



ADDENDUM ONE

Project: **Sullivan County East Middle School Classroom Addition**

Address: **4500 Weaver Pike, Bluff City, Tennessee.**

July 19, 2024

This Addendum is part of the Contract Documents for the above referenced project and modifies the original drawings and/or specifications, dated **7/17/24**, as noted below. The bidder shall acknowledge receipt of this Addendum in the place provided in the Bid Form. The published bid date and time shall remain the same.

GENERAL:

None

DRAWINGS:

None

SPECIFICATIONS:

1. **Section 000101 – Table of Contents** – Revised to strike specification section not applicable to this project.
2. **Section 003132 – Geotechnical Report** – See Report from original building construction.
3. **Section 004113 – Bid Form** – See Bid Form omitted from original issued package.

END OF ADDENDUM 1



Sullivan East Middle School
Classroom Addition
Bluff City, Tennessee

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August 15, 2017

CainRashWest Architects, Inc.
130 Regional Park Drive
Kingsport, Tennessee 37660

ATTENTION: Ms. Dineen West, AIA, LEED AP BD+C – President
dineen@grcinc.com

Subject: **REPORT OF PRELIMINARY GEOTECHNICAL EXPLORATION**
Proposed Sullivan County Middle School Site – Weaver Pike
Bluff City, Tennessee
GEOServices Project No. 51-17019A

Dear Ms. West:

We are submitting the results of the additional borings performed for the subject project due to the original building location and site layout changing. This geotechnical exploration was performed in general accordance with our Proposal No. 15-17021A, dated July 20, 2017. The following report, along with the *Report of Preliminary Geotechnical Exploration* originally issued on March 20, 2017 under GEOServices' project number 51-17019, presents our findings and preliminary recommendations for the proposed Sullivan County Middle School (SCMS) site in Bluff City, Tennessee.


GEOServices sincerely appreciates the opportunity to serve as your geotechnical consultant. Should you have any questions regarding this report, or if we can be of any further assistance, please contact us at your convenience.

Sincerely,

GEOServices, LLC



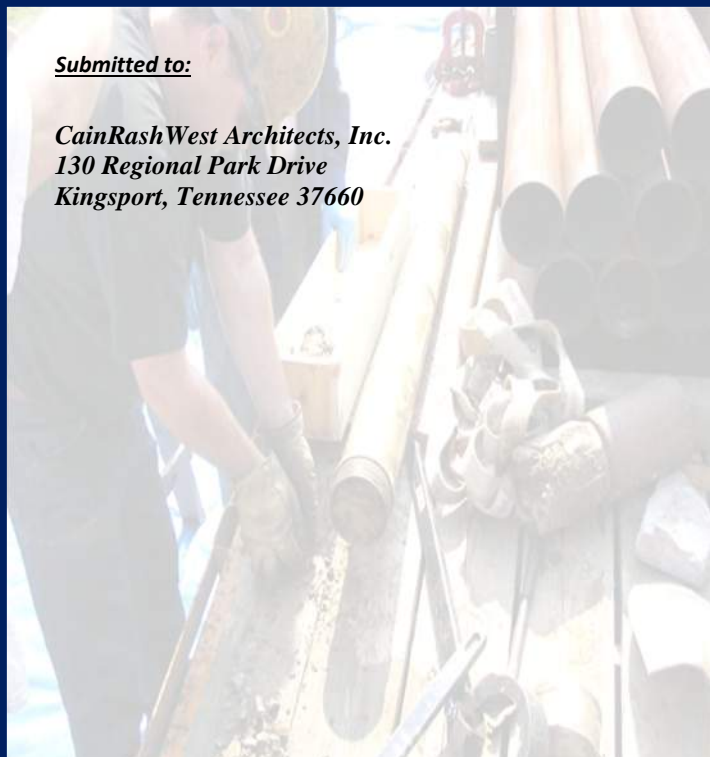
Alex J. Merritt, P.E.
Geotechnical Engineer
TN 119,283



J. Russell Ashburn III, P.E.
Senior Engineer

Submitted to:

***CainRashWest Architects, Inc.
130 Regional Park Drive
Kingsport, Tennessee 37660***



**REPORT OF
PRELIMINARY
GEOTECHNICAL
EXPLORATION**

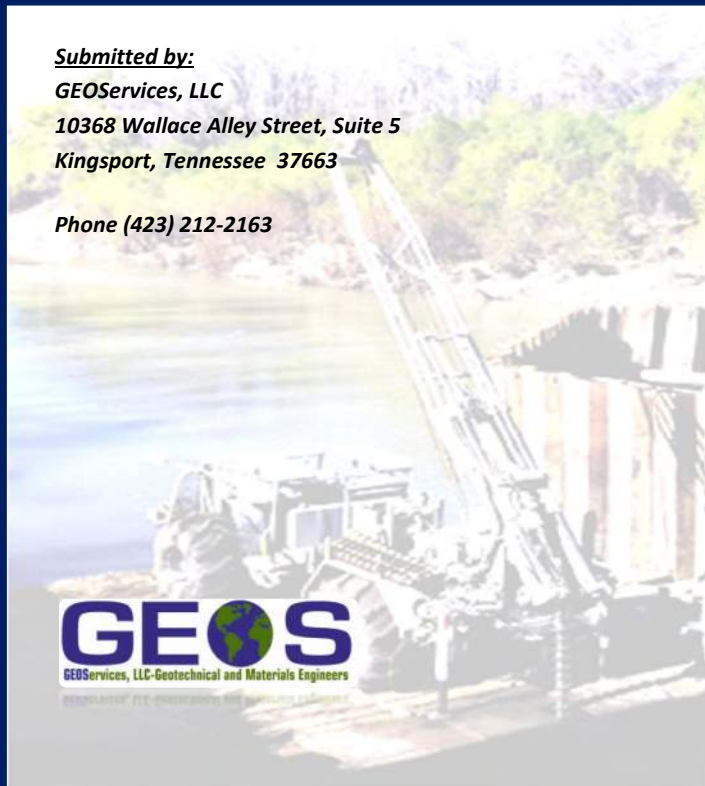
**SULLIVAN COUNTY
MIDDLE SCHOOL –
WEAVER PIKE**

Bluff City, Tennessee

Submitted by:

***GEOServices, LLC
10368 Wallace Alley Street, Suite 5
Kingsport, Tennessee 37663***

Phone (423) 212-2163



**GEOSERVICES, LLC
PROJECT NO. 51-17019A**

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this additional geotechnical exploration was to characterize the subsurface conditions for the design and construction of the proposed Sullivan County Middle School (SCMS) in Bluff City, Tennessee. The additional soil test borings reported herein were performed due to the school structure moving from the northern portion of the site to the southern portion of the site, basically “flip-flopping” with the athletic fields. The information obtained from the original soil test borings (B-1 through B-5) and subsequent conclusions and recommendations provided in the *Report of Preliminary Geotechnical Exploration* previously issued on March 20, 2017 under GEOServices’ project number 51-17019 shall be considered in addition to the information presented herein during the project design process. The results of this preliminary exploration (boring location plan, boring logs and laboratory data) are included in Appendix C of this report for your convenience. This report provides preliminary recommendations for general site preparation, grading, and foundation support for the proposed future development.

1.2 PROJECT INFORMATION AND SITE DESCRIPTION

We understand that the new Sullivan County Middle School (SCMS) is proposed to be developed at the approximately 60-acre site off Weaver Pike in Bluff City, Tennessee. Project information was originally provided by you via email correspondence on February 15, 2017. Following issuance of the original preliminary geotechnical report, during the design process, the school structure moved from the northern portion of the site to the southern portion of the site, basically “flip-flopping” with the athletic fields. You provided us with a site plan showing the new building location via email on July 18, 2017. The provided site plan also included proposed additional boring locations with maximum drill depths at each boring location. No structural information was available at the time of this preliminary report. However, based on our experience with similar types of construction, we anticipate the building(s) to be supported on a system of shallow, soil supported foundations and

consist of concrete slabs-on-grade, concrete masonry unit (CMU), and structural steel frame construction.

Based on our site visits and our review of published United States Geologic Survey (USGS) topographic information, the site consists of primarily grass covered agricultural fields and generally slopes from east to west. Based on available topographic information, there appears to be approximately 40 to 60 feet of topographic relief across the site. Although, no proposed grading information was available at this time, based on the existing topography and the preliminary site plan provided, we anticipate maximum cuts and fills on the order of about 15 to 20 feet or greater may be required to establish final grades at this site.

1.3 SCOPE OF STUDY

This preliminary geotechnical exploration involved a site reconnaissance, field drilling, laboratory testing, and engineering analysis. The following sections of this report present discussions of the field exploration, site conditions, and conclusions and recommendations. Following the text of this report, Appendix A presents figures and test boring records. Appendix B presents a summary of laboratory test results.

2.0 EXPLORATION AND TESTING PROGRAMS

2.1 FIELD EXPLORATION

The site subsurface conditions were explored with five (5) soil test borings in the vicinity of the new building footprint during this additional exploration. Approximate boring locations are shown on Figure 2 of Appendix A. The boring locations were staked in the field by GEOServices personnel based on the proposed boring location plan provided by you. The ground surface elevations at each boring location were determined using surveying techniques by Alley & Associates, Inc. Drilling was performed on August 3, 2017. The depths reference the ground surface elevations at the site that existed at the time of the exploration. The borings were advanced using 3.25-inch inside diameter hollow stem augers (HSA) with an ATV-mounted drill rig. The drill crew worked in general accordance with ASTM D6151 (HSA Drilling). Sampling of overburden soils was accomplished using the standard penetration test procedure (ASTM D1586). Detailed test boring records are presented in Appendix A.

2.2 LABORATORY TEST PROGRAM

Soil samples collected during drilling were transported to our laboratory for visual classification and laboratory testing. The following laboratory testing was performed on select samples to determine various properties of the soil:

- Atterberg Limits (ASTM D4318): Two (2) Atterberg Limits tests were performed for this project. These tests help us to confirm our visual classifications according to the Unified Soil Classification System (USCS). The plastic limit and liquid limit represent the moisture content at which a cohesive soil changes from a semi-solid to a plastic state and from a plastic state to liquid state, respectively.

- Natural Moisture Content (ASTM D2216): Moisture content determinations were performed on 35 samples for this project. The natural moisture content is defined as the ratio of the weight of water present in the soil to the dry weight of soil.

The test results are presented on the Soil Data Summary, enclosed in Appendix B.

3.0 SUBSURFACE CONDITIONS

3.1 GEOLOGIC CONDITIONS

The project site, and most of East Tennessee, lies in the Appalachian Valley and Ridge Physiographic Province. The Province is characterized by elongated, northeasterly-trending ridges formed on highly resistant sandstones and shales. Between ridges, broad valleys and rolling hills are formed primarily on less resistant limestones, dolomites and shales.

Published geologic information indicates that the site is underlain by bedrock of the Knox Group, which is not differentiated into its individual formations in this area. The Knox Group, where undivided, consists of siliceous dolomite and interbedded limestone. These rock units weather to produce a thick residual clay overburden. Silica in the form of chert is resistant to weathering and is scattered in various quantities throughout the clay residuum.

Since the underlying bedrock formation contains dolomite and limestone, the site is susceptible to the typical carbonate hazards of irregular weathering, cave and cavern conditions, and overburden sinkholes. Carbonate rock, while appearing very hard and resistant, is soluble in slightly acidic water. This characteristic, plus differential weathering of the bedrock mass, is responsible for the hazards. Of these hazards, the occurrence of sinkholes is potentially the most damaging to overlying soil supported structures. In East Tennessee, sinkholes occur primarily due to differential weathering of the bedrock and “flushing” or “raveling” of overburden soils into the cavities in the bedrock. The loss of solids creates a cavity or “dome” in the overburden. Growth of the dome over time or excavation over the dome can create a condition in which rapid, local subsidence or collapse of the roof of the dome occurs.

3.2 SUBSURFACE CONDITIONS

3.2.1 Surficial Materials

A surface layer of topsoil approximately 8 to 12 inches thick was encountered in each of the five borings performed during this exploration. There may be areas of deeper topsoil and/or agriculturally disturbed soil across this site. Existing residual soils were encountered beneath the surficial materials to boring termination or auger refusal depths.

3.2.2 Residual Soils

Beneath the existing surficial materials in each of the five borings performed during this exploration, residual soils were encountered to the termination depth of 20 feet in boring C-3 and to the auger refusal depths ranging from 24.5 to 34.5 feet in borings C-1, C-2, C-4, and C-5. Residual soils are classified as soils which have been formed in place from the weathering of the underlying bedrock. The residual soils generally consisted of red brown elastic silts and tan brown lean clays with isolated chert and weather rock. Standard Penetration Test (SPT) N-values are used to evaluate the consistency of soils. The N-values of the residuum ranged from 1 blow per foot (bpf) of penetration to 50 blows for zero inches of penetration, indicating a consistency of very soft to hard. The N-values of the residuum typically decreased with depth, which is not unusual in this geologic region. The N-values of the residual materials in the upper 10 to 15 feet below the ground surface typically ranged from about 10 to 20 bpf, indicating consistencies of stiff to very stiff. However, the N-values of the residuum below the stiffer, upper materials were markedly less consistent typically ranging from about 1 to 7 bpf, indicating consistencies of very soft to firm.

The natural moisture content of the residuum ranged from 12.4 to 54.2 percent and generally increased with depth. Atterberg limits testing on two (2) bulk samples of the residuum revealed liquid limits (LL) of 58 percent for both samples, with corresponding plasticity indices (PI) of 26 and 27 percent, respectively. The tested soils are both classified as MH (elastic silt) in general accordance with the Unified Soil Classification System (USCS).

3.2.3 Subsurface Water

Subsurface water was not observed in any of the borings at the completion of drilling. Subsurface water levels may fluctuate due to seasonal changes in precipitation amounts. Additionally, discontinuous zones of perched water may exist within the overburden and/or at the contact with bedrock. The groundwater information presented in this report is the information that was collected at the time of our field activities. We recommend that the contractor determine the actual groundwater level at the site at the time of the construction activities.

3.2.4 Auger Refusal Conditions

Auger refusal materials were encountered in each of the borings performed during this exploration at depths ranging from of 24.5 to 34.5 feet, with the exception of boring C-3. A summary of the refusal depths is presented in the table below:

Boring	Ground Surface Elevation	Refusal Depth (ft.)	Refusal Elevation
C-1	1524.7	28.1	1496.6
C-2	1523.7	26.7	1497.0
C-4	1528.4	24.5	1503.9
C-5	1529.6	34.5	1495.1

Refusal is a designation applied to any material that cannot be removed by the power auger. Auger refusal may indicate dense gravel or cobble layers, boulders, rock ledges or pinnacles, or the top of continuous bedrock. Based on our experience with the geology of this area, we anticipate that the auger refusal materials encountered in our soil test borings are likely dolomite bedrock. In this type of geology, bedrock elevations can vary quite significantly over short distances. There is a possibility that rock pinnacles are encountered during construction activities at lesser depths than our boring points.

3.2.5 General

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in Appendix A should be reviewed for specific information at individual boring locations. The depth and thickness of the subsurface strata indicated on the boring cross-sections were generalized from and interpolated between test locations. The transition between materials will likely be more abrupt than gradual in this geologic setting. Information on actual subsurface conditions exists only at the specific boring locations and is relevant to the time the exploration was performed. Variations may occur and should be expected between boring locations. The stratification lines were used for our analytical purposes and, unless specifically stated otherwise, should not be used as the basis for design or construction cost estimates.

4.0 PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

4.1 SITE ASSESSMENT

The results of the field exploration indicate that the site is adaptable for the planned development. However, like most sites there are some challenges associated with the development of this site. These challenges include the reuse of the on-site soils for structural fill, shallow rock/difficult excavations, settlements due to new fill placement, and the underlining karst geology. *The following sections are based on the limited information available at the time of this report. GEOServices recommends that a more detailed exploration addressing the specific geotechnical concerns of the planned project be performed once the structural details, foundation loads, and bearing elevations have been finalized. Once this additional information is developed, GEOServices can assist in developing an exploration plan to further explore subsurface conditions in critical areas of the site.*

4.1.1 Shallow Rock/Difficult Excavations

No proposed grading information was available at the time of writing this report. However, based on our review of existing topographic information and the preliminary site plan, we anticipate excavations on the order of 15 to 20 feet may be required to establish final grades through several areas of this site. However, based on the existing topographic information, we anticipate the maximum cuts and fills within the new proposed building pad area will likely be limited to about 8 to 12 feet. As previously discussed, during this exploration, auger refusal materials were encountered in soil test borings C-1, C-2, C-4, and C-5 at depths ranging from 24.5 to 34.5 feet below the existing ground surface, which is below our anticipated excavation depths. However, numerous rock outcroppings were observed along the ground surface at several locations across the site. Based on our experience in the area, we anticipate pinnacle rock to be encountered. We do not anticipate that the pinnacle rock at this site will be removable with conventional earthmoving equipment, but will require loosening and breaking utilizing blasting and/or rock hammering prior to excavation.

4.1.2 Settlements Due to New Fill Placement

Based on the existing topography, we anticipate new fills on the order of 15 to 20 feet may be required to establish final grades at some areas of this site. Soil fill heights of this magnitude may produce total settlements on the order of 1 to 3 inches. Structures in these areas should be designed to tolerate these magnitudes of settlements, or foundation construction should not commence until the primary settlements have occurred following initial fill placement operations. In addition, if structures in these areas transition from cut to fill (especially in fill depths greater than 10 feet) within the building area, differential settlements should be evaluated.

Settlements of the new fill materials will be greatly dependent on the final grading plan, the type of fill materials to be used, finished floor elevations, and the structural loading information. We recommend that once this information is established for the future development, a more thorough evaluation of the potential settlements be performed.

4.1.3 Reuse of On-Site Soils and Rock for Structural Fill

As discussed earlier, new fill depths on the order of 15 to 20 feet will likely be required to establish final grades for this site. Based on the soil test borings, the on-site materials to be used for structural fill will likely consist of the on-site soils and rock. Two standard Proctor moisture-density relationship tests were performed on bulk samples of soil obtained from borings B-2 and B-3 performed in March of 2017. The maximum dry densities in these materials ranged from about 93 to 104 pounds per cubic foot (pcf). The optimum compaction moistures ranged from 19.4 to 26.5 percent. The natural moisture tests indicate that the on-site soils currently have in-situ moistures ranging from about 20 to 45 percent, with most values in excess of 30 percent. ***Thus, the in-situ moisture contents are 10 to 20 percent, or more, wet of the optimum moisture level, and significant drying will likely be required for the on-site soils prior to compaction.***

In addition to the on-site soils, there will likely be significant areas of blasted rock that will be desired to be used as fill materials on this site. This rock may be used as fill, provided that rock sizes between

18 to 24 inches in maximum dimension can be maintained and that specific areas are designated for rock fill. These areas are typically deep fill areas with exposed slopes that will allow for surface water to drain and not become trapped within the rock fill zones. It is not typical to allow for layers of rock fill zones to be “sandwiched” between soil fill layers. Deeper fill sections are typically utilized so that rock fill is placed significantly (3 to 4 feet typically) below building and utility elevations so that excavations back into the rock fill are not required. GEOServices personnel has been involved with numerous developments where rock fill has been successfully used and can assist in identifying areas and specifications for rock fill zones once grading plans are further developed.

4.1.4 Karst Geology

As mentioned previously, this site is underlain by karst geology. There is a certain degree of risk with respect to sinkhole formation and subsidence that should be considered with any site located within geologic areas underlain by potentially soluble rock units. Our review of the published USGS topographic information revealed several isolated closed depressions in the general vicinity of the project site. Additionally, a closed contour depression was observed in the vicinity of Boring C-4 performed during this exploration. While a rigorous effort to assess the potential for sinkhole formation at this site was beyond the scope of this evaluation, the boring data did reveal some indications of potential signs of karst development, such as significant depths (in excess of about 10 to 15 feet) of very soft to soft soils above the top of rock, such as in borings C-1, C-2, and C-4. The finished floor elevation will be critical in assessment of the risk of future karst development in this area. Excavations in these areas will likely expose karst features including soft soil zones and/or voids between the rock pinnacles. These will likely require corrective actions such as installation of “inverted filters” and/or plugging with flowable fill (lean concrete) when encountered.

4.2 SITE PREPARATION

4.2.1 Subgrade

All topsoil, grass, asphalt, concrete, trees, rock fragments greater than 6 inches, and other debris should be removed from the proposed construction areas. In previously developed areas, it is not uncommon to encounter pockets of construction debris or other deleterious material. These materials, if encountered, should be removed and replaced with properly engineered structural soil fill. After completion of any stripping operations and any required excavations to reach subgrade level, we recommend that the subgrade be proofrolled with a fully-loaded, tandem-axle dump truck or other pneumatic-tired construction equipment of similar weight. The geotechnical engineer or his representative should observe proofrolling. Areas judged to perform unsatisfactorily should be remediated at the geotechnical engineer's discretion. Typically, remedial options consist of undercutting and replacement with structural soil fill. Areas to receive structural soil fill should also be proofrolled prior to the placement of any fill.

4.2.2 Structural Soil Fill

Material considered suitable for use as compacted fill should be clean soil free of organics, trash, and other deleterious material, containing no rock fragments greater than 6 inches in any one dimension. Preferably, borrow material to be used as structural soil fill should have a standard Proctor maximum dry density of 90 pounds per cubic foot (pcf) or greater and a plasticity index (PI) of 35 percent or less. All material being used as soil fill should be tested and confirmed by the geotechnical engineer to be in accordance with the project requirements before being placed. Structural soil fill should be placed in loose, horizontal lifts not exceeding 8 inches in thickness. Each lift should be compacted to at least 95 percent of maximum dry density per the standard Proctor method (ASTM D698) and within the range of minus 2 percent to plus 3 percent of the optimum moisture content. Each lift should be compacted and tested by geotechnical personnel to confirm that the contractor's method is capable of achieving the project requirements before placing any subsequent lifts. Any areas which have become soft or frozen should be removed before additional structural fill is placed.

4.2.3 Shot Rock Fill

We are also providing shot rock fill requirements in the event significant quantities of rock excavation are required in areas of the project site outside of our boring locations. Shot rock structural fill materials shall have maximum dimensions of 24 inches in any direction, and shall be generally well-graded with particle sizes ranging from 24 inches to dust. The amount of fine materials (less than No. 100 sieve) should not exceed 15 percent by weight. Rock embankment shall be formed by back dumping shot, crushed, or blasted rock from the excavation onto previously placed and compacted layers, excluding shale, siltstone, or other degradable materials as identified by the geotechnical engineer. A large crawler tractor (Caterpillar D-9 with dozer blade attachment or comparable) shall be used to spread and level the full width of the fill. The shot rock materials shall be bladed and back-bladed as required to achieve a lift thickness not greater than 36 inches. Rock shall not be end-dumped over edges of the layer being constructed, but shall be deposited on the layer and moved ahead so as to advance the layer with a mixture of rock, rock spalls, and rock fines.

4.2.4 Compacted Crushed Stone Fill

Compacted crushed stone fill should be Type A, Class A, and Grading E in accordance with Section 903.05 of the Tennessee Department of Transportation specifications. The crushed stone fill should be placed in loose, horizontal lifts not exceeding 10 inches in loose thickness. Each lift should be compacted to at least 98 percent of maximum dry density per the standard Proctor method (ASTM D698). Each lift should be compacted and tested by geotechnical personnel to confirm that the contractor's method is capable of achieving the project requirements before placing any subsequent lifts.

4.3 PRELIMINARY FOUNDATION RECOMMENDATIONS

At the time of this preliminary subsurface exploration, no proposed structural information was available. The preliminary foundation recommendations provided are solely based on the limited subsurface information available and our assumptions herein. Once the final grading plan, foundation loads, bearing elevations, and proposed building layouts are available, the preliminary information provided at the time of this report should be confirmed and reevaluated. Additional exploration may also be recommended as additional structural information is available.

4.3.1 Soil-Supported Foundation Construction

Foundation loads up to about 200 kips can be supported on conventional spread foundations bearing in soil. Foundations bearing in residual soils or newly placed compacted fill soils can be designed based on a net allowable bearing capacity of 2,500 pounds per square foot (psf). Total settlements due to this magnitude of foundation loads will likely be on the order of 1 to 1.5 inches, provided that there have not be excavations or fills greater than about 10 feet in the area. We recommend that continuous foundations be a minimum of 18 inches wide and isolated spread footings be a minimum of 24 inches wide to reduce the possibility of a localized punching shear failure. All exterior footings should be designed to bear at least 18 inches below finished exterior grade to protect against frost heave. If there are foundations that transition from soil to rock, then a cushion layer of at least 12 inches of dense graded aggregate should be placed to reduce the potential of point loading near the transitions.

Again, it will be very important to evaluate foundation support alternatives and the settlement estimates based on the specific grading plan and foundation loads for the planned structure once available.

5.0 LIMITATIONS

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. This report is for our geotechnical work only, and no environmental assessment efforts have been performed. The preliminary conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, express or implied, is made.

The analyses and recommendations submitted herein are based, in part, upon the data obtained from the exploration. The nature and extent of variations between the borings will not become evident until construction. We recommend that GEOServices be retained to observe the project construction in the field. GEOServices cannot accept responsibility for conditions which deviate from those described in this report if not retained to perform construction observation and testing. If variations appear evident, then we will re-evaluate the recommendations of this report. In the event that any changes in the nature, design, or location of the project are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and conclusions modified or verified in writing. Also, if the scope of the project should change significantly from that described herein, these recommendations may have to be re-evaluated.

APPENDIX A

Figures and Test Boring Records



NOTES

1.) BASE MAP PROVIDED BY: GOOGLE EARTH

SITE VICINITY MAP

SCMS Weaver Pike

Sullivan County, Tennessee

DRAWN BY: DKA

APPROVED BY: AIM

SCALE: NTS

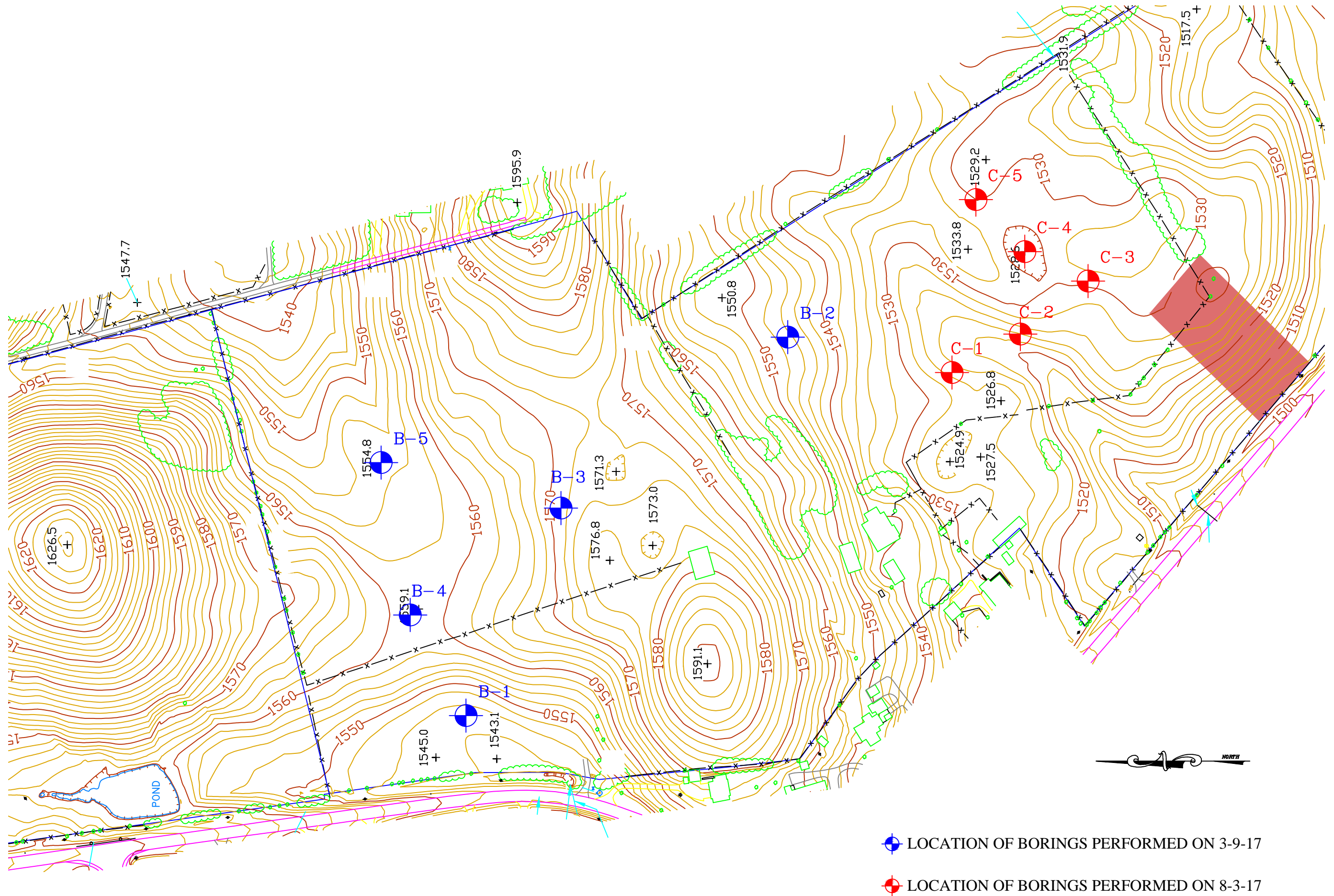
JOB NO.: 51-17019A

DATE: 7/31/2017



6058 Walker Ave Ste Suite 5
Kingsport, Tennessee 37660
Phone: (423) 212-2165

FIGURE 1



NOTES:
1.) BORING LOCATIONS ARE SHOWN IN GENERAL
ARRANGEMENT ONLY.
2.) DO NOT USE BORING LOCATIONS FOR
DETERMINATIONS OF DISTANCES OR QUANTITIES.
3.) BASE MAP PROVIDED BY ALLEY & ASSOCIATES, Inc.

BORING LOCATION PLAN
SCMS Weaver Pike
Sullivan County, Tennessee

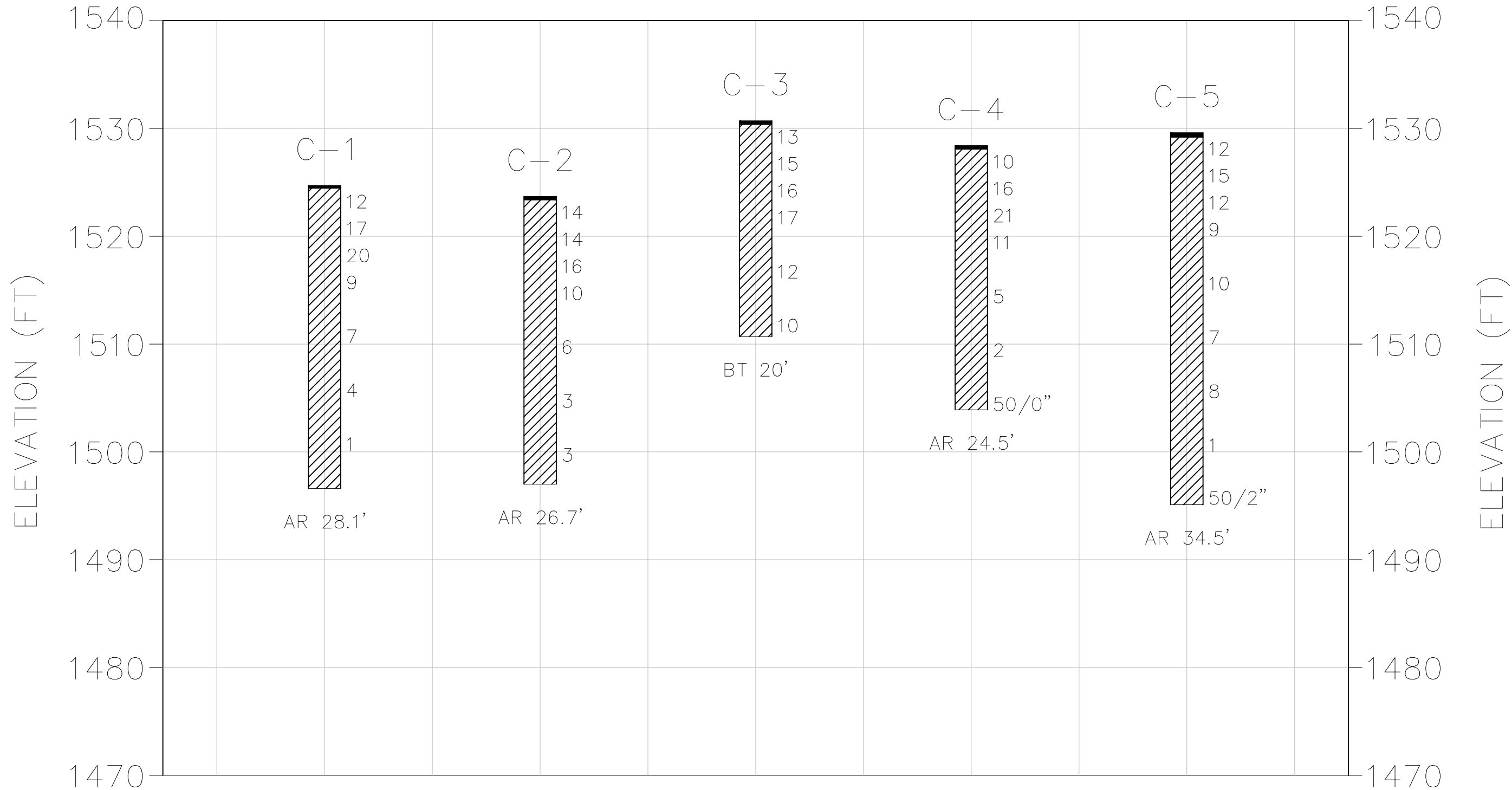
DRAWN BY:	DKA
APPROVED BY:	AIM
SCALE:	NTS
JOB NO.:	51-17019A
DATE:	8/15/2017

GES
Geotechnical and Materials Engineers
10668 Wallace Alley Street Suite 5
Kingsport, Tennessee 37663
Phone: (423) 212-2163

FIGURE 2

LEGEND:

- TOPSOIL
- RESIDUUM



GENERAL NOTES

FINE AND COARSE GRAINED SOIL PROPERTIES

PARTICLE SIZE

BOULDERS:	GREATER THAN 300 mm
COBBLES:	75 mm to 300 mm
GRAVEL:	4.74 mm to 75 mm
COARSE SAND:	2 mm to 4.74 mm
MEDIUM SAND:	0.425 mm to 2 mm
FINE SAND:	0.075 mm to 0.425 mm
SILTS & CLAYS:	LESS THAN 0.075 mm

COARSE GRAINED SOILS (SANDS & GRAVELS)

N-VALUE	RELATIVE DENSITY
0 - 4	VERY LOOSE
5 - 10	LOOSE
11 - 30	MEDIUM DENSE
31 - 50	DENSE
OVER 50	VERY DENSE

FINE GRAINED SOILS (SILTS & CLAYS)

N-VALUE	CONSISTENCY	Qu, PSF
0 - 2	VERY SOFT	0 - 500
3 - 4	SOFT	500 - 1000
5 - 8	FIRM	1000 - 2000
9 - 15	STIFF	2000 - 4000
16 - 30	VERY STIFF	4000 - 8000
OVER 31	HARD	8000 +

STANDARD PENETRATION TEST (ASTM D1586)

THE STANDARD PENETRATION TEST AS DEFINED BY ASTM D1586 IS A METHOD TO OBTAIN A DISTURBED SOIL SAMPLE FOR EXAMINATION AND TESTING AND TO OBTAIN RELATIVE DENSITY AND CONSISTENCY INFORMATION. THE 1.4 INCH I.D./2.0 INCH O.D. SAMPLER IS DRIVEN 3-SIX INCH INCREMENTS WITH A 140 LB. HAMMER FALLING 30 INCHES. THE BLOW COUNTS REQUIRED TO DRIVE THE SAMPLER THE FINAL 2 INCREMENTS ARE ADDED TOGETHER AND DESIGNATED THE N-VALUE. AT TIMES, THE SAMPLER CAN NOT BE DRIVEN THE FULL 18 INCHES. THE FOLLOWING REPRESENTS OUR INTERPRETATION OF THE STANDARD PENETRATION TEST WITH VARIATIONS.

BLOWS/FOOT (N-VALUE)

DESCRIPTION

25.....25 BLOWS DROVE SAMPLER 12" AFTER INITIAL 6" SEATING
75/10".....75 BLOWS DROVE SAMPLER 10" AFTER INITIAL 6" SEATING
50/PR.....PENETRATION REFUSAL OF SAMPLER AFTER INITIAL 6" SEATING

SAMPLING SYMBOLS

ST:	UNDISTURBED SAMPLE
SS:	SPLIT SPOON SAMPLE
CORE:	ROCK CORE SAMPLE
AU:	AUGER OR BAG SAMPLE

SOIL PROPERTY SYMBOLS

N:	STANDARD PENETRATION, BPF
M:	MOISTURE CONTENT %
LL:	LIQUID LIMIT %
PI:	PLASTICITY INDEX %
Qp:	POCKET PENETROMETER VALUE, TSF
Qu:	UNCONFINED COMPRESSIVE STRENGTH, TSF
DUW:	DRY UNIT WEIGHT, PCF

ROCK PROPERTIES

ROCK HARDNESS

ROCK QUALITY DESIGNATION (RQD)

PERCENT	QUALITY
90 TO 100	EXCELLENT
75 TO 90	GOOD
50 TO 75	FAIR
25 TO 50	POOR
0 TO 25	VERY POOR

VERY SOFT:	ROCK DISINTEGRATES OR EASILY COMPRESSES TO TOUCH: CAN BE HARD TO VERY HARD SOIL.
SOFT:	ROCK IS COHERANT BUT BREAKS EASILY TO THUMB PRESSURE AT SHARP EDGES AND CRUMBLES WITH FIRM HAND PRESSURE.
MODERATELY HARD:	SMALL PIECES CAN BE BROKEN OFF ALONG SHARP EDGES BY CONSIDERABLE HARD THUMB PRESSURE: CAN BE BROKEN BY LIGHT HAMMER BLOWS.
HARD:	ROCK CAN NOT BE BROKEN BY THUMB PRESSURE, BUT CAN BE BROKEN BY MODERATE HAMMER BLOWS.
VERY HARD:	ROCK CAN BE BROKEN BY HEAVY HAMMER BLOWS.



SCMS Weaver Pike
Bluff City, Tennessee
GEOServices Project No.: 51-17019A

LOG OF BORING **C-1**

SHEET 1 OF 2

DRILLER Tri-State Drilling
ON-SITE REP. Shannon Snow

BORING NO. / LOCATION

C-1

DRY ON COMPLETION ?

Yes

DATE August 3, 2017 SURFACE ELEV. 1524.7 FT.
REFUSAL: Yes DEPTH 28.1 FT. ELEV. 1496.6 FT.
SAMPLED 28.1 FT. 8.6 M
TOP OF ROCK DEPTH 28.1 FT. ELEV. 1496.6 FT.
BEGAN CORING DEPTH FT. ELEV. FT.
FOOTAGE CORED (LF) FT.
BOTTOM OF HOLE DEPTH 28.1 FT. ELEV. 1496.6 FT.

WATER LEVEL DATA (IF APPLICABLE)

COMPLETION: DEPTH Dry FT.
ELEV. FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. FT.

BORING ADVANCED BY:

POWER AUGERING X

WASHBORING

STRATUM DEPTH		SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
		FROM	TO			N-Value	Qp	LL	PI	%M	
FT.	ELEV.	FT.	FT.								
-											Topsoil 12 inches
2.5	1522.2	1.0	2.5	1	SS	12				18.4	
5.0	1519.7	3.5	5.0	2	SS	17				24.5	Elastic SILT (MH) - Red brown; moist; stiff to very stiff (RESIDUUM)
7.5	1517.2	6.0	7.5	3	SS	20				27.1	
10.0	1514.7	8.5	10.0	4	SS	9				21.0	Elastic SILT (MH) - Red brown; moist; stiff to firm (RESIDUUM)
15.0	1509.7	13.5	15.0	5	SS	7				31.9	
17.5	1507.2										Lean CLAY (CL) - Red tan; moist; soft (RESIDUUM)
20.0	1504.7	18.5	20.0	6	SS	4				30.6	

Log Continued

REMARKS:



SCMS Weaver Pike
Bluff City, Tennessee
GEOServices Project No.: 51-17019A

LOG OF BORING **C-1**

SHEET 2 OF 2

DRILLER Tri-State Drilling
ON-SITE REP. Shannon Snow

BORING NO. / LOCATION C-1 DRY ON COMPLETION ? Yes

DATE August 3, 2017 SURFACE ELEV. 1524.7 FT.
REFUSAL: Yes DEPTH 28.1 FT. ELEV. 1496.6 FT.
SAMPLED 28.1 FT. 8.6 M
TOP OF ROCK DEPTH 28.1 FT. ELEV. 1496.6 FT.
BEGAN CORING DEPTH FT. ELEV. FT.
FOOTAGE CORED (LF) FT.
BOTTOM OF HOLE DEPTH 28.1 FT. ELEV. 1496.6 FT.

WATER LEVEL DATA (IF APPLICABLE)
COMPLETION: DEPTH Dry FT.
ELEV. FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. FT.

BORING ADVANCED BY: POWER AUGERING X WASHBORING

STRATUM DEPTH		SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
FT.	ELEV.	FROM FT.	TO FT.			N-Value	Qp	LL	PI	%M	
22.5	1502.2	23.5	25.0	7	SS	1				33.7	Lean CLAY (CL) - Red tan; moist; very soft (RESIDUUM)
25.0	1499.7										
27.5	1497.2										
30.0	1494.7										
32.5	1492.2										Auger Refusal at 28.1 feet
35.0	1489.7										
37.5	1487.2										
40.0	1484.7										

REMARKS:



SCMS Weaver Pike
Bluff City, Tennessee
GEOServices Project No.: 51-17019A

LOG OF BORING **C-2**

SHEET 1 OF 2

DRILLER Tri-State Drilling
ON-SITE REP. Shannon Snow

BORING NO. / LOCATION

C-2

DRY ON COMPLETION ?

Yes

DATE August 3, 2017 SURFACE ELEV. 1523.7 FT.
REFUSAL: Yes DEPTH 26.7 FT. ELEV. 1497.0 FT.
SAMPLED 26.7 FT. 8.1 M
TOP OF ROCK DEPTH 26.7 FT. ELEV. 1497.0 FT.
BEGAN CORING DEPTH FT. ELEV. FT.
FOOTAGE CORED (LF) FT.
BOTTOM OF HOLE DEPTH 26.7 FT. ELEV. 1497.0 FT.

WATER LEVEL DATA (IF APPLICABLE)

COMPLETION: DEPTH Dry FT.
ELEV. FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. FT.

BORING ADVANCED BY:

POWER AUGERING X

WASHBORING

STRATUM DEPTH		SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
		FROM	TO			N-Value	Qp	LL	PI	%M	
FT.	ELEV.	FT.	FT.								
-											Topsoil 8 inches
2.5	1521.2	1.0	2.5	1	SS	14		58	27	34.8	Elastic SILT (MH) - Red brown; slightly moist to moist; stiff and very stiff (RESIDUUM)
5.0	1518.7	3.5	5.0	2	SS	14				28.5	
7.5	1516.2	6.0	7.5	3	SS	16				35.4	
10.0	1513.7	8.5	10.0	4	SS	10				22.0	
12.5	1511.2										Lean CLAY (CL) - Red tan; moist; firm to soft (RESIDUUM)
15.0	1508.7	13.5	15.0	5	SS	6				45.6	
17.5	1506.2										
20.0	1503.7	18.5	20.0	6	SS	3				54.2	

Log Continued

REMARKS: _____



SCMS Weaver Pike
Bluff City, Tennessee
GEOServices Project No.: 51-17019A

LOG OF BORING **C-2**

SHEET 2 OF 2

DRILLER Tri-State Drilling
ON-SITE REP. Shannon Snow

BORING NO. / LOCATION

C-2

DRY ON COMPLETION ?

Yes

DATE August 3, 2017 SURFACE ELEV. 1523.7 FT.
REFUSAL: Yes DEPTH 26.7 FT. ELEV. 1497.0 FT.
SAMPLED 26.7 FT. 8.1 M
TOP OF ROCK DEPTH 26.7 FT. ELEV. 1497.0 FT.
BEGAN CORING DEPTH FT. ELEV. FT.
FOOTAGE CORED (LF) FT.
BOTTOM OF HOLE DEPTH 26.7 FT. ELEV. 1497.0 FT.

WATER LEVEL DATA (IF APPLICABLE)

COMPLETION: DEPTH Dry FT.
ELEV. FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. FT.

BORING ADVANCED BY:

POWER AUGERING X

WASHBORING

STRATUM				SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION									
DEPTH				FROM	TO			RESULTS		RESULTS												
FT.	IN	IN	ELEV.	FT.	FT.			N-Value	Qp	LL	PI	%M										
22.5	-	-	1501.2	23.5	25.0	7	SS	2				44.1	Lean CLAY (CL) - Red tan; moist; very soft (RESIDUUM)									
25.0	-	-	1498.7																			
27.5	-	-	1496.2																			
30.0	-	-	1493.7																			
32.5	-	-	1491.2																			
35.0	-	-	1488.7																			
37.5	-	-	1486.2																			
40.0	-	-	1483.7																			
Auger Refusal at 26.7 feet																						

REMARKS: _____



SCMS Weaver Pike
Bluff City, Tennessee
GEOServices Project No.: 51-17019A

LOG OF BORING **C-3**

SHEET 1 OF 1

DRILLER Tri-State Drilling
ON-SITE REP. Shannon Snow

BORING NO. / LOCATION

C-3

DRY ON COMPLETION ?

Yes

DATE August 3, 2017 SURFACE ELEV. 1530.7 FT.
REFUSAL: No DEPTH FT. ELEV. FT.
SAMPLED 20.0 FT. 6.1 M
TOP OF ROCK DEPTH FT. ELEV. FT.
BEGAN CORING DEPTH FT. ELEV. FT.
FOOTAGE CORED (LF) FT.
BOTTOM OF HOLE DEPTH 20.0 FT. ELEV. 1510.7 FT.

WATER LEVEL DATA (IF APPLICABLE)

COMPLETION: DEPTH Dry FT.
ELEV. FT.

AFTER 24 HRS. DEPTH TNP FT.
ELEV. FT.

BORING ADVANCED BY:

POWER AUGERING X

WASHBORING

STRATUM DEPTH		SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
		FROM	TO			N-Value	Qp	LL	PI	%M	
FT.	ELEV.	FT.	FT.								
-											Topsoil 10 inches
-											Elastic SILT (MH) with chert - Red brown; slightly moist; stiff (RESIDUUM)
2.5	1528.2	1.0	2.5	1	SS	13				24.9	
-											Elastic SILT (MH) - Red brown; moist; stiff to very stiff (RESIDUUM)
5.0	1525.7	3.5	5.0	2	SS	15				35.2	
-											Elastic SILT (MH) with rock fragments - Red brown; slightly moist; very stiff (RESIDUUM)
7.5	1523.2	6.0	7.5	3	SS	16				41.5	
-											Elastic SILT (MH) with rock fragments - Red brown; slightly moist; very stiff (RESIDUUM)
10.0	1520.7	8.5	10.0	4	SS	17				24.4	
-											Elastic SILT (MH) - Red brown; moist; stiff (RESIDUUM)
12.5	1518.2										
-											Elastic SILT (MH) - Red brown; moist; stiff (RESIDUUM)
15.0	1515.7	13.5	15.0	5	SS	12				42.8	
-											Elastic SILT (MH) - Red brown; moist; stiff (RESIDUUM)
17.5	1513.2										
-											Elastic SILT (MH) - Red brown; moist; stiff (RESIDUUM)
20.0	1510.7	18.5	20.0	6	SS	10				35.5	

Boring Terminated at 20 feet

REMARKS:



SCMS Weaver Pike
Bluff City, Tennessee
GEOServices Project No.: 51-17019A

LOG OF BORING **C-4**

SHEET 1 OF 2

DRILLER Tri-State Drilling
ON-SITE REP. Shannon Snow

BORING NO. / LOCATION

C-4

DRY ON COMPLETION ?

Yes

DATE August 3, 2017 SURFACE ELEV. 1528.4 FT.
REFUSAL: Yes DEPTH 24.5 FT. ELEV. 1503.9 FT.
SAMPLED 24.5 FT. 7.5 M
TOP OF ROCK DEPTH 24.5 FT. ELEV. 1503.9 FT.
BEGAN CORING DEPTH FT. ELEV. FT.
FOOTAGE CORED (LF) FT.
BOTTOM OF HOLE DEPTH 24.5 FT. ELEV. 1503.9 FT.

WATER LEVEL DATA (IF APPLICABLE)

COMPLETION: DEPTH Dry FT.
ELEV. FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. FT.

BORING ADVANCED BY:

POWER AUGERING X

WASHBORING

STRATUM DEPTH		SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
		FROM	TO			N-Value	Qp	LL	PI	%M	
FT.	ELEV.	FT.	FT.								
-											Topsoil 12 inches
2.5	1525.9	1.0	2.5	1	SS	10				12.4	
5.0	1523.4	3.5	5.0	2	SS	16		58	26	31.8	Elastic SILT (MH) - Tan brown; moist; stiff to very stiff (RESIDUUM)
7.5	1520.9	6.0	7.5	3	SS	21				37.1	
10.0	1518.4	8.5	10.0	4	SS	11				42.0	Lean CLAY (CL) - Red tan; moist; stiff to firm (RESIDUUM)
15.0	1513.4	13.5	15.0	5	SS	5				49.5	
17.5	1510.9										Lean CLAY (CL) - Red tan; very moist; very soft (RESIDUUM)
20.0	1508.4	18.5	20.0	6	SS	2				36.8	

Log Continued

REMARKS:



SCMS Weaver Pike
Bluff City, Tennessee
GEOServices Project No.: 51-17019A

LOG OF BORING **C-4**

SHEET 2 OF 2

DRILLER Tri-State Drilling
ON-SITE REP. Shannon Snow

BORING NO. / LOCATION

C-4

DRY ON COMPLETION ?

Yes

DATE August 3, 2017 SURFACE ELEV. 1528.4 FT.
REFUSAL: Yes DEPTH 24.5 FT. ELEV. 1503.9 FT.
SAMPLED 24.5 FT. 7.5 M
TOP OF ROCK DEPTH 24.5 FT. ELEV. 1503.9 FT.
BEGAN CORING DEPTH FT. ELEV. FT.
FOOTAGE CORED (LF) FT.
BOTTOM OF HOLE DEPTH 24.5 FT. ELEV. 1503.9 FT.

WATER LEVEL DATA (IF APPLICABLE)

COMPLETION: DEPTH Dry FT.
ELEV. FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. FT.

BORING ADVANCED BY:

POWER AUGERING X

WASHBORING

STRATUM DEPTH		SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
		FROM	TO			N-Value	Qp	LL	PI	%M	
FT.	ELEV.	FT.	FT.								
22.5	1505.9										Lean CLAY (CL) - Red tan; very moist; hard (RESIDUUM)
25.0	1503.4	23.5	24.5	7	SS	50/0**				32.4	
27.5	1500.9										Auger Refusal at 24.5 feet
30.0	1498.4										
32.5	1495.9										
35.0	1493.4										
37.5	1490.9										
40.0	1488.4										

REMARKS: *Inflated N-values due to encountering rock fragments prior to completion of test interval.



SCMS Weaver Pike
Bluff City, Tennessee
GEOServices Project No.: 51-17019A

LOG OF BORING **C-5**

SHEET 1 OF 2

DRILLER Tri-State Drilling
ON-SITE REP. Shannon Snow

BORING NO. / LOCATION C-5 DRY ON COMPLETION ? Yes

DATE August 3, 2017 SURFACE ELEV. 1529.6 FT.
REFUSAL: Yes DEPTH 34.5 FT. ELEV. 1495.1 FT.
SAMPLED 34.5 FT. 10.5 M
TOP OF ROCK DEPTH 34.5 FT. ELEV. 1495.1 FT.
BEGAN CORING DEPTH FT. ELEV. FT.
FOOTAGE CORED (LF) FT.
BOTTOM OF HOLE DEPTH 34.5 FT. ELEV. 1495.1 FT.

WATER LEVEL DATA (IF APPLICABLE)
COMPLETION: DEPTH Dry FT.
ELEV. FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. FT.

BORING ADVANCED BY: POWER AUGERING X WASHBORING

STRATUM DEPTH		SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
		FROM	TO			N-Value	Qp	LL	PI	%M	
FT.	ELEV.	FT.	FT.								
-											Topsoil 10 inches
2.5	1527.1	1.0	2.5	1	SS	12				21.0	Elastic SILT (MH) - Red brown; slightly moist; stiff (RESIDUUM)
5.0	1524.6	3.5	5.0	2	SS	15				19.7	
7.5	1522.1	6.0	7.5	3	SS	12				17.2	
10.0	1519.6	8.5	10.0	4	SS	9				24.7	
12.5	1517.1										Lean CLAY (CL) - Red tan; moist; stiff to firm (RESIDUUM)
15.0	1514.6	13.5	15.0	5	SS	10				20.1	
17.5	1512.1										
20.0	1509.6	18.5	20.0	6	SS	7				19.9	

Log Continued

REMARKS:



**SCMS Weaver Pike
Bluff City, Tennessee**
GEOServices Project No.: 51-17019A

LOG OF BORING **C-5**

SHEET 2 OF 2

DRILLER Tri-State Drilling
ON-SITE REP. Shannon Snow

BORING NO. / LOCATION

C-5

DRY ON COMPLETION ?

Yes

DATE August 3, 2017 SURFACE ELEV. 1529.6 FT.
REFUSAL: Yes DEPTH 34.5 FT. ELEV. 1495.1 FT.
SAMPLED 34.5 FT. 10.5 M
TOP OF ROCK DEPTH 34.5 FT. ELEV. 1495.1 FT.
BEGAN CORING DEPTH FT. ELEV. FT.
FOOTAGE CORED (LF) FT.
BOTTOM OF HOLE DEPTH 34.5 FT. ELEV. 1495.1 FT.

WATER LEVEL DATA (IF APPLICABLE)

COMPLETION: DEPTH Dry FT.
ELEV. FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. FT.

BORING ADVANCED BY:

POWER AUGERING X

WASHBORING

STRATUM DEPTH		SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
		FROM	TO			N-Value	Qp	LL	PI	%M	
FT.	ELEV.	FT.	FT.								
22.5	1507.1										Lean CLAY (CL) - Red tan; moist; firm (RESIDUUM)
		23.5	25.0	7	SS	8				23.3	
25.0	1504.6										Lean CLAY (CL) with sand - Brown; moist; very soft (RESIDUUM)
		28.5	30.0	8	SS	1				39.3	
27.5	1502.1										Auger Refusal at 34.5 feet
		33.5	34.2	9	SS	50/2**				35.9	
30.0	1499.6										
32.5	1497.1										
35.0	1494.6										
37.5	1492.1										
40.0	1489.6										

REMARKS: *Inflated N-values due to encountering rock fragments prior to completion of test interval.

APPENDIX B

Soil Laboratory Data

SOIL DATA SUMMARY
SCMS Weaver Pike - Bluff City Tennessee
GEOServices Project No. 51-17019A
August 11, 2017

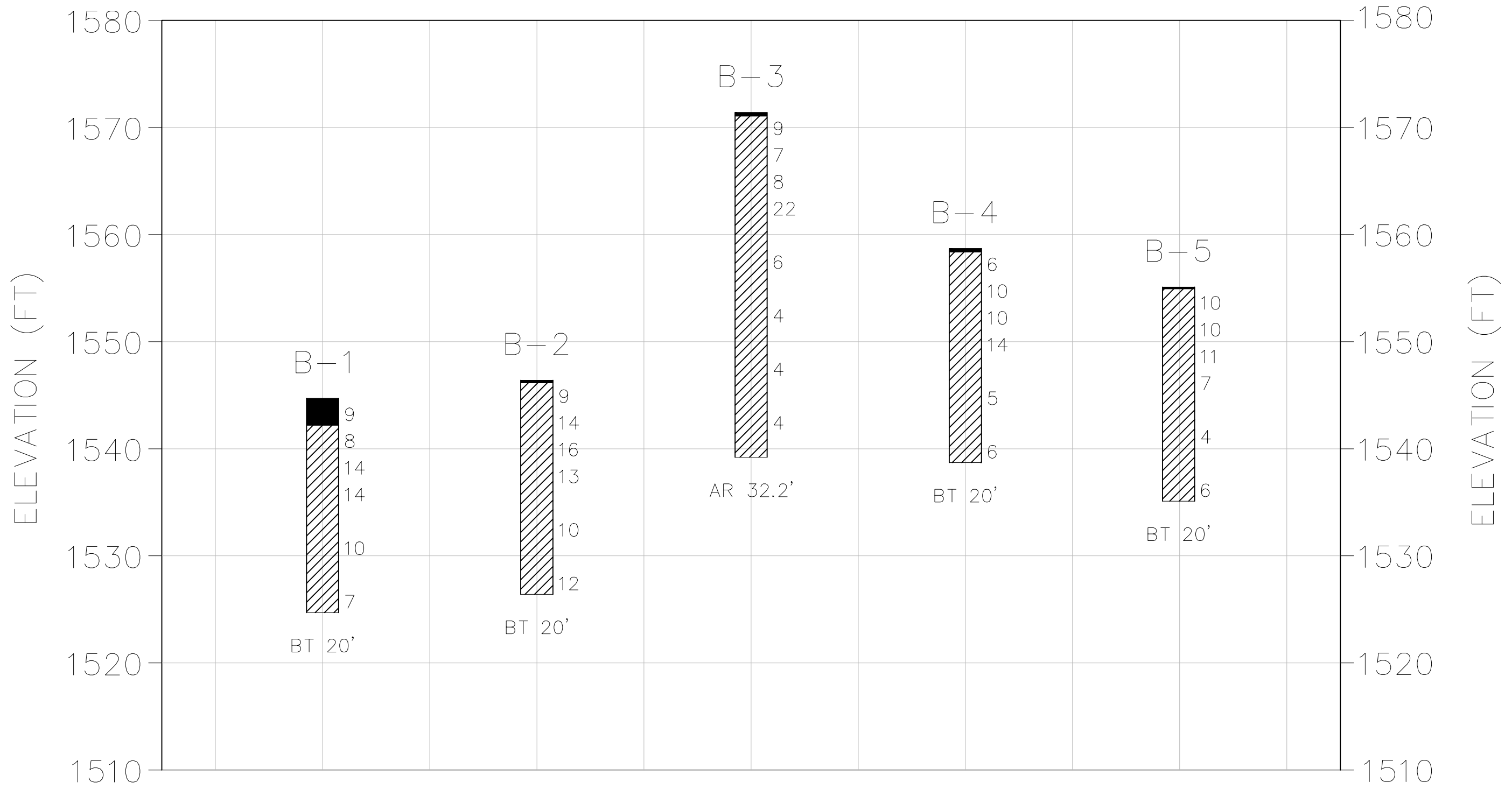
Boring Number	Sample Number	Depth (feet)	Natural Moisture Content	Atterberg Limits			Soil Type
				LL	PL	PI	
C-1	1	1.0 - 2.5	18.4%				
	2	3.5 - 5.0	24.5%				
	3	6.0 - 7.5	27.1%				
	4	8.5 - 10.0	21.0%				
	5	13.5 - 15.0	31.9%				
	6	18.5 - 20.0	30.6%				
	7	23.5 - 25.0	33.7%				
C-2	1	1.0 - 2.5	34.8%				
	2	3.5 - 5.0	28.5%	58	31	27	MH
	3	6.0 - 7.5	35.4%				
	4	8.5 - 10.0	22.0%				
	5	13.5 - 15.0	45.6%				
	6	18.5 - 20.0	54.2%				
	7	23.5 - 25.0	44.1%				
C-3	1	1.0 - 2.5	24.9%				
	2	3.5 - 5.0	35.2%				
	3	6.0 - 7.5	41.5%				
	4	8.5 - 10.0	24.4%				
	5	13.5 - 15.0	42.8%				
	6	18.5 - 20.0	35.5%				
C-4	1	1.0 - 2.5	12.4%				
	2	3.5 - 5.0	31.8%	58	32	26	MH
	3	6.0 - 7.5	37.1%				
	4	8.5 - 10.0	42.3%				
	5	13.5 - 15.0	49.5%				
	6	18.5 - 20.0	36.8%				
	7	23.5 - 25.0	32.4%				
C-5	1	1.0 - 2.5	21.0%				
	2	3.5 - 5.0	19.7%				
	3	6.0 - 7.5	17.2%				
	4	8.5 - 10.0	24.7%				
	5	13.5 - 15.0	20.1%				
	6	18.5 - 20.0	19.9%				
	7	23.5 - 25.0	23.3%				
	8	28.5 - 30.0	39.3%				
	9	33.5 - 35.0	35.9%				

APPENDIX C

Boring Information from March 2017 Borings

LEGEND:

- TOPSOIL
- RESIDUUM



GEOS

Services, LLC-Geotechnical and Materials Engineers

10368 Wallace Alley Street, Suite 5

Kingsport, Tennessee 37663

Phone: (423) 212-2163

DRAWN BY:	DKA
APPROVED BY:	AJM
SCALE:	NTS
JOB NO:	51-17019
DATE:	3/15/2017

SOIL BORING PROFILES

SCMS Weaver Pike

Bluff City, Tennessee

NOTES:

- 1.) BORING LOCATIONS ARE SHOWN IN GENERAL ARRANGMENT ONLY.
- 2.) DO NOT USE BORING LOCATIONS FOR DETERMINATIONS OF DISTANCES OR QUANTITIES.
- 3.) GROUND ELEVATIONS WERE SURVEYED BY: Alley & Associates, Inc.

FIGURE 3



SCMS Weaver Pike
Bluff City, Tennessee
GEOServices Project No.: 51-17019

LOG OF BORING **B-1**
SHEET 1 OF 1

DRILLER Michael Bowens
ON-SITE REP. _____

BORING NO. / LOCATION B-1 DRY ON COMPLETION ? Yes

DATE March 9, 2017 SURFACE ELEV. 1544.7 FT.
REFUSAL: No DEPTH _____ FT. ELEV. _____ FT.
SAMPLED 20.0 FT. 6.1 M
TOP OF ROCK DEPTH _____ FT. ELEV. _____ FT.
BEGAN CORING DEPTH _____ FT. ELEV. _____ FT.
FOOTAGE CORED (LF) _____ FT.
BOTTOM OF HOLE DEPTH 20.0 FT. ELEV. 1524.7 FT.

WATER LEVEL DATA (IF APPLICABLE)
COMPLETION: DEPTH Dry FT.
ELEV. _____ FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. _____ FT.

BORING ADVANCED BY: _____ POWER AUGERING X WASHBORING _____

STRATUM DEPTH		SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
FT.	ELEV.	FROM FT.	TO FT.			N-Value	Qp	LL	PI	%M	
—	—	—	—	—	—	—	—	—	—	—	Agriculturally Disturbed Soil
2.5	1542.2	1.0	2.5	1	SS	9	—	—	—	23.5	
—	—	—	—	—	—	—	—	—	—	—	Silty CLAY (CL) - Tan brown; moist; firm (RESIDUUM)
5.0	1539.7	3.5	5.0	2	SS	8	—	—	—	33.3	
—	—	—	—	—	—	—	—	—	—	—	Silty CLAY (CL) - Red tan brown; moist; stiff to firm (RESIDUUM)
7.5	1537.2	6.0	7.5	3	SS	14	—	—	—	37.8	
—	—	—	—	—	—	—	—	—	—	—	
10.0	1534.7	8.5	10.0	4	SS	14	—	—	—	41.9	
—	—	—	—	—	—	—	—	—	—	—	
12.5	1532.2	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	—	—	
15.0	1529.7	13.5	15.0	5	SS	10	—	—	—	37.1	
—	—	—	—	—	—	—	—	—	—	—	
17.5	1527.2	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	—	—	
20.0	1524.7	18.5	20.0	6	SS	7	—	—	—	31.4	

Boring Terminated at 20.0 feet

REMARKS: _____



SCMS Weaver Pike
Bluff City, Tennessee
GEOServices Project No.: 51-17019

LOG OF BORING **B-2**
SHEET 1 OF 1

DRILLER Michael Bowens
ON-SITE REP. _____

BORING NO. / LOCATION B-2 DRY ON COMPLETION ? Yes

DATE March 9, 2017 SURFACE ELEV. 1546.1 FT.
REFUSAL: No DEPTH _____ FT. ELEV. _____ FT.
SAMPLED 20.0 FT. 6.1 M
TOP OF ROCK DEPTH _____ FT. ELEV. _____ FT.
BEGAN CORING DEPTH _____ FT. ELEV. _____ FT.
FOOTAGE CORED (LF) _____ FT.
BOTTOM OF HOLE DEPTH 20.0 FT. ELEV. 1526.1 FT.

WATER LEVEL DATA (IF APPLICABLE)
COMPLETION: DEPTH Dry FT.
ELEV. _____ FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. _____ FT.

BORING ADVANCED BY: _____ POWER AUGERING X WASHBORING _____

STRATUM DEPTH		SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
FT.	ELEV.	FROM FT.	TO FT.			N-Value	Qp	LL	PI	%M	
—											Topsoil 7 inches
2.5	1543.6	1.0	2.5	1	SS	9				37.2	
5.0	1541.1	3.5	5.0	2	SS	14				38.6	
7.5	1538.6	6.0	7.5	3	SS	16				40.5	
10.0	1536.1	8.5	10.0	4	SS	13				44.3	
12.5	1533.6										Elastic SILT (MH) - Red brown; moist; stiff and very stiff (RESIDUUM)
15.0	1531.1	13.5	15.0	5	SS	10				46.6	
17.5	1528.6										
20.0	1526.1	18.5	20.0	6	SS	12				45.2	

Boring Terminated at 20.0 feet

REMARKS: _____



SCMS Weaver Pike
Bluff City, Tennessee
GEOServices Project No.: 51-17019

LOG OF BORING **B-3**
SHEET 1 OF 2

DRILLER Michael Bowens
ON-SITE REP. _____

BORING NO. / LOCATION B-3 DRY ON COMPLETION ? Yes

DATE March 9, 2017 SURFACE ELEV. 1571.4 FT.
REFUSAL: Yes DEPTH 32.2 FT. ELEV. 1539.2 FT.
SAMPLED 32.2 FT. 9.8 M
TOP OF ROCK DEPTH 32.2 FT. ELEV. 1539.2 FT.
BEGAN CORING DEPTH _____ FT. ELEV. _____ FT.
FOOTAGE CORED (LF) _____ FT.
BOTTOM OF HOLE DEPTH 32.2 FT. ELEV. 1539.2 FT.

WATER LEVEL DATA (IF APPLICABLE)
COMPLETION: DEPTH Dry FT.
ELEV. _____ FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. _____ FT.

BORING ADVANCED BY: _____ POWER AUGERING X WASHBORING _____

STRATUM DEPTH		SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
		FROM	TO			N-Value	Qp	LL	PI	%M	
FT.	ELEV.	FT.	FT.								
—											Topsoil 6 inches
2.5	1568.9	1.0	2.5	1	SS	9				22.9	Silty CLAY (CL) - Tan brown; moist; stiff to firm (RESIDUUM)
5.0	1566.4	3.5	5.0	2	SS	7				21.2	
7.5	1563.9	6.0	7.5	3	SS	8				28.7	Silty CLAY (CL) - Red tan brown; moist; firm (RESIDUUM)
10.0	1561.4	8.5	10.0	4	SS	22*				38.2	Silty CLAY (CL) - Red tan brown; moist; very stiff (RESIDUUM)
12.5	1558.9										
15.0	1556.4	13.5	15.0	5	SS	6				41.0	Silty CLAY (CL) - Red tan brown; moist; firm to soft (RESIDUUM)
17.5	1553.9										
20.0	1551.4	18.5	20.0	6	SS	4				40.3	

Log Continued

REMARKS: *Inflated N-values due to encountering rock fragments prior to completion of test interval.



SCMS Weaver Pike
Bluff City, Tennessee
GEOservices Project No.: 51-17019

LOG OF BORING **B-3**
SHEET 2 OF 2

DRILLER Michael Bowens
ON-SITE REP. _____

BORING NO. / LOCATION B-3 DRY ON COMPLETION ? Yes

DATE March 9, 2017 SURFACE ELEV. 1571.4 FT.
REFUSAL: Yes DEPTH 32.2 FT. ELEV. 1539.2 FT.
SAMPLED 32.2 FT. 9.8 M
TOP OF ROCK DEPTH 32.2 FT. ELEV. 1539.2 FT.
BEGAN CORING DEPTH _____ FT. ELEV. _____ FT.
FOOTAGE CORED (LF) _____ FT.
BOTTOM OF HOLE DEPTH 32.2 FT. ELEV. 1539.2 FT.

WATER LEVEL DATA (IF APPLICABLE)
COMPLETION: DEPTH Dry FT.
ELEV. _____ FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. _____ FT.

BORING ADVANCED BY: _____ POWER AUGERING X WASHBORING _____

STRATUM DEPTH				SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
				FROM	TO			N-Value	Qp	LL	PI	%M	
FT.			ELEV.	FT.	FT.								
22.5			1548.9										
25.0			1546.4	23.5	25.0	7	SS	4				24.1	
27.5			1543.9										
30.0			1541.4	28.5	30.0	8	SS	4				28.7	
32.5			1538.9										
35.0			1536.4										
37.5			1533.9										
40.0			1531.4										

REMARKS: _____



SCMS Weaver Pike
Bluff City, Tennessee
GEOServices Project No.: 51-17019

LOG OF BORING **B-4**
SHEET 1 OF 1

DRILLER Michael Bowens
ON-SITE REP. _____

BORING NO. / LOCATION B-4 DRY ON COMPLETION ? Yes

DATE March 9, 2017 SURFACE ELEV. 1558.7 FT.
REFUSAL: No DEPTH _____ FT. ELEV. _____ FT.
SAMPLED 20.0 FT. 6.1 M
TOP OF ROCK DEPTH _____ FT. ELEV. _____ FT.
BEGAN CORING DEPTH _____ FT. ELEV. _____ FT.
FOOTAGE CORED (LF) _____ FT.
BOTTOM OF HOLE DEPTH 20.0 FT. ELEV. 1538.7 FT.

WATER LEVEL DATA (IF APPLICABLE)
COMPLETION: DEPTH Dry FT.
ELEV. _____ FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. _____ FT.

BORING ADVANCED BY: _____ POWER AUGERING X WASHBORING _____

STRATUM DEPTH		SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
FT.	ELEV.	FROM FT.	TO FT.			N-Value	Qp	LL	PI	%M	
—	—	—	—	—	—	—	—	—	—	—	Topsoil 8 inches
2.5	1556.2	1.0	2.5	1	SS	6	—	—	—	21.4	Silty CLAY (CL) - Red brown; moist; firm to stiff (RESIDUUM)
5.0	1553.7	3.5	5.0	2	SS	10	—	—	—	22.5	—
7.5	1551.2	6.0	7.5	3	SS	10	—	—	—	32.8	Silty CLAY (CL) with chert - Red tan; moist; stiff (RESIDUUM)
10.0	1548.7	8.5	10.0	4	SS	14	—	—	—	28.4	—
12.5	1546.2	—	—	—	—	—	—	—	—	—	—
15.0	1543.7	13.5	15.0	5	SS	5	—	—	—	35.9	Silty CLAY (CL) with sand - Tan brown; moist; stiff to firm (RESIDUUM)
17.5	1541.2	—	—	—	—	—	—	—	—	—	—
20.0	1538.7	18.5	20.0	6	SS	6	—	—	—	18.7	—

Boring Terminated at 20.0 feet

REMARKS: _____



SCMS Weaver Pike
Bluff City, Tennessee
GEOServices Project No.: 51-17019

LOG OF BORING **B-5**
SHEET 1 OF 1

DRILLER Michael Bowens
ON-SITE REP. _____

BORING NO. / LOCATION B-5 DRY ON COMPLETION ? Yes

DATE March 9, 2017 SURFACE ELEV. 1555.1 FT.
REFUSAL: No DEPTH _____ FT. ELEV. _____ FT.
SAMPLED 20.0 FT. 6.1 M
TOP OF ROCK DEPTH _____ FT. ELEV. _____ FT.
BEGAN CORING DEPTH _____ FT. ELEV. _____ FT.
FOOTAGE CORED (LF) _____ FT.
BOTTOM OF HOLE DEPTH 20.0 FT. ELEV. 1535.1 FT.

WATER LEVEL DATA (IF APPLICABLE)
COMPLETION: DEPTH Dry FT.
ELEV. _____ FT.
AFTER 24 HRS. DEPTH TNP FT.
ELEV. _____ FT.

BORING ADVANCED BY: _____ POWER AUGERING X WASHBORING _____

STRATUM DEPTH		SAMPLE DEPTH		SAMPLE OR RUN NO.	SAMPLE TYPE	FIELD RESULTS		LABORATORY RESULTS			STRATUM DESCRIPTION
FT.	ELEV.	FROM FT.	TO FT.			N-Value	Qp	LL	PI	%M	
—											Topsoil 7 inches
2.5	1552.6	1.0	2.5	1	SS	10				34.0	Silty CLAY (CL) - Red brown; moist; stiff to firm (RESIDUUM)
5.0	1550.1	3.5	5.0	2	SS	10				42.4	
7.5	1547.6	6.0	7.5	3	SS	11				40.6	
10.0	1545.1	8.5	10.0	4	SS	7				42.5	
12.5	1542.6										Silty CLAY (CL) - Tan brown; moist; firm to soft (RESIDUUM)
15.0	1540.1	13.5	15.0	5	SS	4				45.5	
17.5	1537.6										Silty CLAY (CL) with weathered rock - Red tan brown; moist; firm (RESIDUUM)
20.0	1535.1	18.5	20.0	6	SS	6				58.5	

Boring Terminated at 20.0 feet

REMARKS: _____

SOIL DATA SUMMARY
SCMS Weaver Pike - Bluff City, Tennessee
GEOServices Project No. 51-17019
March 10, 2017

Boring Number	Sample Number	Depth (feet)	Natural Moisture Content	Atterberg Limits			Soil Type
				LL	PL	PI	
B-1	1	1.0 - 2.5	23.5%				
	2	3.5 - 5.0	33.3%				
	3	6.0 - 7.5	37.8%				
	4	8.5 - 10.0	41.9%				
	5	13.5 - 15.0	37.1%				
	6	18.5 - 20.0	31.4%				
B-2	1	1.0 - 2.5	37.2%	57	31	26	MH
	2	3.5 - 5.0	38.6%				
	3	6.0 - 7.5	40.5%				
	4	8.5 - 10.0	44.3%				
	5	13.5 - 15.0	46.6%				
	6	18.5 - 20.0	45.2%				
B-3	1	1.0 - 2.5	22.9%	43	24	19	CL
	2	3.5 - 5.0	21.2%				
	3	6.0 - 7.5	28.7%				
	4	8.5 - 10.0	38.2%				
	5	13.5 - 15.0	41.0%				
	6	18.5 - 20.0	40.3%				
	7	23.5 - 25.0	24.1%				
	8	28.5 - 30.0	28.7%				
B-4	1	1.0 - 2.5	21.4%				
	2	3.5 - 5.0	22.5%				
	3	6.0 - 7.5	32.8%				
	4	8.5 - 10.0	28.4%				
	5	13.5 - 15.0	35.9%				
	6	18.5 - 20.0	18.7%				
B-5	1	1.0 - 2.5	34.0%				
	2	3.5 - 5.0	42.4%				
	3	6.0 - 7.5	40.6%				
	4	8.5 - 10.0	42.5%				
	5	13.5 - 15.0	45.5%				
	6	18.5 - 20.0	58.5%				

MOISTURE-DENSITY RELATIONSHIP

JOB NUMBER : **51-17019**

JOB NAME : SCMS Weaver Pike

DEPTH: 0-10'

DATE RECEIVED : 3-10-17

DATE COMPLETED : 3-15-17

SAMPLE LOCATION: B-2

METHOD OF TEST : AASHTO T99

METHOD OF SAMPLE PREPARATION : DRY

HAMMER TYPE : MANUAL

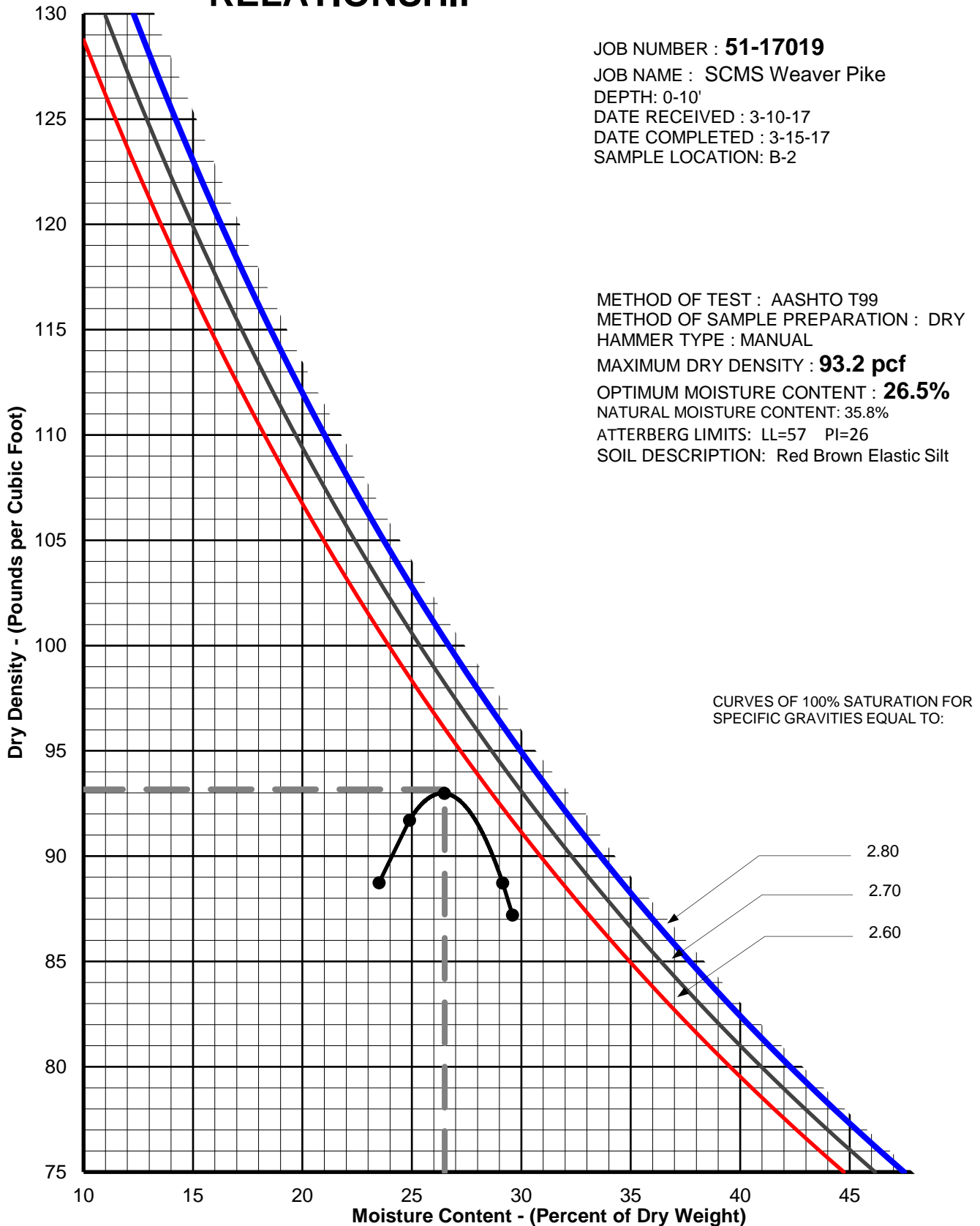
MAXIMUM DRY DENSITY : **93.2 pcf**

OPTIMUM MOISTURE CONTENT : **26.5%**

NATURAL MOISTURE CONTENT: 35.8%

ATTERBERG LIMITS: LL=57 PI=26

SOIL DESCRIPTION: Red Brown Elastic Silt



This document was prepared pursuant to a specific agreement to address the unique requirements of a GEOServices, LLC client. Prior to further use, a GEOServices, LLC professional should be contacted for a complete explanation of its preparation and contents.

MOISTURE-DENSITY RELATIONSHIP

JOB NUMBER : **51-17019**

JOB NAME : SCMS Weaver Pike

DEPTH: 0-10'

DATE RECEIVED : 3-10-17

DATE COMPLETED : 3-15-17

SAMPLE LOCATION: B-3

METHOD OF TEST : AASHTO T99

METHOD OF SAMPLE PREPARATION : DRY
HAMMER TYPE : MANUAL

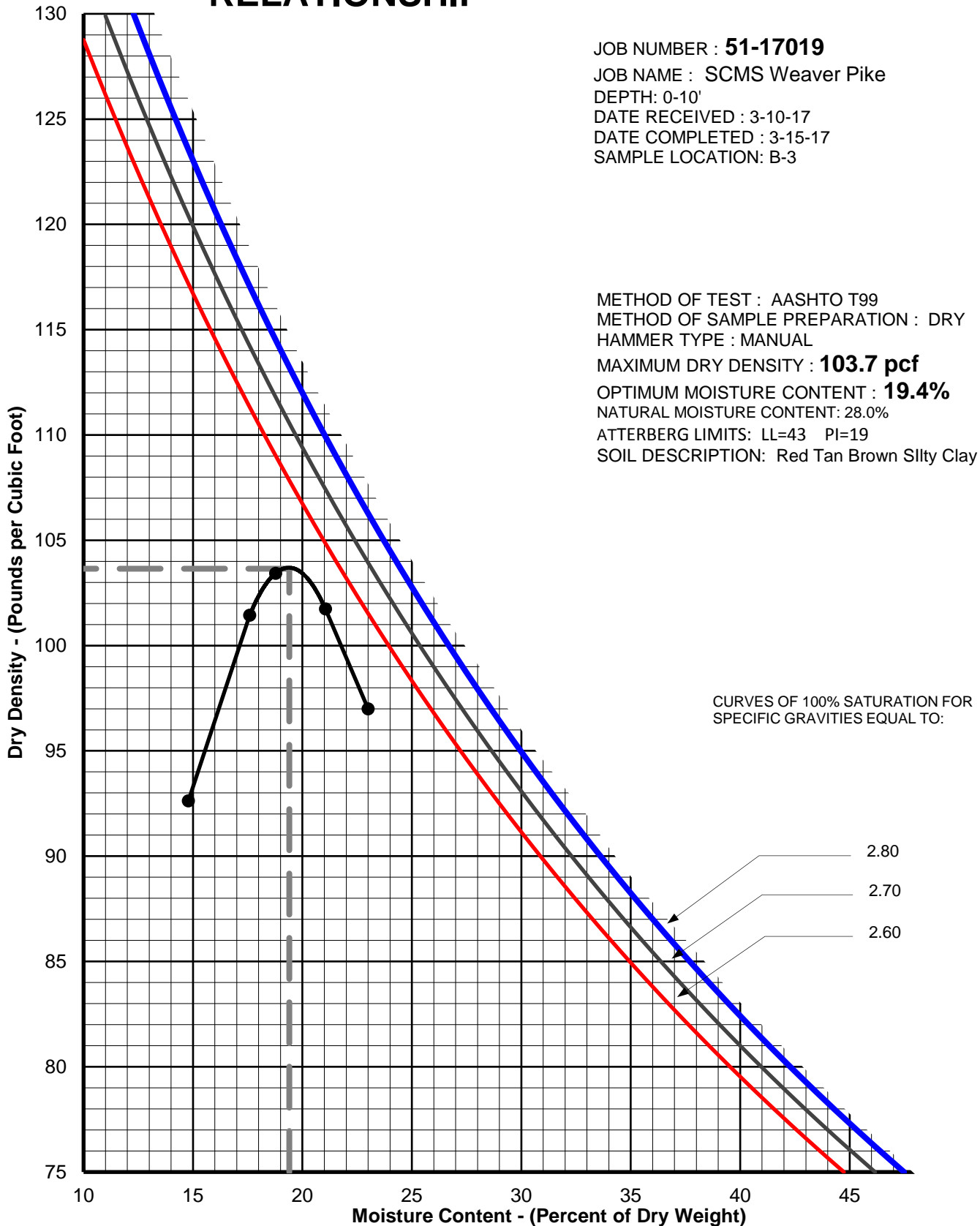
MAXIMUM DRY DENSITY : **103.7 pcf**

OPTIMUM MOISTURE CONTENT : **19.4%**

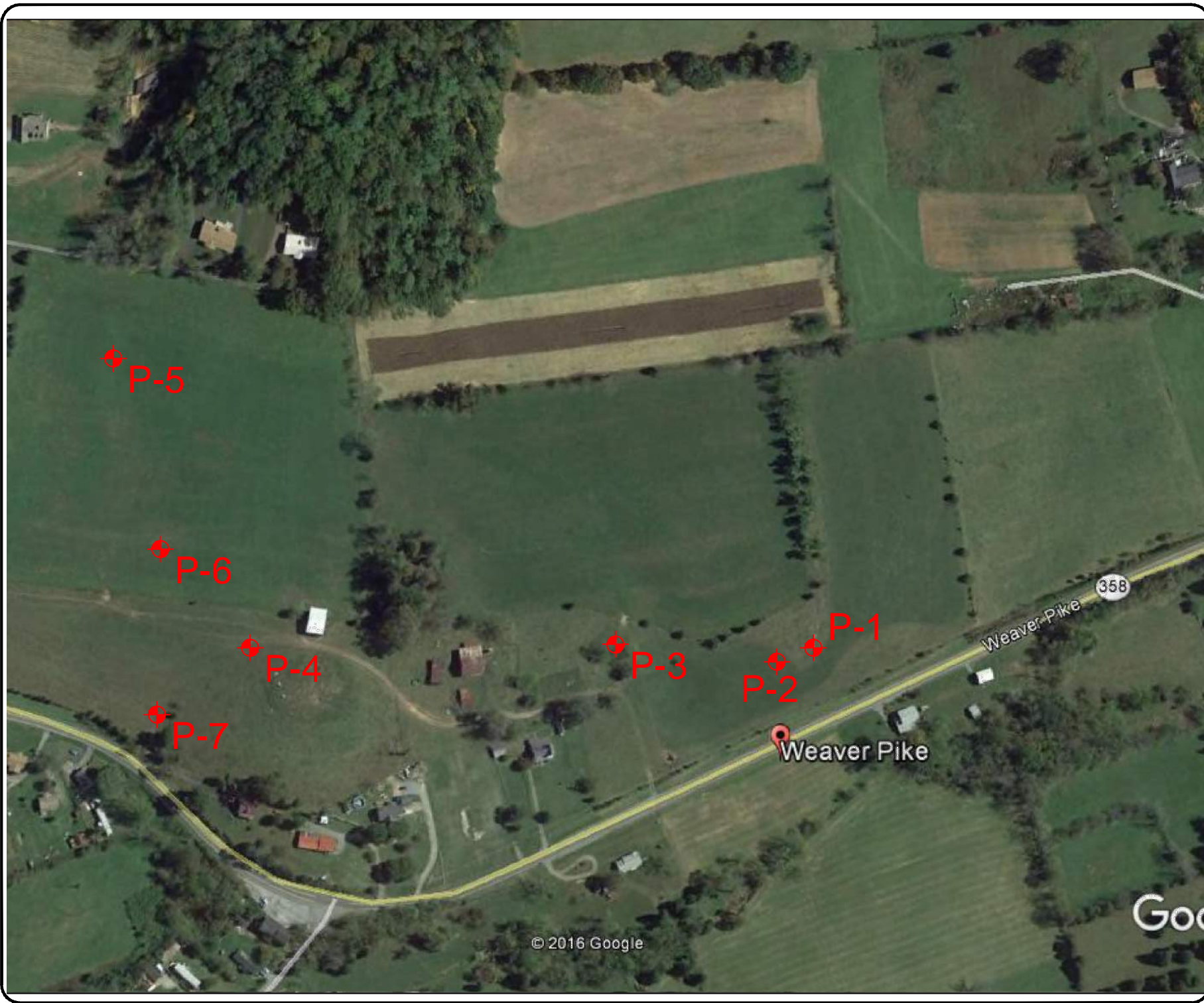
NATURAL MOISTURE CONTENT: 28.0%

ATTERBERG LIMITS: LL=43 PI=19

SOIL DESCRIPTION: Red Tan Brown Silty Clay



This document was prepared pursuant to a specific agreement to address the unique requirements of a GEOServices, LLC client. Prior to further use, a GEOServices, LLC professional should be contacted for a complete explanation of its preparation and contents.



NOTES:
1.) PHOTO LOCATIONS ARE SHOWN IN GENERAL
ARRANGMENT ONLY.
2.) BASE MAP PROVIDED BY Google Earth.



PHOTO LOCATION PLAN

SCMS Weaver Pike

Sullivan County, Tennessee

DRAWN BY:	AIM
APPROVED BY:	AIM
SCALE:	NTS
JOB NO.:	51-17019
DATE:	3/3/2017



GEOS
Environmental and Materials Engineering
10068 Wallace Alley Street Suite 5
Kingsport, Tennessee 37663
Phone: (423) 212-2163

FIGURE 4


Photo 1		
		Date: 2/3/2017 Photographer: Alex J. Merritt, P.E.
Location / Orientation	P-1: Eastern portion of property near proposed football field	
Remarks	Note numerous rock outcroppings	


Photo 2		
		Date: 2/3/2017 Photographer: Alex J. Merritt, P.E.
Location / Orientation	P-2: Eastern portion of property near proposed football field looking northwest	
Remarks		

Photo 3



Date: 2/3/2017

Photographer: Alex J. Merritt, P.E.

Location / Orientation

P-3: Central portion of property near proposed athletic fields looking west

Remarks

Note numerous rock outcroppings near barn

Photo 4



Date: 2/3/2017

Photographer: Alex J. Merritt, P.E.

Location / Orientation

P-4: Western portion of property near proposed school building looking south

Remarks


Photo 5		
		Date: 2/3/2017
		Photographer: Alex J. Merritt, P.E.
Location / Orientation	P-5: Northwest corner of property looking northwest to adjacent property	
Remarks	Note numerous rock outcroppings in the far ground of photograph	



Photo 6		
		Date: 2/3/2017
		Photographer: Alex J. Merritt, P.E.
Location / Orientation	P-6: Western portion of property near proposed building footprint looking northeast	
Remarks		

Photo 7		
		Date: 2/3/2017
		Photographer: Alex J. Merritt, P.E.
Location / Orientation	P-7: Southwestern portion of property along Weaver Pike	
Remarks	Note numerous rock outcroppings	

Sullivan East Middle School
Classroom Addition
Bluff City, Tennessee

B I D F O R M

TO: OWNER: Sullivan County Tennessee
 ADDRESS: 3411 Highway 126
 Blountville, TN 37617

BID TRANSMITTED IN CARE OF: Michelle Ramey, Chief Deputy Purchasing Agent
 Sullivan County Courthouse
 3411 Highway 126
 Blountville, TN 37617

FROM: BIDDER: _____

ADDRESS: _____

CITY/STATE/ZIP: _____

TELEPHONE: _____

TN. LICENSE NO: _____

LICENSE EXPIRATION DATE: _____

THE ABOVE STATED BIDDER IS:

_____ AN INDIVIDUAL

_____ A CORPORATION

_____ A PARTNERSHIP

_____ A JOINT VENTURE CONSISTING OF:

AND IS LICENSED TO DO BUSINESS IN THE STATE OF TENNESSEE,
FOR THE WORK SPECIFIED.

GENTLEMEN:

1. Having examined the plans and specifications, having visited the site of the proposed work, and being completely familiar with the local conditions affecting the cost of the work, and having carefully examined the construction bidding documents with addenda prepared by Cain Rash West Architects and entitled "SULLIVAN EAST MIDDLE SCHOOL CLASSROOM ADDITION",

2. I, (We) propose to execute the portion of the work identified as "**Sullivan East Middle School Classroom Addition**" for the stipulated sum of: (sums shall be in written and numerical form)

Lump Sum Base Bid _____

_____ DOLLARS

(\$ _____).

Proposed Project Duration _____ (_____) Days

****Base Bid shall include an Owner's Contingency of 5% which shall be listed as a line item on the Schedule of Values. Use of Contingency is based upon approval by Owner. Remaining Contingency funds not utilized on the project will be credited back to the Owner.**

****Liquidated Damages shall be \$200 per day if the project exceeds the proposed project duration. Note: Owner is aware of material availability issues – if all reasonable efforts to obtain materials have been made and documented and are not available to complete the project on time, the contractor will not be penalized.**

3. The undersigned agrees to complete all of the work described by the "Contract Documents" and have the space fully ready for occupancy, including any Alternates.
4. The undersigned agrees to commence work under this contract within three working days of receipt of Notice to Proceed.
5. The undersigned agrees that this bid shall be good and may not be withdrawn for a period of (60) sixty calendar days after the scheduled closing time for receiving bids.
6. The undersigned, upon receipt of written notice of the acceptance of this bid, agrees to deliver, to the owner or his agent, the architect, the required performance bond, labor and material payment bond and certificate of insurance in accordance with the specifications and instructions to bidders.

7. The undersigned hereby acknowledges receipt of:

ADDENDUM NO.

DATE

This proposal is respectfully submitted

By: _____

Title: _____

Firm name: _____

Business address: _____

(Seal if this bid is submitted by a Corporation)

This Bid Form consists of three (3) pages.

END OF BID FORM