GROUNDWATER MONITORING PLAN

PLANT BOWEN ASH POND 1 (AP-1) CLOSURE
BARTOW COUNTY, GEORGIA

FOR

Georgia Power

JULY 2021

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Approved
Solid Waste Management Program
Approved By: John Sayer
Digitally signed by John Sayer
Date: 2021.08.30 14:06:28 -04'00'

Geosyntec consultants
engineers | scientists | innovators

Geosyntec Consultants, 1255 Roberts Boulevard, Suite 200, Kennesaw, Georgia 30144
Phone: 678-202-9500, Fax: 678-202-9501

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I. CERTIFICATION

This *Groundwater Monitoring Plan, Georgia Power Company - Plant Bowen Ash Pond 1 (AP-1) Closure* has been prepared by a qualified groundwater scientist or engineer with Geosyntec Consultants, Inc. (Geosyntec) to meet the requirements contained in Chapter 391-3-4-.10 of the Georgia Environmental Protection Division Rules of Georgia, Solid Waste Management, Coal Combustion Residuals (i.e., State CCR Rule). References to the appropriate sections of the State CCR Rule are incorporated throughout this document.

I hereby certify that this Groundwater Monitoring Plan was prepared by, or under the direct supervision of, a "Qualified Groundwater Scientist," in accordance with the State of Georgia Rules of Solid Waste Management. According to Chapter 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 scund professional judgments regarding groundwater monitoring, contaminant fate and transport, and corre:tive action." The design of the groundwater monitoring system was developed in compliance with Chapter 391-3-4-.10(6).

Signature: _____

Date: July 14, 2021

Signature: _____

Date: July 14, 2021

1. INTRODUCTION

Groundwater monitoring is required by the Georgia Environmental Protection Division (GA EPD) to detect and quantify potential changes in groundwater chemistry. This Groundwater Monitoring Plan (plan) describes the groundwater and surface water monitoring program for Ash Pond 1 (AP-1 or Site) at Georgia Power Company's (Georgia Power's) Plant Bowen located in Bartow County, Georgia. This plan meets the requirements of the GA EPD regulations referenced on the certification page and uses GA EPD's Manual for Ground Water Monitoring dated September 1991 as a guidance. Groundwater monitoring well locations are presented on Figure A-1 of **Appendix A** and well construction details on Table A-1 of **Appendix A**.

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

In accordance with the United States Environmental Protection Agency (USEPA) Coal Combustion Rule (§257.90), which is incorporated by Georgia State CCR Rule by reference, a detection monitoring well network for AP-1 has been installed and certified by a qualified professional engineer. This certification has been placed in the facility's operating record and is included in Part B of the permit application. 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 GA EPD prior to the unscheduled installation or abandonment of monitoring wells. Well installation and/or abandonment must be directed by a qualified groundwater scientist.

2. GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

The following section presents the geologic and hydrogeologic conditions for the Site as described in the *Hydrogeologic Assessment Report (Revision 3)* [HAR] tab in Section 2 of Part B of this permit application.

2.1 SITE GEOLOGY

AP-1 is located in the Valley and Ridge Physiographic Province of northwest Georgia, which is characterized by Paleozoic sedimentary rocks that have been folded and faulted into the ridges and valleys that gave this region its name. The floor of the valley is underlain by shales, dolomites, and limestones of Cambrian and Ordovician age. Geologic mapping performed by Lawton et al. (1976) indicates that the Site is underlain by the Ordovician-Cambrian age Knox Dolomite and the Ordovician age Newala Limestone. Based on review of subsurface investigations at the Site, the bedrock is described as predominantly dolomite. AP-1 is underlain primarily by three lithologic units; (i) fill material consisting of earthen embankments and CCR material, (ii) residuum, and (iii) competent dolomite/limestone bedrock.

Based on subsurface investigations, the CCR material includes fly ash, that comprises the bulk of the CCR materials observed in AP-1, and occasional lenses of bottom ash material, generally described as light brownish gray to very dark gray, loose to stiff silty sand, and medium to coarse sand. The residuum at the Site is the result of in-place weathering of the underlying dolomite/limestone bedrock. The residuum consists mainly of mottled light brown to red to yellow, low to high plasticity, stiff to very stiff clay, silt, and silty clay. Most soils contain varying amounts of black chert nodules and chert gravel. The bedrock at the Site is described as light to dark gray, fine to medium-grained, thinly-bedded to massive, dense, and hard dolomite, limestone, and dolomitic limestone. Some evidence of weathering along fracture or bedding surfaces was observed, with some manganese or iron oxide staining. Abundant calcite veins and occasional zones of healed dolomite breccia were observed throughout the bedrock. Solution cavities or voids in the underlying limestone/dolomite bedrock form over geological timeframes along pre-existing discontinuities such as joints and bedding planes. At the Site, these cavities are typically filled with sediment from the in-place weathering of the bedrock or the downward migration of the overlying residuum, but they may also be open, or water filled.

2.2 SITE HYDROGEOLOGY

The uppermost aquifer at AP-1 is a regional groundwater aquifer that occurs in the residuum and fractured and solutioned bedrock. Under natural conditions, the potentiometric surface would be expected to be a subdued reflection of the surface topography; however, the presence of AP-1 and other features at the Plant have locally altered groundwater flow patterns. Groundwater recharge is by precipitation falling onto outcrop areas and then percolating through the residuum to bedrock. Groundwater flow in bedrock is under unconfined to semi-confined conditions from the mantle of overlying lower-permeability residuum and is controlled by secondary porosity along fractures and solution-enhanced features. Based on observations of residuum soil types and horizontal conductivity values, the movement of groundwater in the residuum and highly-weathered upper surface of the bedrock is slow and more characteristic of porous media flow than secondary porosity (fracture) flow. Groundwater flow in the underlying dolomite/limestone bedrock is likely controlled by preferential flow pathways associated with fractures and solution-enhanced joints and fissures.

Groundwater within the residuum and bedrock at AP-1 generally flows to the north and northwest. A component of flow in the southernmost portion of AP-1 is to the south and west, likely due to groundwater mounding related to historical free water storage at the recycle pond (now decommissioned). A potentiometric surface map depicting groundwater flow directions for the residuum/bedrock aquifer is provided in **Appendix A**. The potentiometric surface map represents data recorded in March 2021.

Clustered piezometers (APP2s) installed in the interior of AP-1 indicate higher potentiometric heads in the CCR material than in the underlying bedrock. This is due to the presence of the low permeability residuum which retards vertical infiltration of the mounded water in AP-1. This condition results in a downward hydraulic gradient between the zone of saturation within AP-1 and the uppermost aquifer. This observation is supported by historical water levels measured in piezometers screened in the CCR. Groundwater gradients in the uppermost aquifer are also influenced by the surface water in the GSWP and former recycle pond. The calculated hydraulic gradient along the northwest, west, and south/southwest flow paths are 0.012 feet per foot (ft/ft), 0.019 ft/ft, and 0.015 ft/ft, respectively, based on the March 2021 potentiometric data. While vertical hydraulic gradients at AP-1 are downward, they likely reverse to an upward gradient near natural groundwater discharge areas.

Horizontal hydraulic conductivity (K_h) values for the residuum were reported by SCS (2002) to range from 1.5×10^{-8} to 1.5×10^{-4} cm/s. Vertical hydraulic conductivities (K_v) of residuum, measured in laboratory permeability tests on Shelby tube samples, had a geometric mean of 2.0×10^{-8} cm/s which compares similarly to previously reported K_v values ranging from approximately 10^{-6} to 10^{-8} cm/s. Horizontal hydraulic conductivity values measured for bedrock ranged from 1.1×10^{-5} cm/s to 1.2×10^{-3} cm/s, with a geometric mean of 8.5×10^{-4} cm/s. Additional details regarding the hydrogeologic conditions in the vicinity of AP-1 are provided in the HAR.

3. SELECTION OF WELL LOCATIONS

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

The groundwater monitoring network locations were chosen to monitor upgradient (BGWA) and downgradient (BGWC) conditions at the Site based on groundwater flow direction determined by potentiometric evaluation. Five wells are designated for monitoring of upgradient conditions (i.e., BGWA-2, BGWA-29, BGWA-33, BGWA-47D, and BGWA-48D) and 19 wells are designated for monitoring of downgradient conditions (i.e., BGWC-7, BGWC-8, BGWC-9, BGWC-10, BGWC-12, BGWC-14A, BGWC-16, BGWC-17, BGWC-18, BGWC-19, BGWC-20, BGWC-21, BGWC-22, BGWC-23, BGWC-24, BGWC-25, BGWC-30, BGWC-51, and BGWC-52). Wells are generally spaced approximately 400-600 feet apart and are positioned to provide adequate coverage to detect any groundwater impacts caused by AP-1. The well spacing was established using the groundwater conceptual site model for AP-1 developed by Anchor QEA (Anchor, 2016). The conceptual model describes the preferential flow paths from the ash pond based on new or historical subsurface profiling by electrical resistivity or gravity surveys, and lineament analysis based on topographic maps and satellite photos. Both upgradient and downgradient wells are screened in the upper portion of the uppermost aquifer (i.e., the lower portion of the residuum and the upper portion of bedrock that is most fractured and solutioned), as this represents the primary zone of groundwater flow, except for wells BGWA-47D and BGWA-48D, which were installed to characterize background groundwater conditions at two deeper intervals in the vicinity of background well BGWA-2. Both historical groundwater quality data and potentiometric surface maps illustrate that the five background wells (i.e., BGWA-2, BGWA-29, BGWA-33, BGWA-47D, BGWA-48D) accurately represent background groundwater that has not been affected by leakage from the CCR unit. The supporting groundwater quality data summary tables and potentiometric maps are included within routine semiannual groundwater monitoring reports submitted to GA EPD. Due to the potential presence of preferential groundwater flow pathways resulting from solutioning of the dolomite/limestone bedrock, remote sensing and surface geophysical surveys were used to estimate the location of these zones. The downgradient wells are strategically placed in areas considered to have a higher likelihood of aligning with these linear flow pathways.

Monitoring wells will generally be located outside of areas with frequent auto traffic; however, wells may be installed in heavily trafficked areas when necessary to meet the groundwater monitoring objectives of the GA EPD rules. In addition to the potentiometric surface map, **Appendix A** also includes a tabulated list (Table A-1) of location coordinates for the individual monitoring wells. Additional well construction details (i.e., top-of-casing elevation, well depths, and screened intervals) are also provided on this table.

4. MONITORING WELL DRILLING, CONSTRUCTION, ABANDONMENT AND REPORTING

The AP-1 monitoring well network described in this plan is already in place. The existing monitoring wells were installed following USEPA Region 4 Science and Ecosystem Support Division (SESD) *Operating Procedure for Design and Installation of Monitoring Wells* (USEPA, SESDGUID-101-R1) as a general guide for best practices. The compliance monitoring wells were installed by Anchor between 2015 and 2017 and by Geosyntec between 2018 and 2021; the boring and well construction logs associated with these field efforts are included in **Appendix A**. 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 monitoring wells. Drilling methodologies include but are not limited to: hollow stem augers, direct push, air rotary, mud rotary, and rotosonic techniques. The drilling method will be selected to minimize the disturbance of subsurface materials and not cause impacts to groundwater. Borings will be advanced using an appropriate drilling technology capable of drilling and installing a well in the site-specific geology. Monitoring wells will be installed using the most current version of the USEPA SESD SESDGUID-101-R# as a general guide for best practices. Also, drilling equipment will be decontaminated before use and between borehole locations using the procedures described in the most current version of USEPA SESD *Operating Procedure for Field Equipment Cleaning and Decontamination* (EPA, SESDGUID-205-R#). Well installation will be directed by a qualified groundwater scientist.

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

All drilling for any subsurface hydrologic investigation, or for installation or abandonment of groundwater monitoring wells, will be performed by a driller that has, at the time of installation, a performance bond on file with the Water Well Standards Advisory Council.

4.2 DESIGN AND CONSTRUCTION

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

WELL CASINGS AND SCREENS

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

WELL INTAKE DESIGN

Intake for groundwater monitoring wells will be designed and constructed to: (1) allow sufficient groundwater flow to the well for sampling; (2) minimize the passage of formation materials (turbidity) into the well; and (3) ensure sufficient structural integrity to prevent the collapse of the intake structure.

Each groundwater monitoring well will include a well screen designed to limit the amount of formation material passing into the well when it is purged and sampled. Screens with 0.010-inch slots have proven effective for the earth materials at the Site and will be used unless geologic conditions discovered at the time of installation dictate a different size. Screen length will not exceed 10 feet without justification as to why a longer screen is necessary (e.g., significant variation in groundwater level). If these specifications 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 USEPA SESDGUID-101-R# as a general guide. If the dual-wall pre-packed-screened wells do not yield sufficient water or are excessively turbid after development, further steps will be taken to assure that the well screen is appropriately sized for the formation material. This may include performing sieve analysis of the formation material and determining well screen slot size based on the grain size distribution.

FILTER PACK AND ANNULAR SEAL

The materials used to construct the filter pack will be clean quartz sand of a size that is appropriate for the screened formation. Fabric filters will not be used as filter pack material. Sufficient filter material will be placed in the boring and measurements taken to ensure that no bridging occurs. Upon placement of the filter pack, the well may be pumped to assure settlement of the pack. If pumping is performed, the top elevation of filter pack depth will be monitored, 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 in the boring above the well pack must prevent hydraulic communication between strata and prevent migration from overlying areas into the well screen interval. A minimum of two feet of bentonite (chips, pellets, or slurry) will be placed immediately above the filter pack. The bentonite seal will extend up to the base of any overlying confining zone or the top of the water-bearing zone to prevent cementitious grout from entering the water-bearing or screened zones. If dry bentonite is used, the bentonite must be hydrated with potable water prior to grouting the remaining annulus.

The 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 two 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 2 feet from the edge of the well casing and sloped to drain water away from the well.

Each well will be fitted with a cap that contains a hole or opening to allow the air pressure in the well to equalize with atmospheric pressure. 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 a well's filter pack over time. Therefore, the turbidity of the groundwater from the monitoring wells may gradually increase over time after initial well development. As a result, monitoring wells may need to be redeveloped periodically to remove the silt and clay that has worked its way into the filter packs of the wells. Each monitoring well should be redeveloped when sample turbidity values have significantly increased since initial development or since prior redevelopment. The redevelopment should be performed as described above.

4.3 ABANDONMENT

Per Georgia Rule 391-3-4.10(6)(g), monitoring wells require replacement after two consecutive dry sampling events, unless an alternate schedule has been approved by EPD. A minor modification will be submitted in accordance with 391-3-4.02(3)(b)(6) prior to the installation or decommissioning of monitoring wells. Well replacement and abandonment will be directed by a qualified groundwater scientist, registered in Georgia. Monitoring wells will be abandoned using industry-accepted practices and using the GA EPD *Manual for Groundwater Monitoring* (1991) and Georgia's *Well Water Standards Act of 1985* [Official Code of Georgia Annotated (O.C.G.A.) § 12-5-120, 1985] as guides. 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, survey, develcpment 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 GA EPD. The following information will be documented in this report.

- Well identification
- Name of drilling contractor and type of drill
- 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 data given to within an accuracy of 0.5 feet based on survey data recorded from an acceptable survey point datum by a Georgia-registered professional surveyor
- Well elevation data given to within an accuracy of 0.01 feet based on survey data recorded from an acceptable survey point datum by a Georgia-registered professional surveyor
- 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

This section of the plan describes AP-1 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 anc Frequency, presents the groundwater monitoring parameters and sampling frequency. A minimum of eight independent samples from each groundwater well were collected between June 2016 and August 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 the State CCR Rule, Chapter 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 Chapter 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* (Anchor, 2018). Georgia Power will conduct assessment monitoring in accordance with Chapter 391-3-4-.10(6).

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, 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 GA EPD. The method used will be able to reach a suitable practical quantification limit to detect natural background conditions at the facility. The groundwater samples will be analyzed by licensec and accredited laboratories through the National Environmental Laboratory Accreditation Conference (NELAC). Field instruments used to measure pH will be accurate and reproducible to within 0.1 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	150.1field
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. GROUNDWATER 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 GA EPD approval.

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 will be directed by a qualified groundwater scientist. A minor modification will be submitted to GA EPD in accordance with Rule 391-3-4-.02(3)(b)(6) prior to the installation or decommissioning of monitoring wells.

7. SURFACE WATER MONITORING PLAN

During each semi-annual groundwater sampling event, surface water samples will also be collected from the discharge of the constructed stormwater ponds; sample locations are identified on **Figure A-1**. The surface water monitoring is for the Solid Waste Management Program and is not associated with any existing industrial, industrial stormwater, and/or construction stormwater discharge permitting which are regulated by the National Pollutant Discharge Elimination System (NPDES) requirements of Section 402 of the Clean Water Act. Semi-annual sampling of the surface water locations will commence once final construction certification of the AP-1 permitted closure design has been received by GA EPD. As these stormwater ponds are designed to convey water during and immediately after rain events, it is possible that water will not be flowing from the designated sampling locations (i.e., discharge outlets) associated with these ponds during the time of the semi-annual sampling events. In the event that no flowing water is present at the sampling locations, it will be noted in the field sampling documents associated with that event.

Surface water samples will be collected and handled in accordance with standard industry practice and USEPA Region 4 *Field Branches Quality System and Technical Procedures* as a guide. When possible, the sample should be collected directly into the appropriate sample container provided by the analytical laboratory. If the sample location cannot be physically reached, an intermediate collection device may be used (e.g., a "swing sampler" with a 12-foot handle and a single use container) as presented in the current USEPA field guidance document. When non-dedicated equipment is used, it will be decontaminated prior to use and between surface water sampling locations.

Surface water samples will be analyzed for Appendix IV constituents as listed in **Table 1** and by the methods listed in **Table 2**.

8. 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 and times of possession by each individual

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

9. 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 and surface water 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. Instruments will be recalibrated as necessary (e.g., when calibration checks indicate significant variability), and all checks and recalibration steps will be documented on the field 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 if recalibration does not improve instrument function. Completed calibration field forms will be provided with the semi-annual groundwater monitoring reports.

10. REPORTING RESULTS

A semi-annual groundwater report that documents the results of sampling and analysis will be submitted to GA EPD. Semi-annual groundwater monitoring reports will be submitted to the GA 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 narrative of purging/sampling methodologies, which will include the type of sampling equipment used.
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 will be kept for each sampling event, and will include the following, but not be limited to, well signage, well access, sampling and purging equipment condition, and any site conditions that may affect sampling.

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

17. Tabulated water quality results for the samples of discharging surface water collected semi-annually from Stormwater Ponds 1, 2, and 3. The table presents data for the current reporting period and all historical monitoring events associated with the surface water monitoring program.

18. An iso-concentration map of each Appendix IV constituent identified at a statistically significant level (SSL) during the reporting period. The concentrations will be contoured to the current state and, if applicable, federal groundwater protection standard. Inclusion of the map(s) is only applicable for a unit currently undergoing assessment of corrective measures and/or corrective action.

19. Statistical analyses.

20. Certification by a qualified groundwater scientist.

11. 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 establish statistical limits. Statistical analysis techniques will be consistent with the USEPA document *Statistical Analysis of Groundwater Data at RCRA Facilities Unified Guidance* (Unified Guidance) (USEPA, 2009).

According to GA EPD rules [391-3-4-.10(6)(a)], the Site must specify in the operating record the statistical methods to be used in evaluating groundwater monitoring data for each hazardous constituent. 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 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)]; and

3. Another statistical test method (such as prediction limits or control charts) 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).

An interwell statistical method will be used to compare Appendix III groundwater monitoring data to background conditions. Confidence intervals will be constructed for each downgradient well and used to compare Appendix IV groundwater monitoring data to groundwater protection standards.

A site-specific statistical analysis plan that provides details regarding the statistical methods to be used will be placed in the Site's operating record pursuant to 391-3-4-.10(6). Figure 1, Statistical Analysis Plan Overview, presents a flowchart that depicts the process that will be followed to develop the site-specific plan. Figure 2, Decision Logic for Computing Prediction Limits, presents the logic that will be used to calculate site-specific statistical limits and test groundwater results from compliance monitoring wells against those limits.

FIGURE 1. STATISTICAL ANALYSIS PLAN OVERVIEW

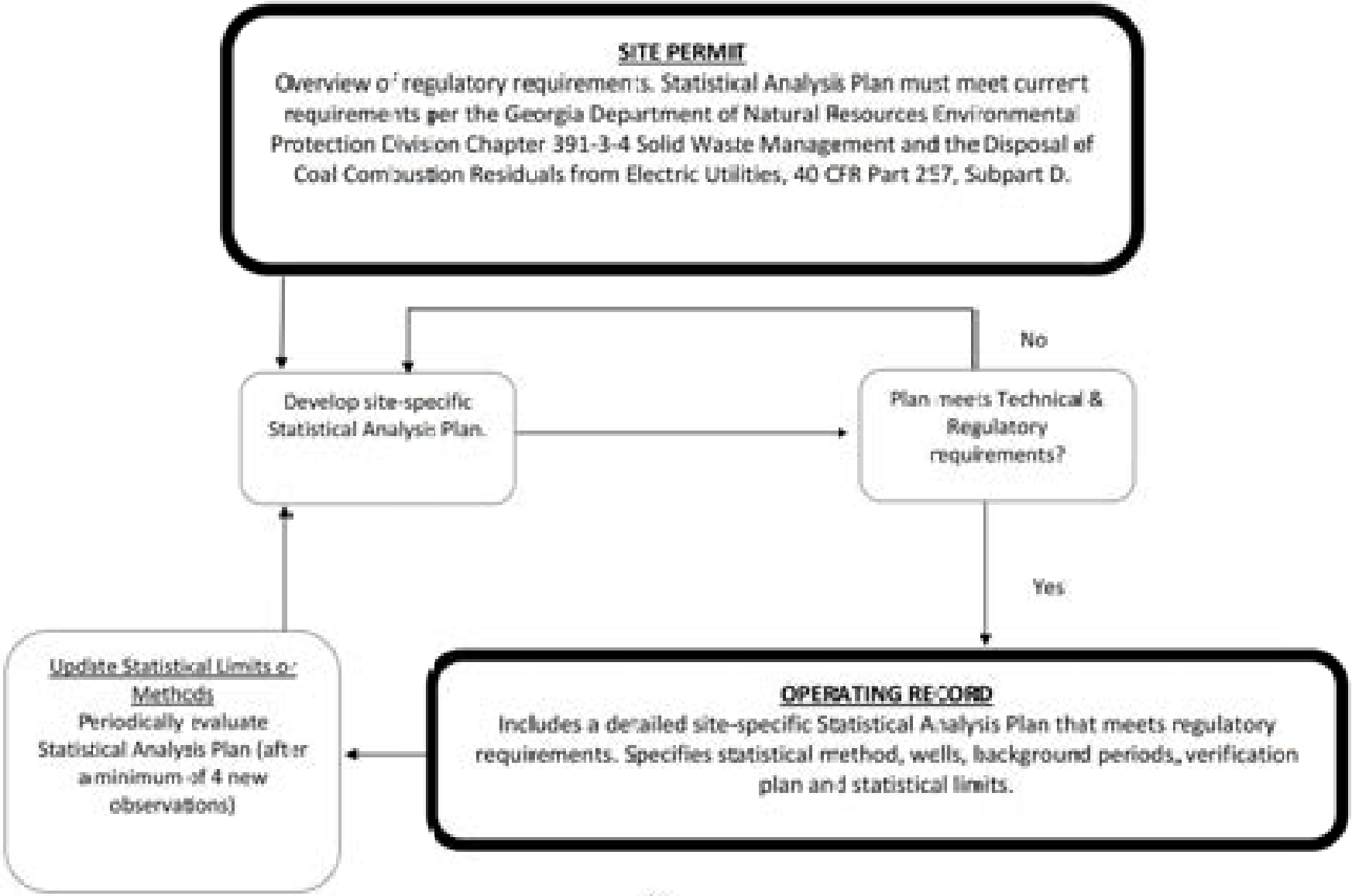
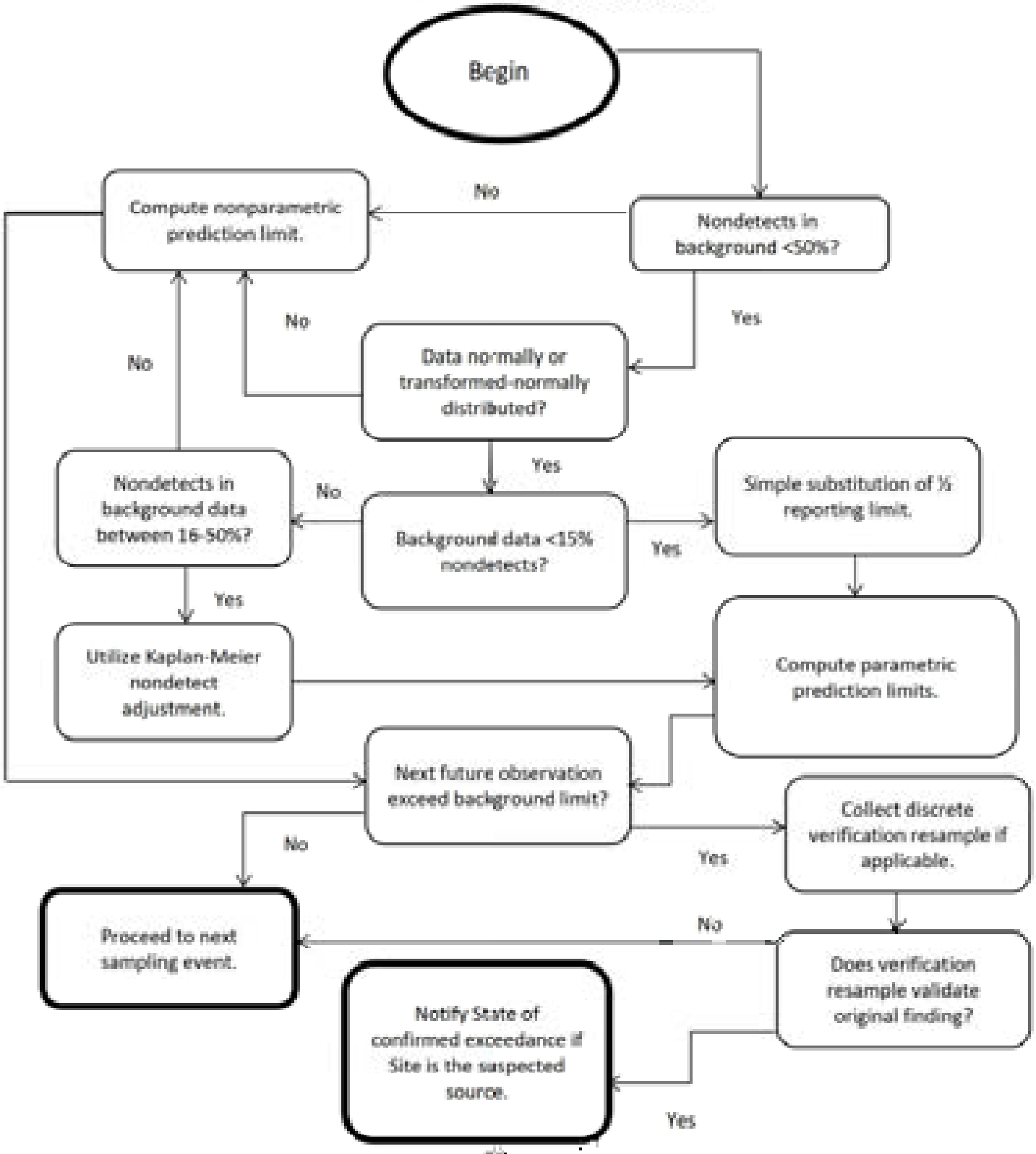


FIGURE 2. DECISION LOGIC FOR COMPUTING TOLERANCE OR PREDICTION INTERVALS



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APPENDIX

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

A. MONITORING SYSTEM DETAILS

FIGURE A-1 COMPLIANCE MONITORING NETWORK

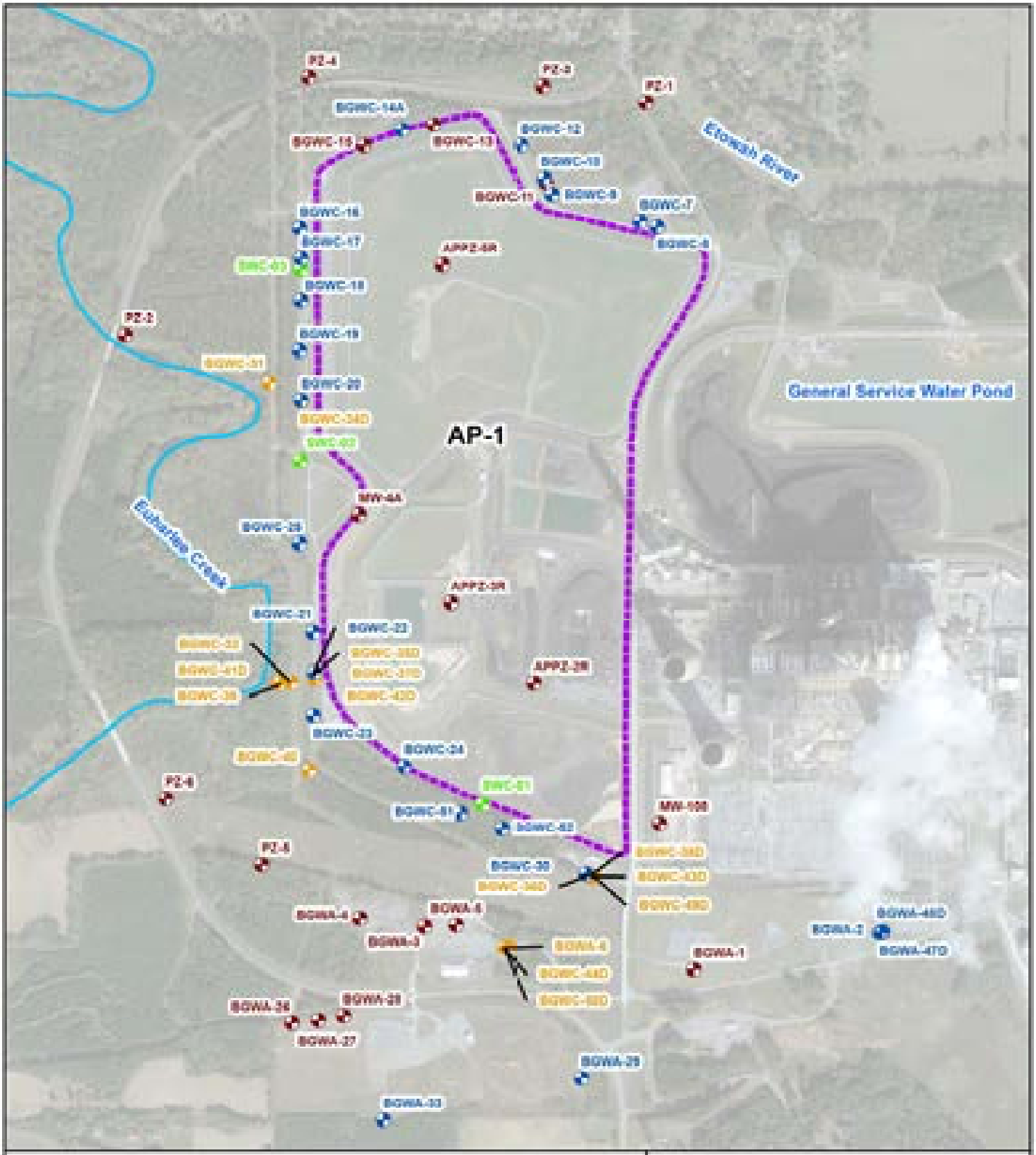
FIGURE A-2 BEDROCK POTENTIOMETRIC SURFACE MAP – MARCH 2021

TABLE A-1 AP-1 MONITORING NETWORK WELL DETAILS

TABLE A-2 AP-1 WATER LEVEL MONITORING NETWORK DETAILS

AP-1 BORING AND WELL CONSTRUCTION LOGS

CERTIFIED WELL NETWORK SURVEY DATA



LEGEND

- Compliance Monitoring Well
- Delineation Monitoring Well
- Piezometer
- Surface Water Sample Point
- Approximate AP-1 Boundary

N

0 500 1,000 2,000 Feet

Notes:
1. Aerial photograph source: Google Earth Pro, November 2019.
2. Surface water samples collected from the discharge of each of the three lined stormwater ponds that will be constructed as part of the final cover system. The placement of the surface water sample points shown on this map are based on the Permit Closure Drawings, drawing sheet no. 50.

Compliance Monitoring Network

Georgia Power Company
Plant Bowen AP-1
Cartersville, Bartow County, Georgia

Geosyntec consultants

Kennesaw, GA | June 2021

Figure A-1

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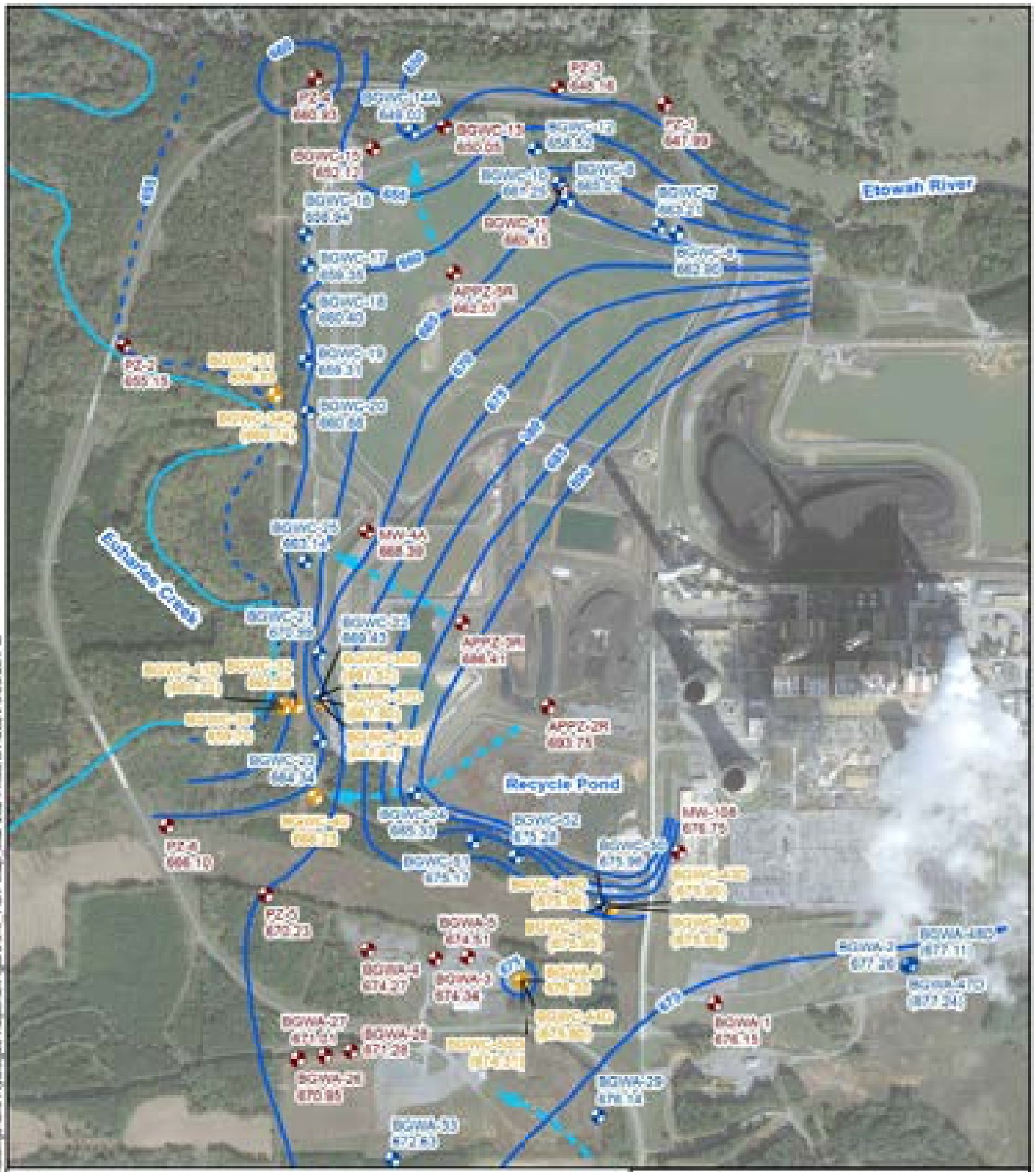

Notes:
1. Water level elevations recorded on March 22, 2021. Elevation provided in feet referenced to the North American Vertical Datum (NAVD) 88. The Recycle Pond water elevation is currently below the measuring threshold of the installed gauge. Based on information provided by Georgia Power, the lowest elevation that the gauge can measure is 668.5 (NAVD).
2. The map shows only the wells/piezometers installed at the time of the gauging event.
3. Water elevation in parentheses is not used in development of groundwater contours due to well being screened at a different elevation in the formation/aquifer.
4. Aerial photograph source: Google Earth Pro, Nov 2019.

Bedrock Potentiometric Surface Map - (March 2021)

Georgia Power Company
Plant Bowen AP-1
Bartow County, Georgia

Geosyntec consultants

Kennesaw, GA | June 2021

Figure A-2

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Table A-1
AP-1 Monitoring Network Well Details
Plant Bowen AP-1, Bartow County, Georgia

Well ID	Purpose	Northing [1]	Easting [1]	Ground Surface Elevation [2] (ft)	Top of Casing Elevation [2] (ft)	Well Depth (ft BTOC) [3]	Top of Screen Elevation [2] (ft)	Bottom of Screen Elevation [2] (ft)	Mean Kh (ft/d)	Mean Kv (ft/d)	Screened Media
BGWA-2	Monitoring, upgradient	1499574.18	2068595.59	727.00	729.69	89.40	670.49	640.49	2.25E+01	--	Bedrock
BGWA-25	Monitoring, upgradient	1498285.84	2066562.32	718.84	721.58	98.80	632.88	622.88	1.55E+01	--	Bedrock
BGWA-33	Monitoring, upgradient	1497972.13	2064876.80	740.50	743.25	81.74	661.18	651.18	--	--	Bedrock
BGWA-47D	Monitoring, upgradient	1499577.79	2068812.48	728.95	729.61	154.04	585.90	575.90	--	--	Bedrock
BGWA-48D	Monitoring, upgradient	1499580.09	2068823.31	728.64	729.58	154.74	564.97	554.97	--	--	Bedrock
BGWC-7	Monitoring, downgradient	1504711.59	2066801.40	702.49	705.24	90.50	625.18	615.18	--	--	Bedrock
BGWC-8	Monitoring, downgradient	1504671.82	2066929.46	703.71	706.48	79.00	636.83	626.83	2.05E+01	--	Bedrock
BGWC-9	Monitoring, downgradient	1504909.12	2066183.27	689.18	691.99	63.00	638.33	628.33	9.50E+00	--	Bedrock
BGWC-10	Monitoring, downgradient	1505815.22	2066083.09	683.39	686.06	62.70	633.66	623.66	--	--	Bedrock
BGWC-12	Monitoring, downgradient	1505279.80	2065908.56	691.71	694.81	78.70	626.01	616.01	3.43E+00	--	Bedrock
BGWC-14A[4]	Monitoring, downgradient	1505358.54	2065015.98	713.55	718.58	98.76	629.57	619.57	--	--	Bedrock
BGWC-16	Monitoring, downgradient	1504650.42	2064247.67	671.65	674.51	49.30	633.31	623.31	1.00E+01	--	Bedrock
BGWC-17	Monitoring, downgradient	1504832.60	2064270.38	671.25	673.69	68.60	615.35	605.35	1.55E+01	--	Bedrock
BGWC-18	Monitoring, downgradient	1504118.75	2064277.80	670.32	672.84	28.18	645.08	635.08	1.75E+01	--	Bedrock
BGWC-19	Monitoring, downgradient	1503742.25	2064244.66	671.44	673.61	55.00	628.91	618.91	4.00E+00	--	Bedrock
BGWC-20	Monitoring, downgradient	1503167.51	2064250.35	672.29	675.14	50.50	635.14	625.14	1.00E-01	--	Bedrock
BGWC-21	Monitoring, downgradient	1501627.51	2064340.00	688.55	691.10	53.10	648.83	638.63	1.30E+00	--	Bedrock
BGWC-22	Monitoring, downgradient	1501323.76	2064258.09	692.44	695.50	43.20	662.60	652.60	9.50E-01	--	Bedrock
BGWC-23	Monitoring, downgradient	1501080.57	2064150.17	693.16	695.59	51.50	654.39	644.39	2.00E-01	--	Bedrock
BGWC-24	Monitoring, downgradient	1500621.22	2065052.84	699.46	702.25	66.50	646.27	636.27	3.00E-01	--	Bedrock
BGWC-25	Monitoring, downgradient	1502292.72	2064294.10	677.00	680.49	57.50	632.87	622.87	3.00E-01	--	Bedrock
BGWC-50	Monitoring, downgradient	1499813.03	2066395.86	698.50	701.86	59.78	651.58	641.58	--	--	Bedrock
BGWC-51	Monitoring, downgradient	1500270.09	2065455.60	708.00	711.40	67.25	654.55	644.55	--	--	Bedrock
BGWC-52	Monitoring, downgradient	1500156.97	2065766.13	707.77	710.75	82.20	638.88	628.88	--	--	Bedrock

Notes:
-- = not available
d = day
ft = feet
ft BTOC = feet below top of casing
Kh = Horizontal Hydraulic Conductivity
Kv = Vertical Hydraulic Conductivity
(1) Coordinates in North American Datum (NAD) 1983, State Plane, Georgia West, feet. Survey completed by GEL Solutions June 10, 2020, except for BGWC-51 and BGWC-52, which were surveyed January 28, 2021.
(2) Elevations referenced to the North American Vertical Datum of 1988 (NAVD88). Survey completed by GEL Solutions June 10, 2020, except for BGWC-51 and BGWC-52, which were surveyed January 28, 2021.
(3) Total well depth accounts for sump if data provided on well construction logs.
(4) Monitoring well BGWC-14 was abandoned on May 17, 2020, and replaced with BGWC-14A.

Table A-2
AP-1 Water Level Monitoring Network Details
Plant Bowen AP-1, Bartow County, Georgia

Well ID	Northing[1]	Easting[1]	Ground Surface Elevation [2] (ft)	Top of Casing Elevation [2] (ft)	Well Depth (ft BTOC) [3]	Top of Screen Elevation [2] (ft)	Bottom of Screen Elevation [2] (ft)	Mean Kh (ft/d)	Mean Kv (ft/d)	Screened Media
Piezometer										
BGWA-1	1499101.23	2067205.48	718.35	720.90	59.20	672.00	662.00	--	--	Bedrock
BGWA-3	1494430.67	2065185.74	721.80	724.28	89.50	645.08	635.08	1.75E-01	--	Bedrock
BGWA-4	1499485.58	2066007.89	726.05	728.67	78.60	660.17	650.17	6.00E-01	--	Bedrock
BGWA-5	1499434.58	2065421.43	718.53	720.92	69.70	661.52	651.52	1.40E-01	--	Bedrock
BGWC-11	1504990.04	2066093.63	683.92	686.50	77.00	619.20	609.20	2.00E-01	--	Bedrock
BGWC-13	1505455.29	2065271.21	714.77	717.43	73.90	653.83	643.83	2.15E+00	--	Bedrock
BGWC-15	1505278.19	2064732.18	715.39	717.92	73.70	654.52	644.52	6.50E-01	--	Bedrock
BGWA-26	1498057.63	2066189.56	726.08	728.65	75.40	663.55	653.55	2.30E+00	--	Bedrock
BGWA-27	1497719.14	2064887.76	732.50	735.25	93.50	652.05	642.05	2.50E+00	--	Bedrock
BGWA-28	1498549.21	2064577.55	734.88	737.45	86.40	661.35	651.35	2.75E+00	--	Bedrock
PZ-1	1505600.54	2066644.10	675.25	677.87	57.52	630.85	620.85	--	--	Bedrock
PZ-2	1503856.86	2062938.81	665.92	668.25	39.20	649.22	639.22	--	--	Bedrock
PZ-3	1505723.97	2066071.08	705.34	707.97	59.60	658.64	648.64	--	--	Bedrock
PZ-4	1505788.58	2066114.61	715.90	718.74	59.78	669.26	659.26	--	--	Bedrock
PZ-5	1499083.63	2065961.22	697.23	700.12	59.89	640.56	630.56	--	--	Bedrock
PZ-6	1500579.68	2065342.81	675.50	678.32	37.82	640.83	630.83	--	--	Bedrock
MW-108	1500184.18	2066056.99	710.74	714.87	88.63	635.74	625.74	--	--	Bedrock
MW-4A	1502520.27	2064097.61	714.26	714.50	56.04	663.26	658.26	--	--	Bedrock
APPZ-2R	1501246.97	2066065.64	713.41	716.89	82.90	641.31	631.31	--	--	Bedrock
APPZ-3R	1501851.02	2065380.93	720.29	723.36	68.38	664.29	654.29	--	--	Bedrock
APPZ-5R	1504304.67	2065118.31	780.67	783.70	153.55	640.45	630.45	--	--	Bedrock
Delineation Monitoring Well										
BGWA-6	1499282.00	2065797.30	714.49	716.93	83.50	683.93	673.93	8.70E+00	--	Bedrock
BGWC-31	1503497.94	2064022.71	668.12	670.54	51.42	629.45	619.45	--	--	Bedrock
BGWC-32	1501252.25	2066188.30	696.36	699.36	51.25	658.49	648.49	--	--	Bedrock
BGWC-34D	1503358.51	2064257.95	672.25	675.17	79.43	606.07	596.07	--	--	Bedrock
BGWC-35D	1503113.30	2066358.63	693.13	695.73	80.59	625.47	615.47	--	--	Bedrock
BGWC-36D	1499887.51	2066415.10	698.07	701.01	96.45	614.89	604.89	--	--	Bedrock
BGWC-37D	1501293.16	2064362.70	693.30	696.05	110.55	595.83	585.83	--	--	Bedrock
BGWC-38D	1499882.36	2066430.17	697.52	700.34	125.81	584.86	574.86	--	--	Bedrock
BGWC-39	1501241.94	2064095.41	676.58	679.12	27.54	661.91	651.91	--	--	Bedrock
BGWC-40	1500589.93	2066317.38	687.12	689.59	62.47	637.45	627.45	--	--	Bedrock
BGWC-41D	1501255.56	2064096.25	676.45	679.12	57.66	631.76	621.76	--	--	Bedrock
BGWC-42D	1501280.52	2066365.25	693.98	696.90	155.92	555.31	545.31	--	--	Bedrock
BGWC-43D	1499750.86	2066444.37	697.29	700.10	165.81	544.62	534.62	--	--	Bedrock
BGWC-44D	1499265.15	2067811.06	714.65	717.30	142.64	584.99	574.99	--	--	Bedrock
BGWC-49D	1499790.13	2066403.96	696.97	699.75	321.13	398.93	388.93	--	--	Bedrock
BGWC-50D	1499269.15	2065781.87	714.68	717.41	183.09	544.08	534.08	--	--	Bedrock

Notes:
-- = not available
d = day
ft = feet
ft BTOC = feet below top of casing
Kh = Horizontal Hydraulic Conductivity
Kv = Vertical Hydraulic Conductivity
(1) Coordinates in North American Datum (NAD) 1983, State Plane, Georgia West, feet. Survey completed by GEL Solutions June 10, 2020, except for wells BGWC-49D and BGWC-50D, which were surveyed March 25, 2021.
(2) Elevations referenced to the North American Vertical Datum of 1988 (NAVD88). Survey completed by GEL Solutions June 10, 2020, except for wells BGWC-49D and BGWC-50D, which were surveyed March 25, 2021.
(3) Total well depth accounts for sump if data provided on well construction logs.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWA-2
LOCATION	Euharlee, Georgia	PAGE	1 of 9
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	727.00 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	166 feet
LOGGED BY	Matt Wilson/Rhonda Tinsley	DATE COMPLETED	10/29/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1498374.18; Easting: 2068599.59		

SAMPLING METHOD	RECOVERY (FEET)	SPLANCL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
NA	NA	NA					**0 to 15.0 feet: CLAY (CL)**, red, dry, low plasticity, very stiff, fissile. (RESIDUAL) (0 to 8.0 feet: verified by visual observation down hole created by vacuum truck.) @ 8 to 8.0 feet: No recovery; interval removed with vacuum truck to clear for utilities.	0	0	100
CB	8.3/8.0	N	5							
			10							
			15				**15.0 to 46.0 feet: CLAY (CH)**, red, dry to moist, moderate plasticity, stiff, occasional white chert nodules, trace well rounded silicic gravel. (RESIDUAL)	5	0	95
CB	11/10	N								
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWA-2
LOCATION	Euharlee, Georgia	PAGE	2 of 9
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	727.00 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	160 feet
LOGGED BY	Matt Wilson/Rhonda Tinsley	DATE COMPLETED	10/29/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1498374.18; Easting: 2068599.59		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
							15.8 to 46.0 feet: CLAY (CL), continued.	5	0	95
			25							
CB	8.8/10	N								
			30							
			35							
CB	11.3/10	N								
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWA-2
LOCATION	Euharlee, Georgia	PAGE	3 of 9
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	727.00 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	160 feet
LOGGED BY	Matt Wilson/Rhonda Tinsley	DATE COMPLETED	10/29/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1498374.18; Easting: 2068599.59		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
			45				**15.8 to 46.0 feet: CLAY (CL)**, continued. @ 41.0 to 46.0 feet: gradational color change from red to light reddish brown.	15	0	85
CB	10.7/10	N	50				**46.0 to 74.7 feet: CLAY WITH GRAVEL (CH)**, light reddish brown, dry, very stiff, high plasticity, occasional well rounded, fine- to cobble-sized silicic gravel, dry to moist. (RESIDUAL)	12	0	88
CB	11/10	N	55				@ 56.0 to 58.5 feet: abundant black, soft, easily crumbled nodules. (Manganese?) @ 58.5 to 61.0 feet: occasional black nodules as above.			
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWA-2
LOCATION	Euharlee, Georgia	PAGE	4 of 9
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	727.00 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	166 feet
LOGGED BY	Matt Wilson/Rhonda Tinsley	DATE COMPLETED	10/29/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1498374.18; Easting: 2068599.59		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION/ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
							46.8 to 74.7 feet: CLAY WITH GRAVEL (CH). -continued.	15	0	85
							@ 61.0 to 66.0 feet: gradual color change from light reddish brown to light brown.			
			65							
CB	10.8/10	N					@ 66.0 feet: light brown, occasional angular black chert nodules.			
			70							
							74.7 to 86.0 feet: DOLOMITE, medium gray with calcite-filled fractures, some weathering (iron staining). (BEDROCK)	NA	NA	NA
			75							
CB	7.3/10	S								
			80							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWA-2
LOCATION	Euharlee, Georgia	PAGE	5 of 9
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	727.00 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	160 feet
LOGGED BY	Matt Wilson/Rhonda Tinsley	DATE COMPLETED	10/29/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1499374.18; Easting: 2068599.59		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
			85				**74.7 to 86.0 feet: DOLOMITE**, continued.	NA	NA	NA
CB	8.4/10	N	90				**86.0 to 138.0 feet: GRAVELLY CLAY (CH)**, light brown, soft, very wet, loose, gravel is angular, well graded, fine to coarse, occasional zones of deep red clay, clay has fragments of dolomite and chert. (VOID INFILL)	30	2	80
CB	5.6/10	N	95							
			100							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWA-2
LOCATION	Euharlee, Georgia	PAGE	6 of 9
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	727.00 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	160 feet
LOGGED BY	Matt Wilson/Rhonda Tinsley	DATE COMPLETED	10/29/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1498374.18; Easting: 2068599.59		

SAMPLING METHOD	RECOVERY (FEET)	SPLANSL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
			105				86.8 to 138.0 feet: GRAVELLY CLAY (CH). -continued.	20	0	80
CB	5.8/10									
			110				@ 108.4 to 110.0 feet: gray sandy silt.			
			115							
CB	0/0						@ 116.0 to 136.0 feet: No recovery, wet and loose.			
			120							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWA-2
LOCATION	Euharlee, Georgia	PAGE	7 of 9
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	727.00 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	160 feet
LOGGED BY	Matt Wilson/Rhonda Tinsley	DATE COMPLETED	10/29/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1498374.18; Easting: 2068599.59		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
							86.8 to 138.0 feet: GRAVELLY CLAY (CH). continued.	20	0	80
CB	9/0		125							
			130							
			135							
CB	5/10						**138.0 to 143.0 feet: DOLOMITE,** see description on next page.	NA	NA	NA
			140							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWA-2
LOCATION	Euharlee, Georgia	PAGE	8 of 9
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	727.00 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	166 feet
LOGGED BY	Matt Wilson/Rhonda Tinsley	DATE COMPLETED	10/29/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1498374.18; Easting: 2068599.59		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
							138.0 to 143.0 feet: DOLOMITE, medium gray with assorted quartz gravel and large chert chunks, breakage along bedding planes, some algal laminations, quartzite at bottom of interval, some iron and/or manganese deposits. (BEDROCK)	NA	NA	NA
							143.0 to 151.0 feet: GRAVELLY CLAY (CH), light brown, soft, very wet, with fragments of dolomite and chert, gravel is angular, well graded, fine to coarse. (VOID INFILL)	20	0	80
			145							
CB	8.8/10									
			150							
							151.0 to 166.0 feet: DOLOMITE, medium gray, hard, dense, fine grained, breakage along bedding planes, some weathering evident. (BEDROCK)	NA	NA	NA
			155							
CB	8.3/10	E								
			160							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWA-2
LOCATION	Euharlee, Georgia	PAGE	9 of 9
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	727.00 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	166 feet
LOGGED BY	Matt Wilson/Rhonda Tinsley	DATE COMPLETED	10/29/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1498374.18; Easting: 2068599.59		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	ORA %	SAND %	FINES %
CB	8.3/10	E	165				151.0 to 166.0 feet: DOLOMITE, continued.	NA	NA	NA
							Total depth: 166.0 feet.			
			170							
			175							
			180							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

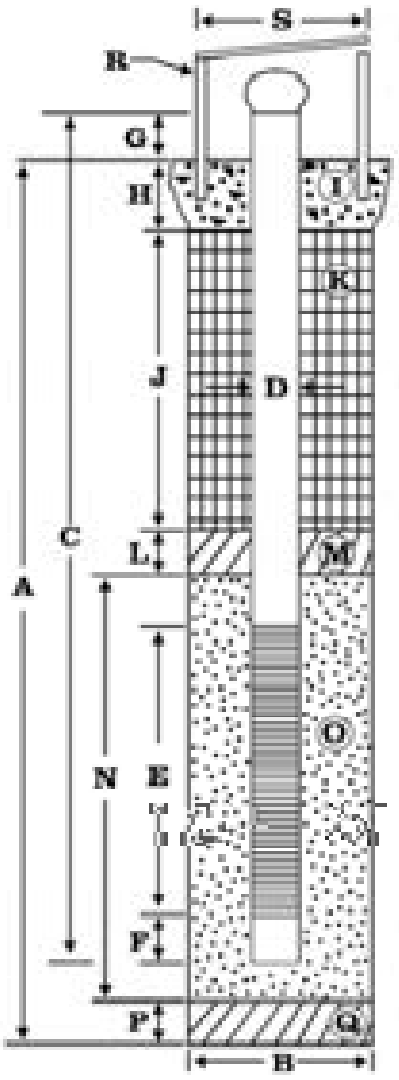
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWA-2
Client Name:	Southern Company	Top of Casing Elev.:	729.69 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	727.1 ft. NAVD88
		Installation Date:	10/28/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Leon Logan, Driller



	Depth (feet)	Elevation (feet, NAVD88)
S	+3.1	730.2
R	+2.9	729.69
G	0.0	726.79
H	1.0	725.79
J	59.8	666.99
C	72.0	654.79
L	75.0	651.79
A	76.2	650.49
N		
E		
O		
F	86.2	640.49
	86.5	640.29
P	87.0	639.79
Q	166.0	560.79
B		

EXPLORATORY BORING

A. Total depth:	166.0 ft.
B. Diameter:	2 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	89.4 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	2.9 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	71.0 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-59.8 ft.)
	Bentonite chips (59.8-72.0 ft.)
L. Filter pack seal thickness:	3.0 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	12.0 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	79.0 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWA-29
LOCATION	Euharlee, Georgia	PAGE	1 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	718.84 ft NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	97 feet
LOGGED BY	Jim Rodwine	DATE COMPLETED	8/7/18
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1496283.04; Easting: 2066362.32		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
	5.3/7	N				**0 to 13.0 feet: CLAY (CL)**, red, stiff, silty clay with occasional to frequent quartz pebbles and chert fragments. No topsoil.			
			5				19	1	80
						Tested with 10 percent hydrochloric acid every foot, no reaction.			
	9/10	N							
			10				5	5	90
						@ 13.0 feet: contact gradational			
						13.0 to 24.0 feet: CLAY (CL), orange, occasionally yellow red or mottled, stiff, silty clay with occasional to frequent quartz pebbles and chert fragments.			
			15				5	5	90
	7/10	N							
			20				1	4	90

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWA-29
LOCATION	Euharlee, Georgia	PAGE	2 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	718.84 ft NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	97 feet
LOGGED BY	Jim Rochelme	DATE COMPLETED	8/7/18
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1498283.04; Easting: 2066362.32		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N				**13.0 to 24.0 feet: CLAY (CL)**, continued.			
						@ 24.0 feet: contact gradational	40	10	50
			25			**24.0 to 54.0 feet: CLAY (CL)**, yellow to orange, sometimes red speckled stiff, silty clay with occasional to frequent quartz pebbles and chert fragments, and silty zones (clayey silt to silty clay). @ 24.0 to 24.7 feet: quartz pebble rich zone; one quartz cobble.	19	1	80
	7.8/10	N							
			30			Tested with 10 percent hydrochloric acid every foot, no reaction.	3	2	95
			35				0	2	98
						@ 36.0 to 36.5 feet: gravelly zone, chert crushed by drilling.			
	9/10	N							
			40				0	5	95

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWA-29
LOCATION	Euharlee, Georgia	PAGE	3 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	718.84 (718.86) ft NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	97 feet
LOGGED BY	Jim Redwine	DATE COMPLETED	8/7/18
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1498283.04; Easting: 2066362.32		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION/ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N				**24.0 to 54.0 feet: CLAY (CL)**, continued.			
						@ 43.5 to 45.0 feet: redder clay zone.			
			45				1	19	80
	10.3/10	N				Tested with 10 percent hydrochloric acid every foot, no reaction.			
			50				0	5	95
						@ 54.0 feet: contact gradational.			
			55			**54.0 to 61.0 feet: SILT (ML)**, yellow silt with occasional fine sand zones and rare dark areas (organics, organic sands, manganese compounds?).	0	0	100
	9.3/10	N							
			60				0	0	100

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWA-29
LOCATION	Euharlee, Georgia	PAGE	4 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	718.84 (718.86) ft NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	97 feet
LOGGED BY	Jim Rechsine	DATE COMPLETED	8/7/16
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1498283.84; Easting: 2066362.33		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N				**54.0 to 61.0 feet: SILT (ML)**, continued.			
						@ 61.0 feet: contact gradational.			
						61.0 to 67.0 feet: CLAY (CL), yellow silty clay with frequent chert fragments.			
			65			@ 65.0 to 66.0 feet: mostly white, chert fragments.	33	33	34
	1.5/10					**67.0 to 77.0 feet: DOLOMITE**, light to medium gray, fine-grained, dolomite.			
						@ 68.0 feet: small amount of rock encountered.			
						@ 68.0 to 71.0 feet: driller reports no rock.			
			70						
		S				@ 71.0 feet: approximate top of rock.			
						@ 71.0 to 77.0 feet: driller reports alternating rock, soft drilling.			
			75						
	1.8/10	S				**77.0 to 97.0 feet: DOLOMITE**, weathered/dissolutioned light gray to tan, fine-grained dolomite. Also very fine-grained tan to light gray LIMESTONE with limestone also weathered/dissolutioned, occasional quartz sand grains floating in the limestone matrix.			
			80						

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWA-29
LOCATION	Euharlee, Georgia	PAGE	5 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	718.84 ft NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	97 feet
LOGGED BY	Jim Rodwine	DATE COMPLETED	8/7/18
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1498283.04; Easting: 2596362.32		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION/ ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
			85			**77.0 to 97.0 feet: DOLOMITE**, continued.			
						Tested every foot with 10 percent hydrochloric acid.			
	5/10	S							
			90						
		W				@ 92.5 to 95.0 feet: fine-grained medium gray calcareous dolomite (mild reaction to 10 percent hydrochloric acid).			
			95			@ 95.0 to 95.7 feet: light gray to white, fractured chert.			
						@ 95.7 to 97.0 feet: light gray, fine to medium-grained dolomite.			
						Total depth: 97.0 feet.			
			100						

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

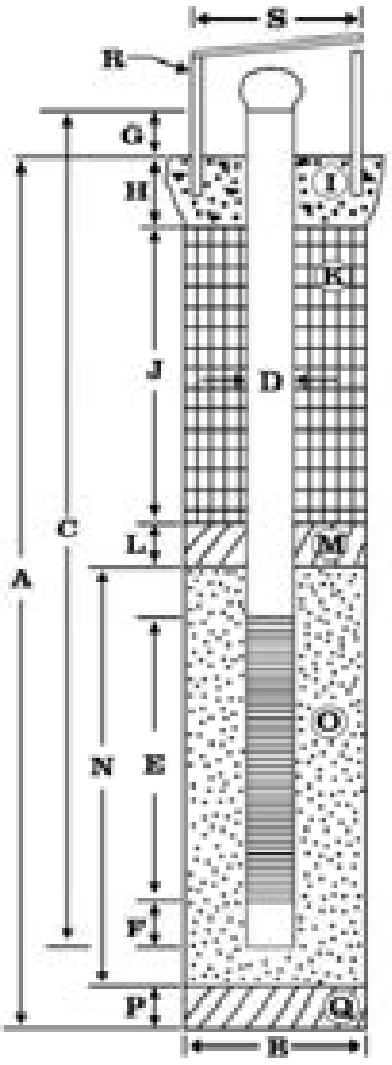
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWA-29
Client Name:	Southern Company	Top of Casing Elev.:	721.38
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	718.86 ft. NAVD88
		Installation Date:	08/07/2018-08/08/2018
Location:	Cartersville, Georgia	Driller:	Cascade Drilling
			Thomas Ardito, Driller



	Depth (feet)	Elevation (feet, NAVD88)
S	+2.5	721.39
R	+2.3	721.38
G	0.0	719.08
H	2.0	717.08
K		
J	62.0	657.08
D		
C		
L	78.0	641.08
M	82.5	636.58
A	86.2	632.88
N		
E		
O		
F	96.2	622.88
	96.5	622.58
P	97.0	622.08
Q	N/A	N/A
B		

EXPLORATORY BORING

A. Total depth:	97.0 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic PS-150

WELL CONSTRUCTION

C. Well casing length:	100.0 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10 ft.
Well screen type:	Pre-pack
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	3.0 ft.
H. Surface seal thickness:	2.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	76.0 ft.
K. Annular seal material:	Bentonite grout (2.0-62.0 ft.)
	3/8" Bentonite chips (62.0-78.0 ft.)
L. Filter pack seal thickness:	4.5 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	14.5 ft.
O. Sand pack material:	Heavy fine sand/#1 SS
P. Bottom material thickness:	N/A
Q. Bottom material:	N/A
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	N/A

NOTES:

SS = Silica Sand.
OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate at least 1 hour.
Bentonite chips allowed to hydrate at least 4 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

Geosyntec consultants

Geosyntec Consultants
1255 Roberts Boulevard
Kennesaw, GA 30144

BGWA-33

CLIENT Southern Company Services | **PROJECT NAME** Plant Bowen

PROJECT NUMBER GW6581C | **PROJECT LOCATION** Euharlee Georgia

DATE STARTED 7/10/18 | **COMPLETED** 7/11/18 | **NORTHING** 11497972.13 ft | **EASTING** 2064676.80 ft

DRILLER Cascade Drilling | **GROUND ELEVATION** 740.50 ft | **BORING DIAMETER** 6 in

DRILLING METHOD Sonic | **TOP OF CASING ELEVATION** 743.25 ft

SAMPLING METHOD 4" core 6" overide | **GEOPHYSICAL CONTRACTOR** —

RIG TYPE Terrasonic 105/1181 | **LOGGED BY** C. Hug | **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0	740			CLAY, Dark brown, red and orange mottled, trace white and pale grey, medium to high plasticity, some silt, dry to moist, weakly cemented and highly calcareous pebbles.	
5	735			5.5': Zone of white weakly cemented calcareous/dolomitic material, dry, silty. Increased white calcareous and cherty material, orange and red lamination, moist.	
10	730			CLAY with SAND, Dark red brown, with white and pale grey, medium to high plasticity, with some fine grained angular sand, highly weathered dolomite and chert gravel, breaking down to silty powder.	
				From 13': More orange and more silty, with fine grained angular sand.	
15	725			From 15': Increased amount of fine grained sand, concentrated in patches.	
				17.5'-18': Band of white clayey silt, comprising highly weathered dolomite and calcareous material, dry.	
20	720			CLAY with SAND, Orange brown, medium to high plasticity.	Bentonite grout
				From 21': Increased amount of fine sand bordering clayey sand in places.	
25	715			From 24': Some grey, highly weathered limestone/ dolomitic pebbles, breaking down to silty powder.	Schedule 40 PVC 2"
				From 28': Some red mottling.	
30	710			SANDY CLAY with GRAVEL, Brown, orange, medium to high plasticity, sand is fine grained, angular quartz with coarse angular quartz and chert gravel and cobbles between 29' and 31', some red mottling, trace black pebbles and some silty patches.	
				With coarse angular quartz and chert gravel and cobbles.	

(Continued Next Page)

Boring Log revised with new survey data dated 6/10/2020.

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Kennesaw, GA 30144

BGWA-33
PAGE 2 OF 3

CLIENT Southern Company Services | **PROJECT NAME** Plant Bowen

PROJECT NUMBER GW6581C | **PROJECT LOCATION** Euharlee Georgia

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
	705			SANDY CLAY with GRAVEL, Brown, orange, medium to high plasticity, sand is fine grained, angular quartz with coarse angular quartz and chert gravel and cobbles between 29' and 31', some red mottling, trace black pebbles and some silty patches. (continued)	
				36': Band of fine to coarse angular quartz/chert gravel.	
45	700			SANDY CLAY, Red, orange brown, mottled, medium plasticity, sand is fine grained, angular, quartz, with some silt and trace of fine grained angular dolomite and limestone gravel.	
				LIMESTONE/DOLOMITE, Gray and pale gray, recovered as fine to coarse grained angular gravel, with silty clay and some cobbles.	
				SANDY CLAY, Red orange, low to medium plasticity, sand is fine grained angular quartz, trace of fine limestone gravel.	
45	695			44': Red brown mottled, brown areas predominantly silty, with occasional thin/fine bands of fine sand ~1-2mm thick.	
				46': With gray limestone/ dolomite gravel, fine to coarse grained, with sandy clay and silt.	
				SILT, Pale brown, non plastic to low plasticity with trace fine grained sand.	
50	690			With more frequent, fine angular dark gray, limestone gravel, some red mottling.	
				51.5': Zone of dark gray angular limestone gravel.	
				LIMESTONE, Gray with white veins, massive-slightly weathered to fresh, recovered as discs of core up to 1" length and angular fragments.	
55	685				
					Bentonite 3/8" chips
60	680			Recovered as pieces of core and discs up to 1" thick with secondary mineralization (calcite) and white calcareous veins throughout.	
65	675			More competent rock recovered as pieces of core between 3" and 9" in length.	
70	670			Gray, recovered as fresh to slightly weathered limestone fragments and pieces of core with calcite mineralization along fracture planes.	20/40 Silica Sand 0.010 slot size 2" Pre Pack, Li-Pack Screen

(Continued Next Page)

Boring Log revised with new survey data dated 6/10/2020.

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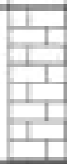
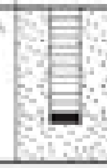
CLIENT Southern Company Services
PROJECT NUMBER GW6581C
PROJECT NAME Plant Bowen
PROJECT LOCATION Euharlee Georgia

DEPTH (ft)	ELEVATION (ft msl)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
75	665			LIMESTONE, Gray with white veins, massive,slightly weathered to fresh, recovered as discs of core up to 1" length and angular fragments. (continued)	 Sump
				Bottom of borehole at 79.0 feet.	Easting and Northing in NAD 1983. Elevation in NAVD 88.
80	660				
85	655				
90	650				
95	645				
100	640				
105	635				
110	630				

SCS GEORGIA 20180113_PLANT BOWEN LOGS.GPJ ACP GINT LIBRARY FROM ARCHIVE.GLB 4/13/15

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BGWA-47D

CLIENT Southern Company Services
PROJECT NAME Bowen Groundwater SRV-AP1
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA
DATE STARTED 5/12/20 **COMPLETED** 5/13/20
NORTHING 1486377.79 ft **EASTING** 2068612.48 ft
DRILLER Cascade Drilling
GROUND ELEVATION 726.93 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic
TOP OF CASING ELEVATION 729.61
SAMPLING METHOD 4" core 6" override
GEOPHYSICAL CONTRACTOR —
RIG TYPE Terra Sonic Full Size Track Mounted Rig
LOGGED BY C. Hug **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0				Hydro Excavation (0 ft to 7 ft) NO SAMPLE	
	720			719.9	
10				CLAY, Dark red (7.5R 3/6), low to medium plasticity, firm to stiff, trace of fine sand, dry to moist.	Schedule 40 PVC 2"
				From 13 ft: Trace of fine, subrounded quartz gravel.	
				From 15 ft: Slightly silty.	
	710				
20					Aquaguard Sodium Bentonite Grout
				From 24 ft: Firm to stiff, less gravel, moist.	
	700				
30				696.9 CLAY with GRAVEL, Dark red (7.5R, 3/6), high plasticity, firm to stiff, trace fine sand, gravel is fine to coarse, rounded to subrounded, quartz, moist.	
				693.9 GRAVELLY CLAY, Dark red (7.5R, 3/6), high plasticity, firm to stiff, trace fine sand, gravel is fine to coarse, rounded to subrounded, quartz, moist. 691.9	
				CLAY, Light red (2.5YR 6/8), high plasticity, trace fine sand, moist.	
	690			From 37 ft: Light red (2.5YR 7/8) and reddish yellow (5YR 7/8) mottled, with some dark red pebbles, high plasticity, trace of fine to coarse, rounded quartz gravel.	
40					
	680			47 ft: Trace fine sand.	

(Continued Next Page)

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CLIENT Southern Company Services
PROJECT NAME Bowen Groundwater SRV-AP1
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
50				CLAY, Light red (2.5YR 6/8), high plasticity, trace fine sand, moist. (continued)	
				From 52 ft: With occasional coarse, rounded to subrounded quartz and chert gravel, up to 4 in in length.	
	670			From 57 ft: Reddish yellow (5YR 7/8) with minor light gray (5YR 7/1) mottling, high plasticity, firm to stiff, trace fine gravel.	
60				667.9	
				CLAY with GRAVEL, Reddish yellow (5YR 7/8); some red (7.5R 5/8) mottling, minor black organic matter, high plasticity, gravel is fine to coarse grained, subrounded, quartz and angular limestone.	
				666.4	
				Band of gray angular limestone gravel between 60 and 60.5 ft.	
				GRAVELLY CLAY, Light red (2.5YR 7/8) and reddish yellow (5YR 7/8) mottled, high plasticity, gravel is subrounded quartz and angular limestone.	
				660.9	
	660			CLAY with GRAVEL, Light red (2.5YR 7/8) and reddish yellow (5YR 7/8) mottled, high plasticity, gravel is subrounded quartz and angular limestone. Occasional larger fragments of limestone up to 6 in. length.	
70					
	650	78.5 ft: 4 in rods falling without resistance, 6 in casing 'scraping' along the borehole sides. No returns, no recovery.			
				648.9	
				648.4	
80				LIMESTONE/DOLOMITE, Dark gray, slightly weathered, massive, very fractured, recovered with fine sand and silt.	
				VOID (78.5 ft to 110 ft)	
	640				
90					
	630				
100					

Aquaguard Sodium Bentonite Grout

Bentonite uncoated 3/8" chips

(Continued Next Page)

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BGWA-47D

CLIENT Southern Company Services

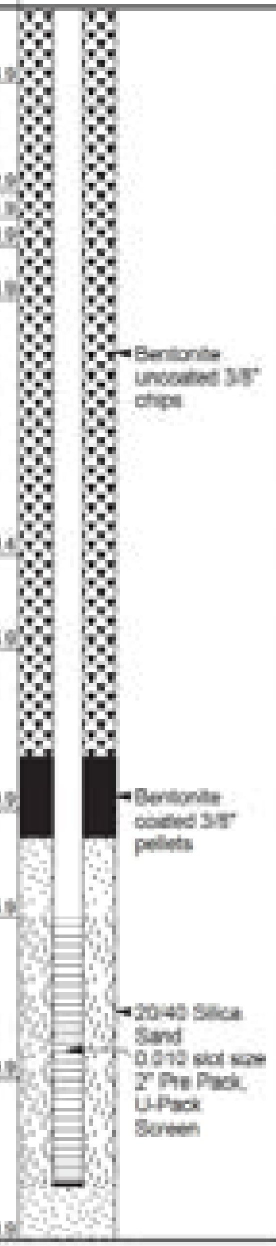
PROJECT NAME Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C

PROJECT LOCATION Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	MATERIAL DESCRIPTION	Elev. at base
110			VOID (78.5 ft to 110 ft) (continued)	616.9
		114 ft: 4 in rods and 6 in casing drop without resistance, no returns, no recovery.	LIMESTONE/DOLOMITE, Gray, slightly weathered to fresh, massive, with fine, white calcareous veins along healed fracture planes, minor reddish yellow iron oxide staining, with calcite and aragonite crystals, some iron oxide stained.	612.9
			VOID (114 ft to 115 ft)	611.9
	610	117 ft: Soft but steady drilling between 118 and 127 ft, recovery of 3 ft indicates that some fines may be washed away.	LIMESTONE/DOLOMITE, Gray, slightly weathered to fresh, massive, with fine, white calcareous veins along healed fracture planes, minor reddish yellow iron oxide staining, with calcite and aragonite crystals.	610.9
			VOID (116 ft to 118 ft)	608.9
120			LIMESTONE/DOLOMITE, Gray, slightly weathered to fresh, massive, with fine, white calcareous veins along healed fracture planes, minor reddish yellow iron oxide staining, with calcite and aragonite crystals. From 122 ft: With yellow and light brown silty/clayey staining. Some calcite and aragonite crystallization along fracture planes. Minor pale green chloride mineralization in places, with abundance of pale brown iron oxide staining around 127 ft.	599.4
	600	127.5 ft: 4 in rods and 6 in casing drop without resistance, no returns, no recovery.	VOID (127.5 ft to 131 ft)	595.9
130		131 ft: Driller reports drilling in rock, no recovery.	LIMESTONE/DOLOMITE - No recovery, lithology based on previous core recovery.	589.9
	590	137 ft: 4 in rods and 6 in casing drop without resistance, no returns, no recovery.	VOID (137 ft to 141 ft)	585.9
140		141 ft: Driller reports drilling in rock, no recovery.	LIMESTONE/DOLOMITE - No recovery.	579.9
	580		VOID (147 ft to 153 ft)	573.9
150				

CONSTRUCTION DIAGRAM



Bottom of borehole at 153.0 feet.

Easting and Northing in NAD 1983
Elevation in NAVD 88

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Kennesaw, GA 30144

BGWA-48D

CLIENT Southern Company Services | **PROJECT NAME** Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C | **PROJECT LOCATION** Euharlee, GA

DATE STARTED 5/14/20 **COMPLETED** 5/18/20 | **NORTHING** 1499380.09 ft **EASTING** 2068623.31 ft

DRILLER Cascade Drilling | **GROUND ELEVATION** 726.63 ft **BORING DIAMETER** 6 in

DRILLING METHOD Sonic | **TOP OF CASING ELEVATION** 729.37 ft

SAMPLING METHOD 4" core 6" override | **GEOPHYSICAL CONTRACTOR** ---

RIG TYPE Terra Sonic Full Size Track Mounted Rig | **LOGGED BY** C. Hug **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0				Hydro Excavation (0 ft to 10 ft) NO SAMPLE	
	720				
10				716.6 CLAY, Dark red (2.5YR 3/6), low to medium plasticity, with trace fine rounded gravel, trace fine sand. Occasional fine to coarse, rounded quartz/chert gravel, moist, firm to stiff.	Schedule 40 PVC 2"
	710			17 ft: With trace of fine to coarse, subrounded to rounded quartz gravel.	
20					
	700			699.6 GRAVELLY CLAY, Reddish yellow (5YR 7/6) and yellowish red (5YR 4/6) mottled, medium to high plasticity, gravel is fine to coarse, subrounded to rounded, quartz/chert, minor black silty pebbles at 29 ft, moist.	
30				694.6 CLAY, Reddish yellow (YR 7/8), yellowish red (5YR 5/8), and pinkish white (5YR 8/2) mottled, high plasticity, trace fine sand, stiff, moist.	Aquaguard Sodium Bentonite Grout
				692.1 CLAY, Dark red (2.5YR 3/6), medium to high plasticity, trace fine sand, trace mica, moist, slightly silty.	
	690				
40				40 ft: Large, rounded sandstone fragment, with black staining, subrounded to rounded quartz and chert gravel.	
				685.6 From 42 ft: Dark red (2.5 YR 3/6) and reddish yellow (5YR 5/8) mottled.	
				681.6 GRAVELLY CLAY, Dark red (2.5 YR 3/6) and reddish yellow (5YR 5/8) mottled, medium to high plasticity, gravel is fine to coarse, rounded to subrounded, quartz and chert.	
	680			CLAY Dark red (2.5YR 3/6), medium to high plasticity, trace fine sand, trace fine quartz and chert gravel.	

(Continued Next Page)

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Geosyntec Consultants
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CLIENT Southern Company Services **PROJECT NAME** Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
50	670			CLAY Dark red (2.5YR 3/6), medium to high plasticity, trace fine sand, trace fine quartz and chert gravel. (continued) At 51 ft: Some pinkish white (5YR 8/2), moist, stiff.	
60	660			666.6 CLAYEY GRAVEL, Dark red (2.5 YR 3/6) and reddish yellow (5YR 5/8) mottled, fine to coarse, rounded to subrounded, quartz and chert, clay is high plasticity, slightly silty. 665.6 CLAY Dark red (2.5YR 3/6), medium to high plasticity, trace fine sand, trace fine quartz gravel. 663.1 CLAYEY SAND, Brown (7.5YR 5/4), fine to medium grained, subangular, quartz, soft, wet, sharp contact with underlying rock. 661.6 LIMESTONE/DOLOMITE, Dark gray, massive, slightly weathered, with white, calcareous veins, with some sandy clay, recovered as pieces of rock with pale gray clayey sand and silty sand.	Aquaguard Sodium Bentonite Grout
70	650	70 ft: Driller reports very low resistance, no returns. 74 ft: Driller reports very low resistance, no returns.		656.6 VOID (70 to 71 ft) Void potentially filled with soft material. 655.6 LIMESTONE/DOLOMITE, Dark gray, massive, slightly weathered, with fine calcarous veins, with some yellow staining. 652.6 VOID (74 to 79 ft) Void potentially filled with soft material. 650.6 LIMESTONE/DOLOMITE, Dark gray, with fine white veins, some secondary mineralization along fracture planes, with occasional pockets up to 6 in in length of softer material between 77 ft and 87 ft.	
80	640			87 ft: Vertical and horizontal fracture planes, fresh rock with pieces of rock up to 7 in long.	
90	630	99 ft: 4 in rods falling without resistance, 6 in casing 'scraping' along the borehole sides. No returns, no recovery.		96 ft to 97 ft: Some yellow staining, with secondary calcite and aragonite crystallization along fracture planes, with some brown iron oxide staining, slightly silty. 627.6 VOID (99 ft to 105 ft) 621.6	Bentonite uncoated 3/8" chips
100	620				

(Continued Next Page)

CLIENT Southern Company Services **PROJECT NAME** Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
110				LIMESTONE/DOLOMITE, Dark gray with white, fine calcareous veins throughout, massive, with secondary calcite and aragonite crystallization along fracture planes, with some brown iron oxide staining, with horizontal and vertical fracture planes, slightly silty. (continued)	
	610			117 ft: Very broken core, vertical and horizontal fractures with calcite mineralization, silty.	
120		123 ft: 4 in rods falling without resistance, 6 in casing 'scraping' along the borehole sides. No returns, no recovery.		604.6	
	600			VOID (122 ft to 139 ft)	
130				587.6	
	590			LIMESTONE/DOLOMITE, Dark gray with white, fine calcareous veins throughout, massive, with secondary calcite and aragonite crystallization along fracture planes, with some brown and yellow iron oxide staining, with horizontal and vertical fracture planes, slightly silty. From 141 ft: Larger fragments of intact core up to 7 in length, crystalline, hard, more fractured between 142 and 147 ft.	
140	580			147 ft: Brown staining, with calcite and aragonite crystallization, very broken and fractured between 147 ft and 157 ft.	Bentonite uncoated 3/8" chips
150					
	570			157 ft: Minor pale brown staining, very broken and fractures, slightly silty.	
160					

(Continued Next Page)

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BGWA-48D

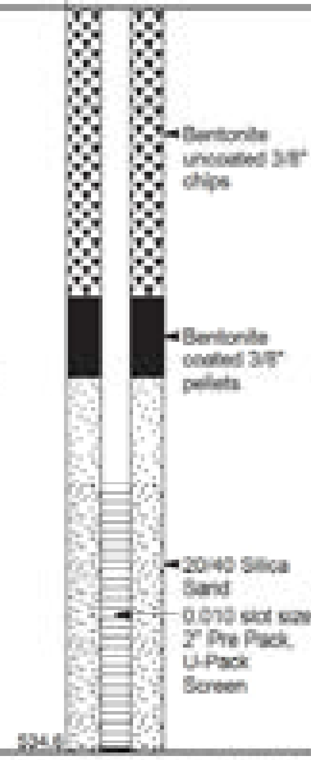
CLIENT Southern Company Services

PROJECT NAME Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C

PROJECT LOCATION Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
	560			LIMESTONE/DOLOMITE, Dark gray with white, fine calcareous veins throughout, massive, with secondary calcite and aragonite crystallization along fracture planes, with some brown and yellow iron oxide staining, with horizontal and vertical fracture planes, slightly silty. From 141 ft: Larger fragments of intact core up to 7 in length, crystalline, hard, more fractured between 142 and 147 ft. *(continued)*	
170					
	550			177 ft: Very broken, with vertical and horizontal fracture planes, secondary mineralization, some pale green (chloride) mineralization and calcite/aragonite crystals along undulating fracture planes.	
180					
	540				
190					



Bottom of borehole at 192.0 feet.

Easting and Northing in NAD 1983.
Elevation in NAVD 88.

Boring Log revised with new survey data dated 8/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-7
LOCATION	Euharlee, Georgia	PAGE	1 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	702.49 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	87.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/01/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1504711.59; Easting: 2066851.40		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH, SOLUTION, ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	5.5/6.5	N					**0 to 2.7 feet: TOPSOIL**, brown, moist, silt and clay, abundant wood pieces.	0	0	100
		N					**2.7 to 16.5 feet: CLAY (CH)**, red with tan and light brown mottling, moist, very stiff, high plasticity, friable, breaks easily into small pieces. (RESIDUAL)	0	0	100
CB	11/10	N	5							
			10				@ ~1.5 to 16.5 feet: very hard, moderate plasticity.			
							@ ~3.0 to 16.5 feet: dry, no plasticity.			
			15							
CB	11.6/10	N					**16.5 to 46.9 feet: SILTY CLAY (CL)**, yellowish red with yellow, tan, and white mottling, dry, low plasticity, hard. (RESIDUAL)	0	0	100
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.
Well installation supervised by Will Newton of Southern Company.

ANCHOR QEA

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-7
LOCATION	Euharlee, Georgia	PAGE	2 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	792.49 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	87.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/01/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1504711.59; Easting: 2066801.40		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION/ ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N					**16.5 to 46.9 feet: SILTY CLAY (CL)**, continued.	0	0	100
							@ 20.0 feet: very hard, no plasticity.			
			25				@ 25.5 feet: moderate plasticity.	0	0	100
CB	10.6/10	N					@ 26.5 feet: color change to red with tan, yellow and white mottling. (RESIDUAL)			
			30							
			35							
CB	6.3/10	N								
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.
Well installation supervised by Will Newton of Southern Company.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-7
LOCATION	Euharlee, Georgia	PAGE	3 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	792.49 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	57.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/01/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1604711.89; Easting: 2066801.40		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N					**16.5 to 46.9 feet: SILTY CLAY (CL)**, continued.	0	0	100
							@ 42.3 to 46.9 feet: abundant chert nodules.			
			45							
CB	5.5/10	N					**46.9 to 47.9 feet: SILT WITH GRAVEL (ML)**, brown, moist, slightly plastic, soft, gravel is angular, heavily weathered limestone.	40-50	0	50-60
		E					**47.9 to 57.5 feet: LIMESTONE**, dark gray, hard, very fine grained crystals, surface has powdery appearance, rare calcite veins, breakage along bedding planes. (BEDROCK)	NA	NA	NA
		E								
		E	50							
		E								
		E								
		E								
		E								
		E								
		E	55							
		E								
CB	7.4/10	E								
		S					**57.5 to 59.5 feet: DOLOMITE**, dark gray, hard, very fine grained crystals, rare calcite veins, breakage along bedding planes. (BEDROCK)	NA	NA	NA
		W								
		E					**59.5 to 61.0 feet: LIMESTONE**, desc. on next page.	NA	NA	NA
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.
Well installation supervised by Will Newton of Southern Company.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-7
LOCATION	Euharlee, Georgia	PAGE	4 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	702.49 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	87.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/01/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1504711.89; Easting: 2066801.49		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		E					**59.5 to 61.0 feet: LIMESTONE**, dark gray, hard, very fine grained crystals, surface has powdery appearance, rare calcite veins. (BEDROCK)	NA	NA	NA
		S					**61.0 to 62.0 feet: DOLOMITE**, dark gray, hard, very fine grained crystals, rare calcite veins, breakage along bedding planes. (BEDROCK)	NA	NA	NA
		E					**62.0 to 87.5 feet: LIMESTONE**, dark gray, hard, very fine grained crystals, surface has powdery appearance, rare calcite veins, breakage along bedding planes. (BEDROCK)	NA	NA	NA
		E								
		E								
		E	65							
CB	6.0/10	E								
		E								
		E								
		E								
		E	70							
		E								
		E								
		E								
		E								
		E								
		E	75							
		E								
CB	4.0/10	E								
		E								
		E								
		E								
		E	80							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.
Well installation supervised by Will Newton of Southern Company.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-7
LOCATION	Euharlee, Georgia	PAGE	5 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	702.49 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	87.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/01/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1504711.59; Easting: 2066861.40		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		E					**62.8 to 87.5 feet: LIMESTONE**, continued.	NA	NA	NA
		E								
		E								
		E								
		W					@ 84.0 to 86.5 feet: weakly effervescent.			
		W	85							
		W								
		W								
CB							Total depth: 87.5 feet.			
			90							
			95							
			100							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.
Well installation supervised by Will Newton of Southern Company.

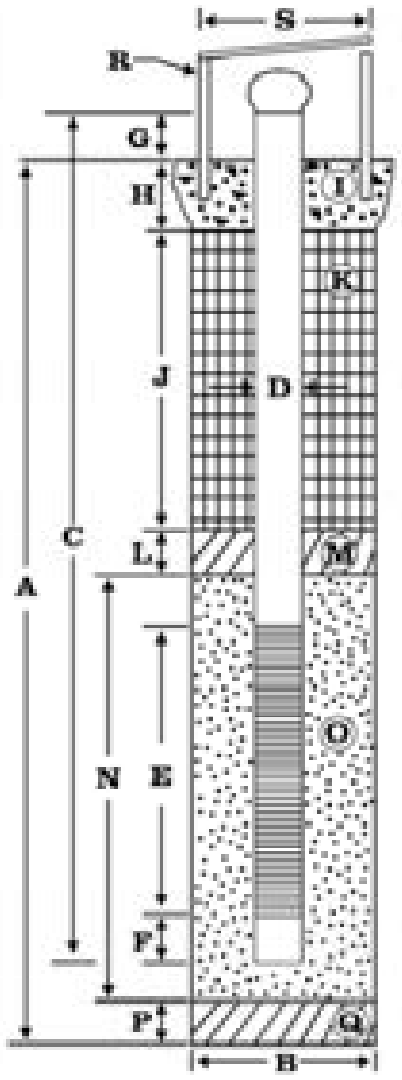
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-7
Client Name:	Southern Company	Top of Casing Elev.:	705.38 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	702.7 ft. NAVD88
		Installation Date:	10/01/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Leon Logan, Driller



	Depth (feet)	Elevation (feet, NAVD88)
+3.2		705.9
+3.0		705.38
0.0		702.38
1.0		701.38
40.0		665.38
72.2		630.18
75.2		627.18
77.2		625.18
87.2		615.18
87.5		614.88
87.5		614.88
NA		NA

EXPLORATORY BORING

A. Total depth:	88.5 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	90.5 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	3.0 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	70.2 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-40.0 ft.)
	Bentonite chips (40.0-72.2 ft.)
L. Filter pack seal thickness:	3.0 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	12.3 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	NA
Q. Bottom material:	NA
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-8
LOCATION	Euharlee, Georgia	PAGE	1 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	703.71 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	86.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	11/18/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1504671.82; Easting: 2066929.46		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
NA	NA	NA					**0 to 59.4 feet: CLAY (CH)**, dark red, dry, very stiff, high plasticity, occasional small chert nodules and nodules of light gray, soft, powdery material. (0 to 10.0 feet: No recovery. Interval removed with vacuum truck to clear for utilities. Red clay via visual observation down hole.)	0	0	100
			5							
CB	8.5/8.5	N	10					0	0	100
			15							
CB	11.3/10	N								
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-8
LOCATION	Euharlee, Georgia	PAGE	2 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	793.71 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	86.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	11/18/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1594871.82; Easting: 2066929.46		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
							0 to 59.4 feet: CLAY (CH), continued.	0	0	100
			25							
CB	10.8/10	N					@ 26.5 feet: color change to light brownish red with dark red, light gray and tan mottling.			
			30							
			35							
CB	10.9/10	N					@ 36.5 feet: color change to reddish light brown with light gray and tan mottling, density change to firm.			
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-8
LOCATION	Euharlee, Georgia	PAGE	3of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	783.71 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	88.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	11/18/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1934671.82; Easting: 2066929.46		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
							0 to 59.4 feet: CLAY (CH), continued.	0	0	100
							@ 43.1 to 43.3 feet: gray silt layer.			
			45							
CB	10.5/10	N								
			50							
			55							
CB	10.4/10	N					@ 56.5 feet: wet, color change to red.			
		W	60				59.4 to 63.8 feet: CLAY, description on next page.	0	0	100

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-8
LOCATION	Euharlee, Georgia	PAGE	4 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	703.71 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	80.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	11/18/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1594671.82; Easting: 2066929.46		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		W					**59.4 to 63.8 feet: CLAY**, red, moist, firm, high plasticity, weakly effervescent. (RESIDUAL)	0	0	100
		E	65				**63.8 to 67.6 feet: LIMESTONE**, dark gray, thinly bedded, 1- to 2-inch thick beds, breakage along bedding planes, microcrystaline, effervesces readily, slightly weathered, red iron oxide stains on surfaces. (BEDROCK)	NA	NA	NA
CB	6.5/10	E								
		S					**67.6 to 80.0 feet: DOLOMITE**, light gray to gray, fine grained crystals, medium bed thickness, 3- to 10-inches thick, breakage along bedding planes, laminations and thin banding in places, beds appear to be dipping 25 to 30 degrees, slighty weathered, some red iron-oxide staining. (BEDROCK) @ 68.5 to 71.0 feet: void.	NA	NA	NA
			70			VOID				
CB	1.5/10	S	75							
			80							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-8
LOCATION	Euharlee, Georgia	PAGE	5 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	703.71 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	86.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	11/18/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1504671.82; Easting: 2066929.46		

SAMPLING METHOD	RECOVERY (FEET)	SPLANSL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		NA	85				**67.6 to 80.0 feet: DOLOMITE**, continued. @ 80.0 to 86.5 feet: clay-filled void, no recovery of void material in core barrel, but red clay residue on top of bit indicates that it is clay filled. (VOID INFILL)	0	0	100
			90				Total depth: 86.5 feet.			
			95							
			100							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

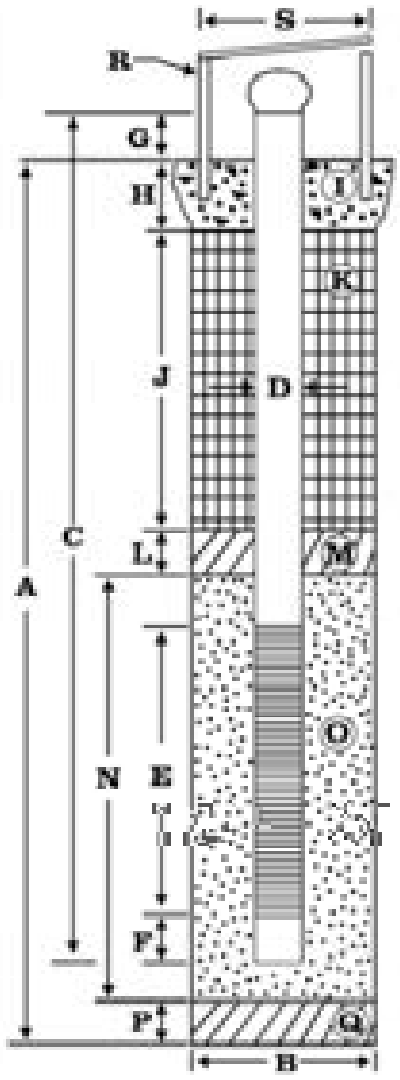
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-8
Client Name:	Southern Company	Top of Casing Elev.:	706.43 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	703.9 ft. NAVD88
		Installation Date:	11/18/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Leon Logan, Driller



	Depth (feet)	Elevation (feet, NAVD88)
S	+3.1	707.0
R	+2.9	706.43
G	0.0	703.53
H	1.0	702.53
J	40.5	663.03
C	60.3	643.23
L	64.8	638.73
A	66.7	636.83
N		
E		
O		
F	76.7	626.83
	77.0	626.53
P	78.0	625.53
Q	86.5	617.03
B		

EXPLORATORY BORING

A. Total depth:	86.5 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	79.9 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	2.9 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	59.3 ft.
K. Annular seal material:	Bentonite grout (1.0-40.5 ft.)
	Bentonite chips (40.5-60.3 ft.)
L. Filter pack seal thickness:	4.5 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	13.2 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	8.5 ft.
Q. Bottom material:	Native/Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 4 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-9
LOCATION	Euharlee, Georgia	PAGE	1 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	689.18 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	68 feet
LOGGED BY	Rhonda Tinsley	DATE COMPLETED	11/13/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1504909.12; Easting: 2066143.27		

SAMPLING METHOD	RECOVERY (FEET)	SPLANEL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	4.7/7.0	N	0				**0 to 39 feet: CLAY (CL)**, reddish brown, crumbly, chert fragments, moist at surface. (RESIDUAL)	10	0	90
CB	10.3/10	NA	5				@ 7.0 feet: large chert fragment.			
CB	10.5/10	NA	10				@ 7.0 feet: frequent chert fragments, some black.	10	0	90
			15							
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-9
LOCATION	Euharlee, Georgia	PAGE	2 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	689.18 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	68 feet
LOGGED BY	Rhonda Tinsley	DATE COMPLETED	11/13/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1504909.12; Easting: 2066143.27		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION/ ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
							0 to 39 feet: CLAY (CL), continued.	10	0	90
CB	10.2/10	NA	25				@ 27.0 feet: softer.	10	0	90
			30							
			35							
CB	4.5/10	NA								
							39.8 to 41.0 feet: VOID, mud filled.	NA	NA	NA
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-9
LOCATION	Euharlee, Georgia	PAGE	3 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	689.18 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	68 feet
LOGGED BY	Rhonda Tinsley	DATE COMPLETED	11/13/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1594909.12; Easting: 2066143.27		

SAMPLING METHOD	RECOVERY (FEET)	SPLANG. SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
							39.8 to 41.0 feet: VOID, continued.	NA	NA	NA
							41.0 to 68.0 feet: DOLOMITE, gray, hard, calcite filled fractures, fine grained, slight weathering. (BEDROCK)	NA	NA	NA
CB	9.7/10	S	45							
			50							
							@ 54.0 feet: large calcite-filled vugs and fractures with iron staining, brecciated dolomite and chert nodules, possible fracture zone (some very large pieces).			
			55							
CB	8.5/11	NA								
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-8
LOCATION	Euharlee, Georgia	PAGE	4 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	689.18 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	68 feet
LOGGED BY	Rhonda Tinsley	DATE COMPLETED	11/13/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1604909.12; Easting: 2066143.27		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB		S	65			VOID	**41.0 to 68.0 feet: DOLOMITE**, continued. @ 61.0 to 63.0 feet: VOID. @ 65.0 to 68.0 feet: VOID.	NA	NA	NA
			70				Total depth: 68.0 feet.			
			75							
			80							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

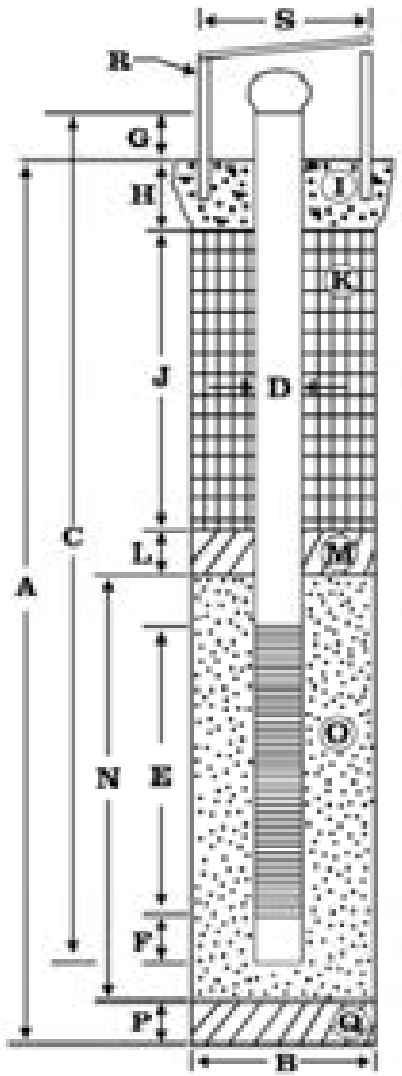
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-9
Client Name:	Southern Company	Top of Casing Elev.:	691.93 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	689.4 ft. NAVD88
		Installation Date:	11/13/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Jimmy Hall, Jr., Driller



	Depth (feet)	Elevation (feet, NAVD88)
	+3.1	692.5
	+2.9	691.93
	0.0	689.03
	1.0	688.03
	35.0	654.03
	43.0	646.03
	47.5	641.53
	50.7	638.33
	60.7	628.33
	61.0	628.03
	61.0	628.03
	68.0	621.03

EXPLORATORY BORING

A. Total depth:	68.0 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	63.9 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	2.9 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	42.0 ft.
K. Annular seal material:	Bentonite grout (1.0-35.0 ft.)
	Bentonite chips (35.0-43.0 ft.)
L. Filter pack seal thickness:	3.5 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	12.5 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	8.0 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 4 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-10
LOCATION	Euharlee, Georgia	PAGE	1 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	683.39 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	67 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/07/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1505033.22; Easting: 2066081.09		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	8.1/7.0	N					**0 to 0.8 foot: GRAVEL (GW)**, gray, loose, wet, angular, road base.	100	0	0
							@ 0 to 0.2 foot: grass and topsoil.	0	0	100
							0.8 to 9.7 feet: CLAY (CH), yellowish red with dark red and tan mottling, stiff, high plasticity, trace silt in zones, occasional coarse sand grain size white nodules. (RESIDUAL)			
							@ 8.8 to 1.0 foot: moist, dry below.			
CB	11.8/10	N	5							
			10				**9.7 to 26.1 feet: SILTY CLAY (CH)**, light yellowish red with dark red and tan patches, moist, soft to stiff, moderately plastic. (RESIDUAL)	0	0	100
							@ ~4.0 feet: trace sand, trace dark gray specs.			
			15				@ ~6.2 to 16.5 feet: friable, dry, breaks apart in horizontal layers.			
CB	10.9/10	N					@ ~7.0 to 27.0 feet: occasional chert nodules.			
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-10
LOCATION	Euharlee, Georgia	PAGE	2 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	683.39 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	87 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/07/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1505033.22; Easting: 2066091.09		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH, SOLUTION, ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N					**9.7 to 26.1 feet: SILTY CLAY (CH)**, continued.	0	0	100
							@ 23.7 to 26.1 feet: very soft, low plasticity, trace sand, mottled orange and white.			
			25							
							26.1 to 45.9 feet: CLAY (CH), light reddish brown with occasional red and gray mottling, high plasticity, moist, stiff, trace chert nodules. (RESIDUAL)	0	0	100
CB	10.8/10	N								
			30							
			35							
CB	9.8/10	N					@ 37.0 feet: abundant chert nodules.			
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-19
LOCATION	Euharlee, Georgia	PAGE	3 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	683.39 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	67 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/07/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1605033.22; Easting: 2066081.09		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION/ ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N					**39.1 to 45.9 feet: CLAY (CH)**, continued.	0	0	100
		N	45				@ 44.8 to 45.2 feet: dark grayish brown, silt layer with light gray nodules.			
		S					@ 45.2 to 45.9 feet: clay with angular gravel, stiff, dry.	NA	NA	NA
CB	6.2/10	S					**45.9 to 57.8 feet: DOLOMITE**, dark gray, hard, dense, occasional white laminations, sample is heavily disturbed from coring, no voids, very fine grained crystals, individual beds range from 0.5- to 3-inches thick, breakage along bedding planes. (BEDROCK)			
			50				@ 45.9 to 47.0 feet: heavily weathered, possible grout bleed.			
							@ 47.0 to 57.8 feet: unweathered.			
							@ 47.4 to 48.4 feet: color change to light gray.			
							@ 51.4 to 54.6 feet: chert nodules and dolomite in calcite matrix, possible fracture zone.			
							@ 51.4 to 57.8 feet: abundant calcite veins, effervesces.			
CB	10/10	S	55							
		E					**57.8 to 60.7 feet: LIMESTONE**, dark gray with white powdery surface, hard, dense, abundant calcite veins, effervesces readily, microcrystalline. (BEDROCK)	NA	NA	NA
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-10
LOCATION	Euharlee, Georgia	PAGE	4 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	683.39 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	67 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/07/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1505033.22; Easting: 2064081.09		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		E					**57.8 to 60.7 feet: LIMESTONE**, continued.	NA	NA	NA
		S					**60.7 to 67.0 feet: DOLOMITE**, dark gray, hard, very fine grained crystals, no voids, occasional calcite veins, unweathered, breakage along bedding planes, possible slickensides observed, individual beds are 0.5- to 8.0-inches thick. (BEDROCK)	NA	NA	NA
			65							
							Total depth: 67.0 feet.			
			70							
			75							
			80							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

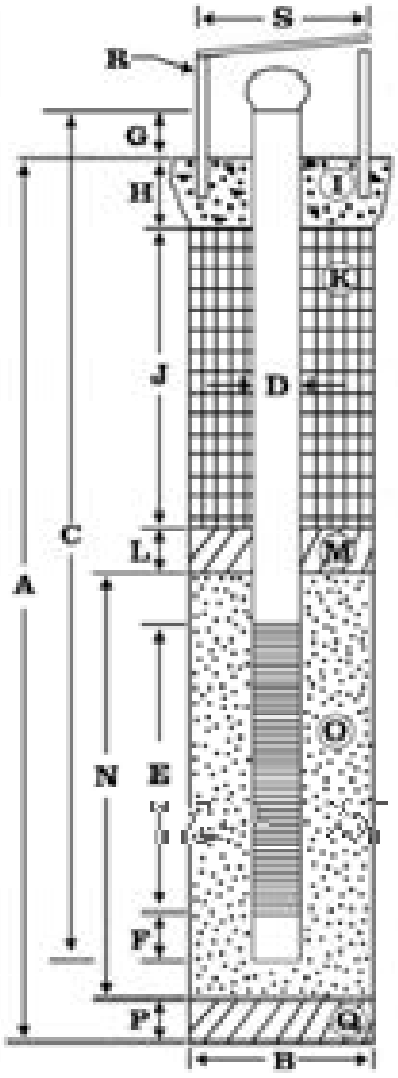
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-10
Client Name:	Southern Company	Top of Casing Elev.:	686.06 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	683.6 ft. NAVD88
		Installation Date:	10/06/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Leon Logan, Driller



Depth (feet)	Elevation (feet, NAVD88)
+3.2	686.8
+3.0	686.06
0.0	683.06
1.0	682.06
40.0	643.06
44.7	638.36
47.8	635.26
49.4	633.66
59.4	623.66
59.7	623.36
61.0	622.06
67.0	616.06

EXPLORATORY BORING

A. Total depth:	67.0 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	62.7 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	3.0 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	43.7 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-40.0 ft.)
	Bentonite chips (40.0-59.8 ft.)
L. Filter pack seal thickness:	3.1 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	13.2 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	6.0 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-12
LOCATION	Euharlee, Georgia	PAGE	1 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	691.71 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	85.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/21/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1505279.88; Easting: 2065908.56		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	5.8/5.5	N	0				0 to 0.6 foot: TOPSOIL.	0	0	100
							0.6 to 48.4 feet: CLAY (CH), dark red, moist, stiff, high plasticity, occasional white chert nodules. (RESIDUAL)	0	0	100
			5							
CB	11.3/10	N					@ 5.5 feet: color change to light brownish red with tan mottling, consistency change to very stiff, dry.			
			10							
			15							
CB	11/10	N								
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-12
LOCATION	Euharlee, Georgia	PAGE	2 of 8
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	691.71 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	85.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/21/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1505279.89; Easting: 2065908.56		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
							0.6 to 48.4 feet: CLAY (CH), continued.	0	0	100
							@ 22.9 feet: moist, consistency change to firm.			
			25				@ 24.5 to 24.6 feet: silt layer; yellowish brown with white mottling; no plasticity.			
CB	11.3/10	N					@ 25.5 feet: color change to light yellowish brown with red mottling.			
			30				@ 29.9 feet: color change to light reddish brown.			
							@ 32.9 feet: color change to light brown with tan and dark brown mottling, brown colored fraction is silty.			
			35				@ 35.2 feet: fine sand seam.			
CB	11.7/10	N								
							@ 39.5 feet: consistency change to soft.			
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-12
LOCATION	Euharlee, Georgia	PAGE	3 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	691.71 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	95.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/21/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1505279.68; Easting: 2065908.56		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION/ ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
			45				**0.6 to 48.4 feet: CLAY (CH)**, continued. @ 41.7 feet: consistency change to firm. @ 44.4 feet: seam of fine gravel-sized granular brownish gray material. @ 45.0 feet: same as above.	0	0	100
CB	8.0/10	N								
		N	50				**48.4 to 51.1 feet: GRAVELLY CLAY (CH)**, brownish red, wet, soft, moderate plasticity, gravel is angular, fine to cobble-sized, heavily weathered dolomite. (VOID INFILL)	40	0	60
		N					**51.1 to 56.6 feet: CLAYEY GRAVEL (GC)**, gray and brownish red, gravel is gray, fine to cobble-sized, angular, heavily weathered dolomite, clay is brownish red, moderate plasticity, soft, wet. (VOID INFILL) @ 51.6 to 51.9 feet: sandy interval, gray sand, does not effervesce. @ 52.8 to 53.1 feet: gray sandy interval, as above.	80	0	20
CB	9.1/10		55							
		S					**56.6 to 60.0 feet: DOLOMITE**, light gray with red discolorations, abundant voids filled with calcite, heavily weathered. (BEDROCK)	NA	NA	NA
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-12
LOCATION	Euharlee, Georgia	PAGE	4 of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	691.71 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	85.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/21/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1505279.86; Easting: 2065908.56		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOIL/ROCK ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		NA				VOID	@ 60.0 to 62.0 feet: driller noted a 3-foot void from approximately 60.0 to 63.0 feet bgs. Bottom foot of void filled with gravelly clay and sand.	NA	NA	NA
		E					**62.8 to 66.5 feet: CLAYEY SILTY GRAVELLY SAND** (SP/CH), mixed red, dark gray and light brown. Sand is light brown to dark gray, fine grained. Silt is dark gray, compact, no plasticity. Gravel is weathered dolomite (effervesces readily). Clay is red with moderate plasticity. (VOID INFILL)	30	50	20
			65				@ 63.0 to 66.5 feet: wet, soupy, very soft.			
CB	3.5/6.5									
		S					**66.5 to 67.0 feet: DOLOMITE**. (BEDROCK)	NA	NA	NA
		NA				VOID	@ 67.0 to 69.0 feet: void.			
		E					**69.8 to 70.6 feet: SAND WITH SILT AND GRAVEL** (SP-SM), sand is brown to light gray, fine to medium grained, silt is light gray, compact, gravel is weathered dolomite, effervesces readily. (VOID INFILL)	30	50	20
		S	70				**70.6 to 75.5 feet: DOLOMITE**, gray, slightly weathered, medium grained, small voids, bedding planes and fractures filled with coarse grained white and pink colored calcite crystals. (BEDROCK)	NA	NA	NA
CB	2.7/5.5									
			75							
CB	9.2/10	N					**75.5 to 83.8 feet: CLAY WITH GRAVEL AND SAND** (CH), light red, wet, soft. Gravel is weathered dolomite, sand is dark gray, fine grained. (VOID INFILL)	20	50	30
							@ 76.9 to 77.0 feet: sand layer.			
			80							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-12
LOCATION	Euharlee, Georgia	PAGE	5of 5
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	691.71 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	85.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/21/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1505279.88; Easting: 2065908.56		

SAMPLING METHOD	RECOVERY (FEET)	SPLANG SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N	75				**75.5 to 83.8 feet: CLAY WITH GRAVEL AND SAND** (CH), continued. @ 80.2 to 80.3 feet: sand layer. @ 81.0 to 81.1 feet: light gray silt layer. @ 81.8 to 81.9 feet: sand layer. @ 82.8 to 83.1 feet: sand layer.	20	10	70
		S	85				**83.8 to 85.5 feet: DOLOMITE**, light gray with red discolorations, abundant voids filled with calcite, heavily weathered. (BEDROCK)	NA	NA	NA
							Total depth: 85.5 feet.			
			90							
			95							
			100							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

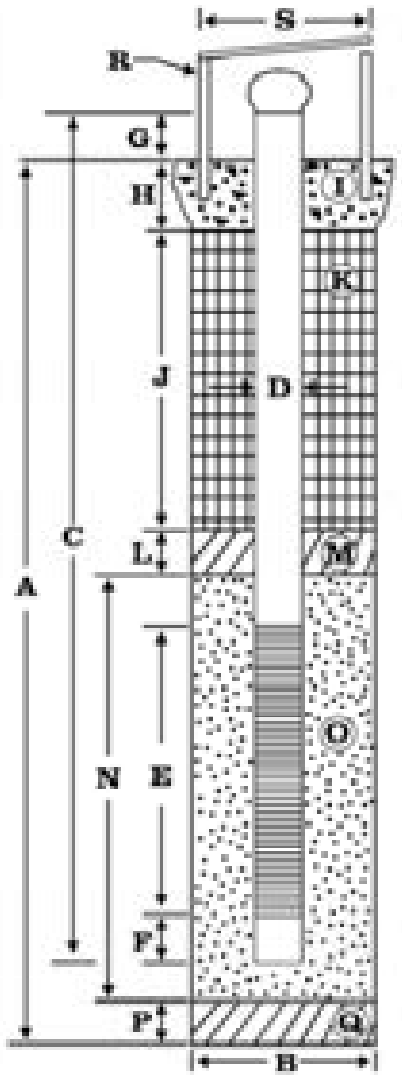
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-12
Client Name:	Southern Company	Top of Casing Elev.:	694.41 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	691.9 ft. NAVD88
		Installation Date:	10/21/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			David Wilcox, Driller



	Depth (feet)	Elevation (feet, NAVD88)
S	+3.3	695.2
R	+3.1	694.41
G	0.0	691.31
H	1.0	690.31
J	40.0	651.31
C	59.8	631.51
L	62.8	628.51
M	65.3	626.01
N	75.3	616.01
E	75.6	615.71
F	76.7	614.61
P	85.5	605.81
Q		
B		

EXPLORATORY BORING

A. Total depth:	85.5 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	78.7 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	3.1 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	58.8 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-40.0 ft.)
	Bentonite chips (40.0-59.8 ft.)
L. Filter pack seal thickness:	3.0 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	13.9 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	8.8 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Geosyntec consultants

Geosyntec Consultants
1255 Roberts Boulevard
Kennesaw, GA 30144

BGWC-14A

CLIENT Southern Company Services
PROJECT NAME Bowen Groundwater SRV-AP1
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA
DATE STARTED 5/4/20 **COMPLETED** 5/4/20
NORTHING 1505398.53 ft **EASTING** 2065015.97 ft
DRILLER Cascade Drilling
GROUND ELEVATION 715.57 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic
TOP OF CASING ELEVATION 718.33 ft
SAMPLING METHOD 4" core 6" override
GEOPHYSICAL CONTRACTOR —
RIG TYPE Terra Sonic Full Size Track Mounted Rig
LOGGED BY C. Hug **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0	710			Hydro Excavation (0-12 ft) NO SAMPLE	
10	700			703.6 CLAY, Yellowish red (5YR 5/8) and reddish yellow (5YR 6/8) mottled, medium to high plasticity, firm to stiff, with trace of fine, angular limestone gravel. From 16 ft: Reddish yellow; high plasticity, trace of fine sand, stiff.	Schedule 40 PVC 2"
20	690			697.1 CLAYEY SAND, Yellowish red (5YR 5/8) and reddish yellow (5YR 6/8) mottled, fine grained, subrounded to subangular, quartz, wet. 694.6 CLAY, Yellowish red (5YR 5/8) and reddish yellow (5YR 6/8) mottled, high plasticity, trace fine sand, trace fine, gray limestone gravel.	Aquaguard Sodium Bentonite Grout
30	680			688.6 SANDY CLAY, Yellowish brown (10YR 5/8), yellow (10YR 7/8), and yellowish red (5 YR 5/8), low plasticity, sand is fine grained, subangular, quartz, soft, moist. From 29 ft: With light gray mottling and red bands, soft, residual soil.	
40	670			679.6 SILTY CLAY, Reddish yellow (7.5 YR 7/8) and yellowish red (5YR 5/8) mottled, minor light gray, soft, ow to medium plasticity, with limestone fragments up to 3 inch long. From 39 ft: Becoming more silty, bordering clayey silt. 674.6 SILT, Reddish yellow (7.5 YR 7/8) and yellowish red (5YR 5/8) mottled, minor light gray, soft, non plastic to low plasticity, with limestone fragments up to 3 inch long. 669.6 SILTY CLAY, Yellowish red (5YR 5/8), medium to high plasticity, with limestone fragments up to 4 inch long and some fine sand.	Bentonite uncoated 3/8" chips

(Continued Next Page)

Geosyntec consultants

Geosyntec Consultants
1255 Roberts Boulevard
Kennesaw, GA 30144

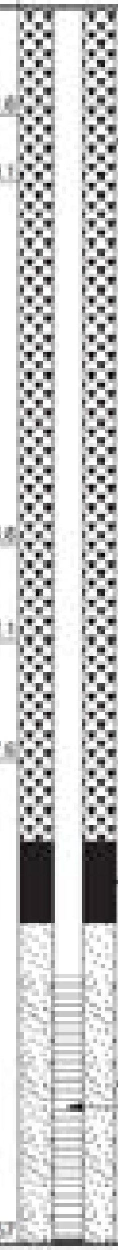
BGWC-14A

CLIENT Southern Company Services **PROJECT NAME** Bowen Groundwater SRV-AP1

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
50		56.5 ft: Driller reported no returns, no resistance on 4" rod. Six inch override scratching sides when advanced with no drilling effort.		SILTY CLAY, Yellowish red (5YR 5/8), medium to high plasticity, with limestone fragments up to 4 inch long and some fine sand. (continued)	
	661.6			SILTY CLAY with GRAVEL, Light olive brown (2.5Y 5/6) and yellow (2.5Y 7/8), very fine sand, with some silt and clay, with angular limestone fragments up to 1.5 inch long.	
	659.1			VOID (56.5 to 70 ft)	
70	645.6	70 ft: Moderately hard drilling. 74 ft: Driller reported no returns, no resistance on 4" rod. Six inch override scratching sides when advanced with no drilling effort.		LIMESTONE/DOLOMITE, Dark gray and dark bluish gray, massive to thinly bedded, highly fractured, with fine calcite veins throughout, with secondary mineralization along fracture planes, recovered as gravel sized, subrounded pieces of limestone and disc-shaped core fragments. With horizontal and vertical fracture planes, fresh to slightly weathered.	
	642.1			VOID (73.5 to 78 ft)	
	637.6	86 to 89 ft: Driller getting returns. 89-96ft: No returns. 86 to 96 ft: No voids reported.		LIMESTONE/DOLOMITE, Dark gray and dark bluish gray, massive to thinly bedded, highly fractured, with fine calcite veins throughout, with secondary mineralization along fracture planes, recovered as gravel sized, subrounded pieces of limestone and disc-shaped core fragments. With horizontal and vertical fracture planes, fresh to slightly weathered. 89 ft: Larger pieces of core recovered up to 4 inch length, massive, fresh, dolomitic, with fine white calcite veins.	
	619.57				

Depth scale: 50, 60, 70, 80, 90. Elevation scale: 660, 650, 640, 630, 620.



Bottom of borehole at 96.0 feet.

Easting and Northing in NAD 1983.
Elevation in NAVD 88.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-16
LOCATION	Euharlee, Georgia	PAGE	1 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	671.65 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	47 feet
LOGGED BY	Rhonda Tinsley	DATE COMPLETED	11/12/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1504656.42; Easting: 2064247.67		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
NA	NA	NA					**0 to 20.0 feet: CLAY (CH)**, yellowish brown, stiff, mottled. (RESIDUAL) (0 to 10.0 feet: vacuumed for utility clearance.)	0	0	100
CB	8.5/10	N	10							
CB	9.0/10	NA	15							
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-16
LOCATION	Euharlee, Georgia	PAGE	2 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	671.65 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	47 feet
LOGGED BY	Rhonda Tinsley	DATE COMPLETED	11/12/18
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1594656.42; Easting: 2064247.67		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	ORA %	SAND %	FINES %
							20.8 to 21.5 feet: SAND (SP), loose, fine grained, stiff.	0	0	100
							21.5 to 24.0 feet: DOLOMITE, white, pulverized due to dry sonic drilling, weathered. (WEATHERED BEDROCK)	NA	NA	NA
		S	25				**24.0 to 31.0 feet: CLAY WITH GRAVEL (CH)**, yellowish brown, wet, gravel composed of dolomite. (VOID INFILL)	NA	NA	NA
CB	8.5/10	E								
			30				**31.0 to 32.0 feet: SAND (SP)**, white to light gray, loose. (VOID INFILL)	40	60	0
							32.0 to 40.0 feet: DOLOMITE, gray, hard, with many calcite-filled fractures. (BEDROCK)	NA	NA	NA
			35							
CB	7.6/10	S					@ 37.0 feet: dolomite is weathered, fractured, and water stained with vugs, possible breccia.			
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-16
LOCATION	Euharlee, Georgia	PAGE	3 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	671.65 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	47 feet
LOGGED BY	Rhonda Tinsley	DATE COMPLETED	11/12/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1594656.42; Easting: 2064247.87		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB		S	45				**40.9 to 46.0 feet: SILTY SAND WITH GRAVEL (SM)**, mottled brown and yellowish brown, loose, gravel composed of dolomite. (VOID INFILL)	20	80	20
		N					**46.9 to 47.0 feet: CLAY WITH GRAVEL (CH)**, yellowish brown, stiff, dolomite gravel. (VOID INFILL)	NA	NA	NA
			50				Total depth: 47.0 feet.			
			55							
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

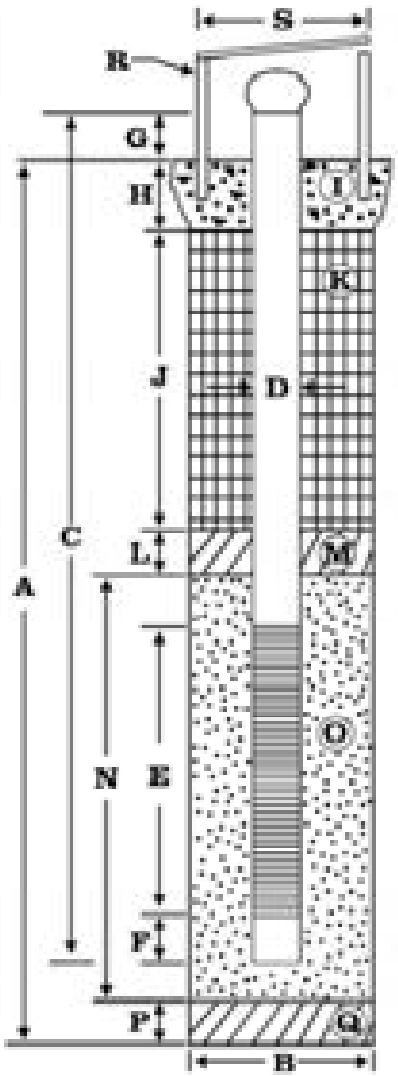
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-16
Client Name:	Southern Company	Top of Casing Elev.:	674.31 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	671.7 ft. NAVD88
		Installation Date:	11/12/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Jimmy Hall, Jr., Driller



	Depth (feet)	Elevation (feet, NAVD88)
	+3.2	674.9
	+3.1	674.31
	0.0	671.21
	1.0	670.21
	15.0	656.21
	30.0	641.20
	34.0	637.21
	35.9	635.31
	45.9	625.31
	46.2	625.01
	47.0	624.21
	NA	NA

EXPLORATORY BORING

A. Total depth:	47.0 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	49.2 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	3.0 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	29.0 ft.
K. Annular seal material:	Bentonite grout (1.0-15.0 ft.)
	Bentonite chips (15.0-30.0 ft.)
L. Filter pack seal thickness:	4.0 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	13.0 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	NA
Q. Bottom material:	NA
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-17
LOCATION	Euharlee, Georgia	PAGE	1 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	671.25 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	66.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/22/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1504432.00; Easting: 2064259.38		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	8.7/6.5	N					**0 to 1.1 feet: TOPSOIL**, dark grayish brown, silt, abundant plant debris.	NA	NA	NA
		N					**1.1 to 12.6 feet: GRAVELLY SANDY SILT (ML)**, light brown, loose, dry, crumbly, does not effervesce, gravel is rounded to well rounded, gravel composed of chert, appears to be quartzite. (FILL) @ 2.3 to 2.5 feet: dark gray silt layer, plant debris.	25	25	50
CB	12.7/10	N	5							
			10							
		N					**12.6 to 21.5 feet: CLAY (CH)**, light reddish brown, moist, stiff, high plasticity, occasional chert nodules, trace white and gray granular material, soft. (RESIDUAL) @ ~5.5 feet: soft, wet.	0	0	100
CB	11.1/10		15							
		E					@ ~8.9 20 20.1 feet: silty clay, effervesces readily.			
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-17
LOCATION	Euharlee, Georgia	PAGE	2 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	671.25 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	66.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/22/18
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1554432.00; Easting: 2064259.38		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		W					**12.6 to 21.5 feet: CLAY (CH)**, continued.	0	0	100
							@ 20.1 to 21.5 feet: very wet, soupy, effervesces weakly.			
		N					**21.5 to 23.5 feet: CLAYEY GRAVEL (GC)**, light reddish brown, wet, fine to cobble angular dolomite gravel, low plasticity, very wet clay. (VOID INFILL)	80	0	20
		N	25				**23.5 to 30.6 feet: CLAY (CH)**, red, with abundant chert nodules, wet, high plasticity, firm, significant amounts of "grout bleed" in interval. (RESIDUAL)	0	0	100
CB	10.7/10									
		N	30				**30.6 to 34.8 feet: CLAY WITH GRAVEL (CH)**, light brownish red, wet, high plasticity, soft, gravel composed of weathered dolomite. (VOID INFILL)	10	0	90
		SW	35				**34.8 to 36.5 feet: DOLOMITE**, gray, moderately well weathered, medium-grained crystals, few intact beds remain, approximately 1- to 2-inches thick. (BEDROCK)	NA	NA	NA
CB	7.3/10	N					@ 34.8 to 35.5 feet: zone of mixed clay and heavily weathered dolomite.	20	0	70
							36.5 to 42.1 feet: GRAVELLY CLAY (CH), light brownish red, wet, very soft, high plasticity clay, gravel is weathered dolomite, some beds can be observed, approximately 2- to 4-inches thick, effervesces weakly. (WEATHERED BEDROCK)			
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-17
LOCATION	Euharlee, Georgia	PAGE	3 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	671.28 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	66.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/22/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1594432.09; Easting: 2664259.58		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		W					36.5 to 42.1 feet: GRAVELLY CLAY (CH), continued.	25	0	75
		E	45				42.1 to 46.5 feet: SANDY GRAVEL WITH CLAY (GW-GC), reddish brown grading to grayish brown, loose, wet, gray fraction may be ash?, effervesces readily. (VOID INFILL)	50	30	20
							@ 45.5 to 46.5 feet: possible ash layer.			
CB	8.6/10	W					46.5 to 49.6 feet: CLAYEY GRAVEL (GC), light brownish red, wet, gravel is fine to cobble-sized, angular dolomite, clay is moderate plasticity, very soft. (WEATHERED BEDROCK)	80	0	20
		E	50				49.6 to 50.8 feet: CLAY WITH SAND AND GRAVEL (CH), light brownish red and dark brown mixed, high plasticity clay, soft, wet, sand is dark brown, fine grained, gravel is fine to coarse, angular, effervesces readily. (VOID INFILL)	20	20	60
								20	0	80
		S					50.8 to 52.4 feet: CLAY WITH GRAVEL (CH), brownish red, stiff, moist, high plasticity, occasional fine to coarse gravel. (VOID INFILL)	NA	NA	NA
			55				52.4 to 66.5 feet: DOLOMITE, light gray, heavily weathered, abundant calcite-filled voids, few unweathered beds remain, approximately 1- to 2-inches thick, breakage along bedding planes. (BEDROCK)			
							@ 52.4 to 53.6 feet: heavily weathered.			
							@ 53.6 to 55.1 feet: moderately weathered.			
CB	11.3/10						@ 55.1 to 56.5 feet: heavily weathered.			
		E					@ 58.1 to 59.3 feet: zone of heavily weathered dolomite, readily effervesces, light brown, wet, soft, dolomite easily broken by hand, trace sand. (WEATHERED BEDROCK)			
		S	60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-17
LOCATION	Euharlee, Georgia	PAGE	4 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	671.28 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	66.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/22/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1604432.00; Easting: 2064259.38		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOIL/ROCK ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		S	65			VOID	**52.4 to 66.5 feet: DOLOMITE**, continued. @ 59.3 to 66.5 feet: dolomite, weathered, dry sonic drilling pulverized most of sample, fine grained crystals, abundant calcite-filled fractures and voids. @ 60.0 to 62.0 feet: void was reported by driller.	NA	NA	NA
			70							
			75							
			80							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

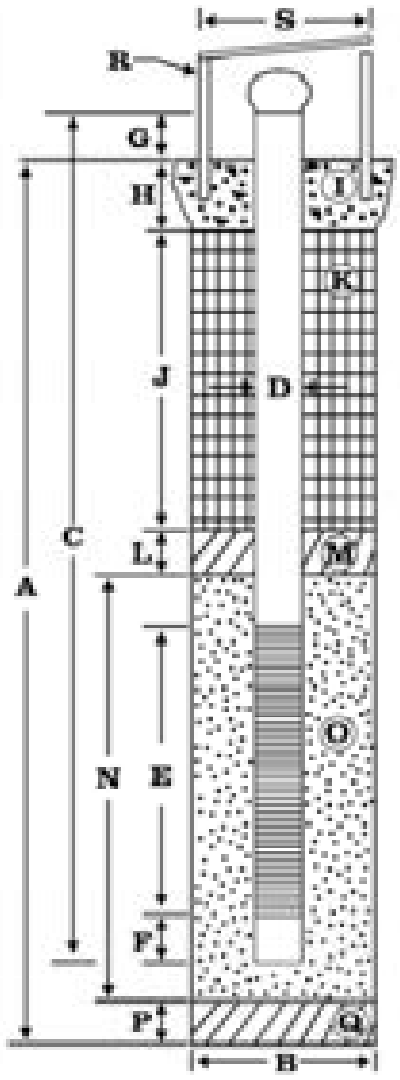
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-17
Client Name:	Southern Company	Top of Casing Elev.:	673.65 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	671.3 ft. NAVD88
		Installation Date:	10/22/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			David Wilcox, Driller



	Depth (feet)	Elevation (feet, NAVD88)
+2.8		674.1
+2.6		673.65
0.0		671.05
1.0		670.05
20.2		650.85
48.5		622.55
53.6		617.45
55.7		615.35
65.7		605.35
66.0		605.05
66.5		604.55
NA		NA

EXPLORATORY BORING

A. Total depth:	66.5 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	68.6 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	2.8 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	47.5 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-20.2 ft.)
	Bentonite chips (20.2-48.5 ft.)
L. Filter pack seal thickness:	5.1 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	12.9 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	NA
Q. Bottom material:	NA
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-18
LOCATION	Euharlee, Georgia	PAGE	1 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	679.32 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	46.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/13/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1504118.73; Easting: 2064257.00		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	6.5/6.5	N	0				**0 to 8.4 feet: SILT (ML)**, light brownish gray, very stiff, dry, no plasticity, crumbles under pressure, trace red coloration in small veins and filament-like veins, one piece of vegetation (rootlet) at 5.1 feet. (RESIDUAL) @ 0 to 0.5 foot: abundant rootlets.	0	0	100
CB	11.3/10	N	5							
			10				**8.4 to 21.6 feet: SILTY CLAY (CH)**, light brownish gray with red mottling, dry, stiff, medium plasticity. (RESIDUAL) @ 12.0 feet: moist, firm. @ 13.2 feet: wet, soft.	0	0	100
CB	8.1/10	N	15				@ 16.5 to 21.6 feet: abundant chert nodules, color change to light reddish brown.			
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-18
LOCATION	Euharlee, Georgia	PAGE	2 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	670.32 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	46.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/13/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1504118.73; Easting: 2064257.89		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N					**8.4 to 21.6 feet: SILTY CLAY (CH)**, continued.	0	0	100
		S	25				**21.6 to 29.0 feet: DOLOMITE**, light gray, hard, dense, wet, moderately weathered, fine grained, abundant rust colored discoloration on surfaces, identifiable beds are between 1- and 4-inches thick, breakage along bedding planes. (BEDROCK)	NA	NA	NA
CB	6.6/10	S								
		NA	30			VOID	@ 29.0 to 33.0 feet: driller notes void.			
		N	35				**33.0 to 39.0 feet: GRAVELLY CLAY (CH)**, light reddish brown, soft, wet, moderate plasticity, gravel is angular, well graded, fine to cobble-size dolomite. (VOID INFILL)	30	0	70
CB	6.3/10	N								
			40				**39.0 to 46.5 feet: CLAYEY GRAVEL (GC)**, description on next page.	60	0	40

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-18
LOCATION	Euharlee, Georgia	PAGE	3 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	670.32 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	46.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/13/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1934118.73; Easting: 2064287.00		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N	45				**39.8 to 46.5 feet: CLAYEY GRAVEL (GC)**, light reddish brown, wet, well graded, fine to cobble size, angular dolomite gravel, very soft, moderate plasticity clay. (VOID INFILL)	60	0	40
			50				Total depth: 46.5 feet.			
			55							
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

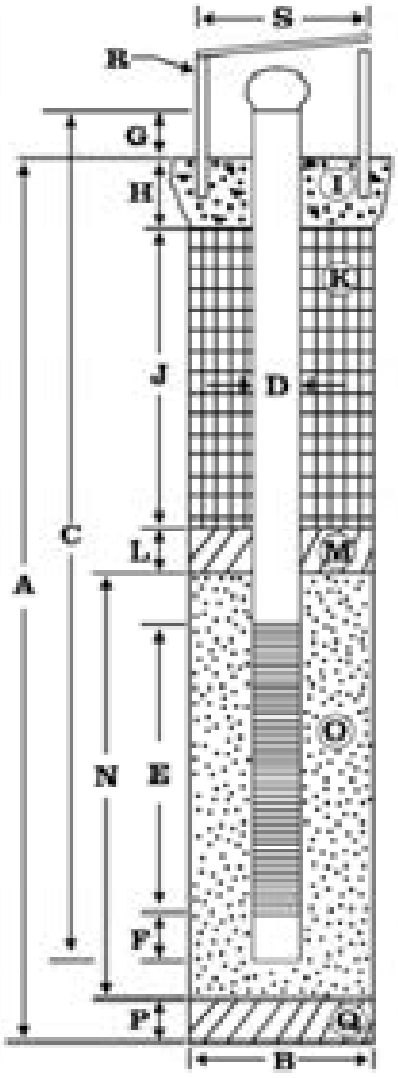
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-18
Client Name:	Southern Company	Top of Casing Elev.:	672.88 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	670.3 ft. NAVD88
		Installation Date:	10/13/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			David Wilcox, Driller



	Depth (feet)	Elevation (feet, NAVD88)
	+2.9	673.2
	+2.7	672.88
	0.0	670.18
	1.0	669.18
	14.5	655.68
	19.6	650.58
	22.8	647.38
	25.1	645.08
	35.1	635.08
	35.4	634.78
	35.8	634.38
	46.5	623.68

EXPLORATORY BORING

A. Total depth:	46.5 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	38.1 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	2.7 ft.
H. Surface seal thickness:	1.1 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	18.6 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-14.5 ft.)
	Bentonite chips (14.5-19.6 ft.)
L. Filter pack seal thickness:	3.2 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	13.0 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	10.7 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-19
LOCATION	Euharlee, Georgia	PAGE	1 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	671.04 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	56.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/12/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1503742.25; Easting: 2064244.66		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	7.3/6.5	N					**0 to 1.2 feet: TOPSOIL**, brown, soft, abundant vegetation.	0	0	100
		N					**1.2 to 3.3 feet: CLAY WITH GRAVEL (CL)**, light brown, moist, stiff, no plasticity, fine to coarse angular gray gravel. (FILL)	30	0	70
							@ 3.0 to 3.3 feet: clayey gravel layer.	80	0	20
		N					**3.3 to 11.6 feet: CLAY (CL)**, light brown, dry, hard, low plasticity. (RESIDUAL)	0	0	100
			5				@ 5.6 to 5.7 feet: chert nodules, white. @ 6.1 to 6.2 feet: chert nodules, white.			
CB	4.4/10	N								
			10							
							11.6 to 19.5 feet: CLAY (CH), light brown, moist, stiff, high plasticity. (RESIDUAL) @ ~ 12.3 feet: thin layer of white, soft, granular material. @ ~ 12.3 to 19.5 feet: occasional white chert nodules.	0	0	100
			15							
CB	5.4/10	N								
		S	20				**19.5 to 20.2 feet: DOLOMITE**, desc. on next page.	NA	NA	NA

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-19
LOCATION	Euharlee, Georgia	PAGE	2 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	671.04 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	56.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/12/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1593742.29; Easting: 2064244.66		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION/ ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		S					**19.5 to 20.2 feet: DOLOMITE**, medium grained, highly weathered, parts are soft and crumbly. @ 20.2 to 21.7 feet: VOID, as reported by driller.	NA	NA	NA
		N					**21.7 to 24.8 feet: GRAVELLY CLAY (CH)**, light brown, wet, soft, moderate plasticity, gravel is angular, well graded, fine to cobble-sized. (VOID INFILL)	40	0	60
		S	25				**24.8 to 27.8 feet: DOLOMITE**, dark gray, partially pulverized by drilling, individual beds 1- to 5-inches thick, breakage along bedding planes, slightly weathered.	NA	NA	NA
CB	7.8/10	S								
		N					**27.8 to 30.2 feet: GRAVELLY CLAY (CH)**, light brown, wet, soft, moderate plasticity, gravel is highly weathered dolomite. (VOID INFILL)	30	0	70
			30				@ 30.1 to 30.2 feet: light gray sand layer.	0	0	100
		N					**30.2 to 32.1 feet: CLAY (CH)**, light reddish brown, wet, highly plastic. (RESIDUAL)			
		N					**32.1 to 32.9 feet: GRAVELLY CLAY (CH)**, same as at 27.8 to 30.2 feet. (VOID INFILL)	30	0	70
		N					**32.9 to 35.3 feet: CLAY (CH)**, same as at 30.2 to 32.1 feet. (RESIDUAL) @ 32.9 feet: thin light gray sand layer.	0	0	100
			35				**35.3 to 39.3 feet: CLAYEY GRAVEL (GW)**, light brown, wet, loose, well graded, fine to cobble sized dolomite gravel. (VOID INFILL)	70	0	30
CB	6.0/10	N								
			40				**39.3 to 41.7 feet: CLAY (CH)**, desc. on next page.	0	0	100

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-19
LOCATION	Euharlee, Georgia	PAGE	3 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	671.04 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	56.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/12/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1593742.25; Easting: 2064244.66		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N					**39.3 to 41.7 feet: CLAY (CH)**, light yellowish red, very soft, wet, high plasticity. (VOID INFILL)	0	0	100
		S					**41.7 to 45.8 feet: DOLOMITE**, light gray, wet, pulverized by dry sonic drilling, slightly weathered. (BEDROCK)	NA	NA	NA
			45							
		N					**45.8 to 47.7 feet: CLAYEY GRAVEL (GW)**, same as at 35.9 to 39.3 feet. (VOID INFILL)	60	0	40
CB	12.0/10	N					**47.7 to 48.4 feet: SAND (SP)**, light gray, fine grained, poorly graded, does not effervesce, weakly cemented, breaks up in fingers. (VOID INFILL)	0	100	0
							48.4 to 48.7 feet: CLAYEY GRAVEL (GW), same as at 45.8 to 47.7 feet. (VOID INFILL)	60	0	40
			50				**48.7 to 49.1 feet: SAND (SP)**, same as at 47.7 to 48.4 feet. (VOID INFILL)	0	100	0
							49.1 to 52.8 feet: CLAYEY GRAVEL (GW), light reddish brown, wet, loose, well graded, fine to cobble size.	60	0	40
		S					@ 51.5 to 52.2 feet: light gray silt bandings. (VOID INFILL)	NA	NA	NA
		S					**52.8 to 56.0 feet: DOLOMITE**, gray, sample is pulverized from dry sonic drilling, hard, dense, slightly weathered. (BEDROCK)			
		S	55							
		N					**56.0 to 56.5 feet: DOLOMITE AND CLAY (DOL/CH)**, light reddish brown, firm, high plasticity clay, dolomite is in layers 0.1- to 0.2-feet thick with clay in between, dolomite is heavily weathered. (WEATHERED BEDROCK)	0	0	100
							Total depth: 56.5 feet.			
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

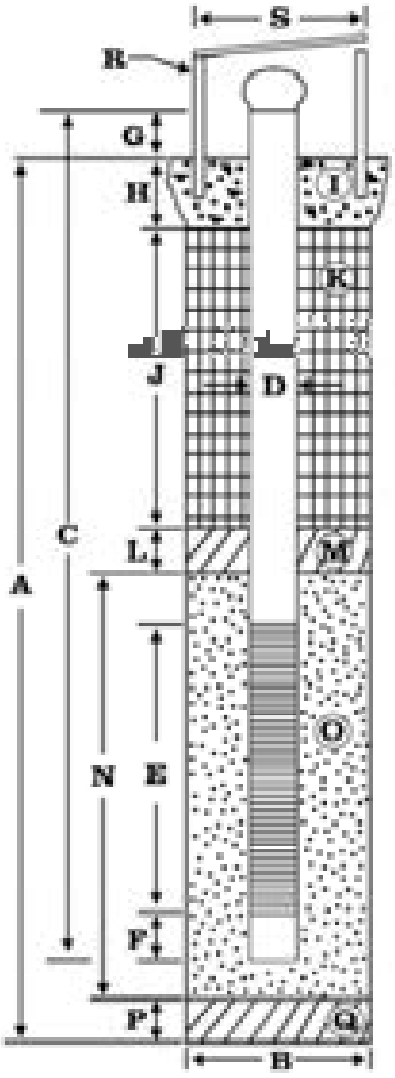
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-19
Client Name:	Southern Company	Top of Casing Elev.:	673.61 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	671.1 ft. NAVD88
		Installation Date:	10/12/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Leon Logan, Driller



	Depth (feet)	Elevation (feet, NAVD88)
	+3.2	674.3
	+3.0	673.61
	0.0	670.61
	1.0	669.61
	15.5	655.11
	35.8	633.81
	39.8	630.81
	41.7	628.91
	51.7	618.91
	52.0	618.61
	52.3	618.31
	56.5	614.11

EXPLORATORY BORING

A. Total depth:	56.5 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	55.0 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	3.0 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	35.8 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-15.5 ft.)
	Bentonite chips (15.5-35.8 ft.)
L. Filter pack seal thickness:	3.0 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	12.5 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	4.2 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-20
LOCATION	Euharlee, Georgia	PAGE	1 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	672.29 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	46.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/09/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1503367.73; Easting: 2064259.55		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION/ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	7.7/6.5	E					**0 to 1.7 feet: ROAD BASE, GRAVEL (GW)**, gray, angular, dry, silty gravel. (FILL) @ ~.0 to 1.7 feet: silty gravel.	100	0	0
		E/N					**1.7 to 4.0 feet: MIX OF CLAY, AND ROAD BASE GRAVEL (CH/GW)**, clay is yellowish red, firm, moist, high plasticity; gravel is gray, angular, dry. (FILL)	50	0	50
		N	5				**4.0 to 17.0 feet: CLAY (CH)**, reddish light brown with light red mottling, high plasticity, damp, stiff. (RESIDUAL) @ 5.8 to 5.9 feet: white chert nodule.	0	0	100
CB	8.2/10						@ 8.2 feet: chert nodules (black) layer.			
			10				@ ~10.1 feet: 0.1-foot layer of black chert nodules. @ ~11.4 to 11.5 feet: layer of rust colored granular material.			
CB	5.8/10	E E E	15				**17.0 to 46.5 feet: LIMESTONE**, dark gray, hard, dense, effervesces readily, unweathered, sharp contact at 17.0 feet, individual beds range from 0.05- to 0.2-feet thick, surface of beds have white powdery texture, breakage along bedding planes. (BEDROCK)	NA	NA	NA
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-20
LOCATION	Euharlee, Georgia	PAGE	2 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	672.29 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	46.9 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/09/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1503367.73; Easting: 2064259.55		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		E					**17.8 to 46.5 feet: LIMESTONE**, continued.	NA	NA	NA
		E					@ 16.5 to 26.5 feet: poor recovery, driller did not note any voids. Driller noted that the formation took the water he added during drilling.			
							@ 17.7 to 18.4 feet: lenticular and linear calcite-filled veins.			
							@ 22.4 to 23.1 feet: surface of beds have weathered orange to rust colored residue.			
		E	25							
CB	6.9/10	E								
		E								
		E								
		E	30							
		E								
		E					@ 31.3 to 33.2 feet: color change to light gray, some vertical calcite veins. Does not have powdery surface texture. Evidence of weathering on surfaces, rust red residue on outer surfaces.			
		E					@ 33.2 to 34.0 feet: abundant calcite veins.			
		E								
		E	35							
		E								
CB	6.3/10	E					@ 36.5 to 38.4 feet: some rust-colored weathering staining on rock surfaces.			
		E								
		E								
		E					@ 39.0 to 39.7 feet: 0.7-foot-thick bed with horizontal and vertical calcite veins.			
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-29
LOCATION	Euharlee, Georgia	PAGE	3 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	672.29 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	46.9 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/09/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1503367.73; Easting: 2064259.55		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		E					**17.9 to 46.9 feet: LIMESTONE**, continued.	NA	NA	NA
		E								
		E								
		E	45				@ 45.5 to 46.5 feet: rust-colored staining on surfaces, slightly weathered, chert nodules and calcite veins.			
							Total depth: 46.9 feet.			
			50							
			55							
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

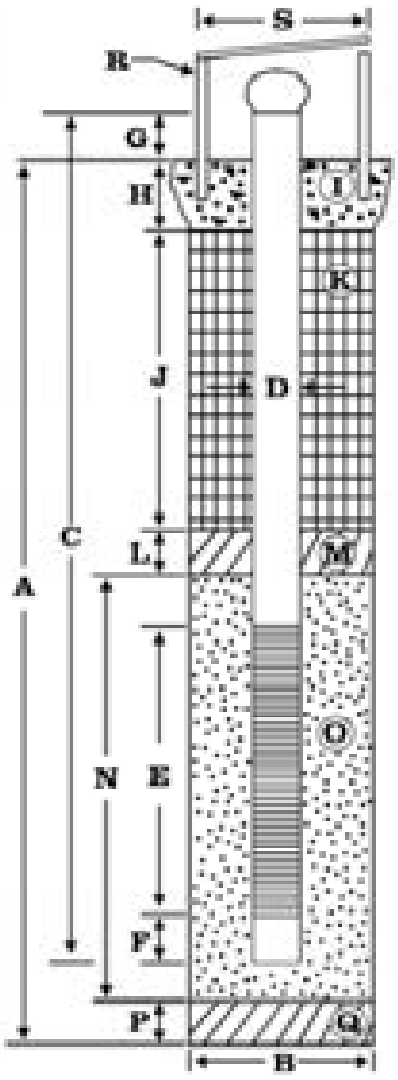
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-20
Client Name:	Southern Company	Top of Casing Elev.:	675.14 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	672.3 ft. NAVD88
		Installation Date:	10/09/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			David Wilcox, Driller



	Depth (feet)	Elevation (feet, NAVD88)
	+3.6	675.9
	+3.4	675.14
	0.0	671.74
	1.0	670.74
	15.2	656.54
	30.8	640.94
	33.8	637.94
	36.6	635.14
	46.6	625.14
	46.9	624.84
	46.9	624.84
	NA	NA

EXPLORATORY BORING

A. Total depth:	46.9 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	50.3 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	3.1 ft.
H. Surface seal thickness:	1.3 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	29.8 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-15.2ft.)
	Bentonite chips (15.2-30.8 ft.)
L. Filter pack seal thickness:	3.0 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	13.1 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	NA
Q. Bottom material:	NA
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-21
LOCATION	Euharlee, Georgia	PAGE	1 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	688.53 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	57 feet
LOGGED BY	Jim Redwine	DATE COMPLETED	03/02/16
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1501627.51; Easting: 2064348.09		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	7/7	N					0 to 0.3 foot: TOPSOIL.	NA	NA	NA
		E					0.3 to 1.0 foot: **LIMESTONE GRAVEL**, gray, fine limestone, part of road base.	NA	NA	NA
		N						NA	NA	NA
							1.0 to 4.6 feet: CLAY (CL), red to gray mottled. (RESIDUAL)			
							Acid test performed every 1.0 feet throughout boring.			
			5				**4.6 to 27.0 feet: CLAY (CL)**, reddish to yellowish, slightly mottled, stiff. (RESIDUAL)	NA	NA	NA
CB	10/10	N								
			10							
			15							
CB	10/10	N						1	4	95
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-21
LOCATION	Euharlee, Georgia	PAGE	2 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	688.53 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	57 feet
LOGGED BY	Jim Redwine	DATE COMPLETED	03/02/18
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1501627.51; Easting: 2064348.09		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	10/10	N					**4.6 to 25.3 feet: CLAY (CL)**, continued.	1	4	95
		N	25				@ 25.3 to 25.5 feet: gray to red silt zone, possibly weathered dolomite, no reaction to hydrochloric acid.			
CB	10/10	N					**27.8 to 32.0 feet: CLAY (CH)**, brown, very soft, soupy mud (toothpaste consistency) in sleeve. Rods dropped from 27.8 to 32.0 feet. (VOID NFILL)	2	2	96
		S	30				**32.8 to 41.0 feet: DOLOMITE**, light to dark gray, medium-grained, no effervescence without scratching. (BEDROCK)	NA	NA	NA
		E								
		S								
		S	35				@ 32.8 to 33.0 feet: light gray grout, reacts with hydrochloric acid.			
CB	6/10	S								
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-21
LOCATION	Euharlee, Georgia	PAGE	3 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	688.83 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	57 feet
LOGGED BY	Jim Redwine	DATE COMPLETED	03/02/16
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1501637.51; Easting: 2064048.09		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	9/10						**32.8 to 41.0 feet: DOLOMITE**, continued.	NA	NA	NA
							41.0 to 45.5 feet: DOLOMITE, weathered zone, tan mud on top, tripoli (silt-sized weathered dolomite residuum) on bottom. (WEATHERED BEDROCK)	NA	NA	NA
			45				@ Approximately 44.0 feet: trace mottled dolomite.			
							45.5 to 57.0 feet: DOLOMITE, light to dark gray, medium-grained with occasional horizontal lighter-colored coarse-grained dolomite beds and occasional near vertical healed fractures. Fracture filling has a slight reaction to hydrochloric acid.	NA	NA	NA
CB	10/10	S								
		S	50							
		S	55							
							Total depth: 57.0 feet.			
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

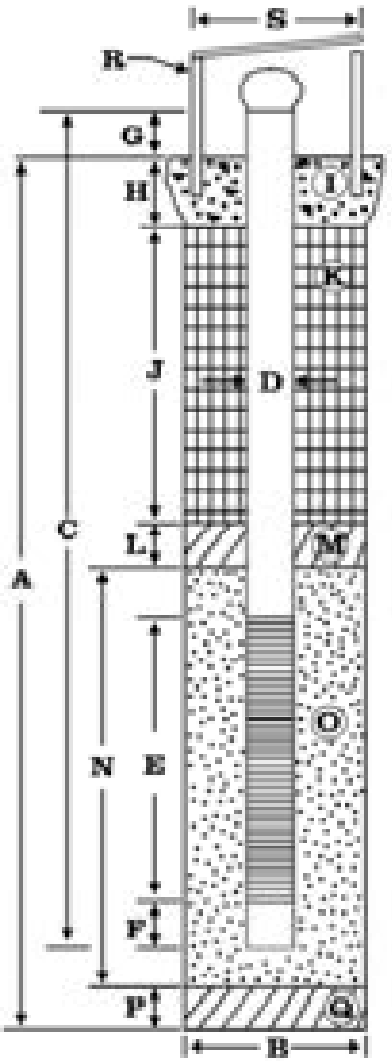
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-21
Client Name:	Southern Company	Top of Casing Elev.:	691.33 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	688.6 ft. NAVD88
		Installation Date:	03/02/2016
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Thomas Ardito, Driller



	Depth (feet)	Elevation (feet, NAVD88)
S	NA	NA
R	+2.8	691.33
G	0.0	688.53
H	1.0	687.53
J	23.0	665.53
C	33.5	655.03
L	37.0	651.53
M	39.7	648.83
N		
E		
O		
F	49.9	638.63
P	50.3	638.23
Q	51.0	637.53
B	57.0	631.53

EXPLORATORY BORING

A. Total depth:	57.0 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	53.4 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	2.8 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	32.5 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-23.0 ft.)
	Bentonite chips (23.0-33.5 ft.)
L. Filter pack seal thickness:	3.5 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	14.0 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	6.0 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

SS = silica sand.
OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
Bottom material bentonite chips allowed to hydrate for 1 hour.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-22
LOCATION	Euharlee, Georgia	PAGE	1 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	692.64 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	46.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/08/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1501323.76; Easting: 2064358.05		

SAMPLING METHOD	RECOVERY (FEET)	SPLANEL SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	5.1/6.5	NA					0 to 0.3 foot: TOPSOIL, abundant plant debris.	NA	NA	NA
		N					0.3 to 2.9 feet: CLAYEY SILT (ML), reddish brown, dry, no plasticity, stiff. (FILL)	0	0	100
		N					2.9 to 26.5 feet: CLAY (CH), red with yellow and tan mottling, dry, hard, moderate plasticity. (RESIDUAL)	0	0	100
CB	12.1/10	N	5							
							@ 8.2 feet: color change to light red with red, yellow and tan mottling.			
			10				@ 10.6 feet: color change to light brown with red, yellow and tan mottling.			
CB	12.0/10	N	15							
							@ 18.6 feet: moist, consistency change to stiff.			
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-22
LOCATION	Euharlee, Georgia	PAGE	2 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	692.64 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	46.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/08/18
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1591223.76; Easting: 2084358.65		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N					**2.9 to 26.5 feet: CLAY (CH)**, continued.	0	0	100
							@ 20.6 feet: consistency change to soft.			
							@ 22.3 feet: consistency change to stiff, occasional chert nodules, highly plastic.			
			25							
CB	1.9/2.5	N					**26.5 to 27.6 feet: GRAVELLY SILT (ML)**, light reddish brown, soft, wet, angular coarse gravel, slightly plastic. (WEATHERED BEDROCK)	40	0	60
		S					**27.6 to 46.5 feet: DOLOMITE**, dark gray, hard, dense, very fine crystals, ribboned with horizontal calcite veins, some vertical calcite veins, sample is broken along bedding planes, beds range from 0.5- to 5-inches thick. (BEDROCK)	N/A	N/A	N/A
CB	8.7/7.5	S					@ 27.6 to 29.6 feet: slightly weathered, rust colored deposits on bedding surfaces.			
		S	30				@ 29.6 to 46.5 feet: unweathered			
		S					@ 32.0 feet: 2- to 3-inch void.			
		S					@ 32.3 to 43.3 feet: no calcite veins.			
		S								
		S								
		S	35							
		S								
CB	9.3/10	S								
		S								
		S								
		S								
		S	40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-22
LOCATION	Euharlee, Georgia	PAGE	3 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	692.64 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	46.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/08/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1501323.76; Easting: 2064358.05		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		S					**27.6 to 46.5 feet: DOLOMITE**, continued.	NA	NA	NA
		S								
		S								
		S					@ +3.3 to 46.5 feet: some vertical calcite veins.			
		S								
		S	45							
		S								
							Total depth: 46.5 feet.			
			50							
			55							
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

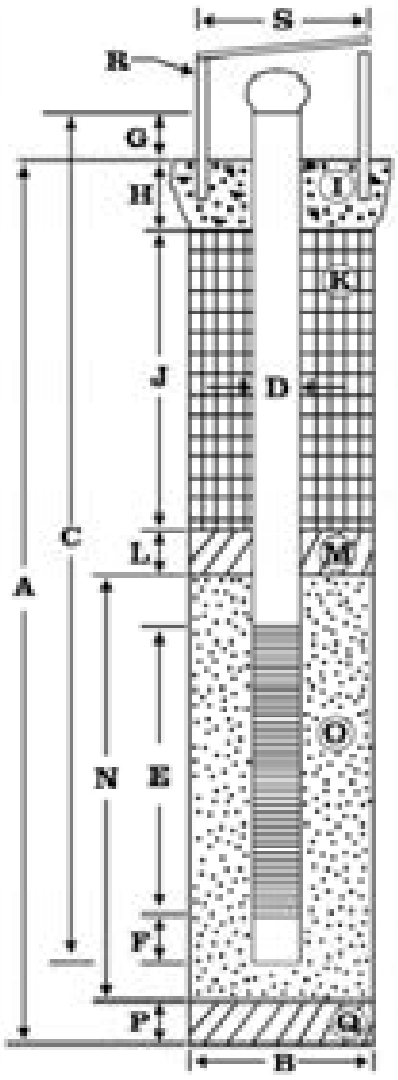
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-22
Client Name:	Southern Company	Top of Casing Elev.:	695.50 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	692.6 ft. NAVD88
		Installation Date:	10/08/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Leon Logan, Driller



	Depth (feet)	Elevation (feet, NAVD88)
S	+3.2	695.8
R	+3.0	695.8
G	0.0	692.6
H	1.0	691.6
J	20.5	672.1
L	24.8	667.8
M	28.5	664.1
O	29.9	662.7
F	39.9	652.7
P	40.2	652.4
Q	40.5	652.1
B	46.5	646.1

EXPLORATORY BORING

A. Total depth:	46.5 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	43.3 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	3.0 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	23.8 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-20.5 ft.)
	Bentonite chips (20.5-24.8 ft.)
L. Filter pack seal thickness:	3.7 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	12.0 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	6.0 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-23
LOCATION	Euharlee, Georgia	PAGE	1 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	693.16 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	56.5 feet
LOGGED BY	Rhonda Tinsley	DATE COMPLETED	10/15/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1501000.57; Easting: 2064350.17		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	5.7/6.5	N					0 to 0.5 foot: **TOPSOIL**, dark brown, with vegetation.	NA	NA	NA
							0.5 to 2.4 feet: **GRAVELLY SILT (ML)**, reddish brown, soft.	NA	NA	NA
							2.4 to 3.6 feet: **CLAY (CL)**, yellowish brown and tan mottled, stiff, with black organics.	NA	NA	NA
							3.6 to 9.0 feet: **SILT (ML)**, dark brown, dry, crumbly, with organics.	NA	NA	NA
CB	11.5/10	N	5							
			10				9.0 to 16.0 feet: **CLAY WITH GRAVEL (CL)**, yellowish brown, mottled, dry, hard. (RESIDUAL)	NA	NA	NA
			15							
CB	11.6/10	N					16.0 to 27.5 feet: **CLAY (CL)**, yellowish brown, stiff, with angular chert gravel. (RESIDUAL)	NA	NA	NA
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-23
LOCATION	Euharlee, Georgia	PAGE	2 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	693.16 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	56.5 feet
LOGGED BY	Rhonda Tinsley	DATE COMPLETED	10/15/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1501000.87; Easting: 2064359.17		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N					**16.8 to 27.5 feet: CLAY (CL)**, continued.	NA	NA	NA
		N								
			20							
			25							
CB	9.5/10									
							27.5 to 28.0 feet: CLAY WITH GRAVEL (CL), gray, soft, gravel is composed of weathered dolomite.	10	10	80
								NA	NA	NA
		E					**28.0 to 56.5 feet: DOLOMITE**, black to gray, hard, dense, with calcite-filled fractures. (BEDROCK)			
		S	30							
			35							
CB	9/10	S*								
							@ 39.0 to 41.0 feet: staining, evidence of slight weathering.			
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-23
LOCATION	Euharlee, Georgia	PAGE	3 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	693.16 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	56.5 feet
LOGGED BY	Rhonda Tinsley	DATE COMPLETED	10/15/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1501000.87; Easting: 2064359.17		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N					28.8 to 56.5 feet: DOLOMITE, continued.	NA	NA	NA
			45							
CB	8.4/10	S*								
			50							
			55							
							Total depth: 56.5 feet.			
			60							

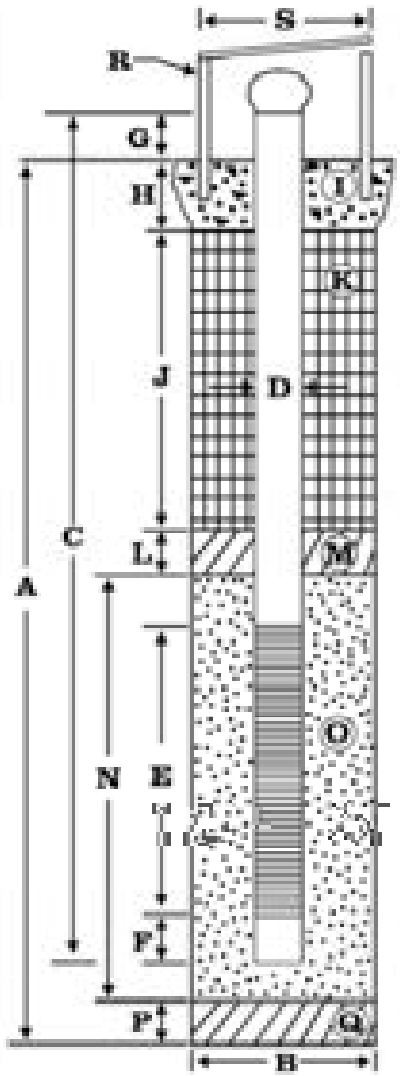
REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-23
Client Name:	Southern Company	Top of Casing Elev.:	695.50 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	693.2 ft. NAVD88
		Installation Date:	10/15/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			David Wilcox, Driller



	Depth (feet)	Elevation (feet, NAVD88)
	+3.1	696.3
	+2.9	695.50
	0.0	692.60
	1.0	691.60
	25.0	667.60
	32.5	660.10
	35.9	656.70
	38.3	654.30
	48.3	644.30
	48.6	644.00
	49.0	643.60
	56.5	636.10

EXPLORATORY BORING

A. Total depth:	56.5 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	51.5 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	2.9 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	31.5 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-25.0 ft.)
	Bentonite chips (25.0-32.5 ft.)
L. Filter pack seal thickness:	3.4 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	12.1 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	7.5 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-24
LOCATION	Euharlee, Georgia	PAGE	1 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	699.46 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	66.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/27/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1500621.22; Easting: 2065032.84		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	6.5/6.5	N					0 to 3.0 feet: **MIX OF CLAY, SILT, SAND AND FINE GRAVEL**, dark gray and reddish brown, moist. (FILL)	10	20	70
		N					3.0 to 37.7 feet: **CLAY (CH)**, light grayish brown with red and light gray mottling, dry, high plasticity, stiff. (RESIDUAL)	0	0	100
			5							
CB	10.8/10	N					@ 6.5 feet: color change to light reddish brown with light gray mottling.			
			10							
							@ ~12.5 feet: consistency change to very stiff.			
			15							
CB	10.9/10	N								
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-24
LOCATION	Euharlee, Georgia	PAGE	2 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	699.46 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	66.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/27/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1599621.22; Easting: 2065032.84		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		N					3.0 to 37.7 feet: **CLAY (CH)**, continued.	0	0	100
			25							
CB	10/10	N					@ 26.0 to 26.1 feet: black chert nodules. @ 26.0 to 29.2 feet: abundant chert nodules. @ 26.5 feet: moist to wet.			
			30				@ 29.2 to 37.7 feet: occasional chert nodules.			
			35							
CB	8.3/10	N S					**37.7 to 41.4 feet: DOLOMITE**, gray, moderately weathered, wet, few beds can be discerned approximately 0.5- to 3-inches thick, moderately competent, drilling broke sample up into angular gravel sized pieces. (BEDROCK)	NA	NA	NA
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-24
LOCATION	Euharlee, Georgia	PAGE	3 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	699.46 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	66.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/27/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1500621.22; Easting: 2065032.84		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTIONS ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		S					37.7 to 41.6 feet: (top of rock) DOLOMITE, continued.	NA	NA	NA
		N					41.6 to 46.5 feet: GRAVELLY CLAY (CH), light reddish brown, wet, soft, moderate plasticity, sticky, gravel is angular, heavily weathered dolomite. (VOID INFILL) @ 41.6 to 41.8 feet: extremely weathered dolomite zone, can break apart with hands.	40	0	60
			45							
CB	7.4/10	E					46.5 to 66.5 feet: LIMESTONE, dark gray, microcrystalline, thinly bedded, beds approximately 0.5- to 3-inches thick, breakage along bedding planes, surface of beds has powdery appearance. (BEDROCK)	NA	NA	NA
			50				@ 52.5 to 52.7 feet: very thin black and white laminations, algal structures?			
							@ 53.8 to 63.0 feet: abundant light red vein and fracture infillings. Slightly weathered surfaces.			
			55							
CB	8.6/10	E								
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-24
LOCATION	Euharlee, Georgia	PAGE	4 of 4
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	699.46 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	66.5 feet
LOGGED BY	Matt Wilson	DATE COMPLETED	10/27/15
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1599821.22; Easting: 2065932.84		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
		E	65				**46.5 to 66.5 feet: LIMESTONE**, continued.	NA	NA	NA
							@ 63.0 to 63.6 feet: 0.6-foot thick bed.			
							TD at depth: 66.5 feet.			
			70							
			75							
			80							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

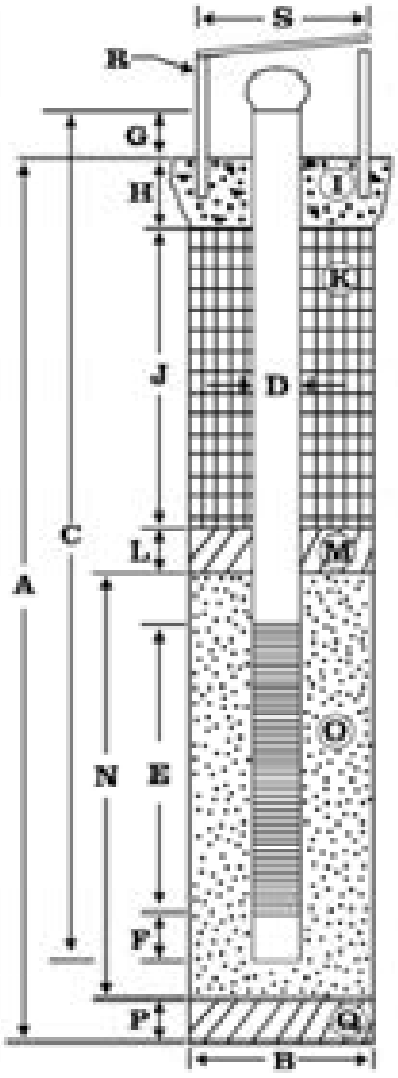
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-24
Client Name:	Southern Company	Top of Casing Elev.:	702.27 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	699.5 ft. NAVD88
		Installation Date:	10/27/15
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			David Wilcox, Driller



	Depth (feet)	Elevation (feet, NAVD88)
	+3.2	702.7
	+3.0	702.27
	0.0	699.27
	1.0	698.27
	20.2	679.07
	47.5	651.77
	50.5	648.77
	53.0	646.27
	63.0	636.27
	63.3	635.97
	64.0	635.27
	66.5	632.77

EXPLORATORY BORING

A. Total depth:	66.5 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	66.4 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	3.0 ft.
H. Surface seal thickness:	1.1 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	46.5 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-20.2 ft.)
	Bentonite chips (20.2-47.5 ft.)
L. Filter pack seal thickness:	3.0 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	13.5 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	2.5 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 8 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BOWC-28
LOCATION	Euharlee, Georgia	PAGE	1 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	677.60 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	57 feet
LOGGED BY	Jim Redwine	DATE COMPLETED	03/03/16
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1502292.73; Easting: 2064244.10		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	7/7	N	0				**0 to 7.0 feet: CLAY (CL)**, red to light brown mottled, stiff. (RESIDUAL) No topsoil - scraped off from previous construction?	7	5	88
							Acid test performed every 1.0 feet throughout boring.			
CB	10/10	N	5				**7.0 to 24.0 feet: CLAY (CL)**, tan to reddish brown, stiff, with rare to frequent gravel in matrix. (RESIDUAL)	NA	NA	NA
			10							
			15				@ 16.5 to 17.0 feet: no gravel in sample.	0	5	95
CB	10/10	N								
			20							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-25
LOCATION	Euharlee, Georgia	PAGE	2 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	677.60 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	57 feet
LOGGED BY	Jim Redwine	DATE COMPLETED	03/03/16
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1502292.73; Easting: 2064244.10		

SAMPLING METHOD	RECOVERY (FEET)	SPLIT-SPOON SOLUTION/ ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	10/10	N					**7.0 to 24.0 feet: CLAY (CL)**, continued.	NA	NA	NA
			25				**24.0 to 29.0 feet: CLAY (CL)**: tan to grayish brown, stiff to plastic. Getting wetter, more plastic, less red, with depth, occasional gravel. (RESIDUAL)	NA	NA	NA
CB	10/10	N								
			30				**29.0 to 37.0 feet: CLAY (CL) WITH GRAVEL**, light orange to tan, stiff to plastic clay with frequent gravel and occasional very weathered dolomite zones. (RESIDUAL)	NA	NA	NA
			35					35	15	50
CB	7/10	S					**37.0 to 52.5 feet: DOLOMITE BRECCIA**, gray dolomite clasts, from a few milimeters to a few inches in size, with white cement between the clasts. Cement looks like carbonate, but only an occasional reaction to dilute hydrochloric acid.	NA	NA	NA
			40							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-25
LOCATION	Euharlee, Georgia	PAGE	3 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	677.60 ft. NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	57 feet
LOGGED BY	Jim Redwine	DATE COMPLETED	03/03/16
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83 WZ) Northing: 1502292.73; Easting: 2064244.10		

SAMPLING METHOD	RECOVERY (FEET)	SPLASH SOLUTION ACID TEST RESULT	DEPTH IN FEET	WELL DETAILS	GAMMA LOG	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	7/10	E					**37.0 to 52.5 feet: DOLOMITE BRECCIA**, continued	NA	NA	NA
			45							
CB	7/10	E					@ 48.0 to 51.0 feet: void. Driller thought relativity open, not mud-filled, though difficult to tell.			
			50							
		E					**52.5 to 54.0 feet: DOLOMITE**, light gray, medium-grained. Vertical and approximately 45° fractures filled with carbonate mineral(s). Some carbonate cement reacts with hydrochloric acid, some does not.	NA	NA	NA
		E	55				**54.0 to 57.0 feet: DOLOMITE BRECCIA**, same as at 37.0 to 52.5 feet.	NA	NA	NA
							Total depth: 57.0 feet.			
			60							

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent. NAVD88 = North American Vertical Datum of 1988. NAD83 WZ = North American Datum of 1983, West Zone.

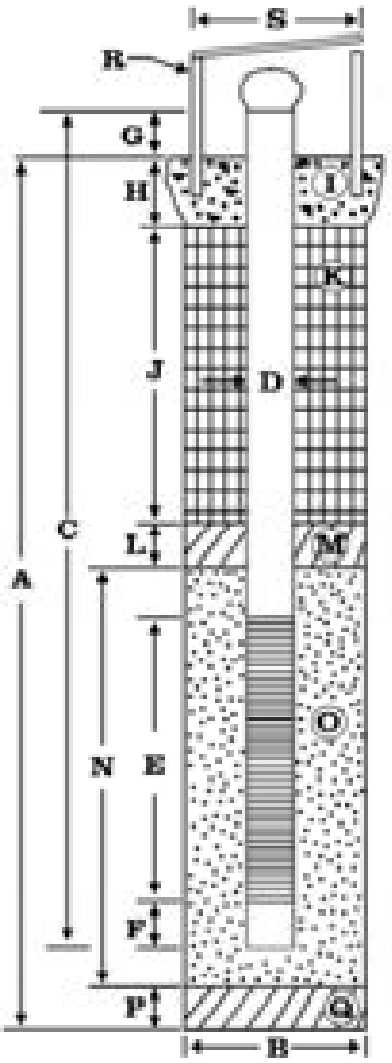
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-25
Client Name:	Southern Company	Top of Casing Elev.:	680.47 ft. NAVD88
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	677.6 ft. NAVD88
		Installation Date:	03/03/16
Location:	Euharlee, Georgia	Driller:	Cascade Drilling
			Thomas Ardito, Driller



	Depth (feet)	Elevation (feet, NAVD88)
S	NA	NA
R	+2.9	680.47
G	0.0	677.57
H	1.0	676.57
J	33.0	644.57
L	39.0	638.57
M	42.0	635.57
N	44.7	632.87
E		
O		
F	54.7	622.87
	55.0	622.57
P	57.0	620.57
Q	57.0	620.57
B		

EXPLORATORY BORING

A. Total depth:	57.0 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic

WELL CONSTRUCTION

C. Well casing length:	58.3 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10.0 ft.
Well screen type:	3.5-inch OD U-Pak PVC
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	2.9 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	38.0 ft.
K. Annular seal material:	Cement/bentonite grout (1.0-33.0 ft.)
	Bentonite chips (33.0-39.0 ft.)
L. Filter pack seal thickness:	3.0 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	15.0 ft.
O. Sand pack material:	#1 Silica sand
P. Bottom material thickness:	2.0 ft.
Q. Bottom material:	Bentonite chips
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	NA

NOTES:

SS = silica sand.
OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate for 1 hour.
Bentonite chips allowed to hydrate for over 4 hours.
NAVD88 = North American Vertical Datum of 1988.

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-39
LOCATION	Euharlee, Georgia	PAGE	1 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	696.39 ft NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	58 feet
LOGGED BY	Jim Redwine	DATE COMPLETED	1/4/17
SAMPLING METHOD	4-in. ID by 10-ft. core barrel	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83) WZ Northing: 1499818.93; Easting: 2066395.88		

SAMPLING METHOD	RECOVERY (FEET)	ACID TEST RESULT	DEPTH (FEET)	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB	9.25/7	N	5			0 to 10.0 feet: CLAY (CH), overburden, stiff plastic, orange to red to yellow (minor) Acid tested with 10% hydrochloric acid at least every foot	0	5	95
CB	11.0/10	N	10			@ 10.0 feet: Contact gradational 10.0 to 34.0 feet: CLAY (CH), yellow stiff silty to plastic with rare gravel	5	25	70
CB	12.0/10	N	15						
			20						

REMARKS: Acid test: E = Effervesces readily, N = No effervescence, S = Effervesces when the surface is scratched, W = Weakly effervescent.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-39
LOCATION	Euharlee, Georgia	PAGE	2 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	690.39 ft NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	58 feet
LOGGED BY	Jim Redwine	DATE COMPLETED	1/4/17
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	6-inches
COORDINATES	(NAD83) WZ Northing: 1499815.93; Easting: 2046395.86		

SAMPLING METHOD	RECOVERY (FEET)	ACID TEST RESULT	DEPTH (FEET)	WELL DETAILS	LITHOLOGIC LOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB		N				10.0 to 34.0 feet: CLAY (CH), yellow stiff silty to plastic with rare gravel			
						Acid tested with 10% hydrochloric acid at least every foot			
			25						
CB	9.0/T	N							
			30						
						33.0 to 33.5 feet: DOLOMITE, weathered, pebbles			
						@ 33.0 to 34.0 feet: ground rock due to drilling	1	4	95
		E				@ approximately 34.0 feet: top of rock			
CB	2.0/3	W				34.0 to 38.0 feet: DOLOMITE, fine to medium grained, gray, occasional thin (1") black chert layers			
			35			@ 34.5 and 36.4 feet, approximate: CHERT, black			
CB	0.0/10					@ 38.0 to 44.0 feet: VOID, no recovery			
			40						

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

ANCHOR QEA

Boring Log revised with new survey data dated 6/10/2020.

LOG OF EXPLORATORY BORING

PROJECT NAME	Plant Bowen Hydrogeological Investigation	BORING NUMBER	BGWC-39
LOCATION	Euharlee, Georgia	PAGE	3 of 3
DRILLED BY	Cascade Drilling, Inc.	GROUND SURFACE ELEVATION	699.39 ft NAVD88
DRILL METHOD	Rotosonic - PS-150	TOTAL DEPTH	58 feet
LOGGED BY	Jim Redwine	DATE COMPLETED	1/4/17
SAMPLING METHOD	4-in. ID by 10-ft. core barrel (CB)	BOREHOLE DIAMETER	8-inches
COORDINATES	(NAD83) WZ Northing: 1499815.93; Easting: 2066395.86		

SAMPLING METHOD	RECOVERY (FEET)	ACID TEST RESULT	DEPTH (FEET)	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION	GRA %	SAND %	FINES %
CB			45			@ 36.0 to 44.0 feet: VOID, no recovery 44.0 to 58.0 feet: DOLOMITE, fine to medium grained, gray @ 46.0 to 47.0 feet: VOID, no recovery @ 47.0 to 58.0 feet: some voids likely, but not easily noticeable by driller; partial recovery			
CB	4.0/11	W/E	50			Acid tested with 10% hydrochloric acid at least every foot			
			55						
			60			Total depth: 58.0 feet			

REMARKS: Acid test: E = Effervesces readily; N = No effervescence; S = Effervesces when the surface is scratched; W = Weakly effervescent.

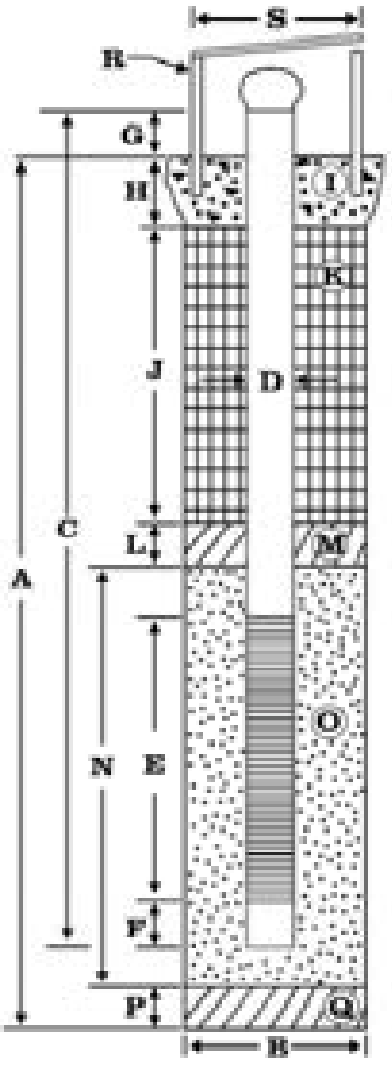
ANCHOR QEA

Well construction Log revised with new survey data dated 6/10/2020.

ANCHOR QEA

WELL DETAILS

Project Number:	151114-03	Boring/Well No.:	BGWC-30
Client Name:	Southern Company	Top of Casing Elev.:	701.06 ft
Project Name:	Plant Bowen Hydrogeologic Investigation	Ground Surface Elev.:	698.50 ft. NAVD88
		Installation Date:	01/04/17 - 01/09/17
Location:	Cartersville, Georgia	Driller:	Cascade Drilling



	Depth (feet)	Elevation (feet, NAVD88)
S	+2.68	701.18
R	+2.48	701.06
G	0.0	698.58
H	2.0	696.58
K		
J	29.0	669.58
D		
C	41.0	657.58
L	45.0	653.58
M	47.0	651.58
A		
N		
E		
O		
F	57.0	641.58
	57.3	641.28
P	58.0	640.58
Q	58.0	640.58
B		

EXPLORATORY BORING

A. Total depth:	58.0 ft.
B. Diameter:	6 in.
Drilling method:	Rotosonic PS-150

WELL CONSTRUCTION

C. Well casing length:	59.8 ft.
Well casing material:	Schedule 40 PVC
D. Well casing diameter:	2 in.
E. Well screen length:	10 ft.
Well screen type:	Pre-pack
Well screen slot size:	0.010 in.
F. Well sump/end cap length	0.3 ft.
G. Well casing height (stickup):	2.5 ft.
H. Surface seal thickness:	2.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	39.0 ft.
K. Annular seal material:	Bentonite grout (2.0-29.0 ft.)
	3/8" Bentonite chips (29.0-41.0 ft.)
L. Filter pack seal thickness:	4.0 ft.
M. Filter pack seal material:	Bentonite pellets
N. Sand pack thickness:	13.0 ft.
O. Sand pack material:	#1 SS
P. Bottom material thickness:	N/A
Q. Bottom material:	N/A
R. Protective casing material:	Aluminum
S. Protective casing diameter:	Square – 4 in.
Well centralizer depths:	N/A

NOTES:

SS = Silica Sand.
OD = Outside diameter. PVC = Polyvinyl chloride.
Bentonite pellets allowed to hydrate at least 1 hour.
Bentonite chips allowed to hydrate at least 4 hours.
NAVD88 = North American Vertical Datum of 1988.

Geosyntec consultants
Geosyntec Consultants
1255 Roberts Boulevard
Kennesaw, GA 30144

BGWC-51

CLIENT	Southern Company Services	**PROJECT NAME**	Plant Bowen Well Installation
PROJECT NUMBER	GW6581C	**PROJECT LOCATION**	Euharlee, GA
DATE STARTED	1/22/21 **COMPLETED** 1/22/21	**NORTHING**	1500270.09 ft **EASTING** 2065455.80 ft
DRILLER	Cascade Drilling	**GROUND ELEVATION**	706.99 ft **BORING DIAMETER** 6 in
DRILLING METHOD	Sonic	**TOP OF CASING ELEVATION**	711.49 ft
SAMPLING METHOD	4 in core 6 in override	**GEOPHYSICAL CONTRACTOR**	—
RIG TYPE	Terrasonic 11-38/12	**LOGGED BY** T. Kessler	**CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0				Air Knife Excavation (0 to 10 ft) NO SAMPLE	
	705				
5					
	700				Bentonite grout
10				699.0 SILTY CLAY, Red with yellow and black mottling throughout, stiff, medium plasticity, trace sand, highly weathered rock fragments, moist. 697.0	
	695			SAPROLITE, Pink, low plasticity clay, trace silts and sands, iron staining, remnant rock structures, moist.	
15					Schedule 40 2" PVC
	690				
20		20 ft: Increased drill chatter.		20 ft: Dark reddish brown.	
	685				
25				683.0 SANDY CLAY, Yellow, stiff, low plasticity, trace chert gravel, moist.	
	680				
30		30 to 40 ft: Intermittant increase of drill chatter.		30 ft: Strong brown with black mottling, trace silt and sand.	
	675				

(Continued Next Page)

Geosyntec Consultants
1255 Roberts Boulevard
Kennesaw, GA 30144

BGWC-51

CLIENT Southern Company Services
PROJECT NAME Plant Bowen Well Installation
PROJECT NUMBER GW6581C
PROJECT LOCATION Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	MATERIAL DESCRIPTION
35			SANDY CLAY, Yellow, stiff, low plasticity, trace chert gravel, moist. (continued)
			37 ft: Yellow.
40	670		40 ft: Reddish yellow.
45	665		
	661.0		
50	660		DOLOMITE/DOLOMITIC LIMESTONE, White, pink, gray, thinly laminated, iron staining, fractures present.
55	655	55 ft: Highly weathered. 57 to 60 ft: Void space encountered. Rods dropping without resistance.	
	652.0		NO RECOVERY (VOID 57-60 ft)
60	650	60 to 70 ft: Very soft drilling, no drill chatter.	NO RECOVERY (60 - 70 ft)
65	645		
70	640 / 639.0		

CONSTRUCTION DIAGRAM

Top of screen elevation: 654.57 ft

Bottom of screen elevation: 644.57 ft

Bottom of well elevation: 644.24 ft

Bottom of borehole at 70.0 feet.

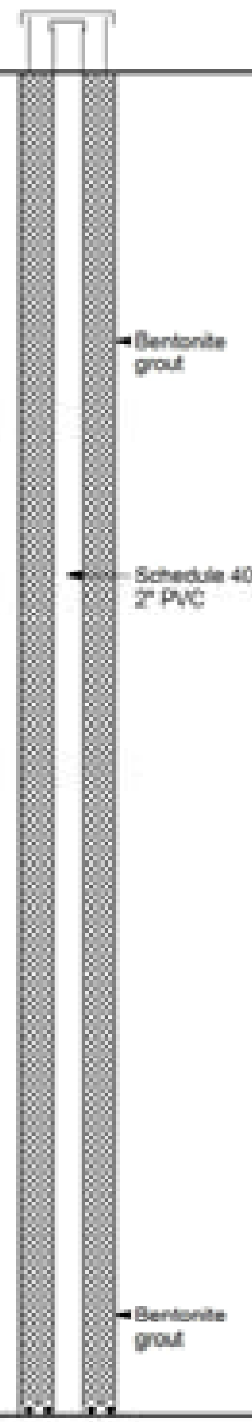
Geosyntec Consultants
1255 Roberts Boulevard
Kennesaw, GA 30144

BGWC-52

CLIENT Southern Company Services	**PROJECT NAME** Plant Bowen Well Installation
PROJECT NUMBER GW6581C	**PROJECT LOCATION** Euharlee, GA
DATE STARTED 1/19/21 **COMPLETED** 1/21/21	**NORTHING** 1500156.97 ft **EASTING** 2065764.13 ft
DRILLER Cascade Drilling	**GROUND ELEVATION** 707.77 ft **BORING DIAMETER** 6 in
DRILLING METHOD Sonic	**TOP OF CASING ELEVATION** 710.75 ft
SAMPLING METHOD 4 in core 6 in override	**GEOPHYSICAL CONTRACTOR** —
RIG TYPE Terrasonic 11-38212	**LOGGED BY** T. Kessler **CHECKED BY** J. Ivanowski

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION
0				Air Knife Excavation (0-10 ft) NO SAMPLE
	705			
5				
	700			
10				697 ft SILTY CLAY, Reddish yellow with white and yellow mottling, stiff, medium plasticity, trace fine sand, moist.
	695			
15				
	690			18 ft: Soft.
20				20 ft: Black mottling throughout, trace gravel.
	685			
25				
	680			
30				
	675			
35				
	670			667 ft

CONSTRUCTION DIAGRAM



(Continued Next Page)

Geosyntec consultants

Geosyntec Consultants
1255 Roberts Boulevard
Kennesaw, GA 30144

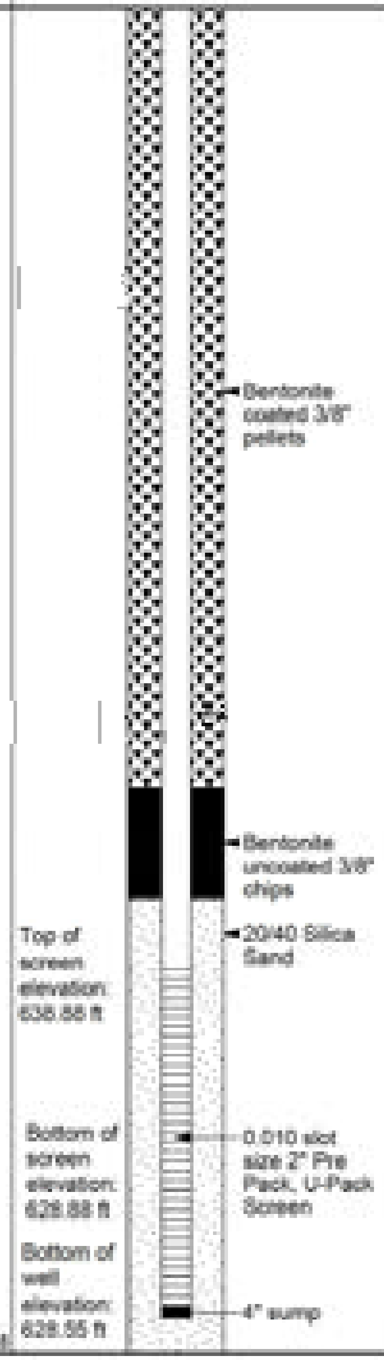
BGWC-52

CLIENT Southern Company Services **PROJECT NAME** Plant Bowen Well Installation

PROJECT NUMBER GW6581C **PROJECT LOCATION** Euharlee, GA

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION
40		40 to 43 ft: No recovery. 43 ft: Increased drill chatter. Slow drilling with minimal water return.		LIMESTONE, Gray, fine grained, thinly bedded, occasional white chert veins, iron staining near the top.
	665			
45				
	660			
50				50 ft: Black chert veins throughout, iron staining on fractured surfaces.
	655	54 ft: Increased drill chatter.		
55				
	650			
60				
	645	64 ft: Return water changed from clear to white.		
65				
	640			
70				70 ft: Trace iron staining.
	635			
75		76 to 80 ft: Slow drilling with no return of water.		
	630			From 78 ft: With abundance of chert, white, iron staining throughout.
80				627.6

CONSTRUCTION DIAGRAM



Bottom of borehole at 80.0 feet.

Well ID	Casing Northing	Casing Easting	Top of Casing Elevation	Nail or Pad Northing	Nail or Pad Easting	Nail or Pad Elevation	Description
APPZ-1R	1502759.7800	2068712.0150	723.72	1502759.7100	2068712.2580	721.30	Pad
APPZ-2R	1505247.0710	2066003.5910	716.76	No Nail or Pad	No Nail or Pad	No Nail or Pad	
APPZ-3R	1505850.7590	2065391.0620	723.25	No Nail or Pad	No Nail or Pad	No Nail or Pad	
APPZ-4R	1504159.2210	2066562.0150	756.27	No Nail or Pad	No Nail or Pad	No Nail or Pad	
APPZ-5R	1504384.2060	2065318.1520	781.01	No Nail or Pad	No Nail or Pad	No Nail or Pad	
BGWA-1	1499101.2330	2067205.4840	720.90	1499099.7450	2067205.5570	718.33	Nail
BGWA-2	1499374.1780	2068599.5890	729.65	1499375.5380	2068599.2110	727.00	Nail
BGWA-3	1499420.8650	2065185.7410	724.28	1499459.7940	2065186.4400	721.80	Nail
BGWA-4	1499485.3840	2064697.8860	728.67	1499484.6470	2064697.8230	726.05	Nail
BGWA-5	1499434.5770	2065421.4290	720.92	1499435.8630	2065420.9790	718.51	Nail
BGWA-6	1499362.0060	2065797.2960	716.93	1499360.7270	2065797.4950	714.49	Nail
BGWA-26	1498097.6320	2064189.9360	728.65	1498096.3750	2064190.2360	726.09	Nail
BGWA-27	1498719.1370	2064087.5440	745.26	1498717.9660	2064087.3850	742.50	Nail
BGWA-28	1498749.2120	2064577.5480	737.45	1498748.0330	2064577.8260	734.88	Nail
BGWA-29	1498281.0400	2066362.3220	721.38	1498281.3350	2066363.4710	718.84	Nail
BGWA-31	1497972.1280	2064876.8020	743.25	1497973.2410	2064876.5710	740.39	Nail
BGWA-47D	1499177.7920	2068612.4750	729.61	1499179.0260	2068612.1590	726.91	Nail
BGWA-48D	1499180.0620	2068623.3120	729.38	1499181.3800	2068622.8110	726.64	Nail
BGWC-7	1504711.5850	2066801.4010	705.38	1504712.6730	2066801.6580	702.49	Nail
BGWC-8	1506671.8190	2066529.4570	706.43	1506671.9810	2066528.1400	703.71	Nail
BGWC-9	1504909.1160	2066143.2740	691.93	1504910.3720	2066143.9980	689.18	Nail
BGWC-10	1505033.2210	2066081.0870	686.06	1505032.4430	2066080.0010	683.39	Nail
BGWC-11	1504998.5580	2066093.8130	686.50	1504998.1840	2066092.6800	683.91	Nail
BGWC-12	1505279.8790	2065908.5600	694.41	1505280.6600	2065909.6120	691.71	Nail
BGWC-13	1505435.2910	2065251.2120	717.43	1505436.6470	2065250.9020	714.77	Nail
BGWC-14A	1505398.5370	2065015.9770	718.33	1505397.3710	2065016.4760	715.57	Nail
BGWC-15	1505278.1860	2064732.1750	717.92	1505279.3650	2064731.5540	715.39	Nail
BGWC-16	1504656.4230	2064247.6720	674.31	1504656.5440	2064248.9800	671.65	Nail
BGWC-17	1504432.0000	2064259.3780	673.65	1504432.1320	2064260.9170	671.25	Nail
BGWC-18	1504118.7310	2064257.0010	672.88	1504118.8950	2064258.2380	670.32	Nail
BGWC-19	1503742.2490	2064244.6620	673.61	1503742.2750	2064246.0870	671.04	Nail
BGWC-20	1503367.7320	2064259.5540	675.14	1503367.8070	2064260.9880	672.29	Nail
BGWC-21	1501627.5070	2064348.0850	691.33	1501627.5620	2064348.7420	688.51	Nail
BGWC-22	1501121.7580	2064358.0500	695.50	1501124.0060	2064358.8500	692.64	Nail
BGWC-23	1501000.5600	2064350.1650	695.50	1501000.7820	2064351.5070	693.16	Nail
BGWC-24	1500621.2160	2065032.8370	702.27	1500620.5540	2065032.5600	699.46	Nail
BGWC-25	1502292.7330	2064244.0960	680.47	1502292.7670	2064244.7480	677.60	Nail
BGWC-30	1499815.9250	2066395.8550	701.06	1499816.6150	2066394.2650	698.39	Nail
BGWC-31	1503497.9400	2064022.7100	670.54	1503498.6900	2064022.7850	668.12	Nail
BGWC-32	1501752.2530	2064184.5000	698.38	1501751.1230	2064184.4150	696.38	Nail
BGWC-34D	1503356.5090	2064257.9510	675.17	1503356.5380	2064259.1800	672.25	Nail
BGWC-35D	1501312.1980	2064358.6280	695.73	1501312.2690	2064359.9690	693.13	Nail
BGWC-36D	1499807.5120	2066411.1000	701.01	1499808.5120	2066415.4490	698.07	Nail
BGWC-37D	1501293.3360	2064362.7040	696.05	1501293.4130	2064364.0670	693.50	Nail
BGWC-38D	1499802.3640	2066430.1680	700.34	1499803.5490	2066430.5880	697.52	Nail
BGWC-39	1501241.9360	2064095.4090	679.12	1501240.8940	2064095.1310	676.58	Nail
BGWC-40	1500589.9290	2064317.3780	689.59	1500589.8560	2064315.9070	687.12	Nail
BGWC-41D	1501255.9840	2064096.2330	679.12	1501254.7560	2064095.8860	676.43	Nail
BGWC-42D	1501280.5170	2064365.2520	696.90	1501281.0250	2064366.5510	693.98	Nail
BGWC-43D	1499706.8540	2066444.3710	700.33	1499708.0660	2066444.7590	697.29	Nail

MW-44D	1499265.1400	2061815.0610	717.30	1499263.8630	2061812.3480	714.65	Nail
DW-1R	1502184.3010	2065959.4780	728.04	1502184.3690	2065959.2050	725.13	Pad
DW-2R	1502362.7930	2065954.5780	721.89	1502362.8750	2065954.3250	719.12	Pad
MW-4R	1502511.8620	2064690.5390	715.09	No Nail or Pad	No Nail or Pad	No Nail or Pad	
MW-10R	1500193.8750	2066947.2050	715.27	1500193.7950	2066947.1990	712.88	Pad
PZ-1	1505600.5170	2064844.1000	677.87	1505600.2290	2064840.9740	675.35	Nail
PZ-2	1503856.8610	2062938.8050	668.25	1503857.0020	2062937.9100	665.92	Nail
PZ-3	1505721.9720	2066071.0850	707.97	1505721.6360	2066070.7810	705.58	Nail
PZ-4	1505788.5820	2064316.4100	718.74	1505788.4030	2064315.0880	715.96	Nail
PZ-5	1499889.6270	2063961.2240	700.12	1499888.8430	2063961.7310	697.23	Nail
PZ-6	1500379.4810	2061042.8090	676.10	1500378.7200	2061041.9120	675.50	Nail

Benchmark	Northing	Easting	Elevation
BM-01	1504173.799	2067395.883	717.78

SURVEY DATA CERTIFICATION FOR SOUTHERN COMPANY TO DETERMINE NORTHING, EASTING, AND VERTICAL ELEVATION OF THE NAIL IN THE CONCRETE PAD & THE PVC WELL CASING. DATE OF FIELD SURVEY & INSPECTION: 05/26/2020-06/01/2020. FIELD SURVEY POSITIONAL TOLERANCE=0.3 FEET HORIZONTAL-NAD'83, 0.01 VERTICAL-NAVD '88. EQUIPMENT USED FOR HORIZONTAL LOCATION: TRIMBLE R10 RTK GPS & TRIMBLE S5 ROBOTIC TOTAL STATION. THE VERTICAL LOCATION OF EACH SURVEYED POINT WAS ESTABLISHED BASED UPON LEVEL RUNS WITH A DIGITAL LEVEL LOOP FROM VERTICAL CONTROL ESTABLISHED BY ON SITE BENCHMARK BM-01 SET BY GSI SOLUTIONS USING A TRIMBLE DINI LEVEL.

GEORGIA
No. LS-3119
LAND SURVEYOR
JEFFREY R. TOOLE

06/10/2020

Well ID	Casing Northing	Casing Easting	Top of Casing Elevation	Nail or Pad Northing	Nail or Pad Easting	Nail or Pad Elevation	Description
BGWC-S1	1500270.088	2065455.804	711.489	1500271.133	2065456.272	708.991	NAIL
BGWC-S2	1500156.965	2065764.132	710.748	1500158.037	2065764.506	707.772	NAIL
Benchmark	Northing	Easting	Elevation				
BM-B1	1504573.789	2067395.885	717.78				

SURVEY DATA CERTIFICATION FOR SOUTHERN COMPANY TO DETERMINE NORTHING, EASTING, AND VERTICAL ELEVATION OF THE NAIL IN THE CONCRETE PAD & THE PVC WELL CASING. DATE OF FIELD SURVEY & INSPECTION: 01/26/2021. FIELD SURVEY POSITIONAL TOLERANCE=0.5 FEET HORIZONTAL-NAD'83, 0.01 VERTICAL-NAVD '88. EQUIPMENT USED FOR HORIZONTAL LOCATION: TRIMBLE R10 RTK GPS & TRIMBLE S5 ROBOTIC TOTAL STATION. THE VERTICAL LOCATION OF EACH SURVEYED POINT WAS ESTABLISHED BASED UPON LEVEL RUNS WITH A DIGITAL LEVEL LOOP FROM VERTICAL CONTROL ESTABLISHED BY ON-SITE BENCHMARK BM-B1 SET BY GEL SOLUTIONS USING A TRIMBLE DINI LEVEL

1/28/2021

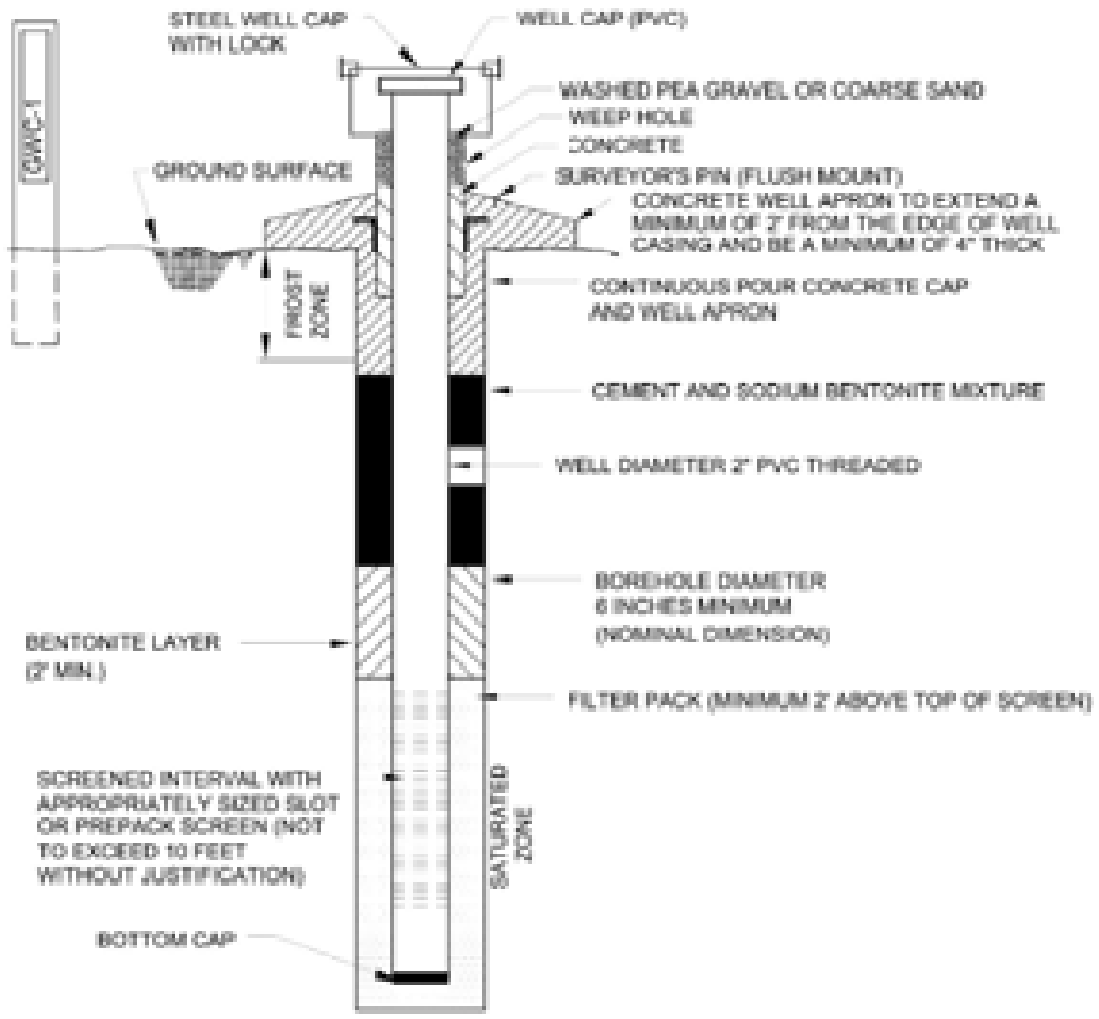
Well ID	Casing Northing	Casing Easting	Top of Casing Elevation	Nail or Pad Northing	Nail or Pad Easting	Nail or Pad Elevation	Description
BGWC-49D	1499790.128	2066461.957	699.75	1499791.623	2066462.261	696.95	NAIL
BGWC-50D	1499269.15	2065781.874	717.434	1499267.799	2065782.021	714.675	NAIL
Benchmark	Northing	Easting	Elevation				
BM-B1	1504573.789	2067395.885	717.78				

SURVEY DATA CERTIFICATION FOR SOUTHERN COMPANY TO DETERMINE NORTHING, EASTING, AND VERTICAL ELEVATION OF THE NAIL IN THE CONCRETE PAD & THE PVC WELL CASING. DATE OF FIELD SURVEY & INSPECTION: 03/23/2021. FIELD SURVEY POSITIONAL TOLERANCE=0.5 FEET HORIZONTAL-NAD'83, 0.01 VERTICAL-NAVD '88. EQUIPMENT USED FOR HORIZONTAL LOCATION: TRIMBLE R10 RTK GPS & TRIMBLE S5 ROBOTIC TOTAL STATION. THE VERTICAL LOCATION OF EACH SURVEYED POINT WAS ESTABLISHED BASED UPON LEVEL RUNS WITH A DIGITAL LEVEL LOOP FROM VERTICAL CONTROL ESTABLISHED BY ON-SITE BENCHMARK BM-B1 SET BY GEL SOLUTIONS USING A TRIMBLE DINI LEVEL

3/25/2021

COA - LS003119
Exp. 06/30/2022

B. GROUNDWATER MONITORING WELL DETAIL



GROUNDWATER MONITORING WELL (TYP.)

C. GROUNDWATER SAMPLING PROCEDURE

Groundwater sampling will be conducted using the most current applicable *EPA 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.

Georgia Power 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 Georgia Power 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. The water measuring device will consist of a probe and measuring tape capable of measuring water levels with accuracy to 0.1 feet.

3. Install Pump: If a dedicated pump is not present, slowly lower the pump into the well to the midpoint of the well screen or a depth otherwise approved by the hydrogeologist or project scientist. The pump intake must be kept at least two feet above the bottom of the well to prevent disturbance and suspension of any sediment present in the bottom of the well. Record the depth to which the pump is lowered. All non-dedicated pumps and wiring will be decontaminated before use and between well locations using procedures described in the latest version of the EPA Region 4 SESD guidance document, *Operating Procedure - Field Equipment Cleaning and Decontamination* (EPA, SESDGUID-205-R#) as a guide.

4. Measure Water Level: Immediately prior to purging, measure the water level again with the pump in the well. Leave the water level measuring device in the well.

5. Purge Well: Begin pumping the well at approximately 100 to 500 milliliters per minute (mL/min). Monitor the water level continually. Maintain a steady flow rate that results in a stabilized water level with 0.3 feet or less of variability. Avoid entraining air in the tubing. Record each adjustment made to the pumping rate and the water level measured immediately after each adjustment.

6. Monitor Indicator Parameters: Monitor and record the field indicator parameters [turbidity, temperature, specific conductance, pH, oxidation-reduction potential (ORP), and dissolved oxygen (DO)] approximately every three to five minutes. The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings at a minimum:

   ±0.1 for pH

±5% for specific conductance (conductivity)

±10% 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 low-flow rate according to the most current version of EPA 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.