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STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY MECKLENBURG

PROJECT DESCRIPTION <u>I-77 & SR 213</u>6 (GILEAD RD) INTERCHANGE - UPGRADE EXISTING DIAMOND INTERCHANGE TO DIVERGING DIAMOND INTERCHANGE

SITE DESCRIPTION BRIDGE OVER I-77 ON SR 2136 (GILEAD ROAD) BETWEEN SR 2138 AND NC 115

	STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
]	N.C.	I–5714	1	18

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 SOLI TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 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 BORNICS 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 DECREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS. MOICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL 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 NOV CLIMATION TEVETONS. 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 THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONS TO BE INCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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12/18/2017

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SIGNATURE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION
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 ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM DISB6). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO LCASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTE ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK REPRESENTED BY A ZONE OF WEATHERED ROCK.
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:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT ROCK (WR) 100 BLOWS PER FOOT IF TESTED.
GENERAL CLASS. GRANULAR MATERIALS (≤ 35%, PASSING *200) SILT-CLAY MATERIALS (> 35%, PASSING *200) ORGANIC MATERIALS GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 A-4, A-5 <td>MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS OUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</td> <td>CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC RC WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE IN GNEISS, GABBRO, SCHIST, ETC.</td>	MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS OUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC RC WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE IN GNEISS, GABBRO, SCHIST, ETC.
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTA
	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	ROCK (NCR) DOLD THE NOLUCE THE VOLUCE TELED JIN THE POSHE COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDS
7 PASSING "10 50 MX GRANULAR SILT- CLAY MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.
■40 30 MX 50 MX 51 MN ■200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL <u>SOILS OTHER MATERIAL</u>	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK
MATERIAL PASSING =40 LL 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 50LS WITH PI 6 MX NP 18 MX 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN 10 MX 18 MX 11 MN 11 MN MODERATE HIGHLY	TRACE OF ORGANIC MATTER 2 32 3 5% TRACE 1 10% LITTLE ORGANIC MATTER 3 5% 5 12% LITTLE 10 20% MODERATELY ORGANIC 5 10% 12 20% SOME 20 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY C (V SLIJ) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER H OF A CRYSTALLINE NATURE.
GROUP INDEX Ø Ø Ø 4 MX 8 MX 12 MX 16 MX N0 MX ANDURTS OF ORGANIC ORGANIC USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC ORGANIC SOILS SOILS <t< td=""><td>GROUND WATER</td><td>SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO RC (SLI.) I INCH, OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONA CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMEN</td></t<>	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO RC (SLI.) I INCH, OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONA CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMEN
MATERIALS SAND SHIL ONEVEL HIND SUILS SUILS SUILS GEN. RATING AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR FAIR TO POOR POOR UNSUITABL	▼ STATIC WATER LEVEL AFTER 24 HOURS ▼PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA ○ ○ ● ○ ● ○ ● ○ ● ○ ● ○	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECT: (MOD.) GRANITOID ROCKS, MOST FELOSPARS ARE DULL AND DISCOLORED, SOME SHOW CLA DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH WITH FRESH ROCK.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL F
CONSISTENCY OR DENSENESS PRIMARY SOIL TYPE COMPACTNESS OR PRANCE OF STANDARD RANGE OF UNCONFINED COMPACTNESS OF PENETRATION RESISTENCE COMPRESSIVE STRENGTH	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE L (MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND IF TESTED, WOULD YIELD SPT REFUSAL
CONSISTENCI (N-VALUE) (TONS/FT ²) GENERALLY VERY LOOSE < 4	↓ with soil description → öf röck structures ↓ soil symbol ⊕ of röck structures ↓ soil symbol ⊕ soil symbol ↓ soil symbol ⊕ soil symbol ↓ soil symbol ⊕ soil symbol	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND E (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS (TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YELD SPT N VALUES) 100 BPF
MATERIAL (NON-COHESIVE) MEDIUM DENSE DENSE 10 TO 30 N/A VERY DENSE 30 TO 50	ATTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT 	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS AF SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS O (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0 MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	INFERRED ROCK LINE MY MONITORING WELL TEST BORING WITH CORE TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N N</u> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS ALSO AN EXAMPLE.
HARD > 30 > 4 TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS
		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMEN SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER B TO DETACH HAND SPECIMEN.
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COMPLE (GR.) COMPLE SAND (CSE. SD.) FINE SAND (F SD.) SIL T (SL.) CLAY (CL.) GRAIN MM 305 75 2.0 0.25 0.05 0.005	ACCEPTABLE DEGRADABLE ROCK EMBANKMENT UN BALKFILL ABBREVIATIONS AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DI HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE D BY MODERATE BLOWS.
SIZE IN. 12 3 SOIL MOISTURE - CORRELATION OF TERMS	BT - BORING TERMINATED MICA - MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY γ - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC γ_{1} - DRY UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE O HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD POINT OF A GEOLOGIST'S PICK.
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST <u>SAMPLE ABBREVIATIONS</u> DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE PLASTIC	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPON F - FINE SL SILT.SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCH FINGERMAIL.
RANGE - WET - (W) SEMISULID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS w - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE ATTAIN OPTIMUM MOISTURE MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO EQUIPMENT USED ON SUBJECT PROJECT	TERM SPACING TERM VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED WIDE 3 TO 10 FEET THICKLY BEDDED
SLSHRINKAGE LIMIT	DRILL UNITS; ADVANCING TOOLS; HAMMER TYPE; X CME-550-X CLAY BITS X AUTOMATIC MANUAL	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED Ø. CLOSE Ø.16 TO 1 FOOT VERY THINLY BEDDED Ø. VERY CLOSE LESS THAN Ø.16 FEET THICKLY LAMINATED Ø.ØØ THINLY LAMINATED Ø.ØØ
PLASTICITY	X DIEDRICH D-50 X 8' HOLLOW AUGERS CORE SIZE:	INDURATION
PLASTICITY INDEX (PI) DRY STRENGTH	CME-55 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HE
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
HIGHLY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH COLOR	PORTABLE HOIST	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH ST BREAKS EASILY WHEN HIT WITH HAMMER. GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL
		INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL DIFFICULT TO BREAK WITH HAMMER.
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.		EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE SAMPLE BREAKS ACROSS GRAINS.

PROJECT REFERENCE NO.



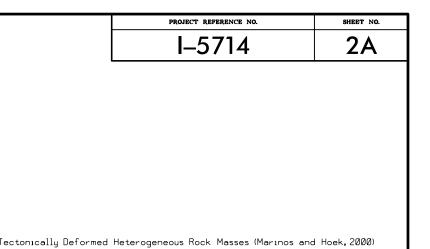
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	TERMS AND DEFINITIONS
ED. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS OFTEN	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
T N VALUES >	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.
OCK THAT	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
NCLUDES GRANITE.	SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
AL PLAIN IF TESTED. IC.	$\underline{\text{COLLUVIUM}}$ - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
MAY NOT YIELD STONE, CEMENTED	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.
RINGS UNDER	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
COATINGS IF OPEN.	$\overline{\text{DIP}}$ - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
HAMMER BLOWS IF	<u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
OCK UP TO AL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
R BLOWS. IS. IN	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AY. ROCK HAS H AS COMPARED	PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FELDSPARS DULL	FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
LOSS OF STRENGTH WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
EVIDENT BUT ARE KAOLINIZED	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
ANE RAGEINIZED	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
RE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
DF STRONG ROCK T ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VALUES < 100 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
IN SMALL AND S. SAPROLITE IS	ROCK DUALITY 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 RUN AND EXPRESSED AS A PERCENTAGE.
NS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
BLOWS REQUIRED	<u>SILL</u> - 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.
DEEP CAN BE DETACHED	<u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
OR PICK POINT. D BLOWS OF THE	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPI) - 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.
N FRAGMENTS NT. SMALL.THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
. PIECES 1 INCH	<u>STRATA ROCK QUALITY DESIGNATION (SROD)</u> - 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.
HED READILY BY	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	BENCH MARK: BL 1-5714-18: N-608845.50, E-1446008.21, ELEV766.75
THICKNESS 4 FEET	CONTROL POINT #820CL: N-609229.67, E-1446466.61, EL753.882
1.5 - 4 FEET	LEAD: N-609124.14, E-1446787.05, EL773.45 ELEVATION: FEET
.16 - 1.5 FEET 03 - 0.16 FEET	NOTES:
08 - 0.03 FEET < 0.008 FEET	NORTHINGS AND EASTINGS OBTAINED USING A TRIMBLE GEO7X WITH SUB-FOOT ACCURACY.
EAT, PRESSURE, ETC.	COORDINATES AND ELEVATION FOR CONTROL POINT #82OCL (LOCATED AT STATION 820+00 ALONG I-77 (-L-) CENTERLINE) WAS PROVIDED BY SUGAR CREEK CONSTRUCTION, LLC.
TEEL PROBE:	
PROBE;	
E;	DATE: 8-15-14

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

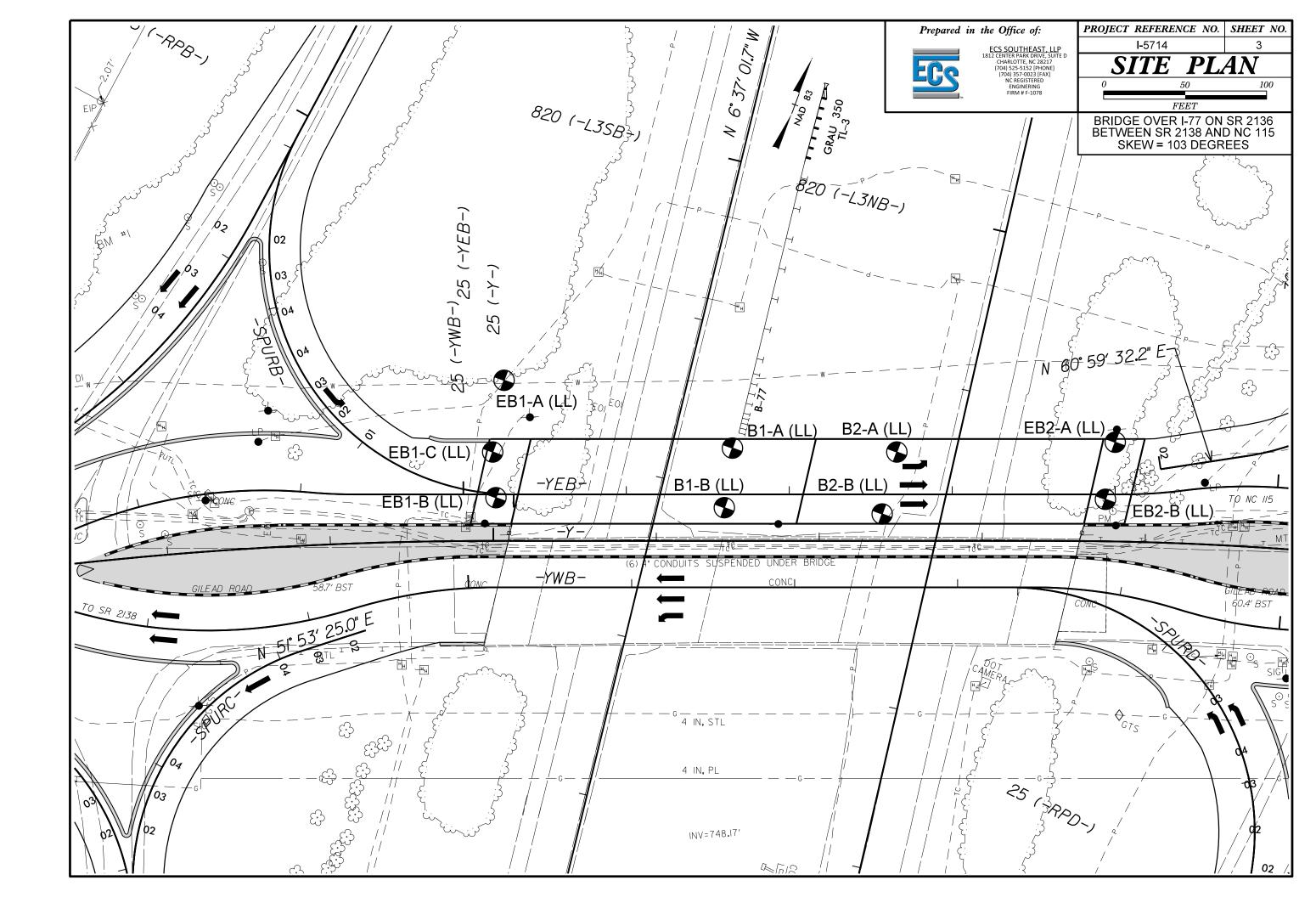
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

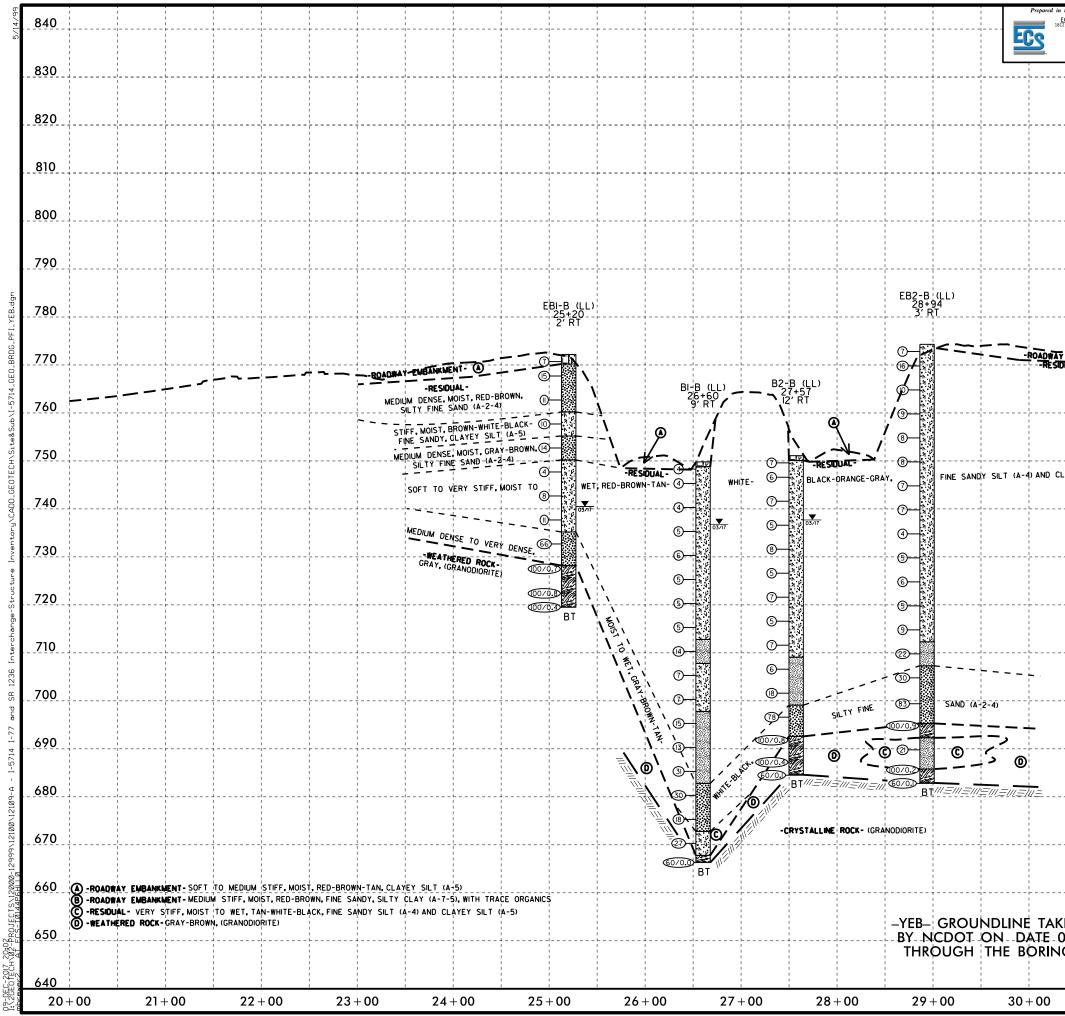
AASHTO LRFD Figure 10.4.6.4–1 — Determination of GSI for Jointed P	Rock Mass (Marinos and Hoek, 2000)		AASHTO LRFD Figure 10.4.6.4–2 $-$ Determination of GSI for T
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.	fresh unwe itly weather faces wea	with compact coatings or filings or angular fragments VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or filings	GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos.P and Hoek E., 2000) From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fail poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.
STRUCTURE	DECREASING SURFACE QUALITY		COMPOSITION AND STRUCTURE
INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90 N/	/A N/A	A. Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass, in shallow tunnels or slopes these bedding planes may cause structurally controlled instability,
disturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets	70 60		B. Sand- stone with thin inter-
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets	50		layers of siltstone amounts stone layers
BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity DISINTEGRATED - poorly inter- locked, heavily broken rock mass	40		C, D, E, and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H .
DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces		20	G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers
LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	N/A N/A	10	Manana into small rock pi



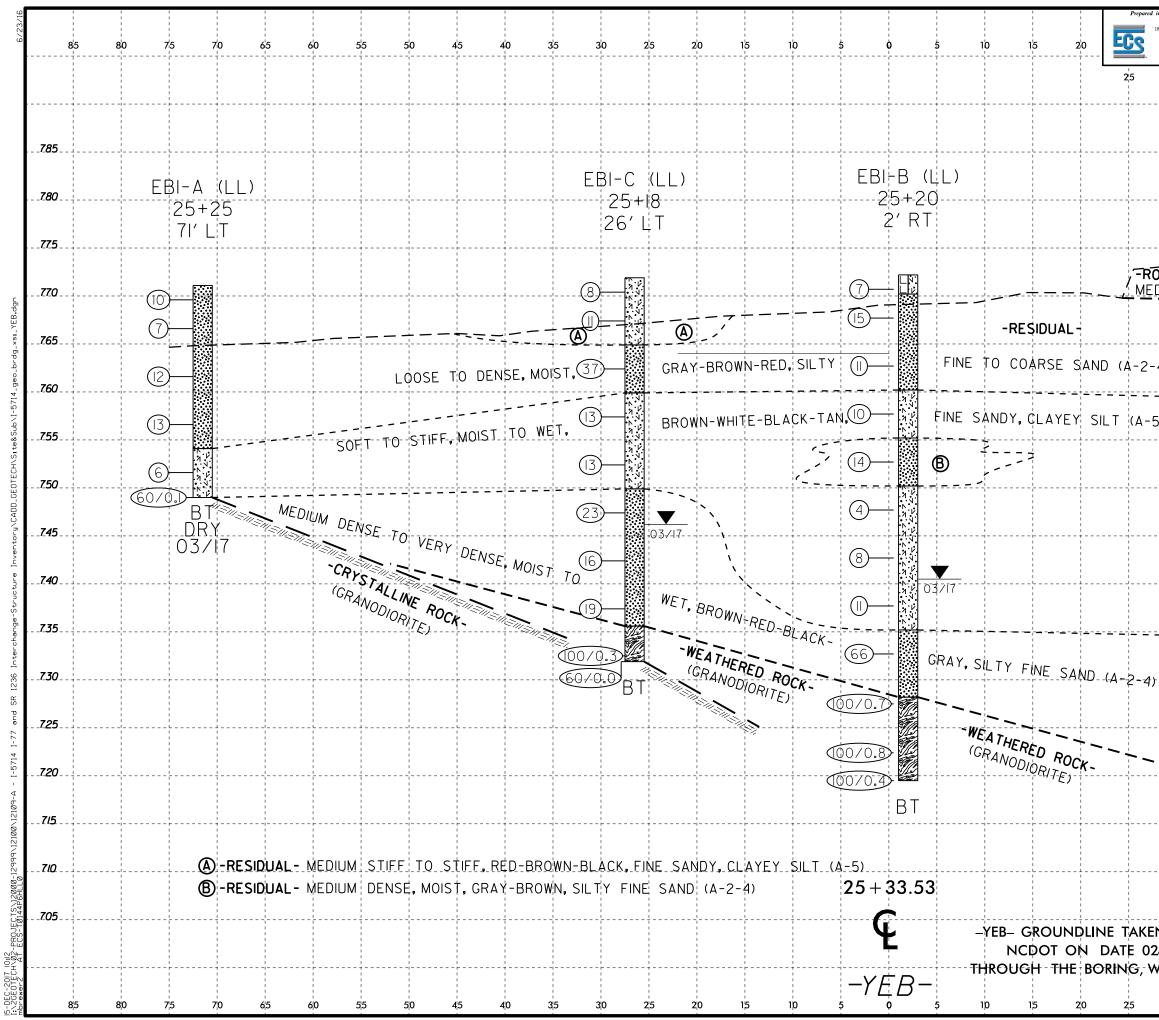
جَعَتَ الله المعالم المعالم المعالم المعالم المعالم المعالم المعالم SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)	VERY GOOD - Very Rough, fresh unweathered surfaces	COOD - Rough, slightly weathered surfaces	FAIR - Smooth, moderately weathered and altered surfaces	POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments	VERY POOR - Very smooth, slicken- sided or highly weathered surfaces with soft clay coatings or fillings
	70 60	A			
E. Weak siltstone or clayey shale with sandstone layers		50 B 40	С	D E	
eformed, d/faulted, hale or siltstone deformed forming an tructure			30	F 20	
eformed silty forming a e with pockets ers of onsformed oneces.			¢	ŀ	+ ¹⁰

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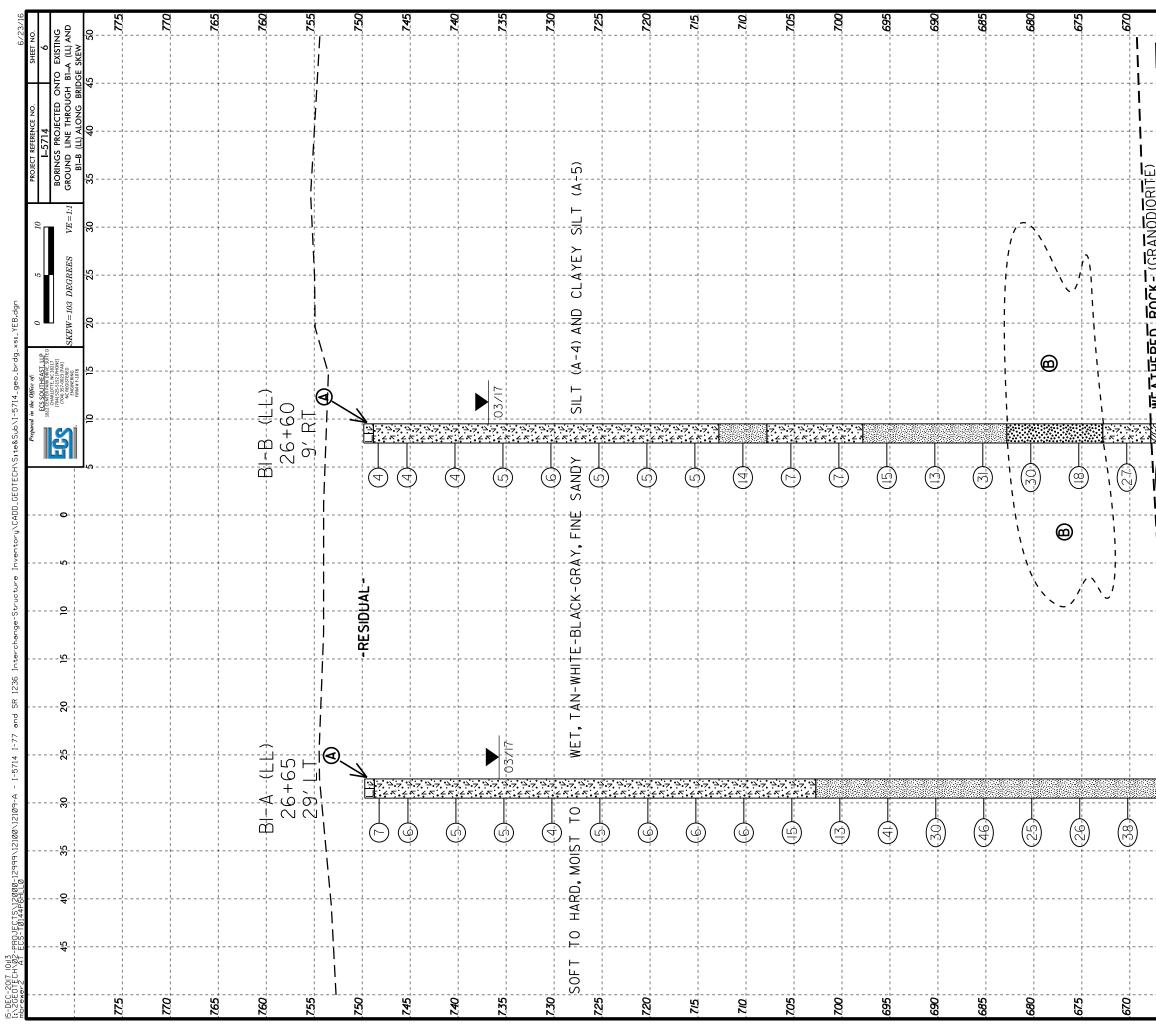




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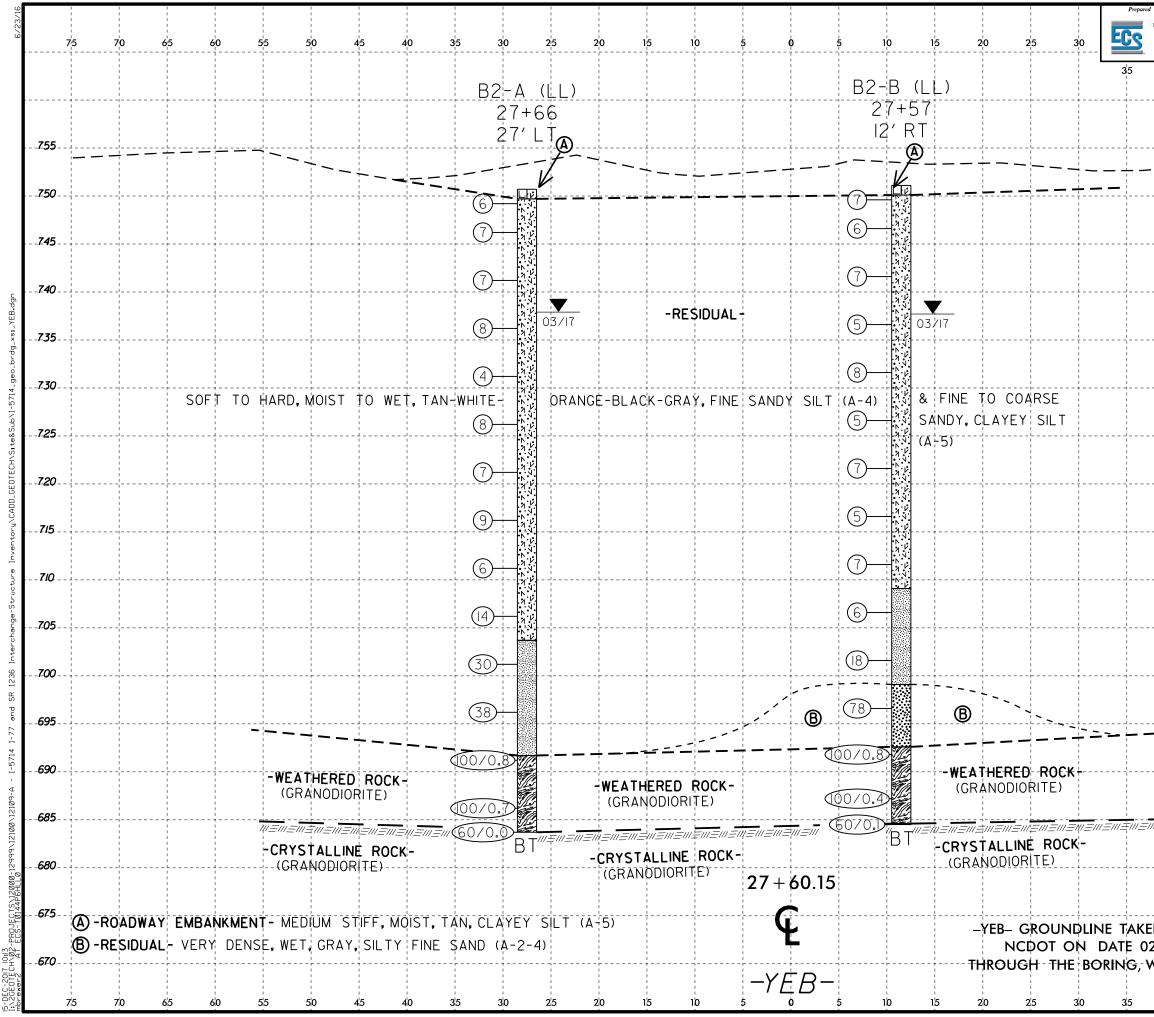


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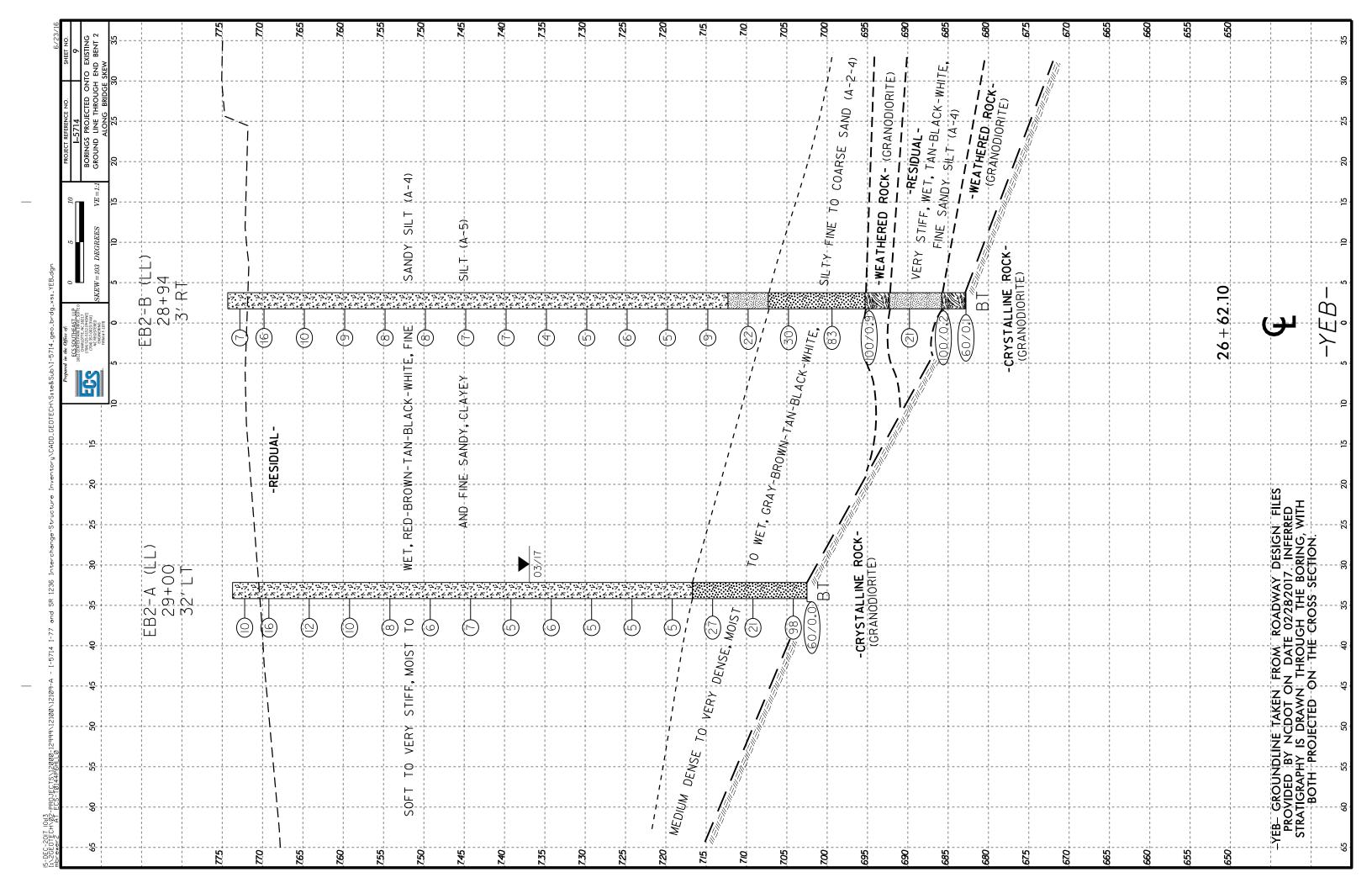


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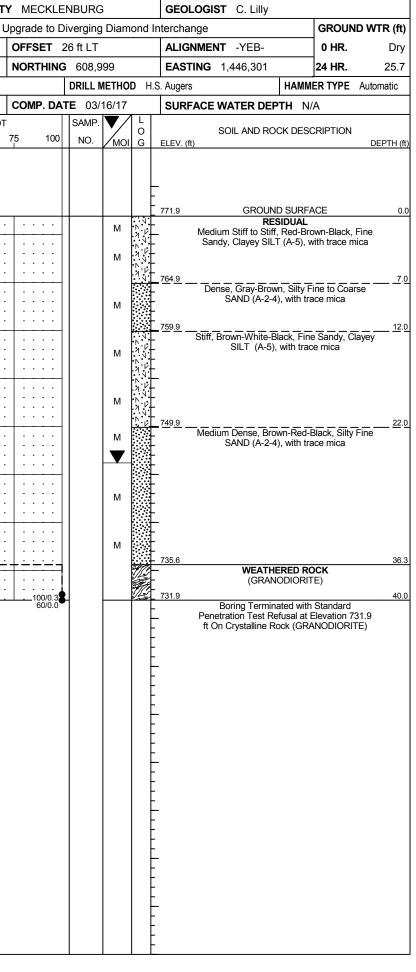
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COL	LAR ELE	EV . 77	′1.1 ft		Т	OTAL I	DEPT	H 22.	.1 ft		NO	RTHIN	G 609,0	042		EA	STING 1,446,292	24 HR. Dry	COL	LAR EL	EV. 77	72.2 ft		Т	OTAL DEP	TH 52.7 f	ť	N
DRILI	RIG/HAI	MMER E	FF./DA	TE HI	PC2473	3 CME-5	550 92%	% 11/02/	/2016				DRILL	METH	OD	H.S. Aug	ers HAMM	MER TYPE Automatic	DRIL	L RIG/HA	MMER E	FF./DA	TE H	PC2473	3 CME-550 92	% 11/02/201	16	
DRIL	LER J.	Cain			S	TART	DATE	03/1	6/17		со	MP. DA	ATE 03/	/16/17	7	SU	RFACE WATER DEPTH	N/A	DRII	LER J	. Cain			S	TART DATE	03/16/1	7	0
ELEV	DRIVE ELEV	DEPTH	BLC	ow co	JNT			BLOV	NS PE	R FOO	Т		SAMP.				SOIL AND ROCK DES	SCRIPTION	ELEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT		BLOWS I		
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	2	5	50		75	100	NO.	Имс	DI G			DEPTH (ft	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 :	25 !	50	7
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l	767.6 -	3.5	2	3	4	. <i> </i> . . <i> </i> .		· · ·		· · ·	. .	· · ·		М			Fine to Coarse SAND (A-2 mica	2-4), with trace			1	5	7	8		· · · ·	· · ·	•
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MECKLEN	BURG		GEOLOGIST C. Lilly	
pgrade to Div	erging Diam	ond Ir	nterchange	GROUND WTR (ft)
OFFSET 2 f	t RT		ALIGNMENT -YEB-	0 HR. Dry
NORTHING	608,973		EASTING 1,446,312	24 HR. 31.7
D	RILL METHO	D H.S	S. Augers	IAMMER TYPE Automatic
COMP. DATE	03/16/17		SURFACE WATER DEPTI	I N/A
	SAMP.	L		
75 100	NO. MOI	O G	SOIL AND ROCK	DESCRIPTION
	М		772.2 GROUND S ROADWAY EN 770.2 Medium Stiff, Red-Brow	IBANKMENT vn, Clayey SILT (A-5)2.0
	М		RESID Medium Dense, Red-Br (A-2-4), with	own, Silty Fine SAND
· · · · · · · · · · · · · · · · · · ·	М	╶╶╶╶╴┨┈┍╴ ╱╶╴╴ ╱	760.2	
	М		SILT (A-5), wi 755.2	y-Brown, Silty Fine 17.0
	М		750.2 Soft to Stiff, Tan-Whit	22.0 Black, Clayey SILT 22.0
	М	, , , , , , , , , , , , , , , , , , ,	(A-5), with 1	race mica
	M V	<u>, , , , , , , , , , , , , , , , , , , </u>		
	W	<u>, , , , , , , , , , , , , , , , , , , </u>	735.2 Very Dense, Gray-Brc (A-2-4), with	wn, Silty Fine SAND 37.0 trace mica
	W		728.2	44.0
. 100/0.7 . 100/0.8			WEATHER Gray, (GRAN	ED ROCK
100/0.4			Boring Terminated at Weathered Rock ((Elevation 719.5 ft In

WBS	50127	7.1.FS1			TI	P	I-5714			COU	NT
SITE	DESCR		I-77	and S	SR 213	36	(Gilead F	Road) Ir	nter	chang	je l
BOR	ing no.	EB1-	C (LL)		S	T/	ATION 2	5+18			
COL	LAR ELE	E V . 77	'1.9 ft		т	0	TAL DEPT	H 40	.0 ft		
DRILL	RIG/HAI	MMER E	FF./DA	TE HI	PC2473	(CME-550 92	% 11/02	/201	6	
DRIL	LER J.	. Cain			S	T/		03/1	6/1	7	
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760		13.5					/	/ · · ·	-		
	- 1 30.4	- 13.5	4	6	7	1					· ·
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	753.4	18.5	5	6	7		· · · · · ·		-		
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750	 748.4	23 5					1			<u>.</u> .	
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	743.4	28.5	4	7	9		· · · j. · · · j.		-		· ·
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740		33.5					· · ·].	<u> </u>			
			7	10	9	1		 			· ·
735		ŧ					· · ·	╞═╧	<u> </u>	<u> -:-</u> :-	<u> </u>
	732.8	39.1	10515				· · · · ·				· ·
	732.8 - 731.9 -	- 39.1 - 40.0 -	100/0.3 60/0.0			┝		L			
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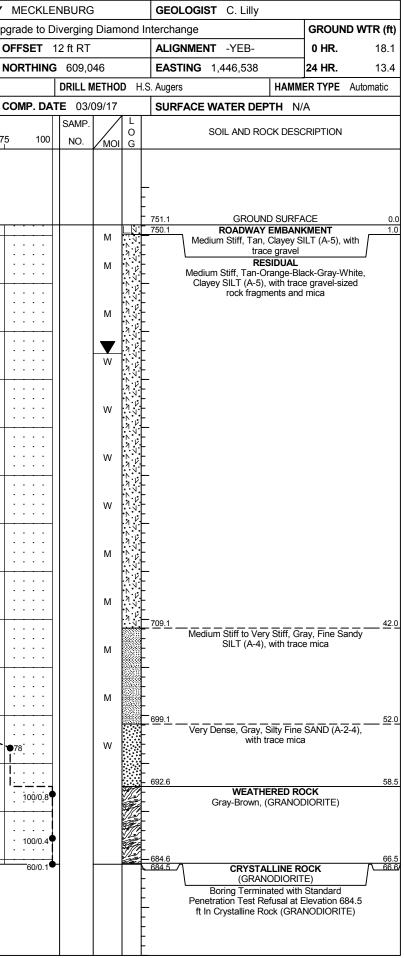
												JRE	LUG																				
WBS	50127	7.1.FS1			TI	I P I-5	714			COU	INTY	MECKI	ENBUF	RG			GEOLO	OGIST	C. Lilly					5 501					P 1-57			COUN	
SITE	DESCR	IPTION	I-77	and S	R 213	36 (Gile	ead F	Road) Inter	chang		-	-	-	amo	ond I	Interchan	ge			GROUN	D WTR (ft)	SITE	DESC	RIPTIC	DN I-7	7 and	SR 213	36 (Gile	ad Roa	ad) Inter	change	Upgrad
BORI	NG NO.	B1-A	(LL)		S	TATIO	N 2	6+65				OFFSET					_		-YEB-		0 HR.	18.1	BOF	RING N). B1	-A (LL)		S	TATION	1 26+	65		OFF
COLL		EV . 74	9.7 ft		т	OTAL	DEPT	TH 8	34.8 ft	t		NORTHIN	IG 609	,052			EASTI	NG 1,	,446,438		24 HR.	14.0	COL	LAR E	LEV.	749.7 f	t	Т	OTAL D)EPTH	84.8 f	t	NOR
DRILL	RIG/HAI	MMER E	FF./DA	TE HF	C2473	CME-5	550 92	2% 11/	02/201	6			DRILL	. MET	HOD) Н.	S. Augers			HAMM	ER TYPE	Automatic	DRIL	L RIG/H	AMMER	EFF./D	ATE H	PC2473	CME-55	50 92%	11/02/201	6	
DRIL	LER J.	Cain			S	TART	DATE	E 03	8/09/1	7		COMP. D	ATE 0	3/09/	17		SURFA	ACE W/	ATER DE	PTH N/	A		DRI	LER		ı 		S	TART D	ATE	03/09/1	7	COM
ELEV	DRIVE ELEV	DEPTH		W COL					OWS F				SAM	17		L O		SC	DIL AND R	OCK DESC	RIPTION		ELEV	DRIVE		···	ow co					PER FOO	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	2	25	5	50		75 10	NO.		ION	G	ELEV. (ft)					DEPTH (ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25		50	75
750	749.2	0.5										1				- 10-	749.7			ND SURFA		0.0 1.0	670	+	+		+	-			Mato	h Line	
	-	Ŧ	3	3	4	• 7	•••				· ·			N	И.		- 140.7		n Stiff, Tar	n, Clayey S					Ŧ						i i i i		
745	746.2	3.5	2	2	4		•••		· · ·						иŀ		<u> </u>		R	ace gravel			665	666.2	83.5	5	32	68/0.3			· · [· ·	 <u>-</u>	· · · · ·
	-	F					• •						1		•		-	(A-5), wi	ith trace m	White-Black ica and tra	ce gravel-s	SILT sized			Ŧ								1
	- 741.2	8.5					•••				•••					^ \ \	-	c	quartz frag	ments at 38	3.5 Feet				Ŧ								
740	-	+	2	2	3	- • 5-	· ·		· · ·					N	м :		-								+								
	-	ŧ					•••								•		-								Ŧ								
735	736.2	13.5	2	2	3	 .	· · · ·		· · · · · ·		•••				V ‡	².↓	-								Ŧ			1					
	-	Ŧ					• •						1	N	м :	∧ √ ∧	-								Ŧ								
	731.2	18.5				i:	•••		· · ·		• •					^ / ↓ _ ↓	-								Ŧ								
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725	726.2	23.5	1	2	3		· · · ·		· · · · · ·		· · · ·				и :	″ ×	-								ŧ								
120	-	ŧ				-\$ 5	• •			· ·			11	"	•	א ג ע ג	-								Ŧ								
	- 721.2	28.5				j :	•••		· · ·							∧ [↓]	-								‡								
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715	716.2	33.5	1	3	3	į:	· · · ·		· · ·						и :	<u>∧</u> ,	-								‡								
715	-	ŧ		Ŭ	U	● 6. ·											-								‡								
	- 711.2	38.5				· 1 ·	· · · ·		 		· · · ·	· · · ·				1	-								‡								
710		- 30.3	2	2	4	.	•••	· ·	· · ·	· ·	•••		41		м :	7 V V	-								‡								
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705	706.2	43.5	4	6	9		\ ·		 			· · · ·			и	1	-								‡								
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	- 701.2	48.5				: :	ţ:		 			 					<u>702.7</u>	Stiff to	Hard, Tan	-White-Bla	ck-Gray, Fi	ine 47.0			‡								
700		+0.5	3	5	8	1	• •13_	· ·		· ·	•••			N	И	8	-	Sa	indy SILT (A-4), with t	race mica				‡			1					
	-	ŧ				::			· · ·	· · · ·	· ·	 			000-00 <i>1</i> /	<u></u>	-								‡			1					
605	696.2	53.5	8	17	24	::	· · · ·		· · ·	· · · ·	••• •••			.			-								‡			1					
695		ŧ		''	-7			<u> </u>	1 41-						И		-								‡			1					
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690	691.2	58.5	6	11	19	1	• •	/.)	· ·	•••			N	И		-								‡			1					
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605	686.2	63.5	7	19	27		· · · ·		. \ \.		· ·	 					-								‡			1					
685		ŧ		19	21			1.		46 					И		-								‡			1					
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680	681.2	68.5	5	10	15	1		4 25_			•••			N	И		-								‡			1					
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075	676.2	73.5	4	9	17	::	· · · ·		 	· ·	· ·						-								‡			1					
675		ŧ	*	3	17			P 26_		<u>.</u> .					И		-								+			1					
	-	+					· · · ·		 	· ·	· ·						-								‡								
670	671.2	78.5	9	17	21	1 • •	••		 •38		•••				и	<u>-</u>	-								+								

T١	MECKLE	NB	URG			GEOLOGIS	T C. Lilly			
ι	Ipgrade to D	live	rging	Diam	ond I	nterchange			GROUN	D WTR (ft)
	OFFSET	29 f	t LT			ALIGNMEN	T -YEB-		0 HR.	18.1
]	NORTHING	6	609,0	52		EASTING	1,446,438		24 HR.	14.0
		DR	RILL M	IETHOI	о н.:	S. Augers		НАММ	ER TYPE	Automatic
	COMP. DA	TE	03/0)9/17		SURFACE V	VATER DEPT	H N//	4	
T		SA	AMP.	7	L O		SOIL AND ROC	K DESC	RIPTION	
	75 100	1	NO.	моі	G					
_		. 🖵 .								
:					-	Sun	to Hard, Tan-W Sandy SILT (A-4), with t	race mica	ine
•	· · · · ·					665.7 _664.9	-	inued)		84.0
-	100/0.8				<i>477</i>	1	WEATHE Gray-Brown, (G	RANOE	IORITE)	/
					þ	Borir	ng Terminated a leathered Rock	t Elevat	on 664.9 f	t In
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	50127						TY MECKLE				GEOLOGIST C. Lilly	1	WBS 50127.1.FS1	TIP I-5714 COUNTY I
				and S	_	36 (Gilead Road) Interchange			Diamor		-	GROUND WTR (ft)		I SR 2136 (Gilead Road) Interchange Upg
	NG NO.				_	TATION 26+60	OFFSET 9				ALIGNMENT -YEB-	0 HR. 19.0	BORING NO. B1-B (LL)	STATION 26+60 OF
COLL	AR ELE	V. 74	9.8 ft		T	OTAL DEPTH 83.5 ft	NORTHING	609,01	16	E	EASTING 1,446,446	24 HR. 13.0	COLLAR ELEV. 749.8 ft	TOTAL DEPTH 83.5 ft NC
DRILL	RIG/HAN	MMER E	FF./DA	TE HF	PC2473	CME-550 92% 11/02/2016		DRILL M	ETHOD	H.S. A	Augers HAMN	IER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE	HPC2473 CME-550 92% 11/02/2016
	ER J.	Cain				TART DATE 03/10/17	COMP. DAT	1 1.	_ ^ .		SURFACE WATER DEPTH N	/A	DRILLER J. Cain	START DATE 03/10/17 CC
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)		OW COU 0.5ft		BLOWS PER FOC 0 25 50	T 75 100	SAMP. NO.			SOIL AND ROCK DES .EV. (ft)	CRIPTION DEPTH (ft)	ELEV Cft) CRIVE ELEV (ft) DEPTH BLOW C (ft) (ft) 0.5ft 0.5	
750	749.3	- 0.5								74	9.8 GROUND SURF. 8.8 ROADWAY EMBAN		670	Match Line
745	_746.3	-	2	2	2	• • <td>· · · · · ·</td> <td></td> <td>M M M</td> <td></td> <td>Soft, Brown, Clayey S RESIDUAL Soft to Medium Stiff, Tan-Wh SILT (A-5), with trac</td> <td>iILT (A-5)</td> <td>666.3 + 83.5</td> <td></td>	· · · · · ·		M M M		Soft, Brown, Clayey S RESIDUAL Soft to Medium Stiff, Tan-Wh SILT (A-5), with trac	iILT (A-5)	666.3 + 83.5	
740		- - 8.5 - -	2	2	2	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	· · · · · · · · · · · · · · · · · · ·		м м					
735	736.3	- 	2	2	3	• • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·		V (۲, ۲, ۲, ۲, ۲, ۲, ۲, ۲, ۲, ۲, ۲, ۲, ۲, ۲					
730	731.3	 	2	3	3	• • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·		W V					
725	726.3	23.5 - -	2	2	3	• • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·		W X X X					
720	721.3	28.5	2	2	3	- · · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		М	, , , , , , , , , , , , , , , , , , ,				
715	716.3	33.5	1	3	2	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	· · · · · · · · · · · · · · · · · · ·		M	ビー マーレー マーレー マーレー アー アー	2.8	37.0		
710	711.3	38.5	3	4	10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	· · · · · · · · · · · · · · · · · · ·		М		Stiff, Tan-White-Black, Fin (A-4), with trace	mica		
705	706.3	43.5 - -	2	3	4	• •	· · · · · · · · · · · · · · · · · · ·		M N	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Medium Stiff, Tan-White-Bla (A-5), with trace	ick, Clayey SILT mica		
700	701.3	-	2	3	4		· · · · · · · · · · · · · · · · · · ·		M		17.8 Stiff to Hard, Tan-White-Bla	52.0		
695	696.3 	-	4	7	8		· · · · · · · · · · · · · · · · · · ·		М		SILT (A-4), with trac			
690		- - -	3	5	8		· · · · · · · · · · · · · · · · · · ·		М					
685	686.3	- - -	7	13	18	- · · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		М	- - - - - - - - - - - - - - - - - - -	2.8 Dense to Medium Dense, Ta	67.067.0		
680	681.3 - - - 676.3	- - -	9	12	18	30	· · · · · · · · · · · · · · · · · · ·		М	- - - -	Silty Fine to Coarse SAND (/ mica			
675	676.3 - - - - 671.3	- - -	4	5	13	• • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·		М		2.8 Very Stiff, Tan-White-Black			
670	0/1.0	10.0	3	5	22	1 · · · · · · · · · · · · · · · ·			M		(A-5), with trace	mica		

UNT	MECKLEN	NBURG	i		GEOLOGI	ST C. Lilly			
nge L	Ipgrade to Di	verging	Diam	ond Ir	terchange			GROUN	D WTR (ft)
	OFFSET 9	ft RT			ALIGNME	NT -YEB-		0 HR.	19.0
	NORTHING	609,0	16		EASTING	1,446,446		24 HR.	13.0
		DRILL N	IETHO	D H.S	6. Augers		HAMM	ER TYPE	Automatic
	COMP. DAT	E 03/	10/17		SURFACE	WATER DEP	TH N/	A	
-00T		SAMP.		L	1				
	75 100	NO.	мо	O G		SOIL AND ROO	CK DESC	RIPTION	
ie 	T								
<u></u>					667.8	WEATHE	RED RC	СК	82.0
	60/0.0			1	666.3	(GRAN	ODIORIT	E)	83.5
				F	Per	Boring Termina etration Test Re	fusal at E	Elevation 6	66.3
				F	ft(On Crystalline Ro	ock (GRA	NODIORI	ΓE)
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	50127					I P I-571						MECK						OLOG	IST (C. Lilly							5012						I-571			1	JNTY
SITE	DESCR		l I-77	and S	SR 21	36 (Gilea	d Ro	ad) In	terch	nange	Upg	rade to	o Dive	rging	g Diar	mono		-					GROUI	ND WTR	(ft)						SR 2	136 (Gilead	l Roa	d) Inte	rchanç	ge Upg
BOR	NG NO	. B2-A	(LL)		s	TATION	27+	66			0	FFSET	27 f	t LT			AL	GNME	NT ·	-YEB-			0 HR.	[Dry	BOR	ING NC). B2-	B (LL)		;	STAT	ION	27+5	57		0
COLI	AR ELI	EV. 75	50.7 ft		Т	OTAL DE	PTH	67.0) ft		N	orthi	NG 6	609,0)85		EA	STING	1,44	46,533		2	24 HR.	1:	2.8	COL	LAR EL	EV. 7	′51.1 f	t		τοτ/	L DE	PTH	66.61	ft	N
DRILL	RIG/HA	MMER E	FF./DA	TE HF	PC2473	CME-550) 92%	11/02/2	2016				DF	RILL N	NETHO	OD	H.S. Aug	ers			HA	MME	R TYPE	Automat	ic	DRILL	RIG/HA	MMER	EFF./D	ATE H	IPC24	73 CN	IE-550	92% 1	1/02/20	16	
DRIL	LER J	. Cain			S	TART DA	ΔTE	03/09	9/17		C	omp. I	DATE	03/	09/17	7	SU	RFACE	E WAT	rer di	PTH	N/A	۱			DRIL	LER	I. Cain			:	STAF	T DA	TE (03/09/^	17	C
ELEV	DRIVE ELEV	DEPTH	']		BLOW						amp.	▼∕				SOIL	. AND F	OCK D	ESCF	RIPTION	1		ELEV	DRIVE ELEV	IDEF I	· ·	ow co	-					PER FO	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25		50		75	1	1 00	NO.	/мс		ELEV	. (ft)						DEPT	H (ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5f	t 0		25		50	75
755		÷															-									755		+									
		Ŧ															F											Ŧ									
750	750.2	0.5															750.7		P	GROL					0.0	750	750.6	- 0.5	2	3	4	╪┼╴	1			<u> </u>	
	-	Ŧ	2	3	3	• 6	·								M	, 	; <u> ; ; </u>			Stiff, Ta		ey SIL	T (A-5),	, with	1.0		747.6	T 3.5					. ● 7 	· · ·			
	747.2	3.5	3	3	4		•			· · ·		· · · ·	.		м	N N			(LL 0)	F	ESIDU	AL						<u> </u>	2	2	4		6				
745	-	ł														1 N	j.	50					e-Black-0 ace mica			745		ŧ					<u>+</u>	.	<u> </u>	+	
	742.2	8.5	2	2			•	· · ·	•	· · ·	•	· · ·	.			N N	.] ;]										742.6	8.5	2	3	4	_	. .l	· ·		· ·	· ·
740	-	ŧ		3	4	•7 .	•		•		•		·		M	× 1	ļ.									740		Ŧ					<u>•</u> * ·	· ·	· · ·	<u> </u>	••
	737.2	4.05				. .	:	· · · · · ·	:	· · · · · ·		· · · · · ·															737.6	+ 13.5					1::	: :	· · ·	· · · ·	
735		<u> 13.5 </u>	3	3	5	.↓ .∳8 .	· ·	· · · · · ·		· · · · · ·		· · · · · ·			м	N N										735		‡	2	2	3	، [5 <u>`</u>	· · ·	•••	· ·	· · ·
735	-	ŧ				 <u>†</u>																				735		ŧ					+			1	
	732.2	18.5	2	1	3			· · · · · ·		· · · · · ·	•	· · · · · ·	•		м	N 1											732.6	+ 18.5 +	6	4	4			· · ·	•••		· · ·
730	-	ŧ				● ⁴ ··	•	· · ·	-	· · ·							Ļ									730		ŧ					- <u>+</u>	· ·	· · ·	· · ·	
	727.2	23.5				\``		· · ·		· · · · · ·	.	· · · · · ·	.			7	÷										727.6	+ 23.5					1		· · · · · ·		
725		+	3	3	5		•	· · ·		· · · · · ·		· · · · · ·			М	N 1	ļ.									725		Ŧ	2	2	3	(5		· · · · · ·		•••
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700	702.2	48.5						· · · ·		· · · ·	.	· · · ·	.				- <u>103.1</u>		ry Stiff	to Harc	, Gray-	White	, Fine S	Sandy	<u>47</u> .0		702.6	48.5	3	7	11		· ·\· · · \				
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690	-	ŧ	21	4/	55/0.5		•	· · ·	· [Ī	• 100/0	.8•						(WEAT Gray, (G						690		‡						· ·		<u> </u>	••
	687.2	+ - 62 F						· · · · · ·		· · · · · ·		· · · · · ·											,				687.6	+ 63.5					· · ·		· · · ·		· · ·
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000	683.7	67.0	60/0 5									<u> </u>					683.7						N		67.0	000	684.6	<u>+ 66.5</u> +	60/0.	1	+	╧	<u> </u>	<u> </u>		<u>+</u>	<u> </u>
		ŧ	60/0.0	'								60/0					ŧ	Per	netratio	on Test	Refusal	l at Ele	Standard evation (683.7				‡		1							
	_	ŧ															F	ft	On Cry	/stalline	Rock (GRAN	NODIOR	RITE)				‡									
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	50127					P I-5714				MECKLE				GEOLOGIST C. Lilly	1	
						36 (Gilead R	-	terchang	· · ·	-		Diam	ond li	-		
	ING NO.)		TATION 29				OFFSET 3				ALIGNMENT -YEB-	-	44.7
	LAR ELE					OTAL DEPT			N	ORTHING				EASTING 1,446,657		24.9
			FF./DA	TE HI		CME-550 929							D H.S		IER TYPE Automa	atic
	LER J. DRIVE									COMP. DA	-	20/17	1 L T	SURFACE WATER DEPTH N	/A	
ELEV (ft)	ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	1	0 2	5	'S PER F0 50	סטן זיק	5 100	SAMP. NO.	моі	0	SOIL AND ROCK DES		<u>РТН (</u> 1
775																
	773.2	0.5	3											773.7 GROUND SURF	ACE	0
	-	35	3	4	6	· • 10 ·	· · ·	· · · ·	· ·			M		Medium Stiff to Ver Red-Brown-Tan-Black-Whit	ry Stiff, e. Fine Sandv.	
770	770.2	3.5	6	7	9	16						м		- Clayey SILT (A-5), with	trace mica.	
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765	765.2	8.5	4	6	6				•••					-		
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700	760.2	-					· · ·	· · · ·	: :	· · · · ·						
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755	755.2	18.5	3	4	4			· · ·	• •					-		
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745	745.2	28.5	2	4	3			· · ·	• •					-		
	-	-	2		5	● 7	· · ·	· · · ·	::	· · · · ·		M				
740	- 740.2	33.5					· · ·	· · · · ·	· ·	· · · · ·						
/40		- 33.5	1	2	3	6 5						м		-		
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735	735.2	38.5	1	3	3	$ \cdot \cdot \cdot$		· · ·	•••					-		
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730	- 730.2	43.5					· · ·	· · · · · · ·	· ·	· · · · ·						
130	- 130.2	- 40.0	2	2	3	• 5						м		-		
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725	725.2	48.5	2	2	3			· · · ·	•••					-		
	-	-	-	-	Ŭ	•5	· · · · · ·	: .	::			M				
720	- 720.2	53.5					· · · ·	· · · · · · ·	· ·	· · · · ·						
120		- 55.5	3	2	3	● 5						м		-		
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715	715.2	58.5	5	11	16			• • • •	•••					Medium Dense to Very Dens - Silty Fine to Coarse SAND (A	se, Gray-Brown, A-2-4), with trace	
	-	-	Ŭ				●27 /		::	· · · · ·		M		mica.		
710	- 710.2	63.5				::::/	· · ·	· · · ·	· ·	· · · ·	1					
10	<u> </u>	- 03.5	6	9	12	1	 1					w		-		
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705	705.2	68.5	16	39	59			· · ·	~~	····		۱۸/		-		
	- 702.5	71.2			00		· · ·	· · · ·		••••••••••••••••••••••••••••••••••••••	8	W		702.5		71
	-		60/0.0							60/0.0	7			Boring Terminated with Penetration Test Refusal at		
		F									1			ft On Crystalline Rock (GR/	ANODIORITE)	
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-	50127						-5714						ENBURG			GEOLOGIST C. Lilly	T		5 5012					P I-5714		COUN	
										change	_			g Diar	mond	Interchange	GROUND WTR (ft)							6 (Gilead I	,	erchange	∍ Up
BOR	NG NO	. EB2-	B (LL)	s	TATI	ON 2	28+94	4		OFF	SET	3 ft RT			ALIGNMENT -YEB-	0 HR. Dry	BOF	RING NO	. EB2	-B (LL)		ST	TATION 2	<u>28+94</u>		C
COLI	AR ELI	EV . 77	4.3 ft		Т	ΌΤΑ	L DEP	ΤH	91.5 f	t	NOR	RTHING	G 609,	102		EASTING 1,446,663	24 HR. 36.8	COL	LAR EL	EV. 7	74.3 ft		тс	DTAL DEP	TH 91.5	ft	N
DRILL	RIG/HA	MMER E	FF./DA	TE HF	PC2473	3 CME	E-550 9	2% 11	/02/201	6			DRILL	METHO	DD H	.S. Augers HAMM	IER TYPE Automatic	DRIL	L RIG/HA	MMER E	FF./DA	TE HF	PC2473	CME-550 92	2% 11/02/20	016	
DRIL	LER J					TAR	T DAT	E 03	3/16/1	7	CON	IP. DA	TE 03/		7	SURFACE WATER DEPTH N	/A	DRI	LER J				ST	ART DAT			C
ELEV	DRIVE ELEV			DW COL						PER FOC		100	SAMP.			SOIL AND ROCK DES	CRIPTION	ELEV	DRIVE ELEV	DEPTH	· – – – – –	W COL				B PER FO	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0		25		50 I	75	100	NO.	/мс	DI G	ELEV. (ft)	DEPTH (ft)	(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft		25	50	75
775	773.8	+						_									ACE 0.0	695	+	┣──-			+		Mat	tch Line	
		<u>+ 0.5</u> T	2	3	4	1 .	7 • •	.				· · · · · ·		М	N N V	- RESIDUAL Soft to Very Sti	iff,			Ŧ							
770	770.8	3.5	5	8	8		· · · ·							м	N N V	Red-Brown-Tan-White-Blac (A-5), with trace r		690	690.8	83.5	5	9	12		<u> </u>		
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765		+	4	4	6	11-	•10	+-				· · ·		м	к 7 7 У	_		685		ŧ	100/0.2						<u> </u>
		ŧ							· · · ·			 			к V Л V	-			682.9	91.4	60/0.1			<u> </u>	<u> </u>	.	
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	710.0	+ - 63.5				:	· \ ·		· · · · · ·			· · · · · ·			1. V	712.3 Very Stiff, Tan-White-Black, I	Fine Sandy SILT			Ŧ							
710	710.8 -	+ 03.5 +	5	10	12	1	•• \	 		· · ·		· · ·		м		(A-4), with trace r	mica		-	ŧ							
	-	ŧ				:		Υ.								- <u>- 707.3 </u>	67.0			ŧ							
705	705.8	68.5	5	10	20	:	· · · · · ·	N.	· · · · · ·	· · · ·		· · · · · ·				Medium Dense to Ver Tan-White-Black-Gray-Bro	ry Dense, own, Silty Fine			Ŧ							
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035		L	<u>3</u> 2	1.21	49/0.4	tl.				I			1.1	I	Part			ı L		L	1		I I				

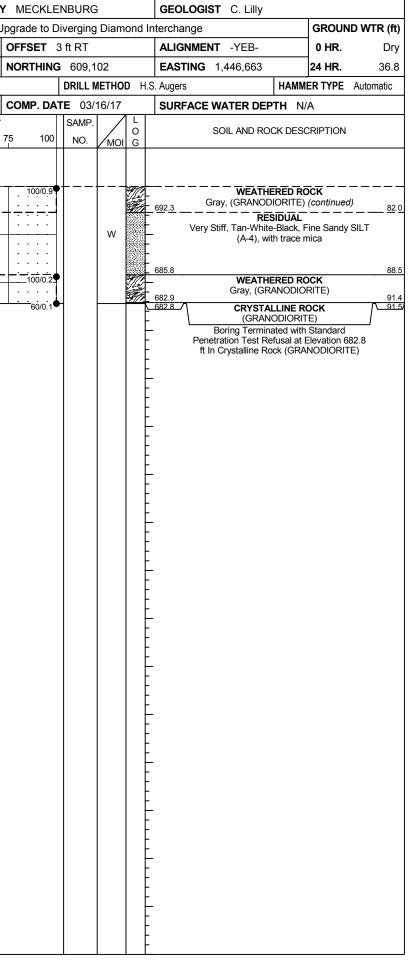




Photo No.1: View at existing Bent 2 looking west (downstation) on -YEB- (SR 2136)



Photo No. 2: View at existing Bent I looking east (upstation) on -YEB- (SR 2136)



Photo No. 3: View at End Bent I looking east (upstation) on -YEB- (SR 2136)

