

0400DEL-P30

RETAINING WALL 2 NOTES

DESIGN MSE RETAINING WALLS FOR THE FOLLOWING:
 A) H = DESIGN HEIGHT + EMBEDMENT
 B) MINIMUM DESIGN LIFE = 100 YEARS
 C) MAXIMUM FACTORED BEARING VERTICAL STRESS ON FOUNDATION MATERIAL SHALL BE AS SHOWN IN THE TABLE BELOW.
 D) MSE WALLS SOIL REINFORCEMENT LENGTH SHALL BE AS SHOWN IN THE TABLE BELOW TO SATISFY EXTERNAL AND GLOBAL STABILITY.

STATION		REINFORCEMENT LENGTH RATIO	MAXIMUM FACTORED VERTICAL STRESS ON FOUNDATION MATERIAL	REQUIRED EMBEDMENT DEPTH RATIO
FROM	TO		PSF	
-WALL2-29+50.33	-WALL2-30+73.08	GREATER OF 8 FEET OR 1.0H *	3,000	GREATER OF 2 FEET OR H/10
-WALL2-30+73.08	-WALL2-32+01.72	GREATER OF 8 FEET OR 1.0H	3,000	GREATER OF 2 FEET OR H/10

*MSE WALL SOIL REINFORCEMENT IN THE OVERLAP AREA OF WALL 1 AND WALL 2 BETWEEN STATIONS -WALL2- 29+50.33 AND 33+73.08 SHALL EXTEND FROM BACKFACE OF WALL 2 TO THE BURIED FRONT FACE OF WALL 1 (REINFORCEMENT LENGTH BETWEEN THESE STATIONS IS APPROXIMATELY 13 FEET).

E) AGGREGATE PARAMETERS:

AGGREGATE TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (C) PSF
COARSE AGGREGATE	110	38	0

F) IN-SITU ASSUMED MATERIAL PROPERTIES:

MATERIAL STANDARD SIZE NO. (IN ACCORDANCE WITH SECTIONS 1005 AND 1014 OF THE NCDOT STANDARD SPECIFICATIONS)	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (C) PSF
RANDOM BACKFILL	120	30	0

G) FOUNDATION SOILS:

STATION		UNIT WEIGHT (γ) PCF	DRAINED FRICTION ANGLE (φ') DEGREES	DRAINED COHESION (C') PSF	UNDRAINED SHEAR STRENGTH (Su) PSF
FROM	TO				
-WALL2-29+50.33	-WALL2-32+01.72	110	28	0	900

H) DESIGN RETAINING WALL 2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

CONSTRUCTION OF MSE RETAINING WALL 2 SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

- OBSERVE A 1-MONTH WAITING PERIOD AFTER CONSTRUCTING THE PRECAST WALL PANELS TO THE FINAL DESIGN HEIGHT. THE GRADE BEHIND THE WALL PANELS INCLUDING THE REINFORCED ZONE AND THE EMBANKMENT SHALL BE AT THE ELEVATION OF THE BOTTOM OF THE PROPOSED PAVEMENT STRUCTURE.
- CAST-IN-PLACE REINFORCED CONCRETE COPING IS REQUIRED FOR MSE WALL 2. CONSTRUCT COPING, PERFORM FINAL GRADING AND PAVING OPERATIONS AFTER THE WAITING PERIOD HAS ENDED WITH THE APPROVAL OF GEOTECHNICAL ENGINEER.

RETAINING WALL 3 NOTES

DESIGN MSE RETAINING WALLS FOR THE FOLLOWING:
 A) H = DESIGN HEIGHT + EMBEDMENT
 B) MINIMUM DESIGN LIFE = 100 YEARS
 C) MAXIMUM FACTORED BEARING VERTICAL STRESS ON FOUNDATION MATERIAL SHALL BE AS SHOWN IN THE TABLE BELOW.
 D) MSE WALLS SOIL REINFORCEMENT LENGTH SHALL BE AS SHOWN IN THE TABLE BELOW TO SATISFY EXTERNAL AND GLOBAL STABILITY.

STATION		REINFORCEMENT LENGTH RATIO	MAXIMUM FACTORED VERTICAL STRESS ON FOUNDATION MATERIAL	REQUIRED EMBEDMENT DEPTH RATIO
FROM	TO		PSF	
-WALL3-16+37.04	-WALL3-17+25	GREATER OF 8 FEET OR 1.1H	2,500	GREATER OF 2 FEET OR H/10
-WALL3-17+25	-WALL3-21+23.89	1.1H	4,000	GREATER OF 2 FEET OR H/10

E) AGGREGATE PARAMETERS:

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

F) IN-SITU ASSUMED MATERIAL PROPERTIES:

MATERIAL STANDARD SIZE NO. (IN ACCORDANCE WITH SECTIONS 1005 AND 1014 OF THE NCDOT STANDARD SPECIFICATIONS)	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (φ) DEGREES	COHESION (C) PSF
RANDOM BACKFILL	120	32	0

G) FOUNDATION SOILS:

STATION		UNIT WEIGHT (γ) PCF	DRAINED FRICTION ANGLE (φ') DEGREES	DRAINED COHESION (C') PSF	UNDRAINED SHEAR STRENGTH (Su) PSF
FROM	TO				
-WALL3-16+37.04	-WALL3-17+75	115	28	0	650
-WALL3-17+75	-WALL3-21+23.89	115	28	0	800

H) DESIGN RETAINING WALL 3 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

CONSTRUCTION OF MSE RETAINING WALL 3 SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

- CONSTRUCT THE PRECAST WALL PANELS TO THE FINAL DESIGN HEIGHT. THE GRADE BEHIND THE WALL PANELS INCLUDING THE REINFORCED ZONE AND THE EMBANKMENT SHALL BE AT THE ELEVATION OF THE BOTTOM OF THE PROPOSED PAVEMENT STRUCTURE.
- PERFORM SETTLEMENT MONITORING AS SPECIFIED IN NOTES BELOW. A 3-MONTH WAITING PERIOD IS ANTICIPATED TO ACHIEVE THE ESTIMATED SETTLEMENT OF 4 INCHES BENEATH THE MSE WALL.
- CAST-IN-PLACE REINFORCED CONCRETE COPING IS REQUIRED FOR MSE WALL 3. CONSTRUCT COPING, PERFORM FINAL GRADING AND PAVING OPERATIONS AFTER THE WAITING PERIOD HAS ENDED FOLLOWING THE PROCEDURES IN NOTES BELOW WITH THE APPROVAL OF GEOTECHNICAL ENGINEER.
- POST CONSTRUCTION SETTLEMENT OF UP TO 1 INCH SHOULD BE EXPECTED UNDER THE MSE WALL.

INSTALL SETTLEMENT MONITORING PLATES 15 FEET BEHIND THE BACK FACE OF THE FIRST ROW OF MSE WALL PANELS AT THE LEVELING PAD BEARING ELEVATION.

SETTLEMENT PLATES SHALL BE INSTALLED AT APPROXIMATE STATIONS -L-17+00, -L-18+25 AND -L-19+75 TO MONITOR SETTLEMENTS DURING THE CONSTRUCTION AND WAITING PERIOD.

CONTINUE SETTLEMENT MONITORING DURING CONSTRUCTION AND RECORD READINGS USING THE EMBANKMENT SETTLEMENT GAUGE FORM PROVIDED BY NCDOT. THE INFORMATION SHOULD INCLUDE TOP OF EXISTING PIPE AND TOP OF NEW PIPE WHENEVER AN EXTENSION IS ADDED, EMBANKMENT ELEVATION AT TIME OF PIPE EXTENSION AND EMBANKMENT ELEVATION AT TIME OF EACH SETTLEMENT READING.

THE FOLLOWING MINIMUM SETTLEMENT READINGS SHALL BE OBTAINED BY THE PROJECT SURVEYOR AND PROVIDED TO THE GEOTECHNICAL ENGINEER TO DETERMINE WHEN THE WAITING PERIOD MAY BE STOPPED.
 (A) IMMEDIATELY AFTER PLATE INSTALLATION
 (B) WHEN HALF OF THE MSE WALL FILL IS PLACED
 (C) ONCE A WEEK DURING THE WAITING PERIOD

RETAINING WALL 3 NOTES (CONT'D)

SETTLEMENT MONITORING DEVICES SHALL BE PROTECTED AT ALL TIMES AGAINST DAMAGE BY CONSTRUCTION EQUIPMENT, VEHICLES AND PERSONNEL.

INCLUDE SURVEY POINTS ON THE FRONT FACE OF PANELS IMMEDIATELY ABOVE THE LEVELING PAD FOLLOWING PANEL INSTALLATION AT APPROXIMATE STATIONS -L-17+00, -L- 18+25 AND -L- 19+75 TO MONITOR THE VERTICAL AND HORIZONTAL MOVEMENTS OF MSE WALL 3 DURING AND AFTER CONSTRUCTION. READINGS SHOULD BE OBTAINED ONCE A WEEK AND PROVIDED TO THE GEOTECHNICAL ENGINEER.

LIGHTWEIGHT AGGREGATE MEETING THE REQUIREMENTS OF MSE RETAINING WALLS SPECIAL PROVISIONS SHALL BE REQUIRED IN THE MSE WALL REINFORCED ZONE BETWEEN ELEVATIONS SHOWN IN THE TABLE BELOW AND THE BOTTOM OF PROPOSED PAVEMENT SUBGRADE ELEVATION.

STATION		LIGHTWEIGHT AGGREGATE BOTTOM ELEVATION
FROM	TO	
-WALL3- 17+25	-WALL3- 18+25	+751 FEET
-WALL3- 18+25	-WALL3- 19+00	+749 FEET
-WALL3- 19+00	-WALL3- 21+23.89	VARIES (BEGIN AT LEVELING PAD ELEV.)

INSTALL GEOTEXTILE SEPARATION FABRIC AT THE BOTTOM OF THE LIGHTWEIGHT AGGREGATE AND AT INTERFACES BETWEEN DIFFERENT FILL MATERIALS AS SHOWN IN THE DRAWINGS. GEOTEXTILE SHALL MEET THE REQUIREMENTS OF THE NCDOT STANDARD SPECIFICATIONS SECTION 1056, TYPE 2.

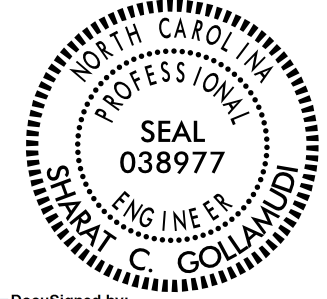
LIGHTWEIGHT AGGREGATE MEETING THE REQUIREMENTS OF LIGHTWEIGHT AGGREGATE SPECIAL PROVISIONS SHALL BE REQUIRED IN THE EMBANKMENT BETWEEN ELEVATIONS SHOWN IN THE TABLE BELOW AND THE BOTTOM OF PROPOSED PAVEMENT SUBGRADE ELEVATION.

STATION		LIGHTWEIGHT AGGREGATE BOTTOM ELEVATION
FROM	TO	
-L- 17+25	-L- 20+05 *	+759 FEET

*TIE TO THE END OF REINFORCED ZONE FOR MSE WALL 3 AT END BENT 1.

INSTALL GEOTEXTILE SEPARATION FABRIC AT THE BOTTOM AND TOP OF THE LIGHTWEIGHT AGGREGATE AND AT INTERFACES BETWEEN DIFFERENT FILL MATERIALS AS SHOWN. GEOTEXTILE SHALL MEET THE REQUIREMENTS OF THE NCDOT STANDARD SPECIFICATIONS SECTION 1056, TYPE 2.


FILL WITHIN THE MSE RETAINING WALL 3 REINFORCED ZONE AND ROADWAY EMBANKMENT ADJACENT TO THE REINFORCED ZONE SHALL BE PLACED IN LIFTS CONCURRENTLY. LIGHTWEIGHT AGGREGATE WITHIN THE EMBANKMENT SHALL BE CONSTRUCTED FOLLOWING THE LINES AND GRADES AS SHOWN.

GEOTECHNICAL ENGINEER  DocuSigned by: G. Gollamudi 2/19/2015	ENGINEER _____ DATE _____ SIGNATURE
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DRAWN BY: E. C. DECOLA	DATE: 10/22/14
CHECKED BY: R. C. LARSON	DATE: 10/22/14
PREPARED BY: R. RAHIE	DATE: 01/07/15
REVIEWED BY: S. C. GOLLAMUDI	DATE: 01/07/15

PROJECT NO.: U-5008
MECKLENBURG COUNTY
STATION: 20+45.05 -L- P.O.T = 14+54.24 -Y4- P.O.T.

 AMEC E&I, Inc. 4021 STIRRUP CREEK DRIVE, SUITE 100 DURHAM, NORTH CAROLINA 27703 (919) 381-9900 NC Engineering F-1253 NC Geology C-247		MSE RETAINING WALL NOTES		SHEET NO. W-5 TOTAL SHEETS 19	
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		