ID: U-2803

CONTRACT: C203028

STATE	STATE PROJECT REFERENCE NO.		SHEET NO.	TOTAL SHEETS
N.C.	U-2803		1	23
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION		
9.8070219		P.E.		
		CONST.		

CONTENTS:

LINE	STATION	PLAN	X-SECTIONS
-L-	15+00 - 54+00	3-5	6-12

CONTAINS ADDENDUM

Refer to the following Inventory Addendum as well as this Inventory.

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

STATE PROJECT 9.8070219 I.D. NO. U-2803

F.A. PROJECT

COUNTY ORANGE

DESCRIPTION SR 1919 (SMITH LEVEL ROAD) FROM ROCK HAVEN ROAD TO BRIDGE # 88 OVER MORGAN CREEK

INVENTORY

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

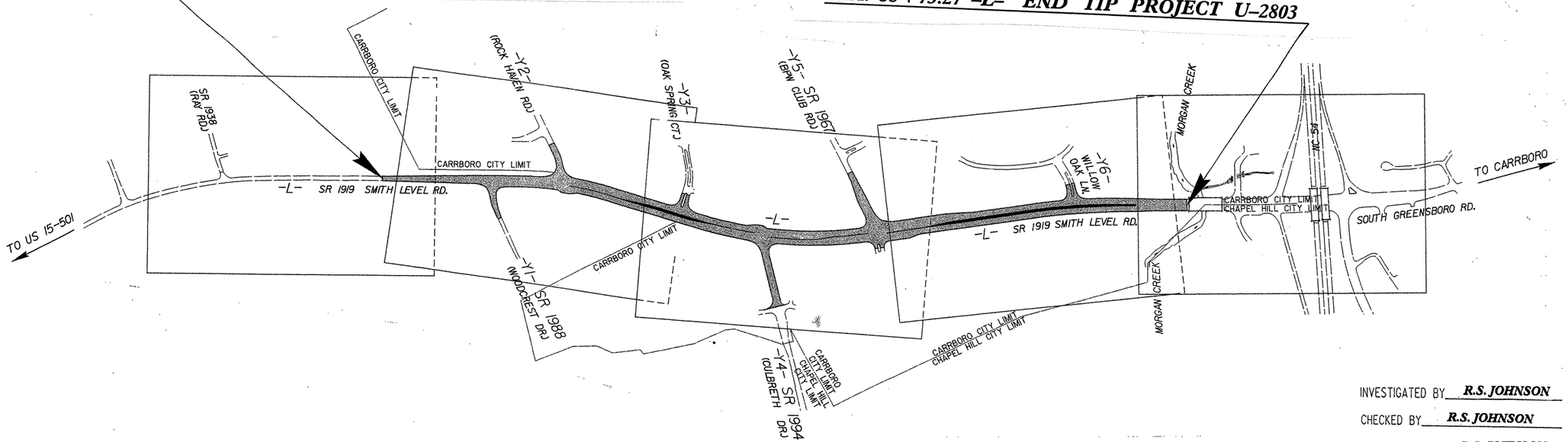
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) 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.

NAD 83

STA. 13+00.00 -L- BEGIN TIP PROJECT U-2803

STA. 55+73.27 -L- END TIP PROJECT U-2803



INVESTIGATED BY R.S. JOHNSON PERSONNEL J.T. BAGWELL

CHECKED BY R.S. JOHNSON R.D. BRANON

SUBMITTED BY R.S. JOHNSON E.C. CAMPBELL

DATE 10/02

DRAWN BY: TTW, ECC

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS 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 LICENSED SEAL 604 GEOLOGIST RICHARD S. JOHNSON

Richard S. Johnson
SIGNATURE

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2	

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤35% PASSING #200)							SILT-CLAY MATERIALS (>35% PASSING #200)				ORGANIC MATERIALS		
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	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX		50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
LIQUID LIMIT PLASTIC INDEX	6 MX		N.P.		40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0		0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND		FINE SAND		SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD								FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

P.I. OF A-7-5 ≤ L.L. - 30 : P.I. OF A-7-6 > L.L. - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.5 0.5 TO 1 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.0	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F. SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12"	3"				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

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.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 30
MODERATELY COMPRESSIBLE	LIQUID LIMIT 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT- CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.
- STATIC WATER LEVEL AFTER 24 HOURS.
- PW — PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA
- SPRING OR SEEPAGE

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS
- INFERRED SOIL BOUNDARIES
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP/DIP DIRECTION OF ROCK STRUCTURES
- ● - SOUNDING ROD
- SPT CPT DPT DMT VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF — SPT REFUSAL

SAMPLE DESIGNATIONS

- S- BULK SAMPLE
- SS- SPLIT SPOON SAMPLE
- ST- SHELBY TUBE SAMPLE
- RS- ROCK SAMPLE
- RT- RECOMPACTED TRIAXIAL SAMPLE
- CBR - CBR SAMPLE

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F. - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED
FRAGS. - FRAGMENTS
MED. - MEDIUM
PMT - PRESSUREMETER TEST
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT
W - MOISTURE CONTENT
V. - VERY
VST - VANE SHEAR TEST

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- ☐ MOBILE B-___
- ☐ BK-51
- ☐ CME-45
- ☐ CME-550
- ☐ PORTABLE HOIST
- ☐ OTHER _____
- ☐ OTHER _____

ADVANCING TOOLS:
- ☐ CLAY BITS
- ☐ 6" CONTINUOUS FLIGHT AUGER
- ☐ 8" HOLLOW AUGERS
- ☐ HARD FACED FINGER BITS
- ☐ TUNG.-CARBIDE INSERTS
- ☐ CASING ☐ W/ ADVANCER
- ☐ TRICONE _____" STEEL TEETH
- ☐ TRICONE _____" TUNG.-CARB.
- ☐ CORE BIT
- ☐ OTHER _____

HAMMER TYPE:
- ☐ AUTOMATIC ☐ MANUAL

CORE SIZE:
- ☐ -B_____
- ☐ -N_____
- ☐ -H_____

HAND TOOLS:
- ☐ POST HOLE DIGGER
- ☐ HAND AUGER
- ☐ SOUNDING ROD
- ☐ VANE SHEAR TEST
- ☐ OTHER _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN 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 FOLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V. SLI.)	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.
SLIGHT (SLI.)	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.
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.
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*
SEVERE (SEV.)	ALL ROCKS 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*
VERY SEVERE (V. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REOUCED 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*
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.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
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 GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGISTS PICK.
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.
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 FINGERNAIL.

FRACTURE SPACING

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

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS WHICH 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 IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS WHICH 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 DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (F.P.) - 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (R.Q.D.) - 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 WHICH 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, WHICH 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 B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 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 (S.R.Q.D.) - 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 (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK:

ELEVATION:

NOTES:

REVISED 09/15/00

GE34 Wednesday March 06 2002 legend_E11_07_

3/23

Earthwork Balance Sheet

Volumes in Cubic Yards

PROJECT: U-2803 COUNTY: Orange DATE: 7/20/2012 COMPILED BY: PJS

CHAIN	STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
			TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. (+)20%		ROCK	SUITABLE	UNSUIT.	TOTAL
SUMMARY 1																
L	13+00.00	34+50.00	2,219	270			1,949	4,645	270	4,375	5,520	3,301				
Y1	12+50.00	13+12.70	12				12	52		52	62	50				
Y2	12+30.00	13+18.11	136				136	16		16	19			117		117
Y3	12+33.00	13+09.54	18				18	318		318	382	364				
Y4	13+78.00	17+28.69	106				106	172		172	206	100				
SUBTOTAL			2,491	270			2,221	5,203	270	4,933	6,189	3,815		117		117
SUMMARY 2																
L	34+50.00	55+73.27	3,881	595			3,286	6,462	595	5,867	7,635	3,754				
Y5	11+88.00	15+31.56	244				244	505		505	606	362				
Y6	11+80.00	12+47.10	108				108	3		3	4			104		104
SUBTOTAL			4,233	595			3,638	6,970	595	6,375	8,245	4,116		104		104
SHEET TOTALS			6,724	865			5,859	12,173	865	11,308	14,434	7,931		221		221
LOSS DUE TO CLEARING AND GRUBBING			-400				-400					400				
EARTH WASTE IN LIEU OF BORROW												-221		-221		-221
SHOULDER MATERIAL								105		105	126	126				
PROJECT TOTALS			6,324	865			5,459	12,278	865	11,413	14,560	8,236				
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT												412				
GRAND TOTALS			6,324									8,648				
SAY			**6,400**									**8,700**				
ESTIMATED UNDERCUT			1,000													
ESTIMATED SHALLOW UNDERCUT			500													
(PER GEOTECH REC'S 07/24/12)																
DRAINAGE DITCH EXCAVATION			80													

NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHEAL F. EASLEY
GOVERNOR

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

LYNDO TIPPETT
SECRETARY

October 10, 2002

STATE PROJECT: 9.8070219 (U-2803)
F. A. PROJECT: N/A
COUNTY: Orange

DESCRIPTION: Carrboro – SR 1919 (Smith Level Road) from Rock Haven Road to Bridge No. 88 over Morgan Creek

SUBJECT: Geotechnical Report – Inventory

The proposed project consists of the widening of SR 1919, Smith Level Road, from Rock Haven Road to the Morgan Creek bridge. Widening will be comprised of improving the existing two-lane road to a 4-lane facility with turn lanes. The project is approximately 0.8 mile in length.

A limited geotechnical subsurface investigation was conducted during February 2002 utilizing ATV-mounted CME-45C drill machine with 6 inch or hollow stem augers in selected location to determine the quantity of hard rock in the areas of unclassified excavation. Soil samples were taken for field classification and selected samples were sent to the Materials & Test Unit for laboratory analysis.

The following survey lines were investigated and subsurface plans and cross sections are included with this report.

Line	Station
-L-	15+00 to 54+00

Subsurface plans were not prepared for the following survey lines, although a visual reconnaissance was performed.

Line	Station
-L-	13+11 to 15+00
-L-	54+00 to 55+68
-Y1-	10+00 to 13+31
-Y2-	10+00 to 13+79

9/23

Line	Station
-Y3-	10+00 to 13+43
-Y4-	10+00 to 13+90
-Y5-	10+00 to 15+54
-Y6-	10+00 to 12+71

AREAS OF SPECIAL GEOTECHNICAL INTEREST

1) Hard Rock: Hard rock was encountered above or within 6 feet of proposed grade at the following locations.

Line	Station
-L-	22+25 to 24+25
-L-	32+75 to 35+75
-L-	40+25 to 42+75

Physiography and Geology

The project is located in the Piedmont Physiographic Province and is underlain by metamorphosed granite of the Carolina Slate Belt. An outcrop of hard rock was observed between Station 41+38 to 41+57 -L- approximately 65 feet right. Ground elevation ranges along the project from elevation 354 to 480 feet, which provides excellent surface drainage to the Morgan Creek. Land use along Smith Level Road is highly concentrated residential and commercial.

Soils Properties

Soils present on this project are separated into three major categories based on origin. These categories are alluvial soils, residual soils and existing roadway embankment.

Alluvial soils occurred along Morgan Creek and tributaries. No sufficient quantities of alluvial soils are encountered in the widening of this project. These soils are compressible although consolidation should be within the construction period.

Residual soils are comprised of surficial yellow-brown to red-brown medium soft to very stiff, moist sandy and silty clay (A-7-5, A-6). This surficial clay is 2 to 10 feet in thickness and has plastic indices ranging from 11 to 33. Underlying the surficial clay are thin layers of tan-brown to gray, stiff to hard, moist to dry sandy silt (A-4) or weathered rock. Weathered rock and hard rock occurred interlayered with these residual soils.

Existing roadway embankment was found along -L- (SR 1919) and consisted of red-brown sandy and silty clay (A-7-5, A-6). These clayey soils are excavated residual soils described above which have been compacted for these embankments during roadway construction. No problems are anticipated with the existing embankment materials located on this project.

Rock Properties

Hard rock was encountered above or within 6 feet of proposed grade at the following locations.

5/23

Line	Station
-L-	22+25 to 24+25
-L-	32+75 to 35+75
-L-	40+25 to 42+75

Hard rock is composed of granite injections within the Carolina Slate Belt. Blasting will be required to construct the widening of Smith Level Road. Due to the close proximity of residential and commercial properties, control-blasting techniques should be used.

Groundwater

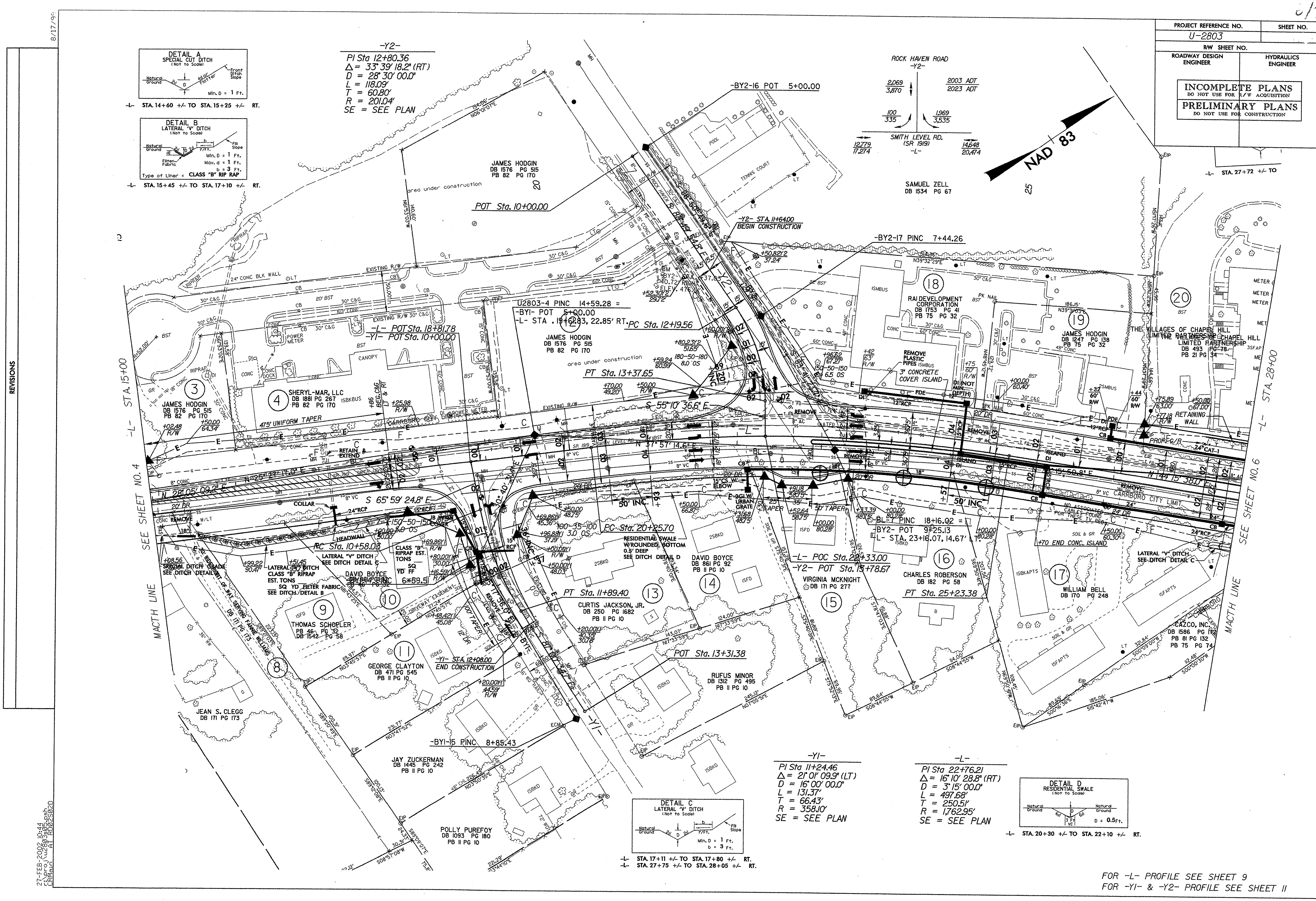
No groundwater levels were recorded across this site. Groundwater is not anticipated within 6 feet of proposed grade.

GEOTECHNICAL DESCRIPTIVE ANALYSIS

Due to the relatively short nature of this project and consistency of the subsurface conditions, a geotechnical descriptive analysis section was not deemed necessary.

Respectfully submitted,

Richard S. Johnson, L. G.
Engineering Geologist



PROJECT REFERENCE NO.
SHEET NO.
U-2803
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
NAD 83
DETAIL A
SPECIAL CUT DITCH
(Not to Scale)
-L- STA. 14+60 +/- TO STA. 15+25 +/- RT.
DETAIL B
LATERAL 'V' DITCH
(Not to Scale)
Type of Liner = CLASS "B" RIP RAP
-L- STA. 15+45 +/- TO STA. 17+10 +/- RT.
-Y2-
PI Sta 12+80.36
Δ = 33° 39' 18.2" (RT)
D = 28° 30' 00.0"
L = 118.09'
T = 60.80'
R = 201.04'
SE = SEE PLAN
ROCK HAVEN ROAD
-Y2-
2003 ADT
2023 ADT
SMITH LEVEL RD.
(SR 1919)
-L-
-BY2-16 POT 5+00.00
-BY2-17 PINC 7+44.26
-Y2- STA. 11+64.00
BEGIN CONSTRUCTION
POT Sta. 10+00.00
JAMES HODGIN
DB 1576 PG 515
PB 82 PG 170
SAMUEL ZELL
DB 1534 PG 67
RAI DEVELOPMENT CORPORATION
DB 1753 PG 41
PB 75 PG 32
JAMES HODGIN
DB 1247 PG 138
PB 75 PG 32
THE VILLAGES OF CHAPEL HILL LIMITED PARTNERSHIP
DB 493 PG 78
PB 21 PG 34
U2803-4 PINC 14+59.28 =
-BY1- POT 5+00.00
-L- STA. 15+62.83, 22.85' RT.
PC Sta. 12+19.56
-L- POT Sta. 18+81.78
-Y1- POT Sta. 10+00.00
SHERYL-MAR, LLC
DB 1881 PG 267
PB 82 PG 170
JAMES HODGIN
DB 1576 PG 515
PB 82 PG 170
475' UNIFORM TAPER
PT Sta. 13+37.65
S 55° 10' 36.6" E
N 37° 57' 14.6" E
S 65° 59' 24.8" E
N 28° 05' 09.2" E
N 44° 15' 38.0" E
REMOVE PLASTIC PIPES
3' CONCRETE COVER ISLAND
RETAINING WALL
CARRBORO CITY LIMIT
PC Sta. 10+58.03
PC Sta. 20+25.70
RESIDENTIAL SWALE W/ROUNDED BOTTOM 0.5' DEEP
SEE DITCH DETAIL D
-BL-7 PINC 18+16.02 =
-BY2- POT 9+25.13
-L- STA. 23+16.07, 14.67' LT.
+70 END CONC. ISLAND
LATERAL "V" DITCH
SEE DITCH DETAIL C
-L- POC Sta. 22+33.00
-Y2- POT Sta. 13+78.67
PT Sta. 25+23.38
PT Sta. 11+89.40
DAVID BOYCE
DB 861 PG 92
PB 11 PG 10
VIRGINIA MCKNIGHT
DB 171 PG 277
CHARLES ROBERSON
DB 182 PG 58
WILLIAM BELL
DB 170 PG 248
CAZCO, INC.
DB 1586 PG 178
PB 81 PG 132
PB 75 PG 74
CURTIS JACKSON, JR.
DB 250 PG 1682
PB 11 PG 10
THOMAS SCHOPLER
PB 46 PG 32
DB 1542 PG 58
GEORGE CLAYTON
DB 471 PG 545
PB 11 PG 10
-Y1- STA. 12+08.00
END CONSTRUCTION
POT Sta. 13+31.38
RUFUS MINOR
DB 1312 PG 495
PB 11 PG 10
JEAN S. CLEGG
DB 171 PG 173
JAY ZUCKERMAN
DB 1445 PG 242
PB 11 PG 10
-BY1-15 PINC 8+85.43
POLLY PUREFOY
DB 1093 PG 180
PB 11 PG 10
-L- STA. 15+00
-L- STA. 28+00
SEE SHEET NO. 4
SEE SHEET NO. 6
MATCH LINE
-L- STA. 27+72 +/- TO
DETAIL C
LATERAL 'V' DITCH
(Not to Scale)
-L- STA. 17+11 +/- TO STA. 17+80 +/- RT.
-L- STA. 27+75 +/- TO STA. 28+05 +/- RT.
-Y1-
PI Sta 11+24.46
Δ = 21° 01' 09.9" (LT)
D = 16° 00' 00.0"
L = 131.37'
T = 66.43'
R = 358.10'
SE = SEE PLAN
-L-
PI Sta 22+76.21
Δ = 16° 10' 28.8" (RT)
D = 3° 15' 00.0"
L = 497.68'
T = 250.51'
R = 1,762.95'
SE = SEE PLAN
DETAIL D
RESIDENTIAL SWALE
(Not to Scale)
-L- STA. 20+30 +/- TO STA. 22+10 +/- RT.
FOR -L- PROFILE SEE SHEET 9
FOR -Y1- & -Y2- PROFILE SEE SHEET 11
REVISIONS

7/25

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
U-2803	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y3-
PI Sta 11+43.20
Δ = 28° 16' 10.4" (RT)
D = 21° 00' 00.0"
L = 134.62'
T = 68.71'
R = 272.84'
SE = SEE PLANS

-L-
PI Sta 34+51.79
Δ = 25° 16' 47.5" (LT)
D = 2° 45' 00.0"
L = 919.27'
T = 467.24'
R = 2,083.48'
SE = SEE PLANS

NAD 83

OAK SPRING CT. -Y3-
1,082 / 1,691 — 2003 ADT / 2023 ADT
204 / 552 — 878 / 1,139
SMITH LEVEL RD. (SR 1919) -L-
14,052 / 20,226 — 14,726 / 20,813

BPW CLUB RD. (SR 1967) -Y5-
4,800 / 8,800 — 2003 ADT / 2023 ADT
687 / 1,643 — 4,113 / 7,157
SMITH LEVEL RD. (SR 1919) -L-
16,313 / 22,300 — 17,000 / 27,500

SEE SHEET NO. 5 — -L- STA. 28+00 — SEE SHEET NO. 7 — -L- STA. 41+00

MACTH LINE

-BY3-18 POT 5+00.00
POT Sta. 10+00.00
-BY5-20 POT 5+00.00
POT Sta. 10+00.00
PC Sta. 10+74.49
PT Sta. 12+09.11
-Y3- STA. 12+27.50 BEGIN CONSTRUCTION
-Y5- STA. 12+03.00 BEGIN CONSTRUCTION
-L- POT Sta. 33+24.85
-Y4- POT Sta. 10+00.00
-BL-9 PINC 28+25.81 =
-BY4- POT 5+00.00
-L- STA. 33+31.07, 55.86' LT.
PC Sta. 29+84.55
-L- POT Sta. 39+50.59
-Y5- POT Sta. 15+54.33
+94 BEG. CONC. ISLAND
-BL-8 PINC 24+20.27 =
-L- POT Sta. 28+69.93
-Y3- POT Sta. 13+45.05 25.97' RT.
-BL-10 PINC 35+08.51 =
-BY5- POT 11+15.11
-L- STA. 39+92.11, 53.04' LT.
PT Sta. 39+03.82
-Y4- STA. 13+90.00 END CONSTRUCTION

THE VILLAGES OF CHAPEL HILL LIMITED PARTNERSHIP
DB 493 PG 78
PB 21 PG 34

SUNSTATES EQUITIES, INC.
DB 789 PG 322
PB 55 PG 149

ANDREW OLSHAN
DB 1083 PG 398
PB 55 PG 149

MANIFEST BUILDERS, INC.
(DB 1574 PG 402
DB 1826 PG 519
PB 83 PG 97
PB 56 PG 28

DOUGLAS CRAWFORD-BROWN
DB 978 PG 34
PB 55 PG 149

MITCHELL SAFFIE
DB 826 PG 288
PB 58 PG 149

MICHAEL DEVON
DB 1391 PG 17
PB 58 PG 160

LEVI GREEN
DB 1241 PG 355
PB 83 PG 97

CAZCO, INC.
DB 1586 PG 172
PB 81 PG 132
PB 75 PG 74

ZINNCO, INC.
DB 2000 PG 242
PB 81 PG 132

ZINNCO, INC.
DB 2106 PG 590
PB 81 PG 132

WILLIAM BELCHER
DB 2122 PG 580
PB 81 PG 132

UCC ASSISTED LIVING
DB 1597 PG 82
PB 81 PG 114

UCC LIVING CENTERS, INC.
DB 1597 PG 73
PB 81 PG 114

ONSIGHT CORPORATION, L.L.C.
DB 1559 PG 438

(1) PHYLLIS HOLT
DB 1880 PG 321
PB 57 PG 118

(2) BLAIR PRIMUS
DB 1747 PG 327
PB 57 PG 118

(3) MIRACLE LINDSAY
DB 1051 PG 501
PB 57 PG 118

(4) AUGUSTUS NEVILLE
DB 950 PG 191
PB 57 PG 118

(5) STANLEY SOCHA
DB 1261 PG 489
PB 57 PG 118

(6) TEAL PLACE TOWNHOUSE HOMEOWNERS' ASSOCIATION, INC.
DB 950 PG 180
PB 57 PG 118

14,726 / 20,813 — SMITH LEVEL RD. (SR 1919) -L- — 16,313 / 23,357
1,661 / 2,530 — 3,248 / 5,074
4,909 / 7,604 — 2003 ADT / 2023 ADT
CULBRETH DR. (SR 1994) -Y4-

FOR -L- PROFILE SEE SHEET 10
FOR -Y3-, -Y4- & -Y5- PROFILE SEE SHEET 12

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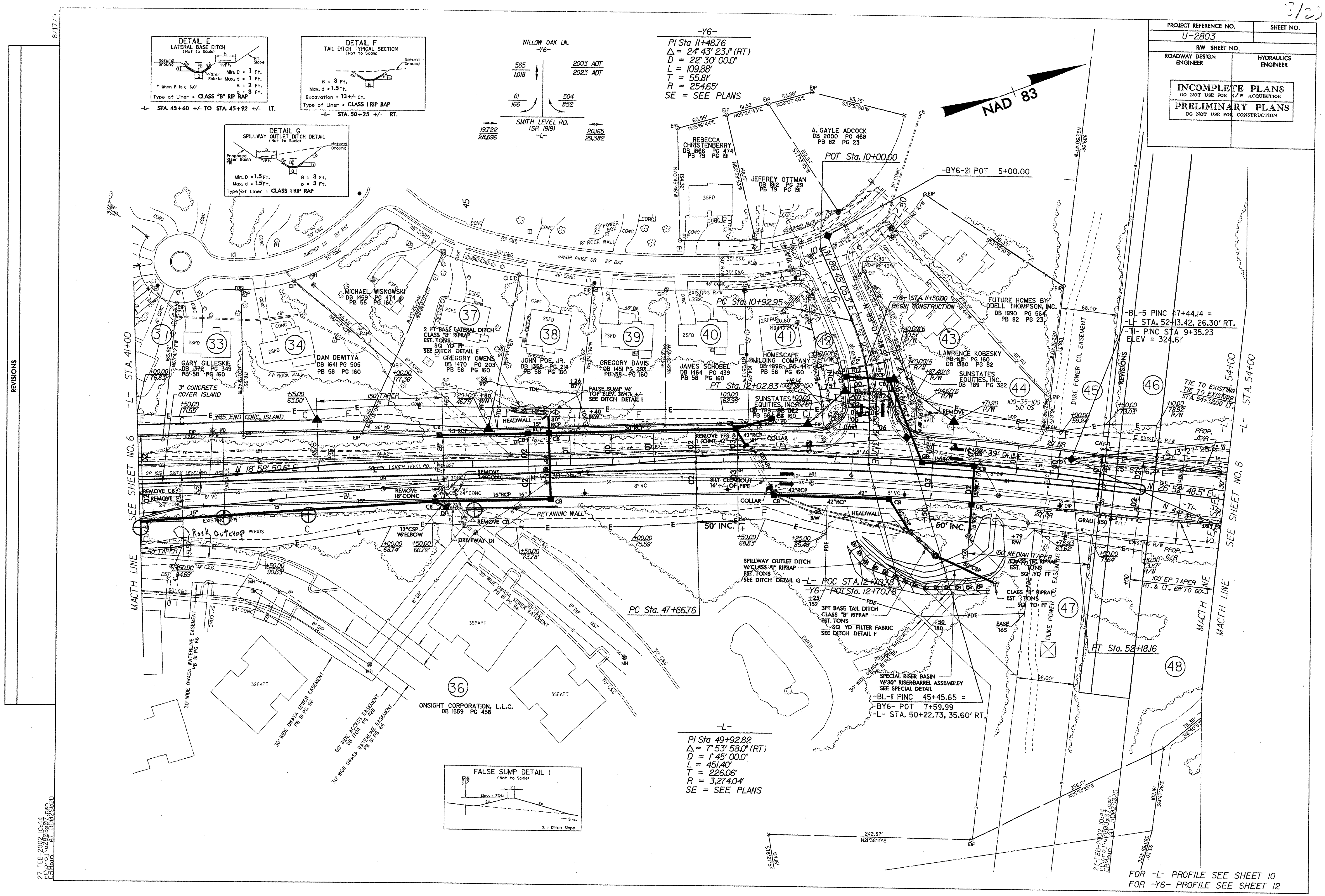

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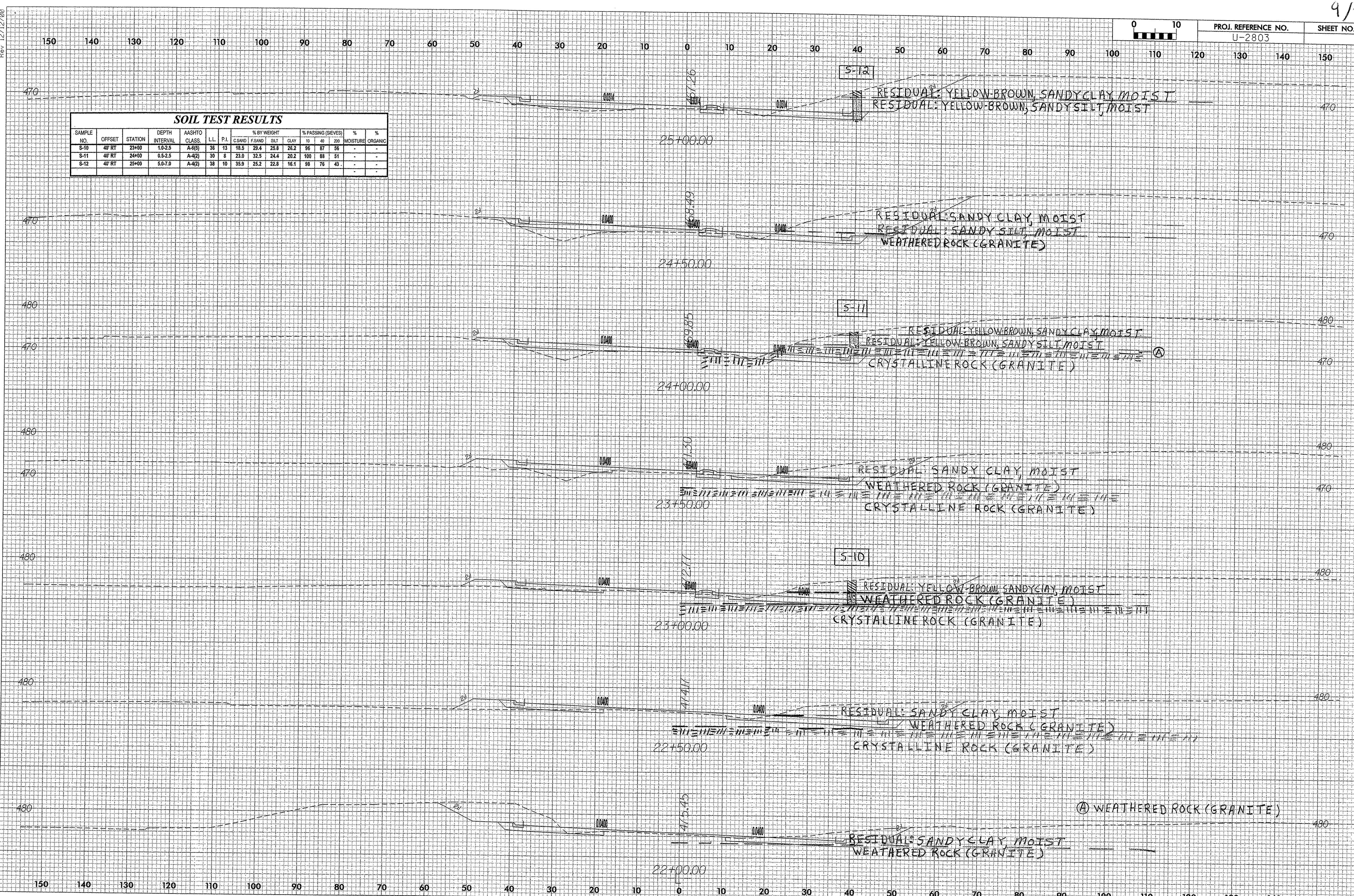
PROJ. REFERENCE NO.	SHEET NO.
U-2803	

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	% BY WEIGHT F.SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
S-10	40' RT	23+00	1.0-2.5	A-6(5)	36	13	18.5	29.4	25.8	26.2	96	87	56	-	-
S-11	40' RT	24+00	0.5-2.5	A-4(2)	30	8	23.0	32.5	24.4	20.2	100	88	51	-	-
S-12	40' RT	25+00	5.0-7.0	A-4(2)	38	10	35.9	25.2	22.8	16.1	98	76	43 .	-	-
														-	-



Rev 12/12/00

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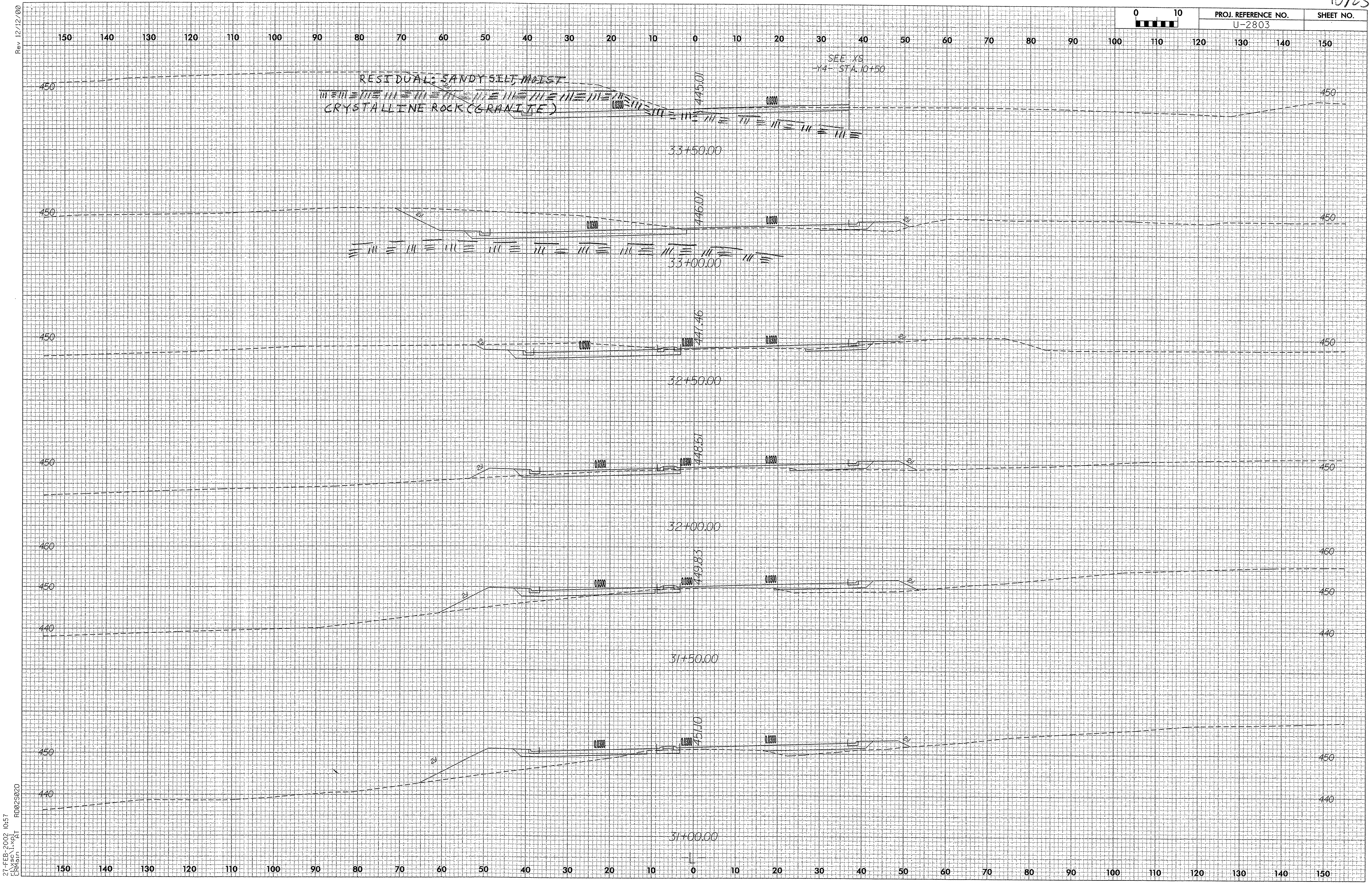
10/23



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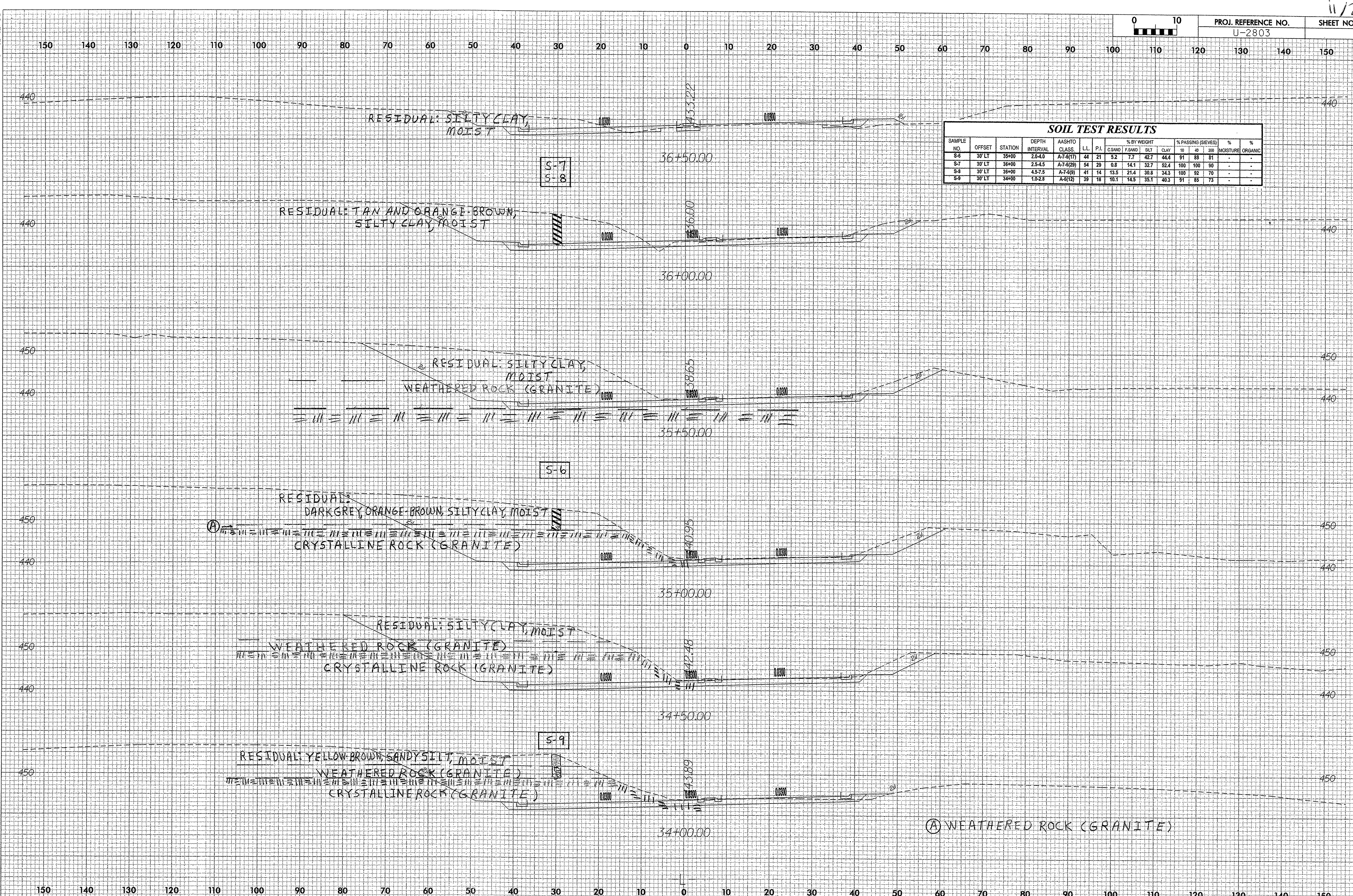
	U-2803	

11/23



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	% BY WEIGHT F.SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
S-6	30' LT	35+00	2.0-4.0	A-7-6(17)	44	21	5.2	7.7	42.7	44.4	91	88	81	-	-
S-7	30' LT	36+00	2.5-4.5	A-7-6(29)	54	29	0.8	14.1	32.7	52.4	100	100	90	-	-
S-8	30' LT	36+00	4.5-7.5	A-7-6(9)	41	14	13.5	21.4	30.8	34.3	100	92	70	-	-
S-9	30' LT	34+00	1.0-2.8	A-6(12)	39	18	10.1	14.5	35.1	40.3	91	85	73	-	-

Rev 12/12/00

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Rev 12/12/00

PROJ. REFERENCE NO.	SHEET NO.
U-2803	

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-5	60' RT	41+00	2.0-3.0	A-4(0)	26	5	37.9	23.6	20.4	18.1	86	63	37	-	-

S-5

RESIDUAL: TAN AND GREEN-GREY, SILTY CLAY, MOIST
WEATHERED ROCK (GRANITE)
CRYSTALLINE ROCK (GRANITE)
Ⓐ

41+00.00

RESIDUAL: SILTY CLAY, MOIST
WEATHERED ROCK (GRANITE)
CRYSTALLINE ROCK (GRANITE)

40+50.00

RESIDUAL: SILTY CLAY MOIST
WEATHERED ROCK (GRANITE)

40+00.00

SEE XS
-Y5- STA. 15+00

DRIVE @
UNIVERSITY
COMMONS

39+50.00

Ⓐ RESIDUAL: GREEN-GREY, SANDY SILT, MOIST

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Rev 12/12/00

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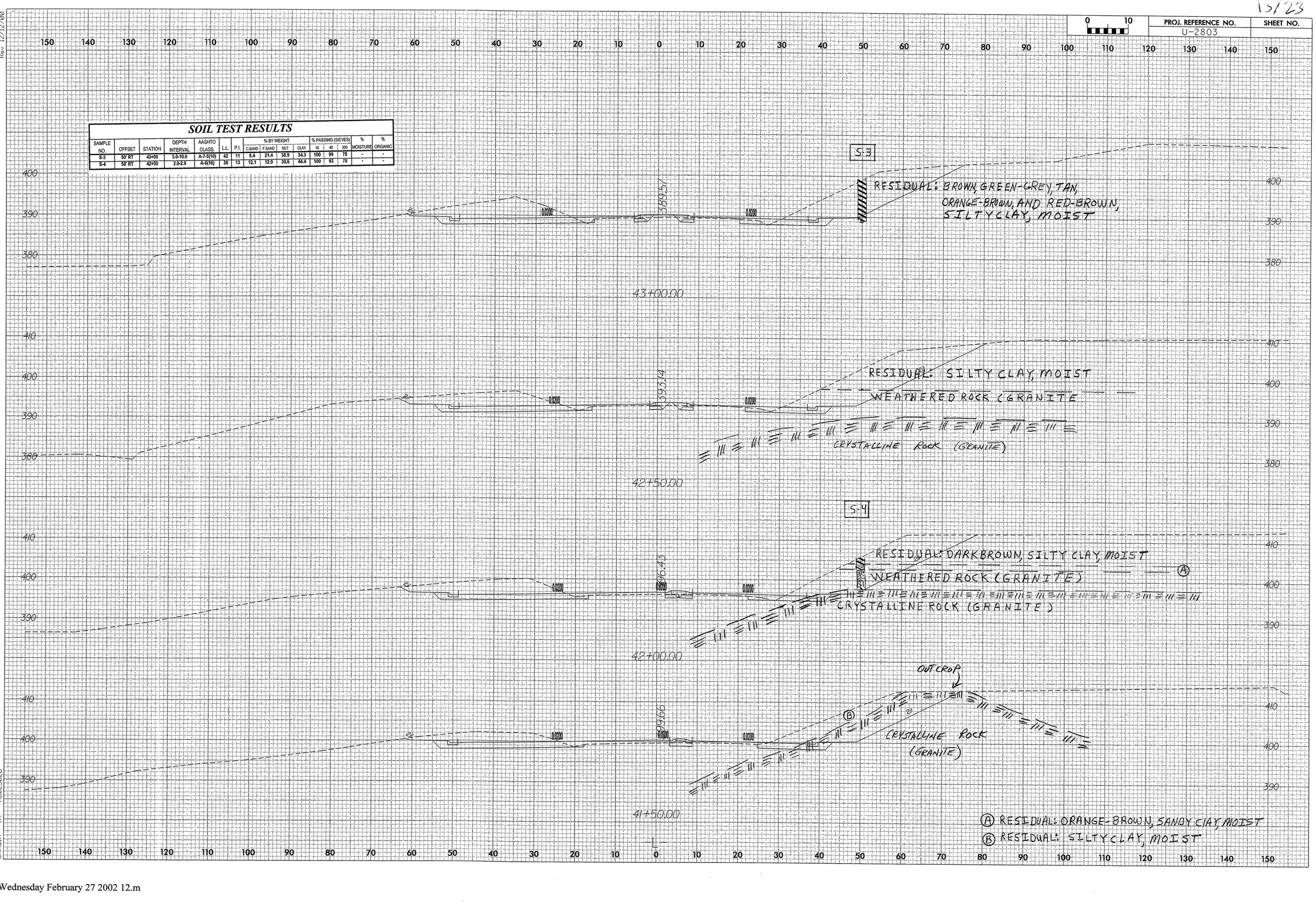
	U-2803	

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-3	50' RT	43+00	5.0-10.0	A-7-5(10)	42	11	5.4	21.4	38.9	34.3	100	99	78	-	-
S-4	50' RT	42+00	2.0-2.9	A-6(10)	36	13	12.1	12.9	30.6	44.4	100	93	78	-	-



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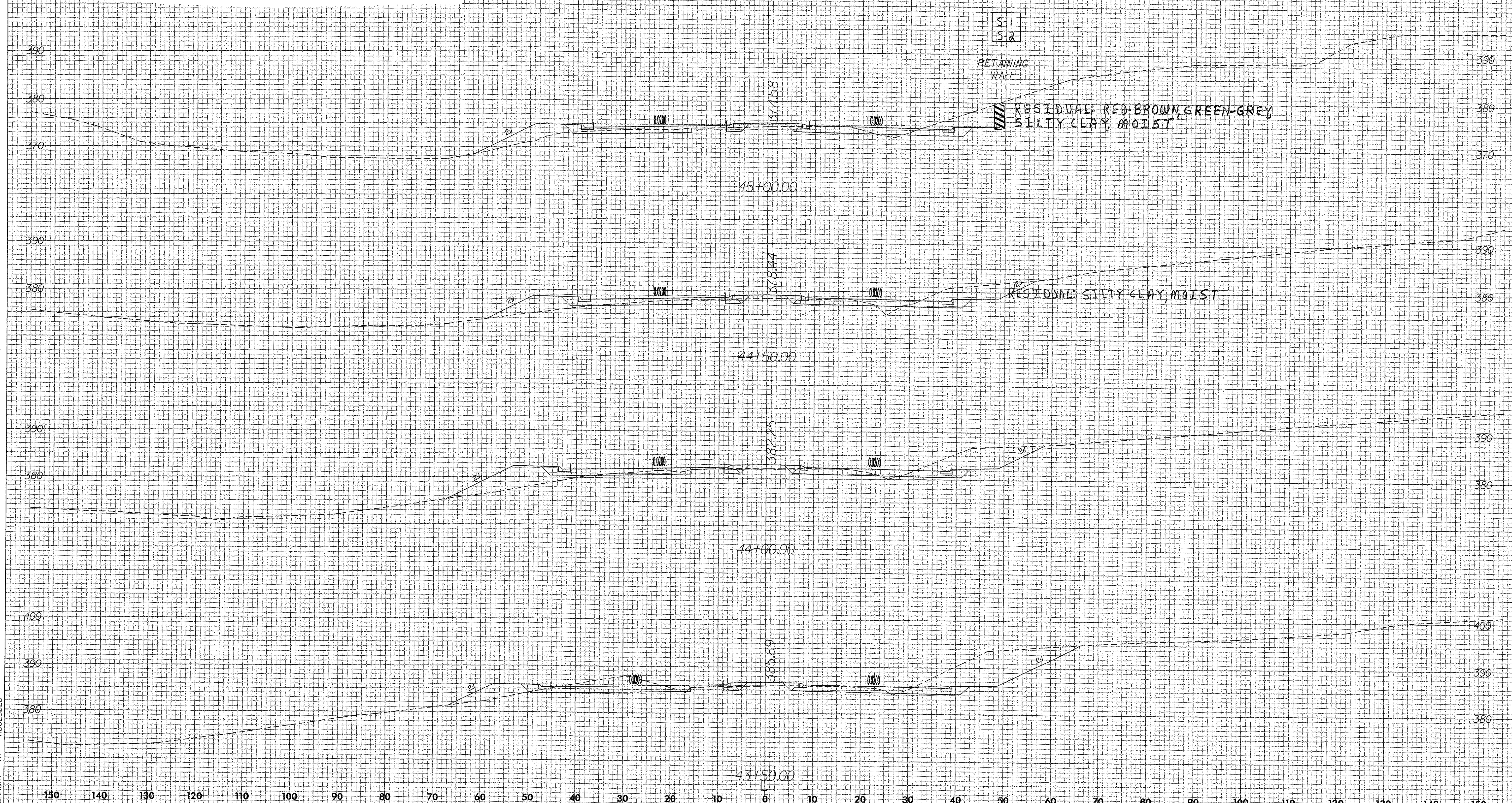
PROJ. REFERENCE NO.	SHEET NO.
U-2803	

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-1	49' RT	45+00	0.0-2.5	A-7-6(14)	45	20	11.1	10.3	30.2	48.4	90	83	73	-	-
S-2	49' RT	45+00	2.5-5.0	A-7-6(22)	50	22	4.8	8.9	31.9	54.4	100	97	89	-	-



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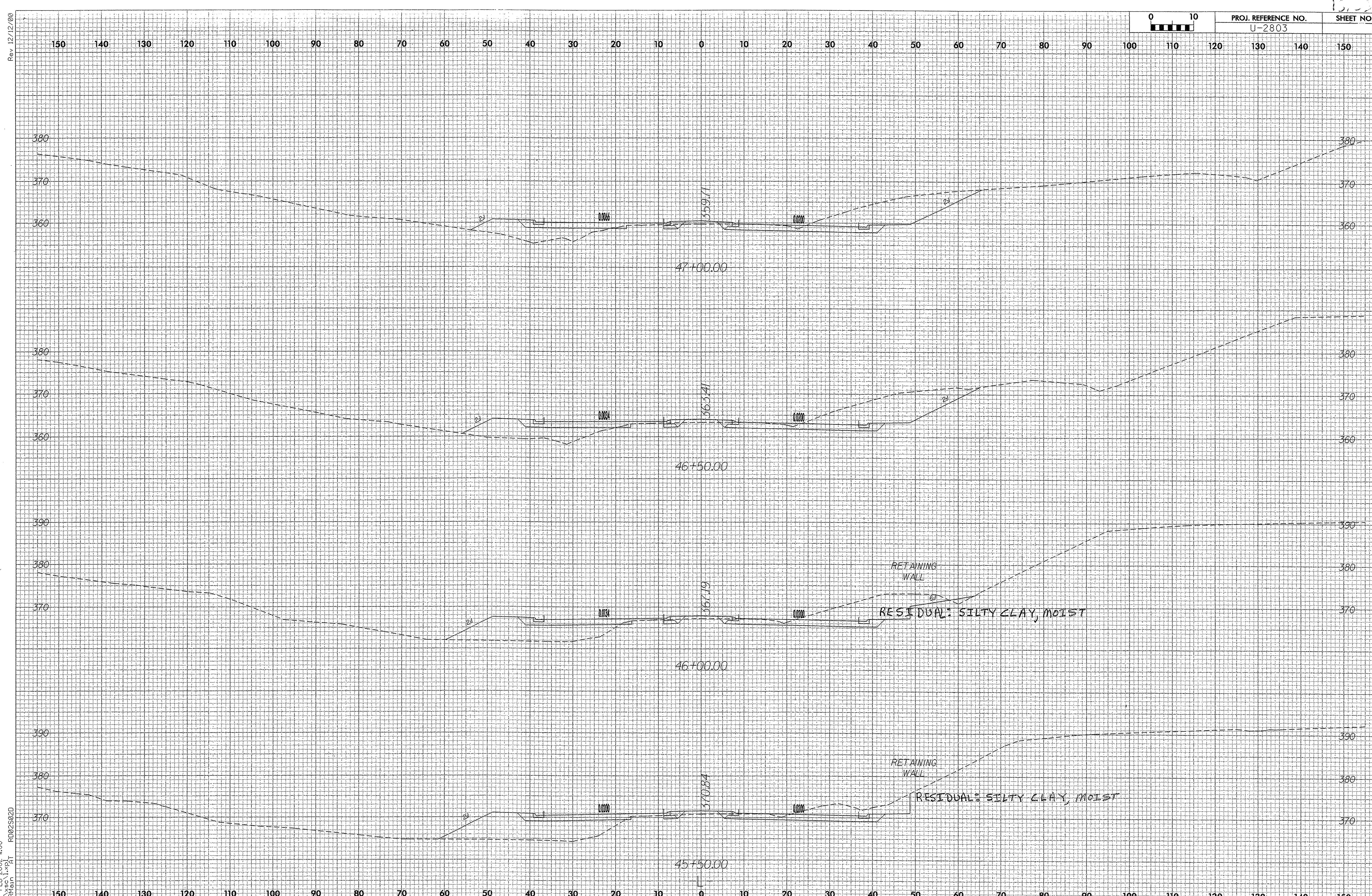
PROJ. REFERENCE NO.
U-2803
SHEET NO.
0 10
47+00.00
359.71
46+50.00
363.41
46+00.00
367.19
RETAINING WALL
RESIDUAL: SILTY CLAY, MOIST
45+50.00
370.84
RETAINING WALL
RESIDUAL: SILTY CLAY, MOIST
Rev 12/12/00
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RD02S02D

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34860.1.1 (U-2803)	1	15

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

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34860.1.1 (U-2803) F.A. PROJ. N/A

COUNTY ORANGE

PROJECT DESCRIPTION SR 1919 (SMITH LEVEL ROAD) FROM SOUTH OF ROCK HAVEN ROAD TO BRIDGE NO. 88 OVER MORGAN CREEK

SITE DESCRIPTION ADDENDUM TO ROADWAY SUBSURFACE INVESTIGATION INVENTORY; CORE BORINGS IN PROPOSED UNCLASSIFIED EXCAVATION

CONTENTS

PERSONNEL

N.D. MOHS

F&R

INVESTIGATED BY N.D. MOHS

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

DATE JULY 2012

CAUTION NOTICE

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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.

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS 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 LICENSED SEAL 2124 GEOLOGIST NATHAN DANIEL MOHS 7/26/12

DRAWN BY: N.D. MOHS

16/23

PROJECT REFERENCE NO.	SHEET NO.
34860.1.1 (U-2803)	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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 (AASHTO T206, 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:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
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	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
LIQUID LIMIT PLASTIC INDEX	6 MX		NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT PLASTIC RANGE (PI) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

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.

GRADATION

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.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT / DPT / DMT / VST / PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [ ] CME-550
- [ ] PORTABLE HOIST
- [X] CME-55
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [X] -N_____
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

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PROJECT REFERENCE NO.	SHEET NO.
34860.1.1 (U-2803)	2A

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

ROCK DESCRIPTION

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:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	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.
SLIGHT (SLI.)	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.
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.
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*
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*
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*
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.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
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.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
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.
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 FINGERNAIL.

FRACTURE SPACING

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

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

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 DISLODGED 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 (SRQD) - 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.

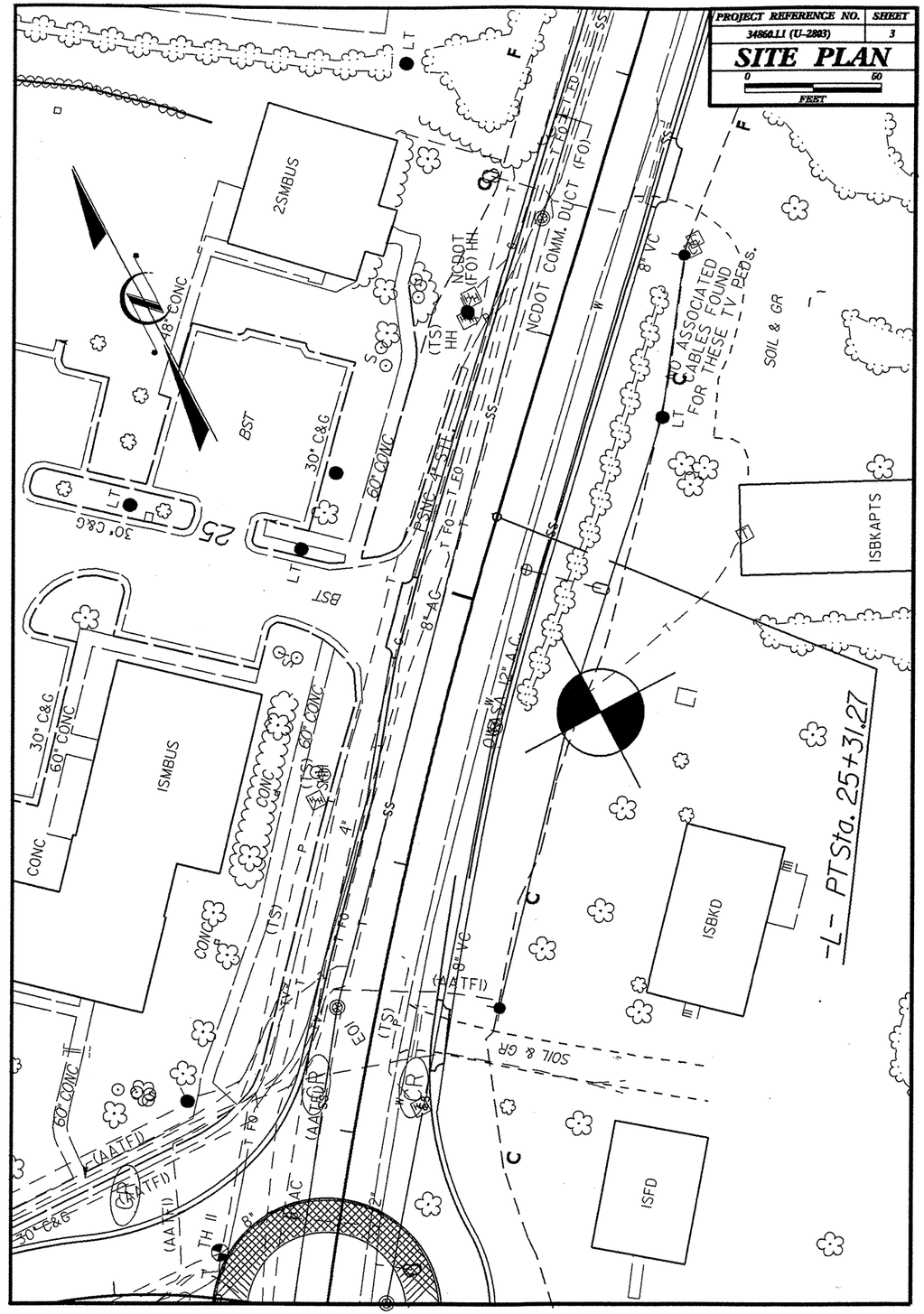
TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK:

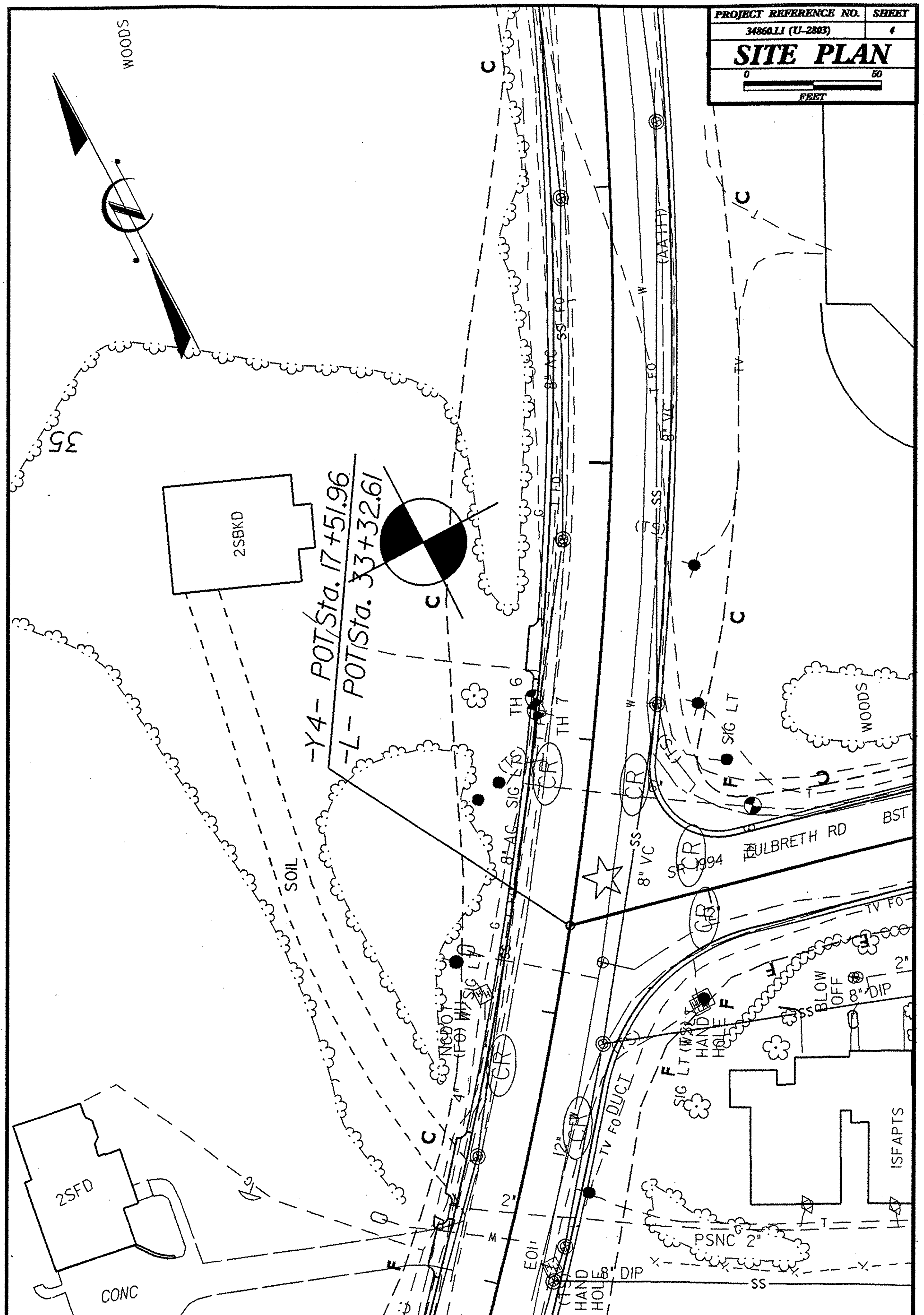
ELEVATION: FT.

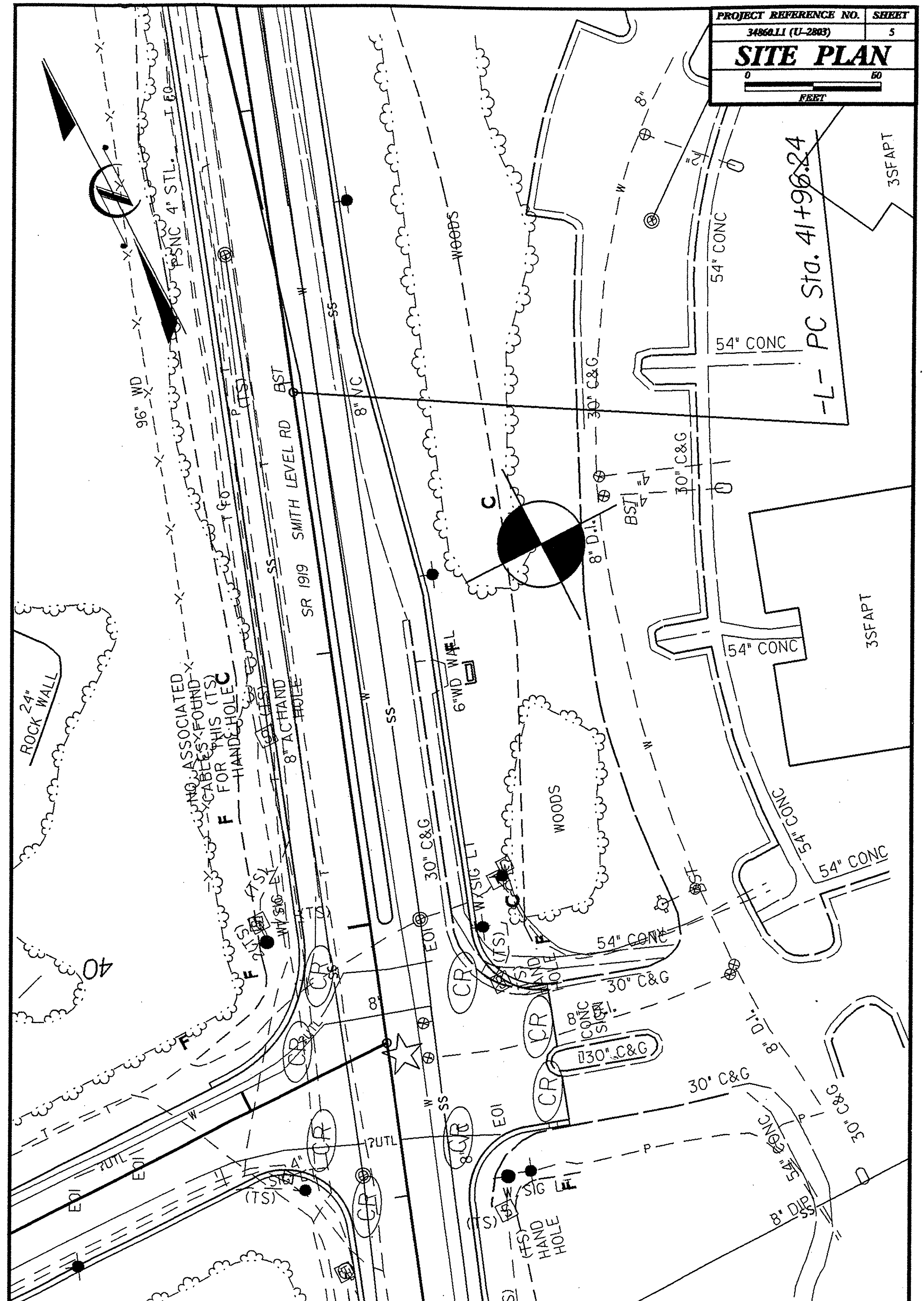
NOTES:

REVISED 09/23/09



18/23


PROJECT REFERENCE NO.
SHEET
34860.1.1 (U-2803)
4
SITE PLAN
0
50
FEET
WOODS
35
2SBKD
-Y4- POT Sta. 17+51.96
-L- POT Sta. 33+32.61
TH 6
TH 7
SIG LT
WOODS
FULBRETH RD
BST
SR 1994
SOIL
BLOW OFF
8" DIP
HAND HOLE
TV FO DUCT
ISFAPTS
2SFD
CONC
PSNC 2"
8" DIP
HAND HOLE
SS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SHEET
34860.1.1 (U-2803)
5
SITE PLAN
0
50
FEET
3SFAPT
-L- PC Sta. 41+96.24
54" CONC
54" CONC
30" C&G
30" C&G
PSNC 4" STL.
96" WD
BST
SMITH LEVEL RD
SR 1919
8" VC
WOODS
8" D.I.
BST
3SFAPT
54" CONC
6"WD WELL
24" ROCK WALL
NO ASSOCIATED CABLES FOUND FOR THIS (TS) HAND HOLE
8" AC HAND HOLE
WOODS
54" CONC
54" CONC
30" C&G
30" C&G
8" D.I.
30" C&G
40
54" CONC
8" DIP
SIG LT
HAND HOLE
EOI

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34860.1.1	**TIP** U-2803	**COUNTY** ORANGE	**GEOLOGIST** Mohs, N. D.	
SITE DESCRIPTION SR 1919 FROM SOUTH OF ROCK HAVEN ROAD TO BRIDGE NO. 88 OVER MORGAN CREEK				**GROUND WTR (ft)**
BORING NO. 1	**STATION** 24+72	**OFFSET** 56 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 476.1 ft	**TOTAL DEPTH** 23.3 ft	**NORTHING** 779,623	**EASTING** 1,976,567	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 12/15/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/29/12	**COMP. DATE** 05/29/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
480										
										476.1 GROUND SURFACE 0.0
475										**RESIDUAL** ORANGE AND BROWN, SANDY SILT
	472.6	3.5	14	17	25	42		M		
470										
	467.6	8.5	5	100/0.3		100/0.3				467.1 9.0
465							RS-1			466.7 9.4 **WEATHERED ROCK** (METAVOLCANIC) **CRYSTALLINE ROCK** GREEN-GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING (METAVOLCANIC) REC=69% RQD=25% RMR=52
460										
455										452.8 23.3 Boring Terminated at Elevation 452.8 ft IN CRYSTALLINE ROCK (METAVOLCANIC)

NCDOT BORE SINGLE U2803_GEO_BH.GPJ NC_DOT.GDT 7/26/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34860.1.1	**TIP** U-2803	**COUNTY** ORANGE	**GEOLOGIST** Mohs, N. D.	
SITE DESCRIPTION SR 1919 FROM SOUTH OF ROCK HAVEN ROAD TO BRIDGE NO. 88 OVER MORGAN CREEK				**GROUND WTR (ft)**
BORING NO. 1	**STATION** 24+72	**OFFSET** 56 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 476.1 ft	**TOTAL DEPTH** 23.3 ft	**NORTHING** 779,623	**EASTING** 1,976,567	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 12/15/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/29/12	**COMP. DATE** 05/29/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE N	**TOTAL RUN** 13.9 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
466.7											ELEV. (ft) DEPTH (ft)
											Begin Coring @ 9.4 ft
465	466.7	9.4	3.9	1:20/0.9 2:06/1.0 1:32/1.0 1:02/1.0	(2.5) 64%	(0.4) 10%	RS-1	(9.6) 69%	(3.5) 25%		466.7 9.4 **CRYSTALLINE ROCK** GREEN-GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING (METAVOLCANIC) REC=69% RQD=25% RMR=52
	462.8	13.3	5.0	1:28/1.0 2:18/1.0 1:35/1.0 1:11/1.0 2:03/1.0	(3.6) 72%	(0.5) 10%					
460	457.8	18.3	5.0	2:45/1.0 2:30/1.0 2:30/1.0 1:45/1.0 2:08/1.0	(3.5) 70%	(2.6) 52%					
455	452.8	23.3									452.8 23.3 Boring Terminated at Elevation 452.8 ft IN CRYSTALLINE ROCK (METAVOLCANIC)

NCDOT CORE SINGLE U2803_GEO_BH.GPJ NC_DOT.GDT 7/26/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34860.1.1	**TIP** U-2803	**COUNTY** ORANGE	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION SR 1919 FROM SOUTH OF ROCK HAVEN ROAD TO BRIDGE NO. 88 OVER MORGAN CREEK			**GROUND WTR (ft)**
BORING NO. 2	**STATION** 34+68	**OFFSET** 67 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 456.1 ft	**TOTAL DEPTH** 26.9 ft	**NORTHING** 780,434	**EASTING** 1,977,133 — **24 HR.** 8.5
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 12/15/2011	**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/29/12	**COMP. DATE** 05/29/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
460											
										456.1 GROUND SURFACE	0.0
455										**RESIDUAL** TAN, SILTY SAND	
	452.6	3.5	55	45/0.2		100/0.7				452.6	3.5
450										451.1 **WEATHERED ROCK** (METAVOLCANIC)	5.0
	447.6	8.5								**RESIDUAL** ORANGE, SILTY CLAY	
445			6	8	15	23					
										444.4	11.7
	442.6	13.5	60/0.1			60/0.1				442.6 **WEATHERED ROCK** (METAVOLCANIC)	13.5
440										442.2 **CRYSTALLINE ROCK** (METAVOLCANIC)	13.9
							RS-2			**CRYSTALLINE ROCK** GREEN-GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING (METAVOLCANIC) REC=86% RQD=48% RMR=52	
435											
430										429.2	26.9
										Boring Terminated at Elevation 429.2 ft IN CRYSTALLINE ROCK (METAVOLCANIC)	

NCDOT BORE SINGLE U2803_GEO_BH.GPJ NC_DOT.GDT 7/26/12

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NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34860.1.1	**TIP** U-2803	**COUNTY** ORANGE	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION SR 1919 FROM SOUTH OF ROCK HAVEN ROAD TO BRIDGE NO. 88 OVER MORGAN CREEK			**GROUND WTR (ft)**
BORING NO. 2	**STATION** 34+68	**OFFSET** 67 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 456.1 ft	**TOTAL DEPTH** 26.9 ft	**NORTHING** 780,434	**EASTING** 1,977,133 — **24 HR.** 8.5
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 12/15/2011	**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/29/12	**COMP. DATE** 05/29/12	**SURFACE WATER DEPTH** N/A
CORE SIZE N	**TOTAL RUN** 13.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS — ELEV. (ft)	DEPTH (ft)
442.2											Begin Coring @ 13.9 ft	
440	442.2	13.9	3.0	2:23/1.0 2:19/1.0 2:45/1.0	(2.0) 67%	(0.0) 0%		(11.2) 86%	(6.2) 48%		442.2 **CRYSTALLINE ROCK** GREEN-GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING (METAVOLCANIC) REC=86% RQD=48% RMR=52	13.9
	439.2	16.9	5.0	2:44/1.0 2:18/1.0 2:47/1.0 2:22/1.0 2:20/1.0	(4.4) 88%	(2.6) 52%	RS-2					
435	434.2	21.9	5.0	3:12/1.0 2:48/1.0 3:47/1.0 3:45/1.0 3:31/1.0	(4.8) 96%	(3.6) 72%						
430	429.2	26.9									429.2	26.9
											Boring Terminated at Elevation 429.2 ft IN CRYSTALLINE ROCK (METAVOLCANIC)	

NCDOT CORE SINGLE U2803_GEO_BH.GPJ NC_DOT.GDT 7/26/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34860.1.1	**TIP** U-2803	**COUNTY** ORANGE	**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION SR 1919 FROM SOUTH OF ROCK HAVEN ROAD TO BRIDGE NO. 88 OVER MORGAN CREEK			**GROUND WTR (ft)**
BORING NO. 3	**STATION** 41+28	**OFFSET** 82 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 413.7 ft	**TOTAL DEPTH** 16.7 ft	**NORTHING** 780,984	**EASTING** 1,977,512 — **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 12/15/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 05/30/12	**COMP. DATE** 05/30/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
415										413.7 GROUND SURFACE 0.0
										RESIDUAL TAN, SANDY SILT
410	410.2	3.5	100/0.2			100/0.2	RS-3			410.2 3.5
										410.0 3.7 **WEATHERED ROCK** (METAVOLCANIC)
405							RS-4			**CRYSTALLINE ROCK** GREEN-GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, CLOSE FRACTURE SPACING (METAVOLCANIC) REC=70% RQD=18% RMR=52
400										397.0 16.7
										Boring Terminated at Elevation 397.0 ft IN CRYSTALLINE ROCK (METAVOLCANIC)

NCDOT BORE SINGLE U2803_GEO_BH.GPJ NC_DOT.GDT 7/26/12

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NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34860.1.1	**TIP** U-2803	**COUNTY** ORANGE	**GEOLOGIST** Mohs, N. D.	
SITE DESCRIPTION SR 1919 FROM SOUTH OF ROCK HAVEN ROAD TO BRIDGE NO. 88 OVER MORGAN CREEK				**GROUND WTR (ft)**
BORING NO. 3	**STATION** 41+28	**OFFSET** 82 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 413.7 ft	**TOTAL DEPTH** 16.7 ft	**NORTHING** 780,984	**EASTING** 1,977,512	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 12/15/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 05/30/12	**COMP. DATE** 05/30/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE N	**TOTAL RUN** 13.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
410											Begin Coring @ 3.7 ft
	410.0	3.7	3.0	2:05/1.0 1:35/1.0 2:27/1.0	(2.0) 67%	(0.0) 0%	RS-3	(9.1) 70%	(2.3) 18%		410.0 3.7 **CRYSTALLINE ROCK** GREEN-GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, CLOSE FRACTURE SPACING (METAVOLCANIC) REC=70% RQD=18% RMR=52
	407.0	6.7									
405			5.0	1:56/1.0 1:35/1.0 1:33/1.0 2:39/1.0 2:50/1.0	(2.6) 52%	(1.0) 20%	RS-4				
	402.0	11.7									
400			5.0	2:34/1.0 2:09/1.0 2:41/1.0 2:39/1.0 3:19/1.0	(4.5) 90%	(1.3) 26%					
	397.0	16.7									397.0 16.7 Boring Terminated at Elevation 397.0 ft IN CRYSTALLINE ROCK (METAVOLCANIC)

NCDOT CORE SINGLE U2803_GEO_BH.GPJ NC_DOT.GDT 7/26/12

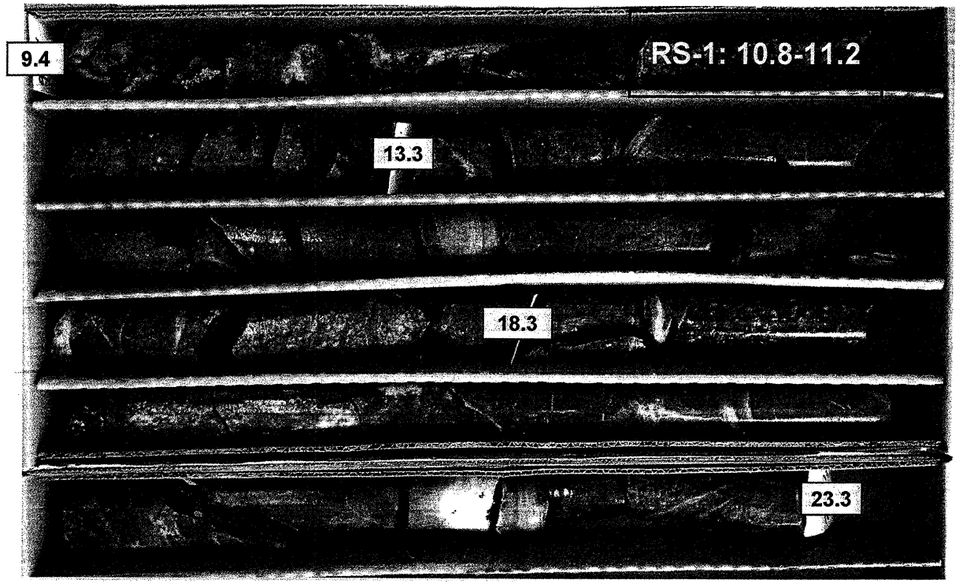
ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	H/D RATIO	UNIT WT lbs/ft3	Ultimate lbf	Ultimate ksi	Ultimate (corrected) ksi	Sec. Mod. @ 40% Mpsi
RS-1	56 RT	24+72	10.8-11.2	2.1	170.9	22500	9.2	9.3	6.16
RS-2	67 LT	34+68	16.9-17.3	2.13	162.9	10490	4.3	4.3	3.52
RS-3	82 RT	41+28	3.9-4.2	2.14	154.9	7930	3.3	3.3	1.74
RS-4	82 RT	41+28	8.7-9.2	2.24	160.0	4220	1.7	1.8	1.93

CORE PHOTOGRAPH

-L- 24+72, 56' RT

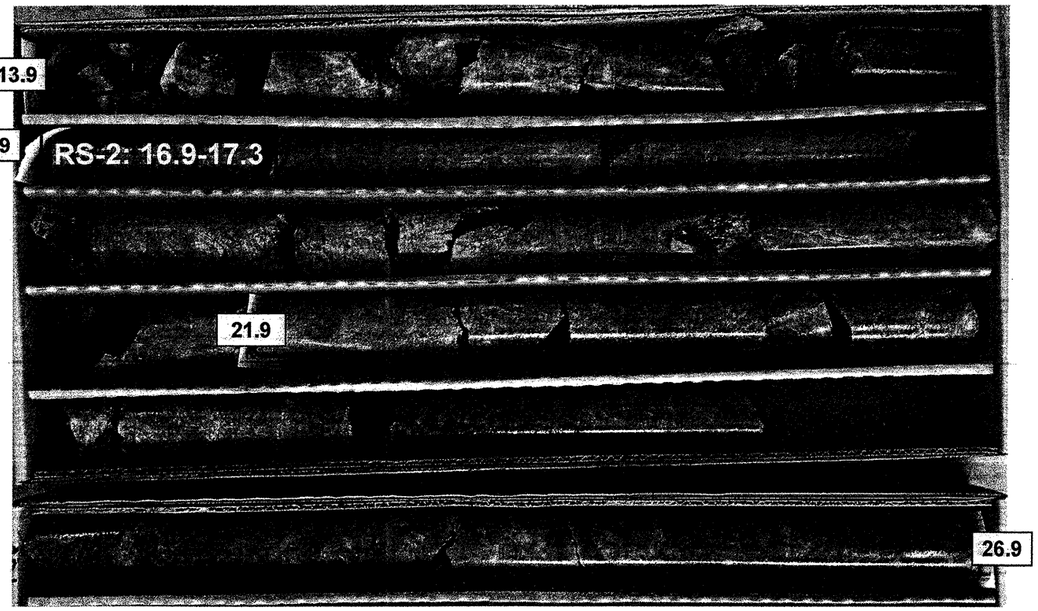
BOXES 1 & 2: 9.4 - 23.3 FEET



CORE PHOTOGRAPH

-L- 34+68, 67' LT

BOXES 1 & 2: 13.9 - 26.9 FEET



CORE PHOTOGRAPH

-L- 41+28, 82' RT

BOX 1: 3.7 - 16.7 FEET