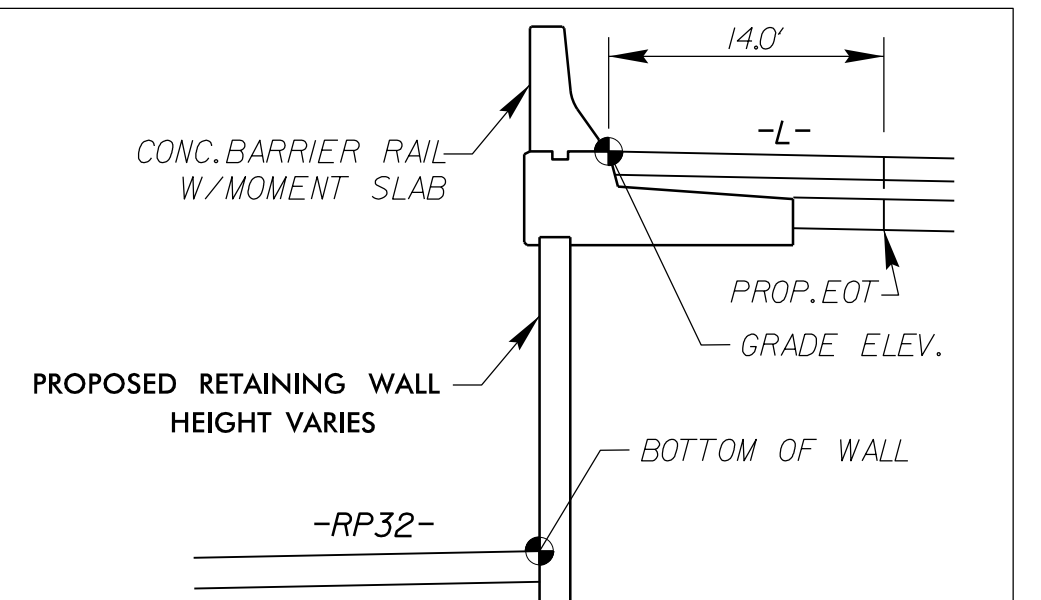
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ESTIMATED SOLDIER PILE WALL QUANTITIES*

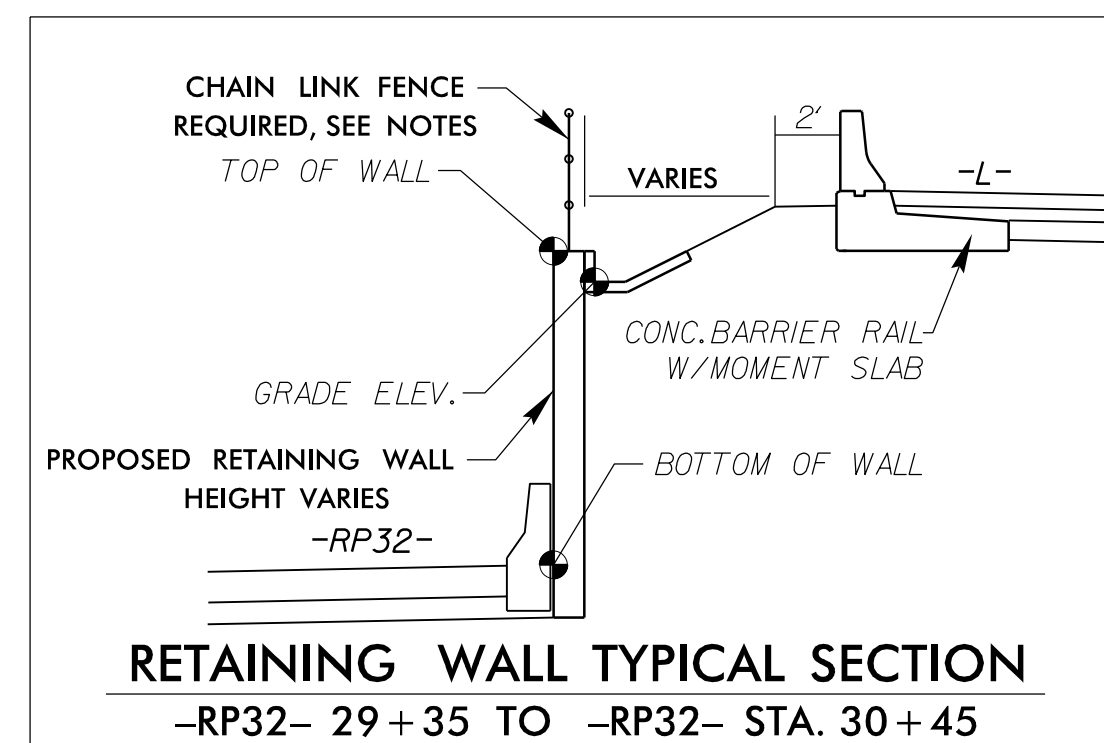
(SQUARE FEET)

SOLDIER PILE RETAINING WALL NO. 6	3,170
ARCHITECTURAL CONCRETE SURFACE TREATMENT	3,065

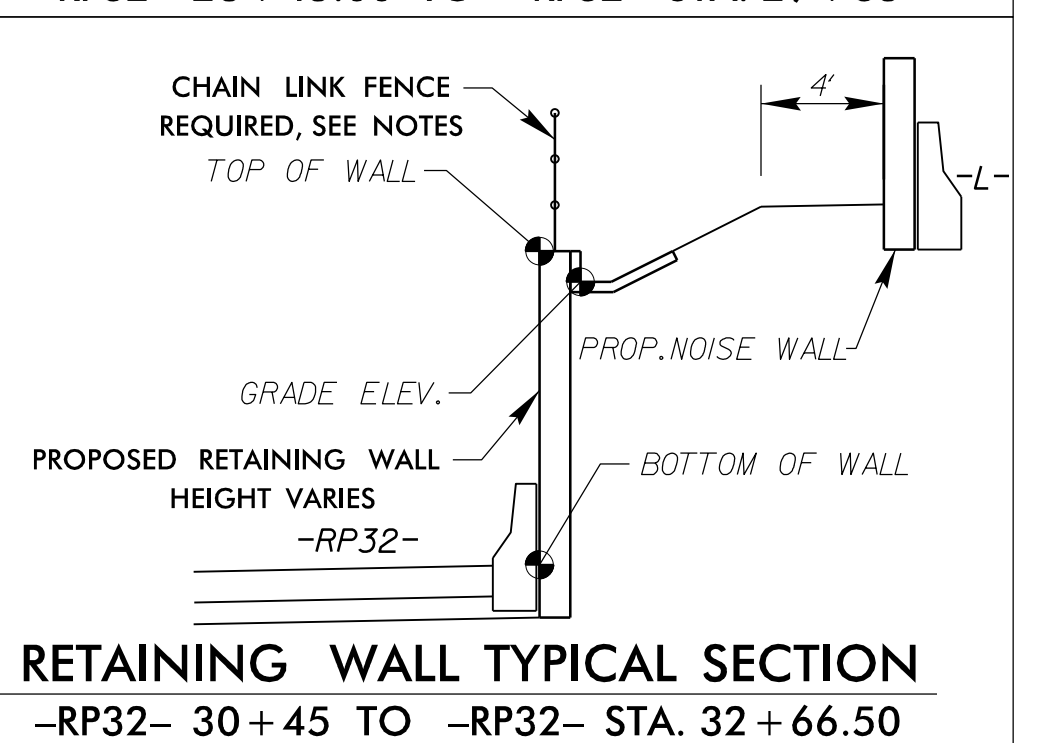
* = ESTIMATED WALL QUANTITIES INCLUDE
ESTIMATED WALL EMBEDMENT AREA



RETAINING WALL TYPICAL SECTION
-RP32- 28 + 45.00 TO -RP32- STA. 29 + 35



RETAINING WALL TYPICAL SECTION
-RP32- 29 + 35 TO -RP32- STA. 30 + 45



RETAINING WALL TYPICAL SECTION
-RP32- 30 + 45 TO -RP32- STA. 32 + 66.50

PROJECT NO.: I-2513AC

BUNCOMBE COUNTY

STATION: +/- -RP32- 28+45 TO -RP32- 32+66.5

SHEET 1 OF 3 WALL ID RW-6

RETAINING WALL NO. 6 SOLDIER PILE WALL PLAN AND ENVELOPE

REVISIONS

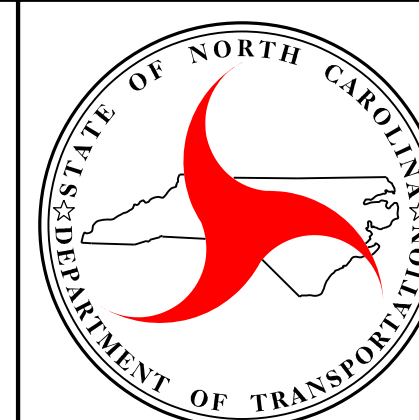
NO.	BY	DATE	NO.	BY	DATE
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SHEET
NO.
W-17

Prepared in the Office of:



ECS SOUTHEAST, LLC
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1519



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

GEOTECHNICAL
ENGINEER

SEAL

018979

ENGINEER

MOHAMMED A. MULLA

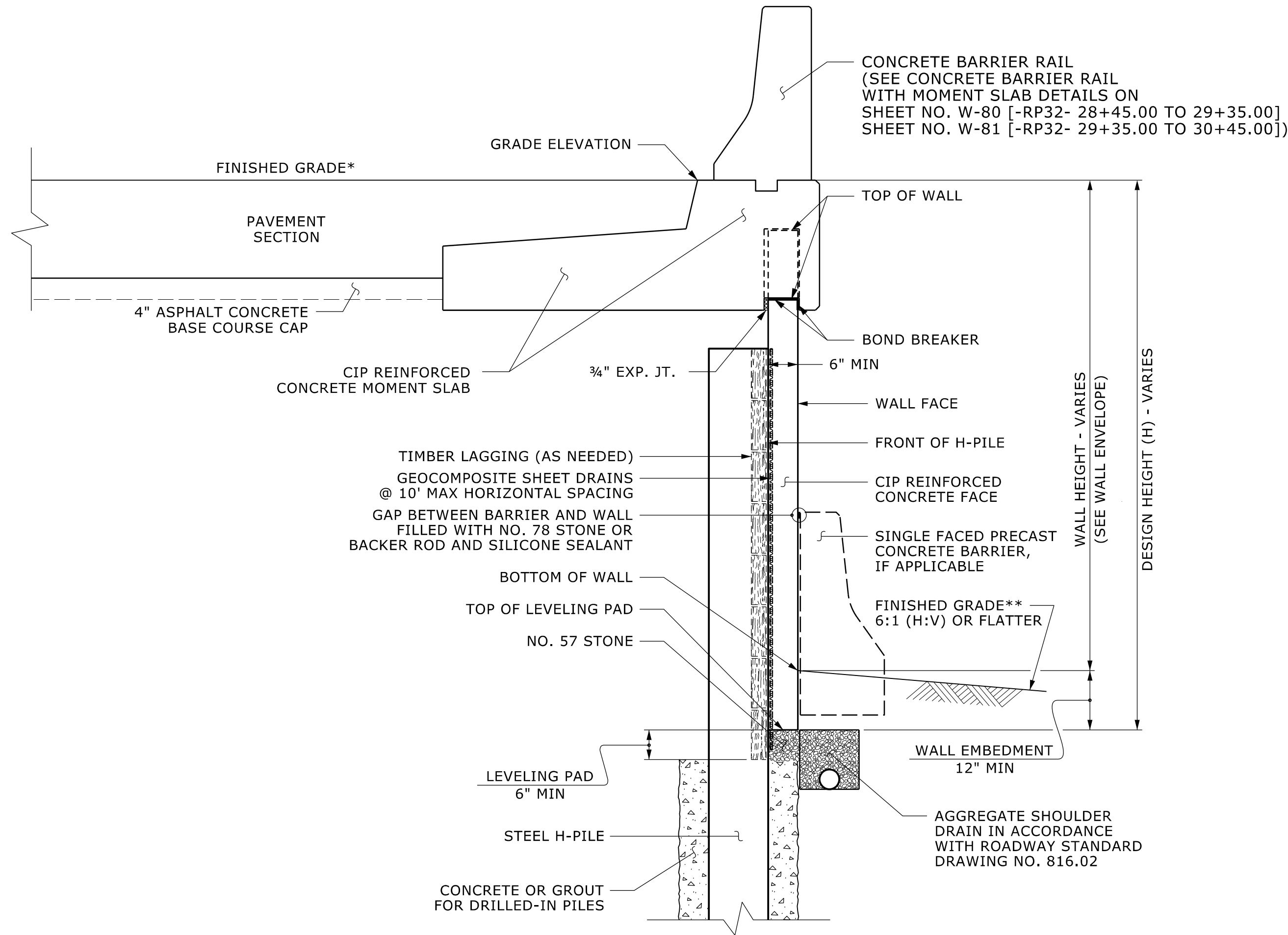
7/20/2026

SIGNATUREDATE

ENGINEER

SIGNATUREDATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



**SOLDIER PILE WALL WITH
CIP FACE AND MOMENT SLAB - TYPICAL SECTION**
-RP32- STA. 28+45.00 TO -RP32- STA. 29+35

NOTES:

- FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS PROVISION.
- FOR SINGLE FACED CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS
- A CONCRETE BARRIER RAIL WITH MOMENT SLAB IS REQUIRED ABOVE RETAINING WALL NO. 6. SEE PLANS FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS.
- A 48" BLACK VINYL COATED CHAIN LINK FENCE IS REQUIRED FROM -RP32- STA 29+35.00 TO -RP32- 32+66.50. SEE ROADWAY STANDARD 866.06 (ROADWAY DETAIL AND PAY ITEM).
- DRILLED-IN H-PILES ARE REQUIRED FOR RETAINING WALL NO. 6.
- USE A SOLDIER PILE RETAINING WALL WITH A CIP REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 6.
- CIP REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALL NO. 6.
- AN ARCHITECTURAL CONCRETE SURFACE TREATMENT IS REQUIRED FOR RETAINING WALL NO. 6. SEE "ARCHITECTURAL CONCRETE SURFACE TREATMENT" SPECIAL PROVISION.
- BEFORE BEGINNING SOLDIER PILE WALL DESIGN FOR RETAINING WALL NO. 6, 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 NO. 6 FOR THE FOLLOWING:
1) H = WALL HEIGHT + WALL EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MINIMUM WALL EMBEDMENT DEPTH = 1.5 FT
4) IN-SITU ASSUMED MATERIAL PARAMETERS:
UNIT WEIGHT, γ = 120 PCF
FRICTION ANGLE, ϕ = 30 DEGREES
COHESION, c = 0.0 PSF
- DESIGN RETAINING WALL NO. 6 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.
- DESIGN RETAINING WALL NO. 6 FOR SOUND WALL BARRIER WALL 7B LOADING. SOUND WALL OFFSET AND PANEL HEIGHTS VARY ALONG WALL 6 ALIGNMENT. SEE NOISE WALL STANDARD DRAWING & SPECIAL PROVISIONS (APPENDIX H) FOR LOADING DETAILS.
- EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 6. VERIFY PIPE AND STRUCTURE LOCATIONS AND ELEVATIONS WITH UTILITY PLANS BEFORE BEGINNING SOLDIER PILE WALL DESIGN OR CONSTRUCTION.

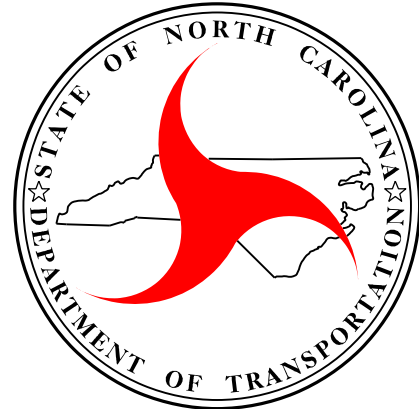
PROJECT NO.: I-2513AC
BUNCOMBE COUNTY
STATION: +/- -RP32- 28+45 TO -RP32- 32+66.5
SHEET 2 OF 3 WALL ID RW-6

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

Prepared in the Office of:

ECS

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(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
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ENGINEERING
FIRM # F-1519



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

**RETAINING WALL NO. 6
SOLDIER PILE WALL
TYPICAL SECTION AND NOTES**

REVISIONS						SHEET NO. W-18
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

SIGNATURE

SIGNATURE	DATE
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NOTES:

The diagrams illustrate two methods of retaining wall construction. The left diagram shows a wall with welded wire reinforcement (WWR) and a bond breaker. The right diagram shows a wall with precast concrete coping and a bond breaker. Both diagrams include labels for various components and dimensions.

Left Diagram Labels:

- FINISHED GRADE*
- 4" THICK CONCRETE DITCH*
- 2:1 (H:V)
- 12"
- 0" - 24"
- 12" MIN
- WELDED WIRE REINFORCEMENT (WWR) 6 x 6-W1.4 x W1.4
- CIP CONCRETE COPING
- TOP OF WALL
- BOND BREAKER
- CIP FACING
- PERMITTED CONST. JOINT WITH WWR
- GRADE ELEVATION**

Right Diagram Labels:

- FINISHED GRADE*
- 4" THICK CONCRETE DITCH*
- 2:1 (H:V)
- 12"
- 0" - 24"*
- 12" MIN
- WELDED WIRE REINFORCEMENT (WWR) 6 x 6-W1.4 x W1.4
- PRECAST CONCRETE COPING
- TOP OF WALL
- PERMITTED CONST. JOINT WITH WWR
- BOND BREAKER
- CIP FACING
- GRADE ELEVATION**

CONCRETE DITCH BEHIND
WALL WITH CONCRETE COPING

COPING DETAILS

PROJECT NO.: I-2513AC

BUNCOMBE COUNTY

STATION: +/- -RP32- 28+45 TO -RP32- 32+66.5

SHEET 3 OF 3

RETAINING WALL NO. 6 SOLDIER PILE WALL TYPICAL SECTION AND NOTES

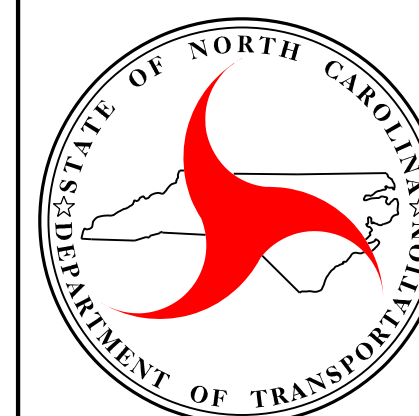
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
			3			W-
			4			

SHEET
NO.
W-19

Prepared in the Office of:



ECS SOUTHEAST, LLC
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1519

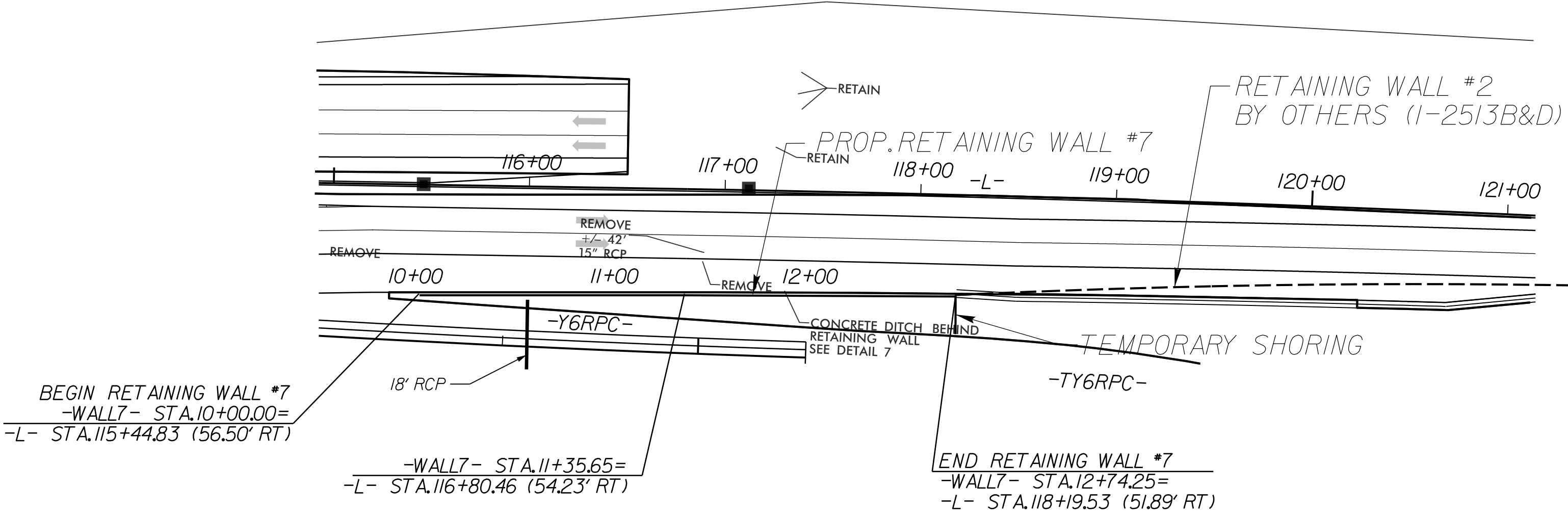
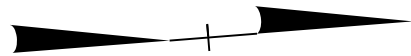


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

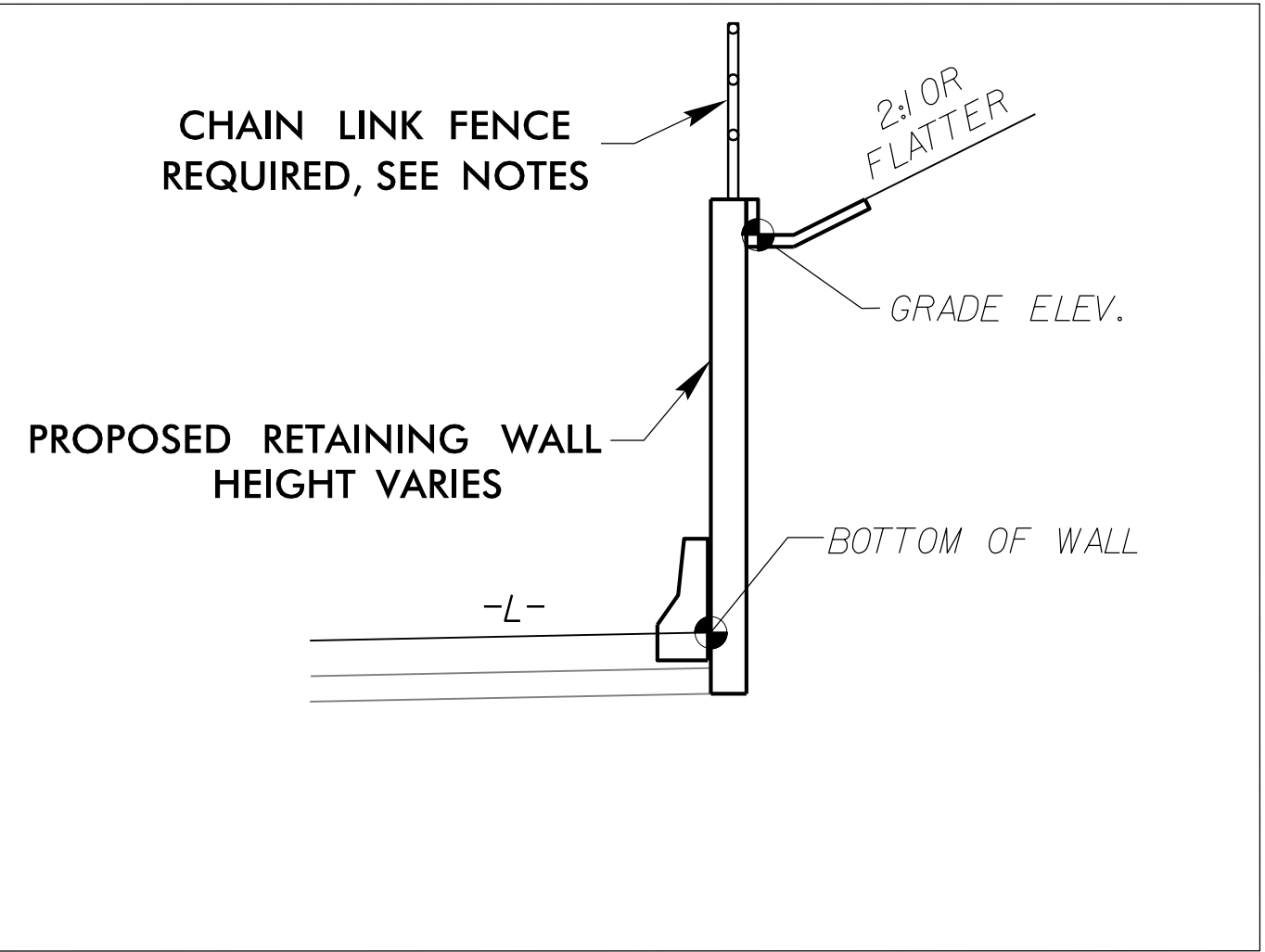
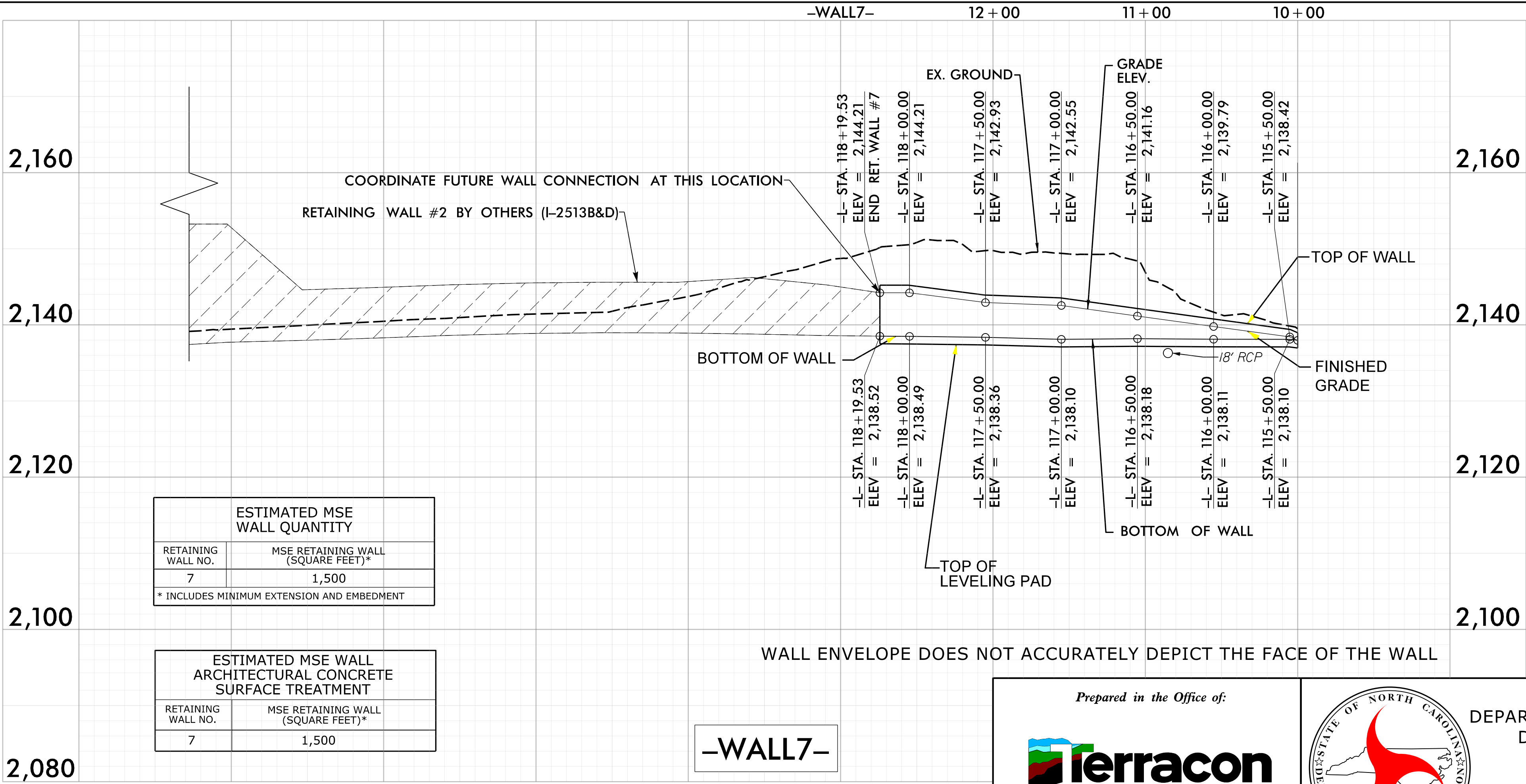
GEOTECHNICAL
ENGINEERING UNIT

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

RETAINING WALL #7 DETAIL SHEET
MSE RETAINING WALL NO.7 PLAN



MSE RETAINING WALL NO.7 ENVELOPE



PROJECT NO.: 34165.1.6 (I-2513AC)
BUNCOMBE COUNTY
STATION: STA 10+00.00 - 12+74.25 -WALL 7-
SHEET 1 OF 2 WALL ID RW-7

PREPARED BY: ALMULLA, H. DATE: 04/07/2026
REVIEWED BY: RIGGS, Jr., A. F. DATE: 04/07/2026

Prepared in the Office of:

350 SPRING FOREST ROAD, SUITE 100
RALEIGH, NORTH CAROLINA 27609
NO. REGISTERED ENGINEERING FIRM: E-0869
NC REGISTERED GEOLOGIC FIRM: C-367

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL
ENGINEERING UNIT

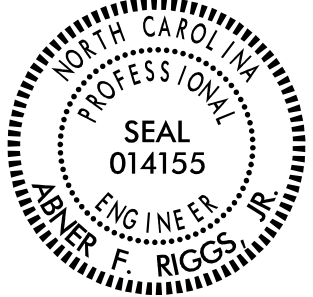
MSE WALL WITH PRECAST PANELS
RETAINING WALL NO. 7
PLAN AND ENVELOPE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	FIELDS, W. D.	5/1/26	3	FIELDS, W. D.	6/15/26	
2	FIELDS, W. D.	6/12/26	4			

PROJECT REFERENCE NO.
I-2513AC

SHEET NO.
W-21

GEOTECHNICAL ENGINEER

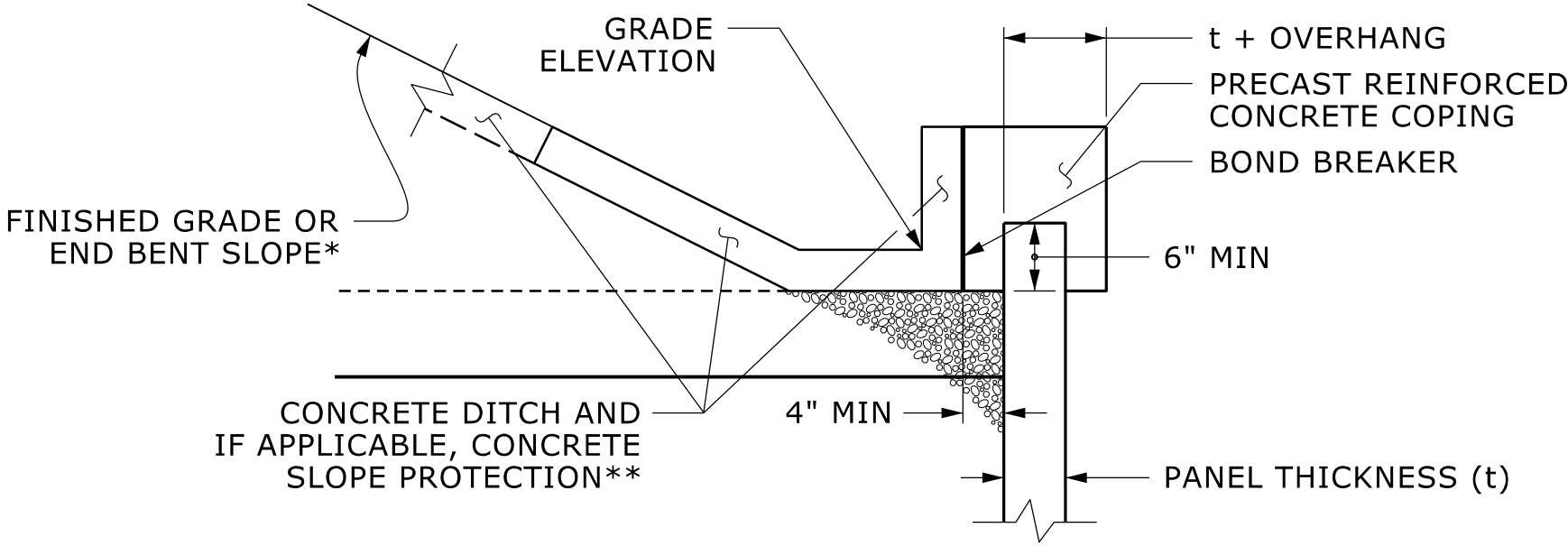
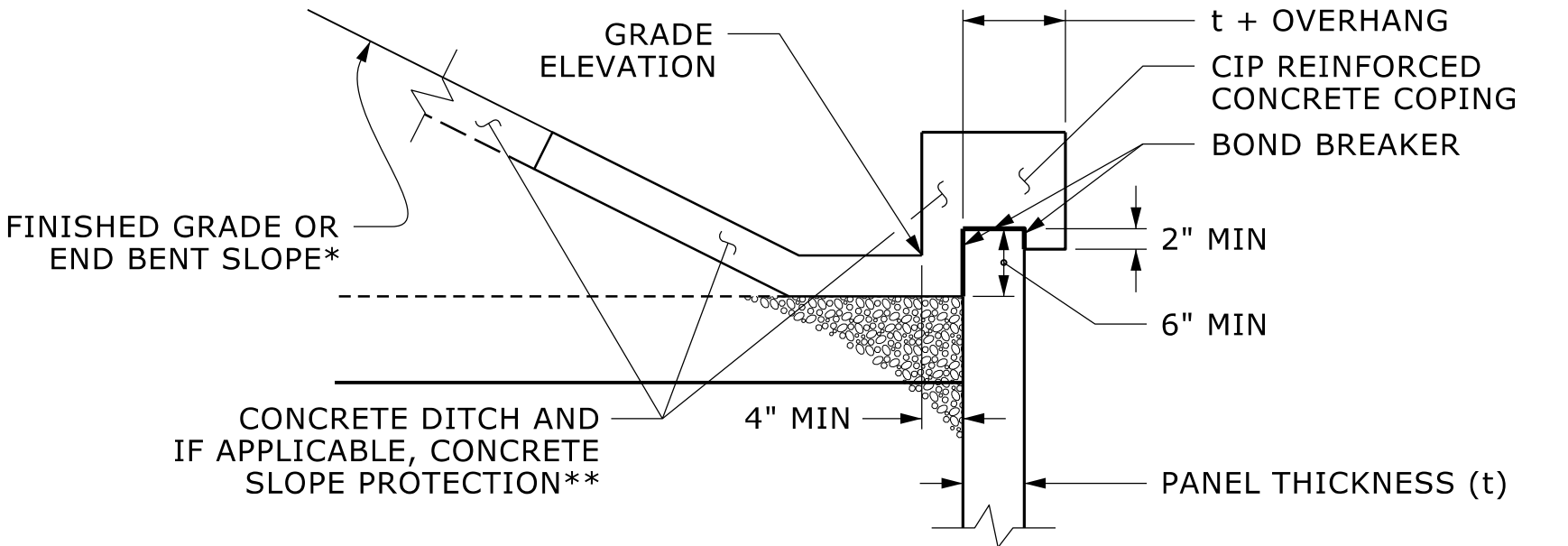
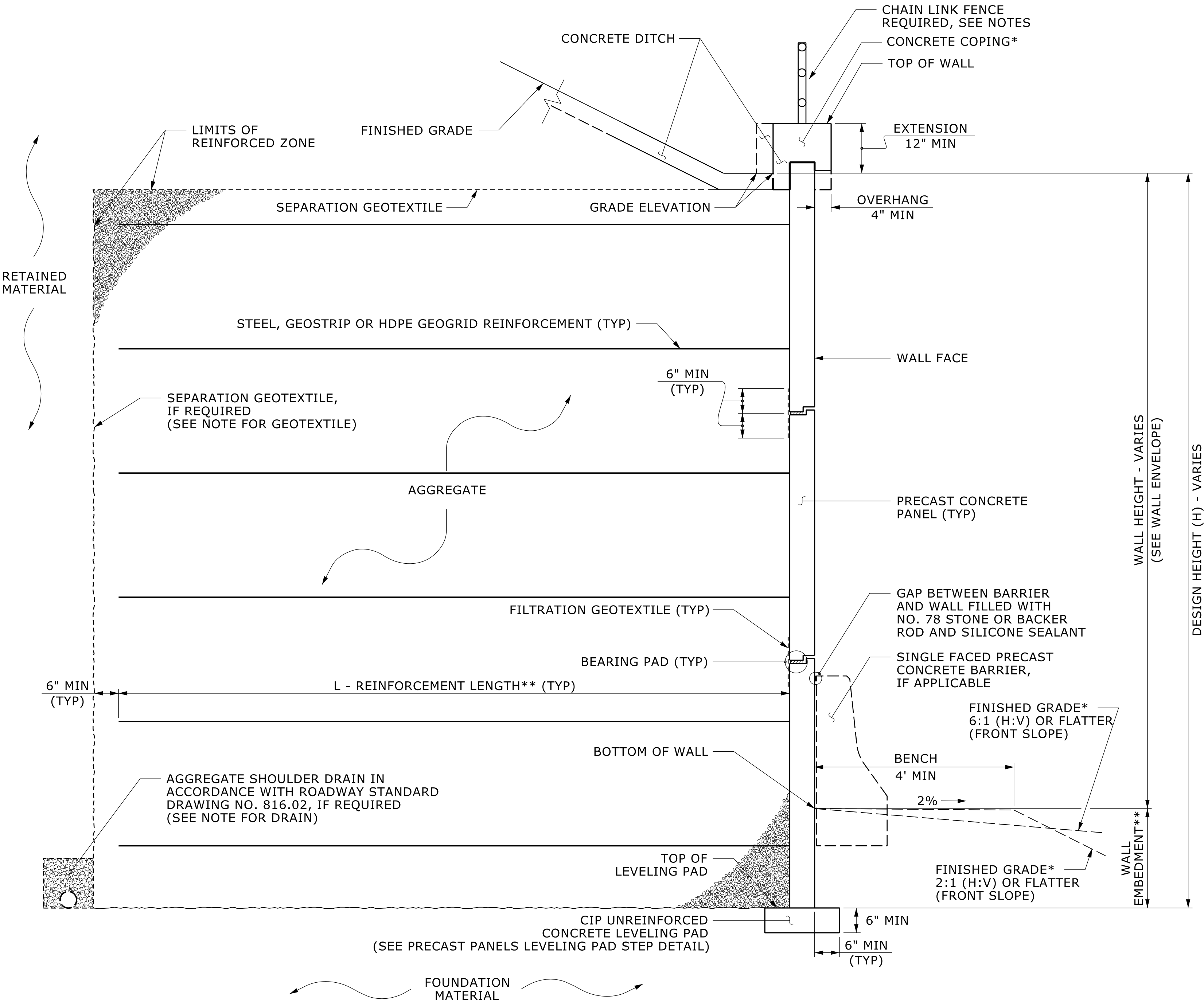


DocuSigned by:
Almer Riggs, Jr.
C2F3AC86D28161

ENGINEER

SIGNATURE
DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



COPING DETAILS

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

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.

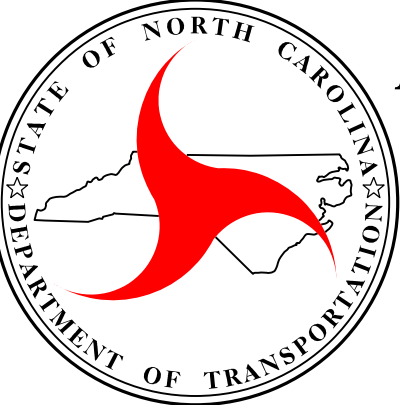
PROJECT NO.: 34165.1.6 (I-2513AC)
BUNCOMBE COUNTY
STATION: STA 10+00.00 - 12+74.25 -WALL7-
SHEET 2 OF 2 WALL ID RW-7

PREPARED BY: ALMULLA, H.	DATE: 04/07/2026
REVIEWED BY: RIGGS, Jr., A. F.	DATE: 04/07/2026

Prepared in the Office of:



3150 SPRING FOREST ROAD, SUITE 100
RALEIGH, NORTH CAROLINA 27616
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

MSE WALL WITH PRECAST PANELS
RETAINING WALL NO. 7 WITH BACK
SLOPE TYPICAL SECTIONS AND NOTES

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1	FIELDS, W. D.	05/01/26	3		
2	FIELDS, W. D.	06/12/26	4		

NOTES:

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

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

CIP REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALL 7.

AN ARCHITECTURAL CONCRETE SURFACE TREATMENT IS REQUIRED FOR RETAINING WALL NO. 7. SEE "ARCHITECTURAL CONCRETE SURFACE TREATMENT" SPECIAL PROVISIONS

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 7.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 7.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 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 NO. 7 FOR THE FOLLOWING:

- 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 2,050 PSF
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 1.3H) OR 6.0 FT, WHICHEVER IS LONGER
- 5) MINIMUM EMBEDMENT ELEVATION = 1.0 FT
- 6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (Y) PCF	FRICTION ANGLE (φ) 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 (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
RETAINED	120	31	0
FOUNDATION	120	31	0

DESIGN RETAINING WALL NO. 7 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

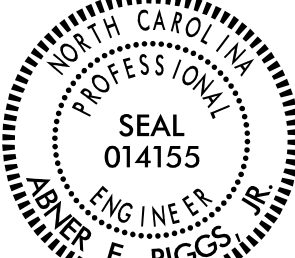
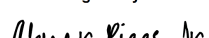
48" BLACK VINYL COATED CHAIN LINK FENCE IS REQUIRED FULL LENGTH OF WALL. SEE ROADWAY STANDARD 866.06 (ROADWAY DETAIL AND PAY ITEM).

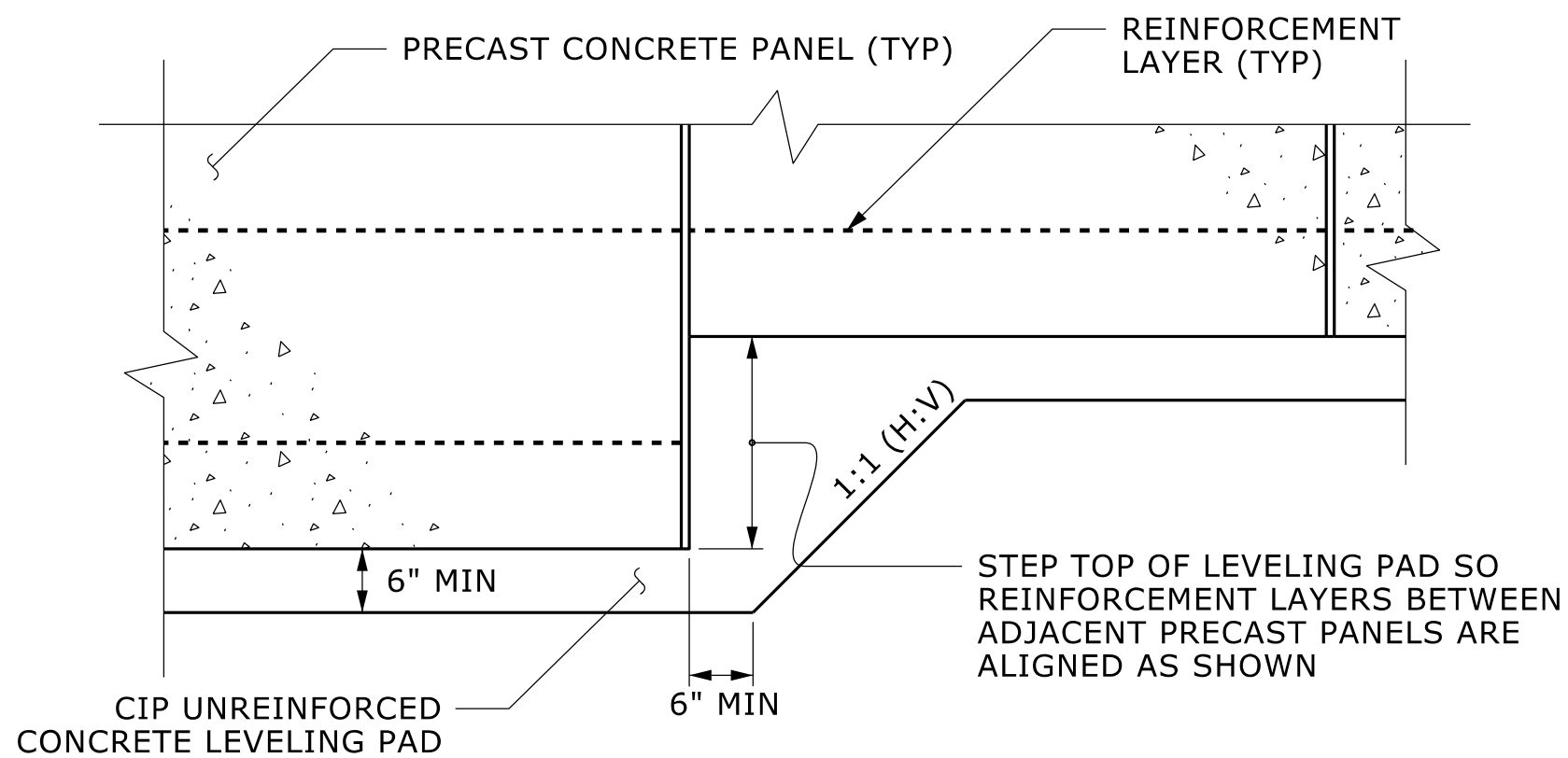
EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 7.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 7 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

"TEMPORARY SHORING" IS REQUIRED FOR RETAINING WALL NO. 7 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION.

"TEMPORARY SHORING" IS REQUIRED AT THE PHASING LOCATION -RWAL7- STA. 12+74.25 = -L- STA. 118+19.53 EXTENDING 20' RIGHT PERPENDICULAR TO WALL

PROJECT REFERENCE NO.		SHEET NO.	
I-2513AC		W-22	
GEOTECHNICAL ENGINEER 		ENGINEER	
DocuSigned by:  02EEAC84D2761 SIGNATURE		7/22/2026 _____ SIGNATURE	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



PRECAST PANELS LEVELING PAD STEP DETAIL

PROJECT NO.: 34165.1.6 (I-2513AC)

BUNCOMBE COUNTY

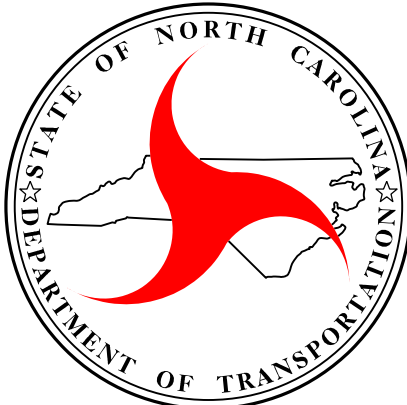
STATION: STA 10+00.00 - 12+74.25 -WALL7-

SHEET 2 OF 2 WALL ID RW-7

Prepared in the Office of:



3150 SPRING FOREST ROAD, SUITE 100
RALEIGH, NORTH CAROLINA 27616
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



**NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

**GEOTECHNICAL
ENGINEERING UNIT**

MSE WALL WITH PRECAST PANELS
RETAINING WALL NO. 7 WITH BACK
SLOPE TYPICAL SECTIONS AND NOTES

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1	FIELDS, W. D.	05/01/26	3		
2	FIELDS, W. D.	06/12/26	4		

GEOTECHNICAL
ENGINEER

SEAL
048207

ENGINEER

STEPHEN C. CROCKETT

DocuSigned by:
Stephen Crockett

7/17/2026

SIGNATURE

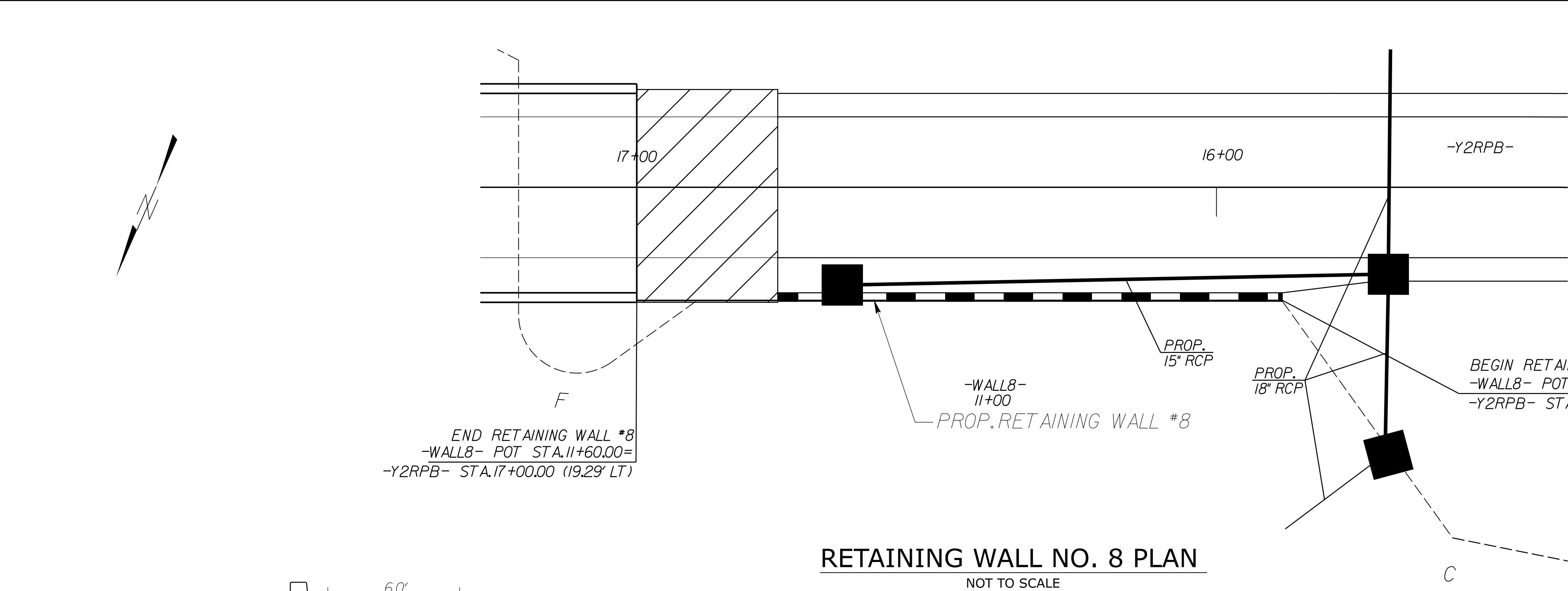
DATE

ENGINEER

SIGNATURE

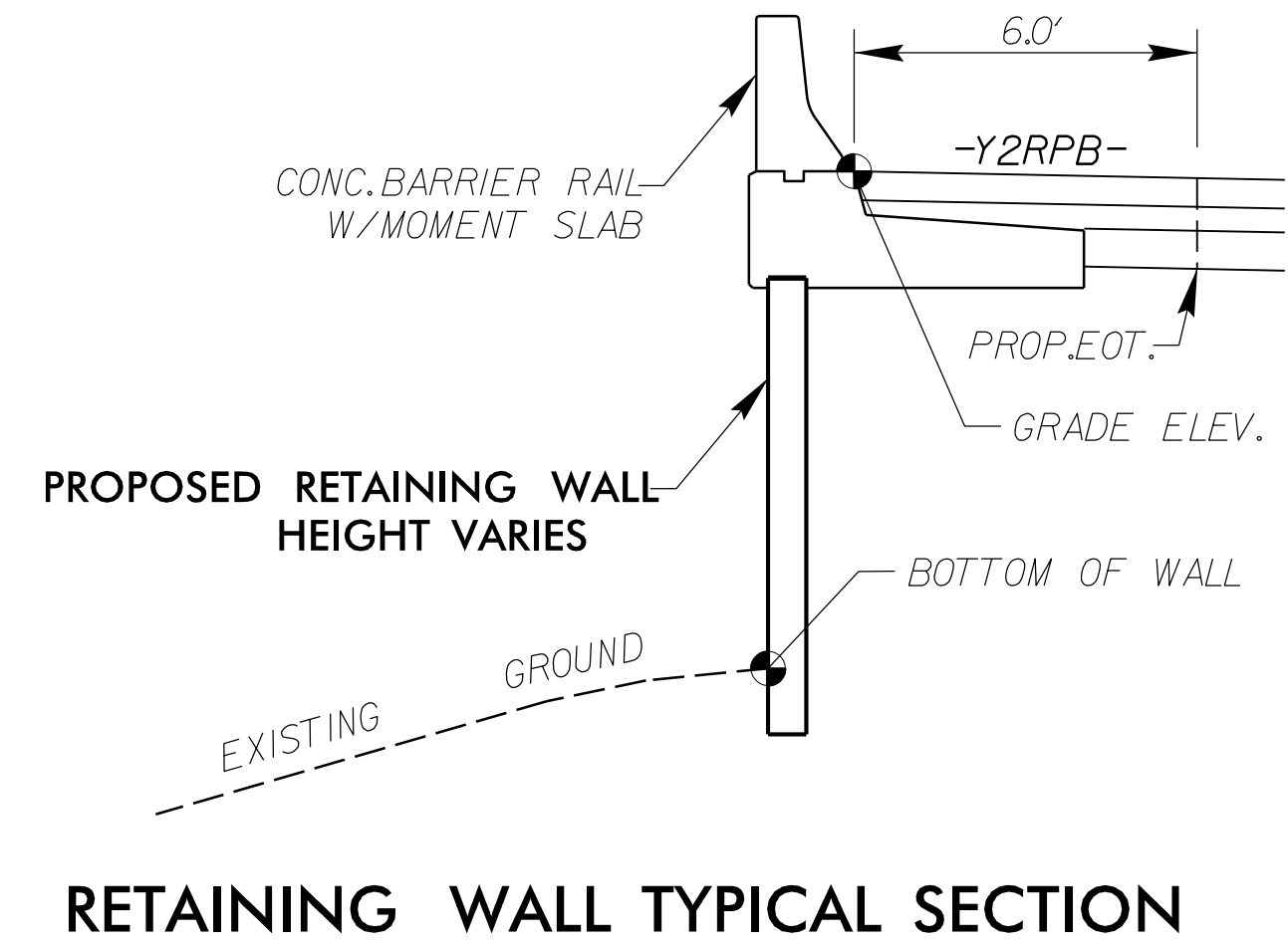
DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

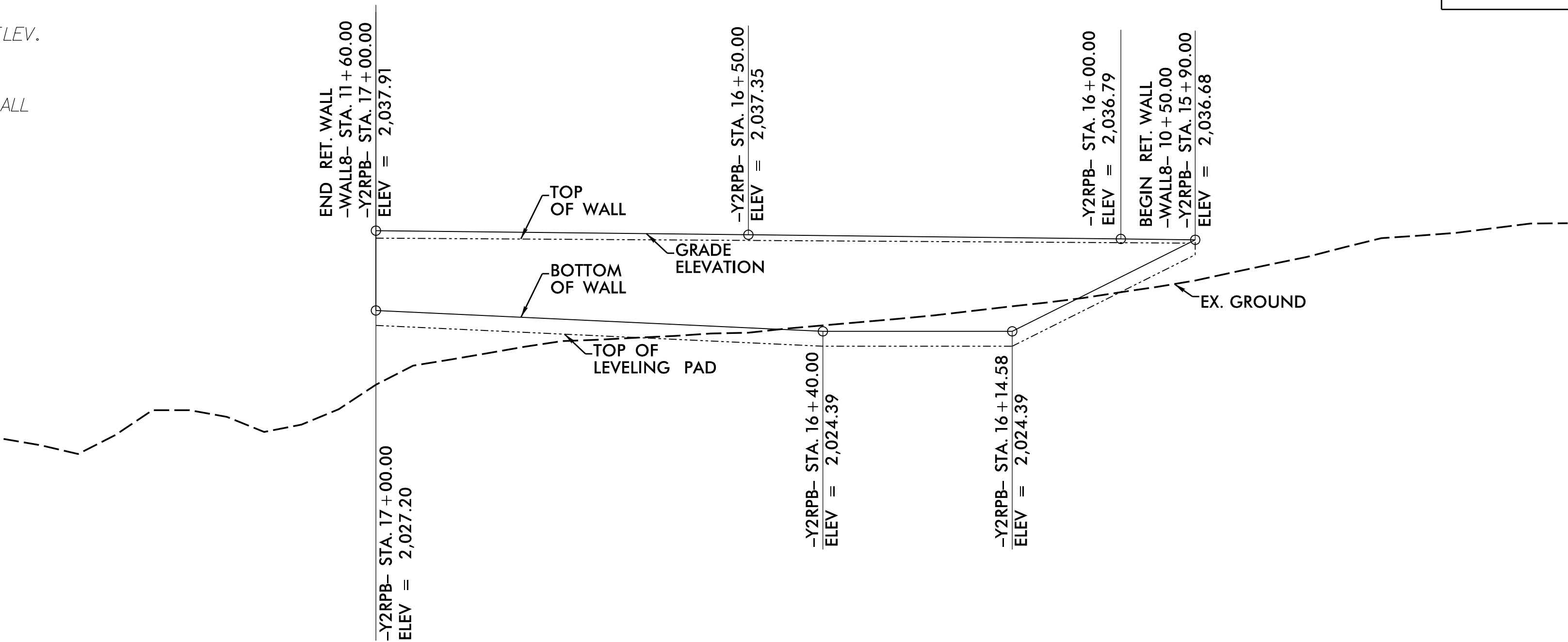


RETAINING WALL NO. 8 PLAN
NOT TO SCALE

ESTIMATED MSE WALL QUANTITIES (SQUARE FEET)	
PAY ITEM	QUANTITY
MSE RETAINING WALL NO.8	1,410 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	1,410 SF



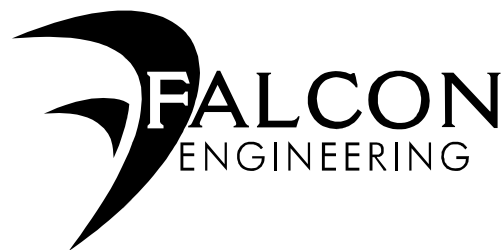
RETAINING WALL TYPICAL SECTION



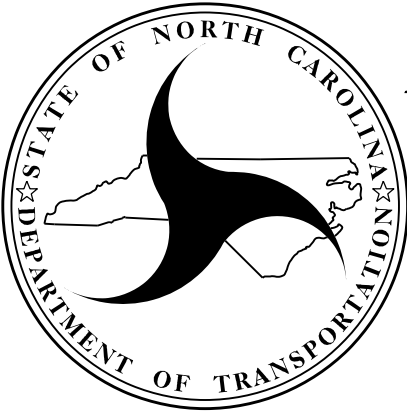
RETAINING WALL NO. 8 ENVELOPE
DIMENSIONS OF WALL TAKEN ALONG FRONT FACE OF MSE WALL
NOT TO SCALE

PROJECT NO.: I-2513AC
BUNCOMBE COUNTY
STATION: -Y2RPB- 15+90.00 TO 17+00.00
SHEET 1 OF 3
WALL ID WALL8

PREPARED BY: S. CROCKETT	DATE: 4/2/26
REVIEWED BY: J. HAMM	DATE: 4/3/26

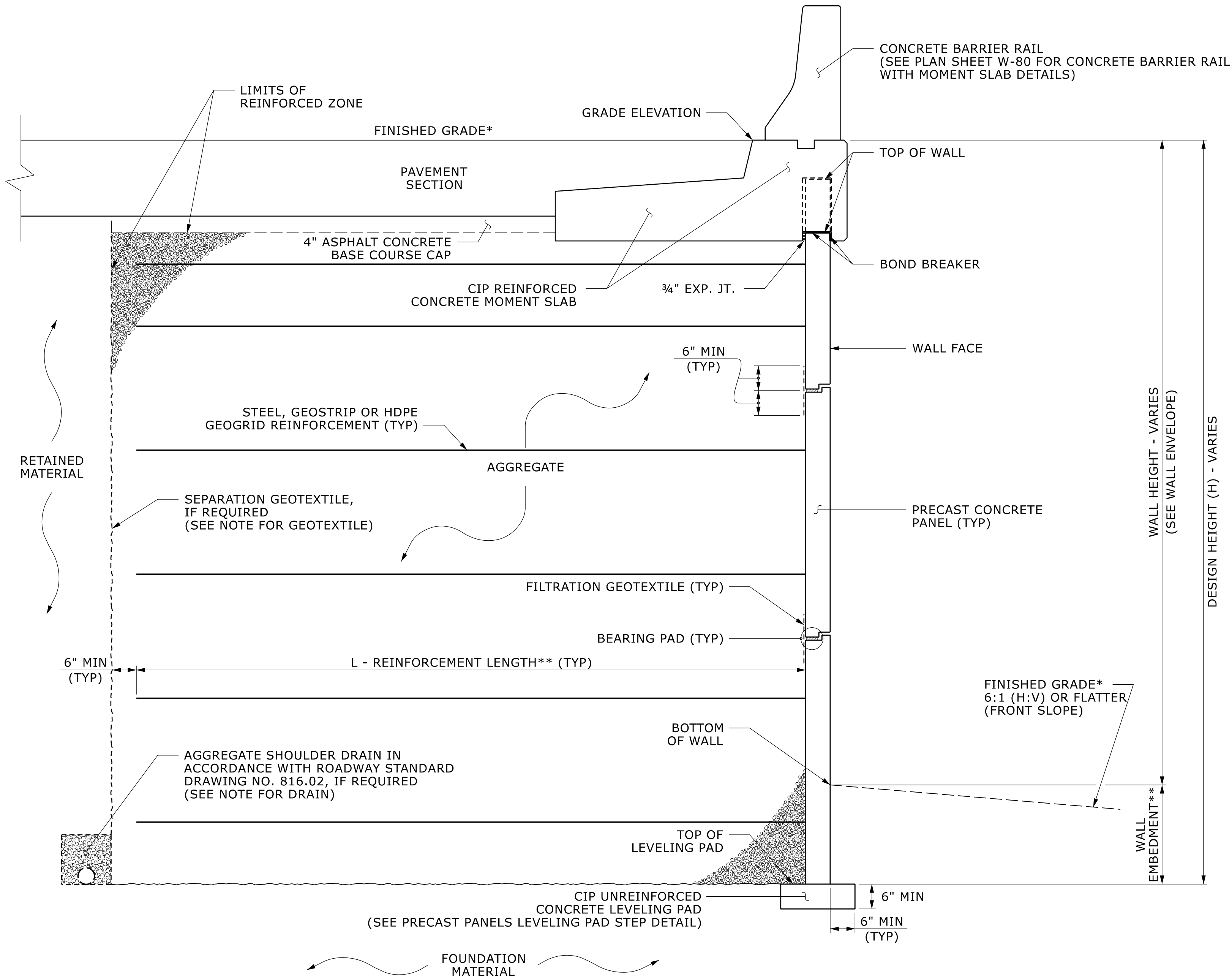


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CARY, NC 27513
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DIVISION OF HIGHWAYS
GEOTECHNICAL
ENGINEERING UNIT

REVISIONS						SHEET NO. W-23
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



MSE 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.

GEOTECHNICAL
ENGINEER

DocuSigned by:
Stephen Crockett
CSCASPED48E4M3S

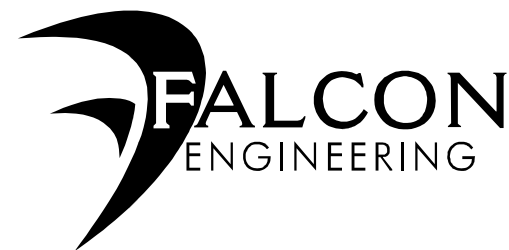
ENGINEER

SIGNATUREDATE

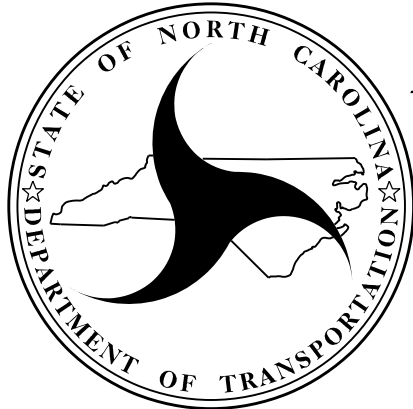
SIGNATUREDATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PREPARED BY: S. CROCKETT	DATE: 4/2/26
REVIEWED BY: J. HAMM	DATE: 4/3/26



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CARY, NC 27513
PHONE: 919.871.0800
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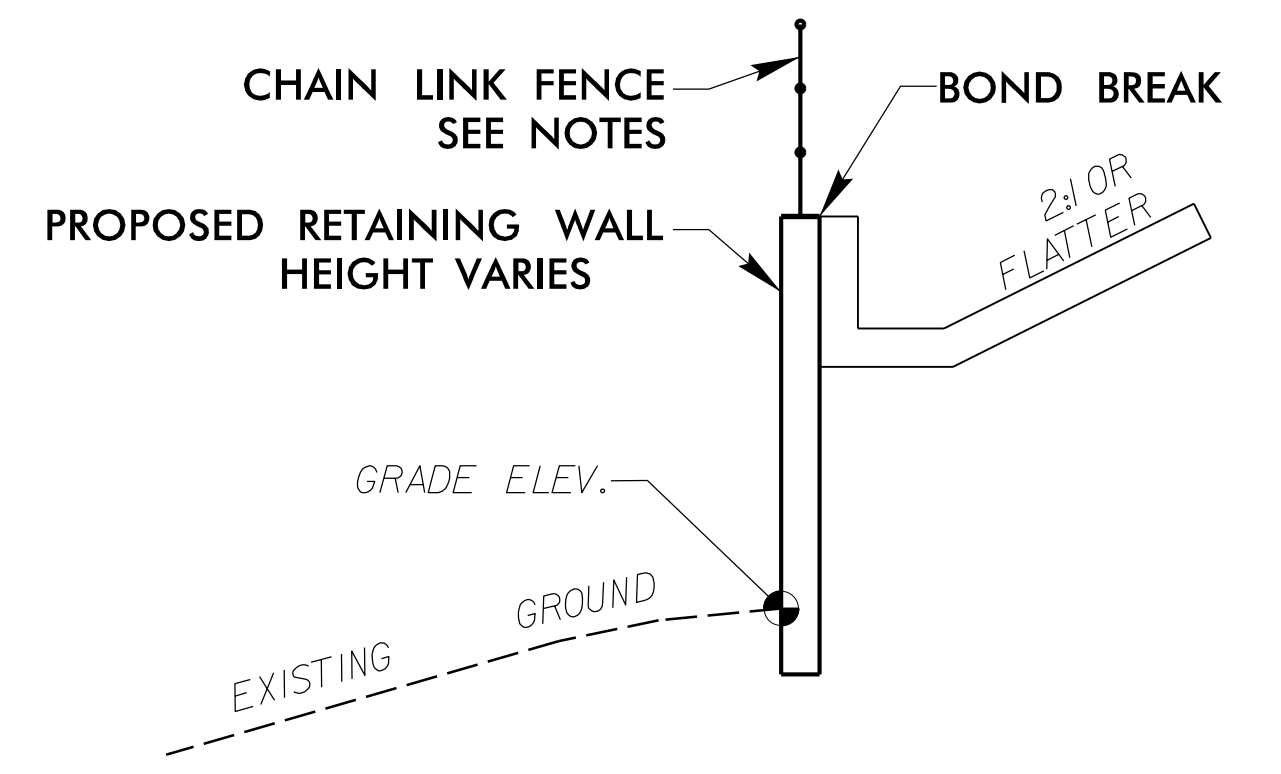
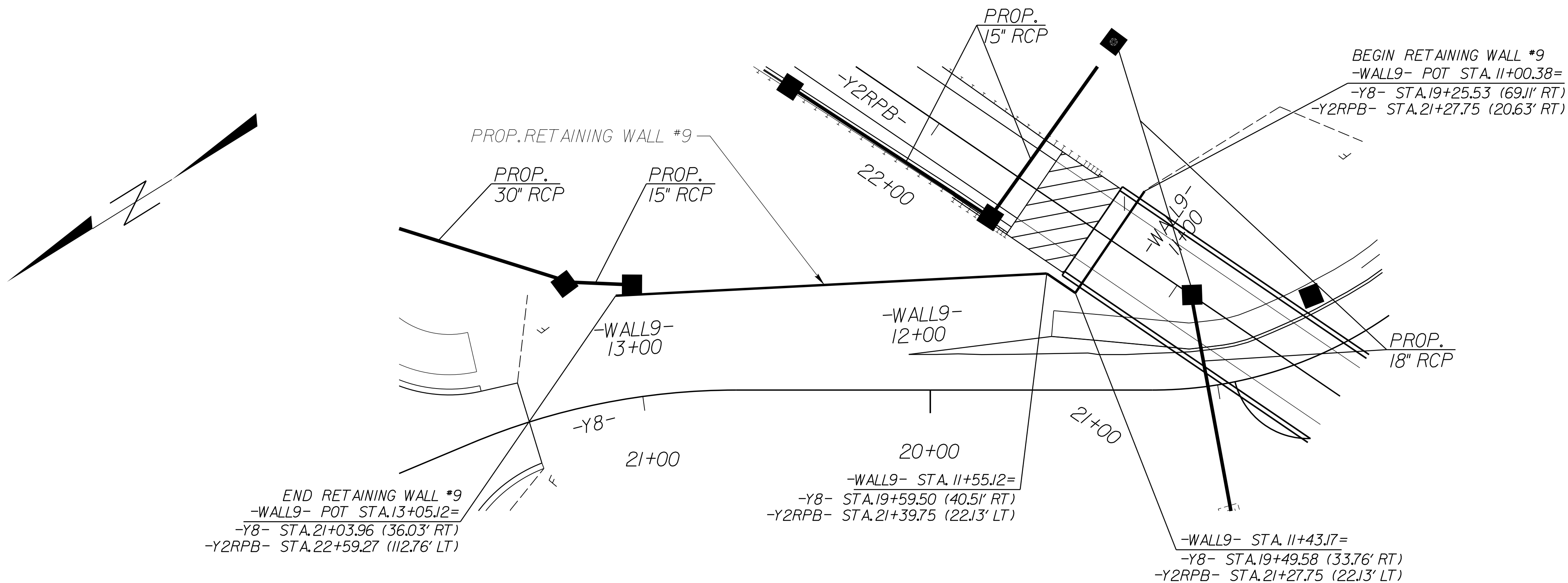


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DIVISION OF HIGHWAYS

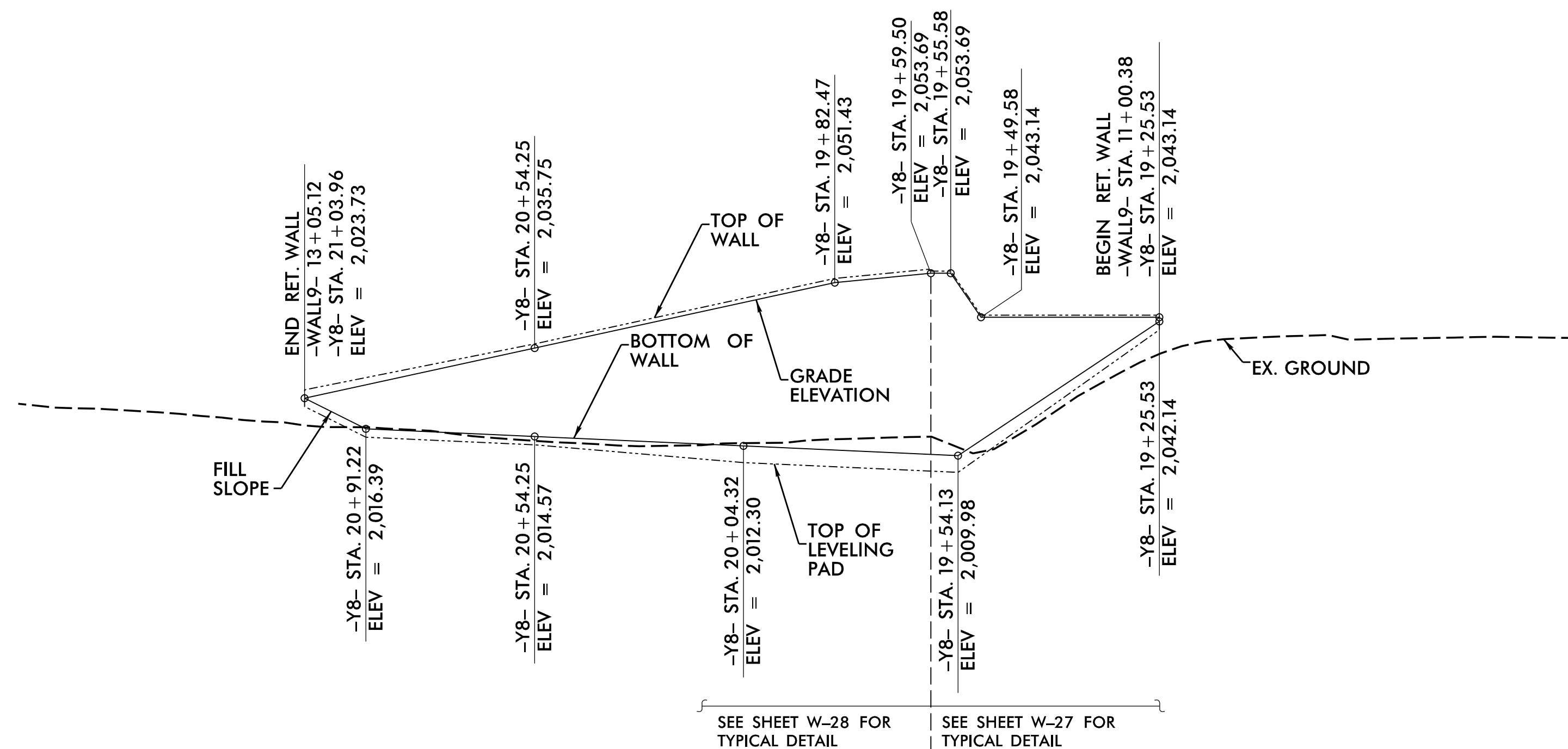
GEOTECHNICAL
ENGINEERING UNIT

PROJECT NO.: I-2513AC
BUNCOMBE COUNTY
STATION: -Y2RPB- 15+90.00 TO 17+00.00
SHEET 2 OF 3WALL ID WALL8

REVISIONS						SHEET NO. W-24
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

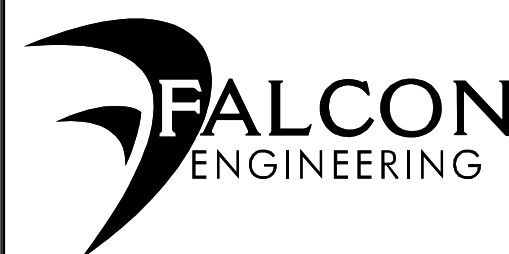


ESTIMATED MSE WALL QUANTITIES (SQUARE FEET)	
PAY ITEM	QUANTITY
MSE RETAINING WALL NO.9	5,755 SF
ARCHITECTURAL CONCRETE SURFACE TREATMENT	5,755 SF



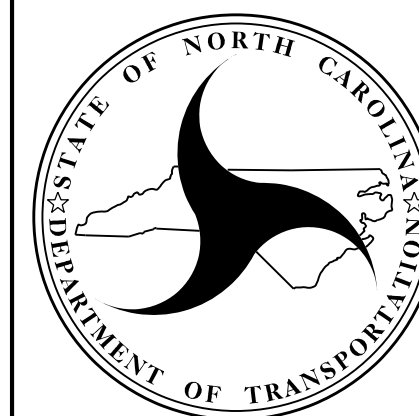
PROJECT NO.: I-2513AC
BUNCOMBE COUNTY
STATION: -Y8- 19+25.53 TO 21+03.96
SHEET 1 OF 4 WALL ID WALL9

PREPARED BY: S. CROCKETT	DATE:4/2/26
REVIEWED BY: J. HAMM	DATE:4/3/26



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CARY, NC 27513

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DIVISION OF HIGHWAYS

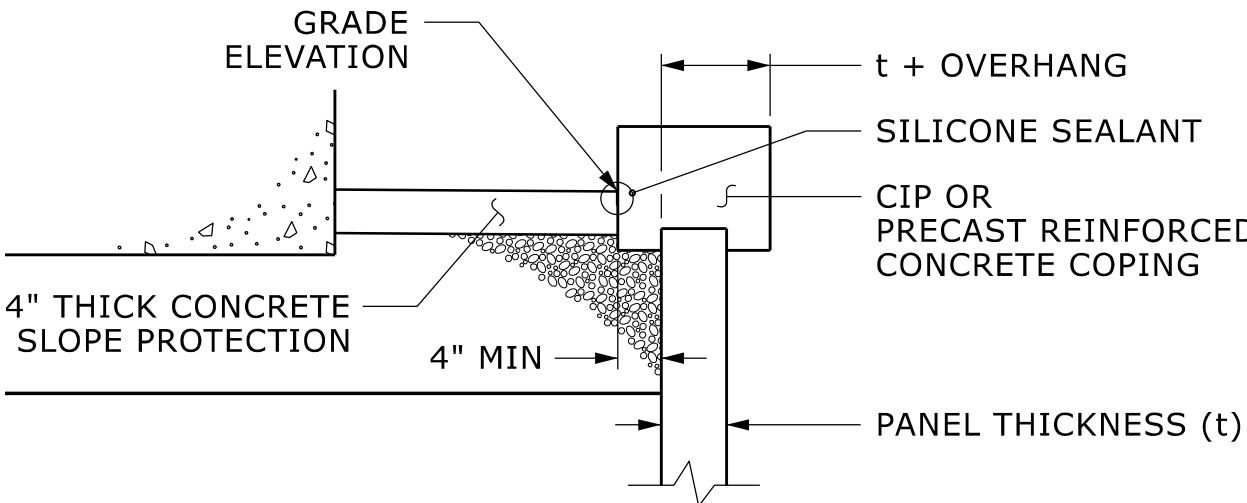
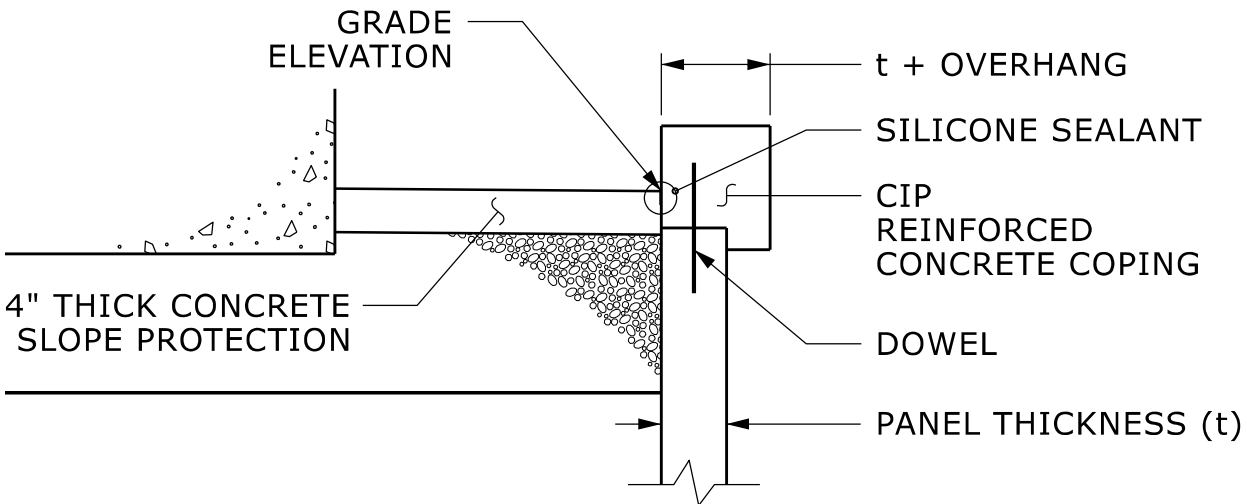
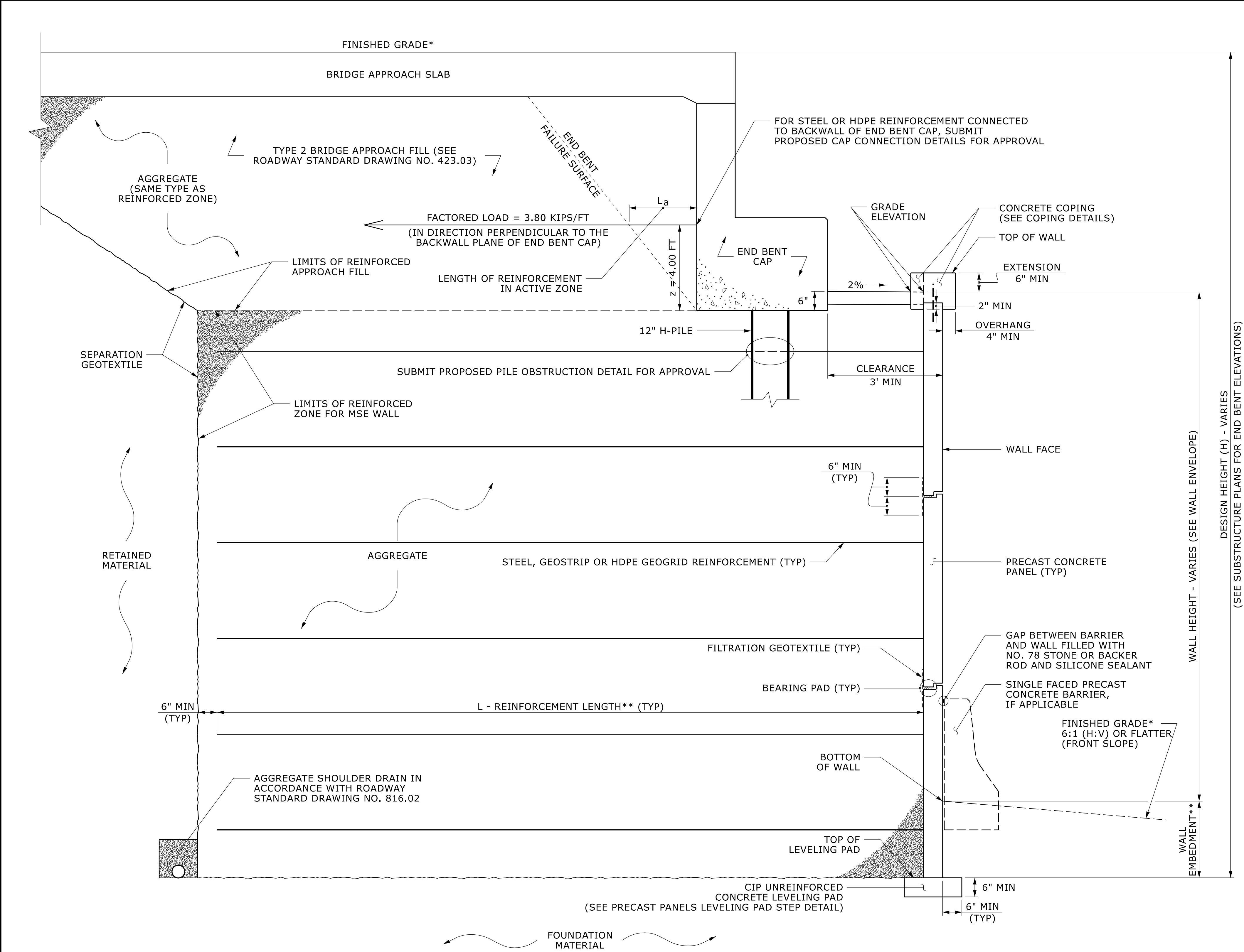
GEOTECHNICAL
ENGINEERING UNIT

V

RETAINING WALL NO. 9

WALL PLAN AND ENVELOPE

REVISIONS						SHEET NO. W-26
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



COPING DETAILS

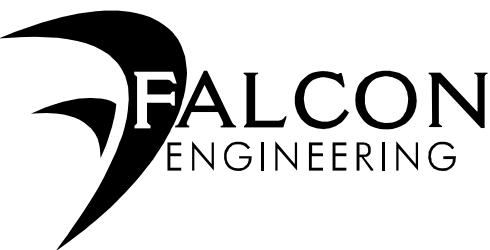
AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELSWITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION (-WALL9- STA. 11+00.38 TO 11+55.12)

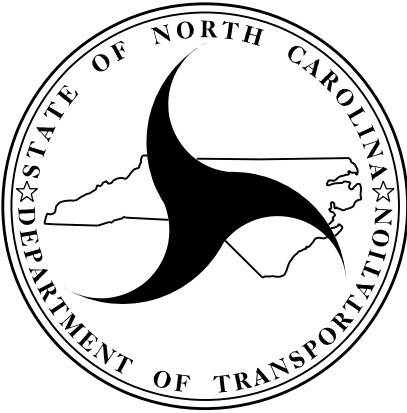
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE,
MSE WALL NOTES FOR WALL EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

PROJECT NO.: I-2513AC
BUNCOMBE COUNTY
STATION: -Y8- 19+25.53 TO 21+03.96
SHEET 2 OF 4 WALL ID WALL9

PREPARED BY: S. CROCKETT	DATE: 4/2/26
REVIEWED BY: J. HAMM	DATE: 4/3/26



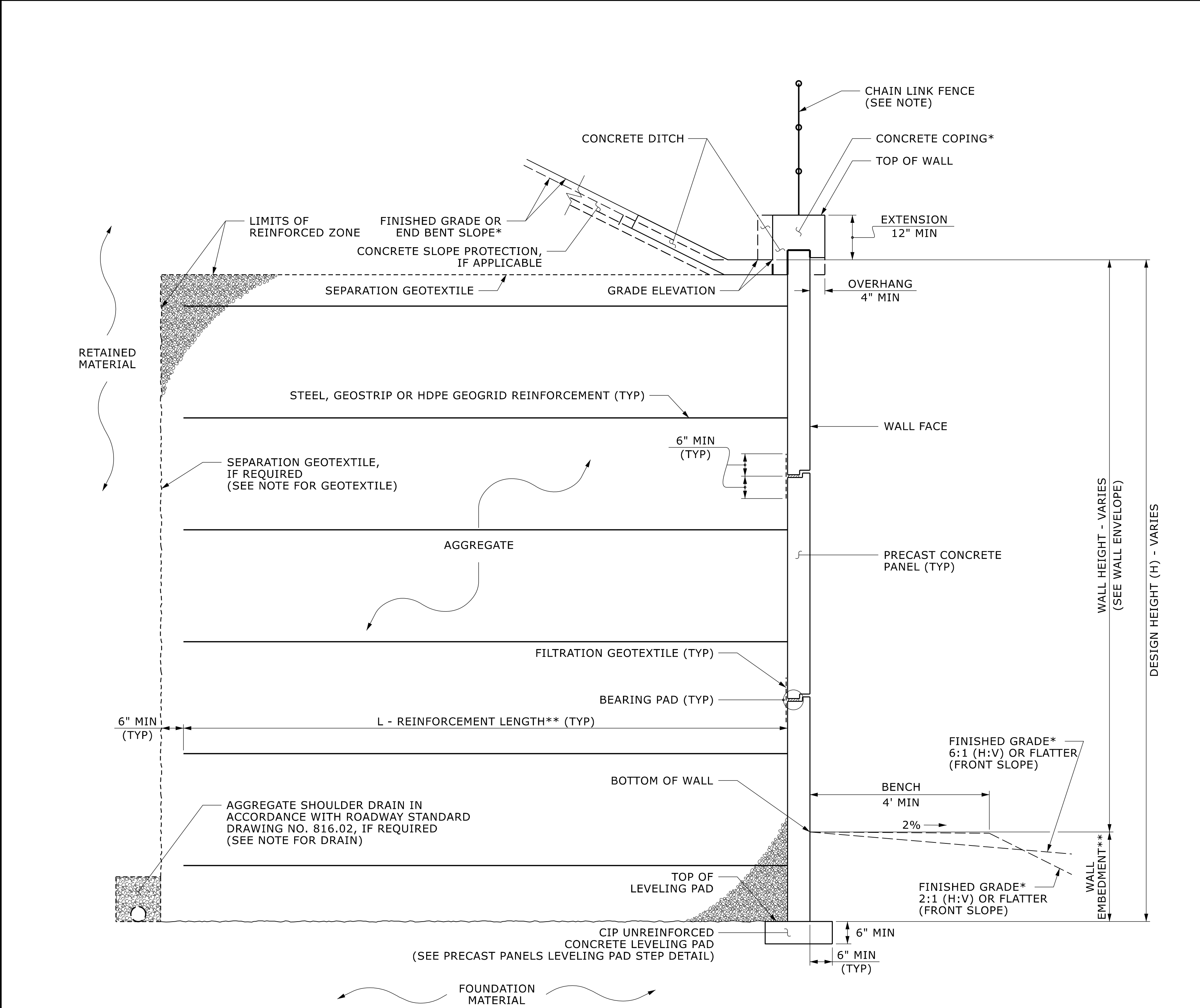
FALCON ENGINEERING, INC.
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NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
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ENGINEERING UNIT

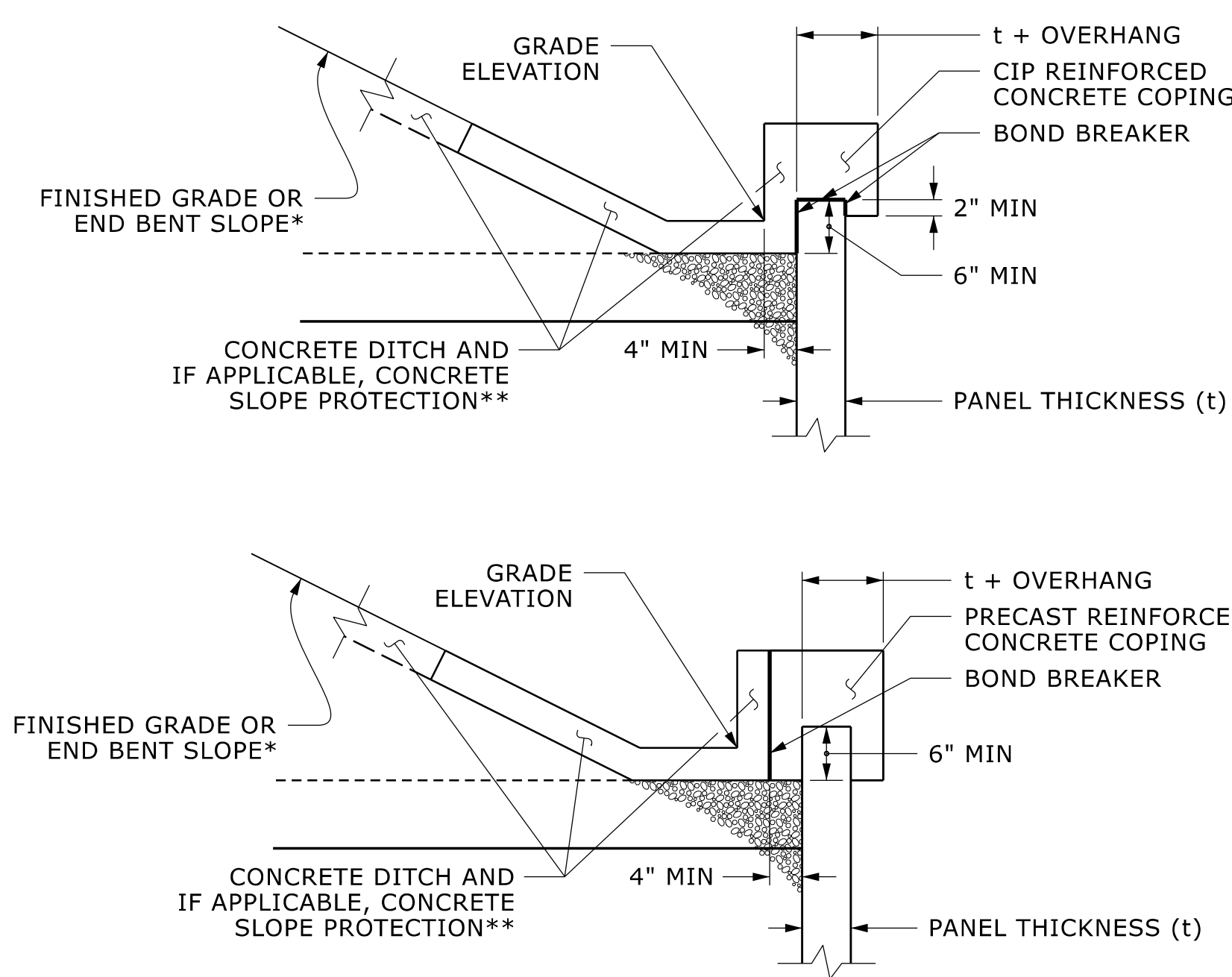
MSE ABUTMENT WALL WITH
PANELS TYPICAL AND COPING
DETAILS FOR RETAINING WALL NO. 9
(-WALL9- STA. 11+00.38 TO 11+55.12)

REVISIONS						SHEET NO. W-27
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION (-WALL9- STA. 11+55.12 TO 13+05.12)

*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.

GEOTECHNICAL ENGINEER

DocuSigned by:
Stephen Crockett
CSCASPFED4BE0435

ENGINEER

7/17/2026

SIGNATURE

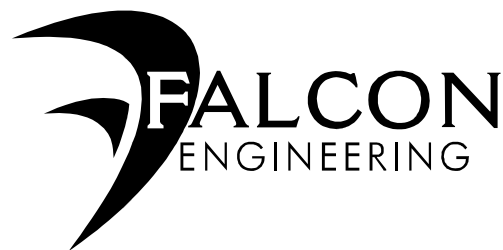
DATE

SIGNATURE

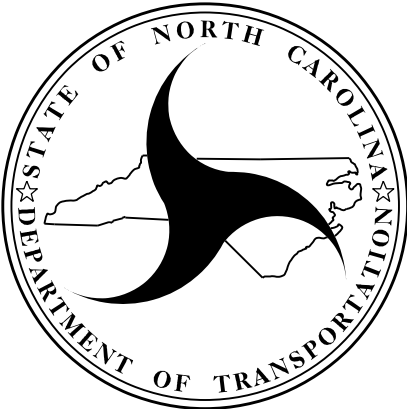
DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PREPARED BY: S. CROCKETT	DATE: 4/2/26
REVIEWED BY: J. HAMM	DATE: 4/3/26



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

PROJECT NO.: I-2513AC
BUNCOMBE COUNTY
STATION: -Y8- 19+25.53 TO 21+03.96
SHEET 3 OF 4 WALL ID WALL9

**MSE WALL WITH PANELS
TYPICAL AND COPING DETAILS FOR
RETAINING WALL NO. 9
(-WALL9- STA. 11+55.12 TO 13+05.12)**

REVISIONS						SHEET NO. W-28
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

NOTES:

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

FOR TYPE 2 BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY STANDARD DRAWING NO. 423.03.

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

A 48" BLACK VINYL COATED CHAIN LINK FENCE IS REQUIRED FROM -WALL9- STA. 11+55.12 TO STA. 13+05.12. SEE ROADWAY STANDARD 866.06 (ROADWAY DETAIL AND PAY ITEM).

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NO. 9.

AN ARCHITECTURAL FINISH IS REQUIRED FOR PRECAST CONCRETE PANELS FOR RETAINING WALL NO. 9. SEE ARCHITECTURAL CONCRETE SURFACE TREATMENT SPECIAL PROVISION.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 9.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 9.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO. 9, 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 NO. 9 FOR THE FOLLOWING:

- 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 9,690 PSF
4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6 FT, WHICHEVER IS LONGER
5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) 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 (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
RETAINED	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NO. 9 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

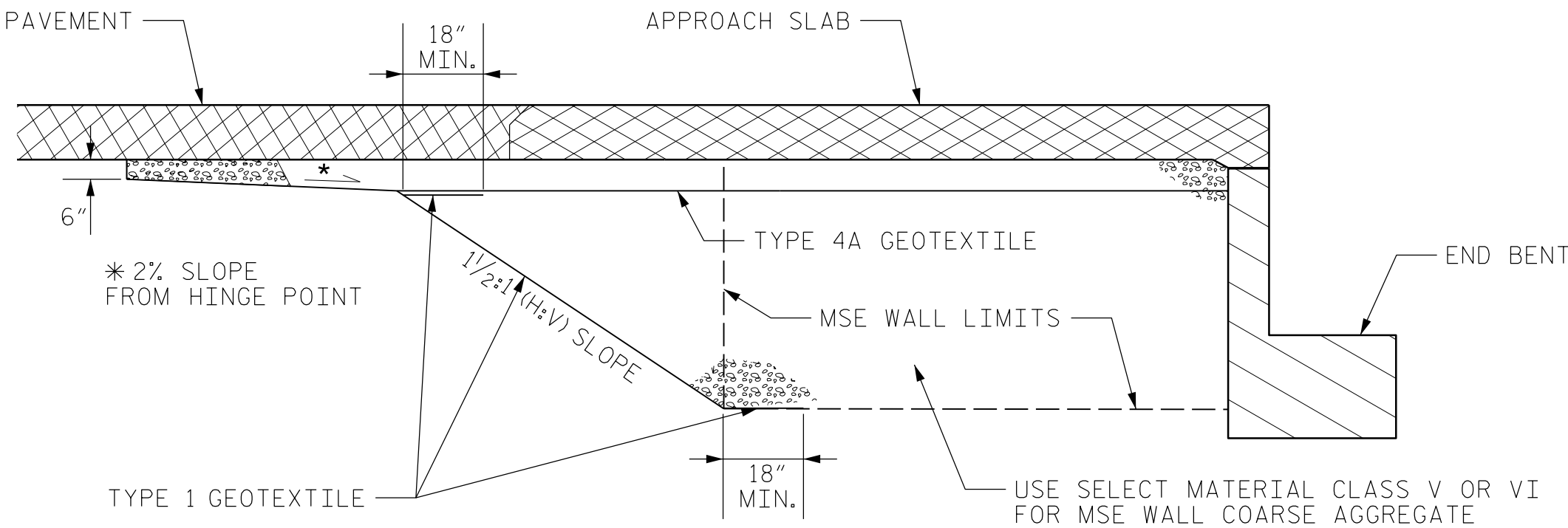
DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L_a) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO. 2 LOCATED AT -Y2RPB- STATION 21+35.00. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 9.

FOUNDATIONS FOR END BENT NO. 2 LOCATED AT -Y2RPB- STATION 21+35.00 WILL INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 9. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 9 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

AT THE CONTRACTOR'S OPTION, "TEMPORARY SHORING FOR WALL CONSTRUCTION" MAY BE USED TO CONSTRUCT RETAINING WALL NO. 9. SEE MSE RETAINING WALLS PROVISION FOR TEMPORARY SHORING FOR WALL CONSTRUCTION.

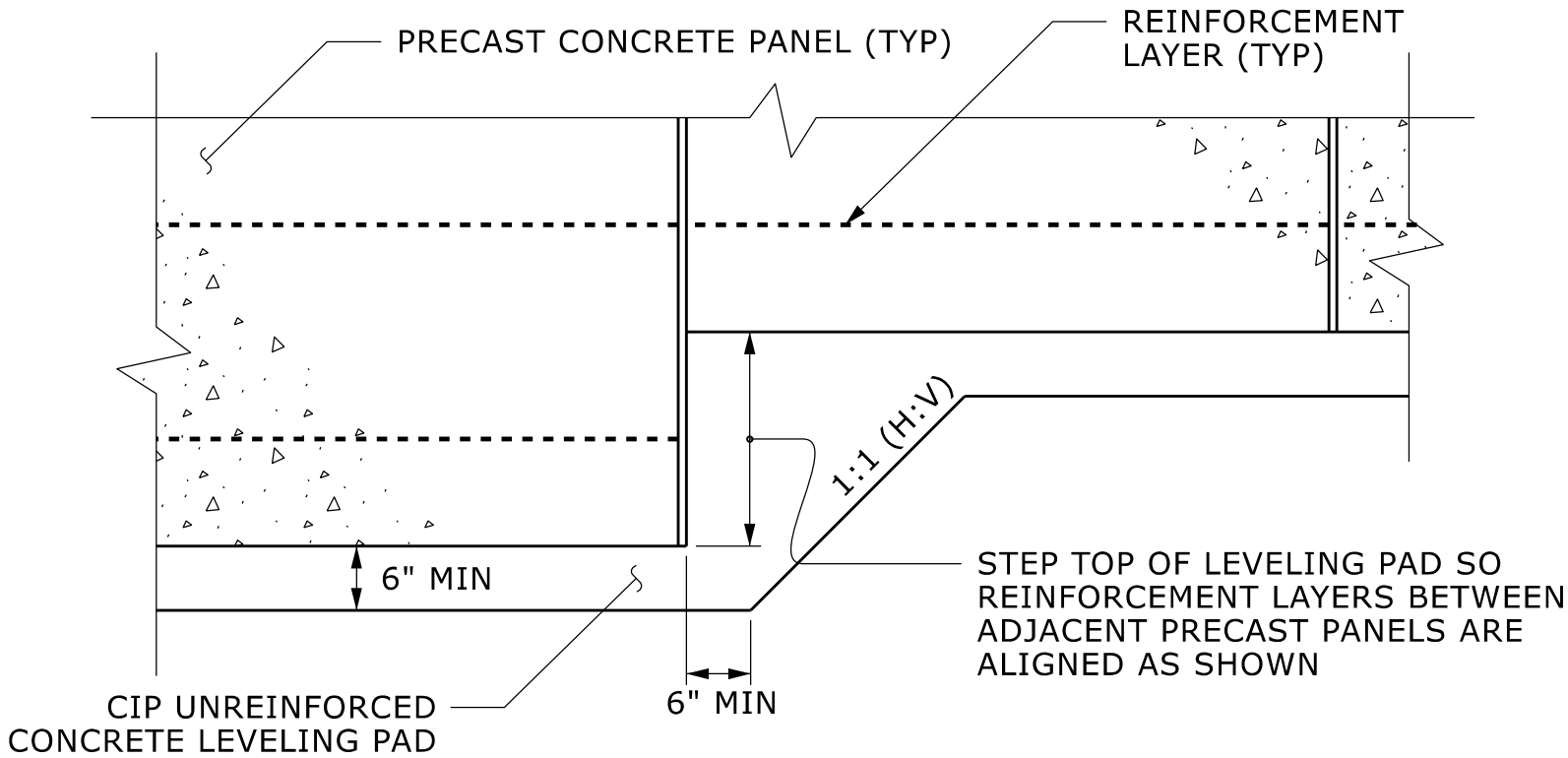


APPROACH FILL WITH
ADJACENT MSE WALL DETAIL

USE WHERE MSE WALL REINFORCED ZONE AND APPROACH FILL LIMITS OVERLAP. OUTSIDE OF MSE WALL REINFORCED ZONE LIMITS, SEE ROADWAY STANDARD DRAWING NO. 423.01.

PREPARED BY: S. CROCKETT	DATE: 4/2/26
REVIEWED BY: J. HAMM	DATE: 4/3/26

GEOTECHNICAL ENGINEER		ENGINEER	
DocuSigned by: 		7/17/2026	
SIGNATURE		DATE	
SIGNATURE		DATE	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: I-2513AC

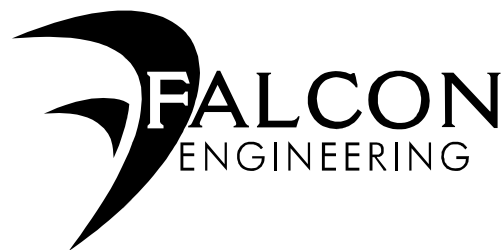
BUNCOMBE COUNTY

STATION: -Y8- 19+25.53 TO 21+03.96

SHEET 4 OF 4 WALL ID WALL9

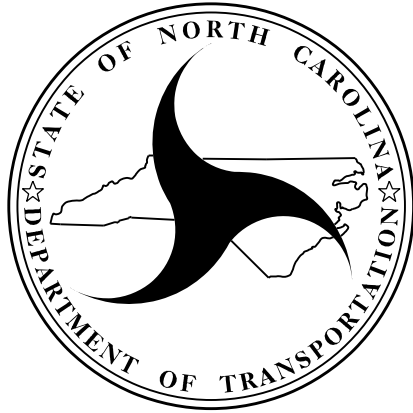
MSE WALL WITH PANELS NOTES
AND WALL DETAILS
FOR RETAINING WALL NO. 9

REVISIONS						SHEET NO. W-29
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



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DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

GEOTECHNICAL
ENGINEER



DocuSigned by:
Stephen Crockett
CSCASPFED48E0435
SIGNATURE

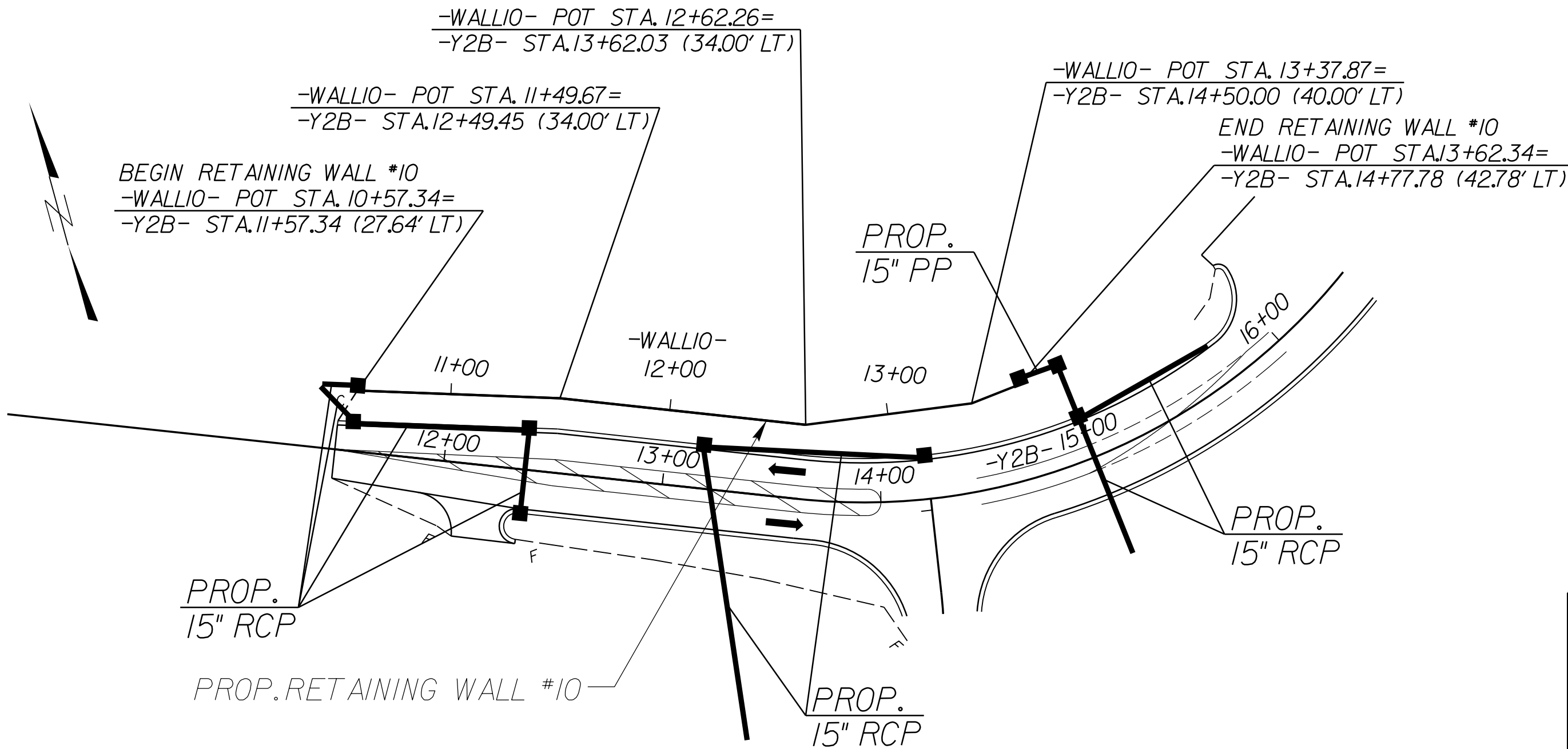
ENGINEER

7/17/2026

SIGNATURE

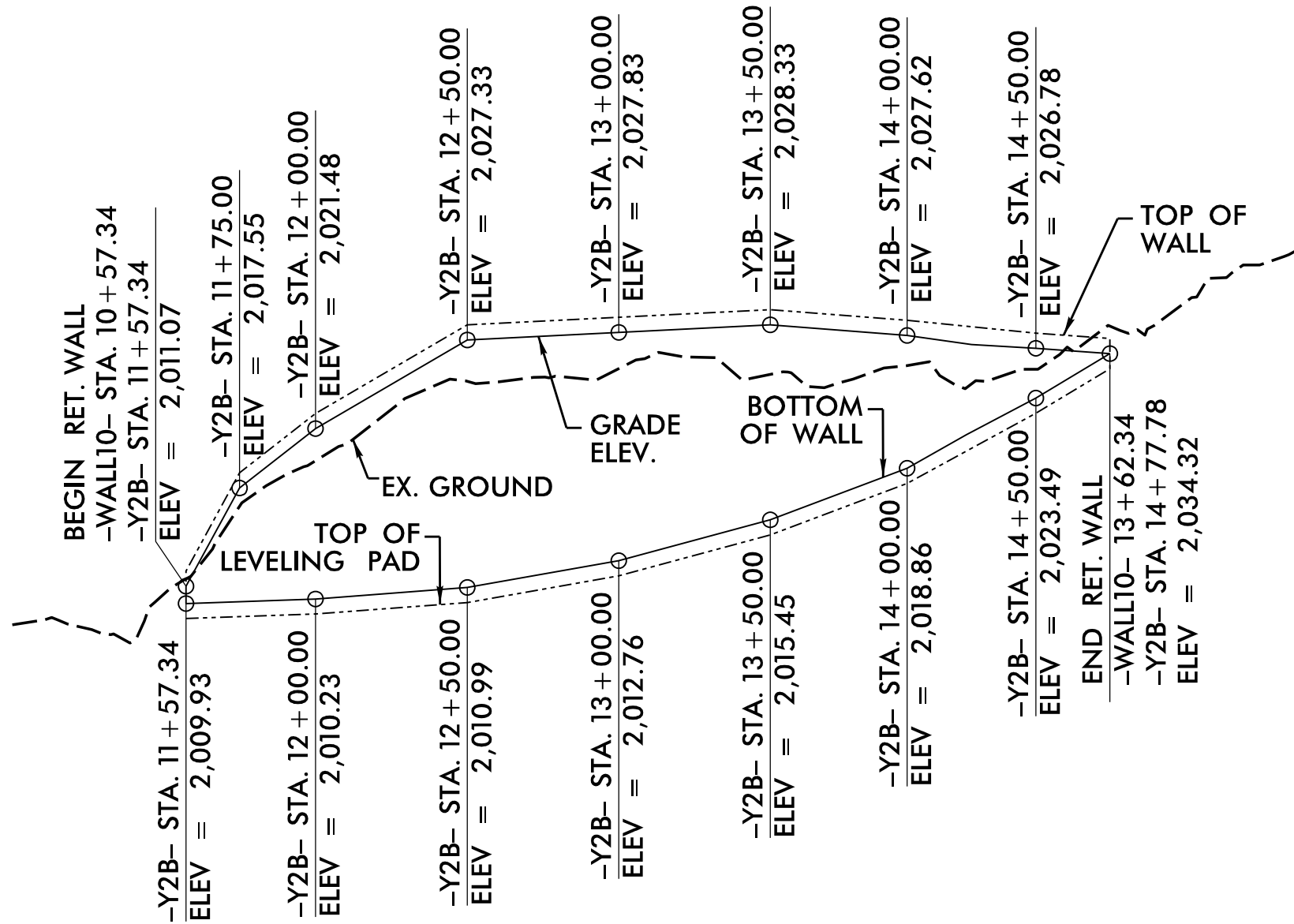
DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

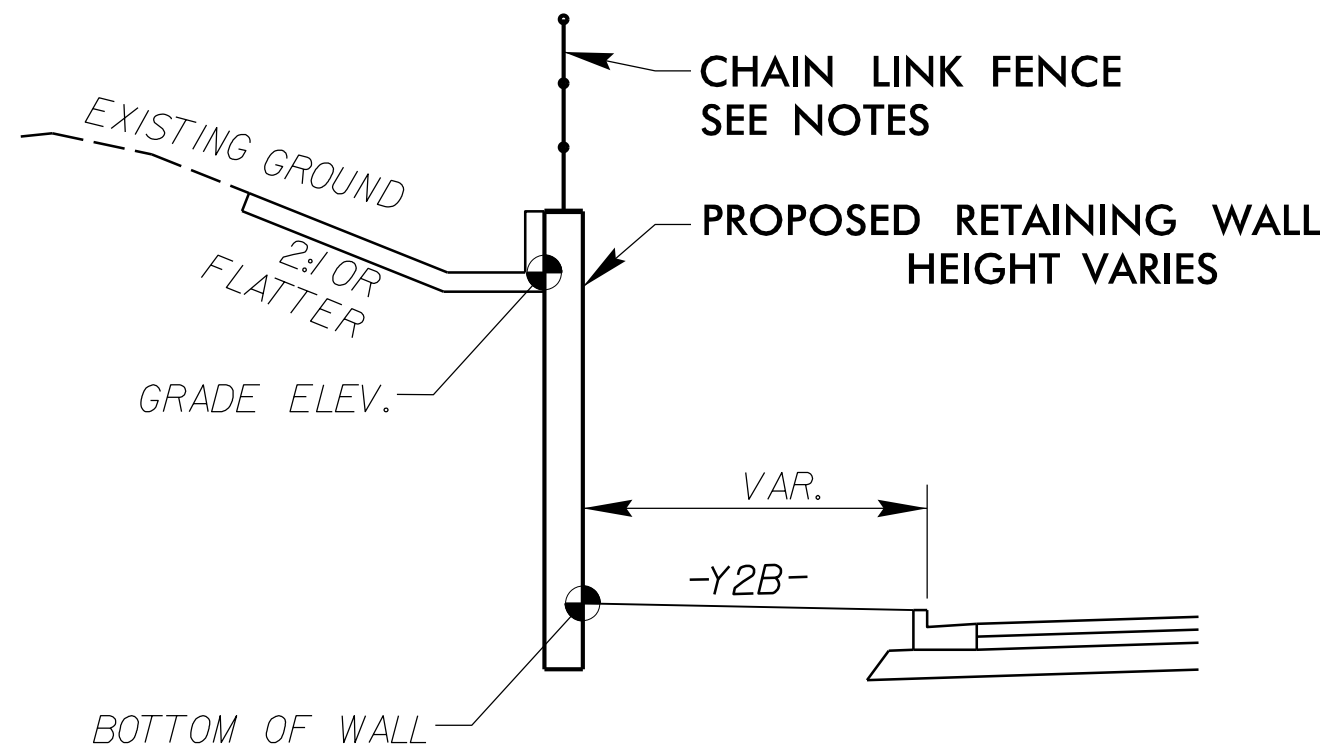


RETAINING WALL NO. 10 PLAN
NOT TO SCALE

ESTIMATED SOIL NAIL WALL QUANTITIES			
RETAINING WALL NO.	SOIL NAIL RETAINING WALLS (SQUARE FEET)	SOIL NAIL VERIFICATION TESTS	SOIL NAIL PROOF TESTS
10	3,885	2	7
PAY ITEM			QUANTITY
ARCHITECTURAL CONCRETE SURFACE TREATMENT			3,885 SQ FT



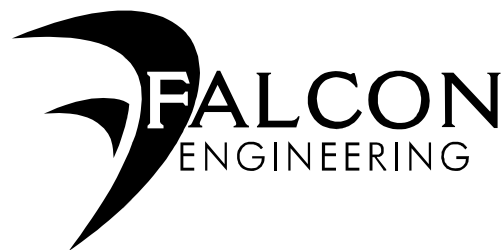
RETAINING WALL NO. 10 ENVELOPE
DIMENSIONS OF WALL TAKEN ALONG FRONT FACE OF MSE WALL
NOT TO SCALE



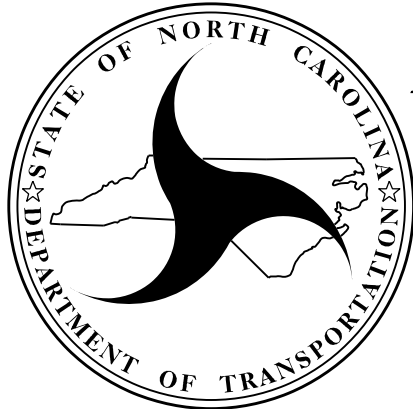
RETAINING WALL TYPICAL SECTION
-WALL10- STA. 10+57.34 TO STA. 13+62.34

PROJECT NO.: I-2513AC
BUNCOMBE COUNTY
STATION: -Y2B- 11+57.34 TO 14+77.78
SHEET 1 OF 2
WALL ID WALL10

PREPARED BY: S. CROCKETT	DATE: 4/2/26
REVIEWED BY: J. HAMM	DATE: 4/3/26



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

RETAINING WALL NO. 10
WALL PLAN AND ENVELOPE

REVISIONS						SHEET NO. W-30
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

GEOTECHNICAL
ENGINEER



DocuSigned by:
Stephen Crockett
CSCASPFED48E435
SIGNATURE

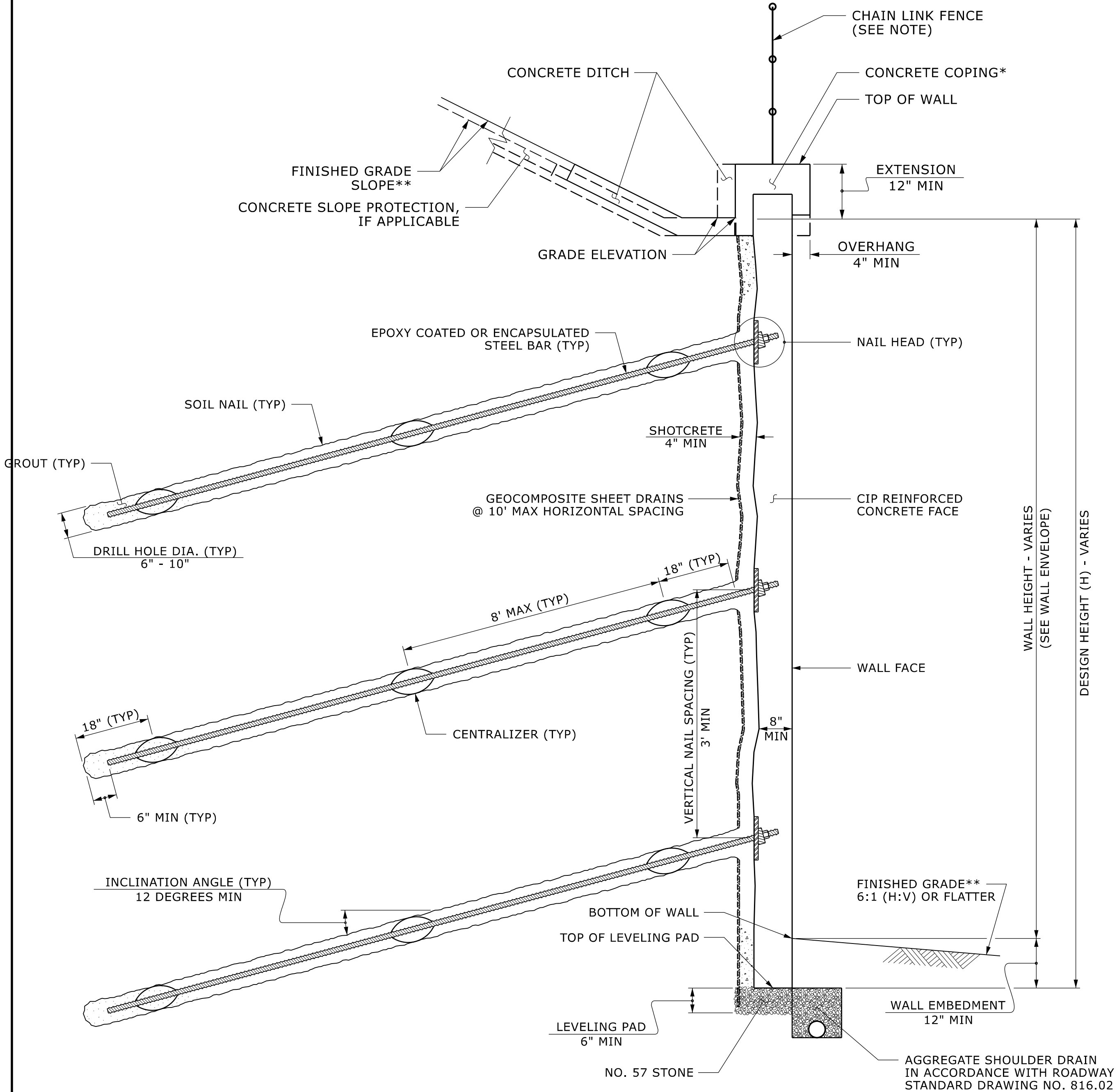
ENGINEER

7/17/2026

SIGNATURE

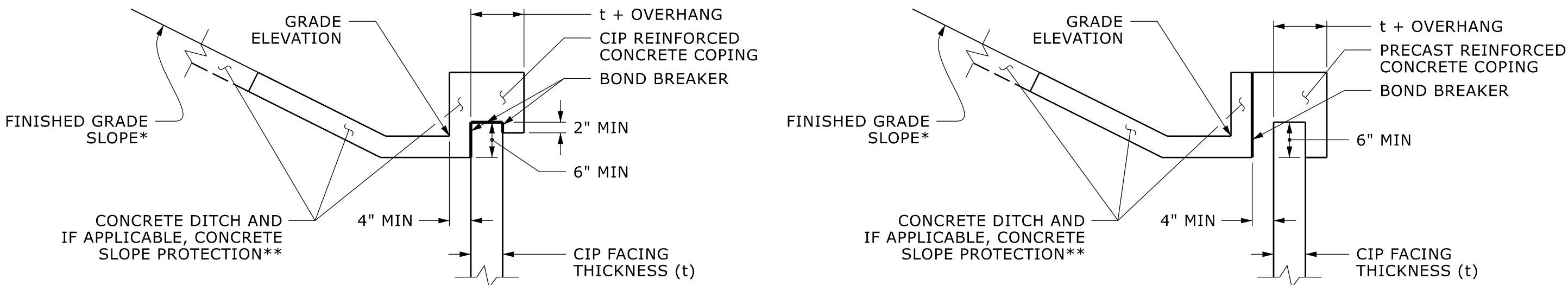
DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



SOIL NAIL WALL - TYPICAL SECTION

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



COPING DETAILS

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

NOTES:

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

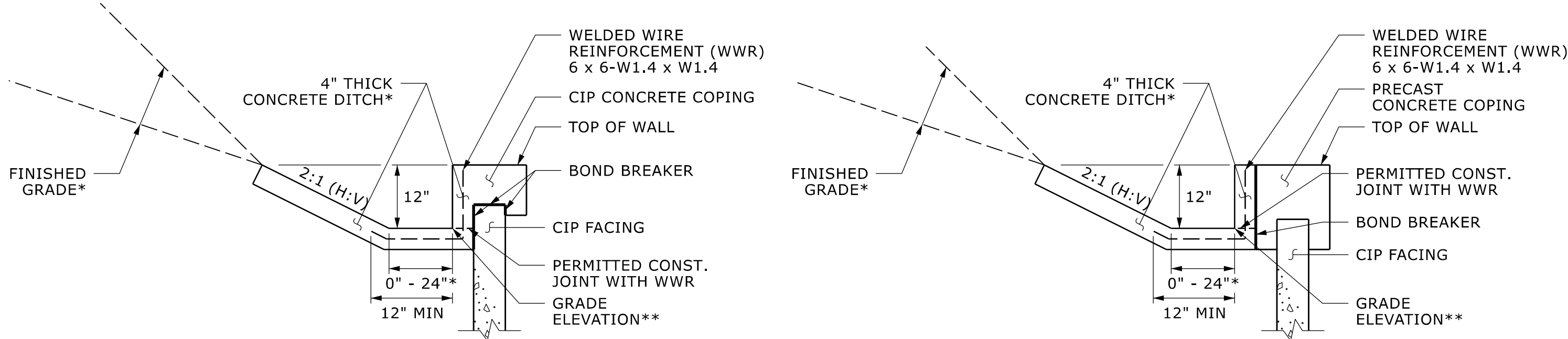
A 48" BLACK VINYL COATED CHAIN LINK FENCE IS REQUIRED FOR THE FULL LENGTH OF RETAINING WALL NO. 10. SEE ROADWAY STANDARD 866.06 (ROADWAY DETAIL AND PAY ITEM).

AN ARCHITECTURAL FINISH IS REQUIRED FOR THE CIP REINFORCED CONCRETE FACE FOR RETAINING WALL NO. 10. SEE "ARCHITECTURAL CONCRETE SURFACE TREATMENT" SPECIAL PROVISION.

BEFORE BEGINNING SOIL NAIL WALL DESIGN FOR RETAINING WALL NO. 10, 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 NO. 10 FOR THE FOLLOWING:
- 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
 - 2) DESIGN LIFE = 100 YEARS
 - 3) MINIMUM WALL EMBEDMENT ELEVATION = 1 FT
 - 4) MINIMUM SOIL NAIL LENGTH = 0.7H OR 10 FT, WHICHEVER IS LONGER
 - 5) IN-SITU ASSUMED MATERIAL PARAMETERS
UNIT WEIGHT, γ = 120 PCF
FRICTION ANGLE, ϕ = 30 DEGREES
COHESION, c = 0 PSF

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH SOIL NAILS FOR RETAINING WALL NO. 10.



CONCRETE DITCH BEHIND
WALL WITH CONCRETE COPING

*SEE ROADWAY PLANS FOR CONCRETE
DITCH AND FINISHED GRADE DETAILS.
**SEE WALL ENVELOPE FOR GRADE ELEVATIONS.

PROJECT NO.: I-2513AC

BUNCOMBE COUNTY

STATION: -Y2B- 11+57.34 TO 14+77.78

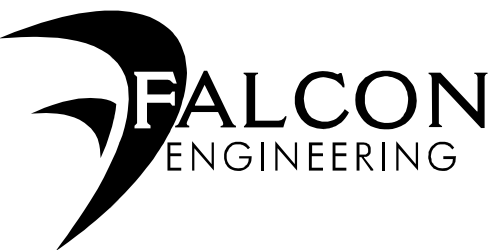
SHEET 2 OF 2

WALL ID WALL10

SOIL NAIL WALL TYPICAL AND
NOTES FOR RETAINING WALL
NO. 10

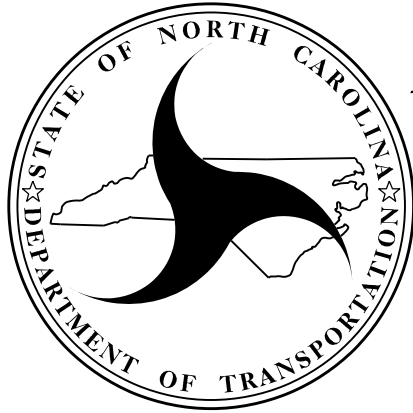
REVISIONS						SHEET NO. W-31
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

PREPARED BY: S. CROCKETT	DATE: 4/2/26
REVIEWED BY: J. HAMM	DATE: 4/3/26



FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
CARY, NC 27513

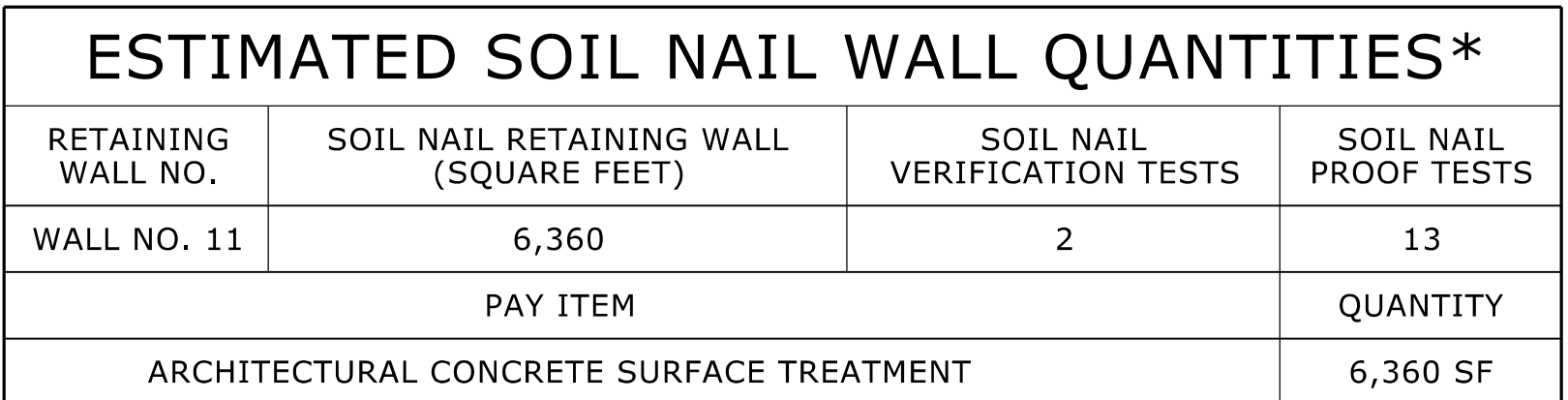
PHONE: 919.871.0800
www.falconengineers.com



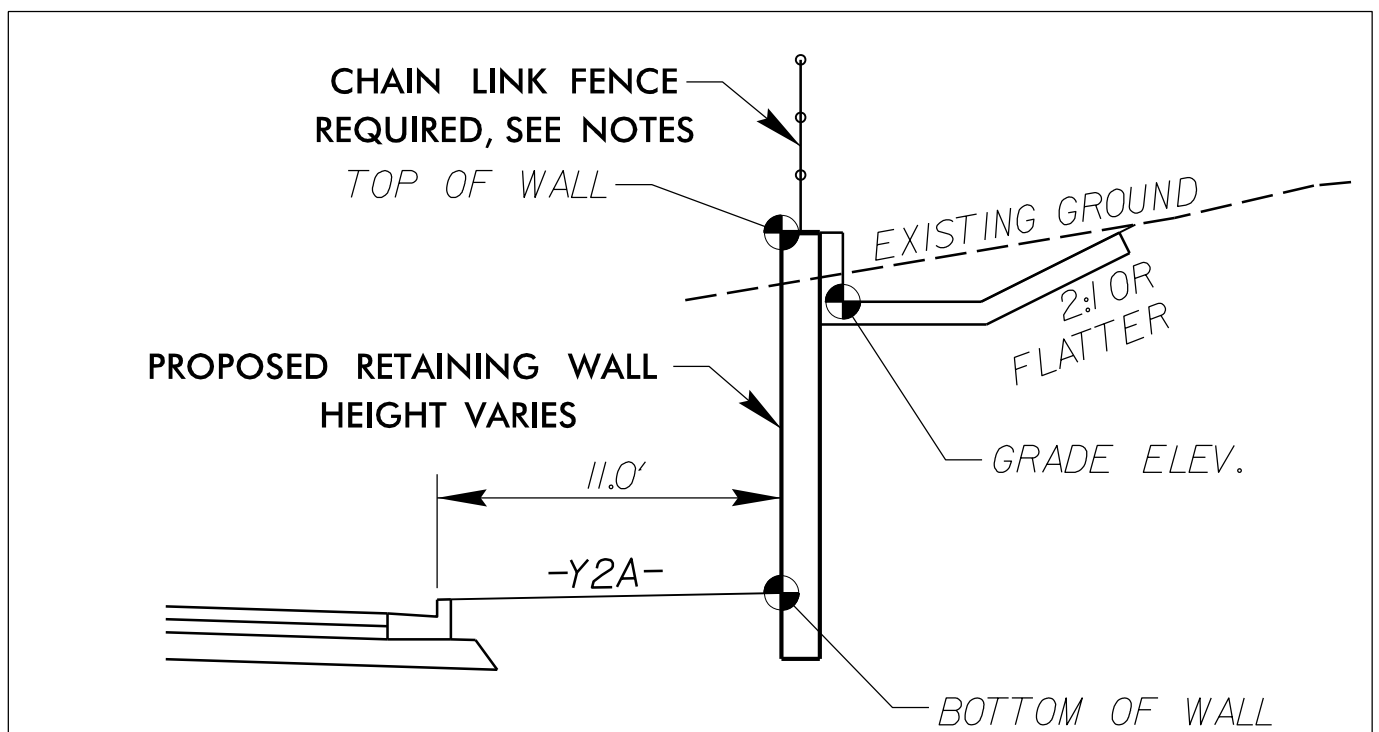
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

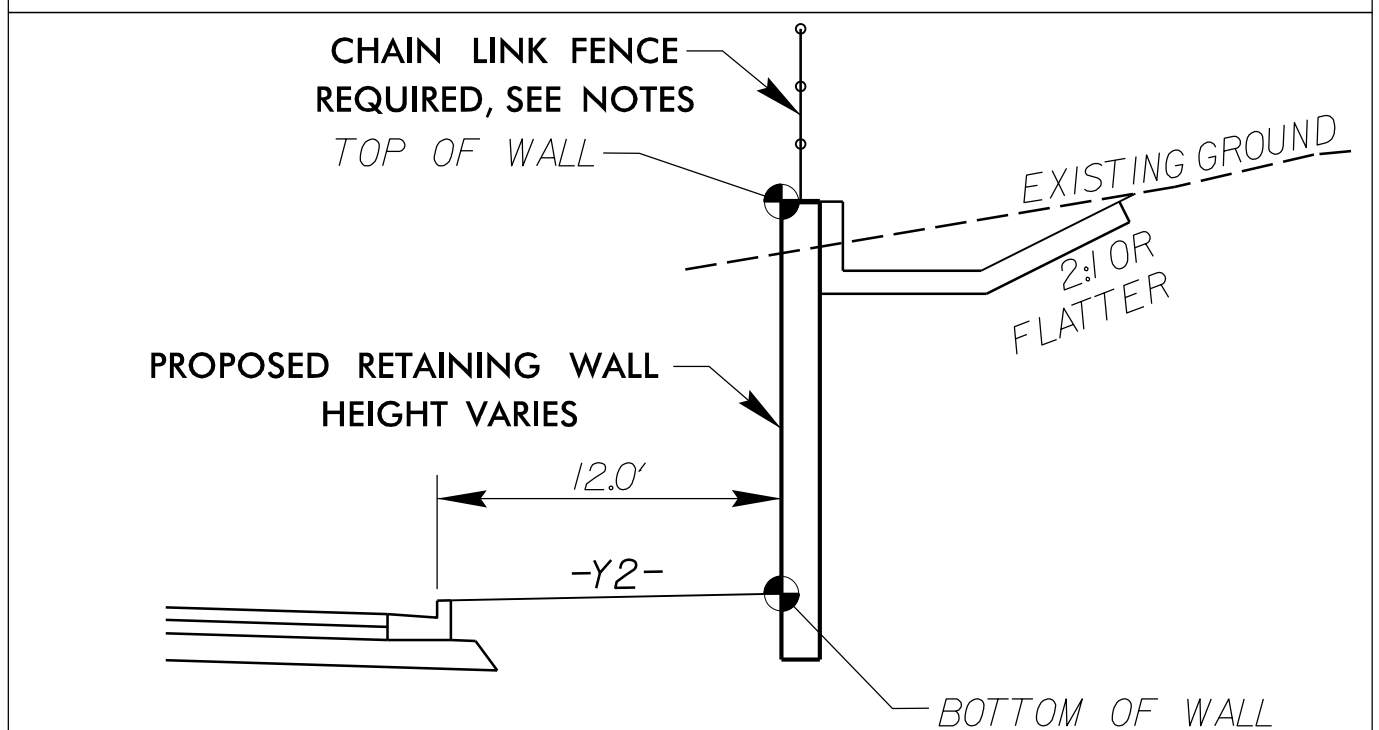
GEOTECHNICAL ENGINEER 7/20/2026 _____ SIGNATURE DATE	ENGINEER _____ SIGNATURE DATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



* = ESTIMATED WALL QUANTITIES INCLUDE
ESTIMATED WALL EMBEDMENT AREA



-Y2- STA. 10+95.77 TO STA. -Y2A- 12+45.00

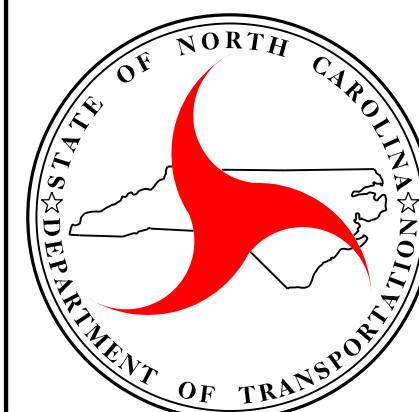
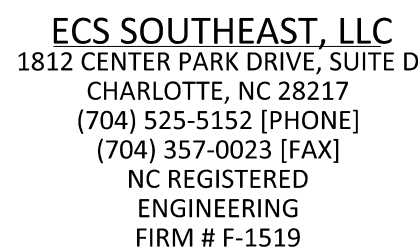


-Y2- STA. 29+00.00 TO STA. -Y2- 10+95.77

BUNCOMBE COUNTY

SHEET 1 OF 2 WALL ID RW-11

Prepared in the Office of:



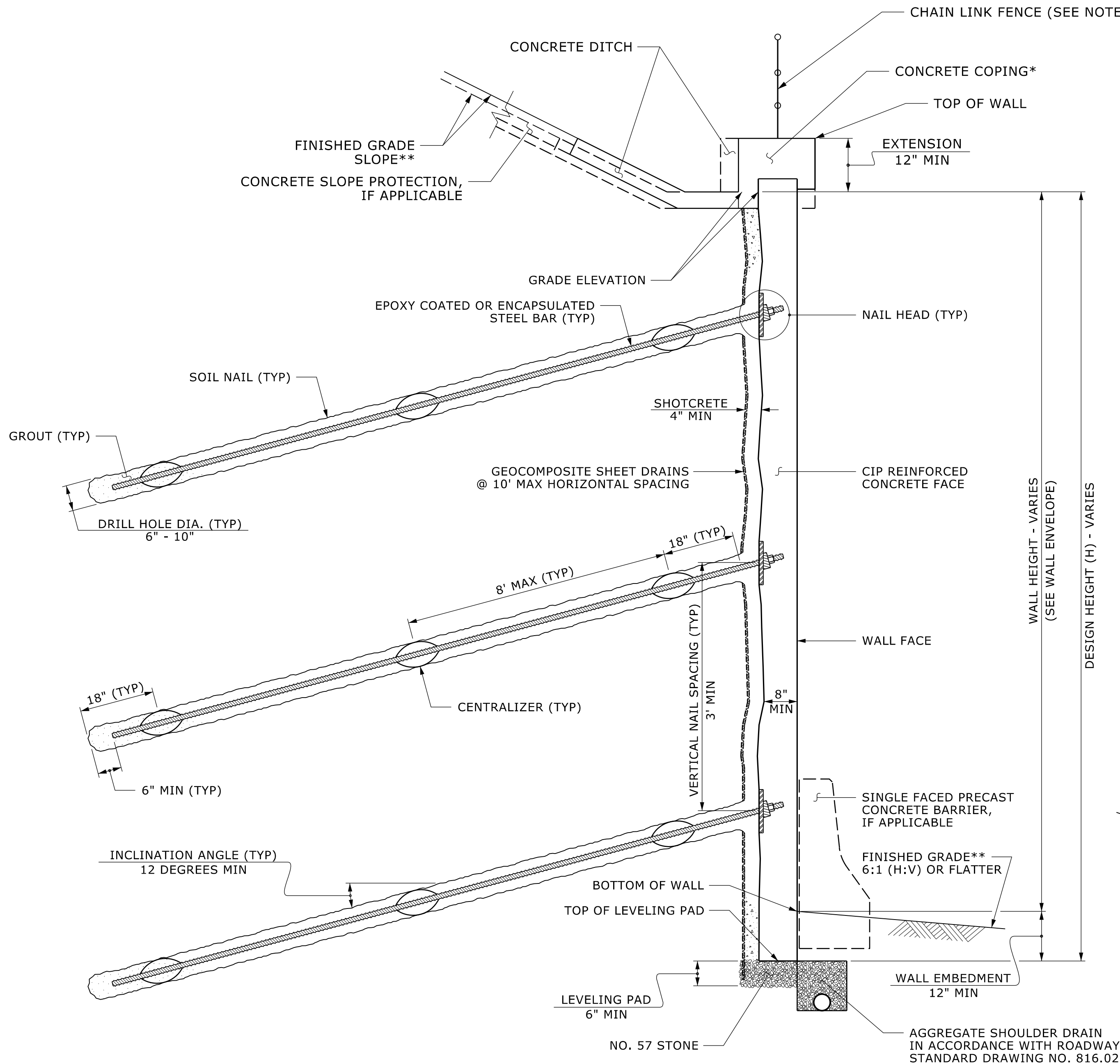
GEOTECHNICAL
ENGINEERING UNIT

REVISIONS

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

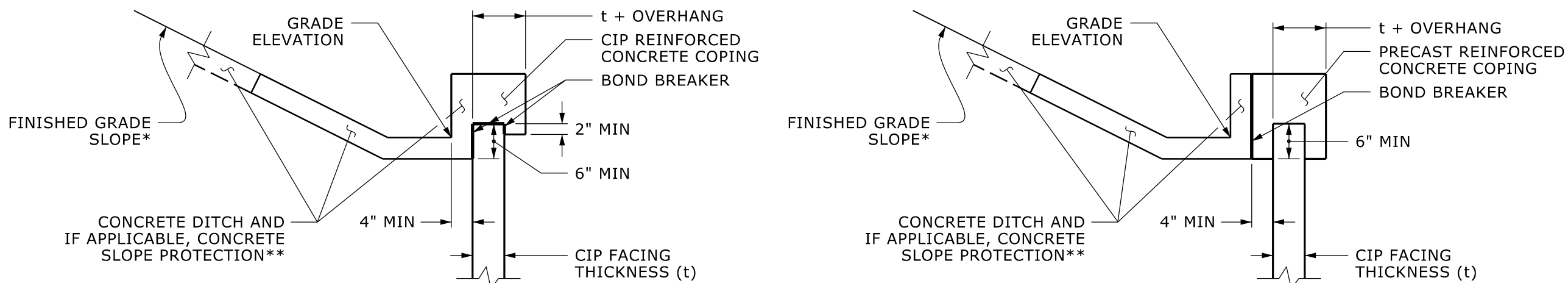
SHEET
NO.
W-32

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

SOIL NAIL WALL - TYPICAL SECTION

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



COPING DETAILS

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

NOTES:

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

A 48" BLACK VINYL COATED CHAIN LINK FENCE IS REQUIRED FOR RETAINING WALL NO. 11. SEE ROADWAY STANDARD 866.06 (ROADWAY DETAIL AND PAY ITEM).

CIP REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALL NO. 11.

AN ARCHITECTURAL CONCRETE SURFACE TREATMENT IS REQUIRED FOR RETAINING WALL NO. 11. SEE "ARCHITECTURAL CONCRETE SURFACE TREATMENT" SPECIAL PROVISION.

BEFORE BEGINNING SOIL NAIL WALL DESIGN FOR RETAINING WALL NO. 11, 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.

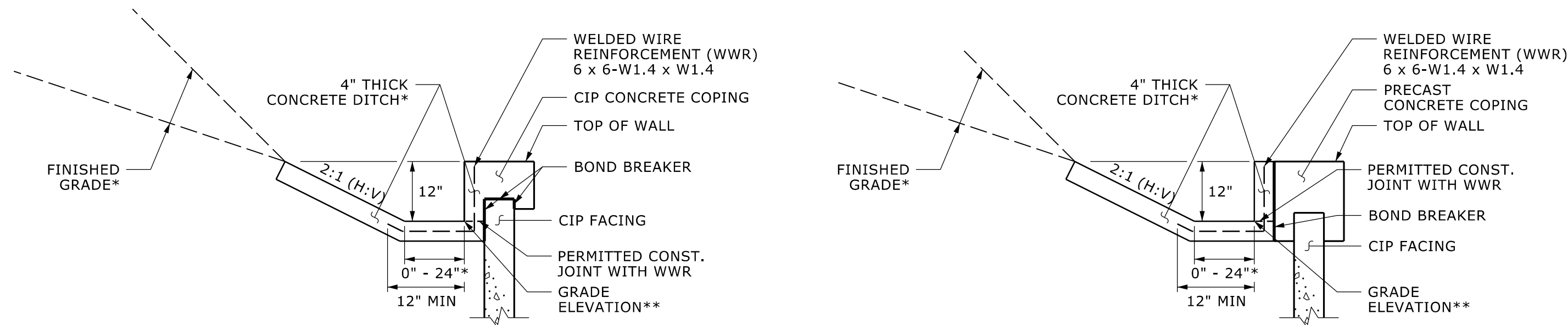
DESIGN RETAINING WALL NO. 11 FOR THE FOLLOWING:
1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MINIMUM WALL EMBEDMENT ELEVATION = 1 FT
4) IN-SITU ASSUMED MATERIAL PARAMETERS:
UNIT WEIGHT, γ = 120 PCF
FRICTION ANGLE, ϕ = 30 DEGREES
COHESION, c = 0.0 PSF

MINIMUM SOIL NAIL LENGTH = 1.0 H OR 10 FT. WHICHEVER IS LONGER

DESIGN RETAINING WALL NO. 11 FOR A PIPE EXTENDING THROUGH THE WALL AS SHOWN. VERIFY PIPE LOCATION AND ELEVATION BEFORE BEGINNING SOIL NAIL WALL DESIGN OR CONSTRUCTION.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH SOIL NAILS FOR RETAINING WALL NO. 11.

DESIGN RETAINING WALL NO. 11 TO INCORPORATE DRAIN DROP INLET STRUCTURE 6005 LOCATED NEAR -WALL11- STA. 14+71.63, AND FOR 15" PP PIPE GOING UNDERNEATH WALL NO. 11 INTO DRAIN DROP STRUCTURE 6006 AT THE TOE OF THE WALL. INCLUDE DETAILS IN SOIL NAIL WALL DESIGN SUBMITTAL.



CONCRETE DITCH BEHIND WALL WITH CONCRETE COPING

*SEE ROADWAY PLANS FOR CONCRETE
DITCH AND FINISHED GRADE DETAILS.
**SEE WALL ENVELOPE FOR GRADE ELEVATIONS.

PROJECT NO.: I-2513AC

BUNCOMBE COUNTY

STATION: +/- -Y2A- 12+45 TO -Y2- 29+00

SHEET 2 OF 2 WALL ID RW-11

RETAINING WALL NO. 11 SOIL NAIL WALL TYPICAL SECTION AND NOTES

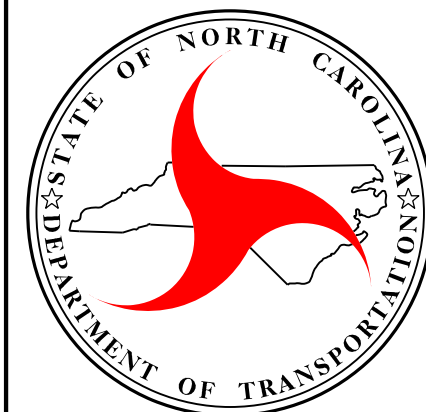
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1		3				
2		4				

W-33

Prepared in the Office of:



ECS SOUTHEAST, LLC
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1519

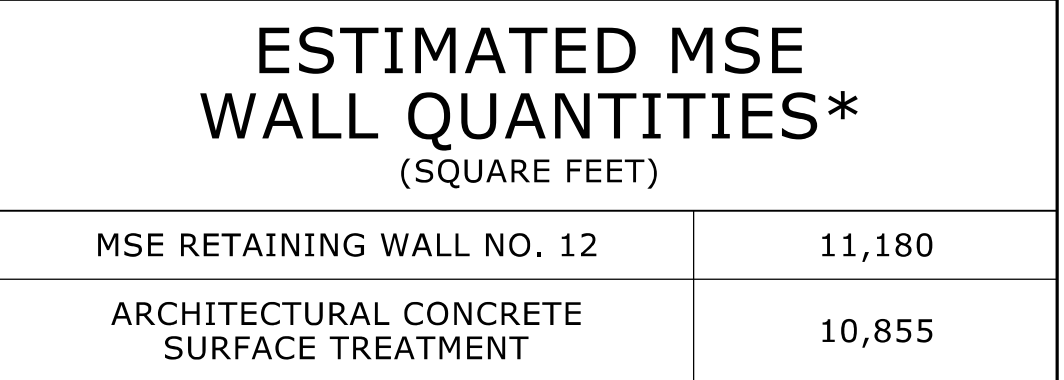


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

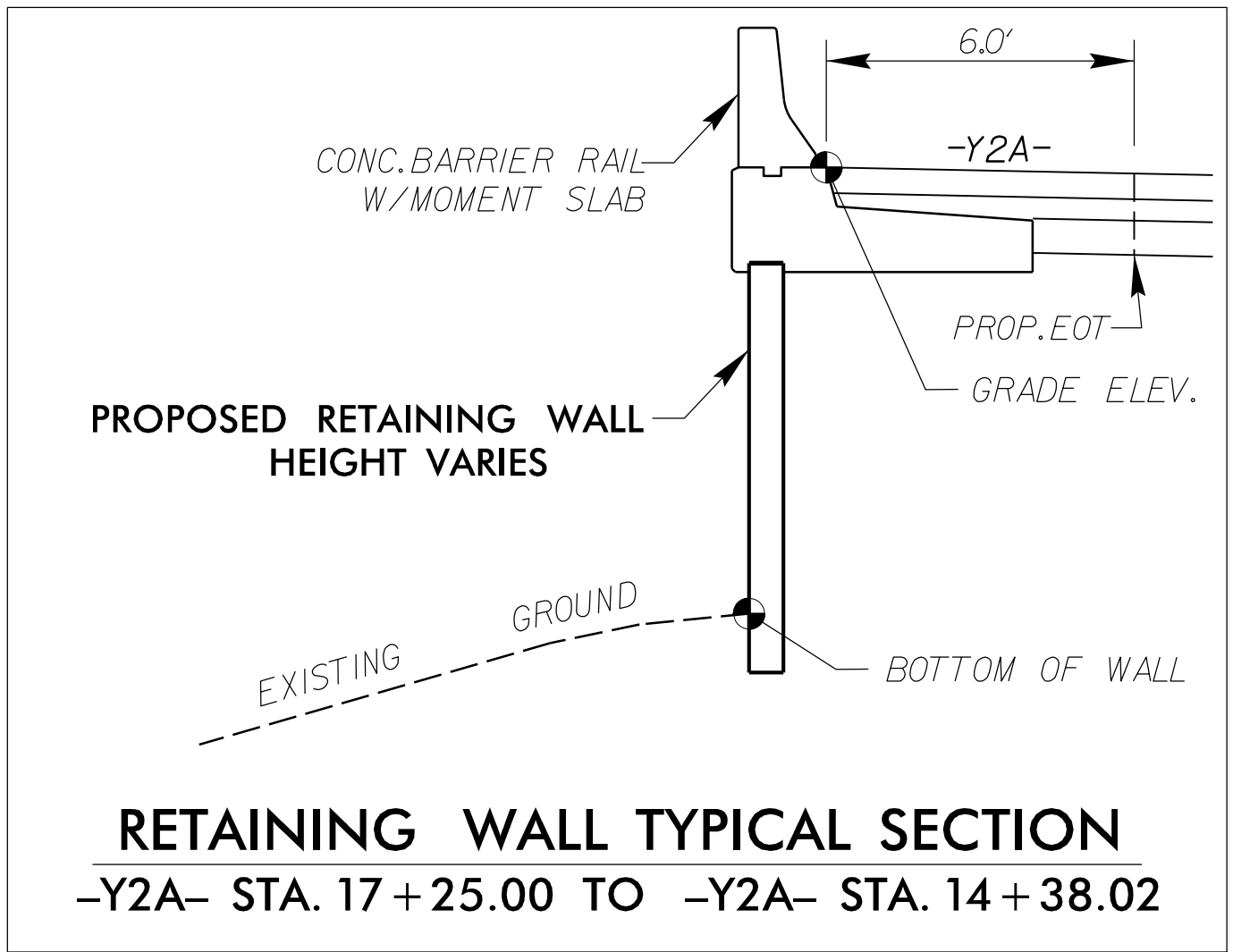
GEOTECHNICAL
ENGINEERING UNIT

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

GEOTECHNICAL ENGINEER 7/20/2026 SIGNATURE DATE	ENGINEER SIGNATURE DATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



* = ESTIMATED WALL QUANTITIES INCLUDE
ESTIMATED WALL EMBEDMENT AREA

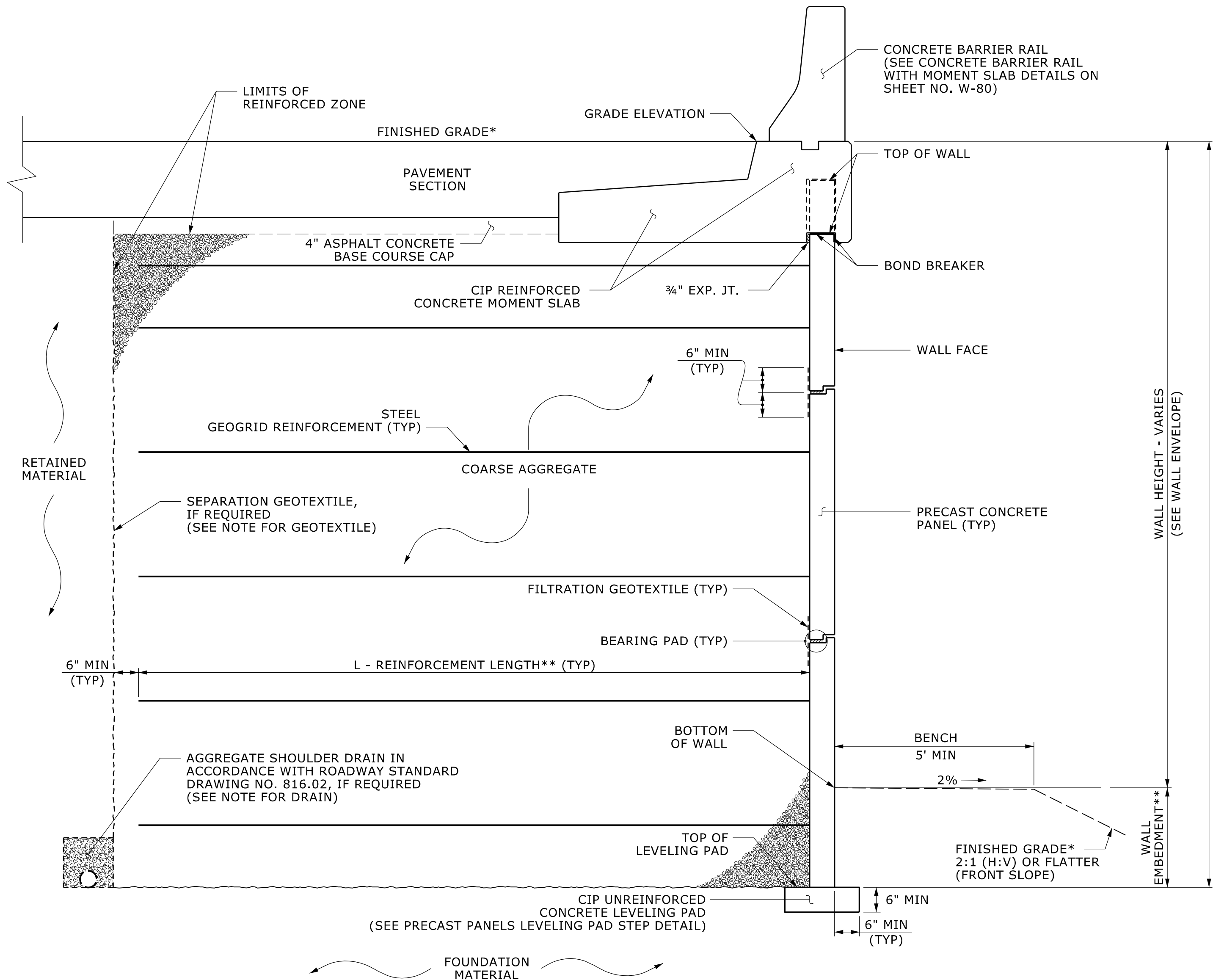


REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1	-	-	3	-	-
2	-	-	4	-	-

SHEET
NO.
W-3.

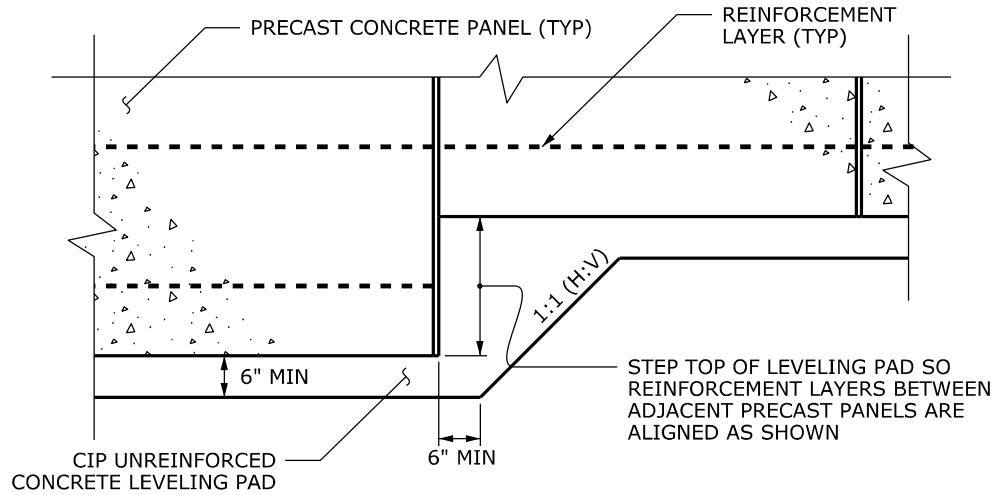
PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

J:\JUN-2026 2158
E:\Users\emcintosh\OneDrive - ECS Corporate Services\31 Asheville - I-25134C - Typical sheets - EM.dgn
E:\Users\emcintosh\OneDrive - ECS Corporate Services\31 Asheville - I-25134C - Typical sheets - EM.dgn
E:\Users\emcintosh\OneDrive - ECS Corporate Services\31 Asheville - I-25134C - Typical sheets - EM.dgn



MSE 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.



PRECAST PANELS LEVELING PAD STEP DETAIL

NOTES:

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

A CONCRETE BARRIER RAIL WITH MOMENT SLAB IS REQUIRED ABOVE RETAINING WALL NO. 12. SEE PLANS FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS.

DO NOT USE FINE AGGREGATE IN REINFORCEMENT ZONE FOR MSE WALL NO. 12.

DO NOT USE GEOSYNTHETIC REINFORCEMENT FOR MSE WALL NO. 12.

AN ARCHITECTURAL CONCRETE SURFACE TREATMENT IS REQUIRED FOR RETAINING WALL NO. 12. SEE "ARCHITECTURAL CONCRETE SURFACE TREATMENT" SPECIAL PROVISION.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO. 12.

A DRAIN IS REQUIRED FOR RETAINING WALL NO. 12.

DESIGN RETAINING WALL NO. 12 FOR THE FOLLOWING:

- 1) H = WALL HEIGHT + WALL EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 12,850 PSF
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.9 H OR 6 FT., WHICHEVER IS LONGER
- 5) MINIMUM EMBEDMENT DEPTH = H/5 FOR -WALL12- STA. 11+87.42 TO 13+49.92, OTHERWISE H/7 OR 2 FT., WHICHEVER IS GREATER.
- 6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
COARSE	110	38	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AGGREGATE MATERIAL REQUIREMENTS.			

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

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

DESIGN RETAINING WALL NO. 12 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO. 12.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 12 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING WALL NO. 12 BEFORE BEGINNING ROADWAY CONSTRUCTION. BEFORE BEGINNING THE WAITING PERIOD, INSTALL HUB IN THE SUBGRADE AT -WALL12- STA. 12+81.6. SURVEY THE HUB INITIALLY AND EVERY 3 TO 4 DAYS THEREAFTER FOR RELATIVE MOVEMENT AND SUBMIT THE DATA TO THE ENGINEER WEEKLY. THE ENGINEER WILL DETERMINE WHEN THE WAITING PERIOD ENDS AND FINAL OVERLYING CONSTRUCTION CAN BEGIN.

"TEMPORARY SHORING" MAY BE REQUIRED FOR RETAINING WALL NO. 12 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE TRAFFIC CONTROL PLANS.

PROJECT NO.: I-25134C

BUNCOMBE COUNTY

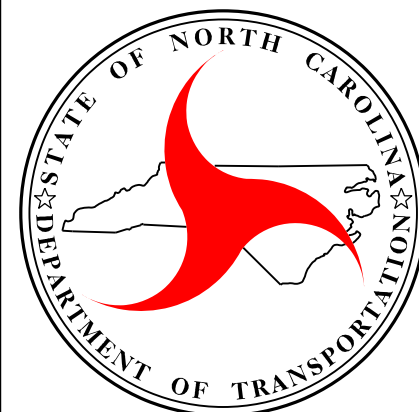
STATION +/- -Y2A- 17+25 TO -Y2A- 14+38.02

SHEET 2 OF 2 WALL ID RW-12

Prepared in the Office of:



ECS SOUTHEAST, LLC
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1519



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 12
MSE WALL WITH PRECAST PANELS
TYPICAL SECTION AND NOTES

REVISIONS

NO.	BY	DATE	NO.	BY	DATE	SHEET NO.
1			3			W-35
2			4			

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

RETAINING WALL #13 DETAIL SHEET

GEOTECHNICAL
ENGINEER

SEAL
018979

ENGINEER

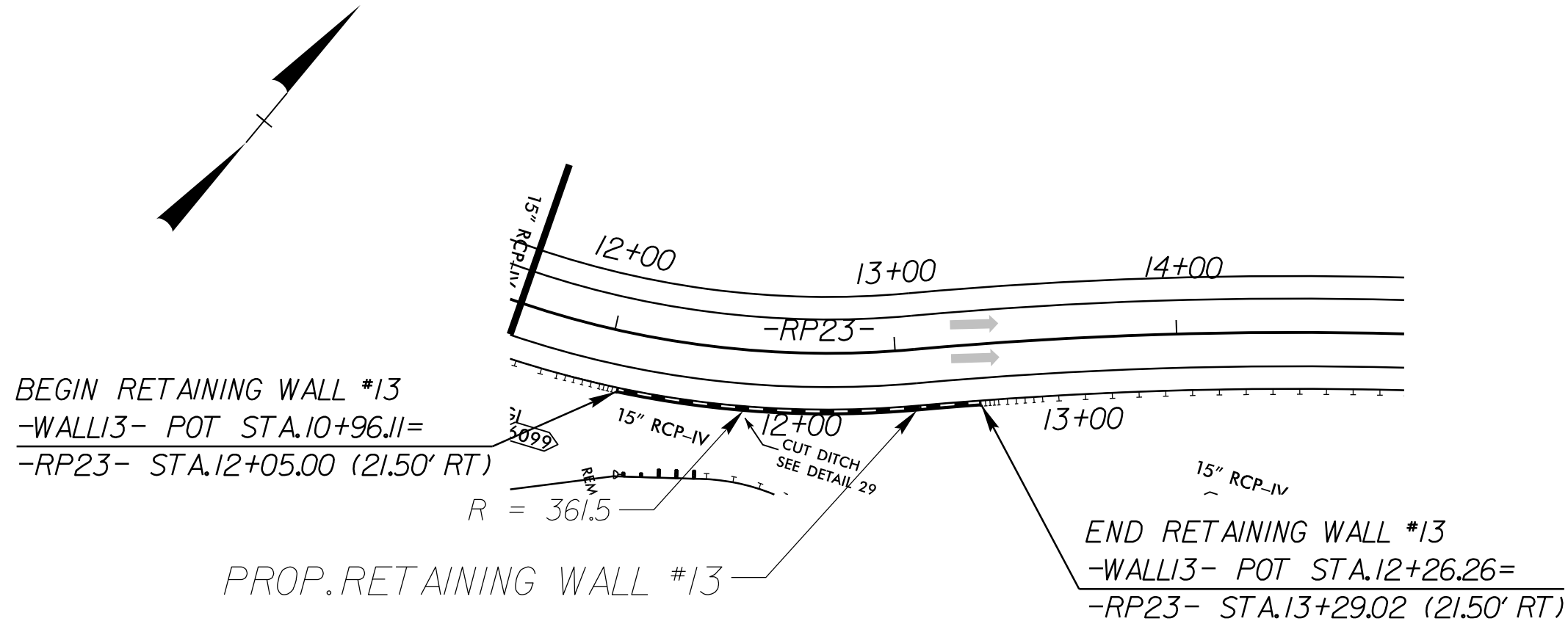
7/20/2026

SIGNATUREDATE

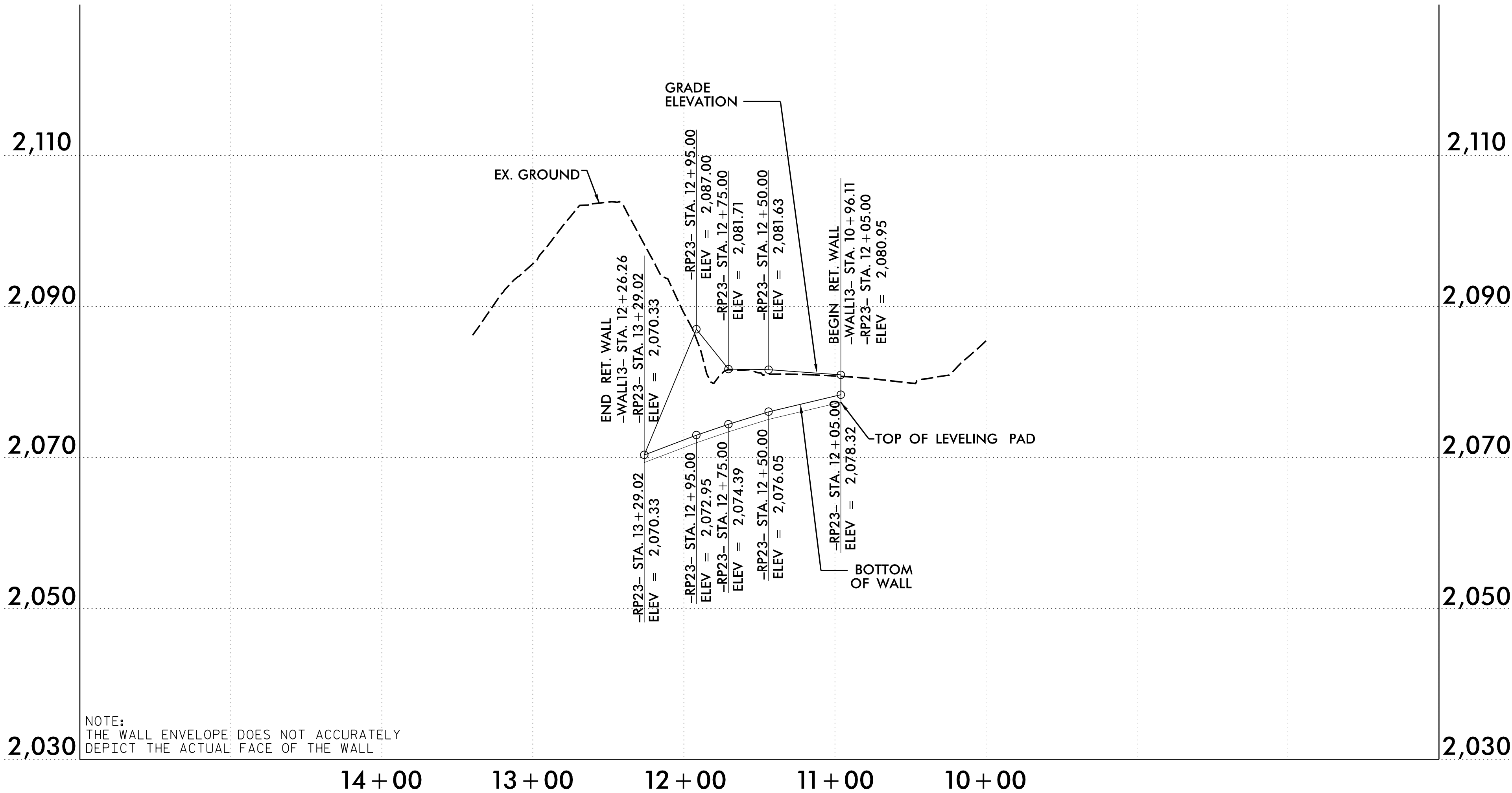
ENGINEER

SIGNATUREDATE

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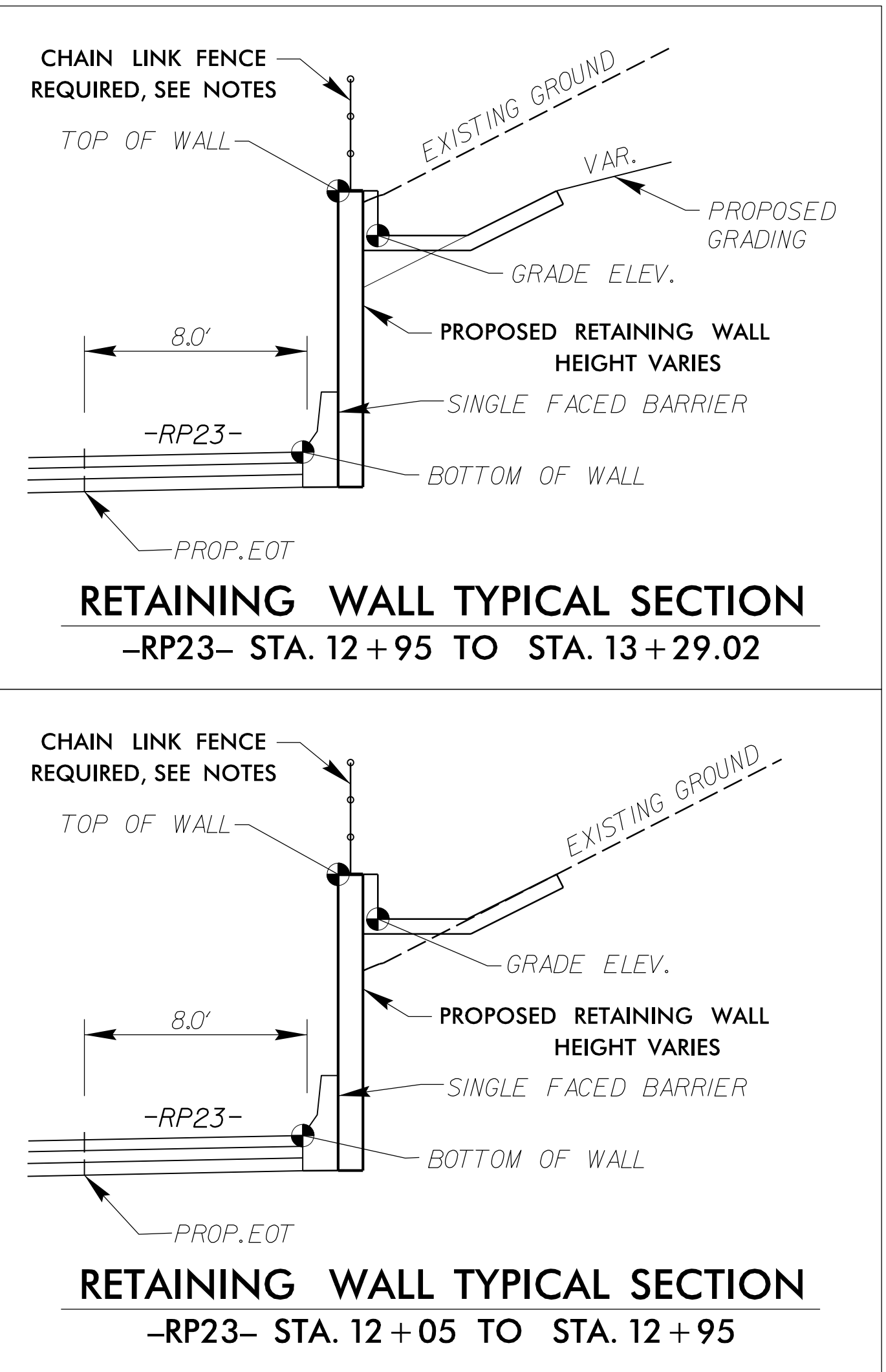


RETAINING WALL NO. 13 – PLAN VIEW



RETAINING WALL NO. 13 – ENVELOPE VIEW

ESTIMATED SOIL NAIL WALL QUANTITIES			
RETAINING WALL NO.	SOIL NAIL RETAINING WALL (SQUARE FEET)	SOIL NAIL VERIFICATION TESTS	SOIL NAIL PROOF TESTS
WALL NO. 13	965 SF	2	4
PAY ITEM			QUANTITY
ARCHITECTURAL CONCRETE SURFACE TREATMENT			965 SF



PROJECT NO.: I-2513AC
BUNCOMBE COUNTY
STATION: +/- -RP23- 12+05 TO -RP23- 13+29.02
SHEET 1 OF 2 WALL ID RW-13

I:\JUN-2026\1411-2513AC\1411-2513AC.dgn Structures\CADD\GEOTECH\Plan\Prof\I-2513AC_rdy_RET-Wall13.dgn
I:\JUN-2026\1411-2513AC\1411-2513AC.dgn Structures\CADD\GEOTECH\Plan\Prof\I-2513AC_rdy_RET-Wall13.dgn
I:\JUN-2026\1411-2513AC\1411-2513AC.dgn Structures\CADD\GEOTECH\Plan\Prof\I-2513AC_rdy_RET-Wall13.dgn

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

Prepared in the Office of:

ECS

ECS SOUTHEAST, LLC

1812 CENTER PARK DRIVE, SUITE D

CHARLOTTE, NC 28217

(704) 525-5152 [PHONE]

(704) 357-0023 [FAX]

NC REGISTERED ENGINEERING

FIRM # F-1519

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL
ENGINEERING UNIT

REVISIONS						SHEET NO. W-36
NO.	BY	DATE	NO.	BY	DATE	
1		3				
2			4			

GEOTECHNICAL
ENGINEER

SEAL

018979

ENGINEER

MOHAMMED A. MULLA

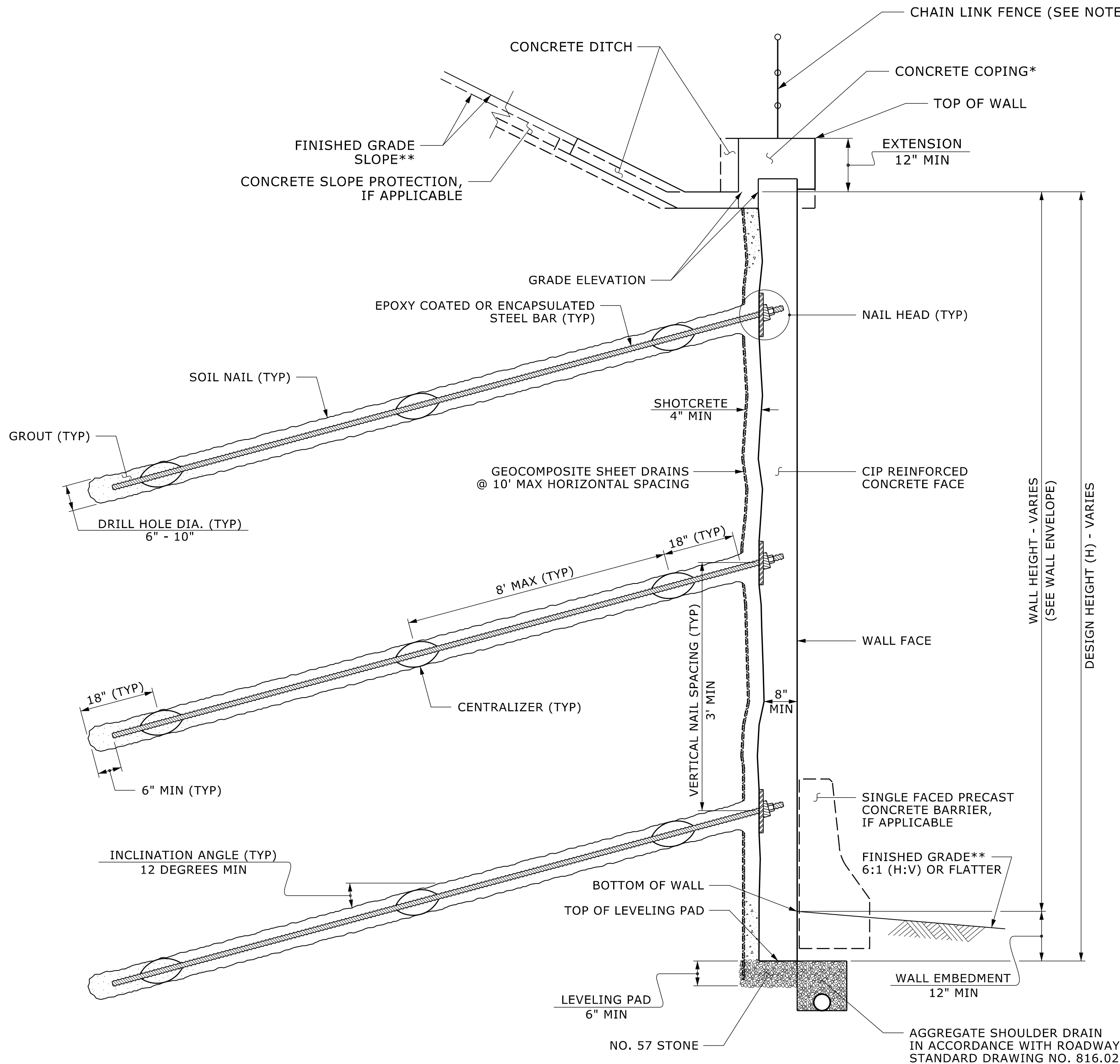
7/20/2026

SIGNATUREDATE

ENGINEER

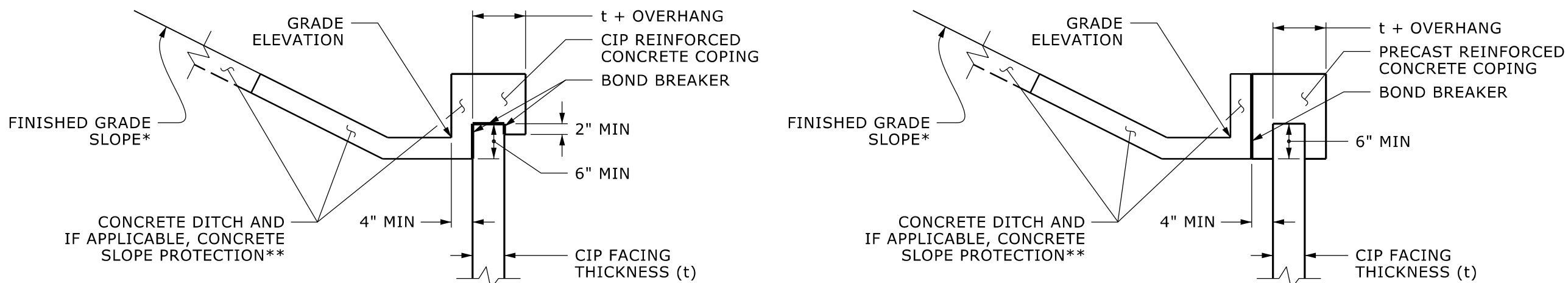
SIGNATUREDATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



SOIL NAIL WALL - TYPICAL SECTION

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

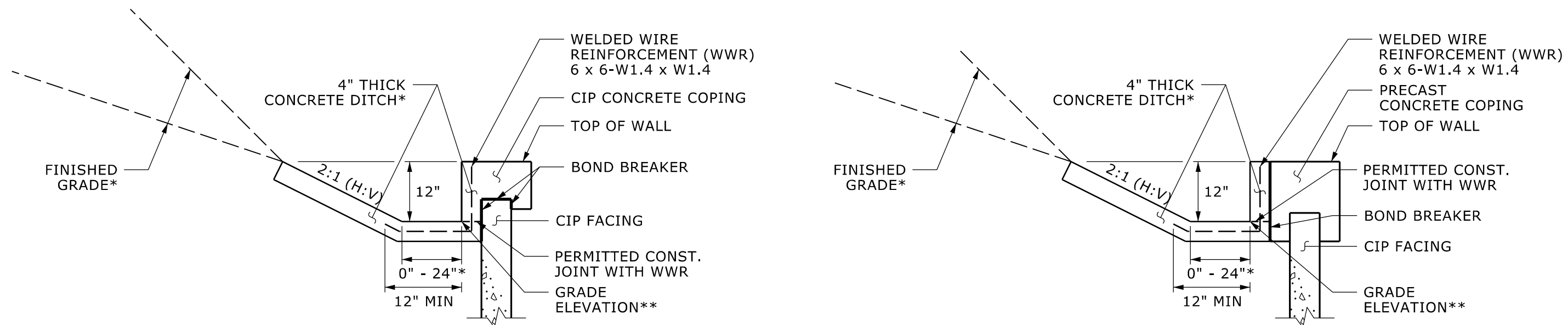


COPING DETAILS

*SEE PLANS FOR FINISHED GRADE SLOPE DETAILS.
**SEE CONCRETE DITCH BEHIND WALL 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.
- A 48" BLACK VINYL COATED CHAIN LINK FENCE IS REQUIRED FOR RETAINING WALL NO. 13. SEE ROADWAY STANDARD 866.06 (ROADWAY DETAIL AND PAY ITEM).
- CIP REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALL NO. 13.
- AN ARCHITECTURAL CONCRETE SURFACE TREATMENT IS REQUIRED FOR RETAINING WALL NO. 13. SEE "ARCHITECTURAL CONCRETE SURFACE TREATMENT" SPECIAL PROVISION.
- BEFORE BEGINNING SOIL NAIL WALL DESIGN FOR RETAINING WALL NO. 13, 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 NO. 13 FOR THE FOLLOWING:
1) H = WALL HEIGHT + WALL EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MINIMUM WALL EMBEDMENT DEPTH = 1 FT
4) IN-SITU ASSUMED MATERIAL PARAMETERS
UNIT WEIGHT, γ = 120 PCF
FRICTION ANGLE, ϕ = 30 DEGREES
COHESION, c = 0 PSF
- MINIMUM SOIL NAIL LENGTH = 1.2H OR 10FT, WHICHEVER IS LONGER
- EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH SOIL NAILS FOR RETAINING WALL NO. 13.



CONCRETE DITCH BEHIND
WALL WITH CONCRETE COPING

*SEE ROADWAY PLANS FOR CONCRETE
DITCH AND FINISHED GRADE DETAILS.
**SEE WALL ENVELOPE FOR GRADE ELEVATIONS.

PROJECT NO.: I-2513AC
BUNCOMBE COUNTY
STATION: +/- -RP23- 12+05 TO -RP23- 13+29.02
SHEET 2 OF 2 WALL ID RW-13

RETAINING WALL NO. 13
SOIL NAIL WALL
TYPICAL SECTION AND NOTES

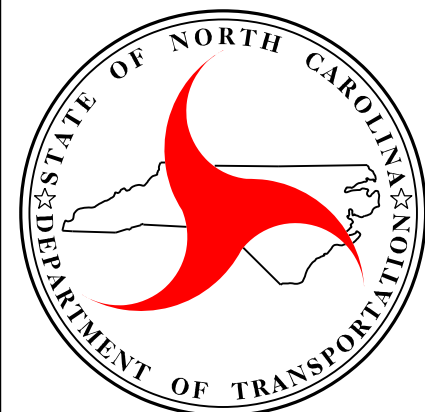
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

W-37

Prepared in the Office of:



ECS SOUTHEAST, LLC
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1519



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL #14 DETAIL SHEET

GEOTECHNICAL
ENGINEER



ENGINEER

SIGNATURE

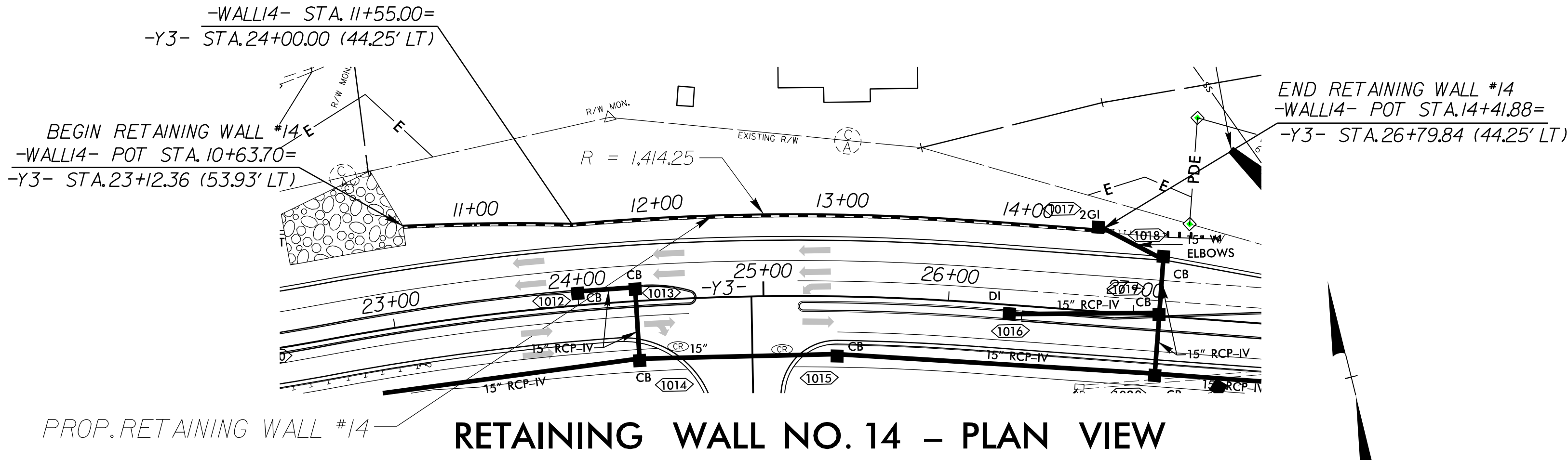
DATE

7/20/2026

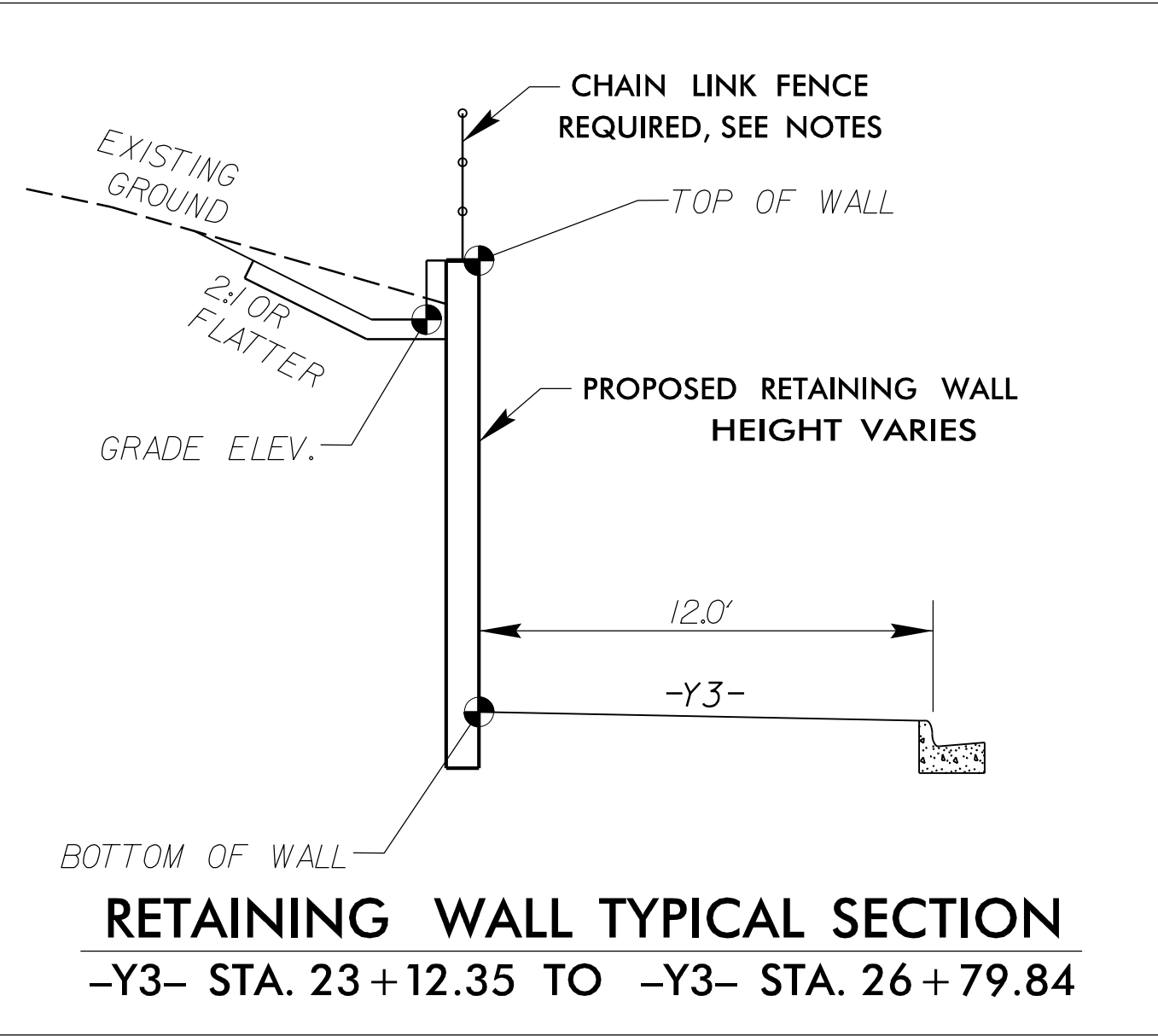
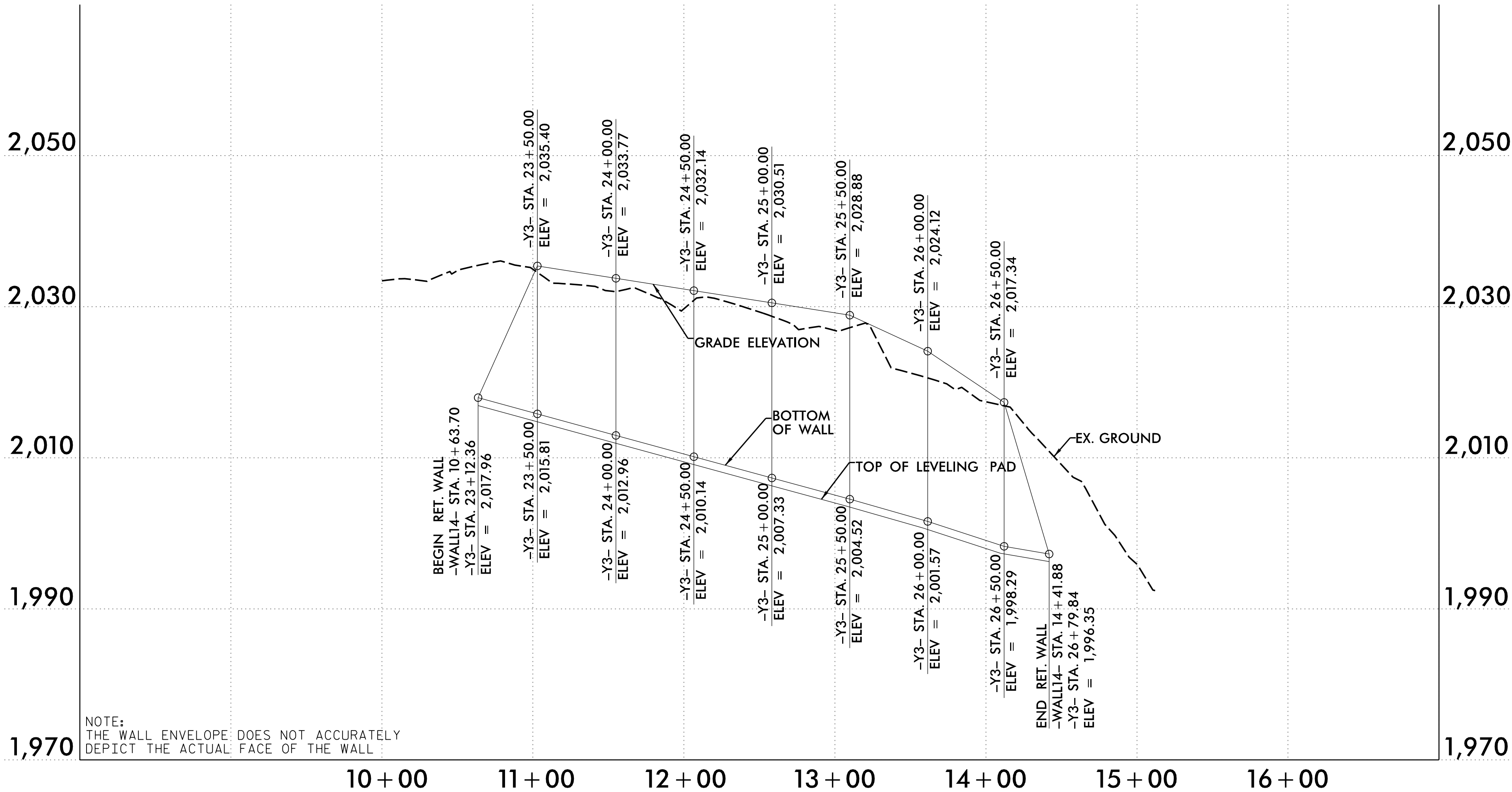
SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



ESTIMATED SOIL NAIL WALL QUANTITIES			
RETAINING WALL NO.	SOIL NAIL RETAINING WALL (SQUARE FEET)	SOIL NAIL VERIFICATION TESTS	SOIL NAIL PROOF TESTS
WALL NO. 14	7,875 SF	2	16
PAY ITEM			QUANTITY
ARCHITECTURAL CONCRETE SURFACE TREATMENT			7,875 SF



RETAINING WALL NO. 14 – ENVELOPE VIEW

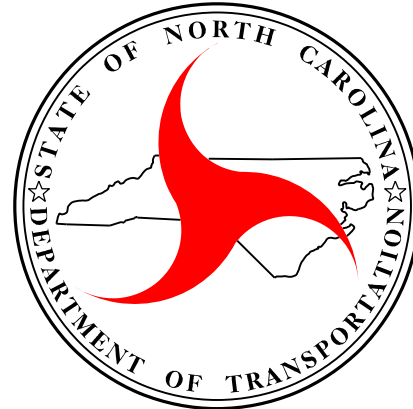
PROJECT NO.: I-2513AC
BUNCOMBE COUNTY
STATION: +/- -Y3- 23+12.36 TO -Y3- 26+79.84
SHEET 1 OF 2 WALL ID RW-14

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

Prepared in the Office of:



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NC REGISTERED
ENGINEERING
FIRM # F-1519



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 14
SOIL NAIL WALL
PLAN AND ENVELOPE

REVISIONS						SHEET NO. W-38
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



7/20/2026

SIGNATURE _____

SIGNATURE	DATE
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DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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.

A 48" BLACK VINYL COATED CHAIN LINK FENCE IS REQUIRED FOR RETAINING WALL NO. 14. SEE ROADWAY STANDARD 866.06 (ROADWAY DETAIL AND PAY ITEM).

CIP REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALL NO. 14.

AN ARCHITECTURAL CONCRETE SURFACE TREATMENT IS REQUIRED FOR RETAINING WALL NO. 14. SEE "ARCHITECTURAL CONCRETE SURFACE TREATMENT" SPECIAL PROVISION.

BEFORE BEGINNING SOIL NAIL WALL DESIGN FOR RETAINING WALL NO. 14, 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 NO. 14 FOR THE FOLLOWING:

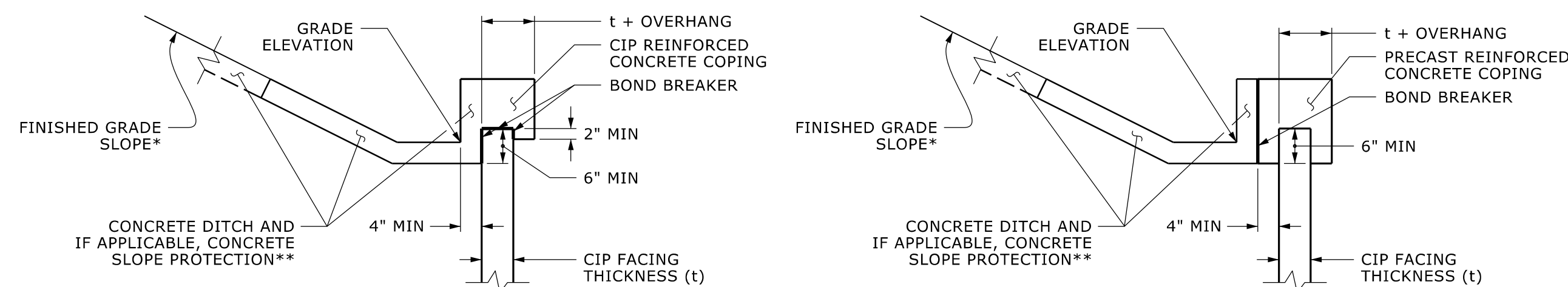
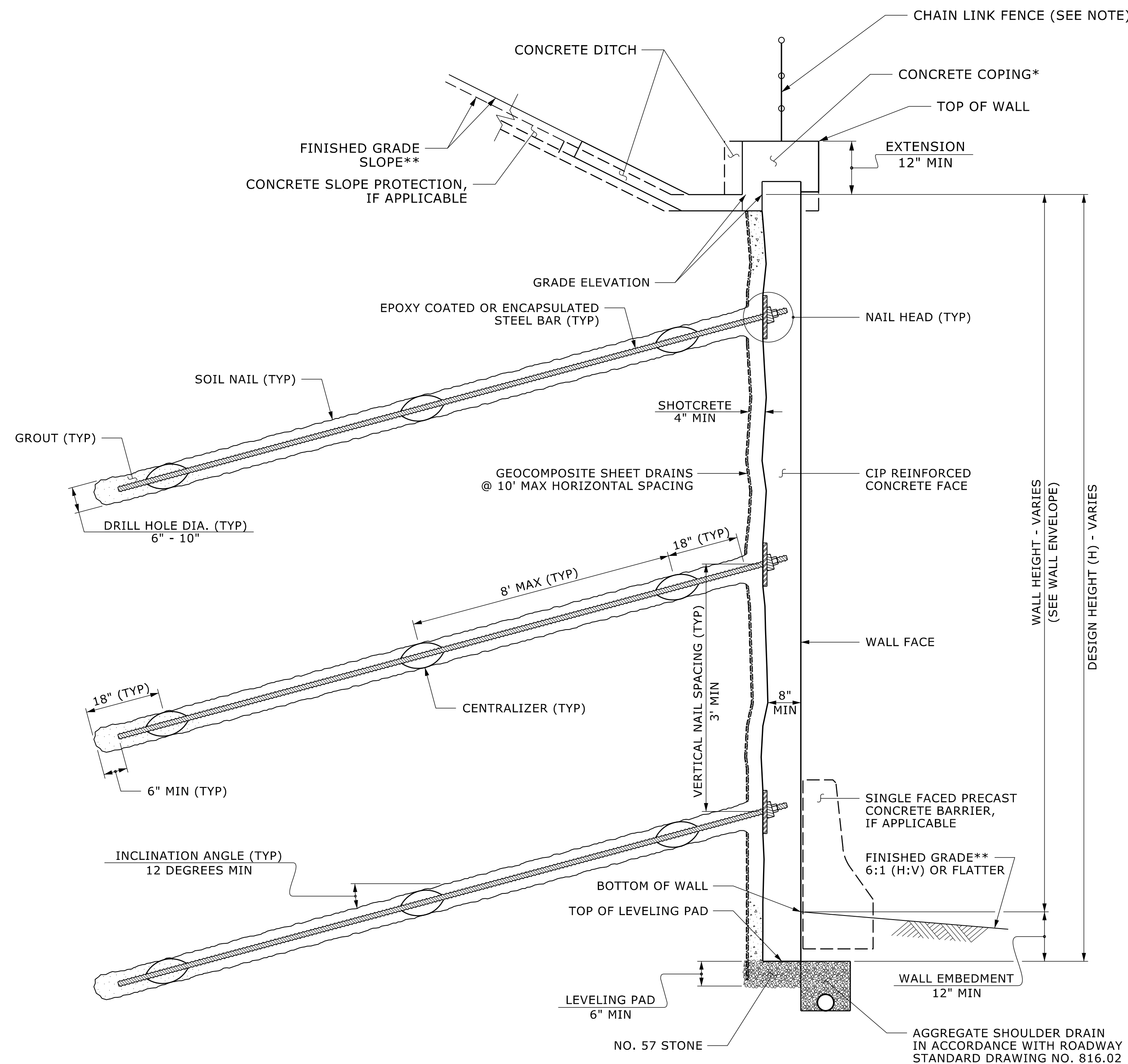
- 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MINIMUM WALL EMBEDMENT ELEVATION = 1 FT
- 4) IN-SITU ASSUMED MATERIAL PARAMETERS:
 UNIT WEIGHT, γ = 120 PCF
 FRICTION ANGLE, ϕ = 30 DEGREES
 COHESION, c = 0 PSF
- 5) MINIMUM REINFORCEMENT LENGTH (L) = 1.2 H OR 10 FT., WHICHEVER IS LONGER, UNLESS NOTED OTHERWISE (SEE #6 BELOW)
- 6) MINIMUM REINFORCEMENT LENGTH (L) = 1.0 H FOR STA. 13+79.4 TO 14+41.88 FOR RIGHT OF WAY

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH SOIL NAILS FOR RETAINING WALL NO. 14.



*SEE ROADWAY PLANS FOR CONCRETE
DITCH AND FINISHED GRADE DETAILS.
**SEE WALL ENVELOPE FOR GRADE ELEVATIONS.

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

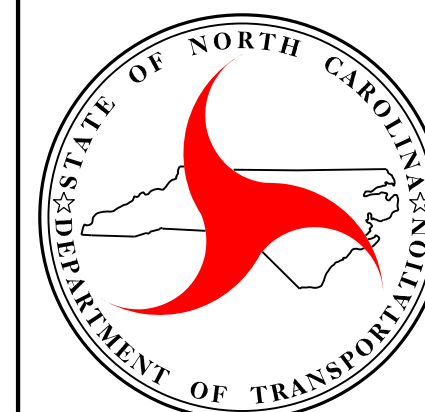


*SEE PLANS FOR FINISHED GRADE SLOPE DETAILS.
**SEE CONCRETE DITCH BEHIND WALL DETAILS.

Prepared in the Office of:



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NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

PROJECT NO.: I-2513AC

BUNCOMBE COUNTY

STATION: +/- -Y3- 23+12.36 TO -Y3- 26+79.84

SHEET 2 OF 2 WALL ID RW-14

RETAINING WALL NO. 14
SOIL NAIL WALL
TYPICAL SECTION AND NOTES

REVISIONS						SHEET NO. W-39
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

SHEET
NO.

W-3C

1-JUN-2026 18:01
\\Users\emcintosh\OneDrive - ECS Corporate Services\31-Asheville - 31-4489 [2513AC 17]
McIntosh AT FCS-NVIF-7VTA Structures\CADD_GEO\TECH\PlanProf\2513AC_Typicol_sheets_EM.dgn

RETAINING WALL #15 DETAIL SHEET

GEOTECHNICAL
ENGINEER



ENGINEER

7/20/2026

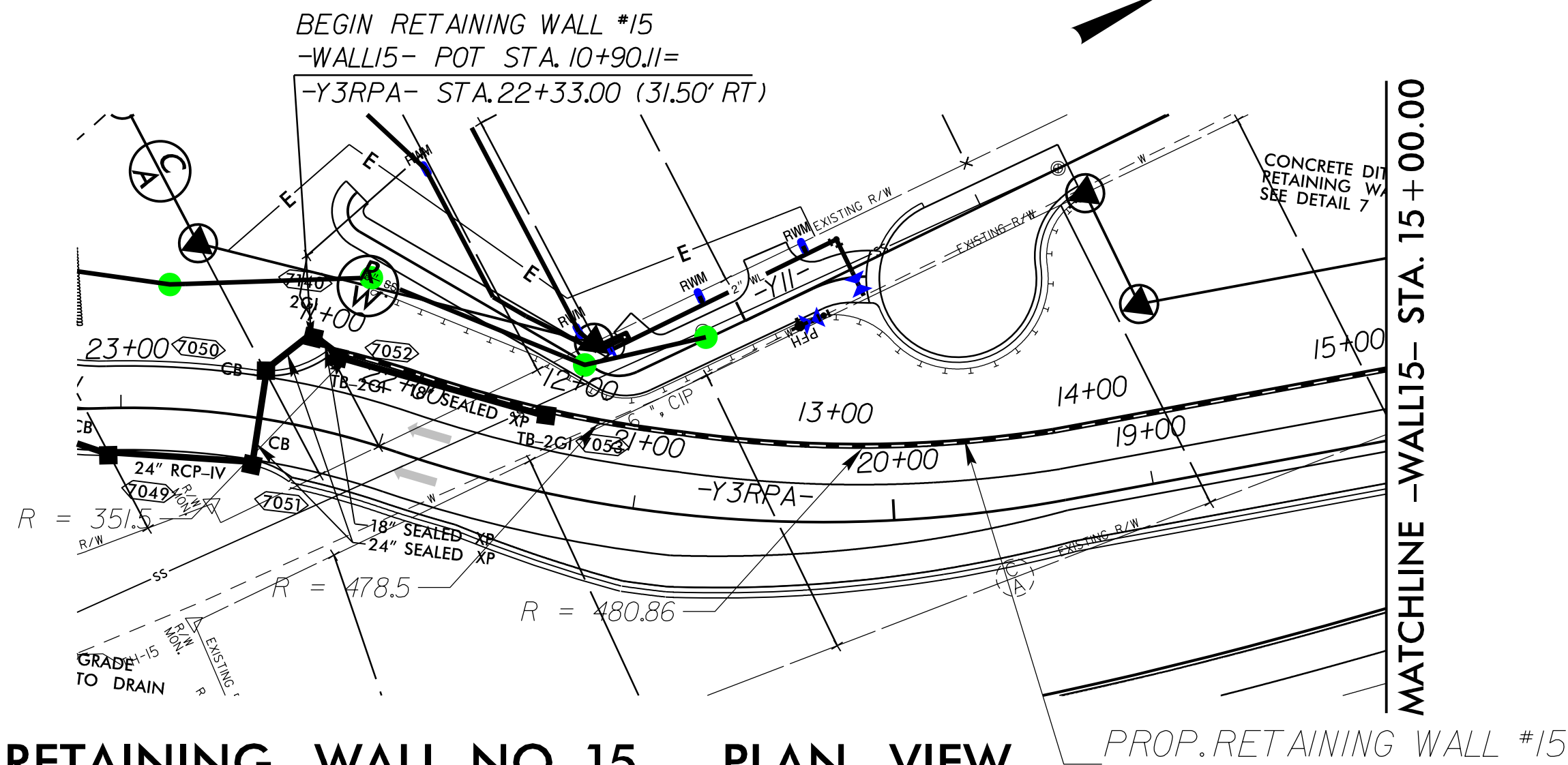
SIGNATURE

DATE

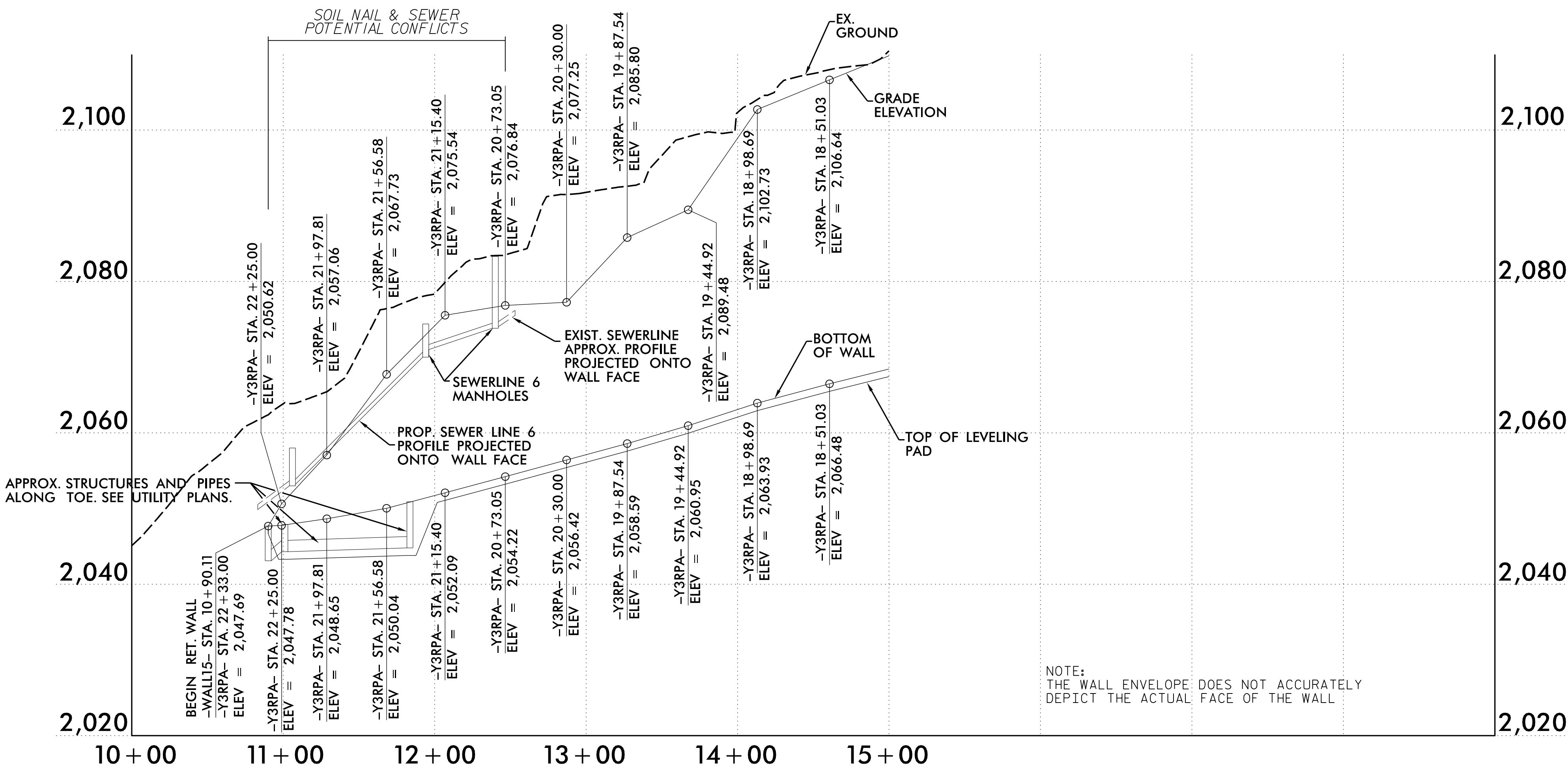
SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

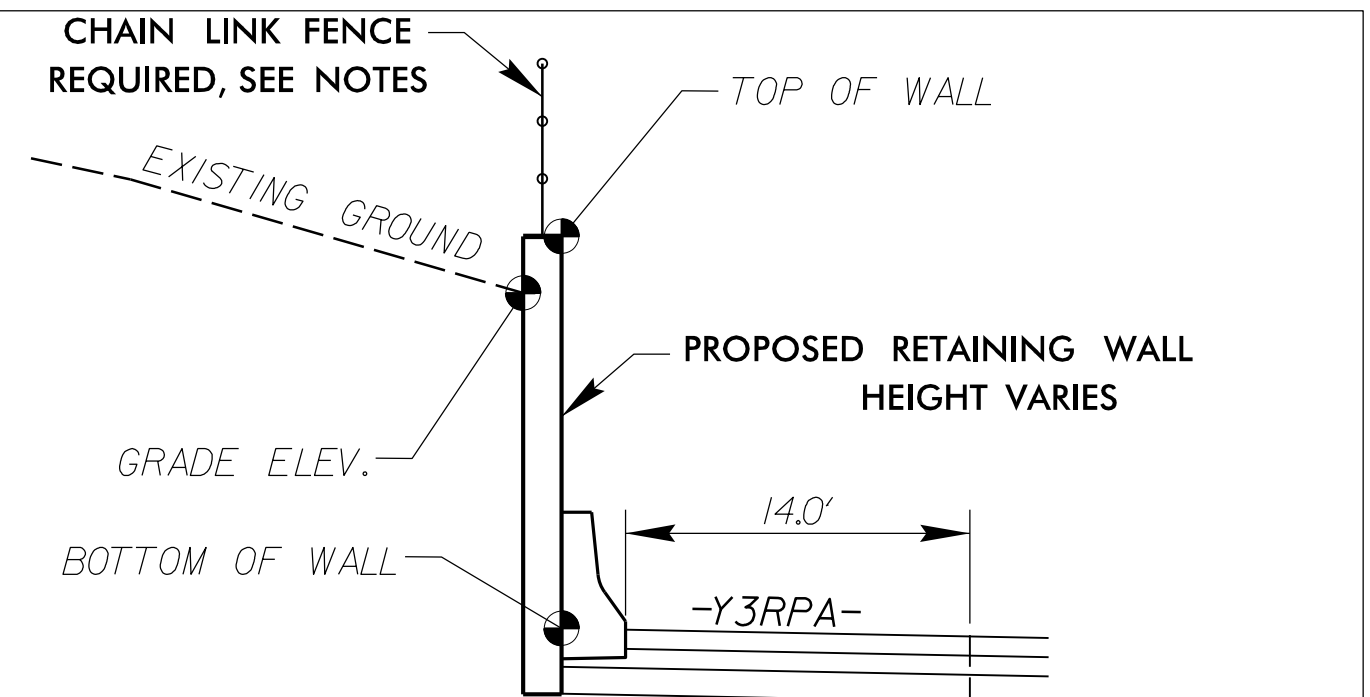


RETAINING WALL NO. 15 – PLAN VIEW

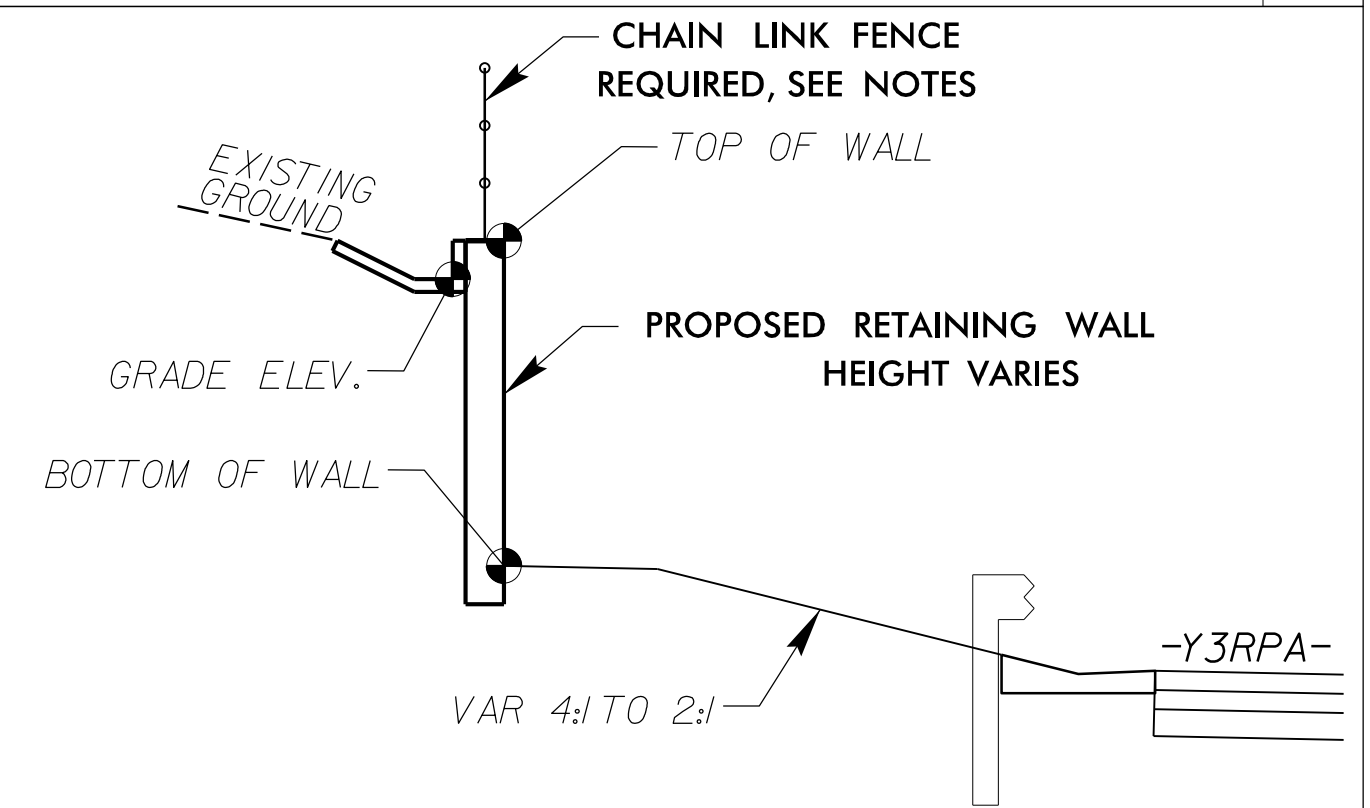


RETAINING WALL NO. 15 – ENVELOPE VIEW

ESTIMATED SOIL NAIL WALL QUANTITIES			
RETAINING WALL NO.	SOIL NAIL RETAINING WALL (SQUARE FEET)	SOIL NAIL VERIFICATION TESTS	SOIL NAIL PROOF TESTS
WALL NO. 15	38,425 SF	2	77
PAY ITEM			QUANTITY
ARCHITECTURAL CONCRETE SURFACE TREATMENT			38,425 SF



RETAINING WALL TYPICAL SECTION
-Y3RPA- STA. 22+48.19 TO -Y3RPA- STA. 14+10.39



RETAINING WALL TYPICAL SECTION
-Y3RPA- STA. 14+10.39 TO -L- STA. 23+50.02

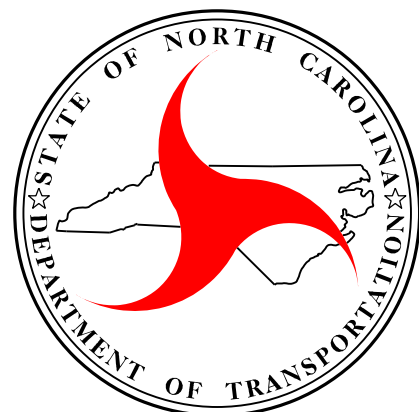
PROJECT NO.: I-2513AC
BUNCOMBE COUNTY
STATION: +/- -Y3RPA- 22+33 TO -L- 98+25
SHEET 1 OF 3 WALL ID RW-15

PREPARED BY: E. A. MCINTOSH, P.E.	DATE: 06/26
REVIEWED BY: M. A. MULLA, P.E.	DATE: 06/26

Prepared in the Office of:



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NORTH CAROLINA
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DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 15
SOIL NAIL WALL
PLAN AND ENVELOPE

REVISIONS						SHEET NO. W-40
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	
2	-	-	4	-	-	