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STATE OF NORTH CAROLINA

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

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<u>SHEET</u>	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4,5	CROSS SECTIONS
6,7	PROFILE
8 - II	BORE LOG & CORE REPORTS
12 - 14	CORE PHOTOGRAPHS

STRUCTURE SUBSURFACE INVESTIGATION

	FERENCE NO RUTHERFORI	8581.1.1			_	F.A. PF	ROJ		
	DESCRIPTION	NO. 87	ON	US	64	OVER	BROAD	RIVER	
ITE DES	CRIPTION								

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	SHEETS
N.C.	B-4811 38581.1.1	1	14

CAUTION NOTICE

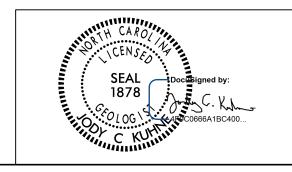
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOCS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENOIMERING UNIT AT 1919 250-040BN. RHITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOCS, 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 BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BORCHOLE, THE LABORATORY SAMPLE DATA AND THE IN STIL OIL-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 OR SOIL MOISTURE CONDITIONS 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 TEMPORATION AND WAND AS WELL AS OTHER NON-CLIMATIC FACTORS. 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 INVESTICATION 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 INVESTICATIONS 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.

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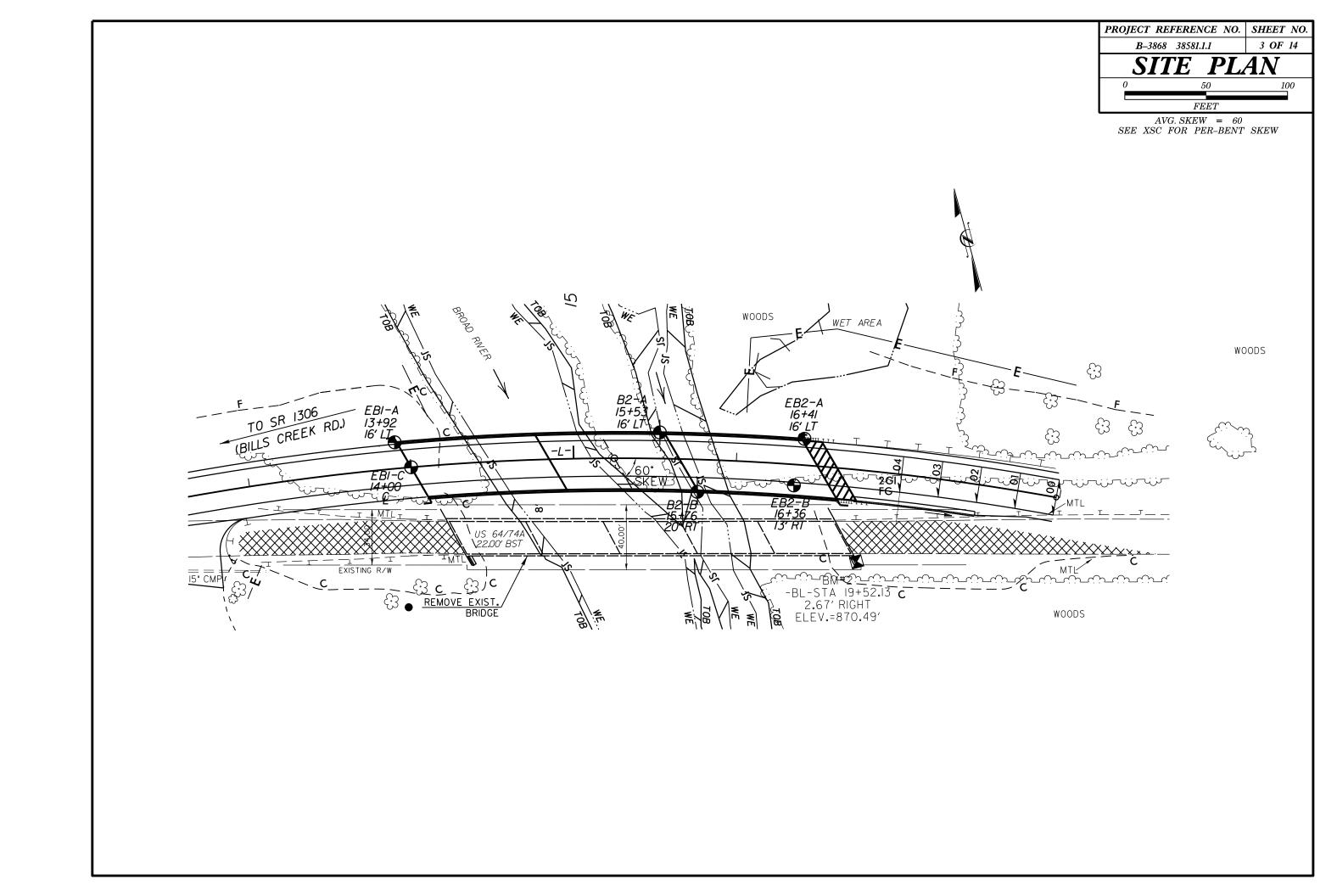
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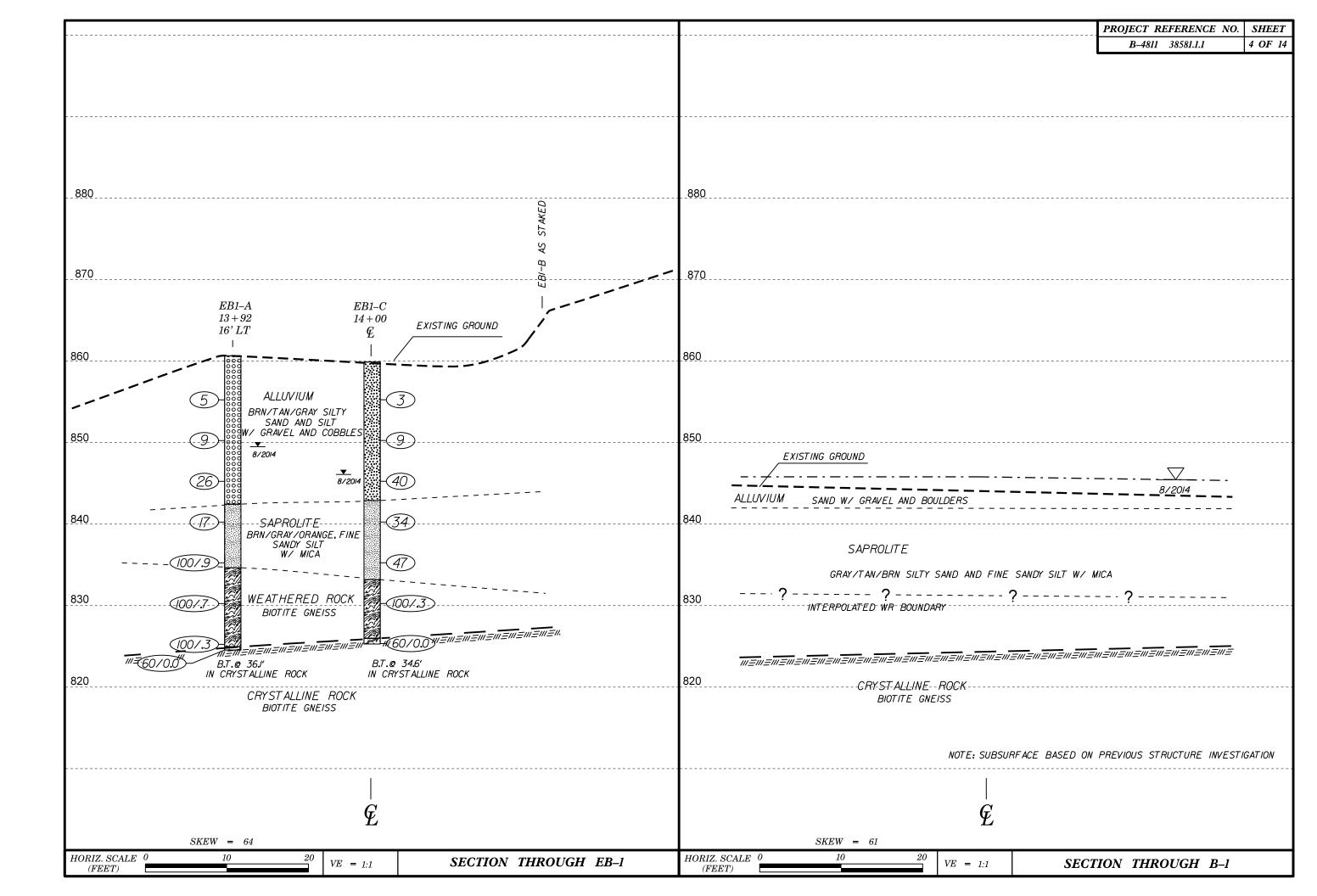
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

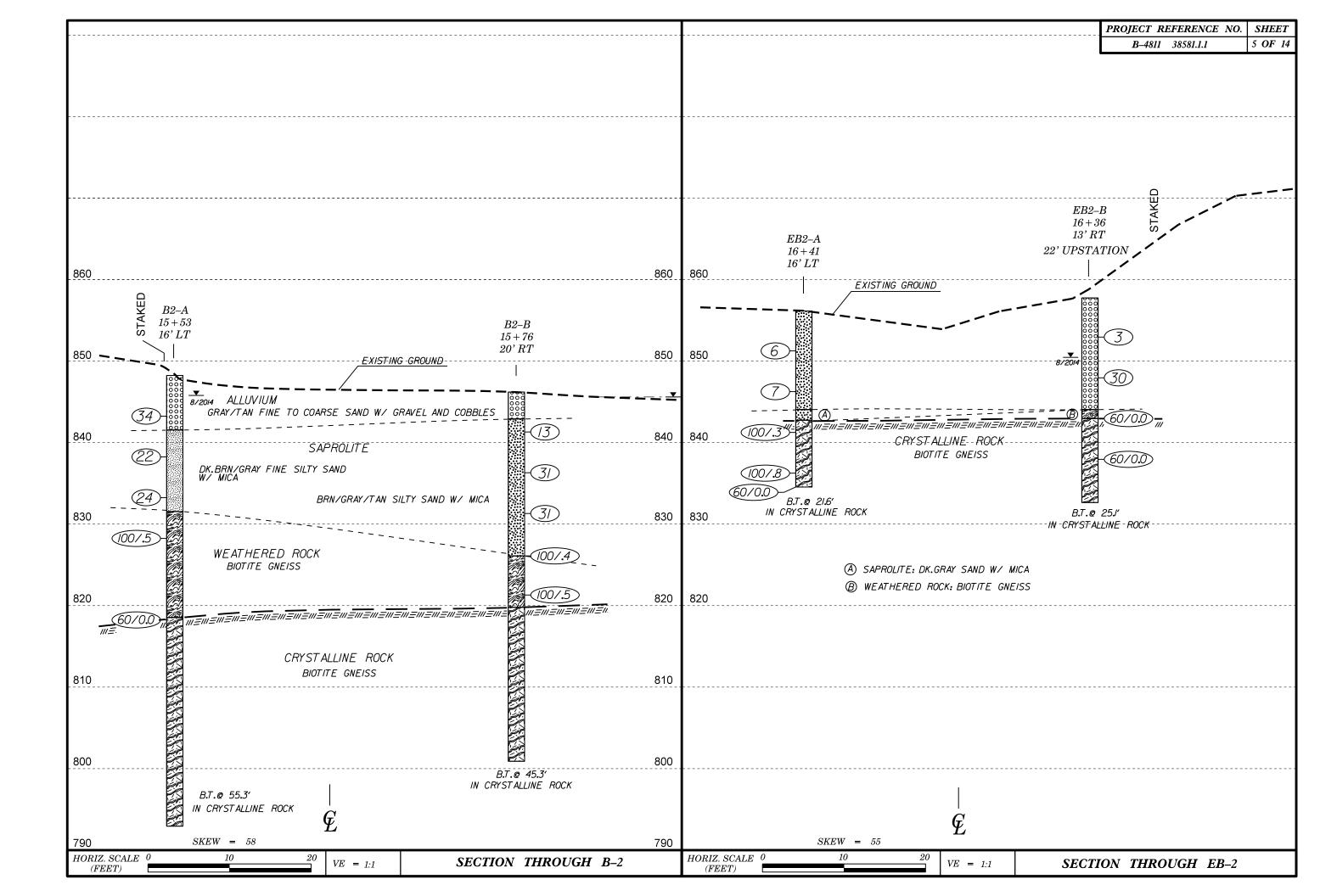
DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

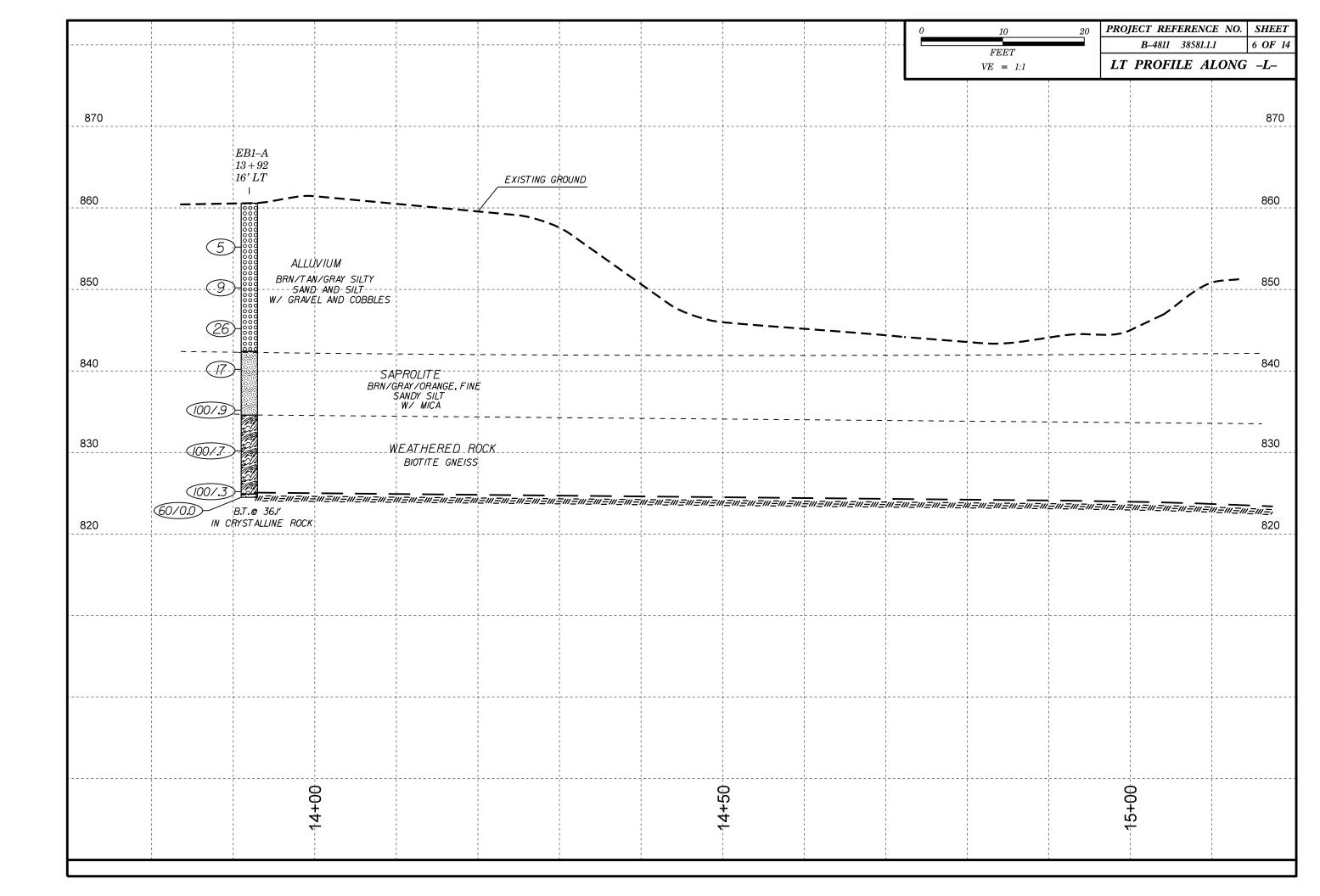
SUBSURFACE INVESTIGATION

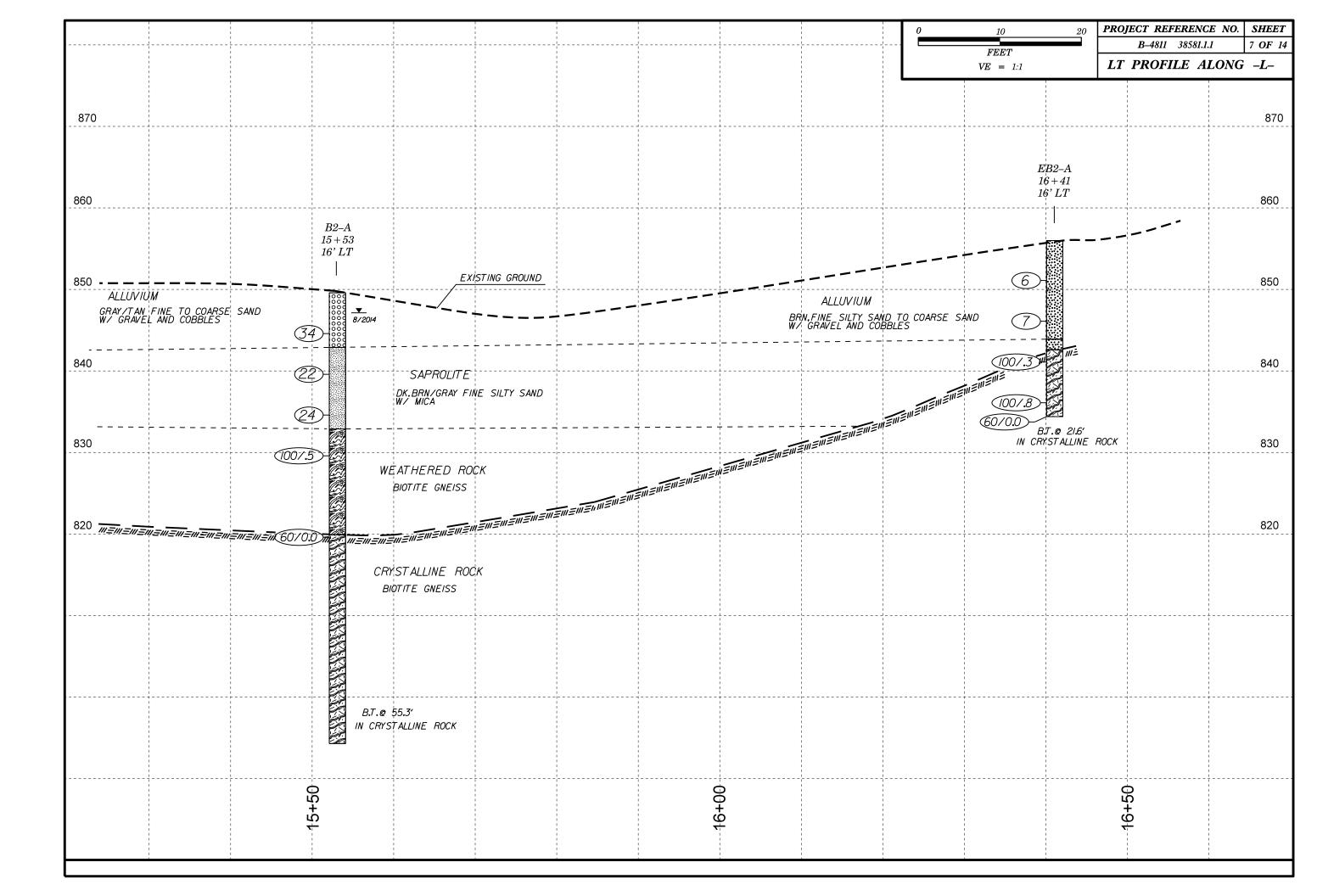
	SOIL AND RO	OCK LEGEND, TERM	IS, SYMBOLS, AND ABBREVIATIONS	
SOIL DESCRIPTION	GRADATION		ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 180 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T286, ASTM D-1586), SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS CENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTITIENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, AND CONCULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY, SULY CLAY, MOST WITH INTERBEDDED FINE SAND LIVERS, HIGHLY PLASTIC, A-7-6 SOIL LEGEND AND AASHTO CLASSIFICATION	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY T POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OF ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY TH SUBANGULAR, SUBROUNDED, OR ROUNDED. MINERALOGICAL COMPOSIT	HE SAME SIZE. (ALSO MORE SIZES. S E TERMS: <u>ANGULAR</u> ,	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	NLLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. OUIFER - A WATER BEARING FORMATION OR STRATA. RENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. REGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, REHAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. MATESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL NOT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE
SOIL LEGEND FIND	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAQLIN, ETC. ARE WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. COMPRESSIBILITY		CRYSTALLINE ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE. GREISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE NON-CRYSTALLINE SEDIMENTARY ROCK THAT WOULD YELD SPT REFUSAL IF TESTED. ROCK TYPE	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.
SYMBOL	HIGHLY COMPRESSIBLE LIOUID LIM PERCENTAGE OF MATERI	IT EQUAL TO 31-50 IT GREATER THAN 50 AL	CP) SHELL BEDS, ETC.	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL ENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
* 10 50 MX		OTHER MATERIAL RACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	NOCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIQUID LIMIT	MODERATELY ORGANIC 5 - 10% 12 - 20% S	ITTLE 10 - 20% OME 20 - 35% IGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. SAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRAGS. OF MAJOR MATERIALS SAND GRAVEL AND SAND SAND GRAVEL AND SAND SOILS SOILS GRAVEL AND SAND SOILS SOILS GRAVEL AND SAND SOILS SOILS		DRILLING	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. SISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
GEN. RATING	TABLE PERCHED WATER, SATURATED ZONE, OR WATER BEA	RING STRATA	(MOD.) 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	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. LOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 : PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS RANGE OF STANDARD RANGE OF UNCONFINE	SPRING OR SEEP MISCELLANEOUS SYMBOL		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	THE STREAM. COMMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SOIL TYPE COMPRESSIVE PENETRATION RESISTENCE (COMPRESSIVE STRENG (N-VALUE) (TONS/FT2)	WITH SOIL DESCRIPTION VST PMT	S - BULK SAMPLE	IF TESTED, WOULD YIELD SPT REFUSAL SEVERE ALL ROCK EXCEPT QUARITZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED SEVERE ALL ROCK EXCEPT QUARITZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED SEVERE ALL ROCK EXCEPT QUARITZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED SEVERE ALL ROCK EXCEPT QUARITZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED SEVERE ALL ROCK EXCEPT QUARITZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED SEVERE ALL ROCK EXCEPT QUARITZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED SEVERE ALL ROCK EXCEPT QUARITZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED SEVERE ALL ROCK EXCEPT QUARITZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED SEVERE ALL ROCK EXCEPT QUARITZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED SEVERE ALL ROCK EXCEPT QUARITZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED SEVERE ALL ROCK EXCEPT QUARITZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED SEVERE ALL ROCK EXCEPT BUT REDUCED OR STAINED OR STAINED ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED BUT	OINT - 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
GENERALLY GRANULAR MATERIAL MON-COHESIVE) UERY DENSE DENSE MON-COHESIVE) UERY DENSE	SOIL SYMBOL AUGER BORING ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT	SS - SPLIT SPOON SAMPLE ST - SHELBY TUBE	EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	TS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTILED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT	INFERRED SOIL BOUNDARY MWO MONITORING W INFERRED ROCK LINE PIEZOMETER	RS - RUCK SAMPLE	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	VERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 10 8 0.5 TO 1.0	ALLUVIAL SOIL BOUNDARY INSTALLATION 25/025 DIP & DIP DIRECTION OF SLOPE INDICA INSTALLATION	SAMPLE TOR	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	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
TEXTURE OR GRAIN SIZE U.S. STO. SIEVE SIZE 4 10 40 60 200 270	ROCK STRUCTURES SOUNDING ROD REF SPT N-VALUE REF SPT REFUSAL	RATIO SAMPLE	VERY HARD CANNOT BE SCRATCHED BY KNIFF OR SHARP PICK, BREAKING OF HAND SPECIMENS BEQUIRES	EXPRESSED AS A PERCENTAGE. SAPPOLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE SARENT ROCK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	ABBREVIATIONS		HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	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.
BOULDER COBBLE GRAVEL SAND SAND SILT CL			MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
SOIL MOISTURE - CORRELATION OF TERMS	CSE COARSE NP - NON PLASTIC OMT - DILATOMETER TEST ORG ORGANIC OPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST	7 - UNIT WEIGHT	HARD CAN BE EXCOVED UN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	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 ITHAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION - SATURATED - USUALLY LIQUID; VERY WET, USUALLY	F - FINE SD SAND, SANDY FOSS FOSSILIFEROUS SL SILT, SILTY		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.	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
PLASTIC RANGE - WET - (W) FROM BELOW THE GROUND WATER 1 SEMISOLID; REQUIRES DRYING TO	FRAGS FRAGMENTS TCR - TRICONE REFUSAL	222	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE (PI) PLASTIC LIMIT - WET - (W) ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT	PROJECT HAMMER TYPE:	TERM SPACING IERM THICKNESS	BFNCH MARK: BM 2, 2.67' RT OF -BL- STA, 19+52.13
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOIS SL SHRINKAGE LIMIT	MOBILE B CLAY BITS	AUTOMATIC MANUAL	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDOED > 4 FEET - WIDE 3 TO 10 FEET THICKLY BEDOED 1.5 - 4 FEET - MODERATELY CLOSE 1.0 3 FEET THINLY BEDOED 0.16 - 1.5 FEET -	ELEVATION: 870.49 FT.
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	BK-51 6* CONTINUOUS FLIGHT AUGER 8* HOLLOW AUGERS	CORE SIZE:	I SURSE SUBSTITUTE I VERY THINLY BEDDED 0.03 - 0.16 FEE!	NOTES:
PLASTICITY PLASTICITY INDEX (P) DRY STRENGTH	CME-45C HARD FACED FINGER BITS	X-NXWL	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS X CASING X W/ ADVANCER	□-н	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM	PORTABLE HOIST CASING W/ AUVANCER TRICONE • STEEL TEETH	HAND TOOLS: POST HOLE DIGGER	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:	
HIGH PLASTICITY 26 OR MORE HIGH COLOR	TRICONE TUNGCARB.	HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRA		SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	













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		heek, [TART DATE			COMP. DA				SURFACE WATER DEP		
, [DRIVE	DEPTH	,	ow co				PER FOOT		SAMP.	V	1		· -	<u></u>
•	ELEV (ft)	(ft)		0.5ft	0.5ft	0 :	25 5	50	75 100	NO.	МО	O I G	SOIL AND RO	CK DESCRIPTION	N DEPTH
1							1								
T		‡	<u> </u>		<u> </u>	 	Ţ • • • • •		1		<u> </u>	 	ALI	UVIAL	
		‡				[]::::	::::	: : : :			İ		BRN/GRAY/TAN SI SAND W/ GRAV	TY FINE TO COBBI	DARSE LES
_	854.9_	4.6			ļ.,_	<u> </u>							-		
		‡	1	2	1	3 : : :	:::::						,		
		†				$ \dot{j} $						計			
╀	849.9	9.6	4	4	5	1	+						-		
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		† , , ,				::	11								
+	<u>- 844.9</u> -	14.6	14	20	20		· · •40					W	•		
		‡				::::	: : <i>f</i> : :						842.5 SAP	ROLITE	17
L	839.9_	19.6			<u> </u>		1					Mt.	BRN/TAN/ORANGE		ILT W/
		<u> </u>	11	18	16		• 34				"		5010	L MIOA	
		Ŧ			1							W F	•		
Ł	834.9	24.6	18	21	26		1/.	 	1				• · · · · · · · · · · · · · · · · · · ·		
		‡	'°	-	20		: : : .•	47	1::::				832.8	DER BOST	26
	:	‡				::::		1	: : : :				WEATHE BRN/TAN/GRAY S	RED ROCK AND W/ SOME	MICA
╁	829.9 <u> </u>	29.6	100/.3						100+				•		
	-	Ī											•		
	- 824.9	34.6						<u> </u>					825.6 .824.9 CRYSTAL	LINE ROCK	
+	<u></u>	- 34-0	60/0.0						60/0.0	7		F	CRYSTALLINE RO	CK, BIOTITE GI	NEISS
		Ŧ											Boring Terminate PENETRATION		
	_	‡					·						Elevation 824.9 ft IN		
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	38581						3-4811			Y RUTHEI	RFORD			GEOLOGIST Elliott, D). C.	
SITE	DESCR	IPTIO	N BRI	DGE	NO. 0	87 O	N US 64	4 OVER E	ROAD R	RIVER						GROUND WTR (
BOR	NG NO	B2-/	٩		s	TAT	ON 15	+53		OFFSET	16 ft LT			ALIGNMENT -L-		OHR. N
COL	LAR ELI	EV. 8	49.6 ft		T	OTA	L DEPT	H 55.3 ft	:	NORTHIN	3 624,€	536		EASTING 1,057,203		24 HR. 2
DRILL	RIG/HA	MMER E	FF./DA	TE A	FO0134	CME	-45C 889	% 05/14/20	14		DRILL	METHO	D N	W Casing W/SPT & Core	HAMM	ER TYPE Automatic
DRIL	LER C	heek,	D. O.		S	TAR	T DATE	07/30/1	4	COMP. DA	TE 07/	30/14		SURFACE WATER DEF	TH N	/A
ELEV (ft)	DRIVE ELEV	DEPTH (ft)	' 	OW CO					ER FOOT		SAMP.	\▼/		SOIL AND RO	CK DES	CRIPTION
(19	(ft)	(17)	0.5ft	0.5ft	0.5ft	0			i0 !	75 100	NO.	MOI	G	ELEV. (ft)		DEPTH
														-		
850						Ц,			I	1 2 2 2 2	<u> </u>	ļ	000		D SURFA	ACE
	-	[-		- 20								000	GRAY/TAN FINE	TO COAF	
845	844.6		1		30	<u> ·</u>							000	GRAVEL A	AND COE	BLES
	044.6	- 3. U	8	17	17			34					000	_ - _ 842,9		
								/::::							ROLITE	
840	839.6	10.0	2	7	15	 	/	<i></i>							MICA	, our oome
				'	l .		: 12	2								
835	834.6	45.0												• •		•
	034.6	- 15.0	11	11	13			24		<u> </u>				- . 832,9		11
	-	_			24									GRAY/BRN/WHT SA		CK
830	829.6	20.0	1007.5			╟								- SEAMS.		
	_	_	1007.0			:				100+				•		
825		Ĺ				-								· -		•
	_	-				:	: : :							-		
		-														
820	819.6	30.0	60/0.0			-				. 60/0.0	,			_819.9 CRYSTAI	I INF RO	29 OCK
	-	_	0.070.0											WHT, TO LT, GRAY GRANITIC B	r, Poori	Y FOLIATED,
815	-	-												GIONNIO B	101112	SNEIGO
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810	-	_												-		•
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805	.]	-		:				::::								
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800	_	_		-										-		
	}					-										
795	-	•				-										
											-		2/2	794,3 Boring Termina	ted WiTH	55 CASING
	1	-]										F	ADVANCER REFUS IN CRYSTALLINE RO	AL at Ele	vation 794.3 ft
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	3858				٠	B-48′						RFORD			GEOLO	OGIST	Elliott,	D. C.	T	
				DGE NO	T			R BR	DAD F	-				Т					1	ID WTR (ft)
	NG NO				 		15+53			+		16 ft LT			ALIGNI				0 HR.	N/A
	LAR EL				.!		PTH 55			NO	RTHING	624,6					,057,203		24 HR.	2.5
				TE AFOO						T		<u> </u>		т	Casing W					Automatic
	LER C				-		TE 07/3			CC	MP. DA	TE 07/	/30/14		SURFA	CEW	ATER DE	PTH N	I/A	
	E SIZE			L BBU			N 24.31		ΔΤΔ	1										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	STR REC. (ft) %	RQD (ft) %	ь О С	ELEV. ((ft)		DE	SCRIPT	ION AI	ND REMAR	ks		DEPTH (fi
18.55																	@ 31.01			
	818.6	31.0	4.3	0:12/0.3 1:34/1.0	(3.6) 84%	(2.9)					1 1	*		CF	RYSTALL	JNE RO	OCK (conti	inued)		
815	814,3 T	35.3		1:36/1.0 1:22/1.0		İ					-									
		- 55.5	5.0	0:52/1.0	(3.9) 78%	(2.7) 54%					- -									
		‡		1:26/1.0	1070	34%			[-									
810	809.3	40.3	F.0	0:55/1.0 0:58/1.0	(5.4)	(4.0)					_									
		‡	5,0	0:46/1.0	(5.1) 102%	(4.9) · 98%					-									
305	804,3 [—]	150		2:41/1.0 3:21/1.0		;					_									
	804,3	45.3	5.0	3:27/1.0 1:23/1.0	(4.3)	(2.2)					_									
	-	t		1:11/1.0 1:21/1.0	86%	44%					_									
800	799.3	50.3		1:26/1.0 1:20/1.0					ļ	\$	_									
			5.0	1:09/1.0 3:10/1.0	(4.8) 96%	(4.7) 94%					[
95	•	F		3:01/1.0 3:48/1.0				:			_									
-	794.3	55.3		3:54/1.0							794.3	Borir	ng Termir	nated V	ITH CAS	SING A	DVANCER	REFUSA	L at Elevati	55. on
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	38581					IP B-4811	1	Y RUTHER	FORD			GEOLOGIST Elliott, D. C.	
SITE	DESCR	IPTION	I BRI	DGE	NO. 08	87 ON US 64 OVER	BROAD F	RIVER					GROUND WTR (ff
BORI	NG NO	. B2-E	3		S	TATION 15+76		OFFSET	20 ft RT			ALIGNMENT -L-	OHR. N/A
COLL	AR ELI	EV. 84	46.2 ft		T	OTAL DEPTH 45.3	ft	NORTHING	624,5	594		EASTING 1,057,216	24 HR. 0.0
DRILL	RIG/HA	MMER E	FF./DA	TE A	FO0134	CME-45C 88% 05/14/2	2014		DRILL	METHO	יא ם	W Casing W/SPT & Core HAMI	MER TYPE Automatic
DRIL	LER C	heek, I	D. O.		S	TART DATE 07/29	14	COMP. DA		29/14	<i>,</i> ,	SURFACE WATER DEPTH N	I/A
ELEV	DRIVE ELEV	DEPTH	`——	OW CO	T	4	PER FOOT	ı	SAMP.	V	0	SOIL AND ROCK DES	CRIPTION
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO.	MOI	G	ELEV. (ft)	DEPTH (
850		<u> </u>										_	
	-	E									E		
845	_		 		 			1	+	_	000	846.2 GROUND SURF	
	-	-									000	GRAY/BRN SAND W/ G 842.9 COBBLES	RAVEL AND3.
	841.3	4.9	<u> </u>									. SAPROLITE BRN/GRAY/TAN, FINE SA	
840	_	-	4	7	6	13				-		SOME MICA	
		Ī				::::X ::::					F	•	
835	836.4	9.8	6	13	18	31			-			•	
	-	F				1 1					F	- •	
	831.3	14.9	<u> </u>									· ·	
830	_	Ę.	16	13	18	4 31						· -	
	-	F									F	•	
825	826.3	19.9	100/.4	-				· 100+	-		111	826.1 WEATHERED R	20 OCK
	-	F '									9	TAN/GRAY/ORANGE SIL SOME MICA	
		F											•
820	820.3	25.9	100/.5				1	100+				_819.8	26.
	-	-]			CRYSTALLINE R WHT. TO DK. GRAY, POOI	RLY FOLIATED
815	-	F										GRANITIC BIOTITE	GNEISS
	-	F						,				-	
	-	F						1				· ·	
810	_	F										-	·
ŀ	-						1						
805							1::::						
	-	F		:								 -	
	-	F										800.9	45.
Ī	-	_							1		F	Boring Terminated WIT ADVANCER REFUSAL at E	H CASING
	-	-										IN CRYSTALLINE ROCK, BI	
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WBS	38581			RE B	•	B-481					RUTHER	RFORD			GEO	LOGI	ST EII	iott, D	C.		
SITE	DESCR	IPTION	I BR	DGE NO	. 087 (ON US	64 OVE	R BR	OAD F	RIVE	₹									GROUN	ID WTR (ft
30RI	NG NO.	B2-E	3		STA	TION	15+76			OF	FSET	20 ft R	Γ		ALIC	SNME	NT -L-			0 HR.	N/A
COLI	AR ELI	EV. 84	16.2 ft		тот	AL DE	PTH 45	.3 ft		NO	RTHING	624,	594		EAS	TING	1,057	,216		24 HR.	0.0
DRILL	RIG/HAI	VIMER E	FF./DA	TE AFO	134 CN	1E-45C	88% 05/1	4/2014				DRILL	METH	OD NV	V Casin	g W/SP	T & Core)	HAMN	IER TYPE	Automatic
DRIL	LER C	heek, I	D. O.		STAI	RT DA	TE 07/2	9/14		co	MP. DA	TE 07	/29/14	ļ	SUR	FACE	WATE	R DEP	TH N.	/A	
OR	E SIZE	NXWL	-		тот	AL RU	N 18.9 f	t		1							•	:			···
LEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	UN RQD (ft) %	SAMP. NO.	STF REC. (ft)	RQD (ft) %	LOG	ELEV. (ft)		ľ	DESCR	IPTION	AND RE	EMARK	S		DEPTH (
19.79												·			Beai	n Cori	ng @ 2	6.4 ft			`
	819.8	26,4	3.9	1:12/0.9 0:49/1.0	(2.7)	(0.4)					819.8						LLINE R				26
	815.9	30.3		0:43/1.0	69%	10%					-										
815	<u> </u>	- 30.3	5.0	0:37/1.0	(4.8)	(3.4)					<u>-</u>										
	-	_		0:42/1.0 1:22/1.0	96%	68%					-										
	810.9	35.3		1:57/1.0 2:06/1.0							-										
810	-	_	5.0	2:17/1.0 2:31/1.0	(4.6) 92%	(4.3) 86%				2	_						•				
	-	-	}	2:01/1.0	3270	0070					-										
305	805.9	40.3		1:40/1.0 2:07/1.0	1,5						- -										
305	_	_	5.0	2:23/1.0 2:04/1.0	(5.0) 100%	(4.7) 94%					-										
l	-	_		1:52/1.0 2:13/1.0							-										
ŀ	800.9	45.3	<u> </u>	2:17/1.0						وتونية	800.9	Bori	ing Ten	minated	WITH	CASING	ADVAN	ICER R	EFUSAL	at Elevation	45 on
	-	-									-						E ROCK				
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WBS	S 38581.1.1 TIP B-4811 COUN								COUN	ry RU	THE	RFORD			GEOLOGIST Elliott, D. C.		
SITE	DESCR	PTIO	N BR	IDGE	NO. 0	87 ON	US 6	4 OVER	BROAD	RIVER						GROUND WT	R (f
BOR	BORING NO. EB2-A STATION 16+41									OFFSET 16 ft LT					ALIGNMENT -L- 0 HR.		N/A
COL	COLLAR ELEV. 856.1 ft TOTAL DEPTH 21.6 ft									NOR	NORTHING 624,608				EASTING 1,057,288	24 HR.	Dr
DRILL RIG/HAMMER EFF./DATE AFO0134 CME-45C 88% 05/14/2014									014	DRILL METHOD NW				D N		MER TYPE Automa	<u> </u>
	LER C							07/25/1	-	COMI	P. DA	TE 07/			SURFACE WATER DEPTH N		
LEV	DRIVE	DEPTH		ow co		TT T			PER FOO			SAMP.	V /	11	OOK AGE WATER DET THE R	II.	
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0,5ft	0	2	5	50	75	100	NO.	MOI	G	SOIL AND ROCK DES		DT
						<u> </u>			· · · · · ·				1		2CEV. (II)	DEP	PTH
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-	-				1										-		
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55	<u> </u>		 	-	 	 			T · · · ·			-	-	\$	856.1 GROUND SURF ALLUVIAL	ACE	
	7	•	ļ	ŀ		17.		,		-					BRN/GRAY FINE SAND W/ COBBLES	GRAVEL AND	
	851.2 T	4.9				; :			1						- COBBLES		
50		•	2	3	3	6.				• • •			M		- -		
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	846.2	9.9							: : :		::				•		
45	Ŧ	•	3	3	4	7.	\dashv						M		- - - 844.0		
	#						\	 							842.7 SAPROLITE		12 13
40	841.2	14.9	100/.3								400.	,[DK. GRAY, NO SAMPLE WEATHERED RO		
40	‡	•	100,.0			 .				+	100+				 GRAY/TAN/BLK SAND W/ 		
Į	+			•							[
35	836.2		100/.8						: : : :]. i		9	- -		
	834.5	21.6	60/0.0			<u> </u>			L	 	-100+	1			-834.5 Boring Terminated WITH	STANDARD	21.
	‡	:													PENETRATION TEST R	EFUSAL at	
	<u> </u>	.	. ,											-	Elevation 834.5 ft ON CRYST BIOTITE GNES		
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SHEET NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT TIP B-4811 COUNTY RUTHERFORD GEOLOGIST Elliott, D. C. WBS 38581.1.1 SITE DESCRIPTION BRIDGE NO. 087 ON US 64 OVER BROAD RIVER GROUND WTR (ft) OFFSET 13 ft RT ALIGNMENT -L-0 HR. BORING NO. EB2-B STATION 16+36 COLLAR ELEV. 857.7 ft TOTAL DEPTH 25.1 ft **NORTHING** 624,583 **EASTING** 1,057,274 24 HR. 7.3 Caved HAMMER TYPE Automatic DRILL RIG/HAMMER EFF./DATE AFO0134 CME-45C 88% 05/14/2014 DRILL METHOD NW Casing W/SPT & Core DRILLER Cheek, D. O. **START DATE** 07/28/14 COMP. DATE 07/28/14 SURFACE WATER DEPTH N/A DRIVE ELEV DEPTH BLOW COUNT SAMP. **BLOWS PER FOOT** MOI G SOIL AND ROCK DESCRIPTION (ft) 0.5ft 0.5ft 0.5ft 75 100 NO. (ft) DEPTH (ft) GROUND SURFACE ALLUVIAL BRN/GRAY FINE TO COARSE SAND AND GRAVEL. W/ COBBLES AND BOULDERS 847.9 9.8 . 15 W WEATHERED ROCK WEATHERED ROCK, NO DESC. 60/0.0 60/0.D CRYSTALLINE ROCK LT. TO MED. GRAY, POOR TO MOD. FOLIATED BIOTITE GNEISS. WEATHERED ROCK SEAMS TO 19.8' 19.8 60/0.0 60/0.0 - - -. . . . Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 832.6 ft IN CRYSTALLINE ROCK, BIOTITE GNEISS

840 837.9 835

B-4811 38581.1.1

BORING B2-A

BOX 1 OF 3

DEPTH: 31.0-41.8



BORING B2-A

BOX 2 OF 3

DEPTH: 41.8-50.3



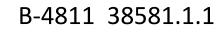


B-4811 38581.1.1

BORING B1-B

BOX 3 OF 3

DEPTH: 50.3-55.3



BORING B2-B

BOX 1 OF 2

DEPTH: 26.4-39.6





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BORING B2-B

BOX 2 OF 2

DEPTH: 39.6-45.3

