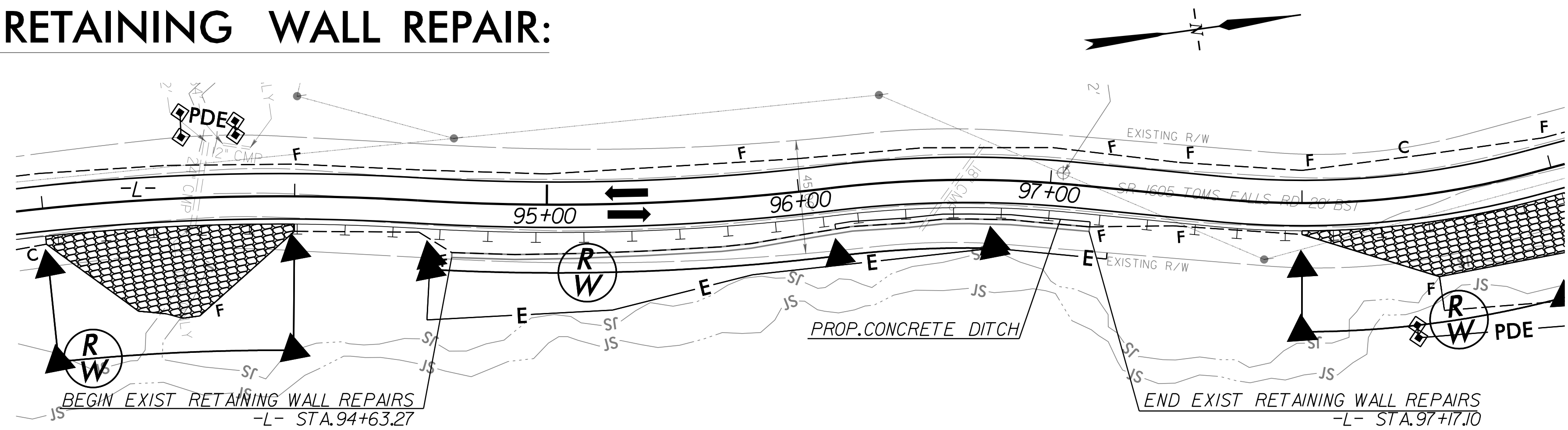


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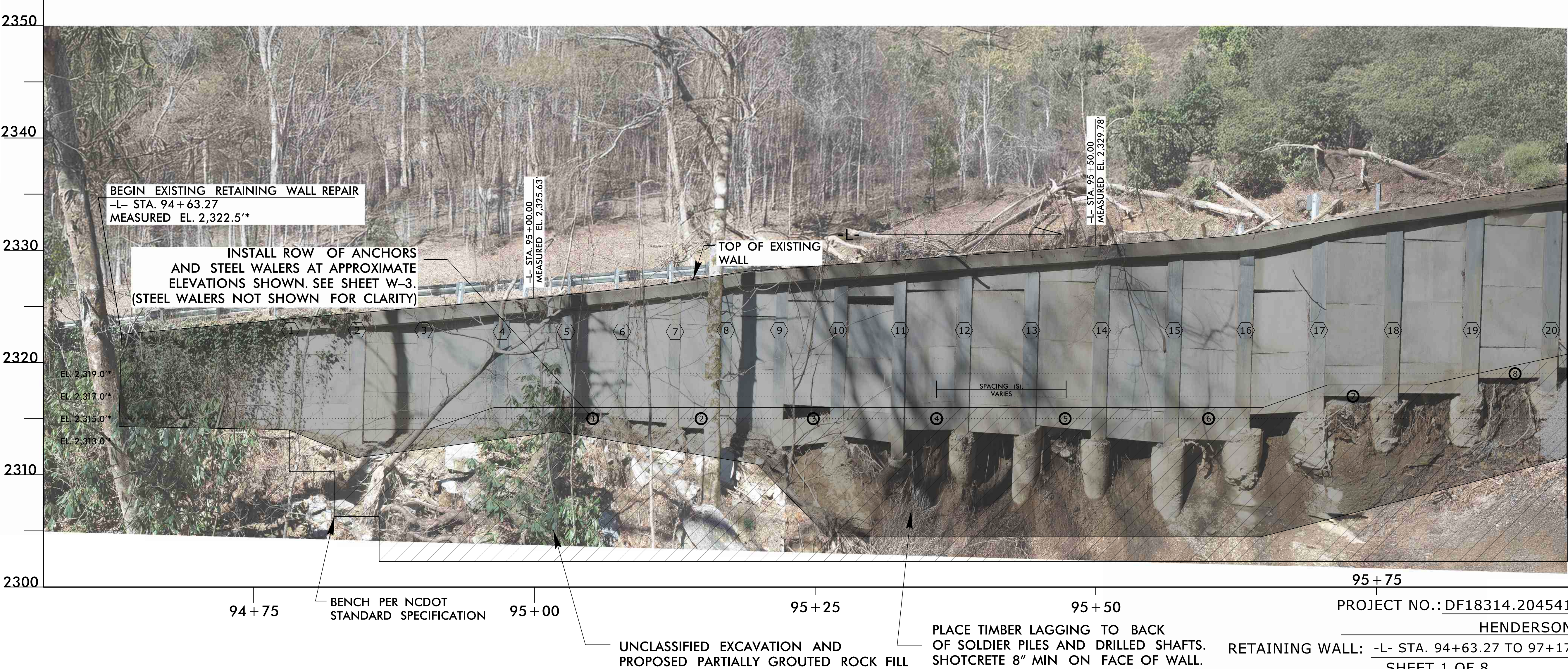
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and sealed by the individuals whose names and license
numbers appear on each page, on the dates appearing
with their signature on that page.**

**This file or an individual page
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SITE 7 EXISTING RETAINING WALL REPAIR:



EXISTING RETAINING WALL SITE 7 – PLAN
NOT TO SCALE



SITE 7 EXISTING RETAINING WALL – ENVELOPE

RETAINING WALL IMAGERY TAKEN MARCH 2025.
*ELEVATIONS PRESENTED ON SCALED IMAGERY AND MEASURED FROM PROVIDED CROSS SECTIONS OR ESTIMATED. ELEVATIONS SHOULD BE CONSIDERED APPROXIMATE.

NOT TO SCALE
(LOOKING AT FACE OF WALL)
REFER TO HATCHING KEY ON SHEET W-2
⊕ EXISTING PILE DESIGNATION
⊗ PROPOSED ANCHOR AND ANCHOR DESIGNATION

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

Prepared in the Office of:
CGE | **CAROLINAS GEOTECHNICAL GROUP**
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

EXISTING RETAINING WALL REPAIR
SITE 7

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

GEOTECHNICAL ENGINEER

ENGINEER

ENGINEER

Seal

Seal

Signed by: Robert C. Kiel

06/27/2025

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MATCHLINE -L- STA. 95+92
SEE SHEET W-2

KEY:

APPROXIMATE EXISTING WALL FACE AREA & EXPOSED WALL FOUNDATIONS

APPROXIMATE LIMITS OF PROPOSED SHOTCRETE FACE

APPROXIMATE LIMITS OF UNCLASSIFIED EXCAVATION & PARTIALLY GROUTED ROCK FILL

CONSTRUCTION SEQUENCE:

1. DEMOLISH AND REMOVE CONCRETE COPING, AS NEEDED.

2. REMOVE CONCRETE PANELS BETWEEN PILES 1 THROUGH 30.

3. INSTALL SOLDIER PILE WALL ANCHORS AND WALERS.

4. UNCLASSIFIED EXCAVATION IN PREPARATION FOR ROCK EMBANKMENTS.

5. PLACE TIMBER LAGGING BEHIND SOLDIER PILES AND EXISTING DRILLED SHAFTS, AS NEEDED.

6. PLACE EXCAVATABLE FLOWABLE FILL BEHIND TIMBER LAGGING TO TOP OF EXISTING DRILLED SHAFTS IN LIFTS, AS NEEDED.

7. CONTRACTOR TO ASSESS THE PRESENCE OF VOIDS BEHIND EXISTING PANELS.
8. REINSTALL PRECAST PANELS LEVEL AND FILL VOIDS WITH EXCAVATABLE FLOWABLE FILL, AS NEEDED.

9. PLACE 8 INCH MIN. REINFORCED SHOTCRETE FACE FROM TOP OF WALER TO TOP OF ROCK.

10. INSTALL PARTIALLY GROUTED ROCK FILL AND ROCK EMBANKMENTS.

11. PLACE CAST-IN-PLACE (CIP) CONCRETE COPING WITH DITCH, AS NEEDED.

12. CONTRACTOR TO PLACE ROCK EMBANKMENTS AROUND THE ENDS OF THE EXISTING WALL TO TIE INTO GROUTED ROCK FILL, AS GEOMETRY ALLOWS.

GEOTECHNICAL ENGINEER

ENGINEER

North Carolina Professional Seal
042642
ENGINEER
ROBERT E. KRAL

Signed by:
Robert E. Kral
AAFBFF73C5E4B1

06/27/2025

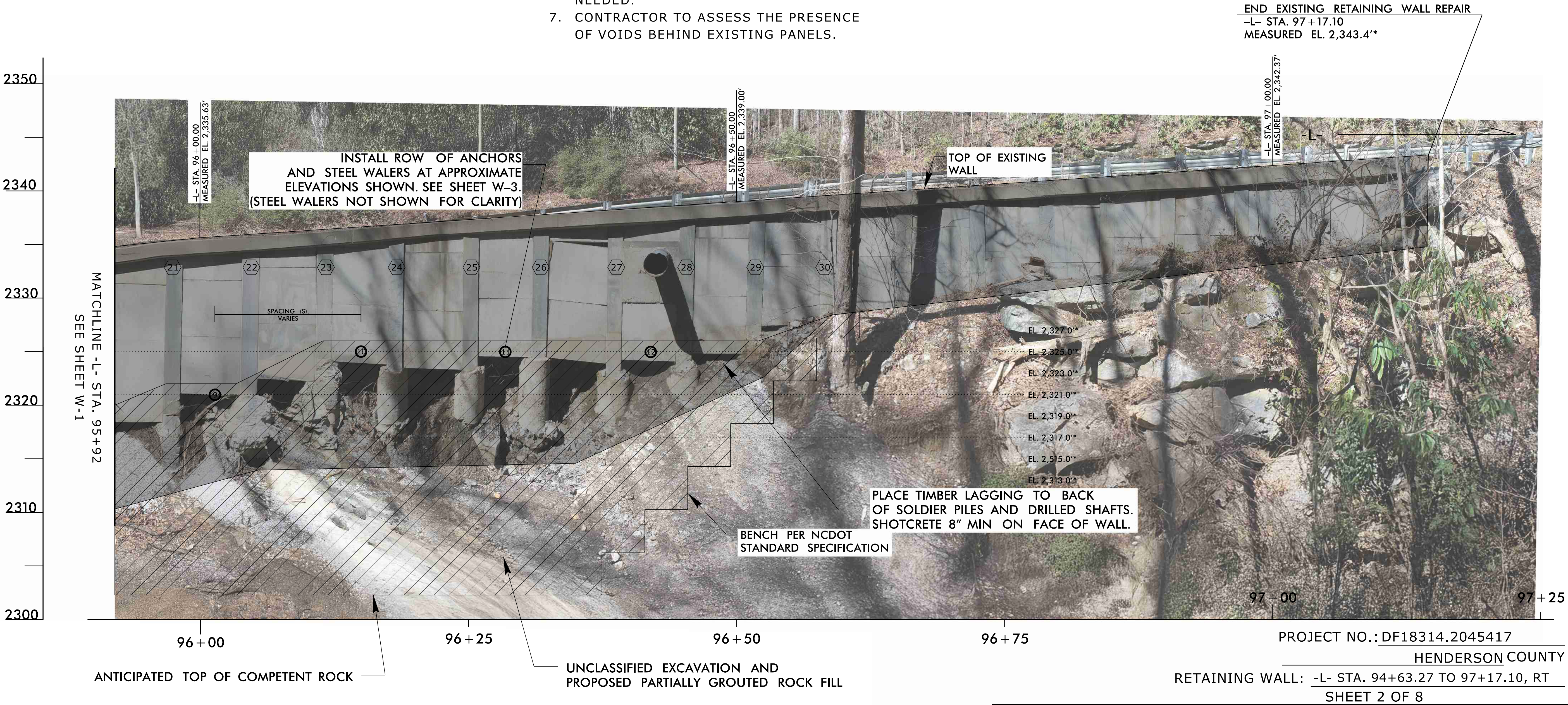
SIGNATURE

DATE

SIGNATURE

DATE

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SITE 7 EXISTING RETAINING WALL – ENVELOPE (CONTINUED)

NOT TO SCALE
(LOOKING AT FACE OF WALL)

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

RETAINING WALL IMAGERY TAKEN MARCH 2025.
*ELEVATIONS PRESENTED ON SCALED IMAGERY AND MEASURED FROM PROVIDED CROSS SECTIONS OR ESTIMATED. ELEVATIONS SHOULD BE CONSIDERED APPROXIMATE.

Prepared in the Office of:

CGR

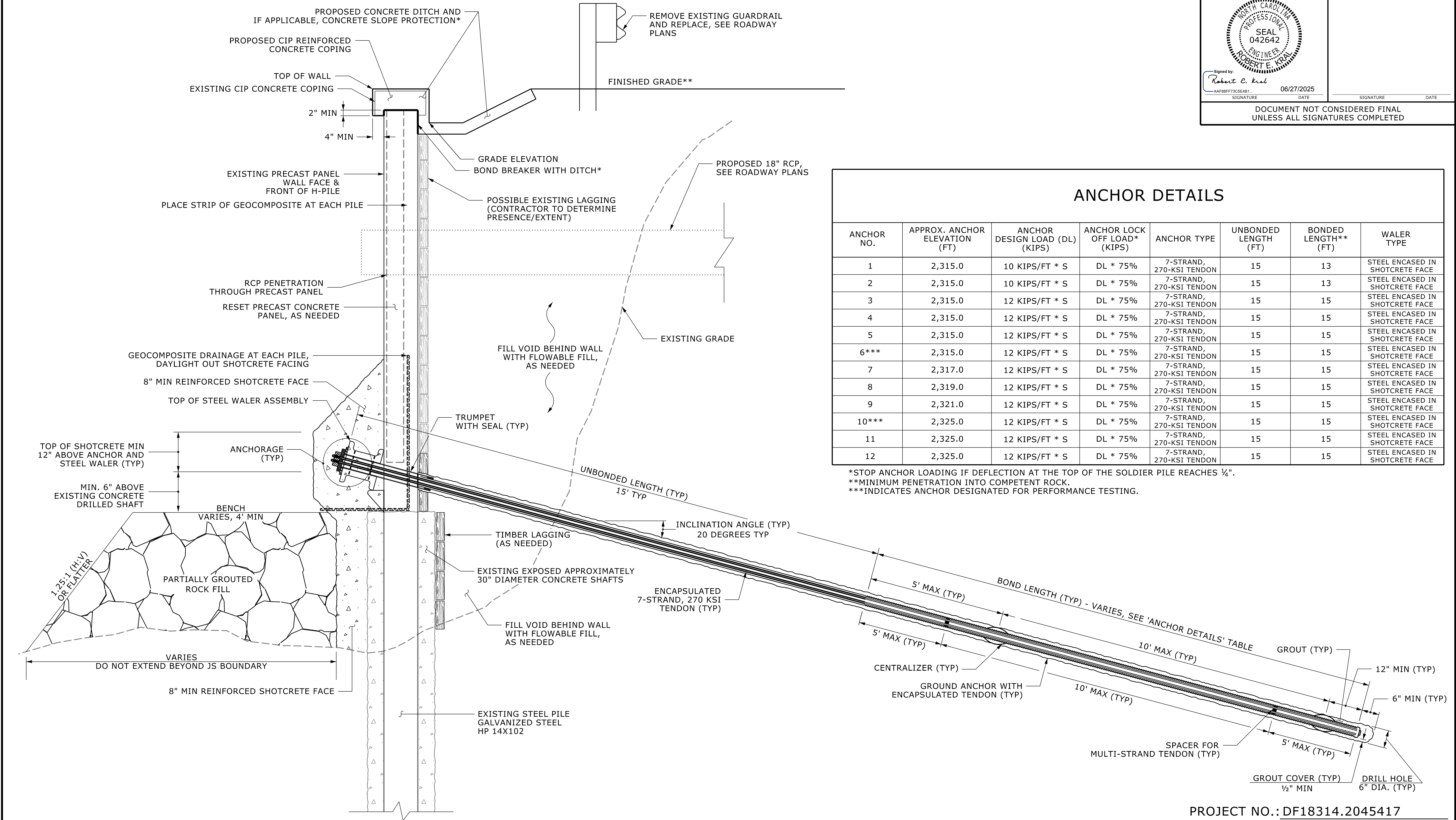
CAROLINAS
GEOTECHNICAL
GROUP

1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

EXISTING RETAINING WALL REPAIR
SITE 7

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

SHEET NO.
W-2



ANCHOR DETAILS

ANCHOR NO.	APPROX. ANCHOR ELEVATION (FT)	ANCHOR DESIGN LOAD (DL) (KIPS)	ANCHOR LOCK OFF LOAD* (KIPS)	ANCHOR TYPE	UNBONDED LENGTH (FT)	BONDED LENGTH** (FT)	WALER TYPE
1	2,315.0	10 KIPS/FT * S	DL * 75%	7-STRAND, 270-KSI TENDON	15	13	STEEL ENCASED IN SHOTCRETE FACE
2	2,315.0	10 KIPS/FT * S	DL * 75%	7-STRAND, 270-KSI TENDON	15	13	STEEL ENCASED IN SHOTCRETE FACE
3	2,315.0	12 KIPS/FT * S	DL * 75%	7-STRAND, 270-KSI TENDON	15	15	STEEL ENCASED IN SHOTCRETE FACE
4	2,315.0	12 KIPS/FT * S	DL * 75%	7-STRAND, 270-KSI TENDON	15	15	STEEL ENCASED IN SHOTCRETE FACE
5	2,315.0	12 KIPS/FT * S	DL * 75%	7-STRAND, 270-KSI TENDON	15	15	STEEL ENCASED IN SHOTCRETE FACE
6***	2,315.0	12 KIPS/FT * S	DL * 75%	7-STRAND, 270-KSI TENDON	15	15	STEEL ENCASED IN SHOTCRETE FACE
7	2,317.0	12 KIPS/FT * S	DL * 75%	7-STRAND, 270-KSI TENDON	15	15	STEEL ENCASED IN SHOTCRETE FACE
8	2,319.0	12 KIPS/FT * S	DL * 75%	7-STRAND, 270-KSI TENDON	15	15	STEEL ENCASED IN SHOTCRETE FACE
9	2,321.0	12 KIPS/FT * S	DL * 75%	7-STRAND, 270-KSI TENDON	15	15	STEEL ENCASED IN SHOTCRETE FACE
10***	2,325.0	12 KIPS/FT * S	DL * 75%	7-STRAND, 270-KSI TENDON	15	15	STEEL ENCASED IN SHOTCRETE FACE
11	2,325.0	12 KIPS/FT * S	DL * 75%	7-STRAND, 270-KSI TENDON	15	15	STEEL ENCASED IN SHOTCRETE FACE
12	2,325.0	12 KIPS/FT * S	DL * 75%	7-STRAND, 270-KSI TENDON	15	15	STEEL ENCASED IN SHOTCRETE FACE

*STOP ANCHOR LOADING IF DEFLECTION AT THE TOP OF THE SOLDIER PILE REACHES 1/4".

**MINIMUM PENETRATION INTO COMPETENT ROCK.

***INDICATES ANCHOR DESIGNATED FOR PERFORMANCE TESTING.

PROJECT NO.: DF18314.2045417

HENDERSON COUNTY

RETAINING WALL: -L- STA. 94+63.27 TO 97+17.10, RT

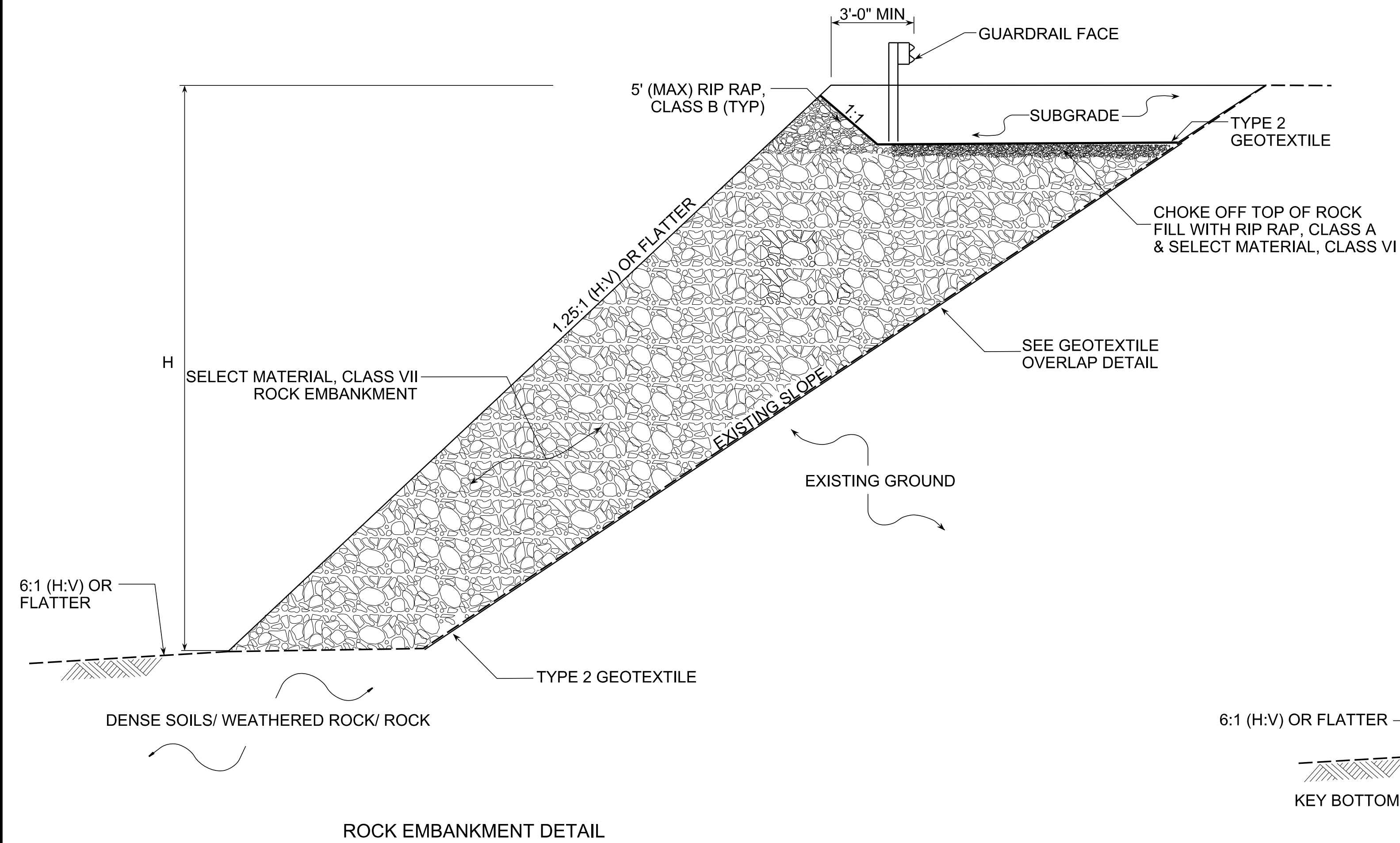
SHEET 3 OF 8

ANCHORED SOLDIER PILE WALL REPAIR - TYPICAL SECTION

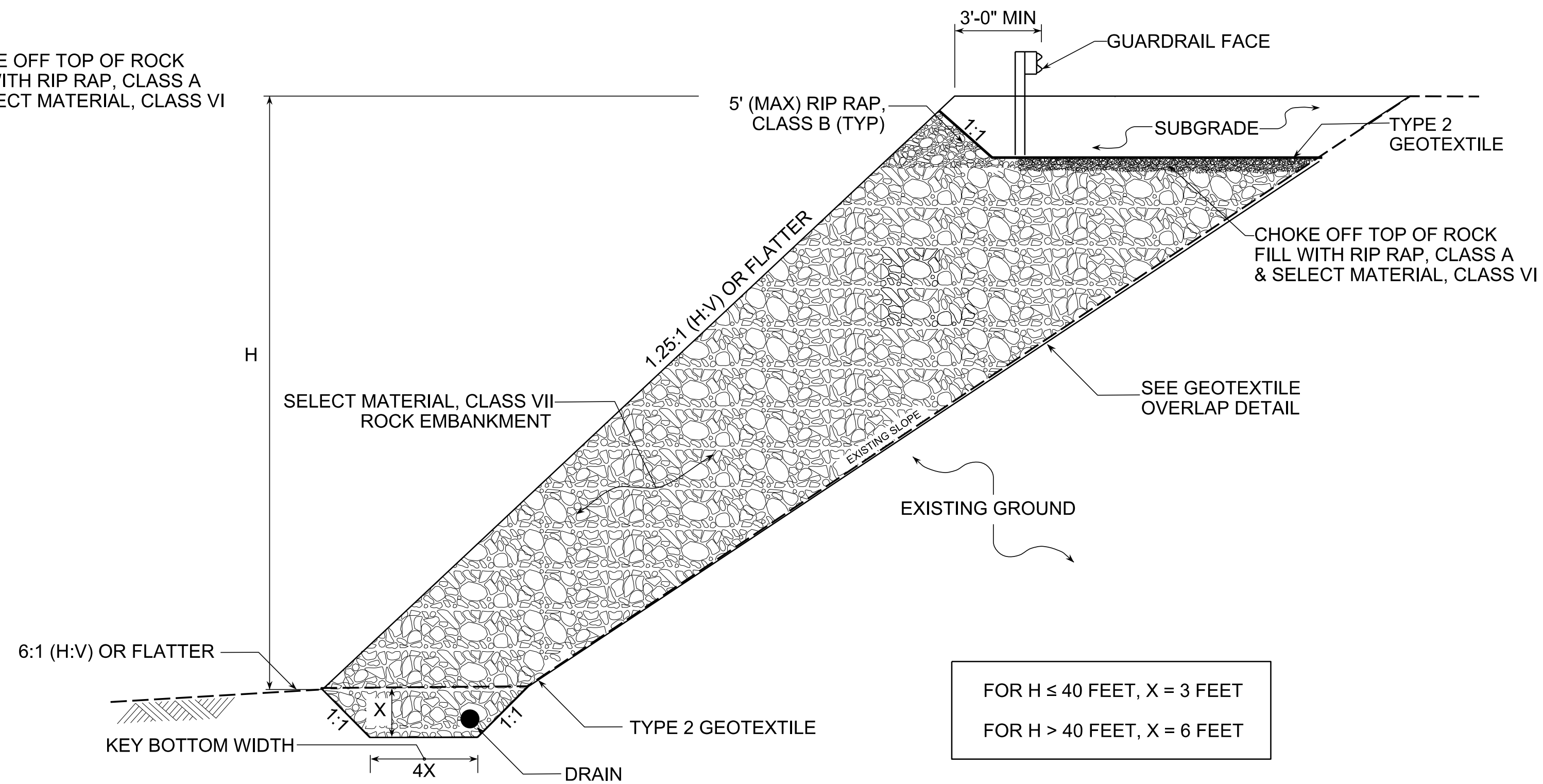
APPROXIMATELY -L- STA. 95+00.00 TO 96+60.00, RT

*SEE CONCRETE DITCH BEHIND WALL DETAILS.

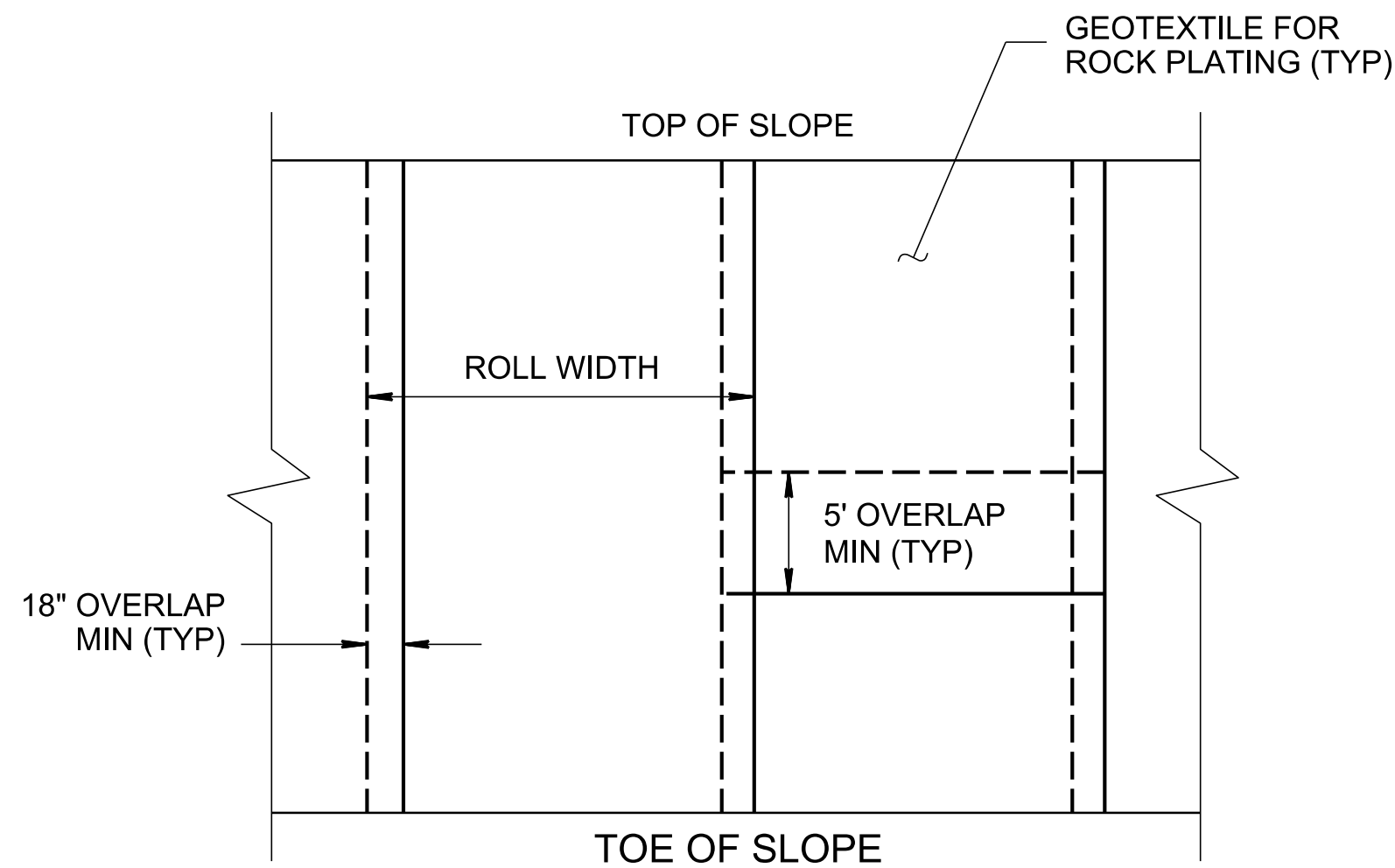
**SEE PLANS FOR FINISHED GRADE.

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ROCK EMBANKMENT DETAIL



ROCK EMBANKMENT WITH TOE KEY DETAIL



GEOTEXTILE OVERLAP DETAIL
(PLAN VIEW)

NOTES:

1. THE MAXIMUM ALLOWABLE HEIGHT FOR THE ROCK EMBANKMENT DETAIL IS 80'.
2. FOR ROCK EMBANKMENT, BENCH EXISTING SLOPE IN ACCORDANCE WITH SECTION 235 OF THE STANDARD SPECIFICATIONS, WHERE POSSIBLE.

ROCK EMBANKMENTS

PROJECT NO.: DF18314.2045417

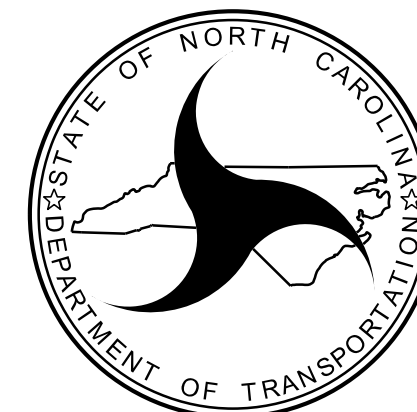
HENDERSON COUNTY

RETAINING WALL: -L- STA. 94+63.27 TO 97+17.10, RT

SHEET 4 OF 8

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

Prepared in the Office of:
CG2 | **CAROLINAS
GEOTECHNICAL
GROUP**
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

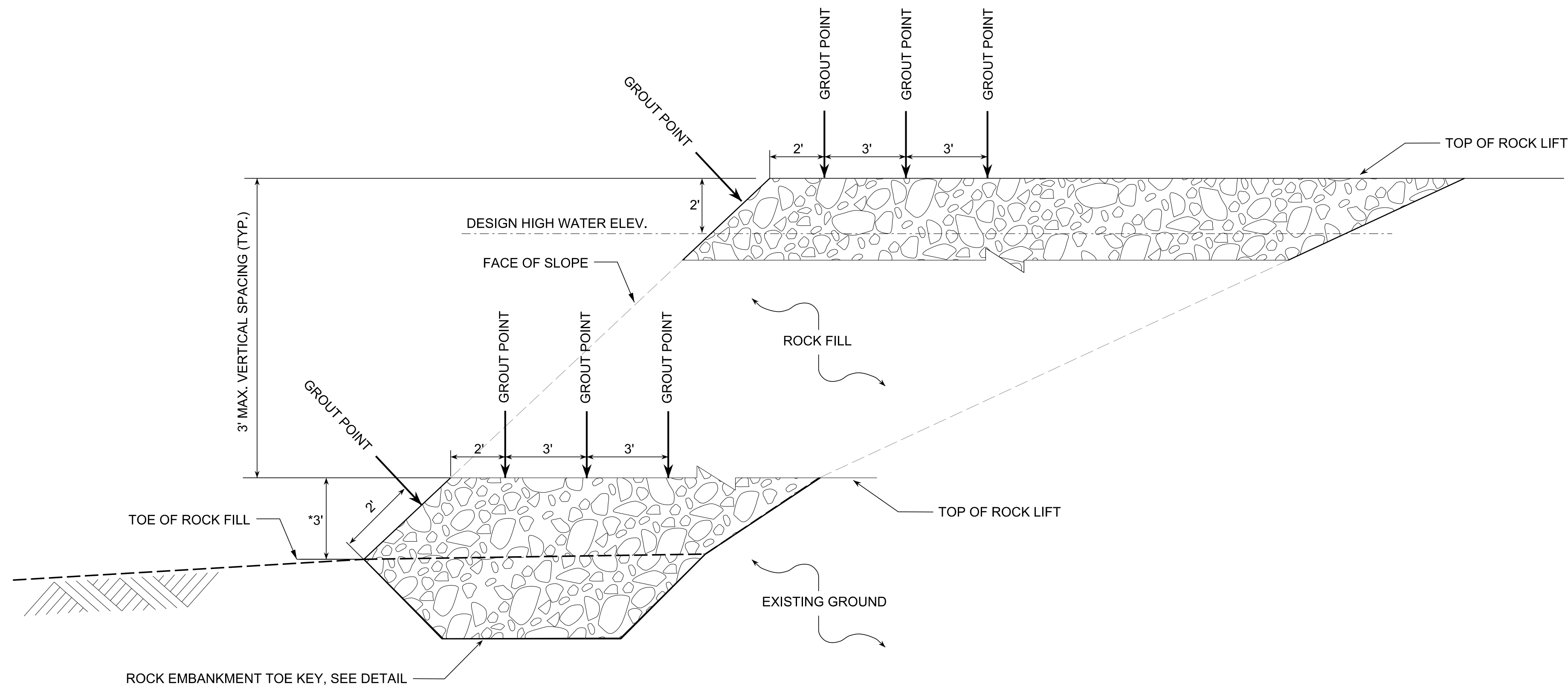


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

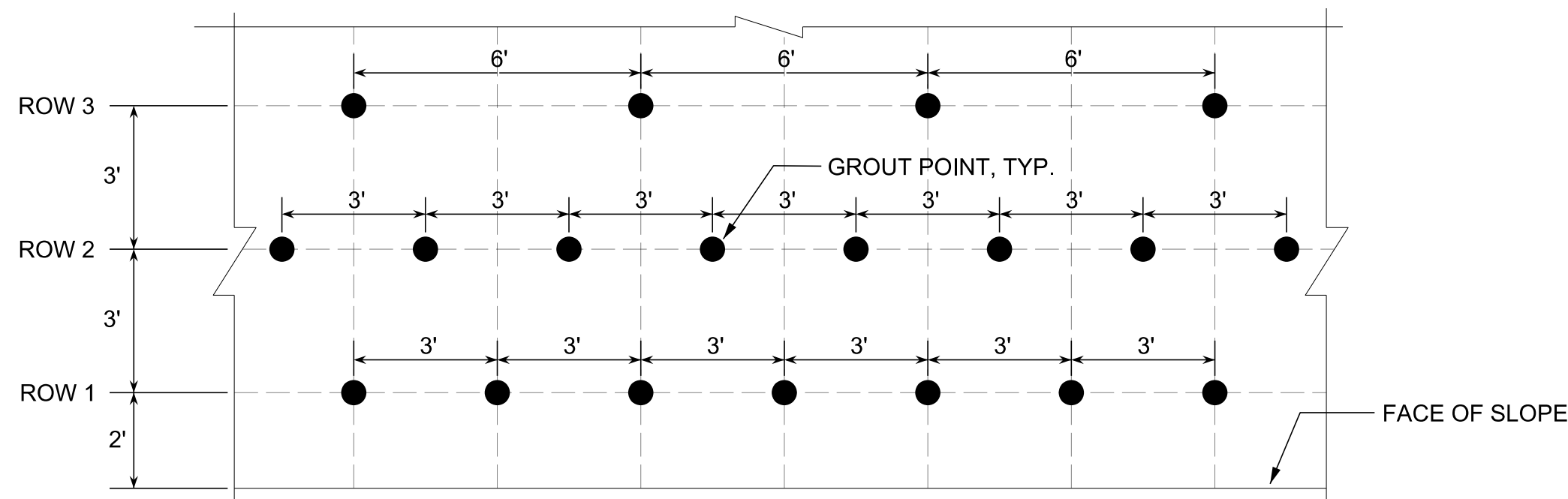
GEOTECHNICAL
ENGINEERING UNIT

EXISTING RETAINING WALL REPAIR
SITE 7

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



PARTIALLY GROUTED ROCK FILL - ROCK FILL SECTION
* IF NO TOE KEY, START GROUTING AT THE TOP OF THE FIRST 3-FT LIFT

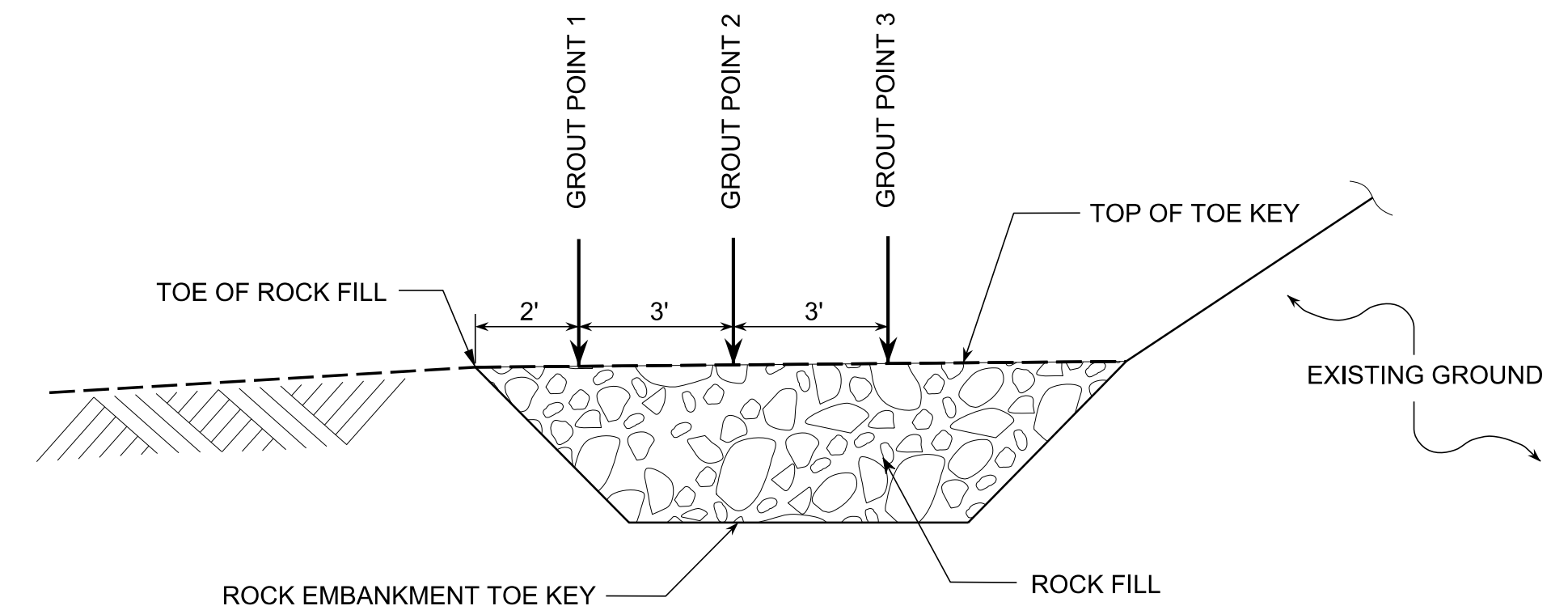


PARTIALLY GROUTED ROCK FILL - PLAN VIEW GROUT POINTS
VIEW FROM FRONT TOP

NOTES:

FOR PARTIALLY GROUTED ROCK FILL, SEE SPECIAL PROVISION.

APPLY GROUT ON THE SLOPE FACE AND AT THE TOP OF EACH 3 FT LIFT OF ROCK FILL. APPLY 3 CUBIC FEET OF GROUT AT EACH GROUT POINT IN THE PATTERNS SHOWN ON PAGE 2. THE HIGHEST GROUT POINT WILL BE THE TOP OF THE ROCK EMBANKMENT.



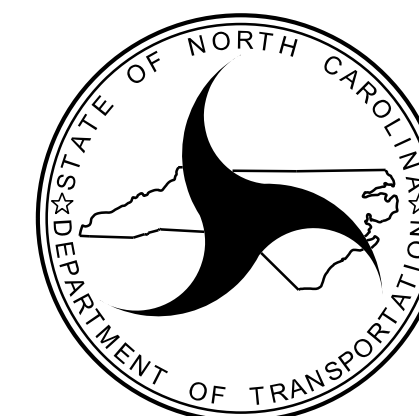
PARTIALLY GROUTED ROCK FILL - TOE KEY DETAIL

PARTIALLY GROUTED ROCK FILL DETAILS

PROJECT NO.: DF18314.2045417
HENDERSON COUNTY
RETAINING WALL: -L- STA. 94+63.27 TO 97+17.10, RT
SHEET 5 OF 8

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

Prepared in the Office of:
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1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
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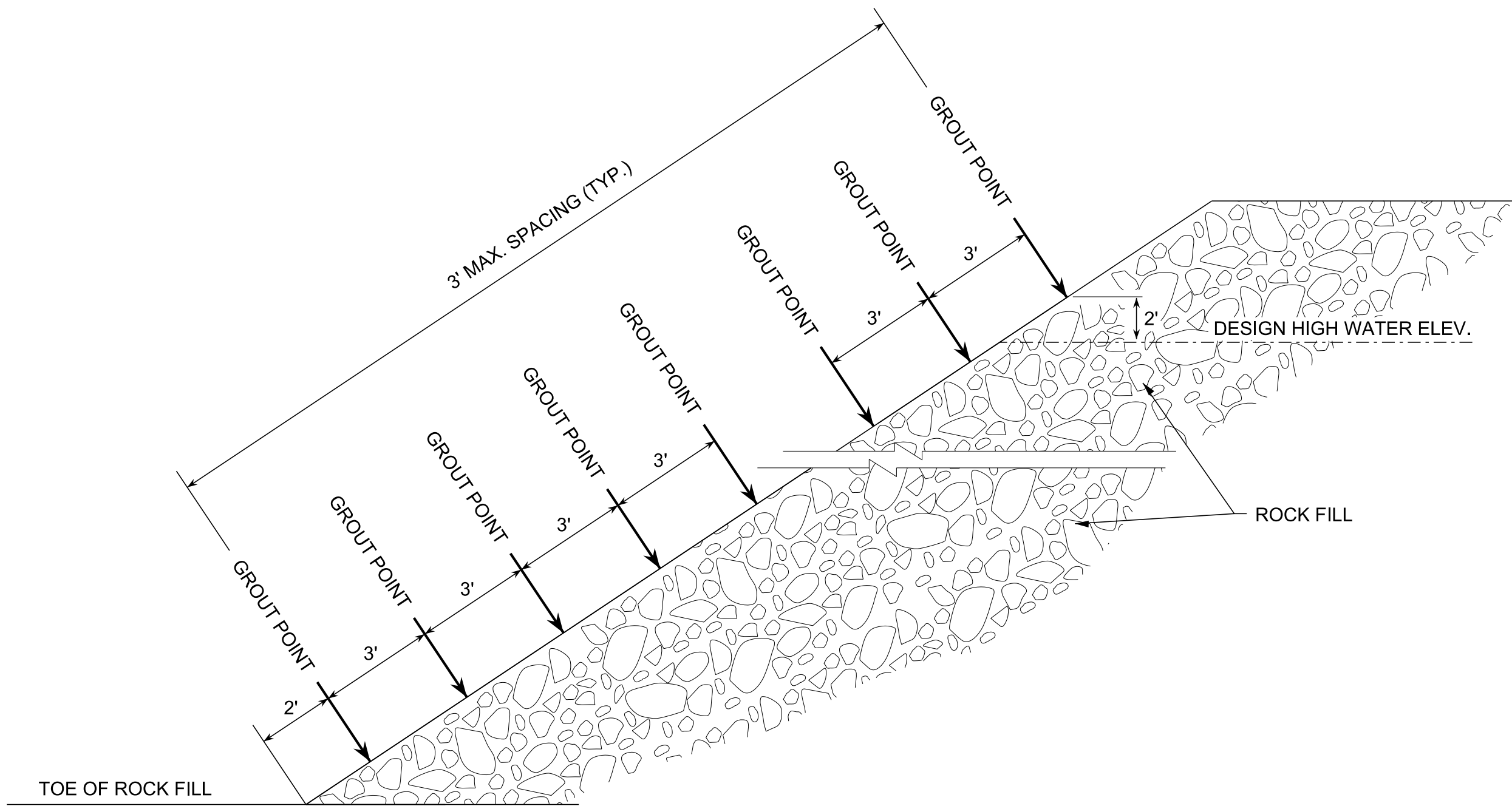


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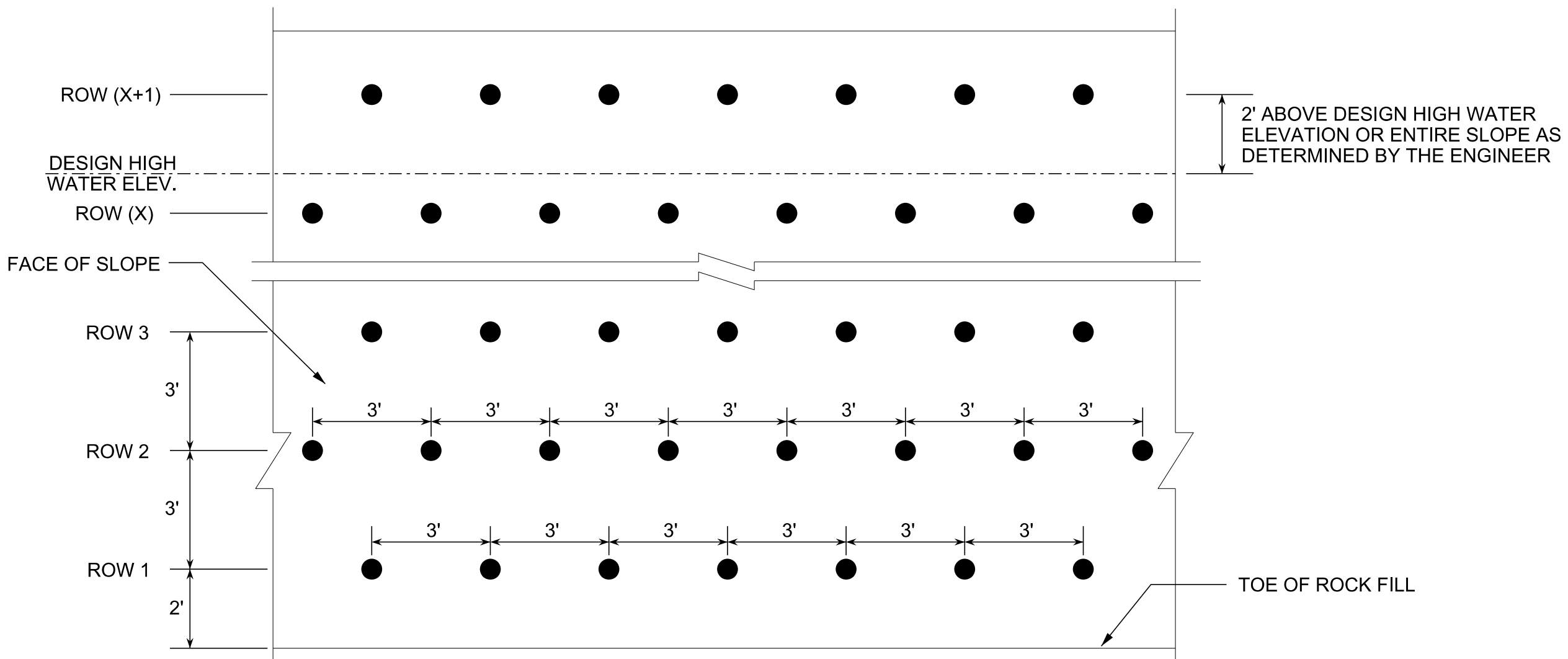
GEOTECHNICAL
ENGINEERING UNIT

EXISTING RETAINING WALL REPAIR
SITE 7

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



PARTIALLY GROUTED ROCK FILL - SLOPE FACE DETAIL



PARTIALLY GROUTED ROCK FILL - SLOPE FACE GROUT POINTS
VIEW FROM FRONT SLOPE FACE

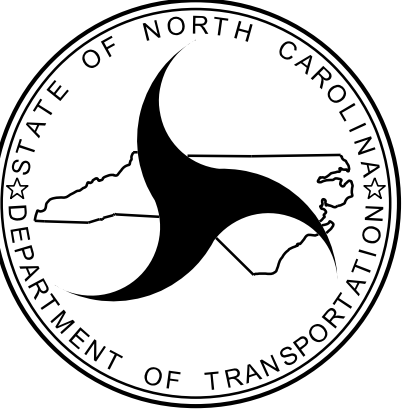
PARTIALLY GROUTED ROCK FILL DETAILS

PROJECT NO.: DF18314.2045417
HENDERSON COUNTY
RETAINING WALL: -L- STA. 94+63.27 TO 97+17.10, RT
SHEET 6 OF 8

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25



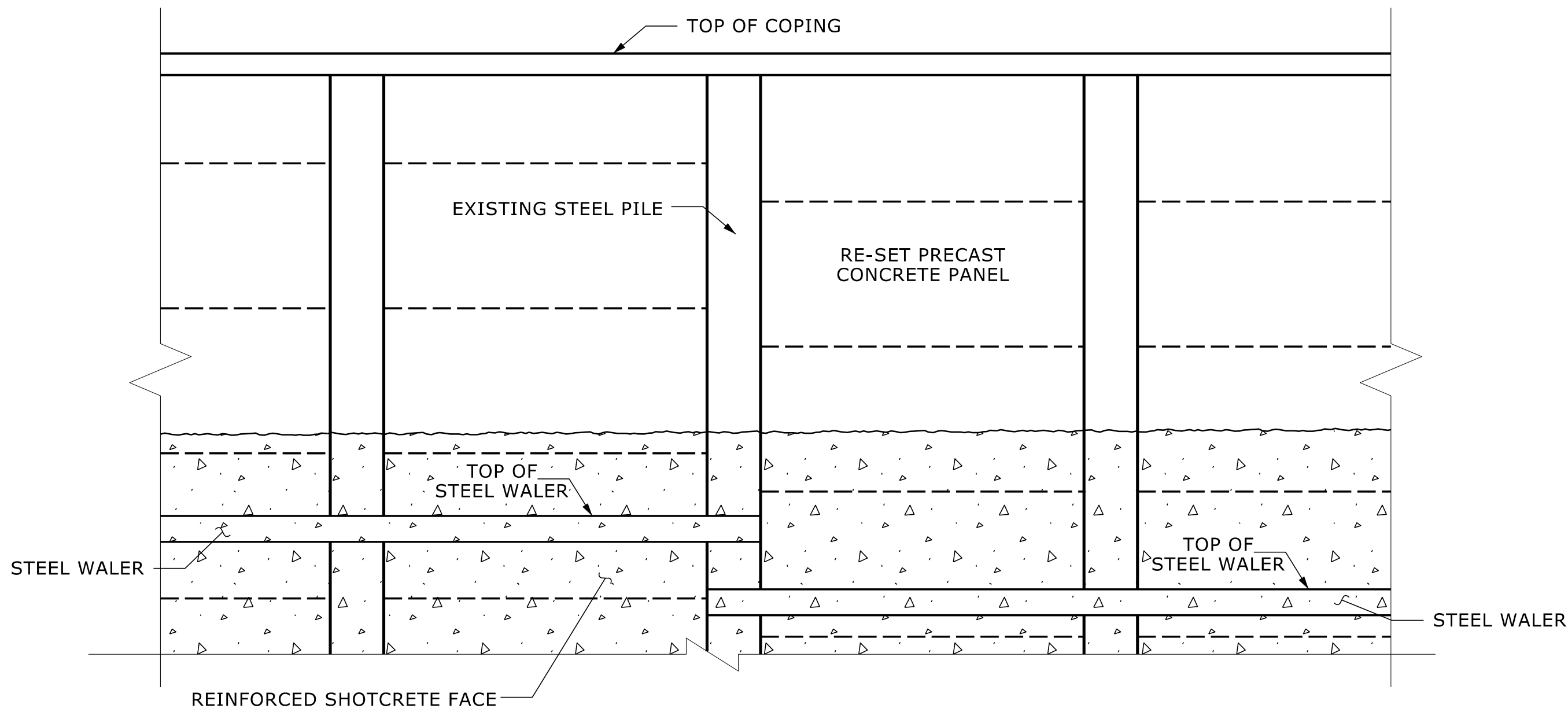
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1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684



NORTH CAROLINA
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DIVISION OF HIGHWAYS

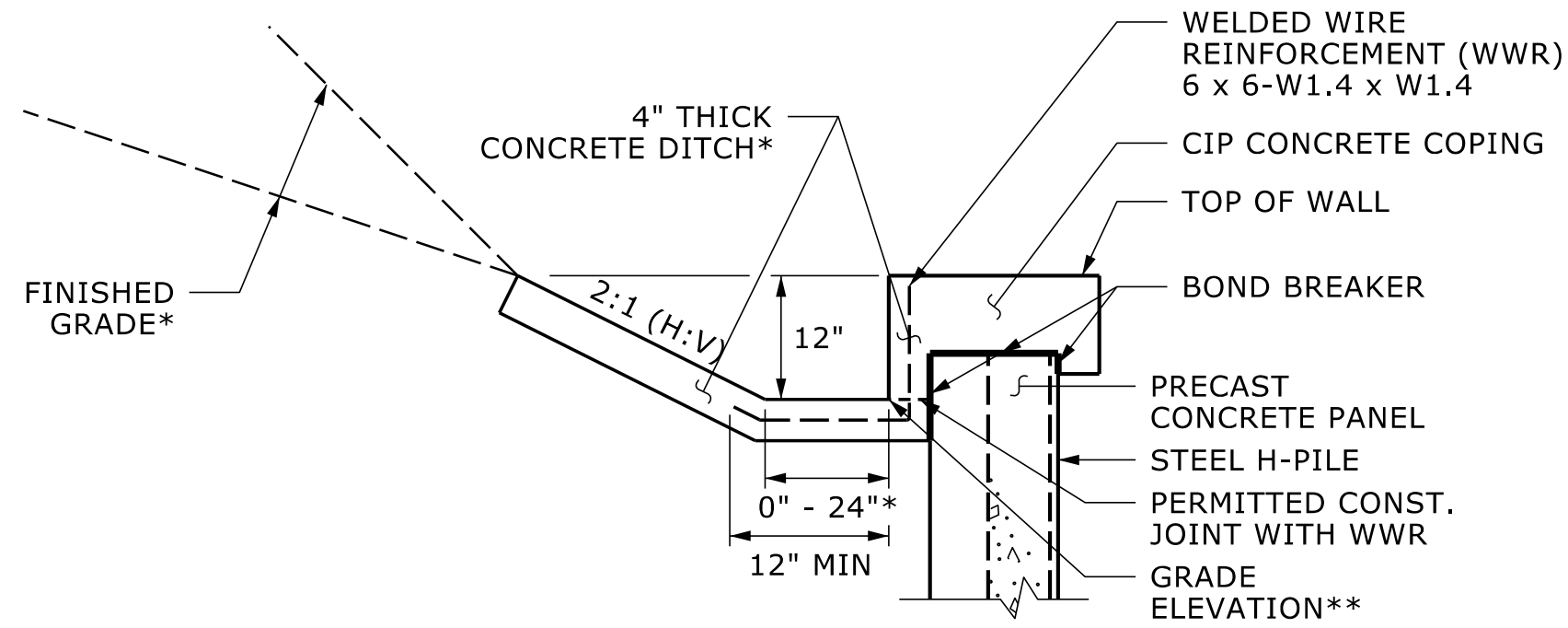
GEOTECHNICAL
ENGINEERING UNIT

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

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SOLDIER PILE WALL FACE - TYPICAL

APPROXIMATELY -L- STA. 95+00.00 TO 96+60.00, RT



CONCRETE DITCH BEHIND
WALL WITH CONCRETE COPING

*SEE ROADWAY PLANS FOR CONCRETE
DITCH AND FINISHED GRADE DETAILS.
**SEE WALL ENVELOPE FOR GRADE ELEVATIONS.
FOR CONCRETE DITCHES, SEE SECTION 850
OF THE STANDARD SPECIFICATIONS.

PROJECT NO.: DF18314.2045417

HENDERSON COUNTY

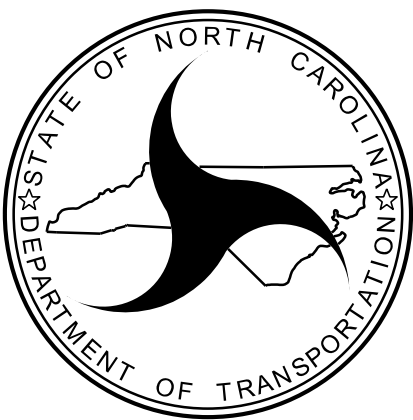
RETAINING WALL: -L- STA. 94+63.27 TO 97+17.10, RT

SHEET 7 OF 8

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25



Prepared in the Office of:
**CAROLINAS
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GROUP**
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
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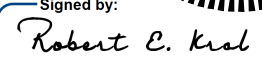



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

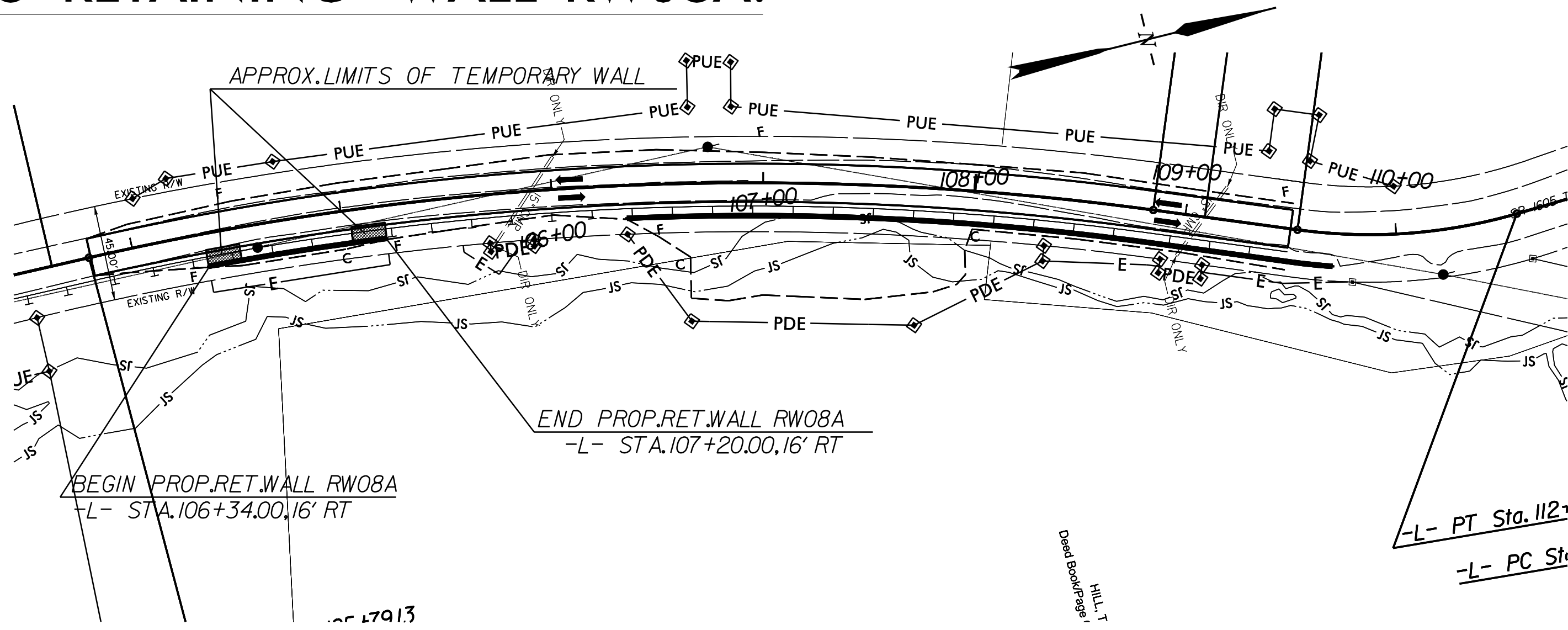
GEOTECHNICAL
ENGINEERING UNIT

EXISTING RETAINING WALL REPAIR
SITE 7

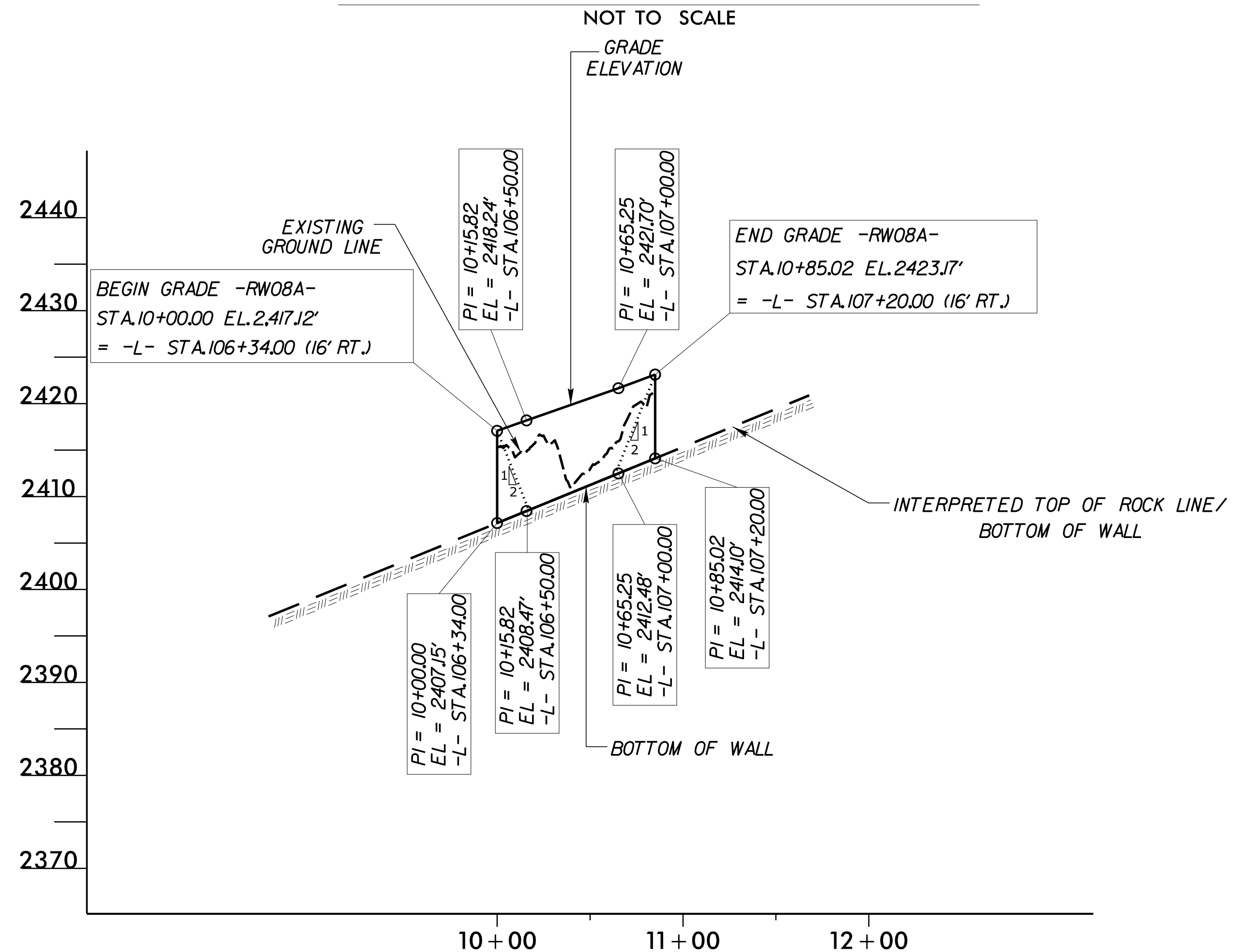
REVISIONS						SHEET NO. W-7
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

		<div>GEOTECHNICAL ENGINEER</div> <div></div> <div>Signed by:  06/27/2025</div> <div>SIGNATUREDATE</div>		<div>ENGINEER</div> <div></div> <div>SIGNATUREDATE</div>																			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED																							
<div>ESTIMATED QUANTITIES - SITE 7 EXISTING RETAINING WALL REPAIRS</div> <table><tr><td>SHOTCRETE WALL FACE</td><td>1,450 SF</td></tr><tr><td>TIEBACK ANCHORS</td><td>12 EA</td></tr><tr><td>ANCHOR PERFORMANCE TESTS</td><td>4 EA</td></tr><tr><td>ANCHOR PROOF TESTS</td><td>12 EA</td></tr><tr><td>CIP CONCRETE COPING</td><td>260 LF</td></tr><tr><td>CONCRETE DITCH</td><td>260 LF</td></tr><tr><td>UNCLASSIFIED EXCAVATION</td><td>875 CY</td></tr></table>						SHOTCRETE WALL FACE	1,450 SF	TIEBACK ANCHORS	12 EA	ANCHOR PERFORMANCE TESTS	4 EA	ANCHOR PROOF TESTS	12 EA	CIP CONCRETE COPING	260 LF	CONCRETE DITCH	260 LF	UNCLASSIFIED EXCAVATION	875 CY				
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<div>EXISTING RETAINING WALL REPAIRS PAY ITEMS</div> <table><tr><td>SITE 7 EXISTING RETAINING WALL REPAIRS</td><td>1 LS</td></tr><tr><td>ROCK EMBANKMENTS</td><td>2,400 TON</td></tr><tr><td>#57 STONE</td><td>0 TON</td></tr><tr><td>GEOTEXTILE FOR ROCK EMBANKMENTS</td><td>310 SY</td></tr><tr><td>GROUT FOR ROCK FILL</td><td>175 CY</td></tr></table>						SITE 7 EXISTING RETAINING WALL REPAIRS	1 LS	ROCK EMBANKMENTS	2,400 TON	#57 STONE	0 TON	GEOTEXTILE FOR ROCK EMBANKMENTS	310 SY	GROUT FOR ROCK FILL	175 CY								
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GROUT FOR ROCK FILL	175 CY																						
<div>NOTES:</div> <div>FOR EXISTING SOLDIER PILE RETAINING WALL REPAIRS, SEE EXISTING RETAINING WALL REPAIRS SPECIAL PROVISION.</div> <div>FOR ROCK EMBANKMENTS, SEE ROCK EMBANKMENTS STANDARD PROVISION.</div> <div>FOR PARTIALLY GROUTED ROCK FILL, SEE PARTIALLY GROUTED ROCK FILL SPECIAL PROVISION.</div> <div>FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.</div> <div>EACH TIEBACK ANCHOR SHALL BE STRESSED AND LOCKED OFF TO THE LOADS SPECIFIED IN THE TABLE ON SHEET W-8. ANCHOR STRESSING SHALL BE PERFORMED IN ACCORDANCE WITH THE EXISTING RETAINING WALL REPAIRS SPECIAL PROVISION.</div> <div>ALL ANCHORS SHALL BE STRESSED AND LOCKED OFF PRIOR TO PLACING ANY EXCAVATABLE FLOWABLE FILL.</div> <div>PROVIDE EXCAVATABLE FLOWABLE FILL IN ACCORDANCE WITH SECTION 1000-7 OF THE STANDARD SPECIFICATIONS. PLACE EXCAVATABLE FLOWABLE FILL IN LIFTS NOT EXCEEDING 24 INCHES AND ONLY AFTER ALL TIEBACK ANCHORS HAVE BEEN STRESSED AND LOCKED OFF.</div> <div>CONTRACTOR SHALL DEMOLISH AND REMOVE THE EXISTING CONCRETE COPING AS NECESSARY TO ACCESS AND RESET THE PRECAST CONCRETE PANELS BETWEEN SOLDIER PILES. PANELS SHALL BE RESET TO A LEVEL AND PLUMB POSITION CONSISTENT WITH ORIGINAL ALIGNMENT AND ELEVATIONS. CONTRACTOR SHALL EXERCISE CARE TO PREVENT DAMAGE TO THE EXISTING PANELS. ANY PANELS DAMAGED OR BROKEN DURING DEMOLITION, HANDLING, OR RESETTING SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. ALL LABOR, MATERIALS, EQUIPMENT, AND DISPOSAL ASSOCIATED WITH COPING REMOVAL, PANEL RESETTING, AND ANY REQUIRED PANEL REPLACEMENT SHALL BE CONSIDERED INCIDENTAL TO THE WALL REPAIR AND NO ADDITIONAL COMPENSATION WILL BE MADE.</div> <div>CONTRACTOR SHALL CORE OR SAW-CUT A CLEAN, CIRCULAR OPENING THROUGH THE EXISTING PRECAST CONCRETE PANEL TO ACCOMMODATE THE PROPOSED 18-INCH REINFORCED CONCRETE PIPE (RCP) AS SHOWN ON THE PLANS. THE OPENING SHALL ALLOW A MAXIMUM 1-INCH ANNULAR SPACE AROUND THE PIPE. AFTER INSTALLATION, SEAL THE ANNULAR SPACE USING NON-SHRINK, NON-METALLIC GROUT CONFORMING TO NCDOT STANDARD SPECIFICATIONS SECTION 1003 FOR TYPE 2 GROUT. GROUT SHALL BE PLACED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS TO ACHIEVE A WATERTIGHT CONNECTION. CONTRACTOR SHALL PREVENT DAMAGE TO THE PANEL DURING CUTTING, PIPE PLACEMENT, OR GROUTING. ALL LABOR, MATERIALS, AND ANY NECESSARY PANEL REPAIRS SHALL BE CONSIDERED INCIDENTAL TO THE PIPE INSTALLATION.</div>																							
<div>PROJECT NO.: DF18314.2045417</div> <div>HENDERSON COUNTY</div> <div>RETAINING WALL: -L- STA. 94+63.27 TO 97+17.10, RT</div> <div>SHEET 8 OF 8</div>																							
<div>PREPARED BY: KND</div> <div>REVIEWED BY: REK</div>		<div>DATE: 06/25</div> <div>DATE: 06/25</div>		<div><div>Prepared in the Office of:</div><div>CAROLINAS GEOTECHNICAL GROUP</div><div>1805 SARDIS ROAD NORTH SUITE 100 CHARLOTTE, NC 28270 (980) 339-8684</div></div> <div><div>EXISTING RETAINING WALL REPAIR SITE 7</div><div>REVISIONS</div><table><tr><th>NO.</th><th>BY</th><th>DATE</th><th>NO.</th><th>BY</th><th>DATE</th></tr><tr><td>1</td><td></td><td></td><td>3</td><td></td><td></td></tr><tr><td>2</td><td></td><td></td><td>4</td><td></td><td></td></tr></table><div>SHEET NO. W-8</div></div>		NO.	BY	DATE	NO.	BY	DATE	1			3			2			4		
NO.	BY	DATE	NO.	BY	DATE																		
1			3																				
2			4																				

SITE 8 RETAINING WALL RW08A:



RETAINING WALL RW08A – PLAN



RETAINING WALL RW08A – ENVELOPE

NOT TO SCALE
(LOOKING AT FACE OF WALL)

GEOTECHNICAL ENGINEER

Signed by:
Robert E. Kral
AAFBFF73C5E4B3
SIGNATURE

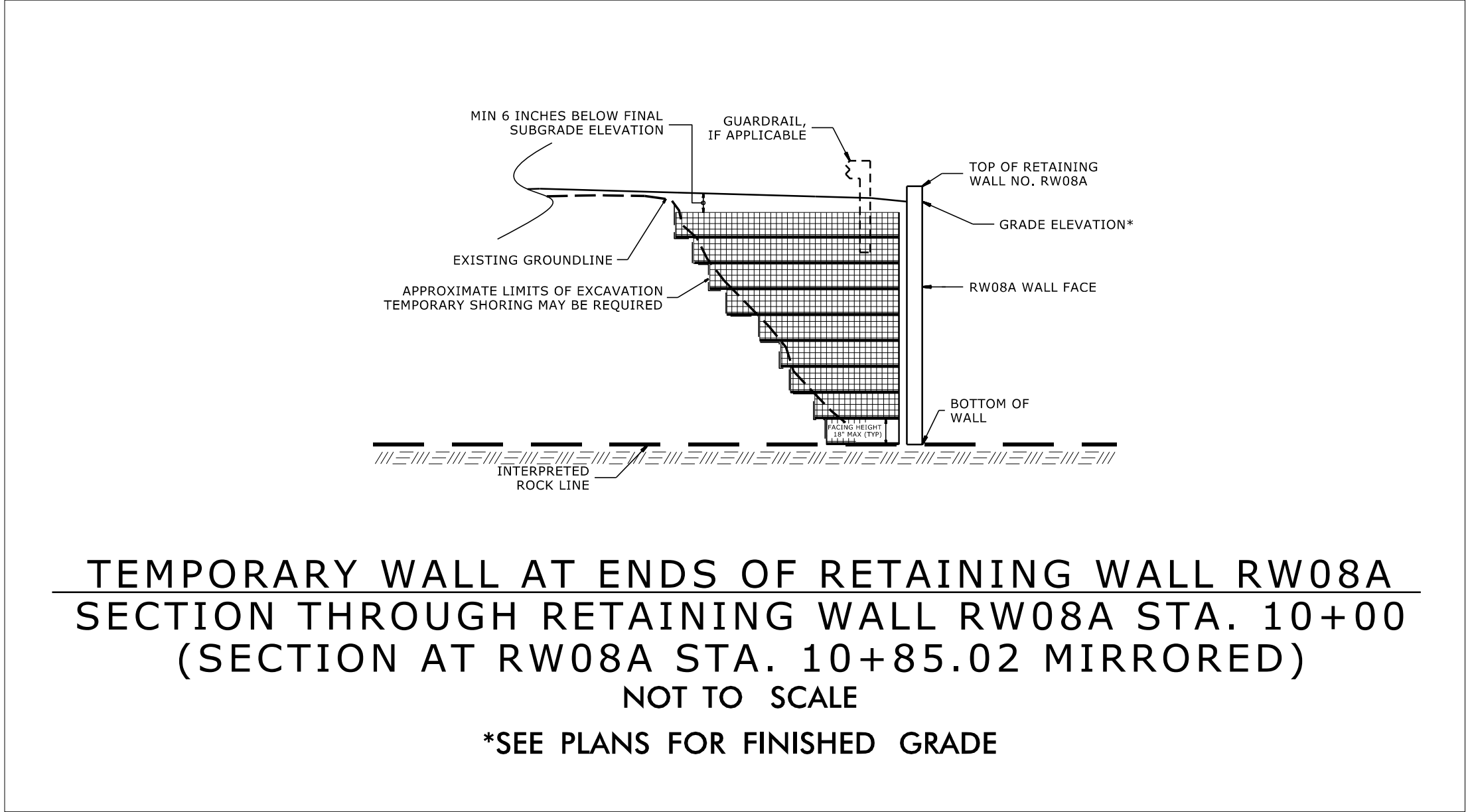
06/25/2025
DATE

ENGINEER

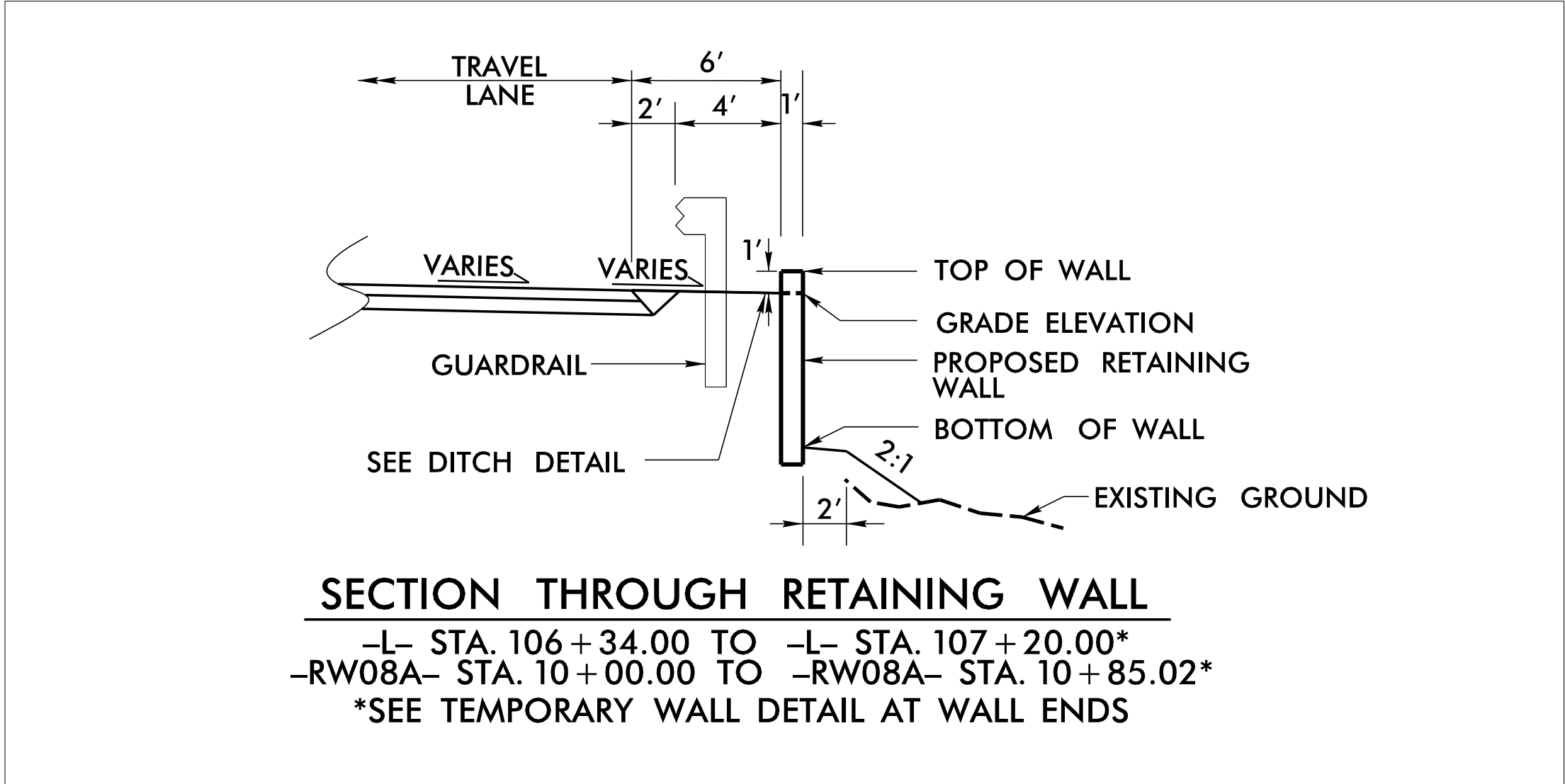
SIGNATURE

DATE

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TEMPORARY WALL AT ENDS OF RETAINING WALL RW08A
SECTION THROUGH RETAINING WALL RW08A STA. 10+00
(SECTION AT RW08A STA. 10+85.02 MIRRORED)
NOT TO SCALE
*SEE PLANS FOR FINISHED GRADE



SECTION THROUGH RETAINING WALL

-L- STA. 106 + 34.00 TO -L- STA. 107 + 20.00*
-RW08A- STA. 10 + 00.00 TO -RW08A- STA. 10 + 85.02*
*SEE TEMPORARY WALL DETAIL AT WALL ENDS

PROJECT NO.: DF18314.2045378
HENDERSON COUNTY
RETAINING WALL RW08A: -RW08B- STA. 10+00.00 TO 10+85.02
SHEET 1 OF 7

Prepared in the Office of:

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GEOTECHNICAL
GROUP

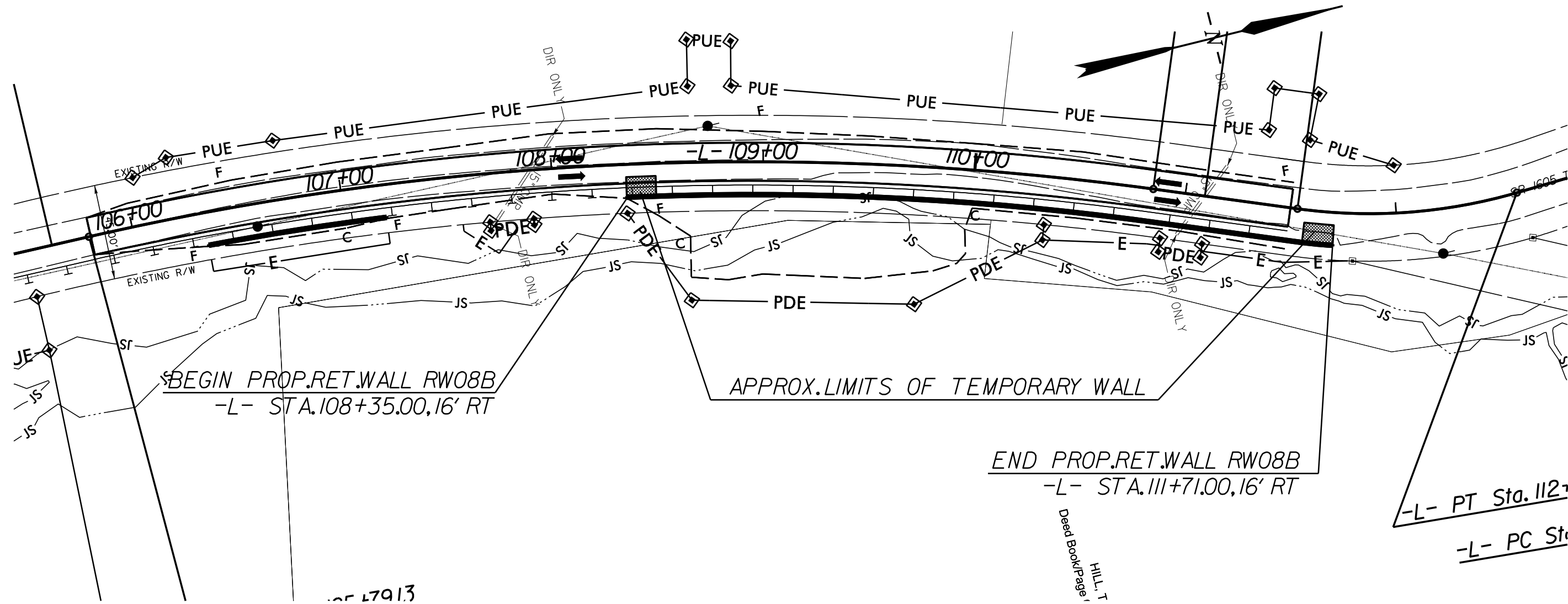
1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

SITE 8 RETAINING WALLS
RW08A AND RW08B
SOLDIER PILE RETAINING WALLS

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

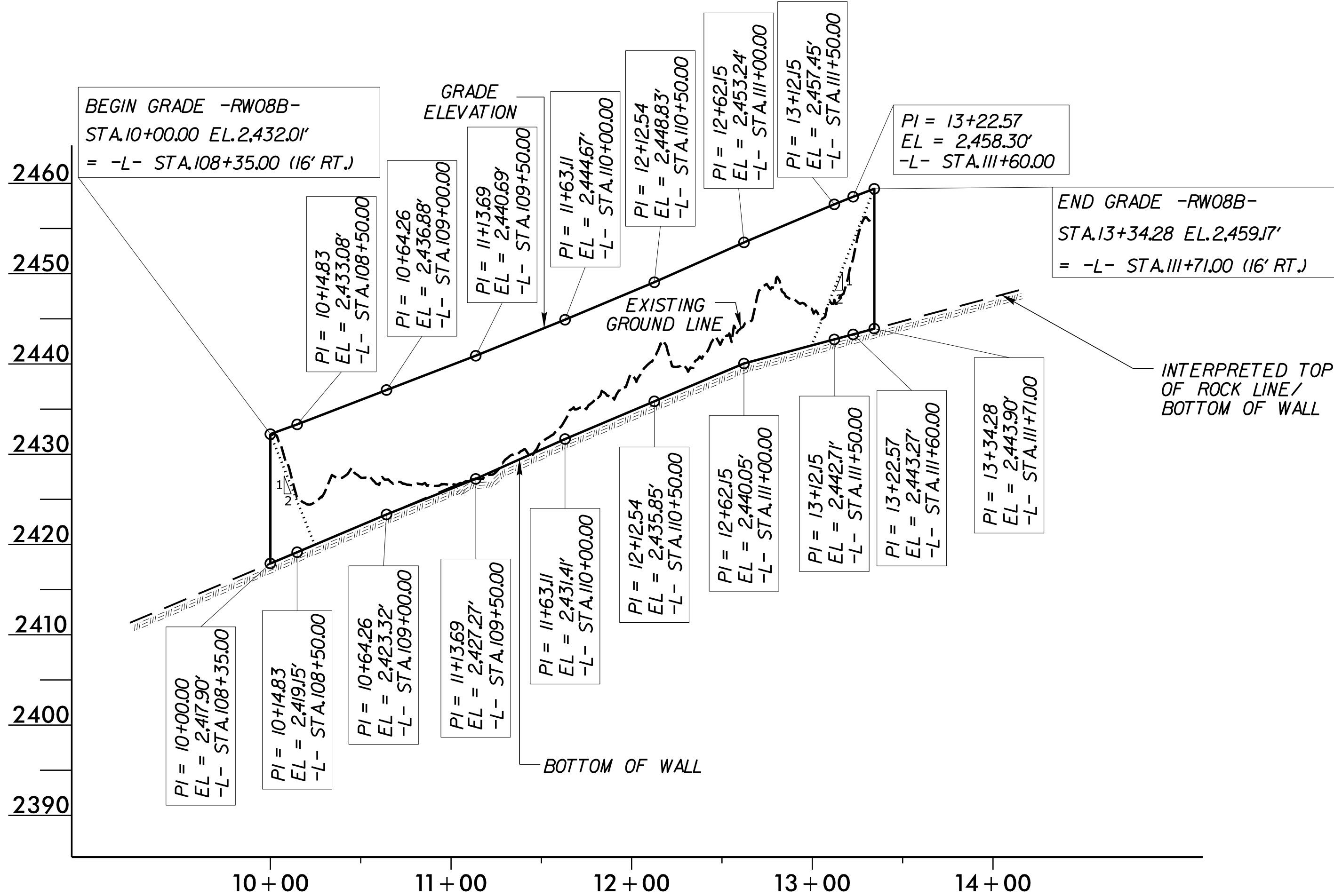
SHEET NO.
W-8

SITE 8 RETAINING WALL RW08B:



RETAINING WALL RW08B – PLAN

NOT TO SCALE



RETAINING WALL RW08B – ENVELOPE

NOT TO SCALE
(LOOKING AT FACE OF WALL)

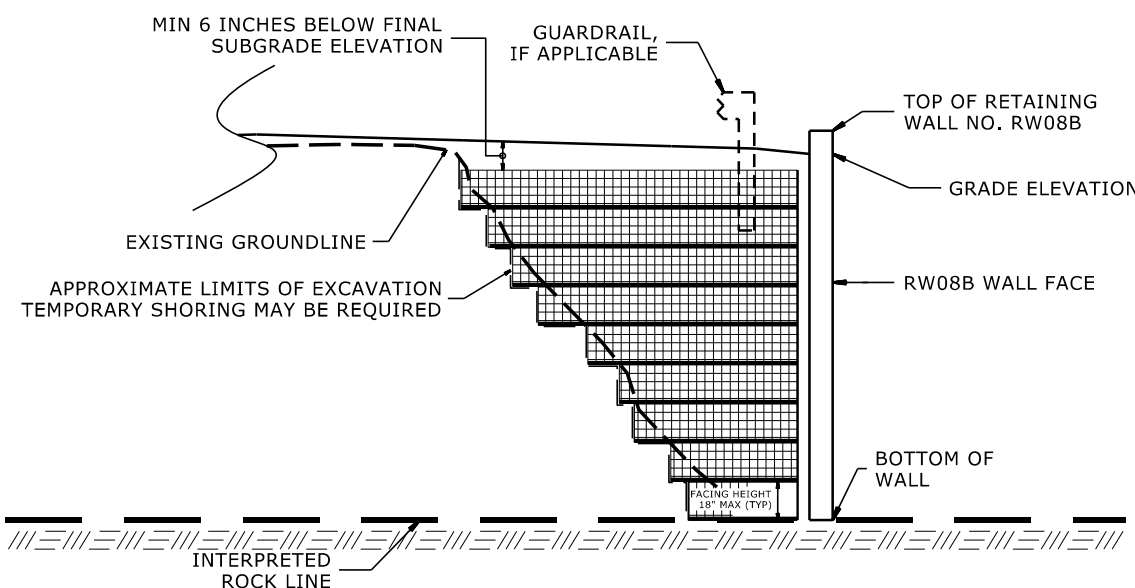
GEOTECHNICAL
ENGINEER

Signed by:
Robert E. Kral
06/25/2025
DATE

ENGINEER

SIGNATURE
DATE

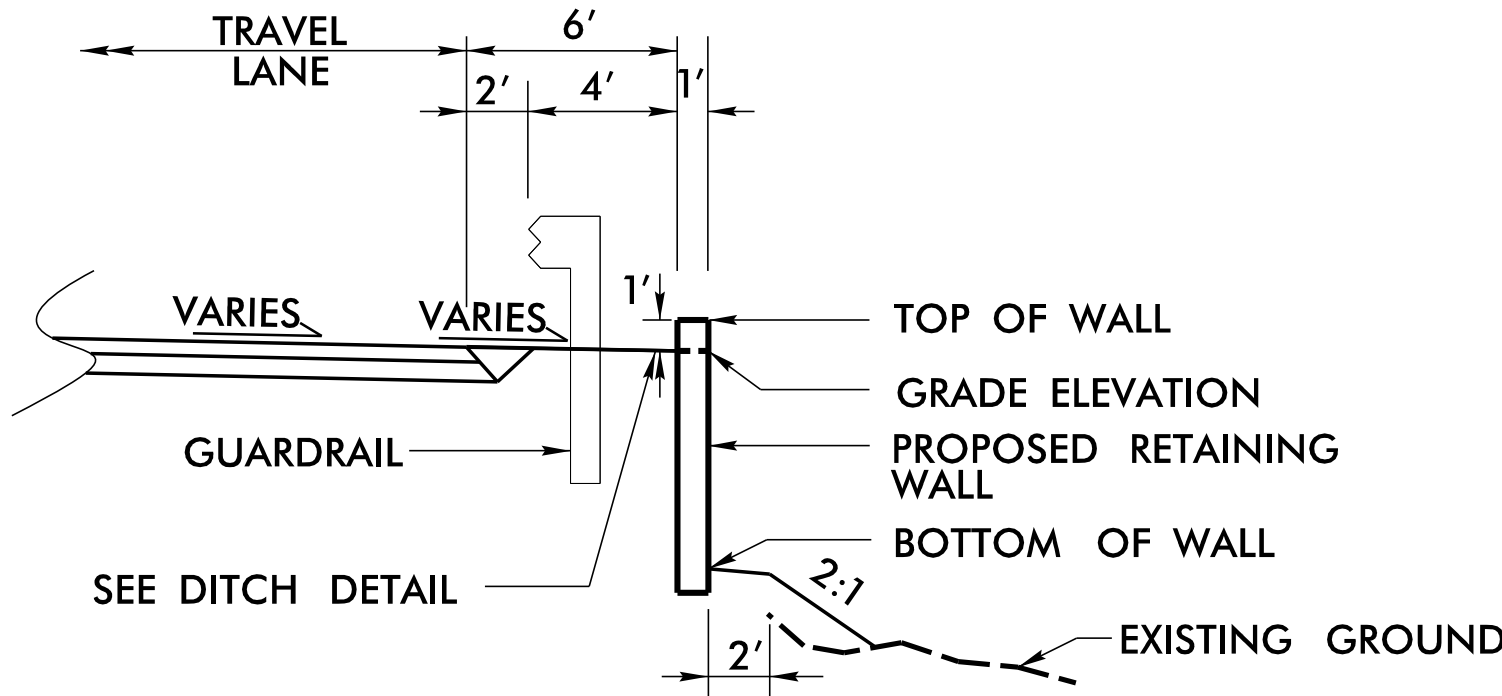
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TEMPORARY WALL AT ENDS OF RETAINING WALL RW08B
SECTION THROUGH RETAINING WALL RW08B STA. 10+00
(SECTION AT RW08B STA. 13+34.28 MIRRORED)

NOT TO SCALE

*SEE PLANS FOR FINISHED GRADE



SECTION THROUGH RETAINING WALL

-L- STA. 108 + 35.00 TO -L- STA. 111 + 71.00*
-RW08B- STA. 10 + 00.00 TO -RW08B- STA. 13 + 34.28*
*SEE WIRE BASKET WALL DETAIL AT WALL ENDS

PROJECT NO.: DF18314.2045378

HENDERSON COUNTY

RETAINING WALL RW08B: -RW08B- STA. 10+00.00 TO 13+34.28

SHEET 2 OF 7

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

RETAINING WALL RW08B ENVELOPE AND WALL LAYOUT PROVIDED RS&H MAY 2025 AND MODIFIED BY CG2.

Prepared in the Office of:


CAROLINAS
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CHARLOTTE, NC 28270
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SITE 8 RETAINING WALLS
RW08A AND RW08B
SOLDIER PILE RETAINING WALLS

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

GEOTECHNICAL
ENGINEER



Signed by:
Robert E. Kral
AAFBFF73C5E4B1

ENGINEER

SIGNATUREDATE

SIGNATUREDATE

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NOTES:

FOR SOLDIER PILE RETAINING WALLS, SEE SOLDIER PILE RETAINING WALLS WITH PANEL KEY SPECIAL PROVISION.

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

DRILLED-IN H-PILES ARE REQUIRED FOR RETAINING WALLS NO. RW08A AND RW08B.

USE A SOLDIER PILE RETAINING WALL WITH PRECAST CONCRETE PANELS THAT MEET SECTION 1077 OF THE STANDARD SPECIFICATIONS FOR RETAINING WALLS NO. RW08A AND RW08B.

AT THE CONTRACTOR'S OPTION, USE SOIL NAIL WALL ON MICROPILE SUPPORTED GRADE BEAM FOR RETAINING WALLS NO. RW08A OR RW08B. FOR SOIL NAIL SHOULDER BUILD-OUT, SEE SOIL NAIL RETAINING WALLS SPECIAL PROVISION. FOR MICROPILE 2'-6" GRADE BEAM, SEE SLOPE STABILIZATION GRADE BEAM PLANS AND MICROPILES SPECIAL PROVISION. FOR SOIL NAIL WALL ON MICROPILE SUPPORTED GRADE BEAM, SEE SHEET W-12.

BEFORE BEGINNING SOLDIER PILE WALL DESIGN FOR RETAINING WALLS NO. RW08A AND RW08B, 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 WALLS NO. RW08A AND RW08B FOR THE FOLLOWING:

- 1) DESIGN HEIGHT (H) = WALL HEIGHT + WALL EMBEDMENT
- 2) DESIGN LIFE = 75 YEARS
- 3) MINIMUM WALL EMBEDMENT DEPTH = 6 INCHES INTO CIP REINFORCED CONCRETE LEVELING PAD
- 4) ASSUMED BORROW MATERIAL PARAMETERS, SEE SECTION 1018 OF THE STANDARD SPECIFICATIONS

UNIT WEIGHT, γ = 120 PCF

FRICTION ANGLE, φ = 30 DEGREES

COHESION, c = 0 PSF
- 5) IN-SITU ASSUMED MATERIAL PARAMETERS RESIDUAL SOIL:

UNIT WEIGHT, γ = 120 PCF

FRICTION ANGLE, φ = 30 DEGREES

COHESION, c = 0 PSF
- 6) IN-SITU ASSUMED MATERIAL PARAMETERS CRYSTALLINE ROCK:

UNIT WEIGHT, γ = 170 PCF

FRICTION ANGLE, φ = 34 DEGREES

COHESION, c = 1,000 PSF

THE MINIMUM WALL EMBEDMENT FOR RETAINING WALLS NO. RW08A AND RW08B INCLUDES EMBEDMENT FOR SCOUR.

DESIGN RETAINING WALLS NO. RW08A AND RW08B FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

DESIGN RETAINING WALLS NO. RW08A AND RW08B FOR 300 LB/FT HORIZONTAL TRAFFIC IMPACT LOAD.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH GROUND ANCHORS FOR RETAINING WALLS NO. RW08A AND RW08B.

KEY THE PRECAST CONCRETE PANELS MINIMUM OF 6 INCHES INTO THE CIP REINFORCED CONCRETE LEVELING PAD AT RETAINING WALLS NO. RW08A AND RW08B.

IF THE CIP REINFORCED CONCRETE LEVELING PAD DOES NOT EXTEND A MINIMUM OF 8 INCHES BEYOND THE FACES OF THE SOLDIER PILES ON ALL SIDES, PROVIDE DOWEL REINFORCEMENT AT THE BASE OF THE LEVELING PAD INTO COMPETENT ROCK.

CAST 2 INCH DIAMETER SCHEDULE 40 PVC DRAIN PIPE WEEP HOLES. SPACING OF WEEP HOLES SHALL NOT EXCEED 10 FEET. ANCHOR 6 INCH BY 6 INCH GALVANIZED STEEL WIRE MESH, REINFORCEMENT WWR 4 X 4-W4.0 X W4.0 FIRMLY TO BACK OF PANEL AT THE END OF THE PVC WEEP HOLE PIPE.

"TEMPORARY SHORING" MAY BE REQUIRED FOR RETAINING WALLS NO. RW08A AND RW08B IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE ROADWAY OR TRAFFIC CONTROL PLANS.

TOTAL STRUCTURE QUANTITIES -
SOLDIER PILE RETAINING WALLS

RW08A	SOLDIER PILE RETAINING WALLS WITH PANEL KEY	810 SF
RW08B	SOLDIER PILE RETAINING WALLS WITH PANEL KEY	4,620 SF
TOTAL SOLDIER PILE RETAINING WALLS WITH PANEL KEY		5,430 SF

SOLDIER PILE RETAINING
WALL NO. RW08A

STA. -RW08A-	GRADE ELEVATION (FT)	PROP. BOTTOM OF WALL ELEVATION* (FT)	WALL DESIGN HEIGHT "H" (FT)
10+00.00	2,417.12	2,407.15	10.47
10+15.82	2,418.24	2,408.47	9.77
10+65.25	2,421.70	2,412.48	9.22
10+85.02	2,423.17	2,414.10	9.57

*BOTTOM OF WALL ELEVATION INTERPRETED FROM APPROXIMATE TOP OF ROCK LINE AS INDICATED BY THE BORINGS.

SOLDIER PILE RETAINING
WALL NO. RW08B

STA. -RW08B-	GRADE ELEVATION (FT)	PROP. BOTTOM OF WALL ELEVATION* (FT)	WALL DESIGN HEIGHT "H" (FT)
10+00.00	2,432.01	2,417.90	14.61
10+14.83	2,433.08	2,419.15	14.43
10+64.26	2,436.88	2,423.32	14.06
11+13.69	2,440.69	2,427.27	13.92
11+63.11	2,444.67	2,431.41	13.76
12+12.54	2,448.83	2,435.85	13.48
12+62.15	2,453.24	2,440.05	13.69
13+12.15	2,457.45	2,442.71	15.24
13+22.57	2,458.30	2,443.27	15.53
13+34.28	2,459.17	2,443.90	15.77

*BOTTOM OF WALL ELEVATION INTERPRETED FROM APPROXIMATE TOP OF ROCK LINE AS INDICATED BY THE BORINGS.

PROJECT NO.: DF18314.2045378

HENDERSON COUNTY

RETAINING WALL RW08A: -RW08A- STA. 10+00.00 TO 10+85.02

RETAINING WALL RW08B: -RW08B- STA. 10+00.00 TO 13+34.28

SHEET 3 OF 7

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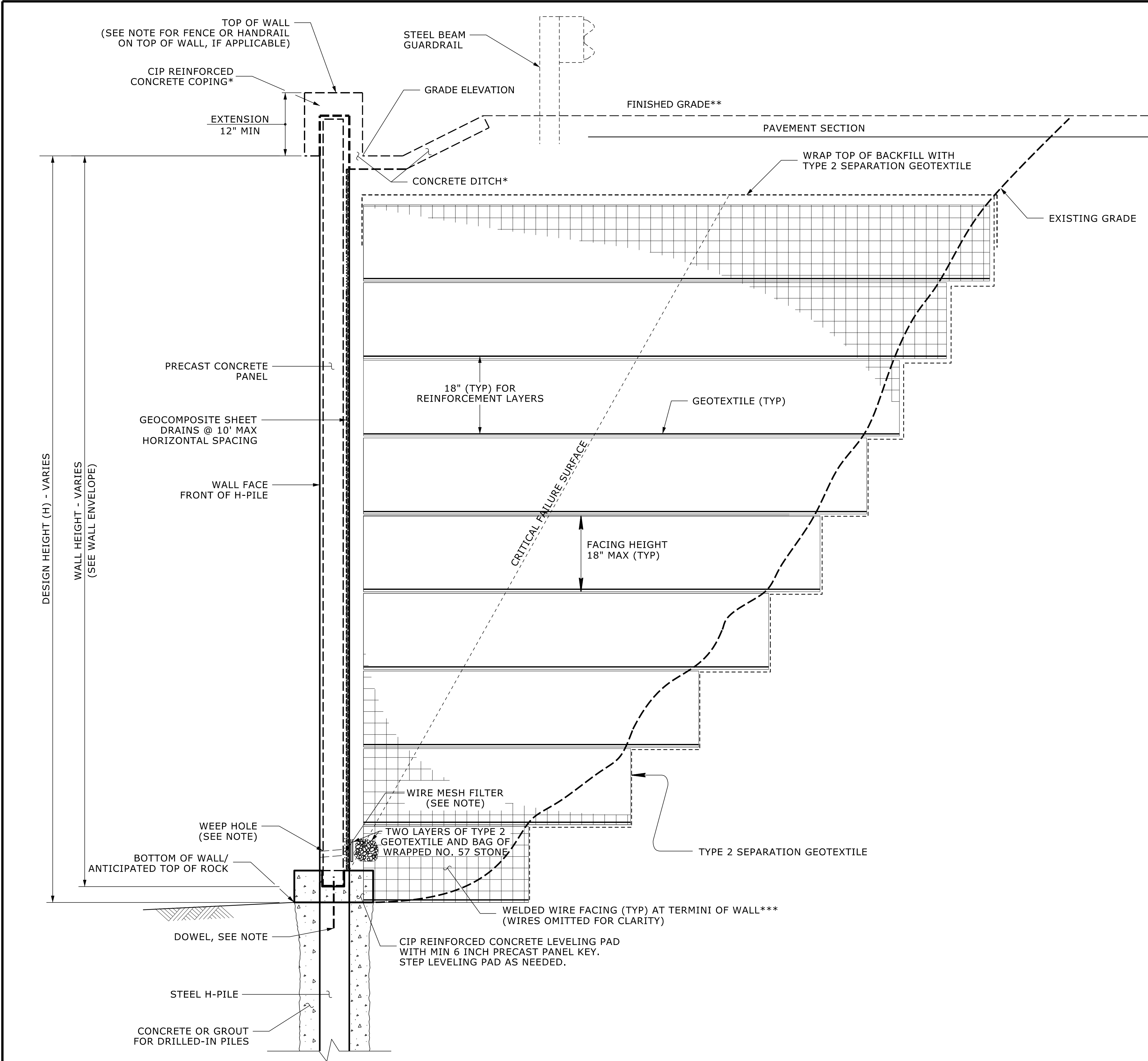
CAROLINAS
GEOTECHNICAL
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1805 SARDIS ROAD NORTH
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CHARLOTTE, NC 28270
(980) 339-8684

SITE 8 RETAINING WALLS
RW08A AND RW08B
SOLDIER PILE RETAINING WALLS

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

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25




SOLDIER PILE RETAINING WALL - TYPICAL SECTION

*SEE CONCRETE DITCH BEHIND WALL WITH PRECAST PANEL DETAILS, SHEET W-14
**SEE PLANS FOR FINISHED GRADE
***SEE TEMPORARY WALL DETAILS ON SHEET W-13

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

GEOTECHNICAL ENGINEER



Signed by:
Robert E. Kral
AAFBFF73C5E4B1
SIGNATURE

06/25/2025
DATE


ENGINEER

SIGNATURE

DATE

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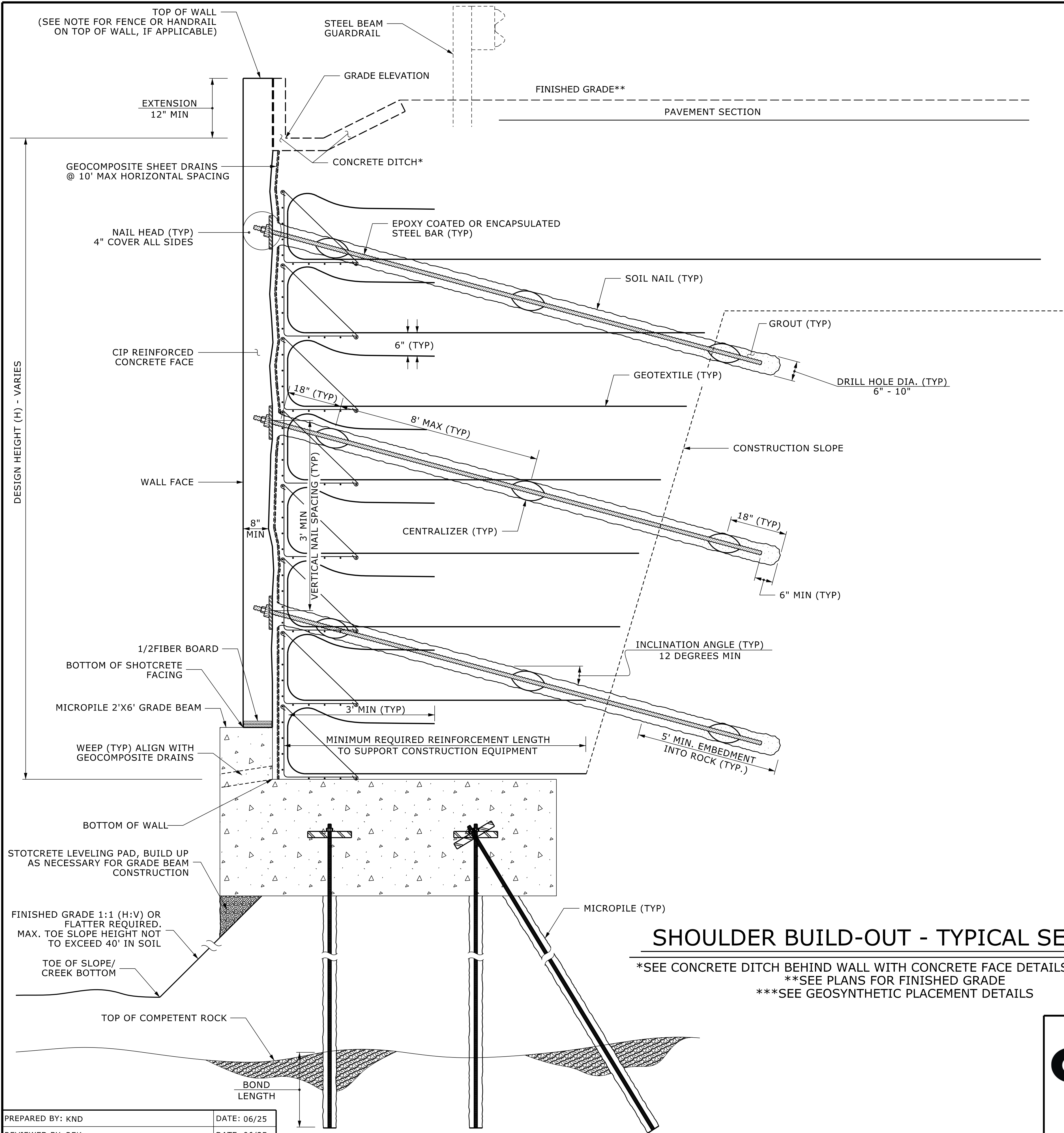
PROJECT NO.: DF18314.2045378
HENDERSON COUNTY
RETAINING WALL RW08A: -RW08A- STA. 10+00.00 TO 10+85.02
RETAINING WALL RW08B: -RW08B- STA. 10+00.00 TO 13+34.28
SHEET 4 OF 7



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SITE 8 RETAINING WALLS
RW08A AND RW08B
SOLDIER PILE RETAINING WALLS

REVISIONS						SHEET NO. W-11
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



SHOULDER BUILD-OUT - TYPICAL SECTION

*SEE CONCRETE DITCH BEHIND WALL WITH CONCRETE FACE DETAILS, SHEET W-14

**SEE PLANS FOR FINISHED GRADE

***SEE GEOSYNTHETIC PLACEMENT DETAILS

NOTES:

FOR SOIL NAIL SHOULDER BUILD-OUT, SEE SOIL NAIL RETAINING WALLS SPECIAL PROVISION.

FOR MICROPILE 2'6' GRADE BEAM, SEE SLOPE STABILIZATION GRADE BEAM PLANS AND MICROPILES SPECIAL PROVISION.

FOR MICROPILES, SEE MICROPILES SPECIAL PROVISION.

ESTABLISH THE BACK OF SOIL NAIL WALL FACE AT A 3.5' OR GREATER OFFSET FROM THE BACK OF THE EXISTING OR PROPOSED GUARDRAIL POST.

EXTEND THE TOP TWO LAYERS OF GEOTEXTILE TO CENTERLINE OF ROAD.

ESTIMATED SOIL NAIL AVERAGE LENGTH = 25'

ESTIMATED MICROPILE AVERAGE LENGTH = 20'

MINIMUM MICROPILE ROCK BOND LENGTH = 5'

MINIMUM SOIL NAIL ROCK BOND LENGTH = 5'

MINIMUM OVERALL SOIL NAIL AND MICROPILE LENGTH = 10'

AT THE TERMINI OF RETAINING WALLS NO. RW08A AND RW08B, PROVIDE WELDED WIRE MESH FACING INSTALLED PERPENDICULAR TO THE WALL FACE. SEE SHEET W-13.

PROJECT NO.: DF18314.2045378

HENDERSON COUNTY

RETAINING WALL RW08A: -RW08A- STA. 10+00.00 TO 10+85.02

RETAINING WALL RW08B: -RW08B- STA. 10+00.00 TO 13+34.28

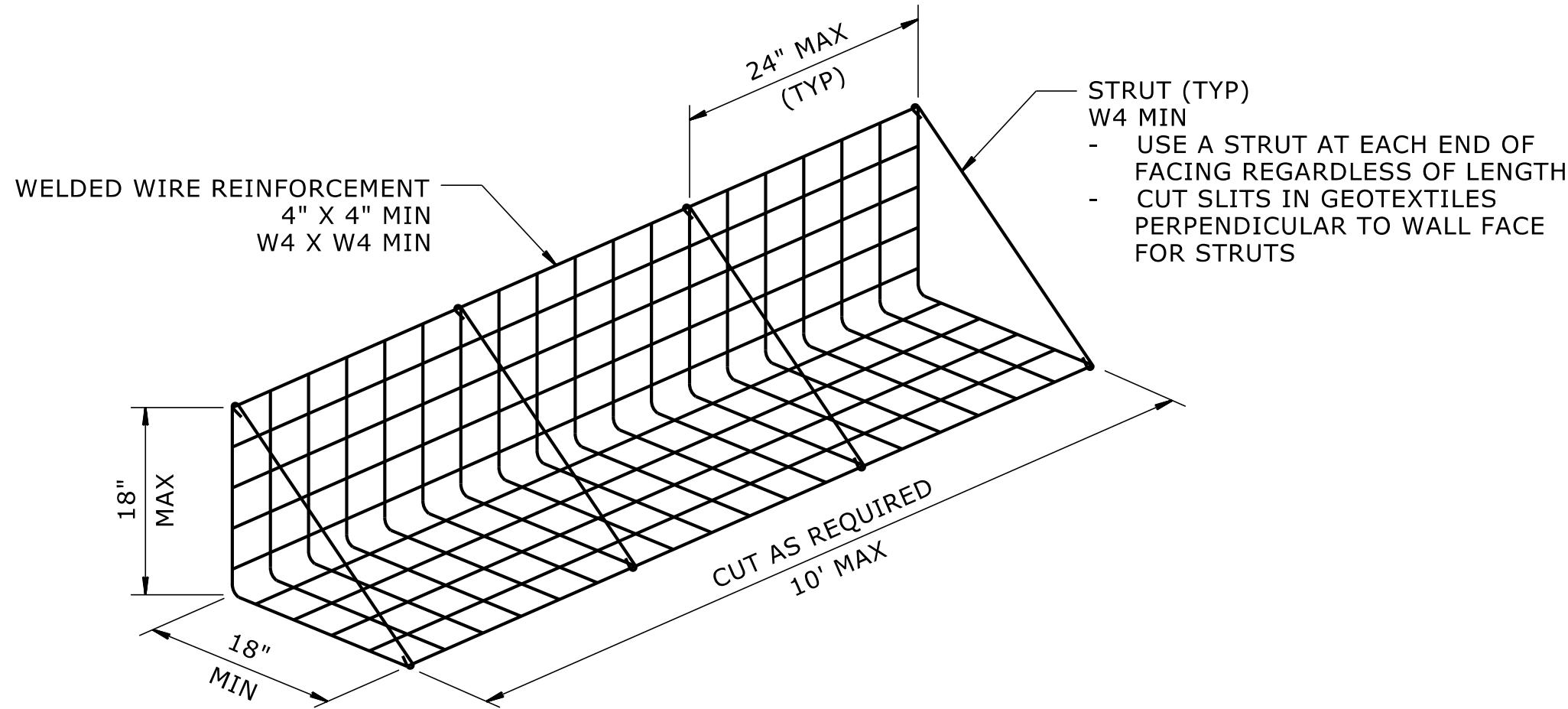
SHEET 5 OF 7

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CHARLOTTE, NC 28270
(980) 339-8684

SITE 8 RETAINING WALLS
RW08A AND RW08B
SOLDIER PILE RETAINING WALLS

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

PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25



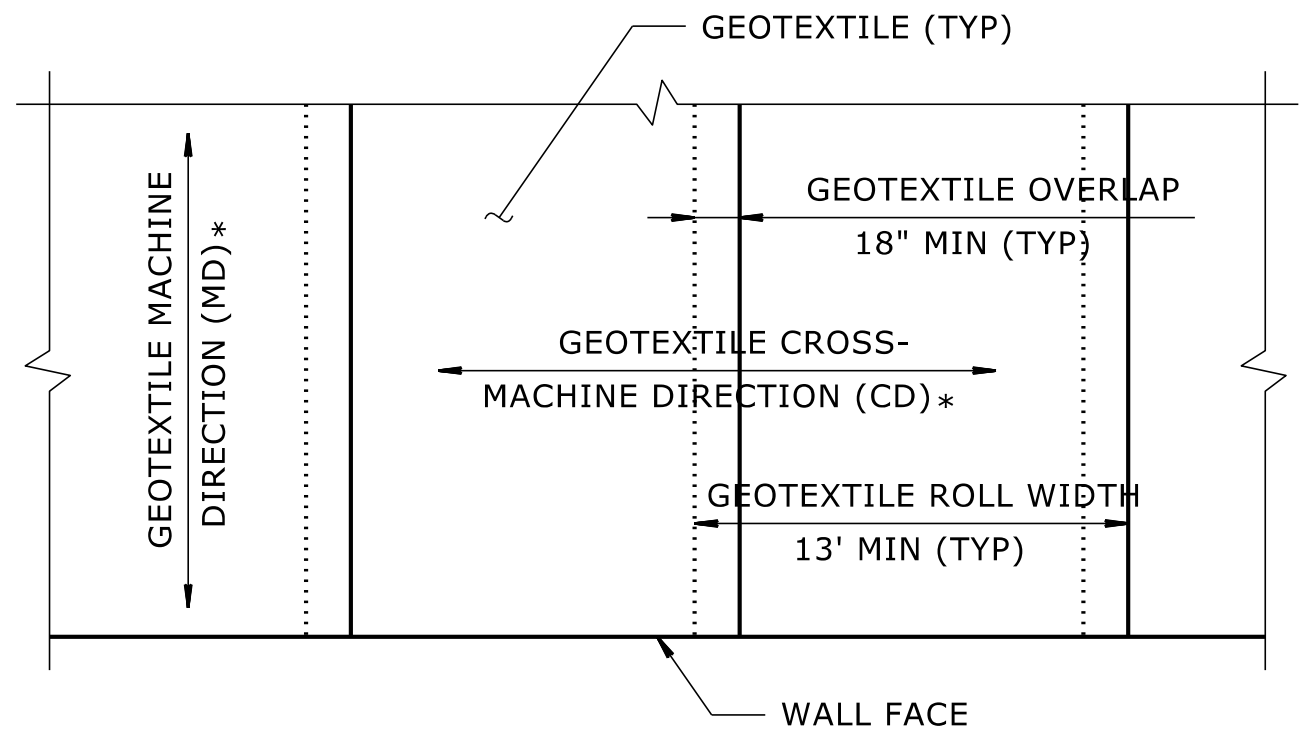
TEMPORARY WALL FACING DETAIL

NOTES:

- FOR TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
- TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF
- DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
- WALL EMBEDMENT IS NOT REQUIRED FOR TEMPORARY WALLS ON ROCK AS DETERMINED BY THE ENGINEER.
- DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
- CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.

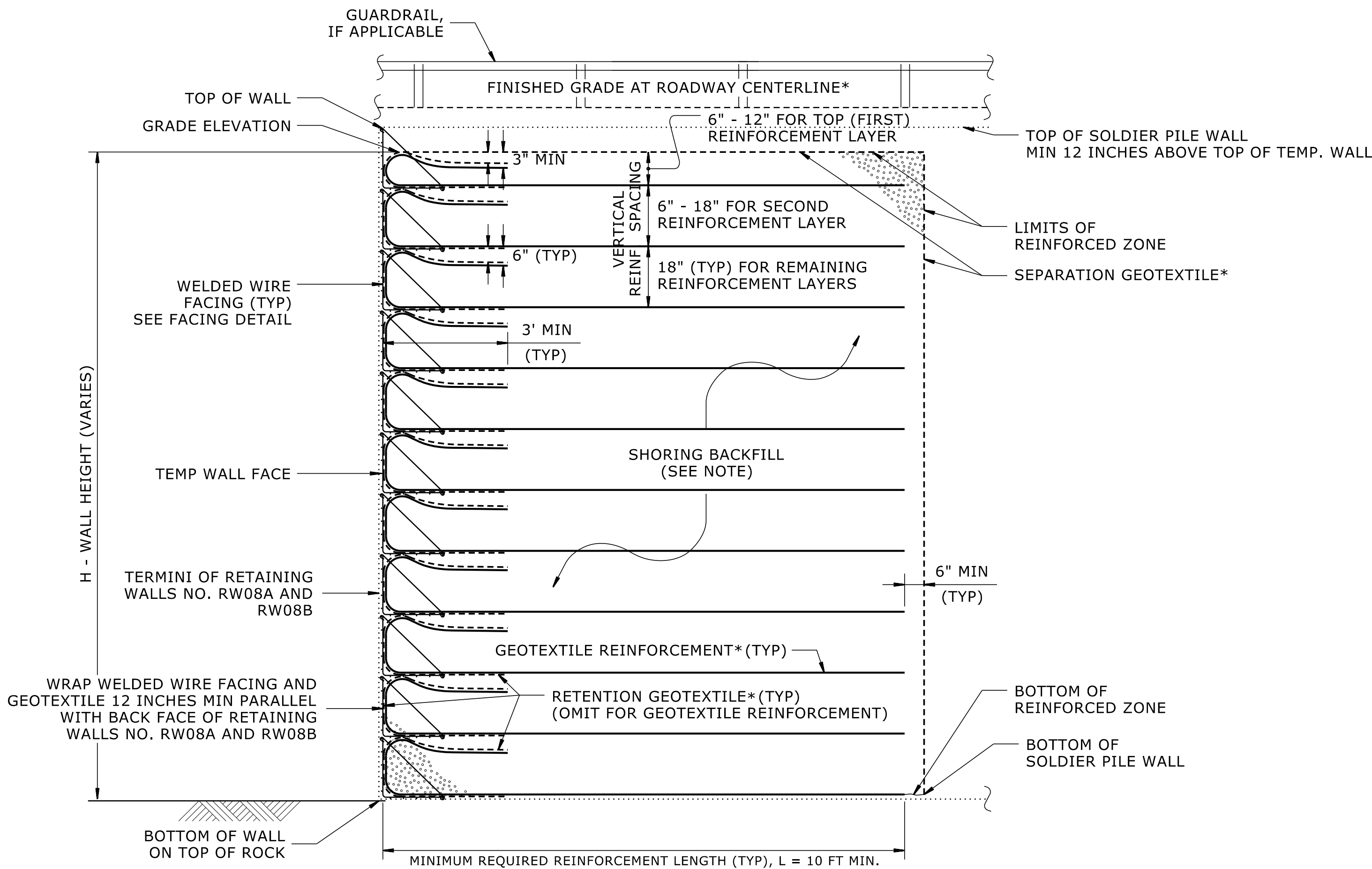
ESTIMATED TEMPORARY WALL QUANTITIES

TEMPORARY WALLS RW08A	200 SQ FT
TEMPORARY WALLS RW08B	300 SQ FT



TEMPORARY WALL GEOTEXTILE PLACEMENT DETAIL

(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)
PLAN VIEW
*SEE NOTE



TEMPORARY WALL DETAIL

LOOKING AT FACE OF BEGINNING RETAINING WALLS NO. RW08A AND RW08B
(MIRRORED FOR END OF WALL)

*SEE GEOSYNTHETIC PLACEMENT DETAILS
**SEE ROADWAY PLANS FOR FINISHED GRADE

PROJECT NO.: DF18314.2045378


HENDERSON COUNTY

RETAINING WALL RW08A: -RW08A- STA. 10+00.00 TO 10+85.02

RETAINING WALL RW08B: -RW08B- STA. 10+00.00 TO 13+34.28

SHEET 6 OF 7

GEOTECHNICAL ENGINEER



Signed by:
Robert E. Kral
AAFB8FF73C5E4B1
SIGNATURE

ENGINEER

06/25/2025
DATE

SIGNATURE

DATE

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PREPARED BY: KND	DATE: 06/25
REVIEWED BY: REK	DATE: 06/25

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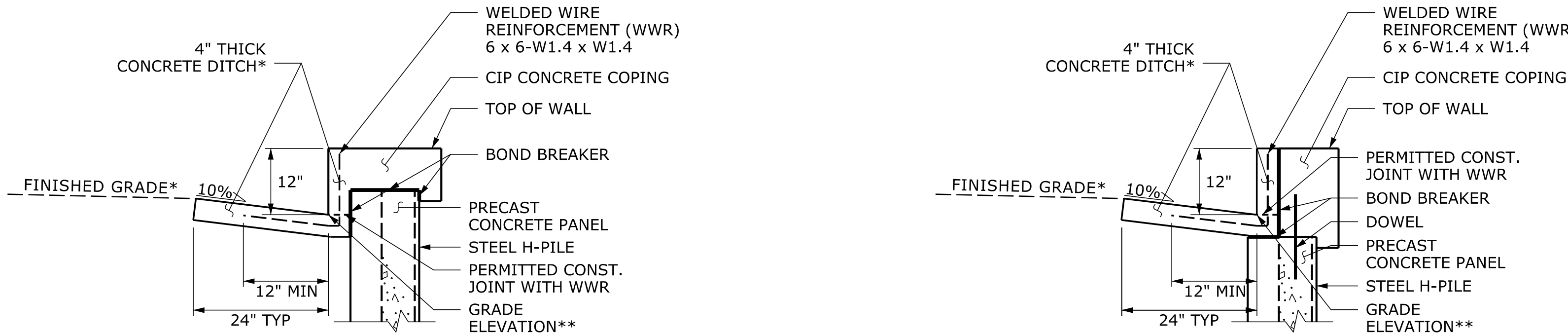


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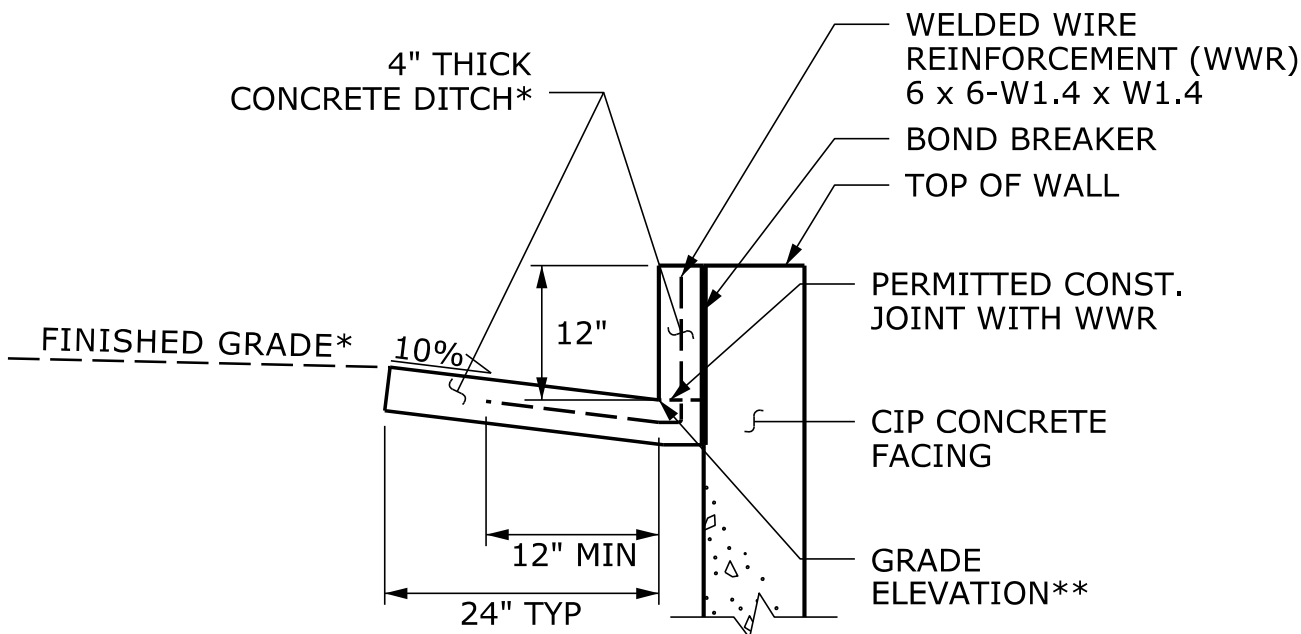
SITE 8 RETAINING WALLS
RW08A AND RW08B
SOLDIER PILE RETAINING WALLS

REVISIONS						SHEET NO. W-13
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			



CONCRETE DITCH BEHIND WALL WITH PRECAST PANEL

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



CONCRETE DITCH BEHIND WALL WITH CONCRETE FACING

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

TOTAL STRUCTURE QUANTITIES - CONTRACTORS OPTION SHOULDER BUILD-OUT RW08A

SHOTCRETE	35 CY
REINFORCING STEEL	7,200 LB
MICROPILE, AVERAGE LENGTH	75 EA
MICROPILE, ADDITIONAL LENGTH OVER AVERAGE	0 LF
MICROPILE PROOF TESTS	4 EA
GEOCOMPOSITE DRAINS	100 LF
SOIL NAIL, AVERAGE LENGTH	40 EA
SOIL NAIL, ADDITIONAL LENGTH OVER AVERAGE	0 LF
WIRE BASKET FORMS	60 EA
GEOTEXTILE FOR TEMPORARY WALL	250 SY
BORROW	95 CY

TOTAL STRUCTURE QUANTITIES - CONTRACTORS OPTION SHOULDER BUILD-OUT RW08B

SHOTCRETE	175 CY
REINFORCING STEEL	29,500 LB
MICROPILE, AVERAGE LENGTH	255 EA
MICROPILE, ADDITIONAL LENGTH OVER AVERAGE	0 LF
MICROPILE PROOF TESTS	13 EA
GEOCOMPOSITE DRAINS	500 LF
SOIL NAIL, AVERAGE LENGTH	205 EA
SOIL NAIL, ADDITIONAL LENGTH OVER AVERAGE	0 LF
WIRE BASKET FORMS	320 EA
GEOTEXTILE FOR TEMPORARY WALL	2,000 SY
BORROW	825 CY

PROJECT NO.: DF18314.2045378

HENDERSON COUNTY

RETAINING WALL RW08A: -RW08A- STA. 10+00.00 TO 10+85.02

RETAINING WALL RW08B: -RW08B- STA. 10+00.00 TO 13+34.28

SHEET 7 OF 7