DRAFT Report of Geotechnical Exploration
UK Gatton College of Business & Economics Expansion
Lexington, Kentucky
S&ME Project No. 25830176

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February 13, 2026

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Ross Tarrant Architects
101 Old Lafayette Avenue
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Attention: Mr. Michael Mays, PE

Reference: **DRAFT Report of Geotechnical Exploration**
University of Kentucky Gatton College of Business & Economics Expansion
Lexington, Kentucky
S&ME Project No. 25830176

Dear Mr. Mays:

S&ME, Inc. (S&ME) has completed our geotechnical exploration for the expansion of the University of Kentucky Gatton College of Business & Economics building located on the University of Kentucky campus in Lexington, Kentucky. We performed our work in general accordance with S&ME Proposal No. 25830176 dated November 7, 2025 and authorized by Mr. Randy Brookshire of Ross Tarrant Architects on November 24, 2025. The purpose of this exploration was to obtain subsurface data at the site and provide geotechnical recommendations for design and construction of the building expansion.

This report explains our understanding of the project, documents our findings, and presents our conclusion and engineering recommendations.

Sincerely,

S&ME, Inc.

William J. Young, PE
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1.0 Introduction

S&ME, Inc. (S&ME) has completed our geotechnical exploration for the expansion of the University of Kentucky Gatton College of Business & Economics building located on the University of Kentucky campus in Lexington, Kentucky. We performed our work in general accordance with S&ME Proposal No. 25830176 dated November 7, 2025 and authorized by Mr. Randy Brookshire of Ross Tarrant Architects on November 24, 2025. The purpose of this exploration was to obtain subsurface data at the site and provide geotechnical recommendations for design and construction of the building expansion.

This report explains our understanding of the project, documents our findings, and presents our conclusion and engineering recommendations.

2.0 Project and Site Description

A new, approximately 20,000 square-foot, addition to the existing Gatton College of Business & Economics is proposed to be constructed at 550 South Limestone, Lexington, Kentucky. Figure 1 in Appendix I shows the approximate project site location.

A schematic site development plan was included in the RFP (File Name: 251030-SME-GEOTECH-25021.pdf) provided via email on October 31, 2025, with a proposed boring location plan and the requested work scope for the exploration and report. Specifically, the new building addition will adjoin the existing building extend to the southwest which will require the demolition of the existing Matthews Building.

Beyond the building addition, the improvements will also consist of new plaza spaces, concrete curbs, and walks. No new pavement areas are proposed as part of this project. It is expected the new foundation system for the building addition will be rock bearing. It should be noted that the existing foundation system for the UK Gatton College of Business & Economics is comprised of drilled shafts and shallow spread footings bearing on bedrock. The preliminary maximum column load was supplied as 500 kips, while the maximum continuous foundation load was supplied as 14 kips per lineal foot.

Although the existing Matthews Building will be demolished as part of the proposed building expansion project, the existing Burr oak tree is to remain. This tree is located on the southwest corner of the existing Gatton College facility and is of great importance to the University.

Review of provided site topographic information indicates the site is generally nearly level to gently sloping, with a maximum of about 4 feet of relief across the property (with elevations generally decreasing, moving west to east) extending to the east side of the Matthews Building. The relief extends to about 5 feet on the west side of the Matthews Building. Maximum slopes of about 5½H:1V, with maximum slope heights of 3 feet or less, are noted within the area of proposed improvements. While grading plans were not available for our review at the time of this report publication, we anticipate that the FFE (Finished Floor Elevation) of the new addition will match the FFE of the existing building (about 955.2 feet along this side of the building). As such, we anticipate that three feet or less of cut/fill will be required to reach design grade.

Based on the supplied drawings, the existing Matthews Building has a main floor FFE of 961.4 feet. However, the Matthews Building has a partially below grade basement but the basement FFE was not indicated on the supplied drawing. Based on our rough measurement of 9 feet between the main floor level and the basement level, we believe that the basement FFE of the Matthews Building is around 950 to 952 feet. Thus, we expect that the demolished Matthews Building basement will require approximately three to five feet of fill to match the FFE of the new building addition and up to about 8 feet to match surrounding grades along the southern perimeter of the excavation. Since cuts of less than 5 feet are expected on-site, we expect that the majority of the required fill material will be obtained from an off-site source. The use of properly crushed demolition debris is also an option for use as new fill material.

3.0 Geology

A review of the United States Geologic Survey (USGS) geologic map of the Lexington West Quadrangle (1967) indicates this project site is underlain by the Grier Limestone Member of the Lexington Limestone Formation of the Middle Ordovician Geologic Age.

The Grier Limestone Member consists of limestone that is light gray, fine grained, and rubbly. Observation of the recovered rock core generally agreed with the geologic mapping. The Lexington Limestone is prone to Karst features such as differential weathering, solution enlarged soil filled joints and sinkholes. The more common presentations of Karst development in the project area are an erratic top of rock profile due to differential weathering of the limestone and soil filled, solution enlarged joints in the bedrock. Subsurface water that may affect this project is water that infiltrates down through the soil from rainfall and collecting in solution widened joints and fractures and along the soil/rock interface. Alignments of solution enlarged fractures, sinkholes, caverns and depressions commonly indicate fracture zones followed by subsurface water courses.

The Kentucky Geological Survey (KGS) identifies this portion of Lexington as having an “intense” potential for Karst activity. The Geologic Quadrangle mapping does not indicate any sinkholes mapped at, or close to, this project site. While there are several closed depressions mapped within 1 mile of this site, we did not observe any surface indications of Karst development at this site. However, previous site development may have hidden such indications.

Our current exploration confirms the geologic mapping of the Grier Formation at this site. In the building addition footprint, the depths to the limestone bedrock can vary greatly due to the limestone being dissolved away leaving sinkholes, soil filled slots or troughs.

The USGS mapping of the UK campus indicates that a closed depression is located about 2,300 feet southeast of this site, to the west of the existing WT Young Library and another is located about 1,000 feet northwest of this site (also mapped in the Grier Formation).

No faults are mapped in the project area; however, the northeast/southwest trending Bryan Station Fault Zone is located about 2.2 miles to the southwest of this site. The geologic dip in the project site area is less than 1 percent to the northwest.

4.0 EXPLORATION METHODS

The procedures used by S&ME for field and laboratory sampling and testing are in general accordance with ASTM procedures and established engineering practice. Appendix II contains brief descriptions of the procedures used in this exploration.

4.1 Field Exploration

Based upon our proposal, we were to drill fourteen (14) borings for this project. During the utility clearance process, boring B-03 was eliminated due to numerous underground utilities within this area. As such, we drilled thirteen (13) soil test borings as part of the field exploration. These borings were labeled B-01 through B-14 with boring B-03 being eliminated. Due to anticipated foundation loading conditions, the borings were extended to auger refusal. At least twenty (20) feet of rock coring was performed at each of the thirteen (13) boring locations to better understand bedrock characteristics on-site.

S&ME personnel rough staked the 14 proposed boring locations. Pinpoint Utility Protection personnel then cleared underground utilities at each of the boring locations, offsetting the boring locations as applicable to avoid existing underground utility conflicts. As previously stated, boring B-03 was abandoned due to numerous underground utilities within this area. Offsetting boring B-03 from existing underground utilities would have placed it near adjacent borings. The horizontal locations and elevations of the as-drilled borings were measured by Pinpoint Utility Protection personnel using hand-held survey grade GPS equipment. Upon review of the obtained survey data, discrepancies between the supplied elevations and elevations on the supplied drawing were denoted. S&ME personnel returned to the site and used hand-held survey grade GPS equipment to obtain new boring location data. We obtained similar horizontal location results, but again obtained questionable top of hole elevations. We believe that these elevation discrepancies are due to trees on-site and the heights of the nearby buildings causing issues with the GPS satellite signal. Since this area has not changed significantly within numerous years, we used publicly available LiDAR (Light Detection and Ranging) data to obtain surface elevations (rounded to the nearest foot) for our 13 borings.

The measured boring locations are noted on the Boring Location Plan (Figure 2) included in Appendix I. Please reference Table 1 – Boring Locations below for more detailed information.

Table 1 – Boring Locations

Boring	Latitude	Longitude
B-01	38.037843	-84.506886
B-02	38.037747	-84.507049
B-04	38.037577	-84.507046
B-05	38.037730	-84.506809
B-06	38.037461	-84.506957
B-07	38.037652	-84.506753
B-08	38.037378	-84.506806
B-09	38.037508	-84.506526
B-10	38.037358	-84.506639

Boring	Latitude	Longitude
B-11	38.037423	-84.506553
B-12	38.037383	-84.506486
B-13	38.037304	-84.506418
B-14	38.037413	-84.506210

S&ME personnel were on-site during drilling to observe pertinent surface and site features indicative of the site geology, record and log the recovered soil and rock core samples, and direct the drilling and sampling operations.

The borings were drilled by track-mounted Diedrich D-50 drill rigs using 3¼ inch hollow stem augers. Soil samples were obtained using a split-barrel sampler driven by an automatic hammer system in general accordance with ASTM D1586. We also obtained relatively undisturbed (Shelby) tube samples of the soil using direct push methods in general accordance with ASTM D1587.

As requested, rock coring was performed in the 13 borings advanced in this exploration in general accordance with ASTM D2113. An NX size core barrel is used to produce cylindrical cores 1-7/8 inches in diameter. Core rod RPM and advance rate were monitored during each run to prevent plugging the bit or core blockage or damage. Water without additives was trucked to the site and circulated through the boring to flush cuttings and cool the drill bit during the coring process. Circulating water was released on the surface during and after completion of coring.

Coring lengths of at least 20 feet were performed at all 13 borings. In general, rock coring was continued until 10 feet of competent rock was obtained. Thus, 3 of the 13 borings (B-09, B-12, and B-13) had rock core depths beyond 20 feet. At boring B-12, we cored 40.2 feet of rock core to a total hole depth of 83.7 feet. The upper rock core runs yielded very little rock core return which we attribute to this boring encountering a mud filled crevice or slot in the bedrock. Crevices, slots, or troughs in the bedrock are common in Karst terrain.

Procedures for preserving recovered rock core specimens followed those given for routine care of non-sensitive, non-fragile samples for which only general visual observation will be performed. Steps for routine care are described in ASTM D 5079, "*Standard Practices for Preserving and Transporting Rock Core Samples*", section 7.5.1. The obtained rock cores were placed in channels in specially constructed cardboard core boxes. Samples extruded from the barrel in longer segments were mechanically broken to permit storage, with breaks marked as such on the core. Empty portions of channels were packed with wood or paper to prevent slippage of the core during transport.

The recovered cores were placed in rock core sample boxes and delivered to our laboratory where the geologist and engineer logged and photographed the rock cores. Boxes were transported flat and secured to prevent sliding or vibration. A preliminary field log of each core indicating recovery and general visual description was prepared prior to packing of the core.

The lengths of individual sample runs are intended to divide the rock into sections or more or less similar degrees of weathering, disintegration or intact strength. Since the recovered rock was relatively uniform in appearance in the field, drill "runs" were typically defined by the length of the core barrel during each advance. The stratification lines shown on the boring records represent the approximate boundaries between soil and rock types. The transitions may be more gradual than shown. A general description of our field procedures, a test boring record legend and Test Boring Records are provided in Appendix II of this report.

4.2 Laboratory Testing

Following sample retrieval, representative portions of recovered soil samples were placed in sealed plastic storage bags. The recovered samples were returned to our laboratory where applicable physical tests were performed. These tests are used to help assess the engineering properties of the soil. Procedures for preserving soil samples obtained in the field and transportation of samples to the laboratory generally followed those given in ASTM D4220, "*Standard Practice for Preserving and Transporting Soil Samples*" for one of four groups of samples described in Section 4.

Delivered soil samples were visually classified by an engineer in general accordance with the Unified Soil Classification System (ASTM D2487) or the visual-manual method (ASTM D2488). Based on visual classification, the geotechnical engineer assigned certain laboratory tests to confirm visual classification or to determine some basic soil properties. These included:

- ASTM D 2216, "*Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil or Rock by Mass.*"
- ASTM D 4318, "*Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.*"

Rock strength was qualitatively estimated based on observation of the recovered core samples and supplemented by compressive strength testing of recovered specimens. The geotechnical engineer observed the recovered rock in each core run to visually assess the properties of the material in terms of apparent hardness, continuity, quality, and degree of weathering. Terminology used in relating rock mass behavior based on the recovered rock core specimens consider core "recovery" - the ratio of the sample length recovered in the core barrel to the total length of the core run, expressed as a percent, and Rock Quality Designation (RQD). Rock Quality Designation is described by ASTM D 6032, "*Standard Test Method for Determining Rock Quality Designation (RQD) of Rock Core*." The RQD is the percentage of the core run consisting of moderately hard or harder NX-sized rock core recovered in segments 4 inches long or longer. When properly interpreted by a qualified professional, the RQD value provides a basis for preliminary design decisions involving foundations or excavation in rock.

Only those pieces or rock formed by natural joints, bedding planes, shear zones, or cleavage planes that result in surfaces of separation were considered for computation of recovery or RQD. Breaks in the core due to drilling or handling were not considered. Pieces were considered intact when they appeared to have been bonded together prior to coring and broken surfaces consisted of fresh rock. Where a surface could not be determined as either a natural or mechanical break, it was considered a natural break.

Representative rock core samples were selected from the recovered cores across the building addition area at potential bearing depths to attempt to capture variations in weathering or hardness. The unconfined compressive strength of the rock core specimens was determined generally following the procedures described in ASTM D 7012 Method C, "*Standard Test Method for Unconfined Compressive Strength of Intact Rock Core Specimens*." Selected recovered samples of intact rock core were cut to length, then placed in a loading frame and an axial load continuously applied until peak load and failure were obtained.

Laboratory test results are noted on the individual boring logs in Appendix II. The laboratory test results are also included in Appendix III.

5.0 SUBSURFACE CONDITIONS

As mentioned above, we were to drill fourteen (14) borings for this project. During the utility clearance process, boring B-03 was eliminated due to numerous underground utilities within this area. Thus, we drilled a total of thirteen (13) soil test borings as part of the field exploration.

Surface Materials

Topsoil was encountered at the surface of our 13 boring locations. The thickness of the topsoil varied from about 5 to 7 inches. It should be noted that our measured topsoil thickness represents the thickness of the root zone.

Existing Fill

Beneath the surficial topsoil, existing fill materials were encountered in our 13 soil test borings. The thickness of the existing fill varied from about 2½ feet to about 9 feet. The existing fill consisted of lean clay (CL) that was soft to very stiff, brown to dark brown, and moist to wet. The existing fill also contained various amounts of rock fragments, gravel, black oxide nodules, and trace subangular chert fragments. At boring B-10, crushed brick fragments were also observed in the existing fill. It should be noted that the inclusion of rock fragments could inflate the SPT N-values, thus the fill soils may be softer than indicated in our borings. Please note that fill could be encountered in other areas of the site due to past grading activities. Fill soils are often placed without apparent engineering control of either their composition, moisture content, fill placement and compaction being applied systematically in thin lifts. Thus, any existing fill soils should be considered unreliable for structural support due to variable consistency, apparent strength, and compressibility.

Two Atterberg limits tests were performed on the fill soils with LL's (Liquid Limits) of 40 and 42 percent and PI's (Plasticity Indices) of 19 and 22 percent, respectively. The results of our laboratory testing can be seen in Appendix III.

Residuum

Beneath the fill material, we encountered residuum generally consisting of fat clay (CH) in the 13 borings. These soils form part of the weathered profile of the Ordivician age Lexington Limestone Formation, well consolidated fine-grained sediments indicated on local geologic maps. These fat clay (CH) soils extended to either a weathered rock zone or to the top of rock (auger refusal). The depths of the residuum varied from about 13½ feet to 33½ feet. It should be noted that the deepest depth of residuum is located at boring B-12, which is also where we encountered poor quality bedrock (likely a mud filled crevice or slot in the bedrock).

The fat clay (CH) residual soils were classified as soft to hard relative consistency; however, the soft soil was encountered at the soil/rock interface. Most of these residual soils were in the firm to very stiff range. These residual soils were multiple shades of brown (light to dark), moist to wet, and contained varying amounts of weathered limestone rock fragments. Also, black oxide nodules were observed in some samples.

Two Atterberg limits tests were performed on fat clay (CH) residual soil samples with LL's (Liquid Limits) of 66 to 71 percent and PI's (Plasticity Indices) of 38 and 39 percent, respectively. The results of our laboratory testing can be found in Appendix III of this report.

Refusal to Drilling

Each of our 13 borings was advanced to auger refusal, which varied in depth from 13½ feet (boring B-09) to 33½ feet (boring B-12). Beneath the residual soils at 7 of our 13 borings, we encountered a weathered rock zone which varied in thickness from about 0.3 feet to 3.2 feet before encountering auger refusal. The weathered rock zone consisted of heavily weathered gray limestone or soft, gray, weathered shale. Please note that refusal of our drilling tools in this geologic setting may have resulted from the presence of lenses or seams of cemented or hard soils, boulders or ledges of weathered or partially weathered rock, or continuous, relatively hard competent rock.

The term "refusal" in the context of this report refers to the inability of the drill rig employed on the project to further advance the boring with the type of soil auger and bit in use. Practical refusal of the tools may take the form of binding or seizing of the bit, "walking off" of the drill string, or liftoff of the rig itself when the operator attempts to crowd the Kelly bar.

The refusal materials resisted penetration by soil augers and were sampled by diamond rock core methods at all 13 of our boring locations. Coring lengths of at least 20 feet were performed at all 13 borings. In general, rock coring was continued until 10 feet of competent rock was obtained. Thus, 3 of the 13 borings (B-09, B-12, and B-13) had rock core lengths beyond 20 feet. At boring B-12, we cored 40.2 feet of rock core to a total hole depth of 83.7 feet. The upper rock core runs yielded very little rock return which we attribute to this boring encountering a mud filled crevice or slot in the bedrock. Crevices, slots, or troughs in the bedrock are common in Karst terrain.

Core recoveries of individual rock core runs ranged from 0 percent to 100 percent. Rock Quality Designations (RQD) of the recovered rock cores ranged from 0 to 93 percent. It should be noted that we encountered an 8-inch void from 40.2 to 40.9 feet in boring B-11 while rock coring (which is not uncommon in Karst terrain). No other voids were encountered during our rock coring. At boring B-12, we cored from auger refusal at 33.5 feet to 63.7 feet encountering heavily weathered, fractured, limestone that likely contained shale beds, mud seams, and clay filled voids. We had very poor recoveries and very poor RQD values within this zone. Core water loss was also observed in 3 of our 13 borings – at 43 feet in boring B-11, at 64 feet in boring B-12, and at 42 feet in boring B-13. Loss of coring water is not uncommon in Karst terrain.

In general, the encountered bedrock was comprised of light gray to dark gray limestone with various amounts of calcareous shale. Based on visual estimations by an S&ME geologist, the limestone percentage varied from 60 to 80 percent while the shale content varied from 20 to 40 percent.

Please reference Table 2 – Summary of Bedrock Information below more detailed information.

Table 2 – Summary of Bedrock Information

Boring	Surface Elevation (ft)	Depth to Top of Rock (ft)	Top of Rock Elevation (ft)	Thickness of Weathered Rock (ft)	Depth to Auger Refusal (ft)	Auger Refusal Elevation (ft)
B-01	960	18.0	942	0.4	18.4	942
B-02	957	19.7	937	0.0	19.7	937
B-04	960	18.6	941	0.0	18.6	941
B-05	956	14.8	941	1.1	15.9	940
B-06	961	18.8	942	0.0	18.8	942
B-07	957	19.2	938	0.0	19.2	938
B-08	961	18.6	943	1.0	19.6	942
B-09	955	13.5	941	0.0	13.5	941
B-10	959	19.0	940	3.2	22.2	937
B-11	958	23.1	934	0.0	23.1	934
B-12	958	33.2	925	0.3	33.5	925
B-13	960	22.9	937	0.4	23.3	936
B-14	958	26.6	931	0.6	27.2	930

5.1 Composition and Quality of Recovered Rock Core

Seven representative samples of intact rock (first sample suitable for testing) were cut to length and compressed in a loading frame with an axial load continuously applied until peak load and failure were obtained. Samples were soaked prior to testing. These 7 representative rock core samples indicated unconfined compressive strengths ranging from 1,700 ksf (kips per square foot) to 2,670 ksf.

5.2 Ground Water Measurements

The borings were dry upon completion of soil augering and prior to set up for rock coring. Seasonal and periodic variations in precipitation can affect the observed water level conditions. Perched water is often encountered near the soil/bedrock transition and should not be considered the static groundwater table which is encountered at much greater depths in central Kentucky.

6.0 Conclusions and Recommendations

6.1 General Discussion

We recommend that the new addition to the existing UK Gatton College of Business & Economics building be supported by drilled shafts bearing in bedrock since the existing building is supported by drilled shafts bearing in bedrock. We expect that there could be issues with drilled shaft installation due to poor rock quality encountered at this site. Thus, the exact depths of the installed drilled shafts will have a significant impact on your construction budget. During our previous geotechnical work on the UK Gatton College of Business & Economics building, a large void (cave) was encountered which required that some portions of the ground floor slab be constructed as a structural slab. Thus, there is the possibility that a structural slab could be required in some portions of this new addition. Additionally, this new building addition extends into the footprint of the existing Matthews Building which will require demolition before new construction begins. Previous construction activities and existing/abandoned utilities in this area will complicate site development.

The following sections highlight areas of concern with development of the site and construction of the proposed building addition.

6.1.1 *Demolition of Existing Site Improvements*

As previously stated, the existing Matthews Building will need to be completely demolished before new construction can begin. The razed debris, which will include the foundation and the basement concrete, is not suitable for support of the new floor slabs in their current condition. As such, they should be removed entirely and undercut to stable soil before new construction begins. Portions of the demolition debris can be reused as fill material provided it meets the requirements detailed later in this report. Expect that old fill or other deleterious material will be encountered in the demolition area. Although not observed, old foundations, wells, cisterns, septic tanks/fields, or other underground structures could be encountered in this area due to the repeated development of this area. Your project budget should include a contingency for the removal and remediation of any encountered underground structures.

Several trees and shrubs will require complete removal before new construction can begin. Although the existing Matthews Building will be demolished as part of the proposed building expansion project, the existing Burr oak tree is to remain. This tree is located on the southwest corner of the existing Gatton College facility and is of great importance to the University. All other surface vegetation within the proposed construction area will require clearing and grubbing.

Concrete sidewalks, steps, light poles and numerous underground utilities exist within the proposed building addition footprint. All of these will require complete removal as part of the new construction. The demolished concrete can be recycled as fill material provided it meets the requirements detailed later in this report.

6.1.2 *Existing Fill*

Existing fill materials were encountered in our 13 soil borings. The thickness of the existing fill varied from about 2½ feet to about 9 feet. The existing fill consisted of lean clay (CL) that was soft to very stiff, brown to dark brown, and moist to wet. The existing fill also contained various amounts of rock fragments, gravel, black oxide nodules, and trace subangular chert fragments. At boring B-10, crushed brick fragments were also observed in the existing fill. Please note that fill could be encountered in other areas of the site due to past grading activities.

Two Atterberg limits tests were performed on the existing fill soils with LL's (Liquid Limits) of 40 and 42 percent and PI's (Plasticity Indices) of 19 and 22 percent. These soils meet the requirements for structural soil fill provided in this report – provided that these soils do not contain any organic or deleterious materials. However, fill soils are often placed without apparent engineering control of either their composition, moisture content, fill placement and compaction being applied systematically in thin lifts. As such, any existing fill soils should be considered unreliable for structural support due to variable consistency, apparent strength, and compressibility. Therefore, we recommend the removal and replacement of the encountered fill soils to provide proper support for new slab on grade concrete. If the Owner is willing to assume responsibility for leaving the existing fill in-place, then the existing fill can be proofrolled and remediated as necessary to provide more consistent support for new slab on grade concrete.

6.1.3 *High Plasticity Clay*

The residual soils encountered in our 13 borings consisted of fat clay (CH). Two Atterberg limits tests were performed on the fat clay (CH) residual soils with LL's (Liquid Limits) of 66 and 71 percent and PI's (Plasticity Indices) of 38 and 39 percent, respectively. Fat clay (CH) soils are considered high plastic; therefore, there is concern about their shrink/swell properties. Soils with plasticity indices greater than 30 percent have a tendency to shrink or swell with changes in moisture content. We anticipate the high plasticity soils will potentially impact the project if they are used as structural fill within the upper 3 feet below required subgrade elevation.

Lightly-loaded structural elements such as slabs-on-grade, sidewalks, and non-load bearing walls (if any) are susceptible to damage from shrinking and swelling soils, particularly in areas that have been cut to grade where these soils, if present, would be at very shallow depth. Where these soils are incorporated into structural fills, swell potential can likely be reduced if the soil moisture content is kept near or above the plastic limit. In these cases soil swell is not as likely to occur.

Moisture control during placement of these soils is crucial to the performance of the soil fill. Placing the higher plasticity soils deeper within the fill areas and then capping the fat clay with lean clay or crushed stone may be more economical than wasting the high plasticity/swell-susceptible clay and importing select structural soil fill. The swell potential of fat clays is of particular concern, since water may cause the fat clays to swell. Lime treatment of high plasticity clays has been shown to greatly reduce the swell potential. In general, lime treatment increases the plastic limit of the soil thereby reducing the plasticity index of the soil making it far less susceptible to moisture increases. If construction takes place during wet periods of the year, wasting of wet soils may be required since high plasticity clays dry slowly.

At our 13 boring locations, existing fill consisting of lean clay (CL) overlies the fat clay (CH) residual soils. However, we have no data as to the soils that exist beneath the existing Matthews Building. Thus, there could be fat clay (CH) soils at, or near, the proposed floor slab subgrade elevation. These soils should be evaluated once the basement slab of the Matthews Building has been removed. Additionally, excavated residual fat clay (CH) soil should <u>not</u> be used as new structural fill within two feet of subgrade elevation beneath slab on grade concrete areas.

6.1.4 *Building Demolition and Re-Use of Demolition Debris*

Demolition of the existing Matthews Building superstructure, foundations, concrete sidewalks, etc. will generate a significant volume of material potentially available for re-use in construction sitework if processed and handled correctly. S&ME has successfully used demolition debris beneath several major projects in central Kentucky, including our previous work at the Gatton Building. If the demolition debris is chosen as a fill material, the demolition and sizing process should be reviewed by the Geotechnical Engineer to insure proper aggregate size and composition. Additional discussion about crushing and material gradation is included in following sections of this report.

6.1.5 *Variable Bedrock Quality*

The depth to auger refusal in our 13 borings varied greatly – from about 13½ feet at boring B-09 to about 33½ feet at boring B-12. Excluding these two extremes, 7 of our 13 borings encountered auger refusal between 15 and 20 feet below existing ground surface and 4 of our 13 borings encountered auger refusal between 20 and 30 feet below existing ground surface. We attribute these variable depths to bedrock to the highly variable nature of Karst terrain. Based on our obtained auger refusal depths, we do not anticipate that bedrock removal will be required for underground utilities or mass grading. However, shallow pinnacled rock could be encountered in deep on-site excavations. If rock is encountered in deep excavations, we expect that rock removal can be accomplished by hoe ramming or rock grinding methods. Blasting is not advisable at this site due to the numerous surrounding structures and frequent pedestrian and automobile traffic.

6.1.6 *Protection of Existing Structures*

There are numerous underground utilities within the proposed construction area. We expect that some of these will have to remain in place and in service during the demolition process. Care should be taken not to damage these utilities during site excavation. Note that it does not require actual contact with a utility to inflict damage. Excavating into a utility trench and removing the backfill stone, whether intentionally or unintentionally, can cause undermining and loss of support to piping that can lead to damage of the pipe. Thus, the demolition contractor should be made aware of his responsibility to protect utilities that must remain in service.

Because the existing Gatton Building is supported by drilled shafts bearing on bedrock, undermining existing foundations is not expected. Since grade beams connect the existing drilled shafts, deep excavations adjacent to the current exterior grade beams could undermine the floor slab sections above. Thus, these deep excavations (if any) require evaluation by a geotechnical engineer to confirm if temporary shoring is required. Please note that the design of a shoring system was beyond our scope of work for this project.

6.2 Initial Site Preparation

Before demolition of the Matthews Building begins, remove all of the existing trees, shrubs, grass, or other vegetation within the proposed construction area that are not to remain in place (such as the Burr oak). These materials should be wasted off-site. Depending upon the required grade, the resulting holes from root balls should be backfilled with compacted structural fill to reach subgrade elevation. The topsoil can be stockpiled for later use in landscape areas.

The existing Matthews Building should be demolished according to the demolition plan (by others). Building debris not suitable for crushing and re-use as new fill should be hauled off-site. Building materials suitable for crushing along with concrete sidewalks, steps, etc. should be segregated if theses materials are to be crushed and reused. If the contractor chooses not to crush on-site, then these materials should be hauled off-site and properly disposed of.

Previously unexplored or unknown conditions could become evident during site preparation operations. S&ME must judge whether the recommendations in this report should be modified in view of the actual site conditions encountered. Once the initial site preparation is complete, S&ME should be retained to visit the site and assess the exposed grade before new fill is placed. Observed soft areas should be remediated at the S&ME engineer's discretion before moving on to subsequent tasks.

As previously discussed, existing fill material was encountered beneath the topsoil at each of our 13 soil borings. We recommend that all of the existing fill material be removed to expose stiff or better residual soil. The excavated fill material can be re-used as new fill material provided it does not contain deleterious materials. If the Owner is willing to accept the risk of leaving the old fill material in-place, then inconsistent areas can be remediated on a case-by-case basis to provide "consistent" support for the new floor slab.

Once the initial site stripping has occurred, we recommend a proofroll of the at-grade areas and areas to receive structural fill. Proofrolling consists of observing a loaded dump truck or scraper traffic over the planned fill area. Areas observed to exhibit excessive rutting and/or deflection should be remediated at the engineer's direction. Areas where planned construction bears at or near the existing site grades may require stabilizing prior to beginning construction. Either undercutting and backfilling with structural fill or aerating/drying and re-compaction of the soil will likely be required.

To control distress associated with high plasticity (swelling) clay soils on-site, the upper two feet of the floor slab subgrade should have a Plasticity Index (PI) of 30 percent or less. Where fat clay is present within two (2) feet of the building addition area subgrade elevation, we recommend undercutting and replacing with lean clay or low plasticity material such as crushed limestone or crushed and processed shot rock. Fat clay can be used as structural fill in deeper fill areas within the building addition footprint. If suspect soils are observed during site grading or if off-site fill soils are to be imported, additional Atterberg Limits testing should be performed.

6.3 Bedrock Excavation

Based on the encountered auger refusal elevations within the new building addition area and a preliminary FEE of 955.2 feet, we do not expect mass rock removal will be required. However, trench rock removal could be required for underground utilities depending on their applicable depths beneath, or adjacent to, the building addition.

If bedrock excavation is required, we expect that hard rock removal methods such as trenching, grinding, or hoe ramming will be required. Since this is a heavily developed area with numerous buildings, roadways, and pedestrian traffic, we do not recommend blasting at this project site.

A combination of heavy-duty rock trenching equipment and hoe-ramming may be used to perform the required trench rock excavation for utility installation for this project. If the contractor chooses to perform mass rock removal by trenching and hoe-ramming, the following items should be considered:

- Trenching/hoe-ramming will not require a comprehensive pre-blast survey to be conducted on all structures that have the potential to be impacted by blasting operations.
- Trenching/hoe-ramming will reduce the ground vibrations compared to blasting
- Trenching/hoe-ramming will offer more control over rock excavation but typically takes longer to perform.
- Trenching/hoe-ramming will not require the stoppage of traffic along South Limestone while being performed.
- Dust control measures will need to be implemented during trenching/hoe-ramming operations.

6.4 Structural Fill Placement

6.4.1 *Soil Fill*

Structural fill is defined as inorganic natural soil with a maximum particle size of 3 inches and maximum dry density of at least 100 pounds per cubic foot (pcf) when tested by the standard Proctor method (ASTM D698) and a plasticity index (PI) of less than 30 percent. While the existing lean clay (CL) fill satisfies the criteria for structural soil fill, the residual fat clay (CH) soils at this site do not meet these plasticity requirements; however, it can be used in deeper fills.

6.4.2 *Demolition Debris Fill*

To use the demolition debris as fill will require that the final product not be open graded where water can collect and percolate into the ground. It should have at least ten percent passing the #40 sieve along with larger pieces to fill the void spaces. Crush the concrete and excavated bedrock (if any) together, and the brick and CMU block together.

Do not mix the brick, CMU block and concrete as the harder concrete will pulverize the softer brick and block into dust. Crush the demolition debris to generate a maximum particle size of 4 inches. Place the crushed debris in 10 to 12 inch thick loose lifts and compact. For quality control, the crushed debris should be tested to evaluate the gradation at the beginning of the crushing process to confirm the crusher set-up. Once confirmed, production crushing can continue. Care should be taken to remove wood, steel, drywall and other deleterious material prior to crushing as separating after crushing is very difficult.

6.4.3 *Fill Placement*

Whether the fill consists of clean soil or crushed and processed demolition debris, testing of the fill is imperative – both before placement to determine the fills adequacy for use and during placement to verify adequate compactive effort has been applied.

Standard Proctor testing, Atterberg limits testing and/or grain size distribution testing of fill soils should be performed by S&ME for compliance with the project specifications before it is used as fill material. If soils are imported to the site, we recommend the soils be tested for conformance with the project specifications before being transported to the site. Please realize laboratory conformance testing usually takes 3 to 4 business days to complete; therefore, the Contractor should plan accordingly.

Structural fill placement should occur in relatively thin (6 to 8-inch) layers and be compacted to at least 98 percent of the standard Proctor maximum dry density beneath all slab on grade concrete areas. For fills greater than 10 feet in height (not expected), we recommend at least 100 percent of the standard Proctor maximum dry density. The moisture content of the fill should be maintained within 2 percent of the soil’s optimum moisture content even though compaction may be achieved at moisture contents outside the specified range.

The upper two feet of structural fill beneath the building addition area and the last 20 feet of sidewalks connecting to building entrances should consist of lean clay soils with a plasticity index less than 30 percent or KYTC Dense Graded Aggregate (DGA), or quarry screenings. Do not use fat clay with a PI of greater than 30 percent as fill within two feet of subgrade beneath the building or sidewalks connecting to entrances, as the expansive properties of the fat clay may result in unwanted swell and distress to lightly loaded structural elements such as slabs, patios, sidewalks, etc. Excavated fat clay should be used in greenspace, non-structural areas that are not planned for future development, or in deep fill areas.

In-place density testing must be performed on structural fill as a check that the recommended compaction criteria have been achieved. This allows our project engineer to evaluate the quality of the fill construction and assess that the design criteria is being achieved in the field. We further recommend these tests be performed on a full-time basis by S&ME. The testing frequency for density tests performed on a full-time basis can be determined by our personnel based on the area to be tested, the grading equipment used, and construction schedule. Tests should be performed at vertical intervals of 8-inches or less (the recommended lift thickness) as the fill is being placed.

6.5 Foundation Recommendations

Based upon a preliminary finished first floor elevation (FFE) of 955.2 feet, we recommend that the new addition to the Gatton Building be supported by drilled shafts bearing on bedrock. S&ME recommends the foundation excavations extend through the soil and weathered bedrock to bear on intact bedrock. The following sections include more detailed recommendations for drilled shaft foundations.

6.5.1 Drilled Shaft Design and Construction Considerations

We recommend use of an allowable bedrock end bearing pressure of **70 ksf** (kips per square foot) for drilled shaft foundations bearing on intact, relatively unweathered limestone bedrock. For drilled shafts bearing on intact bedrock, we anticipate both total and differential settlements of approximately 1/4 of an inch or less, not including elastic compression of the foundations.

For drilled shafts, we recommend a minimum rock socket of 2-feet into intact bedrock to penetrate through weathered bedrock. Additionally, a 25 percent increase in the allowable axial unit end bearing pressure may be used for short term (transient) load increases. At that magnitude of transient increase, deflections will be within the elastic response zone of the rock and will not result in permanent deflection. S&ME recommends that increases in design values for short term loadings due to wind and seismic loads be in accordance with the Kentucky Building Code or other applicable Code. For uplift resistance, an allowable unit side resistance for the unweathered limestone of 5,000 psf can be used (assuming 4,000 psi concrete for the drilled shafts).

The following construction considerations are recommended for drilled shaft construction:

- Clean the foundation bearing area so it is nearly level or suitably benched and is free of ponded water or loose material.
- For shafts that require side resistance, clean the socket "face" prior to concrete placement. Cleaning will require hand cleaning or washing if a mud smear forms on the face of the rock. The geotechnical engineer should approve the rock socket surface prior to concrete placement.
- Provide a minimum drilled shaft diameter of 30 inches to reasonably enter the drilled shaft excavation for cleaning, bottom preparation, and inspection.
- Make provisions for groundwater removal from the drilled shaft excavation after rainfall events. Subsurface water often occurs along the soil/rock interface for several days after rain. If water is flowing into the drilled shaft at less than 20 gallons per minute, pumps may be used to maintain less than 2 inches of water in the drilled shaft during cleaning and inspection. After approval of the bearing surface, the pumps should be pulled and concreting commenced immediately. If more than 20 gallons per minute are flowing into the

drilled shaft, the water level should be allowed to stabilize before attempting to place the concrete. For this condition, concrete placement should be accomplished using a tremie pipe or concrete pumping equipment.

- Specify a concrete slump of 7 to 9 inches for the drilled shaft construction. This slump is recommended to fill irregularities along the sides and bottom of the drilled shaft, displace water as it is placed, and permit placement of reinforcing cages into the fluid concrete.
- Retain S&ME personnel to observe foundation excavations after the bottom of the hole is leveled, cleaned of any mud or extraneous material, and de-watered.
- Install temporary (if no voids greater than 6 inches are encountered) or permanent (if voids greater than 6 inches are encountered) protective steel casing or Sonotube to prevent side wall collapse, prevent excessive mud and water intrusion, and to allow workers to clean and inspect the drilled shaft.
- Where temporary casing is required, the protective steel casing may be extracted as the concrete is placed provided a sufficient head of concrete is maintained inside the steel casing to prevent soil or water intrusion into the newly placed concrete.
- Direct the concrete placement into the drilled shaft through a centering chute or tremie to reduce side flow or segregation.

6.5.2 *Drilled Shaft Rock Excavations*

Our experience indicates general drilled shaft construction and delineation of "rock" in the excavation is greatly facilitated if adequate drilling equipment is used. We recommend the use of a drill capable of producing at least 500,000 inch·pounds of torque and 35,000 pounds of downward force. Additionally, we recommend that rock be defined as material which cannot be penetrated by a heavy-duty earth auger with hardened teeth at a rate in excess of 3 inches per minute.

6.5.3 *Drilled Shaft Quality Control Requirements*

We recommend that the drilled shaft construction be observed by an S&ME geotechnical engineer or an S&ME, ICC Certified Special Inspector experienced in drilled shaft construction. The observation should address the following items:

- Top location within tolerances
- Correct plan dimensions
- Plumbness within tolerances
- Materials excavated agree with borings
- Statement of bottom cleanliness
- Construction procedure

Drilled shafts with diameters of 30-inches or greater are large enough to allow a down-hole inspection of the bearing conditions. S&ME will assess the rock condition during construction using 2-inch diameter probe holes to evaluate the actual condition at each shaft location. Specifications are typically written to require the contractor to perform at least one probe hole per shaft at his expense and provide access to the base of the shaft for the engineer to examine the bearing materials.

We recommend drilling the probe holes at least 5-feet into the rock-bearing material for all drilled shafts. These probe holes are usually drilled with a pneumatic percussion drill by the Contractor. S&ME will check the probe hole using a hooked-end steel feeler rod to assess the rock continuity and to check for the presence of mud seams or voids. If this check indicates a discontinuity or void in the rock, our Engineer will compute the expected settlement for that shaft using elastic theory. If the calculated settlement exceeds the allowable, our Engineer will require that the drilled shaft be excavated deeper. Additional probe holes may be required by the S&ME Geotechnical Engineer to check foundations supported on marginal material.

6.5.4 Bedrock Evaluation Alternatives

There are several alternatives to physically sending a person into the drilled shaft excavation to drill a test hole and another to inspect the test hole. These include pre-coring of the bedrock or using geophysical methods to evaluate the bedrock at individual drilled shaft locations.

There are numerous benefits to either coring the bedrock at each drilled shaft location or using geophysical testing methods including:

- Setting the final bearing elevation/depth and shaft lengths prior to finalization of bids resulting in fewer unknowns during bidding or change orders during construction.
- Fewer delays and/or change orders during construction resulting from having to extend drilled shaft excavations that encounter unsuitable conditions that were not observed during the geotechnical exploration.
- The reinforcing cages can be constructed off-site since the shaft length is known. We anticipate that the project site will likely be congested. Eliminating an area for constructing rebar cages will help reduce such congestion.
- Eliminating the need to send workers into the excavation to drill a test hole or inspect the test hole. This is an improvement in jobsite safety as well as efficiency during drilled shaft excavation.

One option for bedrock evaluation is to use conventional rock coring methods to sample the bedrock at each drilled shaft location. This approach has been performed on numerous projects and provides a physical sample of the bedrock that can be measured and analyzed. The engineer can then provide a recommended bearing elevation for the drilled shafts.

Another option for bedrock evaluation is to use optical and acoustic televiewers to observe probe holes drilled into the bedrock. The probe holes need to be at least 3-inches in diameter but can be drilled with air-track equipment (similar to drills used for blasting) which are typically faster and less expensive than a conventional rock core drill. After installing PVC casing in the soil overburden, the televiewers are lowered into the borehole. Optical televiewers utilize recordings from a high resolution CMOS digital image sensor combined with a fisheye lens to provide a continuous digital image. Acoustic televiewers use ultrasound pulses from a rotating sensor to record the amplitude and travel time of the signals reflected at the interface between fluids and the borehole wall. The combination of these televiewers provide direct measurements of the bedrock in-situ including height and depth of voids or seams as well as strike, dip, and aperture of planer features.

Both coring and drilling of the probe holes and use of the geophysical testing can be performed before the drilled shaft contractor mobilizes. Scheduling of the either the coring or geophysical televiewers must be included in the project scheduling. Obviously, the greater number of drilled shafts that are planned, the greater the amount of time will be required.

6.5.5 *Drilled Shafts Near Storm Sewer Beneath Building Addition*

During the course of our work, we were supplied a preliminary foundation plan which indicated that a new storm sewer must pass beneath this new building addition. The new storm sewer will consist of RCP (Reinforced Concrete Pipe) and will run in a southeast to northwest direction (somewhat paralleling the southwest face of the existing Gatton Building). The RCP is to be encased in concrete thus creating a 6 feet wide utility corridor that will interfere with currently proposed drilled shaft locations. As such, offsetting of some of the drilled shaft locations will be required to avoid this concrete utility encasement. Obviously, proper construction of the concrete utility encasement must be followed to avoid any extraneous concrete flows or wings extending beyond the intent of the corridor design (which could cause difficult drilled shaft installation).

We recommend that the proposed outer edge of any drilled shaft be no closer than one-half of its diameter to the outer edge of the concrete utility encasement. We expect that the drilled shaft tip bearing elevation will be far below the lower edge of the concrete utility encasement so there should not be a concern for group interaction between drilled shafts. However, if adjacent drilled shafts are to be within 3 diameters of each other, then special construction procedures must be followed. In these cases, one drilled shaft must be installed first with the second drilled shaft installed at least 3 days after the concrete has been placed in the first drilled shaft.

6.6 Site Seismic Classification

The current seismic design procedures outlined in the NEHRP (National Earthquake Hazard Reduction Program) guidelines mandate structural design loads to be based on the seismic coefficients of the site. Based on the results of our exploration and the geology of the area, we recommend **a site seismic classification of "C"** for this project site. This classification is further defined in the Kentucky Building Code.

Site specific seismic testing in the form of MASW geophysical testing may allow for use of a higher site seismic classification.

6.7 Below Grade Walls

At present, this expansion to the Gatton Building does not include a basement or partial basement. However, we expect that there will be elevator pits associated with the new construction. Also, there may be retaining walls located outside of the building addition footprint based on the final grading plan. As such, any below grade walls will be required to resist the lateral earth pressures of the soil and backfill placed behind them.

The lateral earth pressure coefficients listed below assume the excavation behind the wall will be backfilled with compacted KYTC No. 57 crushed stone of sufficient width that a Rankine failure surface could develop within the crushed stone backfill. The Rankine failure surface is defined by a 1H:1V slope projected from the rear base of the wall where it meets the foundation to the proposed finished grade. In areas where the face of the limestone falls within the Rankine failure surface, the lateral earth pressure coefficients will be conservative. The No. 57 crushed stone will also be conducive to draining water from behind the walls. A non-woven filter fabric <u>must</u> be placed between the open graded crushed stone and the retained soil to help prevent migration of soil into the stone.

We recommend that the below grade wall design include drainage such as a prefabricated drain board or at least a 2 feet wide zone of KYDOT No. 57 crushed stone immediately behind the wall. For elevator pits, the collected water from the perimeter drain should be directed outside of the building and into the stormwater collection system. For exterior retaining walls, the outlets of the drainage system should be directed to daylight or to the stormwater collection system.

The following chart indicates the recommended values associated with stone and clay backfill for the various lateral earth pressure coefficients for horizontal backfill surface. We recommend that the At-Rest coefficient be used for below grade walls that are not free to rotate.

S&ME recommends the At-Rest coefficient be used for the elevator pit. The following table provides the Active and At-Rest coefficients as well as the corresponding equivalent fluid pressures.

Table 6.7 – Lateral Earth Pressures

Backfill Material	Φ′	Unit Weight	Active (Ka)	Equivalent Active Fluid Pressure (psf)	At-Rest (Ko)	Equivalent At-Rest Fluid Pressure (psf)
KYTC No. 57 Stone	40°	105 pcf	0.22	20	0.35	35
Soil Backfill	24°	120 pcf	0.42	50	0.59	70

6.8 Slab On Grade Concrete Recommendations

Although the building is multi-story, only the first floor will use slab on grade concrete construction. We also expect sidewalks, steps, patios, etc. to be constructed as slab on grade concrete. Based on the preliminary FFE of 955.2 feet, we expect that some of the slab areas will be in cut areas (possibly into fat clay soils) while other areas will be in existing fill areas. As previously discussed, we recommend the removal of all existing fill material within the construction areas. We believe that most (if not all) of the excavated existing fill material can be re-used as new fill provided it does not contain deleterious material and meets the criteria for structural fill in this report. The Owner may elect to leave the existing fill material in-place, provided they assume the risk of future problems due to inconsistent slab support. Therefore, the slab on grade concrete could be supported by a combination of existing fill material, residual clay, and newly placed and compacted fill.

Due to the fat clay soils encountered in our borings, we recommend the upper two feet of the building addition area subgrade consist of low plasticity fill with a plasticity index (PI) of less than 30 percent, crushed limestone, or quarry screenings. If bedrock excavation is required to achieve the required subgrade elevation (not expected), we recommend over-excavating the bedrock to allow for a minimum of 1-foot of crushed stone beneath the floor slab. The intent of the over-excavation is to soften the transition where the slab will bear on bedrock to bearing on soil. The crushed stone will also aid in draining water from beneath the floor slab.

We recommend that control joints be placed in the slab around columns and along footing supported walls to reduce cracking due to minor differential settlements. We recommend that ACI 302.1R-96 “GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION” be followed for design and placement of concrete floor slabs.

Between completion of grading and slab construction, floor slab subgrades are often disturbed by weather, footing and utility line installation, and other construction activities. For this reason, the subgrade should be evaluated by an S&ME engineer immediately prior to constructing the slab.

SPECIAL SLAB NOTE: During the construction of the last phase of the Gatton Building, a large void (cave) was encountered. Thus, some of the slab-on-grade floors were required to be constructed as structural floor slabs bearing on the adjacent grade beams which were supported by the installed drilled shafts. Based on our limited geotechnical data at the time of this draft report preparation, we cannot easily ascertain if structural floor slab sections will be required as part of this project. However, structural floor slabs may be required if significant voids (or a cave) is encountered during the geophysical or construction process. Thus, your construction budget should include a contingency for structural floor slabs if they are required.

7.0 FOLLOW-UP SERVICES

Our services should not end with the submission of this geotechnical report. S&ME should be kept involved throughout the design and construction process to maintain continuity and to assess whether our recommendations are properly interpreted and implemented. To achieve this, we should be retained to review project plans and specifications with the designers to see that our recommendations are fully incorporated. We also should be retained to observe and test the site preparation, foundation excavation, and building construction. If we are not allowed the opportunity to continue our involvement on this project, we cannot be held responsible for the recommendations in this report.

Our familiarity with the site and with the foundation recommendations will make us a valuable part of your construction quality assurance team. In addition, a qualified engineering technician should observe and test all structural concrete and steel. Only experienced, qualified persons trained in geotechnical engineering and familiar with foundation construction should be allowed to evaluate and test foundation excavations. Normally, full-time observations and testing of the site work and foundation installation is appropriate.

8.0 LIMITATIONS OF REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The 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 representation or warranty either express or implied, is made.

We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary.

Our conclusions and recommendations are based on limited data from a field exploration program. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, bacteria). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested.

S&ME should be retained to review the final plans and specifications to confirm that earthwork, foundation, and other recommendations are properly interpreted and implemented. The recommendations in this report are contingent on S&ME's review of final plans and specifications followed by our observation and monitoring of earthwork and foundation construction activities.

For more information on the use and limitations of this report, please read the Geoprofessional Business Association (GBA) document that follows this page.

Important Information About Your

Geotechnical Engineering Report

Variations in subsurface conditions can be a principal cause of construction delays, cost overruns and claims. The following information is provided to assist you in understanding and managing the risk of these variations.

Geotechnical Findings Are Professional Opinions

Geotechnical engineers cannot specify material properties as other design engineers do. Geotechnical material properties have a far broader range on a given site than any manufactured construction material, and some geotechnical material properties may change over time because of exposure to air and water, or human activity.

Site exploration identifies subsurface conditions at the time of exploration and only at the points where subsurface tests are performed or samples obtained. Geotechnical engineers review field and laboratory data and then apply their judgment to render professional opinions about site subsurface conditions. Their recommendations rely upon these professional opinions. Variations in the vertical and lateral extent of subsurface materials may be encountered during construction that significantly impact construction schedules, methods and material volumes. While higher levels of subsurface exploration can mitigate the risk of encountering unanticipated subsurface conditions, no level of subsurface exploration can eliminate this risk.

Scope of Geotechnical Services

Professional geotechnical engineering judgment is required to develop a geotechnical exploration scope to obtain information necessary to support design and construction. A number of unique project factors are considered in developing the scope of geotechnical services, such as the exploration objective; the location, type, size and weight of the proposed structure; proposed site grades and improvements; the construction schedule and sequence; and the site geology.

Geotechnical engineers apply their experience with construction methods, subsurface conditions and exploration methods to develop the exploration scope. The scope of each exploration is unique based on available project and site information. Incomplete project information or constraints on the scope of exploration increases the risk of variations in subsurface conditions not being identified and addressed in the geotechnical report.

Services Are Performed for Specific Projects

Because the scope of each geotechnical exploration is unique, each geotechnical report is unique. Subsurface conditions are explored and recommendations are made for a specific project.

Subsurface information and recommendations may not be adequate for other uses. Changes in a proposed structure location, foundation loads, grades, schedule, etc. may require additional geotechnical exploration, analyses, and consultation. The geotechnical engineer should be consulted to determine if additional services are required in response to changes in proposed construction, location, loads, grades, schedule, etc.

Geo-Environmental Issues

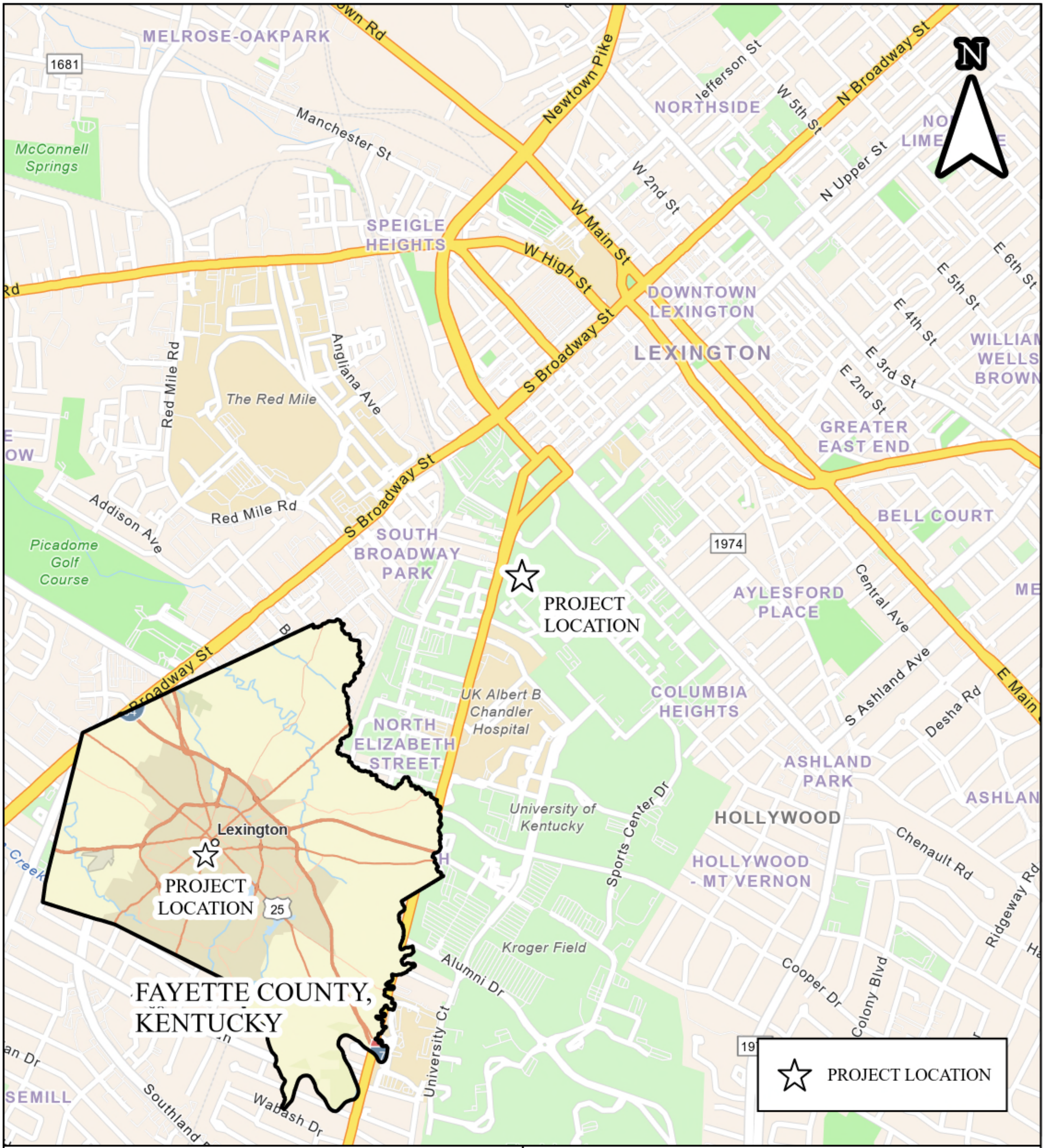
The equipment, techniques, and personnel used to perform a geo-environmental study differ significantly from those used for a geotechnical exploration. Indications of environmental contamination may be encountered incidental to performance of a geotechnical exploration but go unrecognized. Determination of the presence, type or extent of environmental contamination is beyond the scope of a geotechnical exploration.

Geotechnical Recommendations Are Not Final

Recommendations are developed based on the geotechnical engineer's understanding of the proposed construction and professional opinion of site subsurface conditions. Observations and tests must be performed during construction to confirm subsurface conditions exposed by construction excavations are consistent with those assumed in development of recommendations. It is advisable to retain the geotechnical engineer that performed the exploration and developed the geotechnical recommendations to conduct tests and observations during construction. This may reduce the risk that variations in subsurface conditions will not be addressed as recommended in the geotechnical report.

Portion obtained with permission from "Important Information About Your Geotechnical Engineering Report", ASFE, 2004

Appendix I – Site Location Plan / Boring Location Plan



REFERENCE: GIS BASE LAYERS WERE OBTAINED FROM SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

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US FEET

PROJECT LOCATION PLAN

UK GATTON COLLEGE OF BUSINESS & ECONOMICS EXPANSION
ROSS TARRANT ARCHITECTS
LEXINGTON, FAYETTE COUNTY, KENTUCKY

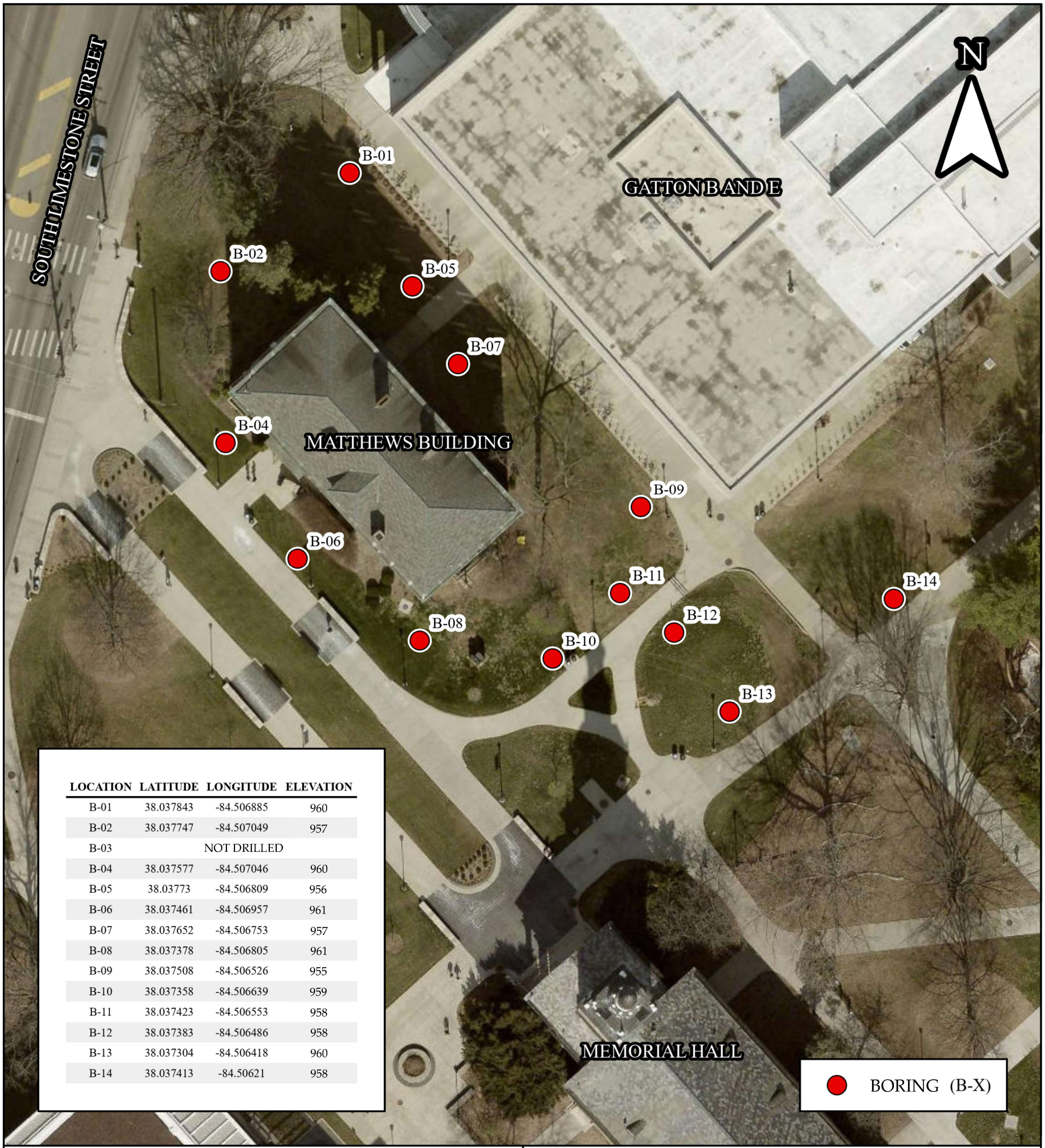
SCALE
1 IN = 50 FT

DATE
2/13/2026

PROJECT NO.
25830176

FIGURE NO.
1

DRAWING PATH: PLOTTED BY COLINRIOUX T:\LEXINGTON-1830\PROJECTS\2025\25830176_ROSS TARRANT_UK GATTON COLLEGE EXPANSION GEOTECH\GEO\PROJECT DOCS\REPORTS\APP1



LOCATION	LATITUDE	LONGITUDE	ELEVATION
B-01	38.037843	-84.506885	960
B-02	38.037747	-84.507049	957
B-03	NOT DRILLED		
B-04	38.037577	-84.507046	960
B-05	38.03773	-84.506809	956
B-06	38.037461	-84.506957	961
B-07	38.037652	-84.506753	957
B-08	38.037378	-84.506805	961
B-09	38.037508	-84.506526	955
B-10	38.037358	-84.506639	959
B-11	38.037423	-84.506553	958
B-12	38.037383	-84.506486	958
B-13	38.037304	-84.506418	960
B-14	38.037413	-84.50621	958

REFERENCE: GIS BASE LAYERS WERE OBTAINED FROM EAGLEVIEW, LFUCG, SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

0 13 25 50 75 100
US FEET

BORING LOCATION PLAN

UK GATTON COLLEGE OF BUSINESS & ECONOMICS EXPANSION
ROSS TARRANT ARCHITECTS
LEXINGTON, FAYETTE COUNTY, KENTUCKY

SCALE
1 IN = 50 FT

DATE
2/13/2026

PROJECT NO.
25830176

FIGURE NO.
2

DRAWING PATH: PLOTTED BY COLINRIOUX T:\LEXINGTON-1830\PROJECTS\2025\25830176_ROSS TARRANT_UK GATTON COLLEGE EXPANSION GEOTECH\GEO\PROJECT DOCS\REPORTS\APP1

Appendix II – Test Boring Records / Rock Core Photologs

SOIL LOG LEGEND

SOIL PROPERTY SYMBOLS

N - Standard Penetration, bpf
NMC - Natural Moisture Content, %
F - Fines Content, %
LL - Liquid Limit, %
PL - Plastic Limit, %
PI - Plasticity Index, %
PPV - Pocket Penetrometer Value, tsf
Qu - Unconfined Compressive Strength
γd - Dry Unit Weight, pcf

The STANDARD PENETRATION TEST (SPT) as defined by ASTM D1586 (or AASHTO T206) is a method to obtain a disturbed soil sample for examination and testing and to obtain relative density and consistency information. A standard 1.4-inch I.D./2-inch O.D. split-barrel sampler is driven three 6-inch increments with a 140 lb. hammer freely falling 30 inches. The hammer can either be of a trip, free-fall design, or actuated by a rope and cathead. The SPT N Value is determined by adding the number of blows from the 2nd and 3rd 6-inch increments. A normalized blowcount (N_{60}) may be determined by the following equation: N_{60} = [Rig Energy Ratio (%) / 60] * N.

SHELBY TUBE (ST) samples are obtained by hydraulically pushing a thin-walled tube (typically 3-inches in diameter) to obtain a relatively undisturbed sample for testing of fine-grained soils to determine engineering properties such as strength, compressibility, permeability, and density. Shelby tubes are sampled in general accordance with ASTM D1587 (AASHTO T207).

☒ **SPT**

▭ **ST**

Descriptive Order of Soil Strata: Geologic Disposition (i.e., Fill, Colluvium, Alluvium, etc.), ASTM Group Name (ASTM Group Symbol), quantified/qualified soil constituents, misc. constituents, consistency/density, color, organic description, moisture. ASTM group classifications is determined per ASTM D2487 where lab testing has been performed and ASTM D2488 where lab testing has not been performed.

ASTM GROUP NAME (SYMBOL) AND GRAPHIC

- ▨ WELL GRADED GRAVEL (GW)
- ▨ POORLY GRADED GRAVEL (GP)
- ▨ WELL GRADED GRAVEL WITH SILT (GW-GM)
- ▨ WELL GRADED GRAVEL WITH CLAY (GW-GC)
- ▨ POORLY GRADED GRAVEL WITH SILT (GP-GM)
- ▨ POORLY GRADED GRAVEL WITH CLAY (GP-GC)
- ▨ SILTY GRAVEL (GM)
- ▨ CLAYEY GRAVEL (GC)
- ▨ CLAYEY GRAVEL WITH SILT (GC-GM)
- ▨ WELL GRADED SAND (SW)
- ▨ POORLY GRADED SAND (SP)
- ▨ WELL GRADED SAND WITH SILT (SW-SM)
- ▨ WELL GRADED SAND WITH CLAY (SW-SC)
- ▨ POORLY GRADED SAND WITH SILT (SP-SM)
- ▨ POORLY GRADED SAND WITH CLAY (SP-SC)
- ▨ SILTY SAND (SM)
- ▨ CLAYEY SAND (SC)
- ▨ CLAYEY SAND WITH SILT (SC-SM)
- ▨ LEAN CLAY (CL)
- ▨ SILTY CLAY (CL-ML)
- ▨ SILT (ML)
- ▨ FAT CLAY (CH)
- ▨ ELASTIC SILT (MH)
- ▨ ORGANIC LOW PLASTICITY SILT OR CLAY (OL)
- ▨ ORGANIC HIGH PLASTICITY SILT OR CLAY (OH)
- ▨ PEAT (PT)
- ▨ TOPSOIL
- ■ ASPHALT
- ▨ BASE - CEMENT MODIFIED
- ▨ BASE - CEMENT STABILIZED AGGREGATE
- ▨ BASE - GRAVEL
- ▨ CONCRETE
- □ VOID / NO RECOVERY
- ▨ IGM / PWR

FINE-GRAINED SOIL
(Relative Consistency)

	N	PPV
Very Soft	< 2 bpf	< 0.25 tsf
Soft	2 - 4 bpf	> 0.25 - 0.5 tsf
Firm	5 - 8 bpf	> 0.5 - 1.0 tsf
Stiff	9 - 15 bpf	> 1.0 - 2.0 tsf
Very Stiff	16 - 30 bpf	> 2.0 - 4.0 tsf
Hard	> 30 bpf	> 4.0 tsf

COARSE-GRAINED SOIL
(Relative Density)

	N
Very Loose	< 5 bpf
Loose	5 - 10 bpf
Medium Dense	11 - 30 bpf
Dense	31 - 50 bpf
Very Dense	> 50 bpf

MINOR CONSTITUENTS
(% By Weight)

	Percentage
Trace	0% - 10%
Little	11% - 20%
Some	21% - 35%
"And"	≥ 36%

ORGANIC CONTENT OF SOIL
(Determined by ASTM D2974 or AASHTO T267)

Classification	Percentage
With Organic Matter	4% - 15%
Organic Soil	16% - 30%
Peat	> 30%

MOISTURE CONDITION

Dry	Absense of moisture, dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

▽ **At Time of Drilling (ATD)**	Groundwater observation made anytime during the drilling process. Depending on time of reading and drilling methodologies, this value may be influenced by the drilling process.
▽ **End of Drilling**	Groundwater measurement soon after the drilling processes are complete, and the borehole is at final depth. Drilling fluids, if introduced during drilling, may influence this measurement.
▼ **After Drilling**	Groundwater measurements made in a borehole hours to days after drilling is complete. Depending on subsurface conditions, elapsed time, drilling process, etc. this observation may reflect a stabilized level.

REFERENCES:

FHWA NHI-16-072, Geotechnical Engineering Circular No. 5 "Geotechnical Site Characterization"
ASTM Specifications D2487 and D2488
DOT Specifications & Design Manuals from NC, SC, OH, MI, IN, PA, VA.

ROCK CORE LOG LEGEND

ROCK CORE RECOVERY

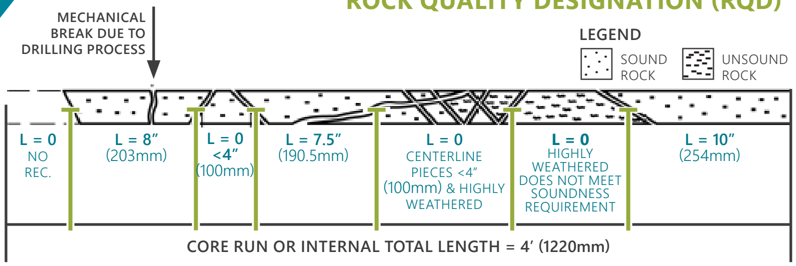
Rock Core Sample

Core Diameter (I.D.)	Inches
BQ	1-7/16
NQ	1-7/8
HQ	2-1/2

$$\text{REC} = \frac{\text{Length of Rock Core Recovered}}{\text{Length of Core Run}} \times 100$$

(Recovery)

ROCK QUALITY DESIGNATION (RQD)



$$\text{RQD} = \left(\frac{\sum \text{Sound Core with Length (L)} \geq 4'' \text{ (100mm)}}{\text{Core Run or Interval Total Length}}\right) \times 100$$

(Equation)

$$\text{RQD} = \left(\frac{8''+7.5''+10''}{48''}\right) \times 100 = 53\%$$

(Example) (FAIR)

ROCK QUALITY

Percent	Quality
>90–100	Excellent
>75–90	Good
>50–75	Fair
>25–50	Poor
0–25	Very Poor

(ASTM D6032)

GRAIN SIZE

Very Fine-Grained	<0.003 in. (<0.075 mm)
Fine-Grained	0.003 – 0.02 in. (0.075 – 0.425 mm)
Medium-Grained	0.02 – 0.8 in. (0.425 – 2 mm)
Coarse-Grained	0.8 – 2 in. (2 – 4.75 mm)
Very Coarse-Grained	>2 in. (>4.75 mm)

BEDDING

Very Thickly Bedded	>3 ft.
Thickly Bedded	3 ft. – 18 in.
Thinly Bedded	18 in. – 2 in.
Very Thinly Bedded	2 in. – 0.4 in.
Laminated	0.4 in. – 0.1 in.
Thinly Laminated	<0.1 in.

FRACTURE RATE / SPACING

Unfractured	>10 ft.
Intact	10 ft. – 3 ft.
Slightly Fractured	3 ft. – 1 ft.
Moderately Fractured	12 in. – 4 in.
Fractured	4 in. – 2 in.
Highly Fractured	< 2 in.

SURFACE ROUGHNESS

Very Rough	Near vertical steps and ridges occur on the discontinuity surface.
Slightly Rough	Asperities on the discontinuity surface are distinguishable and can be felt.
Smooth	Surface appears smooth and feels so to the touch.
Slickensided	Surface has a smooth, glassy finish with visual evidence of striation.

WEATHERING

Fresh	No visible sign of rock material weathering; slight discoloration on major discontinuity surfaces is possible.
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All rock material may be discolored by weathering and the external surface may be somewhat weaker than in its fresh condition.
Moderately Weathered	Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones. A minimum 2 in. diameter sample cannot be broken readily by hand.
Highly Weathered	More than half the rock is decomposed or disintegrated to soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones. A minimum 2 in. diameter sample can be broken readily by hand across the rock fabric.
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is largely still intact. Material can by granulated by hand.
Residual Soil	All rock material is converted to soil. Material can be easily broken apart by hand.

STRENGTH

		APPROX. UNCONFINED COMPRESSIVE STRENGTH (PSI)
Extremely Strong Rock	Specimen can only be chipped with firm blows from the hammer end of a geological hammer.	**> 36,250**
Very Strong Rock	Specimen requires many firm blows from the hammer end of a geological hammer to fracture.	**36,250 – 14,500**
Strong Rock	Specimen requires more than one firm blow of the point of a geological hammer to fracture.	**14,500 – 7,250**
Medium Strong Rock	Specimen cannot be scraped or cut with a pocket knife. Specimen can be fractured with a single firm blow with a geological hammer point.	**7,250 – 3,500**
Weak Rock	Shallow cuts or scrapes can be made in a specimen with a pocket knife. A firm blow with a geological hammer creates shallow indents.	**3,500 – 725**
Very Weak Rock	Specimen crumbles under sharp blow with point of geological hammer and can be peeled with a pocket knife.	**725 – 150**
Extremely Weak Rock	Specimen can be indented by thumbnail.	**150 – 35**

HARDNESS

Very Hard	Cannot be scratched with a pocket knife; leaves knife steel marks on surface.
Hard	Can be scratched by a pocket knife with difficulty; scratch produces little powder and is only faintly visible; trace of knife's steel may be visible.
Moderately Hard	Can be readily scratched by a pocket knife; scratch leaves a heavy trace of dust and scratch is readily visible after the powder has been blown away.
Low Hardness	Can be gouged deeply or carved with a pocket knife.
Friable	Easily crumbled by hand, pulverized or reduced to powder sand is too soft to be cut by a pocket knife.
Soft	Very weak plastic material.

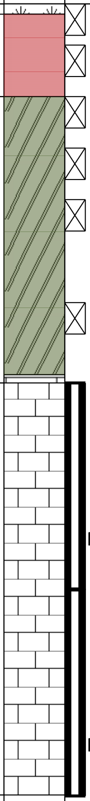
REFERENCES:

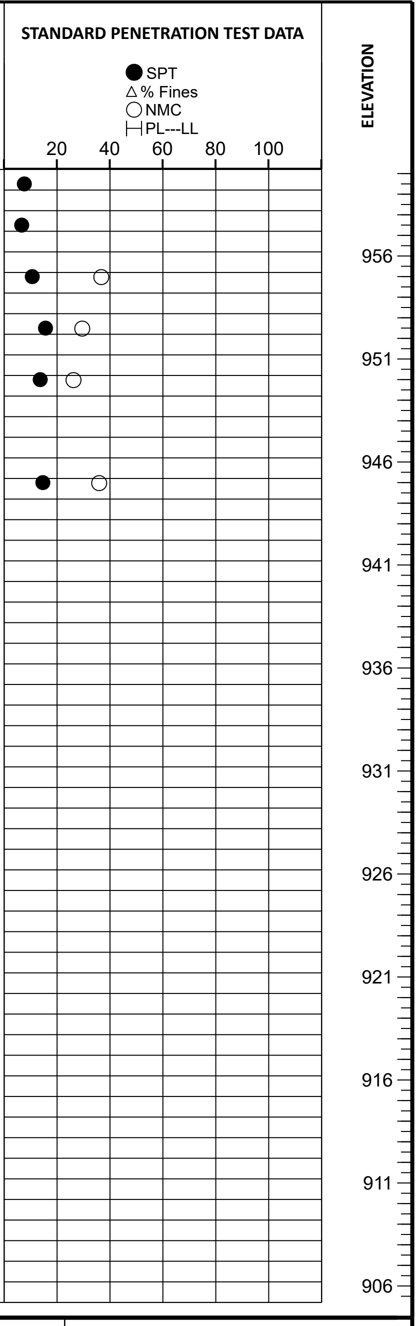
FHWA NHI-16-072, GEOTECHNICAL ENGINEERING CIRCULAR NO. 5 "GEOTECHNICAL SITE CHARACTERIZATION"
DOT SPECIFICATIONS & DESIGN MANUALS FROM NC, SC, OH, MI, IN, PA.

PROJECT:	UK Gatton College Expansion Lexington, KY **S&ME Project No. 25830176**	**BORING LOG: B-01** *Sheet 1 of 1*

DATE DRILLED: 01/05/2026	**ELEVATION:** 960 ft	**NOTES:** **Boring location and elevation established using handheld GPS equipment with sub-meter accuracy**
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Horn & Associates	**BORING DEPTH:** 38.4 ft	
HAMMER TYPE: Safety Hammer (140 lb)	**CLOSURE:** Alternating Layers of Bentonite Chips and Cuttings	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Bacot, E	**NORTHING:** 3903856.3 **EASTING:** 5279243.1
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES		Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
0		0.5		SS-1 (16 in)	TOPSOIL (6 INCHES)	4-4-4 N = 8
			Fill	SS-2 (17 in)	FILL, LEAN CLAY (CL), firm, brown, moist, with rock fragments, trace chert, sub-angular,	3-3-4 N = 7
5		4.5	Residuum	SS-3 (17 in)	FAT CLAY (CH), stiff to very stiff, light brown to dark brown	3-5-6 N = 11
				SS-4 (18 in)		8-7-9 N = 16
10				SS-5 (18 in)		4-7-7 N = 14
15	Auger refusal at 18.4 feet			SS-6 (18 in)		3-4-11 N = 15
		18.0			LIMESTONE, heavily-weathered, gray	
20		18.4	Rock	Run-1 REC-98% RQD-90%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 70% limestone with 30% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured	
30				Run-2 REC-98% RQD-77%		
		38.4			Coring terminated at 38.4 feet	





GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf),
AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT: UK Gatton College Expansion
Lexington, KY
S&ME Project No. 25830176

BORING LOG: B-02

Sheet 1 of 1

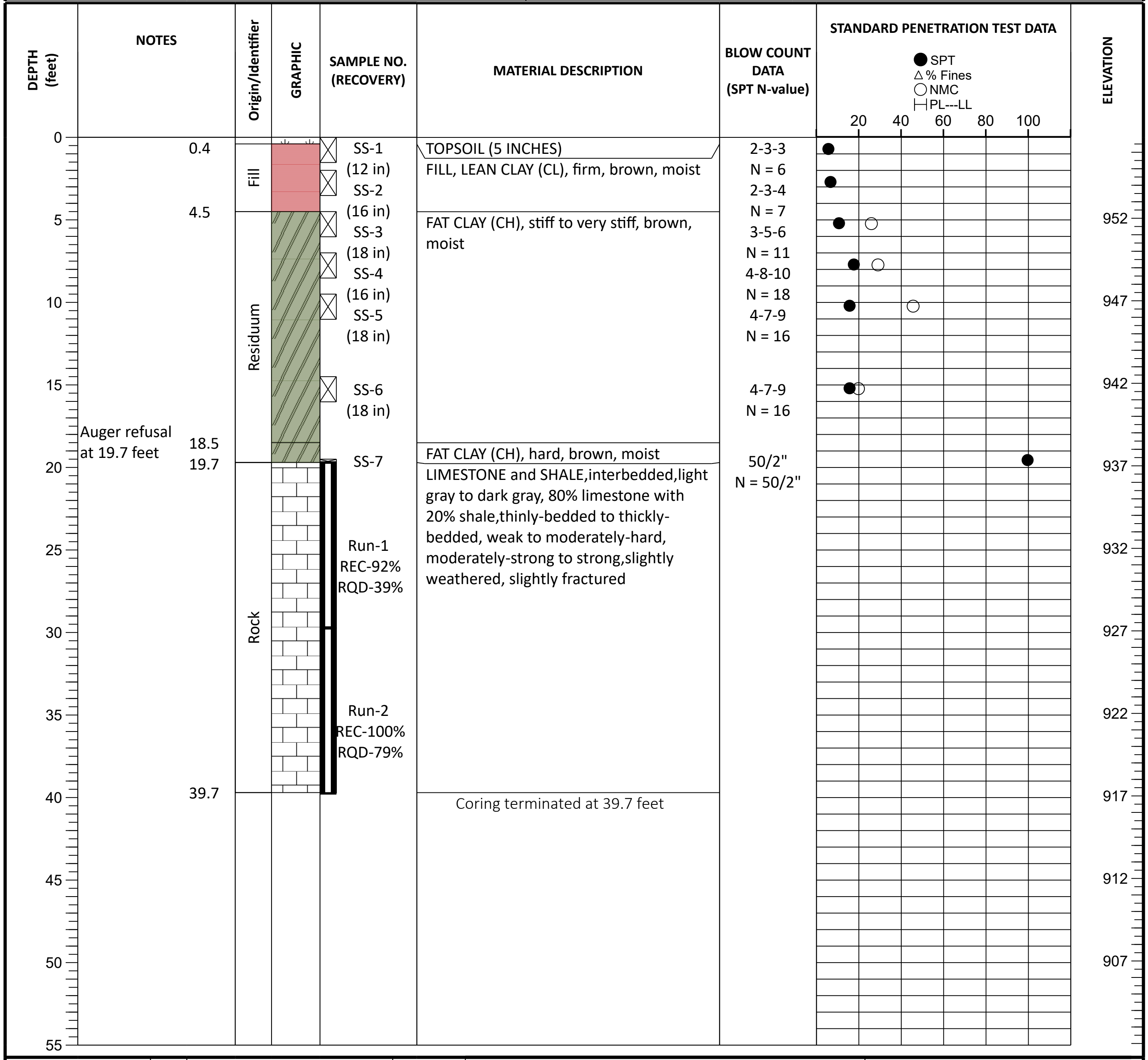
DATE DRILLED: 01/05/2026
ELEVATION: 957 ft
DRILL RIG: Diedrich D-50
DATUM: NAVD88
DRILLER: Horn & Associates
BORING DEPTH: 39.7 ft
HAMMER TYPE: Safety Hammer (140 lb)
CLOSURE: Alternating Layers of Bentonite Chips and Cuttings
DRILLING METHOD: 3-1/4" HSA, NQ
LOGGED BY: Bacot, E
SAMPLING METHOD: SS

NOTES:
Boring location and elevation established using handheld GPS equipment with sub-meter accuracy

NORTHING: 3903820.7 **EASTING:** 5279196.4

PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky FIPS 1600 Feet

NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
0.4		SS-1 (12 in)	TOPSOIL (5 INCHES)	2-3-3 N = 6
	Fill	SS-2 (16 in)	FILL, LEAN CLAY (CL), firm, brown, moist	2-3-4 N = 7
4.5	Residuum	SS-3 (18 in)	FAT CLAY (CH), stiff to very stiff, brown, moist	3-5-6 N = 11
		SS-4 (16 in)		4-8-10 N = 18
		SS-5 (18 in)		4-7-9 N = 16
		SS-6 (18 in)		4-7-9 N = 16
Auger refusal at 19.7 feet 18.5		SS-7	FAT CLAY (CH), hard, brown, moist	50/2" N = 50/2"
19.7	Rock	Run-1 REC-92% RQD-39%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 80% limestone with 20% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured	
		Run-2 REC-100% RQD-79%		
39.7			Coring terminated at 39.7 feet	



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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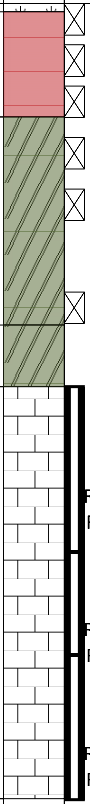
PROJECT: UK Gatton College Expansion
Lexington, KY
S&ME Project No. 25830176

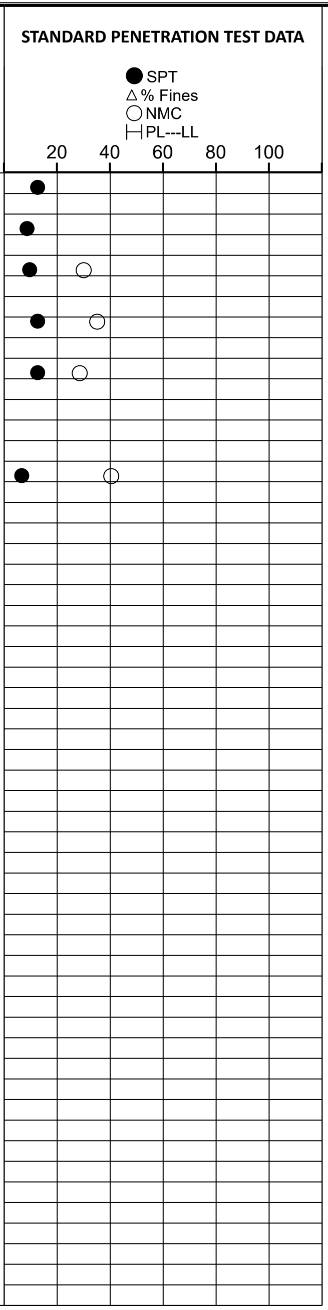
BORING LOG: B-04

Sheet 1 of 1

DATE DRILLED: 01/05/2026	**ELEVATION:** 960 ft	**NOTES:** Boring location and elevation established using handheld GPS equipment with sub-meter accuracy	
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88		
DRILLER: Horn & Associates	**BORING DEPTH:** 38.6 ft		
HAMMER TYPE: Safety Hammer (140 lb)	**CLOSURE:** Alternating Layers of Bentonite Chips and Cuttings		
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Bacot, E	**NORTHING:** 3903758.8	**EASTING:** 5279198.2
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet		

DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0 – 0.4	0.4		SS-1 (12 in)	TOPSOIL (5 INCHES)	2-4-9 N = 13	960
0.4 – 5.5	5.5	Fill	SS-2 (16 in) SS-3 (18 in)	FILL, LEAN CLAY (CL), stiff, brown , moist, with trace rock fragments and gravel	3-4-5 N = 9 3-4-6 N = 10	955
5.5 – 15.6	15.6	Residuum	SS-4 (18 in) SS-5 (18 in) SS-6 (18 in)	FAT CLAY (CH), stiff, brown , moist, with trace rock fragments and gravel	4-5-8 N = 13 3-5-8 N = 13 2-3-4 N = 7	950 945
15.6 – 18.6	Auger refusal at 18.6 feet 18.6	Residuum		FAT CLAY (CH), firm, brown , moist, with trace rock fragments and gravel		
18.6 – 38.6	38.6	Rock	Run-1 REC-100% RQD-61% Run-2 REC-100% RQD-90% Run-3 REC-100% RQD-79%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 80% limestone with 20% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured		940 935 930 925 920
38.6				Coring terminated at 38.6 feet		





GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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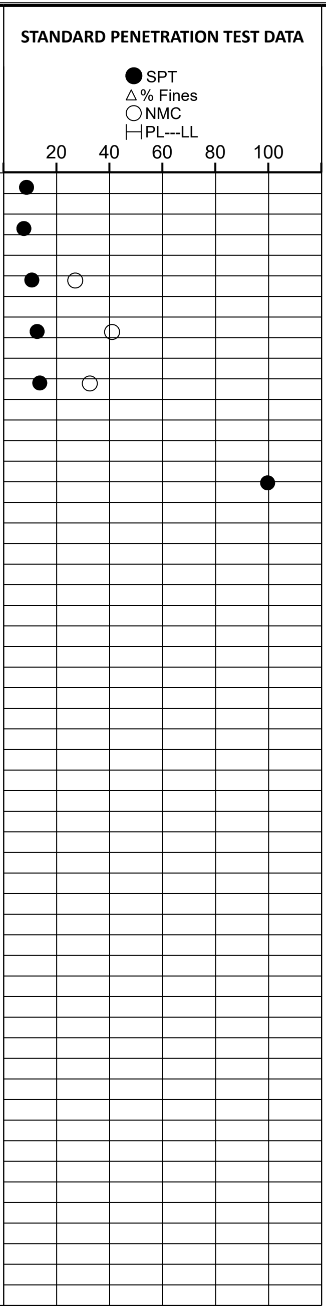
AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT: UK Gatton College Expansion Lexington, KY **S&ME Project No. 25830176**		**BORING LOG: B-05** *Sheet 1 of 1*
DATE DRILLED: 01/05/2026	**ELEVATION:** 956 ft	**NOTES:** **Boring location and elevation established using handheld GPS equipment with sub-meter accuracy**
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Horn & Associates	**BORING DEPTH:** 35.9 ft	
HAMMER TYPE: Safety Hammer (140 lb)	**CLOSURE:** Alternating Layers of Bentonite Chips and Cuttings	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Bacot, E	**NORTHING:** 3903815.3 **EASTING:** 5279265.7
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
0.6			SS-1 (17 in)	TOPSOIL (7 INCHES)	3-4-5 N = 9	
2.6		Fill	SS-2 (18 in)	FILL, LEAN CLAY (CL), firm to stiff, dark brown, moist, with gravel	2-3-5 N = 8	
14.8			SS-3 (18 in) SS-4 (18 in) SS-5 (18 in)	FAT CLAY (CH), firm to stiff, dark brown, moist, with gravel	3-5-6 N = 11 4-6-7 N = 13 4-5-9 N = 14	951 946
15.9	Auger refusal at 15.9 feet	Resid uum	SS-6	LIMESTONE and SHALE, heavily-weathered, gray, sampled as hard soil	1-2-50/2" N = 50/2"	941
35.9		Rock	Run-1 REC-99% RQD-68% Run-2 REC-99% RQD-86%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 75% limestone with 25% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured		936 931 926 921
				Coring terminated at 35.9 feet		916 911 906



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

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AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT: UK Gatton College Expansion
Lexington, KY
S&ME Project No. 25830176

BORING LOG: B-06

Sheet 1 of 1

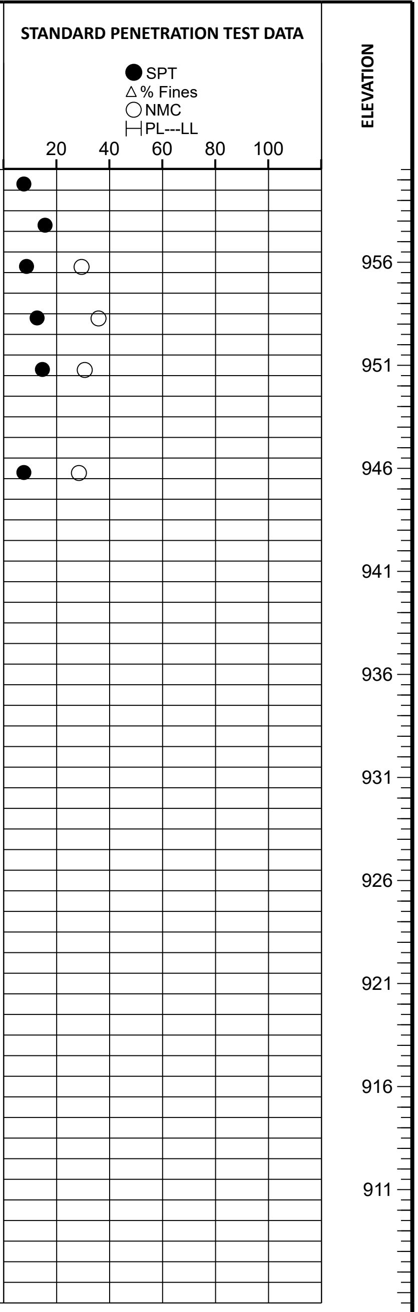
DATE DRILLED: 01/06/2026	**ELEVATION:** 960 ft
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88
DRILLER: Horn & Associates	**BORING DEPTH:** 38.8 ft
HAMMER TYPE: Safety Hammer (140 lb)	**CLOSURE:** Alternating Layers of Bentonite Chips and Cuttings
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Bacot, E
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet

NOTES:
Boring location and elevation established using handheld GPS equipment with sub-meter accuracy

NORTHING: 3903716.9 **EASTING:** 5279224.2

DEPTH (feet): 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55

DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
0.4			SS-1 (14 in)	TOPSOIL (5 INCHES)	2-4-4 N = 8
		Fill	SS-2 (6 in)	FILL, LEAN CLAY (CL), firm to very stiff, brown, moist, with rock fragments and gravel	22-9-7 N = 16
4.0		Residuum	SS-3 (17 in)	FAT CLAY (CH), firm to stiff, brown, moist, with rock fragments and gravel	3-4-5 N = 9
			SS-4 (18 in)		4-6-7 N = 13
			SS-5 (18 in)		4-6-9 N = 15
			SS-6 (18 in)		2-4-4 N = 8
18.8	Auger refusal at 18.8 feet	Rock	Run-1 REC-95% RQD-62%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 65% limestone with 35% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured	
			Run-2 REC-100% RQD-88%		
			Run-3 REC-100% RQD-93%		
38.8				Coring terminated at 38.8 feet	



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	∇			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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AR = Auger Refusal, IGM = Intermediate Geomaterial

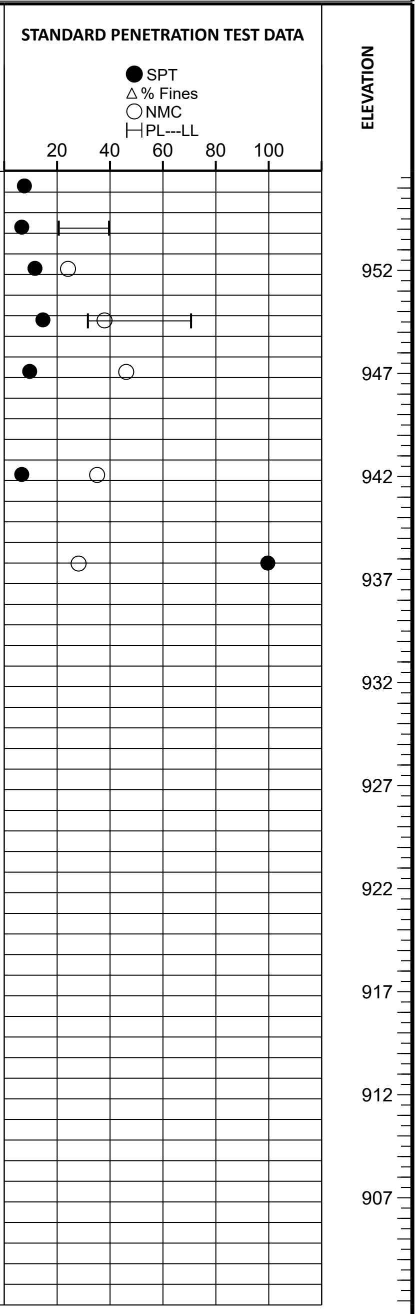
PROJECT: UK Gatton College Expansion
Lexington, KY
S&ME Project No. 25830176

BORING LOG: B-07

Sheet 1 of 1

DATE DRILLED: 01/06/2026
ELEVATION: 957 ft
DRILL RIG: Diedrich D-50
DATUM: NAVD88
DRILLER: Horn & Associates
BORING DEPTH: 39.2 ft
HAMMER TYPE: Safety Hammer (140 lb)
CLOSURE: Alternating Layers of Bentonite Chips and Cuttings
DRILLING METHOD: 3-1/4" HSA, NQ
LOGGED BY: Bacot, E
SAMPLING METHOD: SS
NOTES: Boring location and elevation established using handheld GPS equipment with sub-meter accuracy
NORTHING: 3903787.2 **EASTING:** 5279282.2
PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky FIPS 1600 Feet

NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
0.4		SS-1 (18 in)	TOPSOIL (5 INCHES)	4-4-4 N = 8
5.5	Fill	SS-2 (18 in)	FILL, LEAN CLAY WITH SAND (CL), firm to stiff, brown, moist, with trace rock fragments and gravel	2-3-4 N = 7
18.5	Residuum	SS-3 (18 in) SS-4 (17 in) SS-5 (18 in) SS-6 (18 in)	FAT CLAY (CH), firm to stiff, brown, moist, with trace rock fragments and gravel	3-4-8 N = 12 3-7-8 N = 15 4-4-6 N = 10 3-3-4 N = 7
Auger refusal at 19.2 feet 19.2		SS-7 (0 in)	FAT CLAY (CH), hard, brown, moist, with weathered limestone fragments	50/1" N = 50/1"
39.2	Rock	Run-1 REC-98% RQD-89% Run-2 REC-94% RQD-69%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 80% limestone with 20% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured	
			Borehole terminated at 39.2 feet	

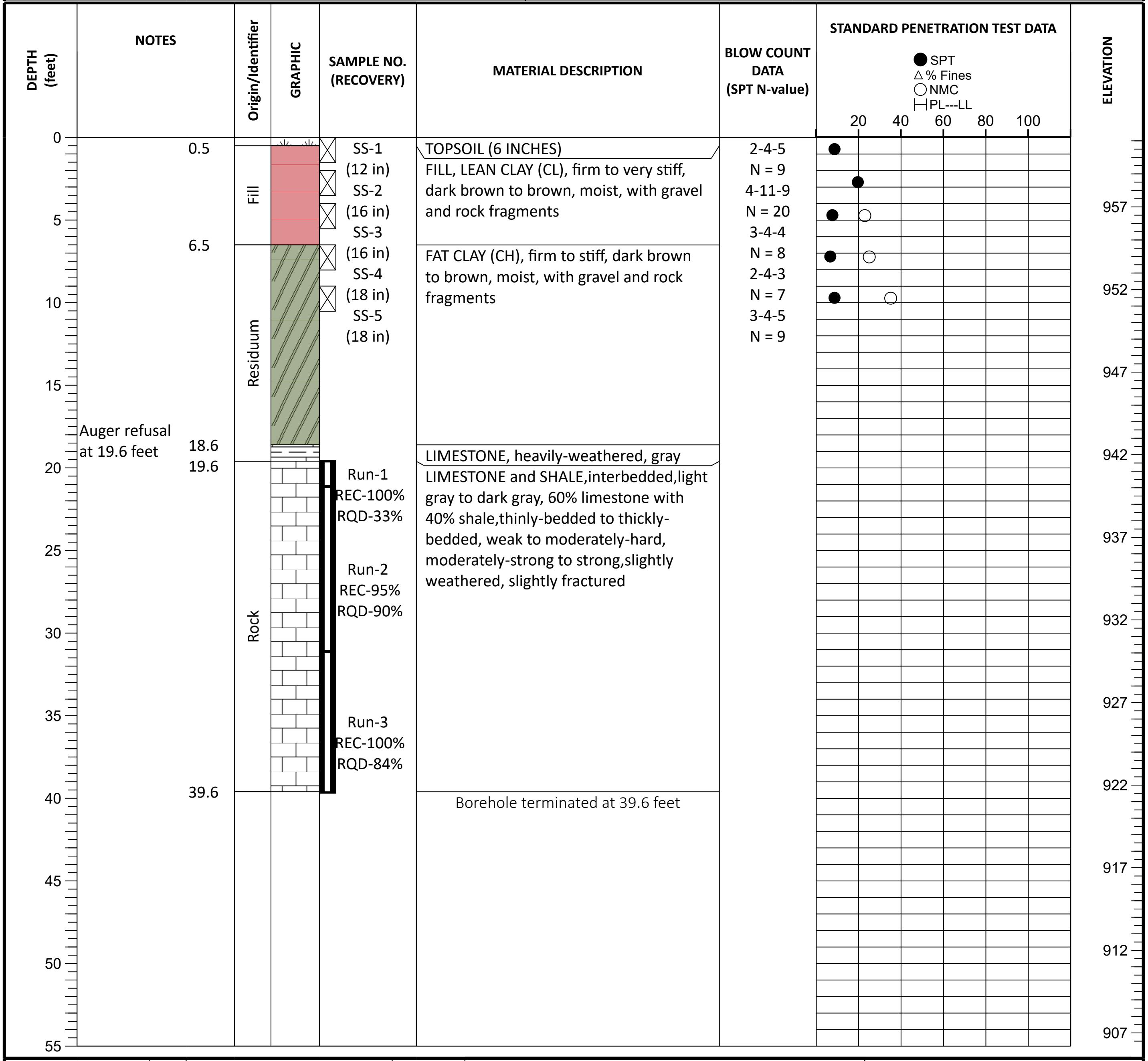


GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf),
AR = Auger Refusal, IGM = Intermediate Geomaterial

Boring location and elevation established
using handheld GPS with sub-meter accuracy

PROJECT:	UK Gatton College Expansion Lexington, KY **S&ME Project No. 25830176**	**BORING LOG: B-08** *Sheet 1 of 1*	
DATE DRILLED: 01/06/2026	**ELEVATION:** 961 ft	**NOTES:** Boring location and elevation established using handheld GPS equipment with sub-meter accuracy	
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88		
DRILLER: Horn & Associates	**BORING DEPTH:** 39.6 ft		
HAMMER TYPE: Safety Hammer (140 lb)	**CLOSURE:** Alternating Layers of Bentonite Chips and Cuttings		
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Bacot, E	**NORTHING:** 3903687.3	**EASTING:** 5279268.4
SAMPLING METHOD: SS		**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	



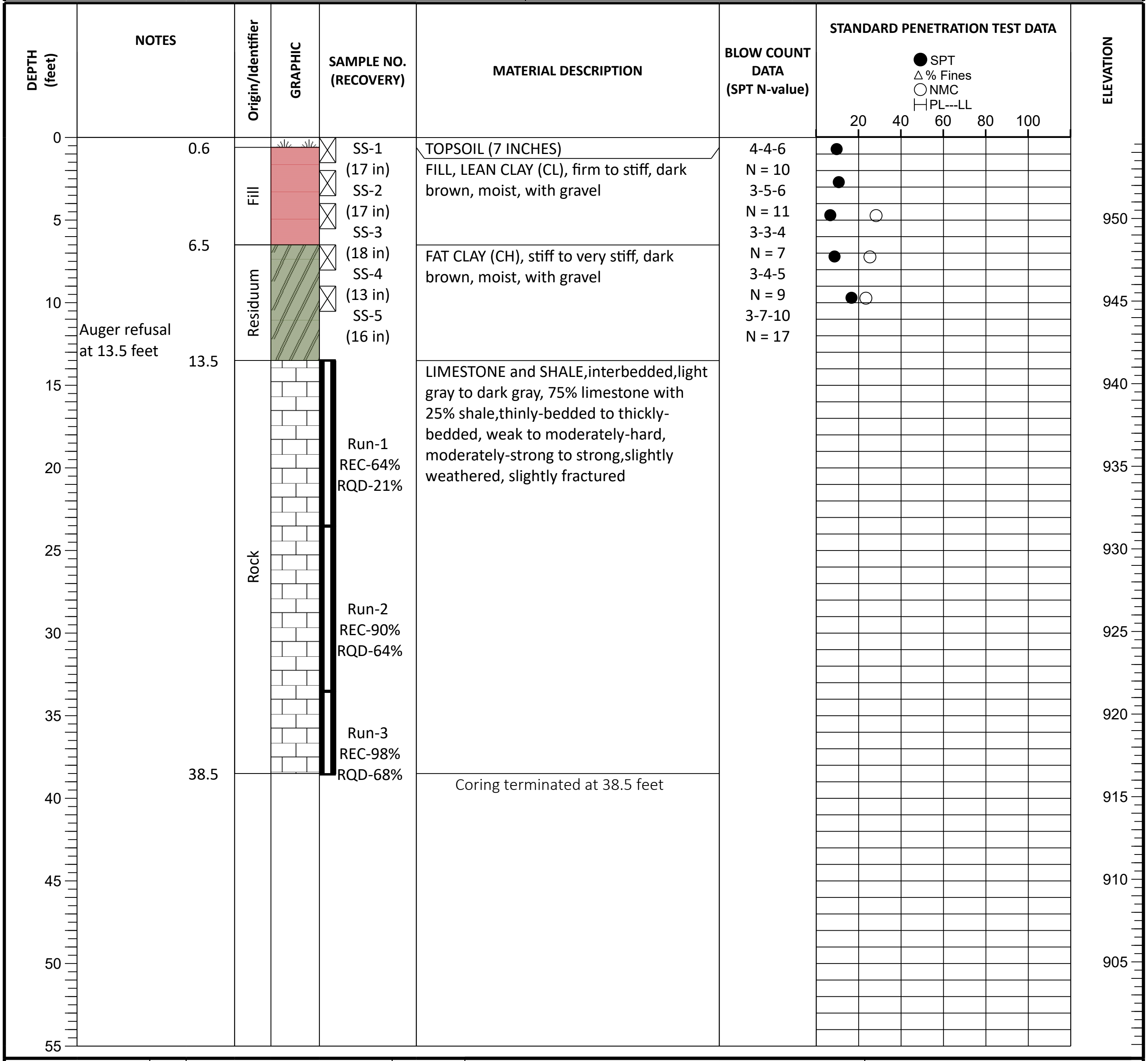
NOTES		Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
	0.5		SS-1 (12 in)	TOPSOIL (6 INCHES)	2-4-5 N = 9
	6.5	Fill	SS-2 (16 in) SS-3 (16 in)	FILL, LEAN CLAY (CL), firm to very stiff, dark brown to brown, moist, with gravel and rock fragments	4-11-9 N = 20 3-4-4 N = 8
	18.6	Residuum	SS-4 (18 in) SS-5 (18 in)	FAT CLAY (CH), firm to stiff, dark brown to brown, moist, with gravel and rock fragments	2-4-3 N = 7 3-4-5 N = 9
Auger refusal at 19.6 feet	19.6			LIMESTONE, heavily-weathered, gray	
	39.6	Rock	Run-1 REC-100% RQD-33% Run-2 REC-95% RQD-90% Run-3 REC-100% RQD-84%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 60% limestone with 40% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured	
				Borehole terminated at 39.6 feet	

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf),
AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	UK Gatton College Expansion Lexington, KY **S&ME Project No. 25830176**	**BORING LOG: B-09** *Sheet 1 of 1*

DATE DRILLED: 01/06/2026	**ELEVATION:** 955 ft	**NOTES:** **Boring location and elevation established using handheld GPS equipment with sub-meter accuracy**
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Horn & Associates	**BORING DEPTH:** 38.5 ft	
HAMMER TYPE: Safety Hammer (140 lb)	**CLOSURE:** Alternating Layers of Bentonite Chips and Cuttings	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Bacot, E	**NORTHING:** 3903735.6 **EASTING:** 5279348.3
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	



DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
0.6			SS-1 (17 in)	TOPSOIL (7 INCHES)	4-4-6 N = 10
		Fill	SS-2 (17 in)	FILL, LEAN CLAY (CL), firm to stiff, dark brown, moist, with gravel	3-5-6 N = 11
6.5			SS-3 (18 in)		3-3-4 N = 7
		Residuum	SS-4 (13 in)	FAT CLAY (CH), stiff to very stiff, dark brown, moist, with gravel	3-4-5 N = 9
	Auger refusal at 13.5 feet		SS-5 (16 in)		3-7-10 N = 17
13.5		Rock	Run-1 REC-64% RQD-21%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 75% limestone with 25% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured	
			Run-2 REC-90% RQD-64%		
38.5			Run-3 REC-98% RQD-68%		
				Coring terminated at 38.5 feet	

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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PROJECT: UK Gatton College Expansion
Lexington, KY
S&ME Project No. 25830176

BORING LOG: B-10

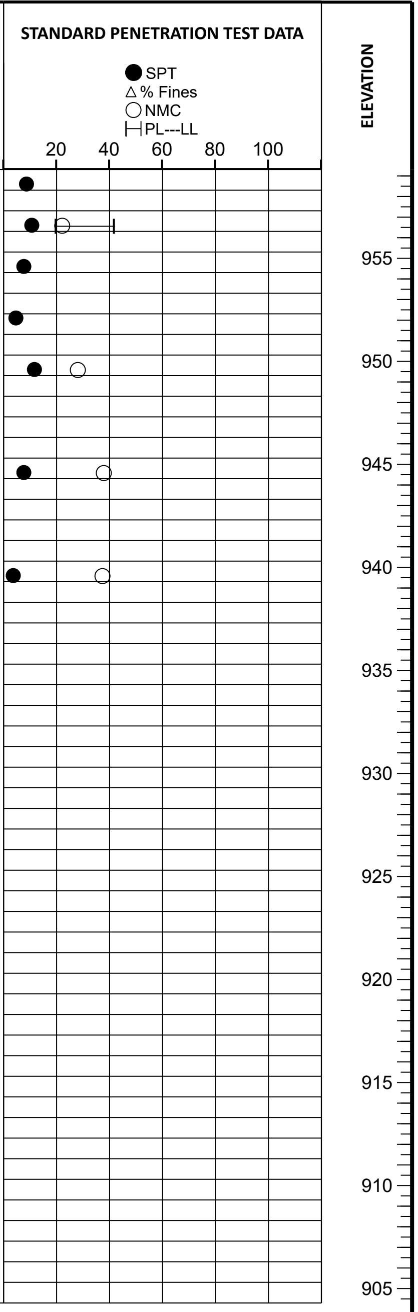
Sheet 1 of 1

DATE DRILLED: 01/07/2026
ELEVATION: 959 ft
DRILL RIG: Diedrich D-50
DATUM: NAVD88
DRILLER: Horn & Associates
BORING DEPTH: 42.2 ft
HAMMER TYPE: Safety Hammer (140 lb)
CLOSURE: Alternating Layers of Bentonite Chips and Cuttings
DRILLING METHOD: 3-1/4" HSA, NQ
LOGGED BY: Bacot, E
SAMPLING METHOD: SS
PROJECT COORDINATE SYSTEM - NAD 1983 StatePlane Kentucky FIPS 1600 Feet

NOTES:
Boring location and elevation established using handheld GPS equipment with sub-meter accuracy

NORTHING: 3903680.7 **EASTING:** 5279316.4

DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
0.5		Fill	SS-1 (12 in)	TOPSOIL (6 INCHES)	2-3-6 N = 9
			SS-2 (18 in)	FILL, LEAN CLAY (CL), firm to stiff, brown to dark brown, moist to wet, with rock fragments, gravel and crushed brick fragments	5-5-6 N = 11
			SS-3 (10 in)		3-4-4 N = 8
			SS-4 (17 in)		1-2-3 N = 5
9.0		Residuum	SS-5 (18 in)	FAT CLAY (CH), stiff, brown to dark brown, moist to wet, with rock fragments, gravel and crushed brick fragments	3-5-7 N = 12
14.0			SS-6 (18 in)	FAT CLAY (CH), firm, brown to dark brown, moist to wet, with rock fragments and gravel	3-4-4 N = 8
19.0	Auger refusal at 22.2 feet		SS-7 (18 in)	WEATHERED SHALE, soft, gray, moist	1-2-2 N = 4
22.2		Rock	Run-1 REC-99% RQD-55% Run-2 REC-100% RQD-92% Run-3 REC-94% RQD-74%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 75% limestone with 25% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured, with vugs and dissolution features	
42.2				Coring terminated at 42.2 feet	



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

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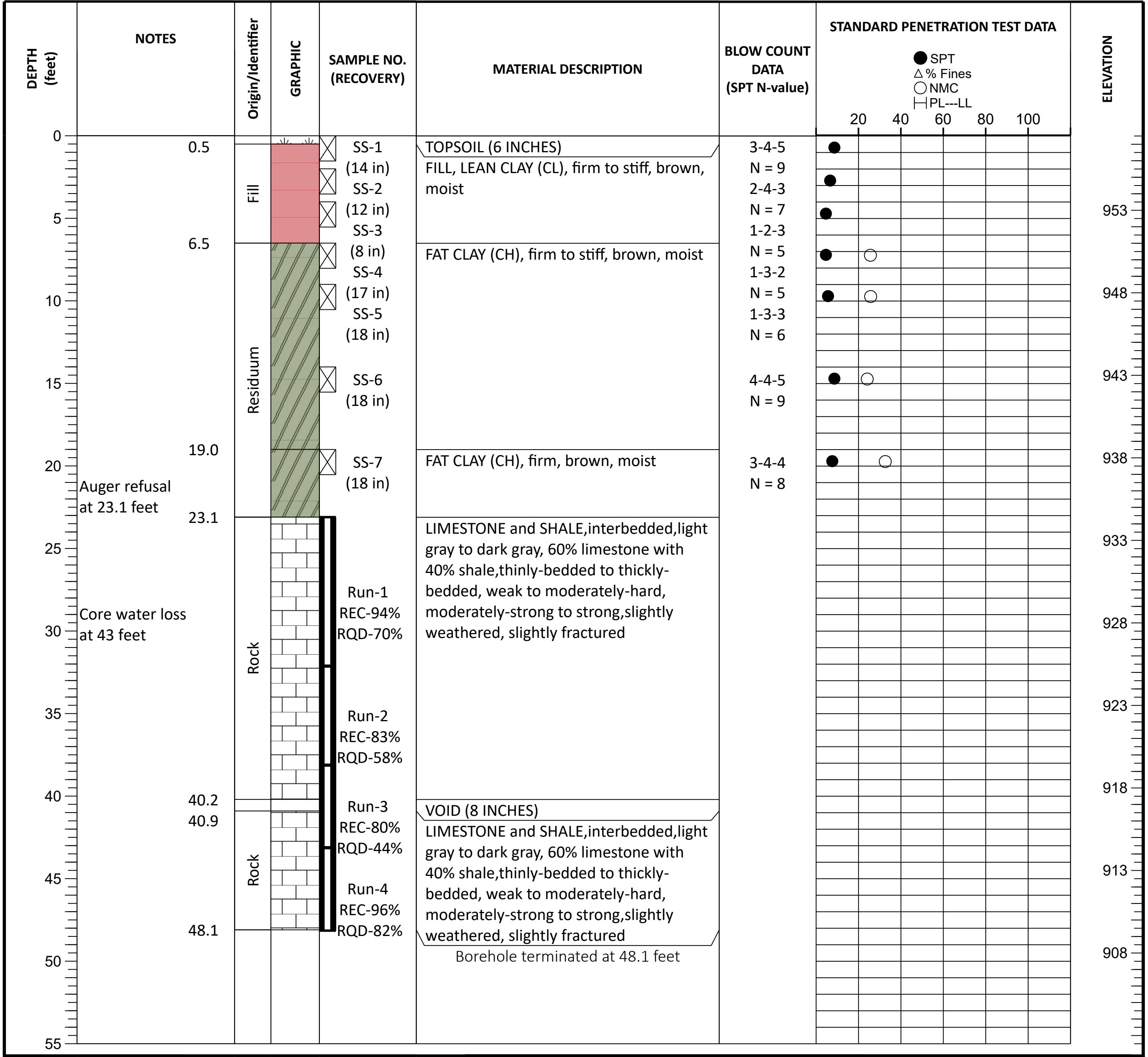
AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	UK Gatton College Expansion Lexington, KY **S&ME Project No. 25830176**	**BORING LOG: B-11**	*Sheet 1 of 1*

DATE DRILLED: 01/07/2026	**ELEVATION:** 958 ft	**NOTES:** **Boring location and elevation established using handheld GPS equipment with sub-meter accuracy**
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Horn & Associates	**BORING DEPTH:** 48.1 ft	
HAMMER TYPE: Safety Hammer (200 lb)	**CLOSURE:** Alternating Layers of Bentonite Chips and Cuttings	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Bacot, E	**NORTHING:** 3903704.5 **EASTING:** 5279340.8
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	



DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
0.5		Fill	SS-1 (14 in)	TOPSOIL (6 INCHES) FILL, LEAN CLAY (CL), firm to stiff, brown, moist	3-4-5 N = 9
			SS-2 (12 in)		2-4-3 N = 7
6.5		Residuum	SS-3 (8 in)	FAT CLAY (CH), firm to stiff, brown, moist	1-2-3 N = 5
			SS-4 (17 in)		1-3-2 N = 5
			SS-5 (18 in)		1-3-3 N = 6
			SS-6 (18 in)		4-4-5 N = 9
19.0			SS-7 (18 in)	FAT CLAY (CH), firm, brown, moist	3-4-4 N = 8
23.1	Auger refusal at 23.1 feet	Rock	Run-1 REC-94% RQD-70%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 60% limestone with 40% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured	
	Core water loss at 43 feet		Run-2 REC-83% RQD-58%		
40.2			Run-3 REC-80% RQD-44%	VOID (8 INCHES)	
40.9		Rock	Run-4 REC-96% RQD-82%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 60% limestone with 40% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured	
48.1				Borehole terminated at 48.1 feet	

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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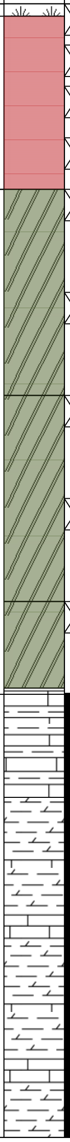
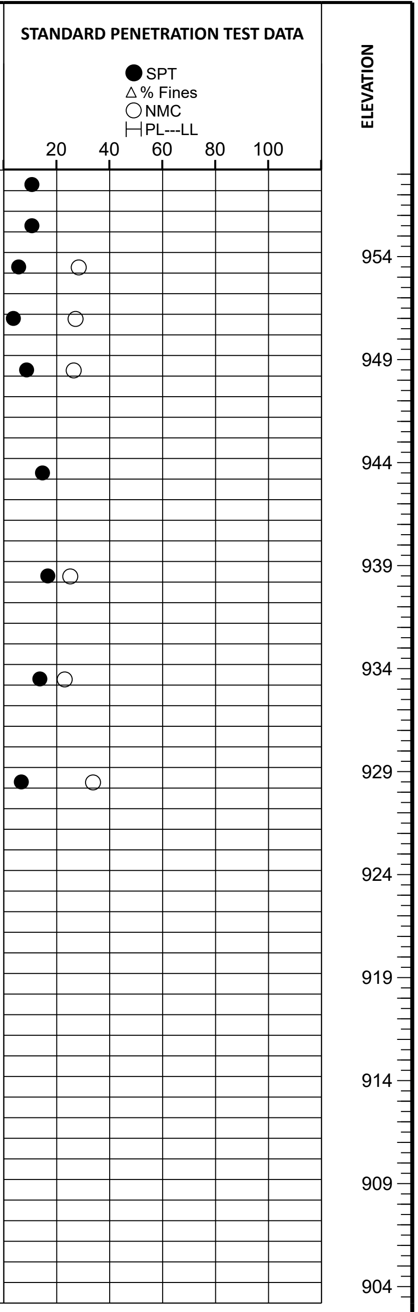
AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	UK Gatton College Expansion Lexington, KY **S&ME Project No. 25830176**	**BORING LOG: B-12** *Sheet 1 of 2*

DATE DRILLED: 01/07/2026	**ELEVATION:** 958 ft	**NOTES:** **Boring location and elevation established using handheld GPS equipment with sub-meter accuracy**
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Horn & Associates	**BORING DEPTH:** 83.7 ft	
HAMMER TYPE: Safety Hammer (140 lb)	**CLOSURE:** Alternating Layers of Bentonite Chips and Cuttings	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Bacot, E	**NORTHING:** 3903690.2 **EASTING:** 5279360.3
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
0.6			SS-1 (18 in)	TOPSOIL (7 INCHES)	4-5-6 N = 11
		Fill	SS-2 (18 in) SS-3 (14 in) SS-4 (11 in)	FILL, LEAN CLAY (CL), soft to stiff, brown, moist, with gravel	4-6-5 N = 11 2-3-3 N = 6 2-2-2 N = 4
9.0		Residuum	SS-5 (18 in) SS-6 (0 in)	FAT CLAY (CH), stiff, brown, moist, with gravel	2-4-5 N = 9 4-6-9 N = 15
19.0		Residuum	SS-7 (18 in) SS-8 (18 in)	FAT CLAY (CH), stiff to very stiff, brown, moist, with gravel	4-7-10 N = 17 4-5-9 N = 14
29.0	Auger refusal at 33.5 feet	Residuum	SS-9 (13 in)	FAT CLAY (CH), firm, brown, moist, with gravel	2-3-4 N = 7
33.2				LIMESTONE, heavily-weathered, gray	
33.5			Run-1 REC-20% RQD-0%	LIMESTONE and SHALE, interbedded, light gray to dark gray, heavily-weathered, fractured	
38.5			Run-2 REC-0% RQD-0% Run-3 REC-0% RQD-0% Run-4 REC-36% RQD-6%	SHALE, and LIMESTONE light gray to dark gray, heavily-weathered, fractured, low-recovery, likely shale-beds and mud-seams, clay-filled voids	





GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
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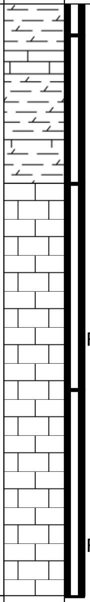
AR = Auger Refusal, IGM = Intermediate Geomaterial

PROJECT:	UK Gatton College Expansion Lexington, KY **S&ME Project No. 25830176**	**BORING LOG: B-12** *Sheet 2 of 2*

DATE DRILLED: 01/07/2026	**ELEVATION:** 958 ft	**NOTES:** **Boring location and elevation established using handheld GPS equipment with sub-meter accuracy**
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Horn & Associates	**BORING DEPTH:** 83.7 ft	
HAMMER TYPE: Safety Hammer (140 lb)	**CLOSURE:** Alternating Layers of Bentonite Chips and Cuttings	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Bacot, E	**NORTHING:** 3903690.2 **EASTING:** 5279360.3
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	



DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	ELEVATION
		Rock	Run-5 REC-0% RQD-0%	SHALE, and LIMESTONE light gray to dark gray, heavily-weathered, fractured, low-recovery, likely shale-beds and mud-seams, clay-filled voids		
60						899
63.7	Core water loss at 64 feet		Run-6 REC-84% RQD-57%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 75% limestone with 25% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured		
65						894
70						889
75						884
80			Run-7 REC-92% RQD-88%			879
83.7				Coring terminated at 83.7 feet		
85						874
90						869
95						864
100						859
105						854
110						849

STANDARD PENETRATION TEST DATA
● SPT
△ % Fines
○ NMC
├┤PL---LL
20 40 60 80 100

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

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PROJECT: UK Gatton College Expansion
Lexington, KY
S&ME Project No. 25830176

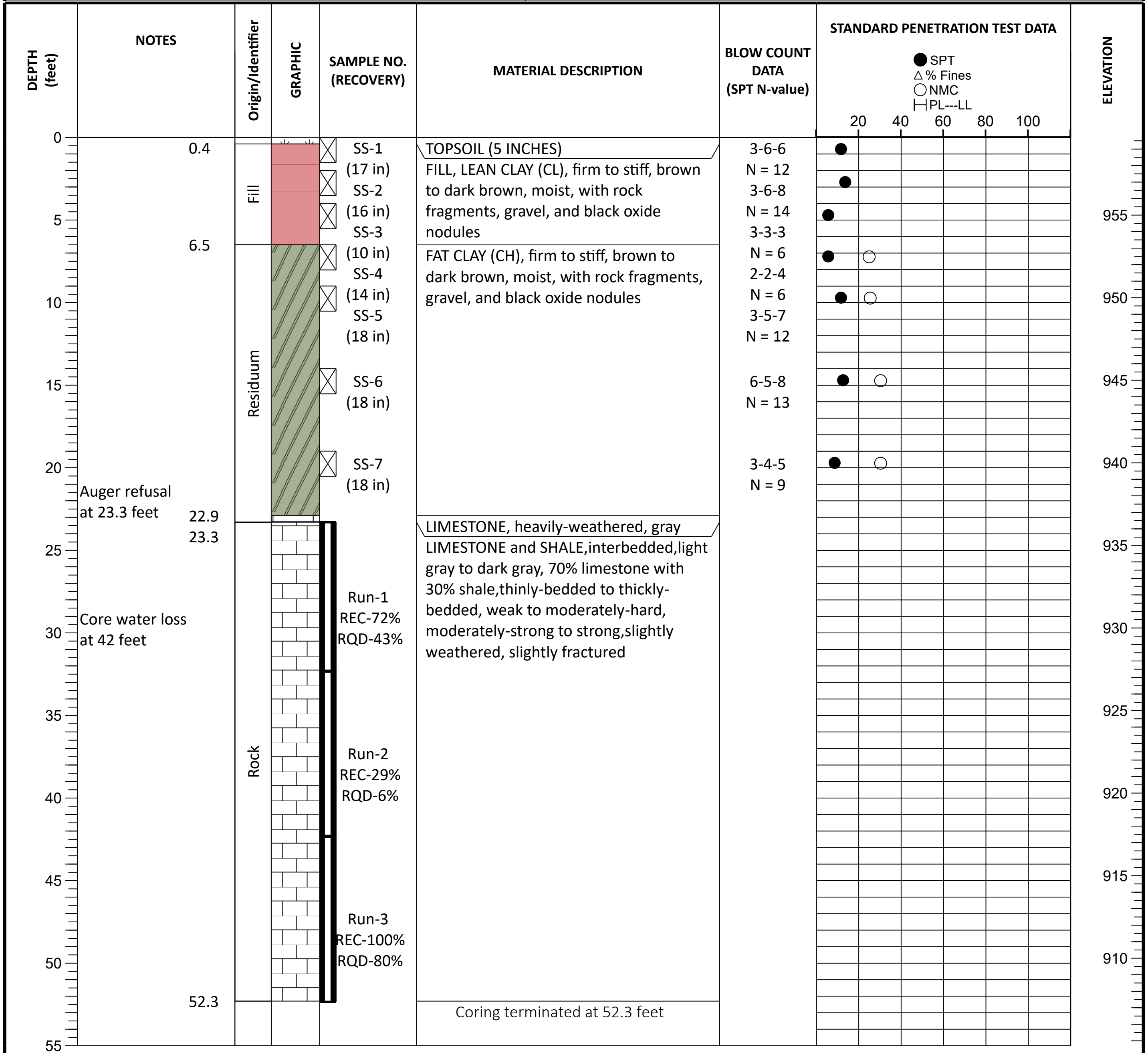
BORING LOG: B-13

Sheet 1 of 1

DATE DRILLED: 01/07/2026	**ELEVATION:** 960 ft
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88
DRILLER: Horn & Associates	**BORING DEPTH:** 52.3 ft
HAMMER TYPE: Safety Hammer (140 lb)	**CLOSURE:** Alternating Layers of Bentonite Chips and Cuttings
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Bacot, E
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet

NOTES:
Boring location and elevation established using handheld GPS equipment with sub-meter accuracy

NORTHING: 3903661.6 **EASTING:** 5279380.3



DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
0.4		Fill	SS-1 (17 in)	TOPSOIL (5 INCHES)	3-6-6 N = 12
			SS-2 (16 in)	FILL, LEAN CLAY (CL), firm to stiff, brown to dark brown, moist, with rock fragments, gravel, and black oxide nodules	3-6-8 N = 14
			SS-3 (10 in)		3-3-3 N = 6
6.5		Residuum	SS-4 (14 in)	FAT CLAY (CH), firm to stiff, brown to dark brown, moist, with rock fragments, gravel, and black oxide nodules	2-2-4 N = 6
			SS-5 (18 in)		3-5-7 N = 12
			SS-6 (18 in)		6-5-8 N = 13
	Auger refusal at 23.3 feet		SS-7 (18 in)		3-4-5 N = 9
22.9				LIMESTONE, heavily-weathered, gray	
23.3	Core water loss at 42 feet	Rock	Run-1 REC-72% RQD-43%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 70% limestone with 30% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured	
			Run-2 REC-29% RQD-6%		
			Run-3 REC-100% RQD-80%		
52.3				Coring terminated at 52.3 feet	

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

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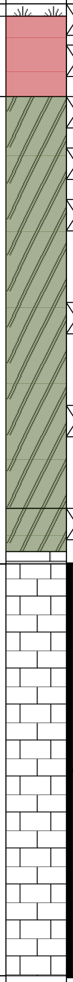
PROJECT: UK Gatton College Expansion
Lexington, KY
S&ME Project No. 25830176

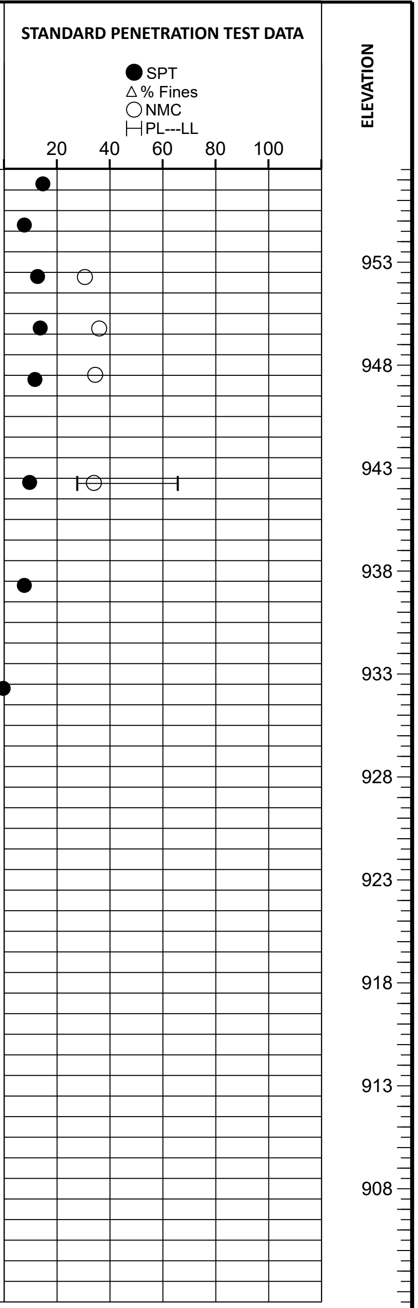
BORING LOG: B-14

Sheet 1 of 1

DATE DRILLED: 01/07/2026	**ELEVATION:** 958 ft	**NOTES:** Boring location and elevation established using handheld GPS equipment with sub-meter accuracy
DRILL RIG: Diedrich D-50	**DATUM:** NAVD88	
DRILLER: Horn & Associates	**BORING DEPTH:** 47.2 ft	
HAMMER TYPE: Safety Hammer (140 lb)	**CLOSURE:** Alternating Layers of Bentonite Chips and Cuttings	
DRILLING METHOD: 3-1/4" HSA, NQ	**LOGGED BY:** Bacot, E	**NORTHING:** 3903702.4 **EASTING:** 5279439.7
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane Kentucky FIPS 1600 Feet	

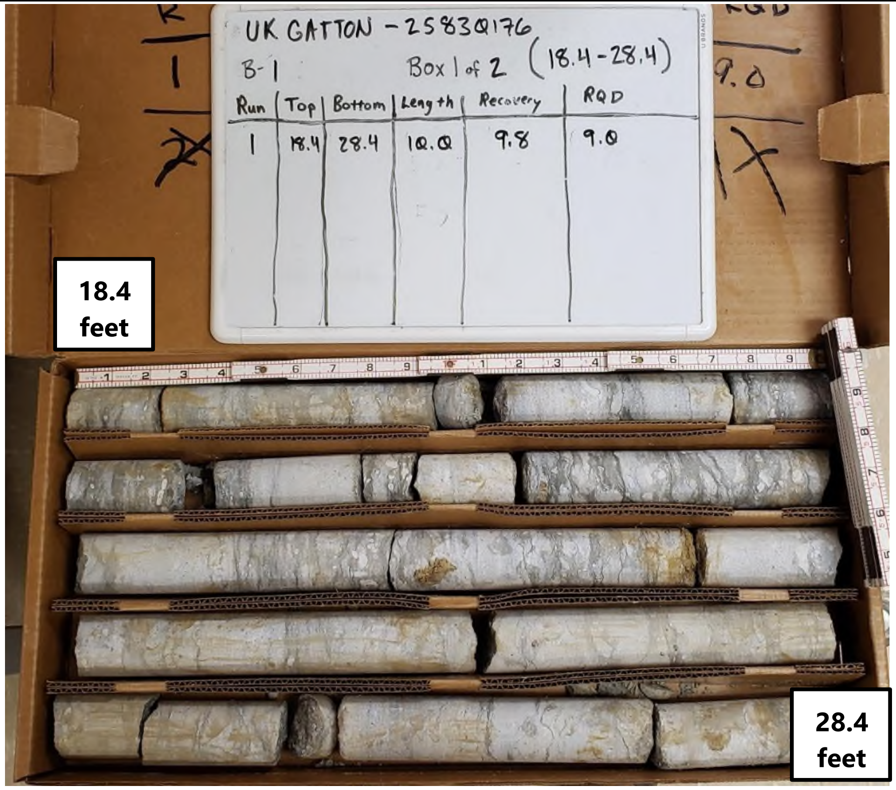
DEPTH (feet)	NOTES	Origin/Identifier	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)
0.6			SS-1 (16 in)	TOPSOIL (7 INCHES)	5-9-6 N = 15
		Fill	SS-2 (16 in)	FILL, LEAN CLAY (CL), firm to stiff, brown moist, with some rock fragments	3-4-4 N = 8
4.5		Residuum	SS-3 (18 in)	FAT CLAY (CH), firm to stiff, brown moist, with some rock fragments	5-5-8 N = 13
			SS-4 (17 in)		4-6-8 N = 14
			SS-5 (18 in)		4-5-7 N = 12
			SS-6 (18 in)		2-4-6 N = 10
			SS-7 (4 in)		1-2-6 N = 8
24.5	Auger refusal at 27.2 feet		SS-8 (2 in)	FAT CLAY (CH), soft, brown moist, with some rock fragments	0-0-0 N = WOH
26.6				LIMESTONE, heavily-weathered, gray	
27.2		Rock	Run-1 REC-87% RQD-25%	LIMESTONE and SHALE,interbedded,light gray to dark gray, 60% limestone with 40% shale,thinly-bedded to thickly-bedded, weak to moderately-hard, moderately-strong to strong,slightly weathered, slightly fractured	
			Run-2 REC-100% RQD-65%		
47.2				Coring terminated at 47.2 feet	





GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽			
END OF DRILLING	▼			
AFTER DRILLING	▼			Not encountered
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf),
AR = Auger Refusal, IGM = Intermediate Geomaterial



Depth:	18.4-28.4 feet
Date:	1/14/2025
Photographer:	Kevin Roberts
Surface Elevation:	960 feet
Latitude:	38.037843° N
Longitude:	84.506886° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 70% limestone with 30% shale

Box:	**Borehole:**
1 of 2	**B-01**

Depth:	28.4-38.4 feet
Date:	1/14/2025
Photographer:	Kevin Roberts
Surface Elevation:	960 feet
Latitude:	38.037843° N
Longitude:	84.506886° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 70% limestone with 30% shale

Box:	**Borehole:**
2 of 2	**B-01**

UK GATTON - 25830176
B-2 Box 1 of 2 (19.7-29.7)

Run	Top	Bottom	Length	Recovery	RQD
1	19.7	29.7	10.0	9.2	3.9

Depth:	19.7-29.7 feet
Date:	1/14/2025
Photographer:	Kevin Roberts
Surface Elevation:	957 feet
Latitude:	38.037747° N
Longitude:	84.507049° W
Remarks: Limestone with calcareous shale, light gray to dark gray, moderately-strong to strong, estimated 80% limestone with 20% shale	
Box:	**Borehole:**
1 of 2	**B-02**

UK GATTON - 25830176
B-2 Box 2 of 2 (29.7-39.7)

Run	Top	Bottom	Length	Recovery	RQD
2	29.7	39.7	10.0	10.0	7.9

Depth:	29.7-39.7 feet
Date:	1/14/2025
Photographer:	Kevin Roberts
Surface Elevation:	957 feet
Latitude:	38.037747° N
Longitude:	84.507049° W
Remarks: Limestone with calcareous shale, light gray to dark gray, moderately-strong to strong, estimated 80% limestone with 20% shale	
Box:	**Borehole:**
2 of 2	**B-02**

UK GATTON – 25830176
B-4 Box 1 of 2 (18.6-31.6)

Run	Top	Bottom	Length	Recovery	RQD
1	18.6	26.6	8.0	8.0	4.9
2	26.6	31.6	5.0	5.0	4.5

Depth:	18.6-31.6 feet
Date:	1/14/2025
Photographer:	Kevin Roberts
Surface Elevation:	960 feet
Latitude:	38.037577° N
Longitude:	84.507048° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 80% limestone with 20% shale

Box:	**Borehole:**
1 of 2	**B-04**

UK GATTON – 25830176
B-4 Box 2 of 2 (31.6-38.6)

Run	Top	Bottom	Length	Recovery	RQD
3	31.6	38.6	7.0	7.0	5.5

Depth:	31.6-38.6 feet
Date:	1/14/2025
Photographer:	Kevin Roberts
Surface Elevation:	960 feet
Latitude:	38.037577° N
Longitude:	84.507048° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 80% limestone with 20% shale

Box:	**Borehole:**
2 of 2	**B-04**

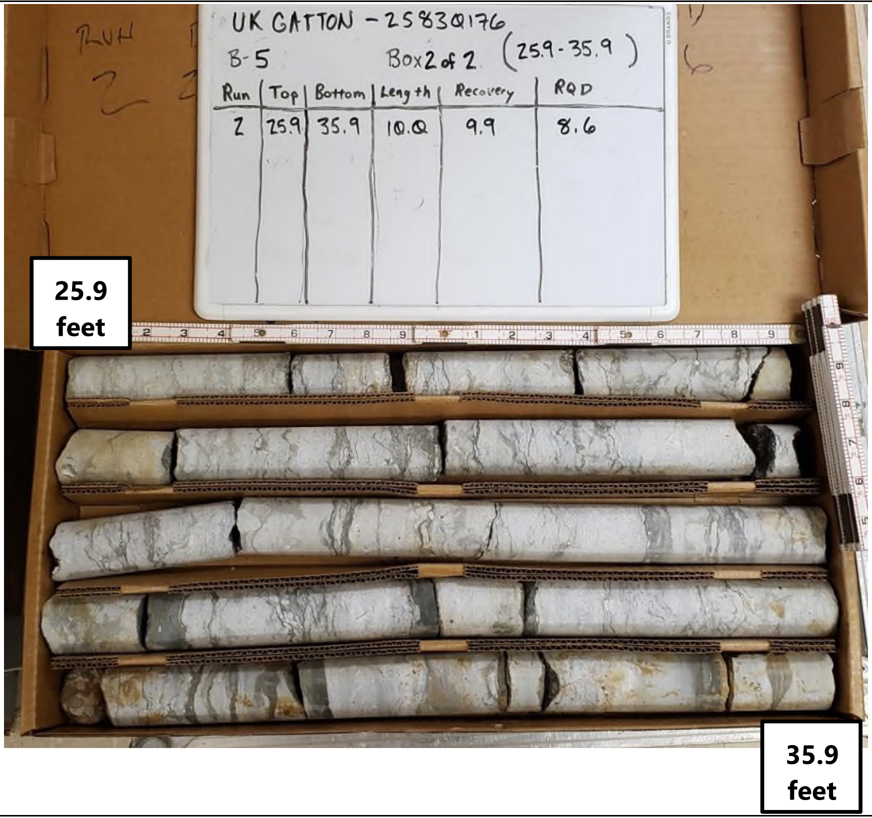
UK GATTON - 25830176
B-5 Box 1 of 2 (15.9-25.9)

Run	Top	Bottom	Length	Recovery	RQD
1	15.9	25.9	10.0	9.9	6.8

Depth:	15.9-25.9 feet
Date:	1/14/2025
Photographer:	Kevin Roberts
Surface Elevation:	956 feet
Latitude:	38.037730° N
Longitude:	84.506809° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 75% limestone with 25% shale

Box:	**Borehole:**
1 of 2	**B-05**



UK GATTON - 25830176
B-5 Box 2 of 2 (25.9-35.9)

Run	Top	Bottom	Length	Recovery	RQD
2	25.9	35.9	10.0	9.9	8.6

Depth:	25.9-35.9 feet
Date:	1/14/2025
Photographer:	Kevin Roberts
Surface Elevation:	956 feet
Latitude:	38.037730° N
Longitude:	84.506809° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 75% limestone with 25% shale

Box:	**Borehole:**
2 of 2	**B-05**

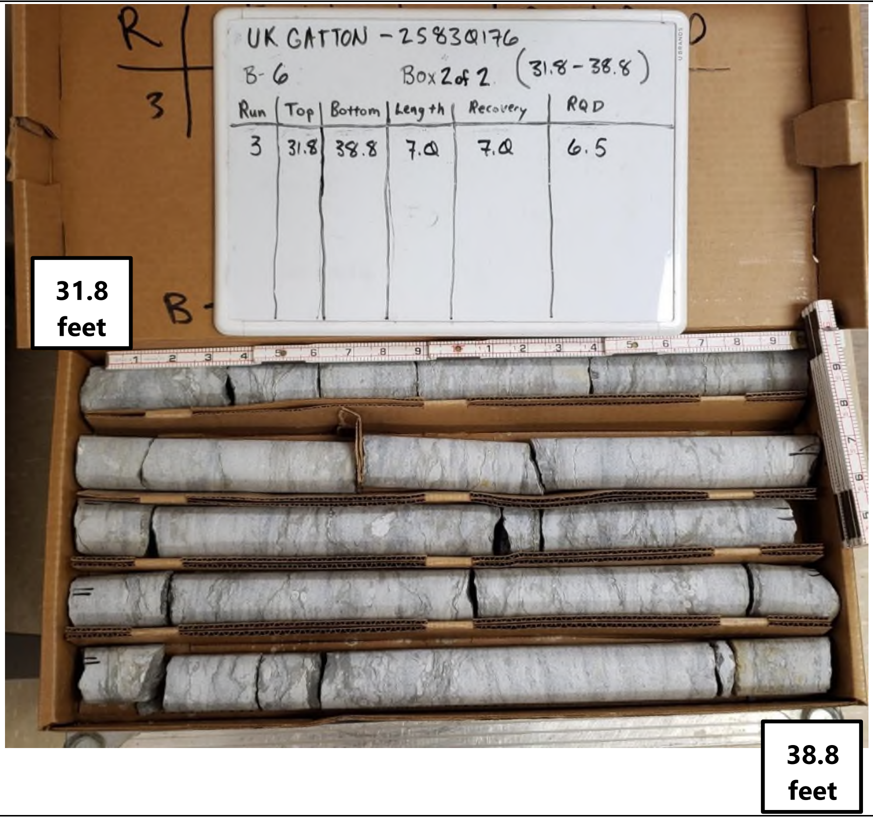
UK GATTON – 25830176
B-6 Box 1 of 2 (18.8 - 31.8)

Run	Top	Bottom	Length	Recovery	RQD
1	18.8	26.8	8.0	7.8	5.4
2	26.8	31.8	5.0	5.0	4.4

Depth:	18.8-31.8 feet
Date:	1/14/2025
Photographer:	Kevin Roberts
Surface Elevation:	961 feet
Latitude:	38.037461° N
Longitude:	84.506957° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 65% limestone with 35% shale

Box:	**Borehole:**
1 of 2	**B-06**



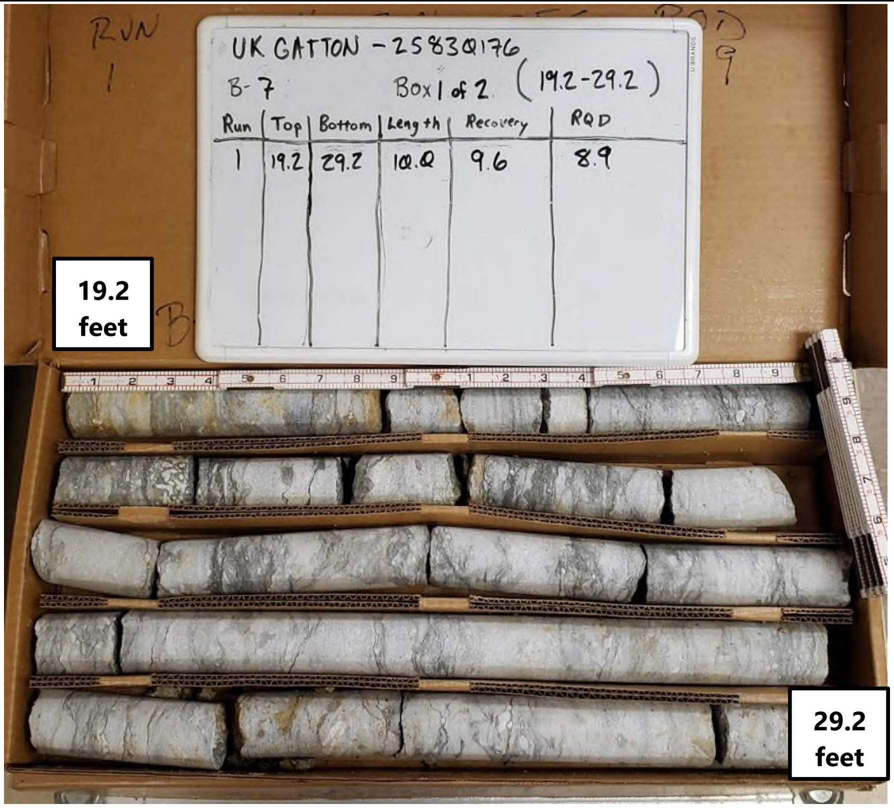
UK GATTON – 25830176
B-6 Box 2 of 2 (31.8 - 38.8)

Run	Top	Bottom	Length	Recovery	RQD
3	31.8	38.8	7.0	7.0	6.5

Depth:	31.8-38.8 feet
Date:	1/14/2025
Photographer:	Kevin Roberts
Surface Elevation:	961 feet
Latitude:	38.037461° N
Longitude:	84.506957° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 65% limestone with 35% shale

Box:	**Borehole:**
2 of 2	**B-06**



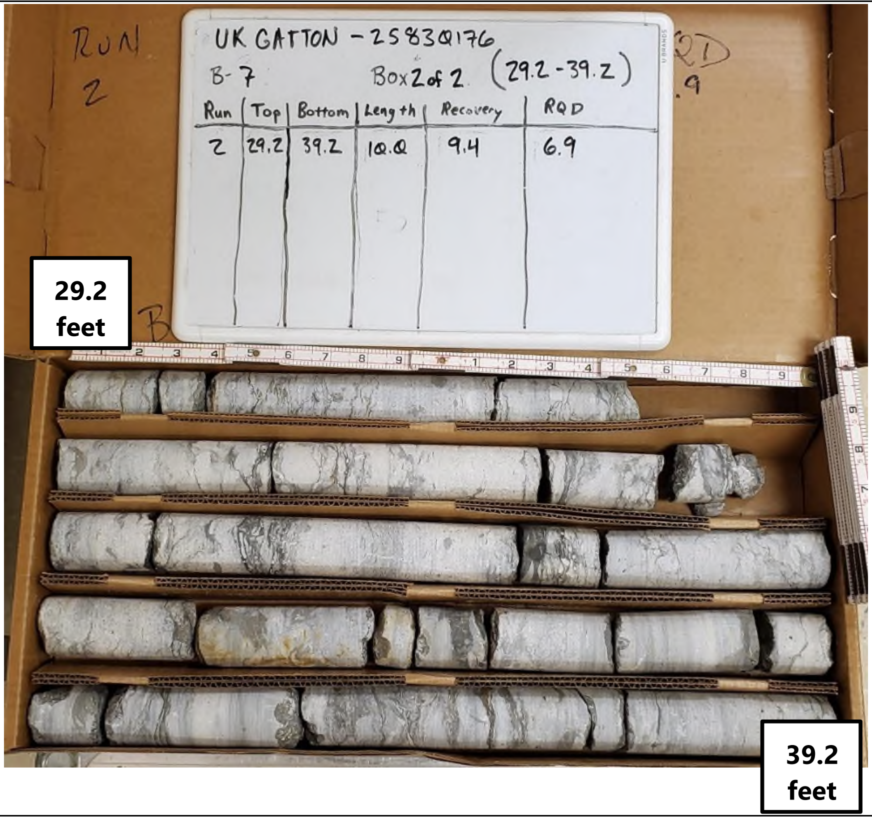
UK GATTON - 25830176
B-7 Box 1 of 2 (19.2-29.2)

Run	Top	Bottom	Length	Recovery	RQD
1	19.2	29.2	10.0	9.6	8.9

Depth:	19.2-29.2 feet
Date:	1/14/2025
Photographer:	Kevin Roberts
Surface Elevation:	957 feet
Latitude:	38.037652° N
Longitude:	84.506753° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 80% limestone with 20% shale

Box:	**Borehole:**
1 of 2	**B-07**



UK GATTON - 25830176
B-7 Box 2 of 2 (29.2-39.2)

Run	Top	Bottom	Length	Recovery	RQD
2	29.2	39.2	10.0	9.4	6.9

Depth:	29.2-39.2 feet
Date:	1/14/2025
Photographer:	Kevin Roberts
Surface Elevation:	957 feet
Latitude:	38.037652° N
Longitude:	84.506753° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 80% limestone with 20% shale

Box:	**Borehole:**
2 of 2	**B-07**

UK GATTON – 25830176
B-8 Box 1 of 2 (19.6 - 29.6)

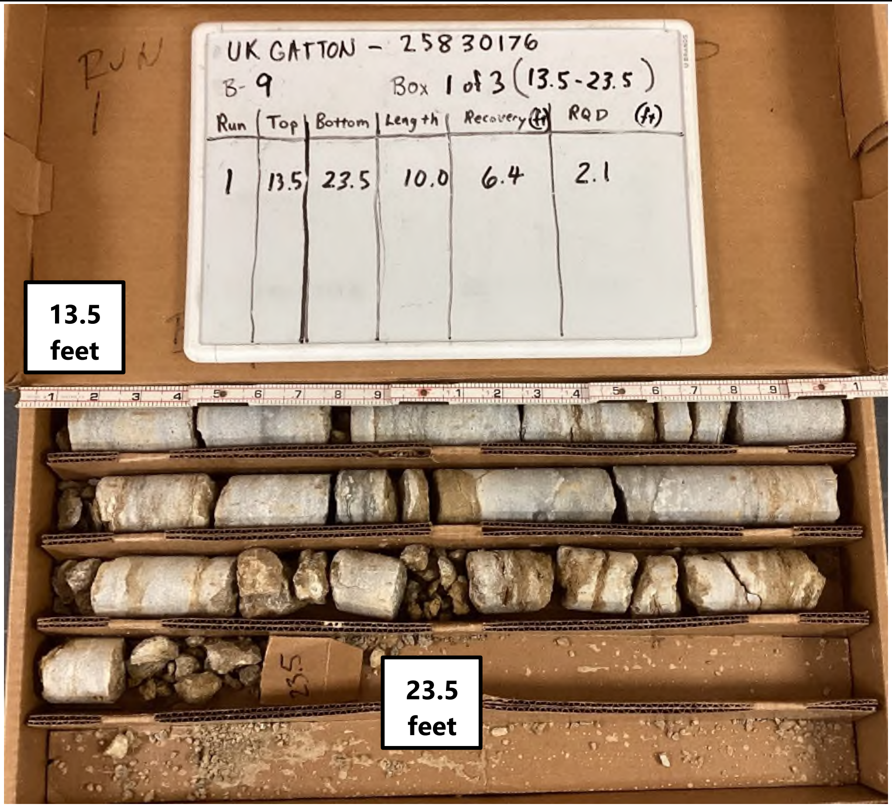
Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
1	19.6	21.1	1.5	1.5	0.5
2	21.1	31.1	10.0	9.5	9.0

Depth:	19.6-29.6 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	961 feet
Latitude:	38.037378° N
Longitude:	84.506806° W
Remarks: Limestone with calcareous shale, light gray to dark gray, moderately-strong to strong, estimated 60% limestone with 40% shale	
Box:	**Borehole:**
1 of 2	**B-08**

UK GATTON – 25830176
B-8 Box 2 of 2 (29.6 - 39.6)

Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
3	31.1	39.6	8.5	8.5	7.1

Depth:	29.6-39.6 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	961 feet
Latitude:	38.037378° N
Longitude:	84.506806° W
Remarks: Limestone with calcareous shale, light gray to dark gray, moderately-strong to strong, estimated 60% limestone with 40% shale	
Box:	**Borehole:**
2 of 2	**B-08**



Depth:	13.5-23.5 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	955 feet
Latitude:	38.037508° N
Longitude:	84.506526° W

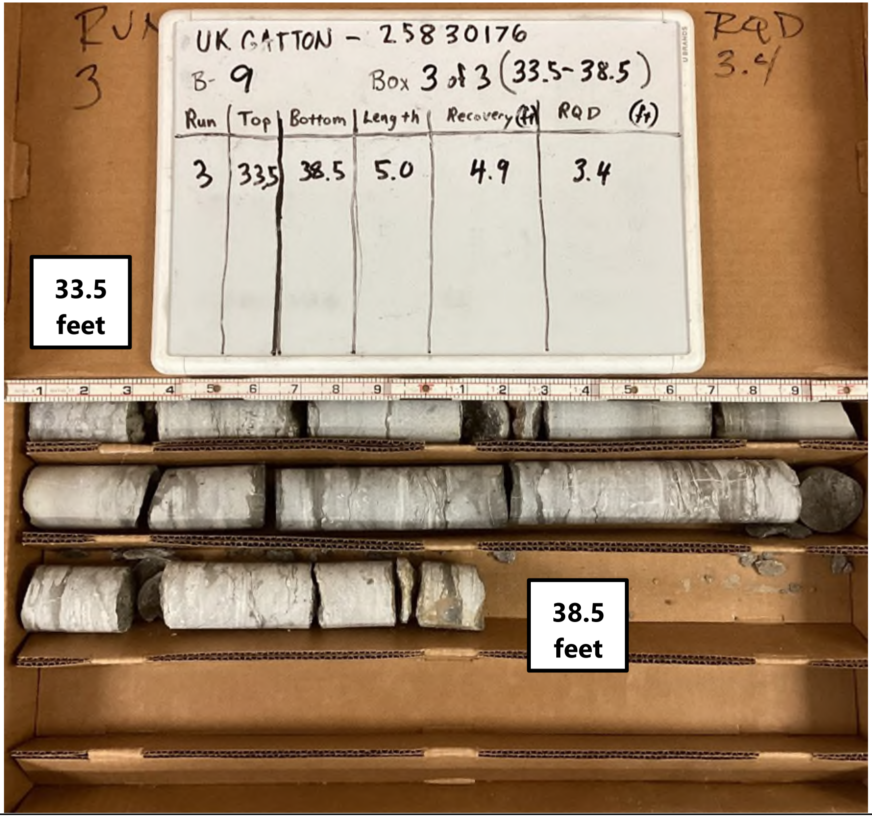
Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 75% limestone with 25% shale

Box:	**Borehole:**
1 of 3	**B-09**

Depth:	23.5-33.5 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	955 feet
Latitude:	38.037508° N
Longitude:	84.506526° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 75% limestone with 25% shale

Box:	**Borehole:**
2 of 3	**B-09**



UK GATTON – 25830176
B-9 Box 3 of 3 (33.5-38.5)

Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
3	33.5	38.5	5.0	4.9	3.4

Depth:	33.5-38.5 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	955 feet
Latitude:	38.037508° N
Longitude:	84.506526° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 75% limestone with 25% shale

Box:	**Borehole:**
3 of 3	**B-09**

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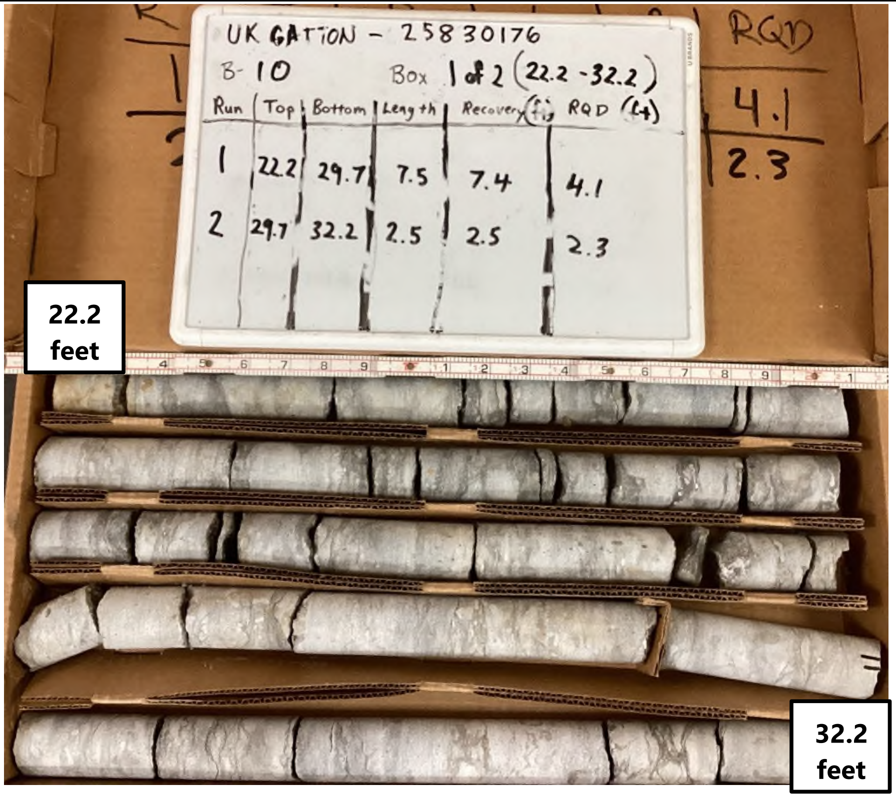

UK GATTON – 25830176
B-10 Box 1 of 2 (22.2-32.2)

Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
1	22.2	29.7	7.5	7.4	4.1
2	29.7	32.2	2.5	2.5	2.3

Depth:	22.2-32.2 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	959 feet
Latitude:	38.037358° N
Longitude:	84.506639° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 75% limestone with 25% shale

Box:	**Borehole:**
1 of 2	**B-10**

UK GATTON – 25830176
B-10 Box 2 of 2 (32.2-42.2)

Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
3	32.2	42.2	10.0	9.4	7.4

Depth:	32.2-42.2 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	959 feet
Latitude:	38.037358° N
Longitude:	84.506639° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 75% limestone with 25% shale

Box:	**Borehole:**
2 of 2	**B-10**

UK GATTON - 25830176
B-11 Box 1 of 3 (23.1-33.1)

Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
1	23.1	32.1	9.0	8.5	6.3
2	32.1	38.1	6.0	5.0	3.5

Depth:	23.1-33.1 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	958 feet
Latitude:	38.037423° N
Longitude:	84.506553° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 60% limestone with 40% shale

Box:	**Borehole:**
1 of 3	**B-11**

UK GATTON - 25830176
B-11 Box 2 of 3 (33.1-43.1)

Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
2	32.1	38.1	6.0	5.0	3.5
3	38.1	43.1	5.0	4.0	2.2

Depth:	33.1-43.1 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	958 feet
Latitude:	38.037423° N
Longitude:	84.506553° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 60% limestone with 40% shale

Box:	**Borehole:**
2 of 3	**B-11**

43.1 feet

48.1 feet

Depth:	43.1-48.1 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	958 feet
Latitude:	38.037423° N
Longitude:	84.506553° W
Remarks: Limestone with calcareous shale, light gray to dark gray, moderately-strong to strong, estimated 60% limestone with 40% shale	
Box:	**Borehole:**
3 of 3	**B-11**

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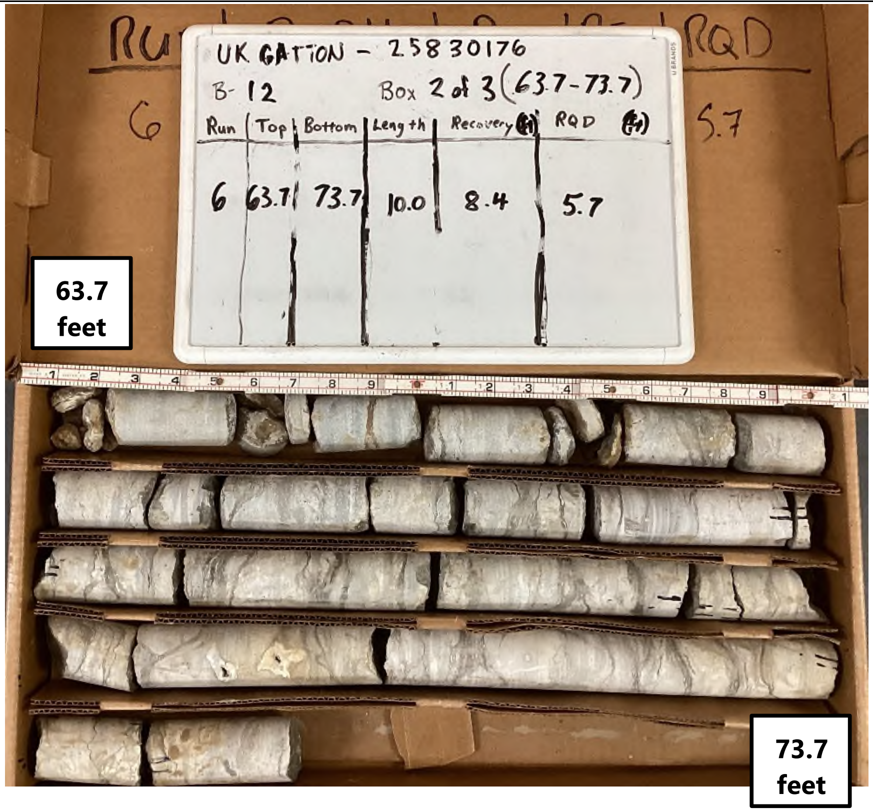
UK GATION - 25830176
B- 12 Box 1 of 3 (33.5-63.7)

Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
1	33.5	38.5	5.0	1.0	0.0
2	38.5	43.5	5.0	0.0	0.0
3	43.5	48.5	5.0	0.0	0.0
4	48.5	56.5	8.0	2.9	0.5
5	56.5	63.7	7.2	0.0	0.0

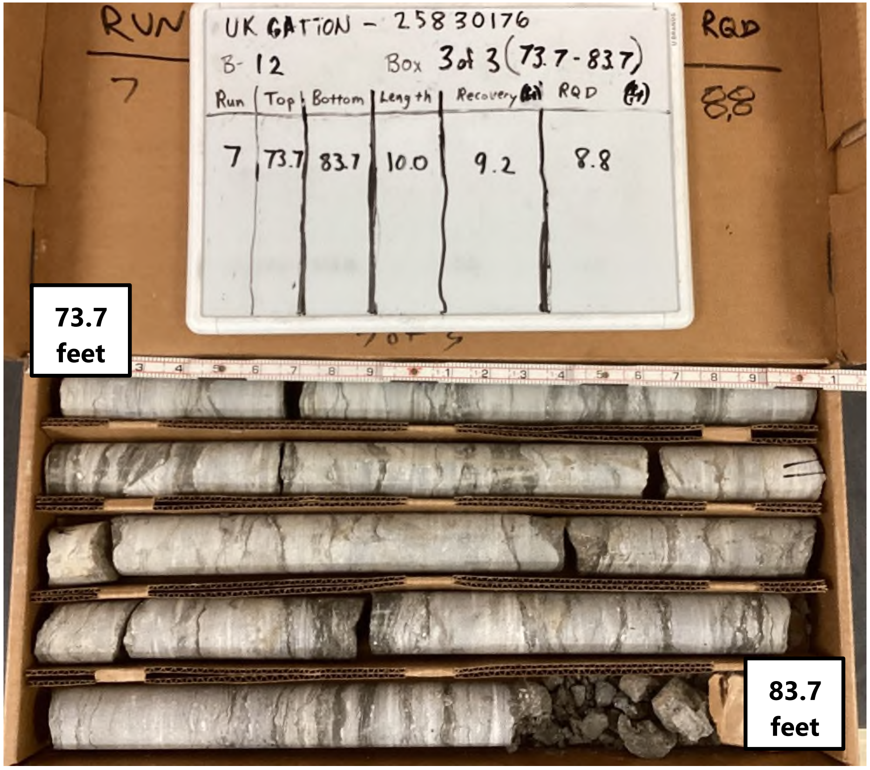
Depth:	33.5-63.7 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	958 feet
Latitude:	38.037383° N
Longitude:	84.506486° W
Remarks: Shale with interbedded limestone, light gray to dark gray, shale-beds/mud-seams/clay-filled void	
Box:	**Borehole:**
1 of 3	B-12



UK GATION - 25830176
B- 12 Box 2 of 3 (63.7-73.7)

Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
6	63.7	73.7	10.0	8.4	5.7

Depth:	63.7-73.7 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	958 feet
Latitude:	38.037383° N
Longitude:	84.506486° W
Remarks: Limestone with calcareous shale, light gray to dark gray, moderately-strong to strong, estimated 75% limestone with 25% shale	
Box:	**Borehole:**
2 of 3	B-12



UK GATTON - 25830176
B-12 Box 3of 3 (73.7-83.7)

Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
7	73.7	83.7	10.0	9.2	8.8

Depth:	73.7-83.7 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	958 feet
Latitude:	38.037383° N
Longitude:	84.506486° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 75% limestone with 25% shale

Box:	**Borehole:**
3 of 3	**B-12**

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UK GATTON – 25830176
B-13 Box 1 of 2 (23.3-43.3)

Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
1	23.3	32.3	9.0	6.5	3.9
2	32.3	42.3	10.0	2.9	0.6
3	42.3	52.3	10.0	9.8	8.0

Depth:	23.3-43.3 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	960 feet
Latitude:	38.037304° N
Longitude:	84.506418° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 70% limestone with 30% shale

Box:	**Borehole:**
1 of 2	**B-13**

UK GATTON – 25830176
B-13 Box 2 of 2 (43.3-52.3)

Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
3	42.3	52.3	10.0	9.8	8.0

Depth:	43.3-52.3 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	960 feet
Latitude:	38.037304° N
Longitude:	84.506418° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 70% limestone with 30% shale

Box:	**Borehole:**
2 of 2	**B-13**

UK GATTON – 25830176
B-14 Box 1 of 2 (27.2-37.2)

Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
1	27.2	37.2	10.0	8.7	2.5

Depth:	27.2-37.2 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	958 feet
Latitude:	38.037413° N
Longitude:	84.506210° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 60% limestone with 40% shale

Box:	**Borehole:**
1 of 2	**B-14**

UK GATTON – 25830176
B-14 Box 2 of 2 (37.2 - 47.2)

Run	Top	Bottom	Length	Recovery (ft)	RQD (ft)
2	37.2	47.2	10.0	10.0	6.5

Depth:	37.2-47.2 feet
Date:	1/15/2025
Photographer:	Daniel Draper
Surface Elevation:	958 feet
Latitude:	38.037413° N
Longitude:	84.506210° W

Remarks:
Limestone with calcareous shale,
light gray to dark gray,
moderately-strong to strong,
estimated 60% limestone with 40% shale

Box:	**Borehole:**
2 of 2	**B-14**

Summary of Field Procedures

♦ Boring and Sampling

Soil Test Boring with Hollow-Stem Auger

Soil sampling and penetration testing were performed in general accordance with ASTM D1586, *Standard Test Method for Penetration Test and Split Barrel Sampling of Soils*. Borings were made by mechanically twisting a continuous steel hollow stem auger into the soil. At regular intervals, soil samples were obtained with a standard 1.4-inch I. D., 2-inch O. D., split barrel sampler. The sampler was first seated six inches to penetrate any loose cuttings, then driven an additional 12 inches with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler through the two final six inch increments was recorded as the penetration resistance (SPT N) value. The N-value, when properly interpreted by qualified professional staff, is an index of the soil strength and foundation support capability.

Undisturbed (UD) Sampling

Split spoon or split barrel sampling provide samples suitable for visual examination and classification tests but not sufficiently intact for quantitative laboratory testing. To provide samples for quantitative tests, relatively undisturbed samples were obtained by pushing sections of 3-inch O.D., 16-guage, steel tubing (Shelby tube) into the soil at the desired sampling intervals. The procedures used generally followed those described in ASTM D1587, *Standard Practice for Thin-Walled Tube Geotechnical Sampling of Soils*. Each tube, together with the encased soil, was carefully removed from the ground and the length of the recovered soil measured. Locations and depths of undisturbed samples were recorded on each field test boring record.

Refusal to Drilling

Refusal to the soil drilling methods used at this site may result from encountering hard cemented soil, soft weathered rock, coarse gravel, cobbles or boulders, thin rock seams, or the upper surface of sound continuous rock. Core drilling would be required to determine the character and continuity of materials below refusal of the soil auger in natural soils. Where fills are present, refusal to drilling may also result from encountering buried debris, building materials, or objects. Backhoe test pits would be required to expose and identify buried materials below refusal levels in filled areas.

Rock Core Drilling in Uncased Borehole

In selected borings where refusal to the drilling tools had been encountered, materials below refusal level were cored using a diamond studded bit fastened to the end of hollow double tube core barrel. Hollow stem augers were left in place to stabilize the borehole and the core barrel inserted through the annulus of the drilling rod. Coring was conducted in general accordance with the procedures described in ASTM D2113, *Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigation*. In this case an NX size core barrel was used to produce cylindrical cores 1-7/8 inches in diameter. Core rod RPM and advance rate were closely monitored during each run to prevent plugging the bit or core blockage or damage. Water without additives was trucked to the site and circulated through the boring to flush cuttings and cool the drill bit during the coring process. Circulating water was released on the surface after completion of coring.

Borehole Closure

Boreholes in areas subject to foot traffic or farm animals were closed immediately after drilling. Boreholes were filled by slowly pouring auger cuttings into the open hole such that minimal "bridging" of the material occurred in the hole. Backfilling of the upper two feet of each hole was tamped as heavily as possible with a shovel handle or other hand held equipment, and the backfill crowned to direct rainfall away on the surface. Where boreholes exceeded five feet in depth, a plastic hole plug was firmly tamped into place within the backfill at a depth of about two feet.

Preservation and Transporting of Soil Samples with Control of Field Moisture

Procedures for preserving soil samples obtained in the field and transportation of samples to the laboratory generally followed those given in ASTM D4220, *Standard Practice for Preserving and Transporting Soil Samples* for Group B samples as defined in Section 4. Group B samples are those samples not suspected of being contaminated and for which only water content and classification, proctor, relative density, or profile logging will be performed. Group B samples also include bulk samples that are intended to be remolded in the laboratory for compaction, swell pressure, percent swell, consolidation, permeability, CBR, or shear testing. Representative samples of the cuttings or split spoon samples, or representative bulk samples, were placed in suitably identified, sealed glass jars or plastic containers and transported to the laboratory. Sample identification numbers on the containers corresponded to sample numbers recorded on field boring records or test pit records. Thin-walled tube samples were sealed at the ends with paraffin and capped with plastic end caps.

Preservation and Transport of Rock Core Requiring Routine Care

Procedures for preserving recovered rock core specimens followed those given for routine care of non-sensitive, non-fragile samples for which only general visual examination will be performed. Steps for routine care are described in ASTM D5079, *Standard Practices for Preserving and Transporting Rock Core Samples*, section 7.5.1. Rock cored in 5 to 10 foot runs were placed in sleeves or channels in specially constructed wood or cardboard core boxes. Empty portions of sleeves or channels were packed with wood or paper to prevent slippage of the core during transport. Boxes were transported flat and secured to prevent sliding or vibration. A preliminary field log of each core indicating recovery and general visual description was prepared prior to packing of the core.

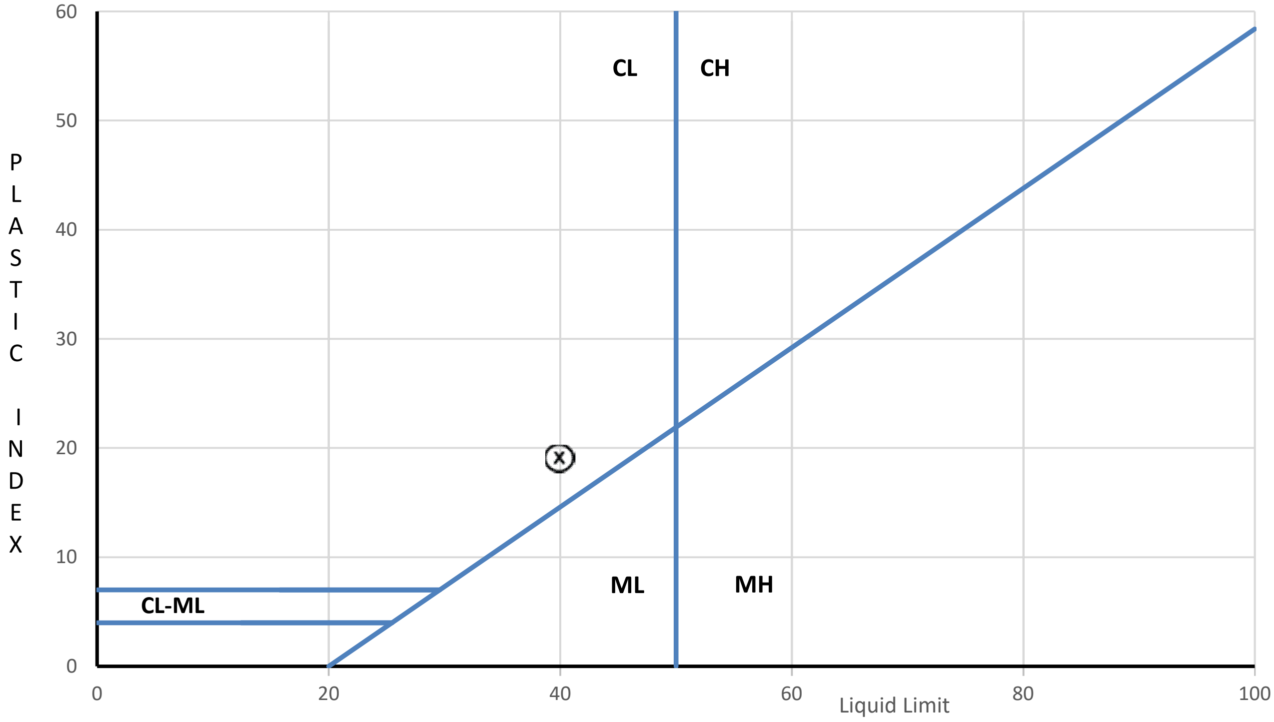
♦ Field Tests of Earth Materials

The subsurface conditions encountered during drilling were reported on a field test boring record by the chief driller. The record contains information about the drilling method, samples attempted and sample recovery, indications of materials in the borings such as coarse gravel, cobbles, etc., and indications of materials encountered between sample intervals. Representative soil samples were placed in glass jars and transported to the laboratory along with the field boring records. Recovered samples not expended in laboratory tests are commonly retained in our laboratory for 60 days following completion of drilling. Field boring records are retained at our office.

Measurement of Static Water Levels

Water level readings were made in the open boreholes immediately after completing drilling and withdrawal of the tools. Where feasible, measurements were repeated after an elapsed period of 24 hours to gauge the stabilized water level. Procedures for measurement of liquid levels in open boreholes are described in ASTM D4750, *Standard Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well)*. A weighted measuring tape was slowly lowered into each borehole until the liquid surface was penetrated by the weighted end. The reading on the tape was recorded at a reference point on the surface and compared to the reading at the demarcation of the wetted and unwetted portions of the tape. The difference between the two readings was recorded as the depth of the liquid surface below the reference point. Measurements made by this method were then repeated until approximately consistent values were obtained.

Appendix III – Laboratory Testing Results



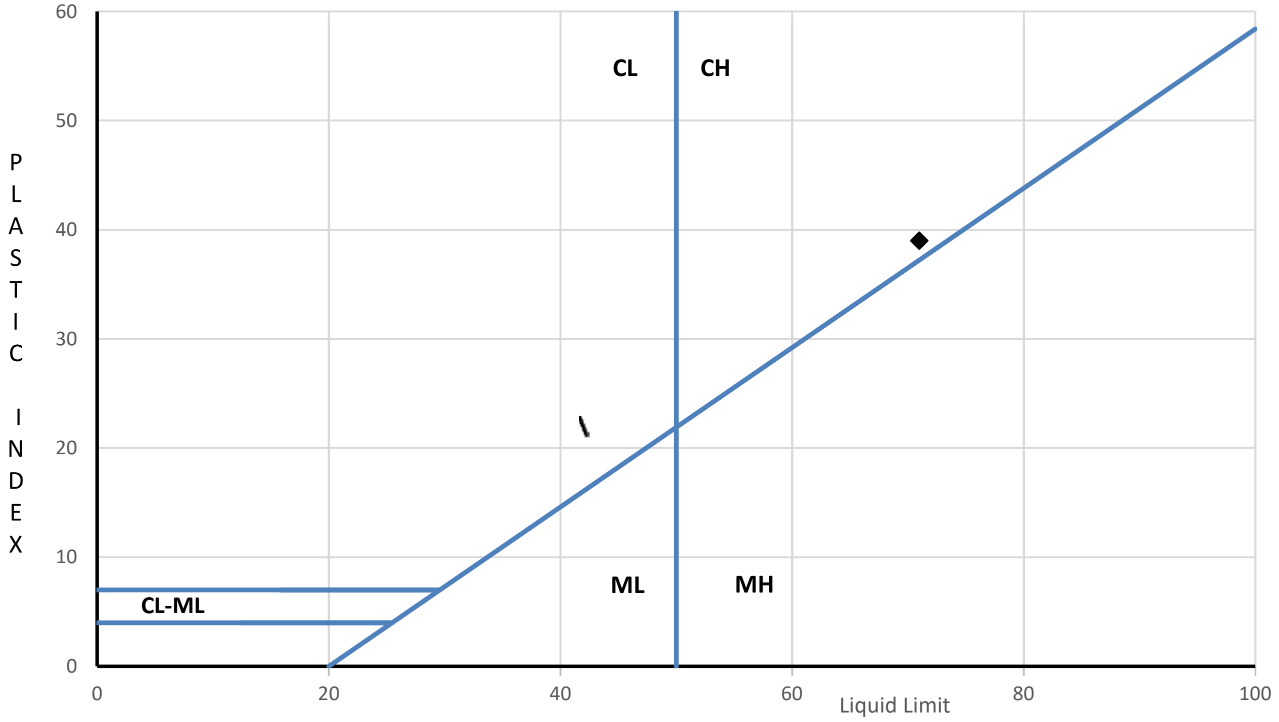
Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
	B-01	SS-3	4.5	36.9						
	B-01	SS-4	7	29.7						
	B-01	SS-5	9.5	26.4						
	B-01	SS-6	14.5	36.1						
	B-02	SS-3	4.5	26.1						
	B-02	SS-4	7	29.2						
	B-02	SS-5	9.5	45.8						
	B-02	SS-6	14.5	20.0						
	B-04	SS-3	4	30.2						
	B-04	SS-4	6.5	35.3						
	B-04	SS-5	9	28.7						
	B-04	SS-6	14	40.6						
	B-05	SS-3	4.5	27.2						
	B-05	SS-4	7	41.1						
	B-05	SS-5	9.5	32.7						
	B-06	SS-3	4	29.6						
	B-06	SS-4	6.5	36.0						
	B-06	SS-5	9	30.8						
	B-06	SS-6	14	28.6						
⊗	B-07	SS-2	2		40	21	19		CL	

INDEX TEST RESULTS

Project Name	UK Gatton College Expansion
Project Number	25830176

Approved by	Date
	1/23/2026 10:52

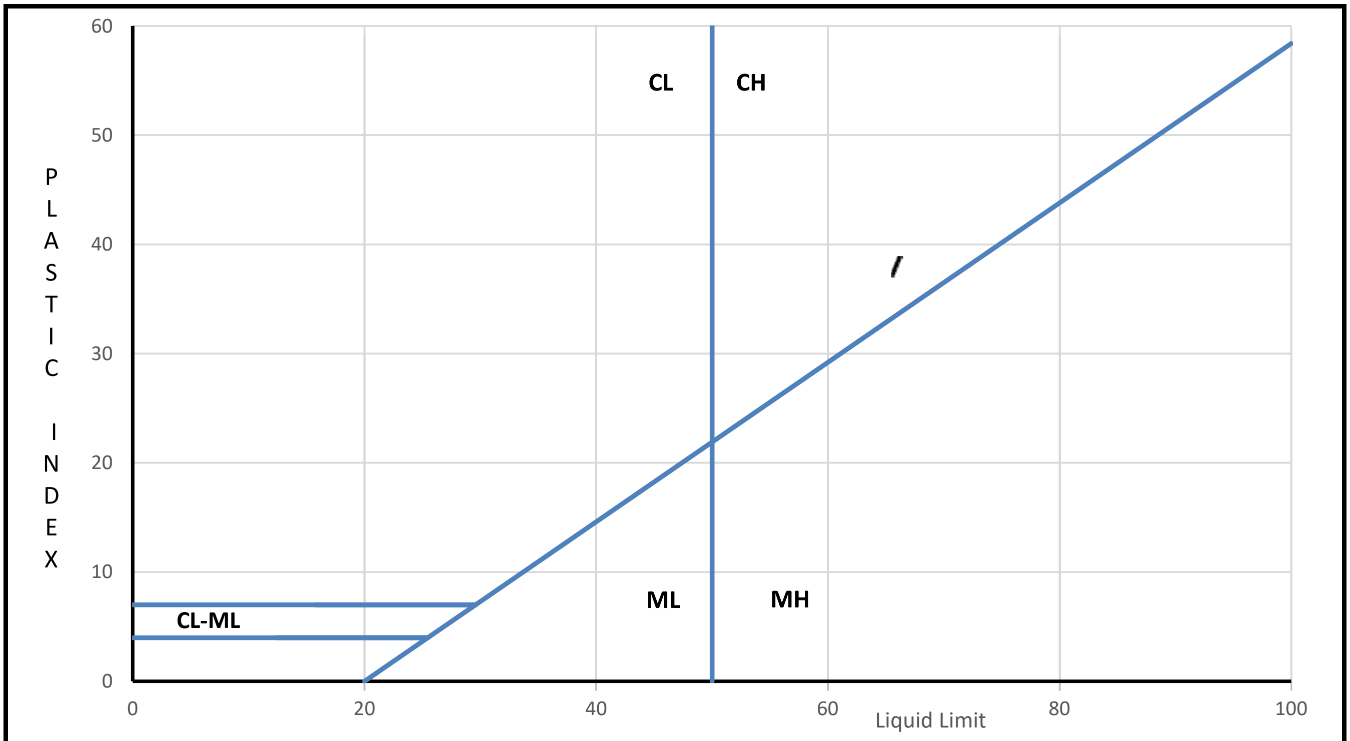
LEXI_26002606
2/9/2026



Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
	B-07	SS-3	4	24.3						
◆	B-07	SS-4	6.5	38.1	71	32	39		CH	
	B-07	SS-5	9	46.3						
	B-07	SS-6	14	35.3						
	B-07	SS-7	19	28.3						
	B-08	SS-3	4	23.1						
	B-08	SS-4	6.5	25.2						
	B-08	SS-5	9	35.3						
	B-09	SS-3	4	28.4						
	B-09	SS-4	6.5	25.5						
	B-09	SS-5	9	23.6						
\	B-10	SS-2	2	22.3	42	20	22		CL	
	B-10	SS-5	9	28.2						
	B-10	SS-6	14	38.0						
	B-10	SS-7	19	37.5						
	B-11	SS-4	6.5	25.8						
	B-11	SS-5	9	25.9						
	B-11	SS-6	14	24.3						
	B-11	SS-7	19	32.8						
	B-12	SS-3	4	28.5						

INDEX TEST RESULTS

Project Name	UK Gatton College Expansion
Project Number	25830176
Approved by	Date
	1/23/2026 10:52



Specimen Identification				MC	LL	PL	PI	Fines	Classification (symbol is based on minus 40 material only when no grain size information is present.)	
	ID	No.	Top Depth						Symbol	Name
	B-12	SS-4	6.5	27.3						
	B-12	SS-5	9	26.6						
	B-12	SS-7	19	25.3						
	B-12	SS-8	24	23.2						
	B-12	SS-9	29	33.9						
	B-13	SS-4	6.5	25.1						
	B-13	SS-5	9	25.6						
	B-13	SS-6	14	30.5						
	B-13	SS-7	19	30.5						
	B-14	SS-3	4.5	30.7						
	B-14	SS-4	7	36.1						
	B-14	SS-5	9.5	34.6						
/	B-14	SS-6	14.5	34.1	66	28	38		CH	

INDEX TEST RESULTS

Project Name	UK Gatton College Expansion
Project Number	25830176

Approved by	Date
	1/23/2026 10:54

Form No. TR-D7012C-01
Revision No. : 1LexF
Revision Date: 01/12/26

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D7012 Method C

Quality Assurance

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

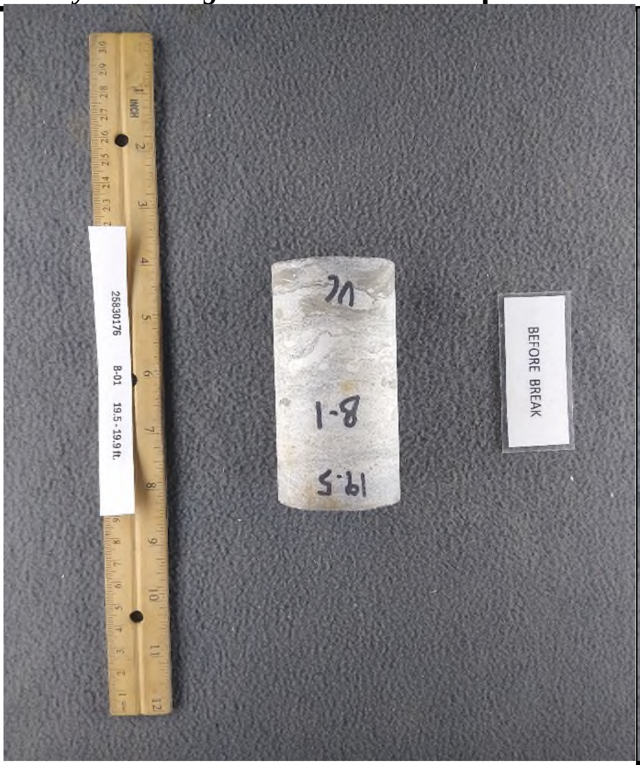
Project No.:	25830176	Report Date:	02/02/26
Project Name:	UK Gatton College Expansion	Test Date(s):	01/30/26
Client Name:	Ross Tarrant Architects		
Client Address:	101 Old Lafayette Ave, Lexington, KY 40502	Received Date:	01/14/26
Location:	B-01	Depth, ft:	19.5 - 19.9

Sample Description: light gray limestone

Angle of load relative to lithology: Approximately perpendicular

Test Results

Moisture Content	***0.2***	**%**	***Compressive Strength***	***2,490***	**ksf**
Dry Unit Weight	***167.2***	**pcf**		***17,300***	**psi**



Before Test

After Test

Strain rate: 0.015 in/min.

Notes / Deviations / References: **Per ASTM D4543 7.6, for specimens which have physical characteristics which prevent planing the sample to within the flatness requirement it is permissible to cap them with gypsum. This specimen was too fragile for planing to within the flatness requirement and was capped with gypsum.**

Jacob Folsom	Jacob Folsom	Laboratory Services Manager	2/4/2026
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D7012C-01
Revision No. 1LexF
Devision Date: 01/12/26

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D 7012 Method C

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project Name: UK Gatton College Expansion
Location: B-01
Depth, feet: 19.5 - 19.9

Summary of Specimen Tolerances

Length/diameter target:	**MET**	Perpendicularity target:	**MET**
Side straightness target:	**MET**	Planeness target:	**CAPPED**
Parallelism target:	**CAPPED**		

*ASTM D4543-08 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance, Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content, chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For these and other rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial that this is not possible, the rock specimen will be prepared to the closest tolerance practicable and be considered the best effort and report it as such. If allowable or necessary for the intended test, capping the ends of the specimen as discussed in ASTM D7012 is permitted."

Length to Diameter Ratio

Length, inches: 3.98 Diameter, inches: 1.869
Ratio: 2.13 length to 1 diameter
Target tolerance: L:D ratio between 2 to 1 and 2.5 to 1

Side Straightness

Maximum gap between side of core and reference plate, inches: < .02
Target tolerance: Maximum gap less than .02 inches

Planeness

Dial gauge reading, inches

Not Applicable - Capped

Distance along diameter, inches

Maximum point-line deviation, inches: NA
Target Tolerance: No individually measured point should deviate from the best fit line by more than .001 inches.

Parallelism

Slope difference, Diameter 1, degrees: NA-
Slope difference, Diameter 2, degrees: CAPPED
Target Tolerance: Difference between slopes on each end less than 0.25⁰

Perpendicularity

Maximum divergence from end surface perpendicularity to long axis: NA

Target Tolerance: Each diameter perpendicular to the long axis to within 0.25⁰

Note: specimens without straight sides cannot be machined to pass.

Test Information

Strain rate, in/min: 0.015
OR
Stress rate, lbs/sec:
Time to failure, min: 5.97
Temperature: room temperature

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UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D7012 Method C

Quality Assurance

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project No.:	25830176	Report Date:	02/02/26
Project Name:	UK Gatton College Expansion	Test Date(s):	01/30/26
Client Name:	Ross Tarrant Architects		
Client Address:	101 Old Lafayette Ave, Lexington, KY 40502	Received Date:	01/14/26
Location:	B-02	Depth, ft:	21.6 - 22.6

Sample Description: light gray limestone

Angle of load relative to lithology: Approximately perpendicular

Test Results

Moisture Content	***0.5***	**%**	***Compressive Strength***	***1,980***	**ksf**
Dry Unit Weight	***163.4***	**pcf**		***13,700***	**psi**

Before Test

After Test

Strain rate: 0.015 in/min.

Notes / Deviations / References: **Per ASTM D4543 7.6, for specimens which have physical characteristics which prevent planing the sample to within the flatness requirement it is permissible to cap them with gypsum. This specimen was too fragile for planing to within the flatness requirement and was capped with gypsum.**

Jacob Folsom	Jacob Folsom	Laboratory Services Manager	2/4/2026
Technical Responsibility	*Signature*	*Position*	*Date*

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UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D 7012 Method C

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project Name: UK Gatton College Expansion Location: B-02 Depth, feet: 21.6 - 22.6

Summary of Specimen Tolerances

Length/diameter target:	**MET**	Perpendicularity target:	**MET**
Side straightness target:	**MET**	Planeness target:	**CAPPED**
Parallelism target:	**CAPPED**		

*ASTM D4543-08 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance, Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content, chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For these and other rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial that this is not possible, the rock specimen will be prepared to the closest tolerance practicable and be considered the best effort and report it as such. If allowable or necessary for the intended test, capping the ends of the specimen as discussed in ASTM D7012 is permitted."

Length to Diameter Ratio

Length, inches: 3.89 Diameter, inches: 1.760
Ratio: 2.21 length to 1 diameter
Target tolerance: L:D ratio between 2 to 1 and 2.5 to 1

Side Straightness

Maximum gap between side of core and reference plate, inches: < .02
Target tolerance: Maximum gap less than .02 inches

Planeness

Dial gauge reading, inches

Not Applicable - Capped

Distance along diameter, inches

Maximum point-line deviation, inches: NA
Target Tolerance: No individually measured point should deviate from the best fit line by more than .001 inches.

Parallelism

Slope difference, Diameter 1, degrees: NA-
Slope difference, Diameter 2, degrees: CAPPED
Target Tolerance: Difference between slopes on each end less than 0.25⁰

Perpendicularity

Maximum divergence from end surface perpendicularity to long axis: NA

Target Tolerance: Each diameter perpendicular to the long axis to within 0.25⁰

Note: specimens without straight sides cannot be machined to pass.

Test Information

Strain rate, in/min: 0.015
OR
Stress rate, lbs/sec:
Time to failure, min: 2.87
Temperature: room temperature

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UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D7012 Method C

Quality Assurance

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project No.:	25830176	Report Date:	02/02/26
Project Name:	UK Gatton College Expansion	Test Date(s):	01/30/26
Client Name:	Ross Tarrant Architects		
Client Address:	101 Old Lafayette Ave, Lexington, KY 40502	Received Date:	01/14/26
Location:	B-05	Depth, ft:	25.9 - 26.3
Sample Description:	light gray limestone		

Angle of load relative to lithology: Approximately perpendicular

Test Results

Moisture Content	***0.2***	**%**	***Compressive Strength***	***2,670***	**ksf**
Dry Unit Weight	***166.1***	**pcf**		***18,500***	**psi**

Before Test

After Test

Strain rate: 0.015 in/min.

Notes / Deviations / References: **Per ASTM D4543 7.6, for specimens which have physical characteristics which prevent planing the sample to within the flatness requirement it is permissible to cap them with gypsum. This specimen was too fragile for planing to within the flatness requirement and was capped with gypsum.**

Jacob Folsom	Jacob Folsom	Laboratory Services Manager	2/4/2026
Technical Responsibility	*Signature*	*Position*	*Date*

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Revision No. 1LexF
Devision Date: 01/12/26

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D 7012 Method C

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project Name: UK Gatton College Expansion Location: B-05 Depth, feet: 25.9 - 26.3

Summary of Specimen Tolerances

Length/diameter target:	**MET**	Perpendicularity target:	**MET**
Side straightness target:	**MET**	Planeness target:	**CAPPED**
Parallelism target:	**CAPPED**		

*ASTM D4543-08 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance, Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content, chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For these and other rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial that this is not possible, the rock specimen will be prepared to the closest tolerance practicable and be considered the best effort and report it as such. If allowable or necessary for the intended test, capping the ends of the specimen as discussed in ASTM D7012 is permitted."

Length to Diameter Ratio

Length, inches: 4.25 Diameter, inches: 1.869
Ratio: 2.27 length to 1 diameter
Target tolerance: L:D ratio between 2 to 1 and 2.5 to 1

Side Straightness

Maximum gap between side of core and reference plate, inches: < .02
Target tolerance: Maximum gap less than .02 inches

Planeness

Dial gauge reading, inches

Not Applicable - Capped

Distance along diameter, inches

Maximum point-line deviation, inches: NA
Target Tolerance: No individually measured point should deviate from the best fit line by more than .001 inches.

Parallelism

Slope difference, Diameter 1, degrees: NA-
Slope difference, Diameter 2, degrees: CAPPED
Target Tolerance: Difference between slopes on each end less than 0.25⁰

Perpendicularity

Maximum divergence from end surface perpendicularity to long axis: NA

Target Tolerance: Each diameter perpendicular to the long axis to within 0.25⁰

Note: specimens without straight sides cannot be machined to pass.

Test Information

Strain rate, in/min: 0.015
OR
Stress rate, lbs/sec:
Time to failure, min: 4.5
Temperature: room temperature

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UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D7012 Method C

Quality Assurance

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project No.:	25830176	Report Date:	02/02/26
Project Name:	UK Gatton College Expansion	Test Date(s):	01/30/26
Client Name:	Ross Tarrant Architects		
Client Address:	101 Old Lafayette Ave, Lexington, KY 40502	Received Date:	01/14/26
Location:	B-06	Depth, ft:	29.9 - 30.3

Sample Description: light gray limestone

Angle of load relative to lithology: Approximately perpendicular

Test Results

Moisture Content	***0.3***	**%**	***Compressive Strength***	***2,210***	**ksf**
Dry Unit Weight	***166.4***	**pcf**		***15,400***	**psi**

Before Test

After Test

Strain rate: 0.015 in/min.

Notes / Deviations / References: **Per ASTM D4543 7.6, for specimens which have physical characteristics which prevent planing the sample to within the flatness requirement it is permissible to cap them with gypsum. This specimen was too fragile for planing to within the flatness requirement and was capped with gypsum.**

Jacob Folsom	Jacob Folsom	Laboratory Services Manager	2/4/2026
Technical Responsibility	*Signature*	*Position*	*Date*

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Devision Date: 01/12/26

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D 7012 Method C

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project Name: UK Gatton College Expansion Location: B-06 Depth, feet: 29.9 - 30.3

Summary of Specimen Tolerances

Length/diameter target:	**MET**	Perpendicularity target:	**MET**
Side straightness target:	**MET**	Planeness target:	**CAPPED**
Parallelism target:	**CAPPED**		

*ASTM D4543-08 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance, Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content, chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For these and other rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial that this is not possible, the rock specimen will be prepared to the closest tolerance practicable and be considered the best effort and report it as such. If allowable or necessary for the intended test, capping the ends of the specimen as discussed in ASTM D7012 is permitted."

Length to Diameter Ratio

Length, inches: 3.92 Diameter, inches: 1.761
Ratio: 2.22 length to 1 diameter

Target tolerance: L:D ratio between 2 to 1 and 2.5 to 1

Side Straightness

Maximum gap between side of core and reference plate, inches: < .02

Target tolerance: Maximum gap less than .02 inches

Planeness

Dial gauge reading, inches

Not Applicable - Capped

Distance along diameter, inches

Maximum point-line deviation, inches: NA

Target Tolerance: No individually measured point should deviate from the best fit line by more than .001 inches.

Parallelism

Slope difference, Diameter 1, degrees: NA-
Slope difference, Diameter 2, degrees: CAPPED

Target Tolerance: Difference between slopes on each end less than 0.25⁰

Perpendicularity

Maximum divergence from end surface perpendicularity to long axis: NA

Target Tolerance: Each diameter perpendicular to the long axis to within 0.25⁰

Note: specimens without straight sides cannot be machined to pass.

Test Information

Strain rate, in/min: 0.015
OR
Stress rate, lbs/sec:
Time to failure, min: 0.07
Temperature: room temperature

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Form No. TR-D7012C-01
Revision No. : 1LexF
Revision Date: 01/12/26

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D7012 Method C

Quality Assurance

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project No.: 25830176 Report Date: 02/02/26
Project Name: UK Gatton College Expansion Test Date(s): 01/30/26
Client Name: Ross Tarrant Architects
Client Address: 101 Old Lafayette Ave, Lexington, KY 40502 Received Date: 01/14/26
Location: B-10 Depth, ft: 24.3 - 24.7
Sample Description: light gray limestone

Angle of load relative to lithology: Approximately perpendicular

Test Results

Moisture Content	***0.2***	**%**	***Compressive Strength***	***2,370***	**ksf**
Dry Unit Weight	***166.1***	**pcf**		***16,400***	**psi**

Before Test

After Test

Strain rate: 0.015 in/min.

Notes / Deviations / References: **Per ASTM D4543 7.6, for specimens which have physical characteristics which prevent planing the sample to within the flatness requirement it is permissible to cap them with gypsum. This specimen was too fragile for planing to within the flatness requirement and was capped with gypsum.**

Jacob Folsom	Jacob Folsom	Laboratory Services Manager	2/4/2026
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D7012C-01
Revision No. 1LexF
Devision Date: 01/12/26

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D 7012 Method C

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project Name: UK Gatton College Expansion Location: B-10 Depth, feet: 24.3 - 24.7

Summary of Specimen Tolerances

Length/diameter target:	**MET**	Perpendicularity target:	**MET**
Side straightness target:	**MET**	Planeness target:	**CAPPED**
Parallelism target:	**CAPPED**		

*ASTM D4543-08 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance, Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content, chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For these and other rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial that this is not possible, the rock specimen will be prepared to the closest tolerance practicable and be considered the best effort and report it as such. If allowable or necessary for the intended test, capping the ends of the specimen as discussed in ASTM D7012 is permitted."

Length to Diameter Ratio

Length, inches: 4.19 Diameter, inches: 1.761
Ratio: 2.38 length to 1 diameter
Target tolerance: L:D ratio between 2 to 1 and 2.5 to 1

Side Straightness

Maximum gap between side of core and reference plate, inches: < .02
Target tolerance: Maximum gap less than .02 inches

Planeness

Dial gauge reading, inches

Not Applicable - Capped

Distance along diameter, inches

Maximum point-line deviation, inches: NA
Target Tolerance: No individually measured point should deviate from the best fit line by more than .001 inches.

Perpendicularity

Maximum divergence from end surface perpendicularity to long axis: NA

Target Tolerance: Each diameter perpendicular to the long axis to within 0.25⁰

Note: specimens without straight sides cannot be machined to pass.

Parallelism

Slope difference, Diameter 1, degrees: NA-
Slope difference, Diameter 2, degrees: CAPPED
Target Tolerance: Difference between slopes on each end less than 0.25⁰

Test Information

Strain rate, in/min: 0.015
OR
Stress rate, lbs/sec:
Time to failure, min: 3.08
Temperature: room temperature

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Form No. TR-D7012C-01
Revision No. : 1LexF
Revision Date: 01/12/26

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D7012 Method C

Quality Assurance

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project No.: 25830176
Report Date: 02/02/26
Project Name: UK Gatton College Expansion
Test Date(s): 01/30/26
Client Name: Ross Tarrant Architects
Client Address: 101 Old Lafayette Ave, Lexington, KY 40502
Received Date: 01/14/26
Location: B-13
Depth, ft: 24.7 - 25.1
Sample Description: light gray limestone

Angle of load relative to lithology: Approximately perpendicular

Test Results

Moisture Content ***0.4*** **%**
Dry Unit Weight ***165.0*** **pcf**
Compressive Strength ***1,700*** **ksf**
11,800 **psi**

Before Test

After Test

Strain rate: 0.015 in/min.

Notes / Deviations / References: **Per ASTM D4543 7.6, for specimens which have physical characteristics which prevent planing the sample to within the flatness requirement it is permissible to cap them with gypsum. This specimen was too fragile for planing to within the flatness requirement and was capped with gypsum.**

Jacob Folsom — *Technical Responsibility*
Jacob Folsom — *Signature*
Laboratory Services Manager — *Position*
2/4/2026 — *Date*

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Form No. TR-D7012C-01
Revision No. 1LexF
Devision Date: 01/12/26

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D 7012 Method C

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project Name: UK Gatton College Expansion Location: B-13 Depth, feet: 24.7 - 25.1

Summary of Specimen Tolerances

Length/diameter target:	**MET**	Perpendicularity target:	**MET**
Side straightness target:	**MET**	Planeness target:	**CAPPED**
Parallelism target:	**CAPPED**		

*ASTM D4543-08 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance, Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content, chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For these and other rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial that this is not possible, the rock specimen will be prepared to the closest tolerance practicable and be considered the best effort and report it as such. If allowable or necessary for the intended test, capping the ends of the specimen as discussed in ASTM D7012 is permitted."

Length to Diameter Ratio

Length, inches: 4.06 Diameter, inches: 1.763
Ratio: 2.30 length to 1 diameter
Target tolerance: L:D ratio between 2 to 1 and 2.5 to 1

Side Straightness

Maximum gap between side of core and reference plate, inches: < .02
Target tolerance: Maximum gap less than .02 inches

Planeness

Dial gauge reading, inches

Not Applicable - Capped

Distance along diameter, inches

Maximum point-line deviation, inches: NA
Target Tolerance: No individually measured point should deviate from the best fit line by more than .001 inches.

Parallelism

Slope difference, Diameter 1, degrees: NA-
Slope difference, Diameter 2, degrees: CAPPED
Target Tolerance: Difference between slopes on each end less than 0.25⁰

Perpendicularity

Maximum divergence from end surface perpendicularity to long axis: NA

Target Tolerance: Each diameter perpendicular to the long axis to within 0.25⁰

Note: specimens without straight sides cannot be machined to pass.

Test Information

Strain rate, in/min:	0.015
OR	
Stress rate, lbs/sec:	
Time to failure, min:	3.05
Temperature:	room temperature

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UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D7012 Method C

Quality Assurance

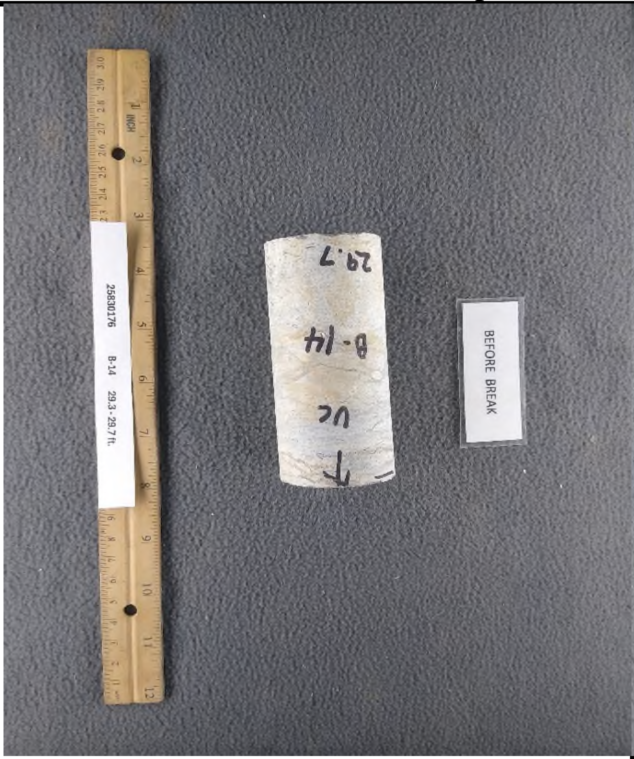
S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project No.: 25830176 Report Date: 02/02/26
Project Name: UK Gatton College Expansion Test Date(s): 01/30/26
Client Name: Ross Tarrant Architects
Client Address: 101 Old Lafayette Ave, Lexington, KY 40502 Received Date: 01/14/26
Location: B-14 Depth, ft: 29.3 - 29.7
Sample Description: light gray limestone

Angle of load relative to lithology: Approximately perpendicular

Test Results

Moisture Content	***0.2***	**%**	***Compressive Strength***	***2,210***	**ksf**
Dry Unit Weight	***166.4***	**pcf**		***15,300***	**psi**



Before Test

After Test

Strain rate: 0.015 in/min.

Notes / Deviations / References: **Per ASTM D4543 7.6, for specimens which have physical characteristics which prevent planing the sample to within the flatness requirement it is permissible to cap them with gypsum. This specimen was too fragile for planing to within the flatness requirement and was capped with gypsum.**

Jacob Folsom	Jacob Folsom	Laboratory Services Manager	2/4/2026
Technical Responsibility	*Signature*	*Position*	*Date*

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UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D 7012 Method C

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project Name: UK Gatton College Expansion
Location: B-14
Depth, feet: 29.3 - 29.7

Summary of Specimen Tolerances

Length/diameter target:	**MET**	Perpendicularity target:	**MET**
Side straightness target:	**MET**	Planeness target:	**CAPPED**
Parallelism target:	**CAPPED**		

*ASTM D4543-08 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance, Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content, chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For these and other rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial that this is not possible, the rock specimen will be prepared to the closest tolerance practicable and be considered the best effort and report it as such. If allowable or necessary for the intended test, capping the ends of the specimen as discussed in ASTM D7012 is permitted."

Length to Diameter Ratio

Length, inches: 4.26
Diameter, inches: 1.869
Ratio: 2.28 length to 1 diameter

Target tolerance: L:D ratio between 2 to 1 and 2.5 to 1

Side Straightness

Maximum gap between side of core and reference plate, inches: < .02

Target tolerance: Maximum gap less than .02 inches

Planeness

Dial gauge reading, inches

Not Applicable - Capped

Distance along diameter, inches

Maximum point-line deviation, inches: NA

Target Tolerance: No individually measured point should deviate from the best fit line by more than .001 inches.

Parallelism

Slope difference, Diameter 1, degrees: NA-
Slope difference, Diameter 2, degrees: CAPPED

Target Tolerance: Difference between slopes on each end less than 0.25⁰

Perpendicularity

Maximum divergence from end surface perpendicularity to long axis: NA

Target Tolerance: Each diameter perpendicular to the long axis to within 0.25⁰

Note: specimens without straight sides cannot be machined to pass.

Test Information

Strain rate, in/min: 0.015
OR
Stress rate, lbs/sec:
Time to failure, min: 3.88
Temperature: room temperature

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Summary of Laboratory Procedures

Recovered disturbed and undisturbed samples and the drillers' field logs were transported to the laboratory where they were examined by the geotechnical engineer. Selected samples representative of certain groups of soils were subjected to simple classification tests by hand or other simple means.

Recovered disturbed and undisturbed samples and the drillers' field logs were transported to the laboratory where they were examined by the geotechnical engineer. Selected samples representative of certain groups of soils were subjected to simple classification tests by hand or other simple means. Other samples were tested in the laboratory to determine their strength or consolidation properties.

Laboratory Tests of Soil

Examination of Split Spoon Soil Samples

Soil and rock samples and field boring records were reviewed in the laboratory by the geotechnical engineer. Soils were classified in general accordance with the visual-manual method described in ASTM D 2488, *Standard Practice for Description and Identification of Soils (Visual-Manual Method)*. The geotechnical engineer also prepared the final boring records enclosed with this report.

Extrusion and Examination of Group C Undisturbed Samples

Undisturbed samples were stored in the vertical position in the laboratory. Samples were extruded from the thin-walled sampler, using a specially constructed extruder, in the same direction of travel as the sample entered the tube during sampling. In certain cases it was necessary to cut the tube into short sections to facilitate removal of the soil without compressing or disturbing the sample. Specimens were trimmed using a wire saw or steel straightedge. Where removal of pebbles or crumbling resulting from trimming caused voids on the surface of the specimens selected for quantitative laboratory testing, they were filled with remolded soil obtained from the trimmed portion of the sample.

Moisture Content Testing of Soil Samples by Oven Drying

Moisture content was determined in general conformance with the methods outlined in ASTM D2216, "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil or Rock by Mass." This method is limited in scope to Group B, C, or D samples of earth materials which do not contain appreciable amounts of organic material, soluble solids such as salt or reactive solids such as cement. This method is also limited to samples which do not contain contamination.

A representative portion of the soil was divided from the sample using one of the methods described in Section 9 of ASTM D2216. The split portion was then placed in a drying oven and heated to approximately 110 degrees C overnight or until a constant mass was achieved after repetitive weighing. The moisture content of the soil was then computed as the mass of water removed from the sample by drying, divided by the mass of the sample dry, times 100 percent. No attempt was made to exclude any particular particle size from the portion split from the sample.

Liquid and Plastic Limits Testing

Atterberg limits of the soils was determined generally following the methods described by ASTM D4318, *Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils*. Albert Atterberg originally defined "limits of consistency" of fine grained soils in terms of their relative ease of deformation at various moisture contents. In current engineering usage, the liquid limit of a soil is defined as the moisture content, in percent, marking the upper limit of viscous flow and the boundary with a semi-liquid state. The plastic limit defines the lower limit of plastic behavior, above which a soil behaves plastically below which it retains its shape upon drying. The plasticity index (PI) is the range of water content over which a soil behaves plastically. Numerically, the PI is the difference between liquid limit and plastic limit values.

Representative portions of fine grained Group A, B, C, or D samples were prepared using the wet method described in Section 10.1 of ASTM D4318. The liquid limit of each sample was determined using the multipoint method (Method A) described in Section 11. The liquid limit is by definition the moisture content where 25 drops of a hand operated liquid limit device are required to close a standard width groove cut in a soil sample placed in the device. After each test, the moisture content of the sample was adjusted and the sample replaced in the device. The test was repeated to provide a minimum of three widely spaced combinations of N versus moisture content. When plotted on semilog paper, the liquid limit moisture content was determined by straight line interpolation between the data points at N equals 25 blows.

The plastic limit was determined using the procedure described in Section 17 of ASTM D4318. A selected portion of the soil used in the liquid limit test was kneaded and rolled by hand until it could no longer be rolled to a 3.2 mm thread on a glass plate. This procedure was repeated until at least 6 grams of material was accumulated, at which point the moisture content was determined using the methods described in ASTM D2216.

The prepared sample was placed in a compressive testing machine and the specimen compressed in the platen at a rate of 1 to 2 percent strain per minute. Deformation and loading of the sample were recorded at regular intervals until the load values began to decrease with increasing axial strain, or a total strain of 15 percent of the original sample length was attained. Sample stress was corrected at each load increment for the change in cross sectional area produced by deformation of the sample using the formulae in sections 8.2 and 8.3 of ASTM D 2166.

Unconfined Compressive Strength Tests of Compacted Cohesive Samples

The unconfined compressive strength of compacted cohesive soils was determined generally following the procedures described by ASTM D2166, *Standard Test Method for Unconfined Compressive Strength of Cohesive Soil*. Specimens were prepared in a standard mold by compacting them at predetermined moisture contents to the dry density values prescribed by the geotechnical engineer. Compacted samples were then removed from the mold and specimens prepared using the procedures described in Section 6.4 of ASTM D2166. The ends of each specimen were carved by hand and trimmed as necessary to provide a surface perpendicular to the specimen's long axis, but the ends were not capped.

The prepared sample was placed in a compressive testing machine and the specimen compressed in the platen at a rate of 1 to 2 percent strain per minute. Deformation and loading of the sample were recorded at regular intervals until the load values began to decrease with increasing axial strain, or a total strain of 15 percent of the original sample length was attained. Sample stress was corrected at each load increment for the change in cross sectional area produced by deformation of the sample using the formulae in sections 8.2 and 8.3 of ASTM D2166.

◆ Laboratory Tests of Rock

Examination of Rock Core Specimens

Rock core samples returned to the laboratory were examined by the geotechnical engineer or geologist and the percentage recovery and rock quality designation (RQD) estimated for each run. A core run is defined either as 1) a drill run defined by the length of the core barrel; 2) a change in formation or rock type could constitute the end of a core run; or 3) a core run can be a selected zone of concern. Core run lengths are indicated on the attached boring records.

The "recovery" is the ratio of the sample length recovered in the core barrel to the total length of the core run, expressed as a percent. Rock Quality Designation is described by ASTM D6032, *Standard Test Method for Determining Rock Quality Designation (RQD) of Rock Core*. The RQD is the percentage of the core run consisting of moderately hard or harder NX-sized rock core recovered in segments 4 inches long or longer. When properly interpreted by a qualified professional, the RQD value provides a basis for preliminary design decisions involving foundations or excavation in rock.

Only those pieces or rock formed by natural joints, bedding planes, shear zones, or cleavage planes that result in surfaces of separation were considered for RQD purposes. Pieces formed by breaks in the core due to drilling or handling were not considered. Pieces were considered intact when they appeared to have been bonded together prior to coring and broken surfaces consisted of fresh rock. Where a surface could not be determined as either a natural or mechanical break, it was considered a natural break.

Rock core specimens were classified based on the following characteristics:

Hardness	Description of Core
Soft Rock	May be broken with fingers
Moderately Soft	May be scratched by a nail, corners and edges may be broken with fingers
Moderately Hard	Light blow of hammer required to break sample
Hard Rock	Hard blow of hammer required to break sample
Very Hard	Rock core rings when struck by hammer

Continuity	Core Recovery in Percent
Incompetent	Less than 40 percent
Competent	40 – 70 percent
Fairly Continuous	70 – 90 percent
Continuous	90 – 100 percent

Rock Quality	Rock Quality Designation

Very Poor	0 - 25 percent
Poor	25 – 50 percent
Fair	50 – 75 percent
Good	75 – 90 percent
Excellent	90 – 100 percent

Weathering	Description
Fresh	Rock fresh, crystals bright, some joints may show slight staining
Very Slight	Joints stained, some joints may show thin clay coatings
Slight	Joints stained and rock discolored up to 1 inch from joint surfaces
Moderate	Significant discoloration and weathering effects
Moderately Severe	All rock except quartz discolored and stained
Severe	Rock severely discolored and stained, few intact pieces remain
Very Severe	Rock fabric remains but reduced in strength to strong soil

Detailed rock descriptions, percent recovery, RQD values and the core barrel or bit size used are shown on the appropriate boring records in the Appendix.

Unconfined Compressive Strength Tests of Intact Rock Core

The unconfined compressive strength of intact rock core specimens will be determined generally following the procedures described in ASTM D7012, *Standard Test Methods for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures*. Selected recovered samples of intact rock core representative of each run will be cut to length and the ends machined flat. Specimens will then be placed in a loading frame and axial load continuously applied until peak load and failure are obtained. Specimens selected for testing will meet shape and L/D proportions outlined in ASTM D4543, *Standard Practice for Preparing Rock Core Specimens and Determining Dimensional and Shape Tolerances*. The specimen minimum dimension should be at least six to ten times the maximum particle or mineral dimension, and the L/D ratio at least 2 to 2.5. Samples will be soaked prior to testing.