

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	C-4901B	1	15

**STATE OF NORTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
**GEOTECHNICAL ENGINEERING UNIT**

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 49010.I.STR05T1B F.A. PROJ. NA  
COUNTY DAVIDSON  
PROJECT DESCRIPTION DOUBLE TRACK FROM CP BOWERS TO CP LAKE  
SITE DESCRIPTION UPPER LAKE ROAD (SR 2024) GRADE SEPARATION OVER HAMBY CREEK TRIBUTARY AND NSNCRR RAILROAD

**CONTENTS**

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-12	BORE LOG & CORE REPORT(S)
13-14	CORE PHOTOGRAPH(S)
15	SOIL TEST RESULTS

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1901 TOL-6050. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (ON-PLACED) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

R. E. KRAL

C. A. BOYCE

A. J. FOWLER

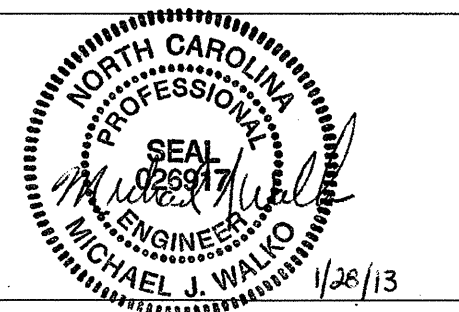
M. R. GRABSKI

INVESTIGATED BY F&R, INC.

CHECKED BY M. J. WALKO

SUBMITTED BY F&R, INC.

DATE JANUARY, 2013



**PROJECT: C203141 ID: C-4901B**

DRAWN BY: R. E. KRAL





NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

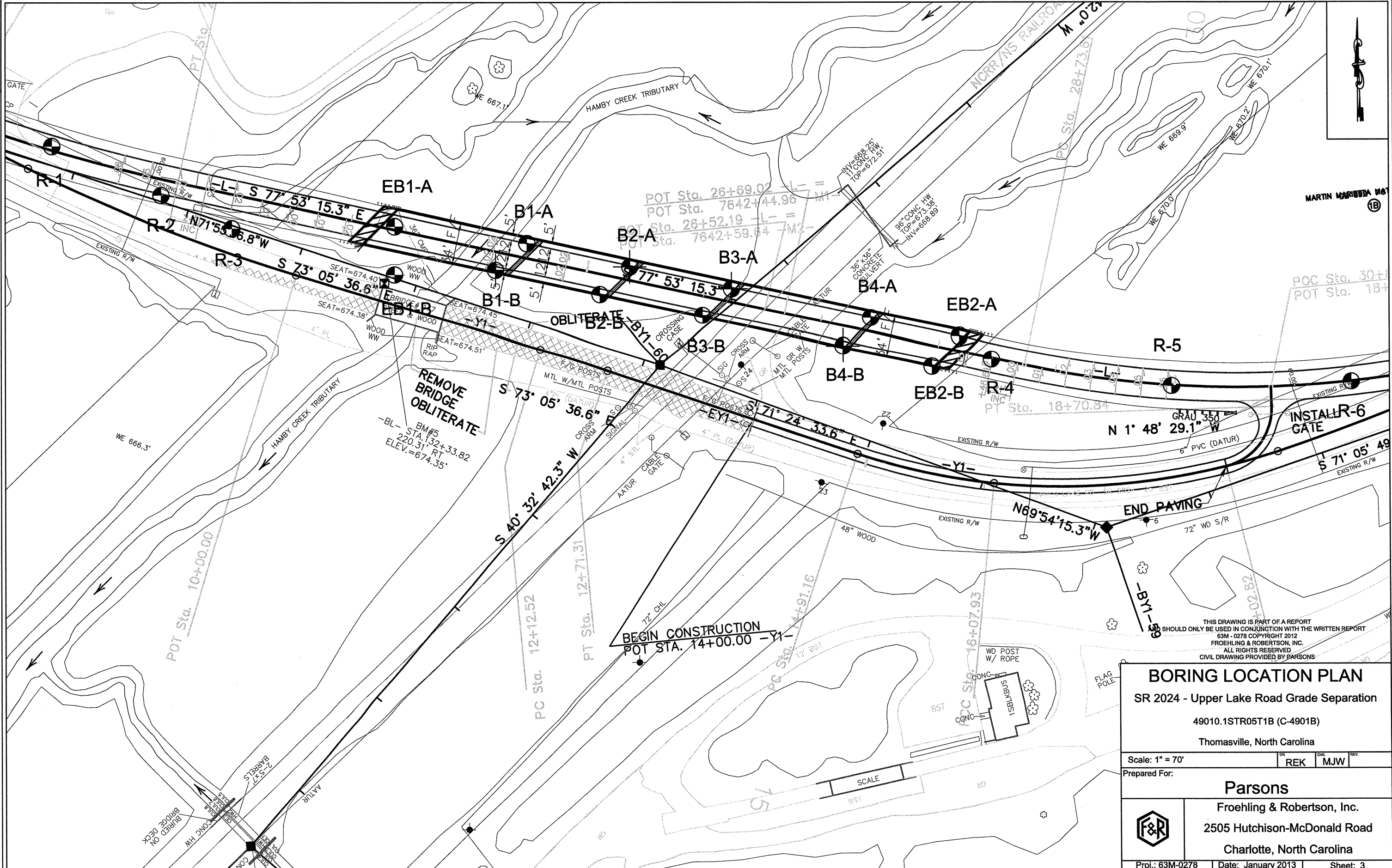
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
**GEOTECHNICAL ENGINEERING UNIT**

**SUBSURFACE INVESTIGATION**

**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS	
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY-SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HEAVY PLASTIC, A-7-6</i>		WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <u>ANGULAR</u> , <u>SUBANGULAR</u> , <u>SUBROUNDED</u> , OR <u>ROUNDED</u> .		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.  FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.		ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.	
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING			
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		FRESH ROCK FRESH CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.			
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7		COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50		VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.			
SYMBOL		PERCENTAGE OF MATERIAL ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC >10%		SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.			
% PASSING #10 #40 #200		GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP		MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.			
LIQUID LIMIT GROUP INDEX				MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL.			
GROUP INDEX				SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF.			
USUAL TYPES OF MAJOR MATERIALS				VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF.			
GENERATING AS A SUBGRADE				COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.			
CONSISTENCY OR DENSENESS		MISCELLANEOUS SYMBOLS		ROCK HARDNESS			
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.			
GENERAL GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES		HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.			
GENERAL SILT-CLAY MATERIAL (COHESIVE) VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES		MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.			
TEXTURE OR GRAIN SIZE		MISCELLANEOUS SYMBOLS		MEDIUM HARD CAN BE GROVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.			
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270		MISCELLANEOUS SYMBOLS		SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.			
BOULDER (BLD.) COBBLE (COB.) GRAVEL (GRV.) COARSE SAND (CSE, SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)		MISCELLANEOUS SYMBOLS		VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.			
GRAIN SIZE MM 305 75 2.0 0.25 0.05 0.005		MISCELLANEOUS SYMBOLS		FRACTURE SPACING		BEDDING	
SOIL MOISTURE - CORRELATION OF TERMS		MISCELLANEOUS SYMBOLS		TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET		TERM THICKNESS > 4 FEET 1.5 - 4 FEET 0.16 - 1.5 FEET 0.03 - 0.16 FEET 0.008 - 0.03 FEET < 0.008 FEET	
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		MISCELLANEOUS SYMBOLS		INDURATION		BENCH MARK: FA0064 ELEVATION: 673.53 FT.	
LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE		MISCELLANEOUS SYMBOLS		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.		NOTES:	
PL PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE		MISCELLANEOUS SYMBOLS					
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE		MISCELLANEOUS SYMBOLS					
SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE		MISCELLANEOUS SYMBOLS					
PLASTICITY		MISCELLANEOUS SYMBOLS					
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY		MISCELLANEOUS SYMBOLS					
COLOR		MISCELLANEOUS SYMBOLS					
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		MISCELLANEOUS SYMBOLS					

0250DEL\_P102



THIS DRAWING IS PART OF A REPORT  
 SHOULD ONLY BE USED IN CONJUNCTION WITH THE WRITTEN REPORT  
 63M-0278 COPYRIGHT 2012  
 FROEHLING & ROBERTSON, INC.  
 ALL RIGHTS RESERVED  
 CIVIL DRAWING PROVIDED BY PARSONS

**BORING LOCATION PLAN**  
 SR 2024 - Upper Lake Road Grade Separation  
 49010.1STR05T1B (C-4901B)  
 Thomasville, North Carolina

Scale: 1" = 70'

Prepared For: REK MJW

**Parsons**  
 Froehling & Robertson, Inc.  
 2505 Hutchison-McDonald Road  
 Charlotte, North Carolina

Proj.: 63M-0278 Date: January 2013 Sheet: 3



WBS 49010.1.STR05T1B		TIP C-4901B		COUNTY Davidson		GEOLOGIST R. Kral									
SITE DESCRIPTION SR 2024 - Upper Lake Road Grade Separation							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 23+36		OFFSET 6 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 674.7 ft		TOTAL DEPTH 30.0 ft		NORTHING 767,407		EASTING 1,655,144									
0 HR. 28.0		24 HR. 8.0													
DRILL RIG/HAMMER EFF./DATE F&R968 CME-550X 81% 12/28/2011				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER C. Boyce		START DATE 02/06/12		COMP. DATE 02/06/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
675	674.7	0.0	0	1	1								M	GROUND SURFACE	0.0
	671.2	3.5	3	3	2								SS-2 18%	ARTIFICIAL FILL Tan and brown clayey fine to coarse SAND (A-2-B)	3.5
670	666.2	8.5	3	5	8								M	ARTIFICIAL FILL Brown and tan fine sandy SILT (A-4(0)) with trace rock fragments	8.5
665	661.2	13.5	45	55/0.3									M	RESIDUAL Tan and gray clayey SILT (A-5)	13.5
660	656.2	18.5	100/0.2											WEATHERED ROCK Gray and tan GRANITE	18.5
655	651.2	23.5	65	35/0.2											100/0.2
650	646.2	28.5	60/0.1												100/0.7
645	644.7	30.0	60/0.0											CRYSTALLINE ROCK Gray and tan GRANITE	30.0
Boring Terminated with Standard Penetration Test Refusal at Elevation 644.7 ft on CRYSTALLINE ROCK (Granitic Rock)															
1) Driller indicated approximately 8 inches of Surficial Organic Laden soil.															

NCDOT BORE SINGLE 63M-0278 (UPPER LAKE ROAD).GPJ NC\_DOT.GDT 8/17/12

WBS 49010.1.STR05T1B		TIP C-4901B		COUNTY Davidson		GEOLOGIST R. Kral									
SITE DESCRIPTION SR 2024 - Upper Lake Road Grade Separation							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 23+45		OFFSET 40 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 674.7 ft		TOTAL DEPTH 19.0 ft		NORTHING 767,367		EASTING 1,655,114									
0 HR. 17.0		24 HR. 9.0													
DRILL RIG/HAMMER EFF./DATE F&R968 CME-550X 81% 12/28/2011				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER C. Boyce		START DATE 02/06/12		COMP. DATE 02/06/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
675	674.7	0.0	2	1	2								M	GROUND SURFACE	0.0
	671.2	3.5	2	1	2								M	ARTIFICIAL FILL Brown fine sandy SILT (A-4) with trace rock fragments	3.5
670	666.2	8.5	3	6	6								SS-1 23%	Tan fine sandy CLAY (A-6)	8.5
665	661.2	13.5	11	29	38								M	RESIDUAL Tan and orange fine sandy CLAY (A-6(9))	13.5
660	656.2	18.5	100/0.3											WEATHERED ROCK Gray and brown silty fine to coarse SAND (A-2-4) with little rock fragments	18.5
655	655.7	19.0	60/0.0											Gray and brown silty fine to coarse SAND (A-2-4) with little rock fragments	19.0
WEATHERED ROCK Gray, green and orange GRANITE															
Boring Terminated with Standard Penetration Test Refusal at Elevation 655.7 ft on CRYSTALLINE ROCK (Granitic Rock)															
1) Driller indicated approximately 8 inches of Surficial Organic Laden soil.															

NCDOT BORE SINGLE 63M-0278 (UPPER LAKE ROAD).GPJ NC\_DOT.GDT 8/17/12





# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

SHEET

5

WBS 49010.1.STR05T1B		TIP C-4901B		COUNTY Davidson		GEOLOGIST R. Kral										
SITE DESCRIPTION SR 2024 - Upper Lake Road Grade Separation							GROUND WTR (ft)									
BORING NO. B1-A		STATION 24+47		OFFSET 9 ft LT		ALIGNMENT -L-	0 HR. 8.0									
COLLAR ELEV. 671.3 ft		TOTAL DEPTH 16.0 ft		NORTHING 767,393		EASTING 1,655,254	24 HR. 5.5									
DRILL RIG/HAMMER EFF./DATE F&R968 CME-550X 81% 12/28/2011				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER C. Boyce		START DATE 01/18/12		COMP. DATE 01/18/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
675																
	671.3	0.0													671.3	0.0
670			1	2	2											
	667.8	3.5	3	4	4											
665																
	662.8	8.5	20	71	29/0.1										662.3	9.0
660																
	657.8	13.5	100/0.4													
	655.3	16.0	60/0.0												655.3	16.0
<p style="margin: 0;">Boring Terminated with Standard Penetration Test Refusal at Elevation 655.3 ft on CRYSTALLINE ROCK (Granitic Rock)</p> <p style="margin: 0;">1) Driller indicated approximately 10 inches of Surficial Organic Laden soil.</p>																

NCDOT BORE SINGLE 63M-0278 (UPPER LAKE ROAD).GPJ NC\_DOT.GDT 8/17/12

WBS 49010.1.STR05T1B		TIP C-4901B		COUNTY Davidson		GEOLOGIST R. Kral / J. Harris									
SITE DESCRIPTION SR 2024 - Upper Lake Road Grade Separation							GROUND WTR (ft)								
BORING NO. B1-B		STATION 24+26		OFFSET 18 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 671.7 ft		TOTAL DEPTH 37.5 ft		NORTHING 767,371		EASTING 1,655,228									
DRILL RIG/HAMMER EFF./DATE F&R968 CME-550X 81% 12/28/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER C. Boyce		START DATE 01/18/12		COMP. DATE 01/18/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
675															
671.7	671.7	0.0												671.7	0.0
670			1	1	2							W	RESIDUAL		
668.2	668.2	3.5	3	3	4							M	Tan and brown fine sandy CLAY (A-6)	3.5	
665													Tan silty CLAY (A-7-5)		
663.2	663.2	8.5	17	23	24							M	Tan and white silty fine to coarse SAND (A-2-4)	8.0	
660															
658.2	658.2	13.5	100/0.5										WEATHERED ROCK	13.5	
655													Tan and white GRANITE		
654.2	654.2	17.5	60/0.0										CRYSTALLINE ROCK	17.5	
650												RS-1	Light gray to medium gray fine to medium grained rhyolitic METATUFF		
645															
644.2	644.2	27.5											CRYSTALLINE ROCK	27.5	
643.2	643.2	28.5											Dark greenish gray fine grained mafic METAVOLCANIC	28.5	
640													CRYSTALLINE ROCK		
635												RS-2	Light gray to medium gray fine to medium grained rhyolitic METATUFF		
634.2	634.2	37.5											Boring Terminated at Elevation 634.2 ft in CRYSTALLINE ROCK (Granitic Rock)	37.5	

NCDOT BORE SINGLE 63M-0278 (UPPER LAKE ROAD).GPI.NC.DOT.GDT 8/17/12

WBS 49010.1.STR05T1B		TIP C-4901B		COUNTY Davidson		GEOLOGIST R. Kral / J. Harris						
SITE DESCRIPTION SR 2024 - Upper Lake Road Grade Separation							GROUND WTR (ft)					
BORING NO. B1-B		STATION 24+26		OFFSET 18 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 671.7 ft		TOTAL DEPTH 37.5 ft		NORTHING 767,371		EASTING 1,655,228						
DRILL RIG/HAMMER EFF./DATE F&R968 CME-550X 81% 12/28/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic								
DRILLER C. Boyce		START DATE 01/18/12		COMP. DATE 01/18/12		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
654.2	654.2	17.5	5.0	N=60/0.0 2:43/1.0 6:52/1.0 8:28/1.0 8:45/1.0	(4.8)	(0.3)		(9.5)	(0.3)		Begin Coring @ 17.5 ft	17.5
650	649.2	22.5	5.0	9:05/1.0 10:40/1.0 28:29/1.0 17:07/1.0 3:43/1.0	(4.7)	(0.0)	RS-1				CRYSTALLINE ROCK Light gray to medium gray, slightly to moderately weathered, hard, very close to closely spaced fractures, rhyolitic METATUFF	
645	644.2	27.5	5.0	2:56/1.0 2:18/1.0 2:57/1.0 4:08/1.0	(4.7)	(1.9)		(1.0)	(0.0)		CRYSTALLINE ROCK Dark greenish gray, moderately weathered, moderately hard, very close fractures, mafic METAVOLCANIC	27.5
640	639.2	32.5	5.0	7:09/1.0 7:58/1.0 10:08/1.0 11:04/1.0 9:03/1.0	(4.3)	(0.7)	RS-2	(8.0)	(2.8)		CRYSTALLINE ROCK Light gray to medium gray, slightly weathered, hard, very close to closely spaced fractures, rhyolitic METATUFF	28.5
635	634.2	37.5									RS-2 34.0 - 34.4 qu = 10,180 psi RMR = 7+8+10+20+10 = 55 Boring Terminated at Elevation 634.2 ft in CRYSTALLINE ROCK (Granitic Rock)	37.5

NCDOT BORE SINGLE 63M-0278 (UPPER LAKE ROAD).GPI.NC.DOT.GDT 8/17/12

- 1) Auger Refusal at a depth of 17.5 feet, began coring at a depth of 17.5 feet.
- 2) Driller indicated approximately 12 inches of Surficial Organic Laden soil.





**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**BORELOG REPORT**

SHEET

8

WBS 49010.1.STR05T1B		TIP C-4901B		COUNTY Davidson		GEOLOGIST R. Kral										
SITE DESCRIPTION SR 2024 - Upper Lake Road Grade Separation							GROUND WTR (ft)									
BORING NO. B2-B		STATION 25+15		OFFSET 19 ft RT		ALIGNMENT -L-	0 HR. 19.0									
COLLAR ELEV. 675.6 ft		TOTAL DEPTH 29.0 ft		NORTHING 767,351		EASTING 1,655,315	24 HR. 9.0									
DRILL RIG/HAMMER EFF./DATE F&R968 CME-550X 81% 12/28/2011				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER C. Boyce		START DATE 01/18/12		COMP. DATE 01/18/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)		
680																
675	675.6	0.0	1	1	2							M	X	675.6	0.0	GROUND SURFACE
670	672.1	3.5	2	2	3							M	X	672.6	3.0	ARTIFICIAL FILL Red-orange silty CLAY (A-7-5)
665	667.1	8.5	18	27	32							D		667.6	8.0	RESIDUAL Tan, orange and brown clayey SILT (A-5)
660	662.1	13.5	26	31	40							D				Gray, brown and green silty fine to coarse SAND (A-2-4) with some rock fragments
655	657.1	18.5	10	8	11							W		657.1	18.5	Gray, black and brown clayey SILT (A-5)
650	652.1	23.5	44	56/0.2										652.1	23.5	WEATHERED ROCK Gray and brown METAVOLCANIC
	647.1	28.5												647.1	28.5	CRYSTALLINE ROCK Gray and tan GRANITE
	646.6	29.0	60/0.0											646.6	29.0	
																Boring Terminated with Standard Penetration Test Refusal at Elevation 646.6 ft on CRYSTALLINE ROCK (Granitic Rock)
																1) Driller indicated approximately 8 inches of Surficial Organic Laden soil.

NCDOT BORE SINGLE 63M-0278 (UPPER LAKE ROAD).GPJ NC\_DOT.GDT 01/17/12

WBS 49010.1.STR05T1B		TIP C-4901B		COUNTY Davidson		GEOLOGIST R. Kral / J. Harris										
SITE DESCRIPTION SR 2024 - Upper Lake Road Grade Separation							GROUND WTR (ft)									
BORING NO. B3-A		STATION 26+22		OFFSET 9 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 678.6 ft		TOTAL DEPTH 35.0 ft		NORTHING 767,356		EASTING 1,655,425										
DRILL RIG/HAMMER EFF./DATE F&R968 CME-550X 81% 12/28/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER C. Boyce		START DATE 01/17/12		COMP. DATE 01/17/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
680														678.6	GROUND SURFACE	0.0
	678.6	0.0	2	2	2							M			ARTIFICIAL FILL Red-orange and black silty CLAY (A-7-5) with trace rock fragments	
675	675.1	3.5	5	4	6							M				
670	670.1	8.5	7	5	8							M			RESIDUAL Red-orange and tan clayey SILT (A-5)	8.0
665	665.1	13.5												665.1		13.5
	663.6	15.0												663.6	CRYSTALLINE ROCK Tan GRANITE	15.0
660														658.6	CRYSTALLINE ROCK Light gray to medium gray fine grained felsic METAVOLCANIC	20.0
655															CRYSTALLINE ROCK Medium gray fine to coarse grained meta GABBRO	
650																
645														643.6	Boring Terminated at Elevation 643.6 ft in CRYSTALLINE ROCK (Granitic Rock)	35.0
<p>1) Auger Refusal at a depth of 15.0 feet, began coring at a depth of 15.0 feet.</p> <p>2) Driller indicated no Surficial Organic Laden soil.</p>																

NCDOT BORE SINGLE 63M-0278 (UPPER LAKE ROAD).GPJ NC\_DOT.GDT 8/17/12

WBS 49010.1.STR05T1B		TIP C-4901B		COUNTY Davidson		GEOLOGIST R. Kral / J. Harris						
SITE DESCRIPTION SR 2024 - Upper Lake Road Grade Separation							GROUND WTR (ft)					
BORING NO. B3-A		STATION 26+22		OFFSET 9 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 678.6 ft		TOTAL DEPTH 35.0 ft		NORTHING 767,356		EASTING 1,655,425						
DRILL RIG/HAMMER EFF./DATE F&R968 CME-550X 81% 12/28/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic								
DRILLER C. Boyce		START DATE 01/17/12		COMP. DATE 01/17/12		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC (%)	ROD (%)		REC (%)	ROD (%)			
683.6												
	683.6	15.0	5.0	N=60/0.0 23:20/1.0 12:28/1.0 15:05/1.0 28:40/1.0 58:20/1.0	(5.0) 100%	(0.8) 16%		(5.0) 100%	(0.8) 16%		Begin Coring @ 15.0 ft	
660												
	658.6	20.0	5.0	9:50/1.0 9:58/1.0 12:17/1.0 19:03/1.0 28:29/1.0	(4.8) 96%	(2.2) 44%		(14.2) 95%	(7.2) 48%		RS-4 18.3 - 18.8 qu = 12,580 psi RMR = 7+3+10+20+7 = 47	20.0
655												
	653.6	25.0	5.0	3:35/1.0 3:01/1.0 3:13/1.0 3:54/1.0 5:16/1.0	(4.6) 92%	(3.1) 62%					CRYSTALLINE ROCK Medium gray, slightly weathered, hard, very close to closely spaced fractures, meta GABBRO	
650												
	648.6	30.0	5.0	8:21/1.0 8:50/1.0 43:54/1.0 14:44/1.0 7:58/1.0	(4.8) 96%	(1.9) 38%					RS-5 23.3 - 23.8 qu = 18,760 psi RMR = 12+8+10+20+10 = 60	
645												
	643.6	35.0									Boring Terminated at Elevation 643.6 ft in CRYSTALLINE ROCK (Granitic Rock)	35.0
<p>1) Auger Refusal at a depth of 15.0 feet, began coring at a depth of 15.0 feet.</p> <p>2) Driller indicated no Surficial Organic Laden soil.</p>												

NCDOT BORE SINGLE 63M-0278 (UPPER LAKE ROAD).GPJ NC\_DOT.GDT 8/17/12





WBS 49010.1.STR05T1B		TIP C-4901B		COUNTY Davidson		GEOLOGIST R. Kral / J. Harris										
SITE DESCRIPTION SR 2024 - Upper Lake Road Grade Separation							GROUND WTR (ft)									
BORING NO. B4-B	STATION 27+22	OFFSET 18 ft RT	ALIGNMENT -L-			0 HR.	1.0									
COLLAR ELEV. 670.0 ft	TOTAL DEPTH 30.0 ft	NORTHING 767,309	EASTING 1,655,518			24 HR.	1.5									
DRILL RIG/HAMMER EFF./DATE F&R968 CME-550X 81% 12/28/2011			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER C. Boyce		START DATE 01/19/12	COMP. DATE 01/19/12	SURFACE WATER DEPTH N/A												
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
670														670.0	GROUND SURFACE	0.0
	670.0	0.0	0	0	3									667.0	RESIDUAL Brown and orange silty CLAY (A-7-5)	3.0
	666.5	3.5												665.0	Brown and tan silty fine to coarse SAND (A-2-4)	
665			2	2	3									661.5		8.5
	661.5	8.5												660.0	WEATHERED ROCK Brown and tan GRANITE	10.0
660			46	54	0.3									655.0	CRYSTALLINE ROCK Dark greenish gray fine grained mafic METAVOLCANIC	15.0
	660.0	10.0												650.0	CRYSTALLINE ROCK Light to medium gray fine to medium grained felsic METAVOLCANIC	
655														645.0		
650														640.0		
645														640.0		
640														640.0		
Boring Terminated at Elevation 640.0 ft in CRYSTALLINE ROCK (Granitic Rock)																
1) Auger Refusal at a depth of 10.0 feet, began coring at a depth of 10.0 feet.																
2) Driller indicated approximately 12 inches of Surficial Organic Laden soil.																

NCDOT BORE SINGLE 63M-0278 (UPPER LAKE ROAD).GPJ NC\_DOT.GDT 8/17/12

WBS 49010.1.STR05T1B		TIP C-4901B		COUNTY Davidson		GEOLOGIST R. Kral / J. Harris						
SITE DESCRIPTION SR 2024 - Upper Lake Road Grade Separation							GROUND WTR (ft)					
BORING NO. B4-B	STATION 27+22	OFFSET 18 ft RT	ALIGNMENT -L-			0 HR.	1.0					
COLLAR ELEV. 670.0 ft	TOTAL DEPTH 30.0 ft	NORTHING 767,309	EASTING 1,655,518			24 HR.	1.5					
DRILL RIG/HAMMER EFF./DATE F&R968 CME-550X 81% 12/28/2011			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic							
DRILLER C. Boyce		START DATE 01/19/12	COMP. DATE 01/19/12	SURFACE WATER DEPTH N/A								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (%)	ROD (%)	REC. (%)	ROD (%)				
680												
	680.0	10.0	5.0	N=60/0.0 5:27/1.0 8:18/1.0 5:12/1.0 4:28/1.0 3:42/1.0	(4.5) 90%	(0.0) 0%	(4.5) 90%	(0.0) 0%		660.0	Begin Coring @ 10.0 ft CRYSTALLINE ROCK Dark greenish gray, slightly weathered, hard, very close to closely spaced fractures, mafic METAVOLCANIC	10.0
655										655.0	RMR = 7+3+10+12+10 = 42 CRYSTALLINE ROCK Light to medium gray, slightly weathered, moderately hard to hard, very close to closely spaced fractures, felsic METAVOLCANIC	15.0
			5.0	12:17/1.0 7:19/1.0 3:07/1.0 8:05/1.0 6:19/1.0	(5.0) 100%	(2.6) 52%	(14.0) 93%	(5.8) 39%				
650										650.0	CRYSTALLINE ROCK Light to medium gray fine to medium grained felsic METAVOLCANIC RS-6 25.0 - 25.5 qu = 13,330 psi RMR = 7+8+5+20+10 = 50	
			5.0	7:08/1.0 8:22/1.0 6:09/1.0 3:52/1.0 5:07/1.0	(4.0) 80%	(1.2) 24%						
645										645.0		
			5.0	4:38/1.0 4:41/1.0 6:15/1.0 5:22/1.0 7:49/1.0	(5.0) 100%	(2.0) 40%						
640										640.0	Boring Terminated at Elevation 640.0 ft in CRYSTALLINE ROCK (Granitic Rock)	30.0
1) Auger Refusal at a depth of 10.0 feet, began coring at a depth of 10.0 feet.												
2) Driller indicated approximately 12 inches of Surficial Organic Laden soil.												

NCDOT CORE SINGLE 63M-0278 (UPPER LAKE ROAD).GPJ NC\_DOT.GDT 8/17/12

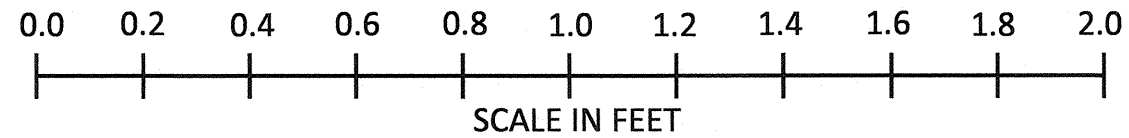




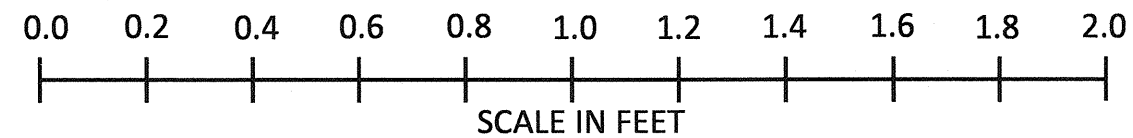
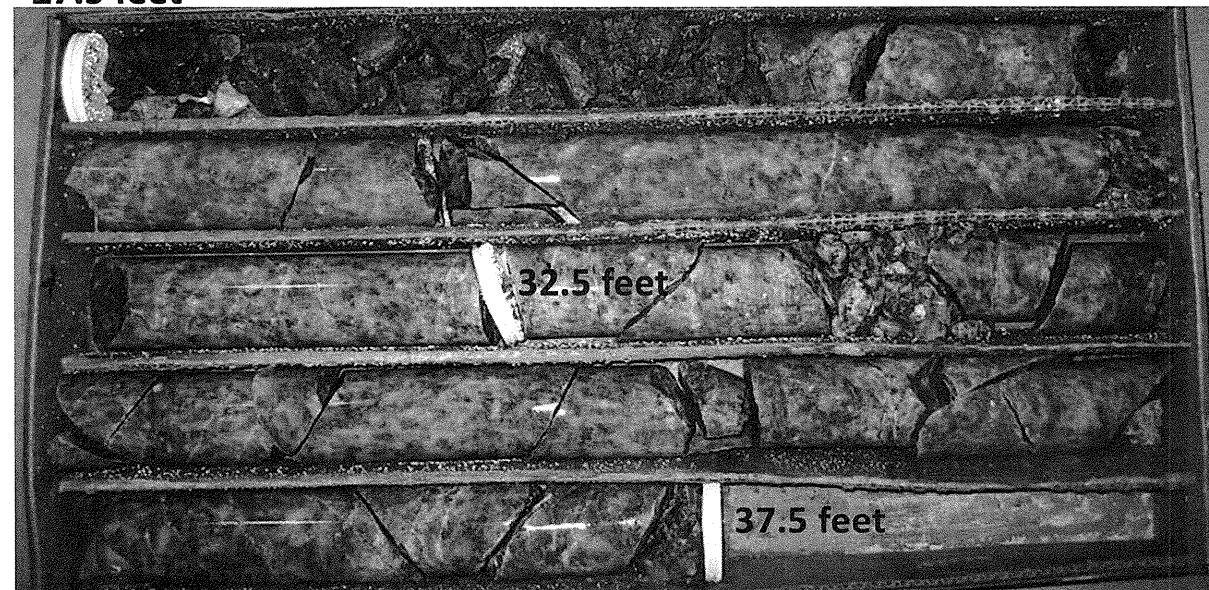


**SR 2024 – Upper Lake Road Grade Separation**  
**CORE PHOTOGRAPHS: B1-B: Station 24+26**

17.5 feet

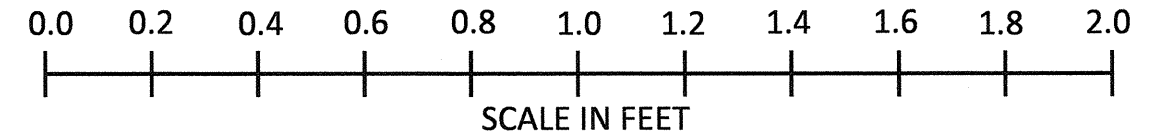


27.5 feet

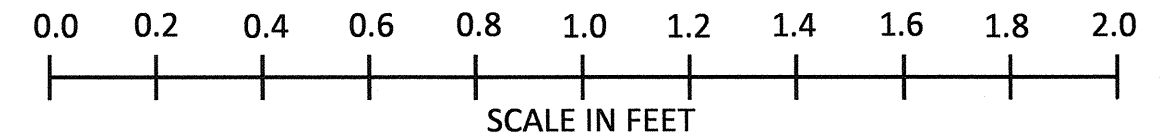


**SR 2024 – Upper Lake Road Grade Separation**  
**CORE PHOTOGRAPHS: B2-A: Station 25+35**

18.0 feet



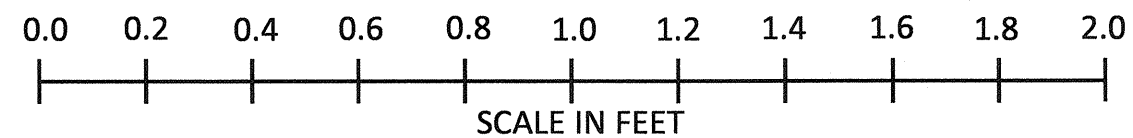
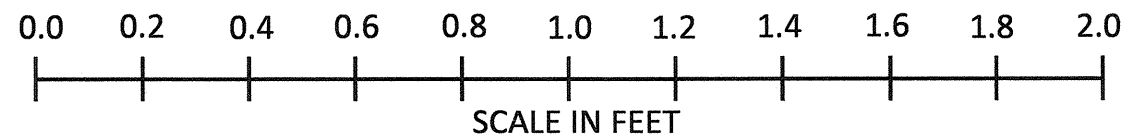
29.6 feet



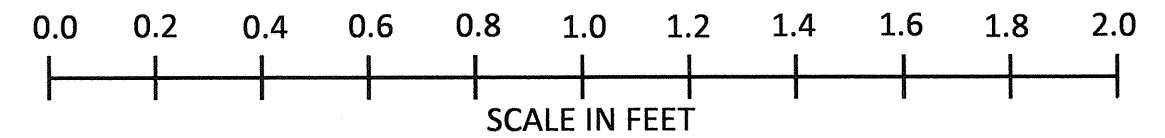
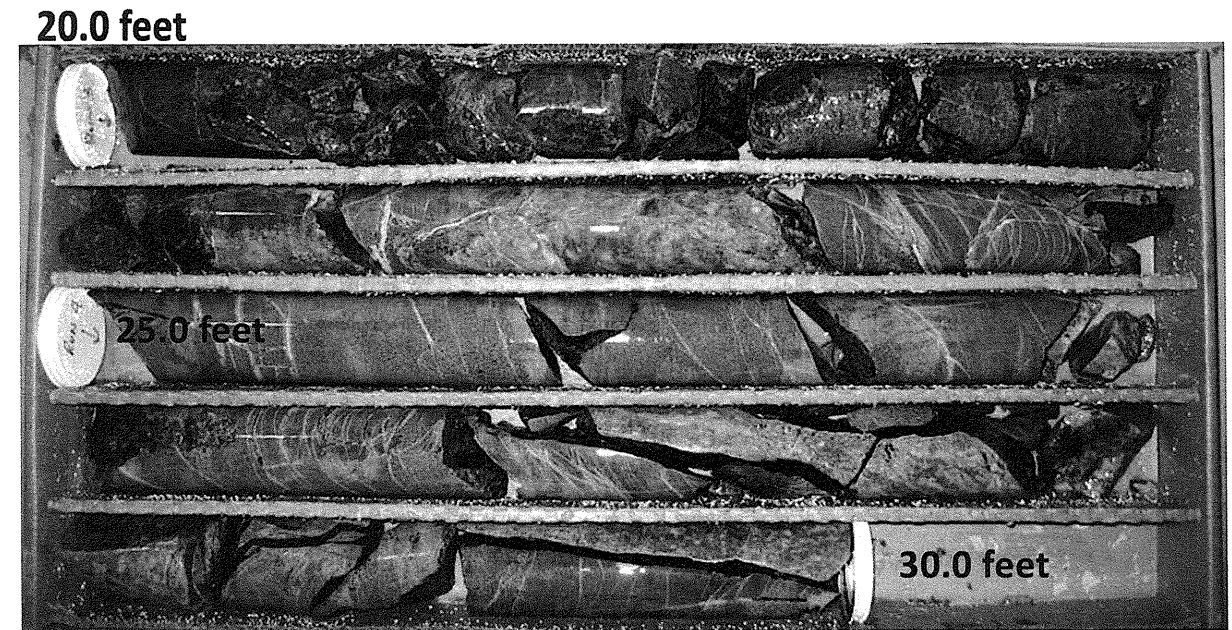
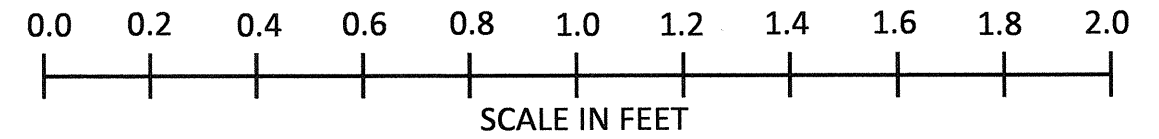




**SR 2024 – Upper Lake Road Grade Separation**  
**CORE PHOTOGRAPHS: B3-A: Station 26+22**



**SR 2024 – Upper Lake Road Grade Separation**  
**CORE PHOTOGRAPHS: B4-B: Station 27+22**





## SOIL TEST RESULTS

Boring No.	Sample No.	Station	Offset	Depth Interval	AASHTO Class.	L.L.	P.I.	% By Weight				% Passing (Sieves)			% Moisture	% Organic
								C. Sand	F. Sand	Silt	Clay	10	40	200		
EB1-B	SS-1	23+24	15' RT	8.5-10.0	A-6(9)	20	17	20.4	19.7	32.9	27.0	100.0	88.3	63.2	23	NT
EB1-A	SS-2	23+34	15' LT	3.5-5.0	A-4(0)	17	1	8.8	34.3	43.6	13.3	100.0	96.4	64.4	18	NT
EB2-B	SS-3	28+02	15' RT	3.5-5.0	A-4(3)	28	7	5.5	32.8	46.9	14.8	100.0	99.5	68.8	28	NT
EB2-A	SS-4	28+22	15' LT	3.5-5.0	A-4(0)	23	2	7.4	41.1	38.5	13.0	100.0	99.7	59.3	28	NT
R-3	ST-1	22+44	31' RT	9.0-11.0	A-7-6(11)	41	14	23.0	3.4	35.3	38.3	100.0	80.8	74.6	30	NT
R-4	ST-2	28+47	CL	6.0-8.0	A-4(4)	34	9	18.4	25.1	33.5	23.0	100.0	88.1	60.9	28	NT

NT = Not Tested

## ROCK TEST RESULTS

Boring No.	Sample No.	Station	Offset	Depth Interval	Area (square inches)	Unit Weight (pcf)	Length (inches)	Diameter (inches)	Unconfined Compressive Strength (psi)
B1-B	RS-1	24+26	18' RT	20.0-20.4	2.99	172.4	3.27	1.95	9540*
B1-B	RS-2	24+26	18' RT	34.0-34.4	3.11	166.6	3.80	1.99	10180*
B2-A	RS-3	25+35	8' LT	30.0-30.5	3.14	166.8	4.97	2.00	4,360
B3-A	RS-4	26+22	9' LT	18.3-18.8	3.11	139.2	4.89	1.99	12,580
B3-A	RS-5	26+22	9' LT	23.3-23.8	3.11	167.5	4.89	1.99	18,760
B4-B	RS-6	27+22	18' RT	25.0-25.5	3.05	186.2	4.34	1.97	13,330

\* A reduction factor applied where L/D ratio is less than 2