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-4060 REFERENCE **CONTENTS** 

**DESCRIPTION** 

BORE LOGS & CORE LOGS W/ CORE PHOTOGRAPHS SUMMARY OF SOIL CLASSIFICATION & GRADATIONS

TITLE SHEET LEGEND

SITE PLAN

PROFILE(S) CROSS SECTION(S)

SHEET NO.

6-I3

# 34605

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** 

## GEOTECHNICAL ENGINEERING UNIT

### **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY Alleghany PROJECT DESCRIPTION US 21 Western Loop from SR 1172 (Grandview Drive) to US 21 SITE DESCRIPTION Bridge on -L- (Sparta Bypass) over Unnamed Tributary to Bledsoe Creek

STATE PROJECT REFERENCE NO. R - 4060

#### **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 1991 707-680. 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 MOILCATED IN THE SUBSURFACE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY WARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY WARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY CONSIDERABLY WITH TIME TO CONDITIONS MAY WAR INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO 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 FOR BE ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- 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.

Robbie DeLost Mike Morgan Herold Morris INVESTIGATED BY <u>ICA</u> Engineering DRAWN BY \_Wesley Shuecraft CHECKED BY Kenneth Bussey SUBMITTED BY Kenneth Bussey DATE \_\_\_\_\_February 2, 2015

**PERSONNEL** 



6/3/2015

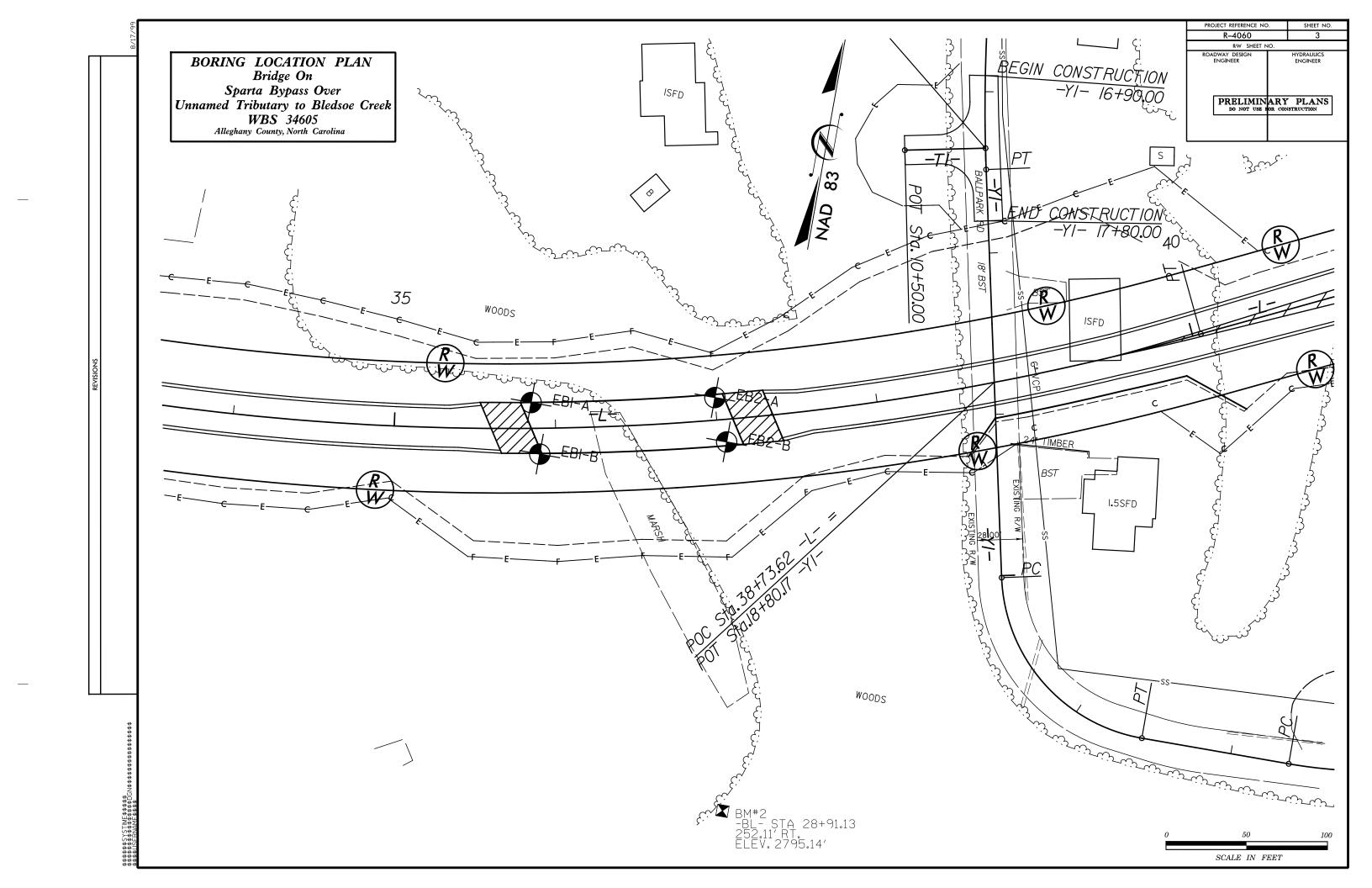
PROJECT REFERENCE NO. SHEET NO. 2

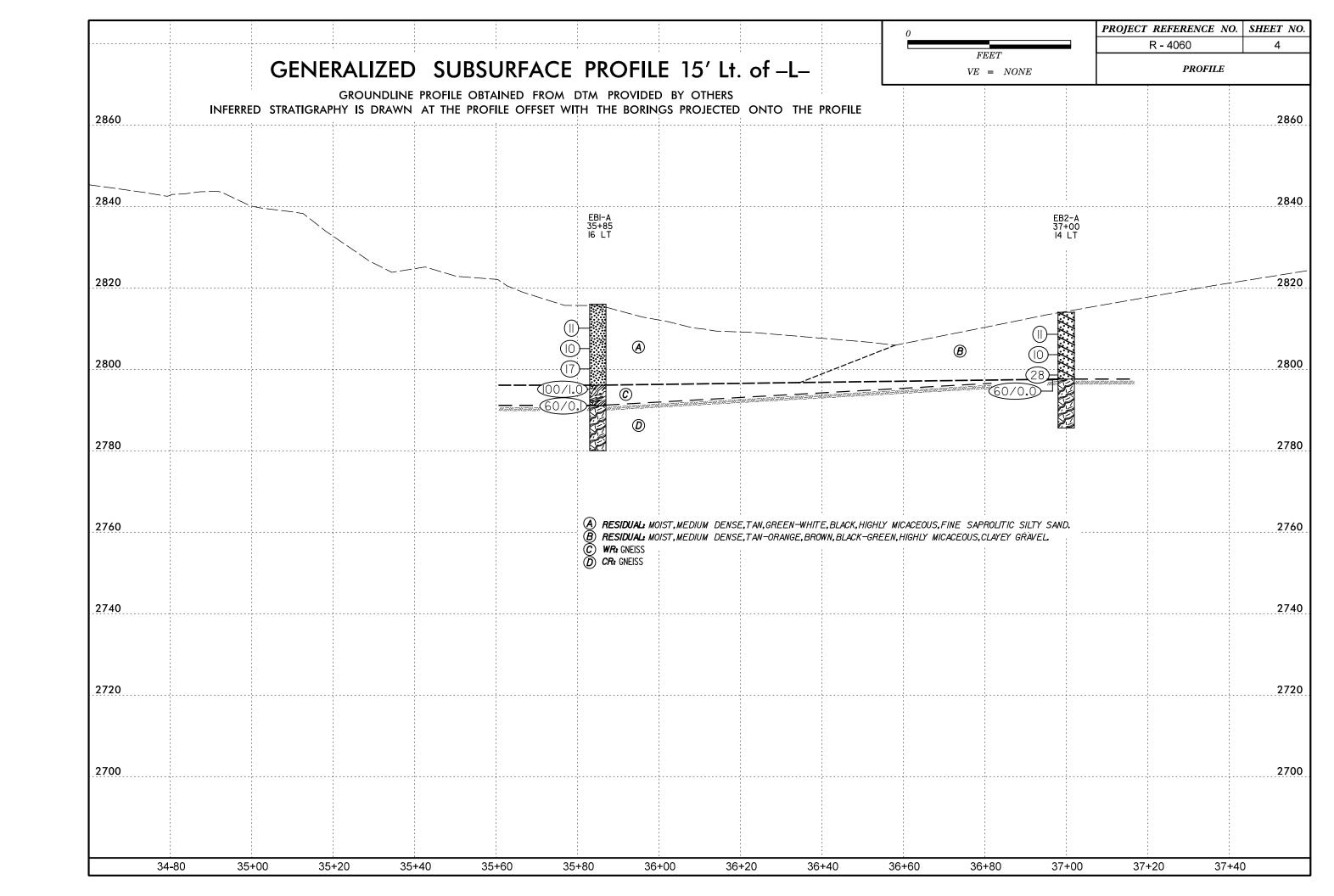
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

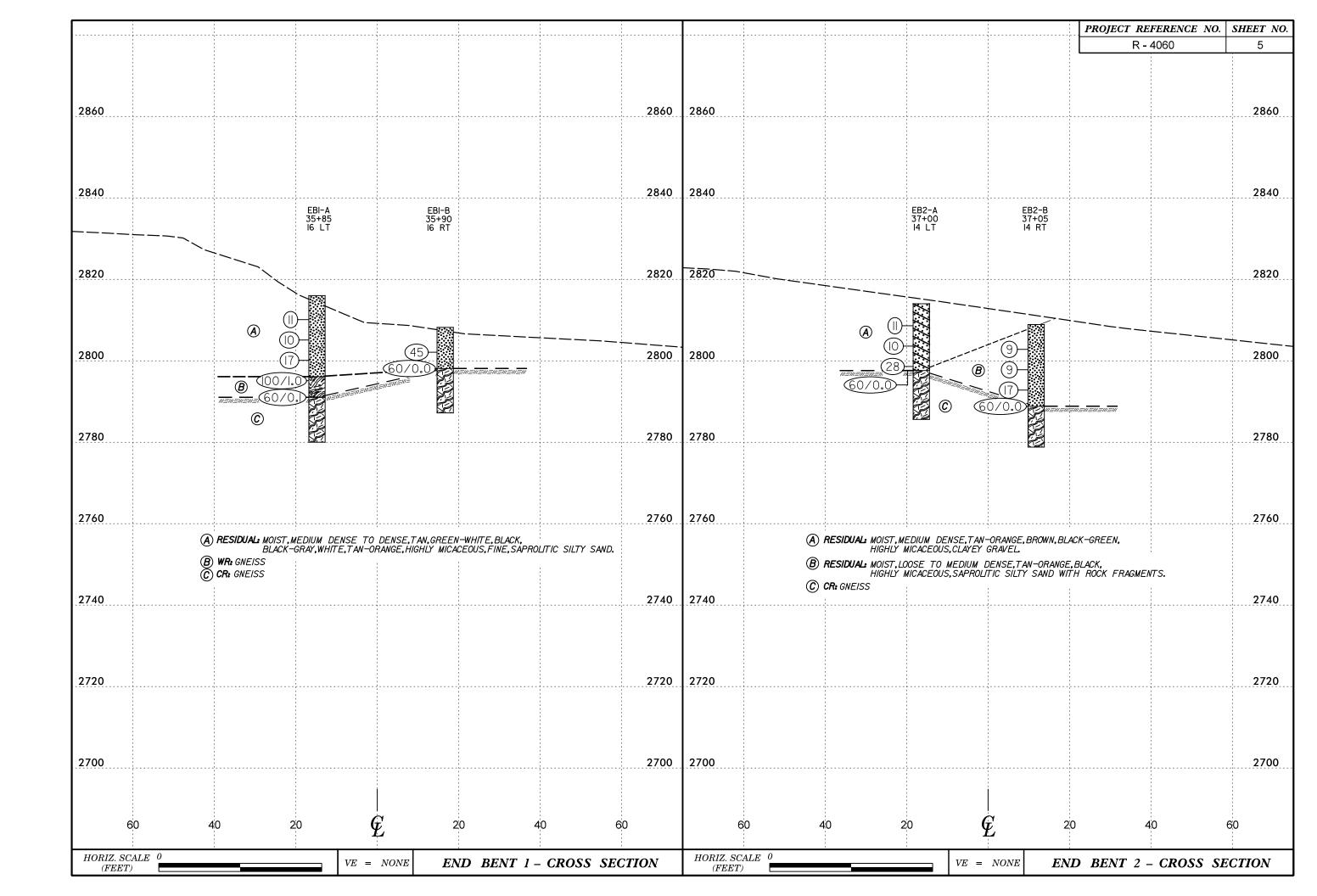
## SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

| SOIL DESCRIPTION  | GRADATION   | ROCK DESCRIPTION  | TERMS AND DEFINITIONS   |
|---|---|---|---|
| SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN   | WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  | HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.          | ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  |
| 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 D1586). SOIL CLASSIFICATION  | <u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - 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 Ø.1 FOOT PER 60   | AQUIFER - A WATER BEARING FORMATION OR STRATA.  |
| IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH   | ANGULARITY OF GRAINS  | BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.   | 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 SAID 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:  | 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 > 1000 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 OPERANTS MATERIALS   | MINERALOGICAL COMPOSITION   | CRYSTALLINE CRYSTALLINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT   | WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND   |
| LLASS. (\$35% PASSING *200) (>35% PASSING *200)   | 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-3 A-6, A-7 A-1, A-2 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      |
| SYMBOL 000000000000000000000000000000000000   | SLIGHTLY COMPRESSIBLE LL < 31   | ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.   | OF SLOPE.   |
| 7. PASSING  | 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 BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.                           |
| *10 50 MX GRANULAR SILI- MUCK,  | PERCENTAGE OF MATERIAL  | (CP) SHELL BEDS, ETC. WEATHERING  | DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT  |
| *40 38 MX 58 MX 51 MN PEAT **  *200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN | GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL  | FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER  | ROCKS OR CUTS MASSIVE ROCK.   |
| MATERIAL  | TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%   | HAMMER IF CRYSTALLINE.  | <u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.  |
| PASSING *40   | LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%  | VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (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   10 MX   10 MX   11 MN   11 MN   10 MX   10 MX   11 MN   11 MN   11 MN   MNDEGATE   HIGHLY  | HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE   | OF A CRYSTALLINE NATURE.  | LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.   |
| GROUP INDEX Ø Ø Ø 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF ORGANIC SOILS  | ONCOME WHICK  | SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO   | FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.                                    |
| USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER   | ▼ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING   | (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR 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 <u>24</u> 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 POOR POOR UNSUITABL  | 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 SUBGRADE PI OF A-7-5 SUBGROUP IS ≤ LL - 3Ø +PI OF A-7-6 SUBGROUP IS > LL - 3Ø  | — SPRING OR SEEP  | WITH FRESH ROCK.  | FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.  FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE  |
| 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     | FIELD.  |
| COMPACTNIESS OR RANGE OF STANDARD RANGE OF UNCONFINED   | TD OF MOE   | (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 CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT <sup>2</sup> )   | ROADWAY EMBANKMENT (RE)  DIP & DIP DIRECTION  WITH SOIL DESCRIPTION  OF ROCK STRUCTURES   | IF TESTED, WOULD YIELD SPT REFUSAL  SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT  | LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.   |
| CENERALLY VERY LOOSE ( 4  | SOIL SYMBOL SPET DATE TEST BORING SLOPE INDICATOR INSTALLATION  | (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED  | LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.   |
| GRANULAR LUUSE 4 10 10 10 N/A   | M T   | TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.  IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF  | MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS   |
| MATERIAL DENSE 30 TO 50   | ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT AUGER BORING CONE PENETROMETER   | VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE   | USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  |
| VERY DENSE   > 50   | INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD   | SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR             | PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.  |
| GENERALLY SOFT 2 TO 4 0.25 TO 0.5   | MW - TEST BORING  | VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>  | RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  |
| SILT-CLAY   MEDIUM STIFF   4 TO 8   0.5 TO 1.0   MATERIAL   STIFF   8 TO 15   1 TO 2  | INFERRED ROCK LINE MONITORING WELL WITH CORE  | COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS                | ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF   |
| (COHESIVE)  | ALLUVIAL SOIL BOUNDARY A PIEZOMETER INSTALLATION SPT N-VALUE  | ALSO AN EXAMPLE.  | ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  |
| HARD > 30 > 4  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  | EXCAVATION WITTABLE 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 - USED IN THE TOP 3 FEET OF 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 Ø.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 3Ø5 75 2.Ø Ø.25 Ø.Ø5 Ø.ØØ5   | AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST   | 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  CL CLAY MOD MODERATELY 7 - UNIT WEIGHT   | MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.  CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE                   | 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 |
| SOIL MOISTURE - CORRELATION OF TERMS  | CPT - CONE PENETRATION TEST NP - NON PLASTIC $\dot{\gamma}_{ m d}$ - DRY UNIT WEIGHT  | POINT OF A GEOLOGIST'S PICK.  | TO OR LESS THAN Ø.1 FOOT PER 60 BLOWS.  |
| SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION   | CSE COARSE ORG ORGANIC  DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS  | 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                        | STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.                                    |
| - SATURATED - USUALLY LIQUID: VERY WET, USUALLY   | DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK  | PIECES CAN BE BROKEN BY FINGER PRESSURE.  | STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL   |
| (SAT.) FROM BELOW THE GROUND WATER TABLE  | e - VOID RATIO         SD SAND, SANDY         SS - SPLIT SPOON           F - FINE         SL SILT, SILTY         ST - SHELBY TUBE   | VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY               | 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.                               |
| LL LIQUID LIMIT   | FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL   | FINGERNALL.   | TOPSOIL (TS.) - SURFACE SDILS USUALLY CONTAINING ORGANIC MATTER.  |
| RANGE   - WET - (W) SEMISOLID; REQUIRES DATING TO   | FRAGS FRAGMENTS $\omega$ - MOISTURE CONTENT CBR - CALIFORNIA BEARING  | FRACTURE SPACING BEDDING  | BENCH MARK; BM#2 8" SPIKE IN ROOT OF IO" WILD CHERRY  |
| (PI) PL PLASTIC LIMIT   | HI HIGHLY V - VERY RATIO  | TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET  | BL STATION 28+9I.00 252' RIGHT  |
| OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE  | EQUIPMENT USED ON SUBJECT PROJECT  DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:   | ■ WIDE 3 TO 10 FEET   THICKLY BEDDED 1.5 - 4 FEET   | N 1006373, E 1379222 ELEVATION: 2795.14 FEET  |
| SL _ SHRINKAGE LIMIT  | DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:  X CME-45C CLAY BITS X AUTOMATIC MANUAL  | MODERATELY CLOSE  | NOTES:  |
| - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE  | OLOGATZANIGUO EL TOUT. AUGED  | VERY CLOSE LESS THAN Ø.16 FEET THICKLY LAMINATED Ø.008 - 0.03 FEET  |   |
|   | CME-55 B*HOLLOW AUGERS CORE SIZE:   | THINLY LAMINATED < 0.008 FEET  INDURATION   |   |
| PLASTICITY  |   | FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.   |   |
| PLASTICITY INDEX (PI) DRY STRENGTH  NON PLASTIC Ø-5 VERY LOW  | TUNG-CARRIDE INSERTS  | RUBBING WITH FINGER FREES NUMEROUS GRAINS;  |   |
| SLIGHTLY PLASTIC 6-15 SLIGHT  | VANE SHEAR TEST V CASING V W/ ADVANCER HAND TOOLS:  | GENILE BLUW BY HAMMER DISINIEGRATES SAMPLE.   |   |
| MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH  | POST HOLE DIGGER  | MODERATELY INDURATED  GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.   |   |
| COLOR   | TOTAL | CRAINS ARE DISCISSED TO SERARATE WITH STEEL BRODE.  |   |
|   | TIONG-CAMB. SOUNDING ROD    X   CORE BIT   VANE SHEAR TEST  | INDURATED 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.   | VANE SHEAR TEST   | EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;  |   |
|   |   | SAMPLE BREAKS ACROSS GRAINS.  | DATE: 8-15-14   |







| <b>WBS</b> 34 |   |          |        |       |         | <b>P</b> R-406                                   | POR            |           | Y ALLEGHA      | ANY      |        |      | GEOLOGIST DeLost, F                    | ₹.        |                                 |            |
|---------------|---|----------|--------|-------|---------|--|----------------|-----------|----------------|----------|--------|------|--|-----------|---------------------------------|------------|
| SITE DES      | CRIPTI                                  | ON       | US 2   | 1 Wes | tern Lo | oop from   | SR 1172 (      | Grandview | Drive) to US 2 | 21       |        |      | •                                      | G         | ROUND W                         | TR (ft     |
| BORING N      | NO. E                                   | B1-A     | ١      |       | ST      | ATION  | 35+85          |           | OFFSET         | 16 ft LT |        |      | ALIGNMENT - L-                         | (         | HR.                             | N/A        |
| COLLAR        | ELEV.                                   | 2,8      | 16.0 f | t     | тс      | TAL DE   | <b>PTH</b> 36. | O ft      | NORTHING       | 1,006    | ,637   |      | <b>EASTING</b> 1,379,063               | 24        | HR.                             | N/A        |
| DRILL RIG/I   | HAMMEF                                  | REFF     | ./DATE | ICA   | 0404 CN | 1E-45C 90°                                       | % 08/25/201    | 4         |                | DRILL N  | METHOD | NV C | V Casing w/ Advancer                   | HAMMER    | TYPE Auto                       | matic      |
| DRILLER       |   | an, N    | Λ.     |       | ST      | ART DA   | TE 11/1        | 5/14      | COMP. DA       | TE 11/   | 15/14  |      | SURFACE WATER DEP                      | TH N/A    |                                 |            |
| ELEV DRI      | =\/  ບ⊏                                 | PTH      |        | W COI |         |  |                | S PER FOO |                | SAMP.    |        |      | SOIL AND RO                            | CK DESCR  | IPTION                          |            |
| (ft) (ft      | t) (1                                   | ft)      | 0.5ft  | 0.5ft | 0.5ft   | 0  | 25             | 50        | 75 100         | NO.      | MOI    | G    | ELEV. (ft)                             |           | D                               | EPTH (     |
| 2820          | <u> </u>                                |          |        |       |         |  |                |           |                |          |        |      | _<br>-<br>-                            |           |                                 |            |
| 2815          | +                                       | $\dashv$ |        |       |         | <del>                                     </del> |                |           |                |          |        |      |  | O SURFACI | <u> </u>                        | 0          |
| 2,81          | 1.1 4                                   | .9       | 3      | 5     | 6       | . j .<br>. j .<br>. j .                          |                |           |                | SS-1     | 25% M  |      | Tan, green-white, b<br>highly micaceou | lack med  | dense, silty,<br>ic <b>SAND</b> |            |
| 2,80          | 6.1 9                                   | .9       | 3      | 3     | 7       | 10-  |                |           |                |          | М      |      | -<br>-<br>_                            |           |                                 |            |
|               | ‡                                       |          |        |       |         | : '/.'   |                |           | :   : : : :    |          |        |      | -<br>-                                 |           |                                 |            |
| 2,80          | 1.1 14                                  | 1.9      | 3      | 6     | 11      | :: ;   |                |           |                |          | М      |      | -<br>-                                 |           |                                 |            |
| 2,79          | 16.1 19                                 | 9.9      | 34     | 50    | 50      |  |                |           | 100/1.0        |          | IVI    |      |  | ERED ROCK |                                 | 1          |
| 2,79          | 11.1 24                                 | 1.9      | 60/0.1 |       |         |  |                |           | 60/0.1         |          |        |      |  | LINE ROC  | K                               | 2 <u>2</u> |
| 2785          | <u> </u>                                |          |        |       |         |  |                |           |                |          |        |      | Crystalline CRYSTAI                    | LINE ROC  | K                               | I          |
| 2780          | ‡                                       |          |        |       |         |  |                |           |                |          |        |      | -<br>-<br>-<br>2,780.0                 |           |                                 | 36         |
|               | Ŧ                                       |          |        |       |         |  |                |           |                |          |        |      | Boring Terminated a<br>Crystalline     |           |                                 |            |
|               | Į<br>Į                                  |          |        |       |         |  |                |           |                |          |        |      | Boring backfille                       | `         | ,                               |            |
|               | Ī                                       |          |        |       |         |  |                |           |                |          |        |      | -<br>-<br>-<br>-                       |           |                                 |            |
|               | +                                       |          |        |       |         |  |                |           |                |          |        |      | -<br>-<br>-<br>-                       |           |                                 |            |
|               | ‡                                       |          |        |       |         |  |                |           |                |          |        |      | -<br>-<br>-<br>-                       |           |                                 |            |
|               | Ī                                       |          |        |       |         |  |                |           |                |          |        |      | -<br>-<br>-<br>-                       |           |                                 |            |
|               | +++++++++++++++++++++++++++++++++++++++ |          |        |       |         |  |                |           |                |          |        |      | -<br>-<br>-<br>-                       |           |                                 |            |
|               | †                                       |          |        |       |         |  |                |           |                |          |        |      | -<br>-<br>-<br>-                       |           |                                 |            |
|               | ‡                                       |          |        |       |         |  |                |           |                |          |        |      | •<br>•<br>•                            |           |                                 |            |



|       | 34605.1.2                    |         |                          |               | R-406         |                 |               |               |       | LEGHANY                   | GEOLOGIST DeLost, I   | ₹.         |              |           |
|-------|------------------------------|---------|--------------------------|---------------|---------------|-----------------|---------------|---------------|-------|---------------------------|---|------------|--------------|-----------|
| SITE  | DESCRIPTION                  | US 2    | 21 Wester                | n Loop        | from          | SR 1172         | (Grand        | lview [       | Drive | to US 21                  |   |            | GROUND       | WTR (ft)  |
| BOR   | ING NO. EB1-                 | A       |                          | STA           | TION          | 35+85           |               |               | OF    | SET 16 ft LT              | ALIGNMENT - L-  |            | 0 HR.        | N/A       |
| COL   | LAR ELEV. 2,                 | 816.0 1 | ft                       | TOT           | AL DE         | <b>PTH</b> 36.  | 0 ft          |               | NO    | <b>RTHING</b> 1,006,637   | <b>EASTING</b> 1,379,063  |            | 24 HR.       | N/A       |
| DRILI | RIG/HAMMER EF                | F./DATI | E ICA040                 | 4 CME-        | 45C 90%       | % 08/25/20°     | 14            |               |       | DRILL METHOD NW           | Casing w/ Advancer  | HAMME      | R TYPE A     | utomatic  |
| DRIL  | LER Morgan,                  | M.      |                          | STAI          | RT DA         | TE 11/1         | 5/14          |               | CC    | <b>MP. DATE</b> 11/15/14  | SURFACE WATER DEF   | TH N/      | 4            |           |
| COR   | E SIZE NQ2                   |         |                          |               |               | <b>N</b> 11.0 f | t             |               |       |                           |   |            |              |           |
| ELEV  |                              |         | DRILL<br>RATE            | REC.          | JN<br>RQD     | SAMP.           | REC.          | ATA<br>RQD    | L     | D                         | ESCRIPTION AND REMARK   | (S         |              |           |
| (ft)  | (ft) (ft)                    | (ft)    | (Min/ft)                 | (ft)<br>%     | (ft)<br>%     | NO.             | (ft)<br>%     | (ft)<br>%     | Ğ     | ELEV. (ft)                | LOOKII TION AND KLIVIAKI  |            |              | DEPTH (ft |
| 2791  | 2 701 0   25 0               | 0.0     | 0.45/0.0                 | (0.0)         | (0.0)         |                 | (40.0)        | (40.0)        |       |                           | Begin Coring @ 25.0 ft  |            |              |           |
| 2/90  | 2,791.0 25.0<br>2,790.2 25.8 | 5.0     | 2:15/0.8<br>3:15<br>3:24 | (0.6)<br>75%  | (0.0)<br>0%   |                 | (10.6)<br>96% | (10.0)<br>91% |       |                           | CRYSTALLINE ROCK<br>k, brown-orange stain (upper                |            |              | 25.0      |
|       | ‡                            |         | 3:46<br>3:41             | (5.0)<br>100% | (5.0)<br>100% |                 |               |               |       | feldspar-quartz rich,     | hard, v. wide discontinuities,<br>trcs. vugs, feldspar-quartz-m | uscovite-  | biotite Gnei | SS.       |
| 2785  | 2,785.2 30.8                 |         | 3:23                     |               |               |                 |               |               |       | 4 0°-20° jts. w/          | ron oxide stain (upper 0.4'),                                   | no jts. be | low 25.6'    |           |
|       | 1 1                          | 5.2     | 4:18<br>3:32             | (5.0)<br>96%  | (5.0)<br>96%  |                 |               |               |       | •                         |   |            |              |           |
|       | 1 1                          |         | 3:42<br>3:49             |               |               |                 |               |               |       |                           |   |            |              |           |
| 2780  | 2,780.0 36.0                 |         | 4:23/1.2                 |               |               |                 | _             |               |       | 2,780.0 Boring Terminated | at Elevation 2,780.0 ft in Crys                                 | stalline R | ock (Gneiss  | 36.0      |
|       | <del> </del>                 |         |                          |               |               |                 |               |               |       |                           | packfilled immediately upon o                                   |            |              | ,         |
|       | Ŧ                            |         |                          |               |               |                 |               |               |       |                           | additional minimal actions a point                              | op.oo      |              |           |
|       | Ŧ                            |         |                          |               |               |                 |               |               |       | <del>-</del><br>•         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | ·<br><del>-</del>         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       |                              |         |                          |               |               |                 |               |               |       | <del>-</del>              |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | 1 1                          |         |                          |               |               |                 |               |               |       | =                         |   |            |              |           |
|       | <u> </u>                     |         |                          |               |               |                 |               |               |       |                           |   |            |              |           |
|       | 1                            |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | Ŧ                            |         |                          |               |               |                 |               |               |       | <del>-</del>              |   |            |              |           |
|       |                              |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | <del>-</del><br>·         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | <del>-</del>              |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       |                              |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | <u>+</u>                     |         |                          |               |               |                 |               |               |       | <del>-</del>              |   |            |              |           |
|       | l ±                          |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | <del> </del>                 |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | Ŧ                            |         |                          |               |               |                 |               |               |       | <del>-</del><br>·         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | <del>-</del>              |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | •<br>•                    |   |            |              |           |
|       |                              |         |                          |               |               |                 |               |               |       | <del>_</del>              |   |            |              |           |
|       |                              |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       |                              |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | <del>-</del><br>·         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | -                         |   |            |              |           |
|       | ‡                            |         |                          |               |               |                 |               |               |       | •<br>•                    |   |            |              |           |
|       | +                            |         |                          |               |               |                 |               |               |       | •                         |   |            |              |           |



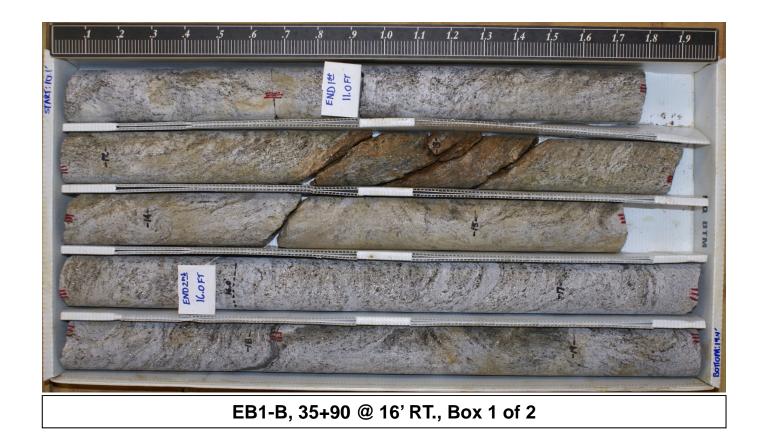


| WBS     |                                   |                                 |         |       |          | R-4060     |                |             | Y ALLEGH     | ANY      |            |                                       | GEOLOGIST DeLost, F  | ₹.                                 |           |          |
|---------|-----------------------------------|---------------------------------|---------|-------|----------|------------|----------------|-------------|--------------|----------|------------|---------------------------------------|--|------------------------------------|-----------|----------|
| SITE D  | ESCR                              | IPTION                          | US 2    | 1 Wes | stern Lo | oop from S | R 1172 (       | Grandview [ | Orive) to US | 21       |            |                                       |  |                                    | GROUND    | WTR (ft  |
| BORIN   | G NO.                             | EB1-E                           | 3       |       | ST       | ATION 3    | 35+90          |             | OFFSET       | 16 ft RT |            |                                       | ALIGNMENT -L-  |                                    | 0 HR.     | N/A      |
| COLLA   | AR ELE                            | <b>EV</b> . 2,8                 | 308.2 f | t     | TC       | TAL DEP    | <b>TH</b> 21.0 | ft          | NORTHING     | 3 1,006  | ,607       |                                       | <b>EASTING</b> 1,379,074                                     |                                    | 24 HR.    | N/A      |
| DRILL R | IG/HAM                            | IMER EF                         | F./DATE | ICA(  | 0404 CN  | IE-45C 90% | 08/25/2014     | ļ           | •            | DRILL N  | IETHO      | O NV                                  | V Casing w/ Advancer   | HAMME                              | R TYPE A  | utomatic |
| DRILLE  | ER M                              | organ, I                        | M.      |       | ST       | ART DAT    | E 11/15        | /14         | COMP. DA     | TE 11/   | 15/14      |                                       | SURFACE WATER DEP  | TH N/A                             |           |          |
| LEV C   | DRIVE                             | DEPTH                           | BLO     | W CO  | UNT      |            | BLOW           | S PER FOO   | T            | SAMP.    | <b>V</b> / | 1 L                                   | SOIL AND RO  | CK DECC                            | DIDTION   |          |
| (ft)    | ELEV<br>(ft)                      | (ft)                            | 0.5ft   | 0.5ft | 0.5ft    | 0          | 25             | 50          | 75 100       | NO.      | MOI        | O<br>G                                | ELEV. (ft)   | CK DESC                            | RIPTION   | DEPTH    |
| 2810    |                                   | -                               |         |       |          |            |                | 1   : : : : |              |          |            | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | RE   | D SURFA<br>SIDUAL                  |           |          |
| 2800    | 2,803.1<br>-<br>-<br>-<br>2,798.1 |                                 | 6       | 20    | 25       |            |                | [           | 60/0.0       | -        | М          |                                       | Black-gray, white, the highly micaceon (A)                   | an-orange<br>us, saprol<br>\-2-4). | itic SAND | 10       |
| 795     | -                                 | -<br>-<br>-<br>-<br>-<br>-<br>- | 60/0.0  |       |          |            |                |             |              |          |            |                                       | CRYSTA Crystalline   | LLINE RO                           |           |          |
|         |                                   |                                 |         |       |          |            |                |             |              |          |            |                                       | Z,787.2  Boring Terminated Crystalline  Boring backfille con | Rock (Gn                           | eiss).    | 2 tin    |

SHEET 8

## NCDOT GEOTECHNICAL ENGINEERING UNIT

|        | 34605.       |               |         |                                      |               | R-406         |                 |                |  |    | LLEGHAN    |               |          | GEOLOGIST DeLost,  | R.           |            |              |
|--------|--------------|---------------|---------|--------------------------------------|---------------|---------------|-----------------|----------------|--|----|------------|---------------|----------|--|--------------|------------|--------------|
|        | DESCRIP      |               |         | 1 Wester                             |               |               |                 | (Grand         | lview [  | _  |            |               |          |  |              | -          | D WTR (ft)   |
| BOR    | ING NO.      | EB1-E         | 3       |                                      | STA           | ΓΙΟΝ          | 35+90           |                |  | OF | FSET 16    | ft RT         |          | ALIGNMENT -L-  |              | 0 HR.      | N/A          |
| COL    | LAR ELE      | <b>V.</b> 2,8 | 308.2 f | t                                    | TOT           | AL DE         | <b>PTH</b> 21.  | 0 ft           |  | NO | RTHING     | 1,006,607     |          | <b>EASTING</b> 1,379,074                                     |              | 24 HR.     | N/A          |
| DRILL  | RIG/HAMN     | IER EF        | F./DATE | E ICA040                             | 4 CME-        | 45C 90%       | % 08/25/20°     | 14             |  |    |            | DRILL METHOD  | ) NW     | Casing w/ Advancer   | HAMME        | ER TYPE    | Automatic    |
| DRIL   | LER Mo       | rgan, I       | M.      |                                      | STA           | RT DA         | TE 11/1         | 5/14           |  | co | MP. DAT    | E 11/15/14    |          | SURFACE WATER DE   | PTH N/       | 4          |              |
| COR    | E SIZE N     | VQ2           |         |                                      |               |               | <b>1</b> 10.9 f |                |  |    |            |               |          |  |              |            |              |
| ELEV   | RUN<br>ELEV  | DEPTH         |         | DRILL<br>RATE                        | REC.          | JN<br>RQD     | SAMP.           | REC.           | RQD  | L  |            |               | DI       | ESCRIPTION AND REMAR   | KS           |            |              |
| (ft)   | (ft)         | (ft)          | (ft)    | (Min/ft)                             | (ft)<br>%     | (ft)<br>%     | NO.             | (ft)<br>%      | (ft)<br>%                                      | Ğ  | ELEV. (ft) |               |          |  |              |            | DEPTH (ft    |
| 2798.1 | 2 709 1      | 10.1          | 0.0     | N. 60/0.0                            | (0.0)         | (0.0)         |                 | (40.0)         | (40.0)   |    |            |               |          | Begin Coring @ 10.1 ft                                       |              |            |              |
| 0705   | 2,798.1      | 19:1          | 5.0     | N=60/0.0<br>3:22/0.9                 | 100%          | (0.9)<br>100% |                 | (10.9)<br>100% |  |    | 2,798.1    | White, gray,  | black, l | CRYSTALLINE ROCK<br>prown-orange stain interval,             | fresh to s   | li. weathe | 10.1<br>red  |
| 2795   | † ‡          |               |         | 2:55<br>2:48<br>2:41<br>3:00<br>3:11 | (5.0)<br>100% | (4.3)<br>86%  |                 |                |  |    | _          | d             | lisconti | sev. weathered (12.7'-13.4'<br>nuities, folded and crenulate | ed, foliated | d,         |              |
|        | 2,792.2      | 16.0          |         | 3:00<br>3:11                         |               |               |                 |                |  |    | _          | feldspar-qua  | rtz-biot | ite-muscovite, Gneiss w/qua<br>diorite dike @ 18.0'.         | artz-feldsp  | ar rich po | ds,          |
| 2790   | <del> </del> |               | 5.0     | 2:56<br>3:16                         | (5.0)<br>100% | (5.0)<br>100% |                 |                |  |    | _          | 4 40°-70° jts | . w/iror | oxide stain, mod. sev. wea<br>3mm open, along foliation      | thered wa    | ills, <1mm | to           |
|        | 1 Ŧ          |               |         | 3:45<br>3:21                         |               |               |                 |                |  |    | -          |               |          | omm open, along lonation                                     | •            |            |              |
|        | 2,787.2      | 21.0          |         | 4:06                                 |               |               |                 | <u> </u>       |  |    | 2,787.2    | Boring Termi  | inated a | at Elevation 2,787.2 ft in Cry                               | stalline R   | ock (Gnei  | 21.0<br>ss). |
|        | ‡            |               |         |                                      |               |               |                 |                | Boring backfilled immediately upon completion. |    |            |               |          |  | `            | /-         |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    |            |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        |              |               |         |                                      |               |               |                 |                |  |    | _          |               |          |  |              |            |              |
|        |              |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | +            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | Ŧ            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -<br>-     |               |          |  |              |            |              |
|        |              |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | +            |               |         |                                      |               |               |                 |                |  |    | _          |               |          |  |              |            |              |
|        |              |               |         |                                      |               |               |                 |                |  |    | _          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | _          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | <u>†</u>     |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | +            |               |         |                                      |               |               |                 |                |  |    | _          |               |          |  |              |            |              |
|        | <del> </del> |               |         |                                      |               |               |                 |                |  |    | _          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -<br>-     |               |          |  |              |            |              |
|        |              |               |         |                                      |               |               |                 |                |  |    | _          |               |          |  |              |            |              |
|        | <u>†</u>     |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | <del> </del> |               |         |                                      |               |               |                 |                |  |    | _          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -<br>-     |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -<br>      |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        |              |               |         |                                      |               |               |                 |                |  |    | _          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        |              |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | ±            |               |         |                                      |               |               |                 |                |  |    | _          |               |          |  |              |            |              |
|        | Ŧ            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |
|        | ‡            |               |         |                                      |               |               |                 |                |  |    | -          |               |          |  |              |            |              |





EB1-B, 35+90 @ 16' RT., Box 2 of 2

|       | 34605               |              |         |        |          | <b>P</b> R-                                      |             |              |       | COUNT    | Y ALLEG      | IAH  | NY      |            |      | GEOLOGIST DeLost, F                   | ₹.                        |            |           |
|-------|---------------------|--------------|---------|--------|----------|--|-------------|--------------|-------|----------|--------------|------|---------|------------|------|---------------------------------------|---------------------------|------------|-----------|
| SITE  | DESCR               | PTION        | US 2    | 21 Wes | stern Lo | oop fro  | om SR       | R 1172 (     | (Gran | idview D | Prive) to US | S 21 |         |            |      |                                       |                           | GROUNE     | WTR (f    |
| BORI  | NG NO.              | EB2-         | A       |        | ST       | TATIO  | <b>N</b> 37 | <b>7</b> +00 |       |          | OFFSET       | 14   | 4 ft LT |            |      | ALIGNMENT -L-                         |                           | 0 HR.      | N/A       |
| COLI  | AR ELE              | <b>V.</b> 2, | 814.0 f | ft     | т        | DTAL   | DEPT        | <b>H</b> 28. | 7 ft  |          | NORTHI       | NG   | 1,006,  | 660        |      | <b>EASTING</b> 1,379,175              |                           | 24 HR.     | N/A       |
| DRILL | RIG/HAN             | MER EF       | F./DATE | E ICA  | 0404 CN  | 1E-45C   | 90%0        | 8/25/201     | 4     |          |              |      | DRILL M | ETHO       | ) NV | V Casing w/ Advancer                  | HAMMEI                    | R TYPE     | Automatic |
| DRIL  | LER M               | organ,       | M.      |        | S1       | ART  | DATE        | 11/1         | 4/14  |          | COMP. D      | ÞΑΤ  | E 11/1  | 14/14      |      | SURFACE WATER DEP                     | TH N/A                    |            |           |
| LEV   | DRIVE<br>ELEV       | DEPTH        | BLC     | W CO   | UNT      |  |             | BLOW         | /S PE | R F001   | -            |      | SAMP.   | lacksquare | LO   | SOIL AND RO                           | CK DESCI                  | DIDTION    |           |
| (ft)  | (ft)                | (ft)         | 0.5ft   | 0.5ft  | 0.5ft    | 0  | 2           | 25           | 50    |          | 75 10        | 00   | NO.     | MOI        |      | ELEV. (ft)                            | OK DESCI                  | XIF HON    | DEPTH     |
|       |                     |              |         |        |          |  |             |              |       |          |              |      |         |            |      |                                       |                           |            |           |
| 2815  |                     |              |         |        |          |  |             |              |       |          |              |      |         |            |      |                                       |                           |            |           |
|       | -                   |              |         |        |          | <del>                                     </del> | ·           | T            |       |          | T            | +    |         |            | ***  | _ RES                                 | D SURFAC<br>SIDUAL        |            | (         |
|       | -                   | -            |         |        |          | : :  | <br>        |              | :     |          |              | :    |         |            |      | _ Tan-orange, brow dense, highly mica | vn, black-g<br>ceous, cla | reen, med  | i.<br>EL  |
| 810   | 2,809.6             | - 4.4        | 4       | 6      | 5        | -  | <u> </u>    |              | -     |          | <del> </del> | -    | 00.0    | 000/ 1     |      |                                       | N-2-6).                   | , ,        |           |
|       | -                   |              | -       | "      |          |  | 11          |              | -     |          |              | -    | SS-2    | 20% IV     |      | -<br>-                                |                           |            |           |
| 2805  | 0.004.0             |              |         |        |          | :  |             |              | -     |          |              | -    |         |            |      | -                                     |                           |            |           |
|       | 2,804. <del>6</del> | - 9.4<br>-   | 4       | 4      | 6        |  | 10          |              |       |          |              |      |         | М          |      | -                                     |                           |            |           |
|       | -                   |              |         |        |          | : :  | ./:         |              |       |          |              | .    |         |            |      | -                                     |                           |            |           |
| 2800  | 2,799.6             | -<br>- 14.4  |         | 40     | 40       |  |             |              | -     |          |              | -    |         |            |      | -<br><del>-</del>                     |                           |            |           |
|       | 2,797.6 <b>-</b>    | -<br>- 16.4  | 8       | 12     | 16       | : :  |             | 28           | _:    | <u></u>  |              |      |         | M          |      | - 2,797.6                             |                           |            | 1         |
| 795   | -                   | -            | 60/0.0  |        |          | : :  |             |              |       |          | 60/0         | .01  |         |            |      | - CRYSTA<br>- Crystalline             | rock (Gne                 |            |           |
| 133   | -                   | -            |         |        |          |  |             |              | -     |          |              |      |         |            |      | <u>-</u><br>-                         |                           |            |           |
|       | -                   | -            |         |        |          | : :  |             |              |       |          |              | :    |         |            |      | <del>-</del><br>-                     |                           |            |           |
| 790   | _                   | -            |         |        |          |  |             |              | •     |          |              |      |         |            |      | -<br><del>-</del>                     |                           |            |           |
|       | -                   |              |         |        |          | : :  |             |              |       |          |              | :    |         |            |      | -<br>-                                |                           |            |           |
|       | -                   | _            |         |        |          | : :  |             |              | -     |          |              | :    |         |            |      | -<br>- 2,785.3                        |                           |            | 28        |
|       |                     |              |         |        |          |  |             |              |       |          |              | _    |         |            |      | Boring Terminated a                   | at Elevatio               | n 2,785.3  | ft in     |
|       | -                   | _            |         |        |          |  |             |              |       |          |              |      |         |            |      | -                                     |                           |            |           |
|       | _                   | _            |         |        |          |  |             |              |       |          |              |      |         |            |      | Boring backfille com                  | a immedia<br>ipletion.    | itely upon |           |
|       | -                   |              |         |        |          |  |             |              |       |          |              |      |         |            |      | <u>-</u><br>-                         |                           |            |           |
|       | -                   | _            |         |        |          |  |             |              |       |          |              |      |         |            |      | -<br>-                                |                           |            |           |
|       | -                   | -            |         |        |          |  |             |              |       |          |              |      |         |            |      | _<br>-                                |                           |            |           |
|       | -                   | _            |         |        |          |  |             |              |       |          |              |      |         |            |      | <u>-</u>                              |                           |            |           |
|       | -                   |              |         |        |          |  |             |              |       |          |              |      |         |            |      | -                                     |                           |            |           |
|       | -                   | -            |         |        |          |  |             |              |       |          |              |      |         |            |      | -                                     |                           |            |           |
|       | -                   |              |         |        |          |  |             |              |       |          |              |      |         |            |      | -                                     |                           |            |           |
|       | _                   | -            |         |        |          |  |             |              |       |          |              |      |         |            |      | -<br><del>-</del>                     |                           |            |           |
|       | -                   | -            |         |        |          |  |             |              |       |          |              |      |         |            |      | -<br>-                                |                           |            |           |
|       | -                   |              |         |        |          |  |             |              |       |          |              |      |         |            |      | -<br>-                                |                           |            |           |
|       | -                   | -            |         |        |          |  |             |              |       |          |              |      |         |            |      | <del>-</del><br>-                     |                           |            |           |
|       | -                   |              |         |        |          |  |             |              |       |          |              |      |         |            |      | -<br>-                                |                           |            |           |
|       | -                   | _            |         |        |          |  |             |              |       |          |              |      |         |            |      | -<br>-                                |                           |            |           |
|       | -                   |              |         |        |          |  |             |              |       |          |              |      |         |            |      | -<br>-                                |                           |            |           |
|       | -                   | _            |         |        |          |  |             |              |       |          |              |      |         |            |      | _                                     |                           |            |           |
|       | _                   | ŀ            |         |        |          |  |             |              |       |          |              |      |         |            |      | _                                     |                           |            |           |
|       | -                   |              |         |        |          |  |             |              |       |          |              |      |         |            |      | -<br>-                                |                           |            |           |
|       | -                   | -            |         |        |          |  |             |              |       |          |              |      |         |            |      | -<br>-                                |                           |            |           |
|       | -                   | -            |         |        |          |  |             |              |       |          |              |      |         |            |      | _<br>-                                |                           |            |           |
|       | -                   | -            |         |        |          |  |             |              |       |          |              |      |         |            |      | -<br>-                                |                           |            |           |
|       | _                   | -            |         |        |          |  |             |              |       |          |              |      |         |            |      | -<br><del>-</del>                     |                           |            |           |
|       | -                   | -            |         |        |          |  |             |              |       |          |              |      |         |            |      | -<br>-                                |                           |            |           |
|       | -                   | -            |         |        |          |  |             |              |       |          |              |      |         |            |      | <u>-</u>                              |                           |            |           |



| <b>WBS</b> 3460                          | 5.1.2                    |             |  | TIP          | R-406                  | 0                | C                        | OUNT   | YA                                    | LLEGHA   | ANY   | GEOLOGIST DeLo             | ost, R.       |            |            |
|--|--------------------------|-------------|--|--------------|------------------------|------------------|--------------------------|--|---------------------------------------|--|---|----------------------------|---------------|------------|------------|
| SITE DESCI                               | RIPTION                  | US 2        | 1 Wester                                       | n Loop       | from                   | SR 1172          | (Granc                   | lview [  | Orive)                                | to US 2  | 1   |                            |               | GROUN      | ID WTR (fi |
| BORING NO                                | . EB2-                   | 4           |  | STA          | ΓΙΟΝ                   | 37+00            |                          |  | OF                                    | FSET   | 14 ft LT  | ALIGNMENT -L-              |               | 0 HR.      | N/A        |
| COLLAR EL                                | <b>EV.</b> 2,            | 814.0 f     | t  | тот          | AL DE                  | PTH 28.          | 7 ft                     |  | NO                                    | RTHING   | 1,006,660   | <b>EASTING</b> 1,379,1     | 75            | 24 HR.     | N/A        |
| DRILL RIG/HA                             | MMER EF                  | F./DATE     | E ICA0404                                      | 4 CME-       | 45C 90%                | % 08/25/201      | 14                       |  |                                       |  | DRILL METHOD NW   | Casing w/ Advancer         | HAMI          | MER TYPE   | Automatic  |
| DRILLER 1                                | lorgan,                  | М.          |  | STAI         | RT DA                  | TE 11/1          | 4/14                     |  | СО                                    | MP. DA   | ΓΕ 11/14/14   | SURFACE WATER              | DEPTH N       | I/A        |            |
| CORE SIZE                                |                          |             |  | -            |                        | <b>N</b> 12.3 ft |                          |  |                                       |  |   |                            |               |            |            |
| ELEV RUN ELEV (ft)                       | DEPTH<br>(ft)            | RUN<br>(ft) | DRILL<br>RATE<br>(Min/ft)                      |              | JN<br>RQD<br>(ft)<br>% | SAMP.<br>NO.     | STR<br>REC.<br>(ft)<br>% | ATA<br>RQD<br>(ft)<br>%  | L<br>O<br>G                           | ELEV. (  |   | ESCRIPTION AND REM         | MARKS         |            | DEPTH      |
| 2797.6                                   |                          |             |  |              |                        |                  |                          | ,,,  |                                       | ,  | ,   | Begin Coring @ 16.         | 4 ft          |            |            |
| 2,797.6<br>2,793.6<br>2,793.6<br>2,788.6 | 20.4<br>- 25.4<br>- 28.7 |             | (3.8)<br>95%<br>(5.0)<br>100%<br>(3.3)<br>100% |              | (12.3)<br>100%         | (12.1)<br>98%    |                          | - 2,797.6<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | v. hard to hard, clos<br>biotite, mus | CRYSTALLINE RO cat. tan-brown-orange s e to widely spaced fracts scovite Gneiss, quartz-f walls, <1mm open; 4 20 mod. sev. weathered | CK<br>stain, fresh to<br>s., foliated, for<br>feldspar rich<br>o°-30° jts. w/ | eldspar, qua<br>pods.      | artz<br>tain, |            |            |
| 2,785.3                                  | 7 28.7                   |             | 4:10<br>\1:05/0.3                              | <del> </del> |                        |                  |                          |  |                                       | 2,785.3  | Boring Terminated a   | at Elevation 2,785.3 ft in | Crystalline   | Rock (Gnei | 2<br>SS).  |
|  | <del></del>              |             |  |              |                        |                  |                          |  |                                       |  | Boring b  | ackfilled immediately u    | pon completi  | on.        |            |



EB2-A, 37+00 @ 14' LT., Box 1 of 2

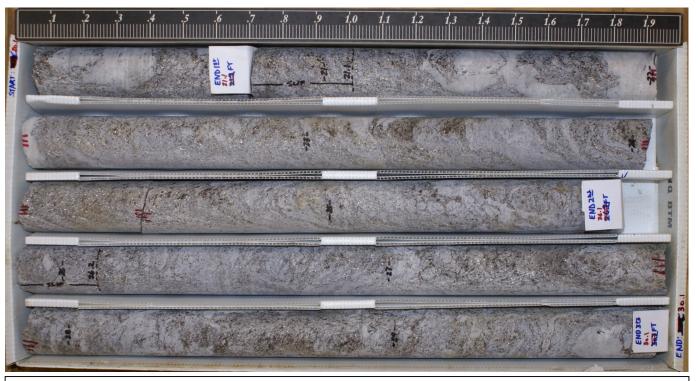


EB2-A, 37+00 @ 14' RT., Box 2 of 2

| <b>WBS</b> 346 |             |       |        |       |          | P R-4060              |             | Y ALLEGHA      | ANY      |            |        | GEOLOGIST DeLost, F                            | ₹.                             |               |
|----------------|-------------|-------|--------|-------|----------|-----------------------|-------------|----------------|----------|------------|--------|--|--------------------------------|---------------|
| SITE DES       | CRIPTI      | ON    | US 2   | 1 Wes | stern Lo | oop from SR 1172 (0   | Frandview I | Orive) to US 2 | 21       |            |        |  | GR                             | OUND WTR      |
| BORING N       | O. E        | B2-B  | 3      |       | ST       | TATION 37+05          |             | OFFSET         | 14 ft RT |            |        | ALIGNMENT -L-                                  | 0                              | HR. N         |
| COLLAR E       | LEV.        | 2,8   | 08.9 f | t     | тс       | OTAL DEPTH 30.1       | ft          | NORTHING       | 1,006    | 634        |        | <b>EASTING</b> 1,379,187                       | 24                             | HR. N         |
| DRILL RIG/H    | IAMMER      | REFF  | ./DATE | ICA   | 0404 CM  | 1E-45C 90% 08/25/2014 |             |                | DRILL N  | IETHOL     | ) NV   | V Casing w/ Advancer                           | HAMMER T                       | YPE Automatic |
| DRILLER        | Morga       | an, N | /l.    |       | ST       | ART DATE 11/14/       | 14          | COMP. DA       | TE 11/   | 14/14      |        | SURFACE WATER DEP                              |                                |               |
| LEV DRIV       | /E DEF      | РΤН   | BLO    | w co  | UNT      | BLOWS                 | PER FOO     | Г              | SAMP.    | <b>V</b> / |        | COIL AND DO                                    | CK DECCDID                     | TION          |
| (ft) ELE       |             | ft)   | 0.5ft  | 0.5ft | 0.5ft    | 0 25                  | 50          | 75 100         | NO.      | MOI        | O<br>G | SOIL AND RO                                    | CK DESCRIP                     | DEPTI         |
|                |             |       |        |       |          |                       |             |                |          |            |        |  |                                |               |
| 2810           |             |       |        |       |          |                       |             |                |          |            |        | _  |                                |               |
|                | $\pm$       |       |        |       |          |                       |             |                | +        |            |        |  | D SURFACE<br>SIDUAL            |               |
|                | Ŧ           |       |        |       |          |                       |             |                |          |            |        | Tan-orange, black highly micaceous             | , loose to med                 | d. dense,     |
| 2,803          | I<br>3.8+ 5 | ,     |        |       |          |                       |             |                |          |            |        | w/rock fr                                      | ags. (A-2-4).                  | 07415         |
| 2,80           | T 3         | '     | 3      | 4     | 5        | • • • • • • • • •     |             | .              |          | М          |        | -  |                                |               |
| 2800           | Ŧ           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
|                | 3.8 10      | ).1   | 2      | 3     | 6        |                       |             |                | 00.0     | 040/ 1     |        | <del>-</del><br>-                              |                                |               |
|                | Ŧ           |       | 2      | 3     |          | . 49                  |             |                | SS-3     | 31% N      | <br>   | -<br>-   |                                |               |
| 795            | . ‡         |       |        |       |          |                       |             |                |          |            |        | -<br><del>-</del>                              |                                |               |
| 2,793          | 3.8 15      | 5.1   | 3      | 7     | 10       | 17                    |             |                |          | М          |        | -<br>-   |                                |               |
| 700            | ‡           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
| 2,788          | 3.8 20      | ).1   |        |       |          |                       |             |                |          |            |        |  |                                |               |
|                | ‡           |       | 60/0.0 |       |          |                       |             | 60/0.0         |          |            |        |  | LLINE ROCK<br>rock (Gneiss     |               |
| 785            | ‡           |       |        |       |          |                       |             |                |          |            |        | -<br>-   | ,                              | ,             |
|                | †           |       |        |       |          |                       |             | .              |          |            |        | -<br>-   |                                |               |
|                | Ŧ           |       |        |       |          |                       |             | .              |          |            |        | <u>-</u>                                       |                                |               |
| 780            | Ŧ           |       |        |       |          |                       | +           | 4              |          |            |        | _<br><br>_ 2,778.8                             |                                | :             |
|                | Ŧ           |       |        |       |          |                       |             |                |          |            |        | <ul> <li>Boring Terminated</li> </ul>          | at Elevation 2<br>Rock (Gneiss | ,778.8 ft in  |
|                | Ŧ           |       |        |       |          |                       |             |                |          |            |        | _  |                                |               |
|                | Ŧ           |       |        |       |          |                       |             |                |          |            |        | <ul><li>Boring backfille</li><li>con</li></ul> | a immediately<br>ipletion.     | y upon        |
|                | ‡           |       |        |       |          |                       |             |                |          |            |        | <del>-</del><br>-                              |                                |               |
|                | ‡           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
|                | ‡           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
|                | ‡           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
|                | ‡           |       |        |       |          |                       |             |                |          |            |        | <del>-</del><br>-                              |                                |               |
|                | ‡           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
|                | 1           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
|                | ŧ           |       |        |       |          |                       |             |                |          |            |        | -  |                                |               |
|                | 1           |       |        |       |          |                       |             |                |          |            |        | -  |                                |               |
|                | Ŧ           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
|                | Ŧ           |       |        |       |          |                       |             |                |          |            |        | <del>-</del><br>-                              |                                |               |
|                | Ŧ           |       |        |       |          |                       |             |                |          |            |        | -  |                                |               |
|                | ‡           |       |        |       |          |                       |             |                |          |            |        | <del>-</del><br>-                              |                                |               |
|                | ‡           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
|                | #           |       |        |       |          |                       |             |                |          |            |        | -<br><del>-</del>                              |                                |               |
|                | ‡           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
|                | ‡           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
|                | $\pm$       |       |        |       |          |                       |             |                |          |            |        | _<br>-   |                                |               |
|                | Ŧ           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
|                | Ŧ           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
|                | ‡           |       |        |       |          |                       |             |                |          |            |        | <del>-</del><br>-                              |                                |               |
|                | ‡           |       |        |       |          |                       |             |                |          |            |        | -<br>-   |                                |               |
|                | +           |       |        |       | 1        |                       |             |                |          |            |        | _  |                                |               |



|              | 34605.1.2    |             |             |                                      |                   | R-406                  |                 |                   |                  |             | LLEGHA    |                |          | GEOLOGIST DeLost,   | R.         |            |             |
|--------------|--------------|-------------|-------------|--------------------------------------|-------------------|------------------------|-----------------|-------------------|------------------|-------------|-----------|----------------|----------|---|------------|------------|-------------|
| SITE         | DESCRIPT     | ION         | US 2        | 1 Wester                             | n Loop            | from                   | SR 1172         | (Granc            | lview [          | Drive       | ) to US 2 | 1              |          |   |            | GROUN      | ID WTR (ft) |
| BOR          | ING NO. E    | B2-B        |             |                                      | STA               | TION                   | 37+05           |                   |                  | OF          | FSET 1    | 4 ft RT        |          | ALIGNMENT -L-   |            | 0 HR.      | N/A         |
| COL          | LAR ELEV.    | 2,80        | 08.9 f      | t                                    | TOT               | AL DE                  | PTH 30.         | 1 ft              |                  | NC          | RTHING    | 1,006,634      |          | <b>EASTING</b> 1,379,187                                    |            | 24 HR.     | N/A         |
| DRILI        | RIG/HAMME    | R EFF       | ./DATE      | E ICA040                             | 4 CME-            | 45C 90%                | % 08/25/20°     | 14                |                  |             |           | DRILL METHOD   | NW (     | Casing w/ Advancer  | HAMMI      | ER TYPE    | Automatic   |
| DRIL         | LER Morg     | jan, M      | l.          |                                      | STA               | RT DA                  | TE 11/1         | 4/14              |                  | CC          | MP. DAT   | E 11/14/14     |          | SURFACE WATER DE  | PTH N/     | A          |             |
| COR          | E SIZE NO    | 22          |             |                                      | 1                 |                        | <b>1</b> 10.0 f |                   |                  |             |           |                |          |   |            |            |             |
| ELEV<br>(ft) |              | PTH<br>(ft) | RUN<br>(ft) | DRILL<br>RATE<br>(Min/ft)            | REC.<br>(ft)<br>% | JN<br>RQD<br>(ft)<br>% | SAMP.<br>NO.    | REC.<br>(ft)<br>% | RQD<br>(ft)<br>% | L<br>O<br>G | ELEV. (f  | t)             | DI       | ESCRIPTION AND REMAR  | KS         |            | DEPTH (ft   |
| 2788.8       | 3            |             |             |                                      |                   |                        |                 |                   |                  |             |           |                |          | Begin Coring @ 20.1 ft                                      |            |            |             |
|              | 2,788.8 2    | <u>4:1</u>  | 1.0<br>5.0  | N=60/0.0<br>4:08                     | (1.0)<br>\100%/   | (1.0)<br>\100%/        |                 | 97%               | (9.7)<br>97%     |             | 2,788.8   | White, gra     | y, blacl | CRYSTALLINE ROCK<br>k, fresh to v. sli. weathered,          | v. hard to | hard, wide | 20.1<br>e   |
| 2785         | 1 ‡          |             |             | 5:02<br>6:17<br>6:02<br>5:09<br>4:13 | (5.0)<br>100%     | (5.0)<br>100%          |                 |                   |                  |             | _         | discontinuitie | s, folia | ted, feldspar-quartz-biotite-i<br>feldspar-quartz rich pods |            | Gneiss, s  | cat.        |
|              | 2,782.8 2    | 6.1         |             | 5:09<br>4:13                         | 10070             |                        |                 |                   |                  |             | _         |                | 1        | 20° jt. w/hard, rough walls,                                |            |            |             |
|              | +            |             | 4.0         | 4:42<br>4:34                         | (2.7)<br>68%      | (3.7)<br>93%           |                 |                   |                  |             |           |                |          |   |            |            |             |
| 2780         |              | 0.1         |             | 2:31<br>2:29                         | 0070              | 3570                   |                 |                   |                  |             | 2,778.8   |                |          |   |            |            | 30.1        |
|              | +            | 0.1         |             | 2.23                                 |                   |                        |                 |                   |                  |             |           | Boring Term    | inated a | at Elevation 2,778.8 ft in Cry                              | stalline R | ock (Gnei  | ss).        |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             |           | В              | oring b  | ackfilled immediately upon                                  | completio  | n.         |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | +            |             |             |                                      |                   |                        |                 |                   |                  |             | -         |                |          |   |            |            |             |
|              | <del> </del> |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             |           |                |          |   |            |            |             |
|              | <u>†</u>     |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | +            |             |             |                                      |                   |                        |                 |                   |                  |             | -         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | +            |             |             |                                      |                   |                        |                 |                   |                  |             | -         |                |          |   |            |            |             |
|              | Ŧ            |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | 1 ±          |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | T            |             |             |                                      |                   |                        |                 |                   |                  |             | -         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             |           |                |          |   |            |            |             |
|              |              |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | +            |             |             |                                      |                   |                        |                 |                   |                  |             | -         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             | -         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | <u>†</u>     |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | <del> </del> |             |             |                                      |                   |                        |                 |                   |                  |             | -         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             |           |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | +            |             |             |                                      |                   |                        |                 |                   |                  |             | -         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             |           |                |          |   |            |            |             |
|              | <u>†</u>     |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              |              |             |             |                                      |                   |                        |                 |                   |                  |             | -         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             |           |                |          |   |            |            |             |
|              |              |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              |              |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             | F         |                |          |   |            |            |             |
|              |              |             |             |                                      |                   |                        |                 |                   |                  |             | <u> </u>  |                |          |   |            |            |             |
|              | +            |             |             |                                      |                   |                        |                 |                   |                  |             | _         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             | F         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             | ţ         |                |          |   |            |            |             |
|              | +            |             |             |                                      |                   |                        |                 |                   |                  |             | -         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             | F         |                |          |   |            |            |             |
|              | ‡            |             |             |                                      |                   |                        |                 |                   |                  |             | <u> </u>  |                |          |   |            |            |             |
|              | +            |             |             |                                      |                   |                        |                 |                   |                  |             | ⊢         |                |          |   |            |            |             |



EB2-B, 37+05 @ 14' RT., Box 1 of 1

#### EB1-A

|            |        |         |                |           |      |      | SOIL TEST F | RESULTS |        |      |      |            |       |          |         |
|------------|--------|---------|----------------|-----------|------|------|-------------|---------|--------|------|------|------------|-------|----------|---------|
|            |        |         |                | AASHTO    |      |      |             | % BY V  | /EIGHT |      | % PA | SSING (SIE | EVES) | %        | %       |
| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | CLASS.    | L.L. | P.I. | C. SAND     | F. SAND | SILT   | CLAY | 10   | 40         | 200   | MOISTURE | ORGANIC |
| SS-1       | 16 LT  | 35+85   | 4.9-6.2        | A-2-4 (0) | 30   | 1    | 33.6        | 48.8    | 6.8    | 10.8 | 96.9 | 83.6       | 23.2  | 24.7     | -       |

#### EB2-A

|            |        |         |                |           |      |      | SOIL TEST F | RESULTS |        |      |      |            |       |          |         |
|------------|--------|---------|----------------|-----------|------|------|-------------|---------|--------|------|------|------------|-------|----------|---------|
|            |        |         |                | AASHTO    |      |      |             | % BY V  | VEIGHT |      | % PA | SSING (SIE | EVES) | %        | %       |
| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | CLASS.    | L.L. | P.I. | C. SAND     | F. SAND | SILT   | CLAY | 10   | 40         | 200   | MOISTURE | ORGANIC |
| SS-2       | 14 LT  | 37+00   | 4.4-5.9        | A-2-6 (0) | 33   | 11   | 39.4        | 39.5    | 8.4    | 12.7 | 51.3 | 38.8       | 14.3  | 20.2     | -       |

#### EB2-B

|            |   |         |                |           |      |      | SOIL TEST F | RESULTS |      |      |      |      |      |          |         |
|------------|---|---------|----------------|-----------|------|------|-------------|---------|------|------|------|------|------|----------|---------|
|            | AASHTO % BY WEIGHT % PASSING (SIEVES) % % |         |                |           |      |      |             |         |      |      |      |      |      |          |         |
| SAMPLE NO. | OFFSET                                    | STATION | DEPTH INTERVAL | CLASS.    | L.L. | P.I. | C. SAND     | F. SAND | SILT | CLAY | 10   | 40   | 200  | MOISTURE | ORGANIC |
| SS-3       | 14 RT                                     | 37+05   | 10.1-11.6      | A-2-4 (0) | 29   | 3    | 22.2        | 53.3    | 15.8 | 8.8  | 97.3 | 89.7 | 32.9 | 30.5     | -       |

REFERENCE

**CONTENTS** 

**DESCRIPTION** 

BORE LOGS & CORE LOGS

TITLE SHEET LEGEND SITE PLAN

PROFILE

SHEET NO.

34605

#### STATE OF NORTH CAROLINA

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

### **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY Alleghany PROJECT DESCRIPTION US 21 Western Loop from SR 1172 (Grandview Drive) to US 21 SITE DESCRIPTION Wall 1 Right of -L- Station 39+40 Wall 2 Left of -L Station 41+20Wall 3 Left of -Y2- Station 16+20

#### RETAINING WALLS

| STATE | STATE PROJECT REFERENCE NO. | SHEET<br>NO. | TOTAL<br>SHEETS |
|-------|-----------------------------|--------------|-----------------|
| N.C.  | R-4060                      | 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 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 1991 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

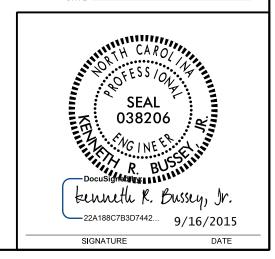
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND 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 MOILCATED IN THE SUBSURFACE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY WARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY WARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY CONSIDERABLY WITH TIME TO CONDITIONS MAY WAR INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO 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 FOR BE ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- 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.

| -              | Robbie DeLost    |
|----------------|------------------|
| -              | Mike Morgan      |
| -              | Herold Morris    |
| _              |                  |
| _              |                  |
| _              |                  |
|                |                  |
| INVESTIGATED E | BY Michael Gragg |
| DRAWN BY       | amara Stivers    |
|                | Kenny Bussey     |
|                | ICA Engineering  |
| DATE May 2     |                  |

**PERSONNEL** 



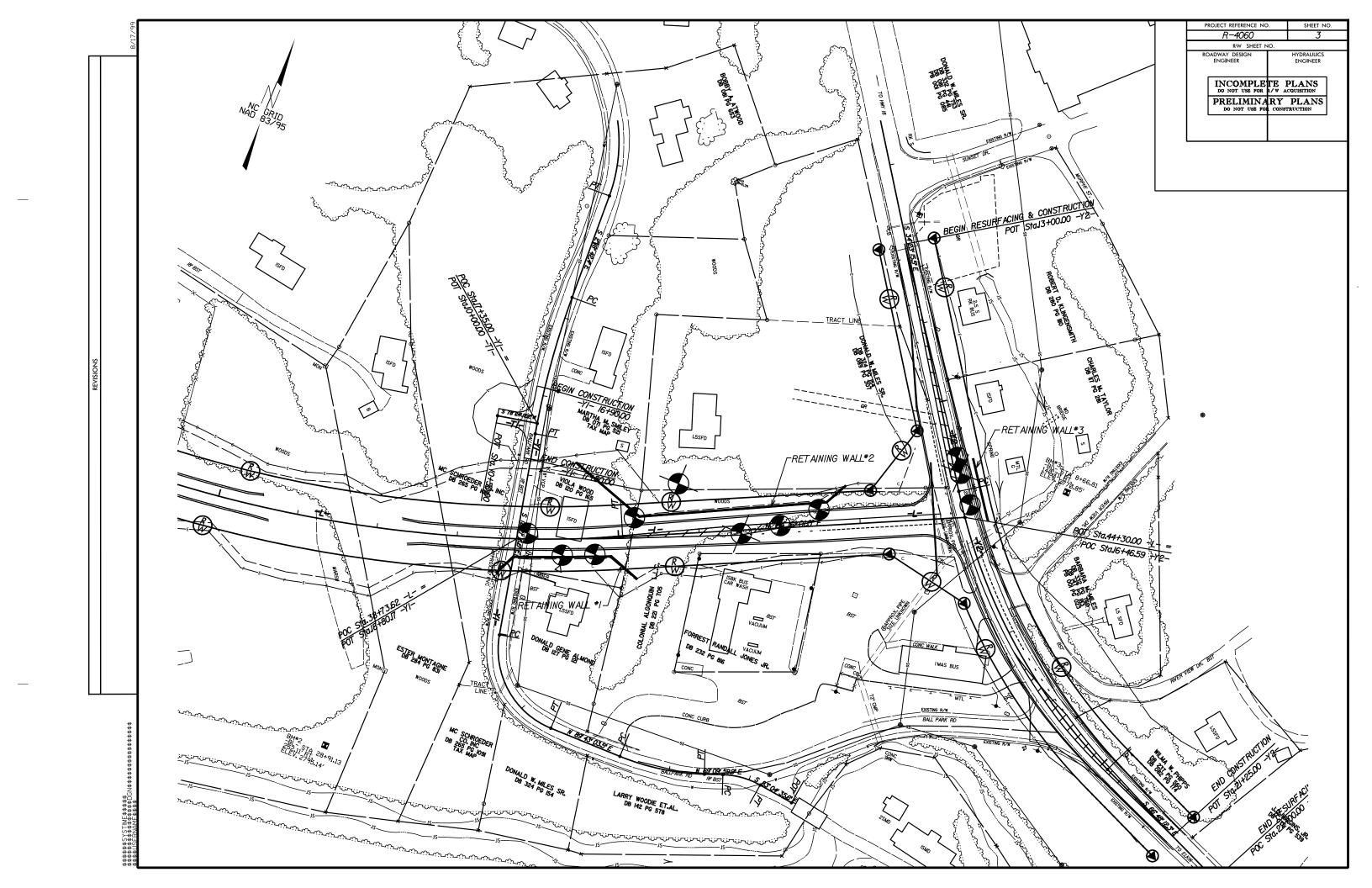
PROJECT REFERENCE NO. SHEET NO. 2

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

## SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

| SOIL DESCRIPTION   | GRADATION  | ROCK DESCRIPTION   | TERMS AND DEFINITIONS   |
|--|--|--|---|
| SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN<br>BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT   | 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. | HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. | ALLUYIUM (ALLUY.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  |
| ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION   | 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 Ø.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN           | ADUIFER - A WATER BEARING FORMATION OR STRATA.  |
| IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH  | ANGULARITY OF GRAINS   | REPRESENTED BY A ZONE OF WEATHERED ROCK.   | 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 INTERREDDED 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:   | 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, <u>SUBANGULAR</u> , <u>SUBROUNDED</u> , OR <u>ROUNDED</u> .   | 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  |
| CENEDAL CRANIII AD MATERIAL C CILTCLAY MATERIAL C  | MINERALOGICAL COMPOSITION  | THE TO COARSE CRAIN ICNEOUS AND METAMORPHIC POCK THAT  | WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND   |
| CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS   | MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAQLIN, ETC.  ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.                                       | CRYSTALLINE 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-3 A-6, A-7 A-7-5 A-3 A-6, A-7   | COMPRESSIBILITY  | NON COVETAL INF. FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN  | CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.   |
| 000000000000000000000000000000000000000  | SLIGHTLY COMPRESSIBLE LL < 31  | ROCK (NCR)  SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.   | COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM 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- GRANULAR 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 PEAT   | GRANULAR SILT - CLAY   | - WEATHERING   | DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.  |
| M 45. M 45. M 46. M 46. M 46. KM 52. KM 52. KM 52. KM 52. KM 51. KM 52. KM 51. M 52 | 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 HAMMER IF CRYSTALLINE.  | DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE   |
| MATERIAL PASSING *40 COULD HITH  | LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%   | VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,   | HORIZONTAL.   |
| LL 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 40 MX 41 MN LITTLE OR PI 6 MX NP 18 MX 18 MX 11 MN 18 MX 18     | MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%<br>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 LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.   |
| CROLIE INDEX A A A AMY B MY 12 MY 16 MY MD MY AMDINTS OF ORGANIC   | GROUND WATER   | OF A CRYSTALLINE NATURE.  SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO  | FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE  |
| USIAL TYPE CTOME EDACE ORGANIC SUILS   | ✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING  | (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR   | SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.   |
| OF MAJOR GRAVEL, AND SAND SOULS SOULS SOULS  | ▼ STATIC WATER LEVEL AFTER 24 HOURS  | CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.   | FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.   |
| MATERIALS SANU   | ✓ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA  | MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS           | FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.  |
| GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR POOR UNSUITABL   | E  | DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED   | 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  | SPRING OR SEEP   | WITH FRESH ROCK.  MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL  | FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE   |
| CONSISTENCY OR DENSENESS   | MISCELLANEOUS SYMBOLS  | SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH  | FIELD.  |
| PRIMARY COLL TYPE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED   | ROADWAY EMBANKMENT (RE) 25/825 DIP & DIP DIRECTION   | (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.  IF TESTED, WOULD YIELD SPT REFUSAL  | JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.  |
| PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )  | ROADWAY EMBANKMENT (RE)  OF ROCK STRUCTURES  | SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT   | LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.   |
| GENERALLY VERY LOOSE < 4   | SOIL SYMBOL  SPT ONT TEST BORING  SLOPE INDICATOR INSTALLATION   | (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED 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 LUUSE 4 10 10 GRANULAR MEDIUM DENSE 10 TO 30 N/A  | VST PMT UNSTREEMTION   | IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF  | MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS   |
| MATERIAL DENSE 30 TO 50  | ARTIFICIAL FILL (AF) OTHER AUGER BORING ONE PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING TEST   | VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE  | USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  |
| VERY DENSE         > 50           VERY SOFT         < 2  | INFERRED SOIL BOUNDARY CORE BORING SOUNDING ROD  | SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR    | PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.  |
| GENERALLY SOFT 2 TO 4 0.25 TO 0.5  | MN - TECT PORING   | VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>   | RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  |
| SILT-CLAY  | INFERRED ROCK LINE MONITORING WELL WITH CORE   | COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS       | ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF   |
| (COHESIVE) VERY STIFF 15 TO 30 2 TO 4  | ***** ALLUVIAL SOIL BOUNDARY \( \triangle \text{PIEZOMETER} \\ \text{INSTALLATION} \\ \text{OPT N-VALUE} \)  | ALSO AN EXAMPLE.   | ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  |
| HARD > 30 > 4  TEXTURE OR GRAIN SIZE   | RECOMMENDATION SYMBOLS   | ROCK HARDNESS  | SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT   |
|  |  | VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES  | ROCK.   |
| U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053   | I EXCAVATION   | SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.  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        |
| COARSE FINE  | SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL  | TO DETACH HAND SPECIMEN.   | THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.   |
| BOULDER   COBBLE   GRAVEL   SAND   SAND   SILT   CLAY  | ABBREVIATIONS  | MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE   | 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 PIECES CAN BE BROKEN BY FINGER PRESSURE.   | TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  |
| - SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE   | e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON   | VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH  | STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY |
|  | 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 FINGERNAIL.  | THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.   |
| PLASTIC   SEMISOLID; REQUIRES DRYING TO  | FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING                                    | FRACTURE SPACING BEDDING   | TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.  |
| (PI) PL PLASTIC LIMIT  | FRAGS FRAGMENTS $w$ - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO   | TERM SPACING TERM THICKNESS  | BENCH MARK:   |
| ON CONTINUE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE   | EQUIPMENT USED ON SUBJECT PROJECT  | VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET   | ELEVATION: FEET   |
| OM OPTIMUM MOISTURE SL   | DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:   | WIDE   |   |
| PENLIPES ANDITIONAL WATER TO   | X CME-45C CLAY BITS X AUTOMATIC MANUAL   | CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET  | NOTES:  ELEVATIONS DERIVED FROM r4060_ls_tin.tin FILE.  |
| - DRY - (D) ATTAIN OPTIMUM MOISTURE  | CME-55 6° CONTINUOUS FLIGHT AUGER CORE SIZE:   | THINLY LAMINATED < 0.008 FEET  | ELEVATIONS DERIVED FROM 14080_IS_TITL.TITL FILE.  |
| PLASTICITY   | X 8* HOLLOW AUGERS   | INDURATION   | ]   |
| PLASTICITY INDEX (PI) DRY STRENGTH   | CME-550 HARD FACED FINGER BITS X -N Q2   | FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.  |   |
| NON PLASTIC 0-5 VERY LOW   | TUNGCARBIDE INSERTS  | FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.   |   |
| MODERATELY PLASTIC 16-25 MEDIUM  | VANE SHEAR TEST X CASING X W/ ADVANCER HAND TOOLS:  POST HOLE DIGGER   | CDAING CAN BE CEDADATED EDOM CAMBLE WITH CIFEL BRODE.  |   |
| HIGHLY PLASTIC 26 OR MORE HIGH   | PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER  | MODERATELY INDURATED  MODERATELY INDURATED  MODERATELY INDURATED  BREAKS EASILY WHEN HIT WITH HAMMER.  |   |
| COLOR  | TRICONE TRICONE SOUNDING ROD   | INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;   |   |
| DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).  | X CORE BIT VANE SHEAR TEST   | DIFFICULT TO BREAK WITH HAMMER.  |   |
| 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.   | DATE: 8-15-1-   |
|  |  |  | 3   |



| 330 7'LT 20'RT 20'RT   |  |  |  | R-4060<br>Roadway design hydrau<br>engineer engini                      |
|--|--|--|--|---|
| AND ARTERIAL FILLINGS & MATERIAL FILL FILLY HOUSE STORY AND ARTERIAL FILLINGS OF THE PROPERTY  |  |  |  | DO NOT USE FOR R/W ACQUISIT  PRELIMINARY PLA                            |
| 201  |  | -WALL 1-   | -WALL 2-   |   |
| 200  |  | -L-  |  | -Y2-  |
| ## ANTIFICAL FILL INCOME STATE SHOWN CONTROL OF THE | 840  |  |  |   |
| A MITHEMA FILL PER LY MUCKES SULTY SANCE MED.  B RESIDUAL TO A PROPERTY SANCE MED.  B |  | 7' LT  |  |   |
| ANTIFICAL FILL HELT AN ORANGE STIP JUNCTURES STIP J | 30   | 20' KT 20' RT  | 62' LT   |   |
| ANTIFICAL FILL HELT AN ORANGE STIP JUNCTURES STIP J | 220  |  |  |   |
| 1700 B RESIDUAL THA DEADER STAND SHOWN OF SHEET SHO | .20  |  |  |   |
| THE BY ANTIFORM FILL RED & TANLOSE, MACKEDIS, SITT SAND.  B RESIDUAL FILE RED & TANLOSE, MACKEDIS, SITT SAND.  B RESIDUAL FILE RED & TANLOSE, MACKEDIS, SITT SAND.  B RESIDUAL FILL RED & TANLOSE, MACKEDIS, SITT SAND.  B RESIDUAL FILL RED & TANLOSE, MACKED S, SITT SAND.  B ATTIFICIAL FILL RED, TAN-OPANCE, STIFF, MICHAEUS, SITT, SAND, MACKED S, SITT SAND.  C RESIDUAL TAN OPANCE GOSE, INCACCOUS, SITT SAND.  C RESIDUAL TAN-OPANCE GOSE, INCACCOUS, SITT SAND VARCOUS, SITT SAND.  C RESIDUAL TAN-OPANCE GOSE, INCACCOUS, SITT SAND.  C RESIDUAL TAN-OPANCE GOSE, INCACCOUS, SITT SAND VARCOUS, SITT S | 310  |  |  |   |
| A ARTIFRIM. FILL RED. & TAM LOOSE MICROSCOUS. SULTY SAND.  B RESIDUAL TAM SHORE TAM OF SULCE WHITE FIRST WAS ARRESTED OF THE CONTROL OF SULTY SAND.  A ARTIFRIM. FILL RED. TAM OF SULTY SAND.  B RESIDUAL TAM SHORE TAM OF SULTY SAND.  A ARTIFRIM. FILL RED. TAM OF SULTY SAND.  B ARTIFRIM. FILL RED. TAM OF SULTY SAND.  B ARTIFRIM. FILL RED. TAM OF SULTY SAND.  B ARTIFRIM. FILL RED. TAM OF SULTY SAND.  C RESIDUAL TAM OF SULTY SAND.  C R |  |  |  |   |
| TOO ATTIFICIAL FILL RED. & TAYLLOSS SID.  TO ARTIFICIAL FILL RED. & TAYLLOSS SID.  TO ARTIFICIAL FILL RED. TAYLOSS SID.  TO WAS ONESS.  THE PART OF MARKET STATE OF MARKET STATE STA | 300  | (B)  |  |   |
| 190 B ARTIFICIAL FILL RED & TANLIDOSE SID.  (A) ARTIFICIAL FILL RED & TANLIDOSE SID.  (B) RESIDUAL TAN-BACK WRITE.  (B) WIRGHESS.  (B) WIRGHESS.  (C) WIRGHESS.  (E) WIRGHESS.  (E) RESIDUAL TAN-ORNAGE SEFF-MICROCOUS SILTY, SAIDY, MED.  (E) ARTIFICIAL FILL RED TAN-ORNAGE SEFF-MICROCOUS SILTY, SAIDY, MED.  (E) ARTIFICIAL FILL RED TAN-ORNAGE SEFF-MICROCOUS SILTY, SAIDY, MED.  (E) RESIDUAL TAN-ORNAGE SEFF-MICROCOUS SILTY SAIDY.  (E) RESIDUAL TAN-ORNAGE SEFF-MICROCOUS SILTY SAIDY MED.  (E) RESIDUAL TAN-ORNAGE SEFF-MICROCOUS SILTY SAIDY WRITE MED.  (E) RESIDUAL TAN-ORNAGE SEFF-MICROCOUS SILTY SAID W ROCK  (E) WIRD SEFF-MICROCOUS SILTY  | 790  | BT @————————————————————————————————————   | © 4'RT 3'LT 20'LT  | 7' LT   |
| ARTIFICIAL FILL RED & TANLOGSE, MINACEOUS, SULTY SIND.  (B) RESIDUAL TRA-PROMECTAN, GRAW-BLOCKWHITE, GRAW-GREEN LOOSE TO VERT DENSE, RIGHT MINACEOUS, SULTY SIND.  (C) WAR GREESS  (E) WAR GREESS  (E) WAR GREESS  (I) ARTIFICIAL FILL BED.T.MORANGE, STIFF, NICACEOUS, SULTY, SANDY, MED.  (II) ARTIFICIAL FILL BED.T.MORANGE, STIFF, NICACEOUS, SULTY, SANDY, MED.  (II) ARTIFICIAL FILL BED.T.MORANGE, STIFF, NICACEOUS, SULTY, SANDY, MED.  (II) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITFY, SANDY, MED.  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITFY, SANDY, MED.  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITFY, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANGE, GREEN-BLOCK, SITF, MINITUM (CACCOUS, SANDY)  (III) ARTIFICIAL FILL BED.T.MORANG   |  | 38————————————————————————————————————   | BT BT  | 7'-LT 10' LT  |
| ### MICACOUS, SULTY SAND.  ### RESIDUALT THE PROPERTY SULCE, WHITE EARLY SULCE OF THE CONSTRUCTION OF THE  | 780  | <b>U</b>   |  |   |
| ## RESIDUALT TAN-OPAMOE, TAN GRAY-BLACK, WHITE. ## GRAY-BLACK, WHI | The second secon | A) ARTIFICIAL FILL RED & TAN, LOOSE,   |  |   |
| ## OF THE PROPERTY OF THE PROP | 770  | B) RESIDUAL TAN-ORANGE, TAN, GRAY-BLACK, WHITE, GRAY-GREEN. LOOSE TO VERY DENSE. |  |   |
| ATTIFICIAL FILL RED.TAN—ORANGE.STIFF, MICACEOUS, SILTY, SANDY, MED. PLASTICITY CLAY:  (B) ATTIFICIAL FILL RED.TAN—ORANGE, LOSSE, MICACEOUS, SILTY SAND.  (C) RESIDUAL TAN—ORANGE, GREEN—BLACK, GRAY, WHITE MICACEOUS, SANDY; (D) RESIDUAL TAN—ORANGE, GREEN—BLACK, GRAY, WHITE MED.DENSE, HIGHLY (D) RESIDUAL TAN—ORANGE, GREEN—BLACK, GRAY, WHITE MED.DENSE, HIGHLY (E) RESIDUAL TAN—ORANGE, GREEN, WHITE, THO—ORANGE, BROWN, GRAX—SILTY SAND, DW. PROCK FRAGS. (E) RESIDUAL TAN—ORANGE, BROWN, GRAX—GREEN, LOOSE (I) OR SELS, AFROLITIC, HIGHLY MICACEOUS, SLITY, FINE SAND, WHOCK FRAGS. (I) ALLUMING, GK. BROWN—BLACK, MURITE, PROMP—GRAY, GREEN, WHITE, BLACK, TAN—ORANGE, LOOSE, TO MED. FRAGS-PROMS, FRANDHE, BROWN—GRAYMEE STAN, SLITO MOD, SEV, WEAR HERED WIS AND ALLUMING, GRAY, GREEN, WHITE, BLACK, TAN—BROWN—GRAYGE, SILTY, SAND, (I) OWN, GRAY, GREEN, WHITE, BLACK, TAN—BROWN—GRAYGE, SILTY, SAND, (I) OWN, GRAY, GREEN, WHITE, BLACK, TAN—BROWN—GRAYGE, SILTY, SAND, (I) OWN, GRAY, GREEN, WHITE, BLACK, TAN—BROWN—GRAYGE, SILTY, SAND, (I) OWN, GRAY, GREEN, WHITE, BLACK, TAN—BROWN—GRAYGE, SILTY, SAND, (I) OWN, GRAY, GREEN, WHITE, BLACK, TAN—BROWN—GRAYGE, SILTY, SAND, (I) OWN, GRAY, GREEN, WHITE, BLACK, TAN—BROWN—GRAYGE, SILTY, SAND, (I) OWN, GRAY, GREEN, WHITE, BLACK, TAN—BROWN—GRAYGE, SILTY, SAND, (I) OWN, GRAY, GREEN, WHITE, BLACK, TAN—BROWN—GRAYGE, SILTY, SAND, (I) OWN, GRAY, GREEN, WHITE, BLACK, TAN—BROWN—GRAYGE, SILTY, SAND, (I) OWN, GRAY, GREEN, WHITE, BLACK, TAN—BROWN—GRAYGE, SILTY, SAND, (I) OWN, GRAY, GREEN, WHITE, BLACK, TAN—BROWN—GRAYGE, GREEN, (II) OWN, GREEN | 760  | HIGHLY MICACEOUS, SILTY SAND.  | (B) BT   |   |
| ARTIFICIAL FILL RED, TWDRAWGE, STIFF, MICACEOUS, SILTY, SAND.  (B) ARTIFICIAL FILL RED, TWDRAWGE, LOOSE, MICACEOUS, SILTY SAND.  (C) RESIDUAL TAN-ORANGE, GREEN-BLACK, STIFF, HIGHLY MICACEOUS, SANDY, SARDUTTO SILT.  (D) RESIDUAL TAN-ORANGE, GREEN-BLACK, GRAY, WHITE, MED, DENSE, HIGHLY MICACEOUS, SILTY SAND W. ROCK FRASS.  (C) RESIDUAL TAN-ORANGE, GREEN-BLACK, GRAY, WHITE, MED, DENSE, HIGHLY MICACEOUS, SILTY SAND W. ROCK FRASS.  (C) RESIDUAL TAN-ORANGE, BREEN, MED, TO MOD, GREEN, V. LOOSE TO DENSE, SAPROLITIC, HIGHLY MICACEOUS, SILTY SAND W. ROCK FRASS.  (C) RESIDUAL TAN-ORANGE, BREEN, MED, TO MOD, GREEN, V. LOOSE TO DENSE, SAPROLITIC, HIGHLY MICACEOUS, SILTY SAND W. ROCK FRASS.  (C) CRI, GRAY, LT, GRAY, BLACK, WHITE, BROWN-ORANGE STAIN, SILTO MOD, SEV. WEATHERED W. SEV. WE     |  |  | \\ \\_\  |   |
| ### ARTIFICIAL FILL RED.TAN—ORANGE_LOOSE_MICACEOUS, SILTY SAND.    RESIDUAL_TAN—ORANGE_GREEN—BLACK, STIFF, HIGHLY MICACEOUS, SANDY, SARDWITE, SULTY SAND WITE, MED. DENSE_HIGHLY MICACEOUS, SANDY, SAND WITE, MED. DENSE_HIGHLY MICACEOUS, SULTY SAND WITE, MED. DENSE_HIGHLY MICACEOUS, SULTY SAND WITE, MED. DENSE_HIGHLY MICACEOUS, SULTY SAND WITE, MED. DENSE_SILTY SAND.    RESIDUAL_TAN—ORANGE_DENSE_SILTY SAND WITE, MED. DENSE_SILTY SAND WITE, MED. DENS | ′50  |  | (A) APTIFICIAL FILL DED TAN ORANGE STIFF MONOFOLIS SITTY SAMPY HED   | <b>®</b> → <b>® T</b>   |
| © RESIDUAL TAN-ORANGE, GREEN-BLACK, STIFF, HIGHLY MICACEOUS, SANDY, SAPROLITIC SILT.  © RESIDUAL TAN-ORANGE, GREEN-BLACK, GRAY, WHITE, MED. DENSE, HIGHLY MICACEOUS, SILTY SAND W. ROCK FRAGS.  (E) RESIDUAL TAN-ORANGE, GREEN, WHITE, TAN-ORANGE, BROWN, GRAY GREEN, V. LOOSE TO DENSE, SAPROLITIC, HIGHLY MICACEOUS, SILTY SAND W. ROCK FRAGS.  (E) RESIDUAL TAN-ORANGE, BROWN, GRAY -GREEN, V. LOOSE TO DENSE, SAPROLITIC, HIGHLY MICACEOUS, SILTY SAND W. ROCK FRAGS.  (C) CRI, GRAY, I.T., GRAY, BLACK, WHITE, BROWN - ORANGE, STAN, SILTO MOD. SEV. WEATHERED W. SEV. WEATHERED SEAUS, MED. TO MOD. HARD, CLOSE FRACS. PACING, FRIABLE © JT, WALLS & SEANS, MIDELY VARIABLE FOLIATION, FELDS PRABE BIOTITE—MUSCOVITE—OUART Z GIVENS.  (E) WIR, BROWN, GRAY, MED. DENSE, SAPROLITIC, SILTY SAND W.  (D) RESIDUAL TAN, BROWN, GRAY, MED. DENSE, SAPROLITIC, SILTY SAND W.  (D) RESIDUAL TAN, BROWN, GRAY, MED. DENSE, SAPROLITIC, SILTY SAND W.  (D) RESIDUAL TAN, BROWN, GRAY, MED. DENSE, SAPROLITIC, SILTY SAND W.)  (D) RESIDUAL TAN, BROWN, GRAY, MED. DENSE, SAPROLITIC, SILTY SAND W.)  (D) RESIDUAL TAN, BROWN, GRAY, MED. DENSE, SAPROLITIC, SILTY SAND W.)  (D) RESIDUAL TAN, BROWN, GRAY, MED. DENSE, SAPROLITIC, SILTY SAND W.)  |  |  | PLASTICITY CLAY:  (B) ARTIFICIAL FILL: RED.TAN-ORANGE, STIFF, MICACEOUS, SILTY, SAND.                              |   |
| MICACEOUS, SILTY SAND W/ ROCK FRAGS.  (E) RESIDUAL TAN, GRAY, WHITE, TAN—ORANGE, BROWN, GRAY—GREEN, V. LOOSE TO DENSE, SAPROLITIC, HIGHLY MICACEOUS, SILTY SAND W/ ROCK FRAGS.  (F) CR. GRAY, LT, GRAY, BLACK, WHITE, BROWN—GRAYGE STAIN, SULTO MODD. SEV. WEATHERED W/SEV. WEATHERED SEAMS, MEDITO MOD. HARD, CLOSE FRAC, SPACING, FRIABLE & JT. WALLS & SEAMS, WIDELY VARIABLE FOLIATION, FELDSPAR—BUTTE—MUSCOVITE—QUARTZ GNEISS.  (F) WR. BROWN, GRAYGE STAIN, V. SEV. WEATHERED W/SEAMS COMPLETELY WEATHERED, INTACT FRAGS, GNEISS.  (H) RESIDUAL TAN, BROWN, GRAY, MED. DENSE, SAPROLITIC, SILTY SAND W/ BOULDERS & WR. SEAMS.  | <b>'40</b>   |  | © RESIDUAL: TAN-ORANGE, GREEN-BLACK, STIFF, HIGHLY MICACEOUS, SANDY,   | (A) ROADWAY EMBANKMENT: TAN, ORANGE, RED-BROWN, BROWN, V. LOOSE         |
| (E) RESIDUAL: TAN, GRAY, WHITE, TAN-ORANGE, BROWN, GRAY-GREEN, V. LOOSE TO DENSE, SAPROLITIC, HIGHLY MICACEOUS, SILTY SAND W/ROCK FRAGS.  (F) CR: GRAY, LT. GRAY, BLACK, WHITE, BROWN-ORANGE STAIN, SILTO MOD. SEV. WEATHERED W/SEV. WEATHERED SEAMS, MED. TO MOD. HARD, CLOSE FRAGC. SPACING, FRIABLE O. JT. WALLS & SEAMS, WIDELY VARIABLE FOLIATION, FELDSPAR-BIOTITE—MUSCOVITE—QUARTZ GNEISS. (G) WR: DK, BROWN, ORANGE STAIN, V. SEV. WEATHERED W/SEAMS COMPLETELY WEATHERED, INTACT FRAGS, GNEISS. (H) RESIDUAL: TAN, BROWN, GRAY, MED. DENSE, SAPROLITIC, SILTY SAND W/ BOULDERS & WR SEAMS.  | 730  |  |  |   |
| FRAGS.    CR. GRAY, I.T. GRAY, BLACK, WHITE, BROWN-ORANGE STAIN, SULTO MOD. SEV.   DENSE, HIGHLY MICACEOUS, SAPROLITIC, SILTY SAND.  |  |  | (E) RESIDUAL: TAN GRAY WHITE TAN ORANGE BROWN GRAY - GREEN V. LOOSE  | SAND.  © RESIDUAL: GRAY, GREEN, WHITE, BLACK, TAN-ORANGE, LOOSE TO MED. |
| WEAT HERED W/SEV-WEAT HERED SEAMS, MED.TO MOD. HARD, CLOSE  WEAT HERED W/SEV-WEAT HERED SEAMS, WEAT, W | 720  |  | FRAGS.  (F) CR: GRAY, LT. GRAY, BLACK, WHITE, BROWN-ORANGE STAIN, SLI. TO MOD. SEV.                                | DENSE, HIGHLY MICACEOUS, SAPROLITIC, SILTY SAND.                        |
| (©) WR: DK. BROWN, ORANGE STAIN, V. SEV. WEATHERED W/SEAMS COMPLETELY HARD, CLOSE TO MOD. CLOSE FRAC. SPACING, FOLIATED, WEATHERED, INTACT FRAGS., GNEISS.  (H) RESIDUAL: TAN, BROWN, GRAY, MED. DENSE, SAPROLITIC, SILTY SAND W/ BOULDERS & WR SEAMS.  (O) BOULDERS & WR SEAMS.   | 710  |  | WEAI HERED W/SEV.WEAI HERED SEAMS,MED.10 MOD.HARD,CLOSE<br>FRAC.SPACING.FRIABLE @ JT.WALLS & SEAMS.WIDELY VARIABLE |   |
| (H) RESIDUAL: TAN, BROWN, GRAY, MED. DENSE, SAPROLITIC, SILTY SAND W/ BOULDERS & WR SEAMS.   | 10   |  | WR. DK. BROWN, ORANGE STAIN, V. SEV. WEATHERED W∕SEAMS COMPLETELY     WEATHERED, INTACT FRAGS, GNEISS.             | HARD,CLOSE-TO-MOD.CLOSE-FRAC.SPACING,FOLIATED,                          |
| .90  | 700  |  | (H) RESIDUAL: TAN, BROWN, GRAY, MED. DENSE, SAPROLITIC, SILTY SAND W/BOULDERS & WR SEAWS.                          |   |
|  | 90   |  |  |   |
|  |  |  |  |   |

| <b>WBS</b> 34605.1.2   | TIP R-4060 COUNT                | TY ALLEGHANY        | GEOLOGIST DeLost, R.   | <b>WBS</b> 34605.1.2   | TIP R-4060 COUN                | TY ALLEGHANY                          | GEOLOGIST DeLost, R.   |
|--|---------------------------------|---------------------|--|--|--------------------------------|---------------------------------------|--|
| SITE DESCRIPTION US 21 Wester  | ern Loop from SR 1172 (Grandvie | ew Drive) to US 21  | GROUND WTR (ft)  | SITE DESCRIPTION US 21 Weste   | ern Loop from SR 1172 (Grandvi | ew Drive) to US 21                    | GROUND WTR (ft   |
| BORING NO. L_3887L   | STATION 38+87                   | OFFSET 7 ft LT      | ALIGNMENT -L- 0 HR. Dry  | BORING NO. L_3930R   | STATION 39+30                  | OFFSET 20 ft RT                       | ALIGNMENT -L- 0 HR. Dry  |
| COLLAR ELEV. 2,828.0 ft  | TOTAL DEPTH 31.5 ft             | NORTHING N/A        | EASTING N/A 24 HR. FIAD  | COLLAR ELEV. 2,825.2 ft  | TOTAL DEPTH 36.4 ft            | NORTHING N/A                          | EASTING N/A 24 HR. FIAD  |
| DRILL RIG/HAMMER EFF./DATE ICA04   | 04 CME-45C 90% 08/25/2014       | DRILL METHOD H.S    | S. Augers HAMMER TYPE Automatic  | DRILL RIG/HAMMER EFF./DATE ICA04   | 04 CME-45C 90% 08/25/2014      | DRILL METHOD H.                       | .S. Augers HAMMER TYPE Automatic   |
| DRILLER Morgan, M.   | <b>START DATE</b> 11/18/14      | COMP. DATE 11/18/14 | SURFACE WATER DEPTH N/A  | DRILLER Morgan, M.   | <b>START DATE</b> 11/18/14     | COMP. DATE 11/18/14                   | SURFACE WATER DEPTH N/A  |
| ELEV (ft)  | I                               | 75 100   110   0    | SOIL AND ROCK DESCRIPTION  ELEV. (ft)  DEPTH (ft)  | DENTH   DENTH   BLOW COUNT   Color   Color |                                | 75 100 NO. MOI G                      | SOIL AND ROCK DESCRIPTION  |
| 2825  2.823.0 5.0  2.818.0 10.0  2.813.0 15.0  2.813.0 15.0  2.808.0 20.0  2.808.0 20.0  3 7 1  2805  2.803.0 25.0  4 7 8  2.798.0 30.0  5 9 1 | 4                               | M                   | 2,828.0 GROUND SURFACE 0.0  RESIDUAL  Tan, gray-black, white, loose to med. dense, highly micaceous, silty, saprolitic SAND (A-2-4).  2,796.5  Boring Terminated at Elevation 2,796.5 ft in Residual Soils.  Boring moved due to underground utilities & backfilled upon completion. | 2825  2820  2820  2820  2815  2815  2810  2810  2810  2810  2810  2805  2805  2800   | 9 014 000                      | M M M M M M M M M M M M M M M M M M M | Z,825.2 GROUND SURFACE 0.  RESIDUAL  Tan-orange, white, gray-black, loose to very dense, highly micaceous, silty SAND (A-2-4). |
| UNI BORE DOUBLE RAUGO_GEO_RWALLS. SPAKTA BYPASS.GFJ NC_DOT.GDT 8/8/15  |                                 |                     | a backined upon completion.  | 2790 2,790.3 34.9 10 17 2  |                                | M                                     | 2,788.8 36.  Boring Terminated at Elevation 2,788.8 ft in Residual Soils.  |

| WBS  | 34605            | 5.1.2        |        |       | TI       | <b>IP</b> R-4060                               | COUNT        | Y ALLEGH       | IANY     |            |            | GEOLOGIST DeLost,                                     | R.                   |                         |
|------|------------------|--------------|--------|-------|----------|--|--------------|----------------|----------|------------|------------|---|----------------------|-------------------------|
| SITE | DESCF            | RIPTIO       | N US   | 21 W  | estern   | Loop from SR 1172 (                            | Grandvie     | w Drive) to l  | JS 21    |            |            |   |                      | GROUND WTR (            |
| BOR  | ING NO           | ). L_39      | 970R   |       | S.       | <b>TATION</b> 39+70                            |              | OFFSET         | 20 ft RT |            |            | ALIGNMENT -L-   |                      | 0 HR. Di                |
| COL  | LAR EL           | <b>EV.</b> 2 | ,823.8 | ft    | T        | OTAL DEPTH 36.4 f                              | t            | NORTHING       | G N/A    |            |            | EASTING N/A   |                      | <b>24 HR</b> . FIA      |
|      | . RIG/HAI        |              |        |       | A0404    | CME-45C 90% 08/25/201                          | 1            |                | DRILL    | ИЕТНО      | D H.       | S. Augers   | HAMM                 | J<br>IER TYPE Automatic |
| DRIL | LER M            | lorgan.      | M.     |       |          | TART DATE 11/18/1                              |              | COMP. DA       |          |            |            | SURFACE WATER DE                                      |                      |                         |
| LEV  | DRIVE            | DEPTH        |        | ow co |          | T  | PER FOOT     |                | SAMP.    | <b>V</b> / | 1 - 1      | <u> </u>  |                      |                         |
| (ft) | ELEV<br>(ft)     | (ft)         | 0.5ft  |       |          | 0 25   | 50           | 75 100         | NO.      | MO         | O  <br>  G | SOIL AND RO   | CK DES               | CRIPTION DEPTH          |
|      |                  |              |        |       |          |  |              |                |          |            |            |   |                      |                         |
| 2825 |                  |              |        |       |          |  |              |                |          |            |            |   |                      |                         |
| .020 | -                | ‡            |        |       |          |  | T            |                |          |            |            | 2,823.8 GROUN   |                      |                         |
|      | -                | ‡            |        |       |          |  |              |                |          |            |            | Red, tan, loose, n                                    | rICIAL F<br>nicaceou |                         |
| 2820 | -                | ‡            |        |       |          | 1  |              |                |          |            |            | -<br>-  | A-2-4).              |                         |
|      | 2,818.9 <u>-</u> | 4.9          | 2      | 3     | 3        |  |              |                |          | М          |            | •<br>•  |                      |                         |
|      | -                | t            |        |       |          | ]  |              |                |          |            |            |   |                      |                         |
| 2815 | 2,813.9-         | 9.9          |        |       |          | <del>                                   </del> | <del> </del> | <del>   </del> |          |            |            | _<br>. 2,813.8  |                      | 10                      |
|      | -                | T            | 1      | 2     | 3        | 5  |              |                |          | М          |            |   | SIDUAL               |                         |
| 2810 | -                | Ŧ            |        |       |          |  |              |                |          |            |            | <ul> <li>dense, highly mica</li> </ul>                | aceous,              | silty, saprolitic       |
|      | 2,808.9          | 14.9         | 3      | 3     | 4        |  |              |                |          | ,,         |            | - SAN   | <b>D</b> (A-2-4)     | ).                      |
|      | -                | Ŧ            | "      |       | '        |  |              |                |          | M          |            | •   |                      |                         |
| 2805 | 2,803.9          | ‡,,,         |        |       |          | -1   |              |                |          |            |            | <del>-</del>  |                      |                         |
|      | 2,803.9-         | 19.9<br>+    | 1      | 4     | 7        | 1 . 1  |              |                |          | М          |            | •   |                      |                         |
| 2800 | -                | ‡            |        |       |          | : : ; :   : : : :                              |              |                |          |            |            | •   |                      |                         |
| 2000 | 2,798.9          | 24.9         |        |       | <u> </u> |  |              |                |          |            |            | <del>-</del><br>·                                     |                      |                         |
|      | -                | ‡            | 3      | 8     | 11       | 19   |              |                |          | M          |            | •   |                      |                         |
| 2795 | -                | <u> </u>     |        |       |          |  |              |                |          |            |            | <del>-</del>  |                      |                         |
|      | 2,793.9          | 29.9         | 8      | 9     | 12       |  |              |                |          | М          |            |   |                      |                         |
|      | -                | +            |        |       |          |  |              |                |          | '''        |            | •   |                      |                         |
| 2790 | 2,788.9          | I<br>I 34 0  |        |       |          |  |              | 1              |          |            |            | <del>-</del>  |                      |                         |
|      | 2,700.3          | 34.3         | 13     | 26    | 74       | ::::)  1122.                                   |              | 100/1.0        | <u>.</u> | М          | an         | _ 2,787.8<br>_ <del>2,787.4</del> \                   | EDEN D               | 30 <b>CK</b> 236        |
|      | -                | ‡            |        |       |          |  |              |                |          |            |            | Weathered   | d rock (G            | Sneiss)                 |
|      | -                | ‡            |        |       |          |  |              |                |          |            |            | <ul> <li>Boring Terminated a<br/>Weathered</li> </ul> |                      | '.                      |
|      | -                | ‡            |        |       |          |  |              |                |          |            |            | •   | ,                    | ,                       |
|      | _                | ‡            |        |       |          |  |              |                |          |            |            | •<br><del>-</del>                                     |                      |                         |
|      | -                | ŧ            |        |       |          |  |              |                |          |            |            |   |                      |                         |
|      | -                | +            |        |       |          |  |              |                |          |            |            | •   |                      |                         |
|      | _                | Ŧ            |        |       |          |  |              |                |          |            |            | <del>-</del>  |                      |                         |
|      | -                | Ŧ            |        |       |          |  |              |                |          |            |            | •   |                      |                         |
|      | -                | ‡            |        |       |          |  |              |                |          |            |            | •   |                      |                         |
|      | -                | ‡            |        |       |          |  |              |                |          |            |            | <del>-</del><br>·                                     |                      |                         |
|      | -                | ‡            |        |       |          |  |              |                |          |            |            |   |                      |                         |
|      | _                | ŧ            |        |       |          |  |              |                |          |            |            | _   |                      |                         |
|      | -                | Ŧ            |        |       |          |  |              |                |          |            |            | •   |                      |                         |
|      | -                | Ŧ            |        |       |          |  |              |                |          |            |            | •   |                      |                         |
|      | _                | ‡            |        |       |          |  |              |                |          |            |            | <del>-</del>  |                      |                         |
|      | -                | ‡            |        |       |          |  |              |                |          |            |            | •   |                      |                         |
|      | -                | ‡            |        |       |          |  |              |                |          |            |            |   |                      |                         |
|      | _                | ł            |        |       |          |  |              |                |          |            |            | <del>-</del>  |                      |                         |
|      | -                | Ŧ            |        |       |          |  |              |                |          |            |            | •   |                      |                         |
|      | -                | Ŧ            |        |       |          |  |              |                |          |            |            | •   |                      |                         |
|      | -                | ‡            |        |       |          |  |              |                |          |            |            | <del>-</del><br>•                                     |                      |                         |
|      | -                | ‡            |        |       | 1        |  |              |                |          |            |            |   |                      |                         |
|      | -                | 1            |        |       |          |  |              |                | 1        |            | [          | -   |                      |                         |

| <b>IBS</b> 34 | 605.1       | .2            |         |        | TI    | <b>P</b> R-406                        | 60            |           | COUN    | TY ALI   | EGH/        | ANY     |  | GEO          | LOGIST DeLost, R.                               |                 |                      | WBS        | <b>3</b> 3460 | 05.1.2        |        |       | TII      | <b>P</b> R-400 | 60           | C       | OUNT    | ' ALLEGH      | ANY      |        |            | GEOLOGIST Del      | _ost, R.   |            |
|---------------|-------------|---------------|---------|--------|-------|---------------------------------------|---------------|-----------|---------|----------|-------------|---------|--|--------------|---|-----------------|----------------------|------------|---------------|---------------|--------|-------|----------|----------------|--------------|---------|---------|---------------|----------|--------|------------|--------------------|--|------------|
| ITE DE        | SCRIP       | MOIT          | US 2    | 21 We  | stern | Loop froi                             | m SR          | 1172 (0   | Grandvi | ew Drive | e) to U     | IS 21   |  |              |   | GROUN           | ND WTR (ft           | SITE       | DESC          | CRIPTIO       | N US   | 21 W  | estern l | Loop fro       | m SR 1′      | 172 (Gr | andviev | / Drive) to l | JS 21    |        |            |                    | GROU   | ND WTR     |
| ORING         | NO.         | L_402         | 21L     |        | S     | TATION                                | 40+2          | 21        |         | OFFS     | <b>ET</b> 2 | 3 ft LT |  | ALIG         | NMENT -L-                                       | 0 HR.           | Dry                  | BOR        | RING N        | <b>O.</b> L_4 | 078L   |       | ST       | TATION         | 40+78        |         |         | OFFSET (      | 62 ft LT |        |            | ALIGNMENT -L-      | 0 HR.  | D          |
| OLLAR         | ELEV        | <b>/.</b> 2,8 | 326.8 f | ft     | T     | OTAL DE                               | EPTH          | 36.3 ft   |         | NOR      | THING       | N/A     |  | EAS          | Γ <b>ING</b> N/A                                | 24 HR.          | FIAD                 | COL        | LAR E         | <b>LEV.</b> 2 | ,824.2 | ft    | TC       | OTAL DE        | <b>PTH</b> 2 | 9.8 ft  |         | NORTHING      | 3 N/A    |        |            | EASTING N/A        | 24 HR.   | FIA        |
| RILL RIG      | /HAMM       | IER EF        | F./DAT  | TE ICA | 40404 | CME-45C 9                             | 90% 08        | 3/25/2014 |         |          |             | DRILL N | IETHOD                                 | H.S. Auger   | S HAMN  | MER TYPE        | Automatic            | DRILI      | L RIG/H       | AMMER E       | FF./DA | TE IC | CA0404 C | CME-45C        | 90% 08/2     | 5/2014  |         |               | DRILL N  | METHO  | D NW       | Casing w/ Advancer | HAMMER TYPE  | Automation |
| RILLER        |             | gan, I        | M.      |        | S.    | TART DA                               | ATE 1         | 11/18/14  | 4       | СОМ      | P. DAT      | TE 11/  | 18/14                                  | SUR          | FACE WATER DEPTH                                | N/A             |                      | DRIL       | LLER          | Morgan        | , M.   |       | ST       | TART DA        | ATE 11.      | /18/14  |         | COMP. DA      | TE 11/   | /20/14 |            | SURFACE WATE       | R DEPTH N/A  |            |
| EV DRI        | VE DE       | EPTH_         |         | w cou  |       |                                       |               | LOWS P    |         |          |             |         | <b>▼</b>                               | 1            | SOIL AND ROCK DES                               | SCRIPTION       | I                    | ELEV       | DRIVE         | DEPTH         | BLC    | ow co |          |                |              |         | R FOOT  |               | SAMP.    | . /    | LO         | SOIL AN            | D ROCK DESCRIPTION   | N          |
| ft) [f        |             | (ft)          | 0.5ft   | 0.5ft  | 0.5ft | 0                                     | 25            | 5         | 0       | 75       | 100         | NO.     | MOI G                                  | ELEV. (      |   |                 | DEPTH (ft            |            | (ft)          | (ft)          | 0.5ft  | 0.5ft | 0.5ft    | 0              | 25           | 50      | -       | 75 100        | NO.      | МО     |            |                    |  |            |
|               |             |               |         |        |       |                                       |               |           |         |          |             |         |  |              |   |                 |                      |            |               |               |        |       |          |                |              |         |         |               |          |        |            |                    |  |            |
| 30            |             |               |         |        |       |                                       |               |           |         |          |             |         |  | L            |   |                 |                      | 2825       |               |               |        |       |          |                |              |         |         |               |          |        |            | 2,824.2 GF         | OUND SURFACE   |            |
|               | <u> </u>    |               |         |        |       |                                       |               |           |         |          |             |         |  | E            |   |                 |                      |            |               | <u> </u>      |        |       | +        | : :[:          |              |         |         | T : : : :     |          |        |            | -                  | ARTIFICIAL FILL  |            |
|               | F           |               |         |        |       | H . L .                               |               |           |         |          |             |         | XI                                     | 2,826.8      | GROUND SURF<br>ARTIFICIAL F                     |                 | 0.0                  | <b>⊣</b> I |               | 1             |        |       |          | : :  :         | :   : :      | : :     |         |               |          |        |            |                    | ange, stiff, micaceous, s<br>d. plasticity <b>CLAY</b> (A-7- |            |
| 325           | $\pm$       |               |         |        |       |                                       |               |           |         |          |             |         |  |              | Red, tan-orange, loose, m<br>SAND (A-2-4        | nicaceous, s    | silty,               | 2820       | 2,820.        | 3 3.9         | 3      | 5     | 8        | • 1:           | 3            |         |         |               |          | М      |            |                    |  |            |
| 2.82          | 2.0         | 4.8           |         |        |       |                                       | .   :         |           |         |          |             |         |  | :E           | SAND (A-2                                       | <del>*</del> ). |                      |            |               | Ŧ             |        |       |          | $  \cdot '$    | .            | : :     |         |               |          |        |            | 2,817.0            |  |            |
| 20            | +           |               | 2       | 5      | 5     | · •10                                 | :   :         |           |         |          | : :         |         | М                                      | 2,819.8_     |   |                 | 7.0                  | 2815       | 2,815.        | 3 8.9         |        |       |          | '/: :          |              |         |         |               |          |        |            | Tan-orange         | , loose, silty <b>SAND</b> (A-2                              | -4).       |
|               | Ŧ           |               |         |        |       |                                       |               |           |         |          |             |         | · ·                                    | 2,013.0      | RESIDUAL  |                 |                      |            |               | Ŧ             | 3      | 2     | 2        | 4              |              |         |         |               |          | М      | MF.        |                    |  |            |
| 2,81          | 7.0         | 9.8           | 2       | 4      | 5     |                                       |               |           |         |          |             |         | N.                                     | <u>:</u>     | Tan-orange, green-blac micaceous, sandy, saprol |                 |                      |            | 2 811         | 2<br>13.0     |        |       |          | : :``:         |              |         |         |               |          |        |            | 2,811.7            |  |            |
| 5             | #           |               | _       | 7      | 3     | · <b>•</b> 9 ·                        |               |           |         |          |             |         | M N                                    |              |   |                 |                      | 2810       |               | 13.0          | 5      | 16    | 16       |                | • <u>• 3</u> | 2       | · · · · |               |          | D      |            | 2,809.7 Tan, gray- | RESIDUAL<br>white, black, dense, high                        | nly _      |
|               | ‡           |               |         |        |       | :   :                                 |               |           |         |          |             |         | ,                                      | 2,813.7<br>- | Tan-orange, green-black                         | , gray & wh     | <u>13</u> .1<br>ite, | 1          |               | ‡             |        |       |          |                |              |         |         |               |          |        |            | micaceous,         | silty, saprolitic <b>SAND</b> w/ frags. (A-2-4).             | rock       |
| 1             | 2.0 1       | 14.8          | 3       | 5      | 6     | · ↓ ·<br>• ●11                        | :   :         |           |         |          |             |         | D                                      |              | med. dense, highly mic<br>SAND w/rock frags.    | aceous, silt    | ty                   |            |               | ‡             |        |       |          |                |              |         |         |               |          |        |            | CR                 | YSTALLINE ROCK   |            |
| 0             | $\pm$       |               |         |        |       |                                       |               |           |         |          |             |         |  | Ŀ            | Grang annoon mage.                              | (**= :):        |                      | 2805       | -             | $\pm$         |        |       |          | <u> </u>       |              |         |         |               |          |        |            | Crys               | talline rock (Gneiss)  |            |
| 2 80          | 7.0 I       | 198           |         |        |       |                                       |               |           |         |          |             |         | 000                                    |              |   |                 |                      |            |               | Ŧ             |        |       |          |                |              |         |         |               |          |        |            |                    |  |            |
| 5             | <del></del> |               | 8       | 7      | 6     | - • 1:                                | 3.   .        |           |         |          | ::          |         | М                                      | <u>:</u> [   |   |                 |                      | 2800       |               | Ŧ             |        |       |          |                |              |         |         |               |          |        |            |                    |  |            |
|               | ‡           |               |         |        |       | · · · \                               |               |           |         |          |             |         |  |              |   |                 |                      | 2000       | 2,799.        | 4 24.8        | 1      | 2     | 98       |                |              |         |         |               |          |        |            | 2,799.4 WI         | EATHERED ROCK  | -          |
| 2,80          | 2.0 2       | 24.8          | 8       | 11     | 8     | i::                                   | V:   :        |           |         |          |             |         | ************************************** |              |   |                 |                      |            |               | ‡             |        |       |          |                |              |         |         | 100/0.9       | <b>'</b> |        |            | Weat               | hered rock (Gneiss), YSTALLINE ROCK                          |            |
| 0             | #           |               | °       | "      | 0     |                                       | 19            |           |         |          | • •         |         | М                                      |              |   |                 |                      | 2795       |               | ‡             |        |       |          |                |              | • •     |         |               |          |        |            |                    | talline rock (Gneiss)  |            |
|               | <u> </u>    |               |         |        |       |                                       | <u> </u>      |           |         |          |             |         |  |              |   |                 |                      |            |               | <del> </del>  |        |       |          |                |              |         |         |               | 1        |        |            | Boring Termin      | ated at Elevation 2,794.                                     | 4 ft in    |
|               | 7.0 2       | 29.8          | 4       | 7      | 9     | : : <b>i</b>                          |               |           |         |          |             |         | м                                      |              |   |                 |                      |            |               | +             |        |       |          |                |              |         |         |               |          |        | l -        | •                  | alline Rock (Gneiss).  |            |
| 5             | Ŧ           |               |         |        |       | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | 7             |           |         |          |             |         |  | :F           |   |                 |                      |            |               | Ŧ             |        |       |          |                |              |         |         |               |          |        | l F        |                    | lled upon completion. Be so slope steepness and              |            |
| 2.70          | 2.0         | , ,           |         |        |       |                                       | $ \lambda $ . |           |         |          |             |         |  | :[           |   |                 |                      |            |               | Ŧ             |        |       |          |                |              |         |         |               |          |        | l F        |                    | trees.   |            |
| 2,73          | 2.01.       | 04.0          | 10      | 13     | 14    |                                       | . •2          | 7 · · ·   |         |          |             |         | М                                      | 2,790.5      |   |                 | 36.3                 | .]         |               | ‡             |        |       |          |                |              |         |         |               |          |        |            |                    |  |            |
|               | #           |               |         |        |       |                                       | -             |           |         |          |             |         |  | F            | Boring Terminated at Eleva<br>Residual Soi      | ation 2,790.    | 5 ft in              |            |               | ‡             |        |       |          |                |              |         |         |               |          |        |            |                    |  |            |
|               | ‡           |               |         |        |       |                                       |               |           |         |          |             |         |  | Ė            |   |                 |                      |            |               | ‡             |        |       |          |                |              |         |         |               |          |        | <u> </u>   |                    |  |            |
|               | 1           |               |         |        |       |                                       |               |           |         |          |             |         |  | Ł            |   |                 |                      |            |               | 1             |        |       |          |                |              |         |         |               |          |        | ΙĿ         |                    |  |            |
|               | +           |               |         |        |       |                                       |               |           |         |          |             |         |  | -            |   |                 |                      |            |               | +             |        |       |          |                |              |         |         |               |          |        | <b> </b> - |                    |  |            |
|               | Ŧ           |               |         |        |       |                                       |               |           |         |          |             |         |  | F            |   |                 |                      |            |               | Ŧ             |        |       |          |                |              |         |         |               |          |        | l F        |                    |  |            |
|               | ‡           |               |         |        |       |                                       |               |           |         |          |             |         |  | F            |   |                 |                      |            |               | ‡             |        |       |          |                |              |         |         |               |          |        | ΙĒ         |                    |  |            |
|               | ‡           |               |         |        |       |                                       |               |           |         |          |             |         |  | ļ.           |   |                 |                      |            |               | ‡             |        |       |          |                |              |         |         |               |          |        |            |                    |  |            |
|               | ‡           |               |         |        |       |                                       |               |           |         |          |             |         |  | Ė            |   |                 |                      |            |               | <b>†</b>      |        |       |          |                |              |         |         |               |          |        | l E        |                    |  |            |
|               | $\pm$       |               |         |        |       |                                       |               |           |         |          |             |         |  | F            |   |                 |                      |            |               | $\pm$         |        |       |          |                |              |         |         |               |          |        | l E        |                    |  |            |
|               | Ŧ           |               |         |        |       |                                       |               |           |         |          |             |         |  | F            |   |                 |                      |            |               | Ŧ             |        |       |          |                |              |         |         |               |          |        | l F        |                    |  |            |
|               | ‡           |               |         |        |       |                                       |               |           |         |          |             |         |  | ļ.           |   |                 |                      |            |               | ‡             |        |       |          |                |              |         |         |               |          |        |            |                    |  |            |
|               | ‡           |               |         |        |       |                                       |               |           |         |          |             |         |  | <u> </u>     |   |                 |                      |            |               | ‡             |        |       |          |                |              |         |         |               |          |        |            |                    |  |            |
|               | ‡           |               |         |        |       |                                       |               |           |         |          |             |         |  | Ė            |   |                 |                      |            |               | ‡             |        |       |          |                |              |         |         |               |          |        | 1          |                    |  |            |
|               | 土           |               |         |        |       |                                       |               |           |         |          |             |         |  | Ł            |   |                 |                      |            |               | 1             |        |       |          |                |              |         |         |               |          |        | 1 E        |                    |  |            |
|               | Ŧ           |               |         |        |       |                                       |               |           |         |          |             |         |  | }            |   |                 |                      |            |               | +             |        |       |          |                |              |         |         |               |          |        | F          |                    |  |            |
|               | ‡           |               |         |        |       |                                       |               |           |         |          |             |         |  | F            |   |                 |                      |            |               | Ŧ             |        |       |          |                |              |         |         |               |          |        |            |                    |  |            |
|               | ‡           |               |         |        |       |                                       |               |           |         |          |             |         |  | L            |   |                 |                      |            |               | ‡             |        |       |          |                |              |         |         |               |          |        | <u> </u>   |                    |  |            |
|               | ‡           |               |         |        |       |                                       |               |           |         |          |             |         |  | ţ            |   |                 |                      |            |               | ‡             |        |       |          |                |              |         |         |               |          |        |            |                    |  |            |
|               | +           |               |         |        |       |                                       |               |           |         |          |             |         |  | E            |   |                 |                      |            |               | İ             |        |       |          |                |              |         |         |               |          |        | <u> </u>   |                    |  |            |
|               | Ŧ           |               |         |        |       |                                       |               |           |         |          |             |         |  | F            |   |                 |                      |            |               | Ŧ             |        |       |          |                |              |         |         |               |          |        | F          |                    |  |            |
|               | ‡           |               |         |        |       |                                       |               |           |         |          |             |         |  | F            |   |                 |                      |            |               | Ţ             |        |       |          |                |              |         |         |               |          |        |            |                    |  |            |
|               | †           |               |         |        |       |                                       |               |           |         |          |             |         |  | ţ            |   |                 |                      |            |               | ‡             |        |       |          |                |              |         |         |               |          |        |            |                    |  |            |

| WBS          | 34605                       | 5.1.2         |             |                                      | TIP               | R-406                  | 60              | С                        | OUNT                     | ΓY /        | LLEGH               | IANY                  | GEOLOGIST DeLost,  | R.           |                       |           |
|--------------|-----------------------------|---------------|-------------|--------------------------------------|-------------------|------------------------|-----------------|--------------------------|--------------------------|-------------|---------------------|-----------------------|--|--------------|-----------------------|-----------|
| SITE         | DESCR                       | RIPTIOI       | N US        | 21 Weste                             | ern Lo            | op fror                | n SR 117        | ′2 (Gra                  | andvie                   | ew D        | rive) to l          | JS 21                 | <u> </u>   |              | GROUN                 | D WTR (ft |
|              | ING NO                      |               |             |                                      |                   |                        | 40+78           | · -                      |                          | _           |                     | 62 ft LT              | ALIGNMENT -L-  |              | 0 HR.                 | Dry       |
| COL          | LAR EL                      | EV. 2,        | 824.2       | ft                                   | тот               | AL DE                  | <b>PTH</b> 29   | .8 ft                    |                          | NC          | RTHIN               | G N/A                 | EASTING N/A  |              | 24 HR.                | FIAD      |
|              |                             |               |             | ΓΕ ICA04                             | 04 CMI            | E-45C 9                | 0% 08/25/2      | 2014                     |                          |             |                     | DRILL METHOD NW       |  | HAMMI        | ER TYPE               | Automatic |
| DRIL         | LER M                       | lorgan,       | М.          |                                      | STA               | RT DA                  | TE 11/1         | 8/14                     |                          | СС          | MP. DA              | TE 11/20/14           | SURFACE WATER DE   | PTH N/       | A                     |           |
|              | E SIZE                      |               |             |                                      | тот               | AL RU                  | <b>N</b> 13.9 f | t                        |                          |             |                     |                       |  |              |                       |           |
| ELEV<br>(ft) | RUN<br>ELEV<br>(ft)         | DEPTH<br>(ft) | RUN<br>(ft) | DRILL<br>RATE<br>(Min/ft)            | REC.<br>(ft)<br>% | JN<br>RQD<br>(ft)<br>% | SAMP.<br>NO.    | STF<br>REC.<br>(ft)<br>% | RATA<br>RQD<br>(ft)<br>% | L<br>O<br>G | ELEV. (             |                       | ESCRIPTION AND REMARI  | KS           |                       | DEPTH (fi |
| 2809.7       |                             | 14.5          | 0.0         | 4.05/0.0                             | (0.0)             | (0.0)                  |                 | (7.0)                    | (4.4)                    |             |                     |                       | Begin Coring @ 14.5 ft                                       |              |                       |           |
|              | 2,809.7<br>2,809.4 <u>]</u> | 14.8          | 0.3<br>5.0  | \ <u>1:25/0.3</u><br>0:42            | (0.3)<br>100%     | (0.0)<br>0%            |                 | (7.3)<br>71%             | (4.1)<br>40%             |             | - 2,809.7<br>-      | Grav. It. grav. blad  | CRYSTALLINE ROCK<br>ck, white, brown-orange stai             | n. mod. to   | mod. sev              | 14.5      |
| 2805         | -                           | -             |             | 0:42<br>1:18<br>1:22<br>1:31<br>1:39 | (4.3)<br>86%      | (1.8)<br>36%           |                 |                          |                          |             | -<br>-              | spacing, fria         | weathered seams, med. to rable @ joint walls, widely val     | riable folia | , close fra<br>ation, | C.        |
| 2003         | 2,804.4                     | - 19.8<br>-   | 5.0         | 1:39<br>1:30                         | (2.7)             | (2.3)                  |                 |                          |                          |             | <del>-</del>        |                       | oar-biotite-muscovite-quartz<br>eathered walls, iron stain & |              | mm open;              | 3         |
|              | -                           | -             |             | 1:43<br>0:58                         | 54%               | 46%                    |                 |                          |                          |             | <b>-</b><br>-       |                       | ı, clay & iron stain, 3-5mm o<br>n stain & clay 1mm open, se |              |                       |           |
| 2800         | 2,799.4                     | -<br>24.8     |             | 1:11<br>0:27                         |                   |                        |                 |                          |                          |             | -<br>2,799.4        | •                     |  |              |                       | 24.8      |
|              | 2,798.0                     | L             | 2.6         | N=100                                | (4.4)             | (0.7)                  |                 | (4.4)                    | (0.7)                    |             | 2,798.0             |                       | WEATHERED ROCK<br>thered rock inferred from co               | re loss.     |                       | 26.2      |
| 2795         | -                           | -             | 3.6         | 1:12<br>0:44                         | (1.4)<br>39%      | (0.7)<br>19%           |                 | (1.4)<br>39%             | (0.7)<br>19%             |             | -<br>-              |                       | CRYSTALLINE ROCK   |              |                       | /         |
| 2/95         | 2,794.4                     | - 29.8<br>-   |             | 0:18<br><u>0:12/0.6</u>              | -                 |                        |                 |                          |                          |             | <u></u> 2,794.4     | 2 80° jts. w/sev. w   | As described above 14.5'-24 eathered walls, iron stain &     | mica, 1-2    |                       |           |
|              | -                           | -             |             |                                      |                   |                        |                 |                          |                          |             | <b>-</b><br>-       | clay                  | ain & clay, 1mm open; 4 20°<br>/ 1mm open, sev. weathered    | d walls      |                       |           |
|              | -                           | _             |             |                                      |                   |                        |                 |                          |                          |             | _                   | Boring Terminated a   | at Elevation 2,794.4 ft in Cry                               | stalline R   | ock (Gneis            | ss).      |
|              | -                           | _             |             |                                      |                   |                        |                 |                          |                          |             | -                   | Boring backfilled upo | n completion. Boring moved<br>and pine trees.                | due to sl    | ope steep             | ness      |
|              | -                           | _             |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       | and pine needs   |              |                       |           |
|              | -                           | -             |             |                                      |                   |                        |                 |                          |                          |             | _                   |                       |  |              |                       |           |
|              | -                           | _             |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       |  |              |                       |           |
|              | _                           | L             |             |                                      |                   |                        |                 |                          |                          |             | _                   |                       |  |              |                       |           |
|              | -                           | Ŀ             |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       |  |              |                       |           |
|              | -                           |               |             |                                      |                   |                        |                 |                          |                          |             | <u>-</u>            |                       |  |              |                       |           |
|              | _                           | -             |             |                                      |                   |                        |                 |                          |                          |             | _                   |                       |  |              |                       |           |
|              | -                           | F             |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       |  |              |                       |           |
|              | -                           | Ī             |             |                                      |                   |                        |                 |                          |                          |             | _                   |                       |  |              |                       |           |
|              | -                           | -             |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       |  |              |                       |           |
|              | -                           | -             |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       |  |              |                       |           |
|              | _                           | -             |             |                                      |                   |                        |                 |                          |                          |             | _                   |                       |  |              |                       |           |
|              | -                           | ļ             |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       |  |              |                       |           |
|              | -                           | -             |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       |  |              |                       |           |
|              | -                           | -             |             |                                      |                   |                        |                 |                          |                          |             | _                   |                       |  |              |                       |           |
|              | -                           | -             |             |                                      |                   |                        |                 |                          |                          |             | -<br>-              |                       |  |              |                       |           |
|              | -                           | _             |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       |  |              |                       |           |
|              | -                           | <u> </u>      |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       |  |              |                       |           |
|              | -                           | -             |             |                                      |                   |                        |                 |                          |                          |             | <b>-</b><br>-       |                       |  |              |                       |           |
|              | -                           | -             |             |                                      |                   |                        |                 |                          |                          |             | <del>-</del>        |                       |  |              |                       |           |
|              | -                           | _             |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       |  |              |                       |           |
|              | _                           | _             |             |                                      |                   |                        |                 |                          |                          |             | -<br><del>-</del> - |                       |  |              |                       |           |
|              | -                           | <u> </u>      |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       |  |              |                       |           |
|              | -                           | _             |             |                                      |                   |                        |                 |                          |                          |             | =                   |                       |  |              |                       |           |
|              | -                           | -             |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       |  |              |                       |           |
|              | -                           |               |             |                                      |                   |                        |                 |                          |                          |             | -                   |                       |  |              |                       |           |
|              | -                           | F             |             |                                      |                   |                        |                 |                          |                          |             | -<br>-              |                       |  |              |                       |           |
| ı            | _                           | Γ             | l           |                                      | l                 | l                      |                 | 1                        | 1                        | 1           |                     |                       |  |              |                       |           |
|              | -                           |               |             |                                      |                   |                        |                 |                          |                          |             | <b>-</b>            |                       |  |              |                       |           |

| WBS         | 3460                  | 5.1.2                    |        |       | TI     | I <b>P</b> R-4060      | COUNT          | Y ALLEGH      | ANY          |       |             | GEOLOGIST DeLost, R.   |   |
|-------------|-----------------------|--------------------------|--------|-------|--------|------------------------|----------------|---------------|--------------|-------|-------------|--|---|
| SITE        | DESCI                 | RIPTIO                   | N US   | 21 W  | estern | Loop from SR 1172 (    | Grandvie       | w Drive) to l | JS 21        |       |             |  | GROUND WTR (f                               |
| BOR         | NG NC                 | <b>).</b> L_41           | 152R   |       | S.     | <b>TATION</b> 41+52    |                | OFFSET -      | 4 ft RT      |       |             | ALIGNMENT -L-  | 0 HR. Dry                                   |
| COLI        | AR EL                 | <b>EV.</b> 2,            | 787.4  | ft    | T      | OTAL DEPTH 27.8 f      | t              | NORTHING      | 3 N/A        |       |             | EASTING N/A  | <b>24 HR.</b> FIAD                          |
| DRILL       | RIG/HA                | MMER E                   | FF./DA | TE IC | A0404  | CME-45C 90% 08/25/2014 | ļ              |               | DRILL N      | 1ETHO | D NV        | V Casing w/ Advancer HA  | AMMER TYPE Automatic                        |
| DRIL        | LER N                 | ∕lorgan,                 | M.     |       | S.     | TART DATE 11/18/1      | 4              | COMP. DA      | TE 11/       | 20/14 |             | SURFACE WATER DEPTH  | 1 N/A                                       |
| LEV<br>(ft) | DRIVE<br>ELEV<br>(ft) | DEPTH<br>(ft)            | 0.5ft  | 0.5ft |        | <del> </del>           | PER FOOT<br>50 | 75 100        | SAMP.<br>NO. | MOI   | L<br>O<br>G | SOIL AND ROCK (ELEV. (ft)  | DESCRIPTION DEPTH (                         |
| 790         |                       | <br>                     |        |       |        |                        | <del></del>    |               |              |       | -           | 2,787.4 GROUND SI  |   |
| 785         | 2,782.7               | 4.7                      | 5      | 11    | 10     |                        |                |               |              | D     |             | Tan-orange, brown,<br>dense, fine, silty, hig<br>saprolitic <b>SAND</b> w/ro | white-gray, med.<br>ghly micaceous,         |
| 780         | 2,777.7               | 9.7                      | 5      | 5     | 6      | P21                    |                |               |              |       |             | -  |   |
| 775         | 2,772.7               | 14.7                     |        |       |        | . J                    |                |               |              | D     |             | 2,772.6  | 14  |
| 770         | -<br>-<br>-           | ‡<br>‡                   | 60/0.1 |       |        |                        |                |               |              |       |             | CRYSTALLII Crystalline roc - 2,768.4 WEATHERE                                | k (Gneiss)                                  |
| 765         | -<br>-<br>-           | ‡<br>‡                   |        |       |        |                        |                |               |              |       |             | Weathered Roo  |   |
| 760         | 2,761.1               | 26.3                     | 5      | 9     | 13     | 22                     |                |               | -            |       |             | 2,761.1 RESIDU<br>-2,759.6 Tan, brown, gray, med saprolitic SAND w/bou       | l. dense, fine, silty,                      |
|             | -<br>-<br>-           | †<br>-<br>-<br>-<br>-    |        |       |        |                        |                |               |              |       | -           | rock seams  Boring Terminated at EI Residual  Boring backfilled upon         | (A-2-4).<br>evation 2,759.6 ft in<br>Soils. |
|             | -<br>-<br>-           | <del> </del><br> -<br> - |        |       |        |                        |                |               |              |       |             | moved due to slope st<br>tree.   | eepness and pine                            |
|             | -<br>-                | <br> -<br> -<br> -       |        |       |        |                        |                |               |              |       | -           | -  |   |
|             | -<br>-<br>-<br>-      | <u>+</u><br>+<br>+<br>+  |        |       |        |                        |                |               |              |       |             | _  |   |
|             | -<br>-<br>-<br>-      | <u>+</u><br>+<br>+       |        |       |        |                        |                |               |              |       |             | -  |   |
|             | -<br>-<br>-           | †<br>†                   |        |       |        |                        |                |               |              |       |             | -  |   |
|             | -<br>-<br>-           | <del> </del><br>         |        |       |        |                        |                |               |              |       |             | -  |   |
|             | -<br>-                | <del> </del><br> -<br> - |        |       |        |                        |                |               |              |       |             | -  |   |
|             | <u>-</u><br>-         | ‡<br>‡                   |        |       |        |                        |                |               |              |       | -           | -  |   |

| <b>VBS</b> 34605.1.2                         |                   |  | TIP  | R-406                                  | 60             | C                            | OUNT                    | Y A         | LLEGH.  | ANY  | GEOLOGIST DeLost,  | R.   |   |                 |
|--|-------------------|--|--|--|----------------|------------------------------|-------------------------|-------------|---|--|--|--|---|-----------------|
| SITE DESCRIPTION                             | N US              | 21 Weste   | ern Lo                                       | op fror                                | n SR 117       |                              |                         |             |   |  | <u> </u>   |  | GROUN   | ID WTR (f       |
| BORING NO. L_4                               |                   |  |  |  | 41+52          |                              |                         | _           | FSET 4  |  | ALIGNMENT -L-  |  | 0 HR.   | Dr              |
| OLLAR ELEV. 2                                | .787.4            | ft   | -  |  | <b>PTH</b> 27  | .8 ft                        |                         | NO          | RTHING  | N/A  | EASTING N/A  |  | 24 HR.  | FIAD            |
| ORILL RIG/HAMMER                             |                   |  |  |  |                |                              |                         |             |   | DRILL METHOD NW  |  |  |   | Automatic       |
| ORILLER Morgar                               | , M.              |  | STAI   | RT DA                                  | TE 11/1        | 8/14                         |                         | СО          | MP. DA  | <b>TE</b> 11/20/14   | SURFACE WATER DE   | PTH N/A  | \   |                 |
| ORE SIZE NQ2                                 | •                 |  | тоти   | AL RU                                  | <b>N</b> 11.51 | ft                           |                         |             |   |  | 1  | -  |   |                 |
| LEV RUN DEPT (ft) (ft)                       | RUN<br>(ft)       | DRILL<br>RATE<br>(Min/ft)  | REC.<br>(ft)<br>%                            | JN<br>RQD<br>(ft)<br>%                 | SAMP.<br>NO.   | STR<br>REC.<br>(ft)<br>%     | ATA<br>RQD<br>(ft)<br>% | L<br>O<br>G | ELEV. (f  |  | ESCRIPTION AND REMAR   | (S   |   | DEPTH (         |
| 72.6   | 1.5               | 1:40/0.5   | (1.5)  | (1.5)                                  |                | (4.2)                        | (2.1)                   |             | - 27726   |  | Begin Coring @ 14.8 ft<br>CRYSTALLINE ROCK   |  |   | 1.4             |
| 2.772.6 14.8<br>2.771.1 16.3<br>2.766.1 21.3 | 1.5<br>5.0<br>5.0 | 1:40/0.5<br>1:44<br>1:36<br>0:51<br>1:04<br>1:30<br>0:36<br>0:21<br>0:25<br>0:32 | (1.5)<br>100%<br>(3.1)<br>62%<br>(0.0)<br>0% | (1.5)<br>(100%)<br>(1.5)<br>30%<br>N/A |                | (4.2)<br>100%<br>(0.4)<br>5% | (3.1)<br>74%<br>N/A     |             | - 2,772.6<br>-<br>-<br>- 2,768.4<br>-<br>-<br>- | w/sev. weathered se<br>in seams, foliate<br>2 70°-80° jts. w/irc<br>w/hard, rough walls;<br>Dark brown, oran | unge stain, white, black, sli. to ams, med. to mod. hard, clo ed, feldspar, quartz, biotite, ron oxide stain, rough walls, < 7+ 20°-30° jts. w/iron oxide sopen  WEATHERED ROCK  rge stain, v. sev. weathered to | se frac. sp<br>nuscovite,<br>1mm oper<br>stain, some | acing, fria<br>Gneiss.<br>a; 2 60° jt<br>e w/clay 1 | able 19 s. I mm |
| 2,761.1 26.3                                 |                   | 0:42<br>0:32   |  |  |                |                              |                         |             | 2,761.1   |  | frags. Gneiss, no recovery ir<br>WR. Resumed SPT samplin   |  | rpreted a   | is              |
| 760  |                   | N=22   |  |  |                |                              |                         |             | 2,759.6   |  | RESIDUAL   |  |   | 27              |
| 1  |                   |  |  |  |                |                              |                         |             |   | · ·  | ated at Elevation 2,759.6 ft in completion. Boring moved   |  |   |                 |
|  |                   |  |  |  |                |                              |                         |             |   |  |  |  |   |                 |

| <b>WBS</b> 34605.1.2  | OG REPORT  TIP R-4060 COUNTY ALLEG           | GHANY GEOLOGIST DeLost, R.   |   | <b>WBS</b> 34605.1.2   | TIP R-4060 COUN                   | ITY ALLEGHANY              | GEOLOGIST DeLost, R.        |   |
|---|--|--|---|--|-----------------------------------|----------------------------|-----------------------------|---|
| SITE DESCRIPTION US 21 Wes  | stern Loop from SR 1172 (Grandview Drive) to | o US 21  | GROUND WTR (ft)   | SITE DESCRIPTION US 21 W   | estern Loop from SR 1172 (Grandvi | iew Drive) to US 21        | •                           | GROUND WTR (ft)   |
| BORING NO. L_4201L  | STATION 42+01 OFFSET                         | T 3 ft LT ALIGNMENT -L-  | <b>0 HR.</b> Dry  | BORING NO. L_4250L   | STATION 42+50                     | OFFSET 20 ft LT            | ALIGNMENT -L-               | 0 HR. Dry   |
| COLLAR ELEV. 2,785.6 ft   | TOTAL DEPTH 25.8 ft NORTHII                  | ING N/A EASTING N/A  | 24 HR. FIAD   | COLLAR ELEV. 2,786.6 ft  | TOTAL DEPTH 20.9 ft               | NORTHING N/A               | EASTING N/A                 | 24 HR. FIAD   |
| DRILL RIG/HAMMER EFF./DATE ICA  | 0404 CME-45C 90% 08/25/2014                  | DRILL METHOD H.S. Augers HAMI  | MER TYPE Automatic  | DRILL RIG/HAMMER EFF./DATE IC  | CA0404 CME-45C 90% 08/25/2014     | DRILL METHOD               | H.S. Augers HA              | AMMER TYPE Automatic  |
| DRILLER Morgan, M.  | START DATE 11/18/14 COMP. D                  | DATE 11/18/14 SURFACE WATER DEPTH  | N/A   | DRILLER Morgan, M.   | <b>START DATE</b> 11/16/14        | <b>COMP. DATE</b> 11/16/14 | SURFACE WATER DEPTH         | 1 N/A   |
| DRIVE   DEPTH   BLOW COU     O.5ft   O.5ft  |  | SAMP. L O SOIL AND ROCK DES  | SCRIPTION DEPTH (ft)  | $\begin{array}{c c} ELEV & DRIVE \\ (ft) & (ft) \end{array} \qquad \begin{array}{c c} DEPTH & BLOW \ CO \\ (ft) & 0.5ft \end{array}$ |                                   | OT SAMP. 75 100 NO. MOI    | L<br>O SOIL AND ROCK I<br>G | DESCRIPTION   |
| 2785  2780  2781.3 4.3  2780  2,776.3 9.3  2775  2,776.3 14.3 | 7  | NO. MOI G ELEV. (ft)  2,785.6 GROUND SUR  RESIDUAL  Tan, gray, white, tan-ora med. dense to dense, sil saprolitic fine SANI  D  D  D  D  D  D  D  D  D  D  D  D  D | DEPTH (ft)  IFACE 0.0  L ange & brown, Ity, micaceous, D (A-2-4).  25.8 ation 2,759.8 ft in ils. mpletion. Boring | (ft) (ft) 0.5ft 0.5ft 2790 2785 2782 4.4 5 10 2,777.2 9.4 7 10 2,777.2 19.4 WOH 2  | 10                                | D D                        |                             | JRFACE 0.0  JAL en, white, v. loose e, silty, highly sAND w/rock frags2-4).  20.9  evation 2,765.7 ft in Soils. |

| <b>W</b> BOREL  | OG REPORT                                  |                                    |   |                                    |  |   |
|---|--|------------------------------------|---|------------------------------------|--|---|
| <b>WBS</b> 34605.1.2  | TIP R-4060 COUNTY ALLEC                    | GHANY GEOLOGIST DeLost,            | , R.  | <b>WBS</b> 34605.1.2               | TIP R-4060 COUNTY ALLE                           | GHANY GEOLOGIST DeLost, R.  |
| SITE DESCRIPTION US 21 Wes  | tern Loop from SR 1172 (Grandview Drive) t | to US 21                           | GROUND WTR (ft)   | SITE DESCRIPTION US 21 W           | estern Loop from SR 1172 (Grandview Drive)       | to US 21 GROUND WTR (ft)  |
| BORING NO. Y2_1572L   |  | T 7 ft LT ALIGNMENT -Y2-           | <b>0 HR.</b> N/A  | <b>BORING NO.</b> Y2_1592L         |  | T 7 ft LT ALIGNMENT -Y2- 0 HR. N/A                                      |
| COLLAR ELEV. 2,782.4 ft   |  | HING N/A EASTING N/A               | <b>24 HR.</b> N/A   | COLLAR ELEV. 2,782.0 ft            |  | ING N/A EASTING N/A 24 HR. N/A  |
| DRILL RIG/HAMMER EFF./DATE ICAG   |  | DRILL METHOD NW Casing w/ Advancer | HAMMER TYPE Automatic                                     | DRILL RIG/HAMMER EFF./DATE IC      |  | DRILL METHOD NW Casing W/SPT & Core HAMMER TYPE Automatic               |
| DRILLER Morgan, M.  | <u> </u>                                   | DATE 11/19/14 SURFACE WATER DI     | EPTH N/A  | DRILLER Morgan, M.                 |  | DATE 11/19/14 SURFACE WATER DEPTH N/A                                   |
| ELEV (ft) DRIVE ELEV (ft) DEPTH BLOW COUNTY (ft) 0.5ft 0.5ft 0  |  | 100 NO. MOI G ELEV. (ft)           | OCK DESCRIPTION  DEPTH (ft)                               | ELEV DRIVE ELEV (ft) DEPTH BLOW CO |  | 00 SOIL AND ROCK DESCRIPTION NO. MOI G                                  |
| (ii)  |  | NOT G ELEV. (II)                   | DEPTH (II)  | (ii)                               |  | No. 7 WOT G   |
| 2785  |  |                                    |   | 2785                               |  |   |
| +   |  |                                    | UD CUDEACE  | +                                  |  |   |
|   |  | ROADWA                             | ND SURFACE 0.0 Y EMBANKMENT                               |                                    | <del>                                     </del> | 2,782.0 GROUND SURFACE 0.0  ROADWAY EMBANKMENT                          |
| 2780  |  | silty SANDw                        | ose, highly micaceous,<br>/rock frags. (A-2-4).           | 2780                               |  | SILT w/roadway gravel (A-4).  |
| 2,777.7+ 4.7  | <u> </u>                                   |                                    |   | 2,777.2 4.8 60/0.0                 |  | · 1 2,777.2 4.8   |
| 2775  | T  |                                    |   | 2775                               |  |   |
| 2,772.7+ 9.7  | ‡:::  ::::  ::::  ::::                     |                                    |   |                                    |  |   |
| 2770  | 1 6  |                                    |   |                                    |  |   |
|   |  |                                    |   | <del> </del>                       |  | Boring Terminated at Elevation 2,770.2 ft in Crystalline Rock (Gneiss). |
|   | 2 4  | ·     Sat                          |   |                                    |  |   |
| 2765  |  |                                    | LLUVIAL — — — — — 18.0                                    |                                    |  | [-  |
| 2,762.7 19.7 7 10   |  | Dark brown-blace                   | ck, multi-colored, med.<br>/ey, fine <b>SAND</b> (A-2-4). |                                    |  |   |
| 2760  | 1  |                                    | /ey, lifle <b>SAND</b> (A-2-4).                           |                                    |  |   |
| 2,757.7+ 24.7   | :::::::::::::::::::::::::::::::::::        | ·                                  |   |                                    |  |   |
| 3 8   | 92   | VVEAII                             | HERED ROCK 25.7   |                                    |  |   |
|   |  | Boring Terminated                  | d rock (Gneiss).  |                                    |  |   |
|   |  | Weathered                          | d Rock (Gneiss).  | ‡                                  |  |   |
|   |  |                                    |   |                                    |  | [-  |
|   |  |                                    |   |                                    |  |   |
|   |  |                                    |   |                                    |  |   |
|   |  |                                    |   |                                    |  |   |
| 4   4   |  |                                    |   |                                    |  |   |
|   |  |                                    |   | ‡                                  |  |   |
| 9: 1  |  |                                    |   |                                    |  |   |
|   |  |                                    |   |                                    |  | [-  |
|   |  |                                    |   |                                    |  |   |
| 988.9   |  |                                    |   |                                    |  |   |
|   |  |                                    |   |                                    |  |   |
| 4   4     4   1 |  |                                    |   |                                    |  |   |
| 38.88   |  |                                    |   | ‡                                  |  |   |
|   |  |                                    |   |                                    |  |   |
|   |  |                                    |   |                                    |  | [-  |
|   |  | [-                                 |   |                                    |  | [-  |
| R406  |  | <u> </u>                           |   |                                    |  |   |
|   |  |                                    |   |                                    |  |   |
|   |  | ‡                                  |   |                                    |  |   |
|   |  |                                    |   |                                    |  |   |
|   |  |                                    |   |                                    |  |   |

| WBS 34605.1.2                |  | TIP          | R-406  |                 |                          |                  |             | LEGHA      | NY  | GEOLOGIST DeLos   | t, R.   |   | -              |
|------------------------------|--|--------------|--|-----------------|--------------------------|------------------|-------------|------------|---|---|---|---|----------------|
| SITE DESCRIPTION US 2        | 21 Weste   | ern Lo       | op fror  | n SR 117        | '2 (Gra                  | andvie           | w Di        | /e) to US  | S 21  | •   |   | GROUNE  | WTR (f         |
| BORING NO. Y2_1592L          |  |              | 15+92  |                 |                          | _                | SET 7       |            | ALIGNMENT -Y2-  | 0 HR. N/A   |   |   |                |
| COLLAR ELEV. 2,782.0 f       | тот  | AL DE        | PTH 11.  | .8 ft           |                          | NO               | THING       | N/A        | EASTING N/A   | 24 HR.  | N/A   |   |                |
| DRILL RIG/HAMMER EFF./DAT    | E ICA04  | 404 CM       | E-45C 9  | 0% 08/25/2      | 2014                     |                  |             | 1          | DRILL METHOD NW   | Casing W/SPT & Core   | НАММ  | ER TYPE /   | Automatic      |
| DRILLER Morgan, M.           |  | STA          | RT DA  | TE 11/1         | 9/14                     |                  | СО          |            | E 11/19/14  | SURFACE WATER D   |   |   |                |
| CORE SIZE NQ2                |  | <u> </u>     |  | <b>N</b> 7.0 ft |                          |                  |             |            |   |   |   |   |                |
| ELEV RUN DEPTH RUN (ft) (ft) | DRILL<br>RATE<br>(Min/ft)  |              | UN<br>RQD<br>(ft)<br>%                                   | SAMP.<br>NO.    | STR<br>REC.<br>(ft)<br>% | RQD<br>(ft)<br>% | L<br>O<br>G | ELEV. (ft) | DI  | ESCRIPTION AND REMAR  | RKS   |   | DEPTH          |
|                              | ` '  | 1 "          | 70   |                 | 70                       | 70               |             |            |   | Begin Coring @ 4.8 ft   |   |   | <u> </u>       |
| 2,771.3 10.7                 | N=60/0.0<br>\1.36/0.9/<br>1.54<br>0.30<br>1.11<br>2.25<br>2.41<br>2.32/1.1 | (3.7)<br>74% | (0.7)<br>\\78% \\(\) (2.8)<br>56%<br>(0.7)<br>\\\64% \\\ |                 | (5.4)                    | (4.2) 60%        |             |            | sev. to completely w<br>fracs., scat. vugs, foli<br>sev. to comp. weath<br>1 80° jt. w/sli. roug<br>w/clay, hard walls, 1 | Begin Coring @ 4.8 ft CRYSTALLINE ROCE n-brown-orange stain, v. si- reathered seams, hard, clo- lated, feldspar-quartz-boitit nered seam 6.9'-8.6' include additional core loss 11.6'-1 h & hard walls; 8 40°-70° jt mm-2mm infill; 4 0°-20° jts open at Elevation 2,770.2 ft in Cr | i. to mod. se to mod. e-muscovies core los 1.8'. s. w/iron ox | close space<br>te, Gneiss w<br>s @ 7.0'-8.4<br>xide & some<br>ide stain 1 m | ed<br>//v.<br> |

| NBS      | 34605         | 5.1.2              |          |       | TI      | I <b>P</b> R-40                            | 60   |        | COUNT    | Y ALLE   | GHA                | NY      |        |        | GEOLOGIST DeLost, R.            |                          |              |             |  |
|----------|---------------|--------------------|----------|-------|---------|--|--|--------|----------|----------|--------------------|---------|--------|--------|---------------------------------|--------------------------|--------------|-------------|--|
| SITE     | ESCR          | IPTIO              | N US     | 21 W  | estern  | Loop fro                                   | m SR 11  | 72 (0  | Grandvie | w Drive) | to U               | S 21    |        |        |                                 |                          | GROUNI       | D WTR (f    |  |
| BORIN    | IG NO         | . Y2_′             | 1633     |       | S.      | TATION                                     | 16+33  |        |          | OFFSE    | <b>T</b> 10        | 0 ft LT |        |        | ALIGNMENT -Y2-                  |                          | 0 HR.        | N/A         |  |
| COLL     | AR EL         | <b>EV.</b> 2,      | 781.4    | ft    | T       | OTAL D                                     | <b>EPTH</b> 31                                 | 1.2 ft |          | NORTH    | IING               | N/A     |        |        | EASTING N/A                     |                          | 24 HR.       | N/A         |  |
|          |               | /MER E             |          |       | A0404 ( | CMF-45C                                    | 90% 08/25                                      | /2014  |          |          |                    | DRILL N | /FTHO  | D N\   | W Casing w/ Advancer            | I наммі                  | ER TYPE      | Automatic   |  |
|          |               | lorgan,            |          |       |         |  | ATE 11/  |        |          | COMP.    | _                  |         |        |        | SURFACE WATER DE                |                          |              | · iatomatio |  |
|          |               | DEPTH              |          | ow co |         |  |  |        | ER FOOT  |          |                    | SAMP.   | T /    | L      | OOK! AGE WATER DE               | 1 111 14/                |              |             |  |
| LEV (ft) | ELEV<br>(ft)  | (ft)               | <b>-</b> | 0.5ft |         | 0  | 25   | 5      |          |          | 00                 | NO.     | MOI    | O<br>G | SOIL AND RO                     | CK DES                   | CRIPTION     | DEPTH (     |  |
|          | (11)          |                    |          |       |         |  |  |        |          |          |                    |         | V WOI  |        | LLLV. (II)                      |                          |              | DEFIII      |  |
| 705      |               |                    |          |       |         |  |  |        |          |          |                    |         |        |        |                                 |                          |              |             |  |
| 785      |               | _                  |          |       |         |  |  |        |          |          |                    |         |        |        | <del>-</del><br>-               |                          |              |             |  |
|          | -             | _                  |          |       |         |  |  |        |          |          |                    |         |        |        | -<br>- 2,781.4 GROUN            | D SURFA                  | ACE          | C           |  |
| 780      | _             |                    |          |       |         |  | :! : :   |        |          |          | ·                  |         |        |        | ROADWAY                         | EMBAN                    | KMENT        |             |  |
|          | -             |                    |          |       |         |  |  |        |          |          |                    |         |        |        | Red-brown, bro dense, highly mi | caceous                  | , silty SAND |             |  |
| 2        | ,776.9        | 4.5                | 11       | 11    | 12      |  |  |        |          |          | $ \cdot  $         |         | l      |        | w/roadway                       | gravel (A                | A-2-4).      |             |  |
| 775      | _             | _                  | ''       | ''    | '2      |  | 23   | • •    |          | ļ : : :  |                    |         | M      | L      | <del>-</del>                    |                          |              |             |  |
|          | _             |                    |          |       |         | : : :                                      | $f \mid :::$                                   |        |          |          |                    |         |        |        | -<br>-                          |                          |              |             |  |
| 2        | ,771.7-       | - 9.7              | 5        | 8     | 8       |  | $\langle \cdot \mid \cdot \cdot \cdot \rangle$ |        |          |          | $\cdot \mid \mid$  |         |        |        | -                               |                          |              |             |  |
| 770      | -             | -                  |          |       | "       |  | 16   |        |          | +        |                    |         | Sat.   |        | -<br><del>-</del>               |                          |              |             |  |
|          | 1             | -                  |          |       |         | :,%:                                       |  |        |          |          |                    |         |        |        | <del>-</del><br>-               |                          |              |             |  |
|          | .,766.7-      | - 14.7<br>-        | 1        | 1     | 1       | <u>                                   </u> |  |        |          |          |                    |         | Sat.   | L      | -<br>-                          |                          |              |             |  |
| 65       | -             | _                  |          |       |         | <del>    2</del>                           |  |        |          | +        |                    |         | ) Oat. |        | <del>_</del><br>-               |                          |              |             |  |
|          | . 704 7       | [ ,, ,             |          |       |         |  |  |        |          |          | $\cdot \mid \mid$  |         |        |        | -                               |                          |              |             |  |
| 60       | 2,761.7-<br>- | - 19.7<br>-        | 1        | WOH   | 12      |  | 2.   |        |          |          | :                  |         | Sat.   |        | - 2,761.4<br>- <b>RE</b>        | SIDUAL                   |              | 2(          |  |
| 00       | -             | _                  |          |       |         | i  |  |        |          | <u> </u> | $\exists$          |         |        |        | Green, gray, whit               | e, tan, or               | range, black | ζ,          |  |
| 2        | -<br>-756.7,  | -<br>- 24.7        |          |       |         | :/: :                                      |  |        |          |          |                    |         |        |        | saprolitic silt                 |                          |              | 5,          |  |
| 55       | - ,730.7      | - <del>24</del> ./ | 1        | 2     | 3       | 5  |  |        | : : : :  | : : :    | .                  |         | Sat.   |        | -<br>-                          |                          |              |             |  |
| -        | -             | -                  |          |       |         | -\-  |  |        |          |          | $\overline{\cdot}$ |         |        |        | <del>-</del><br>•               |                          |              |             |  |
| 2        | -<br>751.7-   | -<br>- 29.7        |          |       |         | : <u>`</u>                                 |  |        | <br>     |          |                    |         |        |        | -<br>-                          |                          |              |             |  |
|          |               | -                  | 4        | 7     | 7       | · · •                                      | 14   |        |          |          | •                  |         | Sat.   |        | 2,750.2                         |                          |              | 31          |  |
|          | -             | -                  |          |       |         |  |  |        |          |          |                    |         |        |        | Boring Terminated a             | at Elevati<br>Iual Soils |              | ft in       |  |
|          | -             |                    |          |       |         |  |  |        |          |          |                    |         |        |        | •                               |                          |              |             |  |
|          |               | _                  |          |       |         |  |  |        |          |          |                    |         |        |        | <del>-</del>                    |                          |              |             |  |
|          | _             | _                  |          |       |         |  |  |        |          |          |                    |         |        | l      | -                               |                          |              |             |  |
|          | -             |                    |          |       |         |  |  |        |          |          |                    |         |        |        | -                               |                          |              |             |  |
|          | _             |                    |          |       |         |  |  |        |          |          |                    |         |        |        | -<br>-                          |                          |              |             |  |
|          | _             | _                  |          |       |         |  |  |        |          |          |                    |         |        |        | <u>.</u>                        |                          |              |             |  |
|          | -             | -                  |          |       |         |  |  |        |          |          |                    |         |        | ╽      | -                               |                          |              |             |  |
|          | _             | Ē                  |          |       |         |  |  |        |          |          |                    |         |        |        | <del>.</del>                    |                          |              |             |  |
|          |               |                    |          |       |         |  |  |        |          |          |                    |         |        |        | <del>-</del><br>-               |                          |              |             |  |
|          | -             |                    |          |       |         |  |  |        |          |          |                    |         |        | 1      | _                               |                          |              |             |  |
|          | _             |                    |          |       |         |  |  |        |          |          |                    |         |        |        | -<br><del>-</del>               |                          |              |             |  |
|          | 1             |                    |          |       |         |  |  |        |          |          |                    |         |        |        | <del>-</del><br>-               |                          |              |             |  |
|          | -             |                    |          |       |         |  |  |        |          |          |                    |         |        |        | <u>.</u>                        |                          |              |             |  |
|          | -             | _                  |          |       |         |  |  |        |          |          |                    |         |        |        | _                               |                          |              |             |  |
|          | 1             |                    |          |       |         |  |  |        |          |          |                    |         |        |        | <del>-</del><br>-               |                          |              |             |  |
|          | _             | _                  |          |       |         |  |  |        |          |          |                    |         |        |        | <u>-</u>                        |                          |              |             |  |
|          | -             | _                  |          |       |         |  |  |        |          |          |                    |         |        |        | <del>_</del><br>-               |                          |              |             |  |
|          | 1             | -                  |          |       |         |  |  |        |          |          |                    |         |        |        | =<br>•                          |                          |              |             |  |
|          | -             | -                  |          |       |         |  |  |        |          |          |                    |         |        |        | -<br>-                          |                          |              |             |  |
|          | -             | <u> </u>           |          |       |         |  |  |        |          |          |                    |         |        | -      | <u>-</u>                        |                          |              |             |  |
|          | -             | -                  |          |       |         |  |  |        |          |          |                    |         |        |        | <del>-</del><br>-               |                          |              |             |  |
|          |               | <u> </u>           |          |       |         |  |  |        |          |          |                    |         |        |        | <u> </u>                        |                          |              |             |  |
|          | -             | -                  |          |       |         |  |  |        |          |          |                    |         |        | -      | <del>_</del><br>-               |                          |              |             |  |
|          | -             |                    |          |       |         |  |  |        |          |          |                    |         |        |        | <del>-</del><br>•               |                          |              |             |  |
|          | -             | <b>-</b>           |          |       | 1       | 1  |  |        |          |          |                    |         | l      | ı H    | -                               |                          |              |             |  |