GROUNDWATER MONITORING PLAN FOR ASH POND E

PLANT BRANCH
PUTNAM COUNTY, GEORGIA

FOR

Georgia Power

April 2025
REV. 0

Geosyntec consultants
engineers | scientists | innovators

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I. CERTIFICATION

This *Groundwater Monitoring Plan, Georgia Power Company - Plant Branch Ash Pond AP-E* has been prepared by, or under the direct supervision of, a Qualified Groundwater Scientist and a registered professional engineer with Geosyntec Consultants, Inc. (Geosyntec) to meet the requirements contained in Chapter 391-3-4-.10 of the Georgia Environmental Protection Division Rules of Georgia, Solid Waste Management, Coal Combustion Residuals (i.e., State CCR Rule) as well as the United States Environmental Protection Agency Coal Combustion Residuals Rule (40 CFR §257), Part 90. References to the appropriate sections of the State CCR Rule are incorporated throughout this document.

I hereby certify that this Groundwater Monitoring Plan was prepared by, or under the direct supervision of, a Qualified Groundwater Scientist and a Registered Professional Engineer in accordance with the State of Georgia Rules of Solid Waste Management. According to 391-3-4-.01, a Qualified Groundwater Scientist is "a professional engineer or geologist registered to practice in Georgia who has received a baccalaureate or post-graduate degree in the natural sciences or engineering and has sufficient training and experience in groundwater hydrology and related fields that enable individuals to make sound professional judgments regarding groundwater monitoring, contaminant fate and transport, and corrective action." The design of the groundwater monitoring system was developed in compliance with Georgia Environmental Protection Division Rules of Solid Waste Management, Chapter 391-3-4.10(6).

Signature: _____

Date: 4-14-2025

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GEORGIA REGISTERED PROFESSIONAL GEOLOGIST
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1. INTRODUCTION

Groundwater monitoring is required for coal combustion residual (CCR) units by the Georgia Environmental Protection Division (GA EPD) to detect and quantify potential changes in groundwater chemistry. This Groundwater Monitoring Plan describes the groundwater monitoring program for Ash Pond E (AP-E or the Site) at Georgia Power Company's (Georgia Power) Plant Branch (Plant). This plan meets the requirements of GA EPD rules and uses GA EPD's Manual for Ground Water Monitoring dated September 1991 as a guide. Groundwater monitoring well locations and construction details are presented on **Figure A-1** and **Table A-1** of **Appendix A**.

Groundwater monitoring will occur in accordance with 391-3-4-.10 of the Georgia Solid Waste Management Rules. If the monitoring requirements specified in this plan conflict with GA EPD rules (391-3-4), the GA EPD rules will take precedent.

In accordance with the United States Environmental Protection Agency (USEPA) Coal Combustion Rule (§257.90), which is incorporated by Georgia State Rule by reference, a detection monitoring well network for AP-E has been installed. The existing monitoring wells were installed following the guidelines presented herein. Additionally, this plan documents the methods for future monitoring well installation and/or replacement, and procedures for well abandonment. As required by 391-3-4.10(6)(g), a minor modification will be submitted to GA EPD prior to the unscheduled installation or abandonment of monitoring wells. Well installation and/or abandonment must be directed by a qualified groundwater scientist.

2. GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

Geologic and hydrogeologic conditions for this Site are described in a report, *Geologic and Hydrogeologic Summary Report*, prepared by Golder (2018). This report was also included as an appendix in the *Hydrogeological Assessment Report Revision 2,* prepared by Geosyntec (2025) and submitted as Part B of the permit application. Key elements of this report are summarized below.

2.1 SITE GEOLOGY

The Site is underlain by biotite gneiss with local mafic lithologic variations represented by amphibolite/hornblende gneiss and diabase. Based on review of site-specific geologic mapping, the Plant property is primarily underlain by a fine- to medium-grained, poorly jointed biotite-quartz-feldspar gneiss that has been deeply and uniformly weathered. The gneiss is well-banded and well foliated with a planar, northeast-trending fabric and weathering develops a relatively thick, clay-rich, vermiculitic soil. The gneiss is locally interlayered with a zone of highly concentrated hornblende gneiss/amphibolite that trends northeast across the southern portion of AP-E.

Three small mafic intrusive masses were observed around AP-E as well: two occur southeast of the pond and the third occurs northwest of the pond. These discontinuous masses are resistant to weathering, standing out in relief relative to the surrounding differentially-weathered biotite gneiss. The intrusives consist of spheroidally- weathered, medium-grained, equigranular diabase that is well jointed and massive. Weathering of the diabase yields a massive, fat-clay with relict feldspar phenocrysts.

The southern end of the Site is underlain by migmatitic gneiss with large amphibole crystals and discontinuous pods of amphibolilte as observed along with entrance road on the southern end of the property. Exposures of this unit are chaotically folded. Based on lack of exposure, contact relationship between the migmatitic gneiss and biotite gneiss was not determined.

Based on review of available information, micaceous, locally saprolitic soils, consisting primarily of clay, silty clay, silt, and sandy clay occur as a variably-thick blanket of residuum overlying bedrock across most of the Site. The thickness of residual soils encountered in the borings is variable, ranging from a few feet to as much as 90 feet. In the Piedmont, partially weathered rock (PWR) is described by Standard Penetration Test (SPT) blow counts that exceed 50 blows/foot. In the absence of SPT data, transitionally weathered rock (TWR) is defined based on the presence of saprolitic structures, rock fragments, and denser materials. Where data were available to determine the thickness of TWR, it is relatively thin (i.e., 10 feet or less), if present, except for a few locations where the thickness exceeds 20 feet.

2.2 SITE HYDROGEOLOGY

A regional, unconfined aquifer system is present at the Site, consisting of residual soils and transitionally weathered rock. Interconnected fractures in the transition zone transmit groundwater stored in the overburden soils to underlying bedrock, similar to the conceptual model for groundwater flow described in the Piedmont by LeGrand (2004). Overall, groundwater recharge is thought to occur in the uplands and groundwater discharge near onsite surface water bodies. The water level trends noted at Plant Branch are comparable to similar hydrogeologic settings in the Piedmont region of southeastern US.

Additionally, the relationship between groundwater levels and the Site topography is consistent with the slope-aquifer conceptual model for groundwater flow in the Piedmont (LeGrand, 2004).

The Site is directly underlain by up to a 90-foot thick blanket of overburden, which is comprised of residual soils and transitionally weathered rock.

Based on field hydraulic conductivity tests and laboratory permeability tests, the overburden is hydraulic conductivity ranges from 1.25 x 10^{-2} cm/s to 1.68 x 10^{-4} cm/sec. The overall geometric mean across the entire set of wells and piezometers is 5.71 x 10^{-4} cm/s. Bedrock beneath the overburden is primarily characterized by poorly-jointed, feldspathic biotite gneiss with a localized zone of highly concentrated layers of amphibolite/hornblende gneiss interlayered with the biotite gneiss. Isolated diabase intrusive masses are also present on Site. Lineaments identified around the Site are consistent in orientation with structural features observed during geologic mapping, indicating that development of surface lineations is likely controlled by preferential weathering related to discontinuities in bedrock. The top of rock surface generally mimics Site topography.

Boring logs and monitoring/piezometer installation logs were used to evaluate hydrostratigraphy of the Site. Material types identified included residual soils, saprolitic soil, saprolitic and/or transitionally weathered rock (or PWR if blow counts were provided), and competent bedrock. Based on review of the logs, the screen/filter pack interval for most of the piezometers and monitoring wells installed onsite provides connection to overburden that is saturated, indicating that the Site is underlain by a regional groundwater aquifer that occurs within the overburden.

In general, the hydrogeology at the Site is likely fairly uniform as noted by similar lithologic characteristics in the subsurface with the exception of local mafic units within the gneiss. These differing rock types are interlayered such that they are not likely to result in significant geochemical variation in the overburden and groundwater chemistry.

2.3 UPPERMOST AQUIFER

The uppermost aquifer occurs within the overburden and TWR at the Site. Although the degree of connection between the overburden/TWR and underlying bedrock aquifer systems is not known, the bedrock is massive with few joints available to receive groundwater from the overlying overburden. Consequently, groundwater flow within the uppermost aquifer is anticipated to occur primarily along the transitionally weathered rock zone which is located at the interface between the overburden residual soils and massive bedrock.

The potentiometric surface for the uppermost aquifer is generally eastward from the topographically high area upgradient of AP-E. In general, the groundwater flow is to the east, south, and west, respectively, where AP-E is situated north of Lake Sinclair (refer to **Figure A-2**). Localized groundwater flow directions within this aquifer are influenced by the topography and top of rock variations onsite. Locally, the potentiometric surface contours are also influenced by the pond dewatering activities. This pond was impounded on a topographic high within a former tributary that flowed eastward into Beaverdam Creek. A series of topographically high hilltops occur west of Pond E and appear to influence groundwater flow. Piezometer locations PZ-2I/S through PZ-5I/S exhibit groundwater elevations between approximately 438 and 452 feet, or around 12 to 26 feet higher than AP- E. These piezometer locations in turn are located east of the topographic divide between AP-E and the intermittent to permanently flowing creek to the west. Thus, these hilltops likely represent an upgradient groundwater divide on the property west of AP-E.

Recharge to the uppermost aquifer is primarily through precipitation. Data indicate that there is generally a downward gradient in topographically higher areas and an upward gradient in the topographic lows. Groundwater appears to be supporting surface water flow in these tributaries, as indicated by the local overlap in topographic and groundwater contours of similar elevation. Fractures generally decrease with depth, which is often reflected in boring logs from wells and piezometers installed at the Site. Hydrogeologic conditions at the Site indicate that the uppermost aquifer at the Site is unconfined and is hydraulically connected to the bedrock through the transitionally-weathered zone.

Based on review of the potentiometric contours, horizontal hydraulic gradient is variable and reflects topography at the Site. The horizontal gradient appears to be steeper around the downgradient perimeter of the ponds, particularly along embankments where groundwater flow lines are influenced by the constructed slopes for the dams. Generally, most of groundwater flow across the Site occurs laterally in the TWR zone. Because the Site is underlain by clay-rich residual soils and relatively massive bedrock, groundwater is expected to move laterally more than vertically within the TWR, which is considered to have a higher hydraulic conductivity relative to the overlying clay-rich and underlying massive bedrock material.

2.4 HYDRAULIC GRADIENT AND GROUNDWATER FLOW VELOCITY

The hydraulic gradient and groundwater velocity were calculated based on the August 2024 water elevation data and along two transects between two sets of well pairs. The hydraulic gradient in the northern portion of the Site, between wells BRGWA-5S and BRGWC-33S, was calculated as 0.005 feet per foot (ft/ft). The gradient in the Site's southern portion was calculated as 0.01 ft/ft between wells PZ-4I and BRGWC-38S. The average hydraulic gradient for the Site based on these reported values is 0.008 ft/ft. Hydraulic gradients are variable and reflect topography at the Site. The gradients are steeper around the downgradient perimeter of AP-E, particularly along the eastern embankment where groundwater flow lines are influenced by the constructed slopes of the earthen dike.

An average and a maximum groundwater velocity were calculated using (i) the average K_h for the four wells in the well pairs listed above, (5.78 ft/day) and (ii) the maximum K_h (18.84 ft/day), respectively, along with the hydraulic gradient between each of the well pairs. An effective porosity of 0.20 was used based on the published estimated values for effective porosity for a silty sand-type soil (Kresic, 2006). Based on these parameters Darcy's equation for flow velocity in a porous medium was used as follows:

$$V = linear\ velocity = \frac{K_h * i}{n_e}$$

where:

V = Groundwater flow velocity (ft/day)
K_h = Horizontal Hydraulic Conductivity (ft/day)
i = Horizontal hydraulic gradient (ft/ft)
h_1 and h_2 = Groundwater elevation at location 1 and 2
L = Distance between location 1 and 2
n_e = Effective porosity

The average (but conservatively high) groundwater velocity was calculated as 0.21 ft/day, and the

estimated maximum groundwater velocity was calculated as 0.69 ft/day.

3. SELECTION OF WELL LOCATIONS

Groundwater monitoring wells are installed to monitor the uppermost aquifer beneath the Site. Locations are selected based on several factors, including (i) the former extent of the ash pond, (ii) the final ash pond closure plan, which includes excavation and removal of CCR materials and de-watering of ponds, (iii) and site geologic and hydrogeologic considerations. Locations are chosen to serve as upgradient (BRGWA), or lateral/downgradient (BRGWC) based on groundwater flow direction determined by potentiometric evaluation. A more detailed discussion of the conceptual model for groundwater flow and monitoring well placement at the Site is included in the *Hydrogeologic Assessment Report Revision 2* (Geosyntec, 2025).

All monitoring wells are, and will be, positioned to provide adequate coverage to detect potential impacts from the AP-E unit. Both upgradient and downgradient wells are screened in the uppermost aquifer, in the saprolite, PWR, and/or upper fractured bedrock. Upgradient monitoring well locations are sufficient to accurately represent the quality of background groundwater that has not been affected by the potential for leakage from the AP-E unit. Monitoring wells will generally be located outside of areas with frequent auto traffic; however, wells may be installed in heavily trafficked areas when necessary to meet the groundwater monitoring objectives of the GA EPD rules. A map depicting monitoring well locations for AP-E as a multi-unit network is included in **Figure A-1** of **Appendix A**. In addition, **Figure A-2** of **Appendix A** presents the locations of piezometers used for monitoring of groundwater levels.

4. MONITORING WELL DRILLING, CONSTRUCTION, ABANDONMENT & REPORTING

The monitoring wells included in this monitoring network were installed in general accordance with USEPA Region 4 Science and Ecosystem Support Division (SESD) *Operating Procedure for Design and Installation of Monitoring Wells* (USEPA, SESDGUID-101-R2) as a general guide for best practices. Any future monitoring wells will be installed in accordance with the following procedures.

4.1 DRILLING

A variety of well drilling methods are available for the purpose of installing groundwater monitoring wells. Drilling methodologies include but are not limited to hollow stem augers, direct push, air rotary, mud rotary, and rotosonic techniques. The drilling method will be selected to minimize the disturbance of subsurface materials and not cause impacts to groundwater. Borings will be advanced using an appropriate drilling technology capable of drilling and installing a well in the site-specific geology. Monitoring wells will be installed using the most current version of the USEPA SESD SESDGUID-101-R2 as a general guide for best practices. Also, drilling equipment will be decontaminated before use and between borehole locations using the procedures described in the most current version of USEPA Laboratory Services and Applied Science Division *Field Equipment Cleaning and Decontamination* (LSASDPROC-205-R4). Well installation will be directed by a Qualified Groundwater Scientist.

Sampling and/or coring may be used to help determine the stratigraphy and geology at the well location. Samples and cores will be logged under the supervision of a Qualified Groundwater Scientist. Screen depths will be chosen based on the depth to the uppermost aquifer.

All drilling for any subsurface hydrogeologic investigation, or for installation or abandonment of groundwater monitoring wells, will be performed by a driller that has, at the time of installation, a performance bond on file with the Water Well Standards Advisory Council. Standards for surveying and reporting of coordinates and elevation for monitoring wells is discussed in section 4.4.

4.2 DESIGN AND CONSTRUCTION

Well construction materials will be sufficiently durable to resist chemical and physical degradation and will not interfere with the quality of groundwater samples.

WELL CASINGS AND SCREENS

American Society for Testing and Materials (ASTM), National Science Foundation (NSF) rated, Schedule 40, 2-inch diameter polyvinyl chloride (PVC) pipe with flush threaded connections will be used for the well riser and screens. Compounds that can cause PVC to deteriorate (e.g., organic compounds) are not expected at this facility. If conditions warrant, other appropriate materials may be used for construction with prior written approval from the GA EPD.

WELL INTAKE DESIGN

Intake for groundwater monitoring wells shall be designed and constructed to: (1) allow sufficient groundwater flow to the well for sampling; (2) minimize the passage of formation materials (turbidity)

into the well; and (3) ensure sufficient structural integrity to prevent the collapse of the intake structure.

Each groundwater monitoring well will include a well screen designed to limit the amount of formation material passing into the well when it is purged and sampled. Screens with 0.010-inch slots have proven effective for the earth materials at the Site and will be used unless geologic conditions discovered at the time of installation dictate a different size. Screen length shall not exceed 10 feet without justification as to why a longer screen is necessary (e.g., significant variation in groundwater level). If the above techniques prove ineffective for developing a well with sufficient yield or acceptable turbidity, further steps will be taken to assure that the well screen is appropriately sized for the formation material. This may include performing sieve analysis of the formation material and determining well screen slot size based on the grain size distribution.

Pre-packed dual-wall well screens will be the preferred screen-type for well construction. Pre-packed well screens combine a centralized inner well screen, a developed filter sand pack, and an outer conductor screen in one integrated unit composed of inert materials. Pre-packed well screens will be installed following general industry standards and using the current version of USEPA SESDGUID-101-R2 as a general guide. If the dual-wall pre-packed-screened wells do not yield sufficient water or are excessively turbid after development, further steps will be taken to assure that the well screen is appropriately sized for the formation material. This may include performing sieve analysis of the formation material and determining well screen slot size based on the grain size distribution.

FILTER PACK AND ANNULAR SEAL

The materials used to construct the filter pack will be clean quartz sand of a size that is appropriate for the screened formation. Fabric filters will not be used as filter pack material. Sufficient filter material will be placed in the boring and measurements taken to ensure that no bridging occurs. Upon placement of the filter pack, the well may be pumped to assure settlement of the pack. If pumping is performed, the top of elevation of filter pack depth will be measured, with additional sand added if necessary. The filter pack will extend a minimum of two feet above the top of the well screen.

The materials used to seal the annular space in the boring above the well pack must prevent hydraulic communication between strata and prevent migration from overlying areas into the well screen interval. A minimum of two feet of bentonite (chips, pellets, or slurry) will be placed immediately above the filter pack. The bentonite seal will extend up to the base of any overlying confining zone or the top of the water-bearing zone to prevent cementitious grout from entering the water-bearing or screened zones. If dry bentonite is used, the bentonite must be hydrated with potable water prior to grouting the remaining annulus. The bentonite seal will be allowed to hydrate for at least eight hours or the manufacturer's recommended hydration time, whichever is greater.

The annulus above the bentonite seal will be grouted with a cement and bentonite mixture (approximately 94 pounds cement / 3 to 5 pounds bentonite / 6.5 gallons of potable water) or bentonite slurry placed via tremie pipe from the top of the bentonite seal. During grouting, care will be taken to assure that the bentonite seal is not disturbed by locating the base of the tremie pipe approximately two feet above the bentonite seal and injecting grout at low pressure/velocity. The grout will be allowed to cure for at least 24 hours prior to well completion.

PROTECTIVE CASING AND WELL COMPLETION

After allowing the grout to settle, the well will be finished by installing a flush-mount or above-ground protective casing as appropriate, and building a surface cap. The use of flush-mount wells will generally be limited to paved surfaces unless Site operations warrant otherwise. The surface cap will extend from the top of grout to ground surface, where it will become a concrete apron extending outward with a radius of at least 2 feet from the edge of the well casing and sloped to drain water away from the well.

Each well will be fitted with a cap that contains a hole or opening to allow the air pressure in the well to equalize with atmospheric pressure. The cap will be locked in flush mount wells. In wells with above-ground protection, the space between the well casing and the protective casing will be filled with coarse sand or pea-gravel to within approximately 6 inches of the top of the well casing. A small weep hole will be drilled at the base of the metal casing for the drainage of moisture from the casing. Above ground protective covers will be locked.

Protective bollards may be installed around each above-grade groundwater monitoring well. Well construction in high traffic areas will generally be limited unless Site conditions warrant otherwise.

The groundwater monitoring well detail attached in **Appendix B-1**, Groundwater Monitoring Well Detail, illustrates the general design and construction details for a monitoring well.

WELL DEVELOPMENT

After well construction is completed, wells will be developed by alternately purging and surging until relatively clear discharge water with little turbidity is observed. The goal will be to achieve a turbidity of less than 10 nephelometric turbidity units (NTUs); however, formation-specific conditions may not allow this target to be accomplished. Additionally, the stabilization criteria contained in **Appendix C**, Groundwater Sampling Procedures, should be met. A variety of techniques may be used to develop Site groundwater monitoring wells. The method used must create reversals or surges in flow to eliminate bridging by particles around the well screen. These reversals or surges can be created by using surge blocks, bailers, or pumps. The wells will be developed using a pump capable of inducing the stress necessary to achieve the development goals. All development equipment will be decontaminated prior to first use and between wells.

In low yielding wells, potable water may be added to the well to facilitate surging of the well screen interval and removal of fine-grained sediment. If water is added, the volume will be documented and at minimum two times the volume of water added will be purged from the well.

The geologic formations underlying the Site contain clay and silt particles that are small enough to work their way through a well's filter pack over time. Therefore, the turbidity of the groundwater from the monitoring wells may gradually increase over time after initial well development. As a result, monitoring wells may need to be redeveloped periodically to remove the silt and clay that has worked its way into the filter packs of the wells. Each monitoring well should be redeveloped when sample turbidity values have significantly increased since initial development or since prior redevelopment. The redevelopment should be performed as described above.

Well development will be conducted under the supervision of a certified groundwater professional and well development data will be provided as part of well installation report.

4.3 ABANDONMENT

In accordance with 391-3-4-.10(6)(g), monitoring wells require abandonment and replacement after two consecutive dry sampling events, unless an alternate schedule is approved by the GA EPD. Well abandonment will be directed by a qualified groundwater scientist registered to practice in the State of Georgia using industry-accepted practices, the GA EPD Manual for Groundwater Monitoring (1991), and Georgia's Well Water Standards Act of 1985 [Official Code of Georgia Annotated (O.C.G.A.) § 12-5-120, 1985] as guides. Neat Portland cement or bentonite will be used as appropriate to complete abandonment and seal the well borehole. A minor modification shall be submitted in accordance with Rule 391-3-4.02(3)(b)(6) prior to the installation or decommissioning of monitoring wells.

4.4 DOCUMENTATION

The following information documenting the construction of each well at AP-E is provided on either the boring logs or the well installation reports for the existing monitoring system (Appendix A). Within 60 days of construction, development, and survey or abandonment of each groundwater monitoring well, a well installation/abandonment report will be submitted to GA EPD certified by a Qualified Groundwater Scientist (certified Professional Engineer or Professional Geologist). For installed wells, the following information will be provided:

- Well Identification
- Name of drilling contractor and type of drill rig
- Documentation that the driller, at the time the monitoring wells were installed, had a bond on file with the Water Well Advisory Council
- Narrative of drilling technique applied, well construction details, and well development procedures, including drilling dates, drilling fluids used (if applicable), well casing and screen materials, screen slot size, and joint type
- Dates of drilling and initial well emplacement
- Drilling method and drilling fluid, if used
- Well location (±0.5 ft)
- Borehole diameter and well casing diameter
- Well depth (±0.1 ft)
- Lithologic logs
- Well casing materials
- Screen materials and design (i.e., interval in feet below ground surface and elevation)
- Screen length
- Screen slot size
- Joint type
- Filter pack emplacement method and material/size and volume
- Details of filter pack material/size, emplacement method (narrative), and volume
- Seal emplacement method and type/volume of sealant
- Schematic of the well with dimensions for all components (e.g., casing, screen, sump, well pad)
- Well location given to within an accuracy of 0.5 feet based upon survey from acceptable survey point datum (NAD83) by a Georgia-registered professional surveyor
- Vertical elevations given to within an accuracy of 0.01 feet based upon survey from acceptable survey point datum (NAVD88) by a Georgia-registered professional surveyor

- Documentation of ground surface elevation (±0.01 feet). Based on the survey data from a known datum
- Documentation of top of casing elevation (±0.01 feet) Based on the survey data from a known datum
- Type of protective well cap and sump dimensions
- Well development date
- Well turbidity following development
- Narrative of well development method and documentation that water quality field parameters meet well development criteria (Section 4.2); as well as the specific procedures used and date of well development

In accordance with the Georgia Water Well Standards Act (O.C.G.A §12-5-120), at least once every five years, the owner of the property on which a monitoring well is constructed shall have the monitoring well(s) inspected by a certified Professional Engineer or Professional Geologist, who shall direct appropriate remedial corrective work to be performed if the well does not conform to standards. Well inspection records and records of remedial corrective work are subject to review by GA EPD. Additionally, the cost estimate based upon current year cost for the well inspections will be provided as part of the cost calculations for the groundwater monitoring period.

5. GROUNDWATER MONITORING PARAMETERS AND FREQUENCY

The following describes groundwater sampling requirements with respect to parameters for analysis, sampling frequency, sample preservation and shipment, and analytical methods. Groundwater samples used to provide compliance monitoring data will not be filtered prior to collection. When referenced throughout this plan, Appendix III and Appendix IV parameters refer to the parameters contained in Appendix III and Appendix IV of 40 CFR 257, Subpart D, 80 Fed. Reg. 21468 (April 17, 2015).

A minimum of eight independent samples from each groundwater well will be collected and analyzed for 40 CFR 257, Subpart D, Appendix III, and Appendix IV test parameters to establish a background statistical dataset. Subsequently, in accordance with 391-3-4-.10(6), the monitoring frequency for the Appendix III parameters will be at least semi-annual during the active life of the facility and the post-closure care period. If required, assessment monitoring will be performed per Georgia Chapter 391-3-4-.10, Rules for Solid Waste Management. Assessment monitoring was initiated on November 13, 2019, per GA Chapter 391-3-4-.10(6) Rules for Solid Waste Management, and the Site entered into an assessment of corrective measures on July 21, 2022. Details regarding groundwater monitoring parameters and frequency are presented in **Table 1**, *Groundwater Monitoring Parameters & Frequency*.

The groundwater samples will be analyzed using methods specified in USEPA Manual SW-846, EPA 600/4-79-020, Standard Methods for the Examination of Water and Wastewater (SM18-20), USEPA Methods for the Chemical Analysis of Water and Wastes (MCAWW), American Society for Testing and Materials (ASTM), or other suitable analytical methods approved by GA EPD. The method used will be able to reach a suitable practical quantification limit to detect natural background conditions at the facility. The groundwater samples will be analyzed by licensed and accredited laboratories through the National Environmental Laboratory Accreditation Conference (NELAC). Field instruments used to measure pH must be accurate and reproducible to within 0.1 Standard Units (S.U.). Details regarding analytical methods are presented in **Table 2**, *Analytical Methods*.

TABLE 1
GROUNDWATER MONITORING PARAMETERS & FREQUENCY

MONITORING PARAMETER		GROUNDWATER MONITORING	
		Background	Semi-Annual Events
Field Parameters	Temperature	X	X
	pH	X	X
	ORP	X	X
	Turbidity	X	X
	Specific Conductance	X	X
	Dissolved Oxygen	X	X
Appendix III (Detection)	Boron	X	X
	Calcium	X	X
	Chloride	X	X
	Fluoride	X	X
	pH	X	X
	Sulfate	X	X
	Total Dissolved Solids	X	X
Appendix IV (Assessment)	Antimony	X	Assessment sampling frequency and parameter list determined in accordance with Georgia Chapter 391-3-4.10(6).
	Arsenic	X	
	Barium	X	
	Beryllium	X	
	Cadmium	X	
	Chromium	X	
	Cobalt	X	
	Fluoride	X	
	Lead	X	
	Lithium	X	
	Mercury	X	
	Molybdenum	X	
	Selenium	X	
	Thallium	X	
	Radium 226 & 228	X	

TABLE 2
ANALYTICAL METHODS

Parameters	USEPA Method Number
Boron	6010D/6020B
Calcium	6010D/6020B
Chloride	300.0/300.1/9250/9251/9253/9056A
Fluoride	300.0/300.1/9214/9056A
pH	150.1 field
Sulfate	9035/9036/9038/300.0/300.1/9056A
Total Dissolved Solids (TDS)	160/2540C
Antimony	EPA 7040/7041/6010D/6020B
Arsenic	EPA 7060A/7061A/6010D/6020B
Barium	EPA 7080A/7081/6010D/6020B
Beryllium	EPA 7090/7091/6010D/6020B
Cadmium	EPA 7130/7131A/6020B
Chromium	EPA 7190/7191/6010D/6020B
Cobalt	EPA 7200/7201/6010D/6020B
Fluoride	300.0/300.1/9214/9056A
Lead	EPA 7420/7421/6010D/6020B
Lithium	6010/6020B
Mercury	7470
Molybdenum	6010/6020B
Selenium	EPA 7740/7741A/6010D/6020B
Thallium	EPA 7840/7841/6010D/6020B
Radium 226 and 228 combined	EPA 903/9320/9315

6. SAMPLE COLLECTION

During each sampling event, groundwater samples will be collected and handled in accordance with the procedures specified in **Appendix C**, Groundwater Sampling Procedure. Sampling procedures were developed using standard industry practice and USEPA Region 4 *Field Branches Quality System and Technical Procedures* as a guide. Low-flow sampling methodology will be utilized for sample collection. Alternative industry accepted sampling techniques may be used when appropriate with prior GA EPD approval. The applied groundwater purging, and sampling methodologies will be discussed in the groundwater semi-annual monitoring reports submitted to GA EPD.

For groundwater sampling, positive gas displacement Teflon or stainless-steel bladder pumps will be used for purging. If dedicated bladder pumps are not used, portable bladder pumps or peristaltic pumps (with dedicated or disposable tubing) may be used. When non-dedicated equipment is used, it will be decontaminated prior to use and between wells. Non-dedicated equipment will be decontaminated in accordance with the US EPA LSASDPROC-205-R4 (US EPA, 2020).

Per Georgia Rule 391-3-4-.10(6)(g) monitoring wells require replacement after two consecutive dry sampling events. Well installation must be directed by a qualified groundwater scientist. A minor modification will be submitted in accordance with Rule 391-3-4-.02 prior to the installation or decommissioning of monitoring wells.

7. CHAIN-OF-CUSTODY

Samples will be handled under chain-of-custody (COC) procedures beginning in the field. The COC record will contain the following information:

- Sample identification numbers
- Signature of collector
- Date and time of collection
- Sample type
- Sample point identification
- Number of sample containers
- Signature of person(s) involved in the chain of possession
- Notated date(s) and time(s) of sample transfer between individuals
- Date and time of possession by each individual

The samples will remain in the custody of assigned personnel, an assigned agent, or the laboratory. If the samples are transferred to other employees for delivery or transport, the sampler or possessor must relinquish possession and the samples must be received by the new owner.

If the samples are being shipped, a hard copy COC will be signed and enclosed within the shipping container.

Samplers must use COC forms provided by the analytical laboratory or use a COC form similarly formatted and containing the information listed above.

8. FIELD QUALITY ASSURANCE / QUALITY CONTROL

All field quality control samples will be prepared the same as compliance samples with regard to sample volume, containers, and preservation. The following quality control samples will be collected during each sampling event:

Field Equipment Rinsate Blanks - Where sampling equipment is not new or dedicated, an equipment rinsate blank will be collected at a rate of one blank per 10 samples using non-dedicated equipment.

Field Duplicates - Field duplicates are collected by filling additional containers at the same location, and the field duplicate is assigned a unique sample identification number. One blind field duplicate will be collected for every 10 samples.

Field Blanks - Field blanks are collected in the field using the same water source that is used for decontamination. The water is poured directly into the supplied sample containers in the field and submitted to the laboratory for analysis of target constituents. One field blank will be collected for every 10 samples.

The groundwater samples will be analyzed by licensed and accredited laboratories through the National Environmental Laboratory Accreditation Program (NELAP).

The groundwater quality field meter(s) used during a sampling event will be calibrated in a manner consistent with the manufacturer's specifications before sampling activities commence and at the start of each day during which groundwater samples will be collected (i.e., a field day). The calibration data will be recorded on the appropriate field form. Instruments will be recalibrated as necessary (e.g., when calibration checks indicate significant variability), and all checks and recalibration steps will be documented on field calibration forms. Calibration of the instruments will also be checked if any readings during sampling activities are suspect. Replacement probes and meters will be obtained as a corrective action in the event that recalibration does not improve instrument function. Calibration field forms will be included in all groundwater monitoring reports.

9. REPORTING RESULTS

A semi-annual groundwater report that documents the results of sampling and analysis will be submitted to EPD, added to the site Operating Record, and posted to Georgia Power's CCR Website. Semi-annual groundwater monitoring reports will be submitted to the EPD within 90 days of receipt and statistical analysis of the groundwater analytical data from the laboratory. At a minimum, semi-annual reports will include:

1. A narrative describing sampling activities and findings including a summary of the number of samples collected, the dates the samples were collected and whether the samples were required by the detection or assessment monitoring programs.

2. A record of field sampling conditions including, well signage, well access, sampling, and purging equipment condition, and site conditions that may affect sampling will be recorded on a Well Inspection Form (**Appendix C**). These forms will be included as an appendix to the semi-annual groundwater monitoring reports.

3. A brief overview of purging/sampling methodologies.

4. Discussion of results.

5. Recommendations for the future monitoring consistent with the Rules.

6. Potentiometric surface contour map for the aquifer(s) being monitored, signed, and sealed by a Georgia-registered PG or PE.

7. Table of as-built information for groundwater monitoring wells including top of casing elevations, ground surface elevations, screened elevations, groundwater elevations and depth to water measurements.

8. Groundwater flow rate and direction calculations.

9. Identification of any groundwater wells that were installed or decommissioned during the preceding year, along with a narrative description of why these actions were taken.

10. A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels).

11. If applicable, semi-annual assessment monitoring results.

12. Any alternate source demonstration completed during the previous monitoring period, if applicable.

13. Laboratory reports.

14. COC documentation.

15. Field sampling logs including field instrument calibration, indicator parameters and parameter stabilization criteria.

16. Documentation of non-functioning or dry well location.

17. Table of current analytical results for each well, highlighting statistically significant increases and concentrations above Maximum Contaminant Level (MCL)

18. Certification by a qualified groundwater scientist

19. Statistical analyses of Appendix III statistically significant increases (SSI) and Appendix IV statistically significant limits (SSL), including trend analyses of SSLs of Appendix IV constituents if the unit is currently undergoing assessment of corrective measures.

20. Plume delineation (if applicable)

21. Updated potable water well survey (annually, if applicable)

10. STATISTICAL ANALYSES

Groundwater quality data from each sampling event will be statistically evaluated to determine if there has been a statistically significant change in groundwater chemistry. Historical background data will be used to determine statistical limits.

According to EPD rules (391-3-4-.10(6)(a), which incorporates the statistical analysis requirements of 40 CFR 257.93 by reference), the Site must specify in the operating record the statistical methods to be used in evaluating groundwater monitoring data for each constituent. The statistical test chosen shall be conducted separately for each constituent in each well. As authorized by the rule, statistical tests that may be used include:

1. A prediction interval procedure in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the upper prediction limit. (§257.93(f)(3)).

2. A control chart approach that gives control limits for each constituent. ((§257.93(f)(4)).

3. Another statistical test method (such as prediction limits or control charts) that meets the performance standards of §257.93(g). A justification for an alternative method will be placed in the operating record and the Director notified of the use of an alternative test. The justification will demonstrate that the alternative method meets the performance standards of §257.93(g).

Figure 1, *Statistical Analysis Plan Overview*, presents a flowchart that depicts the process to be followed to develop the site-specific plan. **Figure 2***, Decision Logic for Computing Tolerance or Prediction Intervals* presents the logic used to calculate site-specific statistical limits and test compliance results against those limits. Interwell statistical methods will be used to compare Appendix III groundwater monitoring data to background conditions. Confidence intervals will be constructed for each downgradient well and used to compare Appendix IV groundwater monitoring data to groundwater protection standards. These statistical analysis methods are consistent with the *Statistical Analysis of Groundwater Data at RCRA Facilities Unified Guidance* (Unified Guidance) (US EPA, 2009).

FIGURE 1. STATISTICAL ANALYSIS PLAN OVERVIEW

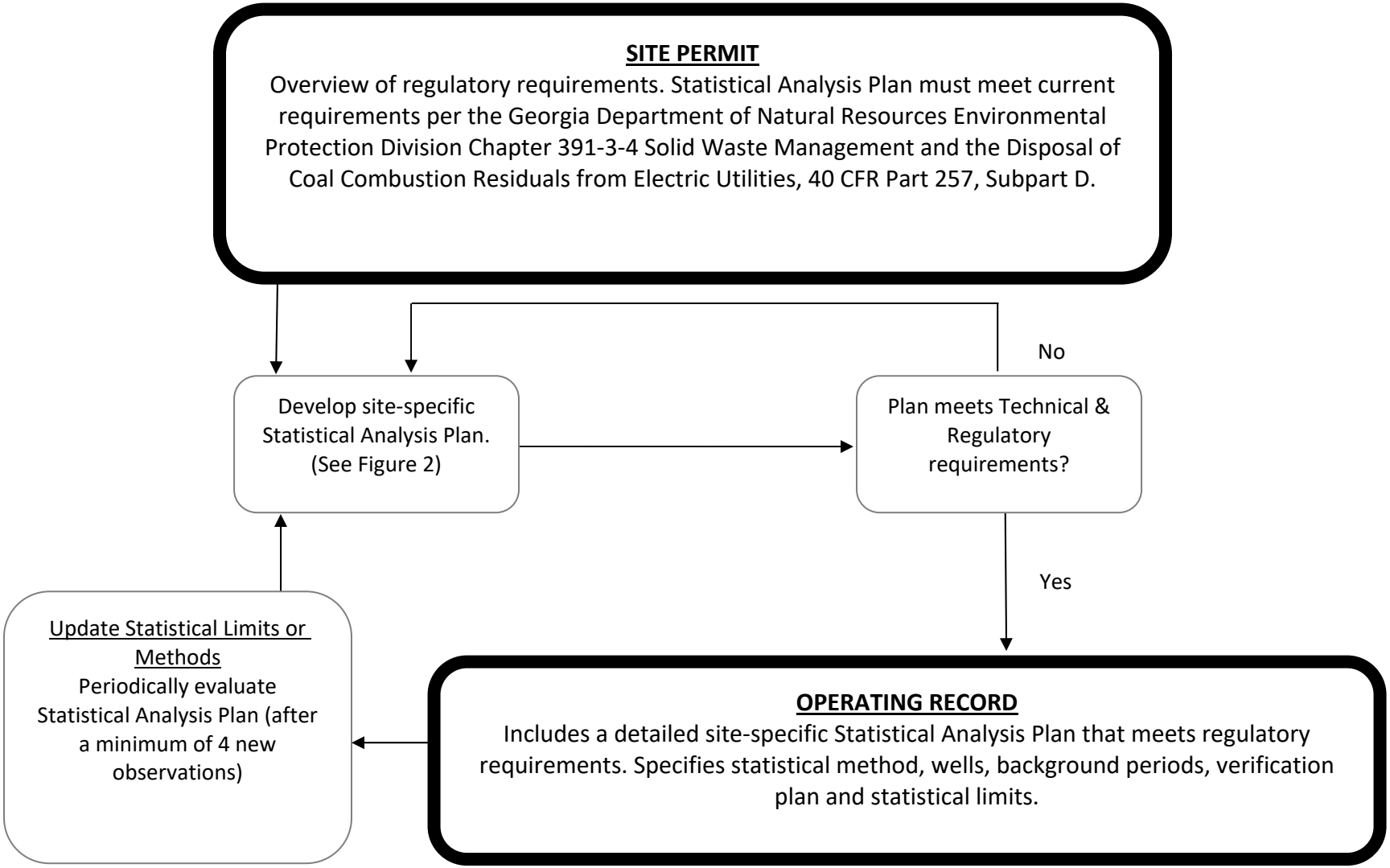
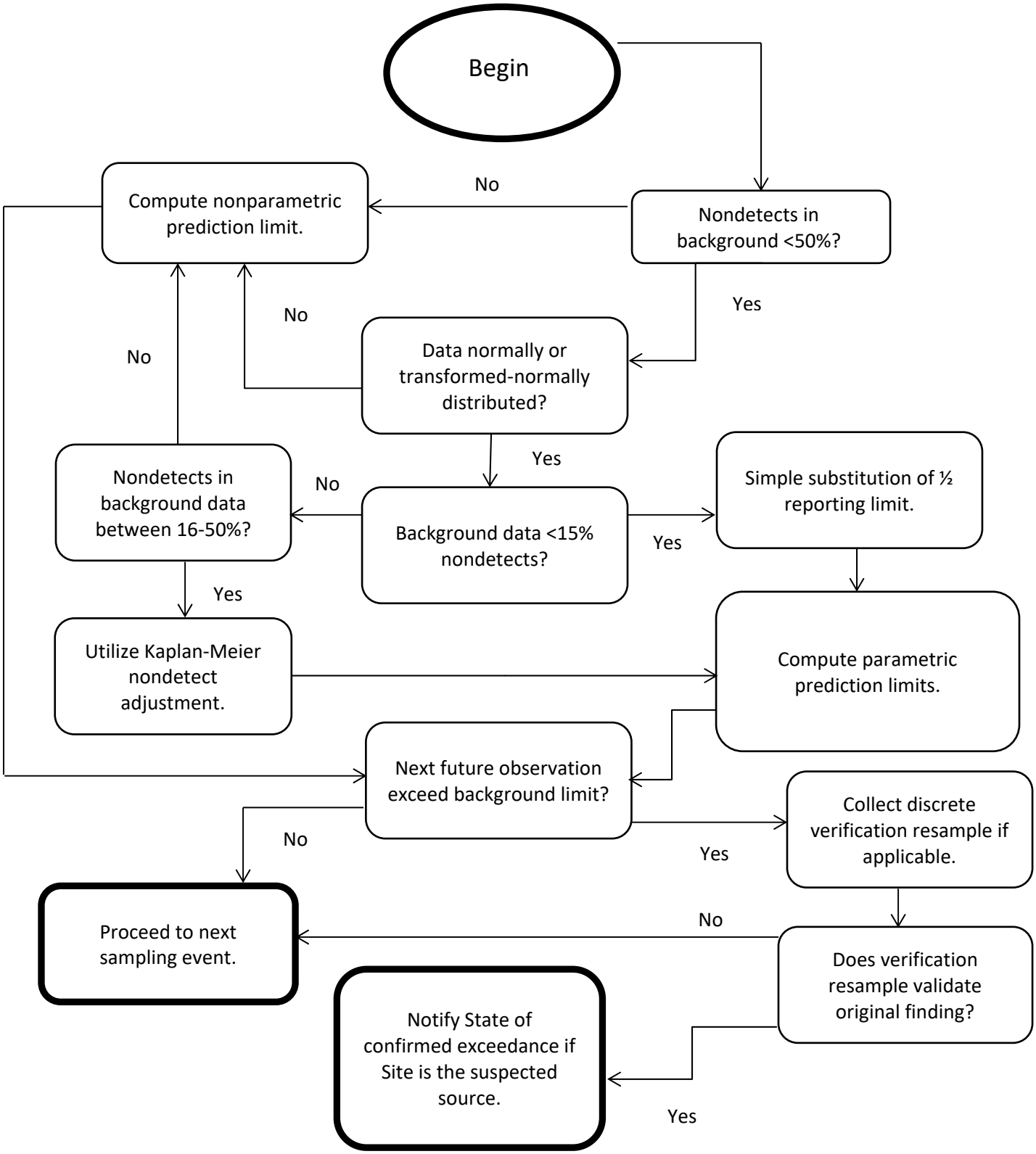


FIGURE 2. DECISION LOGIC FOR COMPUTING TOLERANCE OR PREDICTION INTERVALS



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APPENDICES

A. MONITORING SYSTEM DETAILS
B. GROUNDWATER MONITORING WELL INFORMATION
C. GROUNDWATER SAMPLING PROCEDURE

A. MONITORING SYSTEM DETAILS

N

LEGEND

- Detection Monitoring Well
- Horizontal Assessment Monitoring Well
- Vertical Assessment Monitoring Well
- Wetland Area
- Beaverdam Creek
- Property Boundary
- Approximate Ash Pond Boundary

Notes:
1. Property Boundary Provided by Southern Company Services.
2. Aerial: Google Earth Imagery, November 2019 and Georgia Power Company, January 2024.

0 1,000 2,000
Scale in Feet

MONITORING WELL NETWORK
ASH POND E

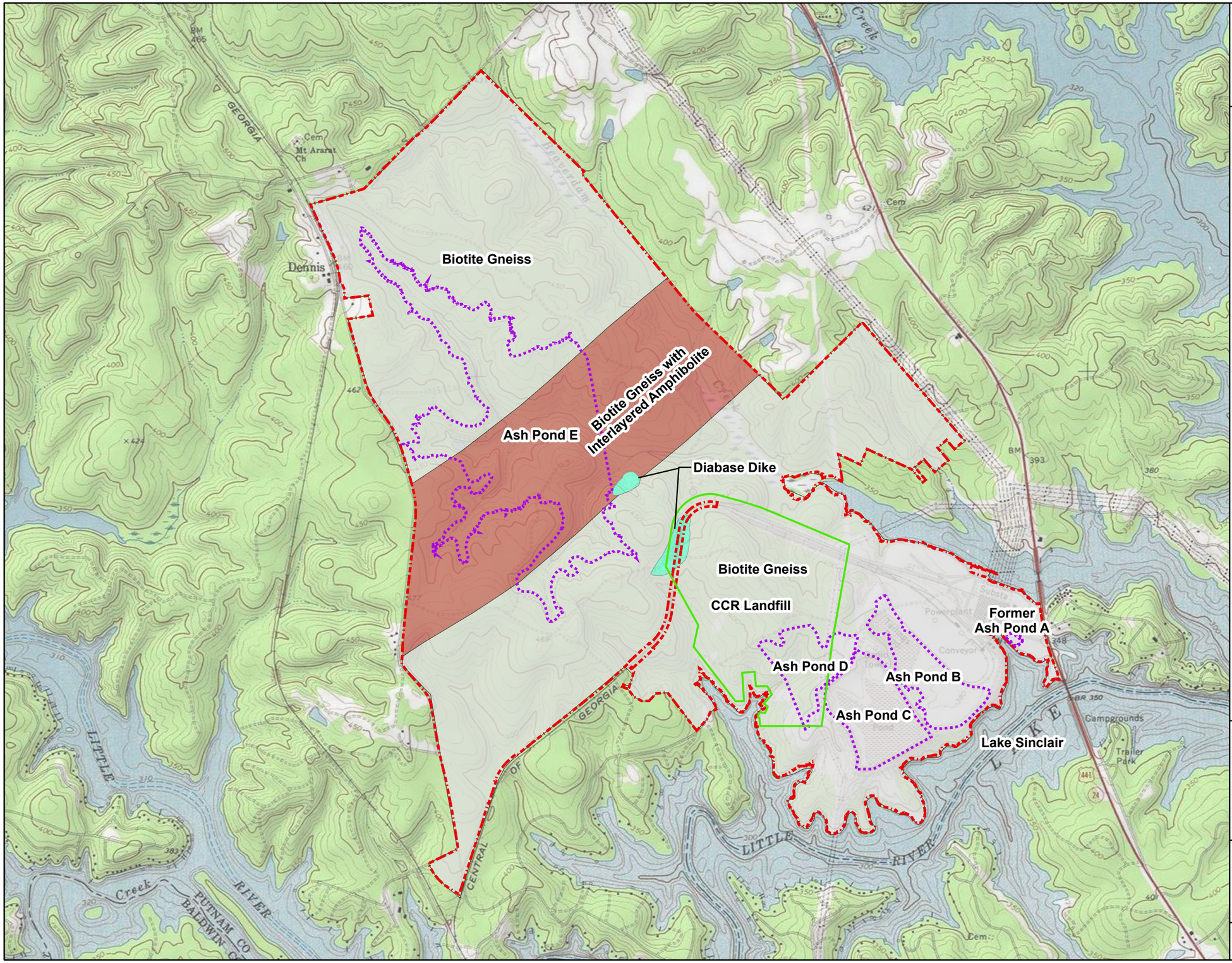
GEORGIA POWER COMPANY
PLANT BRANCH AP-E
PUTNAM COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | JANUARY 2025

FIGURE A-1



N

LEGEND

- Diabase Dike
- Biotite Gneiss
- Biotite Gneiss with Interlayered Amphibolite
- Approximate Boundary of Ash Pond
- CCR Landfill Permit Boundary
- Property Boundary

Notes:
1. Property Boundary Provided by Southern Company Services.
2. Topo Map Source: USA_Topo_Maps: Copyright:© 2013 National Geographic Society, i-cubed.

0 2,000 4,000
Scale in Feet

SITE GEOLOGICAL MAP

GEORGIA POWER COMPANY
PLANT BRANCH AP-E
PUTNAM COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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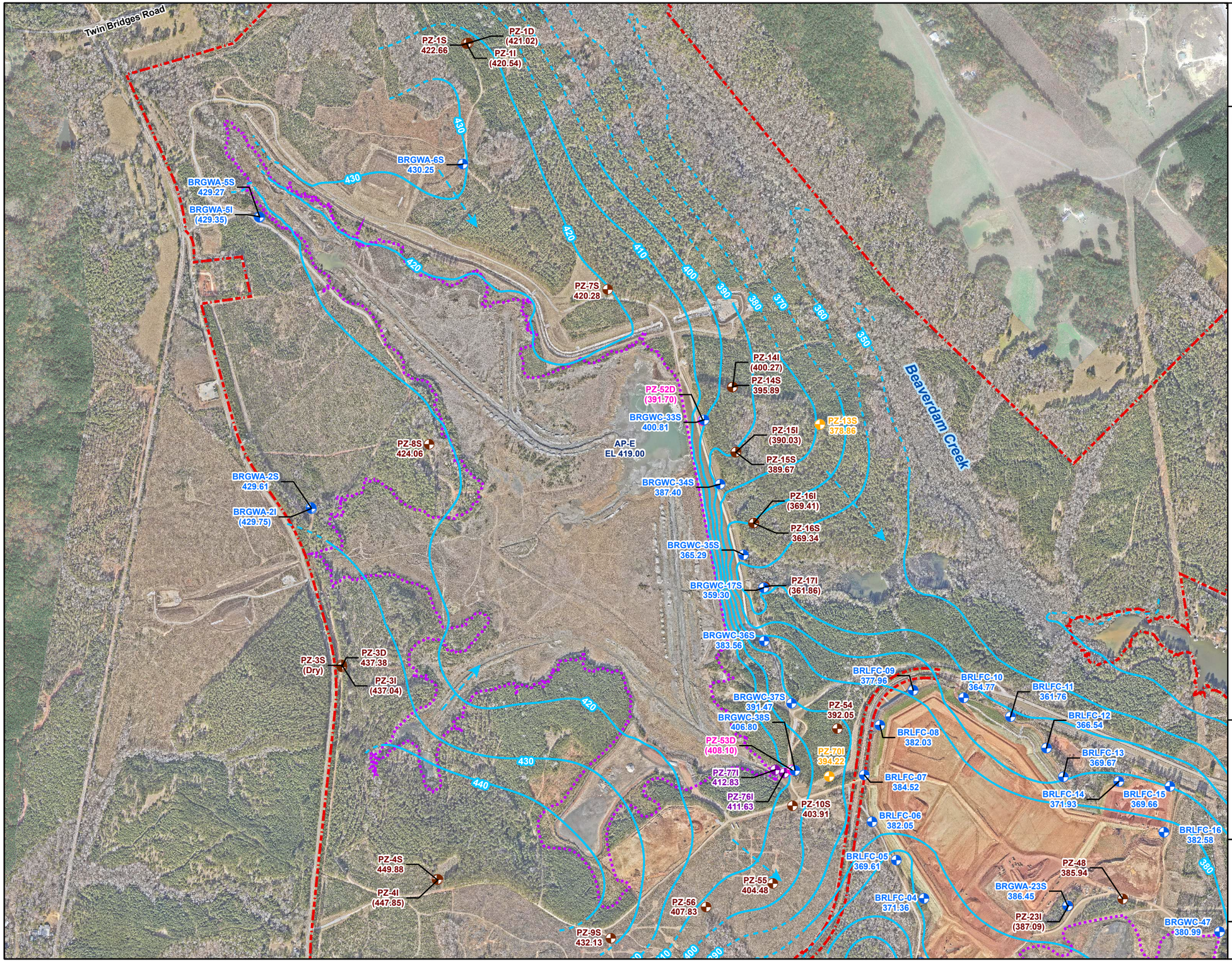
FIGURE A-2



N

LEGEND

- Detection Monitoring Well
- Horizontal Assessment Monitoring Well
- Vertical Assessment Monitoring Well
- Piezometer
- Temporary Piezometer
- Groundwater Elevation Iso-Contour
- Groundwater Elevation Iso-Contour (Inferred)
- Approximate Groundwater Flow Direction
- Property Boundary
- Approximate Ash Pond Boundary

JOSEPH M. IVANOWSKI ★ GEORGIA REGISTERED PROFESSIONAL GEOLOGIST ★ No. 002140

Notes:
1. Water level elevation recorded on August 26, 2024, for semiannual groundwater event.
2. Elevation provided in feet (ft) referenced to the North American Vertical Datum of 1988 (NAVD 88).
3. Groundwater iso-contours based on linear interpolation and extrapolation from known groundwater elevation data, and topographic elevations.
4. Groundwater elevations in parentheses were not used to make the groundwater contours because these wells are screened at a different elevation in the formation/aquifer.
5. Coordinate System: NAD 1983 State Plane Georgia West_FIPS (U.S. Feet).
6. Property Boundary Provided by Southern Company Services.
7. Aerial: Google Earth Imagery, November 2019 and Georgia Power Company, January 2024.

0 1,200 2,400
Scale in Feet

POTENTIOMETRIC SURFACE CONTOUR MAP - AUGUST 2024

GEORGIA POWER COMPANY
PLANT BRANCH AP-E
PUTNAM COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

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FIGURE A-3

N

LEGEND

- Detection Monitoring Well
- Horizontal Assessment Monitoring Well
- Vertical Assessment Monitoring Well
- Piezometer
- Temporary Piezometer
- Wetland Area
- Beaverdam Creek
- Property Boundary
- Approximate Ash Pond Boundary

Notes:
1. Property Boundary Provided by Southern Company Services.
2. Aerial: Google Earth Imagery, November 2019 and Georgia Power Company, January 2024.

0 1,000 2,000
Scale in Feet

PIEZOMETER AND GROUNDWATER MONITORING WELL LOCATIONS

GEORGIA POWER COMPANY
PLANT BRANCH AP-E
PUTNAM COUNTY, GEORGIA

Prepared For: Georgia Power

Prepared By: Geosyntec consultants

KENNESAW, GA | JANUARY 2025

FIGURE A-4

Table A-1
Piezometer, and Well Construction Details
Plant Branch, Putnam County, Georgia

Piezometer ID	Easting [1]	Northing [1]	TOC Elevation (ft NAVD88) [2]	Ground Surface Elevation (ft NAVD88)	Top of Screen Elevation (ft NAVD88)	Bottom of Screen Elevation (ft NAVD88)	Well Depth (ft bgs)	Monitoring Designation	Screened Media
Ash Pond E - Detection Monitoring Wells									
BRGWA-2S	2549952.60	1167139.70	443.20	440.40	406.2	396.2	44.6	Upgradient (Pond E)	Saprolite
BRGWA-2I	2549957.30	1167130.00	443.14	440.50	386.6	376.6	64.3	Upgradient (Pond E)	Bedrock
BRGWA-5S	2549415.50	1170177.50	443.86	440.80	411.2	401.2	40.0	Upgradient (Pond E)	Saprolite
BRGWA-5I	2549408.00	1170183.70	443.79	441.10	390.3	380.3	61.2	Upgradient (Pond E)	Bedrock
BRGWA-6S	2551540.80	1170732.90	458.96	455.80	416.5	406.5	49.7	Upgradient (Pond E)	Saprolite
BRGWC-17S	2554687.70	1166301.50	365.32	362.20	360.5	355.5	7.1	Downgradient (Pond E)	Saprolite
BRGWC-33S	2554064.80	1168057.00	416.68	414.20	398.1	388.1	26.5	Downgradient (Pond E)	Saprolite/PWR/Bedrock
BRGWC-34S	2554231.20	1167384.00	391.96	389.20	376.2	366.2	23.4	Downgradient (Pond E)	Saprolite
BRGWC-35S	2554476.30	1166646.00	366.31	363.70	346.5	336.5	27.6	Downgradient (Pond E)	Saprolite
BRGWC-36S	2554693.30	1165742.70	389.84	383.10	365.3	355.3	28.2	Downgradient (Pond E)	Saprolite
BRGWC-37S	2554979.50	1165093.00	447.05	444.40	391.2	381.2	63.6	Downgradient (Pond E)	Saprolite/PWR
BRGWC-38S	2555016.50	1164391.90	432.24	429.80	402.0	392.0	38.2	Downgradient (Pond E)	Saprolite/PWR
Ash Pond E - Assessment Monitoring Wells									
PZ-13S	2555276.70	1168011.40	409.97	406.50	382.2	372.2	34.7	Site Investigation (Pond E)	Saprolite
PZ-52D	2554051.70	1168053.90	417.03	414.30	365.0	355.0	59.7	Site Investigation (Pond E)	Bedrock
PZ-53D	2554984.30	1164393.80	434.68	431.60	301.1	291.1	140.7	Site Investigation (Pond E)	Bedrock
PZ-70I	2555374.08	1164326.66	425.70	422.88	383.2	373.2	50.2	Site Investigation (Pond E)	Salprolite/PWR
Ash Pond E - Water Level Piezometers									
PZ-1D[3]	2551598.10	1171999.00	463.41	462.90	396.9	302.9	160.0	Site-wide Water Levels	Bedrock
PZ-1I	2551577.80	1171995.80	464.71	461.90	392.8	382.8	79.5	Site-wide Water Levels	Bedrock
PZ-1S	2551588.00	1171996.40	465.07	462.40	407.8	397.8	65.0	Site-wide Water Levels	Saprolite
PZ-3D[3]	2550275.10	1165474.40	487.50	486.70	439.0	356.7	130.0	Site-wide Water Levels	Bedrock
PZ-3I	2550273.20	1165494.50	489.49	486.50	442.3	432.3	54.6	Site-wide Water Levels	Bedrock
PZ-3S	2550274.60	1165484.50	490.53	487.00	457.5	447.5	39.9	Site-wide Water Levels	Saprolite
PZ-4I	2551282.00	1163246.80	482.98	479.90	443.5	433.5	46.8	Site-wide Water Levels	Bedrock
PZ-4S	2551270.10	1163247.80	482.87	479.90	460.3	450.3	30.0	Site-wide Water Levels	Saprolite
PZ-7S	2553055.60	1169419.20	451.57	449.00	414.9	404.9	44.5	Site-wide Water Levels	Saprolite
PZ-8S	2551188.90	1167801.10	453.08	450.50	411.4	401.4	49.5	Site-wide Water Levels	Saprolite
PZ-9S	2553089.60	1162633.30	469.28	466.10	428.5	418.5	48.0	Site-wide Water Levels	Saprolite
PZ-10S	2554990.50	1164021.50	433.85	431.00	400.9	390.9	40.5	Site-wide Water Levels	Saprolite
PZ-14I	2554365.60	1168398.20	422.71	419.90	376.5	366.5	53.8	Site-wide Water Levels	Bedrock
PZ-14S	2554359.20	1168398.70	423.31	420.20	393.0	383.0	37.6	Site-wide Water Levels	Saprolite
PZ-15I	2554399.20	1167720.90	403.06	400.20	321.9	311.9	88.7	Site-wide Water Levels	Bedrock
PZ-15S	2554394.00	1167720.30	402.90	400.10	370.6	360.6	39.9	Site-wide Water Levels	Saprolite
PZ-16I	2554587.50	1166980.70	382.45	379.50	351.3	341.3	38.6	Site-wide Water Levels	Bedrock
PZ-16S	2554581.40	1166977.80	382.52	379.30	370.6	360.6	19.1	Site-wide Water Levels	Saprolite
PZ-17I	2554702.50	1166313.80	365.33	362.30	329.2	319.2	43.5	Site-wide Water Levels	Bedrock
PZ-54	2555458.30	1164828.70	443.86	440.80	399.2	389.2	51.8	Site-wide Water Levels	Saprolite
PZ-55	2554783.60	1163208.00	453.07	450.20	410.9	400.9	49.5	Site-wide Water Levels	Saprolite/PWR/Bedrock
PZ-56	2554086.30	1162965.10	418.84	416.20	396.8	386.8	29.7	Site-wide Water Levels	Saprolite/ PWR/Bedrock
Temporary Piezometers									
PZ-76I	2554903.80	1164366.20	433.84	430.89	400.1	390.1	41.0	Site-wide Water Levels	PWR
PZ-77I	2554810.04	1164396.90	433.33	430.31	400.5	390.5	40.1	Site-wide Water Levels	PWR

Notes:

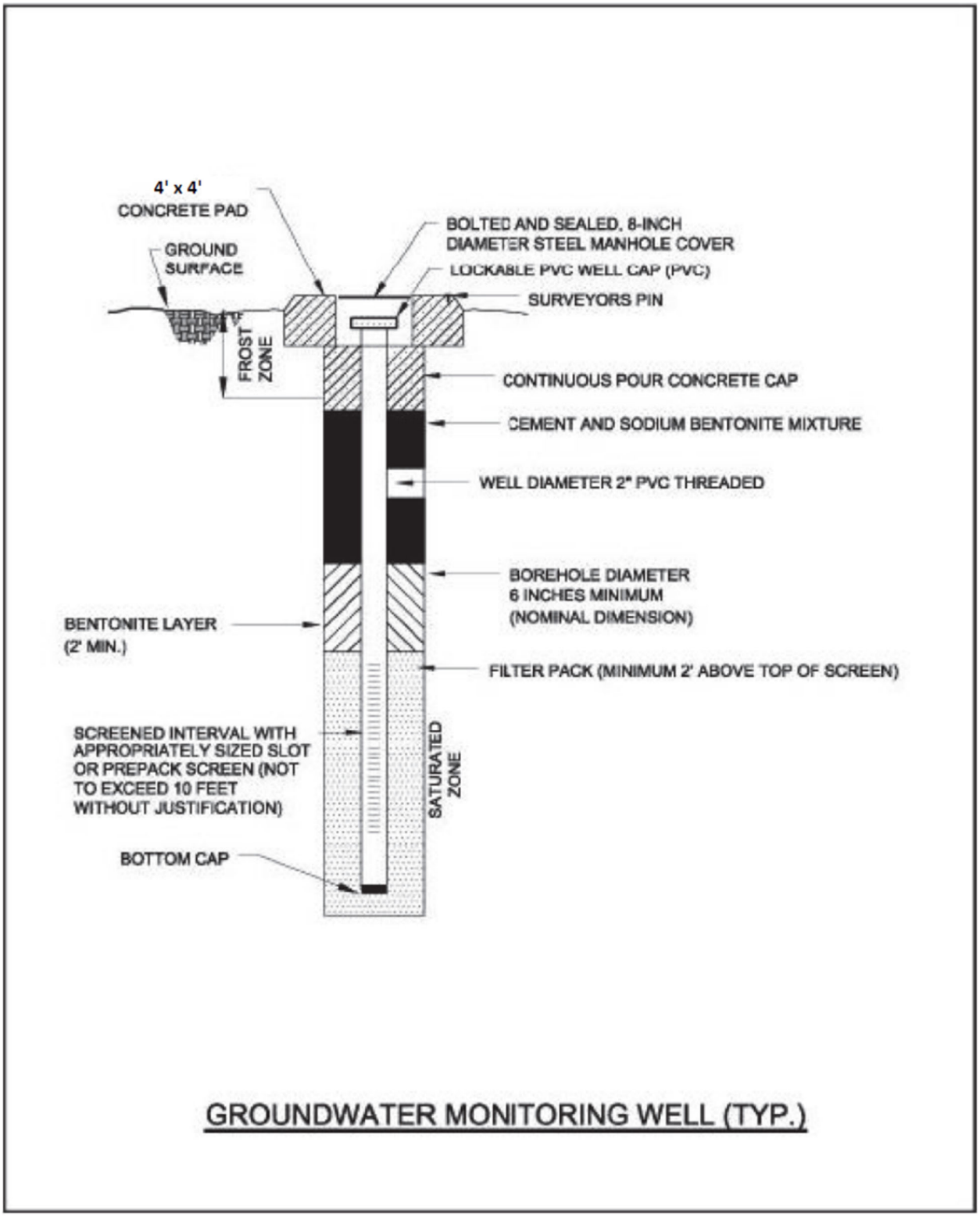
ft bgs = Feet below ground surface

TOC = Top of Casing

1. Coordinates in North America Datum (NAD) 1983, State Plane, Georgia West Zone, feet.
2. Elevations in feet (ft) are referenced to the North American Vertical Datum of 1988 (NAVD88).
3. Piezometer completed as open borehole in bedrock.

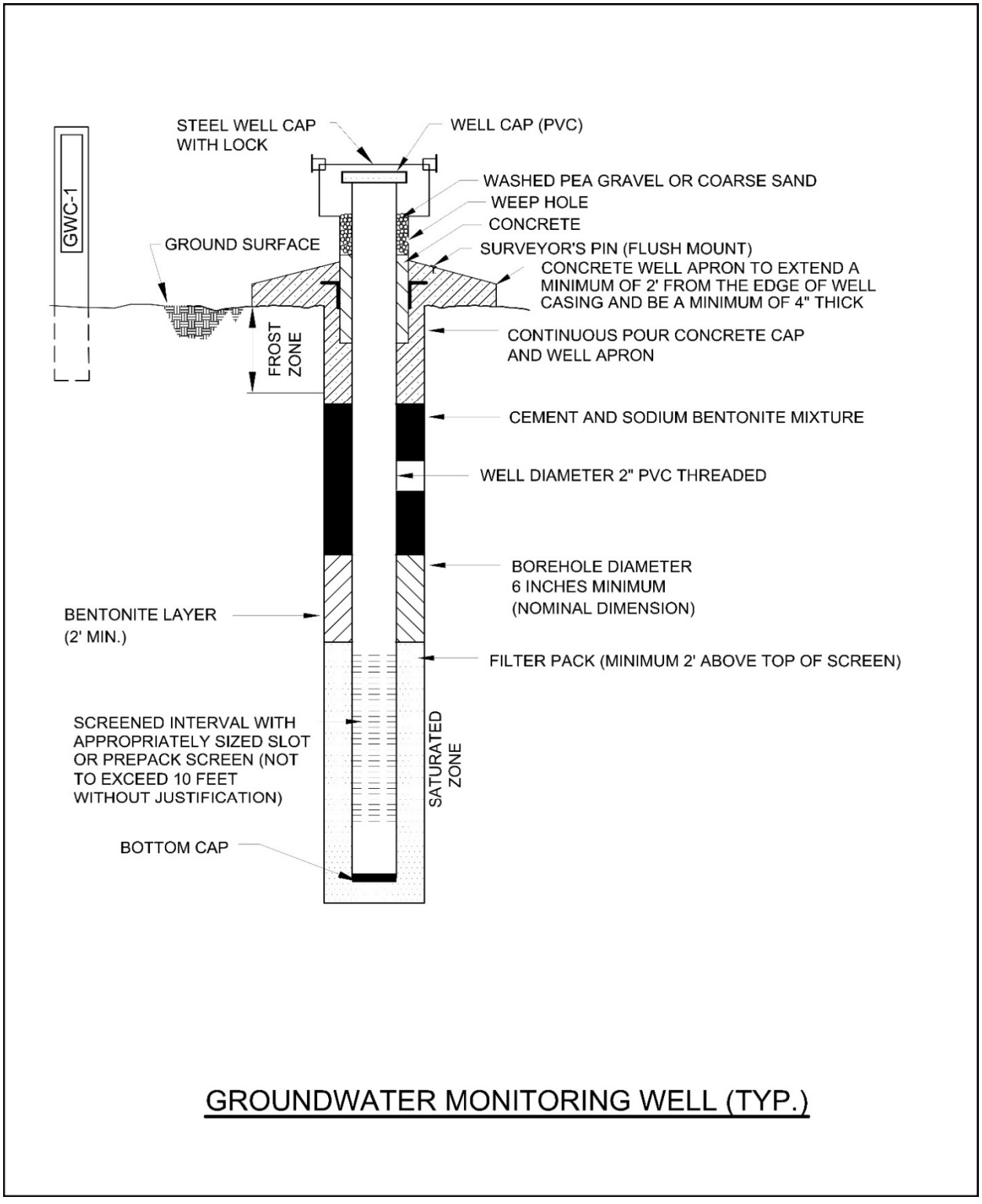
B. GROUNDWATER MONITORING WELL INFORMATION

B-1A. GROUNDWATER MONITORING WELL DETAIL (FLUSH MOUNT)



GROUNDWATER MONITORING WELL (TYP.)

B-1B. GROUNDWATER MONITORING WELL DETAIL (ABOVE GROUND)



B-2. DRILLERS PERFORMANCE BONDS

SURETY RIDER

To be attached to and form a part of

Bond No. 800031223

Type of Bond: Performance Bond for Water Well Contractors

dated effective June 30, 2017
(MONTH-DAY-YEAR)

executed by Michael C. Rice/Cascade Drilling, L.P. , as Principal,
(PRINCIPAL)

and by Atlantic Specialty Insurance Company , as Surety,

in favor of State of Georgia
(OBLIGEE)

in consideration of the mutual agreements herein contained the Principal and the Surety hereby consent to changing

Coverage under the bond to include:
Michael Coleman

Nothing herein contained shall vary, alter or extend any provision or condition of this bond except as herein expressly stated.

This rider is effective December 21, 2017
(MONTH-DAY-YEAR)

Signed and Sealed December 21, 2017
(MONTH-DAY-YEAR)

Michael C. Rice/Cascade Drilling, L.P.
(PRINCIPAL)

By: _____
(PRINCIPAL)

Atlantic Specialty Insurance Company

By: _____
Elizabeth R. Hahn, Attorney-in-Fact

ATLANTIC SPECIALTY INSURANCE COMPANY CORPORATE SEAL 986 NEW YORK

S-0443/GE 8/08

XDP

OneBeacon
INSURANCE GROUP

Power of Attorney

KNOW ALL MEN BY THESE PRESENTS, that ATLANTIC SPECIALTY INSURANCE COMPANY, a New York corporation with its principal office in Plymouth, Minnesota, does hereby constitute and appoint: **Deanna M. French, Jill A. Wallace, Susan B. Larson, Elizabeth R. Hahn, Jana M. Roy, Scott McGilvray, Mindee L. Rankin, Ronald J. Lange, John R. Claeys, Roger Kaltenbach, Guy Armfield, Scott Fisher**, each individually if there be more than one named, its true and lawful Attorney-in-Fact, to make, execute, seal and deliver, for and on its behalf as surety, any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof; provided that no bond or undertaking executed under this authority shall exceed in amount the sum of: **sixty million dollars ($60,000,000)** and the execution of such bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof in pursuance of these presents, shall be as binding upon said Company as if they had been fully signed by an authorized officer of the Company and sealed with the Company seal. This Power of Attorney is made and executed by authority of the following resolutions adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the President, any Senior Vice President or Vice-President (each an "Authorized Officer") may execute for and in behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and affix the seal of the Company thereto; and that the Authorized Officer may appoint and authorize an Attorney-in-Fact to execute on behalf of the Company any and all such instruments and to affix the Company seal thereto; and that the Authorized Officer may at any time remove any such Attorney-in-Fact and revoke all power and authority given to any such Attorney-in-Fact.

Resolved: That the Attorney-in-Fact may be given full power and authority to execute for and in the name and on behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and any such instrument executed by any such Attorney-in-Fact shall be as binding upon the Company as if signed and sealed by an Authorized Officer and, further, the Attorney-in-Fact is hereby authorized to verify any affidavit required to be attached to bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof.

This power of attorney is signed and sealed by facsimile under the authority of the following Resolution adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the signature of an Authorized Officer, the signature of the Secretary or the Assistant Secretary, and the Company seal may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing an Attorney-in-Fact for purposes only of executing and sealing any bond, undertaking, recognizance or other written obligation in the nature thereof, and any such signature and seal where so used, being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.

IN WITNESS WHEREOF, ATLANTIC SPECIALTY INSURANCE COMPANY has caused these presents to be signed by an Authorized Officer and the seal of the Company to be affixed this eighth day of December, 2014.

ATLANTIC SPECIALTY INSURANCE COMPANY CORPORATE SEAL 1986 NEW YORK

By _____
Paul J. Brehm, Senior Vice President

STATE OF MINNESOTA
HENNEPIN COUNTY

On this eighth day of December, 2014, before me personally came Paul J. Brehm, Senior Vice President of ATLANTIC SPECIALTY INSURANCE COMPANY, to me personally known to be the individual and officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, that he is the said officer of the Company aforesaid, and that the seal affixed to the preceding instrument is the seal of said Company and that the said seal and the signature as such officer was duly affixed and subscribed to the said instrument by the authority and at the direction of the Company.

TARA JANELLE STAFFORD
NOTARY PUBLIC - MINNESOTA
My Commission Expires
January 31, 2020

_____
Notary Public

I, the undersigned, Assistant Secretary of ATLANTIC SPECIALTY INSURANCE COMPANY, a New York Corporation, do hereby certify that the foregoing power of attorney is in full force and has not been revoked, and the resolutions set forth above are now in force.

Signed and sealed. Dated 21 day of December, 2017

ATLANTIC SPECIALTY INSURANCE COMPANY CORPORATE SEAL 1986 NEW YORK

This Power of Attorney expires
October 1, 2019

_____
James G. Jordan, Assistant Secretary

COPY

Bond Number K08315607

Performance Bond For Water Well Contractors And Drillers

Name of Water Well Contractor or Driller Michael C. Rice/Cascade Drilling, L.P.

Know All Men By These Present

That we Michael C. Rice/Cascade Drilling, L.P. AND ANY AND ALL EMPLOYEES, OFFICERS AND PARTNERS, as Principal, and Westchester Fire Insurance Company as Surety, are held and firmly bound unto the Director of the Environmental Protection Division (Director), Department of Natural Resources, State of Georgia and his or her Successor or Successors in office, as Obligee, in the full sum of **TWENTY THOUSAND AND NO/00 DOLLARS ($20.000.00)** for the payment of which will and truly to be made, we bind ourselves, our heir, administrators, successors and assigns, jointly and severally, by the present.

WHEREAS, the WATER WELL STANDARDS ACT OF 1985 (Ga. Laws 1985, p. 1192) (the "ACT") requires that water well contractors and drillers file performance bonds with the director to ensure compliance with the ACT; and WHEREAS the above bound PRINCIPAL is subject to the terms and provisions of said ACT. NOW, THEREFORE, the conditions of this obligation are such that if the above bound PRINCIPAL shall fully and faithfully perform the duties and in all things comply with the procedures and standards set forth in the ACT as now and hereafter amended, and the rules and regulations promulgated pursuant thereto, including but not limited to the correction of any violation of such procedures and standards upon discovery, irrespective of whether such discovery is made before completion of any well subject to this bond, then this obligation shall be void; otherwise of full force and effect.

And Surety, for value received, agrees that no amendment to existing laws, rules or regulations, or adoption of new laws, rules or regulations shall in anyway discharge its obligation on this bond, and does hereby waive notice of any such amendment, adoption or modification.

This bond shall be effective from date of issuance and shall continue in effect until terminated by expiration, mutual agreement or cancellation upon sixty (60) days written notice to Principal and Obligee; provided that the rights of the obligee and beneficiaries under this bond which arose prior to such termination shall continue.

The bond is effective 9/20/13 and unless sooner terminated, this bond shall terminate June 30, 2015. In Witness Thereof the Principal and Surety have caused these present to be duly signed and sealed, this 20th day of, September 2013.

Michael C. Rice/Cascade Drilling, L.P.

PRINCIPAL, BY _____ (L.S.) TITLE: _____

Westchester Fire Insurance Company

SURETY BY: Roxana Palacios

Roxana Palacios, Attorney-in-Fact

GEORGIA REGISTERED AGENT N/A SEAL:

Revised December 2012

CONTINUATION
CERTIFICATE

Atlantic Specialty Insurance Company , Surety upon

a certain Bond No. 800033976

dated effective 09/27/2017
(MONTH-DAY-YEAR)

on behalf of Ricky Davis / Cascade Drilling, L.P.
(PRINCIPAL)

and in favor of Department of Natural Resources, State of Georgia
(OBLIGEE)

does hereby continue said bond in force for the further period

beginning on 06/30/2019
(MONTH-DAY-YEAR)

and ending on 06/30/2021
(MONTH-DAY-YEAR)

Amount of bond Thirty Thousand and 00/100 Dollars ($30,000.00)

Description of bond Performance Bond for Water Well Contractors

Premium: $1200.00

PROVIDED: That this continuation certificate does not create a new obligation and is executed upon the express condition and provision that the Surety's liability under said bond and this and all Continuation Certificates issued in connection therewith shall not be cumulative and that the said Surety's aggregate liability under said bond and this and all such Continuation Certificates on account of all defaults committed during the period (regardless of the number of years) said bond had been and shall be in force, shall not in any event exceed the amount of said bond as hereinbefore set forth.

Signed and dated on March 4th, 2019
(MONTH-DAY-YEAR)

Atlantic Specialty Insurance Company

By Andrew P. Larsen
Attorney-in-Fact Andrew P. Larsen

Parker, Smith & Feek, Inc.
Agent

2233 112th Ave NE Bellevue, WA 98004
Address of Agent

425-709-3600
Telephone Number of Agent

S-0157/GE 8/08

XDP

CERTIFICATE OF LIABILITY INSURANCE

DATE(MM/DD/YYYY) 11/02/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
Aon Risk Services Southwest, Inc. Houston TX Office 5555 San Felipe Suite 1500 Houston TX 77056 USA	PHONE (A/C. No. Ext): (866) 283-7122	FAX (A/C. No.): (800) 363-0105
	E-MAIL ADDRESS:	

INSURED	INSURER(S) AFFORDING COVERAGE	NAIC #
Cascade Drilling, L.P. PO Box 1184 17270 Woodinville-Redmond Road Building "A", #777 Woodinville WA 98072 USA	INSURER A: Zurich American Ins Co	16535
	INSURER B: Aspen Specialty Insurance Company	10717
	INSURER C:	
	INSURER D:	
	INSURER E:	
	INSURER F:	

COVERAGES **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS. **Limits shown are as requested**

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
B	X **COMMERCIAL GENERAL LIABILITY** CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY PRO-JECT LOC OTHER:			ERAFXLW15	11/01/2015	11/01/2016	EACH OCCURRENCE	$1,000,000
							DAMAGE TO RENTED PREMISES (Ea occurrence)	$300,000
							MED EXP (Any one person)	$25,000
							PERSONAL & ADV INJURY	$1,000,000
							GENERAL AGGREGATE	$2,000,000
							PRODUCTS - COMP/OP AGG	$2,000,000
							Professional Liability	$1,000,000
A	**AUTOMOBILE LIABILITY** X ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS HIRED AUTOS NON-OWNED AUTOS			BAP 0137342-01	11/01/2015	11/01/2016	COMBINED SINGLE LIMIT (Ea accident)	$2,000,000
							BODILY INJURY (Per person)	
							BODILY INJURY (Per accident)	
							PROPERTY DAMAGE (Per accident)	
B	**UMBRELLA LIAB** X OCCUR X **EXCESS LIAB** CLAIMS-MADE DED RETENTION			EXAFXLY15	11/01/2015	11/01/2016	EACH OCCURRENCE	$10,000,000
							AGGREGATE	$10,000,000
A	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** ANY PROPRIETOR / PARTNER / EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N: N **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		WC013734402 Workers Comp AOS	11/01/2015	11/01/2016	X PER STATUTE OTH-ER	
A				WC013734502 Workers Comp AR,MA,NE, NY	11/01/2015	12/01/2015	E.L. EACH ACCIDENT	$1,000,000
							E.L. DISEASE-EA EMPLOYEE	$1,000,000
							E.L. DISEASE-POLICY LIMIT	$1,000,000
B	Contractor Poll			ERAFXLW15	11/01/2015	11/01/2016	Aggregate	$1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Certificate Holder is included as Additional Insured in accordance with the policy provisions of the Auto, General and Excess Liability policy. A Waiver of Subrogation is granted in favor of Certificate Holder in accordance with the policy provisions of the AL GL WC policy. Insurance evidenced herein is Primary to other insurance available to an Additional Insured, but only in accordance with the policy's provisions.

CERTIFICATE HOLDER

Southern Company Services
Attn: Keith Morgan
42 Inverness Center Parkway
BIN B426
Birmingham AL 35242 USA

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Aon Risk Services Southwest, Inc.

POLICY NUMBER: ERAFXLW15

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – PRIMARY AND NON-CONTRIBUTORY

It is hereby agreed that the Policy is amended as follows solely as respects Coverage Section 1. , Coverage 1A (Bodily Injury and Property Damage) and Coverage 1B (Personal and Advertising Injury):

SCHEDULE

Name of Person or Organization:
Where required by written contract.

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

The persons or organizations shown in the Schedule above are insureds under § III. WHO IS AN INSURED, paragraph F. of this Policy subject to all the terms and conditions of that paragraph.

With respect to the persons or organizations shown in the Schedule above, this Policy shall be primary and non-contributory with any other valid and collectible insurance available to such persons or organizations.

All other terms and conditions of this Policy remain unchanged.

POLICY NUMBER: ERAFXLW15

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

WAIVER OF TRANSFER OF RIGHTS OF RECOVERY

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s)
Blanket as required by written contract.

It is hereby agreed that “any person or organization” referred to in the waiver of rights of recovery contained in the last sentence of Section VI. **CONDITIONS**, paragraph O., **Subrogation,** includes the person or organization listed in the above Schedule.

All other terms and conditions of this Policy remain unchanged.

CONTINUATION CERTIFICATE

SAFECO Insurance Company of America , Surety upon

a certain Bond No. **4993104**

dated effective **June 30, 1987**
(MONTH-DAY-YEAR)

on behalf of **Southern Company Services, Inc.**
(PRINCIPAL)

and in favor of **Georgia - Dept. of Natural Resources**

(OBLIGEE)

does hereby continue said bond in force for the further period

beginning on **June 30, 2014**
(MONTH-DAY-YEAR)

and ending on **June 30, 2015**
(MONTH-DAY-YEAR)

Amount of bond **$10,000.00**

Description of bond **Water Well Contractors & Drillers**

Premium: **$100.00**

PROVIDED: That this continuation certificate does not create a new obligation and is executed upon the express condition and provision that the Surety's liability under said bond and this and all Continuation Certificates issued in connection therewith shall not be cumulative and that the said Surety's aggregate liability under said bond and this and all such Continuation Certificates on account of all defaults committed during the period (regardless of the number of years) said bond had been and shall be in force, shall not in any event exceed the amount of said bond as hereinbefore set forth.

Signed and dated on **April 09, 2014**
(MONTH-DAY-YEAR)

SAFECO Insurance Company of America

By _____
D-Ann Kleidosty, Attorney-In-Fact

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.
This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Certificate No. 6125754

First National Insurance Company of America
General Insurance Company of America
Safeco Insurance Company of America

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That First National Insurance Company of America, General Insurance Company of America, and Safeco Insurance Company of America are corporations duly organized under the laws of the State of New Hampshire (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Chaun M. Wilson; D-Ann Kleidosty; Gary D. Eklund; Sharon J. Potts; Sylvia M. Ogle; Tracey D. Watson; William G. Moody

all of the city of Atlanta, state of GA each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 15th day of May, 2013.

First National Insurance Company of America
General Insurance Company of America
Safeco Insurance Company of America

By: _____
Gregory W. Davenport, Assistant Secretary

STATE OF WASHINGTON ss
COUNTY OF KING

On this 15th day of May, 2013, before me personally appeared Gregory W. Davenport, who acknowledged himself to be the Assistant Secretary of First National Insurance Company of America, General Insurance Company of America, and Safeco Insurance Company of America, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Seattle, Washington, on the day and year first above written.

K.D RILEY COMM. EXP. NOTARY PUBLIC 12-09-2013 STATE OF WASHINGTON

By: KD Riley
KD Riley, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-law and Authorizations of First National Insurance Company of America, General Insurance Company of America, and Safeco Insurance Company of America, which are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS – Section 12. Power of Attorney. Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes Gregory W. Davenport, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and biding upon the Company with the same force and effect as though manually affixed.

I, David M. Carey, the undersigned, Assistant Secretary, of First National Insurance Company of America, General Insurance Company of America, and Safeco Insurance Company of America do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 9th day of April, 20 14.

By: _____
David M. Carey, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or residual value guarantees.

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

CONTINUATION CERTIFICATE

SAFECO Insurance Company of America , Surety upon

a certain Bond No. 4993104

dated effective June 30, 1987
(MONTH-DAY-YEAR)

on behalf of Southern Company Services, Inc.
(PRINCIPAL)

and in favor of Georgia Department of Natural Resources, Environmental Protection Division

(OBLIGEE)

does hereby continue said bond in force for the further period

beginning on June 30, 2017
(MONTH-DAY-YEAR)

and ending on June 30, 2018
(MONTH-DAY-YEAR)

Amount of bond $10,000.00

Description of bond Water Well Contractors & Drillers

PROVIDED: That this continuation certificate does not create a new obligation and is executed upon the express condition and provision that the Surety's liability under said bond and this and all Continuation Certificates issued in connection therewith shall not be cumulative and that the said Surety's aggregate liability under said bond and this and all such Continuation Certificates on account of all defaults committed during the period (regardless of the number of years) said bond had been and shall be in force, shall not in any event exceed the amount of said bond as hereinbefore set forth.

Signed and dated on May 04, 2017
(MONTH-DAY-YEAR)

SAFECO Insurance Company of America

By

D- Ann Kleidosty, Attorney-in-Fact

S-0157/GEEF 11/99

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.
This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Certificate No. 7710213

American States Insurance Company
First National Insurance Company of America
General Insurance Company of America
Safeco Insurance Company of America

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That American States Insurance Company is a corporation duly organized under the laws of the State of Indiana, that First National Insurance Company of America, General Insurance Company of America, and Safeco Insurance Company of America are corporations duly organized under the laws of the State of New Hampshire (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint,

Brooke A. Sharp; Christine Doczy; D-Ann Kleidosty; Gary D. Eklund; Sharon J. Potts; Sylvia M. Ogle

all of the city of Atlanta, state of GA each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 4th day of April, 2017.

American States Insurance Company
First National Insurance Company of America
General Insurance Company of America
Safeco Insurance Company of America

By: _____
David M. Carey, Assistant Secretary

STATE OF PENNSYLVANIA ss
COUNTY OF MONTGOMERY

On this 4th day of April, 2017, before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of American States Insurance Company, First National Insurance Company of America, General Insurance Company of America, and Safeco Insurance Company of America, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at King of Prussia, Pennsylvania, on the day and year first above written.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Teresa Pastella, Notary Public
Upper Merion Twp., Montgomery County
My Commission Expires March 28, 2021
Member, Pennsylvania Association of Notaries

By: _____
Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS – Section 12. Power of Attorney. Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Renee C. Llewellyn, the undersigned, Assistant Secretary, of American States Insurance Company, First National Insurance Company of America, General Insurance Company of America, and Safeco Insurance Company of America do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 4th day of May, 2017.

By: _____
Renee C. Llewellyn, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or residual value guarantees.

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

CLIENT'S COPY

SURETY BOND CONTINUATION CERTIFICATE

TO: State of Georgia
Division of Environmental Protection
2 Martin Luther King Jr. Drive SE
Suite 1252
Atlanta, GA 30334

To be attached to and form a part of: Performance Bond for Well Contractors and Drillers

Principal on the Bond: Michael C. Rice/Cascade Drilling, L.P.

Surety Bond Number: K08315607

Bond Amount: Twenty Thousand and 00/100 Dollars ($20,000.00)

In consideration of the agreed premium charged for this bond, it is understood and agreed that the following change shall be made to this obligation:

[x] **CONTINUATION CERTIFICATE**

This certificate extends the life of the bond to June 30, 2017. It is executed upon the express condition that the surety's liability under said bond, together with this and all previous continuation certificates, shall not be cumulative and shall in no event exceed the amount specifically set forth in said bond or any existing certificate changing the amount of said bond.

Signed, sealed and dated this 26th day of May , 2015 .

Westchester Fire Insurance Company

By: Katie J

Katie Snider, Attorney-in-Fact

Surety of Record: Westchester Fire Insurance Company
436 Walnut Street
Philadelphia, PA 19106
Phone: (415) 547-4513

Agent of Record: Kibble & Prentice, a USI Company
601 Union Street, Suite 1000
Seattle, WA 98101
Phone: (206) 441-6300

Power of Attorney

WESTCHESTER FIRE INSURANCE COMPANY

Know all men by these presents: That **WESTCHESTER FIRE INSURANCE COMPANY,** a corporation of the Commonwealth of Pennsylvania pursuant to the following Resolution, adopted by the Board of Directors of the said Company on December 11, 2006, to wit:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into the ordinary course of business (each a "Written Commitment"):

(1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.

(2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such persons written appointment as such attorney-in-fact.

(3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.

(4) Each of the Chairman, the President and Vice Presidents of the Company in hereby authorized, for and on behalf of the Company, to delegate in writing any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.

(5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested.

Does hereby nominate, constitute and appoint Heather Allen, Holly E Ulfers, Katie Snider, Nancy N Hill, Roxana Palacios, Steven W Palmer, all of the City of SEATTLE, Washington, each individually if there be more than one named, its true and lawful attorney-in-fact, to make, execute, seal and deliver on its behalf, and as its act and deed any and all bonds, undertakings, recognizances, contracts and other writings in the nature thereof in penalties not exceeding Fifteen million dollars & zero cents ($15,000,000.00) and the execution of such writings in pursuance of these presents shall be as binding upon said Company, as fully and amply as if they had been duly executed and acknowledged by the regularly elected officers of the Company at its principal office,

IN WITNESS WHEREOF, the said Stephen M. Haney, Vice-President, has hereunto subscribed his name and affixed the Corporate seal of the said **WESTCHESTER FIRE INSURANCE COMPANY** this 22 day of December 2014.

WESTCHESTER FIRE INSURANCE COMPANY

Stephen M. Haney, Vice President

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF PHILADELPHIA ss.

On this 22 day of December, AD. 2014 before me, a Notary Public of the Commonwealth of Pennsylvania in and for the County of Philadelphia came Stephen M. Haney, Vice-President of the **WESTCHESTER FIRE INSURANCE COMPANY** to me personally known to be the individual and officer who executed the preceding instrument, and he acknowledged that he executed the same, and that the seal affixed to the preceding instrument is the corporate seal of said Company; that the said corporate seal and his signature were duly affixed by the authority and direction of the said corporation, and that Resolution, adopted by the Board of Directors of said Company, referred to in the preceding instrument, is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal at the City of Philadelphia the day and year first above written.

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
KAREN E. BRANDT, Notary Public
City of Philadelphia, Phila. County
My Commission Expires Sept. 26, 2018

Notary Public

I, the undersigned Assistant Secretary of the **WESTCHESTER FIRE INSURANCE COMPANY,** do hereby certify that the original POWER OF ATTORNEY, of which the foregoing is a substantially true and correct copy, is in full force and effect.

In witness whereof, I have hereunto subscribed my name as Assistant Secretary, and affixed the corporate seal of the Corporation, this 26th day of May, 2015.

William L. Kelly, Assistant Secretary

THIS POWER OF ATTORNEY MAY NOT BE USED TO EXECUTE ANY BOND WITH AN INCEPTION DATE AFTER December 22, 2016.

Bond Number 1001126889

Performance Bond For Drillers

Name of Driller Phillip Pitts and Stan White

Know All Men By These Presents

That we Phillip Pitts and Stan White and _____ Thompson Engineering, Inc. any and all employees, officers and partners (collectively hereinafter, **Principal**), and we American Contractors Indemnity Company, duly organized under the laws of the State of California (hereinafter, **Surety**), are held and firmly bound unto the Director of the Environmental Protection Division, Department of Natural Resources, State of Georgia (**Director**) and his or her Successor or Successors in office, as **Obligee**, in the full sum of **FIFTEEN THOUSAND DOLLARS ($15,000.00)** for the payment of which will and truly to be made, the Principal and Surety bind ourselves, our heirs, administrators, successors and assigns, jointly and severally, by these presents.

WHEREAS, the Water Well Standards Act of 1985 (O.C.G.A. §§ 12-5-120 *et seq.*) (the Act) requires that a Driller, as that term is defined by the Act, have a performance bond with the Director to ensure compliance with the Act; and WHEREAS the above bound Principal is subject to the terms and provisions of said Act.

NOW, THEREFORE, the conditions of this obligation are such that if the above bound Principal shall fully and faithfully perform the duties and in all things comply with the procedures and standards set forth in the Act as now and hereafter amended, and the rules and regulations promulgated pursuant thereto, including but not limited to the correction of any violation of such procedures and standards upon discovery, irrespective of whether such discovery is made before completion of any well subject to this bond, then this obligation shall be void; otherwise it shall remain in full force and effect.

And Surety, for value received, agrees that no amendment to existing laws, rules or regulations, or adoption of new laws, rules or regulations shall in anyway discharge its obligation on this bond, and does hereby waive notice of any such amendment, adoption or modification.

This bond shall be effective from the 1st day of November, 2018 and shall continue in effect until June 30, 2019, unless sooner terminated by mutual agreement of Principal and Surety, provided that no such termination may be made unless sixty (60) days' prior written notice is made to the Director. In the event of such termination, the rights of the Director as Obligee and beneficiaries under this bond which arose prior to such termination shall continue.

IN WITNESS THEREOF the Principal and Surety have caused these present to be duly signed and sealed, this the 26th day of February, 2019.

Principal
Thompson Engineering, Inc.

Print name: Chad R. Brown
Title: CLO + Secretary

Seal:

THOMPSON ENGINEERING, INC. CORPORATE SEAL ALABAMA

Surety
American Contractors Indemnity Company

Print name: Dewey Brashier
Title: Attorney-in-Fact

Seal:

Revised March 2017

TOKIO MARINE HCC

POWER OF ATTORNEY

AMERICAN CONTRACTORS INDEMNITY COMPANY TEXAS BONDING COMPANY
UNITED STATES SURETY COMPANY U.S. SPECIALTY INSURANCE COMPANY

KNOW ALL MEN BY THESE PRESENTS: That American Contractors Indemnity Company, a California corporation, Texas Bonding Company, an assumed name of American Contractors Indemnity Company, United States Surety Company, a M aryland corporation and U.S. Specialty Insurance Company, a Texas corporation (collectively, the "Companies"), do by these presents make, constitute and appoint:

Jim E. Brashier, Troy P. Wagener, Loren Richard Howell, Jr., Dewey Brashier,
Kathleen B. Scarborough, Susan Skrmetta, John W. Nance

its true and lawful Attorney(s)-in-fact, each in their separate capacity if more than one is named above, with full power and authority hereby conferred in its name, place and stead, to execute, acknowledge and deliver **any and all bonds, recognizances, undertakings or other instruments or contracts of suretyship to include riders, amendments, and consents of surety, providing the bond penalty does not exceed** ******Unlimited****** Dollars (***unlimited***). This Power of Attorney shall expire without further action on April 23rd, 2022. This Power of Attorney is granted under and by authority of the following resolutions adopted by the Boards of Directors of the Companies:

Be it Resolved, that the President, any Vice-President, any Assistant Vice-President, any Secretary or any Assistant Secretary shall be and is hereby vested with full power and authority to appoint any one or more suitable persons as Attorney(s)-in-Fact to represent and act for and on behalf of the Company subject to the following provisions:

Attorney-in-Fact may be given full power and authority for and in the name of and on behalf of the Company, to execute, acknowledge and deliver, any and all bonds, recognizances, contracts, agreements or indemnity and other conditional or obligatory undertakings, including any and all consents for the release of retained percentages and/or final estimates on engineering and construction contracts, and any and all notices and documents canceling or terminating the Company's liability thereunder, and any such instruments so executed by any such Attorney-in-Fact shall be binding upon the Company as if signed by the President and sealed and effected by the Corporate Secretary.

Be it Resolved, that the signature of any authorized officer and seal of the Company heretofore or hereafter affixed to any power of attorney or any certificate relating thereto by facsimile, and any power of attorney or certificate bearing facsimile signature or facsimile seal shall be valid and binding upon the Company with respect to any bond or undertaking to which it is attached.

IN WITNESS WHEREOF, The Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 1st day of June, 2018.

AMERICAN CONTRACTORS INDEMNITY COMPANY TEXAS BONDING OMPANY
UNITED STATES SURETY COMPANY U.S. SPECIALTY INSURANCE COMPANY

State of California

County of Los Angeles

By: _____
Daniel P. Aguilar, Vice President

A Notary Public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document

On this 1st day of June, 2018, before me, Sonia O. Carrejo, a notary public, personally appeared Daniel P. Aguilar, Vice President of American Contractors Indemnity Company, Texas Bonding Company, United States Surety Company and U.S. Specialty Insurance Company who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (seal)

SONIA O. CARREJO
Notary Public - California
Los Angeles County
Commission # 2239479
My Comm. Expires Apr 23, 2022

I, Kio Lo, Assistant Secretary of American Contractors Indemnity Company, Texas Bonding Company, United States Surety Company and U.S. Specialty Insurance Company, do hereby certify that the above and foregoing is a true and correct copy of a Power of Attorney, executed by said Companies, which is still in full force and effect; furthermore, the resolutions of the Boards of Directors, set out in the Power of Attorney are in full force and effect.

In Witness Whereof, I have hereunto set my hand and affixed the seals of said Companies at Los Angeles, California this 26th day of February, 2019.

Corporate Seals
Bond No. 1001126889

Agency No. 17033

_____
Kio Lo, Assistant Secretary

HCCSMANPOA06/2018

visit tmhcc.com/surety for more information

Power of Attorney

KNOW ALL MEN BY THESE PRESENTS, that ATLANTIC SPECIALTY INSURANCE COMPANY, a New York corporation with its principal office in Plymouth, Minnesota, does hereby constitute and appoint: **Deanna M. French, Susan B. Larson, Elizabeth R. Hahn, Jana M. Roy, Scott McGilvray, Mindee L. Rankin, Ronald J. Lange, John R. Claeys, Roger Kaltenbach, Guy Armfield, Scott Fisher, Andrew P. Larsen, Nicholas Fredrickson, William M. Smith, Derek Sabo, Charla M. Boadle**, each individually if there be more than one named, its true and lawful Attorney-in-Fact, to make, execute, seal and deliver, for and on its behalf as surety, any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof; provided that no bond or undertaking executed under this authority shall exceed in amount the sum of: **unlimited** and the execution of such bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof in pursuance of these presents, shall be as binding upon said Company as if they had been fully signed by an authorized officer of the Company and sealed with the Company seal. This Power of Attorney is made and executed by authority of the following resolutions adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the President, any Senior Vice President or Vice-President (each an "Authorized Officer") may execute for and in behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and affix the seal of the Company thereto; and that the Authorized Officer may appoint and authorize an Attorney-in-Fact to execute on behalf of the Company any and all such instruments and to affix the Company seal thereto; and that the Authorized Officer may at any time remove any such Attorney-in-Fact and revoke all power and authority given to any such Attorney-in-Fact.

Resolved: That the Attorney-in-Fact may be given full power and authority to execute for and in the name and on behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and any such instrument executed by any such Attorney-in-Fact shall be as binding upon the Company as if signed and sealed by an Authorized Officer and, further, the Attorney-in-Fact is hereby authorized to verify any affidavit required to be attached to bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof.

This power of attorney is signed and sealed by facsimile under the authority of the following Resolution adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the signature of an Authorized Officer, the signature of the Secretary or the Assistant Secretary, and the Company seal may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing an Attorney-in-Fact for purposes only of executing and sealing any bond, undertaking, recognizance or other written obligation in the nature thereof, and any such signature and seal where so used, being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.

IN WITNESS WHEREOF, ATLANTIC SPECIALTY INSURANCE COMPANY has caused these presents to be signed by an Authorized Officer and the seal of the Company to be affixed this twenty-seventh day of April, 2020.

ATLANTIC SPECIALTY INSURANCE COMPANY CORPORATE SEAL 1986 NEW YORK

By _____
Paul J. Brehm, Senior Vice President

STATE OF MINNESOTA
HENNEPIN COUNTY

On this twenty-seventh day of April, 2020, before me personally came Paul J. Brehm, Senior Vice President of ATLANTIC SPECIALTY INSURANCE COMPANY, to me personally known to be the individual and officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, that he is the said officer of the Company aforesaid, and that the seal affixed to the preceding instrument is the seal of said Company and that the said seal and the signature as such officer was duly affixed and subscribed to the said instrument by the authority and at the direction of the Company.

ALISON DWAN NASH-TROUT
NOTARY PUBLIC - MINNESOTA
My Commission Expires
January 31, 2025

_____
Notary Public

I, the undersigned, Secretary of ATLANTIC SPECIALTY INSURANCE COMPANY, a New York Corporation, do hereby certify that the foregoing power of attorney is in full force and has not been revoked, and the resolutions set forth above are now in force.

Signed and sealed. Dated 12 day of April, 2021.

ATLANTIC SPECIALTY INSURANCE COMPANY CORPORATE SEAL 1986 NEW YORK

This Power of Attorney expires
January 31, 2025

_____
Kara Barrow, Secretary

Please direct bond verifications to surety@intactinsurance.com

CONTINUATION
CERTIFICATE

Atlantic Specialty Insurance Company , Surety upon

a certain Bond No. 800033976

dated effective 09/27/2017
(MONTH-DAY-YEAR)

on behalf of Ricky Davis / Cascade Drilling, L.P.
(PRINCIPAL)

and in favor of Department of Natural Resources, State of Georgia
(OBLIGEE)

does hereby continue said bond in force for the further period

beginning on 06/30/2021
(MONTH-DAY-YEAR)

and ending on 06/30/2023
(MONTH-DAY-YEAR)

Amount of bond Thirty Thousand and 00/100 Dollars ($30,000.00)

Description of bond Performance Bond for Water Well Contractors

PROVIDED: That this continuation certificate does not create a new obligation and is executed upon the express condition and provision that the Surety's liability under said bond and this and all Continuation Certificates issued in connection therewith shall not be cumulative and that the said Surety's aggregate liability under said bond and this and all such Continuation Certificates on account of all defaults committed during the period (regardless of the number of years) said bond had been and shall be in force, shall not in any event exceed the amount of said bond as hereinbefore set forth.

Signed and dated on April 12th , 2021
(MONTH-DAY-YEAR)

Atlantic Specialty Insurance Company

By Andrew P. Larsen
Attorney-in-Fact Andrew P. Larsen

Parker, Smith & Feek, Inc.
Agent

2233 112th Ave NE Bellevue, WA 98004
Address of Agent

425-709-3600
Telephone Number of Agent

S-0157/GE 8/08

XDP

B-3. SURVEYOR CERTIFICATION

METRO ENGINEERING & SURVEYING CO., INC.
SURVEYORS - ENGINEERS - PHOTOGRAMMETRISTS
PROVIDING PROFESSIONAL SERVICE SINCE 1967

1469 HIGHWAY 20 WEST • MCDONOUGH, GA 30253
phone: 770-707-0777 fax: 770.707-0755
WWW.METRO-ENGINEERING.COM

SURVEYOR'S REPORT

SCOPE OF WORK:

Field survey of existing monitoring wells at Georgia Power Company, Plant Branch in Milledgeville, GA.

Horizontal and vertical datum was derived from RTK GPS observations with corrections from the eGPS network and conventional surveying equipment. Horizontal datum is Georgia State Plane, West Zone, NAD83(2011) and vertical datum is NAVD88.

EQUIPMENT USED TO ESTABLISH THE MONITORING WELL LOCATIONS:

Trimble R8 Dual Frequency GPS Receiver
Leica TS16 Total Station
Leica DNA10 Digital Level

CERTIFICATION:

I hereby certify that the center of well casing (PVC) has a horizontal accuracy of 0.5+/- feet or better using a Trimble R8 Dual Frequency RTK (survey-grade) global positioning system receiver referencing the Georgia State Plane, west zone, NAD83(2011) coordinate system in US survey feet. The top of well casing (PVC) elevation data was determined in feet above mean sea level based on the NAVD88 vertical datum. Vertical data was confirmed to be accurate within 0.01 foot through establishment of a closed level check loop with a Leica DNA10 digital level having a published accuracy of 0.9mm per dual-traverse kilometer.

James R. Green R.L.S. No. 2543

GEORGIA REGISTERED NO. LS002543 PROFESSIONAL LAND SURVEYOR JAMES RANDOLPH GREEN

Date: 7/23/20

Plant Branch
Monitoring Well Locations
Ash Pond B, C & D
July 22, 2020

Well ID	LATITUDE	LONGITUDE	NAIL NORTHING	NAIL EASTING	NAIL ELEVATION	PVC NORTHING	PVC EASTING	TOP PVC ELEVATION	ELEV AT BASE CONC/GRD
BRGWA-12I	N33.197981	W83.314877	1164300.90	2557137.50	431.48	1164301.2	2557138.9	434.39	431.5
BRGWA-12S	N33.197941	W83.314864	1164286.30	2557141.70	431.64	1164286.6	2557142.9	434.64	431.6
BRGWA-23S	N33.194311	W83.312528	1162970.70	2557868.20	425.43	1162971.7	2557868.1	428.24	425.5
BRGWC-25I	N33.187670	W83.301326	1160584.70	2561315.10	354.96	1160583.7	2561315.1	357.37	355.0
BRGWC-27I	N33.185265	W83.306589	1159696.00	2559712.80	363.97	1159695.3	2559712.2	366.86	364.0
BRGWC-29I	N33.186890	W83.302200	1160298.70	2561049.90	350.61	1160297.6	2561050.2	353.23	350.6
BRGWC-30I	N33.190566	W83.313141	1161608.20	2557692.60	349.97	1161607.6	2557691.8	352.61	350.0
BRGWC-32S	N33.187992	W83.310531	1160678.60	2558497.60	403.62	1160677.7	2558497.9	406.39	403.6
BRGWC-45	N33.192199	W83.302065	1162229.10	2561074.90	381.65	1162229.8	2561075.5	384.58	381.6
BRGWC-47	N33.193530	W83.307343	1162701.00	2559456.40	408.75	1162700.7	2559456.7	411.20	408.8
BRGWC-50	N33.190421	W83.297841	1161593.70	2562372.00	378.71	1161593.3	2562372.9	381.35	378.8
BRGWC-52I	N33.189551	W83.298594	1161275.50	2562144.70	381.12	1161275.0	2562145.3	383.87	381.2
PZ-11S	N33.192944	W83.315371	1162466.00	2557002.70	390.95	1162467.3	2557002.5	393.99	390.9
PZ-12D	N33.198010	W83.314885	1164311.90	2557135.00	431.40	1164311.9	2557136.4	434.09	431.4
PZ-18I	N33.188252	W83.312988	1160766.20	2557747.10	359.65	1160766.2	2557745.5	362.55	359.6
PZ-18S	N33.188228	W83.312982	1160757.30	2557748.70	359.77	1160757.3	2557747.4	362.82	359.7
PZ-19I	N33.185563	W83.309241	1159797.90	2558900.70	368.85	1159797.1	2558900.0	371.74	368.9
PZ-19S	N33.185586	W83.309258	1159806.00	2558895.60	368.50	1159805.4	2558894.5	371.42	368.4
PZ-20I	N33.184705	W83.305130	1159494.60	2560159.30	362.16	1159495.4	2560160.2	365.34	362.2
PZ-20S	N33.184691	W83.305140	1159489.40	2560156.20	362.19	1159490.3	2560157.0	365.41	362.2
PZ-21I	N33.187691	W83.301283	1160592.70	2561327.70	355.85	1160591.6	2561328.2	358.92	355.8
PZ-21S	N33.187694	W83.301305	1160593.70	2561321.20	355.43	1160592.4	2561321.3	358.52	355.5
PZ-23I	N33.194321	W83.312497	1162974.30	2557877.90	425.00	1162975.4	2557877.7	427.74	425.1
PZ-26I	N33.187898	W83.300306	1160670.00	2561625.80	368.01	1160669.0	2561626.4	370.63	368.0
PZ-28I	N33.184732	W83.305158	1159504.90	2560150.40	362.45	1159505.1	2560151.7	364.81	362.5
PZ-31S	N33.188716	W83.312244	1160937.10	2557972.70	374.35	1160936.9	2557971.8	376.77	374.3
PZ-39	N33.196254	W83.313842	1163674.90	2557459.80	431.92	1163675.4	2557460.5	434.78	432.0
PZ-43	N33.191985	W83.298942	N.A.	N.A.	N.A.	1162159.8	2562031.3	383.71	381.0
PZ-44	N33.190799	W83.300405	1161723.80	2561586.80	380.49	1161724.6	2561587.5	383.04	380.5
PZ-46	N33.193658	W83.303739	1162755.50	2560558.40	382.09	1162756.2	2560559.0	384.64	382.1
PZ-48	N33.194504	W83.310642	1163047.70	2558445.00	418.20	1163046.7	2558444.6	420.90	418.3
PZ-49	N33.195198	W83.301871	1163321.90	2561124.90	382.22	1163321.2	2561125.7	384.99	382.2
PZ-51I	N33.190523	W83.297623	1161631.40	2562438.30	377.88	1161631.1	2562439.3	380.52	378.0
PZ-51S	N33.190474	W83.297644	1161613.90	2562432.10	377.79	1161613.4	2562433.1	380.27	377.9

Plant Branch
Monitoring Well Locations
Ash Pond E
Jul;y 22, 2020

Well ID	LATITUDE	LONGITUDE	NAIL NORTHING	NAIL EASTING	NAIL ELEVATION	PVC NORTHING	PVC EASTING	TOP PVC ELEVATION	ELEV AT BASE CONC/ GRD
BRD-1	N33.206557	W83.303323	N.A.	N.A.	N.A.	1167450.6	2560647.5	375.17	372.4
BRD-2	N33.192972	W83.336911	N.A.	N.A.	N.A.	1162424.7	2550413.1	444.48	441.2
BRGWA-2I	N33.205913	W83.338279	1167129.7	2549958.4	440.47	1167130.0	2549957.3	443.14	440.5
BRGWA-2S	N33.205940	W83.338294	1167139.2	2549953.9	440.43	1167139.7	2549952.6	443.20	440.4
BRGWA-5I	N33.214317	W83.339996	1170184.6	2549409.0	441.17	1170183.7	2549408.0	443.79	441.1
BRGWA-5S	N33.214300	W83.339971	1170178.5	2549416.5	440.87	1170177.5	2549415.5	443.86	440.8
BRGWA-6S	N33.215780	W83.333008	1170733.3	2551542.2	455.77	1170732.9	2551540.8	458.96	455.8
BRGWC-17S	N33.203532	W83.322836	1166300.8	2554686.9	362.12	1166301.5	2554687.7	365.32	362.2
BRGWC-24S	N33.192629	W83.296220	1162401.9	2562862.9	351.35	1162400.9	2562862.2	354.10	351.4
BRGWC-33S	N33.208371	W83.324826	1168056.7	2554064.0	414.10	1168057.0	2554064.8	416.68	414.2
BRGWC-34S	N33.206518	W83.324300	1167384.0	2554230.3	389.16	1167384.0	2554231.2	391.96	389.2
BRGWC-35S	N33.204484	W83.323519	1166645.7	2554475.2	363.66	1166646.0	2554476.3	366.31	363.7
BRGWC-36S	N33.201997	W83.322833	1165743.2	2554694.1	383.04	1165742.7	2554693.3	389.84	383.1
BRGWC-37S	N33.200205	W83.321914	1165092.1	2554978.9	444.35	1165093.0	2554979.5	447.05	444.4
BRGWC-38S	N33.198277	W83.321812	1164391.5	2555015.6	429.68	1164391.9	2555016.5	432.24	429.8
PB-10D	N33.196004	W83.310294	N.A.	N.A.	N.A.	1163593.4	2558546.7	400.31	397.5
PB-10S	N33.195992	W83.310279	N.A.	N.A.	N.A.	1163588.9	2558551.2	400.91	397.6
PB-13D	N33.191900	W83.316570	N.A.	N.A.	N.A.	1162084.5	2556638.8	373.77	371.1
PB-13S	N33.191900	W83.316612	N.A.	N.A.	N.A.	1162084.4	2556626.1	373.31	370.8
PB-1S	N33.199673	W83.317420	N.A.	N.A.	N.A.	1164910.5	2556355.9	403.16	400.4
PB-2D	N33.199504	W83.315596	N.A.	N.A.	N.A.	1164853.6	2556914.2	416.71	414.9
PB-4D	N33.198110	W83.318400	N.A.	N.A.	N.A.	1164339.6	2556060.7	412.12	409.0
PB-4S	N33.198098	W83.318372	N.A.	N.A.	N.A.	1164335.1	2556069.2	411.15	409.3
PB-7S	N33.196710	W83.318003	N.A.	N.A.	N.A.	1163831.3	2556186.2	402.88	399.7
PB-8D	N33.194480	W83.316062	N.A.	N.A.	N.A.	1163024.4	2556786.7	401.74	398.2
PB-8S	N33.194463	W83.316044	N.A.	N.A.	N.A.	1163018.2	2556792.3	401.82	398.6
PZ-10S	N33.197260	W83.321907	1164022.6	2554990.2	430.92	1164021.5	2554990.5	433.85	431.0
PZ-13S	N33.208218	W83.320866	1168012.6	2555276.6	406.45	1168011.4	2555276.7	409.97	406.5
PZ-14I	N33.209302	W83.323834	1168397.1	2554365.3	419.85	1168398.2	2554365.6	422.71	419.9
PZ-14S	N33.209303	W83.323855	1168397.4	2554358.8	420.17	1168398.7	2554359.2	423.31	420.2

Plant Branch
Monitoring Well Locations
Ash Pond E
Jul;y 22, 2020

PZ-15I	N33.207440	W83.323742	1167720.8	2554397.9	400.10	1167720.9	2554399.2	403.06	400.2
PZ-15S	N33.207438	W83.323759	1167720.3	2554392.6	400.04	1167720.3	2554394.0	402.90	400.1
PZ-16I	N33.205401	W83.323146	1166979.9	2554586.7	379.41	1166980.7	2554587.5	382.45	379.5
PZ-16S	N33.205393	W83.323166	1166977.2	2554580.3	379.32	1166977.8	2554581.4	382.52	379.3
PZ-17I	N33.203566	W83.322788	1166312.8	2554701.6	362.22	1166313.8	2554702.5	365.33	362.3
PZ-1D	N33.219259	W83.332788	1171997.7	2551598.1	462.82	1171999.0	2551598.1	463.41	462.9
PZ-1I	N33.219250	W83.332855	1171994.6	2551577.9	461.71	1171995.8	2551577.8	464.71	461.9
PZ-1S	N33.219251	W83.332821	1171995.0	2551588.0	462.22	1171996.4	2551588.0	465.07	462.4
PZ-3D	N33.201356	W83.337283	1165474.3	2550274.1	486.67	1165474.4	2550275.1	487.50	486.7
PZ-3I	N33.201412	W83.337289	1165494.5	2550271.8	486.48	1165494.5	2550273.2	489.49	486.5
PZ-3S	N33.201384	W83.337284	1165484.4	2550273.2	487.07	1165484.5	2550274.6	490.53	487.0
PZ-40S	N33.192669	W83.296398	1162416.0	2562807.9	353.17	1162414.9	2562807.7	355.96	353.2
PZ-41S	N33.192716	W83.296555	1162432.8	2562760.0	354.23	1162431.8	2562759.4	357.17	354.3
PZ-42S	N33.193854	W83.296624	1162844.5	2562734.8	358.92	1162845.7	2562735.0	361.66	359.0
PZ-4I	N33.195212	W83.334049	1163248.0	2551282.2	479.96	1163246.8	2551282.0	482.98	479.9
PZ-4S	N33.195216	W83.334088	1163249.1	2551270.2	479.90	1163247.8	2551270.1	482.87	479.9
PZ-52D	N33.208362	W83.324870	1168053.7	2554050.6	414.15	1168053.9	2554051.7	417.03	414.3
PZ-53D	N33.198283	W83.321917	1164392.7	2554984.3	431.59	1164393.8	2554984.3	434.68	431.6
PZ-54	N33.199468	W83.320356	1164829.5	2555458.7	440.71	1164828.7	2555458.3	443.86	440.8
PZ-55	N33.195029	W83.322604	1163208.8	2554783.0	450.11	1163208.0	2554783.6	453.07	450.2
PZ-56	N33.194377	W83.324890	1162965.6	2554085.6	416.17	1162965.1	2554086.3	418.84	416.2
PZ-7S	N33.212137	W83.328090	1169418.5	2553054.5	448.98	1169419.2	2553055.6	451.57	449.0
PZ-8S	N33.207731	W83.334235	1167800.4	2551188.1	450.42	1167801.1	2551188.9	453.08	450.5
PZ-9S	N33.193487	W83.328157	1162634.1	2553088.8	466.08	1162633.3	2553089.6	469.28	466.1

GEL ENGINEERING OF NC INC

Plant Branch Monitoring Wells

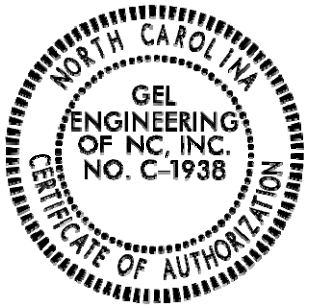
Field Surveys: 9/26/2022-9/26/2022

Well ID	Casing Northing	Casing Easting	Top of Casing Elevation	Nail or Pad Northing	Nail or Pad Easting	Nail or Pad Elevation	Description
BRLFC-01	1162232.420	2557158.878	381.35	1162234.588	2557160.953	378.49	NAIL
BRLFC-02	1161957.831	2556825.523	384.13	1161957.141	2556824.248	381.63	NAIL
BRLFC-03	1162377.227	2556336.547	369.42	1162377.112	2556337.910	366.38	NAIL
BRLFC-04	1163049.095	2556365.006	388.42	1163047.818	2556364.818	385.43	NAIL
BRLFC-05	1163451.177	2556075.022	383.62	1163450.615	2556074.153	380.81	NAIL
BRLFC-06	1163851.241	2555822.506	397.85	1163852.017	2555823.832	391.96	NAIL
BRLFC-07	1164341.769	2555739.634	409.69	1164340.724	2555739.503	407.00	NAIL
BRLFC-08	1164864.460	2555903.702	400.44	1164863.290	2555903.253	397.72	NAIL
BRLFC-09	1165226.617	2556252.713	394.45	1165227.164	2556251.549	391.52	NAIL
BRLFC-10	1165147.934	2556780.479	415.79	1165146.733	2556780.432	412.83	NAIL
BRLFC-11	1164949.835	2557269.423	386.84	1164951.153	2557269.792	383.90	NAIL
BRLFC-12	1164623.001	2557646.354	379.92	1164622.609	2557645.281	376.87	NAIL
BRLFC-13	1164323.879	2557823.208	389.26	1164324.574	2557822.015	386.55	NAIL
BRLFC-14	1164274.064	2558403.895	384.99	1164274.959	2558404.532	382.29	NAIL
BRLFC-15	1164224.277	2558938.713	398.64	1164225.422	2558939.234	395.98	NAIL
BRLFC-16	1163744.066	2558875.358	418.68	1163743.046	2558876.074	416.10	NAIL
PZ-64	1161787.721	2562404.290	381.94	1161790.008	2562403.066	379.37	NAIL
PZ-65	1161692.719	2562240.567	382.06	1161693.105	2562242.972	379.61	NAIL
PZ-66	1161747.912	2562134.650	383.52	1161747.859	2562137.193	380.86	NAIL
PZ-67	1161831.975	2561919.762	381.48	1161832.305	2561922.342	378.78	NAIL
PZ-68	1160690.480	2558512.904	405.25	1160689.686	2558515.174	402.50	NAIL
PZ-69	1160311.386	2558447.455	379.36	1160312.091	2558444.956	376.97	NAIL
PZ-70	1164326.658	2555374.075	425.70	1164327.641	2555373.457	422.88	NAIL
PB-D01	1162230.144	2557916.814	400.83	N/A	N/A	N/A	BORING
PB-D02	1162246.300	2558208.403	402.96	N/A	N/A	N/A	BORING
PB-D03	1162358.679	2559046.329	408.09	N/A	N/A	N/A	BORING
PB-D04	1161913.252	2558507.940	403.12	N/A	N/A	N/A	BORING
PB-D05	1161840.817	2558094.790	399.40	N/A	N/A	N/A	BORING
PB-D06	1161478.306	2558295.128	399.53	N/A	N/A	N/A	BORING
SB-33S	1168079.825	2554050.908	414.87	N/A	N/A	N/A	BORING
SB-38S	1164375.049	2554988.232	430.68	N/A	N/A	N/A	BORING

Benchmark	Northing	Easting	Elevation
GEL1	1162581.977	2556743.623	391.46
GEL2	1161860.379	2562295.003	380.25

SURVEY DATA CERTIFICATION FOR SOUTHERN COMPANY TO DETERMINE NORTHING, EASTING, AND VERTICAL ELEVATION OF THE NAIL IN THE CONCRETE PAD & THE PVC WELL CASING. DATE OF FIELD SURVEY & INSPECTION: 09/26/2022-09/28/2022. FIELD SURVEY POSITIONAL TOLERANCE=0.5 FEET HORIZONTAL-NAD'83, 0.01 VERTICAL-NAVD '88. EQUIPMENT USED FOR HORIZONTAL LOCATION: TRIMBLE R10 & R12 RTK GPS & TRIMBLE S5 ROBOTIC TOTAL STATION. THE VERTICAL LOCATION OF EACH SURVEYED POINT WAS ESTABLISHED BASED UPON LEVEL RUNS WITH A DIGITAL LEVEL LOOP FROM VERTICAL CONTROL ESTABLISHED BY ON-SITE BENCHMARKS GEL1 & GEL2 SET BY GEL SOLUTIONS USING A TRIMBLE DINI LEVEL

10/3/2022



COA - LS003119
Exp. 12/31/2022

B-4. BORING LOGS

BORING BRGWA-2S / PZ-02 S

ES

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 4/2/2014 **COMPLETED** 4/2/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 44.6 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 10.2 ft. after 288 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- See PZ-02 I for material descriptions			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		▼			
15					
20					
25					
30					Annular Seal: bentonite pellets
35					Filter: silica filter sand
40					**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
45					Sump:0.399999999999999 ft.

Bottom of borehole at 44.6 feet.

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:49 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/13/2014 **COMPLETED** 3/14/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; Casing Advance; HQ Rock Core
DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 64.3 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 10.1 ft. after 288 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: subsoil damp, medium stiff, silty CLAY, red and yellow-red			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		▼ - CL: saprolite damp, medium stiff, silty CLAY, yellow-red with black mottles, micas			
15		- ML: saprolite very damp, soft, clayey SILT, soft, red-brown, micas			
20		- ML: saprolite very damp, soft, clayey SILT, soft, red-brown, micas, some sand			
25		- ML: saprolite very damp, soft, clayey SILT, red-brown, micas, some sand			
30		- ML: saprolite very damp, hard, sandy SILT, dark gray and dark brown with black and white mottles			
35		- SM: saprolite wet, dense, silty SAND, dark gray-brown			
40		- MH: saprolite wet, stiff, clayey SILT, stiff, gray-brown with black mottles, micas			

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:49 - \\ALTRCFP01\X2\WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
45		- SM: saprolite wet, very dense, silty SAND, very dense, dark gray with white mottles			Completion: protective aluminum cover with bollards; 4-foot square concrete pad (CONTINUED)
		- SM: saprolite wet, dense, silty SAND, very dense, dark gray			
50		- Hornblend-Biotite GNEISS: fine to medium grain, very hard, not weathered, flow banded, few fractures, hornblende, biotite, feldspar, quartz, trace pyrite, vertical quartz veins, fresh			Annular Seal: bentonite pellets
					Filter: silica filter sand
55		- fine to coarse grain, very hard, not weathered, flow banded, few fractures, hornblende, biotite, feldspar, quartz, trace pyrite and garnet, fresh			
60		- fine to coarse grain, very hard, not weathered, flow banded, few fractures, hornblende, biotite, feldspar, quartz, trace pyrite, fresh			**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
65		Bottom of borehole at 64.3 feet.			Sump:0.399999999999999 ft.
70					
75					
80					
85					
90					

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:49 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

BORING BRGWA-5S / PZ-05 S
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ES

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 4/3/2014 **COMPLETED** 4/3/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 40 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 10 ft. after 250 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- See PZ-05 I for material descriptionsSee PZ-5 I for material descriptions			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		▽			
15					
20					
25					
30					Annular Seal: bentonite pellets Filter: silica filter sand
35					**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
40					Sump:0.399999999999999 ft.

Bottom of borehole at 40.0 feet.

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 4/2/2014 **COMPLETED** 4/3/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; Casing Advance; HQ Rock Core
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 61.2 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 10 ft. after 250 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: residuum damp, very stiff, silty CLAY, red with yellow-red mottles			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		▼ - CL: residuum damp, medium stiff, silty CLAY, red with yellow-red and black mottles			
15		- CL: saprolite very damp, soft, silty CLAY, yellow-red with black mottles, mica			
20		- MH: saprolite wet, soft, clayey SILT, red-yellow with black mottles			
25		- MH: saprolite wet, medium stiff, clayey SILT, yellow-brown with black mottles, mica			
30		- MH: saprolite wet, stiff, clayey SILT, brown-gray with black mottles			
35		- MH: saprolite wet, very stiff, sandy SILT, gray with white mottles			
40		- MH: saprolite wet, hard, sandy SILT, gray with white mottles			

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
		(Con't)			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
45		- ----auger refusal----			(CONTINUED)
		Amphibolite GNEISS			
		- fine to medium grain, moderately weathered, massive, numerous fractures, black and white grains, boulder			Annular Seal: bentonite pellets
		Soft material, norecovery			
50		**Amphibolite GNEISS**			Filter: silica filter sand
		- fine to coarse grain, not to moderately weathered, massive, numerous fractures, light gray partially weathered rock, then coarse grained weathered amphibolite			
		- fine to medium grain, not to highly weathered, massive, numerous fractures, gray to dark gray, light gray banding			
55		- fine to medium grain, not to slightly weathered, massive, fractures 58-59 ft., gray, light gray banding, pyrite			**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
60		- fine to medium grain, not to slightly weathered, massive, fractures 60-61 ft., gray, light gray banding, pyrite			Sump:0.400000000000006 ft.
		Bottom of borehole at 61.2 feet.			
65					
70					
75					
80					
85					
90					

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 4/1/2014 **COMPLETED** 4/1/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 51 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 24.9 ft. after 300 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: residuum dry, very stiff, CLAY, red			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		- CL: residuum dry, medium stiff, silty CLAY, red with yellow-red mottles			
15		- ML: saprolite dry, medium stiff, clayey SILT, red with red-yellow and black mottles, micas			
20		- ML: saprolite dry, medium stiff, clayey SILT, red with red-yellow and black mottles, micas			
25		- MH: saprolite wet, soft, clayey SILT, brown-yellow with black mottles, micas			
30		- MH: saprolite wet, soft, clayey SILT, brown-yellow with black mottles, micas			
35		- MH: saprolite wet, medium stiff, clayey SILT, brown-yellow with black mottles, micas			Annular Seal: bentonite pellets
40		- MH: saprolite wet, medium stiff, clayey SILT, brown-yellow with black mottles, micas			Filter: silica filter sand **Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
45		*(Con't)* - MH: saprolite wet, stiff, clayey SILT, olive-yellow with gray mottles, sand			Completion: protective aluminum cover with bollards; 4-foot square concrete pad (CONTINUED)
50		- MH: saprolite wet, medium stiff, clayey SILT, olive-gray with brown mottles			**Standpipe:** **2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack Sump:0.400000000000006 ft. Cave-in to 49.7 ft.
		Bottom of borehole at 51.0 feet.			
55					
60					
65					
70					
75					
80					
85					
90					

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/13/2014 **COMPLETED** 3/13/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 7.1 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 1.5 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		▼ - See PZ-17 I for material descriptions			Completion: protective steel cover; 4-foot square concrete pad Annular Seal: bentonite pellets Filter: silica filter sand **Standpipe: 2" OD PVC (SCH 40)** Screen: 5 ft; pre-pack Sump:0.399999999999999 ft.
		Bottom of borehole at 7.1 feet.			
10					
15					
20					
25					
30					
35					
40					

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

BORING PZ-17 I
PAGE 1 OF 1
ES

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/11/2014 **COMPLETED** 3/12/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; Casing Advance; HQ Rock Core
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 43.5 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 0.1 ft. after 24 hrs.
NOTES

DEPTH (ft)	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5	- CH: alluvium wet, very soft, silty CLAY, dark brown and blue-gray, gravel			Completion: protective steel cover; 4-foot square concrete pad
10	**Amphibolite GNEISS** - fine grain, hard, slightly weathered, massive, dark gray - SM: residuum wet, loose, silty SAND, brown-yellow with light brown mottles			
15	**Amphibolite GNEISS** - fine grain, hard, slightly weathered, massive, dark gray - casing advance - no samples, unconsolidated material			
20	**Amphibolite GNEISS** - fine grain, hard, slightly weathered, massive, fractures 15-18 ft., dark gray - casing advance - no samples, unconsolidated material			
25	- SM: saprolite wet, medium dense, silty SAND, dark brown with pale yellow mottles			
30	- SM: saprolite wet, very dense, silty SAND, brown with pale yellow mottles			Annular Seal: bentonite pellets Filter: silica filter sand
35	**Amphibolite GNEISS** - medium grain, medium hard, moderately weathered, massive, dark gray and dark gray-brown			
40	**Amphibolite GNEISS** - medium grain, medium hard, moderately weathered, massive, dark gray and dark gray-brown - casing advance - no samples, unconsolidated material - refusal, no recovery			**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack Sump:0.399999999999999 ft.

Bottom of borehole at 43.5 feet.

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2\WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

RECORD OF BOREHOLE BRGWC-33S/PZ-33S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 26.50 ft
LOCATION: Milledgville, GA

DRILL RIG: Full Size Track Mounted Sonic
DATE STARTED: 7/26/16
DATE COMPLETED: 7/26/16

NORTHING: 1,168,056.81
EASTING: 2,554,063.96
GS ELEVATION: 414.14
TOC ELEVATION: 416.92 ft

DEPTH W.L.: 5.16 (bgs)
ELEVATION W.L.: 411.76 (amsl)
DATE W.L.: 7/27/2016
TIME W.L.: 09:00

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL / PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
0		0.00 - 0.40 TOPSOIL, Sandy SILT, non-plastic fines, fine sand, some organics (roots); light brown (5YR 5/6), residual soil (W6), non-cohesive, dry, loose	ML		0.40 412.64					
		0.40 - 1.50 non-plastic fines, fine sand, trace organics (roots); moderate reddish brown (10R 4/6), completely weathered (W5), weathered micaceous grains, quartz, SAPROLITE; non-cohesive, dry, compact			1.50	1		5.30 6.50	Portland Cement (Type II)	
5	410	1.50 - 8.00 Sandy SILT, non-plastic fines, some low plasticity fines pockets, fine sand; moderate reddish brown (10R4/6), highly weathered to completely weathered (W4-W5), trace relict foliations, weathered micaceous grains, SAPROLITE; non-cohesive, moist, compact			406.14					
		8.00 - 11.00 SILTY SAND, fine to medium sub-angular sand, non-plastic to very low plasticity fines; light brown (5YR 5/6) to moderate reddish brown (10R 4/6) mottled dark yellowish brown (10YR 4/2), highly to completely weathered (W4 to W5), weathered micaceous grains, quatz, biotite, SAPROLITE; non-cohesive, wet, compact	SM		8.00 403.14				3/8" Bentonite Chips	**WELL CASING** Interval: 0'-16' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded
10	405	11.00 - 24.50 some low plasticity fines; pale yellowish brown (10YR 6/2) mottled white (N9), black (N1) and light brown (5YR 5/6), highly weathered (W4), some relict foliations, weathered micaceous grains, bioitite, feldspar, quartz, SAPROLITE; non-cohesive, wet, compact			11.00	2		7.20 10.00	3/8" Bentonite Pellets	**WELL SCREEN** Interval: 16'-26' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC
15	400								30/45 Sand #1 Sand	**FILTER PACK** Interval: 13.0'-26.5' Type: 13.0'-14.0' 30/45 Sand - 14.0'-26.5' #1 Sand
						3		2.00 2.00		**FILTER PACK SEAL** Interval: 13.0'-8.0' Type: 8.0'-11.0' 3/8" Bentonite Chips - 11.0'-13.0' 3/8" Bentonite Pellets
20	395									**ANNULUS SEAL** Interval: 2'-8' Type: Portland Cement (Type II)
						4		7.40 8.00	0.010" Screen Slot	**WELL COMPLETION** Pad: 4'x4'x4" Protective Casing: Anodized Aluminum
	390				389.64					**DRILLING METHODS** Soil Drill: 4-inch Sonic Rock Drill: 4-inch Sonic
25		24.50 - 26.00 TRANSITIONALLY WEATHERED ROCK, fine to medium sub-angular sand, non-plastic fines, fine to coarse angular soft gravels (core stones); medium gray (N5), highly weathered (W4), some moderately weathered (W3) core stones, quartz, weathred micaceous grains, biotite, some relict foliations in core stones, non-cohesive, wet, dense	TWR		24.50 388.14				#1 Sand	
			GNIESS		387.64					
30	385	26.00 - 26.50 BEDROCK, moderately weathered (W3), thin foliation bands, grayish orange (10YR 7/4), black (N1) and medium gray (N5), fine to medium grained, slightly porous, weak (R2), GNIESS, quartz, biotite, feldspar, weathered micaceous grains								
		Boring completed at 26.50 ft								
35	380									
40	375									
45	370									

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Dale Osterburg

GA INSPECTOR: Jeffrey Ingram
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17

Golder Associates

BOREHOLE RECORD PLAT BRANCH LOGS.GPJ PIEDMONT.GDT 9/18/17

RECORD OF BOREHOLE BRGWC-34S/PZ-34S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 25.00 ft
LOCATION: Milledgville, GA

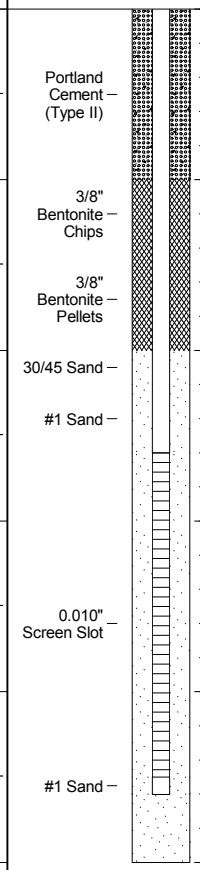
DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/24/16
DATE COMPLETED: 7/25/16

NORTHING: 1,167,383.97
EASTING: 2,554,230.23
GS ELEVATION: 389.04
TOC ELEVATION: 392.06 ft

DEPTH W.L.: 0.50 (bgs)
ELEVATION W.L.: 391.56 (amsl)
DATE W.L.: 07/25/2016
TIME W.L.: na

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0		0.00 - 5.00 CLAY, trace sand; red-orange; cohesive, moist	CL		384.04	1		4.50 / 5.00
5	385	5.00 - 13.00 sandy SILT, micaceous; brown, SAPROLITE; cohesive, moist, firm	ML		5.00 376.04	2 3		5.00 / 5.00 5.00 / 5.00
10	380							
15	375	13.00 - 16.00 SILTY SAND, micaceous; brown, SAPROLITE; moist	SM		13.00 373.04			
20	370	16.00 - 23.00 sandy SILT, micaceous; black-brown, SAPROLITE; moist	ML		16.00 366.04	4 5		5.00 / 5.00 5.00 / 5.00
25	365	23.00 - 25.00 SILTY SAND, micaceous; brown-white, quartz and feldspar grains; moist	SM		23.00 364.04			
		Boring completed at 25.00 ft						
30	360							
35	355							
40	350							
45	345							

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0.0'-13.0'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 13.0'-23.0'
Material: Schedule 40 PVC
Diameter: 2"
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 10.0'-25.0'
Type: 10.0'-11.0' 30/45 Sand - 11.0'-25.0' #1 Sand

FILTER PACK SEAL
Interval: 5.0'-10.0'
Type: 5.0'-8.0' 3/8" Bentonite Chips - 8.0'-10.0' 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 3.0'-5.0'
Type: Portland Cement (Type II)

WELL COMPLETION
Pad: 4'x4'x4"
Protective Casing: Anodized Aluminum

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: N/A

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade
DRILLER: Ray Whitt

GA INSPECTOR: Mike Smilley, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17

Golder Associates

BOREHOLE RECORD PLAT BRANCH LOGS.GPJ PIEDMONT.GDT 9/18/17

RECORD OF BOREHOLE BRGWC-35S/PZ-35S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 30.00 ft
LOCATION: Milledgville, GA

DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/22/16
DATE COMPLETED: 7/23/16

NORTHING: 1,166,645.80
EASTING: 2,554,475.19
GS ELEVATION: 363.68
TOC ELEVATION: 366.54 ft

DEPTH W.L.: 0.4 (bgs)
ELEVATION W.L.: 366.14 (amsl)
DATE W.L.: 7/25/2016
TIME W.L.: 07:20

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
0		0.00 - 5.00 Sandy SILT, fine to medium sub-angular sand; brown-orange; dry, loose	ML			1		3.50/5.00		
5	360				358.68				Portland Cement (Type II)	**WELL CASING** Interval: 0.0'-17.0' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded
		5.00 - 12.50 CLAY; brown/gray, cohesive, firm, moist			5.00					**WELL SCREEN** Interval: 17.0'-27.0' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC
	355		CH			2		5.00/5.00		**FILTER PACK** Interval: 14.0'-28.0' Type: 14.0'-15.0' 30/45 Sand - 15.0'-17.0' #1 Sand
10									3/8" Bentonite Chips	**FILTER PACK SEAL** Interval: 9.0'-14.0' Type: 9.0'-12.0' 3/8" Bentonite Chips - 12.0'-14.0' 3/8" Bentonite Pellets
					351.18	3		4.50/5.00		
		12.50 - 14.00 sandy SILTY CLAY; blue/gray; cohesive, moist, soft	CL		12.50				3/8" Bentonite Pellets	**ANNULUS SEAL** Interval: 0.0'-9.0' Type: Portland Cement (Type II)
	350				349.68					
15		14.00 - 30.00 Sandy SILT, fine to coarse sand, some loose cohesive clay balls; orange/brown, micaceous, SAPROLITE; moist, loose			14.00				30/45 Sand	**WELL COMPLETION** Pad: 4'x4'x4" Protective Casing: Anodized Aluminum
						4		5.00/5.00	#1 Sand	
	345									**DRILLING METHODS** Soil Drill: 4-inch Sonic Rock Drill: N/A
20										
			ML			5		5.00/5.00	0.010" Screen Slot	
	340									
25		25.00: Wet core								
						6		5.00/5.00	#1 Sand	
	335								3/8" Bentonite Chips	
30					333.68					
		Boring completed at 30.00 ft								
	330									
35										
	325									
40										
	320									
45										

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade
DRILLER: Ray Whitt

GA INSPECTOR: Mike Smilley, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17

Golder Associates

BOREHOLE RECORD PLAT BRANCH LOGS.GPJ PIEDMONT.GDT 9/18/17

RECORD OF BOREHOLE BRGWC-36S/PZ-36S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 28.70 ft
LOCATION: Milledgville, GA

DRILL RIG: Full Size Track Mounted Sonic
DATE STARTED: 7/25/16
DATE COMPLETED: 7/26/16

NORTHING: 1,165,743.30
EASTING: 2,554,694.19
GS ELEVATION: 382.94
TOC ELEVATION: 386.00 ft

DEPTH W.L.: 0.00 (bgs)
ELEVATION W.L.: 386.00 (amsl)
DATE W.L.: 8/6/2016
TIME W.L.: 10:00

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
0		0.00 - 1.10 TOPSOIL, SILTY SAND, fine sand, non-plastic fines, some organics (roots); dark reddish brown (10YR 5/4), residual soil (W6), some weathered micaceous grains, non-cohesive, moist, loose	SM		381.84					
		1.10 - 1.90 Sandy CLAYEY SILT, low plasticity fines, fine sand, some organics (roots); very dusky red (10R 2/2) to dark yellowish brown (10YR 4/2), residual soil (W6), some weathered micaceous grains, RESIDUUM; cohesive, w<PL, firm	ML		381.04					
			SP-SM		1.90 379.94					
	380				3.00	1		3.20 6.50		
5		1.90 - 3.00 SAND, fine to medium sub-angular sand, some non-plastic fines, trace fine sub-angular gravel; dark yellowish brown (10YR 4/2), residual soil (W6), quartz, trace weathered micaceous grains, RESIDUUM; non-cohesive, moist, loose	CL						Portland Cement (Type II)	**WELL CASING** Interval: 0.0'-18.7' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded
	375	3.00 - 8.00 Sandy SILTY CLAY, moderate plasticity fines, fine sand, moderate yellowish brown (10YR 5/4), residual soil (W6), quartz, trace weathered micaceous grains, cohesive, w~PL, firm			374.94 8.00					**WELL SCREEN** Interval: 18.7'-28.7' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC
10		8.00 - 13.90 trace fine angular gravel; pale yellowish brown (10YR 6/2) mottled medium gray (N5), residual soil (W6), trace feldspars, quartz and weathered micaceous grains, cohesive, w~PL, firm				2		8.60 10.00	3/8" Bentonite Chips	**FILTER PACK** Interval: 14.80'-28.70' Type: 14.8'-15.3' 30/45 Sand - 15.3'-28.7' #1 Sand
	370				369.04					**FILTER PACK SEAL** Interval: 9.5'-14.8' Type: 9.5'-12.8' 3/8" Bentonite Chips - 12.8'-14.8' 3/8" Bentonite Pellets
15		13.90 - 28.50 SAND, fine to medium sub-angular sand, trace non-plastic fines, some fine to coarse angular soft gravels (core stones); brownish gray (5YR 6/1) mottled light brown (5YR 5/6) white (N9) and black (N1), with feldspar, quartz, biotite, and weathered micaceous grains, highly weathered (W4) with moderately weathered (W3) core stones, relic foliations in core stones, non-cohesive, moist, compact, SAPROLITE			13.90				3/8" Bentonite Pellets 30/45 Sand	**ANNULUS SEAL** Interval: 2.0'-9.5' Type: Portland Cement (Type II)
	365					3		5.00 5.00	#1 Sand	**WELL COMPLETION** Pad: 4'x4'x4" Protective Casing: Anodized Aluminum
20			SP							**DRILLING METHODS** Soil Drill: 4-inch Sonic Rock Drill: N/A
	360					4		5.00 5.00	0.010" Screen Slot	
25										
	355					5		2.00 2.00		
					354.44				#1 Sand	
		Boring completed at 28.70 ft			28.50					
30										
	350									
35										
	345									
40										
	340									
45										

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Dale Osterburg

GA INSPECTOR: Jeffrey Ingram
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17

Golder Associates

BOREHOLE RECORD PLAT BRANCH LOGS.GPJ PIEDMONT.GDT 9/18/17

RECORD OF BOREHOLE BRGWC-37S/PZ-37S

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 66.00 ft
LOCATION: Milledgville, GA

DRILL RIG: Full Size Track Mounted Sonic
DATE STARTED: 7/23/16
DATE COMPLETED: 7/24/16

NORTHING: 1,165,092.09
EASTING: 2,554,978.90
GS ELEVATION: 444.20
TOC ELEVATION: 447.23 ft

DEPTH W.L.: 43.40 (bgs)
ELEVATION W.L.: (amsl)
DATE W.L.: 7/25/2016
TIME W.L.: 06:45

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES
0		0.00 - 0.60 TOPSOIL, Sandy SILT, non-plastic fines, fine rounded sand, some organics (roots); dark yellowish brown (10YR 6/2), residual soil (W6), non-cohesive, dry, loose	ML		443.6 0.60 441.8				
		0.60 - 2.40 Sandy SILT, non-plastic fines, fine sand; light brown (5YR 5/6), to moderate reddish brown (10R 4/6), residual soil to completely weathered (W6-W5), SAPROLITE, non-cohesive, dry, dense			2.40	1		6.00 6.00	
5	440	2.40 - 8.50 SAND and SILT, fine sand, non-plastic fines, some low plasticity fines, some soft fine to coarse angular gravels (core stones); moderate reddish brown (10R 4/6), completely weathered (W5), trace relic foliations in core stones, weathered micaceous grains, SAPROLITE, non-cohesive, dry, compact	SP & ML		435.7				
10	435	8.50 - 18.00 Sandy SILT, non-plastic to low plasticity fines, fine sand, some weak fine to coarse angular gravels (core stones); light brown (5YR 5/6) mottled moderate reddish brown (10R 4/6), highly to completely weathered (W4 to W5), trace relic foliations in core stones, weathered micaceous grains, SAPROLITE, cohesive, w<PL, firm	ML		8.50 426.2	2		7.70 10.00	
15	430								
20	425	18.00 - 25.00 SILTY SAND, fine sand, non-plastic to low plasticity fines, some soft fine to coarse angular gravels (core stones); pale yellowish brown (10YR 6/2) mottled white (N9) and black (N1) with some light brown (5YR 5/6) staining, frequent relic foliations, quatz, weathered micaceous grains, biotite, feldspar, SAPROLITE, non-cohesive, moist, compact	SM		18.00 419.2	3		5.70 10.00	Portland Cement – (Type II)
25	420	25.00 - 25.10 0.1 foot layer of light brown (5YR 5/6) SILT	ML		25.10				
		25.10 - 33.50 SILTY SAND, fine sand, non-plastic to very low plasticity fines, trace angular weak fine to coarse gravels (core stones); pale yellowish brown (10YR 6/2), to very pale orange (10YR 8/2) mottled black (N1) and white (N9), highly weathered (W4), quartz, felsphar, weathered micaceous grains, biotite, trace relic foliations, SAPROLITE, non-cohesive, moist, compact	SM		410.7	4		7.20 10.00	
30	415	33.50 - 36.00 SILTY SAND, fine sand, non-plastic to very low plasticity fines, trace soft fine to coarse angular gravels (core stones); light brown (5YR 5/6) mottled black (N1) and white (N9), highly to completely weathered (W4 to W5), weathered micaceous grains, biotite, feldspar, SAPROLITE, non-cohesive, moist, dense			33.50 408.2				
35	410	36.00 - 38.00 SILTY SAND, fine sand, non-plastic fines; grayish orange (10YR 7/4), completely weathered (W5), quartz, weathered micaceous grains, SAPROLITE, non-cohesive, wet, compact			36.00 406.2				
40	405	38.00 - 42.00 SILTY SAND, fine sand, non-plastic to low plasticity fines, trace soft fine to coarse angular gravels (core stones); light brown (5YR 5/6) to pale yellowish brown (10YR 6/2), mottled white (N9) and black (N1), highly weathered (W4), weathered micaceous grains, biotite, quartz, SAPROLITE, non-cohesive, moist, dense			38.00 402.2	5		9.50 10.00	
45	400		SP & ML		42.00				

Log continued on next page

WELL CASING
Interval: 0.0'-53.6'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 53.6'63.6'
Material: U-Pack Schedule 40 PVC
Diameter: 2"
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 50.0'-64.0'
Type: 50.0'-51.0' 30/45 Sand - 51.0'-64.0' #1 Sand

FILTER PACK SEAL
Interval: 50.0'-45.0'
Type: 45.0'-48.0' 3/8" Bentonite Chips - 48.0'-50.0' 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 2'-45'
Type: Portland Cement (Type II)

WELL COMPLETION
Pad: 4'x4'x4"
Protective Casing: Anodized Aluminum

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: N/A

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Dale Osterburg

GA INSPECTOR: Jeffrey Ingram
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17

Golder Associates

RECORD OF BOREHOLE BRGWC-37S/PZ-37S

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 66.00 ft
LOCATION: Milledgville, GA

DRILL RIG: Full Size Track Mounted Sonic
DATE STARTED: 7/23/16
DATE COMPLETED: 7/24/16

NORTHING: 1,165,092.09
EASTING: 2,554,978.90
GS ELEVATION: 444.20
TOC ELEVATION: 447.23 ft

DEPTH W.L.: 43.40 (bgs)
ELEVATION W.L.: (amsl)
DATE W.L.: 7/25/2016
TIME W.L.: 06:45

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
45		42.00 - 53.00 SAND & SILT, fine sand, non-plastic to very low plasticity fines; some soft angular fine to coarse gravels (core stones); pale yellowish brown (10YR 6/2) mottled white (N9) and light olive gray (5Y 5/2), highly weathered (W4), some relic foliations, feldspar, quartz, weathered micaceous grains, biotite, SAPROLITE, non-cohesive, moist, dense *(Continued)* 46.00: highly weathered (W4) to moderately weathered (W3)	SP & ML			5			3/8" Bentonite Chips 3/8" Bentonite Pellets 30/45 Sand	**WELL CASING** Interval: 0.0'-53.6' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded **WELL SCREEN** Interval: 53.6'63.6' Material: U-Pack Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC **FILTER PACK** Interval: 50.0'-64.0' Type: 50.0'-51.0' 30/45 Sand - 51.0'-64.0' #1 Sand **FILTER PACK SEAL** Interval: 50.0'-45.0' Type: 45.0'-48.0' 3/8" Bentonite Chips - 48.0'-50.0' 3/8" Bentonite Pellets **ANNULUS SEAL** Interval: 2'-45' Type: Portland Cement (Type II) **WELL COMPLETION** Pad: 4'x4'x4" Protective Casing: Anodized Aluminum **DRILLING METHODS** Soil Drill: 4-inch Sonic Rock Drill: N/A
50	395					6		10.00 / 10.00		
					391.2					
		53.00 - 63.00 SAND, fine to medium sub-angular sand, non-plastic fines, some fine to coarse angular soft gravel (core stones); pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/6) mottled black (N1) and white (N9), strong foliations in core stones, moderately to highly weathered (W3-W4), weathered micaceous grains, biotite, quartz, feldspar, SAPROLITE; non-cohesive, wet, dense			53.00					
55			SP			7		3.50 / 3.50	#1 Sand 0.010" Screen Slot	
60	385									
					381.2	8		6.50 / 6.50		
		63.00 - 66.00 TRANSITIONALLY WEATHERED ROCK, fine to medium sub-angular sand, non-plastic fines, trace fine to coarse soft gravels (core stones); pale yellowish brown (10YR 6/2) to yellowish gray (5Y 2/2) mottled white (N9) and black (N1), moderately weathered (W3), quartz, feldspar, weathered micaceous grains, biotite, PARTIALLY WEATHERED ROCK; non-cohesive, wet, very dense	TWR		63.00				#1 Sand #1 Sand Natural Cave In	
65	380				378.2					
		Boring completed at 66.00 ft								
70	375									
75	370									
80	365									
85	360									
90	355									

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Dale Osterburg

GA INSPECTOR: Jeffrey Ingram
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17

Golder Associates

BOREHOLE RECORD PLAT BRANCH LOGS.GPJ PIEDMONT.GDT 9/18/17

RECORD OF BOREHOLE BRGWC-38S/PZ-38S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 38.50 ft
LOCATION: Milledgville, GA

DRILL RIG: Full Size Track Mounted Sonic
DATE STARTED: 7/22/16
DATE COMPLETED: 7/22/16

NORTHING: 1,164,391.62
EASTING: 2,555,015.42
GS ELEVATION: 429.55
TOC ELEVATION: 432.33 ft

DEPTH W.L.: 16.70 (bgs)
ELEVATION W.L.: 415.63 (amsl)
DATE W.L.: 7/23/2016
TIME W.L.: 18:20

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES NO.	SAMPLES TYPE	SAMPLES REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES
0		0.00 - 10.00 (0.0-10.0) HYDROVAC (no recovery)	NA		419.55	1		0.00 / 10.00	Portland Cement (Type II)
10	420	10.00 - 10.60 Sandy SILT, low plasticity fines, fine sand; moderate reddish brown (10R 4/6) to light brown (5YR 5/6), completely to highly weathered (W4 to W5), some relict foliations, weathered micaceous grains, biotite, quartz, SAPROLITE; cohesive, w<PL, firm	ML		418.95				
			SM		418.35				
		10.60 - 11.20 SILTY SAND, fine to coarse sub-angular sand, non-plastic fines; light brown (5YR 5/6), highly to completely weathered (W4 to W5), weathered micaceous grains, biotite, quartz, feldspar, SAPROLITE; non-cohesive, moist, compat	ML		11.20	2		4.60 / 6.00	
15	415	11.20 - 18.00 Sandy SILT, low plasticity fines, fine sand; moderate reddish brown (10R 4/6) to light brown (5YR 5/6), completely to highly weathered (W4 to W5), some relict foliations, weathered micaceous grains, biotite, quartz, SAPROLITE; cohesive, w<PL, firm			411.55				
20	410	18.00 - 23.50 SAND and SILT, fine sand, low plasticity fines; light brown (5YR 5/6) to moderate reddish brown (10R 4/6), highly weathered (W4), some relict foliations, weathered micaceous grains, biotite, quartz, feldspar, SAPROLITE; cohesive, w~PL, firm	SP & ML		18.00 406.05	3		5.10 / 10.00	3/8" Bentonite Chips 3/8" Bentonite Pellets
25	405	23.50 - 25.00 SILTY SAND, fine to medium sub-angular sand, non-plastic to low plasticity fines, moderate reddish brown (10R 4/6) to light brown (5YR 5/6), mottled black (N1) and white (N9), highly weathered (W4), weak relict foliations, weathered micaceous grains, biotite, quartz, feldspar, SAPROLITE; non-cohesive, moist, compact	SM		23.50 404.55				30/45 Sand
			SP-SM		25.00 403.55				
		25.00 - 26.00 SAND, fine to coarse angular sand, non-plastic fines, some angular fine gravels (core stones); yellowish gray (5Y 7/2) to very pale orange (10YR 8/2), highly to moderately weathered (W4 to W3), strong relict foliations, felsphar, quartz, weathered micaceous grains, biotite, SAPROLITE; non-cohesive, wet, compact	SP		26.00 400.55	4		6.70 / 10.00	#1 Sand
30	400	26.00 - 29.00 SAND, medium sub-rounded sand, trace non-plastic fines; light brown (5YR 5/6), completely weathered (W5), quartz, feldspar, weathered micaceous grains, SAPROLITE; non-cohesive, wet, compact	SM		29.00 396.55				0.010" Screen Slot
		29.00 - 33.00 SILTY SAND, fine to medium sub-angular sand, low plasticity fines, trace fine angular gravels (core stones); pale yellowish brown (10YR 6/2) mottled black (N1) and light brown (5YR 5/6) and greenish gray (5GY 6/1), highly to moderately weathered (W4 to W3), strong relict foliations, quartz, weathered micaceous grains, biotite, feldspar, SAPROLITE; cohesive, w>PL, very stiff	ML		33.00 393.55				
35	395	33.00 - 36.00 SILT, low plasticity fines, fine to medium sub-angular sand, trace angular fine gravel (core stones); pale yellowish brown (10YR 6/2) mottled white (N9), black (N1) and greenish gray (5G 6/1), highly weathered (W4), weathered micaceous grains, biotite, quartz, feldspars, strong relict foliations, SAPROLITE; cohesive, w~PL, very stiff	TWR		36.00 391.05	5		2.50 / 2.50	#1 Sand
40	390	36.00 - 38.50 TRANSITIONALLY WEATHERED ROCK, low plasticity fines, fine sand; light brown (5YR 5/6), white (N9) black (N1), some relict foliations, moderately weathered (W3), feldspar, biotite, quartz, weathered micaceous grains, cohesive, w~PL, hard							
		Boring completed at 38.50 ft							
45	385								

WELL CASING
Interval: 0.0'-27.8'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 27.8'-37.8'
Material: Schedule 40 PVC
Diameter: 2"
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 24.5'-38.5'
Type: 24.5'-25.5' 30/45 Sand - 25.5'-38.5' #1 Sand

FILTER PACK SEAL
Interval: 19.5'-24.5'
Type: 19.5'-22.5' 3/8" Bentonite Chips - 22.5'-24.5' 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 3.0'-19.5'
Type: Portland Cement (Type II)

WELL COMPLETION
Pad: 4'x4'x4"
Protective Casing: Anodized Aluminum

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: N/A

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Caribbean Drilling Services
DRILLER: Dale Osterburg

GA INSPECTOR: Jeffrey Ingram
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17

Golder Associates

BOREHOLE RECORD PLAT BRANCH LOGS.GPJ PIEDMONT.GDT 9/18/17

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/19/2014 **COMPLETED** 3/20/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Casing Advance
DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 65 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 43.4 ft. after 96 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- See PZ-01 I and PZ-01 D for material descriptions			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10					
15					
20					
25					
30					
35					Annular Seal: bentonite pellets
40					Filter: silica filter sand

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:49 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

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BORING PZ-01 S
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ES

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
					Completion: protective aluminum cover with bollards; 4-foot square concrete pad
					(CONTINUED)
45					
50					Filter: silica filter sand
55					
60					**Standpipe: 2" OD PVC (SCH 40)** Screen: 9.99999999999999 ft; pre-pack
65					Sump:0.400000000000006 ft.
		Bottom of borehole at 65.0 feet.			
70					
75					
80					
85					
90					

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:49 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/18/2014 **COMPLETED** 3/19/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; Casing Advance; HQ Rock Core
DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 79.6 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 46.3 ft. after 100 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: residuum dry, very stiff, silty CLAY, red with yellow-red mottles, micas			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		- CL: residuum dry, stiff, silty CLAY, red, dark red and red-brown, yellow and black mottles, micas			
15		- ML: saprolite dry, stiff, SILT, red-yellow with white mottles			
20		- ML: saprolite dry, very stiff, clayey SILT, gray-brown, micas			
25		- ML: saprolite dry, very stiff, clayey SILT, gray-brown, micas			
30		- ML: saprolite dry, very stiff, clayey SILT, gray-brown with black mottles, micas			
35		- ML: saprolite dry, very stiff, clayey SILT, gray-brown with black mottles, micas			
40		- ML: saprolite dry, very stiff, clayey SILT, gray-brown with white and black mottles, micas			

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:49 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
					Completion: protective aluminum cover with bollards; 4-foot square concrete pad
		(Con't)			(CONTINUED)
45		- ML: saprolite dry, very hard, clayey SILT, gray-brown with white and black mottles, micas			
50		- ML: saprolite dry, very hard, clayey SILT, gray-brown with dark gray mottles, sand, micas			
55		- SW: saprolite dry, very dense, SAND, gray and light gray, fine grained, gravel (pulverized rock fragments)			
60		- SW: saprolite dry, very dense, SAND, gray and light gray, fine grained, gravel (pulverized rock fragments)			
65		- No recovery			Annular Seal: bentonite pellets
		Biotite GNEISS - fine to coarse grain, hard, not weathered, massive, banded, numerous fractures, biotite, feldspar, quartz, gray			Filter: silica filter sand
70		- fine to coarse grain, hard, not weathered, massive, banded, few fractures, biotite, feldspar, quartz, dark gray and white			**Standpipe: 2" OD PVC (SCH 40)**
75		- fine to coarse grain, hard, not weathered, massive, banded, numerous fractures, biotite, feldspar, quartz, dark gray and white			Screen: 10 ft; pre-pack
80					Sump:0.400000000000006 ft.
		Bottom of borehole at 79.6 feet.			
85					
90					

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:49 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/20/2014 **COMPLETED** 4/4/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; Casing Advance; HQ Rock Core
DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 160 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 49.5 ft. after 100 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
		Lean Clay (CL) - residuum dry, silty CLAY, red			
5		**Silt (ML)** - residuum dry, clayey SILT, yellow-red with yellow mottles, micas - ML: saprolite dry, clayey SILT, light red, then pale brown with yellow-red mottles, some sand, micas			
10		- ML: saprolite damp, clayey SILT, pale brown with black and white mottles, then pale red with black and white mottles			
15		- ML: saprolite damp, clayey SILT, brown with black mottles, micas, sand			
20		**Lean Clay (CL)** - saprolite damp, silty CLAY, brown and gray-brown with black mottles, micas			
25		**Silt (ML)** - saprolite damp, clayey SILT, pale red-brown with white and black mottles, quartz gravel seams, micas			
30		**Lean Clay (CL)** - saprolite dry, CLAY, yellow - CL: saprolite dry, CLAY, yellow and pale yellow			
35		**Silt (ML)** - saprolite dry, clayey SILT, light gray with red and black mottles, micas - ML: saprolite damp, clayey SILT, gray-brown, then light brown with red mottles, sand, micas			
40		- ML: saprolite damp, clayey SILT, brown with white and black mottles			
		Lean Clay (CL)			

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
45		- saprolite damp, silty CLAY, light brown with white mottles, quartz gravel seams **Lean Clay (CL)** *(Con't)* - CL: saprolite damp, silty CLAY, light brown with white mottles, quartz gravel seams			(CONTINUED)
50		▼			
55		- casing advance - no samples 50-65.5 ft., unconsolidated material			
60					
65		- Biotite GNEISS: fine grain, hard, not weathered, massive, numerous fractures, dark gray and white, biotite, feldspar, quartz			
70		- fine to coarse grain, hard, not weathered, massive, numerous fractures, dark gray and white, biotite, feldspar, quartz			
75		- fine to coarse grain, hard, not weathered, massive, numerous fractures, dark gray and white, biotite, feldspar, quartz			
80		- fine to coarse grain, hard to soft, not to highly weathered, flow banded, numerous fractures, dark gray, white bands, biotite, feldspar, quartz, fresh			
85		- fine to coarse grain, hard, not weathered, flow banded, numerous fractures, dark gray, white bands, biotite, feldspar, quartz, fresh			
90		- fine grain, hard, not weathered, massive, few fractures, dark gray, white bands, biotite, feldspar phenocrysts, quartz, micro-folds, fresh			

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:49 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA (CONTINUED)
		(Con't) - fine grain, hard, not weathered, massive, few fractures, dark gray, white bands, biotite, feldspar phenocrysts, quartz, few micro-folds, fresh			
100		- fine grain, hard, not weathered, flow banded, few fractures, dark gray, white banding, biotite, feldspar phenocrysts, quartz, micro-folds, fresh			
105		- fine grain, hard, not weathered, massive, few fractures, dark gray, white bands, biotite, feldspar phenocrysts, quartz, dark gray, white bands, micro-folds, fresh			
110		- fine grain, hard, not weathered, massive, few fractures, dark gray and white, biotite, feldspar phenocrysts, quartz, micro-folds, fresh			
115		- coarse grain, hard, not weathered, massive, numerous fractures, dark gray, dark green, biotite (coarse), quartz			
120		- coarse grain, hard, not weathered, flow banded, few fractures, dark gray, white banding, biotite, feldspar phenocrysts, quartz, micro-folds, fresh			
125		- fine grain, hard, not weathered, massive, few fractures, dark gray, biotite, quartz			
130		- fine to coarse grain, hard, not weathered, massive, few fractures, dark gray and white, biotite, quartz, feldspar phenocrysts			
135		- fine to coarse grain, hard, not weathered, massive, numerous fractures, dark gray and white, biotite, quartz, feldspar phenocrysts			
140		- fine to coarse grain, hard, not weathered, massive, numerous fractures, dark gray and white, biotite, quartz, feldspar phenocrysts			
145		- fine grain, hard, not weathered, massive, few fractures, dark gray,			

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA (CONTINUED)
150		biotite, quartz *(Con't)*			
		- fine grain, hard, not weathered, massive, few fractures, dark gray, white bands, biotite, feldspar, quartz, fresh			
155					
		- fine grain, hard, not weathered, massive, few fractures, dark gray, white bands, biotite, feldspar, quartz, fresh			
160					
		Bottom of borehole at 160.0 feet.			
165					
170					
175					
180					
185					
190					
195					

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:49 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

BORING PZ-03 S
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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/11/2014 **COMPLETED** 3/11/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger
DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 40 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** Dry after 100 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- See PZ-03 D and PZ-03 I for material descriptions			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10					
15					
20					
25					Annular Seal: bentonite pellets
30					Filter: silica filter sand
35					**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
40					Sump:0.399999999999999 ft.
		Bottom of borehole at 40.0 feet.			

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/11/2014 **COMPLETED** 3/11/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; Casing Advance; HQ Rock Core
DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 54.6 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 49.1 ft. after 168 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: residuum damp, hard, CLAY, red, some sand			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		- CL-ML: saprolite dry, very stiff, clayey SILT, yellow-red, micas			
15		- CL-ML: saprolite dry, medium stiff, clayey SILT, yellow-red, black mottles, micas			
20		- CL-ML: saprolite dry, stiff, clayey SILT, red-brown, black mottles, micas			
25		- CL-ML: saprolite dry, medium stiff, clayey SILT, red-yellow and gray-brown, black mottles, micas			
30		- CL-ML: saprolite dry, medium stiff, clayey SILT, red-yellow and gray-brown, black mottles, micas			
35		- CL-ML: saprolite dry, medium stiff, clayey SILT, red-yellow and gray-brown, black mottles, micas, quartz gravel			
40		- ML: saprolite dry, hard, sandy SILT, gray, white mottles, quartz gravel			Annular Seal: bentonite pellets
		Biotite GNEISS - medium grain, medium hard to soft, moderately weathered, fractures, gray-brown, black-white banding, biotite, quartz, feldspar phenocrysts			Filter: silica filter sand

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
45		**Biotite GNEISS** *(Con't)* - No recovery			Completion: protective aluminum cover with bollards; 4-foot square concrete pad (CONTINUED)
50		**Felsic biotite GNEISS** - medium grain, very soft to hard, highly to not weathered, flow banded, occassional fractures, gray with black-white banding, partially weathred to 50 FT., then fresh, feldpsar phenocrysts			**Standpipe:** **2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
55		Bottom of borehole at 54.6 feet.			Sump:0.399999999999999 ft.
60					
65					
70					
75					
80					
85					
90					

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/11/2014 **COMPLETED** 3/27/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; HQ Rock Core; HQ Rock Core
DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 130 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 49.8 ft. after 288 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5					
10		**Silty Clay (CL-ML)** - residuum dry, CLAY, red, then clayey SILT red with red-yellow and black mottles, micas			
15		**Silty Sand (SM)** - saprolite silty SAND, light red with white and black mottles, micas - SM: saprolite damp, silty SAND, white with black mottles, micas			
20		**Lean Clay (CL)** - silty CLAY, red, yellow-red, dark red, micas **Silty Sand (SM)** - silty SAND, light red and white **Silt (ML)** - saprolite damp, clayey SILT, white and red, yellow-red, pink, black, micas, quartz sand and gravel, weathered amphibolite			
25		- ML: saprolite damp, clayey SILT, dark gray-brown, red-yellow, black and weak red, micas			
30		- ML: saprolite damp, clayey SILT, red-yellow, black and red, micas			
35		**Silty Sand (SM)** - saprolite dry, silty SAND, gray-brown, white, some gravel,			
40		**Partially Weathered Rock (PWR)** ~~- saprolite dry, weathered GNEISS, black-white banding~~			

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
45					(CONTINUED)
50		**Horneblende/biotite GNEISS** - fine to medium grain, hard, not weathered, flow banded, few fractures, gray-brown, black-white banding, feldspar, quartz, horneblende, biotite, fresh - fine to medium grain, hard, not weathered, flow banded, few fractures, gray-brown, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh			
55		- fine to medium grain, hard, not weathered, flow banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh			
60		- fine to medium grain, hard, not weathered, flow banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh			
65		- fine to medium grain, hard, not weathered, flow banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh			
70		- fine to coarse grain, hard, not weathered, flow banded, banded, few fractures, gray-brown, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh			
75		- fine to coarse grain, hard, not weathered, massive, banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh			
80		- fine to coarse grain, hard, not weathered, massive, banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh, highly fractured, 80-80.5			
85		- fine to coarse grain, hard, not weathered, massive, banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh			
90		- fine to coarse grain, hard, not weathered, massive, banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh			

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA (CONTINUED)
		Horneblende/biotite GNEISS *(Con't)* - fine to coarse grain, hard, not weathered, flow banded, banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh			
100		- fine to coarse grain, hard, not weathered, flow banded, banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh, coarse schistose biotite			
105		- fine to coarse grain, hard, not weathered, flow banded, banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh, coarse schistose biotite			
110		- fine to coarse grain, hard, not weathered, massive, banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh			
115		- coarse grain, hard, not weathered, flow banded, banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh, pink augen-shaped feldspar			
120		- fine to coarse grain, hard, not weathered, flow banded, banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh			
125		- medium to coarse grain, hard, not weathered, flow banded, banded, few fractures, black-white banding, variable bedding thicknesses, feldspar, quartz, horneblende, biotite, fresh, pink augen-shaped feldspar			
130		Bottom of borehole at 130.0 feet.			
135					
140					
145					

BORING PZ-04 S
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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/10/2014 **COMPLETED** 3/10/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger
DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 30 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** Dry after 100 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- See PZ-04 I for material descriptions			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10					
15					Annular Seal: bentonite pellets
20					Filter: silica filter sand
25					**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
30		Bottom of borehole at 30.0 feet.			Sump:0.399999999999999 ft.
35					
40					

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/6/2014 **COMPLETED** 3/6/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; Casing Advance; HQ Rock Core
DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 47 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 30.6 ft. after 144 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: residuum damp, stiff, silty CLAY red, some sand, micas			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		- SM: saprolite very damp, loose, silty SAND, red-yellow with white and black mottles, clay, coarse quartz sand, micas			
15		- ML: saprolite damp, medium stiff, clayey SILT, yellow-red and red-brown with black mottles, micas			
20		- ML: saprolite very damp, stiff, sandy SILT, brown-yellow and red-brown with black mottles			
25		- SM: saprolite very damp, medium dense, silty SAND, medium dense, pale brown with white mottles			
30		- ML: saprolite wet, very stiff, sandy SILT, yellow-brown with white mottles, micas, clay			Annular Seal: bentonite pellets
35		- ---auger refusal---- - Felsic biotite GNEISS: fine to coarse grain, hard to soft, slightly weathered, dark gray, black-white banding, feldspar, quartz, biotite, some fractures			Filter: silica filter sand
40		- medium to coarse grain, medium hard to soft, moderately to highly weathered, banded, numerous fractures, dark gray with black-white banding, weathered zone 35-37 ft., feldspar phenocrysts, quartz, biotite, hornblende - Felsic hornblende/biotite GNEISS: medium to coarse grain, hard, not weathered, one fractrure, distinct black-white banding, feldspar phenocrysts, quartz, biotite, hornblende, fresh			**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2\WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
45		*(Con't)* - Felsic hornblende/biotite GNEISS: medium to coarse grain, hard, not weathered, distinct black-white banding, feldspar, quartz, biotite, hornblende, felspar phenocrysts, fresh			Completion: protective aluminum cover with bollards; 4-foot square concrete pad (CONTINUED) **Standpipe:** **2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack Sump:0.399999999999999 ft. Cave-in to 46.8 ft.
		Bottom of borehole at 47.0 feet.			
50					
55					
60					
65					
70					
75					
80					
85					
90					

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

BORING PZ-07 S

ES

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 4/1/2014 **COMPLETED** 4/1/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 46 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 20.5 ft. after 300 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: residuum dry, CLAY, red, trace micas			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		- ML: saprolite dry, clayey SILT, red with yellow-red mottles, micas			
15		- ML: saprolite dry, clayey SILT, red-yellow with black and white mottles, micas			
20		- ML: saprolite damp, sandy SILT, weak red with gray and white mottles, micas			
25		- ML: saprolite damp, clayey SILT, yellow-brown with red-brown and black mottles, sand			
30		- ML: saprolite damp, clayey SILT, yellow-brown with red-brown and black mottles, sand			Annular Seal: bentonite pellets
35		- ML: saprolite damp, SILT, gray with black mottles, micas			Filter: silica filter sand
40		- ML: saprolite damp, SILT, dark gray-brown, micas			**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
45		- ML: saprolite damp, SILT, gray-brown with white mottles, micas			Sump:0.399999999999999 ft. Cave-in to 44.5 ft.

Bottom of borehole at 46.0 feet.

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 4/1/2014 **COMPLETED** 4/1/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 51 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 21.5 ft. after 300 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: residuum dry, stiff, silty CLAY, red, micas			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		- ML: saprolite dry, stiff, SILT, dark red with black and white mottles, micas			
15		- ML: saprolite dry, stiff, sandy SILT, red with pale red and black mottles, micas			
20		- ML: saprolite dry, stiff, sandy SILT, red with pale red and black mottles, micas			
25		- MH: saprolite damp, medium stiff, sandy SILT, red and yellow-brown, white mottles, micas			
30		- MH: saprolite wet, medium stiff, clayey SILT, gray-brown with white mottles, micas			
35		- MH: saprolite wet, medium stiff, clayey SILT, brown with white and black mottles			Annular Seal: bentonite pellets Filter: silica filter sand
40		- MH: saprolite wet, medium stiff, clayey SILT, brown with white and black mottles			**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2\WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

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LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
45		*(Con't)* - MH: saprolite wet, medium stiff, clayey SILT, brown with white and black mottles			(CONTINUED) Completion: protective aluminum cover with bollards; 4-foot square concrete pad
50		- MH: saprolite wet, stiff, clayey SILT, brown with white and black mottles			**Standpipe:** **2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack Sump:0.399999999999999 ft. Cave-in to 49.5 ft.
		Bottom of borehole at 51.0 feet.			
55					
60					
65					
70					
75					
80					
85					
90					

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/5/2014 **COMPLETED** 3/5/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; Casing Advance
DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 50.5 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 36.1 ft. after 170 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: residuum dry, very stiff, silty CLAY, red, yellow-red mottles			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		- ML: saprolite dry, stiff, clayey SILT, yellow-red with pink mottles, micas			
15		- ML: saprolite dry, medium stiff, SILT, pale brown, red-yellow and white mottles, micas, schistose			
20		- ML: saprolite dry, stiff, SILT, pale brown with white mottles, sand, micas			
25		- ML: saprolite dry, stiff, sandy SILT, pale gray-brown with yellow-brown mottles, micas			
30		- ML: saprolite damp, stiff, clayey SILT, stiff, pale brown with dark brown mottles, sand, micas			Annular Seal: bentonite pellets
35		- ML: saprolite damp, very stiff, sandy SILT, dark gray-brown with pale yellow and light gray-brown mottles, micas			Filter: silica filter sand
40		- ML: saprolite damp, very stiff, sandy SILT, gray-brown with red-yellow and light gray mottles, micas			**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack

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BORING PZ-09 S
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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
45		*(Con't)* - ML: saprolite damp, very stiff, clayey SILT, gray-brown with white mottles, sand, micas			Completion: protective aluminum cover with bollards; 4-foot square concrete pad (CONTINUED) **Standpipe:** **2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack Sump:0.399999999999999 ft. Cave-in to 48 ft.
50		- ML: saprolite very damp, hard, clayey SILT, gray with white mottles, micas			
		Bottom of borehole at 50.5 feet.			
55					
60					
65					
70					
75					
80					
85					
90					

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

BORING PZ-10 S
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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/4/2014 **COMPLETED** 3/5/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; Casing Advance
DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 41 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 21.4 ft. after 192 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: residuum dry, medium dense, silty SAND, red-yellow with pale yellow mottles			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		- ML: saprolite damp, stiff, sandy SILT, pale gray-brown with pale yellow and light red mottles, micas			
15		- ML: saprolite damp, stiff, sandy SILT, stiff, dark gray-brown with red mottles, micas			
20		- ML: saprolite damp, medium stiff, sandy SILT, medium stiff, yellow-red with white and gray-brown mottles, micas			
25		- ML: saprolite wet, stiff, sandy SILT, gray and white with yellow, mottles, micas			Annular Seal: bentonite pellets
30		- ML: saprolite wet, stiff, SILT, dark gray and white with red-brown mottles, micas, some sand and clay			Filter: silica filter sand
35		- ML: saprolite damp, very stiff, sandy SILT, gray and white, clay			**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
40		- ML: saprolite damp, hard, clayey SILT, gray and white, micas, sand			Sump:0.399999999999999 ft. Cave-in to 39 ft.

Bottom of borehole at 41.0 feet.

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

BORING PZ-13 S
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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/18/2014 **COMPLETED** 3/19/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 36 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 19.9 ft. after 170 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: residuum dry, very stiff, silty CLAY, red with yellow-red mottles, sand, micas			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		- ML: saprolite dry, medium stiff, clayey SILT, medium stiff, red-yellow with pale yellow mottles, micas			
15		- ML: saprolite dry, medium stiff, clayey SILT, yellow-brown, white and brown with black mottles, micas			
20		- MH: saprolite wet, soft, clayey SILT, gray-brown and red-brown with black mottles, sand, micas			Annular Seal: bentonite pellets; Filter: silica filter sand
25		- MH: saprolite wet, soft, clayey SILT, gray-brown and red-brown with black mottles, sand, micas			
30		- MH: saprolite wet, stiff, sandy SILT, brown, white and pale brown, micas			**Standpipe: 2" OD PVC (SCH 40)**; Screen: 10 ft; pre-pack
35		- MH: saprolite wet, very stiff, sandy SILT, brown, white and pale brown, micas			Sump:0.400000000000006 ft.; Cave-in to 34.7 ft.
		Bottom of borehole at 36.0 feet.			
40					

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

BORING PZ-14 S
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SOUTHERN COMPANY

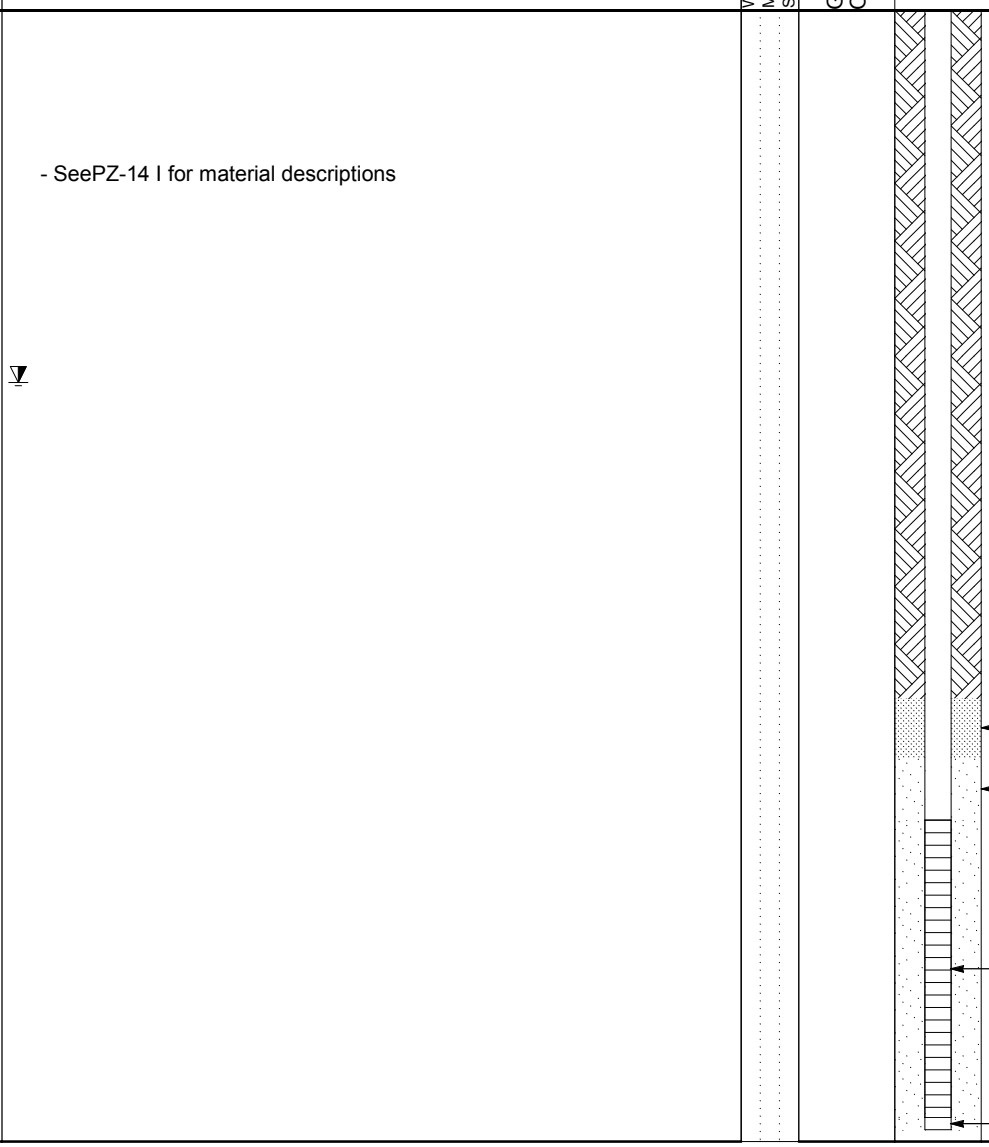
LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/20/2014 **COMPLETED** 3/20/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 38 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 12.5 ft. after 48 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- SeePZ-14 I for material descriptions			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10					
15					
20					
25					Annular Seal: bentonite pellets
30					Filter: silica filter sand
35					**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
40		Bottom of borehole at 38.0 feet.			Sump:0.399999999999999 ft.



SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/19/2014 **COMPLETED** 3/20/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; Casing Advance; HQ Rock Core
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 53.8 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 11.4 ft. after 130 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: residuum dry, stiff, silty CLAY, red, micas, sand			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		- ML: saprolite dry, stiff, sandy SILT, yellow-red, red-brown			
15		- MH: saprolite wet, soft, sandy SILT, gray-brown, white, yellow-brown with black mottles, micas, clay			
20		- MH: saprolite wet, medium stiff, sandy SILT, white, pale brown with black mottles, micas			
25		- SM: saprolite wet, loose, silty SAND, pale brown with red-brown mottles, trace micas, fine grained			
30		- SC-SM: saprolite wet, loose, SAND, brown with red-brown mottles, micas, clay, silt			
35		- SC-SM: saprolite wet, loose, SAND, brown with red-brown mottles, micas, clay, silt			
40		- MH: saprolite wet, hard, sandy SILT, dark gray-brown and white with black mottles, micas			Annular Seal: bentonite pellets
		- Felsic biotite GNEISS: coarse grain, soft to hard, moderately to not weathered, flow banded, Several fractures, dark brown, white bands, partially weathered to 41.5 ft., then fresh, black and white banding, pink			Filter: silica filter sand

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
45		and white felspar phenocrysts *(Con't)* - hard, not weathered, flow banded, no fractures, black and white bands, fresh, pink and white feldspar phenocrysts			Completion: protective aluminum cover with bollards; 4-foot square concrete pad (CONTINUED)
50		- hard, not weathered, flow banded, no fractures, black and white bands, fresh, pink and white feldspar phenocrysts			**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack Sump:0.399999999999999 ft.
55		Bottom of borehole at 53.8 feet.			
60					
65					
70					
75					
80					
85					
90					

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

BORING PZ-15 S
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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/25/2014 **COMPLETED** 3/27/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 39.9 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 6 ft. after 240 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		▽ - See PZ-15 I for material descriptions			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10					
15					
20					
25					Annular Seal: bentonite pellets
30					Filter: silica filter sand
35					**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
40					Sump:0.399999999999999 ft.

Bottom of borehole at 39.9 feet.

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/24/2014 **COMPLETED** 3/25/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; Casing Advance; HQ Rock Core
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 88.7 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 15 ft. after 240 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: residuum damp, stiff, silty CLAY, red with light red mottles, micas			Completion: protective aluminum cover with bollards; 4-foot square concrete pad
10		**Fat Clay (CH)** - residuum wet, soft, silty CLAY, red with light red mottles, micas			
15		▽ **Elastic Silt (MH)** - saprolite wet, soft, sandy SILT, light brown and light red, micas			
20		- MH: saprolite wet, soft, clayey SILT, brown-yellow, micas			
25		- MH: saprolite damp, medium stiff, clayey SILT, brown and red-brown with white mottles, micas			
30		**Poorly-graded Sand (SP)** - saprolite wet, medium dense, silty SAND, light brown with white mottles, micas			
35		- SP: saprolite wet, dense, silty SAND, light brown with white mottles, micas			
40		- SP: saprolite wet, dense, silty SAND, light brown with white mottles, micas			

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
45		**Poorly-graded Sand (SP)** *(Con't)* - SP: saprolite wet, very dense, silty SAND, light brown with white mottles			Completion: protective aluminum cover with bollards; 4-foot square concrete pad (CONTINUED)
50		**Fat Clay (CH)** - saprolite wet, very dense, sandy CLAY, gray-brown, micas			
55		**Well-graded Sand (SP)** - saprolite wet, very dense, clayey SAND, dark gray-brown with black mottles, micas			
60		- CH: saprolite wet, very dense, sandy CLAY, gray-brown, micas			
65		- SP: saprolite wet, very dense, sandy SILT, dark gray with brown mottles, gravel			
70		- SP: saprolite wet, very dense, sandy SILT, dark gray with brown mottles, gravel			
75		- ----auger refusal---- **Biotite/amphibolite GNEISS** - fine to coarse grain, soft to hard, highly to not weathered, flow banded, several fractures, black and white banding, weathered zone 76-77.5 ft., then fresh, feldspar, biotite, quartz, hornblende, feldspar phenocrysts - GRAVEL, pulverized rock			Annular Seal: bentonite pellets Filter: silica filter sand
80		- Biotite/amphibolite GNEISS: fine to coarse grain, hard, not weathered, flow banded, few fractures, black and white banding, fresh, feldspar, biotite, quartz, hornblende, feldspar phenocrysts			**Standpipe:** **2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
85		- fine to coarse grain, hard, not weathered, flow banded, few fractures, black and white banding, fresh, feldspar, biotite, quartz, hornblende, feldspar phenocrysts			Sump:0.400000000000006 ft.
90		Bottom of borehole at 88.7 feet.			

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

BORING PZ-16 S
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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/18/2014 **COMPLETED** 3/18/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 19.8 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 6.5 ft. after 48 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- See PZ-16 I for material descriptions			Completion: protective steel cover; 4-foot square concrete pad
10					Annular Seal: bentonite pellets
15					Filter: silica filter sand
20					**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
					Sump:0.400000000000002 ft. Cave-in to 19.1 ft.
		Bottom of borehole at 19.8 feet.			

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

BORING PZ-16 I
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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/13/2014 **COMPLETED** 3/14/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; Casing Advance; HQ Rock Core
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 39.2 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 6.6 ft. after 150 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS	WELL DATA
5		- CL: residuum dry, very stiff, silty CLAY, yellow-brown and red-yellow with black mottles			Completion: protective steel cover; 4-foot square concrete pad
10		- MH: saprolite wet, stiff, sandy SILT, olive-brown with white and black mottles			
15		- MH: saprolite wet, stiff, clayey SILT, dark gray-brown, brown, micas			
20		- MH: saprolite wet, hard, clayey SILT, olive-brown and brown with white mottles, sand			
25		- MH: saprolite wet, hard, clayey SILT, olive-brown and brown with white mottles, sand - MH: **Amphibolite GNEISS** - medium to coarse grain, soft to hard, highly to not weathered, numerous fractures, dark gray-brown, weathered, then fresh dark gray			Annular Seal: bentonite pellets Filter: silica filter sand
30		- medium to coarse grain, soft to hard, highly to not weathered, numerous fractures, alternating partially weathered rock and fresh rock			**Standpipe: 2" OD PVC (SCH 40)** Screen: 10 ft; pre-pack
35		- medium to coarse grain, soft to hard, highly to not weathered, numerous fractures, alternating partially weathered rock and fresh rock			Sump:0.399999999999999 ft. Cave-in to 38.6 ft.
40		Bottom of borehole at 39.2 feet.			

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

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SOUTHERN COMPANY

LOG OF TEST BORING

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Plant Branch Hydrogeologic Study
LOCATION Milledgeville, GA

DATE STARTED 3/11/2014 **COMPLETED** 3/12/2014 **SURF. ELEV.** Not Surveyed **COORDINATES:**
CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hollow Stem Auger; Casing Advance; HQ Rock Core
DRILLED BY S. Denty **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**
BORING DEPTH 43.5 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED** 0.1 ft. after 24 hrs.
NOTES

DEPTH (ft)	MATERIAL DESCRIPTION	HCL REACTION (Weak / Moderate / Strong)	GROUNDWATER OBSERVATIONS
5	- CH: alluvium wet, very soft, silty CLAY, dark brown and blue-gray, gravel		
10	**Amphibolite GNEISS** - fine grain, hard, slightly weathered, massive, dark gray - SM: residuum wet, loose, silty SAND, brown-yellow with light brown mottles		
15	**Amphibolite GNEISS** - fine grain, hard, slightly weathered, massive, dark gray - casing advance - no samples, unconsolidated material		
20	**Amphibolite GNEISS** - fine grain, hard, slightly weathered, massive, fractures 15-18 ft., dark gray - casing advance - no samples, unconsolidated material		
25	- SM: saprolite wet, medium dense, silty SAND, dark brown with pale yellow mottles		
30	- SM: saprolite wet, very dense, silty SAND, brown with pale yellow mottles		
35	**Amphibolite GNEISS** - medium grain, medium hard, moderately weathered, massive, dark gray and dark gray-brown		
40	**Amphibolite GNEISS** - medium grain, medium hard, moderately weathered, massive, dark gray and dark gray-brown - casing advance - no samples, unconsolidated material - refusal, no recovery		

WELL DATA

Completion:
protective steel cover; 4-foot square concrete pad

Annular Seal:
bentonite pellets

Filter:
silica filter sand

Standpipe:
2" OD PVC (SCH 40)
Screen:
10 ft; pre-pack

Sump:0.399999999999999 ft.

Bottom of borehole at 43.5 feet.

SIMPLE GEOLOGY WITH WELL - ESEE DATABASE.GDT - 4/29/14 10:50 - \\ALTRCFP01\X2WSHAUG$\DESKTOP\BRANCH\PLANT BRANCH PIEZOMETERS.GPJ

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-1
Sheet 1 of 2

SITE	Plant Branch Gypsum Storage	HOLE DEPTH	55	SURF.ELEV.	396.16
LOCATION	Milledgeville, GA	COORDINATES N	1163963.27	E	2555946.87
ANGLE	NA	BEARING	NA	CONTRACTOR	Southern Company
DRILL NO.	CME 550	DRILLING METHOD	4¼-in I.D. HSA	NO. SAMPLES	11
NO. U.D. SAMPLES	0	CASING SIZE	NA	LENGTH	NA
CORE SIZE	NA	TOTAL % REC.	NA	WATER TABLE DEPTH	23
ELEV.	373.16	TIME AFTER COMP.	1 week	DATE TAKEN	10/10/2007
TYPE GROUT		QUANTITY		MIX	
DRILLING START DATE	10/3/2007	DRILLER	D. Willis	RECORDER	R Tinsley
APPROVED	J. Jordan	DRILLING COMP. DATE	10/3/2007		

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
0									
1									
2									
3									
4		Dark red, micaceous, medium dense, fine silty SAND	1	3.5-5.0	3-5-7	12			
5									
6									
7									
8									
9		Tan, with red and gray, mottled, moist, stiff sandy SILT	2	8.5-10.0	4-4-8	12			
10.0 10	386.16								
11									
12									
13									
14		Yellow to light gray, micaceous, moist, stiff sandy SILT	3	13.5-15.0	3-6-8	14			
15									
16									
17									
18									
19		Yellow, micaceous, fine, loose SILTY SAND	4	18.5-20.0	2-4-4	8	SAPROLITE		
20.0 20	376.16								
21									
22									
23	▼								
24									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-1
Sheet 2 of 2

SITE: Plant Branch Gypsum Storage | TOTAL DEPTH: 55 | SURF.ELEV.: 396.16

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
25		very moist silty SAND with clayey layers, with quartz	5	23.5-25.0	5-4-2	7	SAPROLITE		
26									
27									
28									
29		large pebbles up to 1 inch diameter							
30.0 30	366.16		6	28.5-30.0	14-11-12	23	SAPROLITE		
31									
32									
33									
34		dark green, dense, silty SAND	7	33.5-35.0	22-20-17	37	SAPROLITE		
35									
36									
37									
38									
39		very dense, dark green, gray and white SAPROLITE	8	38.5-40.0	21-31-34	65	SAPROLITE		
40.0 40	356.16								
41									
42									
43									
44		SAA	9	43.5-45.0	28-42-42	84	SAPROLITE		
45									
46									
47									
48									
49		SAA	10	48.5-50.0	25-46-50/3	96+	SAPROLITE		
50.0 50	346.16								
51									
52									
53									
54		SAA	11	53.5-55.0	19-50/4	100+	SAPROLITE		
55	341.16								
56		Boring terminated at 55 feet.							

Form GS9901 7-26-2004

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-2
Sheet 1 of 2

SITE	Plant Branch Gypsum Storage			HOLE DEPTH	50	SURF.ELEV.	395.57
LOCATION	Milledgeville, GA			COORDINATES N	1164489.83	E	2557475.509
ANGLE	NA	BEARING	NA	CONTRACTOR	Southern Company	DRILL NO.	CME 550
DRILLING METHOD	4¼-in I.D. HSA			NO. SAMPLES	10	NO. U.D. SAMPLES	0
CASING SIZE	NA	LENGTH	NA	CORE SIZE	NA	TOTAL % REC.	NA
WATER TABLE DEPTH	28.5	ELEV.	367.07	TIME AFTER COMP.	24 hr	DATE TAKEN	10/23/2007
TYPE GROUT		QUANTITY		MIX		DRILLING START DATE	10/22/2007
DRILLER	D. Willis	RECORDER	D. Willis/Tinsley	APPROVED	J. Jordan	DRILLING COMP. DATE	10/22/2007

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
0									
1									
2									
3									
4		Red, micaceous, very stiff SANDY CLAY (CL)							
5			1	3.5-5.0	8-11-15	26			
6									
7									
8									
9		SAA							
10.0 10	385.57		2	8.5-10.0	8-10-12	22			
11									
12									
13									
14		Yellow to red, micaceous, medium dense, fine							
15		SILTY SAND (SM)	3	13.5-15.0	10-8-7	15	SAPROLITE		
16									
17									
18									
19									
20.0 20	375.57	yellow to brown	4	18.5-20.0	6-7-7	14	SAPROLITE		
21									
22									
23									
24									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-2
Sheet 2 of 2

SITE **Plant Branch Gypsum Storage** TOTAL DEPTH **50** SURF.ELEV. 395.57

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
25		micas	5	23.5-25.0	10-9-9	18	SAPROLITE		
26									
27									
28									
29	▼	dense, white, gold and dark brown silty SAND (SM)							
30.0 30	365.57		6	28.5-30.0	7-11-21	32	SAPROLITE		
31									
32									
33									
34		very dense							
35			7	33.5-35.0	16-24-31	55	SAPROLITE		
36									
37									
38									
39		dark gray to white SAND (SAPROLITE)							
40.0 40	355.57		8	38.5-40.0	24-30-50/4	80+	SAPROLITE		
41									
42									
43									
44		SAA							
45			9	43.5-45.0	24-34-50/4	84+	SAPROLITE		
46									
47									
48									
49		SAA							
50.0 50	345.57		10	48.5-50.0	31-46-50/4	96+	SAPROLITE		
51		Boring terminated at 50 feet.							
52									
53									
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-3
Sheet 1 of 2

SITE: Plant Branch Gypsum Storage | HOLE DEPTH: 39 | SURF.ELEV.: 389.25
LOCATION: Milledgeville, GA | COORDINATES N: 1164115.31 | E: 2558453.03
ANGLE: NA | BEARING: NA | CONTRACTOR: Southern Company | DRILL NO.: CME 550
DRILLING METHOD: 4¼-in I.D. HSA | NO. SAMPLES: 7 | NO. U.D. SAMPLES: 0
CASING SIZE: NA | LENGTH: NA | CORE SIZE: NA | TOTAL % REC.: NA
WATER TABLE DEPTH: 18.1 | ELEV.: 371.15 | TIME AFTER COMP.: 24 hr | DATE TAKEN: 10/31/2007
TYPE GROUT: | QUANTITY: | MIX: | DRILLING START DATE: 10/30/2007
DRILLER: D. Willis | RECORDER: D. Willis/Tinsley | APPROVED: J. Jordan | DRILLING COMP. DATE: 10/30/2007

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
0									
4		Yellowish red to white, dry, micaceous, dense SILTY SAND (SM)	1	3.5-5.0	6-11-21	35			
9		medium dense, with black nodules	2	8.5-10.0	5-5-6	11			
10.0	379.25								
14		White, black, and orange speckled, micaceous, medium dense, fine to medium grained SAND (SP) with silt	3	13.5-15.0	3-5-7	12	SAPROLITE		
18	▼								
19		Greenish gray to gold, very micaceous, moist, medium dense SILTY SAND (SM) with layers of orange and white weathered feldspar	4	18.5-20.0	4-7-22	29	SAPROLITE		
20.0	369.25								
24		SAA							

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-3
Sheet 2 of 2

SITE **Plant Branch Gypsum Storage** TOTAL DEPTH **39** SURF.ELEV. 389.25

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
25			5	23.5-25.0	10-9-9	18			
26									
27									
28									
29		very dense, relict rock structure							
30.0 30	359.25		6	28.5-30.0	7-11-21	32	SAPROLITE		
31									
32									
33									
34		SAA							
35			7	33.5-35.0	16-24-31	55	SAPROLITE		
36									
37									
38									
39.0 39	350.25	no sample							
40		BOH @ 39'							
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-4
Sheet 1 of 3

SITE	Plant Branch Gypsum Storage			HOLE DEPTH	69	SURF.ELEV.	427.35
LOCATION	Milledgeville, GA			COORDINATES N	1163855.17	E	2557467.17
ANGLE	NA	BEARING	NA	CONTRACTOR	Southern Company	DRILL NO.	CME 550
DRILLING METHOD	4¼-in I.D. HSA	NO. SAMPLES	9	NO. U.D. SAMPLES	0		
CASING SIZE	NA	LENGTH	NA	CORE SIZE	HQ	TOTAL % REC.	NA
WATER TABLE DEPTH	28.3	ELEV.	399.05	TIME AFTER COMP.	24 hr	DATE TAKEN	10/2/2007
TYPE GROUT		QUANTITY		MIX		DRILLING START DATE	10/1/2007
DRILLER	D. Willis	RECORDER	R Tinsley	APPROVED		DRILLING COMP. DATE	10/1/2007

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
0									
1									
2									
3									
4		Dark reddish brown, moist, hard, sandy SILT (MH)	1	3.5-5.0	10-14-21	35			
5									
6									
7									
8									
9		Very stiff, micaceous, sandy SILT (ML)	2	8.5-10.0	8-11-16	27			
10.0 10	417.35								
11									
12									
13									
14		reddish, micaceous, SANDY SILT OR SILTY SAND (ML/SM)	3	13.5-15.0	3-4-7	11			
15									
16									
17									
18									
19		brown	4	18.5-20.0	3-4-5	9			
20.0 20	407.35								
21									
22									
23									
24		SAA							

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-4
Sheet 2 of 3

SITE **Plant Branch Gypsum Storage** TOTAL DEPTH **69** SURF.ELEV. 427.35

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
25			5	23.5-25.0	3-4-6	10			
26									
27									
28									
29	▼	Brown and white, medium dense, micaceous SILTY SAND (SM)							
30.0 30	397.35		6	28.5-30.0	6-7-9	16	SAPROLITE		
31									
32									
33									
34		dense	7	33.5-35.0	10-11-21	32	SAPROLITE		
35									
36									
37									
38									
39		brown, gray and white, PARTIALLY WEATHERED							
40.0 40	387.35	ROCK (PWR)	8	38.5-40.0	11-21-42	63	SAPROLITE		
41									
42									
43									
44									
45			9	43.5-45.0	50/1	100+	SAPROLITE		
46									
47									
47.5 48	379.85	Auger refusal at 47.5 feet. Began coring.							
49		Weathered black and white biotite GNEISS.	Run 1	47.5-49.0				81%	0%
50									
51									
52			Run 2	49.0-54.0				100%	50%
53									
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-4
Sheet 3 of 3

SITE: Plant Branch Gypsum Storage | TOTAL DEPTH: 69 | SURF.ELEV.: 427.35

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
57									
58		Folded	Run 3	54.0-59.0				46%	20%
59		Weathered and fractured							
60.0 60	367.35								
61									
62			Run 4	59.0-64.0				40%	20%
63									
64									
65		Hard, competent biotite GNEISS							
66									
67			Run 5	64.0-69.0				100%	94%
68									
69.0 69	358.35								
70		BOH @ 69'							
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88.0 88	339.35								

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-5
Sheet 1 of

SITE: **Plant Branch Gypsum Disposal** | HOLE DEPTH: 50.0' | SURF.ELEV.: 396.29
LOCATION: Millegeville, Ga | COORDINATES N: 1163413.74 | E: 2556445.93
ANGLE: | BEARING: | CONTRACTOR: SCS | DRILL NO.:
DRILLING METHOD: HSA | NO. SAMPLES: | NO. U.D. SAMPLES:
CASING SIZE: | LENGTH: | CORE SIZE: | TOTAL % REC.:
WATER TABLE DEPTH: 29.2 | ELEV.: 367.09 | TIME AFTER COMP.: 24 hr | DATE TAKEN: 11/2/2007
TYPE GROUT: | QUANTITY: | MIX: | DRILLING START DATE: 11/1/2007
DRILLER: Willis | RECORDER: Tinsley | APPROVED: | DRILLING COMP. DATE: 11/1/2007

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0.0 0	396.29								
1									
2									
3									
4		Reddish brown highly micaceous firm sandy SILT (MH)		3.5 - 5	6-8-13	21			
5									
6									
7									
8									
9				8.5 - 10	8-10-12	22			
10		Brown sandy SILT (MH)							
11									
12									
13									
14		Light brown sandy SILT (MH)		13.5 - 15	4-4-6	10			
15									
16									
17									
18									
19		Reddish brown, micaceous SILT with feldspar		18.5 - 20	5-5-6	11	SAPROLITE		
20									
21									
22									
23				23.5 - 25	4-6-8	14	SAPROLITE		
24		White micaceous fine- to coarse-grained SAND (feldspar and quartz saprolite)							

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-5
Sheet 2 of 0

SITE **Plant Branch Gypsum Disposal** TOTAL DEPTH **50.0'** SURF.ELEV. 396.29

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
25									
26									
27									
28									
29	▼	Brown micaceous fine- to coarse-grained SAND (feldspar and quartz saprolite)		28.5 - 30	5-5-6	11	SAPROLITE		
30									
31									
32									
33									
34				33.5 - 35	4-4-6	10	SAPROLITE		
35		Mottled green, brown and white micaceous fine- to coarse-grained SAND (feldspar, quartz, and biotite)							
36									
37									
38									
39		Brown micaceous fine- to coarse-grained SAND (feldspar and quartz saprolite)		38.5 - 40	5-4-7	11	SAPROLITE		
40									
41									
42									
43									
44		saa		43.5 - 45	22-50/4		SAPROLITE		
45									
46									
47									
48									
49		no sample		48.5 - 50	50/1		SAPROLITE		
50									
51		BOH @ 50.0'							
52									
53									
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-6
Sheet 1 of 2

SITE: Plant Branch Gypsum Disposal | HOLE DEPTH: 56.0' | SURF.ELEV.: 399.12
LOCATION: Millegeville, Ga | COORDINATES N: 1162771.99 | E: 2555683.83
ANGLE: | BEARING: | CONTRACTOR: | DRILL NO.:
DRILLING METHOD: HSA | NO. SAMPLES: | NO. U.D. SAMPLES:
CASING SIZE: | LENGTH: | CORE SIZE: | TOTAL % REC.:
WATER TABLE DEPTH: 36 | ELEV.: | TIME AFTER COMP.: 24 hr | DATE TAKEN: 11/6/2007
TYPE GROUT: | QUANTITY: | MIX: | DRILLING START DATE: 11/6/2007
DRILLER: Milam | RECORDER: Tinsley | APPROVED: | DRILLING COMP. DATE: 11/7/2007

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0.0 0	0.00								
1									
2									
3									
4									
5		Reddish brown to white, mottled firm sandy SILT ML)							
6		with quartz and feldspar grains	1	4.5-6.0	4-6-6	12	Saprolite		
7									
8									
9									
10							UD		
11			2	9.5-11			7.1 x 10^{-5} cm/sec		
12									
13									
14									
15		Red fine to coarse grained SAND (SM) dry, loose, with							
16		muscovite and feldspar grains	3	14.5-16	4-6-6	12	UD Saprolite		
17									
18									
19									
20		Pale brown, fine to coarse grained SAND with muscovite							
21		and feldspar grains	4	19.5-21	7-3-4	7	Saprolite		
22									
23									
24									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-6
Sheet 2 of 2

SITE **Plant Branch Gypsum Disposal** TOTAL DEPTH **56.0'** SURF.ELEV. 399.12

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
25									
26		Yellowish brown mottled coarse - grained silty SAND, (SM) loose with muscovite	5	24.5-26	3-5-5	10	Saprolite		
27									
28									
29									
30		saa	6	29.5-3	4-4-4	8	Saprolite		
31									
32									
33									
34									
35									
36	▼	Light gray silty SAND (SM)	7	34.5-36	3-3-4	7	Saprolite		
37									
38									
39									
40		Gray to yellowish brown fine- to coarse-grained silty SAND with feldspar grains and muscovite	8	39.5-41	2-3-4	7	Saprolite		
41									
42									
43									
44									
45									
46			9	3-4-6	3-4-6	10	Saprolite		
47									
48									
49									
50		saa	10	49.5-51	3-4-7	11	Saprolite		
51									
52									
53									
54									
55		saa, mottled	11	54.5-56	6-9-10	19	Saprolite		
56		BOH @ 56'							

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-7
Sheet 1 of 2

SITE	Plant Branch Gypsum Storage			HOLE DEPTH	49	SURF.ELEV.	395.99
LOCATION	Milledgeville, GA			COORDINATES N	1162367.21	E	2555395.02
ANGLE		BEARING		CONTRACTOR		DRILL NO.	CME 550
DRILLING METHOD	H.S.A./HQ	NO. SAMPLES	6	NO. U.D. SAMPLES			
CASING SIZE		LENGTH		CORE SIZE		TOTAL % REC.	
WATER TABLE DEPTH	27'	ELEV.	368.99	TIME AFTER COMP.	24hr	DATE TAKEN	11/8/2007
TYPE GROUT		QUANTITY		MIX		DRILLING START DATE	11/7/2007
DRILLER	Milam	RECORDER	Tinsley	APPROVED		DRILLING COMP. DATE	11/7/2007

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0.0 0	0.00								
1									
2									
3									
4									
5		Reddish brown micaceous sandy SILT (ML)							
6			1	4.5-6	4-10-12	22			
7									
8									
9									
10		Pink micaceous silty fine - to coarse - grained SAND (SM) with feldspar	2	9.5-11	7-9-12	21	Saprolite		
11									
12									
13									
14									
15		mottled, orange to tan micaceous, silty fine - coarse - grained SAND (SM)	3	14.5-16	3-3-5	8	Saprolite		
16									
17									
18									
19									
20		Brown, micaceous sandy SILT (ML) with feldspar to silty fine- to medium - grained SAND (SM)	4	19.5-21	5-5-7	12	Saprolite		
21									
22									
23									
24									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-7
Sheet 2 of 2

SITE **Plant Branch Gypsum Storage** TOTAL DEPTH **49** SURF.ELEV. **395.99**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
25		Brown silty fine - to medium - grained SAND (SM)							
26			5	24.5-26	3-5-7	12	Saprolite		
27	▼								
28									
29									
30		saa							
31			6	29.5-31	18-31-38	69	Saprolite		
32									
33		Refusal @ 33'							
34		Gray slightly weathered biotite GNEISS							
35									
36			Run-1	33-39				100%	50%
37									
38									
39									
40									
41		Extremely folded							
42			Run-2	39-44				100%	80%
43									
44									
45									
46									
47			Run-3	44-49				94%	-
48									
49									
50		BOH @ 49 feet							
51									
52									
53									
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-8
Sheet 1 of 2

SITE: Plant Branch Gypsum Disposal | HOLE DEPTH: 36' | SURF.ELEV.: 369.43
LOCATION: Millegeville, Ga | COORDINATES N: 1162769.32 | E: 2556304.64
ANGLE: | BEARING: | CONTRACTOR: SCS | DRILL NO.: CME 550
DRILLING METHOD: HSA | NO. SAMPLES: | NO. U.D. SAMPLES:
CASING SIZE: | LENGTH: | CORE SIZE: | TOTAL % REC.:
WATER TABLE DEPTH: NA | ELEV.: | TIME AFTER COMP.: | DATE TAKEN:
TYPE GROUT: | QUANTITY: | MIX: | DRILLING START DATE: 11/7/2007
DRILLER: Milam | RECORDER: Tinsley | APPROVED: | DRILLING COMP. DATE: 11/7/2007

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0.0 0	0.00								
5		Reddish brown to white, mottled firm SILT and clayey to silty SAND with feldspar	1	4.5-6.0	3-5-9	14			
10		Gray silty SAND (SM)	2	9.5-11					
12			UD				2.0×10^{-5} cm/sec		
15		Brown, very micaceous sandy SILT (ML)	3	14.5-16					
19							Saprolite		
20		light brown silty, micaceous fine - coarse grained SAND (feldspars)	4	19.5-21	7-3-4	7			

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-8
Sheet 2 of 2

SITE **Plant Branch Gypsum Disposal** TOTAL DEPTH **36'** SURF.ELEV. 369.43

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
25									
26		saa	5	24.5-26	16-25-32	57	Saprolite		
27									
28									
29									
30		saa							
31			6	29.5-3	17-19-18	37	Saprolite		
32									
33									
34									
35		Dark gray silty fine - coarse - grained SAND							
36		with feldspar	7	34.5-36	9-17-12	29	Saprolite		
37		BOH @ 36'							
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-9
Sheet 1 of 2

SITE	Plant Branch Gypsum Storage			HOLE DEPTH	44.5	SURF.ELEV.	416.95
LOCATION	Milledgeville, GA			COORDINATES N	1163144.52	E	2557356.84
ANGLE	NA	BEARING	NA	CONTRACTOR	Southern Company	DRILL NO.	CME 550
DRILLING METHOD	4¼-in I.D. HSA			NO. SAMPLES	6	NO. U.D. SAMPLES	0
CASING SIZE	NA	LENGTH	NA	CORE SIZE	HQ	TOTAL % REC.	NA
WATER TABLE DEPTH	27	ELEV.	389.95	TIME AFTER COMP.	24 hr	DATE TAKEN	10/3/2007
TYPE GROUT		QUANTITY		MIX		DRILLING START DATE	10/2/2007
DRILLER	D. Willis	RECORDER	D. Willis/Tinsley	APPROVED	W. Wang	DRILLING COMP. DATE	10/2/2007

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
0									
1									
2									
3									
4		Red, moist, very stiff, micaceous, SANDY SILT (ML)	1	3.5-5.0	6-7-9	16			
5									
6									
7									
8									
9		Brown, micaceous, SANDY SILT and SILTY SAND (ML/SM)	2	8.5-10.0	4-5-7	12			
10.0 10	406.95								
11									
12									
13									
14		Brown, white, and black, medium dense, micaceous, SILTY SAND (SM),	3	13.5-15.0	5-5-10	15	Saprolite		
15									
16									
17									
18									
19		Gray, brown, and white, dense, PWR	4	18.5-20.0	7-9-12	21	Saprolite		
20.0 20	396.95								
21									
22									
23									
24		SAA							

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-9
Sheet 2 of 2

SITE: **Plant Branch Gypsum Storage** TOTAL DEPTH: **44.5** SURF.ELEV.: 416.95

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
25			5	23.5-25.0	13-13-16	29	Saprolite		
26									
27	▼								
28									
29		with rock fragments							
30.0 30	386.95		6	28.5-30.0	33-50/2	100+	Saprolite		
31									
32		Auger refusal at 31.5 feet. Began coring.							
33		Slightly weathered, green and white BIOTITE GNEISS with weathered fracture surfaces	Run 1	31.5-34.5				100%	63
34									
35									
36									
37			Run 2	34.5-39.5				100%	89
38									
39.0 39	377.95								
40									
41									
42			Run 3	39.5-44.5				94%	92
43		fresh							
44									
45		BOH @ 44.5 feet.							
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-10
Sheet 1 of 2

SITE	Plant Branch Gypsum Storage			HOLE DEPTH	40	SURF.ELEV.	393.12
LOCATION	Milledgeville, GA			COORDINATES N	1163758.26	E	2558368.33
ANGLE	NA	BEARING	NA	CONTRACTOR	Southern Company	DRILL NO.	CME 550
DRILLING METHOD	4¼-in I.D. HSA	NO. SAMPLES	8	NO. U.D. SAMPLES	0		
CASING SIZE	NA	LENGTH	NA	CORE SIZE	NA	TOTAL % REC.	NA
WATER TABLE DEPTH	13.4	ELEV.	379.72	TIME AFTER COMP.	24 hr	DATE TAKEN	10/31/2007
TYPE GROUT		QUANTITY		MIX		DRILLING START DATE	10/30/2007
DRILLER	D. Willis	RECORDER	D. Willis/Tinsley	APPROVED	J. Jordan	DRILLING COMP. DATE	10/30/2007

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
0									
1									
2									
3									
4		Yellowish red and black, micaceous, medium dense, fine SILTY SAND (SM)	1	3.5-5.0	6-8-14	22			
5									
6									
7									
8									
9									
10.0 10	383.12	yellowish red to brown, loose	2	8.5-10.0	3-4-4	8			
11									
12									
13									
14	▼	Medium dense, moist, white, tan and black, micaceous, fine to medium grained SAND (SP)	3	13.5-15.0	4-6-6	12	Saprolite		
15									
16									
17									
18									
19		SAA							
20.0 20	373.12		4	18.5-20.0	6-7-7	14	Saprolite		
21									
22									
23									
24									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-10
Sheet 2 of 2

SITE **Plant Branch Gypsum Storage** TOTAL DEPTH **40** SURF.ELEV. 393.12

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
25		very moist, with isolated red clays	5	23.5-25.0	5-10-18	28	Saprolite		
26									
27									
28									
29		dense, light tan to white, wet							
30.0 30	363.12		6	28.5-30.0	16-18-22	40	Saprolite		
31									
32									
33									
34		dark brown, white, and tan, medium dense, SILTY SAND (SM)							
35			7	33.5-35.0	6-8-10	18	Saprolite		
36									
37									
38									
39		dense, tan and white, fine to coarse grained							
40.0 40	353.12		8	38.5-40.0	17-27-22	49	Saprolite		
41		BOH @ 40.0'							
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-11
Sheet 1 of 2

SITE	Plant Branch Gypsum Storage			HOLE DEPTH	48	SURF.ELEV.	406.6
LOCATION	Milledgeville, GA			COORDINATES N	1163429.2	E	2558734.56
ANGLE	NA	BEARING	NA	CONTRACTOR	Southern Company	DRILL NO.	CME 550
DRILLING METHOD	4¼-in I.D. HSA			NO. SAMPLES	9	NO. U.D. SAMPLES	0
CASING SIZE	NA	LENGTH	NA	CORE SIZE	NA	TOTAL % REC.	NA
WATER TABLE DEPTH	23.3	ELEV.	383.3	TIME AFTER COMP.	1 week	DATE TAKEN	10/31/2007
TYPE GROUT		QUANTITY		MIX		DRILLING START DATE	10/23/2007
DRILLER	D. Willis	RECORDER	D. Willis/Tinsley	APPROVED		DRILLING COMP. DATE	10/23/2007

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
0									
1									
2									
3									
4		Reddish brown, very stiff silty SAND							
5			1	3.5-5.0	7-8-10	18			
6									
7									
8									
9									
10.0 10	396.60	saa	2	8.5-10.0	4-4-6	10			
11									
12									
13									
14									
15		saa	3	13.5-15.0	4-5-10	15			
16									
17									
18									
19									
20.0 20	386.60	SAA	4	18.5-20.0	4-4-10	14			
21									
22									
23									
24	▼								

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-11
Sheet 2 of 2

SITE: Plant Branch Gypsum Storage | TOTAL DEPTH: 48 | SURF.ELEV.: 406.6

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
25			5	23.5-25.0	13-17-19	36			
26									
27		Multicolored, black and brown, micaceous SILTY SAND (SM)					Saprolite		
28									
29									
30.0 30	376.60	very dense	6	28.5-30.0	22-50/3	100+	Saprolite		
31									
32									
33									
34									
35		SAA	7	33.5-35.0	50/1	100+	Saprolite		
36									
37									
38									
39									
40.0 40	366.60	SAA	8	38.5-40.0	50/1	100+	Saprolite		
41									
42									
43									
44		SAA							
45			9	43.5-45.0	50/1	100+	Saprolite		
46									
47									
48									
49		BOH @ 48.0 feet.							
50									
51									
52									
53									
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-12
Sheet 1 of 3

SITE	Plant Branch Gypsum Storage	HOLE DEPTH	58.5	SURF.ELEV.	418.31
LOCATION	Milledgeville, GA	COORDINATES N	1163135.56	E	2558055.16
ANGLE	NA	BEARING	NA	CONTRACTOR	Southern Company
DRILL NO.	CME 550				
DRILLING METHOD	4¼-in I.D. HSA	NO. SAMPLES	10	NO. U.D. SAMPLES	0
CASING SIZE	NA	LENGTH	NA	CORE SIZE	NA
TOTAL % REC.	NA				
WATER TABLE DEPTH	27.3	ELEV.	391.01	TIME AFTER COMP.	1 week
DATE TAKEN	10/9/007				
TYPE GROUT		QUANTITY		MIX	
DRILLING START DATE	10/2/2007				
DRILLER	D. Willis	RECORDER	D. Willis	APPROVED	J. Jordan
DRILLING COMP. DATE	10/2/2007				

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
0									
1									
2									
3									
4		Reddish brown very stiff, micaceous, silty SAND							
5			1	3.5-5.0	5-10-15	25			
6									
7									
8									
9									
10.0 10	408.31	reddish brown sandy SILT	2	8.5-10.0	5-8-10	18			
11									
12									
13									
14		stiff							
15			3	13.5-15.0	4-4-6	10			
16									
17									
18									
19		increasing sand							
20.0 20	398.31		4	18.5-20.0	3-4-5	9			
21									
22									
23									
24									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-12
Sheet 2 of 3

SITE: Plant Branch Gypsum Storage — TOTAL DEPTH: 53.5 — SURF.ELEV.: 418.31

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
25			5	23.5-25.0	3-4-5	9			
26									
27		Multicolored, black and brown, micaceous SILTY SAND (SM)					Saprolite		
28	▼								
29									
30.0 30	388.31	very dense	6	28.5-30.0	2-2-4	6	Saprolite		
31									
32									
33									
34									
35		SAA	7	33.5-35.0	2-3-3	6	Saprolite		
36									
37									
38									
39									
40.0 40	378.31	SAA	8	38.5-40.0	5-5-7	12	Saprolite		
41									
42									
43									
44		SAA							
45			9	43.5-45.0	6-8-9	17	Saprolite		
46									
47									
48									
49									
50			10	48.5-50.0	6-9-13	22	Saprolite		
51									
52									
53							augering w/o sampling to term.		
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-12
Sheet 3 of 3

SITE Plant Branch Gypsum Storage TOTAL DEPTH 58.5 SURF.ELEV. 418.31

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
57							augering w/o sampling		
58									
59		BOH @ 58.5 feet.							
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88	330.31								

88.0

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-13
Sheet 1 of 2

SITE: Plant Branch | HOLE DEPTH: 40.5 | SURF.ELEV.: 393.36
LOCATION: Gypsum Disposal | COORDINATES N: 1162622.44 | E: 2557055.17
ANGLE: | BEARING: | CONTRACTOR: | DRILL NO.: CME 550X
DRILLING METHOD: HSA/HQ coring | NO. SAMPLES: 3 | NO. U.D. SAMPLES:
CASING SIZE: | LENGTH: | CORE SIZE: HQ | TOTAL % REC.: 39
WATER TABLE DEPTH: 17.4' | ELEV.: 375.96 | TIME AFTER COMP.: 24 hr | DATE TAKEN: 11/7/2007
TYPE GROUT: | QUANTITY: | MIX: | DRILLING START DATE: 11/6/2007
DRILLER: Willis | RECORDER: Tinsley | APPROVED: | DRILLING COMP. DATE: 11/7/2007

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0.0 0	393.36								
1		Yellowish brown to gray mottled, firm SILT with feldspar grains							
2									
3									
4			1	3.5 - 5	6-8-9	17			
5									
6									
7									
8									
9		Light gray to brown, silty, fine- to coarse-grained SAND with biotite, feldpspar and quartz	2	8.5 - 10	6-13-50/4		Saprolite		
10									
11									
12									
13									
14		saa	3	13.5 - 15	50/1		Saprolite		
15									
16									
17									
18	▼								
19									
20									
21									
22		Begin coring at 22'							
23		Very hard quartzite and BIOTITE GNEISS		22.3 - 25.5				75	67
24									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-13
Sheet 2 of 2

SITE **Plant Branch** TOTAL DEPTH **40.5** SURF.ELEV. 393.36

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
25									
26		Very hard, gray QUARTZITE		25.5 - 30.5			rough drilling	8	0
27									
28									
29									
30									
31									
32									
33									
34		rubbly QUARTZITE		30.5 - 40.5				91	50
35		Hard BIOTITE GNEISS							
36									
37									
38									
39									
40									
41		BOH @ 40.5'							
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-14
Sheet 1 of 1

SITE: **PLANT BRANCH GYPSUM STORAGE** HOLE DEPTH: 36' SURF.ELEV.: 348.51
LOCATION: Milledgeville, Ga COORDINATES N: 1161742.98 E: 2556080.23
ANGLE: BEARING: CONTRACTOR: SCS DRILL NO.: CME 550X
DRILLING METHOD: HSA/HQ coring NO. SAMPLES: 0 NO. U.D. SAMPLES:
CASING SIZE: LENGTH: CORE SIZE: HQ TOTAL % REC.:
WATER TABLE DEPTH: 9.1 ELEV.: TIME AFTER COMP.: 24 hr DATE TAKEN: 11/8/2007
TYPE GROUT: QUANTITY: MIX: DRILLING START DATE: 11/7/2007
DRILLER: Willis RECORDER: Willis APPROVED: DRILLING COMP. DATE: 11/7/2007

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0.0 0	348.51								
1		Rocky at surface		0 - 3.5	50/1			0	
2									
3									
4		Aufer refusal at 3.7'							
5		Slightly sandy SILT and boulders		3.7 - 4.9			Very rough drilling	100	
6									
7				4.9 - 9.9				26	0
8									
9									
10	▼								
20				9.9 - 36.0				0	0
30									
36									
		BOH @ 36'							

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-15
Sheet 1 of 2

SITE	Plant Branch Gypsum Storage	HOLE DEPTH	31.5	SURF.ELEV.	366.76
LOCATION	Milledgeville, GA	COORDINATES N	1161806.19	E	2557684.38
ANGLE	NA	BEARING	NA	CONTRACTOR	Southern Company
DRILL NO.	CME 550				
DRILLING METHOD	4¼-in I.D. HSA	NO. SAMPLES	3	NO. U.D. SAMPLES	0
CASING SIZE	NA	LENGTH	NA	CORE SIZE	HQ
TOTAL % REC.	NA				
WATER TABLE DEPTH	4.6	ELEV.	362.16	TIME AFTER COMP.	24 hr
DATE TAKEN	10/26/2007				
TYPE GROUT		QUANTITY		MIX	
DRILLING START DATE	10/23/2007				
DRILLER	D. Willis	RECORDER	L. Garland	APPROVED	J. Jordan
DRILLING COMP. DATE	10/25/2007				

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
0									
1		Grayish brown, micaceous, fine to medium, medium dense SILTY SAND (SM)							
2									
3									
4									
5	▼		1	3.5-5.0	6-7-9	16			
6									
7		dark orangish brown							
8									
9									
10.0 10	356.76		2	8.5-10.0	4-5-7	12	Saprolite		
11									
12									
13		very dense							
14									
15			3	13.5-15.0	50/1	100+	Saprolite		
16									
17									
18									
19									
20.0 20	346.76	Auger refusal at 20.3 feet.							
21		Slightly weathered Biotite GNEISS							
22									
23		Less weathered	Run 1	20.3-24.0				81	50
24									

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SOUTHERN COMPANY
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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-15
Sheet 2 of 2

SITE: **Plant Branch Gypsum Storage** TOTAL DEPTH: **31.5** SURF.ELEV.: 366.76

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
25		Hard, Biotite GNEISS							
26									
27			Run 2	24.0-29.0				100%	100%
28									
29									
30.0 30	336.76								
31			Run 3	29.0-31.5				76%	69%
31.5 32	335.26	BOH @ t 31.5 feet.							
33									
34									
35									
36									
37									
38									
39									
40.0 40	326.76								
41									
42									
43									
44									
45									
46									
47									
48									
49									
50.0 50	316.76								
51									
52									
53									
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-16
Sheet 1 of 2

SITE: Plant Branch Gypsum Disposal | HOLE DEPTH: 45.5 | SURF.ELEV.: 406.93
LOCATION: Milledgeville, ga | COORDINATES N: 1162751.02 | E: 2558503.58
ANGLE: | BEARING: | CONTRACTOR: | DRILL NO.: CME 550x
DRILLING METHOD: HSA/HQ | NO. SAMPLES: | NO. U.D. SAMPLES:
CASING SIZE: | LENGTH: | CORE SIZE: HQ | TOTAL % REC.:
WATER TABLE DEPTH: 12.3 | ELEV.: 394.63 | TIME AFTER COMP.: 24 hr | DATE TAKEN: 11/1/2007
TYPE GROUT: | QUANTITY: | MIX: | DRILLING START DATE: 10/31/2007
DRILLER: Willis | RECORDER: Tinsley | APPROVED: | DRILLING COMP. DATE: 10/31/2007

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0.0 0	406.93								
1									
2									
3									
4		Mottled, reddish brown to gray SILT with mica							
5		and feldspar grains	1	3.5 - 5	6-8-9	17			
6									
7									
8									
9									
10		Light gray silty SAND		8.5 - 10	6-13-50/4	13			
11									
12									
13	▼								
14									
15		Gray sandy SILT with mica and large feldspar grains		13.5 - 15	50/1	50	Saprolite		
16									
17									
18									
19		saa		18.5 - 20	50/1	50	Saprolite		
20									
21									
22									
23									
24		Auger refusal @ 23.6							

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-16
Sheet 2 of 2

SITE **Plant Branch Gypsum Disposal** TOTAL DEPTH **45.5** SURF.ELEV. 406.93

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
25		Dark to light gray, hard Biotite GNEISS					very complexly		
26									
27				23.8 - 29.5			folded	57	31
28		0.5' void					(Migmatite)		
29									
30									
31									
32									
33									
34				29.5 - 39.5				99	87
35									
36									
37									
38									
39									
40									
41									
42				39.5 - 45.5				100	90
43									
44									
45									
46									
47		BOH @ 45.5'							
48									
49									
50									
51									
52									
53									
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-17
Sheet 1 of 2

SITE	Plant Branch Gypsum Storage	HOLE DEPTH	54	SURF.ELEV.	403.12
LOCATION	Milledgeville, GA	COORDINATES N	1160722.41	E	2558395.21
ANGLE	NA	BEARING	NA	CONTRACTOR	Southern Company
DRILL NO.	CME 550				
DRILLING METHOD	4¼-in I.D. HSA	NO. SAMPLES	6	NO. U.D. SAMPLES	0
CASING SIZE	NA	LENGTH	NA	CORE SIZE	HQ
TOTAL % REC.	NA				
WATER TABLE DEPTH	30.8	ELEV.	372.32	TIME AFTER COMP.	24 hr
DATE TAKEN	10/30/2007				
TYPE GROUT		QUANTITY		MIX	
DRILLING START DATE	10/29/2007				
DRILLER	D. Willis	RECORDER	Tinsley	APPROVED	
DRILLING COMP. DATE	10/29/2007				

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
0									
1									
2									
3									
4		Red, micaceous, medium dense SILTY SAND (SM)							
5			1	3.5-5.0	6-5-7	12			
6									
7									
8									
9		saa							
10.0 10	393.12		2	8.5-10.0	7-7-7	14			
11									
12									
13									
14									
15		saa	3	13.5-15.0	7-8-9	17			
16									
17									
18									
19									
20.0 20	383.12	saa	4	18.5-20.0	9-7-7	14			
21									
22									
23									
24									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-17
Sheet 2 of 2

SITE **Plant Branch Gypsum Storage** TOTAL DEPTH **54** SURF.ELEV. 403.12

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	%Rec	RQD
25		white to greenish gray fine- to coarse-grained SAND	5	23.5-25.0	8-8-8	16	Saprolite		
26									
27									
28									
29		white, black, and grayish green							
30.0 30	373.12		6	28.5-30.0	11-12-15	27	Saprolite		
31	▼								
31.5 32	371.62	Auger refusal at 32.3 feet.							
33		Moderately to slightly weathered,gray Biotite GNEISS	Run 1	32.3-34.0				92%	53
34									
35									
36									
37			Run 2	34.0-39.0				64%	40
38									
39		weathering along fractures							
40.0 40	363.12								
41									
42			Run 3	39.0-44.0				96%	82
43									
44									
45									
46									
47		interbedded amphibolite							
48									
49			Run 4	44.0-54.0				100%	74%
50.0 50	353.12								
51									
52									
53									
54									
55		BOH @ 54.0 feet.							
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-18
Sheet 1 of 2

SITE	Plant Branch Gypsum Storage	HOLE DEPTH	40	SURF.ELEV.	408.66
LOCATION	Milledgeville, GA	COORDINATES N	1163117.29	E	2559032.31
ANGLE	0	BEARING	0	CONTRACTOR	Ranger
DRILL NO.	CME-550	DRILLING METHOD	H.S.A. & NQ coring	NO. SAMPLES	6
NO. U.D. SAMPLES	0	CASING SIZE	N W	LENGTH	30
CORE SIZE	NQ 10'	TOTAL % REC.	96.50%	WATER TABLE DEPTH	26.6
ELEV.	N/A	TIME AFTER COMP.	1 hour	DATE TAKEN	2/16/2009
TYPE GROUT	N/A	QUANTITY	N/A	MIX	N/A
DRILLING START DATE	2/16/2009	DRILLER	J. Crowe	RECORDER	L. Garland
APPROVED	L. Garland	DRILLING COMP. DATE	2/16/2009		

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0.0	0	408.66							
	1								
	2								
	3								
	4								
	5	reddish brown clayey medium to fine SAND with some silt very micacous	1	3.5-5	7-8-8	16			
	6								
	7								
	8								
	9								
	10	orangish brown silty medium to fine SAND very micacous	2	8.5-10	4-5-7	12			
	11								
	12								
	13								
	14								
	15	yellowish orange and brown silty medium to fine SAND very micacous	3	13.5-15	5-6-7	13			
	16								
	17								
	18								
	19								
	20	light gray and brown sandy SILT very micacous	4	18.5-20	5-11-12	23			
	21								
	22								
	23	light gray and brown silty medium to fine SAND very micacous							
	24								

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-18
Sheet 2 of 2

SITE **Plant Branch Gypsum Storage** TOTAL DEPTH 40 SURF.ELEV. 408.66

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
25		light gray and brown silty medium to fine SAND very micacous	5	23.5-25	7-9-15	24			
26									
27									
28									
29									
30			6	28.5-30	15-50/0	100+			
31		Encountered Auger Refusal and began coring @ 30'							
32		BIOTITE GNEISS moderately to highly weathered, moderately hard to soft, intensely to moderately fractured with highly to completely weathered joints	R-1	30-35				98	52
33									
34									
35									
36		BIOTITE GNEISS slightly to highly weathered, hard to moderately hard, moderately to highly fractured with highly weathered joints	R-2	35-40				95	72
37									
38									
39									
40									
41		Boring Completed @ 40'							
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

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DRILLING LOG
GEOLOGICAL SERVICES

Hole No. BH-19
Sheet 1 of 1

SITE	Plant Branch Gypsum Storage	HOLE DEPTH	20	SURF.ELEV.	407.41
LOCATION	Milledgeville, GA	COORDINATES N	1162391.11	E	2558896.55
ANGLE	0	BEARING	0	CONTRACTOR	Ranger
DRILL NO.	CME-550	DRILLING METHOD	H.S.A.	NO. SAMPLES	3
NO. U.D. SAMPLES	0	CASING SIZE	N/A	LENGTH	N/A
CORE SIZE	N/A	TOTAL % REC.	N/A	WATER TABLE DEPTH	3.72
ELEV.	N/A	TIME AFTER COMP.	1 hour	DATE TAKEN	2/17/2009
TYPE GROUT	N/A	QUANTITY	N/A	MIX	N/A
DRILLING START DATE	2/17/2009	DRILLER	J. Crowe	RECORDER	L. Garland
APPROVED	L. Garland	DRILLING COMP. DATE	2/17/2009		

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test From To	Blows	N	Comments	% Rec	RQD
0.0 0	407.41								
5		ash	1	3.5-5	3-4-3	7			
10		ash	2	8.5-10	2-2-4	6			
15		ash	3	13.5-15	1-2-3	5			
20		red brown sandy CLAY with silt observed on auger			no sample due to blowback		out of ash at bottom of boring		

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SOUTHERN COMPANY SERVICES

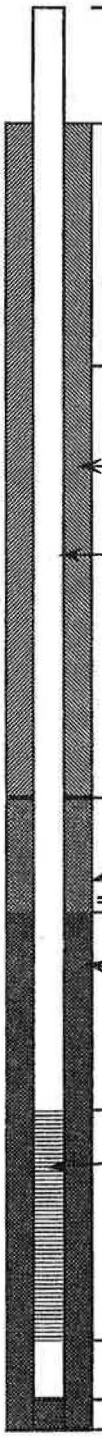
WELL CONSTRUCTION LOG		PROJECT Plant Branch Gypsum Storage	WELL NO
SITE Plant Branch		LOCATION Milledgeville, GA	
DATE STARTED 10/3/2007	ENDED 10/3/2007	PREPARED L. Garland	BH-1

	DEPTH	ELEVATION
TOP OF CASING		398.07
GROUND SURFACE	0	396.16
BACKFILL MATERIAL TYPE 3/8" Shur-Plug 8 bags **RISER CASING** DIA 2" TYPE Schedule 40 PVC		
WATER LEVEL:23.8		
TOP OF SEAL	39	357.16
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OF FILTER PACK	41	355.16
FILTER PACK TYPE: #2 Filter Sand 15 bags		
BOTTOM OF RISER/ TOP OF SCREEN	43	351.16
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	53	341.16
BOTTOM OF CASING	53.5	340.66
BOTTOM OF HOLE	53.5	340.66

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG	PROJECT Plant Branch Gypsum Storage	WELL NO.
SITE Plant Branch	LOCATION Milledgeville, GA	
DATE STARTED 10/23/2007	ENDED 10/23/2007	PREPARED L. Garland	BH-2

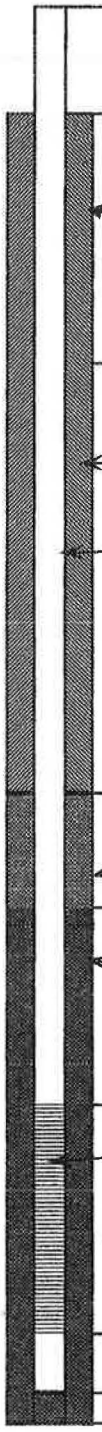


	DEPTH	ELEVATION
TOP OF CASING		398.96
GROUND SURFACE	0	395.57
BACKFILL MATERIAL TYPE 3/8" Shur-Plug 8 Bags **RISER CASING** DIA 2" TYPE Schedule 40 PVC		
WATER LEVEL:23.8		
TOP OF SEAL	39	356.57
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
=SUM() TOP OR FILTER PACK	37	354.57
FILTER PACK TYPE: #2 Filter Sand 15 bags		
BOTTOM OF RISER/ TOP OF SCREEN	38.5	353.07
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	49.5	343.07
BOTTOM OF CASING	50	342.57
BOTTOM OF HOLE	50	342.57

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG	PROJECT Plant Branch Gypsum Storage	WELL NO
SITE Plant Branch	LOCATION Milledgeville, GA	
DATE STARTED 10/31/2007 ENDED 10/31/2007	PREPARED L. Garland	BH-3



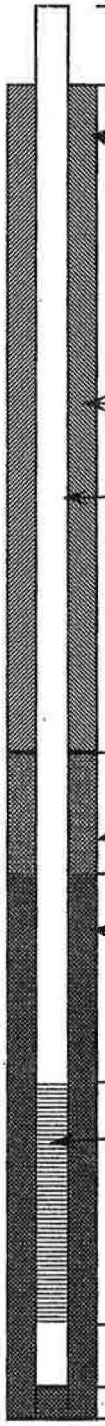
	DEPTH	ELEVATION
TOP OF CASING		393.34
GROUND SURFACE	0	389.25
PROTECTIVE CASING DIA TYPE N/A BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug 8 bags **RISER CASING** DIA 2" TYPE Schedule 40 PVC		
TOP OF SEAL	25	364.25
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OF FILTER PACK	27	362.25
FILTER PACK TYPE: #2 Filter Sand BOTTOM OF RISER/		
TOP OF SCREEN	28	361.25
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	38	351.25
BOTTOM OF CASING	39	350.25
BOTTOM OF HOLE	39	350.25

WATER LEVEL:18.1'

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG		PROJECT	Plant Branch Gypsum Storage	WELL NO.
SITE	Plant Branch	LOCATION	Milledgeville, GA	
DATE STARTED	10/1/2007	ENDED	10/1/2007	PREPARED DeAnthony Willis	BH-4



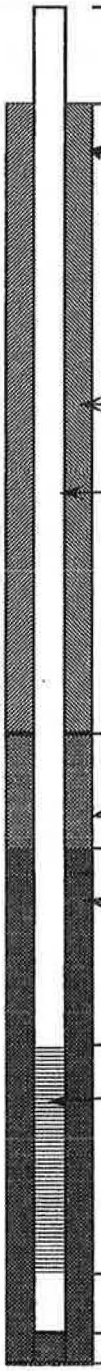
	DEPTH	ELEVATION
TOP OF SURFACE		428.79
GROUND SURFACE	0	427.35
PROTECTIVE CASING DIA TYPE N/A BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug 8 bags **RISER CASING** DIA 2" TYPE Schedule 40 PVC		
TOP OF SEAL	54	373.35
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OF FILTER PACK	56	371.35
FILTER PACK TYPE: #2 Filter Sand 15 bags BOTTOM OF RISER/		
TOP OF SCREEN	58.5	368.85
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	68.5	358.85
BOTTOM OF CASING	69	358.35
BOTTOM OF HOLE	69	358.35

WATER LEVEL:47.6' (1 week)

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG	PROJECT Plant Branch Gypsum Storage	WELL NO.
SITE Plant Branch	LOCATION Milledgeville, GA	
DATE STARTED 11/5/2007 ENDED 11/5/2007	PREPARED L. Garland	BH-5



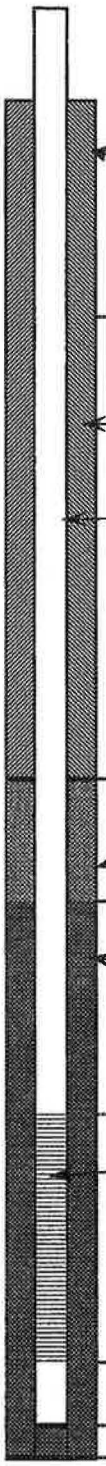
	DEPTH	ELEVATION
TOP OF CASING		400.41
GROUND SURFACE	0	396.29
PROTECTIVE CASING DIA TYPE N/A BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug 12 bags **RISER CASING** DIA 2" TYPE Schedule 40 PVC		
TOP OF SEAL	35	361.29
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OF FILTER PACK	37	359.29
FILTER PACK TYPE: #2 Filter Sand 8 bags BOTTOM OF RISER/		
TOP OF SCREEN	39.5	356.79
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	49.5	346.79
BOTTOM OF CASING	50	346.29
BOTTOM OF HOLE	50	346.29

WATER LEVEL: 29.4

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG	PROJECT Plant Branch Gypsum Storage	WELL NO.
SITE Plant Branch	LOCATION Milledgeville, GA	
DATE STARTED 11/6/2007	ENDED 11/7/2007	PREPARED L. Garland	BH-6



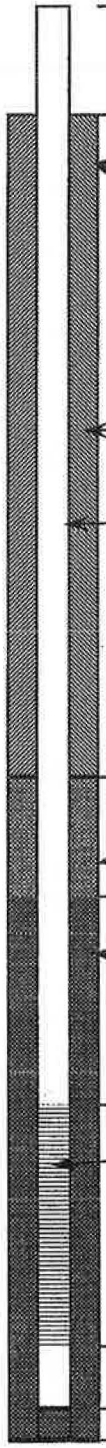
	DEPTH	ELEVATION
TOP OF SURFACE		404.38
GROUND SURFACE	0	399.12
PROTECTIVE CASING DIA TYPE N/A BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug **RISER CASING** DIA 2" TYPE Schedule 40 PVC		
TOP OF SEAL	39	360.12
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OF FILTER PACK	41.5	357.62
FILTER PACK TYPE: #2 Filter Sand 10 bags BOTTOM OF RISER/		
TOP OF SCREEN	44.5	354.62
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	54.5	344.62
BOTTOM OF CASING	55	343.12
BOTTOM OF HOLE	55	343.12

WATER LEVEL:35.3

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG	PROJECT Plant Branch Gypsum Storage	WELL NO.
SITE Plant Branch	LOCATION Milledgeville, GA	
DATE STARTED 11/7/2007	ENDED 10/8/2007	PREPARED L. Garland



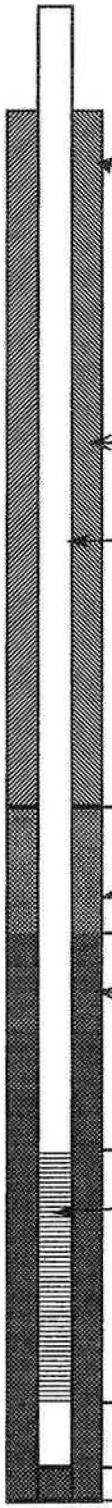
	DEPTH	ELEVATION
TOP OF CASING		397.59
GROUND SURFACE	0	395.99
PROTECTIVE CASING DIA TYPE N/A BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug 11 bags **RISER CASING** DIA 2" TYPE Schedule 40 PVC		
TOP OF SEAL	25	370.99
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OF FILTER PACK	28	367.99
FILTER PACK TYPE: #2 Filter Sand 2 bags		
BOTTOM OF RISER/ TOP OF SCREEN	38.5	357.49
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	48.5	347.49
BOTTOM OF CASING	49	345.99
BOTTOM OF HOLE	49	345.99

WATER LEVEL:27

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG		PROJECT	Plant Branch Gypsum Storage	WELL NO.
SITE	Plant Branch	LOCATION	Milledgeville, GA	
DATE STARTED	11/7/2007	ENDED	11/7/2007	PREPARED L. Garland	BH-8



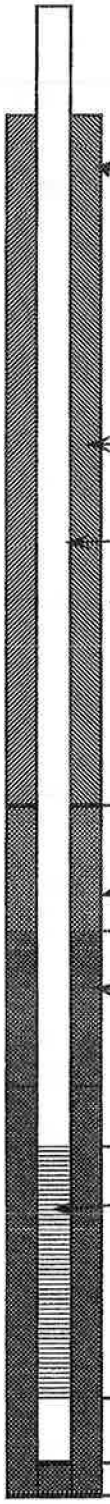
	DEPTH	ELEVATION
TOP OF CASING		370.41
GROUND SURFACE	0	369.43
PROTECTIVE CASING DIA TYPE N/A		
BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug		
RISER CASING DIA 2" TYPE Schedule 40 PVC		
TOP OF SEAL	19.5	349.93
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OR FILTER PACK	22	347.43
FILTER PACK TYPE: #2 Filter Sand 8 bags		
BOTTOM OF RISER/ TOP OF SCREEN	24.5	344.93
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	34.5	334.93
BOTTOM OF CASING	35	334.43
BOTTOM OF HOLE	35	334.43

WATER LEVEL:5.3

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG	PROJECT Plant Branch Gypsum Storage	WELL NO.
SITE Plant Branch	LOCATION Milledgeville, GA	
DATE STARTED 10/15/2007 ENDED 10/15/2007	PREPARED L. Garland	BH-9



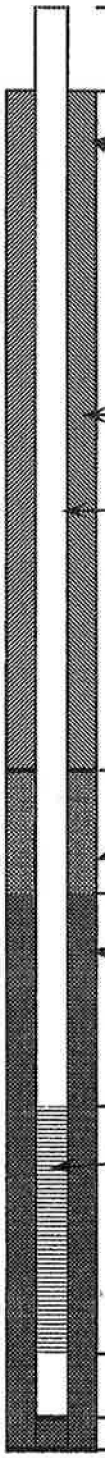
		DEPTH	ELEVATION
TOP OF CASING			418.27
GROUND SURFACE		0	416.95
PROTECTIVE CASING			
DIA			
TYPE	N/A		
BOTTOM OF PROTECTIVE CASING			
BACKFILL MATERIAL			
TYPE	3/8" Shur-Plug		
RISER CASING			
DIA	2"		
TYPE	Schedule 40 PVC		
TOP OF SEAL		28.5	388.45
ANNUAL SEAL			
TYPE	1/4" Bentonite Pellets		
TOP OR FILTER PACK		31	385.95
FILTER PACK			
TYPE:	#2 Filter Sand		
	2 bags		
BOTTOM OF RISER/ TOP OF SCREEN		33.7	383.25
SCREEN			
DIA TYPE	2"		
TYPE	Schedule 40 PVC		
OPENING	0.010 opening		
BOTTOM OF SCREEN		43.7	373.25
BOTTOM OF CASING		44.2	372.75
BOTTOM OF HOLE		44.2	372.75

WATER LEVEL:28

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG:		PROJECT: Plant Branch Gypsum Storage	WELL NO:
SITE: Plant Branch		LOCATION: Milledgeville, GA	
DATE STARTED: 10/30/2007	ENDED: 10/30/2007	PREPARED: L. Garland	BH-10

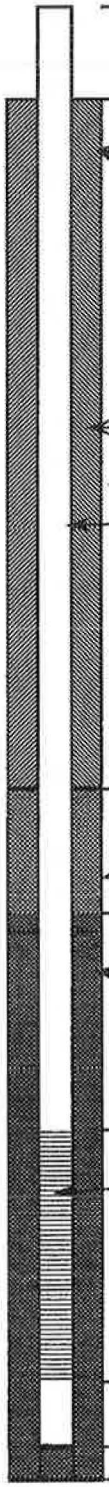


	DEPTH	ELEVATION
TOP OF CASING		397.1
GROUND SURFACE	0	393.12
PROTECTIVE CASING DIA TYPE N/A BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug 8 bags **RISER CASING** DIA 2" TYPE Schedule 40 PVC		
WATER LEVEL:29'		
TOP OF SEAL	25	368.12
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OF FILTER PACK	27.5	365.62
FILTER PACK TYPE: #2 Filter Sand 15 bags		
BOTTOM OF RISER/ TOP OF SCREEN	29	364.12
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	39	354.12
BOTTOM OF CASING	40	353.12
BOTTOM OF HOLE	40	353.12

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG		PROJECT	Plant Branch Gypsum Storage	WELL NO
SITE Plant Branch		LOCATION	Milledgeville, GA	
DATE STARTED 10/23/2007	ENDED 10/23/2007	PREPARED	L. Garland	BH-11



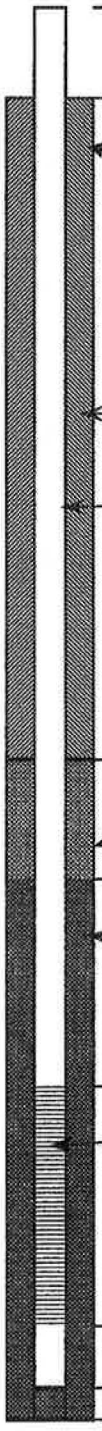
	DEPTH	ELEVATION
TOP OF CASING		410.57
GROUND SURFACE	0	406.6
PROTECTIVE CASING DIA TYPE N/A		
BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug		
RISER CASING DIA 2" TYPE Schedule 40 PVC		
TOP OF SEAL	34.5	372.1
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OR FILTER PACK	36	370.6
FILTER PACK TYPE: #2 Filter Sand 9 bags		
BOTTOM OF RISER/ TOP OF SCREEN	38	368.6
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	48	358.6
BOTTOM OF CASING	48.5	358.1
BOTTOM OF HOLE	48.5	358.1

WATER LEVEL: 23.7

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG		PROJECT: Plant Branch Gypsum Storage	WELL NO:
SITE: Plant Branch		LOCATION: Milledgeville, GA	
DATE STARTED: 10/2/2007	ENDED: 10/2/2007	PREPARED: L. Garland	BH-12



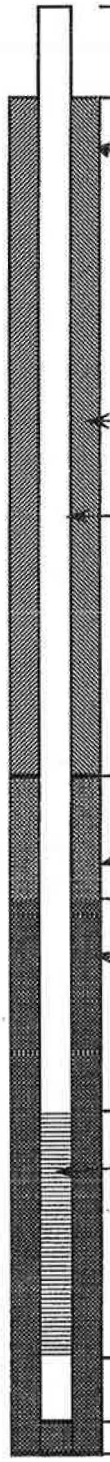
	DEPTH	ELEVATION
TOP OF CASING		419.85
GROUND SURFACE	0	418.31
PROTECTIVE CASING DIA TYPE N/A BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug 18 bags **RISER CASING** DIA 2" TYPE Schedule 40 PVC		
TOP OF SEAL	43	375.31
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OR FILTER PACK	45	373.31
FILTER PACK TYPE: #2 Filter Sand 9 bags BOTTOM OF RISER/		
TOP OF SCREEN	47	371.31
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	57	361.31
BOTTOM OF CASING	57.5	360.81
BOTTOM OF HOLE	57.5	360.81

WATER LEVEL:27.7

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG		PROJECT Plant Branch Gypsum Storage	WELL NO.
SITE Plant Branch		LOCATION Milledgeville, GA	
DATE STARTED 11/6/2007	ENDED 10/7/2007	PREPARED L. Garland	BH-13



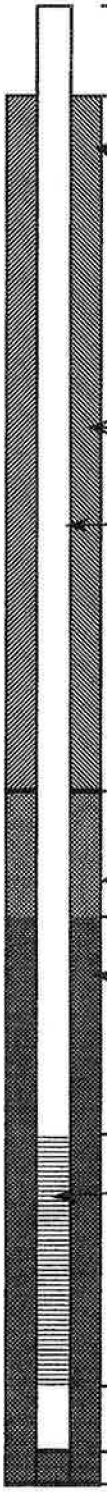
	DEPTH	ELEVATION
TOP OF CASING		397.37
GROUND SURFACE	0	393.36
PROTECTIVE CASING DIA TYPE N/A		
BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug 10 bags **RISER CASING** DIA 2" TYPE Schedule 40 PVC		
TOP OF SEAL	N/A	
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OF FILTER PACK	N/A	
FILTER PACK TYPE: #2 Filter Sand 3 bags		
BOTTOM OF RISER/ TOP OF SCREEN	39.5	353.86
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	39.5	353.86
BOTTOM OF CASING	40	353.36
BOTTOM OF HOLE	40	353.36

WATER LEVEL:17.5

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG		PROJECT: Plant Branch Gypsum Storage	WELL NO.
SITE: Plant Branch		LOCATION: Milledgeville, GA	
DATE STARTED: 11/7/2007	ENDED: 11/7/2007	PREPARED: L. Garland	BH-14



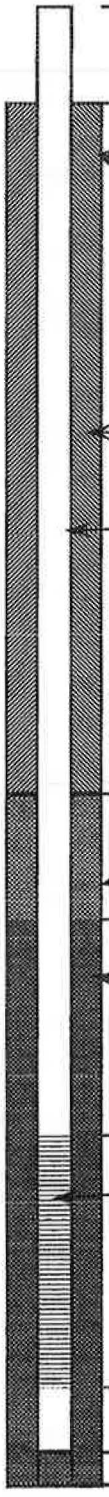
	DEPTH	ELEVATION
TOP OF CASING		352.52
GROUND SURFACE	0	348.51
PROTECTIVE CASING DIA TYPE N/A		
BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug		
RISER CASING DIA 2" TYPE Schedule 40 PVC		
TOP OF SEAL	12	336.51
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OF FILTER PACK	14	334.51
FILTER PACK TYPE: Natural Filter to 23' 1bag #2 Sand to 14 feet		
BOTTOM OF RISER/ TOP OF SCREEN	25.5	323.01
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	35.5	313.01
BOTTOM OF CASING	36	312.51
BOTTOM OF HOLE	36	312.51

WATER LEVEL: 9

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG		PROJECT: Plant Branch Gypsum Storage	WELL NO.
SITE: Plant Branch		LOCATION: Milledgeville, GA	
DATE STARTED: 10/29/2007	ENDED: 10/29/2007	PREPARED: L. Garland	BH-15



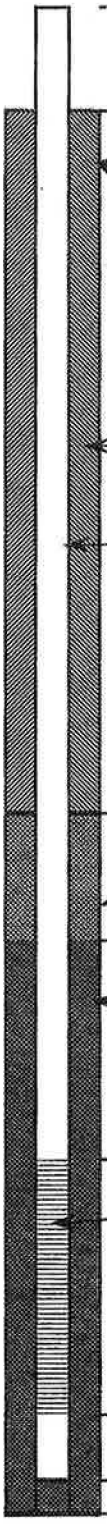
	DEPTH	ELEVATION
TOP OF CASING		370.74
GROUND SURFACE	0	366.76
PROTECTIVE CASING DIA TYPE N/A		
BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug 9 bags **RISER CASING** DIA 2" TYPE Schedule 40 PVC		
TOP OF SEAL	16.2	350.56
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OR FILTER PACK	18.2	348.56
FILTER PACK TYPE: #2 Filter Sand 3 bags		
BOTTOM OF RISER/ TOP OF SCREEN	21	345.76
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	31	335.76
BOTTOM OF CASING	31.5	335.26
BOTTOM OF HOLE	31.5	335.26

WATER LEVEL: 4.6

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG	PROJECT Plant Branch Gypsum Storage	WELL NO.
SITE Plant Branch	LOCATION Milledgeville, GA	
DATE STARTED 11/5/2007 ENDED 11/6/2007	PREPARED L. Garland	BH-16



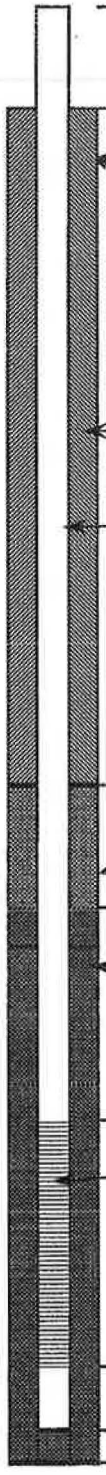
	DEPTH	ELEVATION
TOP OF CASING		411.33
GROUND SURFACE	0	406.93
PROTECTIVE CASING DIA TYPE N/A BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug **RISER CASING** DIA 2" TYPE Schedule 40 PVC TOP OF SEAL		
ANNUAL SEAL TYPE 1/4" Bentonite Pellets TOP OF FILTER PACK	20	386.93
FILTER PACK TYPE: #2 Filter Sand 3 1/4 bags BOTTOM OF RISER/ TOP OF SCREEN	23.2	383.73
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening BOTTOM OF SCREEN	44.5	362.43
BOTTOM OF CASING	45	361.93
BOTTOM OF HOLE	45	361.93

WATER LEVEL: 11.9

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG	PROJECT: Plant Branch Gypsum Storage	WELL NO.
SITE: Plant Branch	LOCATION: Milledgeville, GA	
DATE STARTED: 10/29/2007	ENDED: 10/30/2007	PREPARED: L. Garland	BH-17



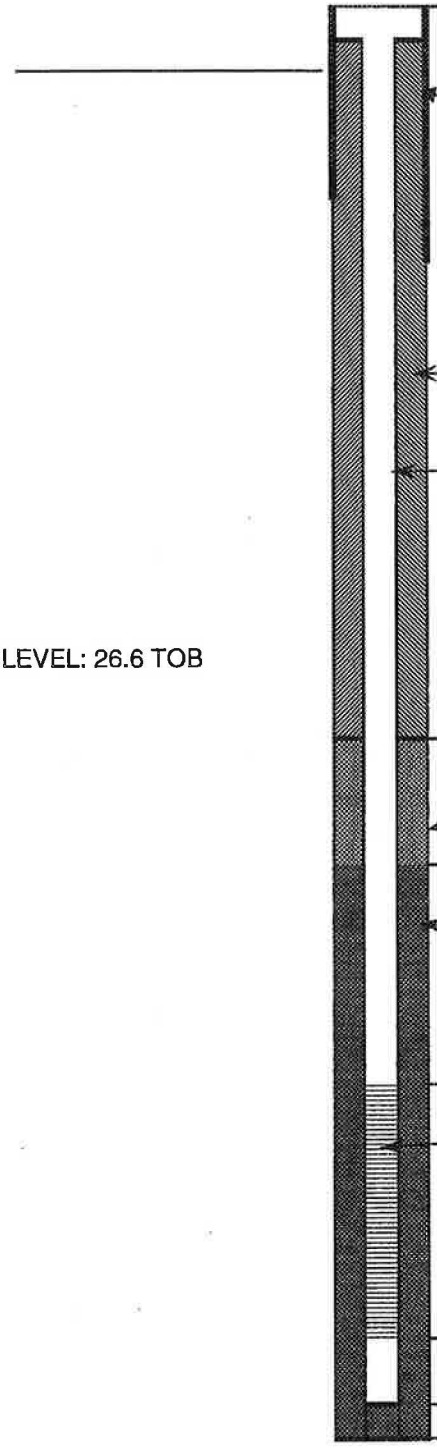
	DEPTH	ELEVATION
TOP OF CASING		406.6
GROUND SURFACE	0	403.12
PROTECTIVE CASING DIA TYPE N/A		
BOTTOM OF PROTECTIVE CASING		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug 8 bags		
RISER CASING DIA 2" TYPE Schedule 40 PVC		
TOP OF SEAL	25	378.12
ANNULAR SEAL TYPE 1/4" Bentonite Pellets		
TOP OF FILTER PACK	27	376.12
FILTER PACK TYPE: #2 Filter Sand 15 bags		
BOTTOM OF RISER/ TOP OF SCREEN	43	360.12
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	53	350.12
BOTTOM OF CASING	54	349.12
BOTTOM OF HOLE	54	349.12

WATER LEVEL:30.8'

HOLE DIA: 8"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG		PROJECT	Plant Branch Gypsum Storage	WELL NO.
SITE	Plant Branch	LOCATION	Milledgeville, GA	
DATE STARTED	2/16/2009	ENDED	2/16/2009	PREPARED L. Garland	BH-18

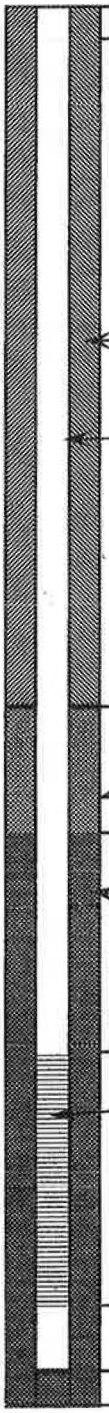


	DEPTH	ELEVATION
Top of standup casing		409.66
GROUND SURFACE	0	408.66
PROTECTIVE CASING DIA 2" TYPE PVC Schedule 40		
BACKFILL MATERIAL TYPE 3/8" Shur-Plug		
RISER CASING DIA 2" TYPE Schedule 40 PVC		
WATER LEVEL: 26.6 TOB		
TOP OF SEAL	26	382.66
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OF FILTER PACK	28	380.66
FILTER PACK TYPE: #2 Filter Sand 1 bag		
BOTTOM OF RISER/ TOP OF SCREEN	30	378.66
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	40.	368.66
BOTTOM OF CASING	40.5	368.16
BOTTOM OF HOLE	40.5	368.16

HOLE DIA: 4.25"

SOUTHERN COMPANY SERVICES

WELL CONSTRUCTION LOG	PROJECT Plant Branch Gypsum Storage	WELL NO
SITE Plant Branch	LOCATION Milledgeville, GA	
DATE STARTED 2/17/2009 ENDED 2/17/2009	PREPARED L. Garland	BH-19



	DEPTH	ELEVATION
Top of riser casing		408.41
GROUND SURFACE	0	407.4
BACKFILL MATERIAL TYPE 3/8" Shur-Plug **RISER CASING** DIA 2" TYPE Schedule 40 PVC		
TOP OF SEAL	6	401.41
ANNUAL SEAL TYPE 1/4" Bentonite Pellets		
TOP OF FILTER PACK	8	399.41
FILTER PACK TYPE: #2 Filter Sand I bag		
BOTTOM OF RISER/ TOP OF SCREEN	10	397.41
SCREEN DIA TYPE 2" TYPE Schedule 40 PVC OPENING 0.010 opening		
BOTTOM OF SCREEN	20	387.41
BOTTOM OF CASING	20.5	386.91
BOTTOM OF HOLE	20.5	386.91

WATER LEVEL: 3.72

HOLE DIA: 4.25"

Geosyntec consultants
engineers | scientists | innovators

Client: Georgia Power Company
Project: Plant Branch CCR Landfill Site Investigation
Address: 1100 Milledgeville Rd, Milledgeville

WELL LOG
Well No. PB-1S/PB-1
Page: 1 of 5

Drilling Start Date:	**01/18/2019**	Boring Depth (ft):	**96**	Well Depth (ft):	**38/NA**
Drilling End Date:	**01/22/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**24.54/NA**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**24.4/NA**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**CME-550**	Top of Casing Elev. (ft)	**403.06/NA**	Sanitary Seal:	**Bentonite Chips/Pellets**
Driller:	**Stan White**	Ground Elev. (ft):	**400.26/NA**	Filter Pack:	**Sand**
Logged By:	**Joseph Ivanowski**	Location (X,Y):	**1164916.83, 2556350.54**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
0				SS	0.58	1 1 1 1	2	(0') Clayey SAND (SC); moist, reddish-brown, organic material.	PB-1 (0-2)	400
				SS	1.66	1 3 4 5	7	(2') Sandy lean CLAY (CL); medium plasticity, medium stiff, dry, reddish-brown, micaceous, some quartz gravel in lenses.	PB-1 (2-4)	
5				SS	2	3 5 8 9	13		PB-1 (4-6)	395
				SS	2	3 3 5 5	8	(6') Clayey SAND (SC); mostly medium grained sand, few coarse gravel, few clay, medium dense, dry, light reddish-brown, some coarse quartz sand lenses.	PB-1 (6-8)	
				SS	1.84	2 3 4 7	7	(8') SILT (ML); mostly silt, nonplastic, medium stiff, dry, yellowish-brown, small iron oxide concretions throughout (10 mm).	PB-1 (8-10)	
10				SS	1.84	3 4 5 5	9	(10') SILT (ML); mostly silt, nonplastic, medium stiff, dry, yellowish-brown, small iron oxide concretions throughout (10 mm), more fine sand and mica.	PB-1 (10-12)	390
				SS	2	3 4 5 6	9	(12') Silty SAND (SM); medium dense, dry, pale reddish-brown, weak relict structure, micaceous, some gravel quartz lenses.	PB-1 (12-14)	
				SS	2	4 3 5 6	8		PB-1 (14-16)	
15				SS	1.66	3 5 7 7	12	(16') Silty SAND (SM); dense, moist, pale reddish-brown, relict rock structure more evident, micaceous, some gravel quartz lenses.	PB-1 (16-18)	385
				SS	2	4 4 6 7	10		PB-1 (18-20)	
20										

NOTES: PB-1S is a stickup well located ~10ft away from PB-1 borehole.
NA = Not Applicable

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WELL LOG
Well No. PB-1S/PB-1
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Drilling Start Date:	**01/18/2019**	Boring Depth (ft):	**96**	Well Depth (ft):	**38/NA**
Drilling End Date:	**01/22/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**24.54/NA**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**24.4/NA**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**CME-550**	Top of Casing Elev. (ft)	**403.06/NA**	Sanitary Seal:	**Bentonite Chips/Pellets**
Driller:	**Stan White**	Ground Elev. (ft):	**400.26/NA**	Filter Pack:	**Sand**
Logged By:	**Joseph Ivanowski**	Location (X,Y):	**1164916.83, 2556350.54**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	Sample Type	Recovery (ft)	Blow Counts	N Value / RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	Lab Sample	ELEV. (ft msl)
20	SH	2				PB-1 (20-22)	380
	SS	2	4 6 7 8	13	(22') Silty SAND (SM); dense, moist, pale reddish-brown, micaceous with relict rock fabric.	PB-1 (22-24)	
	SS	2	5 8 11 15	19	(24') Silty SAND (SM); dense, wet, pale reddish-brown, micaceous with relict rock fabric, weathered quartz lens at 25.5 ft.	PB-1 (24-26)	
25	SS	2	6 11 20 24	31		PB-1 (26-28)	375
	SS	1.34	17 36 50/4	86	(28') Silty SAND (SM); dense, wet, pale reddish-brown, material becoming harder, more rock like, highly weathered Gneiss. (28') Top of PWR.	PB-1 (28-30)	
30	SS	1.26	11 37 50	87		PB-1 (30-32)	370
					(32') Switched to 5ft-center for SPT (SS) sampling due to PWR.		
35	SS	1.58	16 37 40 38	77	(35') Weathered Gneiss, abundant quartz, mica with biotite.	PB-1 (35-37)	365
40							

NOTES: PB-1S is a stickup well located ~10ft away from PB-1 borehole.
NA = Not Applicable

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WELL LOG
Well No. PB-1S/PB-1
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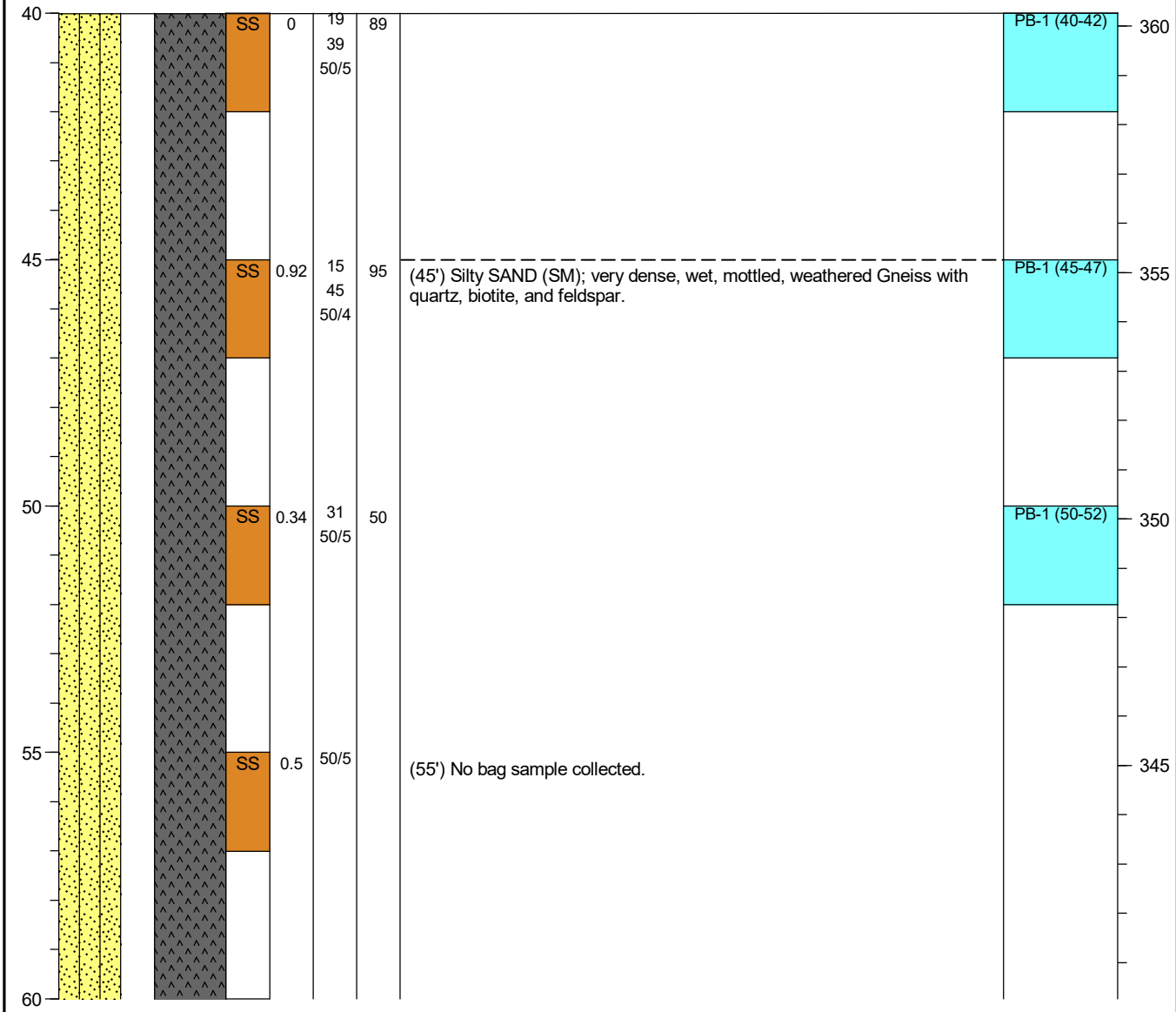
Drilling Start Date:	**01/18/2019**	Boring Depth (ft):	**96**	Well Depth (ft):	**38/NA**
Drilling End Date:	**01/22/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**24.54/NA**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**24.4/NA**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**CME-550**	Top of Casing Elev. (ft)	**403.06/NA**	Sanitary Seal:	**Bentonite Chips/Pellets**
Driller:	**Stan White**	Ground Elev. (ft):	**400.26/NA**	Filter Pack:	**Sand**
Logged By:	**Joseph Ivanowski**	Location (X,Y):	**1164916.83, 2556350.54**	Sampling Method(s):	**SS/SH/CO**



NOTES: PB-1S is a stickup well located ~10ft away from PB-1 borehole.
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WELL LOG
Well No. PB-1S/PB-1
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Drilling Start Date:	**01/18/2019**	Boring Depth (ft):	**96**	Well Depth (ft):	**38/NA**
Drilling End Date:	**01/22/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**24.54/NA**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**24.4/NA**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**CME-550**	Top of Casing Elev. (ft)	**403.06/NA**	Sanitary Seal:	**Bentonite Chips/Pellets**
Driller:	**Stan White**	Ground Elev. (ft):	**400.26/NA**	Filter Pack:	**Sand**
Logged By:	**Joseph Ivanowski**	Location (X,Y):	**1164916.83, 2556350.54**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
60				SS	0.16	44 50/4	50	(60') No bag sample collected.		340
65				SS	5.5	50/2		(65') Silty SAND (SM); very dense, wet, some coarse quartz sand, weathered Gneiss with relict banding, quartz, feldspar, and biotite. PWR becomes more competent. Very slow drilling, effective auger refusal at 67ft. (67') Began mud rotary drilling.		335
70								(72') No bag sample collected.		330
75										325
80								(79') Very hard drilling.		

NOTES: PB-1S is a stickup well located ~10ft away from PB-1 borehole.
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WELL LOG
Well No. PB-1S/PB-1
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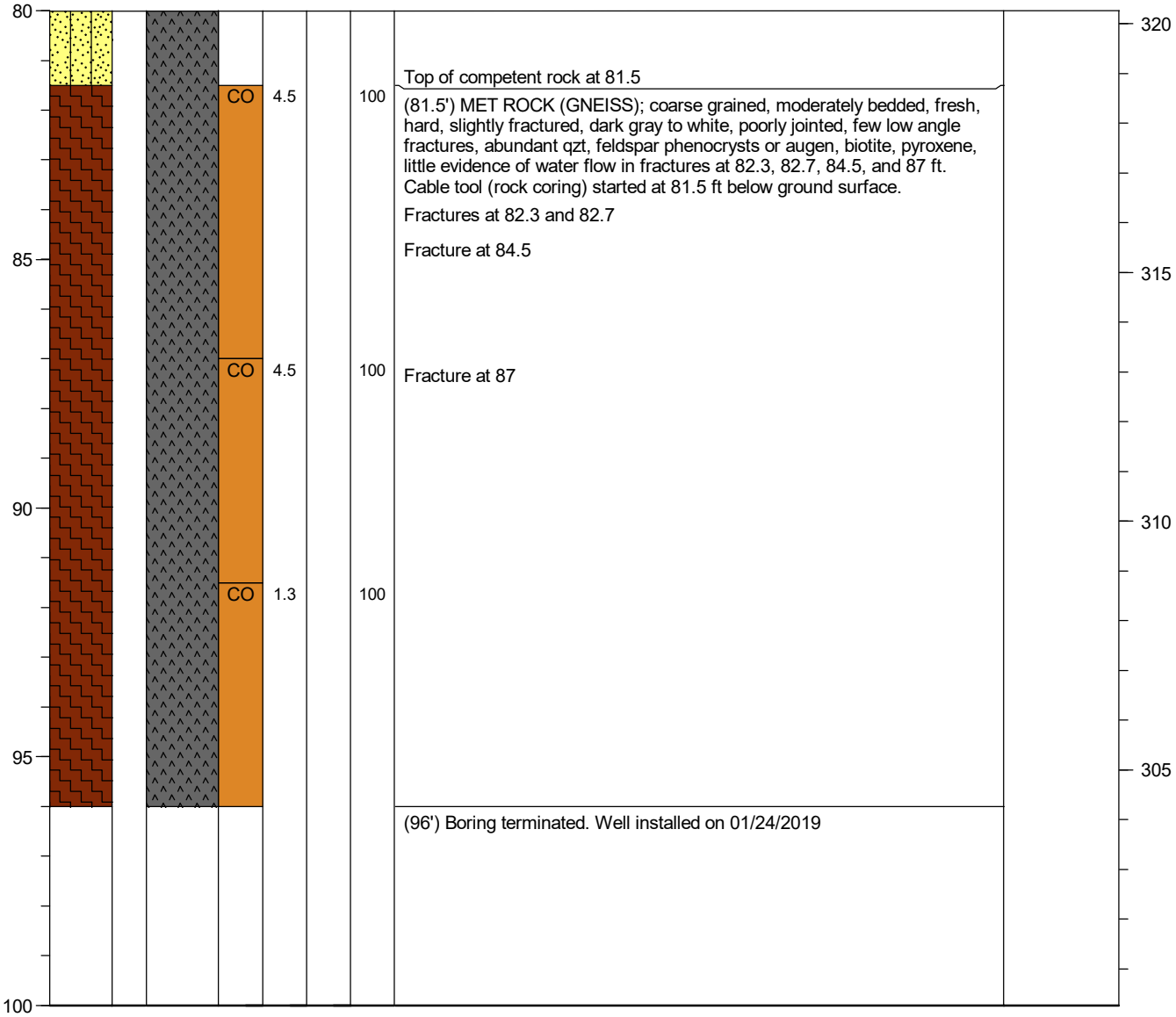
Drilling Start Date:	**01/18/2019**	Boring Depth (ft):	**96**	Well Depth (ft):	**38/NA**
Drilling End Date:	**01/22/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**24.54/NA**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**24.4/NA**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**CME-550**	Top of Casing Elev. (ft)	**403.06/NA**	Sanitary Seal:	**Bentonite Chips/Pellets**
Driller:	**Stan White**	Ground Elev. (ft):	**400.26/NA**	Filter Pack:	**Sand**
Logged By:	**Joseph Ivanowski**	Location (X,Y):	**1164916.83, 2556350.54**	Sampling Method(s):	**SS/SH/CO**



NOTES: PB-1S is a stickup well located ~10ft away from PB-1 borehole.
NA = Not Applicable

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WELL LOG
Well No. PB-2D
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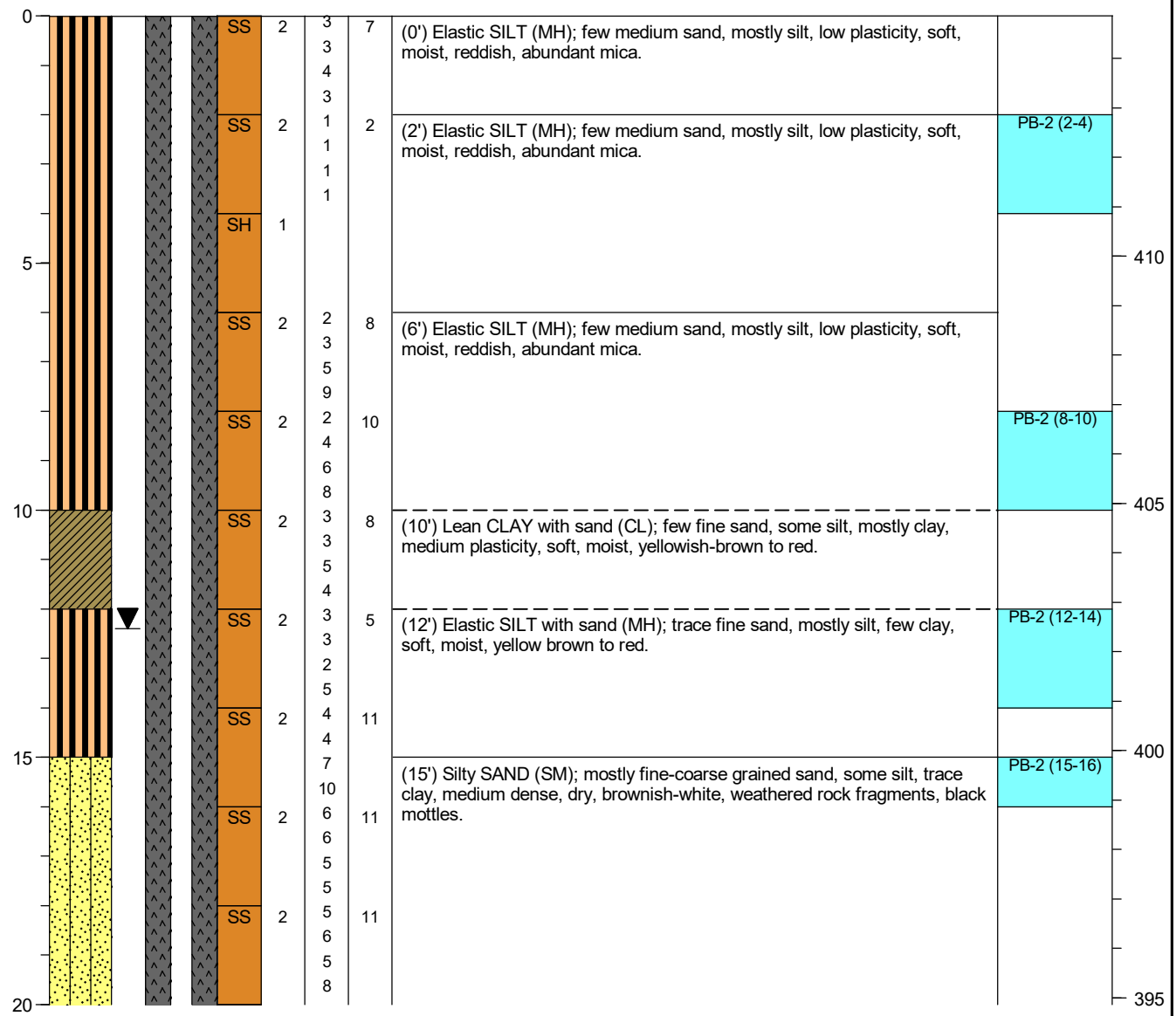
Drilling Start Date:	**11/29/2018**	Boring Depth (ft):	**61**	Well Depth (ft):	**57**
Drilling End Date:	**12/04/2018**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**39.50**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**12.40**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**416.76**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**414.86**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1164853.32, 2556913.92**	Sampling Method(s):	**SS/SH/CO**



NOTES: PB-2D is a stickup well.
NA = Not Applicable

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WELL LOG
Well No. PB-2D
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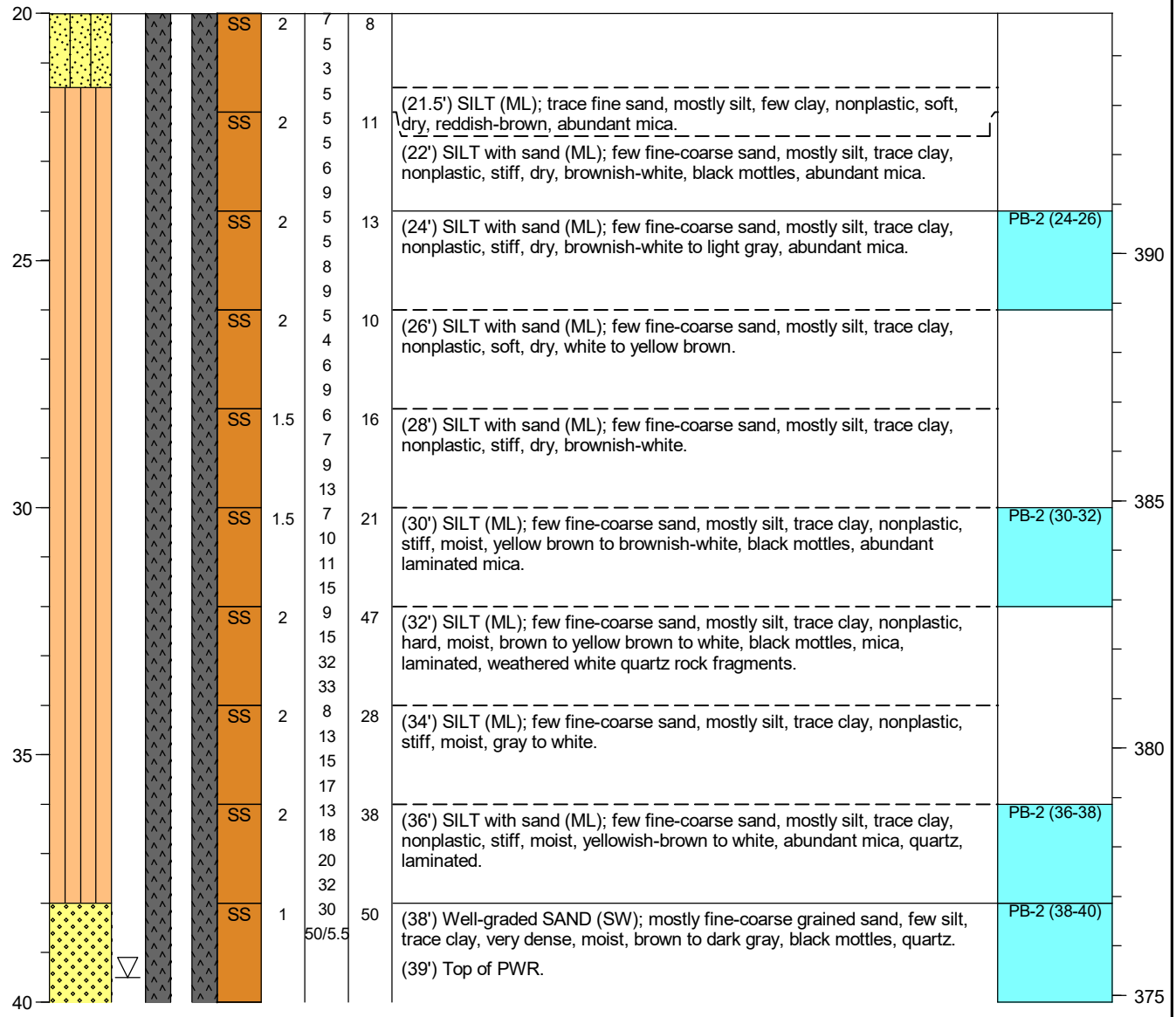
Drilling Start Date:	**11/29/2018**	Boring Depth (ft):	**61**	Well Depth (ft):	**57**
Drilling End Date:	**12/04/2018**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**39.50**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**12.40**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**416.76**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**414.86**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1164853.32, 2556913.92**	Sampling Method(s):	**SS/SH/CO**



NOTES: PB-2D is a stickup well.
NA = Not Applicable

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WELL LOG
Well No. PB-2D
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Drilling Start Date:	**11/29/2018**	Boring Depth (ft):	**61**	Well Depth (ft):	**57**
Drilling End Date:	**12/04/2018**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**39.50**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**12.40**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**416.76**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**414.86**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1164853.32, 2556913.92**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
40				SS	0.2	50/2.5		(42.9') Auger refusal.		
				CO	2.75		64	(43') MET ROCK (GNEISS); moderately bedded, fresh, hard, slightly fractured, dark gray to white, dark biotite and white feldspar minerals, strong, dark and light banding, trace red, flow banding, slightly decomposed near top, competent, fine to medium grain. Cable tool (rock coring) started at 43 ft below ground surface.		
45										370
				CO	4.3		87	(46.5') MET ROCK (GNEISS); moderately bedded, fresh, hard, unfractured, dark gray to white, dark biotite and white feldspar minerals, strong, dark and light banding, flow banding, competent, medium to coarse grain.		
50								Couldn't retrieve core, redrilled with new core catcher and bit, then retrieved core, as a result Run 3 has several mechanical fractures.		365
				CO	3.3		66	(51') MET ROCK (GNEISS); fresh, hard, unfractured, dark white, dark biotite and white feldspar minerals, strong, dark and light banding, flow banding, competent, medium to coarse grain, several mechanical breaks from redrilling. 51-52 ft was drilled (not cored) due to a weathered layer (mostly sand) jamming core bit.		
55										360
				CO	4.75		95	(56') MET ROCK (GNEISS); fresh, hard, unfractured, dark white, dark biotite and white feldspar minerals, strong, dark and light banding, flow banding, competent, medium to coarse grain.		
60										355

NOTES: PB-2D is a stickup well.
NA = Not Applicable

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WELL LOG
Well No. PB-2D
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Drilling Start Date: **11/29/2018**	Boring Depth (ft): **61**	Well Depth (ft): **57**
Drilling End Date: **12/04/2018**	Boring Diameter (in): **6.50**	Well Diam. (in)/Screen Slot (in): **2.0/0.010**
Drilling Company: **Thompson Engineering**	Static Water Level (ft): **39.50**	Riser Material: **Sch 40 PVC**
Drilling Method: **Hollow Stem Auger**	DTW After Drilling (ft): **12.40**	Screen Material: **Sch 40 PVC Slotted**
Drilling Equipment: **D-50**	Top of Casing Elev. (ft) **416.76**	Sanitary Seal: **Bentonite Pellets**
Driller: **Phil Pitts**	Ground Elev. (ft): **414.86**	Filter Pack: **Sand**
Logged By: **Nardos Tilahun**	Location (X,Y): **1164853.32, 2556913.92**	Sampling Method(s): **SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
60										
								(61') Boring terminated. Well installed on 12/05/2018		
65										350

NOTES: PB-2D is a stickup well.
NA = Not Applicable

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BORING LOG
Boring No. PB-3
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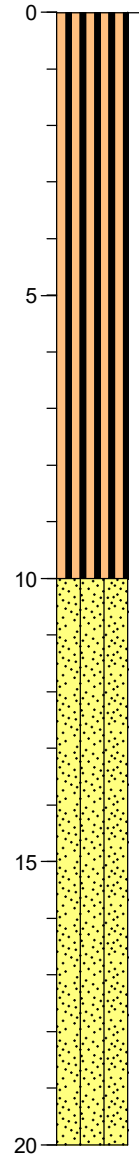
Drilling Start Date:	**11/27/2018**	Boring Depth (ft):	**44**
Drilling End Date:	**11/27/2018**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**432.08**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1164263.28, 2556754.55**



DEPTH (ft)	Sample Type	Recovery (ft)	Blow Counts	N Value / RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	Lab Sample	ELEVATION (ft)
0	SS	2	2 2 2 5	4	(0') Elastic SILT (MH); trace fine sand, mostly silt, few clay, low plasticity, very soft, moist, reddish.		
	SS	2	3 4 6 10	10	(2') Elastic SILT (MH); trace fine sand, mostly silt, few clay, low plasticity, very soft, moist, reddish, abundant mica.	PB-3(2-4)	430
5	SH	1			(4') Shelby tube discarded (only 12-inch recovery).		
	SS	2	3 3 4 10	7	(6') Elastic SILT (MH); trace fine sand, mostly silt, few clay, low plasticity, very soft, moist, reddish, abundant mica.		425
	SH	2				PB-3(6-8)	
10	SS	2	3 2 4 4	6	(10') Silty SAND (SM); mostly fine grained sand, some silt, trace clay, loose, moist, yellowish-red to red, abundant mica, dark and pink mottles.		
	SS	2	2 3 3 5	6	(12') Silty SAND (SM); mostly fine grained sand, some silt, trace clay, loose, moist, yellowish-brown, abundant mica.	PB-3(12-14)	420
15	SS	2	3 3 5 7	8	(14') Silty SAND (SM); mostly fine grained sand, some silt, trace clay, loose, moist, yellowish-brown, white layers of quartz (15.5-16 ft).		
	SS	2	4 3 5 7	8	(16') Silty SAND (SM); mostly fine-coarse grained sand, little silt, trace clay, moist, yellowish-brown, scattered white layers of quartz, dark mottle layers.	PB-3(16-18)	415
	SS	2	3 3 5 8	8	(18') Silty SAND (SM); mostly fine-coarse grained sand, little silt, trace clay, moist, yellowish-brown, white layer of quartz (19.5-20), scattered dark mottles.		
20							

NOTES: NA = Not Applicable

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BORING LOG
Boring No. PB-3
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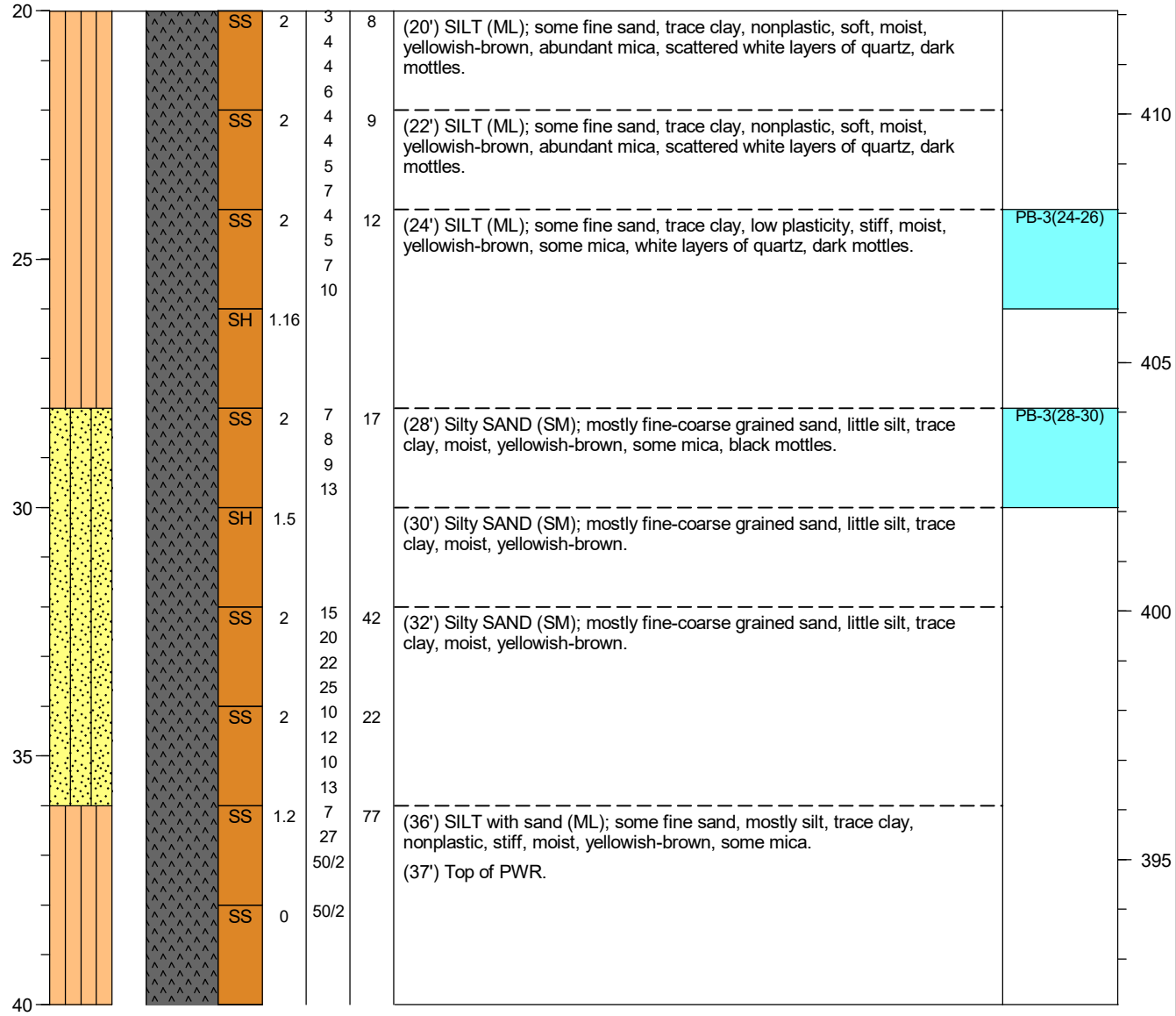
Drilling Start Date:	**11/27/2018**	Boring Depth (ft):	**44**
Drilling End Date:	**11/27/2018**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**432.08**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1164263.28, 2556754.55**



NOTES: NA = Not Applicable

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BORING LOG
Boring No. PB-3
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Drilling Start Date:	**11/27/2018**	Boring Depth (ft):	**44**
Drilling End Date:	**11/27/2018**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**432.08**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1164263.28, 2556754.55**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEVATION (ft)
40				SS	1.5	16 31 50	81	(40') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, dense, moist, white to whitish-brown.	Pb-3(40-41.5)	
				SS	0.8	28 50/4	50	(42') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, very dense, moist, white to whitish-brown.		390
45								(44') Auger Refusal. Boring terminated.		385
50										

NOTES: NA = Not Applicable

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WELL LOG
Well No. PB-4S/PB-4D
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Drilling Start Date:	**01/14/2019**	Boring Depth (ft):	**121**	Well Depth (ft):	**48/114.5**
Drilling End Date:	**01/16/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**31.54/29.62**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**31.70/31.00**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**CME-550**	Top of Casing Elev. (ft)	**411.06/412.18**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Stan White**	Ground Elev. (ft):	**409.26/409.08**	Filter Pack:	**Sand**
Logged By:	**Joseph Ivanowski**	Location (X,Y):	**1164335.02, 2556069.22**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	Lab Sample	ELEV. (ft msl)
0	SS	1.34	1 1 3 4	4	(0') Clayey SAND (SC); some fine-coarse grained sand, some silt, little clay, moist, reddish.	PB-4 (0-2)	
	SS	1.76	1 6 8 11	14	(2') Lean CLAY (CL); trace fine sand, mostly clay, medium plasticity, stiff, moist, dark reddish, micaceous with trace quartz fragments.	PB-4 (2-4)	
5	SS	1.76	3 5 8 10	13		PB-4 (4-6)	405
	SS	1.66	5 4 7 10	11	(6') Elastic SILT (MH); little fine sand, mostly silt, trace clay, low plasticity, stiff, moist, dark reddish, more micaceous.	PB-4 (6-8)	
	SS	1.5	2 3 5 5	8		PB-4 (8-10)	400
10	SS	1.76	3 4 5 14	9		PB-4 (10-12)	
	SS	2	2 3 5 7	8	(11') Silty SAND (SM); mostly fine grained sand, trace coarse gravel, some silt, trace clay, dense, dry, mottled red to pink brown, trace quartz gravel. (12') Silty SAND (SM); mostly fine grained sand, trace coarse gravel, some silt, trace clay, moist, yellowish-white, 1 inch thick clay lens 14.6 to 14.7.	PB-4 (12-14)	
	SS	1.58	3 4 5 4	9			395
15					Attempted Shelby Tube, only 10 in recovery, discarded.		
	SH	1.92					390
20							

NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
NA = Not Applicable

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WELL LOG
Well No. PB-4S/PB-4D
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Drilling Start Date:	**01/14/2019**	Boring Depth (ft):	**121**	Well Depth (ft):	**48/114.5**
Drilling End Date:	**01/16/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**31.54/29.62**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**31.70/31.00**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**CME-550**	Top of Casing Elev. (ft)	**411.06/412.18**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Stan White**	Ground Elev. (ft):	**409.26/409.08**	Filter Pack:	**Sand**
Logged By:	**Joseph Ivanowski**	Location (X,Y):	**1164335.02, 2556069.22**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
20				SS	2	3 5 9 12	14	(20') Silty SAND (SM); mostly fine grained sand, trace coarse gravel, some silt, trace clay, moist, yellowish-white, relict structure more pronounced.	PB-4 (20-22)	
				SS	2	6 7 8 13	15		PB-4 (22-24)	
				SS	2	5 7 8 15	15	(24.5') SILT from 24.5 to 25 ft.	PB-4 (24-26)	385
25				SS	2	5 7 10 13	17	(25') SILT with sand (ML); trace coarse gravel, some fine-coarse sand, mostly silt, nonplastic, very stiff, moist, mottled pale brown to gray to white, relict rock fabric.	PB-4 (26-28)	
				SS	2	8 11 13 16	24		PB-4 (28-30)	380
30				SS	2	7 10 14 17	24		PB-4 (30-32)	
				SS	2	7 10 15 18	25	(31') SILT with sand (ML); trace coarse gravel, some fine-coarse sand, mostly silt, nonplastic, very stiff, wet, pale brown, rock fabric becoming stronger.	PB-4 (32-34)	
				SS	2	8 11 15 20	26	(34') Sandy zone of weathered rock at 33.7 ft.	PB-4 (34-36)	375
35				SS	1.58	8 15 19 30	34	(36') Very stiff, grading to PWR.	PB-4 (36-38)	
				SS	1.66	12 30 50/5	80		PB-4 (38-40)	370
40								(39') Top of PWR.		

NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
NA = Not Applicable

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WELL LOG
Well No. PB-4S/PB-4D
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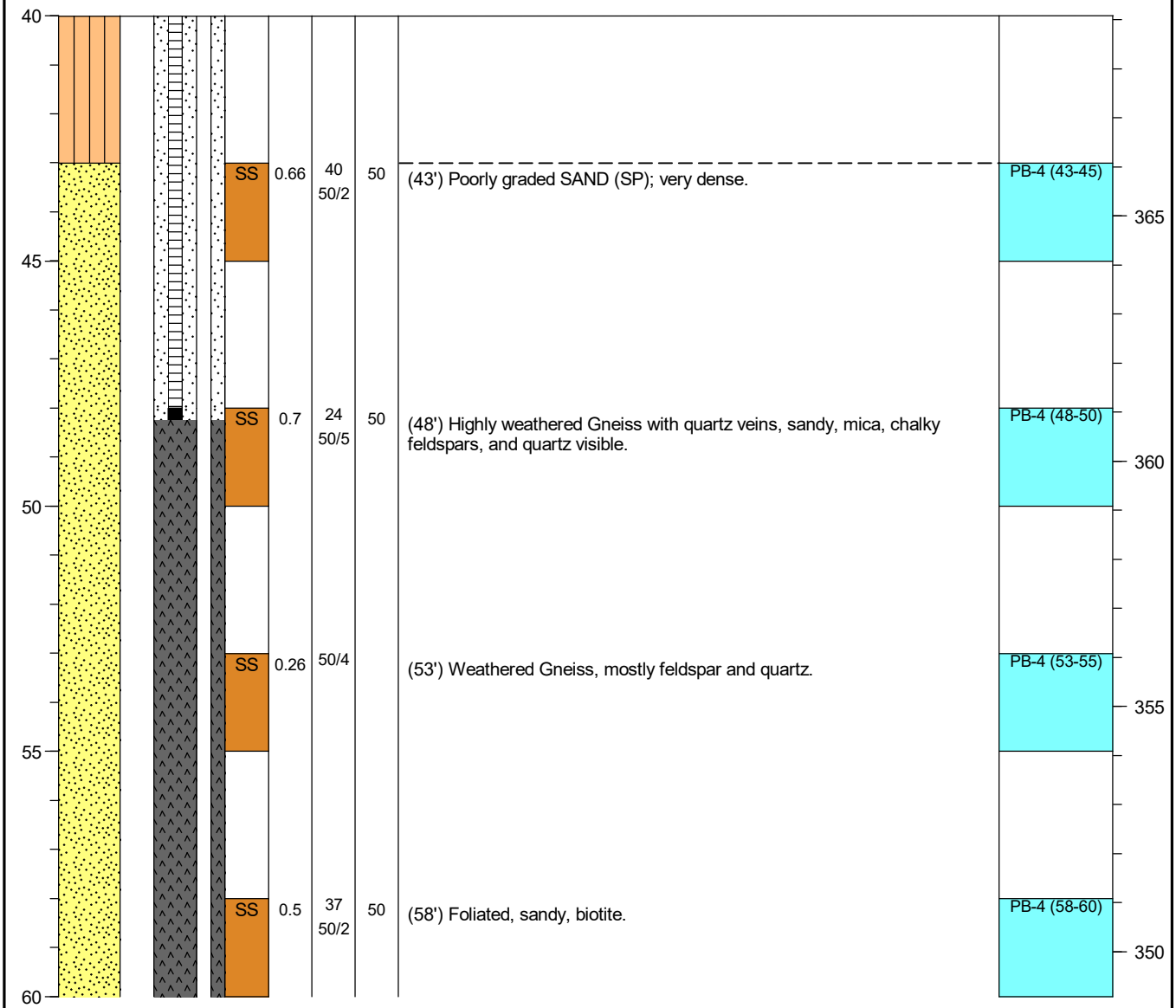
Drilling Start Date: **01/14/2019**	Boring Depth (ft): **121**	Well Depth (ft): **48/114.5**
Drilling End Date: **01/16/2019**	Boring Diameter (in): **6.50**	Well Diam. (in)/Screen Slot (in): **2.0/0.010**
Drilling Company: **Thompson Engineering**	Static Water Level (ft): **31.54/29.62**	Riser Material: **Sch 40 PVC**
Drilling Method: **Hollow Stem Auger**	DTW After Drilling (ft): **31.70/31.00**	Screen Material: **Sch 40 PVC Slotted**
Drilling Equipment: **CME-550**	Top of Casing Elev. (ft) **411.06/412.18**	Sanitary Seal: **Bentonite Pellets**
Driller: **Stan White**	Ground Elev. (ft): **409.26/409.08**	Filter Pack: **Sand**
Logged By: **Joseph Ivanowski**	Location (X,Y): **1164335.02, 2556069.22**	Sampling Method(s): **SS/SH/CO**



NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
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WELL LOG
Well No. PB-4S/PB-4D
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Drilling Start Date:	**01/14/2019**	Boring Depth (ft):	**121**	Well Depth (ft):	**48/114.5**
Drilling End Date:	**01/16/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**31.54/29.62**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**31.70/31.00**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**CME-550**	Top of Casing Elev. (ft)	**411.06/412.18**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Stan White**	Ground Elev. (ft):	**409.26/409.08**	Filter Pack:	**Sand**
Logged By:	**Joseph Ivanowski**	Location (X,Y):	**1164335.02, 2556069.22**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
60										
				SS	0.3	50/3.5		(63') Biotite, foliated, sandy, mostly feldspar.	PB-4 (63-65)	345
65										
				SS	0.62	17 50/5	50	(68') Moderately weathered biotite gneiss foliated, mostly feldspars.	PB-4 (68-70)	340
70										
				SS	0.38	50/5		(73') Poorly graded SAND (SP); very dense, mostly felsic minerals, sandy texture.	PB-4 (73-75)	335
75										
				SS	0.2	50/3		(78') Biotite, sandy texture.	PB-4 (78-80)	330
80										

NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
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WELL LOG
Well No. PB-4S/PB-4D
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Drilling Start Date:	**01/14/2019**	Boring Depth (ft):	**121**	Well Depth (ft):	**48/114.5**
Drilling End Date:	**01/16/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**31.54/29.62**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**31.70/31.00**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**CME-550**	Top of Casing Elev. (ft)	**411.06/412.18**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Stan White**	Ground Elev. (ft):	**409.26/409.08**	Filter Pack:	**Sand**
Logged By:	**Joseph Ivanowski**	Location (X,Y):	**1164335.02, 2556069.22**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
80										
				SS	0.58	44 50/3.5	50	(83') Biotite, sandy, predominately mafic minerals.	PB-4 (83-85)	325
85										
				SS	0.16	50/4		(88') Mostly felsic minerals, sandy.	PB-4 (88-90)	320
90										
				SS	0.04	50/0.5		(94') Hard, mostly quartz and feldspar.	PB-4 (93-95)	315
95								(96') Began mud rotary drilling.		
										310
100										

NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
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WELL LOG
Well No. PB-4S/PB-4D
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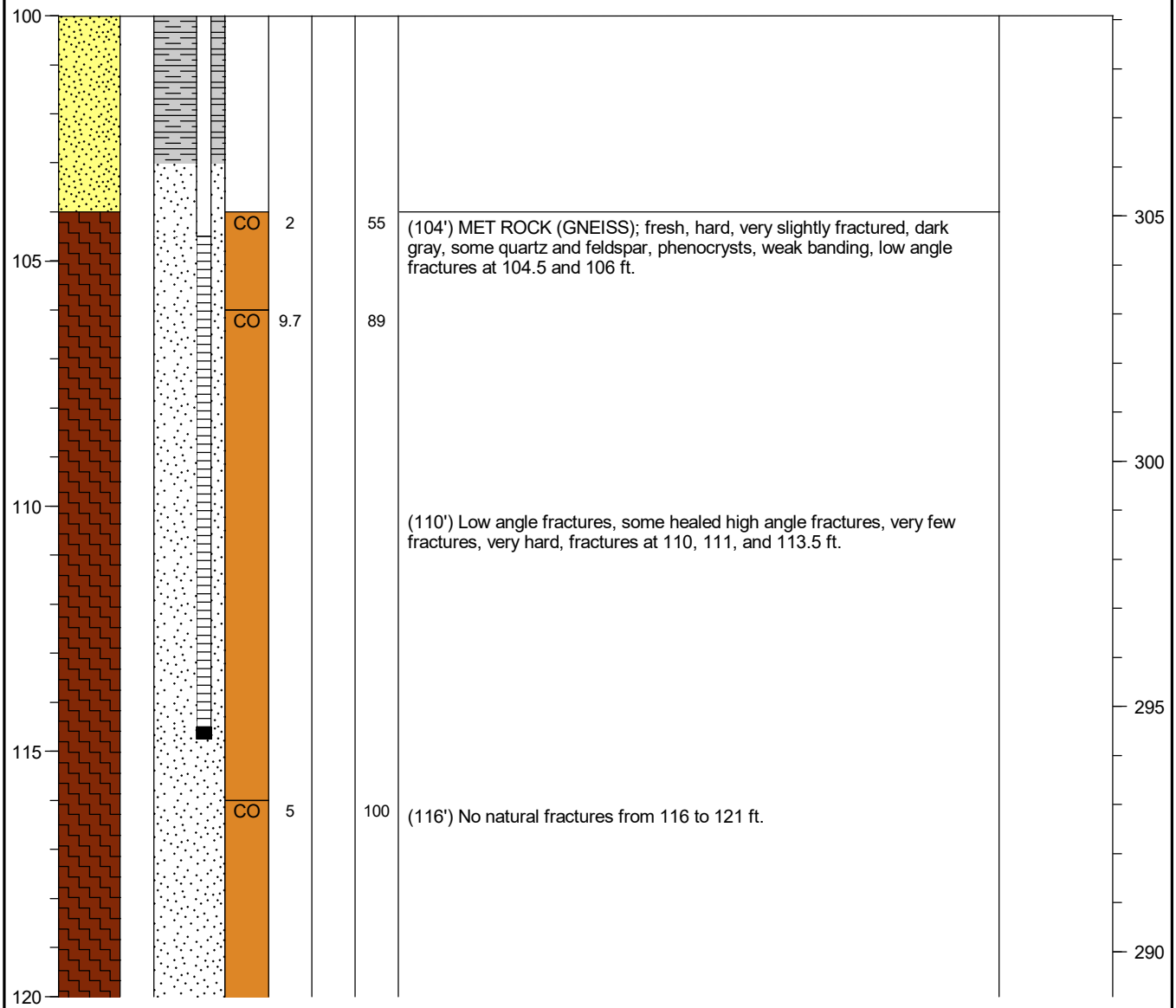
Drilling Start Date:	**01/14/2019**	Boring Depth (ft):	**121**	Well Depth (ft):	**48/114.5**
Drilling End Date:	**01/16/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**31.54/29.62**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**31.70/31.00**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**CME-550**	Top of Casing Elev. (ft)	**411.06/412.18**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Stan White**	Ground Elev. (ft):	**409.26/409.08**	Filter Pack:	**Sand**
Logged By:	**Joseph Ivanowski**	Location (X,Y):	**1164335.02, 2556069.22**	Sampling Method(s):	**SS/SH/CO**



NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
NA = Not Applicable

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WELL LOG
Well No. PB-4S/PB-4D
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Drilling Start Date:	**01/14/2019**	Boring Depth (ft):	**121**	Well Depth (ft):	**48/114.5**
Drilling End Date:	**01/16/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**31.54/29.62**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**31.70/31.00**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**CME-550**	Top of Casing Elev. (ft)	**411.06/412.18**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Stan White**	Ground Elev. (ft):	**409.26/409.08**	Filter Pack:	**Sand**
Logged By:	**Joseph Ivanowski**	Location (X,Y):	**1164335.02, 2556069.22**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
120										
								(121') Boring terminated. Well installed on 01/17/2019		
125										285

NOTES: PB-4S and PB-4D are stickup wells, PB-4S is ~10ft away from PB-4D well.
NA = Not Applicable

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BORING LOG
Boring No. PB-5
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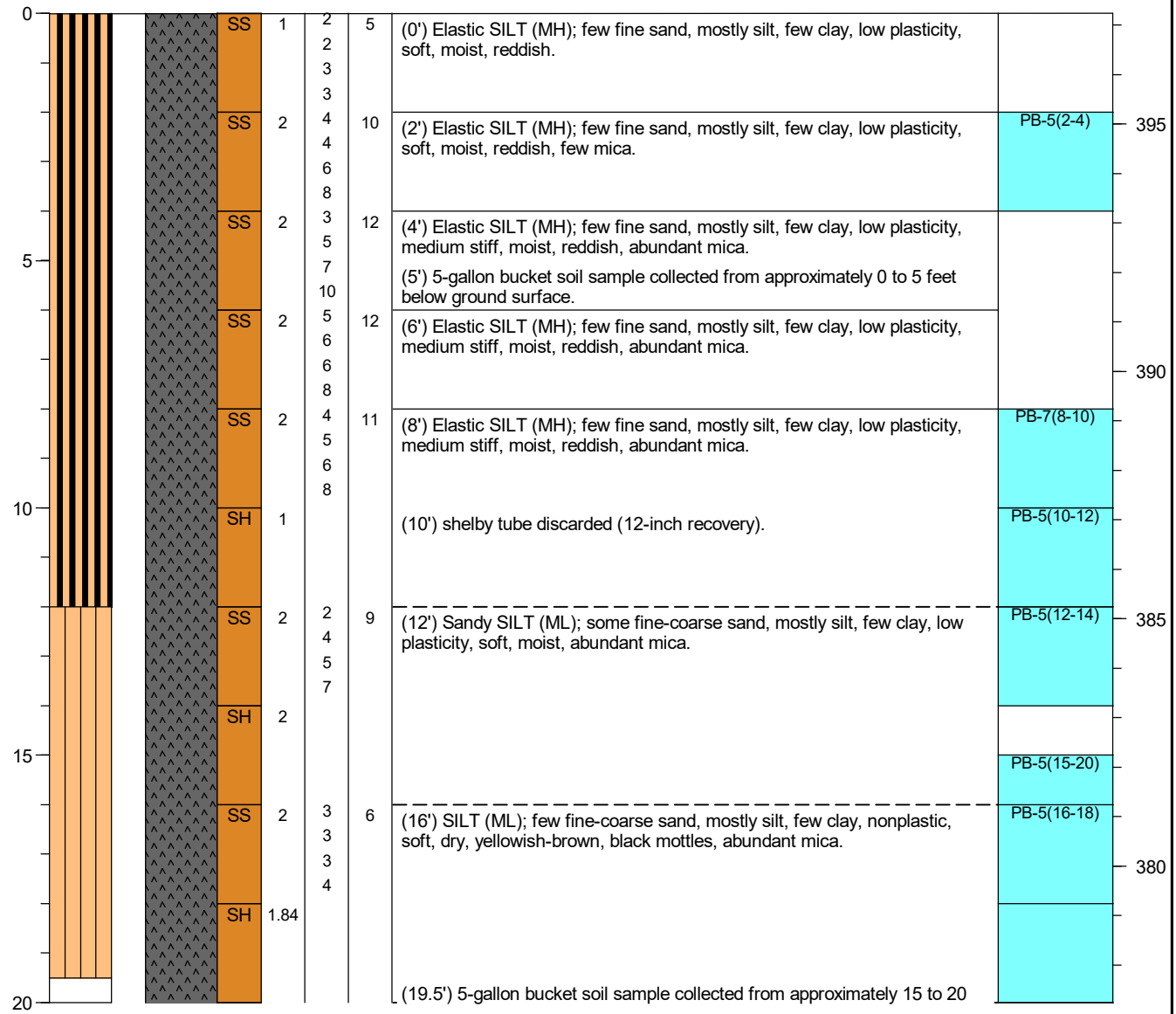
Drilling Start Date:	**12/06/2018**	Boring Depth (ft):	**29**
Drilling End Date:	**12/07/2018**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**397.24**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1164240.05, 2557564.18**



DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT: Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEVATION (ft)
0				SS	1	2 2 3 3	5	(0') Elastic SILT (MH); few fine sand, mostly silt, few clay, low plasticity, soft, moist, reddish.		
				SS	2	4 4 6 8	10	(2') Elastic SILT (MH); few fine sand, mostly silt, few clay, low plasticity, soft, moist, reddish, few mica.	PB-5(2-4)	395
5				SS	2	3 5 7 10	12	(4') Elastic SILT (MH); few fine sand, mostly silt, few clay, low plasticity, medium stiff, moist, reddish, abundant mica. (5') 5-gallon bucket soil sample collected from approximately 0 to 5 feet below ground surface.		
				SS	2	5 6 6 8	12	(6') Elastic SILT (MH); few fine sand, mostly silt, few clay, low plasticity, medium stiff, moist, reddish, abundant mica.		390
				SS	2	4 5 6 8	11	(8') Elastic SILT (MH); few fine sand, mostly silt, few clay, low plasticity, medium stiff, moist, reddish, abundant mica.	PB-7(8-10)	
10				SH	1			(10') shelby tube discarded (12-inch recovery).	PB-5(10-12)	
				SS	2	2 4 5 7	9	(12') Sandy SILT (ML); some fine-coarse sand, mostly silt, few clay, low plasticity, soft, moist, abundant mica.	PB-5(12-14)	385
				SH	2					
15				SS	2	3 3 3 4	6	(16') SILT (ML); few fine-coarse sand, mostly silt, few clay, nonplastic, soft, dry, yellowish-brown, black mottles, abundant mica.	PB-5(15-20) PB-5(16-18)	380
				SH	1.84			(19.5') 5-gallon bucket soil sample collected from approximately 15 to 20		
20										

NOTES: NA = Not Applicable

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BORING LOG
Boring No. PB-5
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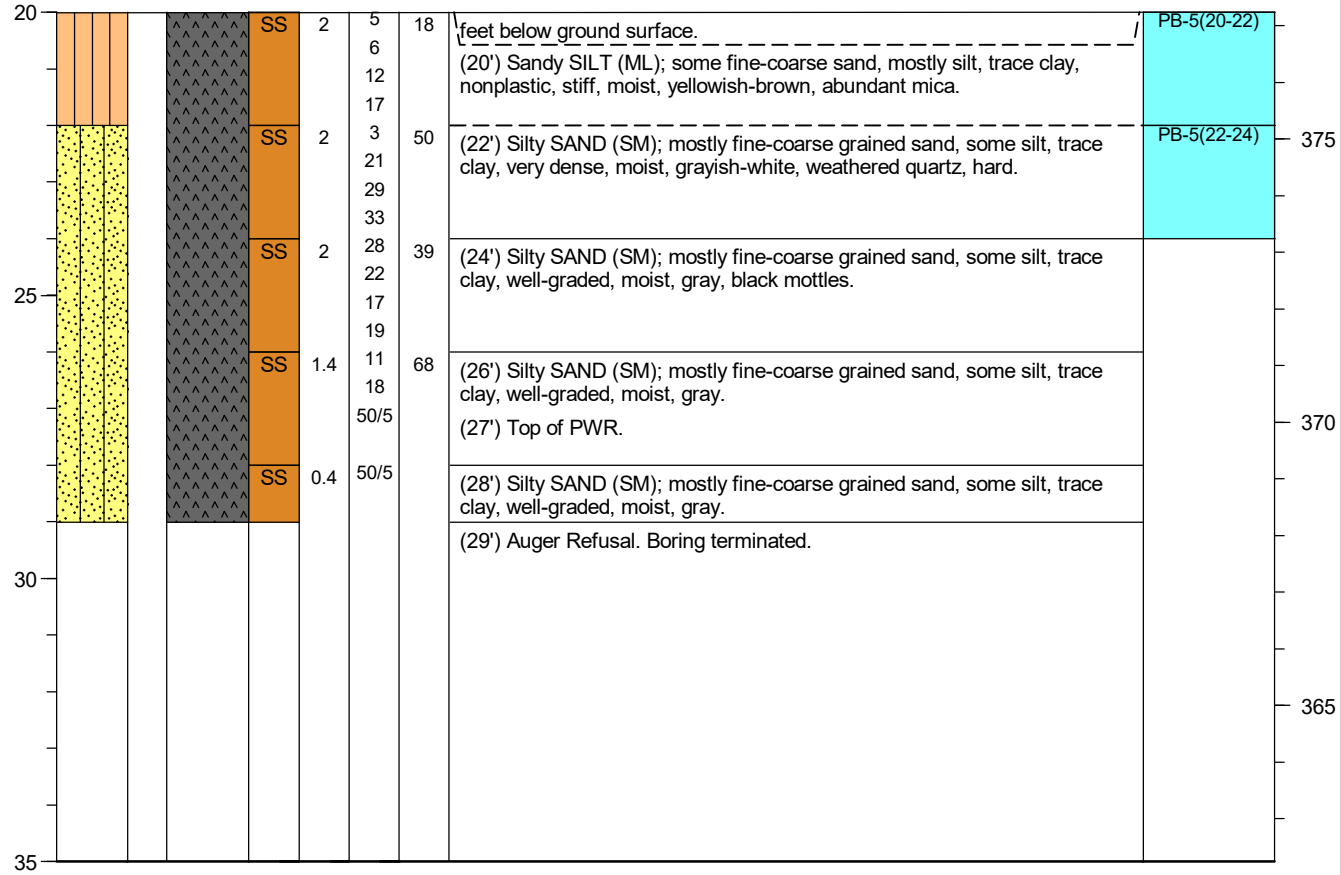
Drilling Start Date:	**12/06/2018**	Boring Depth (ft):	**29**
Drilling End Date:	**12/07/2018**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**397.24**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1164240.05, 2557564.18**



NOTES: NA = Not Applicable

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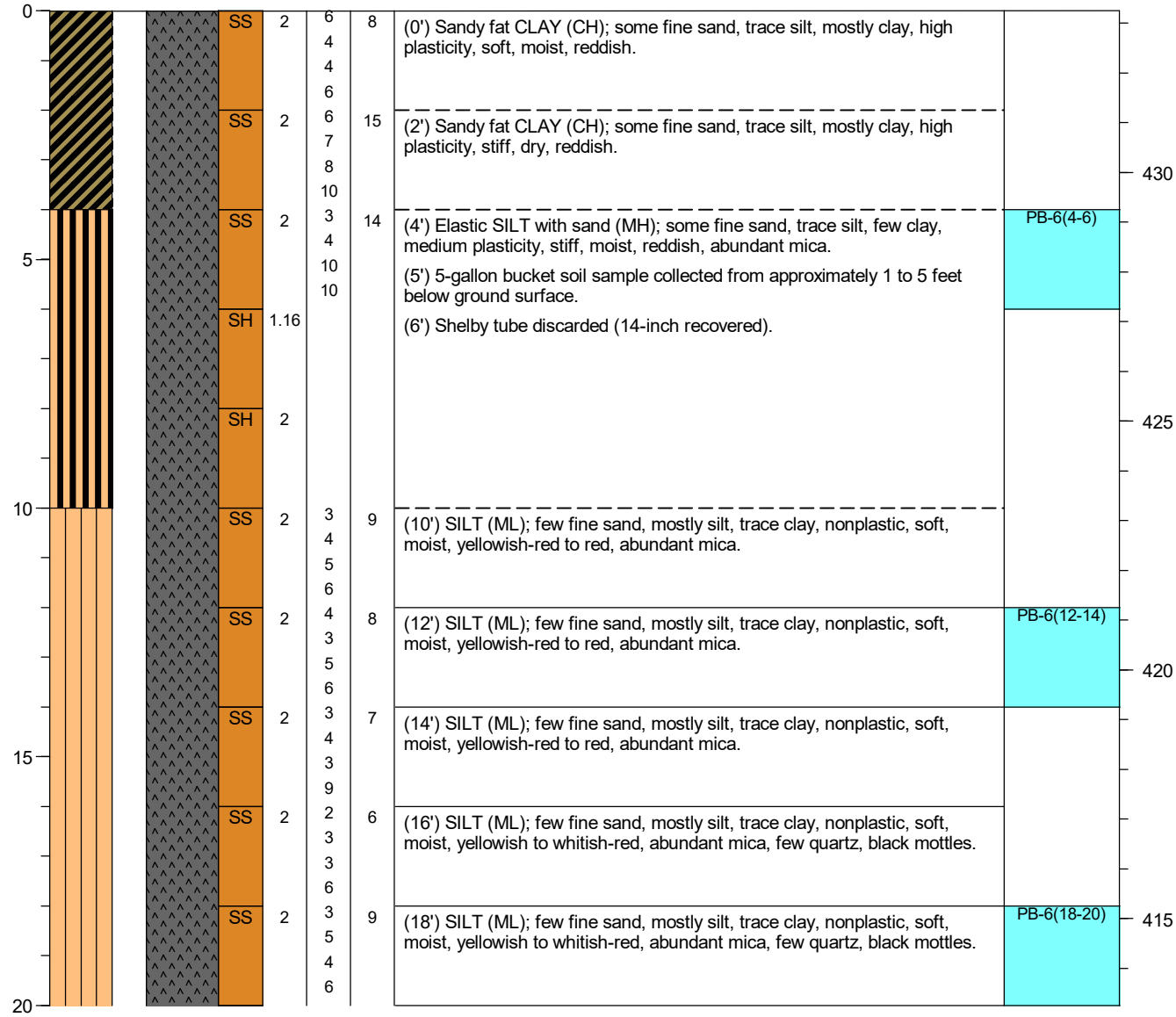
BORING LOG
Boring No. PB-6
Page: 1 of 4

Drilling Start Date:	**11/28/2018**	Boring Depth (ft):	**74**
Drilling End Date:	**11/29/2018**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**433.25**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163787.23, 2557244.14**



NOTES: NA = Not Applicable

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BORING LOG
Boring No. PB-6
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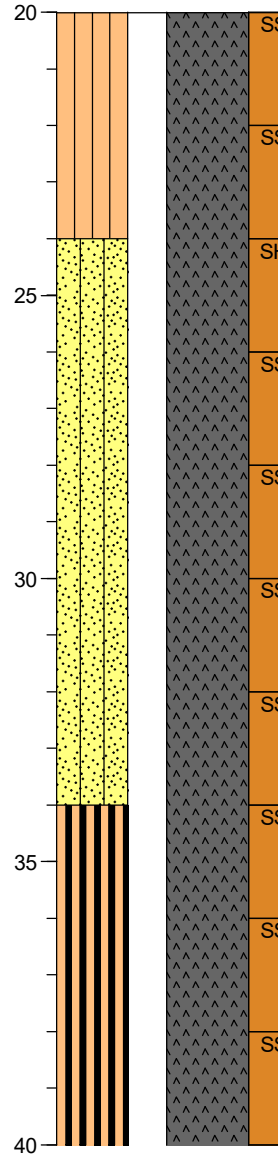
Drilling Start Date:	**11/28/2018**	Boring Depth (ft):	**74**
Drilling End Date:	**11/29/2018**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**433.25**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163787.23, 2557244.14**



DEPTH (ft)	Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	Lab Sample	ELEVATION (ft)
20	SS	2	8 6 2 4	8	(20') SILT (ML); some fine sand, mostly silt, trace clay, nonplastic, soft, moist, yellowish-brown to white, abundant white quartz and mica.		
	SS	2	4 4 5 10	9	(22') SILT (ML); some fine sand, mostly silt, trace clay, nonplastic, moist, brownish-white to dark brown, abundant white quartz and mica.	PB-6(22-24)	410
	SH	1.76			(24') Silty SAND (SM).		
25	SS	2	6 7 12 18	19	(26') Silty SAND (SM); mostly fine grained sand, some silt, trace clay, medium dense, moist, grayish-brown, dark mottles, abundant mica.		
	SS	2	3 4 8 15	12	(28') Silty SAND (SM); mostly fine grained sand, some silt, trace clay, medium dense, moist, grayish-brown, dark mottles, abundant mica.		405
30	SS	2	6 7 9 27	16	(30') Silty SAND (SM); mostly fine grained sand, some silt, trace clay, medium dense, moist, grayish-brown, trace white layers of quartz.		
	SS	2	5 6 10 35	16	(32') Silty SAND (SM); mostly fine grained sand, some silt, trace clay, medium dense, moist, grayish-brown, trace white layers of quartz.		400
	SS	2	8 9 17 45	26	(34') Elastic SILT (MH); some fine sand, mostly silt, stiff, moist, brown, black mottles, abundant mica and quartz.	PB-6(34-36)	
35	SS	2	9 11 36 41	47	(36') Elastic SILT (MH); some fine sand, mostly silt, low plasticity, hard, moist, brownish-white to brown, black mottles, abundant mica and quartz.		
	SS	1.8	5 10 18 50/4	28	(38') Elastic SILT (MH); some fine sand, mostly silt, low plasticity, hard, moist, brownish-white to brown, black mottles, abundant mica and quartz.		395
40							

NOTES: NA = Not Applicable

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BORING LOG
Boring No. PB-6
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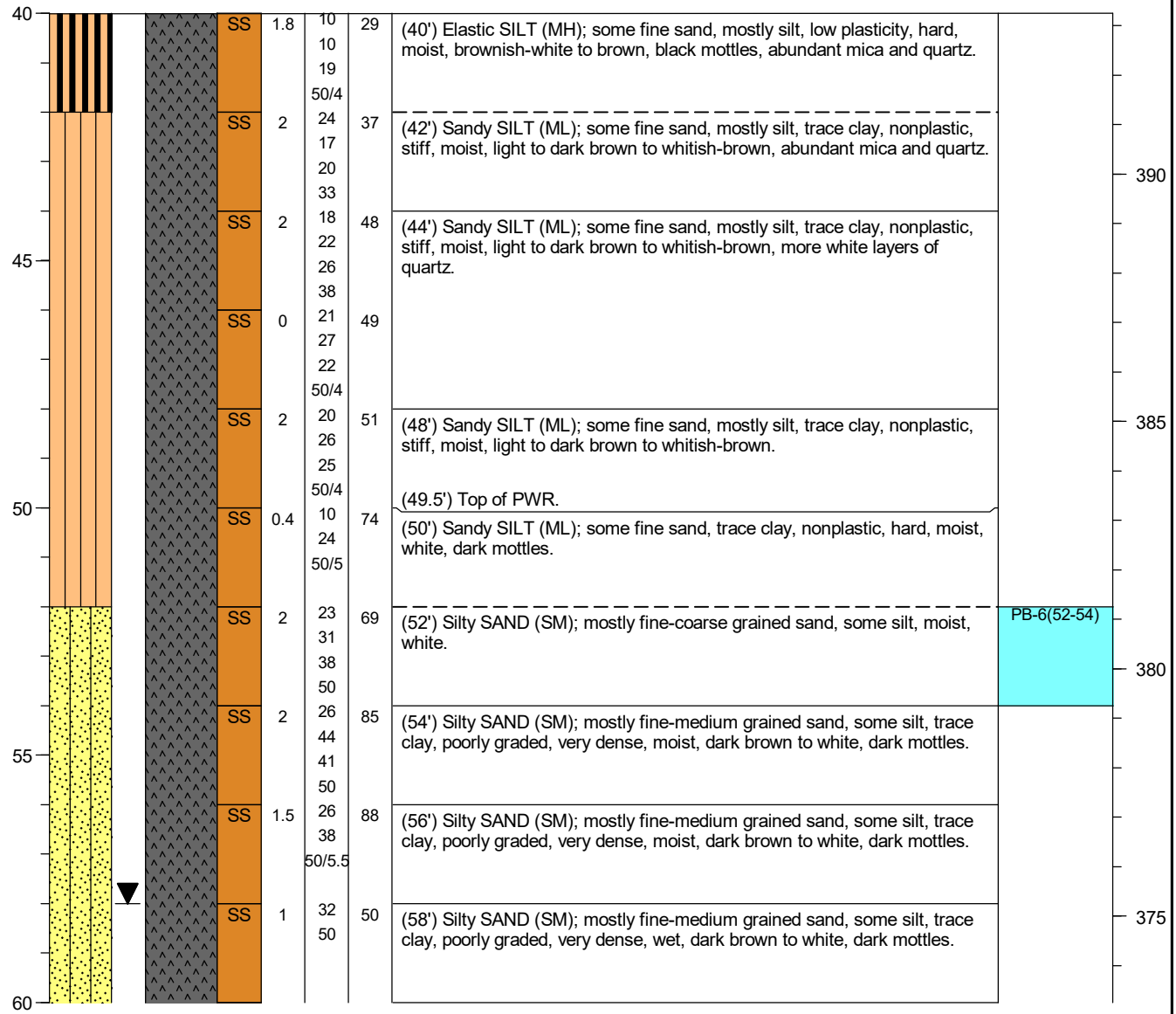
Drilling Start Date:	**11/28/2018**	Boring Depth (ft):	**74**
Drilling End Date:	**11/29/2018**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**433.25**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163787.23, 2557244.14**



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BORING LOG
Boring No. PB-6
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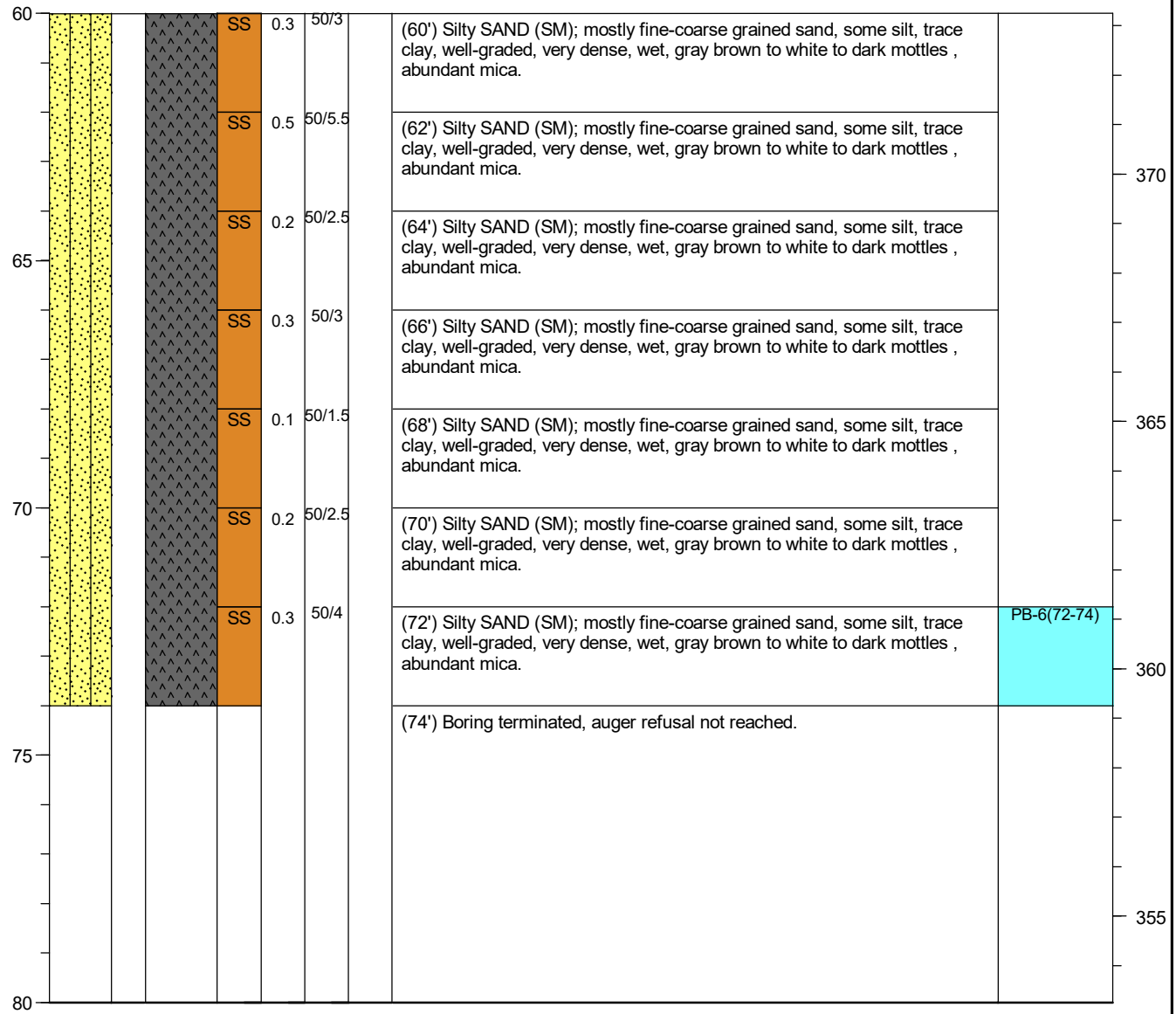
Drilling Start Date:	**11/28/2018**	Boring Depth (ft):	**74**
Drilling End Date:	**11/29/2018**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**433.25**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163787.23, 2557244.14**



NOTES: NA = Not Applicable

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WELL LOG
Well No. PB-7S/PB-7
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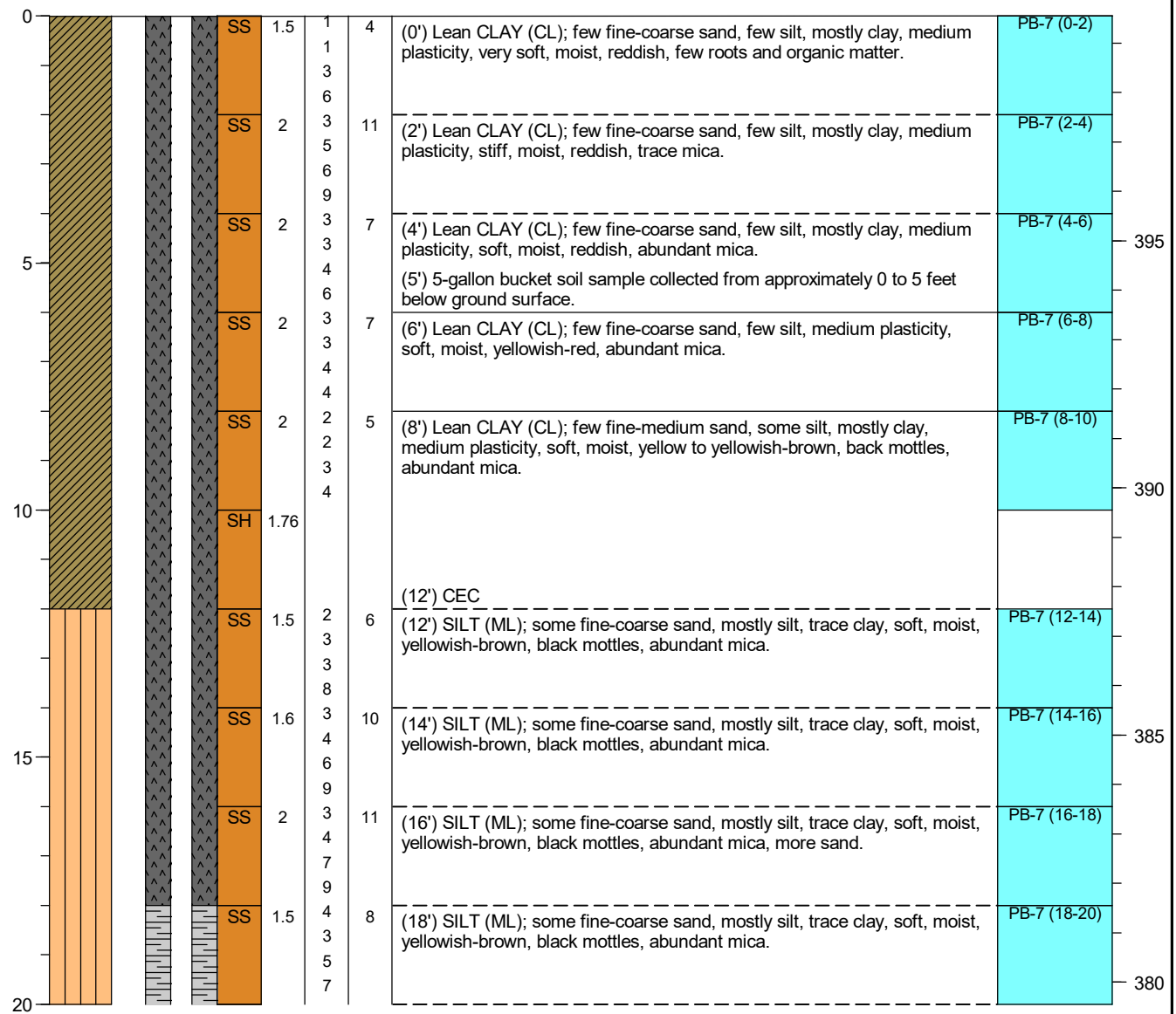
Drilling Start Date:	01/10/2019	Boring Depth (ft):	59.6	Well Depth (ft):	33
Drilling End Date:	01/14/2019	Boring Diameter (in):	6.50	Well Diam. (in)/Screen Slot (in):	2.0/0.010
Drilling Company:	Thompson Engineering	Static Water Level (ft):	24.51/NA	Riser Material:	Sch 40 PVC
Drilling Method:	Hollow Stem Auger	DTW After Drilling (ft):	24.60/NA	Screen Material:	Sch 40 PVC Slotted
Drilling Equipment:	D-50	Top of Casing Elev. (ft)	402.86/NA	Sanitary Seal:	Bentonite Pellets
Driller:	Phil Pitts	Ground Elev. (ft):	399.86/399.55	Filter Pack:	Sand
Logged By:	Nardos Tilahun	Location (X,Y):	1163831.32, 2556176.27	Sampling Method(s):	SS/SH/CO



NOTES: PB-7S is a stickup well located ~10ft away from PB-7 borehole.
NA = Not Applicable

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WELL LOG
Well No. PB-7S/PB-7
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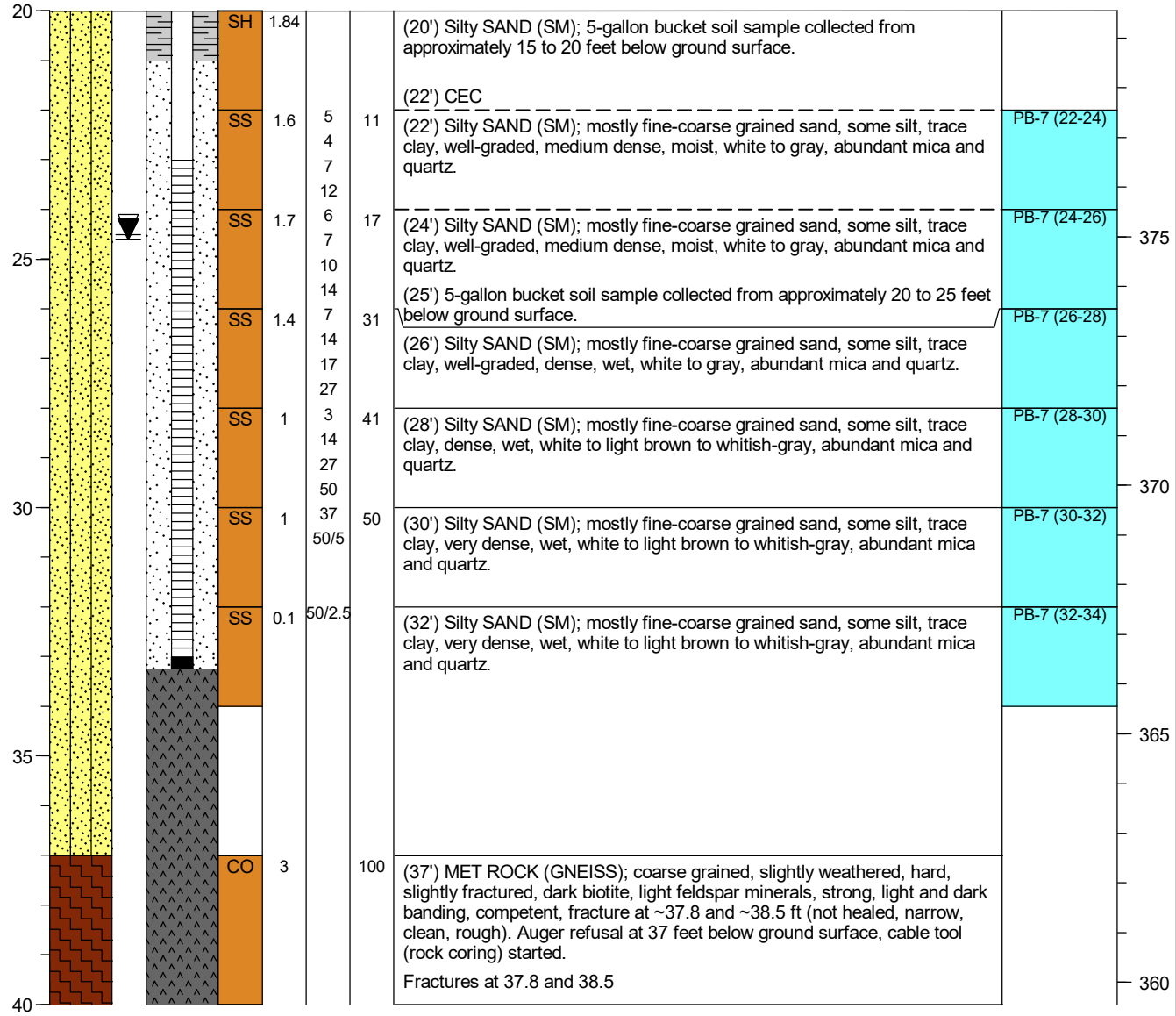
Drilling Start Date:	**01/10/2019**	Boring Depth (ft):	**59.6**	Well Depth (ft):	**33**
Drilling End Date:	**01/14/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**24.51/NA**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**24.60/NA**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**402.86/NA**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**399.86/399.55**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163831.32, 2556176.27**	Sampling Method(s):	**SS/SH/CO**



DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
20				SH	1.84			(20') Silty SAND (SM); 5-gallon bucket soil sample collected from approximately 15 to 20 feet below ground surface. (22') CEC		
				SS	1.6	5 4 7 12	11	(22') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, medium dense, moist, white to gray, abundant mica and quartz.	PB-7 (22-24)	
25				SS	1.7	6 7 10 14	17	(24') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, medium dense, moist, white to gray, abundant mica and quartz. (25') 5-gallon bucket soil sample collected from approximately 20 to 25 feet below ground surface.	PB-7 (24-26)	375
				SS	1.4	7 14 17 27	31	(26') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, dense, wet, white to gray, abundant mica and quartz.	PB-7 (26-28)	
				SS	1	3 14 27 50	41	(28') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, dense, wet, white to light brown to whitish-gray, abundant mica and quartz.	PB-7 (28-30)	370
30				SS	1	37 50/5	50	(30') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, very dense, wet, white to light brown to whitish-gray, abundant mica and quartz.	PB-7 (30-32)	
				SS	0.1	50/2.5		(32') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, very dense, wet, white to light brown to whitish-gray, abundant mica and quartz.	PB-7 (32-34)	
35										365
				CO	3		100	(37') MET ROCK (GNEISS); coarse grained, slightly weathered, hard, slightly fractured, dark biotite, light feldspar minerals, strong, light and dark banding, competent, fracture at ~37.8 and ~38.5 ft (not healed, narrow, clean, rough). Auger refusal at 37 feet below ground surface, cable tool (rock coring) started. Fractures at 37.8 and 38.5		
40										360

NOTES: PB-7S is a stickup well located ~10ft away from PB-7 borehole.
NA = Not Applicable

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WELL LOG
Well No. PB-7S/PB-7
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Drilling Start Date:	**01/10/2019**	Boring Depth (ft):	**59.6**	Well Depth (ft):	**33**
Drilling End Date:	**01/14/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**24.51/NA**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**24.60/NA**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**402.86/NA**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**399.86/399.55**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163831.32, 2556176.27**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
40				CO	5		100	(40') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, dark biotite, light feldspar minerals, strong, light and dark banding, competent, mechanical break.		355
45				CO	4.5		90	(45') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, dark biotite, light feldspar minerals, strong, light and dark banding, competent, mechanical break.		350
50				CO	5		100	(50') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, dark biotite, light feldspar minerals, strong, light and dark banding, competent, mechanical break.		345
55				CO	4.6		100	(55') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, dark biotite, light feldspar minerals, strong, light and dark banding, competent, mechanical break.		340
60								(59.6') Boring terminated. Well installed on 01/14/2019		

NOTES: PB-7S is a stickup well located ~10ft away from PB-7 borehole.
NA = Not Applicable

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WELL LOG
Well No. PB-8S/PB-8D
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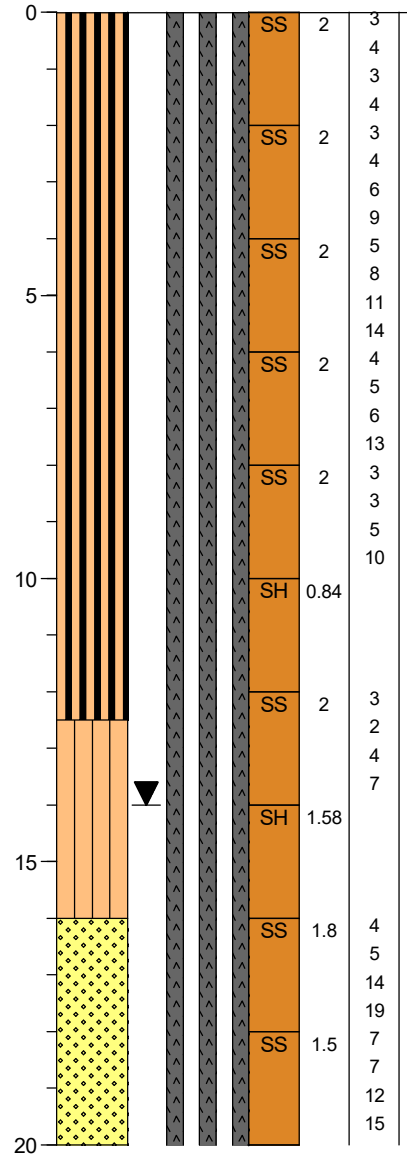
Drilling Start Date:	01/06/2019	Boring Depth (ft):	106	Well Depth (ft):	35/106
Drilling End Date:	01/08/2019	Boring Diameter (in):	6.50	Well Diam. (in)/Screen Slot (in):	2.0/0.010
Drilling Company:	Thompson Engineering	Static Water Level (ft):	22.05/22.11	Riser Material:	Sch 40 PVC
Drilling Method:	Hollow Stem Auger	DTW After Drilling (ft):	22.60/14.00	Screen Material:	Sch 40 PVC Slotted
Drilling Equipment:	D-50	Top of Casing Elev. (ft)	401.69/401.77	Sanitary Seal:	Bentonite Pellets
Driller:	Phil Pitts	Ground Elev. (ft):	398.69/398.47	Filter Pack:	Sand
Logged By:	Nardos Tilahun	Location (X,Y):	1163024.59, 2556786.55	Sampling Method(s):	SS/SH/CO



DEPTH (ft)	Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	Lab Sample	ELEV. (ft msl)
0	SS	2	3 4 3 4	7	(0') Elastic SILT (MH); trace fine-coarse sand, mostly silt, few clay, low plasticity, soft, moist, reddish, few roots and mica.		
	SS	2	3 4 6 9	10	(2') Elastic SILT (MH); trace fine-coarse sand, mostly silt, few clay, low plasticity, soft, moist, reddish, abundant mica.	PB-8 (2-4)	395
5	SS	2	5 8 11 14	19	(4') Elastic SILT (MH); trace fine-coarse sand, mostly silt, few clay, low plasticity, stiff, moist, reddish, black mottles. (5') 5-gallon bucket soil sample collected from approximately 0 to 5 feet below ground surface		
	SS	2	4 5 6 13	11	(6') Elastic SILT (MH); trace fine-coarse sand, mostly silt, few clay, low plasticity, stiff, moist, reddish, black mottles.		
	SS	2	3 3 5 10	8	(8') Elastic SILT with sand (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, soft, moist, yellowish-brown, abundant mica.	PB-8 (8-10)	390
10	SH	0.84			Switched from 4 1/4 auger to 3 1/4 auger. Shelby tube discarded.		
	SS	2	3 2 4 7	6		PB-8 (12-12.5)	
					(12.5') SILT (ML); few fine-coarse sand, mostly silt, few clay, nonplastic, soft, moist, yellowish-brown, abundant mica.	PB-8 (12.5-14)	385
15	SH	1.58					
	SS	1.8	4 5 14 19	19	(16') Well-graded SAND (SW); mostly fine-coarse grained sand, some silt, trace clay, medium dense, wet, yellowish-brown, abundant mica and quartz.	PB-8 (16-18)	
	SS	1.5	7 7 12 15	19	(18') Well-graded SAND (SW); mostly fine-coarse grained sand, some silt, trace clay, medium dense, wet, yellowish-brown, abundant mica and quartz.	PB-8 (18-22)	380
20							

NOTES: PB-8S and PB-8D are stickup wells, PB-8S is ~10ft away from PB-8D well. Depth to water at PB-8S is 22.6 feet below ground surface.
NA = Not Applicable

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WELL LOG
Well No. PB-8S/PB-8D
Page: 2 of 6

Drilling Start Date:	**01/06/2019**	Boring Depth (ft):	**106**	Well Depth (ft):	**35/106**
Drilling End Date:	**01/08/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**22.05/22.11**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**22.60/14.00**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**401.69/401.77**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**398.69/398.47**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163024.59, 2556786.55**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
20				SS	1.5	5 6 11 17	17	(20') Poorly graded SAND (SP); mostly fine-medium grained sand, some silt, few clay, medium dense, wet, gray to white, abundant mica and quartz.	PB-8 (20-22)	
				SS	1.2	14 16 20 27	36	(22') Poorly graded SAND (SP); mostly fine-medium grained sand, some silt, few clay, dense, wet, gray to white, some quartz.		375
25				SS	1.4	14 17 23 32	40	(24') Poorly graded SAND (SP); mostly fine-medium grained sand, some silt, few clay, dense, wet, gray to white, some quartz.		
				SS	1	17 31 50/2	81	(26') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz. (27') Top of PWR	PB-8 (26-28)	
				SS	1.5	25 23 40 50/4	63	(28') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz.		370
30										
				SS	0.8	34 50/5.5	50	(33') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz.		365
35										
				SS	0.5	44 50/5	50	(38') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, very dense, wet, gray to white, some quartz.		360
40										

NOTES: PB-8S and PB-8D are stickup wells, PB-8S is ~10ft away from PB-8D well. Depth to water at PB-8S is 22.6 feet below ground surface.
NA = Not Applicable

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WELL LOG
Well No. PB-8S/PB-8D
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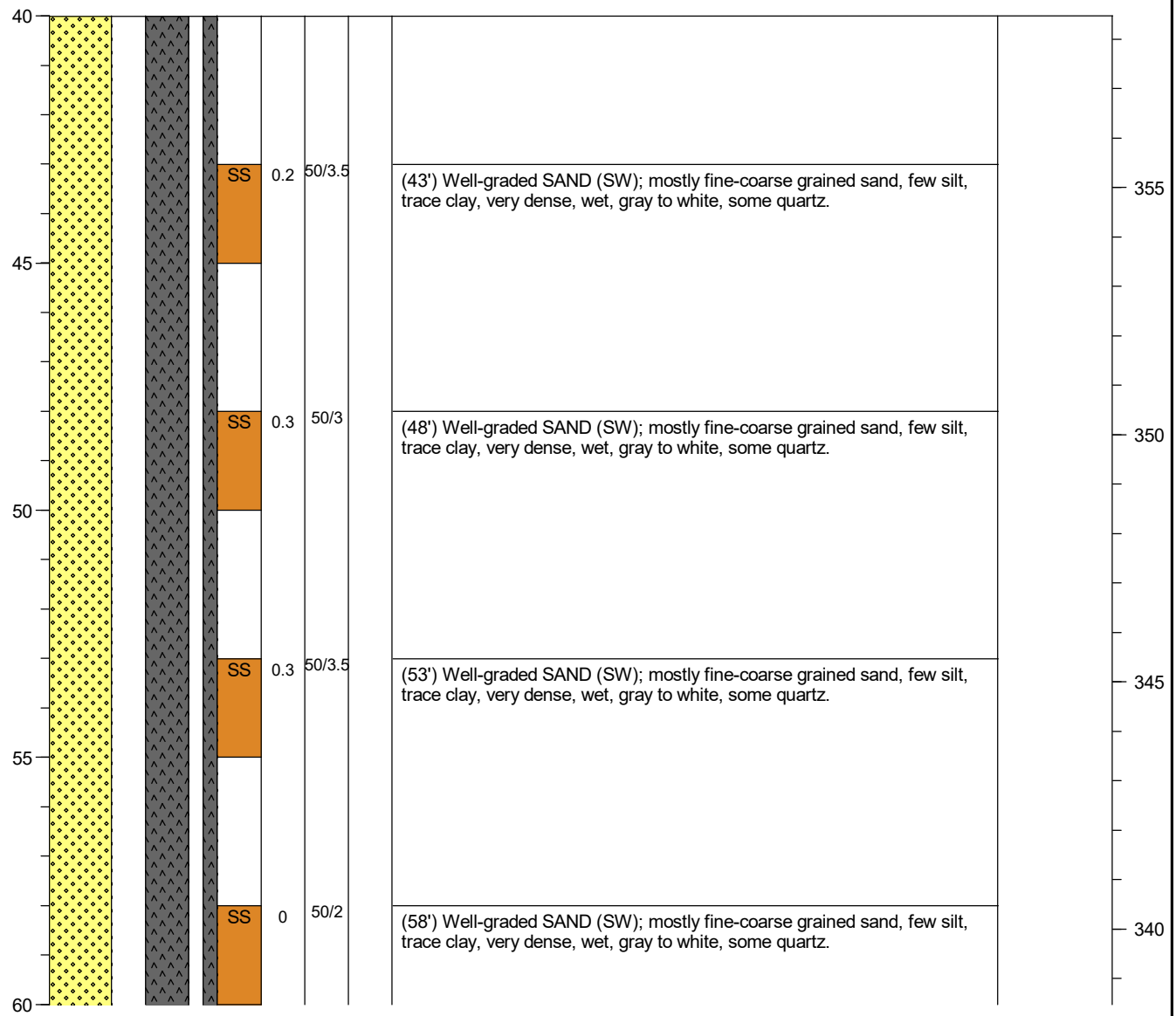
Drilling Start Date:	**01/06/2019**	Boring Depth (ft):	**106**	Well Depth (ft):	**35/106**
Drilling End Date:	**01/08/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**22.05/22.11**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**22.60/14.00**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**401.69/401.77**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**398.69/398.47**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163024.59, 2556786.55**	Sampling Method(s):	**SS/SH/CO**



NOTES: PB-8S and PB-8D are stickup wells, PB-8S is ~10ft away from PB-8D well. Depth to water at PB-8S is 22.6 feet below ground surface.
NA = Not Applicable

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WELL LOG
Well No. PB-8S/PB-8D
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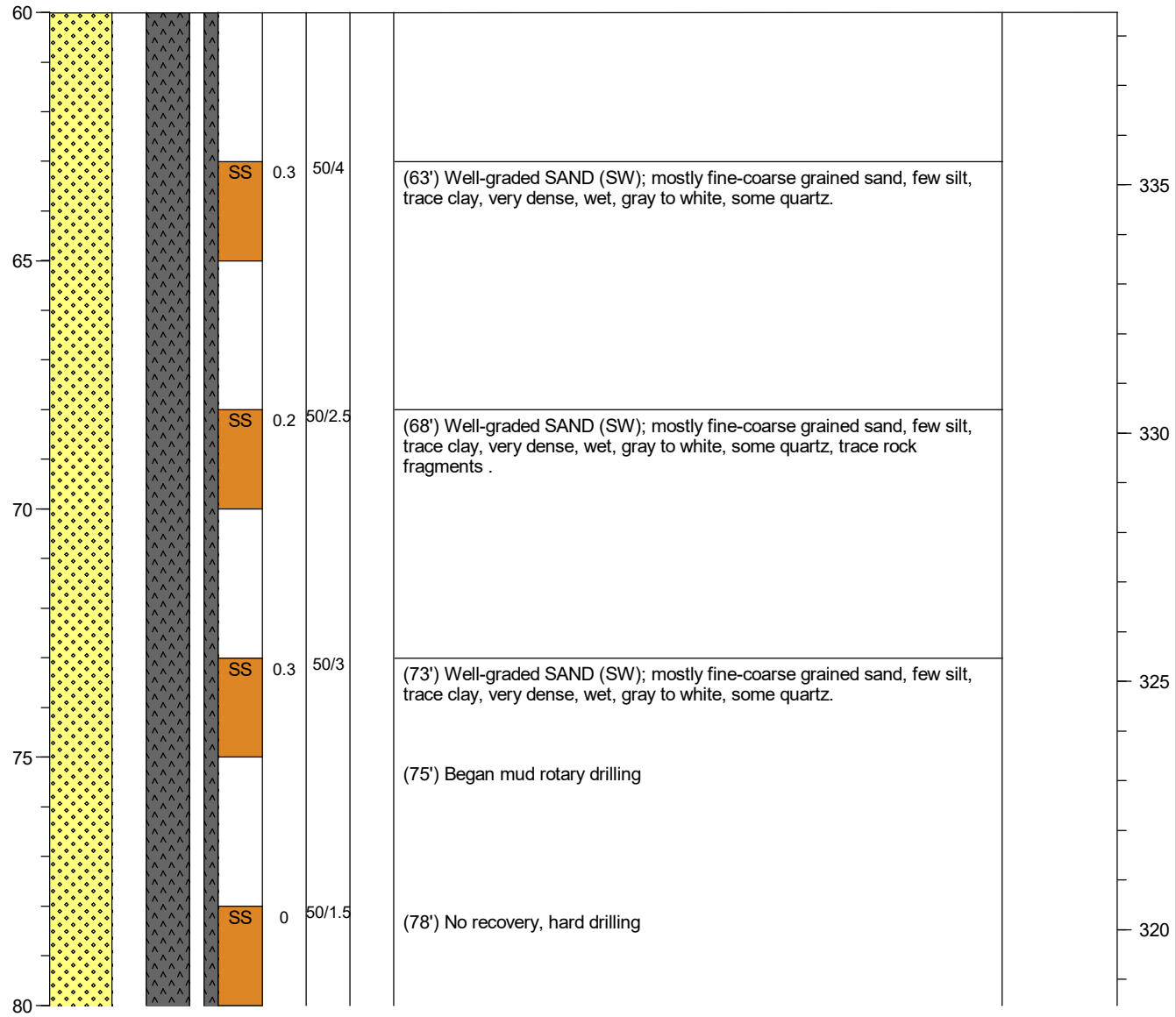
Drilling Start Date:	**01/06/2019**	Boring Depth (ft):	**106**	Well Depth (ft):	**35/106**
Drilling End Date:	**01/08/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**22.05/22.11**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**22.60/14.00**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**401.69/401.77**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**398.69/398.47**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163024.59, 2556786.55**	Sampling Method(s):	**SS/SH/CO**



NOTES: PB-8S and PB-8D are stickup wells, PB-8S is ~10ft away from PB-8D well. Depth to water at PB-8S is 22.6 feet below ground surface.
NA = Not Applicable

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WELL LOG
Well No. PB-8S/PB-8D
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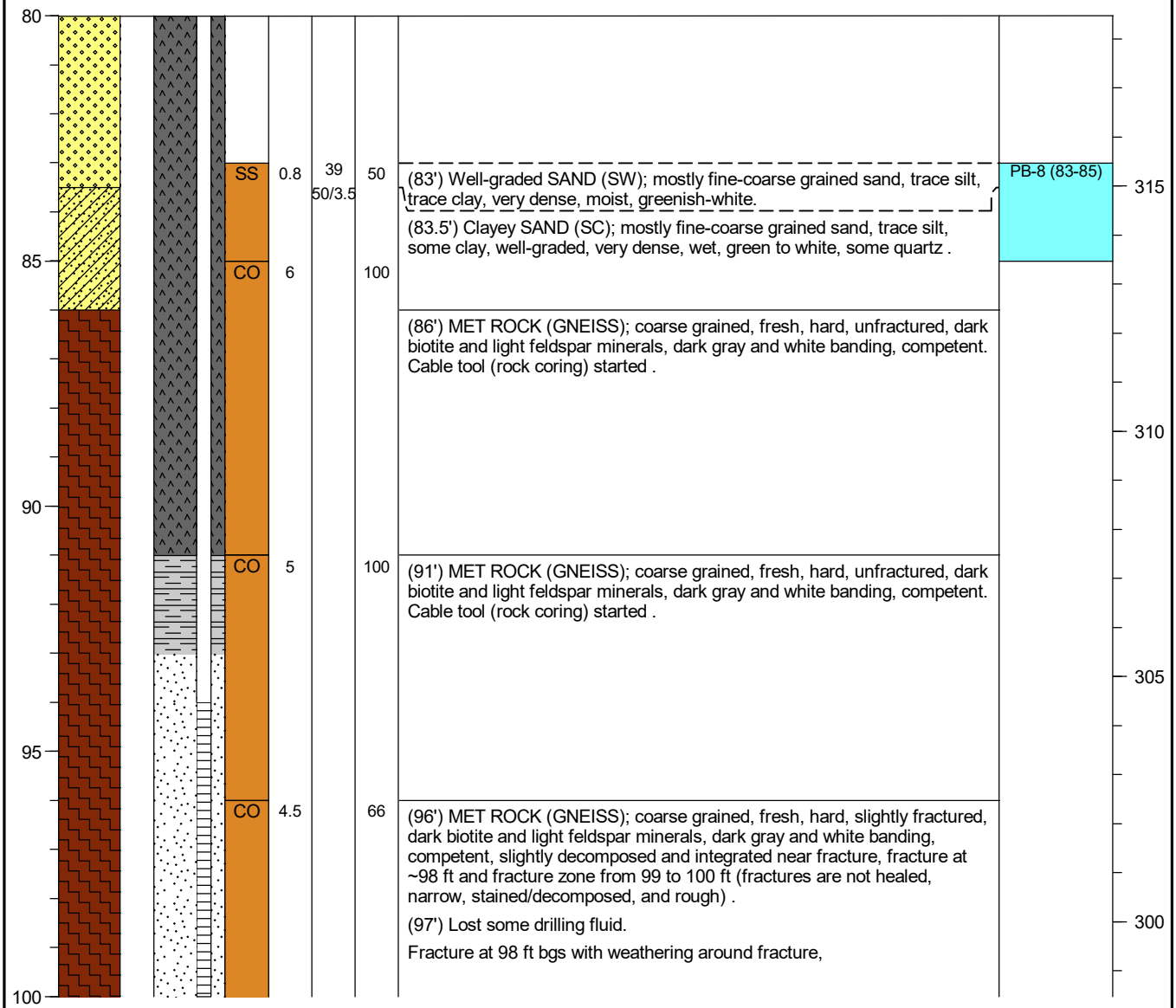
Drilling Start Date:	**01/06/2019**	Boring Depth (ft):	**106**	Well Depth (ft):	**35/106**
Drilling End Date:	**01/08/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**22.05/22.11**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**22.60/14.00**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**401.69/401.77**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**398.69/398.47**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163024.59, 2556786.55**	Sampling Method(s):	**SS/SH/CO**



NOTES: PB-8S and PB-8D are stickup wells, PB-8S is ~10ft away from PB-8D well. Depth to water at PB-8S is 22.6 feet below ground surface.
NA = Not Applicable

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WELL LOG
Well No. PB-8S/PB-8D
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Drilling Start Date:	**01/06/2019**	Boring Depth (ft):	**106**	Well Depth (ft):	**35/106**
Drilling End Date:	**01/08/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**22.05/22.11**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**22.60/14.00**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**401.69/401.77**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**398.69/398.47**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163024.59, 2556786.55**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
100										
				CO	4.7		88	(101') MET ROCK (GNEISS); coarse grained, fresh, hard, slightly fractured, dark biotite and light feldspar minerals, dark gray and white banding, competent, slightly decomposed and integrated near fracture, fracture at ~103, 104.5, and 104.7 ft (fractures are not healed, narrow, stained/decomposed, and rough) . (102') Lost some drilling fluid Fracture at 103, 104.5, and 104.7 ft bgs.		295
105								(106') Boring terminated.		290
110										

NOTES: PB-8S and PB-8D are stickup wells, PB-8S is ~10ft away from PB-8D well. Depth to water at PB-8S is 22.6 feet below ground surface.
NA = Not Applicable

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BORING LOG
Boring No. PB-9
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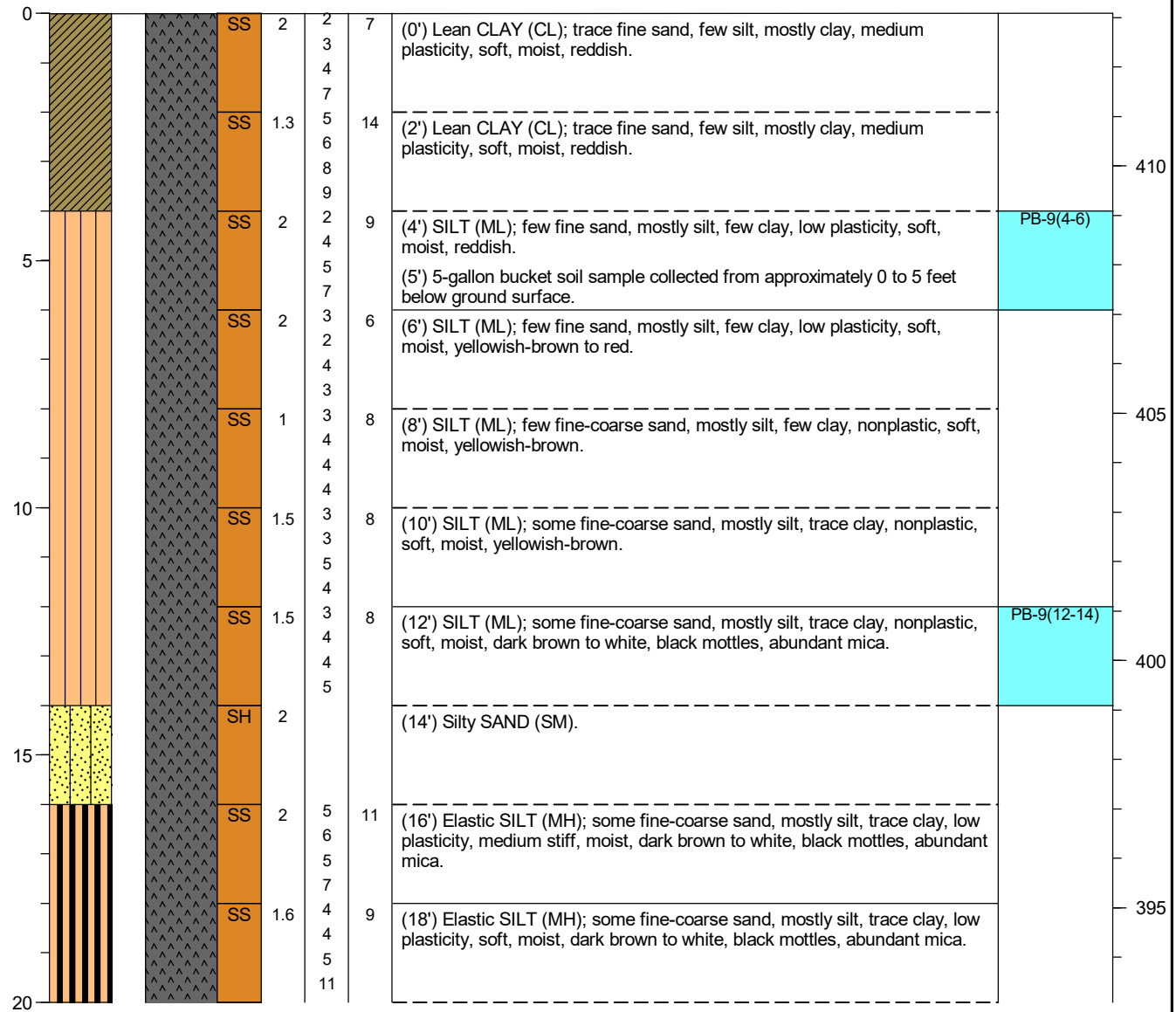
Drilling Start Date:	12/09/2018	Boring Depth (ft):	31
Drilling End Date:	12/10/2018	Boring Diameter (in):	6.50
Drilling Company:	Thompson Engineering	Sampling Method(s):	SS/SH
Drilling Method:	Hollow Stem Auger	Static Water Level (ft):	NA
Drilling Equipment:	D-50	DTW After Drilling (ft):	NA
Driller:	Phil Pitts	Ground Surface Elev. (ft):	413.09
Logged By:	Nardos Tilahun	Location (X,Y):	1162754.16, 2557580.83



DEPTH (ft)	Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	Lab Sample	ELEVATION (ft)
0	SS	2	2 3 4	7	(0') Lean CLAY (CL); trace fine sand, few silt, mostly clay, medium plasticity, soft, moist, reddish.		
	SS	1.3	7 5 6	14	(2') Lean CLAY (CL); trace fine sand, few silt, mostly clay, medium plasticity, soft, moist, reddish.		410
5	SS	2	8 9 2	9	(4') SILT (ML); few fine sand, mostly silt, few clay, low plasticity, soft, moist, reddish. (5') 5-gallon bucket soil sample collected from approximately 0 to 5 feet below ground surface.	PB-9(4-6)	
	SS	2	4 5 7	6	(6') SILT (ML); few fine sand, mostly silt, few clay, low plasticity, soft, moist, yellowish-brown to red.		
	SS	1	3 2 4	8	(8') SILT (ML); few fine-coarse sand, mostly silt, few clay, nonplastic, soft, moist, yellowish-brown.		405
10	SS	1.5	3 3 4	8	(10') SILT (ML); some fine-coarse sand, mostly silt, trace clay, nonplastic, soft, moist, yellowish-brown.		
	SS	1.5	4 3 3	8	(12') SILT (ML); some fine-coarse sand, mostly silt, trace clay, nonplastic, soft, moist, dark brown to white, black mottles, abundant mica.	PB-9(12-14)	
	SH	2	5 4 4 5		(14') Silty SAND (SM).		400
15	SS	2	5 6 5	11	(16') Elastic SILT (MH); some fine-coarse sand, mostly silt, trace clay, low plasticity, medium stiff, moist, dark brown to white, black mottles, abundant mica.		
	SS	1.6	7 4 4	9	(18') Elastic SILT (MH); some fine-coarse sand, mostly silt, trace clay, low plasticity, soft, moist, dark brown to white, black mottles, abundant mica.		395
20			5 11				

NOTES: NA = Not Applicable

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BORING LOG
Boring No. PB-9
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Drilling Start Date:	**12/09/2018**	Boring Depth (ft):	**31**
Drilling End Date:	**12/10/2018**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**413.09**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1162754.16, 2557580.83**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEVATION (ft)
20				SS	1.4	6 6 6 9	12	(20') SILT (ML); some fine-coarse sand, mostly silt, few clay, nonplastic, medium stiff, moist, light to dark brown, black mottles, weathered quartz rock fragments, abundant mica. 5-gallon bucket soil sample collected from approximately 15 to 20 feet below ground surface.		
				SS	1.2	5 6 7 15	13	(22') SILT (ML); some fine-coarse sand, mostly silt, few clay, nonplastic, medium stiff, moist, light brown to grayish-white, black mottles, weathered quartz rock fragments, abundant mica.	PB-9(22-24)	390
				SS	1.4	6 8 11 15	19	(24') SILT (ML); some fine-coarse sand, mostly silt, few clay, nonplastic, medium stiff, moist, light brown to grayish-white, black mottles, weathered quartz rock fragments, abundant mica, laminated.		
25				SS	1.3	18 28 22 14	50	(26') Silty SAND (SM); mostly fine-medium grained sand, some silt, trace clay, poorly graded, dense, moist, white brown to light gray, black mottles, some mica.	PB-9(26-28)	
				SS	1.1	11 43 50/1.5	93	(28') Silty SAND (SM); mostly fine-medium grained sand, some silt, trace clay, poorly graded, very dense, moist, light brown to light gray , black mottles, some mica.		385
								(29') Top of PWR.		
30				SS	0.3	50/4		(30') Silty SAND (SM); mostly fine-medium grained sand, some silt, trace clay, poorly graded, very dense, moist, light gray to white, black mottles, some mica.		
								(31') Auger Refusal. Boring terminated.		380
35										

NOTES: NA = Not Applicable

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WELL LOG
Well No. PB-10S/PB-10D
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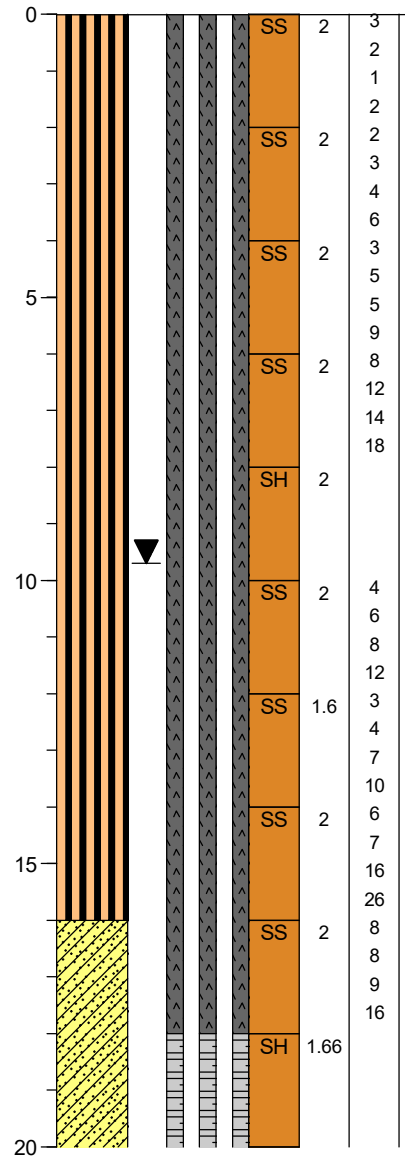
Drilling Start Date:	01/16/2019	Boring Depth (ft):	91	Well Depth (ft):	33/85
Drilling End Date:	01/17/2019	Boring Diameter (in):	6.50	Well Diam. (in)/Screen Slot (in):	2.0/0.010
Drilling Company:	Thompson Engineering	Static Water Level (ft):	9.91/10.04	Riser Material:	Sch 40 PVC
Drilling Method:	Hollow Stem Auger	DTW After Drilling (ft):	9.70/9.70	Screen Material:	Sch 40 PVC Slotted
Drilling Equipment:	D-50	Top of Casing Elev. (ft)	400.94/400.33	Sanitary Seal:	Bentonite Pellets
Driller:	Phil Pitts	Ground Elev. (ft):	398.04/397.98	Filter Pack:	Sand
Logged By:	Nardos Tilahun	Location (X,Y):	1163593.00, 2558546.51	Sampling Method(s):	SS/SH/CO



DEPTH (ft)	Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	Lab Sample	ELEV. (ft msl)
0	SS	2	3 2 1 2	3	(0') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, very soft, moist, reddish, some roots.	PB-10 (0-2)	
	SS	2	2 3 4 6	7	(2') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, soft, moist, reddish.	PB-10 (2-4)	395
	SS	2	3 5 5 9	10	(4') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, soft, moist, yellowish-brown. (5') 5-gallon bucket soil sample collected from approximately 0 to 5 feet below ground surface.	PB-10 (4-6)	
5	SS	2	8 12 14 18	26	(6') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, medium stiff, moist, yellowish-brown, black mottles.	PB-10 (6-8)	
	SH	2					390
					(10') CEC		
10	SS	2	4 6 8 12	14	(10') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, medium stiff, wet, yellowish-brown, few mica.	PB-10 (10-12)	
	SS	1.6	3 4 7 10	11	(12') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, low plasticity, medium stiff, wet, yellowish-brown, abundant mica.	PB-10 (12-14)	385
	SS	2	6 7 16 26	23	(14') Elastic SILT (MH); few fine-coarse sand, mostly silt, few clay, medium plasticity, medium stiff, wet, light gray to light brown, abundant mica. (15') 5-gallon bucket soil sample collected from approximately 10 to 15 feet below ground surface.	PB-10 (14-16)	
15	SS	2	8 8 9 16	17	(16') Clayey SAND (SC); mostly fine grained sand, trace silt, some clay, medium dense, wet, greenish-gray, abundant mica.	PB-10 (16-18)	
	SH	1.66					380
20					(20') CEC		

NOTES: PB-10S and PB-10D are stickup wells, PB-10S is ~10ft away from PB-10D well. Depth to water at PB-10S is 9.7 feet below ground surface.
NA = Not Applicable

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WELL LOG
Well No. PB-10S/PB-10D
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Drilling Start Date:	**01/16/2019**	Boring Depth (ft):	**91**	Well Depth (ft):	**33/85**
Drilling End Date:	**01/17/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**9.91/10.04**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**9.70/9.70**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**400.94/400.33**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**398.04/397.98**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163593.00, 2558546.51**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
20				SS	2	4 8 11 11	19	(20') Clayey SAND (SC); mostly fine grained sand, trace silt, some clay, medium dense, wet, greenish-gray to light brown, black mottles, abundant mica. 5-gallon bucket soil sample collected from approximately 15 to 20 feet below ground surface.	PB-10 (20-22)	
				SS	1.6	3 7 30 46	37	(22') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, few clay, dense, wet, light brown, abundant mica.	PB-10 (22-24)	375
25				SS	1.4	41 26 46 50/3	72	(24') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, few clay, very dense, wet, light brown, abundant mica.	PB-10 (24-26)	
				SS	0.3	50/5		(26') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, few clay, very dense, wet, light brown, abundant mica.	PB-10 (26-28)	370
30				SS	0.3	50/3		(30') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, few clay, very dense, wet, dark brown, abundant mica.	PB-10 (30-32)	365
35				SS	0.3	50/3		(35') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, few clay, very dense, wet, dark brown, abundant mica, soft drilling (30-35).	PB-10 (35-37)	360
40										

NOTES: PB-10S and PB-10D are stickup wells, PB-10S is ~10ft away from PB-10D well. Depth to water at PB-10S is 9.7 feet below ground surface.
NA = Not Applicable

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WELL LOG
Well No. PB-10S/PB-10D
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Drilling Start Date:	**01/16/2019**	Boring Depth (ft):	**91**	Well Depth (ft):	**33/85**
Drilling End Date:	**01/17/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**9.91/10.04**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**9.70/9.70**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**400.94/400.33**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**398.04/397.98**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163593.00, 2558546.51**	Sampling Method(s):	**SS/SH/CO**

NOTES: PB-10S and PB-10D are stickup wells, PB-10S is ~10ft away from PB-10D well. Depth to water at PB-10S is 9.7 feet below ground surface.
NA = Not Applicable

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WELL LOG
Well No. PB-10S/PB-10D
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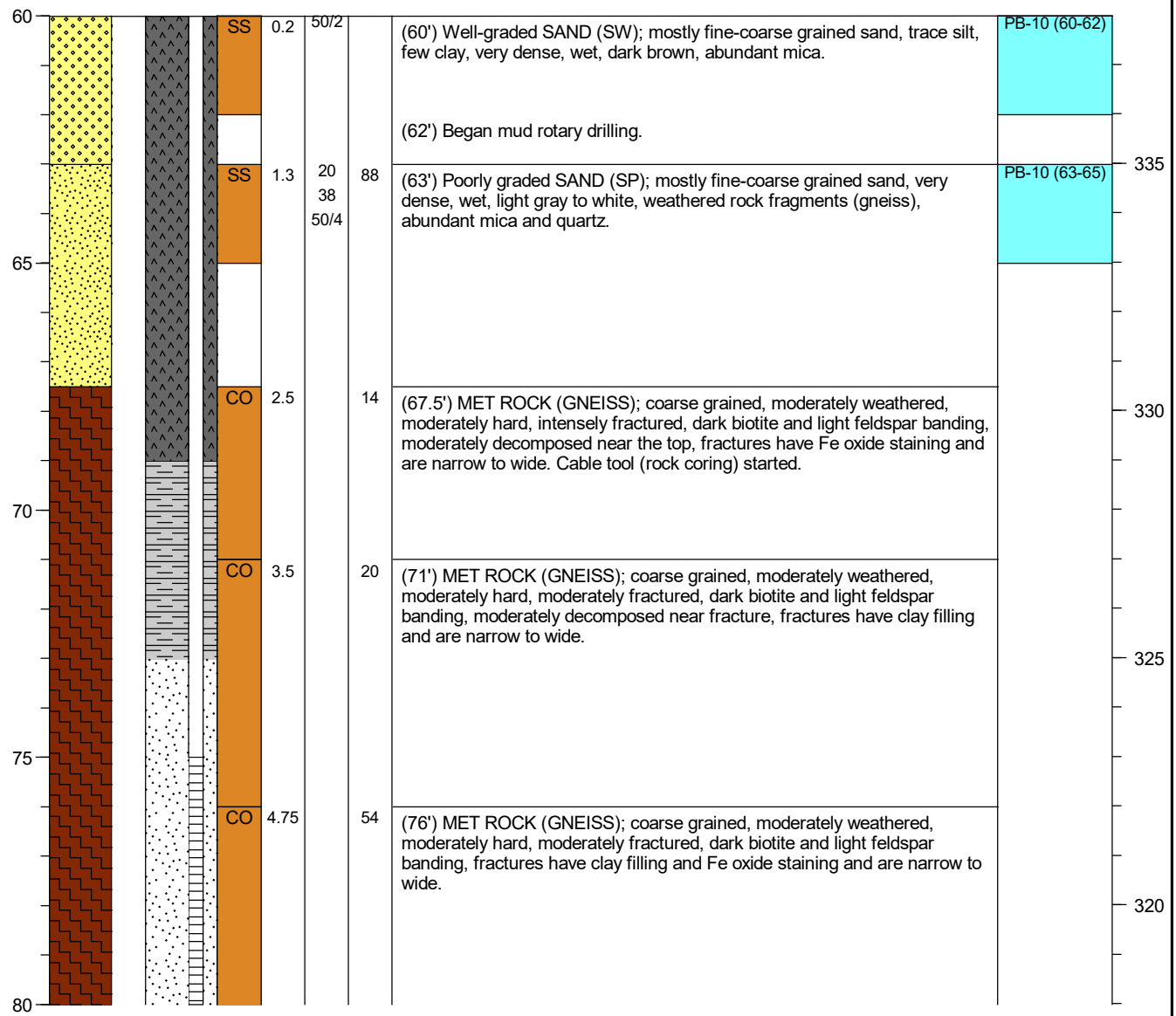
Drilling Start Date:	**01/16/2019**	Boring Depth (ft):	**91**	Well Depth (ft):	**33/85**
Drilling End Date:	**01/17/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**9.91/10.04**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**9.70/9.70**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**400.94/400.33**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**398.04/397.98**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163593.00, 2558546.51**	Sampling Method(s):	**SS/SH/CO**



NOTES: PB-10S and PB-10D are stickup wells, PB-10S is ~10ft away from PB-10D well. Depth to water at PB-10S is 9.7 feet below ground surface.
NA = Not Applicable

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WELL LOG
Well No. PB-10S/PB-10D
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Drilling Start Date:	**01/16/2019**	Boring Depth (ft):	**91**	Well Depth (ft):	**33/85**
Drilling End Date:	**01/17/2019**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**9.91/10.04**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**9.70/9.70**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**400.94/400.33**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**398.04/397.98**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163593.00, 2558546.51**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
80										
				CO	4.5		80	(81') MET ROCK (GNEISS); coarse grained, moderately weathered, moderately hard, moderately fractured, dark biotite and light feldspar banding, moderately decomposed near the fracture, fractures have Fe oxide staining and are narrow to wide, weathered fracture zone (81-81.5 ft).		315
85				CO	5		100	(86') MET ROCK (GNEISS); coarse grained, fresh, hard, unfractured, competent, mechanical break.		310
90								(91') Boring terminated.		305
95										

NOTES: PB-10S and PB-10D are stickup wells, PB-10S is ~10ft away from PB-10D well. Depth to water at PB-10S is 9.7 feet below ground surface.
NA = Not Applicable

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BORING LOG

Boring No. PB-11

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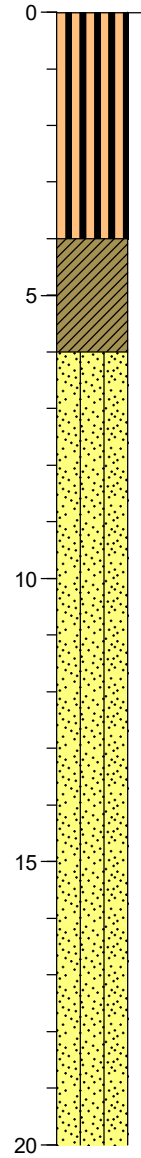
Drilling Start Date:	**12/07/2018**	Boring Depth (ft):	**46**
Drilling End Date:	**12/09/2018**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**410.42**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163856.34, 2557923.26**



DEPTH (ft)	Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	Lab Sample	ELEVATION (ft)
0	SS	2	2 3 5 5	8	(0') Elastic SILT (MH); few fine sand, mostly silt, few clay, low plasticity, soft, moist, reddish, abundant mica.		410
	SS	1.5	3 5 8 11	13	(2') Elastic SILT (MH); few fine sand, mostly silt, few clay, low plasticity, soft, moist, reddish, abundant mica, black mottles.	PB-11(2-4)	
5	SS	1.5	5 5 4 7	9	(4') Lean CLAY (CL); few fine sand, some silt, mostly clay, medium plasticity, soft, moist, yellowish-brown to red, abundant mica. (5') 5-gallon bucket soil sample collected from approximately 0 to 5 feet below ground surface.	PB-11(4-6)	405
	SS	2	4 4 5 6	9	(6') Silty SAND (SM); mostly fine grained sand, some silt, few clay, moist, yellowish-brown, black mottles.	PB-11(6-8)	
	SS	1.6	3 4 4 5	8	(8') Silty SAND (SM); mostly fine grained sand, some silt, few clay, moist, yellowish-brown, black mottles.		
10	SS	2	4 4 5 7	9	(10') Silty SAND (SM); mostly fine-coarse grained sand, some silt, few clay, loose, moist, yellowish-brown to dark brown, black mottles, white quartz.	PB-11(10-12)	400
	SH	2			(12') Silty SAND (SM); 5-gallon bucket soil sample collected from approximately 7 to 12 feet below ground surface.		
15	SS	2	6 6 8 7	14	(14') Silty SAND (SM); mostly fine-medium grained sand, some silt, trace clay, medium dense, moist, brownish-white.	PB-11(14-16)	395
	SS	2	6 7 9 11	16	(16') Silty SAND (SM); mostly fine-medium grained sand, some silt, trace clay, medium dense, moist, brownish-white, black mottles.		
	SS	2	7 5 7 10	12	(18') Silty SAND (SM); mostly fine-medium grained sand, some silt, trace clay, medium dense, moist, brownish-white, black mottles.		
20							

NOTES: NA = Not Applicable

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BORING LOG
Boring No. PB-11
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Drilling Start Date:	12/07/2018	Boring Depth (ft):	46
Drilling End Date:	12/09/2018	Boring Diameter (in):	6.50
Drilling Company:	Thompson Engineering	Sampling Method(s):	SS/SH
Drilling Method:	Hollow Stem Auger	Static Water Level (ft):	NA
Drilling Equipment:	D-50	DTW After Drilling (ft):	NA
Driller:	Phil Pitts	Ground Surface Elev. (ft):	410.42
Logged By:	Nardos Tilahun	Location (X,Y):	1163856.34, 2557923.26

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT: Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEVATION (ft)
20				SS	2	6 6 7 9	13	(20') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, medium dense, moist, grayish-white, black mottles.		390
				SS	2	8 8 8 11	16	(22') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, medium dense, moist, grayish-white, black mottles.		
25				SS	2	6 10 10 10	20	(24') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, medium dense, moist, grayish-white to white to gray, black mottles, mica, laminated.	PB-11(24-26)	385
				SS	1.5	8 10 14 17	24	(26') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, medium dense, moist, grayish-white to white to gray, black mottles, mica, laminated.		
				SS	2	12 13 17 20	30	(28') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, medium dense, moist, grayish-white, black mottles.		
30				SS	1.3	8 10 13 22	23	(30') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, medium dense, moist, grayish-white, black mottles.		380
				SS	1.5	3 6 10 13	16	(32') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, medium dense, moist, grayish-white, black mottles, laminated.		
				SS	1.8	10 14 20 19	34	(34') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, dense, moist, grayish-white, black mottles, laminated.		
35				SS	1	12 16 17 31	33	(36') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, dense, wet, grayish-white, laminated, weathered quartz rock fragment.		375
				SS	1.1	5 5 11 16	16	(38') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, dense, wet, grayish-white, laminated.		
40										

NOTES: NA = Not Applicable

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BORING LOG
Boring No. PB-11
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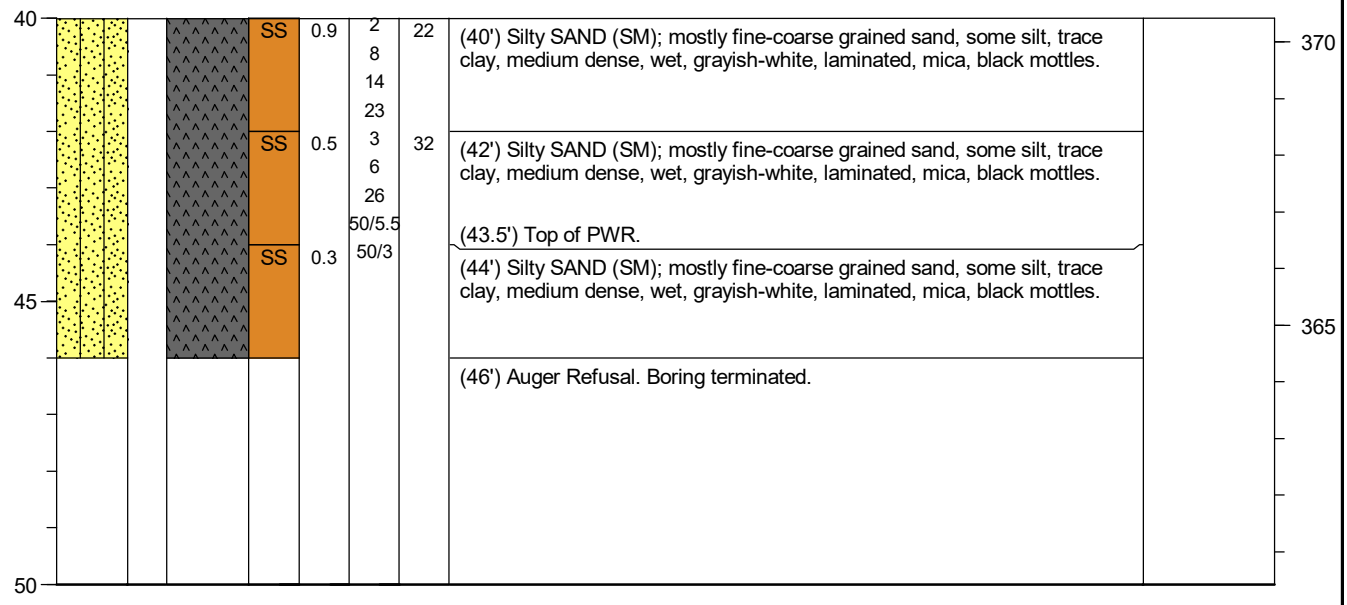
Drilling Start Date:	**12/07/2018**	Boring Depth (ft):	**46**
Drilling End Date:	**12/09/2018**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**410.42**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1163856.34, 2557923.26**



DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEVATION (ft)
40				SS	0.9	2 8 14 23	22	(40') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, medium dense, wet, grayish-white, laminated, mica, black mottles.		370
				SS	0.5	3 6 26 50/5.5	32	(42') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, medium dense, wet, grayish-white, laminated, mica, black mottles. (43.5') Top of PWR.		
45				SS	0.3	50/3		(44') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, medium dense, wet, grayish-white, laminated, mica, black mottles.		365
50								(46') Auger Refusal. Boring terminated.		

NOTES: NA = Not Applicable

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BORING LOG
Boring No. PB-12
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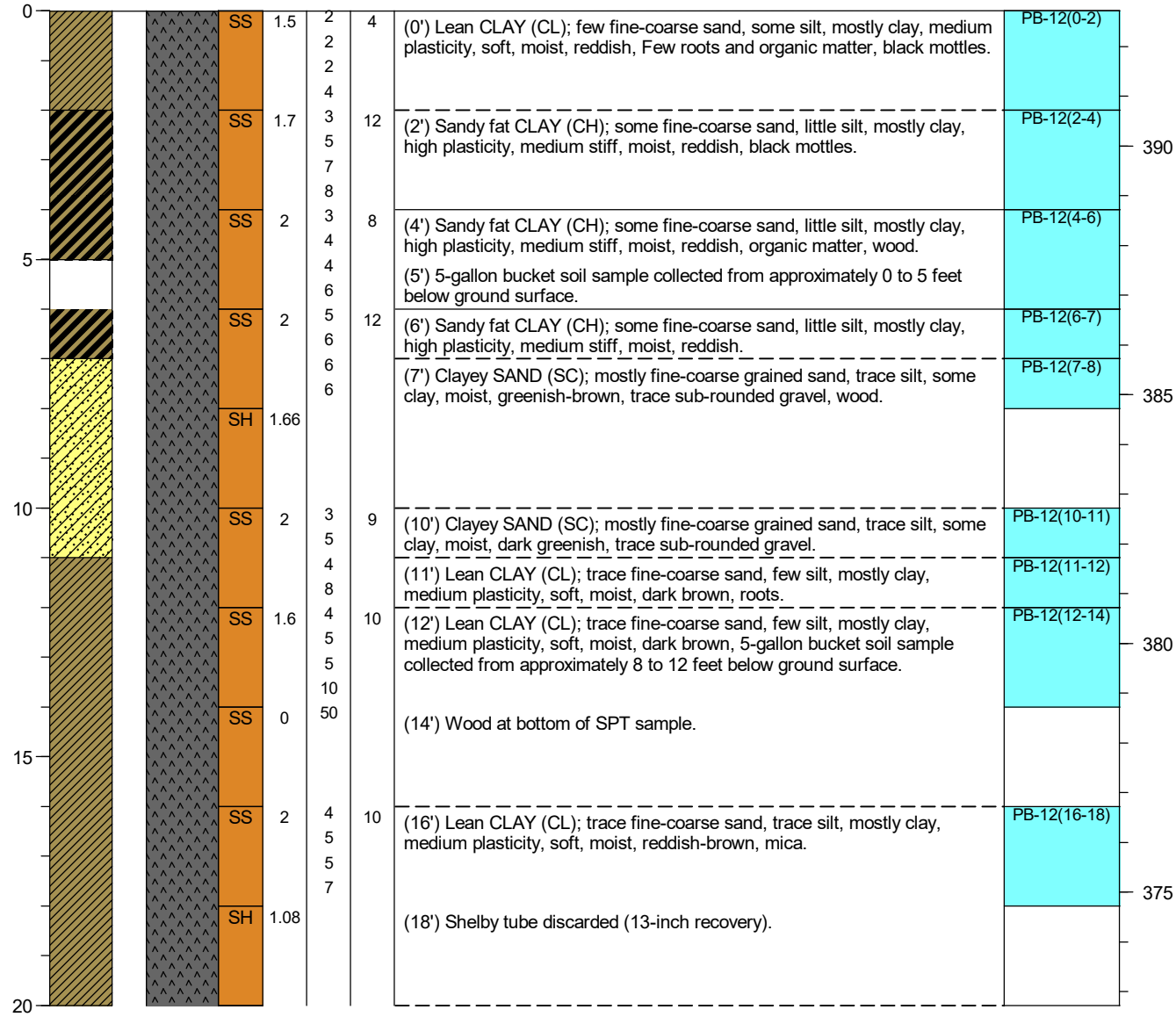
Drilling Start Date:	01/15/2019	Boring Depth (ft):	51
Drilling End Date:	01/15/2019	Boring Diameter (in):	6.50
Drilling Company:	Thompson Engineering	Sampling Method(s):	SS/SH
Drilling Method:	Hollow Stem Auger	Static Water Level (ft):	NA
Drilling Equipment:	D-50	DTW After Drilling (ft):	NA
Driller:	Phil Pitts	Ground Surface Elev. (ft):	392.72
Logged By:	Nardos Tilahun	Location (X,Y):	1162629.04, 2556585.18



DEPTH (ft)	Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	Lab Sample	ELEVATION (ft)
0	SS	1.5	2 2 2	4	(0') Lean CLAY (CL); few fine-coarse sand, some silt, mostly clay, medium plasticity, soft, moist, reddish, Few roots and organic matter, black mottles.	PB-12(0-2)	
	SS	1.7	4 3 5	12	(2') Sandy fat CLAY (CH); some fine-coarse sand, little silt, mostly clay, high plasticity, medium stiff, moist, reddish, black mottles.	PB-12(2-4)	390
5	SS	2	7 8 3	8	(4') Sandy fat CLAY (CH); some fine-coarse sand, little silt, mostly clay, high plasticity, medium stiff, moist, reddish, organic matter, wood.	PB-12(4-6)	
					(5') 5-gallon bucket soil sample collected from approximately 0 to 5 feet below ground surface.		
	SS	2	4 4 6	12	(6') Sandy fat CLAY (CH); some fine-coarse sand, little silt, mostly clay, high plasticity, medium stiff, moist, reddish.	PB-12(6-7)	
			5 6 6 6		(7') Clayey SAND (SC); mostly fine-coarse grained sand, trace silt, some clay, moist, greenish-brown, trace sub-rounded gravel, wood.	PB-12(7-8)	385
	SH	1.66					
10	SS	2	3 5 4	9	(10') Clayey SAND (SC); mostly fine-coarse grained sand, trace silt, some clay, moist, dark greenish, trace sub-rounded gravel.	PB-12(10-11)	
			8		(11') Lean CLAY (CL); trace fine-coarse sand, few silt, mostly clay, medium plasticity, soft, moist, dark brown, roots.	PB-12(11-12)	
	SS	1.6	4 5 5	10	(12') Lean CLAY (CL); trace fine-coarse sand, few silt, mostly clay, medium plasticity, soft, moist, dark brown, 5-gallon bucket soil sample collected from approximately 8 to 12 feet below ground surface.	PB-12(12-14)	380
	SS	0	10 50		(14') Wood at bottom of SPT sample.		
15	SS	2	4 5 5	10	(16') Lean CLAY (CL); trace fine-coarse sand, trace silt, mostly clay, medium plasticity, soft, moist, reddish-brown, mica.	PB-12(16-18)	
			7				375
	SH	1.08			(18') Shelby tube discarded (13-inch recovery).		
20							

NOTES: NA = Not Applicable

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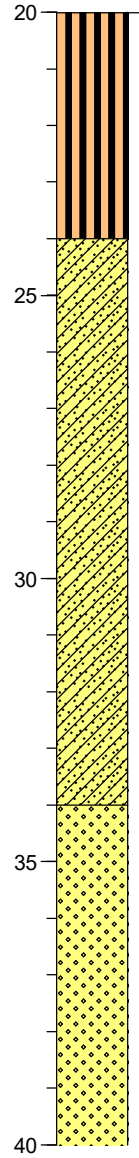
Address: 1100 Milledgeville Rd, Milledgeville

BORING LOG
Boring No. PB-12
Page: 2 of 3

Drilling Start Date:	**01/15/2019**	Boring Depth (ft):	**51**
Drilling End Date:	**01/15/2019**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**392.72**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1162629.04, 2556585.18**



DEPTH (ft)	COLLECT: Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEVATION (ft)
20	SS	2	4 6 7 12	13	(20') Elastic SILT with sand (MH); some fine-coarse sand, mostly silt, little clay, medium plasticity, medium stiff, moist, reddish-brown, wood at the top.	PB-12(20-22)	
	SH	2			(22') 5-gallon bucket soil sample collected from approximately 16 to 22 feet below ground surface.	PB-12(22-24)	370
25	SS	1.5	6 8 8 13	16	(24') Clayey SAND (SC); mostly fine-coarse grained sand, trace silt, some clay, medium dense, moist, yellowish-brown, mica.	PB-12(24-26)	
	SS	1.5	7 9 11 14	20	(26') Clayey SAND (SC); mostly fine-coarse grained sand, trace silt, some clay, well-graded, medium dense, wet, yellowish-brown, trace fine to coarse angular gravel.	PB-12(26-28)	365
	SS	1.2	6 7 11 14	18	(28') Clayey SAND (SC); mostly fine-coarse grained sand, trace silt, some clay, well-graded, medium dense, wet, yellowish-brown.	PB-12(28-30)	
30	SS	1.3	10 11 14 16	25	(30') Clayey SAND (SC); mostly fine-coarse grained sand, trace silt, some clay, well-graded, medium dense, wet, yellowish-brown.	PB-12(30-32)	
	SH	2					360
	SS	1	10 13 13 14	26	(34') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, well-graded, medium dense, wet, yellowish-brown, black mottles, abundant mica.	PB-12(34-36)	
35	SS	1.4	8 13 18 26	31	(36') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, well-graded, dense, wet, yellowish-brown, black mottles, abundant mica.	PB-12(36-38)	355
	SS	1.2	13 15 16 28	31	(38') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, well-graded, dense, wet, yellowish-brown, black mottles, abundant mica.	PB-12(38-40)	
40							

NOTES: NA = Not Applicable

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BORING LOG
Boring No. PB-12
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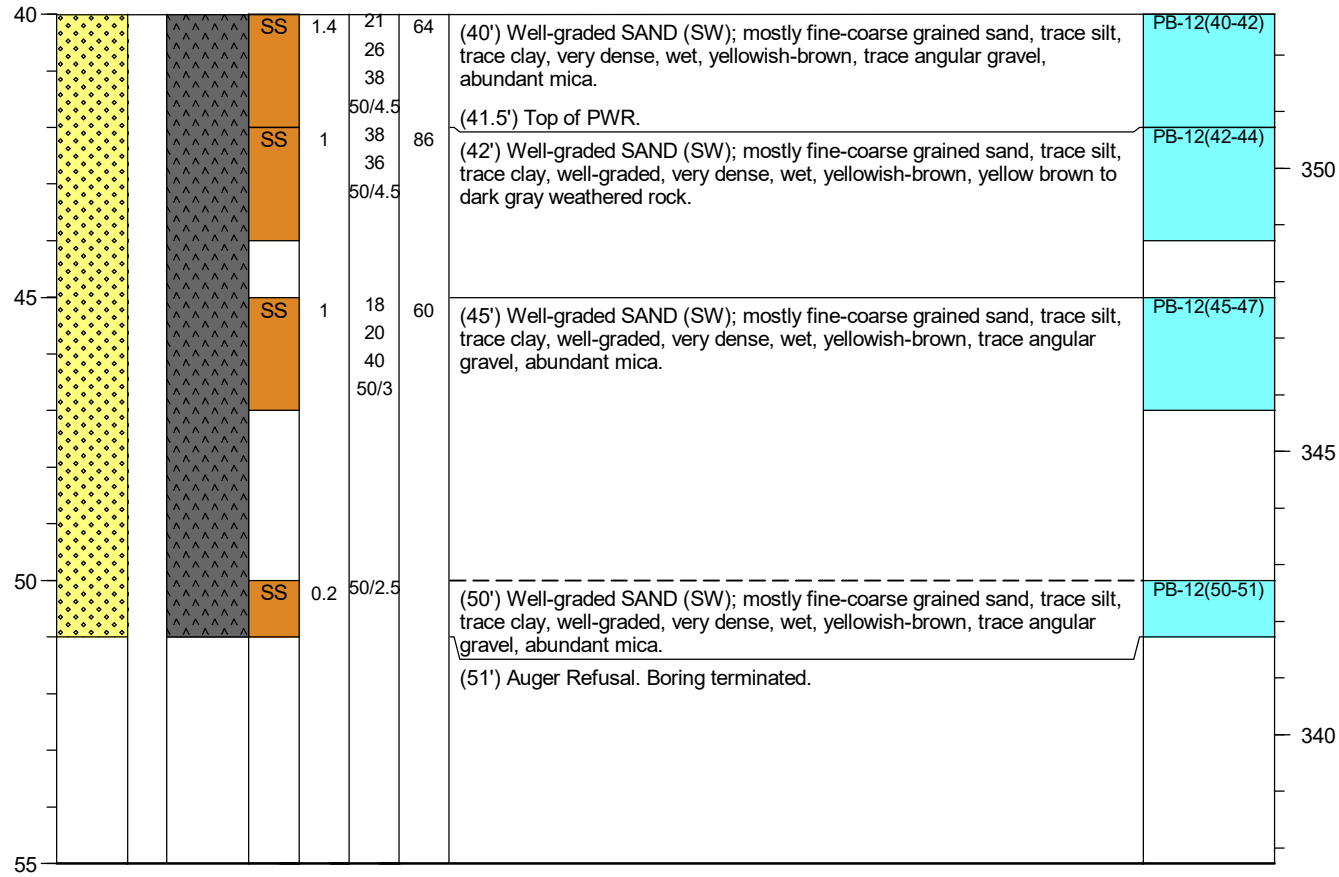
Drilling Start Date:	**01/15/2019**	Boring Depth (ft):	**51**
Drilling End Date:	**01/15/2019**	Boring Diameter (in):	**6.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Hollow Stem Auger**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Phil Pitts**	Ground Surface Elev. (ft):	**392.72**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1162629.04, 2556585.18**



NOTES: NA = Not Applicable

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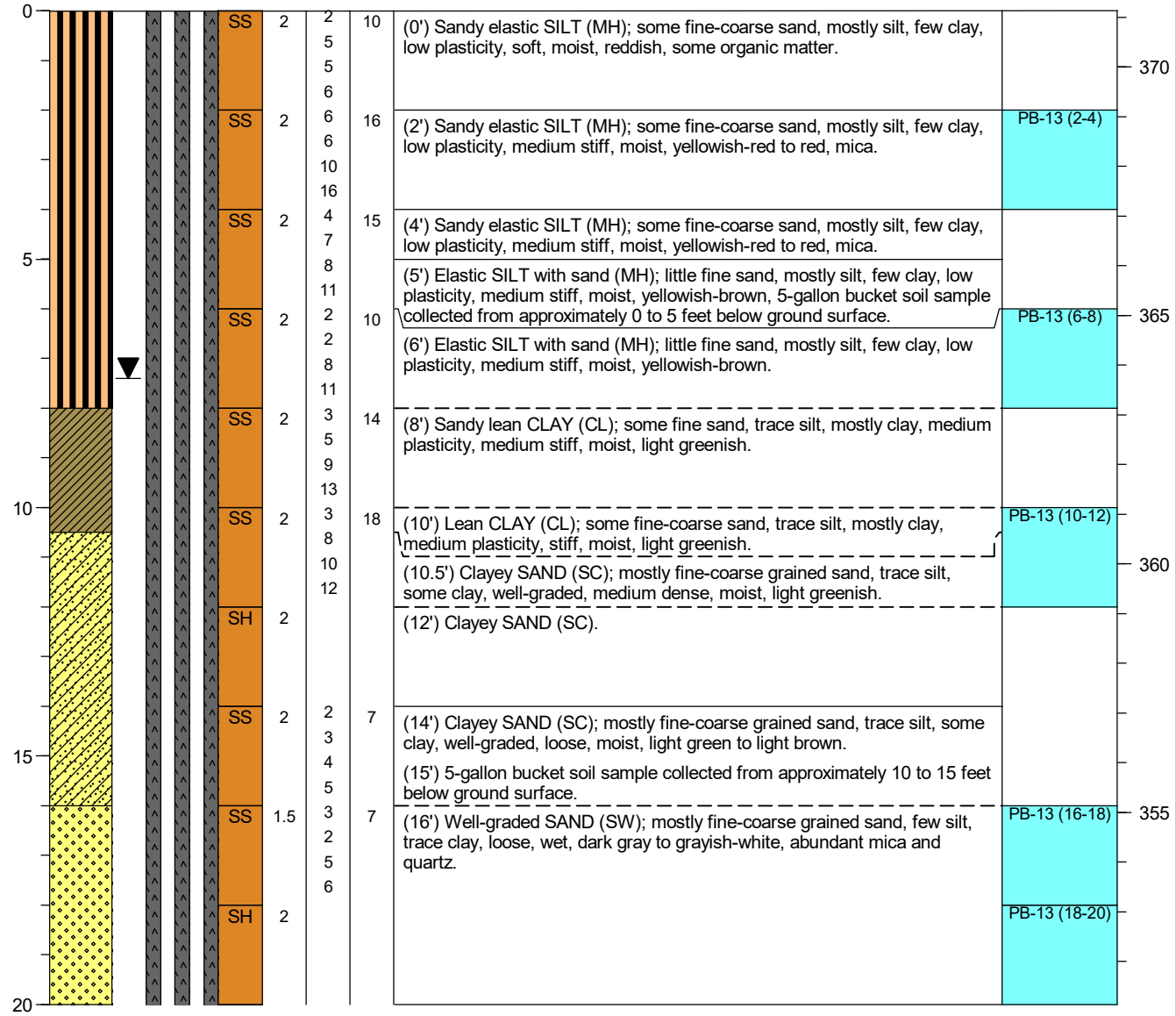
WELL LOG
Well No. PB-13S/PB-13D
Page: 1 of 6

Drilling Start Date:	12/10/2018	Boring Depth (ft):	107.8	Well Depth (ft):	50/97
Drilling End Date:	12/18/2018	Boring Diameter (in):	6.50	Well Diam. (in)/Screen Slot (in):	2.0/0.010
Drilling Company:	Thompson Engineering	Static Water Level (ft):	7.19/7.74	Riser Material:	Sch 40 PVC
Drilling Method:	Hollow Stem Auger	DTW After Drilling (ft):	7.40/7.40	Screen Material:	Sch 40 PVC Slotted
Drilling Equipment:	D-50	Top of Casing Elev. (ft)	373.38/373.83	Sanitary Seal:	Bentonite Pellets
Driller:	Phil Pitts	Ground Elev. (ft):	370.88/371.13	Filter Pack:	Sand
Logged By:	Nardos Tilahun	Location (X,Y):	1162084.45, 2556638.75	Sampling Method(s):	SS/SH/CO



DEPTH (ft)	Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	Lab Sample	ELEV. (ft msl)
0	SS	2	2 5 5 6	10	(0') Sandy elastic SILT (MH); some fine-coarse sand, mostly silt, few clay, low plasticity, soft, moist, reddish, some organic matter.		370
	SS	2	6 6 10 16	16	(2') Sandy elastic SILT (MH); some fine-coarse sand, mostly silt, few clay, low plasticity, medium stiff, moist, yellowish-red to red, mica.	PB-13 (2-4)	
	SS	2	4 7 8 11	15	(4') Sandy elastic SILT (MH); some fine-coarse sand, mostly silt, few clay, low plasticity, medium stiff, moist, yellowish-red to red, mica.		
5	SS	2	2 2 8 11	10	(5') Elastic SILT with sand (MH); little fine sand, mostly silt, few clay, low plasticity, medium stiff, moist, yellowish-brown, 5-gallon bucket soil sample collected from approximately 0 to 5 feet below ground surface.	PB-13 (6-8)	365
					(6') Elastic SILT with sand (MH); little fine sand, mostly silt, few clay, low plasticity, medium stiff, moist, yellowish-brown.		
	SS	2	3 5 9 13	14	(8') Sandy lean CLAY (CL); some fine sand, trace silt, mostly clay, medium plasticity, medium stiff, moist, light greenish.		
10	SS	2	3 8 10 12	18	(10') Lean CLAY (CL); some fine-coarse sand, trace silt, mostly clay, medium plasticity, stiff, moist, light greenish.	PB-13 (10-12)	360
					(10.5') Clayey SAND (SC); mostly fine-coarse grained sand, trace silt, some clay, well-graded, medium dense, moist, light greenish.		
	SH	2			(12') Clayey SAND (SC).		
	SS	2	2 3 4 5	7	(14') Clayey SAND (SC); mostly fine-coarse grained sand, trace silt, some clay, well-graded, loose, moist, light green to light brown.		
15					(15') 5-gallon bucket soil sample collected from approximately 10 to 15 feet below ground surface.		
	SS	1.5	3 2 5 6	7	(16') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, trace clay, loose, wet, dark gray to grayish-white, abundant mica and quartz.	PB-13 (16-18)	355
	SH	2				PB-13 (18-20)	
20							

NOTES: PB-13S and PB-13D are stickup wells, PB-13S is ~10ft away from PB-13D well. Depth to water at PB-13S is 7.4 feet below ground surface.
NA = Not Applicable

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WELL LOG
Well No. PB-13S/PB-13D
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Drilling Start Date:	**12/10/2018**	Boring Depth (ft):	**107.8**	Well Depth (ft):	**50/97**
Drilling End Date:	**12/18/2018**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**7.19/7.74**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**7.40/7.40**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**373.38/373.83**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**370.88/371.13**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1162084.45, 2556638.75**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
20				SS	1.5	3 5 7 9	12	(20') Silty SAND (SM); mostly fine-medium grained sand, some silt, trace clay, poorly graded, medium dense, wet, light gray.		350
				SS	1.2	4 6 8 11	14	(22') Silty SAND (SM); mostly fine-medium grained sand, some silt, trace clay, poorly graded, medium dense, wet, light gray.		
				SS	0.8	4 7 9 10	16	(24') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white, abundant mica, 5-gallon bucket soil sample collected from approximately 20 to 24 feet below ground surface.		
25				SS	1	5 6 9 12	15	(26') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white to yellow gray.		345
				SS	0.8	2 5 7 9	12	(28') Well-graded SAND (SW); mostly fine-coarse grained sand, few silt, few clay, medium dense, wet, grayish-white to yellowish-gray, abundant mica and quartz.	PB-13 (28-30)	
30				SH	2				PB-13 (30-32)	340
				SS	0.7	9 13 15 14	28	(32') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white to white, abundant mica and quartz.		
				SS	0.8	5 8 15 15	23	(34') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white to white, abundant mica and quartz, laminated.		
35				SS	0.8	6 7 10 13	17	(36') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white to white, abundant mica and quartz, laminated.		335
				SS	1	6 7 10 13	17	(38') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white to white, abundant mica and quartz.		
40										

NOTES: PB-13S and PB-13D are stickup wells, PB-13S is ~10ft away from PB-13D well. Depth to water at PB-13S is 7.4 feet below ground surface.
NA = Not Applicable

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WELL LOG
Well No. PB-13S/PB-13D

Drilling Start Date:	**12/10/2018**	Boring Depth (ft):	**107.8**	Well Depth (ft):	**50/97**
Drilling End Date:	**12/18/2018**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**7.19/7.74**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**7.40/7.40**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**373.38/373.83**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**370.88/371.13**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1162084.45, 2556638.75**	Sampling Method(s):	**SS/SH/CO**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	WELL COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEV. (ft msl)
40				SS	0.8	8 10 13 18	23	(40') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, medium dense, wet, grayish-white to white, abundant mica and quartz.		330
				SS	1.3	7 7 9 16	16	(42') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, medium dense, wet, green to white, abundant mica and quartz.	PB-13 (42-44)	
45				SS	1	10 17 30 41	47	(44') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, dense, wet, greenish, abundant mica and quartz.		325
				SS	0.3	5 6 16 42	22	(46') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, medium dense, wet, green to white, abundant mica and quartz, laminated.		
				SS	1.1	32 26 31 43	57	(48') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, well-graded, very dense, wet, dark gray to dark brown to white, abundant mica and quartz, laminated.		320
50				SS	0.4	21 50/5	50	(53') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, very dense, wet, grayish-white, abundant mica and quartz, laminated, black mottles. (54') Top of PWR.		
55				SS	0.3	50/4		(58') Silty SAND (SM); mostly fine-coarse grained sand, some silt, trace clay, very dense, wet, grayish-white, abundant mica and quartz, laminated, black mottles.		315
60										

NOTES: PB-13S and PB-13D are stickup wells, PB-13S is ~10ft away from PB-13D well. Depth to water at PB-13S is 7.4 feet below ground surface.
NA = Not Applicable

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WELL LOG
Well No. PB-13S/PB-13D
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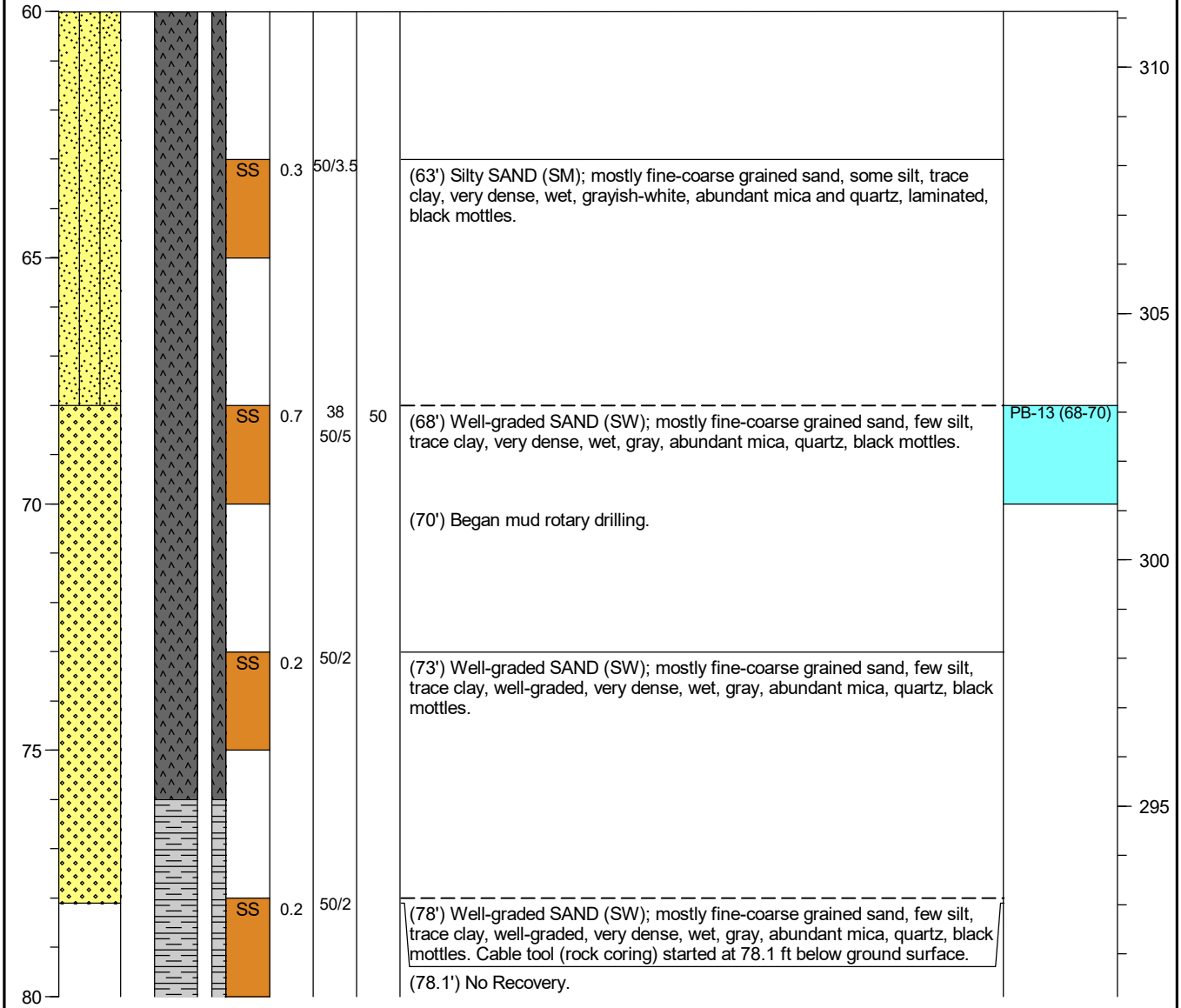
Drilling Start Date:	**12/10/2018**	Boring Depth (ft):	**107.8**	Well Depth (ft):	**50/97**
Drilling End Date:	**12/18/2018**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**7.19/7.74**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**7.40/7.40**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**373.38/373.83**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**370.88/371.13**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1162084.45, 2556638.75**	Sampling Method(s):	**SS/SH/CO**



NOTES: PB-13S and PB-13D are stickup wells, PB-13S is ~10ft away from PB-13D well. Depth to water at PB-13S is 7.4 feet below ground surface.
NA = Not Applicable

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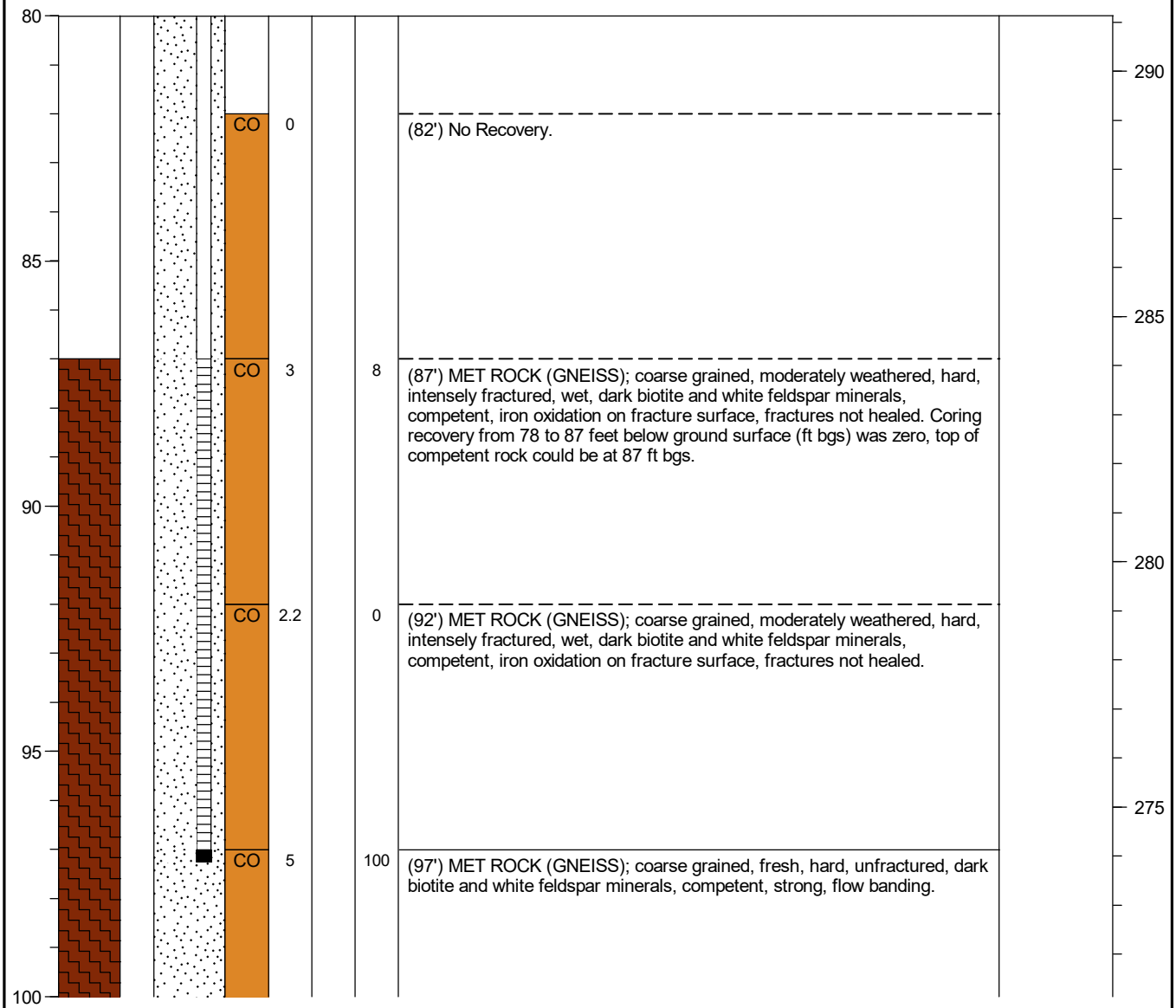
WELL LOG
Well No. PB-13S/PB-13D

Drilling Start Date:	**12/10/2018**	Boring Depth (ft):	**107.8**	Well Depth (ft):	**50/97**
Drilling End Date:	**12/18/2018**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**7.19/7.74**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**7.40/7.40**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**373.38/373.83**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**370.88/371.13**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1162084.45, 2556638.75**	Sampling Method(s):	**SS/SH/CO**



NOTES: PB-13S and PB-13D are stickup wells, PB-13S is ~10ft away from PB-13D well. Depth to water at PB-13S is 7.4 feet below ground surface.
NA = Not Applicable

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WELL LOG
Well No. PB-13S/PB-13D
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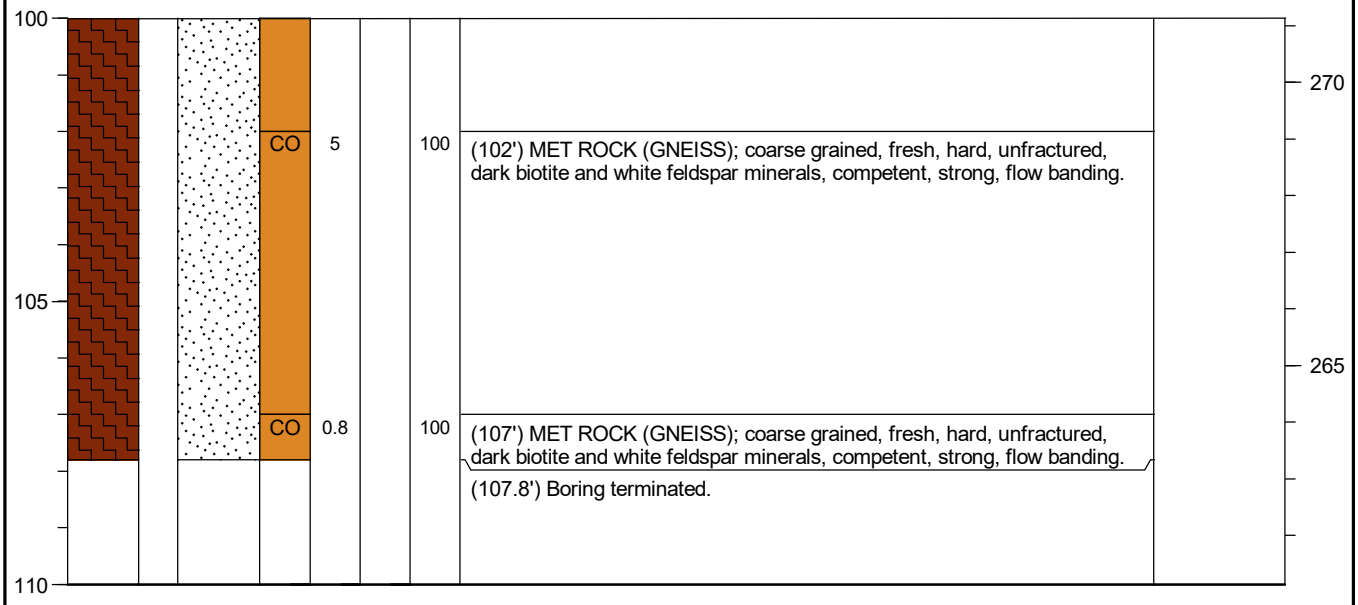
Drilling Start Date:	**12/10/2018**	Boring Depth (ft):	**107.8**	Well Depth (ft):	**50/97**
Drilling End Date:	**12/18/2018**	Boring Diameter (in):	**6.50**	Well Diam. (in)/Screen Slot (in):	**2.0/0.010**
Drilling Company:	**Thompson Engineering**	Static Water Level (ft):	**7.19/7.74**	Riser Material:	**Sch 40 PVC**
Drilling Method:	**Hollow Stem Auger**	DTW After Drilling (ft):	**7.40/7.40**	Screen Material:	**Sch 40 PVC Slotted**
Drilling Equipment:	**D-50**	Top of Casing Elev. (ft)	**373.38/373.83**	Sanitary Seal:	**Bentonite Pellets**
Driller:	**Phil Pitts**	Ground Elev. (ft):	**370.88/371.13**	Filter Pack:	**Sand**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1162084.45, 2556638.75**	Sampling Method(s):	**SS/SH/CO**



NOTES: PB-13S and PB-13D are stickup wells, PB-13S is ~10ft away from PB-13D well. Depth to water at PB-13S is 7.4 feet below ground surface.
NA = Not Applicable

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BORING LOG
Boring No. PB-14
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Drilling Start Date:	01/22/2019	Boring Depth (ft):	46
Drilling End Date:	01/23/2019	Boring Diameter (in):	3.50
Drilling Company:	Thompson Engineering	Sampling Method(s):	SS/SH
Drilling Method:	Mud Rotary	Static Water Level (ft):	NA
Drilling Equipment:	D-50	DTW After Drilling (ft):	NA
Driller:	Richard Blackstock	Ground Surface Elev. (ft):	407.1
Logged By:	Nardos Tilahun	Location (X,Y):	1162544.74, 2557951.78

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEVATION (ft)
0				SS	2	3 4 6 8	10	(0') Lean CLAY (CL); trace fine-medium sand, few silt, mostly clay, medium plasticity, soft, moist, reddish, some roots.	PB-14(0-2)	
				SS	2	6 9 13 15	22	(2') Lean CLAY (CL); trace fine sand, few silt, mostly clay, medium plasticity, stiff, moist, reddish, some yellow mottles and mica.	PB-14(2-4)	405
5				SS	2	4 5 7 8	12	(4') Lean CLAY (CL); trace fine sand, few silt, mostly clay, medium plasticity, stiff, moist, reddish, some yellow mottles and mica.	PB-14(4-6)	
				SS	2	4 4 6 8	10	(6') Lean CLAY (CL); few fine-coarse sand, few silt, mostly clay, medium plasticity, reddish, some mica.	PB-14(6-8)	
				SH	2				PB-14(8-10)	400
10				SS	1.6	1 1 2 4	3	(10') Sandy elastic SILT (MH); some fine-coarse sand, mostly silt, few clay, low plasticity, very soft, moist, reddish-brown, trace quarts and mica.	PB-14(10-12)	
				SH	1.66					395
				SS	1.6	1 1 2 2	3	(14') Sandy elastic SILT (MH); some fine-coarse sand, mostly silt, few clay, low plasticity, very soft, moist, yellowish-brown to yellowish-gray, abundant mica, black mottles.	PB-14(14-16)	
15				SS	2	1 2 2 3	4	(16') Sandy elastic SILT (MH); some fine-coarse sand, mostly silt, few clay, low plasticity, very soft, moist, yellowish-brown to yellowish-gray, abundant mica, black mottles.	PB-14(16-18)	
				SH	1.76					390
20										

NOTES: NA = Not Applicable

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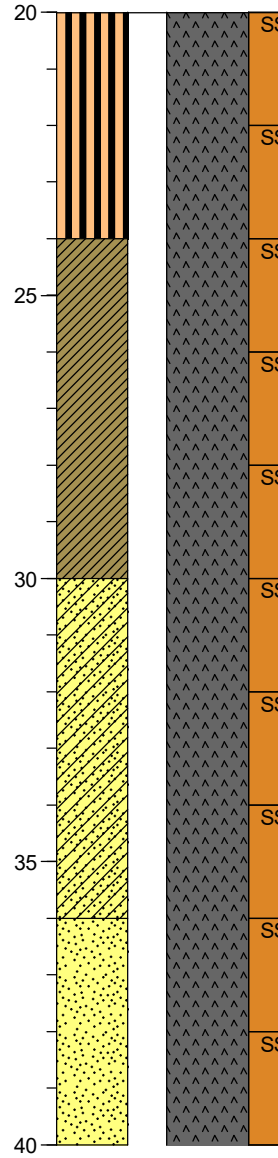
BORING LOG
Boring No. PB-14
Page: 2 of 3

Drilling Start Date:	01/22/2019	Boring Depth (ft):	46
Drilling End Date:	01/23/2019	Boring Diameter (in):	3.50
Drilling Company:	Thompson Engineering	Sampling Method(s):	SS/SH
Drilling Method:	Mud Rotary	Static Water Level (ft):	NA
Drilling Equipment:	D-50	DTW After Drilling (ft):	NA
Driller:	Richard Blackstock	Ground Surface Elev. (ft):	407.1
Logged By:	Nardos Tilahun	Location (X,Y):	1162544.74, 2557951.78



DEPTH (ft)	Sample Type	Recovery (ft)	Blow Counts	N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	Lab Sample	ELEVATION (ft)
20	SS	1.6	1 2 2 3	4	(20') Sandy elastic SILT (MH); some fine-coarse sand, few silt, few clay, low plasticity, very soft, moist, yellowish-gray to yellowish-brown, abundant mica, black mottles.	PB-14(20-22)	
	SS	1.5	2 3 3 5	6	(22') Sandy elastic SILT (MH); some fine-coarse sand, few silt, few clay, low plasticity, soft, moist, yellowish-gray to yellowish-brown, abundant mica, black mottles.	PB-14(22-24)	385
	SS	2	2 2 4 5	6	(24') Lean CLAY (CL); some fine-coarse sand, some silt, mostly clay, medium plasticity, soft, moist, yellowish-brown, abundant mica, black mottles.	PB-14(24-26)	
25	SS	2	2 4 5 6	9	(26') Lean CLAY (CL); some fine-coarse sand, some silt, mostly clay, medium plasticity, soft, moist, yellowish-brown, abundant mica, black mottles.	PB-12(26-28)	380
	SS	2	3 3 4 6	7	(28') Lean CLAY (CL); some fine-coarse sand, some silt, mostly clay, medium plasticity, soft, moist, yellowish-brown, abundant mica, black mottles.	PB-14(28-30)	
30	SS	2	3 5 6 8	11	(30') Clayey SAND (SC); mostly fine-medium grained sand, few silt, some clay, poorly graded, dense, wet, yellowish-brown, abundant mica, black mottles.	PB-14(30-32)	
	SS	2	3 5 6 9	11	(32') Clayey SAND (SC); mostly fine-medium grained sand, few silt, some clay, poorly graded, dense, wet, yellowish-brown, abundant mica, black mottles.	PB-14(32-34)	375
	SS	1.6	4 6 7 9	13	(34') Clayey SAND (SC); mostly fine-medium grained sand, few silt, some clay, poorly graded, dense, wet, yellowish-brown, abundant mica, black mottles.	PB-14(34-36)	
35	SS	1.6	7 10 10 17	20	(36') Poorly graded SAND (SP); mostly fine-medium grained sand, trace silt, trace clay, medium dense, moist, brown, abundant mica.	PB-14(36-38)	370
	SS	1.6	15 19 25 26	44	(38') Poorly graded SAND (SP); mostly fine-medium grained sand, trace silt, trace clay, medium dense, moist, yellowish-brown to gray, abundant mica, black mottles.	PB-14(38-40)	
40							

NOTES: NA = Not Applicable

Geosyntec consultants
engineers | scientists | innovators

Client: Georgia Power Company
Project: Plant Branch CCR Landfill Site Investigation
Address: 1100 Milledgeville Rd, Milledgeville

BORING LOG
Boring No. PB-14
Page: 3 of 3

Drilling Start Date:	**01/22/2019**	Boring Depth (ft):	**46**
Drilling End Date:	**01/23/2019**	Boring Diameter (in):	**3.50**
Drilling Company:	**Thompson Engineering**	Sampling Method(s):	**SS/SH**
Drilling Method:	**Mud Rotary**	Static Water Level (ft):	**NA**
Drilling Equipment:	**D-50**	DTW After Drilling (ft):	**NA**
Driller:	**Richard Blackstock**	Ground Surface Elev. (ft):	**407.1**
Logged By:	**Nardos Tilahun**	Location (X,Y):	**1162544.74, 2557951.78**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT: Sample Type	COLLECT: Recovery (ft)	COLLECT: Blow Counts	COLLECT: N Value RQD (%)	SOIL/ROCK VISUAL DESCRIPTION	MEASURE: Lab Sample	ELEVATION (ft)
40				SS	1.7	13 17 18 23	35	(40') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, dense, moist, whitish-brown, abundant mica.	PB-14(40-42)	
				SS	2	21 22 16 25	38	(42') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, dense, moist, brownish-white to dark gray, trace gravel.	PB-14(42-44)	365
45				SS	0.4	50/4.5		(44') Well-graded SAND (SW); mostly fine-coarse grained sand, trace silt, trace clay, very dense, moist, white to dark gray, abundant mica and quartz. Top of PWR.	PB-14(44-46)	
								(46') Top of rock. Boring terminated.		360
50										

NOTES: NA = Not Applicable

RECORD OF BOREHOLE PZ-52D

SHEET 1 of 2

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 59.50 ft
LOCATION: 13' west of BRGWC-33S

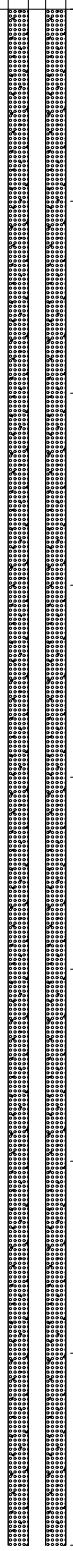
DRILL RIG: C 600 Track Mounted
DATE STARTED: 5/14/20
DATE COMPLETED: 5/14/20

NORTHING: 1,168,053.90
EASTING: 2,554,051.70
GS ELEVATION: 414.3
TOC ELEVATION: 417.03 ft

DEPTH W.L.: 46.5
ELEVATION W.L.: 367.8'
DATE W.L.: 5/15/2020
TIME W.L.: 0735

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0		0.00 - 10.00 Air knife hole, water level ~ 5 feet bgs from SCS during hole clearing			404.3			
10	405	10.00 - 11.00 silty CLAY, red 2.5 YR 5/8, wet, slightly plastic, cohesive, soft. Residual soil	CL		10.00 403.3			
		11.00 - 17.00 silty SAND, very fine to medium sand, 7.5 YR 4/6 strong brown, weathered biotite gneiss, SAPROLITE, subhorizontal foliation, micaceous, medium grained gneiss, moist to wet, cohesive, non-PLASTIC, firm. Poorly sorted medium grained sand (quartz and plagioclase) 0.1 ft thick lenses from 13 - 15.5 feet	SM		11.00 397.3	1	ROTO SONIC	10.00 7.00
15	400	17.00 - 20.00 silty SAND, very fine to medium sand, variegated white, brown, orange, very dark brown to black, SAPROLITE, weathered biotite gneiss, cohesive, stiff, non-plastic, mosit to wet. Quartz-plagioclase-biotite ferrous oxide oxidation throughout	SM		17.00 394.3	2	ROTO SONIC	10.00 10.00
20	395	20.00 - 28.00 SILTY SAND, very fine to medium sand, variegated white, brown, orange, very dark brown to black, SAPROLITE, weakly foliated, weatehred biotite gneiss, cohesive, stiff, non-plastic, mosit to wet quatz-plagioclase-biotite oxidation staining throughout	SM		20.00 386.3			
25	390	28.00 - 28.50 Transitional weathered rock (TWR), biotite gneiss	TWR		385.8 28.50			
30	385	28.50 - 37.00 BIOTITE GNEISS, medium grained, phaneritic hornblende-quartz-plagioclase-biotite. Foliation orientation varies from subhorizontal to near vertical, weakly foliated from 31.5-32 feet, oxidation staining throughout, white and black foliations at 31 ft, 32.5 ft, and 33.5 ft	GNIESS		377.3	3	ROTO SONIC	9.00 10.00
35	380	37.00 - 47.00 INTERLAYERED BIOTITE GNEISS AND TWR, poor recovery due to subsurface materials and drilling methodology, rock recovered is oxidized throughout and appears less coherent section above, fractured	GNIESS		37.00	4	ROTO SONIC	2.50 10.00
40	375	Log continued on next page						

PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 49.5'
Material: Sch 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 49.5' - 59.5'
Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen
Diameter: 2
Slot Size: 0.10
End Cap: 4"

FILTER PACK
Interval: 47' - 59.5'
Type: #1 Sand

FILTER PACK SEAL
Interval: 43' - 47'
Type: 3/8" Pel-Plug

ANNULUS SEAL
Interval: 0' - 43'
Type: AquaGuard Bentonite Grout

WELL COMPLETION
Pad: 4' x 4' x 2"
Protective Casing: Aluminum

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Fref Kraus

GA INSPECTOR: Shannon George, PG
CHECKED BY: Brian Steele, PG DATE: 6/23/20

GOLDER

BOREHOLE RECORD PLANT_BRANCH_20200603.GPJ PIEDMONT.GDT 7/27/20

RECORD OF BOREHOLE PZ-52D

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 59.50 ft
LOCATION: 13' west of BRGWC-33S

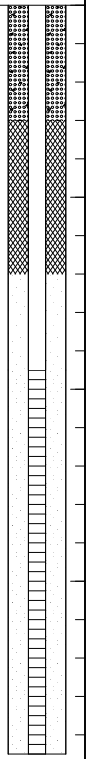
DRILL RIG: C 600 Track Mounted
DATE STARTED: 5/14/20
DATE COMPLETED: 5/14/20

NORTHING: 1,168,053.90
EASTING: 2,554,051.70
GS ELEVATION: 414.3
TOC ELEVATION: 417.03 ft

DEPTH W.L.: 46.5
ELEVATION W.L.: 367.8'
DATE W.L.: 5/15/2020
TIME W.L.: 0735

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	TYPE	REC
40		37.00 - 47.00 INTERLAYERED BIOTITE GNEISS AND TWR, poor recovery due to subsurface materials and drilling methodology, rock recovered is oxidized throughout and appears less coherent section above, fractured *(Continued)*	GNIESS		367.3	4	ROTO SONIC	2.50 / 10.00
45	370							
50	365	47.00 - 59.50 BIOTITE GNEISS, medium grained, phaneritic hornblende-quartz-plagioclase-biotite, foliation orientation varies overall ~ 45 degrees from horizontal, weakly foliated, fractures/oxidation, minor oxidation at 50 ft, 51.5 ft, and 54.5 ft	GNIESS		47.00	5	ROTO SONIC	10.00
55	360							
	355				354.8	6	ROTO SONIC	2.50 / 2.50
60		Boring completed at 59.50 ft						
65	350							
70	345							
75	340							
80	335							

PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 49.5'
Material: Sch 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 49.5' - 59.5'
Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen
Diameter: 2
Slot Size: 0.10
End Cap: 4"

FILTER PACK
Interval: 47' - 59.5'
Type: #1 Sand

FILTER PACK SEAL
Interval: 43' - 47'
Type: 3/8" Pel-Plug

ANNULUS SEAL
Interval: 0' - 43'
Type: AquaGuard Bentonite Grout

WELL COMPLETION
Pad: 4' x 4' x 2"
Protective Casing: Aluminum

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Fref Kraus

GA INSPECTOR: Shannon George, PG
CHECKED BY: Brian Steele, PG DATE: 6/23/20

GOLDER

BOREHOLE RECORD PLANT_BRANCH_20200603.GPJ PIEDMONT.GDT 7/27/20

RECORD OF BOREHOLE PZ-53D

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 144.00 ft
LOCATION: 28' west of BRGWC-38S

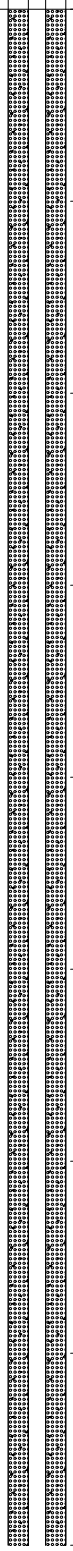
DRILL RIG: C 600 Track Mounted
DATE STARTED: 5/16/20
DATE COMPLETED: 5/17/20

NORTHING: 1,164,393.80
EASTING: 2,554,984.30
GS ELEVATION: 431.6
TOC ELEVATION: 434.68 ft

DEPTH W.L.: 14.2'
ELEVATION W.L.: 417.4'
DATE W.L.: 5/19/2020
TIME W.L.: 745

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0	430	0.00 - 10.00 HYDROVAC HOLE, ML, SILT, red, plastic to slightly plastic, cohesive, firm to stiff, dry to moist			421.6			
10	420	10.00 - 15.00 ML, clayey sandy SILT, fine sand, micaceous throughout, red, very weak foliation, trace relict foliation, non-plastic to slightly plastic, soft, dry to moist, primarily very weathered biotite gneiss SAPROLITE	ML		10.00 416.6	1	ROTO SONIC	10.00 10.00
15	415	15.00 - 19.00 SM, silty SAND, very fine to fine sand, weakly foliated, cohesive, soft, non-plastic, moist, primarily very weathered metagranite	SM		15.00 412.6			
20	410	19.00 - 29.00 ML, clayey sandy SILT, ine sand, micaceous throughout, red, very weak foliation, trace relict foliation, non-plastic to slightly plastic, soft, dry to moist, primarily metagranite SAPROLITE 18'-20', biotite gneiss 20'-23.5', metagranite 23.5'-29'	ML		19.00 402.6	2	ROTO SONIC	10.00 10.00
25	405							
30	400	29.00 - 39.00 ML, clayey sandy SILT, fine sand, pale brown orange dark brown to black, subhorizontal foliation, moderately foliated, quartz-plagioclase-biotite, cohesive, soft to firm, wet, SM; 29'-30' and 34'-35'	ML		29.00 392.6	3	ROTO SONIC	12.50 10.00
35	395							
40		Log continued on next page	SP		39.00	4		

PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 129.4'
Material: Sch 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 129.4' - 139.4'
Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen
Diameter: 2"
Slot Size: 0.010"
End Cap: 3"

FILTER PACK
Interval: 126.6' - 140'
Type: #1 Sand

FILTER PACK SEAL
Interval: 121' - 126.6'
Type: 3/8" Pel-Plug

ANNULUS SEAL
Interval: 0' - 121'
Type: AquaGuard Bentonite Grout

WELL COMPLETION
Pad: 4' x 4' x 2"
Protective Casing: Aluminum

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Fred Kraus

GA INSPECTOR: Shannon George, PG
CHECKED BY: Brian Steele, PG DATE: 6/23/20

GOLDER

RECORD OF BOREHOLE PZ-53D

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 144.00 ft
LOCATION: 28' west of BRGWC-38S

DRILL RIG: C 600 Track Mounted
DATE STARTED: 5/16/20
DATE COMPLETED: 5/17/20

NORTHING: 1,164,393.80
EASTING: 2,554,984.30
GS ELEVATION: 431.6
TOC ELEVATION: 434.68 ft

DEPTH W.L.: 14.2'
ELEVATION W.L.: 367.8'
DATE W.L.: 5/19/2020
TIME W.L.: 745

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
40		39.00 - 42.00 SP, SAND, poorly graded, sme silt, medium to coarse sand, reddish brown, subangular to angular, non-cohesive, non-plastic, loose, moist to wet.	SP		389.6					
	390	39.8'-42' SAPROLITE, biotitte gneiss with granite interlayers, moderately foliated, white to pale brown to yellowish brown to very dark brown, medium to coarse grained, little to some oxidation, moist, cohesive, non-plastic, very stiff *(Continued)*			42.00					
45		42.00 - 49.00 CL/CH, sandy CLAY, dary grayish brown with interlayers of white, very stiff to hard, moist, plastic, weathered biotite gneiss	CL-CH			4	ROTO SONIC	14.00 10.00		
	385				382.6					
50		49.00 - 53.00 SM, silty SAND, fine to medium sand, with clay, brown, weathered gneiss, quartz-plagioclase-biotite, weakly foliated, very stiff to hard, non-plastic, moist	SM		49.00					
	380				378.6					
55		53.00 - 63.00 SM, silty clayey SAND, fine to coarse sand, subangular to angular, brown, weathered gneiss quartz-plagioclase-biotite, medium grained, subhorizontal foliation, cohesive, stiff to very stiff, moist, non-plastic to plastic, SAPROLITE			53.00	5	ROTO SONIC	10.50 10.00		
	375		SM							
60										
	370				368.6					
65		63.00 - 65.00 CL, silty sandy CLAY, fine sand, brown to light olive brown, weathered gneiss, micaceous, moderately to weakly foliated, cohesive, plastic, moist to wet, w~PL, firm to very stiff	CL		63.00 366.6	6	ROTO SONIC	12.00 10.00		
	365	65.00 - 69.00 SM, silty SAND, very fine to medium sand, pale brown, slightly weathered to weathered gneiss biotite-quartz-plagioclase/feldspar	SM		65.00 362.6					
70		69.00 - 70.00 SP-SM, Sand with Silt, very fine to medium sand, poorly graded, weathered biotite gneiss, weakly foliated to no foliation, dark grayish brown, wet, loose, non-plastic	SP-SM		69.00 361.6 70.00	7	ROTO SONIC	5.50 4.50		
	360	70.00 - 73.50 ML, clayey sandy SILT, fine to medium sand, angular, brown to dark grayish brown, dry to moist, non-plastic	ML							
		73.00 - 75.00 SP-SM, Sand with Silt, very fine to coarse sand, poorly graded, not foliated, weathered biotite gneiss	SP-SM		358.1 356.6	8	ROTO SONIC	6.50 5.50		
75		75.00 - 79.00 SM, silty SAND, fine to coarse sand, TWR/SAPROLITE, interlayered SM and TWR, feldspathic biotite gneiss, coarse gravel throughout, firm to very hrd, dry	SM		75.00 352.6					
	355		ML		79.00	9		9.50 10.00		
80		Log continued on next page								

WELL CASING
Interval: 0' - 129.4'
Material: Sch 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 129.4' - 139.4'
Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen
Diameter: 2"
Slot Size: 0.010"
End Cap: 3"

FILTER PACK
Interval: 126.6' - 140'
Type: #1 Sand

FILTER PACK SEAL
Interval: 121' - 126.6'
Type: 3/8" Pel-Plug

ANNULUS SEAL
Interval: 0' - 121'
Type: AquaGuard Bentonite Grout

WELL COMPLETION
Pad: 4' x 4' x 2"
Protective Casing: Aluminum

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Fred Kraus

GA INSPECTOR: Shannon George, PG
CHECKED BY: Brian Steele, PG DATE: 6/23/20

GOLDER

RECORD OF BOREHOLE PZ-53D

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 144.00 ft
LOCATION: 28' west of BRGWC-38S

DRILL RIG: C 600 Track Mounted
DATE STARTED: 5/16/20
DATE COMPLETED: 5/17/20

NORTHING: 1,164,393.80
EASTING: 2,554,984.30
GS ELEVATION: 431.6
TOC ELEVATION: 434.68 ft

DEPTH W.L.: 14.2'
ELEVATION W.L.: 367.8'
DATE W.L.: 5/19/2020
TIME W.L.: 745

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES SAMPLE NO.	TYPE	REC	PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
80		79.00 - 85.00 ML, sandy SILT, fine to medium sand, angular, brown, subhorizontal foliation, wet from drilling *(Continued)*	ML		346.6	9	ROTO SONIC	9.50/10.00		
85	350	85.00 - 89.00 SM, silty SAND, fine to coarse sand, some gravel, weathered felspathic biotite gneiss, SAPROLITE/TWR	SM		85.00 342.6					
90	345	89.00 - 93.00 ML, clayey sandy SILT, very fine to medium sand, subanglar to angular, dark grayish brown to grayish brown, fain foliation	ML		89.00 338.6					
95	340	93.00 - 99.00 SM, silty SAND, very fine to coarse sand, pale brown, weakly foliated, weathered geniss, SAPROLITE	SM		93.00 332.6	10	ROTO SONIC	8.00/10.00		
100	335	99.00 - 102.50 ML, sandy SILT, and silty SAND, veryfine to medium sand, grayish brown to brown, not foliated, very weathered feldspathic geniss, non-plastic to slightly plastic, firm, wet, SAPROLITE	ML		99.00 329.1					
105	330	102.50 - 105.00 SM, silty SAND, very fine to coarse sand, some gravel, subangular to angular, pale brown, weathered gneiss, relict foliation, moderate foliation, hard, non-plastic, dry	SM		102.50 326.6	11	ROTO SONIC	7.00/10.00		
	325	105.00 - 109.00 No recovery			105.00 322.6					
110	320	109.00 - 113.00 ML/SM, sandy SILT and silty SAND, very fine to medium sand, grayish brown to brown, no foliation wet, non-plastic to plastic,	ML		109.00 318.6					
115		113.00 - 115.00 SM, silty SAND, fine to coarse sand, weathered gneiss, weakly foliated, hard, SAPROLITE	SM		113.00 316.6	12	ROTO SONIC	6.00/10.00		
	315	115.00 - 119.00 No recovery			115.00 312.6					
120		Log continued on next page	ML		119.00	13		9.50/10.00		

WELL CASING
Interval: 0' - 129.4'
Material: Sch 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 129.4' - 139.4'
Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen
Diameter: 2"
Slot Size: 0.010"
End Cap: 3"

FILTER PACK
Interval: 126.6' - 140'
Type: #1 Sand

FILTER PACK SEAL
Interval: 121' - 126.6'
Type: 3/8" Pel-Plug

ANNULUS SEAL
Interval: 0' - 121'
Type: AquaGuard Bentonite Grout

WELL COMPLETION
Pad: 4' x 4' x 2"
Protective Casing: Aluminum

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Fred Kraus

GA INSPECTOR: Shannon George, PG
CHECKED BY: Brian Steele, PG DATE: 6/23/20

GOLDER

RECORD OF BOREHOLE PZ-53D

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 144.00 ft
LOCATION: 28' west of BRGWC-38S

DRILL RIG: C 600 Track Mounted
DATE STARTED: 5/16/20
DATE COMPLETED: 5/17/20

NORTHING: 1,164,393.80
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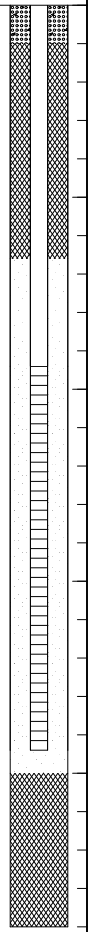
DEPTH W.L.: 14.2'
ELEVATION W.L.: 367.8'
DATE W.L.: 5/19/2020
TIME W.L.: 745

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
120		119.00 - 122.50 ML/SM, sandy SILT and silty SAND, very fine to medium sand, some coarse sand, some weathered gneiss cobbles up to 1.5", dark grayish brown, no foliation, biotite gneiss cobbles are weakly foliated, cohesive, non-plastic to slightly plastic, soft to hard, wet *(Continued)*	ML		309.1			
	310	122.50 - 127.00 SM, silty SAND, fine to coarse sand, weathered gneiss, weakly foliated, hard, SAPROLITE	SM		122.50	13	ROTO SONIC	9.50 / 10.00
125					304.6			
	305	127.00 - 129.00 ML/SM, sandy SILT and silty SAND, very fine to medium sand, some coarse sand, some weathered gneiss cobbles up to 1.5", dark grayish brown, no foliation, biotite gneiss cobbles are weakly foliated, cohesive, non-plastic to slightly plastic, soft to hard, wet	ML		127.00 302.6			
130		129.00 - 131.00 ML, clayey sandy SILT	ML		129.00 300.6			
	300	131.00 - 138.00 SM, silty SAND, fine and medium sand, gray to dark olive gray, interlayered weathered biotite gneiss and amphibolite, SAPROLITE	SM		131.00	14	ROTO SONIC	10.00 / 10.00
135					293.6			
	295	138.00 - 139.00 TWR, transitionally weathered rock, weathered biotite gneiss	TWR		138.00 292.6			
140		139.00 - 144.00 BR, Biotite Gneiss, medium grained, quartz-hornblende-plagioclase, oxidation and fracture zone at 142'-143.5'	BR		139.00	15	ROTO SONIC	5.00 / 5.00
	290				287.6			
		Boring completed at 144.00 ft						
145	285							
150	280							
155	275							
160								

PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 129.4'
Material: Sch 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 129.4' - 139.4'
Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen
Diameter: 2"
Slot Size: 0.010"
End Cap: 3"

FILTER PACK
Interval: 126.6' - 140'
Type: #1 Sand

FILTER PACK SEAL
Interval: 121' - 126.6'
Type: 3/8" Pel-Plug

ANNULUS SEAL
Interval: 0' - 121'
Type: AquaGuard Bentonite Grout

WELL COMPLETION
Pad: 4' x 4' x 2"
Protective Casing: Aluminum

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Fred Kraus

GA INSPECTOR: Shannon George, PG
CHECKED BY: Brian Steele, PG DATE: 6/23/20

GOLDER

RECORD OF BOREHOLE PZ-54

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 52.00 ft
LOCATION: SE of Pond E

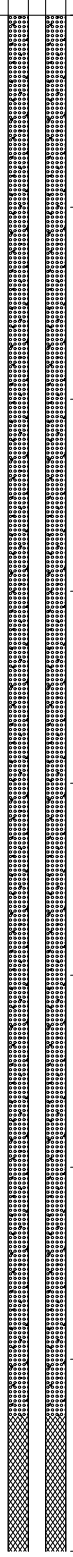
DRILL RIG: C 600 Track Mounted
DATE STARTED: 5/15/20
DATE COMPLETED: 5/15/20

NORTHING: 1,164,828.70
EASTING: 2,555,458.30
GS ELEVATION: 440.8
TOC ELEVATION: 443.86 ft

DEPTH W.L.: 41.4'
ELEVATION W.L.: 399.4'
DATE W.L.: 5/16/2020
TIME W.L.: 735

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0	440	0.00 - 7.00 CL, silty sandy CLAY, medium to coarse sand, angular quartz, red, mottled texture, trace fine gravel, subrounded to subangular, deeply weathered, plagioclase, firm to stiff, dry to moist, RESIDUUM	CL		433.8	1	ROTO SONIC	3.00 / 7.00
5	435	7.00 - 13.00 CL, silty CLAY some sand, fine to medium sand, angular to subangular, yellowish red, no structure, quartz and plagioclase, RESIDUUM	CL		7.00 427.8	2	ROTO SONIC	10.00 / 10.00
10	430	13.00 - 17.00 SM, silty SAND, fine to medium sand, anugular to subangular, light red to red, weak foliation, weathered to very weathered feldspathic biotite gneiss with sodium-plagioclase to potassium feldspar, quartz, little to trace mica, cohesive, non-plastic, firm to moist, dry, RESIDUUM	SM		13.00 423.8			
15	425	17.00 - 19.00 ML, clayey sandy SILT, red, mica rich, deeply weathered, feldspathic biotite gneiss, cohesive, slightly plastic, moist, RESIDUUM	ML		17.00 421.8	3	ROTO SONIC	10.00 / 10.00
20	420	19.00 - 28.00 SM, silty SAND, fine to medium sand, light red to red, weak foliation, weathered to very weathered feldspathic biotite gneiss, moist, cohesive, non-plastic to slightly plastic, firm, SAPROLITE	SM		19.00 412.8			
25	415	28.00 - 37.00 SM, silty SAND, fine to medium sand, light brown to ligh reddish brown, weathered to very weathered, feldspathic biotite gneiss, foliated to weakly foliated, non plastic, firm, oxidation at 28', SAPROLITE	SM		28.00 403.8	4	ROTO SONIC	9.50 / 10.00
30	410							
35	405	37.00 - 48.00 SM, clayey silty SAND, fine sand, pale brown, weathered feldspathic biotite gneiss, quartz-biotite-plagioclase, trace to little oxidation/mottling throughout, foliated to weakly foliated, moist, cohesive, non-plastic, stiff, SAPROLITE	SM		37.00	5	ROTO SONIC	10.00 / 10.00
40		Log continued on next page						

PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 42'
Material: Sch 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 42' - 52'
Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen
Diameter: 2"
Slot Size: 0.010"
End Cap: 3"

FILTER PACK
Interval: 40' - 52'
Type: #1 Sand

FILTER PACK SEAL
Interval: 36.5' - 40'
Type: Pel-Plug 3/8"

ANNULUS SEAL
Interval: 0' - 36.5'
Type: AquaGuard Bentonite Grout

WELL COMPLETION
Pad: 4' x 4' x 2"
Protective Casing: Aluminum

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: N/A

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Fred Kraus

GA INSPECTOR: Shannon George, PG
CHECKED BY: Brian Steele, PG DATE: 6/23/20

GOLDER

RECORD OF BOREHOLE PZ-54

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 52.00 ft
LOCATION: SE of Pond E

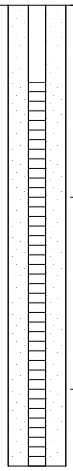
DRILL RIG: C 600 Track Mounted
DATE STARTED: 5/15/20
DATE COMPLETED: 5/15/20

NORTHING: 1,164,828.70
EASTING: 2,555,458.30
GS ELEVATION: 440.8
TOC ELEVATION: 443.86 ft

DEPTH W.L.: 41.4'
ELEVATION W.L.: 399.4'
DATE W.L.: 5/16/2020
TIME W.L.: 735

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES SAMPLE NO.	TYPE	REC
40	400	37.00 - 48.00 SM, clayey silty SAND, fine sand, pale brown, weathered feldspathic biotite gneiss, quartz-biotite-plagioclase, trace to little oxidation/mottling throughout, foliated to weakly foliated, moist, cohesive, non-plastic, stiff, SAPROLITE *(Continued)*	SM		392.8	5	ROTO SONIC	10.00 / 10.00
45	395							
50	390	48.00 - 52.00 TWR, weathered feldspathic biotite gneiss interlayered with unweathered feldspathic biotite gneiss, coarse grained, foliated to weakly foliated, some oxidation staining	TWR		48.00 388.8	6	ROTO SONIC	5.00 / 5.00
		Boring completed at 52.00 ft						
55	385							
60	380							
65	375							
70	370							
75	365							
80								

PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 42'
Material: Sch 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 42' - 52'
Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen
Diameter: 2"
Slot Size: 0.010"
End Cap: 3"

FILTER PACK
Interval: 40' - 52'
Type: #1 Sand

FILTER PACK SEAL
Interval: 36.5' - 40'
Type: Pel-Plug 3/8"

ANNULUS SEAL
Interval: 0' - 36.5'
Type: AquaGuard Bentonite Grout

WELL COMPLETION
Pad: 4' x 4' x 2"
Protective Casing: Aluminum

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: N/A

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Fred Kraus

GA INSPECTOR: Shannon George, PG
CHECKED BY: Brian Steele, PG DATE: 6/23/20

GOLDER

RECORD OF BOREHOLE PZ-55

SHEET 1 of 2

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 49.30 ft
LOCATION: SE of Pond E

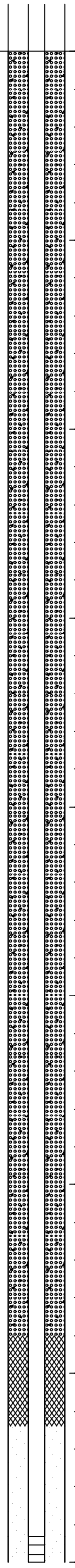
DRILL RIG: TSI Compact Crawler
DATE STARTED: 5/19/20
DATE COMPLETED: 5/19/20

NORTHING: 1,163,208.00
EASTING: 2,554,783.60
GS ELEVATION: 450.2
TOC ELEVATION: 453.07 ft

DEPTH W.L.: 45.3'
ELEVATION W.L.: 404.9'
DATE W.L.: 5/20/2020
TIME W.L.: 740

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0	450	0.00 - 8.00 CL, silty CLAY, some sand, fine to medium sand, quartz angular, dark red, cohesive, slightly plastic to plastic, dry to moist, w<PL, firm to stiff, RESIDUUM	CL		442.2	1	ROTO SONIC	9.00 / 9.00
5	445							
		8.00 - 9.50 ML, sandy SILT, very fine to fine sand, red to dark red, weathered gneiss, foliated, quartz-weathered plagioclase/feldspar and biotite, medium grained gneiss, moist, non-plastic, cohesive, firm, SAPROLITE	ML		8.00 440.7			
10	440	9.50 - 12.00 SM, silty SAND, fine to coarse sand, quartz angular, red, loose, non-plastic, moist to wet, SAPROLITE	SM		9.50 438.2	2	ROTO SONIC	8.00 / 10.00
		12.00 - 39.50 SM, silty SAND, fine to medium sand, weathered feldspathic biotite gneiss, weakly foliated, subhorizontal, non-cohesive, non-plastic, loose to compact, SAPROLITE			12.00			
15	435							
20	430	oxidation/mottling at 28.5' to 31'				3	ROTO SONIC	7.00 / 10.00
25	425		SM					
30	420					4	ROTO SONIC	10.00 / 10.00
35	415							
					410.7	5		
40		Log continued on next page	SP-SM		39.50			

PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 39.3'
Material: Sch 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 39.3' - 49.3'
Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen
Diameter: 2"
Slot Size: 0.010"
End Cap: 3"

FILTER PACK
Interval: 36.4' - 49.3'
Type: #1 Sand

FILTER PACK SEAL
Interval: 34' - 36.4'
Type: Pel-Plug 3/8"

ANNULUS SEAL
Interval: 0' - 34'
Type: AquaGuard Bentonite Grout

WELL COMPLETION
Pad: 4' x 4' x 2"
Protective Casing: Aluminum

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Fred Kraus

GA INSPECTOR: Shannon George, PG
CHECKED BY: Brian Steele, PG DATE: 6/24/20

GOLDER

BOREHOLE RECORD PLANT_BRANCH_20200603.GPJ PIEDMONT.GDT 7/27/20

RECORD OF BOREHOLE PZ-55

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 49.30 ft
LOCATION: SE of Pond E

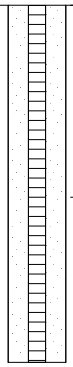
DRILL RIG: TSI Compact Crawler
DATE STARTED: 5/19/20
DATE COMPLETED: 5/19/20

NORTHING: 1,163,208.00
EASTING: 2,554,783.60
GS ELEVATION: 450.2
TOC ELEVATION: 453.07 ft

DEPTH W.L.: 45.3'
ELEVATION W.L.: 404.9'
DATE W.L.: 5/20/2020
TIME W.L.: 740

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES SAMPLE NO.	SAMPLES TYPE	SAMPLES REC
40	410	39.50 - 41.00 SP-SM, poorly graded Sand with Silt, very fine to fine sand, little fine gravel, moist to wet, grayish brown, loose to compact, non-plastic *(Continued)*	SP-SM		409.2			
			ML		41.00 408.2			
		41.00 - 42.00 ML, sandy SILT, very fne to fine sand, pale brown, moist, firm, non-plastic, moderate fliation, SAPROLITE			42.00			
		42.00 - 46.00 SP, SAND, fine sand, brown, poorly graded, moist to wet, loose to compact, non-plastic, SAPROLITE	SP			5	ROTO SONIC	10.30 10.30
45	405				404.2			
		46.00 - 48.50 ML, sandy SILT, fine sand, weathered gneiss, feldspathic biotite gneiss, moderate foliation, cohesive, firm to stiff, non-plastic, moist to wet, SAPROLITE	ML		46.00 401.7			
		48.50 - 49.00 TWR, transtionally weathered rock, weathered biotite gneiss, medium grained	TWR		401.2			
50	400	49.00 - 49.30 BR, Biotite Gneiss, medium grained, moderate foliation, hornblende-quartz-biotite-plagioclase	BR					
		Boring completed at 49.30 ft						
55	395							
60	390							
65	385							
70	380							
75	375							
80								

PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 39.3'
Material: Sch 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 39.3' - 49.3'
Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen
Diameter: 2"
Slot Size: 0.010"
End Cap: 3"

FILTER PACK
Interval: 36.4' - 49.3'
Type: #1 Sand

FILTER PACK SEAL
Interval: 34' - 36.4'
Type: Pel-Plug 3/8"

ANNULUS SEAL
Interval: 0' - 34'
Type: AquaGuard Bentonite Grout

WELL COMPLETION
Pad: 4' x 4' x 2"
Protective Casing: Aluminum

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Fred Kraus

GA INSPECTOR: Shannon George, PG
CHECKED BY: Brian Steele, PG DATE: 6/24/20

GOLDER

RECORD OF BOREHOLE PZ-56

SHEET 1 of 1

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 29.00 ft
LOCATION: SE of Pond E

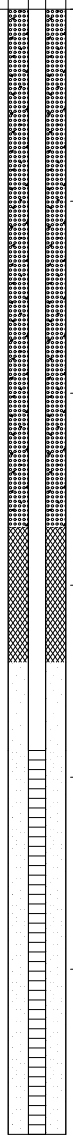
DRILL RIG: TSI Compact Crawler
DATE STARTED: 5/20/20
DATE COMPLETED: 5/20/20

NORTHING: 1,162,965.10
EASTING: 2,554,086.30
GS ELEVATION: 416.2
TOC ELEVATION: 418.84 ft

DEPTH W.L.: 5.35
ELEVATION W.L.: 410.85'
DATE W.L.: 6/2/2020
TIME W.L.: 1146

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC
0	416	0.00 - 6.00 Cl, silty CLAY, dark red, moist, no structure, mica flakes thoughout, cohesive, plastic, firm to stiff, w<PL, RESIDUUM	CL		1	ROTO SONIC	9.00 / 9.00
5	410	6.00 - 14.00 CL, silty CLAY, trace fine sand, yellowish orange, to pale brown, no structure, mottled, cohesive, moist, very stiff, plastic, w<PL, RESIDUUM		410.2 6.00			
10	405		CL		2	ROTO SONIC	10.00 / 10.00
		14.00 - 15.00 SM, silty clayey SAND, fine sand, yellowish red, moist to wet, mottled, compact to dense, non-plastic, RESIDUUM	SM	402.2 14.00 401.2			
15	400	15.00 - 18.00 CL, silty CLAY, little fine sand, red to pale brown to yellowish red, mottled, moist, plastic, stiff to very stiff, w>PL, RESIDUUM	CL	15.00 398.2			
		18.00 - 24.50 SM, silty clayey SAND, fine sand, yellowish red, moist to wet, mottled, compact to dense, non-plastic, RESIDUUM	SM	18.00 391.7	3	ROTO SONIC	3.50 / 6.00
20	395						
25	390	24.50 - 25.00 TWR, slightly weathered biotite gneiss, quartz-hornblende-plagioclase-biotite	TWR	391.2			
		25.00 - 29.00 BR, Interlayered Biotite Gneiss and Amphibolite, primarily biotite gneiss, feldspathic, quartz-hornblende-potassium fledspar-plagioclase-biotite, medium to coarse grained, weak subhorizontal foliation	BR	25.00	4	ROTO SONIC	4.00 / 4.00
		25.7'-26.5' Amphibolite, fine grained, very dark green to black, weakly foliated, quartz-plagioclase-biotite-hornblende		387.2			
30	385	Boring completed at 29.00 ft					
35	380						
40							

PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: 0' - 19.3'
Material: Sch 40 PVC
Diameter: 2"
Joint Type: Threaded

WELL SCREEN
Interval: 19.3' - 29.3'
Material: 0.010" Slotted Schedule 40 PVC Pre-Pack Screen
Diameter: 2"
Slot Size: 0.010"
End Cap: 3"

FILTER PACK
Interval: 17' - 29.3'
Type: #1 Sand

FILTER PACK SEAL
Interval: 13.5' - 17'
Type: Pel-Plug 3/8"

ANNULUS SEAL
Interval: 0' - 13.5'
Type: AquaGuard Bentonite Grout

WELL COMPLETION
Pad: 4' x 4' x 2"
Protective Casing: Aluminum

DRILLING METHODS
Soil Drill: Sonic
Rock Drill: Sonic

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Fred Kraus

GA INSPECTOR: Shannon George, PG
CHECKED BY: Brian Steele, PG DATE: 6/24/20

GOLDER

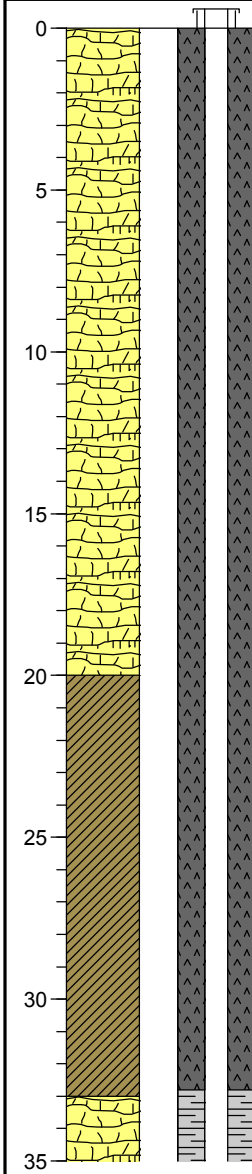
BOREHOLE RECORD PLANT_BRANCH_20200603.GPJ PIEDMONT.GDT 7/27/20

Geosyntec consultants
engineers | scientists | innovators

Client: Southern Company Services
Project: Plant Branch Well Install
Address: 1100 Milledgeville Rd, Milledgeville, GA

WELL LOG
Well No. PZ-70I
Page: 1 of 2

Drilling Start Date:	**08/16/2022**	Boring Depth (ft):	**55**	Well Depth (ft TOC):	**52.98**
Drilling End Date:	**08/16/2022**	Boring Diameter (in):	**6**	Well Diameter (in):	**2**
Drilling Company:	**Cascade Drilling**	Sampling Method(s):	**Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Sonic 4x6**	DTW Post-Installation (ft):	**--**	Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**TSI-150**	Ground Surface Elevation:	**422.88 NAV88**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**C. Franklin**	Top of Casing Elevation:	**425.70 NAV88**	Seal Material(s):	**Grout, Bentonite**
Logged By:	**D. Kegley**	North, East (Y,X):	**1164326.66, 2555374.08**	Filter Pack:	**20/40 Sand**



DEPTH (ft)	Sample Type	Recovery (%)	SOIL/ROCK VISUAL DESCRIPTION	REMARKS	ELEVATION (ft NAV88)
0	GR		(0') PARTIALLY WEATHERED ROCK (PWR); reddish-brown, dry, stiff, low plasticity, micaceous with trace sand and relict rock structure.	Hand augered 0-10 feet bgs.	420
5					415
10	CB	90	(10') Same as above.		410
15			(14') PWR; reddish-brown, dry, stiff, low plasticity, micaceous with relict rock structure.		405
20	CB	60	(20') SANDY CLAY (CL); reddish-brown, soft, low plasticity, micaceous (saprolite).		400
25					395
30	CB	90	(30') Same as above.		390
35			(33') PWR; reddish-brown, low plasticity, micaceous with some rock fragments and relict rock structure.		

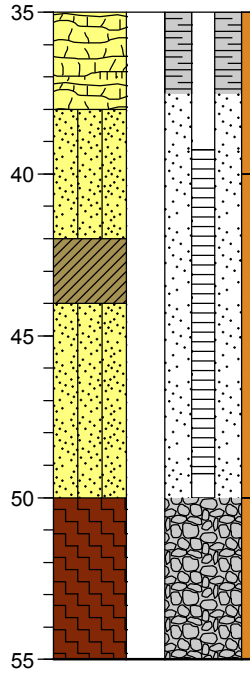
NOTES: Boring cleared with hand auger from 0-10 feet bgs. Well (+2.82 feet stickup) completed with aboveground protective casing set in concrete. Well depth measured from the top of casing (TOC).

Geosyntec consultants
engineers | scientists | innovators

Client: Southern Company Services
Project: Plant Branch Well Install
Address: 1100 Milledgeville Rd, Milledgeville, GA

WELL LOG
Well No. PZ-70I
Page: 2 of 2

Drilling Start Date:	**08/16/2022**	Boring Depth (ft):	**55**	Well Depth (ft TOC):	**52.98**
Drilling End Date:	**08/16/2022**	Boring Diameter (in):	**6**	Well Diameter (in):	**2**
Drilling Company:	**Cascade Drilling**	Sampling Method(s):	**Core Barrel**	Screen Slot (in):	**0.010**
Drilling Method:	**Sonic 4x6**	DTW Post-Installation (ft):	**--**	Riser Material:	**Sch 40 PVC**
Drilling Equipment:	**TSI-150**	Ground Surface Elevation:	**422.88 NAV88**	Screen Material:	**Sch 40 PVC Slotted**
Driller:	**C. Franklin**	Top of Casing Elevation:	**425.70 NAV88**	Seal Material(s):	**Grout, Bentonite**
Logged By:	**D. Kegley**	North, East (Y,X):	**1164326.66, 2555374.08**	Filter Pack:	**20/40 Sand**



DEPTH (ft)	SOIL/ROCK VISUAL DESCRIPTION	REMARKS	ELEVATION (ft NAV88)
		Filter Pack: 3.5 bags 20/40 sand **Top Seal:** One five gallon bucket of coated bentonite pellets	385
38	(38') SILTY SAND (SM); reddish-brown, loose, trace clay (saprolite).		
40	(40') SILTY SAND (SM); reddish-brown, loose, coarse sand with some gravel (saprolite).		380
42	(42') SANDY CLAY (CL); reddish-brown, moist, low to medium plasticity, relict rock structure (saprolite).		
44	(44') SILTY SAND (SM); light brown, loose, trace gravel and trace clay (saprolite).		375
50	(50') GNEISS; competent with multiple fractures near 53 feet, fracture at 54.5 feet, banded, iron oxide staining.		370
55	(55') Boring terminated.		

NOTES: Boring cleared with hand auger from 0-10 feet bgs. Well (+2.82 feet stickup) completed with aboveground protective casing set in concrete. Well depth measured from the top of casing (TOC).

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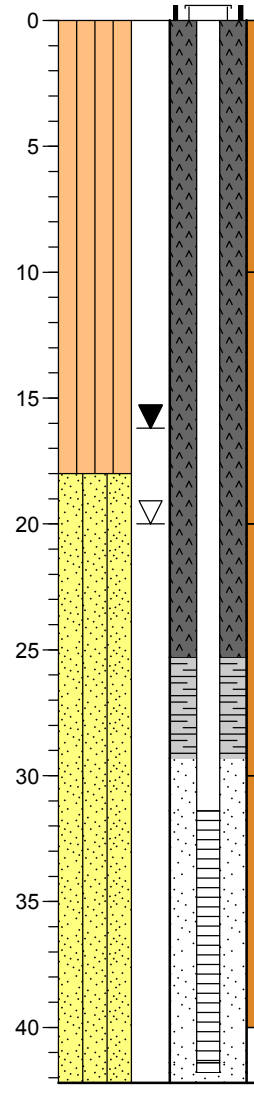
Client: Southern Company Services
Project: Plant Branch Groundwater Services
Address: 1100 Milledgeville Rd, Milledgeville, GA

WELL LOG

Well No. PZ-76I
Page: 1 of 1

Drilling Start Date:	08/02/2023	Boring Depth (ft):	42.2	Well Depth (ft TOC):	44.75
Drilling End Date:	08/02/2023	Boring Diameter (in):	6	Well Diameter (in):	2
Drilling Company:	Cascade Drilling	Sampling Method(s):	Core Barrel	Screen Slot (in):	0.010
Drilling Method:	Sonic 4x6	DTW Post-Installation (ft):	16.2	Riser Material:	Sch 40 PVC
Drilling Equipment:	TSI-150 Comp. Crawler	Ground Surface Elevation:	430.89 NAVD 88	Screen Material:	Sch 40 PVC Slotted
Driller:	B. Griffis	Top of Casing Elevation:	433.84 NAVD 88	Seal Material(s):	Grout, Bentonite
Logged By:	E. Volk	North, East:	1164366.20 ft, 2554903.80 ft	Filter Pack:	20/40 Sand



DEPTH (ft)	SOIL/ROCK VISUAL DESCRIPTION	REMARKS	ELEVATION (ft NAVD 88)
0	(0') Sandy SILT (ML); reddish-brown, dry, stiff, nonplastic, fine to medium sand, micaceous (FILL).		430
5			425
10	(9') Sandy SILT (ML); brown, dry, stiff, nonplastic, fine to medium sand, micaceous, inclusions (white to reddish-brown striations) (SAPROLITE).		420
15			415
20	(18') Silty SAND (SM); light gray/white, dry, loose, some nonplastic fines, fine to coarse grained (subangular) (SAPROLITE).	Water level ~20 feet bgs (moist in core)	410
25	(22') Silty SAND (SM); light gray/white, moist, medium dense, some nonplastic fines, fine to coarse grained (subangular), some coarse gravel (subangular to rounded), micaceous (SAPROLITE).		405
30			400
35		Saturated from 30-33 feet bgs	395
40	(41') Drill to 41 feet bgs. Clean out borehole to 42.2 feet bgs.	Extra slough cleaned out to 42.2 feet bgs	390
	(42.2') Boring terminated.		

NOTES: Temporary piezometer completed with T posts and snow fence. Piezometer depth measured from the top of casing (TOC).

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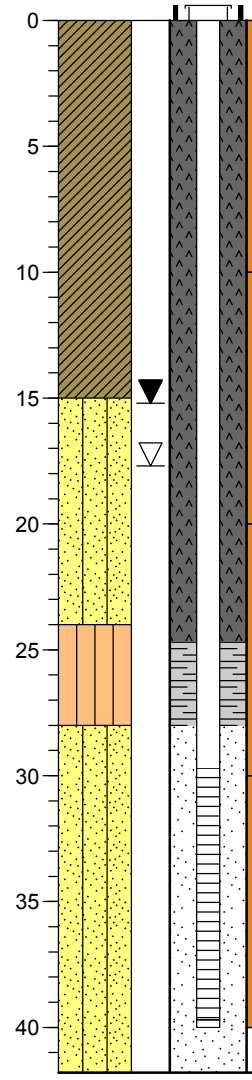
WELL LOG

Well No. PZ-77I
Page: 1 of 1

Drilling Start Date:	08/01/2023	Boring Depth (ft):	41.8	Well Depth (ft TOC):	43.02
Drilling End Date:	08/01/2023	Boring Diameter (in):	6	Well Diameter (in):	2
Drilling Company:	Cascade Drilling	Sampling Method(s):	Core Barrel	Screen Slot (in):	0.010
Drilling Method:	Sonic 4x6	DTW Post-Installation (ft):	15.2	Riser Material:	Sch 40 PVC
Drilling Equipment:	TSI-150 Comp. Crawler	Ground Surface Elevation:	430.31 NAVD 88	Screen Material:	Sch 40 PVC Slotted
Driller:	B. Griffis	Top of Casing Elevation:	433.33 NAVD 88	Seal Material(s):	Grout, Bentonite
Logged By:	E. Volk	North, East:	1164396.90 ft, 2554810.04 ft	Filter Pack:	20/40 Sand



DEPTH (ft)	Sample Type	Recovery (%)	SOIL/ROCK VISUAL DESCRIPTION	REMARKS	ELEVATION (ft NAVD 88)
0	CB	75	(0') Gravelly silty CLAY (CL); reddish-brown, dry to moist, soft, low plasticity, some coarse gravel, trace fine to medium sand, micaceous (SAPROLITE).		430
5					425
10	CB	60			420
15			(15') Silty SAND (SM); light gray, moist, loose to medium dense, nonplastic fines, fine to coarse grained, some coarse gravel, micaceous (SAPROLITE).	Water level tagged at 17.7 feet bgs	415
20	CB	70			410
25			(24') Sandy SILT (ML); brownish gray, saturated, soft, fine to medium sand, some coarse gravel, micaceous (SAPROLITE).		405
			(28') Silty SAND (SM); light gray, moist, dense, some nonplastic fines, fine to coarse grained (subangular), micaceous (SAPROLITE).		
30	CB	75	(30') Silty SAND (SM); light gray, moist, loose, fine to coarse grained (subangular), some coarse gravel, some fragments of friable weathered rock (SAPROLITE).		400
35				Driller tagged ~1 foot slough; advanced outer casing 2 feet using water to clear borehole (~75 gallons) to 41.8 feet bgs	395
40			(40') Drill to 40 feet bgs. Clean out borehole to 41.8 feet bgs.		390
			(41.8') Boring terminated.		

NOTES: Temporary piezometer completed with T posts and snow fence. Piezometer depth measured from the top of casing (TOC).

C. GROUNDWATER SAMPLING PROCEDURE

Groundwater sampling will be conducted using the most current applicable USEPA Region 4 SESD Field Branches Quality System and Technical Procedures as a guide (https://www.epa.gov/quality/quality-system-and-technical-procedures-sesd-field-branches). The following procedures describe the general methods associated with groundwater sampling at the Site. Prior to sampling, the well must be evacuated (purged) to ensure that representative groundwater is obtained. Any item coming in contact with the inside of the well casing or the well water will be kept in a clean container and handled only with gloved hands. Field logbooks and forms shall be kept for each sampling event, and should include, but not be limited to, the following: well signage, well access, sampling and purging equipment condition, and any site conditions that may affect sampling.

GPC will follow the procedures below at each well to ensure that a representative sample is collected:

1. Check the well, the lock, and the locking cap for damage or evidence of tampering. Record observations and notify GPC if it appears that the well has been compromised.

2. Measure and record the depth to water in all wells to be sampled prior to purging using a water measuring device consisting of probe and measuring tape capable of measuring water levels with accuracy to 0.01 foot. Static water levels will be measured from each well, within a 24-hour period. The water level measuring device will be decontaminated prior to lowering in each well.

3. Install Pump: If a dedicated pump is not present, slowly lower the pump into the well to the midpoint of the well screen or a depth otherwise approved by the hydrogeologist or project scientist. The pump intake must be kept at least two feet above the bottom of the well to prevent disturbance and suspension of any sediment present in the bottom of the well. Record the depth to which the pump is lowered. All non-dedicated pumps and wiring will be decontaminated before use and between well locations in general accordance with USEPA Laboratory Services and Applied Science Division *Field Equipment Cleaning and Decontamination* (LSASDPROC-205-R4), or the latest version of the document.

4. Measure Water Level: Immediately prior to purging, measure the water level again with the pump in the well. Leave the water level measuring device in the well.

5. Purge Well: Begin pumping the well at approximately 100 to 500 milliliters per minute (mL/min). Monitor the water level continually. Maintain a steady flow rate that results in a stabilized water level with 0.3 feet or less of variability. Avoid entraining air in the tubing. Record each adjustment made to the pumping rate and the water level measured immediately after each adjustment.

6. Monitor Indicator Parameters: Monitor and record the field indicator parameters [turbidity, temperature, specific conductance, pH, oxidation-reduction potential (ORP), and dissolved oxygen (DO)] approximately every three to five minutes. The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings at a minimum:

   ±0.1 for pH
   ±5% for specific conductance (conductivity)

±10% for DO where DO>0.2mg/L. If DO<0.2mg/L no stabilization criteria apply
<5 NTU for turbidity
Temperature – Record only, not used for stabilization criteria
ORP – Record only, not used for stabilization criteria.

7. Collect samples at a low flow rate according to the most current version of USEPA Region 4 SESD guidance document, *Operating Procedure – Groundwater Sampling* (EPA, SESDPROC-301-R4), and such that drawdown of the water level within the well is stable. Flow rate must be reduced if excessive drawdown is observed during sampling. All sample containers should be filled with minimal turbulence by allowing the groundwater to flow from the tubing gently down the inside of the container.

8. Compliance samples will be unfiltered; however, to determine if turbidity is affecting sample results (i.e., >10 NTU), duplicate samples may be filtered in the field prior to being placed in a sample container, clearly marked as filtered and preserved. Filtering will be accomplished by the use of 0.45-micron filters on the sampling line. At least two filter volumes of sample will pass through before filling sample containers. A new filter must be used for each well and each sampling event. Filtered samples are not considered compliance samples and are only used to evaluate the effects of turbidity. Additional details related to managing for elevated turbidity is discussed below.

9. All sample bottles will be filled, capped, and placed in an ice containing cooler immediately after sampling where temperature control is required. Samples that do not require temperature control will be placed in a clean and secure container.

10. Sample containers and preservative will be appropriate for the analytical method being used.

11. Information contained on sample container labels will include:

    a. Name of facility
    b. Date and time of sampling
    c. Sample description (well number)
    d. Sampler's initials
    e. Preservatives
    f. Analytical method(s)

12. After samples are collected, samplers will remove all non-dedicated equipment. Upon completion of all activity the well will be closed and locked.

13. Non-dedicated equipment will be decontaminated between wells in general accordance with US EPA LSASDPROC-205-R4 (US EPA, 2020).

14. Samples will be delivered to the laboratory following appropriate COC and temperature control requirements. The goal for sample delivery will be within 48 hours of collection.

Throughout the sampling process, new latex or nitrile gloves will be worn by the sampling personnel. A clean pair of new, disposable gloves will be worn each time a different location is sampled, and new gloves

donned prior to filling sample bottles. Gloves will be discarded after sampling each well and before sampling the next well.

The goal when sampling is to attain a turbidity of less than 5 NTU; however, samples may be collected where turbidity is less than 10 NTU and the stabilization criteria described above are met.

If sample turbidity is greater than 5 NTU and all other stabilization criteria have been met, samplers will continue purging for 3 additional hours in order to reduce the turbidity to 5 NTU or less.

- If turbidity remains above 5 NTU but is less than 10 NTU, and all other parameters are stabilized, the well can be sampled.
- Where turbidity remains above 10 NTU, an unfiltered sample will be collected followed by a filtered sample that has passed through an in-line 0.45-micron filter attached to the discharge (sample collection) tube. Data from filtered samples will only be used to quantify the effects of turbidity on sample results.

Samplers will identify the sample bottle as containing a filtered sample on the sample bottle label and on the COC form.

A brief overview of purging and sampling methodologies, including the type of sampling equipment used will be provided in routine monitoring reports.