

STANDARD SEGMENTAL GRAVITY WALL QUANTITIES		
RETAINING WALL NO. 1	-WALL1-	* 492 SQUARE FEET

* WALL AREA IS MEASURED USING THE DESIGN HEIGHT "H"

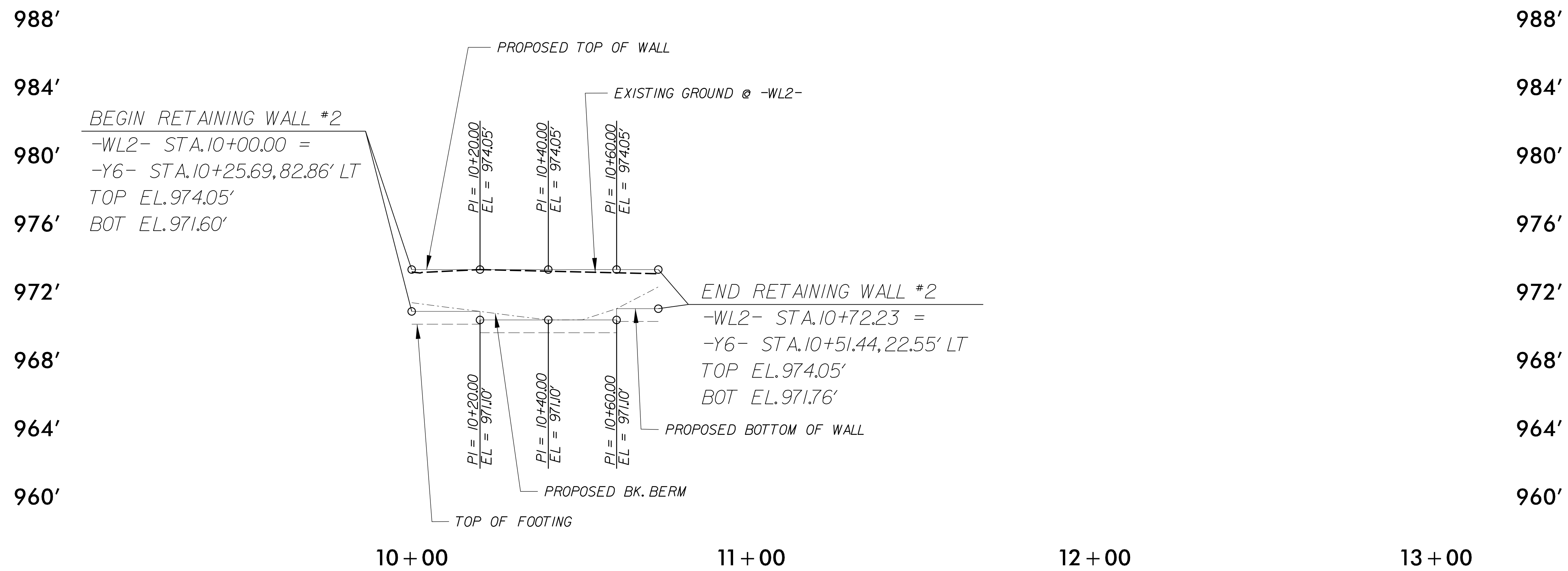
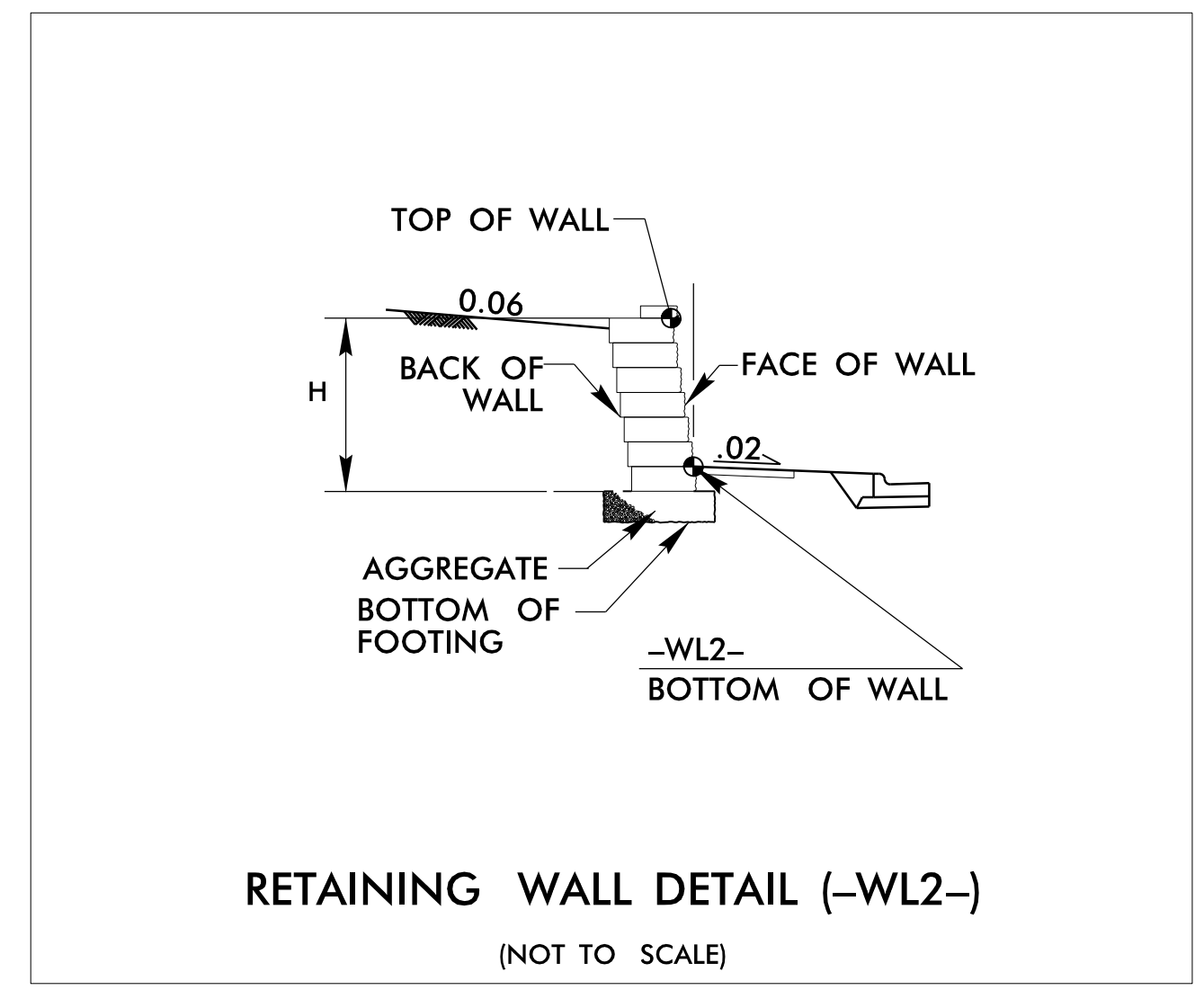
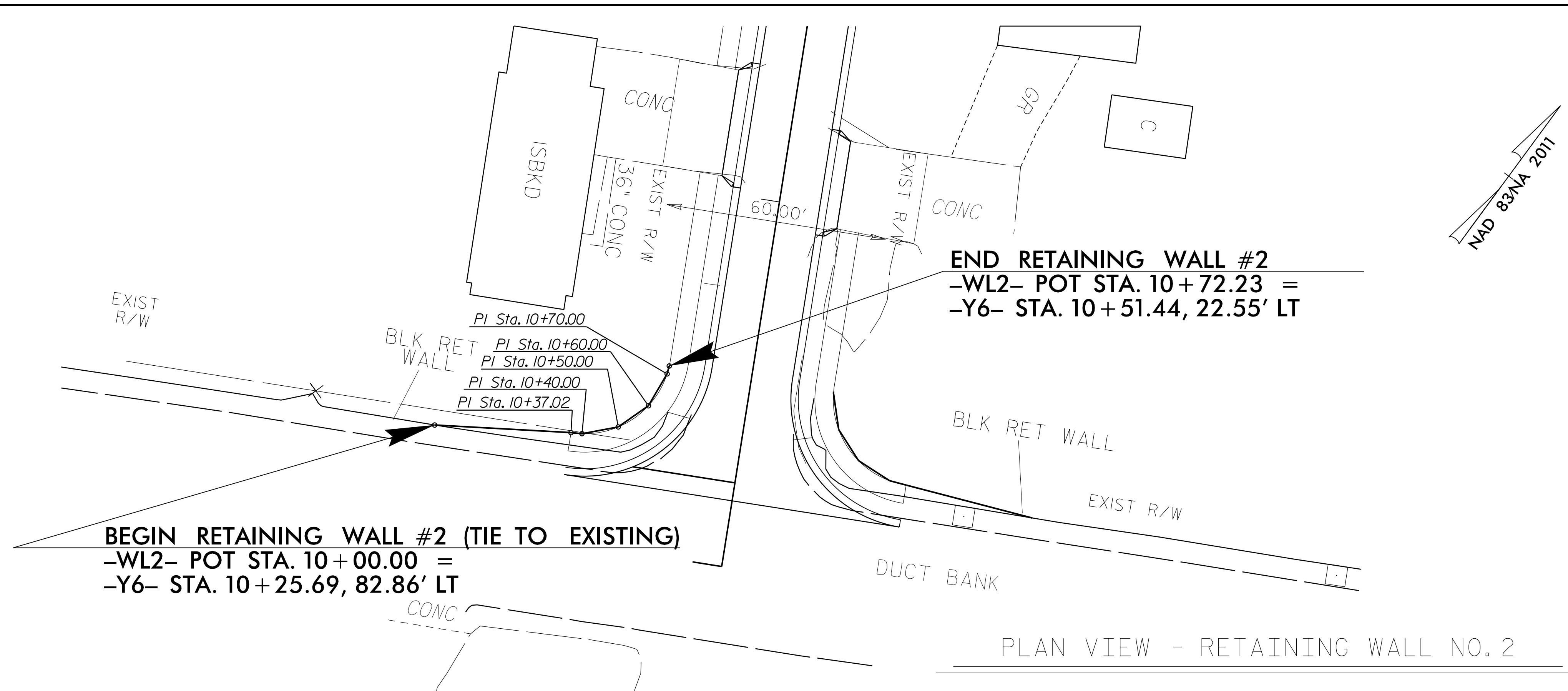
GEOTECHNICAL ENGINEER

ENGINEER

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SIGNATURE DATE SIGNATURE DATE

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STANDARD SEGMENTAL GRAVITY WALL QUANTITIES		
RETAINING WALL NO. 2	-WALL2-	* 249 SQUARE FEET

* WALL AREA IS MEASURED USING THE DESIGN HEIGHT "H"

PROJECT NO.: U-5536
 FORSYTH COUNTY
 STATION: RW2: 10+25.69 -Y6- TO 10+51.44 -Y6-
 SHEET 2 OF 10

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1	SY	11/2024	3		
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RETAINING WALL NO. 2
 STANDARD SEGMENTAL GRAVITY WALL
 PLAN VIEW AND WALL ENVELOPE

PREPARED BY: SY	DATE: 10/2024
REVIEWED BY: SCC	DATE: 10/2024

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

GEOTECHNICAL ENGINEER

ENGINEER

SEAL 031361

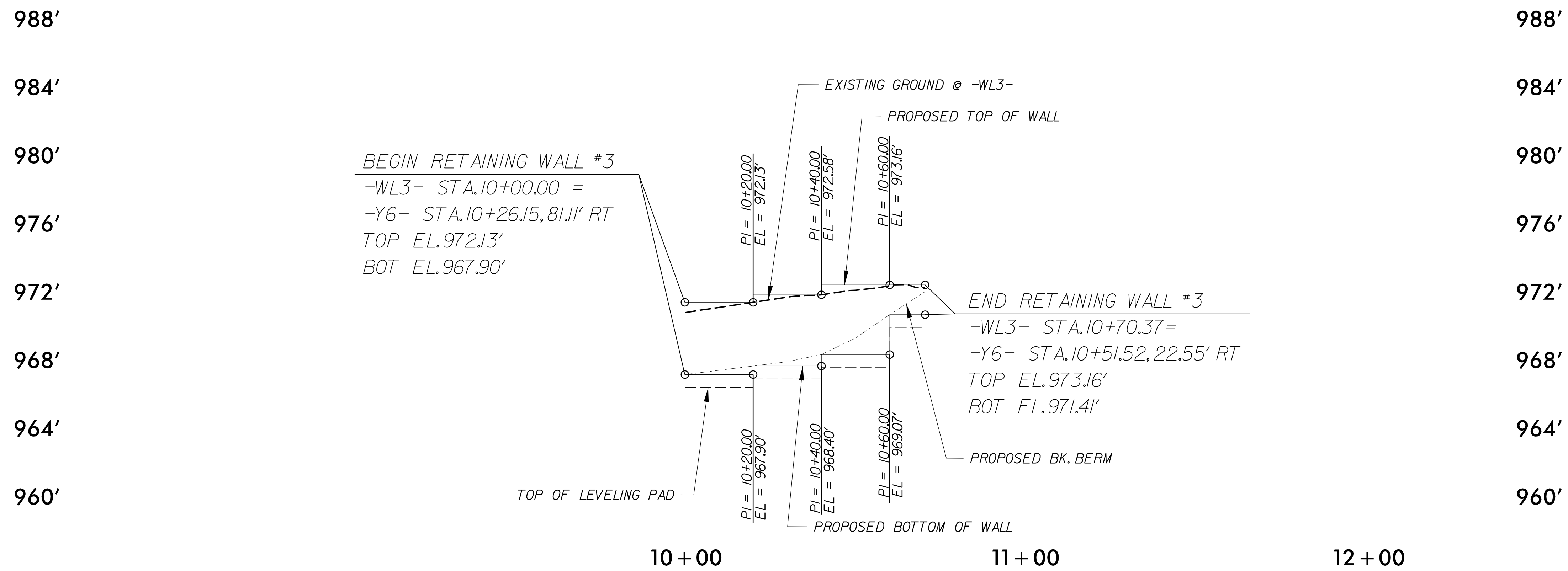
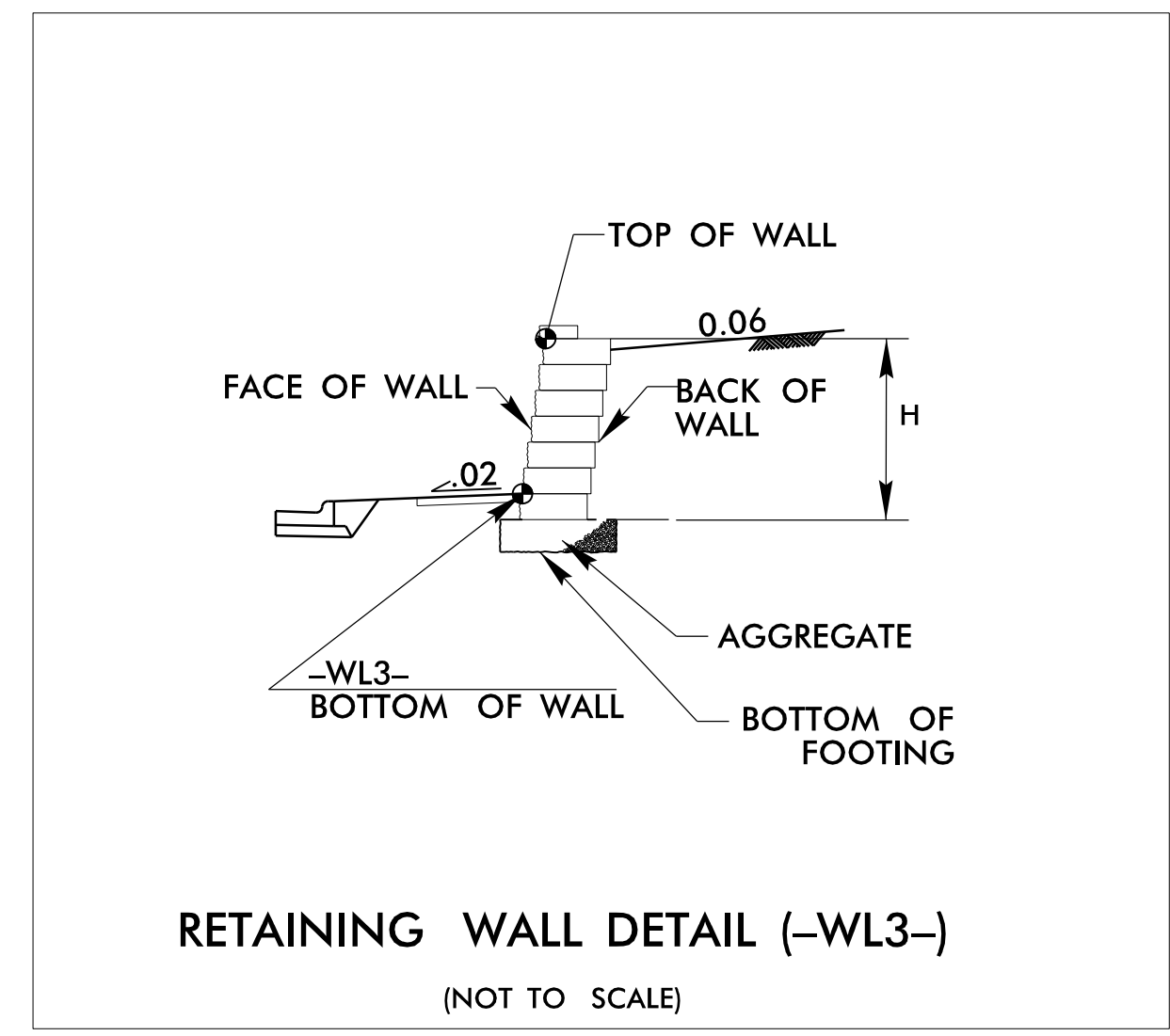
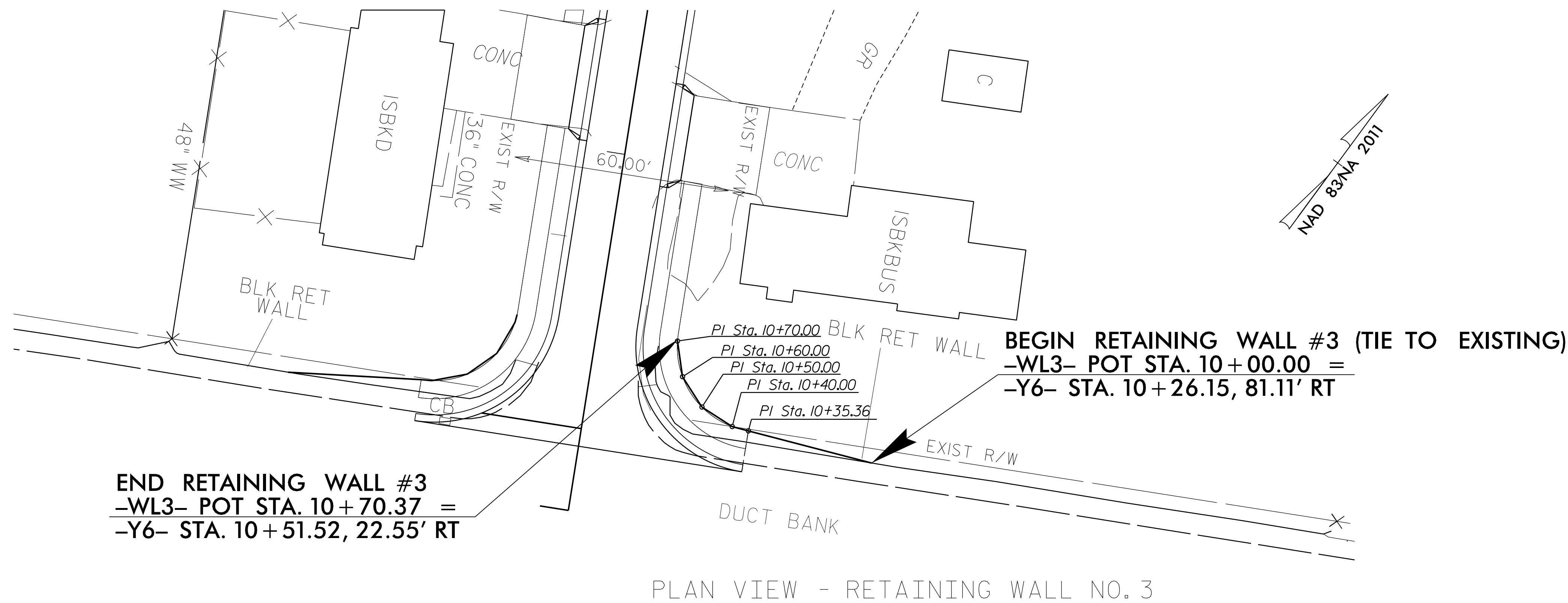
SHIPING YANG

11/15/2024

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MSE RETAINING WALL QUANTITIES

RETAINING WALL NO. 3	-WALL3-	* 321 SQUARE FEET
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* WALL AREA IS MEASURED USING THE DESIGN HEIGHT "H"

PROJECT NO.: U-5536
FORSYTH COUNTY
STATION: RW3: 10+26.15 -Y6- TO 10+51.52 -Y6-
SHEET 3 OF 10

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

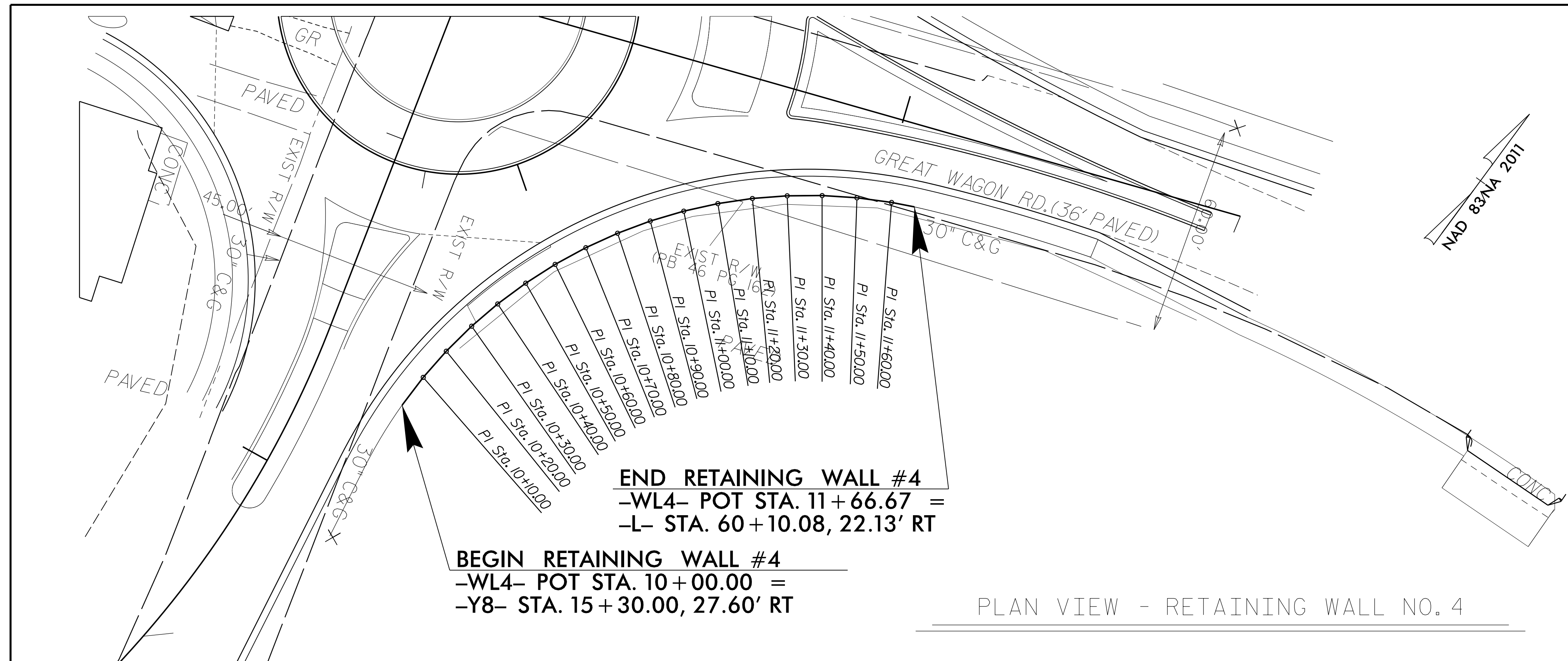
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RETAINING WALL NO. 3 STANDARD SEGMENTAL GRAVITY WALL PLAN VIEW AND WALL ENVELOPE

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1	SY	11/2024	3		
2			4		

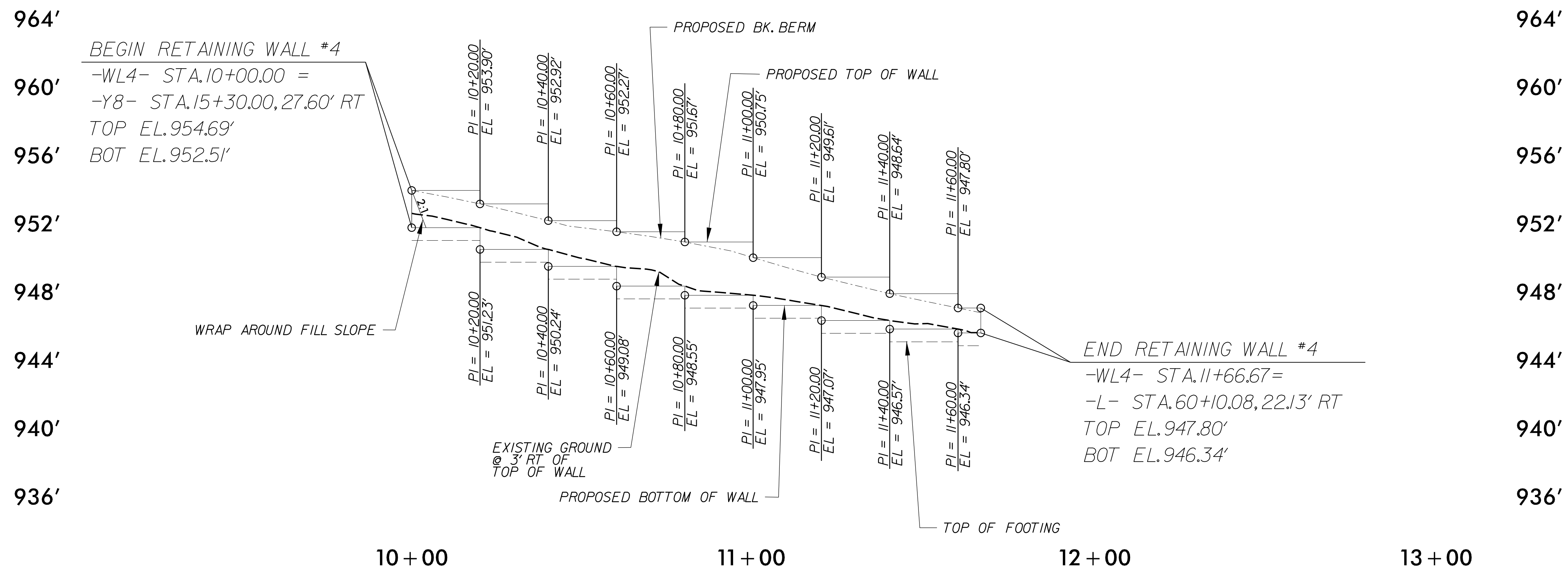
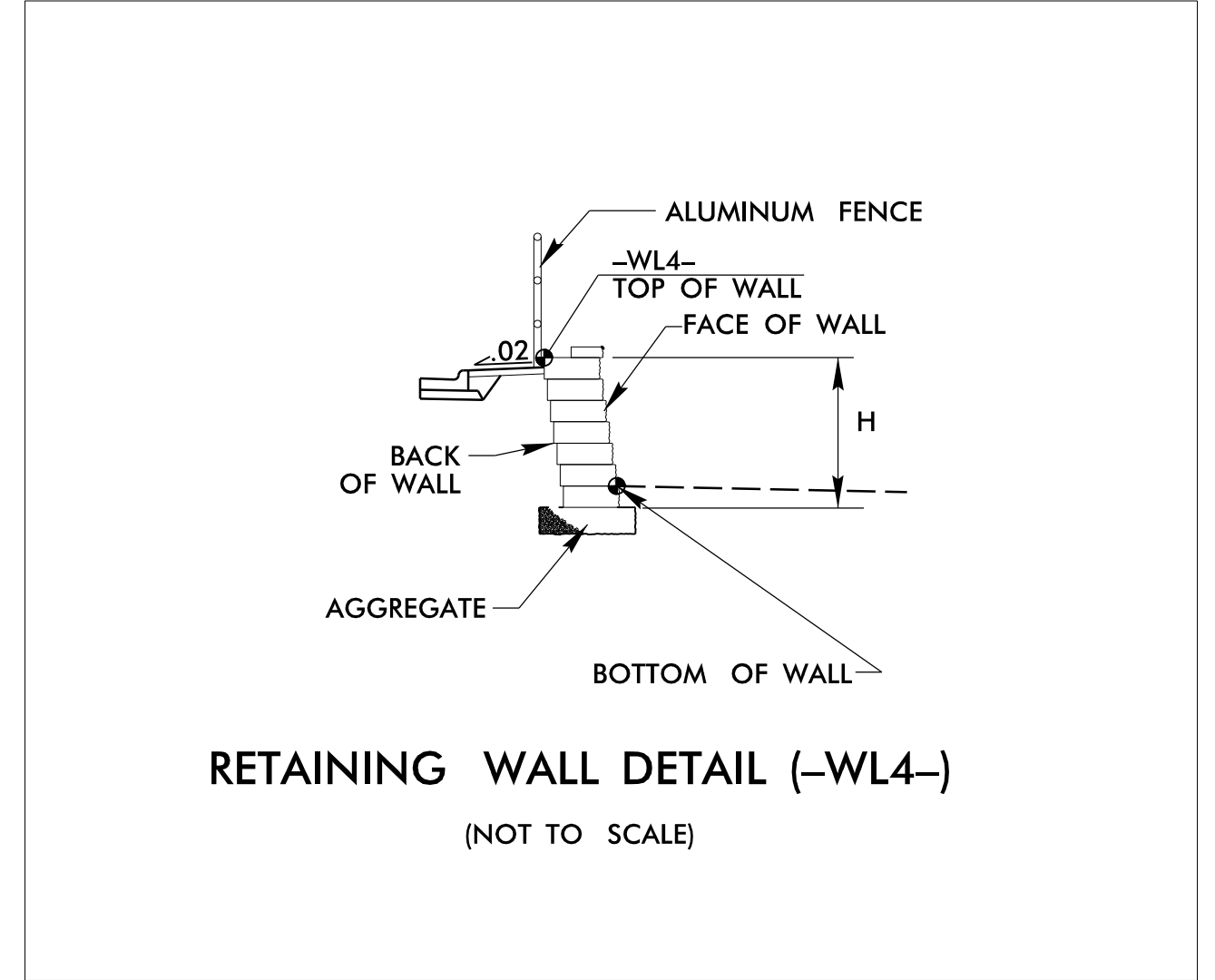
SHEET NO. W-3

PREPARED BY: SY	DATE: 10/2024
REVIEWED BY: SCC	DATE: 10/2024



END RETAINING WALL #4
 -WL4- POT STA. 11+66.67 =
 -L- STA. 60+10.08, 22.13' RT
BEGIN RETAINING WALL #4
 -WL4- POT STA. 10+00.00 =
 -Y8- STA. 15+30.00, 27.60' RT

PLAN VIEW - RETAINING WALL NO. 4



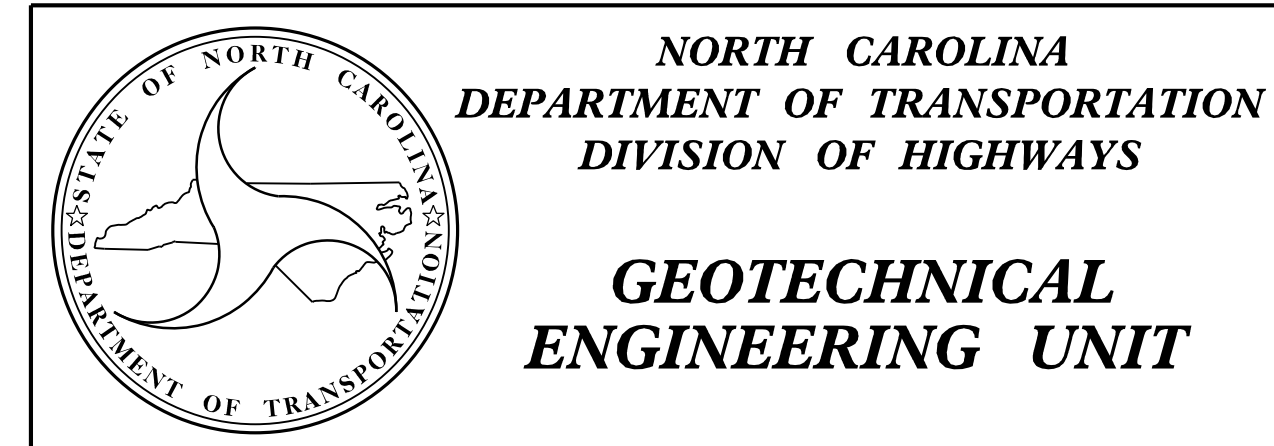
WALL ENVELOPE - RETAINING WALL NO. 4

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

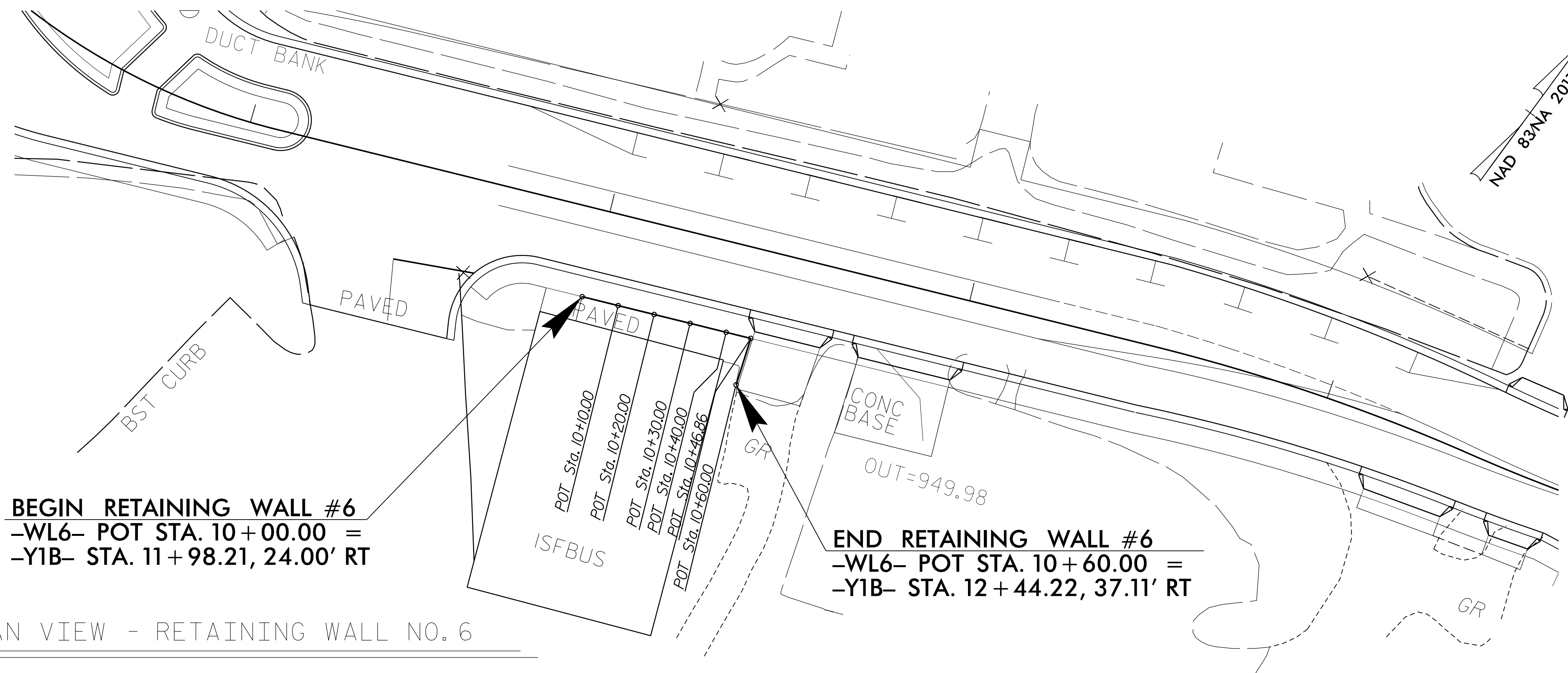
STANDARD SEGMENTAL GRAVITY WALL QUANTITIES		
RETAINING WALL NO. 4	-WALL4-	* 560 SQUARE FEET

* WALL AREA IS MEASURED USING THE DESIGN HEIGHT "H"

PROJECT NO.: U-5536
 FORSYTH COUNTY
 STATION: RW4: 15+30.00 -Y8- TO 60+10.08 -L-
 SHEET 4 OF 10



REVISIONS					
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2			4		



PLAN VIEW - RETAINING WALL NO. 6

GEOTECHNICAL ENGINEER

ENGINEER

SEAL 031361

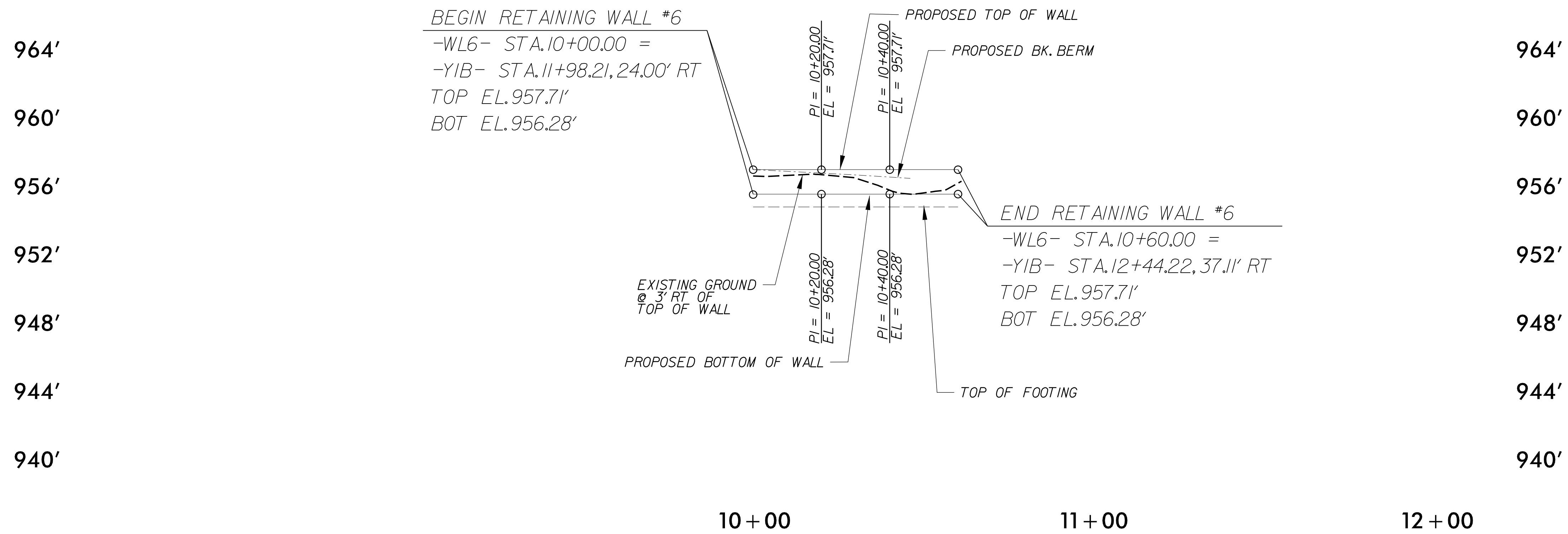
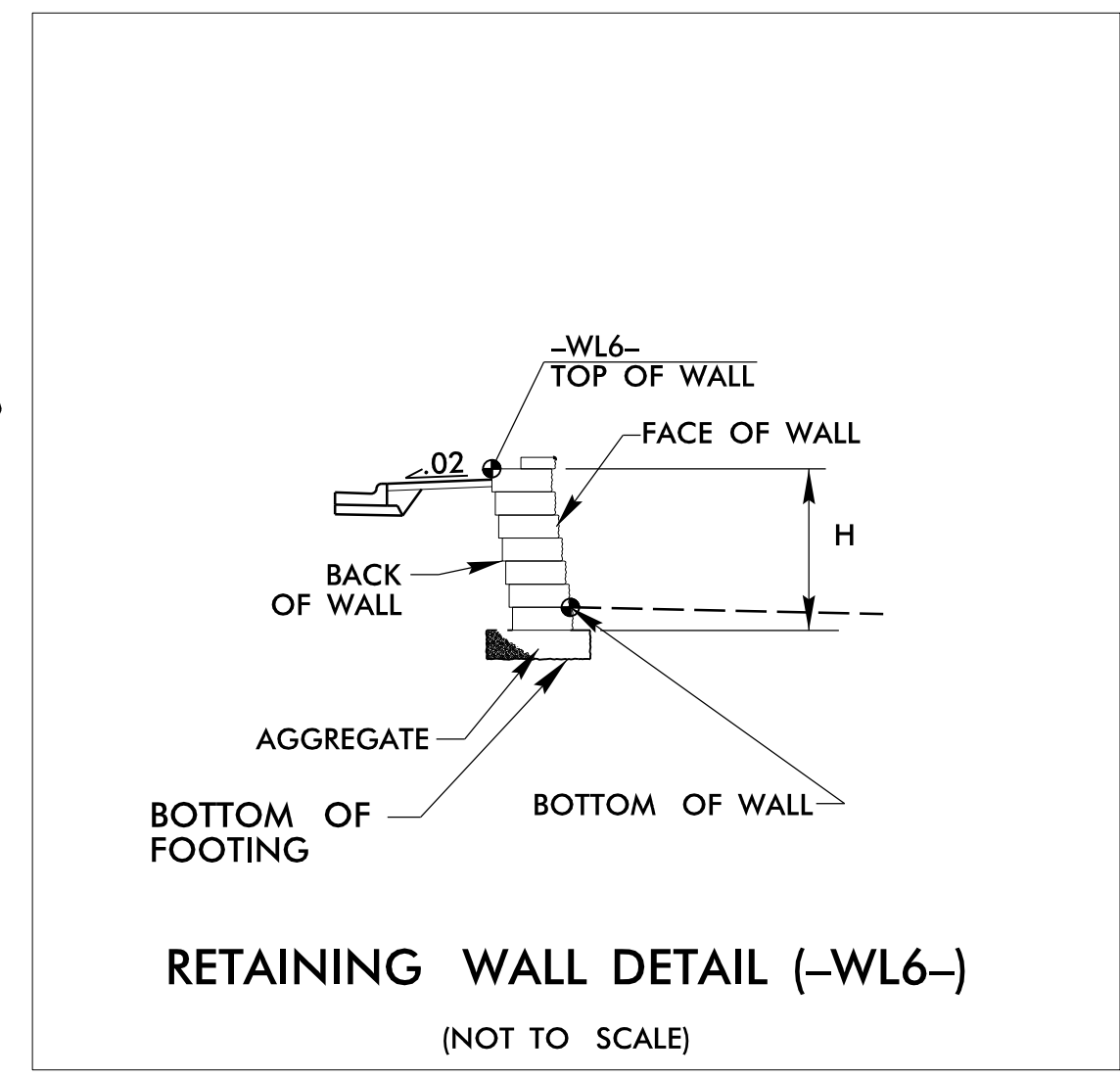
SHIPPING YANG

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WALL ENVELOPE - RETAINING WALL NO. 6

NOTE: 1) OFFSET DIMENSIONS ARE FROM FACE OF WALL
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STANDARD SEGMENTAL GRAVITY WALL QUANTITIES

RETAINING WALL NO. 6	-WALL6-	* 131 SQUARE FEET
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* WALL AREA IS MEASURED USING THE DESIGN HEIGHT "H"

PROJECT NO.: U-5536

FORSYTH COUNTY

STATION: RW6: 11+98.21 -Y1B- TO 12+44.22 -Y1B-

SHEET 5 OF 10

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT


RETAINING WALL NO. 6 STANDARD SEGMENTAL GRAVITY WALL PLAN VIEW AND WALL ENVELOPE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	SY	11/2024	3			W-5
2			4			

PREPARED BY: SY	DATE: 10/2024
REVIEWED BY: SCC	DATE: 10/2024

GEOTECHNICAL ENGINEER

ENGINEER

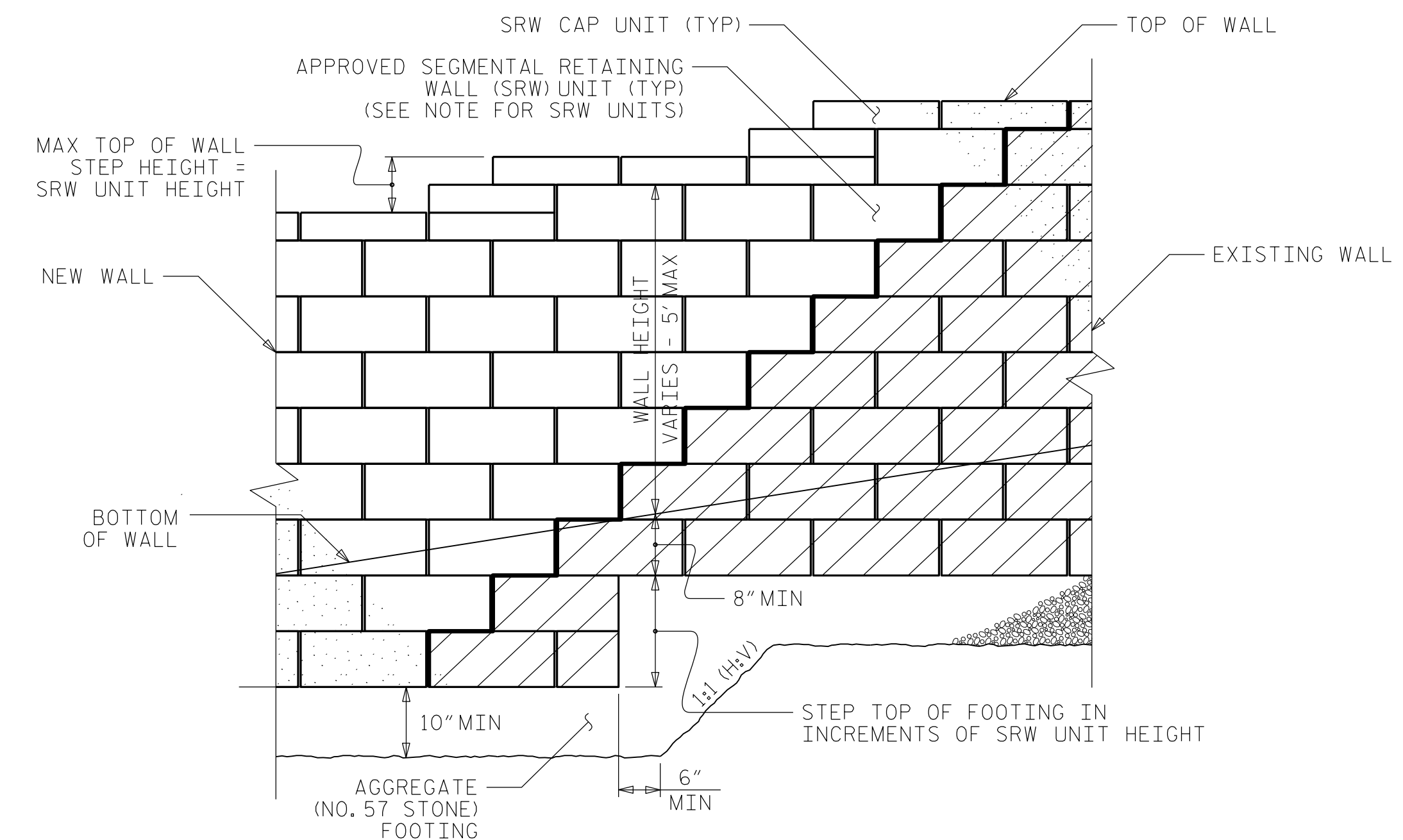


Shiping Yang
11/15/2024

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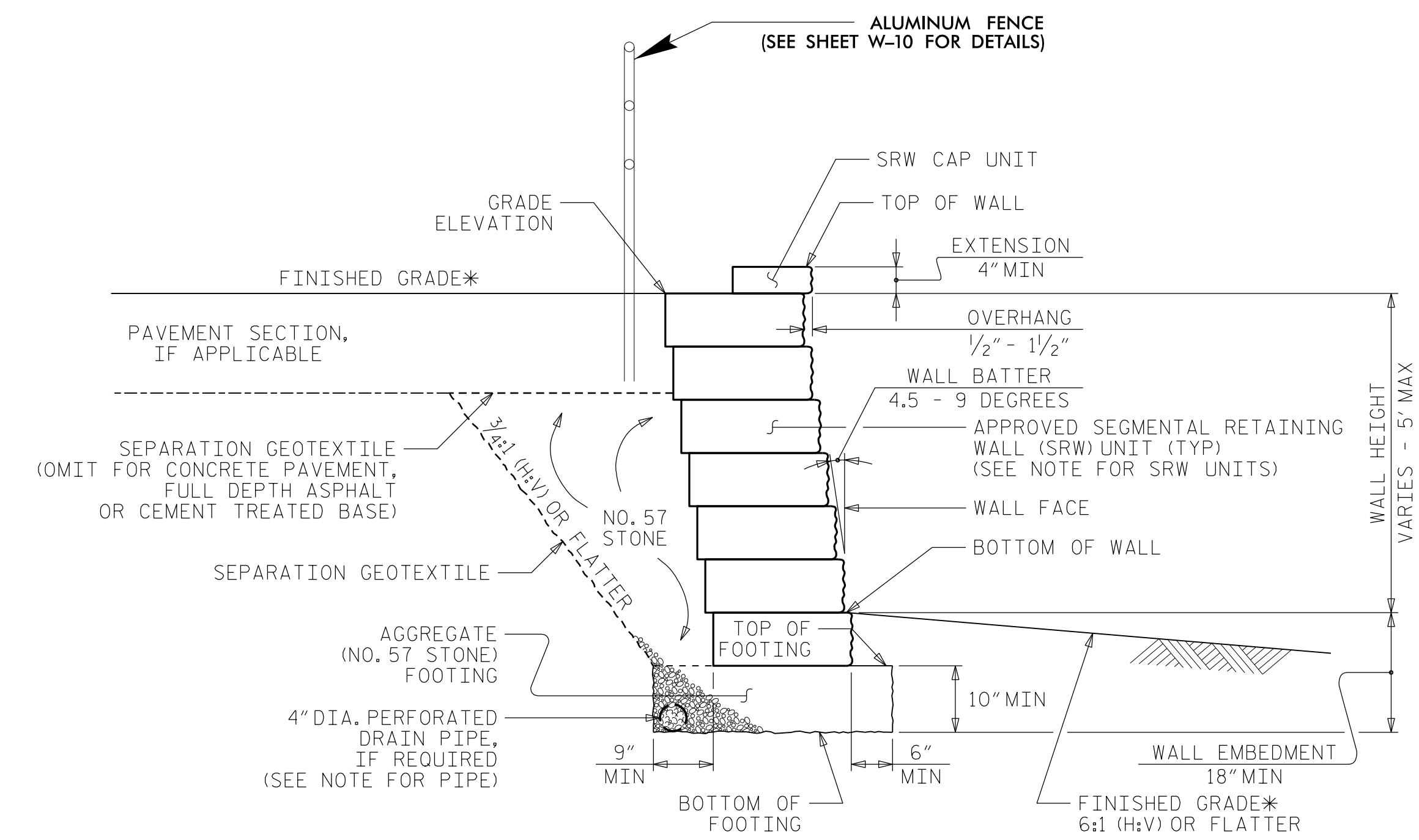
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STANDARD SEGMENTAL GRAVITY WALL - CONNECTION DETAIL

NOTES:

- FOR STANDARD SEGMENTAL GRAVITY RETAINING WALLS, SEE SECTION 454 OF THE STANDARD SPECIFICATIONS.
- A DECORATIVE ALUMINUM FENCE IS REQUIRED ON TOP OF RETAINING WALL NO. 4. SEE ROADWAY PLANS FOR FENCE ATTACHMENT DETAILS.
- DO NOT USE STANDARD SEGMENTAL GRAVITY WALLS FOR INTERSTATE HIGHWAY OR RAILROAD PROJECTS.
- DO NOT USE STANDARD SEGMENTAL GRAVITY WALLS WHEN SURCHARGE LOADS WILL BE WITHIN 5'-6" OF THE BACK OF SRW CAP UNITS FOR WALL HEIGHTS UP TO 4' AND WITHIN 10' OF THE BACK OF SRW CAP UNITS FOR WALL HEIGHTS GREATER THAN 4' TO 5'.
- DO NOT USE STANDARD SEGMENTAL GRAVITY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK
- DECONSTRUCT PART OF THE EXISTING BLOCK WALLS AS SHOWN ON PLANS FOR RETAINING WALL NOS. 1&2. RECONSTRUCT THE NEW WALLS WITH THE EXISTING BLOCKS OR BLOCKS THAT MATCH THE EXISTING BLOCKS.
- SEGMENTAL RETAINING WALL (SRW) UNITS ARE APPROVED FOR EITHER 2' OR 5' MAXIMUM WALL HEIGHTS. FOR DETAILS AND DIMENSIONS OF APPROVED SRW UNITS AND MAXIMUM WALL HEIGHTS, SEE connect.ncdot.gov/resources/Geological/Pages/Products.aspx
- DO NOT MIX APPROVED SRW UNITS FROM DIFFERENT VENDORS ON THE SAME STANDARD SEGMENTAL GRAVITY WALL. USE THE SAME SIZE APPROVED SRW UNITS FOR EACH WALL SECTION.
- BEFORE BEGINNING STANDARD SEGMENTAL 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.
- A DRAIN PIPE IS REQUIRED IF GROUNDWATER IS ABOVE BOTTOM OF FOOTINGS.
- DO NOT PLACE NO. 57 STONE FOR FOOTINGS UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
- WHERE REQUIRED, REMOVE EXISTING WALL UNITS AS SHOWN IN CONNECTION DETAIL AND CONSTRUCT NEW WALL AS SHOWN IN PLANS OR DIRECTED BY THE GEOTECHNICAL OPERATIONS ENGINEER.

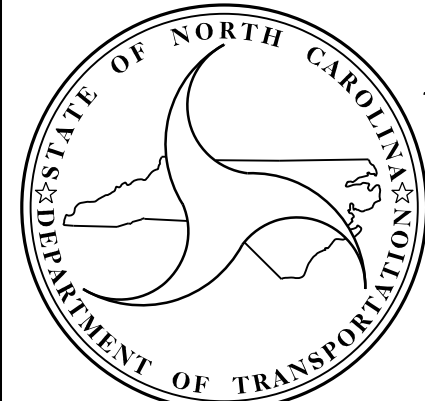


STANDARD SEGMENTAL GRAVITY WALL WITHOUT SLOPE

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PROJECT NO.: U-5536
 FORSYTH COUNTY
 STATION: SEE WALL ENVELOPES
 SHEET 6 OF 10

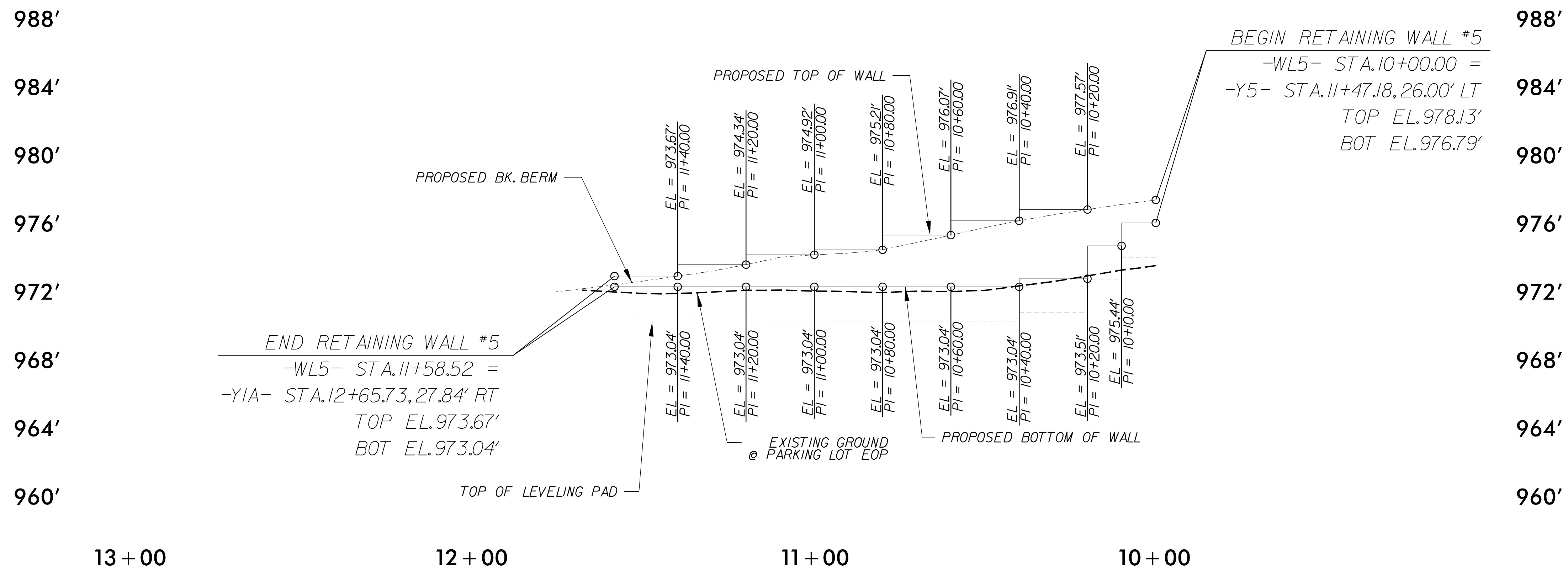
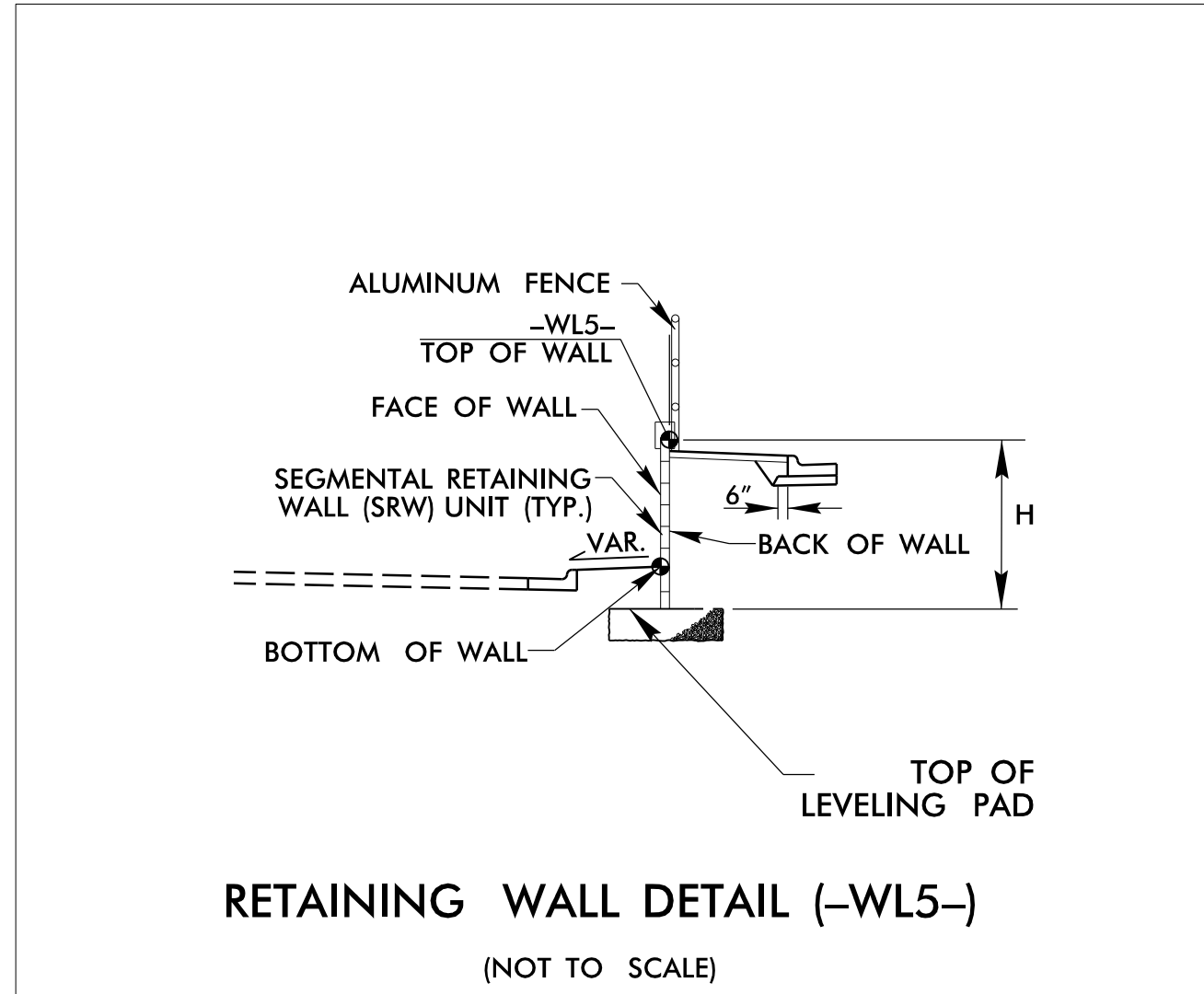
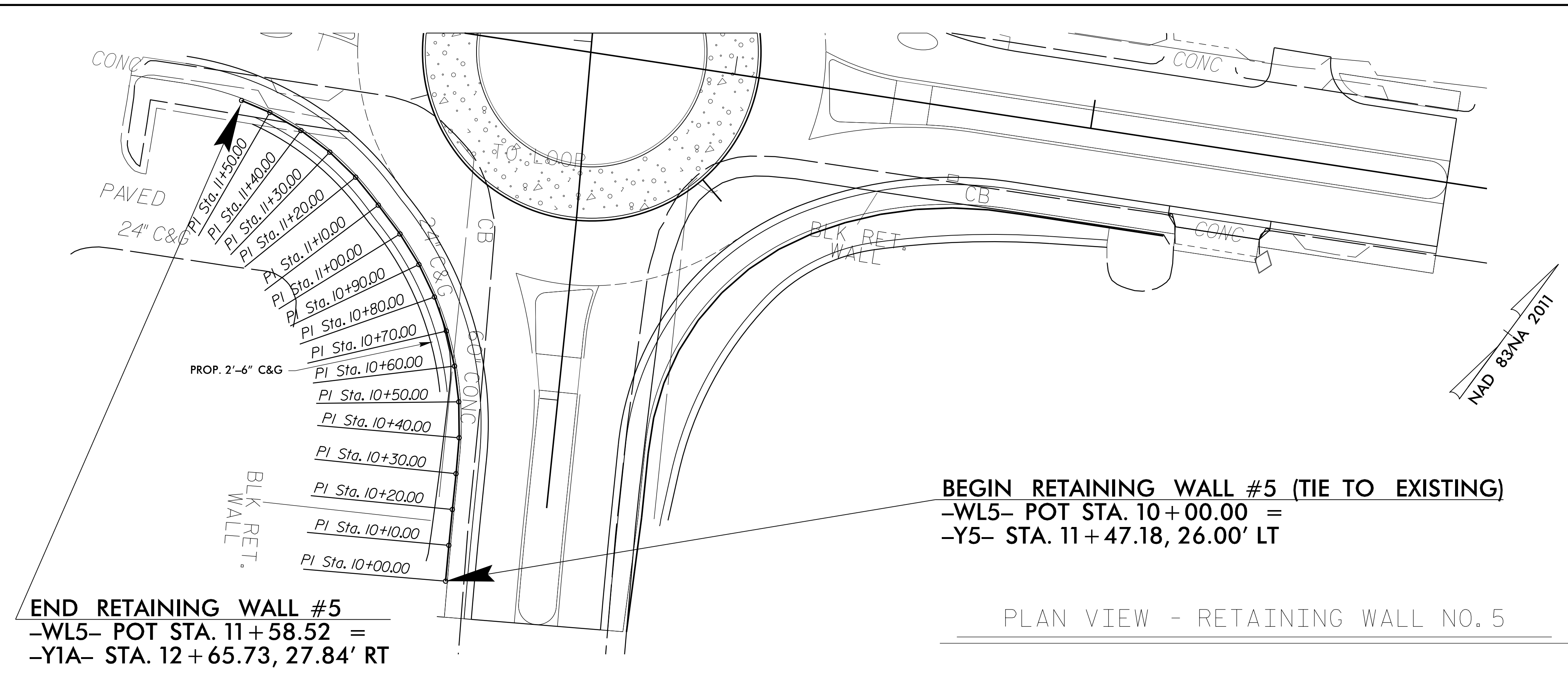
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REVIEWED BY: SCC	DATE: 10/2024



**NORTH CAROLINA
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DIVISION OF HIGHWAYS**

**GEOTECHNICAL
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REVISIONS						SHEET NO. W-6
NO.	BY	DATE	NO.	BY	DATE	
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2			4			

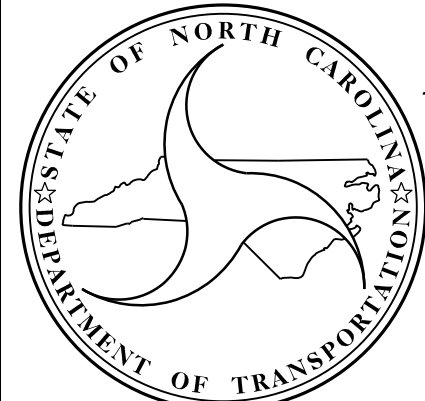


MSE RETAINING WALL QUANTITIES		
RETAINING WALL NO. 5	-WALL5-	* 695 SQUARE FEET

* WALL AREA IS MEASURED USING THE DESIGN HEIGHT "H"


PROJECT NO.: U-5536
 FORSYTH COUNTY
 STATION: RW5: 11+47.18 -Y5- TO
 SHEET 7 OF 10 12+65.73 -Y1A-

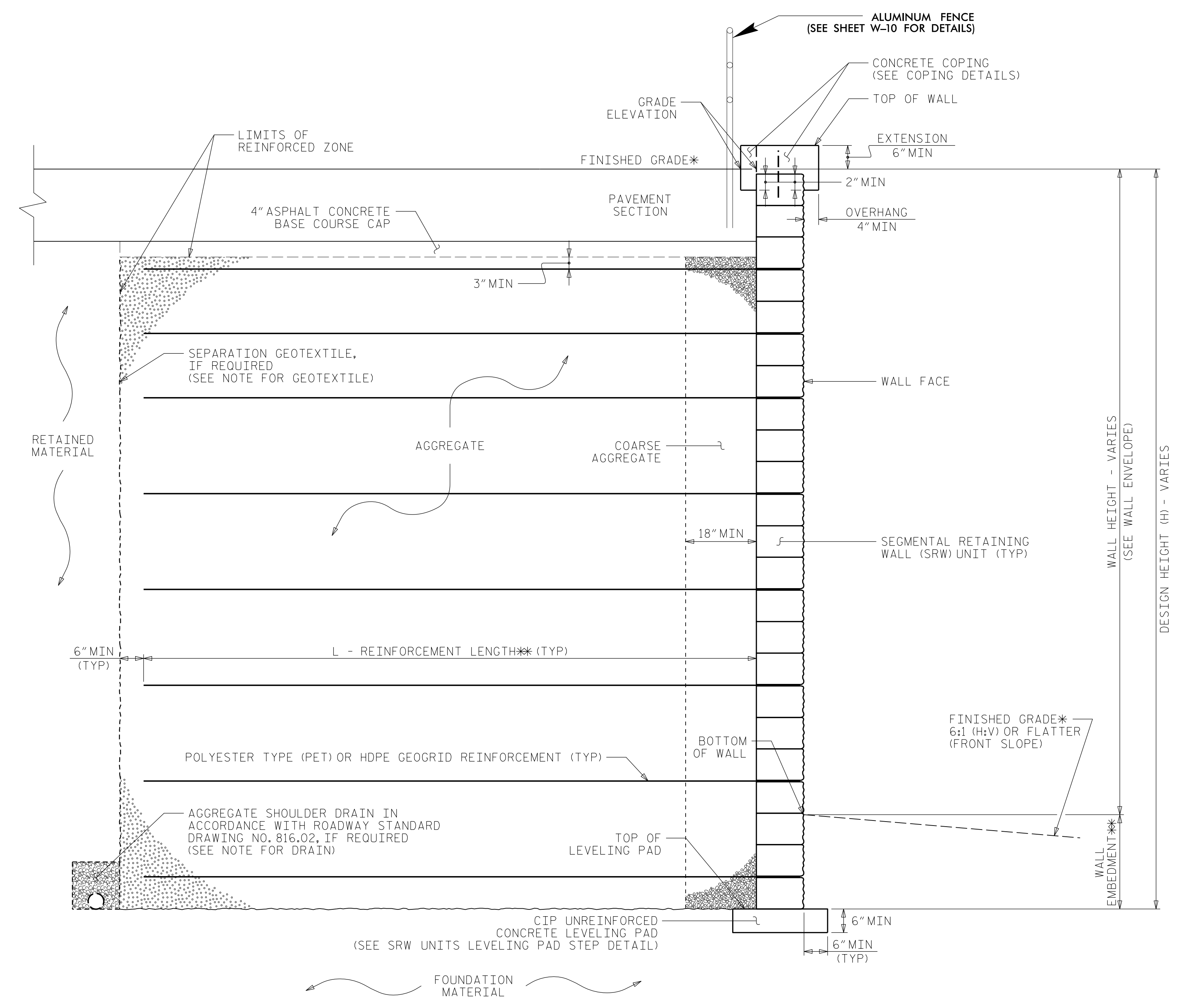
NOTE: 1) OFFSET DIMENSIONS ARE FROM FACE OF WALL
 2) THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF THE WALL



NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

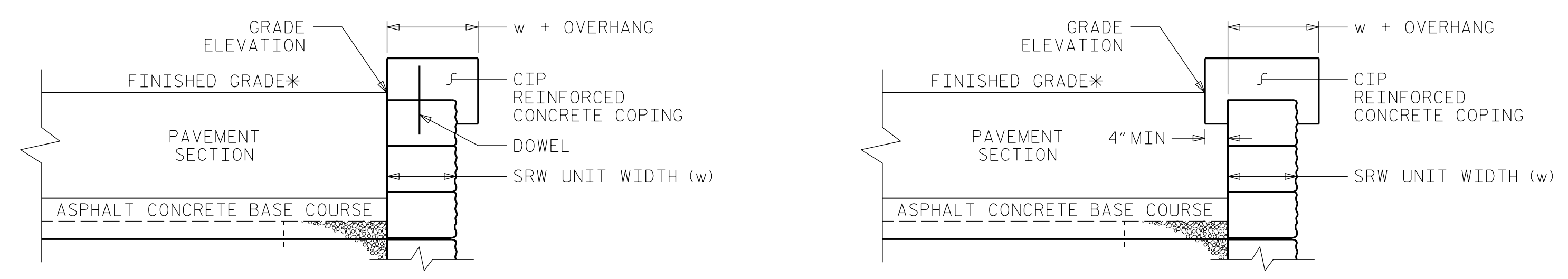
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NO.	BY	DATE	NO.	BY	DATE	
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2			4			

GEOTECHNICAL ENGINEER
 ENGINEER

 Shiping Yang
 11/15/2024
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MSE WALL WITH SRW UNITS - TYPICAL SECTION

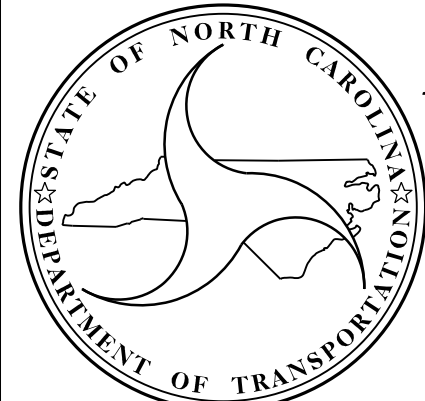
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
 **SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR WALL EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



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.

PREPARED BY: SY	DATE: 10/2024
REVIEWED BY: SCC	DATE: 10/2024


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL
ENGINEERING UNIT

PROJECT NO.: U-5536
 FORSYTH COUNTY
 STATION: SEE WALL ENVELOPES
 SHEET 8 OF 10

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	SY	11/2024	3			W-8
2			4			

GEOTECHNICAL ENGINEER

ENGINEER

Shiping Yang 11/15/2024

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NOTES:

- FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.
- A DECORATIVE ALUMINUM FENCE IS REQUIRED ON TOP OF RETAINING WALL NO. 5. SEE ROADWAY PLANS FOR FENCE ATTACHMENT DETAILS.
- USE AN MSE WALL SYSTEM WITH SEGMENTAL RETAINING WALL UNITS (SRW) UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALL NO. 5.
- WHEN USING AN MSE WALL SYSTEM WITH SRW UNITS FOR RETAINING WALL NO. 5, FREEZE-THAW DURABLE SRW UNITS THAT MEET ARTICLE 1040-4 OF THE STANDARD SPECIFICATIONS ARE REQUIRED.
- DECONSTRUCT PART OF THE EXISTING BLOCK WALLS AS SHOWN ON PLANS FOR RETAINING WALL NO. 5. RECONSTRUCT THE NEW WALLS WITH THE EXISTING BLOCKS OR BLOCKS THAT MATCH THE EXISTING BLOCKS.
- AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALL NO. 5.
- 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) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
 - 2) DESIGN LIFE = 75 YEARS
 - 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 2000 PSF
 - 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8H OR 4 FT, WHICHEVER IS LONGER
 - 5) MINIMUM EMBEDMENT DEPTH = 2 FT
 - 6) REINFORCED ZONE AGGREGATE PARAMETERS:

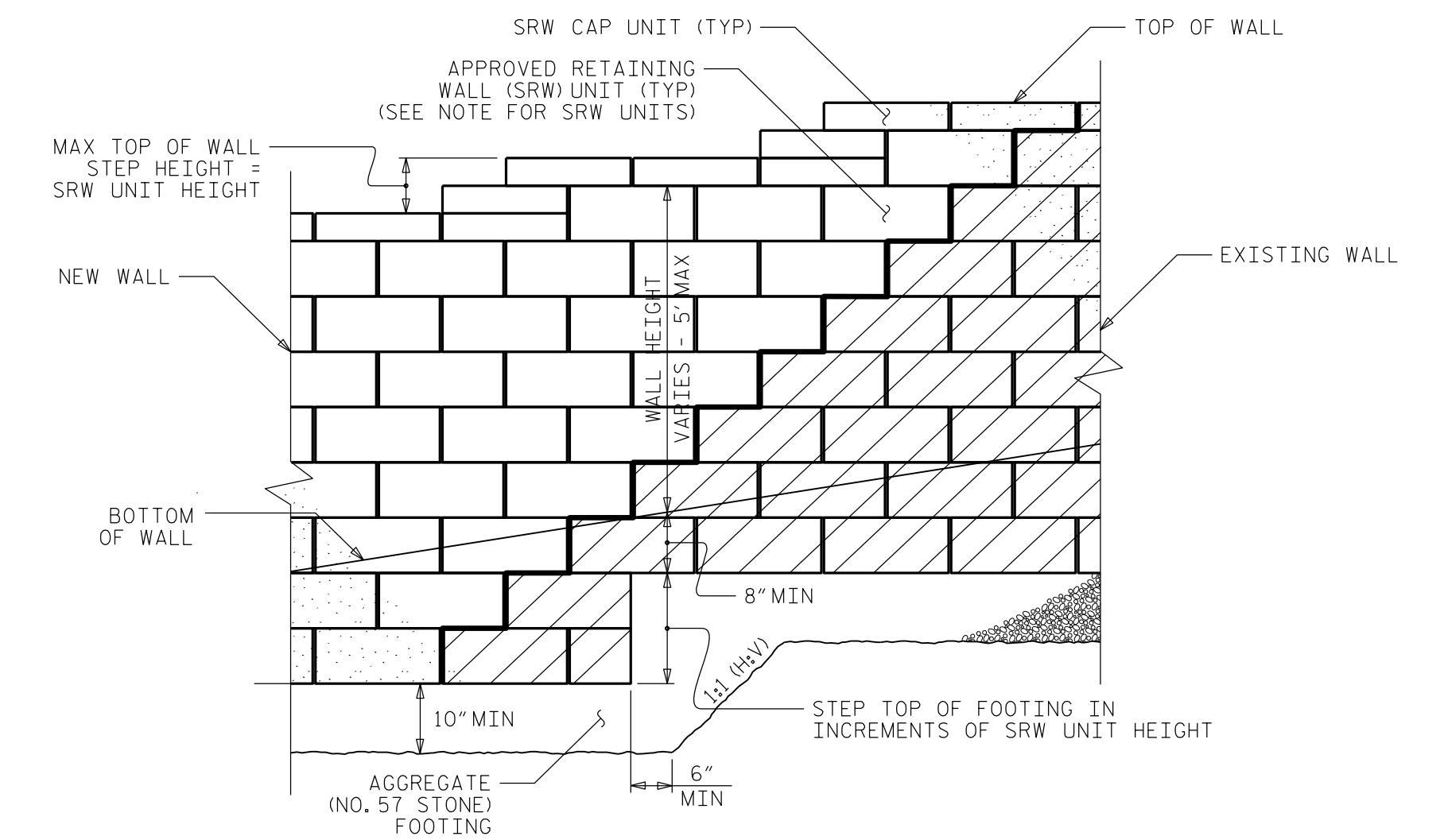
AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
COARSE	110	38	0
FINE	115	34	0

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

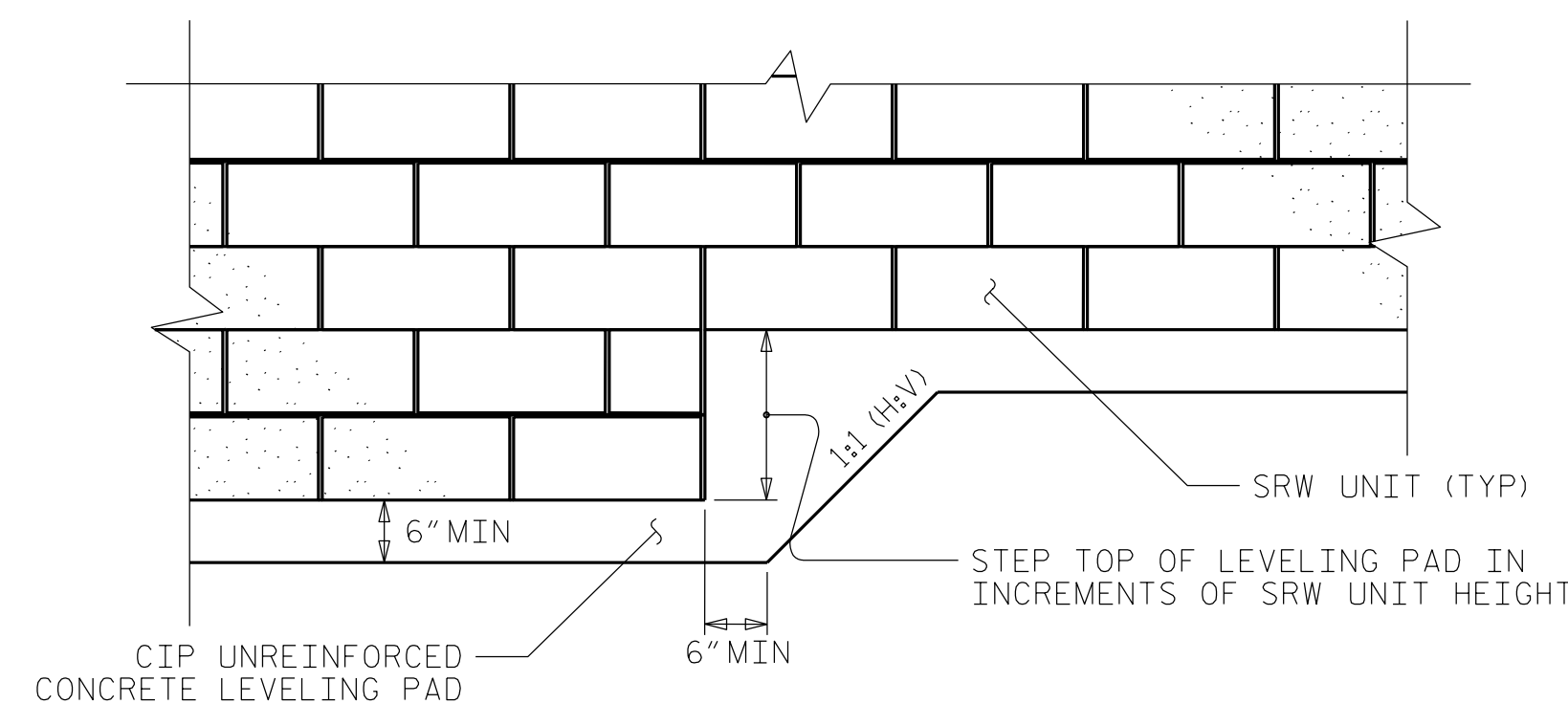
7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (c) PSF
RETAINED	120	0	500
FOUNDATION	120	0	500

- DESIGN RETAINING WALL NO. 5 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. 5.
- DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO. 5 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
- "TEMPORARY SHORING" MAY BE REQUIRED FOR RETAINING WALL NO. 5 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE ROADWAY PLANS.
- WHERE REQUIRED, REMOVE EXISTING WALL UNITS AS SHOWN IN CONNECTION DETAIL AND CONSTRUCT NEW WALL AS SHOWN IN PLANS OR DIRECTED BY THE GEOTECHNICAL OPERATIONS ENGINEER.



WALL - CONNECTION DETAIL



SRW UNITS LEVELING PAD STEP DETAIL

PROJECT NO.: U-5536

FORSYTH COUNTY

STATION: SEE WALL ENVELOPES

SHEET 9 OF 10

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

**GEOTECHNICAL
ENGINEERING UNIT**

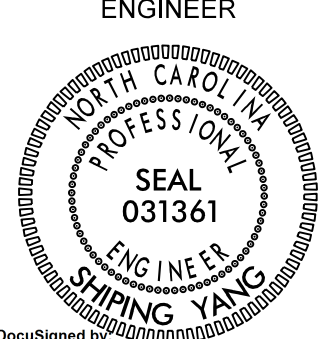
**RETAINING WALL NO. 5
NOTES & LEVELING PAD
STEP DETAIL**

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	SY	11/2024	3			W-9
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REVIEWED BY: SCC	DATE: 10/2024

GEOTECHNICAL ENGINEER

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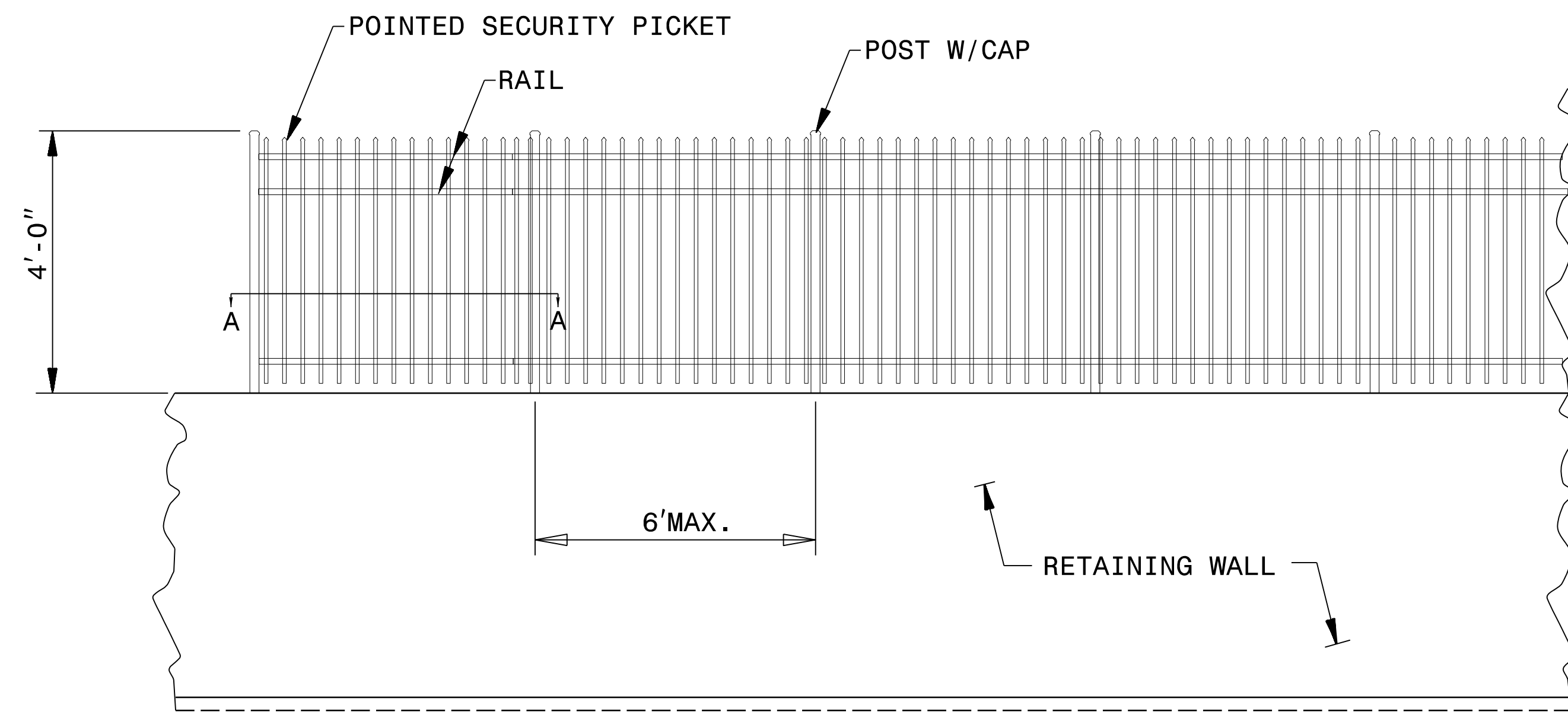
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ENGINEER

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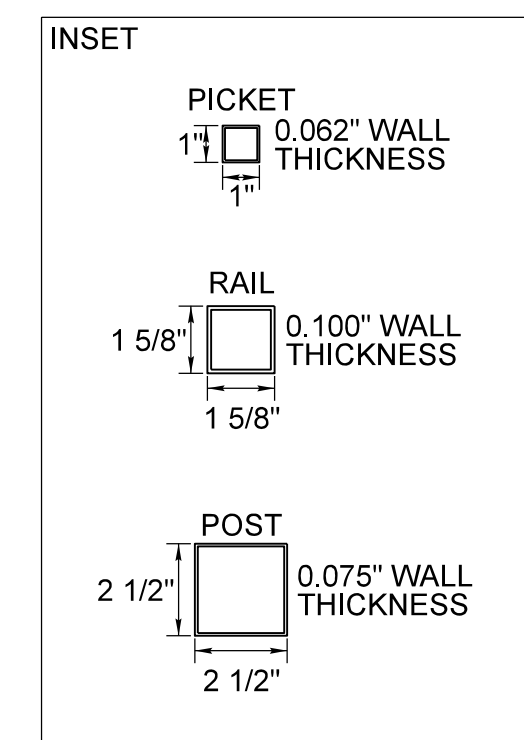
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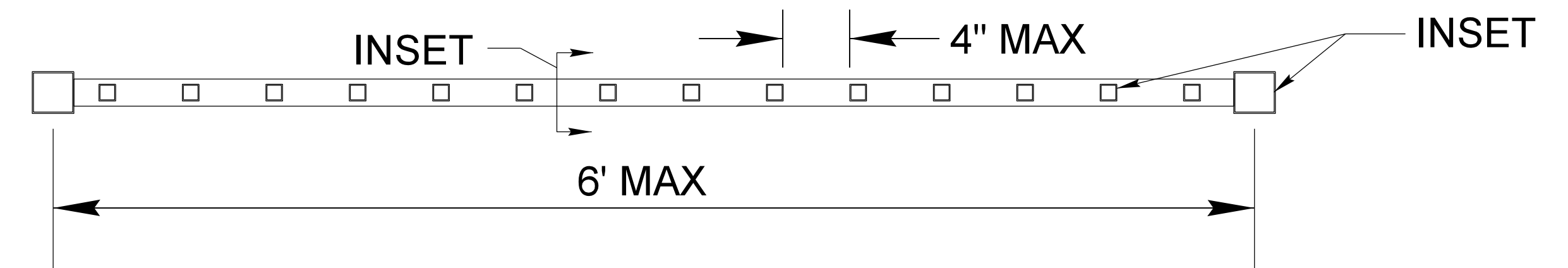
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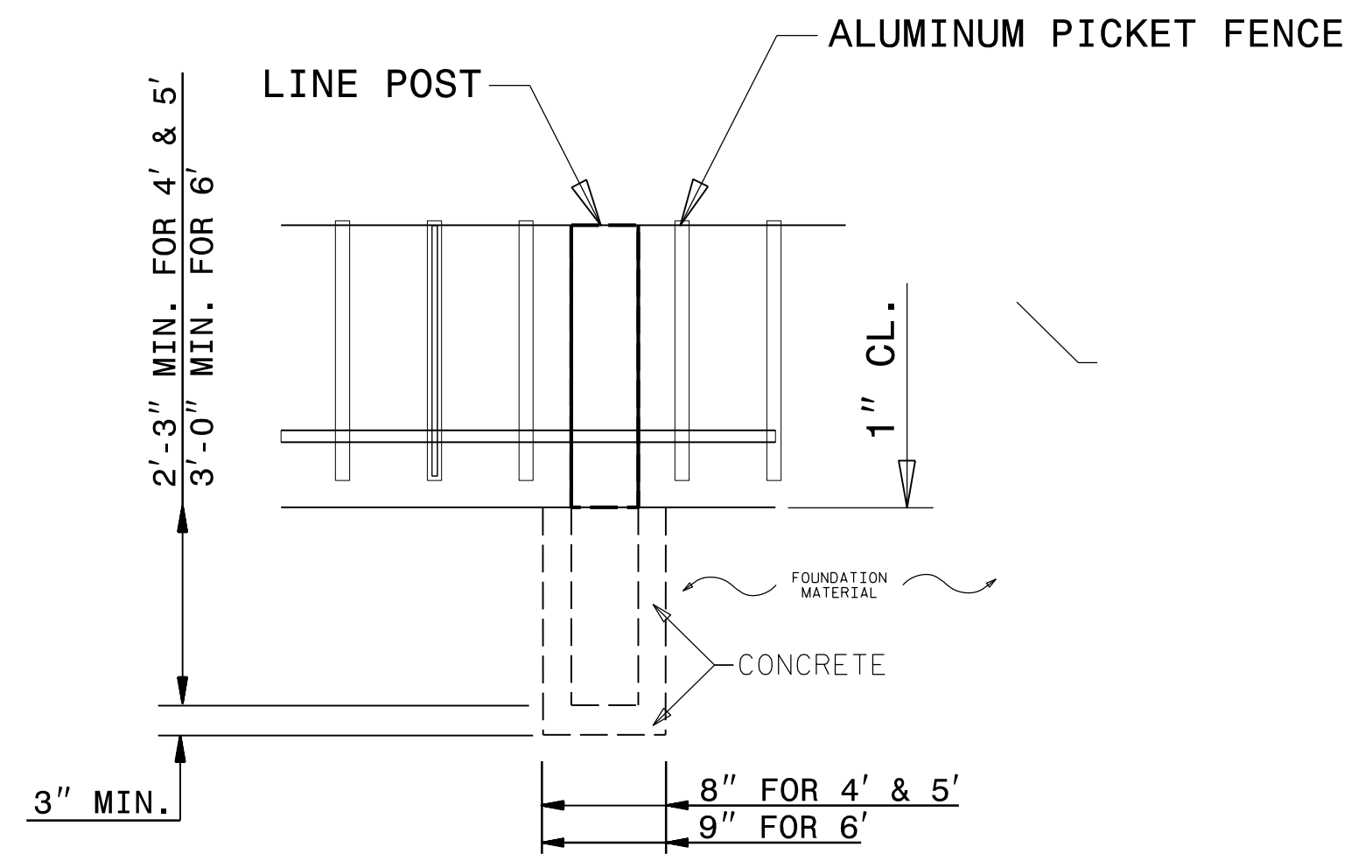
RETAINING WALL MOUNTED ALUMINUM PICKET FENCE



MATERIAL THICKNESS



SECTION A-A



POST EMBEDMENT BEHIND RETAINING WALL DETAIL

- NOTES:**
- 1) SUBMIT ALTERNATE FENCE MATERIAL TO ENGINEER FOR APPROVAL.
 - 2) SUBMIT ANY VARIATIONS IN FENCE DIMENSIONS TO ENGINEER FOR APPROVAL.
 - 3) THE FENCE WILL BE BLACK POWDER COATED.

- NOTES:**
- PLACEMENT OF PIPE SLEEVES SHALL CORRESPOND TO LINE POST AND TERMINAL POST AS SHOWN.
- FILL SPACE BETWEEN POST AND PIPE MATERIAL ACCORDING TO FENCE INSTALLATION SPECIFICATIONS OR MATERIAL APPROVED BY ENGINEER.

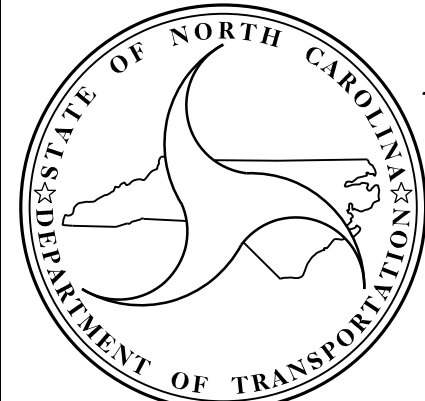
PROJECT NO.: U-5536

FORSYTH COUNTY

STATION: SEE WALL ENVELOPES

SHEET 10 OF 10

PREPARED BY: SY	DATE: 10/2024
REVIEWED BY: ENW	DATE: 10/2024



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

**GEOTECHNICAL
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