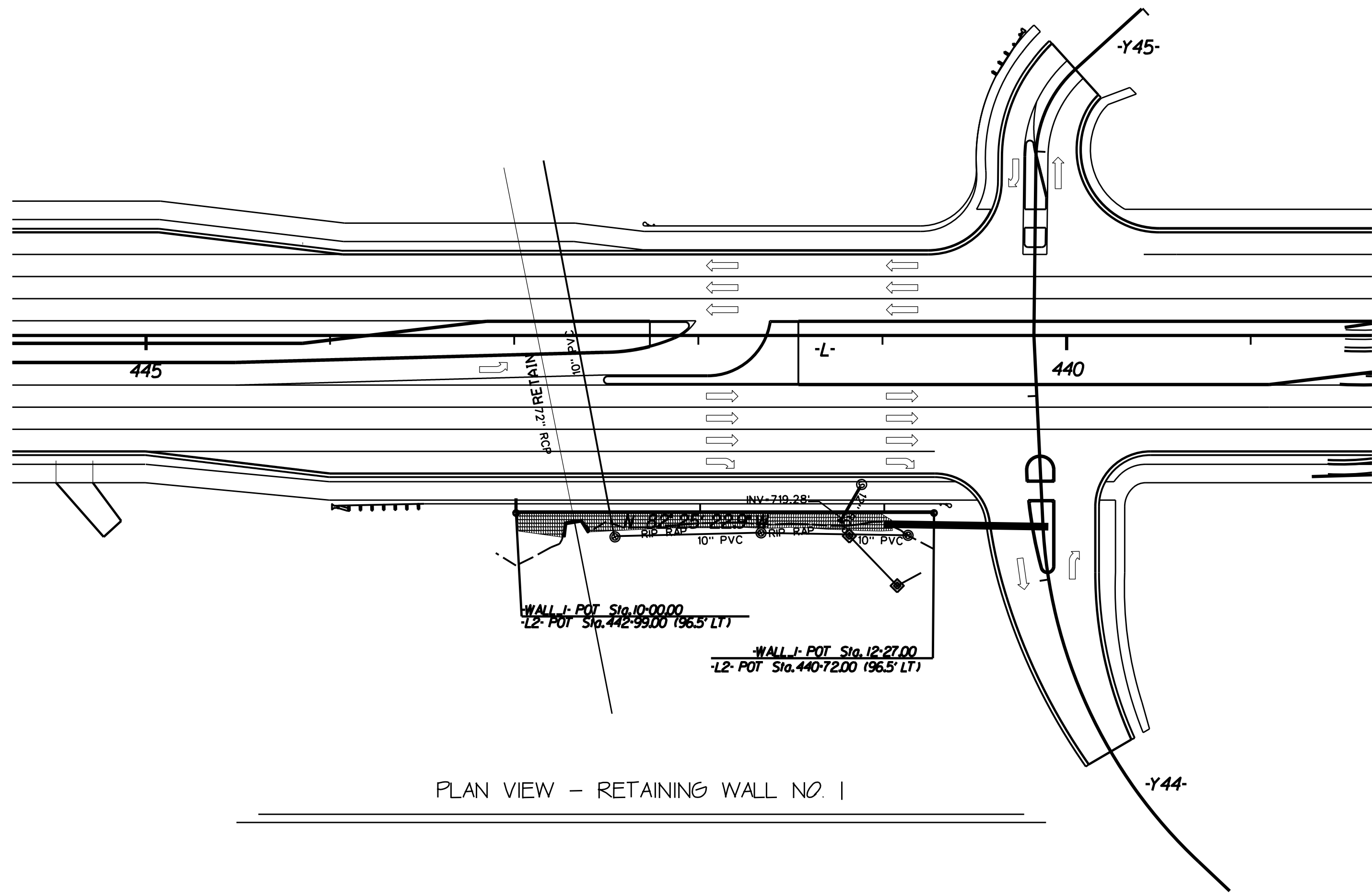
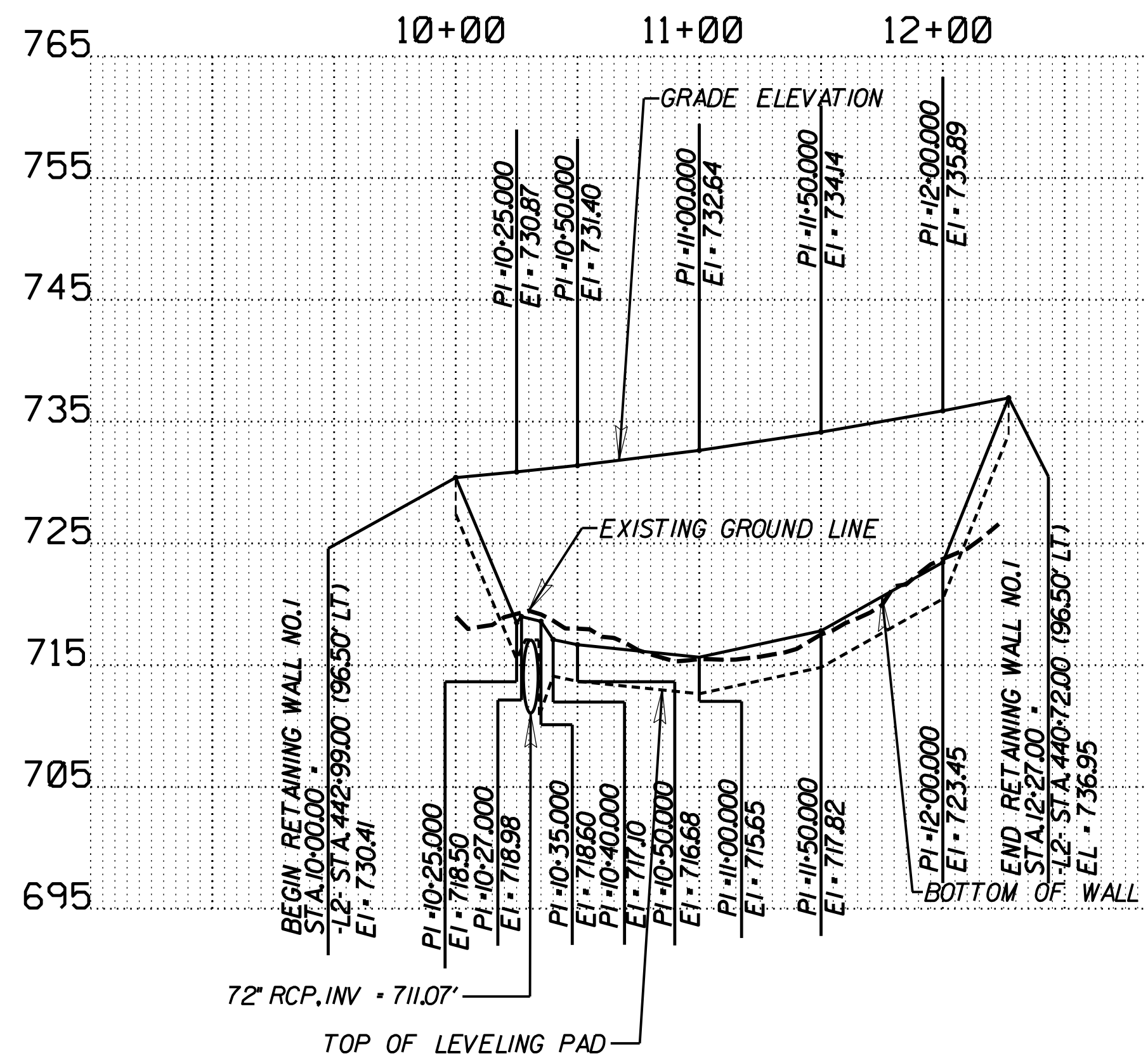




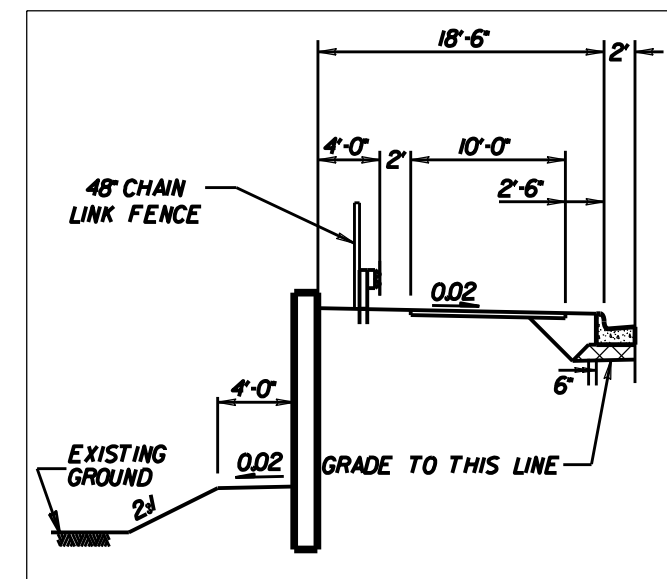
PLAN VIEW - RETAINING WALL NO. 1



WALL ENVELOPE - RETAINING WALL NO. 1

- NOTE:
- 1) OFFSET DIMENSIONS ARE FROM FACE OF WALL
 - 2) THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF THE WALL
 - 3) EMBED WALL AT 72" RCP TO ELEVATION 710'

PREPARED BY: SY	DATE: 8/2025
REVIEWED BY: SCC	DATE: 8/2025



MSE RETAINING WALL QUANTITIES

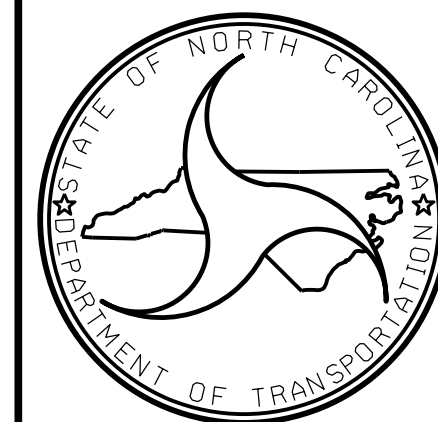
RETAINING WALL NO. 1	-WALL1-	• 3687 SQUARE FEET
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- WALL AREA IS MEASURED USING THE DESIGN HEIGHT 'H'

ARCHITECTURAL SURFACE TREATMENT

RETAINING WALL NO. 1	-WALL1-	• 3687 SQUARE FEET
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PROJECT NO.: U-5765
MECKLENBURG COUNTY
STATION: RW1: 440+72 TO 442+99 -L2-
SHEET 1 OF 8

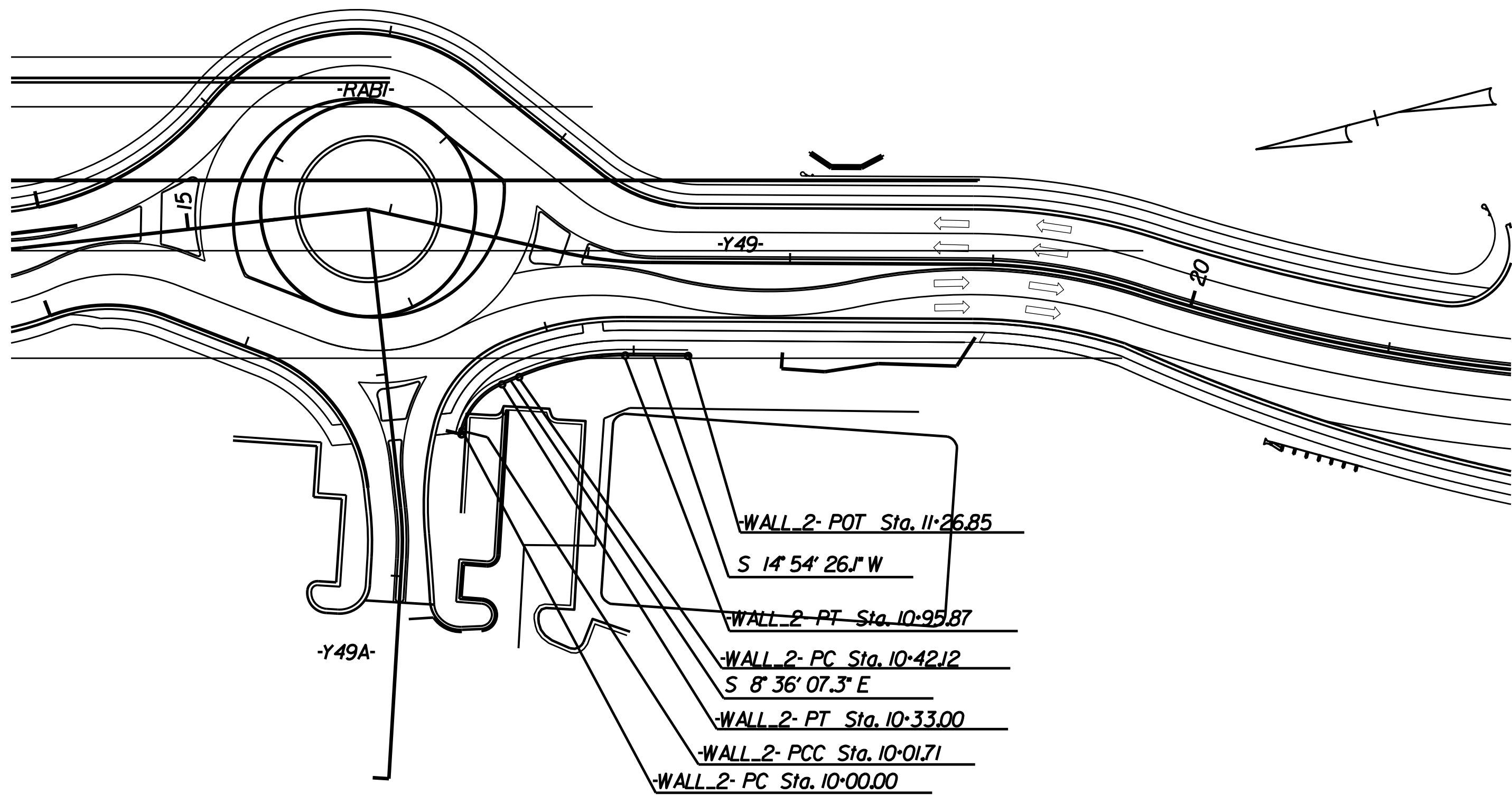


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

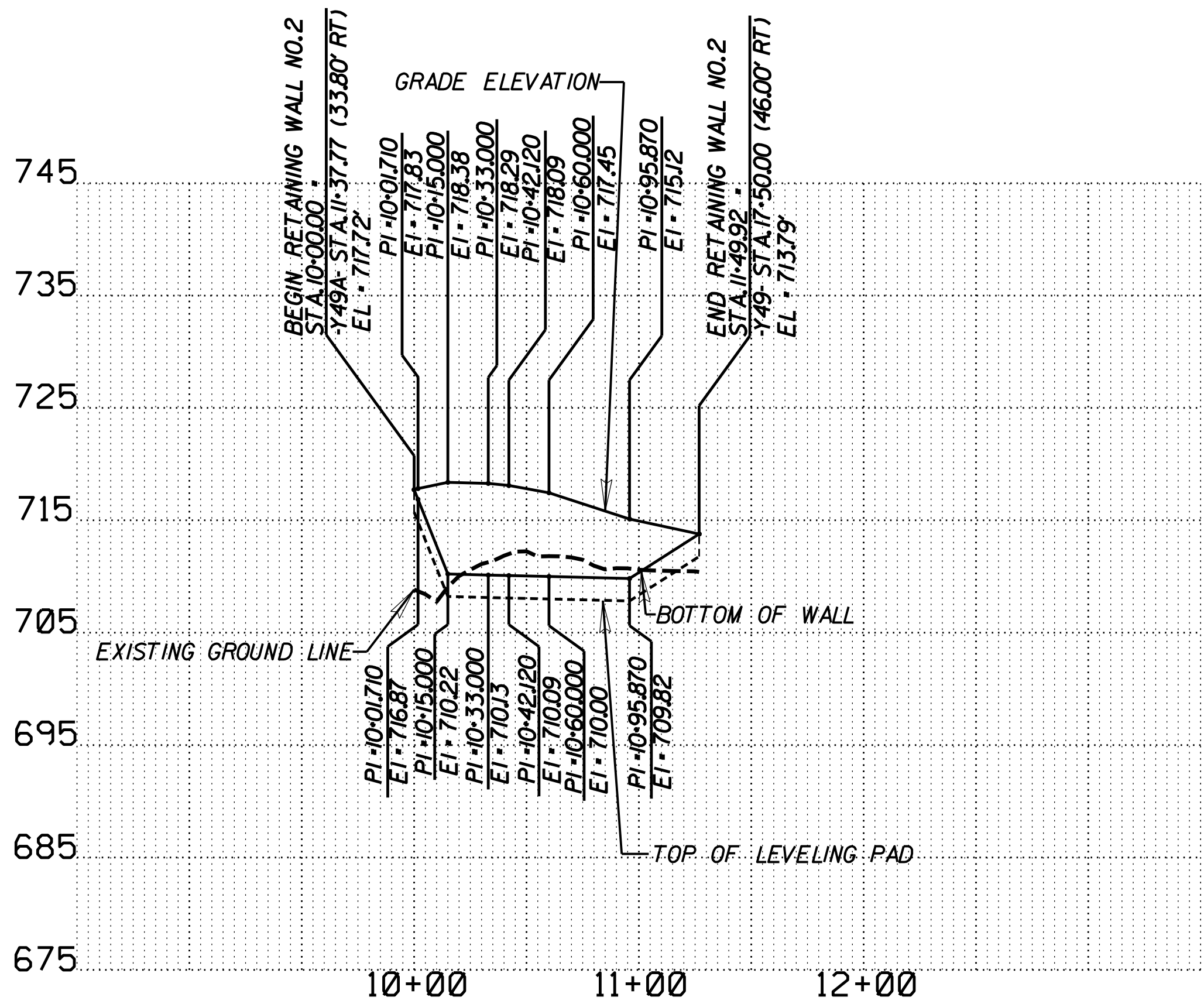
GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 1
MSE WALL WITH
PRECAST CONCRETE PANELS

REVISIONS						SHEET NO. W-1
NO.	BY	DATE	NO.	BY	DATE	
1	SY		3	5/2026		
2			4			

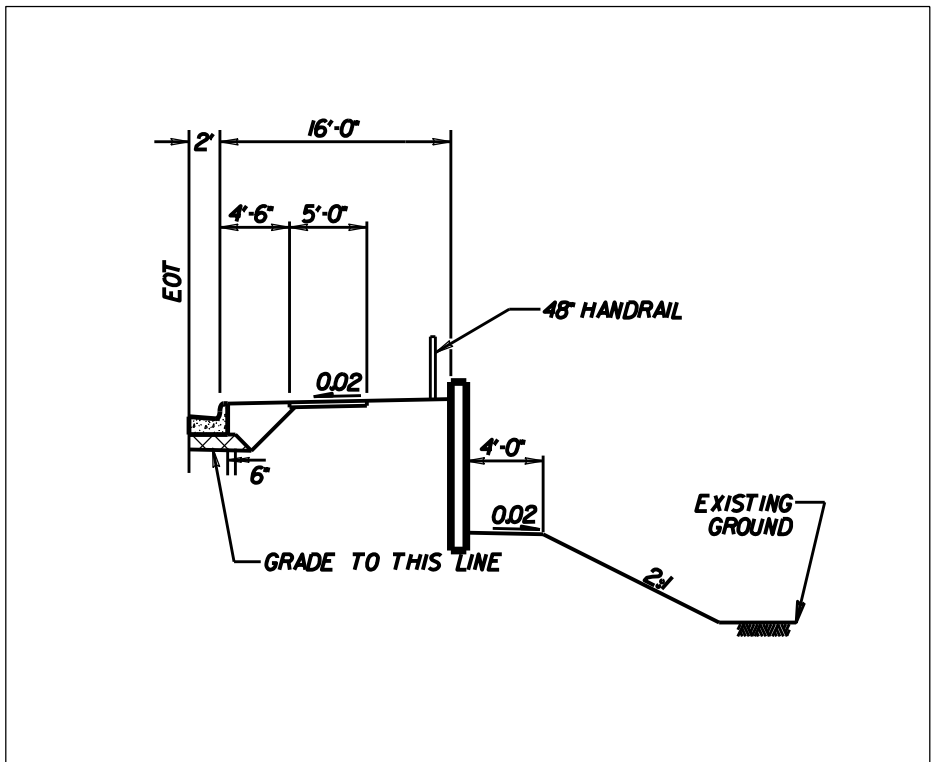


PLAN VIEW - RETAINING WALL NO. 2



WALL ENVELOPE - RETAINING WALL NO. 2

NOTE: 1) OFFSET DIMENSIONS ARE FROM FACE OF WALL
2) THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF THE WALL

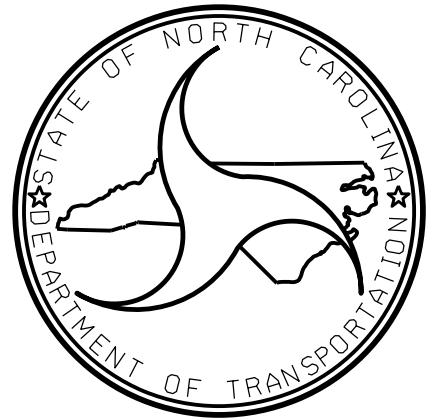


MSE WALL WITH SRW UNITS
QUANTITIES

RETAINING WALL NO. 2 -WALL2- • 985 SQUARE FEET

• WALL AREA IS MEASURED USING THE DESIGN HEIGHT 'H'

PROJECT NO.: U-5765
MECKLENBURG COUNTY
STATION: RW2: 11+37.77 -Y49A- TO 17+50 -Y49-
SHEET 2 OF 8



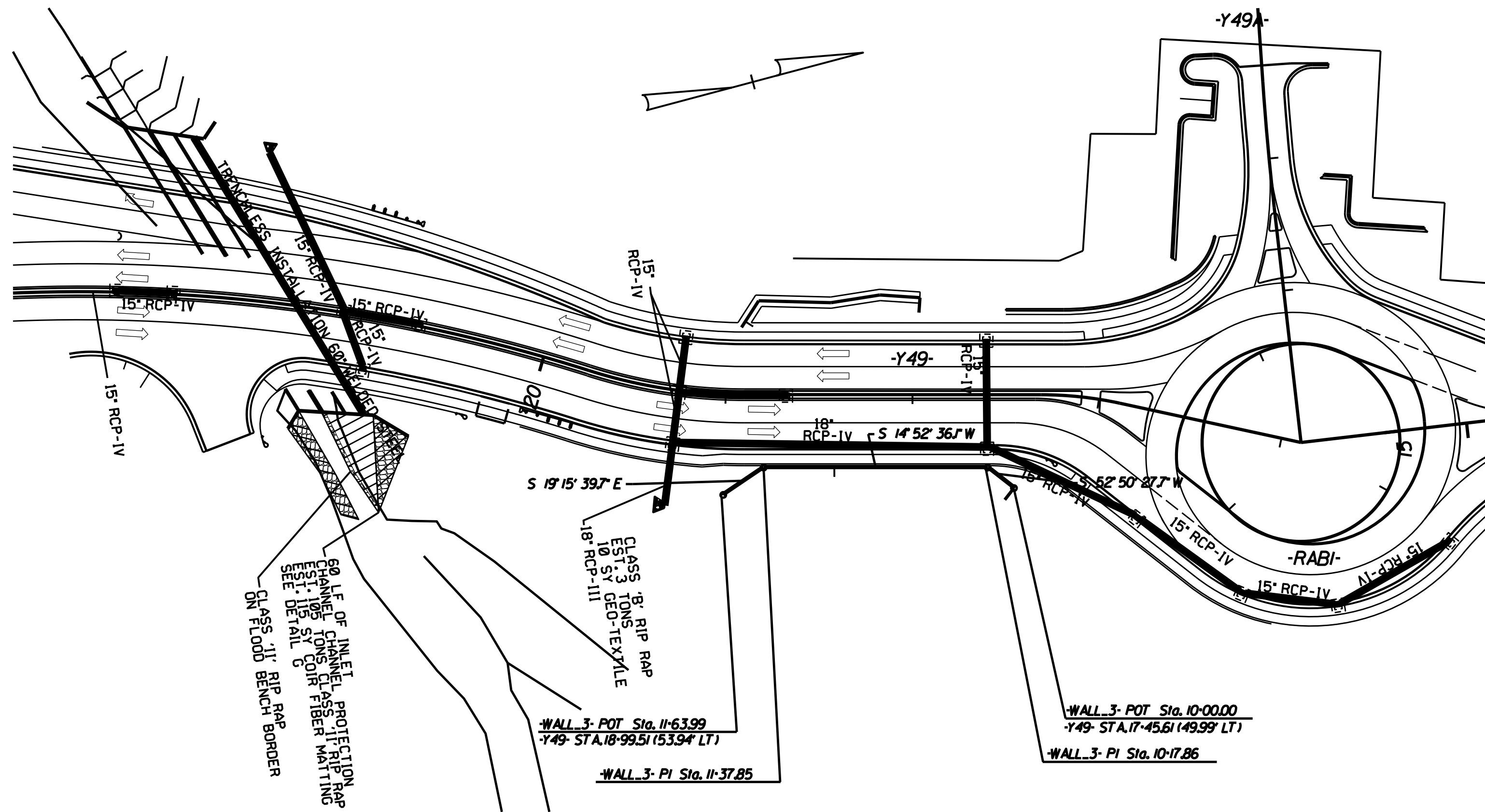
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

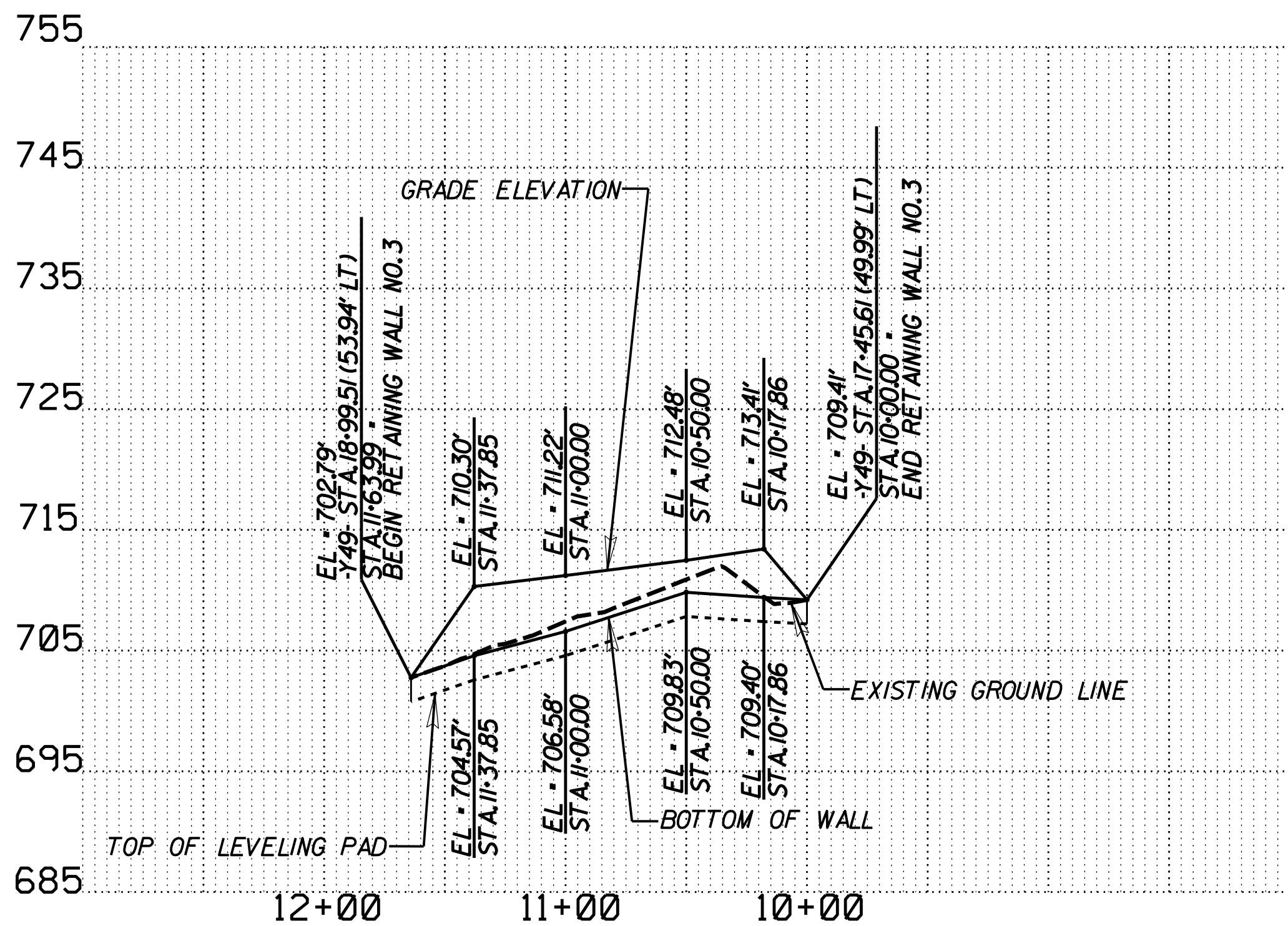
RETAINING WALL NO. 2
MSE WALL WITH SRW UNITS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	SY		3	5/2026		W-2
2			4			

PREPARED BY: SY	DATE: 8/2025
REVIEWED BY: SCC	DATE: 8/2025

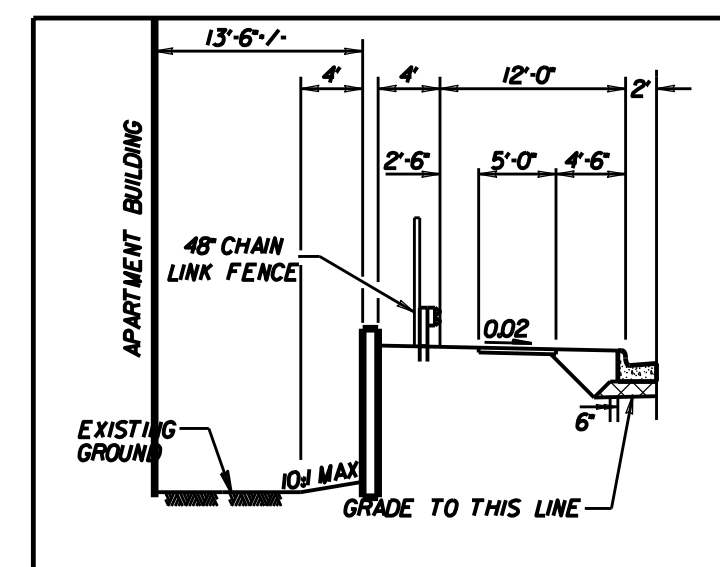


PLAN VIEW - RETAINING WALL NO. 3



WALL ENVELOPE - RETAINING WALL NO. 3

NOTE: 1) OFFSET DIMENSIONS ARE FROM FACE OF WALL
2) THE WALL ENVELOPE DOES NOT ACCURATELY
DEPICT THE ACTUAL FACE OF THE WALL

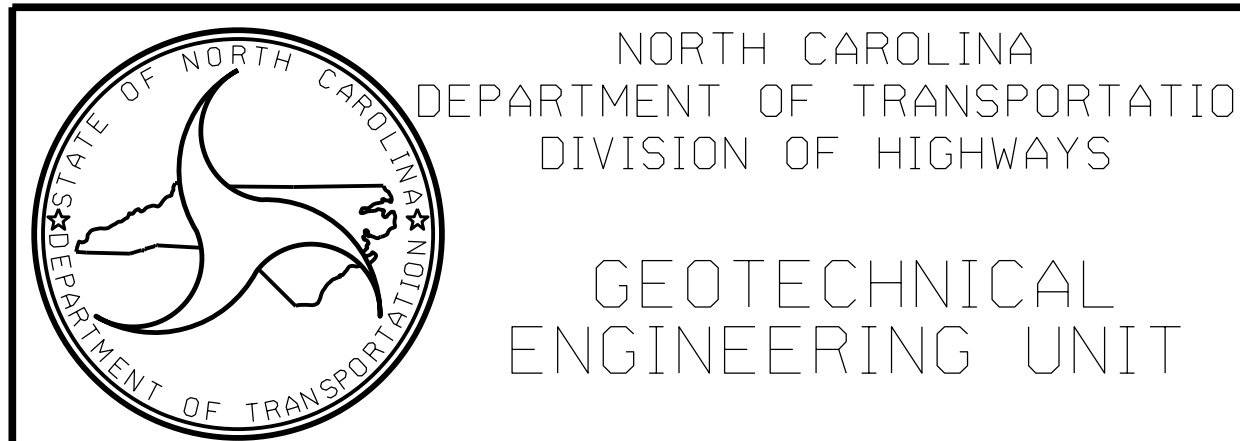


MSE WALL WITH SRW UNITS QUANTITIES

RETAINING WALL NO. 3	-WALL3-	• 924 SQUARE FEET
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• WALL AREA IS MEASURED USING THE DESIGN HEIGHT "H"

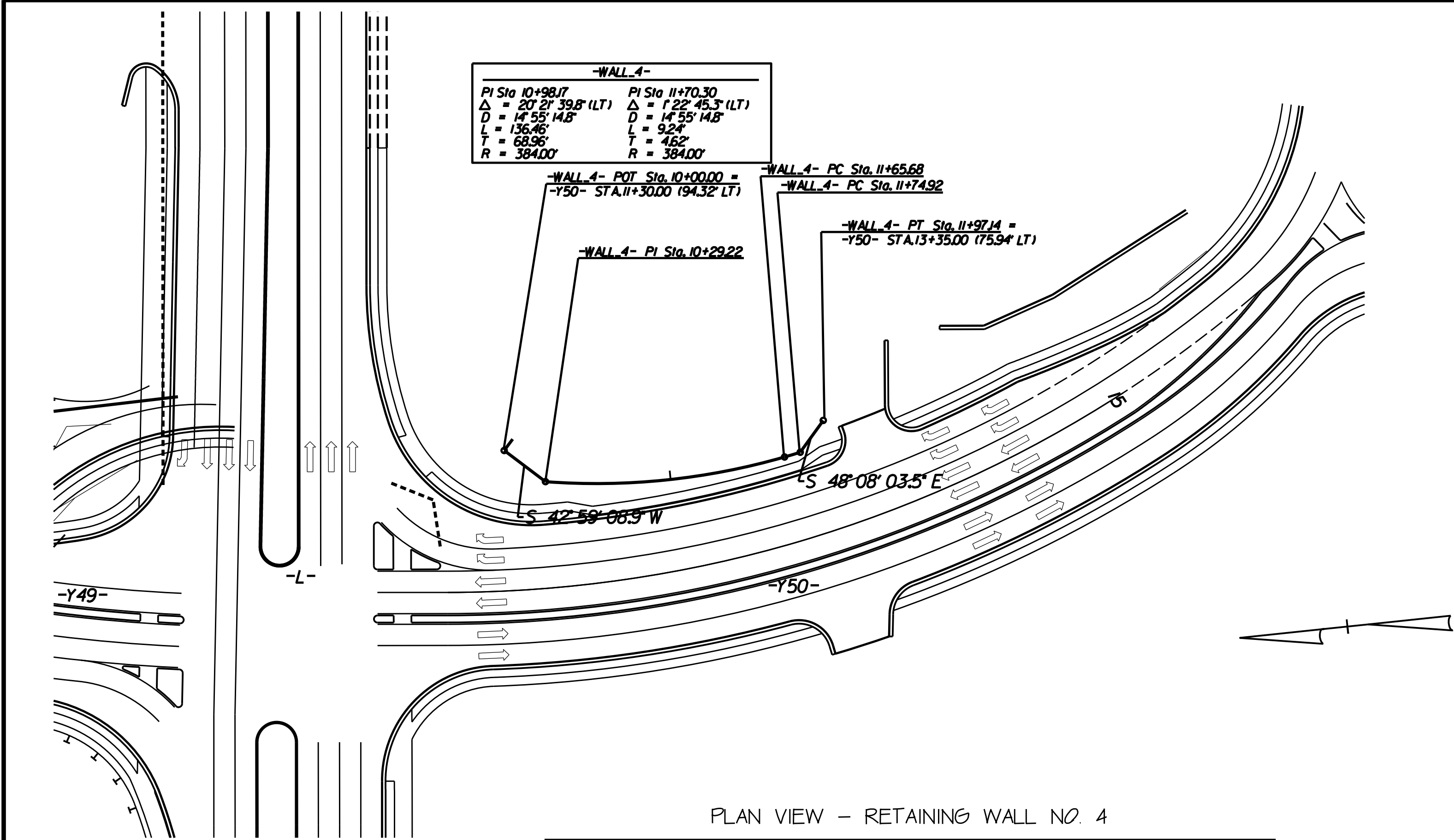
PROJECT NO.: U-5765
MECKLENBURG COUNTY
STATION: RW3: 17+45.61 TO 18+99.51 -Y49-
SHEET 3 OF 8



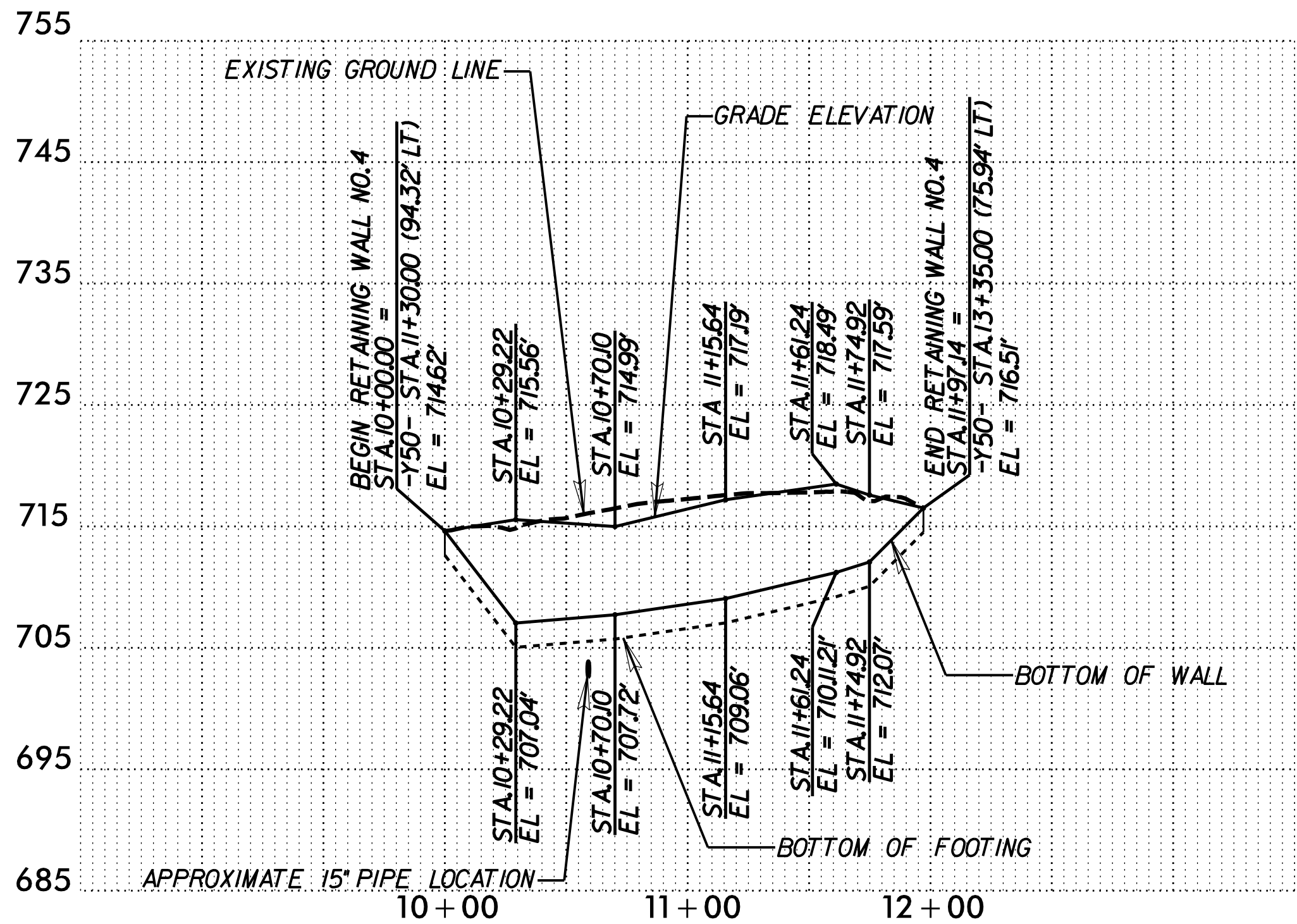
RETAINING WALL NO. 3 MSE WALL WITH SRW UNITS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	SY	8/2026	3			W-3
2			4			

PREPARED BY: SY	DATE: 8/2025
REVIEWED BY: SCC	DATE: 8/2025



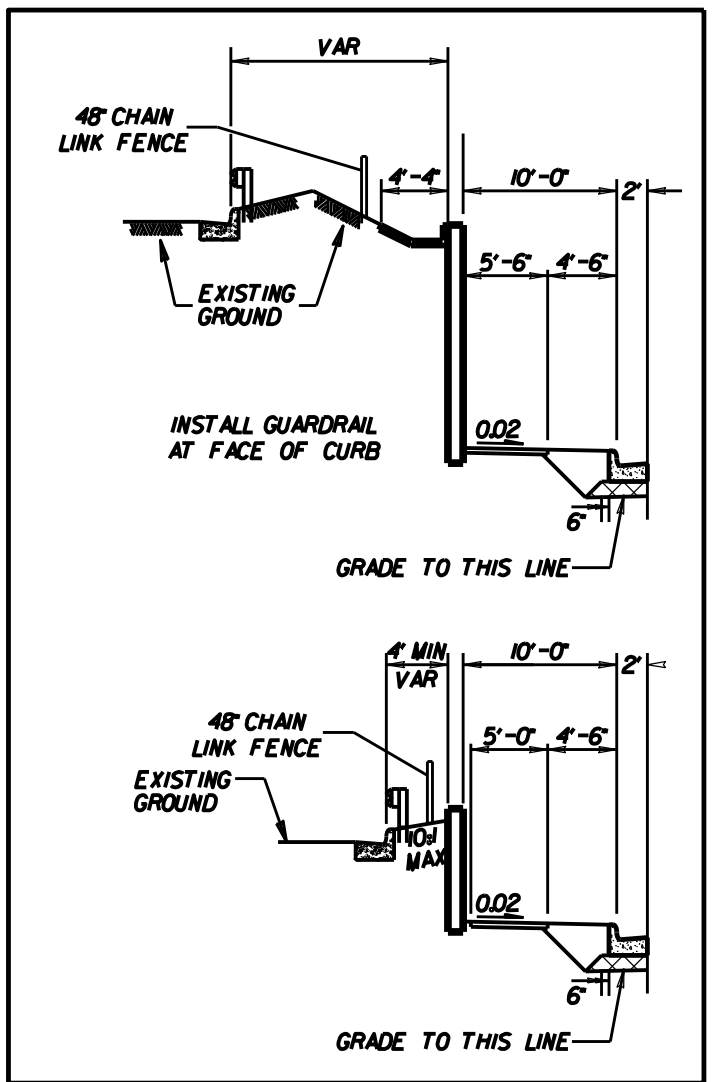
PLAN VIEW - RETAINING WALL NO. 4



WALL ENVELOPE - RETAINING WALL NO. 4

NOTE: 1) OFFSET DIMENSIONS ARE FROM FACE OF WALL
2) THE WALL ENVELOPE DOES NOT ACCURATELY
DEPICT THE ACTUAL FACE OF THE WALL

PREPARED BY: SY	DATE: 8/2025
REVIEWED BY: SCC	DATE: 8/2025

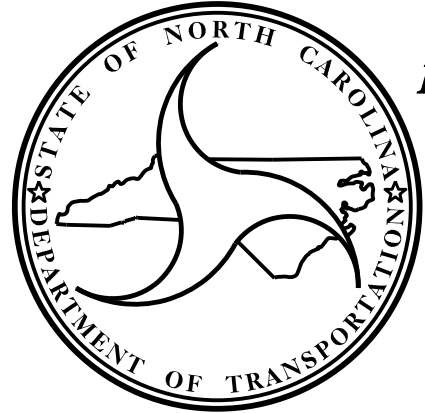


CIP GRAVITY WALL
QUANTITIES

RETAINING WALL NO. 4	-WALL4-	* 1692 SQUARE FEET
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* WALL AREA IS MEASURED USING THE DESIGN HEIGHT "H"

PROJECT NO.: U-5765
MECKLENBURG COUNTY
STATION: RW4: 11+30.00 TO 13+35.00 -Y50-
SHEET 4 OF 8

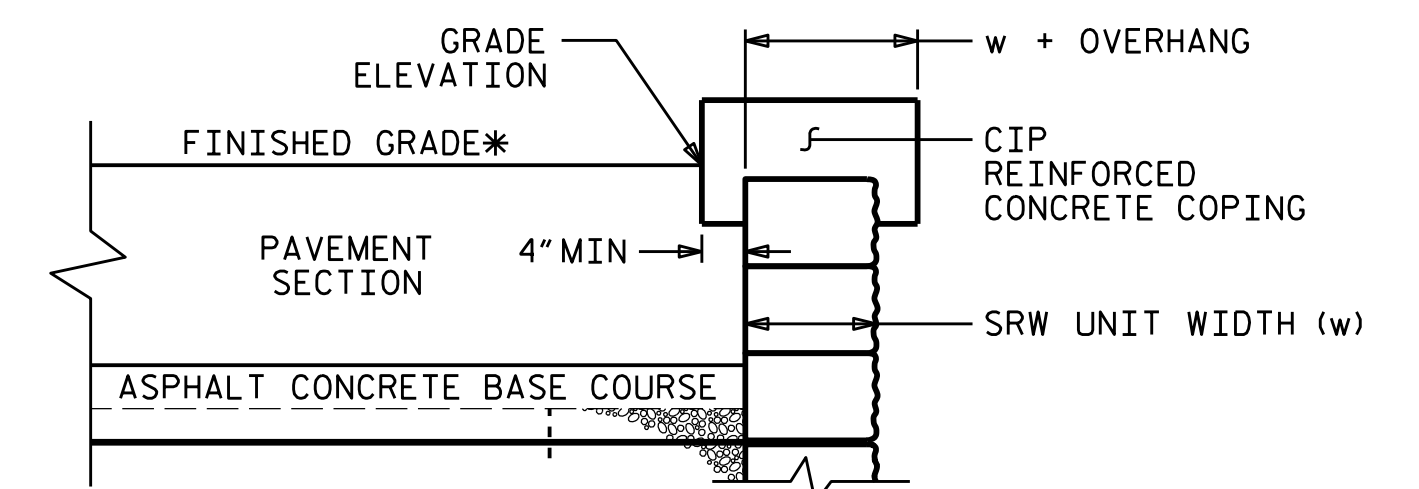
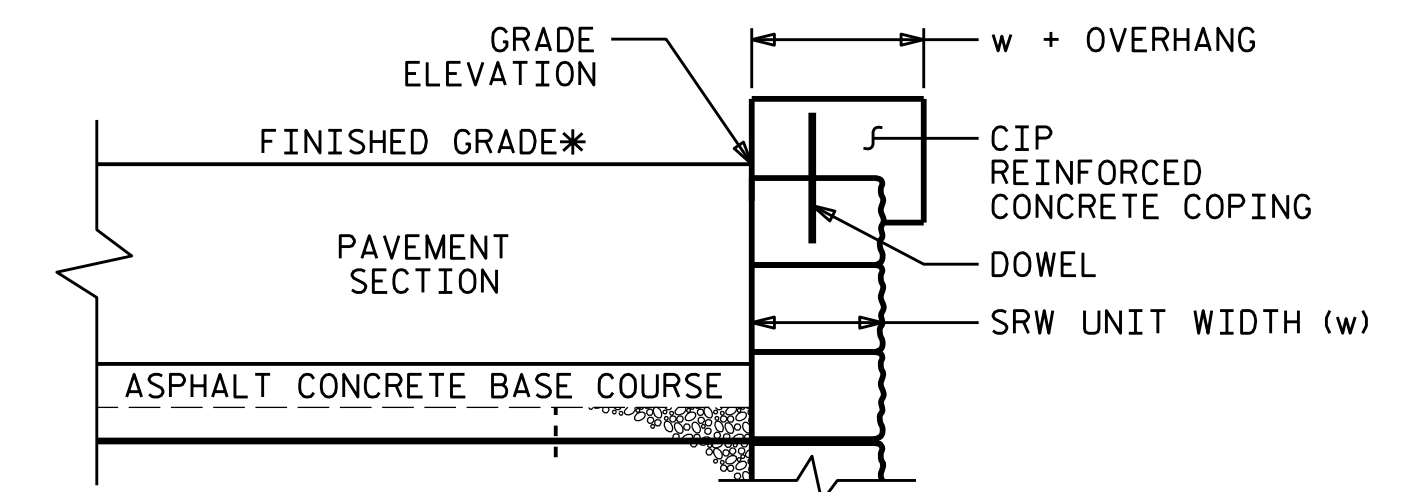
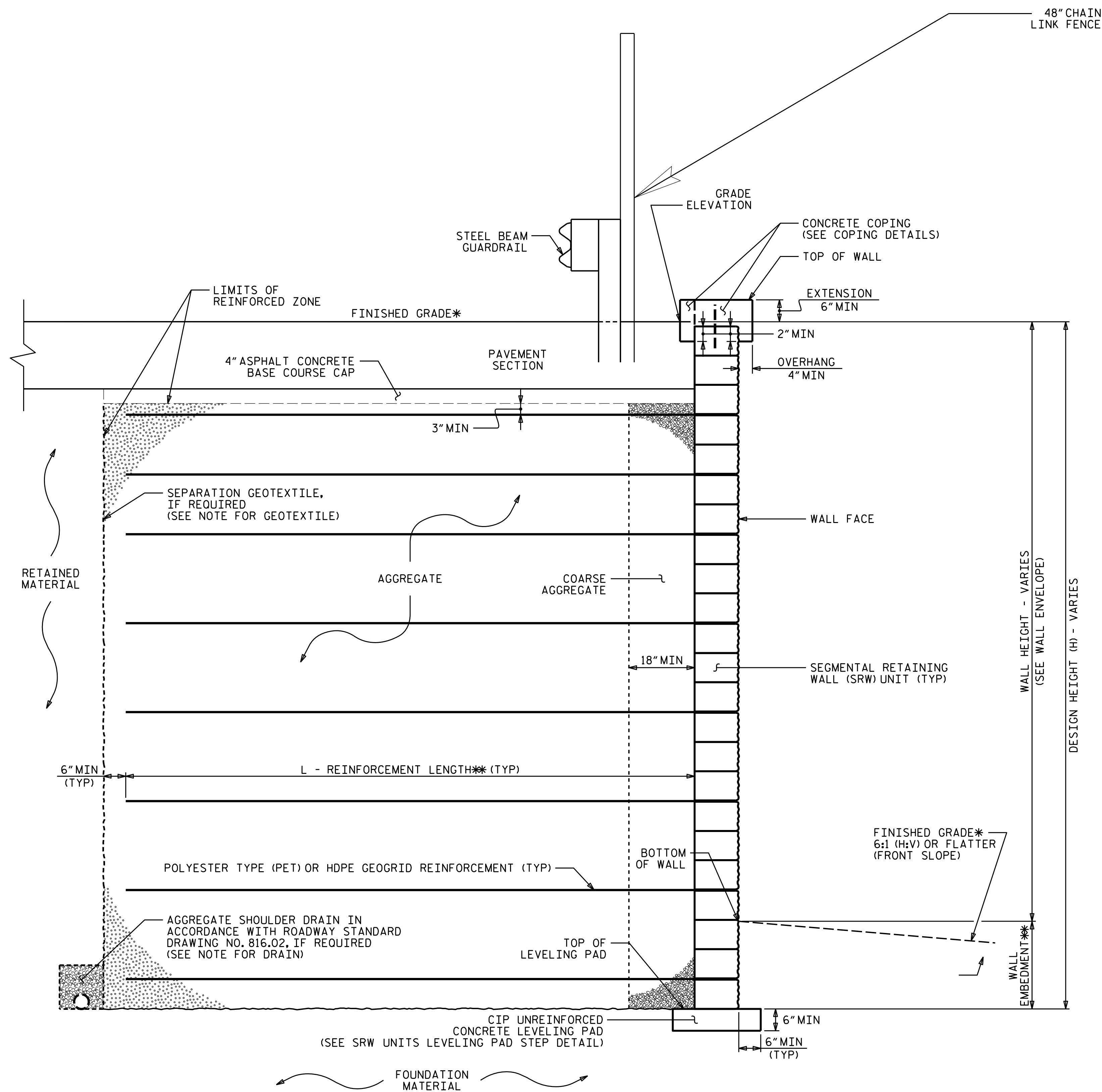


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

RETAINING WALL NO. 4
CIP GRAVITY WALL

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

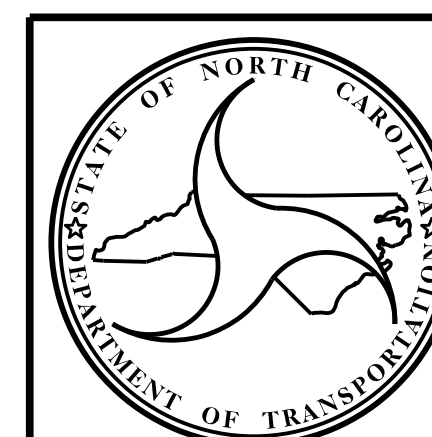


COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO SRW UNITS
WITH DOWELS OR EXTEND COPING DOWN BACK OF SRW UNITS.
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PROJECT NO.: U-5765
MECKLENBURG COUNTY
 STATION: SEE WALL ENVELOPES
 SHEET 6 OF 8

*SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR WALL EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



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

**GEOTECHNICAL
ENGINEERING UNIT**

REVISIONS						SHEET NO. W-6
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

PREPARED BY: SY	DATE: 8/2025
REVIEWED BY: SCC	DATE: 8/2025

GEOTECHNICAL ENGINEER  DocuSigned by <i>Shiping Yang</i> 7A7310E67F7B411... 08/06/2025 SIGNATUREDATE	ENGINEER SIGNATUREDATE
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

NOTES:

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

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

USE AN MSE WALL SYSTEM WITH SEGMENTAL RETAINING WALL UNITS (SRW) UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NOS. 2&3.

WHEN USING AN MSE WALL SYSTEM WITH SRW UNITS FOR RETAINING WALL NOS. 2&3, FREEZE-THAW DURABLE SRW UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS ARE REQUIRED.

AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NOS. 1 THROUGH 3.

A ASLAR STONE ARCHITECTURAL FINISH IS REQUIRED FOR PRECAST CONCRETE PANELS FOR RETAINING WALL NO. 1.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NOS. 1, 2, & 3.

A DRAIN IS REQUIRED FOR RETAINING WALL NOS. 1, 2, & 3.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NOS. 1, 2, & 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. FOR THE FOLLOWING:

1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT

2) DESIGN LIFE = 100 YEARS

3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 4500 PSF FOR RETAINING WALL NO. 1 AND 2500 PSF FOR RETAINING WALL NOS. 2&3

4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7H OR 6 FT, WHICHEVER IS LONGER

5) REINFORCED ZONE AGGREGATE PARAMETERS:

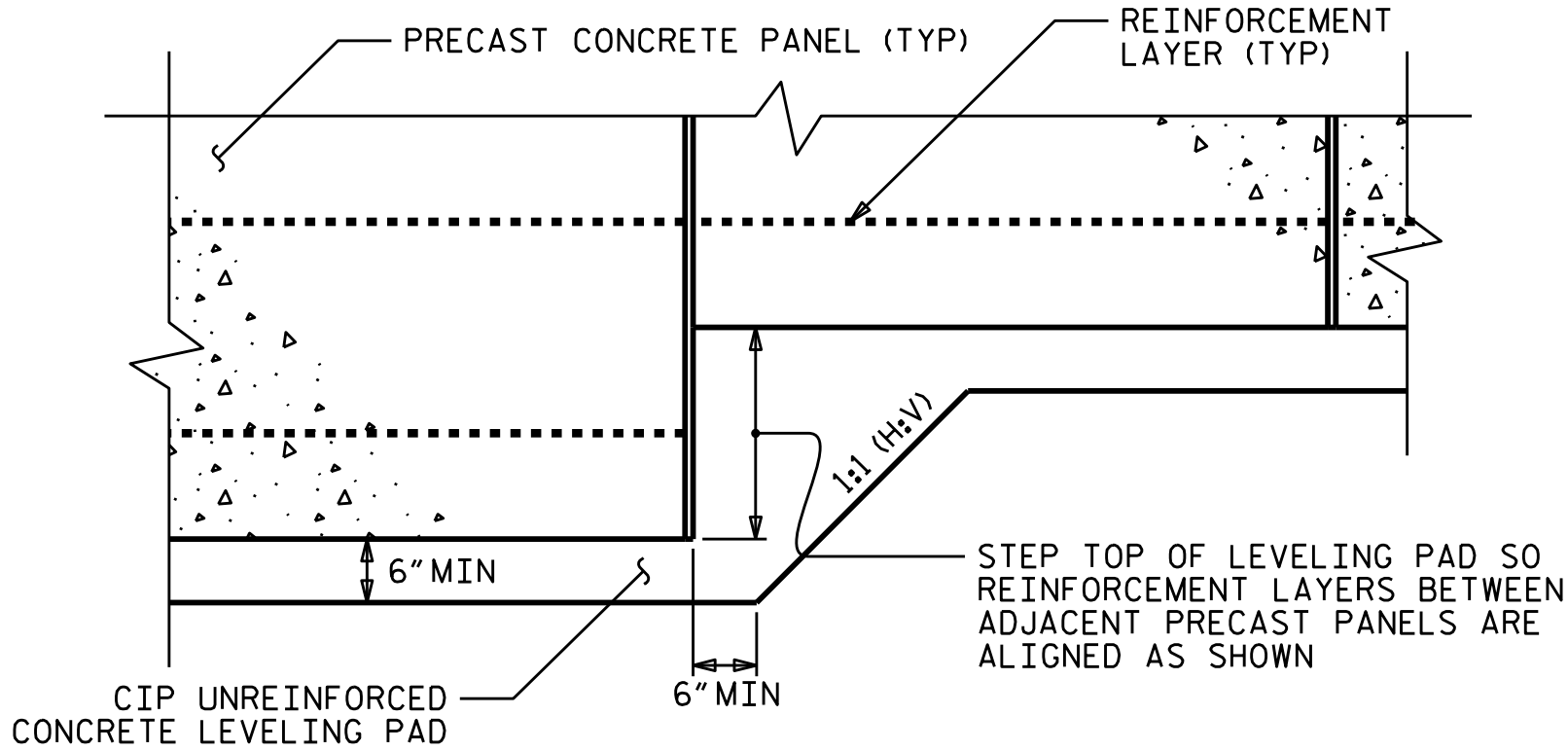
AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
COARSE	110	38	0
FINE	115	34	0
*SEE MSE RETAINING WALLS PROVISION FOR COARSE AND FINE AGGREGATE MATERIAL REQUIREMENTS.			

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	28	0

DESIGN RETAINING WALL NO. 1 FOR A PIPE EXTENDING THROUGH THE WALL AS SHOWN. VERIFY PIPE LOCATION AND ELEVATION BEFORE BEGINNING MSE WALL DESIGN OR CONSTRUCTION.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NOS. 1, 2, & 3 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.



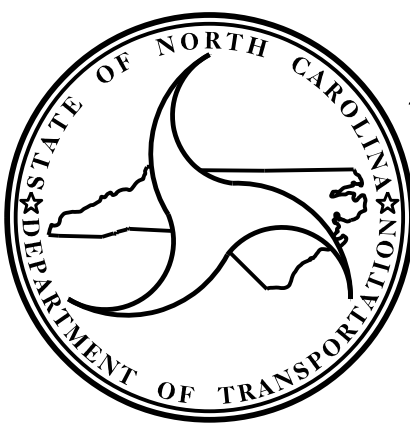
PRECAST PANELS
LEVELING PAD STEP DETAIL

PROJECT NO.: U-5765

MECKLENBURG COUNTY

STATION: SEE WALL ENVELOPES

SHEET 7 OF 8

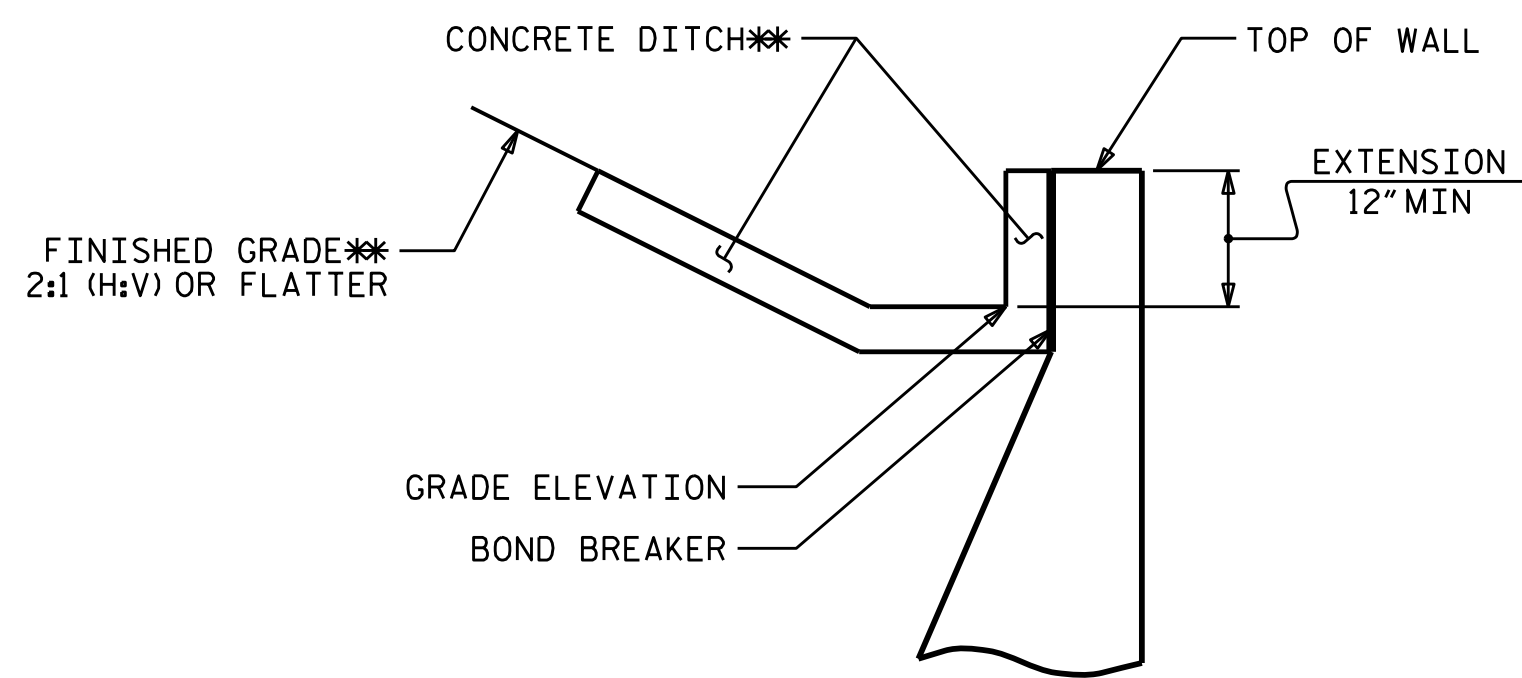


NORTH CAROLINA
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DIVISION OF HIGHWAYS

GEOTECHNICAL
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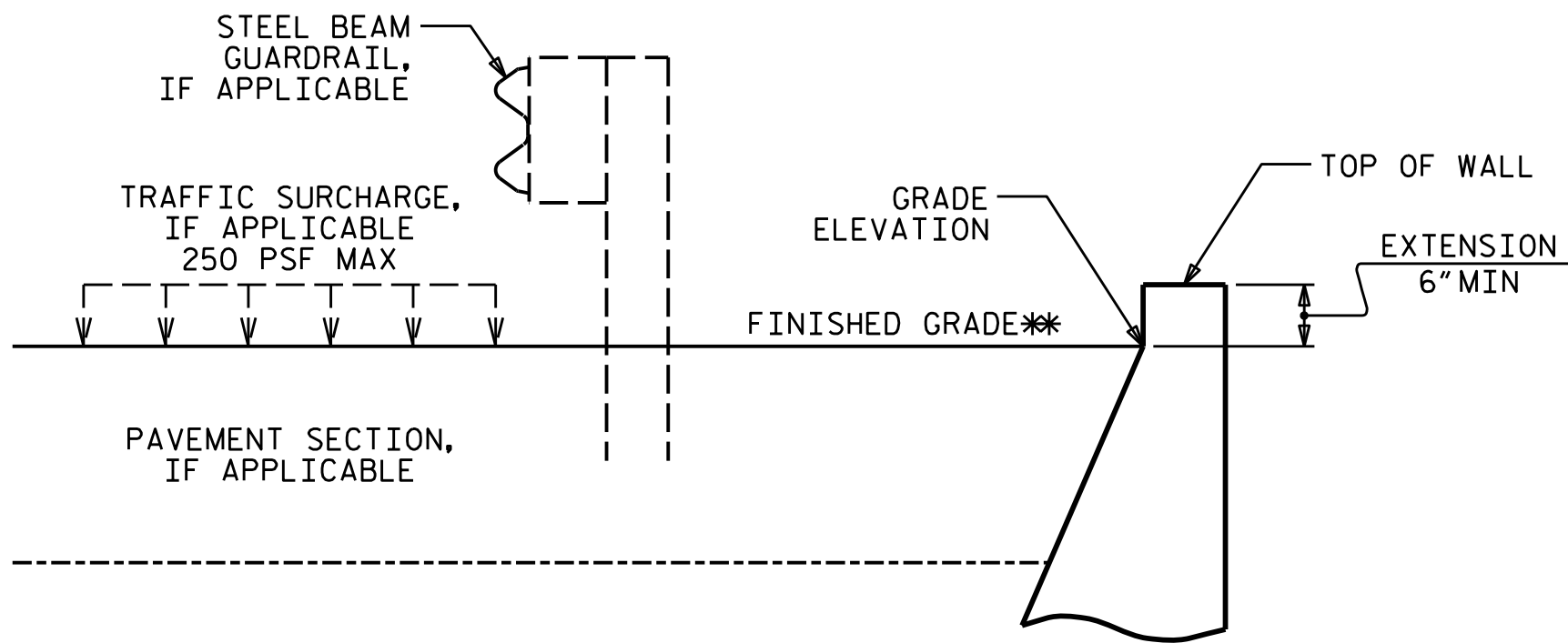
REVISIONS						SHEET NO. W-7
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

PREPARED BY: SY	DATE: 8/2025
REVIEWED BY: SCC	DATE: 8/2025



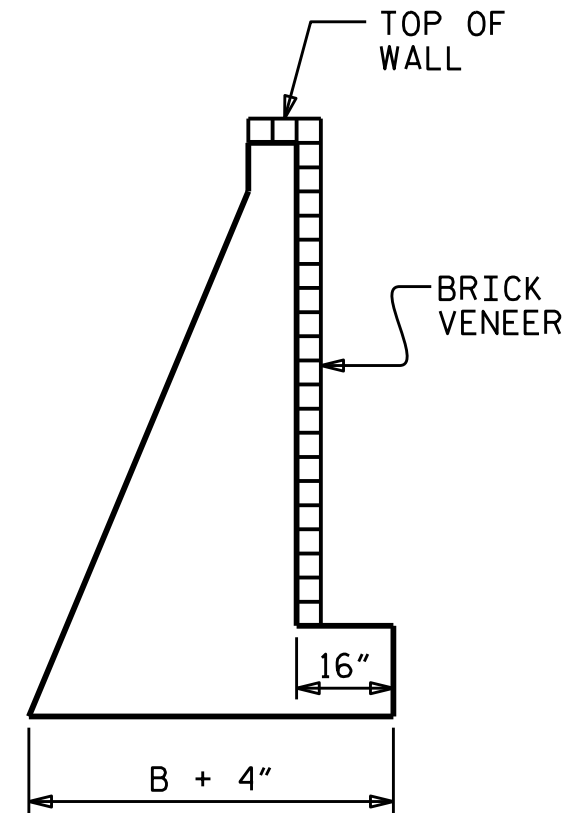
SLOPE CASE

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



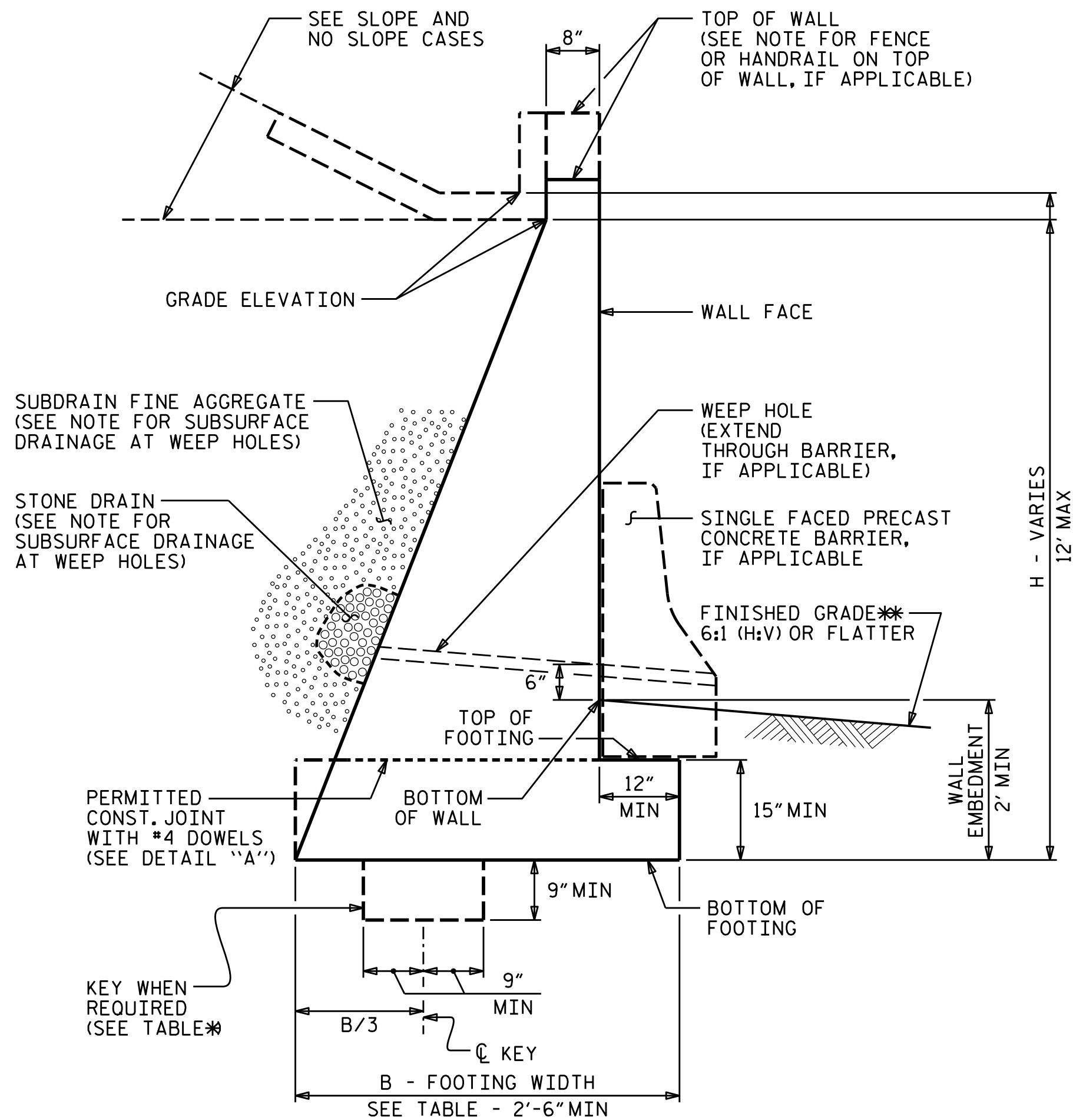
NO SLOPE CASE

**SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



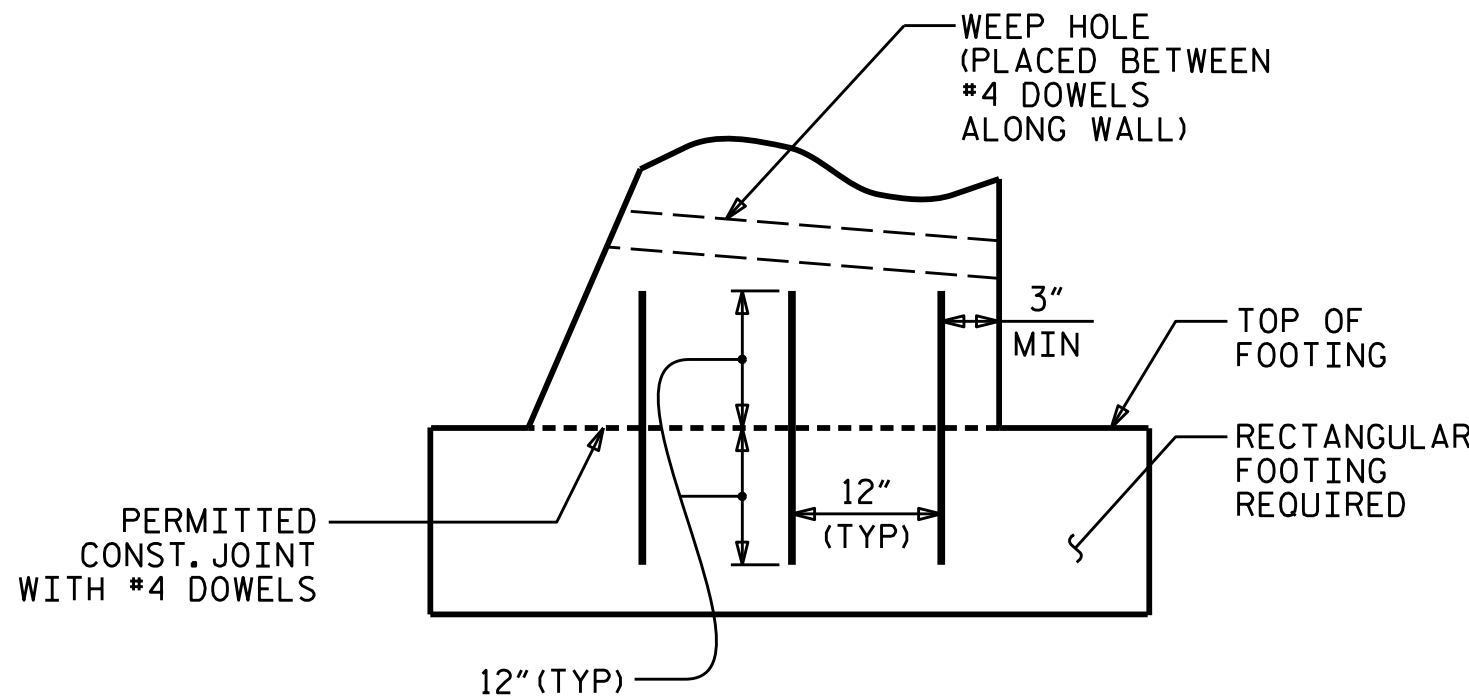
BRICK VENEER DETAIL

(WHEN APPLICABLE)



STANDARD CIP GRAVITY WALL

**SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



DETAIL "A"

H (FT)	3 - < 6	6 - 9	> 9 - 12
SLOPE CASE	.66	.70*	.75*
NO SLOPE CASE WITH TRAFFIC SURCHARGE	.80	.75*	.70*
NO SLOPE CASE WITHOUT TRAFFIC SURCHARGE	.60	.60	.60

B/H RATIO (B = 2'-6" MIN)

*KEY IS REQUIRED FOR "SLOPE CASE" OR "NO SLOPE CASE WITH TRAFFIC SURCHARGE" WHEN H IS 6' OR GREATER.

NOTES:

FOR STANDARD CIP GRAVITY RETAINING WALLS, SEE SECTION 453 OF THE STANDARD SPECIFICATIONS.

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

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

FOR FENCES OR HANDRAILS ON TOP OF WALLS, SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.

FOR SUBSURFACE DRAINAGE AT WEEP HOLES, SEE ARTICLE 414-8 OF THE STANDARD SPECIFICATIONS.

STANDARD CIP GRAVITY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF

DO NOT USE STANDARD CIP GRAVITY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE BOTTOM OF FOOTING.

DO NOT USE STANDARD CIP GRAVITY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW WALLS.

BEFORE BEGINNING STANDARD CIP GRAVITY WALL CONSTRUCTION, SURVEY WALL LOCATIONS AND SUBMIT WALL PROFILE VIEWS (WALL ENVELOPES) FOR REVIEW. FOR WALL ENVELOPES, INCLUDE BOTTOM OF WALL, EXISTING GROUND AND GRADE ELEVATIONS AND OTHER ELEVATIONS AS NEEDED AT INTERVALS OF 25' OR LESS ALONG WALLS. DO NOT START WALL CONSTRUCTION UNTIL WALL ENVELOPES ARE ACCEPTED.

DESIGN RETAINING WALL NO. 4 FOR A PIPE EXTENDING THROUGH THE WALL AS SHOWN. VERIFY PIPE LOCATION AND ELEVATION BEFORE BEGINNING WALL DESIGN OR CONSTRUCTION.

FOR BRICK VENEERS, SUBMIT BRICK SAMPLES FOR APPROVAL BEFORE BEGINNING STANDARD CIP GRAVITY WALL CONSTRUCTION.

DO NOT PLACE CONCRETE FOR FOOTINGS UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

WHEN CONSTRUCTING STANDARD CIP GRAVITY WALLS WITH A CONSTRUCTION JOINT AS SHOWN IN DETAIL "A", PROVIDE A MINIMUM OF 3 EQUALLY SPACED #4 DOWELS AT INTERVALS OF 1'-6" ALONG WALLS.

PROJECT NO.: U-5765

MECKLENBURG COUNTY

STATION: RW4: 11+30.00 TO 13+35.00 -Y50-

SHEET 8 OF 8

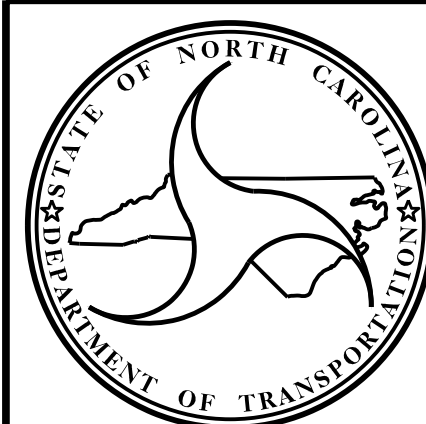
WALL ID RW-4

STANDARD DETAIL NO. 453.01

STANDARD
CIP GRAVITY
RETAINING WALL

DATE: 10-19-21

SHEET
NO.
W-8



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