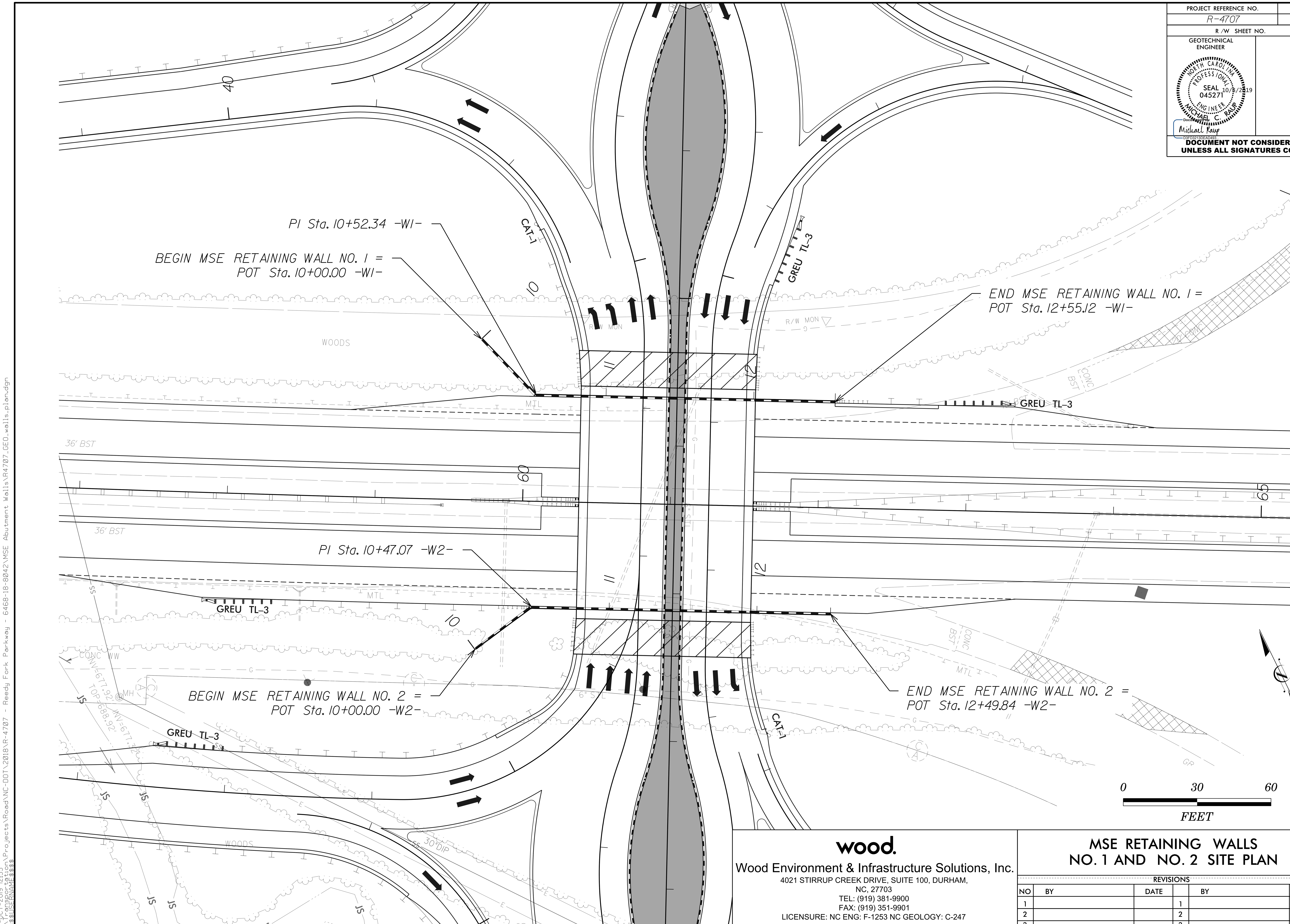
PROJECT REFERENCE NO.	SHEET NO.
R-4707	W-1
R/W SHEET NO.	

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045271 MICHAEL C. RAUP 10/8/2019

Michael Raup

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



wood.

Wood Environment & Infrastructure Solutions, Inc.
4021 STIRRUP CREEK DRIVE, SUITE 100, DURHAM, NC, 27703
TEL: (919) 381-9900
FAX: (919) 351-9901
LICENSURE: NC ENG: F-1253 NC GEOLOGY: C-247

MSE RETAINING WALLS NO. 1 AND NO. 2 SITE PLAN

REVISIONS

NO	BY	DATE	NO	BY	DATE
1			1		
2			2		
3			3		

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PROJECT REFERENCE NO.	SHEET NO.
R-4707	W-2

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 045271 10/28/2019 MICHAEL C. RAUP

Michael Raup

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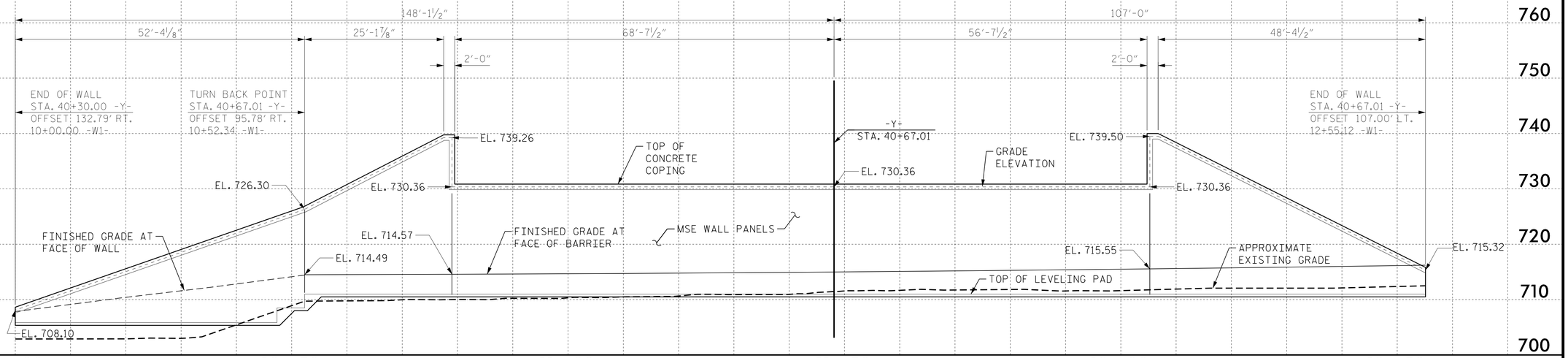
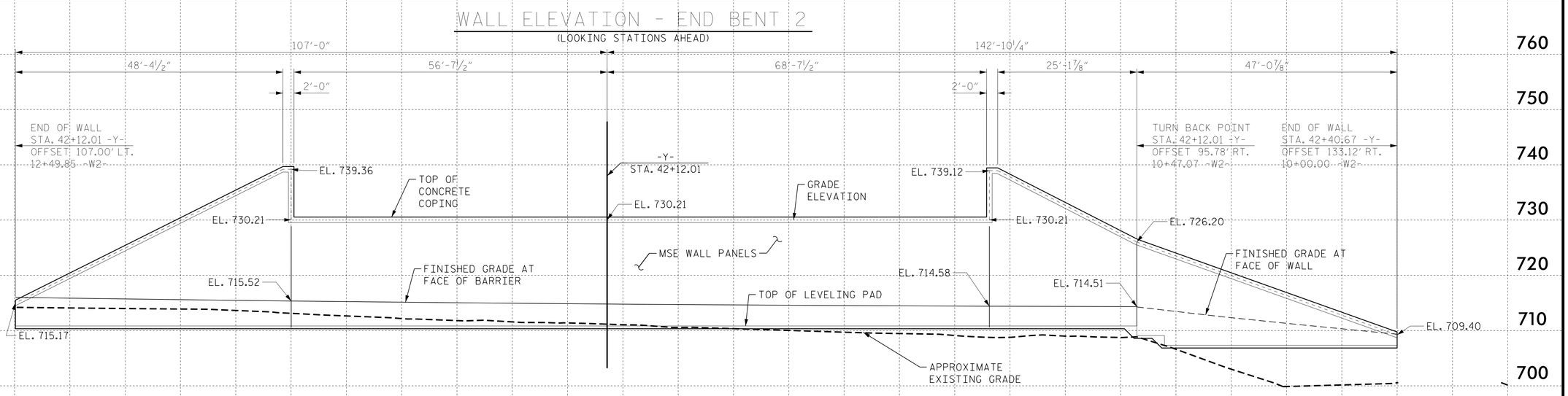
ESTIMATED MSE WALL QUANTITIES
(SQUARE FEET)

MSE RETAINING WALL NO. 1	4730 SF
MSE RETAINING WALL NO. 2	4582 SF

WALL ELEVATION - END BENT 1
(LOOKING STATIONS BACK)



WALL ELEVATION - END BENT 2
(LOOKING STATIONS AHEAD)



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MSE RETAINING WALLS NO. 1 AND NO. 2 ENVELOPES

REVISIONS

NO	BY	DATE		BY	DATE
1			1		
2			2		
3			3		

PROJECT REFERENCE NO.	SHEET NO.
R-4707	W-3

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 037422 ENGINEER JOHNSON

DocuSigned by: J. Shane Johnson 08/15/2021

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NOTES:

1. FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.
2. FOR TYPE III REINFORCED BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY DETAIL DRAWING NO. 422D10.
3. FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.
4. AT THE CONTRACTOR'S OPTION, USE FINE AGGREGATE IN THE REINFORCED ZONE OF RETAINING WALLS AT END BENT NO.1 AND NO.2.
5. CIP REINFORCED CONCRETE COPING IS REQUIRED FOR RETAINING WALLS AT END BENTS NO. 1 AND NO. 2.
6. A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALLS AT END BENTS NO.1 AND NO.2.
7. A DRAIN IS REQUIRED FOR RETAINING WALLS AT END BENTS NO.1 AND NO.2.
8. DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 PRIOR TO BEGINNING MSE WALL CONSTRUCTION.
9. INSTALLATION OF 24-INCH DIAMETER CORRUGATED METAL CANS OR YELLOW JACKET™ PILE SLEEVES AROUND THE PILES AFTER THEY ARE DRIVEN FROM THE BOTTOM OF THE PILE CAP TO THE LEVELING PAD ELEVATION IS REQUIRED FOR PILES AT END BENT NO. 1 AND END BENT NO. 2 .
10. THE CORRUGATED METAL CANS SHALL BE DESIGNED TO WITHSTAND THE PRESSURES FROM COMPACTION OPERATIONS ON ADJACENT FILL WITHOUT DISTORTION. AT A MINIMUM, CORRUGATED METAL CANS SHALL BE 16-GUAGE WITH A WALL THICKNESS OF 0.064 INCHES.
11. LOOSELY BACKFILL CORRUGATED METAL CANS USING THE SAME MATERIAL AS MSE REINFORCED ZONE PRIOR TO CONSTRUCTION OF THE END BENT PILE CAP. DO NOT COMPACT MATERIAL WITHIN THE CAN.
12. DESIGN RETAINING WALLS AT END BENTS NO.1 AND NO. 2 FOR THE FOLLOWING:

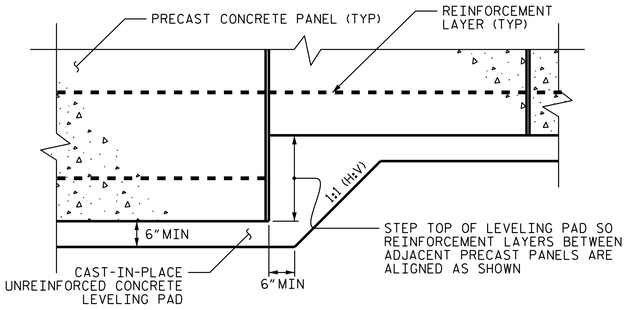
1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 5,500 LB/SF
4) MINIMUM REINFORCEMENT LENGTH (L) = 1.3 H OR 6 FT, WHICHEVER IS LONGER
5) MINIMUM EMBEDMENT DEPTH = 2 FT
6) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
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) LB/CF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) LB/SF
BACKFILL	120	30	0
FOUNDATION	120	30	100

13. DESIGN RETAINING WALLS AT END BENTS NO. 1 AND NO.2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.
14. 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.1 AND END BENT NO. 2 LOCATED AT STATIONS 40+67.01 -Y- AND 42+12.01 -Y- RESPECTIVELY. MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.
15. BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALLS AT END BENTS NO. 1 AND NO. 2, 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.
16. DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALLS AT END BENTS NO.1 AND NO.2 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
17. FOUNDATIONS FOR SIGNS OR LIGHTING MAY BE LOCATED BEHIND RETAINING WALLS AT END BENTS NO.1 AND NO.2 AND MAY INTERFERE WITH REINFORCEMENT. BEFORE BEGINNING MSE WALL CONSTRUCTION, SUBMIT PROPOSED CONSTRUCTION METHODS FOR THESE FOUNDATIONS FOR APPROVAL.
18. EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALLS AT END BENTS NO. 1 AND NO. 2.
19. UNDERCUT SOFT CLAY AT END BENT NO.1 AND END BENT NO.2, IF ENCOUNTERED, TO SUITABLE MATERIAL. BACKFILL UNDERCUT MATERIAL WITH SUITABLE BORROW MATERIAL OR THE SAME MATERIAL AS THE MSE BACKFILL.
20. FINAL GRADING AT BACK OF THE MSE RETAINING WALLS AT END BENT NO. 1 AND END BENT NO. 2 SHOULD NOT BE STEEPER THAN 2:1 (H:V) AT ANY POINT.



PRECAST PANELS LEVELING PAD STEP DETAIL

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LICENSURE: NC ENG: F-1253 NC GEOLOGY: C-247

MSE RETAINING WALLS NO. 1 AND NO. 2 NOTES

REVISIONS

NO	BY	DATE	NO	BY	DATE
1			1		
2			2		
3			3		

PROJECT REFERENCE NO.	SHEET NO.
R-4707	W-4

GEOTECHINCAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 045271 ENGINEER MICHAEL C. RAUP 10/8/2019

Michael Raup

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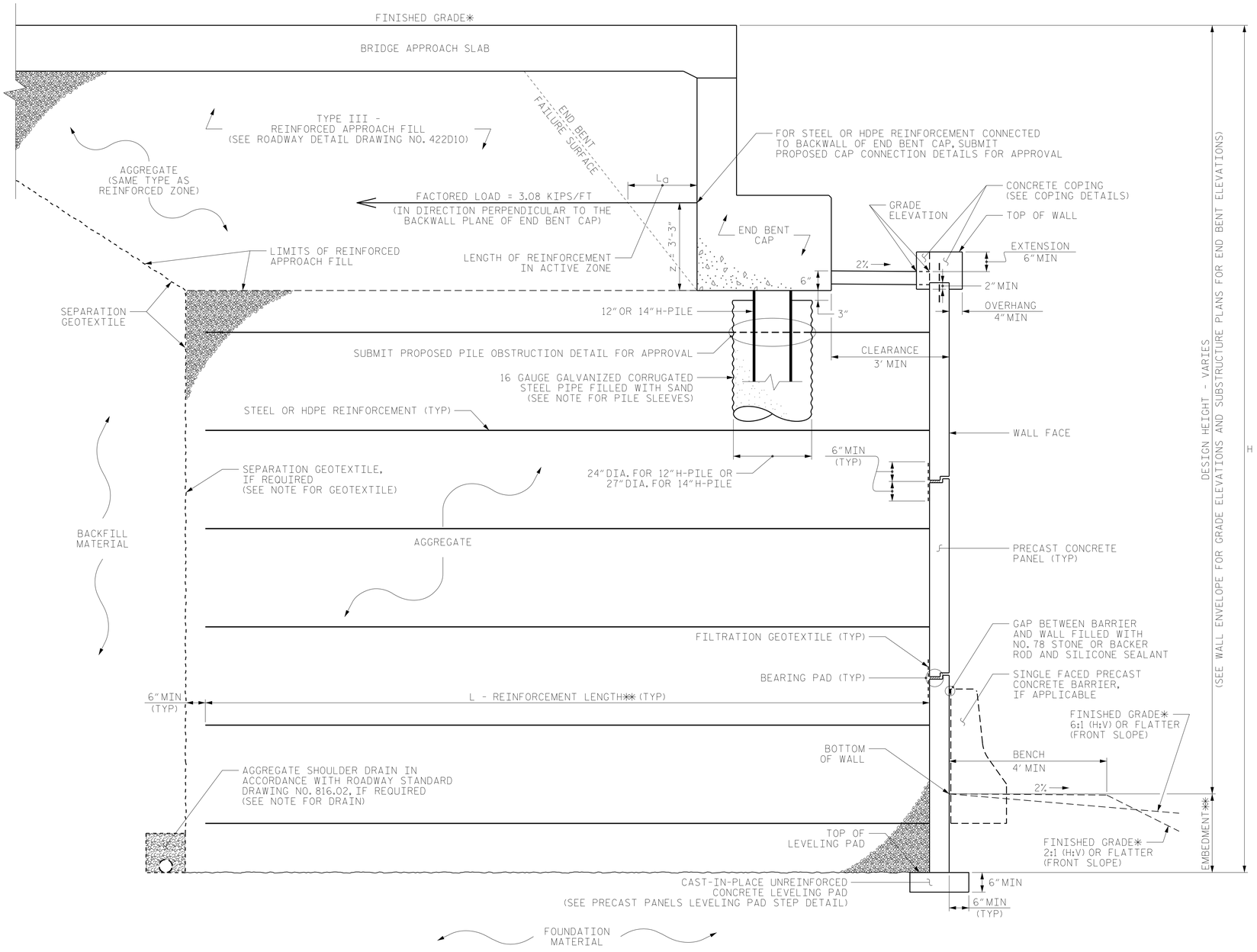
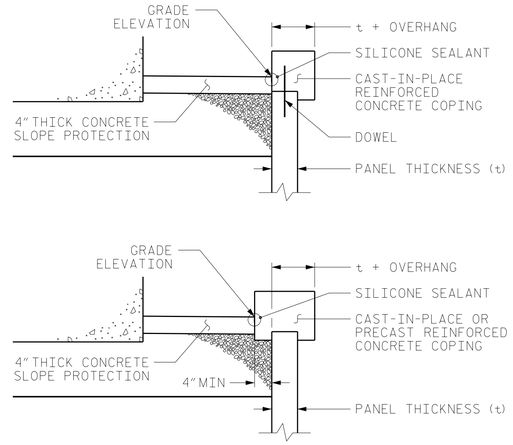


MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

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



COPING DETAILS

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

PREPARED BY: ROYA RAHIE

REVIEWED BY: SHANE JOHNSON

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MSE RETAINING WALLS NO. 1 AND NO. 2 SECTION AT BRIDGE ABUTMENT

REVISIONS

NO	BY	DATE		BY	DATE
1			1		
2			2		
3			3		

PROJECT REFERENCE NO.	SHEET NO.
R-4707	W-5

GEOTECHINCAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 045277 ENGINEER MICHAEL C. RAUB
10/8/2019
DocuSigned by: Michael Raub

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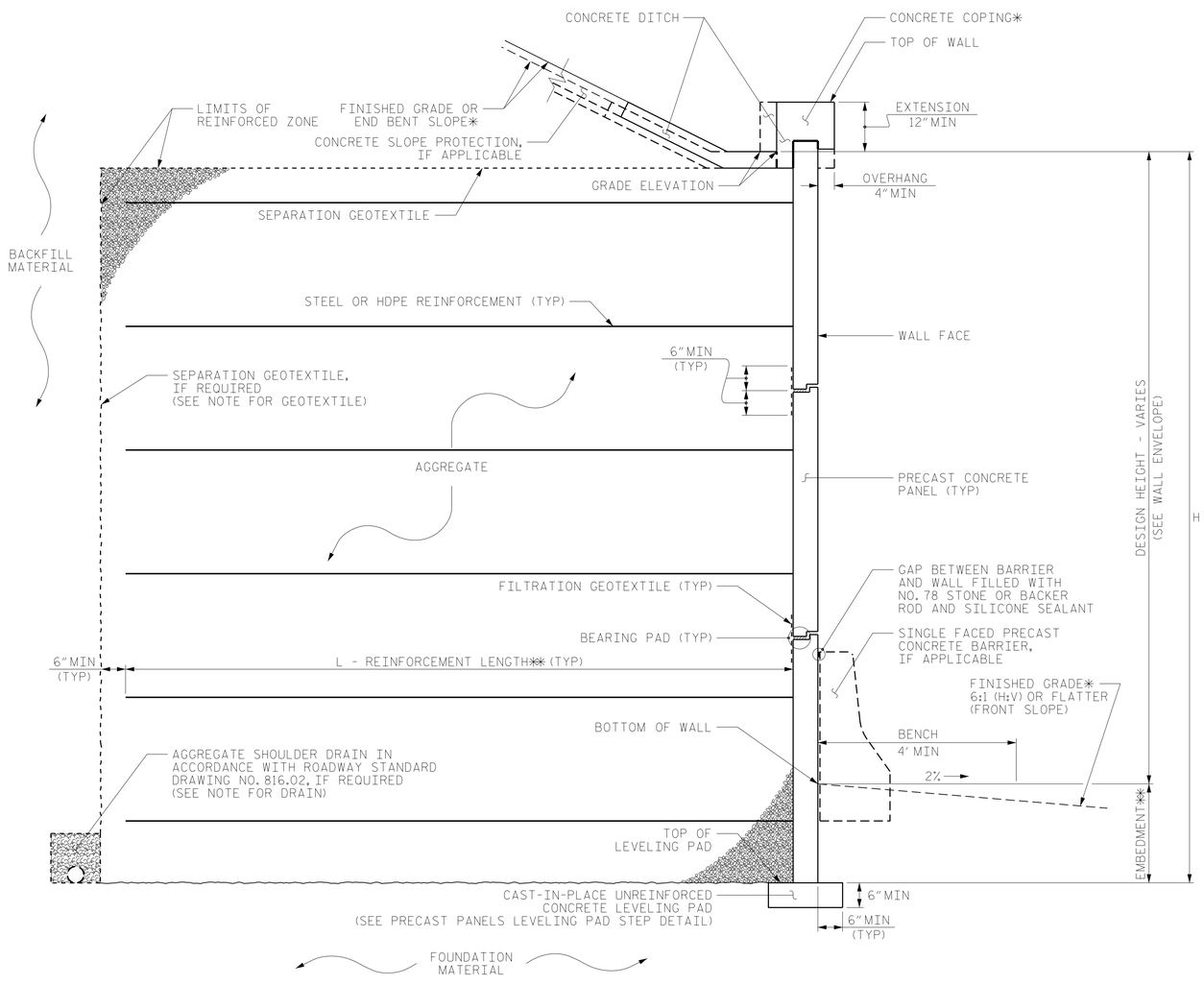
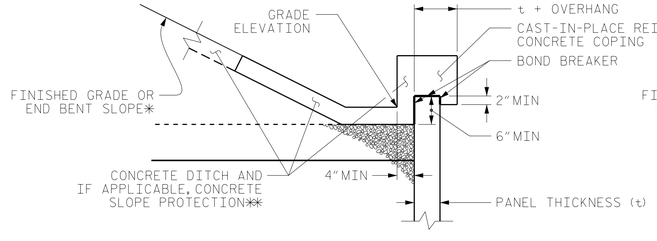
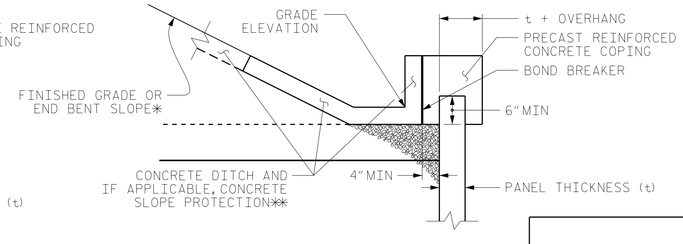


MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

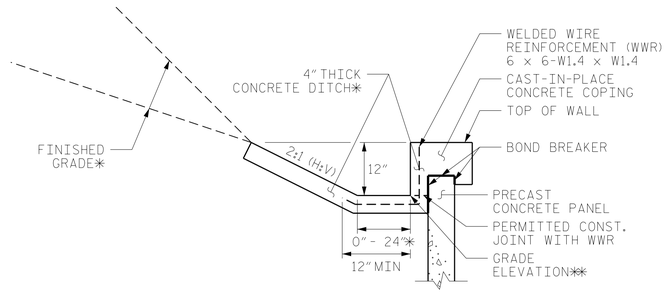
*SEE COPING DETAILS AND PLANS FOR FINISHED GRADE OR END BENT SLOPE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

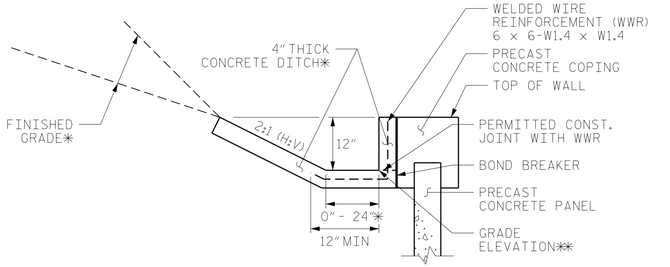




COPING DETAILS

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





MSE WALL WITH PRECAST PANELS

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.

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PREPARED BY: ROYA RAHIE

REVIEWED BY: SHANE JOHNSON

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MSE RETAINING WALLS NO. 1 AND NO. 2 TYPICAL SECTIONS

REVISIONS

NO	BY	DATE		BY	DATE
1			1		
2			2		
3			3		