REFERENCE: 630062
ROJECT: 17BP.4.R.69

7

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STATE OF NORTH CAROLINA

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

STRUCTURE

SUBSURFACE INVESTIGATION COUNTY _NASH

PROJECT DESCRIPTION BRIDGE NO. 62 ON SR 1109 OVER BIG BRANCH

STATE PROJECT REFERENCE NO. 12 630062

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION GEOTECHNICAL ENGINEERING UNIT AT 1999 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

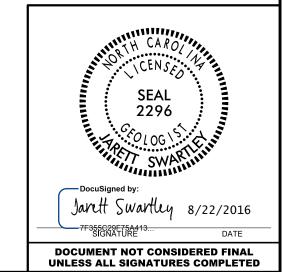
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND 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 MDICATED IN THE SUBSURFACE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MICKLIBRY TO THE PROPERTY OF THE PROPE 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 DES 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 SATISTY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS.

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

	O. B. OTI
	D. G. PINTER
	J.R. SWARTLEY
INVECT	IGATED BY <i>J.R. SWARTLEY</i>
	BY J.R. SWARTLEY
CHECK	ED BY N. T. ROBERSON
Submi [*]	TIED BY N. T. ROBERSON
	JULY 2016

PERSONNEL



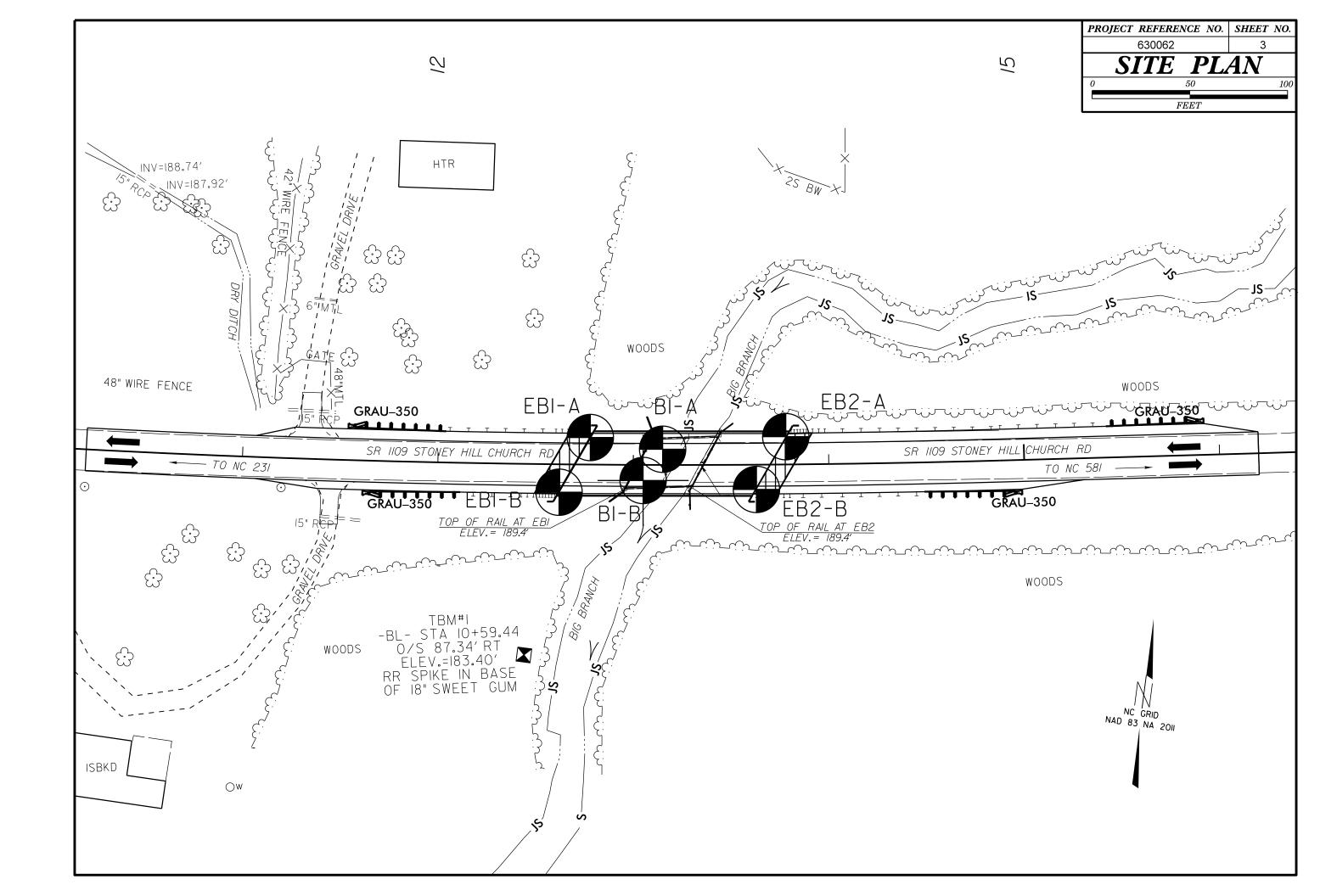
PROJECT REFERENCE NO. SHEET NO. 2

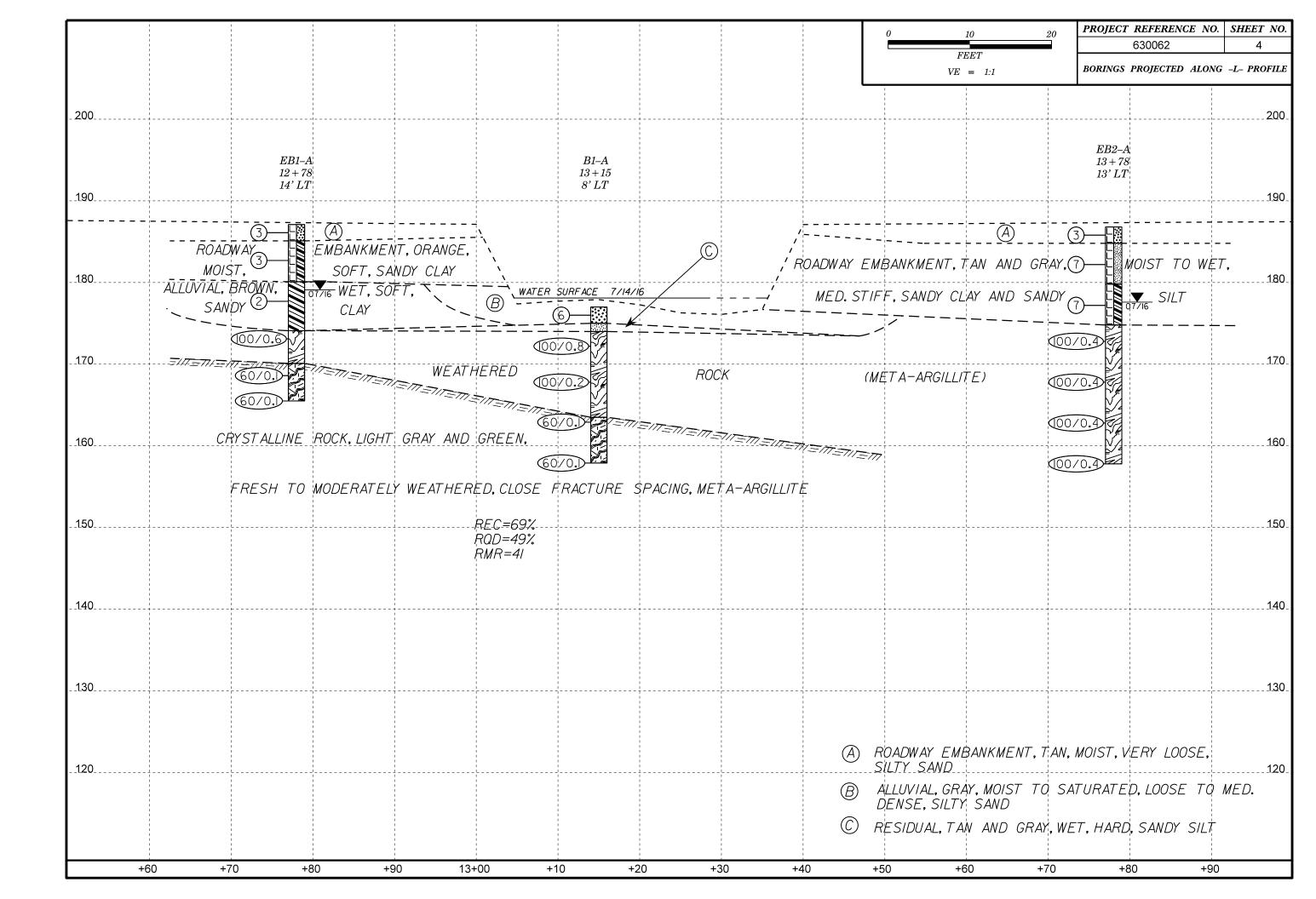
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

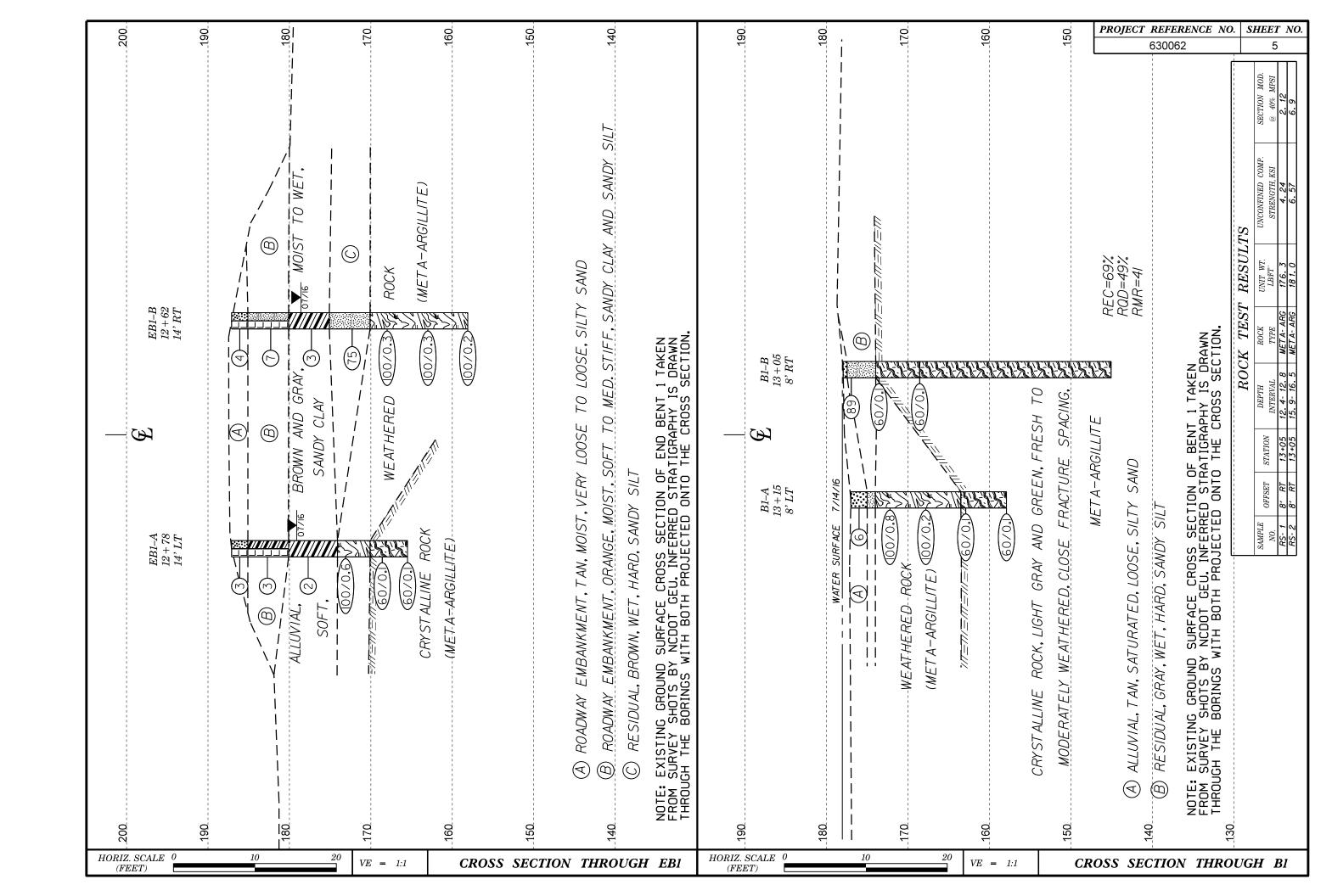
SUBSURFACE INVESTIGATION

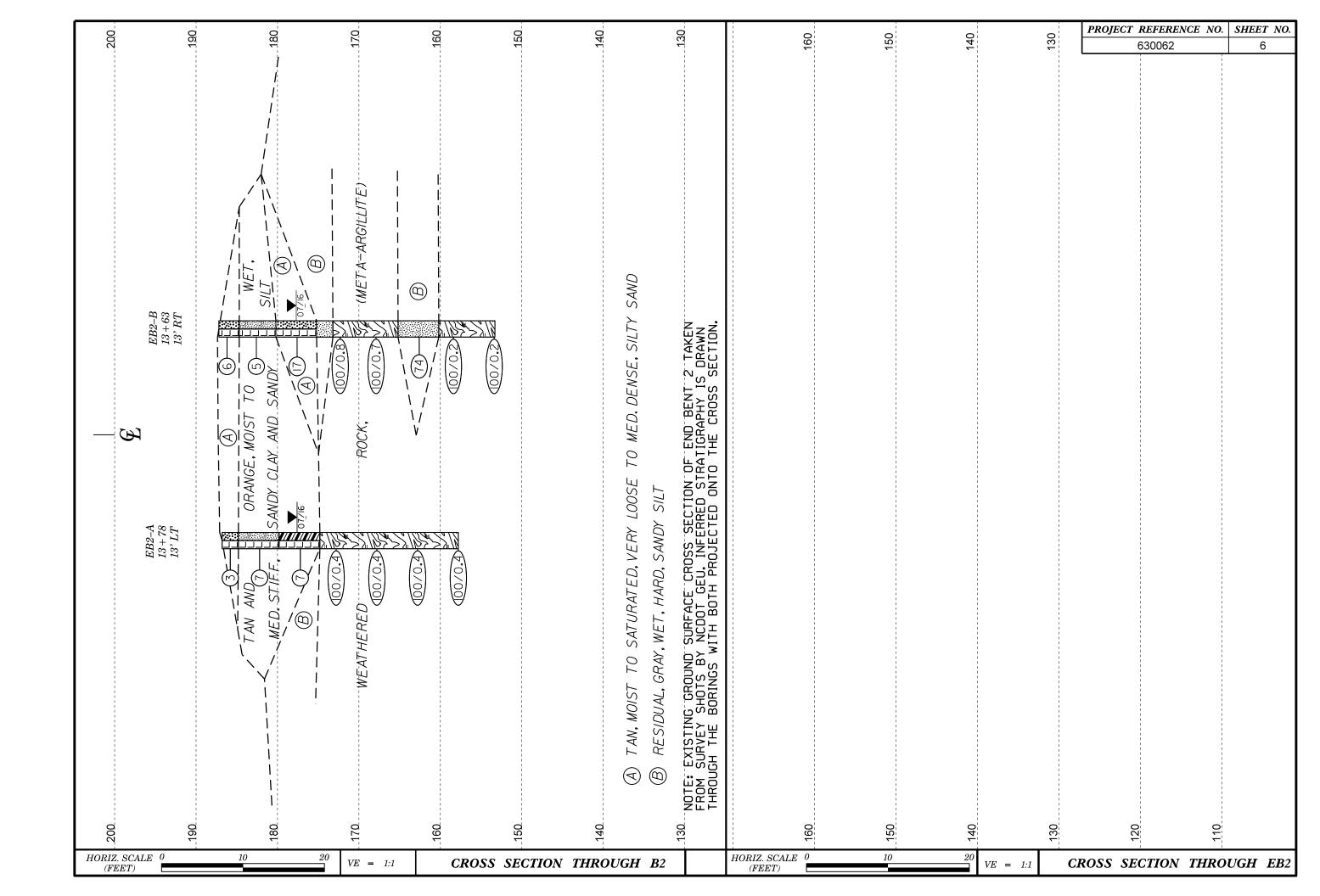
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION WELL CRAPED - INDICATES A COOR REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE	ROCK DESCRIPTION HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED	TERMS AND DEFINITIONS
SOIL IS CONSIDERED 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	<u>WELL GRADED</u> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	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	AQUIFER - A WATER BEARING FORMATION OR STRATA.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	SU/ASU/A	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERALOGICAL COMPOSITION	CRYSTALLINE CRYSTA	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
LLASS. (\$ 35% PASSING "2000) (> 35% PASSING "2000)	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-4-5 A-5 A-6 A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
0000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
% PASSING SILT- SILT- MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*40 30 MX 50 MX 51 MN SOILS SOILS SOILS PEAT	GRANIII AR STILT - CLAY	- WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
13 MX 25 MX 12 MX 25 MX 25 MX 35 MX 35 MX 36 MN 36 MN 36 MN	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING *40	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL.
LL 40 MX 41 MN 11THE OR	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN MODERATE OPCOME	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE GROUND WATER	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH, FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
UNDUP INDEX 8 M 8 MX 12 MX 16 MX NU MX AMUUNIS UP SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAIOR CRAYELAND, FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN, RATING EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR UNSUITABLE	∇ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING 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	PARENT MATERIAL.
AS SUBURABLE POUR	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM,
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	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	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
DANCE OF CTANDARD DANCE OF UNICONSTITUED		(MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACINESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	<u>IF TESTED, WOULD YIELD SPT REFUSAL</u>	<u>LEDGE</u> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
(N-VHLUE) (TUNS/FT)	WITH SOIL DESCRIPTION OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE 4 TO 10	SOIL SYMBOL SOIL SYMBOL SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY FMRANKMENT AUGER BORING CONE PENETROMETER TEST	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE > 50	THAN ROADWAY EMBANKMENT TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25	— INFERRED SOIL BOUNDARY — CORE BORING ● SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MM MONITORING WELL TEST BORING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2	WITH CORE	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - 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
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	→ PIEZOMETER INSTALLATION → SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
U.S. STD. SIEVE SIZE 4 10 40 60 200 270		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNSUITABLE WASTE	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNCLASSIFIED EXCAVATION - UNDERCUT UNCLASSIFIED EXCAVATION - EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	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	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY 7 - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE CHIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
(ATTERBERG LIMITS) DESCRIPTION GOIDE FOR FIELD MOISTORE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID. PEDILIPES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE - WEI - (W) ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	BENCH MARK: TBM #I
" '' PL L PLASTIC LIMIT	EQUIPMENT USED ON SUBJECT PROJECT	TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	N: 748596.6747 E: 2250603.7268
OM _ OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: 183.4 FEET
SL SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6' CONTINUOUS ELIGHT AUGER	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	TOP OF RAIL AT EBI
	CME-55	THINLY LAMINATED < 0.008 FEET INDURATION	ELEV. = 189.4
PLASTICITY		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	TOP OF RAIL AT EB2 ELEV. = 189.4
PLASTICITY INDEX (PI) DRY STRENGTH NON PLASTIC 0-5 VERY LOW		DURRING WITH FINCER EDEES NUMEROUS CRAINS.	
SLIGHTLY PLASTIC 6-15 SLIGHT	I VANE CUEAR TECT	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	X CASING X W/ ADVANCER HAND TOULS: POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:	
	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE 2 15/6 TUNGCARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER,	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	X CORE BIT VANE SHEAR TEST	SHAPP HAMMER RIGHS REGULTRED TO RREAK SAMPLE.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		EXTREMELY INDURATED SHARP HAMMER BLOWS REGULAR SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1-
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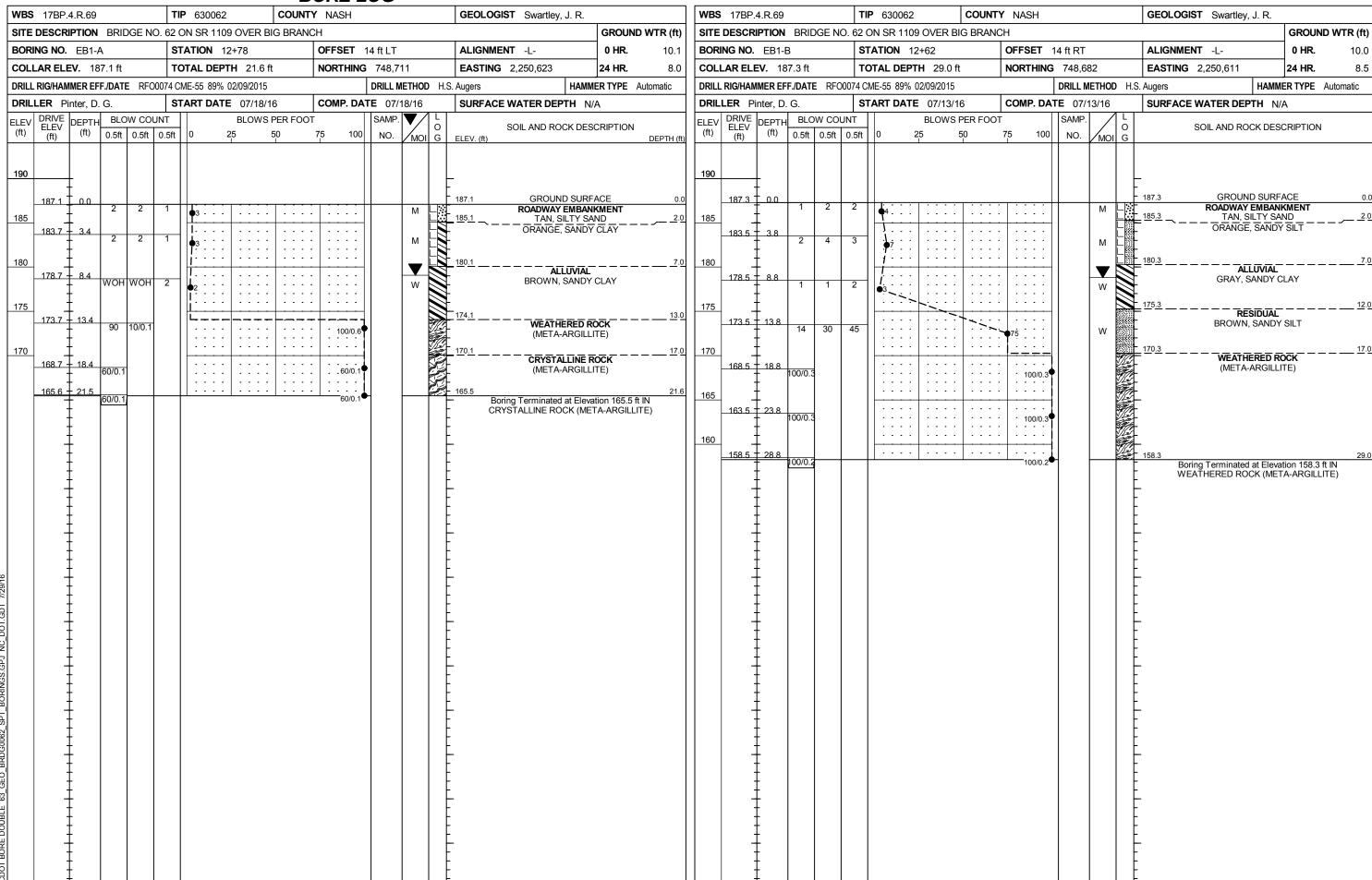








GEOTECHNICAL BORING REPORT BORE LOG



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SHEET 8

WBS	17BP.4	4.R.69			TII	P 63	30062	2		cou	INTY	NA	SH					GEOLOGIST Swartley, J. R.		
SITE DESCRIPTION BRIDGE NO. 62 ON SR 1109 OVER BIG BRANC											ANC	Н							GROUI	ND WTR (ft)
										\rightarrow	OFFSET 8 ft LT						ALIGNMENT -L-	0 HR.	N/A	
COLLAR ELEV. 177.0 ft TOTAL DEPTH 19.1 ft									NOR	THIN	_	748,71			EASTING 2,250,661	24 HR.	N/A			
	RIG/HAM			E RFC										_	DRILL M		NV	, , , , , , , , , , , , , , , , , , , 		Automatic
DRIL	LER Pi					ART	DAT		7/14/1			COM	IP. D	ΑT	E 07/1	4/16		SURFACE WATER DEPTH 0.6	Sft	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft		0		25 25	OWS !	PER FO		75 	100)	SAMP. NO.	MOI	O G	SOIL AND ROCK DESC	CRIPTION	N
180																				
100		-																-		
175	177.0	0.0	WOH	2	4	•	6	Τ.		T		T		+		Sat.	 	177.0 GROUND SURFA		0.0
175	173.0	- - - 4.0				+		+-		 		+		‡			477			$$ $\frac{2.0}{3.0}$
	1/3.0	- 4.0	50	50/0.3		:		. :			: :	. 1	 100/0.8	ş •				GRAY, SANDY S WEATHERED RO	OCK .	
170		- -				-						<u> </u>	· · ·	$\ \ $				(META-ARGILLI	TE)	
	168.0	9.0	100/0.2			:						1	100/0.2	<u>.</u>				- - -		
165]	-				<u>.</u>		1:				1						-		
	163.0	14.0	60/0.1			:		. :			: :		60/0.1					CRYSTALLINE R	OCK	<u>13.5</u>
160	†	- -	00/0.1			:	: : :	: :		: :	: :		60/0.1					(META-ARGILLI	TE)	
100	158.0	- - 19.0										: :		1				_ _ 157.9		19.1
]	-	60/0.1				• • •		· · ·		• •		60/0.1	•				Boring Terminated at Eleva CRYSTALLINE ROCK (MET	tion 157.9 A-ARGIL	ft IN
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SHEET 9

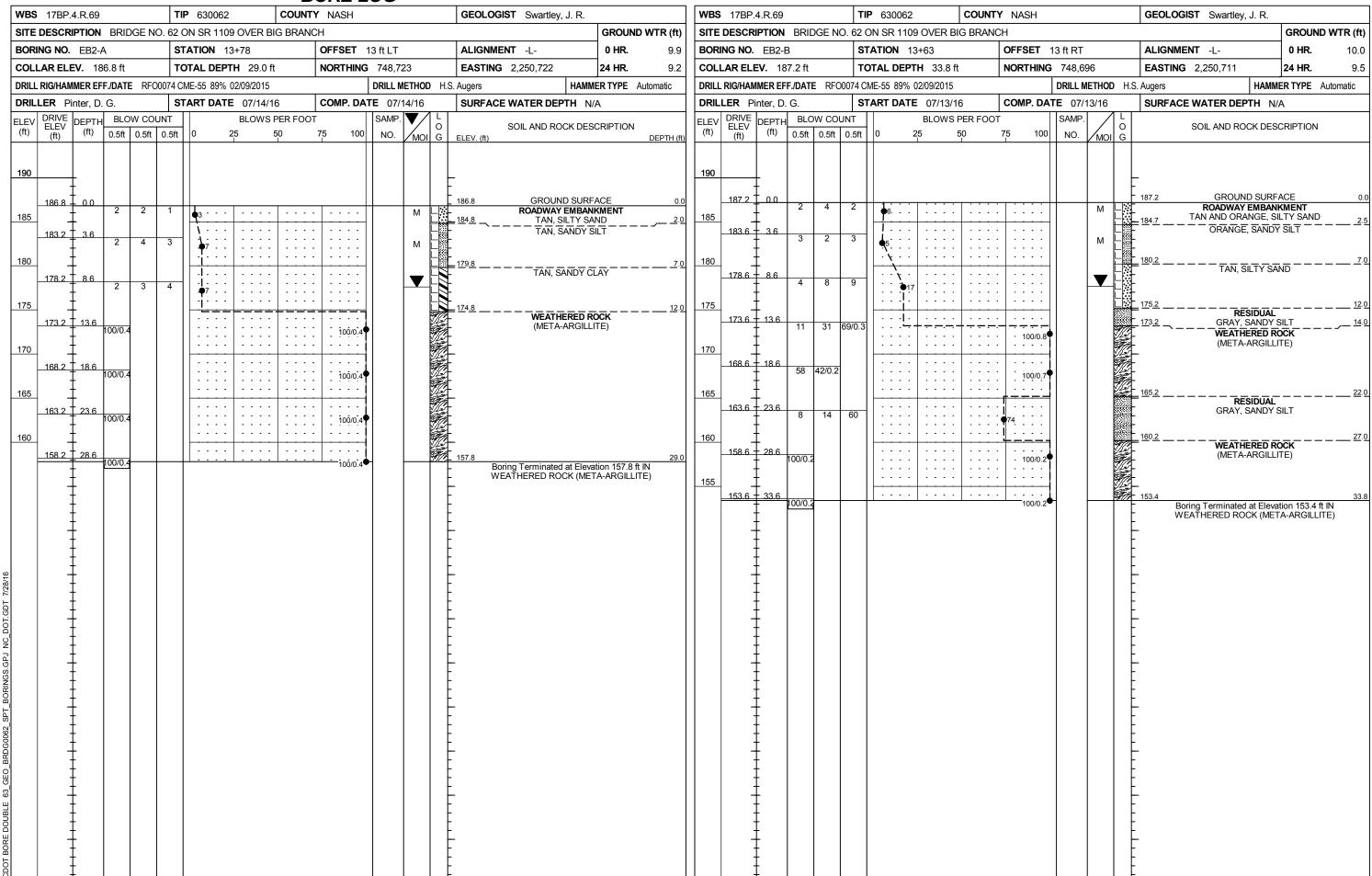
GEOTECHNICAL BORING REPORT BORE LOG

VBS	17BP.	4.R.69			T	IP 630062	T	ORE L Y NASH				GEOLOGIST Swartley, J. R.	
ITE	DESCR	IPTION	BRI	DGE N	O. 62	ON SR 1109 OVER B	G BRANG	СН	GROUND WTR (f				
ORI	NG NO.	В1-В			S	TATION 13+05		OFFSET 8	3 ft RT			ALIGNMENT -L-	0 HR. N/A
OLL	AR ELE	E V. 1	78.0 ft		T	OTAL DEPTH 32.9 f	1	NORTHING	748,69	93		EASTING 2,250,653	24 HR. N/A
RILL	RIG/HAM	IMER E	F/DAT	E RF	D0074 C	CME-55 89% 02/09/2015			DRILL IV	IETHOD) NV	V Casing W/SPT & Core HAMM	ER TYPE Automatic
RIL	LER Pi	nter, D	. G.		S	TART DATE 07/18/1	6	COMP. DA	TE 07/	18/16		SURFACE WATER DEPTH 0.	1ft
_EV	DRIVE ELEV	DEPTH		ow co		4	PER FOO		SAMP.	V /	L	SOIL AND ROCK DES	CRIPTION
ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO.	MOI		ELEV. (ft)	DEPTH (
		9								is .			
80		_										<u> </u>	
	178.0	0.0		1	05						202020	178.0 GROUND SURF	ACE 0
7.	-	-	2	4	85			89		Sat.		ALLUVIAL GRAY, SILTY S	AND
75	- 173.7 -	- - 4.3											SILT /—4
	-	-	60/0.									CRYSTALLINE R (META-ARGILL	OCK
70	_	-											,
	168.7 - -	- 9.3 -	60/0.	1			: : : :	60/0.1	•			- 168.6 CRYSTALLINE R	OCK
e F	-	<u> </u>						: : : : :				 LIGHT GRAY AND GREE MODERATELY WEATHE 	N, FRESH TO ERED, HARD,
65	_	t							RS-1	1		CLOSE FRACTURE S	SPACING,
	-	-						: : : : :	BC 2			-	=
60	-	-							RS-2	1		<u> </u>	
	-	ŀ		1				: : : : :				REC = 69 %	
	-	_						.				RQD = 49 % RMR = 41	
55	-	_										_	
	-												
50	_	E											
	-	-										-	
	-	E											
			-	+	-				-			145.1 Boring Terminated at Eleva	32. ation 145.1 ft IN
	_	ŀ										CRYSTALLINE ROCK (ME	,
	_	E										*no recovery from depth 25 core barrel malfun	
	-	_										_	
T	_	E										_	
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GEOTECHNICAL BORING REPORT CORE LOG

MISS TIPP - ARR9 TIP SQUIDE COUNTY NAS-1 GROUDGEST Swelley, J. R.										U	UF		UG						
BORING NO. B1-B	WBS	17BP.	4.R.69			TIP	63006	2	С	OUNT	Y N	ASH		GEOLOGIST Swartley	/, J. R.				
COLLAR ELEV. 178.0 ft TOTAL DEPTH 32.9 ft NORTHING 748,693 EASTING 2,250,653 24 Hr. N/A													-l GRO						
DRILL RIGH-NameR EFF. Data Driver, D. G. START Data Driver, D. G. Driver, D.	BORI	NG NO.	B1-B			STA	STATION 13+05						3 ft RT		0 HR.	N/A			
DRILL RIGH-Nammer EFF-JDATE RF00074 CME-55 89% 02/09/2015 DRILL METHOD NW Zasing WiSPT & Core HAMMER TYPE Automatic Automatic Automatic DRILL RIGH Automatic Automatic DRILL RIGH Automatic Automa	COLL	AR ELI	E V. 17	'8.0 ft								RTHING	748,693	EASTING 2,250,653		24 HR.	N/A		
DRILLER Pinter, D. G. START DATE 07/18/16 COMP. DATE 07/18/16 SURFACE WATER DEPTH 0.1ft	DRILL	RIG/HAN	IMER EF	F/DAT	E RFO00	74 CME	-55 89%	6 02/09/20	15				DRILL METHOD N	W Casing W/SPT & Core	HAMME	R TYPE Au	utomatic		
CORE SIZE NX	DRILI	LER P	inter, D.	. G.		STAF	RT DA	TE 07/1	8/16		СО	MP. DA			PTH 0.1	ft			
RUN (ft) RUN (ft) RUN (ft) RATE (ft) (ft) RATE (ft) (ft) (ft) RATE (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft)																			
(ff) (ff) (ff) (ff) (ff) (ff) (ff) (ff)	ELEV		DEPTH	RUN		RI	JN		STR	ATA L ROD	L			DECORPTION AND DELLA					
188.6						(ft) %	(ft) %		(ft) %	(ft) %		ELEV. (ft)	DESCRIPTION AND REMAR	KS		DEPTH (ft)		
165 10, 45, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10	168.6													Begin Coring @ 9.4 ft					
165 5.0 345/1.0 100% 78% RS-1 162.1 15.9 150/1.0 100% 78% RS-2 160 152/1.0 152/1.0 152/1.0 152/1.0 153/1.0 153/1.0 155/1.0 155/1.0 155/1.0 155/1.0 155/1.0 155/1.0 155/1.0 150/1.0 150/1.0 150/1.0 155	1,1,1,1	168.6 167.1	9.4 10.9		:25/0.5	(1.5)	(0.4)		(16.2)	(11.4)		168.6	LIGHT GRAV AND	CRYSTALLINE ROCK	PATEL V M	/EATHERE!			
160 162.1 15.9	165		1	5.0	:45/1.0 :45/1.0	(5.0)	(3.9)	DQ 1	0070	1070		-					·		
160 160 160 160 160 160 160 160					1:00/1.0	100%	78%					_							
150 157.1 20.9 1571.0 98% 84% 157.1 20.9 155/1.0 155/1.0 155/1.0 155/1.0 155/1.0 155/1.0 155/1.0 150/1.0 1.07/1.0 0.0% 0.0% 1.15/1.0 1.15/1.0 1.15/1.0 1.15/1.0 1.15/1.0 1.15/1.0 1.15/1.0 1.15/1.0 1.15/1.0 1.15/1.0 1.15/1.0 1.15/1.0 1.15/1.0 1.15/1.0 0.0% 0.0% 1.15/1.0 1.15/1.0 0.0% 0.0% 1.15/1.0 0.0% 0.0% 1.15/1.0 0.0% 0.0% 0.0% 1.15/1.0 0.0% 0.		162.1	15.9	5.0	:50/1.0 :54/1.0	(4.9)	(4.2)	RS-2				-							
157.1 20.9	160	_	F		:52/1.0 :54/1.0	98%	84%					_							
155 5.0 :55/1.0 (4.8) (2.9) (54/1.0 96% 58% 55/1.0 (5.5) (157.1	20.9		:53/1.0							-							
152.1 25.9 :55/1.0 :53/1.0 :53/1.0 :53/1.0 :53/1.0 :53/1.0 :53/1.0 :54/1.0 :54/1.0 :54/1.0 :55/1.0 :1:07/1.0 :0% :0% :0% :0% :1:07/1.0 :55/1.0 :1:07/1.0 :55/1.0 :1:07/1.0 :55/1.0 :1:07/1.0 :55/1.0 :55/1.0 :0% :0% :0% :0% :0% :0% :0% :0% :0% :0	155		-	5.0	:55/1.0		(2.9)					-							
150 152.1 25.9 1.08/1.0 (0.0)	100	-	‡		:55/1.0	30 /0	JU /0					-					20.		
150		152.1	25.9	5.0	:54/1.0	(0.0)	(0.0)					-							
147.1 30.9 1:15/1.0 1	150		‡	5.0	1:07/1.0							-							
145.1 32.9 2.0 1:00/1.0 (0.0)		4474	1 200		:55/1.0							-							
Boring Terminated at Elevation 145.1 ft IN CRYSTALLINE ROCK (META-ARGILLITE)			T	2.0	1:00/1.0							-							
	ł	145.1	32.9		:55/1.0	_0%_	_0%_					145.1	Boring Termina		RYSTALLI	NE ROCK	32.9		
"no recovery from depth 25.9-32.9" due to core barrel malfunction"			ł									-		(META-ARGILLITE)					
		-	1									<u>-</u>	*no recovery fro	om depth 25.9'-32.9' due to co	re barrel m	alfunction*			
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GEOTECHNICAL BORING REPORT BORE LOG



CORE PHOTOGRAPHS

B1-BBOXES 1 - 2: 9.4 - 25.9 FEET



SITE PHOTOGRAPH

