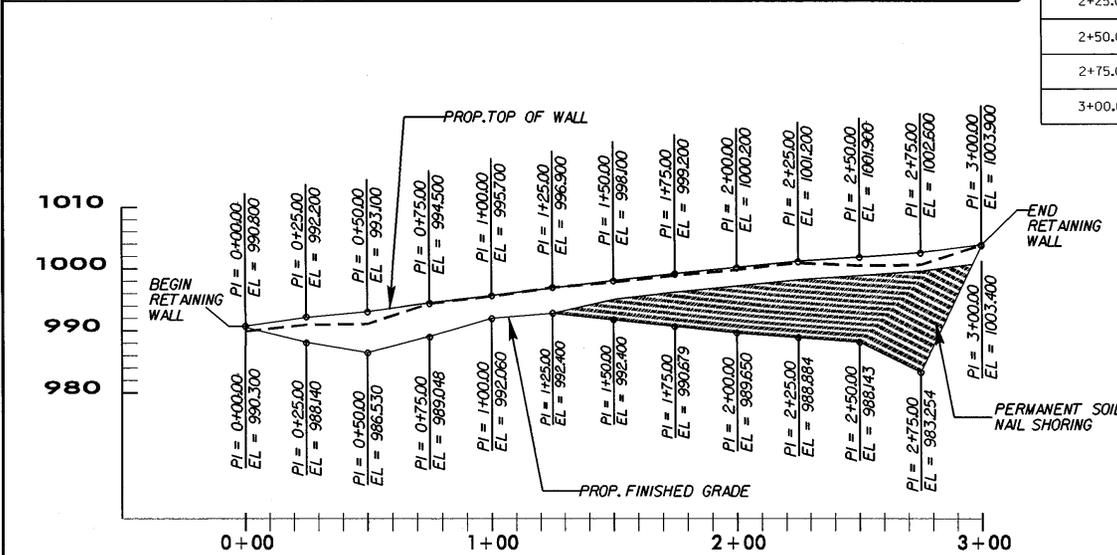


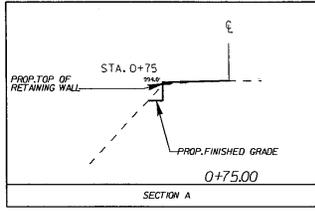
GEOTECHNICAL ENGINEER		ENGINEER	
		SIGNATURE	
		DATE	

SMSE RETAINING WALL ELEVATIONS						
-Y10- STA	OFFSET FROM C (LEFT)	ELEV @ TOP OF WALL	* PROPOSED BOTTOM OF WALL	ESTIMATED SHORING EMBEDMENT	* EXPOSED WALL HEIGHT	** DESIGN WALL HEIGHT "H"
0+00.00	17.10	990.800	990.300		0.500	0.00
0+25.00	16.90	992.200	988.140		4.060	3.560
0+50.00	17.50	993.100	986.530		6.570	6.070
0+75.00	17.80	994.500	989.048		5.452	4.952
1+00.00	17.40	995.700	992.060		3.640	3.140
1+25.00	17.00	996.900	992.400		4.500	4.00
1+50.00	17.40	998.100	991.800	2.000	6.300	5.800
1+75.00	17.60	992.200	990.679	2.000	8.521	8.021
2+00.00	17.60	1000.200	989.650	3.000	10.550	1.050
2+25.00	17.10	1001.200	988.884	3.000	12.316	11.816
2+50.00	16.70	1001.900	988.150	3.500	13.750	13.250
2+75.00	16.20	1002.600	983.280	3.500	19.370	18.870
3+00.00	17.20	1003.900	1003.400	2.000	0.500	0.000

\* ELEVATION @ PROPOSED FINISHED GRADE AND EXPOSED WALL HEIGHT DO NOT INCLUDE EMBEDMENT DEPTH  
 \*\* FOR DESIGN WALL HEIGHT "H" AND ADDITIONAL CONSTRUCTION DETAILS, SEE SHEET 2 OF 2



TOTAL STRUCTURE QUANTITIES	
SHORED MSE RETAINING WALLS	2360 SQ. FT.



ESTIMATED QUANTITIES	
PERMANENT SOIL NAIL SHORING	1725 SQ. FT.

PROJECT NO.: 14C.088064  
 TRANSYLVANIA COUNTY  
 STATION: 0+00.00 to 3+00.00  
 SHEET 1 OF 4

**GEOTECHNICAL ENGINEERING UNIT**

EASTERN REGIONAL OFFICE  
 WESTERN REGIONAL OFFICE  
 CONTRACT OFFICE

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

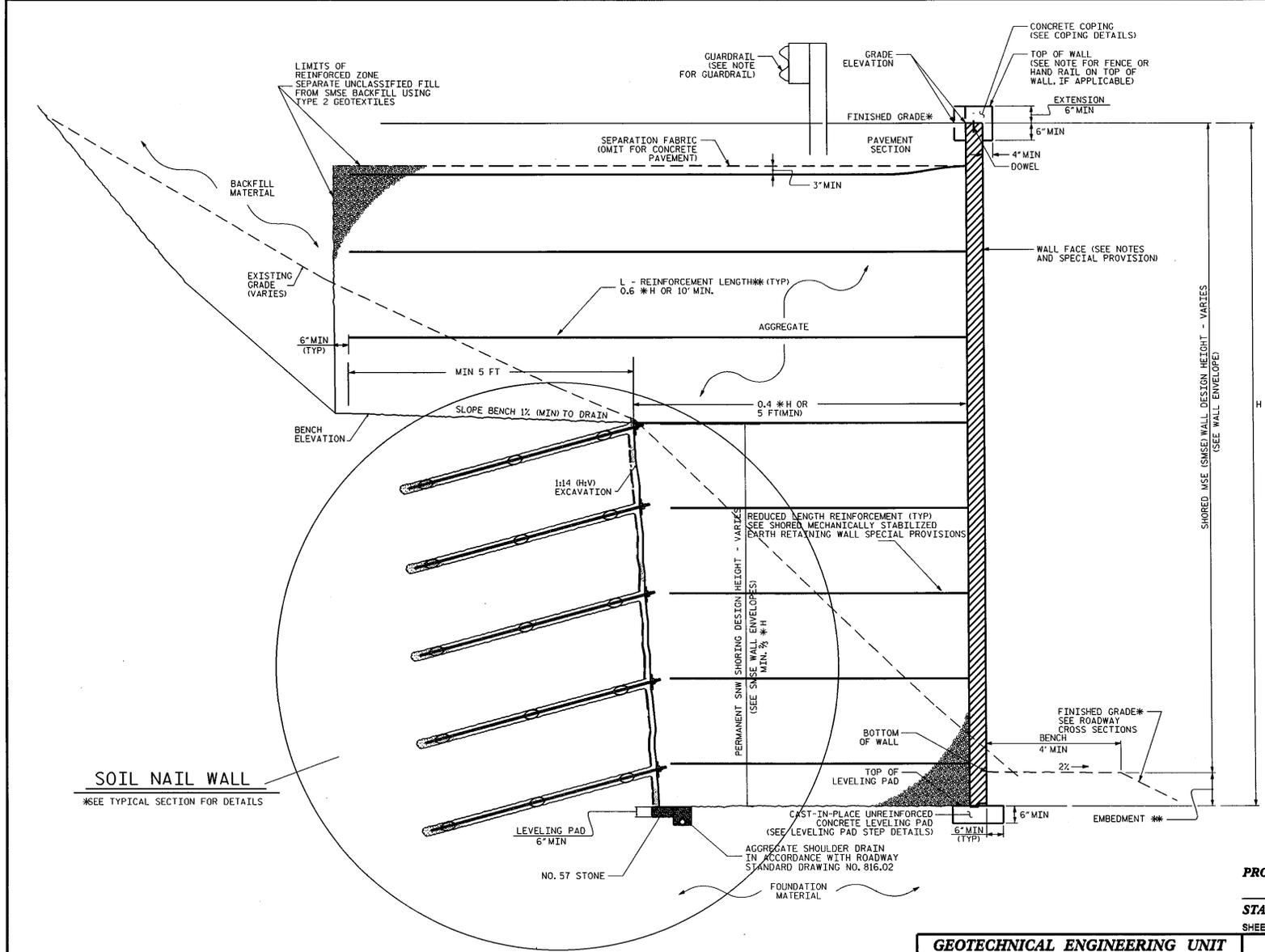
SHORED MECHANICALLY STABILIZED EARTH (SMSE) RETAINING WALL

PREPARED BY: J.T.W. DATE: 2.10.12  
 REVIEWED BY: S.C.C. DATE: 6.16.12

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

TOTAL SHEETS

GEOTECHNICAL ENGINEER  JAMES C. CAIN	ENGINEER  DATE: _____ DATE: _____
--	--



**SOIL NAIL WALL**  
\*SEE TYPICAL SECTION FOR DETAILS

**SMSE WALL TYPICAL SECTION**

\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.  
\*\*SEE SMSE RETAINING WALLS PROVISION FOR EMBEDMENT REQUIREMENTS.

**PROJECT NO.:** 14C.088064  
**TRANSYLVANIA COUNTY**  
**STATION:** 0+00.00 to 3+00.00  
 SHEET 2 OF 4

**GEOTECHNICAL ENGINEERING UNIT**

EASTERN REGIONAL OFFICE  
 WESTERN REGIONAL OFFICE  
 CONTRACT OFFICE

**STATE OF NORTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**RALEIGH**



**SHORED MECHANICALLY STABILIZED EARTH (SMSE) RETAINING WALL**

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

TOTAL SHEETS

PREPARED BY: J.T.W.	DATE: 7.12
REVIEWED BY: S.C.C.	DATE: 7.12

**SMSE NOTES**

FOR SHORED MECHANICALLY STABILIZED EARTH (SMSE) RETAINING WALLS, SEE SHORED MECHANICALLY STABILIZED EARTH RETAINING WALLS SPECIAL PROVISION.

FOR LOCATIONS WHERE A SHORED MECHANICALLY STABILIZED EARTH (SMSE) RETAINING WALL IS NOT USED, USE FULL LENGTH REINFORCEMENT AS SHOWN IN MSE TYPICAL SECTION.

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS. DO NOT USE STANDARD SIZE NO. 25 OR 2MS AS SELECT MATERIAL FOR THE RETAINING WALL.

USE AN SMSE WALL SYSTEM WITH PRECAST PANELS OR CAST-IN-PLACE FACING FOR THIS RETAINING WALL. DO NOT USE SEGMENTAL RETAINING WALL (SRW) UNITS.

A SMOOTH ARCHITECTURAL FINISH IS REQUIRED FOR PRECAST CONCRETE PANELS OR CAST-IN-PLACE FACING FOR THE RETAINING WALL.

CAST-IN-PLACE REINFORCED CONCRETE COPING IS REQUIRED FOR THE RETAINING WALL.

A DRAIN IS REQUIRED FOR THE RETAINING WALL.

BEFORE BEGINNING SMSE WALL DESIGN FOR THE RETAINING WALL, SURVEY EXISTING GROUND ELEVATIONS SHOWN ON THE WALL PROFILE VIEW (WALL ENVELOPE) AND SUBMIT A REVISED WALL ENVELOPE FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THIS ENVELOPE IS ACCEPTED.

DESIGN THE RETAINING WALL FOR WALL HEIGHTS EQUAL TO THE DESIGN HEIGHT (DIFFERENCE BETWEEN GRADE ELEVATION AND BOTTOM OF WALL ELEVATION) PLUS EMBEDMENT (DIFFERENCE BETWEEN BOTTOM OF WALL ELEVATION AND TOP OF LEVELING PAD ELEVATION).

DESIGN THE RETAINING WALL FOR THE FOLLOWING:

- 1) H = DESIGN HEIGHT + EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL STRESS ON FOUNDATION MATERIAL = 4000 LB/SF
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.7 \* H, OR 8 FT, WHICHEVER IS GREATER. (VARIES, SEE PROVISION)
- 5) MINIMUM EMBEDMENT ELEVATION = VARIES, SEE TABLE
- 6) AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (G) LB/CF	FRICTION ANGLE (F) DEGREES	COHESION (C) LB/SF
COARSE	110	38	0
FINE	125	34	0

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

7) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (G) LB/CF	FRICTION ANGLE (F) DEGREES	COHESION (C) LB/SF
BACKFILL	120	30	0
FOUNDATION	115	30	0

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

IF PRESENT, DESIGN THE RETAINING WALL FOR DRAINAGE PIPES THAT EXTEND THROUGH OR UNDER THE WALL, WHERE

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR THE RETAINING WALL.

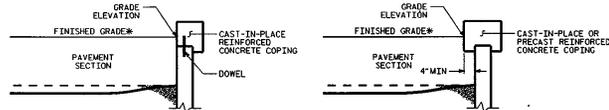
DO NOT PLACE LEVELING PAD CONCRETE, SELECT MATERIAL OR REINFORCEMENT FOR THE RETAINING WALL UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND FOUNDATION MATERIAL.

THE SMSE WALL DESIGNER SHALL CONSULT WITH THE SOIL NAIL WALL DESIGNER TO VERIFY LOCATIONS WHERE "TEMPORARY SHORING" MAY BE REQUIRED FOR THE RETAINING WALL IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE TRAFFIC CONTROL PLANS. IN LOCATIONS WHERE "PERMANENT SOIL NAIL SHORING FOR WALL CONSTRUCTION" IS USED, PAYMENT WILL NOT BE MADE FOR "TEMPORARY SHORING" FOR TRAFFIC CONTROL.

FOR FENCES OR HANDRAILS ON THE TOP OF THE RETAINING WALL, SEE ROADWAY PLANS FOR FENCE OR HANDRAIL ATTACHMENT DETAILS.

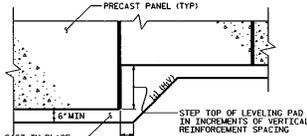
THE PERMANENT SOIL NAIL WALL HEIGHT IS AN ESTIMATE ONLY, THAT IS BASED ON THE ANTICIPATED EXCAVATION PLUS THE MINIMUM EMBEDMENT LISTED.

THE SOIL NAIL WALL DESIGNER IS RESPONSIBLE FOR DETERMINING GLOBAL STABILITY BASED ON THE FINISHED SMSE WALL. SUBMIT THESE RESULTS WITH THE WALL DESIGN PACKAGE. APPLICABLE. VERIFY PIPE LOCATIONS AND ELEVATIONS BEFORE BEGINNING MSE WALL DESIGN OR CONSTRUCTION.

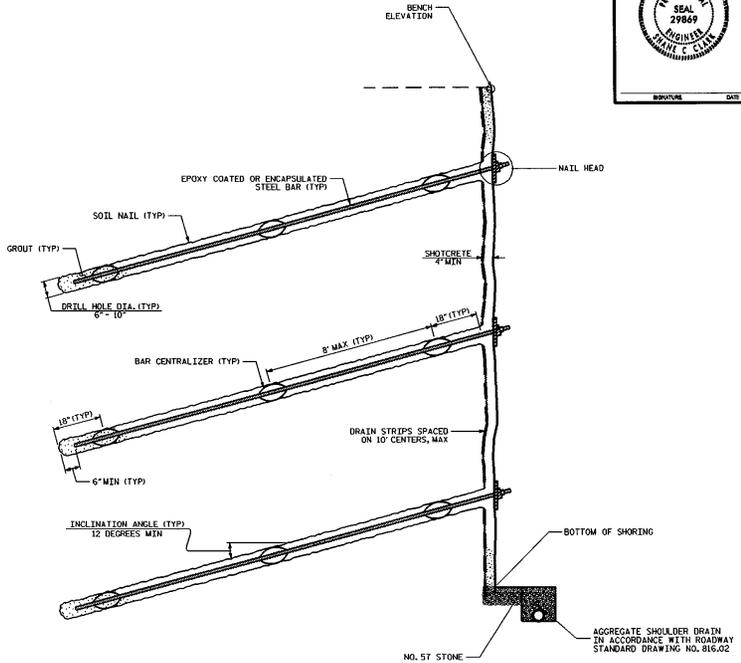


**COPING DETAILS**

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS. SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.



**LEVELING PAD STEP DETAILS**



**PERMANENT SOIL NAIL WALL TYPICAL SECTION**

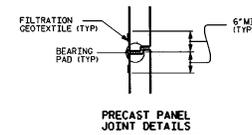
DESIGN SOIL NAIL WALL FOR HEIGHTS EQUAL TO THE DESIGN HEIGHT (DIFFERENCE BETWEEN GRADE ELEVATION AND BOTTOM OF WALL ELEVATION) PLUS EMBEDMENT (DIFFERENCE BETWEEN BOTTOM OF WALL ELEVATION AND TOP OF LEVELING PAD ELEVATION).

DESIGN SOIL NAIL WALL FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

WHERE APPLICABLE, DESIGN SOIL NAIL WALL FOR A PIPE EXTENDING THROUGH THE WALL AS SHOWN. VERIFY PIPE LOCATION AND ELEVATION BEFORE BEGINNING SOIL NAIL WALL DESIGN OR CONSTRUCTION.

"TOP OF SOIL NAIL WALL" AS SHOWN IN WALL ENVELOPES REPRESENTS THE APPROXIMATE GRADE ELEVATION A DISTANCE OF 0.5 TIMES WALL PROPOSED WALL HEIGHT AT THAT STATION.

THE ESTIMATED SOIL NAIL WALL QUANTITY IS BASED ON THE 0.5 TIMES H OFFSET PLUS THE MINIMUM EMBEDMENT LISTED IN THE DESIGN TABLE. THESE VALUES ARE PROVIDED AS AN ESTIMATE ONLY AND MAY VARY DUE TO SITE CONDITIONS.



**PRECAST PANEL JOINT DETAILS**

**PROJECT NO.:** 14C.088064  
**TRANSYLVANIA COUNTY**  
**STATION:** 0+00.00 to 3+00.00  
 SHEET 3 OF 4

**GEOTECHNICAL ENGINEERING UNIT**

EASTERN REGIONAL OFFICE  
 WESTERN REGIONAL OFFICE  
 CONTRACT OFFICE

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SHORED MECHANICALLY STABILIZED EARTH (SMSE) RETAINING WALL**

REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	DATE	
1			3		TOTAL SHEETS
2			4		

PREPARED BY: J.T.W.	DATE: 7.12
REVIEWED BY: S.C.C.	DATE: 7.12

GEOTECHNICAL ENGINEER

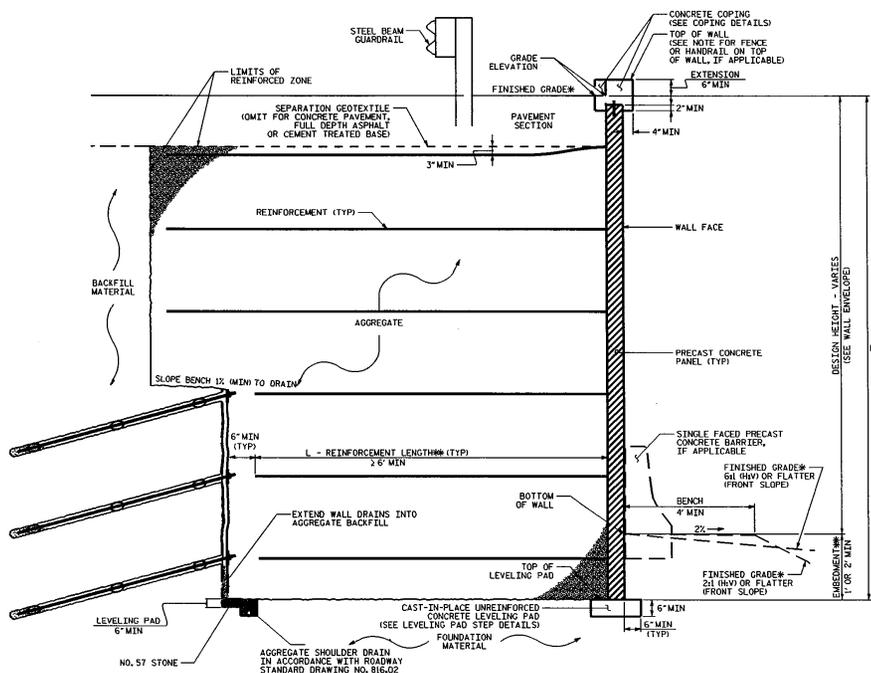
ENGINEER

SEAL 29569

STATE OF NORTH CAROLINA

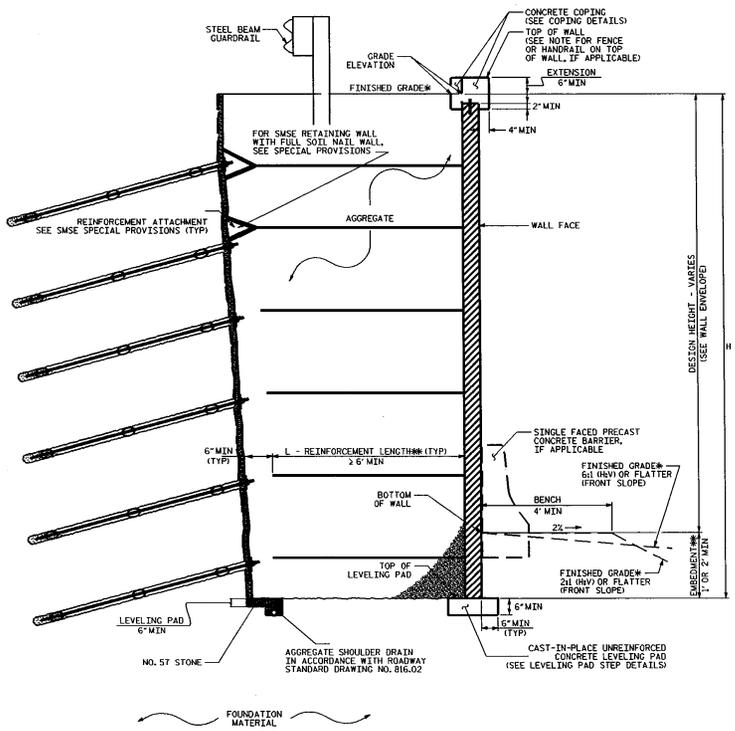
EXPIRES DATE

ISSUES DATE



**SMSE WALL WITH SOIL NAIL WALL <math>\leq \frac{2}{3} H</math>**

\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.  
 \*\*SEE SMSE RETAINING WALLS PROVISION FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



**SMSE WALL WITH FULL HEIGHT SOIL NAIL WALL**

\*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.  
 \*\*SEE SMSE RETAINING WALLS PROVISION FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

PREPARED BY: J.T.W.	DATE: 8.12
REVIEWED BY: S.C.C.	DATE: 8.12

PROJECT NO.: 14C.088064  
 TRANSYLVANIA COUNTY  
 STATION: 0+00.00 to 3+00.00  
 SHEET 4 OF 4

**GEOTECHNICAL ENGINEERING UNIT**  
 EASTERN REGIONAL OFFICE  
 WESTERN REGIONAL OFFICE  
 CONTRACT OFFICE  
 STATE OF NORTH CAROLINA  
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 RALEIGH

**SHORED MECHANICALLY STABILIZED EARTH (SMSE) RETAINING WALL**

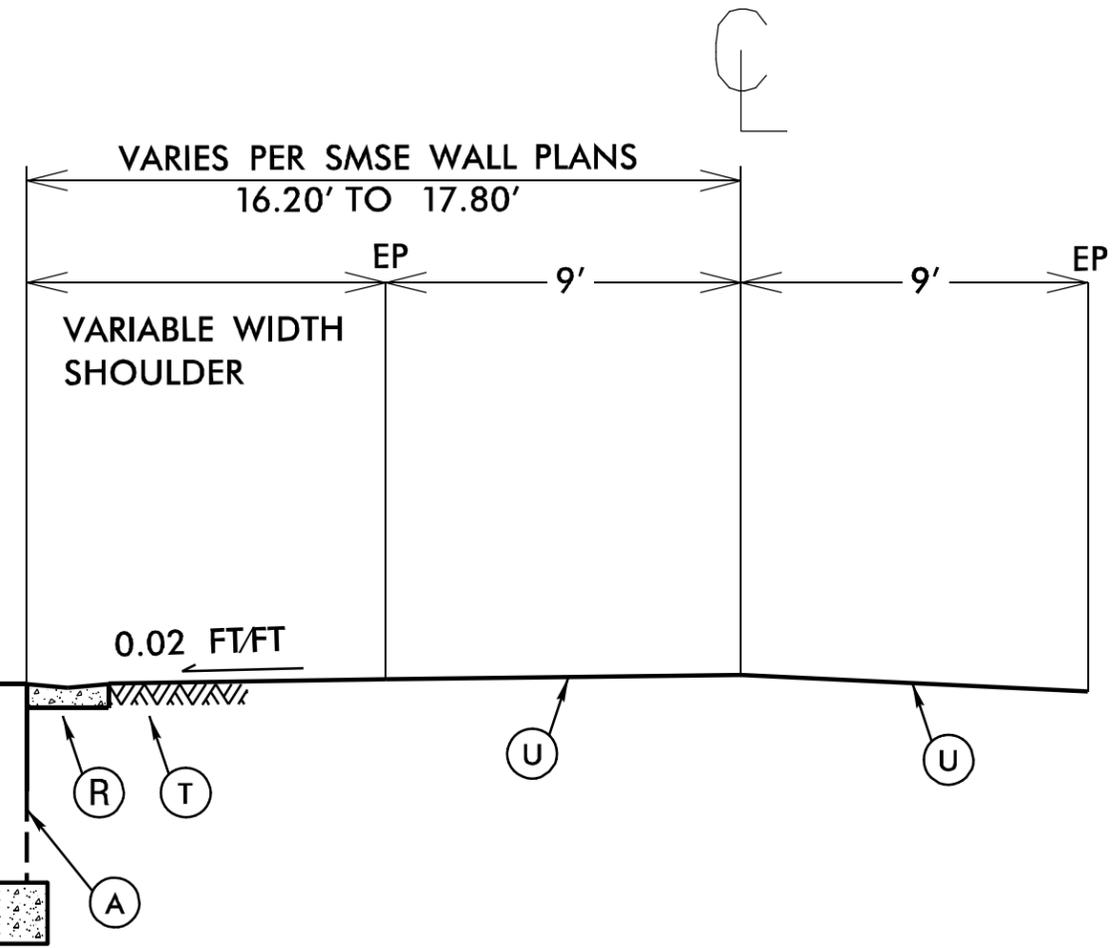
REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	DATE	
1			3		TOTAL SHEETS
2			4		

PROJECT REFERENCE NO.	SHEET NO.
<b>COLD Mtn. SLIDE</b>	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

# SCHEDULE

A	RETAINING WALL STRUCTURE
R	24" VALLEY CONCRETE GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.

**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION



VARIABLE SLOPE

**TYPICAL SECTION #1**  
**SHOULDER CONSTRUCTION SR 1301**  
**COLD MOUNTAIN RETAINING WALL PROJECT**

REVISIONS

8/17/99

SYSTEMS CONDITION  
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