


PROJECT REFERENCE NO. R-4753		SHEET NO. W-6
GEOTECHNICAL ENGINEER  DocuSigned by: Scott Webb 1/3/2017		ENGINEER
SIGNATURE		DATE

NOTES:

- FOR PILE WALLS WITH OPTIONS, SEE PILE WALLS WITH OPTIONS PROVISION.
- A CONCRETE BARRIER RAIL WITH MOMENT SLAB IS REQUIRED ABOVE RETAINING WALL NO. 2 AND 3. SEE PLANS FOR CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS. MODIFY CONCRETE BARRIER RAIL WITH MOMENT SLAB DETAILS TO ACCOMMODATE RETAINING WALLS AS NEEDED.
- BEFORE BEGINNING WALL DESIGN FOR RETAINING WALL NO. 1A, 1, 2, 3, 4, 5, 6, 7A & 7B, 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. 1A, 1, 2, 3, 4, 5, 6, 7A & 7B FOR THE FOLLOWING:
 - DESIGN LIFE = 75 YEARS
 - *57 STONE BACKFILL PARAMETERS:
UNIT WEIGHT, $\gamma = 110$ LB/CF
FRICTION ANGLE, $\phi = 38$ DEGREES
COHESION, $c = 0$ LB/SF
 - SOIL ASSUMED MATERIAL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ LB/CF
FRICTION ANGLE, $\phi = 28$ DEGREES
COHESION, $c = 0$ LB/SF
 - ROCK ASSUMED MATERIAL PARAMETERS:
UNIT WEIGHT, $\gamma = 145$ LB/CF
FRICTION ANGLE, $\phi = 39$ DEGREES
COHESION, $c = 0$ LB/SF
- SEE PILE WALL WITH OPTIONS PROVISION FOR DETERMINING ROCK ELEVATION.
- DESIGN RETAINING WALL NO. 1A, 1, 2, 3, 4, 5, 6, 7A & 7B FOR A LIVE LOAD (TRAFFIC) SURCHARGE.
- DESIGN RETAINING WALLS FOR PIPE EXTENDING UNDER OR THROUGH THE WALL AT THE FOLLOWING LOCATIONS: 28+59, 30+53, 31+30, 76+91, 150+04 AND 151+76. BEFORE BEGINNING WALL DESIGN OR CONSTRUCTION, VERIFY PIPE LOCATION AND ELEVATION. COORDINATE PLANS AND DETAILS WITH THE UTILITY DRAINAGE CONTRACTOR. ENSURE PIPE OUTLET DOES NOT WASHOUT THE FRONT SLOPE OF THE WALL. SUBMIT PLANS AND DETAILS FOR REVIEW.
- EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH GROUND ANCHORS FOR RETAINING WALL NO. 1A, 1, 2, 3, 4, 5, 6, 7A & 7B.
- "TEMPORARY SHORING" MAY BE REQUIRED FOR RETAINING WALL NO. 1A, 1, 2, 3, 4, 5, 6, 7A & 7B CONSTRUCTION IN ACCORDANCE WITH THE TEMPORARY SOIL NAIL SHORING PROVISION. SEE TRAFFIC CONTROL PLANS.
- LOCATION OF PERFORMANCE TESTS TO BE DETERMINED BY ENGINEER.
- NO VALUE ENGINEERING WILL BE ALLOWED FOR THE TEMPORARY SOIL NAIL WALL. NO PAYMENT WILL BE MADE FOR TEMPORARY SOIL NAIL WALL INSTALLATION BELOW DESIGN ELEVATION.
- FOR PERMANENT DESIGN CONDITION USE 100 YEAR WATER ELEVATION. FOR TEMPORARY DESIGN CONDITION USE 100 YEAR WATER ELEVATION MINUS FOUR FEET.
- USE CANTILEVERED SHEET PILE, ANCHORED SHEET PILE, CANTILEVERED PANEL WALL OR ANCHORED PANEL WALL TYPICAL SECTION AT THE DESIGNER'S CHOICE.
- SHEET PILES SHALL EXTEND TO 10 FEET BELOW BOTTOM OF WALL ELEVATION OR REFUSAL AT ROCK ELEVATION. PRIMARY (SOFT) PILES SHALL EXTEND TO 10 FEET BELOW BOTTOM OF WALL ELEVATION OR 2 FEET BELOW ROCK ELEVATION. SEE PILE WALLS WITH OPTIONS PROVISION TO DETERMINE ROCK ELEVATION.
- WELD TO EACH WALL A STEEL SIGN, SATISFACTORY TO THE ENGINEER, SHOWING THE FINAL GRADE ELEVATION AT OUTSIDE OF WALL AND DEPTH TO THE DESIGN ELEVATION. EMBOSS OR ENGRAVE THE SIGN.
- NOTE THAT BOULDERS MAY BE PRESENT THROUGHOUT THE PROJECT SITE. THE PRESENCE OF BOULDERS SHALL NOT BE CONSIDERED A CHANGED CONDITION.
- NCDOT SHOULD INSPECT PILE WALLS WITH OPTIONS AFTER MAJOR STORM EVENTS AND ON EVIDENCE OF EXCESSIVE EROSION NCDOT SHOULD TAKE APPROPRIATE ACTION.

EXAMPLE CONSTRUCTION SEQUENCE FOR ANCHORED SHEET PILE WALLS:

- INSTALL TEMPORARY SOIL NAIL WALL AND EXCAVATE FOR WORK PLATFORM, IF NECESSARY.
- PERFORM VERIFICATION TESTS ON THE SOIL NAIL WALL TO 1.25 DESIGN CAPACITY.
- INSTALL SOLDIER PILES, SOFT PILES, SHEET PILES AND WALERS.
- INSTALL BOTTOM ROW OF ANCHORS.
- PROOF TEST ANCHORS TO 1.25 DESIGN CAPACITY.
- INSTALL ANCHOR CASING. (IF USING TURNBUCKLE, INSTALL TURNBUCKLE AND TIE ROD).
- GROUT REMAINING LENGTH OF ANCHOR.
- INSTALL ANCHOR HEAD AND STRESS TO PREVENT MOVEMENT.
- BACKFILL AND COMPACT UNTIL AT LEAST 2 FEET ABOVE BOTTOM ANCHOR ELEVATION. USE CAUTION WHEN BACKFILLING AROUND ANCHORS.
- LOCK OFF LOWEST ANCHOR ROW.
- BACKFILL TO TOP ANCHOR ROW ELEVATION. (IF THERE IS NO TOP ANCHOR ROW BACKFILL TO GRADE)
- REPEAT STEPS 4 THROUGH 8 FOR SECOND ANCHOR ROW.
- BACKFILL AND COMPACT TO GRADE.
- LOCK OFF SECOND ANCHOR ROW.
- INSTALL COPING OR MOMENT SLAB.
- THE SOIL NAIL WALL WILL STAY IN PLACE.

EXAMPLE CONSTRUCTION SEQUENCE FOR CANTILEVERED SHEET PILE WALLS:

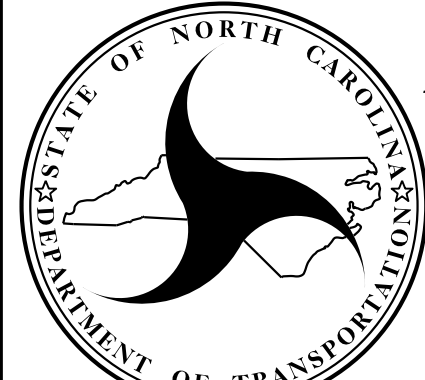
- INSTALL TEMPORARY SOIL NAIL WALL AND EXCAVATE FOR WORK PLATFORM, IF NECESSARY.
- INSTALL SOLDIER PILES, SOFT PILES, SHEET PILES AND WALERS.
- BACKFILL TO GRADE AND COMPACT.
- INSTALL COPING OR MOMENT SLAB.
- THE SOIL NAIL WALL WILL STAY IN PLACE.

100 YEAR WATER ELEVATION		
RETAINING WALL NO.	STATION	ELEVATION (FEET)
1A	18+00 -L-	2114.4
1A	23+00 -L-	2115.4
1	26+61 -L-	2116.2
1	31+75 -L-	2117.1
2	54+77 -L-	2123.1
2	57+05 -L-	2123.4
3	58+00 -L-	2123.6
3	62+10 -L-	2124.0
4	71+70 -L-	2125.3
4	81+80 -L-	2127.0
5	92+10 -L-	2129.8
5	95+75 -L-	2130.8
6	128+35 -L-	2135.8
6	133+35 -L-	2136.5
7A	148+25 -L-	2138.0
7B	153+05 -L-	2139.0

ESTIMATED WALL QUANTITIES	
RETAINING WALL NO.	WALL AREA (SQ. FEET)
1A	10700
1	7800
2	3700
3	11300
4	31000
5	8000
6	13000
7A	1500
7B	3500
TOTAL QUANTITY = 90,400 SF	

WALL STATION LIMITS DESIGN ELEVATION		
RETAINING WALL NO.	STATION LIMITS	DESIGN ELEVATION AT BOTTOM OF WALL
1A	Sta. 18+00.00 -L- to Sta. 23+00.00 -L-	2110
1	Sta. 26+61.00 -L- to Sta. 27+50.00 -L-	2110
1	Sta. 27+50.00 -L- to Sta. 28+00.00 -L-	2109
1	Sta. 28+00.00 -L- to Sta. 28+75.00 -L-	2108
1	Sta. 28+75.00 -L- to Sta. 31+75.00 -L-	2107
2	Sta. 54+77.16 -L- to Sta. 57+05.00 -L-	2122
3	Sta. 58+00.00 -L- to Sta. 59+50.00 -L-	2115
3	Sta. 59+50.00 -L- to Sta. 62+10.00 -L-	2112
4	Sta. 71+70.00 -L- to Sta. 74+50.00 -L-	2115
4	Sta. 74+50.00 -L- to Sta. 78+00.00 -L-	2116
4	Sta. 78+00.00 -L- to Sta. 80+00.00 -L-	2117
4	Sta. 80+00.00 -L- to Sta. 81+80.00 -L-	2118
5	Sta. 92+10.00 -L- to Sta. 95+75.00 -L-	2119
6	Sta. 128+35.00 -L- to Sta. 129+00.00 -L-	2129
6	Sta. 129+00.00 -L- to Sta. 129+50.00 -L-	2127
6	Sta. 129+50.00 -L- to Sta. 133+35.00 -L-	2125
7A	Sta. 148+25.00 -L- to Sta. 149+50.00 -L-	2130
7B	Sta. 150+50.00 -L- to Sta. 153+05.00 -L-	2131

PREPARED BY: RSW	DATE: 9/8/2016
REVIEWED BY: MSM/SCC	DATE: 9/8/2016



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

**GEOTECHNICAL
ENGINEERING UNIT**

WALL NOTES AND DETAILS					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		