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PROJECT: Auburn Park Full Build-Out

**Montgomery County, VA Parks and Recreation** 

**GNI Job No.:** 2893.00

DATE: Tuesday, April 2, 2024

The following additions, deletions and/or modifications are to be incorporated into the Contract Documents and acknowledgement of receipt of this addendum shall be so noted on the Proposal Form submitted.

#### **BID DOCUMENTS**

#### **TECHNICAL SPECIFICATIONS**

#### **DRAWINGS**

#### **CLARIFICATIONS**

1. Please find attached the Geotechnical Engineering Report conducted by ECS Mid-Atlantic, LLC dated March 21, 2021 which corresponds to the boring locations shown on C1-02, C1-03 and C1-04 of the drawings.

#### **ATTACHMENTS**

1. Geotechical Engineering Report by ECS Mid-Atlantic, LLC dated March 21, 2021.

#### **END ADDENDUM NO. 7**





# **ECS Mid-Atlantic, LLC**

Geotechnical Engineering Report Auburn Park

3595 Riner Road Riner, Virginia

ECS Project No. 12:19208

March 12, 2021



Geotechnical • Construction Materials • Environmental • Facilities

March 12, 2021

Mr. Trevor Kimzey, PE Gay and Neel, Inc. 1260 Radford Street Christiansburg, Virginia 24073

ECS Project No. 12:19208

Reference: **Geotechnical Engineering Report** 

> **Auburn Park** 3595 Riner Road Riner, Virginia

Dear Mr. Kimzey:

ECS Mid-Atlantic, LLC (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the above-referenced project. Our services were performed in general accordance with our agreed to scope of work. This report presents our understanding of the geotechnical aspects of the project along with the results of the field exploration and laboratory testing conducted, and our design and construction recommendations.

It has been our pleasure to be of service to Gay and Neel, Inc. during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to verify subsurface conditions assumed for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

**ECS Mid-Atlantic, LLC** 

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#### **Appendix A – Drawings & Reports**

- Site Location Diagram
- Boring Location Diagram

#### **Appendix B – Field Operations**

- Reference Notes for Boring Logs
- Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
- Boring Logs B-1 through B-27, SMW-1 through SWM-6

#### **Appendix C – Laboratory Testing**

- Laboratory Test Results Summary
- Plasticity Chart
- Moisture-Density Relationship Curves

#### **EXECUTIVE SUMMARY**

This Executive Summary is intended as a very brief overview of the primary geotechnical conditions that are expected to affect design and construction. Information gleaned from the Executive Summary should not be utilized in lieu of reading the entire geotechnical report.

Based on the results of our SPT soil borings and assumed structural loads, the proposed lightly loaded structures may be supported on conventional shallow foundations consisting of column or strip footings bearing on natural soils or approved structural fill with an allowable net bearing capacity of 2,000 psf.

Based on the provided preliminary grading plan and the results of our borings, we anticipate shallow rock will be encountered in some cut areas of the site.

#### 1.0 INTRODUCTION

The purpose of this study was to provide geotechnical information for the design of the proposed park development. The project will include the construction of athletic fields, lightly loaded picnic shelters, playground areas, stormwater management, and parking areas. The recommendations developed for this report are based on project information supplied by you.

Our services were provided in accordance with our Proposal No. 14511-P, dated February 5, 2021, as authorized by Gay and Neel, Inc. on February 5, 2021, which includes our Terms and Conditions of Service.

This report contains the procedures and results of our subsurface exploration and laboratory testing programs, review of existing site conditions, engineering analyses, and recommendations for the design and construction of the project.

The report includes the following items:

- A brief review and description of our field and laboratory test procedures and the results of testing conducted
- A review of surface topographical features and site conditions
- A review of area and site geologic conditions
- A review of subsurface soil/rock stratigraphy with pertinent physical properties
- Final soil exploration boring logs
- Recommendations for site preparation and construction of compacted fills, including an evaluation of on-site soils for use as compacted fills and identification of potentially unsuitable soils and/or soils exhibiting excessive moisture at the time of sampling
- Recommended foundation type
- An evaluation of soil and rock excavation issues

#### 2.0 PROJECT INFORMATION

#### 2.1 PROJECT LOCATION/CURRENT SITE USE/PAST SITE USE

The site is located at 3595 Riner Road in the Riner area of Montgomery County, Virginia. At the time of our visit, the ground surface was generally covered with grass. The overall site is located to the southwest and south of the existing Riner Volunteer Fire Department.



Figure 2.1 Site Location

The topography of the site is generally characterized by gently undulating hills. Grades vary from approximately 2120 feet near the middle of the southwest border of the site, to approximately 2061 feet at the southernmost corner of the site.

#### 2.2 PROPOSED CONSTRUCTION

ECS was provided project documents prepared by Gay and Neel, Inc., which included a conceptual master plan dated January 12, 2021, and the preliminary grading plan dated February 2, 2021. Based on our review of the provided documents, we understand the project will include the construction of a park located to the south and west of the Riner Volunteer Fire Department. We understand the park will consist of multiple athletic fields, lightly-loaded picnic shelters, and playground areas.

Structural loading conditions for the picnic shelters have not been provided, however, we anticipate maximum column and wall loads of approximately 25 kips per column and 3 kips per linear foot, respectively.

Based on the existing and proposed grades, it appears maximum cuts and fills will be on the order of approximately 20 feet and 15 feet, respectively, to reach design grades.

Stormwater management, consisting of two ponds and an underground stormwater detention system are included in the design. Design grades have not been provided at this time, however, we understand the proposed ponds will utilize existing grades. We understand the proposed stormwater facility closest to Riner Road will be utilized as a sediment basin during the mass grading phase and later converted to an underground system.

#### 3.0 FIELD EXPLORATION AND LABORATORY TESTING

Our exploration procedures are explained in greater detail in Appendix B including the insert titled Subsurface Exploration Procedures. Our scope of work included drilling 33 borings, as well as four offset borings. Our borings were located with a Trimble GPS unit while referencing available satellite imagery Their approximate locations are shown on the Boring Location Diagram in Appendix A.

#### **3.1 SITE GEOLOGY**

Based on our review of the Interstate 81 Corridor Digital Geologic Compilation: Riner Quadrangle, Virginia (2013), the site is located within the Valley and Ridge Geologic Province of Virginia. Specifically, the mapping indicates the site is underlain by the Rome Formation. Bedrock in this formation primarily consists of phyllitic mudstone, quartzose argillite, metasiltstone, and dolomite, with limestone interbeds.

The carbonate rock types encountered in this geology are subject to development of karst features such as sinkholes. Carbonate materials solution in water over long periods of time, resulting in loss of rock material. The solution process typically occurs along planes of more soluble material and causes the formation of interconnected seams and cavities within carbonate formations.

The boundary between soil and rock is not sharply defined. A transitional zone termed "highly weathered rock" (HWR) is normally found overlying the parent bedrock. Highly weathered rock is defined, for engineering purposes, as residual material with Standard Penetration resistance greater than 100 blows per foot (bpf). Because weathering is facilitated by fractures, joints, and the presence of less resistant rock types, the profile of the HWR and bedrock is typically irregular and erratic, even over short horizontal distances. Also, it is not unusual to find lenses and natural boulders of hard rock "floating" in zones of HWR within the soil mantle, well above the general bedrock level.

#### 3.2 SUBSURFACE CHARACTERIZATION

The subsurface conditions encountered were generally consistent with published geological mapping. The following sections provide generalized characterizations of the soil and rock strata. Please refer to the boring logs in Appendix B.

Approximate Depth (ft)	Stratum	Description	Ranges of SPT <sup>(1)</sup> N-values (bpf)
0-1 (Surface cover)	n/a	Topsoil (approximately 5 to 12 inches)	N/A
0.4-20	I	Residuum, soft to very hard, LEAN CLAY (CL), FAT CLAY (CH), SILT (ML), ELASTIC SILT (MH), CLAYEY SAND (SC), containing varying concentrations of sand, and SILTY SAND (SM)	3 to 65
0.5-22	II	Highly Weathered Rock Sampled as SILTY SAND WITH GRAVEL and GRAVEL WITH SAND (HWR), moist	100+
5.5-22+	III	Hard rock, presumed to be mudstone, argillite, siltstone, dolomite, or limestone	N/A

Notes:

(1) Standard Penetration Testing

#### **3.3 GROUNDWATER OBSERVATIONS**

Water levels were measured in our borings were measured at the time of drilling and are reported in our borings logs in Appendix B. Perched groundwater was encountered in Boring B-18 at a depth of approximately 6 feet. Variations in the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, construction activities, and other factors.

#### 3.4 LABORATORY TESTING

The laboratory testing consisted of selected tests performed on samples obtained during our field exploration operations. Classification and index property tests were performed on representative soil samples. The laboratory testing program included natural moisture content tests (ASTM D2216), percent passing the No. 200 sieve tests (ASTM D1140), and Atterberg Limits tests (ASTM D4318). Standard Proctor tests (VTM-1) were performed on bulk soil samples. The results of all laboratory testing conducted are included in the Appendix of this report.

Each sample was visually classified on the basis of texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and including USCS classification symbols, and ASTM D2487 Standard Practice for Classification for Engineering Purposes (Unified Soil Classification System (USCS)). After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual.

#### **4.0 DESIGN RECOMMENDATIONS**

#### 4.1 KARST RISK COMMENTARY

Based on our site reconnaissance karst features were not observed in close vicinity of the proposed development. However, the site is mapped to be underlain by geologic parent rock which is known to be

carbonate in nature. Based on our experience in the geology, the site will likely be most vulnerable to sinkhole development during the mass grading phase of construction. During grading operations, drainage control is typically poor and the critical rock/soil interface is exposed to flooding from precipitation. It is a common occurrence for small sinkholes to develop during this phase of construction.

The subsurface conditions encountered in the soil test borings consist of residual soils of varying strength and moisture, as well as an erratic karst bedrock surface. In addition, the soil strength profile encountered in some of the borings decreased gradually with depth. These conditions are indicative of residual soils underlain by karst bedrock, which is subject to sinkhole development. Although we define the risk of future sinkhole development on this site as low to moderate, the owner should accept some risk related to the impact of karst features on foundation and overall site performance.

#### 4.2 FOUNDATIONS

Provided subgrades and Structural Fills are prepared as recommended in this report, the proposed lightly loaded shelter structures can be supported by shallow foundations including column footings and continuous wall footings. We recommend the foundation design use the following parameters:

Design Parameter	Column Footing	Wall Footing
Net Allowable Bearing Pressure <sup>(1)</sup>	2,000 psf	2,000 psf
Acceptable Bearing Soil Material	Firm Residual Soils (Stratum I)	Firm Residual Soils (Stratum I)
Minimum Width	24 inches	16 inches
Minimum Footing Embedment Depth (below slab or finished grade) (2)	30 inches	30 inches
Estimated Total Settlement (3)	Less than 1- inch	Less than 1- inch
Estimated Differential Settlement <sup>(4)</sup>	Less than ¾ inches between columns	Less than ¾ inches

Notes:

- (1) Net allowable bearing pressure is the applied pressure in excess of the surrounding overburden soils above the base of the foundation.
- (2) For frost penetration requirements and expansive soil concerns.
- (3) Based on assumed structural loads. If final loads are different, ECS must be contacted to update foundation recommendations and settlement calculations.
- (4) Based on maximum column/wall loads and variability in borings. Differential settlement can be re-evaluated once the foundation plans are more complete.

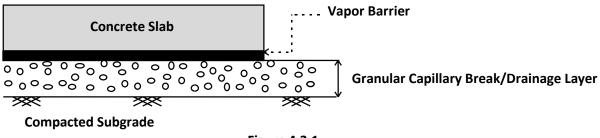
**Shallow Rock:** The borings suggest that hard rock may be encountered at or above design bearing elevations in some areas of the site. This rock is also likely to be seamy, with abrupt transitions between soil-supported and rock-supported footings. In such instances, it is recommended to perform isolated undercuts below the footings to reduce the potential for excessive differential settlement across relatively short horizontal distances. Where footings transition from soil-support to rock-support and the length of the rock seam is greater than 4 feet, we recommend that soil on either side of the rock seam, for a distance of 4 feet along the trench, be removed and replaced with compacted stone. In instances where the rock

pinnacle extends for a distance of less than 4 feet along the trench, the rock pinnacle should be removed to a depth of 12 inches below the design bearing level and replaced with compacted stone.

**Potential Undercuts:** Most of the soils at the foundation bearing elevation are anticipated to be suitable for support of the proposed structure. If soft or unsuitable soils are observed at the footing bearing elevations, the unsuitable soils should be undercut and removed. Any undercut should be backfilled with cementitious flowable fill ( $f'_c \ge 200$  psi at 28 days) or compacted VDOT No. 21-A Stone up to the original design bottom of footing elevation; the original footing shall be constructed at the desired footing elevations. Due to karst potential on the site, we do not recommend the use of VDOT No. 57 Stone for undercut backfilling.

#### **4.3 SLABS ON GRADE**

Provided subgrades and structural fills are prepared as discussed herein, the proposed floor slabs can be constructed as Ground Supported Slabs (or Slab-On-Grade). The following graphic depicts our soil-supported slab recommendations:



- **Figure 4.2.1**
- 1. Drainage Layer Thickness: 4 inches
- 2. Drainage Layer Material: GRAVEL (GP, GW), SAND (SP, SW)

Soft or yielding soils may be encountered in some areas. Those soils should be removed and replaced with compacted Structural Fill in accordance with the recommendations included in this report.

**Subgrade Modulus:** Provided the Structural Fill and Granular Drainage Layer are constructed in accordance with our recommendations, the slab may be designed assuming a modulus of subgrade reaction,  $k_1$  of 75 pci (lbs./cu. inch). The modulus of subgrade reaction value is based on a 1 foot by 1 foot plate load test basis.

**Porous Slab Base:** We recommend the slab-on-grade be underlain by a minimum of 4 inches of clean, angular gravel (crushed stone) having a maximum aggregate size of 1.5 inches. VDOT No. 57 Stone is considered suitable for this purpose. This porous fill layer will facilitate the fine grading of the building pad, provide more uniform bearing conditions, and help prevent the rise of water to the bottom of the slab (capillary action).

**Vapor Barrier:** Before the placement of concrete, a vapor barrier may be placed on top of the granular drainage layer to provide additional protection against moisture penetration through the floor slab. When

a vapor barrier is used, special attention should be given to surface curing of the slab to reduce the potential for uneven drying, curling and/or cracking of the slab. Depending on proposed flooring material types, the structural engineer and/or the architect may choose to eliminate the vapor barrier.

**Rock Above Design Bearing Elevation:** We recommend that sufficient rock be removed to allow placement of the entire drainage layer. This will serve to cushion the slab and reduce the potential for point loads and subsequent cracking of the concrete. In such cases, additional overexcavation of rock should be considered to allow installation of underslab utilities.

**Slab Isolation:** Soil-supported slabs should be isolated from the foundations and foundation-supported elements of the structure so that differential movement between the foundations and slab will not induce excessive shear and bending stresses in the floor slab. Where the structural configuration prevents the use of a free-floating slab such as in a drop down footing/monolithic slab configuration, the slab should be designed with suitable reinforcement and load transfer devices to preclude overstressing of the slab.

#### 5.0 SUBGRADE PREPARATION

#### **5.1 STRIPPING AND GRUBBING**

The subgrade preparation should consist of stripping all vegetation, rootmat, topsoil, existing fill, and any soft or unsuitable materials from the 5-foot expanded building and 2-foot expanded pavement limits, and 5 feet beyond the toe of Structural Fills. Borings performed in "undisturbed" areas of the site contained an observed 5 to 12 inches of topsoil. Deeper topsoil or organic laden soils may be present in wet, low-lying, and poorly drained areas. In wooded areas, the root balls may extend as deep as about 2 feet and will require additional localized stripping depth to completely remove the organics. It is noted that the site has been subject to previous agricultural activity. Often, this results in a subsoil layer which is not organic, but is notably different from the underlying residual soils. It is not uncommon for this layer to be several feet thick, particularly in low-lying areas. This layer, where present, should not be stripped as topsoil unless specifically recommended by the geotechnical engineer in the field. ECS should be retained to verify that topsoil and unsuitable surficial materials have been removed prior to the placement of structural fill or construction of structures.

#### **5.2 PROOFROLLING**

Prior to fill placement or other construction on subgrades, the subgrades should be evaluated by an ECS field technician. The exposed subgrade should be thoroughly proofrolled with construction equipment having a minimum axle load of 10 tons [e.g. fully loaded tandem-axle dump truck]. Proofrolling should be traversed in two perpendicular directions with overlapping passes of the vehicle under the observation of an ECS technician. This procedure is intended to assist in identifying any localized yielding materials.

Where proofrolling identifies areas that are unstable or "pumping" subgrade those areas should be repaired prior to the placement of any subsequent Structural Fill or other construction materials. Methods of stabilization include undercutting, moisture conditioning, or chemical stabilization. The situation should be discussed with ECS to determine the appropriate procedure. Test pits may be excavated to explore the shallow subsurface materials to help in determining the cause of the observed unstable materials, and to assist in the evaluation of appropriate remedial actions to stabilize the subgrade.

#### **5.3 EARTHWORK OPERATIONS**

#### 5.3.1 Weathered Rock and Rock

Based on boring data obtained during the exploration, we anticipate that materials requiring difficult or rock excavation techniques will be encountered during site grading and excavation to planned subgrades. Borings B-06, B-08, and B-21 refused at elevations higher than design elevations. We anticipate these areas will require significant excavation of rock to reach design grades. Borings B-10, B-14, B-16, and B-20 encountered auger refusal at elevations close to design grade. We anticipate these areas may require some amount of difficult excavation to reach design grades. Specific invert elevations have not been provided for the proposed underground stormwater detention, however we anticipate rock will be encountered above design grades in this area as well.

The excavation of weathered rock and rock can have a substantial impact on the cost and schedule of the proposed construction. This discussion considers two general classes of materials for purposes of describing excavatability. Residuum and weathered rock will be used as the terms for the materials to be excavated.

In mass excavations for general site work, overburden soils with standard penetration test N-values of 40 bpf or less can usually be removed with conventional earth excavation equipment. Residual soils or soft weathered (Saprolitic) rock with N-values of 40 to 50 bpf can generally be removed with conventional earth moving equipment after first being loosened with a large single-tooth ripper attached to a large crawler tractor. Harder, less weathered rock will generally require the use of a large single-tooth ripper, dozers, and/or track-mounted backhoes for excavation. However, materials exhibiting N-values of 50 blows or greater for 6 inches of penetration, typically defined as refusal material, will be more difficult to excavate and generally require blasting and other rock excavation techniques. The actual excavatability of the bedrock material will be greatly controlled by in-situ jointing and bedding and may vary from location to location.

In confined excavations, such as utility trenches, excavation of dense residual soils typically requires the use of large track-mounted backhoes. Excavation of harder phases of weathered rock typically requires the use of large track-mounted backhoes, pneumatic spades, or light blasting. Refusal materials (apparent rock) normally require blasting in trench excavations. Blasting in utility trenches should be done carefully to avoid damage to the surrounding materials. When the material to be excavated requires blasting, the contractor should comply with the jurisdictional requirements.

#### 5.3.2 Structural Fill

Prior to placement of Structural Fill, representative bulk samples (about 50 pounds) of on-site and/or off-site borrow should be submitted to ECS for laboratory testing, which will typically include Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships (i.e., Proctors) for compaction. Import materials should be tested prior to being hauled to the site to determine if they meet project specifications. Alternatively, Proctor data from other accredited laboratories can be submitted if the test results are within the last 90 days.

**Satisfactory Structural Fill Materials:** Materials satisfactory for use as Structural Fill should consist of inorganic soils with the following engineering properties and compaction requirements.

STRUCTURAL FILL INDEX PROPERTIES		
Subject Property		
Building and Pavement Areas (Borrow Soils)	LL < 50, PI<25	
Building and Pavement Areas (On-site Soils) LL < 60, PI < 30		
Max. Particle Size 4 inches		
Max. organic content 5% by dry weight		

STRUCTURAL FILL COMPACTION REQUIREMENTS		
Subject	Requirement	
Compaction Standard	Standard Proctor, ASTM D698	
Required Compaction	95% of Max. Dry Density	
Moisture Content	+/-3 % points of the soil's optimum value	
Loose Thickness	8 inches prior to compaction	

**On-Site Borrow Suitability:** Significant natural deposits of soils are present on the site. These occur mostly at relatively shallow depth below the surface where residual soils are most weathered.

**Aggregates/Blast Rock:** The gradation of the material removed by ripping or blasting is typically quite varied. Excavated rock and weathered rock are generally only suitable for use in the deeper parts of embankment fills, or outside the zone of Structural Fill.

When rock or intact weathered rock fragments are placed in non-structural areas, we recommend that the rock fragments be spread out evenly in layers. Many times, the rock needs to be choked off with rock fines, and/or soil, so that voids between the rock fragments are filled. Where the material exhibits large voids between rock fragments, a geotextile may be needed to be placed over the rock prior to placement of additional materials. In general, the larger rock fragments should be placed at the bottom of the fill, but no fragment should exceed 1.5 feet in its maximum dimension. Between 2 feet and 10 feet below the final subgrade elevation, no rock fragment should exceed 8 inches in its maximum dimension. Within 2 feet of the subgrade elevation, no rock fragment should exceed 4 inches in maximum dimension.

In some situations, it can be cost effective to use an onsite rock crusher to produce material that meets the requirements of Structural Fill materials.

**Fill Placement:** Fill materials should not be placed on frozen soils, on frost-heaved soils, and/or on excessively wet soils. Borrow fill materials should not contain frozen materials at the time of placement, and all frozen or frost-heaved soils should be removed prior to placement of Structural Fill or other fill soils and aggregates. Excessively wet soils or aggregates should be scarified, aerated, and moisture conditioned.

#### 5.4 FOUNDATION AND SLAB OBSERVATIONS

**Protection of Foundation Excavations:** Exposure to the environment may weaken the soils at the footing bearing level if the foundation excavations remain open for too long a time. Therefore, foundation

concrete should be placed the same day that excavations are made. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, a 1 to 3-inch thick "mud mat" of "lean" concrete should be placed on the bearing soils before the placement of reinforcing steel.

**Footing Subgrade Observations:** Most of the soils at the foundation bearing elevation are anticipated to be suitable for support of the proposed structure. It is important to have ECS observe the foundation subgrade prior to placing foundation concrete, to confirm the bearing soils are what was anticipated.

**Slab Subgrade Verification:** Prior to placement of a drainage layer, the subgrade should be prepared in accordance with the recommendations found in **Section 5.1.2 Proofrolling**.

#### **5.5 UTILITY INSTALLATIONS**

**Utility Subgrades:** The soils encountered in our exploration are expected to be generally suitable for support of utility pipes. The pipe subgrades should be observed and probed for stability by ECS. Any loose or unsuitable materials encountered should be removed and replaced with suitable compacted Structural Fill, or pipe stone bedding material.

**Utility Backfilling:** The granular bedding material (AASHTO #57 stone) should be at least 4 inches thick, but not less than that specified by the civil engineer's project drawings and specifications. We recommend that the bedding materials be placed up to the springline of the pipe. Fill placed for support of the utilities, as well as backfill over the utilities, should satisfy the requirements for Structural Fill and Fill Placement.

**Excavation Safety:** All excavations and slopes should be constructed and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing, constructing, and maintaining stable temporary excavations and slopes. The contractor's responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

#### 6.0 CLOSING

ECS has prepared this report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation, expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided to ECS by our client. If any of this information is inaccurate or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our

recommendations and provide additional or alternate recommendations that reflect the proposed construction.

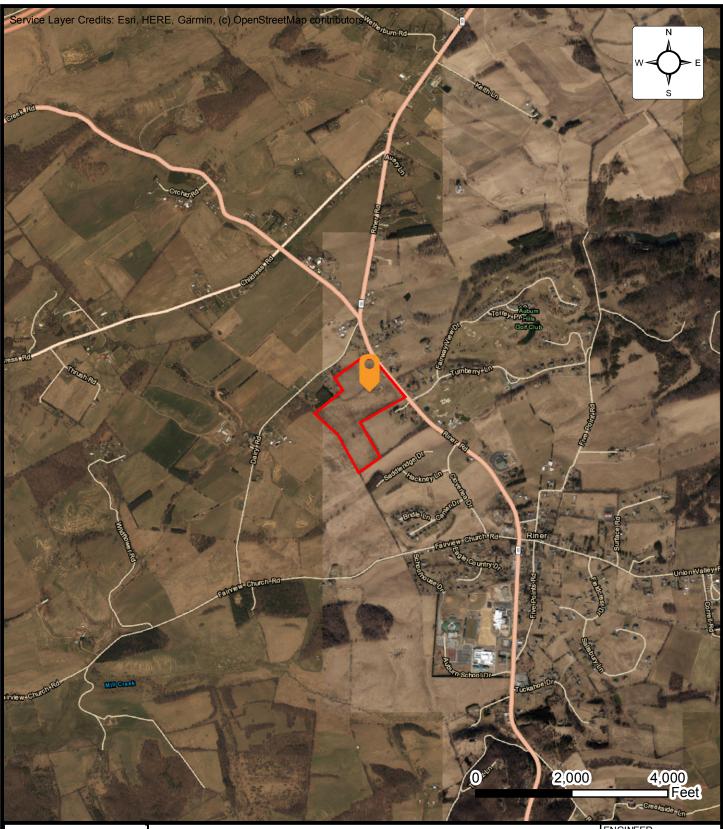
We recommend that ECS review the project plans and specifications so we can confirm that those plans/specifications are in accordance with the recommendations of this geotechnical report.

Field observations, and quality assurance testing during earthwork and foundation installation are an extension of, and integral to, the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendation should issues arise.

ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

## APPENDIX A – Diagrams & Reports

Site Location Diagram
Boring Location Diagram





# Site Location Diagram AUBURN PARK

3595 RINER ROAD, RINER, VIRGINIA

GAY AND NEEL, INC.

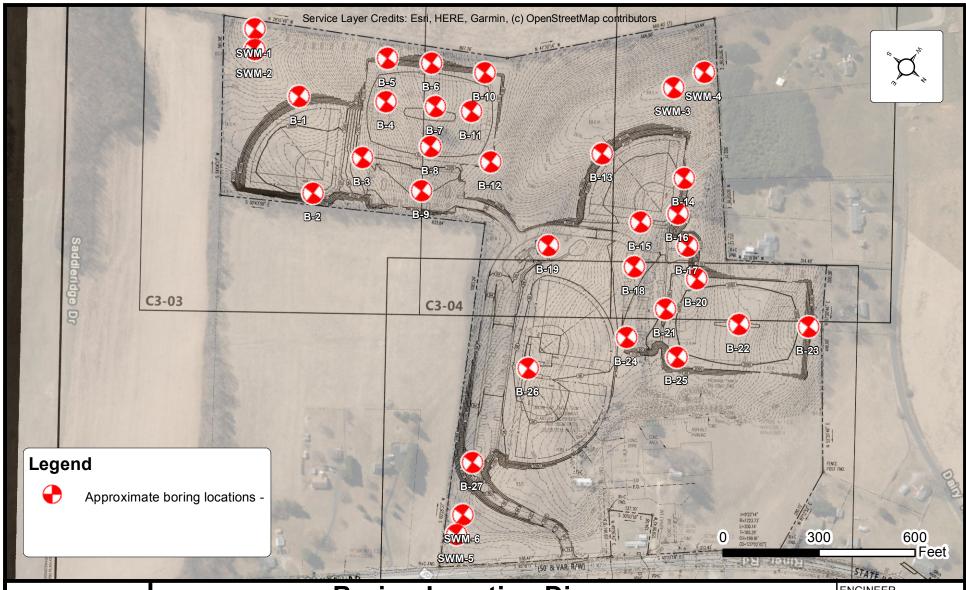
ENGINEER BMQ

SCALE AS NOTED

PROJECT NO. 12:19208

SHEET 1 OF 1

DATE 2/22/2021





# Boring Location Diagram AUBURN PARK

3595 RINER ROAD, RINER, VIRGINIA GAY AND NEEL, INC.

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SCALE

AS NOTED

PROJECT NO. 12:19208

SHEET 1 OF 1

DATE 2/22/2021

## **APPENDIX B – Field Operations**

Reference Notes for Boring Logs Subsurface Exploration Procedure: Standard Penetration Testing (SPT) Boring Logs B-1 through B-27, SWM-1 through SWM-6



## REFERENCE NOTES FOR BORING LOGS

MATERIAL <sup>1,2</sup>			
	ASPI	HALT	
	CON	CRETE	
	GRA	VEL	
	TOPS	SOIL	
	VOID		
	BRIC	κ	
	AGG	REGATE BASE COURSE	
	GW	WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines	
\$0°.0	GP	POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines	
	GM	SILTY GRAVEL gravel-sand-silt mixtures	
I P	GC	CLAYEY GRAVEL gravel-sand-clay mixtures	
^	SW	WELL-GRADED SAND gravelly sand, little or no fines	
	SP	POORLY-GRADED SAND gravelly sand, little or no fines	
	SM	SILTY SAND sand-silt mixtures	
1///	sc	CLAYEY SAND sand-clay mixtures	
	ML	SILT non-plastic to medium plasticity	
	МН	ELASTIC SILT high plasticity	
	CL	LEAN CLAY low to medium plasticity	
	СН	FAT CLAY high plasticity	
	OL	ORGANIC SILT or CLAY non-plastic to low plasticity	
	ОН	ORGANIC SILT or CLAY high plasticity	
7 7 7 7 7 7	PT	PEAT highly organic soils	
1			

	DRILLING SAMPLING SYMBOLS & ABBREVIATIONS		
SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
ws	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

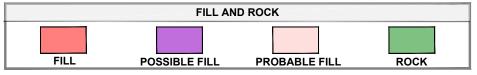
PARTICLE SIZE IDENTIFICATION			
DESIGNATION PARTICLE SIZES			
Boulders		12 inches (300 mm) or larger	
Cobbles		3 inches to 12 inches (75 mm to 300 mm)	
Gravel:	Coarse	3/4 inch to 3 inches (19 mm to 75 mm)	
	Fine	4.75 mm to 19 mm (No. 4 sieve to 3/4 inch)	
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)	
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)	
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)	
Silt & Cla	ay ("Fines")	<0.074 mm (smaller than a No. 200 sieve)	

COHESIVE SILTS & CLAYS		
UNCONFINED  COMPRESSIVE  STRENGTH, QP <sup>4</sup>	SPT <sup>5</sup> (BPF)	CONSISTENCY <sup>7</sup> (COHESIVE)
<0.25	<3	Very Soft
0.25 - <0.50	3 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

RELATIVE AMOUNT <sup>7</sup>	COARSE GRAINED (%) <sup>8</sup>	FINE GRAINED (%) <sup>8</sup>
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective (ex: "Silty")	25 - 45	30 - 45

GRAVELS, SANDS &	NON-COHESIVE SILTS	
SPT <sup>5</sup>	DENSITY	
<5	Very Loose	
5 - 10	Loose	
11 - 30	Medium Dense	
31 - 50	Dense	
>50	Very Dense	

	WATER LEVELS <sup>6</sup>
<u>_</u>	WL (First Encountered)
<u>_</u>	WL (Completion)
<u></u>	WL (Seasonal High Water)
<u></u>	WL (Stabilized)



<sup>&</sup>lt;sup>1</sup>Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

<sup>&</sup>lt;sup>2</sup>To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

<sup>&</sup>lt;sup>3</sup>Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

<sup>&</sup>lt;sup>4</sup>Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

<sup>&</sup>lt;sup>5</sup>Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

<sup>&</sup>lt;sup>6</sup>The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

<sup>&</sup>lt;sup>7</sup>Minor deviation from ASTM D 2488-17 Note 14.

 $<sup>^8\</sup>mbox{Percentages}$  are estimated to the nearest 5% per ASTM D 2488-17.



# SUBSURFACE EXPLORATION PROCEDURE: STANDARD PENETRATION TESTING (SPT) ASTM D 1586

**Split-Barrel Sampling** 

Standard Penetration Testing, or **SPT**, is the most frequently used subsurface exploration test performed worldwide. This test provides samples for identification purposes, as well as a measure of penetration resistance, or N-value. The N-Value, or blow counts, when corrected and correlated, can approximate engineering properties of soils used for geotechnical design and engineering purposes.

## **SPT Procedure:**

- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 12 inches (in 3 or 4 Increments of 6 inches each)
- Auger is advanced\* and an additional SPT is performed
- One SPT test is typically performed for every two to five feet
- Obtain two-inch diameter soil sample





<sup>\*</sup>Drilling Methods May Vary— The predominant drilling methods used for SPT are open hole fluid rotary drilling and hollow-stem auger drilling.

CLIENT							PROJECT			BORING I	VO.:	SHEET:		
Gay and PROJEC							<b>12:19208</b> DRILLER/0			<b>B-01</b> DR:		1 of 1		EC6
Auburn							Blue Ridg							
SITE LOG			er, Virgi	inia 241	149								LOSS OF CIRCULATION	<u> </u>
NORTH <b>355534</b> 2					STING: 913312.0	STATION:			- 1	JRFACE E 170.0	LEVATION:		BOTTOM OF CASING	
	BER	36	(NI)	â					rs	(L:		Plas	tic Limit Water Content	Liquid Limit ∆
DЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	PF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	R	STANDARD PENETRATION  CK QUALITY DESIGNATION  RQD  REC	& RECOVERY
	•,				T 11 T 1			N////////					CALIBRATED PENETROME INES CONTENT] %	TER TON/SF
-					Topsoil Thickness [6"] (CL) Residuum, LEAN (	`I ΔΥ WITH	SAND	4777		1 1	2.2.5			
- -	S-1	SS	18	16	tan- brown, moist, sof		<i>5,</i> <b>12</b> ,			-	2-3-5 (8)	⊗8		
	S-2	SS	18	18							2-4-4 (8)	⊗ <sub>8</sub>	3 <b>4.</b> 0	
5-										2065				
- - -	S-3	SS	18	18						-	2-2-2 (4)	\$4		
-											2.2.5			
10-	S-4	SS	18	18	END OF DRILLIN	JC AT 10 0 F	.T			2060 -	2-3-5 (8)	⊗ <sub>8</sub>		
_					END OF BRILLIN	NG AT 10.0 F	1							
-										]				
_														
-										-				
15 –										2055				
-														
]														
_														
20 -										2050				
										]				
_										-				
_ -														
05										0045				
25 –										2045				
-														
-														
-														
30 –										2040				
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			ATIFICA ounter		NES REPRESENT THE APPROXII  Dry		ARY LINES B			TYPES. IN	CAVE IN		A.60	.L
		mpleti		,	·	BORII								
▼ W	VL (Sea	sonal	High V	Vater)		СОМІ	PLETED:			7 2021	HAMMEI	K TYPE:	Auto	
▼ W	VL (Sta	bilized	1)				PMENT: <b>ME-55</b>	I .	ogg <b>RD</b>	ED BY:	DRILLING	METHC	D: 2 1/4" HSA	
					GEC	TECHNIC				OG				

CLIENT							PROJECT N	O.:		BORING	NO.:	SHEET:		
Gay and							<b>12:19208</b> DRILLER/C	ONTRA		B-02 IR·		1 of 1		FC6
Auburn							Blue Ridge							
SITE LO			er, Virgi	nia 241	149							LOSS	OF CIRCULATION	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
NORTH <b>355555</b>					STING: <b>913527.4</b>	STATION:			- 1	JRFACE E 178.0	LEVATION:	BOT	TOM OF CASING	
	BER	ñ	(NI)	(N					rs	F.		Plastic Lin X—	nit Water Content	Liquid Limit ∆
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	F MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	поск QI —— по —— пе		& RECOVERY
					Topsoil Thickness [6"]								ONTENT] %	
- - -	S-1	SS	18	16	(CH) Residuum, FAT Cl brown, moist, stiff	.AY, trace sa	and,			-	3-5-7 (12)	⊗ <sub>12</sub>	33.6	
- -	S-2	SS	18	18							4-6-6	⊗ <sub>12</sub>		
5-				10						2073	(12)	12		
- - -	S-3	SS	18	17						-    -	4-5-8 (13)	⊗ <sub>13</sub>		
-	_				(ML) SILT WITH SAND,	red- brown	n, moist,				4-5-6			
10 –	S-4	SS	18	14	stiff END OF DRILLIN	IG AT 10.0 F	т			2068	(11)	<b>⊗</b> <sub>11</sub>		
_														
-														
_														
15 –										2063				
-														
- -														
20 <del>-</del>										2058				
- -										2030				
_														
-														
25 -										2053				
-														
_														
30 -										2048				
-														
					NES REPRESENT THE APPROXII	MATE BOUND	ARY LINES BE	TWEEN	SOIL	TYPES. IN	I-SITU THE TR	ANSITION MA	AY BE GRADUA	AL.
			untere	ed)	Dry		NG STARTED	): <b>F</b> e	eb 17	2021	CAVE IN I	DEPTH:	3.90	
<b>Y</b> V			on) ——— High V	Vater)		BORIN COMI	NG PLETED:	Fe	eb 17	2021	HAMMER	R TYPE:	Auto	
	/L (Sta					EQUIF ATV C	PMENT: ME-55		DGG <b>RD</b>	ED BY:	DRILLING	METHOD: 2	2 1/4" HSA	
					GEC	TECHNIC				OG				

CLIENT							PROJECT	NO.:		BORING I	NO.:	SHEET:		
Gay and PROJEC							<b>12:19208</b> DRILLER/0	CONTRA		B-03		1 of 1		FC6
Auburn		/IL.					Blue Ridge							
SITE LO			er, Virgi	inia 241	149								LOSS OF CIRCULATION	<u> </u>
NORTH <b>355561</b> 7	ING:		-	EA	STING: <b>913346.1</b>	STATION:				JRFACE E 190.0	LEVATION:		BOTTOM OF CASING	-
	BER	Ä	(IN)	î					. SJ	(T:		Plas	tic Limit Water Content	: Liquid Limit ∆
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	PF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	R	STANDARD PENETRATIO OCK QUALITY DESIGNATION RQD REC CALIBRATED PENETROMI	& RECOVERY
					Topsoil Thickness [6"]								INES CONTENT] %	
-	S-1	SS	18	14	(CL) Residuum, LEAN ( brown, moist, firm	CLAY, trace	sand,				2-2-3 (5)	$\otimes_5$		
	S-2	SS	18	15							2-3-4	⊗ <sub>7</sub>	•	
5	32	33	10	13	(ML) SILT WITH SAND,	tan moist	soft to			2085	(7)		35.6	
_ _ _	S-3	SS	18	18	firm	tari, moist	, 3011 10				2-1-2 (3)	$\bigotimes_3$		
-											222			
10-	S-4	SS	18	16	END OF DRILLIN	JC AT 10 0 5	<del> </del>			2080	2-2-3 (5)	$\otimes_5$		
-					END OF DRILLIF	NG AT 10.0 I	-1							
										]				
_ -														
4.5										-				
15 –										2075				
-														
-														
20										2070				
_ -														
-										-				
										]				
25 –										2065				
-														
										]				
-										=				
20										-				
30 –										2060 –				
	Tı	HE CTR	TIFIC V	TION ! !!	 NES REPRESENT THE APPROXII	MATE ROLIND	ARY LINES D	FT\MFEN	ווטאן	TYPES IN	-SITLI THE TD	ANSITION	I MAY RE GRADIIA	Al .
\\ \textstyle \textst			unter		Dry		NG STARTE			7 2021	CAVE IN		4.20	NL.
<b>T</b> W	VL (Coi	mpleti	on)			BORII				7 2021	HAMMEI		Auto	
▼ W	VL (Sea	sonal	High V	Vater)			PLETED: PMENT:			ED BY:	HAIVIIVIEI	VIIPE:	Autu	
▼ W	VL (Sta	bilized	)			ATV C	ME-55	В	RD		DRILLING	METHC	D: <b>2 1/4" HSA</b>	
					GEC	TECHNIC	CAL BOR	EHOL	<u>.E L</u> (	OG				

CLIENT							PROJECT			BORING	NO.:	SHEET:		
Gay and							<b>12:19208</b> DRILLER/			B-04		1 of 1		FCC
Auburn		/IL.					Blue Ridg							
SITE LO			er Virgi	inia 241	149		_						LOSS OF CIRCULATION	\(\)\(\)
NORTH 3555569	ING:	,	., •	EA	STING: 913161.2	STATION:				JRFACE E	ELEVATION:		BOTTOM OF CASING	-
333330			2		515161.2							Pla	stic Limit Water Conten	
DЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	PF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"		X	
D	SAME	SAľ	SAME	REC					WA	ELEY	Δ		— REC  CALIBRATED PENETROM FINES CONTENT] %	ETER TON/SF
_					Topsoil Thickness [6"]					1			TINES CONTENT) 70	
- - -	S-1	SS	18	13	(ML) Residuum, SAND	Y SILT, mois	st, stiff			-	4-5-4 (9)	⊗9	18.0	
_ _ _	S-2	SS	18	14						-	3-4-5 (9)	⊗9		
5-					(SM) SILTY FINE SAND,	light hrow	'n			2103	(9)			
_ _ _	S-3	SS	18	14	moist, medium dense		,			-	8-10-14 (24)		⊗ <sub>24</sub>	
-										-	7-9-12			
10 –	S-4	SS	18	15						2098	(21)	8	21	
10 -					END OF DRILLIN	NG AT 10.0 F	₹ <b>T</b>			2030				
-										-				
_														
-										-				
15 <del>-</del>										2093				
_														
_														
_										-				
_														
20 -										2088				
_														
_														
_														
_														
25 –										2083 –				
_														
_										]				
_														
30 -										2078				
	Tł	HE STRA	ATIFICA	TION LII	NES REPRESENT THE APPROXII	MATE BOUND	ARY LINES I	BETWEEN	N SOII	L TYPES. IN	N-SITU THE TR	ANSITIO	N MAY BE GRADU	ΔL
			unter	ed)	Dry	BORII	ng starti	ED: <b>F</b>	eb 17	7 2021	CAVE IN	DEPTH:	4.30	
		mpleti		.,		BORII	NG PLETED:	F	eb 17	7 2021	HAMMEI	R TYPE:	Auto	
			High V	vater)		EQUI	PMENT:	L	.OGG	SED BY:	Dell Livic	: METU	DD: <b>2 1/4" HSA</b>	
<u> </u>	/L (Sta	bilized	)		GEC	ATV C	ME-55		RD F I	ne	DIVILLING	, IVILITI	. <b>с 1/4 ПЗА</b>	
					GEC	VI FOLLIAL		VELICE	<u> </u>	J				

CLIENT							PROJECT NO	).:		BORING	NO.:	SHEET:		
Gay and PROJEC							<b>12:19208</b> DRILLER/CO	NTRΔ		8- <b>05</b> R·		1 of 1		FC6
Auburn		/IL.					Blue Ridge D							
SITE LO			v Virai	inia 241	140							LOSS (	OF CIRCULATION	<u> </u>
NORTH 3555492	ING:	iu, mii	i, viigi	EA	.STING: 913050.7	STATION:				JRFACE E	LEVATION:	BOTT	OM OF CASING	-
		ш	<u> </u>									Plastic Limi X	it Water Content	Liquid Limit ——Δ
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	F MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	ROCK QU. RQI RQI		I & RECOVERY
					Topsoil Thickness [7"]							[FINES CO	NTENT] %	
-	S-1	SS	18	14	(ML) Residuum, SAND GRAVEL, tan- brown, r	moist, very	stiff			_ _ _	5-12-17 (29)	Ø <sub>29</sub>		
_ - -	S-2	SS	18	16	[weathered rock struct samples]	ture visible	e in			-	11-10-11			
5	3-2	33	10	10	(CL) I FANI CLAVI I I I I			Щ		2107	(21)	21 20	J.8	
- - - -	S-3	SS	18	15	(CL) LEAN CLAY, trace s moist, firm to stiff	sand, brow	n, /			-	3-3-3 (6)	⊗6		
_							//	4//]		-				
10 -	S-4	SS	18	18	END OF DRILLIN	IC AT 40 0 I				2102 –	4-5-7 (12)	⊗ <sub>12</sub>		
_					END OF DRILLIP	NG AT 10.0 F	-							
-														
-										-				
15										2097				
-										=				
- -										-				
20-										2092				
- - -										_ -				
-										-				
25 –										2087				
25 – - -										2087 -				
-										-				
- - -										=				
30										2082				
		IE CES	TIFIC	TION	NEC DEDDECENT THE ADDRESS.	MATE DOLLAR	ADVIINE SE		6011	TVDEC !!		ANCITION	/ DE CD ( 2 ) : :	
∇ W					NES REPRESENT THE APPROXII  Dry		ARY LINES BET			TYPES. IN 2021	CAVE IN I		Y BE GRADUA .20	AL
<b>Y</b> W	/L (Coı	mpleti	on)			BORII	NG			2021	HAMMER		uto	
▼ W	/L (Sea	sonal	High V	Vater)			PLETED: PMENT:			ED BY:				
▼ W	/L (Sta	bilized	)			ATV C	ME-55	ВІ	RD		DRILLING	METHOD: 2	1/4" HSA	
					GEC	TECHNIC	CAL BORE	HOL	E L(	OG				

CLIENT:							PROJECT N	O.:		BORING	NO.:	SHEET:		
Gay and PROJEC							<b>12:19208</b> DRILLER/C	)NTR Δ		B-06		1 of 1		FC6
Auburn		/IL.					Blue Ridge							
SITE LO	CATION	N:							-				OSS OF CIRCULATION	>1002
3595 Rir		d, Rine	er, Virgi			T			1				.oss of circobation	
NORTH <b>355561</b> 0					STING: 912979.0	STATION:				JRFACE E 23.0	ELEVATION:		BOTTOM OF CASING	
	IBER	ЬE	(NI)	(Z					SIIS	FT)	_	Plasti	c Limit Water Content	Liquid Limit ∆
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	PF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	RO	STANDARD PENETRATION  RQD  REC	& RECOVERY
	0,		0,					~///×///×					CALIBRATED PENETROMI NES CONTENT] %	ETER TON/SF
-					Topsoil Thickness [6"]	IEDED DOG	/			_				
_	S-1	SS	15	16	(HWR) HIGHLY WEATH SAMPLED AS GRAVEL					-	13-27-50/3" (77/9")			<b>⊗</b> <sub>77/9"</sub>
-	S-2	SS	2	0	purple-gray, moist					_	50/2"			⊗ <sub>50/2"</sub>
5-										2118	(50/2")			
					Refusal encounte END OF DRILLI					_				
							•			-				
										_				
10 –										2113 –				
										_				
										_				
- 15-										2108				
13										2100				
-										_				
										-				
20										2103				
_										_				
										-				
05										-				
25 – –										2098 –				
										-				
										-				
30										2093				
														<u>: : : : : : : : : : : : : : : : : : : </u>
'					NES REPRESENT THE APPROXII	MATE BOUND	ARY LINES BE	TWEEN	SOIL	TYPES. II	N-SITU THE TR	ANSITION	MAY BE GRADUA	\L
		st Enco		ed)	Dry		NG STARTED	): <b>F</b> e	eb 17	2021	CAVE IN	DEPTH:	2.10	
<b>▼</b> W		mpletions asonal		Vater)		BORII COMI	NG PLETED:			2021	HAMMEI	R TYPE:	Auto	
		bilized		/			PMENT: <b>ME-55</b>		OGG <b>RD</b>	ED BY:	DRILLING	METHO	D: <b>2 1/4" HSA</b>	
	•		•		GEC	OTECHNIC				OG				

CLIENT		•					PROJECT NO	.:	BORING I	VO.:	SHEET:	
Gay and PROJEC							12:19208 DRILLER/COI	NTRACT	<b>B-06A</b> OR:		1 of 1	FC6
Auburn	Park						Blue Ridge D					
SITE LOG			er, Virgi	nia 241	149						LOSS OF CIRCULATION	1 2100%
NORTH			, ,		STING:	STATION:			URFACE E <b>123.0</b>	LEVATION:	BOTTOM OF CASING	-
(	IBER	J.	(NI)	(N				SI	ET)	_	Plastic Limit Water Conte X——————	nt Liquid Limit ∆
БЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	OF MATERIAL		WATER LEVELS	ELEVATION (FT)	BLOWS/6"	STANDARD PENETRATION ROCK QUALITY DESIGNATION RQD	
Q	SAMI	SA	SAMI	REC				×	ELE	Ω	— REC  CALIBRATED PENETROI	METER TON/SF
					Auger probed to refus	sal, no sam	pling				[FINES CONTENT] %	
- - - -					performed.				-			
5-					Refusal encounte				2118			
- - - -					END OF DRILLI	NG AT 5.0 F	Т					
- - - -					*performed 4' NE of B	-06			-   -   -   -			
10 -									2113			
- - -												
15-									2108			
- - -									-			
-												
20 -									2103			
- - -												
25 – –									2098 –			
-   -   -												
30-									2093			
									+			
	TI	HE STRA	ATIFICA	TION LI	NES REPRESENT THE APPROXI	MATE BOUND	ARY LINES BET\	VEEN SO	IL TYPES. IN	I-SITU THE TR	i Ansition may be gradu	IAL
			untere	ed)		BORI	NG STARTED:	Feb 1	7 2021	CAVE IN	DEPTH:	
		mpleti	on) High V	Vater)		BORI COM	NG PLETED:	Feb 1	7 2021	HAMMEI	R TYPE: Auto	
		bilized		· attil		EQUI	PMENT: :ME-55	LOG	GED BY:	DRILLING	6 METHOD: <b>2 1/4" HSA</b>	
	•		-		GEO		CAL BORE	HOLE I	.OG			

CLIENT							PROJECT I	NO.:		BORING	NO.:	SHEET:		
Gay and PROJEC							<b>12:19208</b> DRILLER/0	ONTRA		B-07		1 of 1		FCC
Auburn		/IL.					Blue Ridge							
SITE LO									-			LOSS OF	CIRCULATION	)100 <i>x</i> )
3595 Rii		d, Rine	er, Virgi			CTATION			Lei	IDEA CE E	T EVATION			
3555702					STING: 913080.0	STATION:				JRFACE E 1 <b>20.0</b>	ELEVATION:	BOTTO	M OF CASING	
(	1BER	PE	(NI)	<u> </u>					STE	ET)	=	Plastic Limit X	Water Conten	t Liquid Limit ∆
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	PF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	ROCK QUAL RQD REC	ATED PENETRATION	N & RECOVERY
					Topsoil Thickness [6"]							[FINES CONT		: :
-					(GC) Residuum, CLAYE	Y GRAVFI V	WITH			1 -	13-14-20			
_	S-1	SS	18	15	SAND, gray and brown					-	(34)	<b>⊗9</b> <sub>4</sub> 19.7		
-	S-2	SS	6	6	(HWR) HIGHLY WEATH					] -	50/6"			⊗ 50/6"
5-					SAMPLED AS GRAVEL moist, very dense	WITH SANI	O, gray,			2115				
_					(SC) CLAYEY SAND WIT					_	15-18-10			
_ -	S-3	SS	18	15	moist, medium dense	to very dei	nse			-	(28)	∞28	3	9.3
-										-	2-4-7			
10	S-4	SS	18	16						2110	(11)	Ø <sub>11</sub>		
-														
-										-				
-										-				
	S-5	SS	18	16							5-6-7 (13)	<b>⊗</b> <sub>13</sub>	37	<b>?</b> 9
15										2105	, ,			
-										-				
								////		]				
-	S-6	SS	18	18						-	22-38-16		⊗ <sub>54</sub>	
20	30	- 55	10	10	END OF DRILLIN	NG AT 20.0 F	T T	1/:///		2100	(54)		54	
_														
-										-				
-										-				
25 -										2095				
_										2000				
-										-				
-										-				
-										]				
30 –										2090 –				
													:	· · · · · · · · · · · · · · · · · · ·
					NES REPRESENT THE APPROXI									AL
✓ W				ea)	Dry		NG STARTE	D: <b>F</b>	eb 17	7 2021	CAVE IN	DEPTH: <b>7.8</b>	80	
▼ W			-	Vater)		BORII COM	NG PLETED:	F	eb 17	7 2021	HAMME	R TYPE: Au	to	
▼ W				· ucci j		EQUI	PMENT:			ED BY:	DRILLING	6 METHOD: <b>2 1</b>	/4" HSA	
	<sub>(</sub> 5ta		,		GEC	ATV C OTECHNIC	ME-55 CAL BOR		RD .E L	OG				

CLIENT:							PROJECT N	10.:		BORING	NO.:	SHEET:		
Gay and PROJEC							<b>12:19208</b> DRILLER/C	ONTRA		3-08 R·		1 of 1		EC6
Auburn							Blue Ridge							
SITE LOC <b>3595 Ri</b> r			r. Virgi	nia 241	149							LC	OSS OF CIRCULATION	∑100 <i>x</i> ⟩
NORTH <b>3555766</b>	ING:	,	, 0	EA	STING: 913189.5	STATION:				JRFACE E <b>15.0</b>	LEVATION:	E	BOTTOM OF CASING	-
	BER	J.	Î Z	2					FS	(T	_		Limit Water Content	: Liquid Limit Δ
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	F MATERIAL			WATER LEVELS	ELEVATION (FT)	"6/SWOJ8	ROC	STANDARD PENETRATION K QUALITY DESIGNATION RQD REC	
	/S		/5					<b>X</b> ////////////////////////////////////					CALIBRATED PENETROME ES CONTENT] %	ETER TON/SF
‡	C 4		0	_	Topsoil Thickness [7"] (HWR) HIGHLY WEATH	IEDED DOC	<u> </u>			-	22-50/2"			
4	S-1	SS	8	5	SAMPLED AS GRAVEL						(50/2")			50/2"
1					moist, very dense									
5	S-2	SS	8	4						2110	35-50/2" (50/2")			<b>⊗</b> <sub>50/2"</sub>
<b>3</b>				Ī	Refusal encounte	red at 5.5 f	eet.			2110				
=					END OF DRILLI									
1										-				
1														
10 –										2105				
=														
_										]				
4														
15										2100				
1										-				
=														
-														
-										-				
20 –										2095				
=										-				
-										-				
]										]				
25 –										2090				
1										-				
4										-				
=														
-										-				
30 –										2085				
		IE CT0 .	TIFICAT	101111	NEC DEDDECENT THE ADDROVE	MATE DOLLAR	ADVIINE DE	T\&/CC*		TVDEC ''	CITI   TUE TO	ANCITION	MAN DE CRADIT	\1
∇ W					NES REPRESENT THE APPROXII  Dry		NG STARTEI			2021	CAVE IN		2.10	AL.
▼ W						BORII								
▼ W	/L (Sea	sonal	High W	/ater)		СОМ	PLETED:	1		<b>2021</b>	HAMMEI	K IYPE:	Auto	
<b>▼</b> W	/L (Sta	bilized	)				PMENT: : <b>ME-55</b>		ogg <b>RD</b>	ED BY:	DRILLING	METHOD	): <b>2 1/4" HSA</b>	
					GEC	TECHNIC				OG				

CLIENT							PROJECT NO	D.:	BORING	NO.:	SHEET:	
Gay and PROJEC							<b>12:19208</b> DRILLER/CC	NTRACT	<b>B-08A</b> OR:		1 of 1	FC6
Auburn	Park						Blue Ridge D	rilling, Ir	ıc.		T	
SITE LOG			er, Virgi	nia 241	149						LOSS OF CIRCULATION	<u> \</u>
NORTH					STING:	STATION:			SURFACE E 2115.0	ELEVATION:	BOTTOM OF CASING	-
(	1BER	PE	(NI)	<u> </u>				\ <u>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</u>	) }   E	=	Plastic Limit Water Conte	nt Liquid Limit ———∆
БЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	)F MATERIAL		WATER LEVELS	ELEVATION (FT)	BLOWS/6"	STANDARD PENETRATION ROCK QUALITY DESIGNATION RQD	
	SAN	<i>t</i> S	SAN	RE				3			— REC  CALIBRATED PENETROI  [FINES CONTENT] %	METER TON/SF
- - - -					Auger probed to refus performed.	sal, no sam	npling		- - - -		(FINES CONTENT) 76	
5-					Refusal encounte	red at 5.0	feet		2110			
- - - -					END OF DRILLI  * performed 4' from B	NG AT 5.0 I			- - - -			
10 -									2105			
-												
15 <u> </u>									2100			
- - - -									-			
20 -									2095			
- - - -									- - - -			
25 – –									2090 -			
-   - 									-			
30 -									2085			
	TI	HF STR	ATIFICAT	ION I II	NES REPRESENT THE APPROXI	MATE BOLING	DARY LINES BET	WFFN SC	II TYPES IN	N-SITU THE TR	ANSITION MAY RE GRADI	JAI
▽ w			unter		Dry		ING STARTED:		19 2021	CAVE IN		<u>.</u>
<b>T</b> W	/L (Co	mpleti	on)			BOR						
▼ M	/L (Sea	sonal	High V	Vater)		COM	IPLETED:	1	19 2021	HAMMEI	R TYPE: Auto	
▼ W	/L (Sta	bilized	)			ATV (	IPMENT: CME-55		GED BY:	DRILLING	6 METHOD: <b>2 1/4" HSA</b>	
					GEC	<b>OTECHNI</b>	<b>CAL BORE</b>	HOLE	LOG			

CLIENT							PROJECT	- 1	BORING	NO.:	SHEET:		
Gay and							<b>12:19208</b> DRILLER/		B-09		1 of 1		FCC
Auburn		/IL.					Blue Ridg						
SITE LO		N:					, ,	 ,			1088	OF CIRCULATION	>100%
3595 Ri		d, Rine	er, Virgi			T		1			2032	OF CIRCULATION	7.2.7
NORTH <b>355582</b> !			ı		STING: <b>913316.9</b>	STATION:			JRFACE E 1 <b>09.0</b>	ELEVATION:	ВОТ	TTOM OF CASING	
	BER	ŊĘ.	(NE)	Î				l S	(F		Plastic Lii X—	mit Water Content	t Liquid Limit ∆
DЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	DF MATERIAL		WATER LEVELS	ELEVATION (FT)	BLOWS/6"	ROCK C	EC LIBRATED PENETROM	I & RECOVERY
					Topsoil Thickness [7"]						[FINES 0	CONTENT] %	
	S-1	SS	18	18	(SM) Residuum, SILTY GRAVEL, tan, moist, ve		Н			6-19-40 (59)	8.5	$\otimes_{_{\! 5\! Q}}$	
<u>-</u>					(HWR) HIGHLY WEATH		K				0.3		
5-	S-2	SS	8	6	SAMPLED AS SILTY SAI	ND WITH G			2104	24-50/2" (50/2")			⊗ <sub>50/2"</sub>
) -					tan, moist, very dense (ML) SANDY SILT, brow		ery stiff		2104	18-13-16			
_	S-3	SS	18	18						(29)	29		
-									-	8-14-14			
10 –	S-4	SS	18	18	END OF DRULLIN	10 AT 40 0 F			2099	(28)	♦28		
_					END OF DRILLIN	NG AT 10.0 F	FI		-				
_									-				
_									_				
_									-				
15-									2094 –				
_									-				
									]				
-									_				
20 -									2089				
									-				
_									_				
-									0004				
25 –									2084 –				
-									_				
- -									-				
_									-				
30 -									2079				
\\ \textstyle \textst			ATIFICA ounter		NES REPRESENT THE APPROXII  Dry								AL .
		mpleti		/		BORII	NG STARTE NG		2021	CAVE IN		3.80	
▼ v	/L (Sea	sonal	High V	Vater)		сом	PLETED:		9 2021	HAMME	K TYPE:	Auto	
▼ v	/L (Sta	bilized	1)				PMENT: : <b>ME-55</b>	ogg <b>RD</b>	ED BY:	DRILLING	METHOD:	2 1/4" HSA	
					GEO	TECHNIC			OG				

CLIENT:								DJECT NO.: BORING NO.:			SHEET:			
Gay and							12:19208 B-10 DRILLER/CONTRACTOR:				1 of 1		FC6	
PROJECT NAME:  Auburn Park  DRILLER/CONTRACTOR:  Blue Ridge Drilling, Inc.														
SITE LOC	OITA	۷:							-			ı	OSS OF CIRCULATION	>1002
3595 Rin		d, Rine	r, Virgi			CTATION					LEVATION			
3555762.					STING: 912903.9	STATION:	N: SURFACE ELEVATION: 2109.0					BOTTOM OF CASING		
	1BER	뮖	(NE)	<u> </u>					WATER LEVELS	ET)	_		Plastic Limit Water Content Liquid Limit $X$ ——— $\Delta$	
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	F MATERIAL	RIAL			ELEVATION (FT)	BLOWS/6"			
	SAN	S	SAN	RE					>	EF			TER TON/SF	
-					Topsoil Thickness [6"]		/							
	S-1	SS	18	18	(CL) Residuum, LEAN ( gray- brown, moist, ve		e sand,		-	3-6-10 (16)	⊗ <sub>16</sub>	6		
	S-2	SS	18	18						4-7-12				
5		SS	0							2104	(19)	19		
	<del>S-3</del>	33	U	0	No recovery, presumed to be HWR						50/0" (50/0")			<b>⊗</b> 50/0"
_ _ _					Refusal encounte END OF DRILLI					-				
10-										2099				
-										-				
- - -										- - -				
15	15-								2094					
-										-				
= =														
20										2089				
- - -										-    -				
-										-				
25 –										2084 –				
-										-  				
30 –										2079 –				
		HE STRA	ATIFICAT	FION LII	NES REPRESENT THE APPROXII	MATE BOUND	ARY LINES BF	TWEEN	SOII	TYPES. IN	I-SITU THE TR	L ANSITION	MAY BE GRADUA	AL.
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE B  ✓ WL (First Encountered) Dry							NG STARTE			2021	CAVE IN I		Not Observed	
▼ W				Vater)		BORIN COMF	NG PLETED:			2021	HAMME	R TYPE:	Auto	
▼ W						I	PMENT:			ED BY:	DRILLING	METHO	D: <b>2 1/4" HSA</b>	
	_ (5.01	~1112CU	,		GEC	ATV CI			RD E LO	OG				

CLIENT							PROJECT NO.: BORING NO.:			SHEET:					
Gay and							12:19208 B-11  DRILLER/CONTRACTOR:				1 of 1	FC6			
PROJECT NAME:  Auburn Park  DRILLER/CONTRACTOR:  Blue Ridge Drilling, Inc.															
SITE LO		N:									10	>100%			
3595 Ri		d, Rine	er, Virgi			T					LOSS OF CIRCULATION				
355580					STING: <b>913024.1</b>	STATION:	SURFACE ELEVATION 2110.0				BOTTOM OF CASING				
(	IBER	PE	(IN)	2				SIIS	FT)	_	Plastic Limit Water Content Liquid Limit X————————————————————————————————————				
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	PF MATERIAL		WATER LEVELS	ELEVATION (FT)	BLOWS/6"	ROC	N BLOWS/FT N & RECOVERY			
	01		01		T (CIII							ALIBRATED PENETROMETER TON/SF S CONTENT] %			
-					Topsoil Thickness [6"] (CL) Residuum, LEAN CLAY, trace s		sand	<b>7</b>	1 1						
- - -	S-1	SS	18	15	brown, moist, stiff	CLAI, trace	sand,			2-3-6 (9)	Ø <sub>9</sub> 25.6				
-	S-2	SS	18	14			V//			3-5-7 (12)	⊗ <sub>12</sub>				
5-					(CH) FAT CLAY, red bro	we maist	ctiff //	4	2105		12				
- -	S-3	SS	18	15	(CH) FAT CLAT, Ted BTO	vn, moist, stiπ				4-6-7 (13)	⊗ <sub>13</sub>				
10-	S-4	SS	18	18						5-6-6 (12)	<b>⊗</b> <sub>12</sub>				
10 -			END OF DRILLING AT				FT		2100						
_									-						
_															
15 –									2095						
_									1 =						
_															
_															
20 –									2090 –						
-															
_															
_									1 -						
25 –									2085						
_															
<u>-</u>															
_															
30 -									2080						
	-	IE CES	ATICIO:	TICNI	MEC DEDDECEMENT THE ADDRESS.	MATE DOUBLE	A DV LINES SETVI	EN CC	L TVDES :	I CITIL TUE TO	ANICITION	MANUEL CEAS:			
□ V			unter		NES REPRESENT THE APPROXII  Dry		ARY LINES BETWI		L TYPES. IN <b>7 2021</b>	CAVE IN		5.20	<del>\</del> L		
		mpleti			<u> </u>	BORII									
▼ v	VL (Sea	sonal	High V	Vater)			PLETED: PMFNT:		7 2021 GED BY:	HAMMEI		Auto			
EQUIPMENT: LOGGED BY: DRILLING METHOD: 2 1/4" HSA															
					GEC	<b>TECHNIC</b>	AL BOREH	OLE I	.OG						

CLIENT							PROJECT NO.: BORING NO.:			NO.:	SHEET:			
Gay and							12:19208 B-12  DRILLER/CONTRACTOR:					1 of 1	FC6	
PROJECT NAME:  Auburn Park  DRILLER/CONTRACTOR:  Blue Ridge Drilling, Inc.														
SITE LO			er, Virgi	inia 241	149		37					LC	SS OF CIRCULATION	<u> </u>
NORTH <b>355594</b>					STING: <b>913114.2</b>	STATION:	ION: SURFACE ELEVATION 2098.0				ELEVATION:	BOTTOM OF CASING		
												Plastic Limit Water Content Liquid Limit  X		
DЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	DESCRIPTION OF MATERIAL    STANDARD PENETRATION OF MATERIAL PENETRATION OF MATER						& RECOVERY		
	- 7				T 1711 [70]			N///N////					S CONTENT] %	TER TON/SF
- - -	S-1	SS	18	14	Topsoil Thickness [7"] (SM) Residuum, SILTY GRAVEL, tan, moist, m		11.114.1.4				2-6-21 (27)	   ⊗ <sub>2</sub>	27	
- - -					dense						7-13-16			
5-2 SS 18 16 5										2093	(29)	8	<b>29.</b> 0	
- - - -	S-3	SS	18	16						-2088	6-13-17 (30)	€30	30	
_														
10-	S-4	SS	18	14							11-18-32 (50)		⊗ <sub>50</sub>	
-	END OF DRILLING AT 1				NG AT 10.0 F	ŦΤ			2000 _					
_										-				
_										_				
15 –										2083				
13										2003				
_										_				
_										-				
20-										2078				
										-				
_ -										-				
25 –										2073				
										-				
_														
_										-				
30										2068				
			ATIFICA ounter		NES REPRESENT THE APPROXII  Dry							FRANSITION MAY BE GRADUAL		
		mpleti		,	2.,	BORII	NG STAR <sup>-</sup> NG			9 2021	CAVE IN		4.90	
			High V	Vater)		СОМІ	PLETED:			2021	HAMMEI	R TYPE:	Auto	
▼ v	VL (Sta	bilized	)				PMENT: <b>ME-55</b>		ogg <b>RD</b>	ED BY:	DRILLING	METHOD	: 2 1/4" HSA	
					GEC	TECHNIC		REHOL	E L	OG				

CLIENT							PROJECT			BORING	NO.:	SHEET:		
Gay and PROJEC							<b>12:19208</b> DRILLER/			B-13 nR·		1 of 1		ECC
Auburn		/IL.					Blue Ridg							
SITE LO			er, Virgi	inia 241	149							LOSS	OF CIRCULATION	<u>&gt;100x</u>
NORTH <b>355620</b> 8	ING:			EA	STING: <b>912884.3</b>	STATION:			- 1	JRFACE E	LEVATION:	вот	TOM OF CASING	-
(	IBER	ЬE	(NI)	(Z					STIS	FT)	_	Plastic Lin X—	nit Water Conten	t Liquid Limit
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	DF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	ROCK QI ROCK QI		N & RECOVERY
					Topsoil Thickness [7"]								ONTENT] %	
-	S-1	SS	18	18	(ML) Residuum, SAND moist, stiff to very stif		- brown,				2-6-7 (13)	⊗ <sub>13</sub> 19	.5	
- - -	S-2	SS	18	18						-	4-5-8	<b>⊗</b> <sub>13</sub>		
5-	<i>-</i>		10	10						2067	(13)	713		
- - -	S-3	SS	18	18						- - -	6-8-14 (22)	Ø <sub>22</sub>		
]										]	7-11-16			
10 -	S-4	SS	18	18	END OF DRILLIN	NG AT 10 0 F	:т			2062	(27)	⊗ <sub>27</sub>		
_					END OF BRIEFI	10.01	•			]				
_														
_ -										-				
45										0057				
15 –										2057				
-														
-														
_														
20										2052				
-										-				
-														
-										-				
25 –										2047				
										-				
-														
_										-				
30 –										2042				
		IE 077	TIELE	TICAL	NEC DEDDECENT THE	MATE 20:	A D.V. 1 1 1 1 2 2 3	) 	1.65.	TV255		ANICITIO	V DE 02:5:	
∠ w			unter		NES REPRESENT THE APPROXII  Dry		ary lines i NG STARTI							AL.
		mpleti			1	BORII				2021	CAVE IN		3.80	
▼ W				Vater)		СОМІ	PLETED:			2021	HAMMEI	R TYPE:	Auto	
		bilized					PMENT: <b>ME-55</b>		.OGG B <b>RD</b>	ED BY:	DRILLING	METHOD: 2	2 1/4" HSA	
					GEC	OTECHNIC				OG				

CLIENT:  Gay and Neel, Inc.  PROJECT NO.:  BORING NO.:  SHEET:  12:19208  B-14  1 of 1  PROJECT NAME:  DRILLER/CONTRACTOR:												
							TRACT			1 of 1		FC6
Auburn Parl						Blue Ridge Dri						
SITE LOCAT							_			LOSS	OF CIRCULATION	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
3595 Riner I		iner, Vir			CTATION		Ι.	CLIDEACE	TIEV (ATION)			
3556457.0	ı: 			ASTING: 1 <b>912791.0</b> I	STATION:			2101.0	ELEVATION:	ВОТТ	OM OF CASING	
.) 1BER	PE PE	(Z)	<u> </u>				\ <u>\</u>		=	Plastic Lim X——	it Water Content	: Liquid Limit ∆
DEPTH (FT)	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	PF MATERIAL		WATER   EVELS	ELEVATION (FT)	BLOWS/6"			
22	5	, s				<b>N</b> ///					BRATED PENETROM	ETER TON/SF
				Topsoil Thickness [7"]	CAND ton	maist		$\dashv$ $=$				
S-:	1 SS	18	14	(SM) Residuum, SILTY medium dense	SAND, lan,	moist,		-	6-15-15 (30)	⊗30		
S-2	2 SS	18	16					-	6-13-14	• 🔊		
5 - 5	2 33	10	10	(1)14(5) 11(6)11(4)14(5)	15050 DOG			2096	(27)	11.0027		
_ S-3	3 SS	8	8	(HWR) HIGHLY WEATH SAMPLED AS SILTY SAI	ND WITH G			_	35-50/2" (50/2")			⊗ <sub>50/2"</sub>
				tan, very dense, moist Refusal encounte	red at 7.5 fo							
10-				END OF DRILLI	NG AT 7.5 F	Т		2091 –				
								_				
								-				
								-				
15-								2086 -				
								-				
								_				
20								2081				
								-				
								-				
25 –								2076				
								-				
								-				
30-								2071 -				
							_	-				
	THE ST	RATIFIC	L ATION LI	NES REPRESENT THE APPROXII	MATE BOUNDA	ARY LINES BETW	EEN SC	IL TYPES. II	I N-SITU THE TR	L Ansition Ma	Y BE GRADUA	AL.
✓ WL(F	First En	counte		Dry		NG STARTED:		22 2021	CAVE IN		.10	
▼ WL(0			\Mator\		BORIN COMF	NG PLETED:	Feb	22 2021	HAMMEI	R TYPE: A	luto	
W WL(S			vvalei)		EQUIF	PMENT:		GED BY:	DRILLING	6 METHOD: <b>2</b>	1/4" HSA	
VVL (3	JuniiiZ			GEC	ATV CI	ME-55 CAL BOREH	BRD OLE					

CLIENT							PROJECT NO	D.:		BORING I	VO.:	SHEET:		
Gay and							<b>12:19208</b> DRILLER/CC	NTRΔ		8- <b>15</b>		1 of 1		ECC
Auburn		/IL.					Blue Ridge [							
SITE LO			er, Virgi	inia 241	149							LOSS OF C	IRCULATION	<u> </u>
NORTH <b>355643</b> (	ING:			EA	STING: <b>912982.7</b>	STATION:			SU 28.		LEVATION:	воттом	OF CASING	-
	BER	m	(IN)	(Z					r.S	(F.		Plastic Limit V	Vater Content	: Liquid Limit ∆
DЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	DF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	ROCK QUALIT RQD REC	D PENETRATION Y DESIGNATION ED PENETROME	I & RECOVERY
					Topsoil Thickness [6"]							[FINES CONTE	NT] %	
-	S-1	SS	18	16	(ML) Residuum, SAND purple, moist, very sti		and			-	2-9-10 (19)	<b>₩</b> 19	29.0	
_ _ _	S-2	SS	18	15						<del> </del>	7-10-16	⊗ <sub>26</sub>		
5-	32	33	10	13						23	(26)	Ψ26		
_ _ _	S-3	SS	18	16						- - - -	7-11-15 (26)	\$26		
-										7	42.45.20			
10-	S-4	SS	18	15						- 18 -	12-15-20 (35)	⊗ <sub>35</sub>		
-					END OF DRILLIN	NG AT 10.0 F	FT			-				
_										-				
										-				
_										-				
15 –										13				
_										7				
										-				
_										_				
20 -										8-				
_										=				
										=				
_										-				
_										-				
25 –										3-				
_										]				
<u>-</u>										_				
_										_				
30 -										-2				
													*	· · · · · · · · · · · · · · · · · · ·
\ \triangle \ \triangle \ \triangle \ \ \triangle \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			ATIFICA ounter		NES REPRESENT THE APPROXII  Dry									AL
		mpleti		- ~ /	2.,	BORII	NG STARTED:  NG			2021	CAVE IN			
			High V	Vater)		СОМ	PLETED:			2021	HAMMEI	R TYPE: Aut	0	
▼ v	VL (Sta	bilized	l)				PMENT: : <b>ME-55</b>	LC BF		ED BY:	DRILLING	6 METHOD: <b>2 1/</b>	4" HSA	
					GEC		CAL BORE			OG	1			

CLIENT						BORING	NO.:	SHEET:						
Gay and							<b>12:19208</b> DRILLER/	CONTRA		<b>B-16</b> )R:		1 of 1		EC6
Auburn							Blue Ridg							
SITE LO			er, Virgi	nia 241	149							LOSS	S OF CIRCULATION	<u> </u>
NORTH <b>355650</b> 8					STING: <b>912891.3</b>	STATION:				JRFACE E 1 <b>08.0</b>	LEVATION:	BOT	TTOM OF CASING	
	3ER	E	(IN)	(7					LS	(T.		Plastic Li X—	mit Water Content	: Liquid Limit ∆
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	DF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	ROCK C	ANDARD PENETRATION QUALITY DESIGNATION QD LEC LIBRATED PENETROM	& RECOVERY
					Topsoil Thickness [5"]							_	CONTENT] %	: : :
- - - -	S-1	SS	18	14	(ML) Residuum, SAND very stiff to hard	Y SILT, tan,	moist,	1		-	6-8-10 (18)	<b>⊗</b> 18	2 <b>6</b> .9	
- - -	S-2	SS	18	15						-	9-14-13	<b>₽</b> 27		
5-										2103	(27)			
- - -	S-3	SS	18	18						- - -	6-15-16 (31)		28.8	
_					(CH) FAT CLAY WITH SA	AND, brown	n, moist,			]	6-4-9			
10-	S-4	SS	18	18	stiff					2098	(13)	₩13		
- - -					(SM) SILTY SAND WITH	J CDAVEL +	tan							
- - - -					brown, moist, dense	TONAVLL, (	laii			-	9-18-32			
15 <del>-</del>	S-5	SS	18	16						2093	(50)		22.3 50	
- - -					(HWR) HIGHLY WEATH	IFRFD ROCI	K			-				
-					SAMPLED AS SILTY SA	ND WITH G					17-50/3"			
20 –	S-6	SS	9	7	tan- gray, moist, very	dense				2088	(50/3")			⊗ <sub>50/3"</sub>
- -										-				
- - -				•	Refusal encounte					-				
25-										2083				
- -										- - -				
- - -										-				
30-										2078				
													<u></u>	
					NES REPRESENT THE APPROXI	MATE BOUND	ARY LINES E	BETWEEN	l SOII	TYPES. IN	I-SITU THE TR	ANSITION M	AY BE GRADUA	<b>L</b>
	VL (Firs			ed)	Dry	BORII	ng starte	D: <b>F</b>	eb 17	7 2021	CAVE IN	DEPTH:	Not Observed	l
	VL (Coi VL (Sea			Vater)		BORIN COMI	NG PLETED:	F	eb 17	7 2021	HAMME	R TYPE:	Auto	
	VL (Sta			/			PMENT: <b>ME-55</b>		OGG RD	ED BY:	DRILLING	METHOD:	2 1/4" HSA	
	•		-		GEC	OTECHNIC				OG				

CLIENT								OJECT N	Э.:	- 1	BORING	NO.:	SHEET:	
Gay and								: <b>19208</b> ILLER/CO	)NTRA		<b>B-17</b> IR:		1 of 1	-EC9
Auburn								ue Ridge I						
SITE LO			er, Virgi	inia 241	149								LOSS OF CIRCUL	ATION \(\sum_{\text{ide}}\)
NORTH <b>355659</b> 3					STING: 912954.5	STATION:					JRFACE E . <b>12.0</b>	ELEVATION:	BOTTOM OF CA	ASING
(	BER	3c	(NI)	ê						I.S	FT)	_	Plastic Limit Water C	Content Liquid Limit ∆
DЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	DF MATERIAL	L			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	STANDARD PENE ROCK QUALITY DESIG RQD REC CALIBRATED PEN	SNATION & RECOVERY
					(SM) Residuum, SILTY	SAND WI	ITH						[FINES CONTENT] %	
-	S-1	SS	18	15	GRAVEL, tan- brown, r dense to very dense			1			-	5-13-14 (27)	<b>⊗</b> 27	
- -	S-2	SS	18	14							-	8-17-24		
5-	32	33	10	14							2107	(41)	2241	
- - -	S-3	SS	18	15							- - - -	4-7-13 (20)	<b>⊗</b> 20	
- -	S-4	SS	18	14							-	18-21-33	27-64	
10-											2102	(54)	2/7:094	•
- - -					(SM) SILTY SAND, brow	wn, moist	t,				- - -			
- - -	S-5	SS	18	18	medium dense						-	4-7-9	<b>∞</b> <sub>16</sub>	
15	3-3	33	10	10							2097	(16)	<b>P</b> 16	
- - -											- -			
_ 	S-6	SS	18	18							- -	7-10-16 (26)	⊗ <sub>26</sub>	
20 -					END OF DRILLIN	NG AT 20.0	0 FT		1.1.1.1.1		2092 –			
_ _ _											-    -			
25 –											2087 -			
- - -											-			
- - -														
30											2082			
													: :	
					NES REPRESENT THE APPROXI	MATE BOUN	NDARY	LINES BE	TWEEN	I SOIL	TYPES. IN	N-SITU THE TR	RANSITION MAY BE GR	ADUAL
			untere	ed)	Dry	ВОР	RING S	STARTED	: F	eb 22	2 2021	CAVE IN	DEPTH: <b>11.40</b>	
		mpleti asonal	on) ——— High V	Vater)			RING MPLET	 ГЕD:	F	eb 22	2 2021	HAMMEI	R TYPE: Auto	
		bilized		· ucci j		EQU	UIPME / CME-!	ENT:	- 1	OGG RD	ED BY:	DRILLING	6 METHOD: <b>2 1/4" H</b>	SA
	, -		•		GEC	OTECHN					OG			

CLIENT							PROJECT			BORING	NO.:	SHEET:		
Gay and PROJEC							<b>12:19208</b> DRILLER/			B-18 )R·		1 of 1		FC6
Auburn		/IL.					Blue Ridg							
SITE LO			er, Virgi	inia 241	149								LOSS OF CIRCULATION	<u>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</u>
NORTH <b>355649</b> 9					\STING: <b>913106.0</b>	STATION:				JRFACE E	LEVATION:		BOTTOM OF CASING	
	BER	36	(NI)	â					SI	E		Plas	tic Limit Water Content	Liquid Limit Δ
<b>ДЕРТН (FT)</b>	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	DF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"		STANDARD PENETRATION  CK QUALITY DESIGNATION  RQD  REC  CALIBRATED PENETROMI	& RECOVERY
					Topsoil Thickness [7"]							[F	INES CONTENT] %	
- - -	S-1	SS	18	16	(ML) Residuum, SILT, t trace sand, moist, sof						2-2-2 (4)	<b>⊗</b> <sub>4</sub>		
- - -	S-2	SS	18	15						-	2-3-4	⊗ <sub>7</sub>		4 <b>6.</b> 8
5			10	13	(ML) SANDY SILT, tan,	wat soft to	firm		$\nabla$	2095	(7)			46.8
_ _ _	S-3	SS	18	18	(IVIL) SAINDT SILI, tall,	wet, soit to	, , , , , , , , , , , , , , , , , , , ,				1-2-2 (4)	$\bigotimes_4$		
-										-	2-2-4			
10	S-4	SS	18	18						2090	(6)	⊗ <sub>6</sub>		
-					END OF DRILLIN	NG AT 10.0 F	₹T							
-										-				
-										-				
-														
15 _										2085				
-										-				
-										-				
-														
20										2080				
_										_				
-										-				
-														
25 –										2075				
-										=				
-										]				
-														
30 -										2070				
\ \tag{\tau} \rangle \( \tag{\tau} \)			ATIFICA ounter		NES REPRESENT THE APPROXII  6.0									AL .
		mpleti		-4)	0.0	BORII	NG STARTE	-D: <b>F</b>	eb 22	2 2021	CAVE IN		4.10	
▼ W				Vater)		СОМІ	PLETED:			2 2021	HAMMEI	R TYPE:	Auto	
		bilized					PMENT: <b>ME-55</b>	1	.OGG B <b>RD</b>	ED BY:	DRILLING	метно	D: <b>2 1/4" HSA</b>	
					GEC	CAL BOF			OG					

CLIENT							PROJEC			BORING I	NO.:	SHEET:		
Gay and							12:1920	<b>08</b> R/Contr <i>a</i>		B-19 )R·		1 of 1		EC9
Auburn		/IL.						dge Drilling						
SITE LO			er, Virgi	inia 241	149		1						LOSS OF CIRCULATION	<u> </u>
NORTH <b>355624</b> !	ING:		-	EA	STING: <b>913214.2</b>	STATION:				JRFACE E 085.0	LEVATION:		BOTTOM OF CASING	-
	BER	Ä	(IN)	Î					. S	(L:		Plast	ic Limit Water Content	t Liquid Limit ∆
DЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	DF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	RC	STANDARD PENETRATION CK QUALITY DESIGNATION RQD REC	N & RECOVERY
	- 7				T 1711 [70]			N///N///					CALIBRATED PENETROM NES CONTENT] %	ETER TON/SF
_					Topsoil Thickness [7"] (CL) Residuum, LEAN (		sand	-1777		1 1	2.4.5			
- -	S-1	SS	18	13	gray- brown, moist, st		Juliu,			-	3-4-5 (9)	⊗ <sub>9</sub>		
- -	S-2	SS	18	18							3-4-5 (9)	∞9		<b>42</b> .5
5-										2080	. ,			
- - -	S-3	SS	18	18	(ML) SANDY SILT, brow	vn, moist, s	soft				3-2-2 (4)	$\bigotimes_4$		
_														
_	S-4	SS	18	18						0075	1-2-2 (4)	$\bigotimes_4$		
10 –					END OF DRILLIN	NG AT 10.0 I	FT			2075				
_														
_														
-										-				
15 -										2070				
_														
_										-				
_														
20-										2005				
20-										2065				
-														
_														
_														
25 -										2060				
_														
-										-				
_														
30 -										2055				
										-				
	TI	HE STRA	L ATIFICA	TION LII	NES REPRESENT THE APPROXII	MATE BOUND	DARY LINES	S BETWEEN	L I SOII	L TYPES. IN	-SITU THE TR	L Ansition	MAY BE GRADUA	AL
▽ v			ounter		Dry		NG STAR			9 2021	CAVE IN		5.10	
<b>▼</b> ∨	√L (Coi	mpleti	on)			BORI		E.	eh 19	9 2021	HAMMEI	R TYPF.	Auto	
▼ v	VL (Sea	sonal	High V	Vater)			IPLETED: IPMENT:			SED BY:				
▼ v	VL (Sta	bilized	l)			ATV C	CME-55	В	RD		DRILLING	METHO	D: <b>2 1/4" HSA</b>	
					GEC	<b>TECHNIC</b>	<u>CAL BC</u>	<u> PREHOL</u>	<u>.E L</u>	OG				

CLIENT							PROJECT NO	.:		BORING I	VO.:	SHEET:		
Gay and PROJEC							12:19208 DRILLER/CON	NTRΔ(		<b>i-20</b>		1 of 1		FC6
Auburn		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					Blue Ridge Di			١.				
SITE LO	CATIO	N:										LOSS OF CIRC	TUI ATION	>1002>
3595 Riı		d, Rine	er, Virgi			T			1			2035 01 0110	COLATION	
355667					STING: 913018.0	STATION:				RFACE E <b>10.0</b>	LEVATION:	воттом ог	CASING	
(	IBER	PE	(NI)	(N					STE	FT)	_	Plastic Limit Wat	er Content	Liquid Limit ∆
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	PF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	STANDARD F ROCK QUALITY D RQD REC CALIBRATED	ESIGNATION	& RECOVERY
					Topsoil Thickness [6"]		<u> </u>					[FINES CONTENT]	%	: :
_	C 1	SS	10	15	(CL) LEAN CLAY WITH					_	9-18-19			
- - -	S-1	33	18	15	trace gravel, moist, der	nse to medi	ium dense			 	(37)	37		
- - -	S-2	SS	18	12			//			- - - -	4-2-21 (23)	Ø <sub>25.5</sub>		
5-					(HWR) HIGHLY WEATH	IERED ROCI	/ <sub>/</sub>	44		2105				
-	S-3	SS	11	11	SAMPLED AS GRAVEL					=	8-50/5" (50/5")			⊗ <sub>50/5"</sub>
_					moist, very dense (SM) SILTY SAND, tan,	moist,				-			/	
10 -	S-4	SS	18	15	very dense to mediur					2100	13-30-35 (65)		65	
-										-			/	
_										-				
			40							-	3-13-12			
15	S-5	SS	18	14						2095	(25)	⊗ <sub>25</sub>		
-										-				
					(HWR) HIGHLY WEATH SAMPLED AS SILTY SAI					3				
_	S-6	SS	_5_	_5_	purple, moist, very de	_				_	50/5" (50/5")			⊗ <sub>50/5"</sub>
20 –										2090 –				
-					Refusal encounte END OF DRILLIN					-				
										-				
25 –										2085				
										-				
										-				
-										=				
30										2080				
												; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	: 	<u></u>
					NES REPRESENT THE APPROXII	MATE BOUND	ARY LINES BETV	WEEN :	SOIL	TYPES. IN	I-SITU THE TR	ANSITION MAY BE	GRADUA	.L
			ontere	ed)	Dry		NG STARTED:	Fe	b 17	2021	CAVE IN I	DEPTH: <b>7.40</b>		
▼ W	VL (Cor VL (Sea		-	Vater)		BORIN COMI	NG PLETED:	Fe	b 17	2021	HAMMER	R TYPE: Auto		
	VL (Sta			/			PMENT: <b>ME-55</b>	LC BR		ED BY:	DRILLING	6 METHOD: <b>2 1/4</b> "	HSA	
	, -		•		GEC	CAL BOREH			OG					

CLIENT								ROJECT N	0.:		BORING	NO.:	SHEET:			
Gay and								<b>12:19208</b> ORILLER/CO	)NTR/		B-21 nR·		1 of 1		E	.6
Auburn		/IL.						Blue Ridge								<u> </u>
SITE LO							,						LOS	S OF CIRCULATION		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
3595 Ri		id, Rine	er, Virg		ASTING:	STATION	ı.			Sı	IRFACE F	ELEVATION:				
355665					913153.0	317411014					05.0		ВО	TTOM OF CASING		
	ER	111	<u> </u>	<u> </u>						S	í.		Plastic Li X–	imit Water Content	: Liquid Lim ∆	ıit
(FT)	UMB	TYP	IST. (	(I)						EVEL	-J N	9/s		ANDARD PENETRATIO		
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	)F MATERIA	ΔL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"		QUALITY DESIGNATION	I & RECOVERY	′
	SAM	SA	SAM	REC						W	ELE	ш		EC LIBRATED PENETROMI	ETER TON/SF	
					Topsoil Thickness [6"]								[FINES	CONTENT] %	:	-
-	<b>.</b>		40	1.0	(ML) Residuum, SILT, t	race san	d, ta	n-			-	2-5-8				
-	S-1	SS	18	16	gray, moist, stiff						_	(13)	₩13	31.2		
-					(SM) SILTY SAND WITH			ау,			-	4-7-13				
5-	S-2	SS	18	16	moist, medium dense	to dense	e				2100	(20)	20			
_											_					
_	S-3	SS	18	17							-	14-20-15 (35)	8	35		
_											_					
-	S-4	SS	18	16								17-18-22 (40)		⊗ <sub>40</sub>		
10-											2095 –	( -,				
-					Defusal anagunta	rad at 11	1 F fa	204			-					
-					Refusal encounte END OF DRILLII						_					
-																
15-											2090 -					
-											_					
_											-					
_																
_																
20 –											2085 –					
-											_					
-											-					
_											-					
25-											2080 -					
25-											2000 -					
_											-					
_											-					
_											-					
30 -											2075					
_																
					NES REPRESENT THE APPROXI	MATE BOU	INDAR	RY LINES BE	TWEEN	SOIL	TYPES. II	N-SITU THE TR	ANSITION M	AY BE GRADUA	AL.	
✓ WL (First Encountered)     Dry     BORING STARTED:     Feb 22 2021       ▼ WL (Completion)     BORING											CAVE IN I	DEPTH:	5.70			
							DRING		F	eb 22	2 2021	HAMMER	R TYPE:	Auto		
				Vater)				ETED: //ENT:			ED BY:					
▼ V	VL (Sta	bilized	l)			AT	V CMI	E-55	В	RD		DRILLING	METHOD:	2 1/4" HSA		
					GEO	<u>)TECHN</u>	<u>NICA</u>	L BORE	:HOL	<u>.E L</u>	UG					

PROJECT NAME: Auburn Park  SITE LOCATION: 3595 Riner Road, Riner, Virginia 24149  NORTHING: 3556869.3  OBECULATION:  SURFACE ELEVATION: 2096.0  DESCRIPTION OF MATERIAL  OCAUBRATED PENETROMETER TON/SF [FINES CONTENT] %	CLIENT							PROJECT			BORING	NO.:	SHEET:		
STEEL COCATION   3956 Niner, Virginia 24.149   3050 O' GOOLUTION   3956 Niner, Virginia 24.149								12:19208			B-22		1 of 1		<b>LCc</b>
STIE LOCATION:  SOUTHACL LLEVATION:  SOUTHACH LLEVATION:  SOUTHACL LLEV			VIE:												
3955 Riner Road, Riner, Virginia 24169   10013052.7   STATION:   SURTACE FIFVATION:   ROCTING GAME   10013052.7   10013052.7   STATION:   2096.0   SURTACE FIFVATION:   ROCTING GAME   10013052.7   STATION:   SURTACE FIFVATION:   ROCTING GAME   10013052.7   STATION:   SURTACE FIFVATION:   ROCTING GAME   10013052.7   STATION:   ROCTING GAME   10013052.7   STATION:   SURTACE FIFVATION:   ROCTING GAME   10013052.7   STATION:   ROCT			N:					Dide Mag	CDIIIII	5, 1110	•				
10933052.7  10933	3595 Ri	ner Roa	ad, Rin	er, Virg	inia 24:	149								LOSS OF CIRCULATION	<u>}1007</u> }
DESCRIPTION OF MATERIAL   Section   Description of Material   Descri			1				STATION:					ELEVATION:		BOTTOM OF CASING	
The STRATFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES RETWEEN SOIL TYPES. IN-STITUTHE TRANSITION MAY BE GRADUAL.  The STRATFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES RETWEEN SOIL TYPES. IN-STITUTHE TRANSITION MAY BE GRADUAL.  WILl (First Encountered)  THE STRATFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES RETWEEN SOIL TYPES. IN-STITUTHE TRANSITION MAY BE GRADUAL.  WILL (First Encountered)  Dry BORNING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.60  HAMMER TYPE: Auto COMPLETED: Feb 22 2021  DRILLING METHOD: 2164* HS6.		BER	, H	(NI)	2					LS	FT)	_	Plast		
The STRATFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES RETWEEN SOIL TYPES. IN-STITUTHE TRANSITION MAY BE GRADUAL.  The STRATFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES RETWEEN SOIL TYPES. IN-STITUTHE TRANSITION MAY BE GRADUAL.  WILl (First Encountered)  THE STRATFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES RETWEEN SOIL TYPES. IN-STITUTHE TRANSITION MAY BE GRADUAL.  WILL (First Encountered)  Dry BORNING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.60  HAMMER TYPE: Auto COMPLETED: Feb 22 2021  DRILLING METHOD: 2164* HS6.	ОЕРТН (FT	MPLE NUM	SAMPLE TYF	MPLE DIST.	RECOVERY (I	DESCRIPTION C	OF MATERIAL			WATER LEVE	LEVATION (	BLOWS/6'	1	CK QUALITY DESIGNATION RQD	
S-1   SS   18   14		SA		S										CALIBRATED PENETROME	TER TON/SF
S-2   SS   18   14	- - - -	S-1	SS	18	16	(CH) FAT CLAY, trace sa		ray,			-				[99 5 <u>8</u> %
2091  S-3 SS 18 16  S-4 SS 18 15  END OF DRILLING AT 10.0 FT  2086  2071  2071  2071  THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES, IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  WL (Completion)  WL (Completion)  Feb 22 2021  Feb 22 2021  HAMMER TYPE: Auto  COMPLETED: COMPL	-	S-2	SS	18	14	-					-		Ø <sub>12</sub>		
S-3 SS 18 16    S-4 SS 18 15	5-					(CH) FAT CLAY, brown,	moist, sti	ff to firm			2091				
10	- -	S-3	SS	18	16						- -		⊗9		
2086  115  2081  2071  2	-	6.4		10	45						_	4-3-4			
2071 - 20	10-	5-4	33	18	15	END OF DRILLII	NG AT 10.0	FT	1///		2086	(7)	ν <sub>7</sub>		
2071 - 20	-										_				
2071 - 20	-										-				
2071 - 20	-										-				
2071—  30—  THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.60  WL (Completion)  WL (Seasonal High Water)  Feb 22 2021  CAVE IN DEPTH: 4.60  PWL (Seasonal High Water)  EQUIPMENT: LOGGED BY: DRILLING METHOD: 2 1/4" HSA	15										2081				
2071—  30—  THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.60  WL (Completion)  WL (Seasonal High Water)  Feb 22 2021  CAVE IN DEPTH: 4.60  PWL (Seasonal High Water)  EQUIPMENT: LOGGED BY: DRILLING METHOD: 2 1/4" HSA	-										-				
2071—  30—  THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.60  WL (Completion)  WL (Seasonal High Water)  Feb 22 2021  CAVE IN DEPTH: 4.60  PWL (Seasonal High Water)  EQUIPMENT: LOGGED BY: DRILLING METHOD: 2 1/4" HSA	-										_				
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Pry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.60  WL (Completion)  WL (Seasonal High Water)  Feb 22 2021  COMPLETED:  COMPLETED:  EQUIPMENT: LOGGED BY:  DRILLING METHOD: 2 1/4" HSA	20 -										2076				
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Pry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.60  WL (Completion)  WL (Seasonal High Water)  Feb 22 2021  COMPLETED:  COMPLETED:  EQUIPMENT: LOGGED BY:  DRILLING METHOD: 2 1/4" HSA	-										-				
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Pry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.60  WL (Completion)  WL (Seasonal High Water)  Feb 22 2021  COMPLETED:  COMPLETED:  EQUIPMENT: LOGGED BY:  DRILLING METHOD: 2 1/4" HSA	-										-				
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Pry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.60  WL (Completion)  WL (Seasonal High Water)  Feb 22 2021  COMPLETED:  COMPLETED:  EQUIPMENT: LOGGED BY:  DRILLING METHOD: 2 1/4" HSA	25-										2071 -				
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.60  BORING  WL (Completion)  WUL (Seasonal High Water)  Feb 22 2021  HAMMER TYPE: Auto  COMPLETED:  EQUIPMENT: LOGGED BY:  DRILLING METHOD: 2 1/4" HSA	-										_				
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.60  BORING  WL (Completion)  WUL (Seasonal High Water)  Feb 22 2021  HAMMER TYPE: Auto  COMPLETED:  EQUIPMENT: LOGGED BY:  DRILLING METHOD: 2 1/4" HSA	-														
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.60  BORING  WL (Completion)  WUL (Seasonal High Water)  Feb 22 2021  HAMMER TYPE: Auto  COMPLETED:  EQUIPMENT: LOGGED BY:  DRILLING METHOD: 2 1/4" HSA	-										-				
✓ WL (First Encountered) Dry BORING STARTED: Feb 22 2021 CAVE IN DEPTH: 4.60   ✓ WL (Completion) BORING COMPLETED: Feb 22 2021 HAMMER TYPE: Auto   ✓ WL (Seasonal High Water) EQUIPMENT: LOGGED BY: DRILLING METHOD: 2 1/4" HSA	30 -										2066				
✓ WL (First Encountered) Dry BORING STARTED: Feb 22 2021 CAVE IN DEPTH: 4.60   ✓ WL (Completion) BORING COMPLETED: Feb 22 2021 HAMMER TYPE: Auto   ✓ WL (Seasonal High Water) EQUIPMENT: LOGGED BY: DRILLING METHOD: 2 1/4" HSA		_	LIE CEC	ATIFICA	TION	NEC DEDDECENT THE ADDROV	NAATE DOLLAR	DARVIINIECE	) CT) 4/55		L TVDEC :	J CITU TUE TO	ANCITION	NANV DE CRADILLA	1
▼ WL (Completion)  BORING COMPLETED:  COMPLETED:  EQUIPMENT:  LOGGED BY:  DRILLING METHOD: 2 1/4" HSΔ	□ V														NL .
▼ WL (Seasonal High Water)  COMPLETED:  EQUIPMENT: LOGGED BY: DRILLING METHOD: 2 1/4" HSA							BOR	ING							
★ WL (Stabilized)   ATV CME-55   BRD   DKILLING METHOD: 2 1/4" HSA					Water)										
GEOTECHNICAL BOREHOLE LOG	<u>▼ ∨</u>	VL (Sta	bilized	1)		CEC	ATV	CME-55	В	RD		DKILLING	IVIETHO	∪; <b>∠ 1/4</b> " <b>HSA</b>	

CLIENT							PROJECT NO	).:	- 1	BORING I	VO.:	SHEET:		
Gay and PROJEC							12:19208 DRILLER/CO	NTRΔ		<b>3-23</b>		1 of 1		EC9
Auburn		/IL.					Blue Ridge D							
SITE LO			er. Virgi	inia 241	149							LOSS OF (	CIRCULATION	<u>&gt;100%</u>
NORTH	ING:	.,	.,	EA	STING: 912927.3	STATION:				JRFACE E <b>75.0</b>	LEVATION:	BOTTOM	OF CASING	-
		ш	(N						-			Plastic Limit V	Vater Content	t Liquid Limit ∆
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	DF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"		D PENETRATION	
	S		S		Tancail Thickness [7"]		<u> </u>					CALIBRAT	ED PENETROM	ETER TON/SF
- - - -	S-1	SS	18	16	Topsoil Thickness [7"] (ML) Residuum, SAND moist, very stiff		/ĬŤ			- - - - -	6-9-12 (21)	<sup>⊗</sup> 2117.6		
- - -	S-2	SS	18	15						-	5-7-13	⊗ <sub>20</sub>		
5-			10							2070	(20)	720		
- - -	S-3	SS	18	16							2-11-7 (18)	⊗ <sub>18</sub>		
- -	S-4	SS	18	15							8-8-9	<b>⊗</b> <sub>17</sub>		
10 -				13	END OF DRILLIN	NG AT 10.0 F	·T			2065	(17)	-17		
- -										-				
- - -										-    -				
15										2060				
- - -														
- - -														
20 -										2055				
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25 – –										2050 –				
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30-										2045 –				
	Tı	HF STR/	ATIFICAT	TION III	NES REPRESENT THE APPROXII	MATE BOLIND	ARY LINES RET	WFFN	SOII	TYPES IN	I-SITLI THE TR	ANSITION MAY R	F GRADII/	<u></u>
▽ v			unter		Dry		NG STARTED:			2021	CAVE IN I			nL .
		mpleti		Mar. N		BORIN	NG PLETED:	Fe	b 22	2021	HAMMER	R TYPE: Aut	0	
			High V	vater)		EQUIF	PMENT:			ED BY:	DRILLING	6 METHOD: <b>2 1</b> /	'Δ" HSΔ	
<u>*</u> V	v L (Sta	bilized	)		GFC	ATV CI	ME-55 CAL BOREI	BF H <b>OL</b> I		OG	DIVICEIING			

Section   12-1928   12-1	CLIENT								JECT NO.:		BORING	G NO.:	SHEET:		
Substitution   Subs										TRACT	<b>B-24</b>		1 of 1	<b>−− Ľ(</b>	36
STREEDER ALONG MARKEN (Virginia 24149)    Control   Con			/IL.												<b>2</b>
Mail	1							'					LOSS OF CIRCULA	ATION	\100 <i>x</i> \
PRINCIPATION   PRIN	NORTH	IING:	id, Kine	er, Virg	EΑ	ASTING:	STATION:					ELEVATION:	BOTTOM OF CA	SING	
S-1   SS   18   16	333001		111	<u> </u>		313230.2									mit
S-1   SS   18   16	ОЕРТН (FT)	SAMPLE NUME	SAMPLE TYPI	SAMPLE DIST. (	RECOVERY (IIA	DESCRIPTION C	)f Material	-		WATER I EVEL	ELEVATION (F	BLOWS/6"	STANDARD PENE ROCK QUALITY DESIG RQD REC	TRATION BLOWS/F	RY
S-1   SS   18   16		0,		0,		T 11T1 1 [6]]								ETROMETER TON/S	.F
S-2   SS   18   17	- - -	S-1	SS	18	16	(SM) Residuum, SILTY GRAVEL, gray- brown,							<b>⊗</b> <sub>18</sub>		
S	- -	S-2	SS	18	17	defise to defise							<b>⊗</b> 30		
S   S   18   16	5-										2095	_			
10	- -	S-3	SS	18	16								₩48		
END OF DRILLING AT 10.0 FT    2085	-	S-4	SS	18	16							1	⊗ <sub>50</sub>		
2080 - 2080 - 2080 - 2075 - 20	10 -					END OF DRILLIN	NG AT 10.0	FT	: : :		2090	-			
2080 - 2080 - 2080 - 2075 - 20	-											1			
2070  THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Pry BORING STARTED: Feb 22 2021  AVE IN DEPTH: 4.80  W (Completion)  W (Seasonal High Water)  W (Lossabilized)  Provides Signal Hammer Type: Auto  EQUIPMENT: ATV CME-55 BRD  PRILLING METHOD: 2 1/4" HSA	_											]			
2070  THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Pry BORING STARTED: Feb 22 2021  AVE IN DEPTH: 4.80  W (Completion)  W (Seasonal High Water)  W (Lossabilized)  Provides Signal Hammer Type: Auto  EQUIPMENT: ATV CME-55 BRD  PRILLING METHOD: 2 1/4" HSA	_											_			
2070  THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Pry BORING STARTED: Feb 22 2021  AVE IN DEPTH: 4.80  W (Completion)  W (Seasonal High Water)  W (Lossabilized)  Provides Signal Hammer Type: Auto  EQUIPMENT: ATV CME-55 BRD  PRILLING METHOD: 2 1/4" HSA	15-										2085	_			
2075 - 20	_											-			
2075 - 20	-											-			
2075 - 20	_											_			
2075 - 20	_											-			
30 - 2070	20 –										2080	-			
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30 - 2070												]			
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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.80  WL (Completion)  BORING  COMPLETED:  EQUIPMENT: ATV CME-55  BRD  DRILLING METHOD: 2 1/4" HSA	25-										2075	_			
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.80  WL (Completion)  BORING  COMPLETED:  EQUIPMENT: ATV CME-55  BRD  DRILLING METHOD: 2 1/4" HSA	-											-			
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.80  WL (Completion)  BORING  COMPLETED:  EQUIPMENT: ATV CME-55  BRD  DRILLING METHOD: 2 1/4" HSA	_											-			
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.80  WL (Completion)  BORING  COMPLETED:  EQUIPMENT: ATV CME-55  BRD  DRILLING METHOD: 2 1/4" HSA												-			
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: 4.80  WL (Completion)  BORING  COMPLETED: Feb 22 2021  COMPLETED: Feb 22 2021  DRILLING METHOD: 2 1/4" HSA	_											_			
✓ WL (First Encountered) Dry BORING STARTED: Feb 22 2021 CAVE IN DEPTH: 4.80   ✓ WL (Completion) BORING COMPLETED: COMPLETED: EQUIPMENT: ATV CME-55 HAMMER TYPE: Auto    CAVE IN DEPTH: 4.80  Auto  CAVE IN DEPTH: 4.80  BORING STARTED: Feb 22 2021  HAMMER TYPE: Auto  DRILLING METHOD: 2 1/4" HSA	30 –										2070	-			
✓ WL (First Encountered) Dry BORING STARTED: Feb 22 2021 CAVE IN DEPTH: 4.80   ✓ WL (Completion) BORING COMPLETED: COMPLETED: EQUIPMENT: ATV CME-55 HAMMER TYPE: Auto    CAVE IN DEPTH: 4.80  Auto  CAVE IN DEPTH: 4.80  AUTO  CAVE IN DEPTH: 4.80  CAVE IN DEPTH: 4.80  CAVE IN DEPTH: 4.80  CAVE IN DEPTH: 4.80														· · · · · · · · · · · · · · · · · · ·	
▼ WL (Completion) BORING COMPLETED: Feb 22 2021 HAMMER TYPE: Auto   ▼ WL (Seasonal High Water) EQUIPMENT: ATV CME-55 LOGGED BY: BRD DRILLING METHOD: 2 1/4" HSA	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \													ADUAL	
▼ WL (Seasonal High Water) COMPLETED: Feb 22 2021 HAMMER TYPE: Auto   ▼ WL (Stabilized) EQUIPMENT: LOGGED BY: BRD DRILLING METHOD: 2 1/4" HSA					eu)	Dry			TARTED:	Feb 2	22 2021	CAVE IN	DEPTH: <b>4.80</b>		
<ul> <li>✓ WL (Stabilized)</li> <li>EQUIPMENT: LOGGED BY: BRD</li> <li>DRILLING METHOD: 2 1/4" HSA</li> </ul>					Mate:-\				ED:	Feb 2	22 2021	НАММЕ	R TYPE: Auto		
ATV CME-55 BRD					water)		EQU	JIPMEN	NT:			DRILLING	6 METHOD: <b>2 1/4" H</b>	SA	
GEUTELNIKAL DUKENULE LUU	× V	vr (Sta	niiizea	' /		GFC									

CLIENT Gay and		laa					PROJECT 12:19208			BORING <b>B-25</b>	NO.:	SHEET: 1 of 1		
PROJEC							DRILLER/					1011		EC.6
Auburn							Blue Ridg							
SITE LO 3595 Ri			er, Virg	inia 241	149							LOSS OF	CIRCULATION	<u> </u>
NORTH <b>355677</b>			ı		ASTING: <b>913250.1</b>	STATION:				URFACE E 101.0	ELEVATION:	BOTTON	of Casing	
	BER	м	(NI)	2					LS	(L:		Plastic Limit	Water Content	Liquid Limit ∆
DЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	DF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	ROCK QUAL RQD REC CALIBRA	RD PENETRATION S ITY DESIGNATION S ATED PENETROMET	& RECOVERY
_					Topsoil Thickness [6"]							[FINES CONT	ENT] %	
- - -	S-1	SS	18	16	(MH) Residuum, ELAS brown, moist, firm		ace sand,			-	2-3-3 (6)	$\otimes_6$		
- - -	S-2	SS	18	14						-	2-3-4	<b>⊗</b> <sub>7</sub>		44 0.5 × [86.3%
5-			10		(MI) SANDY SIIT ton	and nurnla	maist			2096	(7)		41	J.5
- - -	S-3	SS	18	14	(ML) SANDY SILT, tan a stiff to very stiff	and purple,	, IIIOISL,			- -	2-4-5 (9)	⊗9		
- - -	S-4	SS	18	16						-	4-6-11	<b>⊗</b> <sub>17</sub>		
10-			10	10						2091	(17)			
- - -														
- - 15-	S-5	SS	18	16						2086	8-9-8 (17)	⊗ <sub>17</sub>		
- - -					END OF DRILLI	NG AT 15.0	FT							
- -										-				
20 –										2081				
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25 -										2076				
_ _ _										-				
- - -										-				
30 -										2071				
▽ v			ATIFICA ounter		NES REPRESENT THE APPROXI  Dry		NG STARTE			L TYPES. IN 2 2021	N-SITU THE TE CAVE IN			-
▼ V	VL (Co	mpleti	on)			BORI	NG			2 2021	HAMME			
			High V	Vater)			IPLETED: IPMENT:			SED BY:				
<u>*</u> V	VL (Sta	bilized	1)		CEC	ATV C	CAL ROP		BRD IFI	ne	DIVILLING	6 METHOD: <b>2 1</b>	/ + 113M	
					JEC			<u> </u>	<u></u>	. J				

CLIENT							PROJECT			BORING	NO.:	SHEET:		
Gay and							<b>12:19208</b> DRILLER/			B-26 IR·		1 of 1		FC6
Auburn		/IL.					Blue Ridge							
SITE LO			u Viuni	inia 241	140				<u>-</u>			l	LOSS OF CIRCULATION	<u>&gt;100x</u>
3595 Ria NORTH 355642!	ING:	iu, Kine	er, virgi	EA	STING: 913558.7	STATION:			- 1	JRFACE E	LEVATION:		BOTTOM OF CASING	-
333042		111	(Z		3203007				ľ			Plast	ic Limit Water Content	Liquid Limit
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	PF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	RO	STANDARD PENETRATION CK QUALITY DESIGNATION RQD REC	N BLOWS/FT
	s,		S					\// <i>\</i> \//					CALIBRATED PENETROM NES CONTENT] %	ETER TON/SF
<u> </u>					Topsoil Thickness [6"] (ML) Residuum, SILT V	VITH SAND,	brown,	-111111			2-3-6			
_ 	S-1	SS	18	14	moist, stiff to firm	•					(9)	⊗9		
_ _ 	S-2	SS	18	18						-	2-6-9 (15)	⊗ <sub>15</sub>		
5- -										2076 –	2-3-3			
	S-3	SS	18	18							(6)	⊗ <sub>6</sub>		
- - -	S-4	SS	18	18						- - -	2-3-3 (6)	$\otimes_6$		
10 –					END OF DRILLIN	NG AT 10.0 F	Т			2071 –				
- -														
_ _ _														
15										2066				
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- -										-				
_ 20 –										2061 –				
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25 – –										2056 –				
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30										2051				
	ТІ	HE STRA	ATIFICAT	TION !!!	NES REPRESENT THE APPROXII	MATE BOLINDA	ARY LINES P	SETWEEN	I SOII	TYPES IN	I-SITU THE TR	ANSITION	MAY BE GRADIIA	
∇ V			unter		Dry		NG STARTE			9 2021	CAVE IN		4.40	
		mpleti				BORIN	NG PLETED:	F	eb 19	2021	HAMMEI	R TYPE:	Auto	
		asonal bilized	High V	vater)		EQUIF	PMENT:			ED BY:	DRILLING	METHO	D: <b>2 1/4" HSA</b>	
_ <u>~ v</u>	v L (Std	אוווזפט	,		GEC	ATV CI			RD LE L	OG				

CLIENT							PROJECT I	NO.:		BORING	VO.:	SHEET:		
Gay and							<b>12:19208</b> DRILLER/0	CONTRA		<b>B-27</b> )R:		1 of 1		EC9
Auburn	Park						Blue Ridge							
SITE LO			er, Virgi	nia 241	149								LOSS OF CIRCULATION	<u>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</u>
NORTH <b>355646</b>					STING: 913899.0	STATION:			- 1	JRFACE E	LEVATION:		BOTTOM OF CASING	
(	BER	ЭE	(NI)	Î					ST:	E		Plas	stic Limit Water Content	Liquid Limit ∆
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	F MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	F	STANDARD PENETRATION COCK QUALITY DESIGNATION RQD REC	& RECOVERY
					Topsoil Thickness [6"]								CALIBRATED PENETROMI	TER TON/SF
-	S-1	SS	18	18	(ML) Residuum, SILT V moist, stiff	VITH SAND,	brown,			-	2-4-5 (9)	⊗9	20.7	
- -	S-2	SS	18	18						-	2-5-5 (10)	⊗ <sub>10</sub>		
5- -			10	1.5						2067	3-5-4			
-	S-3	SS	18	16						= =	(9)	⊗9		
10 –	S-4	SS	18	18	END OF DRILLIN	JG AT 10 0 F	: <b>T</b>			2062	3-5-5 (10)	⊗ <sub>10</sub>		
-					LIND OF BIRLEIN	10.01				-				
-														
15										2057				
- -														
-										-				
20 – –										2052				
-														
25 –										2047				
-														
-														
30										2042				
	т:	JE CTD	ATIEICA:	LION I I	NEC BEDRECENT THE ADDROVE	MATE BOLING	V BA I IVIEC D	ET\N/EEN	I SOU	TYPES IN	I_CITI I THE TO	ANSITIO	N MAY BE CRADILL	
▽ v			ounter		NES REPRESENT THE APPROXII  Dry		NG STARTE			2021	CAVE IN		5.40	NL.
<b>Y</b> V						BORIN		F	eb 19	2021	HAMMEI	R TYPE:	Auto	
		isonal bilized	High V	Vater)		EQUIF	PLETED: PMENT:			ED BY:	DRILLING	METHO	DD: <b>2 1/4" HSA</b>	
<u>~ v</u>	· r (Jia	~ IIIZEU	1		GEC	ATV CI			RD .E L	OG				

CLIENT								DJECT N	0.:		BORING	NO.:	SHEET:		
Gay and								<b>19208</b> LLER/C	ONTR		<b>SWM-1</b> DR:		1 of 1		EC6
Auburn							- 1	e Ridge							
SITE LO			er, Virgi	inia 241	149								LO	SS OF CIRCULATION	<u> </u>
NORTH <b>355510</b>					STING: <b>913227.8</b>	STATION:				- 1	JRFACE E <b>061.0</b>	ELEVATION:	В	OTTOM OF CASING	
	BER	JE .	(NI)	(N						LS	(L:			Limit Water Conten	t Liquid Limit ∆
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	DF MATERIAL				WATER LEVELS	ELEVATION (FT)	"6/SWOJ8	ROCI	TANDARD PENETRATION  QUALITY DESIGNATION  RQD  REC  CALIBRATED PENETROM	N & RECOVERY
					Topsoil Thickness [5"]					\$				S CONTENT] %	: :
	S-1	SS	18	16	(ML) Residuum, SILT V moist, stiff	VITH SAND	D, tar	/ I,				3-7-8 (15)	⊗ <sub>15</sub>		
- - -					(ML) SANDY SILT, tan,	moist, ver	y stif	f to				5-7-10			
5-	S-2	SS	18	18	stiff						2056	(17)	<b>⊗</b> <sub>17</sub>	23.1	
- - -	S-3	SS	18	18								6-9-11 (20)	⊗ <sub>20</sub>		
_											-				
10-	S-4	SS	18	16							2051 –	5-7-6 (13)	<b>⊗</b> <sub>13</sub>		
-					END OF DRILLIN	NG AT 10.0	FT				-				
_															
_											-				
15 –											2046				
10 -											2040				
_															
_											-				
20-											2041				
											_				
											-				
_ -											-				
25 –											2036				
_											-				
_											-				
_															
30 -											2031				
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			ATIFICAT ountere		NES REPRESENT THE APPROXII  Dry										AL
		mpleti		1	5.19	BOR		TARTE	): <b>I</b>	-ep 17	7 2021	CAVE IN		5.40	
			High V	Vater)		COM	ЛРLЕТ				7 2021	HAMMEI	R TYPE:	Auto	
▼ v	/L (Sta	bilized	)				JIPME CME-5			.ogg <b>Brd</b>	SED BY:	DRILLING	METHOD	: 2 1/4" HSA	
					GEO	TECHNI					OG				

CLIENT							PROJECT	NO.:	- 1	BORING	NO.:	SHEET:		
Gay and PROJEC							<b>12:19208</b> DRILLER/0	ONTRA		SWM-2		1 of 1		FC6
Auburn		/IL.					Blue Ridge							
SITE LO			er, Virgi	inia 241	149								LOSS OF CIRCULATION	<u> </u>
NORTH <b>355514</b> !					STING: <b>913278.3</b>	STATION:				JRFACE E 062.0	LEVATION:		BOTTOM OF CASING	
	BER	Ä	(IN)	(Z					. S	(F.		Plast	ic Limit Water Content	: Liquid Limit ∆
DЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	DF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	RO	STANDARD PENETRATION CK QUALITY DESIGNATION RQD REC	I & RECOVERY
			·		Tanasil Thisler as CIII				1				CALIBRATED PENETROM	ETER TON/SF
- - -	S-1	SS	18	18	Topsoil Thickness [6"] (ML) SANDY SILT, brow	vn, moist,	firm to stif	f			2-2-3 (5)	<b>⊗</b> <sub>5</sub>		
- - -										- -	3-5-7			
5-	S-2	SS	18	18						2057	(12)	⊗ <sub>12</sub>		
- - -	S-3	SS	18	18	(SM) SILTY SAND, brow dense to loose	wn, moist,	medium			_ 	3-4-7 (11)	⊗ <sub>11</sub>	31.5	
_										-				
_	S-4	SS	18	18							6-4-5 (9)	⊗ <sub>9</sub>		
10 –					END OF DRILLIN	NG AT 10.0	FT	111111		2052				
_										]				
-										_				
_														
15 –										2047				
_										_				
_										-				
20 –										2042				
_										]				
-														
_										-				
25 –										2037				
_										-				
-										-				
_														
30 -										2032				
30 -										2002				
	TI	HE STRA	ATIFICA	TION I II	NES REPRESENT THE APPROXII	MATE BOUNI	DARY LINES R	ETWFFN	I SOII	TYPES IN	I-SITU THE TR	ANSITION	MAY BE GRADU	AL
▽ v			unter		Dry		ING STARTE			7 2021	CAVE IN		5.60	· <del>-</del>
<b>▼</b> ∨	VL (Coi	mpleti	on)			BOR								
<b>™</b> ∧	VL (Sea	sonal	High V	Vater)		COM	1PLETED:			7 2021	HAMME	K TYPE:	Auto	
▼ v	VL (Sta	bilized	)				IPMENT: <b>CME-55</b>		.OGG B <b>rd</b>	ED BY:	DRILLING	METHO	D: 2 1/4" HSA	
					GEC		CAL BOR			OG				

CLIENT							PROJECT I	VO.:		BORING I	NO.:	SHEET:		
Gay and PROJEC							<b>12:19208</b> DRILLER/C	`ONTR 4		SWM-3		1 of 1		FC6
Auburn		/IL.					Blue Ridge							
SITE LO								_				LOSS	OF CIRCULATION	\(\)
3595 Rin		id, Rine	er, Virgi		STING:	STATION:			SI	IRFACE F	LEVATION:			
3556259					912585.3	317111014.				64.0	LL V/ (1101V.	ВОТ	TOM OF CASING	
	BER	Jc	(NI)	2					S	E I		Plastic Lii X—	mit Water Content	Liquid Limit
БЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	IE MATERIAI			WATER LEVELS	ELEVATION (FT)	BLOWS/6"		NDARD PENETRATIO	
DEPT	APLE	AMPI	APLE	COV	DESCRIPTION O	INALLMAL			'ATER	EVAT	BLOV	R	QD	A RECOVERI
	SAN	S	SAN						>				IBRATED PENETROMI	ETER TON/SF
-					Topsoil Thickness [10"	]						[FINES O	CONTENT] %	
-	S-1	SS	18	15	(CL) Residuum, LEAN (	CLAY WITH	SAND,	////		]	2-1-3	⊗4		
_					brown, moist, soft			V///	ł		(4)	[ 4		
			4.0	4.5				1///			2-2-2			
5 <del>-</del>	S-2	SS	18	15					]	2059	(4)	∞4		
-					(ML) SANDY SILT, tan-	brown, mo	ist, firm			1 4	424			
	S-3	SS	18	16	to very stiff						4-3-4 (7)	<b> </b> ♦		
_														
_	S-4	SS	18	14							3-7-23 (30)	⊗₃	)	
10 –					END OF DRILLIN	NG AT 10.0 F	T			2054 –				
_														
-										=				
15										2049				
-														
										]				
-										-				
-														
20 –										2044				
-														
]										]				
-														
25 -										2039				
-														
										]				
-										-				
-														
30 –										2034 –				
		IE CED	ATIFIC 1	TION	NICC DEDDECENT THE ADDRESS	MATE BOLING	A DV LINES S	TT\A/CC	1 0011	TYPEC	CITILITUE	ANCITIONA	AV DE CDADU	
▽ w					NES REPRESENT THE APPROXII  Dry		ARY LINES B NG STARTE							AL.
▼ W					•	BORII		∪. <b>F</b>	CU 22	2 2021	CAVE IN		4.20	
▼ W				Vater)		СОМІ	PLETED:			2 2021	HAMME	R TYPE:	Auto	
▼ W				,			PMENT: <b>ME-55</b>	1	OGG <b>RD</b>	ED BY:	DRILLING	METHOD:	2 1/4" HSA	
	•		-		GEC	TECHNIC				OG				

CLIENT							PROJECT NO	).:	- 1	BORING I	VO.:	SHEET:		
Gay and PROJEC							<b>12:19208</b> DRILLER/CO	NTRA		R:		1 of 1		EC6
Auburn							Blue Ridge D							
SITE LOG			er, Virgi	inia 241	149							LC	OSS OF CIRCULATION	<u> </u>
NORTH <b>355630</b> 8					STING: 912488.9	STATION:				JRFACE E <b>63.0</b>	LEVATION:	В	SOTTOM OF CASING	
	BER	Э <sub>С</sub>	(IN)	â					LS	(L:			Limit Water Content	: Liquid Limit Δ
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION O	PF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	ROC	STANDARD PENETRATION  K QUALITY DESIGNATION  RQD  REC  CALIBRATED PENETROM	I & RECOVERY
_					Topsoil Thickness [12"	1				-		[FINI	ES CONTENT] %	
- - - -	S-1	SS	18	18	(ML) Residuum, SAND moist, soft to very stif	Y SILT, brov	vn,				1-2-2 (4)	⊗4		
- - - -	S-2	SS	18	18							2-2-3 (5)	<b>⊗</b> <sub>5</sub>	24.0	
5 <del>-</del>										2058 –	5-8-11			
_ _ _	S-3	SS	18	15							(19)	<b>⊗</b> 19		
10-	S-4	SS	18	16						2053	9-11-13 (24)	⊗ <sub>2</sub> ,	4	
- - -					END OF DRILLIN	NG AT 10.0 F	т							
- 15-										2048				
- - -										-				
- - -										_ _ -				
20										2043				
- - - -														
- - -										-    -				
25 – –										2038 –				
-   -   -														
30-										2022				
30 -										2033				
	TI	HE STRA	ATIFICAT	L TION LII	NES REPRESENT THE APPROXII	MATE BOUND	ARY LINES BET	WEEN	SOIL	TYPES. IN	-SITU THE TR	<u> </u>   Ansition i	MAY BE GRADUA	AL
∇ W			unter		Dry		NG STARTED:			2021	CAVE IN I		4.10	
<b>Y</b> W				N/=# - ::\		BORIN	NG PLETED:	Fe	b 22	2021	HAMMER	R TYPE:	Auto	
▼ W				vater)		EQUIF	PMENT:			ED BY:	DRILLING	METHOD	): <b>2 1/4" HSA</b>	
	<sub>(</sub> 5:a		,		GEC		ME-55 CAL BOREI		RD E L(	OG				

CLIENT							PROJECT NO	Э.:		BORING I	NO.:	SHEET:		
Gay and PROJEC							<b>12:19208</b> DRILLER/CC	NTRA		R·		1 of 1		FC6
Auburn		/IL.					Blue Ridge [							
SITE LO	CATION	N:							-				OSS OF CIRCULATION	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
3595 Riı		d, Rine	er, Virgi			T			1					
NORTH <b>355656</b> 1					STING: <b>914108.2</b>	STATION:				JRFACE E <b>70.0</b>	LEVATION:		BOTTOM OF CASING	
	IBER	ЬE	(NI)	(N					SIIS	FT)	_	Plasti	c Limit Water Content	Liquid Limit ∆
ОЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	PF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	RO	STANDARD PENETRATION CK QUALITY DESIGNATION RQD REC	& RECOVERY
			- '				8	///S\///S					CALIBRATED PENETROMI NES CONTENT] %	TER TON/SF
					Topsoil Thickness [6"] (SM) Residuum, SILTY	CAND pur				1 1				
- - -	S-1	SS	18	15	moist, dense	SAND, puit	ie, !			-	4-22-14 (36)	10.8	⊗ <sub>36</sub>	
- -	<del>S-2</del>	SS	0	0	No recovery, presume	d to be HW	/R	1.1.1.1.1			50/0" (50/0")			⊗ <sub>50/0"</sub>
5-					Defined an actuate					2065				
_					Refusal encounte END OF DRILLI									
_														
_														
_														
10 -										2060				
_														
-										]				
_										_				
_										]				
15 –										2055				
15-										2000 -				
-										]				
-										7				
-										7				
20 –										2050 –				
_														
_										-				
_										-				
_										-				
25 –										2045				
-										-				
-										1				
-										-				
_										-				
30 -										2040				
										1		:		
	TH	HE STRA	\TIFICAT	L TION I II	 NES REPRESENT THE APPROXII	MATE BOUND	ARY LINES BFT	WEFN	L I SOII	TYPES. IN	I-SITU THF TR	L ANSITION	MAY BE GRADUA	AL.
∇ W			unter		Dry		NG STARTED			2021	CAVE IN I		2.10	
<b>V</b> W	/L (Cor	mpleti	on)			BORIN		F	eb 19	2021	HAMMER	R TYPE:	Auto	
▼ W	/L (Sea	asonal	High V	Vater)			PLETED: PMENT:			ED BY:				
▼ W	/L (Sta	bilized	)				ME-55		OGG RD	נט טו.	DRILLING	METHO	D: <b>2 1/4" HSA</b>	
					GEC	TECHNIC		HOL	E LO	OG				

CLIENT:							PROJECT N	IO.:		BORING I	NO.:	SHEET:	
Gay and							12:19208			SWM-5A		1 of 1	<b>I C O</b>
PROJEC	TNAN	ΛE:					DRILLER/C						-65
Auburn							Blue Ridge	Drilling,	, Inc.	•		T	· ·
SITE LOG 3595 Rir			r, Virgi	nia 241	149							LOSS OF CIRCULATION	) <u>&gt;100</u>
NORTH		•			STING:	STATION:				JRFACE E 170.0	LEVATION:	BOTTOM OF CASING	-
)	IBER	PE	(IN)	(N					. FIS	FT)	_	Plastic Limit Water Conte	nt Liquid Limit
DЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	OF MATERIAL	L		WATER LEVELS	ELEVATION (FT)	BLOWS/6"	STANDARD PENETRATION STANDARD	
DEF	MPL	SAM	MPL	ECO					VATE	LEV	BLC	RQD REC	
	SA	٠,	S,	Œ.					>	ш		CALIBRATED PENETROI	NETER TON/SF
_					Auger probed to refus	sal. no sar	npling					[FINES CONTENT] %	
					performed.	,a., 110 3a.							
_					·					-			
-										-			
5-										2065			
					Refusal encounte END OF DRILLI								
_					END OF DRILLI	NG A1 5.0	гі						
-					*Performed 4 feet SV	of SWM	-5			-			
-										-			
-													
10 –										2060			
-													
										-			
_													
-										-			
15										2055			
_										]			
20										2050			
20 –										2050			
-										-			
-										-			
-										-			
25 –										2045			
-										-			
-										-			
-										-			
										-			
30-										2040			
-													
	T-1	JE CTD (	TIEIC *	LION I I	NEC DEDDECEMENT THE ADDROVE	MATE DOLLA	IDADVI INIEC DE	T\\\/\	COLL	TVDEC IN	CITILITUE TO	ANGITION MANY DE CRASI	Δ1
□ □ W					NES REPRESENT THE APPROXI  Dry		RING STARTE			2021	CAVE IN		AL
▼ W							RING			2021			
∡ ∧	/L (Sea	sonal	High V	Vater)			MPLETED:				HAMMEI	R TYPE: Auto	
▼ W	/L (Sta	bilized	)				JIPMENT: ' <b>CME-55</b>	LC	OGG	ED BY:	DRILLING	6 METHOD: <b>2 1/4" HSA</b>	
	, -				GEC		ICAL BORI	HOL	E LO	OG			

CLIENT	:						PROJECT N	O.:		BORING I	NO.:	SHEET:		
Gay and							12:19208			SWM-6		1 of 1		FCo
PROJEC	T NAN	ΛE:					DRILLER/C							-65
Auburn							Blue Ridge	Drilling	, Inc	•		ı		~
SITE LOG			er, Virgi	inia 241	149							LC	OSS OF CIRCULATION	<u>&gt;100%</u>
NORTH <b>355654</b> 0					STING: 914047.6	STATION:				JRFACE E <b>)73.0</b>	LEVATION:	E	SOTTOM OF CASING	
DЕРТН (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION C	DF MATERIAL			WATER LEVELS	ELEVATION (FT)	BLOWS/6"	⊗	Limit Water Content  X  STANDARD PENETRATION  K QUALITY DESIGNATION	N BLOWS/FT
DEP	SAMPL	SAMI	SAMPL	RECO					WATE	ELEVA	BLC	<u> </u>	RQD REC CALIBRATED PENETROME	TER TON/SF
					Topsoil Thickness [6"]							[FIN	ES CONTENT] %	
-	S-1	SS	18	13	(ML) Residuum, SILT V moist, soft to stiff	VITH SAND	), brown,				3-2-2 (4)	<b>⊗</b> <sub>4</sub>		
5-	S-2	SS	18	15						2068	4-4-9 (13)	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
5- -	S-3	SS	1	1	No recovery, presume	d to be HV	VR			2000 -	50/1" (50/1")			≪ <sub>50/1"</sub>
- - -					Refusal encounte									
10										2063				
- - -														
_ _ _														
15										2058				
- - - -														
20 -										2053				
- - - -														
- - -														
25 <u> </u>										2048				
-   -   -														
30										2043				
														<u> </u>
\(\sigma\)					NES REPRESENT THE APPROXI									\L
✓ W				zu)	Dry	BORI BORI	NG STARTED			2 2021	CAVE IN I		4.50	
<b>▼</b> W	VL (Sea	sonal	High V	Vater)		COM	IPLETED:			2 <b>2021</b> SED BY:	HAMMER		Auto	
▼ W	√L (Sta	bilized	)				CME-55	1	R <b>D</b>		DRILLING	METHOD	): <b>2 1/4" HSA</b>	
					GEO		CAL BORE	HOL	E L	OG				

Signature   12-1926   Signature   Signat	CLIENT							PROJECT N	0.:	I	BORING N	NO.:	SHEET:		
Signature   Sign													1 of 1		<b>LC</b> c
DESCRIPTION   STATION   SURFACE ELEVATION			ΛE:												
SSS   SS   SS   SS   SS   SS   SS								Blue Ridge	Drilling	, Inc.	•		1		-
Substitution   Subs				er. Virgi	inia 241	149							Le	OSS OF CIRCULATION	<u> </u>
Part			.,	, 8			STATION:			SU	JRFACE E	LEVATION:	ı	BOTTOM OF CASING	-
Auger probed to sample depth.   Auger probed to sample depth	(	BER	ЭE	(NI)	2		1			- S	FT)	_			
Auger probed to sample depth.   Auger probed to sample depth	H (FT	MOM	E TYF	JIST.	II)	DESCRIPTION	SE NAATEDIAL			LEVE	Z Z O	"9/S/	I		
Auger probed to sample depth.   Auger probed to sample depth	EPTH	PLE I	MPL	PLE (	SOVE	DESCRIPTION C	JF MATERIAL			VTER	WAT!	NON	ROC		I & RECOVERY
S		SAM	SA	SAM	Ä					$\rangle$		ш			ETER TON/SE
S-4   SS   18   15   (SM) Residuum. SILTY SAND, brown, moist   SA   SS   18   15   (SM) Residuum. SILTY SAND, brown, moist   SA   SS   18   15   (SM) Residuum. SILTY SAND, brown, moist   SA   SS   SA   SS   SA   SS   SA   SA							1 1 11								ETER TONYSI
S-4   SS   18   15   SM/  Residuum, SILTY SAND, brown, moist   SM/  Performed 5 feet from SWM-6   SM/  Performed 5 feet	_					Auger probed to samp	ole depth.								
S-4   SS   18   15   SM/  Residuum, SILTY SAND, brown, moist   SM/  Performed 5 feet from SWM-6   SM/  Performed 5 feet	_										_				
S-4   SS   18   15   SM/  Residuum, SILTY SAND, brown, moist   SM/  Performed 5 feet from SWM-6   SM/  Performed 5 feet	-										-				
S-4   SS   18   15   SM/  Residuum, SILTY SAND, brown, moist   SM/  Performed 5 feet from SWM-6   SM/  Performed 5 feet	-										]				
S-4   SS   18   15   SM/  Residuum, SILTY SAND, brown, moist   SM/  Performed 5 feet from SWM-6   SM/  Performed 5 feet											I _ I				
10	5-										-5				
10	_														
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10	_										] -				
END OF DRILLING AT 10.0 FT  'Performed 5 feet from SWM-6  15 - 15 - 15 - 15 - 15 - 15 - 15 - 15	_	S-4	SS	18	15	(SM) Residuum, SILTY	SAND, bro	own, moist					⊗ <sub>19</sub>	202	
**Performed 5 feet from SWM-6**  **Performed 5 feet from SWM-6**	10						NG AT 10 0	FT			-10	(23)		20.2	
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Pry BORING STARTED: Feb 22 2021  WL (Completion)  BORING COMPLETED: COMPLETED: COMPLETED: Feb 22 2021  HAMMER TYPE: Auto  PRILLING METHOD: 2 1/4" HSA	-					LIND OF BRICEI	10 AT 10.0								
20 - 20 - 25 - 25 - 25 - 25 - 25 - 25 -	-					*Performed 5 feet fro	m SWM-6								
20 - 20 - 25 - 25 - 25 - 25 - 25 - 25 -															
20 - 20 - 25 - 25 - 25 - 25 - 25 - 25 -	_										1 =				
20 - 20 - 25 - 25 - 25 - 25 - 25 - 25 -	15-										-15				
25 - 30 - 30 - 30 - 30 - 30 - 30 - 30 - 3	10 -										-13				
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30 −	25										-25				
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: Not Observed  BORING  WL (Seasonal High Water)  WL (Seasonal High Water)  WL (Stabilized)  DRILLING METHOD: 2 1/4" HSA															
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: Not Observed  BORING  WL (Seasonal High Water)  WL (Seasonal High Water)  WL (Stabilized)  DRILLING METHOD: 2 1/4" HSA	_														
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: Not Observed  BORING  WL (Seasonal High Water)  WL (Seasonal High Water)  WL (Stabilized)  DRILLING METHOD: 2 1/4" HSA															
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: Not Observed  BORING  WL (Seasonal High Water)  WL (Seasonal High Water)  WL (Stabilized)  DRILLING METHOD: 2 1/4" HSA	-														
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL  WL (First Encountered)  Dry  BORING STARTED: Feb 22 2021  CAVE IN DEPTH: Not Observed  BORING  WL (Seasonal High Water)  WL (Seasonal High Water)  WL (Stabilized)  DRILLING METHOD: 2 1/4" HSA	30										7				
✓ WL (First Encountered) Dry BORING STARTED: Feb 22 2021 CAVE IN DEPTH: Not Observed   ✓ WL (Completion) BORING COMPLETED: Feb 22 2021 HAMMER TYPE: Auto   ✓ WL (Seasonal High Water) EQUIPMENT: ATV CME-55 LOGGED BY: BRD DRILLING METHOD: 2 1/4" HSA	30-										-30				
✓ WL (First Encountered) Dry BORING STARTED: Feb 22 2021 CAVE IN DEPTH: Not Observed   ✓ WL (Completion) BORING COMPLETED: Feb 22 2021 HAMMER TYPE: Auto   ✓ WL (Seasonal High Water) EQUIPMENT: ATV CME-55 LOGGED BY: BRD DRILLING METHOD: 2 1/4" HSA														· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
▼ WL (Completion) BORING COMPLETED: Feb 22 2021 HAMMER TYPE: Auto   ▼ WL (Seasonal High Water) EQUIPMENT: ATV CME-55 LOGGED BY: BRD DRILLING METHOD: 2 1/4" HSA						NES REPRESENT THE APPROXI	MATE BOUNI	DARY LINES BE	TWEEN	SOIL	TYPES. IN	-SITU THE TR	ANSITION	MAY BE GRADUA	AL
▼ WL (Seasonal High Water) Feb 22 2021 HAMMER TYPE: Auto   ▼ WL (Stabilized) EQUIPMENT: LOGGED BY: BRD DRILLING METHOD: 2 1/4" HSA	∇ W	/L (Firs	st Enco	unter	ed)	Dry	BOR	ING STARTED	): <b>F</b> e	eb 22	2 2021	CAVE IN	DEPTH:	Not Observed	i
V     WL (Seasonal High Water)       EQUIPMENT:     LOGGED BY:       WL (Stabilized)     ATV CME-55         BRD     DRILLING METHOD: 2 1/4" HSA	<b>▼</b> W	/L (Coi	mpleti	on)			BOR	ING				11444	D TVD5		
© WL (Stabilized) EQUIPMENT: LOGGED BY: DRILLING METHOD: <b>2 1/4" HSA</b> DRILLING METHOD: <b>2 1/4" HSA</b>	▼ W	/L (Sea	asonal	High V	Vater)							HAMMEI	K TYPE:	Auto	
ATV CME-55 BRD					,						ED BY:	DRILLING	- METHOI	D: <b>2 1/4" HSA</b>	
		(J.a	~1112CU	1		GFC					OG				

#### **APPENDIX C – Laboratory Testing**

Laboratory Test Results Summary Plasticity Chart Moisture-Density Relationship Curves

					Atte	erberg Li	mits	**Percent	Moisture	- Density	CBR	(%)	#Organic
Sample Location	Sample Number	Depth (feet)	^MC (%)	Soil Type	LL	PL	PI	Passing No. 200 Sieve	Maximum Density (pcf)	•	0.1 in.	0.2 in.	Content (%)
B-01	S-2	3.5-5	34.0										
B-02	S-1	1-2.5	33.6										
B-03	S-2	3.5-5	35.6										
B-04	S-1	1-2.5	18.0										
B-05	S-2	3.5-5	20.8										
B-07	S-1	1-2.5	19.7										
B-07	S-3	6-7.5	39.3										
B-07	S-5	13.5-15	37.9										
B-09	S-1	1-2.5	8.5										
B-11	S-1	1-2.5	25.6										

Notes: Definitions: See test reports for test method, ^ASTM D2216-19, \*ASTM D2488, \*\*ASTM D1140-17, #ASTM D2974-20e1

MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Auburn Park Project No.: 12:19208

Client: Gay and Neel, Inc. Date Reported:



Office / Lab Address Office Number / Fax

7670 Enon Drive (540)362-2000 ECS Mid-Atlantic LLC - Roanoke Suite 101 Roanoke, VA 24019 (540)362-1202

Tested by	Checked by	Approved by	Date Received
JGeil	jginter	jginter	3/1/2021

					Atte	Atterberg Limits		**Percent	Moisture - Density		CBR (%)		#Organic
Sample Location	Sample Number	Depth (feet)	^MC (%)	Soil Type	LL	PL	PI	Passing No. 200 Sieve	Maximum Density (pcf)	•	0.1 in.	0.2 in.	Content (%)
B-12	S-2	3.5-5	19.0										
B-13	S-1	1-2.5	19.5										
B-14	S-2	3.5-5	11.0										
B-15	S-1	1-2.5	29.0										
B-16	S-1	1-2.5	26.9										
B-16	S-3	6-7.5	28.8										
B-16	S-5	13.5-15	22.3										
B-17	S-2	3.5-5	22.1										
B-17	S-4	8.5-10	27.6										
B-18	S-2	3.5-5	46.8										

Notes: Definitions: See test reports for test method, ^ASTM D2216-19, \*ASTM D2488, \*\*ASTM D1140-17, #ASTM D2974-20e1

MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

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Roanoke, VA 24019 (540)362-1202

Tested by	Checked by	Approved by	Date Received
JGeil	jginter	jginter	3/1/2021

					Atte			**Percent	Moisture - Density		CBR (%)		#Organic
Sample Location	_	Depth (feet)	^MC (%)	Soil Type	LL	PL	PI	Passing No. 200 Sieve	Maximum Density (pcf)	-	0.1 in.	0.2 in.	Content
B-19	S-2	3.5-5	42.5										
B-20	S-2	3.5-5	15.5										
B-21	S-1	1-2.5	31.2										
B-22	S-1	1-2.5	37.0	СН	58	30	28	99					
B-23	S-1	1-2.5	17.6										
B-25	S-2	3.5-5	40.5	МН	73	44	29	86.3					
B-27	S-1	1-2.5	20.7										
SWM-1	S-2	3.5-5	23.1										
SWM-2	S-3	6-7.5	31.5										
SWM-4	S-2	3.5-5	24.0										

Notes: Definitions: See test reports for test method, ^ASTM D2216-19, \*ASTM D2488, \*\*ASTM D1140-17, #ASTM D2974-20e1

MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project:

Auburn Park

Project No.:

12:19208

Client:

Gay and Neel, Inc.

Office / Lab

ECS Mid-Atlantic LLC - Roanoke

Date Reported:

Office Number / Fax

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7670 Enon Drive Suite 101

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Tested by	Checked by	Approved by	Date Received
JGeil	jginter	jginter	3/1/2021

					Atte	Atterberg Limits		1 0100111		Moisture - Density		R (%)	#Organic
Sample Location	Sample Number	_	^MC (%)	Soil Type	LL	PL	PI	Passing No. 200 Sieve	Maximum Density (pcf)	-	0.1 in.	0.2 in.	Content (%)
SWM-5	S-1	1-2.5	10.8										
SWM-6A	S-4	8.5-10	20.2										
B-07 (BULK)	D3S-56	1-10		SC	28	19	9	31.9	125.9	10.5			
B-16 (BULK)	D3S-57	1-10		ML	35	25	10	92.6	104.7	19.1			
B-20 (BULK)	D3S-58	1-10		CL	31	21	10	71.4	114.3	15.9			

Notes: See test reports for test method, ^ASTM D2216-19, \*ASTM D2488, \*\*ASTM D1140-17, #ASTM D2974-20e1

**Definitions:**MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Auburn Park Project No.: 12:19208

Client: Gay and Neel, Inc. Date Reported:

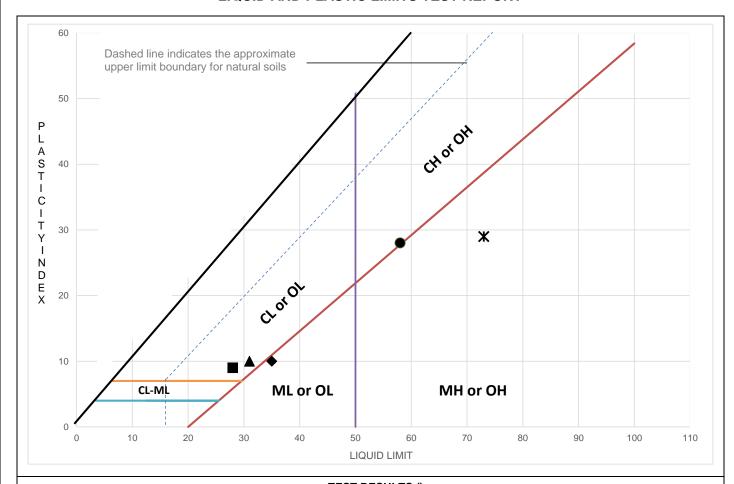
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Roanoke, VA 24019 (540)362-1202

Tested by	Checked by	Approved by	Date Received
JGeil	jginter	jginter	3/1/2021

#### LIQUID AND PLASTIC LIMITS TEST REPORT



#### **TEST RESULTS ()**

								0			
	Sample Location	Sample Number	Sample Depth (ft)	LL	PL	PI	%<#40	%<#200	AASHTO	uscs	Material Description
	B-07	D3S-56	1-10	28	19	9	44.6	31.9	A-2-4	SC	Tan CLAYEY SAND WITH GRAVEL
•	B-16	D3S-57	1-10	35	25	10	98.9	92.6	A-4	ML	Light Brown SILT
<b>A</b>	B-20	D3S-58	1-10	31	21	10	91.1	71.4	A-4	CL	Tan LEAN CLAY WITH SAND
•	B-22	S-1	1-2.5	58	30	28	99.7	99.0	A-7-5	СН	Tan-gray FAT CLAY
*	B-25	S-2	3.5-5	73	44	29	91.0	86.3	A-7-5	МН	Brown ELASTIC SILT

Project: Auburn Park Client: Gay and Neel, Inc. Project No.: 12:19208 Date Reported: 3/10/2021

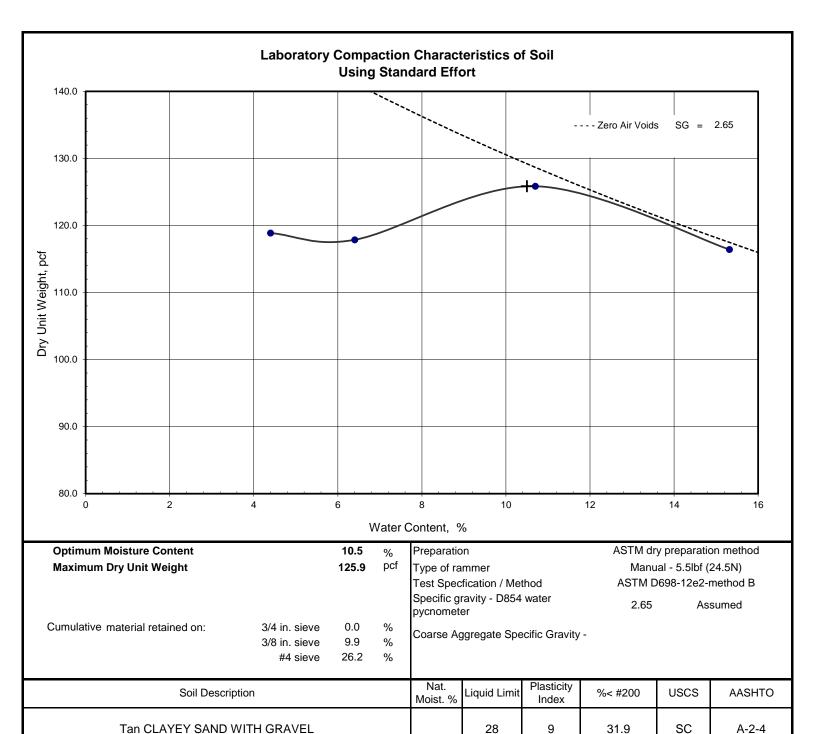


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JGeil	jginter	jginter	3/1/2021



Project: Auburn Park
Client: Gay and Neel, Inc.

Sample / Source B-07 Test Reference/No.: Project No.: 12:19208 Depth (ft.): 1 - 10 Sample No.: D3S-56 Date Reported: 3/10/2021



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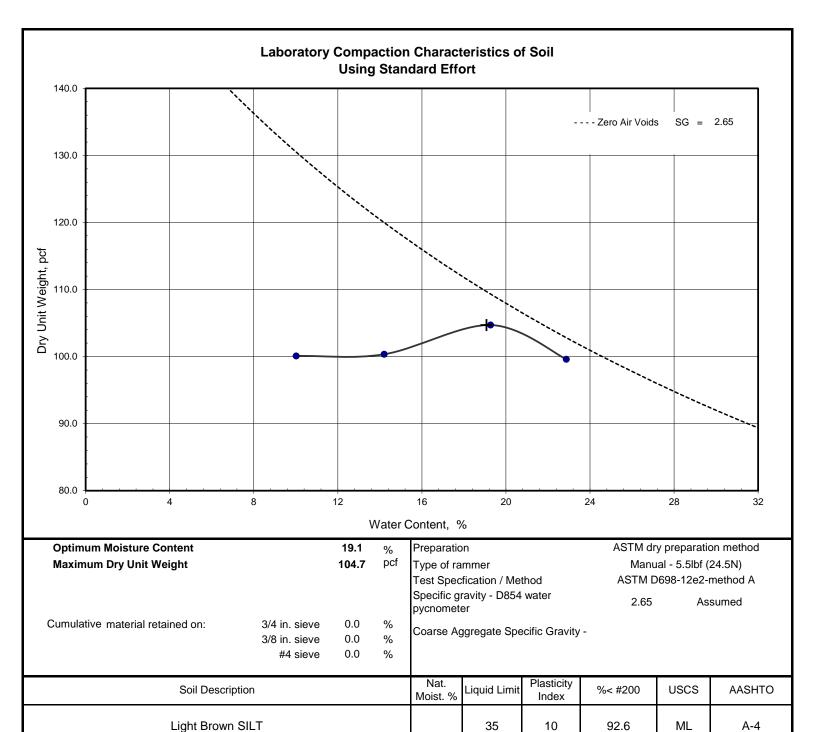
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Tested by	Checked by	Approved by	Date Received	Remarks
JGeil	jginter	jginter	3/1/2021	



Project: Auburn Park
Client: Gay and Neel, Inc.

Sample / Source B-16 Test Reference/No.:

Project No.: 12:19208 Depth (ft.): 1 - 10 Sample No.: D3S-57 Date Reported: 3/10/2021



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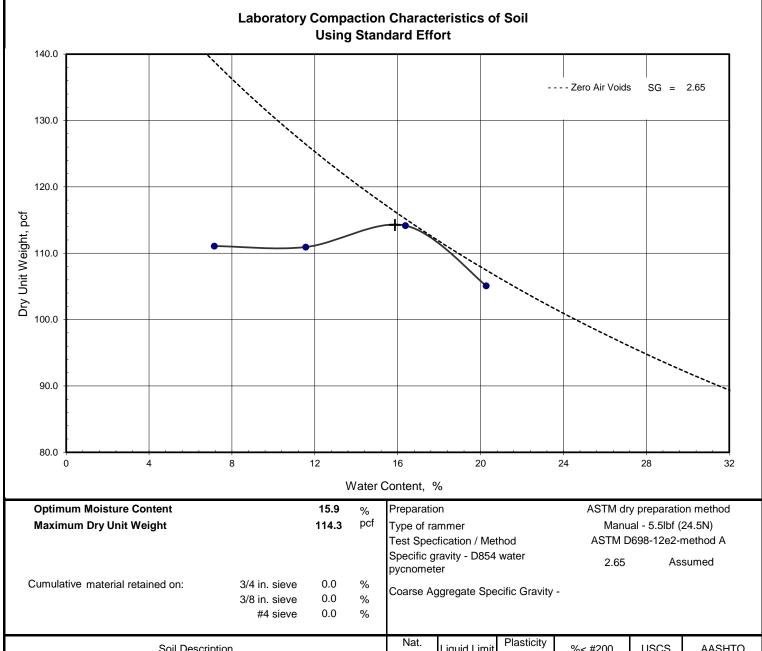
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Tested by	Checked by	Approved by	Date Received	Remarks
JGeil	jginter	jginter	3/1/2021	



Soil Description	Nat. Moist. %	Liquid Limit	Plasticity Index	%< #200	USCS	AASHTO
Tan LEAN CLAY WITH SAND		31	10	71.4	CL	A-4

Project: Auburn Park
Client: Gay and Neel, Inc.

Sample / Source B-20 Test Reference/No.:

Project No.: 12:19208
Depth (ft.): 1 - 10
Sample No.: D3S-58
Date Reported: 3/10/2021



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Tested by	Checked by	Approved by	Date Received	Remarks
JGeil	jginter	jginter	3/1/2021	