GROUNDWATER MONITORING PLAN

PLANT WANSLEY – ASH POND 1 (AP-1)
HEARD AND CARROLL COUNTIES, GEORGIA

FOR

Georgia Power

SEPTEMBER 2019

Geosyntec consultants

engineers | scientists | innovators

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TABLE OF CONTENTS

I. CERTIFICATION

This *Groundwater Monitoring Plan for Georgia Power Company - Plant Wansley Ash Pond 1* has been prepared to meet the requirements of the Georgia Solid Waste Management Rule by a qualified groundwater scientist with Geosyntec Consultants. References to the appropriate 391-3-4 Rules 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," in accordance with the Rules of Solid Waste Management. According to 391-3-4-.01(57), 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 the Georgia Environmental Protection Division (EPD) Rules of Solid Waste Management, Chapter 391-3-4.10(6).

Signature: _____

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1. INTRODUCTION

Groundwater monitoring is required by the Georgia Environmental Protection Division (EPD) to detect and quantify potential changes in groundwater chemistry. This *Groundwater Monitoring Plan* (plan) describes the groundwater monitoring program for the site. This plan meets the requirements of EPD rules and uses EPD's Manual for Ground Water Monitoring dated September 1991 as a guide. Groundwater monitoring well locations are presented on Figure A-1 of **Appendix A** and well construction details on Table A-1 of **Appendix A**.

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 EPD rules (391-3-4), the EPD rules will take precedent.

In accordance with the United States Environmental Protection Agency (USEPA) Coal Combustion Residual (CCR) Rule (§257.90), which is incorporated by Georgia State CCR Rule by reference, a detection monitoring well network for AP-1 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 the 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

The following section presents a summary of the geologic and hydrogeologic conditions for the Site as described in the AP-1 Hydrogeologic Assessment Report (HAR) prepared by Geosyntec Consultants (Geosyntec) on behalf of Georgia Power Company (GPC). The summary below presents only relevant information related to the groundwater monitoring network. The HAR contains more detailed information regarding lithology, hydraulic conductivity, and the conceptual site model for groundwater flow.

2.1 SITE GEOLOGY

AP-1 is located in the Piedmont Physiographic Province of western Georgia, which is characterized by gently rolling hills and narrow valleys with locally pronounced linear ridges. Geologic mapping performed by Golder (2015) and revised by Geosyntec (2018) indicates that the Site is underlain by schist, amphibolite, gneiss, and quartzite. AP-1 is underlain primarily by five lithologic units; (i) CCR material, (ii) alluvial deposits (iii) saprolite, (iv) partially weathered rock (PWR), and (v) metamorphic crystalline bedrock.

Based on subsurface investigations, the CCR material consists of fly ash, generally described as dark to medium gray, soft, and loose to very loose fine sand and silts with some clay. Discontinuous lenses of coarser bottom ash are present throughout the unit, generally described as dark gray, well-graded, fine to coarse sand and fine gravel. Alluvial deposits related to stream and drainage processes are present but not laterally continuous across the Site and likely correspond with former stream channels buried during the construction of the surface impoundment. Alluvium consists of organic silt and fine sand over-bank deposits and fine to coarse sand channel deposits. Saprolitic soils (saprolite) resulting from the in-situ weathering of the parent bedrock material make up a large portion of the Site subsurface and is generally encountered across the Site. Saprolite is described primarily as sandy silt, silty sand, sandy clay, and silty clay. As the saprolite transitions to more rock-like material approaching the bedrock surface, a zone referred to as PWR is encountered. The PWR unit is the hard, semi-consolidated, weathered to intensely fractured rock interface. PWR may include hard, but friable, decomposed rock, as well as gravel to cobble-size rock fragments bound by clay and silt saprolite matrix. The bedrock at the Site is composed primarily of graphitic schist, muscovite schist, biotite schist, schist with interlayered mafic units, amphibolite/hornblende gneiss, granitic gneiss (Long Island Creek Gneiss), and feldspathic quartzite. The ridges to the northwest and southeast of the surface impoundment are underlain by muscovite schist and Long Island Creek Gneiss, respectively, both of which are relatively resistant to weathering. AP-1 and the Storage Water Pond, however, are underlain by schist with interlayered mafic units and feldspathic quartzite, which are more susceptible to weathering, and, thus, the layer of saprolite and PWR is thicker.

2.2 SITE HYDROGEOLOGY

While the aquifer characteristics of each lithologic unit may vary, the groundwater is interconnected between these units, and they effectively act as one, unconfined aquifer. According to previous site investigations, the potentiometric surface is a subdued reflection of the topography. The top of rock surface also generally follows topography and likely controls groundwater flow direction in the uppermost aquifer, which occurs within the saprolite and PWR and is hydraulically connected to the bedrock via fractures and deeply weathered areas of the rock. Recharge is by precipitation infiltrating through the saprolite to the bedrock. Based on observations of soil types and horizontal conductivity values, the

movement of groundwater in the saprolite is very slow and likely acts as flow through a low-permeability porous media. Groundwater flow in the PWR and the "transition zone" between the PWR and the fractured bedrock is expected to be greater than in the overlying saprolite and the underlying fractured bedrock. Groundwater flow in the bedrock is restricted entirely to flow through fractures. Visual observations and geophysical logging during field investigations indicate a trend of decreasing fracture spacing and density with depth, consistent with regional geologic trends.

Three independent potentiometric surface maps depicting groundwater flow directions for the saprolite unit, the PWR, and the bedrock unit are located in **Appendix A** (Appendix Figures A-2, A-3, and A-4 respectively). The potentiometric surface maps represent data recorded in April 2017. Groundwater generally flows to the south and east toward the Chattahoochee River. With a few exceptions and localized irregularities, the similar contours among the three maps support the conceptual model of the aquifer units being connected. In general, steeper potentiometric contours in areas of higher topographic relief give way to lower gradients as the land surface flattens toward the river.

3. SELECTION OF WELL LOCATIONS

Groundwater monitoring wells were installed to monitor the uppermost occurrence of groundwater beneath the Site (i.e., the saprolite/PWR/bedrock aquifer). Locations were selected based on the AP-1 footprint and geologic and hydrogeologic considerations. GPC follows the recommendation as stated in Chapter 2 of the *Manual for Groundwater Monitoring* (EPD, 1991) to determine well spacing based on site-specific conditions. A map depicting the compliance monitoring well network screened within the saprolite/PWR/bedrock aquifer for AP-1 is included as Figure A-1 in **Appendix A**, Monitoring System Details. A more detailed discussion of the hydrogeological investigations conducted in support of monitoring well placement is provided in the HAR (Geosyntec, 2018).

The groundwater monitoring network locations were chosen to monitor background (GWA) and downgradient (GWC) conditions at the Site based on groundwater flow direction determined by potentiometric evaluation. Eight wells are designated for monitoring of background conditions (i.e., WGWA-1, WGWA-2, WGWA-3, WGWA-4, WGWA-5, WGWA-6, WGWA-7, and WGWA-18) and eleven wells are designated for monitoring of downgradient conditions (i.e., WGWC-8, WGWC-9, WGWC-10, WGWC-11, WGWC-12, WGWC-13, WGWC-14A, WGWC-15, WGWC-16, WGWC-17, and WGWC-19). Wells are positioned to provide adequate coverage to detect potential impacts from the CCR impoundment. Both background and downgradient wells are screened in the uppermost aquifer.

Monitoring wells are generally 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 EPD rules. In addition to the potentiometric surface maps, **Appendix A** also includes a tabulated list (Tables A-1 and A-2) of location coordinates for the individual monitoring wells and piezometers used for water level monitoring. Additional well construction details (i.e., top-of-casing elevation, well depths, and screened intervals) are also provided on this tables.

4. MONITORING WELL DRILLING, CONSTRUCTION, ABANDONMENT AND REPORTING

The existing monitoring well network for AP-1 is in place. Existing monitoring wells were installed following Region 4 U.S. Environmental Protection Agency Science and Ecosystem Support Division Operating Procedure for Design and Installation of Monitoring Wells as a general guide for best practices. Details regarding the installation of these wells are described in the Draft Monitoring Well Installation Report for Surface Impoundment Groundwater Monitoring Wells (Golder Associates, 2016). Additional monitoring wells, if necessary, 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 wells. Drilling methodology may include, but not be limited to: hollow stem augers, direct push, air rotary, mud rotary, or rotosonic techniques. The drilling method shall minimize the disturbance of subsurface materials and shall not cause impact to the groundwater. Borings will be advanced using an appropriate drilling technology capable of drilling and installing a well in site-specific geology. Drilling equipment shall be decontaminated before use and between borehole locations using the procedures described in the most current version of the United States Environmental Protection Agency Region 4 Science and Ecosystem Support Division (SESD) guidance document, *Operating Procedure for Field Equipment Cleaning and Decontamination* (USEPA, SESDGUID-205-R#) as a guide.

Sampling and/or coring may be used to help determine the stratigraphy and geology. Samples will be logged by a qualified groundwater scientist. Screen depths will be chosen based on the depth of the uppermost aquifer.

All drilling for any subsurface hydrologic investigation, 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.

Monitoring wells will be installed using the most current version of the USEPA Region 4 SESD *Operating Procedure - Design and Installation of Monitoring Wells* (USEPA, SESDGUID-101-R#) as a general guide for best practices.

As required by 391-3-4.10(6)(g), a minor modification will be submitted to the EPD prior to the installation or decommissioning of monitoring wells. Well installation must be directed by a qualified groundwater scientist.

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 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 EPD.

WELL INTAKE DESIGN

The design and construction of the intake of the groundwater wells shall: (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 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 may be used 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. If utilized, pre-packed well screens will be installed following general industry standards and using the current version of the USEPA Region 4 SESD Operating Procedure - Design and Installation of Monitoring Wells 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 hole 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 filter pack depth will be measured, and additional sand added if necessary. The filter pack will extend approximately one to two feet above the top of the well screen.

The materials used to seal the annular space 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 zone. If dry bentonite is used, the bentonite must be hydrated with potable water prior to grouting the remaining annulus.

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) 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 2 feet above the bentonite seal and injecting grout at low pressure/velocity.

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 the cementitious grout to ground surface, where it will become a concrete apron extending outward with a radius of at least 1.5 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 pressure in the well to equalize with atmospheric pressure. 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 will 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**, 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 5 nephelometric turbidity units (NTUs); however, formation-specific conditions may not allow this target to be accomplished. Additionally, the stabilization criteria contained in **Appendix C** 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, an equal volume purged from the well.

Many geologic formations contain clay and silt particles that are small enough to work their way through the wells' filter packs over time. Therefore, the turbidity of the groundwater from the monitoring wells may gradually increase over time after initial well development. As a result, the monitoring wells may have to be redeveloped periodically to remove the silt and clay that has worked its way into the filter pack of the monitoring 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.

4.3 ABANDONMENT

Monitoring wells will be abandoned using industry-accepted practices and using the 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. The wells will be abandoned under the direction of a professional geologist (P.G.) or engineer (P.E.) registered in Georgia. Neat Portland cement or bentonite will be used as appropriate to complete abandonment and seal the well borehole. Any piezometers or groundwater wells located within the footprint of AP-1 will be over-drilled prior to abandonment.

4.4 DOCUMENTATION

Within 60 days of the construction, development or abandonment of each new groundwater monitoring well completed under the direction of a qualified groundwater scientist or engineer, a well installation/abandonment report will be submitted to the EPD. The following information will be documented in this report.

- 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 dates, drilling fluids used (if applicable), well casing and screen materials, screen slot size, and joint type
- Details of filter pack material/size, emplacement method (narrative), and volume
- Seal emplacement method and type/volume of sealant
- Borehole diameter and well casing diameter
- Type of protective well cap
- Surface seal and volumes/mix of annular seal material
- Screen length and interval reported in feet below ground surface and elevation
- Well location given to within an accuracy of 0.5 feet based upon survey from acceptable survey point
- Well depth given to within an accuracy of 0.01 feet based upon survey from acceptable survey point
- Lithologic logs

- Documentation that water quality field parameters meet well development criteria (Section 4.2)
- Documentation of ground surface elevation (±0.01 feet)
- Documentation of top of casing elevation (±0.01 feet)
- Schematic of the well with dimensions for all components (e.g., casing, screen, sump, well pad)

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.

Table 1, Groundwater Monitoring Parameters and Frequency, presents the groundwater monitoring parameters and sampling frequency. A minimum of eight independent samples from each groundwater well were collected between May 2016 and September 2017 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. Pursuant to 391-3-4-.10(6), an assessment monitoring program was established for AP-1 based on statistically significant increases documented in the 2017 Annual Groundwater Monitoring and Corrective Action Report (Environmental Resources Management, 2018). Georgia Power will complete assessment monitoring activities as required in Georgia Chapter 391-3-4-.10(6), Rules for Solid Waste Management.

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).

As shown on **Table 2**, Analytical Methods, the groundwater samples will be analyzed using methods specified in USEPA Manual SW-846, USEPA 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), ASTM, or other suitable analytical methods approved by 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 0.2 Standard Units (S.U.).

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	6010B/6020B
Calcium	6010B/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 7040/7041/6010B/6020B
Arsenic	EPA 7060A/7061A/6010B/6020B
Barium	EPA 7080A/7081/6010B/6020B
Beryllium	EPA 7090/7091/6010B/6020B
Cadmium	EPA 7130/7131A/6020B
Chromium	EPA 7190/7191/6010B/6020B
Cobalt	EPA 7200/7201/6010B/6020B
Fluoride	300.0/300.1/9214/9056A
Lead	EPA 7420/7421/6010B/6020B
Lithium	6010/6020B
Mercury	7470
Molybdenum	6010/6020B
Selenium	EPA 7740/7741A/6010B/6020B
Thallium	EPA 7840/7841/6010/6020B
Radium 226 and 228 combined	EPA 903/9320/9315

6. SAMPLE COLLECTION

During each sampling event, samples will be collected and handled in accordance with the procedures specified in **Appendix C**, Groundwater Sampling Procedures. 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 EPD approval. The applied groundwater purging and sampling methodologies will be discussed in the groundwater semi-annual monitoring reports submitted to 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.

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 shall be submitted in accordance with Rule 391-3-4-.02 prior to the installation or decommissioning of monitoring wells.

7. CHAIN-OF-CUSTODY

All 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
- Dates of possession by each individual
- Notated date(s) and time(s) of sample transfer between individuals

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 will 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 will 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 20 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 20 samples.

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

Calibration of field instruments will occur daily and follow the recommended (specific) instrument calibration procedures provided by the manufacturer and/or equipment manual specific to each instrument. Daily calibration will be documented on field forms and these field forms will be included in all groundwater monitoring reports. 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 provided with the semi-annual groundwater monitoring reports.

9. REPORTING RESULTS

A semi-annual groundwater report that documents the results of sampling and analysis will be submitted to EPD. Semi-annual groundwater monitoring reports will be submitted to the EPD within 90 days of receipt 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 brief overview of purging/sampling methodologies.

3. Discussion of results.

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

5. Potentiometric surface contour map for the aquifer(s) being monitored, signed and sealed by a Georgia-registered P.G. or P.E.

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

7. Groundwater flow rate and direction calculations.

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

9. 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).

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

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

12. Laboratory Reports.

13. COC documentation.

14. Field sampling logs including field instrument calibration, indicator parameters and parameter stabilization data.

15. Field logs and forms for each sampling event to include, but not limited to, well signage, well access, sampling and purging equipment condition, and any site conditions that may affect sampling.

16. Documentation of non-functioning wells.

17. Table of current analytical results for each well, highlighting statistically significant increases and concentrations above maximum contaminant level (MCL).

18. Statistical analyses.

19. Certification by a qualified groundwater scientist.

10. STATISTICAL ANALYSIS

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 the State CCR Rule Chapter 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 to be evaluated. The statistical test chosen will be conducted separately for each constituent in each well. As authorized by the rule, statistical tests that will be used include:

1. A tolerance or 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 tolerance or 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 that meets the performance standards of §257.93(g) [§257.93(f)(5)]. 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).

Based on site-specific conditions, statistical methods may be intra-well, inter-well, or combination of both.

A site-specific statistical analysis plan that provides details regarding the statistical methods to be used for AP-1 groundwater data was placed in the Site's operating record pursuant to Chapter 391-3-4-.10(6) (GPC, 2017). The procedures presented in the plan are consistent with the USEPA document *Statistical Analysis of Groundwater Data at RCRA Facilities Unified Guidance* (Unified Guidance) (USEPA, 2009). Interwell statistical limits method will be applied on a constituent basis, depending on the appropriateness of the method as determined by an analysis of variance. Prediction limits are calculated as: (i) parametric when data follow a normal or transformed normal distribution and when less than 50% non-detects, utilizing Kaplan Meier non-detect adjustment when applicable; and (ii) nonparametric when data sets contain greater than 50% non-detects or when data are not normally or transformed-normally distributed.

Figure 1, Statistical Analysis Plan Overview, presents a flowchart that depicts the process followed to develop the site-specific plan. **Figure 2**, Decision Logic for Determining Appropriate Statistical Method, depicts the decision logic used to determine the appropriate method as required by 391-3-4-.10(6). **Figure 3,** 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.

FIGURE 1. STATISTICAL ANALYSIS PLAN OVERVIEW

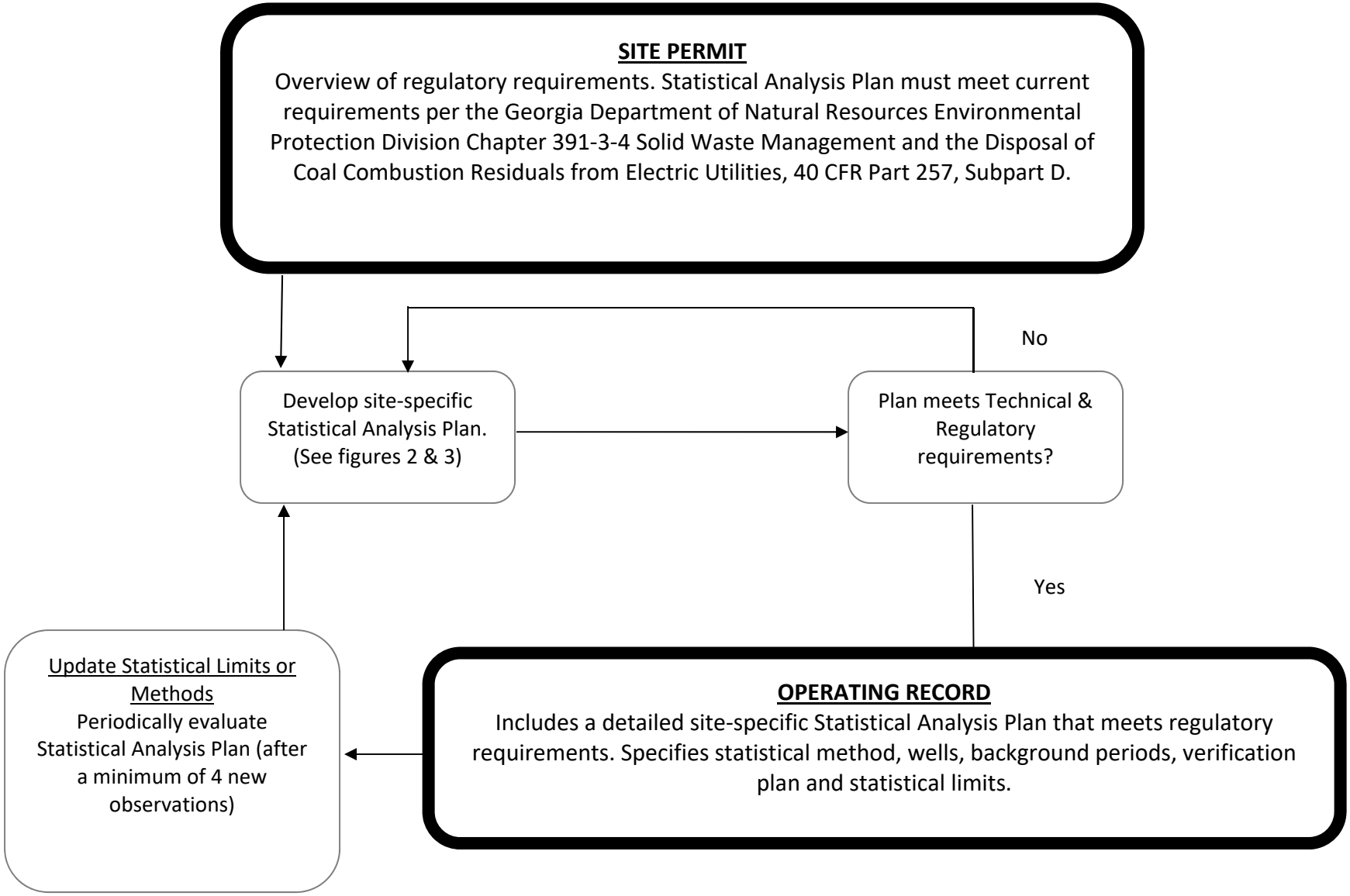


FIGURE 2. DECISION LOGIC FOR DETERMINING APPROPRIATE STATISTICAL METHOD

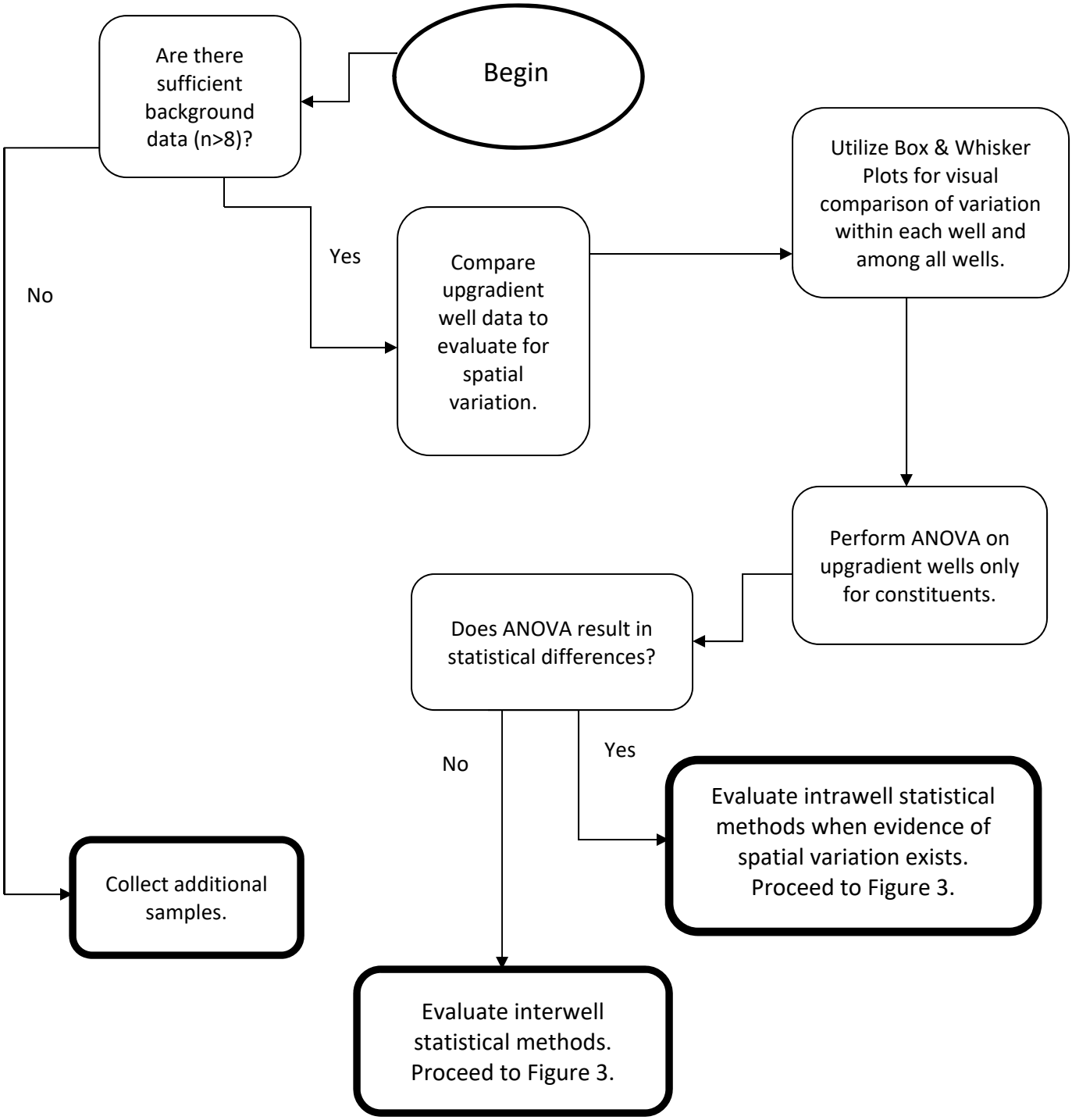
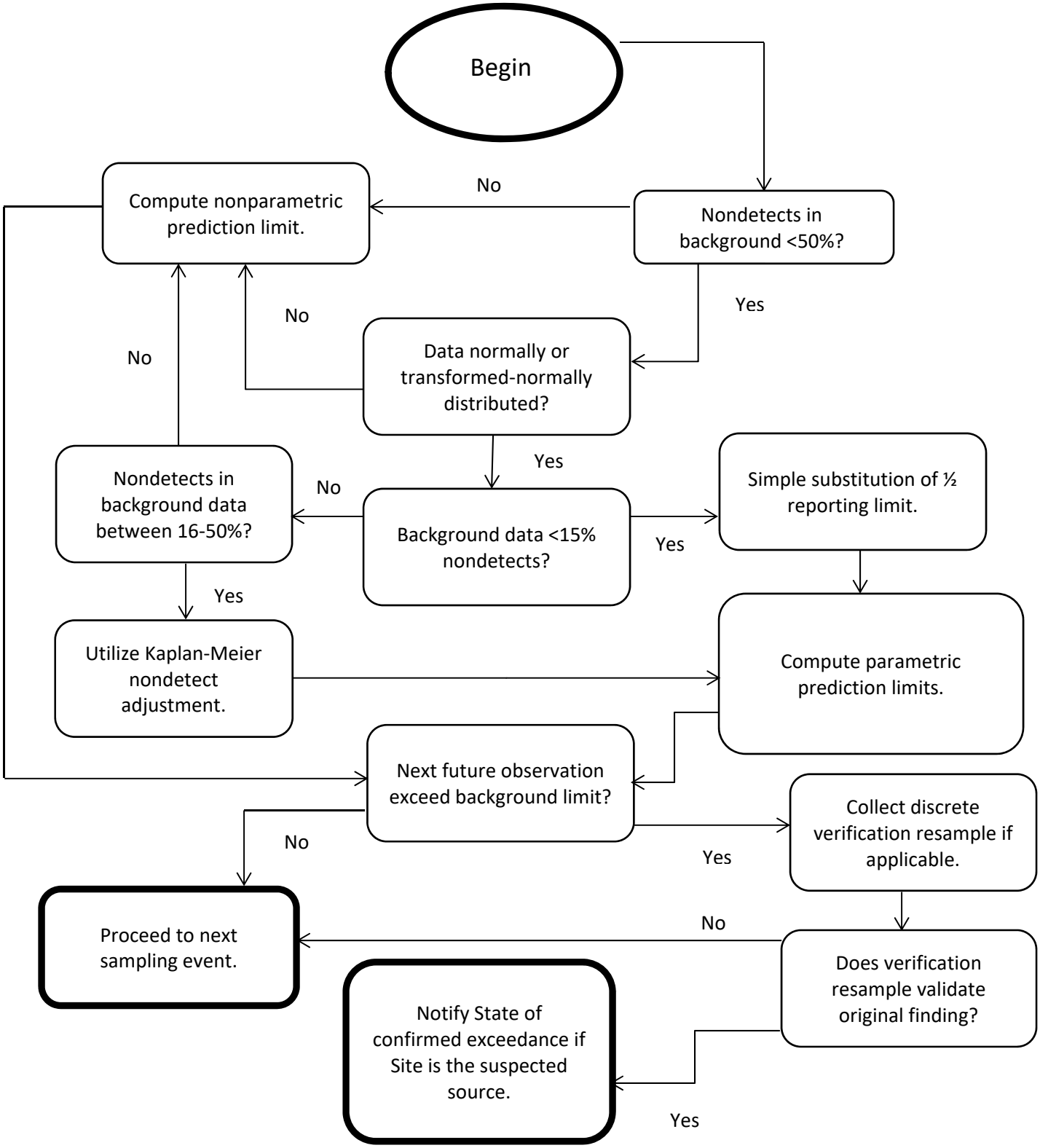


FIGURE 3. DECISION LOGIC FOR COMPUTING TOLERANCE OR PREDICTION INTERVALS



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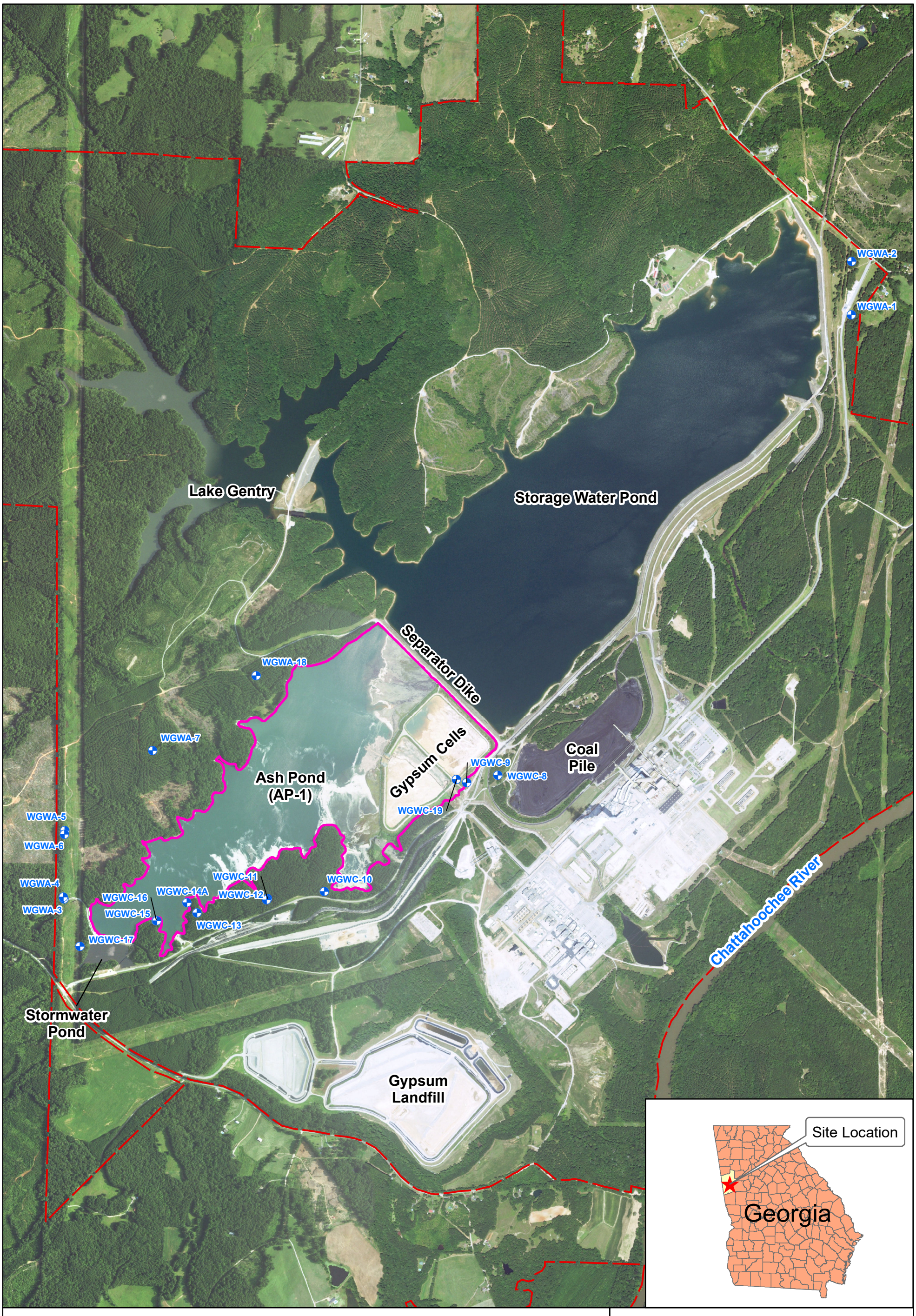
APPENDIX

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

A. MONITORING SYSTEM DETAILS



Notes:
1. *Well no longer sampled as part of background monitoring due to well replacement.
2. Aerial Photograph approximate date - Summer 2015
Source: USDA-FSA-APFO NAIP MrSID Mosaic.

Monitoring Well Network Map
Plant Wansley

Georgia Power Company
1371 Liberty Church Road
Carrollton, GA 30116

Geosyntec consultants

Kennesaw, GA | August 2019

Figure A-1

\\aro-01\prj1$\GA Power\Plant Wansley\GIS\MXD\GWMP\Figure A-1-Monitoring Well Network Map.mxd 8/26/2019 10:57:21 AM

Lake Gentry

Storage Water Pond

Separator Dike

Ash Pond
(AP-1)
797.00

PZ-13
796.66

WGWC-11
796.82

WGWC-10
799.39

PZ-15
796.18

PZ-12
793.27

PB-7
793.10

PZ-18
797.49

PZ-17
793.10

PZ-16
789.17

GWC-30
763.99

GWC-11
694.24

GWC-14
682.89

GWC-16
679.33

GWC-17
683.79

GWC-24
742.77

GWA-2
769.87

GWA-1
754.57

GWC-18
686.10

GWC-22
716.08

GWC-20
698.58

GWC-23
735.55

GWC-21
704.50

790
780
770
760
750
740
730
720
710
700
690

CARROLL HEARD

Georgia Power Rd

Yellow Dirt

S Bridge Rd

Miam Rd

Five Notch Rd

970 ft
886 ft
883 ft
849 ft
800 ft
700 ft

Site Location

Georgia

AP-1 Monitoring Well
Gypsum Landfill Monitoring Well
Piezometer
Approximate Boundary of AP-1
Groundwater Elevation (ft NAVD88)
Approximate Groundwater Flow Direction
Plant Wansley Boundary

Notes:
1. "ft NAVD 88" = feet North American Vertical Datum 88
2. Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

N

0 500 1,000 2,000
Feet

Potentiometric Surface Map in Saprolite
25 April 2017 - Plant Wansley

Georgia Power Company
1371 Liberty Church Road
Carrollton, GA 30116

Geosyntec consultants

Kennesaw, GA | August 2019

Figure
A-2

\\aro-01\prj1$\GA Power\Plant Wansley\GIS\MXD\GWMP\Figure A-2-Potentiometric Surface Map in Saprolite – 25 April 2017.mxd 8/26/2019 10:20:14 AM

Gentry

Lake Gentry

Storage Water Pond

Separator Dike

Ash Pond
(AP-1)
797.00

Yellow Dirt

WGWA-1
757.41

WGWC-16
797.26

GWC-7
722.41

GWC-6
731.71

GWC-27
768.63

GWC-26
752.1

GWC-5
737.1

GWA-4
753.54

GWC-19
691.89

967 ft

886 ft

787 ft

800 ft

790

780

770

760

750

740

730

720

710

700

690

CARROLL
HEARD

Liberty Church Rd

Norfolk Southern

Staple Dairy Rd

Georgia Power Rd

S Bridge Rd

Milam Rd

Hollingsworth Ferry Rd

Webb Rd

Five Notch Rd

Chattahoochee River

Site Location

Georgia

AP-1 Monitoring Well
Gypsum Landfill Monitroring Well
Piezometer
Approximate Boundary of AP-1
Groundwater Elevation (ft NAVD88)
Approximate Groundwater Flow Direction
Plant Wansley Boundary

Notes:
1. "ft NAVD 88" = feet North American Vertical Datum 88
2. Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

N

0 750 1,500 3,000
Feet

Potentiometric Surface Map in PWR
25 April 2017 - Plant Wansley

Georgia Power Company
1371 Liberty Church Road
Carrollton, GA 30116

Geosyntec consultants

Kennesaw, GA | August 2019

Figure
A-3

\\aro-01\prj1$\GA Power\Plant Wansley\GIS\MXD\GWMP\Figure A-3-Potentiometric Surface Map in PWR – 25 April 2017.mxd 8/26/2019 11:25:47 AM

Lake Gentry

Storage Water Pond

Ash Pond
(AP-1)
797.00

Separator Dike

Chattahoochee River

Georgia Power Rd

Hollingsworth Ferry Rd

Webb Rd

Five Notch Rd

S Bridge Rd

Milam Rd

Norfolk Southern

CARROLL
HEARD

WGWA-2
749.26

PZ-08
853.35

WGWA-18
858.42

PZ-06
896.14

WGWA-7
870.74

PZ-04
871.95

WGWA-5
889.31

WGWA-6
882.96

WGWA-4
829.6

WGWA-3
827.02

PZ-01
818.42

WGWC-17
796.92

WGWC-15
796.27

WGWC-14
794.91

WGWC-13
796.69

WGWC-12
797

PB-9
797.837

PZ-11
810.93

PZ-10
805.78

WGWC-19
762.33

WGWC-9
798.52

WGWC-8
776.66

GWC-31
766.55

GWC-33
745.28

GWC-34
730.14

GWC-35
722.44

GWC-8
712.93

GWC-10
697.27

GWC-12
707.72

GWC-13
687.11

GWC-15
680.67

GWA-29
791.41

GWA-28
823.14

GWC-25
760.02

GWA-3
759.03

860
840
900
820
880
800
780
760
740
720
700
680

967 ft
886 ft
787 ft

Site Location

Georgia

AP-1 Monitoring Well
Gypsum Landfill Monitoring Well
Piezometer
Approximate Boundary of AP-1
Groundwater Elevation (ft NAVD88, dashed where inferred)
Approximate Groundwater Flow Direction
Plant Wansley Boundary

Notes:
1. "ft NAVD 88" = feet North American Vertical Datum 88
2. Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

N

0 750 1,500 3,000
Feet

Potentiometric Surface Map in Bedrock
25 April 2017 - Plant Wansley

Georgia Power Company
1371 Liberty Church Road
Carrollton, GA 30116

Geosyntec consultants

Kennesaw, GA | August 2019

Figure
A-4

\\aro-01\prj1$\GA Power\Plant Wansley\GIS\MXD\GWMP\Figure A-4-Potentiometric Surface Map in Bedrock – 25 April 2017.mxd 8/26/2019 11:10:33 AM

Table A-1
AP-1 Monitoring Network Well Details
Plant Wansley, Carroll/Heard County, Georgia

Well ID	Purpose	Northing [1]	Easting [1]	Ground Surface Elevation (ft NAVD88)	Top of Casing Elevation (ft NAVD88)	Well Depth (ft BTOC)[2]	Top of Screen Elevation (ft NAVD88)	Bottom of Screen Elevation (ft NAVD88)	Screened Media
WGWA-1	Monitoring, background	1250656.42	2035580.22	780.00	782.86	129.86	663.00	653.00	PWR
WGWA-2	Monitoring, background	1251556.43	2035589.54	755.64	758.29	102.65	665.64	655.64	Bedrock
WGWA-3	Monitoring, background	1240848.15	2022350.63	826.80	829.02	19.12	820.30	810.30	Bedrock
WGWA-4	Monitoring, background	1240879.82	2022340.78	831.20	834.32	73.92	780.40	760.40	Bedrock
WGWA-5	Monitoring, background	1241998.08	2022369.48	899.30	902.13	23.63	888.90	878.90	Bedrock
WGWA-6	Monitoring, background	1241931.99	2022361.54	894.60	897.05	104.45	822.60	792.60	Bedrock
WGWA-7	Monitoring, background	1243338.47	2023843.69	894.60	897.42	40.02	867.80	857.80	Bedrock
WGWA-18	Monitoring, background	1244595.08	2025580.02	875.50	878.07	39.97	848.50	838.50	Bedrock
WGWC-8	Monitoring, downgradient	1242929.00	2029644.30	777.37	780.00	59.63	730.37	720.37	Bedrock
WGWC-9	Monitoring, downgradient	1242800.62	2029116.49	809.40	812.08	61.48	761.00	751.00	Bedrock
WGWC-10	Monitoring, downgradient	1240971.45	2026725.30	809.61	812.59	148.98	673.61	663.61	Saprolite
WGWC-11	Monitoring, downgradient	1240859.57	2025772.90	821.50	823.96	51.16	783.20	773.20	Saprolite
WGWC-12	Monitoring, downgradient	1240827.20	2025755.40	820.55	823.12	76.57	756.55	746.55	Bedrock
WGWC-13	Monitoring, downgradient	1240610.61	2024585.99	807.49	810.04	95.55	734.49	714.49	Bedrock
WGWC-14A	Monitoring, downgradient	1240785.68	2024416.05	808.01	811.09	43.08	778.01	768.01	PWR/Bedrock
WGWC-15	Monitoring, downgradient	1240483.19	2023912.18	802.12	804.98	56.36	758.62	748.62	Bedrock
WGWC-16	Monitoring, downgradient	1240480.41	2023903.07	801.71	804.49	34.78	779.71	769.71	PWR
WGWC-17	Monitoring, downgradient	1240051.97	2022623.25	813.08	816.02	95.94	730.08	720.08	Bedrock
WGWC-19	Monitoring, downgradient	1242852.02	2028948.67	780.42	783.44	95.02	698.42	688.42	Bedrock

Notes:
ft = feet
NAVD88 North American Vertical Datum 88
BTOC = below top of casing
PWR = partially weathered rock
(1) Coordinates in North American Datum (NAD) 1983, State Plane, Georgia-West, feet.
(2) Total well depth accounts for sump if data provided on well construction logs.

Table A-2

AP-1 Water Level Monitoring Network Well and Piezometer Details

Plant Wansley, Carroll/Heard County, Georgia

Well ID	Purpose	Northing [2]	Easting [2]	Ground Surface Elevation (ft NAVD88)	Top of Casing Elevation (ft NAVD88)	Well Depth (ft BTOC)[3]	Top of Screen Elevation (ft NAVD88)	Bottom of Screen Elevation (ft NAVD88)	Screened Media
WGWC-14[4]	Water level	1240621.86	2024584.92	806.87	809.50	54.63	764.87	754.87	Bedrock
GWA-1	Water level	1236939.13	2027869.54	774.85	778.00	49.85	738.45	728.45	Saprolite
GWA-2	Water level	1237146.12	2027481.94	812.93	816.00	60.07	766.23	756.23	Saprolite
GWA-3	Water level	1237239.20	2027159.47	786.82	789.98	31.16	769.12	759.12	Bedrock
GWA-4	Water level	1237253.84	2026749.01	776.28	779.39	40.61	753.28	743.28	PWR
GWC-5	Water level	1237691.32	2026715.51	752.92	755.60	40.68	725.22	715.22	PWR
GWC-6	Water level	1237923.27	2027012.52	746.70	749.78	31.08	729.00	719.00	PWR
GWC-7	Water level	1238262.00	2027267.59	728.07	730.97	25.90	715.37	705.37	PWR
GWC-8	Water level	1238500.90	2027639.14	720.27	723.30	20.03	713.57	703.57	Bedrock
GWC-9	Water level	1238673.34	2027890.01	709.65	712.56	19.41	703.45	693.45	Bedrock
GWC-10	Water level	1238950.89	2028307.54	705.87	709.47	22.00	697.77	687.77	Bedrock
GWC-11	Water level	1238931.28	2028591.49	697.73	700.96	18.23	693.03	683.03	Saprolite
GWC-12	Water level	1238739.93	2028921.25	721.09	724.22	40.63	693.89	683.89	Bedrock
GWC-13	Water level	1238623.77	2029289.13	690.83	693.75	90.42	616.13	606.13	Bedrock
GWC-14	Water level	1238429.70	2029551.61	688.56	692.81	24.55	678.56	668.56	Saprolite
GWC-15	Water level	1238164.58	2029813.00	684.51	687.57	51.06	646.81	636.81	Bedrock
GWC-16	Water level	1237810.54	2029989.92	686.85	690.12	26.97	673.45	663.45	Saprolite
GWC-17	Water level	1237469.43	2029802.79	701.30	704.34	53.34	661.30	651.30	Saprolite
GWC-18	Water level	1237098.46	2029693.00	697.19	700.20	30.51	679.99	669.99	Saprolite
GWC-19	Water level	1236842.27	2029324.62	696.80	700.86	38.56	672.60	662.60	PWR
GWC-20	Water level	1236646.17	2029150.84	702.55	705.63	71.08	644.85	634.85	Saprolite
GWC-21	Water level	1236231.33	2028635.01	717.37	721.07	38.30	693.07	683.07	Saprolite
GWC-22	Water level	1236394.63	2028325.81	740.99	744.14	77.15	677.29	667.29	Saprolite
GWC-23	Water level	1236656.19	2028089.67	770.42	773.47	68.05	715.72	705.72	Saprolite
GWC-24	Water level	1237354.38	2026408.81	787.13	789.98	51.05	749.23	739.23	Saprolite
GWC-25	Water level	1237403.26	2026090.25	809.18	812.11	61.23	761.18	751.18	Bedrock
GWC-26	Water level	1237623.48	2025790.84	782.49	785.42	59.43	736.29	726.29	PWR
GWC-27	Water level	1237827.75	2025523.43	811.24	814.07	70.83	753.54	743.54	PWR
GWA-28	Water level	1237994.32	2025183.32	846.25	849.03	45.78	813.55	803.55	Bedrock
GWA-29	Water level	1238288.63	2024982.91	831.67	834.70	57.13	787.87	777.87	Bedrock
GWC-30	Water level	1238566.15	2025117.64	788.45	791.03	49.58	751.75	741.75	Saprolite
GWC-31	Water level	1238700.61	2025617.60	793.62	797.54	38.02	770.02	760.02	Bedrock
GWC-32	Water level	1238775.07	2025875.03	782.17	785.22	31.05	764.47	754.47	Bedrock
GWC-33	Water level	1238819.21	2026322.01	757.04	760.03	23.99	746.34	736.34	PWR/Bedrock
GWC-34	Water level	1238558.92	2026570.28	731.84	735.09	51.25	694.64	684.64	PWR/Bedrock
GWC-35	Water level	1238244.57	2026822.28	728.11	730.89	40.78	700.41	690.41	PWR/Bedrock
PB-7	Water level	1240837.08	2026768.14	816.51	819.58	88.07	741.51	731.51	Saprolite
PB-9	Water level	1241490.28	2026504.40	820.49	823.64	73.15	760.49	750.49	Bedrock

Table A-2

AP-1 Water Level Monitoring Network Well and Piezometer Details

Plant Wansley, Carroll/Heard County, Georgia

Well ID	Purpose	Northing [2]	Easting [2]	Ground Surface Elevation (ft NAVD88)	Top of Casing Elevation (ft NAVD88)	Well Depth (ft BTOC)[3]	Top of Screen Elevation (ft NAVD88)	Bottom of Screen Elevation (ft NAVD88)	Screened Media
PZ-01	Water level	1240250.23	2022320.55	854.00	856.78	48.88	817.90	807.90	Bedrock
PZ-04	Water level	1242593.24	2023596.58	886.20	889.09	19.99	879.10	869.10	Bedrock
PZ-06	Water level	1244383.91	2024661.72	912.50	915.33	26.53	898.80	888.80	Bedrock
PZ-08	Water level	1245513.68	2026807.12	880.20	882.84	40.34	852.50	842.50	Bedrock
PZ-10	Water level	1242059.03	2028553.60	829.40	832.16	31.46	810.70	800.70	Bedrock
PZ-11	Water level	1240579.71	2026932.74	820.10	822.99	33.39	799.60	789.60	Bedrock
PZ-12	Water level	1240838.70	2026731.07	816.30	818.88	49.38	779.50	769.50	Saprolite
PZ-13	Water level	1241151.16	2026530.47	847.50	850.04	59.84	800.20	790.20	Saprolite
PZ-15	Water level	1240457.00	2025105.41	824.70	826.96	41.06	795.90	785.90	Saprolite
PZ-16	Water level	1239419.20	2023661.16	797.90	800.55	25.65	784.90	774.90	Saprolite
PZ-17	Water level	1239269.85	2023086.39	828.70	831.21	51.21	790.00	780.00	Saprolite
PZ-18	Water level	1239569.57	2022299.71	811.70	814.12	36.32	787.80	777.80	Saprolite
PZ-20	Water level	1243495.71	2030132.09	784.14	787.27	38.13	759.14	749.14	Saprolite
PZ-21	Water level	1240147.24	2024454.06	811.58	814.71	33.13	791.58	781.58	Saprolite/PWR

Notes:

ft = feet

NAVD88 = North American Vertical Datum 88

BTOC = below top of casing

PWR = partially weathered rock

(1) Additional Monitoring Wells and Piezometers used only to gauge water levels in vicinity of AP-1 and refine the AP-1 potentiometric map.

(2) Coordinates in North American Datum (NAD) 1983, State Plane, Georgia-West, feet.

(3) Total well depth accounts for sump if data provided on well construction logs.

(4) Well no longer sampled as part of background monitoring due to well replacement.

RECORD OF BOREHOLE APA-1/WAGWA-1

SHEET 1 of 3

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 127.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/19/15
DATE COMPLETED: 10/21/15

NORTHING: 1,250,656.42
EASTING: 2,035,580.22
GS ELEVATION: 780.00
TOC ELEVATION: 782.86 ft

DEPTH W.L.:27.6'
DATE W.L.:10/21/15
TIME W.L.:07:50

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	SAMPLES: TYPE	SAMPLES: REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES
0	780	0.00 - 4.00 SILT; orange, dry (fill)	ML		776 4.00				
5	775	4.00 - 26.00 CLAYEY SILT; sample mostly broken down into SILT-sized fragments; light brown to light orange brown, dry. Clasts in sample are very fine grained muscovite-plagioclase schist. (ML) (overburden)	ML						
10	770								
15	765								
20	760								
25	755				754 26.00				
30	750	26.00 - 37.00 grayish-red to grey and red. top 1' is dry, 27' and deeper is moist. Greater abundance of rock fragments in sample 1-2" in diameter. Muscovite-plagioclase schist with <5% quartz. Visible, very fine foliated texture, weathered (sapprolite)	ML						
35	745				743 37.00				
40	740	37.00 - 42.00 SAPROLITE ROCK; moist, grey and brown quartzose schist with about 5% muscovite, <5% garnet <1mm-3mm. Broken into fragments up to 3" in diameter	PWR		738 42.00				
45	735	42.00 - 47.00 moist, grey and light red, weathered muscovite schist interlayered with quartz-rich lenses upt to 2" thick (scarce)							

Log continued on next page

WELL CASING
Interval: -2.5'-118'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 117'-127'
Material: Schedule 40 PVC
Diameter: 2"
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 116-127'
Type: #1 Sand/ Pre-packed Filter

FILTER PACK SEAL
Interval: 114'-116'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-114'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

RECORD OF BOREHOLE APA-1/WAGWA-1

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 127.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/19/15
DATE COMPLETED: 10/21/15

NORTHING: 1,250,656.42
EASTING: 2,035,580.22
GS ELEVATION: 780.00
TOC ELEVATION: 782.86 ft

DEPTH W.L.:27.6'
DATE W.L.:10/21/15
TIME W.L.:07:50

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
45	735	42.00 - 47.00 moist, grey and light red, weathered muscovite schist interlayered with quartz-rich lenses upt to 2" thick (scarce) *(Continued)*		733					
		47.00 - 57.00 CLAYEY SILT; moist, white, 90% plagioclase, 5% muscovite, <5% quartz, with a 2" lense of muscovite schist and weathered pegmatite	ML	47.00 723					
55	725	57.00 - 64.00 SAPROLITE ROCK; moist, orange-brown muscovite plagioclase schist. <5% quartz. metamorphic texture present. Quartzite/quartz rich lenses at 64-66',80-80.1', and 87-88'	PWR	57.00 716				Portland Type 1	
65	715	64.00 - 77.00 POOR RECOVERY; broken quartzose schist, white to grey, wet		64.00 703					
75	705	77.00 - 87.00 SAPROLITE ROCK; weathered muscovite schist, metamorphic foliation, lenses of quartz-rich weather resistant material, moist		77.00 693					
85	695	87.00 - 88.00 brown, wet, foliated quartzite	PWR	87.00 692					
		88.00 - 91.00 moist, orange/brown, garbet muscovite schist, oxidized feldspar, weathered quartz		88.00					
90	690	Log continued on next page							

WELL CASING
Interval: -2.5'-118'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 117'-127'
Material: Schedule 40 PVC
Diameter: 2"
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 116-127'
Type: #1 Sand/ Pre-packed Filter

FILTER PACK SEAL
Interval: 114'-116'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-114'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

RECORD OF BOREHOLE APA-1/WAGWA-1

SHEET 3 of 3

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 127.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/19/15
DATE COMPLETED: 10/21/15

NORTHING: 1,250,656.42
EASTING: 2,035,580.22
GS ELEVATION: 780.00
TOC ELEVATION: 782.86 ft

DEPTH W.L.:27.6'
DATE W.L.:10/21/15
TIME W.L.:07:50

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES
90	690				689 / 91.00				
		91.00 - 107.00 SAPROLITE; moist, white/orange/brown, weathered garnet mica schist	PWR						
95	685								
100	680								
105	675				673 / 107.00				
		107.00 - 113.00 wet, broken rock fragments							
110	670				667 / 113.00				
		113.00 - 117.00 moist, weathered orange soil with faint fabric							3/8" Bentonite Pellets
115	665		PWR		663 / 117.00				
		117.00 - 126.50 PARTIALLY WEATHERED ROCK; wet, brown rock fragments up to 3" in diameter							
120	660								#1 Sand
125	655				653.5				0.010" Slot Screen
		126.50 - 127.00 SAPROLITE; light brown wix of clay, silt, fine to coarse sand and angular gravel	PWR		653				
		Boring completed at 127.00 ft							
130	650								
135	645								

WELL CASING
Interval: -2.5'-118'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 117'-127'
Material: Schedule 40 PVC
Diameter: 2"
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 116-127'
Type: #1 Sand/ Pre-packed Filter

FILTER PACK SEAL
Interval: 114'-116'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-114'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

RECORD OF BOREHOLE APA-2D/WAGWA-2

SHEET 1 of 3

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 107.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/15/15
DATE COMPLETED: 10/16/15

NORTHING: 1,251,556.43
EASTING: 2,035,589.54
GS ELEVATION: 755.64
TOC ELEVATION: 758.29 ft

DEPTH W.L.:11.55'
DATE W.L.:10/20/15
TIME W.L.:10:30

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: SAMPLE NO.	SAMPLES: TYPE	SAMPLES: REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
0	755	0.00 - 5.00 SILTY CLAY; reddish-brown, firm, moist. No fabric. <5% mica flakes. Fill/overburden soil	CL		750.64					
5	750	5.00 - 7.00 SILTY CLAY; orange-red to orange-brown, moist. Oxidized and mottled black stringers (Mn Oxide) and white veins of plagioclase, weathered (saprolite)	CL		5.00 748.64					
		7.00 - 25.00 SILTY CLAY; saprolite	CL		7.00 730.64					
25	730	25.00 - 30.00 CLAYEY SILT; moist, pale brown, some red clay, plagioclase stringers	ML		25.00 725.64					
30	725	30.00 - 60.00 SANDY SILT; dry to moist, pale yellow to brown. Fabric not evident	ML		30.00					
35	720									
40	715								Portland Type 1	
45		Log continued on next page								

WELL CASING
Interval: -2.5'-90'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 90'-100'
Material: Schedule 40 PVC
Diameter: 2"
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 87'-100'
Type: #1 Sand/Pre-packed Filter

FILTER PACK SEAL
Interval: 84'-87'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-84'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Timothy Richards
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

RECORD OF BOREHOLE APA-2D/WAGWA-2

SHEET 2 of 3

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 107.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/15/15
DATE COMPLETED: 10/16/15

NORTHING: 1,251,556.43
EASTING: 2,035,589.54
GS ELEVATION: 755.64
TOC ELEVATION: 758.29 ft

DEPTH W.L.:11.55'
DATE W.L.:10/20/15
TIME W.L.:10:30

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
45	710	30.00 - 60.00 SANDY SILT; dry to moist, pale yellow to brown. Fabric not evident *(Continued)*	ML							
50	705									
55	700									
60	695				695.64 60.00					
		60.00 - 70.00 SANDY SILT; Quartzite rock hard cobble rock fragments	ML							
65	690									
70	685				685.64 70.00					
		70.00 - 77.00 dry, pale yellow to brown, gravelly	ML							
		73.00 - 77.00 NO RECOVERY								
75	680				678.64					
		77.00 - 81.00 SILTY CLAY; sandy; green, moist, weathered rock with chlorite	CL		77.00					
80	675				674.64					
		81.00 - 83.00 GRAVELLY SILT; partially weathered rock, dry, pale brown	ML		81.00 672.64					
		83.00 - 90.00 PARTIALLY WEATHERED ROCK; brown, >3" rock fragments, moist	PWR		83.00				3/8" Bentonite – Pellets	
85	670									
90					665.64					

Log continued on next page

WELL CASING
Interval: -2.5'-90'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 90'-100'
Material: Schedule 40 PVC
Diameter: 2"
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 87'-100'
Type: #1 Sand/Pre-packed Filter

FILTER PACK SEAL
Interval: 84'-87'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-84'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Timothy Richards
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

RECORD OF BOREHOLE APA-2D/WAGWA-2

SHEET 3 of 3

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 107.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/15/15
DATE COMPLETED: 10/16/15

NORTHING: 1,251,556.43
EASTING: 2,035,589.54
GS ELEVATION: 755.64
TOC ELEVATION: 758.29 ft

DEPTH W.L.:11.55'
DATE W.L.:10/20/15
TIME W.L.:10:30

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
90	665	90.00 - 107.00 BEDROCK; SCHIST to SCHISTOSE GNEISS; grey; trace garnets (1-3mm), trace muscovite			90.00				#1 Sand	**WELL CASING** Interval: -2.5'-90' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded
95	660								0.010" Screen Slot	**SURFACE CASING** Interval: N/A Material: N/A Diameter: N/A
100	655	97.00 - 107.00 quartzite with muscovite, pyrite, garnet	BR						#1 Sand	**WELL SCREEN** Interval: 90'-100' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC
105	650				648.64				3/8" Bentonite Pellets	**FILTER PACK** Interval: 87'-100' Type: #1 Sand/Pre-packed Filter
110	645	Boring completed at 107.00 ft								**FILTER PACK SEAL** Interval: 84'-87' Type: 3/8" Bentonite Pellets
115	640									**ANNULUS SEAL** Interval: 0'-84' Type: Portland Type 1
120	635									**WELL COMPLETION** Pad: 4'x4'x4" Protective Casing: Anodized Aluminum
125	630									**DRILLING METHODS** Soil Drill: 4-inch Sonic Rock Drill: 4-inch Sonic
130	625									
135										

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Timothy Richards
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

WGWA-3

BORING PZ-02
PAGE 1 OF 1
ECS38198

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/15/2014 **COMPLETED** 12/15/2014 **SURF. ELEV.** 826.8 **COORDINATES:** N:33.408027 E:-85.065319
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 18 ft. **GROUND WATER DEPTH: DURING** **COMP.** 3.5 ft. **DELAYED** 9.6 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA	ELEV. (DEPTH)
				Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 829.02	
		Silty Gravel (GM) - brown, moist, fine to medium grain, angular, mottled yellow		Surface Seal: concrete	824.8 (2.0)
		- brown, moist, fine to medium grain, angular, mottled orange		Annular Fill: Cement-Bentonite Grout - 1 bag, 46 lbs, Portland Type I/II, 5.5 gal	823.2 (3.6)
5				Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips	821.2 (5.6)
				Filter: silica filter sand - 4 bags, 50 lbs, #1A filter media	820.3 (6.4)
			819.8		
		Gneiss - brown, fine grain, hard to medium hard, moderately weathered, non-foliated		**Well: 2" OD PVC (SCH 40)**	
10				**Well: 2" OD PVC (SCH 40)** **Screen: 10 ft. pre-pack**	
15				Sump:0.40 ft.	810.3 (16.4)
			808.8		

Bottom of borehole at 18.0 feet.

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

WGWA-5

BORING PZ-03
PAGE 1 OF 1
ECS38198

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/23/2014 **COMPLETED** 12/23/2014 **SURF. ELEV.** 899.3 **COORDINATES:** N:33.411187 E:-85.065290
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 21 ft. **GROUND WATER DEPTH: DURING** **COMP.** 10.1 ft. **DELAYED** 9.6 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA	ELEV. (DEPTH)
				Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 902.13	
				Surface Seal: concrete	897.3 (2.0)
				Annular Fill: Cement-Bentonite Grout - 4 bags, 46 lbs, Portland Type I/II, 22 gal	892.7 (6.6)
				Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips	890.7 (8.6)
				Filter: silica filter sand - 4 bags, 50 lbs, #1A filter media	888.9 (10.4)
5		**Silt (ML)** - brown, moist, sandy, mottled orange, micaceous, trace weathered rock	887.3		
10				**Well: 2" OD PVC (SCH 40)**	
15		**Silty Sand (SM)** - gray, moist, fine to coarse grain, trace partially weathered rock	884.3		
20		**Schist** - gray, fine grain, hard to medium hard, moderately to slightly weathered, thickly foliated, more competent with depth	878.3	**Well: 2" OD PVC (SCH 40)** **Screen: 10 ft. pre-pack**	
				Sump:0.40 ft.	878.9 (20.4)

Bottom of borehole at 21.0 feet.

WGWA-7

BORING PZ-05
PAGE 1 OF 1
ECS38198

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/22/2014 **COMPLETED** 12/22/2014 **SURF. ELEV.** 894.6 **COORDINATES:** N:33.414906 E:-85.060497
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 38.1 ft. **GROUND WATER DEPTH: DURING** **COMP.** 9.7 ft. **DELAYED** 10.1 ft. after 24 hrs.
NOTES

DEPTH (ft) | GRAPHIC LOG

STRATA DESCRIPTION

ELEV.

Silt (ML)
- red, wet, sandy, mottled brown and orange, trace clay, mica, weathered rock

- gray, moist, sandy, mottled orange and brown, trace mica and weathered rock

872.6

Schist
- gray, fine grain, hard, not to slightly weathered, massive to thickly banded

856.6

Bottom of borehole at 38.1 feet.

WELL DATA

Protective aluminum cover with bollards
4-foot square concrete pad
Top of casing Elev. = 897.42

ELEV. (DEPTH)

Surface Seal: concrete — 892.6 (2.0)

Annular Fill: Cement-Bentonite Grout - 6 bags, 46 lbs, Portland Type I/II, 33 gal

870.9 (23.7)

Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips — 868.9 (25.7)

Filter: silica filter sand - 4 bags, 50 lbs, #1A filter media — 867.8 (26.8)

Well: 2" OD PVC (SCH 40)

Well: 2" OD PVC (SCH 40)
Screen: 10 ft. pre-pack

857.8 (36.8)

Sump:0.40 ft.

2012 GEOTECH LOG WITH WELL - ESEE2012DATABASE.GDT - 2/26/15 15:57 - S:\WORKGROUPS\APC GENERAL SERVICE COMPLEX\CIVIL TECH SUPPORT\DRILLING\PROJECTS\WANSLEY ASH POND PIEZ\GINT\PLANT_WANSLEY_ASH_POND_1 (2).GPJ

WGWC-8

RECORD OF BOREHOLE APC-1/WAGWC-6D

SHEET 1 of 2

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 57.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/29/15
DATE COMPLETED: 10/29/15

NORTHING: 1,242,928.92
EASTING: 2,029,644.35
GS ELEVATION: 777.37
TOC ELEVATION: 780.00 ft

DEPTH W.L.:36'
DATE W.L.:11/02/2015
TIME W.L.:12:00

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
0		0.00 - 2.00 SAPROLITE; overburden, dry to moist, brown to reddish orange	ML		775.37					
	775	2.00 - 4.00 CLAYEY SILT; dry to moist, brown overburden (saprolite)			2.00 773.37					
5		4.00 - 8.00 red orange overburden (saprolite)	ML		4.00 769.37					
	770	8.00 - 24.00 dry to moist, brown to reddish orange			8.00					
10										
	765									
15										
	760									
20									Portland Type 1	
	755				753.37					
25		24.00 - 28.00 GRAVELLY CLAY; wet, yellow-orange, trace black and white stringers, manganese oxide and weathered feldspar, lean clay	GC		24.00 749.37					
	750	28.00 - 29.00 CLAYEY SAND/PARTIALLY WEATHERED ROCK; wet, brown, clayey silt, some fine to coarse sand, some fine gravel size rock fragments	PWR		28.00 748.37					
30		29.00 - 57.00 Mylonitic QUARTZITE ROCK; white to light brown, rock is less coherent and likely fractured around 54-56' interval	BR		29.00					
	745									
35										
	740									
40										
	735								3/8" Bentonite Pellets	
45		Log continued on next page								

WELL CASING
Interval: -2.5'-47'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 47'-57'
Material: Schedule 40 PVC
Diameter: 2"
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 45'-57'
Type: #1 Sand/Prepacked Filter

FILTER PACK SEAL
Interval: 41.5'-45'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-41.5'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: Hydrovac/4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Kristen Jurinko
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-8

RECORD OF BOREHOLE APC-1/WAGWC-6D

SHEET 2 of 2

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 57.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/29/15
DATE COMPLETED: 10/29/15

NORTHING: 1,242,928.92
EASTING: 2,029,644.35
GS ELEVATION: 777.37
TOC ELEVATION: 780.00 ft

DEPTH W.L.:36'
DATE W.L.:11/02/2015
TIME W.L.:12:00

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
45		29.00 - 57.00 Mylonitic QUARTZITE ROCK; white to light brown, rock is less coherent and likely fractured around 54-56' interval *(Continued)*	BR						#1 Sand 0.010" Slot Screen	**WELL CASING** Interval: -2.5'-47' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded **SURFACE CASING** Interval: N/A Material: N/A Diameter: N/A **WELL SCREEN** Interval: 47'-57' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC **FILTER PACK** Interval: 45'-57' Type: #1 Sand/Prepacked Filter **FILTER PACK SEAL** Interval: 41.5'-45' Type: 3/8" Bentonite Pellets **ANNULUS SEAL** Interval: 0'-41.5' Type: Portland Type 1 **WELL COMPLETION** Pad: 4'x4'x4" Protective Casing: Anodized Aluminum **DRILLING METHODS** Soil Drill: Hydrovac/4-inch Sonic Rock Drill: 4-inch Sonic
50	730									
55	725									
	720	Boring completed at 57.00 ft			720.37					
60										
65	715									
70	710									
75	705									
80	700									
85	695									
90	690									

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Kristen Jurinko
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-9

BORING PZ-09
PAGE 1 OF 2
ECS38198

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/4/2014 **COMPLETED** 12/4/2014 **SURF. ELEV.** 809.4 **COORDINATES:** N:33.413551 E:-85.043204
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 58 ft. **GROUND WATER DEPTH: DURING** **COMP.** 17 ft. **DELAYED** 12.78 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA	ELEV. (DEPTH)
				Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 812.08	
		Utility Clearance (HYDROEXCAVATION)		← Surface Seal: concrete	807.4 (2.0)
10			799.4		
15		**Well-graded Sandy Gravel (GM)** - tan, dry, fine to coarse grain, mottled brown and orange			
20			789.4		
		Silt (ML) - orange, wet, clayey, mottled yellow, with coarse gravel		← Annular Fill: Cement-Bentonite Grout - 6 bags, 46 lbs, Portland Type I/II, 33 gal	
25			786.4		
		Silty Gravel (GM) - white, dry, fine to coarse grain, light brown mottling, some oxidation			
30					
35					
		- mottled orange	771.4		
40		**Partially Weathered Rock** - gray, fine to medium grain, medium hard to hard, moderately to			

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.
45		highly weathered, with oxidation **Partially Weathered Rock***(Con't)*	
50			
55			
			751.4
		Bottom of borehole at 58.0 feet.	

WELL DATA

Protective aluminum cover with bollards
4-foot square concrete pad
Top of casing Elev. = 812.08

(CONTINUED)

ELEV. (DEPTH)

767.9 (41.5)

Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips

765.3 (44.1)

Filter: silica filter sand - 4.5 bags, 50 lbs, #1A filter media

761.0 (48.4)

Well: 2" OD PVC (SCH 40)

Well: 2" OD PVC (SCH 40)
Screen: 10 ft. pre-pack

751.0

Sump:0.40 ft.

WGWC-10

RECORD OF BOREHOLE APC-3D/WAGWC-8

SHEET 1 of 4

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 146.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/27/15
DATE COMPLETED: 10/27/15

NORTHING: 1,240,971.45
EASTING: 2,026,725.30
GS ELEVATION: 809.61
TOC ELEVATION: 812.59 ft

DEPTH W.L.:7.73'
DATE W.L.:10/27/15
TIME W.L.:14:41

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
0		0.00 - 11.00 SILT; dry to moist, yellow to orange-red, some clay, some very fine sand, trace muscovite								
5	805	6.00: Shelby Tube Collected: 6'-8'	ML							
10	800				798.61					
		11.00 - 23.00 CLAYEY SILT; dry to moist, orange to red, 5-10% muscovite, trace black MnO, trace garnet, trace quartz, saprolite			11.00					
15	795		ML							
20	790				786.61					
		23.00 - 37.00 SILT; moist, yellow brown, some clay, come very fine sand, layers of white CLAYEY SILT, 3" thick lense of weathered pegmatite material at 25', 39', and 42'			23.00					
25	785									
30	780		ML							
35	775	36.00: Shelby Tube Collected: 36'-38'			772.61					
		37.00 - 40.00 CLAYEY SILT; some weathered pegmatite material, white/pink weathered potassium felspar and plagioclase			37.00					
40	770		ML		769.61					
		40.00 - 47.00 SILT; moist, yellow brown, some clay, come very fine sand, layers of white CLAYEY SILT, 3" thick lense of weathered pegmatitic material at 42'			40.00					
45	765		ML							

Log continued on next page

WELL CASING
Interval: -2.5'-136'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 136'-146'
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 134'-136
Type: #1 Sand Prepacked Filter

FILTER PACK SEAL
Interval: 131.5'-134'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-131.5'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-10

RECORD OF BOREHOLE APC-3D/WAGWC-8

SHEET 2 of 4

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 146.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/27/15
DATE COMPLETED: 10/27/15

NORTHING: 1,240,971.45
EASTING: 2,026,725.30
GS ELEVATION: 809.61
TOC ELEVATION: 812.59 ft

DEPTH W.L.:7.73'
DATE W.L.:10/27/15
TIME W.L.:14:41

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			ML		762.61					
		47.00 - 58.00 SAPROLITE; moist, grayish brown with some orange mineral oxidation, weathered muscovite schist, predominately weathered feldspars, 10-15%muscovite, <10% quartz			47.00					
50	760		ML							
55	755				751.61					
		58.00 - 58.10 1" black layer with gravel size quarts grains, silt sized black particles			58.10					
60	750	58.10 - 88.00 moist, grayish brown with some orange mineral oxidation, weathered muscovite schist, predominately weathered feldspars								
65	745								Portland Type 1	
70	740									
75	735									
80	730									
85	725				721.61					
		88.00 - 92.00 SANDY SILT; moist to wet, orange brown, sandy silt, very fine to fine sand, trace fine gravel, micaceous	ML		88.00					
90	720	Log continued on next page								

WELL CASING
Interval: -2.5'-136'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 136'-146'
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 134'-136
Type: #1 Sand Prepacked Filter

FILTER PACK SEAL
Interval: 131.5'-134'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-131.5'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-10

RECORD OF BOREHOLE APC-3D/WAGWC-8

SHEET 3 of 4

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 146.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/27/15
DATE COMPLETED: 10/27/15

NORTHING: 1,240,971.45
EASTING: 2,026,725.30
GS ELEVATION: 809.61
TOC ELEVATION: 812.59 ft

DEPTH W.L.:7.73'
DATE W.L.:10/27/15
TIME W.L.:14:41

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
90		88.00 - 92.00 SANDY SILT; moist to wet, orange brown, sandy silt, very fine to fine sand, trace fine gravel, micaceous *(Continued)*	ML		717.61					
		92.00 - 96.00 SAPROLITE; moist, grayish brown with some orangemineral oxidation, weathered muscovite schist, predominantly feldspar, trace quartz, trace biotite, trace garnet	ML		92.00 713.61					
95	715	96.00 - 97.00 SANDY SILT; moist to wet, orange brown, sandy silt, very fine to fine sand, trace fine gravel, micaceous	ML		96.00 712.61					
		97.00 - 106.00 SAPROLITE; moist, grayish brown with some orangemineral oxidation, weathered muscovite schist, predominantly feldspar, trace quartz, trace biotite, trace garnet	ML		97.00					
100	710									
105	705				703.61					
		106.00 - 116.00 NO RECOVERY			106.00					
110	700									
115	695				693.61					
		116.00 - 119.00 SAPROLITE ROCK; garnetiferous, muscovite meta quartzite rock fragments up to 2.5" interbedded with weathered muscovite schist	PWR		116.00 690.61					
120	690	119.00 - 139.00 moist to wet, silty clay and silt, weathered garnet, muscovite, plagioclase, schist, trace quartz			119.00					
125	685									
130	680								3/8" Bentonite Pellets	
135	675	Log continued on next page								

WELL CASING
Interval: -2.5'-136'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 136'-146'
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 134'-136
Type: #1 Sand Prepacked Filter

FILTER PACK SEAL
Interval: 131.5'-134'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-131.5'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-10

RECORD OF BOREHOLE APC-3D/WAGWC-8

SHEET 4 of 4

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 146.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/27/15
DATE COMPLETED: 10/27/15

NORTHING: 1,240,971.45
EASTING: 2,026,725.30
GS ELEVATION: 809.61
TOC ELEVATION: 812.59 ft

DEPTH W.L.:7.73'
DATE W.L.:10/27/15
TIME W.L.:14:41

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES
135		119.00 - 139.00 moist to wet, silty clay and silt, weathered garnet, muscovite, plagioclase, schist, trace quartz *(Continued)*			670.61				#1 Sand
140	670	139.00 - 142.00 SILTY SAND; wet, very fine to fine sand, mottled texture	SM		139.00 667.61				0.010" Slot Screen
145	665	142.00 - 145.00 SAPROLTIE-ROCK/PARTIALLY WEATHERED ROCK; wet, partially weathered garnet quartz muscovite plagioclase schist	PWR		142.00 664.61				
		145.00 - 146.00 wet, wilty sand, some mineral oxidation, 15-20% quartz			145.00 663.61				
150	660	Boring completed at 146.00 ft							
155	655								
160	650								
165	645								
170	640								
175	635								
180	630								

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: -2.5'-136'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 136'-146'
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 134'-136
Type: #1 Sand Prepacked Filter

FILTER PACK SEAL
Interval: 131.5'-134'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-131.5'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-11

LOG OF TEST BORING AND WELL INSTALLATION

BORING PZ-14
PAGE 1 OF 2
ECS38198

SOUTHERN COMPANY

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/8/2014 **COMPLETED** 12/9/2014 **SURF. ELEV.** 821.5 **COORDINATES:** N:33.408139 E:-85.054106
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 47 ft. **GROUND WATER DEPTH: DURING** **COMP.** 27 ft. **DELAYED** 31.6 ft. after 24 hrs.
NOTES

DEPTH (ft) | GRAPHIC LOG

STRATA DESCRIPTION

Silt (ML)
- red, moist, sandy, mottled yellow, trace mica

- mottled yellow, trace gravel

- mottled brown

- gray, moist, mottled orange, black, and white, micaceous

WELL DATA

Protective aluminum cover with bollards
4-foot square concrete pad
Top of casing Elev. = 823.96

ELEV.

ELEV. (DEPTH)

Surface Seal: concrete
819.5
(2.0)

Annular Fill: Cement-Bentonite Grout - 6 bags, 46 lbs, Portland Type I/II, 33 gal

788.9
(32.6)

Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips

786.9
(34.6)

Filter: silica filter sand - 3.5 bags, 50 lbs, #1A filter media

783.2
(38.3)

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA	ELEV. (DEPTH)
				Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 823.96	
45		**Silt (ML)***(Con't)* (CONTINUED)		**Well: 2" OD PVC (SCH 40)** **Well: 2" OD PVC (SCH 40)** **Screen: 10 ft. pre-pack**	
			774.5		
		Bottom of borehole at 47.0 feet.		Sump:0.40 ft.	773.2

WGWC-12

RECORD OF BOREHOLE APC-4D/WAGWC-9D

SHEET 1 of 2

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 77.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/22/15
DATE COMPLETED: 10/22/15

NORTHING: 1,240,827.20
EASTING: 2,025,755.41
GS ELEVATION: 820.55
TOC ELEVATION: 823.12 ft

DEPTH W.L.:20.1'
DATE W.L.:10/22/15
TIME W.L.:08:05

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	ELEV. / DEPTH (ft)
0	820	0.00 - 4.00 CLAYEY SILT; dry to moist, orange-red, <5% muscovite, <5% medium quartz grains, homogenous texture, no fabric	ML	816.55 4.00
5	815	4.00 - 6.00 moist, yellow, orange, garnet, muscovite, plagioclase		814.55 6.00
		6.00 - 7.00 dry to moist, orange-red, <5% muscovite, <5% medium quartz grains, homogenous texture, no fabric		813.55 7.00
10	810	7.00 - 17.00 SAPROLITE/PARTIALLY WEATHERED ROCK; moist (7-49') to wet (49-56'), yellow orange to brown and orange, weathered garnet muscovite feldspar (plagioclase + K-spar) schist, metamorphic fabric more apparent at depth due to the material being less weathered Shelby Tube Collected: 16'-17'	PWR	
15	805			803.55 17.00
20	800	17.00 - 27.00 partially weathered rock, weathered garet rich, with muscovite, feldspar, schist fabric		
25	795			793.55 27.00
30	790	27.00 - 37.00 less weathered, relict fabric evident		
35	785			783.55 37.00
40	780	37.00 - 56.00 partially weathered rock, moist to wet at 49 feet		
45		Log continued on next page		

SAMPLES: SAMPLE NO. | TYPE | REC

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES

Portland Type 1

WELL CONSTRUCTION DETAILS

WELL CASING
Interval: -2.5'-64'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 64'-74'
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 61.5'-77'
Type: #1 Sand/ Prepack Filter

FILTER PACK SEAL
Interval: 59'-61.5'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-59'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-12

RECORD OF BOREHOLE APC-4D/WAGWC-9D

SHEET 2 of 2

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 77.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/22/15
DATE COMPLETED: 10/22/15

NORTHING: 1,240,827.20
EASTING: 2,025,755.41
GS ELEVATION: 820.55
TOC ELEVATION: 823.12 ft

DEPTH W.L.:20.1'
DATE W.L.:10/22/15
TIME W.L.:08:05

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
45	775	37.00 - 56.00 partially weathered rock, moist to wet at 49 feet *(Continued)*								
50	770									
55	765				764.55					
		56.00 - 57.00 SAPROLITE-ROCK; moist to wet, green and dark grey, very fine grained metamorphic rock interlayered with light greenish-grey clay. transition zone			56.00 763.55					
					57.00					
60	760	57.00 - 77.00 ROCK; unweatehred compentent grey to dark grey quartzite, predominantly quartz, 5-10% muscovite, <5% garnet, <5% pyrite. rock is difficult to break with several hammer strikes, but is broken into discs along mica foliations from drilling action. rock broken into smaller fragments from 71-72' interval.							3/8" Bentonite Pellets	
65	755		BR						#1 Sand	
70	750								0.010" Slot Screen	
75	745				743.55					
		Boring completed at 77.00 ft								
80	740									
85	735									
90										

WELL CASING
Interval: -2.5'-64'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 64'-74'
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 61.5'-77'
Type: #1 Sand/ Prepack Filter

FILTER PACK SEAL
Interval: 59'-61.5'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-59'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-13

RECORD OF BOREHOLE APC-5D/WAGWC-10D

SHEET 1 of 3

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 96.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 11/2/15
DATE COMPLETED: 11/4/15

NORTHING: 1,240,610.61
EASTING: 2,024,585.99
GS ELEVATION: 807.49
TOC ELEVATION: 810.04 ft

DEPTH W.L.:20.25'
DATE W.L.:11/4/15
TIME W.L.:10:08

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES
0	805	0.00 - 2.00 SILT; moist, orange overburden	ML		805.49				
		2.00 - 7.00 CLAYEY SILT; moist, brown, micaceous, trace garnets up to 1cm, materials are loose/soft	ML		2.00 800.49				
5	800	7.00 - 22.00 SILTY SAND; moist to wet (18 - 26 feet), orange, brown and white (saprolite)	SM		7.00				
10	795								
15	790	16.00: Shelby Tube Collected: 16'-17'							
20	785				785.49				
		22.00 - 26.00 SAPROLITE; weathered pegmatite	ML		22.00				
25					781.49				
		26.00 - 28.00 trace quartz, wet			26.00 779.49				
	780	28.00 - 35.00 SILTY CLAY; moist, very light brown. metamorphic foliation present. trace gravel size quartzite rock fragments (saprolite)	CL		28.00				
30	775								
35					772.49				Portland Type 1
		35.00 - 36.00 SAPROLITE-ROCK; weathered micaceous meta-quartzite	PWR		35.00 771.49				
		36.00 - 46.00 ROCK; light brown quartzite with light orange oxidation, micaceous meta quartzite	BR		36.00				
40	770								
	765								
45		Log continued on next page							

WELL CASING
Interval: -2.5'-73'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 73'-93' 3"
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 69.5'-96'
Type: #1 Sand/ Prepack Filter

FILTER PACK SEAL
Interval: 66.5'-69.5'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-66.5'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-13

RECORD OF BOREHOLE APC-5D/WAGWC-10D

SHEET 2 of 3

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 96.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 11/2/15
DATE COMPLETED: 11/4/15

NORTHING: 1,240,610.61
EASTING: 2,024,585.99
GS ELEVATION: 807.49
TOC ELEVATION: 810.04 ft

DEPTH W.L.:20.25'
DATE W.L.:11/4/15
TIME W.L.:10:08

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			BR		761.49 / 46.00					
		46.00 - 56.00 more competent rock								
	760									
50										
	755									
55					751.49 / 56.00					
		56.00 - 87.00 light brown quartzite with light orange oxidation, micaceous meta quartzite								
	750									
60										
	745									
65										
	740								3/8" Bentonite Pellets	
70										
	735		BR							
75										
	730									
80										
	725								0.010" Slot Screen	
85									#1 Sand	
	720				720.49 / 87.00					
		87.00 - 96.00 grey and pink quartzite								
90		Log continued on next page								

WELL CASING
Interval: -2.5'-73'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 73'-93' 3"
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 69.5'-96'
Type: #1 Sand/ Prepack Filter

FILTER PACK SEAL
Interval: 66.5'-69.5'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-66.5'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-13

RECORD OF BOREHOLE APC-5D/WAGWC-10D

SHEET 3 of 3

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 96.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 11/2/15
DATE COMPLETED: 11/4/15

NORTHING: 1,240,610.61
EASTING: 2,024,585.99
GS ELEVATION: 807.49
TOC ELEVATION: 810.04 ft

DEPTH W.L.:20.25'
DATE W.L.:11/4/15
TIME W.L.:10:08

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
90	715	87.00 - 96.00 grey and pink quartzite *(Continued)*								
95					711.49					
	710	Boring completed at 96.00 ft								
100	705									
105	700									
110	695									
115	690									
120	685									
125	680									
130	675									
135										

WELL CASING
Interval: -2.5'-73'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 73'-93' 3"
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 69.5'-96'
Type: #1 Sand/ Prepack Filter

FILTER PACK SEAL
Interval: 66.5'-69.5'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-66.5'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

ERM
3200 Windy Hill Rd Ste 1500W
Atlanta, GA 30339
Telephone: 678-486-2700

WGWC-14A

WELL NUMBER WGWC-14A

CLIENT Southern Company Services, Inc.
PROJECT NAME Plant Wansley
PROJECT NUMBER 0372406
PROJECT LOCATION AP
DATE STARTED 1/31/17 **COMPLETED** 1/31/17
GROUND ELEVATION _____ **HOLE SIZE** inches
DRILLING CONTRACTOR Southern Comparny Services, Inc
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger 2"
AT TIME OF DRILLING ---
LOGGED BY MR **CHECKED BY** GEJ
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
	SS	100	ML		(ML) Orange SILT, non-plastic, dry
					2.0
			SM		(SM) Brownish orange Silty SAND, loose, micaceous, dry
5					
	SS	100	SM		(SM) SAA, with white feldspar veins
10					
	SS	100	SM		(SM) SAA, medium dense, denser with depth, well graded, fine - coarse grained
15					
	SS	90	SM		(SM) SAA, reddish orange, moist
					18.5
20			CL		(CL) Orange Silty CLAY, stiff, low plasticity, moist
	SS	70	CL		(CL) Reddish orange Silty CLAY, medium stiff, low plasticity, wet
25			CL		(CL) Orange Silty CLAY, stiff, low plasticity, saprolitic, wet
					24.0
	SS	60	CL		(CL) SAA, very stiff
30					28.0
	SS	60			PWR, foliated
35					33.0
40					

WELL DIAGRAM

Casing Type: PVC

70/30 Portland Cement / bentonite mix

PEL plug 3/8"

20/40 industrial quartz (ANSI std 61) 4" UPACK

Refusal at 40.0 feet.
Bottom of borehole at 40.0 feet.

WGWC-15

RECORD OF BOREHOLE APC-6D/WAGWC-11D

SHEET 1 of 2

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 53.50 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 11/11/15
DATE COMPLETED: 11/11/15

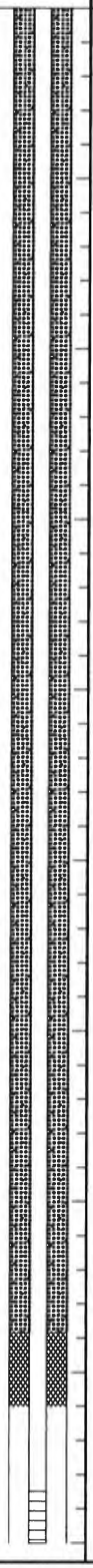
NORTHING: 1,240,483.19
EASTING: 2,023,912.18
GS ELEVATION: 802.12
TOC ELEVATION: 804.98 ft

DEPTH W.L.:5.85'
DATE W.L.:11/13/15
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	ELEV. / DEPTH (ft)
0	800	0.00 - 3.00 CLAYEY SILT; homogenous overburden, orange brown, dry to moist	ML	799.12
		3.00 - 5.00 CLAYEY SILT; homogenous overburden some coarse gravel, some subrounded weathered cobbles of quartzite, trace white and black staining, orange brown, dry to moist		3.00 797.12
5		5.00 - 7.00 CLAYEY SILT; homogenous overburden, orange brown, black foliations, moist, soft		5.00 795.12
	795	7.00 - 9.00 SILTY SAND; grey/brown, silty sand to clayey sand, moist Shleby Tube Collected: 7'-9'	SM	7.00 793.12
10		9.00 - 11.00 SILTY SAND; with some gravel, subangular, slightly weathered quartzite; greyish brown, moist		9.00 791.12
	790	11.00 - 14.00 GRAVELY CLAYEY SILT; fine to coarse quartzite gravel, some medium coarse sand, trace black, brown and white micaceous foliations; greyish brown	MLG	11.00 788.12
15		14.00 - 16.00 SILTY CLAY; micaceous, grey, trace brown and black foliations, dry. soft to firm	CL	14.00 786.12
	785	16.00 - 22.00 CLAYEY GRAVEL; fine to coarse gravel and cobbles, some white quartzite, red, orange and black staining, brwon silty clay, moist Shelby Tube Collected: 17.1'-17.5'	GC	16.00 780.12
20	780	22.00 - 24.50 PARTIALLY WEATHERED ROCK/SAPROLITE; cobble and pulverized quartzite	PWR	22.00 777.62
25		24.50 - 27.00 weathered quartzose schist, trace fine pyrite, drill pulverized rock into grey powder, some 3-4" cobbles		24.50 775.12
	775	27.00 - 29.00 weathered, quartzose gravel, some grey clay		27.00 773.12
		29.00 - 30.00 weathered, pulverized schist, wet		29.00 772.12
30		30.00 - 33.00 weathered, quartzose gravel, some grey clay, wet		30.00 769.12
	770	33.00 - 37.00 BEDROCK; quartzose schist/gneiss, large garnets, green amphibole, mica, black hornblende/biotite, white feldspar	BR	33.00 765.12
35		37.00 - 43.00 various sizes of mafic gneiss and quartzose schist, weathered		37.00 759.12
	765	43.00 - 53.50 mafic gneiss, fine to coarse grey gravel, small weathered cobbles, bedrock		43.00
40				
	760			
45		Log continued on next page		

SAMPLES: SAMPLE NO. | TYPE | REC

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: -2.5'-43'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 43.5'-53.5'
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 41'-53.5'
Type: #1 Sand/Prepack filter

FILTER PACK SEAL
Interval: 38.8'-41'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-38.8'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: David Wilcox

GA INSPECTOR: Kristen Jurinko
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/5/16

DRAFT

WGWC-15

RECORD OF BOREHOLE APC-6D/WAGWC-11D

SHEET 2 of 2

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 53.50 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 11/11/15
DATE COMPLETED: 11/11/15

NORTHING: 1,240,483.19
EASTING: 2,023,912.18
GS ELEVATION: 802.12
TOC ELEVATION: 804.98 ft

DEPTH W.L.:5.85'
DATE W.L.:11/13/15
TIME W.L.:

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		43.00 - 53.50 mafic gneiss, fine to coarse grey gravel, small weathered cobbles, bedrock *(Continued)*							#1 Sand 0.010" slot screen	**WELL CASING** Interval: -2.5'-43' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded **SURFACE CASING** Interval: N/A Material: N/A Diameter: N/A **WELL SCREEN** Interval: 43.5'-53.5' Material: Schedule 40 PVC Diameter: 2' Slot Size: 0.010" End Cap: Schedule 40 PVC **FILTER PACK** Interval: 41'-53.5' Type: #1 Sand/Prepack filter **FILTER PACK SEAL** Interval: 38.8'-41' Type: 3/8" Bentonite Pellets **ANNULUS SEAL** Interval: 0'-38.8' Type: Portland Type 1 **WELL COMPLETION** Pad: 4'x4'x4" Protective Casing: Anodized Aluminum **DRILLING METHODS** Soil Drill: 4-inch Sonic Rock Drill: 4-inch Sonic
50	755									
55	750				748.62					
60	745	Boring completed at 53.50 ft								
65	740									
70	735									
75	730									
80	725									
85	720									
90	715									

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: David Wilcox

GA INSPECTOR: Kristen Jurinko
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/5/16

DRAFT

WGWC-16

RECORD OF BOREHOLE APC-6S/WAGWC-11S

SHEET 1 of 1

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 32.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 11/11/15
DATE COMPLETED: 11/11/15

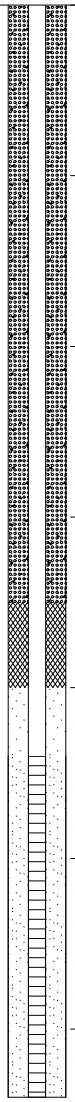
NORTHING: 1,240,480.41
EASTING: 2,023,903.07
GS ELEVATION: 801.71
TOC ELEVATION: 804.49 ft

DEPTH W.L.:5.99'
DATE W.L.:11/13/15
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	ELEV. / DEPTH (ft)
0	800	0.00 - 3.00 CLAYEY SILT (ML); Trace mica flakes, orange brown, homogenous, moist (wet from previous drilling), firm	ML	798.71
		3.00 - 5.00 trace coarse gravel, trace mica flakes, light and trace foliations, firm gravel-subrounded quartzite		3.00 796.71
5	795	5.00 - 7.00 SILTY CLAY (ML); trace coarse sand (black, subrounded, firm), orange brown, some light brown and black foliation, moist	ML	5.00 794.71
		7.00 - 9.00 SILTY SAND (SM); poorly graded, fine to coarse, angular, white quartzite, some clay, orange brown, wet Shelby Tube Collected: 7'-9'	SM	7.00 792.71
10	790	9.00 - 11.00 CLAYEY SILT (ML); saprolite, trace coarse sand, trace fine gravel, stained black and white quartzite, black, dark brown and light brown foliations, some mica flakes, dry to moist	ML	9.00 790.71
		11.00 - 15.00 CLAYEY SILT with GRAVEL; fine to coarse brown gravel, trace rounded cobbles, trace medium coarse sand, quartzite stained black and red, some black foliations, moist		11.00 786.71
15	785	15.00 - 17.00 SILTY SAND; trace fine gravel (quartzite, quartz and schist), orange brown, dry to moist	SM	15.00 784.71
		17.00 - 20.00 SILTY CLAY (ML); gravelly, fine to coarse gravel, cobbles of white quartzite, trace mica flakes, red, orange and black stringers, moist	ML	17.00 781.71
20	780	20.00 - 22.00 SILT (ML); micaceous, trace to large cobbles of quartzite, angular, white/black/orange weathered schist	MLG	20.00 779.71
		22.00 - 26.00 SAPROLITE (ML); pulverized quartzose schist, some cobbles of quartzose schist with coarse sand, orange staining, dry		22.00 775.71
25	775	26.00 - 26.30 GRAVELLY SILT (MLG); brown, weathered micaceous schist, small fracture with fine gravel, dark brown, red brow, orange foliations, moist		774.71
			ML	27.00 773.71
		26.30 - 27.00 SILT (ML); micaceous, grey silt, moist	PWR	28.00 772.71
		27.00 - 28.00 SAPROLITE		29.00 771.71
30	770	28.00 - 29.00 PARTIALLY WEATHERED ROCK; saprolite and gravel, quartzose schist, some cobbles, dry		30.00 770.71
		29.00 - 30.00 sand and gravel, coarse, weathered quartzose schist, small to large cobbles, dry		31.00 769.71
		30.00 - 31.00 sand and gravel, some grey quartzose schist, some silt, fine to coarse sadn, fine to coarse gravel, trace cobbles, angular		
35	765	31.00 - 32.00 sand and gravel, saprolite and coarse, weathered quartzose schist, small to large cobbles, some sand, dry		
		Boring completed at 32.00 ft		
40	760			
45				

SAMPLES: SAMPLE NO. | TYPE | REC

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: -2.5'-23'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 22'-32'
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 20'-32'
Type: #1 Sand/Prepack Filter

FILTER PACK SEAL
Interval: 17.5'-20'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-17.5'
Type: Type 1 Portland

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: David Wilcox

GA INSPECTOR: Kristen Jurinko
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-17

RECORD OF BOREHOLE APC-7/WAGWC-12

SHEET 1 of 3

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 97.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 11/6/15
DATE COMPLETED: 11/6/15

NORTHING: 1,240,051.97
EASTING: 2,022,623.25
GS ELEVATION: 813.08
TOC ELEVATION: 816.02 ft

DEPTH W.L.:23'
DATE W.L.:11/6/15
TIME W.L.:08:00

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES
0	813	0.00 - 13.00 CLAYEY SILT; moist, orange red and orange brown, mottled, homogenous, soft.	ML					
5	810							
10	805	7.00: Shelby Tube Collected: 7'-9'						
15	800	13.00 - 17.00 CLAYEY SILT; dry to moist, light brown to orange, mottled, relict metamorphic texture, fine to medium sand, light brown	ML	800.08 13.00 796.08				
20	795	17.00 - 27.00 SILTY SAND; Fine to medium, light brown Shelby Tube Collected: 17'-19'	SM	17.00 786.08				
25	790							
30	785	27.00 - 37.00 CLAYEY SILT; dry to moist, light brown to orange, mottled, relict metamorphic texture, fine to medium sand, light brown	ML	27.00				
35	780							
40	775	37.00 - 42.00 CLAYEY SILT and SILT; dry to moist, brown and grey, metamorphic texture observed, predominantly feldspar, varying amounts of quartz (<5-15%), biotite and muscovite (5-15%), saprolite		776.08 37.00 771.08				Portland Tpe 1
45	770	42.00 - 47.00 NO RECOVERY; not competent (soil washout)		42.00				

Log continued on next page

WELL CASING
Interval: -2.5'-83'
Material: Schedule 40 PVC
Diameter: 6"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 83'-93'
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 81'-94'
Type: #1 sand/ Prepack Filter

FILTER PACK SEAL
Interval: 78.5'-81'
Type: 3/8" Bentonits Pellets

ANNULUS SEAL
Interval: 0'-78.5'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Kristen Jurinko
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

RECORD OF BOREHOLE APC-7/WAGWC-12

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 97.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 11/6/15
DATE COMPLETED: 11/6/15

NORTHING: 1,240,051.97
EASTING: 2,022,623.25
GS ELEVATION: 813.08
TOC ELEVATION: 816.02 ft

DEPTH W.L.:23'
DATE W.L.:11/6/15
TIME W.L.:08:00

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
45		42.00 - 47.00 NO RECOVERY; not competent (soil washout) *(Continued)*			766.08					
	765	47.00 - 53.00 CLAYEY SILT and SILT; dry to moist, brown and grey, metamorphic texture observed, predominantly feldspar, varying amounts of quartz (<5-15%), biotite and muscovite (5-15%), saprolite	ML		47.00					
50					760.08					
	760	53.00 - 54.00 SILT; grey silt, weathered quartzite and gneiss, trace black laminations, chunks of silt, speckled greywacke	ML		53.00 759.08					
55		54.00 - 57.00 SILT; saprolitic texture more predominant			54.00 756.08					
	755	57.00 - 59.00 SILT; dry, dark brown silt, some fine coarse sand, white quartz/feldspar, some thin laminations of quartzite			57.00 754.08					
60		59.00 - 67.00 PARTIALLY WEATHERED ROCK; clayey silt, weathered quartzite, trace black minerals	PWR		59.00					
	750				746.08					
65		67.00 - 71.00 CLAYEY SAND/SILTY SAND; large cobbles of gneiss and quartzite	SC-SM		67.00					
70					742.08					
	745	71.00 - 76.00 CLAYEY SAND; moist, brown, some orange silty sand, muscovite, weathered quartzite			71.00					
75	740	75.00: 75'-76' large cobbles present			737.08					
		76.00 - 82.00 BEDROCK; grey and white, fractured quartzite, some light orange from mineral oxidation, staining present	BR		76.00				3/8" Bentonite Pellets	**WELL CASING** Interval: -2.5'-83' Material: Schedule 40 PVC Diameter: 6" Joint Type: Threaded **SURFACE CASING** Interval: N/A Material: N/A Diameter: N/A **WELL SCREEN** Interval: 83'-93' Material: Schedule 40 PVC Diameter: 2' Slot Size: 0.010" End Cap: Schedule 40 PVC **FILTER PACK** Interval: 81'-94' Type: #1 sand/ Prepack Filter **FILTER PACK SEAL** Interval: 78.5'-81' Type: 3/8" Bentonits Pellets **ANNULUS SEAL** Interval: 0'-78.5' Type: Portland Type 1 **WELL COMPLETION** Pad: 4'x4'x4" Protective Casing: Anodized Aluminum **DRILLING METHODS** Soil Drill: 4-inch Sonic Rock Drill: 4-inch Sonic
80	735				731.08					
	730	82.00 - 93.00 quartzite			82.00				#1 sand	
85	725								0.010" slot screen	
90		Log continued on next page								

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Kristen Jurinko
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

WGWC-17

RECORD OF BOREHOLE APC-7/WAGWC-12

SHEET 3 of 3

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 97.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 11/6/15
DATE COMPLETED: 11/6/15

NORTHING: 1,240,051.97
EASTING: 2,022,623.25
GS ELEVATION: 813.08
TOC ELEVATION: 816.02 ft

DEPTH W.L.:23'
DATE W.L.:11/6/15
TIME W.L.:08:00

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
90		82.00 - 93.00 quartzite *(Continued)*			720.08					
	720	93.00 - 97.00 SCHIST; fractured quartzitic schist	BR		93.00				3/8" Bentonite Pellets	
95					716.08					
		Boring completed at 97.00 ft								
	715									
100										
	710									
105										
	705									
110										
	700									
115										
	695									
120										
	690									
125										
	685									
130										
	680									
135										

WELL CASING
Interval: -2.5'-83'
Material: Schedule 40 PVC
Diameter: 6"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 83'-93'
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 81'-94'
Type: #1 sand/ Prepack Filter

FILTER PACK SEAL
Interval: 78.5'-81'
Type: 3/8" Bentonits Pellets

ANNULUS SEAL
Interval: 0'-78.5'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Kristen Jurinko
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

WGWC-18

BORING PZ-07
PAGE 1 OF 1
ECS38198

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/16/2014 **COMPLETED** 12/16/2014 **SURF. ELEV.** 875.5 **COORDINATES:** N:33.418400 E:-85.054843
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 37.1 ft. **GROUND WATER DEPTH: DURING** **COMP.** 16.5 ft. **DELAYED** 21.7 ft. after 24 hrs.
NOTES

DEPTH (ft) | GRAPHIC LOG

STRATA DESCRIPTION

Silt (ML)
- brown, moist, sandy, mottled orange and red, trace mica and angular fine gravel

- brown, moist, mottled brown and red, trace fine gravel

848.5

Schist
- gray, fine grain, medium hard, moderately to highly weathered, massive to thickly foliated

838.4

Bottom of borehole at 37.1 feet.

WELL DATA

Protective aluminum cover with bollards
4-foot square concrete pad
Top of casing Elev. = 878.07

ELEV. | ELEV. (DEPTH)

Surface Seal: concrete — 873.5 (2.0)

Annular Fill: Cement-Bentonite Grout - 4 bags, 46 lbs, Portland Type I/II, 22 gal

853.0 (22.5)

Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips — 851.0 (24.5)

Filter: silica filter sand - 4 bags, 50 lbs, #1A filter media — 848.5 (27.0)

Well: 2" OD PVC (SCH 40)

Well: 2" OD PVC (SCH 40)
Screen: 10 ft. pre-pack

Sump:0.40 ft. — 838.5

2012 GEOTECH LOG WITH WELL - ESEE2012DATABASE.GDT - 2/26/15 15:57 - S:\WORKGROUPS\APC GENERAL SERVICE COMPLEX\CIVIL TECH SUPPORT\DRILLING\PROJECTS\WANSLEY ASH POND PIEZ\GINT\PLANT_WANSLEY_ASH_POND_1 (2).GPJ

WGWC-19

RECORD OF BOREHOLE APC-2/WAGWC-7D

SHEET 1 of 3

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 92.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/28/15
DATE COMPLETED: 10/28/15

NORTHING: 1,242,852.02
EASTING: 2,028,948.67
GS ELEVATION: 780.42
TOC ELEVATION: 783.44 ft

DEPTH W.L.:20.5'
DATE W.L.:10/28/15
TIME W.L.:13:10

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
0	780	0.00 - 27.00 SILTY SAND; reddish orange overburden	SM						**WELL CASING** Interval: -2.5'-82' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded **SURFACE CASING** Interval: N/A Material: N/A Diameter: N/A **WELL SCREEN** Interval: 82'-92' Material: Schedule 40 PVC Diameter: 2' Slot Size: 0.010" End Cap: Schedule 40 PVC **FILTER PACK** Interval: 79.1'-92' Type: #1 Sand/Prepacked Filter **FILTER PACK SEAL** Interval: 77'-79.1' Type: 3/8" Bentonite Pellets **ANNULUS SEAL** Interval: 0'-77' Type: Portland Type 1 **WELL COMPLETION** Pad: 4'x4'x4" Protective Casing: Anodized Aluminum **DRILLING METHODS** Soil Drill: Hydrovac/4-inch Sonic Rock Drill: 4-inch Sonic
5	775								
10	770								
15	765								
20	760	22.00: Shelby Tube Collected: 22'-24'							
25	755			753.42 27.00					
30	750	27.00 - 30.00 SILT; dry to moist, light brown, brown, orange brown and grey. Trace white feldspar and black MnO laminations, trace fine gravel, quartz-rich lense from 30-33' (35% quartz). some weathered schist (saprolite) 30.00 - 33.00 some severely weathered gneiss	ML	750.42 30.00 747.42					
35	745	33.00 - 60.00 dry to moist, light brown, brown, orange brown and grey. Trace white feldspar and black MnO laminations, trace fine gravel, quartz-rich lense from 30-33' (35% quartz). some weathered schist (saprolite)		33.00				Portland Type 1	
40	740								
45		Log continued on next page							

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Kristen Jurinko
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-19

RECORD OF BOREHOLE APC-2/WAGWC-7D

SHEET 2 of 3

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 92.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/28/15
DATE COMPLETED: 10/28/15

NORTHING: 1,242,852.02
EASTING: 2,028,948.67
GS ELEVATION: 780.42
TOC ELEVATION: 783.44 ft

DEPTH W.L.:20.5'
DATE W.L.:10/28/15
TIME W.L.:13:10

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	735	33.00 - 60.00 dry to moist, light brown, brown, orange brown and grey. Trace white feldspar and black MnO laminations, trace fine gravel, quartz-rich lense from 30-33' (35% quartz). some weathered schist (saprolite) *(Continued)*								
50	730									
55	725									
60	720				720.42 60.00					
		60.00 - 63.00 stiffer with trace gravel			717.42					
		63.00 - 70.00 PARTIALLY WEATHERED ROCK; brown micaceous schist and garnetiferous greywacke, dry	PWR		63.00 710.42					
65	715									
70	710	70.00 - 87.00 ROCK; garnetiferous greywacke with white plagioclase laminations			70.00					
75	705									
			BR						3/8" Bentonite Pellets	
80	700									
85	695								#1 Sand 0.010" Slot Screen	
					693.42					
		87.00 - 92.00 ROCK; wet, dark grey micaceous schist	BR		87.00					
90		Log continued on next page								

WELL CASING
Interval: -2.5'-82'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 82'-92'
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 79.1'-92'
Type: #1 Sand/Prepacked Filter

FILTER PACK SEAL
Interval: 77'-79.1'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-77'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: Hydrovac/4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Kristen Jurinko
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-19

RECORD OF BOREHOLE APC-2/WAGWC-7D

SHEET 3 of 3

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 92.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 10/28/15
DATE COMPLETED: 10/28/15

NORTHING: 1,242,852.02
EASTING: 2,028,948.67
GS ELEVATION: 780.42
TOC ELEVATION: 783.44 ft

DEPTH W.L.:20.5'
DATE W.L.:10/28/15
TIME W.L.:13:10

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
90	690	87.00 - 92.00 ROCK; wet, dark grey micaceous schist *(Continued)*	BR		688.42					
		Boring completed at 92.00 ft								
95	685									
100	680									
105	675									
110	670									
115	665									
120	660									
125	655									
130	650									
135										

WELL CASING
Interval: -2.5'-82'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 82'-92'
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 79.1'-92'
Type: #1 Sand/Prepacked Filter

FILTER PACK SEAL
Interval: 77'-79.1'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-77'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: Hydrovac/4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Kristen Jurinko
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-14

RECORD OF BOREHOLE APC-5S/WAGWC-10S

SHEET 1 of 2

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 52.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 11/4/15
DATE COMPLETED: 11/5/15

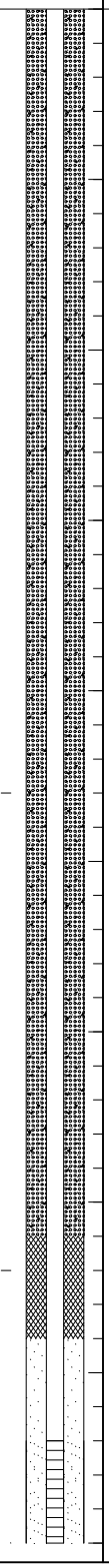
NORTHING: 1,240,621.86
EASTING: 2,024,584.92
GS ELEVATION: 806.87
TOC ELEVATION: 809.50 ft

DEPTH W.L.:33'
DATE W.L.:11/4/15
TIME W.L.:14:00

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	ELEV. / DEPTH (ft)
0	805	0.00 - 2.00 SILT; OVERBURDEN; moist, orange	ML	804.87
		2.00 - 11.00 CLAYEY SILT; moist, brown, micaceous, trace garnet, material is loose/soft		2.00
5	800	6.00: Shelby Tube Collected: 6'-7'	ML	
10	795	11.00 - 26.70 SILTY CLAY; moist to wet, light orange to orange-brown. weathered pegmatitic unit, veins of feldspart, manganese and quartz (<5%), saprolite		795.87 11.00
15	790		CL	
20	785			
25		26.00 - 37.00 lense of silty clay Shleby Tube Collected: 26'-26.7'		780.17
30	780	26.70 - 43.00 SAP-ROCK; PARTIALLY WEATHERED ROCK; meta granitic in texture and composition. predominantly k-spa and plagioclase with increasing quartz content with depth (<5-20%)		26.70
	775		CL	
35			PWR	
	770			769.87
40	765			763.87
		43.00 - 52.00 ROCK; wet, light brown meta-quartzite with light orange mineral oxidation. meta-quartzite, 5-10% muscovite	BR	43.00
45		Log continued on next page		

SAMPLES: SAMPLE NO. | TYPE | REC

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS

WELL CASING
Interval: -2.5'-42'
Material: Schedule 40 PVC
Diameter: 2"
Joint Type: Threaded

SURFACE CASING
Interval: N/A
Material: N/A
Diameter: N/A

WELL SCREEN
Interval: 42'-52'
Material: Schedule 40 PVC
Diameter: 2'
Slot Size: 0.010"
End Cap: Schedule 40 PVC

FILTER PACK
Interval: 39'-52'
Type: #1 Sand/ Prepack Filter

FILTER PACK SEAL
Interval: 36'-39'
Type: 3/8" Bentonite Pellets

ANNULUS SEAL
Interval: 0'-36'
Type: Portland Type 1

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

DRILLING METHODS
Soil Drill: 4-inch Sonic
Rock Drill: 4-inch Sonic

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

WGWC-14

RECORD OF BOREHOLE APC-5S/WAGWC-10S

SHEET 2 of 2

PROJECT: SCS Wansley
PROJECT NUMBER: 154117
DRILLED DEPTH: 52.00 ft
LOCATION: Carrollton, GA

DRILL RIG: PS-150 Track Mounted Rig
DATE STARTED: 11/4/15
DATE COMPLETED: 11/5/15

NORTHING: 1,240,621.86
EASTING: 2,024,584.92
GS ELEVATION: 806.87
TOC ELEVATION: 809.50 ft

DEPTH W.L.:33'
DATE W.L.:11/4/15
TIME W.L.:14:00

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLE NO.	TYPE	REC	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
45		43.00 - 52.00 ROCK; wet, light brown meta-quartzite with light orange mineral oxidation. meta-quartzite, 5-10% muscovite *(Continued)*	BR		754.87				#1 sand 0.010" slot screen	**WELL CASING** Interval: -2.5'-42' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded **SURFACE CASING** Interval: N/A Material: N/A Diameter: N/A **WELL SCREEN** Interval: 42'-52' Material: Schedule 40 PVC Diameter: 2' Slot Size: 0.010" End Cap: Schedule 40 PVC **FILTER PACK** Interval: 39'-52' Type: #1 Sand/ Prepack Filter **FILTER PACK SEAL** Interval: 36'-39' Type: 3/8" Bentonite Pellets **ANNULUS SEAL** Interval: 0'-36' Type: Portland Type 1 **WELL COMPLETION** Pad: 4'x4'x4" Protective Casing: Anodized Aluminum **DRILLING METHODS** Soil Drill: 4-inch Sonic Rock Drill: 4-inch Sonic
50	760									
55	755	Boring completed at 52.00 ft								
60	750									
65	745									
70	740									
75	735									
80	730									
85	725									
90	720									

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Tom Ardito

GA INSPECTOR: Shannon George, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 2/1/16

Golder Associates

BOREHOLE RECORD WANSLEY BORING LOGS.GPJ PIEDMONT.GDT 2/4/16

DRAFT

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/12/2014 **COMPLETED** 12/12/2014 **SURF. ELEV.** 854.0 **COORDINATES:** N:33.406383 E:-85.065401
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 47.6 ft. **GROUND WATER DEPTH: DURING** **COMP.** 19.1 ft. **DELAYED** 16.7 ft. after 24 hrs.
NOTES

DEPTH (ft) | GRAPHIC LOG

STRATA DESCRIPTION

ELEV.

Clayey Gravel (GC)
- red, moist, fine grain, trace sand

849.0

Silt (ML)
- gray, moist, sandy, yellow mottling, trace mica and angular rock fragments

- mottled brown, larger angular rock fragments

839.0

Schist
- gray, fine to aphanitic grain, hard to medium hard, slightly to moderately weathered

- very hard, becomes non-foliated

WELL DATA

Protective aluminum cover with bollards
4-foot square concrete pad
Top of casing Elev. = 856.78

ELEV. (DEPTH)

Surface Seal: concrete
852.0
(2.0)

Annular Fill: Cement-Bentonite Grout - 6 bags, 46 lbs, Portland Type I/II, 33 gal

820.8
(33.2)

Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips

818.8
(35.2)

Filter: silica filter sand - 4 bags, 50 lbs, #1A filter media

817.9
(36.1)

Well: 2" OD PVC (SCH 40)

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA	ELEV. (DEPTH)
				Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 856.78	
45		**Schist***(Con't)*		(CONTINUED) **Well: 2" OD PVC (SCH 40)** **Screen: 10 ft. pre-pack**	
				Sump:0.40 ft.	807.9 (46.1)
			806.4		

Bottom of borehole at 47.6 feet.

BORING PZ-04
PAGE 1 OF 1
ECS38198

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/22/2014 **COMPLETED** 12/22/2014 **SURF. ELEV.** 886.2 **COORDINATES:** N:33.412852 E:-85.061286
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 17 ft. **GROUND WATER DEPTH: DURING** **COMP.** 4.5 ft. **DELAYED** 6 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA	ELEV. (DEPTH)
				Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 889.09	
		Silt (ML) - orange, moist, sandy, mottled red, trace mica		Surface Seal: concrete	883.6 (2.6)
				Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips	
5		- brown, moist, sandy, mottled orange, trace mica and weathered rock			881.6 (4.6)
				Filter: silica filter sand - 4.5 bags, 50 lbs, #1A filter media	
					879.1 (7.2)
			878.2		
10		**Schist** - gray, fine grain, soft to medium hard, slightly to moderately weathered, thinly foliated, oxide staining		**Well: 2" OD PVC (SCH 40)**	
15				**Well: 2" OD PVC (SCH 40)** **Screen: 10 ft. pre-pack**	
			869.2		869.1
		Bottom of borehole at 17.0 feet.		Sump:0.40 ft.	

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

BORING PZ-06
PAGE 1 OF 1
ECS38198

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/16/2014 **COMPLETED** 12/17/2014 **SURF. ELEV.** 912.5 **COORDINATES:** N:33.417798 E:-85.057846
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 23 ft. **GROUND WATER DEPTH: DURING** **COMP.** 7.8 ft. **DELAYED** 8.3 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA	ELEV. (DEPTH)
				Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 915.33	
		Silt (ML) - orange, moist, clayey, mottled dark orange, trace mica and weathered rock		Surface Seal: concrete	910.5 (2.0)
5		- brown, moist, sandy, mottled orange and red, trace mica and weathered rock		Annular Fill: Cement-Bentonite Grout - 2 bags, 46 lbs, Portland Type I/II, 11 gal	
			904.5		904.5 (8.0)
		Schist - gray, fine grain, medium hard to hard, moderately to highly weathered, foliated, oxide staining		Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips	
10					900.9 (11.6)
				Filter: silica filter sand - 4 bags, 50 lbs, #1A filter media	898.8 (13.7)
15				**Well: 2" OD PVC (SCH 40)**	
				Well: 2" OD PVC (SCH 40) **Screen: 10 ft. pre-pack**	
20			889.5		
		Bottom of borehole at 23.0 feet.		Sump:0.40 ft.	888.8

BORING PZ-08
PAGE 1 OF 1
ECS38198

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/15/2014 **COMPLETED** 12/15/2014 **SURF. ELEV.** 880.2 **COORDINATES:** N:33.420953 E:-85.050847
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 37.5 ft. **GROUND WATER DEPTH: DURING** **COMP.** 9.5 ft. **DELAYED** 13.6 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.
		Silt (ML) - orange, dry, sandy, mottled light brown and red, trace mica and gravel	
5			
			873.2
		Silty Sand (SM) - brown, dry, fine to medium grain, mottled orange, trace mica and gravel	
10			
15			
20			
25		- gray, dry, fine to medium grain, mottled orange and light brown, trace mica and gravel	
			851.2
30		**Gneiss** - gray, fine grain, hard, slightly weathered, massive, some oxidation	
35			
			843.1
		Bottom of borehole at 37.5 feet.	

WELL DATA

Protective aluminum cover with bollards
4-foot square concrete pad
Top of casing Elev. = 882.84

ELEV. (DEPTH)

Surface Seal: concrete — 878.2 (2.0)

Annular Fill: Cement-Bentonite Grout - 6 bags, 46 lbs, Portland Type I/II, 33 gal

858.1 (22.1)

Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips

855.7 (24.5)

Filter: silica filter sand - 4 bags, 50 lbs, #1A filter media

852.5 (27.8)

Well: 2" OD PVC (SCH 40)

Well: 2" OD PVC (SCH 40)
Screen: 10 ft. pre-pack

842.5

Sump:0.40 ft.

BORING PZ-10
PAGE 1 OF 1
ECS38198

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/5/2014 **COMPLETED** 12/5/2014 **SURF. ELEV.** 829.4 **COORDINATES:** N:33.411500 E:-85.045028
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 30 ft. **GROUND WATER DEPTH: DURING** **COMP.** 17 ft. **DELAYED** 20.25 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA	ELEV. (DEPTH)
				Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 832.16	
		Utility Clearance (HYDROEXCAVATION)		Surface Seal: concrete	827.4 (2.0)
5					
10			819.4	Annular Fill: Cement-Bentonite Grout - 3 bags, 46 lbs, Portland Type I/II, 16.5 gal	815.1 (14.3)
15		**Gneiss** - gray, fine to medium grain, hard to medium hard, slightly to moderately weathered, massive, banded, with oxidation		Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips	813.1 (16.3)
		- light brown, heavier oxidation		Filter: silica filter sand - 3.5 bags, 50 lbs, #1A filter media	810.7 (18.8)
20				**Well: 2" OD PVC (SCH 40)**	
25				**Well: 2" OD PVC (SCH 40)** **Screen: 10 ft. pre-pack**	
30			799.4	Sump:0.40 ft.	800.7 (28.8)

Bottom of borehole at 30.0 feet.

2012 GEOTECH LOG WITH WELL - ESEE2012DATABASE.GDT - 2/26/15 15:57 - S:\WORKGROUPS\APC GENERAL SERVICE COMPLEX\CIVIL TECH SUPPORT\DRILLING\PROJECTS\WANSLEY ASH POND PIEZ\GINT\PLANT_WANSLEY_ASH_POND_1 (2).GPJ

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

BORING PZ-11
PAGE 1 OF 1
ECS38198

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/4/2014 **COMPLETED** 12/5/2014 **SURF. ELEV.** 820.1 **COORDINATES:** N:33.407397 E:-85.050298
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 30 ft. **GROUND WATER DEPTH: DURING** **COMP.** 16.1 ft. **DELAYED** 20.98 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA	ELEV. (DEPTH)
				Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 822.99	
		Utility Clearance (HYDROEXCAVATION)		Surface Seal: concrete	818.1 (2.0)
5			811.8	Annular Fill: Cement-Bentonite Grout - 2 bags, 46 lbs, Portland Type I/II, 11 gal	
10		**Silt (ML)** - orange, moist, gravelly, mottled light brown			805.6 (14.5)
15		- white, dry, sandy, mottled orange, trace gravel	803.6	Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips	803.0 (17.1)
20		**Silty Gravel (GM)** - orange, wet, fine to medium grain, sandy, mottled brown		Filter: silica filter sand - 4.5 bags, 50 lbs, #1A filter media	799.6 (20.5)
			799.1		
		Schist - tan and pink, fine grain, soft to medium hard, moderately to highly weathered, massive, banded		**Well: 2" OD PVC (SCH 40)**	
25			794.6	**Well: 2" OD PVC (SCH 40)** **Screen: 10 ft. pre-pack**	
		Silt (ML) - tan, wet, mottled pink, trace gravel	793.1		
		Gneiss - pink, fine to medium grain, medium hard to hard, moderately weathered, banded			
30			790.1		789.6
		Bottom of borehole at 30.0 feet.		Sump:0.40 ft.	

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/8/2014 **COMPLETED** 12/8/2014 **SURF. ELEV.** 816.3 **COORDINATES:** N:33.408104 E:-85.050966
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 47 ft. **GROUND WATER DEPTH: DURING** **COMP.** 22 ft. **DELAYED** 24.28 ft. after 24 hrs.
NOTES

DEPTH (ft) | GRAPHIC LOG

STRATA DESCRIPTION

Silt (ML)
- orange, dry, sandy, mottled red and white, micaceous, trace gravel

- red, moist, mottled yellow with black spots, micaceous, trace gravel

- mottled orange

WELL DATA

ELEV.

Protective aluminum cover with bollards
4-foot square concrete pad
Top of casing Elev. = 818.88

ELEV. (DEPTH)

Surface Seal: concrete
814.3
(2.0)

Annular Fill: Cement-Bentonite Grout - 6 bags, 46 lbs, Portland Type I/II, 33 gal

783.7
(32.6)
Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips
781.7
(34.6)
Filter: silica filter sand - 3.5 bags, 50 lbs, #1A filter media
779.5
(36.8)

Well: 2" OD PVC (SCH 40)

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA
				Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 818.88
				ELEV. (DEPTH)
45		**Silt (ML)***(Con't)* (CONTINUED)		**Well: 2" OD PVC (SCH 40)** **Screen: 10 ft. pre-pack**
			769.3	769.5
		Bottom of borehole at 47.0 feet.		Sump:0.40 ft.

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/9/2014 **COMPLETED** 12/9/2014 **SURF. ELEV.** 847.5 **COORDINATES:** N:33.408958 E:-85.051632
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 56.9 ft. **GROUND WATER DEPTH: DURING** **COMP.** 27.5 ft. **DELAYED** 30.9 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA	ELEV. (DEPTH)
		Utility Clearance (HYDROEXCAVATION)		Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 850.04 ←Surface Seal: concrete	845.5 (2.0)
10			837.5		
		Silt (ML) - red, moist, sandy, mottled yellow and black, micaceous			
15					
20		- wet, trace gravel		←Annular Fill: Cement-Bentonite Grout - 6 bags, 46 lbs, Portland Type I/II, 33 gal	
25		- mottled yellow-orange			
		- brown, moist, sandy, mottled orange with black streaks, micaceous			
30					
35		- mottled red			
40					

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.
		Silt (ML)*(Con't)*	(CONTINUED)
		- gray, trace coarse gravel	
45			
		- wet	
50			
		- orange	
55			
			790.5
		Bottom of borehole at 56.9 feet.	

WELL DATA

Protective aluminum cover with bollards
4-foot square concrete pad
Top of casing Elev. = 850.04

ELEV. (DEPTH)

805.0 (42.5)

Annular Seal: bentonite chips - 0.5 bag, 50 lbs, Baroid 3/8" chips

803.0 (44.5)

Filter: silica filter sand - 4.5 bags, 50 lbs, #1A filter media

800.2 (47.3)

Well: 2" OD PVC (SCH 40)

Well: 2" OD PVC (SCH 40)
Screen: 10 ft. pre-pack

790.2

Sump:0.40 ft.

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

BORING PZ-15
PAGE 1 OF 1
ECS38198

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/10/2014 **COMPLETED** 12/10/2014 **SURF. ELEV.** 824.7 **COORDINATES:** N:33.407017 E:-85.056282
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 37 ft. **GROUND WATER DEPTH: DURING** **COMP.** 22.5 ft. **DELAYED** 30.5 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA	ELEV. (DEPTH)
				Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 826.96	
		Utility Clearance (HYDROEXCAVATION)		Surface Seal: concrete	822.7 (2.0)
5			817.7		
10		**Silt (ML)** - red, moist, sandy, mottled brown and yellow with black streaking, micaceous, trace gravel		Annular Fill: Cement-Bentonite Grout - 6 bags, 46 lbs, Portland Type I/II, 33 gal	
15					
20					
25		- wet			802.4 (22.3)
				Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips	
					798.1 (26.6)
				Filter: silica filter sand - 4 bags, 50 lbs, #1A filter media	795.9 (28.8)
30				**Well: 2" OD PVC (SCH 40)**	
35				**Well: 2" OD PVC (SCH 40)** **Screen: 10 ft. pre-pack**	
			787.7		
		Bottom of borehole at 37.0 feet.		Sump:0.40 ft.	785.9

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

BORING PZ-16
PAGE 1 OF 1
ECS38198

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/10/2014 **COMPLETED** 12/11/2014 **SURF. ELEV.** 797.9 **COORDINATES:** N:33.404131 E:-85.060985
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 24.5 ft. **GROUND WATER DEPTH: DURING** **COMP.** 11.4 ft. **DELAYED** 10.5 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA	ELEV. (DEPTH)
				Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 800.55	
		Silt (ML) - brown, moist, clayey, mottled orange		Surface Seal: concrete	795.9 (2.0)
5		- gray, moist, sandy, mottled orange, trace gravel		Annular Fill: Cement-Bentonite Grout - 2 bags, 46 lbs, Portland Type I/II, 11 gal	
10		▽ - wet ▼			787.8 (10.1)
				Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips	785.8 (12.1)
				Filter: silica filter sand - 4.5 bags, 50 lbs, #1A filter media	784.9 (13.0)
15			781.9	**Well: 2" OD PVC (SCH 40)**	
		Silty Sand (SM) - gray, wet, fine to coarse grain, trace mica		**Well: 2" OD PVC (SCH 40)** **Screen: 10 ft. pre-pack**	
20				Sump:0.50 ft.	774.9 (23.0)
			773.4		

Bottom of borehole at 24.5 feet.

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/11/2014 **COMPLETED** 12/11/2014 **SURF. ELEV.** 828.7 **COORDINATES:** N:33.403707 E:-85.062864
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 48 ft. **GROUND WATER DEPTH: DURING** **COMP.** 23.1 ft. **DELAYED** 23.6 ft. after 24 hrs.
NOTES

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	WELL DATA	ELEV. (DEPTH)
			Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 831.21	
		Silt (ML) - orange, moist, clayey, mottled yellow, trace mica and angular rock	Surface Seal: concrete	826.7 (2.0)
5				
10		- orange, moist, sandy, mottled light brown and yellow, trace mica		
15				
20		- mottled red	Annular Fill: Cement-Bentonite Grout - 6 bags, 46 lbs, Portland Type I/II, 33 gal	
25				
30		- tan, very moist		
35		- dark brown, dry, sandy, micaceous, with gravel		795.1 (33.6)
			Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips	793.1 (35.6)
			Filter: silica filter sand - 4 bags, 50 lbs, #1A filter media	790.0 (38.7)
40				

(Continued Next Page)

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	WELL DATA	ELEV. (DEPTH)
				Protective aluminum cover with bollards 4-foot square concrete pad Top of casing Elev. = 831.21	
				(CONTINUED)	
45		**Silt (ML)***(Con't)*		**Well: 2" OD PVC (SCH 40)** **Well: 2" OD PVC (SCH 40)** **Screen: 10 ft. pre-pack**	
			780.7		
		Bottom of borehole at 48.0 feet.		Sump:0.40 ft.	780.0

SOUTHERN COMPANY

LOG OF TEST BORING AND WELL INSTALLATION

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Ash Pond Piezometers
LOCATION Plant Wansley

DATE STARTED 12/11/2014 **COMPLETED** 12/12/2014 **SURF. ELEV.** 811.7 **COORDINATES:** N:33.404512 E:-85.065450
CONTRACTOR CASCADE **EQUIPMENT** SONIC **METHOD** Rotosonic
DRILLED BY T.Ardito **LOGGED BY** S. Baxter **CHECKED BY** L. Millet **ANGLE** **BEARING**
BORING DEPTH 37 ft. **GROUND WATER DEPTH: DURING** **COMP.** 17.9 ft. **DELAYED** 16.1 ft. after 24 hrs.
NOTES

DEPTH (ft) | GRAPHIC LOG

STRATA DESCRIPTION

ELEV.

Utility Clearance (HYDROEXCAVATION)

801.7

Silt (ML)
- red, moist, sandy, mottled yellow with black streaks, trace mica and weathered rock

- mottled orange and white

- light brown, wet, mottled orange with black specks

774.7

Bottom of borehole at 37.0 feet.

WELL DATA

Protective aluminum cover with bollards
4-foot square concrete pad
Top of casing Elev. = 814.12

ELEV. (DEPTH)

Surface Seal: concrete — 809.7 (2.0)

Annular Fill: Cement-Bentonite Grout - 6 bags, 46 lbs, Portland Type I/II, 33 gal

789.1 (22.6)

Annular Seal: bentonite chips - 1 bag, 50 lbs, Baroid 3/8" chips — 787.1 (23.9)

Filter: silica filter sand - 4 bags, 50 lbs, #1A filter media — (24.6) 787.8

Well: 2" OD PVC (SCH 40)

Well: 2" OD PVC (SCH 40)
Screen: 10 ft. pre-pack

777.8

Sump:0.40 ft. — (33.9)

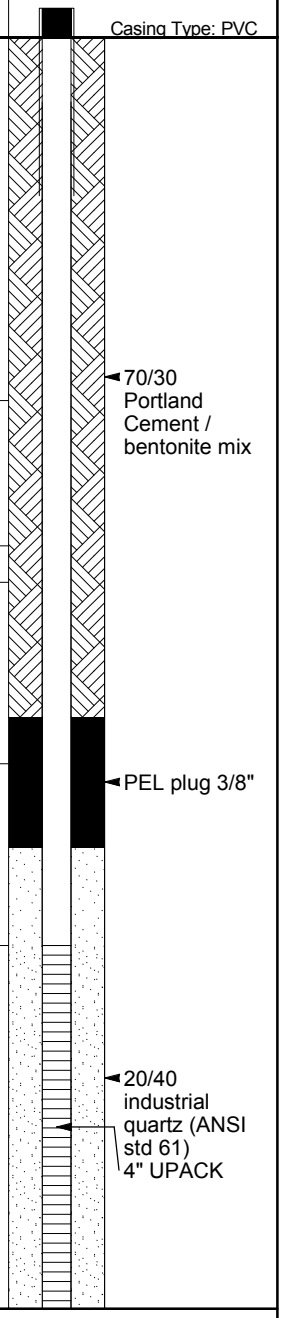
ERM
3200 Windy Hill Rd Ste 1500W
Atlanta, GA 30339
Telephone: 678-486-2700

WELL NUMBER PZ-20

CLIENT Southern Company Services, Inc.
PROJECT NAME Plant Wansley
PROJECT NUMBER 0372406
PROJECT LOCATION AP
DATE STARTED 1/31/17 **COMPLETED** 1/31/17
GROUND ELEVATION _____ **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR Southern Comparny Services, Inc
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger 2"
▽ **AT TIME OF DRILLING** 14.50 ft
LOGGED BY MR **CHECKED BY** GEJ
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0				Hydrovac. No sample collected
10				10.0
15	SS	SM		(SM) white, brown, & red Silty SAND, loose, moist
				14.0
		SM		▽ (SM) red silty SAND, very dense, moist
				15.0
20	SS	SM		(SM) reddish pink Silty SAND with lenses of white CLAY, loose, moist
				20.0
25	SS	SP-SM		(SP-SM) reddish orange SAPROLITE, poorly graded, granitic remnant rock fabric, moist
				25.0
30	SS	SP		(SP) red, brown, & orange coarse SAND, loose, quartz, wet
35	SS	SP		(SP) SAA
				35.0

Refusal at 35.0 feet.
Bottom of borehole at 35.0 feet.

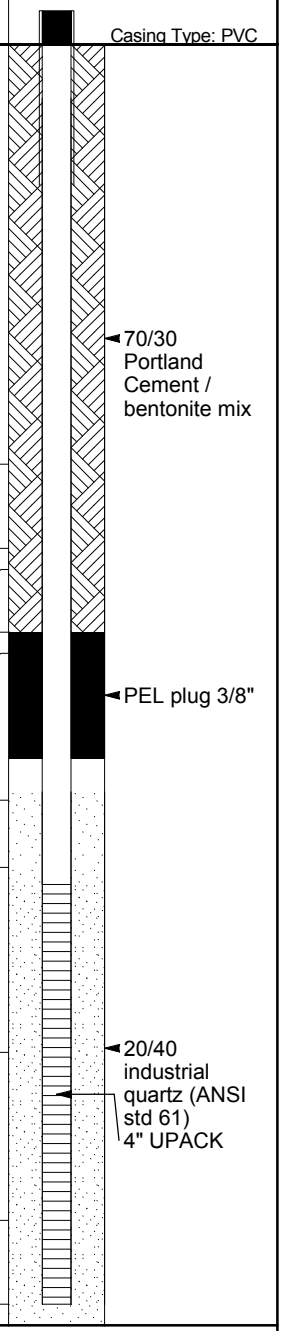


ERM
3200 Windy Hill Rd Ste 1500W
Atlanta, GA 30339
Telephone: 678-486-2700

WELL NUMBER PZ-21

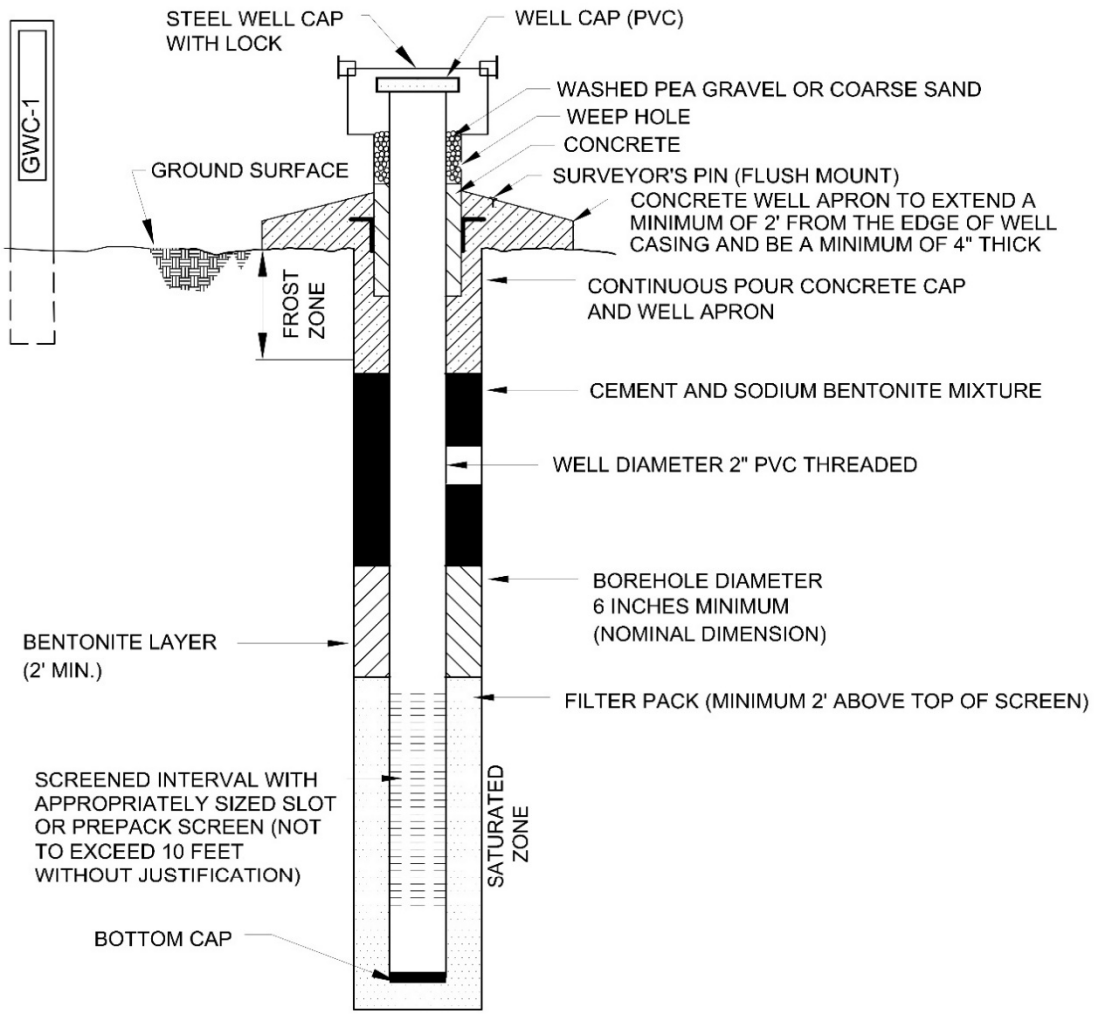
CLIENT Southern Company Services, Inc.
PROJECT NAME Plant Wansley
PROJECT NUMBER 0372406
PROJECT LOCATION AP
DATE STARTED 1/25/17 **COMPLETED** 1/25/17
GROUND ELEVATION _____ **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR Southern Comparny Services, Inc
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger 2"
AT TIME OF DRILLING ---
LOGGED BY AS **CHECKED BY** GEJ
AT END OF DRILLING ---
NOTES
AFTER DRILLING 16.90 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					Hydro-Vac cleared. No sample collected
10					10.0
	SS	90	SM		(SM) Brown, black, orange Silty SAND, loose, well graded, micaceeous, dry
					12.0
			CL-ML		12.5 (CL-ML) Orange and black mottled Silty CLAY, medium stiff, low plasticity, dry
			SM		(SM) Brown, black, orange Silty SAND, loose, well graded, micaceeous, dry
					14.0
15			CL-ML		14.5 (CL-ML) Orange and black mottled Silty CLAY, medium stiff, low plasticity, dry
	SS	93	SM		(SM) Brown, black, orange Silty SAND, loose, well graded, trace mixed clays and gravels, micaceeous, moist - wet
					18.0
			CL-ML		(CL-ML) Orange Silty CLAY, soft, low plasticity, wet
20					19.6
	SS	100	SM		(SM) Brown, black, orange Silty SAND, loose, well graded, micaceeous, wet
					24.0
25			SW		(SW) Grey brown Gravelly Silty SAND, loose, course grained, micaceous, wet
	SS	100	SW		(SW) SAA, foiliated texture
					28.0
30					Grey Partially Weather Rock (PWR), very dense, foliated, micaceous, with coarse quartzite gravel
					30.0



Refusal at 30.5 feet.
Bottom of borehole at 30.5 feet.

B. GROUNDWATER MONITORING WELL DETAIL



GROUNDWATER MONITORING WELL (TYP.)

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.

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 0.1 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 equipment will be decontaminated before use and between well locations in general accordance with USEPA Region 4 SESD guidance document, *Operating Procedure - Field Equipment Cleaning and Decontamination* (EPA, SESDGUID-205-R3), 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:

   ±0.2 for pH

   ±5% for specific conductance (conductivity)

±10% or ±0.2 mg/L (whichever is greater) for DO where DO>0.5mg/L. If DO<0.5mg/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 flow rate between 100 and 200 mL/min according to the most current version of USEPA Region 4 SESD guidance document, *Operating Procedure – Groundwater Sampling* (EPA, SESDPROC-301-R#), 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. 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; however, at no time will samples be analyzed after the method-prescribed hold time.

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.