

November 19, 2021

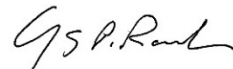
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**Subject: Interim Corrective Measure Work Plan - Deep Zone of Upper  
Surficial Aquifer – Aerobic Biobarrier  
Hercules/Pinova Facility, Brunswick, Georgia**

Dear Penny:

Enclosed for review and approval by the Georgia Department of Natural Resources, Environmental Protection Division (“EPD”) is a document titled *Interim Corrective Measure Work Plan - Deep Zone of Upper Surficial Aquifer – Aerobic Biobarrier, Hercules/Pinova Facility, Brunswick, Georgia* that Geosyntec Consultants has prepared on behalf of Hercules LLC in connection with activities at an industrial facility located at 2801 Cook Street in Brunswick, Georgia (the “Brunswick facility”). Please do not hesitate to contact the undersigned if you should have any questions regarding the enclosed document.

Sincerely,



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Senior Principal



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GR6881M



*Prepared for*

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**INTERIM CORRECTIVE MEASURE  
WORK PLAN  
DEEP ZONE OF UPPER SURFICIAL AQUIFER  
AEROBIC BIOBARRIER  
HERCULES/PINOVA BRUNSWICK FACILITY  
BRUNSWICK, GEORGIA**

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Project Number GR6881M

November 2021

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## 1.0 INTRODUCTION

This Interim Corrective Measure Work Plan (the “Work Plan”) has been prepared by Geosyntec Consultants (“Geosyntec”) on behalf of Hercules LLC (“Hercules”) for submission to the Georgia Department of Natural Resources, Environmental Protection Division (“EPD”) in connection with environmental conditions at an industrial facility located at 2801 Cook Street in Brunswick, Glynn County, Georgia (referred to hereinafter as the “Brunswick facility” or the “Site”) as shown on **Figure 1**. Hercules is addressing environmental conditions at the Brunswick facility pursuant to the corrective action program under the Resource Conservation and Recovery Act (“RCRA”) as administered by EPD. On November 2, 2020, EPD issued Hazardous Waste Permit No. HW-052 (D&S)-2 to Hercules and Pinova, Inc. (“Pinova”) for the Brunswick facility pursuant to the Georgia Hazardous Waste Management Act and the Georgia Rules for Hazardous Waste Management containing requirements relating to, among other things, sitewide corrective action obligations at the Brunswick facility pursuant to the RCRA corrective action program. The purpose of the interim corrective measure (the “ICM”) described in the Work Plan is to reduce the concentrations of selected constituents of potential concern (“COPCs”) in groundwater in the deep zone of the upper surficial aquifer underlying the northern portion of the Brunswick facility situated on the east side of the U.S. Highway 17 corridor as shown on **Figure 2**. This Work Plan has been prepared consistent with the requirements of Hazardous Waste Permit No. HW-052 (D&S)-2.

The ICM presented herein will utilize *in situ* aerobic bioremediation in the form of a biologically active permeable reactive barrier (referred to as an “aerobic biobarrier” in this Work Plan) to achieve reductions in the concentrations and mass flux of COPCs in groundwater in the deep zone of the upper surficial aquifer in the area downgradient of the aerobic biobarrier. The aerobic biobarrier described herein is one of multiple ICMs for groundwater being implemented at the Brunswick facility. As discussed in the Corrective Action Plan (“CAP”) submitted to EPD on February 1, 2021 (Geosyntec, 2021), the aerobic biobarrier described in this Work Plan may be extended to adjoining areas, as necessary, based on the performance of the ICM and ongoing site investigation activities. One or more aerobic biobarriers may also be deployed in other areas at the Brunswick facility, as necessary, based on the performance of the ICM and ongoing site investigation activities.

As discussed in more detail in later sections of this Work Plan, creation of the aerobic biobarrier involves injecting amendments (i.e., oxygen in the form of air) into the groundwater treatment zone through injection wells (referred as “biosparging wells” in

this Work Plan) to promote aerobic conditions (i.e., presence of oxygen) favorable for naturally occurring bacteria to consume or degrade COPCs in groundwater. This ICM will specifically target benzene and chlorobenzene through aerobic biodegradation because these two COPCs represent the majority of the volatile organic compounds (“VOCs”) that have been detected in groundwater in the area of the planned aerobic biobarrier. For instance, benzene and chlorobenzene comprised more than 80 percent (“%”) of the concentrations of VOCs detected in monitoring well MW-29D during the June 2021 semi-annual groundwater monitoring event. Although this ICM targets benzene and chlorobenzene specifically, other COPCs will be monitored in groundwater in the area of the aerobic biobarrier to evaluate the fate of those COPCs as presented in the performance monitoring plan in Section 6.3, below. Benzene and chlorobenzene may be referred to as target COPCs hereinafter.

## **1.1 Site History and Description**

As described in detail in the CAP that Hercules submitted to EPD (Geosyntec, 2021), the operational history of the Brunswick facility spans more than a century. Yaryan Rosin and Turpentine Company began operations at the Brunswick facility in 1911 on a 70-acre parcel to manufacture wood rosins, turpentine and pine oils from rosin extracted from pine stumps via a steam-solvent distillation process. Hercules purchased the Brunswick facility in 1920 and continued manufacturing operations at the Brunswick facility associated with the extraction of rosin and terpene oils from pine stumps. Over time, Hercules acquired additional parcels of land and significantly expanded the scope of the manufacturing operations at the Brunswick facility. After several recent transactions reduced the overall size of the Brunswick facility from its greatest extent, the Brunswick facility now encompasses approximately 321 acres of property, portions of which are owned by Hercules and portions of which are owned by Pinova. Hercules owns approximately 169 acres within the northern and eastern portions of the Brunswick facility while Pinova owns the remaining approximately 152 acres of the Brunswick facility, including all of the active manufacturing areas.

The portion of the Brunswick facility owned by Hercules includes approximately 44 acres of property east of U.S. Highway 17. This portion of the Brunswick facility is commonly referred to as the “Terry Creek Property.” Soils and sediments at the Terry Creek Property are being addressed separately under requirements administered by Region 4 of the United States Environmental Protection Agency (“EPA”) pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended. No solid waste management units or areas of concern have been identified on

the Terry Creek Property as part of actions to implement the RCRA corrective action program. Groundwater beneath the Terry Creek Property is being addressed as part of the overall corrective action process pursuant to Hazardous Waste Permit No. HW-052 (D&S)-2 for the Brunswick facility.

As shown on **Figure 1**, a salt marsh area and tidal surface water bodies, including Dupree Creek and Terry Creek, are located to the east of the Brunswick facility. The N Street Ditch present at the Brunswick facility conveys surface water run-off and non-contact cooling water to the east under U.S. Highway 17 where it discharges to the Outfall Ditch. The Outfall Ditch in turn discharges to Dupree Creek. Both the N Street Ditch and the Outfall Ditch are subject to tidal fluctuations and inundation.

The ICM described in this Work Plan is expected to take place in the eastern portion of the Brunswick facility on the Terry Creek Property that Hercules owns between the northern edge of the Brunswick facility and the Outfall Ditch.

## **1.2 Overview of Geology and Hydrogeology**

While the ICM described in this Work Plan is expected to be performed in the deep zone of the upper surficial aquifer, a broader description of the water-bearing zones and the characteristics of the hydrogeologic units beneath the Brunswick facility to a depth of approximately 200 feet below ground surface (“ft bgs”) is provided below for reference. The geologic and hydrogeologic units that underlie the Brunswick facility to that depth include: the upper surficial aquifer (extending to approximately 100 ft bgs), a semi-confining unit separating the upper surficial aquifer from the lower surficial aquifer, and the lower surficial aquifer (extending to approximately 200 ft bgs). The upper surficial aquifer is divided into three zones: shallow (~ 0–40 ft bgs), intermediate (~ 40–70 ft bgs), and deep (~70–100 ft bgs). Geologic cross-sections showing subsurface conditions in the upper surficial aquifer in the area of the planned aerobic biobarrier are presented on **Figure 3a** and **Figure 3b**.

The aquifer zones are generally based on differences in geologic materials and hydraulic conductivities, and the vertical distribution of VOCs in groundwater. The shallow zone of the upper surficial aquifer is generally composed of interbedded clays, silts, silty sands, clayey sands, and light brown/tan or gray fine to coarse sands. The vadose zone overlying the shallow zone of the upper surficial aquifer is generally very thin, with the seasonal high water table at a depth of only a few feet in many portions of the Brunswick facility. The intermediate zone of the upper surficial aquifer is primarily composed of gray fine to coarse sand, interbedded with varying amounts of clays, silts, silty sands, clayey sands,



and gravel; cemented sands are also sometimes encountered in the intermediate zone of the upper surficial aquifer. The deep zone of the upper surficial aquifer is composed of gray, fine to coarse sand, with relatively lesser amounts of clayey sands, silty sands, silts, and clays. Another characteristic of the deep zone of the upper surficial aquifer is the prevalence of coarse sand and sand with gravel intervals that may provide preferential groundwater flow pathways where they are linearly continuous. The upper portion of the lower surficial aquifer beneath the Brunswick facility is generally composed of olive green to gray fine sands, silty sands, clayey sands, and silts. The lower surficial aquifer is separated from the upper surficial aquifer by a semi-confining unit consisting primarily of silts and clays.

Within the upper surficial aquifer underlying the Brunswick facility, the prevailing direction of groundwater flow is toward the east-southeast, with local variations due to heterogeneities in the subsurface units and tidal influence. This sitewide groundwater flow direction is interpreted based on the potentiometric surface contour map presented as **Figure 4**. The sitewide groundwater flow velocity in the deep zone of the upper surficial aquifer is on the order of 55 feet per year (“ft/yr”). However, the hydraulic gradients are smaller on the east side of U.S. Highway 17 within the vicinity of the planned aerobic biobarrier, resulting in slower groundwater flow velocities in that area.

During the spring of 2021, Hercules installed a series of nineteen additional monitoring wells and observation wells to supplement the existing monitoring well network in the northeastern portion of the Brunswick facility, including the general area where the aerobic biobarrier is expected to be installed. These additional wells were used in connection with a detailed evaluation of the influence of tidal fluctuations on groundwater conditions in the area to the east of U.S. Highway 17 between the northern boundary of the Brunswick facility and the Outfall Ditch leading into Dupree Creek and in the area extending approximately 420 feet to the west of U.S. Highway 17 between the northern boundary of the Brunswick facility and the N Street Ditch. Certain of the additional wells were also used as part of a pilot test of aerobic bioremediation in the deep zone of the upper surficial aquifer in the general area where the aerobic biobarrier is expected to be installed. The results of the tidal evaluation are discussed in Section 2.2 of this Work Plan and are presented in detail in a report titled *Tidal Evaluation and Groundwater Chemistry Data Summary* (the “Tidal Evaluation Report”) included as **Appendix A** to this Work Plan. The Tidal Evaluation Report was also included as an appendix to a report titled *Groundwater Monitoring Report, Semi-Annual Groundwater Monitoring Event – June 2021, Hercules LLC/Pinova, Inc., Brunswick, Georgia* (the “Groundwater Monitoring Report”) that Hercules submitted to EPD on October 22, 2021. Along with

the results of the tidal evaluation, the results of the pilot test of aerobic bioremediation in the deep zone of the upper surficial aquifer are discussed in Section 2.2 of this Work Plan.

### **1.3 Constituents of Potential Concern**

Groundwater in the targeted portion of the deep zone of the upper surficial aquifer was selected for interim corrective measures based on the presence of elevated concentrations of COPCs, specifically benzene and chlorobenzene. As described in the conceptual site model (“CSM”) for the Brunswick facility presented in the CAP, COPCs in source areas in the main manufacturing portion of the Brunswick facility have migrated vertically downward from the shallow zone to the deep zone of the upper surficial aquifer. Once COPCs reach the deep zone of the upper surficial aquifer, they can migrate horizontally eastwards in the deep zone of the upper surficial aquifer in the downgradient direction. Naturally occurring processes affect the migration of COPCs along the flow path in the groundwater system including sorption, dispersion, dilution, and degradation. These natural attenuation processes reduce the concentrations and mass of COPCs present in groundwater and slow down the migration of COPCs relative to groundwater flow velocities.

In addition to on-site sources of COPCs, historical releases of VOCs have been documented at off-site locations on adjacent industrial properties east of U.S. Highway 17 currently owned by Ronald Adams, Walter Douglas Adams, and Anne Adams Rabbino individually and through their closely held corporations, Lanier Parkway Associates LLC and Adams Properties Associates LLC. These industrial properties are collectively referred to hereinafter as the “Adams properties”. The Adams properties are located immediately to the north of the general area where the aerobic biobarrier is expected to be installed. A gasoline station, automotive repair facility, septic pumping service facility, aboveground storage tank farm and paint manufacturing facility were historically present at various times at the Adams properties. Historical releases of VOCs that occurred on the Adams properties include documented releases of benzene, toluene, ethylbenzene, and xylenes (collectively “BTEX”). A separate report titled *Historical Activities and Releases on Neighboring Properties* is included as **Appendix B** of this Work Plan which presents in detail documentation regarding historical activities and known chemical releases at the Adams properties.

## **2.0 BASIS OF THE INTERIM CORRECTIVE MEASURES WORK PLAN**

This section of the Work Plan discusses the objectives of the planned corrective measure, provides a summary of previous studies that were used as a basis for selecting the planned corrective measure, and provides an overview of the selected corrective measure.

### **2.1 Objectives of Corrective Measure**

The interim corrective measure for groundwater in the deep zone of the upper surficial aquifer underlying the northeastern portion of the Brunswick facility near the U.S. Highway 17 corridor is intended to serve two purposes:

- To reduce the concentrations of benzene and chlorobenzene within the target treatment area, which will also reduce the mass flux of these COPCs migrating in the downgradient direction in the deep zone of the upper surficial aquifer.
- To provide information regarding best practices for removal of benzene and chlorobenzene in groundwater in the deep zone of the upper surficial aquifer which may then be expanded to address those target COPCs in groundwater in other locations within the Brunswick facility, as necessary.

The initial objective of the interim corrective measure is to reduce the concentrations of benzene and chlorobenzene in groundwater in the treatment area by 50 %. This objective may be modified, subject to review and approval by EPD, based on updates and refinements to the CSM and fate and transport evaluations. The planned aerobic biobarrier is also expected to reduce the mass flux and concentrations of other COPCs in groundwater susceptible to aerobic biodegradation.

### **2.2 Basis for Selection of Remedial Technology**

As discussed in the CAP (Geosyntec, 2021), a combination of desktop and laboratory evaluations were performed that led to the selection of enhanced *in situ* bioremediation in the form of an aerobic biobarrier as the remedial technology to be used for groundwater in the deep zone of the upper surficial aquifer near the northern edge of the Brunswick facility east of U.S. Highway 17. A broad range of potential remedial technologies were considered including, among others, groundwater extraction and treatment (i.e., pump and treat), phytoremediation, *in situ* chemical oxidation, and enhanced *in situ* bioremediation (both by aerobic and anaerobic means). The potential technologies were compared based on their implementability, effectiveness, and relative cost. As a result of

the screening process, bench scale treatability studies were performed to further evaluate potential *in situ* bioremediation technologies.

Bench scale treatability studies were performed to evaluate degradation of chlorobenzene and benzene via aerobic and anaerobic degradation pathways. The bench scale treatability studies are described in detail in a report prepared by SiREM Laboratory that is included in **Appendix C**. The biotreatability studies involved the preparation of microcosms using groundwater and soils collected from the proposed treatment area in the deep zone of upper surficial aquifer to evaluate aerobic and anaerobic degradation pathways. The biotreatability studies demonstrated that aerobic bioremediation is effective at the bench scale level in degrading both chlorobenzene and benzene. In the aerobic treatment microcosms, benzene was degraded from a concentration of 3,100 micrograms per liter (“µg/L”) to levels below the reporting limit of 20 µg/L within 80 days after treatment began, and chlorobenzene was degraded from a concentration of 820 µg/L to 81 µg/L within the same time period. Therefore, enhanced *in situ* bioremediation via the aerobic degradation pathway was selected to address benzene and chlorobenzene in groundwater in the deep zone of the upper surficial aquifer underlying the area along the northern edge of the Brunswick facility to the east of U.S. Highway 17.

To evaluate the ability to stimulate aerobic degradation of target COPCs in the deep zone of the upper surficial aquifer in the area where the aerobic biobarrier is expected to be installed, Geosyntec completed a biosparging pilot test on behalf of Hercules. In support of the biosparging pilot test, seven wells were installed in the portion of the Brunswick facility east of U.S. Highway 17 between February 22, 2021 and March 25, 2021. Three wells (designated as wells BS-01, BS-02, and BS-03) were installed in the deep zone of the upper surficial aquifer to serve as injection wells (i.e., biosparging wells) for the introduction of oxygen into the subsurface water-bearing zone. Biosparging well BS-01 and BS-02 were installed with screened intervals from 92 to 94 ft bgs. Biosparging well BS-03 was installed with a screened interval from 98.3 to 99 ft bgs. Four wells (designated as wells BS-OW-01, BS-OW-02, BS-OW-03I, and BS-OW-03D) were installed as observation wells for use during the pilot test. These wells are generally referred to as pilot test observation wells. Observation well BS-OW-03I was installed in the intermediate zone of the upper surficial aquifer with a screened interval from approximately 50 to 60 ft bgs. Observation wells BS-OW-01, BS-OW-02, and BS-OW-03D were installed in the deep zone of the upper surficial aquifer with screened intervals from approximately 80 to 90 ft bgs (i.e., similar to monitoring well MW-29D).

The biosparging pilot test was performed in two phases. The first phase of the pilot test was performed using biosparging wells BS-01 and BS-02 between March 15 and March 19, 2021. The second phase of the pilot test was performed using the deeper biosparging well (BS-03) between March 30 and April 2, 2021. The biosparging pilot test generated important data and information to assess design parameters for the aerobic biobarrier to deliver oxygen to the deep zone of the upper surficial aquifer to promote aerobic degradation of benzene and chlorobenzene in groundwater, including air sparging rates, air sparging pressures, and the radius of influence (“ROI”) achieved around biosparging wells. The details of the biosparging pilot test are included in **Appendix D**.

Based on the results obtained from the biosparging pilot test, the typical well head sparging pressure was between 38 and 42 pound per square inch (“psi”) at a sparging depth of 99 ft bgs. At this pressure, a sparging rate ranging between 1.5 standard cubic feet per minute (“scfm”) and 3 scfm was achievable. The estimated ROI achieved during the pilot test was approximately 7.5 feet. The dissolved oxygen content in the deep zone of the upper surficial aquifer increased during the pilot test from 0.03 milligrams per liter (“mg/L”) to up to 26.08 mg/L, which is slightly below the theoretical oxygen solubility concentration at the measured depth. The dissolved oxygen consumption rate was approximately 6 mg/L per day meaning that the injected oxygen (via the biosparging process) may stay in the subsurface for up to four days before being utilized by indigenous bacteria.

In addition to the biosparging pilot test, Hercules completed a tidal evaluation in the general area where the aerobic biobarrier is expected to be installed. In preparation for the tidal evaluation, Hercules installed four new monitoring wells and eleven new observation wells at the Brunswick facility between March 8, 2021 and March 26, 2021. The tidal evaluation was performed between April 14, 2021 and May 17, 2021. The duration of the tidal study was set to monitor one full tidal cycle, including a spring tide event. The tidal evaluation was designed to assess the impact that diurnal tidal cycles have on groundwater conditions near the northern edge of the Brunswick facility, including horizontal and vertical groundwater gradients and flow directions.

Consistent with the objectives of the tidal evaluation, a range of hydraulic and tidal conditions were encountered during the tidal evaluation that included initial conditions (baseline conditions) and conditions associated with a two-inch rainfall event that coincided with a spring tide (full moon). Generally, the results of the tidal evaluation indicate that during the period of evaluation, groundwater flow beneath the eastern portion of the Brunswick facility north of the N Street Ditch and the Outfall Ditch in the

shallow zone of the upper surficial aquifer was consistently to the south from off-site areas north of the Brunswick facility under both high and low tide conditions. Horizontal groundwater flow directions in the intermediate zone of the upper surficial aquifer were observed to vary based on the tidal cycle. The results of the tidal evaluation underscore the significant tidal effect on groundwater flow in the intermediate zone of the upper surficial aquifer, particularly in proximity to Dupree Creek but extending further to the west in the area between the N Street Ditch and the northern boundary of the Brunswick facility. Tidal influence is sufficient to reverse the generally prevailing hydraulic gradient and cause groundwater flow directions to oscillate from west to east and from east to west in the intermediate zone of the upper surficial aquifer. Horizontal groundwater flow directions in the deep zone of the upper surficial aquifer in the general area of the proposed aerobic biobarrier also vary with tidal cycles but generally are toward the east/southeast under various hydraulic and tidal conditions. Potentiometric surface maps showing groundwater flow directions in the deep zone of the upper surficial aquifer at one-hour increments through the baseline tidal cycle are provided in the Tidal Evaluation Report included in **Appendix A**. The potentiometric surface maps for the high tide and low tide conditions as presented in **Appendix A** are included on **Figure 5** for baseline conditions.

Based on the results of the tidal evaluation, horizontal groundwater gradients and flow velocities in the deep zone of the upper surficial aquifer east of U.S. Highway 17 were observed to increase at low tide relative to high tide. Hydraulic gradients were steepest following the significant rainfall event that occurred during the tidal evaluation at both high tide and low tide. As presented in the Tidal Evaluation Report, average horizontal hydraulic gradients in the deep zone of the upper surficial aquifer in proximity to the area where the aerobic biobarrier is expected to be installed ranged from 0.00095 to 0.0013 feet per foot (“ft/ft”) at low tide and 0.00046 to 0.00089 ft/ft at high tide.

### **2.3 Planned Interim Corrective Measure**

Based on the results of the treatability studies, the biosparging pilot test, and the tidal evaluation discussed above, Hercules plans to install an aerobic biobarrier to promote the aerobic biodegradation of benzene and chlorobenzene (together with other COPCs susceptible to aerobic degradation) in the deep zone of the upper surficial aquifer underlying the portion of the Brunswick facility to the north of the Outfall Ditch and east of U.S. Highway 17.

The planned aerobic biobarrier includes injection of oxygen in the form of air into the deep zone of the upper surficial aquifer through a series of injection wells (i.e., biosparging wells). The biosparging wells will be installed in a row aligned generally perpendicular to the groundwater flow direction in the deep zone of the upper surficial aquifer creating a reactive biobarrier. The injected air (oxygen) will promote indigenous microorganisms to biodegrade benzene and chlorobenzene in groundwater together with other COPCs susceptible to aerobic degradation. This process is referred to as biosparging. The biosparging process is similar to air sparging. However, while air sparging removes the target constituents via volatilization at high sparging (air flow) rates, biosparging promotes biodegradation of the target compounds by increasing the levels of dissolved oxygen in groundwater at lower sparging rates. Because biosparging does not volatilize the target compounds, it does not require a soil vapor extraction system to collect vapors.

The exact location and geometry of the planned aerobic biobarrier may be subject to further refinement based on the results from additional assessment activities that are expected to take place over the next several months to further evaluate the impacts that historical operations and releases at the neighboring Adams properties may be having on groundwater quality in the general area where the aerobic biobarrier is planned to be installed.

### **3.0 PRE-IMPLEMENTATION ACTIVITIES AND SITE PREPARATION**

Several planning and preparatory steps will be performed prior to field mobilization to construct the aerobic biobarrier including health and safety planning, permitting and utility clearance, contractor procurement, and electric power hookup. These steps are discussed in this section of the Work Plan.

#### **3.1 Health and Safety Planning**

The existing Health and Safety Plan (“HASP”) for environmental work at the Brunswick facility will be amended to include the tasks, hazards, and hazard mitigation procedures relating to construction, operation and monitoring of the aerobic biobarrier. The amendments to the HASP will address hazard identification and mitigation, establishment of work zones, personal protective equipment requirements for each task, ingress/egress procedures, decontamination procedures, worker breathing space monitoring, and lock out/tag out procedures for the electrical components of the aerobic biobarrier.

#### **3.2 Permitting and Utility Clearance**

Injection of air into the subsurface via a biosparging well in Georgia requires an underground injection control (“UIC”) permit from EPD. Geosyntec will prepare a permit application for submission to EPD to use Class V injection wells for delivery of air to the treatment zone in the deep zone of the upper surficial aquifer. Geosyntec will prepare the permit application form and checklist. The UIC permit application package will include this Work Plan and other pertinent details required by the UIC permit application.

Key above-ground components for the aerobic biobarrier (including an air compressor, piping manifolds, and instrumentation/meters/gauges) will be housed in an enclosed structure (e.g., a connex box, mobile trailer or equivalent) meeting applicable building codes and requirements imposed by the City of Brunswick and/or Glynn County for a temporary structure. Geosyntec will contact the City of Brunswick to discuss any applicable permits for the equipment enclosure, and will apply for such permits that may be needed.

A private utility locator will mark the locations of underground utilities prior to commencement of well installation and construction activities for the aerobic biobarrier. The locations of underground utilities will be used to help finalize locations for performance monitoring wells and biosparging wells and locations for utility trenches



associated with the aerobic biobarrier. The utility clearance process will include using both magnetometer assessments and ground-penetrating radar surveys to locate underground utilities. A preliminary utility survey was performed in February 2021 by Ground Penetrating Radar Systems, Inc. Based on this utility survey, the general area where the aerobic biobarrier is expected to be installed does not include any underground utilities.

### **3.3 Contractor Procurement and Bidding**

Geosyntec will develop procurement packages for use in communicating the scope of work to contractors and suppliers. It is anticipated that the following contractors will be needed: a drilling contractor for well installation activities, a subsurface utility locator, a general contractor for installation of equipment and utilities for the aerobic biobarrier and an equipment fabricator. The procurement packages will be distributed to a list of contractors. The contractor bids will be compared in terms of cost, schedule and overall value and these criteria (among others) will be used by Hercules to select the contractors that will be retained in connection with installation of the aerobic biobarrier.

### **3.4 Electric Power Hookup**

Currently, there is no electric power available in the portion of the Brunswick facility where the aerobic biobarrier is expected to be installed. Following the procurement of required permits from the City of Brunswick and other local government entities (as needed), Geosyntec will contact Georgia Power Company on behalf of Hercules to arrange for installation of an electrical power supply line and a utility power pole to provide electric service for use in operating the aerobic biobarrier. After electric power is available, a licensed electrician will connect the power line to the equipment for the aerobic biobarrier.

## 4.0 AEROBIC BIOBARRIER CONCEPTUAL DESIGN

This section of the Work Plan provides information regarding the design of the aerobic biobarrier, including general details for the biosparging wells, the system piping, and the air compressor system and controls. These components will facilitate the injection of air into the deep zone of the upper surficial aquifer to produce aerobic conditions and are collectively referred to hereinafter as the aerobic biobarrier system. The primary design goal is the implementation of a flexible and optimizable system to deliver air to the deep zone of the upper surficial aquifer to promote the aerobic degradation of benzene and chlorobenzene in groundwater. The operation of the aerobic biobarrier system (including hours of operation, flow rates, and operational cycles) will be adjusted routinely to achieve aerobic conditions in groundwater in proximity to the aerobic biobarrier and to improve the efficiency of the aerobic biobarrier system as much as practicable.

### 4.1 Aerobic Biobarrier Well Layout

Based on the current design for the aerobic biobarrier, a network of 12 biosparging wells will be utilized to create an aerobic biobarrier that is approximately 150 long. The network of biosparging wells is expected to consist of two existing biosparging wells from the biosparging pilot test (i.e., biosparging wells BS-01 and BS-03), and ten newly installed biosparging wells (designated as biosparging wells BS-04 through BS-13). Existing biosparging well BS-02 is not expected to be used due to its close proximity to biosparging well BS-03. As shown on **Figure 6**, the new biosparging wells are expected to be installed in an offset line just to the west of existing biosparging wells BS-01 and BS-03. Those two existing biosparging wells will be used to augment the line of newly installed biosparging wells, as necessary. As noted in Section 2.3 of this Work Plan, the exact location and geometry of the planned aerobic biobarrier may be subject to further refinement based on the results from additional assessment activities that are expected to take place over the next several months to further evaluate the impacts that historical operations and releases at the neighboring Adams properties may be having on groundwater quality in the general area where the aerobic biobarrier is planned to be installed.

The layout of the biosparging wells is based on achieving an anticipated radius of influence of 7.5 feet at each well (i.e., the biosparging wells are expected to be located approximately 15 feet apart) as shown on **Figure 6**. Therefore, the target width of the aerobic biobarrier will be at least 15 feet. As presented in the Tidal Evaluation Report, horizontal hydraulic gradients in the deep zone of the upper surficial aquifer in proximity

to the area where the aerobic biobarrier is expected to be installed were observed to increase at low tide relative to high tide, with average groundwater gradient estimates ranging from 0.00095 to 0.0013 feet per foot (“ft/ft”) at low tide and 0.00046 to 0.00089 ft/ft at high tide. Based on the steepest horizontal hydraulic gradient that was observed, the retention time of impacted groundwater in the aerobic biobarrier would be approximately 0.45 years (160 days), which would be sufficient time for the degradation of target COPCs to take place according to the results of the treatability studies that were performed. Given the range of horizontal hydraulic gradients measured during low tides and high tides, the projected retention time described above is highly conservative.

## **4.2 Design for Biosparging Wells**

The ten new biosparging wells that are expected to be installed will be screened at the bottom of the deep zone of the upper surficial aquifer, immediately above the anticipated location of the low permeability semi-confining unit which separates the upper surficial aquifer from the lower surficial aquifer. The semi-confining unit is expected to be encountered at a depth of approximately 100 feet bgs. The interval in which biosparging will take place may be modified based on lithologic data collected during the installation of performance monitoring wells for the aerobic biobarrier as discussed in Section 5.1 of this Work Plan and the results of baseline sampling activities as discussed in Section 6.2 of this Work Plan.

The planned construction details for the new biosparging wells are provided on **Figure 7**. Each new biosparging well will be constructed with a 2-inch diameter Schedule 40 polyvinyl chloride (“PVC”) riser pipe and a 0.01-inch slotted well screen in borehole at least 6 inches in diameter. The well screen for each biosparging well is expected to be 2 feet long. A sand filter pack (consisting of No. 1 sand) will be installed around the well screen of each biosparging well. The sand filter pack will extend 6 to 12 inches above the top of the well screen. A bentonite seal that is 3 feet thick will be installed above the top of the sand filter pack. The bentonite seal will consist of bentonite clay (no additives) in a pressed pellet or chip form. After the bentonite pellets/chips have been allowed to hydrate in accordance with the manufacturer’s recommendations, the remaining annular space between the top of the bentonite seal and the ground surface will be grouted. Grout will consist of Type I Portland cement as described in ASTM C150 (Standard Specification for Portland Cement) issued by ASTM International and potable water.

As shown on **Figure 7**, the 2-inch diameter PVC riser pipe for each biosparging well will transition to a 2-inch diameter galvanized steel pipe at a depth of approximately 1 ft bgs.

The 2-inch diameter galvanized steel pipe will then transition to a 1-inch diameter galvanized steel pipe and extend approximately 2 feet above the ground surface. The above ground components of each biosparging well will be constructed with galvanized steel pipe (or equivalent) or pressure-rated flex hose that is suitable for compressed air situations. During the construction phase of the aerobic biobarrier, the biosparging wells may be completed in flush mount vaults instead of with above ground surface components so the surface expression of the aerobic biobarrier system components is limited to the area of the equipment enclosure. In such case, the 1-inch Schedule 80 PVC pipes running from the operating equipment for the aerobic biobarrier system as discussed in Section 4.5, below, will transition to 1-inch diameter galvanized steel pipes prior to entering the biosparging well vaults. The well head for each biosparging well will include a pressure gauge and/or a sampling port for purposes of connecting a manometer to the piping to measure the pressure at the well head. A check valve or a ball valve may be used at the well head to prevent water from entering the system piping for a biosparging well when the biosparging well is not actively being used for sparging.

#### **4.3 Sparge System/Equipment Enclosure**

The components of the aerobic biobarrier system involving operating equipment will be procured on a turnkey basis from an equipment fabricator. These components will be placed in an enclosed structure. The enclosed structure is expected to be located near the north end of the aerobic biobarrier as shown on **Figure 6**. The process and instrumentation diagram for a typical biosparging system is shown on **Figure 7**. The aerobic biobarrier system that is expected to be installed at the Brunswick facility includes the following components. The specifications for the components will be finalized during the construction design and contractor procurement process:

**An air compressor:** The aerobic biobarrier system will include an air compressor capable of providing a minimum 75 scfm of total air for the aerobic biobarrier system at 40 psi at the well head of a biosparging well. The air compressor will either be manufactured as a variable speed unit or have a variable frequency drive installed, so that alterations in the operating capacity of the air compressor can be made based upon the design requirements of the aerobic biobarrier system under operating conditions.

**Air compressor appurtenances:** Various appurtenances will be installed in line with the air compressor. These appurtenances are **expected** to include: (i) an air particulate filter; (ii) an air receiver tank; and (iii) condensate separators and

drains. The various pieces of equipment identified above will reduce the volume of condensate that may travel downstream from the air compressor to the individual biosparging wells. Condensate removed from the compressed air will be routed to a condensate management system (including a collection tank) located within the enclosed structure for the aerobic biobarrier system.

**Programmable logic control panel:** A programmable logic control (“PLC”) panel will be installed in the enclosed structure for the aerobic biobarrier system. The PLC panel will include alarms and controls including low pressure and high pressure alarms connected to sensors **downstream** of the air compressor to shut off the aerobic biobarrier system automatically during a system failure. The PLC panel will also include an air holding tank high level switch and a high level alarm to shut off the air compressor when the air holding tank is full. Throughout the aerobic biobarrier system, flow meters and gauges will measure temperature, air pressure, and air flow, and provide these operating parameters to the PLC panel to allow for adjustments to be made during operation of the aerobic biobarrier system.

#### **4.4 Piping Manifolds and Controls**

To help distribute compressed air from the air compressor in the equipment enclosure to the biosparging wells, three manifolds (designated as Manifold A, Manifold B, and Manifold C) at a minimum will be constructed within the equipment enclosure for the aerobic biobarrier system as shown on **Figure 8**. Each manifold will be capable of servicing five biosparging wells. The manifolds will be configured as follows:

- Manifold A – Manifold A will connect to biosparging wells BS-04 through BS-08;
- Manifold B – Manifold B will connect to biosparging wells BS-09 through BS-13; and
- Manifold C – Manifold C will connect to biosparging wells BS-01 and BS-03 and will have three spare legs for future expansion of the aerobic biobarrier as may be needed.

Each manifold will split the compressed air from the air compressor in the equipment enclosure into individual conveyance lines (one line per biosparging well). Each of the five individual legs on the manifold (one for each biosparging well served by the

manifold) will include one pressure gauge, one flow meter, one check valve, and one gate valve so that air flow to each individual biosparging well can be independently monitored and controlled. Also, the flow meter on each leg will be isolated by a three-way ball valve. The three-way ball valve will allow isolation of the in-line flow meter, so that air only passes through the in-line flow meter when necessary (e.g., when collecting a measurement), thus prolonging the life of the flow meter. Each manifold will include a solenoid valve to allow for cycled operation of the aerobic biobarrier system as discussed in Section 4.7 of this Work Plan.

#### **4.5 Piping and Pressure Testing**

Each manifold leg will be connected to a 1-inch diameter Schedule 80 PVC pipe which will run via a subsurface trench network (discussed in Section 4.6, below) from the manifold leg to the location of the associated biosparging well. The 1-inch diameter Schedule 80 PVC pipe will transition to a 1-inch diameter galvanized steel pipe at a depth of at least 1 ft bgs. The 1-inch diameter galvanized steel pipe will then run from below ground to above ground and attach to the well head assembly for the biosparging well as described in Section 4.2, above. High pressure rated flexible piping may be used in lieu of galvanized steel piping. The typical trench details and well head connections for the biosparging wells are shown on **Figure 7**.

During installation, each piping section will be labeled to identify the biosparging well to which it will connect. A total of 12 separate pipe runs will be placed in the primary trench leading from the equipment enclosure to the general area where the biosparging wells will be located. Once the piping is glued with low VOC PVC primer and cement, each run of underground piping will be pressure tested by pressurizing the piping in 10 psi increments to a final pressure of 60 psi. The final pressure of 60 psi will be maintained for an hour. During pressure testing, all joints and fittings will be tested using a soap solution that will bubble if a leak is present. Any identified air leaks will be repaired, and the piping section will be retested to confirm that the repairs were successful in stopping the leaks.

#### **4.6 Trenching Activities**

Piping runs from the manifolds to the biosparging wells will be placed below ground in a trench network. The typical trenching details for the piping runs are shown on **Figure 7**. The typical biosparging pipe trench will be excavated to a depth sufficient to ensure that a minimum of 24 inches of clearance exists between the top of the biosparging piping runs and the ground surface. A total of 12, 1-inch diameter Schedule 80 PVC lines will

be installed in the primary trench to deliver compressed air from the compressor housed in the equipment enclosure to each biosparging well. The trench network will also include laterals branching from the primary trench for piping runs leading to individual biosparging wells. The piping runs will be installed so that they do not touch each other. A buffer of sand that is at least one inch thick will be placed around each pipe. During backfilling of any trenches that are excavated for piping runs, metallic locating tape will be placed at a depth of approximately 1 ft bgs. If suitable, soils excavated from the trenches will be used as backfill material. Alternatively, clean fill material from an offsite borrow source will be used to backfill the trenches. Any excess soils generated from trenching activities will be properly managed.

#### **4.7 Cycled Operation**

As explained in Section 4.4 of this Work Plan, the aerobic biobarrier system will have the capability of cycled operation between individual manifolds so that groups of biosparging wells can operate independently of each other, or in combination. An example of such cycled operations is as follows:

- Hours 0 through 2: Manifold A on, Manifold B off.
- Hours 2 through 4: Manifold A off, Manifold B on.
- Hours 4 through 6: Manifold A on, Manifold B off.
- Hours 6 through 8: Manifold A off, Manifold B on.

In this example, the cycled operation process will repeat, with each manifold operating for up to eight hours per day.

The pulsed cycles and on/off duration for the biosparging wells will be optimized during operations based upon measurements of dissolved oxygen levels in the deep zone of the upper surficial aquifer and reductions in concentrations of benzene and chlorobenzene in groundwater. It is anticipated that once dissolved oxygen is effectively distributed in groundwater in the area of the aerobic biobarrier, the periods during which the manifolds are “off” may be extended and/or the cycle times between areas served by the manifolds may be modified to achieve corrective measure objectives. Similarly, as groundwater monitoring results indicate how particular portions of the aerobic biobarrier are performing, the specific distribution of air flow for each biosparging well and the operational time period for each section of the aerobic biobarrier (and for individual

biosparging wells within the section) will be optimized to achieve corrective measure objectives. Biosparging wells connected to Manifold C (i.e., biosparging wells BS-01 and BS-03) are expected to serve as spare biosparging wells and will be utilized only as necessary to supplement the delivery of air to the subsurface based on the operational performance of the other biosparging wells.

#### **4.8 Design for Performance Monitoring Wells**

Four performance monitoring wells (including existing wells MW-29D and BS-OW-03D and two new performance monitoring wells designated as wells BS-OW-04D and BS-OW-05D) will be used to monitor the effectiveness of the aerobic biobarrier system. The locations of the performance monitoring wells are shown on **Figure 9**. Performance monitoring wells BS-OW-04D, MW-29D and BS-OW-05D are located immediately downgradient of the aerobic biobarrier along a transect perpendicular to the groundwater flow direction. These performance monitoring wells will be used to evaluate reductions in concentrations of benzene and chlorobenzene in the deep zone of the upper surficial aquifer due to the aerobic biobarrier. Performance monitoring well BS-OW-03D is approximately 40 feet downgradient from the aerobic biobarrier. Therefore, groundwater conditions at this monitoring well may not be influenced significantly from the aerobic biobarrier during the first year of groundwater monitoring. This monitoring well will provide information concerning baseline concentrations of COPCs in groundwater downgradient of the aerobic biobarrier prior to operating the aerobic biobarrier system, and the baseline concentrations will be used to help evaluate the long-term effectiveness of the aerobic biobarrier system. The construction details of the performance monitoring wells are provided in **Table 1**.

New performance monitoring wells BS-OW-04D and BS-OW-05D will be constructed using 2-inch diameter Schedule 40 PVC riser pipes and well screens. The screened interval for each of the new performance monitoring wells is expected to be 10 feet long between 80 and 90 feet bgs. The anticipated screened interval for each of the new performance monitoring wells may be adjusted in the field based on results obtained from the evaluation of the soil cores that are expected to be collected at the locations of the new performance monitoring wells.



## **5.0 FIELD IMPLEMENTATION ACTIVITIES**

Field activities in connection with installing the aerobic biobarrier system include installing new biosparging and performance monitoring wells; completing pneumatic slug testing activities; and installing the equipment, piping, controls and enclosed structure for the aerobic biobarrier system. This section of the Work Plan explains the field implementation activities associated with the various components of the aerobic biobarrier system.

### **5.1 Installation of Biosparging and Performance Monitoring Wells**

The new biosparging wells and performance monitoring wells for the aerobic biobarrier system will be installed by a Georgia licensed driller. The new performance monitoring wells will be installed prior to installation of the new biosparging wells so that adjustments relating to the screened intervals of the new biosparging wells can be made as necessary based on the information obtained during installation of the new performance monitoring wells.

The borings for the new biosparging wells and performance monitoring wells will be advanced using sonic drilling techniques. Prior to installing each new well, soil cores will be collected to a depth of approximately 100 ft bgs at the location of each well by the drilling subcontractor. The soil cores will be logged by qualified field personnel to gather information about the subsurface lithology.

Each new biosparging well and performance monitoring well will be developed using a submersible pump, or equivalent, at least 24 hours after grouting to optimize the performance of the well (either as a biosparging well or a performance monitoring well) by cleaning out any fine particles potentially introduced into the well during the drilling process. The submersible pump will be lowered to the total depth of the well, and once at that depth, groundwater extraction will commence until the water is visibly free of particulate matter.

### **5.2 Pneumatic Slug Tests**

Following the installation and development of the performance monitoring wells, pneumatic slug tests will be performed at performance monitoring wells MW-29D, BS-OW-5D and BS-OW-6D to obtain estimated hydraulic conductivity (“K”) values for the surface strata. The slug tests will be performed using nitrogen gas to depress the water table inside each of the performance monitoring wells. Slug tests will be performed no

sooner than 24 hours after well development activities are completed. If practicable, the slug tests will not be performed until water levels have returned to at least 95% of its their original static levels in the performance monitoring wells.

Prior to attaching slug testing equipment at each performance monitoring well, the initial depth to water level and the depth of the well will be recorded. A transducer will be used to measure water pressures (i.e., water levels above the transducer). The transducer will be lowered to a depth of at least 10 feet below the top of the water column to maintain the transducer within the water column during water displacement. Nitrogen gas will then be introduced into the well at a pressure of approximately 4.5 psi to depress the water table within the well. The transducer will record real-time changes to the depth to groundwater during the entirety of the slug test. Upon reaching equilibrium, the applied pressure will be released, and water pressure data will be recorded using the transducer until the depth to water is within approximately 10 percent of the initial reading or for one hour, whichever comes first.

The data from the transducers will be uploaded to a computer and analyzed using an aquifer test analysis software (e.g., AQTESOLV<sup>®</sup> developed by Hydrosolve, Inc.) to estimate the hydraulic conductivity within the screened intervals of each of the performance monitoring wells. The estimated hydraulic conductivities will be used to help refine estimates of groundwater flow velocities and mass flux through the aerobic biobarrier to evaluate the performance of the aerobic biobarrier system during operation.

### **5.3 Installation of the Aerobic Biobarrier System**

In addition to installing biosparging and performance monitoring wells, installation of the aerobic biobarrier system will include the following activities:

- Installation of well head connections at each biosparging well;
- Fabrication of the equipment for the aerobic biobarrier system and the equipment enclosure to house that equipment;
- Preparation (e.g., leveling and grading activities) of the location where the equipment enclosure will be placed;
- Placement of the equipment enclosure;

- Installation of piping from the manifolds to individual biosparging wells, including completing the trenching network for pipe installation, pressure testing of the piping runs and backfilling of trenching network;
- Connection of the operating equipment (i.e., the manifolds) to the piping network leading to the biosparging wells; and
- Connection of electric service to the equipment enclosure to power the equipment for the aerobic biobarrier system.

Following installation of the aerobic biobarrier system, the system will go through a startup phase as described in Section 6.1 of this Work Plan.

#### **5.4 Waste Management**

Solid and liquid investigation derived waste (“IDW”) will be containerized separately to the extent practicable and staged in the Central Accumulation Area in the portion of the Brunswick facility that Hercules owns or in a separate staging area near the location of the aerobic biobarrier. Solid IDW (e.g., drill cuttings) and liquid IDW (e.g., decontamination fluids and well purge water) will be containerized and labeled, as appropriate, indicating the name of the generator, contact information, generation date, and general contents. IDW will be characterized as soon as practicable to allow adequate time for appropriate management and off-site disposal of the IDW.

## **6.0 STARTUP PROCEDURES, OPERATION, MONITORING AND MAINTENANCE ACTIVITIES, AND PERFORMANCE MONITORING ACTIVITIES**

This section of the Work Plan provides details regarding the startup of the aerobic biobarrier system, the planned operation, monitoring and maintenance (“OM&M”) activities for the aerobic biobarrier system, and performance monitoring activities that will be conducted as part of evaluating the efficacy of the aerobic biobarrier system.

### **6.1 System Startup**

Prior to startup of the aerobic biobarrier system, the system will be inspected to confirm that it can operate as desired and that no modifications are necessary. Each of the individual components of the aerobic biobarrier system (both mechanical and digital) will be subject to performance testing to verify that they are functioning appropriately and have not been damaged during transportation or installation of the system.

During startup of the aerobic biobarrier system, the compressed air generated from the air compressor in the equipment enclosure will be provided to each manifold (Manifold A, Manifold B and Manifold C). Each manifold will operate for two hours before cycling to the next manifold; therefore, each manifold will operate for a total of eight hours per day (i.e., eight hours of operation spread out over a 24 hour period in two hour increments). Operational parameters will be compared to the expected design parameters (i.e., well head pressures, air flow rates, and the observed radius of influence for each biosparging well). Adjustments will be made to the operation of the aerobic biobarrier system, as necessary. Once the aerobic biobarrier system is fully operational, the operational cycles can be adjusted, as necessary, to optimize the performance of the system to achieve maximum ROIs for the ideal distribution of dissolved oxygen (i.e., dissolved oxygen at concentrations of greater than 2 mg/L) to promote aerobic bioremediation and to minimize the potential for groundwater mounding to occur. It is anticipated that startup activities for the aerobic biobarrier system will take approximately 5 days to complete.

### **6.2 OM&M Activities**

Upon installation of the aerobic biobarrier system and successful system startup, the equipment for the system will be monitored weekly for the first month and monthly thereafter. Routine OM&M activities will include collecting the following information:

- individual air flow rates and pressures at each biosparging well;
- overall air flow rates, operating pressures, and temperatures for the aerobic biobarrier system;
- overall hours of operation from hour meter readings;
- electric usage from electric meter readings;
- oil and lubrication levels; and
- the volume of collected condensed water.

In addition, monitoring data obtained remotely through telemetry regarding the operation of the aerobic biobarrier system will be recorded manually on a weekly basis. The results of the weekly remote monitoring activities and any alarm notifications provided by the aerobic biobarrier system will provide the basis for OM&M activities conducted outside of the scheduled monthly OM&M events. Any periodic equipment maintenance activities recommended by equipment manufacturers will be performed as part of the routine OM&M activities. The results of OM&M activities will be documented in OM&M logs. A copy of the OM&M logs will be kept on-site inside the equipment enclosure.

### **6.3 Performance Monitoring Plan**

A groundwater performance monitoring program will be implemented to evaluate the effectiveness of the aerobic biobarrier treatment process in reducing the concentrations and mass flux of benzene, chlorobenzene, and other COPCs susceptible to aerobic biodegradation in the deep zone of the upper surficial aquifer. The performance monitoring well network will consist of existing monitoring well MW-29D and new performance monitoring wells BS-OW-04D and BS-OW-05D. In addition, existing wells OW-Q2D, BS-OW-02, BS-OW-03D, MW-62D and OW-Q1D will be used for collecting measurements of field parameters as part of the groundwater performance monitoring program. The monitoring locations are shown on **Figure 9**.

A baseline sampling event prior to the start of operation of the aerobic biobarrier system and five performance monitoring events thereafter will be performed as summarized in **Table 2**. The performance monitoring activities will be performed one month, three months, six months, nine months and twelve months after the aerobic biobarrier system

is placed into operation. For the first performance monitoring event one month after the aerobic biobarrier system is placed into operation, only measurements for field parameters and depth to groundwater will be collected. During subsequent performance monitoring events three months, six months, nine months, and twelve months after the aerobic biobarrier system is placed into operation, groundwater samples will be collected from all of the performance monitoring wells for evaluation of field parameters including depth to water, pH, specific conductance, temperature, dissolved oxygen and oxidation-reduction potential. In addition, groundwater samples will be collected from three performance monitoring wells (wells MW-29D, BS-OW-04D and BS-OW-05D) located downgradient from the aerobic biobarrier for laboratory analysis. Monitoring well BS-OW-3D will be sampled during the baseline sampling event and the twelve-month sampling event for laboratory analysis. The groundwater samples for laboratory analysis will be shipped under chain-of-custody protocols to Test America in Savannah, Georgia for analysis of the following parameters:

- VOCs listed in Appendix IX of 40 C.F.R. Part 264 using EPA Method 8260C;
- Dissolved iron (using EPA Method 6020B or equivalent), and total iron and manganese (using EPA Method 6020B or equivalent); and
- Total organic carbon (“TOC”) using EPA Method 9060A or equivalent.

#### **6.4 Data Analysis**

The initial goal of implementing the aerobic biobarrier system is to reduce average concentrations of benzene and chlorobenzene in groundwater in the deep zone of the upper surficial aquifer immediately downgradient of the aerobic biobarrier by 50%. This goal will be evaluated by comparing average concentrations of benzene and chlorobenzene in performance monitoring wells MW-29D, BS-OW-04D and BS-OW-05D to the average concentrations of benzene and chlorobenzene collected from those three performance monitoring wells before the aerobic biobarrier system is placed into operation (i.e., the baseline monitoring event). Mass flux evaluations for target COPCs may also be performed using the collected data to evaluate the effectiveness of the aerobic biobarrier system.

## 7.0 REPORTING

A construction completion report (“CCR”) will be submitted to EPD within four months after the aerobic biobarrier system is placed into operation. The CCR will summarize the construction activities that were completed, include a manual with system component specifications for the aerobic biobarrier system, present copies of the initial OM&M logs, include the results of initial measurements of field parameters and include the results of the initial baseline groundwater monitoring event.

Progress reports will be submitted to EPD following the performance monitoring events conducted six months and nine months after the aerobic biobarrier system is placed into operation. The progress reports will briefly summarize the data collection activities, field measurements, and analytical results performed during the preceding three-month period.

An interim corrective action effectiveness report for the aerobic biobarrier system will be prepared following the performance monitoring event conducted 12 months after the aerobic biobarrier system is placed into operation. The report will present the groundwater analytical data that were obtained, the analyses of reductions in concentrations of COPCs (primarily benzene and chlorobenzene), and the relative progress toward meeting the objectives of the interim corrective measure. This report will also include recommendations for future actions consistent with the data and observations that are presented, including recommendations for longer term groundwater monitoring.

The interim corrective action effectiveness report for the aerobic biobarrier system will be a stand-alone report. Following the submission of the interim corrective action effectiveness report, Hercules anticipates that further corrective action effectiveness reports for the aerobic biobarrier system will be presented annually as part of the groundwater monitoring reports currently required under the hazardous waste permit for the Brunswick facility that EPD has issued to Hercules and Pinova. The corrective action effectiveness reporting schedule may be modified, as approved by EPD.

Hercules will also send copies of the CCR and corrective action progress and effectiveness reports to the EPD UIC permitting office, if requested, to fulfill a substantive requirement of the UIC permitting program.

## 8.0 SCHEDULE

As previously described, installation and operation of an aerobic biobarrier system to address benzene and chlorobenzene (together with other COPCs susceptible to aerobic degradation) in the deep zone of the upper surficial aquifer underlying the portion of the Brunswick facility to the north of the Outfall Ditch and east of U.S. Highway 17 will include, among other things, planning, permitting, well installation, construction, implementation and monitoring activities. The work is anticipated to progress in the following sequence of steps. An estimated target duration for completion of each step in the process is presented below with the understanding that the duration of particular steps may be modified based on conditions that are encountered and the results that are obtained. Because the steps are generally sequential, a change in the duration of one step may affect the target completion schedule for subsequent steps. As noted in Section 4.1 above, additional assessment activities are expected to take place over the next several months to further evaluate the historical operations and releases at the neighboring Adams properties. Based on the schedule of these additional assessment activities and the results therefrom, the implementation schedule of this Work Plan may change. Hercules will keep EPD informed of the progress in implementing this Work Plan via regularly scheduled Triad meetings or other communications.

The tentative schedule provided below for implementing the Work Plan runs from the date that EPD approves the Work Plan and Hercules completes the additional assessment activities at the adjacent Adams properties as described above. Hercules has assumed that the additional assessment activities will be completed prior to EPD's approval of the Work Plan.

- Pre-mobilization planning, procurement, and permitting activities: four months after EPD approval of the Work Plan;
- Installation of additional biosparging wells and performance monitoring wells and baseline sampling activities (two-month duration): six months after EPD approval of the Work Plan;
- Fabrication and field construction of equipment and infrastructure for delivery of compressed air to the biosparging wells (four-month duration): 10 months after EPD approval of the Work Plan;
- Startup process for the aerobic biobarrier system (one-month duration): 11 months after EPD approval of the Work Plan;



- Initial performance monitoring event for field parameters and associated reporting (one-month after startup): 12 months after EPD approval of the Work Plan;
- Performance monitoring event three months after initiating full-scale operation of the aerobic biobarrier system and completion of the CCR (due one month after receipt of validated laboratory analytical results): 15 months after EPD approval of the Work Plan;
- Performance monitoring event six months after initiating full-scale operation of the aerobic biobarrier and preparation of the initial progress report (due one month after receipt of validated laboratory analytical results): 19 months after EPD approval of the Work Plan;
- Performance monitoring event nine months after initiating full-scale operation of the aerobic biobarrier system and preparation of the follow-up progress report (due one month after receipt of validated laboratory analytical results): 22 months after EPD approval of the Work Plan; and
- Performance monitoring event twelve months after initiating full-scale operation of the aerobic biobarrier system and preparation of the interim corrective action effectiveness report (due approximately two months after receipt of validated laboratory analytical results): 26 months after EPD approval of the Work Plan.

## **9.0 REFERENCES**

Geosyntec. 2021. Corrective Action Plan. Hercules/Pinova Brunswick Facility, Brunswick, Georgia. February 2021.

Interstate Technology Regulatory Council (ITRC). 2010. Use and Measurement of Mass Flux and Mass Discharge. August 2010.

# TABLES

**Table 1**  
**Construction Details for Biosparging and Performance Monitoring Wells**  
**Deep Zone of Upper Surficial Aquifer - Aerobic Biobarrier**  
**Hercules LLC/Pinova Brunswick Facility, Brunswick, GA**

Well ID	Well Function	Well Depth	Screened Interval	Screen Slot Size	Sand Pack Interval	Bentonite Seal
		(ft bgs)	(ft bgs)	(inch)	(ft bgs)	(ft bgs)
<b>Biosparging Wells</b>						
BS-01*	Supplemental Biosparging Well	95	94 to 92	0.01	95 to 89	89 to 85
BS-03*	Supplemental Biosparging Well	99	99 to 98	0.01	99 to 97	97 to 93
BS-04	Biosparging Well	100	100 to 98	0.01	100 to 97	97 to 94
BS-05	Biosparging Well	100	100 to 98	0.01	100 to 97	97 to 94
BS-06	Biosparging Well	100	100 to 98	0.01	100 to 97	97 to 94
BS-07	Biosparging Well	100	100 to 98	0.01	100 to 97	97 to 94
BS-08	Biosparging Well	100	100 to 98	0.01	100 to 97	97 to 94
BS-09	Biosparging Well	100	100 to 98	0.01	100 to 97	97 to 94
BS-10	Biosparging Well	100	100 to 98	0.01	100 to 97	97 to 94
BS-11	Biosparging Well	100	100 to 98	0.01	100 to 97	97 to 94
BS-12	Biosparging Well	100	100 to 98	0.01	100 to 97	97 to 94
BS-13	Biosparging Well	100	100 to 98	0.01	100 to 97	97 to 94
<b>Performance Monitoring Wells</b>						
MW-29*	Performance Monitoring Well	89.8	79.75-89.75	0.01	NA	NA
BS-OW-03D*	Performance Monitoring Well	93	93 to 83	0.01	97 to 79	79 to 74
BS-OW-04D	Performance Monitoring Well	90	90 to 80	0.01	90 to 78	78 to 75
BS-OW-05D	Performance Monitoring Well	90	90 to 80	0.01	90 to 78	78 to 75
OW-Q2D*	Field Parameter Monitoring Well	90.3	90.3 to 80	0.01	97 to 78	78 to 75
BS-OW-02*	Field Parameter Monitoring Well	93	93 to 83	0.01	97 to 80	80 to 76
BS-02*	Field Parameter Monitoring Well	82	82 to 72	0.01	82 to 70	70 to 68
MW-62D*	Field Parameter Monitoring Well	90.3	90.3 to 80	0.01	90.3 to 78	78 to 76
OW-Q1D*	Field Parameter Monitoring Well	90.3	90.3 to 80	0.01	90.3 to 78	78 to 76

**Notes:**

ft bgs - feet below ground surface.

NA: not available

\*: Existing wells

1. Wells will be constructed with Schedule 40 polyvinyl chloride components (including riser pipes and screens).
2. The screened intervals and lengths of the proposed biosparging wells have been selected to inject air at the bottom interval of the deep zone of the upper surficial aquifer (i.e., directly above the semi-confining layer that is present). The screened intervals for the biosparging wells are subject to change based on the depth of the semi-confining layer and low permeability layers (i.e., silty, clayey layers) that may be encountered during well installation activities.
3. The locations for the proposed biosparging and performance monitoring wells may be modified due to the accessibility of the proposed locations and other field conditions that are encountered.

**Table 2**  
**Proposed Performance Monitoring Plan**  
**Deep Zone of Upper Surficial Aquifer - Aerobic Biobarrier**  
**Hercules LLC/Pinova Brunswick Facility, Brunswick, GA**

Monitoring Event	Monitoring Parameters	Analytical Method	Monitoring Wells
Baseline	Depth to Water	N/A	All performance monitoring wells (MW-62D, OW-Q1D, OW-Q2D, BS-02, BS-OW-02, MW-29D, BS-OW-03D, BS-OW-04D, BS-OW-05D)
	Field Parameters <sup>1</sup>	N/A	
	Appendix IX VOCs	EPA 8260C	MW-29D, BS-OW-03D, BS-OW-04D, BS-OW-05D
	Total Organic Carbon	EPA 9060A	
	Total Iron and Manganese	EPA 6020B	
	Dissolved Iron	EPA 6020B	
1-Month Post-Startup	Depth to Water	N/A	All performance monitoring wells (MW-62D, OW-Q1D, OW-Q2D, BS-02, BS-OW-02, MW-29D, BS-OW-03D, BS-OW-04D, BS-OW-05D)
	Field Parameters <sup>1</sup>	N/A	
3-Month Post-Startup	Depth to Water	N/A	All performance monitoring wells (MW-62D, OW-Q1D, OW-Q2D, BS-02, BS-OW-02, MW-29D, BS-OW-03D, BS-OW-04D, BS-OW-05D)
	Field Parameters <sup>1</sup>	N/A	
	Appendix IX VOCs	EPA 8260C	MW-29D, BS-OW-04D, BS-OW-05D
	Total Organic Carbon	EPA 9060A	
	Total Iron and Manganese	EPA 6020B	
	Dissolved Iron	EPA 6020B	
6-Month Post-Startup	Depth to Water	N/A	All performance monitoring wells (MW-62D, OW-Q1D, OW-Q2D, BS-02, BS-OW-02, MW-29D, BS-OW-03D, BS-OW-04D, BS-OW-05D)
	Field Parameters <sup>1</sup>	N/A	
	Appendix IX VOCs	EPA 8260C	MW-29D, BS-OW-04D, BS-OW-05D
	Total Organic Carbon	EPA 9060A	
	Total Iron and Manganese	EPA 6020B	
	Dissolved Iron	EPA 6020B	
9-Month Post-Startup	Depth to Water	N/A	All performance monitoring wells (MW-62D, OW-Q1D, OW-Q2D, BS-02, BS-OW-02, MW-29D, BS-OW-03D, BS-OW-04D, BS-OW-05D)
	Field Parameters <sup>1</sup>	N/A	
	Appendix IX VOCs	EPA 8260C	MW-29D, BS-OW-04D, BS-OW-05D
	Total Organic Carbon	EPA 9060A	
	Total Iron and Manganese	EPA 6020B	
	Dissolved Iron	EPA 6020B	
12-Month Post-Startup	Depth to Water	N/A	All performance monitoring wells (MW-62D, OW-Q1D, OW-Q2D, BS-02, BS-OW-02, MW-29D, BS-OW-03D, BS-OW-04D, BS-OW-05D)
	Field Parameters <sup>1</sup>	N/A	
	Appendix IX VOCs	EPA 8260C	MW-29D, BS-OW-03D, BS-OW-04D, BS-OW-05D
	Total Organic Carbon	EPA 9060A	
	Total Iron and Manganese	EPA 6020B	
	Dissolved Iron	EPA 6020B	

**Notes:**

VOCs- volatile organic compounds - VOCs listed in Appendix IX of 40 C.F.R. Part 264

EPA - Environmental Protection Agency

N/A - not applicable

1- pH, dissolved oxygen (DO), oxidation-reduction potential (ORP), specific conductivity, and temperature

# FIGURES



- Legend**
- Railroad
  - Pinova, Inc. Property
  - Hercules LLC Property
  - Structure



**Notes:**  
 1. Aerial photograph approximate date - January 2019. Source: Google Earth.

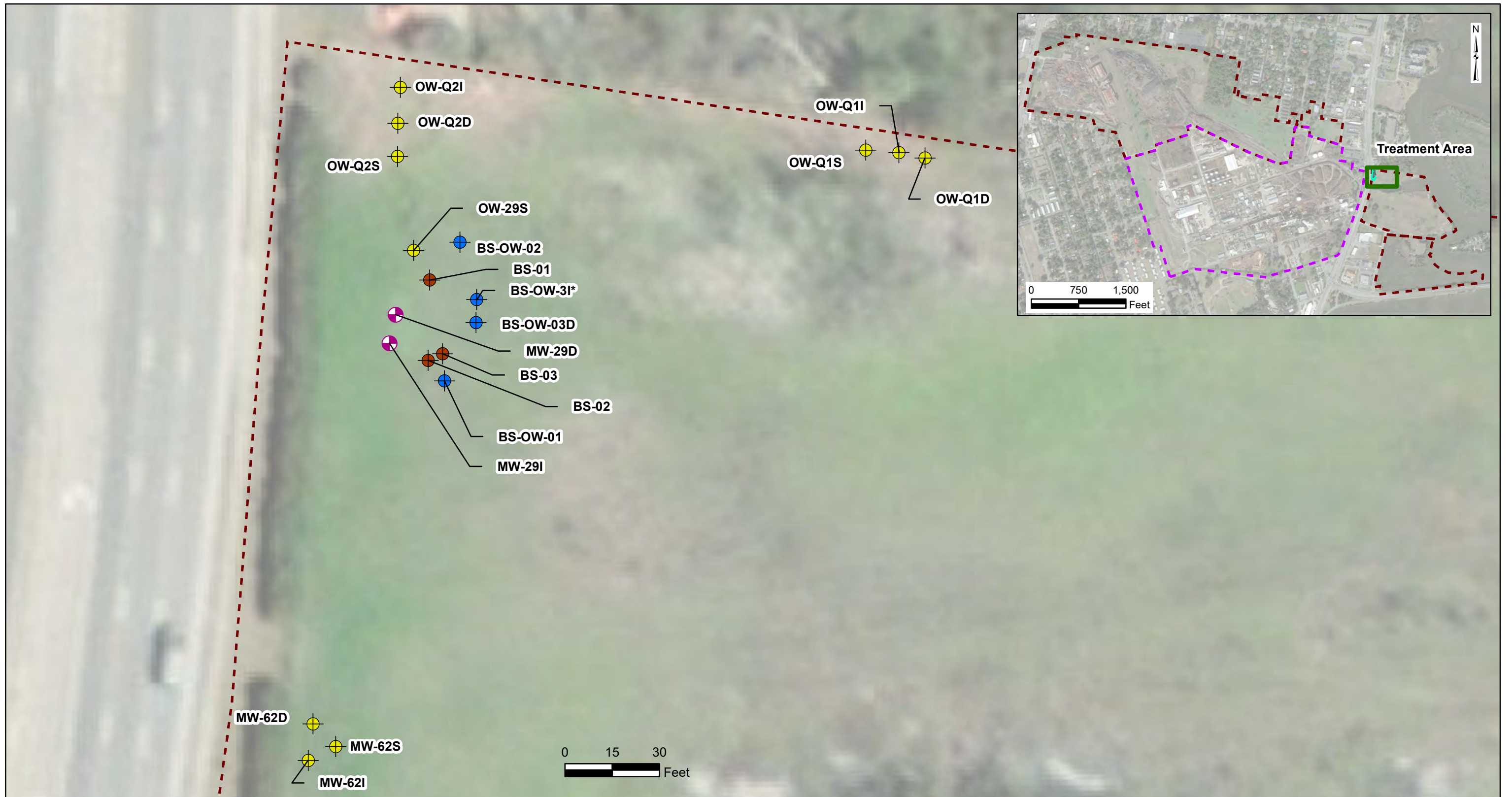
**Site Location**  
 Hercules/Pinova Facility  
 Brunswick, Georgia

**Geosyntec**  
 consultants

Kennesaw, GA

August 2021

**Figure**  
**1**



- Legend**
- Pilot Test Biosparging Well
  - Pilot Test Observation Well
  - Tidal Study Observations Well
  - Monitoring Well – Surficial Aquifer, Upper Unit
  - Pinova Property
  - Hercules Property

**Notes:**  
 \* - Observation well BS-OW-3I will be abandoned prior to installation of aerobic biobarrier.  
 1. "S", "I", and "D" designate monitoring wells screened in the shallow, intermediate and deep zones of the upper surficial aquifer, respectively.  
 2. Aerial photograph approximate date - January 2019. Source: Google Earth.

**General Area of Proposed Aerobic Biobarrier System – Existing Conditions**  
 Hercules/Pinova Facility  
 Brunswick, Georgia

**Geosyntec**  
 consultants

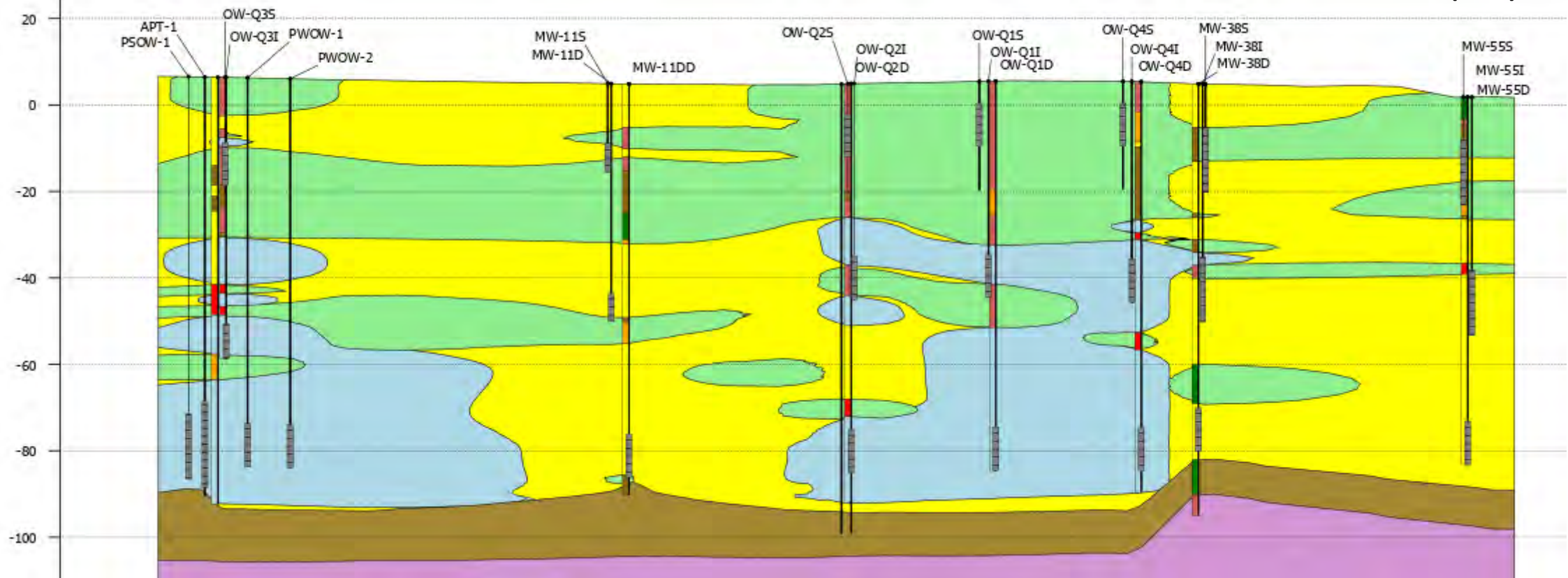
Kennesaw, GA      November 2021

**Figure**  
**2**



A (West)

A' (East)



Scale: 1:1,400

Vertical exaggeration: 5x



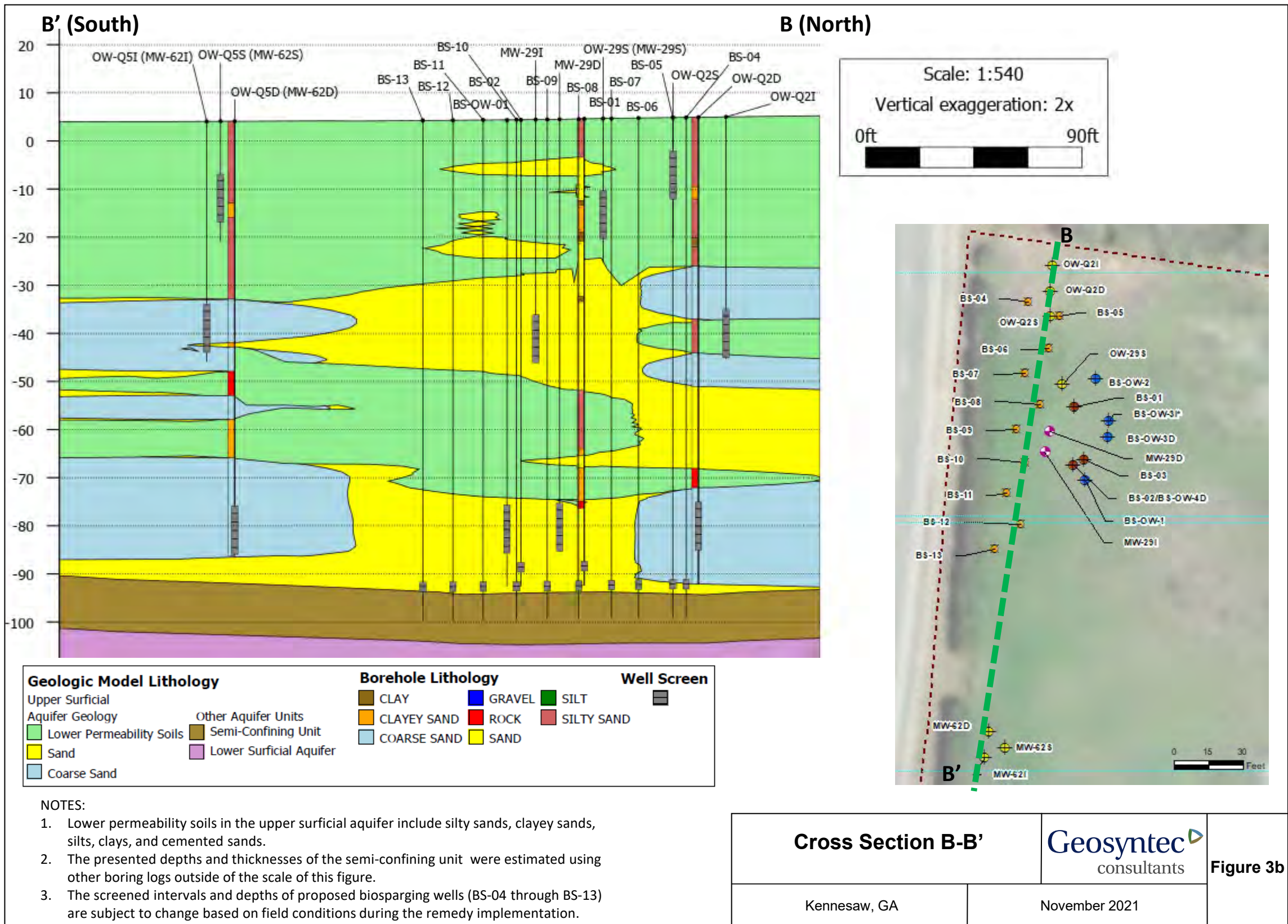
NOTES:

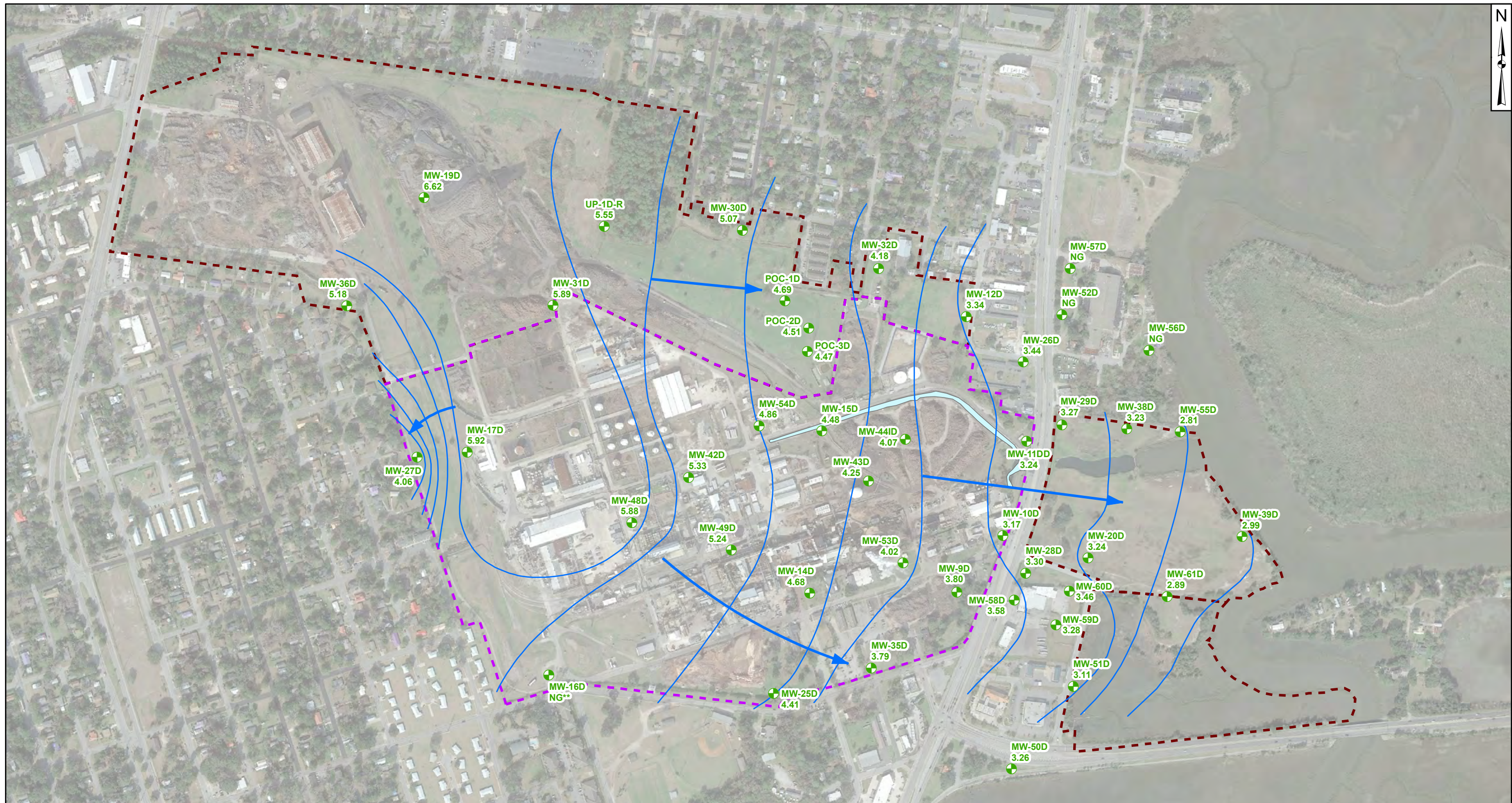
1. Lower permeability soils in the upper surficial aquifer include silty sands, clayey sands, silts, clays, and cemented sands.









Geologic Model Lithology		Borehole Lithology		Well Screen
Upper Surficial Aquifer Geology		Other Aquifer Units		
Lower Permeability Soils	Sand	Semi-Confining Unit	Lower Surficial Aquifer	
Coarse Sand				
		CLAY	GRAVEL	SILT
		CLAYEY SAND	ROCK	SILTY SAND
		COARSE SAND	SAND	

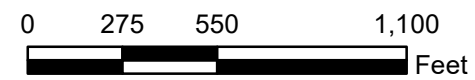
<b>Cross Section A-A'</b>		<b>Geosyntec</b> consultants	<b>Figure 3a</b>
Kennesaw, GA		November 2021	





**Legend**

-  Monitoring Well for Deep Zone of Upper Surficial Aquifer
-  Groundwater Elevation Iso-Contour (ft MSL)
-  Approximate Groundwater Flow Direction - Deep Zone of Upper Surficial Aquifer
-  Pinova, Inc. Property
-  Hercules LLC Property
-  N Street Ditch



**Notes:**

1. Water level measurements recorded on December 7, 2020. Elevation provided in feet above mean sea level (ft MSL).
2. NG = Not gauged.
3. \*\* indicates well was observed to be damaged and was not gauged during the December 2020 groundwater sampling event.
4. Aerial photograph approximate date - January 2019. Source: Google Earth.

**Potentiometric Map**  
**Surficial Aquifer, Deep Zone of Upper Unit**  
 Hercules/Pinova, Inc. Facility  
 Brunswick, Georgia

**Geosyntec**  
 consultants

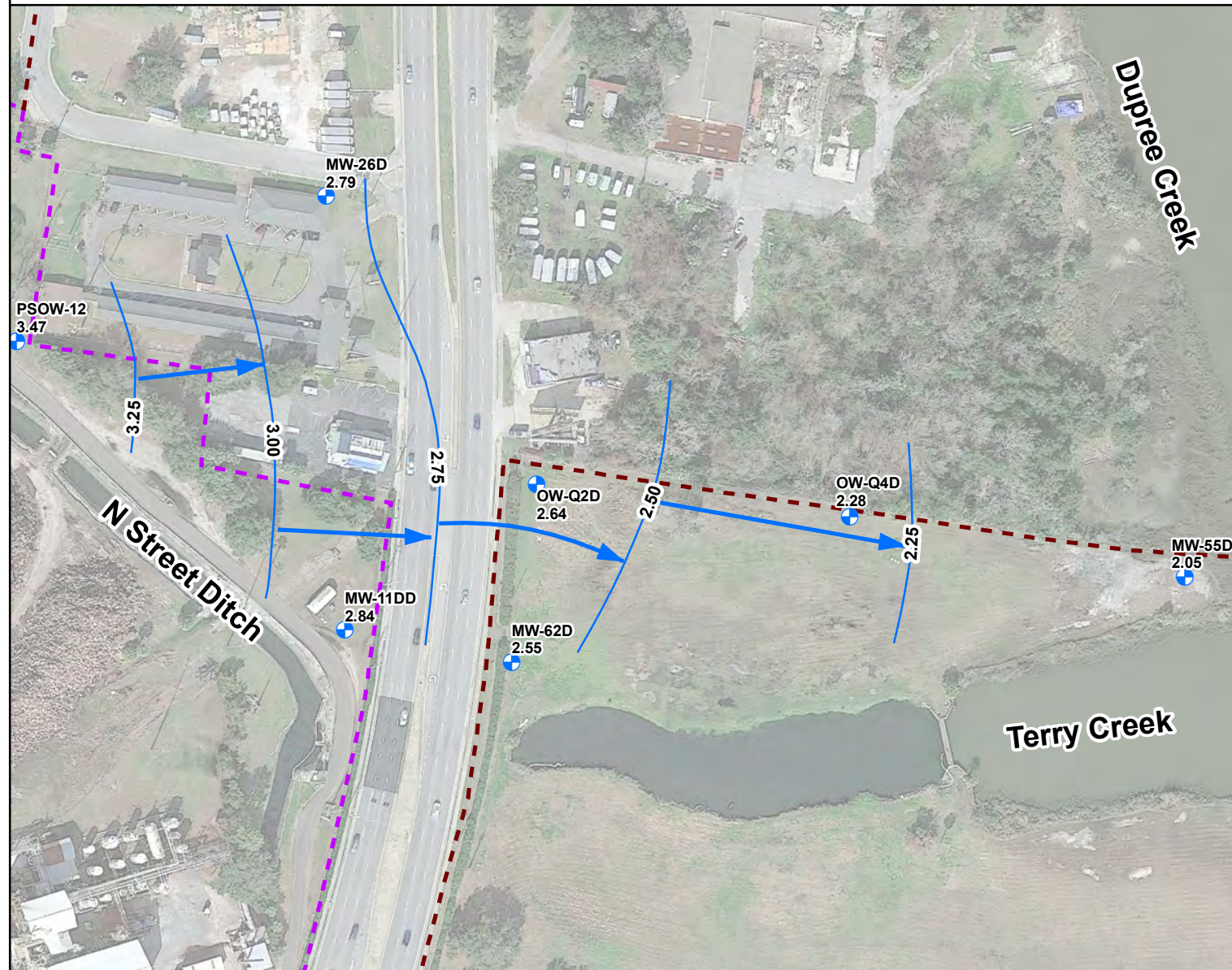
**Figure**

**4**

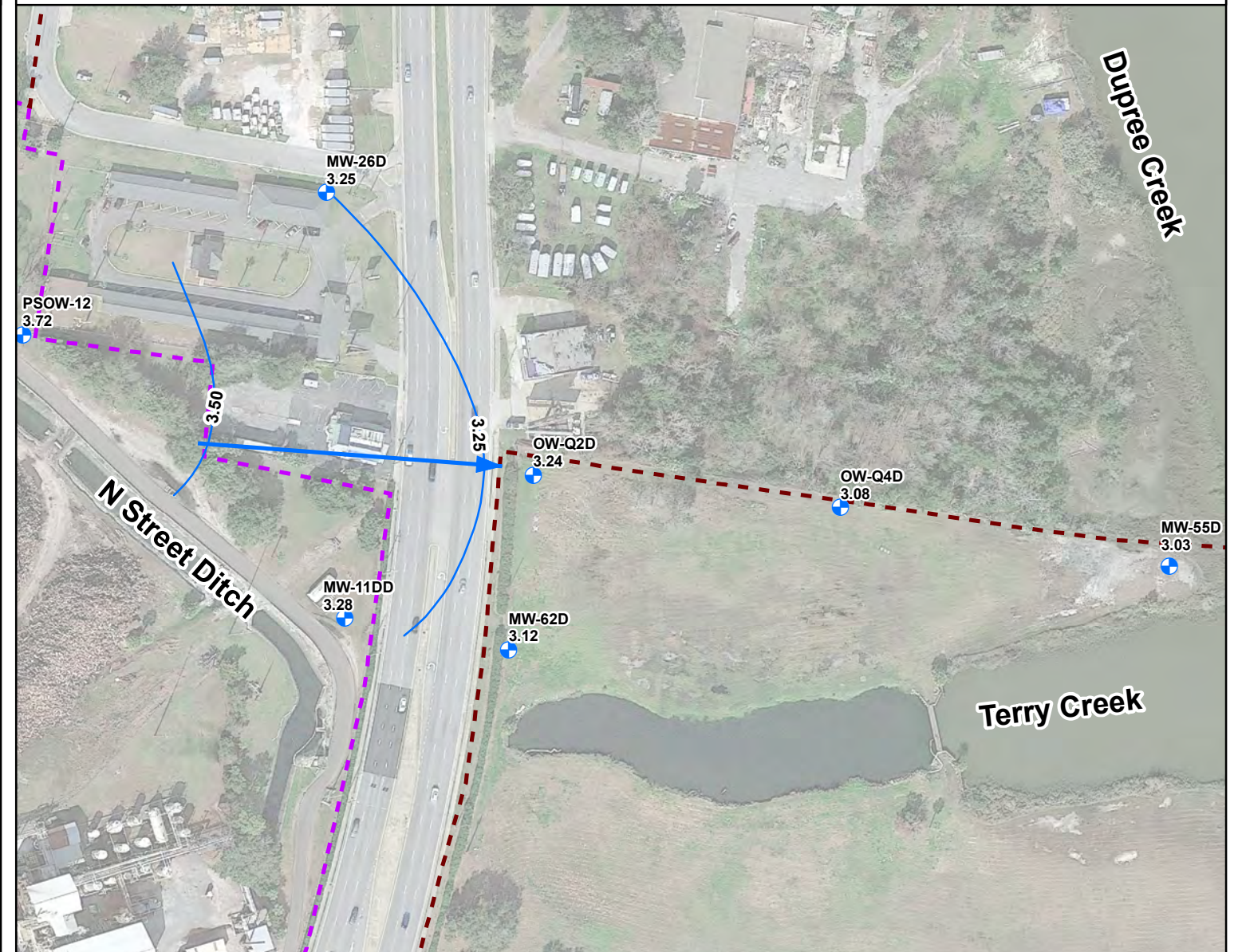
Kennesaw, GA

November 2021

### Low Tide



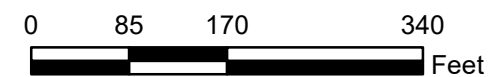
### High Tide



**Legend**

- Tidal Study Well
- Groundwater Elevation
- ➔ Groundwater Flow Direction
- Pinova Property
- Hercules Property

1. Groundwater elevations relative to feet above mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on 9:54 a.m. on April 21, 2021, after correcting for barometric pressure.



**Low and High Tide Potentiometric Map  
Near Proposed Location of Aerobic Biobarrier,  
Deep Zone of Upper Surficial Aquifer  
Hercules/Pinova Facility, Brunswick, Georgia**

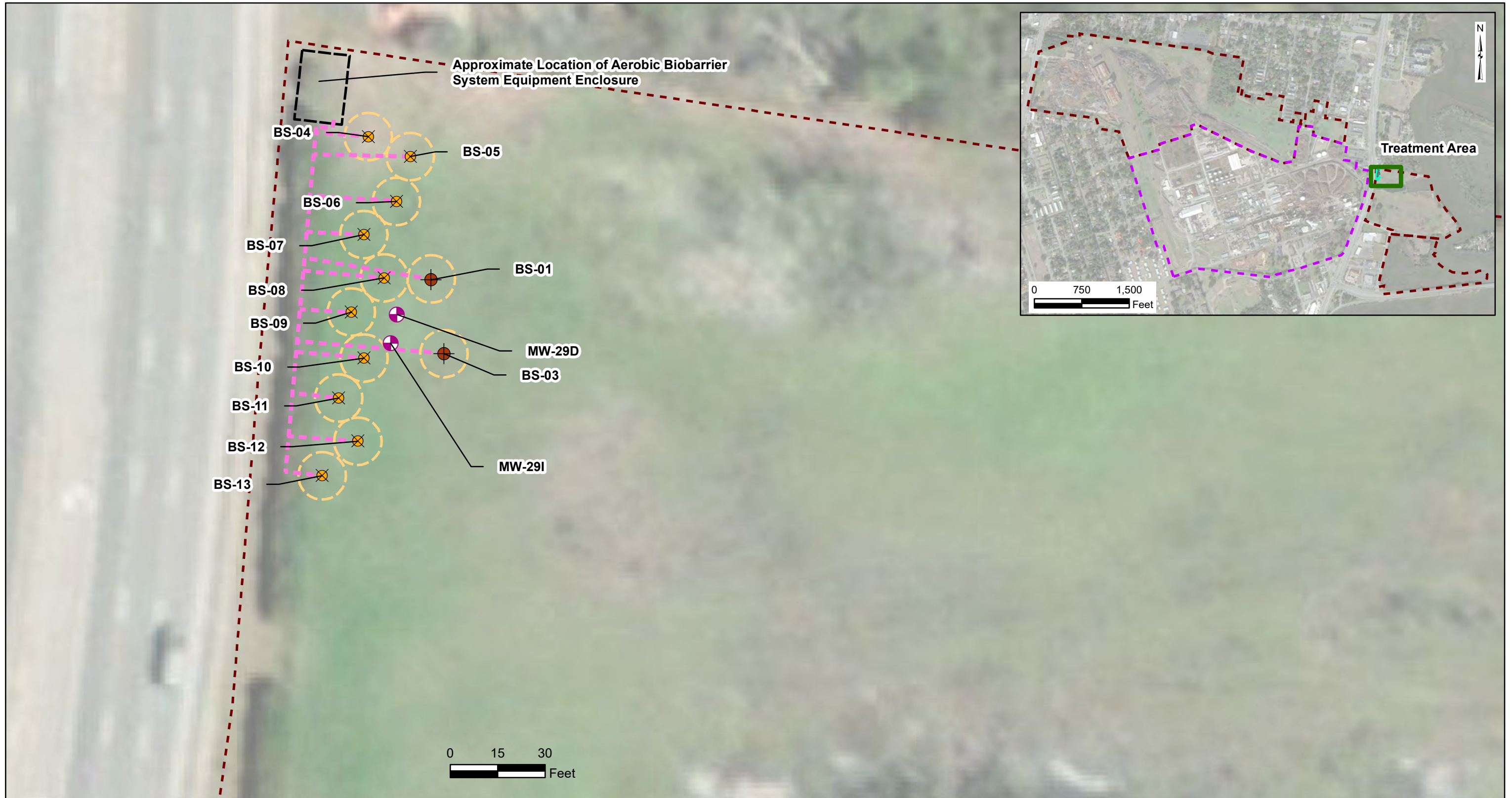
**Geosyntec**  
consultants

**Figure**

**5**

Kennesaw, GA

November 2021



- Legend**
- Supplemental Biosparging Well
  - Monitoring Well – Surficial Aquifer, Upper Unit
  - Proposed Biosparging Well
  - Approximate Location of Trench for Underground Sparging Lines
  - Anticipated radius of influence of biosparging well
  - Pinova Property
  - Hercules Property

- Notes:**
1. "S", "I", and "D" designate monitoring wells screened in the shallow, intermediate and deep zones of the upper surficial aquifer, respectively.
  2. Proposed locations of biosparging wells are subject to change based on field conditions.
  3. Aerial photograph approximate date - January 2019. Source: Google Earth.
  4. Proposed location of aerobic biobarrier system equipment enclosure may be revised based on the final location of electrical service and the exact location and geometry of the aerobic biobarrier.

**Proposed Biosparging Well Layout**  
Hercules/Pinova Facility  
Brunswick, Georgia

**Geosyntec**  
consultants

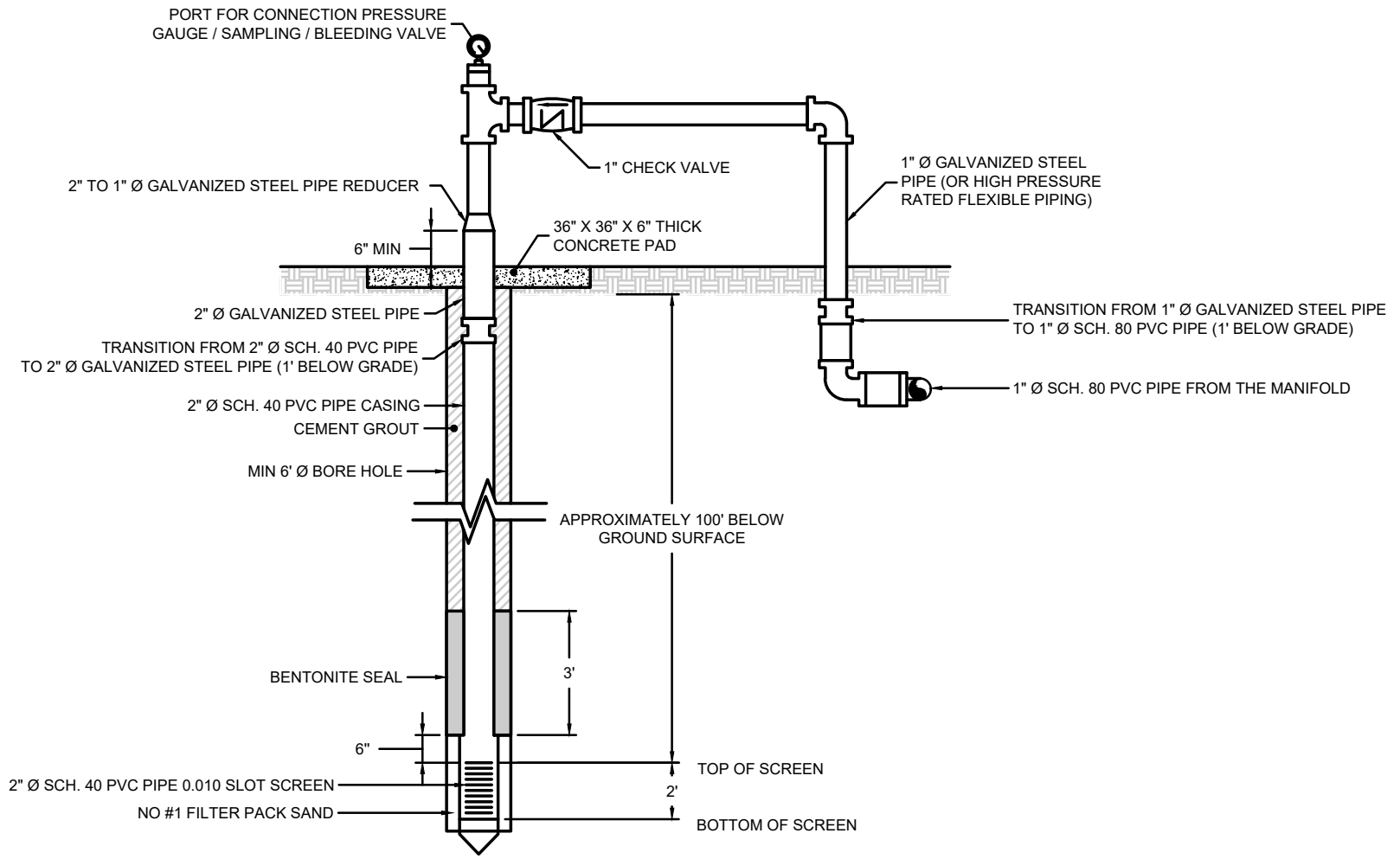
Kennesaw, GA

November 2021

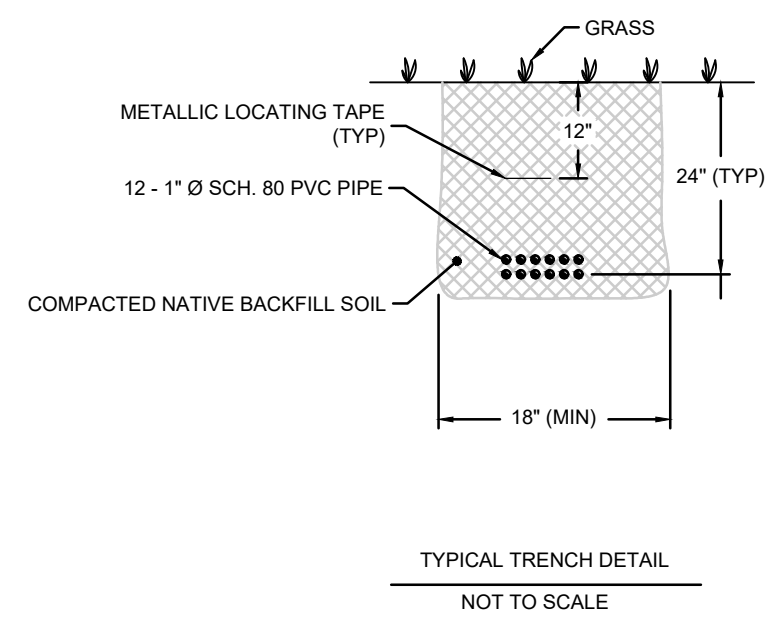
**Figure**  
**6**

Path: N:\Ashland\Brunswick Plant\GIS\MXD\Deep GW ICM\Figure 6 - Biosparge Well Layout.mxd

C:\GEO\WDS01\DMS02941\GR6836-005\_REVISED 07262019 - Last Saved by: JCureton on 11/18/21




TYPICAL BIOSPARGING WELL CONSTRUCTION AND WELL HEAD CONNECTION DETAILS  
NOT TO SCALE



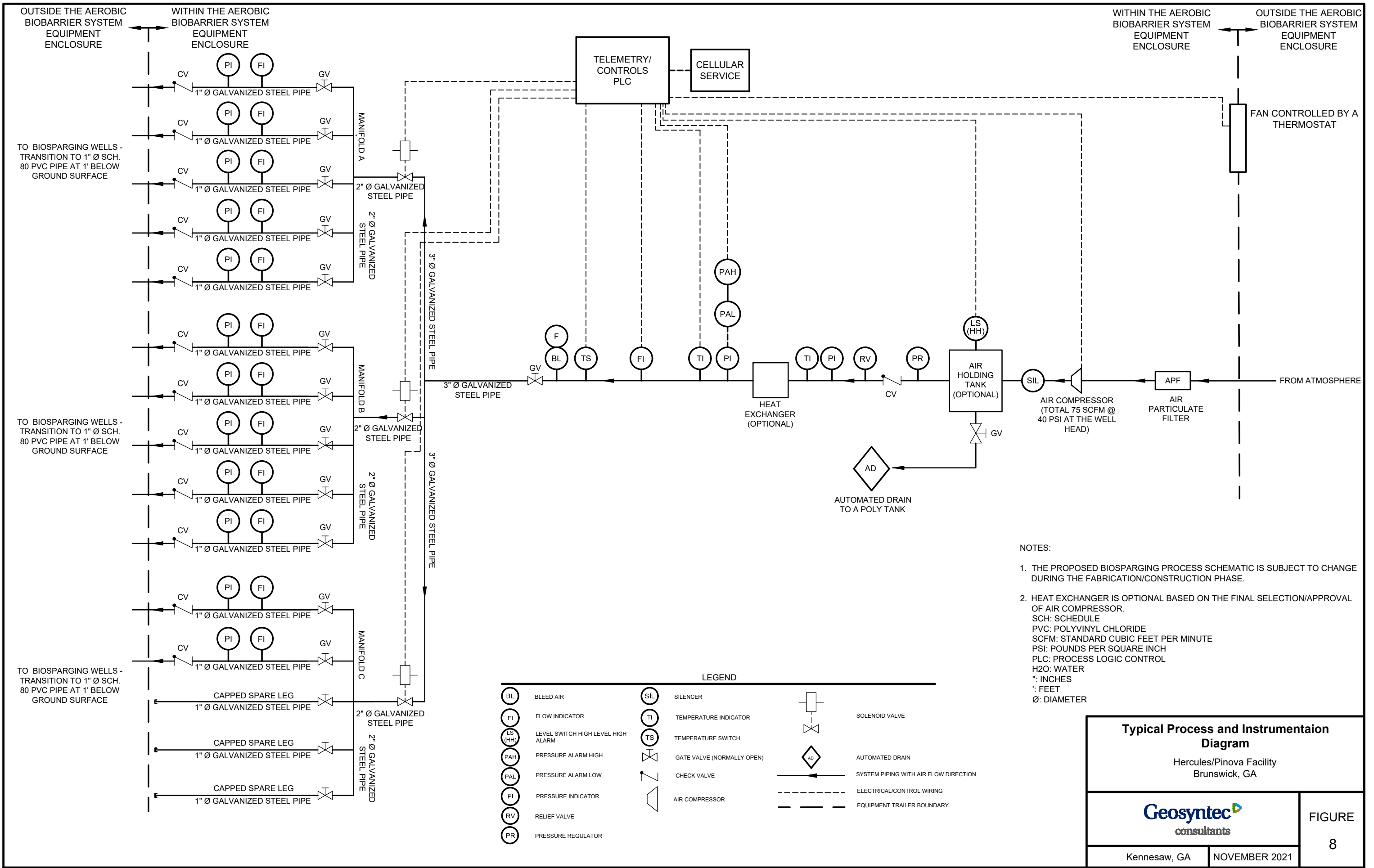
TYPICAL TRENCH DETAIL  
NOT TO SCALE

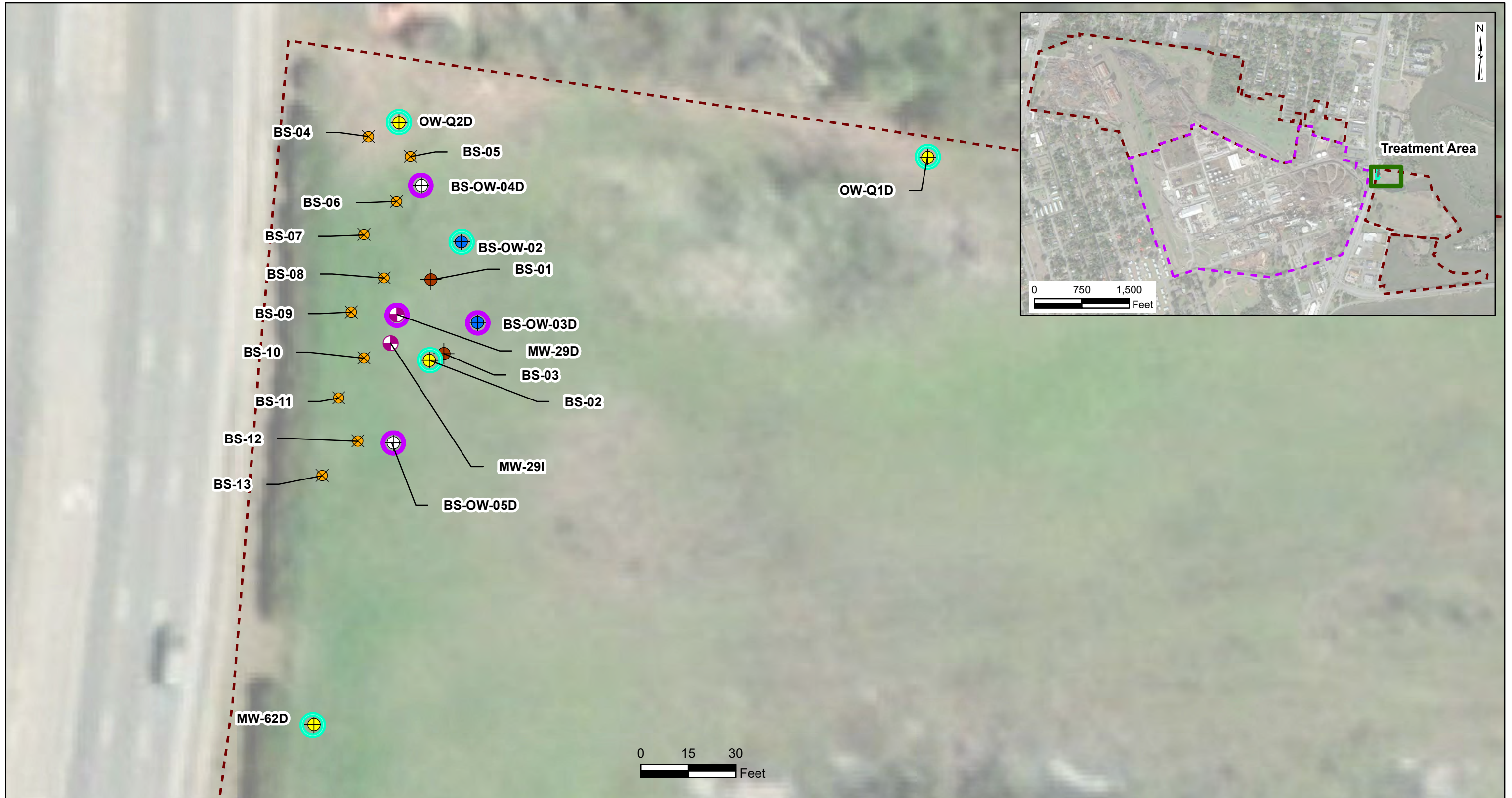
NOTES:

1. THE BIOSPARGING WELLS MAY BE COMPLETED USING FLUSH MOUNT VAULTS (NOT SHOWN HERE) TO DECREASE THE ABOVEGROUND INFRASTRUCTURE ASSOCIATED WITH THE AEROBIC BIOBARRIER SYSTEM AND TO FACILITATE ACCESS TO THE AEROBIC BIOBARRIER SYSTEM EQUIPMENT ENCLOSURE AND UTILITY POLE FOR ELECTRIC POWER.
2. THE NUMBER OF PIPES THAT WILL BE INSTALLED IN TRENCHES WILL VARY. THE WIDTHS OF THE TRENCHES WILL ALSO VARY DEPENDING ON THE NUMBER OF PIPES THAT ARE INSTALLED IN THE TRENCHES.
3. PIPES WITHIN THE TRENCH SHALL NOT TOUCH EACH OTHER AND SHALL HAVE 1" (MIN) SAND BUFFER AROUND EACH PIPE TO MINIMIZE ABRASION FOR PIPES INSTALLED IN TRENCHES.
4. THE SCREENED INTERVALS FOR THE PROPOSED BIOSPARGING WELLS IS SUBJECT TO CHANGE BASED ON THE LITHOLOGY OBSERVED DURING WELL INSTALLATION ACTIVITIES.
5. SCH: SCHEDULE  
PVC: POLYVINYL CHLORIDE  
": INCHES  
Ø: DIAMETER











<p><b>Biosparge Well Construction and Trench Details</b></p> <p>Hercules/Pinova Facility Brunswick, GA</p>	
	<p>FIGURE 7</p>
<p>Kennesaw, GA</p>	<p>NOVEMBER 2021</p>

C:\GEOPIWDS01\DM502941\GR6836-004 - Last Saved by: J.Cureton on 11/18/21





**Legend**

-  Pilot Test Observation Well
-  Tidal Study Observations Well
-  Proposed Performance Monitoring Well
-  Supplemental Biosparging Well
-  Monitoring Well – Surficial Aquifer, Upper Unit
-  Proposed Biosparging Well
-  Pinova Property
-  Hercules Property
-  Monitoring Well – Field Parameters Only
-  Performance Monitoring Well

**Notes:**

- \* - Observation well BS-OW-31 will be abandoned prior to installation of aerobic biobarrier.
- 1. "I", and "D" designate monitoring wells screened in the shallow, intermediate and deep zones of the upper surficial aquifer, respectively.
- 2. Proposed locations of biosparging wells performance monitoring wells are subject to change based on field conditions.
- 3. Aerial photograph approximate date - January 2019. Source: Google Earth.

**Proposed Performance Monitoring Well Network**  
Hercules/Pinova Facility  
Brunswick, Georgia

 Geosyntec consultants		<b>Figure</b> <b>9</b>
Kennesaw, GA	November 2021	

Path: N:\Ashland\Brunswick Plant\GIS\MXD\Deep GW ICM\Figure 9 - Proposed Performance Monitoring Well Network.mxd



# APPENDIX A

## Tidal Evaluation Report

# **TIDAL EVALUATION AND GROUNDWATER CHEMISTRY DATA SUMMARY**

## **HERCULES/PINOVA FACILITY BRUNSWICK, GEORGIA**

*Prepared for*

**Hercules LLC**  
500 Hercules Road  
Wilmington, DE 19808

*Prepared by*

Geosyntec Consultants, Inc.  
1255 Roberts Boulevard, Suite 200  
Kennesaw, Georgia 30144

Project GR6881P

October 2021

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## 1. INTRODUCTION

Geosyntec Consultants, Inc. (“Geosyntec”) has prepared this report titled *Tidal Evaluation and Groundwater Chemistry Data Summary* (the “Tidal Evaluation Report”) on behalf of Hercules LLC (“Hercules”) for submission to the Georgia Department of Natural Resources, Environmental Protection Division (“EPD”) to present the results of an approximately 33-day evaluation of the influence of tidal fluctuations on groundwater conditions in the upper surficial aquifer underlying the eastern portion of the industrial facility located at 2801 Cook Street in Brunswick, Georgia (the “Brunswick facility”). The duration of the tidal evaluation was set to monitor one full tidal cycle, including a spring tide event. The Tidal Evaluation Report summarizes objectives, field methods, and data obtained from pressure transducers installed at various groundwater observation and monitoring wells and one surface water monitoring location in the eastern portion of the Brunswick facility (the “study area”) between April 14, 2021 and May 17, 2021. The study area more specifically covers the area to the east of U.S. Highway 17 between the northern boundary of the Brunswick facility and the N Street Ditch and Outfall Ditch leading into Dupree Creek. The study area also extends approximately 420 feet to the west of U.S. Highway 17 between the northern boundary of the Brunswick facility and the N Street Ditch. Along with obtaining data from the pressure transducers, groundwater samples were collected and analyzed from various observation and monitoring wells in the study area between March 29, 2021 and 30, 2021, prior to installing the pressure transducers for the tidal evaluation. The Tidal Evaluation Report is intended to be appended to a report titled *Groundwater Monitoring Report, Semi-Annual Groundwater Monitoring Event – June 2021, Hercules LLC/Pinova, Inc., Brunswick, Georgia* (the “Groundwater Monitoring Report”) that Geosyntec is preparing for submission to EPD on behalf of Hercules.

## 2. OBJECTIVES

The tidal evaluation was conducted to assess the impacts that diurnal tidal cycles have on groundwater conditions within the study area at the Brunswick facility, including identification and quantification of variations in horizontal and vertical groundwater gradients and flow directions at various stages of the tidal cycle. In addition, groundwater samples were collected and analyzed to better characterize the distribution of constituents of potential concern in groundwater in the study area. The tidal evaluation was performed to further refine the conceptual site model for the Brunswick facility and to support the design for interim corrective measures using *in situ* biological degradation to address constituents of concern in groundwater in the deep zone of the upper surficial aquifer underlying the northern section of the portion of the Brunswick facility east of U.S. Highway 17. Descriptions of the effects of the diurnal tidal cycle on groundwater conditions contained herein are focused on such effects within the study area and assumptions should not be made that these descriptions are necessarily applicable to the rest of the Brunswick facility, particularly portions of the Brunswick facility that lie further to the west away from Dupree Creek and the tidal marsh to the east.

### 3. FIELD METHODS

#### 3.1 Observation Well Installations

Between March 8, 2021 and March 26, 2021, 15 new wells were installed in the study area at the Brunswick facility in support of the tidal evaluation. Eleven of these new wells are designated as observation wells, including observation wells OW-Q1S, OW-Q1I, OW-Q1D, OW-Q2S, OW-Q2I, OW-Q2D, OW-Q3S, OW-Q3I, OW-Q4S, OW-Q4I, and OW-Q4D. Four of these new wells are designated as monitoring wells, including monitoring wells MW-29S, MW-62S, MW-62I, and MW-62D. The locations of the 15 new wells are shown on **Figure 1** along with existing monitoring and observation wells that were installed previously in the vicinity of the study area and that have been used in conjunction with the tidal evaluation.

As discussed in the Groundwater Water Monitoring Report, while monitoring well MW-29S was installed in support of the tidal evaluation, that monitoring well has been incorporated into the monitoring well network for the Brunswick facility because it is adjacent to and complements existing monitoring wells MW-29I and MW-29D. In addition, the monitoring wells in the MW-62 well cluster were initially installed to support the tidal evaluation and were designated as observation well cluster OW-Q5. However, these wells are in the same location as a proposed monitoring well cluster described in a document prepared by Geosyntec on behalf of Hercules titled *Corrective Action Plan, Hercules LLC/Pinova, Inc., Brunswick, Georgia* (the “CAP”) that was submitted to EPD on February 1, 2021. Accordingly, the observation wells in observation well cluster OW-Q5 have been renamed as monitoring wells MW-62S, MW-62I and MW-62D. Because of the nomenclature that was initially used for observation well cluster OW-Q5, this Tidal Evaluation Report may include references to observations wells OW-Q5S, OW-Q5I and OW-Q5D with the understanding that these references mean monitoring wells MW-62S, MW-62I and MW-62D, respectively

Geosyntec contracted with South Atlantic Environmental Drilling and Construction Co. Inc. of Fort Mill, South Carolina to install the new monitoring and observation wells using roto sonic drilling techniques. The monitoring wells and observation wells were designed to be installed to create six well clusters with one well per cluster screened in the shallow zone (designated “S”), one well per cluster screened in the intermediate zone (designated “I”) and one well per cluster screened in the deep zone (designated “D”) of the upper surficial aquifer. Monitoring well MW-29S was installed to complement existing monitoring wells MW-29I and MW-29D and create a well cluster covering all three zones of the upper surficial aquifer. Lithologic and well construction logs are included in **Attachment A**.

The new monitoring and observation wells were installed in boreholes advanced using roto sonic drilling techniques. Soil cores were collected from the boreholes and field screened at 2-foot intervals using a calibrated photoionization detector (“PID”) to assess the soil cores for the presence of volatile organic compounds (“VOCs”). After the soil cores were screened with the PID, the soil cores were logged according to the Unified Soil Classification System by a Geosyntec geologist.



The new monitoring and observation wells were installed in accordance with technical guidance issued by the United States Environmental Protection Agency (“EPA”) titled *Design and Installation of Monitoring Wells* (SESDGUID-101-R2) (EPA, 2018). The monitoring wells and observation wells were constructed of 2-inch diameter Schedule 40 polyvinyl chloride (“PVC”) casing with 10 feet of 2-inch diameter, 0.010-slot PVC well screen, with the exception of observation well OW-Q3I, which was constructed with 8 feet of well screen. Each new monitoring and observation well was completed with an above grade stick-up surface completion including a 4-inch diameter aluminum outer protective casing, except for observation wells OW-Q3S and OW-Q3I that were equipped with 8-inch diameter steel manhole covers. Each new monitoring well and observation well was set within a concrete pad measuring 4 feet by 4 feet by 4 inches thick. A well tag containing the well identification information, date of installation, and construction information was installed at each well.

Monitoring wells and observations wells installed in the shallow, intermediate, and deep zones of the upper surficial aquifer were constructed with screened intervals approximately 10 to 20 feet below ground surface (“ft bgs”), 40 to 50 ft bgs, and 80 to 90 ft bgs, respectively. A summary of well construction details is provided in **Table 1**.

### 3.2 Well Development

After well construction activities were completed, pump and surge methods were used for well development at each new well to remove fine-grained sediments from the filter packs and well bottoms in order to produce groundwater samples with turbidity as low as possible. A submersible pump was used for well development activities which was decontaminated in accordance with technical guidance issued by EPA titled *Field Equipment Cleaning and Decontamination Procedures* (LSASDPROC-205-R4). The well development activities were completed between March 10, 2021 and March 30, 2021. Geosyntec recorded field parameters during well development activities using a calibrated water quality meter until the purged groundwater was free of visible sediment and the turbidity was below 10 nephelometric turbidity units (“NTU”). Water quality parameters including temperature, pH, specific conductance, oxidation reduction potential (“ORP”), and dissolved oxygen (“DO”) were also recorded during well development activities.

Well development logs are included in **Attachment B**.

### 3.3 Well Survey

The horizontal locations and vertical elevations of the new monitoring and observation wells were surveyed on April 9, 2021, by Wellston Associates Land Surveyors, LLC of Warner Robins, Georgia, under the direction of a Georgia registered land surveyor. Observation well cluster OW-Q4 was resurveyed on June 24, 2021. Vertical survey data is relative to the National Geodetic Vertical Datum (“NGVD”) of 1929. Horizontal survey data is presented relative to Zone 17 of the Universal Transverse Mercator (“UTM”) Grid. Ground surface and top of well casing elevation data are shown in **Table 1**. Well survey reports are included in **Attachment C**.

### 3.4 Groundwater Sampling

Geosyntec collected groundwater samples from the new monitoring and observation wells on March 29, 2021, March 30, 2021, and April 6, 2021. Geosyntec collected the groundwater samples using low flow groundwater sampling methods consistent with applicable EPA Region 4 guidance and established groundwater purging and sampling methodologies for the Brunswick facility, including (i) procedures for measuring groundwater quality field parameters, (ii) methods for collecting groundwater samples, and (iii) procedures for decontaminating sampling equipment. Prior to collecting groundwater samples, Geosyntec measured the depth to water from the top of the well casing in each new monitoring and observation well with a decontaminated electronic water level indicator. The new monitoring and observation wells were purged and sampled with a peristaltic pump or a decontaminated stainless-steel submersible pump equipped with new polyethylene tubing for each well. Water quality parameters including temperature, pH, specific conductance, ORP, and DO were monitored using a multimeter calibrated to manufacturer specifications. Once water quality parameters indicated that well stabilization had been achieved, groundwater samples were collected in laboratory provided containers and stored on ice pending delivery under chain of custody protocols to TestAmerica Laboratories in Savannah, Georgia for analysis of site-specific VOCs by EPA Method 8260B.

The groundwater field parameter measurements and laboratory analytical results are shown in **Table 2**. Groundwater sampling logs from the March 2021 groundwater sampling event are included in **Attachment D**. The laboratory and data validation reports from the March 2021 groundwater sampling event are included in **Attachment E**.

### 3.5 Tidal Evaluation

A total of 25 non-vented, data logging pressure transducers were deployed between April 14, 2021 and April 15, 2021. The pressure transducers were programmed to collect data on 15-minute intervals until the transducers were retrieved on May 17, 2021. One of the pressure transducers was used to collect barometric data only. A summary of the deployment of the pressure transducers is provided below:

- Twenty-three pressure transducers were deployed in various newly installed monitoring and observation wells together with certain existing monitoring wells screened within the shallow (eight), intermediate (seven), and deep (eight) zones of the upper surficial aquifer;
  - Twenty of the pressure transducers were In-Situ AquaTroll 200s (“AT200s”) equipped with specific conductivity sensors calibrated with a stock calibration solution prior to deployment; and
  - Three of the pressure transducers were In-Situ RuggedTroll 200s (“RT200s”) deployed without specific conductivity sensors.

- One AT200 with a specific conductivity sensor was deployed in a stilling well installed off a dock in Terry Creek for use in tidal lag-time analysis. This location is referenced as surface water monitoring location SWT-1 and is shown on **Figure 1**; and
- One In-Situ BaroTroll was deployed to collect barometric pressure readings used during data processing to remove the influence of barometric pressure on groundwater levels.

The pressure transducers were secured to the bottom of each well cap using steel cable and installed to a depth of at least 10 feet below the water table. At each location, the well cap was not tightened or sealed to permit direct exposure of groundwater within the well to the atmosphere. A stilling well was installed in Terry Creek and a transducer was deployed to monitor surface water levels. A map showing well locations where transducers were deployed is included on **Figure 1**.

Three rounds of manual depth to groundwater measurements were collected from each monitoring and observation well where a transducer was installed over the period of record, including immediately prior to deployment of the pressure transducers on April 14, 2021, again on May 3, 2021, and immediately prior to retrieval of the pressure transducers on May 17, 2021.

A summary of the depth to groundwater measurements that were collected manually is included in **Table 1**.

#### 4. TRANSDUCER DATA QUALITY EVALUATION

A systematic evaluation of data quality from the pressure transducers was performed to account for potential instrument drift and errant datapoints. The evaluation included adjusting non-vented pressure transducer data for barometric pressure using data collected by the BaroTroll and using methods described in a document titled *Manual Level Mode Correction for Non-Vented Sensors* (In-Situ, 2012). The BaroTroll was set after pressure transducers were already deployed in the OW-Q2, MW-29, and MW-62 (OW-Q5) well clusters. Barometric pressure data for the initial two-hour monitoring period at these three well clusters was obtained from the Brunswick Golden Isles Airport (Weather Station KGABRUNS28).

Barometric-pressure corrected transducer data were converted to groundwater elevations using manual depth-to-water measurements. Data from the pressure transducers were generally matched to the manual depth-to-water measurements collected on May 3, 2021, to provide the best curve fit. However, to provide the best match for the overall data set, data from the pressure transducers deployed in monitoring well MW-29S and observation wells OW-Q2S and OW-Q2D were matched to the manual depth-to-water measurements collected on April 14, 2021. In addition, data from the pressure transducer deployed in monitoring well MW-26D were matched to the manual depth-to-water measurements collected on May 17, 2021. After barometric-pressure corrected transducer data were converted to groundwater elevations, the converted groundwater elevations were plotted versus manual water level measurements to assess instrument drift (if any) over the monitoring period. Individual period-of-record charts for each monitoring location are included in **Attachment F**.

The results of the data quality evaluation indicate that manual water level measurements were generally in agreement with the data from the pressure transducers and transducer drift was not apparent. However, the pressure transducer placed in monitoring well MW-29D malfunctioned and no usable data were recovered. Observation well OW-2D and monitoring well MW-62D (observation well OW-5D) are proximally located north and south of monitoring well MW-29D, respectively. Therefore, the data gap due to the malfunction of the pressure transducer in monitoring well MW-29D is not expected to have a material impact on the overall tidal evaluation. Additionally, groundwater levels at monitoring well MW-29I were higher than at adjacent observation well OW-Q2I and monitoring well MW-62I (observation well OW-Q5I) throughout the period of record for the tidal evaluation. The area around the monitoring well MW-29 cluster was subject to activities associated with the pilot test of aerobic bioremediation that took place between March 15, 2021 and April 3, 2021 (involving injection of air into the deep zone of the upper surficial aquifer to promote aerobic biological activity). Pressure was observed when the well caps from the monitoring wells in monitoring well MW-29 cluster were removed to enable the pressure transducers to be deployed. Such pressure has the potential to impact the transducer readings at these locations.

## 4.1 Tidal Data Analysis

Over the monitoring period for the tidal evaluation, a maximum tidal range of 9.2 feet was observed between high and low tides coinciding with onset of the spring tide event on April 27, 2021, as shown on the SWT-1 surface water transducer chart transducer chart included as **Attachment F**. Tidal amplitude at the SWT-1 location was compared to groundwater levels in certain monitoring wells and observation wells to estimate tidal efficiency, which represents the ratio of tidal amplitude observed at each observation location relative to the tidal amplitude at SWT-1. Tidal lag times were also calculated to represent the time of propagation for a tidal signal from SWT-1 to each monitoring well and observation well that was being assessed. Additionally, tidal cycle impacts on horizontal hydraulic groundwater gradients, vertical hydraulic groundwater gradients, groundwater flow directions, and specific conductivity were assessed across the study area and within each of the shallow, intermediate, and deep zones comprising the upper surficial aquifer. Details regarding the hydrogeologic setting and existing conceptual site model for the Brunswick facility is contained in the CAP that was submitted to EPD on February 1, 2021.

Groundwater elevations were initially compared within each zone of the upper surficial aquifer along three transects, including: an east-west trending transect from observation well cluster OW-Q3/PSOW-12 to monitoring well cluster MW-55 (Transect 1), a north-south trending transect west of U.S. Highway 17 comprised of monitoring well clusters MW-26 and MW-11 (Transect 2), and a north-south trending transect east of U.S. Highway 17 comprised of observation well cluster OW-Q2, monitoring well cluster MW-29 and monitoring well cluster MW-62 (observation well cluster OW-Q5) (Transect 3). The transect locations are shown on **Figure 2**. Twenty-four hour precipitation data were obtained from the weather station at the Brunswick Golden Isles Airport to assess the response of groundwater levels to rain events.

Four apparent groundwater conditions were initially selected for the data analysis presented herein to provide an understanding of groundwater conditions in the study area under potentially different tidal/hydraulic scenarios. These four conditions are shown in each plot of groundwater elevations along specific transects provided in **Attachment G** and are defined as follows:

- Groundwater Condition 1 represents initial baseline conditions on April 21, 2021, that were representative of the first 6-7 days of the study period following deployment of the pressure transducers. The period for Groundwater Condition 1 spans a falling tide between approximately 03:39 (high tide) and 09:54 (low tide), during which there was minimal precipitation.<sup>1</sup>
- Groundwater Condition 2 represents hydraulic loading and aquifer response to an approximately 2-inch rainfall event on April 24, 2021. The period for Groundwater Condition 2 is April 25, 2021, between approximately 08:09 (high tide) and 13:39 (low

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<sup>1</sup> All times provided in this Tidal Evaluation Report are presented in military time nomenclature using a 24-hour convention (i.e., 6:00 a.m. is presented as 06:00 and 6:00 p.m. is presented as 18:00).

tide). Groundwater Condition 2 also corresponds to a transition toward spring tide conditions.

- Groundwater Condition 3 represents ongoing decreasing groundwater elevations in the upper surficial aquifer after the rainfall event on April 24, 2021 and after the spring tide conditions on April 27, 2021. The period for Groundwater Condition 3 is May 11, 2021, between approximately 09:09 (high tide) and 15:24 (low tide).
- Groundwater Condition 4 represents an approximate return to baseline conditions on May 17, 2021, between approximately 00:09 (high tide) and 06:39 (low tide).

Groundwater elevations based on transducer data for each of the four groundwater conditions described above are included in **Table 3**.

## 4.2 Horizontal Hydraulic Gradient Calculations

Horizontal hydraulic gradients were evaluated between multiple sets of well pairs at high and low tide for each of the four groundwater conditions described above within each of the three hydrogeologic zones of the upper surficial aquifer (i.e., the shallow zone, intermediate zone and deep zone). A geometric mean (“geomean”) hydraulic gradient was calculated at high and low tide for Groundwater Conditions 1-4. Tables showing the horizontal hydraulic gradient within each hydrogeologic zone and for each groundwater condition are provided in **Attachment H**.

Potentiometric surface maps reflecting groundwater elevations at high and low tides for Groundwater Conditions 1 and 2 are included as **Figures 3A/B** through **Figures 8A/B**. Similarities between results for Groundwater Conditions 1, 3, and 4 obviated the need to include potentiometric surface maps for Groundwater Conditions 3 and 4. Additionally, a set of time-series potentiometric surface maps at 1-hour intervals between peak high tide and peak low tide are included as **Figures 7A** to **7G** to show how horizontal gradients and flow directions evolved with the tidal cycle in the deep zone of the upper surficial aquifer during baseline conditions.

Charts showing a time-series of horizontal gradients between particular well pairs were generated for each hydrogeologic zone of the upper surficial aquifer to determine the frequency (if any) of groundwater flow reversals occurring over the period of record. These charts are presented in **Attachment I**. A positive horizontal gradient generally indicates flow toward the neighboring surface water body (i.e., toward Dupree Creek) and a negative horizontal gradient generally indicates flow inland toward the center of the Brunswick facility (i.e., away from Dupree Creek). The percentage of time that a horizontal gradient was positive or negative over the monitoring period was calculated to provide an understanding of the localized groundwater flow directions within each hydrogeologic zone of the upper surficial aquifer (**Attachment I**).

## 4.3 Horizontal Hydraulic Gradient Discussion

Horizontal groundwater gradients in the shallow zone of the upper surficial aquifer within the study area are generally consistent across the tidal cycle and the four selected groundwater conditions, with an average horizontal groundwater gradient range between of  $2.42 \times 10^{-3}$  and

$3.63 \times 10^{-3}$  ft/ft. Groundwater levels in the shallow zone of the upper surficial aquifer increased by approximately one foot after the 2-inch rainfall event reflected in Groundwater Condition 2 occurred, resulting in an increase in the hydraulic gradient between monitoring wells MW-29S and MW-62S (observation well OW-5S) and corresponding to the overall highest average gradient in the shallow zone of the upper surficial aquifer of  $3.63 \times 10^{-3}$  ft/ft. As shown in the potentiometric surface maps for the shallow zone of the upper surficial aquifer (**Figures 3A/B to 4A/B**), the predominant groundwater flow direction in the shallow zone of the upper surficial aquifer is to the south toward the Outfall Ditch at both high and low tide (i.e., groundwater is flowing under the Brunswick facility from the neighboring property to the north toward the Outfall Ditch). Based on the horizontal gradient time-series calculations, this groundwater flow direction was observed in the shallow zone of the upper surficial aquifer over the entire period of record for the selected well pairs.

Horizontal hydraulic gradients in the intermediate zone of the upper surficial aquifer within the study area were observed to increase at low tide by up to four times relative to the hydraulic gradients at high tide, with average groundwater gradient estimates ranging from  $4.36 \times 10^{-4}$  to  $5.08 \times 10^{-4}$  ft/ft at high tide and  $1.26 \times 10^{-3}$  and  $1.82 \times 10^{-3}$  ft/ft at low tide. A direct increase in groundwater levels was not observed after the rainfall event took place on April 24, 2021, as reflected in Groundwater Condition 2; however, both groundwater levels and the amplitude between high and low tides increased in the days leading up to the peak spring tide event on April 28, 2021.

In the absence of additional data immediately adjacent to the Outfall Ditch, the predominant groundwater flow direction in the intermediate zone of the upper surficial aquifer appears to shift from generally east toward Dupree Creek at peak low tide to inward and generally toward the OW-Q4 observation well cluster at peak high tide as shown on **Figures 5A/B to 6A/B**. The horizontal hydraulic gradient time series calculations indicate that groundwater flow between monitoring well MW-29I (located near U.S. Highway 17) and monitoring well MW-55I (located adjacent to Dupree Creek) is to the east approximately 90 percent of the time and to the west approximately 10 percent of the time. The horizontal hydraulic gradient time series calculations indicate that groundwater flow between observation well OW-Q4I and monitoring well MW-55I is to the east approximately 51 percent of the time and to the west 49 percent of the time. The horizontal hydraulic gradient time series calculations indicate that groundwater flow between monitoring well MW-29I and observation well OW-Q4I is to the east over the entire period of record. These calculations are included **Attachment I**. The data from the pressure transducers and the calculations that were performed underscore the significant tidal effect on groundwater flow in the intermediate zone of the upper surficial aquifer, particularly in proximity to Dupree Creek but extending further to the west in the study area. Tidal influence is sufficient to reverse the generally prevailing hydraulic gradient and cause groundwater flow directions to oscillate from west to east and from east to west.

Horizontal hydraulic gradients in the deep zone of the upper surficial aquifer within the study area were observed to increase at low tide relative to high tide, with average groundwater gradient estimates ranging from  $2.53 \times 10^{-3}$  to  $3.63 \times 10^{-3}$  ft/ft at high tide and  $2.42 \times 10^{-3}$  to  $3.32 \times 10^{-3}$  ft/ft at

low tide. Groundwater levels and hydraulic gradients in the deep zone of the upper surficial aquifer increased after the rainfall event reflected in Groundwater Condition 2; however, the depth of the deep zone of the upper surficial aquifer likely indicates that such increases may be due to hydraulic loading in the shallower water-bearing zones resulting in increased pressure in the deep zone of the surficial aquifer rather than direct recharge from precipitation. The period following the rainfall event on April 24, 2021, also corresponds to the days leading up to the peak spring tide event on April 28, 2021. In the absence of additional data immediately adjacent to the Outfall Ditch, the predominant groundwater flow direction in the deep zone of the upper surficial aquifer appears to be to the east/southeast toward Dupree Creek at both peak high tide and peak low tide between observation well PSOW-12 (west of U.S. Highway 17) and monitoring well MW-55D (located adjacent to Dupree Creek) as shown on **Figures 7A/E** and **8A/B**.

A series of potentiometric surface maps for the deep zone of the upper surficial aquifer prepared using hourly data between peak high tide and peak low tide have been included that reflect Groundwater Condition 1 and show the evolution of the increasing groundwater gradient to the east/southeast during the transition from high tide to low tide. The horizontal hydraulic gradient time series calculations indicate that groundwater flow between observation well PSOW-12 and observation well OW-Q4D and between observation well OW-Q4D and OW-Q2D is to the east/southeast over the entire period of record. The horizontal hydraulic gradient time series calculations also show that groundwater flow is to the east/southeast between observation well OW-Q4D and monitoring well MW-55D 98 percent of the time and from monitoring well MW-26D and observation well OW-Q2D 99 percent of the time as indicated in the calculations included in **Attachment I**.

#### 4.4 Vertical Hydraulic Gradients

Vertical hydraulic gradients were assessed in eight well pairs for the four groundwater conditions described above by subtracting the groundwater elevation in the deeper interval from the groundwater elevation in the shallower interval at each well pair and dividing by the vertical distance between the mid-points of the well screens. Negative values indicate an upward gradient and positive values indicate a downward gradient. Charts showing groundwater elevations for individual well pairs are included in **Attachment J**. Vertical hydraulic gradient calculations are provided in **Attachment K**.

Observations over the period of record from the study area generally indicate a consistent upward vertical gradient from the shallow to intermediate zone of the surficial aquifer at both high and low tides except with respect to Groundwater Condition 2 (reflecting a significant rainfall event), where hydraulic loading of the surficial system led to a temporary gradient reversal at most observation locations. Vertical gradients observed between the shallow and intermediate zones of the upper surficial aquifer ranged from -0.058 to 0.031 ft/ft during the period of record.

Observations over the period of record generally indicate a weak downward vertical gradient from the intermediate zone to the deep zone of the surficial aquifer at both high and low tides except at observation well clusters OW-Q2 and OW-Q3, where an upward gradient was observed during



high and low tides across the four groundwater conditions described above. An average downward gradient of 0.001 ft/ft was observed between the intermediate and deep zones of the upper surficial aquifer.

#### 4.5 Tidal Lag Time Analysis

Surface water monitoring location SWT-1 was used to estimate the tidal lag time between peak high tide elevations for monitoring wells and observation wells screened across each of the hydrogeologic zones of the upper surficial aquifer. Additionally, a tidal-efficiency ratio was calculated to assess the relative magnitude of the tidal amplitude observed in each monitoring well and observation well relative to the tidal amplitude at surface water monitoring location SWT-1 by dividing the tidal amplitude at each well by the tidal amplitude observed at SWT-1.

The average tidal lag times across Groundwater Conditions 1 through 4 within the shallow zone of the upper surficial aquifer ranged from 33 minutes at observation well OW-Q3S to 190 minutes at monitoring well MW-29S as indicated in **Attachment L**. An appreciable tidal signal was not identified at monitoring well MW-26S. Generally, lag time increased with increased distance from the surface water bodies, however an average lag time of 79 minutes was calculated at monitoring well MW-55S (located adjacent to Dupree Creek). The increased lag time observed at monitoring well MW-55S may be due to localized lithologic heterogeneity at the eastern edge of the Brunswick facility. Pressure buildup was observed at monitoring well MW-29S when the well cap was removed to deploy the pressure transducer at that monitoring well. It is possible that the source of this pressure impacted the arrival time of the tidal signal at the location of monitoring well MW-29S. Due to the similarity in arrival times observed at observation well OW-Q3S (33 minutes) and monitoring well MW-11S (45 minutes), it appears that the N Street Ditch is conveying tidally influenced surface water to groundwater upgradient from Dupree Creek. The maximum tidal-efficiency ratio observed in the shallow zone of the upper surficial aquifer was 0.13 at monitoring well MW-55S and generally decreased with distance from the surface water bodies.

The average tidal lag times within the intermediate zone of the upper surficial aquifer ranged from 16 minutes at monitoring well MW-55I to 57 minutes at observation well OW-Q3I. The maximum tidal-efficiency ratio observed in the intermediate zone of the upper surficial aquifer was 0.20 at monitoring well MW-55I. In general, the tidal lag times increased from east to west across the study area while the tidal-efficiency ratios decreased.

The average tidal lag times within the deep zone of the upper surficial aquifer ranged from 22 minutes at monitoring well MW-55D to 58 minutes at observation well PSOW-12 (to the west of U.S. Highway 17). The maximum tidal-efficiency ratio observed in the deep zone of the upper surficial aquifer was 0.19 at monitoring well MW-55D. In general, the tidal lag times increased from east to west across the study area and the tidal-efficiency ratios decreased at a similar magnitude as observed in the intermediate zone of the upper surficial aquifer.

## 4.6 Specific Conductivity

Specific conductivity data were collected from the 20 AT200 pressure transducers that were deployed at various monitoring and observation wells. The specific conductivity data were averaged over the monitoring period to evaluate the freshwater-saltwater wedge within each hydrogeologic zone of the upper surficial aquifer beneath the study area as shown on **Figures 9 to 11**. For reference, the average observed surface water conductivity at the SWT-1 location was 32,041 microsiemens per centimeter (“ $\mu\text{S}/\text{cm}$ ”). Based on the data from the pressure transducers, conductivity values decrease from east to west across the shallow zone of the upper surficial aquifer underlying the study area, with average conductivity values ranging from 31,946  $\mu\text{S}/\text{cm}$  at monitoring well MW-55S and approximately 2,000  $\mu\text{S}/\text{cm}$  near U.S. Highway 17. Conductivity values appear to generally decrease from southwest to northeast in the intermediate zone of the upper surficial aquifer underlying the study area, with average values ranging from 2,166  $\mu\text{S}/\text{cm}$  at monitoring well MW-11I to 703  $\mu\text{S}/\text{cm}$  at monitoring well MW-55I. Conductivity values in the deep zone of the upper surficial aquifer range from 8,432  $\mu\text{S}/\text{cm}$  at monitoring well MW-55D to 1,433  $\mu\text{S}/\text{cm}$  at observation well OW-Q2D.

## 5. CONCLUSIONS

Based on the results of the tidal evaluation, groundwater in the shallow zone of the upper surficial aquifer underlying the study area was observed to flow predominantly to the south from areas north of the Brunswick facility toward the Outfall Ditch throughout the period of record with an overall average horizontal gradient of  $2.81 \times 10^{-3}$  ft/ft across the four groundwater conditions described herein. The highest groundwater gradients were observed after hydraulic loading from the precipitation event on April 24, 2021 (Groundwater Condition 2). Tidal lag times between the surface water monitoring location (SWT-1) and the wells screened in the shallow zone of the upper surficial aquifer within the study area were calculated between 33 minutes (at observation well OW-Q3S) and 190 minutes (at monitoring well MW-29S). The maximum tidal efficiency ratio was observed at monitoring well MW-55S, where 13 percent of the surface water tidal amplitude was observed during peak high tide.

The direction of groundwater flow in the intermediate zone of the upper surficial aquifer underlying the study area was observed to shift from eastward toward Dupree Creek at low tide to westward away from Dupree Creek (toward observation well OW-Q4I) at high tide. These oscillating groundwater flow directions in the intermediate zone of the upper surficial aquifer highlight the degree of influence that tidal fluctuations have on groundwater conditions in the study area. Horizontal groundwater gradients in the intermediate zone of the upper surficial aquifer underlying the study area ranged between an average of  $4.64 \times 10^{-4}$  ft/ft at high tide and an average of  $1.53 \times 10^{-3}$  ft/ft at low tide across the four groundwater conditions described herein. A relatively continuous upward vertical gradient from the intermediate zone to the shallow zone of the upper surficial aquifer was observed throughout the period of record, except in response to a rainfall event that occurred on April 24, 2021, which reversed the vertical gradients. Tidal lag times between the surface water monitoring location (SWT-1) and the wells screened in the intermediate zone of the upper surficial aquifer within the study area were calculated between 16 minutes (at monitoring well MW-55I) and 46 minutes (at monitoring well MW-62I (observation well OW-Q5I)). The maximum tidal efficiency ratio was observed at monitoring well MW-55I, where 20 percent of the surface water tidal amplitude was observed during peak high tide.

Groundwater in the deep zone of the upper surficial aquifer underlying the study area was observed to flow to the east/southeast below Dupree Creek toward the Atlantic Ocean throughout the period of record. Horizontal groundwater gradients in the deep zone of the upper surficial aquifer ranged between an average of  $6.64 \times 10^{-4}$  ft/ft at high tide and  $1.60 \times 10^{-3}$  ft/ft at low tide across the four groundwater conditions described herein, with the highest horizontal groundwater gradient of  $3.73 \times 10^{-3}$  ft/ft observed to occur following the rainfall event on April 24, 2021. An average downward gradient of 0.001 ft/ft was observed between the intermediate zone and the deep zone of the upper surficial aquifer underlying the study area, with generally weak upward vertical gradients during high tide and weak downward vertical gradients during low tide.

Conductivity values in the shallow zone of the upper surficial aquifer indicate significant saltwater intrusion in the eastern portion of the study area at the Brunswick facility. Conductivity values generally decreased from east to west in the shallow zone of the upper surficial aquifer underlying

the study area at distance from Dupree Creek. Broader trends in the conductivity values from the intermediate and deep zones of the upper surficial aquifer are more difficult to assess due to the limited aerial extent of the data. However, there appears to be a “sandwich” of less salty water present in the intermediate zone between the more brackish groundwater present in shallow zone and deep zone of the upper surficial aquifer.

Refinements to the conceptual site model for the Brunswick facility from the tidal evaluation include information providing a better understanding of the tidal influence on groundwater flow directions and gradients in the study area through a full tidal cycle, particularly in the deep zone of the upper surficial aquifer where interim measures are slated to be implemented, identification of a continuous southerly groundwater flow direction from areas north of the Brunswick facility toward the Outfall Ditch within the shallow zone of the upper surficial aquifer underlying the study area, a generally upward vertical groundwater gradient between the intermediate and shallow zones of the upper surficial aquifer within the study area except during periods of precipitation, a downward vertical groundwater gradient from the intermediate zone to the deep zone of the upper surficial aquifer, oscillating horizontal gradients in the intermediate zone of the upper surficial aquifer in response to tidal fluctuations, and elevated conductivity in both the shallow and deep zones of the upper surficial aquifer.

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# Tables

**Table 1**  
**Well Construction Details and Manual Depth to Water Measurements**  
 Hercules/Pinova Facility, Brunswick, Georgia

WELL DESIGNATION	MW-11S		MW-11D		MW-11DD		MW-26S		MW-26D	
DIAMETER (inches)	2		2		2		2		2	
WELL DEPTH (ft bls)	21		55		91		15		90	
SCREEN LENGTH (ft)	7		7		10		10		10	
GROUND SURFACE ELEVATION (ft msl)	5.36		4.86		5.20		7.43		7.38	
TOP OF CASING ELEVATION (ft msl)	7.82		8.26		8.23		7.25		7.11	
DATE	DTW	ELEV	DTW	ELEV	DTW	ELEV	DTW	ELEV	DTW	ELEV
3/29/2021	5.19	2.63	4.73	3.53	4.92	3.31	-	-	5.99	1.12
4/14/2021	-	-	-	-	-	-	-	-	-	-
4/15/2021	5.83	1.99	5.08	3.18	5.25	2.98	4.19	3.06	4.29	2.82
5/3/2021	5.43	2.39	4.85	3.41	5.01	3.22	3.72	3.53	3.66	3.45
5/17/2021	5.66	2.16	5.01	3.25	5.16	3.07	4.28	2.97	4.05	3.06

WELL DESIGNATION	MW-29S		MW-29I		MW-29D		MW-55S		MW-55I	
DIAMETER (inches)	2		2		2		2		2	
WELL DEPTH (ft bls)	25		51		90		25		55	
SCREEN LENGTH (ft)	10		10		10		15		15	
GROUND SURFACE ELEVATION (ft msl)	5.68		6.14		6.37		5.28		5.07	
TOP OF CASING ELEVATION (ft msl)	8.95		8.74		9.12		8.07		7.92	
DATE	DTW	ELEV	DTW	ELEV	DTW	ELEV	DTW	ELEV	DTW	ELEV
3/29/2021	6.10	2.85	5.5	3.24	6.18	2.94	6.5	1.57	5.8	2.12
4/14/2021	6.79	2.16	5.92	2.82	6.52	2.60	-	-	-	-
4/15/2021	-	-	-	-	-	-	6.48	1.59	4.87	3.05
5/3/2021	9.55	-0.60	5.32	3.42	5.78	3.34	6.25	1.82	4.56	3.36
5/17/2021	7.06	1.89	5.59	3.15	6.12	3.00	6.54	1.53	5.17	2.75

WELL DESIGNATION	MW-55D		OW-Q1S		OW-Q1I		OW-Q1D		OW-Q2S	
DIAMETER (inches)	2		2		2		2		2	
WELL DEPTH (ft bls)	85		25		50		90		17	
SCREEN LENGTH (ft)	10		10		10		10		10	
GROUND SURFACE ELEVATION (ft msl)	5.31		4.98		5.14		5.11		5.35	
TOP OF CASING ELEVATION (ft msl)	7.81		7.80		7.71		7.80		8.28	
DATE	DTW	ELEV	DTW	ELEV	DTW	ELEV	DTW	ELEV	DTW	ELEV
3/29/2021	5.8	2.01	4.61	3.19	5.00	2.71	5.15	2.65	5.24	3.04
4/14/2021	-	-	-	-	-	-	-	-	5.94	2.34
4/15/2021	5.01	2.80	-	-	-	-	-	-	-	-
5/3/2021	4.70	3.11	-	-	-	-	-	-	5.62	2.66
5/17/2021	5.35	2.46	-	-	-	-	-	-	6.24	2.04

WELL DESIGNATION	OW-Q2I		OW-Q2D		OW-Q3S		OW-Q3I		OW-Q4S	
DIAMETER (inches)	2		2		2		2		2	
WELL DEPTH (ft bls)	50		90		25		65		15	
SCREEN LENGTH (ft)	10		10		10		8		10	
GROUND SURFACE ELEVATION (ft msl)	5.91		5.60		6.35		6.35		4.77	
TOP OF CASING ELEVATION (ft msl)	8.93		8.41		6.07		6.15		7.80	
DATE	DTW	ELEV	DTW	ELEV	DTW	ELEV	DTW	ELEV	DTW	ELEV
3/29/2021	6.08	2.85	5.51	2.90	3.21	2.86	2.66	3.49	4.76	3.04
4/14/2021	6.45	2.48	5.91	2.50	-	-	-	-	-	-
4/15/2021	-	-	-	-	3.37	2.70	2.91	3.24	5.40	2.40
5/3/2021	5.70	3.23	5.14	3.27	3.00	3.07	2.77	3.38	5.06	2.74
5/17/2021	6.00	2.93	5.50	2.91	3.41	2.66	2.95	3.20	5.86	1.94

WELL DESIGNATION	OW-Q4I		OW-Q4D		OW-Q5S		OW-Q5I		OW-Q5D	
DIAMETER (inches)	2		2		2		2		2	
WELL DEPTH (ft bls)	51		90		21		48		90	
SCREEN LENGTH (ft)	10		10		10		10		10	
GROUND SURFACE ELEVATION (ft msl)	4.86		5.28		6.00		5.92		5.92	
TOP OF CASING ELEVATION (ft msl)	7.84		7.98		9.11		9.12		8.90	
DATE	DTW	ELEV	DTW	ELEV	DTW	ELEV	DTW	ELEV	DTW	ELEV
3/29/2021	5.33	2.51	5.59	2.39	6.1	3.01	6.74	2.38	5.99	2.91
4/14/2021	-	-	-	-	7.44	1.67	6.39	2.73	6.32	2.58
4/15/2021	4.81	3.03	5.10	2.88	-	-	-	-	-	-
5/3/2021	4.59	3.25	4.84	3.14	7.05	2.06	5.88	3.24	5.75	3.15
5/17/2021	5.06	2.78	5.30	2.68	7.39	1.72	6.16	2.96	6.07	2.83

WELL DESIGNATION	PSOW-12	
DIAMETER (inches)	2	
WELL DEPTH (ft bls)	89	
SCREEN LENGTH (ft)	5	
GROUND SURFACE ELEVATION (ft msl)	6.90	
TOP OF CASING ELEVATION (ft msl)	6.62	
DATE	DTW	ELEV
3/29/2021	-	-
4/14/2021	-	-
4/15/2021	3.02	3.60
5/3/2021	2.91	3.71
5/17/2021	3.09	3.53

Notes:  
 " - " indicates not measured  
 ft indicates feet  
 bls indicates below land surface  
 TOC indicates top of casing  
 ft msl indicates feet relative to mean sea level  
 DTW indicates depth to groundwater below TOC  
 ELEV indicates groundwater elevation

**Table 2**  
**Groundwater Chemistry and Water Quality Parameters**  
Hercules/Pinova Facility, Brunswick, Georgia

Analyte	Units	MW-11D 4/7/2021	MW-11DD 4/7/2021	MW-26D 4/6/2021	MW-29S 3/29/2021	MW-29I 4/3/2021	MW-29D 4/7/2021	MW-38S 4/3/2021	MW-38I 4/3/2021	MW-38D 4/3/2021	MW-55S 4/3/2021	MW-55I 4/3/2021	MW-55D 4/3/2021	MW-62S 3/30/2021	MW-62I 3/30/2021
Aquifer		Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial
Aquifer Unit		Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper
Aquifer Zone		Intermediate	Deep	Deep	Shallow	Intermediate	Deep	Shallow	Intermediate	Deep	Shallow	Intermediate	Deep	Shallow	Intermediate
<b>Field Parameters</b>															
Conductivity	mS/cm	2.46	13.14	9.63	6.64	0.96	9.48	16.10	0.71	7.00	30.80	0.82	8.58	4.80	1.67
Oxygen, Dissolved	mg/L	0.07	0.15	0.27	0.21	0.10	0.13	0.10	0.14	0.07	0.09	0.13	0.09	0.11	0.21
Oxidation Reduction Potential	mV	-72.7	-14.7	-55.5	-96.6	-49.0	-5.3	-42.6	-63.7	-15.9	-359.2	-225.6	-122.8	-140.6	-90.1
pH	SU	6.82	6.20	6.61	7.03	6.17	7.03	5.97	7.27	6.31	7.03	7.43	6.32	8.53	8.33
Temperature	°C	24.34	24.89	24.54	20.24	22.88	21.43	20.03	21.49	22.61	21.76	21.57	22.48	21.37	22.26
Turbidity	NTU	7.98	1.34	3.61	5.64	9.92	2.01	41.4	33.9	24.0	3.11	8.39	6.73	48.1	6.74
<b>Volatile Organic Compounds</b>															
1,1-Dichloroethane	µg/L	1.0 U	<b>1.2</b>	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
1,1-Dichloroethylene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
1,2,3-Trichloropropane	µg/L	3.0 U	3.0 U	3.0 U	1.0 U	1.0 U	6.0 U	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
1,2,4-Trichlorobenzene	µg/L	2.0 U	2.0 U	2.0 U	5.0 U	5.0 U	4.0 U	5.0 U	5.0 U	250 U	5.0 U	5.0 U	50 U	5.0 U	5.0 U
1,2-Dichlorobenzene	µg/L	1.0 U	<b>2.5</b>	1.0 U	1.0 U	1.0 U	<b>8.9</b>	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
1,2-Dichloropropane	µg/L	2.0 U	2.0 U	2.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
1,2,4-Trimethylbenzene	µg/L	2.0 U	2.0 U	2.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
1,4-Dichlorobenzene	µg/L	1.0 U	<b>3.9</b>	1.0 U	1.0 U	1.0 U	<b>14.0</b>	1.0 U	1.0 U	50 U	1.0 U	1.0 U	<b>13</b>	1.0 U	1.0 U
2-Butanone (MEK)	µg/L	10 U	10 U	10 U	10 U	10 U	20 U	10 U	10 U	500 U	10 U	10 U	100 U	10 U	10 U
4-Methyl-2-pentanone (MIBK)	µg/L	15 U	15 U	15 U	10 U	10 U	30 U	10 U	10 U	500 U	10 U	10 U	100 U	10 U	10 U
Acetone	µg/L	20 U	20 U	20 U	10 U	10 U	40 U	10 U	10 U	500 U	10 U	10 U	100 U	10 U	10 U
Benzene	µg/L	<b>54</b>	<b>150</b>	<b>9.6</b>	1.0 U	<b>3.1</b>	<b>730</b>	1.0 U	1.0 U	<b>1200</b>	1.0 U	<b>14</b>	<b>890</b>	1.0 U	1.0 U
Carbon disulfide	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	4.0 U	2.0 U	2.0 U	100 U	2.0 U	2.0 U	20.0 U	2.0 U	2.0 U
Carbon tetrachloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	<b>55</b>	<b>170</b>	<b>2.5</b>	1.0 U	<b>1.1</b>	<b>690</b>	1.0 U	<b>4.5</b>	<b>910</b>	1.0 U	<b>8.2</b>	<b>620</b>	1.0 U	1.0 U
Chloroform	µg/L	1.0 U	<b>180</b>	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
Ethylbenzene	µg/L	1.0 U	<b>4.7</b>	1.0 U	1.0 U	1.0 U	<b>160</b>	1.0 U	1.0 U	<b>74</b>	1.0 U	1.0 U	<b>30</b>	1.0 U	1.0 U
Isopropylbenzene (Cumene)	µg/L	<b>20</b>	<b>23</b>	2.0 U	1.0 U	<b>1.8</b>	<b>200</b>	1.0 U	1.0 U	<b>460</b>	1.0 U	<b>1.8</b>	<b>310</b>	1.0 U	1.0 U
Methylene Chloride	µg/L	10 U	<b>110</b>	10 U	5.0 U	5.0 U	20 U	5.0 U	5.0 U	250 U	5.0 U	5.0 U	50 U	5.0 U	5.0 U
m-Xylene & p-Xylene	µg/L	2.0 U	<b>19</b>	2.0 U	1.0 U	1.0 U	<b>280</b>	1.0 U	1.0 U	<b>79</b>	1.0 U	1.0 U	<b>23.0</b>	1.0 U	1.0 U
o-Xylene	µg/L	2.0 U	2.0 U	2.0 U	1.0 U	1.0 U	40 U	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
p-Isopropyltoluene (Para-cymene)	µg/L	3.0 U	<b>4.1</b>	3.0 U	<b>2.8</b>	1.0 U	6.0 U	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	2.0 U	2.0 U	2.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
Toluene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	<b>3.4</b>	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
Trichloroethene	µg/L	2.0 U	2.0 U	2.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U
Vinyl chloride	µg/L	1.0 U	<b>3.5</b>	1.0 U	1.0 U	1.0 U	<b>4.5</b>	1.0 U	1.0 U	50 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U

NOTES:  
BOLD = Analyte detected above laboratory reporting limit  
U = Not detected at or above the reporting detection limit  
J = Estimated value  
ug/L = micrograms per liter  
mg/L = milligrams per liter  
mS/cm = millisiemens per centimeter



**Table 2**  
**Groundwater Chemistry and Water Quality Parameters**  
Hercules/Pinova Facility, Brunswick, Georgia

Geosyntec Consultants

Analyte	Units	MW-62D 3/30/2021	OW-Q1S 3/30/2021	OW-Q1I 3/30/2021	OW-Q1D 3/30/2021	OW-Q2S 3/29/2021	OW-Q2I 3/30/2021	OW-Q2D 3/29/2021	OW-Q3S 4/6/2021	OW-Q3I 4/6/2021	OW-Q4S 3/30/2021	OW-Q4I 3/30/2021	OW-Q4D 4/3/2021	PSOW-11 4/7/2021	PSOW-12 4/6/2021
	<b>Aquifer</b>	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial	Surficial
	<b>Aquifer Unit</b>	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Upper
	<b>Aquifer Zone</b>	Deep	Shallow	Intermediate	Deep	Shallow	Intermediate	Deep	Shallow	Intermediate	Shallow	Intermediate	Deep	Deep	Deep
<b>Field Parameters</b>															
Conductivity	mS/cm	10.07	20.93	0.78	9.77	2.17	0.95	8.76	0.58	5.45	30.08	0.72	9.01	11.61	12.46
Oxygen, Dissolved	mg/L	0.18	0.05	0.14	0.12	0.15	0.16	0.12	0.13	0.12	0.06	0.11	0.13	0.03	0.25
Oxidation Reduction Potential	mV	-25.7	-39.4	-142.2	-16.2	-121.8	-134.3	-39.8	-149.5	-50.4	-145.3	-130.0	-33.5	-39.5	-44.4
pH	SU	7.11	6.23	7.36	6.26	7.42	7.22	6.30	7.52	6.57	6.33	7.45	6.37	6.39	6.40
Temperature	°C	22.24	19.50	21.98	21.94	19.33	22.26	22.74	21.85	22.43	20.76	23.24	19.86	24.52	23.24
Turbidity	NTU	5.19	4.08	4.64	4.98	1.68	1.03	1.06	7.89	4.82	9.18	1.87	8.41	6.58	2.13
<b>Volatile Organic Compounds</b>															
1,1-Dichloroethane	µg/L	<b>1.0</b>	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethylene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2,3-Trichloropropane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	3.0 U	3.0 U	1.0 U	1.0 U	1.0 U	3.0 U	3.0 U
1,2,4-Trichlorobenzene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U	2.0 U	5.0 U	5.0 U	5.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	µg/L	<b>3.1</b>	1.0 U	1.0 U	<b>8.6</b>	1.0 U	1.0 U	<b>7.6</b>	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	<b>3.1</b>	<b>1.8</b>
1,2-Dichloropropane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	2.0 U
1,2,4-Trimethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	2.0 U
1,3,5-Trimethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	µg/L	<b>5.8</b>	1.0 U	1.0 U	<b>14.0</b>	1.0 U	1.0 U	<b>12</b>	1.0 U	1.0 U	1.0 U	1.0 U	<b>14</b>	<b>4.5</b>	<b>2.3</b>
2-Butanone (MEK)	µg/L	10 U	<b>67</b>	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone (MIBK)	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	15 U	15 U	10 U	10 U	100 U	15 U	15 U
Acetone	µg/L	10 U	<b>24</b>	10 U	10 U	10 U	10 U	10 U	20 U	20 U	10 U	10 U	100 U	20 U	20 U
Benzene	µg/L	<b>100</b>	1.0 U	1.0 U	<b>710</b>	1.0 U	1.0 U	<b>710</b>	1.0 U	<b>410</b>	1.0 U	1.0 U	<b>990</b>	<b>300</b>	<b>160</b>
Carbon disulfide	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Carbon tetrachloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	<b>200</b>	<b>1.3</b>	1.0 U	<b>630</b>	1.0 U	1.0 U	<b>610</b>	1.0 U	<b>87</b>	1.0 U	1.0 U	<b>660</b>	<b>300</b>	<b>220</b>
Chloroform	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	<b>3.3</b>	1.0 U	1.0 U	1.0 U	<b>1.7</b>	<b>1.8</b>
Ethylbenzene	µg/L	<b>1.2</b>	1.0 U	1.0 U	<b>250</b>	1.0 U	1.0 U	<b>230</b>	1.0 U	<b>1.1</b>	1.0 U	1.0 U	<b>180</b>	<b>1.5</b>	<b>1.4</b>
Isopropylbenzene (Cumene)	µg/L	<b>20</b>	1.0 U	1.0 U	<b>210</b>	1.0 U	1.0 U	<b>160</b>	2.0 U	<b>120</b>	1.0 U	1.0 U	<b>260</b>	<b>97</b>	<b>57</b>
Methylene Chloride	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	10 U	5.0 U	5.0 U	5.0 U	10 U	10 U
m-Xylene & p-Xylene	µg/L	<b>4.3</b>	1.0 U	1.0 U	<b>210</b>	1.0 U	1.0 U	<b>210</b>	2.0 U	<b>4.5</b>	1.0 U	1.0 U	<b>320</b>	<b>4.0</b>	<b>2.1</b>
o-Xylene	µg/L	1.0 U	1.0 U	1.0 U	<b>5.2</b>	1.0 U	1.0 U	<b>3.2</b>	2.0 U	2.0 U	1.0 U	1.0 U	10 U	2.0 U	2.0 U
p-Isopropyltoluene (Para-cymene)	µg/L	1.0 U	1.0 U	1.0 U	<b>5.3</b>	<b>7.3</b>	<b>1.0</b>	<b>2.2</b>	3.0 U	3.0 U	1.0 U	1.0 U	10 U	3.0 U	3.0 U
Tetrachloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	2.0 U
Toluene	µg/L	1.0 U	1.0 U	1.0 U	<b>1.7J</b>	1.0 U	1.0 U	<b>2.9</b>	1.0 U	<b>1.5</b>	1.0 U	1.0 U	10 U	<b>1.2</b>	1.0 U
Trichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	2.0 U
Vinyl chloride	µg/L	<b>4.8</b>	1.0 U	1.0 U	<b>6.4</b>	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	10 U	<b>5.1</b>	<b>3.6</b>

NOTES:  
BOLD = Analyte detected above laboratory reporting l  
U = Not detected at or above the reporting detection lin  
J = Estimated value  
ug/L = micrograms per liter  
mg/L = milligrams per liter  
mS/cm = millisiemens per centimeter

**Table 3**  
**Groundwater Elevations for Groundwater Conditions 1 to 4**  
 Hercules/Pinova Facility, Brunswick, Georgia

Well Pair	Interval	Groundwater Condition 1:	High Tide -1	High Tide -2	High Tide -3	High Tide -4	High Tide -5	Groundwater Condition 1:	Groundwater Condition 2:	Groundwater Condition 2:	Groundwater Condition 3:	Groundwater Condition 3:	Groundwater Condition 4:	Groundwater Condition 4:
		High Tide						Low Tide	High Tide	Low Tide	High Tide	Low Tide	High Tide	Low Tide
Date & Time of Tidal High & Low at SWT-1														
		4/21/2021 3:39	4/21/2021 4:49	4/21/2021 5:49	4/21/2021 6:49	4/21/2021 7:49	4/21/2021 8:49	4/21/2021 9:54	4/25/2021 8:09	4/25/2021 13:39	5/11/2021 9:09	5/11/2021 15:24	5/17/2021 0:09	5/17/2021 6:39
MW-11	S	2.26						1.96	2.92	2.48	2.09	1.79	2.22	1.91
	D	3.46						3.04	3.67	3.05	3.07	2.64	3.32	2.93
	DD	3.28	3.27	3.20	3.10	2.99	2.90	2.84	3.50	2.85	2.87	2.45	3.14	2.74
MW-26	S	3.10						3.09	3.61	3.67	3.13	3.11	2.98	2.99
	I	-						-	-	-	-	-	-	-
	D	3.25	3.26	3.17	3.05	2.92	2.84	2.79	3.47	2.74	2.96	2.48	3.24	2.77
MW-29	S	2.11						2.11	2.81	2.90	1.99	2.00	1.92	1.96
	I	3.40						2.86	3.61	2.84	2.95	2.45	3.25	2.75
	D	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-55	S	1.82						1.29	2.07	1.28	1.14	0.73	1.71	1.33
	I	3.32						2.27	3.62	2.01	2.82	1.77	3.27	2.19
	D	3.03	2.97	2.73	2.49	2.26	2.14	2.05	3.34	1.80	2.54	1.55	2.98	1.98
OW-Q2	S	2.22						2.22	2.97	3.02	2.11	2.09	2.03	2.05
	I	3.15						2.60	3.36	2.55	2.69	2.17	3.00	2.47
	D	3.24	3.22	3.10	2.96	2.82	2.71	2.64	3.48	2.59	2.82	2.25	3.13	2.57
OW-Q3/ PSOW-12	S	2.74						2.64	3.53	3.39	2.70	2.63	2.71	2.63
	I	3.40						3.15	3.58	3.24	3.04	2.82	3.24	3.03
	D	3.72	3.73	3.71	3.64	3.58	3.52	3.47	3.90	3.55	3.33	3.12	3.55	3.33
OW-Q4	S	2.29						2.26	3.41	3.36	2.12	2.10	1.98	1.99
	I	3.19						2.40	3.46	2.25	2.72	1.94	3.10	2.31
	D	3.08	3.03	2.83	2.64	2.47	2.36	2.28	3.35	2.12	2.62	1.83	3.00	2.20
OW-Q5	S	1.65						1.64	2.14	2.16	1.55	1.53	1.57	1.59
	I	3.22						2.71	3.42	2.69	2.76	2.30	3.06	2.60
	D	3.12	3.09	2.98	2.85	2.72	2.61	2.55	3.35	2.51	2.72	2.18	3.04	2.49

Notes:

1. Groundwater Condition 1 represents initial baseline conditions on April 21, 2021 between approximately 03:39 (high tide) and 09:54 (low tide).
2. Groundwater Condition 2 represents hydraulic loading and aquifer response to an approximately 2-inch rainfall event on April 24, 2021. The period for Groundwater Condition 2 is April 25, 2021 between approximately 08:09 (high tide) and 13:39 (low tide). This condition also corresponds to a transition towards spring tide conditions.
3. Groundwater Condition 3 represents a decrease in groundwater levels within the surficial aquifer after the April 24, 2021 rain event. The period for Groundwater Condition 3 is May 11, 2021 between approximately 09:09 (high tide) and 15:24 (low tide).
4. Groundwater Condition 4 represents an approximate return to baseline conditions on May 17, 2021 between approximately 00:09 (high tide) and 06:39 (low tide).

# Figures





- Legend**
- Tidal Study Well
  - Surface Water Monitoring Location
  - Pinova Property
  - Hercules Property

1. Transducers were deployed in evaluation network locations except for OW-Q1S, OW-Q1I, and OW-Q1D.



**Tidal Evaluation Network**  
Hercules/Pinova Facility  
Brunswick, Georgia

**Geosyntec**  
consultants

**Figure**  
**1**

Kennesaw, GA

October 2021

Path: \\s01\01\18\Aerial\Brunswick Plant\GIS\Technical Study\Figure 1 Tidal Evaluation Monitoring Locations.mxd



- Legend**
- Tidal Study Well
  - Transect
  - Pinova Property
  - Hercules Property



**Horizontal Gradient Transect Map**  
 Hercules/Pinova Facility  
 Brunswick, Georgia

**Geosyntec**  
 consultants

Kennesaw, GA

October 2021

**Figure**  
**2**

Path: \\s01-01\p118\Aerials\Brunswick Plant\GIS\Koch\Info\Study\Figure 2 Horizontal Gradient Transect Map.mxd



- Legend**
- + Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 21, 2021 around 03:39 after correcting for barometric pressure.



**Shallow Zone of the Upper Surficial Aquifer  
Groundwater Condition 1 - High Tide**  
Hercules/Pinova Facility  
Brunswick, Georgia

**Geosyntec**  
consultants

Kennesaw, GA

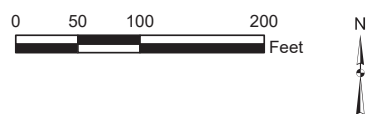
October 2021

**Figure  
3A**



- Legend**
- + Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 21, 2021 around 09:54 after correcting for barometric pressure.



**Shallow Zone of the Upper Surficial Aquifer  
Groundwater Condition 1 - Low Tide**  
Hercules/Pinova Facility  
Brunswick, Georgia

		<b>Figure 3B</b>
Kennesaw, GA	October 2021	

Path: \\ms01\proj\18\Aerial\Brunswick Plant\GIS\Technical Study\Figure 3B Shallow Surficial Aquifer Groundwater Condition 1 - Low Tide.mxd



- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 25, 2021 around 08:09 after correcting for barometric pressure.



**Shallow Zone of the Upper Surficial Aquifer  
Groundwater Condition 2 - High Tide**  
Hercules/Pinova Facility  
Brunswick, Georgia

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Kennesaw, GA

October 2021

**Figure  
4A**





- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 25, 2021 around 13:39 after correcting for barometric pressure.



**Shallow Zone of the Upper Surficial Aquifer  
Groundwater Condition 2 - Low Tide**  
Hercules/Pinova Facility  
Brunswick, Georgia

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Kennesaw, GA

October 2021

**Figure  
4B**



- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property



**Intermediate Zone of the Upper Surficial Aquifer  
Groundwater Condition 1 - High Tide**  
Hercules/Pinova Facility  
Brunswick, Georgia

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**Figure  
5A**

Kennesaw, GA

October 2021

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 21, 2021 around 03:39 after correcting for barometric pressure.



- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 21, 2021 around 09:54 after correcting for barometric pressure.



**Intermediate Zone of the Upper Surficial Aquifer  
Groundwater Condition 1 - Low Tide**  
Hercules/Pinova Facility  
Brunswick, Georgia

		<b>Figure 5B</b>
Kennesaw, GA	October 2021	



- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 25, 2021 around 08:09 after correcting for barometric pressure.



**Intermediate Zone of the Upper Surficial Aquifer  
Groundwater Condition 2 - High Tide**  
Hercules/Pinova Facility  
Brunswick, Georgia

		<b>Figure 6A</b>
Kennesaw, GA	October 2021	



- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 25, 2021 around 13:39 after correcting for barometric pressure.



**Intermediate Zone of the Upper Surficial Aquifer  
Groundwater Condition 2 - Low Tide**  
Hercules/Pinova Facility  
Brunswick, Georgia

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Kennesaw, GA

October 2021

**Figure  
6B**



- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 21, 2021 around 03:39 after correcting for barometric pressure.



**Deep Zone of the Upper Surficial Aquifer  
Groundwater Condition 1 - High Tide**  
Hercules/Pinova Facility  
Brunswick, Georgia

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**Figure  
7A**



- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 21, 2021 around 04:49 after correcting for barometric pressure.



**Deep Zone of the Upper Surficial Aquifer  
Groundwater Condition 1 - High Tide Plus 1 Hour**  
Hercules/Pinova Facility  
Brunswick, Georgia

		<b>Figure 7B</b>
Kennesaw, GA	October 2021	



- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 21, 2021 around 05:49 after correcting for barometric pressure.



**Deep Zone of the Upper Surficial Aquifer  
Groundwater Condition 1 - High Tide Plus 2 Hours**  
Hercules/Pinova Facility  
Brunswick, Georgia

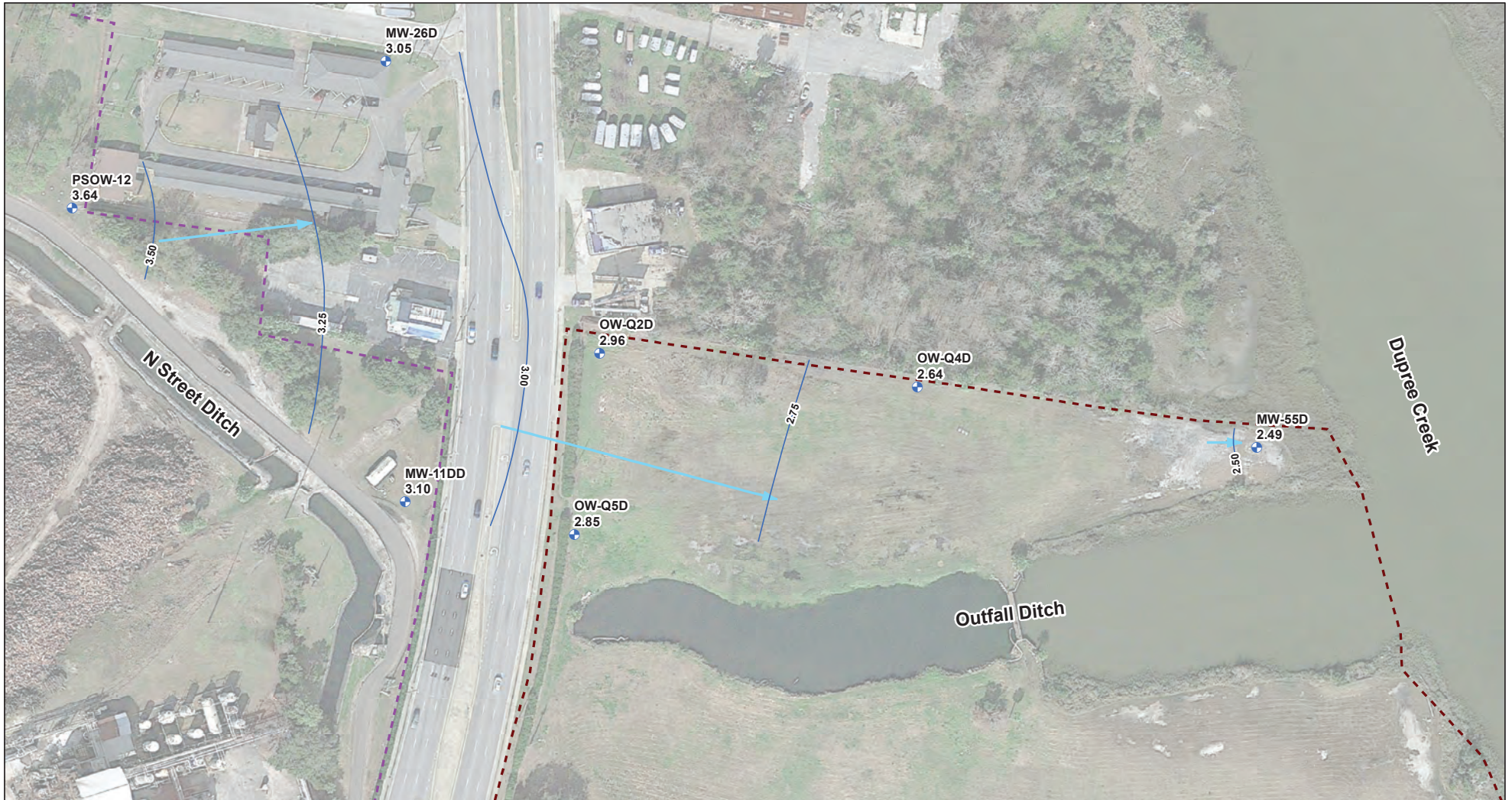
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Kennesaw, GA

October 2021

**Figure  
7C**





- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property



**Deep Zone of the Upper Surficial Aquifer  
Groundwater Condition 1 - High Tide Plus 3 Hours**  
Hercules/Pinova Facility  
Brunswick, Georgia

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**Figure  
7D**

Kennesaw, GA

October 2021

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 21, 2021 around 06:49 after correcting for barometric pressure.



- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property



**Deep Zone of the Upper Surficial Aquifer  
Groundwater Condition 1 - High Tide Plus 4 Hours**  
Hercules/Pinova Facility  
Brunswick, Georgia

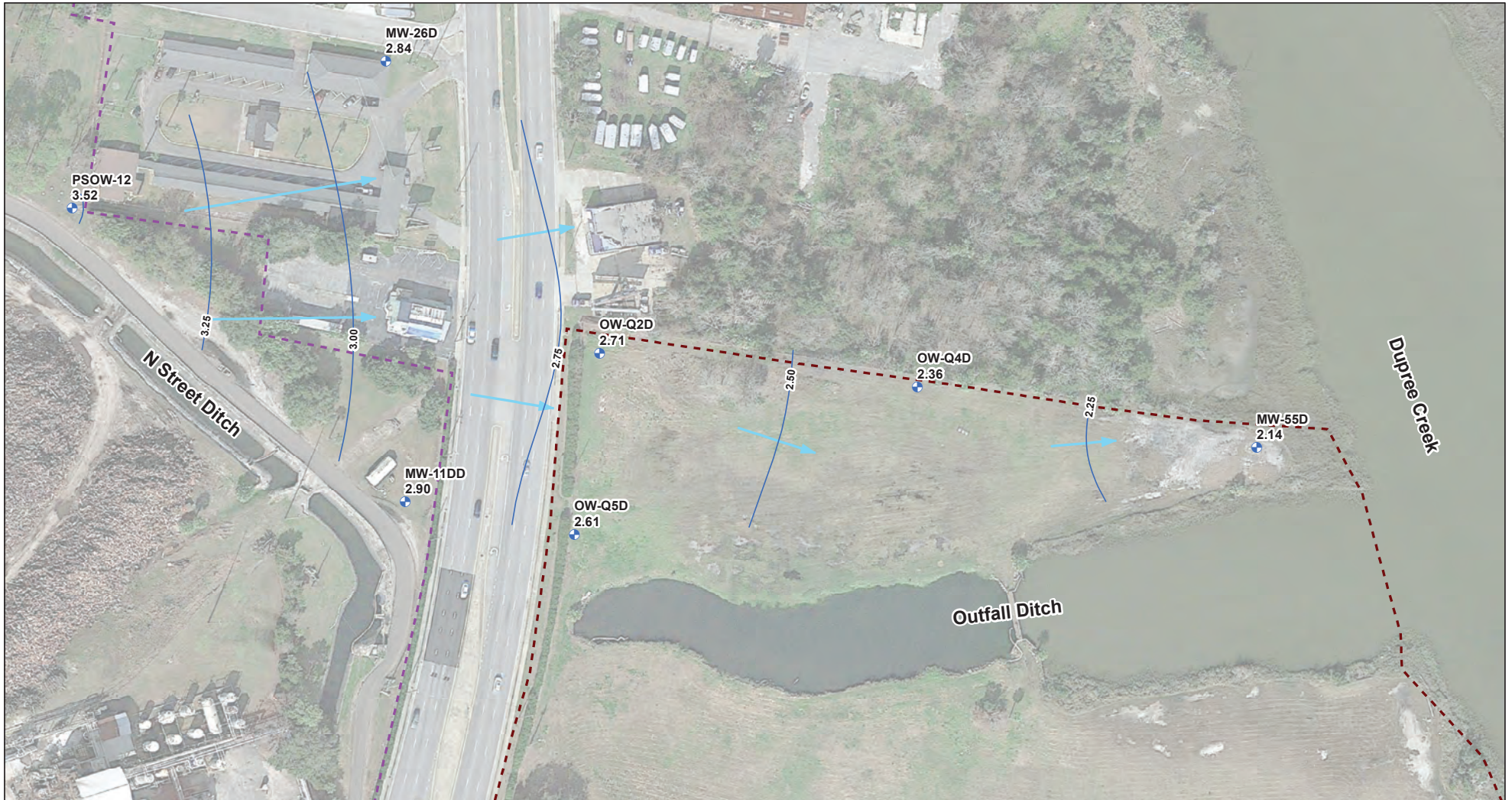
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**Figure  
7E**

Kennesaw, GA

October 2021

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 21, 2021 around 07:49 after correcting for barometric pressure.



- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 21, 2021 around 08:49 after correcting for barometric pressure.



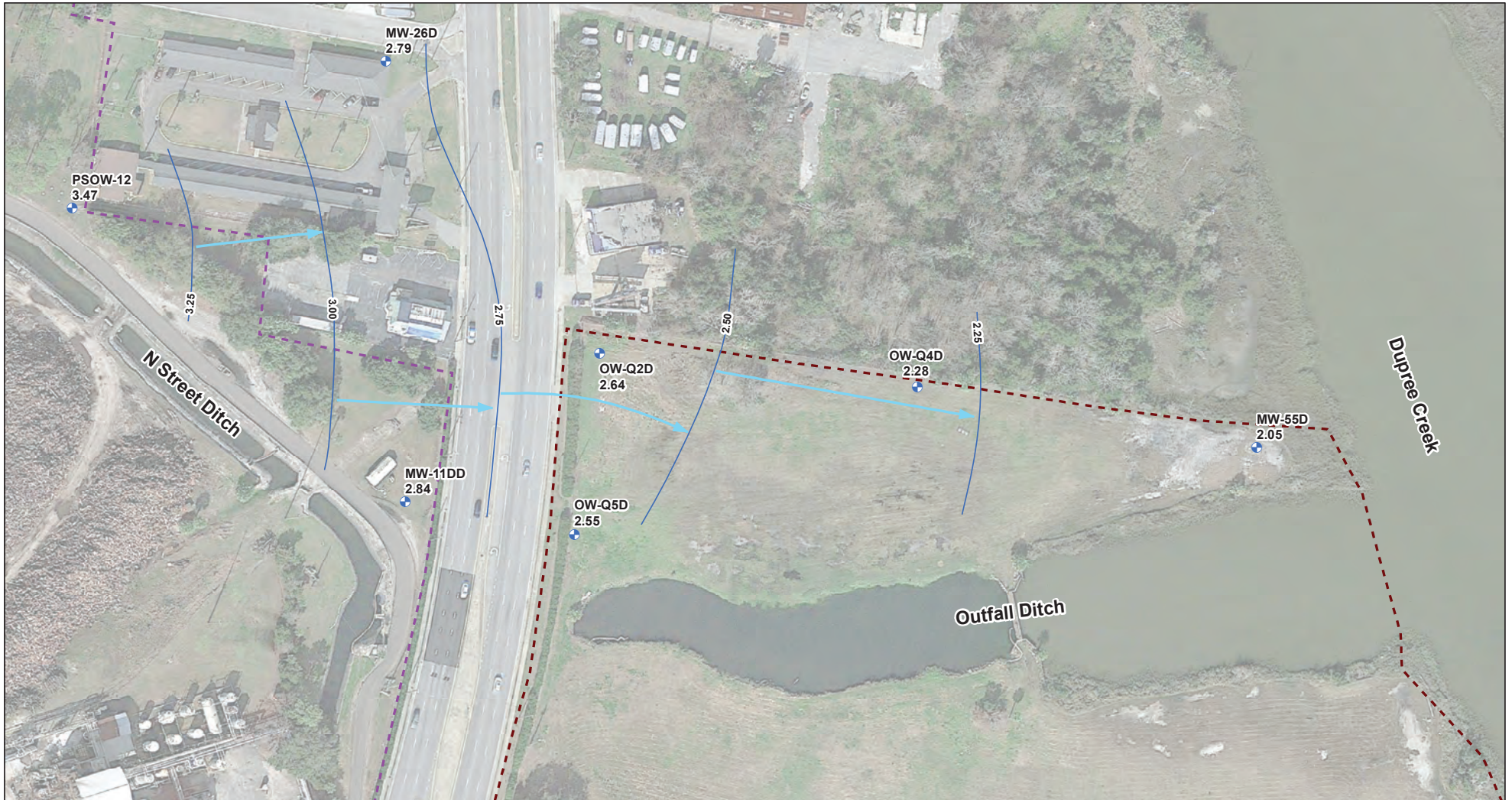
**Deep Zone of the Upper Surficial Aquifer  
Groundwater Condition 1 - High Tide Plus 5 Hours**  
Hercules/Pinova Facility  
Brunswick, Georgia

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Kennesaw, GA

October 2021

**Figure**  
**7F**



- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property



**Deep Zone of the Upper Surficial Aquifer  
Groundwater Condition 1 - Low Tide**  
Hercules/Pinova Facility  
Brunswick, Georgia

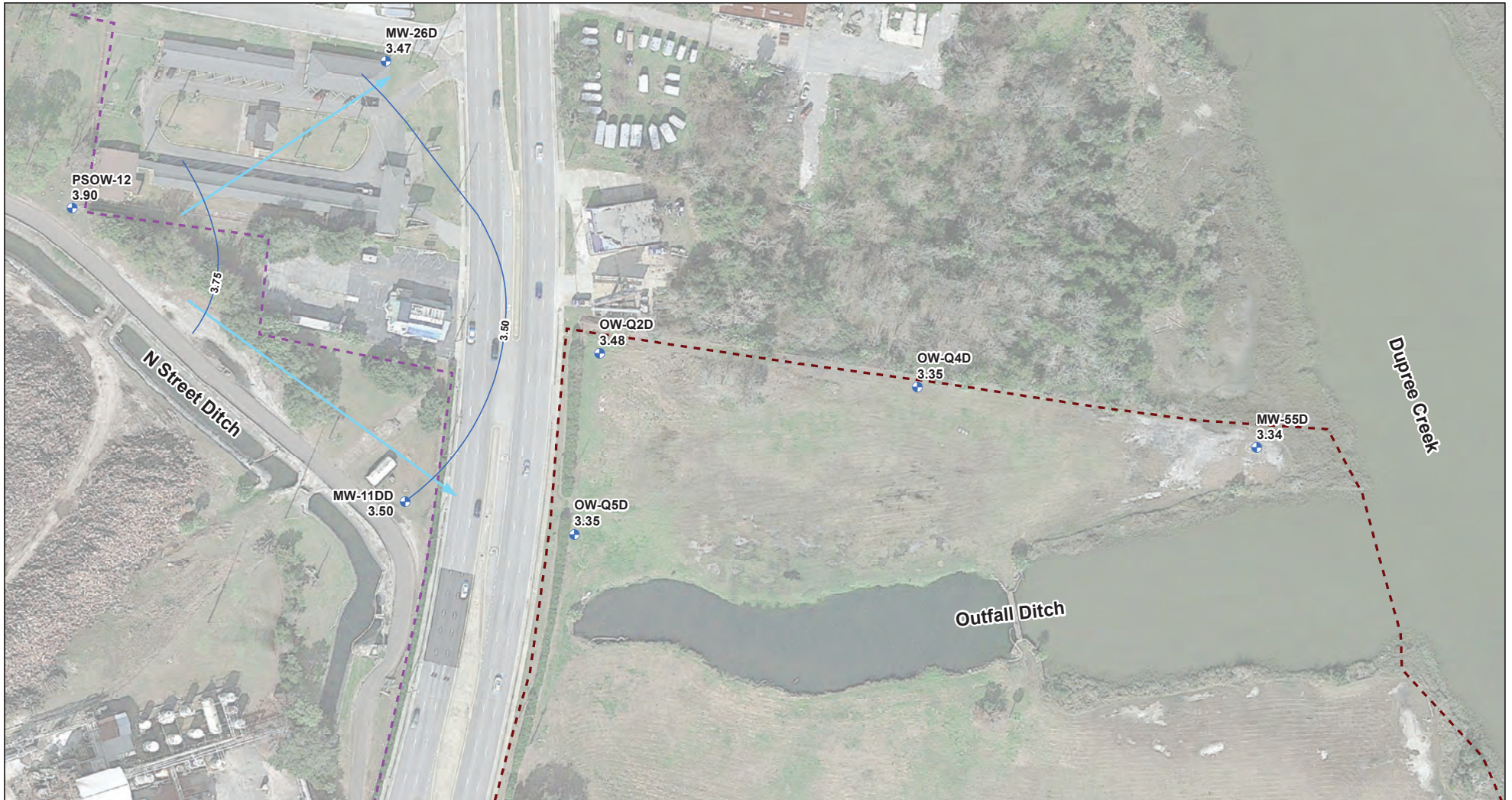
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**Figure  
7G**

Kennesaw, GA

October 2021

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 21, 2021 around 09:54 after correcting for barometric pressure.



- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property



**Deep Zone of the Upper Surficial Aquifer  
Groundwater Condition 2 - High Tide**  
Hercules/Pinova Facility  
Brunswick, Georgia

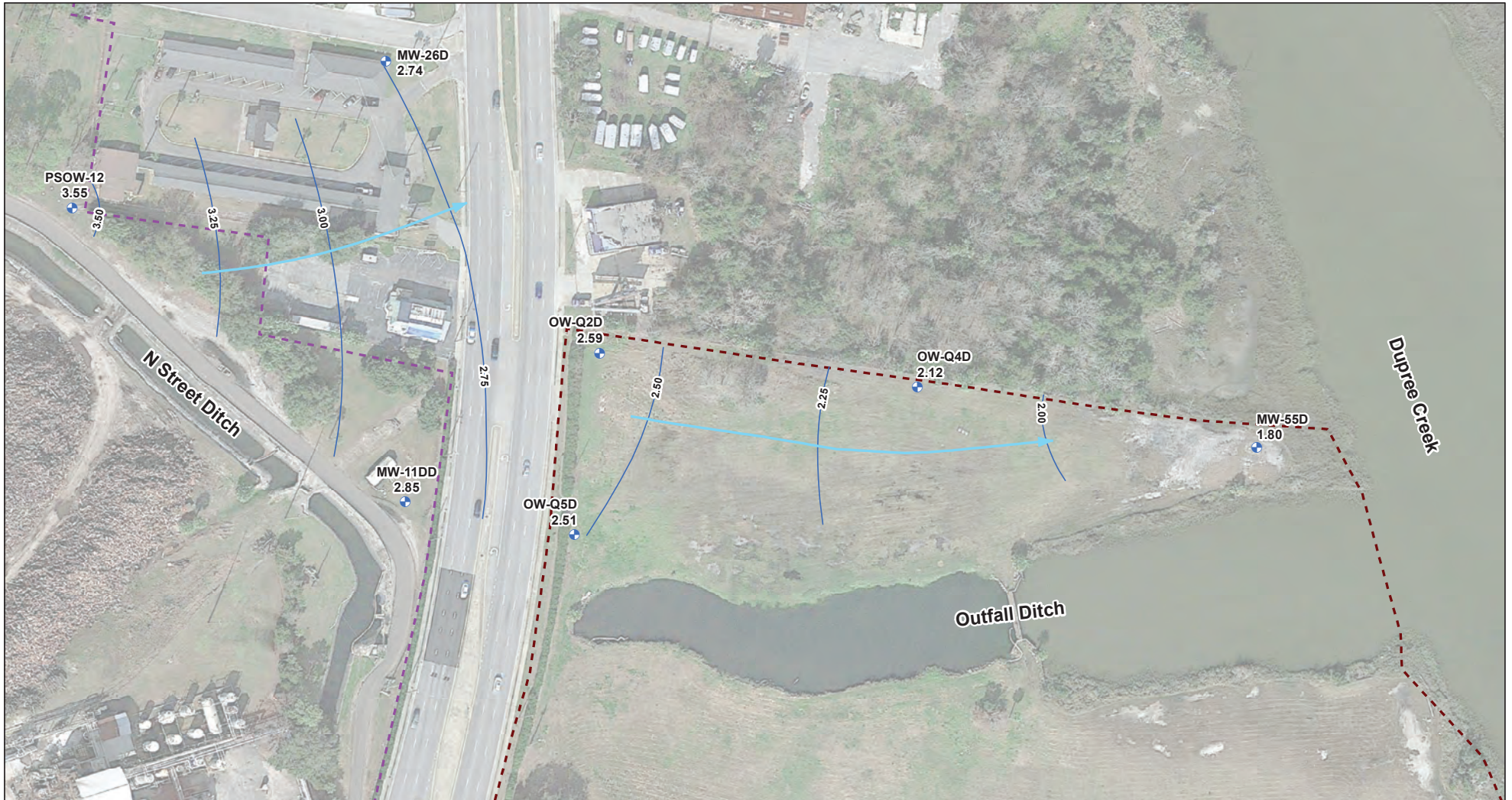
**Geosyntec**  
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**Figure  
8A**

Kennesaw, GA

October 2021

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 25, 2021 around 08:09 after correcting for barometric pressure.



- Legend**
- Tidal Study Well
  - Groundwater Elevation
  - Groundwater Flow Direction
  - Pinova Property
  - Hercules Property



**Deep Zone of the Upper Surficial Aquifer  
Groundwater Condition 2 - Low Tide**  
Hercules/Pinova Facility  
Brunswick, Georgia

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**Figure  
8B**

Kennesaw, GA

October 2021

1. Groundwater elevations relative to feet mean sea level (ft MSL).
2. Groundwater elevations calculated from transducer data collected on April 25, 2021 around 13:39 after correcting for barometric pressure.



- Legend**
- Tidal Study Well
  - Pinova Property
  - Hercules Property



**Shallow Zone of the Upper Surficial Aquifer  
Average Conductivity over Monitoring Period**  
Hercules/Pinova Facility  
Brunswick, Georgia

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**Figure  
9**

1. Specific conductivity ( $\mu\text{S}/\text{cm}$ ) from transducer data averaged of period of measure (April 15 - 17, 2021).

Kennesaw, GA

October 2021



- Legend**
- + Tidal Study Well
  - Pinova Property
  - Hercules Property



**Intermediate Zone of the Upper Surficial Aquifer  
Average Conductivity over Monitoring Period**  
Hercules/Pinova Facility  
Brunswick, Georgia

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**Figure  
10**

1. Specific conductivity ( $\mu\text{S}/\text{cm}$ ) from transducer data averaged of period of measure (April 15 - 17, 2021).

Kennesaw, GA

October 2021

Path: \\s01\c01\pinova\brunswick\pinovastudies\technical\study\figure 10 intermediate surficial aquifer - average conductivity over monitoring period.mxd





- Legend**
- Tidal Study Well
  - Pinova Property
  - Hercules Property



**Deep Zone of the Upper Surficial Aquifer  
Average Conductivity over Monitoring Period**  
Hercules/Pinova Facility  
Brunswick, Georgia

**Geosyntec**  
consultants

**Figure**

1. Specific conductivity ( $\mu\text{S}/\text{cm}$ ) from transducer data averaged of period of measure (April 15 - 17, 2021).

Kennesaw, GA

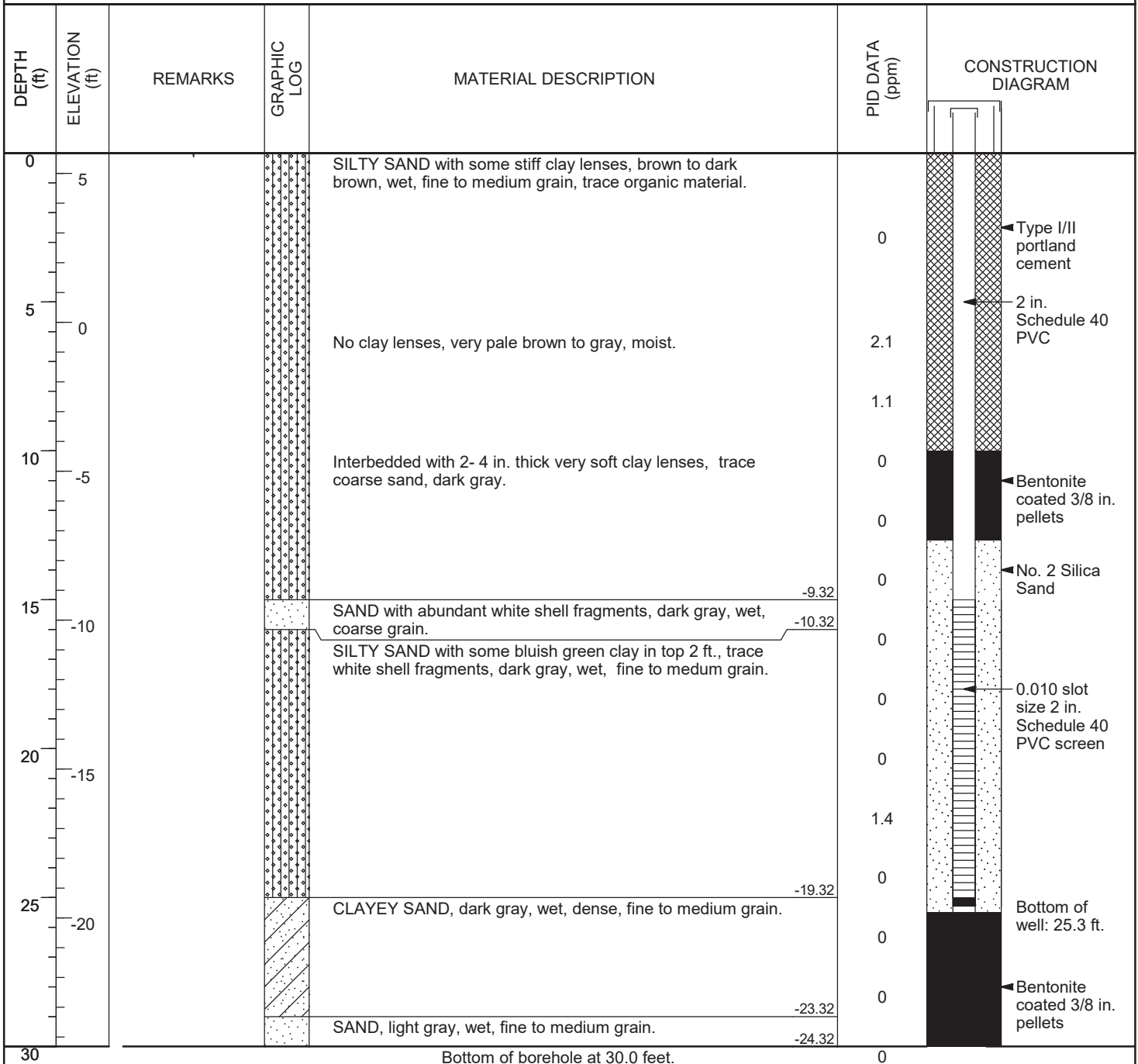
October 2021

**11**

**Attachment A:**  
Well Construction and Lithologic Logs

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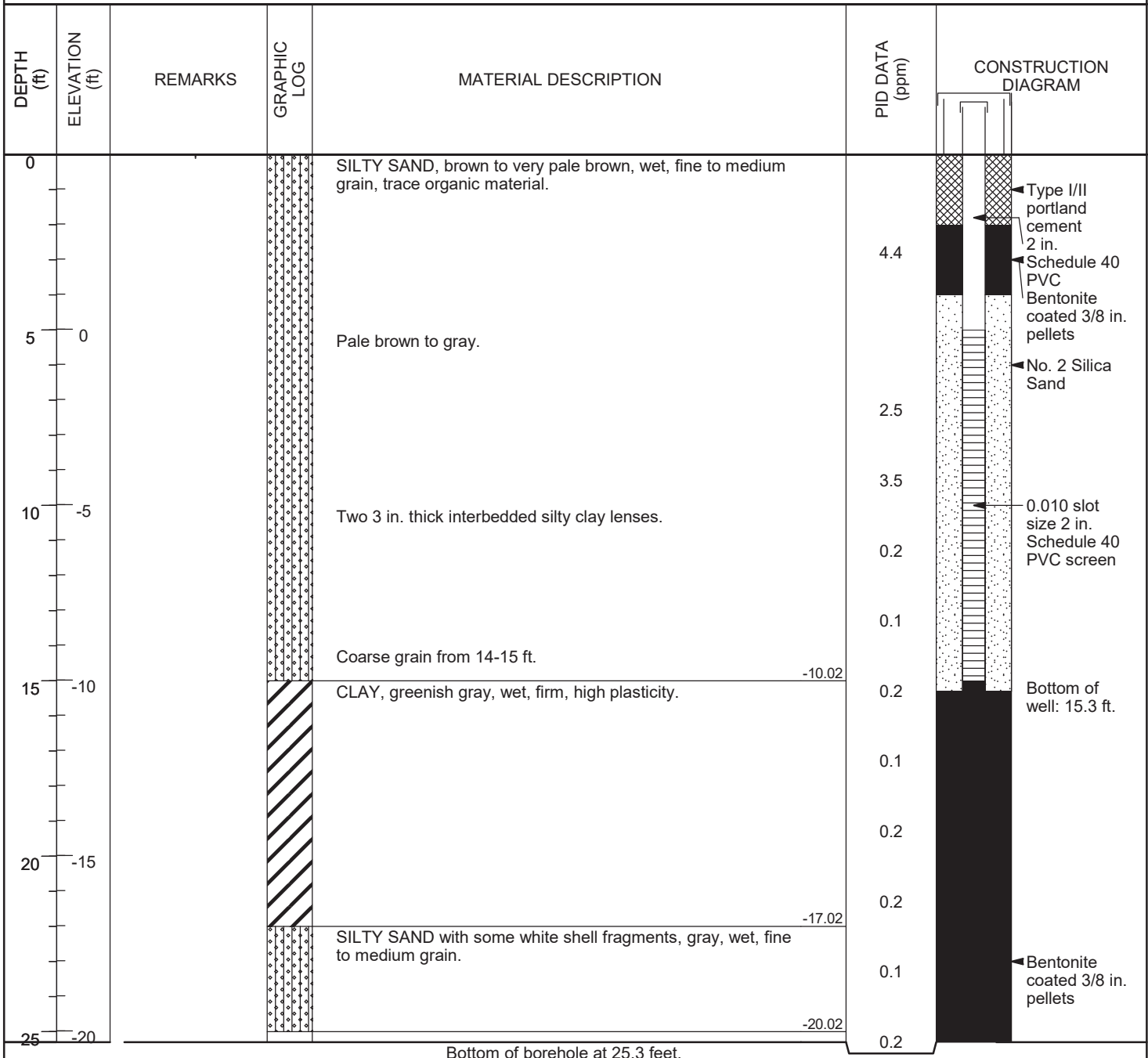
<b>CLIENT</b> Hercules, LLC	<b>PROJECT NAME</b> Observation Well Installation
<b>PROJECT NUMBER</b> GW6881P	<b>PROJECT LOCATION</b> Brunswick, Georgia
<b>DATE STARTED</b> 3/8/21	<b>COMPLETED</b> 3/9/21
<b>DRILLER</b> SAEDACCO	<b>NORTHING</b> 424982.53 ft
<b>DRILLING METHOD</b> Sonic	<b>EASTING</b> 872671.34 ft
<b>SAMPLING METHOD</b> 4 in. core 6 in. override	<b>GROUND ELEVATION</b> 5.68 ft MSL
<b>RIG TYPE</b> Geoprobe 8150 LS	<b>BORING DIAMETER</b> 6 in
	<b>TOP OF CASING ELEVATION</b> 8.9548 ft MSL
	<b>GEOPHYSICAL CONTRACTOR</b> ---
	<b>LOGGED BY</b> A. Ramsey
	<b>CHECKED BY</b> A. Reimer



SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21

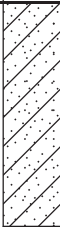




<b>CLIENT</b> Hercules, LLC	<b>PROJECT NAME</b> Observation Well Installation
<b>PROJECT NUMBER</b> GW6881P	<b>PROJECT LOCATION</b> Brunswick, Georgia
<b>DATE STARTED</b> 3/11/21	<b>COMPLETED</b> 3/11/21
<b>DRILLER</b> SAEDACCO	<b>NORTHING</b> 425014.39 ft
<b>DRILLING METHOD</b> Sonic	<b>EASTING</b> 872814.76 ft
<b>SAMPLING METHOD</b> 4 in. core 6 in. override	<b>GROUND ELEVATION</b> 4.98 ft MSL
<b>RIG TYPE</b> Geoprobe 8150 LS	<b>BORING DIAMETER</b> 6 in
	<b>TOP OF CASING ELEVATION</b> 7.8043 ft MSL
	<b>GEOPHYSICAL CONTRACTOR</b> ---
	<b>LOGGED BY</b> A. Ramsey
	<b>CHECKED BY</b> A. Reimer

SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21



<b>CLIENT</b> <u>Hercules, LLC</u>	<b>PROJECT NAME</b> <u>Observation Well Installation</u>
<b>PROJECT NUMBER</b> <u>GW6881P</u>	<b>PROJECT LOCATION</b> <u>Brunswick, Georgia</u>
<b>DATE STARTED</b> <u>3/11/21</u> <b>COMPLETED</b> <u>3/11/21</u>	<b>NORTHING</b> <u>425013.56 ft</u> <b>EASTING</b> <u>872825.28 ft</u>
<b>DRILLER</b> <u>SAEDACCO</u>	<b>GROUND ELEVATION</b> <u>5.14 ft MSL</u> <b>BORING DIAMETER</b> <u>6 in</u>
<b>DRILLING METHOD</b> <u>Sonic</u>	<b>TOP OF CASING ELEVATION</b> <u>7.706 ft MSL</u>
<b>SAMPLING METHOD</b> <u>4 in. core 6 in. override</u>	<b>GEOPHYSICAL CONTRACTOR</b> <u>---</u>
<b>RIG TYPE</b> <u>Geoprobe 8150 LS</u>	<b>LOGGED BY</b> <u>A. Ramsey</u> <b>CHECKED BY</b> <u>A. Reimer</u>

SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
0	5			CLAYEY SAND with some silt, brown, wet, loose with firm clay, fine to medium grain, some organic material.		
5	0			SILTY SAND, pale brown to gray, wet, fine to medium grain.	1.6 0.14	Type I/II portland cement
10	-5			Some interbedded high plasticity SILTY CLAY	2.3 2.4	2 in. Schedule 40 PVC
15	-10			CLAY, greenish gray, wet, firm, high plasticity.	0.6 0.9	
20	-15			CLAYEY SAND with some white shell fragments, gray, wet, fine to medium grain.	0.6 -14.86	
25	-20			SILTY SAND with trace shell fragments, gray, wet, fine to medium grain.	0.4 0.2 0.2 -19.86	
					0.2 0.3	

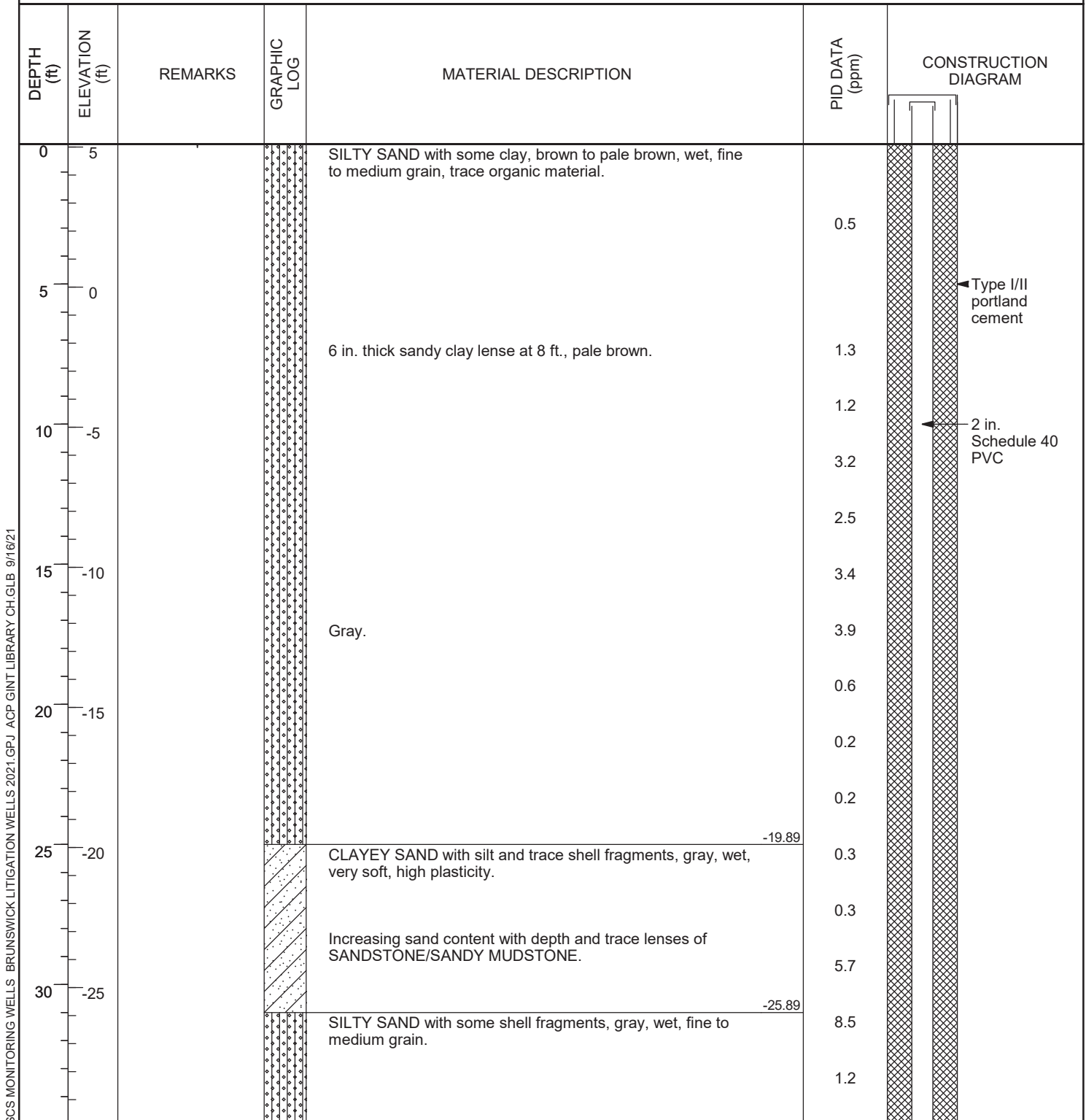
(Continued Next Page)

CLIENT Hercules, LLC PROJECT NAME Observation Well Installation  
PROJECT NUMBER GW6881P PROJECT LOCATION Brunswick, Georgia

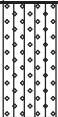
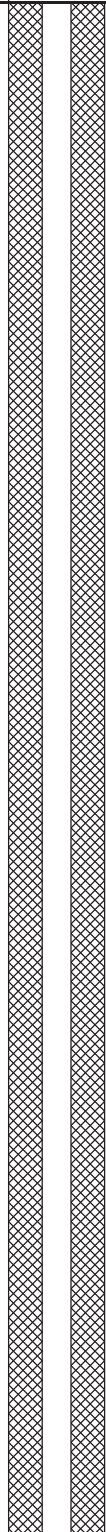

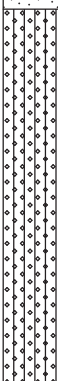

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
30	-25			SILTY SAND with trace shell fragments, gray, wet, fine to medium grain. (continued)	0.7	<p>Bentonite coated 3/8 in. pellets No. 2 Silica Sand</p> <p>0.010 slot size 2 in. Schedule 40 PVC screen</p> <p>Bottom of well: 49.3 ft. No. 2 Silica Sand</p>
				SAND, some clayey sand and trace shell fragments, some 1 in. diameter gravel at 33 ft., gray, wet, loose with lenses of sandy mudstone, coarse grain.	-28.86	
35	-30			No clayey sand or shell fragments, loose.		
40	-35					
45	-40					
50				Bottom of borehole at 50.0 feet.	-44.86	

SCS MONITORING WELLS - BRUNSWICK LITIGATION WELLS 2021.GPJ - ACP GINT LIBRARY CH.GLB 9/16/21

<b>CLIENT</b> <u>Hercules, LLC</u>	<b>PROJECT NAME</b> <u>Observation Well Installation</u>
<b>PROJECT NUMBER</b> <u>GW6881P</u>	<b>PROJECT LOCATION</b> <u>Brunswick, Georgia</u>
<b>DATE STARTED</b> <u>3/12/21</u> <b>COMPLETED</b> <u>3/12/21</u>	<b>NORTHING</b> <u>425011.87 ft</u> <b>EASTING</b> <u>872833.53 ft</u>
<b>DRILLER</b> <u>SAEDACCO</u>	<b>GROUND ELEVATION</b> <u>5.11 ft MSL</u> <b>BORING DIAMETER</b> <u>6 in</u>
<b>DRILLING METHOD</b> <u>Sonic</u>	<b>TOP OF CASING ELEVATION</b> <u>7.8035 ft MSL</u>
<b>SAMPLING METHOD</b> <u>4 in. core 6 in. override</u>	<b>GEOPHYSICAL CONTRACTOR</b> <u>---</u>
<b>RIG TYPE</b> <u>Geoprobe 8150 LS</u>	<b>LOGGED BY</b> <u>A. Ramsey</u> <b>CHECKED BY</b> <u>A. Reimer</u>



CLIENT Hercules, LLC PROJECT NAME Observation Well Installation  
PROJECT NUMBER GW6881P PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
35	-30			SILTY SAND with some shell fragments, gray, wet, fine to medium grain. (continued)	0.9	
				Trace angular gravel, medium to coarse grain. -32.89	0.9	
				SAND, gray, wet, coarse grain.	27.4	
40	-35				20	
					3.3	
					1.1	
45	-40				-41.89	
				SILTY SAND with abundance angular gravel, some clay, gray, wet, fine to coarse grain.	1.8	
					14.4	
50	-45				19.9	
					9	
					3.3	
55	-50				-51.89	
				SAND, gray, trace greenish gray at bottom, wet, coarse grain.	7.5	
					1.5	
60	-55				1.8	
					1.1	
					1.4	
65	-60				0.9	
				Trace gravel with abundant rounded gravel from 67-68 ft.	0.9	
					0.9	
70	-65				1.4	
					1.9	

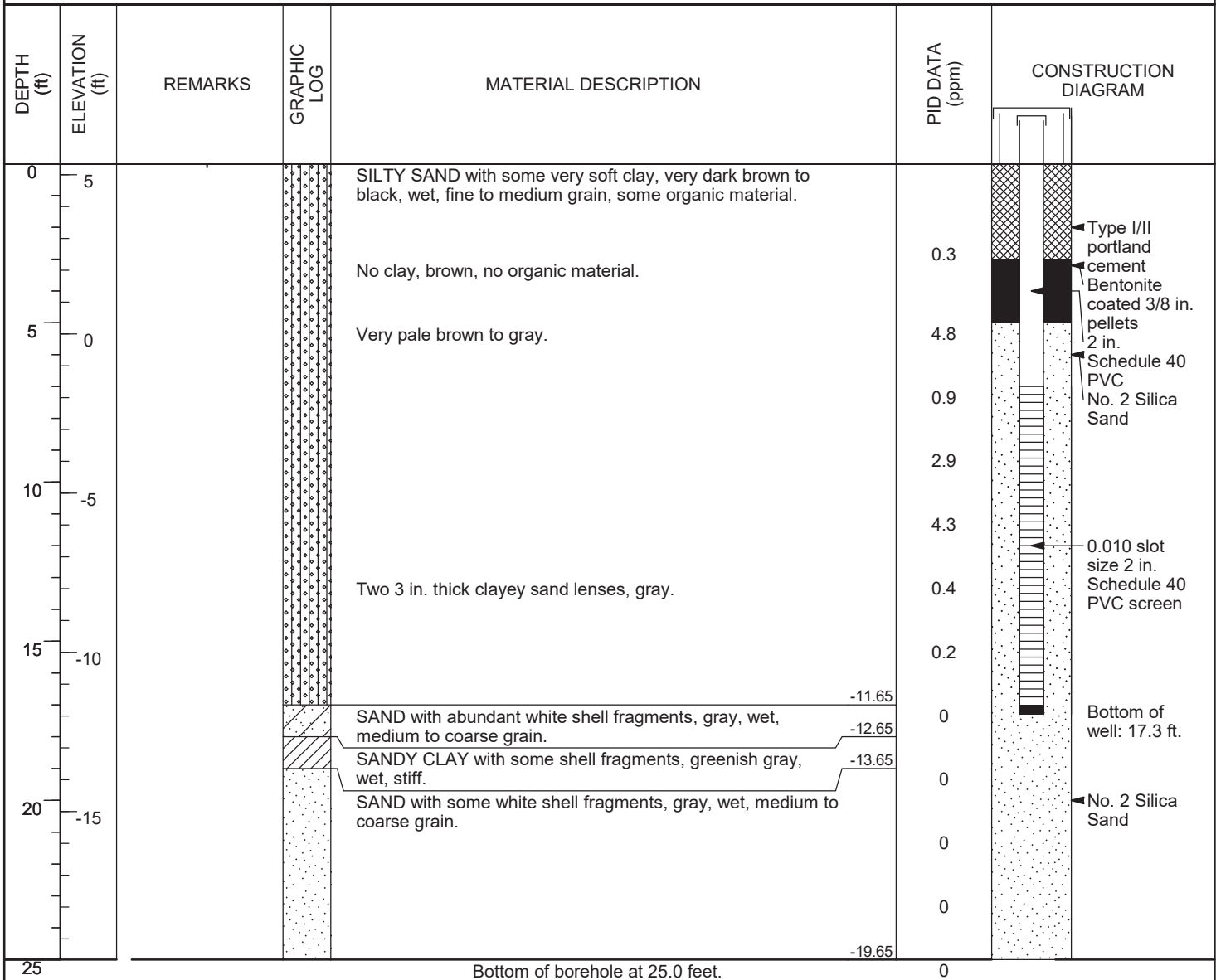
SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21



**CLIENT** Hercules, LLC **PROJECT NAME** Observation Well Installation  
**PROJECT NUMBER** GW6881P **PROJECT LOCATION** Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
75	-70			SAND, gray, trace greenish gray at bottom, wet, coarse grain. (continued) No gravel.	2.3	
80	-75				1.8	
					2.1	
85	-80			Trace rounded gravel from 87-90 ft.	4.1	
					8.8	
					4	
					7.8	
90	-85			Bottom of borehole at 90.3 feet.	2.3	
					4.7	

<b>CLIENT</b> <u>Hercules, LLC</u>	<b>PROJECT NAME</b> <u>Observation Well Installation</u>
<b>PROJECT NUMBER</b> <u>GW6881P</u>	<b>PROJECT LOCATION</b> <u>Brunswick, Georgia</u>
<b>DATE STARTED</b> <u>3/10/21</u> <b>COMPLETED</b> <u>3/10/21</u>	<b>NORTHING</b> <u>425012.39 ft</u> <b>EASTING</b> <u>872666.23 ft</u>
<b>DRILLER</b> <u>SAEDACCO</u>	<b>GROUND ELEVATION</b> <u>5.35 ft MSL</u> <b>BORING DIAMETER</b> <u>6 in</u>
<b>DRILLING METHOD</b> <u>Sonic</u>	<b>TOP OF CASING ELEVATION</b> <u>8.2774 ft MSL</u>
<b>SAMPLING METHOD</b> <u>4 in. core 6 in. override</u>	<b>GEOPHYSICAL CONTRACTOR</b> <u>---</u>
<b>RIG TYPE</b> <u>Geoprobe 8150 LS</u>	<b>LOGGED BY</b> <u>A. Ramsey</u> <b>CHECKED BY</b> <u>A. Reimer</u>



SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21

<b>CLIENT</b> <u>Hercules, LLC</u>	<b>PROJECT NAME</b> <u>Observation Well Installation</u>
<b>PROJECT NUMBER</b> <u>GW6881P</u>	<b>PROJECT LOCATION</b> <u>Brunswick, Georgia</u>
<b>DATE STARTED</b> <u>3/10/21</u> <b>COMPLETED</b> <u>3/10/21</u>	<b>NORTHING</b> <u>425034.29 ft</u> <b>EASTING</b> <u>872667.1 ft</u>
<b>DRILLER</b> <u>SAEDACCO</u>	<b>GROUND ELEVATION</b> <u>5.91 ft MSL</u> <b>BORING DIAMETER</b> <u>6 in</u>
<b>DRILLING METHOD</b> <u>Sonic</u>	<b>TOP OF CASING ELEVATION</b> <u>8.9302 ft MSL</u>
<b>SAMPLING METHOD</b> <u>4 in. core 6 in. override</u>	<b>GEOPHYSICAL CONTRACTOR</b> <u>---</u>
<b>RIG TYPE</b> <u>Geoprobe 8150 LS</u>	<b>LOGGED BY</b> <u>A. Ramsey</u> <b>CHECKED BY</b> <u>A. Reimer</u>

SCS MONITORING WELLS - BRUNSWICK LITIGATION WELLS 2021.GPJ - ACP GINT LIBRARY CH.GLB 9/16/21

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
0	5			SILTY SAND, very dark brown to black, wet, fine grain, some organic material.		
5	0			Brown, fine to medium grain.	0.1	
10	-5			Interbedded with clayey silty, gray.	0.1	
15	-10			SANDY CLAY with trace white shell fragments, greenish gray, wet, stiff.	0.1	
20	-15			SILTY SAND with abundant white shell fragments, gray, wet, fine to medium grain. Interbedded clayey silt to clayey sand at 20 ft., trace white shell fragments.	0.1	
25	-20				0.8	
30	-25			SAND, gray, wet, fine to medium grain.	0.3	
				Medium to coarse grain from 30-50 ft.	0.3	
					2.1	
					2.3	

← Type I/II portland cement

← 2 in. Schedule 40 PVC

CLIENT Hercules, LLC PROJECT NAME Observation Well Installation  
PROJECT NUMBER GW6881P PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
35	-30			SAND, gray, wet, fine to medium grain. <i>(continued)</i>	0.9	<p>Bentonite coated 3/8 in. pellets</p> <p>No. 2 Silica Sand</p> <p>0.010 slot size 2 in. Schedule 40 PVC screen</p>
40	-35				1.7	
45	-40			Abundant shell fragments from 47-48.5 ft.	4.4	
50				Bottom of borehole at 50.3 feet.	6	
					0.9	
					0.6	
					1.2	Bottom of well: 50.3 ft.

SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21


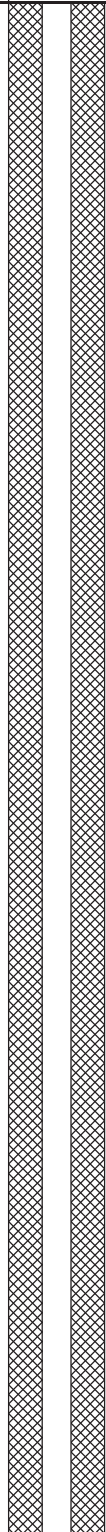




<b>CLIENT</b> <u>Hercules, LLC</u>	<b>PROJECT NAME</b> <u>Observation Well Installation</u>
<b>PROJECT NUMBER</b> <u>GW6881P</u>	<b>PROJECT LOCATION</b> <u>Brunswick, Georgia</u>
<b>DATE STARTED</b> <u>3/9/21</u> <b>COMPLETED</b> <u>3/9/21</u>	<b>NORTHING</b> <u>425022.88 ft</u> <b>EASTING</b> <u>872666.31 ft</u>
<b>DRILLER</b> <u>SAEDACCO</u>	<b>GROUND ELEVATION</b> <u>5.6 ft MSL</u> <b>BORING DIAMETER</b> <u>6 in</u>
<b>DRILLING METHOD</b> <u>Sonic</u>	<b>TOP OF CASING ELEVATION</b> <u>8.4126 ft MSL</u>
<b>SAMPLING METHOD</b> <u>4 in. core 6 in. override</u>	<b>GEOPHYSICAL CONTRACTOR</b> <u>---</u>
<b>RIG TYPE</b> <u>Geoprobe 8150 LS</u>	<b>LOGGED BY</b> <u>A. Ramsey</u> <b>CHECKED BY</b> <u>A. Reimer</u>

SCS MONITORING WELLS - BRUNSWICK LITIGATION WELLS 2021.GPJ - ACP GINT LIBRARY CH.GLB 9/16/21

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
0	5			SILTY SAND with some silty clay, dark brown to black, wet, fine to medium grain, trace organic material.	0	
5	0			Gray to dark gray.	0	← Type I/II portland cement
10	-5				0.1	← 2 in. Schedule 40 PVC
15	-10			CLAYEY SAND with abundant white shell fragments, greenish gray, very stiff.	0.1	
20	-15			SILTY SAND with abundance white shell fragments, interbedded stiff clay lenses, gray, wet, fine to medium grain.	0.1	
25	-20			CLAY, trace sand, gray, moist, trace sand, high plasticity.	0	
30	-25			SILTY SAND, gray, wet, fine to medium grain.	0	
				SAND, trace shell fragments, gray, wet, coarse grain.	4.4	
					14.2	
					0.7	

(Continued Next Page)

CLIENT Hercules, LLC PROJECT NAME Observation Well Installation  
PROJECT NUMBER GW6881P PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
35	-30			SAND, trace shell fragments, gray, wet, coarse grain. <i>(continued)</i>  Increased content of shell fragments.	0.4   0.5   16.8	
40	-35				23.8	
45	-40			SILTY SAND with trace stiff clayey sand lenses, gray, wet, fine to medium grain.	2.6  0.4  0.3	
50	-45				52	
55	-50			SAND, gray, wet, coarse grain.	0.7  0.5  1.9	
60	-55				25.2	
65	-60			Fine to medium grain from 56-73 ft.	21.1  26.3  43.4	
70	-65				45.9	
					30.7  15.1	
					45	
				SANDSTONE/SANDY MUDSTONE with some well rounded quartz gravel, gray, dry, fine to medium grain, very hard.		

SCS MONITORING WELLS - BRUNSWICK LITIGATION WELLS 2021.GPJ - ACP GINT LIBRARY CH.GLB 9/16/21

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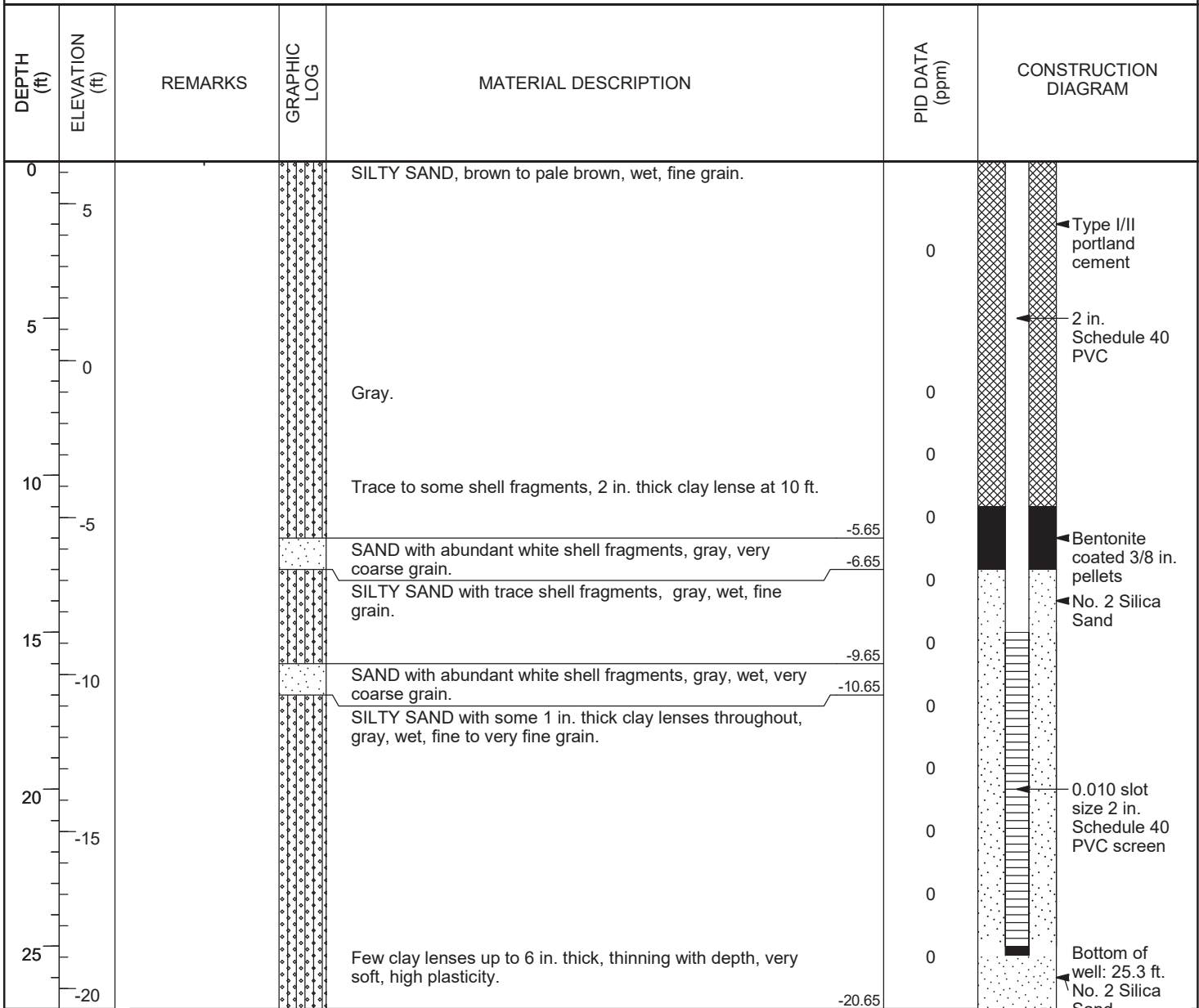
CLIENT Hercules, LLC PROJECT NAME Observation Well Installation  
PROJECT NUMBER GW6881P PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
75	-70			SANDSTONE/SANDY MUDSTONE with some well rounded quartz gravel, gray, dry, fine to medium grain, very hard. <i>(continued)</i>	4.3	<ul style="list-style-type: none"> <li>Bentonite coated 3/8 in. pellets</li> <li>No. 2 Silica Sand</li> <li>0.010 slot size 2 in. Schedule 40 PVC screen</li> <li>Bottom of well: 90.3 ft.</li> <li>No. 2 Silica Sand</li> </ul>
				SAND, gray, wet, well rounded sand, very coarse grain.	2.3	
80	-75				49	
					70.4	
					83.5	
85	-80				109.5	
					112.3	
90	-85				61.4	
					30.7	
					50.1	
95	-90				29.2	
					14.8	

Bottom of borehole at 97.0 feet.

SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21

<b>CLIENT</b> Hercules, LLC	<b>PROJECT NAME</b> Observation Well Installation
<b>PROJECT NUMBER</b> GW6881P	<b>PROJECT LOCATION</b> Brunswick, Georgia
<b>DATE STARTED</b> 3/24/21	<b>COMPLETED</b> 3/24/21
<b>DRILLER</b> SAEDACCO	<b>NORTHING</b> 425163.57 ft
<b>DRILLING METHOD</b> Sonic	<b>EASTING</b> 872110.09 ft
<b>SAMPLING METHOD</b> 4 in. core 6 in. override	<b>GROUND ELEVATION</b> 6.35 ft MSL
<b>RIG TYPE</b> Geoprobe 8150 LS	<b>BORING DIAMETER</b> 6 in
	<b>TOP OF CASING ELEVATION</b> 6.066 ft MSL
	<b>GEOPHYSICAL CONTRACTOR</b> ---
	<b>LOGGED BY</b> A. Ramsey
	<b>CHECKED BY</b> A. Reimer



SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21



<b>CLIENT</b> <u>Hercules, LLC</u>	<b>PROJECT NAME</b> <u>Observation Well Installation</u>
<b>PROJECT NUMBER</b> <u>GW6881P</u>	<b>PROJECT LOCATION</b> <u>Brunswick, Georgia</u>
<b>DATE STARTED</b> <u>3/24/21</u> <b>COMPLETED</b> <u>3/24/21</u>	<b>NORTHING</b> <u>425158.32 ft</u> <b>EASTING</b> <u>872102.6 ft</u>
<b>DRILLER</b> <u>SAEDACCO</u>	<b>GROUND ELEVATION</b> <u>6.35 ft MSL</u> <b>BORING DIAMETER</b> <u>6 in</u>
<b>DRILLING METHOD</b> <u>Sonic</u>	<b>TOP OF CASING ELEVATION</b> <u>6.1549 ft MSL</u>
<b>SAMPLING METHOD</b> <u>4 in. core 6 in. override</u>	<b>GEOPHYSICAL CONTRACTOR</b> <u>---</u>
<b>RIG TYPE</b> <u>Geoprobe 8150 LS</u>	<b>LOGGED BY</b> <u>A. Ramsey</u> <b>CHECKED BY</b> <u>A. Reimer</u>

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
0				SILTY SAND, brown to pale brown to gray, wet, fine grain.		
5					0.1	
5	0					Type I/II portland cement
10				SAND with abundant shell fragments, gray, wet, fine grading to coarse grain.	0.1	
					0	2 in. Schedule 40 PVC
	-5					
				SILTY SAND with trace to some shell fragments, gray, wet, fine grain.	1	
				SAND with abundant shell fragments, gray, wet, coarse grain.	0.3	
15						
	-10			SILTY SAND with trace to some interbedded very soft, high plasticity clay throughout, gray, fine grain.	0.1	
					0.2	
20						
					0.2	
	-15					
					0.4	
					0.2	
25				CLAY with 2-2 in. thick silty sand lenses throughout, gray, wet, soft, high plasticity.	0.2	
					0.1	
					0.1	
30				SILTY SAND, gray, wet, fine to medium grain.	0.1	
					1	
	-25					
					0.3	

SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21

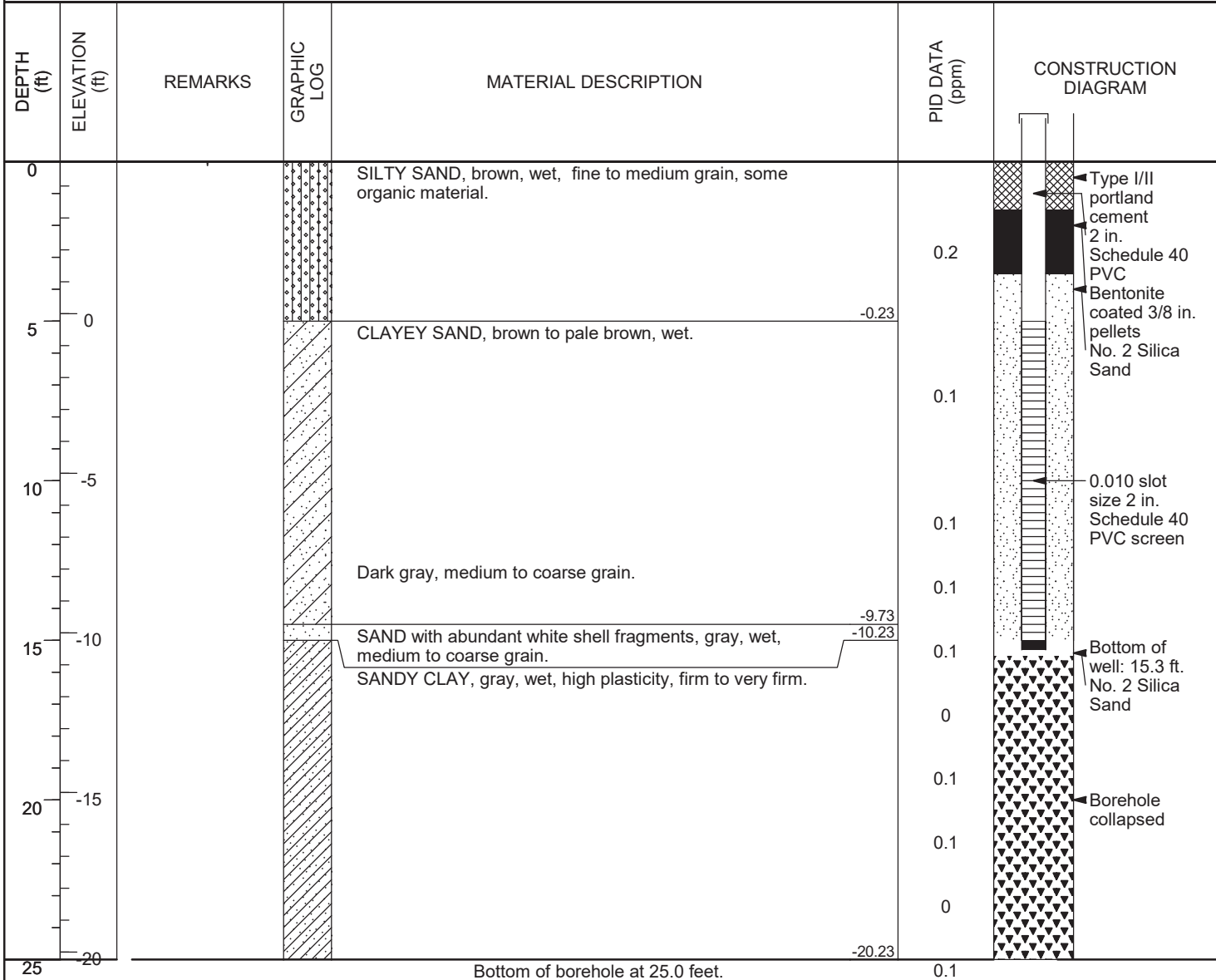
CLIENT Hercules, LLC PROJECT NAME Observation Well Installation  
PROJECT NUMBER GW6881P PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
35				SILTY SAND, gray, wet, fine to medium grain. <i>(continued)</i>	-29.65	<p>                     Bentonite coated 3/8 in. pellets                      No. 2 Silica Sand                      0.010 slot size 2 in. Schedule 40 PVC screen                      Bottom of well: 65.3 ft.                 </p>
	-30			CLAY, gray, wet, soft, high plasticity.	-30.65	
				SAND, gray, wet, coarse grain.		
40					0.2	
	-35				0.1	
					0.2	
					1.1	
					1.3	
45					2.9	
	-40				2.4	
				SANDSTONE/SANDY MUDSTONE, wet, coarse grain, brittle.	-41.65	
					11.5	
50				SAND, gray, wet, coarse grain.	-43.65	
	-45				11.4	
				SANDSTONE/SANDY MUDSTONE with some interbedded CLAYEY SAND, wet, coarse grain, brittle.	-46.65	
					9.2	
55				SAND, gray, wet, coarse grain.	-48.65	
	-50				10.6	
					13.8	
60					10.4	
	-55				10.8	
65					-58.65	
					16.6	

Bottom of borehole at 65.3 feet.

SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21

<b>CLIENT</b> Hercules, LLC	<b>PROJECT NAME</b> Observation Well Installation
<b>PROJECT NUMBER</b> GW6881P	<b>PROJECT LOCATION</b> Brunswick, Georgia
<b>DATE STARTED</b> 3/12/21 <b>COMPLETED</b> 3/13/21	<b>NORTHING</b> 424992.44 ft <b>EASTING</b> 872979.96 ft
<b>DRILLER</b> SAEDACCO	<b>GROUND ELEVATION</b> 4.77 ft MSL <b>BORING DIAMETER</b> 6 in
<b>DRILLING METHOD</b> Sonic	<b>TOP OF CASING ELEVATION</b> 7.8 ft MSL
<b>SAMPLING METHOD</b> 4 in. core 6 in. override	<b>GEOPHYSICAL CONTRACTOR</b> ---
<b>RIG TYPE</b> Geoprobe 8150 LS	<b>LOGGED BY</b> A. Ramsey <b>CHECKED BY</b> A. Reimer



SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21



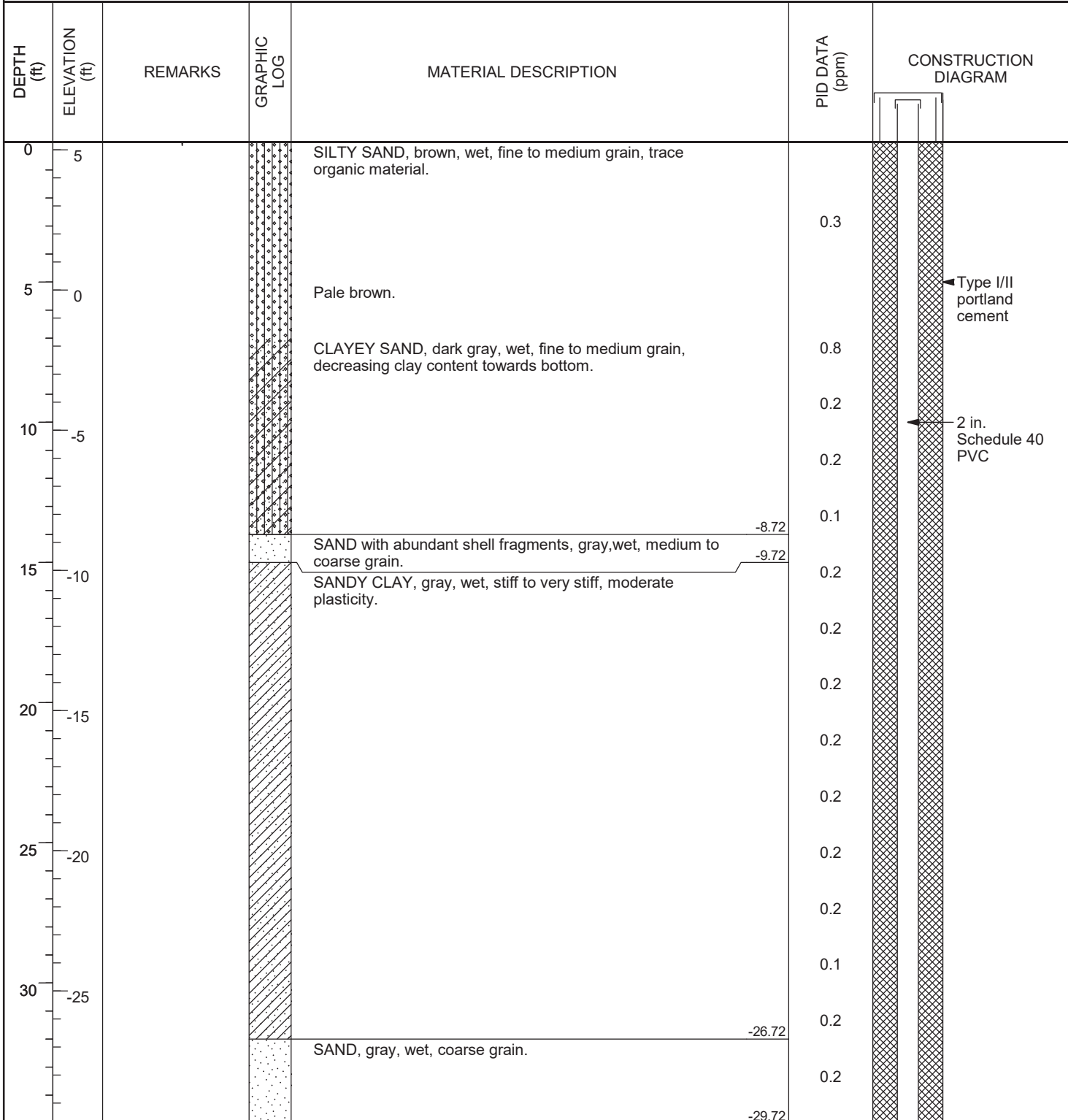
CLIENT Hercules, LLC PROJECT NAME Observation Well Installation  
PROJECT NUMBER GW6881P PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
35				SAND with interbedded, SANDSTONE/SANDY MUDSTONE, gray, wet, coarse grain, dense, brittle.	0	<p>Bentonite coated 3/8 in. pellets No. 2 Silica Sand 0.010 slot size 2 in. Schedule 40 PVC screen</p>
40	-35			SAND, gray, wet, coarse grain, loose.	0.1 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1	

Bottom of borehole at 51.3 feet.

Bottom of well: 51.3 ft.  
No. 2 Silica Sand

<b>CLIENT</b> <u>Hercules, LLC</u>	<b>PROJECT NAME</b> <u>Observation Well Installation</u>
<b>PROJECT NUMBER</b> <u>GW6881P</u>	<b>PROJECT LOCATION</b> <u>Brunswick, Georgia</u>
<b>DATE STARTED</b> <u>3/13/21</u> <b>COMPLETED</b> <u>3/13/21</u>	<b>NORTHING</b> <u>424987.61 ft</u> <b>EASTING</b> <u>873000.7 ft</u>
<b>DRILLER</b> <u>SAEDACCO</u>	<b>GROUND ELEVATION</b> <u>5.28 ft MSL</u> <b>BORING DIAMETER</b> <u>6 in</u>
<b>DRILLING METHOD</b> <u>Sonic</u>	<b>TOP OF CASING ELEVATION</b> <u>7.98 ft MSL</u>
<b>SAMPLING METHOD</b> <u>4 in. core 6 in. override</u>	<b>GEOPHYSICAL CONTRACTOR</b> <u>---</u>
<b>RIG TYPE</b> <u>Geoprobe 8150 LS</u>	<b>LOGGED BY</b> <u>A. Ramsey</u> <b>CHECKED BY</b> <u>A. Reimer</u>



SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21

**CLIENT** Hercules, LLC **PROJECT NAME** Observation Well Installation  
**PROJECT NUMBER** GW6881P **PROJECT LOCATION** Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
35	-30			SANDSTONE/SANDY MUDSTONE, gray, wet, coarse grain, brittle. -31.22	0.4	
				SAND with trace interbedded SANDSTONE/SANDY MUDSTONE, gray, wet, coarse grain.	0.3	
40	-35				0.3	
					0.2	
					0.2	
45	-40				0.2	
					0.3	
					0.6	
50	-45				0.2	
					0.2	
					0.2	
55	-50			SANDSTONE/SANDY MUDSTONE with some well rounded quartz gravel, gray, wet, coarse grain, brittle. -52.72	0.2	
					1.1	
60	-55				0.5	
					-56.72	
				SAND with trace interbedded SANDSTONE/SANDY MUDSTONE, gray, wet, coarse grain.	4.5	
					1.1	
65	-60				1.4	
					1.5	
70	-65			SAND, gray, wet, coarse grain. -64.72	3.2	
					5.7	
					3.1	

SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21

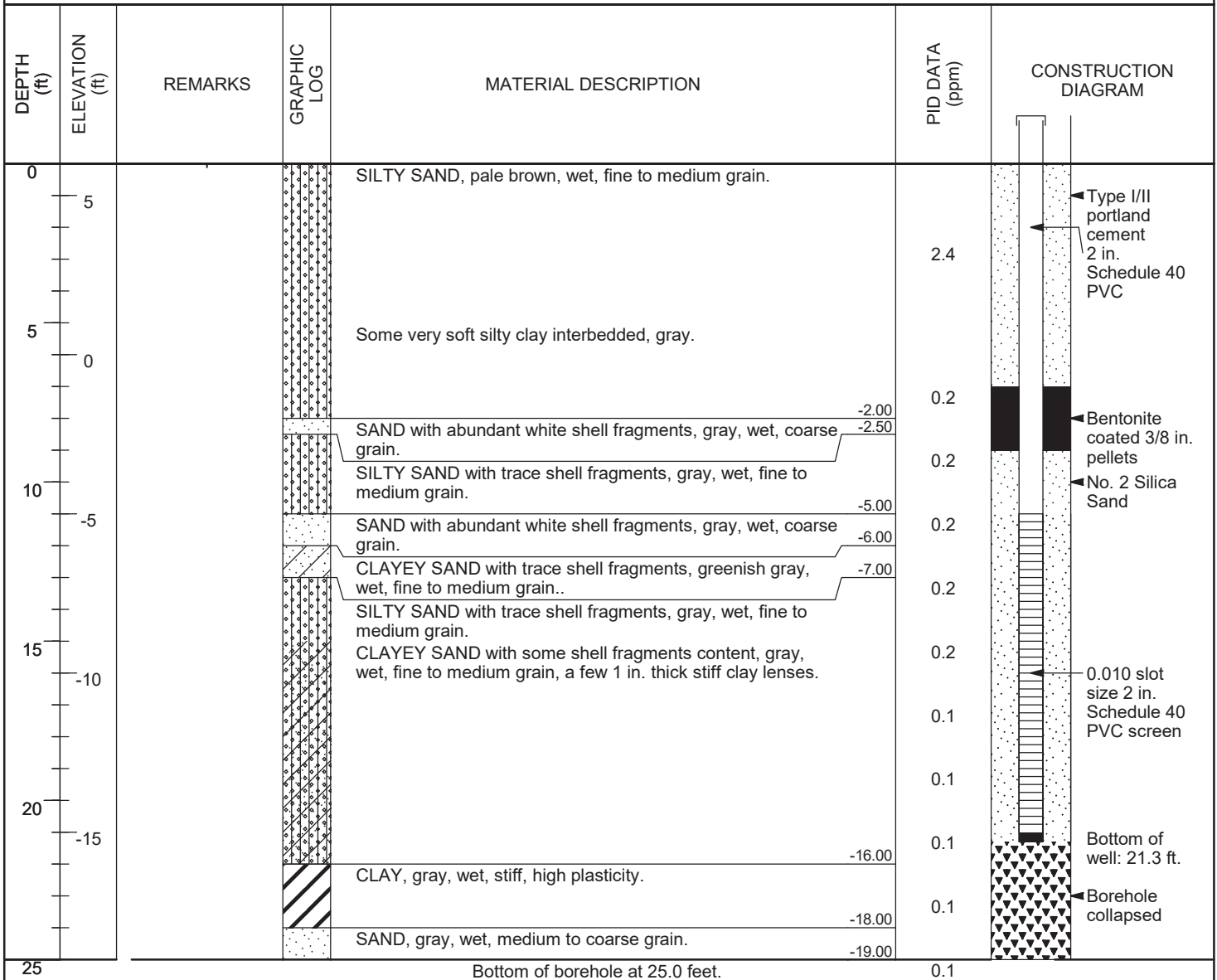
CLIENT Hercules, LLC PROJECT NAME Observation Well Installation  
PROJECT NUMBER GW6881P PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
75	-70			SAND, gray, wet, coarse grain. (continued)		
80	-75					
						6.5
85	-80					16
						11.6
						32.6
						44.2
						33.5
				Some gravelly sand.		24.1
						12.9
						8.6
						6.3
						7.1
95				Bottom of borehole at 95.0 feet.		5.1

SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21

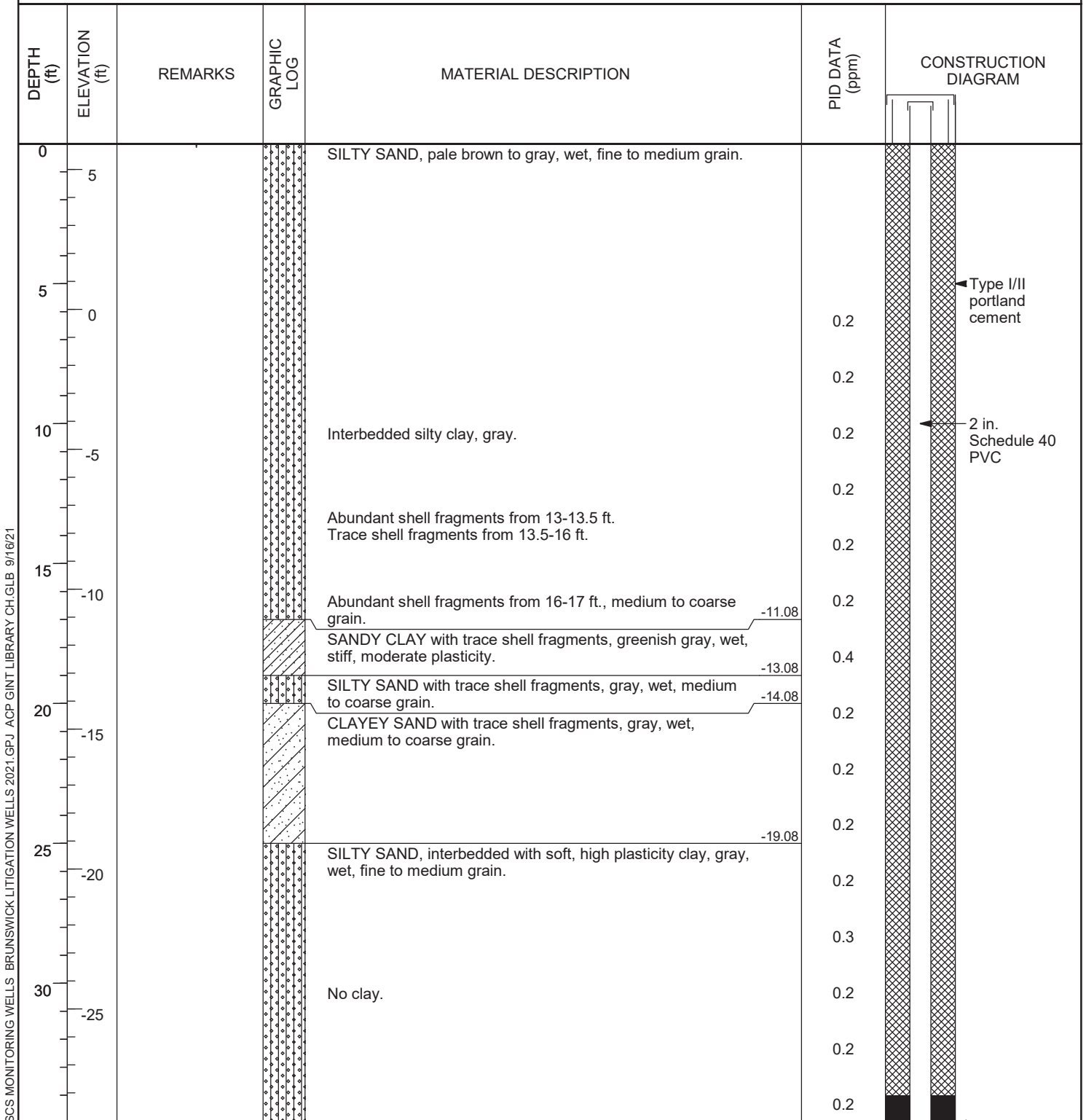


**CLIENT** Hercules, LLC **PROJECT NAME** Observation Well Installation  
**PROJECT NUMBER** GW6881P **PROJECT LOCATION** Brunswick, Georgia  
**DATE STARTED** 3/14/21 **COMPLETED** 3/14/21 **NORTHING** 424825.18 ft **EASTING** 872646.61 ft  
**DRILLER** SAEDACCO **GROUND ELEVATION** 6 ft MSL **BORING DIAMETER** 6 in  
**DRILLING METHOD** Sonic **TOP OF CASING ELEVATION** 9.1137 ft MSL  
**SAMPLING METHOD** 4 in. core 6 in. override **GEOPHYSICAL CONTRACTOR** ---  
**RIG TYPE** Geoprobe 8150 LS **LOGGED BY** A. Ramsey **CHECKED BY** A. Reimer



SCS MONITORING WELLS BRUNSWICK LITIGATION WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/16/21

<b>CLIENT</b> Hercules, LLC	<b>PROJECT NAME</b> Observation Well Installation
<b>PROJECT NUMBER</b> GW6881P	<b>PROJECT LOCATION</b> Brunswick, Georgia
<b>DATE STARTED</b> 3/16/21	<b>COMPLETED</b> 3/16/21
<b>DRILLER</b> SAEDACCO	<b>NORTHING</b> 424820.8 ft
<b>DRILLING METHOD</b> Sonic	<b>EASTING</b> 872637.93 ft
<b>SAMPLING METHOD</b> 4 in. core 6 in. override	<b>GROUND ELEVATION</b> 5.92 ft MSL
<b>RIG TYPE</b> Geoprobe 8150 LS	<b>BORING DIAMETER</b> 6 in
	<b>TOP OF CASING ELEVATION</b> 9.1171 ft MSL
	<b>GEOPHYSICAL CONTRACTOR</b> ---
	<b>LOGGED BY</b> A. Ramsey
	<b>CHECKED BY</b> A. Reimer



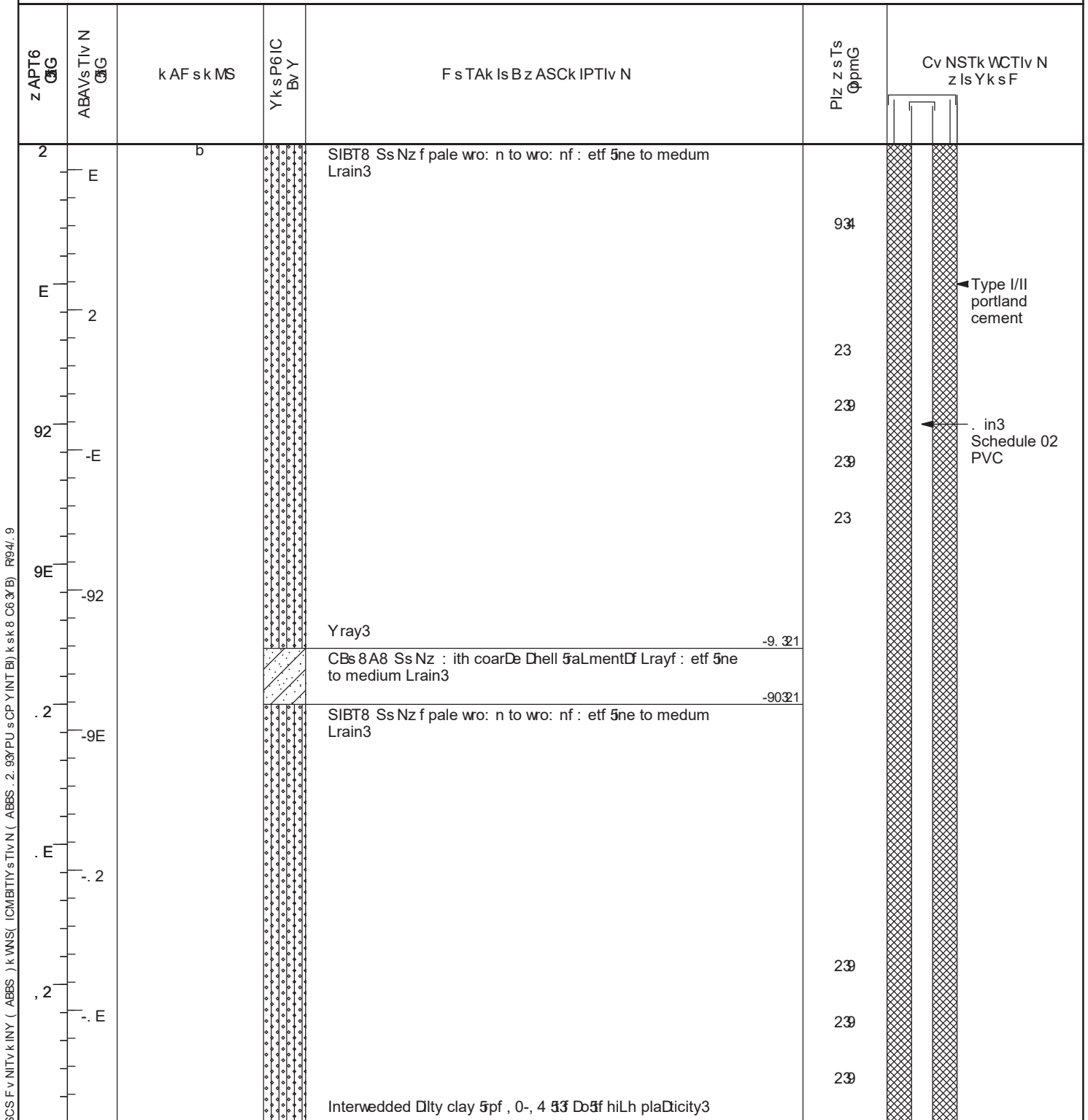
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CLIENT Hercules, LLC PROJECT NAME Observation Well Installation  
PROJECT NUMBER GW6881P PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
35	-30			SILTY SAND, interbedded with soft, high plasticity clay, gray, wet, fine to medium grain. (continued) Coarse grain from 36-49 ft.	0.2	<p>Bentonite coated 3/8 in. pellets No. 2 Silica Sand</p> <p>0.010 slot size 2 in. Schedule 40 PVC screen</p> <p>Bottom of well: 48.3 ft. No. 2 Silica Sand</p>
40	-35				0.2	
45	-40				0.3	
					0.3	
					0.3	
					0.3	
					0.5	
50				SANDSTONE/SANDY MUSDSLONE, gray, wet, fine to medium grain, brittle.	-43.08	
					-44.08	

Bottom of borehole at 50.0 feet.

<b>CLIENT</b> <u>6erculeDf BBC</u>	<b>PROJECT NAME</b> <u>v wDer' ation ( ell InDallation</u>
<b>PROJECT NUMBER</b> <u>Y( g119P</u>	<b>PROJECT LOCATION</b> <u>) runD icHf YeorLia</u>
<b>DATE STARTED</b> <u>, /9g/. 9</u> <b>COMPLETED</b> <u>, /9g/. 9</u>	<b>NORTHING</b> <u>0. 01, . 3 0 5</u> <b>EASTING</b> <u>14. g, R09 5</u>
<b>DRILLER</b> <u>Ss Az s CCv</u>	<b>GROUND ELEVATION</b> <u>E3R 5 MSL</u> <b>BORING DIAMETER</b> <u>g in</u>
<b>DRILLING METHOD</b> <u>Sonic</u>	<b>TOP OF CASING ELEVATION</b> <u>131R0 5 MSL</u>
<b>SAMPLING METHOD</b> <u>0 in3core g in3o' erride</u>	<b>GEOPHYSICAL CONTRACTOR</b> <u>---</u>
<b>RIG TYPE</b> <u>Yeoprowe 19E2 BS</u>	<b>LOGGED BY</b> <u>s3k amDey</u> <b>CHECKED BY</b> <u>s3k eimer</u>



SCS F y NITV k INY ( ABBS ) k VMS( ICMBITY s Tiv N ( ABBS . 2. 937PU s CP Y INT B) k sk 8 C6 37 B) R94/. 9

CLIENT 6erculeDf BBC PROJECT NAME v wDer' ation ( ell InDallation  
PROJECT NUMBER Y( g119P PROJECT LOCATION ) runD icHf YeorLia

z APT6 CG	ABAVsTiv N CG	k AF sk MS	Yk sP6IC Bv Y	F s TAK Is Bz ASCk IPTIv N	Plz z s Ts QpmG	Cv NSTk WCTIv N z Is Yk s F
0				SIBT8 Ss Nz f pale wro: n to wro: nf : etf fine to medum Lrain3(continued)	03	
02				Ss Nz : ith trace Dhell 5aLmentDf Lrayf : etf coarDe Lrain3	23	
04					23	
06					23	
08					23	
10					23	
12				CBs 8A8 Ss Nz : ith awundant Dhell 5aLmentDf Lrayf : etf coarDe Lrain3	23	
14				Ss Nz : ith trace to Dome Dhell 5aLmentDf Lrayf : etf coarDe Lrain3	23	
16					23	
18					23	
20				Ss Nz STv NA/Ss Nz 8 F Wz STv NA : ith Dome clayf Lrayf dryf fine to medium Lrainf writtle3	23	
22					23	
24				Ss Nz : ith trace Dhell 5aLmentDf Lrayf : etf coarDe Lrain3	23	
26					23	
28					23	
30				CBs 8A8 Ss Nz f Lrayf : etf coarDe Lrain3	23	
32					23	
34					23	
36					23	
38					23	
40				Ss Nz : ith Dome : ell rounded KuartJ Lra' elf Lrayf : etf coarDe Lrain3	93	
42					g3	
44					923	

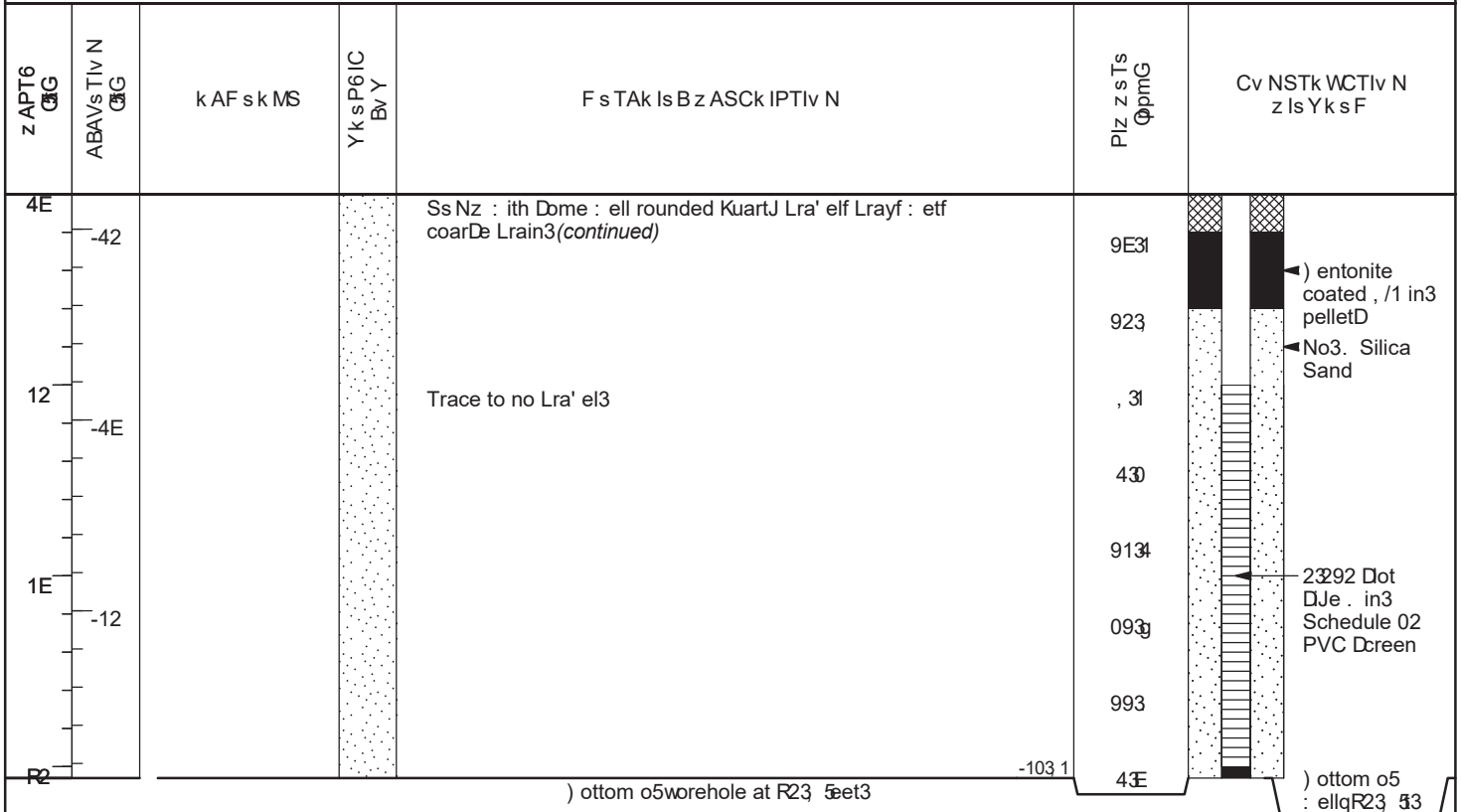
SCS F y NITV k INY ( ABBS ) k VMS ( ICMBITY s Tiv N ( ABBS . 2 . 937PU s CP Y INT B) k sk 8 C6 3' B) R94/ 9

CLIENT 6 erculeDf BBC

PROJECT NAME v wDer' ation ( ell InDtallation

PROJECT NUMBER Y( g119P

PROJECT LOCATION ) runD icHf YeorLia



**Attachment B:**  
Well Development Logs  
(Electronic File Located on CD)

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# **TIDAL EVALUATION AND GROUNDWATER CHEMISTRY DATA SUMMARY**

## **HERCULES/PINOVA FACILITY BRUNSWICK, GEORGIA**

*Prepared for*

**Hercules LLC**  
500 Hercules Road  
Wilmington, DE 19808

*Prepared by*

Geosyntec Consultants, Inc.  
1255 Roberts Boulevard, Suite 200  
Kennesaw, Georgia 30144

Project GR6881P

October 2021



**Attachment B:**  
Well Development Logs

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WELL DEVELOPMENT LOG SHEET

Client:	<u>Hercules/Pinova</u>	Project No.:	<u>GR6881P</u>	Development Date:	<u>3110/21</u>
Site:	<u>Hercules - Bwk, GA</u>	Location:	<u>Brunswick, GA</u>	Field Personnel Name:	<u>A. Ramsey</u>
Well ID:	<u>OW-29S</u>	Pump Type/Model:	<u>MINIMONSOON</u>		
Total Depth (ft) (after purge):	<u>28.15 (3.5 stick up)</u>	Tubing Material:	<u>HDPE</u>		
Depth to Water (ft):	<u>5.79 (3.5 stick up)</u>	Pump Intake Depth (ft):	<u>29.5</u>		
Well Diameter (in):	<u>2</u>	Start/Stop Purge Time:	<u>1510/1554</u>		
Well Volume (gal) = 0.041d <sub>h</sub> :	<u>4.60 gal</u>	Purge Rate (gal/min):	<u>2 gpm</u>		
Well Volume (L) = gal * 3.785:	<u>17.38 L</u>	Total Purge Volume (L):	<u>88 gal   333.08 L</u>		

*d = well diameter (inches); h = length of water column (feet)*

Well Type: Flush  Stick Up  
 Well Lock:  Yes  No  
 Well Cap Condition:  Good  Replace  
 Well Tag Present:  Yes  No

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoe)	Purge Rate (gal/min)	Purged Volume (L)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1550	5.99	4.16	-15	0.20	21.58	0.00	18.15	2	80	
1552	6.02	4.08	-25	0.07	21.59	0.00	18.15	2	84	
1554	6.04	4.03	-29	0.00	21.63	0.00	18.15	2	88	
Stabilizing Criteria	+/- 0.1 SU	+/- 5%		0.2 mg/L or 10% for DO > 0.5 mg/L (whichever is greater)		< 5 NTUs				

WELL DEVELOPMENT LOG SHEET

Client: Hercules/Pinova  
Site: Hercules-Bulk  
Well ID: OW-Q2D  
Total Depth (ft) (after purge): 93.06 (2.65 Stickup)  
Depth to Water (ft): 5.37  
Well Diameter (in): 2"  
Well Volume (gal) = 0.041d<sub>7</sub>h: 14.8 gal  
Well Volume (L) = gal \* 3.785: 55.9 L

Project No.: GR6881P  
Location: Brunswick, GA  
Pump Type/Model: Mini Mandaon  
Tubing Material: HDPE  
Pump Intake Depth (ft): 89  
Start/Stop Purge Time: 1015/1046  
Purge Rate: <sup>gal</sup>2 gal/min  
Total Purge Volume: <sup>gal</sup>66

Development Date: 3/11/21  
Field Personnel Name: A. Ramsay

*d = well diameter (inches); h = length of water column (feet)*

Well Type:  Flush  Stick Up  
Well Lock:  Yes  No  
Well Cap Condition:  Good  Replace  
Well Tag Present:  Yes  No

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoe)	Purge Rate (gal/min)	Purged Volume (ft) Gal	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1025	6.03	2.04	45	1.25	24.20	0.00	56.37	2.9 PM	50	
1040	6.28	2.11	-28	0.144	24.22	0.00	5.41	2	54	
1042	6.29	2.13	-30	0.25	24.22	0.00	5.43	2	58	
1044	6.29	2.14	-30	0.17	24.22	0.00	5.43	2	62	
1046	6.29	2.15	-31	0.15	24.22	0.00	5.44	2	66	
Stabilizing Criteria	+/- 0.1 SU	+/- 5%		0.2 mg/L or 10% for DO > 0.3 mg/L (whichever is greater)		< 5 NTUs				

WELL DEVELOPMENT LOG SHEET

Client: Hercules/Pinova  
 Site: Hercules, BK  
 Well ID: OW-Q2S  
 Total Depth (ft) (after purge): 20.70  
 Depth to Water (ft): 2.67 (20' stickup)  
 Well Diameter (in): 2  
 Well Volume (gal) = 0.041d<sub>2</sub>h: 3.26  
 Well Volume (L) = gal \* 3.785: 12.35

Project No.: CR6881P  
 Location: Brunswick, GA  
 Pump Type/Model: Mini Monsoon  
 Tubing Material: HDPE  
 Pump Intake Depth (ft): 16  
 Start/Stop Purge Time: 3<sup>45</sup> 1516 / 1554  
 Purge Rate (mL/min): 3<sup>45</sup> 76  
 Total Purge Volume (L): 281.2

Development Date: 3/18/21  
 Field Personnel Name: A. Ramsay

*d* = well diameter (inches); *h* = length of water column (feet)

Well Type: Flush Stick Up  
 Well Lock: Yes ~~No~~ AP  
 Well Cap Condition: Good Replace  
 Well Tag Present: Yes No

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoc)	Purge Rate (gal/min)	Purged Volume (L)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1550	6.26	1.33	-41	3.00	21.88	0.00	17.29	2	68	
1552	6.24	1.31	-43	3.14	21.98	0.00	17.29	2	72	
1554	6.24	1.29	-44	3.12	21.97	0.00	17.29	2	76	
Stabilizing Criteria	+/- 0.1 SU	+/- 5%		0.2 mg/L or 10% for DO > 0.5 mg/L (whichever is greater)		< 5 NTUs				

**WELL DEVELOPMENT LOG SHEET**

Client: Hercules/Pinova  
 Site: Hercules-Bnk  
 Well ID: GW-Q2I  
 Total Depth (ft) (after purge): 53.22  
 Depth to Water (ft): 5.68 (2.98)  
 Well Diameter (in): 2  
 Well Volume (gal) = 0.041d<sub>2</sub>h: 7.76  
 Well Volume (L) = gal \* 3.785: 29.36

Project No.: GR6881P  
 Location: Brunswick, GA  
 Pump Type/Model: Mini Monsoon  
 Tubing Material: HDPE  
 Pump Intake Depth (ft): 49  
 Start/Stop Purge Time: 0751/0840  
 Purge Rate (gal/min): 98  
 Total Purge Volume (L): 370.93

Development Date: 3/14/21  
 Field Personnel Name: AR

d = well diameter (inches); h = length of water column (feet)

Well Type: Flush  Stick up  
 Well Lock:  Yes  No AR  
 Well Cap Condition:  Good Replace  
 Well Tag Present:  Yes No

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoc)	Purge Rate (gal/min)	Purged Volume (gal)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
0836	6.74	0.929	-120	0.00	24.19	0.00	6.35	90	2	
0838	6.74	0.930	-121	0.00	24.19	0.00	6.35	94	2	
0840	6.74	0.929	-121	0.00	24.19	0.00	6.35	98	2	
<b>Stabilizing Criteria</b>	+/- 0.1 SU	+/- 5%		0.2 mg/L or 10% for DO > 0.5 mg/L (whichever is greater)		< 5 NTUs				

20.28

WELL DEVELOPMENT LOG SHEET

Client: <u>Hercules/Pinac</u>	Project No.: <u>GR6881P</u>	Development Date: <u>3/14/21</u>
Site: <u>Hercules-BWIC</u>	Location: <u>Brunswick, GA</u>	Field Personnel Name: <u>AR</u>
Well ID: <u>OW-Q1S</u>	Pump Type/Model: <u>Mini Monsoon</u>	
Total Depth (ft) (after purge): <u>16.20</u>	Tubing Material: <u>HDPE</u>	
Depth to Water (ft): <u>3.95 (2.95)</u>	Pump Intake Depth (ft): <u>14</u>	
Well Diameter (in): <u>2</u>	Start/Stop Purge Time: <u>0850/0925 0938/12</u>	
Well Volume (gal) = 0.041d <sup>2</sup> h: <u>2.3</u>	Purge Rate (mL/min): <u>134</u>	
Well Volume (L) = gal * 3.785: <u>2.69</u>	Total Purge Volume (L): <u>5029</u>	

*d* = well diameter (inches); *h* = length of water column (feet)

Well Type: Flush  Stick Up

Well Lock:  Yes  No AR

Well Cap Condition:  Good  Replace

Well Tag Present:  Yes  No

Time	pH (SU)	Spec. Cond. (µmS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoc)	Purge Rate (mL/min)	Purged Volume (gall)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1008	5.72	17.3	3	0.48	19.44	0.00	8.80	2	126	
1016	5.72	17.3	3	0.44	19.44	0.00	8.80	2	130	
1012	5.72	17.3	3	0.43	19.44	0.00	8.80	2	134	
Stabilizing Criteria	+/- 0.1 SU	+/- 5%		0.2 mg/L or 10% for DO > 0.5 mg/L (whichever is greater)		< 5 NTUs				

WELL DEVELOPMENT LOG SHEET

Client: Hercules/Pinora  
 Site: Hercules-BNK  
 Well ID: 0W-QIT  
 Total Depth (ft): \_\_\_\_\_  
 Depth to Water (ft): 5.00  
 Well Diameter (in): 2  
 Well Volume (gal) = 0.041d<sup>2</sup>h: 8.5  
 Well Volume (L) = gal \* 3.785: 32.3  
*d = well diameter (inches); h = length of water column (feet)*  
 Well Type: Flush  Stick Up  
 Well Lock:  Yes  No  
 Well Cap Condition:  Good  Replace  
 Well Tag Present:  Yes  No

Project No.: GR6881P  
 Location: Brunswick, GA  
 Pump Type/Model: Mini monsoon  
 Tubing Material: HDPE  
 Pump Intake Depth (ft): 48  
 Start/Stop Purge Time: 0815/0829  
 Purge Rate (gal/min): 2  
 Total Purge Volume (gal): 55 + 28 = 83  
 Purge Method: Low-Flow Well Volume Other: \_\_\_\_\_  
 Sampling Method: Pump Discharge Other: NA

Sampling Date: 3/17/21  
 Sampler's Name: AR  
 Sample Collection Time: NA  
 Sample Purge Rate (mL/min): NA  
 Sample ID: NA  
 Laboratory Analyses: NA  
 QA/QC Collected?: NA  
 QA/QC I.D.: NA

\* 55 gal previously Purged on 3/16/21

NA = Not applicable

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoc)	Purge Rate (gal/min)	Purged Volume (gal)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
0825	6.93	0.758	-148	0.00	23.13	0.00	5.00	2	20	
0827	6.89	0.758	-146	0.00	23.14	0.00	5.00	↓	4	
0829	6.89	0.758	-146	0.00	23.15	0.00	5.00	↓	4	
Stabilizing Criteria	+/- 0. SU	+/- 5%		0.2 mg/L or 30% for DO > 0.5 mg/L (whichever is greater)	+/- 10%	< 10 NTUs or +/- 10%				

WELL DEVELOPMENT LOG SHEET

Client: <u>Hercules/Pinoax</u>	Project No.: <u>07L881P</u>	Sampling Date: <u>3/17/21</u>
Site: <u>Hercules-BWK</u>	Location: <u>Brunswick, GA</u>	Sampler's Name: <u>AR</u>
Well ID: <u>OW-B1D</u>	Pump Type/Model: <u>Mini Monsoon</u>	Sample Collection Time: <u>NA</u>
Total Depth (ft): _____	Tubing Material: <u>HDPE</u>	Sample Purge Rate (mL/min): <u>NA</u>
Depth to Water (ft): <u>4.85</u>	Pump Intake Depth (ft): <u>89</u>	Sample ID: <u>NA</u>
Well Diameter (in): <u>2</u>	Start/Stop Purge Time: <u>0757/0810</u>	Laboratory Analyses: <u>NA</u>
Well Volume (gal) = 0.041d <sup>2</sup> h: <u>19.3</u>	Purge Rate (mL/min): <u>2</u>	
Well Volume (L) = gal * 3.785: <u>57.7</u>	Total Purge Volume (L): <u>55 + 26 = 81</u>	
<i>d = well diameter (inches); h = length of water column (feet)</i>		
Well Type: Flush <input checked="" type="radio"/> Stick Up <input checked="" type="radio"/>	Purge Method: Low-Flow Well Volume Other: _____	QA/QC Collected? <u>NA</u>
Well Lock: <input checked="" type="radio"/> Yes <input type="radio"/> No	Sampling Method: Pump Discharge Other: <u>NA</u>	QA/QC I.D. <u>NA</u>
Well Cap Condition: <input checked="" type="radio"/> Good <input type="radio"/> Replace		
Well Tag Present: <input checked="" type="radio"/> Yes <input type="radio"/> No		

\*55 gal. previously purged on 3/16/21

NA = Not applicable

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoc)	Purge Rate (gal/min)	Purged Volume (gal)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
0806	5.99	10.8	-44	0.00	23.43	0.00	4.85	2	18	
0808	5.98	10.8	-56	0.00	23.46	0.00	4.84	↓	4	
0810	5.99	10.7	-57	0.00	23.45	0.00	4.83	↓	4	
<b>Stabilizing Criteria</b>	+/- 0. SU	+/- 5%		0.2 mg/L or 10% for DO > 0.5 mg/L (whichever is greater)	+/- 10%	< 10 NTUs or +/- 10%				



WELL DEVELOPMENT LOG SHEET

Client: Hercules/Pinova  
 Site: Hercules Bwk  
 Well ID: OW-Q48<sup>HP</sup>S  
 Total Depth (ft) (after purge): \_\_\_\_\_  
 Depth to Water (ft): 7.83  
 Well Diameter (in): 2  
 Well Volume (gal) = 0.041d<sub>2</sub>h: 2.95  
 Well Volume (L) = gal \* 3.785: 11.17

Project No.: Q26881P  
 Location: Brunswick, GA  
 Pump Type/Model: Mini Mandoran  
 Tubing Material: HDPE  
 Pump Intake Depth (ft): 14  
 Start/Stop Purge Time: 0845 / 0936  
 Purge Rate (gal/min): 2  
 Total Purge Volume (gal): 102

Development Date: 3/17/21  
 Field Personnel Name: AR

*d = well diameter (inches); h = length of water column (feet)*

Well Type: Flush  Stick Up  
 Well Lock:  Yes No  
 Well Cap Condition:  Good Replace  
 Well Tag Present:  Yes No

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoc)	Purge Rate (gal/min)	Purged Volume (gal)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
0932	6.08	29.2	-104	0.79	19.03	2.2	7.83	2	94	
0934	6.08	29.1	-105	0.75	19.93	2.2	7.83	↓	9	
0936	6.07	29.1	-106	0.72	19.92	2.2	7.83	↓	4	
<b>Stabilizing Criteria</b>	+/- 0.1 SU	+/- 5%		0.2 mg/L or 10% for DO > 0.5 mg/L (whichever is greater)		< 5 NTUs				



WELL DEVELOPMENT LOG SHEET

Client: <u>Hercules/Phove</u>	Project No.: <u>GR6881P</u>	Sampling Date: <u>3/17/21, 3/22/21</u>
Site: <u>Hercules-BLK</u>	Location: <u>BLK, GA</u>	Sampler's Name: <u>AP</u>
Well ID: <u>QW-Q5D<del>4</del> Q4D</u>	Pump Type/Model: <u>mini mandoch</u>	Sample Collection Time: <u>NA</u>
Total Depth (ft): <u>94.55 (3.00 stickup)</u>	Tubing Material: <u>HDPE</u>	Sample Purge Rate (mL/min): <u>NA</u>
Depth to Water (ft): <u>4.52</u>	Pump Intake Depth (ft): <u>90</u>	Sample ID: <u>NA</u>
Well Diameter (in): <u>2</u>	Start/Stop Purge Time: <u>1071/1040 and 1400/1413</u>	Laboratory Analyses: <u>NA</u>
Well Volume (gal) = 0.041d <sup>3</sup> h: <u>5.5</u>	Purge Rate (mL/min): <u>2</u>	QA/QC Collected?: <u>NA</u>
Well Volume (L) = gal * 3.785: <u>58.7</u>	Total Purge Volume (ft): <u>46 + 26 = 72</u>	QA/QC I.D.: <u>NA</u>
<i>d = well diameter (inches); h = length of water column (feet)</i>		
Well Type: Flush <input type="checkbox"/> Stick Up <input checked="" type="checkbox"/>	Purge Method: Low-Flow Well Volume Other: <u>NA</u>	
Well Lock: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Sampling Method: Pump Discharge Other: <u>NA</u>	
Well Cap Condition: Good <input checked="" type="checkbox"/> Replace <input type="checkbox"/>		
Well Tag Present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		

NA = Not applicable

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoc)	Purge Rate (mL/min)	Purged Volume (L)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1032	6.12	9.66	-78	0.00	23.48	62.2	4.48	2	46	
1409	5.93	9.52	-66	0.66	23.03	4.11	4.52	2	42.18	
1411	5.93	9.52	-66	0.66	23.03	0.00	4.52	2	4	
1413	5.93	9.52	-66	0.66	23.03	0.00	4.52	2	4	
Stabilizing Criteria	+/- 0. SU	+/- 5%		0.2 mg/L or 10% for DO > 0.5 mg/L (whichever is greater)	+/- 10%	< 10 NTUs or +/- 10%				

18.77, 3.00      53.65, 3.00

WELL DEVELOPMENT LOG SHEET

Client: HERVLES  
 Site: FERRI CREEK / PENNA  
 Well ID: OW-Q35  
 Total Depth (ft) (after purge): -  
 Depth to Water (ft): -  
 Well Diameter (in): 2.0  
 Well Volume (gal) = 0.041d<sub>2</sub>h: -  
 Well Volume (L) = gal \* 3.785: -

Project No: 620881P  
 Location: Brunswick, GA  
 Pump Type/Model: TERRA DO SUBMERSIBIL  
 Tubing Material: LDPE  
 Pump Intake Depth (ft): -  
 Start/Stop Purge Time: 0950 - 1037  
 Purge Rate (gpm/min): 2.0  
 Total Purge Volume (gal): 94  
59.

Development Date: 05/30/21  
 Field Personnel Name: J. BARNHART

d = well diameter (inches); h = length of water column (feet)

Well Type:  Flush  Stick Up (12)  
 Well Lock:  Yes  No  
 Well Cap Condition:  Good  Replace  
 Well Tag Present:  Yes  No

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoc)	Purge Rate (gpm/min)	Purged Volume (gals)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1002	8.62	889	-41.4	2.17	21.15	110	12	2.0	24	
1004	8.39	840	-36.2	2.56	21.07	798		2.0	28	
1007	8.39	848	-36.5	2.16	21.14	45.4		2.0	74	
1029	8.60	840	-49.5	2.02	21.17	30.4		2.0	78	
1031	8.69	844	-59.1	2.01	21.16	21.0		2.0	82	
1033	8.63	848	-61.6	1.95	21.21	17.0		2.0	86	
1035	8.58	856	-57.3	1.93	21.15	15.6		2.0	90	
1037	8.59	846	-64.6	2.07	21.25	7.92		2.0	94	
<b>Stabilizing Criteria</b>	+/- 0.1 SU	+/- 5%		0.2 mg/L or 10% for DO > 0.5 mg/L (whichever is greater)		< 5 NTUs 10				

WELL DEVELOPMENT LOG SHEET

Client: Heavens  
 Site: Terry Creek  
 Well ID: OW-Q5D  
 Total Depth (ft) (after purge): -  
 Depth to Water (ft): -  
 Well Diameter (in): 2.0  
 Well Volume (gal) = 0.041d<sub>2</sub>h: -  
 Well Volume (L) = gal \* 3.785: -

Project No.: GRG881P  
 Location: Brunswick, GA  
 Pump Type/Model: Submersible SS Hurricane  
 Tubing Material: LDPE  
 Pump Intake Depth (ft): -  
 Start/Stop Purge Time: XX  
 Purge Rate (mL/min): 2.0  
 Total Purge Volume (L): XX

Development Date: Y\*  
 Field Personnel Name: J. BARNHART

d = well diameter (inches); h = length of water column (feet)

Well Type: Flush Stick Up  
 Well Lock: Yes No  
 Well Cap Condition: Good Replace  
 Well Tag Present: Yes No

\* well was developed on 03/20 @ 0808-0838

\* below are stability readings on 03/30 @ 1615-1627

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoc)	Purge Rate (mL/min)	Purged Volume (gal)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1619	7.45	10710	-20.0	0.54	22.44	19.3	2	2.0	8	
1621	7.46	10715	-22.1	0.94	22.44	14.5	2	2.0	12	
1623	7.43	10716	-26.6	0.25	22.43	7.35	2	2.0	16	
1625	7.40	10824	-28.8	0.31	22.91	7.29	2	2.0	20	
1627	7.40	10880	-29.4	0.30	22.91	4.51	2	2.0	24	
<b>Stabilizing Criteria</b>	+/- 0.1 SU	+/- 5%		0.2 mg/L or 10% for DO > 0.5 mg/L (whichever is greater)		< 5 NTUs				

Client: Horwath Project No: GR6881P Development Date: 03/30/21  
 Site: HERRI CREEK PENON Location: BURNSVILLE GA Field Personnel Name: J. JARNHART  
 Well ID: 0W-03E Pump Type/Model: Submersible [unclear] TOEMING  
 Total Depth (ft) (after purge): - Tubing Material: LDPE  
 Depth to Water (ft): - Pump Intake Depth (ft): -  
 Well Diameter (in): 2.0 Start/Stop Purge Time: 0900 - 0938  
 Well Volume (gal) = 0.041d<sub>2</sub>h: - Purge Rate (mL/min): 2.0  
 Well Volume (L) = gal \* 3.785: - Total Purge Volume (L): \* 7.6  
*d = well diameter (inches); h = length of water column (feet)*

Well Type:  Flush  Stick Up  (12)  
 Well Lock:  Yes  No  
 Well Cap Condition:  Good  Replace  
 Well Tag Present:  Yes  No

*falls*

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoc)	Purge Rate (mL/min)	Purged Volume	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
0930	6.88	8282	58.3	1.81	21.98	3.71		2.0	60	
0932	7.10	8349	1.7	1.41	21.22	2.15		2.0	64	
0934	7.32	8371	-16.4	1.60	22.34	0.78		2.0	70	
0936	7.33	8385	-26.1	1.65	22.25	0.73		2.0	72	
0938	7.42	8407	-27.8	1.86	22.36	0.82		2.0	76	
<b>Stabilizing Criteria</b>	+/- 0.1 SU	+/- 5%		0.2 mg/L or 10% for DO > 0.5 mg/L (whichever is greater)		< 5 NTUs				

WELL DEVELOPMENT LOG SHEET

Client: HEAVENES  
 Site: TEPPY CREEK/PENNSVA  
 Well ID: OW-055  
 Total Depth (ft) (after purge): -  
 Depth to Water (ft): -  
 Well Diameter (in): 2.0  
 Well Volume (gal) = 0.041d<sub>2</sub>h: -  
 Well Volume (L) = gal \* 3.785: -

Project No: GRC881P  
 Location: Bainsville LA  
 Pump Type/Model: Submersible / SS hurricane  
 Tubing Material: LDPE  
 Pump Intake Depth (ft): -  
 Start/Stop Purge Time: \*\*  
 Purge Rate (gpm/min): 2.0  
 Total Purge Volume (L): 77

Development Date: 2/9  
 Field Personnel Name: J. ARNHART

d = well diameter (inches); h = length of water column (feet)

Well Type: Flush  Stick Up  
 Well Lock:  Yes No  
 Well Cap Condition:  Good Replace  
 Well Tag Present:  Yes No

\* well developed on 03/25 from 1238-1258 & 1330-1505  
 \* below are stability readings on 03/30 @ 142-1531

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoc)	Purge Rate (gpm/min)	Purged Volume (gal)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1425	8.25	5320	-77.5	0.46	21.32	340	10	2.0	100	
1527	8.52	4963	-139.1	0.26	21.63	62.2		2.0	134	
1529	8.48	4465	-139.2	0.18	21.53	65.5		2.0	135	
1531	8.51	4962	-137.8	0.12	21.85	57.8		2.0	142	

<b>Stabilizing Criteria</b>	+/- 0.1 SU	+/- 5%		0.2 mg/L or 10% for DO > 0.5 mg/L (whichever is greater)		< 5 NTUs				
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\* well purged for 30 minutes with a reading above 50+ NTU. all other parameters stable.

WELL DEVELOPMENT LOG SHEET

Client: HERCULES  
 Site: TEPPER CREEK / BRIDGE  
 Well ID: DN-Q5F  
 Total Depth (ft) (after purge): -  
 Depth to Water (ft): -  
 Well Diameter (in): 2.0  
 Well Volume (gal) =  $0.041d_2h$ : -  
 Well Volume (L) = gal \* 3.785: -

Project No.: 12R0881P  
 Location: Braunswick, GA  
 Pump Type/Model: Submersible / SS  
 Tubing Material: LDPE  
 Pump Intake Depth (ft): -  
 Start/Stop Purge Time: \* \*  
 Purge Rate (mL/min): 2.0 g/m  
 Total Purge Volume (L): -

Development Date: 3/25  
 Field Personnel Name: JO ARJUNHART

$d =$  well diameter (inches);  $h =$  length of water column (feet)

Well Type: Flush  Stick Up  
 Well Lock:  Yes No  
 Well Cap Condition:  Good Replace  
 Well Tag Present:  Yes No

0742-0759  
 \* well developed on 3/25 ~~12:30-12:50~~ @ 1530-1505  
 @ 2gpm  
 \* Below are stability readings on 3/29 @ 1530-39

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft btoc)	Purge Rate (mL/min)	Purged Volume (L)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1533	7.19	1715	-111.2	0.26	20.88	9.76	110	2.0	6	
1534	7.17	1657	-117.8	0.73	20.84	9.46		2.0	12	
1539	7.16	1631	-120.1	0.21	20.90	7.80		2.0	18	
Stabilizing Criteria	+/- 0.1 SU	+/- 5%		0.2 mg/L or 10% for DO > 0.5 mg/L (whichever is greater)		< 5 NTUs				



WELL DEVELOPMENT LOG SHEET

Client: HERCULES  
 Site: TERRY CREEK PENNA  
 Well ID: B-3  
 Total Depth (ft) (after purge): —  
 Depth to Water (ft): —  
 Well Diameter (in): 2.0  
 Well Volume (gal) = 0.041d<sup>2</sup>h: —  
 Well Volume (L) = gal \* 3.785: —

Project No: GRO881P  
 Location: BURNSWICK, GA  
 Pump Type/Model: TORNADO 2.0  
 Tubing Material: LDPE  
 Pump Intake Depth (ft): —  
 Start/Stop Purge Time: 1230/1340  
 Purge Rate (gal/min): 2.0 @ 1.5  
 Total Purge Volume (L): 100

Development Date: 11/16/08  
 Field Personnel Name: J. S. ADKINS

*d* = well diameter (inches); *h* = length of water column (feet)

Well Type: Flush  Stk Up   
 Well Lock: Yes  No   
 Well Cap Condition: Good  Replace   
 Well Tag Present: Yes  No

100 gal

Time	pH (SU)	Spec. Cond. (µS/cm)	ORP (mV)	DO (mg/L)	Temp. (°C)	Turbidity (NTUs)	DTW (ft bto)	Purge Rate (gal/min)	Purged Volume (gal)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1306	6.19	17117	26.8	1.54	22.46	1.46	②	2.5	54.0	
1309	6.54	17315	28.5	1.07	22.47	1.77		1.5	<del>0.87</del> 58.5	
1312	6.33	17312	18.3	1.56	22.26	1.01		1.5	63.0	
1333	6.16	17347	5.2	0.36	22.34	1.23		1.5	91.0	
1335	6.17	17408	-3.4	0.35	22.41	1.01		1.5	97.5	
1337	6.20	17432	-8.7	0.35	22.35	1.15		1.5	100	
<b>Stabilizing Criteria</b>	+/- 0.1 SU	+/- 5%		0.2 mg/L or 10% for DO > 0.5 mg/L (whichever is greater)		< 5 NTUs				

EQUIPMENT CALIBRATION LOG

Field Technician: A. Ramsey

Date: 3/10/21

Time (start): 1500

Time (finish): 1510

smarTroll SN: Horiba/U-50001ETMTK9F

Turbidity Meter Type: —

SN: —

Weather Conditions: Sunny, 46/69

Facility and Unit: hercules, BWC

Project No.: 626881P

Calibration log

	Standard Lot # / Date of Expiration	Temp of Standard (°C)	Value of Standard	Initial Reading	Post-Cal Reading	Acceptable Range	Pass?	Comments
Specific Conductance <sup>MS</sup> (µS/cm)	20010025 02/2021	25.8	4.49	—	4.49	+/- 5 %	<input checked="" type="radio"/> Yes No	
pH (4)	↓	↓	4.008AP	—	4.03	+/- 0.1 SU	<input checked="" type="radio"/> Yes No	
pH (7)			—	—	+/- 0.1 SU	Yes No		
pH (10)			—	—	+/- 0.1 SU	Yes No		
ORP (mV)			—	—	+/- 20mV	Yes No		
DO (%) (1pt, 100% water saturated air cal)			25.8	—	8.14	+/- 6 % saturation	<input checked="" type="radio"/> Yes No	
Turbidity 0 NTU			0.0	—	0.0	+/- 0.5 NTU	<input checked="" type="radio"/> Yes No	
Turbidity 1 NTU			—	—	+/- 0.5 NTU	Yes No		
Turbidity 10 NTU			—	—	+/- 0.5 NTU	Yes No		

\* horiba auto-cal

EQUIPMENT CALIBRATION LOG

Field Technician: A. Ramsey

Date: 3/11/21

Time (start): 1000

Time (finish): 1010

smarTroll SN: HoriBa/US000/ET/MTKCF

Turbidity Meter Type: -

SN: -

Weather Conditions: cloudy 52/70

Facility and Unit: Mercedes, BWK

Project No.: GR6881P

Calibration log

	Standard Lot # / Date of Expiration	Temp of Standard (°C)	Value of Standard	Initial Reading	Post-Cal Reading	Acceptable Range	Pass?	Comments
Specific Conductance <sup>m</sup> (µS/cm)	<u>20010025 08/2021</u>	<u>27.9</u>	<u>4.49</u>	<u>-</u>	<u>4.49</u>	<u>+/- 5 %</u>	<input checked="" type="radio"/> Yes <input type="radio"/> No	
pH (4)	↓	↓	<u>4.00</u>	<u>-</u>	<u>3.99</u>	<u>+/- 0.1 SU</u>	<input checked="" type="radio"/> Yes <input type="radio"/> No	
pH (7)	↓	↓	<u>-</u>	<u>-</u>	<u>-</u>	<u>+/- 0.1 SU</u>	<input type="radio"/> Yes <input type="radio"/> No	
pH (10)	↓	↓	<u>-</u>	<u>-</u>	<u>-</u>	<u>+/- 0.1 SU</u>	<input type="radio"/> Yes <input type="radio"/> No	
ORP (mV)	↓	↓	<u>-</u>	<u>-</u>	<u>-</u>	<u>+/- 20mV</u>	<input type="radio"/> Yes <input type="radio"/> No	
DO (%) (1pt, 100% water saturated air cal)			<u>27.9</u>	<u>-</u>	<u>7.84</u>	<u>+/- 6 % saturation</u>	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Turbidity 0 NTU			<u>0.0</u>	<u>-</u>	<u>0.0</u>	<u>+/- 0.5 NTU</u>	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Turbidity 1 NTU			<u>-</u>	<u>-</u>	<u>-</u>	<u>+/- 0.5 NTU</u>	<input type="radio"/> Yes <input type="radio"/> No	
Turbidity 10 NTU			<u>-</u>	<u>-</u>	<u>-</u>	<u>+/- 0.5 NTU</u>	<input type="radio"/> Yes <input type="radio"/> No	

\* horiba auto-cal

EQUIPMENT CALIBRATION LOG

Field Technician: A. Ramsey

Date: 3/16/21<sup>th</sup> 3/13/21

Time (start): 1500

Time (finish): 1510

smarTroll SN: Horiba/U-5000/ET7MTR9F

Turbidity Meter Type: —

SN: —

Weather Conditions: cloudy, 55/83

Facility and Unit: hercules BWK

Project No.: GR6881P

Calibration log

	Standard Lot # / Date of Expiration	Temp of Standard (°C)	Value of Standard	Initial Reading	Post-Cal Reading	Acceptable Range	Pass?	Comments
Specific Conductance <sup>m</sup> (µS/cm)	<u>20010025 08/2021</u>	<u>27.9</u>	<u>4.49</u>	<u>-</u>	<u>4.49</u>	<u>+/- 5%</u>	<u>Yes</u> No	
pH (4)			<u>4.00</u>	<u>-</u>	<u>3.99</u>	<u>+/- 0.1 SU</u>	<u>Yes</u> No	
pH (7)			<u>-</u>	<u>-</u>	<u>-</u>	<u>+/- 0.1 SU</u>	Yes No	
pH (10)			<u>-</u>	<u>-</u>	<u>-</u>	<u>+/- 0.1 SU</u>	Yes No	
ORP (mV)			<u>-</u>	<u>-</u>	<u>-</u>	<u>+/- 20mV</u>	Yes No	
DO (%) (1pt, 100% water saturated air cal)			<u>27.9</u>	<u>-</u>	<u>7.84</u>	<u>+/- 6% saturation</u>	<u>Yes</u> No	
Turbidity 0 NTU			<u>0.0</u>	<u>-</u>	<u>0.0</u>	<u>+/- 0.5 NTU</u>	<u>Yes</u> No	
Turbidity 1 NTU			<u>-</u>	<u>-</u>	<u>-</u>	<u>+/- 0.5 NTU</u>	Yes No	
Turbidity 10 NTU			<u>-</u>	<u>-</u>	<u>-</u>	<u>+/- 0.5 NTU</u>	Yes No	

\* horiba auto-cal

EQUIPMENT CALIBRATION LOG

Field Technician: A. Ramsay

Date: 3/14/21

Time (start): 0740

Time (finish): 0750

smarTroll SN: Horiba U-5000/ET/TK9F

Turbidity Meter Type: -

SN: -

Weather Conditions: Sunny, 60/79

Facility and Unit: Horiba, Bwk

Project No.: GR6881P

Calibration log

	Standard Lot # / Date of Expiration	Temp of Standard (°C)	Value of Standard	Initial Reading	Post-Cal Reading	Acceptable Range	Pass?	Comments
Specific Conductance <sup>M</sup> (µS/cm)	20010029 08/2021	26.1	4.49	-	4.49	+/- 5%	<input checked="" type="radio"/> Yes No	
pH (4)	↓	↓	4.00	-	3.99	+/- 0.1 SU	<input checked="" type="radio"/> Yes No	
pH (7)			-	-	-	+/- 0.1 SU	Yes No	
pH (10)			-	-	-	+/- 0.1 SU	Yes No	
ORP (mV)			-	-	-	+/- 20mV	Yes No	
DO (%) (1pt, 100% water saturated air cal)			26.1	8.10	→	+/- 6% saturation	<input checked="" type="radio"/> Yes No	
Turbidity 0 NTU			0.0	-	0.0	+/- 0.5 NTU	<input checked="" type="radio"/> Yes No	
Turbidity 1 NTU			-	-	-	+/- 0.5 NTU	Yes No	
Turbidity 10 NTU			-	-	-	+/- 0.5 NTU	Yes No	

\*Horiba auto-cal

EQUIPMENT CALIBRATION LOG

Field Technician: A. Ramsay

Date: 3/10/21<sup>AR</sup> 3/17/21

Time (start): 0800

Time (finish): 0810

smarTroll SN: Horiba/U-5000/ET1MTR9F

Turbidity Meter Type: -

SN: -

Weather Conditions: cloudy, 63/74

Facility and Unit: Mercedes, Bwk

Project No.: GR6881P

Calibration log

	Standard Lot # / Date of Expiration	Temp of Standard (°C)	Value of Standard	Initial Reading	Post-Cal Reading	Acceptable Range	Pass?	Comments
Specific Conductance <sup>m</sup> (µS/cm)	20010025 08/2021	27.9	4.49	-	4.49	+/- 5%	<input checked="" type="radio"/> Yes No	
pH (4)			4.00	-	3.99	+/- 0.1 SU	<input checked="" type="radio"/> Yes No	
pH (7)			-	-	-	+/- 0.1 SU	Yes No	
pH (10)			-	-	-	+/- 0.1 SU	Yes No	
ORP (mV)			-	-	-	+/- 20mV	Yes No	
DO (%) (1pt, 100% water saturated air cal)			27.9	-	7.84	+/- 6% saturation	<input checked="" type="radio"/> Yes No	
Turbidity 0 NTU			0.0	-	0.0	+/- 0.5 NTU	<input checked="" type="radio"/> Yes No	
Turbidity 1 NTU			-	-	-	+/- 0.5 NTU	Yes No	
Turbidity 10 NTU			-	-	-	+/- 0.5 NTU	Yes No	

\* horiba auto-cal

EQUIPMENT CALIBRATION LOG

Field Technician: A. Ramsey

Date: ~~3/10/21~~<sup>AR</sup> 3/22/21

Time (start): 1350

Time (finish): 1400

smarTroll SN: horiba/0-5000/ET1MTK9F

Turbidity Meter Type:                     

SN:                     

Weather Conditions: Sunny 57/71

Facility and Unit: hercules, bwrk

Project No.: GR6881P

Calibration log

	Standard Lot # / Date of Expiration	Temp of Standard (°C)	Value of Standard	Initial Reading	Post-Cal Reading	Acceptable Range	Pass?	Comments
Specific Conductance <sup>µM</sup> (µS/cm)	20010025 08/2021	26.9	4.49	-	4.49	+/- 5%	<input checked="" type="radio"/> Yes No	
pH (4)			4.00	-	4.00	+/- 0.1 SU	<input checked="" type="radio"/> Yes No	
pH (7)			-	-	-	+/- 0.1 SU	Yes No	
pH (10)			-	-	-	+/- 0.1 SU	Yes No	
ORP (mV)			-	-	-	+/- 20mV	Yes No	
DO (%) (1pt, 100% water saturated air cal)			26.9	-	7.98	+/- 6% saturation	<input checked="" type="radio"/> Yes No	
Turbidity 0 NTU			0.0	-	0.0	+/- 0.5 NTU	<input checked="" type="radio"/> Yes No	
Turbidity 1 NTU			-	-	-	+/- 0.5 NTU	Yes No	
Turbidity 10 NTU			-	-	-	+/- 0.5 NTU	Yes No	

\* horiba auto-cal

Meter Calibration Report

Site: Hercules

Project No.: GR6881 P/3001/3001

Field Personnel: J. BARNHART

Date: 03/30/21

Recorded By: \_\_\_\_\_

Primary Activities: GW Sampling

Weather: cloudy / light rain

Initial Calibration Completed at: 03/30/21 (time) 0850

Final Calibration Check Completed at: " (time) \_\_\_\_\_

pH calibration		buffer solution		
		pH 4.0	pH 7.0	pH 10.0
Initial	temp (°C)	18.47	18.75	18.61
	instrument reading	4.60	7.00	9.98
	should read/calibrated to	4.60	7.00	10.00
Final	temp (°C)	19.05	18.98	19.13
	instrument reading	4.13	6.89	9.83

specific conductance calibration		standard
		(µS / cm)
Initial	instrument reading	1,000
	should read/calibrated to	1,000
Final	instrument reading	1,165

dissolved oxygen calibration		100%	0%
Initial	temp (°C)	22.0	15.2
	instrument reading	8.758	
	should read/calibrated to	8.744	
Final	temp (°C)	19.8	
	instrument reading	9.10	

ORP calibration	Zobell solution 231 mV (Zobell reads)
Initial Reading	257.0
Final Reading	241.5

Turbidity Calibration	10	Standard	100
	0.5 NTU	20.5 NTU	40 NTU
Initial Reading	9.98	19.8	101
Final Reading	10.2	20.3	99.7

Meter Summary:

pH Meter / Probe: Model: YSI 556 MP3 / 19A100101  
 DO Meter / Probe: Model: \_\_\_\_\_  
 ORP Meter / Probe: Model: \_\_\_\_\_  
 Conductivity Meter / Probe: Model: \_\_\_\_\_  
 Turbidity Meter / Probe: Model: 1-HACH 2100Q / 13110C02M406

Comments: (rental, condition, problems)



**Attachment C**  
**Groundwater Well Survey Report**  
**(Electronic File Located on CD**

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GEOSYNTEC CONSULTANTS  
GROUNDWATER WELL SURVEY REPORT  
BRUNSWICK, GEORGIA  
April 9, 2021

DESIGNATION	NORTHING	EASTING	TOP OF CASING	CONCRETE ELEVATION	GROUND ELEVATION	BOLT ELEVATION
Q3S	425163.57	872110.09	6.07	6.48	6.35	
Q3I	425158.32	872102.60	6.15	6.43		
MW16B	423499.93	869671.57	13.80	10.90		
CONTAM SOIL-1	423884.78	871006.86	8.18			
MW17S	424808.08	869189.53	14.13		11.12	11.61
MW19I	426286.74	868929.65	20.61		17.52	18.13
Q5S	424825.18	872646.62	9.11	6.00		
Q5I	424820.80	872637.93	9.12	5.92		
Q5D	424832.34	872639.41	8.90	5.92		
Q2I	425034.29	872667.10	8.93	6.18	5.91	
Q2D	425022.88	872666.31	8.41	5.94	5.60	
Q2S	425012.39	872666.23	8.28	5.71	5.35	
MW29S	424982.53	872671.34	8.95	5.83	5.68	
BS-OW-2	424985.14	872686.08	8.50	5.79	5.63	
ES-OW-3I	424967.01	872691.36	8.42	5.56	5.03	
BS-OW-3D	424959.66	872691.12	8.70	5.44		
BS-1	424973.12	872676.47	9.00	5.77		
BS-2	424947.65	872675.97	8.85	5.54		
BS-3	424949.80	872680.58	8.63	5.50		
BS-OW-1	424941.18	872681.15	8.22	5.21	5.12	
OW-Q1S	425014.39	872814.76	7.80	5.29	4.98	
OW-Q1I	425013.56	872825.28	7.71	5.14		
OW-Q1D	425011.87	872833.53	7.80	5.11		
OW-Q4S	424992.44	872979.96	7.75	5.11	4.77	
OW-Q4I	424990.89	872990.23	7.73	5.10	4.86	
OW-Q4D	424987.61	873000.70	7.91	5.28		
MW-20S	424175.45	872827.19	10.25		7.08	7.58

GEOSYNTEC CONSULTANTS  
MONITORING WELL SURVEY  
BRUNSWICK, GEORGIA  
June 24, 2021

DESIGNATION	NORTHING	EASTING	TOP OF CASING ELEVATION	CONCRETE ELEVATION	GROUND ELEVATION	BOLT ELEVATION
OW-Q4D TOP CASING	424990.75	873000.29	7.98	5.33		
OW-Q4I TOP CASING	424993.61	872989.64	7.84	5.19		
OW-Q4S TOP CASING	424995.15	872979.36	7.80	5.15		

**Attachment D**  
Groundwater Sample Purge Logs  
(Electronic File Located on CD)

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**Attachment E**  
Groundwater Analytical Reports and Data  
Validation

(Electronic File Located on CD)

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## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858

Laboratory Job ID: 680-197113-1

Client Project/Site: Hercules Brunswick - GW Investigation

**For:**

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Kennesaw, Georgia 30144

Attn: Adria Reimer



Authorized for release by:  
4/14/2021 11:04:08 AM

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*The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Job ID: 680-197113-1**

**Laboratory: Eurofins TestAmerica, Savannah**

## Narrative

### CASE NARRATIVE

**Client: Geosyntec Consultants, Inc.**  
**Project: Hercules Brunswick - GW Investigation**

**Report Number: 680-197113-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

#### RECEIPT

The samples were received on 04/05/2021; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 4.3° C.

#### VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples MW-29S-03292021 (680-197113-1), OW-Q2S-03292021 (680-197113-2), OW-Q2I-03302021 (680-197113-3), OW-Q2D-03292021 (680-197113-4), OW-Q1S-03302021 (680-197113-5), OW-Q1I-03302021 (680-197113-6), OW-Q1D-03302021 (680-197113-7), OW-Q4S-03302021 (680-197113-8), OW-Q4I-03302021 (680-197113-9), OW-Q5S-03302021 (680-197113-10), OW-Q5I-03302021 (680-197113-11), OW-Q5D-03302021 (680-197113-12), EQB-01-03302021 (680-197113-13), EQB-02-03302021 (680-197113-14) and DUP-01 (680-197113-15) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 04/08/2021, 04/10/2021 and 04/12/2021.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batches 680-663313, 680-663281, 680-663289, 680-663625, 680-663719 and 680-663727.

Internal standard (ISTD) response for 1,4-dichlorobenzene-d4 for the following sample was outside acceptance criteria: OW-Q2D-03292021 (680-197113-4). This ISTD does not correspond to any of the requested target compounds; therefore, the data have been reported.

Surrogate recovery for the following samples were outside control limits: OW-Q1D-03302021 (680-197113-7), OW-Q5D-03302021 (680-197113-12) and DUP-01 (680-197113-15). Evidence of matrix interferences is not obvious.

The laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) for analytical batch 680-663289 recovered outside control limits for the following analytes: 1,2,4-Trimethylbenzene and 1,3,5-Trimethylbenzene. These analytes were biased high in the LCS/LCSD and were not detected in the associated samples; therefore, the data have been reported.

The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for analytical batch 680-663313 recovered outside control limits for the following analyte: Methylene Chloride. This analyte was biased high in the LCS and was not detected in the associated samples; therefore, the data have been reported.

The laboratory control sample duplicate (LCSD) for analytical batch 680-663313 recovered outside control limits for the following analyte: 4-Methyl-2-pentanone (MIBK). 4-Methyl-2-pentanone (MIBK) has been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed. These results have been reported and qualified.

The laboratory control sample and/or the laboratory control sample duplicate (LCS/LCSD) for analytical batch 680-663719 recovered outside control limits for the following analyte: 4-Methyl-2-Pentanone. This has been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed.

The laboratory control sample (LCS) for analytical batch 680-663727 recovered outside control limits for the following analyte: 1,2,4-Trimethylbenzene. This analyte was biased high in the LCS and was not detected in the associated samples; therefore, the data have been reported.



# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

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## Job ID: 680-197113-1 (Continued)

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### Laboratory: Eurofins TestAmerica, Savannah (Continued)

Samples OW-Q2D-03292021 (680-197113-4)[10X], OW-Q1D-03302021 (680-197113-7)[10X], OW-Q5D-03302021 (680-197113-12)[10X] and DUP-01 (680-197113-15)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# Sample Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-197113-1	MW-29S-03292021	Water	03/29/21 15:52	04/05/21 10:20	
680-197113-2	OW-Q2S-03292021	Water	03/29/21 17:06	04/05/21 10:20	
680-197113-3	OW-Q2I-03302021	Water	03/30/21 10:00	04/05/21 10:20	
680-197113-4	OW-Q2D-03292021	Water	03/29/21 17:13	04/05/21 10:20	
680-197113-5	OW-Q1S-03302021	Water	03/30/21 11:05	04/05/21 10:20	
680-197113-6	OW-Q1I-03302021	Water	03/30/21 11:50	04/05/21 10:20	
680-197113-7	OW-Q1D-03302021	Water	03/30/21 17:55	04/05/21 10:20	
680-197113-8	OW-Q4S-03302021	Water	03/30/21 14:15	04/05/21 10:20	
680-197113-9	OW-Q4I-03302021	Water	03/30/21 15:20	04/05/21 10:20	
680-197113-10	OW-Q5S-03302021	Water	03/30/21 15:45	04/05/21 10:20	
680-197113-11	OW-Q5I-03302021	Water	03/30/21 17:10	04/05/21 10:20	
680-197113-12	OW-Q5D-03302021	Water	03/30/21 17:49	04/05/21 10:20	
680-197113-13	EQB-01-03302021	Water	03/30/21 18:40	04/05/21 10:20	
680-197113-14	EQB-02-03302021	Water	03/30/21 18:45	04/05/21 10:20	
680-197113-15	DUP-01	Water	03/30/21 00:00	04/05/21 10:20	

# Method Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
5030B	Purge and Trap	SW846	TAL SAV

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858



# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
*1	LCS/LCSD RPD exceeds control limits.
*3	ISTD response or retention time outside acceptable limits.
S1-	Surrogate recovery exceeds control limits, low biased.
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Client Sample ID: MW-29S-03292021

Lab Sample ID: 680-197113-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
p-Cymene	2.8		1.0		ug/L	1		8260B	Total/NA

## Client Sample ID: OW-Q2S-03292021

Lab Sample ID: 680-197113-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
p-Cymene	7.3		1.0		ug/L	1		8260B	Total/NA

## Client Sample ID: OW-Q2I-03302021

Lab Sample ID: 680-197113-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
p-Cymene	1.0		1.0		ug/L	1		8260B	Total/NA

## Client Sample ID: OW-Q2D-03292021

Lab Sample ID: 680-197113-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toluene	2.9		1.0		ug/L	1		8260B	Total/NA
o-Xylene	3.2		1.0		ug/L	1		8260B	Total/NA
Orthodichlorobenzene	7.6		1.0		ug/L	1		8260B	Total/NA
Isopropylbenzene	160		1.0		ug/L	1		8260B	Total/NA
1,4-Dichlorobenzene	12		1.0		ug/L	1		8260B	Total/NA
p-Cymene	2.2		1.0		ug/L	1		8260B	Total/NA
Benzene - DL	710		10		ug/L	10		8260B	Total/NA
Chlorobenzene - DL	610		10		ug/L	10		8260B	Total/NA
Ethylbenzene - DL	230		10		ug/L	10		8260B	Total/NA
m-Xylene & p-Xylene - DL	210		10		ug/L	10		8260B	Total/NA

## Client Sample ID: OW-Q1S-03302021

Lab Sample ID: 680-197113-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	24		10		ug/L	1		8260B	Total/NA
Chlorobenzene	1.3		1.0		ug/L	1		8260B	Total/NA
2-Butanone (MEK)	67		10		ug/L	1		8260B	Total/NA

## Client Sample ID: OW-Q1I-03302021

Lab Sample ID: 680-197113-6

No Detections.

## Client Sample ID: OW-Q1D-03302021

Lab Sample ID: 680-197113-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	710		10		ug/L	10		8260B	Total/NA
Toluene	1.7		1.0		ug/L	1		8260B	Total/NA
o-Xylene	5.2		1.0		ug/L	1		8260B	Total/NA
Chlorobenzene	630		10		ug/L	10		8260B	Total/NA
Orthodichlorobenzene	8.6		1.0		ug/L	1		8260B	Total/NA
Ethylbenzene	250		10		ug/L	10		8260B	Total/NA
Isopropylbenzene	210		10		ug/L	10		8260B	Total/NA
m-Xylene & p-Xylene	210		10		ug/L	10		8260B	Total/NA
Vinyl chloride	6.4		1.0		ug/L	1		8260B	Total/NA
1,4-Dichlorobenzene	14		1.0		ug/L	1		8260B	Total/NA
p-Cymene	5.3		1.0		ug/L	1		8260B	Total/NA

## Client Sample ID: OW-Q4S-03302021

Lab Sample ID: 680-197113-8

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q4I-03302021**

**Lab Sample ID: 680-197113-9**

No Detections.

**Client Sample ID: OW-Q5S-03302021**

**Lab Sample ID: 680-197113-10**

No Detections.

**Client Sample ID: OW-Q5I-03302021**

**Lab Sample ID: 680-197113-11**

No Detections.

**Client Sample ID: OW-Q5D-03302021**

**Lab Sample ID: 680-197113-12**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Benzene	100		1.0		ug/L	1			8260B	Total/NA
1,1-Dichloroethane	1.0		1.0		ug/L	1			8260B	Total/NA
Chlorobenzene	200		10		ug/L	10			8260B	Total/NA
Orthodichlorobenzene	3.1		1.0		ug/L	1			8260B	Total/NA
Ethylbenzene	1.2		1.0		ug/L	1			8260B	Total/NA
Isopropylbenzene	20		1.0		ug/L	1			8260B	Total/NA
m-Xylene & p-Xylene	4.3		1.0		ug/L	1			8260B	Total/NA
Vinyl chloride	4.8		1.0		ug/L	1			8260B	Total/NA
1,4-Dichlorobenzene	5.8		1.0		ug/L	1			8260B	Total/NA

**Client Sample ID: EQB-01-03302021**

**Lab Sample ID: 680-197113-13**

No Detections.

**Client Sample ID: EQB-02-03302021**

**Lab Sample ID: 680-197113-14**

No Detections.

**Client Sample ID: DUP-01**

**Lab Sample ID: 680-197113-15**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Benzene	710		10		ug/L	10			8260B	Total/NA
o-Xylene	5.1		1.0		ug/L	1			8260B	Total/NA
Chlorobenzene	630		10		ug/L	10			8260B	Total/NA
Orthodichlorobenzene	8.5		1.0		ug/L	1			8260B	Total/NA
Ethylbenzene	250		10		ug/L	10			8260B	Total/NA
Isopropylbenzene	200		10		ug/L	10			8260B	Total/NA
m-Xylene & p-Xylene	210		10		ug/L	10			8260B	Total/NA
Vinyl chloride	6.5		1.0		ug/L	1			8260B	Total/NA
1,4-Dichlorobenzene	14		1.0		ug/L	1			8260B	Total/NA
p-Cymene	5.2		1.0		ug/L	1			8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: MW-29S-03292021**

**Lab Sample ID: 680-197113-1**

**Date Collected: 03/29/21 15:52**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/08/21 21:10	1
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 21:10	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 21:10	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 21:10	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 21:10	1
Acetone	10	U	10		ug/L			04/08/21 21:10	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/08/21 21:10	1
Methylene Chloride	5.0	U	5.0		ug/L			04/08/21 21:10	1
Toluene	1.0	U	1.0		ug/L			04/08/21 21:10	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 21:10	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 21:10	1
Chlorobenzene	1.0	U	1.0		ug/L			04/08/21 21:10	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 21:10	1
Orthodichlorobenzene	1.0	U	1.0		ug/L			04/08/21 21:10	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 21:10	1
Ethylbenzene	1.0	U	1.0		ug/L			04/08/21 21:10	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/08/21 21:10	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 21:10	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 21:10	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/08/21 21:10	1
Vinyl chloride	1.0	U	1.0		ug/L			04/08/21 21:10	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 21:10	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/08/21 21:10	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/08/21 21:10	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/08/21 21:10	1
<b>p-Cymene</b>	<b>2.8</b>		1.0		ug/L			04/08/21 21:10	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 21:10	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 21:10	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	97		60 - 124		04/08/21 21:10	1
4-Bromofluorobenzene (Surr)	100		70 - 130		04/08/21 21:10	1
Dibromofluoromethane (Surr)	104		70 - 130		04/08/21 21:10	1
Toluene-d8 (Surr)	100		70 - 130		04/08/21 21:10	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q2S-03292021**

**Lab Sample ID: 680-197113-2**

**Date Collected: 03/29/21 17:06**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/08/21 20:46	1
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 20:46	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 20:46	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 20:46	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 20:46	1
Acetone	10	U	10		ug/L			04/08/21 20:46	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/08/21 20:46	1
Methylene Chloride	5.0	U	5.0		ug/L			04/08/21 20:46	1
Toluene	1.0	U	1.0		ug/L			04/08/21 20:46	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 20:46	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 20:46	1
Chlorobenzene	1.0	U	1.0		ug/L			04/08/21 20:46	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 20:46	1
Orthodichlorobenzene	1.0	U	1.0		ug/L			04/08/21 20:46	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 20:46	1
Ethylbenzene	1.0	U	1.0		ug/L			04/08/21 20:46	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/08/21 20:46	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 20:46	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 20:46	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/08/21 20:46	1
Vinyl chloride	1.0	U	1.0		ug/L			04/08/21 20:46	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 20:46	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/08/21 20:46	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/08/21 20:46	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/08/21 20:46	1
<b>p-Cymene</b>	<b>7.3</b>		1.0		ug/L			04/08/21 20:46	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 20:46	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 20:46	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	98		60 - 124		04/08/21 20:46	1
4-Bromofluorobenzene (Surr)	105		70 - 130		04/08/21 20:46	1
Dibromofluoromethane (Surr)	102		70 - 130		04/08/21 20:46	1
Toluene-d8 (Surr)	100		70 - 130		04/08/21 20:46	1



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q2I-03302021**

**Lab Sample ID: 680-197113-3**

**Date Collected: 03/30/21 10:00**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/12/21 21:18	1
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 21:57	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 21:57	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 21:57	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 21:57	1
Acetone	10	U	10		ug/L			04/08/21 21:57	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/08/21 21:57	1
Methylene Chloride	5.0	U	5.0		ug/L			04/08/21 21:57	1
Toluene	1.0	U	1.0		ug/L			04/08/21 21:57	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 21:57	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 21:57	1
Chlorobenzene	1.0	U	1.0		ug/L			04/12/21 21:18	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 21:57	1
Orthodichlorobenzene	1.0	U	1.0		ug/L			04/08/21 21:57	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 21:57	1
Ethylbenzene	1.0	U	1.0		ug/L			04/12/21 21:18	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/08/21 21:57	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 21:57	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 21:57	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/12/21 21:18	1
Vinyl chloride	1.0	U	1.0		ug/L			04/08/21 21:57	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 21:57	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/08/21 21:57	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/08/21 21:57	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/08/21 21:57	1
<b>p-Cymene</b>	<b>1.0</b>		1.0		ug/L			04/08/21 21:57	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 21:57	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 21:57	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	97		60 - 124		04/08/21 21:57	1
1,2-Dichloroethane-d4 (Surr)	112		60 - 124		04/12/21 21:18	1
4-Bromofluorobenzene (Surr)	106		70 - 130		04/08/21 21:57	1
4-Bromofluorobenzene (Surr)	104		70 - 130		04/12/21 21:18	1
Dibromofluoromethane (Surr)	102		70 - 130		04/08/21 21:57	1
Dibromofluoromethane (Surr)	121		70 - 130		04/12/21 21:18	1
Toluene-d8 (Surr)	101		70 - 130		04/08/21 21:57	1
Toluene-d8 (Surr)	78		70 - 130		04/12/21 21:18	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q2D-03292021**

**Lab Sample ID: 680-197113-4**

**Date Collected: 03/29/21 17:13**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 21:33	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 21:33	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 21:33	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 21:33	1
Acetone	10	U	10		ug/L			04/08/21 21:33	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/08/21 21:33	1
Methylene Chloride	5.0	U	5.0		ug/L			04/08/21 21:33	1
<b>Toluene</b>	<b>2.9</b>		1.0		ug/L			04/08/21 21:33	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 21:33	1
<b>o-Xylene</b>	<b>3.2</b>		1.0		ug/L			04/08/21 21:33	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 21:33	1
<b>Orthodichlorobenzene</b>	<b>7.6</b>		1.0		ug/L			04/08/21 21:33	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 21:33	1
<b>Isopropylbenzene</b>	<b>160</b>		1.0		ug/L			04/08/21 21:33	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 21:33	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 21:33	1
Vinyl chloride	1.0	U	1.0		ug/L			04/08/21 21:33	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 21:33	1
<b>1,4-Dichlorobenzene</b>	<b>12</b>		1.0		ug/L			04/08/21 21:33	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/08/21 21:33	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/08/21 21:33	1
<b>p-Cymene</b>	<b>2.2</b>		1.0		ug/L			04/08/21 21:33	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 21:33	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 21:33	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		60 - 124		04/08/21 21:33	1
4-Bromofluorobenzene (Surr)	102		70 - 130		04/08/21 21:33	1
Dibromofluoromethane (Surr)	102		70 - 130		04/08/21 21:33	1
Toluene-d8 (Surr)	101		70 - 130		04/08/21 21:33	1

## Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Benzene</b>	<b>710</b>		10		ug/L			04/10/21 21:12	10
<b>Chlorobenzene</b>	<b>610</b>		10		ug/L			04/10/21 21:12	10
<b>Ethylbenzene</b>	<b>230</b>		10		ug/L			04/10/21 21:12	10
<b>m-Xylene &amp; p-Xylene</b>	<b>210</b>		10		ug/L			04/10/21 21:12	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	111		60 - 124		04/10/21 21:12	10
4-Bromofluorobenzene (Surr)	96	*3	70 - 130		04/10/21 21:12	10
Dibromofluoromethane (Surr)	114		70 - 130		04/10/21 21:12	10
Toluene-d8 (Surr)	72		70 - 130		04/10/21 21:12	10

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q1S-03302021**

**Lab Sample ID: 680-197113-5**

**Date Collected: 03/30/21 11:05**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/08/21 20:25	1
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 20:25	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 20:25	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 20:25	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 20:25	1
<b>Acetone</b>	<b>24</b>		10		ug/L			04/08/21 20:25	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/08/21 20:25	1
Methylene Chloride	5.0	U	5.0		ug/L			04/08/21 20:25	1
Toluene	1.0	U	1.0		ug/L			04/08/21 20:25	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 20:25	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 20:25	1
<b>Chlorobenzene</b>	<b>1.3</b>		1.0		ug/L			04/08/21 20:25	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 20:25	1
Orthodichlorobenzene	1.0	U	1.0		ug/L			04/08/21 20:25	1
<b>2-Butanone (MEK)</b>	<b>67</b>		10		ug/L			04/08/21 20:25	1
Ethylbenzene	1.0	U	1.0		ug/L			04/08/21 20:25	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/08/21 20:25	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 20:25	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 20:25	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/08/21 20:25	1
Vinyl chloride	1.0	U	1.0		ug/L			04/08/21 20:25	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 20:25	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/08/21 20:25	1
1,2,4-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 20:25	1
1,3,5-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 20:25	1
p-Cymene	1.0	U	1.0		ug/L			04/08/21 20:25	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 20:25	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 20:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	113		60 - 124					04/08/21 20:25	1
4-Bromofluorobenzene (Surr)	106		70 - 130					04/08/21 20:25	1
Dibromofluoromethane (Surr)	118		70 - 130					04/08/21 20:25	1
Toluene-d8 (Surr)	70		70 - 130					04/08/21 20:25	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q11-03302021**

**Lab Sample ID: 680-197113-6**

**Date Collected: 03/30/21 11:50**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/08/21 17:11	1
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 17:11	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 17:11	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 17:11	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 17:11	1
Acetone	10	U	10		ug/L			04/08/21 17:11	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/08/21 17:11	1
Methylene Chloride	5.0	U	5.0		ug/L			04/08/21 17:11	1
Toluene	1.0	U	1.0		ug/L			04/08/21 17:11	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 17:11	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 17:11	1
Chlorobenzene	1.0	U	1.0		ug/L			04/08/21 17:11	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 17:11	1
Orthodichlorobenzene	1.0	U	1.0		ug/L			04/08/21 17:11	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 17:11	1
Ethylbenzene	1.0	U	1.0		ug/L			04/08/21 17:11	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/08/21 17:11	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 17:11	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 17:11	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/08/21 17:11	1
Vinyl chloride	1.0	U	1.0		ug/L			04/08/21 17:11	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 17:11	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/08/21 17:11	1
1,2,4-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 17:11	1
1,3,5-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 17:11	1
p-Cymene	1.0	U	1.0		ug/L			04/08/21 17:11	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 17:11	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 17:11	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		60 - 124					04/08/21 17:11	1
4-Bromofluorobenzene (Surr)	98		70 - 130					04/08/21 17:11	1
Dibromofluoromethane (Surr)	114		70 - 130					04/08/21 17:11	1
Toluene-d8 (Surr)	79		70 - 130					04/08/21 17:11	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q1D-03302021**

**Lab Sample ID: 680-197113-7**

Date Collected: 03/30/21 17:55

Matrix: Water

Date Received: 04/05/21 10:20

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Benzene</b>	<b>710</b>		10		ug/L			04/12/21 19:53	10
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 17:36	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 17:36	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 17:36	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 17:36	1
Acetone	10	U	10		ug/L			04/08/21 17:36	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/08/21 17:36	1
Methylene Chloride	5.0	U	5.0		ug/L			04/08/21 17:36	1
<b>Toluene</b>	<b>1.7</b>		1.0		ug/L			04/08/21 17:36	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 17:36	1
<b>o-Xylene</b>	<b>5.2</b>		1.0		ug/L			04/08/21 17:36	1
<b>Chlorobenzene</b>	<b>630</b>		10		ug/L			04/12/21 19:53	10
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 17:36	1
<b>Orthodichlorobenzene</b>	<b>8.6</b>		1.0		ug/L			04/08/21 17:36	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 17:36	1
<b>Ethylbenzene</b>	<b>250</b>		10		ug/L			04/12/21 19:53	10
<b>Isopropylbenzene</b>	<b>210</b>		10		ug/L			04/12/21 19:53	10
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 17:36	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 17:36	1
<b>m-Xylene &amp; p-Xylene</b>	<b>210</b>		10		ug/L			04/12/21 19:53	10
<b>Vinyl chloride</b>	<b>6.4</b>		1.0		ug/L			04/08/21 17:36	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 17:36	1
<b>1,4-Dichlorobenzene</b>	<b>14</b>		1.0		ug/L			04/08/21 17:36	1
1,2,4-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 17:36	1
1,3,5-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 17:36	1
<b>p-Cymene</b>	<b>5.3</b>		1.0		ug/L			04/08/21 17:36	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 17:36	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 17:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	104		60 - 124		04/08/21 17:36	1
1,2-Dichloroethane-d4 (Surr)	100		60 - 124		04/12/21 19:53	10
4-Bromofluorobenzene (Surr)	88		70 - 130		04/08/21 17:36	1
4-Bromofluorobenzene (Surr)	103		70 - 130		04/12/21 19:53	10
Dibromofluoromethane (Surr)	107		70 - 130		04/08/21 17:36	1
Dibromofluoromethane (Surr)	106		70 - 130		04/12/21 19:53	10
Toluene-d8 (Surr)	66	S1-	70 - 130		04/08/21 17:36	1
Toluene-d8 (Surr)	104		70 - 130		04/12/21 19:53	10

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q4S-03302021**

**Lab Sample ID: 680-197113-8**

**Date Collected: 03/30/21 14:15**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/12/21 17:31	1
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 18:00	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 18:00	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 18:00	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 18:00	1
Acetone	10	U	10		ug/L			04/08/21 18:00	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/08/21 18:00	1
Methylene Chloride	5.0	U	5.0		ug/L			04/08/21 18:00	1
Toluene	1.0	U	1.0		ug/L			04/08/21 18:00	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 18:00	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 18:00	1
Chlorobenzene	1.0	U	1.0		ug/L			04/12/21 17:31	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 18:00	1
Orthodichlorobenzene	1.0	U	1.0		ug/L			04/08/21 18:00	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 18:00	1
Ethylbenzene	1.0	U	1.0		ug/L			04/12/21 17:31	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/12/21 17:31	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 18:00	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 18:00	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/12/21 17:31	1
Vinyl chloride	1.0	U	1.0		ug/L			04/08/21 18:00	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 18:00	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/08/21 18:00	1
1,2,4-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 18:00	1
1,3,5-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 18:00	1
p-Cymene	1.0	U	1.0		ug/L			04/08/21 18:00	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 18:00	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 18:00	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	109		60 - 124		04/08/21 18:00	1
1,2-Dichloroethane-d4 (Surr)	101		60 - 124		04/12/21 17:31	1
4-Bromofluorobenzene (Surr)	103		70 - 130		04/08/21 18:00	1
4-Bromofluorobenzene (Surr)	104		70 - 130		04/12/21 17:31	1
Dibromofluoromethane (Surr)	114		70 - 130		04/08/21 18:00	1
Dibromofluoromethane (Surr)	106		70 - 130		04/12/21 17:31	1
Toluene-d8 (Surr)	77		70 - 130		04/08/21 18:00	1
Toluene-d8 (Surr)	102		70 - 130		04/12/21 17:31	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q4I-03302021**

**Lab Sample ID: 680-197113-9**

**Date Collected: 03/30/21 15:20**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/08/21 18:48	1
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 18:48	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 18:48	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 18:48	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 18:48	1
Acetone	10	U	10		ug/L			04/08/21 18:48	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/08/21 18:48	1
Methylene Chloride	5.0	U	5.0		ug/L			04/08/21 18:48	1
Toluene	1.0	U	1.0		ug/L			04/08/21 18:48	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 18:48	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 18:48	1
Chlorobenzene	1.0	U	1.0		ug/L			04/08/21 18:48	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 18:48	1
Orthodichlorobenzene	1.0	U	1.0		ug/L			04/08/21 18:48	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 18:48	1
Ethylbenzene	1.0	U	1.0		ug/L			04/08/21 18:48	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/08/21 18:48	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 18:48	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 18:48	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/08/21 18:48	1
Vinyl chloride	1.0	U	1.0		ug/L			04/08/21 18:48	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 18:48	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/08/21 18:48	1
1,2,4-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 18:48	1
1,3,5-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 18:48	1
p-Cymene	1.0	U	1.0		ug/L			04/08/21 18:48	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 18:48	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 18:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	109		60 - 124					04/08/21 18:48	1
4-Bromofluorobenzene (Surr)	104		70 - 130					04/08/21 18:48	1
Dibromofluoromethane (Surr)	114		70 - 130					04/08/21 18:48	1
Toluene-d8 (Surr)	74		70 - 130					04/08/21 18:48	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q5S-03302021**

**Lab Sample ID: 680-197113-10**

**Date Collected: 03/30/21 15:45**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/08/21 19:12	1
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 19:12	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 19:12	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 19:12	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 19:12	1
Acetone	10	U	10		ug/L			04/08/21 19:12	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/08/21 19:12	1
Methylene Chloride	5.0	U	5.0		ug/L			04/08/21 19:12	1
Toluene	1.0	U	1.0		ug/L			04/08/21 19:12	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 19:12	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 19:12	1
Chlorobenzene	1.0	U	1.0		ug/L			04/08/21 19:12	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 19:12	1
Orthodichlorobenzene	1.0	U	1.0		ug/L			04/08/21 19:12	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 19:12	1
Ethylbenzene	1.0	U	1.0		ug/L			04/08/21 19:12	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/08/21 19:12	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 19:12	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 19:12	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/08/21 19:12	1
Vinyl chloride	1.0	U	1.0		ug/L			04/08/21 19:12	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 19:12	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/08/21 19:12	1
1,2,4-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 19:12	1
1,3,5-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 19:12	1
p-Cymene	1.0	U	1.0		ug/L			04/08/21 19:12	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 19:12	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 19:12	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	111		60 - 124		04/08/21 19:12	1
4-Bromofluorobenzene (Surr)	99		70 - 130		04/08/21 19:12	1
Dibromofluoromethane (Surr)	115		70 - 130		04/08/21 19:12	1
Toluene-d8 (Surr)	72		70 - 130		04/08/21 19:12	1



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q5I-03302021**

**Lab Sample ID: 680-197113-11**

**Date Collected: 03/30/21 17:10**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/08/21 19:36	1
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 19:36	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 19:36	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 19:36	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 19:36	1
Acetone	10	U	10		ug/L			04/08/21 19:36	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/08/21 19:36	1
Methylene Chloride	5.0	U	5.0		ug/L			04/08/21 19:36	1
Toluene	1.0	U	1.0		ug/L			04/08/21 19:36	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 19:36	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 19:36	1
Chlorobenzene	1.0	U	1.0		ug/L			04/08/21 19:36	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 19:36	1
Orthodichlorobenzene	1.0	U	1.0		ug/L			04/08/21 19:36	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 19:36	1
Ethylbenzene	1.0	U	1.0		ug/L			04/08/21 19:36	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/08/21 19:36	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 19:36	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 19:36	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/08/21 19:36	1
Vinyl chloride	1.0	U	1.0		ug/L			04/08/21 19:36	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 19:36	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/08/21 19:36	1
1,2,4-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 19:36	1
1,3,5-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 19:36	1
p-Cymene	1.0	U	1.0		ug/L			04/08/21 19:36	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 19:36	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 19:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	110		60 - 124					04/08/21 19:36	1
4-Bromofluorobenzene (Surr)	99		70 - 130					04/08/21 19:36	1
Dibromofluoromethane (Surr)	116		70 - 130					04/08/21 19:36	1
Toluene-d8 (Surr)	71		70 - 130					04/08/21 19:36	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q5D-03302021**

**Lab Sample ID: 680-197113-12**

Date Collected: 03/30/21 17:49

Matrix: Water

Date Received: 04/05/21 10:20

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Benzene</b>	<b>100</b>		1.0		ug/L			04/08/21 20:01	1
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 20:01	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 20:01	1
<b>1,1-Dichloroethane</b>	<b>1.0</b>		1.0		ug/L			04/08/21 20:01	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 20:01	1
Acetone	10	U	10		ug/L			04/08/21 20:01	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/08/21 20:01	1
Methylene Chloride	5.0	U	5.0		ug/L			04/08/21 20:01	1
Toluene	1.0	U	1.0		ug/L			04/08/21 20:01	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 20:01	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 20:01	1
<b>Chlorobenzene</b>	<b>200</b>		10		ug/L			04/12/21 20:17	10
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 20:01	1
<b>Orthodichlorobenzene</b>	<b>3.1</b>		1.0		ug/L			04/08/21 20:01	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 20:01	1
<b>Ethylbenzene</b>	<b>1.2</b>		1.0		ug/L			04/08/21 20:01	1
<b>Isopropylbenzene</b>	<b>20</b>		1.0		ug/L			04/08/21 20:01	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 20:01	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 20:01	1
<b>m-Xylene &amp; p-Xylene</b>	<b>4.3</b>		1.0		ug/L			04/08/21 20:01	1
<b>Vinyl chloride</b>	<b>4.8</b>		1.0		ug/L			04/08/21 20:01	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 20:01	1
<b>1,4-Dichlorobenzene</b>	<b>5.8</b>		1.0		ug/L			04/08/21 20:01	1
1,2,4-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 20:01	1
1,3,5-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 20:01	1
p-Cymene	1.0	U	1.0		ug/L			04/08/21 20:01	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 20:01	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 20:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	108		60 - 124		04/08/21 20:01	1
1,2-Dichloroethane-d4 (Surr)	99		60 - 124		04/12/21 20:17	10
4-Bromofluorobenzene (Surr)	98		70 - 130		04/08/21 20:01	1
4-Bromofluorobenzene (Surr)	106		70 - 130		04/12/21 20:17	10
Dibromofluoromethane (Surr)	114		70 - 130		04/08/21 20:01	1
Dibromofluoromethane (Surr)	106		70 - 130		04/12/21 20:17	10
Toluene-d8 (Surr)	63	S1-	70 - 130		04/08/21 20:01	1
Toluene-d8 (Surr)	105		70 - 130		04/12/21 20:17	10

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: EQB-01-03302021**

**Lab Sample ID: 680-197113-13**

**Date Collected: 03/30/21 18:40**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/08/21 14:45	1
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 14:45	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 14:45	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 14:45	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 14:45	1
Acetone	10	U	10		ug/L			04/08/21 14:45	1
4-Methyl-2-pentanone	10	U **	10		ug/L			04/08/21 14:45	1
Methylene Chloride	5.0	U **	5.0		ug/L			04/08/21 14:45	1
Toluene	1.0	U	1.0		ug/L			04/08/21 14:45	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 14:45	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 14:45	1
Chlorobenzene	1.0	U	1.0		ug/L			04/08/21 14:45	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 14:45	1
Orthodichlorobenzene	1.0	U	1.0		ug/L			04/08/21 14:45	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 14:45	1
Ethylbenzene	1.0	U	1.0		ug/L			04/08/21 14:45	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/08/21 14:45	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 14:45	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 14:45	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/08/21 14:45	1
Vinyl chloride	1.0	U	1.0		ug/L			04/08/21 14:45	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 14:45	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/08/21 14:45	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/08/21 14:45	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/08/21 14:45	1
p-Cymene	1.0	U	1.0		ug/L			04/08/21 14:45	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 14:45	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 14:45	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	94		60 - 124		04/08/21 14:45	1
4-Bromofluorobenzene (Surr)	112		70 - 130		04/08/21 14:45	1
Dibromofluoromethane (Surr)	100		70 - 130		04/08/21 14:45	1
Toluene-d8 (Surr)	100		70 - 130		04/08/21 14:45	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: EQB-02-03302021**

**Lab Sample ID: 680-197113-14**

**Date Collected: 03/30/21 18:45**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/08/21 15:05	1
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 15:05	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 15:05	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 15:05	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 15:05	1
Acetone	10	U	10		ug/L			04/08/21 15:05	1
4-Methyl-2-pentanone	10	U **	10		ug/L			04/08/21 15:05	1
Methylene Chloride	5.0	U **	5.0		ug/L			04/08/21 15:05	1
Toluene	1.0	U	1.0		ug/L			04/08/21 15:05	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 15:05	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 15:05	1
Chlorobenzene	1.0	U	1.0		ug/L			04/08/21 15:05	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 15:05	1
Orthodichlorobenzene	1.0	U	1.0		ug/L			04/08/21 15:05	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 15:05	1
Ethylbenzene	1.0	U	1.0		ug/L			04/08/21 15:05	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/08/21 15:05	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 15:05	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 15:05	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/08/21 15:05	1
Vinyl chloride	1.0	U	1.0		ug/L			04/08/21 15:05	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 15:05	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/08/21 15:05	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/08/21 15:05	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/08/21 15:05	1
p-Cymene	1.0	U	1.0		ug/L			04/08/21 15:05	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 15:05	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 15:05	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	96		60 - 124					04/08/21 15:05	1
4-Bromofluorobenzene (Surr)	113		70 - 130					04/08/21 15:05	1
Dibromofluoromethane (Surr)	103		70 - 130					04/08/21 15:05	1
Toluene-d8 (Surr)	102		70 - 130					04/08/21 15:05	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: DUP-01**

**Lab Sample ID: 680-197113-15**

**Date Collected: 03/30/21 00:00**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Benzene</b>	<b>710</b>		10		ug/L			04/12/21 20:40	10
Carbon disulfide	2.0	U	2.0		ug/L			04/08/21 20:49	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/08/21 20:49	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/08/21 20:49	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/08/21 20:49	1
Acetone	10	U	10		ug/L			04/08/21 20:49	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/08/21 20:49	1
Methylene Chloride	5.0	U	5.0		ug/L			04/08/21 20:49	1
Toluene	1.0	U	1.0		ug/L			04/08/21 20:49	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/08/21 20:49	1
<b>o-Xylene</b>	<b>5.1</b>		1.0		ug/L			04/08/21 20:49	1
<b>Chlorobenzene</b>	<b>630</b>		10		ug/L			04/12/21 20:40	10
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 20:49	1
<b>Orthodichlorobenzene</b>	<b>8.5</b>		1.0		ug/L			04/08/21 20:49	1
2-Butanone (MEK)	10	U	10		ug/L			04/08/21 20:49	1
<b>Ethylbenzene</b>	<b>250</b>		10		ug/L			04/12/21 20:40	10
<b>Isopropylbenzene</b>	<b>200</b>		10		ug/L			04/12/21 20:40	10
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/08/21 20:49	1
Chloroform	1.0	U	1.0		ug/L			04/08/21 20:49	1
<b>m-Xylene &amp; p-Xylene</b>	<b>210</b>		10		ug/L			04/12/21 20:40	10
<b>Vinyl chloride</b>	<b>6.5</b>		1.0		ug/L			04/08/21 20:49	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/08/21 20:49	1
<b>1,4-Dichlorobenzene</b>	<b>14</b>		1.0		ug/L			04/08/21 20:49	1
1,2,4-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 20:49	1
1,3,5-Trimethylbenzene	1.0	U **	1.0		ug/L			04/08/21 20:49	1
<b>p-Cymene</b>	<b>5.2</b>		1.0		ug/L			04/08/21 20:49	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/08/21 20:49	1
Trichloroethene	1.0	U	1.0		ug/L			04/08/21 20:49	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	105		60 - 124		04/08/21 20:49	1
1,2-Dichloroethane-d4 (Surr)	101		60 - 124		04/12/21 20:40	10
4-Bromofluorobenzene (Surr)	92		70 - 130		04/08/21 20:49	1
4-Bromofluorobenzene (Surr)	103		70 - 130		04/12/21 20:40	10
Dibromofluoromethane (Surr)	110		70 - 130		04/08/21 20:49	1
Dibromofluoromethane (Surr)	107		70 - 130		04/12/21 20:40	10
Toluene-d8 (Surr)	59	S1-	70 - 130		04/08/21 20:49	1
Toluene-d8 (Surr)	102		70 - 130		04/12/21 20:40	10

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

**Matrix: Water**

**Prep Type: Total/NA**

**Percent Surrogate Recovery (Acceptance Limits)**

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DCA (60-124)	BFB (70-130)	DBFM (70-130)	TOL (70-130)
680-197113-1	MW-29S-03292021	97	100	104	100
680-197113-2	OW-Q2S-03292021	98	105	102	100
680-197113-3	OW-Q2I-03302021	97	106	102	101
680-197113-3	OW-Q2I-03302021	112	104	121	78
680-197113-4	OW-Q2D-03292021	100	102	102	101
680-197113-4 - DL	OW-Q2D-03292021	111	96 *3	114	72
680-197113-5	OW-Q1S-03302021	113	106	118	70
680-197113-6	OW-Q1I-03302021	106	98	114	79
680-197113-7	OW-Q1D-03302021	104	88	107	66 S1-
680-197113-7	OW-Q1D-03302021	100	103	106	104
680-197113-8	OW-Q4S-03302021	109	103	114	77
680-197113-8	OW-Q4S-03302021	101	104	106	102
680-197113-9	OW-Q4I-03302021	109	104	114	74
680-197113-10	OW-Q5S-03302021	111	99	115	72
680-197113-11	OW-Q5I-03302021	110	99	116	71
680-197113-12	OW-Q5D-03302021	108	98	114	63 S1-
680-197113-12	OW-Q5D-03302021	99	106	106	105
680-197113-13	EQB-01-03302021	94	112	100	100
680-197113-14	EQB-02-03302021	96	113	103	102
680-197113-15	DUP-01	105	92	110	59 S1-
680-197113-15	DUP-01	101	103	107	102
LCS 680-663281/4	Lab Control Sample	99	102	108	108
LCS 680-663289/4	Lab Control Sample	112	91	112	80
LCS 680-663313/5	Lab Control Sample	99	102	109	109
LCS 680-663625/3	Lab Control Sample	114	105	113	96
LCS 680-663719/4	Lab Control Sample	95	100	107	104
LCS 680-663727/4	Lab Control Sample	103	88	105	85
LCSD 680-663281/5	Lab Control Sample Dup	103	101	112	106
LCSD 680-663289/5	Lab Control Sample Dup	112	88	111	83
LCSD 680-663313/6	Lab Control Sample Dup	107	101	110	108
LCSD 680-663625/4	Lab Control Sample Dup	103	88	107	86
LCSD 680-663719/5	Lab Control Sample Dup	102	97	109	104
LCSD 680-663727/5	Lab Control Sample Dup	109	91	109	81
MB 680-663281/9	Method Blank	97	100	101	100
MB 680-663289/9	Method Blank	106	98	110	82
MB 680-663313/10	Method Blank	96	113	102	102
MB 680-663625/8	Method Blank	104	93	111	84
MB 680-663719/9	Method Blank	95	101	104	102
MB 680-663727/9	Method Blank	107	104	114	79

**Surrogate Legend**

- DCA = 1,2-Dichloroethane-d4 (Surr)
- BFB = 4-Bromofluorobenzene (Surr)
- DBFM = Dibromofluoromethane (Surr)
- TOL = Toluene-d8 (Surr)

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 680-663281/9**  
**Matrix: Water**  
**Analysis Batch: 663281**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
Carbon f isulTf e	2.0	U	2.0		ug/L			04/08/21 13:d3	1
hetracploroetpene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
1,1-Dicploroetpane	1.0	U	1.0		ug/L			04/08/21 13:d3	1
1,2-DicploroAroAane	1.0	U	1.0		ug/L			04/08/21 13:d3	1
Mbetone	10	U	10		ug/L			04/08/21 13:d3	1
4-5 etpyl-2-Aentanone	10	U	10		ug/L			04/08/21 13:d3	1
5 etpylene Cplorif e	d.0	U	d.0		ug/L			04/08/21 13:d3	1
holuene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
1,2,4-hricplorobenzene	d.0	U	d.0		ug/L			04/08/21 13:d3	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
Cplorobenzene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
1,1-Dicploroetpene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
Ortpof icplorobenzene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
2-Butanone (5 EK)	10	U	10		ug/L			04/08/21 13:d3	1
Etpylbenzene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
IsoAroAylbenzene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
cis-1,2-Dicploroetpene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
CploroTorm	1.0	U	1.0		ug/L			04/08/21 13:d3	1
m-Xylene & A-Xylene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
Vinyl cplorif e	1.0	U	1.0		ug/L			04/08/21 13:d3	1
Carbon tetracplorif e	1.0	U	1.0		ug/L			04/08/21 13:d3	1
1,4-Dicplorobenzene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
1,2,4-hrimetpylbenzene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
1,3,d-hrimetpylbenzene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
A-Cymene	1.0	U	1.0		ug/L			04/08/21 13:d3	1
1,2,3-hricploroAroAane	1.0	U	1.0		ug/L			04/08/21 13:d3	1
hricploroetpene	1.0	U	1.0		ug/L			04/08/21 13:d3	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1,2-Dichloroethane-d4 (Surr)	97		60 - 124		04/08/21 13:53	1
4-Bromofluorobenzene (Surr)	100		70 - 130		04/08/21 13:53	1
Dibromofluoromethane (Surr)	101		70 - 130		04/08/21 13:53	1
Toluene-d8 (Surr)	100		70 - 130		04/08/21 13:53	1

**Lab Sample ID: LCS 680-663281/4**  
**Matrix: Water**  
**Analysis Batch: 663281**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Carbon f isulTf e	d0.0	d3.1		ug/L		106	70 - 130
hetracploroetpene	d0.0	d7.0		ug/L		114	70 - 130
1,1-Dicploroetpane	d0.0	d1.2		ug/L		102	70 - 130
1,2-DicploroAroAane	d0.0	d0.9		ug/L		102	70 - 130
Mbetone	2d0	21d		ug/L		86	67 - 113
4-5 etpyl-2-Aentanone	2d0	238		ug/L		9d	68 - 108
5 etpylene Cplorif e	d0.0	49.0		ug/L		98	70 - 130

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# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-663281/4**  
**Matrix: Water**  
**Analysis Batch: 663281**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
holuene	d0.0	d4.1		ug/L		108	70 - 130
1,2,4-hriclorobenzene	d0.0	d8.0		ug/L		116	70 - 130
o-Xylene	d0.0	d3.1		ug/L		106	70 - 130
Cplorobenzene	d0.0	d1.7		ug/L		103	70 - 130
1,1-Dicploroetpene	d0.0	d3.d		ug/L		107	70 - 130
Ortpof icplorobenzene	d0.0	d2.1		ug/L		104	70 - 130
2-Butanone (5 EK)	2d0	237		ug/L		9d	69 - 114
Etpylbenzene	d0.0	d4.0		ug/L		108	70 - 130
IsoAroAylbenzene	d0.0	d6.3		ug/L		113	70 - 130
cis-1,2-Dicploroetpene	d0.0	d2.3		ug/L		10d	70 - 130
CploroTorm	d0.0	d3.d		ug/L		107	70 - 130
m-Xylene & A-Xylene	d0.0	d3.4		ug/L		107	70 - 130
Vinyl cplorif e	d0.0	4d.6		ug/L		91	66 - 129
Carbon tetracplorif e	d0.0	d4.1		ug/L		108	70 - 130
1,4-Dicplorobenzene	d0.0	d1.d		ug/L		103	70 - 130
1,2,4-hrimetpylbenzene	d0.0	d6.8		ug/L		114	70 - 130
1,3,d-hrimetpylbenzene	d0.0	d6.6		ug/L		113	70 - 130
A-Cymene	d0.0	d4.2		ug/L		108	70 - 130
1,2,3-hricploroAroAane	d0.0	48.2		ug/L		96	70 - 130
hricploroetpene	d0.0	dd.1		ug/L		110	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	99		60 - 124
4-Bromofluorobenzene (Surr)	102		70 - 130
Dibromofluoromethane (Surr)	108		70 - 130
Toluene-d8 (Surr)	108		70 - 130

**Lab Sample ID: LCSD 680-663281/5**  
**Matrix: Water**  
**Analysis Batch: 663281**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	d0.0	48.1		ug/L		96	70 - 130	0	30
Carbon f isulTf e	d0.0	d1.d		ug/L		103	70 - 130	3	30
hetracploroetpene	d0.0	d4.7		ug/L		109	70 - 130	4	30
1,1-Dicploroetpane	d0.0	d2.2		ug/L		104	70 - 130	2	30
1,2-DicploroAroAane	d0.0	d0.7		ug/L		101	70 - 130	0	20
Mcetone	2d0	241		ug/L		96	67 - 113	11	30
4-5 etpyl-2-Aentanone	2d0	260		ug/L		104	68 - 108	9	30
5 etpylene Cplorif e	d0.0	d0.9		ug/L		102	70 - 130	4	30
holuene	d0.0	d2.8		ug/L		106	70 - 130	2	30
1,2,4-hricplorobenzene	d0.0	d8.0		ug/L		116	70 - 130	0	30
o-Xylene	d0.0	d4.d		ug/L		109	70 - 130	3	30
Cplorobenzene	d0.0	d4.0		ug/L		108	70 - 130	4	30
1,1-Dicploroetpene	d0.0	d2.1		ug/L		104	70 - 130	3	20
Ortpof icplorobenzene	d0.0	d1.6		ug/L		103	70 - 130	1	30
2-Butanone (5 EK)	2d0	263		ug/L		10d	69 - 114	10	30
Etpylbenzene	d0.0	d3.3		ug/L		107	70 - 130	1	20

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# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCSD 680-663281/5**  
**Matrix: Water**  
**Analysis Batch: 663281**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
IsoAroAylbenzene	d0.0	dd.6		ug/L		111	70 - 130	1	30
cis-1,2-Dicloroetpene	d0.0	d1.6		ug/L		103	70 - 130	1	30
CploroTorm	d0.0	d4.1		ug/L		108	70 - 130	1	30
m-Xylene & A-Xylene	d0.0	d3.d		ug/L		107	70 - 130	0	30
Vinyl cplorif e	d0.0	43.0		ug/L		86	66 - 129	6	30
Carbon tetracplorif e	d0.0	d1.8		ug/L		104	70 - 130	4	30
1,4-Dicplorobenzene	d0.0	d0.3		ug/L		101	70 - 130	3	30
1,2,4-hrimetpylbenzene	d0.0	dd.8		ug/L		112	70 - 130	2	30
1,3,d-hrimetpylbenzene	d0.0	d6.9		ug/L		114	70 - 130	0	30
A-Cymene	d0.0	d1.3		ug/L		103	70 - 130	d	30
1,2,3-hricploroAroAane	d0.0	d3.d		ug/L		107	70 - 130	10	30
hricploroetpene	d0.0	d4.0		ug/L		108	70 - 130	2	30

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
1,2-Dichloroethane-d4 (Surr)	103		60 - 124
4-Bromofluorobenzene (Surr)	101		70 - 130
Dibromofluoromethane (Surr)	112		70 - 130
Toluene-d8 (Surr)	106		70 - 130

**Lab Sample ID: MB 680-663289/9**  
**Matrix: Water**  
**Analysis Batch: 663289**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/08/21 13:07	1
Carbon f isulTf e	2.0	U	2.0		ug/L			04/08/21 13:07	1
hetracploroetpene	1.0	U	1.0		ug/L			04/08/21 13:07	1
1,1-Dicploroetpane	1.0	U	1.0		ug/L			04/08/21 13:07	1
1,2-DicploroAroAane	1.0	U	1.0		ug/L			04/08/21 13:07	1
Mbetone	10	U	10		ug/L			04/08/21 13:07	1
4-5 etpyl-2-Aentanone	10	U	10		ug/L			04/08/21 13:07	1
5 etpylene Cplorif e	d.0	U	d.0		ug/L			04/08/21 13:07	1
holuene	1.0	U	1.0		ug/L			04/08/21 13:07	1
1,2,4-hricplorobenzene	d.0	U	d.0		ug/L			04/08/21 13:07	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 13:07	1
Cplorobenzene	1.0	U	1.0		ug/L			04/08/21 13:07	1
1,1-Dicploroetpene	1.0	U	1.0		ug/L			04/08/21 13:07	1
Ortpof icplorobenzene	1.0	U	1.0		ug/L			04/08/21 13:07	1
2-Butanone (5 EK)	10	U	10		ug/L			04/08/21 13:07	1
Etpylbenzene	1.0	U	1.0		ug/L			04/08/21 13:07	1
IsoAroAylbenzene	1.0	U	1.0		ug/L			04/08/21 13:07	1
cis-1,2-Dicploroetpene	1.0	U	1.0		ug/L			04/08/21 13:07	1
CploroTorm	1.0	U	1.0		ug/L			04/08/21 13:07	1
m-Xylene & A-Xylene	1.0	U	1.0		ug/L			04/08/21 13:07	1
Vinyl cplorif e	1.0	U	1.0		ug/L			04/08/21 13:07	1
Carbon tetracplorif e	1.0	U	1.0		ug/L			04/08/21 13:07	1
1,4-Dicplorobenzene	1.0	U	1.0		ug/L			04/08/21 13:07	1
1,2,4-hrimetpylbenzene	1.0	U	1.0		ug/L			04/08/21 13:07	1

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# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 680-663289/9**  
**Matrix: Water**  
**Analysis Batch: 663289**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3-d-hrimetpylbenzene	1.0	U	1.0		ug/L			04/08/21 13:07	1
A-Cymene	1.0	U	1.0		ug/L			04/08/21 13:07	1
1,2,3-hricploroAroAane	1.0	U	1.0		ug/L			04/08/21 13:07	1
hricploroetpene	1.0	U	1.0		ug/L			04/08/21 13:07	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		60 - 124		04/08/21 13:07	1
4-Bromofluorobenzene (Surr)	98		70 - 130		04/08/21 13:07	1
Dibromofluoromethane (Surr)	110		70 - 130		04/08/21 13:07	1
Toluene-d8 (Surr)	82		70 - 130		04/08/21 13:07	1

**Lab Sample ID: LCS 680-663289/4**  
**Matrix: Water**  
**Analysis Batch: 663289**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	d0.0	d0.8		ug/L		102	70 - 130
Carbon f isulTf e	d0.0	47.0		ug/L		94	70 - 130
hetracploroetpene	d0.0	43.d		ug/L		87	70 - 130
1,1-Dicploroetpane	d0.0	48.d		ug/L		97	70 - 130
1,2-DicploroAroAane	d0.0	41.0		ug/L		82	70 - 130
Mcetone	2d0	244		ug/L		97	67 - 113
4-5 etpyl-2-Aentanone	2d0	186		ug/L		7d	68 - 108
5 etpylene Cplorif e	d0.0	47.4		ug/L		9d	70 - 130
holuene	d0.0	38.9		ug/L		78	70 - 130
1,2,4-hricplorobenzene	d0.0	d8.d		ug/L		117	70 - 130
o-Xylene	d0.0	d2.0		ug/L		104	70 - 130
Cplorobenzene	d0.0	49.9		ug/L		100	70 - 130
1,1-Dicploroetpene	d0.0	d1.d		ug/L		103	70 - 130
Ortpof icplorobenzene	d0.0	49.4		ug/L		99	70 - 130
2-Butanone (5 EK)	2d0	248		ug/L		99	69 - 114
Etpylbenzene	d0.0	49.3		ug/L		99	70 - 130
IsoAroAylbenzene	d0.0	d2.2		ug/L		104	70 - 130
cis-1,2-Dicploroetpene	d0.0	d2.3		ug/L		10d	70 - 130
Cplorobrm	d0.0	d3.4		ug/L		107	70 - 130
m-Xylene & A-Xylene	d0.0	d1.1		ug/L		102	70 - 130
Vinyl cplorif e	d0.0	40.1		ug/L		80	66 - 129
Carbon tetracplorif e	d0.0	60.3		ug/L		121	70 - 130
1,4-Dicplorobenzene	d0.0	d1.8		ug/L		104	70 - 130
1,2,4-hrimetpylbenzene	d0.0	68.1	*+	ug/L		136	70 - 130
1,3,d-hrimetpylbenzene	d0.0	64.9		ug/L		130	70 - 130
A-Cymene	d0.0	d4.8		ug/L		110	70 - 130
1,2,3-hricploroAroAane	d0.0	d4.6		ug/L		109	70 - 130
hricploroetpene	d0.0	42.2		ug/L		84	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	112		60 - 124
4-Bromofluorobenzene (Surr)	91		70 - 130

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# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-663289/4**  
**Matrix: Water**  
**Analysis Batch: 663289**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
Dibromofluoromethane (Surr)	112		70 - 130
Toluene-d8 (Surr)	80		70 - 130

**Lab Sample ID: LCSD 680-663289/5**  
**Matrix: Water**  
**Analysis Batch: 663289**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	d0.0	49.6		ug/L		99	70 - 130	2	30
Carbon tetrachloride	d0.0	46.0		ug/L		92	70 - 130	2	30
tetrachloroethene	d0.0	43.9		ug/L		88	70 - 130	1	30
1,1-Dichloroethane	d0.0	47.6		ug/L		9d	70 - 130	2	30
1,2-Dichloroethane	d0.0	44.1		ug/L		88	70 - 130	7	20
Methane	2d0	23d		ug/L		94	67 - 113	4	30
4-methyl-2-pentanone	2d0	189		ug/L		76	68 - 108	1	30
5-methylchlorobenzene	d0.0	48.2		ug/L		96	70 - 130	2	30
toluene	d0.0	40.3		ug/L		81	70 - 130	3	30
1,2,4-trichlorobenzene	d0.0	d7.8		ug/L		116	70 - 130	1	30
o-Xylene	d0.0	d2.0		ug/L		104	70 - 130	0	30
Chlorobenzene	d0.0	d0.4		ug/L		101	70 - 130	1	30
1,1-Dichloroethene	d0.0	d0.2		ug/L		100	70 - 130	3	20
Orthodichlorobenzene	d0.0	49.d		ug/L		99	70 - 130	0	30
2-Butanone (5 EK)	2d0	243		ug/L		97	69 - 114	2	30
Ethylbenzene	d0.0	48.1		ug/L		96	70 - 130	2	20
Isooctylbenzene	d0.0	d1.9		ug/L		104	70 - 130	1	30
cis-1,2-Dichloroethene	d0.0	d1.6		ug/L		103	70 - 130	1	30
Chloroform	d0.0	d2.6		ug/L		10d	70 - 130	1	30
m-Xylene & p-Xylene	d0.0	d1.3		ug/L		103	70 - 130	0	30
Vinylchloride	d0.0	40.1		ug/L		80	66 - 129	0	30
Carbon tetrachloride	d0.0	d8.9		ug/L		118	70 - 130	2	30
1,4-Dichlorobenzene	d0.0	d1.2		ug/L		102	70 - 130	1	30
1,2,4-trimethylbenzene	d0.0	70.1	*+	ug/L		140	70 - 130	3	30
1,3,5-trimethylbenzene	d0.0	6d.6	*+	ug/L		131	70 - 130	1	30
p-Cymene	d0.0	d4.3		ug/L		109	70 - 130	1	30
1,2,3-trichlorobenzene	d0.0	d4.1		ug/L		108	70 - 130	1	30
trichloroethene	d0.0	44.1		ug/L		88	70 - 130	4	30

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	112		60 - 124
4-Bromofluorobenzene (Surr)	88		70 - 130
Dibromofluoromethane (Surr)	111		70 - 130
Toluene-d8 (Surr)	83		70 - 130

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 680-663313/10**  
**Matrix: Water**  
**Analysis Batch: 663313**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
Carbon f isulTf e	2.0	U	2.0		ug/L			04/08/21 13:0d	1
hetracploroetpene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
1,1-Dicploroetpane	1.0	U	1.0		ug/L			04/08/21 13:0d	1
1,2-DicploroAroAane	1.0	U	1.0		ug/L			04/08/21 13:0d	1
Mbetone	10	U	10		ug/L			04/08/21 13:0d	1
4-5 etpyl-2-Aentanone	10	U	10		ug/L			04/08/21 13:0d	1
5 etpylene Cplorif e	d.0	U	d.0		ug/L			04/08/21 13:0d	1
holuene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
1,2,4-hricplorobenzene	d.0	U	d.0		ug/L			04/08/21 13:0d	1
o-Xylene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
Cplorobenzene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
1,1-Dicploroetpene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
Ortpof icplorobenzene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
2-Butanone (5 EK)	10	U	10		ug/L			04/08/21 13:0d	1
Etpylbenzene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
IsoAroAylbenzene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
cis-1,2-Dicploroetpene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
CploroTorm	1.0	U	1.0		ug/L			04/08/21 13:0d	1
m-Xylene & A-Xylene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
Vinyl cplorif e	1.0	U	1.0		ug/L			04/08/21 13:0d	1
Carbon tetracplorif e	1.0	U	1.0		ug/L			04/08/21 13:0d	1
1,4-Dicplorobenzene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
1,2,4-hrimetpylbenzene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
1,3,d-hrimetpylbenzene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
A-Cymene	1.0	U	1.0		ug/L			04/08/21 13:0d	1
1,2,3-hricploroAroAane	1.0	U	1.0		ug/L			04/08/21 13:0d	1
hricploroetpene	1.0	U	1.0		ug/L			04/08/21 13:0d	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1,2-Dichloroethane-d4 (Surr)	96		60 - 124		04/08/21 13:05	1
4-Bromofluorobenzene (Surr)	113		70 - 130		04/08/21 13:05	1
Dibromofluoromethane (Surr)	102		70 - 130		04/08/21 13:05	1
Toluene-d8 (Surr)	102		70 - 130		04/08/21 13:05	1

**Lab Sample ID: LCS 680-663313/5**  
**Matrix: Water**  
**Analysis Batch: 663313**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Carbon f isulTf e	d0.0	d2.2		ug/L		104	70 - 130
hetracploroetpene	d0.0	d8.7		ug/L		117	70 - 130
1,1-Dicploroetpane	d0.0	d3.8		ug/L		108	70 - 130
1,2-DicploroAroAane	d0.0	d4.3		ug/L		109	70 - 130
Mbetone	2d0	2d8		ug/L		103	67 - 113
4-5 etpyl-2-Aentanone	2d0	2d4		ug/L		102	68 - 108
5 etpylene Cplorif e	d0.0	74.9	*+	ug/L		1d0	70 - 130

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# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-663313/5**  
**Matrix: Water**  
**Analysis Batch: 663313**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
holuene	d0.0	d4.2		ug/L		108	70 - 130
1,2,4-hriclorobenzene	d0.0	49.8		ug/L		100	70 - 130
o-Xylene	d0.0	d4.1		ug/L		108	70 - 130
Cplorobenzene	d0.0	d4.4		ug/L		109	70 - 130
1,1-Dicploroetpene	d0.0	d1.0		ug/L		102	70 - 130
Ortpof icplorobenzene	d0.0	d2.7		ug/L		10d	70 - 130
2-Butanone (5 EK)	2d0	244		ug/L		98	69 - 114
Etpylbenzene	d0.0	d6.2		ug/L		112	70 - 130
IsoAroAylbenzene	d0.0	d4.4		ug/L		109	70 - 130
cis-1,2-Dicploroetpene	d0.0	d3.9		ug/L		108	70 - 130
CploroTorm	d0.0	d2.2		ug/L		104	70 - 130
m-Xylene & A-Xylene	d0.0	d6.3		ug/L		113	70 - 130
Vinyl cplorif e	d0.0	d1.3		ug/L		103	66 - 129
Carbon tetracplorif e	d0.0	d1.9		ug/L		104	70 - 130
1,4-Dicplorobenzene	d0.0	d2.9		ug/L		106	70 - 130
1,2,4-hrimetpylbenzene	d0.0	d1.4		ug/L		103	70 - 130
1,3,d-hrimetpylbenzene	d0.0	d0.6		ug/L		101	70 - 130
A-Cymene	d0.0	46.8		ug/L		94	70 - 130
1,2,3-hricploroAroAane	d0.0	d3.d		ug/L		107	70 - 130
hricploroetpene	d0.0	d1.9		ug/L		104	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	99		60 - 124
4-Bromofluorobenzene (Surr)	102		70 - 130
Dibromofluoromethane (Surr)	109		70 - 130
Toluene-d8 (Surr)	109		70 - 130

**Lab Sample ID: LCSD 680-663313/6**  
**Matrix: Water**  
**Analysis Batch: 663313**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	d0.0	d3.8		ug/L		108	70 - 130	0	30
Carbon f isulTf e	d0.0	d0.2		ug/L		100	70 - 130	4	30
hetracploroetpene	d0.0	dd.7		ug/L		111	70 - 130	d	30
1,1-Dicploroetpane	d0.0	dd.3		ug/L		111	70 - 130	3	30
1,2-DicploroAroAane	d0.0	d6.4		ug/L		113	70 - 130	4	20
Mcetone	2d0	230		ug/L		92	67 - 113	11	30
4-5 etpyl-2-Aentanone	2d0	27d	*+	ug/L		110	68 - 108	8	30
5 etpylene Cplorif e	d0.0	76.7	*+	ug/L		1d3	70 - 130	2	30
holuene	d0.0	dd.4		ug/L		111	70 - 130	2	30
1,2,4-hricplorobenzene	d0.0	46.3		ug/L		93	70 - 130	7	30
o-Xylene	d0.0	d3.6		ug/L		107	70 - 130	1	30
Cplorobenzene	d0.0	d3.d		ug/L		107	70 - 130	2	30
1,1-Dicploroetpene	d0.0	4d.8		ug/L		92	70 - 130	11	20
Ortpof icplorobenzene	d0.0	d1.2		ug/L		102	70 - 130	3	30
2-Butanone (5 EK)	2d0	268		ug/L		107	69 - 114	9	30
Etpylbenzene	d0.0	d4.4		ug/L		109	70 - 130	3	20

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# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCSD 680-663313/6**  
**Matrix: Water**  
**Analysis Batch: 663313**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
IsoAroAylbenzene	d0.0	d1.2		ug/L		102	70 - 130	6	30
cis-1,2-Dicloroetpene	d0.0	d3.9		ug/L		108	70 - 130	0	30
CploroTorm	d0.0	d4.3		ug/L		109	70 - 130	4	30
m-Xylene & A-Xylene	d0.0	d4.0		ug/L		108	70 - 130	4	30
Vinyl cplorif e	d0.0	49.6		ug/L		99	66 - 129	4	30
Carbon tetracplorif e	d0.0	49.3		ug/L		99	70 - 130	d	30
1,4-Dicplorobenzene	d0.0	d1.3		ug/L		103	70 - 130	3	30
1,2,4-hrimetpylbenzene	d0.0	47.8		ug/L		96	70 - 130	7	30
1,3,d-hrimetpylbenzene	d0.0	48.4		ug/L		97	70 - 130	4	30
A-Cymene	d0.0	42.d		ug/L		8d	70 - 130	10	30
1,2,3-hricploroAroAane	d0.0	dd.d		ug/L		111	70 - 130	4	30
hricploroetpene	d0.0	d1.8		ug/L		104	70 - 130	0	30

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
1,2-Dichloroethane-d4 (Surr)	107		60 - 124
4-Bromofluorobenzene (Surr)	101		70 - 130
Dibromofluoromethane (Surr)	110		70 - 130
Toluene-d8 (Surr)	108		70 - 130

**Lab Sample ID: MB 680-663625/8**  
**Matrix: Water**  
**Analysis Batch: 663625**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/10/21 18:36	1
Carbon f isulTf e	2.0	U	2.0		ug/L			04/10/21 18:36	1
hetracploroetpene	1.0	U	1.0		ug/L			04/10/21 18:36	1
1,1-Dicploroetpane	1.0	U	1.0		ug/L			04/10/21 18:36	1
1,2-DicploroAroAane	1.0	U	1.0		ug/L			04/10/21 18:36	1
Mbetone	10	U	10		ug/L			04/10/21 18:36	1
4-5 etpyl-2-Aentanone	10	U	10		ug/L			04/10/21 18:36	1
5 etpylene Cplorif e	d.0	U	d.0		ug/L			04/10/21 18:36	1
holuene	1.0	U	1.0		ug/L			04/10/21 18:36	1
1,2,4-hricplorobenzene	d.0	U	d.0		ug/L			04/10/21 18:36	1
o-Xylene	1.0	U	1.0		ug/L			04/10/21 18:36	1
Cplorobenzene	1.0	U	1.0		ug/L			04/10/21 18:36	1
1,1-Dicploroetpene	1.0	U	1.0		ug/L			04/10/21 18:36	1
Ortpof icplorobenzene	1.0	U	1.0		ug/L			04/10/21 18:36	1
2-Butanone (5 EK)	10	U	10		ug/L			04/10/21 18:36	1
Etpylbenzene	1.0	U	1.0		ug/L			04/10/21 18:36	1
IsoAroAylbenzene	1.0	U	1.0		ug/L			04/10/21 18:36	1
cis-1,2-Dicploroetpene	1.0	U	1.0		ug/L			04/10/21 18:36	1
CploroTorm	1.0	U	1.0		ug/L			04/10/21 18:36	1
m-Xylene & A-Xylene	1.0	U	1.0		ug/L			04/10/21 18:36	1
Vinyl cplorif e	1.0	U	1.0		ug/L			04/10/21 18:36	1
Carbon tetracplorif e	1.0	U	1.0		ug/L			04/10/21 18:36	1
1,4-Dicplorobenzene	1.0	U	1.0		ug/L			04/10/21 18:36	1
1,2,4-hrimetpylbenzene	1.0	U	1.0		ug/L			04/10/21 18:36	1

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# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 680-663625/8  
 Matrix: Water  
 Analysis Batch: 663625

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3-d-hrimetpylbenzene	1.0	U	1.0		ug/L			04/10/21 18:36	1
A-Cymene	1.0	U	1.0		ug/L			04/10/21 18:36	1
1,2,3-hricploroAroAane	1.0	U	1.0		ug/L			04/10/21 18:36	1
hricploroetpene	1.0	U	1.0		ug/L			04/10/21 18:36	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	104		60 - 124		04/10/21 18:36	1
4-Bromofluorobenzene (Surr)	93		70 - 130		04/10/21 18:36	1
Dibromofluoromethane (Surr)	111		70 - 130		04/10/21 18:36	1
Toluene-d8 (Surr)	84		70 - 130		04/10/21 18:36	1

Lab Sample ID: LCS 680-663625/3  
 Matrix: Water  
 Analysis Batch: 663625

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	d0.0	47.6		ug/L		9d	70 - 130
Carbon f isulTf e	d0.0	38.0		ug/L		76	70 - 130
hetracploroetpene	d0.0	47.3		ug/L		9d	70 - 130
1,1-Dicploroetpane	d0.0	47.4		ug/L		9d	70 - 130
1,2-DicploroAroAane	d0.0	4d.2		ug/L		90	70 - 130
Mbetone	2d0	23d		ug/L		94	67 - 113
4-5 etpyl-2-Aentanone	2d0	227		ug/L		91	68 - 108
5 etpylene Cplorif e	d0.0	d0.3		ug/L		101	70 - 130
holuene	d0.0	47.0		ug/L		94	70 - 130
1,2,4-hricplorobenzene	d0.0	68.8	*+	ug/L		138	70 - 130
o-Xylene	d0.0	42.8		ug/L		86	70 - 130
Cplorobenzene	d0.0	49.1		ug/L		98	70 - 130
1,1-Dicploroetpene	d0.0	42.2		ug/L		84	70 - 130
Ortpof icplorobenzene	d0.0	48.9		ug/L		98	70 - 130
2-Butanone (5 EK)	2d0	239		ug/L		96	69 - 114
Etpylbenzene	d0.0	4d.7		ug/L		91	70 - 130
IsoAroAylbenzene	d0.0	43.0		ug/L		86	70 - 130
cis-1,2-Dicploroetpene	d0.0	d1.1		ug/L		102	70 - 130
CploroTorm	d0.0	d2.9		ug/L		106	70 - 130
m-Xylene & A-Xylene	d0.0	41.9		ug/L		84	70 - 130
Vinyl cplorif e	d0.0	39.4		ug/L		79	66 - 129
Carbon tetracplorif e	d0.0	d0.6		ug/L		101	70 - 130
1,4-Dicplorobenzene	d0.0	49.0		ug/L		98	70 - 130
1,2,4-hrimetpylbenzene	d0.0	d2.6		ug/L		10d	70 - 130
1,3,d-hrimetpylbenzene	d0.0	47.d		ug/L		9d	70 - 130
A-Cymene	d0.0	44.6		ug/L		89	70 - 130
1,2,3-hricploroAroAane	d0.0	49.6		ug/L		99	70 - 130
hricploroetpene	d0.0	47.7		ug/L		9d	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	114		60 - 124
4-Bromofluorobenzene (Surr)	105		70 - 130

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# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-663625/3**  
**Matrix: Water**  
**Analysis Batch: 663625**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
Dibromofluoromethane (Surr)	113		70 - 130
Toluene-d8 (Surr)	96		70 - 130

**Lab Sample ID: LCSD 680-663625/4**  
**Matrix: Water**  
**Analysis Batch: 663625**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	d0.0	47.d		ug/L		9d	70 - 130	0	30
Carbon tetrachloride	d0.0	4d.d		ug/L		91	70 - 130	18	30
tetrachloroethene	d0.0	47.7		ug/L		9d	70 - 130	1	30
1,1-Dichloroethane	d0.0	47.6		ug/L		9d	70 - 130	0	30
1,2-Dichloroethane	d0.0	42.1		ug/L		84	70 - 130	7	20
Methane	2d0	202		ug/L		81	67 - 113	1d	30
4-methyl-2-pentanone	2d0	194		ug/L		78	68 - 108	16	30
5-methylchlorobenzene	d0.0	46.2		ug/L		92	70 - 130	8	30
toluene	d0.0	42.3		ug/L		8d	70 - 130	11	30
1,2,4-trichlorobenzene	d0.0	d6.9		ug/L		114	70 - 130	19	30
o-Xylene	d0.0	d2.2		ug/L		104	70 - 130	20	30
Chlorobenzene	d0.0	49.7		ug/L		99	70 - 130	1	30
1,1-Dichloroethene	d0.0	d2.4	*1	ug/L		10d	70 - 130	22	20
Ortho-dichlorobenzene	d0.0	47.1		ug/L		94	70 - 130	4	30
2-Butanone (5 EK)	2d0	208		ug/L		83	69 - 114	14	30
Ethylbenzene	d0.0	48.4		ug/L		97	70 - 130	6	20
Isooctylbenzene	d0.0	d1.6		ug/L		103	70 - 130	18	30
cis-1,2-Dichloroethene	d0.0	d0.d		ug/L		101	70 - 130	1	30
Chloroform	d0.0	d1.7		ug/L		103	70 - 130	2	30
m-Xylene & p-Xylene	d0.0	d1.9		ug/L		104	70 - 130	21	30
Vinylchloride	d0.0	d1.0		ug/L		102	66 - 129	26	30
Carbon tetrachloride	d0.0	d9.d		ug/L		119	70 - 130	16	30
1,4-Dichlorobenzene	d0.0	48.6		ug/L		97	70 - 130	1	30
1,2,4-trimethylbenzene	d0.0	d9.1		ug/L		118	70 - 130	12	30
1,3,5-trimethylbenzene	d0.0	d7.4		ug/L		11d	70 - 130	19	30
p-Cymene	d0.0	46.3		ug/L		93	70 - 130	4	30
1,2,3-trichlorobenzene	d0.0	d0.7		ug/L		101	70 - 130	2	30
trichloroethene	d0.0	4d.1		ug/L		90	70 - 130	6	30

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	103		60 - 124
4-Bromofluorobenzene (Surr)	88		70 - 130
Dibromofluoromethane (Surr)	107		70 - 130
Toluene-d8 (Surr)	86		70 - 130



# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 680-663719/9**  
**Matrix: Water**  
**Analysis Batch: 663719**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	1.0	U	1.0		ug/L			04/12/21 12:48	1
Carbon f isulTf e	2.0	U	2.0		ug/L			04/12/21 12:48	1
hetracploroetpene	1.0	U	1.0		ug/L			04/12/21 12:48	1
1,1-Dicploroetpane	1.0	U	1.0		ug/L			04/12/21 12:48	1
1,2-DicploroAroAane	1.0	U	1.0		ug/L			04/12/21 12:48	1
Mbetone	10	U	10		ug/L			04/12/21 12:48	1
4-5 etpyl-2-Aentanone	10	U	10		ug/L			04/12/21 12:48	1
5 etpylene Cplorif e	d.0	U	d.0		ug/L			04/12/21 12:48	1
holuene	1.0	U	1.0		ug/L			04/12/21 12:48	1
1,2,4-hricplorobenzene	d.0	U	d.0		ug/L			04/12/21 12:48	1
o-Xylene	1.0	U	1.0		ug/L			04/12/21 12:48	1
Cplorobenzene	1.0	U	1.0		ug/L			04/12/21 12:48	1
1,1-Dicploroetpene	1.0	U	1.0		ug/L			04/12/21 12:48	1
Ortpof icplorobenzene	1.0	U	1.0		ug/L			04/12/21 12:48	1
2-Butanone (5 EK)	10	U	10		ug/L			04/12/21 12:48	1
Etpylbenzene	1.0	U	1.0		ug/L			04/12/21 12:48	1
IsoAroAylbenzene	1.0	U	1.0		ug/L			04/12/21 12:48	1
cis-1,2-Dicploroetpene	1.0	U	1.0		ug/L			04/12/21 12:48	1
CploroTorm	1.0	U	1.0		ug/L			04/12/21 12:48	1
m-Xylene & A-Xylene	1.0	U	1.0		ug/L			04/12/21 12:48	1
Vinyl cplorif e	1.0	U	1.0		ug/L			04/12/21 12:48	1
Carbon tetracplorif e	1.0	U	1.0		ug/L			04/12/21 12:48	1
1,4-Dicplorobenzene	1.0	U	1.0		ug/L			04/12/21 12:48	1
1,2,4-hrimetpylbenzene	1.0	U	1.0		ug/L			04/12/21 12:48	1
1,3,d-hrimetpylbenzene	1.0	U	1.0		ug/L			04/12/21 12:48	1
A-Cymene	1.0	U	1.0		ug/L			04/12/21 12:48	1
1,2,3-hricploroAroAane	1.0	U	1.0		ug/L			04/12/21 12:48	1
hricploroetpene	1.0	U	1.0		ug/L			04/12/21 12:48	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1,2-Dichloroethane-d4 (Surr)	95		60 - 124		04/12/21 12:48	1
4-Bromofluorobenzene (Surr)	101		70 - 130		04/12/21 12:48	1
Dibromofluoromethane (Surr)	104		70 - 130		04/12/21 12:48	1
Toluene-d8 (Surr)	102		70 - 130		04/12/21 12:48	1

**Lab Sample ID: LCS 680-663719/4**  
**Matrix: Water**  
**Analysis Batch: 663719**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Carbon f isulTf e	d0.0	d0.9		ug/L		102	70 - 130
hetracploroetpene	d0.0	d7.d		ug/L		11d	70 - 130
1,1-Dicploroetpane	d0.0	d0.3		ug/L		101	70 - 130
1,2-DicploroAroAane	d0.0	47.6		ug/L		9d	70 - 130
Mbetone	2d0	224		ug/L		89	67 - 113
4-5 etpyl-2-Aentanone	2d0	239		ug/L		9d	68 - 108
5 etpylene Cplorif e	d0.0	49.8		ug/L		100	70 - 130

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# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-663719/4**  
**Matrix: Water**  
**Analysis Batch: 663719**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
holuene	d0.0	d2.2		ug/L		104	70 - 130
1,2,4-hriclorobenzene	d0.0	d7.7		ug/L		11d	70 - 130
o-Xylene	d0.0	d3.8		ug/L		108	70 - 130
Cplorobenzene	d0.0	d2.9		ug/L		106	70 - 130
1,1-Dicploroetpene	d0.0	d2.d		ug/L		10d	70 - 130
Ortpof icplorobenzene	d0.0	d1.8		ug/L		104	70 - 130
2-Butanone (5 EK)	2d0	240		ug/L		96	69 - 114
Etpylbenzene	d0.0	d3.9		ug/L		108	70 - 130
IsoAroAylbenzene	d0.0	dd.8		ug/L		112	70 - 130
cis-1,2-Dicploroetpene	d0.0	49.4		ug/L		99	70 - 130
CploroTorm	d0.0	d1.7		ug/L		103	70 - 130
m-Xylene & A-Xylene	d0.0	d3.8		ug/L		108	70 - 130
Vinyl cplorif e	d0.0	d6.6		ug/L		113	66 - 129
Carbon tetracplorif e	d0.0	d1.7		ug/L		103	70 - 130
1,4-Dicplorobenzene	d0.0	d1.0		ug/L		102	70 - 130
1,2,4-hrimetpylbenzene	d0.0	d6.2		ug/L		112	70 - 130
1,3,d-hrimetpylbenzene	d0.0	d6.7		ug/L		113	70 - 130
A-Cymene	d0.0	d2.7		ug/L		10d	70 - 130
1,2,3-hricploroAroAane	d0.0	d1.7		ug/L		103	70 - 130
hricploroetpene	d0.0	d4.2		ug/L		108	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	95		60 - 124
4-Bromofluorobenzene (Surr)	100		70 - 130
Dibromofluoromethane (Surr)	107		70 - 130
Toluene-d8 (Surr)	104		70 - 130

**Lab Sample ID: LCSD 680-663719/5**  
**Matrix: Water**  
**Analysis Batch: 663719**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	d0.0	46.8		ug/L		94	70 - 130	0	30
Carbon f isulTf e	d0.0	49.8		ug/L		100	70 - 130	2	30
hetracploroetpene	d0.0	d7.1		ug/L		114	70 - 130	1	30
1,1-Dicploroetpane	d0.0	d1.2		ug/L		102	70 - 130	2	30
1,2-DicploroAroAane	d0.0	49.6		ug/L		99	70 - 130	4	20
Mcetone	2d0	267		ug/L		107	67 - 113	18	30
4-5 etpyl-2-Aentanone	2d0	272	*+	ug/L		109	68 - 108	13	30
5 etpylene Cplorif e	d0.0	d2.4		ug/L		10d	70 - 130	d	30
holuene	d0.0	d1.4		ug/L		103	70 - 130	2	30
1,2,4-hriclorobenzene	d0.0	60.4		ug/L		121	70 - 130	d	30
o-Xylene	d0.0	d3.7		ug/L		107	70 - 130	0	30
Cplorobenzene	d0.0	d3.d		ug/L		107	70 - 130	1	30
1,1-Dicploroetpene	d0.0	d0.3		ug/L		101	70 - 130	4	20
Ortpof icplorobenzene	d0.0	d2.d		ug/L		10d	70 - 130	2	30
2-Butanone (5 EK)	2d0	282		ug/L		113	69 - 114	16	30
Etpylbenzene	d0.0	d2.9		ug/L		106	70 - 130	2	20

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# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCSD 680-663719/5**  
**Matrix: Water**  
**Analysis Batch: 663719**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
IsoAroAylbenzene	d0.0	d4.7		ug/L		109	70 - 130	2	30
cis-1,2-Dicloroetpene	d0.0	d0.3		ug/L		101	70 - 130	2	30
CploroTorm	d0.0	d3.2		ug/L		106	70 - 130	3	30
m-Xylene & A-Xylene	d0.0	d2.9		ug/L		106	70 - 130	2	30
Vinyl cplorif e	d0.0	d3.d		ug/L		107	66 - 129	d	30
Carbon tetracplorif e	d0.0	49.8		ug/L		100	70 - 130	4	30
1,4-Dicplorobenzene	d0.0	d1.2		ug/L		102	70 - 130	0	30
1,2,4-hrimetpylbenzene	d0.0	d6.6		ug/L		113	70 - 130	1	30
1,3,d-hrimetpylbenzene	d0.0	d6.8		ug/L		114	70 - 130	0	30
A-Cymene	d0.0	d0.1		ug/L		100	70 - 130	d	30
1,2,3-hricploroAroAane	d0.0	d7.d		ug/L		11d	70 - 130	11	30
hricploroetpene	d0.0	d3.9		ug/L		108	70 - 130	1	30

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
1,2-Dichloroethane-d4 (Surr)	102		60 - 124
4-Bromofluorobenzene (Surr)	97		70 - 130
Dibromofluoromethane (Surr)	109		70 - 130
Toluene-d8 (Surr)	104		70 - 130

**Lab Sample ID: MB 680-663727/9**  
**Matrix: Water**  
**Analysis Batch: 663727**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.0	U	1.0		ug/L			04/12/21 13:24	1
Carbon f isulTf e	2.0	U	2.0		ug/L			04/12/21 13:24	1
hetracploroetpene	1.0	U	1.0		ug/L			04/12/21 13:24	1
1,1-Dicploroetpane	1.0	U	1.0		ug/L			04/12/21 13:24	1
1,2-DicploroAroAane	1.0	U	1.0		ug/L			04/12/21 13:24	1
Mbetone	10	U	10		ug/L			04/12/21 13:24	1
4-5 etpyl-2-Aentanone	10	U	10		ug/L			04/12/21 13:24	1
5 etpylene Cplorif e	d.0	U	d.0		ug/L			04/12/21 13:24	1
holuene	1.0	U	1.0		ug/L			04/12/21 13:24	1
1,2,4-hricplorobenzene	d.0	U	d.0		ug/L			04/12/21 13:24	1
o-Xylene	1.0	U	1.0		ug/L			04/12/21 13:24	1
Cplorobenzene	1.0	U	1.0		ug/L			04/12/21 13:24	1
1,1-Dicploroetpene	1.0	U	1.0		ug/L			04/12/21 13:24	1
Ortpof icplorobenzene	1.0	U	1.0		ug/L			04/12/21 13:24	1
2-Butanone (5 EK)	10	U	10		ug/L			04/12/21 13:24	1
Etpylbenzene	1.0	U	1.0		ug/L			04/12/21 13:24	1
IsoAroAylbenzene	1.0	U	1.0		ug/L			04/12/21 13:24	1
cis-1,2-Dicploroetpene	1.0	U	1.0		ug/L			04/12/21 13:24	1
CploroTorm	1.0	U	1.0		ug/L			04/12/21 13:24	1
m-Xylene & A-Xylene	1.0	U	1.0		ug/L			04/12/21 13:24	1
Vinyl cplorif e	1.0	U	1.0		ug/L			04/12/21 13:24	1
Carbon tetracplorif e	1.0	U	1.0		ug/L			04/12/21 13:24	1
1,4-Dicplorobenzene	1.0	U	1.0		ug/L			04/12/21 13:24	1
1,2,4-hrimetpylbenzene	1.0	U	1.0		ug/L			04/12/21 13:24	1

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# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 680-663727/9  
 Matrix: Water  
 Analysis Batch: 663727

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3-d-hrimetpylbenzene	1.0	U	1.0		ug/L			04/12/21 13:24	1
A-Cymene	1.0	U	1.0		ug/L			04/12/21 13:24	1
1,2,3-hricploroAroAane	1.0	U	1.0		ug/L			04/12/21 13:24	1
hricploroetpene	1.0	U	1.0		ug/L			04/12/21 13:24	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		60 - 124		04/12/21 13:24	1
4-Bromofluorobenzene (Surr)	104		70 - 130		04/12/21 13:24	1
Dibromofluoromethane (Surr)	114		70 - 130		04/12/21 13:24	1
Toluene-d8 (Surr)	79		70 - 130		04/12/21 13:24	1

Lab Sample ID: LCS 680-663727/4  
 Matrix: Water  
 Analysis Batch: 663727

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	d0.0	48.d		ug/L		97	70 - 130
Carbon f isulTf e	d0.0	43.9		ug/L		88	70 - 130
hetracploroetpene	d0.0	4d.8		ug/L		92	70 - 130
1,1-Dicploroetpane	d0.0	46.2		ug/L		92	70 - 130
1,2-DicploroAroAane	d0.0	46.0		ug/L		92	70 - 130
Mcetone	2d0	203		ug/L		81	67 - 113
4-5 etpyl-2-Aentanone	2d0	183		ug/L		73	68 - 108
5 etpylene Cplorif e	d0.0	47.4		ug/L		9d	70 - 130
holuene	d0.0	41.8		ug/L		84	70 - 130
1,2,4-hricplorobenzene	d0.0	dd.2		ug/L		110	70 - 130
o-Xylene	d0.0	d2.6		ug/L		10d	70 - 130
Cplorobenzene	d0.0	d0.2		ug/L		100	70 - 130
1,1-Dicploroetpene	d0.0	47.6		ug/L		9d	70 - 130
Ortpof icplorobenzene	d0.0	48.8		ug/L		98	70 - 130
2-Butanone (5 EK)	2d0	219		ug/L		88	69 - 114
Etpylbenzene	d0.0	48.7		ug/L		97	70 - 130
IsoAroAylbenzene	d0.0	d2.0		ug/L		104	70 - 130
cis-1,2-Dicploroetpene	d0.0	49.9		ug/L		100	70 - 130
Cplorobrm	d0.0	d0.6		ug/L		101	70 - 130
m-Xylene & A-Xylene	d0.0	d1.6		ug/L		103	70 - 130
Vinyl cplorif e	d0.0	d0.2		ug/L		100	66 - 129
Carbon tetracplorif e	d0.0	d4.8		ug/L		110	70 - 130
1,4-Dicplorobenzene	d0.0	d1.0		ug/L		102	70 - 130
1,2,4-hrimetpylbenzene	d0.0	66.4	*+	ug/L		133	70 - 130
1,3,d-hrimetpylbenzene	d0.0	62.9		ug/L		126	70 - 130
A-Cymene	d0.0	d4.0		ug/L		108	70 - 130
1,2,3-hricploroAroAane	d0.0	d0.2		ug/L		100	70 - 130
hricploroetpene	d0.0	47.2		ug/L		94	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	103		60 - 124
4-Bromofluorobenzene (Surr)	88		70 - 130

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# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-663727/4**  
**Matrix: Water**  
**Analysis Batch: 663727**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Surrogate	LCS		Limits
	%Recovery	Qualifier	
Dibromofluoromethane (Surr)	105		70 - 130
Toluene-d8 (Surr)	85		70 - 130

**Lab Sample ID: LCSD 680-663727/5**  
**Matrix: Water**  
**Analysis Batch: 663727**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	d0.0	48.7		ug/L		97	70 - 130	1	30
Carbon tetrachloride	d0.0	42.d		ug/L		8d	70 - 130	3	30
tetrachloroethene	d0.0	42.9		ug/L		86	70 - 130	7	30
1,1-Dichloroethane	d0.0	46.1		ug/L		92	70 - 130	0	30
1,2-Dichloroethane	d0.0	42.3		ug/L		8d	70 - 130	8	20
Methane	2d0	220		ug/L		88	67 - 113	8	30
4-methyl-2-pentanone	2d0	186		ug/L		74	68 - 108	1	30
5-methylchlorobenzene	d0.0	47.9		ug/L		96	70 - 130	1	30
toluene	d0.0	39.7		ug/L		79	70 - 130	d	30
1,2,4-trichlorobenzene	d0.0	d8.3		ug/L		117	70 - 130	d	30
o-Xylene	d0.0	d2.d		ug/L		10d	70 - 130	0	30
Chlorobenzene	d0.0	d0.6		ug/L		101	70 - 130	1	30
1,1-Dichloroethene	d0.0	4d.7		ug/L		91	70 - 130	4	20
Ortho-dichlorobenzene	d0.0	48.0		ug/L		96	70 - 130	2	30
2-Butanone (5 EK)	2d0	23d		ug/L		94	69 - 114	7	30
Ethylbenzene	d0.0	48.d		ug/L		97	70 - 130	0	20
Isooctylbenzene	d0.0	d1.2		ug/L		102	70 - 130	1	30
cis-1,2-Dichloroethene	d0.0	d0.3		ug/L		101	70 - 130	1	30
Chloroform	d0.0	d1.8		ug/L		104	70 - 130	2	30
m-Xylene & p-Xylene	d0.0	d1.d		ug/L		103	70 - 130	0	30
Vinylchloride	d0.0	47.7		ug/L		9d	66 - 129	d	30
Carbon tetrachloride	d0.0	d4.3		ug/L		109	70 - 130	1	30
1,4-Dichlorobenzene	d0.0	d0.2		ug/L		100	70 - 130	2	30
1,2,4-trimethylbenzene	d0.0	63.d		ug/L		127	70 - 130	4	30
1,3,5-trimethylbenzene	d0.0	d9.2		ug/L		118	70 - 130	6	30
p-Cymene	d0.0	49.6		ug/L		99	70 - 130	8	30
1,2,3-trichlorobenzene	d0.0	d2.8		ug/L		106	70 - 130	d	30
trichloroethene	d0.0	44.3		ug/L		89	70 - 130	6	30

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	109		60 - 124
4-Bromofluorobenzene (Surr)	91		70 - 130
Dibromofluoromethane (Surr)	109		70 - 130
Toluene-d8 (Surr)	81		70 - 130

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## GC/MS VOA

### Analysis Batch: 663281

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197113-1	MW-29S-03292021	Total/NA	Water	8260B	
680-197113-2	OW-Q2S-03292021	Total/NA	Water	8260B	
680-197113-3	OW-Q2I-03302021	Total/NA	Water	8260B	
680-197113-4	OW-Q2D-03292021	Total/NA	Water	8260B	
MB 680-663281/9	Method Blank	Total/NA	Water	8260B	
LCS 680-663281/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-663281/5	Lab Control Sample Dup	Total/NA	Water	8260B	

### Analysis Batch: 663289

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197113-5	OW-Q1S-03302021	Total/NA	Water	8260B	
680-197113-6	OW-Q1I-03302021	Total/NA	Water	8260B	
680-197113-7	OW-Q1D-03302021	Total/NA	Water	8260B	
680-197113-8	OW-Q4S-03302021	Total/NA	Water	8260B	
680-197113-9	OW-Q4I-03302021	Total/NA	Water	8260B	
680-197113-10	OW-Q5S-03302021	Total/NA	Water	8260B	
680-197113-11	OW-Q5I-03302021	Total/NA	Water	8260B	
680-197113-12	OW-Q5D-03302021	Total/NA	Water	8260B	
680-197113-15	DUP-01	Total/NA	Water	8260B	
MB 680-663289/9	Method Blank	Total/NA	Water	8260B	
LCS 680-663289/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-663289/5	Lab Control Sample Dup	Total/NA	Water	8260B	

### Analysis Batch: 663313

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197113-13	EQB-01-03302021	Total/NA	Water	8260B	
680-197113-14	EQB-02-03302021	Total/NA	Water	8260B	
MB 680-663313/10	Method Blank	Total/NA	Water	8260B	
LCS 680-663313/5	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-663313/6	Lab Control Sample Dup	Total/NA	Water	8260B	

### Analysis Batch: 663625

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197113-4 - DL	OW-Q2D-03292021	Total/NA	Water	8260B	
MB 680-663625/8	Method Blank	Total/NA	Water	8260B	
LCS 680-663625/3	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-663625/4	Lab Control Sample Dup	Total/NA	Water	8260B	

### Analysis Batch: 663719

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197113-7	OW-Q1D-03302021	Total/NA	Water	8260B	
680-197113-8	OW-Q4S-03302021	Total/NA	Water	8260B	
680-197113-12	OW-Q5D-03302021	Total/NA	Water	8260B	
680-197113-15	DUP-01	Total/NA	Water	8260B	
MB 680-663719/9	Method Blank	Total/NA	Water	8260B	
LCS 680-663719/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-663719/5	Lab Control Sample Dup	Total/NA	Water	8260B	

### Analysis Batch: 663727

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197113-3	OW-Q2I-03302021	Total/NA	Water	8260B	

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# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## GC/MS VOA (Continued)

### Analysis Batch: 663727 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-663727/9	Method Blank	Total/NA	Water	8260B	
LCS 680-663727/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-663727/5	Lab Control Sample Dup	Total/NA	Water	8260B	

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# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: MW-29S-03292021**

**Lab Sample ID: 680-197113-1**

Date Collected: 03/29/21 15:52

Matrix: Water

Date Received: 04/05/21 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	663281	04/08/21 21:10	P1C	TAL SAV
Instrument ID: CMSC										

**Client Sample ID: OW-Q2S-03292021**

**Lab Sample ID: 680-197113-2**

Date Collected: 03/29/21 17:06

Matrix: Water

Date Received: 04/05/21 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	663281	04/08/21 20:46	P1C	TAL SAV
Instrument ID: CMSC										

**Client Sample ID: OW-Q2I-03302021**

**Lab Sample ID: 680-197113-3**

Date Collected: 03/30/21 10:00

Matrix: Water

Date Received: 04/05/21 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	663281	04/08/21 21:57	P1C	TAL SAV
Instrument ID: CMSC										
Total/NA	Analysis	8260B		1	5 mL	5 mL	663727	04/12/21 21:18	EMA	TAL SAV
Instrument ID: CMSO2										

**Client Sample ID: OW-Q2D-03292021**

**Lab Sample ID: 680-197113-4**

Date Collected: 03/29/21 17:13

Matrix: Water

Date Received: 04/05/21 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	663281	04/08/21 21:33	P1C	TAL SAV
Instrument ID: CMSC										
Total/NA	Analysis	8260B	DL	10	5 mL	5 mL	663625	04/10/21 21:12	EMA	TAL SAV
Instrument ID: CMSO2										

**Client Sample ID: OW-Q1S-03302021**

**Lab Sample ID: 680-197113-5**

Date Collected: 03/30/21 11:05

Matrix: Water

Date Received: 04/05/21 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	663289	04/08/21 20:25	UI	TAL SAV
Instrument ID: CMSO2										

**Client Sample ID: OW-Q1I-03302021**

**Lab Sample ID: 680-197113-6**

Date Collected: 03/30/21 11:50

Matrix: Water

Date Received: 04/05/21 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	663289	04/08/21 17:11	UI	TAL SAV
Instrument ID: CMSO2										

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# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q1D-03302021**

**Lab Sample ID: 680-197113-7**

**Date Collected: 03/30/21 17:55**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		10	5 mL	5 mL	663719	04/12/21 19:53	EMA	TAL SAV
Instrument ID: CMSC										
Total/NA	Analysis	8260B		1	5 mL	5 mL	663289	04/08/21 17:36	UI	TAL SAV
Instrument ID: CMSO2										

**Client Sample ID: OW-Q4S-03302021**

**Lab Sample ID: 680-197113-8**

**Date Collected: 03/30/21 14:15**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	663719	04/12/21 17:31	EMA	TAL SAV
Instrument ID: CMSC										
Total/NA	Analysis	8260B		1	5 mL	5 mL	663289	04/08/21 18:00	UI	TAL SAV
Instrument ID: CMSO2										

**Client Sample ID: OW-Q4I-03302021**

**Lab Sample ID: 680-197113-9**

**Date Collected: 03/30/21 15:20**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	663289	04/08/21 18:48	UI	TAL SAV
Instrument ID: CMSO2										

**Client Sample ID: OW-Q5S-03302021**

**Lab Sample ID: 680-197113-10**

**Date Collected: 03/30/21 15:45**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	663289	04/08/21 19:12	UI	TAL SAV
Instrument ID: CMSO2										

**Client Sample ID: OW-Q5I-03302021**

**Lab Sample ID: 680-197113-11**

**Date Collected: 03/30/21 17:10**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	663289	04/08/21 19:36	UI	TAL SAV
Instrument ID: CMSO2										

**Client Sample ID: OW-Q5D-03302021**

**Lab Sample ID: 680-197113-12**

**Date Collected: 03/30/21 17:49**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		10	5 mL	5 mL	663719	04/12/21 20:17	EMA	TAL SAV
Instrument ID: CMSC										

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# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

**Client Sample ID: OW-Q5D-03302021**

**Lab Sample ID: 680-197113-12**

**Date Collected: 03/30/21 17:49**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	663289	04/08/21 20:01	UI	TAL SAV

**Client Sample ID: EQB-01-03302021**

**Lab Sample ID: 680-197113-13**

**Date Collected: 03/30/21 18:40**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	663313	04/08/21 14:45	Y1S	TAL SAV
Instrument ID: CMSU										

**Client Sample ID: EQB-02-03302021**

**Lab Sample ID: 680-197113-14**

**Date Collected: 03/30/21 18:45**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	663313	04/08/21 15:05	Y1S	TAL SAV
Instrument ID: CMSU										

**Client Sample ID: DUP-01**

**Lab Sample ID: 680-197113-15**

**Date Collected: 03/30/21 00:00**

**Matrix: Water**

**Date Received: 04/05/21 10:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		10	5 mL	5 mL	663719	04/12/21 20:40	EMA	TAL SAV
Instrument ID: CMSC										
Total/NA	Analysis	8260B		1	5 mL	5 mL	663289	04/08/21 20:49	UI	TAL SAV
Instrument ID: CMSO2										

## Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

# Chain of Custody Record



Client Information		Project Manager		Lab PM		Carrier Tracking No(s)		COC No	
Site Contact Tim Hassett		Adria Reimer		Eddie Barnett					
Client Contact Hercules LLC		Phone: 678-202-9564		E-Mail eddie.barnett@eurofins.com				Page 1 of 1	
Project Name GW Investigation		Site: Hercules LLC-Pinova, Inc. Brunswick Facility		Due Date Requested:		Analysis Requested		Job #	
		TAT Requested (days): standard TAT						Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDTA Other:	
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=Water, S=Soil, O=Other)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B VOCs - 1,1-Dichloroethane; 1,1-Dichloroethene; 1,2-Dichloropropane; 1,2-Dichlorobenzene; 1,4-Dichlorobenzene; 1,2,4-Trichlorobenzene; 1,3,5-Trichlorobenzene; Cymene, p-; 2-Butanone (MEK); 4-methyl-2-pentanone; Acetone; Benzene; Carbon Disulfide; Carbon Tetrachloride; Chlorobenzene; Chloroform; cis-1,2-Dichloroethene; Ethylbenzene; Isopropylbenzene; Methylene Chloride; m-Xylene & p-Xylene; o-Xylene; Tetrachloroethene; Toluene; Trichloroethane; Vinyl Chloride; 1,2,4-Trimethylbenzene; 1,3,5-Trimethylbenzene	Total Number of Containers	Special Instructions/Note:
MW-295-03202021	3/29/21	1552	G	W		X			 680-197113 Chain of Custody
MW-Q2S-03272021	3/29/21	1700	G	W		X			
MW-Q2I-03302021	3/29/21	1000	G	W		X			
MW-Q2D-03272021	3/29/21	1713	G	W		X			
MW-Q1S-03307021	3/30/21	1105	G	W		X			
MW-Q1I-03302021	3/30/21	1150	G	W		X			
MW-Q1D-03202021	3/30/21	1755	G	W		X			
MW-Q4S-03302021	3/30/21	1415	G	W		X			
MW-Q4I-03302021	3/30/21	1520	G	W		X			
MW-Q5I-03302021	3/30/21	1545	G	W		X			
MW-Q5I-03302021	3/30/21	1710	G	W		X			
Possible Hazard Identification		Sample Date		Sample Time		Sample Type		Matrix	
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological									
Deliverable Requested: I, II, III, IV, Other (specify)									
Method of Shipment		Date/Time		Date/Time		Date/Time		Company	
Relinquished by		02/10/2021		PASS		Company		Company	
Relinquished by		Date/Time		Date/Time		Date/Time		Company	
Custody Seals Intact: Δ Yes Δ No		Custody Seal No		4.2/4.3		Cooler Temperature(s) °C and Other Remarks		Company	



## Joshua Barnhart

---

**From:** Adria Reimer  
**Sent:** March 30, 2021 21:19  
**To:** Dan Gibbs  
**Cc:** Joshua Barnhart  
**Subject:** BWK gw samples - VOC list  
**Attachments:** COC Blank.xls

For the COC:

Client Contact: Hercules LLC

PM: Adria Reimer

Project name: GW Investigation

Site: Hercules LLC/Pinova Inc Brunswick Facility

Analysis: 8260B VOCs:

1,1-Dichloroethane  
1,1-Dichloroethene  
1,2-Dichloropropane  
1,2-Dichlorobenzene  
1,4-Dichlorobenzene  
1,2,4-Trichlorobenzene  
1,2,3-Trichloropropane  
1,2,4-Trimethylbenzene  
1,3,5-Trimethylbenzene  
Cymene, p-  
2-Butanone (MEK)  
4-Methyl-2-pentanone  
Acetone  
Benzene  
Carbon disulfide  
Carbon tetrachloride  
Chlorobenzene  
Chloroform  
cis-1,2-Dichloroethene  
Ethylbenzene  
Isopropylbenzene  
Methylene Chloride  
m-Xylene & p-Xylene  
o-Xylene  
Tetrachloroethene  
Toluene  
Trichloroethene  
Vinyl chloride

Either try to fit these in the rows at the top of the COC, or just put "8260B VOCs – see list in Special Instructions" and list them there, or you can try using the attached if you have somewhere to print it out. If you want to handwrite the COC and send me a photo before submitting labs to lab, I would be more than happy to review.

Plz let me know if you have any questions – thanks!!!

Adria L. Reimer, P.G. (GA, FL)  
Senior Geologist  
Geosyntec Consultants

# Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-197113-1

**Login Number: 197113**

**List Source: Eurofins TestAmerica, Savannah**

**List Number: 1**

**Creator: Sims, Robert D**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197113-1

## Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87052	06-30-21
Georgia	State	E87052	06-30-21

1

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8

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15

## Memorandum

Date: 18 May 2021  
To: Adria Reimer  
Cristin Corless Krachon  
From: Matthew Richardson  
CC: J. Caprio  
Subject: **Stage 2A Data Validation - Level II Data Deliverable – Eurofins  
TestAmerica Job ID 680-197113-1**

**SITE: Hercules Brunswick GW Investigation**

### INTRODUCTION

This report summarizes the findings of the Stage 2A data validation of twelve water samples, one field duplicate sample and two equipment blanks, collected 29-30 March 2021, as part of Hercules Brunswick sampling event. Eurofins TestAmerica Savannah, Georgia analyzed the samples for the following analytical test:

- Select Volatile Organic Compounds (VOCs) by United States Environmental Protection Agency (US EPA) Methods 5030B/8260B

### EXECUTIVE SUMMARY

Overall, based on this Stage 2A data validation covering the quality control (QC) parameters listed below and based on the information provided, the data as qualified are usable for supporting project objectives. The qualified data should be used within the limitations of the qualifications.

The data were reviewed based on professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Superfund Organic Methods Data Review, November 2020 (US EPA-540-R-20-005); and
- The pertinent methods referenced by the laboratory report.

The following samples were analyzed and validated at Stage 2A level in the data set:

Laboratory ID	Client ID
680-197113-1	MW-29S-03292021

Laboratory ID	Client ID
680-197113-2	OW-Q2S-03292021



Laboratory ID	Client ID
680-197113-3	OW-Q2I-03302021
680-197113-4	OW-Q2D-03292021
680-197113-5	OW-Q1S-03302021
680-197113-6	OW-Q1I-03302021
680-197113-7	OW-Q1D-03302021
680-197113-8	OW-Q4S-03302021
680-197113-9	OW-Q4I-03302021

Laboratory ID	Client ID
680-197113-10	OW-Q5S-03302021
680-197113-11	OW-Q5I-03302021
680-197113-12	OW-Q5D-03302021
680-197113-13	EQB-01-03302021
680-197113-14	EQB-02-03302021
680-197113-15	DUP-01

The samples were received within 0-6 degrees Celsius (°C). No sample preservation issues were noted by the laboratory.

A collection time was not documented on the chain of custody (COC) for the field duplicate sample. The field duplicate sample was logged by the laboratory with a collection time of 00:00.

## 1.0 SELECT VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for select VOCs by US EPA methods 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Equipment Blank
- ✓ Trip Blank
- ⊗ Field Duplicate
- ✓ Sensitivity
- ⊗ Electronic Data Deliverable Review

### 1.1 Overall Assessment

#### 1.1.1 Completeness

The VOC data reported in this laboratory report are considered usable for supporting project objectives. The results are considered valid; the analytical completeness defined as the ratio of the

number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this data set is 100%.

### **1.1.2 Analysis Anomaly**

The laboratory narrative indicated that the response of internal standard 1,4-dichlorobenzene-d4 in sample OW-Q2D-03292021 was outside the method specified acceptance criteria. Additional information from the laboratory indicated that the 1,4-dichlorobenzene-d4 response in the 1:10 dilution analysis of sample OW-Q2D-03292021 was low and outside the method specified acceptance criteria. Since no target analytes associated with the low internal standard recovery were reported from the dilution analysis, no qualifications were applied to the data.

### **1.2 Holding Times**

The holding time for VOC analysis of a preserved water sample is 14 days from sample collection to analysis. The holding times were met for the sample analyses.

### **1.3 Method Blank**

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Six method blanks were reported (batches 663281, 663289, 663313, 663625, 663719 and 663727). VOCs were not detected in the method blanks above the reporting limits (RLs).

### **1.4 Matrix Spike/Matrix Spike Duplicate (MS/MSD)**

MS/MSD pairs were not reported.

### **1.5 Laboratory Control Sample (LCS)**

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Six LCS/LCS duplicate (LCSD) pairs were reported. The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria, with the following exceptions.

One or both of the recoveries of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene in the LCS/LCSD pair in batch 663289 were high and outside the laboratory specified acceptance criteria. Since 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were not detected in the associated samples, no qualifications were applied to the data.

One or both of the recoveries of 4-methyl-2-pentanone and methylene chloride in the LCS/LCSD pair in batch 663313 were high and outside the laboratory specified acceptance criteria. Since 4-methyl-2-pentanone and methylene chloride were not detected in the associated samples, no qualifications were applied to the data.

The LCS recovery of 1,2,4-trichlorobenzene and the RPD for 1,1-dichloroethene in the LCS/LCSD pair in batch 663625 were high and outside the laboratory specified acceptance criteria. Since 1,2,4-trichlorobenzene and 1,1-dichloroethene were reported in the associated sample from a different analysis batch, no qualifications were applied to the data.

The LCSD recovery of 4-methyl-2-pentanone in the LCS/LCSD pair in batch 663719 was high and outside the laboratory specified acceptance criteria. Since 4-methyl-2-pentanone was reported in the associated samples from a different analysis batch, no qualifications were applied to the data.

The LCS recovery of 1,2,4-trichlorobenzene in the LCS/LCSD pair in batch 663727 was high and outside the laboratory specified acceptance criteria. Since 1,2,4-trichlorobenzene was reported in the associated sample from a different analysis batch, no qualifications were applied to the data.

## **1.6 Surrogates**

Acceptable surrogate recoveries were reported for the sample analyses, with the following exceptions.

The recoveries of surrogate toluene-d8 in samples OW-Q5D-03302021, DUP-01 and OW-Q1D-03302021 were low and outside the laboratory specified acceptance criteria. Since the recoveries of the remaining surrogates, dibromofluoromethane, 4-bromofluorobenzene and 1,2-dichloroethane-d4, were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

## **1.7 Equipment Blank**

Two equipment blanks, EQB-01-03302021 and EQB-02-03302021, were collected with the sample set. VOCs were not detected in the equipment blanks above the RLs.

## **1.8 Trip Blank**

A trip blank did not accompany the sample set. This did not result in qualification of the data, but the discrepancy should be noted by the data user.

**1.9 Field Duplicate**

One field duplicate sample, DUP-01, was collected with the sample set. Acceptable precision (RPD ≤ 30%) was demonstrated between the field duplicate and the original sample, OW-Q1D-03302021, with the following exception.

Toluene was detected in the parent sample OW-Q1D-03302021 and not detected in the field duplicate sample DUP-01, resulting in a noncalculable RPD result. Therefore, the toluene concentration in OW-Q1D-03302021 was J qualified as estimated, and the non-detect toluene result in DUP-01 was UJ qualified as estimated less than the RL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
DUP-01	Toluene	1.0	U	NC	1.0	UJ	7
OW-Q1D-03302021	Toluene	1.7	NA		1.7	J	7

µg/L-microgram per liter

U-not detected at the RL

NA-not applicable

NC-noncalculable

\* Validation qualifier definitions are provided in Attachment 1 of this report

\*\* Reason code definitions are provided in Attachment 2 of this report

**1.10 Sensitivity**

The samples were reported to the RLs. Elevated non-detect results were not reported.

**1.11 Electronic Data Deliverable (EDD) Review**

The results and sample IDs in the EDD were reviewed against the information provided by the associated level II report at a minimum of 20% as part of the data validation process. The samples were reported to the RLs; both the method detection limits (MDLs) and RLs were listed in the EDD. No other discrepancies were identified between the level II report and the EDD.

\* \* \* \* \*

**ATTACHMENT 1**  
**DATA VALIDATION QUALIFIER DEFINITIONS**  
**AND INTERPRETATION KEY**  
**Assigned by Geosyntec's Data Validation Team**

**DATA QUALIFIER DEFINITIONS**

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to “not detected at or above the reported result”.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

**ATTACHMENT 2**  
**DATA VALIDATION REASON CODES**  
**Assigned by Geosyntec's Data Validation Team**

<b>Valid Value</b>	<b>Description</b>
1	Preservation requirement not met
2	Extraction or analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits or RPD outside limits (LCS/LCSD)
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required

LCS - Laboratory Control Sample

LCSD - Laboratory Control Sample duplicate

RPD - Relative percent difference

## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858

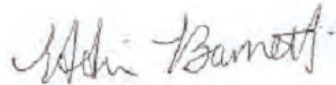
Laboratory Job ID: 680-197237-1

Client Project/Site: Hercules Brunswick - GW Investigation

For:

Geosyntec Consultants, Inc.  
1255 Roberts Blvd, NW  
Suite 200  
Kennesaw, Georgia 30144

Attn: Adria Reimer



Authorized for release by:  
4/19/2021 9:01:39 AM

Eddie Barnett, Project Manager I  
(912)250-0280  
[Eddie.Barnett@Eurofinset.com](mailto:Eddie.Barnett@Eurofinset.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project: Hercules Brunswick - GW Investigation

Job ID: 680-1973P7-1

**Job ID: 680-197237-1**

**Laboratory: Eurofins TestAmerica, Savannah**

## Narrative

### CASE NARRATIVE

**Client: Geosyntec Consultants, Inc.**  
**Project: Hercules Brunswick - GW Investigation**

**Report Number: 680-197237-1**

The following information is provided for your information. The analytical procedures used in the analysis of the samples are described in the attached report. The results of the analysis are provided in the attached report. The results of the analysis are provided in the attached report.

#### RECEIPT

The following information is provided for your information. The analytical procedures used in the analysis of the samples are described in the attached report. The results of the analysis are provided in the attached report.

#### VOLATILE ORGANIC COMPOUNDS (GC-MS)

The following information is provided for your information. The analytical procedures used in the analysis of the samples are described in the attached report. The results of the analysis are provided in the attached report.

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The following information is provided for your information. The analytical procedures used in the analysis of the samples are described in the attached report. The results of the analysis are provided in the attached report.

No additional analytical or quality issues were noted, other than those described above in the Derivation Glossary.

# Sample Summary

Job ID: 680-1973C7-1

Client: Gs noyct Bu l ot yaiGt Q. It uP  
 r jo/nuc: Bnjuainy wjat yk eW s v It gnyAM @t

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-1973C7-1	2 v -5 4D-040C3031	v , @j	04\$CS1 09:00	04\$7\$1 10:30	
680-1973C7-3	Qv -C8H-040C3031	v , @j	04\$CS1 10:08	04\$7\$1 10:30	
680-1973C7-C	Qv -C8I-040C3031	v , @j	04\$CS1 11:0C	04\$7\$1 10:30	
680-1973C7-4	Qv -C8D-040C3031	v , @j	04\$CS1 13:00	04\$7\$1 10:30	
680-1973C7-O	Qv -CCH-040C3031	v , @j	04\$CS1 1C:06	04\$7\$1 10:30	
680-1973C7-6	Qv -CC-040C3031	v , @j	04\$CS1 14:08	04\$7\$1 10:30	
680-1973C7-7	Qv -CCD-040C3031	v , @j	04\$CS1 1QCC	04\$7\$1 10:30	
680-1973C7-8	Qv -39I-040C3031	v , @j	04\$CS1 16:40	04\$7\$1 10:30	
680-1973C7-9	DEr -03-040C3031	v , @j	04\$CS1 00:00	04\$7\$1 10:30	
680-1973C7-10	DEr -0C-040C3031	v , @j	04\$CS1 00:00	04\$7\$1 10:30	
680-1973C7-11	U5 w-0C-040C3031	v , @j	04\$CS1 17:00	04\$7\$1 10:30	
680-1973C7-13	U5 w-04-040C3031	v , @j	04\$CS1 17:10	04\$7\$1 10:30	



# Method Summary

Job ID: 680-1973C7-1

Method Summary: This document provides a summary of the methods used in the study. It includes a table of methods, protocol references, and laboratory references.

Method	Method Description	Protocol	Laboratory
8360w	Voi, On Oj4, t a l ompoat dy (s l SMH)	Hv 826	TAL HAV
5000w	r aj4n , t d Tj, p	Hv 826	TAL HAV

## Protocol References:

Hv 826 = "TnyMnBody Foj Eg, ia, a 4 Hoia v , yG. r hcya, iS hnmæ, i MnBody". The d Edæ. Nognmbnj 1986 At d IG Upd, GyP

## Laboratory References:

TAL HAV = Eajofæ y TnyAmnjæ, . H, g, t t , h. 5103 L, Rouhn Agnt an. H, g, t t , h. s A C1202. TEL (913)C52-7858

# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Detection Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

## Client Sample ID: MW-2 9D-0903101L

## ba6 Sample ID: 870-LRA13A-L

f nalyte	seUult	2 ualifier	sb	QDb	h nit	Dil dac	D	QetPoT	Orep 4ype
1,4-Dichlorobenzene	14		10		ug/L	10		8260B	Total/NA
Benzene	990		10		ug/L	10		8260B	Total/NA
Chlorobenzene	660		10		ug/L	10		8260B	Total/NA
Ethylbenzene	180		10		ug/L	10		8260B	Total/NA
Isopropylbenzene	260		10		ug/L	10		8260B	Total/NA
m-Xylene & p-Xylene	320		10		ug/L	10		8260B	Total/NA

## Client Sample ID: QW-37S-0903101L

## ba6 Sample ID: 870-LRA13A-1

No Detections.

## Client Sample ID: QW-37I-0903101L

## ba6 Sample ID: 870-LRA13A-3

f nalyte	seUult	2 ualifier	sb	QDb	h nit	Dil dac	D	QetPoT	Orep 4ype
Chlorobenzene	4.5		1.0		ug/L	1		8260B	Total/NA

## Client Sample ID: QW-37D-0903101L

## ba6 Sample ID: 870-LRA13A-9

f nalyte	seUult	2 ualifier	sb	QDb	h nit	Dil dac	D	QetPoT	Orep 4ype
Benzene	1200		50		ug/L	50		8260B	Total/NA
Chlorobenzene	910		50		ug/L	50		8260B	Total/NA
Ethylbenzene	74		50		ug/L	50		8260B	Total/NA
Isopropylbenzene	460		50		ug/L	50		8260B	Total/NA
m-Xylene & p-Xylene	79		50		ug/L	50		8260B	Total/NA

## Client Sample ID: QW-55S-0903101L

## ba6 Sample ID: 870-LRA13A-5

No Detections.

## Client Sample ID: QW-55I-0903101L

## ba6 Sample ID: 870-LRA13A-8

f nalyte	seUult	2 ualifier	sb	QDb	h nit	Dil dac	D	QetPoT	Orep 4ype
Benzene	14		1.0		ug/L	1		8260B	Total/NA
Chlorobenzene	8.2		1.0		ug/L	1		8260B	Total/NA
Isopropylbenzene	1.8		1.0		ug/L	1		8260B	Total/NA

## Client Sample ID: QW-55D-0903101L

## ba6 Sample ID: 870-LRA13A-A

f nalyte	seUult	2 ualifier	sb	QDb	h nit	Dil dac	D	QetPoT	Orep 4ype
1,4-Dichlorobenzene	13		10		ug/L	10		8260B	Total/NA
Benzene	890		10		ug/L	10		8260B	Total/NA
Chlorobenzene	620		10		ug/L	10		8260B	Total/NA
Ethylbenzene	30		10		ug/L	10		8260B	Total/NA
Isopropylbenzene	310		10		ug/L	10		8260B	Total/NA
m-Xylene & p-Xylene	23		10		ug/L	10		8260B	Total/NA

## Client Sample ID: QW-1RI-0903101L

## ba6 Sample ID: 870-LRA13A-7

f nalyte	seUult	2 ualifier	sb	QDb	h nit	Dil dac	D	QetPoT	Orep 4ype
Benzene	3.1		1.0		ug/L	1		8260B	Total/NA
Chlorobenzene	1.1		1.0		ug/L	1		8260B	Total/NA
Isopropylbenzene	1.8		1.0		ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

## Client Sample ID: Dh O-01-0903101L

ba6 Sample ID: 870-LRA13A-R

f nalyte	seUlt	2 ualifier	sb	QDb	h nit	Dil dac	D	QetPoT	Orep 4ype
Benzene	920		25		ug/L	25		8260B	Total/NA
Chlorobenzene	740		25		ug/L	25		8260B	Total/NA
Ethylbenzene	220		25		ug/L	25		8260B	Total/NA
Isopropylbenzene	290		25		ug/L	25		8260B	Total/NA
m-Xylene & p-Xylene	370		25		ug/L	25		8260B	Total/NA

## Client Sample ID: Dh O-03-0903101L

ba6 Sample ID: 870-LRA13A-L0

f nalyte	seUlt	2 ualifier	sb	QDb	h nit	Dil dac	D	QetPoT	Orep 4ype
Acetone	380	*+	250		ug/L	25		8260B	Total/NA
Benzene	1100		25		ug/L	25		8260B	Total/NA
Chlorobenzene	850		25		ug/L	25		8260B	Total/NA
Ethylbenzene	73		25		ug/L	25		8260B	Total/NA
Isopropylbenzene	410		25		ug/L	25		8260B	Total/NA
m-Xylene & p-Xylene	70		25		ug/L	25		8260B	Total/NA

## Client Sample ID: E2 B-03-0903101L

ba6 Sample ID: 870-LRA13A-LL

No Detections.

## Client Sample ID: E2 B-09-0903101L

ba6 Sample ID: 870-LRA13A-L1

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: OW-Q4D-04032021**

**Lab Sample ID: 680-197237-1**

**Date Collected: 04/03/21 09:05**

**Matrix: Water**

**Date Received: 04/07/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	10	U	10		ug/L			04/14/21 19:24	10
1,1-Dichloroethene	10	U	10		ug/L			04/14/21 19:24	10
1,2,3-Trichloropropane	10	U	10		ug/L			04/14/21 19:24	10
1,2,4-Trichlorobenzene	50	U	50		ug/L			04/14/21 19:24	10
1,2,4-Trimethylbenzene	10	U	10		ug/L			04/14/21 19:24	10
1,2-Dichlorobenzene	10	U	10		ug/L			04/14/21 19:24	10
1,2-Dichloropropane	10	U	10		ug/L			04/14/21 19:24	10
1,3,5-Trimethylbenzene	10	U	10		ug/L			04/14/21 19:24	10
<b>1,4-Dichlorobenzene</b>	<b>14</b>		10		ug/L			04/14/21 19:24	10
2-Butanone (MEK)	100	U	100		ug/L			04/14/21 19:24	10
4-Methyl-2-pentanone (MIBK)	100	U	100		ug/L			04/14/21 19:24	10
Acetone	100	U	100		ug/L			04/14/21 19:24	10
<b>Benzene</b>	<b>990</b>		10		ug/L			04/14/21 19:24	10
Carbon disulfide	20	U	20		ug/L			04/14/21 19:24	10
Carbon tetrachloride	10	U	10		ug/L			04/14/21 19:24	10
<b>Chlorobenzene</b>	<b>660</b>		10		ug/L			04/14/21 19:24	10
Chloroform	10	U	10		ug/L			04/14/21 19:24	10
cis-1,2-Dichloroethene	10	U	10		ug/L			04/14/21 19:24	10
<b>Ethylbenzene</b>	<b>180</b>		10		ug/L			04/14/21 19:24	10
<b>Isopropylbenzene</b>	<b>260</b>		10		ug/L			04/14/21 19:24	10
Methylene Chloride	50	U **	50		ug/L			04/14/21 19:24	10
<b>m-Xylene &amp; p-Xylene</b>	<b>320</b>		10		ug/L			04/14/21 19:24	10
o-Xylene	10	U	10		ug/L			04/14/21 19:24	10
p-Cymene	10	U	10		ug/L			04/14/21 19:24	10
Tetrachloroethene	10	U	10		ug/L			04/14/21 19:24	10
Toluene	10	U	10		ug/L			04/14/21 19:24	10
Vinyl chloride	10	U	10		ug/L			04/14/21 19:24	10
Trichloroethene	10	U	10		ug/L			04/14/21 19:24	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	106		70 - 130		04/14/21 19:24	10
1,2-Dichloroethane-d4 (Surr)	101		60 - 124		04/14/21 19:24	10
4-Bromofluorobenzene (Surr)	101		70 - 130		04/14/21 19:24	10
Toluene-d8 (Surr)	106		70 - 130		04/14/21 19:24	10

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: MW-38S-04032021**

**Lab Sample ID: 680-197237-2**

**Date Collected: 04/03/21 10:08**

**Matrix: Water**

**Date Received: 04/07/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/14/21 17:44	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 17:44	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/14/21 17:44	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/14/21 17:44	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 17:44	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 17:44	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/14/21 17:44	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 17:44	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 17:44	1
2-Butanone (MEK)	10	U	10		ug/L			04/14/21 17:44	1
4-Methyl-2-pentanone (MIBK)	10	U	10		ug/L			04/14/21 17:44	1
Acetone	10	U	10		ug/L			04/14/21 17:44	1
Benzene	1.0	U	1.0		ug/L			04/14/21 17:44	1
Carbon disulfide	2.0	U	2.0		ug/L			04/14/21 17:44	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/14/21 17:44	1
Chlorobenzene	1.0	U	1.0		ug/L			04/14/21 17:44	1
Chloroform	1.0	U	1.0		ug/L			04/14/21 17:44	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 17:44	1
Ethylbenzene	1.0	U	1.0		ug/L			04/14/21 17:44	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/14/21 17:44	1
Methylene Chloride	5.0	U **	5.0		ug/L			04/14/21 17:44	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/14/21 17:44	1
o-Xylene	1.0	U	1.0		ug/L			04/14/21 17:44	1
p-Cymene	1.0	U	1.0		ug/L			04/14/21 17:44	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/14/21 17:44	1
Toluene	1.0	U	1.0		ug/L			04/14/21 17:44	1
Vinyl chloride	1.0	U	1.0		ug/L			04/14/21 17:44	1
Trichloroethene	1.0	U	1.0		ug/L			04/14/21 17:44	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	104		70 - 130		04/14/21 17:44	1
1,2-Dichloroethane-d4 (Surr)	99		60 - 124		04/14/21 17:44	1
4-Bromofluorobenzene (Surr)	104		70 - 130		04/14/21 17:44	1
Toluene-d8 (Surr)	106		70 - 130		04/14/21 17:44	1



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: MW-38I-04032021**

**Lab Sample ID: 680-197237-3**

**Date Collected: 04/03/21 11:03**

**Matrix: Water**

**Date Received: 04/07/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/14/21 18:04	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 18:04	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/14/21 18:04	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/14/21 18:04	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 18:04	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 18:04	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/14/21 18:04	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 18:04	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 18:04	1
2-Butanone (MEK)	10	U	10		ug/L			04/14/21 18:04	1
4-Methyl-2-pentanone (MIBK)	10	U	10		ug/L			04/14/21 18:04	1
Acetone	10	U	10		ug/L			04/14/21 18:04	1
Benzene	1.0	U	1.0		ug/L			04/14/21 18:04	1
Carbon disulfide	2.0	U	2.0		ug/L			04/14/21 18:04	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/14/21 18:04	1
<b>Chlorobenzene</b>	<b>4.5</b>		1.0		ug/L			04/14/21 18:04	1
Chloroform	1.0	U	1.0		ug/L			04/14/21 18:04	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 18:04	1
Ethylbenzene	1.0	U	1.0		ug/L			04/14/21 18:04	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/14/21 18:04	1
Methylene Chloride	5.0	U **	5.0		ug/L			04/14/21 18:04	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/14/21 18:04	1
o-Xylene	1.0	U	1.0		ug/L			04/14/21 18:04	1
p-Cymene	1.0	U	1.0		ug/L			04/14/21 18:04	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/14/21 18:04	1
Toluene	1.0	U	1.0		ug/L			04/14/21 18:04	1
Vinyl chloride	1.0	U	1.0		ug/L			04/14/21 18:04	1
Trichloroethene	1.0	U	1.0		ug/L			04/14/21 18:04	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	106		70 - 130		04/14/21 18:04	1
1,2-Dichloroethane-d4 (Surr)	100		60 - 124		04/14/21 18:04	1
4-Bromofluorobenzene (Surr)	102		70 - 130		04/14/21 18:04	1
Toluene-d8 (Surr)	105		70 - 130		04/14/21 18:04	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: MW-38D-04032021**

**Lab Sample ID: 680-197237-4**

**Date Collected: 04/03/21 12:05**

**Matrix: Water**

**Date Received: 04/07/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	50	U	50		ug/L			04/14/21 19:44	50
1,1-Dichloroethene	50	U	50		ug/L			04/14/21 19:44	50
1,2,3-Trichloropropane	50	U	50		ug/L			04/14/21 19:44	50
1,2,4-Trichlorobenzene	250	U	250		ug/L			04/14/21 19:44	50
1,2,4-Trimethylbenzene	50	U	50		ug/L			04/14/21 19:44	50
1,2-Dichlorobenzene	50	U	50		ug/L			04/14/21 19:44	50
1,2-Dichloropropane	50	U	50		ug/L			04/14/21 19:44	50
1,3,5-Trimethylbenzene	50	U	50		ug/L			04/14/21 19:44	50
1,4-Dichlorobenzene	50	U	50		ug/L			04/14/21 19:44	50
2-Butanone (MEK)	500	U	500		ug/L			04/14/21 19:44	50
4-Methyl-2-pentanone (MIBK)	500	U	500		ug/L			04/14/21 19:44	50
Acetone	500	U	500		ug/L			04/14/21 19:44	50
<b>Benzene</b>	<b>1200</b>		50		ug/L			04/14/21 19:44	50
Carbon disulfide	100	U	100		ug/L			04/14/21 19:44	50
Carbon tetrachloride	50	U	50		ug/L			04/14/21 19:44	50
<b>Chlorobenzene</b>	<b>910</b>		50		ug/L			04/14/21 19:44	50
Chloroform	50	U	50		ug/L			04/14/21 19:44	50
cis-1,2-Dichloroethene	50	U	50		ug/L			04/14/21 19:44	50
<b>Ethylbenzene</b>	<b>74</b>		50		ug/L			04/14/21 19:44	50
<b>Isopropylbenzene</b>	<b>460</b>		50		ug/L			04/14/21 19:44	50
Methylene Chloride	250	U **	250		ug/L			04/14/21 19:44	50
<b>m-Xylene &amp; p-Xylene</b>	<b>79</b>		50		ug/L			04/14/21 19:44	50
o-Xylene	50	U	50		ug/L			04/14/21 19:44	50
p-Cymene	50	U	50		ug/L			04/14/21 19:44	50
Tetrachloroethene	50	U	50		ug/L			04/14/21 19:44	50
Toluene	50	U	50		ug/L			04/14/21 19:44	50
Vinyl chloride	50	U	50		ug/L			04/14/21 19:44	50
Trichloroethene	50	U	50		ug/L			04/14/21 19:44	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	106		70 - 130		04/14/21 19:44	50
1,2-Dichloroethane-d4 (Surr)	101		60 - 124		04/14/21 19:44	50
4-Bromofluorobenzene (Surr)	102		70 - 130		04/14/21 19:44	50
Toluene-d8 (Surr)	105		70 - 130		04/14/21 19:44	50

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: MW-55S-04032021**

**Lab Sample ID: 680-197237-5**

Date Collected: 04/03/21 13:36

Matrix: Water

Date Received: 04/07/21 10:20

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/14/21 18:24	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 18:24	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/14/21 18:24	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/14/21 18:24	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 18:24	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 18:24	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/14/21 18:24	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 18:24	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 18:24	1
2-Butanone (MEK)	10	U	10		ug/L			04/14/21 18:24	1
4-Methyl-2-pentanone (MIBK)	10	U	10		ug/L			04/14/21 18:24	1
Acetone	10	U	10		ug/L			04/14/21 18:24	1
Benzene	1.0	U	1.0		ug/L			04/14/21 18:24	1
Carbon disulfide	2.0	U	2.0		ug/L			04/14/21 18:24	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/14/21 18:24	1
Chlorobenzene	1.0	U	1.0		ug/L			04/14/21 18:24	1
Chloroform	1.0	U	1.0		ug/L			04/14/21 18:24	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 18:24	1
Ethylbenzene	1.0	U	1.0		ug/L			04/14/21 18:24	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/14/21 18:24	1
Methylene Chloride	5.0	U **	5.0		ug/L			04/14/21 18:24	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/14/21 18:24	1
o-Xylene	1.0	U	1.0		ug/L			04/14/21 18:24	1
p-Cymene	1.0	U	1.0		ug/L			04/14/21 18:24	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/14/21 18:24	1
Toluene	1.0	U	1.0		ug/L			04/14/21 18:24	1
Vinyl chloride	1.0	U	1.0		ug/L			04/14/21 18:24	1
Trichloroethene	1.0	U	1.0		ug/L			04/14/21 18:24	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	105		70 - 130		04/14/21 18:24	1
1,2-Dichloroethane-d4 (Surr)	99		60 - 124		04/14/21 18:24	1
4-Bromofluorobenzene (Surr)	100		70 - 130		04/14/21 18:24	1
Toluene-d8 (Surr)	104		70 - 130		04/14/21 18:24	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: MW-55I-04032021**

**Lab Sample ID: 680-197237-6**

**Date Collected: 04/03/21 14:38**

**Matrix: Water**

**Date Received: 04/07/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/14/21 18:44	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 18:44	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/14/21 18:44	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/14/21 18:44	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 18:44	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 18:44	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/14/21 18:44	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 18:44	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 18:44	1
2-Butanone (MEK)	10	U	10		ug/L			04/14/21 18:44	1
4-Methyl-2-pentanone (MIBK)	10	U	10		ug/L			04/14/21 18:44	1
Acetone	10	U	10		ug/L			04/14/21 18:44	1
<b>Benzene</b>	<b>14</b>		1.0		ug/L			04/14/21 18:44	1
Carbon disulfide	2.0	U	2.0		ug/L			04/14/21 18:44	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/14/21 18:44	1
<b>Chlorobenzene</b>	<b>8.2</b>		1.0		ug/L			04/14/21 18:44	1
Chloroform	1.0	U	1.0		ug/L			04/14/21 18:44	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 18:44	1
Ethylbenzene	1.0	U	1.0		ug/L			04/14/21 18:44	1
<b>Isopropylbenzene</b>	<b>1.8</b>		1.0		ug/L			04/14/21 18:44	1
Methylene Chloride	5.0	U **	5.0		ug/L			04/14/21 18:44	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/14/21 18:44	1
o-Xylene	1.0	U	1.0		ug/L			04/14/21 18:44	1
p-Cymene	1.0	U	1.0		ug/L			04/14/21 18:44	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/14/21 18:44	1
Toluene	1.0	U	1.0		ug/L			04/14/21 18:44	1
Vinyl chloride	1.0	U	1.0		ug/L			04/14/21 18:44	1
Trichloroethene	1.0	U	1.0		ug/L			04/14/21 18:44	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	105		70 - 130		04/14/21 18:44	1
1,2-Dichloroethane-d4 (Surr)	97		60 - 124		04/14/21 18:44	1
4-Bromofluorobenzene (Surr)	102		70 - 130		04/14/21 18:44	1
Toluene-d8 (Surr)	105		70 - 130		04/14/21 18:44	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: MW-55D-04032021**

**Lab Sample ID: 680-197237-7**

**Date Collected: 04/03/21 15:33**

**Matrix: Water**

**Date Received: 04/07/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	10	U	10		ug/L			04/14/21 20:04	10
1,1-Dichloroethene	10	U	10		ug/L			04/14/21 20:04	10
1,2,3-Trichloropropane	10	U	10		ug/L			04/14/21 20:04	10
1,2,4-Trichlorobenzene	50	U	50		ug/L			04/14/21 20:04	10
1,2,4-Trimethylbenzene	10	U	10		ug/L			04/14/21 20:04	10
1,2-Dichlorobenzene	10	U	10		ug/L			04/14/21 20:04	10
1,2-Dichloropropane	10	U	10		ug/L			04/14/21 20:04	10
1,3,5-Trimethylbenzene	10	U	10		ug/L			04/14/21 20:04	10
<b>1,4-Dichlorobenzene</b>	<b>13</b>		10		ug/L			04/14/21 20:04	10
2-Butanone (MEK)	100	U	100		ug/L			04/14/21 20:04	10
4-Methyl-2-pentanone (MIBK)	100	U	100		ug/L			04/14/21 20:04	10
Acetone	100	U	100		ug/L			04/14/21 20:04	10
<b>Benzene</b>	<b>890</b>		10		ug/L			04/14/21 20:04	10
Carbon disulfide	20	U	20		ug/L			04/14/21 20:04	10
Carbon tetrachloride	10	U	10		ug/L			04/14/21 20:04	10
<b>Chlorobenzene</b>	<b>620</b>		10		ug/L			04/14/21 20:04	10
Chloroform	10	U	10		ug/L			04/14/21 20:04	10
cis-1,2-Dichloroethene	10	U	10		ug/L			04/14/21 20:04	10
<b>Ethylbenzene</b>	<b>30</b>		10		ug/L			04/14/21 20:04	10
<b>Isopropylbenzene</b>	<b>310</b>		10		ug/L			04/14/21 20:04	10
Methylene Chloride	50	U **	50		ug/L			04/14/21 20:04	10
<b>m-Xylene &amp; p-Xylene</b>	<b>23</b>		10		ug/L			04/14/21 20:04	10
o-Xylene	10	U	10		ug/L			04/14/21 20:04	10
p-Cymene	10	U	10		ug/L			04/14/21 20:04	10
Tetrachloroethene	10	U	10		ug/L			04/14/21 20:04	10
Toluene	10	U	10		ug/L			04/14/21 20:04	10
Vinyl chloride	10	U	10		ug/L			04/14/21 20:04	10
Trichloroethene	10	U	10		ug/L			04/14/21 20:04	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	107		70 - 130		04/14/21 20:04	10
1,2-Dichloroethane-d4 (Surr)	99		60 - 124		04/14/21 20:04	10
4-Bromofluorobenzene (Surr)	101		70 - 130		04/14/21 20:04	10
Toluene-d8 (Surr)	106		70 - 130		04/14/21 20:04	10

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: MW-29I-04032021**

**Lab Sample ID: 680-197237-8**

Date Collected: 04/03/21 16:45

Matrix: Water

Date Received: 04/07/21 10:20

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/14/21 19:04	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 19:04	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/14/21 19:04	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/14/21 19:04	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 19:04	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 19:04	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/14/21 19:04	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 19:04	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 19:04	1
2-Butanone (MEK)	10	U	10		ug/L			04/14/21 19:04	1
4-Methyl-2-pentanone (MIBK)	10	U	10		ug/L			04/14/21 19:04	1
Acetone	10	U	10		ug/L			04/14/21 19:04	1
<b>Benzene</b>	<b>3.1</b>		1.0		ug/L			04/14/21 19:04	1
Carbon disulfide	2.0	U	2.0		ug/L			04/14/21 19:04	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/14/21 19:04	1
<b>Chlorobenzene</b>	<b>1.1</b>		1.0		ug/L			04/14/21 19:04	1
Chloroform	1.0	U	1.0		ug/L			04/14/21 19:04	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 19:04	1
Ethylbenzene	1.0	U	1.0		ug/L			04/14/21 19:04	1
<b>Isopropylbenzene</b>	<b>1.8</b>		1.0		ug/L			04/14/21 19:04	1
Methylene Chloride	5.0	U **	5.0		ug/L			04/14/21 19:04	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/14/21 19:04	1
o-Xylene	1.0	U	1.0		ug/L			04/14/21 19:04	1
p-Cymene	1.0	U	1.0		ug/L			04/14/21 19:04	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/14/21 19:04	1
Toluene	1.0	U	1.0		ug/L			04/14/21 19:04	1
Vinyl chloride	1.0	U	1.0		ug/L			04/14/21 19:04	1
Trichloroethene	1.0	U	1.0		ug/L			04/14/21 19:04	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	105		70 - 130		04/14/21 19:04	1
1,2-Dichloroethane-d4 (Surr)	99		60 - 124		04/14/21 19:04	1
4-Bromofluorobenzene (Surr)	103		70 - 130		04/14/21 19:04	1
Toluene-d8 (Surr)	105		70 - 130		04/14/21 19:04	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: DUP-02-04032021**

**Lab Sample ID: 680-197237-9**

**Date Collected: 04/03/21 00:00**

**Matrix: Water**

**Date Received: 04/07/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	25	U	25		ug/L			04/14/21 20:24	25
1,1-Dichloroethene	25	U	25		ug/L			04/14/21 20:24	25
1,2,3-Trichloropropane	25	U	25		ug/L			04/14/21 20:24	25
1,2,4-Trichlorobenzene	130	U	130		ug/L			04/14/21 20:24	25
1,2,4-Trimethylbenzene	25	U	25		ug/L			04/14/21 20:24	25
1,2-Dichlorobenzene	25	U	25		ug/L			04/14/21 20:24	25
1,2-Dichloropropane	25	U	25		ug/L			04/14/21 20:24	25
1,3,5-Trimethylbenzene	25	U	25		ug/L			04/14/21 20:24	25
1,4-Dichlorobenzene	25	U	25		ug/L			04/14/21 20:24	25
2-Butanone (MEK)	250	U	250		ug/L			04/14/21 20:24	25
4-Methyl-2-pentanone (MIBK)	250	U	250		ug/L			04/14/21 20:24	25
Acetone	250	U	250		ug/L			04/14/21 20:24	25
<b>Benzene</b>	<b>920</b>		25		ug/L			04/14/21 20:24	25
Carbon disulfide	50	U	50		ug/L			04/14/21 20:24	25
Carbon tetrachloride	25	U	25		ug/L			04/14/21 20:24	25
<b>Chlorobenzene</b>	<b>740</b>		25		ug/L			04/14/21 20:24	25
Chloroform	25	U	25		ug/L			04/14/21 20:24	25
cis-1,2-Dichloroethene	25	U	25		ug/L			04/14/21 20:24	25
<b>Ethylbenzene</b>	<b>220</b>		25		ug/L			04/14/21 20:24	25
<b>Isopropylbenzene</b>	<b>290</b>		25		ug/L			04/14/21 20:24	25
Methylene Chloride	130	U **	130		ug/L			04/14/21 20:24	25
<b>m-Xylene &amp; p-Xylene</b>	<b>370</b>		25		ug/L			04/14/21 20:24	25
o-Xylene	25	U	25		ug/L			04/14/21 20:24	25
p-Cymene	25	U	25		ug/L			04/14/21 20:24	25
Tetrachloroethene	25	U	25		ug/L			04/14/21 20:24	25
Toluene	25	U	25		ug/L			04/14/21 20:24	25
Vinyl chloride	25	U	25		ug/L			04/14/21 20:24	25
Trichloroethene	25	U	25		ug/L			04/14/21 20:24	25

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	107		70 - 130		04/14/21 20:24	25
1,2-Dichloroethane-d4 (Surr)	99		60 - 124		04/14/21 20:24	25
4-Bromofluorobenzene (Surr)	103		70 - 130		04/14/21 20:24	25
Toluene-d8 (Surr)	106		70 - 130		04/14/21 20:24	25

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: DUP-03-04032021**

**Lab Sample ID: 680-197237-10**

**Date Collected: 04/03/21 00:00**

**Matrix: Water**

**Date Received: 04/07/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	25	U	25		ug/L			04/15/21 21:19	25
1,1-Dichloroethene	25	U	25		ug/L			04/15/21 21:19	25
1,2,3-Trichloropropane	25	U	25		ug/L			04/15/21 21:19	25
1,2,4-Trichlorobenzene	130	U	130		ug/L			04/15/21 21:19	25
1,2,4-Trimethylbenzene	25	U	25		ug/L			04/15/21 21:19	25
1,2-Dichlorobenzene	25	U	25		ug/L			04/15/21 21:19	25
1,2-Dichloropropane	25	U	25		ug/L			04/15/21 21:19	25
1,3,5-Trimethylbenzene	25	U	25		ug/L			04/15/21 21:19	25
1,4-Dichlorobenzene	25	U	25		ug/L			04/15/21 21:19	25
2-Butanone (MEK)	250	U	250		ug/L			04/15/21 21:19	25
4-Methyl-2-pentanone (MIBK)	250	U **	250		ug/L			04/15/21 21:19	25
<b>Acetone</b>	<b>380</b>	<b>**</b>	250		ug/L			04/15/21 21:19	25
<b>Benzene</b>	<b>1100</b>		25		ug/L			04/15/21 21:19	25
Carbon disulfide	50	U	50		ug/L			04/15/21 21:19	25
Carbon tetrachloride	25	U	25		ug/L			04/15/21 21:19	25
<b>Chlorobenzene</b>	<b>850</b>		25		ug/L			04/15/21 21:19	25
Chloroform	25	U	25		ug/L			04/15/21 21:19	25
cis-1,2-Dichloroethene	25	U	25		ug/L			04/15/21 21:19	25
<b>Ethylbenzene</b>	<b>73</b>		25		ug/L			04/15/21 21:19	25
<b>Isopropylbenzene</b>	<b>410</b>		25		ug/L			04/15/21 21:19	25
Methylene Chloride	130	U **	130		ug/L			04/15/21 21:19	25
<b>m-Xylene &amp; p-Xylene</b>	<b>70</b>		25		ug/L			04/15/21 21:19	25
o-Xylene	25	U	25		ug/L			04/15/21 21:19	25
p-Cymene	25	U	25		ug/L			04/15/21 21:19	25
Tetrachloroethene	25	U	25		ug/L			04/15/21 21:19	25
Toluene	25	U	25		ug/L			04/15/21 21:19	25
Vinyl chloride	25	U	25		ug/L			04/15/21 21:19	25
Trichloroethene	25	U	25		ug/L			04/15/21 21:19	25

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	110		70 - 130		04/15/21 21:19	25
1,2-Dichloroethane-d4 (Surr)	98		60 - 124		04/15/21 21:19	25
4-Bromofluorobenzene (Surr)	101		70 - 130		04/15/21 21:19	25
Toluene-d8 (Surr)	104		70 - 130		04/15/21 21:19	25



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: EQB-03-04032021**

**Lab Sample ID: 680-197237-11**

**Date Collected: 04/03/21 17:00**

**Matrix: Water**

**Date Received: 04/07/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/14/21 16:11	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 16:11	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/14/21 16:11	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/14/21 16:11	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 16:11	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 16:11	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/14/21 16:11	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 16:11	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 16:11	1
2-Butanone (MEK)	10	U	10		ug/L			04/14/21 16:11	1
4-Methyl-2-pentanone (MIBK)	10	U	10		ug/L			04/14/21 16:11	1
Acetone	10	U	10		ug/L			04/14/21 16:11	1
Benzene	1.0	U	1.0		ug/L			04/14/21 16:11	1
Carbon disulfide	2.0	U	2.0		ug/L			04/14/21 16:11	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/14/21 16:11	1
Chlorobenzene	1.0	U	1.0		ug/L			04/14/21 16:11	1
Chloroform	1.0	U	1.0		ug/L			04/14/21 16:11	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 16:11	1
Ethylbenzene	1.0	U	1.0		ug/L			04/14/21 16:11	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/14/21 16:11	1
Methylene Chloride	5.0	U	5.0		ug/L			04/14/21 16:11	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/14/21 16:11	1
o-Xylene	1.0	U	1.0		ug/L			04/14/21 16:11	1
p-Cymene	1.0	U	1.0		ug/L			04/14/21 16:11	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/14/21 16:11	1
Toluene	1.0	U	1.0		ug/L			04/14/21 16:11	1
Vinyl chloride	1.0	U	1.0		ug/L			04/14/21 16:11	1
Trichloroethene	1.0	U	1.0		ug/L			04/14/21 16:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	107		70 - 130		04/14/21 16:11	1
1,2-Dichloroethane-d4 (Surr)	98		60 - 124		04/14/21 16:11	1
4-Bromofluorobenzene (Surr)	99		70 - 130		04/14/21 16:11	1
Toluene-d8 (Surr)	105		70 - 130		04/14/21 16:11	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: EQB-04-04032021**

**Lab Sample ID: 680-197237-12**

**Date Collected: 04/03/21 17:15**

**Matrix: Water**

**Date Received: 04/07/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/14/21 16:35	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 16:35	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/14/21 16:35	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/14/21 16:35	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 16:35	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 16:35	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/14/21 16:35	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 16:35	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 16:35	1
2-Butanone (MEK)	10	U	10		ug/L			04/14/21 16:35	1
4-Methyl-2-pentanone (MIBK)	10	U	10		ug/L			04/14/21 16:35	1
Acetone	10	U	10		ug/L			04/14/21 16:35	1
Benzene	1.0	U	1.0		ug/L			04/14/21 16:35	1
Carbon disulfide	2.0	U	2.0		ug/L			04/14/21 16:35	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/14/21 16:35	1
Chlorobenzene	1.0	U	1.0		ug/L			04/14/21 16:35	1
Chloroform	1.0	U	1.0		ug/L			04/14/21 16:35	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 16:35	1
Ethylbenzene	1.0	U	1.0		ug/L			04/14/21 16:35	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/14/21 16:35	1
Methylene Chloride	5.0	U	5.0		ug/L			04/14/21 16:35	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/14/21 16:35	1
o-Xylene	1.0	U	1.0		ug/L			04/14/21 16:35	1
p-Cymene	1.0	U	1.0		ug/L			04/14/21 16:35	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/14/21 16:35	1
Toluene	1.0	U	1.0		ug/L			04/14/21 16:35	1
Vinyl chloride	1.0	U	1.0		ug/L			04/14/21 16:35	1
Trichloroethene	1.0	U	1.0		ug/L			04/14/21 16:35	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	107		70 - 130		04/14/21 16:35	1
1,2-Dichloroethane-d4 (Surr)	97		60 - 124		04/14/21 16:35	1
4-Bromofluorobenzene (Surr)	102		70 - 130		04/14/21 16:35	1
Toluene-d8 (Surr)	104		70 - 130		04/14/21 16:35	1

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DBFM (10-470)	DCA (60-423)	BFB (10-470)	TOL (10-470)
680-197237-1	OW-Q4D-04032021	106	101	101	106
680-197237-2	MW-38S-04032021	104	99	104	106
680-197237-3	MW-38I-04032021	106	100	102	105
680-197237-4	MW-38D-04032021	106	101	102	105
680-197237-5	MW-55S-04032021	105	99	100	104
680-197237-6	MW-55I-04032021	105	97	102	105
680-197237-7	MW-55D-04032021	107	99	101	106
680-197237-8	MW-29I-04032021	105	99	103	105
680-197237-9	DUP-02-04032021	107	99	103	106
680-197237-10	DUP-03-04032021	110	98	101	104
680-197237-11	EQB-03-04032021	107	98	99	105
680-197237-12	EQB-04-04032021	107	97	102	104
LCS 680-664029/4	Lab Control Sample	103	90	93	103
LCS 680-664050/5	Lab Control Sample	102	93	95	103
LCS 680-664272/5	Lab Control Sample	111	99	98	110
LCSD 680-664029/5	Lab Control Sample Dup	108	94	89	105
LCSD 680-664050/6	Lab Control Sample Dup	108	96	96	104
LCSD 680-664272/6	Lab Control Sample Dup	111	103	98	110
MB 680-664029/9	Method Blank	108	94	102	107
MB 680-664050/10	Method Blank	106	99	107	105
MB 680-664272/10	Method Blank	107	103	104	106

#### Surrogate Legend

DBFM = Dibromofluoromethane (Surr)  
 DCA = 1,2-Dichloroethane-d4 (Surr)  
 BFB = 4-Bromofluorobenzene (Surr)  
 TOL = Toluene-d8 (Surr)

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 680-664029/9**  
**Matrix: Water**  
**Analysis Batch: 664029**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/14/21 14:13	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 14:13	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/14/21 14:13	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/14/21 14:13	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 14:13	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 14:13	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/14/21 14:13	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 14:13	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 14:13	1
2-Butanone (MEK)	10	U	10		ug/L			04/14/21 14:13	1
4-Methyl-2-pentanone (MIBK)	10	U	10		ug/L			04/14/21 14:13	1
Acetone	10	U	10		ug/L			04/14/21 14:13	1
Benzene	1.0	U	1.0		ug/L			04/14/21 14:13	1
Carbon disulfide	2.0	U	2.0		ug/L			04/14/21 14:13	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/14/21 14:13	1
Chlorobenzene	1.0	U	1.0		ug/L			04/14/21 14:13	1
Chloroform	1.0	U	1.0		ug/L			04/14/21 14:13	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 14:13	1
Ethylbenzene	1.0	U	1.0		ug/L			04/14/21 14:13	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/14/21 14:13	1
Methylene Chloride	5.0	U	5.0		ug/L			04/14/21 14:13	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/14/21 14:13	1
o-Xylene	1.0	U	1.0		ug/L			04/14/21 14:13	1
p-Cymene	1.0	U	1.0		ug/L			04/14/21 14:13	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/14/21 14:13	1
Toluene	1.0	U	1.0		ug/L			04/14/21 14:13	1
Vinyl chloride	1.0	U	1.0		ug/L			04/14/21 14:13	1
Trichloroethene	1.0	U	1.0		ug/L			04/14/21 14:13	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1,2-Di Dth D-Di oret aort#1 --	(Su		) Sg(7S		S6Q 6Q (r 68 7	(
(: / 91 ,5eID-Doret ao9B6rth#1 --	36		m6g(/ 6		S6Q 6Q (r 68 7	(
68 -Di Dth D-D2oaboaoort#1 --	(S/		) Sg(7S		S6Q 6Q (r 68 7	(
zDth oao9Burt#1 --	(S)		) Sg(7S		S6Q 6Q (r 68 7	(

**Lab Sample ID: LCS 680-664029/4**  
**Matrix: Water**  
**Analysis Batch: 664029**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	50.0	54.8		ug/L		110	70 - 130
1,2,3-Trichloropropane	50.0	45.7		ug/L		91	70 - 130
1,2,4-Trichlorobenzene	50.0	55.5		ug/L		111	70 - 130
1,2,4-Trimethylbenzene	50.0	54.9		ug/L		110	70 - 130
1,2-Dichlorobenzene	50.0	50.0		ug/L		100	70 - 130
1,2-Dichloropropane	50.0	46.8		ug/L		94	70 - 130
1,3,5-Trimethylbenzene	50.0	56.2		ug/L		112	70 - 130

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 680-664029/4  
Matrix: Water  
Analysis Batch: 664029

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dichlorobenzene	50.0	50.3		ug/L		101	70 - 130
2-Butanone (MEK)	250	209		ug/L		84	69 - 114
4-Methyl-2-pentanone (MIBK)	250	207		ug/L		83	68 - 108
Acetone	250	199		ug/L		80	67 - 113
Benzene	50.0	45.4		ug/L		91	70 - 130
Carbon disulfide	50.0	50.8		ug/L		102	70 - 130
Carbon tetrachloride	50.0	54.5		ug/L		109	70 - 130
Chlorobenzene	50.0	52.4		ug/L		105	70 - 130
Chloroform	50.0	50.2		ug/L		100	70 - 130
cis-1,2-Dichloroethene	50.0	48.6		ug/L		97	70 - 130
Ethylbenzene	50.0	52.9		ug/L		106	70 - 130
Isopropylbenzene	50.0	56.3		ug/L		113	70 - 130
Methylene Chloride	50.0	47.5		ug/L		95	70 - 130
m-Xylene & p-Xylene	50.0	53.1		ug/L		106	70 - 130
o-Xylene	50.0	52.9		ug/L		106	70 - 130
p-Cymene	50.0	52.2		ug/L		104	70 - 130
Tetrachloroethene	50.0	59.1		ug/L		118	70 - 130
Toluene	50.0	50.8		ug/L		102	70 - 130
Vinyl chloride	50.0	53.3		ug/L		107	66 - 129
Trichloroethene	50.0	55.9		ug/L		112	70 - 130

Surrogate	%Recovery	LCS Qualifier	LCS Limits
1,2-Di Dth D-Di oret aort#1 --	( S7		) S9( 7S
( : / 9f ,5etD-Doret ao9B6rt#1 --	3S		m8g( / 6
69 -Di Dth D-D2oaboaort#1 --	37		) S9( 7S
zDth oao9Burt#1 --	( S7		) S9( 7S

Lab Sample ID: LCSD 680-664029/5  
Matrix: Water  
Analysis Batch: 664029

Client Sample ID: Lab Control Sample Dup  
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	49.9		ug/L		100	70 - 130	1	30
1,1-Dichloroethene	50.0	54.9		ug/L		110	70 - 130	0	20
1,2,3-Trichloropropane	50.0	48.4		ug/L		97	70 - 130	6	30
1,2,4-Trichlorobenzene	50.0	56.0		ug/L		112	70 - 130	1	30
1,2,4-Trimethylbenzene	50.0	55.6		ug/L		111	70 - 130	1	30
1,2-Dichlorobenzene	50.0	49.1		ug/L		98	70 - 130	2	30
1,2-Dichloropropane	50.0	47.8		ug/L		96	70 - 130	2	20
1,3,5-Trimethylbenzene	50.0	56.2		ug/L		112	70 - 130	0	30
1,4-Dichlorobenzene	50.0	48.7		ug/L		97	70 - 130	3	30
2-Butanone (MEK)	250	225		ug/L		90	69 - 114	7	30
4-Methyl-2-pentanone (MIBK)	250	218		ug/L		87	68 - 108	5	30
Acetone	250	208		ug/L		83	67 - 113	4	30
Benzene	50.0	45.6		ug/L		91	70 - 130	0	30
Carbon disulfide	50.0	49.9		ug/L		100	70 - 130	2	30
Carbon tetrachloride	50.0	52.5		ug/L		105	70 - 130	4	30
Chlorobenzene	50.0	53.3		ug/L		107	70 - 130	2	30

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCSD 680-664029/5**  
**Matrix: Water**  
**Analysis Batch: 664029**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloroform	50.0	50.7		ug/L		101	70 - 130	1	30
cis-1,2-Dichloroethene	50.0	48.7		ug/L		97	70 - 130	0	30
Ethylbenzene	50.0	52.6		ug/L		105	70 - 130	1	20
Isopropylbenzene	50.0	55.3		ug/L		111	70 - 130	2	30
Methylene Chloride	50.0	49.5		ug/L		99	70 - 130	4	30
m-Xylene & p-Xylene	50.0	52.8		ug/L		106	70 - 130	1	30
o-Xylene	50.0	53.3		ug/L		107	70 - 130	1	30
p-Cymene	50.0	47.7		ug/L		95	70 - 130	9	30
Tetrachloroethene	50.0	60.1		ug/L		120	70 - 130	2	30
Toluene	50.0	50.9		ug/L		102	70 - 130	0	30
Vinyl chloride	50.0	50.4		ug/L		101	66 - 129	5	30
Trichloroethene	50.0	57.1		ug/L		114	70 - 130	2	30

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
1,2-Di Dth D-Di oret aort#1 --	(Su		) Sg( 7S
( : / 91 , 5e1D: Doret ao9B6rt#1 --	36		nSg( / 6
69 -Di Dth D-D2oaboort#1 --	u3		) Sg( 7S
zDth oao9Burt#1 --	(ST		) Sg( 7S

**Lab Sample ID: MB 680-664050/10**  
**Matrix: Water**  
**Analysis Batch: 664050**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/14/21 13:43	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 13:43	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/14/21 13:43	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/14/21 13:43	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 13:43	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 13:43	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/14/21 13:43	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/14/21 13:43	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/14/21 13:43	1
2-Butanone (MEK)	10	U	10		ug/L			04/14/21 13:43	1
4-Methyl-2-pentanone (MIBK)	10	U	10		ug/L			04/14/21 13:43	1
Acetone	10	U	10		ug/L			04/14/21 13:43	1
Benzene	1.0	U	1.0		ug/L			04/14/21 13:43	1
Carbon disulfide	2.0	U	2.0		ug/L			04/14/21 13:43	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/14/21 13:43	1
Chlorobenzene	1.0	U	1.0		ug/L			04/14/21 13:43	1
Chloroform	1.0	U	1.0		ug/L			04/14/21 13:43	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/14/21 13:43	1
Ethylbenzene	1.0	U	1.0		ug/L			04/14/21 13:43	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/14/21 13:43	1
Methylene Chloride	5.0	U	5.0		ug/L			04/14/21 13:43	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/14/21 13:43	1
o-Xylene	1.0	U	1.0		ug/L			04/14/21 13:43	1
p-Cymene	1.0	U	1.0		ug/L			04/14/21 13:43	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 680-664050/10  
 Matrix: Water  
 Analysis Batch: 664050

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	1.0	U	1.0		ug/L			04/14/21 13:43	1
Toluene	1.0	U	1.0		ug/L			04/14/21 13:43	1
Vinyl chloride	1.0	U	1.0		ug/L			04/14/21 13:43	1
Trichloroethene	1.0	U	1.0		ug/L			04/14/21 13:43	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Di Dth D-Di oret aort#1 --	( Sm		) Sg( 7S		S6Q 60 ( r 787	(
( : / 91 ,5e1D-Doret ao9B6rt#1 --	33		nSg( / 6		S6Q 60 ( r 787	(
69 -Di Dth D-D2oaboort#1 --	( S)		) Sg( 7S		S6Q 60 ( r 787	(
zDth oao9Burt#1 --	( ST		) Sg( 7S		S6Q 60 ( r 787	(

Lab Sample ID: LCS 680-664050/5  
 Matrix: Water  
 Analysis Batch: 664050

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethane	50.0	51.6		ug/L		103	70 - 130
1,1-Dichloroethene	50.0	48.1		ug/L		96	70 - 130
1,2,3-Trichloropropane	50.0	52.4		ug/L		105	70 - 130
1,2,4-Trichlorobenzene	50.0	49.3		ug/L		99	70 - 130
1,2,4-Trimethylbenzene	50.0	50.7		ug/L		101	70 - 130
1,2-Dichlorobenzene	50.0	49.0		ug/L		98	70 - 130
1,2-Dichloropropane	50.0	51.1		ug/L		102	70 - 130
1,3,5-Trimethylbenzene	50.0	49.2		ug/L		98	70 - 130
1,4-Dichlorobenzene	50.0	50.0		ug/L		100	70 - 130
2-Butanone (MEK)	250	241		ug/L		96	69 - 114
4-Methyl-2-pentanone (MIBK)	250	235		ug/L		94	68 - 108
Acetone	250	248		ug/L		99	67 - 113
Benzene	50.0	51.1		ug/L		102	70 - 130
Carbon disulfide	50.0	49.5		ug/L		99	70 - 130
Carbon tetrachloride	50.0	50.2		ug/L		100	70 - 130
Chlorobenzene	50.0	52.5		ug/L		105	70 - 130
Chloroform	50.0	50.2		ug/L		100	70 - 130
cis-1,2-Dichloroethene	50.0	50.7		ug/L		101	70 - 130
Ethylbenzene	50.0	55.0		ug/L		110	70 - 130
Isopropylbenzene	50.0	52.3		ug/L		105	70 - 130
Methylene Chloride	50.0	69.2	*+	ug/L		138	70 - 130
m-Xylene & p-Xylene	50.0	53.4		ug/L		107	70 - 130
o-Xylene	50.0	52.5		ug/L		105	70 - 130
p-Cymene	50.0	46.0		ug/L		92	70 - 130
Tetrachloroethene	50.0	55.5		ug/L		111	70 - 130
Toluene	50.0	52.2		ug/L		104	70 - 130
Vinyl chloride	50.0	57.4		ug/L		115	66 - 129
Trichloroethene	50.0	50.6		ug/L		101	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Di Dth D-Di oret aort#1 --	( S		) Sg( 7S
( : / 91 ,5e1D-Doret ao9B6rt#1 --	37		nSg( / 6

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-664050/5**  
**Matrix: Water**  
**Analysis Batch: 664050**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
69 -Di Dth D-D2oaboaort#   --	37		) S9( 7S
zDth oao9Burt#   --	( S7		) S9( 7S

**Lab Sample ID: LCSD 680-664050/6**  
**Matrix: Water**  
**Analysis Batch: 664050**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	52.4		ug/L		105	70 - 130	2	30
1,1-Dichloroethene	50.0	47.1		ug/L		94	70 - 130	2	20
1,2,3-Trichloropropane	50.0	53.3		ug/L		107	70 - 130	2	30
1,2,4-Trichlorobenzene	50.0	47.2		ug/L		94	70 - 130	4	30
1,2,4-Trimethylbenzene	50.0	49.5		ug/L		99	70 - 130	2	30
1,2-Dichlorobenzene	50.0	48.8		ug/L		98	70 - 130	1	30
1,2-Dichloropropane	50.0	50.7		ug/L		101	70 - 130	1	20
1,3,5-Trimethylbenzene	50.0	49.2		ug/L		98	70 - 130	0	30
1,4-Dichlorobenzene	50.0	51.1		ug/L		102	70 - 130	2	30
2-Butanone (MEK)	250	252		ug/L		101	69 - 114	5	30
4-Methyl-2-pentanone (MIBK)	250	247		ug/L		99	68 - 108	5	30
Acetone	250	271		ug/L		109	67 - 113	9	30
Benzene	50.0	51.9		ug/L		104	70 - 130	2	30
Carbon disulfide	50.0	49.7		ug/L		99	70 - 130	1	30
Carbon tetrachloride	50.0	49.9		ug/L		100	70 - 130	1	30
Chlorobenzene	50.0	53.4		ug/L		107	70 - 130	2	30
Chloroform	50.0	52.2		ug/L		104	70 - 130	4	30
cis-1,2-Dichloroethene	50.0	51.5		ug/L		103	70 - 130	2	30
Ethylbenzene	50.0	54.4		ug/L		109	70 - 130	1	20
Isopropylbenzene	50.0	52.2		ug/L		104	70 - 130	0	30
Methylene Chloride	50.0	71.3	*+	ug/L		143	70 - 130	3	30
m-Xylene & p-Xylene	50.0	53.0		ug/L		106	70 - 130	1	30
o-Xylene	50.0	52.2		ug/L		104	70 - 130	1	30
p-Cymene	50.0	44.9		ug/L		90	70 - 130	2	30
Tetrachloroethene	50.0	56.4		ug/L		113	70 - 130	2	30
Toluene	50.0	53.0		ug/L		106	70 - 130	2	30
Vinyl chloride	50.0	57.1		ug/L		114	66 - 129	1	30
Trichloroethene	50.0	50.3		ug/L		101	70 - 130	1	30

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
1,2-Di Dth D-Di oret aort#   --	( Su		) S9( 7S
( : / 91 ,5e1D-Doret ao9B6rt#   --	3m		nS9( / 6
69 -Di Dth D-D2oaboaort#   --	3m		) S9( 7S
zDth oao9Burt#   --	( S6		) S9( 7S



# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 680-664272/10**  
**Matrix: Water**  
**Analysis Batch: 664272**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/15/21 14:37	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/15/21 14:37	1
1,2,3-Trichloropropane	1.0	U	1.0		ug/L			04/15/21 14:37	1
1,2,4-Trichlorobenzene	5.0	U	5.0		ug/L			04/15/21 14:37	1
1,2,4-Trimethylbenzene	1.0	U	1.0		ug/L			04/15/21 14:37	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/15/21 14:37	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/15/21 14:37	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/15/21 14:37	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/15/21 14:37	1
2-Butanone (MEK)	10	U	10		ug/L			04/15/21 14:37	1
4-Methyl-2-pentanone (MIBK)	10	U	10		ug/L			04/15/21 14:37	1
Acetone	10	U	10		ug/L			04/15/21 14:37	1
Benzene	1.0	U	1.0		ug/L			04/15/21 14:37	1
Carbon disulfide	2.0	U	2.0		ug/L			04/15/21 14:37	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/15/21 14:37	1
Chlorobenzene	1.0	U	1.0		ug/L			04/15/21 14:37	1
Chloroform	1.0	U	1.0		ug/L			04/15/21 14:37	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/15/21 14:37	1
Ethylbenzene	1.0	U	1.0		ug/L			04/15/21 14:37	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/15/21 14:37	1
Methylene Chloride	5.0	U	5.0		ug/L			04/15/21 14:37	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/15/21 14:37	1
o-Xylene	1.0	U	1.0		ug/L			04/15/21 14:37	1
p-Cymene	1.0	U	1.0		ug/L			04/15/21 14:37	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/15/21 14:37	1
Toluene	1.0	U	1.0		ug/L			04/15/21 14:37	1
Vinyl chloride	1.0	U	1.0		ug/L			04/15/21 14:37	1
Trichloroethene	1.0	U	1.0		ug/L			04/15/21 14:37	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Di Dth D-Di oret aort#1 --	(S)		) Sg (7S		S6Q TQ (r 68)	(
( : / 91 ,5e1D-Doret ao9B6rth#1 --	(S7		m6g (/ 6		S6Q TQ (r 68)	(
69 -Di Dth D-D2oaboaoort#1 --	(S6		) Sg (7S		S6Q TQ (r 68)	(
zDth oao9Burt#1 --	(Sm		) Sg (7S		S6Q TQ (r 68)	(

**Lab Sample ID: LCS 680-664272/5**  
**Matrix: Water**  
**Analysis Batch: 664272**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethane	50.0	54.7		ug/L		109	70 - 130
1,1-Dichloroethene	50.0	48.4		ug/L		97	70 - 130
1,2,3-Trichloropropane	50.0	54.4		ug/L		109	70 - 130
1,2,4-Trichlorobenzene	50.0	48.0		ug/L		96	70 - 130
1,2,4-Trimethylbenzene	50.0	50.5		ug/L		101	70 - 130
1,2-Dichlorobenzene	50.0	50.4		ug/L		101	70 - 130
1,2-Dichloropropane	50.0	52.4		ug/L		105	70 - 130
1,3,5-Trimethylbenzene	50.0	49.8		ug/L		100	70 - 130

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 680-664272/5  
 Matrix: Water  
 Analysis Batch: 664272

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dichlorobenzene	50.0	51.8		ug/L		104	70 - 130
2-Butanone (MEK)	250	272		ug/L		109	69 - 114
4-Methyl-2-pentanone (MIBK)	250	261		ug/L		104	68 - 108
Acetone	250	293	*+	ug/L		117	67 - 113
Benzene	50.0	52.9		ug/L		106	70 - 130
Carbon disulfide	50.0	52.7		ug/L		105	70 - 130
Carbon tetrachloride	50.0	50.1		ug/L		100	70 - 130
Chlorobenzene	50.0	53.4		ug/L		107	70 - 130
Chloroform	50.0	53.4		ug/L		107	70 - 130
cis-1,2-Dichloroethene	50.0	50.3		ug/L		101	70 - 130
Ethylbenzene	50.0	55.6		ug/L		111	70 - 130
Isopropylbenzene	50.0	52.1		ug/L		104	70 - 130
Methylene Chloride	50.0	74.7	*+	ug/L		149	70 - 130
m-Xylene & p-Xylene	50.0	53.9		ug/L		108	70 - 130
o-Xylene	50.0	53.7		ug/L		107	70 - 130
p-Cymene	50.0	46.3		ug/L		93	70 - 130
Tetrachloroethene	50.0	59.4		ug/L		119	70 - 130
Toluene	50.0	55.4		ug/L		111	70 - 130
Vinyl chloride	50.0	56.8		ug/L		114	66 - 129
Trichloroethene	50.0	52.7		ug/L		105	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Di Dth D-Di oret aort#1 --	((		) Sg( 7S
( : / 9f ,5etD-Doret ao9B6rt#1 --	33		m8g( / 6
69f -Di Dth D-D2oaboaort#1 --	3u		) Sg( 7S
zDth oao9Burt#1 --	((S		) Sg( 7S

Lab Sample ID: LCSD 680-664272/6  
 Matrix: Water  
 Analysis Batch: 664272

Client Sample ID: Lab Control Sample Dup  
 Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethane	50.0	54.3		ug/L		109	70 - 130	1	30
1,1-Dichloroethene	50.0	46.5		ug/L		93	70 - 130	4	20
1,2,3-Trichloropropane	50.0	56.4		ug/L		113	70 - 130	4	30
1,2,4-Trichlorobenzene	50.0	48.4		ug/L		97	70 - 130	1	30
1,2,4-Trimethylbenzene	50.0	49.1		ug/L		98	70 - 130	3	30
1,2-Dichlorobenzene	50.0	50.4		ug/L		101	70 - 130	0	30
1,2-Dichloropropane	50.0	52.6		ug/L		105	70 - 130	0	20
1,3,5-Trimethylbenzene	50.0	48.5		ug/L		97	70 - 130	3	30
1,4-Dichlorobenzene	50.0	50.5		ug/L		101	70 - 130	3	30
2-Butanone (MEK)	250	279		ug/L		112	69 - 114	3	30
4-Methyl-2-pentanone (MIBK)	250	273	*+	ug/L		109	68 - 108	4	30
Acetone	250	298	*+	ug/L		119	67 - 113	2	30
Benzene	50.0	52.9		ug/L		106	70 - 130	0	30
Carbon disulfide	50.0	51.6		ug/L		103	70 - 130	2	30
Carbon tetrachloride	50.0	48.4		ug/L		97	70 - 130	3	30
Chlorobenzene	50.0	53.4		ug/L		107	70 - 130	0	30

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCSD 680-664272/6**  
**Matrix: Water**  
**Analysis Batch: 664272**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloroform	50.0	53.1		ug/L		106	70 - 130	1	30
cis-1,2-Dichloroethene	50.0	52.5		ug/L		105	70 - 130	4	30
Ethylbenzene	50.0	54.1		ug/L		108	70 - 130	3	20
Isopropylbenzene	50.0	51.2		ug/L		102	70 - 130	2	30
Methylene Chloride	50.0	73.0	*+	ug/L		146	70 - 130	2	30
m-Xylene & p-Xylene	50.0	53.9		ug/L		108	70 - 130	0	30
o-Xylene	50.0	52.6		ug/L		105	70 - 130	2	30
p-Cymene	50.0	44.4		ug/L		89	70 - 130	4	30
Tetrachloroethene	50.0	56.9		ug/L		114	70 - 130	4	30
Toluene	50.0	54.4		ug/L		109	70 - 130	2	30
Vinyl chloride	50.0	54.7		ug/L		109	66 - 129	4	30
Trichloroethene	50.0	51.1		ug/L		102	70 - 130	3	30

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
1,2-Di Dth D-Di oret aort#1 --	((		) Sg(7S
( : / 91 ,5e1D-Doret ao9B6rt#1 --	( S7		nSg( / 6
69 -Di Dth D-D2oaboort#1 --	3u		) Sg(7S
zDth oao9Burt#1 --	(( S		) Sg(7S

# QC Association Summary

Job ID: 680-1973C7-1

Int Gs noyct Bu l ot yaiGt Q. It uP  
r jo/nucHe: Bnjuainy wjat yk eW- s v It gny@, @t

## GC/MS VOA

### Analysis Batch: 664029

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-1973C7-11	MT w-0C-0NDC3031	AOGISDQ	v , @j	8360w	
680-1973C7-13	MT w-0N-0NDC3031	AOGISDQ	v , @j	8360w	
4 w 680-66N039S	4 n@od wi, t W	AOGISDQ	v , @j	8360w	
LI H 680-66N039S	L, b l ot @oi H, mpin	AOGISDQ	v , @j	8360w	
LI HD 680-66N039S	L, b l ot @oi H, mpin Dap	AOGISDQ	v , @j	8360w	

### Analysis Batch: 664050

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-1973C7-1	Uv -T ND-0NDC3031	AOGISDQ	v , @j	8360w	
680-1973C7-3	4 v -C8H-0NDC3031	AOGISDQ	v , @j	8360w	
680-1973C7-C	4 v -C8I-0NDC3031	AOGISDQ	v , @j	8360w	
680-1973C7-N	4 v -C8D-0NDC3031	AOGISDQ	v , @j	8360w	
680-1973C7-5	4 v -55H-0NDC3031	AOGISDQ	v , @j	8360w	
680-1973C7-6	4 v -55I-0NDC3031	AOGISDQ	v , @j	8360w	
680-1973C7-7	4 v -55D-0NDC3031	AOGISDQ	v , @j	8360w	
680-1973C7-8	4 v -39I-0NDC3031	AOGISDQ	v , @j	8360w	
680-1973C7-9	DEr -03-0NDC3031	AOGISDQ	v , @j	8360w	
4 w 680-66N050S0	4 n@od wi, t W	AOGISDQ	v , @j	8360w	
LI H 680-66N050S	L, b l ot @oi H, mpin	AOGISDQ	v , @j	8360w	
LI HD 680-66N050S	L, b l ot @oi H, mpin Dap	AOGISDQ	v , @j	8360w	

### Analysis Batch: 664272

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-1973C7-10	DEr -0C-0NDC3031	AOGISDQ	v , @j	8360w	
4 w 680-66N0373S0	4 n@od wi, t W	AOGISDQ	v , @j	8360w	
LI H 680-66N0373S	L, b l ot @oi H, mpin	AOGISDQ	v , @j	8360w	
LI HD 680-66N0373S	L, b l ot @oi H, mpin Dap	AOGISDQ	v , @j	8360w	

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: MW-2 9D-09031016**

**Lab Sample ID: 870-6xd13d-6**

**Date CollecteR: 0903v16 0x:04**

**/ atri5: Water**

**Date Teceiyer: 090dv16 60:10**

s rep BPpe	Aatch BPpe	Aatch / ethoR	TFn	Dil Qactor	Initial umoFnt	Oinal umoFnt	Aatch QFmber	s repareR or unalPNr	unalPzt	Lab
Total/NA	Analysis	8260B		10	5 mL	5 mL	664050	04/14/21 19:24	EMA	TAL SAV
Instrument ID: CMSU										

**Client Sample ID: / W-37S-09031016**

**Lab Sample ID: 870-6xd13d-1**

**Date CollecteR: 0903v16 60:07**

**/ atri5: Water**

**Date Teceiyer: 090dv16 60:10**

s rep BPpe	Aatch BPpe	Aatch / ethoR	TFn	Dil Qactor	Initial umoFnt	Oinal umoFnt	Aatch QFmber	s repareR or unalPNr	unalPzt	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	664050	04/14/21 17:44	EMA	TAL SAV
Instrument ID: CMSU										

**Client Sample ID: / W-37I-09031016**

**Lab Sample ID: 870-6xd13d-3**

**Date CollecteR: 0903v16 66:03**

**/ atri5: Water**

**Date Teceiyer: 090dv16 60:10**

s rep BPpe	Aatch BPpe	Aatch / ethoR	TFn	Dil Qactor	Initial umoFnt	Oinal umoFnt	Aatch QFmber	s repareR or unalPNr	unalPzt	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	664050	04/14/21 18:04	EMA	TAL SAV
Instrument ID: CMSU										

**Client Sample ID: / W-37D-09031016**

**Lab Sample ID: 870-6xd13d-9**

**Date CollecteR: 0903v16 61:04**

**/ atri5: Water**

**Date Teceiyer: 090dv16 60:10**

s rep BPpe	Aatch BPpe	Aatch / ethoR	TFn	Dil Qactor	Initial umoFnt	Oinal umoFnt	Aatch QFmber	s repareR or unalPNr	unalPzt	Lab
Total/NA	Analysis	8260B		50	5 mL	5 mL	664050	04/14/21 19:44	EMA	TAL SAV
Instrument ID: CMSU										

**Client Sample ID: / W-44S-09031016**

**Lab Sample ID: 870-6xd13d-4**

**Date CollecteR: 0903v16 63:38**

**/ atri5: Water**

**Date Teceiyer: 090dv16 60:10**

s rep BPpe	Aatch BPpe	Aatch / ethoR	TFn	Dil Qactor	Initial umoFnt	Oinal umoFnt	Aatch QFmber	s repareR or unalPNr	unalPzt	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	664050	04/14/21 18:24	EMA	TAL SAV
Instrument ID: CMSU										

**Client Sample ID: / W-44I-09031016**

**Lab Sample ID: 870-6xd13d-8**

**Date CollecteR: 0903v16 69:37**

**/ atri5: Water**

**Date Teceiyer: 090dv16 60:10**

s rep BPpe	Aatch BPpe	Aatch / ethoR	TFn	Dil Qactor	Initial umoFnt	Oinal umoFnt	Aatch QFmber	s repareR or unalPNr	unalPzt	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	664050	04/14/21 18:44	EMA	TAL SAV
Instrument ID: CMSU										

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197237-1

**Client Sample ID: / W-44D-09031016**

**Lab Sample ID: 870-6xd13d-d**

**Date CollecteR: 0903v16 64:33**

/ atri5: Water

**Date Teceiyer: 090dv16 60:10**

s rep BPpe	Aatch BPpe	Aatch / ethoR	TFn	Dil Qactor	Initial umoFnt	Oinal umoFnt	Aatch QFmber	s reparaR or unalPNeR	unalPzt	Lab
Total/NA	Analysis	8260B		10	5 mL	5 mL	664050	04/14/21 20:04	EMA	TAL SAV
Instrument ID: CMSU										

**Client Sample ID: / W-1xl-09031016**

**Lab Sample ID: 870-6xd13d-7**

**Date CollecteR: 0903v16 68:94**

/ atri5: Water

**Date Teceiyer: 090dv16 60:10**

s rep BPpe	Aatch BPpe	Aatch / ethoR	TFn	Dil Qactor	Initial umoFnt	Oinal umoFnt	Aatch QFmber	s reparaR or unalPNeR	unalPzt	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	664050	04/14/21 19:04	EMA	TAL SAV
Instrument ID: CMSU										

**Client Sample ID: DEs-01-09031016**

**Lab Sample ID: 870-6xd13d-x**

**Date CollecteR: 0903v16 00:00**

/ atri5: Water

**Date Teceiyer: 090dv16 60:10**

s rep BPpe	Aatch BPpe	Aatch / ethoR	TFn	Dil Qactor	Initial umoFnt	Oinal umoFnt	Aatch QFmber	s reparaR or unalPNeR	unalPzt	Lab
Total/NA	Analysis	8260B		25	5 mL	5 mL	664050	04/14/21 20:24	EMA	TAL SAV
Instrument ID: CMSU										

**Client Sample ID: DEs-03-09031016**

**Lab Sample ID: 870-6xd13d-60**

**Date CollecteR: 0903v16 00:00**

/ atri5: Water

**Date Teceiyer: 090dv16 60:10**

s rep BPpe	Aatch BPpe	Aatch / ethoR	TFn	Dil Qactor	Initial umoFnt	Oinal umoFnt	Aatch QFmber	s reparaR or unalPNeR	unalPzt	Lab
Total/NA	Analysis	8260B		25	5 mL	5 mL	664272	04/15/21 21:19	UI	TAL SAV
Instrument ID: CMSU										

**Client Sample ID: U2 A-03-09031016**

**Lab Sample ID: 870-6xd13d-66**

**Date CollecteR: 0903v16 6d:00**

/ atri5: Water

**Date Teceiyer: 090dv16 60:10**

s rep BPpe	Aatch BPpe	Aatch / ethoR	TFn	Dil Qactor	Initial umoFnt	Oinal umoFnt	Aatch QFmber	s reparaR or unalPNeR	unalPzt	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	664029	04/14/21 16:11	EMA	TAL SAV
Instrument ID: CMSC										

**Client Sample ID: U2 A-09-09031016**

**Lab Sample ID: 870-6xd13d-61**

**Date CollecteR: 0903v16 6d:64**

/ atri5: Water

**Date Teceiyer: 090dv16 60:10**

s rep BPpe	Aatch BPpe	Aatch / ethoR	TFn	Dil Qactor	Initial umoFnt	Oinal umoFnt	Aatch QFmber	s reparaR or unalPNeR	unalPzt	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	664029	04/14/21 16:35	EMA	TAL SAV
Instrument ID: CMSC										

**LaboratorP T eferencez:**

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Address:

Regulatory Program:  DW  NPDES  RCRA  Other:

Client Contact Company Name: <b>Geosyntec Consultants</b> Address: <b>1255 Roberts Blvd NW Suite 200</b> City/State/Zip: <b>Kennesaw, GA 30144</b> Phone: <b>678-202-9500</b> Fax: _____ Project Name: <b>GW Investigation</b> Site: <b>Hercules/Inovix Brunswick Fac. 14</b> PO #: <b>GR6881P</b>		Project Manager: <b>Adria Reimer</b> Tel/Email: <b>678-202-9564</b> Analysis Turnaround Time <input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Site Contact: Lab Contact: <b>B2608 - See Appendix</b> Filtered Sample (Y/N) _____ Perform MS/MSD (Y/N) _____ Date: _____ Carrier: _____		COC No: _____ of _____ COCs Sampler: <b>Dan Giers</b> For Lab Use Only: Walk-in Client: _____ Lab Sampling: _____ Job / SDG No.: _____							
Sample Identification Sample ID Sample Date Sample Time Sample Type (C=Comp, G=Grab) Matrix # of Cont.		Date Time Type Matrix Cont.		Sample Specific Notes:		Sample Specific Notes:							
OW-04d-04032021		4/3/21 09:05		G		GW		3		<del>                     List of Analysis                      B2608 - See Appendix                      04-04-2021                 </del>		 680-197237 Chain of Custody	
MW-38s-04032021		4/3/21 10:08		G		GW		3					
MW-38I-04032021		4/3/21 11:03		G		GW		3					
MW-38d-04032021		4/3/21 12:05		G		GW		3					
MW-55s-04032021		4/3/21 13:36		G		GW		3					
MW-55I-04032021		4/3/21 14:38		G		GW		3					
MW-55d-04032021		4/3/21 15:33		G		GW		3					
MW-29I-04032021		4/3/21 16:45		G		GW		3					
DUP-02-04032021		4/3/21 --		G		GW		3					
DUP-03-04032021		4/3/21 --		G		GW		3					
EQB-03-04032021		4/3/21 17:00		G		W		3					
EQB-04-04032021		4/3/21 17:15		G		W		3					

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Special Instructions/QC Requirements & Comments:

Non-Hazard  Flammable  Skin Irritant  Unknown  Poison B

Return to Client  Disposal by Lab  Archive for \_\_\_\_\_ Months

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Cooler Temp. (°C): Obs'd: \_\_\_\_\_ Corr'd: **3.8** Therm ID No.: \_\_\_\_\_

Received by: **DAN GIERS** Date/Time: **4/5/21 09:30** Company: \_\_\_\_\_

Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

Received in laboratory by: **JR** Date/Time: **4-7-21 10:20** Company: **TA**



## Joshua Barnhart

---

**From:** Adria Reimer  
**Sent:** March 30, 2021 21:19  
**To:** Dan Gibbs  
**Cc:** Joshua Barnhart  
**Subject:** BWK gw samples - VOC list  
**Attachments:** COC Blank.xls

For the COC:

Client Contact: Hercules LLC

PM: Adria Reimer

Project name: GW Investigation

Site: Hercules LLC/Pinova Inc Brunswick Facility

Analysis: 8260B VOCs:

1,1-Dichloroethane  
1,1-Dichloroethene  
1,2-Dichloropropane  
1,2-Dichlorobenzene  
1,4-Dichlorobenzene  
1,2,4-Trichlorobenzene  
1,2,3-Trichloropropane  
1,2,4-Trimethylbenzene  
1,3,5-Trimethylbenzene  
Cymene, p-  
2-Butanone (MEK)  
4-Methyl-2-pentanone  
Acetone  
Benzene  
Carbon disulfide  
Carbon tetrachloride  
Chlorobenzene  
Chloroform  
cis-1,2-Dichloroethene  
Ethylbenzene  
Isopropylbenzene  
Methylene Chloride  
m-Xylene & p-Xylene  
o-Xylene  
Tetrachloroethene  
Toluene  
Trichloroethene  
Vinyl chloride

Either try to fit these in the rows at the top of the COC, or just put "8260B VOCs – see list in Special Instructions" and list them there, or you can try using the attached if you have somewhere to print it out. If you want to handwrite the COC and send me a photo before submitting labs to lab, I would be more than happy to review.

Plz let me know if you have any questions – thanks!!!

Adria L. Reimer, P.G. (GA, FL)  
Senior Geologist  
Geosyntec Consultants



## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-197237-1

**Login Number: 197237**

**List Source: Eurofins TestAmerica, Savannah**

**List Number: 1**

**Creator: Sims, Robert D**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
Project Site: Bejcules wj unsk icW- Gv IngestiTation

Job ID: 680-1973P7-1

## Laboratory: Eurofins TestAmerica, Savannah

Additional certifications listed below are applicable to this project.

Authority	Program	Identification Number	Expiration Date
Elojif a	N5LAR	587023	06-P0-31
GeojTia	Htate	587023	06-P0-31

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## Memorandum

Date: 18 May 2021  
To: Adria Reimer  
Cristin Corless Krachon  
From: Matthew Richardson  
CC: J. Caprio  
Subject: **Stage 2A Data Validation - Level II Data Deliverable – Eurofins TestAmerica Job ID 680-197237-1**

**SITE: Hercules Brunswick GW Investigation**

### INTRODUCTION

This report summarizes the findings of the Stage 2A data validation of eight water samples, two field duplicate samples and two equipment blanks, collected 3 April 2021, as part of Hercules Brunswick sampling event. Eurofins TestAmerica Savannah, Georgia analyzed the samples for the following analytical test:

- Select Volatile Organic Compounds (VOCs) by United States Environmental Protection Agency (US EPA) Methods 5030B/8260B

### EXECUTIVE SUMMARY

Overall, based on this Stage 2A data validation covering the quality control (QC) parameters listed below and based on the information provided, the data as qualified are usable for supporting project objectives. The qualified data should be used within the limitations of the qualifications.

The data were reviewed based on professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Superfund Organic Methods Data Review, November 2020 (US EPA-540-R-20-005); and
- The pertinent methods referenced by the laboratory report.

The following samples were analyzed and validated at Stage 2A level in the data set:

Laboratory ID	Client ID
680-197237-1	OW-Q4D-04032021

Laboratory ID	Client ID
680-197237-2	MW-38S-04032021

Laboratory ID	Client ID
680-197237-3	MW-38I-04032021
680-197237-4	MW-38D-04032021
680-197237-5	MW-55S-04032021
680-197237-6	MW-55I-04032021
680-197237-7	MW-55D-04032021

Laboratory ID	Client ID
680-197237-8	MW-29I-04032021
680-197237-9	DUP-02-04032021
680-197237-10	DUP-03-04032021
680-197237-11	EQB-03-04032021
680-197237-12	EQB-04-04032021

The samples were received within 0-6 degrees Celsius (°C). No sample preservation issues were noted by the laboratory.

Collection times were not documented on the chain of custody (COC) for the field duplicate samples. The field duplicate samples were logged by the laboratory with collection times of 00:00.

## 1.0 SELECT VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for select VOCs by US EPA methods 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ⊗ Laboratory Control Sample
- ✓ Surrogates
- ✓ Equipment Blank
- ✓ Trip Blank
- ✓ Field Duplicate
- ✓ Sensitivity
- ⊗ Electronic Data Deliverable Review

### 1.1 Overall Assessment

The VOC data reported in this laboratory report are considered usable for supporting project objectives. The results are considered valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to

the total number of analytical results requested on samples submitted for this analysis, for this data set is 100%.

## 1.2 Holding Times

The holding time for VOC analysis of a preserved water sample is 14 days from sample collection to analysis. The holding times were met for the sample analyses.

## 1.3 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 664029, 664050 and 664272). VOCs were not detected in the method blanks above the reporting limits (RLs).

## 1.4 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were not reported.

## 1.5 Laboratory Control Sample (MS/MSD)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCS/LCS duplicate (LCSD) pairs were reported. The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria, with the following exceptions.

The recoveries of methylene chloride in the LCS/LCSD pair in batch 664050 were high and outside of the laboratory specified acceptance criteria. Since methylene chloride was not detected in the associated samples, no qualifications were applied to the data.

One or both of the recoveries of acetone, 4-methyl-2-pentanone and methylene chloride in the LCS/LCSD pair in batch 664272 were high and outside of the laboratory specified acceptance criteria. Since 4-methyl-2-pentanone and methylene chloride were not detected in the associated sample, no qualifications were applied to the 4-methyl-2-pentanone and methylene chloride data; however, the acetone concentration in DUP-03-04032021 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier**	Reason Code***
DUP-03-04032021	Acetone	380	*+	380	J	5

µg/L-microgram per liter

\*+ laboratory flag indicating the LCS and/or LCSD is outside acceptance limits, high biased

\*\*Validation qualifier definitions are provided in Attachment 1 of this report

\*\*\* Reason code definitions are provided in Attachment 2 of this report

## **1.6 Surrogates**

Acceptable surrogate recoveries were reported for the sample analyses.

## **1.7 Equipment Blank**

Two equipment blanks, EQB-03-04032021 and EQB-04-04032021, were collected with the sample set. VOCs were not detected in the equipment blanks above the RLs.

## **1.8 Trip Blank**

A trip blank did not accompany the sample set. This did not result in qualification of the data, but the discrepancy should be noted by the data user.

## **1.9 Field Duplicate**

Two field duplicate samples, DUP-02-04032021 and DUP-03-04032021, were collected with the sample set. Acceptable precision ( $RPD \leq 30\%$ ) was demonstrated between the field duplicates and the original samples, OW-Q4D-04032021 and MW-38D-04032021, with the following exceptions.

1,4-Dichlorobenzene was detected in parent sample OW-Q4D-04032021 and not detected in field duplicate OW-Q4D-04032021, resulting in a noncalculable RPD between the results. Since the 1,4-dichlorobenzene concentration in OW-Q4D-04032021 was less than the RL for 1,4-dichlorobenzene in OQ-Q4D-04032021 due to the differences in the two samples' dilutions and based on professional and technical judgment, no qualifications were applied to the data.

Acetone was detected in the field duplicate DUP-03-04032021 and not detected in the parent sample MW-38D-04032021, resulting in a noncalculable RPD between the results. Since the acetone concentration in DUP-03-04032021 was less than the RL for acetone in MW-38D-04032021 due to the differences in the two samples' dilutions and based on professional and technical judgment, no qualifications were applied to the data.

## **1.10 Sensitivity**

The samples were reported to the RLs. Elevated non-detect results were reported due to the dilutions analyzed.

## **1.11 Electronic Data Deliverable (EDD) Review**

The results and sample IDs in the EDD were reviewed against the information provided by the associated level II report at a minimum of 20% as part of the data validation process. The samples

were reported to the RLs; both the method detection limits (MDLs) and RLs were listed in the EDD. No other discrepancies were identified between the level II report and the EDD.

---

\* \* \* \* \*

**ATTACHMENT 1**  
**DATA VALIDATION QUALIFIER DEFINITIONS**  
**AND INTERPRETATION KEY**  
**Assigned by Geosyntec's Data Validation Team**

**DATA QUALIFIER DEFINITIONS**

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to “not detected at or above the reported result”.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.



**ATTACHMENT 2**  
**DATA VALIDATION REASON CODES**  
**Assigned by Geosyntec's Data Validation Team**

<b>Valid Value</b>	<b>Description</b>
1	Preservation requirement not met
2	Extraction or analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits or RPD outside limits (LCS/LCSD)
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required

LCS - Laboratory Control Sample

LCSD - Laboratory Control Sample duplicate

RPD - Relative percent difference

## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858

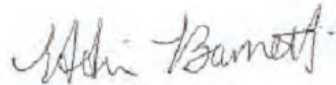
Laboratory Job ID: 680-197389-1

Client Project/Site: Hercules Brunswick - GW Investigation

**For:**

Geosyntec Consultants, Inc.  
1255 Roberts Blvd, NW  
Suite 200  
Kennesaw, Georgia 30144

Attn: Adria Reimer



Authorized for release by:  
4/20/2021 12:04:22 PM

Eddie Barnett, Project Manager I  
(912)250-0280  
[Eddie.Barnett@Eurofinset.com](mailto:Eddie.Barnett@Eurofinset.com)

### LINKS

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[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

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*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Job ID: 680-197389-1**

**Laboratory: Eurofins TestAmerica, Savannah**

**Narrative**

**CASE NARRATIVE**  
**Client: Geosyntec Consultants, Inc.**  
**Project: Hercules Brunswick - GW Investigation**

**Report Number: 680-197389-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

**RECEIPT**

The samples were received on 04/09/2021; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 3.7° C.

**VOLATILE ORGANIC COMPOUNDS (GC-MS)**

Samples MW-26D-04062021 (680-197389-1), PSOW-12-04062021 (680-197389-2), OW-Q3S-04062021 (680-197389-3), OW-Q3I-04062021 (680-197389-4), EQB-05-04062021 (680-197389-5), EQB-06-04062021 (680-197389-6), MW-29D-04072021 (680-197389-7), PSOW-11-04072021 (680-197389-8), MW-11D-04072021 (680-197389-9), MW-11DD-04072021 (680-197389-10), EQB-07-04072021 (680-197389-11), DUP-04-04072021 (680-197389-12) and TB (680-197389-13) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 04/17/2021 and 04/19/2021.

Samples PSOW-12-04062021 (680-197389-2)[5X], OW-Q3I-04062021 (680-197389-4)[10X], MW-29D-04072021 (680-197389-7)[2X], MW-29D-04072021 (680-197389-7)[20X], PSOW-11-04072021 (680-197389-8)[10X], MW-11DD-04072021 (680-197389-10)[5X], DUP-04-04072021 (680-197389-12)[2X] and DUP-04-04072021 (680-197389-12)[20X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Sample Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-197389-1	MW-26D-04062021	Water	04/06/21 16:30	04/09/21 10:50	
680-197389-2	PSOW-12-04062021	Water	04/06/21 17:45	04/09/21 10:50	
680-197389-3	OW-Q3S-04062021	Water	04/06/21 18:33	04/09/21 10:50	
680-197389-4	OW-Q3I-04062021	Water	04/06/21 19:13	04/09/21 10:50	
680-197389-5	EQB-05-04062021	Water	04/06/21 20:00	04/09/21 10:50	
680-197389-6	EQB-06-04062021	Water	04/06/21 20:10	04/09/21 10:50	
680-197389-7	MW-29D-04072021	Water	04/07/21 08:40	04/09/21 10:50	
680-197389-8	PSOW-11-04072021	Water	04/07/21 14:58	04/09/21 10:50	
680-197389-9	MW-11D-04072021	Water	04/07/21 16:00	04/09/21 10:50	
680-197389-10	MW-11DD-04072021	Water	04/07/21 16:50	04/09/21 10:50	
680-197389-11	EQB-07-04072021	Water	04/07/21 17:45	04/09/21 10:50	
680-197389-12	DUP-04-04072021	Water	04/07/21 00:00	04/09/21 10:50	
680-197389-13	TB	Water	04/07/21 00:00	04/09/21 10:50	

# Method Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL TAM
5030B	Purge and Trap	SW846	TAL TAM

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL TAM = Eurofins TestAmerica, Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

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# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## Client Sample ID: MW-26D-04062021

Lab Sample ID: 680-197389-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	9.6		1.0		ug/L	1		8260B	Total/NA
Chlorobenzene	2.5		1.0		ug/L	1		8260B	Total/NA

## Client Sample ID: PSOW-12-04062021

Lab Sample ID: 680-197389-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.8		1.0		ug/L	1		8260B	Total/NA
1,2-Dichlorobenzene	1.8		1.0		ug/L	1		8260B	Total/NA
1,4-Dichlorobenzene	2.3		1.0		ug/L	1		8260B	Total/NA
Ethylbenzene	1.4		1.0		ug/L	1		8260B	Total/NA
Isopropylbenzene	57		2.0		ug/L	1		8260B	Total/NA
m-Xylene & p-Xylene	2.1		2.0		ug/L	1		8260B	Total/NA
Vinyl chloride	3.6		1.0		ug/L	1		8260B	Total/NA
Benzene - DL	160		5.0		ug/L	5		8260B	Total/NA
Chlorobenzene - DL	220		5.0		ug/L	5		8260B	Total/NA

## Client Sample ID: OW-Q3S-04062021

Lab Sample ID: 680-197389-3

No Detections.

## Client Sample ID: OW-Q3I-04062021

Lab Sample ID: 680-197389-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	3.3		1.0		ug/L	1		8260B	Total/NA
Ethylbenzene	1.1		1.0		ug/L	1		8260B	Total/NA
m-Xylene & p-Xylene	4.5		2.0		ug/L	1		8260B	Total/NA
Toluene	1.5		1.0		ug/L	1		8260B	Total/NA
Benzene - DL	410		10		ug/L	10		8260B	Total/NA
Chlorobenzene - DL	87		10		ug/L	10		8260B	Total/NA
Isopropylbenzene - DL	120		20		ug/L	10		8260B	Total/NA

## Client Sample ID: EQB-05-04062021

Lab Sample ID: 680-197389-5

No Detections.

## Client Sample ID: EQB-06-04062021

Lab Sample ID: 680-197389-6

No Detections.

## Client Sample ID: MW-29D-04072021

Lab Sample ID: 680-197389-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,2-Dichlorobenzene	8.9		2.0		ug/L	2		8260B	Total/NA
1,4-Dichlorobenzene	14		2.0		ug/L	2		8260B	Total/NA
Ethylbenzene	160		2.0		ug/L	2		8260B	Total/NA
Toluene	3.4		2.0		ug/L	2		8260B	Total/NA
Vinyl chloride	4.5		2.0		ug/L	2		8260B	Total/NA
Benzene - DL	730		20		ug/L	20		8260B	Total/NA
Chlorobenzene - DL	690		20		ug/L	20		8260B	Total/NA
Isopropylbenzene - DL	200		40		ug/L	20		8260B	Total/NA
m-Xylene & p-Xylene - DL	280		40		ug/L	20		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah



# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## Client Sample ID: PSOW-11-04072021

Lab Sample ID: 680-197389-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.7		1.0		ug/L	1		8260B	Total/NA
1,2-Dichlorobenzene	3.1		1.0		ug/L	1		8260B	Total/NA
1,4-Dichlorobenzene	4.5		1.0		ug/L	1		8260B	Total/NA
Ethylbenzene	1.5		1.0		ug/L	1		8260B	Total/NA
Isopropylbenzene	97		2.0		ug/L	1		8260B	Total/NA
m-Xylene & p-Xylene	4.0		2.0		ug/L	1		8260B	Total/NA
Toluene	1.2		1.0		ug/L	1		8260B	Total/NA
Vinyl chloride	5.1		1.0		ug/L	1		8260B	Total/NA
Benzene - DL	300		10		ug/L	10		8260B	Total/NA
Chlorobenzene - DL	300		10		ug/L	10		8260B	Total/NA

## Client Sample ID: MW-11D-04072021

Lab Sample ID: 680-197389-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	54		1.0		ug/L	1		8260B	Total/NA
Chlorobenzene	55		1.0		ug/L	1		8260B	Total/NA
Isopropylbenzene	20		2.0		ug/L	1		8260B	Total/NA

## Client Sample ID: MW-11DD-04072021

Lab Sample ID: 680-197389-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,2-Dichlorobenzene	2.5		1.0		ug/L	1		8260B	Total/NA
1,4-Dichlorobenzene	3.9		1.0		ug/L	1		8260B	Total/NA
1,1-Dichloroethane	1.2		1.0		ug/L	1		8260B	Total/NA
Ethylbenzene	4.7		1.0		ug/L	1		8260B	Total/NA
Isopropylbenzene	23		2.0		ug/L	1		8260B	Total/NA
m-Xylene & p-Xylene	19		2.0		ug/L	1		8260B	Total/NA
p-Cymene	4.1		3.0		ug/L	1		8260B	Total/NA
Vinyl chloride	3.5		1.0		ug/L	1		8260B	Total/NA
Benzene - DL	150		5.0		ug/L	5		8260B	Total/NA
Chlorobenzene - DL	170		5.0		ug/L	5		8260B	Total/NA
Chloroform - DL	180		5.0		ug/L	5		8260B	Total/NA
Methylene Chloride - DL	110		50		ug/L	5		8260B	Total/NA

## Client Sample ID: EQB-07-04072021

Lab Sample ID: 680-197389-11

No Detections.

## Client Sample ID: DUP-04-04072021

Lab Sample ID: 680-197389-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,2-Dichlorobenzene	9.3		2.0		ug/L	2		8260B	Total/NA
1,4-Dichlorobenzene	14		2.0		ug/L	2		8260B	Total/NA
Ethylbenzene	160		2.0		ug/L	2		8260B	Total/NA
o-Xylene	6.7		4.0		ug/L	2		8260B	Total/NA
Toluene	3.5		2.0		ug/L	2		8260B	Total/NA
Vinyl chloride	4.5		2.0		ug/L	2		8260B	Total/NA
Benzene - DL	750		20		ug/L	20		8260B	Total/NA
Chlorobenzene - DL	690		20		ug/L	20		8260B	Total/NA
Isopropylbenzene - DL	200		40		ug/L	20		8260B	Total/NA
m-Xylene & p-Xylene - DL	290		40		ug/L	20		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: TB**

**Lab Sample ID: 680-197389-13**

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: MW-26D-04062021**

**Lab Sample ID: 680-197389-1**

Date Collected: 04/06/21 16:30

Matrix: Water

Date Received: 04/09/21 10:50

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20	U	20		ug/L			04/17/21 12:38	1
<b>Benzene</b>	<b>9.6</b>		1.0		ug/L			04/17/21 12:38	1
2-Butanone (MEK)	10	U	10		ug/L			04/17/21 12:38	1
Carbon disulfide	2.0	U	2.0		ug/L			04/17/21 12:38	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/17/21 12:38	1
<b>Chlorobenzene</b>	<b>2.5</b>		1.0		ug/L			04/17/21 12:38	1
Chloroform	1.0	U	1.0		ug/L			04/17/21 12:38	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/17/21 12:38	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/17/21 12:38	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/17/21 12:38	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/17/21 12:38	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/17/21 12:38	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/17/21 12:38	1
Ethylbenzene	1.0	U	1.0		ug/L			04/17/21 12:38	1
Isopropylbenzene	2.0	U	2.0		ug/L			04/17/21 12:38	1
Methylene Chloride	10	U	10		ug/L			04/17/21 12:38	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/17/21 12:38	1
m-Xylene & p-Xylene	2.0	U	2.0		ug/L			04/17/21 12:38	1
o-Xylene	2.0	U	2.0		ug/L			04/17/21 12:38	1
p-Cymene	3.0	U	3.0		ug/L			04/17/21 12:38	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/17/21 12:38	1
Toluene	1.0	U	1.0		ug/L			04/17/21 12:38	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/17/21 12:38	1
Trichloroethene	2.0	U	2.0		ug/L			04/17/21 12:38	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/17/21 12:38	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/17/21 12:38	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/17/21 12:38	1
Vinyl chloride	1.0	U	1.0		ug/L			04/17/21 12:38	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
<i>Toluene-d8 (Surr)</i>	100		70 - 130					04/17/21 12:38	1
<i>4-Bromofluorobenzene</i>	98		70 - 130					04/17/21 12:38	1
<i>Dibromofluoromethane</i>	100		70 - 130					04/17/21 12:38	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: PSOW-12-04062021**

**Lab Sample ID: 680-197389-2**

Date Collected: 04/06/21 17:45

Matrix: Water

Date Received: 04/09/21 10:50

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20	U	20		ug/L			04/17/21 15:03	1
2-Butanone (MEK)	10	U	10		ug/L			04/17/21 15:03	1
Carbon disulfide	2.0	U	2.0		ug/L			04/17/21 15:03	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/17/21 15:03	1
Chloroform	1.0	U	1.0		ug/L			04/17/21 15:03	1
<b>cis-1,2-Dichloroethene</b>	<b>1.8</b>		1.0		ug/L			04/17/21 15:03	1
<b>1,2-Dichlorobenzene</b>	<b>1.8</b>		1.0		ug/L			04/17/21 15:03	1
<b>1,4-Dichlorobenzene</b>	<b>2.3</b>		1.0		ug/L			04/17/21 15:03	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/17/21 15:03	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/17/21 15:03	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/17/21 15:03	1
<b>Ethylbenzene</b>	<b>1.4</b>		1.0		ug/L			04/17/21 15:03	1
<b>Isopropylbenzene</b>	<b>57</b>		2.0		ug/L			04/17/21 15:03	1
Methylene Chloride	10	U	10		ug/L			04/17/21 15:03	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/17/21 15:03	1
<b>m-Xylene &amp; p-Xylene</b>	<b>2.1</b>		2.0		ug/L			04/17/21 15:03	1
o-Xylene	2.0	U	2.0		ug/L			04/17/21 15:03	1
p-Cymene	3.0	U	3.0		ug/L			04/17/21 15:03	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/17/21 15:03	1
Toluene	1.0	U	1.0		ug/L			04/17/21 15:03	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/17/21 15:03	1
Trichloroethene	2.0	U	2.0		ug/L			04/17/21 15:03	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/17/21 15:03	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/17/21 15:03	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/17/21 15:03	1
<b>Vinyl chloride</b>	<b>3.6</b>		1.0		ug/L			04/17/21 15:03	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		70 - 130		04/17/21 15:03	1
4-Bromofluorobenzene	100		70 - 130		04/17/21 15:03	1
Dibromofluoromethane	97		70 - 130		04/17/21 15:03	1

**Method: 8260B - Volatile Organic Compounds (GC/MS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Benzene</b>	<b>160</b>		5.0		ug/L			04/19/21 14:50	5
<b>Chlorobenzene</b>	<b>220</b>		5.0		ug/L			04/19/21 14:50	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		70 - 130		04/19/21 14:50	5
4-Bromofluorobenzene	99		70 - 130		04/19/21 14:50	5
Dibromofluoromethane	97		70 - 130		04/19/21 14:50	5

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: OW-Q3S-04062021**

**Lab Sample ID: 680-197389-3**

Date Collected: 04/06/21 18:33

Matrix: Water

Date Received: 04/09/21 10:50

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20	U	20		ug/L			04/17/21 14:44	1
Benzene	1.0	U	1.0		ug/L			04/17/21 14:44	1
2-Butanone (MEK)	10	U	10		ug/L			04/17/21 14:44	1
Carbon disulfide	2.0	U	2.0		ug/L			04/17/21 14:44	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/17/21 14:44	1
Chlorobenzene	1.0	U	1.0		ug/L			04/17/21 14:44	1
Chloroform	1.0	U	1.0		ug/L			04/17/21 14:44	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/17/21 14:44	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/17/21 14:44	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/17/21 14:44	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/17/21 14:44	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/17/21 14:44	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/17/21 14:44	1
Ethylbenzene	1.0	U	1.0		ug/L			04/17/21 14:44	1
Isopropylbenzene	2.0	U	2.0		ug/L			04/17/21 14:44	1
Methylene Chloride	10	U	10		ug/L			04/17/21 14:44	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/17/21 14:44	1
m-Xylene & p-Xylene	2.0	U	2.0		ug/L			04/17/21 14:44	1
o-Xylene	2.0	U	2.0		ug/L			04/17/21 14:44	1
p-Cymene	3.0	U	3.0		ug/L			04/17/21 14:44	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/17/21 14:44	1
Toluene	1.0	U	1.0		ug/L			04/17/21 14:44	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/17/21 14:44	1
Trichloroethene	2.0	U	2.0		ug/L			04/17/21 14:44	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/17/21 14:44	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/17/21 14:44	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/17/21 14:44	1
Vinyl chloride	1.0	U	1.0		ug/L			04/17/21 14:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		70 - 130					04/17/21 14:44	1
4-Bromofluorobenzene	97		70 - 130					04/17/21 14:44	1
Dibromofluoromethane	99		70 - 130					04/17/21 14:44	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: OW-Q3I-04062021**

**Lab Sample ID: 680-197389-4**

Date Collected: 04/06/21 19:13

Matrix: Water

Date Received: 04/09/21 10:50

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20	U	20		ug/L			04/17/21 16:21	1
2-Butanone (MEK)	10	U	10		ug/L			04/17/21 16:21	1
Carbon disulfide	2.0	U	2.0		ug/L			04/17/21 16:21	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/17/21 16:21	1
Chloroform	1.0	U	1.0		ug/L			04/17/21 16:21	1
<b>cis-1,2-Dichloroethene</b>	<b>3.3</b>		1.0		ug/L			04/17/21 16:21	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/17/21 16:21	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/17/21 16:21	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/17/21 16:21	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/17/21 16:21	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/17/21 16:21	1
<b>Ethylbenzene</b>	<b>1.1</b>		1.0		ug/L			04/17/21 16:21	1
Methylene Chloride	10	U	10		ug/L			04/17/21 16:21	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/17/21 16:21	1
<b>m-Xylene &amp; p-Xylene</b>	<b>4.5</b>		2.0		ug/L			04/17/21 16:21	1
o-Xylene	2.0	U	2.0		ug/L			04/17/21 16:21	1
p-Cymene	3.0	U	3.0		ug/L			04/17/21 16:21	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/17/21 16:21	1
<b>Toluene</b>	<b>1.5</b>		1.0		ug/L			04/17/21 16:21	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/17/21 16:21	1
Trichloroethene	2.0	U	2.0		ug/L			04/17/21 16:21	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/17/21 16:21	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/17/21 16:21	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/17/21 16:21	1
Vinyl chloride	1.0	U	1.0		ug/L			04/17/21 16:21	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		70 - 130		04/17/21 16:21	1
4-Bromofluorobenzene	96		70 - 130		04/17/21 16:21	1
Dibromofluoromethane	97		70 - 130		04/17/21 16:21	1

**Method: 8260B - Volatile Organic Compounds (GC/MS) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Benzene</b>	<b>410</b>		10		ug/L			04/17/21 16:02	10
<b>Chlorobenzene</b>	<b>87</b>		10		ug/L			04/17/21 16:02	10
<b>Isopropylbenzene</b>	<b>120</b>		20		ug/L			04/17/21 16:02	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		70 - 130		04/17/21 16:02	10
4-Bromofluorobenzene	98		70 - 130		04/17/21 16:02	10
Dibromofluoromethane	100		70 - 130		04/17/21 16:02	10

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: EQB-05-04062021**

**Lab Sample ID: 680-197389-5**

Date Collected: 04/06/21 20:00

Matrix: Water

Date Received: 04/09/21 10:50

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20	U	20		ug/L			04/17/21 14:05	1
Benzene	1.0	U	1.0		ug/L			04/17/21 14:05	1
2-Butanone (MEK)	10	U	10		ug/L			04/17/21 14:05	1
Carbon disulfide	2.0	U	2.0		ug/L			04/17/21 14:05	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/17/21 14:05	1
Chlorobenzene	1.0	U	1.0		ug/L			04/17/21 14:05	1
Chloroform	1.0	U	1.0		ug/L			04/17/21 14:05	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/17/21 14:05	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/17/21 14:05	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/17/21 14:05	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/17/21 14:05	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/17/21 14:05	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/17/21 14:05	1
Ethylbenzene	1.0	U	1.0		ug/L			04/17/21 14:05	1
Isopropylbenzene	2.0	U	2.0		ug/L			04/17/21 14:05	1
Methylene Chloride	10	U	10		ug/L			04/17/21 14:05	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/17/21 14:05	1
m-Xylene & p-Xylene	2.0	U	2.0		ug/L			04/17/21 14:05	1
o-Xylene	2.0	U	2.0		ug/L			04/17/21 14:05	1
p-Cymene	3.0	U	3.0		ug/L			04/17/21 14:05	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/17/21 14:05	1
Toluene	1.0	U	1.0		ug/L			04/17/21 14:05	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/17/21 14:05	1
Trichloroethene	2.0	U	2.0		ug/L			04/17/21 14:05	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/17/21 14:05	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/17/21 14:05	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/17/21 14:05	1
Vinyl chloride	1.0	U	1.0		ug/L			04/17/21 14:05	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		70 - 130					04/17/21 14:05	1
4-Bromofluorobenzene	97		70 - 130					04/17/21 14:05	1
Dibromofluoromethane	100		70 - 130					04/17/21 14:05	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: EQB-06-04062021**

**Lab Sample ID: 680-197389-6**

Date Collected: 04/06/21 20:10

Matrix: Water

Date Received: 04/09/21 10:50

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20	U	20		ug/L			04/17/21 14:24	1
Benzene	1.0	U	1.0		ug/L			04/17/21 14:24	1
2-Butanone (MEK)	10	U	10		ug/L			04/17/21 14:24	1
Carbon disulfide	2.0	U	2.0		ug/L			04/17/21 14:24	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/17/21 14:24	1
Chlorobenzene	1.0	U	1.0		ug/L			04/17/21 14:24	1
Chloroform	1.0	U	1.0		ug/L			04/17/21 14:24	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/17/21 14:24	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/17/21 14:24	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/17/21 14:24	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/17/21 14:24	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/17/21 14:24	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/17/21 14:24	1
Ethylbenzene	1.0	U	1.0		ug/L			04/17/21 14:24	1
Isopropylbenzene	2.0	U	2.0		ug/L			04/17/21 14:24	1
Methylene Chloride	10	U	10		ug/L			04/17/21 14:24	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/17/21 14:24	1
m-Xylene & p-Xylene	2.0	U	2.0		ug/L			04/17/21 14:24	1
o-Xylene	2.0	U	2.0		ug/L			04/17/21 14:24	1
p-Cymene	3.0	U	3.0		ug/L			04/17/21 14:24	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/17/21 14:24	1
Toluene	1.0	U	1.0		ug/L			04/17/21 14:24	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/17/21 14:24	1
Trichloroethene	2.0	U	2.0		ug/L			04/17/21 14:24	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/17/21 14:24	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/17/21 14:24	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/17/21 14:24	1
Vinyl chloride	1.0	U	1.0		ug/L			04/17/21 14:24	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		70 - 130					04/17/21 14:24	1
4-Bromofluorobenzene	97		70 - 130					04/17/21 14:24	1
Dibromofluoromethane	100		70 - 130					04/17/21 14:24	1



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: MW-29D-04072021**

**Lab Sample ID: 680-197389-7**

Date Collected: 04/07/21 08:40

Matrix: Water

Date Received: 04/09/21 10:50

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	40	U	40		ug/L			04/17/21 17:00	2
2-Butanone (MEK)	20	U	20		ug/L			04/17/21 17:00	2
Carbon disulfide	4.0	U	4.0		ug/L			04/17/21 17:00	2
Carbon tetrachloride	2.0	U	2.0		ug/L			04/17/21 17:00	2
Chloroform	2.0	U	2.0		ug/L			04/17/21 17:00	2
cis-1,2-Dichloroethene	2.0	U	2.0		ug/L			04/17/21 17:00	2
<b>1,2-Dichlorobenzene</b>	<b>8.9</b>		2.0		ug/L			04/17/21 17:00	2
<b>1,4-Dichlorobenzene</b>	<b>14</b>		2.0		ug/L			04/17/21 17:00	2
1,1-Dichloroethane	2.0	U	2.0		ug/L			04/17/21 17:00	2
1,1-Dichloroethene	2.0	U	2.0		ug/L			04/17/21 17:00	2
1,2-Dichloropropane	4.0	U	4.0		ug/L			04/17/21 17:00	2
<b>Ethylbenzene</b>	<b>160</b>		2.0		ug/L			04/17/21 17:00	2
Methylene Chloride	20	U	20		ug/L			04/17/21 17:00	2
4-Methyl-2-pentanone (MIBK)	30	U	30		ug/L			04/17/21 17:00	2
p-Cymene	6.0	U	6.0		ug/L			04/17/21 17:00	2
Tetrachloroethene	4.0	U	4.0		ug/L			04/17/21 17:00	2
<b>Toluene</b>	<b>3.4</b>		2.0		ug/L			04/17/21 17:00	2
1,2,4-Trichlorobenzene	4.0	U	4.0		ug/L			04/17/21 17:00	2
Trichloroethene	4.0	U	4.0		ug/L			04/17/21 17:00	2
1,2,3-Trichloropropane	6.0	U	6.0		ug/L			04/17/21 17:00	2
1,2,4-Trimethylbenzene	4.0	U	4.0		ug/L			04/17/21 17:00	2
1,3,5-Trimethylbenzene	2.0	U	2.0		ug/L			04/17/21 17:00	2
<b>Vinyl chloride</b>	<b>4.5</b>		2.0		ug/L			04/17/21 17:00	2

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		70 - 130		04/17/21 17:00	2
4-Bromofluorobenzene	98		70 - 130		04/17/21 17:00	2
Dibromofluoromethane	99		70 - 130		04/17/21 17:00	2

## Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Benzene</b>	<b>730</b>		20		ug/L			04/17/21 15:23	20
<b>Chlorobenzene</b>	<b>690</b>		20		ug/L			04/17/21 15:23	20
<b>Isopropylbenzene</b>	<b>200</b>		40		ug/L			04/17/21 15:23	20
<b>m-Xylene &amp; p-Xylene</b>	<b>280</b>		40		ug/L			04/17/21 15:23	20
o-Xylene	40	U	40		ug/L			04/17/21 15:23	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		70 - 130		04/17/21 15:23	20
4-Bromofluorobenzene	100		70 - 130		04/17/21 15:23	20
Dibromofluoromethane	98		70 - 130		04/17/21 15:23	20

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: PSOW-11-04072021**

**Lab Sample ID: 680-197389-8**

Date Collected: 04/07/21 14:58

Matrix: Water

Date Received: 04/09/21 10:50

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20	U	20		ug/L			04/17/21 16:41	1
2-Butanone (MEK)	10	U	10		ug/L			04/17/21 16:41	1
Carbon disulfide	2.0	U	2.0		ug/L			04/17/21 16:41	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/17/21 16:41	1
Chloroform	1.0	U	1.0		ug/L			04/17/21 16:41	1
<b>cis-1,2-Dichloroethene</b>	<b>1.7</b>		1.0		ug/L			04/17/21 16:41	1
<b>1,2-Dichlorobenzene</b>	<b>3.1</b>		1.0		ug/L			04/17/21 16:41	1
<b>1,4-Dichlorobenzene</b>	<b>4.5</b>		1.0		ug/L			04/17/21 16:41	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/17/21 16:41	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/17/21 16:41	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/17/21 16:41	1
<b>Ethylbenzene</b>	<b>1.5</b>		1.0		ug/L			04/17/21 16:41	1
<b>Isopropylbenzene</b>	<b>97</b>		2.0		ug/L			04/17/21 16:41	1
Methylene Chloride	10	U	10		ug/L			04/17/21 16:41	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/17/21 16:41	1
<b>m-Xylene &amp; p-Xylene</b>	<b>4.0</b>		2.0		ug/L			04/17/21 16:41	1
o-Xylene	2.0	U	2.0		ug/L			04/17/21 16:41	1
p-Cymene	3.0	U	3.0		ug/L			04/17/21 16:41	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/17/21 16:41	1
<b>Toluene</b>	<b>1.2</b>		1.0		ug/L			04/17/21 16:41	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/17/21 16:41	1
Trichloroethene	2.0	U	2.0		ug/L			04/17/21 16:41	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/17/21 16:41	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/17/21 16:41	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/17/21 16:41	1
<b>Vinyl chloride</b>	<b>5.1</b>		1.0		ug/L			04/17/21 16:41	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		70 - 130					04/17/21 16:41	1
4-Bromofluorobenzene	97		70 - 130					04/17/21 16:41	1
Dibromofluoromethane	99		70 - 130					04/17/21 16:41	1

## Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Benzene</b>	<b>300</b>		10		ug/L			04/17/21 15:42	10
<b>Chlorobenzene</b>	<b>300</b>		10		ug/L			04/17/21 15:42	10
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		70 - 130					04/17/21 15:42	10
4-Bromofluorobenzene	98		70 - 130					04/17/21 15:42	10
Dibromofluoromethane	98		70 - 130					04/17/21 15:42	10

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: MW-11D-04072021**

**Lab Sample ID: 680-197389-9**

Date Collected: 04/07/21 16:00

Matrix: Water

Date Received: 04/09/21 10:50

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20	U	20		ug/L			04/19/21 12:04	1
<b>Benzene</b>	<b>54</b>		1.0		ug/L			04/19/21 12:04	1
2-Butanone (MEK)	10	U	10		ug/L			04/19/21 12:04	1
Carbon disulfide	2.0	U	2.0		ug/L			04/19/21 12:04	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/19/21 12:04	1
<b>Chlorobenzene</b>	<b>55</b>		1.0		ug/L			04/19/21 12:04	1
Chloroform	1.0	U	1.0		ug/L			04/19/21 12:04	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/19/21 12:04	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/19/21 12:04	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/19/21 12:04	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/19/21 12:04	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/19/21 12:04	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/19/21 12:04	1
Ethylbenzene	1.0	U	1.0		ug/L			04/19/21 12:04	1
<b>Isopropylbenzene</b>	<b>20</b>		2.0		ug/L			04/19/21 12:04	1
Methylene Chloride	10	U	10		ug/L			04/19/21 12:04	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/19/21 12:04	1
m-Xylene & p-Xylene	2.0	U	2.0		ug/L			04/19/21 12:04	1
o-Xylene	2.0	U	2.0		ug/L			04/19/21 12:04	1
p-Cymene	3.0	U	3.0		ug/L			04/19/21 12:04	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/19/21 12:04	1
Toluene	1.0	U	1.0		ug/L			04/19/21 12:04	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/19/21 12:04	1
Trichloroethene	2.0	U	2.0		ug/L			04/19/21 12:04	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/19/21 12:04	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/19/21 12:04	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/19/21 12:04	1
Vinyl chloride	1.0	U	1.0		ug/L			04/19/21 12:04	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
<i>Toluene-d8 (Surr)</i>	100		70 - 130					04/19/21 12:04	1
<i>4-Bromofluorobenzene</i>	98		70 - 130					04/19/21 12:04	1
<i>Dibromofluoromethane</i>	100		70 - 130					04/19/21 12:04	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: MW-11DD-04072021**

**Lab Sample ID: 680-197389-10**

Date Collected: 04/07/21 16:50

Matrix: Water

Date Received: 04/09/21 10:50

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20	U	20		ug/L			04/19/21 12:43	1
2-Butanone (MEK)	10	U	10		ug/L			04/19/21 12:43	1
Carbon disulfide	2.0	U	2.0		ug/L			04/19/21 12:43	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/19/21 12:43	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/19/21 12:43	1
<b>1,2-Dichlorobenzene</b>	<b>2.5</b>		1.0		ug/L			04/19/21 12:43	1
<b>1,4-Dichlorobenzene</b>	<b>3.9</b>		1.0		ug/L			04/19/21 12:43	1
<b>1,1-Dichloroethane</b>	<b>1.2</b>		1.0		ug/L			04/19/21 12:43	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/19/21 12:43	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/19/21 12:43	1
<b>Ethylbenzene</b>	<b>4.7</b>		1.0		ug/L			04/19/21 12:43	1
<b>Isopropylbenzene</b>	<b>23</b>		2.0		ug/L			04/19/21 12:43	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/19/21 12:43	1
<b>m-Xylene &amp; p-Xylene</b>	<b>19</b>		2.0		ug/L			04/19/21 12:43	1
o-Xylene	2.0	U	2.0		ug/L			04/19/21 12:43	1
<b>p-Cymene</b>	<b>4.1</b>		3.0		ug/L			04/19/21 12:43	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/19/21 12:43	1
Toluene	1.0	U	1.0		ug/L			04/19/21 12:43	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/19/21 12:43	1
Trichloroethene	2.0	U	2.0		ug/L			04/19/21 12:43	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/19/21 12:43	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/19/21 12:43	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/19/21 12:43	1
<b>Vinyl chloride</b>	<b>3.5</b>		1.0		ug/L			04/19/21 12:43	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		70 - 130		04/19/21 12:43	1
4-Bromofluorobenzene	95		70 - 130		04/19/21 12:43	1
Dibromofluoromethane	100		70 - 130		04/19/21 12:43	1

## Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Benzene</b>	<b>150</b>		5.0		ug/L			04/19/21 10:46	5
<b>Chlorobenzene</b>	<b>170</b>		5.0		ug/L			04/19/21 10:46	5
<b>Chloroform</b>	<b>180</b>		5.0		ug/L			04/19/21 10:46	5
<b>Methylene Chloride</b>	<b>110</b>		50		ug/L			04/19/21 10:46	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		70 - 130		04/19/21 10:46	5
4-Bromofluorobenzene	99		70 - 130		04/19/21 10:46	5
Dibromofluoromethane	100		70 - 130		04/19/21 10:46	5

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: EQB-07-04072021**

**Lab Sample ID: 680-197389-11**

Date Collected: 04/07/21 17:45

Matrix: Water

Date Received: 04/09/21 10:50

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20	U	20		ug/L			04/19/21 10:27	1
Benzene	1.0	U	1.0		ug/L			04/19/21 10:27	1
2-Butanone (MEK)	10	U	10		ug/L			04/19/21 10:27	1
Carbon disulfide	2.0	U	2.0		ug/L			04/19/21 10:27	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/19/21 10:27	1
Chlorobenzene	1.0	U	1.0		ug/L			04/19/21 10:27	1
Chloroform	1.0	U	1.0		ug/L			04/19/21 10:27	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/19/21 10:27	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/19/21 10:27	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/19/21 10:27	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/19/21 10:27	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/19/21 10:27	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/19/21 10:27	1
Ethylbenzene	1.0	U	1.0		ug/L			04/19/21 10:27	1
Isopropylbenzene	2.0	U	2.0		ug/L			04/19/21 10:27	1
Methylene Chloride	10	U	10		ug/L			04/19/21 10:27	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/19/21 10:27	1
m-Xylene & p-Xylene	2.0	U	2.0		ug/L			04/19/21 10:27	1
o-Xylene	2.0	U	2.0		ug/L			04/19/21 10:27	1
p-Cymene	3.0	U	3.0		ug/L			04/19/21 10:27	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/19/21 10:27	1
Toluene	1.0	U	1.0		ug/L			04/19/21 10:27	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/19/21 10:27	1
Trichloroethene	2.0	U	2.0		ug/L			04/19/21 10:27	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/19/21 10:27	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/19/21 10:27	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/19/21 10:27	1
Vinyl chloride	1.0	U	1.0		ug/L			04/19/21 10:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	104		70 - 130					04/19/21 10:27	1
4-Bromofluorobenzene	99		70 - 130					04/19/21 10:27	1
Dibromofluoromethane	101		70 - 130					04/19/21 10:27	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: DUP-04-04072021**

**Lab Sample ID: 680-197389-12**

Date Collected: 04/07/21 00:00

Matrix: Water

Date Received: 04/09/21 10:50

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	40	U	40		ug/L			04/19/21 13:03	2
2-Butanone (MEK)	20	U	20		ug/L			04/19/21 13:03	2
Carbon disulfide	4.0	U	4.0		ug/L			04/19/21 13:03	2
Carbon tetrachloride	2.0	U	2.0		ug/L			04/19/21 13:03	2
Chloroform	2.0	U	2.0		ug/L			04/19/21 13:03	2
cis-1,2-Dichloroethene	2.0	U	2.0		ug/L			04/19/21 13:03	2
<b>1,2-Dichlorobenzene</b>	<b>9.3</b>		2.0		ug/L			04/19/21 13:03	2
<b>1,4-Dichlorobenzene</b>	<b>14</b>		2.0		ug/L			04/19/21 13:03	2
1,1-Dichloroethane	2.0	U	2.0		ug/L			04/19/21 13:03	2
1,1-Dichloroethene	2.0	U	2.0		ug/L			04/19/21 13:03	2
1,2-Dichloropropane	4.0	U	4.0		ug/L			04/19/21 13:03	2
<b>Ethylbenzene</b>	<b>160</b>		2.0		ug/L			04/19/21 13:03	2
Methylene Chloride	20	U	20		ug/L			04/19/21 13:03	2
4-Methyl-2-pentanone (MIBK)	30	U	30		ug/L			04/19/21 13:03	2
<b>o-Xylene</b>	<b>6.7</b>		4.0		ug/L			04/19/21 13:03	2
p-Cymene	6.0	U	6.0		ug/L			04/19/21 13:03	2
Tetrachloroethene	4.0	U	4.0		ug/L			04/19/21 13:03	2
<b>Toluene</b>	<b>3.5</b>		2.0		ug/L			04/19/21 13:03	2
1,2,4-Trichlorobenzene	4.0	U	4.0		ug/L			04/19/21 13:03	2
Trichloroethene	4.0	U	4.0		ug/L			04/19/21 13:03	2
1,2,3-Trichloropropane	6.0	U	6.0		ug/L			04/19/21 13:03	2
1,2,4-Trimethylbenzene	4.0	U	4.0		ug/L			04/19/21 13:03	2
1,3,5-Trimethylbenzene	2.0	U	2.0		ug/L			04/19/21 13:03	2
<b>Vinyl chloride</b>	<b>4.5</b>		2.0		ug/L			04/19/21 13:03	2

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		70 - 130		04/19/21 13:03	2
4-Bromofluorobenzene	98		70 - 130		04/19/21 13:03	2
Dibromofluoromethane	99		70 - 130		04/19/21 13:03	2

## Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Benzene</b>	<b>750</b>		20		ug/L			04/19/21 12:24	20
<b>Chlorobenzene</b>	<b>690</b>		20		ug/L			04/19/21 12:24	20
<b>Isopropylbenzene</b>	<b>200</b>		40		ug/L			04/19/21 12:24	20
<b>m-Xylene &amp; p-Xylene</b>	<b>290</b>		40		ug/L			04/19/21 12:24	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		70 - 130		04/19/21 12:24	20
4-Bromofluorobenzene	99		70 - 130		04/19/21 12:24	20
Dibromofluoromethane	98		70 - 130		04/19/21 12:24	20

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: TB**

**Lab Sample ID: 680-197389-13**

**Date Collected: 04/07/21 00:00**

**Matrix: Water**

**Date Received: 04/09/21 10:50**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20	U	20		ug/L			04/19/21 10:08	1
Benzene	1.0	U	1.0		ug/L			04/19/21 10:08	1
2-Butanone (MEK)	10	U	10		ug/L			04/19/21 10:08	1
Carbon disulfide	2.0	U	2.0		ug/L			04/19/21 10:08	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/19/21 10:08	1
Chlorobenzene	1.0	U	1.0		ug/L			04/19/21 10:08	1
Chloroform	1.0	U	1.0		ug/L			04/19/21 10:08	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/19/21 10:08	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/19/21 10:08	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/19/21 10:08	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/19/21 10:08	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/19/21 10:08	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/19/21 10:08	1
Ethylbenzene	1.0	U	1.0		ug/L			04/19/21 10:08	1
Isopropylbenzene	2.0	U	2.0		ug/L			04/19/21 10:08	1
Methylene Chloride	10	U	10		ug/L			04/19/21 10:08	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/19/21 10:08	1
m-Xylene & p-Xylene	2.0	U	2.0		ug/L			04/19/21 10:08	1
o-Xylene	2.0	U	2.0		ug/L			04/19/21 10:08	1
p-Cymene	3.0	U	3.0		ug/L			04/19/21 10:08	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/19/21 10:08	1
Toluene	1.0	U	1.0		ug/L			04/19/21 10:08	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/19/21 10:08	1
Trichloroethene	2.0	U	2.0		ug/L			04/19/21 10:08	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/19/21 10:08	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/19/21 10:08	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/19/21 10:08	1
Vinyl chloride	1.0	U	1.0		ug/L			04/19/21 10:08	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		70 - 130					04/19/21 10:08	1
4-Bromofluorobenzene	99		70 - 130					04/19/21 10:08	1
Dibromofluoromethane	99		70 - 130					04/19/21 10:08	1

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		TOL (70-130)	BFB (70-130)	DBFM (70-130)
680-197389-1	MW-26D-04062021	100	98	100
680-197389-1 DU	MW-26D-04062021	100	101	101
680-197389-2	PSOW-12-04062021	99	100	97
680-197389-2 - DL	PSOW-12-04062021	99	99	97
680-197389-3	OW-Q3S-04062021	99	97	99
680-197389-4 - DL	OW-Q3I-04062021	99	98	100
680-197389-4	OW-Q3I-04062021	98	96	97
680-197389-5	EQB-05-04062021	102	97	100
680-197389-6	EQB-06-04062021	102	97	100
680-197389-7 - DL	MW-29D-04072021	100	100	98
680-197389-7	MW-29D-04072021	100	98	99
680-197389-8 - DL	PSOW-11-04072021	100	98	98
680-197389-8	PSOW-11-04072021	99	97	99
680-197389-9	MW-11D-04072021	100	98	100
680-197389-10	MW-11DD-04072021	101	95	100
680-197389-10 - DL	MW-11DD-04072021	101	99	100
680-197389-10 MS	MW-11DD-04072021	101	98	100
680-197389-10 MSD	MW-11DD-04072021	101	99	101
680-197389-11	EQB-07-04072021	104	99	101
680-197389-12 - DL	DUP-04-04072021	98	99	98
680-197389-12	DUP-04-04072021	100	98	99
680-197389-13	TB	98	99	99
LCS 660-236711/5	Lab Control Sample	100	98	99
LCS 660-236741/4	Lab Control Sample	102	96	98
LCS 660-236759/4	Lab Control Sample	102	100	103
MB 660-236711/7	Method Blank	100	97	99
MB 660-236741/6	Method Blank	102	98	101
MB 660-236759/6	Method Blank	100	98	99

### Surrogate Legend

TOL = Toluene-d8 (Surr)

BFB = 4-Bromofluorobenzene

DBFM = Dibromofluoromethane



# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 660-236711/7

Matrix: Water

Analysis Batch: 236711

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Acetone	20	U	20		ug/L			04/17/21 11:48	1
Benzene	1.0	U	1.0		ug/L			04/17/21 11:48	1
2-Butanone (MEK)	10	U	10		ug/L			04/17/21 11:48	1
Carbon disulfide	2.0	U	2.0		ug/L			04/17/21 11:48	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/17/21 11:48	1
Chlorobenzene	1.0	U	1.0		ug/L			04/17/21 11:48	1
Chloroform	1.0	U	1.0		ug/L			04/17/21 11:48	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/17/21 11:48	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/17/21 11:48	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/17/21 11:48	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/17/21 11:48	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/17/21 11:48	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/17/21 11:48	1
Ethylbenzene	1.0	U	1.0		ug/L			04/17/21 11:48	1
Isopropylbenzene	2.0	U	2.0		ug/L			04/17/21 11:48	1
Methylene Chloride	10	U	10		ug/L			04/17/21 11:48	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/17/21 11:48	1
m-Xylene & p-Xylene	2.0	U	2.0		ug/L			04/17/21 11:48	1
o-Xylene	2.0	U	2.0		ug/L			04/17/21 11:48	1
p-Cymene	3.0	U	3.0		ug/L			04/17/21 11:48	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/17/21 11:48	1
Toluene	1.0	U	1.0		ug/L			04/17/21 11:48	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/17/21 11:48	1
Trichloroethene	2.0	U	2.0		ug/L			04/17/21 11:48	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/17/21 11:48	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/17/21 11:48	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/17/21 11:48	1
Vinyl chloride	1.0	U	1.0		ug/L			04/17/21 11:48	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Toluene-d8 (Surr)	100		70 - 130		04/17/21 11:48	1
4-Bromofluorobenzene	97		70 - 130		04/17/21 11:48	1
Dibromofluoromethane	99		70 - 130		04/17/21 11:48	1

Lab Sample ID: LCS 660-236711/5

Matrix: Water

Analysis Batch: 236711

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	9.24		ug/L		92	66 - 131
2-Butanone (MEK)	100	83.8		ug/L		84	46 - 146
Carbon disulfide	10.0	5.58		ug/L		56	52 - 129
Carbon tetrachloride	10.0	9.05		ug/L		90	62 - 124
Chlorobenzene	10.0	9.32		ug/L		93	67 - 130
Chloroform	10.0	9.31		ug/L		93	77 - 119
cis-1,2-Dichloroethene	10.0	9.62		ug/L		96	69 - 133
1,2-Dichlorobenzene	10.0	8.92		ug/L		89	69 - 133

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 660-236711/5

Matrix: Water

Analysis Batch: 236711

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
1,4-Dichlorobenzene	10.0	9.30		ug/L		93	69 - 133
1,1-Dichloroethane	10.0	9.31		ug/L		93	68 - 130
1,1-Dichloroethene	10.0	9.56		ug/L		96	62 - 133
1,2-Dichloropropane	10.0	9.58		ug/L		96	79 - 130
Ethylbenzene	10.0	9.11		ug/L		91	77 - 117
Isopropylbenzene	10.0	9.11		ug/L		91	66 - 130
Methylene Chloride	10.0	9.35	J	ug/L		93	64 - 124
4-Methyl-2-pentanone (MIBK)	100	91.9		ug/L		92	46 - 146
m-Xylene & p-Xylene	10.0	8.99		ug/L		90	65 - 130
o-Xylene	10.0	8.75		ug/L		87	63 - 130
p-Cymene	10.0	9.33		ug/L		93	64 - 132
Tetrachloroethene	10.0	9.05		ug/L		91	59 - 130
Toluene	10.0	9.15		ug/L		92	71 - 119
1,2,4-Trichlorobenzene	10.0	9.68		ug/L		97	67 - 130
Trichloroethene	10.0	8.79		ug/L		88	65 - 130
1,2,3-Trichloropropane	10.0	9.22		ug/L		92	68 - 130
1,2,4-Trimethylbenzene	10.0	8.83		ug/L		88	71 - 131
1,3,5-Trimethylbenzene	10.0	8.77		ug/L		88	65 - 130
Vinyl chloride	10.0	9.76		ug/L		98	59 - 130

Surrogate	LCS		Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	100		70 - 130
4-Bromofluorobenzene	98		70 - 130
Dibromofluoromethane	99		70 - 130

Lab Sample ID: 680-197389-1 DU

Matrix: Water

Analysis Batch: 236711

Client Sample ID: MW-26D-04062021

Prep Type: Total/NA

Analyte	Sample		DU		Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Acetone	20	U	20	U	ug/L		NC	30
Benzene	9.6		8.68		ug/L		10	30
2-Butanone (MEK)	10	U	10	U	ug/L		NC	30
Carbon disulfide	2.0	U	2.0	U	ug/L		NC	30
Carbon tetrachloride	1.0	U	1.0	U	ug/L		NC	30
Chlorobenzene	2.5		2.26		ug/L		11	30
Chloroform	1.0	U	1.0	U	ug/L		NC	30
cis-1,2-Dichloroethene	1.0	U	1.0	U	ug/L		NC	30
1,2-Dichlorobenzene	1.0	U	1.0	U	ug/L		NC	30
1,4-Dichlorobenzene	1.0	U	1.0	U	ug/L		NC	30
1,1-Dichloroethane	1.0	U	1.0	U	ug/L		NC	30
1,1-Dichloroethene	1.0	U	1.0	U	ug/L		NC	30
1,2-Dichloropropane	2.0	U	2.0	U	ug/L		NC	30
Ethylbenzene	1.0	U	1.0	U	ug/L		NC	30
Isopropylbenzene	2.0	U	2.0	U	ug/L		NC	30
Methylene Chloride	10	U	10	U	ug/L		NC	30
4-Methyl-2-pentanone (MIBK)	15	U	15	U	ug/L		NC	30
m-Xylene & p-Xylene	2.0	U	2.0	U	ug/L		NC	30

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 680-197389-1 DU

Client Sample ID: MW-26D-04062021

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 236711

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
o-Xylene	2.0	U	2.0	U	ug/L		NC	30
p-Cymene	3.0	U	3.0	U	ug/L		NC	30
Tetrachloroethene	2.0	U	2.0	U	ug/L		NC	30
Toluene	1.0	U	1.0	U	ug/L		NC	30
1,2,4-Trichlorobenzene	2.0	U	2.0	U	ug/L		NC	30
Trichloroethene	2.0	U	2.0	U	ug/L		NC	30
1,2,3-Trichloropropane	3.0	U	3.0	U	ug/L		NC	30
1,2,4-Trimethylbenzene	2.0	U	2.0	U	ug/L		NC	30
1,3,5-Trimethylbenzene	1.0	U	1.0	U	ug/L		NC	30
Vinyl chloride	1.0	U	1.0	U	ug/L		NC	30

Surrogate	DU	DU	Limits
%Recovery	Qualifier		
Toluene-d8 (Surr)	100		70 - 130
4-Bromofluorobenzene	101		70 - 130
Dibromofluoromethane	101		70 - 130

Lab Sample ID: MB 660-236741/6

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 236741

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Acetone	20	U	20		ug/L			04/19/21 09:48	1
Benzene	1.0	U	1.0		ug/L			04/19/21 09:48	1
2-Butanone (MEK)	10	U	10		ug/L			04/19/21 09:48	1
Carbon disulfide	2.0	U	2.0		ug/L			04/19/21 09:48	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/19/21 09:48	1
Chlorobenzene	1.0	U	1.0		ug/L			04/19/21 09:48	1
Chloroform	1.0	U	1.0		ug/L			04/19/21 09:48	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/19/21 09:48	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/19/21 09:48	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/19/21 09:48	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/19/21 09:48	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/19/21 09:48	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/19/21 09:48	1
Ethylbenzene	1.0	U	1.0		ug/L			04/19/21 09:48	1
Isopropylbenzene	2.0	U	2.0		ug/L			04/19/21 09:48	1
Methylene Chloride	10	U	10		ug/L			04/19/21 09:48	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/19/21 09:48	1
m-Xylene & p-Xylene	2.0	U	2.0		ug/L			04/19/21 09:48	1
o-Xylene	2.0	U	2.0		ug/L			04/19/21 09:48	1
p-Cymene	3.0	U	3.0		ug/L			04/19/21 09:48	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/19/21 09:48	1
Toluene	1.0	U	1.0		ug/L			04/19/21 09:48	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/19/21 09:48	1
Trichloroethene	2.0	U	2.0		ug/L			04/19/21 09:48	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/19/21 09:48	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/19/21 09:48	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/19/21 09:48	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 660-236741/6

Matrix: Water

Analysis Batch: 236741

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	1.0	U	1.0		ug/L			04/19/21 09:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		70 - 130					04/19/21 09:48	1
4-Bromofluorobenzene	98		70 - 130					04/19/21 09:48	1
Dibromofluoromethane	101		70 - 130					04/19/21 09:48	1

Lab Sample ID: LCS 660-236741/4

Matrix: Water

Analysis Batch: 236741

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	100	91.3		ug/L		91	45 - 150
Benzene	10.0	9.59		ug/L		96	66 - 131
2-Butanone (MEK)	100	88.1		ug/L		88	46 - 146
Carbon disulfide	10.0	5.46		ug/L		55	52 - 129
Carbon tetrachloride	10.0	9.23		ug/L		92	62 - 124
Chlorobenzene	10.0	9.45		ug/L		95	67 - 130
Chloroform	10.0	9.48		ug/L		95	77 - 119
cis-1,2-Dichloroethene	10.0	9.96		ug/L		100	69 - 133
1,2-Dichlorobenzene	10.0	9.12		ug/L		91	69 - 133
1,4-Dichlorobenzene	10.0	9.41		ug/L		94	69 - 133
1,1-Dichloroethane	10.0	9.96		ug/L		100	68 - 130
1,1-Dichloroethene	10.0	9.55		ug/L		95	62 - 133
1,2-Dichloropropane	10.0	9.93		ug/L		99	79 - 130
Ethylbenzene	10.0	9.39		ug/L		94	77 - 117
Isopropylbenzene	10.0	9.19		ug/L		92	66 - 130
Methylene Chloride	10.0	9.42	J	ug/L		94	64 - 124
4-Methyl-2-pentanone (MIBK)	100	99.3		ug/L		99	46 - 146
m-Xylene & p-Xylene	10.0	8.99		ug/L		90	65 - 130
o-Xylene	10.0	9.12		ug/L		91	63 - 130
p-Cymene	10.0	9.45		ug/L		95	64 - 132
Tetrachloroethene	10.0	9.44		ug/L		94	59 - 130
Toluene	10.0	9.20		ug/L		92	71 - 119
1,2,4-Trichlorobenzene	10.0	9.82		ug/L		98	67 - 130
Trichloroethene	10.0	9.82		ug/L		98	65 - 130
1,2,3-Trichloropropane	10.0	9.32		ug/L		93	68 - 130
1,2,4-Trimethylbenzene	10.0	8.88		ug/L		89	71 - 131
1,3,5-Trimethylbenzene	10.0	8.85		ug/L		88	65 - 130
Vinyl chloride	10.0	10.0		ug/L		100	59 - 130
Surrogate	%Recovery	Qualifier	Limits				
Toluene-d8 (Surr)	102		70 - 130				
4-Bromofluorobenzene	96		70 - 130				
Dibromofluoromethane	98		70 - 130				

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 680-197389-10 MS

Matrix: Water

Analysis Batch: 236741

Client Sample ID: MW-11DD-04072021

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.	Limits
	Result	Qualifier	Added	Result	Qualifier					
Acetone	100	U	500	502		ug/L		100	45 - 150	
Benzene	150		50.0	193		ug/L		86	66 - 131	
2-Butanone (MEK)	50	U	500	549		ug/L		110	46 - 146	
Carbon disulfide	10	U	50.0	28.0		ug/L		56	52 - 129	
Carbon tetrachloride	5.0	U	50.0	48.8		ug/L		98	62 - 124	
Chlorobenzene	170		50.0	225		ug/L		100	67 - 130	
Chloroform	180		50.0	227		ug/L		94	77 - 119	
cis-1,2-Dichloroethene	5.0	U	50.0	52.3		ug/L		105	69 - 133	
1,2-Dichlorobenzene	5.0	U	50.0	51.6		ug/L		99	69 - 133	
1,4-Dichlorobenzene	5.0	U	50.0	50.4		ug/L		93	69 - 133	
1,1-Dichloroethane	5.0	U	50.0	51.9		ug/L		104	68 - 130	
1,1-Dichloroethene	5.0	U	50.0	47.9		ug/L		96	62 - 133	
1,2-Dichloropropane	10	U	50.0	53.2		ug/L		106	79 - 130	
Ethylbenzene	5.0	U	50.0	53.9		ug/L		99	77 - 117	
Isopropylbenzene	19		50.0	67.5		ug/L		96	66 - 130	
Methylene Chloride	110		50.0	153		ug/L		89	64 - 124	
4-Methyl-2-pentanone (MIBK)	75	U	500	567		ug/L		113	46 - 146	
m-Xylene & p-Xylene	16		50.0	64.4		ug/L		97	65 - 130	
o-Xylene	10	U	50.0	49.1		ug/L		98	63 - 130	
p-Cymene	15	U	50.0	49.6		ug/L		99	64 - 132	
Tetrachloroethene	10	U	50.0	46.5		ug/L		93	59 - 130	
Toluene	5.0	U	50.0	49.1		ug/L		98	71 - 119	
1,2,4-Trichlorobenzene	10	U	50.0	50.5		ug/L		101	67 - 130	
Trichloroethene	10	U	50.0	47.6		ug/L		95	65 - 130	
1,2,3-Trichloropropane	15	U	50.0	55.2		ug/L		110	68 - 130	
1,2,4-Trimethylbenzene	10	U	50.0	47.5		ug/L		95	71 - 131	
1,3,5-Trimethylbenzene	5.0	U	50.0	46.8		ug/L		94	65 - 130	
Vinyl chloride	5.0	U	50.0	53.6		ug/L		101	59 - 130	

Surrogate	MS	MS	Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	101		70 - 130
4-Bromofluorobenzene	98		70 - 130
Dibromofluoromethane	100		70 - 130

Lab Sample ID: 680-197389-10 MSD

Matrix: Water

Analysis Batch: 236741

Client Sample ID: MW-11DD-04072021

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier							
Acetone	100	U	500	513		ug/L		103	45 - 150	2	30	
Benzene	150		50.0	186		ug/L		72	66 - 131	3	30	
2-Butanone (MEK)	50	U	500	546		ug/L		109	46 - 146	1	30	
Carbon disulfide	10	U	50.0	27.4		ug/L		55	52 - 129	2	30	
Carbon tetrachloride	5.0	U	50.0	48.3		ug/L		97	62 - 124	1	30	
Chlorobenzene	170		50.0	211		ug/L		74	67 - 130	6	30	
Chloroform	180		50.0	220		ug/L		80	77 - 119	3	30	
cis-1,2-Dichloroethene	5.0	U	50.0	51.3		ug/L		103	69 - 133	2	30	
1,2-Dichlorobenzene	5.0	U	50.0	49.6		ug/L		95	69 - 133	4	30	

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 680-197389-10 MSD

Matrix: Water

Analysis Batch: 236741

Client Sample ID: MW-11DD-04072021

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD
	Result	Qualifier	Added	Result	Qualifier				Limits		Limit
1,4-Dichlorobenzene	5.0	U	50.0	53.8		ug/L		100	69 - 133	6	30
1,1-Dichloroethane	5.0	U	50.0	50.5		ug/L		101	68 - 130	3	30
1,1-Dichloroethene	5.0	U	50.0	46.9		ug/L		94	62 - 133	2	30
1,2-Dichloropropane	10	U	50.0	51.5		ug/L		103	79 - 130	3	30
Ethylbenzene	5.0	U	50.0	52.0		ug/L		96	77 - 117	4	30
Isopropylbenzene	19		50.0	67.6		ug/L		97	66 - 130	0	30
Methylene Chloride	110		50.0	148		ug/L		78	64 - 124	4	30
4-Methyl-2-pentanone (MIBK)	75	U	500	570		ug/L		114	46 - 146	0	30
m-Xylene & p-Xylene	16		50.0	60.1		ug/L		88	65 - 130	7	30
o-Xylene	10	U	50.0	47.9		ug/L		96	63 - 130	3	30
p-Cymene	15	U	50.0	50.5		ug/L		101	64 - 132	2	30
Tetrachloroethene	10	U	50.0	46.2		ug/L		92	59 - 130	1	30
Toluene	5.0	U	50.0	47.2		ug/L		94	71 - 119	4	30
1,2,4-Trichlorobenzene	10	U	50.0	49.8		ug/L		100	67 - 130	1	30
Trichloroethene	10	U	50.0	47.5		ug/L		95	65 - 130	0	30
1,2,3-Trichloropropane	15	U	50.0	52.8		ug/L		106	68 - 130	5	30
1,2,4-Trimethylbenzene	10	U	50.0	47.3		ug/L		95	71 - 131	0	30
1,3,5-Trimethylbenzene	5.0	U	50.0	46.6		ug/L		93	65 - 130	0	30
Vinyl chloride	5.0	U	50.0	54.6		ug/L		103	59 - 130	2	30

Surrogate	MSD	MSD	Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	101		70 - 130
4-Bromofluorobenzene	99		70 - 130
Dibromofluoromethane	101		70 - 130

Lab Sample ID: MB 660-236759/6

Matrix: Water

Analysis Batch: 236759

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Acetone	20	U	20		ug/L			04/19/21 12:30	1
Benzene	1.0	U	1.0		ug/L			04/19/21 12:30	1
2-Butanone (MEK)	10	U	10		ug/L			04/19/21 12:30	1
Carbon disulfide	2.0	U	2.0		ug/L			04/19/21 12:30	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/19/21 12:30	1
Chlorobenzene	1.0	U	1.0		ug/L			04/19/21 12:30	1
Chloroform	1.0	U	1.0		ug/L			04/19/21 12:30	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/19/21 12:30	1
1,2-Dichlorobenzene	1.0	U	1.0		ug/L			04/19/21 12:30	1
1,4-Dichlorobenzene	1.0	U	1.0		ug/L			04/19/21 12:30	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/19/21 12:30	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/19/21 12:30	1
1,2-Dichloropropane	2.0	U	2.0		ug/L			04/19/21 12:30	1
Ethylbenzene	1.0	U	1.0		ug/L			04/19/21 12:30	1
Isopropylbenzene	2.0	U	2.0		ug/L			04/19/21 12:30	1
Methylene Chloride	10	U	10		ug/L			04/19/21 12:30	1
4-Methyl-2-pentanone (MIBK)	15	U	15		ug/L			04/19/21 12:30	1
m-Xylene & p-Xylene	2.0	U	2.0		ug/L			04/19/21 12:30	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 660-236759/6

Matrix: Water

Analysis Batch: 236759

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
o-Xylene	2.0	U	2.0		ug/L			04/19/21 12:30	1
p-Cymene	3.0	U	3.0		ug/L			04/19/21 12:30	1
Tetrachloroethene	2.0	U	2.0		ug/L			04/19/21 12:30	1
Toluene	1.0	U	1.0		ug/L			04/19/21 12:30	1
1,2,4-Trichlorobenzene	2.0	U	2.0		ug/L			04/19/21 12:30	1
Trichloroethene	2.0	U	2.0		ug/L			04/19/21 12:30	1
1,2,3-Trichloropropane	3.0	U	3.0		ug/L			04/19/21 12:30	1
1,2,4-Trimethylbenzene	2.0	U	2.0		ug/L			04/19/21 12:30	1
1,3,5-Trimethylbenzene	1.0	U	1.0		ug/L			04/19/21 12:30	1
Vinyl chloride	1.0	U	1.0		ug/L			04/19/21 12:30	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Toluene-d8 (Surr)	100		70 - 130		04/19/21 12:30	1
4-Bromofluorobenzene	98		70 - 130		04/19/21 12:30	1
Dibromofluoromethane	99		70 - 130		04/19/21 12:30	1

Lab Sample ID: LCS 660-236759/4

Matrix: Water

Analysis Batch: 236759

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Acetone	100	74.3		ug/L		74	45 - 150
Benzene	10.0	9.39		ug/L		94	66 - 131
2-Butanone (MEK)	100	76.6		ug/L		77	46 - 146
Carbon disulfide	10.0	7.39		ug/L		74	52 - 129
Carbon tetrachloride	10.0	9.66		ug/L		97	62 - 124
Chlorobenzene	10.0	9.15		ug/L		92	67 - 130
Chloroform	10.0	9.72		ug/L		97	77 - 119
cis-1,2-Dichloroethene	10.0	10.1		ug/L		101	69 - 133
1,2-Dichlorobenzene	10.0	8.86		ug/L		89	69 - 133
1,4-Dichlorobenzene	10.0	9.37		ug/L		94	69 - 133
1,1-Dichloroethane	10.0	9.62		ug/L		96	68 - 130
1,1-Dichloroethene	10.0	9.92		ug/L		99	62 - 133
1,2-Dichloropropane	10.0	10.1		ug/L		101	79 - 130
Ethylbenzene	10.0	8.75		ug/L		87	77 - 117
Isopropylbenzene	10.0	9.22		ug/L		92	66 - 130
Methylene Chloride	10.0	9.50	J	ug/L		95	64 - 124
4-Methyl-2-pentanone (MIBK)	100	80.2		ug/L		80	46 - 146
m-Xylene & p-Xylene	10.0	8.55		ug/L		86	65 - 130
o-Xylene	10.0	9.04		ug/L		90	63 - 130
p-Cymene	10.0	9.67		ug/L		97	64 - 132
Tetrachloroethene	10.0	9.43		ug/L		94	59 - 130
Toluene	10.0	9.28		ug/L		93	71 - 119
1,2,4-Trichlorobenzene	10.0	7.70		ug/L		77	67 - 130
Trichloroethene	10.0	9.50		ug/L		95	65 - 130
1,2,3-Trichloropropane	10.0	8.47		ug/L		85	68 - 130
1,2,4-Trimethylbenzene	10.0	9.03		ug/L		90	71 - 131
1,3,5-Trimethylbenzene	10.0	9.10		ug/L		91	65 - 130

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 660-236759/4

Matrix: Water

Analysis Batch: 236759

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl chloride	10.0	11.1		ug/L		111	59 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	102		70 - 130
4-Bromofluorobenzene	100		70 - 130
Dibromofluoromethane	103		70 - 130

- 1
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- 3
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- 15



# QC Association Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## GC/MS VOA

### Analysis Batch: 236711

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197389-1	MW-26D-04062021	Total/NA	Water	8260B	
680-197389-2	PSOW-12-04062021	Total/NA	Water	8260B	
680-197389-3	OW-Q3S-04062021	Total/NA	Water	8260B	
680-197389-4 - DL	OW-Q3I-04062021	Total/NA	Water	8260B	
680-197389-4	OW-Q3I-04062021	Total/NA	Water	8260B	
680-197389-5	EQB-05-04062021	Total/NA	Water	8260B	
680-197389-6	EQB-06-04062021	Total/NA	Water	8260B	
680-197389-7 - DL	MW-29D-04072021	Total/NA	Water	8260B	
680-197389-7	MW-29D-04072021	Total/NA	Water	8260B	
680-197389-8 - DL	PSOW-11-04072021	Total/NA	Water	8260B	
680-197389-8	PSOW-11-04072021	Total/NA	Water	8260B	
MB 660-236711/7	Method Blank	Total/NA	Water	8260B	
LCS 660-236711/5	Lab Control Sample	Total/NA	Water	8260B	
680-197389-1 DU	MW-26D-04062021	Total/NA	Water	8260B	

### Analysis Batch: 236741

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197389-9	MW-11D-04072021	Total/NA	Water	8260B	
680-197389-10 - DL	MW-11DD-04072021	Total/NA	Water	8260B	
680-197389-10	MW-11DD-04072021	Total/NA	Water	8260B	
680-197389-11	EQB-07-04072021	Total/NA	Water	8260B	
680-197389-12 - DL	DUP-04-04072021	Total/NA	Water	8260B	
680-197389-12	DUP-04-04072021	Total/NA	Water	8260B	
680-197389-13	TB	Total/NA	Water	8260B	
MB 660-236741/6	Method Blank	Total/NA	Water	8260B	
LCS 660-236741/4	Lab Control Sample	Total/NA	Water	8260B	
680-197389-10 MS	MW-11DD-04072021	Total/NA	Water	8260B	
680-197389-10 MSD	MW-11DD-04072021	Total/NA	Water	8260B	

### Analysis Batch: 236759

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197389-2 - DL	PSOW-12-04062021	Total/NA	Water	8260B	
MB 660-236759/6	Method Blank	Total/NA	Water	8260B	
LCS 660-236759/4	Lab Control Sample	Total/NA	Water	8260B	

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: MW-26D-04062021**

**Lab Sample ID: 680-197389-1**

Date Collected: 04/06/21 16:30

Matrix: Water

Date Received: 04/09/21 10:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	236711	04/17/21 12:38	K1P	TAL TAM
Instrument ID: CHBVM5975										

**Client Sample ID: PSOW-12-04062021**

**Lab Sample ID: 680-197389-2**

Date Collected: 04/06/21 17:45

Matrix: Water

Date Received: 04/09/21 10:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	236711	04/17/21 15:03	K1P	TAL TAM
Instrument ID: CHBVM5975										
Total/NA	Analysis	8260B	DL	5	5 mL	5 mL	236759	04/19/21 14:50	TGP	TAL TAM
Instrument ID: CHBVM5975										

**Client Sample ID: OW-Q3S-04062021**

**Lab Sample ID: 680-197389-3**

Date Collected: 04/06/21 18:33

Matrix: Water

Date Received: 04/09/21 10:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	236711	04/17/21 14:44	K1P	TAL TAM
Instrument ID: CHBVM5975										

**Client Sample ID: OW-Q3I-04062021**

**Lab Sample ID: 680-197389-4**

Date Collected: 04/06/21 19:13

Matrix: Water

Date Received: 04/09/21 10:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	DL	10	5 mL	5 mL	236711	04/17/21 16:02	K1P	TAL TAM
Instrument ID: CHBVM5975										
Total/NA	Analysis	8260B		1	5 mL	5 mL	236711	04/17/21 16:21	K1P	TAL TAM
Instrument ID: CHBVM5975										

**Client Sample ID: EQB-05-04062021**

**Lab Sample ID: 680-197389-5**

Date Collected: 04/06/21 20:00

Matrix: Water

Date Received: 04/09/21 10:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	236711	04/17/21 14:05	K1P	TAL TAM
Instrument ID: CHBVM5975										

**Client Sample ID: EQB-06-04062021**

**Lab Sample ID: 680-197389-6**

Date Collected: 04/06/21 20:10

Matrix: Water

Date Received: 04/09/21 10:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	236711	04/17/21 14:24	K1P	TAL TAM
Instrument ID: CHBVM5975										

Eurofins TestAmerica, Savannah

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: MW-29D-04072021**

**Lab Sample ID: 680-197389-7**

Date Collected: 04/07/21 08:40

Matrix: Water

Date Received: 04/09/21 10:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	DL	20	5 mL	5 mL	236711	04/17/21 15:23	K1P	TAL TAM
Instrument ID: CHBVMB5975										
Total/NA	Analysis	8260B		2	5 mL	5 mL	236711	04/17/21 17:00	K1P	TAL TAM
Instrument ID: CHBVMB5975										

**Client Sample ID: PSOW-11-04072021**

**Lab Sample ID: 680-197389-8**

Date Collected: 04/07/21 14:58

Matrix: Water

Date Received: 04/09/21 10:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	DL	10	5 mL	5 mL	236711	04/17/21 15:42	K1P	TAL TAM
Instrument ID: CHBVMB5975										
Total/NA	Analysis	8260B		1	5 mL	5 mL	236711	04/17/21 16:41	K1P	TAL TAM
Instrument ID: CHBVMB5975										

**Client Sample ID: MW-11D-04072021**

**Lab Sample ID: 680-197389-9**

Date Collected: 04/07/21 16:00

Matrix: Water

Date Received: 04/09/21 10:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	236741	04/19/21 12:04	JFL	TAL TAM
Instrument ID: CHBVMB5975										

**Client Sample ID: MW-11DD-04072021**

**Lab Sample ID: 680-197389-10**

Date Collected: 04/07/21 16:50

Matrix: Water

Date Received: 04/09/21 10:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	DL	5	5 mL	5 mL	236741	04/19/21 10:46	JFL	TAL TAM
Instrument ID: CHBVMB5975										
Total/NA	Analysis	8260B		1	5 mL	5 mL	236741	04/19/21 12:43	JFL	TAL TAM
Instrument ID: CHBVMB5975										

**Client Sample ID: EQB-07-04072021**

**Lab Sample ID: 680-197389-11**

Date Collected: 04/07/21 17:45

Matrix: Water

Date Received: 04/09/21 10:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	236741	04/19/21 10:27	JFL	TAL TAM
Instrument ID: CHBVMB5975										

## Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

**Client Sample ID: DUP-04-04072021**

**Lab Sample ID: 680-197389-12**

Date Collected: 04/07/21 00:00

Matrix: Water

Date Received: 04/09/21 10:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	DL	20	5 mL	5 mL	236741	04/19/21 12:24	JFL	TAL TAM
Instrument ID: CHBVMB5975										
Total/NA	Analysis	8260B		2	5 mL	5 mL	236741	04/19/21 13:03	JFL	TAL TAM
Instrument ID: CHBVMB5975										

**Client Sample ID: TB**

**Lab Sample ID: 680-197389-13**

Date Collected: 04/07/21 00:00

Matrix: Water

Date Received: 04/09/21 10:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	236741	04/19/21 10:08	JFL	TAL TAM
Instrument ID: CHBVMB5975										

**Laboratory References:**

TAL TAM = Eurofins TestAmerica, Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

# Chain of Custody Record

525831



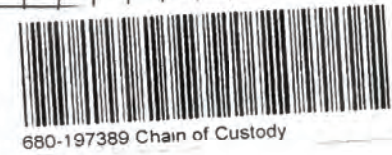
Environment Testing  
TestAmerica

Address: \_\_\_\_\_

Regulatory Program:  DW  NPDES  RCRA  Other:

TAL-8210

<b>Client Contact</b>		<b>Project Manager:</b> <i>Adria Reimer</i>		<b>Site Contact:</b>		<b>Date:</b>		<b>COC No:</b>			
Company Name: <i>Geosyntec Consultants</i>		Tel/Email: <i>678-202-4564</i>		Lab Contact:		Carrier:		1 of 2 COCs			
Address: <i>1255 Roberts Blvd NW Suite 200</i>		<b>Analysis Turnaround Time</b> <input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		Filtered Sample (Y/N) Perform MS / MSD (Y/N) <i>82608 See Attached list of Analysis</i>						Sampler: <i>DAN GIBBS</i>	
City/State/Zip: <i>Kennesaw, GA 30144</i>										For Lab Use Only: Walk-in Client: _____ Lab Sampling: _____	
Phone: <i>678-202-9500</i>										Job / SDG No.: _____	
Fax: _____											
Project Name: <i>GW Investig. - Tran</i>											
Site: <i>Hercules / Pinellas Brunswick, GA facility</i>											
P O #: <i>GR6881P</i>											
<b>Sample Identification</b>		<b>Sample Date</b>	<b>Sample Time</b>	<b>Sample Type (C=Comp, G=Grab)</b>	<b>Matrix</b>	<b># of Cont.</b>	<b>Filtered Sample (Y/N)</b>	<b>Perform MS / MSD (Y/N)</b>	<b>Sample Specific Notes:</b>		
<i>MW-26d-04062021</i>		<i>4/6/2021</i>	<i>1630</i>	<i>GW</i>	<i>GW</i>	<i>3</i>	<i>N</i>	<i>N</i>			
<i>PSOW-12-04062021</i>		<i>4/6/21</i>	<i>1745</i>	<i>G</i>	<i>GW</i>	<i>3</i>	<i>N</i>	<i>N</i>			
<i>OW-Q35-04062021</i>		<i>4/6/21</i>	<i>1833</i>	<i>G</i>	<i>GW</i>	<i>3</i>	<i>N</i>	<i>N</i>			
<i>OW-Q3I-04062021</i>		<i>4/6/21</i>	<i>1913</i>	<i>G</i>	<i>GW</i>	<i>3</i>	<i>N</i>	<i>N</i>			
<i>EQB-05-04062021</i>		<i>4/6/21</i>	<i>2000</i>	<i>G</i>	<i>W</i>	<i>3</i>	<i>N</i>	<i>N</i>			
<i>EQB-06-04062021</i>		<i>4/6/21</i>	<i>2010</i>	<i>G</i>	<i>W</i>	<i>3</i>	<i>N</i>	<i>N</i>			
<i>MW-29d-04072021</i>		<i>4/7/21</i>	<i>0840</i>	<i>G</i>	<i>GW</i>	<i>3</i>	<i>N</i>	<i>N</i>			
<i>PSOW-11-04072021</i>		<i>4/7/21</i>	<i>1458</i>	<i>G</i>	<i>GW</i>	<i>3</i>	<i>N</i>	<i>N</i>			
<i>MW-11d-04072021</i>		<i>4/7/21</i>	<i>1600</i>	<i>G</i>	<i>GW</i>	<i>3</i>	<i>N</i>	<i>N</i>			
<i>MW-11dd-04072021</i>		<i>4/7/21</i>	<i>1650</i>	<i>G</i>	<i>GW</i>	<i>3</i>	<i>N</i>	<i>N</i>			
<i>EQB-07-04072021</i>		<i>4/7/21</i>	<i>1745</i>	<i>G</i>	<i>W</i>	<i>3</i>	<i>N</i>	<i>N</i>			
<i>Dup-04-04072021</i>		<i>4/7/21</i>	<i>-:-</i>	<i>G</i>	<i>GW</i>	<i>3</i>	<i>N</i>	<i>N</i>			
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____											
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.										Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)	
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown										<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months	
Special Instructions/QC Requirements & Comments:											
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C): Obs'd: <i>3.6</i> Cor'd: <i>3.7</i>		Therm ID No.:					
Relinquished by: <i>[Signature]</i>		Company: <i>Geosyntec</i>		Date/Time: <i>4/8/21 1000</i>		Received by:		Company:		Date/Time:	
Relinquished by:		Company:		Date/Time:		Received by:		Company:		Date/Time:	
Relinquished by:		Company:		Date/Time:		Received in Laboratory by: <i>[Signature]</i>		Company: <i>TA</i>		Date/Time: <i>4-9-21 1050</i>	



Page 36 of 45

4/20/2021



Address: \_\_\_\_\_

Regulatory Program:  DW  NPDES  RCRA  Other:

TAL-8210

<b>Client Contact</b>		<b>Project Manager:</b> <i>Adina Resmer</i>		<b>Site Contact:</b>		<b>Date:</b> <i>04-07-2021</i>		<b>COC No.:</b>			
Company Name: <i>Geosyntec Consultants</i>		Tel/Email: <i>678-202-9564</i>		Lab Contact:		Carrier:		2 of 2 COCs			
Address: <i>1255 Roberts Blvd NW S4200</i>		<b>Analysis Turnaround Time</b>									
City/State/Zip: <i>Kennesaw, GA 30144</i>		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below _____ <input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day									
Phone: <i>678-202-9500</i>		Project Name: <i>GW Investigation</i>		Matrix		# of Cont.		Filtered Sample (Y/N) Perform MS / MSD (Y/N) <i>B260B</i>		Sampler: <i>Dan Gerds</i>	
Fax:										For Lab Use Only:	
Site: <i>Hercules / Pinole Brunswick Facility</i>		Job / SDG No.:		Walk-in Client:		Lab Sampling:		Sample Specific Notes:			
P O # <i>GR6881P</i>		Sample Date		Sample Time		Sample Type (C=Comp, G=Grab)					
<i>TB</i>		<i>/</i>		<i>/</i>		<i>G</i>		<i>W</i>		<i>Z</i>	
<i>DG</i>		<i>04-07-2021</i>									
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____		Possible Hazard Identification:		Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)							
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.		<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown		<input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months							
Special Instructions/QC Requirements & Comments:											
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____		Corr'd: _____		Therm ID No.:			
Relinquished by: <i>Dan Gerds</i>		Company: <i>Geosyntec</i>		Date/Time: <i>4/7/21 1000</i>		Received by:		Company:		Date/Time:	
Relinquished by:		Company:		Date/Time:		Received by:		Company:		Date/Time:	
Relinquished by:		Company:		Date/Time:		Received in Laboratory by: <i>[Signature]</i>		Company: <i>TA</i>		Date/Time: <i>4-9-21 1050</i>	





# Chain of Custody Record



<b>Client Information (Sub Contract Lab)</b>		Sampler		Lab PM Barnett Eddie T		Carrier Tracking No(s)		COC No 680-650546 1	
Client Contact		Phone		E-Mail Eddie.Barnett@Eurofinset.com		State of Origin Georgia		Page Page 1 of 2	
Shipping/Receiving		Company TestAmerica Laboratories, Inc		Accreditations Required (See note) NELAP - Florida State Program - Georgia		Job # 680-197389-1			
Address 6712 Benjamin Road Suite 100,		Due Date Requested: 4/19/2021		<b>Analysis Requested</b>		<b>Preservation Codes:</b>			
City Tampa		TAT Requested (days):							
State Zip FL 33634		PO #							
Phone 813-885-7427(Tel) 813-885-7049(Fax)		WO #							
Email		Project # 68022348							
Project Name Hercules Brunswick - GW Investigation		SSOW#		Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)		8260050300 (MDD) select VOCs - Custom List	
Site								Total Number of containers	
<b>Sample Identification - Client ID (Lab ID)</b>		<b>Sample Date</b>		<b>Sample Time</b>		<b>Sample Type (C=Comp, G=grab)</b>		<b>Matrix (W=water, S=solid, O=waste/soil, BT=Tissue, A=Air)</b>	
								<b>Preservation Code</b>	
MW-26D-04062021 (680-197389-1)		4/6/21		16 30 Eastern		Water		Water	
PSOW-12-04062021 (680-197389-2)		4/6/21		17 45 Eastern		Water		Water	
OW-Q3S-04062021 (680-197389-3)		4/6/21		18 33 Eastern		Water		Water	
OW-Q3I-04062021 (680-197389-4)		4/6/21		19 13 Eastern		Water		Water	
EQB-05-04062021 (680-197389-5)		4/6/21		20 00 Eastern		Water		Water	
EQB-06-04062021 (680-197389-6)		4/6/21		20 10 Eastern		Water		Water	
MW-29D-04072021 (680-197389-7)		4/7/21		08 40 Eastern		Water		Water	
PSOW-11-04072021 (680-197389-8)		4/7/21		14 58 Eastern		Water		Water	
MW-11D-04072021 (680-197389-9)		4/7/21		16 00 Eastern		Water		Water	
<p>Note: Since laboratory accreditations are subject to change Eurofins TestAmerica places the ownership of method, analyte &amp; accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins TestAmerica.</p>									
<b>Possible Hazard Identification</b>					<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b>				
Unconfirmed					<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months				
Deliverable Requested: I, II, III, IV, Other (specify)					Primary Deliverable Rank: 2				
Special Instructions/QC Requirements									
Empty Kit Relinquished by		Date		Time		Method of Shipment			
Relinquished by		Date/Time		Company		Received by		Date/Time	
Relinquished by		Date/Time		Company		Received by		Date/Time	
Relinquished by		Date/Time		Company		Received by		Date/Time	
Custody Seals Intact Δ Yes Δ No		Custody Seal No.			Cooler Temperature(s) °C and Other Remarks				





**Eurofins TestAmerica, Savannah**

5102 LaRoche Avenue  
 Savannah, GA 31404  
 Phone: 912-354-7858 Fax: 912-352-0165

**Chain of Custody Record**



Environmental Testing  
 8110001

<b>Client Information (Sub Contract Lab)</b>		Sampler		Lab PM Barnett, Eddie T		Carrier Tracking No(s)		COC No 680-650546 2	
Client Contact		Phone		E-Mail Eddie Barnett@Eurofinset.com		State of Origin Georgia		Page Page 2 of 2	
Shipping/Receiving		Company TestAmerica Laboratories, Inc.		Accreditations Required (See note) NELAP - Florida, State Program - Georgia		Job # 680-197389-1		Preservation Codes:	
Address 6712 Benjamin Road, Suite 100,		Due Date Requested: 4/19/2021		<b>Analysis Requested</b>  Field Filtered Sample (Yes or No) Perform MS/MSD (Yes or No) 8260B/5030B (MOD) Select VOCs - Custom List		Total Number of Containers		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA	
City Tampa		TAT Requested (days):						M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
State, Zip FL, 33634		PO #						Other:	
Phone 813-885-7427(Tel) 813-885-7049(Fax)		WO #							
Email		Project # 68022348							
Project Name Hercules Brunswick - GW Investigation		SSOW#							
Site									
Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=water/Oil, BT=Issue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Special Instructions/Note:	
				Preservation Code					
MW-11DD-04072021 (680-197389-10)		4/7/21	16:50 Eastern		Water		X	3	
EQB-07-04072021 (680-197389-11)		4/7/21	17:45 Eastern		Water		X	3	
DUP-04-04072021 (680-197389-12)		4/7/21	Eastern		Water		X	3	
TB (680-197389-13)		4/7/21	Eastern		Water		X	2	
Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins TestAmerica.									
<b>Possible Hazard Identification</b>					<b>Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)</b>				
Unconfirmed					<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months				
Deliverable Requested I, II, III, IV, Other (specify)			Primary Deliverable Rank 2		Special Instructions/QC Requirements				
Empty Kit Relinquished by			Date	Time	Method of Shipment				
Relinquished by		Date/Time	Company	Received by		Date/Time	Company		
Relinquished by		Date/Time	Company	Received by		Date/Time	Company		
Relinquished by		Date/Time	Company	Received by		Date/Time	Company		
Custody Seals Intact △ Yes △ No		Custody Seal No.			Cooler Temperature(s) °C and Other Remarks				

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4/20/2021



**Eurofins TestAmerica, Savannah**

5102 LaRoche Avenue  
Savannah, GA 31404  
Phone: 912-354-7858 Fax: 912-352-0165

**Chain of Custody Record**



Environment Testing  
America

<b>Client Information (Sub Contract Lab)</b>		Sampler	Lab PM		Carrier Tracking No(s)		COC No			
Client Contact		Phone	Barnett, Eddie T				680-650546.1			
Shipping/Receiving			E-Mail		State of Origin		Page			
Company			Eddie Barnett@Eurofinset.com		Georgia		Page 1 of 2			
TestAmerica Laboratories, Inc.		Accreditations Required (See note)		NELAP - Florida, State Program - Georgia		Job #				
Address		Due Date Requested:		Analysis Requested		Preservation Codes:				
6712 Benjamin Road, Suite 100,		4/19/2021				A - HCL		M - Hexane		
City		TAT Requested (days):				B - NaOH		N - None		
Tampa						C - Zn Acetate		O - AsNaO2		
State, Zip						D - Nitric Acid		P - Na2O4S		
FL, 33634						E - NaHSO4		Q - Na2SO3		
Phone		PO #				F - MeOH		R - Na2S2O3		
813-885-7427(Tel) 813-885-7049(Fax)						G - Amchlor		S - H2SO4		
Email		WO #				H - Ascorbic Acid		T - TSP Dodecahydrate		
						I - Ice		U - Acetone		
Project Name		Project #				J - DI Water		V - MCAA		
Hercules Brunswick - GW Investigation		68022348				K - EDTA		W - pH 4-5		
Site		SSOW#				L - EDA		Z - other (specify)		
								Other:		
<b>Sample Identification - Client ID (Lab ID)</b>		<b>Sample Date</b>	<b>Sample Time</b>	<b>Sample Type (C=Comp, G=grab)</b>	<b>Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)</b>	<b>Field Filtered Sample (Yes or No)</b>	<b>Perform MS/MSD (Yes or No)</b>	<b>8260B/5030B (MOD) Select VOCs - Custom List</b>	<b>Total Number of Containers</b>	<b>Special Instructions/Note:</b>
				Preservation Code:						
MW-26D-04062021 (680-197389-1)		4/6/21	16:30 Eastern		Water		X			3
PSOW-12-04062021 (680-197389-2)		4/6/21	17:45 Eastern		Water		X			3
OW-Q3S-04062021 (680-197389-3)		4/6/21	18:33 Eastern		Water		X			3
OW-Q3I-04062021 (680-197389-4)		4/6/21	19:13 Eastern		Water		X			3
EQB-05-04062021 (680-197389-5)		4/6/21	20:00 Eastern		Water		X			3
EQB-06-04062021 (680-197389-6)		4/6/21	20:10 Eastern		Water		X			3
MW-29D-04072021 (680-197389-7)		4/7/21	08:40 Eastern		Water		X			3
PSOW-11-04072021 (680-197389-8)		4/7/21	14:58 Eastern		Water		X			3
MW-11D-04072021 (680-197389-9)		4/7/21	16:00 Eastern		Water		X			3

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins TestAmerica.

<b>Possible Hazard Identification</b>		<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b>	
Unconfirmed		<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Deliverable Requested: I, II, III, IV, Other (specify)		Special Instructions/QC Requirements:	
Primary Deliverable Rank: 2			

Empty Kit Relinquished by:		Date:	Time:	Method of Shipment:	
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
	4-15-21 1540			4-16-21 0845	ETA
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
Custody Seals Intact:	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:			
Δ Yes Δ No					



**Eurofins TestAmerica, Savannah**

5102 LaRoche Avenue  
 Savannah, GA 31404  
 Phone: 912-354-7858 Fax: 912-352-0165

**Chain of Custody Record**



<b>Client Information (Sub Contract Lab)</b> Client Contact Shipping/Receiving		Sampler: Phone:		Lab PM Barnett, Eddie T E-Mail: Eddie.Barnett@Eurofinset.com		Carrier Tracking No(s) State of Origin: Georgia		COC No: 680-650546.2 Page: Page 2 of 2																																					
Company TestAmerica Laboratories, Inc.				Accreditations Required (See note): NELAP - Florida, State Program - Georgia				Job # 680-197389-1																																					
Address 6712 Benjamin Road, Suite 100,		Due Date Requested: 4/19/2021		<b>Analysis Requested</b>								Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)																																	
City Tampa		TAT Requested (days):		<table border="1" style="width: 100%; height: 100%; text-align: center;"> <tr> <th>Field Filtered Sample (Yes or No)</th> <th>Perform MS/MSD (Yes or No)</th> <th>8260B/5030B (MOD) Select VOCs - Custom List</th> <th colspan="10"></th> <th>Total Number of containers</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>								Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B/5030B (MOD) Select VOCs - Custom List											Total Number of containers																			Other:	
Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B/5030B (MOD) Select VOCs - Custom List											Total Number of containers																																
State Zip FL, 33634		PO #										Project Name Hercules Brunswick - GW Investigation		Project # 68022348																															
Phone 813-885-7427(Tel) 813-885-7049(Fax)		WO #										Site Hercules Brunswick - GW Investigation		SSOW#																															
Email:																																													

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B/5030B (MOD) Select VOCs - Custom List	Total Number of containers	Special Instructions/Note:
MW-11DD-04072021 (680-197389-10)	4/7/21	16:50 Eastern	Water	Water	X			3	
EQB-07-04072021 (680-197389-11)	4/7/21	17:45 Eastern	Water	Water	X			3	
DUP-04-04072021 (680-197389-12)	4/7/21	Eastern	Water	Water	X			3	
TB (680-197389-13)	4/7/21	Eastern	Water	Water	X			2	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins TestAmerica.

<b>Possible Hazard Identification</b> Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify)		Primary Deliverable Rank: 2		<b>Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)</b> <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Empty Kit Relinquished by:		Date:		Time:	
Relinquished by: <i>[Signature]</i>		Date/Time: 4-15-21/1540		Company:	
Relinquished by:		Date/Time:		Received by: <i>[Signature]</i>	
Relinquished by:		Date/Time:		Date/Time: 4-16-21 0845	
Relinquished by:		Date/Time:		Company: <i>ETA</i>	
Custody Seals Intact: Δ Yes Δ No		Custody Seal No.		Cooler Temperature(s) °C and Other Remarks:	



## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-197389-1

**Login Number: 197389**

**List Source: Eurofins TestAmerica, Savannah**

**List Number: 1**

**Creator: Sims, Robert D**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-197389-1

**Login Number: 197389**

**List Number: 2**

**Creator: Redding, Charles S**

**List Source: Eurofins TestAmerica, Tampa**

**List Creation: 04/16/21 09:06 AM**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - GW Investigation

Job ID: 680-197389-1

## Laboratory: Eurofins TestAmerica, Tampa

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E84282	06-30-21
Georgia	State	E84282	06-30-21
Georgia (DW)	State	905	06-30-21
USDA	US Federal Programs	P330-21-00025	02-08-24

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## Memorandum

Date: 18 May 2021  
To: Adria Reimer  
Cristin Corless Krachon  
From: Matthew Richardson  
CC: J. Caprio  
Subject: **Stage 2A Data Validation - Level II Data Deliverable – Eurofins TestAmerica Job ID 680-197389-1**

**SITE: Hercules Brunswick GW Investigation**

### INTRODUCTION

This report summarizes the findings of the Stage 2A data validation of eight water samples, one field duplicate sample, one trip blank and three equipment blanks, collected 6-7 April 2021, as part of Hercules Brunswick sampling event. Eurofins TestAmerica Savannah, Georgia analyzed the samples for the following analytical test:

- Select Volatile Organic Compounds (VOCs) by United States Environmental Protection Agency (US EPA) Methods 5030B/8260B

### EXECUTIVE SUMMARY

Overall, based on this Stage 2A data validation covering the quality control (QC) parameters listed below and the information provided, the data are usable for supporting project objectives.

The data were reviewed based on professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Superfund Organic Methods Data Review, November 2020 (US EPA-540-R-20-005); and
- The pertinent methods referenced by the laboratory report.

The following samples were analyzed and validated at Stage 2A level in the data set:

Laboratory ID	Client ID
680-197389-1	MW-26D-04062021
680-197389-2	PSOW-12-04062021

Laboratory ID	Client ID
680-197389-3	OW-Q3S-04062021
680-197389-4	OW-Q3I-04062021

Laboratory ID	Client ID
680-197389-5	EQB-05-04062021
680-197389-6	EQB-06-04062021
680-197389-7	MW-29D-04072021
680-197389-8	PSOW-11-04072021
680-197389-9	MW-11D-04072021

Laboratory ID	Client ID
680-197389-10	MW-11DD-04072021
680-197389-11	EQB-07-04072021
680-197389-12	DUP-04-04072021
680-197389-13	TB

The samples were received within 0-6 degrees Celsius (°C). No sample preservation issues were noted by the laboratory.

Incorrect error corrections were observed on the chain of custody (COC), instead of the proper procedure of a single strike through, correction, and initials and date of person making the corrections.

A collection time was not documented on the COC for the field duplicate sample. The field duplicate was logged by the laboratory with the collection time of 00:00.

The collection time and date were not documented for the trip blank. The trip blank was logged by the laboratory with the collection date and time of 04/07/2021, 00:00.

## 1.0 SELECT VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for select VOCs by US EPA methods 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Equipment Blank
- ✓ Trip Blank
- ✓ Laboratory Duplicate
- ✓ Field Duplicate
- ✓ Sensitivity
- ⊗ Electronic Data Deliverable Review



## **1.1 Overall Assessment**

### **1.1.1 Completeness**

The VOC data reported in this laboratory report are considered usable for supporting project objectives. The results are considered valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this data set is 100%.

### **1.2 Holding Times**

The holding time for VOC analysis of a preserved water sample is 14 days from sample collection to analysis. The holding times were met for the sample analyses.

### **1.3 Method Blank**

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 236711, 236741 and 236759). VOCs were not detected in the method blanks above the reporting limits (RLs).

### **1.4 Matrix Spike/Matrix Spike Duplicate (MS/MSD)**

One sample set specific MS/MSD pair was reported using sample MW-11DD-04072021. The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria.

### **1.5 Laboratory Control Sample (LCS)**

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

### **1.6 Surrogates**

Acceptable surrogate recoveries were reported for the sample analyses.

### **1.7 Equipment Blank**

Three equipment blanks, EQB-05-04062021, EQB-06-04062021 and EQB-07-04062021, were collected with the sample set. VOCs were not detected in the equipment blanks above the RLs.

### **1.8 Trip Blank**

One trip blank, TB, accompanied the sample set. VOCs were not detected in the trip blank above the RLs.

### **1.9 Laboratory Duplicate**

One sample set specific laboratory duplicate was reported, using sample MW-26D-04062021. The RPD results were within the laboratory specified acceptance criteria.

### **1.10 Field Duplicate**

One field duplicate sample, DUP-04-04072021, was collected with the sample set. Acceptable precision (RPD  $\leq$  30%) was demonstrated between the field duplicate and the original sample, MW-29D-04072021, with the following exception.

o-Xylene was detected at a concentration greater than the RL in the field duplicate DUP-04-04072021 and not detected in the parent sample MW-29D-04072021, resulting in a noncalculable RPD between the results. Since the o-xylene concentration in DUP-04-04072021 was less than the RL for o-xylene in MW-29D-04072021 due to the differences in the two samples' dilutions and based on professional and technical judgment, no qualifications were applied to the data.

### **1.11 Sensitivity**

The samples were reported to the RLs. Elevated non-detect results were reported due to the dilutions analyzed.

### **1.12 Electronic Data Deliverable (EDD) Review**

The results and sample IDs in the EDD were reviewed against the information provided by the associated level II report at a minimum of 20% as part of the data validation process. The samples were reported to the RLs; both the method detection limits (MDLs) and RLs were listed in the EDD. No other discrepancies were identified between the level II report and the EDD.

---

\* \* \* \* \*

**ATTACHMENT 1**  
**DATA VALIDATION QUALIFIER DEFINITIONS**  
**AND INTERPRETATION KEY**  
**Assigned by Geosyntec's Data Validation Team**

**DATA QUALIFIER DEFINITIONS**

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to “not detected at or above the reported result”.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

**ATTACHMENT 2**  
**DATA VALIDATION REASON CODES**  
**Assigned by Geosyntec's Data Validation Team**

<b>Valid Value</b>	<b>Description</b>
1	Preservation requirement not met
2	Extraction or analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits or RPD outside limits (LCS/LCSD)
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required

LCS - Laboratory Control Sample

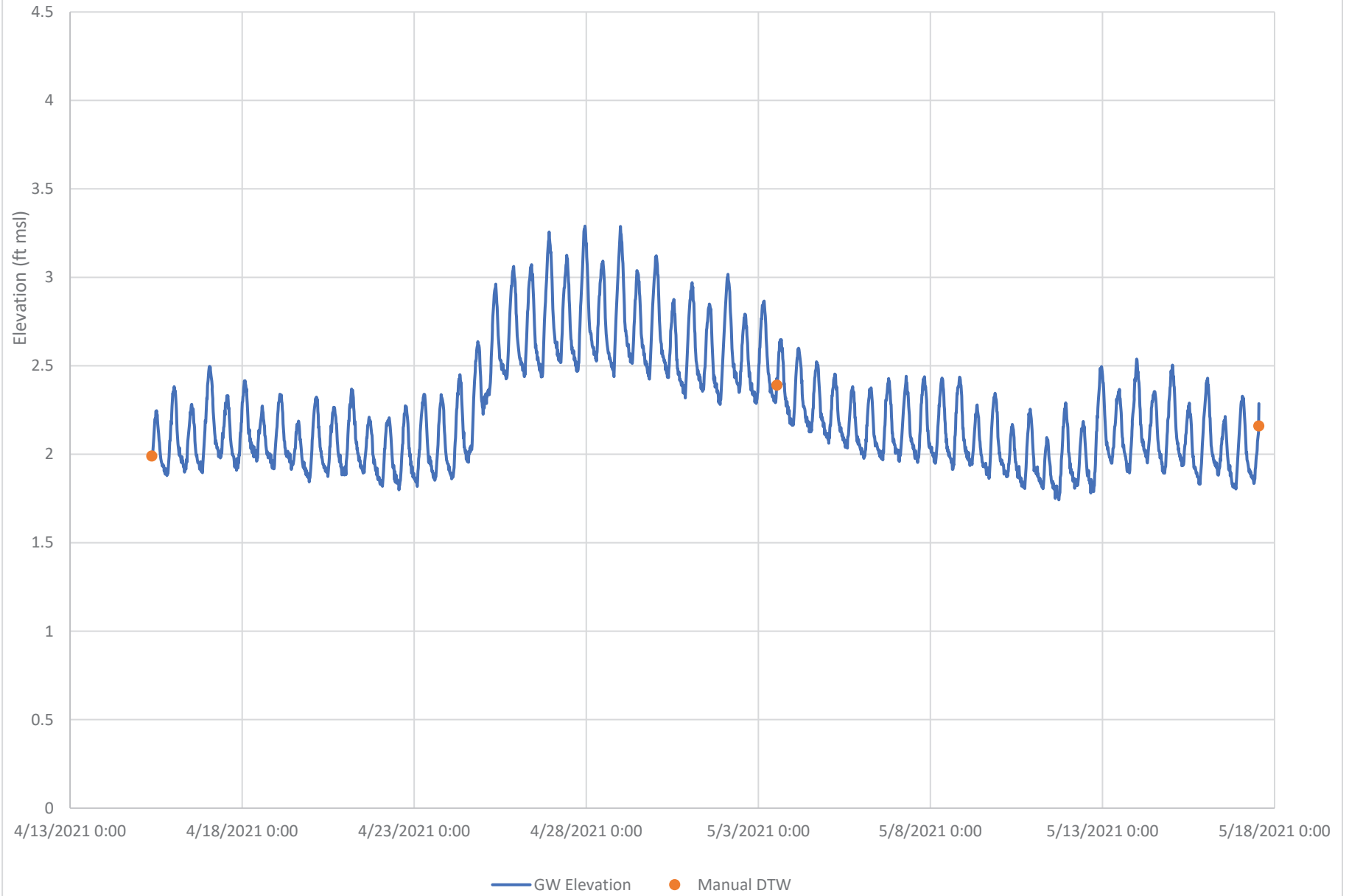
LCSD - Laboratory Control Sample duplicate

RPD - Relative percent difference

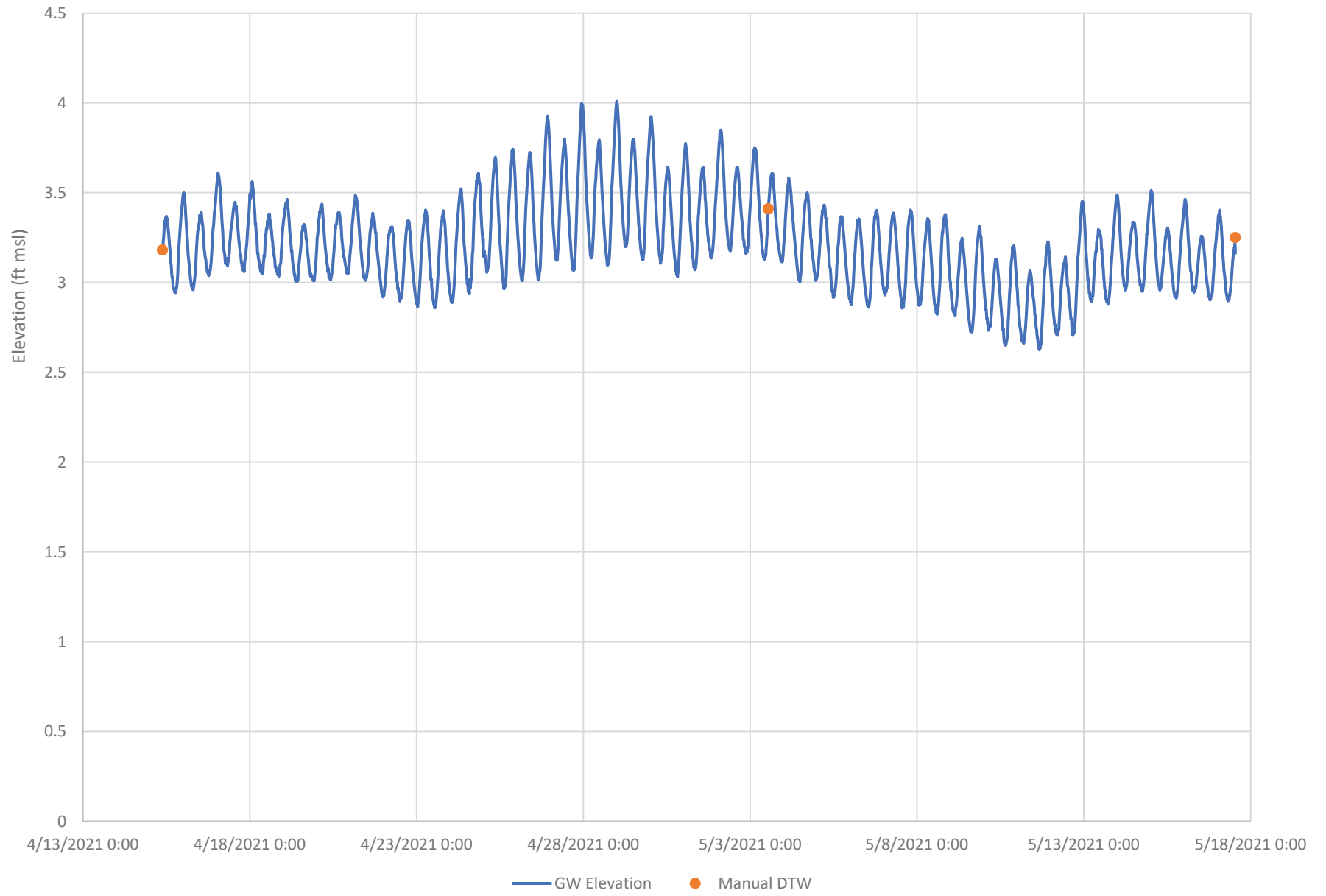
**Attachment F**  
Individual Well Period of Record Transducer  
Charts

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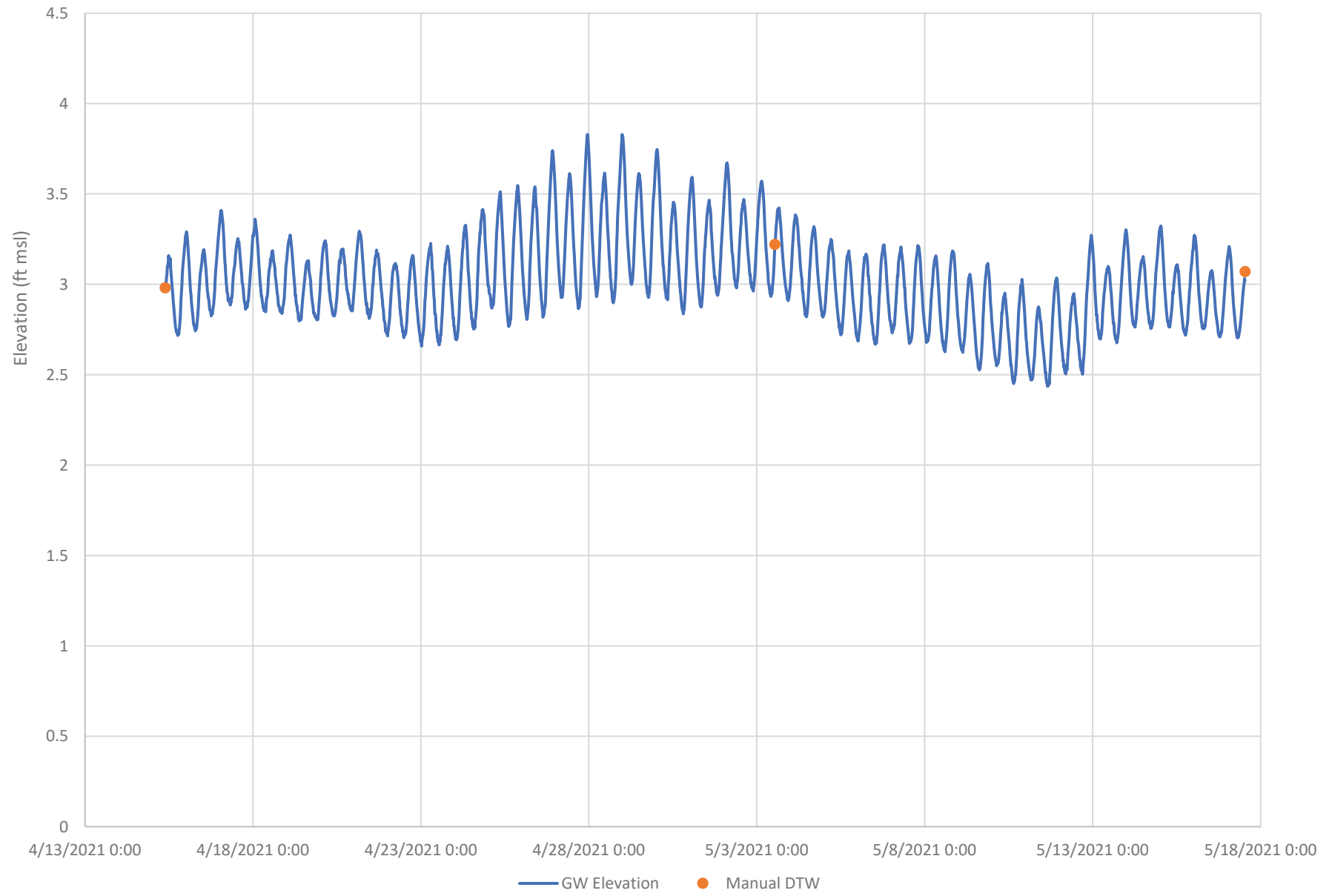
# MW-11S



# MW-11D

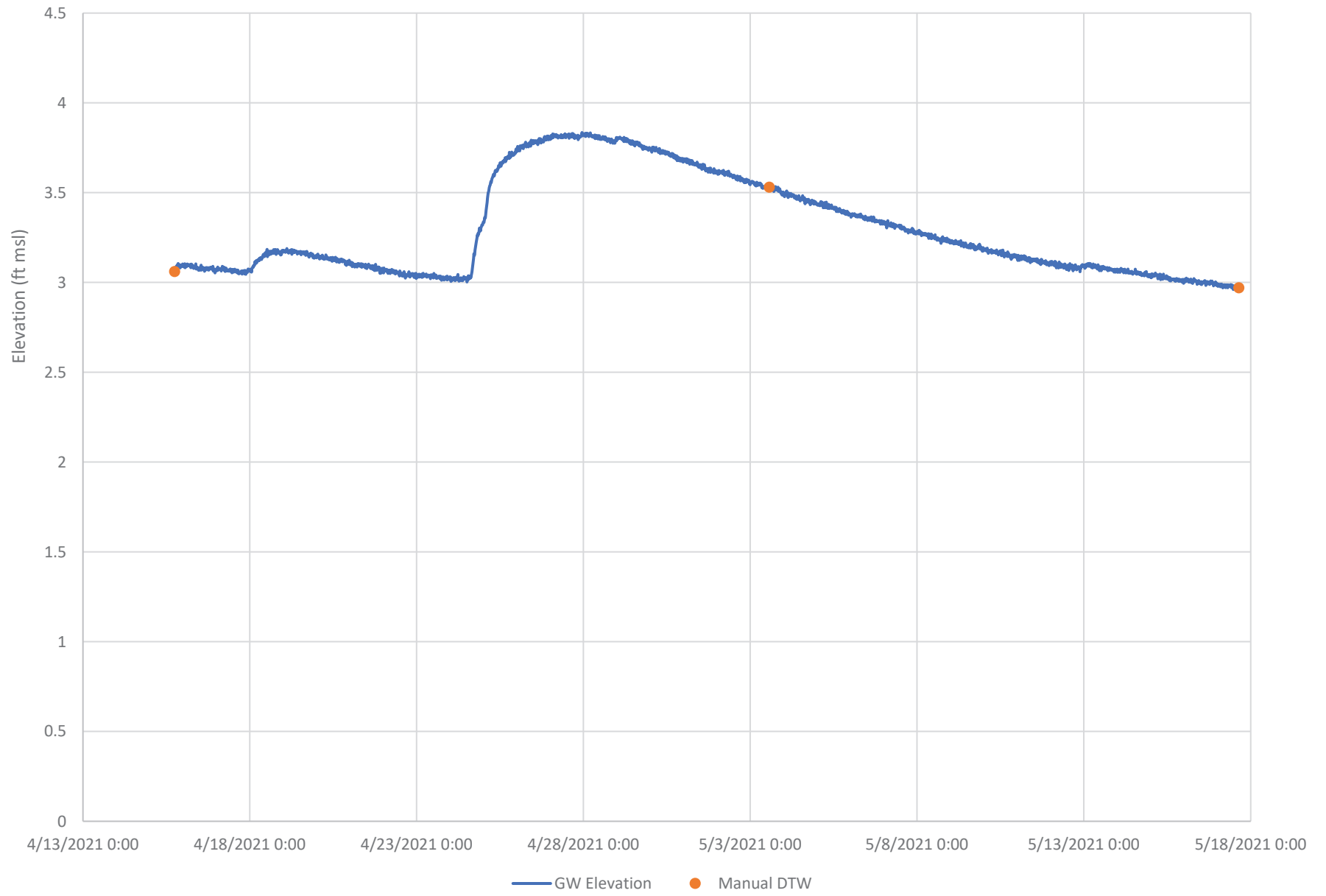


# MW-11DD

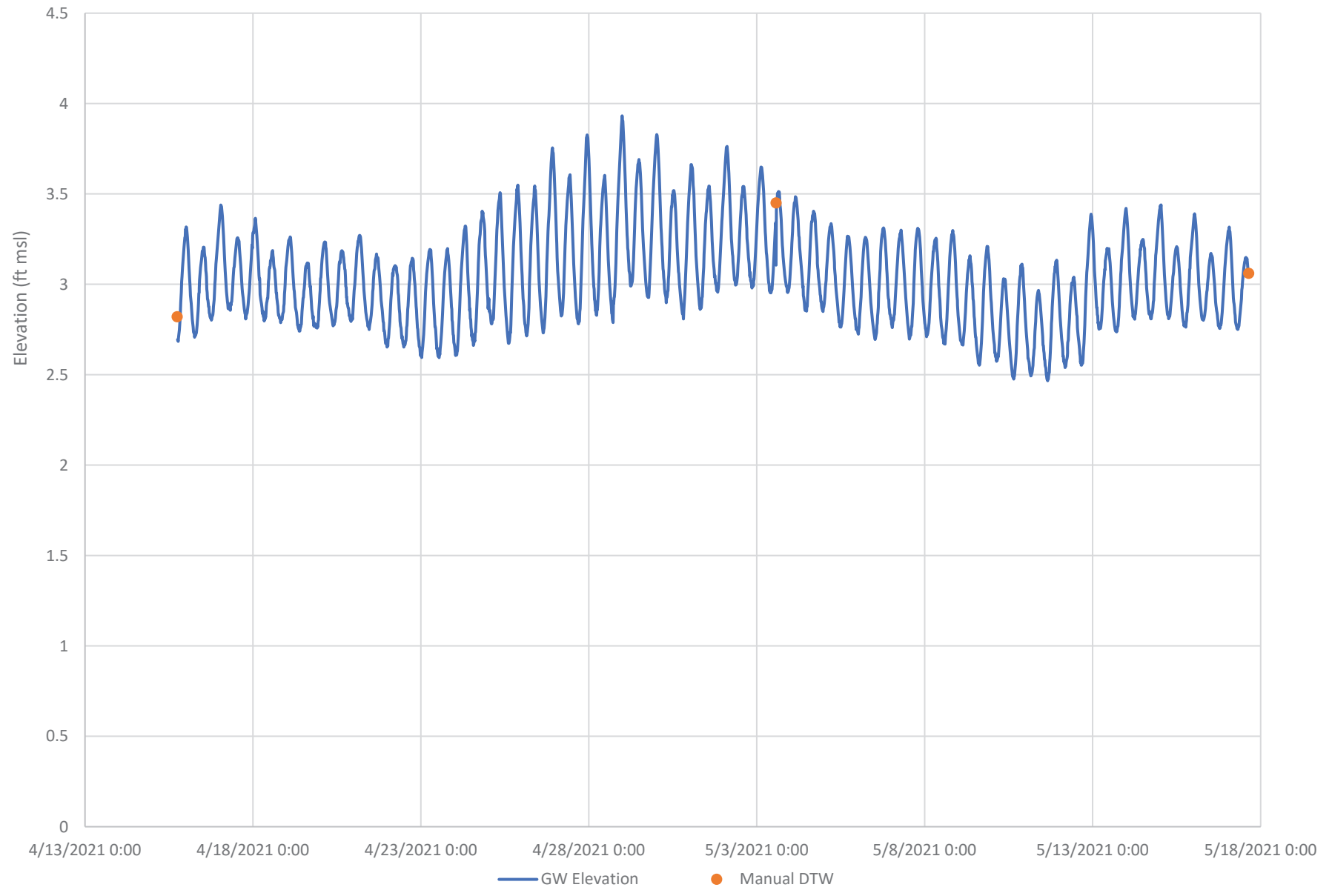




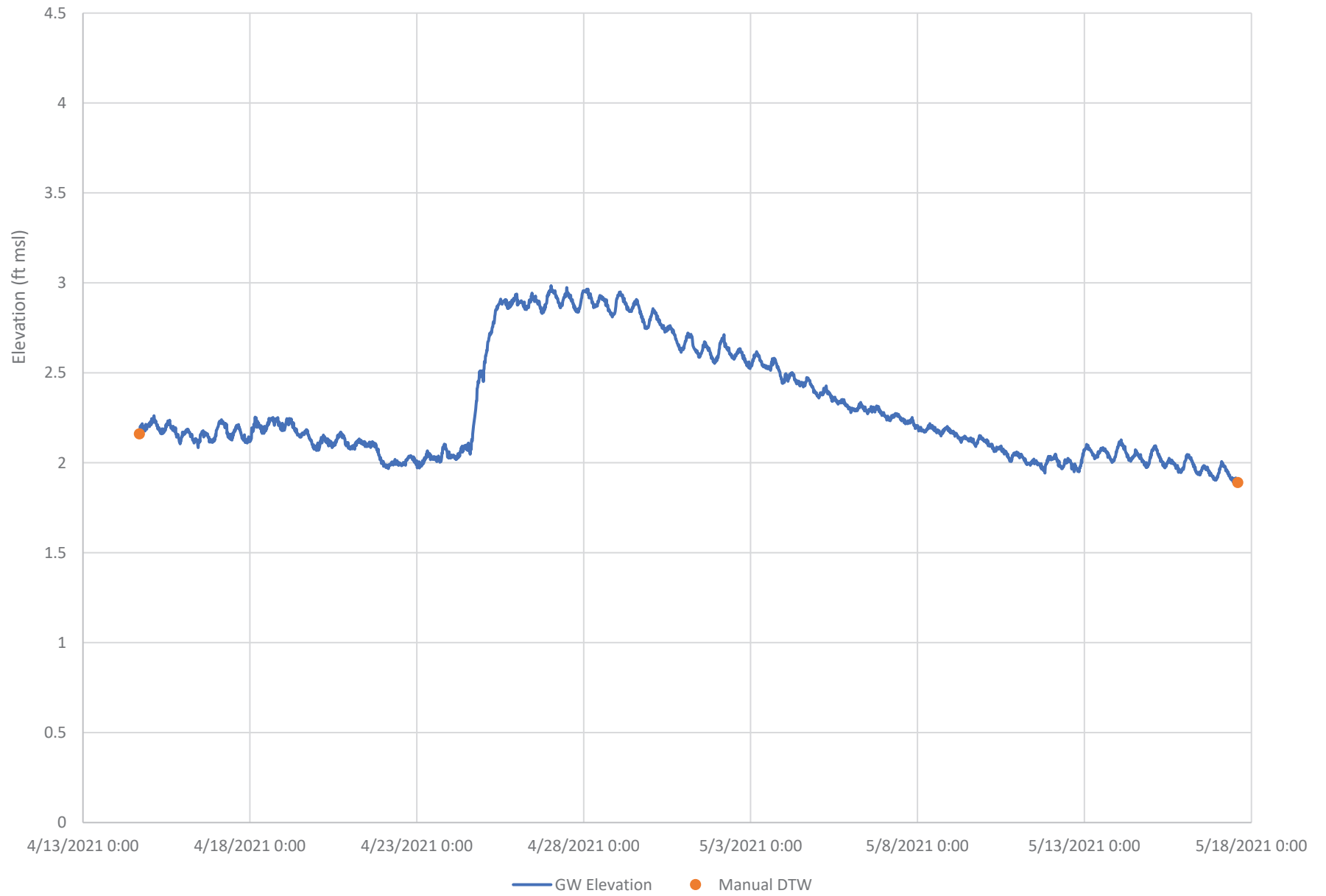
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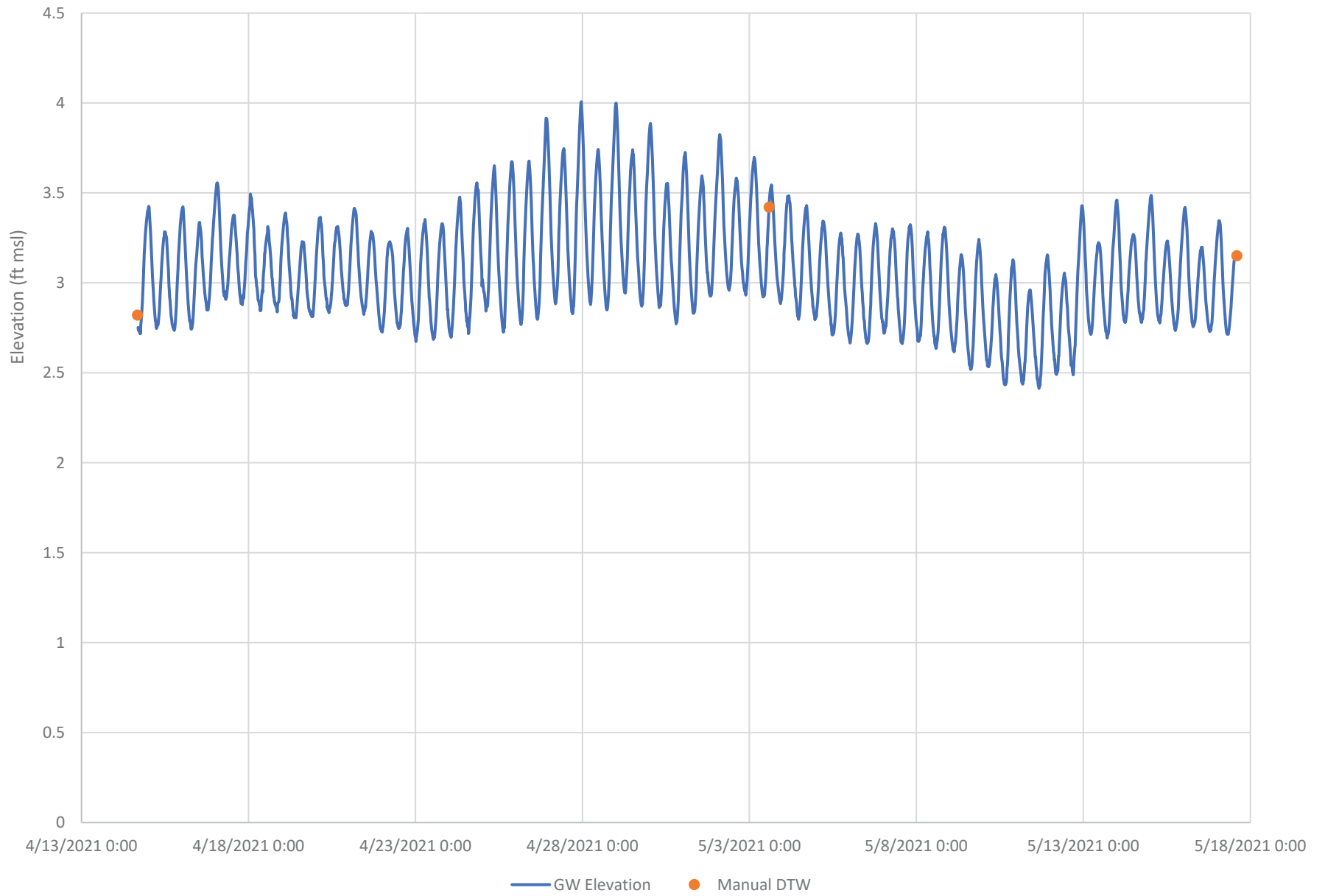
MW-26D



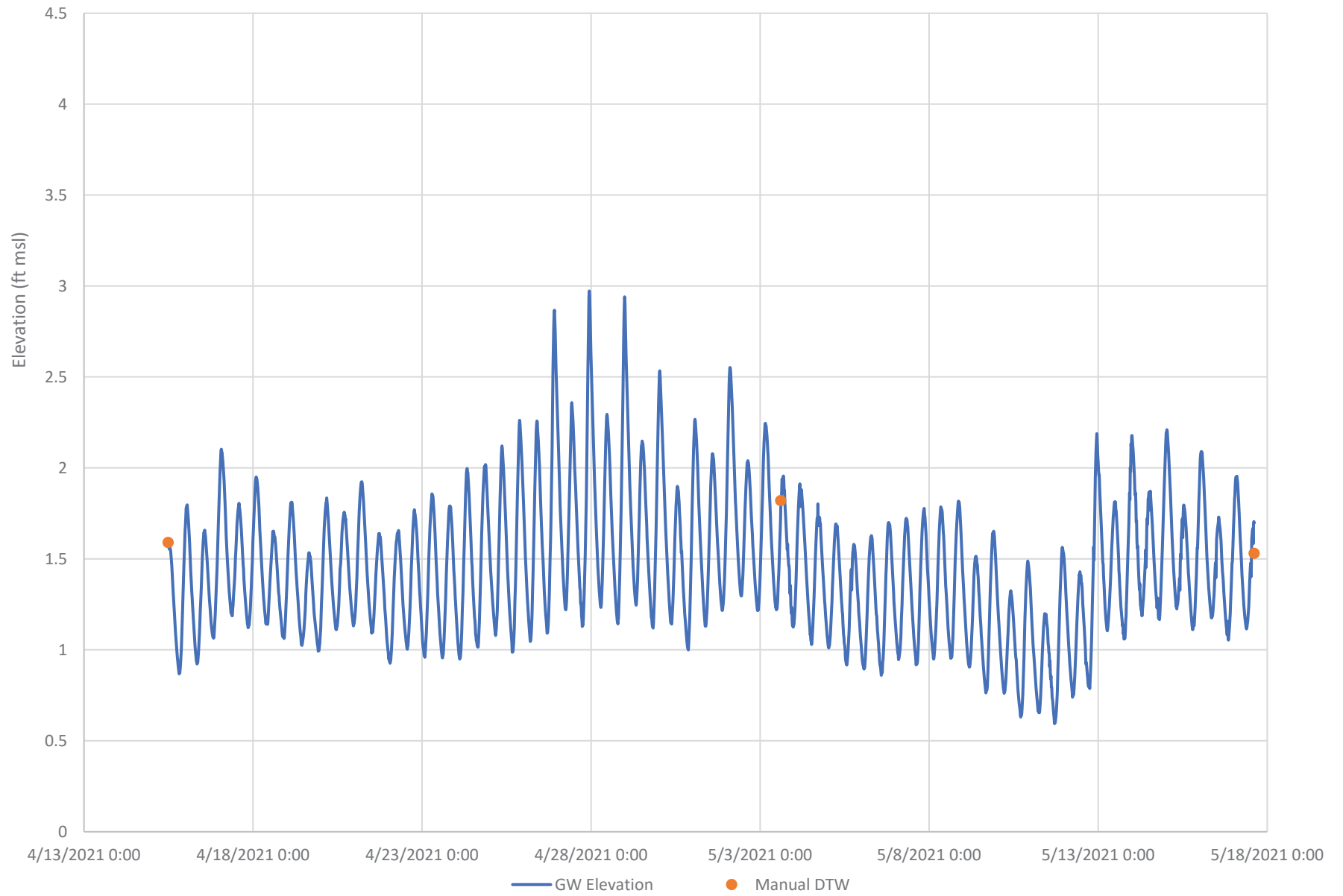
# MW-29S



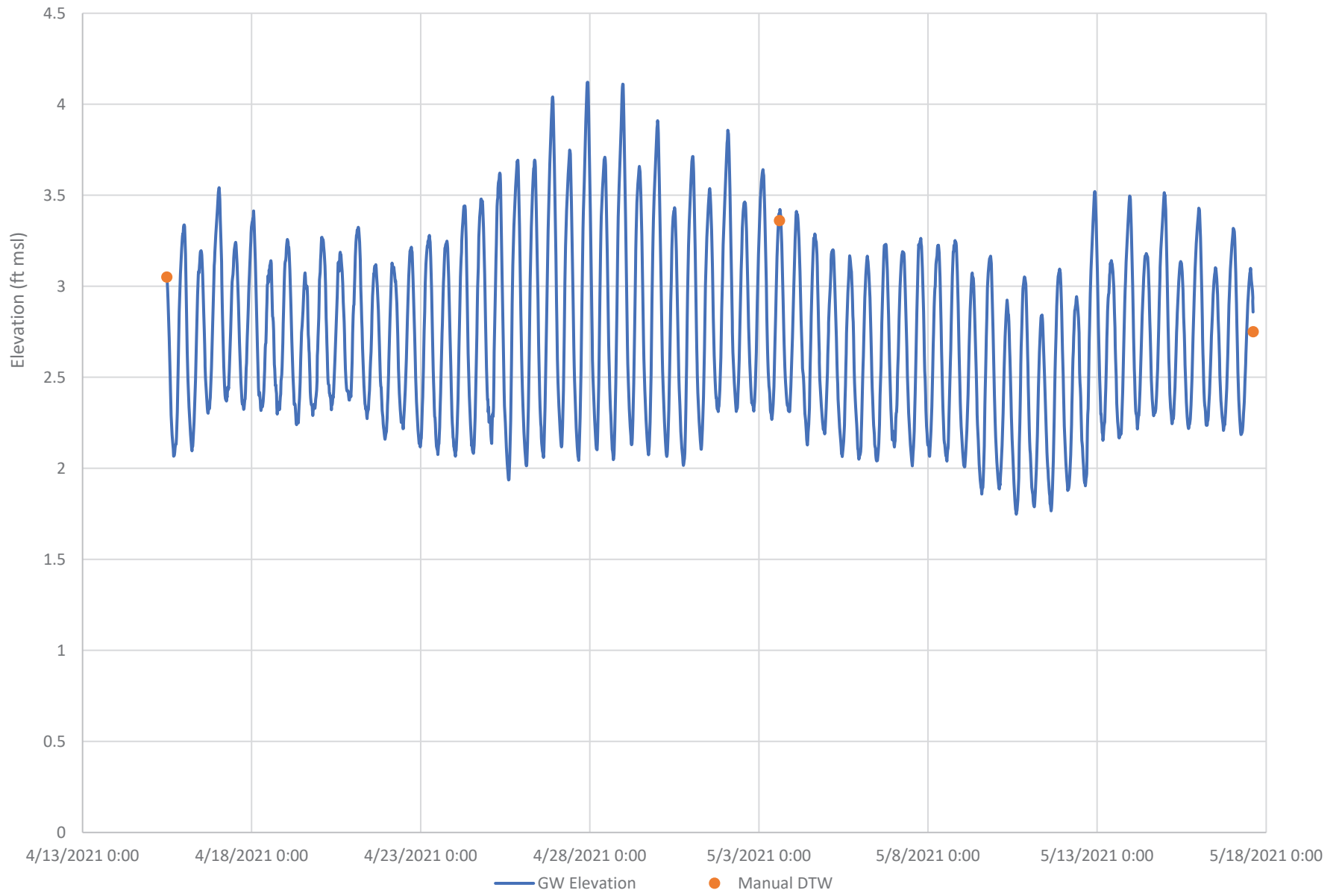
# MW-29I



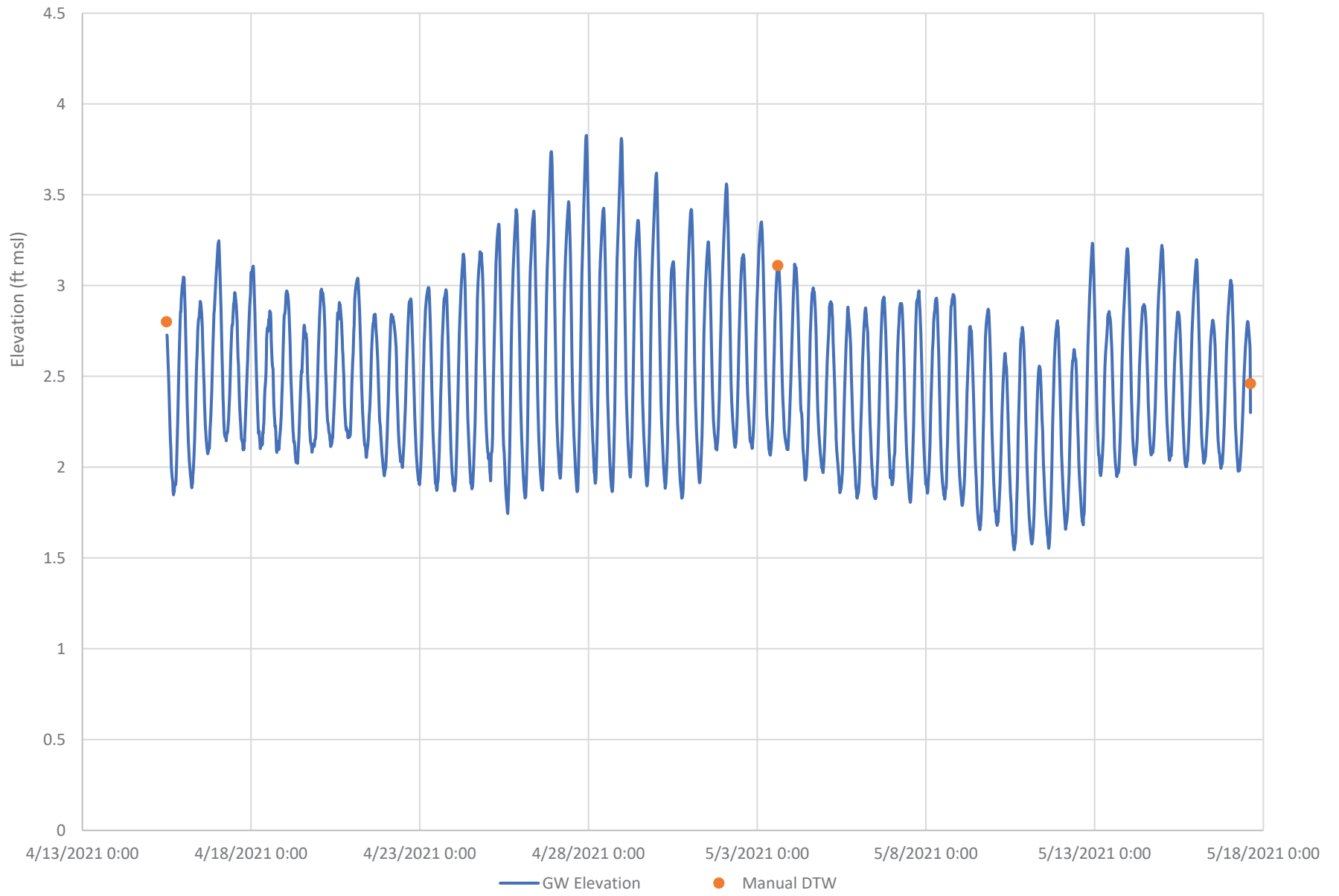
# MW-55S



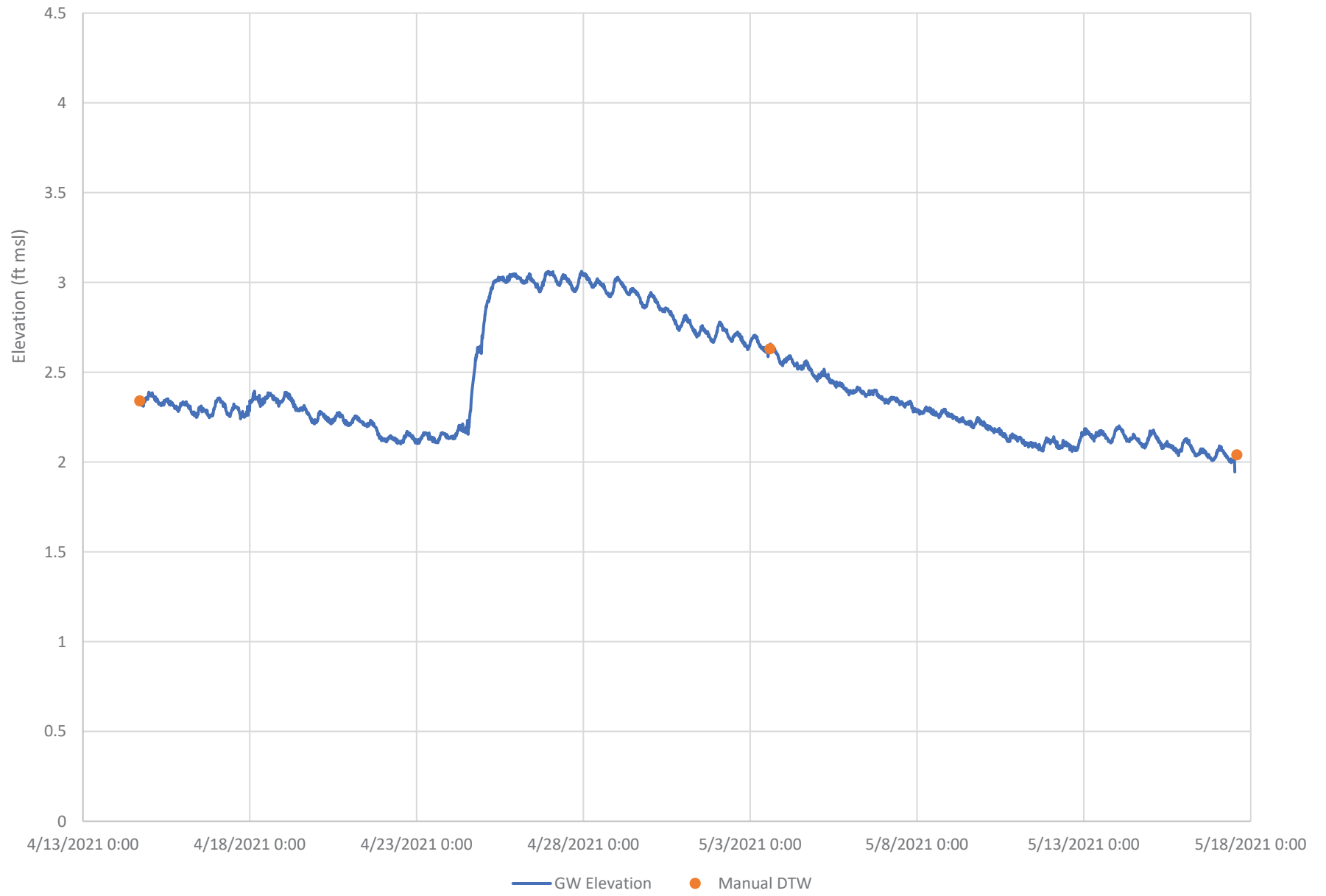
# MW-55I



# MW-55D

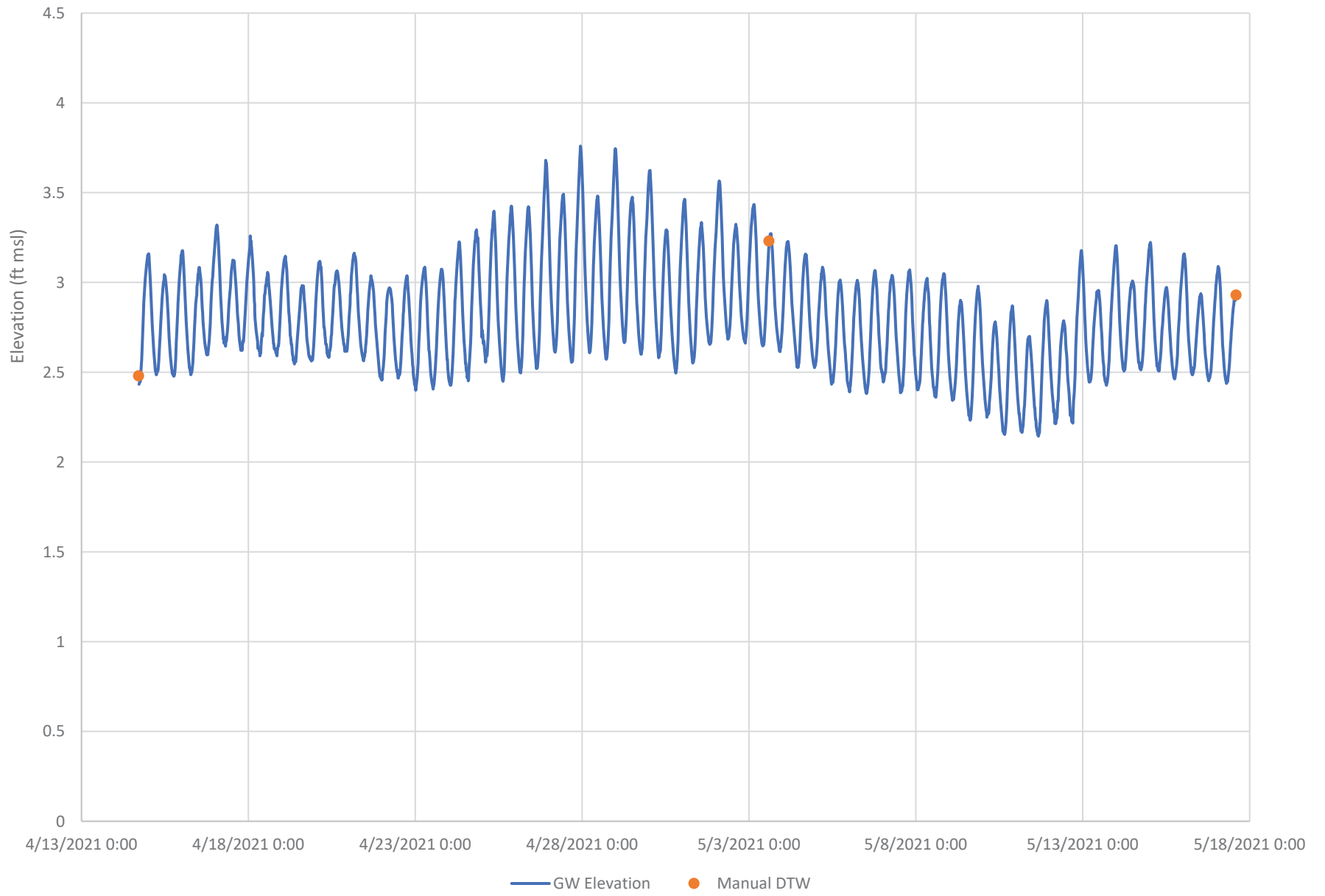


# OW-Q2S

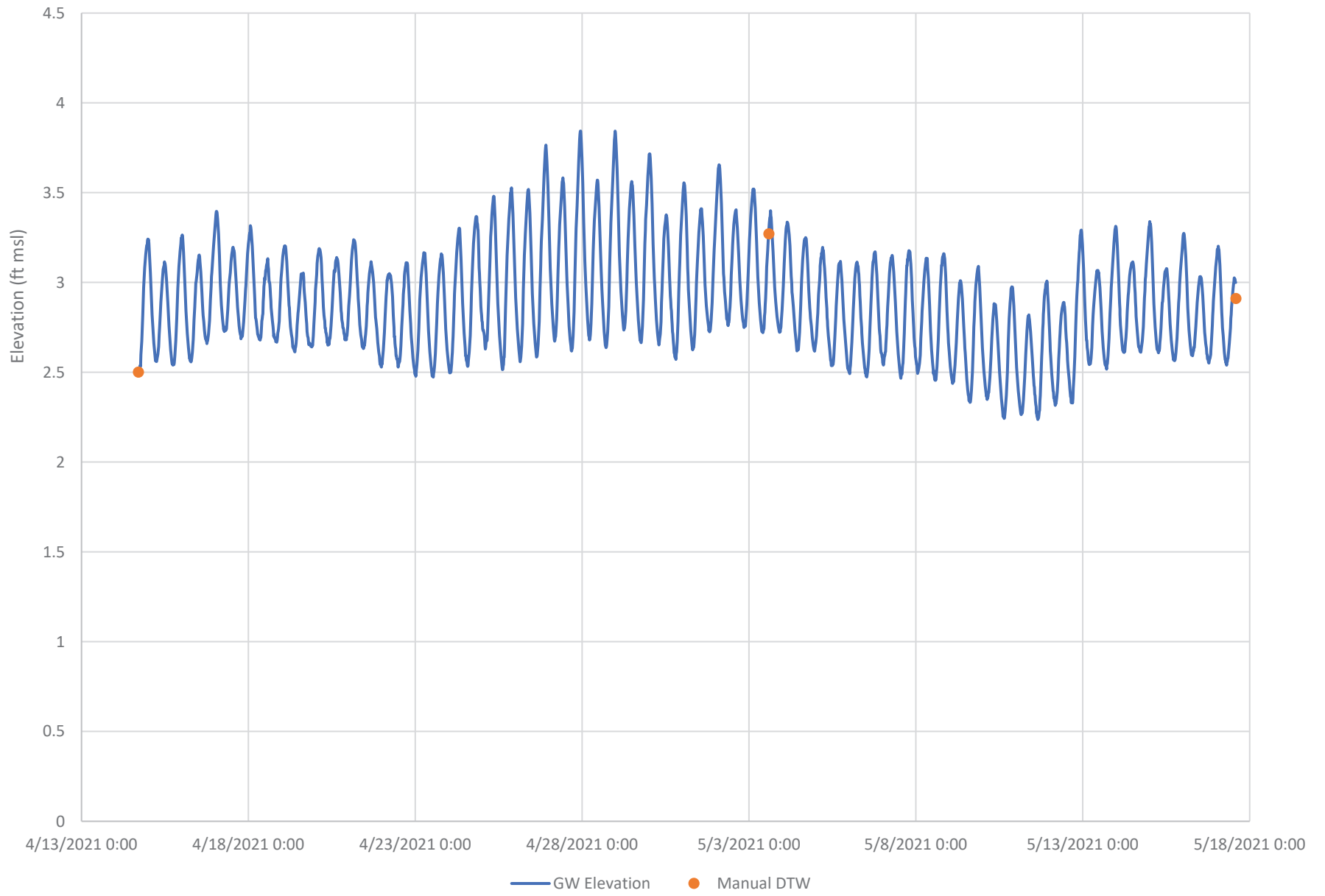




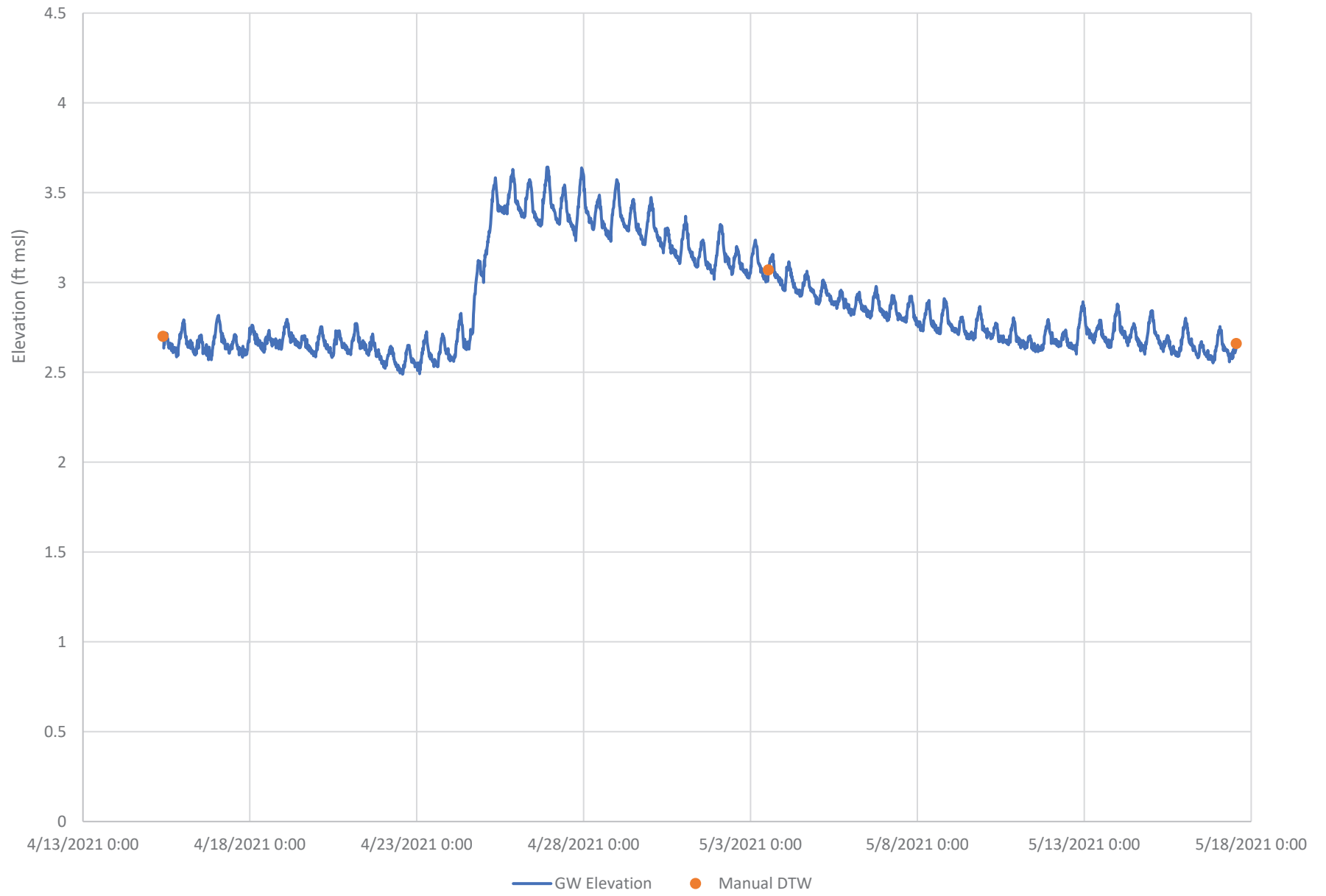
# OW-Q2I



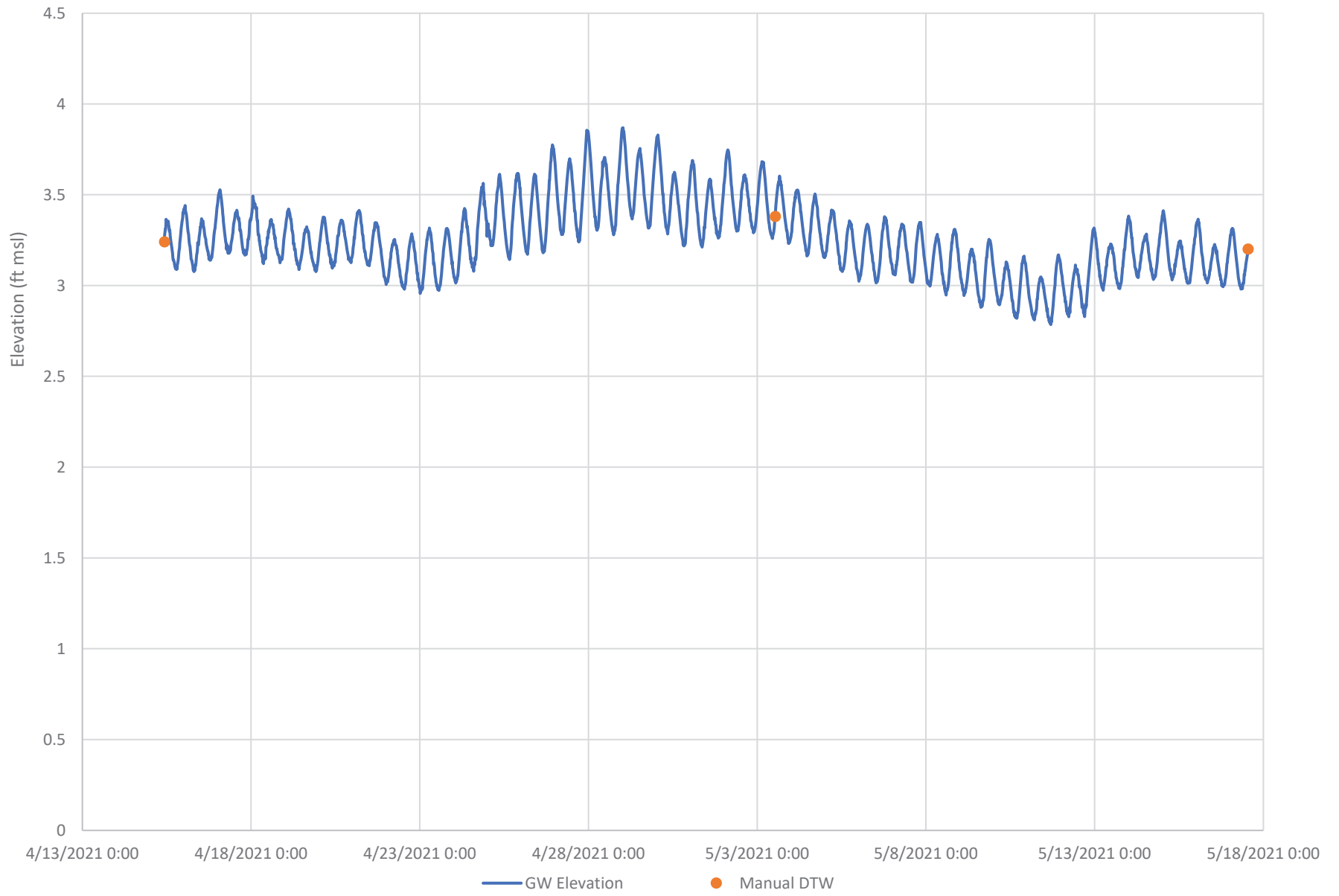
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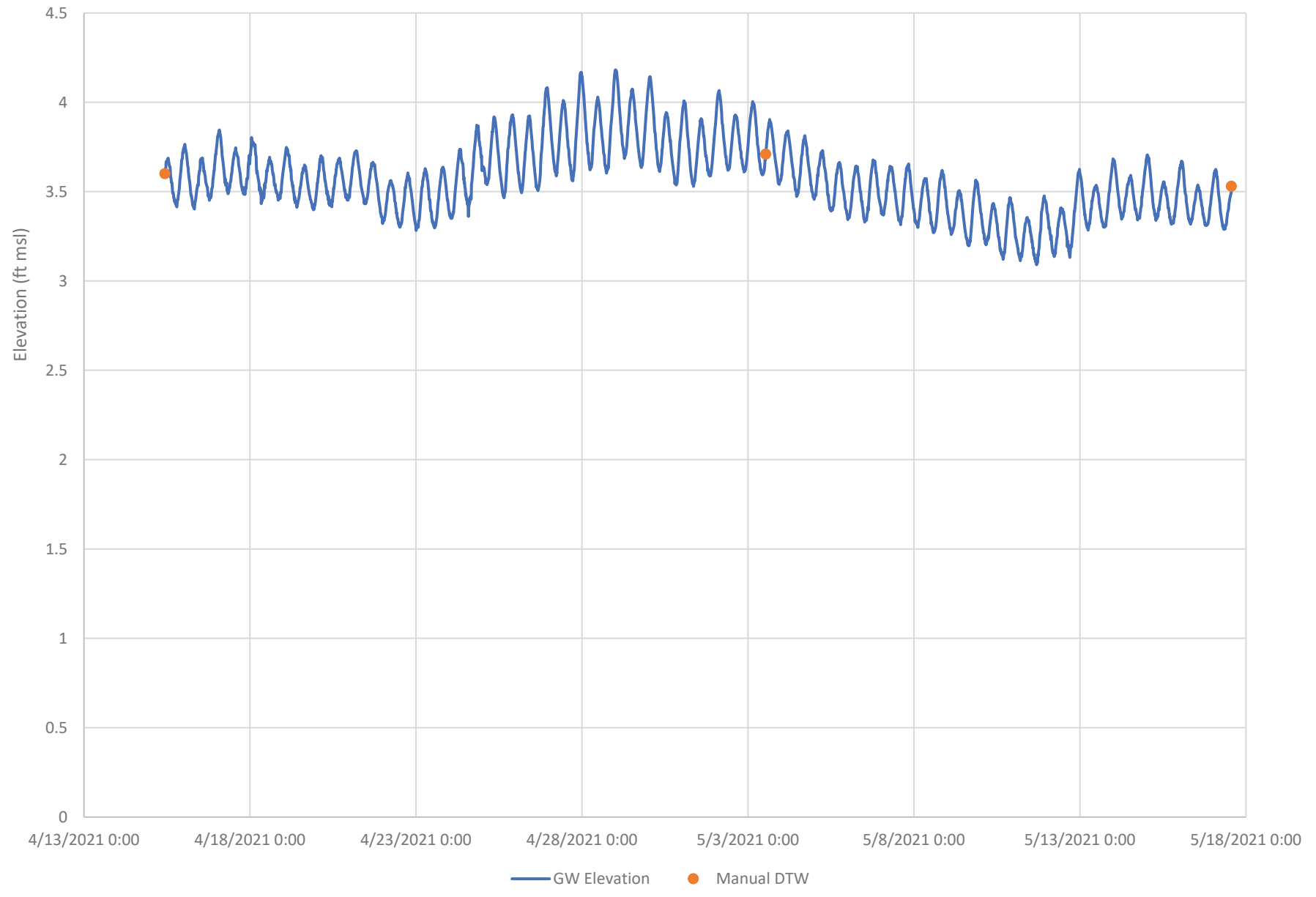
# OW-Q3S



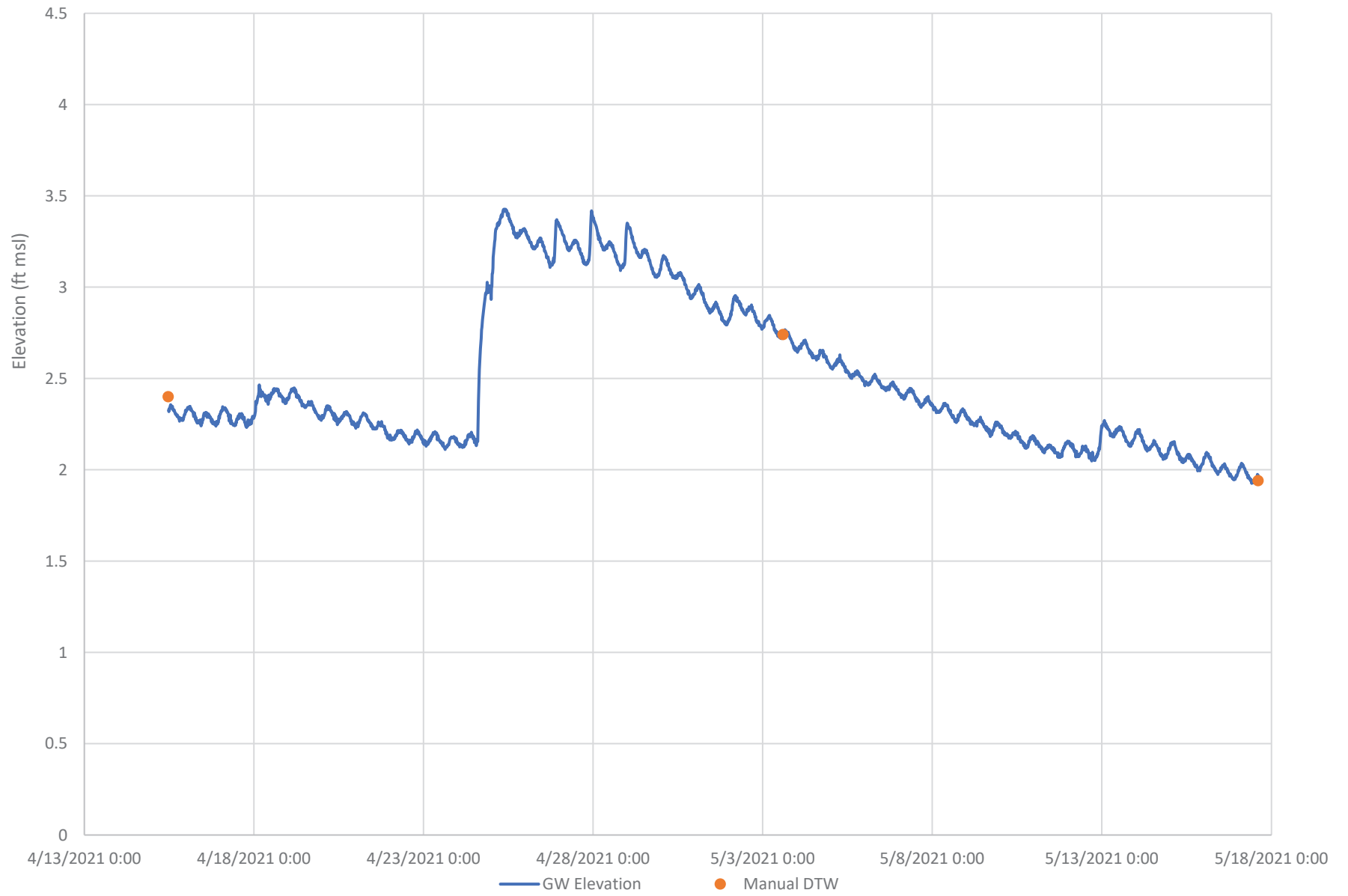
# OW-Q3I



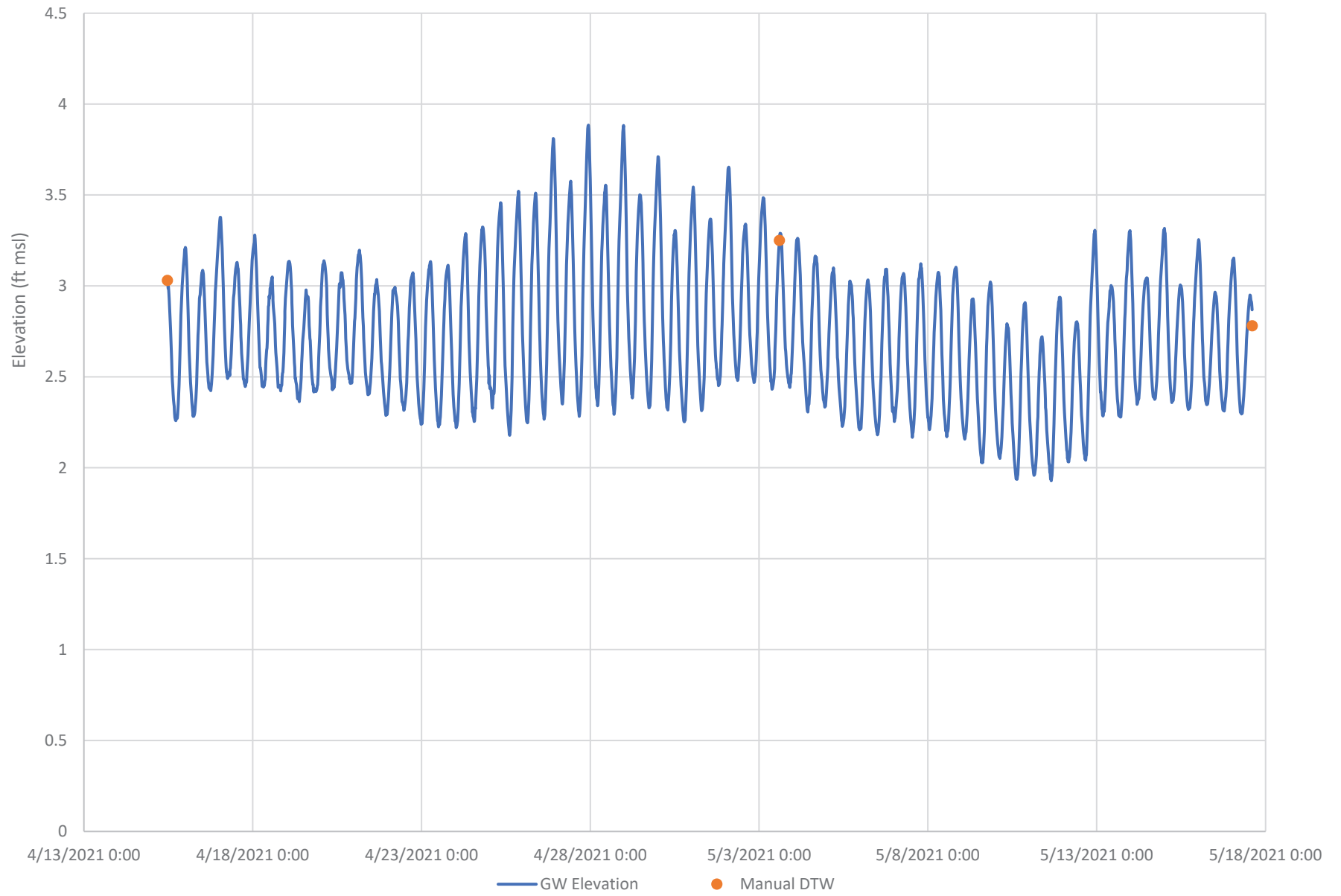
# PSOW-12



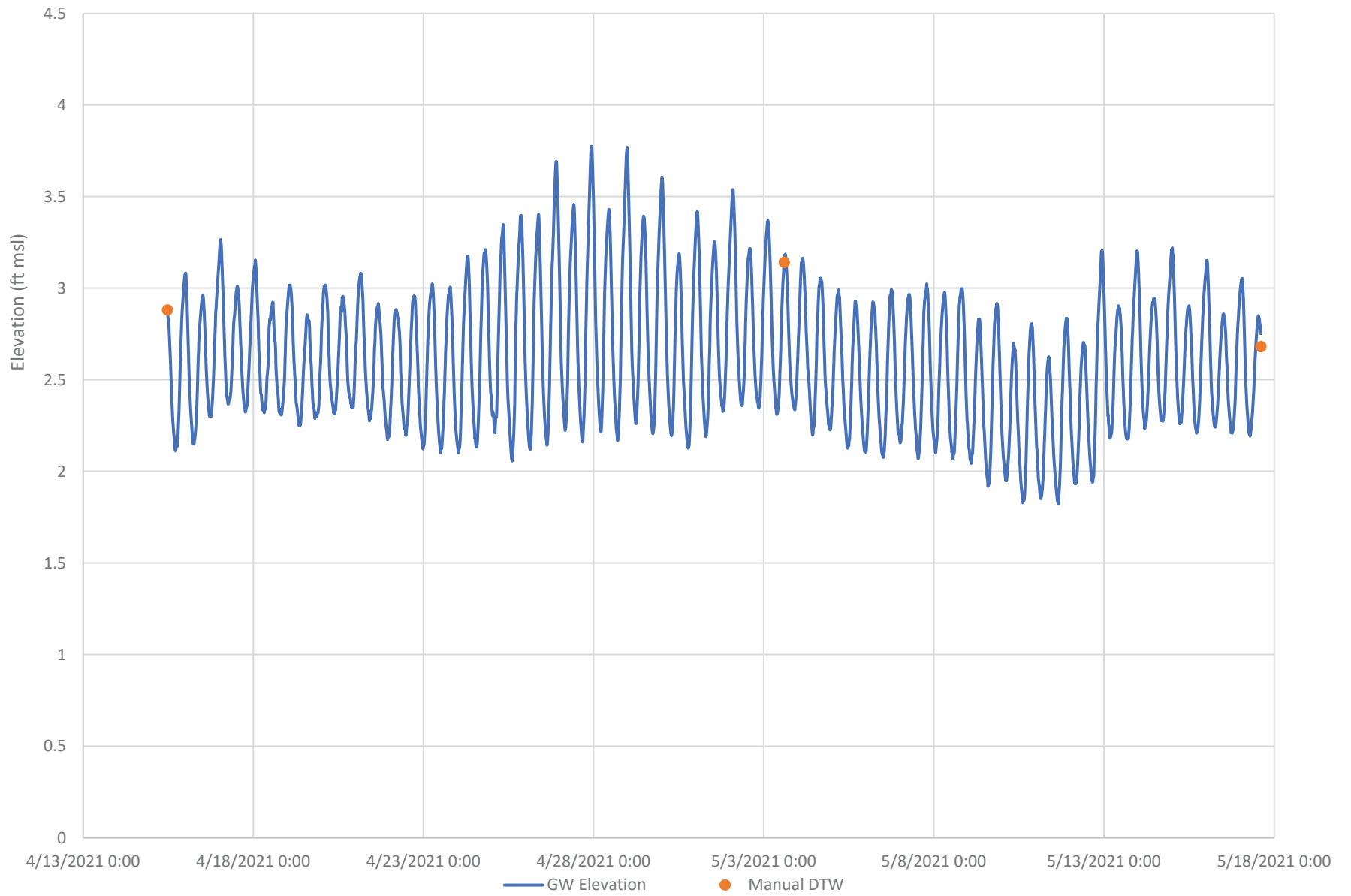
# OW-Q4S



# OW-Q4I

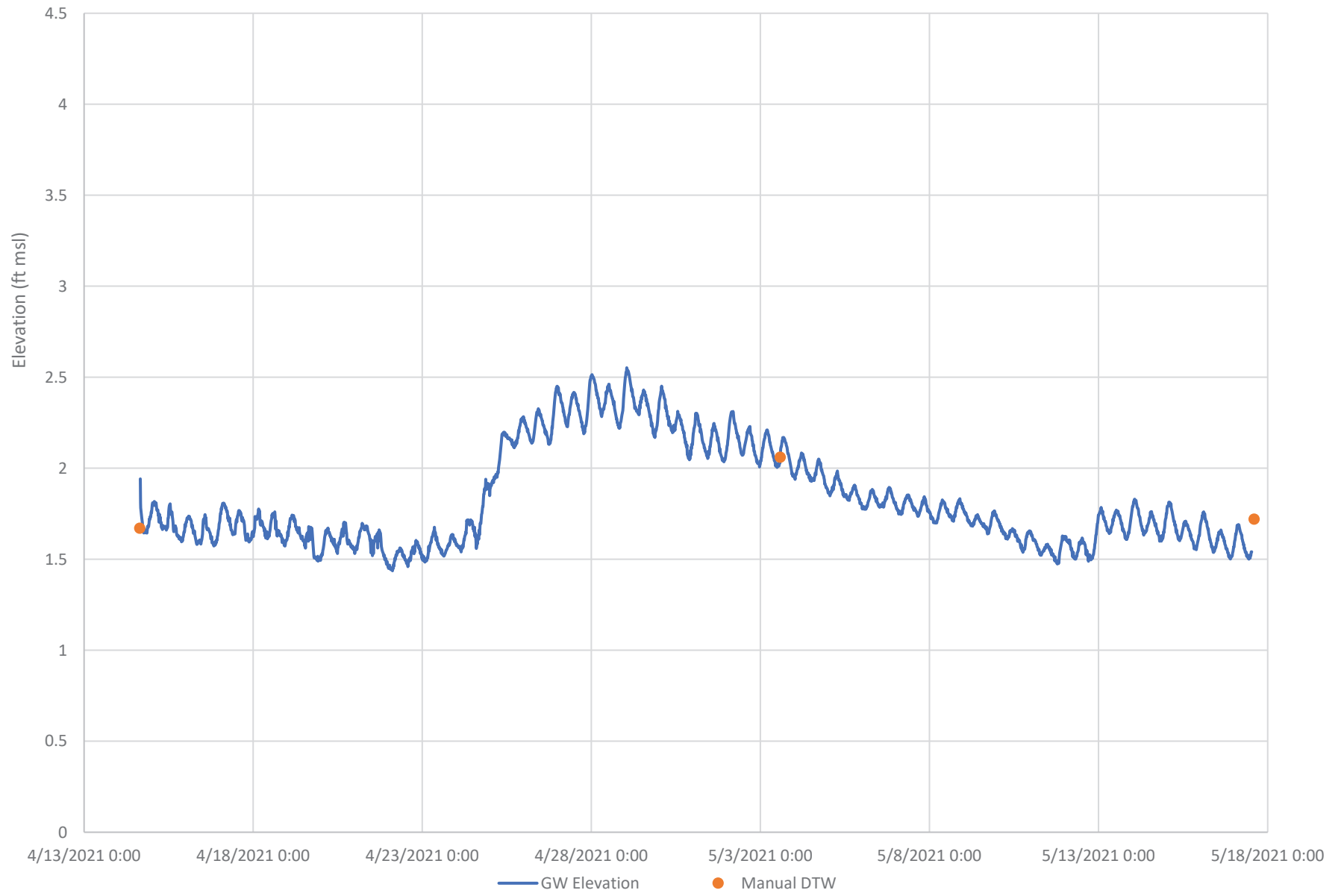


# OW-Q4D

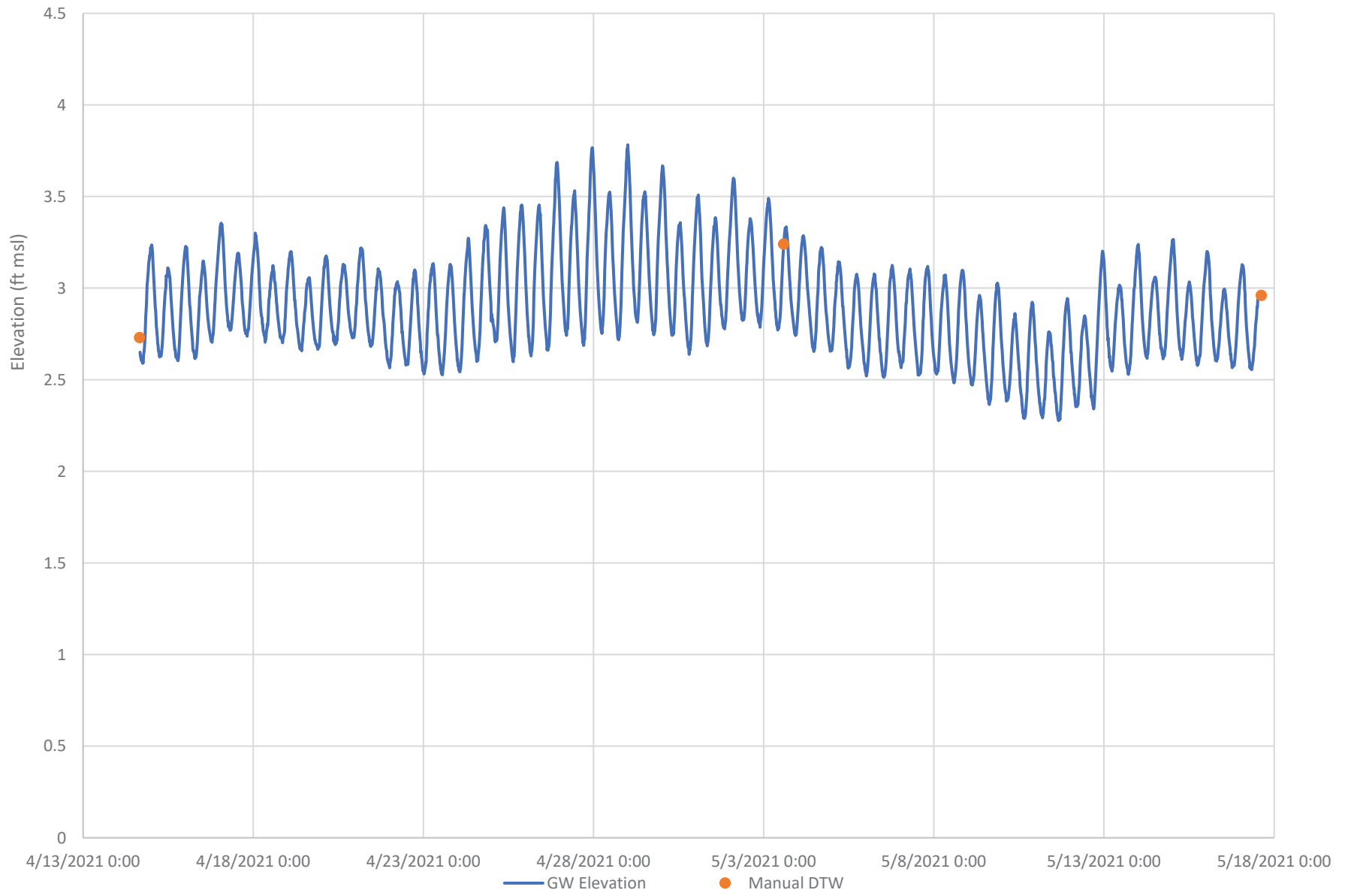




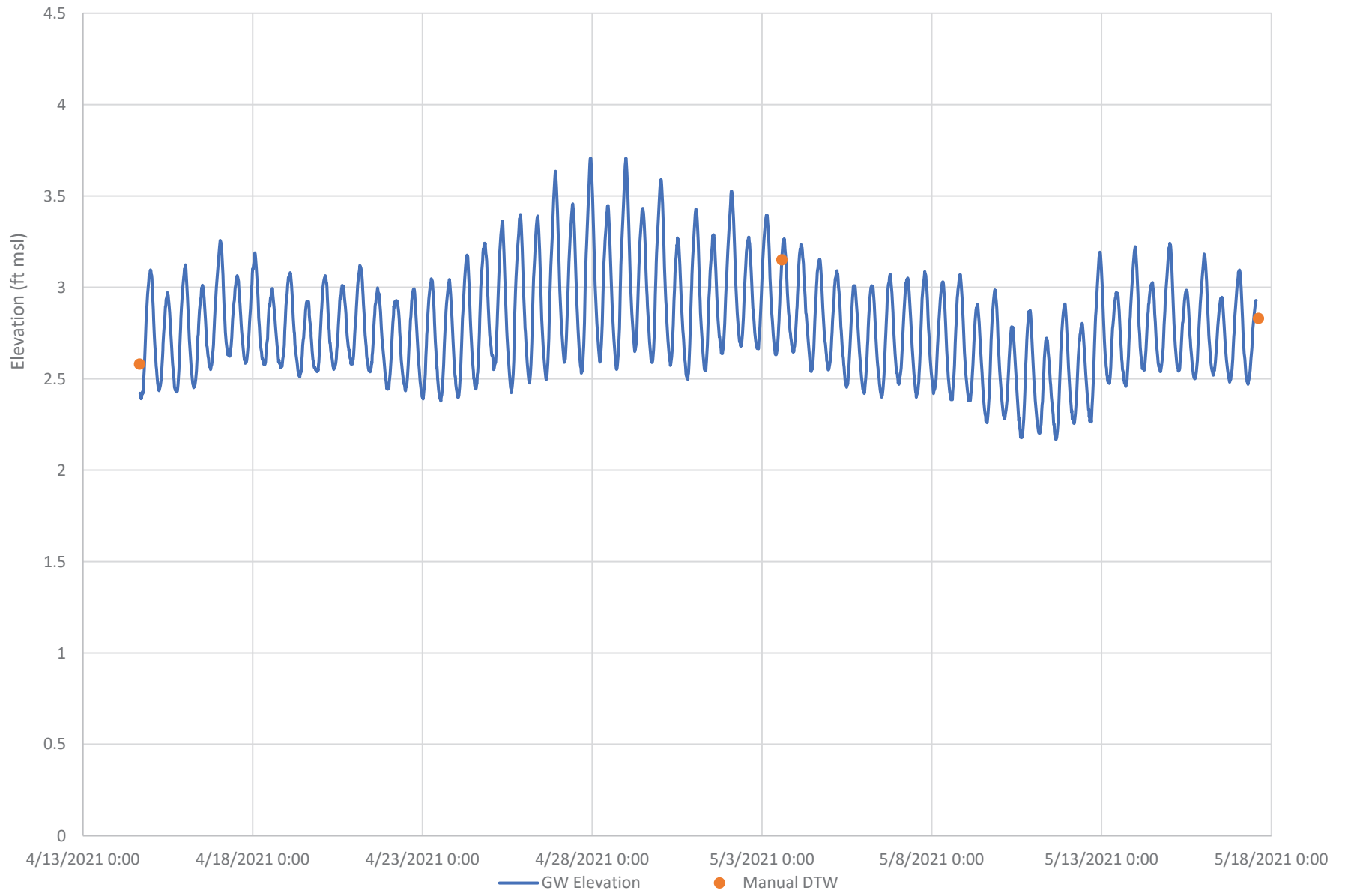
# OW-Q5S



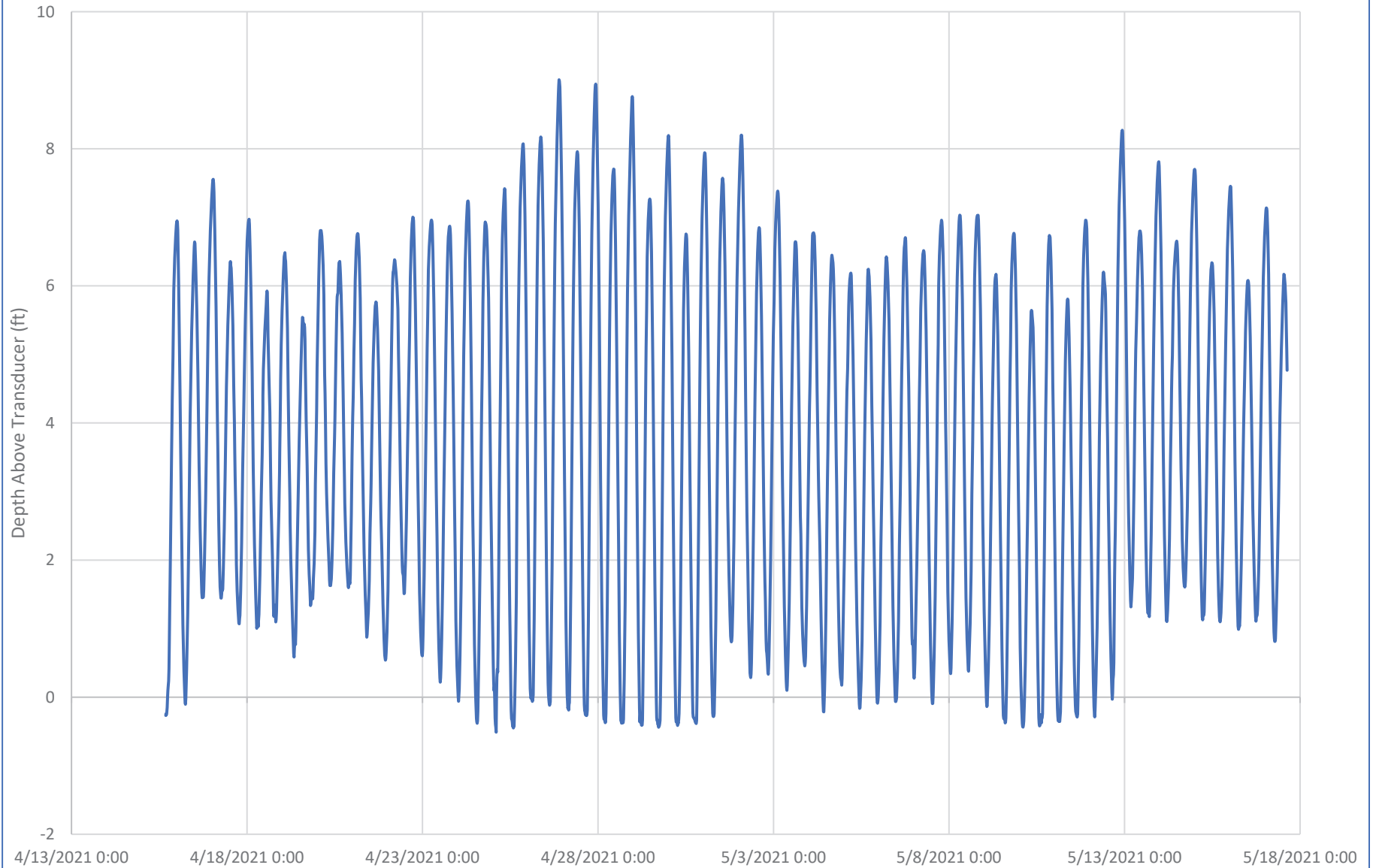
# OW-Q5I



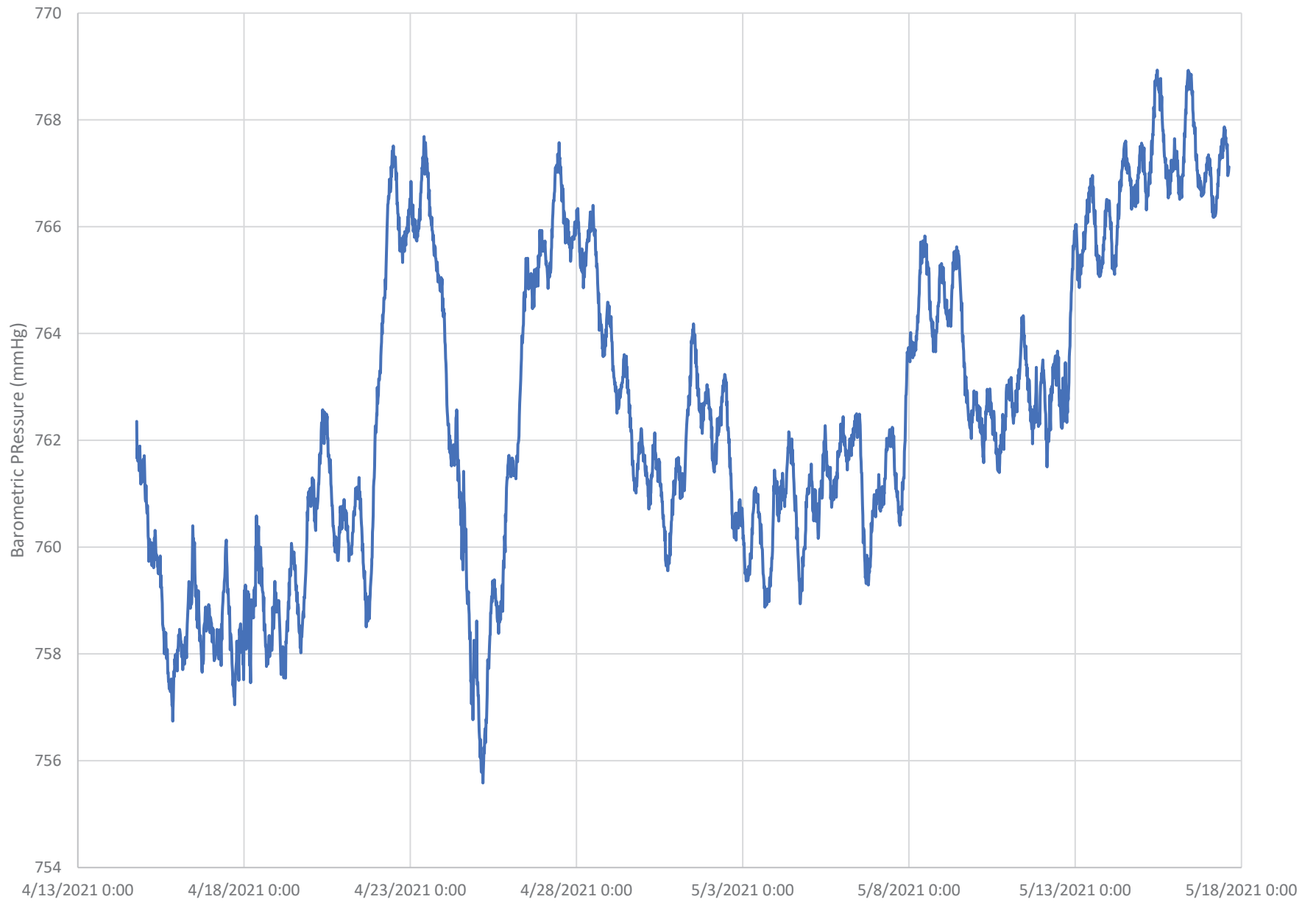
# OW-Q5D



Surface Water Depth Above Transducer



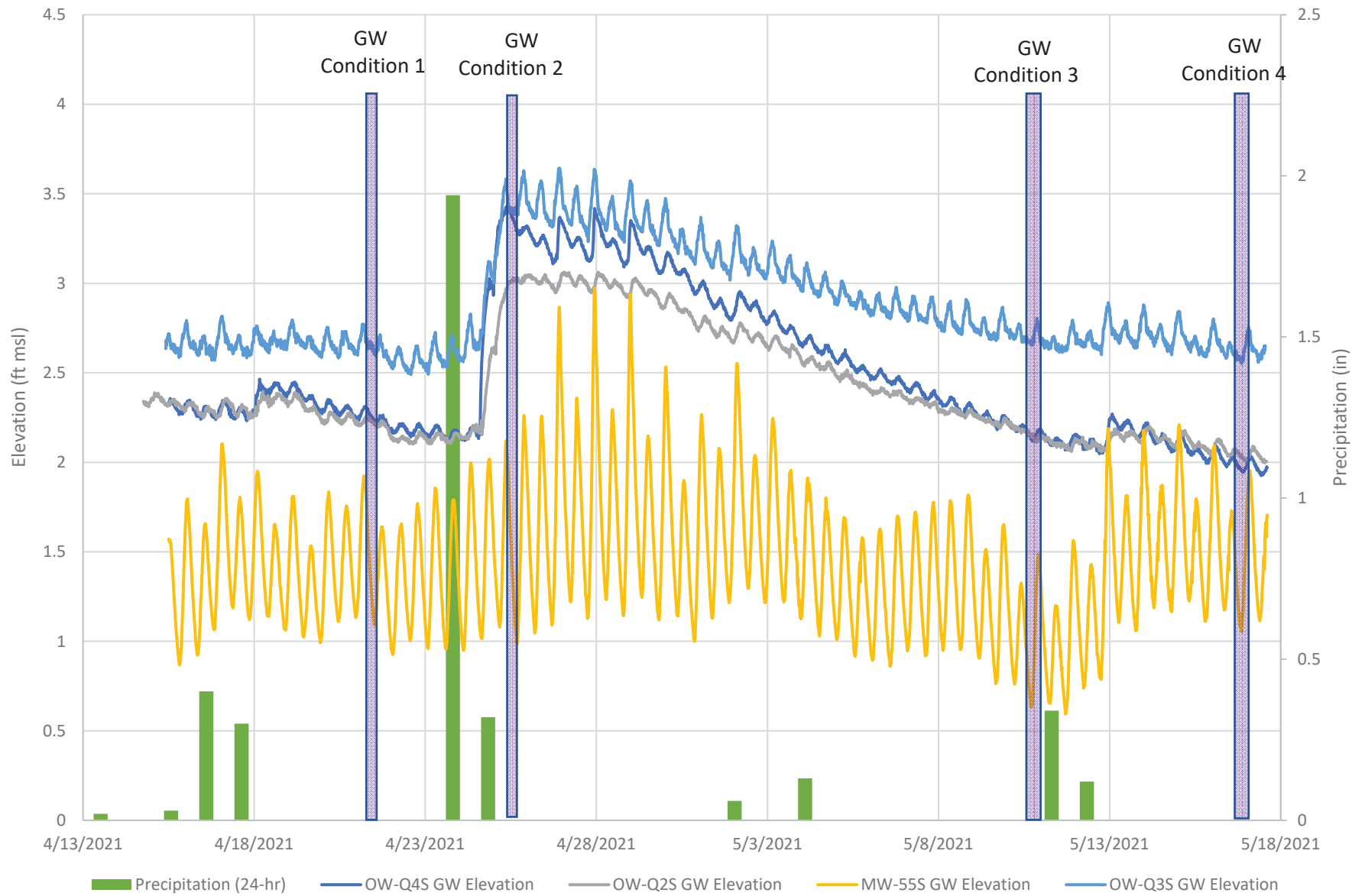
# Barometric Pressure



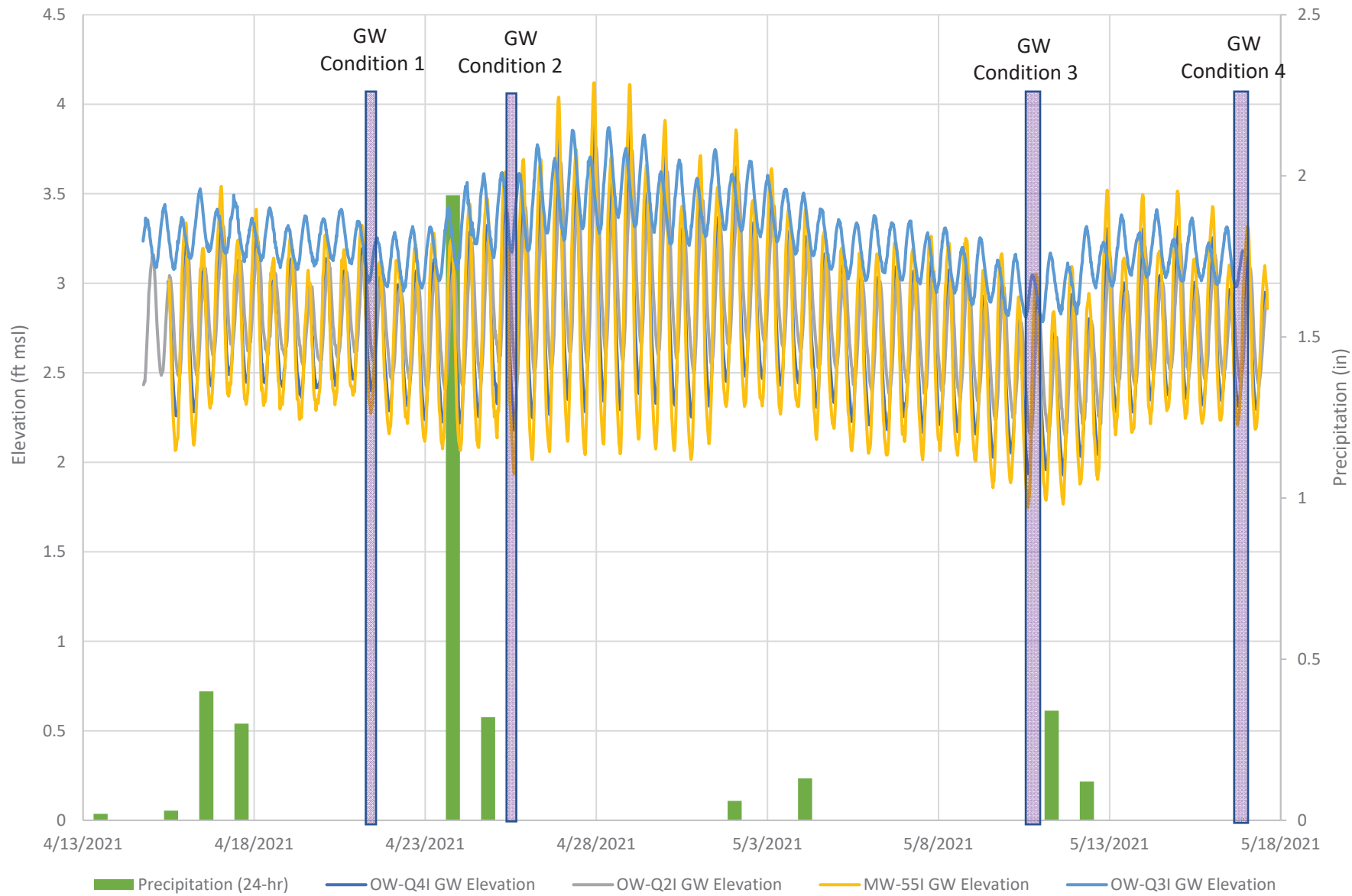
**Attachment G**  
**Transect Groundwater Elevation Charts**

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# Groundwater Elevation Transect 1 Shallow Surficial Aquifer



# Groundwater Elevation Transect 1 Intermediate Surficial Aquifer

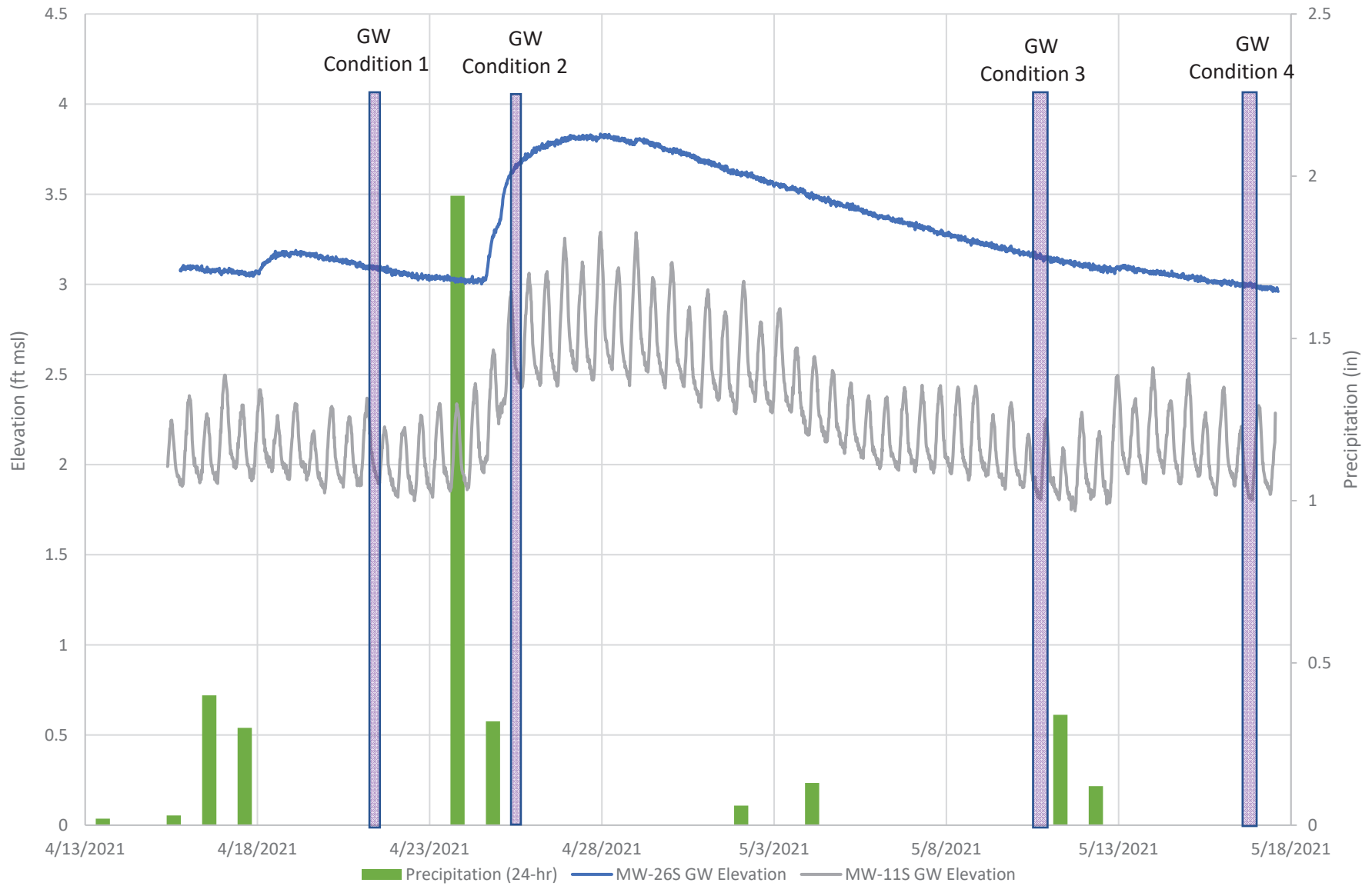




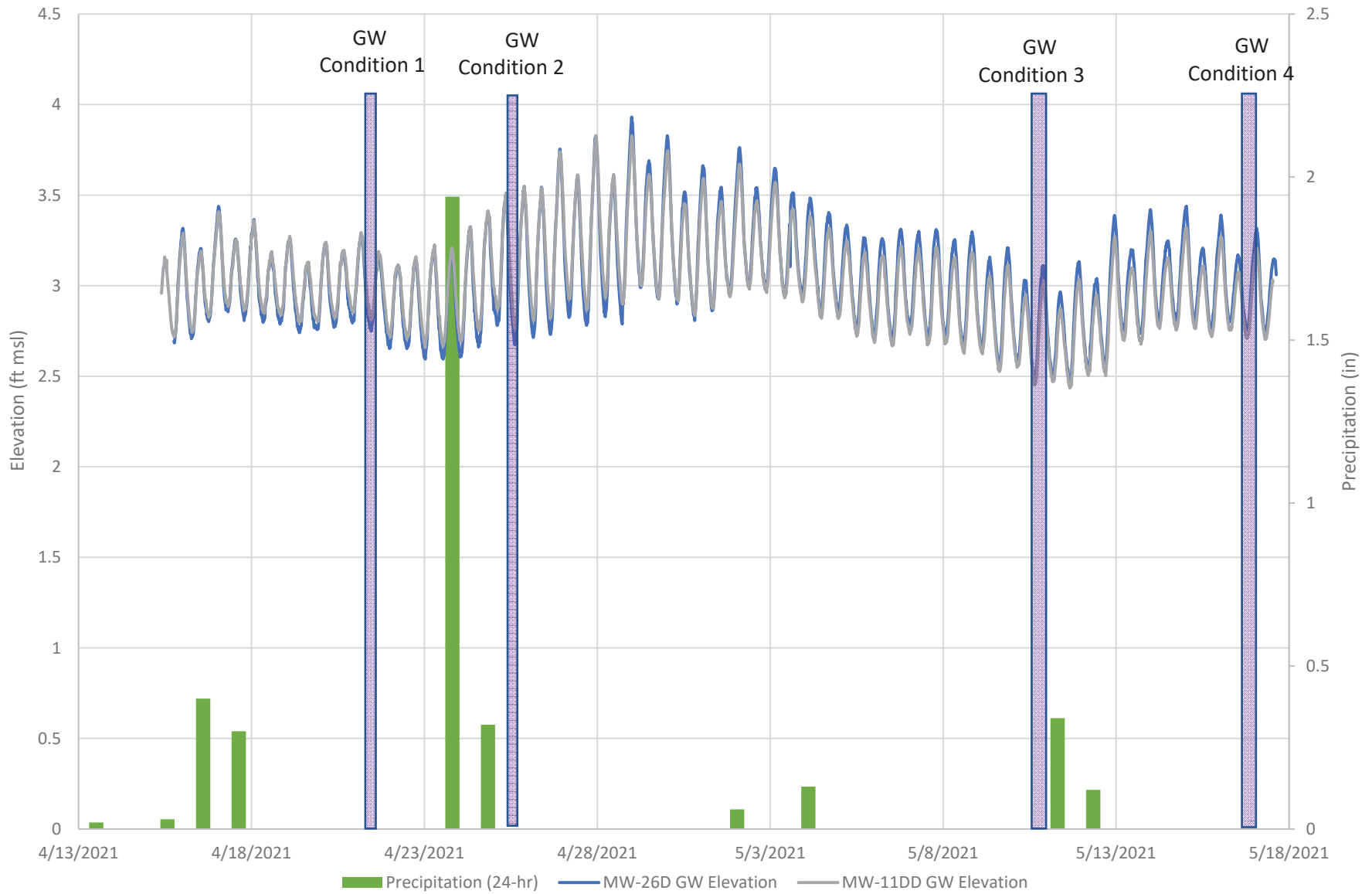
# Groundwater Elevation Transect 1 Deep Surficial Aquifer



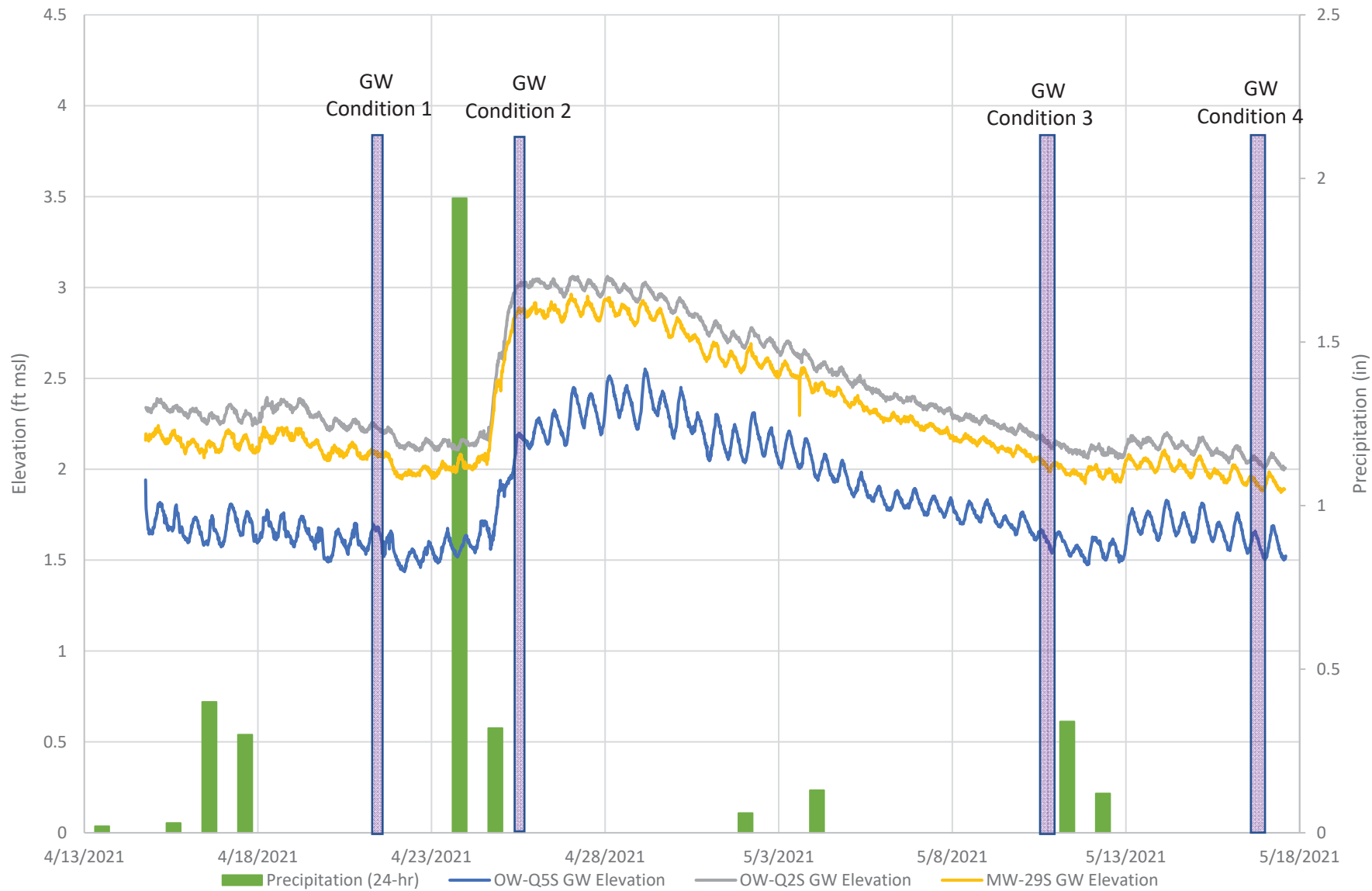
# Groundwater Elevation Transect 2 Shallow Surficial Aquifer



# Groundwater Elevation Transect 2 Deep Surficial Aquifer



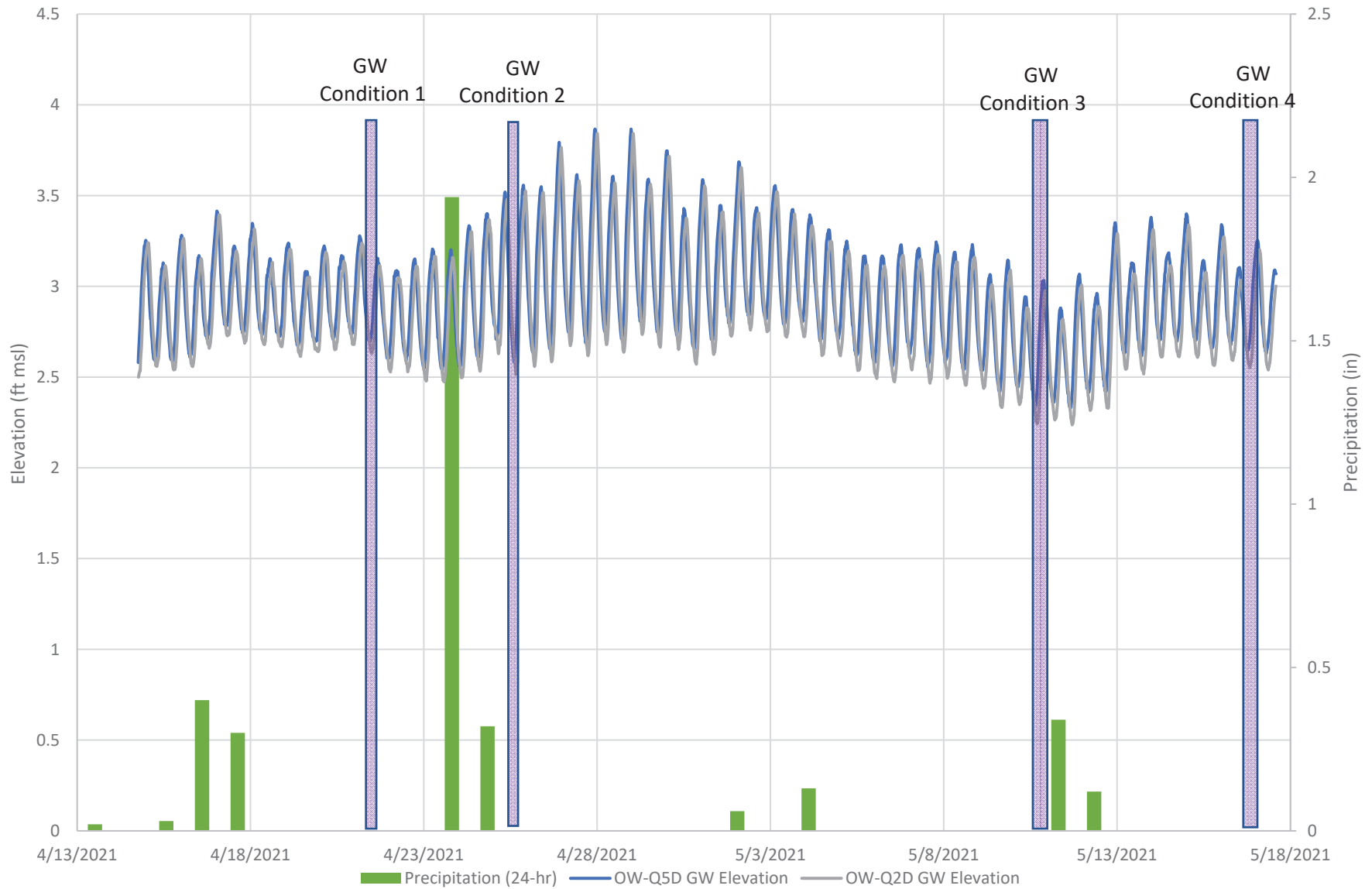
### Groundwater Elevation Transect 3 Shallow Surficial Aquifer



### Groundwater Elevation Transect 3 Intermediate Surficial Aquifer



# Groundwater Elevation Transect 3 Deep Surficial Aquifer



**Attachment H**  
**Horizontal Hydraulic Gradients**

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**Attachment H**  
**Horizontal Groundwater Gradients**  
**Shallow Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

<b>Groundwater Condition 1 - High Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-26S	4/21/2021	3.10	563	1.45	2.57E-03
OW-Q5S		1.65			
OW-Q2S	4/21/2021	2.22	220	0.57	2.60E-03
OW-Q5S		1.65			
MW-29S	4/21/2021	2.11	136	0.46	3.36E-03
OW-Q5S		1.65			
MW-11S	4/21/2021	2.26	218	0.61	2.82E-03
OW-Q5S		1.65			
				<b>Geomean</b>	<b>2.82E-03</b>

<b>Groundwater Condition 1 - Low Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-26S	4/21/2021	3.09	563	1.45	2.57E-03
OW-Q5S		1.64			
OW-Q2S	4/21/2021	2.22	220	0.58	2.63E-03
OW-Q5S		1.64			
MW-29S	4/21/2021	2.11	136	0.47	3.48E-03
OW-Q5S		1.64			
MW-11S	4/21/2021	1.96	218	0.31	1.42E-03
OW-Q5S		1.65			
				<b>Geomean</b>	<b>2.87E-03</b>

Notes:  
ft = feet  
msl = mean sea level



**Attachment H**  
**Horizontal Groundwater Gradients**  
**Shallow Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

<b>Groundwater Condition 2 - High Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-26S	4/25/2021	3.61	563	1.47	2.61E-03
OW-Q5S		2.14			
OW-Q2S	4/25/2021	2.97	220	0.83	3.75E-03
OW-Q5S		2.14			
MW-29S	4/25/2021	2.81	136	0.67	4.95E-03
OW-Q5S		2.14			
MW-11S	4/25/2021	2.92	218	0.78	3.60E-03
OW-Q5S		2.14			
				<b>Geomean</b>	<b>3.63E-03</b>

<b>Groundwater Condition 2 - Low Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-26S	4/25/2021	3.67	563	1.64	2.91E-03
OW-Q5S		2.03			
OW-Q2S	4/25/2021	3.02	220	0.99	4.51E-03
OW-Q5S		2.03			
MW-29S	4/25/2021	2.90	136	0.87	6.38E-03
OW-Q5S		2.03			
MW-11S	4/25/2021	2.48	218	0.32	1.45E-03
OW-Q5S		2.16			
				<b>Geomean</b>	<b>3.32E-03</b>

Notes:  
ft = feet  
msl = mean sea level

**Attachment H**  
**Horizontal Groundwater Gradients**  
**Shallow Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

<b>Groundwater Condition 3 - High Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-26S	5/11/2021	3.13	563	1.58	2.81E-03
OW-Q5S		1.55			
OW-Q2S	5/11/2021	2.08	220	0.53	2.42E-03
OW-Q5S		1.55			
MW-29S	5/11/2021	1.99	136	0.44	3.26E-03
OW-Q5S		1.55			
MW-11S	5/11/2021	2.09	218	0.68	3.11E-03
OW-Q5S		1.42			
				<b>Geomean</b>	<b>2.88E-03</b>

<b>Groundwater Condition 3 - Low Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-26S	5/11/2021	3.11	563	-1.58	2.81E-03
OW-Q5S		1.53			
OW-Q2S	5/11/2021	2.07	220	-0.54	2.43E-03
OW-Q5S		1.53			
MW-29S	5/11/2021	2.00	136	-0.47	3.43E-03
OW-Q5S		1.53			
MW-11S	4/25/2021	2.48	218	0.32	1.45E-03
OW-Q5S		2.16			
				<b>Geomean</b>	<b>2.42E-03</b>

Notes:  
ft = feet  
msl = mean sea level

**Attachment H**  
**Horizontal Groundwater Gradients**  
**Shallow Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

<b>Groundwater Condition 4 - High Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-26S	5/17/2021	2.98	563	1.42	2.52E-03
OW-Q5S		1.57			
OW-Q2S	5/17/2021	2.03	220	0.46	2.10E-03
OW-Q5S		1.57			
MW-29S	5/17/2021	1.92	136	0.35	2.59E-03
OW-Q5S		1.57			
MW-11S	5/17/2021	2.22	218	0.65	2.98E-03
OW-Q5S		1.57			
				<b>Geomean</b>	<b>2.53E-03</b>

<b>Groundwater Condition 4 - Low Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-26S	5/17/2021	2.99	563	-1.53	2.72E-03
OW-Q5S		1.46			
OW-Q2S	5/17/2021	2.05	220	-0.59	2.70E-03
OW-Q5S		1.46			
MW-29S	5/17/2021	1.96	136	-0.50	3.70E-03
OW-Q5S		1.46			
MW-11S	5/17/2021	1.91	218	-0.32	1.47E-03
OW-Q5S		1.59			
				<b>Geomean</b>	<b>2.51E-03</b>

Notes:  
ft = feet  
msl = mean sea level

**Attachment H**  
**Horizontal Groundwater Gradients**  
**Intermediate Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

<b>Groundwater Condition 1 - High Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-29I	4/21/2021	3.40	325	0.21	6.60E-04
OW-Q4I		3.19			
MW-55I	4/21/2021	3.32	385	0.14	3.55E-04
OW-Q4I		3.19			
				<b>Geomean</b>	<b>5.08E-04</b>

<b>Groundwater Condition 1 - Low Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-29I	4/21/2021	2.86	325	0.46	1.42E-03
OW-Q4I		2.40			
MW-11D	4/21/2021	3.04	565	0.63	1.12E-03
OW-Q4I		2.40			
				<b>Geomean</b>	<b>1.26E-03</b>

Notes:

ft = feet

msl = mean sea level

**Attachment H**  
**Horizontal Groundwater Gradients**  
**Intermediate Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

<b>Groundwater Condition 2 - High Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-29I	4/25/2021	3.61	325	0.15	4.68E-04
OW-Q4I		3.46			
MW-55I	4/25/2021	3.62	385	0.16	4.27E-04
OW-Q4I		3.46			
				<b>Geomean</b>	<b>4.47E-04</b>

<b>Groundwater Condition 2 - Low Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-29I	4/25/2021	2.84	325	0.59	1.82E-03
OW-Q4I		2.25			
OW-Q4I	4/25/2021	2.25	385	0.25	6.39E-04
MW-55I		2.01			
MW-11D	4/25/2021	3.05	218	0.87	3.98E-03
OW-Q5I		2.69			
				<b>Geomean</b>	<b>1.67E-03</b>

Notes:

ft = feet

msl = mean sea level

**Attachment H**  
**Horizontal Groundwater Gradients**  
**Intermediate Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

<b>Groundwater Condition 3 - High Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-29I	5/11/2021	2.95	325	0.23	7.17E-04
OW-Q4I		2.72			
MW-55I	5/11/2021	2.82	385	0.10	2.65E-04
OW-Q4I		2.72			
				<b>Geomean</b>	<b>4.36E-04</b>

<b>Groundwater Condition 3 - Low Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-29I	5/11/2021	2.45	325	0.51	1.58E-03
OW-Q4I		1.94			
OW-Q4I	5/11/2021	2.72	385	0.95	2.48E-03
MW-55I		1.77			
MW-11D	5/11/2021	2.64	218	0.34	1.55E-03
OW-Q5I		2.30			
				<b>Geomean</b>	<b>1.82E-03</b>

Notes:

ft = feet

msl = mean sea level

**Attachment H**  
**Horizontal Groundwater Gradients**  
**Intermediate Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

<b>Groundwater Condition 4 - High Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-29I	5/17/2021	3.25	325	0.16	4.83E-04
OW-Q4I		3.10			
MW-55I	5/17/2021	3.27	385	0.17	4.51E-04
MW-Q4I		3.10			
				<b>Geomean</b>	<b>4.67E-04</b>

<b>Groundwater Condition 4 - Low Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-29I	5/17/2021	2.75	325	0.44	1.36E-03
OW-Q4I		2.31			
MW-11D	5/17/2021	2.93	218	0.33	1.53E-03
OW-Q5I		2.60			
				<b>Geomean</b>	<b>1.44E-03</b>

Notes:  
ft = feet  
msl = mean sea level

**Attachment H**  
**Horizontal Groundwater Gradients**  
**Deep Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

<b>Groundwater Condition 1 - High Tide</b>					
Well ID	Date	Water Elevation	Horizontal Distance Between Wells	Head Difference ( $\Delta h$ )	Horizontal Gradient
		(ft msl)	(ft)	(ft)	(ft/ft)
PSOW-12	4/21/2021	3.72	635	0.60	9.38E-04
OW-Q5D		3.12			
MW-11DD	4/21/2021	3.28	185	0.16	8.90E-04
OW-Q5D		3.12			
OW-Q2D	4/21/2021	3.24	335	0.16	4.65E-04
OW-Q4D		3.08			
				<b>Geomean</b>	<b>7.30E-04</b>

<b>Groundwater Condition 1 - Low Tide</b>					
Well ID	Date	Water Elevation	Horizontal Distance Between Wells	Head Difference ( $\Delta h$ )	Horizontal Gradient
		(ft msl)	(ft)	(ft)	(ft/ft)
PSOW-12	4/21/2021	3.47	580	0.83	1.43E-03
OW-Q2D		2.64			
MW-11DD	4/21/2021	2.84	185	0.29	1.56E-03
OW-Q5D		2.55			
OW-Q2D	4/21/2021	2.64	335	0.37	1.09E-03
OW-Q4D		2.28			
				<b>Geomean</b>	<b>1.35E-03</b>

Notes:

ft = feet

msl = mean sea level



**Attachment H**  
**Horizontal Groundwater Gradients**  
**Deep Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

<b>Groundwater Condition 2 - High Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
PSOW-12	4/25/2021	3.90	635	0.55	8.65E-04
OW-Q5D		3.35			
MW-11DD	4/25/2021	3.50	185	0.14	7.78E-04
OW-Q5D		3.35			
				<b>Geomean</b>	<b>8.20E-04</b>

<b>Groundwater Condition 2 - Low Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-11DD	4/25/2021	2.85	185	0.99	5.37E-03
OW-Q5D		2.51			
OW-Q2D	4/25/2021	2.59	335	0.87	2.59E-03
OW-Q4D		2.12			
				<b>Geomean</b>	<b>3.73E-03</b>

Notes:  
ft = feet  
msl = mean sea level

**Attachment H**  
**Horizontal Groundwater Gradients**  
**Deep Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

<b>Groundwater Condition 3 - High Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-11DD	5/11/2021	2.87	185	0.15	8.27E-04
OW-Q5D		2.72			
OW-Q2D	5/11/2021	2.82	335	0.20	6.03E-04
OW-Q4D		2.62			
				<b>Geomean</b>	<b>7.06E-04</b>

<b>Groundwater Condition 3 - Low Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-11DD	5/11/2021	2.45	185	0.27	1.48E-03
OW-Q5D		2.18			
OW-Q2D	5/11/2021	2.25	335	0.41	1.24E-03
OW-Q4D		1.83			
				<b>Geomean</b>	<b>1.35E-03</b>

Notes:  
ft = feet  
msl = mean sea level

**Attachment H**  
**Horizontal Groundwater Gradients**  
**Deep Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

<b>Groundwater Condition 4 - High Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-11DD	5/17/2021	3.14	185	0.10	5.28E-04
OW-Q5D		3.04			
OW-Q2D	5/17/2021	3.13	335	0.14	4.03E-04
OW-Q4D		3.00			
				<b>Geomean</b>	<b>4.61E-04</b>

<b>Groundwater Condition 4 - Low Tide</b>					
<b>Well ID</b>	<b>Date</b>	<b>Water Elevation</b>	<b>Horizontal Distance Between Wells</b>	<b>Head Difference (<math>\Delta h</math>)</b>	<b>Horizontal Gradient</b>
		<b>(ft msl)</b>	<b>(ft)</b>	<b>(ft)</b>	<b>(ft/ft)</b>
MW-11DD	5/17/2021	2.87	185	0.15	8.27E-04
OW-Q5D		2.72			
OW-Q2D	5/17/2021	2.57	335	0.37	1.10E-03
OW-Q4D		2.20			
				<b>Geomean</b>	<b>9.53E-04</b>

Notes:  
ft = feet  
msl = mean sea level

**Attachment I**  
Horizontal Gradient Time Series Charts

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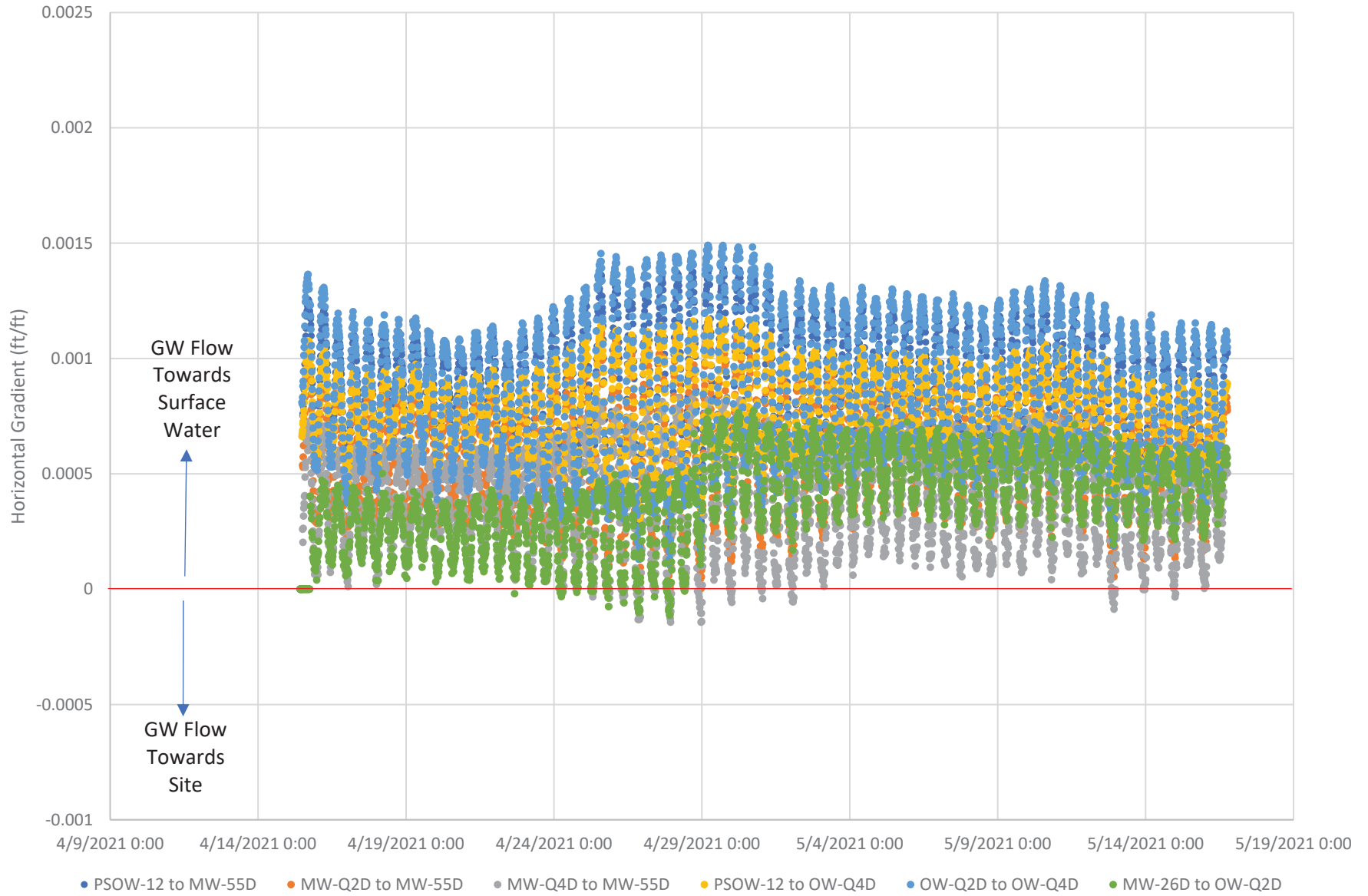
**Localized Flow Direction Based on  
Horizontal Gradients**  
Hercules/Pinova Facility, Brunswick, Georgia

Hydrogeologic Zone of the Upper Surficial Aquifer	Well Pair		Horizontal Gradient Between Well Pair	
			Positive (%)	Negative (%)
Shallow Surficial	MW-29S	OW-Q5S	100%	0%
	OW-Q2S	OW-Q5S	100%	0%
	OW-26S	OW-Q5S	100%	0%
	OW-26S	OW-Q2S	100%	0%
	OW-Q4S	MW-55S	100%	0%
Intermediate Surficial	MW-29I	MW-55I	90%	10%
	OW-Q4I	MW-55I	51%	49%
	MW-29I	OW-Q4I	100%	0%
Deep Surficial	PSOW-12	MW-55D	100%	0%
	OW-Q2D	MW-55D	100%	0%
	OW-Q4D	MW-55D	98%	2%
	PSOW-12	OW-Q4D	100%	0%
	OW-Q4D	OW-Q2D	100%	0%
	MW-26D	OW-Q2D	99%	1%

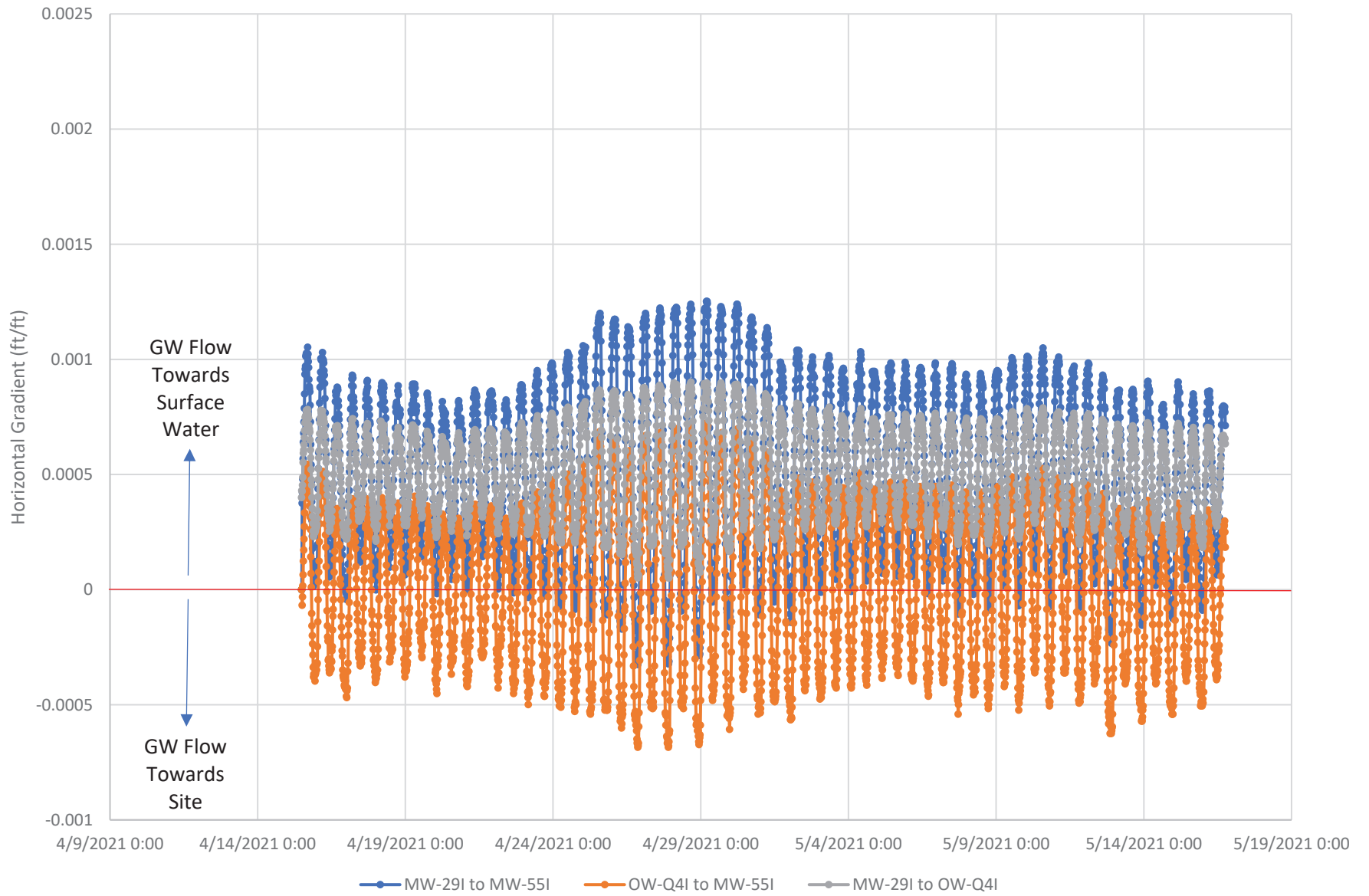
Notes:

1. Positive values represent flow from the first well in the pair towards the second well.
2. Negative values represent flow from the second well in the pair towards the first well.
3. Percentages calculated over the period of record between all well pairs.

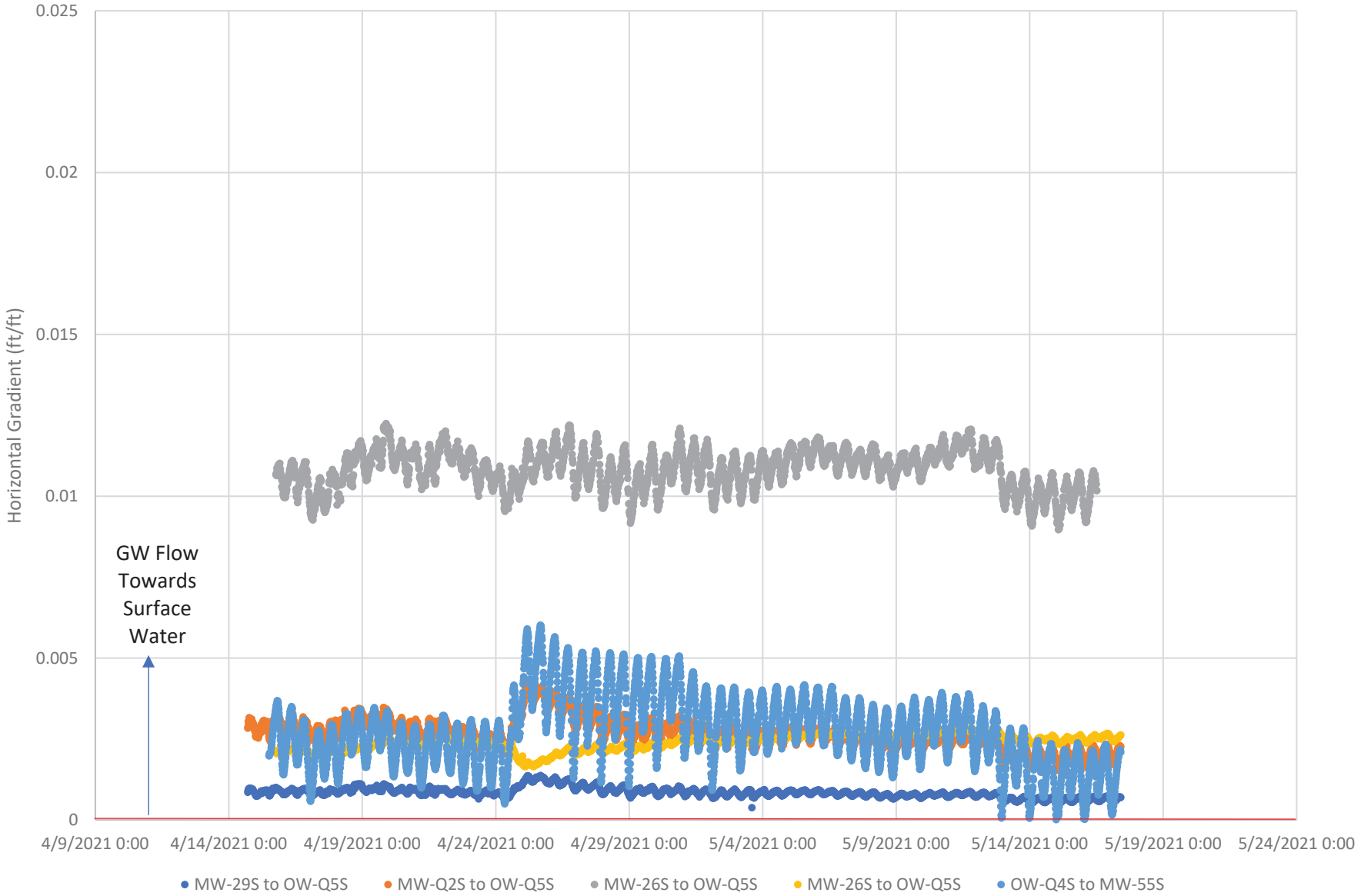
# Horizontal Gradient Time Series Deep Surficial Aquifer



# Horizontal Gradient Time Series Intermediate Surficial Aquifer



# Horizontal Gradient Time Series Shallow Surficial Aquifer

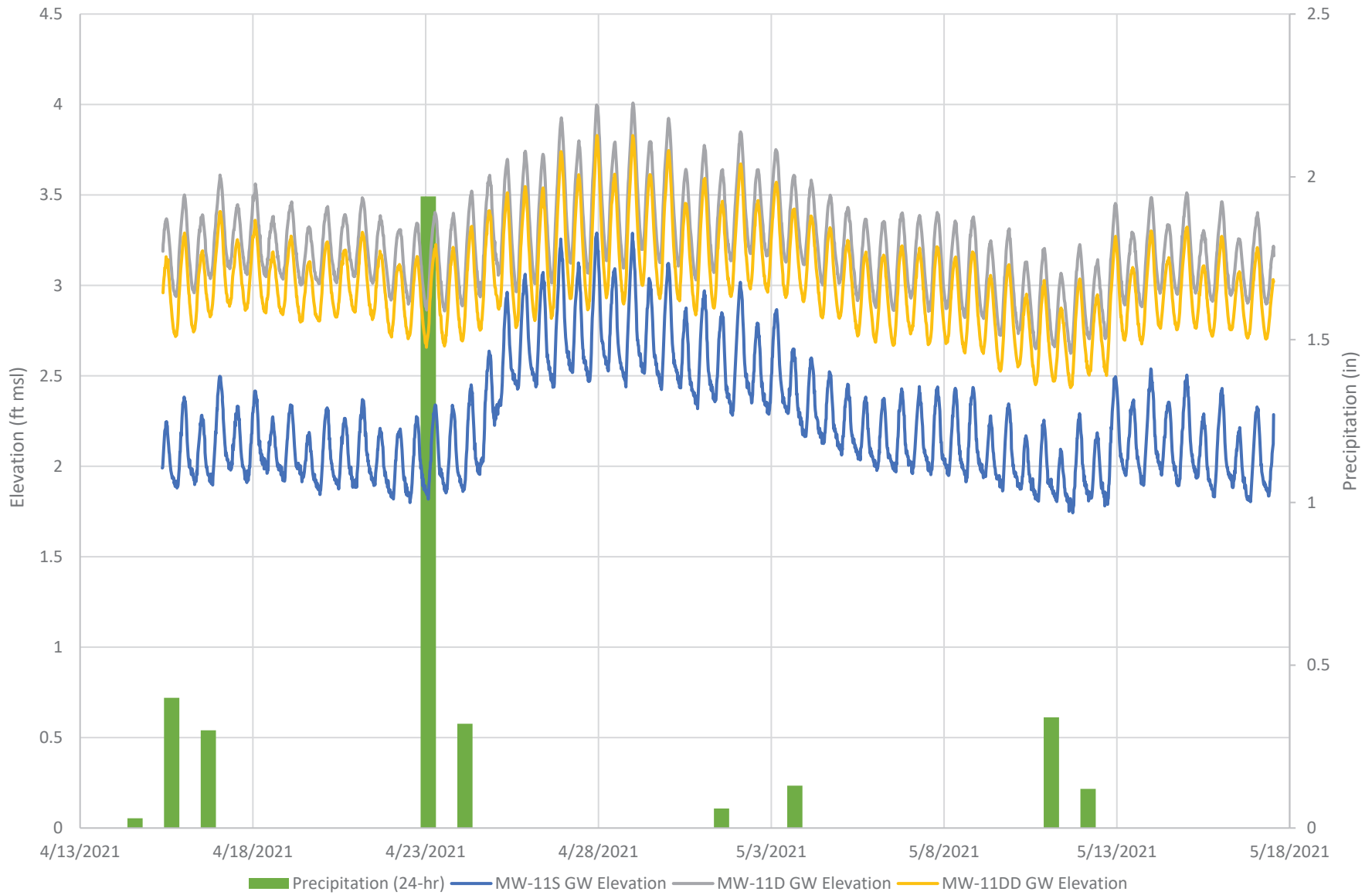




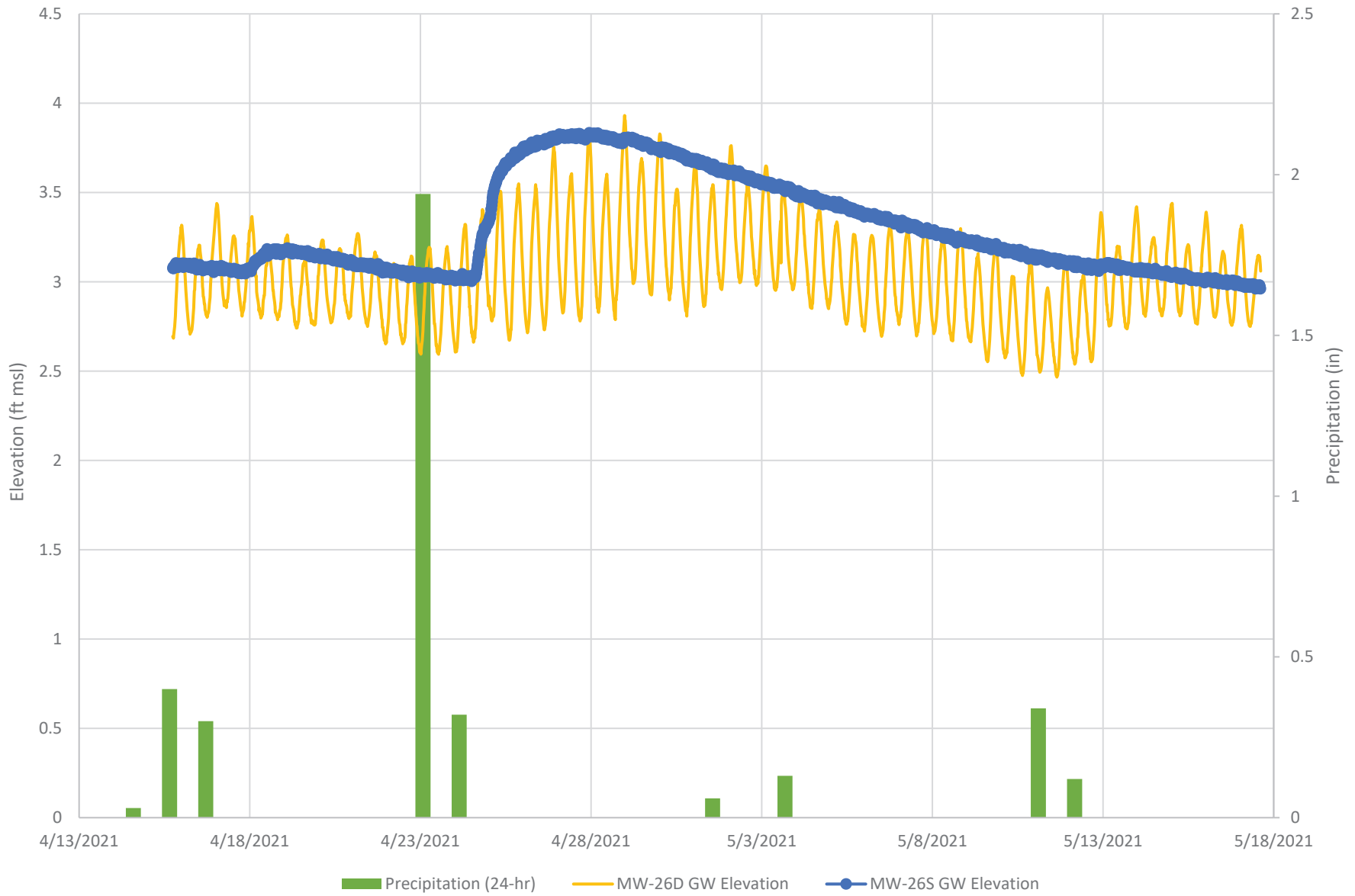
**Attachment J**  
Well Pair Groundwater Elevation Charts

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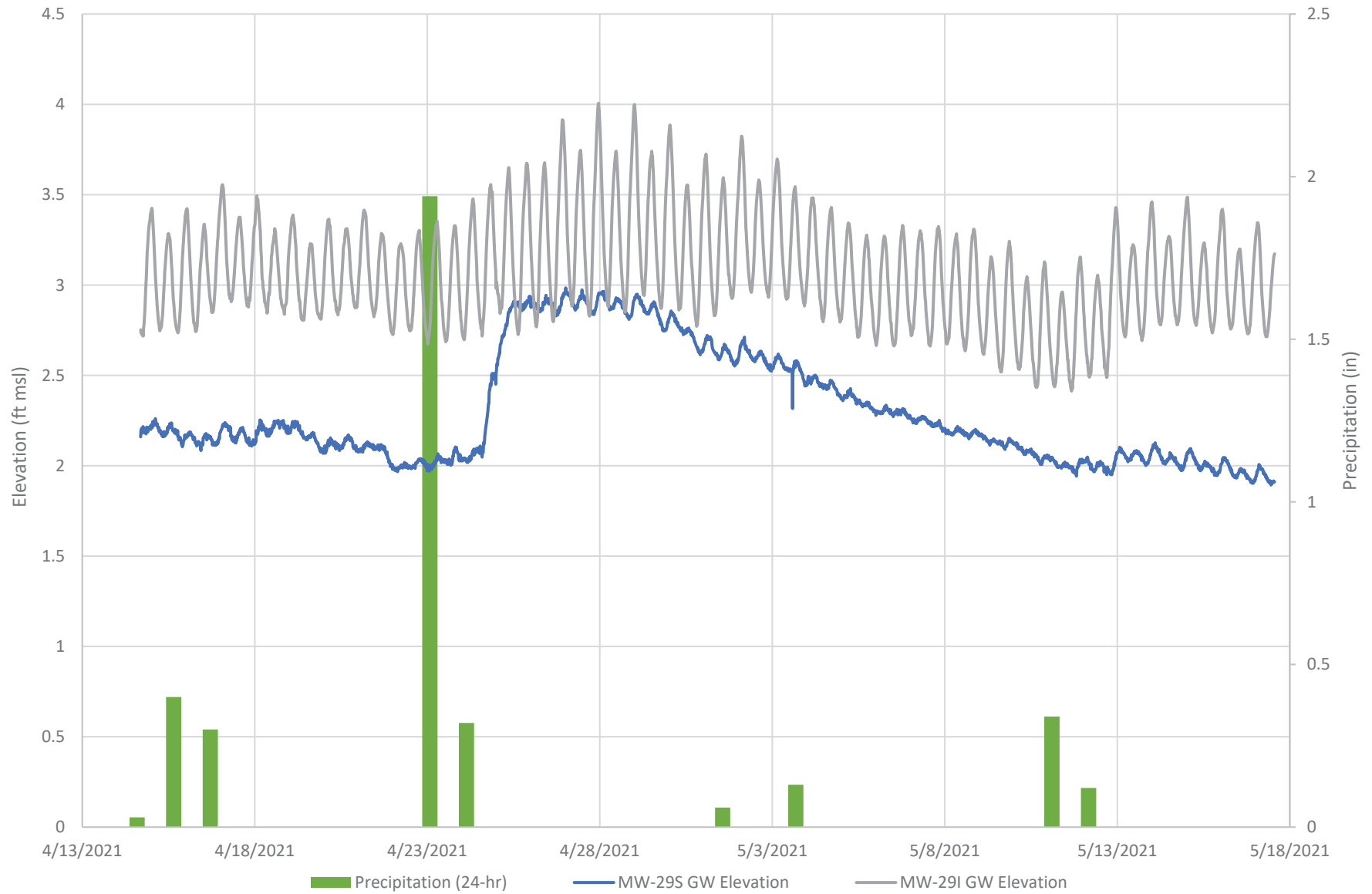
# Groundwater Elevations MW-11 Cluster



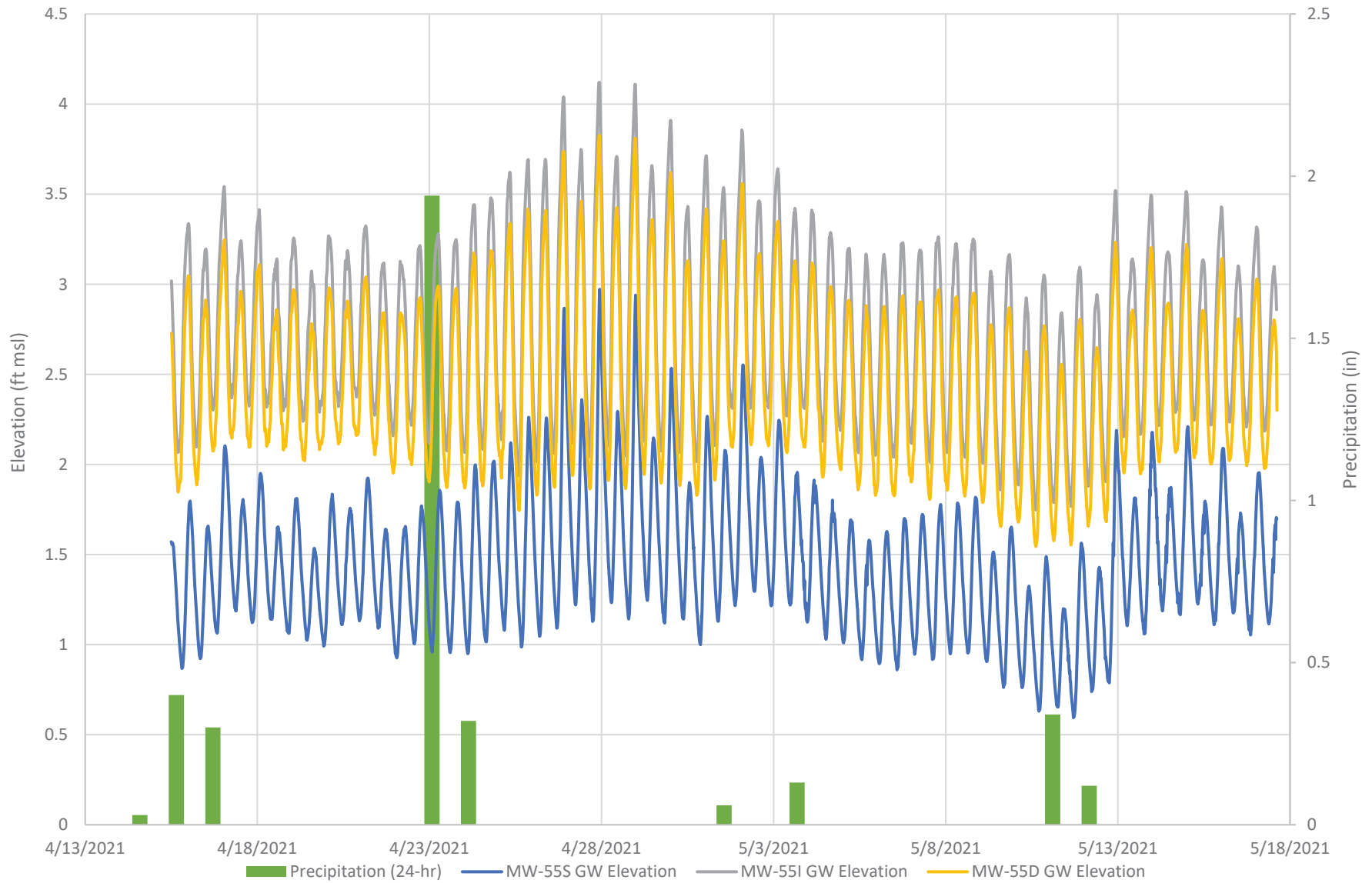
# Groundwater Elevations MW-26 Pair



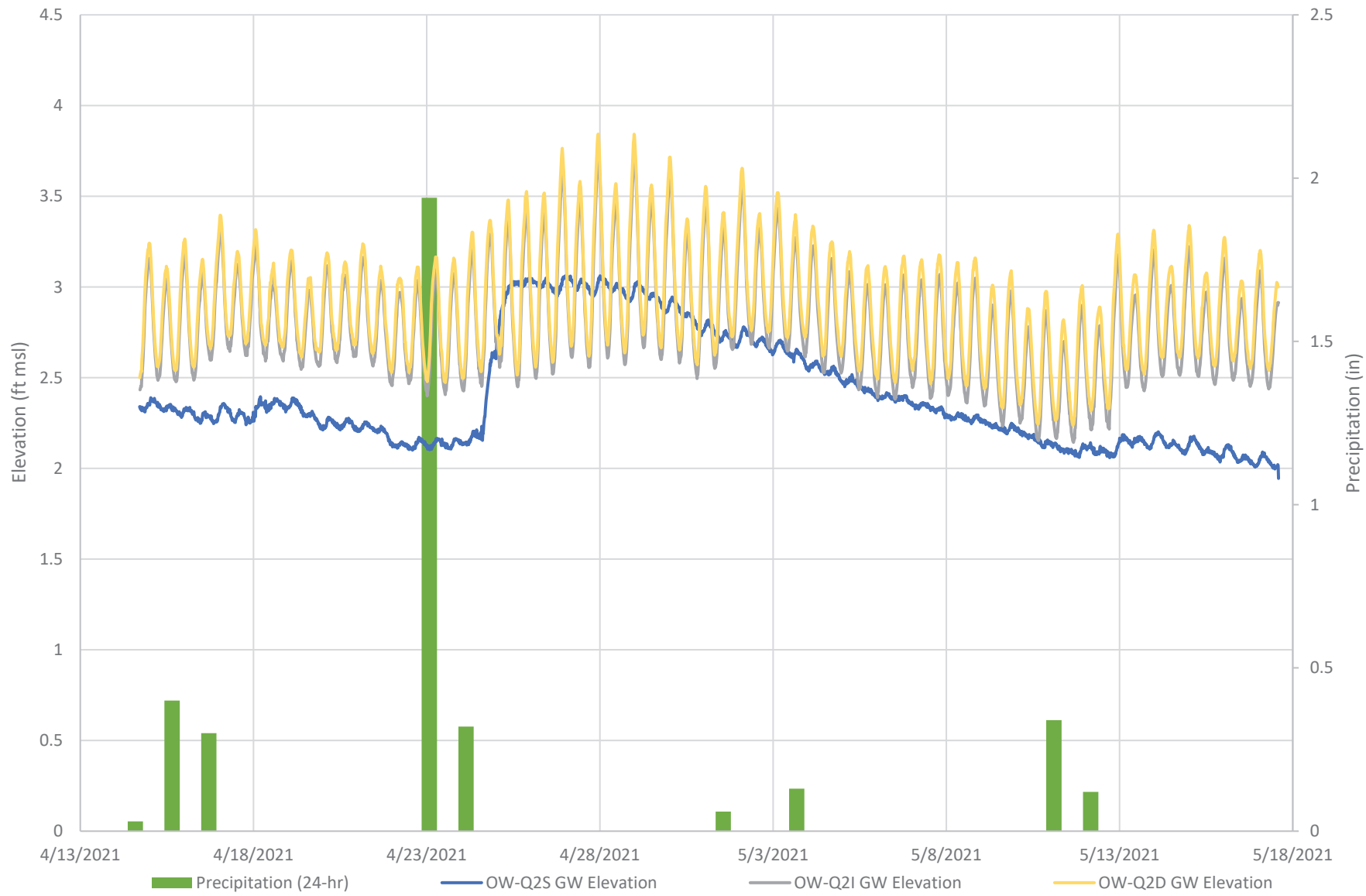
# Groundwater Elevation MW-29 Pair



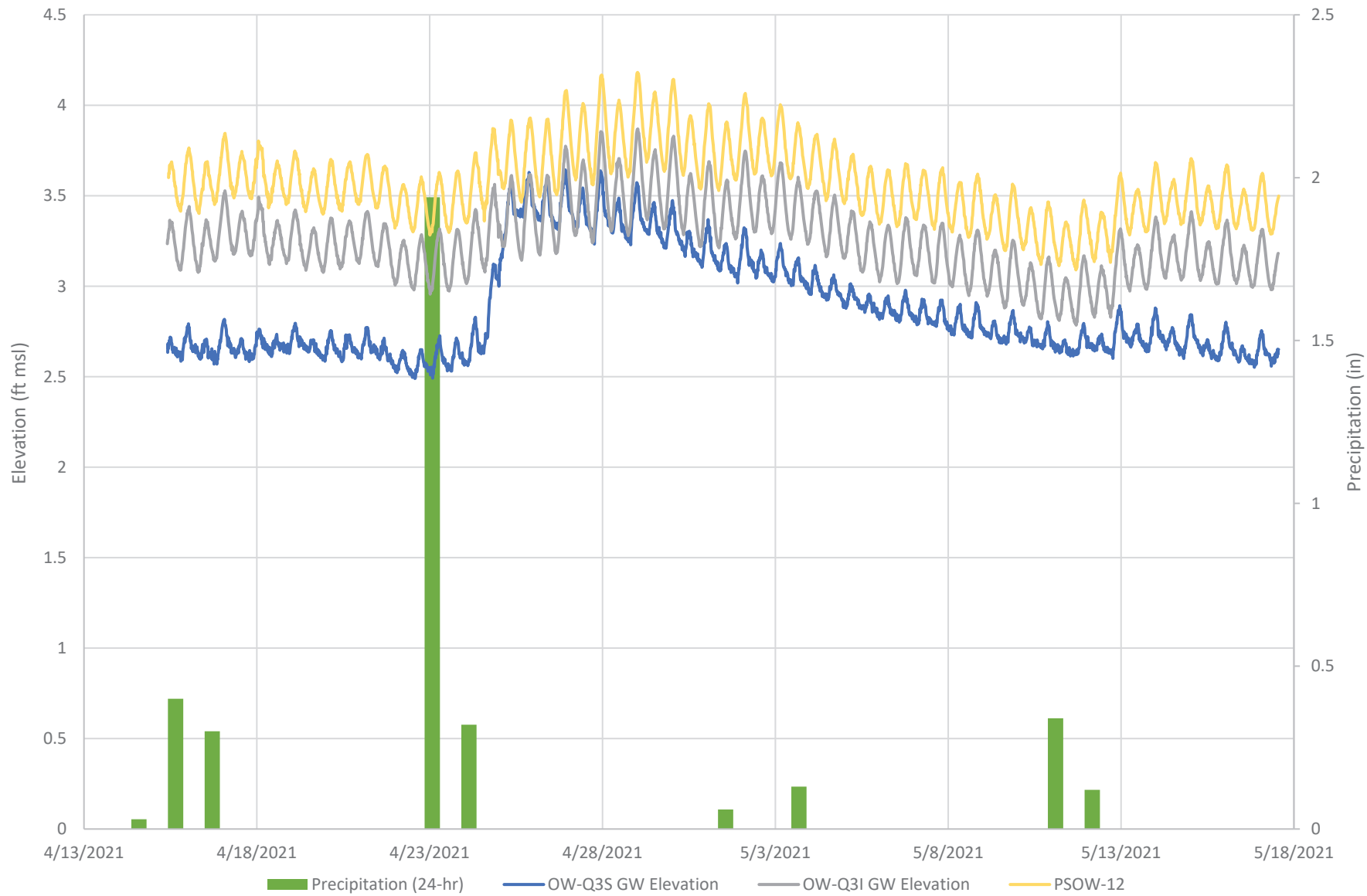
# Groundwater Elevations MW-55 Cluster



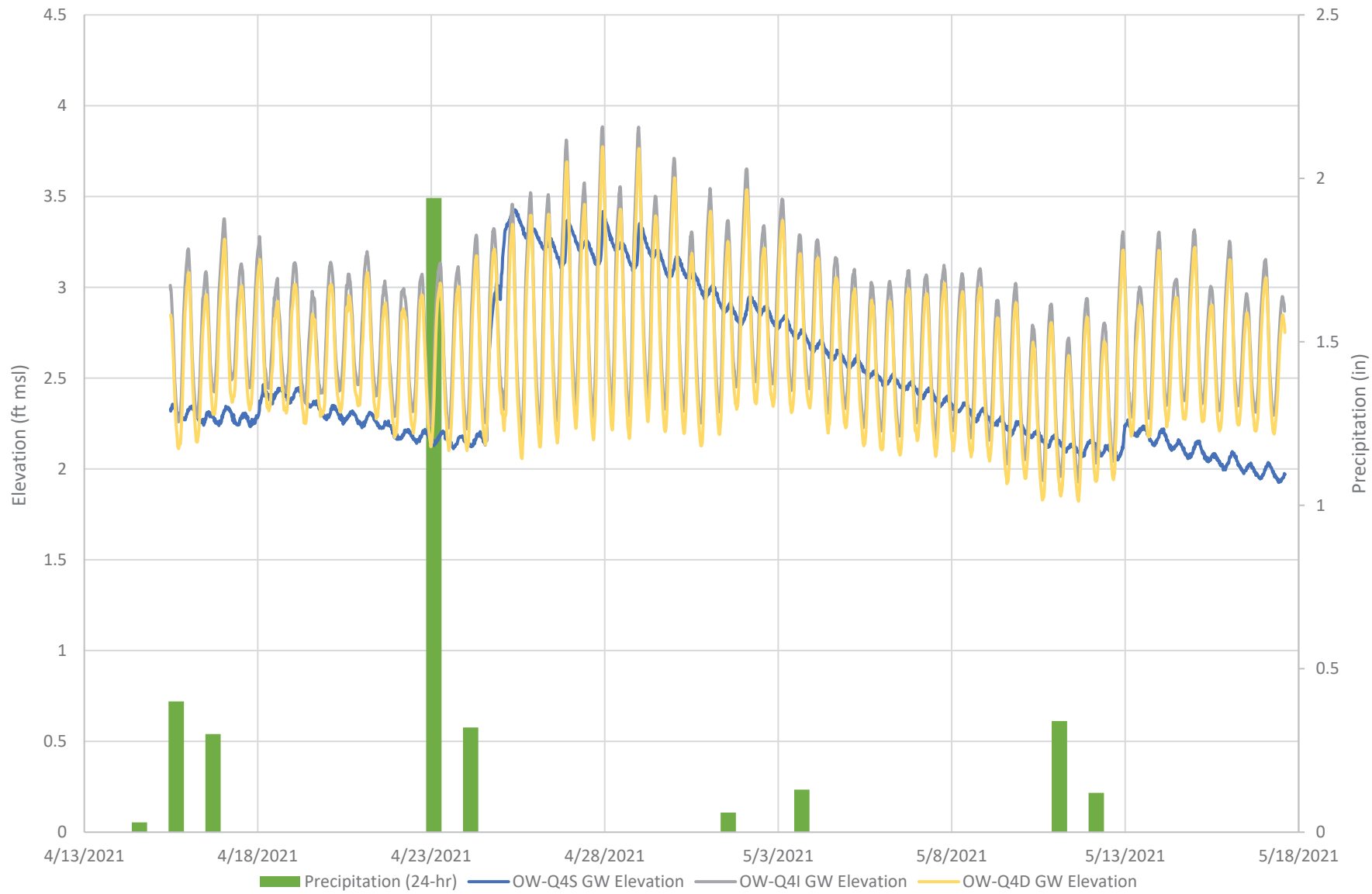
# Groundwater Elevations OW-Q2 Cluster



### Groundwater Elevations OW-Q3 Cluster

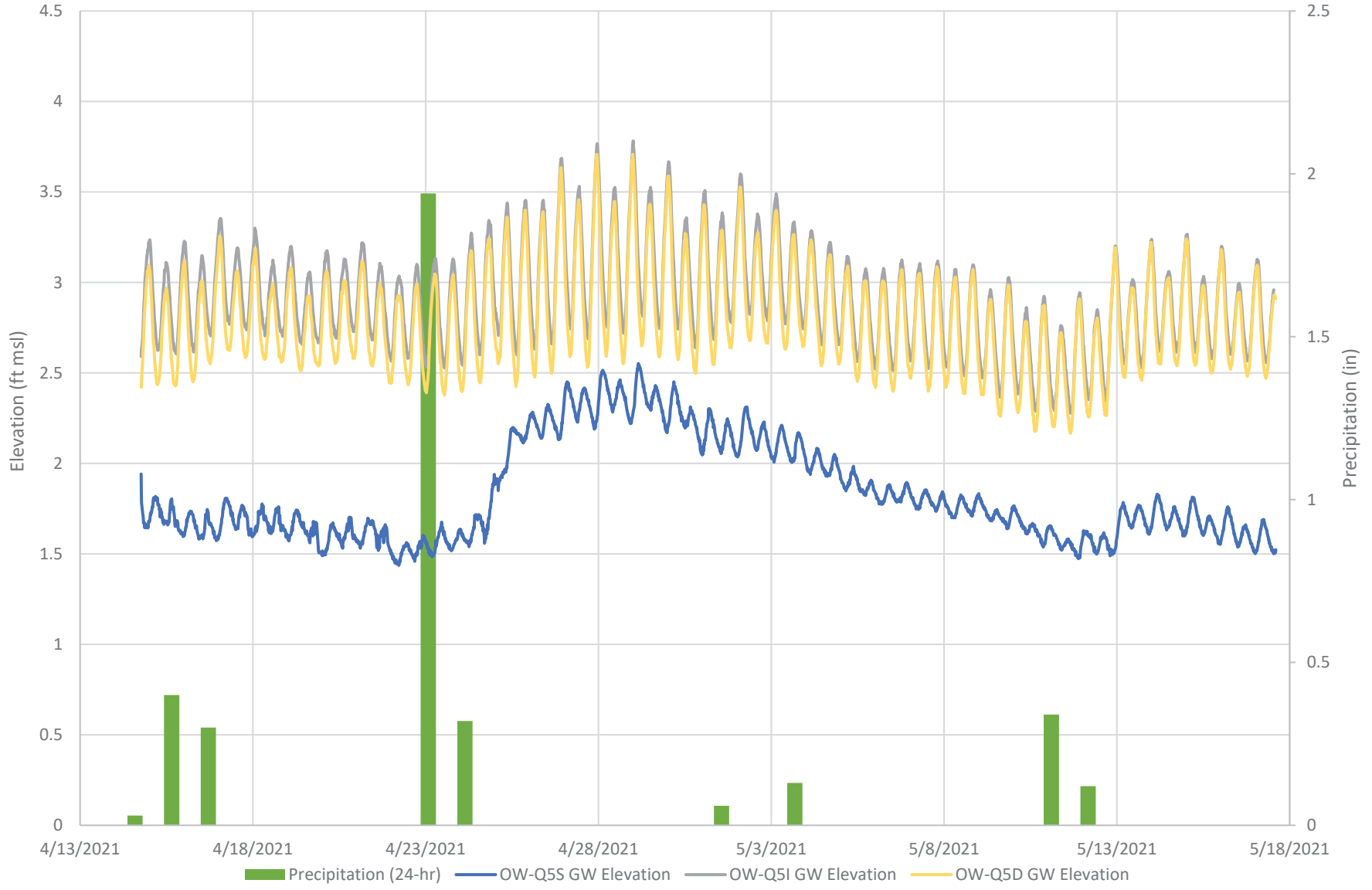


# Groundwater Elevations OW-Q4 Cluster





# Groundwater Elevations OW-Q5 Cluster



**Attachment K**  
Vertical Hydraulic Gradient Estimations

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Attachment K  
Vertical Hydraulic Gradient Estimations  
Hercules/Pinova Facility, Brunswick, Georgia

Geosyntec Consultants

Well Pair	Interval	Screen Mid-Point Elevation (ft msl)	GW Condition 1 - High Tide 4/21/2021 03:39		GW Condition 1 - Low Tide 4/21/2021 09:54		GW Condition 2 - High Tide 4/25/2021 08:09		GW Condition 2 - Low Tide 4/25/2021 13:39		GW Condition 3 - High Tide 5/11/2021 09:09		GW Condition 3 - Low Tide 5/11/2021 15:24		GW Condition 4 - High Tide 5/17/2021 06:09		GW Condition 4 - Low Tide 5/17/2021 06:39	
			Shallow to Intermediate (ft/ft)	Intermediate to Deep (ft/ft)	Shallow to Intermediate (ft/ft)	Intermediate to Deep (ft/ft)	Shallow to Intermediate (ft/ft)	Intermediate to Deep (ft/ft)	Shallow to Intermediate (ft/ft)	Intermediate to Deep (ft/ft)	Shallow to Intermediate (ft/ft)	Intermediate to Deep (ft/ft)	Shallow to Intermediate (ft/ft)	Intermediate to Deep (ft/ft)	Shallow to Intermediate (ft/ft)	Intermediate to Deep (ft/ft)	Shallow to Intermediate (ft/ft)	Intermediate to Deep (ft/ft)
MW-11	S	-11.8	-0.034	0.005	-0.031	0.006	-0.021	0.005	-0.016	0.006	-0.028	0.006	-0.024	0.005	-0.032	0.005	-0.029	0.005
	D	-46.9																
	DD	-80.8																
MW-26	S	-2.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	I	-																
	D	-77.6																
MW-29	S	-14.3	-0.052	N/A	-0.030	N/A	-0.032	N/A	0.002	N/A	-0.038	N/A	-0.018	N/A	-0.053	N/A	-0.032	N/A
	I	-39.4																
	D	-78.4																
MW-55	S	-12.2	-0.050	0.009	-0.032	0.007	-0.051	0.009	-0.024	0.006	-0.022	0.009	-0.034	0.007	-0.052	0.009	-0.029	0.007
	I	-42.4																
	D	-74.7																
OW-Q2	S	-6.7	-0.029	-0.002	-0.012	-0.001	-0.012	-0.003	0.015	-0.001	-0.018	-0.003	-0.003	-0.002	-0.030	-0.003	-0.013	-0.002
	I	-39.1																
	D	-79.4																
OW-Q3	S	-13.6	-0.016	-0.011	-0.012	-0.011	-0.001	-0.011	0.004	-0.011	-0.008	-0.010	-0.005	-0.011	-0.013	-0.011	-0.010	-0.010
	I	-54.7																
	D	-83.5																
OW-Q4	S	-5.2	-0.025	0.003	-0.004	0.003	-0.001	0.003	0.031	0.003	-0.017	0.003	0.004	0.003	-0.031	0.003	-0.009	0.003
	I	-41.1																
	D	-79.7																
OW-Q5	S	-10.0	-0.058	0.002	-0.039	0.004	-0.047	0.002	-0.020	0.004	-0.045	0.001	-0.028	0.003	-0.055	0.000	-0.037	0.002
	I	-37.1																
	D	-79.1																

- Notes:  
1. Positive values represent downward flow  
2. Negative values represent upward flow  
3. ft = feet  
4. S = shallow  
5. I = intermediate  
6. D = deep

Cumulative Averages	
Shallow to Intermediate	-0.023
Intermediate to Deep	0.001

**Attachment L**  
Tidal Time-Lag and Tidal-Efficiency  
Estimations

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**Attachment L**  
**Tidal Time-Lag and Tidal-Efficiency Estimations**  
**Shallow Surficial Aquifer**  
 Hercules/Pinova Facility, Brunswick, Georgia

Monitoring Location	Tidal Cycle No.	Tide Peak Date and Time	Tide Trough Date and Time	Tidal Peak Elevation (ft msl)	Tidal Trough Elevation (ft msl)	Amplitude <sup>1</sup> (ft)	Time Between Cycles (days)	Time Between Cycles (hrs)	Time Between Cycles (mins)	Lag Time Relative to SWT-1 (days)	Lag Time Relative to SWT-1 (hrs)	Lag Time Relative to SWT-1 (mins)	Tidal Efficiency Ratio
SWT-1 <sup>2</sup>	Groundwater Condition 1	4/21/2021 3:39	4/21/2021 9:54	6.76	0.88	5.89	0.26	6.25	375	-	-	-	-
	Groundwater Condition 2	4/25/2021 8:09	4/25/2021 13:39	7.42	0.10	7.32	0.23	5.50	330	-	-	-	-
	Groundwater Condition 3	5/11/2021 9:09	5/11/2021 15:24	5.81	0.06	5.75	0.26	6.25	375	-	-	-	-
	Groundwater Condition 4	5/17/2021 0:09	5/17/2021 6:39	6.94	0.81	6.12	0.27	6.50	390	-	-	-	-
MW-11S	Groundwater Condition 1	4/21/2021 4:20	4/21/2021 12:20	2.37	1.89	0.48	0.33	8.00	480	0.03	0.69	41	0.08
	Groundwater Condition 2	4/25/2021 8:50	4/25/2021 14:35	2.96	2.46	0.51	0.24	5.75	345	0.03	0.69	41	0.07
	Groundwater Condition 3	5/11/2021 9:20	5/11/2021 15:05	2.09	1.75	0.34	0.24	5.75	345	0.01	0.19	11	0.06
	Groundwater Condition 4	5/17/2021 1:35	5/17/2021 9:35	2.33	1.83	0.49	0.33	8.00	480	0.06	1.44	86	0.08
	<b>AVERAGES</b>			<b>2.44</b>	<b>1.98</b>	<b>0.45</b>	<b>0.29</b>	<b>6.88</b>	<b>413</b>	<b>0.03</b>	<b>0.75</b>	<b>45</b>	<b>0.07</b>
MW-26S	Groundwater Condition 1	4/21/2021 5:44	4/21/2021 12:14	3.10	3.08	0.03	0.27	6.50	390	0.09	2.10	126	0.00
	Groundwater Condition 2	-	-	-	-	-	-	-	-	-	-	-	-
	Groundwater Condition 3	5/11/2021 9:14	5/11/2021 16:59	3.13	3.10	0.04	0.32	7.75	465	0.00	0.10	6	0.01
	Groundwater Condition 4	5/17/2021 0:44	5/17/2021 3:59	2.99	2.97	0.02	0.14	3.25	195	0.02	0.60	36	0.00
	<b>AVERAGES</b>			<b>3.08</b>	<b>3.05</b>	<b>0.03</b>	<b>0.24</b>	<b>5.83</b>	<b>350</b>	<b>0.04</b>	<b>0.93</b>	<b>56</b>	<b>0.00</b>
MW-29S	Groundwater Condition 1	4/21/2021 6:37	4/21/2021 10:52	2.91	2.09	0.82	0.18	4.25	255	0.12	2.97	178	0.14
	Groundwater Condition 2	4/25/2021 12:22	4/25/2021 16:52	2.91	2.87	0.04	0.19	4.50	270	0.18	4.22	253	0.01
	Groundwater Condition 3	5/11/2021 11:52	5/11/2021 19:52	2.02	1.94	0.08	0.33	8.00	480	0.11	2.72	163	0.01
	Groundwater Condition 4	5/17/2021 2:52	5/17/2021 11:07	2.01	1.89	0.11	0.34	8.25	495	0.11	2.72	163	0.02
	<b>AVERAGES</b>			<b>2.46</b>	<b>2.20</b>	<b>0.26</b>	<b>0.26</b>	<b>6.25</b>	<b>375</b>	<b>0.13</b>	<b>3.16</b>	<b>190</b>	<b>0.04</b>
MW-55S	Groundwater Condition 1	4/21/2021 5:01	4/21/2021 12:16	1.92	1.26	0.67	0.30	7.25	435	0.06	1.37	82	0.11
	Groundwater Condition 2	4/25/2021 8:46	4/25/2021 16:01	2.12	0.99	1.13	0.30	7.25	435	0.03	0.62	37	0.15
	Groundwater Condition 3	5/11/2021 10:01	5/11/2021 17:01	1.20	0.59	0.60	0.29	7.00	420	0.04	0.87	52	0.11
	Groundwater Condition 4	5/17/2021 2:31	5/17/2021 9:16	1.95	1.11	0.84	0.28	6.75	405	0.10	2.37	142	0.14
	<b>AVERAGES</b>			<b>1.80</b>	<b>0.99</b>	<b>0.81</b>	<b>0.29</b>	<b>7.06</b>	<b>424</b>	<b>0.05</b>	<b>1.31</b>	<b>79</b>	<b>0.13</b>
OW-Q2S	Groundwater Condition 1	4/21/2021 4:07	4/21/2021 12:52	2.24	2.20	0.04	0.36	8.75	525	0.02	0.47	28	0.01
	Groundwater Condition 2	-	-	-	-	-	-	-	-	-	-	-	-
	Groundwater Condition 3	5/11/2021 9:22	5/11/2021 20:07	2.10	2.06	0.04	0.45	10.75	645	0.01	0.22	13	0.01
	Groundwater Condition 4	5/17/2021 3:07	5/17/2021 11:37	2.09	2.00	0.09	0.35	8.50	510	0.12	2.97	178	0.02
	<b>AVERAGES</b>			<b>2.14</b>	<b>2.09</b>	<b>0.06</b>	<b>0.39</b>	<b>9.33</b>	<b>560</b>	<b>0.05</b>	<b>1.22</b>	<b>73</b>	<b>0.01</b>
OW-Q3S	Groundwater Condition 1	4/21/2021 3:49	4/21/2021 13:19	2.77	2.59	0.18	0.40	9.50	570	0.01	0.17	10	0.03
	Groundwater Condition 2	4/25/2021 8:34	4/25/2021 14:49	3.58	3.38	0.20	0.26	6.25	375	0.02	0.42	25	0.03
	Groundwater Condition 3	5/11/2021 9:19	5/11/2021 14:49	2.70	2.61	0.09	0.23	5.50	330	0.01	0.17	10	0.02
	Groundwater Condition 4	5/17/2021 1:34	5/17/2021 8:19	2.75	2.56	0.20	0.28	6.75	405	0.06	1.42	85	0.03
	<b>AVERAGES</b>			<b>2.95</b>	<b>2.79</b>	<b>0.17</b>	<b>0.29</b>	<b>7.00</b>	<b>420</b>	<b>0.02</b>	<b>0.54</b>	<b>33</b>	<b>0.03</b>
OW-Q4S	Groundwater Condition 1	4/21/2021 5:22	4/21/2021 13:37	2.31	2.22	0.09	0.34	8.25	495	0.07	1.72	103	0.02
	Groundwater Condition 2	4/25/2021 9:07	4/25/2021 18:22	3.43	3.27	0.16	0.39	9.25	555	0.04	0.97	58	0.02
	Groundwater Condition 3	5/11/2021 9:52	5/11/2021 16:52	2.13	2.07	0.06	0.29	7.00	420	0.03	0.72	43	0.01
	Groundwater Condition 4	5/17/2021 2:52	5/17/2021 10:07	2.04	1.93	0.11	0.30	7.25	435	0.11	2.72	163	0.02
	<b>AVERAGES</b>			<b>2.48</b>	<b>2.37</b>	<b>0.11</b>	<b>0.33</b>	<b>7.94</b>	<b>476</b>	<b>0.06</b>	<b>1.53</b>	<b>92</b>	<b>0.02</b>
OW-Q5S	Groundwater Condition 1	4/21/2021 5:22	4/21/2021 12:37	1.70	1.52	0.18	0.30	7.25	435	0.07	1.73	104	0.03
	Groundwater Condition 2	4/25/2021 10:07	4/25/2021 17:22	2.20	2.11	0.09	0.30	7.25	435	0.08	1.98	119	0.01
	Groundwater Condition 3	5/11/2021 11:52	5/11/2021 18:37	1.58	1.47	0.11	0.28	6.75	405	0.11	2.73	164	0.02
	Groundwater Condition 4	5/17/2021 3:22	5/17/2021 10:37	1.69	1.50	0.19	0.30	7.25	435	0.13	3.23	194	0.03
	<b>AVERAGES</b>			<b>1.79</b>	<b>1.65</b>	<b>0.14</b>	<b>0.30</b>	<b>7.13</b>	<b>428</b>	<b>0.10</b>	<b>2.42</b>	<b>145</b>	<b>0.02</b>

**Notes:**

- 1) Amplitude calculated by subtracting the tidal trough from the tidal peak elevation and dividing by two.
  - 2) Tidal peak and trough "elevations" for SWT-1 show as transducer depth of water measurements, not absolute surface water elevations.
- " - " indicates data not calculated due to an unrealistic match between the monitoring well and SWT-1 transducer data.
- ft = feet  
 mins = minutes  
 hrs = hours

**Attachment L**  
**Tidal Time-Lag and Tidal-Efficiency Estimations**  
**Intermediate Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

Monitoring Location	Tidal Cycle No.	Tide Peak Date and Time	Tide Trough Date and Time	Tidal Peak Elevation (ft msl)	Tidal Trough Elevation (ft msl)	Amplitude <sup>1</sup> (ft)	Time Between Cycles (days)	Time Between Cycles (hrs)	Time Between Cycles (mins)	Lag Time Relative to SWT-1 (days)	Lag Time Relative to SWT-1 (hrs)	Lag Time Relative to SWT-1 (mins)	Tidal Efficiency Ratio
SWT-1 <sup>2</sup>	Groundwater Condition 1	4/21/2021 3:39	4/21/2021 9:54	6.76	0.88	5.89	0.26	6.25	375	-	-	-	-
	Groundwater Condition 2	4/25/2021 8:09	4/25/2021 13:39	7.42	0.10	7.32	0.23	5.50	330	-	-	-	-
	Groundwater Condition 3	5/11/2021 9:09	5/11/2021 15:24	5.81	0.06	5.75	0.26	6.25	375	-	-	-	-
	Groundwater Condition 4	5/17/2021 0:09	5/17/2021 6:39	6.94	0.81	6.12	0.27	6.50	390	-	-	-	-
MW-11D	Groundwater Condition 1	4/21/2021 3:58	4/21/2021 9:58	3.48	3.04	0.45	0.25	6.00	360	0.01	0.33	20	0.08
	Groundwater Condition 2	4/25/2021 8:43	4/25/2021 14:58	3.70	2.96	0.73	0.26	6.25	375	0.02	0.58	35	0.10
	Groundwater Condition 3	5/11/2021 9:13	5/11/2021 15:58	3.07	2.62	0.44	0.28	6.75	405	0.00	0.08	5	0.08
	Groundwater Condition 4	5/17/2021 1:28	5/17/2021 7:43	3.38	2.90	0.48	0.26	6.25	375	0.06	1.33	80	0.08
	<b>AVERAGES</b>			<b>3.41</b>	<b>2.88</b>	<b>0.53</b>	<b>0.26</b>	<b>6.31</b>	<b>379</b>	<b>0.02</b>	<b>0.58</b>	<b>35</b>	<b>0.08</b>
MW-29I	Groundwater Condition 1	4/21/2021 4:09	4/21/2021 10:54	3.41	2.82	0.59	0.28	6.75	405	0.02	0.50	30	0.10
	Groundwater Condition 2	4/25/2021 8:39	4/25/2021 15:09	3.43	2.73	0.70	0.27	6.50	390	0.02	0.50	30	0.10
	Groundwater Condition 3	5/11/2021 9:39	5/11/2021 16:09	2.96	2.41	0.55	0.27	6.50	390	0.02	0.50	30	0.10
	Groundwater Condition 4	5/17/2021 1:24	5/17/2021 7:24	3.34	2.71	0.63	0.25	6.00	360	0.05	1.25	75	0.10
	<b>AVERAGES</b>			<b>3.35</b>	<b>2.67</b>	<b>0.62</b>	<b>0.27</b>	<b>6.44</b>	<b>386</b>	<b>0.03</b>	<b>0.69</b>	<b>41</b>	<b>0.10</b>
MW-55I	Groundwater Condition 1	4/21/2021 3:54	4/21/2021 9:54	3.32	2.27	1.05	0.25	6.00	360	0.01	0.26	16	0.18
	Groundwater Condition 2	4/25/2021 8:09	4/25/2021 14:24	3.62	1.94	1.69	0.26	6.25	375	0.00	0.01	1	0.23
	Groundwater Condition 3	-	-	-	-	-	-	-	-	-	-	-	-
	Groundwater Condition 4	5/17/2021 0:39	5/17/2021 6:09	3.32	2.18	1.13	0.23	5.50	330	0.02	0.51	31	0.19
	<b>AVERAGES</b>			<b>3.42</b>	<b>2.13</b>	<b>1.29</b>	<b>0.25</b>	<b>5.92</b>	<b>355</b>	<b>0.01</b>	<b>0.26</b>	<b>16</b>	<b>0.20</b>
OW-Q2I	Groundwater Condition 1	4/21/2021 4:06	4/21/2021 10:51	3.16	2.56	0.60	0.28	6.75	405	0.02	0.46	27	0.10
	Groundwater Condition 2	4/25/2021 8:36	4/25/2021 15:06	3.40	2.45	0.95	0.27	6.50	390	0.02	0.46	27	0.13
	Groundwater Condition 3	5/11/2021 9:51	5/11/2021 16:06	2.70	2.14	0.56	0.26	6.25	375	0.03	0.71	42	0.10
	Groundwater Condition 4	5/17/2021 1:21	5/17/2021 7:21	3.09	2.44	0.65	0.25	6.00	360	0.05	1.21	72	0.11
	<b>AVERAGES</b>			<b>3.09</b>	<b>2.40</b>	<b>0.69</b>	<b>0.27</b>	<b>6.38</b>	<b>383</b>	<b>0.03</b>	<b>0.71</b>	<b>42</b>	<b>0.11</b>
OW-Q3I	Groundwater Condition 1	4/21/2021 4:51	4/21/2021 12:06	3.41	3.11	0.30	0.30	7.25	435	0.05	1.20	72	0.05
	Groundwater Condition 2	4/25/2021 8:51	4/25/2021 15:51	3.61	3.14	0.47	0.29	7.00	420	0.03	0.70	42	0.06
	Groundwater Condition 3	5/11/2021 9:21	5/11/2021 16:51	3.04	2.78	0.25	0.31	7.50	450	0.01	0.20	12	0.04
	Groundwater Condition 4	5/17/2021 1:51	5/17/2021 8:06	3.31	2.98	0.33	0.26	6.25	375	0.07	1.70	102	0.05
	<b>AVERAGES</b>			<b>3.34</b>	<b>3.00</b>	<b>0.34</b>	<b>0.29</b>	<b>7.00</b>	<b>420</b>	<b>0.04</b>	<b>0.95</b>	<b>57</b>	<b>0.05</b>
OW-Q4I	Groundwater Condition 1	4/21/2021 3:56	4/21/2021 9:56	3.20	2.40	0.80	0.25	6.00	360	0.01	0.28	17	0.14
	Groundwater Condition 2	4/25/2021 8:11	4/25/2021 14:41	3.46	2.18	1.28	0.27	6.50	390	0.00	0.03	2	0.17
	Groundwater Condition 3	5/11/2021 9:11	5/11/2021 15:41	2.72	1.93	0.79	0.27	6.50	390	0.00	0.03	2	0.14
	Groundwater Condition 4	5/17/2021 1:26	5/17/2021 6:56	3.15	2.30	0.86	0.23	5.50	330	0.05	1.28	77	0.14
	<b>AVERAGES</b>			<b>3.13</b>	<b>2.20</b>	<b>0.93</b>	<b>0.26</b>	<b>6.13</b>	<b>368</b>	<b>0.02</b>	<b>0.41</b>	<b>25</b>	<b>0.15</b>
OW-Q5I	Groundwater Condition 1	4/21/2021 4:10	4/21/2021 10:55	3.22	2.68	0.54	0.28	6.75	405	0.02	0.52	31	0.09
	Groundwater Condition 2	4/25/2021 8:40	4/25/2021 15:25	3.44	2.60	0.84	0.28	6.75	405	0.02	0.52	31	0.11
	Groundwater Condition 3	-	-	-	-	-	-	-	-	-	-	-	-
	Groundwater Condition 4	5/17/2021 1:25	5/17/2021 8:10	3.13	2.56	0.57	0.28	6.75	405	0.05	1.27	76	0.09
	<b>AVERAGES</b>			<b>3.26</b>	<b>2.61</b>	<b>0.65</b>	<b>0.28</b>	<b>6.75</b>	<b>405</b>	<b>0.03</b>	<b>0.77</b>	<b>46</b>	<b>0.10</b>

**Notes:**

- 1) Amplitude calculated by subtracting the tidal trough from the tidal peak elevation and dividing by two.
  - 2) Tidal peak and trough "elevations" for SWT-1 show as transducer depth of water measurements, not absolute surface water elevations.
- " - " indicates data not calculated due to an unrealistic match between the monitoring well and SWT-1 transducer data.

ft - feet

mins - minutes

**Attachment L**  
**Tidal Time-Lag and Tidal-Efficiency Estimations**  
**Deep Surficial Aquifer**  
Hercules/Pinova Facility, Brunswick, Georgia

Monitoring Location	Tidal Cycle No.	Tide Peak Date and Time	Tide Trough Date and Time	Tidal Peak Elevation (ft msl)	Tidal Trough Elevation (ft msl)	Amplitude <sup>1</sup> (ft)	Time Between Cycles (days)	Time Between Cycles (hrs)	Time Between Cycles (mins)	Lag Time Relative to SWT-1 (days)	Lag Time Relative to SWT-1 (hrs)	Lag Time Relative to SWT-1 (mins)	Tidal Efficiency Ratio
SWT-1 <sup>2</sup>	Groundwater Condition 1	4/21/2021 3:39	4/21/2021 9:54	6.76	0.88	5.89	0.26	6.25	375	-	-	-	-
	Groundwater Condition 2	4/25/2021 8:09	4/25/2021 13:39	7.42	0.10	7.32	0.23	5.50	330	-	-	-	-
	Groundwater Condition 3	5/11/2021 9:09	5/11/2021 15:24	5.81	0.06	5.75	0.26	6.25	375	-	-	-	-
	Groundwater Condition 4	5/17/2021 0:09	5/17/2021 6:39	6.94	0.81	6.12	0.27	6.50	390	-	-	-	-
MW-11DD	Groundwater Condition 1	4/21/2021 4:02	4/21/2021 11:02	3.29	2.81	0.48	0.29	7.00	420	0.02	0.40	24	0.08
	Groundwater Condition 2	4/25/2021 8:47	4/25/2021 15:17	3.51	2.77	0.74	0.27	6.50	390	0.03	0.65	39	0.10
	Groundwater Condition 3	5/11/2021 9:47	5/11/2021 15:47	2.87	2.44	0.43	0.25	6.00	360	0.03	0.65	39	0.07
	Groundwater Condition 4	5/17/2021 1:32	5/17/2021 7:32	3.21	2.70	0.51	0.25	6.00	360	0.06	1.40	84	0.08
	<b>AVERAGES</b>			<b>3.22</b>	<b>2.68</b>	<b>0.54</b>	<b>0.27</b>	<b>6.38</b>	<b>383</b>	<b>0.03</b>	<b>0.77</b>	<b>46</b>	<b>0.09</b>
MW-26D	Groundwater Condition 1	4/21/2021 4:20	4/21/2021 10:20	3.27	2.77	0.51	0.25	6.00	360	0.03	0.69	41	0.09
	Groundwater Condition 2	4/25/2021 8:35	4/25/2021 14:50	3.51	2.67	0.83	0.26	6.25	375	0.02	0.44	26	0.11
	Groundwater Condition 3	5/11/2021 9:20	5/11/2021 15:50	2.97	2.47	0.50	0.27	6.50	390	0.01	0.19	11	0.09
	Groundwater Condition 4	5/17/2021 1:35	5/17/2021 7:35	3.32	2.75	0.57	0.25	6.00	360	0.06	1.44	86	0.09
	<b>AVERAGES</b>			<b>3.24</b>	<b>2.66</b>	<b>0.60</b>	<b>0.26</b>	<b>6.19</b>	<b>371</b>	<b>0.03</b>	<b>0.69</b>	<b>41</b>	<b>0.09</b>
MW-55D	Groundwater Condition 1	4/21/2021 3:50	4/21/2021 9:50	3.04	2.05	0.99	0.25	6.00	360	0.01	0.20	12	0.17
	Groundwater Condition 2	4/25/2021 8:20	4/25/2021 14:35	3.34	1.74	1.59	0.26	6.25	375	0.01	0.20	12	0.22
	Groundwater Condition 3	-	-	-	-	-	-	-	-	-	-	-	-
	Groundwater Condition 4	5/17/2021 0:50	5/17/2021 6:20	3.03	1.98	1.05	0.23	5.50	330	0.03	0.70	42	0.17
	<b>AVERAGES</b>			<b>3.14</b>	<b>1.93</b>	<b>1.21</b>	<b>0.25</b>	<b>5.92</b>	<b>355</b>	<b>0.02</b>	<b>0.36</b>	<b>22</b>	<b>0.19</b>
OW-Q2D	Groundwater Condition 1	4/21/2021 3:42	4/21/2021 10:42	3.24	2.63	0.61	0.29	7.00	420	0.00	0.07	4	0.10
	Groundwater Condition 2	4/25/2021 8:27	4/25/2021 14:42	3.48	2.51	0.96	0.26	6.25	375	0.01	0.32	19	0.13
	Groundwater Condition 3	5/11/2021 9:12	5/11/2021 15:42	2.82	2.24	0.58	0.27	6.50	390	0.00	0.07	4	0.10
	Groundwater Condition 4	5/17/2021 1:27	5/17/2021 7:27	3.20	2.54	0.66	0.25	6.00	360	0.05	1.32	79	0.11
	<b>AVERAGES</b>			<b>3.18</b>	<b>2.48</b>	<b>0.70</b>	<b>0.27</b>	<b>6.44</b>	<b>386</b>	<b>0.02</b>	<b>0.44</b>	<b>26</b>	<b>0.11</b>
PSOW-12	Groundwater Condition 1	4/21/2021 4:25	4/21/2021 11:25	3.72	3.43	0.29	0.29	7.00	420	0.03	0.77	46	0.05
	Groundwater Condition 2	4/25/2021 8:25	4/25/2021 15:40	3.92	3.46	0.45	0.30	7.25	435	0.01	0.27	16	0.06
	Groundwater Condition 3	5/11/2021 9:55	5/11/2021 16:40	3.36	3.09	0.26	0.28	6.75	405	0.03	0.77	46	0.05
	Groundwater Condition 4	5/17/2021 2:10	5/17/2021 7:55	3.62	3.29	0.34	0.24	5.75	345	0.08	2.02	121	0.05
	<b>AVERAGES</b>			<b>3.66</b>	<b>3.32</b>	<b>0.34</b>	<b>0.28</b>	<b>6.69</b>	<b>401</b>	<b>0.04</b>	<b>0.96</b>	<b>58</b>	<b>0.05</b>
OW-Q4D	Groundwater Condition 1	4/21/2021 3:44	4/21/2021 9:59	3.08	2.28	0.81	0.26	6.25	375	0.00	0.09	5	0.14
	Groundwater Condition 2	4/25/2021 8:14	4/25/2021 14:14	3.35	3.13	0.22	0.25	6.00	360	0.00	0.09	5	0.03
	Groundwater Condition 3	5/11/2021 9:14	5/11/2021 15:44	2.62	1.82	0.80	0.27	6.50	390	0.00	0.09	5	0.14
	Groundwater Condition 4	5/17/2021 1:29	5/17/2021 6:59	3.05	2.19	0.86	0.23	5.50	330	0.06	1.34	80	0.14
	<b>AVERAGES</b>			<b>3.03</b>	<b>2.35</b>	<b>0.67</b>	<b>0.25</b>	<b>6.06</b>	<b>364</b>	<b>0.02</b>	<b>0.40</b>	<b>24</b>	<b>0.11</b>
OW-Q5D	Groundwater Condition 1	4/21/2021 3:47	4/21/2021 10:02	3.12	2.55	0.57	0.26	6.25	375	0.01	0.14	9	0.10
	Groundwater Condition 2	4/25/2021 8:32	4/25/2021 14:47	3.36	2.42	0.94	0.26	6.25	375	0.02	0.39	24	0.13
	Groundwater Condition 3	5/11/2021 9:17	5/11/2021 15:47	2.72	2.17	0.56	0.27	6.50	390	0.01	0.14	9	0.10
	Groundwater Condition 4	5/17/2021 1:32	5/17/2021 7:32	3.09	2.47	0.63	0.25	6.00	360	0.06	1.39	84	0.10
	<b>AVERAGES</b>			<b>3.07</b>	<b>2.40</b>	<b>0.67</b>	<b>0.26</b>	<b>6.25</b>	<b>375</b>	<b>0.02</b>	<b>0.52</b>	<b>31</b>	<b>0.11</b>

**Notes:**

- 1) Amplitude calculated by subtracting the tidal trough from the tidal peak elevation and dividing by two.
  - 2) Tidal peak and trough "elevations" for SWT-1 show as transducer depth of water measurements, not absolute surface water elevations.
- " - " indicates data not calculated due to an unrealistic match between the monitoring well and SWT-1 transducer data.
- ft - feet  
mins - minutes  
hrs = hours

## APPENDIX B

### Documentation of Historical Activities and Releases on Neighboring Properties



## APPENDIX B

### HISTORICAL ACTIVITIES & RELEASES ON NEIGHBORING PROPERTIES

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#### I. INTRODUCTION

Hercules LLC (“Hercules”) has retained Geosyntec Consultants, Inc. (“Geosyntec”) to develop interim corrective measures as part of a Corrective Action Plan (“CAP”) to address certain constituents of potential concern (“COPCs”) – primarily benzene and chlorobenzene – present in groundwater in the deep zone of the upper surficial aquifer underlying portions of the Hercules/Pinova facility located at 2801 Cook Street in Brunswick, Georgia (the “Brunswick facility”). Based on that evaluation, Hercules plans to utilize *in situ* aerobic bioremediation in the form of a biologically active permeable reactive barrier (referred to as an “aerobic biobarrier”) to intercept and treat benzene and chlorobenzene (together with other COPCs susceptible to aerobic biodegradation) in groundwater in the deep zone of the upper surficial aquifer underlying the northern portion of the Brunswick facility east of the U.S. Highway 17 corridor. This portion of the Brunswick facility is part of property owned by Hercules that is commonly referred to as the Terry Creek property.

In connection with designing the proposed aerobic biobarrier, Geosyntec is conducting a further evaluation of possible off-site sources of volatile organic compounds (“VOCs”) that may be contributing to groundwater conditions in the general area where the aerobic biobarrier is expected to be installed. Such possible off-site sources are associated with two known contaminated sites located east of U.S. Highway 17 and to the immediate north of the Brunswick facility: (1) a former paint manufacturing facility, located on parcels approximately 14 acres in size at 2700 and 2698 Glynn Avenue, that were owned and operated by, among others, O’Brien Corporation (“O’Brien”); and (2) a former gasoline service station, located on a parcel approximately 0.64 acres in size at 2694 Glynn Avenue, that was owned and operated by, among others, Buddy Nesmith Oil Co., Inc. (“Nesmith”). These two contaminated sites are currently owned by Ronald Adams, Walter Douglas Adams, and Anne Adams Rabbino individually and through their closely held corporations, Lanier Parkway Associates LLC and Adams Properties Associates LLC, and are therefore collectively referred to in this document as the “Adams Properties.”

To assist in evaluation of potential off-site sources of COPCs, a review of available reports and data related to the Adams Properties was performed to assess whether there was a documented use of benzene and/or chlorobenzene in connection with historical operations at the Adams Properties and to identify any known or probable releases of these chemicals (or other contaminants) into the soils and/or groundwater at the Adams Properties. This review confirmed that benzene was used and released at both the former O’Brien paint manufacturing facility as well as at the former Nesmith service station, and that chlorobenzene also was likely used in connection with one or both operations, both as a commonly-used solvent in paints and as a commonly-used degreasing

agent for automobile parts.<sup>1,2</sup> Chlorobenzene may also have been stored and handled on the former service station property in connection with a septic cleaning business that operated on the property sometime after 2004.

Available information concerning the historical ownership and operation of the Adams Properties as well as information from past environmental assessments was also collected and reviewed to identify and evaluate data gaps in the nature and distribution of contaminants associated with sources at the Adams Properties. This review identified significant data gaps and uncertainties with respect to the current environmental condition of the Adams Properties.

As discussed further below, the approximately 14-acre former O'Brien paint manufacturing facility was used for industrial manufacturing purposes as far back as 1910. However, the only environmental site assessment work known to have taken place at the property focused solely on storage, process and disposal areas known to have been used during paint manufacturing operations, which did not commence until 1956. These assessments incorrectly stated that industrial operations did not commence on the property until 1930, and did not address the veneer manufacturing, box and crate manufacturing, and plywood manufacturing operations that took place on the property throughout most of the first half of the 20<sup>th</sup> century.

The environmental site assessment work that led to the listing of the former O'Brien paint manufacturing facility on Georgia's Hazardous Sites Inventory ("HSI") as well as the investigations conducted under the Georgia Hazardous Site Response Act ("HSRA") that led to the delisting of the facility in December 2003 left data gaps which are relevant to Hercules' ongoing work at the Brunswick facility. Among other things, the investigations focused almost entirely on shallow conditions in the central portion of the property behind the remaining manufacturing building, with the southern half of the property not assessed at all. This area includes a roadway leading to locations where paint racks were situated bordering the Brunswick facility, as well as a suspected landfill in the southeastern-most corner of the property. In addition, transformers likely to have contained polychlorinated biphenyls ("PCBs") and a drywell of unknown depth were once located in the front of the main manufacturing building, near a laboratory. The transformers were never identified as a potential source of contamination, and groundwater in the drywell area was sampled only once using a temporary monitoring well point screened at a depth of 2-7 feet below ground surface ("bgs"). No evaluation of the laboratory was ever conducted.

In the areas of concern that were identified during site assessment work, soil and groundwater samples were analyzed using the full target list of VOCs, semi-volatile compounds ("SVOCs")

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<sup>1</sup> O'Neil, M.J. (ed.), "The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals," Cambridge, UK: Royal Society of Chemistry (2013): 377.

<sup>2</sup> ATSDR, "Toxicological Profile for Chlorobenzene" (October 2020): 47, available at <https://www.atsdr.cdc.gov/toxprofiles/tp131.pdf>.

and metals only once, in 1995; thereafter, sampling was limited to the following nine constituents for which O'Brien provided release notifications to the Georgia Department of Natural Resources, Environmental Protection Division ("EPD"): benzene, toluene, ethylbenzene and xylenes ("BTEX"), naphthalene, mineral spirits, barium, lead and zinc.

Finally, for BTEX source areas identified east of the main manufacturing building, delineation efforts during the HSRA investigation were minimal, relying largely on one round of analytical results from a portable gas chromatograph. After EPD indicated that analytical results from the gas chromatograph were insufficient to complete vertical delineation of groundwater conditions, a single monitoring well was installed at a depth of 25 feet (still in the shallow zone of the upper surficial aquifer) and sampled once for BTEX compounds in March 1999. With no detections of BTEX compounds during this single event, vertical delineation of groundwater was deemed complete. The intermediate and deep zones of the upper surficial aquifer were never sampled, nor were vertical gradients assessed to evaluate the potential for contaminants to have migrated downward from source area(s), similar to what has been observed to have occurred in the main operational portion of the Brunswick facility.

The files for the former Nesmith service station property indicate that this tract was at one time part of the large veneer manufacturing facility that operated from the 1910s through the mid-1940s on the former O'Brien paint manufacturing property and adjacent tracts. Between 1954 and 1960, the structures supporting that operation were dismantled and the Nesmith property became a fueling station and oil depot with an aboveground storage tank ("AST") farm located in the southeast corner of the property adjacent to the Terry Creek portion of the Brunswick facility. Gasoline service station operations appear to have continued throughout the next 40 years.

Nine underground storage tanks ("USTs") used for fuel storage and dispensing and a waste oil tank were identified and removed from the property between 2000 and 2004. Though the record is not entirely clear, those ten tanks appear to have been installed in the 1980s. The location and details of USTs that supported the former service station operations in the decades prior is currently unknown, and no geophysical survey apparently has ever been conducted on the property to evaluate whether other USTs or buried objects remain.

In 2000, the Georgia Department of Transportation ("GADOT") removed four USTs from the former Nesmith service station property in connection with the expansion of U.S. Highway 17. Significant BTEX contamination was identified in soils and groundwater at that time. In 2009, a brief bioremediation effort was conducted to address shallow groundwater conditions attributed to the gasoline USTs removed by GADOT nine years earlier. Six months after the bioremediation effort concluded, EPD issued a No Further Action ("NFA") determination based on one round of shallow groundwater sampling. At the time, BTEX concentrations were already rebounding from the previous sampling event, with benzene detected as high as 3,100 micrograms per liter ("ug/L") in shallow groundwater. No vertical delineation was ever performed, and BTEX concentrations remained in the downgradient well closest to the Terry Creek portion of the Brunswick facility.

Since 2004, the former Nesmith service station property has been used for various commercial purposes, including several auto repair shops and a staging and storage area for a septic cleaning business. Although VOCs, including chlorobenzene, are known to have been widely used in connection with these types of operations, the potential that these operations may have contributed to groundwater conditions in the area has not yet been investigated.

## II. FORMER O'BRIEN PAINT MANUFACTURING FACILITY

### A. Site Ownership and Operations

The earliest recorded industrial activity on the parcels that comprise the former O'Brien paint manufacturing facility dates back to 1910, when the Georgia Veneer & Package Co. ("Georgia Veneer") acquired the parcels to construct a new box factory.<sup>3</sup> When the facility opened on March 15, 1911, it included "two veneer lathes and a complete outfit for the manufacture of fruit and vegetable packages, boxes and crates and gum veneers for furniture."<sup>4</sup> Over time, the facility expanded and operations grew, spanning both sides of what is now U.S. Highway 17.<sup>5</sup> As of 1937, more than 300 workers were employed to support manufacturing operations.<sup>6</sup> In the 1930s and 1940s, the facility was described as one of the largest industries in Glynn County and the City of Brunswick.<sup>7</sup>

In 1946, Tidewater Plywood Company ("Tidewater") constructed a new mill on the property for the production of plywood, demolishing the infrastructure that had supported the box and veneer manufacturing operations that were conducted on-site for over three decades.<sup>8</sup> At the time, the mill was identified by Georgia Power Company as among the largest new industries in the state.<sup>9</sup> Three years later, Tidewater leased the new plant to Atlas Plywood Corporation, which

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<sup>3</sup> Attachment 1, National Lumberman, Vol. XLVI, No. 11 (Dec. 1, 1910): 79; Attachment 2, The Iron Age, vol. 86, no. 24 (Dec. 15, 1910): 1364; Attachment 3, The Packages, Vol. XIV, No. 4 (Apr. 1911): 80; Attachment 4, Georgia Department of Commerce and Labor, Third Annual Report (1915): 52-53.

**\*Due to the length of Attachments to this Appendix, Attachments are provided electronically through separate submission of a CD.**

<sup>4</sup> Attachment 5, Veneers, Vol. V, No. 4 (Apr. 1911): 20.

<sup>5</sup> Attachment 6, EDR, Collection of Sanborn Fire Insurance Maps: 1913, 1920, 1930.

<sup>6</sup> Attachment 7, The Atlanta Constitution (Jan. 5, 1937): 8.

<sup>7</sup> Attachment 8, The Atlanta Constitution (May 16, 1941): 18; Attachment 9, Quatrefoil Historic Preservation Consulting, Glynn Co. Historic Resources Survey (2009): 27.

<sup>8</sup> Attachment 10, The Atlanta Constitution (Nov. 20, 1945): 3; Attachment 11, The Atlanta Constitution (Aug. 19, 1946): 2; Attachment 12, The Ports of Savannah and Brunswick, Ga., Port Series No. 14 (1946 rev.): 116; Attachment 6, Collection of Sanborn Fire Insurance Maps: 1949.

<sup>9</sup> Attachment 13, The Atlanta Constitution (Sept. 22, 1946): 14.

commenced production of gum panels for the manufacture of doors and door panels.<sup>10</sup> The facility had more than 125 employees.<sup>11</sup>

In 1956, Dixie Paint & Varnish Co. (“Dixie Paint”) acquired the property and converted the main plywood manufacturing building into a paint factory.<sup>12</sup> At the time, Dixie Paint already had a presence in Brunswick; from 1941 until 1955, the company conducted paint and varnish manufacturing operations on a portion of what is now the LCP Chemicals Superfund Site.<sup>13</sup> The acquisition of the property on Glynn Avenue was intended to double Dixie Paint’s production capacity.<sup>14</sup>

After Dixie Paint’s acquisition and conversion of the property, manufacturing of varnishes and automotive, maintenance, household and commercial paints continued for more than three decades, initially as the Dixie line of paints and then by O’Brien, which acquired Dixie in 1966.<sup>15</sup> At the time of O’Brien’s acquisition, Dixie Paint’s Brunswick factory employed 100 people and reported over \$3.5 million in annual sales.<sup>16</sup> By 1983, 1.2 million gallons of paint were produced annually at the facility, consisting of approximately 40% solvent-based and 60% latex-based paints.<sup>17</sup>

In 1991, all operations at the O’Brien paint manufacturing facility ceased and the factory sat abandoned until 1999, when Cherokee Environmental Realty Advisors (“Cherokee”) acquired the property as a short-term investment.<sup>18</sup> In the spring of 2003, the Adams siblings entered into an agreement with Cherokee to acquire the property, with the improved and unimproved portions of

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<sup>10</sup> Attachment 14, Georgia Forestry (July 1950): 10.

<sup>11</sup> Attachment 14, Georgia Forestry (July 1950): 10.

<sup>12</sup> Attachment 15, The Atlanta Constitution (Sept. 22, 1955): 6; Attachment 6, Collection of Sanborn Fire Insurance Maps: 1960.

<sup>13</sup> Attachment 16, EPA Record of Decision, LCP Chemicals Site OU1 (Sept. 2015): Sec. 2.1, 14.

<sup>14</sup> Attachment 17, The Atlanta Constitution (Oct. 13, 1955): 33.

<sup>15</sup> Attachment 18, The South Bend Tribune (Sep. 7, 1966): 48.

<sup>16</sup> Attachment 18, The South Bend Tribune (Sep. 7, 1966): 48.

<sup>17</sup> Attachment 19, ESI Engineering Services, Inc., 1991, Environmental Assessment Report, Dec. 10, 1991 (the “1991 EA Report”): 2.

<sup>18</sup> Attachment 20, Southeastern Environmental Audits, Inc., 1996, Phase II Addendum, Environmental Site Assessment Report (Mar. 18, 1996) (the “1996 Phase II Addendum”): Sec. 1.3, p. 2; Attachment 21, Letter from Stenseth to Divakarla, Ga. Dept. of Nat. Resources, regarding notice of purchase (July 16, 1999).

the property subdivided for ownership purposes. The transaction closed in January 2004.<sup>19</sup> Since that time, the property has been leased to various tenants, including a trailer company, a pine straw supplier, a dock supplier, a custom wood furniture maker, a construction company, and a wood pallet construction company.

## **B. Key Site Features**

Although significant industrial manufacturing operations took place on the property for over 40 years prior to the commencement of paint manufacturing operations in 1956, all environmental assessment work reflected in the available records focused exclusively on the paint manufacturing operations.<sup>20</sup> As a result, little is presently known about waste generation, handling and disposal operations during the veneer manufacturing and packaging era (1910-1945) and the plywood manufacturing era (1945-early 1950s).

Based on Sanborn maps and historical photographs, Georgia Veneer's operations in the first half of the 20th century were particularly significant, spanning both sides of what is now U.S. Highway 17.<sup>21</sup>



GEORGIA VENEER & PACKAGE CO. BRUNSWICK, GA.

22

Photograph 1: Georgia Veneer facility from a 1915 Publication  
by the Georgia Department of Commerce and Labor

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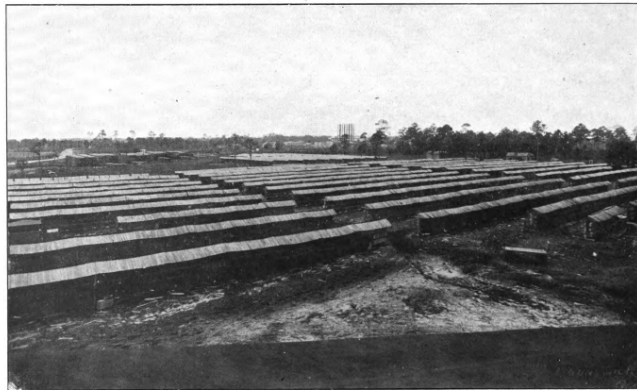
<sup>19</sup> Attachment 22, Deeds from Cherokee San Francisco LLC to Adams Properties Associates LLC (Jan. 21, 2004). Attachment 23, Deed from Cherokee San Francisco LLC to Ronald M. Adams, W. Douglas Adams, and Anne Adams Rabbino (Jan. 21, 2004).

<sup>20</sup> The 1991 EA Report commissioned by O'Brien – the earliest environmental report presently available for the property – states in passing that prior to 1956, the property was used as a box and plywood manufacturing plant since the 1930s. Attachment 19, 1991 EA Report: 1. No other attention was given to the 40+ years of industrial manufacturing operations that took place on the property from 1910 until the early 1950s – an omission that was carried forward throughout all future environmental reports associated with the closure of the O'Brien facility.

<sup>21</sup> Attachment 6, Collection of Sanborn Fire Insurance Maps: 1913, 1920, 1930.

<sup>22</sup> Attachment 4, Georgia Department of Commerce and Labor, Third Annual Report (1915): 52-53.

Newspaper reporting indicates that more persons were employed at the facility during this era than during any other time in the facility's history.<sup>23</sup> Sanborn maps from 1913, 1920 and 1930 depict more than 100 atmospheric veneer drying racks on either side of what is now U.S. Highway 17 (in the area east of the boundary of the Brunswick facility).<sup>24</sup> These appear to be the same racks depicted on the following photograph from 1915:



YARD OF GEORGIA VENEER & PACKAGE CO., BRUNSWICK, GA.

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Photograph 2: Yard of Georgia Veneer facility from a 1915 Publication by the Georgia Department of Commerce and Labor

Other key features formerly on the main facility property included additional outdoor veneer drying racks; buildings for warehousing veneer, cutting veneer, and atmospheric drying of veneer; multiple railroad sidings; a “crate shop”; engine rooms; steam vats; a machine room; a fuel room and an oil house.<sup>26</sup> The 1920 Sanborn map indicates the presence of “one 40 gal chem tk on wheels.”<sup>27</sup> An aerial photograph from 1945 depicts additional infrastructure and roads throughout the property, as well as earth disturbance consistent with a landfill, possibly encroaching onto the Brunswick facility to the south.<sup>28</sup>

The main warehouse building currently located on the property appears to be the plywood mill constructed in 1946 by Tidewater.<sup>29</sup> Available information suggests that the plywood

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<sup>23</sup> Attachment 7, *The Atlanta Constitution* (Jan. 5, 1937): 8.

<sup>24</sup> Attachment 6, Collection of Sanborn Fire Insurance Maps: 1913, 1920, 1930.

<sup>25</sup> Attachment 4, Georgia Department of Commerce and Labor, *Third Annual Report* (1915): 52-53.

<sup>26</sup> Attachment 6, Collection of Sanborn Fire Insurance Maps: 1913, 1920, 1930.

<sup>27</sup> Attachment 6, Collection of Sanborn Fire Insurance Maps: 1920.

<sup>28</sup> Attachment 24, Historical aerial photograph of Brunswick, Ga. (1945).

<sup>29</sup> Attachment 6, Collection of Sanborn Fire Insurance Maps: 1949.

manufacturing operations had a similar, though somewhat smaller, footprint to the paint manufacturing operations that would come later. Hazardous wastes typically associated with the production of plywood include spent solvents, glue wastes, ignitable wastes, and wood preservatives.<sup>30</sup>

Once paint and varnish manufacturing operations replaced plywood manufacturing operations in 1956, Dixie Paint added several features to support its new operations. From 1956 until 1970, a two-acre unlined landfill located behind (east of) the main factory building was reportedly used to dispose of approximately 11 tons of trash per month, including off-specification paint products.<sup>31</sup> In the late 1960s, large paint racks were installed in the southwest corner of the property, immediately north of the Terry Creek portion of the Brunswick facility, for apparent use in the testing of long-term outdoor performance of paints.<sup>32</sup> In addition, a 1961 site plan prepared for Dixie Paint depicts one or more transformers in front of the main production building, which likely contained PCBs based on the time period in which they were in use.<sup>33 34</sup>

Other features supporting the paint manufacturing operations included:

- The main plant building, housing paint milling and mixing operations, paint filling and labelling operations, paint product storage, and raw material and pigment storage;<sup>35</sup>
- A varnish building located to the southeast of the main building, which is first depicted on a 1960 Sanborn map and appears from aerial photographs to be present into the 1980s;<sup>36</sup>

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<sup>30</sup> Attachment 25, U.S. EPA, Furniture/Wood Manufacturing and Refinishing, Document EPA/530-SW-90-027c.

<sup>31</sup> Attachment 19, 1991 EA Report: E-2, 6-7, 12; Attachment 20, 1996 Phase II Addendum: Fig. 2 (former landfill).

<sup>32</sup> The paint racks are visible on historical aerial photographs through at least 1993. Attachment 26, EDR, Collection of Historical Aerial Photographs: 1968, 1974, 1983, 1988, 1993, undated. The remnants of the racks were also observed on the property in 2017. Attachment 27, Dec. 2017 Photograph from Integral Site Evaluation (Dec. 2017).

<sup>33</sup> Attachment 28, Delta Surveyors, Dixie Paint & Varnish Co. Survey (May 19, 1961).

<sup>34</sup> ATSDR, Toxicological Profile for Polychlorinated Biphenyls (PCBs) (November 2000): 467-471, available at <https://www.atsdr.cdc.gov/toxprofiles/tp17.pdf>.

<sup>35</sup> Attachment 19, 1991 EA Report: E-2, 2; Attachment 20, 1996 Phase II Addendum: Fig. 2.

<sup>36</sup> Attachment 6, Collection of Sanborn Fire Insurance Maps: 1960, 1969; Attachment 26, EDR, Collection of Historical Aerial Photographs: 1968, 1974, 1983, 1988. The structure of the varnish building appears to be depicted in the 1996 Phase II Addendum but was never identified as such or evaluated as an area of potential concern. Attachment 20, 1996 Phase II Addendum: Fig. 2.



- A warehouse building located to the northeast of the main building, which is still present today;<sup>37</sup>
- A solvent and resin tank farm containing 44 aboveground tanks with a capacity of approximately 214,000 gallons, which was reportedly situated on a gravel base with one or more storm drains present;<sup>38</sup>
- A spent solvent still, used to reclaim usable solvent from waste solvent generated during the washing of tanks that were used to manufacture solvent-based paints and coatings;<sup>39</sup>
- A caustic tank, used to clean tanks that were used to manufacture solvent- and latex-based paints;<sup>40</sup>
- Settling ponds with an estimated holding capacity of approximately 15,000 gallons, to which wastewater generated from cleaning the latex mixing tanks was discharged beginning in 1971 until their removal in 1991;<sup>41</sup>
- An unlined landfill used to dispose of dried paint sludge from the settling ponds from 1971 until 1991;<sup>42</sup>

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<sup>37</sup> Attachment 6, Collection of Sanborn Fire Insurance Maps: 1969; Attachment 29, Google Earth Photo (Jan. 2019); Attachment 20, 1996 Phase II Addendum: Fig. 2.

<sup>38</sup> Attachment 19, 1991 EA Report: 5-6, 10-11; Attachment 20, 1996 Phase II Addendum: Fig. 2; Attachment 32, Goldman Environmental Management Services, Compliance Status Report (Aug. 30, 1998): 8. According to the 1991 EA Report, typical solvents used at the site included mineral spirits, VM&P [varnish makers and painters] naphtha (benzene), toluene, methyl ethyl ketone (MEK), xylene and acetone, among other unspecified solvents. Attachment 19, 1991 EA Report: 6.

<sup>39</sup> Attachment 19, 1991 EA Report: 6, 11; Attachment 20, 1996 Phase II Addendum: Fig. 2.

<sup>40</sup> Attachment 19, 1991 EA Report: 6, 11; Attachment 20, 1996 Phase II Addendum: Fig. 2.

<sup>41</sup> Attachment 19, 1991 EA Report: 3-4, 11-12, 18; Attachment 20, 1996 Phase II Addendum: Fig. 2. Before this time, wastewater was discharged directly to Dupree Creek. Attachment 19, 1991 EA Report: 3.

<sup>42</sup> Attachment 19, 1991 EA Report: 3-5, 12; Attachment 20, 1996 Phase II Addendum: Fig. 2. According to a 1980 permit application, the following materials were disposed of annually in the unlined landfill: 10,000 pounds of K078 material (solvent cleaning wastes), 36,000 pounds of K079, K080 and K081 materials (water and caustic cleaning wastes and wastewater treatment sludge), and 100 pounds of K082 materials (air pollution control sludges). Attachment 19, 1991 EA Report: 4.

- A drum storage area used to store various raw materials and wastes;<sup>43</sup>
- An underground fuel oil tank located to the south of the main manufacturing building, which was reportedly in operation from 1973 until 1985, although no records are available regarding its installation, operation, or removal;<sup>44</sup> and
- A drywell reportedly located adjacent to a laboratory in the front of the main manufacturing building, for which there are no available records.<sup>45</sup>

## C. Summary of Previous Environmental Investigations

### 1. 1991 Environmental Site Assessment

The first known environmental investigation of the former O'Brien paint manufacturing facility occurred in 1991, shortly after the cessation of 80 years of industrial operations at the facility.<sup>46</sup> As a condition of an anticipated sale of the property, O'Brien retained a consultant to perform a desktop environmental assessment followed by one round of targeted soil and groundwater sampling activities. These activities constituted an initial Phase I and limited Phase II environmental site assessment. The assessment activities focused on seven areas of interest for sampling: the solvent and resin tank farms, the solvent still and caustic wash tank, the settling ponds, the landfill for sludge from the settling ponds, the former landfill adjacent to Dupree Creek, the underground fuel tank, and a suspected landfill in the southeast corner of the property, adjacent to Dupree Creek and the Brunswick facility.<sup>47</sup> With the exception of the underground fuel tank and the suspected landfill, all other areas of interest were located behind the main manufacturing building (i.e., to the east of the building) in the center portion of the property.<sup>48</sup> The main

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<sup>43</sup> Attachment 19, 1991 EA Report: 10; Attachment 20, 1996 Phase II Addendum: Fig. 2.

<sup>44</sup> Attachment 19, 1991 EA Report: 11; Attachment 20, 1996 Phase II Addendum: Fig. A (B-12 soil boring location).

<sup>45</sup> Attachment 20, 1996 Phase II Addendum: 3 & Fig. 2.

<sup>46</sup> A full copy of the 1991 EA Report with attachments has not been located. The report also identifies three earlier reports that have not been located: a 1983 risk assessment report that O'Brien prepared for environmental insurance purposes and 1984 and 1989 preliminary assessment reports prepared by EPD. Attachment 19, 1991 EA Report: "List of Attachments."

<sup>47</sup> Attachment 19, 1991 EA Report: 10-12. O'Brien's consultant speculated that the "suspected landfill" was actually a future, as-yet built landfill. Attachment 19, 1991 EA Report: 12. Its location, however, is consistent with an extensive area of disturbance evident on a 1945 aerial photograph of the area encompassing the former O'Brien paint manufacturing facility. Attachment 24, Historical Aerial Photograph of Brunswick, Ga. (1945).

<sup>48</sup> Attachment 20, 1996 Phase II Addendum: Fig. A (suspected landfill located at boring locations B-1 and B-2; underground fuel tank located at boring location B-12).

manufacturing building itself was not investigated, nor were the varnishing building, drum storage area, paint racks, and drywell. (Indeed, the drywell was not identified to a regulatory agency until years later, and the paint racks never were identified.)

Soil sampling conducted in 1991 was generally confined to a depth interval ranging between one and five feet bgs, with a few samples collected between 5.5 and 7.5 feet deep.<sup>49</sup> Shallow groundwater samples were collected from temporary monitoring well points at depths of approximately three to six feet bgs.<sup>50</sup> Soil and groundwater samples were analyzed for a subset of VOCs – BTEX, methyl ethyl ketone (“MEK”), and acetone – as well as mineral spirits and various metals.<sup>51</sup> No other constituents were analyzed.

BTEX compounds were detected in soils and groundwater under the former settling ponds behind the main manufacturing building.<sup>52</sup> In groundwater, these concentrations “appear[ed] to increase in concentration in a northern to southerly direction which parallels the flow of Dupree Creek.”<sup>53</sup> Mineral spirits were also detected in the former settling pond area, the landfill for sludge from the settling ponds, the area east of the solvent tank farm and the former landfill along Dupree Creek.<sup>54</sup> Benzene in groundwater exceeded the drinking water standard, but the consultant concluded that drinking water standards were inapplicable to the groundwater due to the high salinity and total dissolved solids (“TDS”) content of the groundwater.<sup>55</sup> Soils in the area of the solvent still/caustic tank could not be sampled due to the presence of a thick concrete slab at a depth of one foot bgs.<sup>56</sup>

## **2. 1996 Phase II Site Addendum, Environmental Site Assessment Report**

O’Brien retained a new environmental consultant in 1996 to obtain additional information intended to complete the limited Phase II environmental site assessment activities conducted in 1991. This work again focused exclusively on known areas of concern associated with O’Brien’s paint manufacturing operations, located almost entirely to the east of the main manufacturing building.<sup>57</sup>

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<sup>49</sup> Attachment 19, 1991 EA Report: Table 1.

<sup>50</sup> Attachment 19, 1991 EA Report: Table 1.

<sup>51</sup> Attachment 19, 1991 EA Report: Table 2.

<sup>52</sup> Attachment 19, 1991 EA Report: 19, 25-27.

<sup>53</sup> Attachment 19, 1991 EA Report: 19.

<sup>54</sup> Attachment 19, 1991 EA Report: 19, 25-27.

<sup>55</sup> Attachment 19, 1991 EA Report: 21.

<sup>56</sup> Attachment 19, 1991 EA Report: Table 4, n.3.

<sup>57</sup> Attachment 20, 1996 Phase II Addendum: 2-3 & Fig. 2.

The suspected landfill in the southeast corner of the property was not re-evaluated (where only two soil samples and two groundwater samples had been collected and analyzed, all at depths of less than four feet bgs) nor was the underground fuel tank to the south (where only one soil sample and one groundwater sample had been collected, both at depths of less than five feet bgs). In their place, the drum storage area behind the main manufacturing building was added to the scope of work, as was a drywell located adjacent to a “laboratory” in the front of the building. The entire southern half of the property, including the outdoor paint testing area abutting the Brunswick facility, was not investigated.<sup>58</sup>

As with the 1991 sampling event, sampling in the identified areas of concern was limited to shallow conditions only: soil sampling was conducted to the water table-vadose zone interface (at depths of four feet or less), and groundwater sampling was conducted to an approximate depth of +/- 10 feet bgs.<sup>59</sup> Soil samples were collected from 12 soil borings and analyzed for VOCs, SVOCs, mineral spirits and certain metals.<sup>60</sup> In addition to metals, which were detected in all soil samples, several VOCs, including ethylbenzene, xylenes, isopropylbenzene, n-propylbenzene, 1,3,5-trimethylbenzene, 1,3,4- trimethylbenzene and mineral spirits were detected at a depth of one foot in the area of the solvent still and caustic tank.<sup>61</sup> No soil samples collected from the solvent tank farm or drywell areas were submitted for laboratory analysis.<sup>62</sup>

Groundwater samples were collected from seven temporary shallow groundwater monitoring points at depths ranging from two to seven feet.<sup>63</sup> Metals were detected in all of the groundwater samples.<sup>64</sup> In addition, benzene, ethylbenzene, xylenes and mineral spirits were detected in the shallow groundwater samples obtained in the solvent still/caustic tank area, and ethylbenzene, xylenes and naphthalene were detected in the shallow groundwater samples obtained in the solvent tank farm area.<sup>65</sup> For unknown reasons, no groundwater samples were collected from the former settling ponds area.<sup>66</sup>

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<sup>58</sup> Attachment 20, 1996 Phase II Addendum: Fig. 2.

<sup>59</sup> Attachment 20, 1996 Phase II Addendum: 3.

<sup>60</sup> Attachment 20, 1996 Phase II Addendum: 7-9.

<sup>61</sup> Attachment 20, 1996 Phase II Addendum: 8.

<sup>62</sup> Attachment 20, 1996 Phase II Addendum: 8.

<sup>63</sup> Attachment 20, 1996 Phase II Addendum: 9-10.

<sup>64</sup> Attachment 20, 1996 Phase II Addendum: 9.

<sup>65</sup> Attachment 20, 1996 Phase II Addendum: 10.

<sup>66</sup> Attachment 20, 1996 Phase II Addendum: 10.

Based on these sampling results, O'Brien reported releases under Georgia's Hazardous Substance Response Act ("HSRA") of BTEX, naphthalene, mineral spirits, barium, lead and zinc to EPD in March 1996.<sup>67</sup> Subsequent investigations by O'Brien and its successors-in-title focused exclusively on these nine constituents.

### **3. 1998 Compliance Status Report**

Based on O'Brien's 1996 release notification, EPD listed the former O'Brien paint manufacturing facility on its Hazardous Site Inventory (Site Number 10417) in July 1996 and issued a notice to O'Brien in December 1997 requiring O'Brien to file a Compliance Status Report ("CSR").<sup>68</sup>

After conducting a voluntary corrective action to remove lead-impacted soils from the former settling ponds and the landfill for sludge from the settling ponds as well as an additional area to the east bordering Dupree Creek, O'Brien submitted its CSR to EPD in August 1998.<sup>69</sup> The 1998 CSR focused only on the storage, processing and disposal areas located on the east side of the main manufacturing building which were known to support paint manufacturing operations, but failed to address earlier operations, merely stating that "chemical use and storage information for operations prior to 1966 (Dixie) is unknown."<sup>70</sup>

According to the 1998 CSR, the regulated substances that O'Brien reported to EPD in 1996 as having been released were associated with raw materials commonly used in the manufacture of paints at the property, including pigments that contained lead, barium and zinc and various solvents including toluene, mineral spirits, xylenes and naphthalene.<sup>71</sup> The CSR stated that there were no records indicating that chlorinated solvents were used at the facility;<sup>72</sup> as a result, chlorinated VOCs were not analyzed as part of the sampling effort. However, chlorobenzene is a solvent

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<sup>67</sup> Attachment 30, Applied Environmental Strategies, 1996, Amended Release Notification (Mar. 29, 1996).

<sup>68</sup> Attachment 31, Letter from Woodall (EPD) to Crowley (O'Brien) regarding Compliance Status Report Call-In (Dec. 22, 1997).

<sup>69</sup> Attachment 32, Goldman Environmental Management Services, Compliance Status Report (Aug. 30, 1998) (the "1998 CSR").

<sup>70</sup> Attachment 32, 1998 CSR: 2-3 & Fig. 3 (Site Map).

<sup>71</sup> Attachment 32, 1998 CSR: 6.

<sup>72</sup> Attachment 32, 1998 CSR: 6.

known to have been used in paint manufacturing,<sup>73</sup> and two other O'Brien paint manufacturing facilities that operated during the same era are known to have used (and released) chlorobenzene.<sup>74</sup>

The suspected contaminant source areas east of the main manufacturing building were assessed in connection with the CSR, although again the scope and extent of sampling was limited both in terms of the constituents that were analyzed (limited to those reported by O'Brien in 1996) and the area and extent of sampling. Delineation activities were minimal. To assess the horizontal extent of BTEX in groundwater, O'Brien installed a single temporary well (monitoring well MW-6) approximately 185 feet south of the main manufacturing building at a depth of less than 10 feet bgs.<sup>75</sup> BTEX was not detected in the initial round of sampling from this monitoring well, and the well was not sampled again.<sup>76</sup> To assess the vertical extent of BTEX contamination, O'Brien relied almost exclusively on analytical results obtained from a portable gas chromatograph; of the 11 Geoprobe grab groundwater samples collected from depths greater than 10 feet bgs (ranging from 11 to 33 bgs), only two of these samples were sent for analytical testing at a laboratory (GP1-W-20, GP2-W-15), and both were collected from the area directly behind the main building.<sup>77</sup>

Discrepancies were also present in the datasets. Laboratory confirmation samples were collected from a few Geoprobe locations to evaluate the effectiveness of field screening activities, but the results were not fully consistent.<sup>78</sup> Similarly, there were discrepancies between the shallow Geoprobe results and data collected from shallow groundwater monitoring wells installed in the same locations, which were intended to confirm the results obtained from the portable gas chromatograph.<sup>79</sup> Those shallow monitoring wells were all installed to a total depth of 10 feet with screened intervals from 2-10 feet bgs.<sup>80</sup>

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<sup>73</sup> Attachment 33, U.S. EPA Office of Pollution Prevention and Toxics, Chemical Fact Sheets, Chlorobenzene (1995).

<sup>74</sup> Attachment 34, EnviroAssets, Inc., 2005, Phase III RFI Groundwater Report, South San Francisco, CA (Aug. 14, 2005); Attachment 35, Environ, 2005, Groundwater Plume Stability Monitoring Report, Royal Adhesives & Sealants Site, South Bend, Indiana (Sept. 2005).

<sup>75</sup> Attachment 32, 1998 CSR: 12 & Table 5, Fig. 3.

<sup>76</sup> Attachment 32, 1998 CSR: Table 9.

<sup>77</sup> Attachment 32, 1998 CSR: Table 9.

<sup>78</sup> Attachment 32, 1998 CSR: 11, 19 (noting laboratory detections of BTEX constituents in locations where BTEX was not identified in the field).

<sup>79</sup> Attachment 32, 1998 CSR: 25-26 (noting differing results by two orders of magnitude in laboratory samples which were intended to confirm field sampling results).

<sup>80</sup> Attachment 32, 1998 CSR: Table 5.

Putting aside these discrepancies and the limited extent of sampling, the CSR concluded that benzene, ethylbenzene and naphthalene did not meet EPD's Type 1 groundwater criteria and that lead, barium and zinc did not meet EPD's Type 1 soil criteria, but that all constituents in soils and groundwater met the Type 4 criteria. O'Brien therefore requested that the property be removed from the Hazardous Site Inventory.<sup>81</sup>

#### **4. 1999 Compliance Report Addendum**

In February 1999, EPD issued a Notice of Deficiency, indicating that additional work was needed to complete the CSR.<sup>82</sup> Among other things, EPD noted that direct push technology is not recommended for collecting groundwater samples for delineation purposes. EPD indicated that "at a minimum," the installation of a deep monitoring well in the former solvent and resin tank farm area was necessary to verify the results of the Geoprobe analysis.<sup>83</sup>

Less than three months later, O'Brien submitted a CSR Addendum responding to EPD's Notice of Deficiency.<sup>84</sup> The CSR Addendum documented the installation of a new "deep" monitoring well – monitoring well DW1 – intended to assist in the vertical delineation of BTEX impacts observed in the area of the former solvent still/caustic tank and tank farm. The well was installed with a screened interval from 32 to 37 feet bgs.<sup>85</sup> However, the use of mud rotary drilling to construct the well, the lack of equilibration time between drilling and sampling, and the apparent lack of well purging prior to sample collection likely would have precluded the detection of any groundwater contamination or biased the sample results significantly low. Based on one sampling event conducted in March 1999 during which BTEX was not detected in this well, O'Brien concluded that the vertical extent of the dissolved benzene plume was less than 32 ft bgs.<sup>86</sup> With

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<sup>81</sup> Attachment 32, 1998 CSR: 29.

<sup>82</sup> Attachment 36, EPD, CSR Notice of Deficiency (Feb. 5, 1999).

<sup>83</sup> Attachment 36, EPD, CSR Notice of Deficiency (Feb. 5, 1999): 1. EPD also noted that the analytical method that O'Brien used to analyze BTEX in soils was no longer an approved method and that soil samples should be collected and analyzed at "strategic locations to verify the results of the previous investigation." Attachment 36, EPD CSR NOD: 2. This comment was later retracted, however, based on O'Brien's representation that the soil samples were collected prior to May 1, 1998, when EPD stopped accepting soil analysis using Method 8020 for BTEX. Attachment 37, Letter from Houle to Hendricks (EPD) regarding Response to CSR Notice of Deficiency (Feb. 17, 1999): 3. The CSR itself indicates, however, that the soil samples were collected on June 2, 1998. Attachment 32, 1998 CSR: 15.

<sup>84</sup> Attachment 38, Applied Environmental Strategies, Compliance Status Report Addendum (April 20, 1999) (the "1999 CSR Addendum").

<sup>85</sup> Attachment 38, 1999 CSR Addendum: Sec. 1.

<sup>86</sup> Attachment 38, 1999 CSR Addendum: Sec. 1.

respect to horizontal delineation, O'Brien concluded that the benzene plume was narrowly confined to the former tank farm area.<sup>87</sup>

In July 1999, EPD provided a partial approval of the CSR Addendum, finding that the delineation work was complete but that a Corrective Action Plan ("CAP") needed to be prepared and submitted before EPD could concur with O'Brien's certification of compliance with the Type 4 risk reduction standards.<sup>88</sup> The CAP was to include a groundwater monitoring plan that would remain in place for as long as the former O'Brien paint manufacturing facility met the Type 4 standards and that would ensure that contaminants in groundwater exceeding the Type 1 or Type 2 standards did not migrate onto adjacent property not subject to institutional controls.<sup>89</sup>

In August 1999, Cherokee, which had since acquired the former paint manufacturing facility from O'Brien, submitted a two-page monitoring plan to EPD.<sup>90</sup> The plan proposed to sample six groundwater monitoring wells (including the "deep" monitoring well DW-1) on a semi-annual basis for as long as the former O'Brien paint manufacturing facility was certified as meeting Type 4 standards, with sampling to begin within approximately six months of EPD's approval of the Type 4 compliance certification.<sup>91</sup> Two of the six wells that were identified as hydraulically downgradient – monitoring wells MW-2 and MW-3 – were located directly east of the main building, adjacent to Dupree Creek.<sup>92</sup>

## **5. 2000 CAP and 2003 Revised CAP**

Cherokee submitted a CAP to EPD in August 2000 and a revised CAP to EPD in January 2003.<sup>93</sup> In both versions, the groundwater monitoring plan was modified from the version that Cherokee proposed in 1999, both in terms of sampling frequency (reduced from semi-annual to annual) and

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<sup>87</sup> Attachment 38, 1999 CSR Addendum: Sec. 1; Attachment 32, 1998 CSR: Fig. 2.

<sup>88</sup> Attachment 39, Letter from Hendricks (EPD) to Crowley regarding partial completion of CSR (July 29, 1999).

<sup>89</sup> Attachment 39, Letter from Hendricks (EPD) to Crowley: 1.

<sup>90</sup> Attachment 40, Applied Environmental Strategies, 1999, Compliance Monitoring Plan (Aug. 24, 1999): 1-2.

<sup>91</sup> Attachment 40, Applied Environmental Strategies 1999: 1-2.

<sup>92</sup> Attachment 40, Letter from Houle to Hendricks (EPD) regarding Compliance Monitoring Plan (Aug. 26, 1999): 1-2; Attachment 32, 1998 CSR: Fig. 3 (Site Map).

<sup>93</sup> Attachment 41, Law Engineering and Environmental Services, Inc., Corrective Action Plan (Aug. 20, 2000) (the "2000 CAP"); Attachment 42, MACTEC, Revised Corrective Action Plan (Jan. 2003) (the "2003 Revised CAP").



number of monitoring wells (reduced from six wells to two).<sup>94</sup> The two monitoring wells that remained in the monitoring plan were monitoring well MW-5, located within the former solvent/resin tank farm, and monitoring well MW-2, located to the southeast in the presumed downgradient direction.<sup>95</sup> Among the monitoring wells eliminated from further sampling activities were the vertical delineation well (monitoring well DW-1), which had only been sampled once.

## **6. 2002-2003 Groundwater Sampling Activities**

Cherokee sampled the two monitoring wells that were identified in the revised groundwater monitoring plan for benzene and ethylbenzene in December 2002, and again in January 2003 for benzene and lead in accordance with the 2003 Revised CAP.<sup>96</sup>

In March 2003, EPD asked for an additional round of groundwater sampling to confirm that ethylbenzene and naphthalene met the Type 1 risk reduction standards, the certification for which had been based on groundwater sampling results from 1999.<sup>97</sup> Accordingly, in April 2003, Cherokee sampled monitoring wells MW-2, MW-5 and MW-7 for benzene, ethylbenzene and naphthalene.<sup>98</sup> Benzene was detected at monitoring well MW-7 at a concentration slightly above the Type 1 standard at 5.6 micrograms per liter, whereas ethylbenzene and naphthalene remained at concentrations below the Type 1 risk reduction standards in all three monitoring wells.<sup>99</sup> A Revised Re-Certification Supplemental Report summarizing these sampling results was submitted to EPD in June 2003.<sup>100</sup>

During this same period, Cherokee was actively negotiating with the Adams siblings over the sale of the former O'Brien paint manufacturing facility. Under the terms of their agreement, Cherokee's Revised Re-Certification Supplemental Report, once approved by EPD, would serve

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<sup>94</sup> Attachment 41, 2000 CAP: 2-1, 2-2; Attachment 42, 2003 Revised CAP: 2-1, 2-2.

<sup>95</sup> Attachment 41, 2000 CAP: 2-1, 2-2; Attachment 42, 2003 Revised CAP: 2-1, 2-2; Attachment 32, 1998 CSR: Fig. 3 (Site Map).

<sup>96</sup> Attachment 43, MACTEC, Revised Recertification Supplemental Report (Sept. 2003) (the "2003 Revised Recertification Supplemental Report"): 4-1 through 4-3 & Table 4-3.

<sup>97</sup> Attachment 44, Letter from EPD to Arnold regarding NOD for Revised CAP and Re-Certification Supplemental Report (Mar. 18, 2003).

<sup>98</sup> Attachment 43, 2003 Revised Recertification Supplemental Report: 4-2, 4-3 & Table 4-3.

<sup>99</sup> Attachment 43, 2003 Revised Recertification Report: Table 4-3.

<sup>100</sup> Attachment 43, 2003 Revised Recertification Report: 4-2, 4-3 & Table 4-3.

as the basis for a Brownfields application to be submitted by the Adams siblings, with both documents needing to be approved by EPD as a condition of closing.

With benzene hovering around the Type 1 standard in monitoring well MW-7 during the April 2003 monitoring event, both parties appear to have been keenly interested in continued sampling to demonstrate Type 1 compliance prior to the sale of the former O'Brien paint manufacturing facility. As the parties headed toward closing, additional groundwater samples were collected from the limited set of three shallow monitoring wells on September 11, 2003 and again on November 12, 2003.<sup>101</sup> Benzene was not detected during the September 2003 sampling event and was below the Type 1 standard during the November 2003 sampling event.<sup>102</sup> Cherokee certified compliance with the Type 1 groundwater standards on November 21, 2003,<sup>103</sup> and three days later, Adams submitted a Prospective Purchaser Compliance Status Report and Brownfield Application to EPD on November 24, 2003, certifying the same.<sup>104</sup>

Based on this submission, EPD granted a Limitation of Liability letter to the Adams siblings on December 5, 2003 and delisted the former O'Brien paint manufacturing facility from the Hazardous Site Inventory on December 31, 2003.<sup>105</sup> Closing on the property occurred in January 2004.

## **7. 2018-19 Groundwater Sampling**

Apart from routine groundwater monitoring events that Hercules conducted on the Adams Properties from 2012 through 2018 in conjunction with its ongoing corrective action activities at the Brunswick facility, two additional sets of data have been collected in recent years in connection with pending litigation initiated by the Adams siblings against Hercules and Pinova, Inc. (which owns the active manufacturing portions of the Brunswick facility).

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<sup>101</sup> Attachment 45, MACTEC, Groundwater Recertification Documentation (Nov. 21, 2003): Table 4-3 & Fig. 1. In the interim, EPD concurred that the Type 4 groundwater standard had been met and reclassified the property as a Class III site on the HSI. Attachment 46, Letter from Word (EPD) to Arnold regarding re-certification (Oct. 17, 2003). However, the September and November sampling events were conducted with the objective of certifying compliance with the Type 1 groundwater standard and removing the property from the HSI altogether.

<sup>102</sup> Attachment 45, MACTEC, 2003, Groundwater Recertification Documentation (Nov. 21, 2003): Table 4-3 & Fig. 1.

<sup>103</sup> Attachment 45, MACTEC 2003: Table 4-3 & Fig. 1.

<sup>104</sup> Attachment 47, Dobbs Environmental, 2003, Compliance Status Report and Brownfield Application (Nov. 2003).

<sup>105</sup> Attachment 48, Letter from Couch (EPD) to Adams Properties Associates LLC regarding Limitation of Liability (Dec. 5, 2003).

First, in 2018, Hercules' consultant Integral Consulting, Inc. collected soil gas, surface soil and shallow groundwater samples at the former O'Brien paint manufacturing facility.<sup>106</sup> VOCs were not detected during this sampling event. However, extensive lead, arsenic and PCB impacts exceeding residential risk reduction standards were identified in surface soils throughout the property, including in areas to the east of the main manufacturing building that had been previously certified as clean, as well as in areas north, west and south of the building that had never been investigated.<sup>107</sup> These sampling results indicate that current environmental conditions at the former O'Brien paint manufacturing facility do not meet the applicable risk reduction standards and demonstrate that the previous site assessment work conducted by O'Brien and Cherokee had significant data gaps.

Second, in 2019, the Adams siblings installed and sampled three new groundwater monitoring wells on the southern half of the former O'Brien paint manufacturing facility, to a depth of approximately 85 feet.<sup>108</sup> Two of the monitoring wells were installed south of the main manufacturing building and the third was installed behind the building adjacent to Dupree Creek.<sup>109</sup> Chlorobenzene was detected in all three wells, whereas benzene was not.<sup>110</sup> These sampling results suggest that one or more sources of chlorobenzene are present at the former O'Brien paint manufacturing facility which were not investigated and delineated during the prior site assessment activities. The isolated chlorobenzene data are not representative of the plume from the Brunswick facility which is characterized in the portion of the facility in proximity to the Adams Properties by the co-location of benzene and chlorobenzene.

### **III. FORMER NESMITH SERVICE STATION PROPERTY**

#### **A. Site Ownership and Operations**

The first documented use of the parcel constituting the southwestern portion of the Adams Properties dates to 1920, when operations of Georgia Veneer's box and crate manufacturing facility to the north, east and west extended onto the parcel.<sup>111</sup>

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<sup>106</sup> Attachment 49, Integral Consulting, Inc., 2018, Report of Phase 2 Sampling Activities (Oct. 2018).

<sup>107</sup> Attachment 50, Montrose Environmental Group, 2020, Report on Remediation liability and Redevelopment Implications Associated with Contamination from On-Site Sources at Plaintiffs' Property (March 2020): 16-17, 19 & Fig. 7a-7d.

<sup>108</sup> Attachment 51, Charles Hill, Field Notes for Monitoring Well Installations (Sept. 2018).

<sup>109</sup> Attachment 52, Dobbs Environmental, Monitoring Well Figure. The locations as depicted on this figure are believed to be approximate locations, as the well locations have not yet been surveyed.

<sup>110</sup> Attachment 53, Groundwater Sampling Results (March 2019).

<sup>111</sup> Attachment 6, Collection of Sanborn Fire Insurance Maps: 1920, 1930.

The crate shop was razed near the time of Tidewater's construction of its plywood mill in 1946.<sup>112</sup> The property then sat vacant for approximately 10 years. At some point between 1954 and 1960, a fuel filling station and oil depot was constructed by Pure Oil Company ("Pure Oil") at the property.<sup>113</sup> Pure Oil was later acquired by Union Oil Company of California ("Unocal"), a predecessor of what is now Chevron Corporation.<sup>114</sup> It appears that the property was used as a service station and oil depot by Pure Oil and its successors until approximately 1975.

From 1975 until 1986, the Brunswick and Glynn County Development Authority owned the property, presumably leasing it for continued service station operations.<sup>115</sup> In 1986, Buddy Nesmith Oil Co., Inc. acquired title to the property. At the time, Nesmith had been a marketer and distributor of Unocal products for over 30 years.<sup>116</sup>

In May 1999, GADOT acquired through eminent domain a small portion of the property fronting U.S. Highway 17 for purposes of road expansion.<sup>117</sup> Service station and auto repair operations are believed to have continued after this date, although it is unknown when operations ceased.

In January 2004, the First Bank of Brunswick foreclosed on the property, and Lanier Parkway Associates, LLC ("Lanier Parkway"), a limited liability company formed by the Adams siblings, acquired the property from the bank in foreclosure proceedings later that year.<sup>118</sup> Thereafter, Lanier Parkway leased the property to various auto repair mechanics as well as a company providing septic tank cleaning services.<sup>119</sup>

In 2020, the auto repair shop (service station) building was torn down. The former Nesmith service station property currently sits vacant except for a large billboard sign.

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<sup>112</sup> Attachment 6, Collection of Sanborn Fire Insurance Maps: 1949.

<sup>113</sup> Attachment 6, Collection of Sanborn Fire Insurance Maps: 1960; Station Development Corporation, then a subsidiary of Pure Oil Company, purchased the property in July 1954. Attachment 54, Lawyers' Title Insurance, Title Insurance Policy Excerpt for 2696 Glynn Ave. (2004).

<sup>114</sup> Attachment 55, Britannica, "Unocal Corporation," <https://www.britannica.com/topic/Unocal-Corporation>.

<sup>115</sup> Attachment 54, Lawyers' Title Insurance, Title Insurance Policy Excerpt for 2696 Glynn Ave. (2004).

<sup>116</sup> Attachment 56, Unocal Corp., *Seventy-Six*, Vol. LXIV, No. 6 (Nov./Dec. 1985) at 40 (noting Mr. Nesmith's 30 years marketing and distributing Unocal products).

<sup>117</sup> Attachment 54, Lawyers' Title Insurance, Title Insurance Policy Excerpt for 2696 Glynn Ave. (2004).

<sup>118</sup> Attachment 57, Glynn Co. Property Record, Parcel 01-03942.

<sup>119</sup> Glynn County property records identify the property as "Ace Septic Tank Service." Attachment 57, Glynn Co. Property Record, Parcel 01-03942.

## **B. Key Site Features**

As noted above, a crate shop, veneer drying racks, and rail sidings were present on and around the former Nesmith service station property to support manufacturing operations conducted by Georgia Veneer from at least 1920 until 1946. The nature and extent of materials storage, handling, and disposal at the property during this era is presently unknown.

Beginning in the mid-to-late 1950s, a fuel filling station and oil depot were in service on the former Nesmith service station property with one main building and an ancillary open-air structure. A 1960 Sanborn map depicts four large aboveground storage tanks (i.e., ASTs) located along the property boundary bordering the Brunswick facility.<sup>120</sup> The ASTs presumably were used in servicing the oil depot. Based on a review of Google Earth's historical aerial imagery, the ASTs remained in place until 2005, although the details regarding their use over time is presently unknown.

Details concerning underground storage tanks (i.e., USTs) used to support service station operations are likewise limited:

- No information concerning operation and use of USTs is available for the period from the late 1950s until the early 1980s.
- Various USTs were installed at the former Nesmith service station property in the early-to-mid 1980s. One 2,000-gallon diesel UST was installed on the property in 1981, and five years later, three more USTs were installed -- a 4,000-gallon kerosene UST, a 4,000-gallon gasoline UST and a 2,000-gallon gasoline UST. Those four USTs, together with a used oil UST (installation date unknown) were reportedly removed in 1989.<sup>121</sup> The locations of these former tanks and their condition at the time of removal is presently unknown.
- Four additional USTs were closed and removed by GADOT in February 2000 in connection with the expansion of U.S. Highway 17: two 4,000-gallon gasoline USTs, one 2,000-gallon gasoline UST and one 2,000-gallon diesel UST. These tanks were located south and southwest of the service station building and may have replaced those that had been removed in 1989. BTEX and polycyclic aromatic hydrocarbons ("PAHs") were identified in soil and groundwater samples collected during the removal efforts, and EPD requested that a Corrective Action Plan be submitted.<sup>122</sup>

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<sup>120</sup> Attachment 6, Collection of Sanborn Fire Insurance Maps at 1960.

<sup>121</sup> Attachment 58, Georgia EPD, UST "Data for Gilmer to Worth Counties" (updated July 2021) (excerpt), *available at* <https://epd.georgia.gov/document/document/gilmer-worth-091420/download>.

<sup>122</sup> Attachment 59, Letter from Gulden to Williams (EPD) enclosing Closure Report Form and attachments (May 5, 2000).

- Two additional USTs were identified and removed in 2004: a 4,000-gallon kerosene tank located behind the service station building (i.e., to the east of the building) and a 500-gallon waste oil tank abutting the north side of the building. Nesmith reportedly removed these USTs but did not submit the requested closure report or other documentation to EPD. A third tank, described in reports as a 1,000-gallon spill containment tank or vault, was located inside the truck loading pad area and was apparently not removed.<sup>123</sup>

Apart from the crate shop and ancillary infrastructure, the AST tank farm, and the ten known USTs described above, other site features that have not been evaluated include the recently razed service station building, which may have included floor drains, hydraulic lifts, parts washers, and oil/water separators used in connection with vehicle servicing operations. The building was used as an auto repair shop both before and after Lanier Parkway's acquisition of the property and may have also been used by the septic tank cleaning business that operated at the property in recent years.<sup>124</sup>

Finally, based on a 2003 potentiometric map prepared for the former O'Brien paint manufacturing facility, there is a drainage easement for a nine-foot wide ditch running north to south along the eastern boundary of the property, separating it from the O'Brien paint manufacturing facility.<sup>125</sup> Although the details surrounding the purpose of this ditch are currently unknown, it is possible that the ditch could have served as a transport mechanism for contaminants to reach the adjacent portion of the Brunswick facility.

## **C. Summary of Previous Environmental Investigations**

### **1. 2000 Sampling Activities by GADOT**

The first known sampling event that took place at the former Nesmith service station property was conducted by GADOT in 2000 in connection with its removal of the three gasoline USTs and one diesel UST which were adjacent to U.S. Highway 17 prior to its expansion. Elevated concentrations of BTEX and PAHs were detected in soil samples collected from each of the two excavation pits.<sup>126</sup> PAHs were also detected in a water sample collected from the gasoline UST

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<sup>123</sup> Attachment 60, Dobbs Environmental, 2006, Corrective Action Plan Part A (January 2006); Attachment 61, Letter from Dobbs to Wallace (EPD) enclosing responses to comments (Feb. 7, 2006).

<sup>124</sup> 1,2,4-trichlorobenzene has been used in septic tank and drain cleaner preparations. Attachment 62, U.S. EPA, 1994, *Locating and Estimating Air Emissions from Sources of Chlorobenzenes* (revised): 5-38 (excerpt).

<sup>125</sup> Attachment 63, MACTEC, 2003, "Former O'Brien Paint Facility Potentiometric Surface Map" (Sept. 26, 2003).

<sup>126</sup> Attachment 59, Letter from Gulden to Williams (EPD) enclosing Closure Report Form and attachments (May 5, 2000).

pit at 770 ug/L. Water samples were also collected for analysis of BTEX but for unknown reasons, the analytical results were not provided to EPD.<sup>127</sup>

## **2. 2004 Pre-Acquisition Sampling Activities by Lanier Parkway**

In October and December 2004, additional sampling activities were conducted by Dobbs Environmental (“Dobbs”) in connection with Lanier Parkway’s planned acquisition of the former Nesmith service station property out of foreclosure proceedings. High levels of benzene were detected in soils adjacent to the area where GADOT had removed USTs in 2000 during both sampling events; these soil samples were collected at depths of three feet and seven feet, with the depth of groundwater at four feet. Soil samples were also collected from the excavation pits for the 500-gallon waste oil UST and 4,000-gallon kerosene UST that Nesmith removed in 2004, as well as from the locations of the former AST farm and former AST fill manifolds. BTEX compounds were detected in these locations as well, but at lower levels. An existing groundwater monitoring well (depth unknown) in the vicinity of the kerosene UST that was removed was sampled once for BTEX and PAHs, and no impacts were identified.<sup>128</sup> No investigation of equipment or utilities used in connection with vehicle servicing was performed. No sampling was performed for other VOCs (including chlorobenzene), whether in the vicinity of the waste oil tank or otherwise.<sup>129</sup>

From this point forward, all sampling and cleanup efforts were narrowly focused on a dissolved BTEX plume in groundwater that Dobbs attributed to the USTs and fuel dispensers that GADOT removed in 2000. No investigation was conducted to evaluate the full history of operations at the former Nesmith service station property, which operations dated back to at least as early as the 1920s, or to assess whether additional sources of contamination may have been present as a result of those operations. No geophysical survey was performed to evaluate if other USTs, floor drains, oil/water separators, or other buried objects remained on the property. And even with respect to the known BTEX contamination in soils at the property, no delineation was performed, nor removal or remediation conducted.<sup>130</sup>

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<sup>127</sup> Attachment 64, Letter from Wallace (EPD) to Nesmith enclosing non-compliance history memorandum (April 9, 2004).

<sup>128</sup> The exact location of this well is unclear. Some figures show it as having been to the east of the kerosene UST, and others show it closer to the eastern property boundary, between the kerosene UST and the former AST farm.

<sup>129</sup> Attachment 60, Dobbs Environmental, Corrective Action Plan Part A (Jan. 2006).

<sup>130</sup> Under EPD’s 1995 technical guidance for corrective action for UST releases, “the [h]orizontal and vertical extent of soil contamination must be identified for each BTEX and PAH constituent until laboratory test results indicate contaminant concentrations are non-detectable, including soil samples at and below the groundwater table.” Attachment 65, GUST-CAP-B Guidance (1995): 8. In addition, corrective action for contaminated soil must meet specified threshold values or alternate concentration

### 3. 2006-2010 CAP Activities

In January 2006, Dobbs submitted Part A of an UST corrective action plan (“CAP-Part A”) to EPD, requesting a No Further Action (“NFA”) determination based on the 2004 sampling results.<sup>131</sup> EPD instead directed Lanier Parkway to install two additional monitoring wells.<sup>132</sup>

In April 2006, Dobbs submitted to EPD an addendum to the CAP-Part A, detailing the installation and sampling of three new monitoring wells on the former Nesmith service station property screened in the shallow zone of the upper surficial aquifer between 3 and 8 feet bgs.<sup>133</sup> Two of these monitoring wells were installed along the western property boundary in front of the former service station building, and the third was installed near the eastern property boundary to replace the previously existing well in that area which had been destroyed. BTEX was detected in groundwater at all three monitoring wells, with benzene ranging in concentrations from 220 ug/L to 15,000 ug/L. Monitoring well MW-2, which had the highest recorded concentrations of BTEX, was located less than 100 feet from the northern edge of the Brunswick facility. A groundwater iso-concentration map prepared by Dobbs depicted benzene at a concentration of 100 ug/L within 20 feet of the property boundary (although the property boundary is not called out as such on the map).<sup>134</sup>

Based on these sampling results, EPD directed Lanier Property to submit Part B of a corrective action plan (“CAP-Part B”), which Dobbs prepared and submitted to EPD on behalf of Lanier Property 18 months later, in October 2007.<sup>135</sup> The CAP-Part B proposed installation of a bio-infiltration trench along the western property boundary and presented the results of an additional round of groundwater sampling conducted in February 2007. Elevated concentrations of BTEX were again detected in all three monitoring wells that Dobbs had installed, with benzene measured at a concentration of 11,000 ug/L in monitoring well MW-2.<sup>136</sup> EPD requested that two additional monitoring wells be installed for additional delineation.<sup>137</sup>

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limits that are approved by EPD as protective of human health and the environment. Attachment 65, GUST-CAP-B Guidance (1995): 10-12.

<sup>131</sup> Attachment 60, Dobbs Environmental, Corrective Action Plan Part A (Jan. 2006).

<sup>132</sup> Attachment 66, Letter from Wallace (EPD) to Adams with enclosures (Jan. 23, 2006).

<sup>133</sup> Attachment 67, Letter from Dobbs to Wallace (EPD) with enclosures (Apr. 19, 2006).

<sup>134</sup> Attachment 67, Letter from Dobbs to Wallace (EPD) with enclosures (Apr. 19, 2006).

<sup>135</sup> Attachment 68, Dobbs Environmental, 2007, CAP Part B (Oct. 5, 2007).

<sup>136</sup> Attachment 68, Dobbs Environmental, 2007, CAP Part B (Oct. 5, 2007).

<sup>137</sup> Attachment 69, Letter from Wallace (EPD) to Dobbs enclosing comments (Oct. 17, 2007).



In January 2009, Dobbs submitted an addendum to the CAP-Part B, agreeing to install the two additional monitoring wells.<sup>138</sup> Although “[n]ot convinced the bio-application will decrease the BTEX,” EPD approved the addendum to the CAP-Part B in February 2009 and requested that quarterly groundwater sampling begin in April 2009.<sup>139</sup>

Shortly thereafter, an approximately 80-foot long bio-infiltration trench with a bacteria tank and distribution line was installed. The trench was reported to have been installed to a depth of approximately two feet, with groundwater at a depth between two and four feet bgs.<sup>140</sup>

In addition to the trench installation, the three existing monitoring wells, now described as “temporary” wells, were replaced with four permanent wells. The permanent well that replaced monitoring well MW-2 (now called monitoring well MW-4) was positioned immediately adjacent to the bacteria tank that fed the bacteria/nutrient mix into the bio-infiltration trench. Two of the other permanent monitoring wells were moved to locations different than the locations of the temporary wells, preventing any direct comparison of pre-remediation sampling results with post-remediation sampling results. A fourth monitoring well was installed to the south within approximately 20 feet of the boundary of the Brunswick facility.<sup>141</sup> The final additional delineation well that EPD requested was never installed.

According to progress reports submitted by Dobbs to EPD, biotreatment commenced on March 31, 2009 and continued until October 1, 2009. Mr. Ronald Adams, who at the time was a banker, performed the work himself, reportedly introducing approximately one gallon of bacteria concentrate mixed with molasses and water into the tank every seven to ten days. No formal documentation of the work was provided to EPD. Instead, the progress report descriptions were “[b]ased on Mr. Adams’ recollection.”<sup>142</sup>

The new monitoring wells were sampled on March 31, 2009 (the first day of the bioremediation treatment) and again on November 11, 2009 (ten days after treatment concluded). Benzene concentrations in new monitoring well MW-4 were reported at 3,800 ug/L and 2,100 ug/L. Based on these sampling results, Dobbs again requested that EPD issue an NFA determination.<sup>143</sup>

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<sup>138</sup> Attachment 70, Letter from Dobbs to Wallace (EPD) enclosing responses to comments (Jan. 19, 2009).

<sup>139</sup> Attachment 71, Letter from Wallace (EPD) to Dobbs (Feb. 4, 2009) with Memorandum from Wallace to Lewis re: Review Information Leading to Approval of CAP-Part B Addendum.

<sup>140</sup> Attachment 72, Letter from Dobbs to Wallace (EPD) with enclosures (Dec. 17, 2009).

<sup>141</sup> Attachment 73, Letter from Dobbs to Wallace (EPD) enclosing June 2010 Monitoring Report (June 11, 2010).

<sup>142</sup> Attachment 74, Letter from Dobbs to Wallace (EPD) (Jan. 18, 2010).

<sup>143</sup> Attachment 74, Letter from Dobbs to Wallace (EPD) (Jan. 18, 2010).

In February 2010, EPD requested that two additional semi-annual groundwater monitoring events be performed to monitor for potential rebound in concentrations of BTEX following infiltration of the bacteria/nutrient mix into the bio-infiltration trench.<sup>144</sup> The first of these events took place in May 2010, six months after the bio-treatment concluded. Benzene was detected in monitoring well MW-4 at a concentration of 3,100 ug/L – up 1,000 ug/L from the previous monitoring event. Dobbs again requested that EPD issue an NFA determination, suggesting that the plume was not moving and that concentrations were stable and/or decreasing.<sup>145</sup>

The second groundwater monitoring event that EPD requested in February 2010 was never conducted. In June 2010, EPD granted the requested NFA determination<sup>146</sup> “based on the decrease in concentration.”<sup>147</sup> The concentrations of benzene in the presumed source well had actually increased by 1,000 ug/L (rather than decreased) since the groundwater monitoring event conducted just six months prior, remaining more than 600 times higher than the drinking water standard for benzene.<sup>148</sup>

EPD’s UST CAP-Part B Guidance (1995) provides that the “[h]orizontal and vertical extent of groundwater contamination must be identified for each BTEX and PAH constituent until laboratory test results indicate contaminant concentrations are non-detectable.”<sup>149</sup> Here, vertical delineation was not completed, and the monitoring well immediately adjacent to the Brunswick facility (monitoring well MW-2) had detectable levels of benzene at the time the NFA determination was issued. (PAHs were not analyzed.)

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<sup>144</sup> Attachment 75, Letter from Wallace (EPD) to Dobbs (Feb. 18, 2010).

<sup>145</sup> Attachment 73, Letter from Dobbs to Wallace (EPD) enclosing June 2010 Monitoring Report (June 11, 2010)

<sup>146</sup> Attachment 76, “No Further Action” Letter from Wallace (EPD) to Dobbs (June 22, 2010), with Memorandum from Wallace to Lewis regarding Review Information Leading to Determination of “No Further Action Required” (hereinafter “NFA Letter”). The NFA determination applied only to “the referenced release” and expressly noted that additional measures might be required “if mandated through more stringent State or Federal statutory or regulatory changes” or if “previously unidentified soil contamination, dissolved contamination or free product are identified as originating from this site.”

<sup>147</sup> Attachment 76, NFA Letter with Memorandum from Wallace to Lewis.

<sup>148</sup> While the UST Rules permit risk-based Alternate Concentration Limits under certain circumstances, none were proposed.

<sup>149</sup> Attachment 65, EPD GUST-CAP-B Guidance (1995): 8.

#### 4. 2018 Sampling

The sampling event that Integral conducted on behalf of Hercules in 2018 in connection with the pending litigation also extended onto the former Nesmith service station property.<sup>150</sup> During this event, the sampling team observed petroleum contamination in two shallow groundwater borings, with hydrocarbon odors detected in both borings and visual evidence of greasy and stained soils and an oily sheen.<sup>151</sup>

At the time of the 2018 sampling, the four permanent monitoring wells that were installed in 2009 were no longer present. Integral collected shallow groundwater samples from two temporary well points, including one installed in the general location of former monitoring well MW-4, which historically exhibited the highest benzene concentrations of the former permanent wells. BTEX, naphthalene and isopropylbenzene were detected in this location, with both benzene (990 ug/L) and ethylbenzene (3,000 ug/L) detected at levels well above their respective drinking water standards.<sup>152</sup>

In soils, elevated concentrations of BTEX, naphthalene and isopropylbenzene were detected in samples collected from the area around the former gasoline tanks that GADOT removed in 2000, as well as in samples collected from both the north and south sides of the building.<sup>153</sup> The highest benzene concentration recorded was 460 times higher than EPD's Type 1 risk reduction standards.<sup>154</sup>

These sampling results confirm that substantial amounts of benzene and other petroleum hydrocarbons remained in soil and groundwater nearly a decade after the attempted bioremediation in 2009.

#### IV. CONCLUSION

The aerobic biobarrier that Hercules plans to install is designed to intercept and destroy constituents in the deep zone of the upper surficial aquifer – principally benzene and chlorobenzene – originating from the Brunswick facility west of U.S. Highway 17; however, independent sources of these constituents exist east of U.S. Highway 17 on the Adams Properties. Substantial data gaps regarding additional sources on the Adams Properties remain, with available evidence suggesting that additional sources exist but have not yet been investigated or delineated. Moreover, evaluation of the effectiveness of the aerobic biobarrier must consider the likelihood of additional sources

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<sup>150</sup> Attachment 49, Integral 2018.

<sup>151</sup> Attachment 49, Integral 2018: 3-1.

<sup>152</sup> Attachment 49, Integral 2018: Table 3.

<sup>153</sup> Attachment 49, Integral 2018: Tables 1 & 2.

<sup>154</sup> Attachment 49, Integral 2018: Table 2, p. 7 of 18.

from the Adams Properties contributing to the plume east of U.S. Highway 17 and beyond the target area of the aerobic biobarrier.

## LIST OF ATTACHMENTS

ATTACHMENT	DESCRIPTION
1	National Lumberman, Vol. XLVI, No. 11 (Dec. 1, 1910)
2	The Iron Age, vol. 86, no. 24 (Dec. 15, 1910)
3	The Packages, Vol. XIV, No. 4 (Apr. 1911)
4	Georgia Department of Commerce and Labor, Third Annual Report (1915)
5	Veneers, Vol. V, No. 4 (Apr. 1911)
6	Collection of Sanborn Fire Insurance Maps
7	The Atlanta Constitution (Jan. 5, 1937)
8	The Atlanta Constitution (May 16, 1941)
9	Glynn Co. Historic Resources Survey (2009)
10	The Atlanta Constitution (Nov. 20, 1945)
11	The Atlanta Constitution (Aug. 19, 1946)
12	The Ports of Savannah and Brunswick, Ga., Port Series No. 14 (1946 rev.)
13	The Atlanta Constitution (Sept. 22, 1946)
14	Georgia Forestry (July 1950)
15	The Atlanta Constitution (Sept. 22, 1955)
16	EPA Record of Decision, LCP Chemicals Site OU1 (Sept. 2015)
17	The Atlanta Constitution (Oct. 13, 1955)
18	The South Bend Tribune (Sep. 7, 1966)
19	ESI Engineering Services, Inc., Environmental Assessment Report (Dec. 10, 1991)
20	Southeastern Environmental Audits, Inc., Phase II Addendum, Environmental Site Assessment Report (Mar. 18, 1996)
21	Letter to Ga. Dept. of Nat. Resources (July 16, 1999)
22	Deeds from Cherokee San Francisco LLC to Adams Properties Associates LLC (Jan. 21, 2004)
23	Deed from Cherokee San Francisco LLC to Adams, Adams, and Rabbino (Jan. 21, 2004)
24	Historical aerial photograph of Brunswick, GA (1945)
25	U.S. EPA, Furniture/Wood Manufacturing and Refinishing, Document EPA/530-SW-90-027c.
26	Collection of Historical Aerial Photographs at 1968, 1974, 1983, 1988, 1993, undated
27	December 2017 Photograph from Integral Site Evaluation
28	Delta Surveyors, Dixie Paint & Varnish Co. Survey (May 19, 1961)

**ATTACHMENT****DESCRIPTION**

29	Google Earth Photo (Jan. 2019)
30	Applied Environmental Strategies, Amended Release Notification (Mar. 29, 1996)
31	Letter from Woodall to Crowley re Compliance Status Report Call-In (Dec. 22, 1997)
32	Goldman Environmental Management Services, Compliance Status Report (Aug. 30, 1998)
33	OPPT Chemical Fact Sheets, Chlorobenzene, EPA (1995)
34	EnviroAssets, Inc., Phase III RFI Groundwater Report, South San Francisco, CA (Aug. 14, 2005)
35	Environ, Groundwater Plume Stability Monitoring Report, Royal Adhesives & Sealants Site, South Bend, Indiana (Sept. 2005)
36	CSR Notice of Deficiency (Feb. 5, 1999)
37	Letter from Houle to Hendricks (EPD) re: Response to CSR Notice of Deficiency (Feb. 17, 1999)
38	Applied Environmental Strategies, Compliance Status Report Addendum (April 20, 1999)
39	Letter from Hendricks (EPD) to Crowley re: CSR Completion (July 29, 1999)
40	Letter from Houle to Hendricks (EPD) re: Compliance Monitoring Plan (Aug. 24, 1999)
41	Law Engineering and Environmental Services, Inc., Corrective Action Plan
42	MACTEC, Revised Corrective Action Plan (Jan. 2003)
43	MACTEC, Revised Recertification Supplemental Report (Sept. 2003)
44	Letter from EPD to Arnold re NOD for Revised CAP and Re-Certification (Mar. 18, 2003)
45	MACTEC, Groundwater Recertification Documentation (Nov. 21, 2003)
46	Letter from Word (EPD) to Arnold re Re-Certification (Oct. 17, 2003)
47	Dobbs Environmental, Compliance Status Report and Brownfield Application (Nov. 2003)
48	EPD Limitation of Liability Letter (Dec. 5, 2003)
49	Integral Consulting, Inc., Report of Phase 2 Sampling Activities (Oct. 2018)
50	Montrose Environmental Group, Report on Remediation liability and Redevelopment Implications Associated with Contamination from On-Site Sources at Plaintiffs' Property (March 2020)
51	Field Notes for Monitoring Well Installations (Sept. 2018)
52	Monitoring Well Figure
53	Groundwater Sampling Results (March 2019)
54	Title Insurance Policy Excerpt for 2696 Glynn Ave. (2004)

**ATTACHMENT****DESCRIPTION**

- 55 Unocal Corporation <https://www.britannica.com/topic/Unocal-Corporation>.
- 56 Unocal Corp., *Seventy-Six*, Vol. LXIV, No. 6 (Nov./Dec. 1985)
- 57 Glynn Co. Property Record, Parcel 01-03942
- 58 Georgia EPD, UST “Data for Gilmer to Worth Counties” (updated July 2021), *available at* <https://epd.georgia.gov/document/document/gilmer-worth-091420/download> (excerpt)
- 59 Letter from Gulden to Williams (EPD) enclosing Closure Report Form (May 5, 2000)
- 60 Dobbs Environmental, Corrective Action Plan Part A (January 2006)
- 61 Letter from Dobbs to Wallace (EPD) enclosing responses to comments (Feb. 7, 2006)
- 62 (excerpt) U.S. EPA, *Locating and Estimating Air Emissions from Sources of Chlorobenzenes* (revised) (1994)
- 63 Mactec, “Former O’Brien Paint Facility Potentiometric Surface Map” (Sept. 26, 2003)
- 64 Letter from Wallace (EPD) to Nesmith enclosing Non-compliance history memorandum (April 9, 2004)
- 65 GUST-CAP-B Guidance (1995)
- 66 Letter from Wallace (EPD) to Adams with enclosures (Jan. 23, 2006)
- 67 Letter from Dobbs to Wallace (EPD) with enclosures (Apr. 19, 2006)
- 68 Letter from Dobbs to Wallace (EPD) enclosing CAP Part B (Oct. 5, 2007)
- 69 Letter from Wallace (EPD) to Dobbs enclosing comments (Oct. 17, 2007)
- 70 Letter from Dobbs to Wallace (EPD) enclosing responses to comments (Jan. 19, 2009)
- 71 Letter from Wallace to Dobbs (Feb. 4, 2009) with Memorandum from Wallace to Lewis re: Review Information Leading to Approval of CAP-Part B Addendum.
- 72 Letter from Dobbs to Wallace (EPD) with enclosures (Dec. 17, 2009)
- 73 Letter from Dobbs to Wallace (EPD) enclosing June 2010 Monitoring Report (June 11, 2010)
- 74 Letter from Dobbs to Wallace (EPD) (Jan. 18, 2010)
- 75 Letter from Wallace (EPD) to Dobbs (Feb. 18, 2010)
- 76 “No Further Action” Letter from Wallace (EPD) to Dobbs (June 22, 2010), with Memorandum from Wallace to Lewis re: Review Information Leading to Determination of “No Further Action Required”

ATTACHMENTS TO BE PROVIDED  
ON DIGITAL DISCS WITH  
THE HARD COPY



## APPENDIX C

### Laboratory Report for Biotreatability Studies

**Prepared for:**

Geosyntec Consultants, Inc.  
1255 Roberts Boulevard, Suite 200  
Kennesaw, Georgia 30144

# **Laboratory Treatability Study to Evaluate Aerobic Remediation of Benzene and Chlorobenzene in Groundwater**

Deep Zone of the Upper Surficial Aquifer  
Hercules/Pinova Facility, Brunswick, GA

**Prepared by:**



130 Stone Road West  
Guelph, Ontario N1G 3Z2

SiREM Ref: GR6881C

27 January 2021

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## LIST OF ABBREVIATIONS

%	percent
°C	degrees Celsius
°C/min	degrees Celsius per minute
µg/L	micrograms per liter
CB	chlorobenzene
CO <sub>2</sub>	carbon dioxide
DHG	dissolved hydrocarbon gases
DO	dissolved oxygen
EISB	enhanced <i>in situ</i> bioremediation
FID	flame ionization detector
g	grams
GC	gas chromatograph
Geosyntec	Geosyntec Consultants Inc.
mg/L	milligrams per liter
min	minutes
mL	milliliters
mL/min	milliliters per minute
mmol/bottle	millimoles per bottle
QL	quantitation limit
SiREM	SiREM Laboratory
VOC	volatile organic compounds

## 1. INTRODUCTION

Geosyntec Consultants, Inc. (Geosyntec) retained SiREM Laboratory (SiREM) to conduct a biotreatability study to assess the potential for enhanced *in situ* bioremediation (EISB) of benzene and chlorobenzene under aerobic conditions in groundwater at the Brunswick site in Georgia (the Site). Site materials were collected from Deep Zone of the Upper Surficial aquifer. Geologic materials were collected by Geosyntec on 9 March 2020 and received by SiREM on 12 March 2020. The groundwater used for the study was received by SiREM on 3 March 2020. The chain of custodies received with these samples are provided in Appendix A.

The remainder of this report is divided into four sections. Section 2 contains a summary of key degradation processes for the target compounds of concern. Section 3 presents the experimental materials and methods; Section 4 presents the results and Section 5 provides references.

## 2. SUMMARY OF DEGRADATION PROCESSES

Benzene and chlorobenzene compounds can be biologically degraded under a variety of aerobic and anaerobic conditions (Wiedemeier *et al.* 1995).

Under aerobic conditions, these compounds are rapidly oxidized using oxygen as an electron acceptor producing carbon dioxide (CO<sub>2</sub>) by indigenous microbial populations. Although benzene biodegradation under anoxic and anaerobic conditions is less energetically favorable, it has been observed to occur *in situ* at sites containing benzene and CB compounds. Under appropriate conditions, benzene acts as an electron donor for nitrate-reducing, iron-reducing, sulfate-reducing, or methanogenic microbial populations. CB acts as an electron acceptor and requires the presence of an electron donor. Ultimately both benzene and CB can be degraded via anaerobic pathways to CO<sub>2</sub> (Ulrich *et al.*, 2005). Enhanced biological remediation of benzene and CB can, in certain cases, be achieved by stimulating the indigenous microbial populations through the addition of electron acceptors, such as oxygen and sulfate (De Silva and Alvarez, 2004).

In this study, degradation of benzene and CB under aerobic conditions was investigated

## 3. MATERIALS AND METHODS

The following sections describe the materials and methods used for microcosm construction, amendments and incubation for the aerobic study.

### 3.1 Microcosm Construction and Incubation

The geologic material was collected from deep zone of the upper surficial aquifer at the Hercules/Pinova Facility in Brunswick, Georgia. The geologic material from was homogenized on 26 March 2020 by combining the geologic material from TSB-02-MW29D-78-80, TSB-02-MW29D-80-82, TSB-02-MW29D-84-86, TSB-02-MW29D-86-88 and TSB-02-MW29D-88-90. Initially the Site materials were used to prepare anaerobic microcosms (not discussed in this report). Therefore, cores were placed in a disposable anaerobic glove bag purged with nitrogen gas in order to create an anaerobic environment. Once removed from the cores, the geologic material was homogenized manually and passed through a ¼ inch sieve to

remove larger particles and to improve reproducibility between microcosm replicates. Unused Site materials were placed in cold storage in case there was a need for additional testing.

Geosyntec instructed SIREM to prepare aerobic microcosms based on their review of other treatability study results. Microcosms for the aerobic Brunswick study were then constructed in a fume hood on 8 July 20 by filling sterile 250 milliliter (mL) (nominal volume) screw cap Boston round clear glass bottles (Systems Plus, New Hamburg, ON) with 60 grams (g) of TBS-02 geologic material and 180 mL of MW-29D site groundwater. The microcosms were then capped with Mininert™ (VICI Valco Instruments Canada, Brockville, Ontario) closures to allow repetitive sampling with minimal volatile organic compound (VOC) loss and to allow amendments, as needed, throughout the incubation period. All controls and treatments were constructed in triplicate. In order to provide sufficient sample volumes for external laboratory analysis, additional sacrificial microcosms were constructed for each external analysis time-point throughout the study. Table 1 summarizes the details of microcosm construction.

All aerobic microcosms were incubated under ambient aerobic conditions in the laboratory. During quiescent incubation, all microcosms were covered to minimize photodegradation. Microcosms were incubated for a period of up to 80 days at approximately 22 degrees Celsius (°C) (room temperature).

### 3.1.1 Microcosm Amendments

The first microcosm of each treatment and control was amended with resazurin (Sigma, St. Louis, MO) to monitor redox conditions on 13 July 2020 (Day 0). Resazurin remains pink in the presence of oxygen and can be used as a visual indicator for the presence or absence of oxidizing conditions. Geosyntec specified that the initial benzene and chlorobenzene concentrations in the should be 2.3 mg/L and 0.8 mg/L respectively to represent the historical concentrations measured at the Site. The initial concentrations of the microcosms were not at the target concentrations and therefore on 13 July 2020 (Day 0), the microcosms were spiked with benzene and chlorobenzene to achieve the target concentrations. Details of resazurin amendment as well as benzene and chlorobenzene spiking are provided in Table 1.

Oxygen was amended into the treatment microcosms to maintain aerobic conditions. 100% Oxygen (Linde, Cambridge, Ontario) was amended into the treatment microcosms. Oxygen was monitored and amended as needed, to maintain a dissolved oxygen (DO) concentration between 5 – 8 mg/L in the aqueous phase. Additional oxygen was amended, as needed, throughout the study and monitored by both the resazurin color and the measurement of DO (Table 3). To account for potential headspace losses of volatile contaminants due to multiple oxygen amendments, the sterile control microcosms received equal volumes of nitrogen amendments. Details of gas addition are provided in Tables 1 and 2.

## 3.2 Microcosm Sampling and Analysis

### 3.2.1 Microcosm Sampling

Aqueous samples were collected from the control and treatment microcosms for analysis of benzene and chlorobenzene , dissolved hydrocarbon gases (DHGs – specifically methane), pH

and DO at SiREM. Microcosms were sampled for these parameters using gas-tight 1 mL Hamilton glass syringes. Syringes were cleaned with acidified water (pH ~2) and rinsed 10 times with deionized water between samples, to ensure that VOCs and microorganisms were not transferred between different samples or treatments. Baseline total organic carbon (TOC) samples were collected on the geologic materials at the beginning of the study by filling a 250 mL glass jar with geologic material. Samples were stored on ice and picked up by ALS (ALS Analytical Inc., Waterloo) personnel.

The analytical methods employed by SiREM are described below.

### 3.2.2 Analysis of VOCs and DHGs

This section describes the methods used to quantify the VOCs and DHGs. The quantitation limits (QL) for the VOCs and DHGs were typically 10 micrograms per liter ( $\mu\text{g/L}$ ) in the microcosms based on the sample dilution factor used and the lowest concentration standards that were included in the linear calibration trend.

Aqueous VOC and DHG concentrations in the microcosms were measured using a Hewlett-Packard (Hewlett Packard 7890) gas chromatograph (GC) equipped with an auto sampler (Hewlett Packard G1888) programmed to heat each sample vial to 75°C for 45 minutes (min) prior to headspace injection into a GSQ Plot column (0.53 millimeters x 30 meters, J&W) and a flame ionization detector (FID). Sample vials were heated to ensure that all VOCs in the aqueous sample would partition into the headspace. The injector temperature was 200°C, and the detector temperature was 250°C. The oven temperature was programmed as follows: 35°C for 2 min, increased to 100°C at 50 degrees Celsius per minute ( $^{\circ}\text{C}/\text{min}$ ), then increased to 185°C at 25°C/min and held at 185°C for 6.80 min. The carrier gas was helium at a flow rate of 11 milliliters per minute (mL/min).

After withdrawing a sample (as described in Section 2.2.1) from the microcosms, the sample was injected into a 10 mL auto sampler vial containing acidified deionized water (pH ~2). The sample volume was added to the vial containing deionized water bringing the total volume up to 6 mL. The water was acidified to inhibit microbial activity between microcosm sampling and GC analysis. The vial was sealed with an inert Teflon™-lined septum and aluminum crimp cap for automated injection of 3 mL of headspace onto the GC. One VOC standard was analyzed with each set of samples to verify the instrument five-point calibration curve using methanolic stock solutions containing known concentrations of the target analytes. Calibration was performed using external standards purchased as standard solutions (Sigma, St Louis, Missouri), where known volumes of standard solutions were added to acidified water in auto sampler vials and analyzed as described above for microcosm samples. Data were integrated using Chemstation Software (Agilent Technologies, Santa Clara, California).

### 3.2.3 Analysis of pH

The pH measurements were performed using an Oakton pH spear with a combination pH electrode (Oakton, Vernon Hills, IL). A 0.5 mL sample was collected from the microcosms (as described in section 2.2.1), and the pH was measured on the lab bench. The pH spear was



calibrated at each sampling event according to the manufacturer's instructions using pH 4.0, 7.0 and 10 standards.

### 3.2.4 Analysis of Dissolved Oxygen

The DO analyses were performed using a Mi-730 Micro-Oxygen Electrode (Microelectrodes, Inc., Bedford, NH, USA) in conjunction with the ES350 Pod-Vu software (eDAQ, Denistone East, Australia). A 0.25 mL sample was collected (as described in Section 2.2.1) and placed in a 1.5 mL microcentrifuge tube. The DO was measured on the lab bench immediately after sampling. The DO probe was calibrated before each use according to manufacturer's instructions.

### 3.2.5 External Analysis of Total Organic Carbon

Analysis of total organic carbon (TOC) on the geologic material was performed at ALS (ALS Environmental, Waterloo). Geologic samples were prepared by filling a 250 mL amber glass jar with geologic material.

## 4. RESULTS

Table 2 provides benzene, CB and methane data from the control and treatment microcosms over the incubation period for the study. Results are presented in units of mg/L and millimoles per microcosm bottle (mmol/bottle). Concentrations were converted from mg/L to mmol/bottle using Henry's Law as demonstrated in Appendix B.

Table 3 provides TOC, pH and DO results. The TOC values are reported as a percentage and the DO is reported in mg/L. The mass of oxygen per gram of TOC and per gram of VOC was calculated based on the amount of oxygen added. Figure 3 presents the benzene trends in the concentrations of benzene and CB. Appendix C presents external laboratory reports.

## 5. REFERENCES

- Da Silva, M. L.; Alvarez, P. J. J. 2004. Enhanced anaerobic biodegradation of benzene-toluene-ethylbenzene-xylene-ethanol mixtures in bioaugmented aquifer columns. *Appl. Environ. Microbiol.* 70(8): 4720-4726.
- Ulrich, A.C., H.R. Beller and E.A. Edwards. 2005. Metabolites detected during biodegradation of C-13(6)-benzene in nitrate-reducing and methanogenic enrichment cultures. *Environ Sci Technol* 39: 6681-6691.
- Wiedemeier, T. H.; Miller, R. N.; Wilson, J. T.; Kampbell, D. H. 1995. Significance of anaerobic processes for the intrinsic bioremediation of fuel hydrocarbons. *Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Detection, and Remediation Conference.* 49-61.

## TABLES

**TABLE 1: SUMMARY OF AEROBIC MICROCOSM CONTROLS, TREATMENTS AND AMENDMENTS**

Deep Zone of Upper Surficial Aquifer, Brunswick, GA

Treatment/Control	Assigned Microcosm Number	Number of Microcosms	Geological Material (g)	Groundwater (mL)	Headspace (mL)	Sodium Azide	Mercuric Chloride	Resazurin	Benzene and CB	Gas amendment
Deep Aerobic Sterile Control	7 to 9	3	Amended with 60 g of TSB-02.	Amended with 180 mL of MW-29D site groundwater.	40	Amended with 0.45 mL of a 5 % solution on Day 0.	Amended with 2.52 mL of a 2.7% solution on Day 0.	Amended first replicate with 100 µL of a 1,000 mg/L solution on Day 0.	Spiked with 228 µL of saturated benzene and 309 µL of saturated CB to target final concentrations of 2.3 mg/L and 0.8 mg/L respectively.	Amend with nitrogen gas as needed.
Deep Aerobic Treatment	10 to 12	3		20	--	--	Amend with oxygen gas to an initial target of 21 % of the headspace and then maintain as needed between 5-8 mg/L DO.			

**Notes:**

- - not applicable
- % - percent
- µL - microliter
- CB - chlorobenzene
- DO - dissolved oxygen
- g - grams
- mg/L - milligrams per liter
- mL - milliliters

**TABLE 2: SUMMARY OF AEROBIC MICROCOSM BENZENE, CB AND METHANE RESULTS**  
 Deep Zone of Upper Surficial Aquifer, Brunswick, GA

Treatment	Date	Day	Replicate	Benzene	CB	Methane	Comment	
				mg/L	mg/L	mg/L		
Deep Aerobic Sterile Control	13-Jul-20	0					Poisoned with mercuric chloride and sodium azide.	
							Amended the first replicate with resazurin.	
							Spiked with benzene and CB to target final concentrations of 2.3 mg/L and 0.8 mg/L respectively.	
							Amended with 16.4 mL of nitrogen gas.	
				DASC-1	2.8	0.86	<0.10	
				DASC-2	2.8	0.80	<0.10	
				DASC-3	2.9	0.81	<0.10	
				<b>Average Concentration (mg/L)</b>	2.8	0.82	ND	
				Standard Deviation (mmoles)	1.5E-04	5.5E-05	0.0E+00	
				<b>Average Total mmoles</b>	<b>0.0069</b>	<b>0.0014</b>	<b>ND</b>	
	15-Jul-20	2		DASC-1	2.7	0.91	<0.10	
				DASC-2	2.7	0.79	<0.10	
				DASC-3	2.8	0.77	<0.10	
				<b>Average Concentration (mg/L)</b>	2.7	0.82	ND	
				Standard Deviation (mmoles)	2.2E-05	1.2E-04	0.0E+00	
				<b>Average Total mmoles</b>	<b>0.0066</b>	<b>0.0014</b>	<b>ND</b>	
								Amended with 8.4 mL of nitrogen gas.
	17-Jul-20	4		DASC-1	2.7	0.98	<0.10	
				DASC-2	2.5	0.56	<0.10	
				DASC-3	2.8	0.78	<0.10	
				<b>Average Concentration (mg/L)</b>	2.6	0.77	ND	
				Standard Deviation (mmoles)	4.1E-04	3.4E-04	0.0E+00	
				<b>Average Total mmoles</b>	<b>0.0064</b>	<b>0.0013</b>	<b>ND</b>	
								Amended with 8.4 mL of nitrogen gas.
	27-Jul-20	14		DASC-1	2.7	0.99	<0.10	
				DASC-2	2.8	0.80	<0.10	
				DASC-3	2.8	0.79	<0.10	
				<b>Average Concentration (mg/L)</b>	2.7	0.86	ND	
			Standard Deviation (mmoles)	1.7E-04	1.9E-04	0.0E+00		
			<b>Average Total mmoles</b>	<b>0.0066</b>	<b>0.0014</b>	<b>ND</b>		
05-Aug-20	23		DASC-1	2.6	0.98	<0.10		
			DASC-2	2.5	0.76	<0.10		
			DASC-3	2.7	0.81	<0.10		
			<b>Average Concentration (mg/L)</b>	2.6	0.85	ND		
			Standard Deviation (mmoles)	2.4E-04	1.9E-04	0.0E+00		
			<b>Average Total mmoles</b>	<b>0.0063</b>	<b>0.0014</b>	<b>ND</b>		
							Amended with 8.4 mL of nitrogen gas.	
19-Aug-20	37		DASC-1	2.7	1.0	<0.10		
			DASC-2	2.7	0.77	<0.10		
			DASC-3	2.7	0.8	<0.10		
			<b>Average Concentration (mg/L)</b>	2.7	0.86	ND		
			Standard Deviation (mmoles)	2.9E-05	2.1E-04	0.0E+00		
			<b>Average Total mmoles</b>	<b>0.0066</b>	<b>0.0014</b>	<b>ND</b>		
							Amended with 8.4 mL of nitrogen gas.	
27-Aug-20	45							
02-Sep-20	51		DASC-1	2.6	0.99	<0.10		
			DASC-2	2.7	0.73	<0.10		
			DASC-3	2.7	0.74	<0.10		
			<b>Average Concentration (mg/L)</b>	2.7	0.82	ND		
			Standard Deviation (mmoles)	1.5E-04	2.4E-04	0.0E+00		
			<b>Average Total mmoles</b>	<b>0.0064</b>	<b>0.0014</b>	<b>ND</b>		
							Amended with 8.4 mL of nitrogen gas.	

**TABLE 2: SUMMARY OF AEROBIC MICROCOSM BENZENE, CB AND METHANE RESULTS**  
 Deep Zone of Upper Surficial Aquifer, Brunswick, GA

Treatment	Date	Day	Replicate	Benzene	CB	Methane	Comment
				mg/L	mg/L	mg/L	
Deep Aerobic Sterile Control Continued	11-Sep-20	60	DASC-1	2.5	1.0	<0.10	
			DASC-2	2.6	0.77	<0.10	
			DASC-3	2.6	0.76	<0.10	
			<b>Average Concentration (mg/L)</b>	2.6	0.85	ND	
	Standard Deviation (mmoles)	1.3E-04	2.4E-04	0.0E+00			
	<b>Average Total mmoles</b>	<b>0.0063</b>	<b>0.0014</b>	<b>ND</b>			
	01-Oct-20	80	DASC-1	2.6	0.93	<0.10	
			DASC-2	2.7	0.77	<0.10	
			DASC-3	2.6	0.73	<0.10	
			<b>Average Concentration (mg/L)</b>	2.6	0.81	ND	
Standard Deviation (mmoles)			1.7E-04	1.7E-04	0.0E+00		
<b>Average Total mmoles</b>			<b>0.0063</b>	<b>0.0013</b>	<b>ND</b>		
Deep Aerobic Treatment	13-Jul-20	0					Amended with 8.4 mL of nitrogen gas.
							Spiked with benzene and CB to target final concentrations of 2.3 mg/L and 0.8 mg/L respectively.
							Amended with 16.8 mL of oxygen gas.
			DAT-1	3.0	0.82	<0.10	
	DAT-2	3.0	0.80	<0.10			
	DAT-3	3.2	0.85	<0.10			
	<b>Average Concentration (mg/L)</b>	3.1	0.82	ND			
	Standard Deviation (mmoles)	2.5E-04	3.9E-05	0.0E+00			
	<b>Average Total mmoles</b>	<b>0.0074</b>	<b>0.0014</b>	<b>ND</b>			
	15-Jul-20	2	DAT-1	2.8	0.8	<0.10	
			DAT-2	3.0	0.8	<0.10	
			DAT-3	3.0	0.82	<0.10	
			<b>Average Concentration (mg/L)</b>	2.9	0.81	ND	
	Standard Deviation (mmoles)	2.6E-04	1.8E-05	0.0E+00			
	<b>Average Total mmoles</b>	<b>0.0071</b>	<b>0.0013</b>	<b>ND</b>			
					Amended with 8.4 mL of oxygen gas.		
	17-Jul-20	4	DAT-1	2.8	0.78	<0.10	
			DAT-2	2.9	0.75	<0.10	
			DAT-3	2.9	0.77	<0.10	
			<b>Average Concentration (mg/L)</b>	2.8	0.77	ND	
Standard Deviation (mmoles)	1.9E-04	2.2E-05	0.0E+00				
<b>Average Total mmoles</b>	<b>0.0069</b>	<b>0.0013</b>	<b>ND</b>				
				Amended with 8.4 mL of oxygen gas.			
27-Jul-20	14	DAT-1	2.6	0.77	<0.10		
		DAT-2	3.0	0.81	<0.10		
		DAT-3	3.0	0.87	<0.10		
		<b>Average Concentration (mg/L)</b>	2.9	0.82	ND		
Standard Deviation (mmoles)	4.9E-04	8.6E-05	0.0E+00				
<b>Average Total mmoles</b>	<b>0.0069</b>	<b>0.0014</b>	<b>ND</b>				
05-Aug-20	23	DAT-1	1.8	0.66	<0.10		
		DAT-2	2.2	0.60	<0.10		
		DAT-3	2.0	0.63	<0.10		
		<b>Average Concentration (mg/L)</b>	2.0	0.63	ND		
Standard Deviation (mmoles)	4.8E-04	5.0E-05	0.0E+00				
<b>Average Total mmoles</b>	<b>0.0048</b>	<b>0.0010</b>	<b>ND</b>				
				Amended with 8.4 mL of oxygen gas.			

**TABLE 2: SUMMARY OF AEROBIC MICROCOSM BENZENE, CB AND METHANE RESULTS**  
 Deep Zone of Upper Surficial Aquifer, Brunswick, GA

Treatment	Date	Day	Replicate	Benzene	CB	Methane	Comment		
				mg/L	mg/L	mg/L			
Deep Aerobic Treatment Continued	19-Aug-20	37	DAT-1	0.59	0.48	<0.10			
			DAT-2	1.8	<0.020	<0.10			
			DAT-3	0.83	<0.020	<0.10			
			<b>Average Concentration (mg/L)</b>	1.1	0.16	ND			
			Standard Deviation (mmoles)	1.5E-03	4.6E-04	0.0E+00			
	<b>Average Total mmoles</b>	<b>0.0026</b>	<b>0.00026</b>	<b>ND</b>					
	27-Aug-20	45						Amended with 8.4 mL of oxygen gas.	
	02-Sep-20	51	DAT-1	0.14	0.31	<0.10			
			DAT-2	0.44	0.18	<0.10			
			DAT-3	0.10	0.10	<0.10			
			<b>Average Concentration (mg/L)</b>	0.23	0.20	ND			
			Standard Deviation (mmoles)	4.5E-04	1.7E-04	0.0E+00			
	<b>Average Total mmoles</b>	<b>0.00055</b>	<b>0.00033</b>	<b>ND</b>					
								Amended with 8.4 mL of oxygen gas.	
	11-Sep-20	60	DAT-1	0.038	0.24	<0.10			
			DAT-2	0.18	<0.020	<0.10			
			DAT-3	0.035	0.061	<0.10			
			<b>Average Concentration (mg/L)</b>	0.086	0.15	ND			
			Standard Deviation (mmoles)	2.1E-04	1.3E-01	0.0E+00			
	<b>Average Total mmoles</b>	<b>0.00021</b>	<b>0.00025</b>	<b>ND</b>					
24-Sep-20	73	DAT-1	<0.020	0.23	<0.10				
		DAT-2	0.042	0.053	<0.10				
		DAT-3	<0.020	0.039	<0.10				
		<b>Average Concentration (mg/L)</b>	0.014	0.11	ND				
		Standard Deviation (mmoles)	5.8E-05	1.8E-04	0.0E+00				
<b>Average Total mmoles</b>	<b>0.000034</b>	<b>0.00018</b>	<b>ND</b>						
							Amended with 8.4 mL of oxygen gas.		
01-Oct-20	80	DAT-1	<0.020	0.20	<0.10				
		DAT-2	<0.020	<0.020	<0.10				
		DAT-3	<0.020	0.039	<0.10				
		<b>Average Concentration (mg/L)</b>	ND	0.081	ND				
		Standard Deviation (mmoles)	0.0E+00	1.8E-04	0.0E+00				
<b>Average Total mmoles</b>	<b>ND</b>	<b>0.00013</b>	<b>ND</b>						

**Notes:**

- < - the compound is not detected, the associated value is the detection limit
- CB - chlorobenzene
- DASC - deep aerobic sterile control
- DAT - deep aerobic treatment
- mg/L - milligrams per liter
- mL - milliliters
- mmole - millimole
- ND - not detected

**TABLE 3: SUMMARY OF AEROBIC MICROCOSM TOC, pH, DO, AND OXYGEN PER TOTAL CARBON RESULTS**  
 Deep Zone of Upper Surficial Aquifer, Brunswick, GA

SiREM

Treatment	Date	Day	Replicate	pH	DO	O <sub>2</sub> /TOC**	O <sub>2</sub> /VOC***	
					mg/L	g O <sub>2</sub> /g TOC	g O <sub>2</sub> /g VOC	
S-5734 Geologic Material TOC: 0.31%								
Baseline Deep Benzene Deep Aerobic Sterile Control	13-Jul-20	0	DASC-1	6.66	4.45	--	--	
			DASC-2	6.79	2.41	--	--	
			DASC-3	6.84	5.89	--	--	
			<b>Average</b>	<b>6.76</b>	<b>4.25</b>	--	--	
	Amended with 16.8 mL of nitrogen.							
	15-Jul-20	2	DASC-1	6.66	5.89	--	--	
			DASC-2	6.74	3.55	--	--	
			DASC-3	6.81	4.54	--	--	
			<b>Average</b>	<b>6.74</b>	<b>4.66</b>	--	--	
	Amended with 4.2 mL of nitrogen.							
	17-Jul-20	4	DASC-1	6.62	3.14	--	--	
			DASC-2	6.56	2.33	--	--	
			DASC-3	6.60	4.38	--	--	
			<b>Average</b>	<b>6.59</b>	<b>3.28</b>	--	--	
	Amended with 8.4 mL of nitrogen.							
	20-Jul-20	7	DASC-1	--	--	--	--	
			DASC-2	--	5.09*	--	--	
			DASC-3	--	--	--	--	
			<b>Average</b>	--	<b>5.09</b>	--	--	
	23-Jul-20	10	DASC-1	6.77	--	--	--	
			DASC-2	6.78	3.66*	--	--	
			DASC-3	6.84	--	--	--	
			<b>Average</b>	<b>6.80</b>	<b>3.79</b>	--	--	
	5-Aug-20	23	DASC-1	6.86	4.03	--	--	
			DASC-2	6.81	3.26	--	--	
			DASC-3	6.83	3.69	--	--	
			<b>Average</b>	<b>6.83</b>	<b>3.66</b>	--	--	
	Amended with 8.4 mL of nitrogen.							
14-Aug-20	32	DASC-1	--	3.32	--	--		
		DASC-2	--	3.26	--	--		
		DASC-3	--	3.48	--	--		
		<b>Average</b>	--	<b>3.35</b>	--	--		
19-Aug-20	37	DASC-1	6.81	3.55	--	--		
		DASC-2	6.85	2.56	--	--		
		DASC-3	6.83	3.35	--	--		
		<b>Average</b>	<b>6.83</b>	<b>3.15</b>	--	--		
27-Aug-20	45	DASC-1	--	2.87	--	--		
		DASC-2	--	2.87	--	--		
		DASC-3	--	3.77	--	--		
		<b>Average</b>	--	<b>3.17</b>	--	--		
Amended with 8.4 mL of nitrogen.								
2-Sep-20	51	DASC-1	6.81	--	--	--		
		DASC-2	6.87	--	--	--		
		DASC-3	6.85	--	--	--		
		<b>Average</b>	<b>6.84</b>	--	--	--		
Amended with 8.4 mL of nitrogen.								
11-Sep-20	60	DASC-1	7.14	3.08	--	--		
		DASC-2	7.13	5.51	--	--		
		DASC-3	7.30	3.37	--	--		
		<b>Average</b>	<b>7.19</b>	<b>3.99</b>	--	--		
18-Sep-20	67	DASC-1	--	2.83	--	--		
		DASC-2	--	3.10	--	--		
		DASC-3	--	2.94	--	--		
		<b>Average</b>	--	<b>2.96</b>	--	--		
1-Oct-20	80	DASC-1	6.77	3.42	--	--		
		DASC-2	6.80	3.13	--	--		
		DASC-3	6.97	3.04	--	--		
		<b>Average</b>	<b>6.85</b>	<b>3.19</b>	--	--		
Deep Aerobic Treatment	13-Jul-20	0	DAT-1	6.88	6.62	--	--	
			DAT-2	6.92	7.26	--	--	
			DAT-3	6.76	5.71	--	--	
			<b>Average</b>	<b>6.85</b>	<b>6.53</b>	--	--	
	Amended with 16.8 mL oxygen.							
	15-Jul-20	2	DAT-1	7.22	7.07	0.120	32	
			DAT-2	7.16	6.36	0.120	32	
			DAT-3	7.09	4.49	0.120	32	
			<b>Average</b>	<b>7.16</b>	<b>5.97</b>	<b>0.120</b>	<b>32</b>	
	Amended with 8.4 mL oxygen.							
	17-Jul-20	4	DAT-1	6.86	6.77	0.180	48	
			DAT-2	6.71	4.04	0.180	48	
			DAT-3	6.78	5.01	0.180	48	
			<b>Average</b>	<b>6.78</b>	<b>5.27</b>	<b>0.180</b>	<b>48</b>	
	Amended with 4.2 mL oxygen.							
	20-Jul-20	7	DAT-1	--	5.17	0.209	55	
			DAT-2	--	9.57*	0.209	55	
			DAT-3	--	--	0.209	55	
			<b>Average</b>	--	<b>9.57</b>	<b>0.209</b>	<b>55</b>	
	23-Jul-20	10	DAT-1	6.76	8.71*	0.209	55	
			DAT-2	6.71	--	0.209	55	
			DAT-3	6.70	--	0.209	55	
			<b>Average</b>	<b>6.72</b>	<b>8.71</b>	<b>0.209</b>	<b>55</b>	
	5-Aug-20	23	DAT-1	6.74	5.98	0.209	55	
			DAT-2	6.72	5.07	0.209	55	
			DAT-3	6.67	4.97	0.209	55	
			<b>Average</b>	<b>6.71</b>	<b>5.34</b>	<b>0.209</b>	<b>55</b>	
	Amended with 8.4 mL oxygen.							
14-Aug-20	32	DAT-1	--	6.21	0.269	71		
		DAT-2	--	6.88	0.269	71		
		DAT-3	--	6.79	0.269	71		
		<b>Average</b>	--	<b>6.63</b>	<b>0.269</b>	<b>71</b>		
19-Aug-20	37	DAT-1	6.75	6.57	0.269	71		
		DAT-2	6.80	6.25	0.269	71		
		DAT-3	6.71	5.98	0.269	71		
		<b>Average</b>	<b>6.75</b>	<b>6.27</b>	<b>0.269</b>	<b>71</b>		

**TABLE 3: SUMMARY OF AEROBIC MICROCOSM TOC, pH, DO, AND OXYGEN PER TOTAL CARBON RESULTS**  
 Deep Zone of Upper Surficial Aquifer, Brunswick, GA

SiREM

Treatment	Date	Day	Replicate	pH	DO	O <sub>2</sub> /TOC**	O <sub>2</sub> /VOC***	
					mg/L	g O <sub>2</sub> /g TOC	g O <sub>2</sub> /g VOC	
Deep Aerobic Treatment Continued	27-Aug-20	45	DAT-1	--	5.66	0.269	71	
			DAT-2	--	5.87			
			DAT-3	--	5.40			
			<b>Average</b>	--	<b>5.64</b>			
	Amended with 8.4 mL oxygen.							
	2-Sep-20	51	DAT-1	6.65	2.54	0.329	87	
			DAT-2	6.60	4.97			
			DAT-3	6.58	3.48			
			<b>Average</b>	<b>6.61</b>	<b>3.66</b>			
	Amended with 8.4 mL oxygen.							
	11-Sep-20	60	DAT-1	6.93	5.74	0.389	103	
			DAT-2	7.06	6.61			
			DAT-3	7.17	7.69			
			<b>Average</b>	<b>7.05</b>	<b>6.68</b>			
	18-Sep-20	67	DAT-1	--	5.60	0.389	103	
			DAT-2	--	7.17			
			DAT-3	--	6.34			
			<b>Average</b>	--	<b>6.37</b>			
	1-Oct-20	80	DAT-1	6.70	7.67	0.389	103	
			DAT-2	6.66	6.14			
			DAT-3	6.55	6.14			
			<b>Average</b>	<b>6.64</b>	<b>6.65</b>			

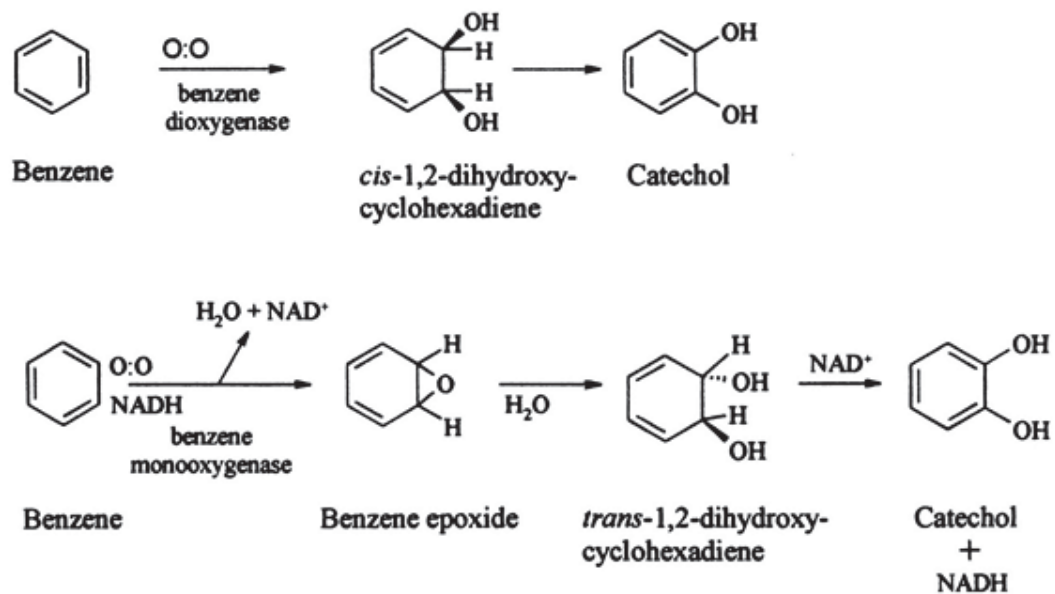
**Notes:**

- \* Composite sample, measured with optical DO probe, standard measurements collected using electrode DO probe
- \*\*Calculated as total grams of oxygen added per grams of total organic carbon (sum of geologic material TOC and aqueous VOCs) at the start of testing
- \*\*Calculated as total grams of oxygen added per grams of total VOCs at the start of testing
- % - percent
- DASC - deep aerobic sterile control
- DAT - deep aerobic treatment
- mg O<sub>2</sub>/g TOC - milligrams of oxygen amended to reactor per gram of organic carbon at the start of the incubation period
- mg O<sub>2</sub>/g VOC - milligrams of oxygen amended to reactor per gram of total VOCs at the start of the incubation period
- mg/L - milligrams per liter
- mL - milliliters
- O<sub>2</sub> - oxygen gas
- SASC - shallow aerobic sterile control
- SAT - shallow aerobic treatment
- TOC - total organic carbon
- VOC - volatile organic compound

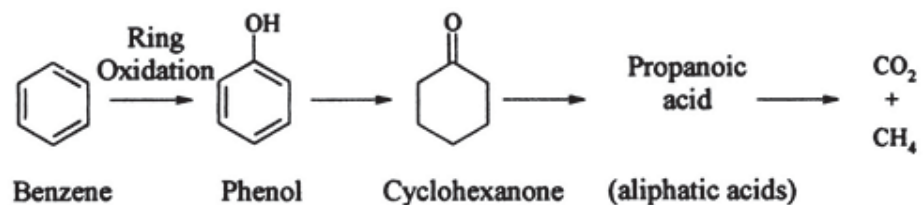


## FIGURES

A)



B)

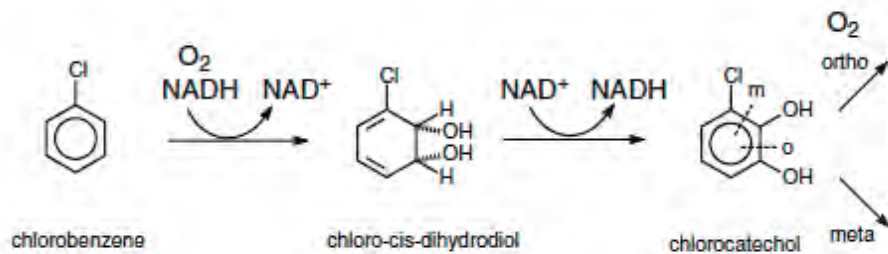


Potential Aerobic Pathway for the Biodegradation of Benzene

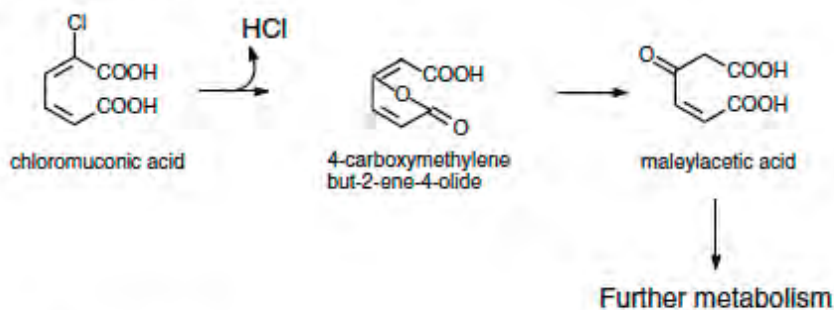


October 2020

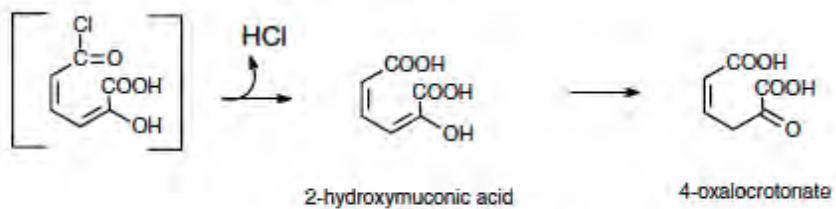
Figure: 1



**ORTHO CLEAVAGE**



**META CLEAVAGE**

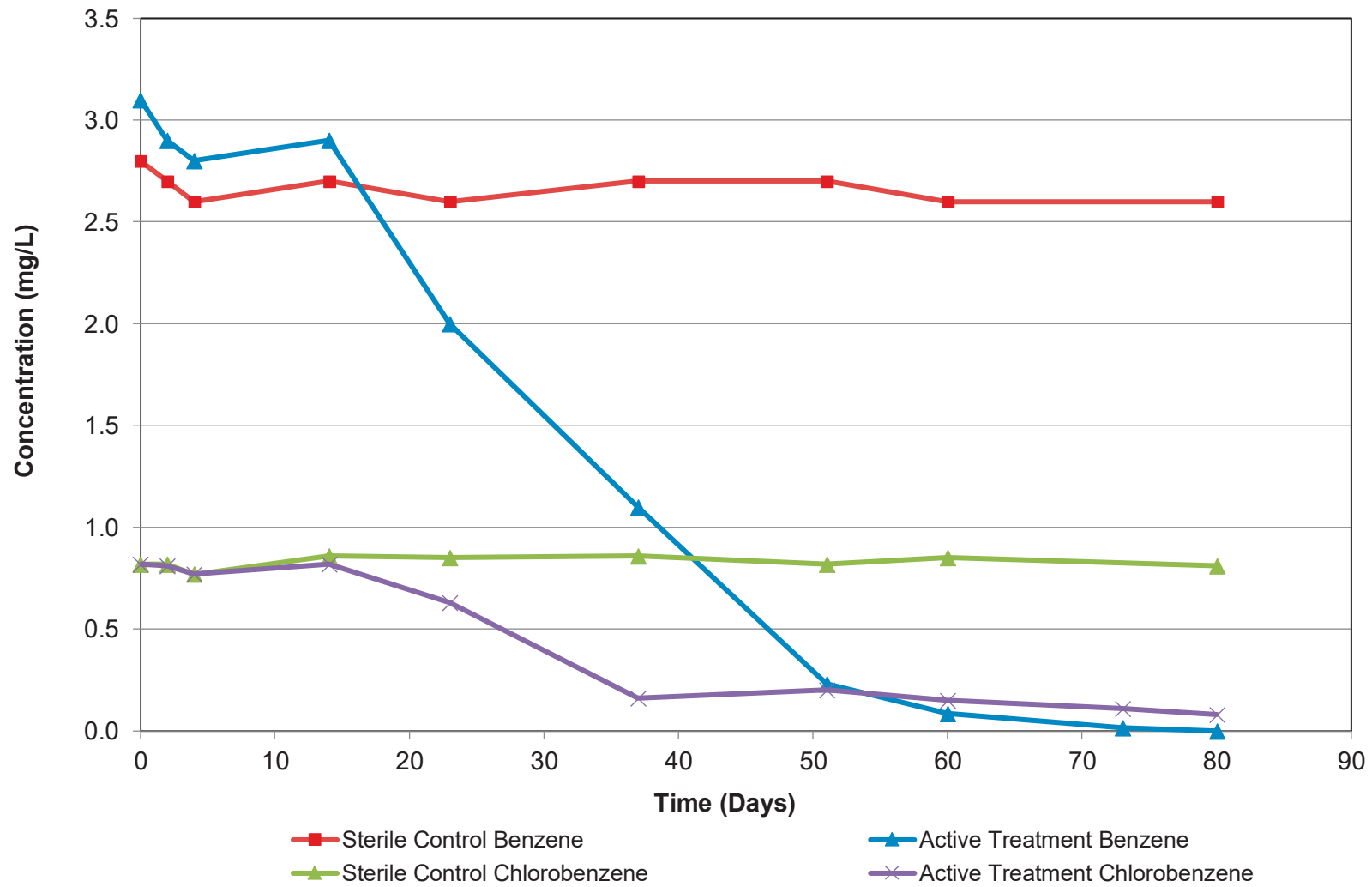


Potential Aerobic Pathway for the Biodegradation of Chlorobenzene



October 2020

Figure: 2



**Notes:**

mg/L - milligrams per liter

**Benzene and Chlorobenzene Concentration Trends  
in Deep Benzene Aerobic Microcosms**

Deep Zone of Upper Surficial Aquifer, Brunswick, GA



January 2021

Figure: 3

## APPENDIX A: Chain of Custody Documentation



# Chain-of-Custody Form

Lab #  
S-5746

*Project Name <i>Brunswick Hercules/Pinwa</i>		*Project # <i>GRG 8813</i>		<b>Analysis</b>																																																																																																																							
*Project Manager <i>Adria Reimer</i>		*Company <i>Geosyntec</i>																																																																																																																									
*Email Address <i>areimer@geosyntec.com</i>				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="12" style="text-align: center;"><b>Preservative Key</b></td> </tr> <tr> <td colspan="12">0. None</td> </tr> <tr> <td colspan="12">1. HCL</td> </tr> <tr> <td colspan="12">2. Other _____</td> </tr> <tr> <td colspan="12">3. Other _____</td> </tr> <tr> <td colspan="12">4. Other _____</td> </tr> <tr> <td colspan="12">5. Other _____</td> </tr> <tr> <td colspan="12">6. Other _____</td> </tr> <tr> <td colspan="12" style="text-align: center;"><b>Other Information</b></td> </tr> </table>												<b>Preservative Key</b>												0. None												1. HCL												2. Other _____												3. Other _____												4. Other _____												5. Other _____												6. Other _____												<b>Other Information</b>											
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*Phone # <i>678-202-9564</i>																																																																																																																											
*Sampler's Signature <i>Ben Weinmann</i>		*Sampler's Printed Name <i>Ben Weinmann</i>																																																																																																																									
Client Sample ID		Sampling		Matrix	# of Containers	Gene-Trac DHC	Gene-Trac VC	Gene-Trac DHB	Gene-Trac DHG	Treatability Study																																																																																																																	
		Date	Time																																																																																																																								
1	<i>15B-01-MW28D-83-84</i>	<i>3/4/20</i>	<i>0945</i>	<i>S</i>	<i>1</i>																																																																																																																						
2	<i>15B01-MW28D-84-85</i>	<i>3/4/20</i>	<i>0950</i>	<i>S</i>	<i>1</i>																																																																																																																						
3	<i>15B-01-MW28D-85-86</i>	<i>3/4/20</i>	<i>0955</i>	<i>S</i>	<i>1</i>																																																																																																																						
4	<i>15B-01-MW28D-86-88</i>	<i>3/4/20</i>	<i>1000</i>	<i>S</i>	<i>1</i>																																																																																																																						
5	<i>15B-02-MW29D-78-80</i>	<i>3/4/20</i>	<i>1200</i>	<i>S</i>	<i>1</i>																																																																																																																						
6	<i>15B-02-MW29D-80-82</i>	<i>3/4/20</i>	<i>1205</i>	<i>S</i>	<i>1</i>																																																																																																																						
7	<i>15B-02-MW29D-84-86</i>	<i>3/4/20</i>	<i>1210</i>	<i>S</i>	<i>1</i>																																																																																																																						
8	<i>15B-02-MW29D-86-88</i>	<i>3/4/20</i>	<i>1215</i>	<i>S</i>	<i>1</i>																																																																																																																						
9	<i>15B-01-MW29D-89-90</i>	<i>3/4/20</i>	<i>1220</i>	<i>S</i>	<i>1</i>																																																																																																																						

P.O. #		Billing Information		Turnaround Time Requested		Cooler Condition: <b>For Lab Use Only</b> <i>Good</i>				Cooler Temperature: <b>For Lab Use Only</b> <i>4°C</i>			
*Bill To:				Normal <input type="checkbox"/>		Custody Seals: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				Proposal #:			
				Rush <input type="checkbox"/>									

Relinquished By:		Received By:		Relinquished By:		Received By:		Relinquished By:		Received By:	
Signature <i>Ben Weinmann</i>		Signature <i>Rachel Hallinan</i>		Signature		Signature		Signature		Signature	
Printed Name <i>Ben Weinmann</i>		Printed Name <i>Rachel Hallinan</i>		Printed Name		Printed Name		Printed Name		Printed Name	
Firm <i>Geosyntec</i>		Firm <i>SIREM</i>		Firm		Firm		Firm		Firm	
Date/Time <i>3/9/20 1530</i>		Date/Time <i>3-12-20 10:00</i>		Date/Time		Date/Time		Date/Time		Date/Time	

Distribution: White - return to Originator; Yellow - Lab Copy; Pink - Retained by Client

\* Mandatory Fields



# Chain-of-Custody Form

iremlab.com

140 Stone Rd W  
Guelph, ON N1G 0Z7  
(519) 822-2265

Lab #

5-5734

*Project Name <b>Brunswick Treatability</b>		*Project #		<b>Analysis</b>																																																																																																													
*Project Manager <b>Adria Reimer</b>		*Company <b>Gessyntec</b>																																																																																																															
*Email Address <b>areimer@gessyntec.com</b>				<table border="1"> <tr> <td colspan="10" style="text-align: center;"><b>Preservative Key</b></td> </tr> <tr> <td colspan="10">0. None</td> </tr> <tr> <td colspan="10">1. HCL</td> </tr> <tr> <td colspan="10">2. Other _____</td> </tr> <tr> <td colspan="10">3. Other _____</td> </tr> <tr> <td colspan="10">4. Other _____</td> </tr> <tr> <td colspan="10">5. Other _____</td> </tr> <tr> <td colspan="10">6. Other _____</td> </tr> <tr> <td colspan="10" style="text-align: center;"><b>Other Information</b></td> </tr> <tr> <td colspan="10">27L total. for CB/CF study <del>not</del></td> </tr> </table>										<b>Preservative Key</b>										0. None										1. HCL										2. Other _____										3. Other _____										4. Other _____										5. Other _____										6. Other _____										<b>Other Information</b>										27L total. for CB/CF study <del>not</del>									
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*Sampler's Signature		*Sampler's Printed Name																																																																																																															
Client Sample ID		Sampling		Matrix	# of Containers	Gene-Trac DHC	Gene-Trac VC	Gene-Trac DHB	Gene-Trac DHG	Gene-Trac tceA	Volatile Fatty Acids	Dissolved Hydrocarbon gases	Treatability Study																																																																																																				
		Date	Time																																																																																																														
<b>MW-29D</b>		<b>28Feb10</b>		<b>GW</b>	<b>5</b>																																																																																																												

P.O. #		Billing Information		Turnaround Time Requested		For Lab Use Only				For Lab Use Only	
*Bill To:				Normal <input type="checkbox"/> Rush <input type="checkbox"/>		Cooler Condition: <b>GOOD</b>				Proposal #: _____	
						Cooler Temperature: <b>0°C.</b>					
						Custody Seals: Yes <input type="checkbox"/> <input checked="" type="checkbox"/>					

Relinquished By:		Received By:		Relinquished By:		Received By:		Relinquished By:		Received By:	
Signature	Signature	Signature	Signature	Signature	Signature	Signature	Signature	Signature	Signature	Signature	Signature
Printed Name	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name
Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time
	<b>D. Nespoli</b>		<b>D. Nespoli</b>								
	<b>SiREM</b>		<b>SiREM</b>								
	<b>MAR 3 '10 1:30pm</b>		<b>MAR 3 '10 1:30pm</b>								

Distribution: White - return to Originator Yellow - Lab Copy Pink - Retained by Client

\* Mandatory fields

## APPENDIX B: Henry's Law Calculation



The following Henry's Law calculation was used to convert SiREM aqueous concentrations to total mmoles of each analyte per microcosm bottle:

$$Total\ mmoles = \frac{C_{liq} \cdot (V_{liq} + H \cdot V_{gas})}{Molecular\ Weight \left( \frac{mg}{mmol} \right)}$$

Where for the study:

$C_{liq}$  = liquid concentration (mg/L)

$V_{liq}$  = liquid volume (0.18 L) per bottle

$V_{gas}$  = headspace volume (0.04 L) per bottle

H = Henry's Law constant (dimensionless)

The Henry's Law constants used are summarized in the table below.

Analyte	Henry's Law Constant <sup>a</sup> (dimensionless)
Benzene	0.222
Chlorobenzene	0.161
Methane	27.27

<sup>a</sup> Source: Montgomery, J.H. 2000. *Groundwater Chemicals Desk Reference, Third Edition*. CRC Press LLC, Boca Raton, FL.

## APPENDIX C: External ALS Analytics Reports



SIREM  
ATTN: Sandra Dworatzek  
130 Stone Road West  
Guelph ON N1G 3Z2

Date Received: 22-JUL-20  
Report Date: 30-JUL-20 12:06 (MT)  
Version: FINAL

Client Phone: 519-822-2265

## Certificate of Analysis

Lab Work Order #: L2478181  
Project P.O. #: NOT SUBMITTED  
Job Reference:  
C of C Numbers:  
Legal Site Desc:

Gayle Braun  
Senior Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 60 Northland Road, Unit 1, Waterloo, ON N2V 2B8 Canada | Phone: +1 519 886 6910 | Fax: +1 519 886 9047  
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2478181-1 S-5715 ES-1 Sampled By: J. WEBB on 21-JUL-20 @ 16:00 Matrix: SOIL							
<b>Organic / Inorganic Carbon</b>							
Fraction Organic Carbon	0.0073		0.0010		29-JUL-20	30-JUL-20	R5171964
Fraction Organic Carbon	0.0076		0.0010		29-JUL-20	30-JUL-20	R5171964
Fraction Organic Carbon	0.0071		0.0010		29-JUL-20	30-JUL-20	R5171964
Average Fraction Organic Carbon	0.0074		0.0010		29-JUL-20	30-JUL-20	R5171964
Total Organic Carbon	0.73		0.10	%	29-JUL-20	30-JUL-20	R5171964
Total Organic Carbon	0.76		0.10	%	29-JUL-20	30-JUL-20	R5171964
Total Organic Carbon	0.71		0.10	%	29-JUL-20	30-JUL-20	R5171964
L2478181-2 S-5734 TSB-02 Sampled By: J. WEBB on 21-JUL-20 @ 16:00 Matrix: SOIL							
<b>Organic / Inorganic Carbon</b>							
Fraction Organic Carbon	0.0030		0.0010		29-JUL-20	30-JUL-20	R5171964
Fraction Organic Carbon	0.0031		0.0010		29-JUL-20	30-JUL-20	R5171964
Fraction Organic Carbon	0.0032		0.0010		29-JUL-20	30-JUL-20	R5171964
Average Fraction Organic Carbon	0.0031		0.0010		29-JUL-20	30-JUL-20	R5171964
Total Organic Carbon	0.30		0.10	%	29-JUL-20	30-JUL-20	R5171964
Total Organic Carbon	0.31		0.10	%	29-JUL-20	30-JUL-20	R5171964
Total Organic Carbon	0.32		0.10	%	29-JUL-20	30-JUL-20	R5171964

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## Reference Information

**Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
TOC-R511-WT	Soil	TOC & FOC-O.Reg 153/04 (July 2011)	CARTER 21.3.2

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

**Chain of Custody Numbers:**
**GLOSSARY OF REPORT TERMS**

*Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.*

*mg/kg - milligrams per kilogram based on dry weight of sample*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample*

*mg/kg lwt - milligrams per kilogram based on lipid weight of sample*

*mg/L - unit of concentration based on volume, parts per million.*

*< - Less than.*

*D.L. - The reporting limit.*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*



## Quality Control Report

Workorder: L2478181

Report Date: 30-JUL-20

Page 1 of 2

Client: SIREM  
 130 Stone Road West  
 Guelph ON N1G 3Z2

Contact: Sandra Dworatzek

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>TOC-R511-WT</b>	<b>Soil</b>							
<b>Batch</b>	<b>R5171964</b>							
<b>WG3372585-3 CRM</b>		<b>WT-TOC-CRM</b>						
Total Organic Carbon			93.8		%		70-130	30-JUL-20
<b>WG3372585-2 LCS</b>								
Total Organic Carbon			101.3		%		80-120	30-JUL-20
Total Organic Carbon			101.3		%		80-120	30-JUL-20
Total Organic Carbon			101.3		%		80-120	30-JUL-20
<b>WG3372585-1 MB</b>								
Total Organic Carbon			<0.10		%		0.1	30-JUL-20

# Quality Control Report

Workorder: L2478181

Report Date: 30-JUL-20

Client: SIREM  
130 Stone Road West  
Guelph ON N1G 3Z2  
Contact: Sandra Dworatzek

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## Legend:

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Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

## Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

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The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.





## APPENDIX D

### Biosparging Pilot Test Report



*Prepared for*

**Hercules, LLC**  
500 Hercules Road  
Wilmington, DE 19808

**BIOSPARGING PILOT TEST REPORT**  
**DEEP ZONE OF UPPER SURFICIAL AQUIFER**  
**HERCULES/PINOVA BRUNSWICK FACILITY**  
**BRUNSWICK, GEORGIA**

*Prepared by*

**Geosyntec**   
consultants

engineers | scientists | innovators

1255 Roberts Boulevard, Suite 200  
Kennesaw, Georgia 30144

Project Number GR6881M

November 2021

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## 1. INTRODUCTION

Geosyntec Consultants, Inc. (“Geosyntec”) has prepared this report on behalf of Hercules LLC (“Hercules”) for submission to the Georgia Department of Natural Resources, Environmental Protection Division (“EPD”) to present the results of a pilot test that Geosyntec performed to assess the feasibility of using *in situ* aerobic bioremediation in the form of a biologically active permeable reactive barrier (referred to hereinafter as an “aerobic biobarrier”) to achieve reductions in the concentrations of certain constituents of potential concern (“COPCs”) in groundwater in the deep zone of the upper surficial aquifer underlying a portion of the industrial facility located at 2801 Cook Street in Brunswick, Glynn County, Georgia (the “Brunswick facility”). In particular, the pilot test evaluated key design parameters associated with the use of biosparging to produce aerobic conditions in the deep zone of the upper surficial aquifer in the area where the aerobic biobarrier is expected to be installed. (The pilot test may be referred to hereinafter as the “biosparging pilot test.”) This report is organized into the following sections: (i) objectives for the pilot test, (ii) installation of wells for the pilot test, (iii) implementation of activities associated with the pilot test, (iv) results from the pilot test, and (v) conclusions from the pilot test.

## **2. PILOT TEST OBJECTIVES**

The objectives of the biosparging pilot test were to:

- confirm the feasibility of injecting compressed air into the deep zone of the upper surficial aquifer in the area where the aerobic biobarrier is expected to be installed;
- collect data concerning the radius of influence (“ROI”) produced at each injection well used in the pilot test in terms of the distribution of dissolved oxygen (“DO”), changes in oxidation reduction potential (“ORP”), and groundwater mounding during the injection of air at various flow rates and injection pressures; and
- assess the general natural rate of depletion of dissolved oxygen in the deep zone of the upper surficial aquifer in the area where the aerobic biobarrier is expected to be installed.

### 3. WELL INSTALLATION ACTIVITIES FOR PILOT TEST

Three wells used for injection of air (referred to as “biosparging wells” and designated as biosparging wells BS-01, BS-02 and BS-03) and four observation wells (designated as observation wells BS-OW-01, BS-OW-02, BS-OW-03D and BS-OW-3I) were installed in the area where the aerobic biobarrier is expected to be installed in the portion of the Brunswick facility to the east of the U.S. Highway 17 and north of the Outfall Ditch as shown on **Figure 1**. Except for biosparging well BS-03, all pilot test biosparging and observation wells were installed between February 22, 2021 and March 3, 2021. Biosparging well BS-03 was installed between March 25 and 26, 2021. Geosyntec contracted with South Atlantic Environmental Drilling and Construction Co. Inc. (“SAEDACCO”) of Fort Mill, South Carolina, to install the biosparging and observation wells for the pilot test using rotosonic drilling methods. All downhole tools were decontaminated by steam-cleaning prior to initiation of drilling activities and between boreholes in accordance with technical guidance issued by the United States Environmental Protection Agency (“EPA”) titled *Field Equipment Cleaning and Decontamination Procedures* (LSASDPROC-205-R4).

Rotosonic drilling techniques were used to advance each borehole. A 4-inch core barrel was advanced in 5-foot increments to collect relatively undisturbed continuous soil cores from the boreholes. The soil cores were field screened at 2-foot intervals using a calibrated photoionization detector (“PID”) with an 11.7 electron-volt lamp to assess the soil cores for the presence of volatile organic compounds (“VOCs”). After the soil cores were screened with the PID, the soil core samples were visually classified and logged according to the Unified Soil Classification System to confirm the lithology of the subsurface.

Each well for the pilot test was installed in accordance with the technical guidance issued by EPA titled *Design and Installation of Monitoring Wells* (SESDGUID-101-R2). The wells were constructed of 2-inch diameter Schedule 40 polyvinyl chloride (“PVC”) casings with 2-inch diameter, 0.010-slot PVC well screens. Well construction details and boring logs for the wells installed for the pilot test are included in **Attachment A**. More information regarding well drilling and well construction activities is provided in the document titled *Groundwater Monitoring Report, Semi-Annual Groundwater Monitoring Event – June 2021, Hercules LLC/Pinova, Inc., Brunswick, Georgia* that Hercules submitted to EPD on October 22, 2021.

During the well installation activities, soil samples were collected from various depth intervals and shipped to Excel Geotechnical Testing Laboratory in Roswell, Georgia for grain size analysis. The geotechnical laboratory reports are included in **Attachment B**.

The screened intervals in feet below ground surface (“ft bgs”) for the biosparging and observation wells for the pilot test are summarized in the following table:

Well ID	Screened Interval, (ft bgs)
BS-01	92-94
BS-02	92-94
BS-03	98.3-99
BS-OW-01	80-90
BS-OW-02	82-92
BS-OW-03D	82-92
BS-OW-03I	50-60

Prior to and after completion of the pilot test, Geosyntec collected groundwater samples from newly installed observation wells BS-OW-01, BS-OW-02, and BS-OW-3D and existing monitoring well MW-29D. The groundwater samples were shipped to Test America Laboratories, Inc. (“Test America”) in Savannah, Georgia under chain-of-custody protocols for laboratory analysis of VOCs, hardness, total and dissolved iron and manganese, total dissolved solids (“TDS”), alkalinity, chloride, chemical oxygen demand, and biological oxygen demand. **Table 1** summarizes the groundwater analytical results that were obtained. **Attachment C** and **Attachment D** include the analytical laboratory results and sampling purge logs from the sampling activities, respectively.

Investigation derived waste (“IDW”) consisting of soil cuttings and purge water generated during well installation and well development activities for the pilot test were placed in labeled 55-gallon drums and staged at the Brunswick facility prior to disposal at appropriate off-site facilities. A total of 11 drums of IDW were generated during well installation and well development activities. Five drums contained soils and six drums contained water. The IDW from the well installation and well development activities for the pilot test were disposed of as non-hazardous waste. **Attachment E** includes the waste characterization laboratory reports and waste manifests for the IDW.



#### **4. IMPLEMENTATION ACTIVITIES ASSOCIATED WITH PILOT TEST**

In order to perform the pilot test, Geosyntec mobilized to the Brunswick facility a biosparging skid, a generator to power the biosparging system, a helium gas cylinder (219 cubic feet capacity), well head connections and hoses, and associated monitoring equipment (including a PID, a water level meter, a water quality meter, a digital manometer, and a helium detector). The biosparging skid included a Hydrovane V04 air compressor capable of providing 19.5 standard cubic feet per minute (“scfm”) of air against a pressure of 100 pounds per square inch (“psi”), four manifold legs each equipped with a ball valve, a pressure gauge, and a flow meter with a needle valve for flow adjustment. The biosparging pilot test was completed in two phases consisting of separate mobilizations. The activities in the first phase of the pilot test occurred between March 15, 2021 and March 19, 2021. The activities in the second phase of the pilot test occurred between March 31, 2021 and April 2, 2021. Step tests and a helium tracer test were performed during the first phase of the pilot test to evaluate biosparging flow rates and pressures. Helium was injected into the formation and used as a tracer. Based on data collected during the first phase of the pilot test, an additional biosparging well (i.e., biosparging well BS-03) was installed and screened at a slighter deeper depth than biosparging wells BS-01 and BS-02 to further evaluate the ROI generated by each biosparging well and oxygen consumption rates in the deep zone of the upper surficial aquifer.

##### **4.1. Activities During First Phase of the Pilot Test**

**Step Tests:** Step tests were performed using biosparging wells BS-01 and BS-02 sequentially on March 16, 2021. Step tests are used to evaluate how subsurface conditions change as increasing amounts of compressed air are injected through each biosparging well used in the pilot test. The distances from biosparging wells BS-01 and BS-02 (as installed) to the surrounding observation wells and monitoring wells were measured in the field. These measurements are summarized in the following table.

Well ID	Distance to Biosparging Well BS-01	Distance to Biosparging Well BS-02
	feet	feet
BS-01	NA	25.58
BS-02	30.5	NA
BS-OW-01	33.2	8.2
BS-OW-02	15.0	38.6
BS-OW-3D	19.8	19.4
BS-OW-3I	15.5	24.8
MW-29D	10.2	18.4

Prior to starting the step tests, measurements of groundwater field parameters including depths to water, DO, ORP, pH and specific conductivity were collected at biosparging wells BS-01 and BS-02, observation wells BS-OW-01, BS-OW-02, BS-OW-03I, and BS-OW-03D, and monitoring wells MW-29I and MW-29D, as summarized in **Table 2**. In addition to the groundwater field parameters, screening measurements for VOCs using a PID and percent oxygen measurements were collected in the head space (within the well casing but above the groundwater level) at the observation wells, as summarized in **Table 3**.

After collecting the baseline readings described above, the biosparging skid was connected to the portable generator. The air compressor on the biosparging skid was then connected to the wellheads of the biosparging wells using pressure rated hoses to initiate the step tests. Step tests were performed using biosparging wells BS-01 and BS-02 individually. The air flow rates for the step tests were 2 scfm, 4 scfm, and 6 scfm for the step tests at biosparging well BS-01 and 2 scfm, 3 scfm, 4 scfm, and 6 scfm for the step tests at biosparging well BS-02.

The air flow rates for each step in the step tests were maintained at each individual biosparging well for approximately an hour as indicated on **Table 3**.

As summarized in **Table 3**, the following data were collected during the step tests:

- Applied air pressures at the biosparging wells;

- PID readings, oxygen content, and well head pressures from the head space in observation wells BS-OW-01, BS-OW-02, BS-OW-03I, and BS-OW-03D, and monitoring well MW-29D;
- DO and ORP levels in groundwater in observation wells BS-OW-01, BS-OW-02, BS-OW-03I, and BS-OW-03D, and monitoring well MW-29D; and
- The depth to water in observation wells BS-OW-01, BS-OW-02, BS-OW-03I, and BS-OW-03D, and monitoring well MW-29D.

**Combined Step Tests and Helium Tracer Test:** Following the completion of the individual step tests at biosparging wells BS-01 and BS-02, a set of combined step tests was performed by sparging simultaneously both biosparging wells using varying air flow rates on March 17 and 18, 2021. In addition, as discussed below, a helium tracer test was performed on March 19, 2021. As summarized in **Table 4**, depth to water, DO, and ORP measurements in groundwater in the observation wells and PID, oxygen content, and pressure measurements from the head spaces in the observation wells were collected during the combined step tests. The following air flow combinations were used during the combined step tests:

- 4 scfm at biosparging well BS-01 and 4 scfm at biosparging well BS-02;
- 4 scfm at biosparging well BS-01 and 2 scfm at biosparging well BS-02;
- 5 scfm at biosparging well BS-01 and 5 scfm at biosparging well BS-02; and
- 1.5 scfm at biosparging well BS-01 and 1.5 scfm at biosparging well BS-02.

A helium tracer test was performed on March 19, 2021. The purpose of the helium tracer test was to add a conservative tracer to the injected air; in this case, conservative means that the tracer will not readily be transformed to other compounds chemically or biologically. During the helium tracer test, a pressurized helium gas cylinder was connected to the manifold legs leading to biosparging wells BS-01 and BS-02. In that way, a low flow of helium gas was injected into the subsurface through biosparging wells BS-01 and BS-02 along with compressed air while conducting sparging in both biosparging wells simultaneously at an air flow rate of 1.5 scfm per well. The total amount of helium gas introduced into the subsurface was approximately 219 cubic feet.

Headspace air from the observation wells was sampled periodically and the samples were analyzed using a helium detector. In addition, PID and oxygen content measurements from the head spaces of the observation wells were collected.

**4.2. Activities During Second Phase of the Pilot Test**

**Additional Deep Biosparging Well Step Test:** Based on the data and information obtained during the first phase of the pilot test, a third biosparging well (designated as biosparging well BS-03) was installed and screened at a slightly deeper interval between approximately 98.3 and 99 ft bgs. The new biosparging well BS-03 was designed to sparge at a deeper depth than the biosparging wells used in the first phase of the pilot test, which were biosparging wells BS-01 and BS-02 screened at intervals between 92 and 94 ft bgs. Biosparging tests using biosparging well BS-03 and varying air flow rates were performed as described below.

The distances from biosparging well BS-03 (as installed) to the surrounding observation wells and to biosparging well BS-02 were measured in the field. These measurements are summarized in the following table.

Well ID	Distances to Biosparging Well BS-03
	feet
BS-02	5.3
BS-OW-01	8.9
BS-OW-02	35.6
BS-OW-3D	14.5
BS-OW-3I	20.08
MW-29D	18.6

The biosparging tests using biosparging well BS-03 were performed between March 31, 2021 and April 2, 2021. A second round of baseline measurements of groundwater field parameters and well head readings were collected on March 30, 2021, prior to starting the biosparging tests. The baseline measurements were obtained from biosparging well BS-02, observation wells BS-OW-01, BS-OW-02, BS-OW-03I, and BS-OW-03D, and

monitoring wells MW-29I and MW-29D and are summarized in **Table 2**. The field data for the biosparging tests using biosparging well BS-03 are included in **Table 5**. Various air flow rates (i.e., 1.5 scfm, 3 scfm, and 5 scfm) were applied to biosparging well BS-03 and measurements of DO, ORP, and depths to water were collected at wells BS-02, BS-OW-01, BS-OW-02, BS-OW-03, and MW-29D along with PID readings, oxygen content, and pressure in the head spaces of these wells.

After the completion of the biosparging tests using biosparging well BS-03, measurements of DO and ORP were collected at biosparging well BS-02 (located approximately 5.3 feet from biosparging well BS-03) the following day (April 3, 2021) to evaluate the rate of depletion of dissolved oxygen resulting from injections of air into the deep zone of the upper surficial aquifer during the biosparging tests.

All equipment associated with the pilot test was removed from the Brunswick facility on April 6, 2021.

## 5. RESULTS

### 5.1. Baseline Parameters

Measurements of groundwater field parameters reflecting baseline conditions were collected on March 15, 2021, prior to the start of the first phase of the pilot test and on March 30, 2021, prior to the start of the second phase of the pilot test. These measurements are presented in **Table 2**. Concentrations of DO in the observation wells were generally below 0.2 milligrams per liter (“mg/L”) during both rounds of baseline measurements, except at monitoring well MW-29D where DO was measured at a concentration of 0.66 mg/L on March 15, 2021. The measured levels of ORP were less than 0 millivolts (“mV”) in all wells (ranging from negative 34.6 mV to negative 124.8 mV) on March 15, 2021. Due to the biosparging activities during the first phase of the pilot test between March 16, 2021 and March 19, 2021, the baseline ORP measurements obtained prior to the start of the second phase of the pilot test were slightly higher (more positive) on March 30, 2021 and ranged between positive 22.1 mV and negative 117.1 mV. The results from both sets of baseline monitoring events are indicative of anaerobic groundwater conditions. The pH measurements that were obtained were slightly higher on March 30, 2021 than on March 15, 2021. The slight increase in pH may be due to reductions in dissolved concentrations of carbon dioxide as a result of the step tests performed during the first phase of the pilot test. The majority of the pH measurements were in a range conducive for microbial growth in a biobarrier (i.e., between 6 and 8 standard units).

The hardness of the groundwater in the area of the biosparging pilot test, as summarized in **Table 1**, is greater than 5,000 mg/L. These hardness values are extremely high and similar to the hardness values that were obtained in groundwater samples collected during the aquifer test performed in the portion of the Brunswick facility west of U.S. Highway 17 and previously reported to EPD. The iron levels measured in groundwater ranged from 27 mg/L to 51 mg/L. The hardness and iron levels will have important bearing on the operation and maintenance of the aerobic biobarrier, including specifically measures for routine monitoring and removal of scaling/biofilm that can occur within the biosparging wells; these types of measures are considered part of routine procedures for operating a biosparging system. The frequency that such measures will need to be taken is dictated by site specific conditions.

## 5.2. Step Tests

The results of the step tests using biosparging wells BS-01 and BS-02 are presented in **Table 3**. During each component of the step tests conducted using biosparging well BS-01 (i.e., at air flows of 2, 4, and 6 scfm) and using biosparging well BS-02 (i.e., at air flows of 2, 3, 4, and 6 scfm), the biosparging injection pressures stayed between 37 psi and 40 psi (i.e., reflecting pressures equivalent to approximately 85 feet of water column and 92 feet of water column). These pressure ranges indicate that the biosparging pressure needed to introduce air into the saturated zone at this depth aligns well with the theoretical pressure generated by the weight of the water column above the screened intervals in the biosparging wells. Due to the sandy formation present in the screened intervals for the biosparging wells, resistance to biosparging from the subsurface lithology was insignificant (i.e., compressed air was readily able to be introduced into the subsurface).

The depth to water measurements that were obtained indicate that the water table increased slightly in the observation wells during the step tests compared to baseline conditions. The depth to water measurements were not adjusted for variations associated with the tidal cycle because the tidal influence on depth to water measurements in the deep zone of the upper surficial aquifer was relatively small over the relatively short duration of the step tests. During the step tests at biosparging well BS-01, changes in the depth to water measurements were generally less than 0.6 feet during biosparging at air flow rates of 4 scfm or less than 0.75 feet during biosparging at a flow rate of 6 scfm. The greatest change in the depth to water measurements (0.74 feet) was observed in observation well BS-OW-02 during the step tests at biosparging well BS-01 at an air flow rate of 6 scfm. During the step tests at biosparging well BS-02, changes in the depth to water were less than 0.2 feet, except at observation well BS-OW-3I (0.56 ft).

Observation well BS-OW-3I exhibited well head pressure measurements higher than the other observation wells when biosparging well BS-01 was used for biosparging and again when biosparging well BS-02 was used for biosparging, as presented in **Table 3**; these results indicated short circuiting of air from the biosparging wells to observation well BS-OW-3I. The well head pressures measured at observation well BS-OW-3I were measured as high as 65 inches of water column, whereas well head pressure measurements obtained at the other observation wells (including those even closer to the wells used for biosparging) ranged from 0.0 to 2.8 inches of water column. Measurements from the well head of observation well BS-OW-3I were discontinued

based on the well head pressure observations indicating short circuiting of air from the biosparging wells to observation well BS-OW-03.

### **5.3. Combined Step Tests and Helium Tracer Test**

The results from the step tests using biosparging wells BS-01 and BS-02 in combination and the results from helium tracer test are presented in **Table 4**. For the combined step tests, the air pressures maintained at the biosparging wells were between 37 psi and 40 psi for an array of applied air flow rates ranging between 1.5 scfm per well and 5 scfm per well. ORP levels showed slightly increasing trends at observation well BS-OW-01 (8.2 feet from biosparging well BS-02), observation well BS-OW-02 (15 feet from biosparging well BS-02) and monitoring well MW-29D (10.2 feet from biosparging well BS-01). Similarly, helium concentrations increased noticeably in the head space of monitoring well MW-29D from 350 parts per million by volume (“ppm”) to 1,850 ppm indicating that the helium mixture that was injected along with the air traveled through the subsurface and into monitoring well MW-29D (i.e., indicating a positive response in the deep zone of the upper surficial aquifer to the biosparging activities). However, DO levels in the observation wells and monitoring well MW-29D did not increase in response to the combined step test, and a recommendation was made to continue the testing process using a deeper biosparging well and by monitoring the responses at observation well locations nearer the well being used for biosparging. The results of the step tests at the deeper biosparging well are provided in the next subsection of this report.

### **5.4. Deep Biosparging Well Test**

The results from the step tests performed using biosparging well BS-03 (which has a top of screen approximately six feet deeper than biosparging wells BS-01 and BS-02) are presented in **Table 5**. At an air flow rate of 1.5 scfm at biosparging well BS-03 on March 31, 2021, DO concentrations increased significantly to 18.79 mg/L in biosparging well BS-02 (located 5.3 feet from biosparging well BS-03), and increased slightly to 0.1 mg/L in observation well BS-OW-01 (8.9 feet from biosparging well BS-03) after a sparging duration of four hours. When the testing was continued using biosparging well BS-03 on April 1 and April 2, 2021, DO concentrations were measured at 11.08 mg/L and 26.08 mg/L in biosparging well BS-02 (5.3 feet from biosparging well BS-03). Although the DO concentration in observation well BS-OW-01 did not show the significant increase that was observed in biosparging well BS-02, the ORP values in observation well BS-OW-01 gradually increased from negative 44.6 mV to negative 16.4 mV, suggesting



that observation well BS-OW-01 was also within the radius of influence created by biosparging activities at biosparging well BS-03. The changes in the depth to water were limited to 0.2 feet in biosparging well BS-02, which was the closest well to biosparging well BS-03, thereby indicating that groundwater mounding was minimal at an air flow rate that achieved the desired increases in DO in the groundwater.

DO concentrations in biosparging well BS-02 dropped from 26.08 mg/L measured on April 2, 2021 at 6:00 p.m. to 19.95 mg/L measured on April 3, 2021 at 5:04 p.m., suggesting an approximate consumption rate for dissolved oxygen of 6 mg/L per day associated with the microbial population in the deep zone of the upper surficial aquifer in the area where the aerobic biobarrier is expected to be installed.

DO concentrations in observation wells BS-02, BS-OW-01, and BS-OW-3D on April 1, 2021 versus distance between these observation wells and biosparging well BS-03 are plotted on **Figure 2**. A DO concentration of 2 mg/L<sup>1</sup> is typically a minimum threshold concentration for designing an aerobic bioremediation system. Therefore, the selected minimum design DO concentration range between 2 mg/L (threshold DO concentration) and 8 mg/L is highlighted on **Figure 2**. The ROI range corresponding to the design DO concentration range is between 6.4 and 8.4 feet as shown on **Figure 2**.

---

<sup>1</sup> United States Environmental Protection Agency, October 2017. *How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites*.

## 6. CONCLUSIONS

The following conclusions are drawn from the results of the biosparging pilot test:

- The pilot test demonstrated that biosparging can effectively increase the concentrations of dissolved oxygen in the deep zone of the upper surficial aquifer to promote aerobic bioremediation;
- A ROI of 7.5 feet is expected to be sufficient to sustain concentrations of dissolved oxygen between 2 mg/L and 8 mg/L in the deep zone of the upper surficial aquifer (i.e., the general mid-point between observed ROIs of 6.4 feet and 8.4 feet from biosparging well BS-03);
- The lithology corresponding to the projected biosparging interval in the deep zone of the upper surficial aquifer consists of medium to coarse grained sand, which is a limiting factor for obtaining a larger ROI as demonstrated from the results of the step tests at biosparging wells BS-01 and BS-02. For full scale application of *in situ* aerobic bioremediation in the form of an aerobic biobarrier, it would be beneficial to install the biosparging wells deeper than biosparging wells BS-01 and BS-02 at depths similar to that of biosparging well BS-03 to achieve the target ROI of 7.5 feet;
- The air pressures needed to inject air into the biosparging wells were generally between 37 and 40 psi. Accordingly, an air compressor that is capable of providing a minimum pressure of 40 psi at each well head for the biosparging wells for the aerobic biobarrier would be needed;
- A biosparging air flow rate of 1.5 scfm appears to be sufficient to sustain dissolved oxygen concentrations at levels sufficient to promote aerobic biodegradation of target COPCs; and
- Based on the dissolved oxygen levels in the groundwater achieved during the pilot test and the observed dissolved oxygen consumption rate, the biosparging wells for the aerobic biobarrier can be operated in a cyclical fashion.

# TABLES

**Table 1**  
**Summary of Analytical Results**  
**Hercules/Pinova Brunswick Facility**  
**Brunswick, GA**

Geosyntec Consultants

Analyte	Well ID	BS-OW-01		BS-OW-02		BS-OW-03D		MW-29D	
		Sampling Date	3/2/2021	4/7/2021	3/2/2021	4/7/2021	3/3/2021	4/7/2021	3/2/2021
<b>Field Parameters</b>									
pH	s.u.	6.09	6.26	6.23	6.31	5.98	6.34	5.95	6.17
Oxidation Reduction Potential	mV	-17.00	-16.60	-17.00	-14.50	-5.00	-31.80	-14.00	-5.30
Dissolved Oxygen	mg/L	0.00	0.12	0.03	0.15	0.00	0.15	0.00	0.13
Specific Conductivity	µS/cm	11,400	10,552	11,800	11,955	10,500	11,007	8,290	9,477
Temperature	degrees Celsius	20.36	24.13	20.81	23.19	21.90	23.96	20.85	21.43
<b>Geochemical Parameters</b>									
Alkalinity, Total	mg/L	270	330	250	330	280	350	250	360
Total Dissolved Solids	mg/L	6,300	6,200	6,000	9,600	4,400	6,100	7,400	7,300
Hardness as calcium carbonate	mg/L	6,100	5,400	6,100	6,400	5,600	5,400	4,400	4,900
<b>Metals</b>									
Iron, total recoverable	µg/L	39,000	32,000	47,000	51,000	28,000	47,000	37,000	27,000
Iron, dissolved	µg/L	31,000	33,000	33,000	51,000	22,000	45,000	28,000	27,000
Manganese, total recoverable	µg/L	870	790	1,100	1,200	1,500	1,600	950	860
Manganese, dissolved	µg/L	840	810	1,100 F1	1,200	1,300	1,500	950	860
<b>Volatile Organic Compounds</b>									
1,1,1-Trichloroethane	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
1,1,2,2-Tetrachloroethane	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
1,1,2-Trichloroethane	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
1,1-Dichloroethane	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
1,1-Dichloroethene	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
1,2,3-Trichlorobenzene	µg/L	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
1,2-Dichloroethane	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
1,2-Dichloropropane	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
2-Butanone (MEK)	µg/L	< 200 **	< 200	< 200 **	< 200	< 200 **	260	< 200	< 200
2-Hexanone	µg/L	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200
4-Methyl-2-pentanone	µg/L	< 200 **	< 200	< 200 **	< 200	< 200 **	< 200	< 200 **	< 200
Acetone	µg/L	< 200 **	< 200 **	< 200 **	< 200 **	< 200 **	< 200 **	< 200	< 200 **
Benzene	µg/L	330	430	170	230	330	490	1000	820
Bromochloromethane	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Bromodichloromethane	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Bromoform	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Bromomethane	µg/L	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Carbon disulfide	µg/L	< 40	< 40	< 40	< 40	< 40	< 40	< 40	< 40
Carbon tetrachloride	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Chlorobenzene	µg/L	330	490	170	270	300	460	760	750
Chloroethane	µg/L	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Ethylbenzene	µg/L	44	110	< 20	< 20	61	110	150	150
Isopropylbenzene	µg/L	49	97	< 20	40	57	110	240	210
m-Xylene & p-Xylene	µg/L	20	74	< 20	48	110	220	360	320
o-Xylene	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Styrene	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Tetrachloroethene	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Toluene	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
trans-1,2-Dichloroethene	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
trans-1,3-Dichloropropene	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Trichloroethene	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Trichlorofluoromethane	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Vinyl chloride	µg/L	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
<b>Other Parameters</b>									
Biochemical Oxygen Demand	mg/L	--	5.8	--	6.3 B	--	9.6	--	19 B
Chemical Oxygen Demand	mg/L	--	200	--	< 1,000	--	1,300	--	< 1,000
Chloride	mg/L	--	3,700	--	4,300	--	3,800	--	3,200

**Notes:**  
BOD - biological oxygen demand  
COD - chemical oxygen demand  
µg/L - micrograms per liter  
mg/L - milligrams per liter  
S.U. - standard unit  
mV - millivolt  
µS/cm - microsiemens per centimeter

**Data Qualifiers:**  
< - not detected (reported at detection limit)  
\*\* - laboratory control sample and/or lab control sample duplicate is outside acceptance limits, high biased  
-- - sample not analyzed for this constituent  
B - estimated concentration  
F1 - matrix spike and/or matrix spike duplicate recovery exceeds control limits

**Table 2**  
**Baseline Field Parameters**  
**Hercules/Pinova Brunswick Facility**  
**Brunswick, GA**

**Geosyntec Consultants**

Notes	Date	Well ID	Depth to water	DO	ORP	Specific conductivity	pH
			ft btoc	mg/L	mV	µS/cm	SU
Baseline results for first phase of pilot test	3/15/2021	BS-01	5.87	0.00	-45.9	13,048	5.45
		BS-02	6.52	0.01	-57.4	14,756	5.89
		BS-OW-01	4.95	0.01	-36.6	8,623	5.91
		BS-OW-02	5.26	0.01	-72	9,030	6.02
		BS-OW-3D	5.43	0.04	-56.2	9,015	5.95
		BS-OW-3I	5.05	0.03	-124.8	1,187	6.95
		MW-29D	5.47	0.66	-34.6	9,263	5.85
		MW-29I	4.93	0.00	-110.9	1,036	6.76
Baseline results for second phase of pilot test	3/30/2021	BS-01	--	--	--	--	--
		BS-02	6.70	0.03	22.1	14,066	6.15
		BS-OW-01	5.88	0.03	-44.9	7,951	6.28
		BS-OW-02	6.20	0.05	-88.7	9,231	6.48
		BS-OW-3D	6.39	0.05	-56.4	9,150	6.30
		BS-OW-3I	5.72	0.03	-117.1	1,304	7.07
		MW-29D	6.45	0.05	-40.2	7,246	6.28
		MW-29I	5.80	0.11	-90.2	1,013	7.27

**Notes:**

DO - dissolved oxygen

ft btoc - ft below top of casing

mg/L - milligram per liter

mV - millivolt

ORP - oxidation reduction potential

S.U. - standard unit

µS/cm - millisiemens per centimeter

-- not measured

**Table 3**  
**Biosparging Wells Step Test Field Data**  
**Hercules/Pinova Brunswick Facility**  
**Brunswick, GA**

Well used for observation			Observation Well BS-OW-01								Observation Well BS-OW-02								Observation Well BS-OW-03D								Observation Well BS-OW-03I								Monitoring Well MW-29D									
Distance to Biosparging Well			33.2 feet to Biosparging Well BS-01, 8.2 feet to Biosparging Well BS-02								15.0 feet to Biosparging Well BS-01, 38.6 feet to Biosparging Well BS-02								19.8 feet to Biosparging Well BS-01, 19.4 feet to Biosparging Well BS-02								15.5 feet to Biosparging Well BS-01, 24.8 feet to Biosparging Well BS-02								10.2 feet to Biosparging Well BS-01, 18.4 feet to Biosparging Well BS-02									
Test Name	Biosparging Rate	Biosparging Well Pressure (psi)	Date	Time	DTW	Changes in DTW	Well Head Pressure	Well Head VOCs	Well Head Oxygen	DO	ORP	DTW	Changes in DTW	Well Head Pressure	Well Head VOCs	Well Head Oxygen	DO	ORP	DTW	Changes in DTW	Well Head Pressure	Well Head VOCs	Well Head Oxygen	DO	ORP	DTW	Changes in DTW	Well Head Pressure	Well Head VOCs	Well Head Oxygen	DO	ORP												
					ft btoc	ft	IWC	ppm	%	mg/L	mV	ft btoc	ft	IWC	ppm	%	mg/L	mV	ft btoc	ft	IWC	ppm	%	mg/L	mV	ft btoc	ft	IWC	ppm	%	mg/L	mV	ft btoc	ft	IWC	ppm	%	mg/L	mV					
Baseline <sup>1</sup>	Not applicable	0	3/16/2021	8:30 AM	5.93	0.00	0.90	1.40	20.90	0.01	-36.60	6.29	0.00	0.90	1.20	20.90	0.01	-72.00	6.45	0.00	0.80	14.50	20.90	0.04	-56.20	6.08	0.00	0.00	0.00	20.90	0.03	-124.80	6.58	0.00	0.00	0.00	20.90	0.66	-34.60					
Step Test at Biosparging Well BS-01	Step 1: 2 scfm at Biosparging Well BS-01	38	3/16/2021	8:48 AM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--						
		38		9:15 AM	5.63	0.30	0.00	1.40	20.70	--	--	6.01	0.28	2.80	0.00	20.90	--	--	6.19	0.26	2.80	165.20	20.90	--	--	5.74	0.34	0.00	0.00	20.90	--	--	6.30	0.28	0.00	0.00	20.90	--	--					
		38		9:45 AM	5.60	0.33	0.40	4.10	20.90	--	--	5.95	0.34	0.70	3.20	20.90	--	--	5.93	0.52	1.90	102.80	20.90	--	--	5.53	0.55	0.00	0.00	20.90	--	--	6.24	0.34	0.00	0.00	20.90	--	--					
	Step 2: 4 scfm at Biosparging Well BS-01	38		10:00 AM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
		38		10:30 AM	5.43	0.50	0.90	8.40	20.60	--	--	5.75	0.54	1.60	3.60	20.90	--	--	5.93	0.52	1.90	171.20	20.90	--	--	6.04	0.54	--	--	6.04	0.54	--	--	20.90	--	--	--	--	--					
		38		11:00 AM	5.37	0.56	0.30	6.20	20.50	--	--	5.70	0.59	0.50	2.40	20.40	--	--	5.90	0.55	0.50	167.30	20.90	--	--	Not measured due to high well head pressure										6.00	0.58	0.00	0.00	20.90	--	--	--	--
	Step 3: 6 scfm at Biosparging Well BS-01	40		11:30 AM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
		40		12:00 PM	5.21	0.72	1.20	9.60	20.90	--	--	5.55	0.74	2.50	5.60	20.90	--	--	5.75	0.70	2.70	190.60	20.90	--	--	Not measured due to high well head pressure										5.85	0.73	0.00	0.00	20.90	--	--	--	--
		40		12:30 PM	5.23	0.70	0.00	0.20	20.90	--	--	5.57	0.72	0.00	0.00	20.90	--	--	5.76	0.69	0.00	18.60	20.90	--	--	Not measured due to high well head pressure										5.85	0.73	0.00	0.00	20.90	--	--	--	--
	Step Test at Biosparging Well BS-02	Step 1: 2 scfm at Biosparging Well BS-02		37	3/16/2021	1:28 PM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
				37		1:58 PM	--	--	0.00	0.40	20.90	--	--	--	--	0.00	0.00	20.90	--	--	--	--	0.00	0.70	20.90	--	--	--	23.10	4.00	16.70	--	--	--	0.00	0.00	20.90	--	--	--	--			
				37		2:28 PM	5.77	0.16	0.00	0.70	20.90	--	--	6.11	0.18	0.00	0.10	20.90	--	--	6.31	0.14	0.00	0.80	20.90	--	--	5.52	0.56	12.30	4.90	15.30	--	--	6.39	0.19	0.00	0.00	20.90	--	--	--	--	
Step 2: 3 scfm at Biosparging Well BS-02		37	2:42 PM	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
		37	3:12 PM	--		--	0.00	0.80	20.90	--	--	--	--	0.00	0.00	20.90	--	--	--	--	0.00	34.80	20.90	--	--	--	4.20	3.60	14.50	--	--	--	0.00	0.00	20.90	--	--	--	--					
		37	3:42 PM	5.84		0.09	0.00	0.50	20.90	--	--	6.18	0.11	0.00	0.00	20.90	--	--	6.36	0.09	0.00	0.10	20.90	--	--	Not measured due to high well head pressure										6.46	0.12	0.00	0.10	20.90	--	--	--	--
Step 3: 4 scfm at Biosparging Well BS-02		37	3:45 PM	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
		37	4:15 PM	--		--	0.00	0.10	20.90	--	--	--	--	0.00	0.00	20.90	--	--	--	--	0.00	0.40	20.90	--	--	Not measured due to high well head pressure										--	--	0.00	0.10	20.90	--	--	--	--
		37	4:45 PM	5.92		0.01	0.00	0.00	20.90	--	--	6.27	0.02	0.00	0.00	20.90	--	--	6.45	0.00	0.00	0.50	0.00	--	--	Not measured due to high well head pressure										6.55	0.03	0.00	0.00	20.90	--	--	--	--
Step 4: 6 scfm at Biosparging Well BS-02		37	4:50 PM	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
		37	5:20 PM	5.82		0.11	0.80	7.30	20.90	--	--	6.18	0.11	0.70	4.80	20.90	--	--	6.36	0.09	0.70	254.90	20.90	--	--	Not measured due to high well head pressure										6.46	0.12	0.00	0.00	20.90	--	--	--	--
Combined Test		Biosparging Well BS-01 at 2 scfm and Biosparging Well BS-02 at 6 scfm	Biosparging Well BS-01 at 40 psi and Biosparging Well BS-02 at 37 psi	3/16/2021		5:25 PM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
	5:59 PM				--	--	--	--	--	0.56	-22.90	--	--	--	--	--	--	--	0.01	-57.30	--	--	--	--	--	--	0.03	-36.90	Not measured due to high well head pressure										--	--	--	--	--	0.02

**Notes:**  
 1: Baseline DO and ORP measurements were collected on March 15, 2021.  
 2: Well head refers to the head space within the casing of observation wells.  
 DO - dissolved oxygen                               psi - pounds per square inch  
 DTW - depth to water                               ppm - parts per million  
 ft btoc - ft below top of casing               scfm - standard cubic feet per minute  
 IWC - inches of water                               VOCs - volatile organic compounds  
 mg/L - milligram per liter                       % - percent  
 mV - millivolt                                       -- not measured  
 ORP - oxidation reduction potential

**Table 4**  
**Biosparging Wells Combined Test Field Data**  
**Hercules/Pinova Brunswick Facility**  
**Brunswick, GA**

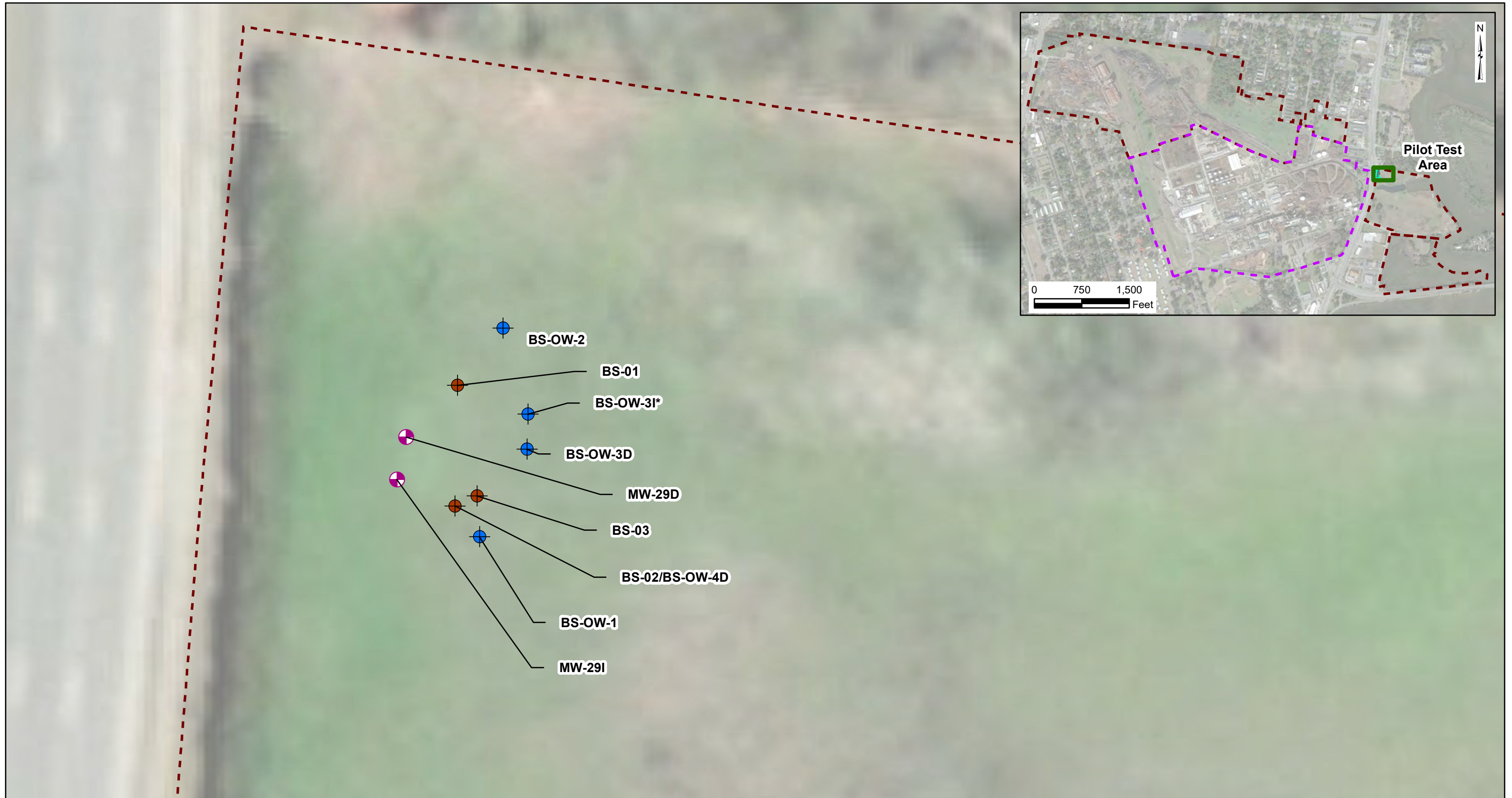
Well used for observation					Observation Well BS-OW-01							Observation Well BS-OW-02							Observation Well BS-OW-03D							Monitoring Well MW-29D							
Distance to Biosparging Well					33.2 feet to Biosparging Well BS-01, 8.2 feet to Biosparging Well BS-02							15.0 feet to Biosparging Well BS-01, 38.6 feet to Biosparging Well BS-02							19.8 feet to Biosparging Well BS-01, 19.4 feet to Biosparging Well BS-02							10.2 feet to Biosparging Well BS-01, 18.4 feet to Biosparging Well BS-02							
Test Name	Biosparging Rate	Biosparging Well Pressure (psi)	Date	Time	DTW	Well Head Helium	Well Head Pressure	Well Head VOCs	Well Head Oxygen	DO	ORP	DTW	Well Head Helium	Well Head Pressure	Well Head VOCs	Well Head Oxygen	DO	ORP	DTW	Well Head Helium	Well Head Pressure	Well Head VOCs	Well Head Oxygen	DO	ORP	DTW	Well Head Helium	Well Head Pressure	Well Head VOCs	Well Head Oxygen	DO	ORP	
					ft btoc	ppm	IWC	ppm	%	mg/L	mV	ft btoc	ppm	IWC	ppm	%	mg/L	mV	ft btoc	ppm	IWC	ppm	%	mg/L	mV	ft btoc	ppm	IWC	ppm	%	mg/L	mV	
Combined Test	Prior to biosparging	0	3/17/2021	8:00 AM	5.36	--	--	--	--	0.03	-22.00	5.77	--	--	--	--	0.02	-53.40	5.90	--	--	--	--	0.04	-23.30	6.01	--	--	--	--	0.04	-22.20	
	Biosparging Well BS-01 at 4 scfm and Biosparging Well BS-02 at 4 scfm	Biosparging Well BS-01 at 40 psi and Biosparging Well BS-02 at 38 psi		9:15 AM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
				10:15 AM	--	--	3.40	3.20	20.40	--	--	--	--	--	--	6.30	2.00	20.90	--	--	--	--	6.60	96.70	20.90	--	--	--	--	0.40	0.90	20.90	--
	Biosparging Well BS-01 at 4 scfm and Biosparging Well BS-02 at 2 scfm	Biosparging Well BS-01 at 40 psi and Biosparging Well BS-02 at 37 psi		11:15 AM	5.18	--	0.70	3.30	20.90	--	--	--	5.54	--	0.80	1.60	20.90	--	--	5.72	--	0.90	85.60	20.90	--	--	5.85	--	0.30	0.90	20.90	--	--
				12:15 PM	5.13	--	0.60	5.00	20.90	--	--	--	5.48	--	0.80	1.80	20.90	--	--	5.66	--	0.90	79.40	20.90	--	--	5.75	--	0.00	0.20	20.90	--	--
	Biosparging Well BS-01 at 4 scfm and Biosparging Well BS-02 at 4 scfm	Biosparging Well BS-01 at 40 psi and Biosparging Well BS-02 at 37 psi		12:28 PM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
				1:15 PM	5.24	--	0.30	4.40	20.90	--	--	--	5.58	--	0.00	0.80	20.90	--	--	5.77	--	0.30	41.40	20.90	--	--	5.88	--	0.00	0.10	20.90	--	--
	Biosparging Well BS-01 at 4 scfm and Biosparging Well BS-02 at 4 scfm	Biosparging Well BS-01 at 40 psi and Biosparging Well BS-02 at 37 psi		2:15 PM	--	--	0.00	2.60	20.90	--	--	--	--	--	0.00	0.10	20.90	--	--	--	--	0.00	27.80	20.90	--	--	--	--	0.00	0.10	20.90	--	--
				3:15 PM	--	--	-0.70	8.30	20.30	--	--	--	--	--	-0.50	4.40	20.90	--	--	--	--	-1.10	101.30	20.90	--	--	--	--	0.00	1.80	20.90	--	--
	Biosparging Well BS-01 at 5 scfm and Biosparging Well BS-02 at 5 scfm	Biosparging Well BS-01 at 40 psi and Biosparging Well BS-02 at 38 psi		4:15 PM	--	--	-2.30	6.70	20.90	--	--	--	--	--	-2.80	2.80	20.90	--	--	--	--	-3.20	86.20	20.90	--	--	--	--	-0.30	1.40	20.90	--	--
				4:16 PM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Biosparging Well BS-01 at 5 scfm and Biosparging Well BS-02 at 5 scfm	Biosparging Well BS-01 at 40 psi and Biosparging Well BS-02 at 38 psi		4:30 PM	5.78	--	-3.30	7.50	20.90	--	--	--	--	--	-3.50	2.40	20.90	--	--	--	--	-4.00	73.50	20.90	--	--	--	--	0.00	1.50	20.90	--	--
				6:30 PM	--	--	-2.50	6.70	20.40	--	--	--	--	--	-4.90	1.20	20.90	--	--	--	--	-5.50	45.70	20.90	--	--	--	--	0.00	1.50	20.90	--	--
	Biosparging Well BS-01 at 5 scfm and Biosparging Well BS-02 at 5 scfm	Biosparging Well BS-01 at 40 psi and Biosparging Well BS-02 at 38 psi		6:35 PM	--	--	--	--	--	--	--	0.01	-23.70	--	--	--	--	--	0.01	-48.20	--	--	--	--	--	0.01	-35.40	--	--	--	--	0.02	-18.90
Prior to biosparging			0	3/18/2021	9:55 AM	--	--	--	--	--	0.01	-20.40	--	--	--	--	--	0.02	-50.30	--	--	--	--	--	0.05	-26.00	--	--	--	--	0.02	-22.40	
Biosparging Well BS-01 at 1.5 scfm and Biosparging Well BS-02 at 1.5 scfm	Biosparging Well BS-01 at 40 psi and Biosparging Well BS-02 at 38 psi	1:45 PM	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
		2:45 PM	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Biosparging Well BS-01 at 1.5 scfm and Biosparging Well BS-02 at 1.5 scfm	Biosparging Well BS-01 at 40 psi and Biosparging Well BS-02 at 38 psi	3:45 PM	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
		4:54 PM	--	--	--	--	--	--	--	0.02	-17.00	--	--	--	--	--	0.02	-43.80	--	--	--	--	--	0.02	-31.60	--	--	--	--	0.03	-15.20		

**Notes:**  
 1: Baseline DO and ORP measurements were collected on March 15, 2021.  
 2: Well head refers to the head space within the casing of observation wells.  
 DTW - depth to water  
 DO - dissolved oxygen  
 ft btoc - ft below top of casing  
 IWC - inches of water  
 mg/L - milligram per liter  
 mV - millivolt  
 psi - pounds per square inch  
 ppm - parts per million  
 scfm - standard cubic feet per minute  
 VOCs - volatile organic compounds  
 -- not measured  
 % - percent








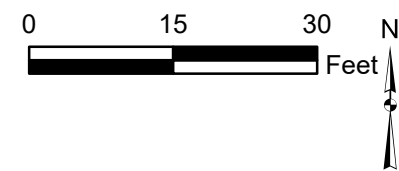


# FIGURES



**Legend**

-  Pilot Test Sparging Well
-  Pilot Test Observation Well
-  Monitoring Well – Surficial Aquifer, Upper Unit
-  Pinova Property
-  Hercules Property



**Notes:**  
 1. "S", "I", and "D" designate monitoring wells screened in the shallow, intermediate and deep zones of the upper surficial aquifer, respectively.  
 2. Aerial photograph approximate date - January 2019. Source: Google Earth.

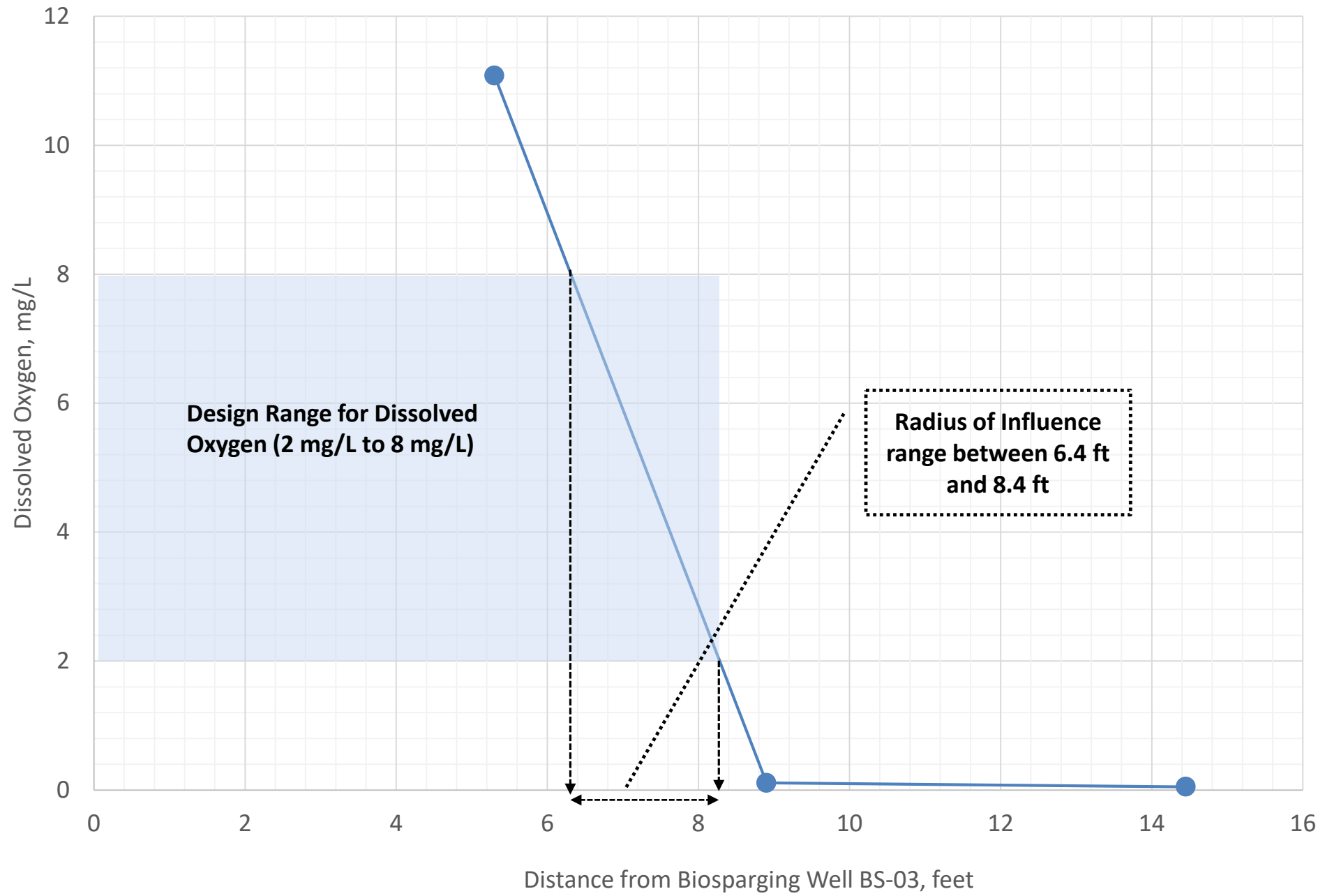
**Pilot Test Well Layout**  
 Hercules/Pinova Facility  
 Brunswick, Georgia

**Geosyntec**  
 consultants

Kennesaw, GA

November 2021

**Figure**  
**1**



mg/L – milligrams per liter  
ft - feet

**Radius of Influence Estimation -  
Biosparging Well BS-03**  
Hercules/Pinova Brunswick Facility

**Geosyntec**  
consultants

Figure

Kennesaw, GA

November 2021

**2**

# ATTACHMENT A

## Well Construction Details and Boring Logs

**CLIENT** Hercules, LLC **PROJECT NAME** Biosparge Pilot Test Well Installation  
**PROJECT NUMBER** GW6881M **PROJECT LOCATION** Brunswick, Georgia  
**DATE STARTED** 2/23/21 **COMPLETED** 2/23/21 **NORTHING** 424973.12 ft **GROUND** **EASTING** 872676.47 ft  
**DRILLER** SAEDACCO **ELEVATION** 5.77 ft MSL **BORING DIAMETER** 6 in  
**DRILLING METHOD** Sonic **TOP OF CASING ELEVATION** 9 ft MSL  
**SAMPLING METHOD** 4 in. core 6 in. override **GEOPHYSICAL CONTRACTOR** ---  
**RIG TYPE** Geoprobe 8150 LS **LOGGED BY** A. Brown **CHECKED BY** A. Reimer

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
0	5			SILTY SAND, dark brown/black, moist, very loose, fine sand, poorly graded, organic material.  Wet beginning at 2 ft.		<p>0 to 5 ft: 2 in. Stainless Steel casing                      From 5 ft: 2 in. Schedule 40 PVC                      Type I/II portland cement</p>
5	0					
10	-5			SAND with trace silt, gray, wet, loose, fine grain, poorly graded.	-2.23	
15	-10				0.4	
					0.4	
					4.6	
					12.9	
					8.1	
					4.9	
					12.5	
					2.6	
					4.2	
					-11.23	
				CLAY, dark gray, wet, soft, high plasticity.	-12.23	
20	-15			CLAYEY SAND with shell fragments, dark gray, wet, fine grain, loose, high plasticity clay.	1	
					1	
					1.5	
					0.9	
					1.1	
					0.5	
					-17.73	
				CLAY, dark gray, wet, soft, high plasticity.	2.1	
25	-20				2.5	
					-19.73	
				SAND, dark gray, wet, medium dense, fine grain, poorly graded.	1.4	
					0.4	
30	-25			Clay lens from 30.5-31 ft.	15.5	
					10.4	
					9.7	
					5.4	
				Clay lens from 33.5-34 ft.	13.3	

SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY.CH.GLB 9/15/21

CLIENT Hercules, LLC PROJECT NAME Biosparge Pilot Test Well Installation  
PROJECT NUMBER GW6881M PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
35	-30			SAND, dark gray, wet, medium dense, fine grain, poorly graded. (continued)	9.3 7.9	
					-31.23 1.7	
				SANDY CLAY, dark gray, wet, moderately stiff, high plasticity, fine grain.		
					-32.23	
				SAND with shell fragments, dark gray, wet medium dense, fine to medium grain, poorly graded.	4.9 9.5	
40	-35				9.6	
				Clay lens from 43-43.5 ft.	5.8 3	
					6.8	
45	-40				2.2	
					9.1	
					3.3	
					8.3	
					1.2	
					3.6	
50	-45				13.5	
					10.4	
					10.1	
					6.3	
					9.5	
55	-50				6.6	
					2.9	
				CLAYEY SILTY SAND, dark gray, wet, medium dense, fine to medium grain, poorly graded.	10.4	
					12.1	
					11.1	
60	-55				0.3	
					6.3	
					0.8	
					5.6	
					3.5	
65	-60				6.5	
					4.1	
					1.8	
					2.4	
				CLAYEY SAND with shell fragments, dark gray, wet, fine grain, loose, high plasticity clay.	-62.73 1.7	
					-64.23	
70	-65			SAND, dark gray, wet, low density, fine grain, poorly graded.	0	
					0.3	
					4.8	
				CLAYEY SAND, dark gray, wet, very dense, fine grain, poorly graded, nonplastic clay.	3.4	
					7.8	

◀ Type I/II portland cement

SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY.CH.GLB 9/15/21

**CLIENT** Hercules, LLC **PROJECT NAME** Biosparge Pilot Test Well Installation  
**PROJECT NUMBER** GW6881M **PROJECT LOCATION** Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
75	-70			CLAYEY SAND, dark gray, wet, very dense, fine grain, poorly graded, nonplastic clay. (continued)	1.4 10 2.3 4.3	<p>Bentonite coated 3/8 in. pellets</p> <p>No. 1 Silica Sand</p> <p>0.010 slot size 2 in Schedule 40 PVC screen Bottom of well: 95 ft.</p>
				-73.73	0.2	
80	-75			SANDSTONE/SANDY MUDSTONE, gray, moist, fine to medium grain, brittle.	21.1	
				-75.23	4.6	
				SAND, gray, wet, very loose, medium to coarse grain, poorly graded.	20.1 17.3 34.5 17.7	
85	-80				18.5 46.3 31.8	
					38.9	
90	-85				13.7 22 2.9	
					4.9	
95	-90				3.7 3.2 2.6	

Bottom of borehole at 97.0 feet. 5

SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY.CH.GLB 9/15/21

<b>CLIENT</b> Hercules, LLC	<b>PROJECT NAME</b> Biosparge Pilot Test Well Installation
<b>PROJECT NUMBER</b> GW6881M	<b>PROJECT LOCATION</b> Brunswick, Georgia
<b>DATE STARTED</b> 2/22/21	<b>COMPLETED</b> 2/24/21
<b>DRILLER</b> SAEDACCO	<b>NORTHING</b> 424947.65 ft
<b>DRILLING METHOD</b> Sonic	<b>EASTING</b> 872675.97 ft
<b>SAMPLING METHOD</b> 4 in. core 6 in. override	<b>GROUND ELEVATION</b> 5.54 ft MSL
<b>RIG TYPE</b> Geoprobe 8150 LS	<b>BORING DIAMETER</b> 6 in
	<b>TOP OF CASING ELEVATION</b> 8.85 ft MSL
	<b>GEOPHYSICAL CONTRACTOR</b> ---
	<b>LOGGED BY</b> A. Brown
	<b>CHECKED BY</b> A. Reimer

SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/15/21

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
0	5			SILTY SAND, dark brown/black, moist, very loose, fine sand, poorly graded, organic material.	1.4	<p>0 to 5 ft: 2 in. Stainless Steel casing</p> <p>From 5 ft: 2 in. Schedule 40 PVC</p>
		Wet beginning at 2.5 ft.			1.9	
		More clay beginning at 5 ft.			1	
5	0				2.6	
					24	
					-1.46	
				SILTY CLAYEY SAND, dark gray, wet, loose, fine sand, poorly graded.	0.6	
				SAND, dark gray, wet, very loose, fine sand, poorly graded.	-2.96	
					1	
					1.1	
10	-5				0.1	
				SANDY CLAY with shell fragments, dark gray, wet, soft, high plasticity.	0.2	
					0.5	
					-7.96	
				SAND with shell fragments, dark gray, wet, loose, fine sand, poorly graded.	0.7	
					0.2	
15	-10				13.1	
					17.9	
					3	
					-14.96	
				CLAY, dark gray, wet, soft, high plasticity.	10.3	
					4.3	
					1	
					-17.96	
				SAND, dark gray, wet, very loose, fine sand, poorly graded.	0.2	
					0.7	
25	-20				0.1	
					0.2	
					2.7	
					11.1	
					17.8	
					7.6	
					1.7	
					9.2	
				Clay lens from 33-33.5 ft. Medium sand beginning at 33.5 ft.	7.9	

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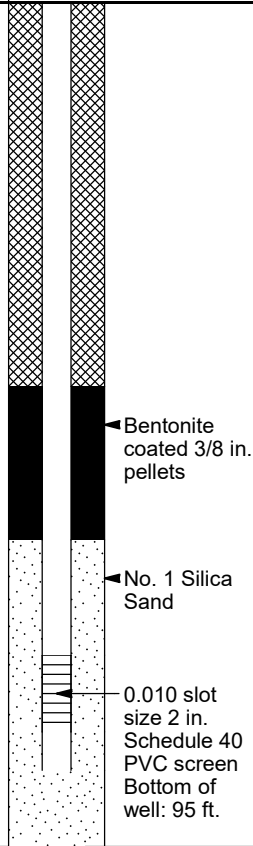


CLIENT Hercules, LLC PROJECT NAME Biosparge Pilot Test Well Installation  
PROJECT NUMBER GW6881M PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
35	-30			Clay lense at 34.5 ft. SAND, dark gray, wet, very loose, fine sand, poorly graded. <i>(continued)</i>	8.8	
					0.3	
					0.6	
					1	
40	-35			CLAYEY SAND, dark gray, wet, very loose, fine to medium grain, high plasticity clay.	0.7	
				SAND with shell fragments, dark gray, wet, loose, medium grain, poorly graded.	0.7	
					0.7	
					0.6	
					0.6	
45	-40				0.8	
					0.7	
					0.2	
50	-45				0.8	
					0.1	
					0.4	
55	-50			CLAYEY SILTY SAND, gray, wet, low to medium dense, fine to medium grain, poorly graded.	0.2	
					0.4	
					0.5	
				Increased clay content from 59-61 ft.	0.2	
60	-55				0	
					0.6	
					0.2	
					0	
					0.3	
65	-60				0.5	
					1.5	
					0.4	
					0.3	
70	-65			SAND, gray, wet, loose, fine to medium grain, poorly graded.	0.2	
					0.5	
					0.3	
				CLAYEY SAND, gray, wet, very dense, fine grain, poorly graded, nonplastic clay.	0.1	
					0.2	

◀ Type I/II portland cement

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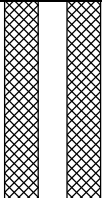
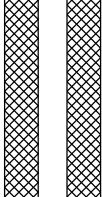
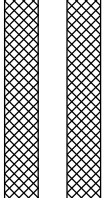
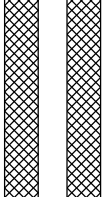
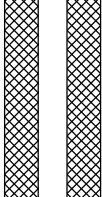
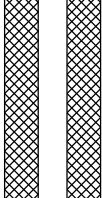
CLIENT Hercules, LLC PROJECT NAME Biosparge Pilot Test Well Installation  
PROJECT NUMBER GW6881M PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
75	-70			CLAYEY SAND, gray, wet, very dense, fine grain, poorly graded, nonplastic clay. (continued)	0.7 0.3	 <p>← Bentonite coated 3/8 in. pellets</p> <p>← No. 1 Silica Sand</p> <p>← 0.010 slot size 2 in. Schedule 40 PVC screen Bottom of well: 95 ft.</p>
				SANDSTONE/SANDY MUDSTONE, gray, moist, fine to medium grain, brittle.	1.3 1.1	
80	-75			SAND, gray, wet, very loose, medium to coarse grain, poorly graded.	1.1 0.5 0.4 0.1 0.1	
85	-80	No recovery from 87-97 ft.			0.2 0.1	
90	-85					
95	-90					
				-91.46		

Bottom of borehole at 97.0 feet.

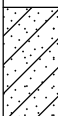





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**CLIENT** Hercules, LLC **PROJECT NAME** Biosparge Pilot Test Well Installation  
**PROJECT NUMBER** GW6881M **PROJECT LOCATION** Brunswick, Georgia  
**DATE STARTED** 3/25/21 **COMPLETED** 3/26/21 **NORTHING** 424949.8 ft **EASTING** 872680.58 ft  
**DRILLER** SAEDACCO **GROUND ELEVATION** 5.5 ft MSL **BORING DIAMETER** 6 in  
**DRILLING METHOD** Sonic **TOP OF CASING ELEVATION** 8.63 ft MSL  
**SAMPLING METHOD** 4 in. core 6 in. override **GEOPHYSICAL CONTRACTOR** ---  
**RIG TYPE** Geoprobe 8150 LS **LOGGED BY** A. Ramsey **CHECKED BY** A. Reimer

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0	5			Not Sampled	
5	0				
10	-5				
15	-10				
20	-15				
25	-20				
30	-25				

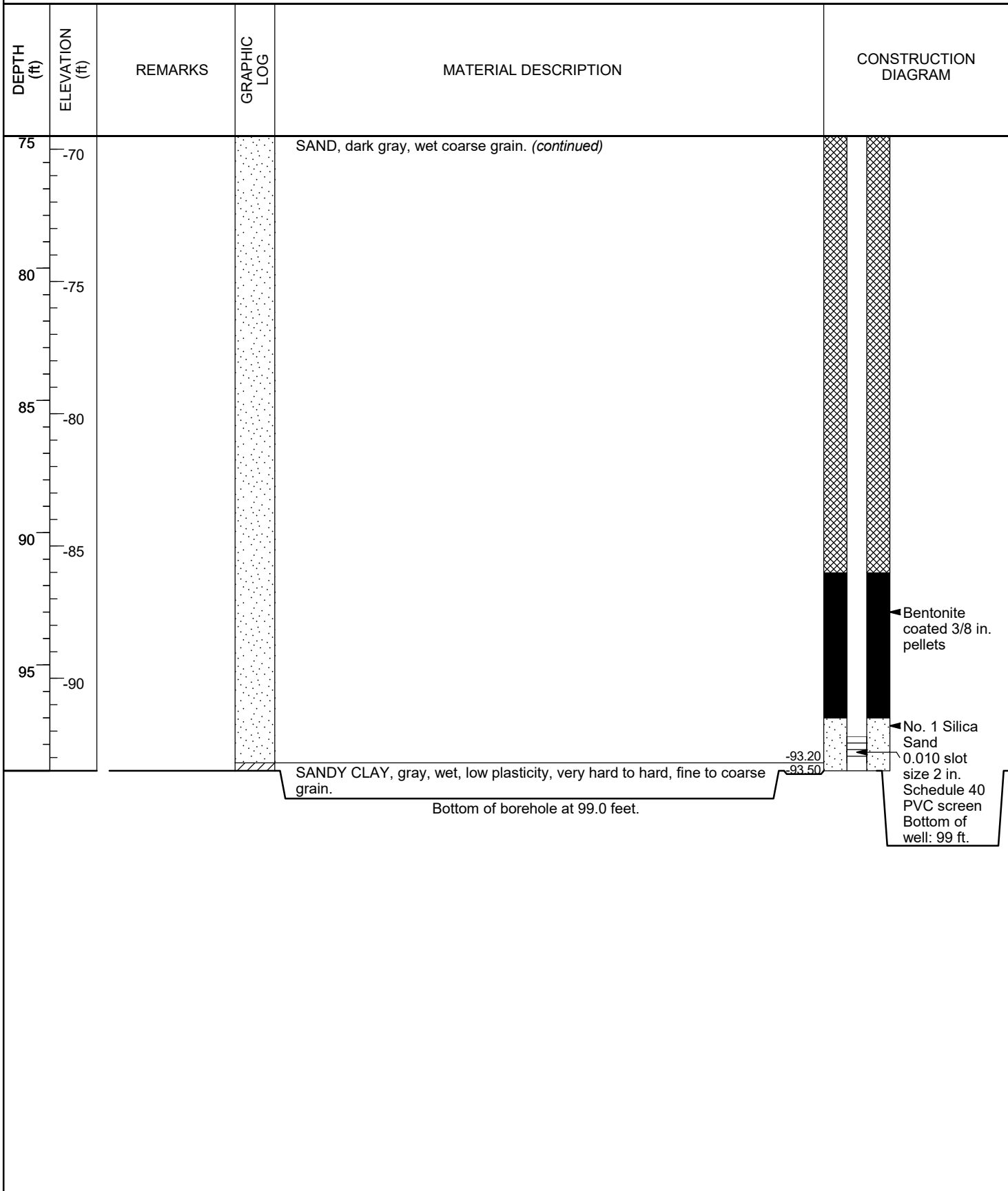
SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/15/21

CLIENT Hercules, LLC PROJECT NAME Biosparge Pilot Test Well Installation  
PROJECT NUMBER GW6881M PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
35	-30			Not Sampled ( <i>continued</i> )	
40	-35				
45	-40				
50	-45			SAND with some clay, gray, wet, medium to coarse grain, hard.	
					2 in. Schedule 40 PVC
				SAND, gray, wet, coarse grain.	
55	-50				Type I/II portland cement
				SAND with some clay, gray, wet, medium to coarse grain, hard.	
				SAND, gray, wet, coarse grain.	
60	-55				
65	-60				
				SANDSTONE/SANDY MUDSTONE, gray, dry, medium to coarse grain, very hard.	
				SAND, dark gray, wet coarse grain.	
70	-65				

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CLIENT Hercules, LLC PROJECT NAME Biosparge Pilot Test Well Installation  
PROJECT NUMBER GW6881M PROJECT LOCATION Brunswick, Georgia



CLIENT Hercules, LLC PROJECT NAME Biosparge Pilot Test Well Installation  
 PROJECT NUMBER GW6881M PROJECT LOCATION Brunswick, Georgia  
 DATE STARTED 2/25/21 COMPLETED 2/25/21 NORTHING 424941.18 ft GROUND EASTING 872681.15 ft  
 DRILLER SAEDACCO ELEVATION 5.21 ft MSL BORING DIAMETER 6 in  
 DRILLING METHOD Sonic TOP OF CASING ELEVATION 8.22 ft MSL  
 SAMPLING METHOD 4 in. core 6 in. override GEOPHYSICAL CONTRACTOR ---  
 RIG TYPE Geoprobe 8150 LS LOGGED BY A. Brown CHECKED BY A. Reimer

SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/15/21

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
0	5			SILTY SAND, dark brown/black, moist, very loose, fine grain, poorly graded, organic material.  Wet beginning at 2 ft.		
5	0				2.8	
					8	
					-1.79	
				SANDY CLAY, dark gray, wet, soft, high plasticity.	12.4	
					3.9	
					-3.79	
				SAND, dark gray, wet, loose, fine grain, poorly graded.	6.6	
10	-5				1.2	← 2 in. Schedule 40 PVC
					0.9	
					-6.29	
				SANDY CLAY, dark gray, wet, soft, high plasticity. Large shell fragments from 11.5-12.5 ft.	0.8	
15	-10				3.4	
					-12.79	
				SAND with shell fragments, dark gray, wet, loose, fine grain, poorly graded.	14.2	
20	-15				9.5	
					6.4	← Type I/II portland cement
					1.4	
					3.4	
				Clay lens at 23 ft.	4.8	
25	-20				1.4	
					12.7	
					-23.79	
				CLAY, dark gray, wet, soft to medium stiff, high plasticity.	1	
30	-25				7.9	
					16.9	
					-27.29	
				SAND, gray, wet, loose, medium grain, poorly graded.	2.2	
					18.9	
					4.1	

(Continued Next Page)

**CLIENT** Hercules, LLC **PROJECT NAME** Biosparge Pilot Test Well Installation  
**PROJECT NUMBER** GW6881M **PROJECT LOCATION** Brunswick, Georgia

SCS MONITORING WELLS - BRUNSWICK BIOSPARGES WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/15/21




DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM	
35	-30			SAND, gray, wet, loose, medium grain, poorly graded. <i>(continued)</i>  Shell fragments and medium grained beginning at 37 ft.	18 7.2 2.5 5.1 4.6 3.1 2.3 6.3 6.6 3.2		
40	-35						3.2 7 3.7 7.5 3.8
45	-40						6.8 13.7 11 11.4
50	-45						3.8 2.8 1.1 7 6
55	-50						
60	-55				SILTY SAND, gray, wet, loose, fine grain, poorly graded. Clay interbedded from 52-53 ft.		
65	-60						
70	-65						
					Clay interbedded from 62-62.5 ft.		
					CLAYEY SAND, gray, wet, dense to very dense, fine to medium grain, poorly graded.		

◀ Type I/II portland cement

◀ Bentonite coated 3/8 in.

(Continued Next Page)

CLIENT Hercules, LLC PROJECT NAME Biosparge Pilot Test Well Installation  
PROJECT NUMBER GW6881M PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
75	-70			CLAYEY SAND, gray, wet, dense to very dense, fine to medium grain, poorly graded. <i>(continued)</i>	-71.79	pellets
				SANDSTONE/SANDY MUDSTONE, gray, moist, fine to medium grain, brittle.	-73.29	No. 2 Silica Sand
80	-75			SAND, gray, wet, very loose, medium to coarse grain, poorly graded.		0.010 slot size 2 in. Schedule 40 PVC screen
85	-80					
90	-85					Bottom of well: 91 ft.
95	-90			Clay interbedded from 92.5-93.5 ft.	18.7 25.5 20.4 7.8 19.2 12.5	
					-91.79	

Bottom of borehole at 97.0 feet.

SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY.CH.GLB 9/15/21



**CLIENT** Hercules, LLC **PROJECT NAME** Biosparge Pilot Test Well Installation  
**PROJECT NUMBER** GW6881M **PROJECT LOCATION** Brunswick, Georgia  
**DATE STARTED** 2/26/21 **COMPLETED** 2/26/21 **NORTHING** 424985.139 ft **GROUND** **EASTING** 872686.08 ft  
**DRILLER** SAEDACCO **ELEVATION** 5.79 ft MSL **BORING DIAMETER** 6 in  
**DRILLING METHOD** Sonic **TOP OF CASING ELEVATION** 8.5 ft MSL  
**SAMPLING METHOD** 4 in. core 6 in. override **GEOPHYSICAL CONTRACTOR** ---  
**RIG TYPE** Geoprobe 8150 LS **LOGGED BY** A. Brown **CHECKED BY** A. Reimer

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
0	5			SILTY SAND, black, moist, very loose, fine grain, poorly graded, organic material.  Wet beginning at 2 ft.		
5	0			CLAYEY SAND, dark brown, wet, loose, fine grain, poorly graded, high plasticity clay. SAND, brown to gray, wet, very loose, fine grain, poorly graded.	-0.21 -1.21	
10	-5			CLAY, dark gray, wet, soft, high plasticity, trace grain.	-5.21	2 in. Schedule 40 PVC
15	-10			SAND, dark gray, wet, very loose fine grain, poorly graded.	-7.71	
20	-15			Shell fragments beginning at 17 ft.	-12.21	
25	-20			SANDY CLAY with shell fragments, dark gray, wet, soft, high plasticity, fine grain.	-18.21	Type I/II portland cement
30	-25			SAND, gray, wet, loose, fine grain, poorly graded.	0.9	
				Clay lens from 32-32.5 ft. Medium sand beginning at 32.5 ft.	8.4 5.4 1.3 0.7 1.3 5.6 2 2.2 1.2	

SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/15/21


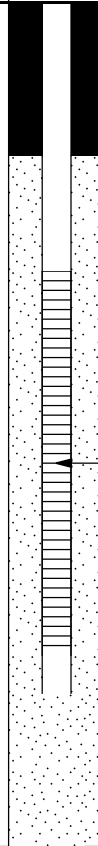


CLIENT Hercules, LLC PROJECT NAME Biosparge Pilot Test Well Installation  
PROJECT NUMBER GW6881M PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
35	-30			SAND, gray, wet, loose, fine grain, poorly graded. (continued)	1.4	
					-31.21	
				CLAYEY SAND, gray, wet, medium dense, medium grain, poorly graded, high plasticity clay.	0.7	
					-32.21	
				SAND with shell fragments, gray, wet, loose, medium grain, poorly graded.	3.1	
					3	
40	-35				3.3	
					2.6	
					3	
					6.5	
					5.9	
45	-40				6	
					3.8	
					3.7	
					3.3	
					3	
50	-45			SILTY SAND, gray, wet, medium dense, fine grain, poorly graded.	3.9	
					4.4	
					4.5	
					6.3	
					3	
55	-50				7.5	
					9.8	
					3.3	
				Medium grain and trace fine gravel beginning at 60.5 ft.	5.2	
					11.7	
					8.2	
					4.7	
					7.8	
65	-60				2.8	
					5.2	
					-61.21	
				SAND, gray, wet, loose, fine to medium grain, poorly graded.	18.7	
					13.6	
					6.6	
					5.8	
70	-65				7.7	
					5.8	
					3.8	
					5	
					-69.21	

SCS MONITORING WELLS - BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/15/21

◀ Type I/II portland cement

**CLIENT** Hercules, LLC **PROJECT NAME** Biosparge Pilot Test Well Installation  
**PROJECT NUMBER** GW6881M **PROJECT LOCATION** Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
75	-70			CLAYEY SAND, gray, wet, dense, fine to medium grain, poorly graded, nonplastic.	12.1 9.5 1 1.3 1.7	 <p>Bentonite coated 3/8 in. pellets</p> <p>No. 2 Silica Sand</p> <p>0.010 slot size 2 in. Schedule 40 PVC screen</p> <p>Bottom of well: 93 ft.</p>
				SANDSTONE/SANDY MUDSTONE, gray, moist, fine to medium grain, brittle.	4.4 9.7 6 12.4 13.2 15.3 17.8 16.9 23 28.6 30.1 44.6 24.4 13 28.4 5	
80	-75			SAND with shell fragemnts, light gray, wet, very loose, medium to coarse grain, poorly graded, round fine gravel at 81 ft. Silty/clayey from 83-84 ft No shell fragments beginning at 84 ft.		
85	-80					
90	-85					
95	-90					
				Bottom of borehole at 97.0 feet.		

SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/15/21

<b>CLIENT</b> Hercules, LLC	<b>PROJECT NAME</b> Biosparge Pilot Test Well Installation
<b>PROJECT NUMBER</b> GW6881M	<b>PROJECT LOCATION</b> Brunswick, Georgia
<b>DATE STARTED</b> 2/26/21	<b>COMPLETED</b> 2/26/21
<b>DRILLER</b> SAEDACCO	<b>NORTHING</b> 424959.66 ft
<b>DRILLING METHOD</b> Sonic	<b>EASTING</b> 872691.12 ft
<b>SAMPLING METHOD</b> 4 in. core 6 in. override	<b>GROUND ELEVATION</b> 5.44 ft MSL
<b>RIG TYPE</b> Geoprobe 8150 LS	<b>BORING DIAMETER</b> 6 in
	<b>TOP OF CASING ELEVATION</b> 8.7 ft MSL
	<b>GEOPHYSICAL CONTRACTOR</b> ---
	<b>LOGGED BY</b> A. Brown
	<b>CHECKED BY</b> A. Reimer

SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/15/21

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
0	5			SILTY SAND, black, moist, loose, fine to medium grain, poorly graded, organic material.  Wet beginning at 2 ft.		
5	0				18.5	
					43.8	
					-1.56	
				SANDY CLAY, dark gray, wet, soft, high plasticity, fine grain.	25.3	
					11.9	
					-3.56	
				SAND, dark gray, wet, loose, fine grain, poorly graded, shell fragments at 10.5 ft.	12.8	
10	-5				6	← 2 in. Schedule 40 PVC
				CLAY with shell fragments, gray green, soft, high plasticity.	4.8	
					-6.56	
				SAND with shell fragments, gray, loose, fine grain, poorly graded.	1	
					1.1	
					6.1	
					4.1	
15	-10				12.2	
					2.3	
					1.3	
					-15.06	
				CLAY, gray, wet, soft, high plasticity.	1.1	
					0.7	
					-17.56	
				SAND, very dark gray, wet, very loose, fine grain, poorly graded.	0.5	
					2.5	
					1	← Type I/II portland cement
25	-20				1.1	
					16.2	
					8.5	
					0.9	
					0.8	
30	-25				0.5	
					-26.06	
				CLAY, gray, wet, soft, high plasticity.	0.5	
					-27.06	
				SAND with shell fragments, gray, wet, very loose, fine to medium grain, poorly graded.	3.7	
					8.2	
					11.9	

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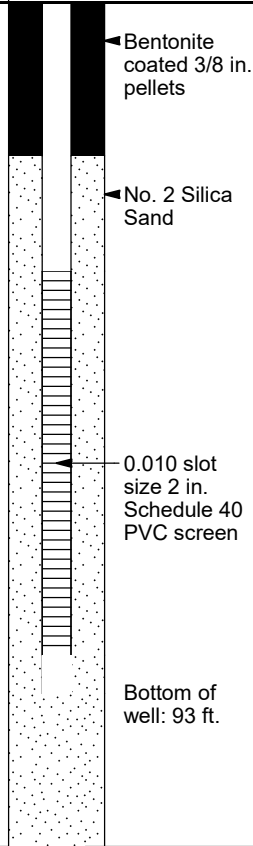


CLIENT Hercules, LLC PROJECT NAME Biosparge Pilot Test Well Installation  
PROJECT NUMBER GW6881M PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
35	-30			SAND with shell fragments, gray, wet, very loose, fine to medium grain, poorly graded. (continued)	1.5	
					0.3	
					3.6	
					0.8	
40	-35				4.5	
					8.5	
					6.6	
					4.2	
					0.9	
45	-40				3.5	
					4.7	
					3.8	
					2.9	
					2.1	
50	-45				1.4	
					1	
					2.9	
					7.8	
					1.8	
55	-50				2.5	
					0.7	
					3.8	
					1.3	
60	-55			SILTY SAND with trace clay, gray, wet, loose to medium dense, fine grain, poorly graded.	1.3	
					0.4	
					1.7	
					1.9	
					1.6	
65	-60				5.3	
					7.2	
					0.2	
					0.4	
					0.3	
70	-65				0.5	
					1.8	
					1	
					3.1	
					1.8	
				CLAYEY SAND, gray, wet, dense, fine grain, poorly graded.		

SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/15/21

◀ Type I/II portland cement

CLIENT Hercules, LLC PROJECT NAME Biosparge Pilot Test Well Installation  
PROJECT NUMBER GW6881M PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
75	-70			CLAYEY SAND, gray, wet, dense, fine grain, poorly graded. (continued)	1.8	 <p>Bentonite coated 3/8 in. pellets</p> <p>No. 2 Silica Sand</p> <p>0.010 slot size 2 in. Schedule 40 PVC screen</p> <p>Bottom of well: 93 ft.</p>
				SANDSTONE/SANDY MUDSTONE, gray, moist, fine to medium grain, brittle.	16.8 16.2	
80	-75			SAND, gray, wet, very loose, medium to coarse grain, poorly graded.	8.8 0.8 1 1.7 0.8 0.9	
85	-80	No recovery from 87-97 ft.			10.3 11.5	
90	-85					
95	-90					
				Bottom of borehole at 97.0 feet.	-91.56	

SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY.CH.GLB 9/15/21

<b>CLIENT</b> Hercules, LLC	<b>PROJECT NAME</b> Biosparge Pilot Test Well Installation
<b>PROJECT NUMBER</b> GW6881M	<b>PROJECT LOCATION</b> Brunswick, Georgia
<b>DATE STARTED</b> 2/27/21	<b>COMPLETED</b> 3/2/21
<b>DRILLER</b> SAEDACCO	<b>NORTHING</b> 424967.01 ft
<b>DRILLING METHOD</b> Sonic	<b>EASTING</b> 872691.36 ft
<b>SAMPLING METHOD</b> 4 in. core 6 in. override	<b>GROUND ELEVATION</b> 5.56 ft MSL
<b>RIG TYPE</b> Geoprobe 8150 LS	<b>BORING DIAMETER</b> 6 in
	<b>TOP OF CASING ELEVATION</b> 8.42 ft MSL
	<b>GEOPHYSICAL CONTRACTOR</b> ---
	<b>LOGGED BY</b> A. Brown
	<b>CHECKED BY</b> A. Reimer

SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/15/21

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
0	5			SILTY SAND, black/dark brown, moist, loose, fine to medium grain, poorly graded, organic material.  Wet beginning at 2 ft.		
5	0			Wood chips at 5.5 ft.	6.3 9 30.1	2 in. Schedule 40 PVC
					-2.44	
				CLAYEY SAND, gray, wet, loose, fine grain, poorly graded, high plasticity clay.	11.8	
					-4.44	
10	-5			SAND, dark gray, wet, very loose, fine grain, poorly graded. Shell fragments beginning at 11 ft.	1.1 4.3	
				CLAY, grayish green, wet, soft, high plasticity.	4.2	
					-8.44	
				SAND with shell fragments and trace clay, gray, wet, loose, fine grain, poorly graded.	4.5 3.6	Type I/II portland cement
15	-10				1.4	
					10 1.9	
					-14.44	
				CLAY with trace sand, gray, wet, soft, high plasticity.	1.6 0.7	
20	-15				1.4	
					1	
					-17.94	
				SAND, gray, wet, very loose, fine grain, poorly graded.	1.4 4.4	
25	-20				2 3.5	
					7	
					10.7	
					5	
					-27.44	
				CLAYEY SAND, gray, wet, loose, fine grain, poorly graded.	7.1	
					-28.44	
					5.1	

(Continued Next Page)

CLIENT Hercules, LLC PROJECT NAME Biosparge Pilot Test Well Installation  
PROJECT NUMBER GW6881M PROJECT LOCATION Brunswick, Georgia

DEPTH (ft)	ELEVATION (ft)	REMARKS	GRAPHIC LOG	MATERIAL DESCRIPTION	PID DATA (ppm)	CONSTRUCTION DIAGRAM
35	-30			SAND with shell fragments, gray, wet, very loose, medium grain, poorly graded. <i>(continued)</i>	5.6 5.4 4 3.4 3.8 3.5 0.5 0.7	Type I/II portland cement
40	-35				1.1 1	Bentonite coated 3/8 in. pellets
45	-40					No. 2 Silica Sand
50	-45				3.2 2.5 1 1.4 1.2 1 0.9 0.8 1.1	0.010 slot size 2 in. Schedule 40 PVC screen
55	-50					
60	-55			SILTY SAND with trace clay, gray, wet, medium dense, fine grain, poorly graded.		

Bottom of borehole at 61.0 feet.

Bottom of well: 61 ft.

SCS MONITORING WELLS BRUNSWICK BIOSPARGE WELLS 2021.GPJ ACP GINT LIBRARY CH.GLB 9/15/21



# ATTACHMENT B

## Geotechnical Laboratory Reports





**Excel Geotechnical Testing, Inc.**  
"Excellence in Testing"

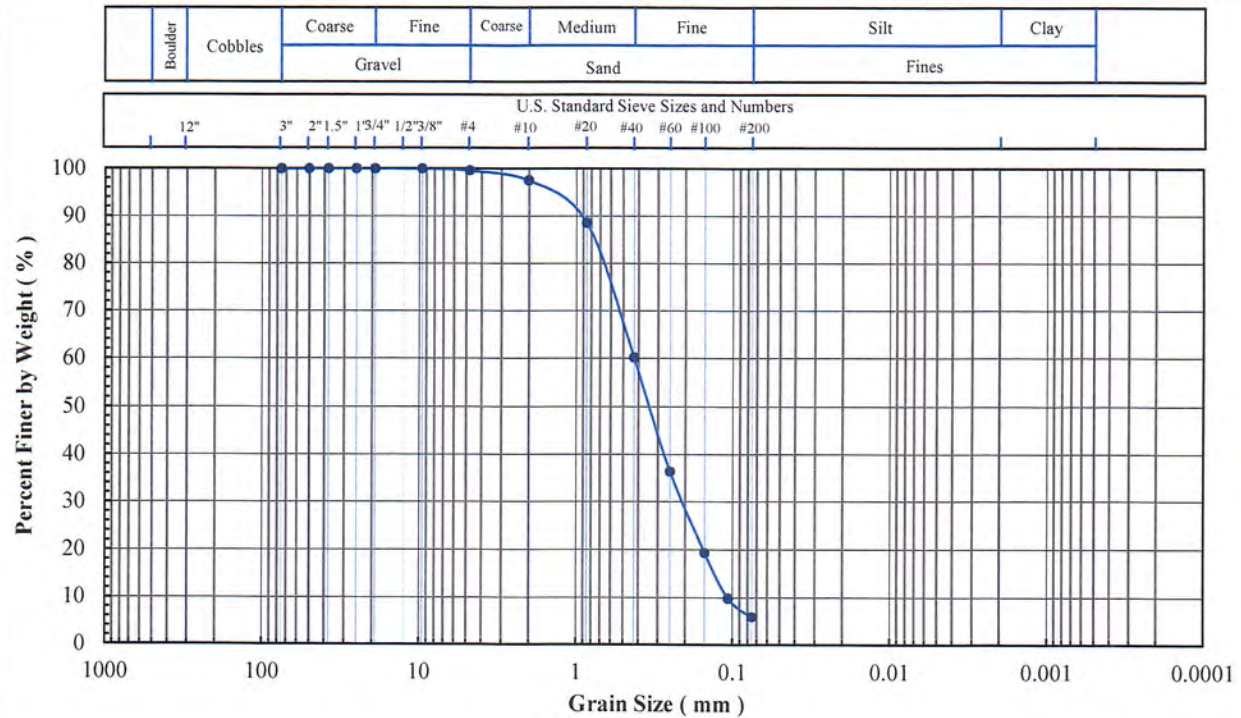
953 Forrest Street, Roswell, Georgia 30075  
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name: Hercules Biosparge Pilot Test  
Project No: PN1031  
Client Sample ID: BS-1-47-56.5'  
Lab Sample No: 21D001

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

**SOIL INDEX PROPERTIES**

Grain Size, Spec. Gravity, Moist. Cont., Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

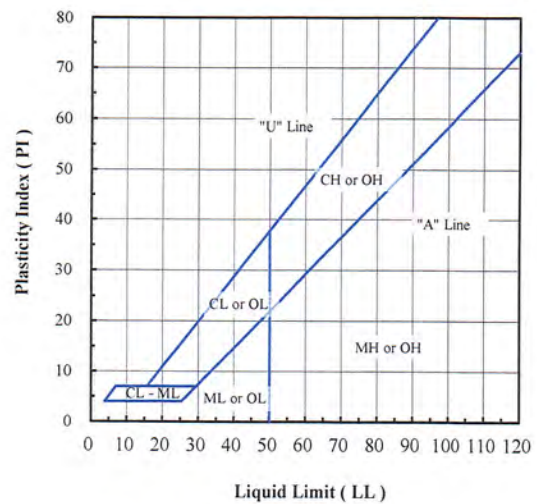


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.6
#10	2.00	97.5
#20	0.850	88.6
#40	0.425	60.2
#60	0.250	36.4
#100	0.150	19.3
#140	0.106	9.8
#200	0.075	5.9

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.4
Sand (%):	93.7
Fines (%):	5.9
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):

Org. Content (%):

Carbon. Content (%):

Client Sample ID.	Lab Sample No.	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits			Engineering Classification
				LL (-)	PL (-)	PI (-)	
BS-1-47-56.5'	21D001	15.2	5.9				

Note(s):

04-16-2021  
AAI/NSR



**Excel Geotechnical Testing, Inc.**  
 "Excellence in Testing"

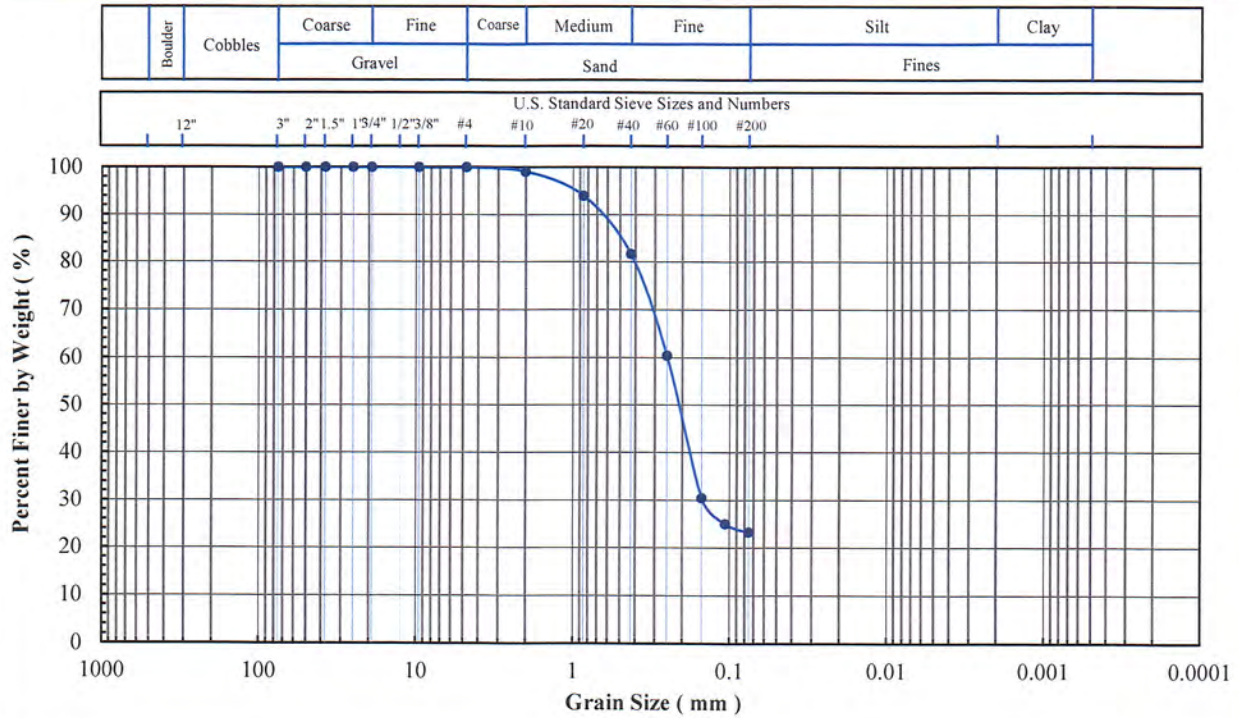
953 Forrest Street, Roswell, Georgia 30075  
 Tel: (770) 910 7537, www.excelgeotesting.com

Project Name: Hercules Biosparge Pilot Test  
 Project No: PN1031  
 Client Sample ID: BS-1-57-67  
 Lab Sample No: 21D002

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

**SOIL INDEX PROPERTIES**

Grain Size, Spec. Gravity, Moist. Cont., Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

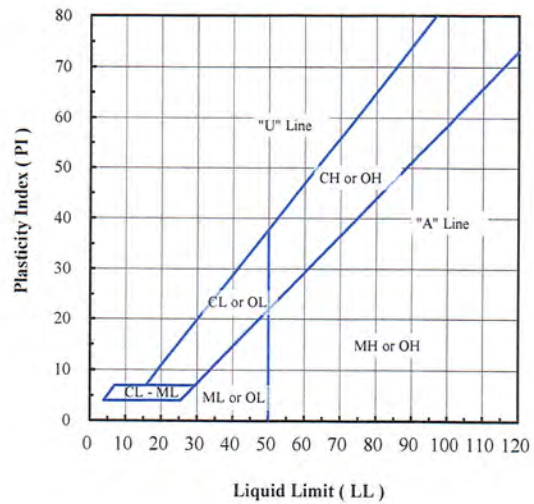


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	100.0
#10	2.00	99.1
#20	0.850	94.0
#40	0.425	81.6
#60	0.250	60.4
#100	0.150	30.5
#140	0.106	25.0
#200	0.075	23.3

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	
Sand (%):	76.7
Fines (%):	23.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):

Org. Content (%):

Carbon. Content (%):

Client Sample ID.	Lab Sample No.	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits			Engineering Classification
				LL (-)	PL (-)	PI (-)	
BS-1-57-67'	21D002	16.5	23.3				

Note(s):

04-16-2021  
AA1 NSR



**Excel Geotechnical Testing, Inc.**  
*"Excellence in Testing"*

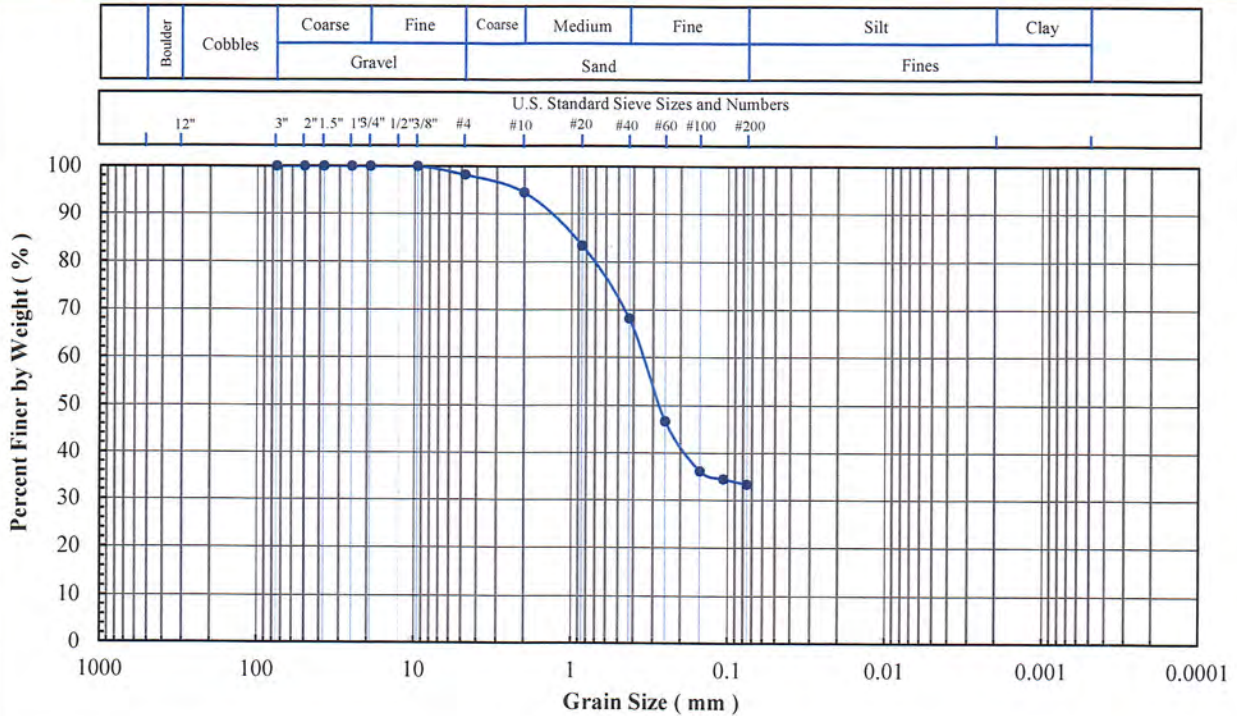
953 Forrest Street, Roswell, Georgia 30075  
 Tel: (770) 910 7537, www.excelgeotesting.com

Project Name: Hercules Biosparge Pilot Test  
 Project No: PN1031  
 Client Sample ID: BS-1-72-79.5'  
 Lab Sample No: 21D003

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318,  
 D4373, D6913, D7928

**SOIL INDEX PROPERTIES**

Grain Size, Spec. Gravity, Moist. Cont.,  
 Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

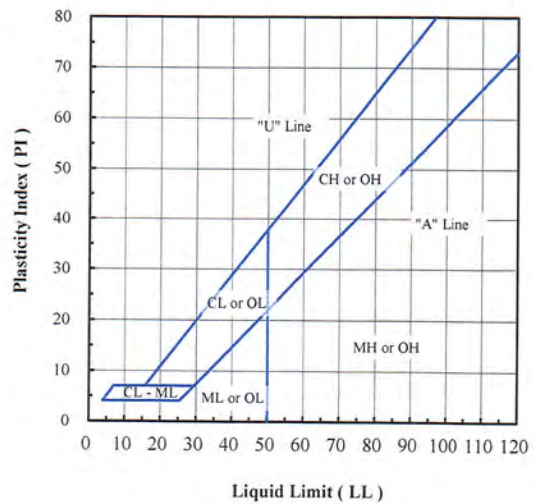


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.2
#10	2.00	94.5
#20	0.850	83.4
#40	0.425	68.1
#60	0.250	46.7
#100	0.150	36.2
#140	0.106	34.5
#200	0.075	33.4

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.8
Sand (%):	64.8
Fines (%):	33.4
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	
-----------------------	--

Org. Content (%):	0.6
-------------------	-----

Carbon. Content (%):	
----------------------	--

Client Sample ID.	Lab Sample No.	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits			Engineering Classification
				LL (-)	PL (-)	PI (-)	
BS-1-72-79.5'	21D003	11.3	33.4				

Note(s):

04-16-2021  
 AA, MSK



**Excel Geotechnical Testing, Inc.**  
"Excellence in Testing"

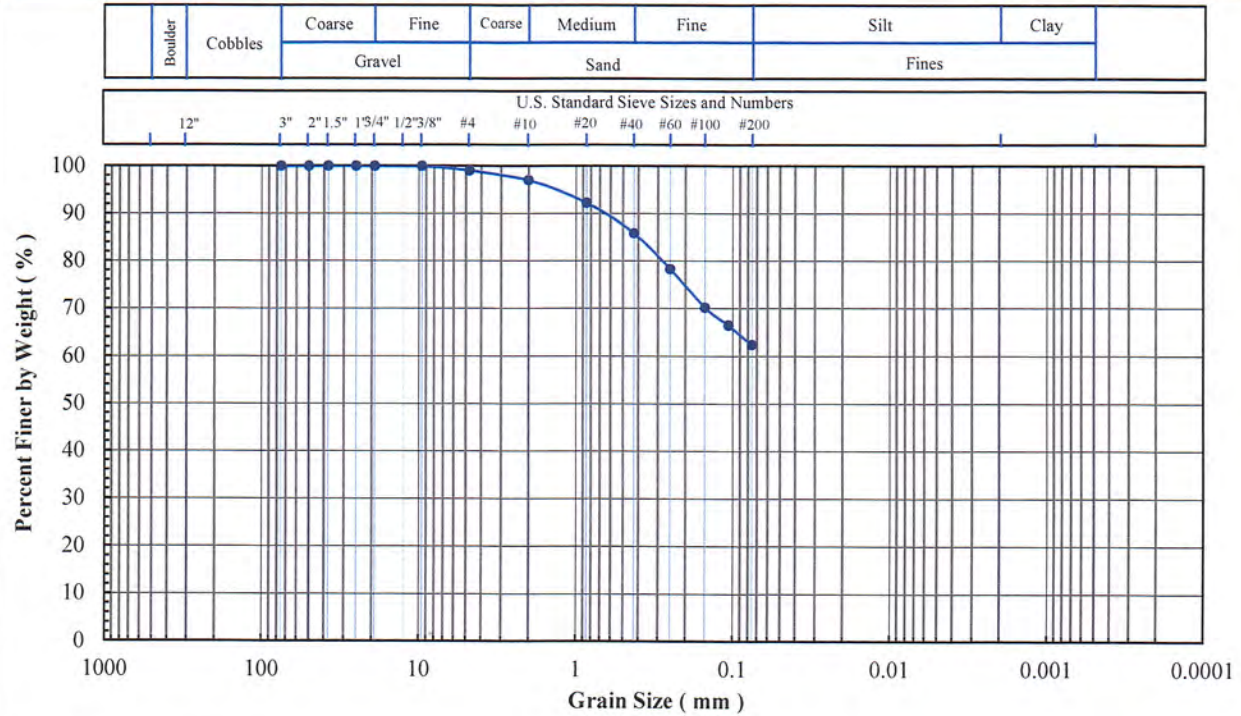
953 Forrest Street, Roswell, Georgia 30075  
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name: Hercules Biosparge Pilot Test  
Project No: PN1031  
Client Sample ID: BS-1-79.5-81'  
Lab Sample No: 21D004

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

**SOIL INDEX PROPERTIES**

Grain Size, Spec. Gravity, Moist. Cont., Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

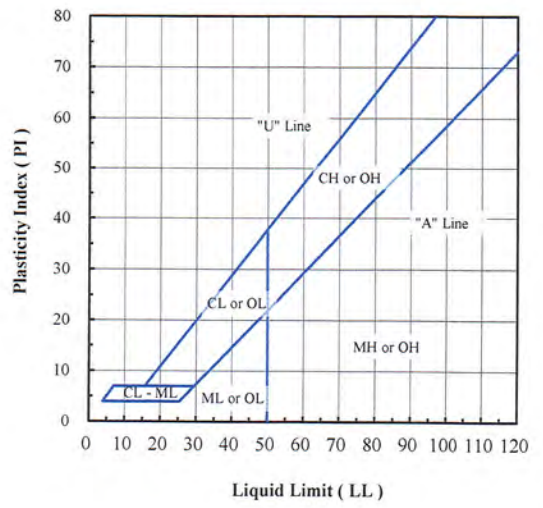


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.1
#10	2.00	97.0
#20	0.850	92.3
#40	0.425	85.9
#60	0.250	78.3
#100	0.150	70.1
#140	0.106	66.4
#200	0.075	62.4

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.9
Sand (%):	36.7
Fines (%):	62.4
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	
-----------------------	--

Org. Content (%):	0.9
-------------------	-----

Carbon. Content (%):	
----------------------	--

Client Sample ID.	Lab Sample No.	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits			Engineering Classification
				LL (-)	PL (-)	PI (-)	
BS-1-79.5-81'	21D004	8.2	62.4				

Note(s):

04-16-2021  
AA. NSR



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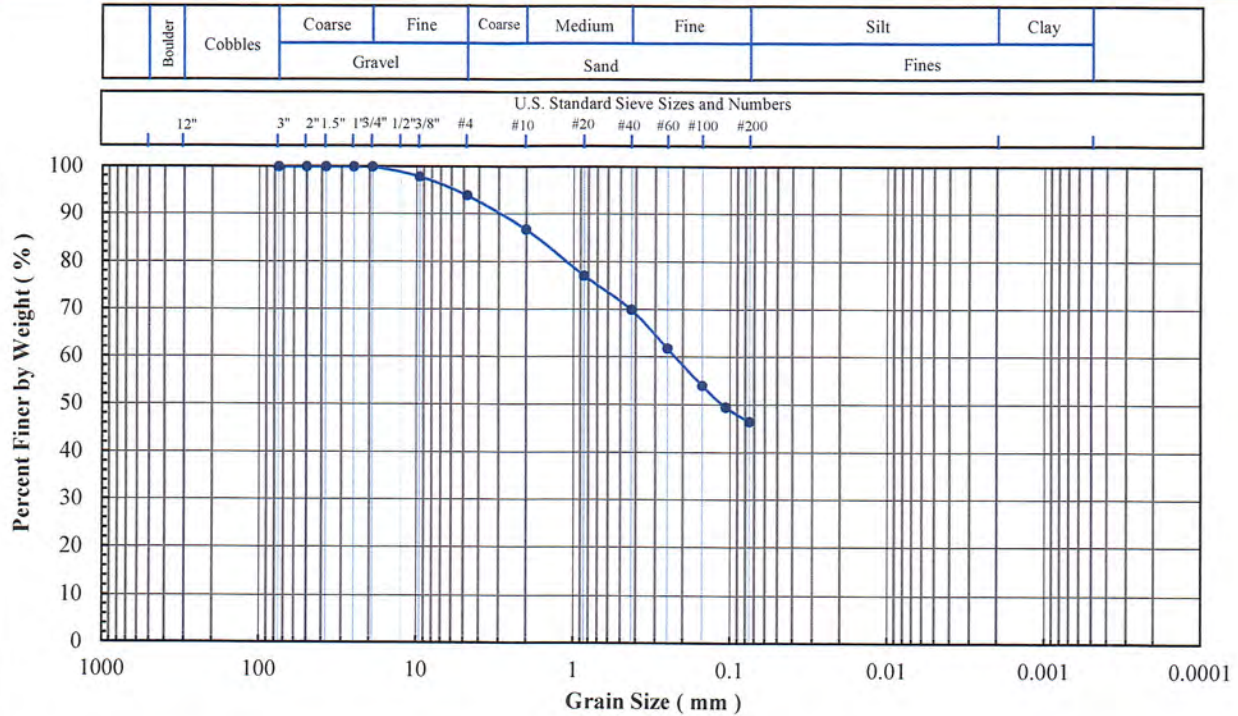
953 Forrest Street, Roswell, Georgia 30075  
 Tel: (770) 910 7537, www.excelgeotesting.com

Project Name: Hercules Biosparge Pilot Test  
 Project No: PN1031  
 Client Sample ID: BS-2-78-80'  
 Lab Sample No: 21D005

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

**SOIL INDEX PROPERTIES**

Grain Size, Spec. Gravity, Moist. Cont., Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

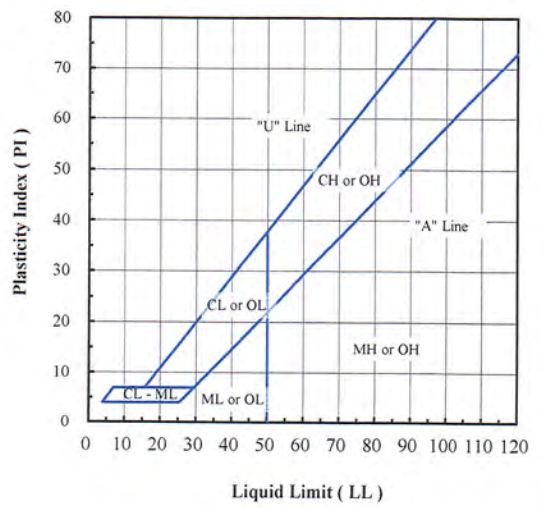


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	97.9
#4	4.75	93.9
#10	2.00	86.7
#20	0.850	77.1
#40	0.425	69.9
#60	0.250	61.7
#100	0.150	53.9
#140	0.106	49.4
#200	0.075	46.4

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	6.1
Sand (%):	47.5
Fines (%):	46.4
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):

Org. Content (%): 0.7

Carbon. Content (%):

Client Sample ID.	Lab Sample No.	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits			Engineering Classification
				LL (-)	PL (-)	PI (-)	
BS-2-78-80'	21D005	7.2	46.4				

Note(s):

04-16-2021  
AA, WSK



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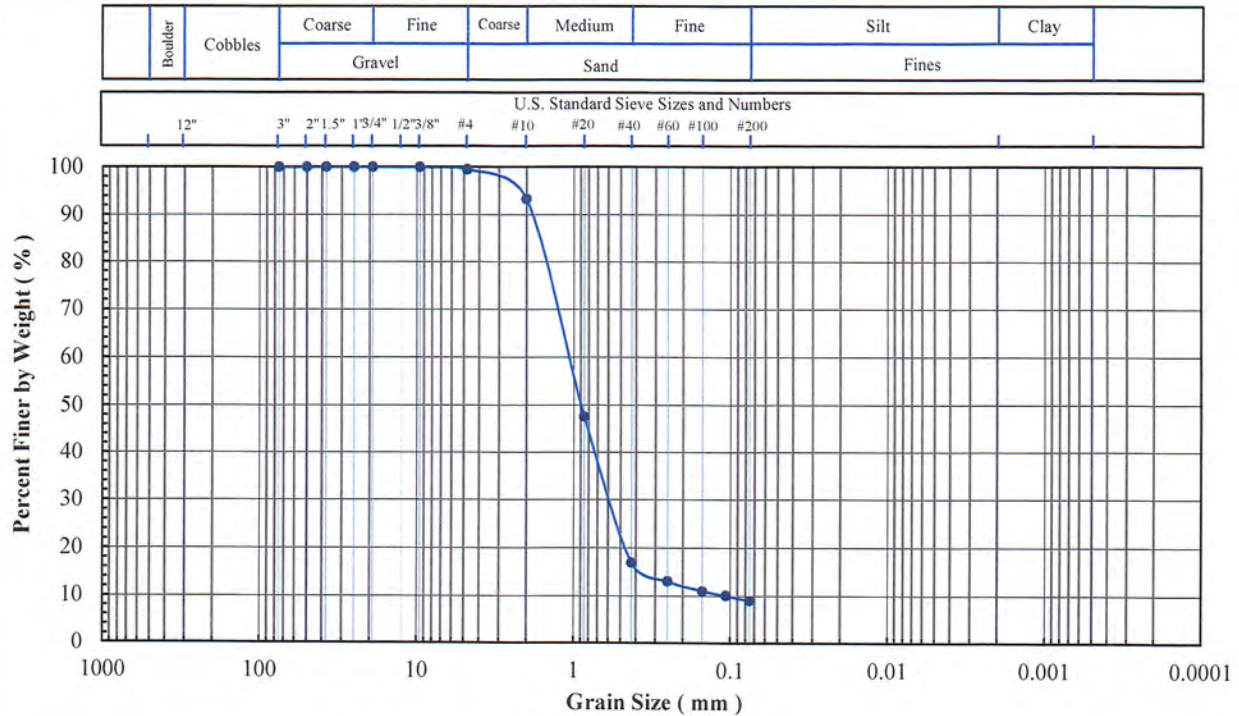
953 Forrest Street, Roswell, Georgia 30075  
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name: Hercules Biosparge Pilot Test  
Project No: PN1031  
Client Sample ID: BS-2-85-90'  
Lab Sample No: 21D006E

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

**SOIL INDEX PROPERTIES**

Grain Size, Spec. Gravity, Moist. Cont., Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

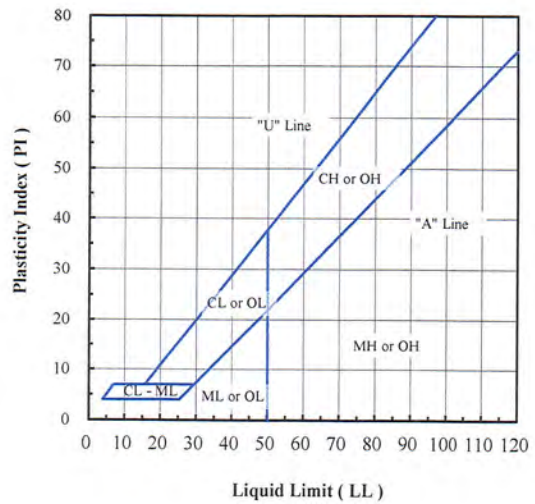


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.5
#10	2.00	93.4
#20	0.850	47.6
#40	0.425	17.0
#60	0.250	13.1
#100	0.150	11.0
#140	0.106	10.1
#200	0.075	9.0

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.5
Sand (%):	90.5
Fines (%):	9.0
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):

Org. Content (%): 0.1

Carbon. Content (%):

Client Sample ID.	Lab Sample No.	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits			Engineering Classification
				LL (-)	PL (-)	PI (-)	
BS-2-85-90'	21D006E	8.5	9.0				

Note(s):

04-16-2021  
AA, NSR





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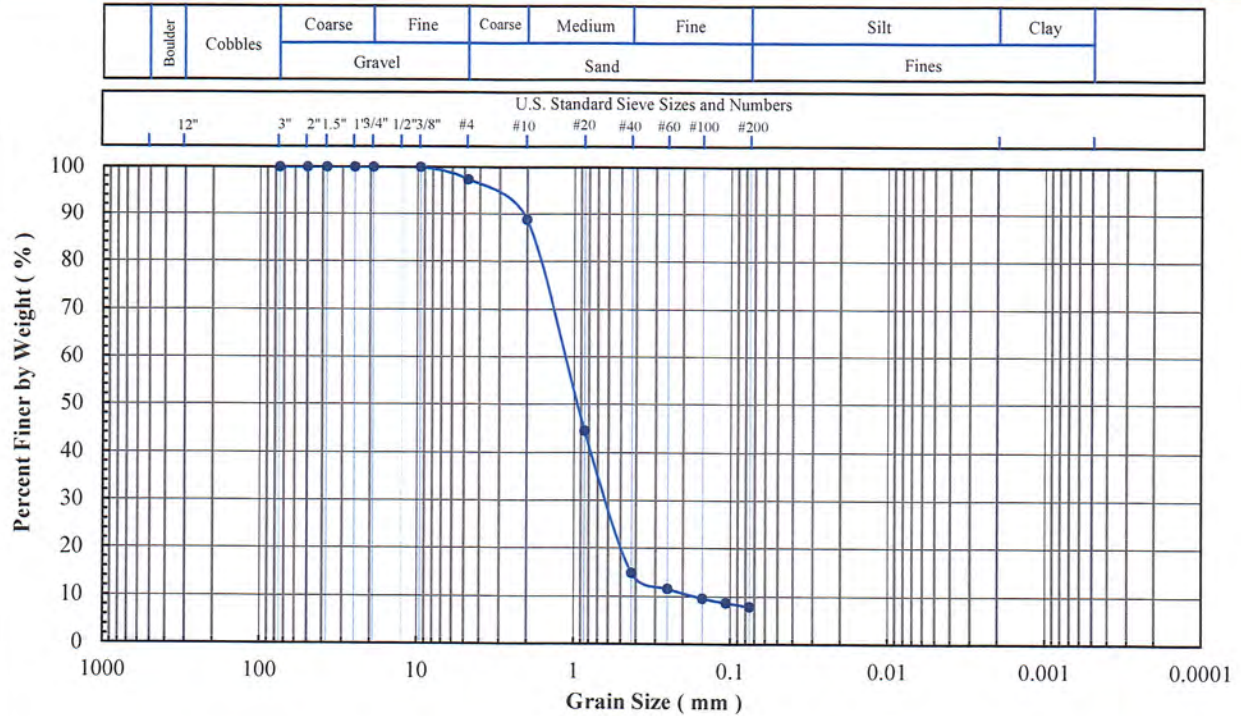
953 Forrest Street, Roswell, Georgia 30075  
 Tel: (770) 910 7537, www.excelgeotesting.com

Project Name: Hercules Biosparge Pilot Test  
 Project No: PN1031  
 Client Sample ID: BS-2-80-87'  
 Lab Sample No: 21D007E

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

**SOIL INDEX PROPERTIES**

Grain Size, Spec. Gravity, Moist. Cont., Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

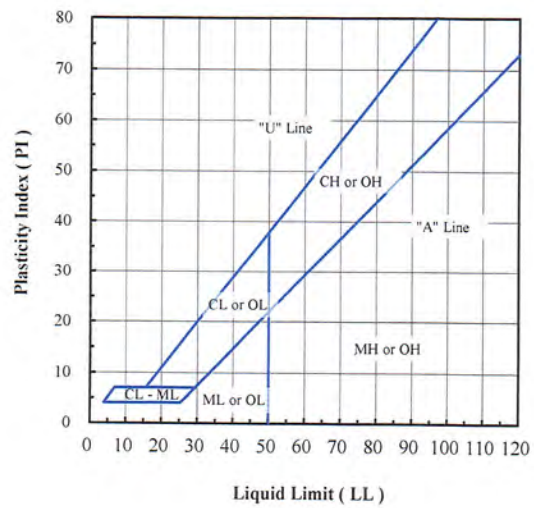


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	97.4
#10	2.00	88.8
#20	0.850	44.4
#40	0.425	14.8
#60	0.250	11.5
#100	0.150	9.5
#140	0.106	8.6
#200	0.075	7.8

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	2.6
Sand (%):	89.6
Fines (%):	7.8
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):

Org. Content (%): 0.1

Carbon. Content (%):

Client Sample ID.	Lab Sample No.	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits			Engineering Classification
				LL (-)	PL (-)	PI (-)	
BS-2-80-87'	21D007E	8.6	7.8				

Note(s):

*04-16-2021  
AA: NSB*



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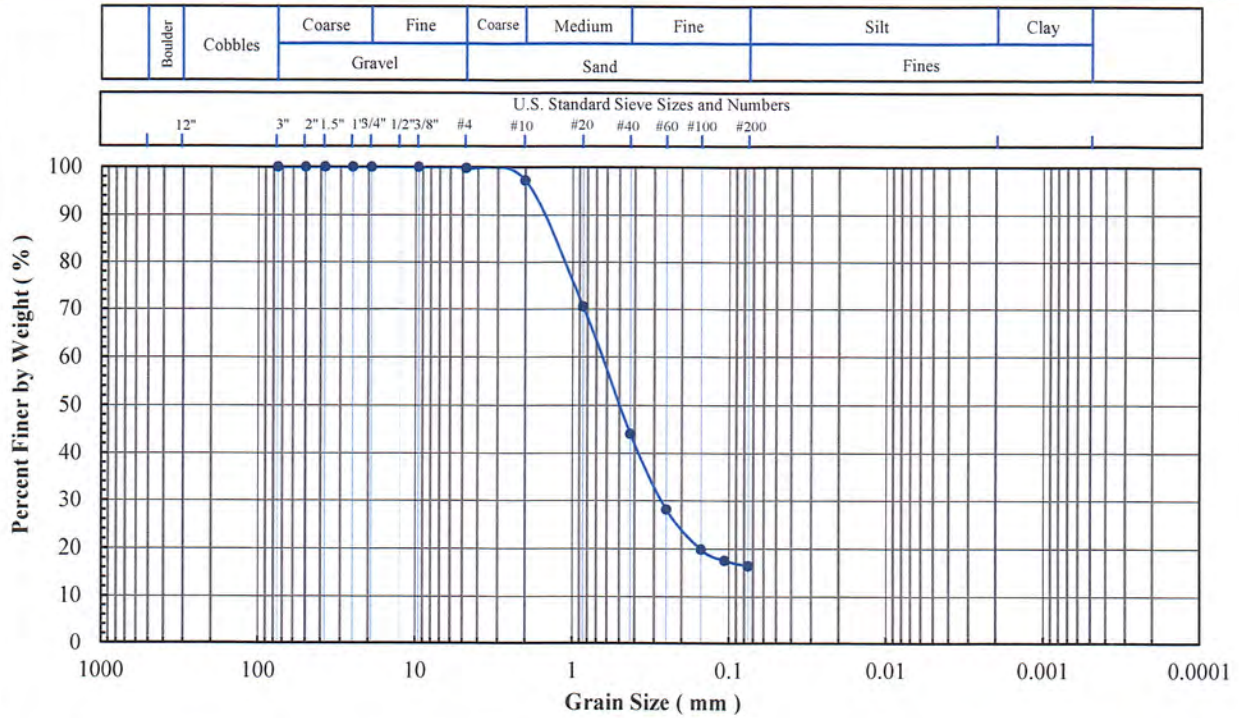
953 Forrest Street, Roswell, Georgia 30075  
 Tel: (770) 910 7537, www.excelgeotesting.com

Project Name: Hercules Biosparge Pilot Test  
 Project No: PN1031  
 Client Sample ID: BS-2-98.7-99'  
 Lab Sample No: 21D008E

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

**SOIL INDEX PROPERTIES**

Grain Size, Spec. Gravity, Moist. Cont., Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

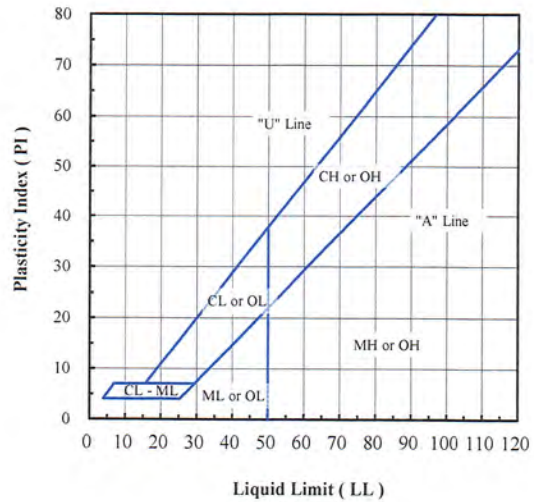


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.8
#10	2.00	97.2
#20	0.850	70.6
#40	0.425	44.1
#60	0.250	28.1
#100	0.150	19.8
#140	0.106	17.5
#200	0.075	16.4

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.2
Sand (%):	83.4
Fines (%):	16.4
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):

Org. Content (%): 1.3

Carbon. Content (%):

Client Sample ID.	Lab Sample No.	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits			Engineering Classification
				LL (-)	PL (-)	PI (-)	
BS-2-98.7-99'	21D008E	23.9	16.4				

Note(s):

04-16-2021  
 AA, #58



**Excel Geotechnical Testing, Inc.**

*"Excellence in Testing"*

953 Forrest Street, Roswell, Georgia 30075

Tel: (770) 910 7537 Fax: (770) 910 7538

# LAST PAGE

**Test Applicability and Limitations:**

- The results are applicable only for the materials received at the laboratory and tested which may or may not be representative of the materials at the site.

**Storage Policy:**

- Uncontaminated Material: All samples (or what is left) will be archived for a period of 3 months from the date received. Thereafter the samples will be discarded unless a written request for extended storage is received. A rate of \$1.00 per sample per day will be applied after the initial 3 month storage period.

- Contaminated Material: All samples (or what is left) will be archived for a period of 3 months from the date received. Thereafter, the samples will be returned to the project manager or his/her designated receiver unless a written request for extended storage is received. A rate of \$1.30 per sample per day will be applied after the initial 3 months storage.

# ATTACHMENT C

## Analytical Laboratory Reports

## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858

Laboratory Job ID: 680-195713-1

Client Project/Site: Hercules - Brunswick Biosparge Pilot Test

**For:**

Geosyntec Consultants, Inc.  
1255 Roberts Blvd, NW  
Suite 200  
Kennesaw, Georgia 30144

Attn: Adria Reimer



*Authorized for release by:  
3/16/2021 7:11:16 AM*

Eddie Barnett, Project Manager I  
(912)250-0280  
[Eddie.Barnett@Eurofinset.com](mailto:Eddie.Barnett@Eurofinset.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

**Job ID: 680-195713-1**

**Laboratory: Eurofins TestAmerica, Savannah**

## Narrative

### CASE NARRATIVE

**Client: Geosyntec Consultants, Inc.**  
**Project: Hercules - Brunswick Biosparge Pilot Test**

**Report Number: 680-195713-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

#### **RECEIPT**

The samples were received on 03/04/2021; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 2.3° C.

BOD and COD are requested on the Chain of Custody, however, sample volume was not provided for the analysis of those methods; therefore, analysis for BOD and COD could not be performed.

#### **VOLATILE ORGANIC COMPOUNDS (GC-MS)**

Samples BS-OW-01 (680-195713-1), BS-OW-02 (680-195713-2), BS-OW-03D (680-195713-3), MW-29D (680-195713-4) and TB-01 (680-195713-5) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 03/06/2021 and 03/09/2021.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batches 680-658322, 680-658333 and 680-658625.

2-Butanone (MEK), 4-Methyl-2-pentanone and Acetone recovered high for LCS 680-658333/5 and LCSD 680-658333/6. These analytes have been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed. These results have been reported and qualified. Refer to the QC report for details.

4-Methyl-2-pentanone recovered high for LCS 680-658625/5. This analyte has been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed. These results have been reported and qualified. Refer to the QC report for details.

Samples BS-OW-01 (680-195713-1)[20X], BS-OW-02 (680-195713-2)[20X], BS-OW-03D (680-195713-3)[20X] and MW-29D (680-195713-4)[20X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **METALS (ICP) - DISSOLVED**

Samples BS-OW-01 (680-195713-1), BS-OW-02 (680-195713-2), BS-OW-03D (680-195713-3) and MW-29D (680-195713-4) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared on 03/05/2021 and analyzed on 03/08/2021.

Iron recovered low for the MS of sample BS-OW-02MS (680-195713-2) in batch 680-658603. Manganese recovered low for the MSD of sample BS-OW-02MSD (680-195713-2) in batch 680-658603. Iron recovered high. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **METALS (ICP)**

Samples BS-OW-01 (680-195713-1), BS-OW-02 (680-195713-2), BS-OW-03D (680-195713-3) and MW-29D (680-195713-4) were analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared on 03/04/2021 and analyzed on

# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

---

## Job ID: 680-195713-1 (Continued)

---

### Laboratory: Eurofins TestAmerica, Savannah (Continued)

03/06/2021.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **HARDNESS AS CALCIUM CARBONATE**

Samples BS-OW-01 (680-195713-1), BS-OW-02 (680-195713-2), BS-OW-03D (680-195713-3) and MW-29D (680-195713-4) were analyzed for hardness as calcium carbonate in accordance with EPA Method 130.2. The samples were analyzed on 03/09/2021.

Samples BS-OW-01 (680-195713-1)[25X], BS-OW-02 (680-195713-2)[25X], BS-OW-03D (680-195713-3)[25X] and MW-29D (680-195713-4)[25X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **ALKALINITY**

Samples BS-OW-01 (680-195713-1), BS-OW-02 (680-195713-2), BS-OW-03D (680-195713-3) and MW-29D (680-195713-4) were analyzed for alkalinity in accordance with SM 2320B. The samples were analyzed on 03/12/2021.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **TOTAL DISSOLVED SOLIDS**

Samples BS-OW-01 (680-195713-1), BS-OW-02 (680-195713-2), BS-OW-03D (680-195713-3) and MW-29D (680-195713-4) were analyzed for total dissolved solids in accordance with SM 2540C. The samples were analyzed on 03/05/2021.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.





# Sample Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-195713-1	BS-OW-01	Water	03/02/21 16:00	03/04/21 09:48	
680-195713-2	BS-OW-02	Water	03/02/21 14:35	03/04/21 09:48	
680-195713-3	BS-OW-03D	Water	03/02/21 12:15	03/04/21 09:48	
680-195713-4	MW-29D	Water	03/02/21 11:00	03/04/21 09:48	
680-195713-5	TB-01	Water	03/02/21 00:00	03/04/21 09:48	

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# Method Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
6010C	Metals (ICP)	SW846	TAL SAV
130.2-1982	Hardness, Total (mg/l as CaCO3)	MCAWW	TAL SAV
2540C-2011	Total Dissolved Solids (Dried at 180 °C)	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL PEN
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV
5030B	Purge and Trap	SW846	TAL SAV
FILTRATION	Sample Filtration	None	TAL SAV

#### Protocol References:

- MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
- None = None
- SM = "Standard Methods For The Examination Of Water And Wastewater"
- SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

- TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001
- TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
U	Indicates the analyte was analyzed for but not detected.

### Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD recovery exceeds control limits.
U	Indicates the analyte was analyzed for but not detected.

### General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Client Sample ID: BS-OW-01

## Lab Sample ID: 680-195713-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	330		20		ug/L	20		8260B	Total/NA
Chlorobenzene	330		20		ug/L	20		8260B	Total/NA
Ethylbenzene	44		20		ug/L	20		8260B	Total/NA
m-Xylene & p-Xylene	20		20		ug/L	20		8260B	Total/NA
Isopropylbenzene	49		20		ug/L	20		8260B	Total/NA
Iron	39000		50		ug/L	1		6010C	Total Recoverable
Manganese	870		10		ug/L	1		6010C	Total Recoverable
Iron	31000		50		ug/L	1		6010C	Dissolved
Manganese	840		10		ug/L	1		6010C	Dissolved
Hardness as calcium carbonate	6100		250		mg/L	25		130.2-1982	Total/NA
Total Dissolved Solids	6300		200		mg/L	1		2540C-2011	Total/NA
Alkalinity, Total	270		1.0		mg/L	1		SM 2320B	Total/NA

## Client Sample ID: BS-OW-02

## Lab Sample ID: 680-195713-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	170		20		ug/L	20		8260B	Total/NA
Chlorobenzene	170		20		ug/L	20		8260B	Total/NA
Iron	47000		50		ug/L	1		6010C	Total Recoverable
Manganese	1100		10		ug/L	1		6010C	Total Recoverable
Iron	33000		50		ug/L	1		6010C	Dissolved
Manganese	1100	F1	10		ug/L	1		6010C	Dissolved
Hardness as calcium carbonate	6100		250		mg/L	25		130.2-1982	Total/NA
Total Dissolved Solids	6000		200		mg/L	1		2540C-2011	Total/NA
Alkalinity, Total	250		1.0		mg/L	1		SM 2320B	Total/NA

## Client Sample ID: BS-OW-03D

## Lab Sample ID: 680-195713-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	330		20		ug/L	20		8260B	Total/NA
Chlorobenzene	300		20		ug/L	20		8260B	Total/NA
Ethylbenzene	61		20		ug/L	20		8260B	Total/NA
m-Xylene & p-Xylene	110		20		ug/L	20		8260B	Total/NA
Isopropylbenzene	57		20		ug/L	20		8260B	Total/NA
Iron	28000		50		ug/L	1		6010C	Total Recoverable
Manganese	1500		10		ug/L	1		6010C	Total Recoverable
Iron	22000		50		ug/L	1		6010C	Dissolved
Manganese	1300		10		ug/L	1		6010C	Dissolved
Hardness as calcium carbonate	5600		250		mg/L	25		130.2-1982	Total/NA
Total Dissolved Solids	4400		200		mg/L	1		2540C-2011	Total/NA
Alkalinity, Total	280		1.0		mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-29D

## Lab Sample ID: 680-195713-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	1000		20		ug/L	20		8260B	Total/NA
Chlorobenzene	760		20		ug/L	20		8260B	Total/NA
Ethylbenzene	150		20		ug/L	20		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Client Sample ID: MW-29D (Continued)

Lab Sample ID: 680-195713-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
m-Xylene & p-Xylene	360		20		ug/L	20		8260B	Total/NA
Isopropylbenzene	240		20		ug/L	20		8260B	Total/NA
Iron	37000		50		ug/L	1		6010C	Total Recoverable
Manganese	950		10		ug/L	1		6010C	Total Recoverable
Iron	28000		50		ug/L	1		6010C	Dissolved
Manganese	950		10		ug/L	1		6010C	Dissolved
Hardness as calcium carbonate	4400		250		mg/L	25		130.2-1982	Total/NA
Total Dissolved Solids	7400		100		mg/L	1		2540C-2011	Total/NA
Alkalinity, Total	250		1.0		mg/L	1		SM 2320B	Total/NA

## Client Sample ID: TB-01

Lab Sample ID: 680-195713-5

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

**Client Sample ID: BS-OW-01**

**Lab Sample ID: 680-195713-1**

**Date Collected: 03/02/21 16:00**

**Matrix: Water**

**Date Received: 03/04/21 09:48**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	20	U	20		ug/L			03/06/21 22:29	20
Chloromethane	20	U	20		ug/L			03/06/21 22:29	20
Vinyl chloride	20	U	20		ug/L			03/06/21 22:29	20
Bromomethane	100	U	100		ug/L			03/06/21 22:29	20
Chloroethane	100	U	100		ug/L			03/06/21 22:29	20
Trichlorofluoromethane	20	U	20		ug/L			03/06/21 22:29	20
1,1-Dichloroethene	20	U	20		ug/L			03/06/21 22:29	20
1,1,2-Trichloro-1,2,2-trifluoroethane	20	U	20		ug/L			03/06/21 22:29	20
Acetone	200	U *+	200		ug/L			03/06/21 22:29	20
Carbon disulfide	40	U	40		ug/L			03/06/21 22:29	20
Methyl acetate	100	U	100		ug/L			03/06/21 22:29	20
Methylene Chloride	100	U	100		ug/L			03/06/21 22:29	20
trans-1,2-Dichloroethene	20	U	20		ug/L			03/06/21 22:29	20
Methyl tert-butyl ether	200	U	200		ug/L			03/06/21 22:29	20
1,1-Dichloroethane	20	U	20		ug/L			03/06/21 22:29	20
cis-1,2-Dichloroethene	20	U	20		ug/L			03/06/21 22:29	20
2-Butanone (MEK)	200	U *+	200		ug/L			03/06/21 22:29	20
Bromochloromethane	20	U	20		ug/L			03/06/21 22:29	20
Chloroform	20	U	20		ug/L			03/06/21 22:29	20
1,1,1-Trichloroethane	20	U	20		ug/L			03/06/21 22:29	20
Cyclohexane	20	U	20		ug/L			03/06/21 22:29	20
Carbon tetrachloride	20	U	20		ug/L			03/06/21 22:29	20
<b>Benzene</b>	<b>330</b>		20		ug/L			03/06/21 22:29	20
1,2-Dichloroethane	20	U	20		ug/L			03/06/21 22:29	20
Trichloroethene	20	U	20		ug/L			03/06/21 22:29	20
Methylcyclohexane	20	U	20		ug/L			03/06/21 22:29	20
1,2-Dichloropropane	20	U	20		ug/L			03/06/21 22:29	20
Bromodichloromethane	20	U	20		ug/L			03/06/21 22:29	20
cis-1,3-Dichloropropene	20	U	20		ug/L			03/06/21 22:29	20
4-Methyl-2-pentanone	200	U *+	200		ug/L			03/06/21 22:29	20
Toluene	20	U	20		ug/L			03/06/21 22:29	20
trans-1,3-Dichloropropene	20	U	20		ug/L			03/06/21 22:29	20
1,1,2-Trichloroethane	20	U	20		ug/L			03/06/21 22:29	20
Tetrachloroethene	20	U	20		ug/L			03/06/21 22:29	20
2-Hexanone	200	U	200		ug/L			03/06/21 22:29	20
Dibromochloromethane	20	U	20		ug/L			03/06/21 22:29	20
<b>Chlorobenzene</b>	<b>330</b>		20		ug/L			03/06/21 22:29	20
<b>Ethylbenzene</b>	<b>44</b>		20		ug/L			03/06/21 22:29	20
o-Xylene	20	U	20		ug/L			03/06/21 22:29	20
<b>m-Xylene &amp; p-Xylene</b>	<b>20</b>		20		ug/L			03/06/21 22:29	20
Styrene	20	U	20		ug/L			03/06/21 22:29	20
Bromoform	20	U	20		ug/L			03/06/21 22:29	20
<b>Isopropylbenzene</b>	<b>49</b>		20		ug/L			03/06/21 22:29	20
1,1,2,2-Tetrachloroethane	20	U	20		ug/L			03/06/21 22:29	20
1,2,3-Trichlorobenzene	100	U	100		ug/L			03/06/21 22:29	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	104		70 - 130		03/06/21 22:29	20
1,2-Dichloroethane-d4 (Surr)	101		60 - 124		03/06/21 22:29	20
Dibromofluoromethane (Surr)	112		70 - 130		03/06/21 22:29	20

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

**Client Sample ID: BS-OW-01**

**Lab Sample ID: 680-195713-1**

Date Collected: 03/02/21 16:00

Matrix: Water

Date Received: 03/04/21 09:48

**Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		70 - 130		03/06/21 22:29	20

**Method: 6010C - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	39000		50		ug/L		03/04/21 15:31	03/06/21 18:50	1
Manganese	870		10		ug/L		03/04/21 15:31	03/06/21 18:50	1

**Method: 6010C - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	31000		50		ug/L		03/05/21 08:33	03/08/21 21:35	1
Manganese	840		10		ug/L		03/05/21 08:33	03/08/21 21:35	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity, Total	270		1.0		mg/L			03/12/21 13:25	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	6100		250		mg/L			03/09/21 12:46	25
Total Dissolved Solids	6300		200		mg/L			03/05/21 13:44	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

**Client Sample ID: BS-OW-02**

**Lab Sample ID: 680-195713-2**

Date Collected: 03/02/21 14:35

Matrix: Water

Date Received: 03/04/21 09:48

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	20	U	20		ug/L			03/06/21 22:54	20
Chloromethane	20	U	20		ug/L			03/06/21 22:54	20
Vinyl chloride	20	U	20		ug/L			03/06/21 22:54	20
Bromomethane	100	U	100		ug/L			03/06/21 22:54	20
Chloroethane	100	U	100		ug/L			03/06/21 22:54	20
Trichlorofluoromethane	20	U	20		ug/L			03/06/21 22:54	20
1,1-Dichloroethene	20	U	20		ug/L			03/06/21 22:54	20
1,1,2-Trichloro-1,2,2-trifluoroethane	20	U	20		ug/L			03/06/21 22:54	20
Acetone	200	U *+	200		ug/L			03/06/21 22:54	20
Carbon disulfide	40	U	40		ug/L			03/06/21 22:54	20
Methyl acetate	100	U	100		ug/L			03/06/21 22:54	20
Methylene Chloride	100	U	100		ug/L			03/06/21 22:54	20
trans-1,2-Dichloroethene	20	U	20		ug/L			03/06/21 22:54	20
Methyl tert-butyl ether	200	U	200		ug/L			03/06/21 22:54	20
1,1-Dichloroethane	20	U	20		ug/L			03/06/21 22:54	20
cis-1,2-Dichloroethene	20	U	20		ug/L			03/06/21 22:54	20
2-Butanone (MEK)	200	U *+	200		ug/L			03/06/21 22:54	20
Bromochloromethane	20	U	20		ug/L			03/06/21 22:54	20
Chloroform	20	U	20		ug/L			03/06/21 22:54	20
1,1,1-Trichloroethane	20	U	20		ug/L			03/06/21 22:54	20
Cyclohexane	20	U	20		ug/L			03/06/21 22:54	20
Carbon tetrachloride	20	U	20		ug/L			03/06/21 22:54	20
<b>Benzene</b>	<b>170</b>		20		ug/L			03/06/21 22:54	20
1,2-Dichloroethane	20	U	20		ug/L			03/06/21 22:54	20
Trichloroethene	20	U	20		ug/L			03/06/21 22:54	20
Methylcyclohexane	20	U	20		ug/L			03/06/21 22:54	20
1,2-Dichloropropane	20	U	20		ug/L			03/06/21 22:54	20
Bromodichloromethane	20	U	20		ug/L			03/06/21 22:54	20
cis-1,3-Dichloropropene	20	U	20		ug/L			03/06/21 22:54	20
4-Methyl-2-pentanone	200	U *+	200		ug/L			03/06/21 22:54	20
Toluene	20	U	20		ug/L			03/06/21 22:54	20
trans-1,3-Dichloropropene	20	U	20		ug/L			03/06/21 22:54	20
1,1,2-Trichloroethane	20	U	20		ug/L			03/06/21 22:54	20
Tetrachloroethene	20	U	20		ug/L			03/06/21 22:54	20
2-Hexanone	200	U	200		ug/L			03/06/21 22:54	20
Dibromochloromethane	20	U	20		ug/L			03/06/21 22:54	20
<b>Chlorobenzene</b>	<b>170</b>		20		ug/L			03/06/21 22:54	20
Ethylbenzene	20	U	20		ug/L			03/06/21 22:54	20
o-Xylene	20	U	20		ug/L			03/06/21 22:54	20
m-Xylene & p-Xylene	20	U	20		ug/L			03/06/21 22:54	20
Styrene	20	U	20		ug/L			03/06/21 22:54	20
Bromoform	20	U	20		ug/L			03/06/21 22:54	20
Isopropylbenzene	20	U	20		ug/L			03/06/21 22:54	20
1,1,2,2-Tetrachloroethane	20	U	20		ug/L			03/06/21 22:54	20
1,2,3-Trichlorobenzene	100	U	100		ug/L			03/06/21 22:54	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	109		70 - 130		03/06/21 22:54	20
1,2-Dichloroethane-d4 (Surr)	102		60 - 124		03/06/21 22:54	20
Dibromofluoromethane (Surr)	107		70 - 130		03/06/21 22:54	20

Eurofins TestAmerica, Savannah



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

**Client Sample ID: BS-OW-02**

**Lab Sample ID: 680-195713-2**

Date Collected: 03/02/21 14:35

Matrix: Water

Date Received: 03/04/21 09:48

**Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130		03/06/21 22:54	20

**Method: 6010C - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	47000		50		ug/L		03/04/21 15:31	03/06/21 18:30	1
Manganese	1100		10		ug/L		03/04/21 15:31	03/06/21 18:30	1

**Method: 6010C - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33000		50		ug/L		03/05/21 08:33	03/08/21 21:19	1
Manganese	1100	F1	10		ug/L		03/05/21 08:33	03/08/21 21:19	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity, Total	250		1.0		mg/L			03/12/21 13:31	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	6100		250		mg/L			03/09/21 12:46	25
Total Dissolved Solids	6000		200		mg/L			03/05/21 13:44	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

**Client Sample ID: BS-OW-03D**

**Lab Sample ID: 680-195713-3**

Date Collected: 03/02/21 12:15

Matrix: Water

Date Received: 03/04/21 09:48

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	20	U	20		ug/L			03/06/21 23:18	20
Chloromethane	20	U	20		ug/L			03/06/21 23:18	20
Vinyl chloride	20	U	20		ug/L			03/06/21 23:18	20
Bromomethane	100	U	100		ug/L			03/06/21 23:18	20
Chloroethane	100	U	100		ug/L			03/06/21 23:18	20
Trichlorofluoromethane	20	U	20		ug/L			03/06/21 23:18	20
1,1-Dichloroethene	20	U	20		ug/L			03/06/21 23:18	20
1,1,2-Trichloro-1,2,2-trifluoroethane	20	U	20		ug/L			03/06/21 23:18	20
Acetone	200	U *+	200		ug/L			03/06/21 23:18	20
Carbon disulfide	40	U	40		ug/L			03/06/21 23:18	20
Methyl acetate	100	U	100		ug/L			03/06/21 23:18	20
Methylene Chloride	100	U	100		ug/L			03/06/21 23:18	20
trans-1,2-Dichloroethene	20	U	20		ug/L			03/06/21 23:18	20
Methyl tert-butyl ether	200	U	200		ug/L			03/06/21 23:18	20
1,1-Dichloroethane	20	U	20		ug/L			03/06/21 23:18	20
cis-1,2-Dichloroethene	20	U	20		ug/L			03/06/21 23:18	20
2-Butanone (MEK)	200	U *+	200		ug/L			03/06/21 23:18	20
Bromochloromethane	20	U	20		ug/L			03/06/21 23:18	20
Chloroform	20	U	20		ug/L			03/06/21 23:18	20
1,1,1-Trichloroethane	20	U	20		ug/L			03/06/21 23:18	20
Cyclohexane	20	U	20		ug/L			03/06/21 23:18	20
Carbon tetrachloride	20	U	20		ug/L			03/06/21 23:18	20
<b>Benzene</b>	<b>330</b>		20		ug/L			03/06/21 23:18	20
1,2-Dichloroethane	20	U	20		ug/L			03/06/21 23:18	20
Trichloroethene	20	U	20		ug/L			03/06/21 23:18	20
Methylcyclohexane	20	U	20		ug/L			03/06/21 23:18	20
1,2-Dichloropropane	20	U	20		ug/L			03/06/21 23:18	20
Bromodichloromethane	20	U	20		ug/L			03/06/21 23:18	20
cis-1,3-Dichloropropene	20	U	20		ug/L			03/06/21 23:18	20
4-Methyl-2-pentanone	200	U *+	200		ug/L			03/06/21 23:18	20
Toluene	20	U	20		ug/L			03/06/21 23:18	20
trans-1,3-Dichloropropene	20	U	20		ug/L			03/06/21 23:18	20
1,1,2-Trichloroethane	20	U	20		ug/L			03/06/21 23:18	20
Tetrachloroethene	20	U	20		ug/L			03/06/21 23:18	20
2-Hexanone	200	U	200		ug/L			03/06/21 23:18	20
Dibromochloromethane	20	U	20		ug/L			03/06/21 23:18	20
<b>Chlorobenzene</b>	<b>300</b>		20		ug/L			03/06/21 23:18	20
<b>Ethylbenzene</b>	<b>61</b>		20		ug/L			03/06/21 23:18	20
o-Xylene	20	U	20		ug/L			03/06/21 23:18	20
<b>m-Xylene &amp; p-Xylene</b>	<b>110</b>		20		ug/L			03/06/21 23:18	20
Styrene	20	U	20		ug/L			03/06/21 23:18	20
Bromoform	20	U	20		ug/L			03/06/21 23:18	20
<b>Isopropylbenzene</b>	<b>57</b>		20		ug/L			03/06/21 23:18	20
1,1,2,2-Tetrachloroethane	20	U	20		ug/L			03/06/21 23:18	20
1,2,3-Trichlorobenzene	100	U	100		ug/L			03/06/21 23:18	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	105		70 - 130		03/06/21 23:18	20
1,2-Dichloroethane-d4 (Surr)	100		60 - 124		03/06/21 23:18	20
Dibromofluoromethane (Surr)	110		70 - 130		03/06/21 23:18	20

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

**Client Sample ID: BS-OW-03D**

**Lab Sample ID: 680-195713-3**

Date Collected: 03/02/21 12:15

Matrix: Water

Date Received: 03/04/21 09:48

**Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	105		70 - 130		03/06/21 23:18	20

**Method: 6010C - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	28000		50		ug/L		03/04/21 15:31	03/06/21 18:45	1
Manganese	1500		10		ug/L		03/04/21 15:31	03/06/21 18:45	1

**Method: 6010C - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	22000		50		ug/L		03/05/21 08:33	03/08/21 22:06	1
Manganese	1300		10		ug/L		03/05/21 08:33	03/08/21 22:06	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity, Total	280		1.0		mg/L			03/12/21 13:37	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	5600		250		mg/L			03/09/21 12:46	25
Total Dissolved Solids	4400		200		mg/L			03/05/21 13:44	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

**Client Sample ID: MW-29D**

**Lab Sample ID: 680-195713-4**

**Date Collected: 03/02/21 11:00**

**Matrix: Water**

**Date Received: 03/04/21 09:48**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	20	U	20		ug/L			03/09/21 20:23	20
Chloromethane	20	U	20		ug/L			03/09/21 20:23	20
Vinyl chloride	20	U	20		ug/L			03/09/21 20:23	20
Bromomethane	100	U	100		ug/L			03/09/21 20:23	20
Chloroethane	100	U	100		ug/L			03/09/21 20:23	20
Trichlorofluoromethane	20	U	20		ug/L			03/09/21 20:23	20
1,1-Dichloroethene	20	U	20		ug/L			03/09/21 20:23	20
1,1,2-Trichloro-1,2,2-trifluoroethane	20	U	20		ug/L			03/09/21 20:23	20
Acetone	200	U	200		ug/L			03/09/21 20:23	20
Carbon disulfide	40	U	40		ug/L			03/09/21 20:23	20
Methyl acetate	100	U	100		ug/L			03/09/21 20:23	20
Methylene Chloride	100	U	100		ug/L			03/09/21 20:23	20
trans-1,2-Dichloroethene	20	U	20		ug/L			03/09/21 20:23	20
Methyl tert-butyl ether	200	U	200		ug/L			03/09/21 20:23	20
1,1-Dichloroethane	20	U	20		ug/L			03/09/21 20:23	20
cis-1,2-Dichloroethene	20	U	20		ug/L			03/09/21 20:23	20
2-Butanone (MEK)	200	U	200		ug/L			03/09/21 20:23	20
Bromochloromethane	20	U	20		ug/L			03/09/21 20:23	20
Chloroform	20	U	20		ug/L			03/09/21 20:23	20
1,1,1-Trichloroethane	20	U	20		ug/L			03/09/21 20:23	20
Cyclohexane	20	U	20		ug/L			03/09/21 20:23	20
Carbon tetrachloride	20	U	20		ug/L			03/09/21 20:23	20
<b>Benzene</b>	<b>1000</b>		20		ug/L			03/09/21 20:23	20
1,2-Dichloroethane	20	U	20		ug/L			03/09/21 20:23	20
Trichloroethene	20	U	20		ug/L			03/09/21 20:23	20
Methylcyclohexane	20	U	20		ug/L			03/09/21 20:23	20
1,2-Dichloropropane	20	U	20		ug/L			03/09/21 20:23	20
Bromodichloromethane	20	U	20		ug/L			03/09/21 20:23	20
cis-1,3-Dichloropropene	20	U	20		ug/L			03/09/21 20:23	20
4-Methyl-2-pentanone	200	U *	200		ug/L			03/09/21 20:23	20
Toluene	20	U	20		ug/L			03/09/21 20:23	20
trans-1,3-Dichloropropene	20	U	20		ug/L			03/09/21 20:23	20
1,1,2-Trichloroethane	20	U	20		ug/L			03/09/21 20:23	20
Tetrachloroethene	20	U	20		ug/L			03/09/21 20:23	20
2-Hexanone	200	U	200		ug/L			03/09/21 20:23	20
Dibromochloromethane	20	U	20		ug/L			03/09/21 20:23	20
<b>Chlorobenzene</b>	<b>760</b>		20		ug/L			03/09/21 20:23	20
<b>Ethylbenzene</b>	<b>150</b>		20		ug/L			03/09/21 20:23	20
o-Xylene	20	U	20		ug/L			03/09/21 20:23	20
<b>m-Xylene &amp; p-Xylene</b>	<b>360</b>		20		ug/L			03/09/21 20:23	20
Styrene	20	U	20		ug/L			03/09/21 20:23	20
Bromoform	20	U	20		ug/L			03/09/21 20:23	20
<b>Isopropylbenzene</b>	<b>240</b>		20		ug/L			03/09/21 20:23	20
1,1,2,2-Tetrachloroethane	20	U	20		ug/L			03/09/21 20:23	20
1,2,3-Trichlorobenzene	100	U	100		ug/L			03/09/21 20:23	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	108		70 - 130		03/09/21 20:23	20
1,2-Dichloroethane-d4 (Surr)	91		60 - 124		03/09/21 20:23	20
Dibromofluoromethane (Surr)	102		70 - 130		03/09/21 20:23	20

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

**Client Sample ID: MW-29D**

**Lab Sample ID: 680-195713-4**

Date Collected: 03/02/21 11:00

Matrix: Water

Date Received: 03/04/21 09:48

**Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130		03/09/21 20:23	20

**Method: 6010C - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	37000		50		ug/L		03/04/21 15:31	03/06/21 17:53	1
Manganese	950		10		ug/L		03/04/21 15:31	03/06/21 17:53	1

**Method: 6010C - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	28000		50		ug/L		03/05/21 08:33	03/08/21 22:01	1
Manganese	950		10		ug/L		03/05/21 08:33	03/08/21 22:01	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity, Total	250		1.0		mg/L			03/12/21 13:42	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	4400		250		mg/L			03/09/21 12:46	25
Total Dissolved Solids	7400		100		mg/L			03/05/21 13:44	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

**Client Sample ID: TB-01**  
**Date Collected: 03/02/21 00:00**  
**Date Received: 03/04/21 09:48**

**Lab Sample ID: 680-195713-5**  
**Matrix: Water**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	1.0	U	1.0		ug/L			03/06/21 16:06	1
Chloromethane	1.0	U	1.0		ug/L			03/06/21 16:06	1
Vinyl chloride	1.0	U	1.0		ug/L			03/06/21 16:06	1
Bromomethane	5.0	U	5.0		ug/L			03/06/21 16:06	1
Chloroethane	5.0	U	5.0		ug/L			03/06/21 16:06	1
Trichlorofluoromethane	1.0	U	1.0		ug/L			03/06/21 16:06	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			03/06/21 16:06	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.0	U	1.0		ug/L			03/06/21 16:06	1
Acetone	10	U	10		ug/L			03/06/21 16:06	1
Carbon disulfide	2.0	U	2.0		ug/L			03/06/21 16:06	1
Methyl acetate	5.0	U	5.0		ug/L			03/06/21 16:06	1
Methylene Chloride	5.0	U	5.0		ug/L			03/06/21 16:06	1
trans-1,2-Dichloroethene	1.0	U	1.0		ug/L			03/06/21 16:06	1
Methyl tert-butyl ether	10	U	10		ug/L			03/06/21 16:06	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			03/06/21 16:06	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			03/06/21 16:06	1
2-Butanone (MEK)	10	U	10		ug/L			03/06/21 16:06	1
Bromochloromethane	1.0	U	1.0		ug/L			03/06/21 16:06	1
Chloroform	1.0	U	1.0		ug/L			03/06/21 16:06	1
1,1,1-Trichloroethane	1.0	U	1.0		ug/L			03/06/21 16:06	1
Cyclohexane	1.0	U	1.0		ug/L			03/06/21 16:06	1
Carbon tetrachloride	1.0	U	1.0		ug/L			03/06/21 16:06	1
Benzene	1.0	U	1.0		ug/L			03/06/21 16:06	1
1,2-Dichloroethane	1.0	U	1.0		ug/L			03/06/21 16:06	1
Trichloroethene	1.0	U	1.0		ug/L			03/06/21 16:06	1
Methylcyclohexane	1.0	U	1.0		ug/L			03/06/21 16:06	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			03/06/21 16:06	1
Bromodichloromethane	1.0	U	1.0		ug/L			03/06/21 16:06	1
cis-1,3-Dichloropropene	1.0	U	1.0		ug/L			03/06/21 16:06	1
4-Methyl-2-pentanone	10	U	10		ug/L			03/06/21 16:06	1
Toluene	1.0	U	1.0		ug/L			03/06/21 16:06	1
trans-1,3-Dichloropropene	1.0	U	1.0		ug/L			03/06/21 16:06	1
1,1,2-Trichloroethane	1.0	U	1.0		ug/L			03/06/21 16:06	1
Tetrachloroethene	1.0	U	1.0		ug/L			03/06/21 16:06	1
2-Hexanone	10	U	10		ug/L			03/06/21 16:06	1
Dibromochloromethane	1.0	U	1.0		ug/L			03/06/21 16:06	1
Chlorobenzene	1.0	U	1.0		ug/L			03/06/21 16:06	1
Ethylbenzene	1.0	U	1.0		ug/L			03/06/21 16:06	1
o-Xylene	1.0	U	1.0		ug/L			03/06/21 16:06	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			03/06/21 16:06	1
Styrene	1.0	U	1.0		ug/L			03/06/21 16:06	1
Bromoform	1.0	U	1.0		ug/L			03/06/21 16:06	1
Isopropylbenzene	1.0	U	1.0		ug/L			03/06/21 16:06	1
1,1,2,2-Tetrachloroethane	1.0	U	1.0		ug/L			03/06/21 16:06	1
1,2,3-Trichlorobenzene	5.0	U	5.0		ug/L			03/06/21 16:06	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	115		70 - 130		03/06/21 16:06	1
1,2-Dichloroethane-d4 (Surr)	106		60 - 124		03/06/21 16:06	1
Dibromofluoromethane (Surr)	117		70 - 130		03/06/21 16:06	1

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

**Client Sample ID: TB-01**

**Date Collected: 03/02/21 00:00**

**Date Received: 03/04/21 09:48**

**Lab Sample ID: 680-195713-5**

**Matrix: Water**

**Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)**

<u>Surrogate</u>	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Dil Fac</u>
4-Bromofluorobenzene (Surr)	115		70 - 130		03/06/21 16:06	1

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# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

## Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TOL	DCA	DBFM	BFB
		(70-130)	(60-124)	(70-130)	(70-130)
680-195713-1	BS-OW-01	104	101	112	106
680-195713-2	BS-OW-02	109	102	107	104
680-195713-3	BS-OW-03D	105	100	110	105
680-195713-4	MW-29D	108	91	102	104
680-195713-5	TB-01	115	106	117	115
LCS 680-658322/4	Lab Control Sample	105	101	109	97
LCS 680-658333/5	Lab Control Sample	109	109	109	109
LCS 680-658625/5	Lab Control Sample	105	111	114	100
LCSD 680-658322/5	Lab Control Sample Dup	103	101	108	94
LCSD 680-658333/6	Lab Control Sample Dup	109	113	113	112
LCSD 680-658625/6	Lab Control Sample Dup	105	102	105	105
MB 680-658322/9	Method Blank	107	101	113	111
MB 680-658333/10	Method Blank	107	94	102	106
MB 680-658625/10	Method Blank	107	91	101	105

### Surrogate Legend

TOL = Toluene-d8 (Surr)

DCA = 1,2-Dichloroethane-d4 (Surr)

DBFM = Dibromofluoromethane (Surr)

BFB = 4-Bromofluorobenzene (Surr)



# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 680-658322/9**  
**Matrix: Water**  
**Analysis Batch: 658322**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Dichlorodifluoromethane	1.0	U	1.0		ug/L			03/06/21 15:06	1
Chloromethane	1.0	U	1.0		ug/L			03/06/21 15:06	1
Vinyl chloride	1.0	U	1.0		ug/L			03/06/21 15:06	1
Bromomethane	5.0	U	5.0		ug/L			03/06/21 15:06	1
Chloroethane	5.0	U	5.0		ug/L			03/06/21 15:06	1
Trichlorofluoromethane	1.0	U	1.0		ug/L			03/06/21 15:06	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			03/06/21 15:06	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.0	U	1.0		ug/L			03/06/21 15:06	1
Acetone	10	U	10		ug/L			03/06/21 15:06	1
Carbon disulfide	2.0	U	2.0		ug/L			03/06/21 15:06	1
Methyl acetate	5.0	U	5.0		ug/L			03/06/21 15:06	1
Methylene Chloride	5.0	U	5.0		ug/L			03/06/21 15:06	1
trans-1,2-Dichloroethene	1.0	U	1.0		ug/L			03/06/21 15:06	1
Methyl tert-butyl ether	10	U	10		ug/L			03/06/21 15:06	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			03/06/21 15:06	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			03/06/21 15:06	1
2-Butanone (MEK)	10	U	10		ug/L			03/06/21 15:06	1
Bromochloromethane	1.0	U	1.0		ug/L			03/06/21 15:06	1
Chloroform	1.0	U	1.0		ug/L			03/06/21 15:06	1
1,1,1-Trichloroethane	1.0	U	1.0		ug/L			03/06/21 15:06	1
Cyclohexane	1.0	U	1.0		ug/L			03/06/21 15:06	1
Carbon tetrachloride	1.0	U	1.0		ug/L			03/06/21 15:06	1
Benzene	1.0	U	1.0		ug/L			03/06/21 15:06	1
1,2-Dichloroethane	1.0	U	1.0		ug/L			03/06/21 15:06	1
Trichloroethene	1.0	U	1.0		ug/L			03/06/21 15:06	1
Methylcyclohexane	1.0	U	1.0		ug/L			03/06/21 15:06	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			03/06/21 15:06	1
Bromodichloromethane	1.0	U	1.0		ug/L			03/06/21 15:06	1
cis-1,3-Dichloropropene	1.0	U	1.0		ug/L			03/06/21 15:06	1
4-Methyl-2-pentanone	10	U	10		ug/L			03/06/21 15:06	1
Toluene	1.0	U	1.0		ug/L			03/06/21 15:06	1
trans-1,3-Dichloropropene	1.0	U	1.0		ug/L			03/06/21 15:06	1
1,1,2-Trichloroethane	1.0	U	1.0		ug/L			03/06/21 15:06	1
Tetrachloroethene	1.0	U	1.0		ug/L			03/06/21 15:06	1
2-Hexanone	10	U	10		ug/L			03/06/21 15:06	1
Dibromochloromethane	1.0	U	1.0		ug/L			03/06/21 15:06	1
Chlorobenzene	1.0	U	1.0		ug/L			03/06/21 15:06	1
Ethylbenzene	1.0	U	1.0		ug/L			03/06/21 15:06	1
o-Xylene	1.0	U	1.0		ug/L			03/06/21 15:06	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			03/06/21 15:06	1
Styrene	1.0	U	1.0		ug/L			03/06/21 15:06	1
Bromoform	1.0	U	1.0		ug/L			03/06/21 15:06	1
Isopropylbenzene	1.0	U	1.0		ug/L			03/06/21 15:06	1
1,1,2,2-Tetrachloroethane	1.0	U	1.0		ug/L			03/06/21 15:06	1
1,2,3-Trichlorobenzene	5.0	U	5.0		ug/L			03/06/21 15:06	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Toluene-d8 (Surr)	107		70 - 130		03/06/21 15:06	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 680-658322/9**  
**Matrix: Water**  
**Analysis Batch: 658322**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

<i>Surrogate</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
1,2-Dichloroethane-d4 (Surr)	101		60 - 124		03/06/21 15:06	1
Dibromofluoromethane (Surr)	113		70 - 130		03/06/21 15:06	1
4-Bromofluorobenzene (Surr)	111		70 - 130		03/06/21 15:06	1

**Lab Sample ID: LCS 680-658322/4**  
**Matrix: Water**  
**Analysis Batch: 658322**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

<i>Analyte</i>	<i>Spike Added</i>	<i>LCS Result</i>	<i>LCS Qualifier</i>	<i>Unit</i>	<i>D</i>	<i>%Rec</i>	<i>%Rec. Limits</i>
Dichlorodifluoromethane	50.0	42.5		ug/L		85	70 - 130
Chloromethane	50.0	43.1		ug/L		86	59 - 127
Vinyl chloride	50.0	45.7		ug/L		91	66 - 129
Bromomethane	50.0	50.9		ug/L		102	28 - 192
Chloroethane	50.0	76.4		ug/L		153	31 - 213
Trichlorofluoromethane	50.0	52.0		ug/L		104	63 - 142
1,1-Dichloroethene	50.0	53.3		ug/L		107	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	57.1		ug/L		114	63 - 141
Acetone	250	254		ug/L		102	67 - 113
Carbon disulfide	50.0	55.4		ug/L		111	70 - 130
Methyl acetate	100	88.5		ug/L		88	67 - 110
Methylene Chloride	50.0	49.4		ug/L		99	70 - 130
trans-1,2-Dichloroethene	50.0	53.4		ug/L		107	70 - 130
Methyl tert-butyl ether	50.0	51.7		ug/L		103	70 - 130
1,1-Dichloroethane	50.0	53.7		ug/L		107	70 - 130
cis-1,2-Dichloroethene	50.0	52.3		ug/L		105	70 - 130
2-Butanone (MEK)	250	251		ug/L		100	69 - 114
Bromochloromethane	50.0	53.1		ug/L		106	70 - 130
Chloroform	50.0	53.8		ug/L		108	70 - 130
1,1,1-Trichloroethane	50.0	55.4		ug/L		111	70 - 130
Cyclohexane	50.0	51.9		ug/L		104	23 - 175
Carbon tetrachloride	50.0	55.4		ug/L		111	70 - 130
Benzene	50.0	55.8		ug/L		112	70 - 130
1,2-Dichloroethane	50.0	53.2		ug/L		106	70 - 130
Trichloroethene	50.0	59.2		ug/L		118	70 - 130
Methylcyclohexane	50.0	56.6		ug/L		113	70 - 130
1,2-Dichloropropane	50.0	53.0		ug/L		106	70 - 130
Bromodichloromethane	50.0	51.6		ug/L		103	70 - 130
cis-1,3-Dichloropropene	50.0	54.7		ug/L		109	70 - 130
4-Methyl-2-pentanone	250	232		ug/L		93	68 - 108
Toluene	50.0	54.5		ug/L		109	70 - 130
trans-1,3-Dichloropropene	50.0	57.0		ug/L		114	70 - 130
1,1,2-Trichloroethane	50.0	52.1		ug/L		104	70 - 130
Tetrachloroethene	50.0	58.7		ug/L		117	70 - 130
2-Hexanone	250	230		ug/L		92	70 - 130
Dibromochloromethane	50.0	52.4		ug/L		105	70 - 130
Chlorobenzene	50.0	57.0		ug/L		114	70 - 130
Ethylbenzene	50.0	56.2		ug/L		112	70 - 130
o-Xylene	50.0	57.8		ug/L		116	70 - 130

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-658322/4**  
**Matrix: Water**  
**Analysis Batch: 658322**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
m-Xylene & p-Xylene	50.0	58.4		ug/L		117	70 - 130
Styrene	50.0	58.5		ug/L		117	70 - 130
Bromoform	50.0	51.4		ug/L		103	69 - 129
Isopropylbenzene	50.0	58.1		ug/L		116	70 - 130
1,1,2,2-Tetrachloroethane	50.0	51.7		ug/L		103	70 - 130
1,2,3-Trichlorobenzene	50.0	59.4		ug/L		119	61 - 141

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	105		70 - 130
1,2-Dichloroethane-d4 (Surr)	101		60 - 124
Dibromofluoromethane (Surr)	109		70 - 130
4-Bromofluorobenzene (Surr)	97		70 - 130

**Lab Sample ID: LCSD 680-658322/5**  
**Matrix: Water**  
**Analysis Batch: 658322**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dichlorodifluoromethane	50.0	42.7		ug/L		85	70 - 130	0	40
Chloromethane	50.0	43.3		ug/L		87	59 - 127	0	30
Vinyl chloride	50.0	46.0		ug/L		92	66 - 129	1	30
Bromomethane	50.0	51.3		ug/L		103	28 - 192	1	30
Chloroethane	50.0	76.6		ug/L		153	31 - 213	0	30
Trichlorofluoromethane	50.0	50.9		ug/L		102	63 - 142	2	30
1,1-Dichloroethene	50.0	51.4		ug/L		103	70 - 130	4	20
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	54.4		ug/L		109	63 - 141	5	30
Acetone	250	262		ug/L		105	67 - 113	3	30
Carbon disulfide	50.0	53.5		ug/L		107	70 - 130	4	30
Methyl acetate	100	90.6		ug/L		91	67 - 110	2	30
Methylene Chloride	50.0	49.2		ug/L		98	70 - 130	0	30
trans-1,2-Dichloroethene	50.0	51.6		ug/L		103	70 - 130	3	30
Methyl tert-butyl ether	50.0	51.3		ug/L		103	70 - 130	1	30
1,1-Dichloroethane	50.0	52.8		ug/L		106	70 - 130	2	30
cis-1,2-Dichloroethene	50.0	51.1		ug/L		102	70 - 130	2	30
2-Butanone (MEK)	250	252		ug/L		101	69 - 114	0	30
Bromochloromethane	50.0	53.4		ug/L		107	70 - 130	1	30
Chloroform	50.0	52.2		ug/L		104	70 - 130	3	30
1,1,1-Trichloroethane	50.0	54.2		ug/L		108	70 - 130	2	30
Cyclohexane	50.0	50.2		ug/L		100	23 - 175	3	30
Carbon tetrachloride	50.0	54.1		ug/L		108	70 - 130	2	30
Benzene	50.0	54.7		ug/L		109	70 - 130	2	30
1,2-Dichloroethane	50.0	53.4		ug/L		107	70 - 130	0	50
Trichloroethene	50.0	57.3		ug/L		115	70 - 130	3	30
Methylcyclohexane	50.0	53.7		ug/L		107	70 - 130	5	30
1,2-Dichloropropane	50.0	51.7		ug/L		103	70 - 130	2	20
Bromodichloromethane	50.0	51.0		ug/L		102	70 - 130	1	30
cis-1,3-Dichloropropene	50.0	54.6		ug/L		109	70 - 130	0	20
4-Methyl-2-pentanone	250	235		ug/L		94	68 - 108	2	30

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCSD 680-658322/5**  
**Matrix: Water**  
**Analysis Batch: 658322**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Toluene	50.0	53.3		ug/L		107	70 - 130	2	30
trans-1,3-Dichloropropene	50.0	56.6		ug/L		113	70 - 130	1	30
1,1,2-Trichloroethane	50.0	52.4		ug/L		105	70 - 130	1	30
Tetrachloroethene	50.0	56.7		ug/L		113	70 - 130	3	30
2-Hexanone	250	235		ug/L		94	70 - 130	2	20
Dibromochloromethane	50.0	51.7		ug/L		103	70 - 130	1	30
Chlorobenzene	50.0	55.9		ug/L		112	70 - 130	2	30
Ethylbenzene	50.0	54.8		ug/L		110	70 - 130	3	20
o-Xylene	50.0	56.1		ug/L		112	70 - 130	3	30
m-Xylene & p-Xylene	50.0	56.5		ug/L		113	70 - 130	3	30
Styrene	50.0	57.4		ug/L		115	70 - 130	2	30
Bromoform	50.0	50.1		ug/L		100	69 - 129	3	30
Isopropylbenzene	50.0	55.6		ug/L		111	70 - 130	4	30
1,1,2,2-Tetrachloroethane	50.0	50.9		ug/L		102	70 - 130	2	30
1,2,3-Trichlorobenzene	50.0	57.3		ug/L		115	61 - 141	4	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
<i>Toluene-d8 (Surr)</i>	103		70 - 130
<i>1,2-Dichloroethane-d4 (Surr)</i>	101		60 - 124
<i>Dibromofluoromethane (Surr)</i>	108		70 - 130
<i>4-Bromofluorobenzene (Surr)</i>	94		70 - 130

**Lab Sample ID: MB 680-658333/10**  
**Matrix: Water**  
**Analysis Batch: 658333**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	1.0	U	1.0		ug/L			03/06/21 15:23	1
Chloromethane	1.0	U	1.0		ug/L			03/06/21 15:23	1
Vinyl chloride	1.0	U	1.0		ug/L			03/06/21 15:23	1
Bromomethane	5.0	U	5.0		ug/L			03/06/21 15:23	1
Chloroethane	5.0	U	5.0		ug/L			03/06/21 15:23	1
Trichlorofluoromethane	1.0	U	1.0		ug/L			03/06/21 15:23	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			03/06/21 15:23	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.0	U	1.0		ug/L			03/06/21 15:23	1
Acetone	10	U	10		ug/L			03/06/21 15:23	1
Carbon disulfide	2.0	U	2.0		ug/L			03/06/21 15:23	1
Methyl acetate	5.0	U	5.0		ug/L			03/06/21 15:23	1
Methylene Chloride	5.0	U	5.0		ug/L			03/06/21 15:23	1
trans-1,2-Dichloroethene	1.0	U	1.0		ug/L			03/06/21 15:23	1
Methyl tert-butyl ether	10	U	10		ug/L			03/06/21 15:23	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			03/06/21 15:23	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			03/06/21 15:23	1
2-Butanone (MEK)	10	U	10		ug/L			03/06/21 15:23	1
Bromochloromethane	1.0	U	1.0		ug/L			03/06/21 15:23	1
Chloroform	1.0	U	1.0		ug/L			03/06/21 15:23	1
1,1,1-Trichloroethane	1.0	U	1.0		ug/L			03/06/21 15:23	1
Cyclohexane	1.0	U	1.0		ug/L			03/06/21 15:23	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 680-658333/10**  
**Matrix: Water**  
**Analysis Batch: 658333**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	1.0	U	1.0		ug/L			03/06/21 15:23	1
Benzene	1.0	U	1.0		ug/L			03/06/21 15:23	1
1,2-Dichloroethane	1.0	U	1.0		ug/L			03/06/21 15:23	1
Trichloroethene	1.0	U	1.0		ug/L			03/06/21 15:23	1
Methylcyclohexane	1.0	U	1.0		ug/L			03/06/21 15:23	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			03/06/21 15:23	1
Bromodichloromethane	1.0	U	1.0		ug/L			03/06/21 15:23	1
cis-1,3-Dichloropropene	1.0	U	1.0		ug/L			03/06/21 15:23	1
4-Methyl-2-pentanone	10	U	10		ug/L			03/06/21 15:23	1
Toluene	1.0	U	1.0		ug/L			03/06/21 15:23	1
trans-1,3-Dichloropropene	1.0	U	1.0		ug/L			03/06/21 15:23	1
1,1,2-Trichloroethane	1.0	U	1.0		ug/L			03/06/21 15:23	1
Tetrachloroethene	1.0	U	1.0		ug/L			03/06/21 15:23	1
2-Hexanone	10	U	10		ug/L			03/06/21 15:23	1
Dibromochloromethane	1.0	U	1.0		ug/L			03/06/21 15:23	1
Chlorobenzene	1.0	U	1.0		ug/L			03/06/21 15:23	1
Ethylbenzene	1.0	U	1.0		ug/L			03/06/21 15:23	1
o-Xylene	1.0	U	1.0		ug/L			03/06/21 15:23	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			03/06/21 15:23	1
Styrene	1.0	U	1.0		ug/L			03/06/21 15:23	1
Bromoform	1.0	U	1.0		ug/L			03/06/21 15:23	1
Isopropylbenzene	1.0	U	1.0		ug/L			03/06/21 15:23	1
1,1,2,2-Tetrachloroethane	1.0	U	1.0		ug/L			03/06/21 15:23	1
1,2,3-Trichlorobenzene	5.0	U	5.0		ug/L			03/06/21 15:23	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	107		70 - 130		03/06/21 15:23	1
1,2-Dichloroethane-d4 (Surr)	94		60 - 124		03/06/21 15:23	1
Dibromofluoromethane (Surr)	102		70 - 130		03/06/21 15:23	1
4-Bromofluorobenzene (Surr)	106		70 - 130		03/06/21 15:23	1

**Lab Sample ID: LCS 680-658333/5**  
**Matrix: Water**  
**Analysis Batch: 658333**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dichlorodifluoromethane	50.0	44.0		ug/L		88	70 - 130
Chloromethane	50.0	50.9		ug/L		102	59 - 127
Vinyl chloride	50.0	49.0		ug/L		98	66 - 129
Bromomethane	50.0	67.5		ug/L		135	28 - 192
Chloroethane	50.0	76.6		ug/L		153	31 - 213
Trichlorofluoromethane	50.0	54.2		ug/L		108	63 - 142
1,1-Dichloroethene	50.0	55.1		ug/L		110	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	57.2		ug/L		114	63 - 141
Acetone	250	311	*+	ug/L		124	67 - 113
Carbon disulfide	50.0	57.3		ug/L		115	70 - 130
Methyl acetate	100	102		ug/L		102	67 - 110
Methylene Chloride	50.0	54.9		ug/L		110	70 - 130

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-658333/5**  
**Matrix: Water**  
**Analysis Batch: 658333**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
trans-1,2-Dichloroethene	50.0	54.1		ug/L		108	70 - 130
Methyl tert-butyl ether	50.0	57.0		ug/L		114	70 - 130
1,1-Dichloroethane	50.0	54.1		ug/L		108	70 - 130
cis-1,2-Dichloroethene	50.0	54.0		ug/L		108	70 - 130
2-Butanone (MEK)	250	312	*+	ug/L		125	69 - 114
Bromochloromethane	50.0	53.9		ug/L		108	70 - 130
Chloroform	50.0	51.7		ug/L		103	70 - 130
1,1,1-Trichloroethane	50.0	52.5		ug/L		105	70 - 130
Cyclohexane	50.0	53.9		ug/L		108	23 - 175
Carbon tetrachloride	50.0	53.3		ug/L		107	70 - 130
Benzene	50.0	52.5		ug/L		105	70 - 130
1,2-Dichloroethane	50.0	53.7		ug/L		107	70 - 130
Trichloroethene	50.0	54.3		ug/L		109	70 - 130
Methylcyclohexane	50.0	55.4		ug/L		111	70 - 130
1,2-Dichloropropane	50.0	55.4		ug/L		111	70 - 130
Bromodichloromethane	50.0	53.7		ug/L		107	70 - 130
cis-1,3-Dichloropropene	50.0	54.6		ug/L		109	70 - 130
4-Methyl-2-pentanone	250	314	*+	ug/L		126	68 - 108
Toluene	50.0	55.3		ug/L		111	70 - 130
trans-1,3-Dichloropropene	50.0	55.2		ug/L		110	70 - 130
1,1,2-Trichloroethane	50.0	58.8		ug/L		118	70 - 130
Tetrachloroethene	50.0	57.3		ug/L		115	70 - 130
2-Hexanone	250	312		ug/L		125	70 - 130
Dibromochloromethane	50.0	55.1		ug/L		110	70 - 130
Chlorobenzene	50.0	52.6		ug/L		105	70 - 130
Ethylbenzene	50.0	50.7		ug/L		101	70 - 130
o-Xylene	50.0	48.6		ug/L		97	70 - 130
m-Xylene & p-Xylene	50.0	49.0		ug/L		98	70 - 130
Styrene	50.0	50.7		ug/L		101	70 - 130
Bromoform	50.0	54.1		ug/L		108	69 - 129
Isopropylbenzene	50.0	49.1		ug/L		98	70 - 130
1,1,2,2-Tetrachloroethane	50.0	56.5		ug/L		113	70 - 130
1,2,3-Trichlorobenzene	50.0	62.0		ug/L		124	61 - 141

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	109		70 - 130
1,2-Dichloroethane-d4 (Surr)	109		60 - 124
Dibromofluoromethane (Surr)	109		70 - 130
4-Bromofluorobenzene (Surr)	109		70 - 130

**Lab Sample ID: LCSD 680-658333/6**  
**Matrix: Water**  
**Analysis Batch: 658333**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dichlorodifluoromethane	50.0	44.6		ug/L		89	70 - 130	1	40
Chloromethane	50.0	51.5		ug/L		103	59 - 127	1	30
Vinyl chloride	50.0	49.3		ug/L		99	66 - 129	1	30

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCSD 680-658333/6**  
**Matrix: Water**  
**Analysis Batch: 658333**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromomethane	50.0	70.8		ug/L		142	28 - 192	5	30
Chloroethane	50.0	76.4		ug/L		153	31 - 213	0	30
Trichlorofluoromethane	50.0	53.4		ug/L		107	63 - 142	1	30
1,1-Dichloroethene	50.0	56.0		ug/L		112	70 - 130	2	20
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	57.0		ug/L		114	63 - 141	0	30
Acetone	250	326	*+	ug/L		130	67 - 113	5	30
Carbon disulfide	50.0	58.4		ug/L		117	70 - 130	2	30
Methyl acetate	100	108		ug/L		108	67 - 110	6	30
Methylene Chloride	50.0	55.9		ug/L		112	70 - 130	2	30
trans-1,2-Dichloroethene	50.0	55.7		ug/L		111	70 - 130	3	30
Methyl tert-butyl ether	50.0	58.8		ug/L		118	70 - 130	3	30
1,1-Dichloroethane	50.0	55.3		ug/L		111	70 - 130	2	30
cis-1,2-Dichloroethene	50.0	53.6		ug/L		107	70 - 130	1	30
2-Butanone (MEK)	250	321	*+	ug/L		128	69 - 114	3	30
Bromochloromethane	50.0	55.0		ug/L		110	70 - 130	2	30
Chloroform	50.0	53.4		ug/L		107	70 - 130	3	30
1,1,1-Trichloroethane	50.0	52.8		ug/L		106	70 - 130	1	30
Cyclohexane	50.0	53.7		ug/L		107	23 - 175	0	30
Carbon tetrachloride	50.0	52.6		ug/L		105	70 - 130	1	30
Benzene	50.0	54.4		ug/L		109	70 - 130	3	30
1,2-Dichloroethane	50.0	56.0		ug/L		112	70 - 130	4	50
Trichloroethene	50.0	55.2		ug/L		110	70 - 130	2	30
Methylcyclohexane	50.0	55.1		ug/L		110	70 - 130	0	30
1,2-Dichloropropane	50.0	56.5		ug/L		113	70 - 130	2	20
Bromodichloromethane	50.0	54.5		ug/L		109	70 - 130	2	30
cis-1,3-Dichloropropene	50.0	56.0		ug/L		112	70 - 130	2	20
4-Methyl-2-pentanone	250	325	*+	ug/L		130	68 - 108	3	30
Toluene	50.0	57.1		ug/L		114	70 - 130	3	30
trans-1,3-Dichloropropene	50.0	56.5		ug/L		113	70 - 130	2	30
1,1,2-Trichloroethane	50.0	61.2		ug/L		122	70 - 130	4	30
Tetrachloroethene	50.0	58.5		ug/L		117	70 - 130	2	30
2-Hexanone	250	321		ug/L		128	70 - 130	3	20
Dibromochloromethane	50.0	56.6		ug/L		113	70 - 130	3	30
Chlorobenzene	50.0	53.1		ug/L		106	70 - 130	1	30
Ethylbenzene	50.0	52.0		ug/L		104	70 - 130	3	20
o-Xylene	50.0	49.1		ug/L		98	70 - 130	1	30
m-Xylene & p-Xylene	50.0	49.2		ug/L		98	70 - 130	0	30
Styrene	50.0	51.9		ug/L		104	70 - 130	2	30
Bromoform	50.0	54.4		ug/L		109	69 - 129	1	30
Isopropylbenzene	50.0	50.2		ug/L		100	70 - 130	2	30
1,1,2,2-Tetrachloroethane	50.0	56.3		ug/L		113	70 - 130	0	30
1,2,3-Trichlorobenzene	50.0	63.4		ug/L		127	61 - 141	2	30

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
Toluene-d8 (Surr)	109		70 - 130
1,2-Dichloroethane-d4 (Surr)	113		60 - 124
Dibromofluoromethane (Surr)	113		70 - 130

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCSD 680-658333/6**  
**Matrix: Water**  
**Analysis Batch: 658333**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

<i>Surrogate</i>	<i>%Recovery</i>	<i>LCSD LCSD Qualifier</i>	<i>Limits</i>
4-Bromofluorobenzene (Surr)	112		70 - 130

**Lab Sample ID: MB 680-658625/10**  
**Matrix: Water**  
**Analysis Batch: 658625**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Dichlorodifluoromethane	1.0	U	1.0		ug/L			03/09/21 14:15	1
Chloromethane	1.0	U	1.0		ug/L			03/09/21 14:15	1
Vinyl chloride	1.0	U	1.0		ug/L			03/09/21 14:15	1
Bromomethane	5.0	U	5.0		ug/L			03/09/21 14:15	1
Chloroethane	5.0	U	5.0		ug/L			03/09/21 14:15	1
Trichlorofluoromethane	1.0	U	1.0		ug/L			03/09/21 14:15	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			03/09/21 14:15	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.0	U	1.0		ug/L			03/09/21 14:15	1
Acetone	10	U	10		ug/L			03/09/21 14:15	1
Carbon disulfide	2.0	U	2.0		ug/L			03/09/21 14:15	1
Methyl acetate	5.0	U	5.0		ug/L			03/09/21 14:15	1
Methylene Chloride	5.0	U	5.0		ug/L			03/09/21 14:15	1
trans-1,2-Dichloroethene	1.0	U	1.0		ug/L			03/09/21 14:15	1
Methyl tert-butyl ether	10	U	10		ug/L			03/09/21 14:15	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			03/09/21 14:15	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			03/09/21 14:15	1
2-Butanone (MEK)	10	U	10		ug/L			03/09/21 14:15	1
Bromochloromethane	1.0	U	1.0		ug/L			03/09/21 14:15	1
Chloroform	1.0	U	1.0		ug/L			03/09/21 14:15	1
1,1,1-Trichloroethane	1.0	U	1.0		ug/L			03/09/21 14:15	1
Cyclohexane	1.0	U	1.0		ug/L			03/09/21 14:15	1
Carbon tetrachloride	1.0	U	1.0		ug/L			03/09/21 14:15	1
Benzene	1.0	U	1.0		ug/L			03/09/21 14:15	1
1,2-Dichloroethane	1.0	U	1.0		ug/L			03/09/21 14:15	1
Trichloroethene	1.0	U	1.0		ug/L			03/09/21 14:15	1
Methylcyclohexane	1.0	U	1.0		ug/L			03/09/21 14:15	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			03/09/21 14:15	1
Bromodichloromethane	1.0	U	1.0		ug/L			03/09/21 14:15	1
cis-1,3-Dichloropropene	1.0	U	1.0		ug/L			03/09/21 14:15	1
4-Methyl-2-pentanone	10	U	10		ug/L			03/09/21 14:15	1
Toluene	1.0	U	1.0		ug/L			03/09/21 14:15	1
trans-1,3-Dichloropropene	1.0	U	1.0		ug/L			03/09/21 14:15	1
1,1,2-Trichloroethane	1.0	U	1.0		ug/L			03/09/21 14:15	1
Tetrachloroethene	1.0	U	1.0		ug/L			03/09/21 14:15	1
2-Hexanone	10	U	10		ug/L			03/09/21 14:15	1
Dibromochloromethane	1.0	U	1.0		ug/L			03/09/21 14:15	1
Chlorobenzene	1.0	U	1.0		ug/L			03/09/21 14:15	1
Ethylbenzene	1.0	U	1.0		ug/L			03/09/21 14:15	1
o-Xylene	1.0	U	1.0		ug/L			03/09/21 14:15	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			03/09/21 14:15	1
Styrene	1.0	U	1.0		ug/L			03/09/21 14:15	1

Eurofins TestAmerica, Savannah



# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 680-658625/10**  
**Matrix: Water**  
**Analysis Batch: 658625**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	1.0	U	1.0		ug/L			03/09/21 14:15	1
Isopropylbenzene	1.0	U	1.0		ug/L			03/09/21 14:15	1
1,1,2,2-Tetrachloroethane	1.0	U	1.0		ug/L			03/09/21 14:15	1
1,2,3-Trichlorobenzene	5.0	U	5.0		ug/L			03/09/21 14:15	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	107		70 - 130		03/09/21 14:15	1
1,2-Dichloroethane-d4 (Surr)	91		60 - 124		03/09/21 14:15	1
Dibromofluoromethane (Surr)	101		70 - 130		03/09/21 14:15	1
4-Bromofluorobenzene (Surr)	105		70 - 130		03/09/21 14:15	1

**Lab Sample ID: LCS 680-658625/5**  
**Matrix: Water**  
**Analysis Batch: 658625**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Dichlorodifluoromethane	50.0	49.5		ug/L		99	70 - 130
Chloromethane	50.0	59.7		ug/L		119	59 - 127
Vinyl chloride	50.0	55.6		ug/L		111	66 - 129
Bromomethane	50.0	62.3		ug/L		125	28 - 192
Chloroethane	50.0	53.2		ug/L		106	31 - 213
Trichlorofluoromethane	50.0	57.6		ug/L		115	63 - 142
1,1-Dichloroethene	50.0	54.4		ug/L		109	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	53.2		ug/L		106	63 - 141
Acetone	250	260		ug/L		104	67 - 113
Carbon disulfide	50.0	53.1		ug/L		106	70 - 130
Methyl acetate	100	99.4		ug/L		99	67 - 110
Methylene Chloride	50.0	53.3		ug/L		107	70 - 130
trans-1,2-Dichloroethene	50.0	54.4		ug/L		109	70 - 130
Methyl tert-butyl ether	50.0	50.5		ug/L		101	70 - 130
1,1-Dichloroethane	50.0	51.7		ug/L		103	70 - 130
cis-1,2-Dichloroethene	50.0	53.7		ug/L		107	70 - 130
2-Butanone (MEK)	250	277		ug/L		111	69 - 114
Bromochloromethane	50.0	50.9		ug/L		102	70 - 130
Chloroform	50.0	51.0		ug/L		102	70 - 130
1,1,1-Trichloroethane	50.0	50.6		ug/L		101	70 - 130
Cyclohexane	50.0	50.1		ug/L		100	23 - 175
Carbon tetrachloride	50.0	49.9		ug/L		100	70 - 130
Benzene	50.0	51.5		ug/L		103	70 - 130
1,2-Dichloroethane	50.0	53.5		ug/L		107	70 - 130
Trichloroethene	50.0	52.0		ug/L		104	70 - 130
Methylcyclohexane	50.0	51.1		ug/L		102	70 - 130
1,2-Dichloropropane	50.0	55.0		ug/L		110	70 - 130
Bromodichloromethane	50.0	53.7		ug/L		107	70 - 130
cis-1,3-Dichloropropene	50.0	54.0		ug/L		108	70 - 130
4-Methyl-2-pentanone	250	274	*+	ug/L		109	68 - 108
Toluene	50.0	52.4		ug/L		105	70 - 130
trans-1,3-Dichloropropene	50.0	50.7		ug/L		101	70 - 130

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-658625/5**  
**Matrix: Water**  
**Analysis Batch: 658625**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,2-Trichloroethane	50.0	55.3		ug/L		111	70 - 130
Tetrachloroethene	50.0	54.4		ug/L		109	70 - 130
2-Hexanone	250	270		ug/L		108	70 - 130
Dibromochloromethane	50.0	55.1		ug/L		110	70 - 130
Chlorobenzene	50.0	50.6		ug/L		101	70 - 130
Ethylbenzene	50.0	49.9		ug/L		100	70 - 130
o-Xylene	50.0	50.0		ug/L		100	70 - 130
m-Xylene & p-Xylene	50.0	48.7		ug/L		97	70 - 130
Styrene	50.0	50.9		ug/L		102	70 - 130
Bromoform	50.0	50.6		ug/L		101	69 - 129
Isopropylbenzene	50.0	49.3		ug/L		99	70 - 130
1,1,2,2-Tetrachloroethane	50.0	52.5		ug/L		105	70 - 130
1,2,3-Trichlorobenzene	50.0	54.2		ug/L		108	61 - 141

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	105		70 - 130
1,2-Dichloroethane-d4 (Surr)	111		60 - 124
Dibromofluoromethane (Surr)	114		70 - 130
4-Bromofluorobenzene (Surr)	100		70 - 130

**Lab Sample ID: LCSD 680-658625/6**  
**Matrix: Water**  
**Analysis Batch: 658625**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dichlorodifluoromethane	50.0	49.7		ug/L		99	70 - 130	0	40
Chloromethane	50.0	56.6		ug/L		113	59 - 127	5	30
Vinyl chloride	50.0	54.8		ug/L		110	66 - 129	1	30
Bromomethane	50.0	61.6		ug/L		123	28 - 192	1	30
Chloroethane	50.0	69.9		ug/L		140	31 - 213	27	30
Trichlorofluoromethane	50.0	57.6		ug/L		115	63 - 142	0	30
1,1-Dichloroethene	50.0	53.4		ug/L		107	70 - 130	2	20
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	54.0		ug/L		108	63 - 141	1	30
Acetone	250	245		ug/L		98	67 - 113	6	30
Carbon disulfide	50.0	52.8		ug/L		106	70 - 130	1	30
Methyl acetate	100	98.5		ug/L		99	67 - 110	1	30
Methylene Chloride	50.0	50.6		ug/L		101	70 - 130	5	30
trans-1,2-Dichloroethene	50.0	51.8		ug/L		104	70 - 130	5	30
Methyl tert-butyl ether	50.0	47.9		ug/L		96	70 - 130	5	30
1,1-Dichloroethane	50.0	48.6		ug/L		97	70 - 130	6	30
cis-1,2-Dichloroethene	50.0	50.2		ug/L		100	70 - 130	7	30
2-Butanone (MEK)	250	261		ug/L		105	69 - 114	6	30
Bromochloromethane	50.0	49.0		ug/L		98	70 - 130	4	30
Chloroform	50.0	47.9		ug/L		96	70 - 130	6	30
1,1,1-Trichloroethane	50.0	48.6		ug/L		97	70 - 130	4	30
Cyclohexane	50.0	50.4		ug/L		101	23 - 175	1	30
Carbon tetrachloride	50.0	49.7		ug/L		99	70 - 130	0	30
Benzene	50.0	48.6		ug/L		97	70 - 130	6	30

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCSD 680-658625/6**  
**Matrix: Water**  
**Analysis Batch: 658625**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloroethane	50.0	48.7		ug/L		97	70 - 130	9	50
Trichloroethene	50.0	51.4		ug/L		103	70 - 130	1	30
Methylcyclohexane	50.0	50.8		ug/L		102	70 - 130	1	30
1,2-Dichloropropane	50.0	51.2		ug/L		102	70 - 130	7	20
Bromodichloromethane	50.0	49.3		ug/L		99	70 - 130	9	30
cis-1,3-Dichloropropene	50.0	50.1		ug/L		100	70 - 130	8	20
4-Methyl-2-pentanone	250	264		ug/L		106	68 - 108	3	30
Toluene	50.0	51.9		ug/L		104	70 - 130	1	30
trans-1,3-Dichloropropene	50.0	47.6		ug/L		95	70 - 130	6	30
1,1,2-Trichloroethane	50.0	51.3		ug/L		103	70 - 130	8	30
Tetrachloroethene	50.0	55.0		ug/L		110	70 - 130	1	30
2-Hexanone	250	259		ug/L		103	70 - 130	4	20
Dibromochloromethane	50.0	51.7		ug/L		103	70 - 130	6	30
Chlorobenzene	50.0	50.3		ug/L		101	70 - 130	0	30
Ethylbenzene	50.0	49.2		ug/L		98	70 - 130	1	20
o-Xylene	50.0	46.9		ug/L		94	70 - 130	6	30
m-Xylene & p-Xylene	50.0	46.4		ug/L		93	70 - 130	5	30
Styrene	50.0	46.5		ug/L		93	70 - 130	9	30
Bromoform	50.0	48.1		ug/L		96	69 - 129	5	30
Isopropylbenzene	50.0	48.1		ug/L		96	70 - 130	2	30
1,1,2,2-Tetrachloroethane	50.0	49.6		ug/L		99	70 - 130	6	30
1,2,3-Trichlorobenzene	50.0	58.9		ug/L		118	61 - 141	8	30

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
Toluene-d8 (Surr)	105		70 - 130
1,2-Dichloroethane-d4 (Surr)	102		60 - 124
Dibromofluoromethane (Surr)	105		70 - 130
4-Bromofluorobenzene (Surr)	105		70 - 130

## Method: 6010C - Metals (ICP)

**Lab Sample ID: MB 680-658071/1-A**  
**Matrix: Water**  
**Analysis Batch: 658382**

**Client Sample ID: Method Blank**  
**Prep Type: Total Recoverable**  
**Prep Batch: 658071**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	50	U	50		ug/L		03/04/21 15:31	03/06/21 16:45	1
Manganese	10	U	10		ug/L		03/04/21 15:31	03/06/21 16:45	1

**Lab Sample ID: LCS 680-658071/2-A**  
**Matrix: Water**  
**Analysis Batch: 658382**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total Recoverable**  
**Prep Batch: 658071**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	1700	1660		ug/L		98	80 - 120
Manganese	400	395		ug/L		99	80 - 120

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Method: 6010C - Metals (ICP) (Continued)

**Lab Sample ID: MB 680-658121/1-B**  
**Matrix: Water**  
**Analysis Batch: 658603**

**Client Sample ID: Method Blank**  
**Prep Type: Dissolved**  
**Prep Batch: 658123**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	50	U	50		ug/L		03/05/21 08:33	03/08/21 21:09	1
Manganese	10	U	10		ug/L		03/05/21 08:33	03/08/21 21:09	1

**Lab Sample ID: LCS 680-658121/2-B**  
**Matrix: Water**  
**Analysis Batch: 658603**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Dissolved**  
**Prep Batch: 658123**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	400	396		ug/L		99	80 - 120

**Lab Sample ID: 680-195713-2 MS**  
**Matrix: Water**  
**Analysis Batch: 658603**

**Client Sample ID: BS-OW-02**  
**Prep Type: Dissolved**  
**Prep Batch: 658123**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	1100	F1	400	1440		ug/L		80	75 - 125

**Lab Sample ID: 680-195713-2 MSD**  
**Matrix: Water**  
**Analysis Batch: 658603**

**Client Sample ID: BS-OW-02**  
**Prep Type: Dissolved**  
**Prep Batch: 658123**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Manganese	1100	F1	400	1390	F1	ug/L		69	75 - 125	3	20

## Method: 130.2-1982 - Hardness, Total (mg/l as CaCO3)

**Lab Sample ID: MB 680-658670/1**  
**Matrix: Water**  
**Analysis Batch: 658670**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB MB		RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Hardness as calcium carbonate	10	U	10		mg/L			03/09/21 12:46	1

**Lab Sample ID: LCS 680-658670/2**  
**Matrix: Water**  
**Analysis Batch: 658670**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits

**Lab Sample ID: LCSD 680-658670/3**  
**Matrix: Water**  
**Analysis Batch: 658670**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Method: 2540C-2011 - Total Dissolved Solids (Dried at 180 °C)

**Lab Sample ID: MB 680-658220/1**  
**Matrix: Water**  
**Analysis Batch: 658220**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	5.0	U	5.0		mg/L			03/05/21 13:44	1

**Lab Sample ID: LCS 680-658220/2**  
**Matrix: Water**  
**Analysis Batch: 658220**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	2460	2430		mg/L		99	80 - 120

**Lab Sample ID: LCSD 680-658220/3**  
**Matrix: Water**  
**Analysis Batch: 658220**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	2460	2390		mg/L		97	80 - 120	2	25

## Method: SM 2320B - Alkalinity

**Lab Sample ID: MB 400-523609/4**  
**Matrix: Water**  
**Analysis Batch: 523609**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity, Total	1.0	U	1.0		mg/L			03/12/21 11:27	1

**Lab Sample ID: LCS 400-523609/5**  
**Matrix: Water**  
**Analysis Batch: 523609**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity, Total	100	92.1		mg/L		92	80 - 120

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## GC/MS VOA

### Analysis Batch: 658322

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195713-5	TB-01	Total/NA	Water	8260B	
MB 680-658322/9	Method Blank	Total/NA	Water	8260B	
LCS 680-658322/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-658322/5	Lab Control Sample Dup	Total/NA	Water	8260B	

### Analysis Batch: 658333

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195713-1	BS-OW-01	Total/NA	Water	8260B	
680-195713-2	BS-OW-02	Total/NA	Water	8260B	
680-195713-3	BS-OW-03D	Total/NA	Water	8260B	
MB 680-658333/10	Method Blank	Total/NA	Water	8260B	
LCS 680-658333/5	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-658333/6	Lab Control Sample Dup	Total/NA	Water	8260B	

### Analysis Batch: 658625

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195713-4	MW-29D	Total/NA	Water	8260B	
MB 680-658625/10	Method Blank	Total/NA	Water	8260B	
LCS 680-658625/5	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-658625/6	Lab Control Sample Dup	Total/NA	Water	8260B	

## Metals

### Prep Batch: 658071

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195713-1	BS-OW-01	Total Recoverable	Water	3005A	
680-195713-2	BS-OW-02	Total Recoverable	Water	3005A	
680-195713-3	BS-OW-03D	Total Recoverable	Water	3005A	
680-195713-4	MW-29D	Total Recoverable	Water	3005A	
MB 680-658071/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-658071/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

### Filtration Batch: 658121

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195713-1	BS-OW-01	Dissolved	Water	FILTRATION	
680-195713-2	BS-OW-02	Dissolved	Water	FILTRATION	
680-195713-3	BS-OW-03D	Dissolved	Water	FILTRATION	
680-195713-4	MW-29D	Dissolved	Water	FILTRATION	
MB 680-658121/1-B	Method Blank	Dissolved	Water	FILTRATION	
LCS 680-658121/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
680-195713-2 MS	BS-OW-02	Dissolved	Water	FILTRATION	
680-195713-2 MSD	BS-OW-02	Dissolved	Water	FILTRATION	

### Prep Batch: 658123

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195713-1	BS-OW-01	Dissolved	Water	3005A	658121
680-195713-2	BS-OW-02	Dissolved	Water	3005A	658121
680-195713-3	BS-OW-03D	Dissolved	Water	3005A	658121
680-195713-4	MW-29D	Dissolved	Water	3005A	658121
MB 680-658121/1-B	Method Blank	Dissolved	Water	3005A	658121
LCS 680-658121/2-B	Lab Control Sample	Dissolved	Water	3005A	658121

Eurofins TestAmerica, Savannah

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Metals (Continued)

### Prep Batch: 658123 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195713-2 MS	BS-OW-02	Dissolved	Water	3005A	658123
680-195713-2 MSD	BS-OW-02	Dissolved	Water	3005A	658123

### Analysis Batch: 658382

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195713-1	BS-OW-01	Total Recoverable	Water	6010C	658071
680-195713-2	BS-OW-02	Total Recoverable	Water	6010C	658071
680-195713-3	BS-OW-03D	Total Recoverable	Water	6010C	658071
680-195713-4	MW-29D	Total Recoverable	Water	6010C	658071
MB 680-658071/1-A	Method Blank	Total Recoverable	Water	6010C	658071
LCS 680-658071/2-A	Lab Control Sample	Total Recoverable	Water	6010C	658071

### Analysis Batch: 658603

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195713-1	BS-OW-01	Dissolved	Water	6010C	658123
680-195713-2	BS-OW-02	Dissolved	Water	6010C	658123
680-195713-3	BS-OW-03D	Dissolved	Water	6010C	658123
680-195713-4	MW-29D	Dissolved	Water	6010C	658123
MB 680-658121/1-B	Method Blank	Dissolved	Water	6010C	658123
LCS 680-658121/2-B	Lab Control Sample	Dissolved	Water	6010C	658123
680-195713-2 MS	BS-OW-02	Dissolved	Water	6010C	658123
680-195713-2 MSD	BS-OW-02	Dissolved	Water	6010C	658123

## General Chemistry

### Analysis Batch: 523609

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195713-1	BS-OW-01	Total/NA	Water	SM 2320B	
680-195713-2	BS-OW-02	Total/NA	Water	SM 2320B	
680-195713-3	BS-OW-03D	Total/NA	Water	SM 2320B	
680-195713-4	MW-29D	Total/NA	Water	SM 2320B	
MB 400-523609/4	Method Blank	Total/NA	Water	SM 2320B	
LCS 400-523609/5	Lab Control Sample	Total/NA	Water	SM 2320B	

### Analysis Batch: 658220

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195713-1	BS-OW-01	Total/NA	Water	2540C-2011	
680-195713-2	BS-OW-02	Total/NA	Water	2540C-2011	
680-195713-3	BS-OW-03D	Total/NA	Water	2540C-2011	
680-195713-4	MW-29D	Total/NA	Water	2540C-2011	
MB 680-658220/1	Method Blank	Total/NA	Water	2540C-2011	
LCS 680-658220/2	Lab Control Sample	Total/NA	Water	2540C-2011	
LCSD 680-658220/3	Lab Control Sample Dup	Total/NA	Water	2540C-2011	

### Analysis Batch: 658670

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195713-1	BS-OW-01	Total/NA	Water	130.2-1982	
680-195713-2	BS-OW-02	Total/NA	Water	130.2-1982	
680-195713-3	BS-OW-03D	Total/NA	Water	130.2-1982	
680-195713-4	MW-29D	Total/NA	Water	130.2-1982	
MB 680-658670/1	Method Blank	Total/NA	Water	130.2-1982	

Eurofins TestAmerica, Savannah

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## General Chemistry (Continued)

### Analysis Batch: 658670 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 680-658670/2	Lab Control Sample	Total/NA	Water	130.2-1982	
LCSD 680-658670/3	Lab Control Sample Dup	Total/NA	Water	130.2-1982	

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# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

**Client Sample ID: BS-OW-01**

**Lab Sample ID: 680-195713-1**

**Date Collected: 03/02/21 16:00**

**Matrix: Water**

**Date Received: 03/04/21 09:48**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		20	5 mL	5 mL	658333	03/06/21 22:29	Y1S	TAL SAV
Instrument ID: CMSP2										
Dissolved	Filtration	FILTRATION			1.0 mL	1.0 mL	658121	03/05/21 08:25	BJB	TAL SAV
Dissolved	Prep	3005A			50 mL	50 mL	658123	03/05/21 08:33	BJB	TAL SAV
Dissolved	Analysis	6010C		1			658603	03/08/21 21:35	BWR	TAL SAV
Instrument ID: ICPE										
Total Recoverable	Prep	3005A			50 mL	50 mL	658071	03/04/21 15:31	BCB	TAL SAV
Total Recoverable	Analysis	6010C		1			658382	03/06/21 18:50	BCB	TAL SAV
Instrument ID: ICPE										
Total/NA	Analysis	130.2-1982		25	25 mL	25 mL	658670	03/09/21 12:46	NVF	TAL SAV
Instrument ID: NOEQUIP										
Total/NA	Analysis	2540C-2011		1	5 mL	200 mL	658220	03/05/21 13:44	MS	TAL SAV
Instrument ID: NOEQUIP										
Total/NA	Analysis	SM 2320B		1			523609	03/12/21 13:25	CAC	TAL PEN
Instrument ID: AUTOTITRATOR										

**Client Sample ID: BS-OW-02**

**Lab Sample ID: 680-195713-2**

**Date Collected: 03/02/21 14:35**

**Matrix: Water**

**Date Received: 03/04/21 09:48**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		20	5 mL	5 mL	658333	03/06/21 22:54	Y1S	TAL SAV
Instrument ID: CMSP2										
Dissolved	Filtration	FILTRATION			1.0 mL	1.0 mL	658121	03/05/21 08:25	BJB	TAL SAV
Dissolved	Prep	3005A			50 mL	50 mL	658123	03/05/21 08:33	BJB	TAL SAV
Dissolved	Analysis	6010C		1			658603	03/08/21 21:19	BWR	TAL SAV
Instrument ID: ICPE										
Total Recoverable	Prep	3005A			50 mL	50 mL	658071	03/04/21 15:31	BCB	TAL SAV
Total Recoverable	Analysis	6010C		1			658382	03/06/21 18:30	BCB	TAL SAV
Instrument ID: ICPE										
Total/NA	Analysis	130.2-1982		25	25 mL	25 mL	658670	03/09/21 12:46	NVF	TAL SAV
Instrument ID: NOEQUIP										
Total/NA	Analysis	2540C-2011		1	5 mL	200 mL	658220	03/05/21 13:44	MS	TAL SAV
Instrument ID: NOEQUIP										
Total/NA	Analysis	SM 2320B		1			523609	03/12/21 13:31	CAC	TAL PEN
Instrument ID: AUTOTITRATOR										

**Client Sample ID: BS-OW-03D**

**Lab Sample ID: 680-195713-3**

**Date Collected: 03/02/21 12:15**

**Matrix: Water**

**Date Received: 03/04/21 09:48**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		20	5 mL	5 mL	658333	03/06/21 23:18	Y1S	TAL SAV
Instrument ID: CMSP2										

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Client Sample ID: BS-OW-03D

## Lab Sample ID: 680-195713-3

Date Collected: 03/02/21 12:15

Matrix: Water

Date Received: 03/04/21 09:48

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			1.0 mL	1.0 mL	658121	03/05/21 08:25	BJB	TAL SAV
Dissolved	Prep	3005A			50 mL	50 mL	658123	03/05/21 08:33	BJB	TAL SAV
Dissolved	Analysis	6010C		1			658603	03/08/21 22:06	BWR	TAL SAV
Instrument ID: ICPE										
Total Recoverable	Prep	3005A			50 mL	50 mL	658071	03/04/21 15:31	BCB	TAL SAV
Total Recoverable	Analysis	6010C		1			658382	03/06/21 18:45	BCB	TAL SAV
Instrument ID: ICPE										
Total/NA	Analysis	130.2-1982		25	25 mL	25 mL	658670	03/09/21 12:46	NVF	TAL SAV
Instrument ID: NOEQUIP										
Total/NA	Analysis	2540C-2011		1	5 mL	200 mL	658220	03/05/21 13:44	MS	TAL SAV
Instrument ID: NOEQUIP										
Total/NA	Analysis	SM 2320B		1			523609	03/12/21 13:37	CAC	TAL PEN
Instrument ID: AUTOTITRATOR										

## Client Sample ID: MW-29D

## Lab Sample ID: 680-195713-4

Date Collected: 03/02/21 11:00

Matrix: Water

Date Received: 03/04/21 09:48

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		20	5 mL	5 mL	658625	03/09/21 20:23	UI	TAL SAV
Instrument ID: CMSP2										
Dissolved	Filtration	FILTRATION			1.0 mL	1.0 mL	658121	03/05/21 08:25	BJB	TAL SAV
Dissolved	Prep	3005A			50 mL	50 mL	658123	03/05/21 08:33	BJB	TAL SAV
Dissolved	Analysis	6010C		1			658603	03/08/21 22:01	BWR	TAL SAV
Instrument ID: ICPE										
Total Recoverable	Prep	3005A			50 mL	50 mL	658071	03/04/21 15:31	BCB	TAL SAV
Total Recoverable	Analysis	6010C		1			658382	03/06/21 17:53	BCB	TAL SAV
Instrument ID: ICPE										
Total/NA	Analysis	130.2-1982		25	25 mL	25 mL	658670	03/09/21 12:46	NVF	TAL SAV
Instrument ID: NOEQUIP										
Total/NA	Analysis	2540C-2011		1	10 mL	200 mL	658220	03/05/21 13:44	MS	TAL SAV
Instrument ID: NOEQUIP										
Total/NA	Analysis	SM 2320B		1			523609	03/12/21 13:42	CAC	TAL PEN
Instrument ID: AUTOTITRATOR										

## Client Sample ID: TB-01

## Lab Sample ID: 680-195713-5

Date Collected: 03/02/21 00:00

Matrix: Water

Date Received: 03/04/21 09:48

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	658322	03/06/21 16:06	P1C	TAL SAV
Instrument ID: CMSAA										

### Laboratory References:

TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001  
TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Eurofins TestAmerica, Savannah





**Chain of Custody Record**



<b>Client Information (Sub Contract Lab)</b>		Sampler:		Lab PM Barnett, Eddie T		Carrier Tracking No(s)		COC No 680-646092.1			
Client Contact		Phone:		E-Mail: Eddie.Barnett@Eurofinset.com		State of Origin: Georgia		Page Page 1 of 1			
Shipping/Receiving		Company TestAmerica Laboratories, Inc.		Accreditations Required (See note) NELAP - Florida, State Program - Georgia		Job # 680-195713-1		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)			
Address 3355 McLemore Drive, City: Pensacola State, Zip FL, 32514 Phone 850-474-1001(Tel) 850-478-2671(Fax) Email:		Due Date Requested: 3/14/2021		TAT Requested (days):		<b>Analysis Requested</b>		Other:			
Project Name Hercules - Brunswick Biosparge Pilot Test		PO #:		Project #: 68022348				Field Filtered Sample (Yes or No)		Total Number of containers	
Site:		WO #:		SSOW#:				Perform MS/MSD (Yes or No)		2320BI Alkalinity, Total (only)	
Sample Identification - Client ID (Lab ID)		Sample Date		Sample Time				Sample Type (C=Comp, G=grab)		Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	
						Preservation Code:					
BS-OW-01 (680-195713-1)		3/2/21		16:00 Eastern		Water		X			
BS-OW-02 (680-195713-2)		3/2/21		14:35 Eastern		Water		X			
BS-OW-03D (680-195713-3)		3/2/21		12:15 Eastern		Water		X			
MW-29D (680-195713-4)		3/2/21		11:00 Eastern		Water		X			
<p>Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte &amp; accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins TestAmerica.</p>											
<b>Possible Hazard Identification</b>					<b>Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)</b>						
Unconfirmed					<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months						
Deliverable Requested: I, II, III, IV, Other (specify)					Primary Deliverable Rank: 2						
Empty Kit Relinquished by:					Special Instructions/QC Requirements:						
Relinquished by:		Date/Time: 3-10-21/1443		Company:		Received by:		Date/Time:			
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:			
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time: 3-11-21 951 ETR			
Custody Seals Intact: Δ Yes Δ No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 0.8 °C TR9							

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3/16/2021



# Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-195713-1

**Login Number: 195713**

**List Number: 1**

**Creator: Banda, Christy S**

**List Source: Eurofins TestAmerica, Savannah**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	False	Sulfuric volume not provided for COD.
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	False	Insufficient volume provided to analyze for BOD
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-195713-1

**Login Number: 195713**

**List Number: 2**

**Creator: Avery, Kathy R**

**List Source: Eurofins TestAmerica, Pensacola**

**List Creation: 03/11/21 04:56 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.8°C IR 9
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	False	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-195713-1

## Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87052	06-30-21
Georgia	State	E87052	06-30-21

## Laboratory: Eurofins TestAmerica, Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alabama	State	40150	06-30-21
ANAB	ISO/IEC 17025	L2471	02-23-23
Arizona	State	AZ0710	01-12-22
Arkansas DEQ	State	88-0689	09-02-21
California	State	2510	06-30-21
Florida	NELAP	E81010	06-30-21
Georgia	State	E81010(FL)	06-30-21
Illinois	NELAP	200041	10-09-21
Iowa	State	367	08-01-22
Kansas	NELAP	E-10253	10-31-21
Kentucky (UST)	State	53	06-30-21
Kentucky (WW)	State	KY98030	12-31-21
Louisiana	NELAP	30976	06-30-21
Louisiana (DW)	State	LA017	12-31-21
Maryland	State	233	09-30-21
Massachusetts	State	M-FL094	06-30-21
Michigan	State	9912	06-30-21
New Jersey	NELAP	FL006	06-30-21
New York	NELAP	12115	04-01-21
North Carolina (WW/SW)	State	314	12-31-21
Oklahoma	State	9810-186	08-31-21
Pennsylvania	NELAP	68-00467	01-31-22
Rhode Island	State	LAO00307	12-30-21
South Carolina	State	96026002	06-30-21
Tennessee	State	TN02907	06-30-21
Texas	NELAP	T104704286	09-30-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	US Federal Programs	P330-18-00148	05-17-21
Virginia	NELAP	460166	06-14-21
Washington	State	C915	05-15-21
West Virginia DEP	State	136	06-30-21



## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858

Laboratory Job ID: 680-197281-1

Client Project/Site: Hercules - Brunswick Biosparge Pilot Test

**For:**

Geosyntec Consultants, Inc.  
1255 Roberts Blvd, NW  
Suite 200  
Kennesaw, Georgia 30144

Attn: Adria Reimer



Authorized for release by:  
4/20/2021 7:29:12 AM

Eddie Barnett, Project Manager I  
(912)250-0280  
[Eddie.Barnett@Eurofinset.com](mailto:Eddie.Barnett@Eurofinset.com)

### LINKS

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[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Job ID: 680-197281-1**

**Laboratory: Eurofins TestAmerica, Savannah**

## Narrative

### CASE NARRATIVE

**Client: Geosyntec Consultants, Inc.**  
**Project: Hercules - Brunswick Biosparge Pilot Test**

**Report Number: 680-197281-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

#### **RECEIPT**

The samples were received on 04/08/2021; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 0.4° C and 2.1° C.

#### **VOLATILE ORGANIC COMPOUNDS (GC-MS)**

Samples MW-29D (680-197281-1), BS-OW-02 (680-197281-2), BS-OW-03D (680-197281-3), BS-OW-01 (680-197281-4) and TB-01 (680-197281-5) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 04/15/2021.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 680-664227.

Acetone recovered high for LCSD 680-664227/5. Acetone has been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed. These results have been reported and qualified. Refer to the QC report for details.

Samples MW-29D (680-197281-1)[20X], BS-OW-02 (680-197281-2)[20X], BS-OW-03D (680-197281-3)[20X] and BS-OW-01 (680-197281-4)[20X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **METALS (ICP) - DISSOLVED**

Samples MW-29D (680-197281-1), BS-OW-02 (680-197281-2), BS-OW-03D (680-197281-3) and BS-OW-01 (680-197281-4) were analyzed for Metals (ICP) - Dissolved in accordance with EPA SW-846 Method 6010C. The samples were prepared and analyzed on 04/09/2021.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **METALS (ICP)**

Samples MW-29D (680-197281-1), BS-OW-02 (680-197281-2), BS-OW-03D (680-197281-3) and BS-OW-01 (680-197281-4) were analyzed for Metals (ICP) in accordance with EPA SW-846 Method 6010C. The samples were prepared and analyzed on 04/09/2021.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **HARDNESS AS CALCIUM CARBONATE**

Samples MW-29D (680-197281-1), BS-OW-02 (680-197281-2), BS-OW-03D (680-197281-3) and BS-OW-01 (680-197281-4) were analyzed for hardness as calcium carbonate in accordance with EPA Method 130.2. The samples were analyzed on 04/10/2021.

Samples MW-29D (680-197281-1)[25X], BS-OW-02 (680-197281-2)[25X], BS-OW-03D (680-197281-3)[25X] and BS-OW-01 (680-197281-4)[25X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

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## Job ID: 680-197281-1 (Continued)

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### Laboratory: Eurofins TestAmerica, Savannah (Continued)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### ALKALINITY

Samples MW-29D (680-197281-1), BS-OW-02 (680-197281-2), BS-OW-03D (680-197281-3) and BS-OW-01 (680-197281-4) were analyzed for alkalinity in accordance with SM 2320B. The samples were analyzed on 04/14/2021.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### TOTAL DISSOLVED SOLIDS

Samples MW-29D (680-197281-1), BS-OW-02 (680-197281-2), BS-OW-03D (680-197281-3) and BS-OW-01 (680-197281-4) were analyzed for total dissolved solids in accordance with SM 2540C. The samples were analyzed on 04/08/2021 and 04/09/2021.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### ANIONS BY ION CHROMATOGRAPHY (28 DAY)

Samples MW-29D (680-197281-1), BS-OW-02 (680-197281-2), BS-OW-03D (680-197281-3) and BS-OW-01 (680-197281-4) were analyzed for Anions by Ion Chromatography (28 Day) in accordance with EPA Method 300.0. The samples were analyzed on 04/19/2021.

Samples MW-29D (680-197281-1)[50X], BS-OW-02 (680-197281-2)[50X], BS-OW-03D (680-197281-3)[50X] and BS-OW-01 (680-197281-4)[50X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### BIOCHEMICAL OXYGEN DEMAND

Samples MW-29D (680-197281-1), BS-OW-02 (680-197281-2), BS-OW-03D (680-197281-3) and BS-OW-01 (680-197281-4) were analyzed for Biochemical Oxygen Demand in accordance with SM 5210B. The samples were analyzed on 04/08/2021 and 04/09/2021.

The method blank result associated with batch 663328 was higher than the method-required limit of 0.2 mg/L, but below the RL of 2.0 mg/L, and is reported as non-detect.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### CHEMICAL OXYGEN DEMAND

Samples MW-29D (680-197281-1), BS-OW-02 (680-197281-2), BS-OW-03D (680-197281-3) and BS-OW-01 (680-197281-4) were analyzed for chemical oxygen demand in accordance with SM 5220D. The samples were analyzed on 04/10/2021.

Samples MW-29D (680-197281-1)[100X], BS-OW-02 (680-197281-2)[100X], BS-OW-03D (680-197281-3)[100X] and BS-OW-01 (680-197281-4)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Sample Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-197281-1	MW-29D	Water	04/07/21 08:40	04/08/21 10:20	
680-197281-2	BS-OW-02	Water	04/07/21 10:00	04/08/21 10:20	
680-197281-3	BS-OW-03D	Water	04/07/21 11:05	04/08/21 10:20	
680-197281-4	BS-OW-01	Water	04/07/21 12:05	04/08/21 10:20	
680-197281-5	TB-01	Water	04/07/21 00:00	04/08/21 10:20	

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# Method Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
300.0-1993 R2.1	Anions, Ion Chromatography	MCAWW	TAL SAV
6010C	Metals (ICP)	SW846	TAL SAV
130.2-1982	Hardness, Total (mg/l as CaCO3)	MCAWW	TAL SAV
2540C-2011	Total Dissolved Solids (Dried at 180 °C)	SM	TAL SAV
5210B-2011	BOD, 5-Day	SM	TAL SAV
5220D-2011	Chemical Oxygen Demand	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL PEN
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL SAV
5030B	Purge and Trap	SW846	TAL SAV

#### Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.  
SM = "Standard Methods For The Examination Of Water And Wastewater"  
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001  
TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
U	Indicates the analyte was analyzed for but not detected.

### HPLC/IC

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### General Chemistry

Qualifier	Qualifier Description
b	Result Detected in the Unseeded Control blank (USB).
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Detection Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## Client Sample ID: MW-29D

## Lab Sample ID: 680-197281-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	820		20		ug/L	20		8260B	Total/NA
Chlorobenzene	750		20		ug/L	20		8260B	Total/NA
Ethylbenzene	150		20		ug/L	20		8260B	Total/NA
Isopropylbenzene	210		20		ug/L	20		8260B	Total/NA
m-Xylene & p-Xylene	320		20		ug/L	20		8260B	Total/NA
Chloride	3200		25		mg/L	50		300.0-1993 R2.1	Total/NA
Iron	27000		50		ug/L	1		6010C	Total Recoverable
Manganese	860		10		ug/L	1		6010C	Total Recoverable
Iron	27000		50		ug/L	1		6010C	Dissolved
Manganese	860		10		ug/L	1		6010C	Dissolved
Hardness as calcium carbonate	4900		250		mg/L	25		130.2-1982	Total/NA
Total Dissolved Solids	7300		200		mg/L	1		2540C-2011	Total/NA
Biochemical Oxygen Demand	19	b	2.0		mg/L	1		5210B-2011	Total/NA
Alkalinity, Total	360		1.0		mg/L	1		SM 2320B	Total/NA

## Client Sample ID: BS-OW-02

## Lab Sample ID: 680-197281-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	230		20		ug/L	20		8260B	Total/NA
Chlorobenzene	270		20		ug/L	20		8260B	Total/NA
Isopropylbenzene	40		20		ug/L	20		8260B	Total/NA
m-Xylene & p-Xylene	48		20		ug/L	20		8260B	Total/NA
Chloride	4300		25		mg/L	50		300.0-1993 R2.1	Total/NA
Iron	51000		50		ug/L	1		6010C	Total Recoverable
Manganese	1200		10		ug/L	1		6010C	Total Recoverable
Iron	51000		50		ug/L	1		6010C	Dissolved
Manganese	1200		10		ug/L	1		6010C	Dissolved
Hardness as calcium carbonate	6400		250		mg/L	25		130.2-1982	Total/NA
Total Dissolved Solids	9600		200		mg/L	1		2540C-2011	Total/NA
Biochemical Oxygen Demand	6.3	b	2.0		mg/L	1		5210B-2011	Total/NA
Alkalinity, Total	330		1.0		mg/L	1		SM 2320B	Total/NA

## Client Sample ID: BS-OW-03D

## Lab Sample ID: 680-197281-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Butanone (MEK)	260		200		ug/L	20		8260B	Total/NA
Benzene	490		20		ug/L	20		8260B	Total/NA
Chlorobenzene	460		20		ug/L	20		8260B	Total/NA
Ethylbenzene	110		20		ug/L	20		8260B	Total/NA
Isopropylbenzene	110		20		ug/L	20		8260B	Total/NA
m-Xylene & p-Xylene	220		20		ug/L	20		8260B	Total/NA
Chloride	3800		25		mg/L	50		300.0-1993 R2.1	Total/NA
Iron	47000		50		ug/L	1		6010C	Total Recoverable
Manganese	1600		10		ug/L	1		6010C	Total Recoverable
Iron	45000		50		ug/L	1		6010C	Dissolved
Manganese	1500		10		ug/L	1		6010C	Dissolved
Hardness as calcium carbonate	5400		250		mg/L	25		130.2-1982	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah



# Detection Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## Client Sample ID: BS-OW-03D (Continued)

Lab Sample ID: 680-197281-3

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	6100		200		mg/L	1		2540C-2011	Total/NA
Biochemical Oxygen Demand	9.6		2.0		mg/L	1		5210B-2011	Total/NA
Chemical Oxygen Demand	1300		1000		mg/L	100		5220D-2011	Total/NA
Alkalinity, Total	350		1.0		mg/L	1		SM 2320B	Total/NA

## Client Sample ID: BS-OW-01

Lab Sample ID: 680-197281-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	430		20		ug/L	20		8260B	Total/NA
Chlorobenzene	490		20		ug/L	20		8260B	Total/NA
Ethylbenzene	110		20		ug/L	20		8260B	Total/NA
Isopropylbenzene	97		20		ug/L	20		8260B	Total/NA
m-Xylene & p-Xylene	74		20		ug/L	20		8260B	Total/NA
Chloride	3700		25		mg/L	50		300.0-1993 R2.1	Total/NA
Iron	32000		50		ug/L	1		6010C	Total Recoverable
Manganese	790		10		ug/L	1		6010C	Total Recoverable
Iron	33000		50		ug/L	1		6010C	Dissolved
Manganese	810		10		ug/L	1		6010C	Dissolved
Hardness as calcium carbonate	5400		250		mg/L	25		130.2-1982	Total/NA
Total Dissolved Solids	6200		200		mg/L	1		2540C-2011	Total/NA
Biochemical Oxygen Demand	5.8		2.0		mg/L	1		5210B-2011	Total/NA
Chemical Oxygen Demand	200		100		mg/L	10		5220D-2011	Total/NA
Alkalinity, Total	330		1.0		mg/L	1		SM 2320B	Total/NA

## Client Sample ID: TB-01

Lab Sample ID: 680-197281-5

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Client Sample ID: MW-29D**

**Lab Sample ID: 680-197281-1**

**Date Collected: 04/07/21 08:40**

**Matrix: Water**

**Date Received: 04/08/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	20	U	20		ug/L			04/15/21 19:37	20
1,1,1,2-Tetrachloroethane	20	U	20		ug/L			04/15/21 19:37	20
1,1,2-Trichloro-1,2,2-trifluoroethane	20	U	20		ug/L			04/15/21 19:37	20
1,1,2-Trichloroethane	20	U	20		ug/L			04/15/21 19:37	20
1,1-Dichloroethane	20	U	20		ug/L			04/15/21 19:37	20
1,1-Dichloroethene	20	U	20		ug/L			04/15/21 19:37	20
1,2,3-Trichlorobenzene	100	U	100		ug/L			04/15/21 19:37	20
1,2-Dichloroethane	20	U	20		ug/L			04/15/21 19:37	20
1,2-Dichloropropane	20	U	20		ug/L			04/15/21 19:37	20
2-Butanone (MEK)	200	U	200		ug/L			04/15/21 19:37	20
2-Hexanone	200	U	200		ug/L			04/15/21 19:37	20
4-Methyl-2-pentanone	200	U	200		ug/L			04/15/21 19:37	20
Acetone	200	U *	200		ug/L			04/15/21 19:37	20
<b>Benzene</b>	<b>820</b>		20		ug/L			04/15/21 19:37	20
Bromochloromethane	20	U	20		ug/L			04/15/21 19:37	20
Bromodichloromethane	20	U	20		ug/L			04/15/21 19:37	20
Bromoform	20	U	20		ug/L			04/15/21 19:37	20
Bromomethane	100	U	100		ug/L			04/15/21 19:37	20
Carbon disulfide	40	U	40		ug/L			04/15/21 19:37	20
Carbon tetrachloride	20	U	20		ug/L			04/15/21 19:37	20
<b>Chlorobenzene</b>	<b>750</b>		20		ug/L			04/15/21 19:37	20
Chloroethane	100	U	100		ug/L			04/15/21 19:37	20
Chloroform	20	U	20		ug/L			04/15/21 19:37	20
Chloromethane	20	U	20		ug/L			04/15/21 19:37	20
cis-1,2-Dichloroethene	20	U	20		ug/L			04/15/21 19:37	20
cis-1,3-Dichloropropene	20	U	20		ug/L			04/15/21 19:37	20
Cyclohexane	20	U	20		ug/L			04/15/21 19:37	20
Dibromochloromethane	20	U	20		ug/L			04/15/21 19:37	20
Dichlorodifluoromethane	20	U	20		ug/L			04/15/21 19:37	20
<b>Ethylbenzene</b>	<b>150</b>		20		ug/L			04/15/21 19:37	20
<b>Isopropylbenzene</b>	<b>210</b>		20		ug/L			04/15/21 19:37	20
Methyl acetate	100	U	100		ug/L			04/15/21 19:37	20
Methyl tert-butyl ether	200	U	200		ug/L			04/15/21 19:37	20
Methylcyclohexane	20	U	20		ug/L			04/15/21 19:37	20
Methylene Chloride	100	U	100		ug/L			04/15/21 19:37	20
<b>m-Xylene &amp; p-Xylene</b>	<b>320</b>		20		ug/L			04/15/21 19:37	20
o-Xylene	20	U	20		ug/L			04/15/21 19:37	20
Styrene	20	U	20		ug/L			04/15/21 19:37	20
Tetrachloroethene	20	U	20		ug/L			04/15/21 19:37	20
Toluene	20	U	20		ug/L			04/15/21 19:37	20
trans-1,2-Dichloroethene	20	U	20		ug/L			04/15/21 19:37	20
trans-1,3-Dichloropropene	20	U	20		ug/L			04/15/21 19:37	20
Trichloroethene	20	U	20		ug/L			04/15/21 19:37	20
Trichlorofluoromethane	20	U	20		ug/L			04/15/21 19:37	20
Vinyl chloride	20	U	20		ug/L			04/15/21 19:37	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		60 - 124		04/15/21 19:37	20
4-Bromofluorobenzene (Surr)	107		70 - 130		04/15/21 19:37	20
Dibromofluoromethane (Surr)	119		70 - 130		04/15/21 19:37	20

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Client Sample ID: MW-29D**

**Lab Sample ID: 680-197281-1**

Date Collected: 04/07/21 08:40

Matrix: Water

Date Received: 04/08/21 10:20

**Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	113		70 - 130		04/15/21 19:37	20

**Method: 300.0-1993 R2.1 - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3200		25		mg/L			04/19/21 22:52	50

**Method: 6010C - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	27000		50		ug/L		04/09/21 10:27	04/09/21 22:18	1
Manganese	860		10		ug/L		04/09/21 10:27	04/09/21 22:18	1

**Method: 6010C - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	27000		50		ug/L		04/09/21 10:27	04/09/21 22:13	1
Manganese	860		10		ug/L		04/09/21 10:27	04/09/21 22:13	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	1000	U	1000		mg/L			04/10/21 10:44	100
Alkalinity, Total	360		1.0		mg/L			04/14/21 16:06	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	4900		250		mg/L			04/10/21 11:22	25
Total Dissolved Solids	7300		200		mg/L			04/08/21 13:24	1
Biochemical Oxygen Demand	19	b	2.0		mg/L			04/08/21 15:52	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Client Sample ID: BS-OW-02**

**Lab Sample ID: 680-197281-2**

**Date Collected: 04/07/21 10:00**

**Matrix: Water**

**Date Received: 04/08/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	20	U	20		ug/L			04/15/21 20:02	20
1,1,1,2-Tetrachloroethane	20	U	20		ug/L			04/15/21 20:02	20
1,1,2-Trichloro-1,2,2-trifluoroethane	20	U	20		ug/L			04/15/21 20:02	20
1,1,2-Trichloroethane	20	U	20		ug/L			04/15/21 20:02	20
1,1-Dichloroethane	20	U	20		ug/L			04/15/21 20:02	20
1,1-Dichloroethene	20	U	20		ug/L			04/15/21 20:02	20
1,2,3-Trichlorobenzene	100	U	100		ug/L			04/15/21 20:02	20
1,2-Dichloroethane	20	U	20		ug/L			04/15/21 20:02	20
1,2-Dichloropropane	20	U	20		ug/L			04/15/21 20:02	20
2-Butanone (MEK)	200	U	200		ug/L			04/15/21 20:02	20
2-Hexanone	200	U	200		ug/L			04/15/21 20:02	20
4-Methyl-2-pentanone	200	U	200		ug/L			04/15/21 20:02	20
Acetone	200	U*	200		ug/L			04/15/21 20:02	20
<b>Benzene</b>	<b>230</b>		20		ug/L			04/15/21 20:02	20
Bromochloromethane	20	U	20		ug/L			04/15/21 20:02	20
Bromodichloromethane	20	U	20		ug/L			04/15/21 20:02	20
Bromoform	20	U	20		ug/L			04/15/21 20:02	20
Bromomethane	100	U	100		ug/L			04/15/21 20:02	20
Carbon disulfide	40	U	40		ug/L			04/15/21 20:02	20
Carbon tetrachloride	20	U	20		ug/L			04/15/21 20:02	20
<b>Chlorobenzene</b>	<b>270</b>		20		ug/L			04/15/21 20:02	20
Chloroethane	100	U	100		ug/L			04/15/21 20:02	20
Chloroform	20	U	20		ug/L			04/15/21 20:02	20
Chloromethane	20	U	20		ug/L			04/15/21 20:02	20
cis-1,2-Dichloroethene	20	U	20		ug/L			04/15/21 20:02	20
cis-1,3-Dichloropropene	20	U	20		ug/L			04/15/21 20:02	20
Cyclohexane	20	U	20		ug/L			04/15/21 20:02	20
Dibromochloromethane	20	U	20		ug/L			04/15/21 20:02	20
Dichlorodifluoromethane	20	U	20		ug/L			04/15/21 20:02	20
Ethylbenzene	20	U	20		ug/L			04/15/21 20:02	20
<b>Isopropylbenzene</b>	<b>40</b>		20		ug/L			04/15/21 20:02	20
Methyl acetate	100	U	100		ug/L			04/15/21 20:02	20
Methyl tert-butyl ether	200	U	200		ug/L			04/15/21 20:02	20
Methylcyclohexane	20	U	20		ug/L			04/15/21 20:02	20
Methylene Chloride	100	U	100		ug/L			04/15/21 20:02	20
<b>m-Xylene &amp; p-Xylene</b>	<b>48</b>		20		ug/L			04/15/21 20:02	20
o-Xylene	20	U	20		ug/L			04/15/21 20:02	20
Styrene	20	U	20		ug/L			04/15/21 20:02	20
Tetrachloroethene	20	U	20		ug/L			04/15/21 20:02	20
Toluene	20	U	20		ug/L			04/15/21 20:02	20
trans-1,2-Dichloroethene	20	U	20		ug/L			04/15/21 20:02	20
trans-1,3-Dichloropropene	20	U	20		ug/L			04/15/21 20:02	20
Trichloroethene	20	U	20		ug/L			04/15/21 20:02	20
Trichlorofluoromethane	20	U	20		ug/L			04/15/21 20:02	20
Vinyl chloride	20	U	20		ug/L			04/15/21 20:02	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		60 - 124		04/15/21 20:02	20
4-Bromofluorobenzene (Surr)	106		70 - 130		04/15/21 20:02	20
Dibromofluoromethane (Surr)	121		70 - 130		04/15/21 20:02	20

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Client Sample ID: BS-OW-02**

**Lab Sample ID: 680-197281-2**

Date Collected: 04/07/21 10:00

Matrix: Water

Date Received: 04/08/21 10:20

**Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	111		70 - 130		04/15/21 20:02	20

**Method: 300.0-1993 R2.1 - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4300		25		mg/L			04/19/21 23:05	50

**Method: 6010C - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	51000		50		ug/L		04/09/21 10:27	04/09/21 21:59	1
Manganese	1200		10		ug/L		04/09/21 10:27	04/09/21 21:59	1

**Method: 6010C - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	51000		50		ug/L		04/09/21 10:27	04/09/21 21:46	1
Manganese	1200		10		ug/L		04/09/21 10:27	04/09/21 21:46	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	1000	U	1000		mg/L			04/10/21 10:44	100
Alkalinity, Total	330		1.0		mg/L			04/14/21 16:12	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	6400		250		mg/L			04/10/21 11:22	25
Total Dissolved Solids	9600		200		mg/L			04/08/21 13:24	1
Biochemical Oxygen Demand	6.3	b	2.0		mg/L			04/08/21 16:02	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Client Sample ID: BS-OW-03D**

**Lab Sample ID: 680-197281-3**

Date Collected: 04/07/21 11:05

Matrix: Water

Date Received: 04/08/21 10:20

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	20	U	20		ug/L			04/15/21 20:28	20
1,1,1,2-Tetrachloroethane	20	U	20		ug/L			04/15/21 20:28	20
1,1,2-Trichloro-1,2,2-trifluoroethane	20	U	20		ug/L			04/15/21 20:28	20
1,1,2-Trichloroethane	20	U	20		ug/L			04/15/21 20:28	20
1,1-Dichloroethane	20	U	20		ug/L			04/15/21 20:28	20
1,1-Dichloroethene	20	U	20		ug/L			04/15/21 20:28	20
1,2,3-Trichlorobenzene	100	U	100		ug/L			04/15/21 20:28	20
1,2-Dichloroethane	20	U	20		ug/L			04/15/21 20:28	20
1,2-Dichloropropane	20	U	20		ug/L			04/15/21 20:28	20
<b>2-Butanone (MEK)</b>	<b>260</b>		200		ug/L			04/15/21 20:28	20
2-Hexanone	200	U	200		ug/L			04/15/21 20:28	20
4-Methyl-2-pentanone	200	U	200		ug/L			04/15/21 20:28	20
Acetone	200	U *	200		ug/L			04/15/21 20:28	20
<b>Benzene</b>	<b>490</b>		20		ug/L			04/15/21 20:28	20
Bromochloromethane	20	U	20		ug/L			04/15/21 20:28	20
Bromodichloromethane	20	U	20		ug/L			04/15/21 20:28	20
Bromoform	20	U	20		ug/L			04/15/21 20:28	20
Bromomethane	100	U	100		ug/L			04/15/21 20:28	20
Carbon disulfide	40	U	40		ug/L			04/15/21 20:28	20
Carbon tetrachloride	20	U	20		ug/L			04/15/21 20:28	20
<b>Chlorobenzene</b>	<b>460</b>		20		ug/L			04/15/21 20:28	20
Chloroethane	100	U	100		ug/L			04/15/21 20:28	20
Chloroform	20	U	20		ug/L			04/15/21 20:28	20
Chloromethane	20	U	20		ug/L			04/15/21 20:28	20
cis-1,2-Dichloroethene	20	U	20		ug/L			04/15/21 20:28	20
cis-1,3-Dichloropropene	20	U	20		ug/L			04/15/21 20:28	20
Cyclohexane	20	U	20		ug/L			04/15/21 20:28	20
Dibromochloromethane	20	U	20		ug/L			04/15/21 20:28	20
Dichlorodifluoromethane	20	U	20		ug/L			04/15/21 20:28	20
<b>Ethylbenzene</b>	<b>110</b>		20		ug/L			04/15/21 20:28	20
<b>Isopropylbenzene</b>	<b>110</b>		20		ug/L			04/15/21 20:28	20
Methyl acetate	100	U	100		ug/L			04/15/21 20:28	20
Methyl tert-butyl ether	200	U	200		ug/L			04/15/21 20:28	20
Methylcyclohexane	20	U	20		ug/L			04/15/21 20:28	20
Methylene Chloride	100	U	100		ug/L			04/15/21 20:28	20
<b>m-Xylene &amp; p-Xylene</b>	<b>220</b>		20		ug/L			04/15/21 20:28	20
o-Xylene	20	U	20		ug/L			04/15/21 20:28	20
Styrene	20	U	20		ug/L			04/15/21 20:28	20
Tetrachloroethene	20	U	20		ug/L			04/15/21 20:28	20
Toluene	20	U	20		ug/L			04/15/21 20:28	20
trans-1,2-Dichloroethene	20	U	20		ug/L			04/15/21 20:28	20
trans-1,3-Dichloropropene	20	U	20		ug/L			04/15/21 20:28	20
Trichloroethene	20	U	20		ug/L			04/15/21 20:28	20
Trichlorofluoromethane	20	U	20		ug/L			04/15/21 20:28	20
Vinyl chloride	20	U	20		ug/L			04/15/21 20:28	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		60 - 124		04/15/21 20:28	20
4-Bromofluorobenzene (Surr)	107		70 - 130		04/15/21 20:28	20
Dibromofluoromethane (Surr)	119		70 - 130		04/15/21 20:28	20

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Client Sample ID: BS-OW-03D**

**Lab Sample ID: 680-197281-3**

Date Collected: 04/07/21 11:05

Matrix: Water

Date Received: 04/08/21 10:20

**Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	112		70 - 130		04/15/21 20:28	20

**Method: 300.0-1993 R2.1 - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3800		25		mg/L			04/19/21 23:18	50

**Method: 6010C - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	47000		50		ug/L		04/09/21 10:27	04/09/21 22:04	1
Manganese	1600		10		ug/L		04/09/21 10:27	04/09/21 22:04	1

**Method: 6010C - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	45000		50		ug/L		04/09/21 10:27	04/09/21 22:09	1
Manganese	1500		10		ug/L		04/09/21 10:27	04/09/21 22:09	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	1300		1000		mg/L			04/10/21 10:44	100
Alkalinity, Total	350		1.0		mg/L			04/14/21 16:18	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	5400		250		mg/L			04/10/21 11:22	25
Total Dissolved Solids	6100		200		mg/L			04/09/21 10:43	1
Biochemical Oxygen Demand	9.6		2.0		mg/L			04/09/21 11:00	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Client Sample ID: BS-OW-01**

**Lab Sample ID: 680-197281-4**

Date Collected: 04/07/21 12:05

Matrix: Water

Date Received: 04/08/21 10:20

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	20	U	20		ug/L			04/15/21 20:54	20
1,1,1,2-Tetrachloroethane	20	U	20		ug/L			04/15/21 20:54	20
1,1,2-Trichloro-1,2,2-trifluoroethane	20	U	20		ug/L			04/15/21 20:54	20
1,1,2-Trichloroethane	20	U	20		ug/L			04/15/21 20:54	20
1,1-Dichloroethane	20	U	20		ug/L			04/15/21 20:54	20
1,1-Dichloroethene	20	U	20		ug/L			04/15/21 20:54	20
1,2,3-Trichlorobenzene	100	U	100		ug/L			04/15/21 20:54	20
1,2-Dichloroethane	20	U	20		ug/L			04/15/21 20:54	20
1,2-Dichloropropane	20	U	20		ug/L			04/15/21 20:54	20
2-Butanone (MEK)	200	U	200		ug/L			04/15/21 20:54	20
2-Hexanone	200	U	200		ug/L			04/15/21 20:54	20
4-Methyl-2-pentanone	200	U	200		ug/L			04/15/21 20:54	20
Acetone	200	U *	200		ug/L			04/15/21 20:54	20
<b>Benzene</b>	<b>430</b>		20		ug/L			04/15/21 20:54	20
Bromochloromethane	20	U	20		ug/L			04/15/21 20:54	20
Bromodichloromethane	20	U	20		ug/L			04/15/21 20:54	20
Bromoform	20	U	20		ug/L			04/15/21 20:54	20
Bromomethane	100	U	100		ug/L			04/15/21 20:54	20
Carbon disulfide	40	U	40		ug/L			04/15/21 20:54	20
Carbon tetrachloride	20	U	20		ug/L			04/15/21 20:54	20
<b>Chlorobenzene</b>	<b>490</b>		20		ug/L			04/15/21 20:54	20
Chloroethane	100	U	100		ug/L			04/15/21 20:54	20
Chloroform	20	U	20		ug/L			04/15/21 20:54	20
Chloromethane	20	U	20		ug/L			04/15/21 20:54	20
cis-1,2-Dichloroethene	20	U	20		ug/L			04/15/21 20:54	20
cis-1,3-Dichloropropene	20	U	20		ug/L			04/15/21 20:54	20
Cyclohexane	20	U	20		ug/L			04/15/21 20:54	20
Dibromochloromethane	20	U	20		ug/L			04/15/21 20:54	20
Dichlorodifluoromethane	20	U	20		ug/L			04/15/21 20:54	20
<b>Ethylbenzene</b>	<b>110</b>		20		ug/L			04/15/21 20:54	20
<b>Isopropylbenzene</b>	<b>97</b>		20		ug/L			04/15/21 20:54	20
Methyl acetate	100	U	100		ug/L			04/15/21 20:54	20
Methyl tert-butyl ether	200	U	200		ug/L			04/15/21 20:54	20
Methylcyclohexane	20	U	20		ug/L			04/15/21 20:54	20
Methylene Chloride	100	U	100		ug/L			04/15/21 20:54	20
<b>m-Xylene &amp; p-Xylene</b>	<b>74</b>		20		ug/L			04/15/21 20:54	20
o-Xylene	20	U	20		ug/L			04/15/21 20:54	20
Styrene	20	U	20		ug/L			04/15/21 20:54	20
Tetrachloroethene	20	U	20		ug/L			04/15/21 20:54	20
Toluene	20	U	20		ug/L			04/15/21 20:54	20
trans-1,2-Dichloroethene	20	U	20		ug/L			04/15/21 20:54	20
trans-1,3-Dichloropropene	20	U	20		ug/L			04/15/21 20:54	20
Trichloroethene	20	U	20		ug/L			04/15/21 20:54	20
Trichlorofluoromethane	20	U	20		ug/L			04/15/21 20:54	20
Vinyl chloride	20	U	20		ug/L			04/15/21 20:54	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	104		60 - 124		04/15/21 20:54	20
4-Bromofluorobenzene (Surr)	107		70 - 130		04/15/21 20:54	20
Dibromofluoromethane (Surr)	117		70 - 130		04/15/21 20:54	20

Eurofins TestAmerica, Savannah



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Client Sample ID: BS-OW-01**

**Lab Sample ID: 680-197281-4**

Date Collected: 04/07/21 12:05

Matrix: Water

Date Received: 04/08/21 10:20

**Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)**

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	112		70 - 130		04/15/21 20:54	20

**Method: 300.0-1993 R2.1 - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3700		25		mg/L			04/19/21 23:30	50

**Method: 6010C - Metals (ICP) - Total Recoverable**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	32000		50		ug/L		04/09/21 10:27	04/09/21 21:50	1
Manganese	790		10		ug/L		04/09/21 10:27	04/09/21 21:50	1

**Method: 6010C - Metals (ICP) - Dissolved**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33000		50		ug/L		04/09/21 10:27	04/09/21 21:55	1
Manganese	810		10		ug/L		04/09/21 10:27	04/09/21 21:55	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	200		100		mg/L			04/10/21 10:44	10
Alkalinity, Total	330		1.0		mg/L			04/14/21 16:24	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	5400		250		mg/L			04/10/21 11:22	25
Total Dissolved Solids	6200		200		mg/L			04/09/21 10:43	1
Biochemical Oxygen Demand	5.8		2.0		mg/L			04/09/21 11:08	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Client Sample ID: TB-01**  
**Date Collected: 04/07/21 00:00**  
**Date Received: 04/08/21 10:20**

**Lab Sample ID: 680-197281-5**  
**Matrix: Water**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	1.0	U	1.0		ug/L			04/15/21 15:20	1
1,1,2,2-Tetrachloroethane	1.0	U	1.0		ug/L			04/15/21 15:20	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.0	U	1.0		ug/L			04/15/21 15:20	1
1,1,2-Trichloroethane	1.0	U	1.0		ug/L			04/15/21 15:20	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/15/21 15:20	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/15/21 15:20	1
1,2,3-Trichlorobenzene	5.0	U	5.0		ug/L			04/15/21 15:20	1
1,2-Dichloroethane	1.0	U	1.0		ug/L			04/15/21 15:20	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/15/21 15:20	1
2-Butanone (MEK)	10	U	10		ug/L			04/15/21 15:20	1
2-Hexanone	10	U	10		ug/L			04/15/21 15:20	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/15/21 15:20	1
Acetone	10	U *	10		ug/L			04/15/21 15:20	1
Benzene	1.0	U	1.0		ug/L			04/15/21 15:20	1
Bromochloromethane	1.0	U	1.0		ug/L			04/15/21 15:20	1
Bromodichloromethane	1.0	U	1.0		ug/L			04/15/21 15:20	1
Bromoform	1.0	U	1.0		ug/L			04/15/21 15:20	1
Bromomethane	5.0	U	5.0		ug/L			04/15/21 15:20	1
Carbon disulfide	2.0	U	2.0		ug/L			04/15/21 15:20	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/15/21 15:20	1
Chlorobenzene	1.0	U	1.0		ug/L			04/15/21 15:20	1
Chloroethane	5.0	U	5.0		ug/L			04/15/21 15:20	1
Chloroform	1.0	U	1.0		ug/L			04/15/21 15:20	1
Chloromethane	1.0	U	1.0		ug/L			04/15/21 15:20	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/15/21 15:20	1
cis-1,3-Dichloropropene	1.0	U	1.0		ug/L			04/15/21 15:20	1
Cyclohexane	1.0	U	1.0		ug/L			04/15/21 15:20	1
Dibromochloromethane	1.0	U	1.0		ug/L			04/15/21 15:20	1
Dichlorodifluoromethane	1.0	U	1.0		ug/L			04/15/21 15:20	1
Ethylbenzene	1.0	U	1.0		ug/L			04/15/21 15:20	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/15/21 15:20	1
Methyl acetate	5.0	U	5.0		ug/L			04/15/21 15:20	1
Methyl tert-butyl ether	10	U	10		ug/L			04/15/21 15:20	1
Methylcyclohexane	1.0	U	1.0		ug/L			04/15/21 15:20	1
Methylene Chloride	5.0	U	5.0		ug/L			04/15/21 15:20	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/15/21 15:20	1
o-Xylene	1.0	U	1.0		ug/L			04/15/21 15:20	1
Styrene	1.0	U	1.0		ug/L			04/15/21 15:20	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/15/21 15:20	1
Toluene	1.0	U	1.0		ug/L			04/15/21 15:20	1
trans-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/15/21 15:20	1
trans-1,3-Dichloropropene	1.0	U	1.0		ug/L			04/15/21 15:20	1
Trichloroethene	1.0	U	1.0		ug/L			04/15/21 15:20	1
Trichlorofluoromethane	1.0	U	1.0		ug/L			04/15/21 15:20	1
Vinyl chloride	1.0	U	1.0		ug/L			04/15/21 15:20	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	105		60 - 124		04/15/21 15:20	1
4-Bromofluorobenzene (Surr)	109		70 - 130		04/15/21 15:20	1
Dibromofluoromethane (Surr)	116		70 - 130		04/15/21 15:20	1

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Client Sample ID: TB-01**

**Lab Sample ID: 680-197281-5**

**Date Collected: 04/07/21 00:00**

**Matrix: Water**

**Date Received: 04/08/21 10:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)**

<u>Surrogate</u>	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Dil Fac</u>
Toluene-d8 (Surr)	112		70 - 130		04/15/21 15:20	1

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# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

**Matrix: Water**

**Prep Type: Total/NA**

## Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA	BFB	DBFM	TOL
		(60-124)	(70-130)	(70-130)	(70-130)
680-197281-1	MW-29D	107	107	119	113
680-197281-2	BS-OW-02	106	106	121	111
680-197281-3	BS-OW-03D	106	107	119	112
680-197281-4	BS-OW-01	104	107	117	112
680-197281-5	TB-01	105	109	116	112
LCS 680-664227/4	Lab Control Sample	103	96	108	106
LCSD 680-664227/5	Lab Control Sample Dup	108	97	110	106
MB 680-664227/9	Method Blank	106	112	118	112

### Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

TOL = Toluene-d8 (Surr)

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 680-664227/9**  
**Matrix: Water**  
**Analysis Batch: 664227**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
1,1,1-Trichloroethane	1.0	U	1.0		ug/L			04/15/21 14:54	1
1,1,1,2-Tetrachloroethane	1.0	U	1.0		ug/L			04/15/21 14:54	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.0	U	1.0		ug/L			04/15/21 14:54	1
1,1,2-Trichloroethane	1.0	U	1.0		ug/L			04/15/21 14:54	1
1,1-Dichloroethane	1.0	U	1.0		ug/L			04/15/21 14:54	1
1,1-Dichloroethene	1.0	U	1.0		ug/L			04/15/21 14:54	1
1,2,3-Trichlorobenzene	5.0	U	5.0		ug/L			04/15/21 14:54	1
1,2-Dichloroethane	1.0	U	1.0		ug/L			04/15/21 14:54	1
1,2-Dichloropropane	1.0	U	1.0		ug/L			04/15/21 14:54	1
2-Butanone (MEK)	10	U	10		ug/L			04/15/21 14:54	1
2-Hexanone	10	U	10		ug/L			04/15/21 14:54	1
4-Methyl-2-pentanone	10	U	10		ug/L			04/15/21 14:54	1
Acetone	10	U	10		ug/L			04/15/21 14:54	1
Benzene	1.0	U	1.0		ug/L			04/15/21 14:54	1
Bromochloromethane	1.0	U	1.0		ug/L			04/15/21 14:54	1
Bromodichloromethane	1.0	U	1.0		ug/L			04/15/21 14:54	1
Bromoform	1.0	U	1.0		ug/L			04/15/21 14:54	1
Bromomethane	5.0	U	5.0		ug/L			04/15/21 14:54	1
Carbon disulfide	2.0	U	2.0		ug/L			04/15/21 14:54	1
Carbon tetrachloride	1.0	U	1.0		ug/L			04/15/21 14:54	1
Chlorobenzene	1.0	U	1.0		ug/L			04/15/21 14:54	1
Chloroethane	5.0	U	5.0		ug/L			04/15/21 14:54	1
Chloroform	1.0	U	1.0		ug/L			04/15/21 14:54	1
Chloromethane	1.0	U	1.0		ug/L			04/15/21 14:54	1
cis-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/15/21 14:54	1
cis-1,3-Dichloropropene	1.0	U	1.0		ug/L			04/15/21 14:54	1
Cyclohexane	1.0	U	1.0		ug/L			04/15/21 14:54	1
Dibromochloromethane	1.0	U	1.0		ug/L			04/15/21 14:54	1
Dichlorodifluoromethane	1.0	U	1.0		ug/L			04/15/21 14:54	1
Ethylbenzene	1.0	U	1.0		ug/L			04/15/21 14:54	1
Isopropylbenzene	1.0	U	1.0		ug/L			04/15/21 14:54	1
Methyl acetate	5.0	U	5.0		ug/L			04/15/21 14:54	1
Methyl tert-butyl ether	10	U	10		ug/L			04/15/21 14:54	1
Methylcyclohexane	1.0	U	1.0		ug/L			04/15/21 14:54	1
Methylene Chloride	5.0	U	5.0		ug/L			04/15/21 14:54	1
m-Xylene & p-Xylene	1.0	U	1.0		ug/L			04/15/21 14:54	1
o-Xylene	1.0	U	1.0		ug/L			04/15/21 14:54	1
Styrene	1.0	U	1.0		ug/L			04/15/21 14:54	1
Tetrachloroethene	1.0	U	1.0		ug/L			04/15/21 14:54	1
Toluene	1.0	U	1.0		ug/L			04/15/21 14:54	1
trans-1,2-Dichloroethene	1.0	U	1.0		ug/L			04/15/21 14:54	1
trans-1,3-Dichloropropene	1.0	U	1.0		ug/L			04/15/21 14:54	1
Trichloroethene	1.0	U	1.0		ug/L			04/15/21 14:54	1
Trichlorofluoromethane	1.0	U	1.0		ug/L			04/15/21 14:54	1
Vinyl chloride	1.0	U	1.0		ug/L			04/15/21 14:54	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1,2-Dichloroethane-d4 (Surr)	106		60 - 124		04/15/21 14:54	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 680-664227/9**  
**Matrix: Water**  
**Analysis Batch: 664227**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
4-Bromofluorobenzene (Surr)	112		70 - 130		04/15/21 14:54	1
Dibromofluoromethane (Surr)	118		70 - 130		04/15/21 14:54	1
Toluene-d8 (Surr)	112		70 - 130		04/15/21 14:54	1

**Lab Sample ID: LCS 680-664227/4**  
**Matrix: Water**  
**Analysis Batch: 664227**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec.
							Limits
1,1,1-Trichloroethane	50.0	51.9		ug/L		104	70 - 130
1,1,2,2-Tetrachloroethane	50.0	54.4		ug/L		109	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	51.1		ug/L		102	63 - 141
1,1,2-Trichloroethane	50.0	54.5		ug/L		109	70 - 130
1,1-Dichloroethane	50.0	50.3		ug/L		101	70 - 130
1,1-Dichloroethene	50.0	47.5		ug/L		95	70 - 130
1,2,3-Trichlorobenzene	50.0	62.1		ug/L		124	61 - 141
1,2-Dichloroethane	50.0	52.7		ug/L		105	70 - 130
1,2-Dichloropropane	50.0	51.3		ug/L		103	70 - 130
2-Butanone (MEK)	250	256		ug/L		103	69 - 114
2-Hexanone	250	242		ug/L		97	70 - 130
4-Methyl-2-pentanone	250	241		ug/L		97	68 - 108
Acetone	250	268		ug/L		107	67 - 113
Benzene	50.0	53.2		ug/L		106	70 - 130
Bromochloromethane	50.0	49.1		ug/L		98	70 - 130
Bromodichloromethane	50.0	50.1		ug/L		100	70 - 130
Bromoform	50.0	53.7		ug/L		107	69 - 129
Bromomethane	50.0	40.6		ug/L		81	28 - 192
Carbon disulfide	50.0	50.5		ug/L		101	70 - 130
Carbon tetrachloride	50.0	52.1		ug/L		104	70 - 130
Chlorobenzene	50.0	56.0		ug/L		112	70 - 130
Chloroethane	50.0	44.7		ug/L		89	31 - 213
Chloroform	50.0	51.7		ug/L		103	70 - 130
Chloromethane	50.0	44.0		ug/L		88	59 - 127
cis-1,2-Dichloroethene	50.0	51.0		ug/L		102	70 - 130
cis-1,3-Dichloropropene	50.0	54.1		ug/L		108	70 - 130
Cyclohexane	50.0	46.5		ug/L		93	23 - 175
Dibromochloromethane	50.0	53.9		ug/L		108	70 - 130
Dichlorodifluoromethane	50.0	47.4		ug/L		95	70 - 130
Ethylbenzene	50.0	53.6		ug/L		107	70 - 130
Isopropylbenzene	50.0	55.3		ug/L		111	70 - 130
Methyl acetate	100	88.3		ug/L		88	67 - 110
Methyl tert-butyl ether	50.0	54.0		ug/L		108	70 - 130
Methylcyclohexane	50.0	52.7		ug/L		105	70 - 130
Methylene Chloride	50.0	49.3		ug/L		99	70 - 130
m-Xylene & p-Xylene	50.0	55.2		ug/L		110	70 - 130
o-Xylene	50.0	55.4		ug/L		111	70 - 130
Styrene	50.0	57.2		ug/L		114	70 - 130
Tetrachloroethene	50.0	57.0		ug/L		114	70 - 130

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-664227/4**  
**Matrix: Water**  
**Analysis Batch: 664227**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Toluene	50.0	53.2		ug/L		106	70 - 130
trans-1,2-Dichloroethene	50.0	50.0		ug/L		100	70 - 130
trans-1,3-Dichloropropene	50.0	57.9		ug/L		116	70 - 130
Trichloroethene	50.0	57.2		ug/L		114	70 - 130
Trichlorofluoromethane	50.0	46.9		ug/L		94	63 - 142
Vinyl chloride	50.0	50.0		ug/L		100	66 - 129

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	103		60 - 124
4-Bromofluorobenzene (Surr)	96		70 - 130
Dibromofluoromethane (Surr)	108		70 - 130
Toluene-d8 (Surr)	106		70 - 130

**Lab Sample ID: LCSD 680-664227/5**  
**Matrix: Water**  
**Analysis Batch: 664227**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	50.0	49.7		ug/L		99	70 - 130	4	30
1,1,2,2-Tetrachloroethane	50.0	58.8		ug/L		118	70 - 130	8	30
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	48.3		ug/L		97	63 - 141	6	30
1,1,2-Trichloroethane	50.0	57.3		ug/L		115	70 - 130	5	30
1,1-Dichloroethane	50.0	50.1		ug/L		100	70 - 130	0	30
1,1-Dichloroethene	50.0	45.5		ug/L		91	70 - 130	4	20
1,2,3-Trichlorobenzene	50.0	64.1		ug/L		128	61 - 141	3	30
1,2-Dichloroethane	50.0	54.1		ug/L		108	70 - 130	3	50
1,2-Dichloropropane	50.0	51.5		ug/L		103	70 - 130	0	20
2-Butanone (MEK)	250	277		ug/L		111	69 - 114	8	30
2-Hexanone	250	264		ug/L		105	70 - 130	9	20
4-Methyl-2-pentanone	250	262		ug/L		105	68 - 108	8	30
Acetone	250	293	*+	ug/L		117	67 - 113	9	30
Benzene	50.0	52.5		ug/L		105	70 - 130	1	30
Bromochloromethane	50.0	50.8		ug/L		102	70 - 130	3	30
Bromodichloromethane	50.0	51.1		ug/L		102	70 - 130	2	30
Bromoform	50.0	55.7		ug/L		111	69 - 129	4	30
Bromomethane	50.0	41.3		ug/L		83	28 - 192	2	30
Carbon disulfide	50.0	48.5		ug/L		97	70 - 130	4	30
Carbon tetrachloride	50.0	49.6		ug/L		99	70 - 130	5	30
Chlorobenzene	50.0	56.5		ug/L		113	70 - 130	1	30
Chloroethane	50.0	43.1		ug/L		86	31 - 213	4	30
Chloroform	50.0	51.6		ug/L		103	70 - 130	0	30
Chloromethane	50.0	41.5		ug/L		83	59 - 127	6	30
cis-1,2-Dichloroethene	50.0	50.6		ug/L		101	70 - 130	1	30
cis-1,3-Dichloropropene	50.0	56.2		ug/L		112	70 - 130	4	20
Cyclohexane	50.0	43.3		ug/L		87	23 - 175	7	30
Dibromochloromethane	50.0	56.8		ug/L		114	70 - 130	5	30
Dichlorodifluoromethane	50.0	44.1		ug/L		88	70 - 130	7	40
Ethylbenzene	50.0	52.9		ug/L		106	70 - 130	1	20

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 680-664227/5  
 Matrix: Water  
 Analysis Batch: 664227

Client Sample ID: Lab Control Sample Dup  
 Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Isopropylbenzene	50.0	53.5		ug/L		107	70 - 130	3	30
Methyl acetate	100	97.0		ug/L		97	67 - 110	9	30
Methyl tert-butyl ether	50.0	56.6		ug/L		113	70 - 130	5	30
Methylcyclohexane	50.0	50.6		ug/L		101	70 - 130	4	30
Methylene Chloride	50.0	49.4		ug/L		99	70 - 130	0	30
m-Xylene & p-Xylene	50.0	54.5		ug/L		109	70 - 130	1	30
o-Xylene	50.0	55.7		ug/L		111	70 - 130	1	30
Styrene	50.0	56.2		ug/L		112	70 - 130	2	30
Tetrachloroethene	50.0	54.8		ug/L		110	70 - 130	4	30
Toluene	50.0	53.2		ug/L		106	70 - 130	0	30
trans-1,2-Dichloroethene	50.0	48.8		ug/L		98	70 - 130	3	30
trans-1,3-Dichloropropene	50.0	60.1		ug/L		120	70 - 130	4	30
Trichloroethene	50.0	56.0		ug/L		112	70 - 130	2	30
Trichlorofluoromethane	50.0	44.5		ug/L		89	63 - 142	5	30
Vinyl chloride	50.0	46.8		ug/L		94	66 - 129	7	30

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
1,2-Dichloroethane-d4 (Surr)	108		60 - 124
4-Bromofluorobenzene (Surr)	97		70 - 130
Dibromofluoromethane (Surr)	110		70 - 130
Toluene-d8 (Surr)	106		70 - 130

## Method: 300.0-1993 R2.1 - Anions, Ion Chromatography

Lab Sample ID: MB 680-664765/33  
 Matrix: Water  
 Analysis Batch: 664765

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.50	U	0.50		mg/L			04/19/21 20:33	1

Lab Sample ID: LCS 680-664765/34  
 Matrix: Water  
 Analysis Batch: 664765

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	10.2		mg/L		102	90 - 110

Lab Sample ID: LCSD 680-664765/35  
 Matrix: Water  
 Analysis Batch: 664765

Client Sample ID: Lab Control Sample Dup  
 Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	10.0	10.0		mg/L		100	90 - 110	1	15



# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## Method: 6010C - Metals (ICP)

Lab Sample ID: MB 680-663508/1-A  
 Matrix: Water  
 Analysis Batch: 663801

Client Sample ID: Method Blank  
 Prep Type: Total Recoverable  
 Prep Batch: 663508

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	50	U	50		ug/L		04/09/21 10:27	04/09/21 21:04	1
Manganese	10	U	10		ug/L		04/09/21 10:27	04/09/21 21:04	1

Lab Sample ID: LCS 680-663508/2-A  
 Matrix: Water  
 Analysis Batch: 663801

Client Sample ID: Lab Control Sample  
 Prep Type: Total Recoverable  
 Prep Batch: 663508

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	400	380		ug/L		95	80 - 120

## Method: 130.2-1982 - Hardness, Total (mg/l as CaCO3)

Lab Sample ID: MB 680-663657/1  
 Matrix: Water  
 Analysis Batch: 663657

Client Sample ID: Method Blank  
 Prep Type: Total/NA

Analyte	MB MB		RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Hardness as calcium carbonate	10	U	10		mg/L			04/10/21 11:22	1

Lab Sample ID: LCS 680-663657/2  
 Matrix: Water  
 Analysis Batch: 663657

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits

Lab Sample ID: LCSD 680-663657/3  
 Matrix: Water  
 Analysis Batch: 663657

Client Sample ID: Lab Control Sample Dup  
 Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit

Lab Sample ID: 680-197281-1 DU  
 Matrix: Water  
 Analysis Batch: 663657

Client Sample ID: MW-29D  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit

Lab Sample ID: 680-197281-2 DU  
 Matrix: Water  
 Analysis Batch: 663657

Client Sample ID: BS-OW-02  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## Method: 2540C-2011 - Total Dissolved Solids (Dried at 180 °C)

**Lab Sample ID: MB 680-663384/1**  
**Matrix: Water**  
**Analysis Batch: 663384**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	5.0	U	5.0		mg/L			04/08/21 13:24	1

**Lab Sample ID: LCS 680-663384/2**  
**Matrix: Water**  
**Analysis Batch: 663384**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	2460	2470		mg/L		100	80 - 120

**Lab Sample ID: LCSD 680-663384/3**  
**Matrix: Water**  
**Analysis Batch: 663384**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	2460	2440		mg/L		99	80 - 120	1	25

**Lab Sample ID: 680-197281-1 DU**  
**Matrix: Water**  
**Analysis Batch: 663384**

**Client Sample ID: MW-29D**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	7300		7040		mg/L		3	5

**Lab Sample ID: MB 680-663511/1**  
**Matrix: Water**  
**Analysis Batch: 663511**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	5.0	U	5.0		mg/L			04/09/21 10:43	1

**Lab Sample ID: LCS 680-663511/2**  
**Matrix: Water**  
**Analysis Batch: 663511**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	2460	2430		mg/L		99	80 - 120

**Lab Sample ID: LCSD 680-663511/3**  
**Matrix: Water**  
**Analysis Batch: 663511**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Dissolved Solids	2460	2430		mg/L		99	80 - 120	0	25

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## Method: 5210B-2011 - BOD, 5-Day

**Lab Sample ID: USB 680-663328/4**  
**Matrix: Water**  
**Analysis Batch: 663328**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	USB Result	USB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Biochemical Oxygen Demand	2.0	U	2.0		mg/L			04/08/21 12:12	1

**Lab Sample ID: LCS 680-663328/5**  
**Matrix: Water**  
**Analysis Batch: 663328**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Biochemical Oxygen Demand	198	205		mg/L		104	85 - 115

**Lab Sample ID: LCSD 680-663328/6**  
**Matrix: Water**  
**Analysis Batch: 663328**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Biochemical Oxygen Demand	198	179		mg/L		90	85 - 115	14	30

**Lab Sample ID: USB 680-663507/4**  
**Matrix: Water**  
**Analysis Batch: 663507**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	USB Result	USB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Biochemical Oxygen Demand	2.0	U	2.0		mg/L			04/09/21 11:32	1

**Lab Sample ID: LCS 680-663507/5**  
**Matrix: Water**  
**Analysis Batch: 663507**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Biochemical Oxygen Demand	198	218		mg/L		110	85 - 115

## Method: 5220D-2011 - Chemical Oxygen Demand

**Lab Sample ID: MB 680-663641/3**  
**Matrix: Water**  
**Analysis Batch: 663641**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	10	U	10		mg/L			04/10/21 10:44	1

**Lab Sample ID: LCS 680-663641/4**  
**Matrix: Water**  
**Analysis Batch: 663641**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chemical Oxygen Demand	50.0	52.8		mg/L		106	90 - 110

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## Method: SM 2320B - Alkalinity

**Lab Sample ID: MB 400-527645/4**  
**Matrix: Water**  
**Analysis Batch: 527645**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity, Total	1.0	U	1.0		mg/L			04/14/21 15:14	1

**Lab Sample ID: LCS 400-527645/5**  
**Matrix: Water**  
**Analysis Batch: 527645**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity, Total	100	107		mg/L		107	80 - 120



# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## GC/MS VOA

### Analysis Batch: 664227

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197281-1	MW-29D	Total/NA	Water	8260B	
680-197281-2	BS-OW-02	Total/NA	Water	8260B	
680-197281-3	BS-OW-03D	Total/NA	Water	8260B	
680-197281-4	BS-OW-01	Total/NA	Water	8260B	
680-197281-5	TB-01	Total/NA	Water	8260B	
MB 680-664227/9	Method Blank	Total/NA	Water	8260B	
LCS 680-664227/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-664227/5	Lab Control Sample Dup	Total/NA	Water	8260B	

## HPLC/IC

### Analysis Batch: 664765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197281-1	MW-29D	Total/NA	Water	300.0-1993 R2.1	
680-197281-2	BS-OW-02	Total/NA	Water	300.0-1993 R2.1	
680-197281-3	BS-OW-03D	Total/NA	Water	300.0-1993 R2.1	
680-197281-4	BS-OW-01	Total/NA	Water	300.0-1993 R2.1	
MB 680-664765/33	Method Blank	Total/NA	Water	300.0-1993 R2.1	
LCS 680-664765/34	Lab Control Sample	Total/NA	Water	300.0-1993 R2.1	
LCSD 680-664765/35	Lab Control Sample Dup	Total/NA	Water	300.0-1993 R2.1	

## Metals

### Prep Batch: 663508

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197281-1	MW-29D	Dissolved	Water	3005A	
680-197281-1	MW-29D	Total Recoverable	Water	3005A	
680-197281-2	BS-OW-02	Dissolved	Water	3005A	
680-197281-2	BS-OW-02	Total Recoverable	Water	3005A	
680-197281-3	BS-OW-03D	Dissolved	Water	3005A	
680-197281-3	BS-OW-03D	Total Recoverable	Water	3005A	
680-197281-4	BS-OW-01	Dissolved	Water	3005A	
680-197281-4	BS-OW-01	Total Recoverable	Water	3005A	
MB 680-663508/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-663508/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

### Analysis Batch: 663801

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197281-1	MW-29D	Dissolved	Water	6010C	663508
680-197281-1	MW-29D	Total Recoverable	Water	6010C	663508
680-197281-2	BS-OW-02	Dissolved	Water	6010C	663508
680-197281-2	BS-OW-02	Total Recoverable	Water	6010C	663508
680-197281-3	BS-OW-03D	Dissolved	Water	6010C	663508
680-197281-3	BS-OW-03D	Total Recoverable	Water	6010C	663508
680-197281-4	BS-OW-01	Dissolved	Water	6010C	663508
680-197281-4	BS-OW-01	Total Recoverable	Water	6010C	663508
MB 680-663508/1-A	Method Blank	Total Recoverable	Water	6010C	663508
LCS 680-663508/2-A	Lab Control Sample	Total Recoverable	Water	6010C	663508

Eurofins TestAmerica, Savannah

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## General Chemistry

### Analysis Batch: 527645

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197281-1	MW-29D	Total/NA	Water	SM 2320B	
680-197281-2	BS-OW-02	Total/NA	Water	SM 2320B	
680-197281-3	BS-OW-03D	Total/NA	Water	SM 2320B	
680-197281-4	BS-OW-01	Total/NA	Water	SM 2320B	
MB 400-527645/4	Method Blank	Total/NA	Water	SM 2320B	
LCS 400-527645/5	Lab Control Sample	Total/NA	Water	SM 2320B	

### Analysis Batch: 663328

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197281-1	MW-29D	Total/NA	Water	5210B-2011	
680-197281-2	BS-OW-02	Total/NA	Water	5210B-2011	
USB 680-663328/4	Method Blank	Total/NA	Water	5210B-2011	
LCS 680-663328/5	Lab Control Sample	Total/NA	Water	5210B-2011	
LCSD 680-663328/6	Lab Control Sample Dup	Total/NA	Water	5210B-2011	

### Analysis Batch: 663384

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197281-1	MW-29D	Total/NA	Water	2540C-2011	
680-197281-2	BS-OW-02	Total/NA	Water	2540C-2011	
MB 680-663384/1	Method Blank	Total/NA	Water	2540C-2011	
LCS 680-663384/2	Lab Control Sample	Total/NA	Water	2540C-2011	
LCSD 680-663384/3	Lab Control Sample Dup	Total/NA	Water	2540C-2011	
680-197281-1 DU	MW-29D	Total/NA	Water	2540C-2011	

### Analysis Batch: 663507

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197281-3	BS-OW-03D	Total/NA	Water	5210B-2011	
680-197281-4	BS-OW-01	Total/NA	Water	5210B-2011	
USB 680-663507/4	Method Blank	Total/NA	Water	5210B-2011	
LCS 680-663507/5	Lab Control Sample	Total/NA	Water	5210B-2011	
LCSD 680-663507/6	Lab Control Sample Dup	Total/NA	Water	5210B-2011	

### Analysis Batch: 663511

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197281-3	BS-OW-03D	Total/NA	Water	2540C-2011	
680-197281-4	BS-OW-01	Total/NA	Water	2540C-2011	
MB 680-663511/1	Method Blank	Total/NA	Water	2540C-2011	
LCS 680-663511/2	Lab Control Sample	Total/NA	Water	2540C-2011	
LCSD 680-663511/3	Lab Control Sample Dup	Total/NA	Water	2540C-2011	

### Analysis Batch: 663641

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197281-1	MW-29D	Total/NA	Water	5220D-2011	
680-197281-2	BS-OW-02	Total/NA	Water	5220D-2011	
680-197281-3	BS-OW-03D	Total/NA	Water	5220D-2011	
680-197281-4	BS-OW-01	Total/NA	Water	5220D-2011	
MB 680-663641/3	Method Blank	Total/NA	Water	5220D-2011	
LCS 680-663641/4	Lab Control Sample	Total/NA	Water	5220D-2011	

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## General Chemistry

### Analysis Batch: 663657

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-197281-1	MW-29D	Total/NA	Water	130.2-1982	
680-197281-2	BS-OW-02	Total/NA	Water	130.2-1982	
680-197281-3	BS-OW-03D	Total/NA	Water	130.2-1982	
680-197281-4	BS-OW-01	Total/NA	Water	130.2-1982	
MB 680-663657/1	Method Blank	Total/NA	Water	130.2-1982	
LCS 680-663657/2	Lab Control Sample	Total/NA	Water	130.2-1982	
LCSD 680-663657/3	Lab Control Sample Dup	Total/NA	Water	130.2-1982	
680-197281-1 DU	MW-29D	Total/NA	Water	130.2-1982	
680-197281-2 DU	BS-OW-02	Total/NA	Water	130.2-1982	

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Client Sample ID: MW-29D**

**Lab Sample ID: 680-197281-1**

**Date Collected: 04/07/21 08:40**

**Matrix: Water**

**Date Received: 04/08/21 10:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		20	5 mL	5 mL	664227	04/15/21 19:37	Y1S	TAL SAV
		Instrument ID: CMSAA								
Total/NA	Analysis	300.0-1993 R2.1		50	5 mL	5 mL	664765	04/19/21 22:52	T1C	TAL SAV
		Instrument ID: CICK								
Dissolved	Prep	3005A			50 mL	50 mL	663508	04/09/21 10:27	BJB	TAL SAV
Dissolved	Analysis	6010C		1			663801	04/09/21 22:13	BCB	TAL SAV
		Instrument ID: ICPE								
Total Recoverable	Prep	3005A			50 mL	50 mL	663508	04/09/21 10:27	BJB	TAL SAV
Total Recoverable	Analysis	6010C		1			663801	04/09/21 22:18	BCB	TAL SAV
		Instrument ID: ICPE								
Total/NA	Analysis	130.2-1982		25	25 mL	25 mL	663657	04/10/21 11:22	NVF	TAL SAV
		Instrument ID: NOEQUIP								
Total/NA	Analysis	2540C-2011		1	5 mL	200 mL	663384	04/08/21 13:24	PG	TAL SAV
		Instrument ID: NOEQUIP								
Total/NA	Analysis	5210B-2011		1			663328	04/08/21 15:52	OLB	TAL SAV
		Instrument ID: BOD 2								
Total/NA	Analysis	5220D-2011		100	2 mL	2 mL	663641	04/10/21 10:44	MCL	TAL SAV
		Instrument ID: SPC7								
Total/NA	Analysis	SM 2320B		1			527645	04/14/21 16:06	RRC	TAL PEN
		Instrument ID: AUTOTITRATOR								

**Client Sample ID: BS-OW-02**

**Lab Sample ID: 680-197281-2**

**Date Collected: 04/07/21 10:00**

**Matrix: Water**

**Date Received: 04/08/21 10:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		20	5 mL	5 mL	664227	04/15/21 20:02	Y1S	TAL SAV
		Instrument ID: CMSAA								
Total/NA	Analysis	300.0-1993 R2.1		50	5 mL	5 mL	664765	04/19/21 23:05	T1C	TAL SAV
		Instrument ID: CICK								
Dissolved	Prep	3005A			50 mL	50 mL	663508	04/09/21 10:27	BJB	TAL SAV
Dissolved	Analysis	6010C		1			663801	04/09/21 21:46	BCB	TAL SAV
		Instrument ID: ICPE								
Total Recoverable	Prep	3005A			50 mL	50 mL	663508	04/09/21 10:27	BJB	TAL SAV
Total Recoverable	Analysis	6010C		1			663801	04/09/21 21:59	BCB	TAL SAV
		Instrument ID: ICPE								
Total/NA	Analysis	130.2-1982		25	25 mL	25 mL	663657	04/10/21 11:22	NVF	TAL SAV
		Instrument ID: NOEQUIP								
Total/NA	Analysis	2540C-2011		1	5 mL	200 mL	663384	04/08/21 13:24	PG	TAL SAV
		Instrument ID: NOEQUIP								
Total/NA	Analysis	5210B-2011		1			663328	04/08/21 16:02	OLB	TAL SAV
		Instrument ID: BOD 2								
Total/NA	Analysis	5220D-2011		100	2 mL	2 mL	663641	04/10/21 10:44	MCL	TAL SAV
		Instrument ID: SPC7								

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# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## Client Sample ID: BS-OW-02

## Lab Sample ID: 680-197281-2

Date Collected: 04/07/21 10:00

Matrix: Water

Date Received: 04/08/21 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2320B		1			527645	04/14/21 16:12	RRC	TAL PEN

## Client Sample ID: BS-OW-03D

## Lab Sample ID: 680-197281-3

Date Collected: 04/07/21 11:05

Matrix: Water

Date Received: 04/08/21 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B Instrument ID: CMSAA		20	5 mL	5 mL	664227	04/15/21 20:28	Y1S	TAL SAV
Total/NA	Analysis	300.0-1993 R2.1 Instrument ID: CICK		50	5 mL	5 mL	664765	04/19/21 23:18	T1C	TAL SAV
Dissolved	Prep	3005A			50 mL	50 mL	663508	04/09/21 10:27	BJB	TAL SAV
Dissolved	Analysis	6010C Instrument ID: ICPE		1			663801	04/09/21 22:09	BCB	TAL SAV
Total Recoverable	Prep	3005A			50 mL	50 mL	663508	04/09/21 10:27	BJB	TAL SAV
Total Recoverable	Analysis	6010C Instrument ID: ICPE		1			663801	04/09/21 22:04	BCB	TAL SAV
Total/NA	Analysis	130.2-1982 Instrument ID: NOEQUIP		25	25 mL	25 mL	663657	04/10/21 11:22	NVF	TAL SAV
Total/NA	Analysis	2540C-2011 Instrument ID: NOEQUIP		1	5 mL	200 mL	663511	04/09/21 10:43	PG	TAL SAV
Total/NA	Analysis	5210B-2011 Instrument ID: BOD 2		1			663507	04/09/21 11:00	OLB	TAL SAV
Total/NA	Analysis	5220D-2011 Instrument ID: SPC7		100	2 mL	2 mL	663641	04/10/21 10:44	MCL	TAL SAV
Total/NA	Analysis	SM 2320B Instrument ID: AUTOTITRATOR		1			527645	04/14/21 16:18	RRC	TAL PEN

## Client Sample ID: BS-OW-01

## Lab Sample ID: 680-197281-4

Date Collected: 04/07/21 12:05

Matrix: Water

Date Received: 04/08/21 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B Instrument ID: CMSAA		20	5 mL	5 mL	664227	04/15/21 20:54	Y1S	TAL SAV
Total/NA	Analysis	300.0-1993 R2.1 Instrument ID: CICK		50	5 mL	5 mL	664765	04/19/21 23:30	T1C	TAL SAV
Dissolved	Prep	3005A			50 mL	50 mL	663508	04/09/21 10:27	BJB	TAL SAV
Dissolved	Analysis	6010C Instrument ID: ICPE		1			663801	04/09/21 21:55	BCB	TAL SAV
Total Recoverable	Prep	3005A			50 mL	50 mL	663508	04/09/21 10:27	BJB	TAL SAV
Total Recoverable	Analysis	6010C Instrument ID: ICPE		1			663801	04/09/21 21:50	BCB	TAL SAV
Total/NA	Analysis	130.2-1982 Instrument ID: NOEQUIP		25	25 mL	25 mL	663657	04/10/21 11:22	NVF	TAL SAV

Eurofins TestAmerica, Savannah

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

**Client Sample ID: BS-OW-01**

**Lab Sample ID: 680-197281-4**

Date Collected: 04/07/21 12:05

Matrix: Water

Date Received: 04/08/21 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540C-2011		1	5 mL	200 mL	663511	04/09/21 10:43	PG	TAL SAV
Total/NA	Analysis	5210B-2011		1			663507	04/09/21 11:08	OLB	TAL SAV
		Instrument ID: BOD 2								
Total/NA	Analysis	5220D-2011		10	2 mL	2 mL	663641	04/10/21 10:44	MCL	TAL SAV
		Instrument ID: SPC7								
Total/NA	Analysis	SM 2320B		1			527645	04/14/21 16:24	RRC	TAL PEN
		Instrument ID: AUTOTITRATOR								

**Client Sample ID: TB-01**

**Lab Sample ID: 680-197281-5**

Date Collected: 04/07/21 00:00

Matrix: Water

Date Received: 04/08/21 10:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	664227	04/15/21 15:20	Y1S	TAL SAV
		Instrument ID: CMSAA								

**Laboratory References:**

TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001  
 TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

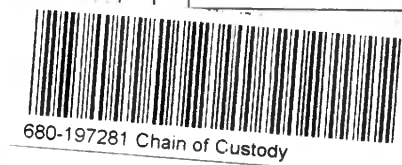
Address: \_\_\_\_\_

ATLANTA

Regulatory Program:  DW  NPDES  RCRA  Other:

TAL-8210

Client Contact		Project Manager: <u>Al C. Blak</u>		Site Contact:		Date: <u>04-07-2021</u>		COC No:	
Company Name: <u>Geosynte Consultants</u>		Tel/Email: <u>Aciblak@geosynte.com</u>		Lab Contact:		Carrier:		1 of 1 COCs	
Address: <u>1255 Roberts Blvd, Suite 200</u>		Analysis Turnaround Time		Filtered Sample (Y/N) Perform MS/MSD (Y/N) <u>8260B VOCs (3)</u> <u>130.2 Herbicides (1)</u> <u>2320B Aikalinities (1)</u> <u>6010c - Total Fe and Mn (1)</u> <u>2540c - TDS (Priority) (1)</u> <u>5210B - BOD (1)</u> <u>5220D - COD (1)</u> <u>6010C - Field Filtration Fe/Mn (1)</u>				Sampler:	
City/State/Zip: <u>Kennesaw, GA 30144</u>		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below _____						For Lab Use Only:	
Phone: <u>678-202-9500</u>		<input type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day						Walk-in Client:	
Fax:								Lab Sampling:	
Project Name: <u>Bio Sprays Pilot Test</u>								Job / SDG No.:	
Site: <u>Hendrix/Prinos Brunswick County</u>									
PO# <u>GR6881M</u>									
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sample Specific Notes:		
<u>MW-29d</u>		<u>4/7/21</u>	<u>0840</u>	<u>G</u>	<u>GW</u>	<u>10</u>	<u>Y</u>	<u>N</u>	<u>Z</u>
<u>BS-OW-02</u>		<u>4/7/21</u>	<u>1006</u>	<u>G</u>	<u>GW</u>	<u>10</u>	<u>Y</u>	<u>N</u>	<u>Z</u>
<u>BS-OW-03d</u>		<u>4/7/21</u>	<u>1105</u>	<u>G</u>	<u>GW</u>	<u>10</u>	<u>Y</u>	<u>N</u>	<u>Z</u>
<u>BS-OW-01</u>		<u>4/7/21</u>	<u>1205</u>	<u>G</u>	<u>GW</u>	<u>10</u>	<u>Y</u>	<u>N</u>	<u>Z</u>
<u>TB-01</u>		<u>—</u>	<u>—</u>	<u>G</u>	<u>W</u>	<u>2</u>	<u>N</u>	<u>N</u>	<u>Z</u>
<u>DG-04-07-2021</u>									
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____									
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.					Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)				
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown					<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months				
Special Instructions/QC Requirements & Comments: <u>2 coders</u>									
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____		Therm ID No.:		<u>2.0/0.3 (cr) 2.1/0.4°</u>	
Relinquished by: <u>Dan G. F. B.</u>		Company: <u>Geosynte</u>		Date/Time: <u>4/7/21 1315</u>		Received by: <u>[Signature]</u>		Company: <u>24-08-21</u>	
Relinquished by:		Company:		Date/Time:		Received by:		Date/Time: <u>1020</u>	
Relinquished by:		Company:		Date/Time:		Received in Laboratory by:		Date/Time:	



**Eurofins TestAmerica, Savannah**

5102 LaRoche Avenue  
Savannah, GA 31404  
Phone: 912-354-7858 Fax: 912-352-0165

**Chain of Custody Record**



Environment Testing  
America

<b>Client Information (Sub Contract Lab)</b>		Sampler:		Lab PM: Barnett, Eddie T		Carrier Tracking No(s):		COC No: 680-649783.1	
Client Contact: Shipping/Receiving		Phone:		E-Mail: Eddie.Barnett@Eurofinset.com		State of Origin: Georgia		Page: Page 1 of 1	
Company: TestAmerica Laboratories, Inc.		Address: 3355 McLemore Drive, City: Pensacola State, Zip: FL, 32514 Phone: 850-474-1001(Tel) 850-478-2671(Fax) Email:		Accreditations Required (See note): NELAP - Florida; State Program - Georgia		Job #: 680-197281-1		Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Z - other (specify)	
Project Name: Hercules - Brunswick Biosparge Pilot Test Site:		Due Date Requested: 4/14/2021 TAT Requested (days):		PO #:		WO #:		Project #: 68022348 SSOW#:	
<b>Sample Identification - Client ID (Lab ID)</b>		<b>Sample Date</b>		<b>Sample Time</b>		<b>Sample Type (C=comp, G=grab)</b>		<b>Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)</b>	
								Field Filtered Sample (Yes or No)	
								Perform MS/MSD (Yes or No)	
								2320B/ Alkalinity, Total (only)	
								Total Number of containers	
								Special Instructions/Note:	
MW-29D (680-197281-1)		4/7/21		08:40 Eastern		Water		X	
BS-OW-02 (680-197281-2)		4/7/21		10:00 Eastern		Water		X	
BS-OW-03D (680-197281-3)		4/7/21		11:05 Eastern		Water		X	
BS-OW-01 (680-197281-4)		4/7/21		12:05 Eastern		Water		X	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins TestAmerica.

<b>Possible Hazard Identification</b>		<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b>	
Unconfirmed		<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Deliverable Requested: I, II, III, IV, Other (specify)		Special Instructions/QC Requirements:	
Empty Kit Relinquished by:		Date:	
Relinquished by: <i>[Signature]</i>		Date/Time: <i>4/14/21 1526</i>	
Relinquished by: <i>[Signature]</i>		Date/Time: <i>4/14/21 1251</i>	
Relinquished by: <i>[Signature]</i>		Date/Time: <i>[Signature]</i>	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Cooler Temperature(s) °C and Other Remarks: <i>0.0°C, 0.7°C, 1.6°C 289</i>	

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4/20/2021



# Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-197281-1

**Login Number: 197281**

**List Source: Eurofins TestAmerica, Savannah**

**List Number: 1**

**Creator: Banda, Christy S**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-197281-1

**Login Number: 197281**

**List Number: 2**

**Creator: Perez, Trina M**

**List Source: Eurofins TestAmerica, Pensacola**

**List Creation: 04/12/21 09:52 AM**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.0°C, 0.7°C, 1.6°C IR-9
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules - Brunswick Biosparge Pilot Test

Job ID: 680-197281-1

## Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87052	06-30-21
Georgia	State	E87052	06-30-21

## Laboratory: Eurofins TestAmerica, Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alabama	State	40150	06-30-21
ANAB	ISO/IEC 17025	L2471	02-23-23
Arizona	State	AZ0710	01-12-22
Arkansas DEQ	State	88-0689	09-02-21
California	State	2510	06-30-21
Florida	NELAP	E81010	06-30-21
Georgia	State	E81010(FL)	06-30-21
Illinois	NELAP	200041	10-09-21
Iowa	State	367	08-01-22
Kansas	NELAP	E-10253	10-31-21
Kentucky (UST)	State	53	06-30-21
Kentucky (WW)	State	KY98030	12-31-21
Louisiana	NELAP	30976	06-30-21
Louisiana (DW)	State	LA017	12-31-21
Maryland	State	233	09-30-21
Massachusetts	State	M-FL094	06-30-21
Michigan	State	9912	06-30-21
New Jersey	NELAP	FL006	06-30-21
North Carolina (WW/SW)	State	314	12-31-21
Oklahoma	State	9810	08-31-21
Pennsylvania	NELAP	68-00467	01-31-22
Rhode Island	State	LAO00307	12-30-21
South Carolina	State	96026002	06-30-21
Tennessee	State	TN02907	06-30-21
Texas	NELAP	T104704286	09-30-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	US Federal Programs	P330-21-00056	05-17-21
Virginia	NELAP	460166	06-14-21
Washington	State	C915	05-15-21
West Virginia DEP	State	136	06-30-21

# ATTACHMENT D

## Sampling Purge Logs



GROUNDWATER SAMPLING LOG SHEET

Client: Hercules Project No: GR6881M Sampling Date: 3/2/21  
 Site: Brunswick Location: Brunswick, GA Sampler's Name: ABrown  
 Well ID: MW-290 Pump Type/Model: Alexis Peristaltic Sample Collection Time: 1100  
 Total Depth (ft)<sup>1</sup>: 89.75' Tubing Material: LDPE Sample Purge Rate (L/min)<sup>3</sup>: 200  
 Depth to Water (ft): 5.40 Pump Intake Depth (ft): ~85 Sample ID: MW-290  
 Well Diameter (in): 2" Start/Stop Purge Time: 1030 / 1100 Laboratory Analyses: See GOC  
 Well Volume (gal) = 0.041d<sup>2</sup>h: — Purge Rate (L/min)<sup>2</sup>: 200  
 Well Volume (L) = gal \* 3.785: — Total Purge Volume (L): 4.0  
 d = well diameter (inches) h = length of water column (feet) Purge Method: Low Flow Well Volume: — Other: — QA/QC Collected? No  
 Well Type: Flush  Stick On Sampling Method: Pump Discharge Other: Reverse Flow VOCs QA/QC ID: —  
 Well Lock: Yes No —  
 Well Bolted: Yes  No  Bolts Needed: NA  
 Well Cap Condition: Good Replace  Other  All sample containers requiring chemical preservation properly preserved prior to demob from well? Yes No   
 Well Tag Present: Yes No  Water in Vault: Yes  No

Time	Temp. (°C)	Spec. Cond. (µS/cm)	DO (mg/L)	pH (SU)	ORP (mV)	Turbidity (NTUs)	Purge Rate (mL/min)	Purged Volume (L)	H <sub>2</sub> O Depth (ft btoc)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1035	20.52	8010	0.73	5.96	-5	0.0	200	1.0	5.43	
1040	20.65	8090	0.53	5.96	-7	0.0	200	2.0	5.43	
1045	20.78	8200	0.00	5.95	-11	0.0	200	3.0	5.43	
1050	20.85	8290	0.00	5.95	-14	0.0	200	4.0	5.43	Parameters Stable
1100	Sample Collected									
<b>Stabilizing Criteria</b> <sup>4,5</sup>	+/- 1°C	+/- 5%	10% (see note below) <sup>(9)</sup>	+/- 0.1 unit	+/- 10 mV	+/- 10% or <10 NTUs	>100 mL < 500 mL		<0.33 ft <sup>6,7</sup>	

(1) - Maximum purge rate of 250 mL/min  
 (2) - Sample rate to be between 100 mL/min and 250 mL/min  
 (3) - Collect sample from pump discharge without tubing contacting sample container  
 (4) - Field parameter measurements to be recorded every 3 to 5 minutes  
 (5) - Stabilization criteria based on three most recent consecutive measurements  
 (6) - Monitor depth to water every 3 to 5 minutes. Well drawdown to be 0.33 ft or less. Purge/sampling rate to be lowered as necessary to keep drawdown below 0.33 ft  
 (7) - Contact field team lead if drawdown > 0.33 ft - do not switch to 3 well volume method until instructed  
 (8) - Preserve all samples as appropriate immediately following collection  
 (9) - DO is not a stabilization criteria for the "Groundwater Sampling" SESD Standard Operating Procedure

Purge Log QA/QC'd By:  
Date:  
Purge Log QA/QC'd By:  
Date:

GROUNDWATER SAMPLING LOG SHEET

Client: Heracles Project No: GR6881M Sampling Date: 3/2/21  
 Site: Brunswick Location: Brunswick, GA Sampler's Name: ABrown  
 Well ID: BS-0W-01 Pump Type/Model: Alexis Peristaltic Sample Collection Time: 1600  
 Total Depth (ft)<sup>1</sup>: 91' Tubing Material: LDPE Sample Purge Rate (L/min)<sup>3</sup>: 200  
 Depth to Water (ft): 5.42 Pump Intake Depth (ft): ~85' Sample ID: BS-0W-01  
 Well Diameter (in): 2" Start/Stop Purge Time: 1530 / 1600 Laboratory Analyses: See COC  
 Well Volume (gal) = 0.041d<sup>2</sup>h: - Purge Rate (L/min)<sup>2</sup>: 200  
 Well Volume (L) = gal \* 3.785: - Total Purge Volume (L): 5.0  
 d = well diameter (inches) h = length of water column (feet) Purge Method: Low-Flow Well Volume: - Other: - QA/QC Collected? No  
 Well Type: Flush Stick Up Sampling Method: Pump Discharge Other: Reverse Flow VOCs QA/QC ID: -  
 Well Lock: Yes No  
 Well Bolted: Yes No Bolts Needed: NA  
 Well Cap Condition: Good Replace: - Other: - All sample containers requiring chemical preservation properly preserved prior to demob from well? Yes No  
 Well Tag Present: Yes No - Water in Vault: Yes No

Time	Temp. (°C)	Spec. Cond. (µS/cm)	DO (mg/L)	pH (SU)	ORP (mV)	Turbidity (NTUs)	Purge Rate (mL/min)	Purged Volume (L)	H <sub>2</sub> O Depth (ft btoc)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1535	19.85	10600	0.75	6.07	-4	0.0	200	1.0	5.44	
1540	19.99	10800	0.44	6.07	-6	0.0	200	2.0	5.44	
1545	20.23	11200	0.00	6.07	-11	0.0	200	3.0	5.44	
1550	20.33	11400	0.00	6.08	-15	0.0	200	4.0	5.44	
1555	20.36	11400	0.00	6.09	-17	0.0	200	5.0	5.44	Parameters Stable
1600	Sample Collected									
<b>Stabilizing Criteria<sup>4,5</sup></b>	+/- 1°C	+/- 5%	10% (see note below) <sup>(9)</sup>	+/- 0.1 unit	+/- 10 mV	+/- 10% or <10 NTUs	>100 mL < 500 mL		<0.33 ft <sup>6,7</sup>	

(1) - Maximum purge rate of 250 mL/min  
 (2) - Sample rate to be between 100 mL/min and 250 mL/min  
 (3) - Collect sample from pump discharge without tubing contacting sample container  
 (4) - Field parameter measurements to be recorded every 3 to 5 minutes  
 (5) - Stabilization criteria based on three most recent consecutive measurements  
 (6) - Monitor depth to water every 3 to 5 minutes. Well drawdown to be 0.33 ft or less. Purge/sampling rate to be lowered as necessary to keep drawdown below 0.33 ft  
 (7) - Contact field team lead if drawdown > 0.33 ft - do not switch to 3 well volume method until instructed  
 (8) - Preserve all samples as appropriate immediately following collection  
 (9) - DO is not a stabilization criteria for the "Groundwater Sampling" SESD Standard Operating Procedure

Purge Log QA/QC'd By:  
Date:  
  
 Purge Log QA/QC'd By:  
Date:

GROUNDWATER SAMPLING LOG SHEET

Client: Hercules Project No: GR6881M Sampling Date: 3/2/21  
 Site: Brunswick Location: Brunswick, GA Sampler's Name: ABrown  
 Well ID: BS-0W-02 Pump Type/Model: Alexis Peristaltic Sample Collection Time: 1435  
 Total Depth (ft)<sup>1</sup>: 93' Tubing Material: LDPE Sample Purge Rate (L/min)<sup>3</sup>: 200  
 Depth to Water (ft): 5.48 Pump Intake Depth (ft): ~87' Sample ID: BS-0W-02  
 Well Diameter (in): 2" Start/Stop Purge Time: 1407 / 1435 Laboratory Analyses: See LOD  
 Well Volume (gal) = 0.041d<sup>2</sup>h: - Purge Rate (L/min)<sup>2</sup>: 200  
 Well Volume (L) = gal \* 3.785: - Total Purge Volume (L): 5.0  
 d = well diameter (inches) h = length of water column (feet) Purge Method: Low-Flow Well Volume Other  
 Well Type: Flush Stick Up Sampling Method: Pump Discharge Other: Reverse flow Vocs QA/QC Collected? No  
 Well Lock: Yes No QA/QC I.D. -  
 Well Bolted: Yes No Bolts Needed NA  
 Well Cap Condition: Good Replace Other  
 Well Tag Present: Yes No Water in Vault Yes No All sample containers requiring chemical preservation properly preserved prior to demob from well? Yes No

Time	Temp. (°C)	Spec. Cond. (µS/cm)	DO (mg/L)	pH (SU)	ORP (mV)	Turbidity (NTUS)	Purge Rate (mL/min)	Purged Volume (L)	H <sub>2</sub> O Depth (ft btoc)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1412	19.52	10800	3.46	6.19	-19	0.0	200	1.0	5.51	
1417	20.04	11200	2.37	6.21	-31	0.0	200	2.0	5.51	
1422	20.55	11700	0.88	6.23	-48	0.0	200	3.0	5.51	
1427	20.72	11800	0.41	6.23	-54	0.0	200	4.0	5.51	
1432	20.81	11800	0.03	6.23	-57	0.0	200	5.0	5.51	Parameters Stable
1435	Sample Collected									
Stabilizing Criteria <sup>4,5</sup>	+/- 1°C	+/- 5%	10% (see note below) <sup>(8)</sup>	+/- 0.1 unit	+/- 10 mV	+/- 10% or <10 NTUS	>100 mL < 500 mL		<0.33 ft <sup>6,7</sup>	

(1) - Maximum purge rate of 250 mL/min  
 (2) - Sample rate to be between 100 mL/min and 250 mL/min  
 (3) - Collect sample from pump discharge without tubing contacting sample container  
 (4) - Field parameter measurements to be recorded every 3 to 5 minutes  
 (5) - Stabilization criteria based on three most recent consecutive measurements  
 (6) - Monitor depth to water every 3 to 5 minutes. Well drawdown to be 0.33 ft or less. Purge/sampling rate to be lowered as necessary to keep drawdown below 0.33 ft  
 (7) - Contact field team lead if drawdown > 0.33 ft - do not switch to 3 well volume method until instructed  
 (8) - Preserve all samples as appropriate immediately following collection  
 (9) - DO is not a stabilization criteria for the 'Groundwater Sampling' SESD Standard Operating Procedure

Purge Log QA/QC'd By:  
Date:  
Purge Log QA/QC'd By:  
Date:

GROUNDWATER SAMPLING LOG SHEET

Client: Horwath  
 Site: Brunswick  
 Well ID: BS-0W-03D  
 Total Depth (ft)<sup>1</sup>: 93  
 Depth to Water (ft): 5.47  
 Well Diameter (in): 2"  
 Well Volume (gal) = 0.041d<sup>2</sup>h: —  
 Well Volume (L) = gal \* 3.785: —

Project No: GR6881M  
 Location: Brunswick, GA  
 Pump Type/Model: Alexis Peristaltic  
 Tubing Material: LDPE  
 Pump Intake Depth (ft): ~87  
 Start/Stop Purge Time: 1145 / 1215  
 Purge Rate (L/min)<sup>2</sup>: 200  
 Total Purge Volume (L): 5.0

Sampling Date: 3/3/21  
 Sampler's Name: ABrown  
 Sample Collection Time: 1215  
 Sample Purge Rate (L/min)<sup>3</sup>: 200  
 Sample ID: BS-0W-03D  
 Laboratory Analyses: See COC

d = well diameter (inches) h = length of water column (feet)  
 Well Type: Flush  Stick type  
 Well Lock: Yes  No  
 Well Bolted: Yes  No  Bolts Needed: NA  
 Well Cap Condition:  Good  Replace  Other  
 Well Tag Present:  Yes  No  Water in Vault: Yes  No  No

Purge Method:  Low-Flow  Well Volume  Other:  
 Sampling Method:  Pump Discharge  Other: Reverse Flow VOCs

QA/QC Collected? No  
 QA/QC ID: —

All sample containers requiring chemical preservation properly preserved prior to demob from well?  Yes  No

Time	Temp. (°C)	Spec. Cond. (µS/cm)	DO (mg/L)	pH (SU)	ORP (mV)	Turbidity (NTUs)	Purge Rate (mL/min)	Purged Volume (L)	H <sub>2</sub> O Depth (ft btoc)	Notes (Purge method, water clarity, odor, purge rate, issues with pump/well/weather/etc.)
1150	20.85	10400	0.0	6.05	21	0.0	200	1.0	5.50	
1155	21.83	11000	0.0	5.99	9	0.0	200	2.0	5.50	
1200	21.89	11000	0.0	5.99	8	0.0	200	3.0	5.50	
1205	21.92	10700	0.0	5.99	2	0.0	200	4.0	5.50	
1210	21.90	10500	0.0	5.98	-5	0.0	200	5.0	5.50	Parameters Stable
<del>1215</del>										
1215	Sample Collected									
3/3/21										
AB										
<b>Stabilizing Criteria<sup>4, 5</sup></b>	+/- 1°C	+/- 5%	10% (see note below) <sup>(9)</sup>	+/- 0.1 unit	+/- 10 mV	+/- 10% or <10 NTUs	>100 mL < 500 mL		<0.33 ft <sup>6, 7</sup>	

(1) - Maximum purge rate of 250 mL/min  
 (2) - Sample rate to be between 100 mL/min and 250 mL/min  
 (3) - Collect sample from pump discharge without tubing contacting sample container  
 (4) - Field parameter measurements to be recorded every 3 to 5 minutes  
 (5) - Stabilization criteria based on three most recent consecutive measurements  
 (6) - Monitor depth to water every 3 to 5 minutes. Well drawdown to be 0.33 ft or less. Purge/sampling rate to be lowered as necessary to keep drawdown below 0.33 ft.  
 (7) - Contact field team lead if drawdown > 0.33 ft - do not switch to 3 well volume method until instructed  
 (8) - Preserve all samples as appropriate immediately following collection  
 (9) - DO is not a stabilization criteria for the "Groundwater Sampling" SESD Standard Operating Procedure

Purge Log QA/QC'd By:  
 Date:  
 Purge Log QA/QC'd By:  
 Date:

Groundwater Sampling

Site: Hercules/Pinova Brunswick Plant

Project No.: GR6881P, 3001, 3001

Monitoring Well: MW-29d

Date: 04-07-2021

Sample ID: MW-29d-04072021

Sampler(s): D. GIBBS

Well Condition: Good

Purge Method: Low Flow

Initial Depth to Water (ft): 6.15

Initial Depth to Bottom (ft): 92.26

Well Diameter (in): 2

Height of Water (ft): 26.11

multiply ht by 0.163 for 2" well, 1.06 for 5", 1.47" for 6" well = Total Volume in Well (gal): 14.04

Final Depth to Water (ft): 6.21

Requested analyses: Swamp + 8260B

Time	Well Gauging	Start Purge	Readings	Start Samp.	End Samp.	Depth to Water (ft)	Volume Removed (g)	Flow Rate (ml/min)	Temp. (°C)	Cond. (µS/cm) (ATC)	D. O (mg/L)	pH (ATC)	Redox Potential (± mv)	Turb (ntu)	Appearance of Water (color, odor, turbidity)
0800	X					6.15									
0810		X													
0815			X			6.21	1L	200	20.11	9830.2	0.35	6.31	-7.0	9.21	
0820			X			6.21	2L	200	20.69	9670.1	0.23	6.18	-10.0	5.10	
0825			X			6.21	3L	200	21.01	9527.3	0.17	6.16	-8.5	4.04	
0830			X			6.21	4L	200	21.31	9461.0	0.12	6.16	-6.0	2.54	
0835			X			6.21	5L	200	21.43	9477.3	0.13	6.17	-5.3	2.01	
0840				X											
0910					X										

*Do 04-07-2021*

Split, Blank, Duplicate, & Filtered Samples		Water Quality Meter	
Sample ID	Description	Meter Number:	<u>907348</u>
<u>MW-29d-04072021 08.40</u>	<u>Swamp</u>	Calibrated on/by:	<u>04-07-21 / D. GIBBS</u>
<u>Dup-04-04072021</u>	<u>- - -</u>	<b>Purge and Sample Methods</b>	
Weather: <u>Sunny</u>		CIRCLE ONE ON EACH LINE	
Notes: (filtering, pump position, nearby activities, problems, deviations from plan, etc.)		<input checked="" type="checkbox"/> Low Flow / Well Volume / Low Permeability	
		Peristaltic / <input checked="" type="checkbox"/> Submersible / Bladder / Bailor	
		Total Volume Purged: <u>5L</u> g	
		<b>Stabilization Parameters</b>	
		turbidity: ± 10% or < 10 NTU	
		pH: ± 0.1 units    temperature ± 3%	
		specific conductance: ± 10%	
		Note: redox potential and dissolved oxygen are recorded but not evaluated for stability	

Groundwater Sampling

Site: Hercules/Pinova Brunswick Plant

Project No.: GR6881P, 3001, 3001

Monitoring Well: 55-OW-02

Date: 04-07-2021

Sample ID: BS-OW-02

Sampler(s): D. GARDNER

Well Condition: Good

Purge Method: Low Flow

Initial Depth to Water (ft): 6.14

Initial Depth to Bottom (ft): 95.02

Well Diameter (in): 2

Height of Water (ft): 88.88

multiply ht by 0.163 for 2" well, 1.06 for 5", 1.47" for 6" well = Total Volume in Well (gal): 14.49

Final Depth to Water (ft): 6.14

Requested analyses: Sweep

Time	Well Gauging	Start Purge	Readings	Start Samp	End Samp	Depth to Water (ft)	Volume Removed (g)	Flow Rate (ml/min)	Temp. (°C)	Cond. (µS/cm) (ATC)	D. O. (mg/L)	pH (ATC)	Redox Potential (± mv)	Turb (ntu)	Appearance of Water (color, odor, turbidity)
0923	X					6.14									
0935	X														
0940		X				6.19	1L	200	22.63	11756.5	0.26	6.37	-15.9	5.55	
0945		X				6.19	2L	200	22.97	11948.9	0.19	6.30	-12.7	2.45	
0950		X				6.19	3L	200	23.10	11937.0	0.17	6.31	-14.8	1.15	
0955		X				6.19	4L	200	23.19	11954.9	0.15	6.31	-14.5	1.00	
1000				X											
1015				X											
<del>04-07-2021</del>															

<b>Split, Blank, Duplicate, &amp; Filtered Samples</b>		<b>Water Quality Meter</b>	
Sample ID	Description	Meter Number:	<u>407348</u>
<u>BS-OW-02</u>	<u>10:00 Sweep</u>	Calibrated on/by:	<u>04-07-21 D. GARDNER</u>
<b>Weather:</b> <u>Sunny</u>		<b>Purge and Sample Methods</b>	
<b>Notes:</b> (filtering, pump position, nearby activities, problems, deviations from plan, etc.)		<b>CIRCLE ONE ON EACH LINE</b>	
		<input checked="" type="checkbox"/> <u>Low Flow</u> / Well Volume / Low Permeability	
		<input type="checkbox"/> Peristaltic / Submersible / Bladder / Bailor	
		Total Volume Purged: <u>4L</u> g	
		<b>Stabilization Parameters</b>	
		turbidity: ± 10% or < 10 NTU	
		pH: ± 0.1 units    temperature ± 3%	
		specific conductance: ± 10%	
		Note: redox potential and dissolved oxygen are recorded but not evaluated for stability	

Groundwater Sampling

Site: Hercules/Pinova Brunswick Plant

Project No.: GR6881P, 3001, 3001

Monitoring Well: 35-OW-3d  
 Sample ID: BS-OW-8d  
 Well Condition: Good  
 Initial Depth to Water (ft): 6.45  
 Well Diameter (in): 2  
 multiply ht by 0.163 for 2" well, 1.06 for 5", 1.47" for 6" well =  
 Final Depth to Water (ft): 6.48

Date: 04-07-2021  
 Sampler(s): D. GIBBS  
 Purge Method: Low Flow  
 Initial Depth to Bottom (ft): 95.12  
 Height of Water (ft): 88.67  
 Total Volume in Well (gal): 14.45  
 Requested analyses: Sweep

Time	Well Gauging	Start Purge	Readings	Start Samp.	End Samp.	Depth to Water (ft)	Volume Removed (g)	Flow Rate (ml/min)	Temp. (°C)	Cond. (µS/cm) (ATC)	D. O. (mg/l.)	pH (ATC)	Redox Potential (+ mv)	Turb (ntu)	Appearance of Water (color, odor, turbidity)
6:45															
1029	X					6.45									
1040		X													
1045			X			6.48	1L	200	23.87	12723.9	0.45	6.35	-30.0	2.06	
1050			X			6.48	2L	200	23.96	11897.4	0.32	6.36	-33.8	2.31	
1055			X			6.48	3L	200	24.00	11299.0	0.18	6.35	-33.8	1.74	
1100			X			6.48	4L	200	23.96	11007.1	0.15	6.34	-31.8	1.59	
1105				X											
1120					X										
<del>DG 04-07-2021</del>															

<b>Split, Blank, Duplicate, &amp; Filtered Samples</b>		<b>Water Quality Meter</b>	
Sample ID	Description	Meter Number:	<u>407348</u>
<u>BS-OW-8d</u>	<u>11:05 Sweep</u>	Calibrated on/by:	<u>04-07-21 / DG</u>
<b>Weather: <u>Sunny</u></b>		<b>Purge and Sample Methods</b>	
Notes: (filtering, pump position, nearby activities, problems, deviations from plan, etc.)		CIRCLE ONE ON EACH LINE	
		<input checked="" type="checkbox"/> <u>Low Flow</u> / Well Volume / Low Permeability	
		<input checked="" type="checkbox"/> <u>Peristaltic</u> / Submersible / Bladder / Bailor	
		Total Volume Purged: <u>4L</u> g	
		<b>Stabilization Parameters</b>	
		turbidity: ± 10% or < 10 NTU	
		pH: ± 0.1 units    temperature ± 3%	
		specific conductance: ± 10%	
		Note: redox potential and dissolved oxygen are recorded but not evaluated for stability	

Groundwater Sampling

Site: Hercules/Pinova Brunswick Plant

Project No.: GR6881P, 3001, 3001

Monitoring Well: BS-OW-01  
 Sample ID: BS-OW-01  
 Well Condition: Good  
 Initial Depth to Water (ft): 6.00  
 Well Diameter (in): 2  
 multiply ht by 0.163 for 2" well, 1.06 for 5", 1.47" for 6" well = Total Volume in Well (gal):  
 Final Depth to Water (ft): \_\_\_\_\_

Date: 04-07-2021  
 Sampler(s): D. GIBBS  
 Purge Method: Low Flow  
 Initial Depth to Bottom (ft): 92.92  
 Height of Water (ft): 86.92  
 Requested analyses: Sweep

Time	Well Gauging	Start Purge	Readings	Start Samp	End Samp	Depth to Water (ft)	Volume Removed (g)	Flow Rate (ml/min)	Temp. (°C)	Cond. (µS/cm) (ATC)	D. O. (mg/L)	pH (ATC)	Redox Potential (± mv)	Turb (ntu)	Appearance of Water (color, odor, turbidity)
1128	X					6.00									
1140		X													
1145			X			6.03	1L	200	24.45	10209.5	0.23	6.31	-12.9	9.63	
1150			X			6.03	2L	200	24.14	10368.5	0.15	6.28	-15.1	4.18	
1155			X			6.03	3L	200	24.09	10471.2	0.13	6.27	-15.8	7.42	
1200			X			6.03	4L	200	24.13	10552.1	0.12	6.26	-16.6	6.06	
1205				X											
1220					X										

*Handwritten:* DG-04-07-2021

<b>Split, Blank, Duplicate, &amp; Filtered Samples</b>		<b>Water Quality Meter</b>	
Sample ID	Description	Meter Number:	<u>407348</u>
<u>BS-OW-01</u>	<u>12:05 Sweep</u>	Calibrated on/by:	<u>04/01/21 / D. GIBBS</u>
<b>Weather:</b> <u>Sunny</u>		<b>Purge and Sample Methods</b>	
<b>Notes:</b> (filtering, pump position, nearby activities, problems, deviations from plan, etc)		CIRCLE ONE ON EACH LINE	
		<input checked="" type="checkbox"/> Low Flow Well Volume / Low Permeability	
		<input checked="" type="checkbox"/> Peristaltic / Submersible / Bladder / Bailor	
		Total Volume Purged: <u>4L</u> g	
		<b>Stabilization Parameters</b>	
		turbidity: ± 10% or < 10 NTU	
		pH: ± 0.1 units    temperature ± 3%	
		specific conductance: ± 10%	
		Note: redox potential and dissolved oxygen are recorded but not evaluated for stability	



# ATTACHMENT E

## Waste Characterization Laboratory Reports and Manifests

JA-678035

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: **GAD00406552**

2. Page 1 of 1

3. Emergency Response Phone: **Univar Solutions 800-421-0331**

4. Waste Tracking Number: **NHWM000077080**

5. Generator's Name and Mailing Address: **HERCULES LLC, 2801 Cook St BRUNSWICK, GA, 31520 803-767-9281**

Generator's Site Address (if different than mailing address):

Generator's Phone:

6. Transporter 1 Company Name: **UNIVAR SOLUTIONS USA INC.**

U.S. EPA ID Number: **TXR000084869**

7. Transporter 2 Company Name: **DUPRE TRANSPORT (DRY VAN)**

U.S. EPA ID Number: **LAR000045963**

8. Designated Facility Name and Site Address: **VLS RECOVERY SERVICES, LLC, 188 RIP WILEY ROAD, FT. GERALD, GA, 317508987**

Facility's Phone: **229-796-0082**

U.S. EPA ID Number: **GAD109263467**

HM	9. Waste Shipping Name and Description	10. Containers		11. Total Quantity	12. Unit Wt./Vol.
		No.	Type		
1	Non-Regulated Material	051	DM	30600	P
2					
3					
4					

13. Special Handling Instructions and Additional Information

1. 6992(Non Hazardous Soil and Debris)

PLACARDS PROVIDED BY THE CARRIER/SHIPPER YES/NO DRIVER SIGNATURE \_\_\_\_\_

\*\*\*Emergency Phone: Chemtrec 800-424-9300 CCN 1811\*\*\*

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Officer's Printed/Typed Name: **Daniel Pile (Agent for Hercules LLC)**

Signature: *[Signature]*

Month Day Year: **6 23 21**

15. International Shipments  Import to U.S.  Export from U.S. Port of entry/exit: \_\_\_\_\_ Date leaving U.S.: \_\_\_\_\_

Transporter Signature (for exports only): \_\_\_\_\_

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: **JEFF DICKS**

Signature: *[Signature]*

Month Day Year: **06 23 2021**

Transporter 2 Printed/Typed Name: **JEFF DICKS**

Signature: *[Signature]*

Month Day Year: **6 24 21**

17. Discrepancy

17a. Discrepancy Indication Space  Quantity  Type  Residue  Partial Rejection  Full Rejection

Manifest Reference Number: \_\_\_\_\_

17b. Alternate Facility (or Generator) \_\_\_\_\_ U.S. EPA ID Number \_\_\_\_\_

Facility's Phone: \_\_\_\_\_

17c. Signature of Alternate Facility (or Generator) \_\_\_\_\_ Month Day Year \_\_\_\_\_

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: **James Johnson**

Signature: *[Signature]*

Month Day Year: **6 24 21**

#64772

82

NON-HAZARDOUS  
WASTE MANIFEST

1. Generator ID Number  
GAD 004 065 520

2. Page 1 of  
1

3. Emergency Response Phone  
(800) 839-3975

4. Waste Tracking Number  
0210356

5. Generator's Name and Mailing Address  
HERCULES LLC  
2801 COOK STREET  
BRUNSWICK, GA 31520  
Generator's Phone: (803) 767-9281

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name  
STAT

U.S. EPA ID Number  
NCD 980 799 142

7. Transporter 2 Company Name

U.S. EPA ID Number

8. Designated Facility Name and Site Address  
EQIS ATLANTA TRANSFER & PROCESSING  
5600 FULTON INDUSTRIAL BLVD, SW  
ATLANTA, GA 30336  
Facility's Phone: (404) 494-3520

U.S. EPA ID Number  
GAR 000 039 776

9. Waste Shipping Name and Description

10. Containers

No. Type

11. Total  
Quantity

12. Unit  
Wt./Vol.

1. NON REGULATED MATERIAL

82

DM

24,600

P

2.

3.

4.

13. Special Handling Instructions and Additional Information

1. C171843ATL / NON HAZARDOUS GROUND WATER PURGE

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeor's Printed/Typed Name

Signature

Month Day Year

Daniel Pile (Agent for Hercules)

Daniel Pile

6 24 21

15. International Shipments  Import to U.S.  Export from U.S.

Port of entry/exit:

Date leaving U.S.:

Transporter Signature (for exports only):

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name

Signature

Month Day Year

DEAN BUNYARNE

Dean Bunyarne

6 24 21

Transporter 2 Printed/Typed Name

Signature

Month Day Year

17. Discrepancy

17a. Discrepancy Indication Space

Quantity

Type

Residue

Partial Rejection

Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)

U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator)

Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name

Signature

Month Day Year

JASON SMITH

Jason Smith

06 25 21

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858

Laboratory Job ID: 680-196387-1

Client Project/Site: Hercules Brunswick - Wells

**For:**

Geosyntec Consultants, Inc.  
1255 Roberts Blvd, NW  
Suite 200  
Kennesaw, Georgia 30144

Attn: Adria Reimer



Authorized for release by:  
4/9/2021 3:18:20 PM

Eddie Barnett, Project Manager I  
(912)250-0280  
[Eddie.Barnett@Eurofinset.com](mailto:Eddie.Barnett@Eurofinset.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Job ID: 680-196387-1**

**Laboratory: Eurofins TestAmerica, Savannah**

## Narrative

### CASE NARRATIVE

**Client: Geosyntec Consultants, Inc.**  
**Project: Hercules Brunswick - Wells**

**Report Number: 680-196387-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

#### RECEIPT

The samples were received on 03/17/2021; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.4° C and 1.5° C.

#### TCLP VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples IDW-W-1 (680-196387-1), IDW-W-2 (680-196387-2), IDW-W-3 (680-196387-3), IDW-S-1 (680-196387-4), IDW-S-2 (680-196387-5), IDW-S-3 (680-196387-6) and IDW-S-4 (680-196387-7) were analyzed for TCLP volatile organic compounds (GC-MS) in accordance with EPA SW-846 Methods 1311/8260B. The samples were leached on 03/19/2021, 03/23/2021 and 03/30/2021 and analyzed on 03/19/2021, 03/28/2021 and 04/07/2021.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 680-660420 and analytical batch 680-660370.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 680-660980 and analytical batch 680-661698.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 680-663119 and analytical batch 680-663093.

1,2-Dichloroethane-d4 (Surr) recovered outside the surrogate recovery criteria high for LCS 680-660370/5 and LCSD 680-660370/6. Refer to the QC report for details.

2-Butanone (MEK) recovered high for LCSD 680-660370/6. This analyte was biased high in the LCSD and was not detected in the associated samples; therefore, the data have been reported. Refer to the QC report for details.

Samples IDW-W-1 (680-196387-1)[20X], IDW-W-2 (680-196387-2)[20X], IDW-W-3 (680-196387-3)[20X], IDW-S-1 (680-196387-4)[20X], IDW-S-2 (680-196387-5)[20X], IDW-S-3 (680-196387-6)[20X] and IDW-S-4 (680-196387-7)[20X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### TCLP SEMIVOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples IDW-W-1 (680-196387-1), IDW-W-2 (680-196387-2), IDW-W-3 (680-196387-3), IDW-S-1 (680-196387-4), IDW-S-2 (680-196387-5), IDW-S-3 (680-196387-6) and IDW-S-4 (680-196387-7) were analyzed for TCLP semivolatile organic compounds (GC-MS) in accordance with EPA SW846 Methods 1311 / 8270D. The samples were leached on 03/19/2021 and 03/22/2021, prepared on 03/23/2021 and analyzed on 03/25/2021.

The minimum response factor (RF) criteria for the continuing calibration verification (CCV) analyzed in batch 680-661361 was outside criteria for the following analyte: Hexachlorobenzene. A CCV standard at or below the reporting limit (RL) was analyzed with the affected samples and found to be acceptable. As indicated in the reference method, sample analysis may proceed; however, any detection for the affected analyte is considered estimated.

# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Job ID: 680-196387-1 (Continued)

### Laboratory: Eurofins TestAmerica, Savannah (Continued)

The following analyte has been identified, in the reference method and/or via historical data, to be poor and/or erratic performer: Pyridine. This analyte may have a %D >20% but must be <50% in the continuing calibration verification (CCV).

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **PESTICIDES (TCLP)**

Samples IDW-W-1 (680-196387-1), IDW-W-2 (680-196387-2), IDW-W-3 (680-196387-3), IDW-S-1 (680-196387-4), IDW-S-2 (680-196387-5), IDW-S-3 (680-196387-6) and IDW-S-4 (680-196387-7) were analyzed for Pesticides (TCLP) in accordance with EPA SW-846 Method 1311/8081B\_8082A. The samples were leached on 03/19/2021 and 03/22/2021, prepared on 03/24/2021 and analyzed on 03/25/2021 and 03/29/2021.

This method incorporates 2nd column confirmation. Corrective action is not taken for surrogate/spike compounds unless results from both columns are unacceptable. Results outside criteria are qualified.

Two surrogates are used for this analysis. The laboratory's SOP allows one of these surrogates to be outside acceptance criteria without performing re-extraction/re-analysis. The following sample contained an allowable number of surrogate compounds outside limits: IDW-W-3MS (680-196387-3MS) and IDW-S-4MS (680-196387-7MS). These results have been reported and qualified.

Surrogate recovery for the following samples were outside control limits: IDW-W-1 (680-196387-1) and IDW-W-2 (680-196387-2). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

PCB-1016 recovered low for the MS of sample IDW-S-4MS (680-196387-7) in batch 680-661843. PCB-1016 and PCB-1260 exceeded the RPD limit for the MSD of sample IDW-S-4MSD (680-196387-7) in batch 680-661843. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **METALS (ICP) - TCLP**

Samples IDW-W-1 (680-196387-1), IDW-W-2 (680-196387-2), IDW-W-3 (680-196387-3), IDW-S-1 (680-196387-4), IDW-S-2 (680-196387-5), IDW-S-3 (680-196387-6) and IDW-S-4 (680-196387-7) were analyzed for Metals (ICP) - TCLP in accordance with EPA SW-846 Methods 1311/6010C. The samples were leached on 03/19/2021 and 03/22/2021, prepared on 03/22/2021 and 03/24/2021 and analyzed on 03/24/2021.

Silver recovered low for the MS of sample IDW-W-1MS (680-196387-1) and MSD of sample IDW-W-1MSD (680-196387-1) in batch 680-661149. Refer to the QC report for details.

Silver recovered low for the MS of sample IDW-S-1MS (680-196387-4) and MSD of sample IDW-S-1MSD (680-196387-4) in batch 680-661329. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **MERCURY - TCLP**

Samples IDW-W-1 (680-196387-1), IDW-W-2 (680-196387-2), IDW-W-3 (680-196387-3), IDW-S-1 (680-196387-4), IDW-S-2 (680-196387-5), IDW-S-3 (680-196387-6) and IDW-S-4 (680-196387-7) were analyzed for mercury - TCLP in accordance with EPA SW-846 Methods 1311/7470A. The samples were leached on 03/19/2021 and 03/22/2021, prepared on 03/22/2021 and 03/23/2021 and analyzed on 03/22/2021 and 03/24/2021.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **IGNITABILITY FOR SOLIDS**

Samples IDW-S-1 (680-196387-4), IDW-S-2 (680-196387-5), IDW-S-3 (680-196387-6) and IDW-S-4 (680-196387-7) were analyzed for ignitability for solids in accordance with EPA SW-846 Method 1030. The samples were analyzed on 03/19/2021.

The following samples did not ignite: IDW-S-1 (680-196387-4), IDW-S-2 (680-196387-5), IDW-S-3 (680-196387-6) and IDW-S-4 (680-196387-7); therefore, an ignitability value could not be obtained. The result has been reported as "No Burn" (NB).

# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

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## Job ID: 680-196387-1 (Continued)

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### Laboratory: Eurofins TestAmerica, Savannah (Continued)

No samples ignited, therefore, there were no duplicates. An LCSD was added which met acceptability criteria.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# Sample Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-196387-1	IDW-W-1	Water	03/16/21 13:10	03/17/21 10:30	
680-196387-2	IDW-W-2	Water	03/16/21 13:25	03/17/21 10:30	
680-196387-3	IDW-W-3	Water	03/16/21 13:50	03/17/21 10:30	
680-196387-4	IDW-S-1	Solid	03/16/21 11:58	03/17/21 10:30	
680-196387-5	IDW-S-2	Solid	03/16/21 12:05	03/17/21 10:30	
680-196387-6	IDW-S-3	Solid	03/16/21 12:20	03/17/21 10:30	
680-196387-7	IDW-S-4	Solid	03/16/21 12:30	03/17/21 10:30	

# Method Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	TAL SAV
8081B/8082A	Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography	SW846	TAL SAV
6010C	Metals (ICP)	SW846	TAL SAV
7470A	Mercury (CVAA)	SW846	TAL SAV
1030	Ignitability, Solids	SW846	TAL SAV
1311	TCLP Extraction	SW846	TAL SAV
3010A	Preparation, Total Metals	SW846	TAL SAV
3520C	Liquid-Liquid Extraction (Continuous)	SW846	TAL SAV
5030B	Purge and Trap	SW846	TAL SAV
7470A	Preparation, Mercury	SW846	TAL SAV

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
S1+	Surrogate recovery exceeds control limits, high biased.
U	Indicates the analyte was analyzed for but not detected.

### GC/MS Semi VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

### GC Semi VOA

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
S1-	Surrogate recovery exceeds control limits, low biased.
U	Indicates the analyte was analyzed for but not detected.

### Metals

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)

Eurofins TestAmerica, Savannah

# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

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# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Client Sample ID: IDW-W-1

Lab Sample ID: 680-196387-1

No Detections.

## Client Sample ID: IDW-W-2

Lab Sample ID: 680-196387-2

No Detections.

## Client Sample ID: IDW-W-3

Lab Sample ID: 680-196387-3

No Detections.

## Client Sample ID: IDW-S-1

Lab Sample ID: 680-196387-4

Analyte	Result	Qualifier	NONE	NONE	Unit	Dil Fac	D	Method	Prep Type
Ignitability	NB				mm/sec	1		1030	Total/NA

## Client Sample ID: IDW-S-2

Lab Sample ID: 680-196387-5

Analyte	Result	Qualifier	NONE	NONE	Unit	Dil Fac	D	Method	Prep Type
Ignitability	NB				mm/sec	1		1030	Total/NA

## Client Sample ID: IDW-S-3

Lab Sample ID: 680-196387-6

Analyte	Result	Qualifier	NONE	NONE	Unit	Dil Fac	D	Method	Prep Type
Ignitability	NB				mm/sec	1		1030	Total/NA

## Client Sample ID: IDW-S-4

Lab Sample ID: 680-196387-7

Analyte	Result	Qualifier	NONE	NONE	Unit	Dil Fac	D	Method	Prep Type
Ignitability	NB				mm/sec	1		1030	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-W-1**

**Lab Sample ID: 680-196387-1**

**Date Collected: 03/16/21 13:10**

**Matrix: Water**

**Date Received: 03/17/21 10:30**

## Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	0.020	U	0.020		mg/L			03/19/21 15:04	20
Chlorobenzene	0.020	U	0.020		mg/L			03/19/21 15:04	20
Tetrachloroethene	0.020	U	0.020		mg/L			03/19/21 15:04	20
Carbon tetrachloride	0.020	U	0.020		mg/L			03/19/21 15:04	20
Chloroform	0.020	U	0.020		mg/L			03/19/21 15:04	20
Benzene	0.020	U	0.020		mg/L			03/19/21 15:04	20
Vinyl chloride	0.020	U	0.020		mg/L			03/19/21 15:04	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			03/19/21 15:04	20
2-Butanone (MEK)	0.20	U *	0.20		mg/L			03/19/21 15:04	20
Trichloroethene	0.020	U	0.020		mg/L			03/19/21 15:04	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	104		70 - 130		03/19/21 15:04	20
1,2-Dichloroethane-d4 (Surr)	117		60 - 124		03/19/21 15:04	20
Dibromofluoromethane (Surr)	110		70 - 130		03/19/21 15:04	20
4-Bromofluorobenzene (Surr)	96		70 - 130		03/19/21 15:04	20

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pyridine	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 19:41	1
2,4,5-Trichlorophenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 19:41	1
2,4,6-Trichlorophenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 19:41	1
2,4-Dinitrotoluene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 19:41	1
2-Methylphenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 19:41	1
3 & 4 Methylphenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 19:41	1
Hexachlorobenzene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 19:41	1
Hexachlorobutadiene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 19:41	1
Hexachloroethane	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 19:41	1
Nitrobenzene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 19:41	1
Pentachlorophenol	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 19:41	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol (Surr)	93		31 - 141	03/23/21 19:51	03/25/21 19:41	1
2-Fluorobiphenyl (Surr)	79		38 - 130	03/23/21 19:51	03/25/21 19:41	1
2-Fluorophenol (Surr)	72		25 - 130	03/23/21 19:51	03/25/21 19:41	1
Terphenyl-d14 (Surr)	38		10 - 143	03/23/21 19:51	03/25/21 19:41	1
Phenol-d5 (Surr)	79		25 - 130	03/23/21 19:51	03/25/21 19:41	1
Nitrobenzene-d5 (Surr)	91		39 - 130	03/23/21 19:51	03/25/21 19:41	1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Heptachlor epoxide	0.0013	U	0.0013		mg/L		03/24/21 18:23	03/25/21 21:43	1
Chlordane (technical)	0.013	U	0.013		mg/L		03/24/21 18:23	03/25/21 21:43	1
gamma-BHC (Lindane)	0.0013	U	0.0013		mg/L		03/24/21 18:23	03/25/21 21:43	1
Endrin	0.0013	U	0.0013		mg/L		03/24/21 18:23	03/25/21 21:43	1
Methoxychlor	0.0013	U	0.0013		mg/L		03/24/21 18:23	03/25/21 21:43	1
Heptachlor	0.0013	U	0.0013		mg/L		03/24/21 18:23	03/25/21 21:43	1
Toxaphene	0.13	U	0.13		mg/L		03/24/21 18:23	03/25/21 21:43	1
PCB-1016	0.025	U	0.025		mg/L		03/24/21 18:23	03/25/21 21:43	1
PCB-1221	0.025	U	0.025		mg/L		03/24/21 18:23	03/25/21 21:43	1

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-W-1**

**Lab Sample ID: 680-196387-1**

**Date Collected: 03/16/21 13:10**

**Matrix: Water**

**Date Received: 03/17/21 10:30**

**Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1232	0.025	U	0.025		mg/L		03/24/21 18:23	03/25/21 21:43	1
PCB-1242	0.025	U	0.025		mg/L		03/24/21 18:23	03/25/21 21:43	1
PCB-1248	0.025	U	0.025		mg/L		03/24/21 18:23	03/25/21 21:43	1
PCB-1254	0.025	U	0.025		mg/L		03/24/21 18:23	03/25/21 21:43	1
PCB-1260	0.025	U	0.025		mg/L		03/24/21 18:23	03/25/21 21:43	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	70		40 - 130	03/24/21 18:23	03/25/21 21:43	1
DCB Decachlorobiphenyl	5	S1-	14 - 130	03/24/21 18:23	03/25/21 21:43	1

**Method: 6010C - Metals (ICP) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.20	U	0.20		mg/L		03/22/21 08:35	03/24/21 01:25	1
Barium	1.0	U	1.0		mg/L		03/22/21 08:35	03/24/21 01:25	1
Cadmium	0.10	U	0.10		mg/L		03/22/21 08:35	03/24/21 01:25	1
Chromium	0.20	U	0.20		mg/L		03/22/21 08:35	03/24/21 01:25	1
Lead	0.20	U	0.20		mg/L		03/22/21 08:35	03/24/21 01:25	1
Selenium	0.50	U	0.50		mg/L		03/22/21 08:35	03/24/21 01:25	1
Silver	0.10	U F1	0.10		mg/L		03/22/21 08:35	03/24/21 01:25	1

**Method: 7470A - Mercury (CVAA) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.020	U	0.020		mg/L		03/22/21 09:13	03/22/21 19:44	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-W-2**

**Lab Sample ID: 680-196387-2**

**Date Collected: 03/16/21 13:25**

**Matrix: Water**

**Date Received: 03/17/21 10:30**

## Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	0.020	U	0.020		mg/L			03/19/21 15:29	20
Chlorobenzene	0.020	U	0.020		mg/L			03/19/21 15:29	20
Tetrachloroethene	0.020	U	0.020		mg/L			03/19/21 15:29	20
Carbon tetrachloride	0.020	U	0.020		mg/L			03/19/21 15:29	20
Chloroform	0.020	U	0.020		mg/L			03/19/21 15:29	20
Benzene	0.020	U	0.020		mg/L			03/19/21 15:29	20
Vinyl chloride	0.020	U	0.020		mg/L			03/19/21 15:29	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			03/19/21 15:29	20
2-Butanone (MEK)	0.20	U *	0.20		mg/L			03/19/21 15:29	20
Trichloroethene	0.020	U	0.020		mg/L			03/19/21 15:29	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		70 - 130		03/19/21 15:29	20
1,2-Dichloroethane-d4 (Surr)	119		60 - 124		03/19/21 15:29	20
Dibromofluoromethane (Surr)	115		70 - 130		03/19/21 15:29	20
4-Bromofluorobenzene (Surr)	95		70 - 130		03/19/21 15:29	20

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pyridine	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 20:03	1
2,4,5-Trichlorophenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:03	1
2,4,6-Trichlorophenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:03	1
2,4-Dinitrotoluene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:03	1
2-Methylphenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:03	1
3 & 4 Methylphenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:03	1
Hexachlorobenzene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:03	1
Hexachlorobutadiene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:03	1
Hexachloroethane	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:03	1
Nitrobenzene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:03	1
Pentachlorophenol	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 20:03	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol (Surr)	88		31 - 141	03/23/21 19:51	03/25/21 20:03	1
2-Fluorobiphenyl (Surr)	86		38 - 130	03/23/21 19:51	03/25/21 20:03	1
2-Fluorophenol (Surr)	72		25 - 130	03/23/21 19:51	03/25/21 20:03	1
Terphenyl-d14 (Surr)	44		10 - 143	03/23/21 19:51	03/25/21 20:03	1
Phenol-d5 (Surr)	79		25 - 130	03/23/21 19:51	03/25/21 20:03	1
Nitrobenzene-d5 (Surr)	88		39 - 130	03/23/21 19:51	03/25/21 20:03	1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Heptachlor epoxide	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 21:59	1
Chlordane (technical)	0.012	U	0.012		mg/L		03/24/21 18:23	03/25/21 21:59	1
gamma-BHC (Lindane)	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 21:59	1
Endrin	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 21:59	1
Methoxychlor	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 21:59	1
Heptachlor	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 21:59	1
Toxaphene	0.12	U	0.12		mg/L		03/24/21 18:23	03/25/21 21:59	1
PCB-1016	0.023	U	0.023		mg/L		03/24/21 18:23	03/25/21 21:59	1
PCB-1221	0.023	U	0.023		mg/L		03/24/21 18:23	03/25/21 21:59	1

Eurofins TestAmerica, Savannah



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-W-2**

**Lab Sample ID: 680-196387-2**

**Date Collected: 03/16/21 13:25**

**Matrix: Water**

**Date Received: 03/17/21 10:30**

**Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1232	0.023	U	0.023		mg/L		03/24/21 18:23	03/25/21 21:59	1
PCB-1242	0.023	U	0.023		mg/L		03/24/21 18:23	03/25/21 21:59	1
PCB-1248	0.023	U	0.023		mg/L		03/24/21 18:23	03/25/21 21:59	1
PCB-1254	0.023	U	0.023		mg/L		03/24/21 18:23	03/25/21 21:59	1
PCB-1260	0.023	U	0.023		mg/L		03/24/21 18:23	03/25/21 21:59	1

Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	73		40 - 130				03/24/21 18:23	03/25/21 21:59	1
DCB Decachlorobiphenyl	5	S1-	14 - 130				03/24/21 18:23	03/25/21 21:59	1

**Method: 6010C - Metals (ICP) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.20	U	0.20		mg/L		03/22/21 08:35	03/24/21 01:49	1
Barium	1.0	U	1.0		mg/L		03/22/21 08:35	03/24/21 01:49	1
Cadmium	0.10	U	0.10		mg/L		03/22/21 08:35	03/24/21 01:49	1
Chromium	0.20	U	0.20		mg/L		03/22/21 08:35	03/24/21 01:49	1
Lead	0.20	U	0.20		mg/L		03/22/21 08:35	03/24/21 01:49	1
Selenium	0.50	U	0.50		mg/L		03/22/21 08:35	03/24/21 01:49	1
Silver	0.10	U	0.10		mg/L		03/22/21 08:35	03/24/21 01:49	1

**Method: 7470A - Mercury (CVAA) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.020	U	0.020		mg/L		03/22/21 09:13	03/22/21 19:58	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-W-3**

**Lab Sample ID: 680-196387-3**

**Date Collected: 03/16/21 13:50**

**Matrix: Water**

**Date Received: 03/17/21 10:30**

## Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	0.020	U	0.020		mg/L			04/07/21 19:23	20
Chlorobenzene	0.020	U	0.020		mg/L			04/07/21 19:23	20
Tetrachloroethene	0.020	U	0.020		mg/L			04/07/21 19:23	20
Carbon tetrachloride	0.020	U	0.020		mg/L			04/07/21 19:23	20
Chloroform	0.020	U	0.020		mg/L			04/07/21 19:23	20
Benzene	0.020	U	0.020		mg/L			04/07/21 19:23	20
Vinyl chloride	0.020	U	0.020		mg/L			04/07/21 19:23	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			04/07/21 19:23	20
2-Butanone (MEK)	0.20	U	0.20		mg/L			04/07/21 19:23	20
Trichloroethene	0.020	U	0.020		mg/L			04/07/21 19:23	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	105		70 - 130		04/07/21 19:23	20
1,2-Dichloroethane-d4 (Surr)	99		60 - 124		04/07/21 19:23	20
Dibromofluoromethane (Surr)	102		70 - 130		04/07/21 19:23	20
4-Bromofluorobenzene (Surr)	97		70 - 130		04/07/21 19:23	20

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pyridine	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 20:24	1
2,4,5-Trichlorophenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:24	1
2,4,6-Trichlorophenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:24	1
2,4-Dinitrotoluene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:24	1
2-Methylphenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:24	1
3 & 4 Methylphenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:24	1
Hexachlorobenzene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:24	1
Hexachlorobutadiene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:24	1
Hexachloroethane	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:24	1
Nitrobenzene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 20:24	1
Pentachlorophenol	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 20:24	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol (Surr)	87		31 - 141	03/23/21 19:51	03/25/21 20:24	1
2-Fluorobiphenyl (Surr)	91		38 - 130	03/23/21 19:51	03/25/21 20:24	1
2-Fluorophenol (Surr)	77		25 - 130	03/23/21 19:51	03/25/21 20:24	1
Terphenyl-d14 (Surr)	74		10 - 143	03/23/21 19:51	03/25/21 20:24	1
Phenol-d5 (Surr)	83		25 - 130	03/23/21 19:51	03/25/21 20:24	1
Nitrobenzene-d5 (Surr)	87		39 - 130	03/23/21 19:51	03/25/21 20:24	1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Heptachlor epoxide	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 22:15	1
Chlordane (technical)	0.012	U	0.012		mg/L		03/24/21 18:23	03/25/21 22:15	1
gamma-BHC (Lindane)	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 22:15	1
Endrin	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 22:15	1
Methoxychlor	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 22:15	1
Heptachlor	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 22:15	1
Toxaphene	0.12	U	0.12		mg/L		03/24/21 18:23	03/25/21 22:15	1
PCB-1016	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 22:15	1
PCB-1221	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 22:15	1

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-W-3**

**Lab Sample ID: 680-196387-3**

**Date Collected: 03/16/21 13:50**

**Matrix: Water**

**Date Received: 03/17/21 10:30**

**Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1232	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 22:15	1
PCB-1242	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 22:15	1
PCB-1248	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 22:15	1
PCB-1254	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 22:15	1
PCB-1260	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 22:15	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
<i>Tetrachloro-m-xylene</i>	73		40 - 130				03/24/21 18:23	03/25/21 22:15	1
<i>DCB Decachlorobiphenyl</i>	14		14 - 130				03/24/21 18:23	03/25/21 22:15	1

**Method: 6010C - Metals (ICP) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.20	U	0.20		mg/L		03/22/21 08:35	03/24/21 01:54	1
Barium	1.0	U	1.0		mg/L		03/22/21 08:35	03/24/21 01:54	1
Cadmium	0.10	U	0.10		mg/L		03/22/21 08:35	03/24/21 01:54	1
Chromium	0.20	U	0.20		mg/L		03/22/21 08:35	03/24/21 01:54	1
Lead	0.20	U	0.20		mg/L		03/22/21 08:35	03/24/21 01:54	1
Selenium	0.50	U	0.50		mg/L		03/22/21 08:35	03/24/21 01:54	1
Silver	0.10	U	0.10		mg/L		03/22/21 08:35	03/24/21 01:54	1

**Method: 7470A - Mercury (CVAA) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.020	U	0.020		mg/L		03/22/21 09:13	03/22/21 20:02	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-S-1**

**Lab Sample ID: 680-196387-4**

**Date Collected: 03/16/21 11:58**

**Matrix: Solid**

**Date Received: 03/17/21 10:30**

## Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.020	U	0.020		mg/L			03/28/21 13:04	20
2-Butanone (MEK)	0.20	U	0.20		mg/L			03/28/21 13:04	20
Carbon tetrachloride	0.020	U	0.020		mg/L			03/28/21 13:04	20
Chlorobenzene	0.020	U	0.020		mg/L			03/28/21 13:04	20
Chloroform	0.020	U	0.020		mg/L			03/28/21 13:04	20
1,4-Dichlorobenzene	0.020	U	0.020		mg/L			03/28/21 13:04	20
1,2-Dichloroethane	0.020	U	0.020		mg/L			03/28/21 13:04	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			03/28/21 13:04	20
Tetrachloroethene	0.020	U	0.020		mg/L			03/28/21 13:04	20
Trichloroethene	0.020	U	0.020		mg/L			03/28/21 13:04	20
Vinyl chloride	0.020	U	0.020		mg/L			03/28/21 13:04	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	107		70 - 130		03/28/21 13:04	20
Dibromofluoromethane (Surr)	118		70 - 130		03/28/21 13:04	20
1,2-Dichloroethane-d4 (Surr)	104		60 - 124		03/28/21 13:04	20
Toluene-d8 (Surr)	112		70 - 130		03/28/21 13:04	20

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-Dinitrotoluene	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 20:45	1
Hexachlorobenzene	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 20:45	1
Hexachlorobutadiene	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 20:45	1
Hexachloroethane	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 20:45	1
2-Methylphenol	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 20:45	1
3 & 4 Methylphenol	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 20:45	1
Nitrobenzene	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 20:45	1
Pentachlorophenol	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 20:45	1
Pyridine	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 20:45	1
2,4,5-Trichlorophenol	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 20:45	1
2,4,6-Trichlorophenol	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 20:45	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl (Surr)	97		38 - 130	03/23/21 19:51	03/25/21 20:45	1
2-Fluorophenol (Surr)	80		25 - 130	03/23/21 19:51	03/25/21 20:45	1
Nitrobenzene-d5 (Surr)	98		39 - 130	03/23/21 19:51	03/25/21 20:45	1
Phenol-d5 (Surr)	85		25 - 130	03/23/21 19:51	03/25/21 20:45	1
Terphenyl-d14 (Surr)	92		10 - 143	03/23/21 19:51	03/25/21 20:45	1
2,4,6-Tribromophenol (Surr)	93		31 - 141	03/23/21 19:51	03/25/21 20:45	1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	0.012	U	0.012		mg/L		03/24/21 18:23	03/29/21 17:26	1
Endrin	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 17:26	1
gamma-BHC (Lindane)	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 17:26	1
Heptachlor	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 17:26	1
Heptachlor epoxide	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 17:26	1
Methoxychlor	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 17:26	1
Toxaphene	0.12	U	0.12		mg/L		03/24/21 18:23	03/29/21 17:26	1
PCB-1016	0.023	U	0.023		mg/L		03/24/21 18:23	03/29/21 17:26	1

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-S-1**

**Lab Sample ID: 680-196387-4**

Date Collected: 03/16/21 11:58

Matrix: Solid

Date Received: 03/17/21 10:30

**Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1221	0.023	U	0.023		mg/L		03/24/21 18:23	03/29/21 17:26	1
PCB-1232	0.023	U	0.023		mg/L		03/24/21 18:23	03/29/21 17:26	1
PCB-1242	0.023	U	0.023		mg/L		03/24/21 18:23	03/29/21 17:26	1
PCB-1248	0.023	U	0.023		mg/L		03/24/21 18:23	03/29/21 17:26	1
PCB-1254	0.023	U	0.023		mg/L		03/24/21 18:23	03/29/21 17:26	1
PCB-1260	0.023	U	0.023		mg/L		03/24/21 18:23	03/29/21 17:26	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	102		14 - 130	03/24/21 18:23	03/29/21 17:26	1
Tetrachloro-m-xylene	72		40 - 130	03/24/21 18:23	03/29/21 17:26	1

**Method: 6010C - Metals (ICP) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 19:44	1
Barium	1.0	U	1.0		mg/L		03/24/21 12:07	03/24/21 19:44	1
Cadmium	0.10	U	0.10		mg/L		03/24/21 12:07	03/24/21 19:44	1
Chromium	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 19:44	1
Lead	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 19:44	1
Selenium	0.50	U	0.50		mg/L		03/24/21 12:07	03/24/21 19:44	1
Silver	0.10	U F1	0.10		mg/L		03/24/21 12:07	03/24/21 19:44	1

**Method: 7470A - Mercury (CVAA) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.020	U	0.020		mg/L		03/23/21 15:49	03/24/21 13:52	1

**General Chemistry**

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Ignitability	NB				mm/sec			03/19/21 11:55	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-S-2**

**Lab Sample ID: 680-196387-5**

**Date Collected: 03/16/21 12:05**

**Matrix: Solid**

**Date Received: 03/17/21 10:30**

## Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.020	U	0.020		mg/L			03/28/21 13:29	20
2-Butanone (MEK)	0.20	U	0.20		mg/L			03/28/21 13:29	20
Carbon tetrachloride	0.020	U	0.020		mg/L			03/28/21 13:29	20
Chlorobenzene	0.020	U	0.020		mg/L			03/28/21 13:29	20
Chloroform	0.020	U	0.020		mg/L			03/28/21 13:29	20
1,4-Dichlorobenzene	0.020	U	0.020		mg/L			03/28/21 13:29	20
1,2-Dichloroethane	0.020	U	0.020		mg/L			03/28/21 13:29	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			03/28/21 13:29	20
Tetrachloroethene	0.020	U	0.020		mg/L			03/28/21 13:29	20
Trichloroethene	0.020	U	0.020		mg/L			03/28/21 13:29	20
Vinyl chloride	0.020	U	0.020		mg/L			03/28/21 13:29	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	107		70 - 130		03/28/21 13:29	20
Dibromofluoromethane (Surr)	119		70 - 130		03/28/21 13:29	20
1,2-Dichloroethane-d4 (Surr)	106		60 - 124		03/28/21 13:29	20
Toluene-d8 (Surr)	111		70 - 130		03/28/21 13:29	20

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-Dinitrotoluene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:07	1
Hexachlorobenzene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:07	1
Hexachlorobutadiene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:07	1
Hexachloroethane	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:07	1
2-Methylphenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:07	1
3 & 4 Methylphenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:07	1
Nitrobenzene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:07	1
Pentachlorophenol	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 21:07	1
Pyridine	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 21:07	1
2,4,5-Trichlorophenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:07	1
2,4,6-Trichlorophenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:07	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl (Surr)	101		38 - 130	03/23/21 19:51	03/25/21 21:07	1
2-Fluorophenol (Surr)	86		25 - 130	03/23/21 19:51	03/25/21 21:07	1
Nitrobenzene-d5 (Surr)	100		39 - 130	03/23/21 19:51	03/25/21 21:07	1
Phenol-d5 (Surr)	90		25 - 130	03/23/21 19:51	03/25/21 21:07	1
Terphenyl-d14 (Surr)	101		10 - 143	03/23/21 19:51	03/25/21 21:07	1
2,4,6-Tribromophenol (Surr)	94		31 - 141	03/23/21 19:51	03/25/21 21:07	1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	0.012	U	0.012		mg/L		03/24/21 18:23	03/29/21 17:42	1
Endrin	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 17:42	1
gamma-BHC (Lindane)	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 17:42	1
Heptachlor	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 17:42	1
Heptachlor epoxide	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 17:42	1
Methoxychlor	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 17:42	1
Toxaphene	0.12	U	0.12		mg/L		03/24/21 18:23	03/29/21 17:42	1
PCB-1016	0.024	U	0.024		mg/L		03/24/21 18:23	03/29/21 17:42	1

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-S-2**

**Lab Sample ID: 680-196387-5**

Date Collected: 03/16/21 12:05

Matrix: Solid

Date Received: 03/17/21 10:30

**Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1221	0.024	U	0.024		mg/L		03/24/21 18:23	03/29/21 17:42	1
PCB-1232	0.024	U	0.024		mg/L		03/24/21 18:23	03/29/21 17:42	1
PCB-1242	0.024	U	0.024		mg/L		03/24/21 18:23	03/29/21 17:42	1
PCB-1248	0.024	U	0.024		mg/L		03/24/21 18:23	03/29/21 17:42	1
PCB-1254	0.024	U	0.024		mg/L		03/24/21 18:23	03/29/21 17:42	1
PCB-1260	0.024	U	0.024		mg/L		03/24/21 18:23	03/29/21 17:42	1

Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	102		14 - 130				03/24/21 18:23	03/29/21 17:42	1
Tetrachloro-m-xylene	73		40 - 130				03/24/21 18:23	03/29/21 17:42	1

**Method: 6010C - Metals (ICP) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 20:19	1
Barium	1.0	U	1.0		mg/L		03/24/21 12:07	03/24/21 20:19	1
Cadmium	0.10	U	0.10		mg/L		03/24/21 12:07	03/24/21 20:19	1
Chromium	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 20:19	1
Lead	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 20:19	1
Selenium	0.50	U	0.50		mg/L		03/24/21 12:07	03/24/21 20:19	1
Silver	0.10	U	0.10		mg/L		03/24/21 12:07	03/24/21 20:19	1

**Method: 7470A - Mercury (CVAA) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.020	U	0.020		mg/L		03/23/21 15:49	03/24/21 14:15	1

**General Chemistry**

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Ignitability	NB				mm/sec			03/19/21 11:55	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-S-3**

**Lab Sample ID: 680-196387-6**

**Date Collected: 03/16/21 12:20**

**Matrix: Solid**

**Date Received: 03/17/21 10:30**

## Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.020	U	0.020		mg/L			03/28/21 13:55	20
2-Butanone (MEK)	0.20	U	0.20		mg/L			03/28/21 13:55	20
Carbon tetrachloride	0.020	U	0.020		mg/L			03/28/21 13:55	20
Chlorobenzene	0.020	U	0.020		mg/L			03/28/21 13:55	20
Chloroform	0.020	U	0.020		mg/L			03/28/21 13:55	20
1,4-Dichlorobenzene	0.020	U	0.020		mg/L			03/28/21 13:55	20
1,2-Dichloroethane	0.020	U	0.020		mg/L			03/28/21 13:55	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			03/28/21 13:55	20
Tetrachloroethene	0.020	U	0.020		mg/L			03/28/21 13:55	20
Trichloroethene	0.020	U	0.020		mg/L			03/28/21 13:55	20
Vinyl chloride	0.020	U	0.020		mg/L			03/28/21 13:55	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130		03/28/21 13:55	20
Dibromofluoromethane (Surr)	119		70 - 130		03/28/21 13:55	20
1,2-Dichloroethane-d4 (Surr)	105		60 - 124		03/28/21 13:55	20
Toluene-d8 (Surr)	112		70 - 130		03/28/21 13:55	20

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-Dinitrotoluene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:28	1
Hexachlorobenzene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:28	1
Hexachlorobutadiene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:28	1
Hexachloroethane	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:28	1
2-Methylphenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:28	1
3 & 4 Methylphenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:28	1
Nitrobenzene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:28	1
Pentachlorophenol	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 21:28	1
Pyridine	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 21:28	1
2,4,5-Trichlorophenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:28	1
2,4,6-Trichlorophenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 21:28	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl (Surr)	96		38 - 130	03/23/21 19:51	03/25/21 21:28	1
2-Fluorophenol (Surr)	82		25 - 130	03/23/21 19:51	03/25/21 21:28	1
Nitrobenzene-d5 (Surr)	99		39 - 130	03/23/21 19:51	03/25/21 21:28	1
Phenol-d5 (Surr)	89		25 - 130	03/23/21 19:51	03/25/21 21:28	1
Terphenyl-d14 (Surr)	89		10 - 143	03/23/21 19:51	03/25/21 21:28	1
2,4,6-Tribromophenol (Surr)	90		31 - 141	03/23/21 19:51	03/25/21 21:28	1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	0.011	U	0.011		mg/L		03/24/21 18:23	03/29/21 17:58	1
Endrin	0.0011	U	0.0011		mg/L		03/24/21 18:23	03/29/21 17:58	1
gamma-BHC (Lindane)	0.0011	U	0.0011		mg/L		03/24/21 18:23	03/29/21 17:58	1
Heptachlor	0.0011	U	0.0011		mg/L		03/24/21 18:23	03/29/21 17:58	1
Heptachlor epoxide	0.0011	U	0.0011		mg/L		03/24/21 18:23	03/29/21 17:58	1
Methoxychlor	0.0011	U	0.0011		mg/L		03/24/21 18:23	03/29/21 17:58	1
Toxaphene	0.11	U	0.11		mg/L		03/24/21 18:23	03/29/21 17:58	1
PCB-1016	0.022	U	0.022		mg/L		03/24/21 18:23	03/29/21 17:58	1

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# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-S-3**

**Lab Sample ID: 680-196387-6**

Date Collected: 03/16/21 12:20

Matrix: Solid

Date Received: 03/17/21 10:30

**Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1221	0.022	U	0.022		mg/L		03/24/21 18:23	03/29/21 17:58	1
PCB-1232	0.022	U	0.022		mg/L		03/24/21 18:23	03/29/21 17:58	1
PCB-1242	0.022	U	0.022		mg/L		03/24/21 18:23	03/29/21 17:58	1
PCB-1248	0.022	U	0.022		mg/L		03/24/21 18:23	03/29/21 17:58	1
PCB-1254	0.022	U	0.022		mg/L		03/24/21 18:23	03/29/21 17:58	1
PCB-1260	0.022	U	0.022		mg/L		03/24/21 18:23	03/29/21 17:58	1

Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	98		14 - 130				03/24/21 18:23	03/29/21 17:58	1
Tetrachloro-m-xylene	67		40 - 130				03/24/21 18:23	03/29/21 17:58	1

**Method: 6010C - Metals (ICP) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 20:24	1
Barium	1.0	U	1.0		mg/L		03/24/21 12:07	03/24/21 20:24	1
Cadmium	0.10	U	0.10		mg/L		03/24/21 12:07	03/24/21 20:24	1
Chromium	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 20:24	1
Lead	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 20:24	1
Selenium	0.50	U	0.50		mg/L		03/24/21 12:07	03/24/21 20:24	1
Silver	0.10	U	0.10		mg/L		03/24/21 12:07	03/24/21 20:24	1

**Method: 7470A - Mercury (CVAA) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.020	U	0.020		mg/L		03/23/21 15:49	03/24/21 14:20	1

**General Chemistry**

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Ignitability	NB				mm/sec			03/19/21 11:55	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-S-4**

**Lab Sample ID: 680-196387-7**

**Date Collected: 03/16/21 12:30**

**Matrix: Solid**

**Date Received: 03/17/21 10:30**

## Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.020	U	0.020		mg/L			03/28/21 14:20	20
2-Butanone (MEK)	0.20	U	0.20		mg/L			03/28/21 14:20	20
Carbon tetrachloride	0.020	U	0.020		mg/L			03/28/21 14:20	20
Chlorobenzene	0.020	U	0.020		mg/L			03/28/21 14:20	20
Chloroform	0.020	U	0.020		mg/L			03/28/21 14:20	20
1,4-Dichlorobenzene	0.020	U	0.020		mg/L			03/28/21 14:20	20
1,2-Dichloroethane	0.020	U	0.020		mg/L			03/28/21 14:20	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			03/28/21 14:20	20
Tetrachloroethene	0.020	U	0.020		mg/L			03/28/21 14:20	20
Trichloroethene	0.020	U	0.020		mg/L			03/28/21 14:20	20
Vinyl chloride	0.020	U	0.020		mg/L			03/28/21 14:20	20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130		03/28/21 14:20	20
Dibromofluoromethane (Surr)	118		70 - 130		03/28/21 14:20	20
1,2-Dichloroethane-d4 (Surr)	103		60 - 124		03/28/21 14:20	20
Toluene-d8 (Surr)	112		70 - 130		03/28/21 14:20	20

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-Dinitrotoluene	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 21:49	1
Hexachlorobenzene	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 21:49	1
Hexachlorobutadiene	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 21:49	1
Hexachloroethane	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 21:49	1
2-Methylphenol	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 21:49	1
3 & 4 Methylphenol	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 21:49	1
Nitrobenzene	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 21:49	1
Pentachlorophenol	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 21:49	1
Pyridine	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 21:49	1
2,4,5-Trichlorophenol	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 21:49	1
2,4,6-Trichlorophenol	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 21:49	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl (Surr)	101		38 - 130	03/23/21 19:51	03/25/21 21:49	1
2-Fluorophenol (Surr)	81		25 - 130	03/23/21 19:51	03/25/21 21:49	1
Nitrobenzene-d5 (Surr)	100		39 - 130	03/23/21 19:51	03/25/21 21:49	1
Phenol-d5 (Surr)	86		25 - 130	03/23/21 19:51	03/25/21 21:49	1
Terphenyl-d14 (Surr)	106		10 - 143	03/23/21 19:51	03/25/21 21:49	1
2,4,6-Tribromophenol (Surr)	94		31 - 141	03/23/21 19:51	03/25/21 21:49	1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	0.012	U	0.012		mg/L		03/24/21 18:23	03/29/21 18:14	1
Endrin	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 18:14	1
gamma-BHC (Lindane)	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 18:14	1
Heptachlor	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 18:14	1
Heptachlor epoxide	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 18:14	1
Methoxychlor	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/29/21 18:14	1
Toxaphene	0.12	U	0.12		mg/L		03/24/21 18:23	03/29/21 18:14	1
PCB-1016	0.024	U F1 F2	0.024		mg/L		03/24/21 18:23	03/29/21 18:14	1

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-S-4**

**Lab Sample ID: 680-196387-7**

**Date Collected: 03/16/21 12:30**

**Matrix: Solid**

**Date Received: 03/17/21 10:30**

**Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - TCLP (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1221	0.024	U	0.024		mg/L		03/24/21 18:23	03/29/21 18:14	1
PCB-1232	0.024	U	0.024		mg/L		03/24/21 18:23	03/29/21 18:14	1
PCB-1242	0.024	U	0.024		mg/L		03/24/21 18:23	03/29/21 18:14	1
PCB-1248	0.024	U	0.024		mg/L		03/24/21 18:23	03/29/21 18:14	1
PCB-1254	0.024	U	0.024		mg/L		03/24/21 18:23	03/29/21 18:14	1
PCB-1260	0.024	U F2	0.024		mg/L		03/24/21 18:23	03/29/21 18:14	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	108		14 - 130	03/24/21 18:23	03/29/21 18:14	1
Tetrachloro-m-xylene	74		40 - 130	03/24/21 18:23	03/29/21 18:14	1

**Method: 6010C - Metals (ICP) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 20:28	1
Barium	1.0	U	1.0		mg/L		03/24/21 12:07	03/24/21 20:28	1
Cadmium	0.10	U	0.10		mg/L		03/24/21 12:07	03/24/21 20:28	1
Chromium	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 20:28	1
Lead	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 20:28	1
Selenium	0.50	U	0.50		mg/L		03/24/21 12:07	03/24/21 20:28	1
Silver	0.10	U	0.10		mg/L		03/24/21 12:07	03/24/21 20:28	1

**Method: 7470A - Mercury (CVAA) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.020	U	0.020		mg/L		03/23/21 15:49	03/24/21 14:24	1

**General Chemistry**

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Ignitability	NB				mm/sec			03/19/21 11:55	1

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA	DBFM	TOL	BFB
		(60-124)	(70-130)	(70-130)	(70-130)
LCS 680-661698/4	Lab Control Sample	101	109	108	96
LCSD 680-661698/5	Lab Control Sample Dup	103	110	108	97
MB 680-661698/9	Method Blank	103	116	112	107

#### Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)

DBFM = Dibromofluoromethane (Surr)

TOL = Toluene-d8 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Solid

Prep Type: TCLP

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	BFB	DBFM	DCA	TOL
		(70-130)	(70-130)	(60-124)	(70-130)
680-196387-4	IDW-S-1	107	118	104	112
680-196387-5	IDW-S-2	107	119	106	111
680-196387-6	IDW-S-3	104	119	105	112
680-196387-7	IDW-S-4	104	118	103	112
LB 680-660980/1-A	Method Blank	105	118	104	111

#### Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

DCA = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA	DBFM	TOL	BFB
		(60-124)	(70-130)	(70-130)	(70-130)
LCS 680-660370/5	Lab Control Sample	125 S1+	113	104	97
LCS 680-663093/5	Lab Control Sample	108	104	107	101
LCSD 680-660370/6	Lab Control Sample Dup	132 S1+	120	102	97
LCSD 680-663093/6	Lab Control Sample Dup	111	107	105	99
MB 680-660370/10	Method Blank	115	112	105	96
MB 680-663093/10	Method Blank	99	102	106	100

#### Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)

DBFM = Dibromofluoromethane (Surr)

TOL = Toluene-d8 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: TCLP

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		TOL (70-130)	DCA (60-124)	DBFM (70-130)	BFB (70-130)
680-196387-1	IDW-W-1	104	117	110	96
680-196387-2	IDW-W-2	101	119	115	95
680-196387-3	IDW-W-3	105	99	102	97
LB 680-660420/1-A	Method Blank	105	116	114	97
LB 680-663119/1-A	Method Blank	104	99	102	100

### Surrogate Legend

TOL = Toluene-d8 (Surr)  
 DCA = 1,2-Dichloroethane-d4 (Surr)  
 DBFM = Dibromofluoromethane (Surr)  
 BFB = 4-Bromofluorobenzene (Surr)

## Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)					
		FBP (38-130)	2FP (25-130)	TBP (31-141)	TPHL (10-143)	PHL (25-130)	NBZ (39-130)
LCS 680-661013/15-A	Lab Control Sample	92	85	93	115	77	91
MB 680-661013/14-A	Method Blank	83	70	79	92	73	83

### Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)  
 2FP = 2-Fluorophenol (Surr)  
 TBP = 2,4,6-Tribromophenol (Surr)  
 TPHL = Terphenyl-d14 (Surr)  
 PHL = Phenol-d5 (Surr)  
 NBZ = Nitrobenzene-d5 (Surr)

## Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid

Prep Type: TCLP

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)					
		FBP (38-130)	2FP (25-130)	NBZ (39-130)	PHL (25-130)	TPHL (10-143)	TBP (31-141)
680-196387-4	IDW-S-1	97	80	98	85	92	93
680-196387-5	IDW-S-2	101	86	100	90	101	94
680-196387-6	IDW-S-3	96	82	99	89	89	90
680-196387-7	IDW-S-4	101	81	100	86	106	94
LB 680-660636/1-E	Method Blank	93	73	88	79	98	91

### Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)  
 2FP = 2-Fluorophenol (Surr)  
 NBZ = Nitrobenzene-d5 (Surr)  
 PHL = Phenol-d5 (Surr)  
 TPHL = Terphenyl-d14 (Surr)  
 TBP = 2,4,6-Tribromophenol (Surr)

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: TCLP

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)					
		TBP (31-141)	FBP (38-130)	2FP (25-130)	TPHL (10-143)	PHL (25-130)	NBZ (39-130)
680-196387-1	IDW-W-1	93	79	72	38	79	91
680-196387-2	IDW-W-2	88	86	72	44	79	88
680-196387-3	IDW-W-3	87	91	77	74	83	87
LB 680-660404/1-E	Method Blank	97	100	87	99	87	96

### Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)  
 FBP = 2-Fluorobiphenyl (Surr)  
 2FP = 2-Fluorophenol (Surr)  
 TPHL = Terphenyl-d14 (Surr)  
 PHL = Phenol-d5 (Surr)  
 NBZ = Nitrobenzene-d5 (Surr)

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography

Matrix: Solid

Prep Type: TCLP

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		DCBP1 (14-130)	TCX1 (40-130)
680-196387-4	IDW-S-1	102	72
680-196387-4 MS	IDW-S-1	102	82
680-196387-4 MSD	IDW-S-1	93	75
680-196387-5	IDW-S-2	102	73
680-196387-6	IDW-S-3	98	67
680-196387-7	IDW-S-4	108	74
680-196387-7 MS	IDW-S-4	50	36 S1-
680-196387-7 MSD	IDW-S-4	97	75
LB 680-660636/1-F	Method Blank	88	65

### Surrogate Legend

DCBP = DCB Decachlorobiphenyl  
 TCX = Tetrachloro-m-xylene

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		TCX2 (40-130)	DCBP1 (14-130)
LCS 680-661180/12-A	Lab Control Sample	80	89
LCS 680-661180/15-A	Lab Control Sample	73	75
MB 680-661180/11-A	Method Blank	72	80

### Surrogate Legend

TCX = Tetrachloro-m-xylene  
 DCBP = DCB Decachlorobiphenyl

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas

### Chromatography

Matrix: Water

Prep Type: Total/NA

#### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TCX1 (40-130)	DCBP1 (14-130)
LCS 680-661180/18-A	Lab Control Sample	73	69

#### Surrogate Legend

TCX = Tetrachloro-m-xylene  
DCBP = DCB Decachlorobiphenyl

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas

### Chromatography

Matrix: Water

Prep Type: TCLP

#### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TCX1 (40-130)	DCBP1 (14-130)
680-196387-1	IDW-W-1	70	5 S1-
680-196387-2	IDW-W-2	73	5 S1-
680-196387-3	IDW-W-3	73	14

#### Surrogate Legend

TCX = Tetrachloro-m-xylene  
DCBP = DCB Decachlorobiphenyl

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas

### Chromatography

Matrix: Water

Prep Type: TCLP

#### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TCX2 (40-130)	DCBP1 (14-130)
680-196387-3 MS	IDW-W-3	72	12 S1-
680-196387-3 MSD	IDW-W-3	70	14
LB 680-660404/1-F	Method Blank	71	89

#### Surrogate Legend

TCX = Tetrachloro-m-xylene  
DCBP = DCB Decachlorobiphenyl

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 680-660370/10**  
**Matrix: Water**  
**Analysis Batch: 660370**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Carbon tetrachloride	0.0010	U	0.0010		mg/L			03/19/21 14:14	1
Chlorobenzene	0.0010	U	0.0010		mg/L			03/19/21 14:14	1
Benzene	0.0010	U	0.0010		mg/L			03/19/21 14:14	1
Chloroform	0.0010	U	0.0010		mg/L			03/19/21 14:14	1
1,2-Dichloroethane	0.0010	U	0.0010		mg/L			03/19/21 14:14	1
2-Butanone (MEK)	0.010	U	0.010		mg/L			03/19/21 14:14	1
1,1-Dichloroethene	0.0010	U	0.0010		mg/L			03/19/21 14:14	1
Tetrachloroethene	0.0010	U	0.0010		mg/L			03/19/21 14:14	1
Trichloroethene	0.0010	U	0.0010		mg/L			03/19/21 14:14	1
Vinyl chloride	0.0010	U	0.0010		mg/L			03/19/21 14:14	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1,2-Dichloroethane-d4 (Surr)	115		60 - 124		03/19/21 14:14	1
Dibromofluoromethane (Surr)	112		70 - 130		03/19/21 14:14	1
Toluene-d8 (Surr)	105		70 - 130		03/19/21 14:14	1
4-Bromofluorobenzene (Surr)	96		70 - 130		03/19/21 14:14	1

**Lab Sample ID: LCS 680-660370/5**  
**Matrix: Water**  
**Analysis Batch: 660370**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Carbon tetrachloride	0.0500	0.0614		mg/L		123	70 - 130
Chlorobenzene	0.0500	0.0497		mg/L		99	70 - 130
Benzene	0.0500	0.0478		mg/L		96	70 - 130
Chloroform	0.0500	0.0535		mg/L		107	70 - 130
1,2-Dichloroethane	0.0500	0.0613		mg/L		123	70 - 130
2-Butanone (MEK)	0.250	0.283		mg/L		113	69 - 114
1,1-Dichloroethene	0.0500	0.0533		mg/L		107	70 - 130
Tetrachloroethene	0.0500	0.0628		mg/L		126	70 - 130
Trichloroethene	0.0500	0.0551		mg/L		110	70 - 130
Vinyl chloride	0.0500	0.0503		mg/L		101	66 - 129

Surrogate	LCS	LCS	Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	125	S1+	60 - 124
Dibromofluoromethane (Surr)	113		70 - 130
Toluene-d8 (Surr)	104		70 - 130
4-Bromofluorobenzene (Surr)	97		70 - 130

**Lab Sample ID: LCSD 680-660370/6**  
**Matrix: Water**  
**Analysis Batch: 660370**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
		Result	Qualifier						
Carbon tetrachloride	0.0500	0.0565		mg/L		113	70 - 130	8	30
Chlorobenzene	0.0500	0.0502		mg/L		100	70 - 130	1	30
Benzene	0.0500	0.0486		mg/L		97	70 - 130	2	30
Chloroform	0.0500	0.0541		mg/L		108	70 - 130	1	30

Eurofins TestAmerica, Savannah



# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCSD 680-660370/6**  
**Matrix: Water**  
**Analysis Batch: 660370**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dichloroethane	0.0500	0.0642		mg/L		128	70 - 130	5	50
2-Butanone (MEK)	0.250	0.300	*+	mg/L		120	69 - 114	6	30
1,1-Dichloroethene	0.0500	0.0472		mg/L		94	70 - 130	12	20
Tetrachloroethene	0.0500	0.0596		mg/L		119	70 - 130	5	30
Trichloroethene	0.0500	0.0533		mg/L		107	70 - 130	3	30
Vinyl chloride	0.0500	0.0408		mg/L		82	66 - 129	21	30

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
1,2-Dichloroethane-d4 (Surr)	132	S1+	60 - 124
Dibromofluoromethane (Surr)	120		70 - 130
Toluene-d8 (Surr)	102		70 - 130
4-Bromofluorobenzene (Surr)	97		70 - 130

**Lab Sample ID: MB 680-661698/9**  
**Matrix: Solid**  
**Analysis Batch: 661698**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	0.0010	U	0.0010		mg/L			03/28/21 12:12	1
Chlorobenzene	0.0010	U	0.0010		mg/L			03/28/21 12:12	1
Benzene	0.0010	U	0.0010		mg/L			03/28/21 12:12	1
Chloroform	0.0010	U	0.0010		mg/L			03/28/21 12:12	1
1,4-Dichlorobenzene	0.0010	U	0.0010		mg/L			03/28/21 12:12	1
1,2-Dichloroethane	0.0010	U	0.0010		mg/L			03/28/21 12:12	1
2-Butanone (MEK)	0.010	U	0.010		mg/L			03/28/21 12:12	1
1,1-Dichloroethene	0.0010	U	0.0010		mg/L			03/28/21 12:12	1
Tetrachloroethene	0.0010	U	0.0010		mg/L			03/28/21 12:12	1
Trichloroethene	0.0010	U	0.0010		mg/L			03/28/21 12:12	1
Vinyl chloride	0.0010	U	0.0010		mg/L			03/28/21 12:12	1

Surrogate	MB %Recovery	MB Qualifier	MB Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	103		60 - 124		03/28/21 12:12	1
Dibromofluoromethane (Surr)	116		70 - 130		03/28/21 12:12	1
Toluene-d8 (Surr)	112		70 - 130		03/28/21 12:12	1
4-Bromofluorobenzene (Surr)	107		70 - 130		03/28/21 12:12	1

**Lab Sample ID: LCS 680-661698/4**  
**Matrix: Solid**  
**Analysis Batch: 661698**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Carbon tetrachloride	0.0500	0.0540		mg/L		108	70 - 130
Chlorobenzene	0.0500	0.0565		mg/L		113	70 - 130
Benzene	0.0500	0.0558		mg/L		112	70 - 130
Chloroform	0.0500	0.0521		mg/L		104	70 - 130
1,4-Dichlorobenzene	0.0500	0.0536		mg/L		107	70 - 130
1,2-Dichloroethane	0.0500	0.0513		mg/L		103	70 - 130
2-Butanone (MEK)	0.250	0.262		mg/L		105	69 - 114

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-661698/4**  
**Matrix: Solid**  
**Analysis Batch: 661698**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	0.0500	0.0534		mg/L		107	70 - 130
Tetrachloroethene	0.0500	0.0588		mg/L		118	70 - 130
Trichloroethene	0.0500	0.0583		mg/L		117	70 - 130
Vinyl chloride	0.0500	0.0505		mg/L		101	66 - 129

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	101		60 - 124
Dibromofluoromethane (Surr)	109		70 - 130
Toluene-d8 (Surr)	108		70 - 130
4-Bromofluorobenzene (Surr)	96		70 - 130

**Lab Sample ID: LCSD 680-661698/5**  
**Matrix: Solid**  
**Analysis Batch: 661698**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Carbon tetrachloride	0.0500	0.0538		mg/L		108	70 - 130	0	30
Chlorobenzene	0.0500	0.0557		mg/L		111	70 - 130	1	30
Benzene	0.0500	0.0554		mg/L		111	70 - 130	1	30
Chloroform	0.0500	0.0527		mg/L		105	70 - 130	1	30
1,4-Dichlorobenzene	0.0500	0.0544		mg/L		109	70 - 130	1	30
1,2-Dichloroethane	0.0500	0.0529		mg/L		106	70 - 130	3	50
2-Butanone (MEK)	0.250	0.275		mg/L		110	69 - 114	5	30
1,1-Dichloroethene	0.0500	0.0522		mg/L		104	70 - 130	2	20
Tetrachloroethene	0.0500	0.0583		mg/L		117	70 - 130	1	30
Trichloroethene	0.0500	0.0590		mg/L		118	70 - 130	1	30
Vinyl chloride	0.0500	0.0504		mg/L		101	66 - 129	0	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	103		60 - 124
Dibromofluoromethane (Surr)	110		70 - 130
Toluene-d8 (Surr)	108		70 - 130
4-Bromofluorobenzene (Surr)	97		70 - 130

**Lab Sample ID: MB 680-663093/10**  
**Matrix: Water**  
**Analysis Batch: 663093**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon tetrachloride	0.0010	U	0.0010		mg/L			04/07/21 15:40	1
Chlorobenzene	0.0010	U	0.0010		mg/L			04/07/21 15:40	1
Benzene	0.0010	U	0.0010		mg/L			04/07/21 15:40	1
Chloroform	0.0010	U	0.0010		mg/L			04/07/21 15:40	1
1,2-Dichloroethane	0.0010	U	0.0010		mg/L			04/07/21 15:40	1
2-Butanone (MEK)	0.010	U	0.010		mg/L			04/07/21 15:40	1
1,1-Dichloroethene	0.0010	U	0.0010		mg/L			04/07/21 15:40	1
Tetrachloroethene	0.0010	U	0.0010		mg/L			04/07/21 15:40	1
Trichloroethene	0.0010	U	0.0010		mg/L			04/07/21 15:40	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 680-663093/10**  
**Matrix: Water**  
**Analysis Batch: 663093**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.0010	U	0.0010		mg/L			04/07/21 15:40	1
Surrogate	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		60 - 124					04/07/21 15:40	1
Dibromofluoromethane (Surr)	102		70 - 130					04/07/21 15:40	1
Toluene-d8 (Surr)	106		70 - 130					04/07/21 15:40	1
4-Bromofluorobenzene (Surr)	100		70 - 130					04/07/21 15:40	1

**Lab Sample ID: LCS 680-663093/5**  
**Matrix: Water**  
**Analysis Batch: 663093**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Carbon tetrachloride	0.0500	0.0496		mg/L		99	70 - 130
Chlorobenzene	0.0500	0.0515		mg/L		103	70 - 130
Benzene	0.0500	0.0550		mg/L		110	70 - 130
Chloroform	0.0500	0.0549		mg/L		110	70 - 130
1,2-Dichloroethane	0.0500	0.0539		mg/L		108	70 - 130
2-Butanone (MEK)	0.250	0.251		mg/L		101	69 - 114
1,1-Dichloroethene	0.0500	0.0496		mg/L		99	70 - 130
Tetrachloroethene	0.0500	0.0448		mg/L		90	70 - 130
Trichloroethene	0.0500	0.0458		mg/L		92	70 - 130
Vinyl chloride	0.0500	0.0464		mg/L		93	66 - 129
Surrogate	%Recovery	LCS Qualifier	Limits				
1,2-Dichloroethane-d4 (Surr)	108		60 - 124				
Dibromofluoromethane (Surr)	104		70 - 130				
Toluene-d8 (Surr)	107		70 - 130				
4-Bromofluorobenzene (Surr)	101		70 - 130				

**Lab Sample ID: LCSD 680-663093/6**  
**Matrix: Water**  
**Analysis Batch: 663093**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Carbon tetrachloride	0.0500	0.0475		mg/L		95	70 - 130	4	30
Chlorobenzene	0.0500	0.0510		mg/L		102	70 - 130	1	30
Benzene	0.0500	0.0547		mg/L		109	70 - 130	1	30
Chloroform	0.0500	0.0557		mg/L		111	70 - 130	1	30
1,2-Dichloroethane	0.0500	0.0566		mg/L		113	70 - 130	5	50
2-Butanone (MEK)	0.250	0.266		mg/L		106	69 - 114	6	30
1,1-Dichloroethene	0.0500	0.0470		mg/L		94	70 - 130	5	20
Tetrachloroethene	0.0500	0.0436		mg/L		87	70 - 130	3	30
Trichloroethene	0.0500	0.0447		mg/L		89	70 - 130	2	30
Vinyl chloride	0.0500	0.0457		mg/L		91	66 - 129	1	30
Surrogate	%Recovery	LCSD Qualifier	Limits						
1,2-Dichloroethane-d4 (Surr)	111		60 - 124						

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCSD 680-663093/6**  
**Matrix: Water**  
**Analysis Batch: 663093**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
Dibromofluoromethane (Surr)	107		70 - 130
Toluene-d8 (Surr)	105		70 - 130
4-Bromofluorobenzene (Surr)	99		70 - 130

**Lab Sample ID: LB 680-660420/1-A**  
**Matrix: Water**  
**Analysis Batch: 660370**

**Client Sample ID: Method Blank**  
**Prep Type: TCLP**

Analyte	LB LB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Carbon tetrachloride	0.020	U	0.020		mg/L			03/19/21 14:39	20
Chlorobenzene	0.020	U	0.020		mg/L			03/19/21 14:39	20
Benzene	0.020	U	0.020		mg/L			03/19/21 14:39	20
Chloroform	0.020	U	0.020		mg/L			03/19/21 14:39	20
1,2-Dichloroethane	0.020	U	0.020		mg/L			03/19/21 14:39	20
2-Butanone (MEK)	0.20	U	0.20		mg/L			03/19/21 14:39	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			03/19/21 14:39	20
Tetrachloroethene	0.020	U	0.020		mg/L			03/19/21 14:39	20
Trichloroethene	0.020	U	0.020		mg/L			03/19/21 14:39	20
Vinyl chloride	0.020	U	0.020		mg/L			03/19/21 14:39	20

Surrogate	LB LB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1,2-Dichloroethane-d4 (Surr)	116		60 - 124		03/19/21 14:39	20
Dibromofluoromethane (Surr)	114		70 - 130		03/19/21 14:39	20
Toluene-d8 (Surr)	105		70 - 130		03/19/21 14:39	20
4-Bromofluorobenzene (Surr)	97		70 - 130		03/19/21 14:39	20

**Lab Sample ID: LB 680-660980/1-A**  
**Matrix: Solid**  
**Analysis Batch: 661698**

**Client Sample ID: Method Blank**  
**Prep Type: TCLP**

Analyte	LB LB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Carbon tetrachloride	0.020	U	0.020		mg/L			03/28/21 12:38	20
Chlorobenzene	0.020	U	0.020		mg/L			03/28/21 12:38	20
Benzene	0.020	U	0.020		mg/L			03/28/21 12:38	20
Chloroform	0.020	U	0.020		mg/L			03/28/21 12:38	20
1,4-Dichlorobenzene	0.020	U	0.020		mg/L			03/28/21 12:38	20
1,2-Dichloroethane	0.020	U	0.020		mg/L			03/28/21 12:38	20
2-Butanone (MEK)	0.20	U	0.20		mg/L			03/28/21 12:38	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			03/28/21 12:38	20
Tetrachloroethene	0.020	U	0.020		mg/L			03/28/21 12:38	20
Trichloroethene	0.020	U	0.020		mg/L			03/28/21 12:38	20
Vinyl chloride	0.020	U	0.020		mg/L			03/28/21 12:38	20

Surrogate	LB LB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1,2-Dichloroethane-d4 (Surr)	104		60 - 124		03/28/21 12:38	20
Dibromofluoromethane (Surr)	118		70 - 130		03/28/21 12:38	20
Toluene-d8 (Surr)	111		70 - 130		03/28/21 12:38	20
4-Bromofluorobenzene (Surr)	105		70 - 130		03/28/21 12:38	20

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: LB 680-663119/1-A**  
**Matrix: Water**  
**Analysis Batch: 663093**

**Client Sample ID: Method Blank**  
**Prep Type: TCLP**

Analyte	LB LB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Carbon tetrachloride	0.020	U	0.020		mg/L			04/07/21 17:19	20
Chlorobenzene	0.020	U	0.020		mg/L			04/07/21 17:19	20
Benzene	0.020	U	0.020		mg/L			04/07/21 17:19	20
Chloroform	0.020	U	0.020		mg/L			04/07/21 17:19	20
1,2-Dichloroethane	0.020	U	0.020		mg/L			04/07/21 17:19	20
2-Butanone (MEK)	0.20	U	0.20		mg/L			04/07/21 17:19	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			04/07/21 17:19	20
Tetrachloroethene	0.020	U	0.020		mg/L			04/07/21 17:19	20
Trichloroethene	0.020	U	0.020		mg/L			04/07/21 17:19	20
Vinyl chloride	0.020	U	0.020		mg/L			04/07/21 17:19	20

Surrogate	LB LB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1,2-Dichloroethane-d4 (Surr)	99		60 - 124		04/07/21 17:19	20
Dibromofluoromethane (Surr)	102		70 - 130		04/07/21 17:19	20
Toluene-d8 (Surr)	104		70 - 130		04/07/21 17:19	20
4-Bromofluorobenzene (Surr)	100		70 - 130		04/07/21 17:19	20

## Method: 8270D - Semivolatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 680-661013/14-A**  
**Matrix: Solid**  
**Analysis Batch: 661361**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 661013**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
2,4-Dinitrotoluene	0.010	U	0.010		mg/L		03/23/21 19:51	03/25/21 17:10	1
2-Methylphenol	0.010	U	0.010		mg/L		03/23/21 19:51	03/25/21 17:10	1
Hexachlorobenzene	0.010	U	0.010		mg/L		03/23/21 19:51	03/25/21 17:10	1
3 & 4 Methylphenol	0.010	U	0.010		mg/L		03/23/21 19:51	03/25/21 17:10	1
Hexachlorobutadiene	0.010	U	0.010		mg/L		03/23/21 19:51	03/25/21 17:10	1
Hexachloroethane	0.010	U	0.010		mg/L		03/23/21 19:51	03/25/21 17:10	1
Nitrobenzene	0.010	U	0.010		mg/L		03/23/21 19:51	03/25/21 17:10	1
Pentachlorophenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 17:10	1
Pyridine	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 17:10	1
2,4,5-Trichlorophenol	0.010	U	0.010		mg/L		03/23/21 19:51	03/25/21 17:10	1
2,4,6-Trichlorophenol	0.010	U	0.010		mg/L		03/23/21 19:51	03/25/21 17:10	1

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
2-Fluorobiphenyl (Surr)	83		38 - 130	03/23/21 19:51	03/25/21 17:10	1
2-Fluorophenol (Surr)	70		25 - 130	03/23/21 19:51	03/25/21 17:10	1
2,4,6-Tribromophenol (Surr)	79		31 - 141	03/23/21 19:51	03/25/21 17:10	1
Terphenyl-d14 (Surr)	92		10 - 143	03/23/21 19:51	03/25/21 17:10	1
Phenol-d5 (Surr)	73		25 - 130	03/23/21 19:51	03/25/21 17:10	1
Nitrobenzene-d5 (Surr)	83		39 - 130	03/23/21 19:51	03/25/21 17:10	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-661013/15-A**  
**Matrix: Solid**  
**Analysis Batch: 661361**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 661013**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
2,4-Dinitrotoluene	0.100	0.101		mg/L		101	52 - 130
2-Methylphenol	0.100	0.0878		mg/L		88	40 - 130
Hexachlorobenzene	0.100	0.105		mg/L		105	43 - 130
3 & 4 Methylphenol	0.100	0.0882		mg/L		88	42 - 130
Hexachlorobutadiene	0.100	0.0729		mg/L		73	27 - 130
Hexachloroethane	0.100	0.0698		mg/L		70	29 - 130
Nitrobenzene	0.100	0.0922		mg/L		92	43 - 130
Pentachlorophenol	0.200	0.210		mg/L		105	33 - 130
Pyridine	0.200	0.188		mg/L		94	10 - 130
2,4,5-Trichlorophenol	0.100	0.102		mg/L		102	48 - 130
2,4,6-Trichlorophenol	0.100	0.102		mg/L		102	47 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2-Fluorobiphenyl (Surr)	92		38 - 130
2-Fluorophenol (Surr)	85		25 - 130
2,4,6-Tribromophenol (Surr)	93		31 - 141
Terphenyl-d14 (Surr)	115		10 - 143
Phenol-d5 (Surr)	77		25 - 130
Nitrobenzene-d5 (Surr)	91		39 - 130

**Lab Sample ID: LB 680-660404/1-E**  
**Matrix: Water**  
**Analysis Batch: 661361**

**Client Sample ID: Method Blank**  
**Prep Type: TCLP**  
**Prep Batch: 661013**

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-Dinitrotoluene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 16:26	1
2-Methylphenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 16:26	1
Hexachlorobenzene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 16:26	1
3 & 4 Methylphenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 16:26	1
Hexachlorobutadiene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 16:26	1
Hexachloroethane	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 16:26	1
Nitrobenzene	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 16:26	1
Pentachlorophenol	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 16:26	1
Pyridine	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 16:26	1
2,4,5-Trichlorophenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 16:26	1
2,4,6-Trichlorophenol	0.050	U	0.050		mg/L		03/23/21 19:51	03/25/21 16:26	1

Surrogate	LB %Recovery	LB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl (Surr)	100		38 - 130	03/23/21 19:51	03/25/21 16:26	1
2-Fluorophenol (Surr)	87		25 - 130	03/23/21 19:51	03/25/21 16:26	1
2,4,6-Tribromophenol (Surr)	97		31 - 141	03/23/21 19:51	03/25/21 16:26	1
Terphenyl-d14 (Surr)	99		10 - 143	03/23/21 19:51	03/25/21 16:26	1
Phenol-d5 (Surr)	87		25 - 130	03/23/21 19:51	03/25/21 16:26	1
Nitrobenzene-d5 (Surr)	96		39 - 130	03/23/21 19:51	03/25/21 16:26	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LB 680-660636/1-E**  
**Matrix: Solid**  
**Analysis Batch: 661361**

**Client Sample ID: Method Blank**  
**Prep Type: TCLP**  
**Prep Batch: 661013**

Analyte	LB LB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
2,4-Dinitrotoluene	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 16:48	1
2-Methylphenol	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 16:48	1
Hexachlorobenzene	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 16:48	1
3 & 4 Methylphenol	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 16:48	1
Hexachlorobutadiene	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 16:48	1
Hexachloroethane	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 16:48	1
Nitrobenzene	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 16:48	1
Pentachlorophenol	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 16:48	1
Pyridine	0.25	U	0.25		mg/L		03/23/21 19:51	03/25/21 16:48	1
2,4,5-Trichlorophenol	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 16:48	1
2,4,6-Trichlorophenol	0.049	U	0.049		mg/L		03/23/21 19:51	03/25/21 16:48	1
Surrogate	LB LB		Limits				Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier							
2-Fluorobiphenyl (Surr)	93		38 - 130				03/23/21 19:51	03/25/21 16:48	1
2-Fluorophenol (Surr)	73		25 - 130				03/23/21 19:51	03/25/21 16:48	1
2,4,6-Tribromophenol (Surr)	91		31 - 141				03/23/21 19:51	03/25/21 16:48	1
Terphenyl-d14 (Surr)	98		10 - 143				03/23/21 19:51	03/25/21 16:48	1
Phenol-d5 (Surr)	79		25 - 130				03/23/21 19:51	03/25/21 16:48	1
Nitrobenzene-d5 (Surr)	88		39 - 130				03/23/21 19:51	03/25/21 16:48	1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography

**Lab Sample ID: MB 680-661180/11-A**  
**Matrix: Water**  
**Analysis Batch: 661317**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 661180**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Chlordane (technical)	0.00025	U	0.00025		mg/L		03/24/21 18:23	03/25/21 20:06	1
Endrin	0.00025	U	0.00025		mg/L		03/24/21 18:23	03/25/21 20:06	1
gamma-BHC (Lindane)	0.00025	U	0.00025		mg/L		03/24/21 18:23	03/25/21 20:06	1
Heptachlor	0.00025	U	0.00025		mg/L		03/24/21 18:23	03/25/21 20:06	1
Heptachlor epoxide	0.00025	U	0.00025		mg/L		03/24/21 18:23	03/25/21 20:06	1
Methoxychlor	0.00025	U	0.00025		mg/L		03/24/21 18:23	03/25/21 20:06	1
Toxaphene	0.0025	U	0.0025		mg/L		03/24/21 18:23	03/25/21 20:06	1
PCB-1016	0.00050	U	0.00050		mg/L		03/24/21 18:23	03/25/21 20:06	1
PCB-1221	0.00050	U	0.00050		mg/L		03/24/21 18:23	03/25/21 20:06	1
PCB-1232	0.00050	U	0.00050		mg/L		03/24/21 18:23	03/25/21 20:06	1
PCB-1242	0.00050	U	0.00050		mg/L		03/24/21 18:23	03/25/21 20:06	1
PCB-1248	0.00050	U	0.00050		mg/L		03/24/21 18:23	03/25/21 20:06	1
PCB-1254	0.00050	U	0.00050		mg/L		03/24/21 18:23	03/25/21 20:06	1
PCB-1260	0.00050	U	0.00050		mg/L		03/24/21 18:23	03/25/21 20:06	1
Surrogate	MB MB		Limits				Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier							
Tetrachloro-m-xylene	72		40 - 130				03/24/21 18:23	03/25/21 20:06	1
DCB Decachlorobiphenyl	80		14 - 130				03/24/21 18:23	03/25/21 20:06	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography (Continued)

**Lab Sample ID: LCS 680-661180/12-A**  
**Matrix: Water**  
**Analysis Batch: 661317**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 661180**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Endrin	0.0000500	0.0000546		mg/L		109	59 - 143
gamma-BHC (Lindane)	0.0000500	0.0000525		mg/L		105	52 - 130
Heptachlor	0.0000500	0.0000395		mg/L		79	35 - 130
Heptachlor epoxide	0.0000500	0.0000554		mg/L		111	52 - 130
Methoxychlor	0.0000500	0.0000622		mg/L		124	52 - 136

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Tetrachloro-m-xylene	80		40 - 130
DCB Decachlorobiphenyl	89		14 - 130

**Lab Sample ID: LCS 680-661180/15-A**  
**Matrix: Water**  
**Analysis Batch: 661317**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 661180**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
PCB-1016	0.00300	0.00181		mg/L		60	44 - 130
PCB-1260	0.00300	0.00287		mg/L		96	35 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Tetrachloro-m-xylene	73		40 - 130
DCB Decachlorobiphenyl	75		14 - 130

**Lab Sample ID: LCS 680-661180/18-A**  
**Matrix: Water**  
**Analysis Batch: 661317**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 661180**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlordane (technical)	0.00200	0.00139		mg/L		69	62 - 130
Toxaphene	0.00400	0.00422		mg/L		105	56 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Tetrachloro-m-xylene	73		40 - 130
DCB Decachlorobiphenyl	69		14 - 130

**Lab Sample ID: LB 680-660404/1-F**  
**Matrix: Water**  
**Analysis Batch: 661317**

**Client Sample ID: Method Blank**  
**Prep Type: TCLP**  
**Prep Batch: 661180**

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	0.012	U	0.012		mg/L		03/24/21 18:23	03/25/21 19:34	1
Endrin	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 19:34	1
gamma-BHC (Lindane)	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 19:34	1
Heptachlor	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 19:34	1
Heptachlor epoxide	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 19:34	1
Methoxychlor	0.0012	U	0.0012		mg/L		03/24/21 18:23	03/25/21 19:34	1
Toxaphene	0.12	U	0.12		mg/L		03/24/21 18:23	03/25/21 19:34	1

Eurofins TestAmerica, Savannah



# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography (Continued)

**Lab Sample ID: LB 680-660404/1-F**  
**Matrix: Water**  
**Analysis Batch: 661317**

**Client Sample ID: Method Blank**  
**Prep Type: TCLP**  
**Prep Batch: 661180**

Analyte	LB LB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
PCB-1016	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 19:34	1
PCB-1221	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 19:34	1
PCB-1232	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 19:34	1
PCB-1242	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 19:34	1
PCB-1248	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 19:34	1
PCB-1254	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 19:34	1
PCB-1260	0.024	U	0.024		mg/L		03/24/21 18:23	03/25/21 19:34	1

Surrogate	LB LB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Tetrachloro-m-xylene	71		40 - 130	03/24/21 18:23	03/25/21 19:34	1
DCB Decachlorobiphenyl	89		14 - 130	03/24/21 18:23	03/25/21 19:34	1

**Lab Sample ID: LB 680-660636/1-F**  
**Matrix: Solid**  
**Analysis Batch: 661317**

**Client Sample ID: Method Blank**  
**Prep Type: TCLP**  
**Prep Batch: 661180**

Analyte	LB LB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Chlordane (technical)	0.011	U	0.011		mg/L		03/24/21 18:23	03/25/21 19:50	1
Endrin	0.0011	U	0.0011		mg/L		03/24/21 18:23	03/25/21 19:50	1
gamma-BHC (Lindane)	0.0011	U	0.0011		mg/L		03/24/21 18:23	03/25/21 19:50	1
Heptachlor	0.0011	U	0.0011		mg/L		03/24/21 18:23	03/25/21 19:50	1
Heptachlor epoxide	0.0011	U	0.0011		mg/L		03/24/21 18:23	03/25/21 19:50	1
Methoxychlor	0.0011	U	0.0011		mg/L		03/24/21 18:23	03/25/21 19:50	1
Toxaphene	0.11	U	0.11		mg/L		03/24/21 18:23	03/25/21 19:50	1
PCB-1016	0.022	U	0.022		mg/L		03/24/21 18:23	03/25/21 19:50	1
PCB-1221	0.022	U	0.022		mg/L		03/24/21 18:23	03/25/21 19:50	1
PCB-1232	0.022	U	0.022		mg/L		03/24/21 18:23	03/25/21 19:50	1
PCB-1242	0.022	U	0.022		mg/L		03/24/21 18:23	03/25/21 19:50	1
PCB-1248	0.022	U	0.022		mg/L		03/24/21 18:23	03/25/21 19:50	1
PCB-1254	0.022	U	0.022		mg/L		03/24/21 18:23	03/25/21 19:50	1
PCB-1260	0.022	U	0.022		mg/L		03/24/21 18:23	03/25/21 19:50	1

Surrogate	LB LB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Tetrachloro-m-xylene	65		40 - 130	03/24/21 18:23	03/25/21 19:50	1
DCB Decachlorobiphenyl	88		14 - 130	03/24/21 18:23	03/25/21 19:50	1

**Lab Sample ID: 680-196387-3 MS**  
**Matrix: Water**  
**Analysis Batch: 661317**

**Client Sample ID: IDW-W-3**  
**Prep Type: TCLP**  
**Prep Batch: 661180**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS MS		Unit	D	%Rec	%Rec. Limits
				Result	Qualifier				
Endrin	0.0012	U	0.00228	0.00205		mg/L		90	59 - 143
gamma-BHC (Lindane)	0.0012	U	0.00228	0.00211		mg/L		92	52 - 130
Heptachlor	0.0012	U	0.00228	0.00155		mg/L		68	35 - 130
Heptachlor epoxide	0.0012	U	0.00228	0.00215		mg/L		94	52 - 130
Methoxychlor	0.0012	U	0.00228	0.00180		mg/L		79	52 - 136

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography (Continued)

**Lab Sample ID: 680-196387-3 MS**  
**Matrix: Water**  
**Analysis Batch: 661317**

**Client Sample ID: IDW-W-3**  
**Prep Type: TCLP**  
**Prep Batch: 661180**

Surrogate	MS MS		Limits
	%Recovery	Qualifier	
Tetrachloro-m-xylene	72		40 - 130
DCB Decachlorobiphenyl	12	S1-	14 - 130

**Lab Sample ID: 680-196387-3 MSD**  
**Matrix: Water**  
**Analysis Batch: 661317**

**Client Sample ID: IDW-W-3**  
**Prep Type: TCLP**  
**Prep Batch: 661180**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD MSD		Unit	D	%Rec	%Rec.		RPD	Limit
				Result	Qualifier				Limits	RPD		
Endrin	0.0012	U	0.00237	0.00233		mg/L		98	59 - 143	13	50	
gamma-BHC (Lindane)	0.0012	U	0.00237	0.00230		mg/L		97	52 - 130	9	50	
Heptachlor	0.0012	U	0.00237	0.00164		mg/L		69	35 - 130	6	50	
Heptachlor epoxide	0.0012	U	0.00237	0.00221		mg/L		93	52 - 130	3	50	
Methoxychlor	0.0012	U	0.00237	0.00202		mg/L		85	52 - 136	11	50	

Surrogate	MSD MSD		Limits
	%Recovery	Qualifier	
Tetrachloro-m-xylene	70		40 - 130
DCB Decachlorobiphenyl	14		14 - 130

**Lab Sample ID: 680-196387-4 MS**  
**Matrix: Solid**  
**Analysis Batch: 661843**

**Client Sample ID: IDW-S-1**  
**Prep Type: TCLP**  
**Prep Batch: 661180**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS MS		Unit	D	%Rec	%Rec.		RPD	Limit
				Result	Qualifier				Limits	RPD		
Chlordane (technical)	0.012	U	0.0957	0.0725		mg/L		76	62 - 130			
Toxaphene	0.12	U	0.191	0.140	p	mg/L		73	56 - 130			

Surrogate	MS MS		Limits
	%Recovery	Qualifier	
Tetrachloro-m-xylene	82		40 - 130
DCB Decachlorobiphenyl	102		14 - 130

**Lab Sample ID: 680-196387-4 MSD**  
**Matrix: Solid**  
**Analysis Batch: 661843**

**Client Sample ID: IDW-S-1**  
**Prep Type: TCLP**  
**Prep Batch: 661180**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD MSD		Unit	D	%Rec	%Rec.		RPD	Limit
				Result	Qualifier				Limits	RPD		
Chlordane (technical)	0.012	U	0.0897	0.0634		mg/L		71	62 - 130	13	50	
Toxaphene	0.12	U	0.179	0.181		mg/L		101	56 - 130	26	50	

Surrogate	MSD MSD		Limits
	%Recovery	Qualifier	
Tetrachloro-m-xylene	75		40 - 130
DCB Decachlorobiphenyl	93		14 - 130

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography (Continued)

**Lab Sample ID: 680-196387-7 MS**  
**Matrix: Solid**  
**Analysis Batch: 661843**

**Client Sample ID: IDW-S-4**  
**Prep Type: TCLP**  
**Prep Batch: 661180**

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.	Limits
	Result	Qualifier		Result	Qualifier					
PCB-1016	0.024	U F1 F2	0.146	0.0432	F1	mg/L		30		44 - 130
PCB-1260	0.024	U F2	0.146	0.0691		mg/L		47		35 - 130
<b>Surrogate</b>	<b>%Recovery</b>	<b>MS MS Qualifier</b>	<b>Limits</b>							
Tetrachloro-m-xylene	36	S1-	40 - 130							
DCB Decachlorobiphenyl	50		14 - 130							

**Lab Sample ID: 680-196387-7 MSD**  
**Matrix: Solid**  
**Analysis Batch: 661843**

**Client Sample ID: IDW-S-4**  
**Prep Type: TCLP**  
**Prep Batch: 661180**

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier							
PCB-1016	0.024	U F1 F2	0.132	0.0780	F2	mg/L		59		44 - 130	57	50
PCB-1260	0.024	U F2	0.132	0.125	F2	mg/L		95		35 - 130	57	50
<b>Surrogate</b>	<b>%Recovery</b>	<b>MSD MSD Qualifier</b>	<b>Limits</b>									
Tetrachloro-m-xylene	75		40 - 130									
DCB Decachlorobiphenyl	97		14 - 130									

## Method: 6010C - Metals (ICP)

**Lab Sample ID: MB 680-660639/1-A**  
**Matrix: Water**  
**Analysis Batch: 661149**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 660639**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	0.020	U	0.020		mg/L		03/22/21 08:35	03/24/21 01:10	1
Barium	0.10	U	0.10		mg/L		03/22/21 08:35	03/24/21 01:10	1
Cadmium	0.010	U	0.010		mg/L		03/22/21 08:35	03/24/21 01:10	1
Chromium	0.020	U	0.020		mg/L		03/22/21 08:35	03/24/21 01:10	1
Lead	0.020	U	0.020		mg/L		03/22/21 08:35	03/24/21 01:10	1
Selenium	0.050	U	0.050		mg/L		03/22/21 08:35	03/24/21 01:10	1
Silver	0.010	U	0.010		mg/L		03/22/21 08:35	03/24/21 01:10	1

**Lab Sample ID: LCS 680-660639/2-A**  
**Matrix: Water**  
**Analysis Batch: 661149**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 660639**

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.	Limits
Arsenic	2.00	1.81		mg/L		90		80 - 120
Barium	2.00	2.00		mg/L		100		80 - 120
Cadmium	1.00	0.936		mg/L		94		80 - 120
Chromium	2.00	1.93		mg/L		96		80 - 120
Lead	9.08	8.60		mg/L		95		80 - 120
Selenium	2.00	1.90		mg/L		95		80 - 120
Silver	1.00	0.956		mg/L		96		80 - 120

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 6010C - Metals (ICP) (Continued)

**Lab Sample ID: LB 680-661130/3-A**  
**Matrix: Solid**  
**Analysis Batch: 661329**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 661130**

Analyte	LB LB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 19:39	1
Barium	1.0	U	1.0		mg/L		03/24/21 12:07	03/24/21 19:39	1
Cadmium	0.10	U	0.10		mg/L		03/24/21 12:07	03/24/21 19:39	1
Chromium	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 19:39	1
Lead	0.20	U	0.20		mg/L		03/24/21 12:07	03/24/21 19:39	1
Selenium	0.50	U	0.50		mg/L		03/24/21 12:07	03/24/21 19:39	1
Silver	0.10	U	0.10		mg/L		03/24/21 12:07	03/24/21 19:39	1

**Lab Sample ID: MB 680-661130/1-A**  
**Matrix: Solid**  
**Analysis Batch: 661329**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 661130**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	0.020	U	0.020		mg/L		03/24/21 12:07	03/24/21 19:30	1
Barium	0.10	U	0.10		mg/L		03/24/21 12:07	03/24/21 19:30	1
Cadmium	0.010	U	0.010		mg/L		03/24/21 12:07	03/24/21 19:30	1
Chromium	0.020	U	0.020		mg/L		03/24/21 12:07	03/24/21 19:30	1
Lead	0.020	U	0.020		mg/L		03/24/21 12:07	03/24/21 19:30	1
Selenium	0.050	U	0.050		mg/L		03/24/21 12:07	03/24/21 19:30	1
Silver	0.010	U	0.010		mg/L		03/24/21 12:07	03/24/21 19:30	1

**Lab Sample ID: LCS 680-661130/2-A**  
**Matrix: Solid**  
**Analysis Batch: 661329**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 661130**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Barium	2.00	2.07		mg/L		104	80 - 120
Cadmium	1.00	0.996		mg/L		100	80 - 120
Chromium	2.00	2.03		mg/L		101	80 - 120
Lead	9.08	8.87		mg/L		98	80 - 120
Selenium	2.00	2.02		mg/L		101	80 - 120
Silver	1.00	1.01		mg/L		101	80 - 120

**Lab Sample ID: LB 680-660404/1-C**  
**Matrix: Water**  
**Analysis Batch: 661149**

**Client Sample ID: Method Blank**  
**Prep Type: TCLP**  
**Prep Batch: 660639**

Analyte	LB LB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	0.20	U	0.20		mg/L		03/22/21 08:35	03/24/21 01:20	1
Barium	1.0	U	1.0		mg/L		03/22/21 08:35	03/24/21 01:20	1
Cadmium	0.10	U	0.10		mg/L		03/22/21 08:35	03/24/21 01:20	1
Chromium	0.20	U	0.20		mg/L		03/22/21 08:35	03/24/21 01:20	1
Lead	0.20	U	0.20		mg/L		03/22/21 08:35	03/24/21 01:20	1
Selenium	0.50	U	0.50		mg/L		03/22/21 08:35	03/24/21 01:20	1
Silver	0.10	U	0.10		mg/L		03/22/21 08:35	03/24/21 01:20	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 6010C - Metals (ICP) (Continued)

**Lab Sample ID: 680-196387-1 MS**  
**Matrix: Water**  
**Analysis Batch: 661149**

**Client Sample ID: IDW-W-1**  
**Prep Type: TCLP**  
**Prep Batch: 660639**

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.	Limits
	Result	Qualifier		Result	Qualifier					
Arsenic	0.20	U	3.20	2.74		mg/L		86		75 - 125
Barium	1.0	U	3.20	3.15		mg/L		99		75 - 125
Cadmium	0.10	U	1.60	1.41		mg/L		88		75 - 125
Chromium	0.20	U	1.60	1.45		mg/L		90		75 - 125
Lead	0.20	U	1.60	1.30		mg/L		81		75 - 125
Selenium	0.50	U	3.20	2.81		mg/L		88		75 - 125
Silver	0.10	U F1	1.60	0.355	F1	mg/L		22		75 - 125

**Lab Sample ID: 680-196387-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 661149**

**Client Sample ID: IDW-W-1**  
**Prep Type: TCLP**  
**Prep Batch: 660639**

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier							
Arsenic	0.20	U	3.20	2.77		mg/L		87		75 - 125	1	20
Barium	1.0	U	3.20	3.12		mg/L		98		75 - 125	1	20
Cadmium	0.10	U	1.60	1.40		mg/L		87		75 - 125	1	20
Chromium	0.20	U	1.60	1.43		mg/L		90		75 - 125	1	20
Lead	0.20	U	1.60	1.29		mg/L		80		75 - 125	1	20
Selenium	0.50	U	3.20	2.71		mg/L		85		75 - 125	4	20
Silver	0.10	U F1	1.60	0.350	F1	mg/L		22		75 - 125	1	20

**Lab Sample ID: 680-196387-4 MS**  
**Matrix: Solid**  
**Analysis Batch: 661329**

**Client Sample ID: IDW-S-1**  
**Prep Type: TCLP**  
**Prep Batch: 661130**

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.	Limits
	Result	Qualifier		Result	Qualifier					
Arsenic	0.20	U	3.20	3.00		mg/L		94		75 - 125
Barium	1.0	U	3.20	3.10		mg/L		97		75 - 125
Cadmium	0.10	U	1.60	1.50		mg/L		94		75 - 125
Chromium	0.20	U	1.60	1.51		mg/L		94		75 - 125
Lead	0.20	U	1.60	1.39		mg/L		87		75 - 125
Selenium	0.50	U	3.20	3.08		mg/L		96		75 - 125
Silver	0.10	U F1	1.60	0.421	F1	mg/L		26		75 - 125

**Lab Sample ID: 680-196387-4 MSD**  
**Matrix: Solid**  
**Analysis Batch: 661329**

**Client Sample ID: IDW-S-1**  
**Prep Type: TCLP**  
**Prep Batch: 661130**

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier							
Arsenic	0.20	U	3.20	2.92		mg/L		91		75 - 125	3	20
Barium	1.0	U	3.20	3.02		mg/L		94		75 - 125	3	20
Cadmium	0.10	U	1.60	1.46		mg/L		92		75 - 125	3	20
Chromium	0.20	U	1.60	1.47		mg/L		92		75 - 125	3	20
Lead	0.20	U	1.60	1.37		mg/L		86		75 - 125	2	20
Selenium	0.50	U	3.20	3.02		mg/L		94		75 - 125	2	20
Silver	0.10	U F1	1.60	0.430	F1	mg/L		27		75 - 125	2	20

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: MB 680-660656/12-A**  
**Matrix: Water**  
**Analysis Batch: 660971**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 660656**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020		mg/L		03/22/21 09:13	03/22/21 19:30	1

**Lab Sample ID: LCS 680-660656/13-A**  
**Matrix: Water**  
**Analysis Batch: 660971**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 660656**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.250	0.255		mg/L		102	80 - 120

**Lab Sample ID: MB 680-660994/1-A**  
**Matrix: Solid**  
**Analysis Batch: 661174**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 660994**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00020		mg/L		03/23/21 15:49	03/24/21 13:38	1

**Lab Sample ID: LCS 680-660994/2-A**  
**Matrix: Solid**  
**Analysis Batch: 661174**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 660994**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.250	0.245		mg/L		98	80 - 120

**Lab Sample ID: LB 680-660404/1-D**  
**Matrix: Water**  
**Analysis Batch: 660971**

**Client Sample ID: Method Blank**  
**Prep Type: TCLP**  
**Prep Batch: 660656**

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.020	U	0.020		mg/L		03/22/21 09:13	03/22/21 19:39	1

**Lab Sample ID: 680-196387-1 MS**  
**Matrix: Water**  
**Analysis Batch: 660971**

**Client Sample ID: IDW-W-1**  
**Prep Type: TCLP**  
**Prep Batch: 660656**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.020	U	0.0830	0.0814		mg/L		98	80 - 120

**Lab Sample ID: 680-196387-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 660971**

**Client Sample ID: IDW-W-1**  
**Prep Type: TCLP**  
**Prep Batch: 660656**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.020	U	0.0830	0.0803		mg/L		97	80 - 120	1	20

**Lab Sample ID: LB 680-660636/1-D**  
**Matrix: Solid**  
**Analysis Batch: 661174**

**Client Sample ID: Method Blank**  
**Prep Type: TCLP**  
**Prep Batch: 660994**

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.020	U	0.020		mg/L		03/23/21 15:49	03/24/21 13:47	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: 680-196387-4 MS**  
**Matrix: Solid**  
**Analysis Batch: 661174**

**Client Sample ID: IDW-S-1**  
**Prep Type: TCLP**  
**Prep Batch: 660994**  
 %Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Mercury	0.020	U	0.0830	0.0798		mg/L		96	80 - 120

**Lab Sample ID: 680-196387-4 MSD**  
**Matrix: Solid**  
**Analysis Batch: 661174**

**Client Sample ID: IDW-S-1**  
**Prep Type: TCLP**  
**Prep Batch: 660994**  
 %Rec. RPD

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Mercury	0.020	U	0.0830	0.0810		mg/L		98	80 - 120	2	20

## Method: 1030 - Ignitability, Solids

**Lab Sample ID: MB 680-660419/1**  
**Matrix: Solid**  
**Analysis Batch: 660419**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Ignitability	NB				mm/sec			03/19/21 11:55	1

**Lab Sample ID: LCS 680-660419/2**  
**Matrix: Solid**  
**Analysis Batch: 660419**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ignitability	2.71	2.708		mm/sec		100	75 - 125

**Lab Sample ID: LCSD 680-660419/9**  
**Matrix: Solid**  
**Analysis Batch: 660419**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Ignitability	2.73	2.733		mm/sec		100	75 - 125	1	10

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## GC/MS VOA

### Analysis Batch: 660370

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-1	IDW-W-1	TCLP	Water	8260B	660420
680-196387-2	IDW-W-2	TCLP	Water	8260B	660420
LB 680-660420/1-A	Method Blank	TCLP	Water	8260B	660420
MB 680-660370/10	Method Blank	Total/NA	Water	8260B	
LCS 680-660370/5	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-660370/6	Lab Control Sample Dup	Total/NA	Water	8260B	

### Leach Batch: 660420

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-1	IDW-W-1	TCLP	Water	1311	
680-196387-2	IDW-W-2	TCLP	Water	1311	
LB 680-660420/1-A	Method Blank	TCLP	Water	1311	

### Leach Batch: 660980

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-4	IDW-S-1	TCLP	Solid	1311	
680-196387-5	IDW-S-2	TCLP	Solid	1311	
680-196387-6	IDW-S-3	TCLP	Solid	1311	
680-196387-7	IDW-S-4	TCLP	Solid	1311	
LB 680-660980/1-A	Method Blank	TCLP	Solid	1311	

### Analysis Batch: 661698

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-4	IDW-S-1	TCLP	Solid	8260B	660980
680-196387-5	IDW-S-2	TCLP	Solid	8260B	660980
680-196387-6	IDW-S-3	TCLP	Solid	8260B	660980
680-196387-7	IDW-S-4	TCLP	Solid	8260B	660980
LB 680-660980/1-A	Method Blank	TCLP	Solid	8260B	660980
MB 680-661698/9	Method Blank	Total/NA	Solid	8260B	
LCS 680-661698/4	Lab Control Sample	Total/NA	Solid	8260B	
LCSD 680-661698/5	Lab Control Sample Dup	Total/NA	Solid	8260B	

### Analysis Batch: 663093

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-3	IDW-W-3	TCLP	Water	8260B	663119
LB 680-663119/1-A	Method Blank	TCLP	Water	8260B	663119
MB 680-663093/10	Method Blank	Total/NA	Water	8260B	
LCS 680-663093/5	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-663093/6	Lab Control Sample Dup	Total/NA	Water	8260B	

### Leach Batch: 663119

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-3	IDW-W-3	TCLP	Water	1311	
LB 680-663119/1-A	Method Blank	TCLP	Water	1311	

## GC/MS Semi VOA

### Leach Batch: 660404

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-1	IDW-W-1	TCLP	Water	1311	
680-196387-2	IDW-W-2	TCLP	Water	1311	

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# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## GC/MS Semi VOA (Continued)

### Leach Batch: 660404 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-3	IDW-W-3	TCLP	Water	1311	
LB 680-660404/1-E	Method Blank	TCLP	Water	1311	

### Leach Batch: 660636

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-4	IDW-S-1	TCLP	Solid	1311	
680-196387-5	IDW-S-2	TCLP	Solid	1311	
680-196387-6	IDW-S-3	TCLP	Solid	1311	
680-196387-7	IDW-S-4	TCLP	Solid	1311	
LB 680-660636/1-E	Method Blank	TCLP	Solid	1311	

### Prep Batch: 661013

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-1	IDW-W-1	TCLP	Water	3520C	660404
680-196387-2	IDW-W-2	TCLP	Water	3520C	660404
680-196387-3	IDW-W-3	TCLP	Water	3520C	660404
680-196387-4	IDW-S-1	TCLP	Solid	3520C	660636
680-196387-5	IDW-S-2	TCLP	Solid	3520C	660636
680-196387-6	IDW-S-3	TCLP	Solid	3520C	660636
680-196387-7	IDW-S-4	TCLP	Solid	3520C	660636
LB 680-660404/1-E	Method Blank	TCLP	Water	3520C	660404
LB 680-660636/1-E	Method Blank	TCLP	Solid	3520C	660636
MB 680-661013/14-A	Method Blank	Total/NA	Solid	3520C	
LCS 680-661013/15-A	Lab Control Sample	Total/NA	Solid	3520C	

### Analysis Batch: 661361

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-1	IDW-W-1	TCLP	Water	8270D	661013
680-196387-2	IDW-W-2	TCLP	Water	8270D	661013
680-196387-3	IDW-W-3	TCLP	Water	8270D	661013
680-196387-4	IDW-S-1	TCLP	Solid	8270D	661013
680-196387-5	IDW-S-2	TCLP	Solid	8270D	661013
680-196387-6	IDW-S-3	TCLP	Solid	8270D	661013
680-196387-7	IDW-S-4	TCLP	Solid	8270D	661013
LB 680-660404/1-E	Method Blank	TCLP	Water	8270D	661013
LB 680-660636/1-E	Method Blank	TCLP	Solid	8270D	661013
MB 680-661013/14-A	Method Blank	Total/NA	Solid	8270D	661013
LCS 680-661013/15-A	Lab Control Sample	Total/NA	Solid	8270D	661013

## GC Semi VOA

### Leach Batch: 660404

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-1	IDW-W-1	TCLP	Water	1311	
680-196387-2	IDW-W-2	TCLP	Water	1311	
680-196387-3	IDW-W-3	TCLP	Water	1311	
LB 680-660404/1-F	Method Blank	TCLP	Water	1311	
680-196387-3 MS	IDW-W-3	TCLP	Water	1311	
680-196387-3 MSD	IDW-W-3	TCLP	Water	1311	

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## GC Semi VOA

### Leach Batch: 660636

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-4	IDW-S-1	TCLP	Solid	1311	
680-196387-5	IDW-S-2	TCLP	Solid	1311	
680-196387-6	IDW-S-3	TCLP	Solid	1311	
680-196387-7	IDW-S-4	TCLP	Solid	1311	
LB 680-660636/1-F	Method Blank	TCLP	Solid	1311	
680-196387-4 MS	IDW-S-1	TCLP	Solid	1311	
680-196387-4 MSD	IDW-S-1	TCLP	Solid	1311	
680-196387-7 MS	IDW-S-4	TCLP	Solid	1311	
680-196387-7 MSD	IDW-S-4	TCLP	Solid	1311	

### Prep Batch: 661180

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-1	IDW-W-1	TCLP	Water	3520C	660404
680-196387-2	IDW-W-2	TCLP	Water	3520C	660404
680-196387-3	IDW-W-3	TCLP	Water	3520C	660404
680-196387-4	IDW-S-1	TCLP	Solid	3520C	660636
680-196387-5	IDW-S-2	TCLP	Solid	3520C	660636
680-196387-6	IDW-S-3	TCLP	Solid	3520C	660636
680-196387-7	IDW-S-4	TCLP	Solid	3520C	660636
LB 680-660404/1-F	Method Blank	TCLP	Water	3520C	660404
LB 680-660636/1-F	Method Blank	TCLP	Solid	3520C	660636
MB 680-661180/11-A	Method Blank	Total/NA	Water	3520C	
LCS 680-661180/12-A	Lab Control Sample	Total/NA	Water	3520C	
LCS 680-661180/15-A	Lab Control Sample	Total/NA	Water	3520C	
LCS 680-661180/18-A	Lab Control Sample	Total/NA	Water	3520C	
680-196387-3 MS	IDW-W-3	TCLP	Water	3520C	660404
680-196387-3 MSD	IDW-W-3	TCLP	Water	3520C	660404
680-196387-4 MS	IDW-S-1	TCLP	Solid	3520C	660636
680-196387-4 MSD	IDW-S-1	TCLP	Solid	3520C	660636
680-196387-7 MS	IDW-S-4	TCLP	Solid	3520C	660636
680-196387-7 MSD	IDW-S-4	TCLP	Solid	3520C	660636

### Analysis Batch: 661317

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-1	IDW-W-1	TCLP	Water	8081B/8082A	661180
680-196387-2	IDW-W-2	TCLP	Water	8081B/8082A	661180
680-196387-3	IDW-W-3	TCLP	Water	8081B/8082A	661180
LB 680-660404/1-F	Method Blank	TCLP	Water	8081B/8082A	661180
LB 680-660636/1-F	Method Blank	TCLP	Solid	8081B/8082A	661180
MB 680-661180/11-A	Method Blank	Total/NA	Water	8081B/8082A	661180
LCS 680-661180/12-A	Lab Control Sample	Total/NA	Water	8081B/8082A	661180
LCS 680-661180/15-A	Lab Control Sample	Total/NA	Water	8081B/8082A	661180
LCS 680-661180/18-A	Lab Control Sample	Total/NA	Water	8081B/8082A	661180
680-196387-3 MS	IDW-W-3	TCLP	Water	8081B/8082A	661180
680-196387-3 MSD	IDW-W-3	TCLP	Water	8081B/8082A	661180

### Analysis Batch: 661843

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-4	IDW-S-1	TCLP	Solid	8081B/8082A	661180
680-196387-5	IDW-S-2	TCLP	Solid	8081B/8082A	661180
680-196387-6	IDW-S-3	TCLP	Solid	8081B/8082A	661180

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# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## GC Semi VOA (Continued)

### Analysis Batch: 661843 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-7	IDW-S-4	TCLP	Solid	8081B/8082A	661180
680-196387-4 MS	IDW-S-1	TCLP	Solid	8081B/8082A	661180
680-196387-4 MSD	IDW-S-1	TCLP	Solid	8081B/8082A	661180
680-196387-7 MS	IDW-S-4	TCLP	Solid	8081B/8082A	661180
680-196387-7 MSD	IDW-S-4	TCLP	Solid	8081B/8082A	661180

## Metals

### Leach Batch: 660404

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-1	IDW-W-1	TCLP	Water	1311	
680-196387-2	IDW-W-2	TCLP	Water	1311	
680-196387-3	IDW-W-3	TCLP	Water	1311	
LB 680-660404/1-C	Method Blank	TCLP	Water	1311	
LB 680-660404/1-D	Method Blank	TCLP	Water	1311	
680-196387-1 MS	IDW-W-1	TCLP	Water	1311	
680-196387-1 MSD	IDW-W-1	TCLP	Water	1311	

### Leach Batch: 660636

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-4	IDW-S-1	TCLP	Solid	1311	
680-196387-5	IDW-S-2	TCLP	Solid	1311	
680-196387-6	IDW-S-3	TCLP	Solid	1311	
680-196387-7	IDW-S-4	TCLP	Solid	1311	
LB 680-660636/1-D	Method Blank	TCLP	Solid	1311	
680-196387-4 MS	IDW-S-1	TCLP	Solid	1311	
680-196387-4 MSD	IDW-S-1	TCLP	Solid	1311	

### Prep Batch: 660639

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-1	IDW-W-1	TCLP	Water	3010A	660404
680-196387-2	IDW-W-2	TCLP	Water	3010A	660404
680-196387-3	IDW-W-3	TCLP	Water	3010A	660404
LB 680-660404/1-C	Method Blank	TCLP	Water	3010A	660404
MB 680-660639/1-A	Method Blank	Total/NA	Water	3010A	
LCS 680-660639/2-A	Lab Control Sample	Total/NA	Water	3010A	
680-196387-1 MS	IDW-W-1	TCLP	Water	3010A	660404
680-196387-1 MSD	IDW-W-1	TCLP	Water	3010A	660404

### Prep Batch: 660656

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-1	IDW-W-1	TCLP	Water	7470A	660404
680-196387-2	IDW-W-2	TCLP	Water	7470A	660404
680-196387-3	IDW-W-3	TCLP	Water	7470A	660404
LB 680-660404/1-D	Method Blank	TCLP	Water	7470A	660404
MB 680-660656/12-A	Method Blank	Total/NA	Water	7470A	
LCS 680-660656/13-A	Lab Control Sample	Total/NA	Water	7470A	
680-196387-1 MS	IDW-W-1	TCLP	Water	7470A	660404
680-196387-1 MSD	IDW-W-1	TCLP	Water	7470A	660404

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# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Metals

### Analysis Batch: 660971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-1	IDW-W-1	TCLP	Water	7470A	660656
680-196387-2	IDW-W-2	TCLP	Water	7470A	660656
680-196387-3	IDW-W-3	TCLP	Water	7470A	660656
LB 680-660404/1-D	Method Blank	TCLP	Water	7470A	660656
MB 680-660656/12-A	Method Blank	Total/NA	Water	7470A	660656
LCS 680-660656/13-A	Lab Control Sample	Total/NA	Water	7470A	660656
680-196387-1 MS	IDW-W-1	TCLP	Water	7470A	660656
680-196387-1 MSD	IDW-W-1	TCLP	Water	7470A	660656

### Prep Batch: 660994

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-4	IDW-S-1	TCLP	Solid	7470A	660636
680-196387-5	IDW-S-2	TCLP	Solid	7470A	660636
680-196387-6	IDW-S-3	TCLP	Solid	7470A	660636
680-196387-7	IDW-S-4	TCLP	Solid	7470A	660636
LB 680-660636/1-D	Method Blank	TCLP	Solid	7470A	660636
MB 680-660994/1-A	Method Blank	Total/NA	Solid	7470A	
LCS 680-660994/2-A	Lab Control Sample	Total/NA	Solid	7470A	
680-196387-4 MS	IDW-S-1	TCLP	Solid	7470A	660636
680-196387-4 MSD	IDW-S-1	TCLP	Solid	7470A	660636

### Prep Batch: 661130

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-4	IDW-S-1	TCLP	Solid	3010A	660636
680-196387-5	IDW-S-2	TCLP	Solid	3010A	660636
680-196387-6	IDW-S-3	TCLP	Solid	3010A	660636
680-196387-7	IDW-S-4	TCLP	Solid	3010A	660636
LB 680-661130/3-A	Method Blank	Total/NA	Solid	3010A	
MB 680-661130/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 680-661130/2-A	Lab Control Sample	Total/NA	Solid	3010A	
680-196387-4 MS	IDW-S-1	TCLP	Solid	3010A	660636
680-196387-4 MSD	IDW-S-1	TCLP	Solid	3010A	660636

### Analysis Batch: 661149

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-1	IDW-W-1	TCLP	Water	6010C	660639
680-196387-2	IDW-W-2	TCLP	Water	6010C	660639
680-196387-3	IDW-W-3	TCLP	Water	6010C	660639
LB 680-660404/1-C	Method Blank	TCLP	Water	6010C	660639
MB 680-660639/1-A	Method Blank	Total/NA	Water	6010C	660639
LCS 680-660639/2-A	Lab Control Sample	Total/NA	Water	6010C	660639
680-196387-1 MS	IDW-W-1	TCLP	Water	6010C	660639
680-196387-1 MSD	IDW-W-1	TCLP	Water	6010C	660639

### Analysis Batch: 661174

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-4	IDW-S-1	TCLP	Solid	7470A	660994
680-196387-5	IDW-S-2	TCLP	Solid	7470A	660994
680-196387-6	IDW-S-3	TCLP	Solid	7470A	660994
680-196387-7	IDW-S-4	TCLP	Solid	7470A	660994
LB 680-660636/1-D	Method Blank	TCLP	Solid	7470A	660994

Eurofins TestAmerica, Savannah

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Metals (Continued)

### Analysis Batch: 661174 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-660994/1-A	Method Blank	Total/NA	Solid	7470A	660994
LCS 680-660994/2-A	Lab Control Sample	Total/NA	Solid	7470A	660994
680-196387-4 MS	IDW-S-1	TCLP	Solid	7470A	660994
680-196387-4 MSD	IDW-S-1	TCLP	Solid	7470A	660994

### Analysis Batch: 661329

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-4	IDW-S-1	TCLP	Solid	6010C	661130
680-196387-5	IDW-S-2	TCLP	Solid	6010C	661130
680-196387-6	IDW-S-3	TCLP	Solid	6010C	661130
680-196387-7	IDW-S-4	TCLP	Solid	6010C	661130
LB 680-661130/3-A	Method Blank	Total/NA	Solid	6010C	661130
MB 680-661130/1-A	Method Blank	Total/NA	Solid	6010C	661130
LCS 680-661130/2-A	Lab Control Sample	Total/NA	Solid	6010C	661130
680-196387-4 MS	IDW-S-1	TCLP	Solid	6010C	661130
680-196387-4 MSD	IDW-S-1	TCLP	Solid	6010C	661130

## General Chemistry

### Analysis Batch: 660419

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-196387-4	IDW-S-1	Total/NA	Solid	1030	
680-196387-5	IDW-S-2	Total/NA	Solid	1030	
680-196387-6	IDW-S-3	Total/NA	Solid	1030	
680-196387-7	IDW-S-4	Total/NA	Solid	1030	
MB 680-660419/1	Method Blank	Total/NA	Solid	1030	
LCS 680-660419/2	Lab Control Sample	Total/NA	Solid	1030	
LCSD 680-660419/9	Lab Control Sample Dup	Total/NA	Solid	1030	

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-W-1**

**Lab Sample ID: 680-196387-1**

**Date Collected: 03/16/21 13:10**

**Matrix: Water**

**Date Received: 03/17/21 10:30**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			100 mL	100 mL	660420	03/19/21 12:07	JEB	TAL SAV
TCLP	Analysis	8260B		20	5 mL	5 mL	660370	03/19/21 15:04	UI	TAL SAV
Instrument ID: CMSP2										
TCLP	Leach	1311			1.0 g	1.0 mL	660404	03/19/21 10:18	JEB	TAL SAV
TCLP	Prep	3520C			200.6 mL	1 mL	661013	03/23/21 19:51	EHS	TAL SAV
TCLP	Analysis	8270D		1			661361	03/25/21 19:41	T1C	TAL SAV
Instrument ID: CMSG										
TCLP	Leach	1311			1.0 g	1.0 mL	660404	03/19/21 10:18	JEB	TAL SAV
TCLP	Prep	3520C			20.0 mL	5 mL	661180	03/24/21 18:23	EHS	TAL SAV
TCLP	Analysis	8081B/8082A		1			661317	03/25/21 21:43	JCK	TAL SAV
Instrument ID: CSGK										
TCLP	Leach	1311			1.0 g	1.0 mL	660404	03/19/21 10:18	JEB	TAL SAV
TCLP	Prep	3010A			5 mL	50 mL	660639	03/22/21 08:35	BCB	TAL SAV
TCLP	Analysis	6010C		1			661149	03/24/21 01:25	BCB	TAL SAV
Instrument ID: ICPE										
TCLP	Leach	1311			1.0 g	1.0 mL	660404	03/19/21 10:18	JEB	TAL SAV
TCLP	Prep	7470A			0.50 mL	50 mL	660656	03/22/21 09:13	JKL	TAL SAV
TCLP	Analysis	7470A		1			660971	03/22/21 19:44	JKL	TAL SAV
Instrument ID: LEEMAN2										

**Client Sample ID: IDW-W-2**

**Lab Sample ID: 680-196387-2**

**Date Collected: 03/16/21 13:25**

**Matrix: Water**

**Date Received: 03/17/21 10:30**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			100 g	100 mL	660420	03/19/21 12:07	JEB	TAL SAV
TCLP	Analysis	8260B		20	5 mL	5 mL	660370	03/19/21 15:29	UI	TAL SAV
Instrument ID: CMSP2										
TCLP	Leach	1311			1.0 g	1.0 mL	660404	03/19/21 10:18	JEB	TAL SAV
TCLP	Prep	3520C			200.7 mL	1 mL	661013	03/23/21 19:51	EHS	TAL SAV
TCLP	Analysis	8270D		1			661361	03/25/21 20:03	T1C	TAL SAV
Instrument ID: CMSG										
TCLP	Leach	1311			1.0 g	1.0 mL	660404	03/19/21 10:18	JEB	TAL SAV
TCLP	Prep	3520C			21.3 mL	5 mL	661180	03/24/21 18:23	EHS	TAL SAV
TCLP	Analysis	8081B/8082A		1			661317	03/25/21 21:59	JCK	TAL SAV
Instrument ID: CSGK										
TCLP	Leach	1311			1.0 g	1.0 mL	660404	03/19/21 10:18	JEB	TAL SAV
TCLP	Prep	3010A			5 mL	50 mL	660639	03/22/21 08:35	BCB	TAL SAV
TCLP	Analysis	6010C		1			661149	03/24/21 01:49	BCB	TAL SAV
Instrument ID: ICPE										
TCLP	Leach	1311			1.0 g	1.0 mL	660404	03/19/21 10:18	JEB	TAL SAV
TCLP	Prep	7470A			0.50 mL	50 mL	660656	03/22/21 09:13	JKL	TAL SAV
TCLP	Analysis	7470A		1			660971	03/22/21 19:58	JKL	TAL SAV
Instrument ID: LEEMAN2										

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

**Client Sample ID: IDW-W-3**

**Lab Sample ID: 680-196387-3**

**Date Collected: 03/16/21 13:50**

**Matrix: Water**

**Date Received: 03/17/21 10:30**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			100 mL	1.0 mL	663119	03/30/21 15:44	WRB	TAL SAV
TCLP	Analysis	8260B		20	5 mL	5 mL	663093	04/07/21 19:23	Y1S	TAL SAV
Instrument ID: CMSP2										
TCLP	Leach	1311			1.0 g	1.0 mL	660404	03/19/21 10:18	JEB	TAL SAV
TCLP	Prep	3520C			201.9 mL	1 mL	661013	03/23/21 19:51	EHS	TAL SAV
TCLP	Analysis	8270D		1			661361	03/25/21 20:24	T1C	TAL SAV
Instrument ID: CMSG										
TCLP	Leach	1311			1.0 g	1.0 mL	660404	03/19/21 10:18	JEB	TAL SAV
TCLP	Prep	3520C			20.5 mL	5 mL	661180	03/24/21 18:23	EHS	TAL SAV
TCLP	Analysis	8081B/8082A		1			661317	03/25/21 22:15	JCK	TAL SAV
Instrument ID: CSGK										
TCLP	Leach	1311			1.0 g	1.0 mL	660404	03/19/21 10:18	JEB	TAL SAV
TCLP	Prep	3010A			5 mL	50 mL	660639	03/22/21 08:35	BCB	TAL SAV
TCLP	Analysis	6010C		1			661149	03/24/21 01:54	BCB	TAL SAV
Instrument ID: ICPE										
TCLP	Leach	1311			1.0 g	1.0 mL	660404	03/19/21 10:18	JEB	TAL SAV
TCLP	Prep	7470A			0.50 mL	50 mL	660656	03/22/21 09:13	JKL	TAL SAV
TCLP	Analysis	7470A		1			660971	03/22/21 20:02	JKL	TAL SAV
Instrument ID: LEEMAN2										

**Client Sample ID: IDW-S-1**

**Lab Sample ID: 680-196387-4**

**Date Collected: 03/16/21 11:58**

**Matrix: Solid**

**Date Received: 03/17/21 10:30**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			25.02 g	500 mL	660980	03/23/21 16:22	JEB	TAL SAV
TCLP	Analysis	8260B		20	5 mL	5 mL	661698	03/28/21 13:04	P1C	TAL SAV
Instrument ID: CMSAA										
TCLP	Leach	1311			100.02 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	3520C			202.1 mL	1 mL	661013	03/23/21 19:51	EHS	TAL SAV
TCLP	Analysis	8270D		1			661361	03/25/21 20:45	T1C	TAL SAV
Instrument ID: CMSG										
TCLP	Leach	1311			100.02 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	3520C			21.4 mL	5 mL	661180	03/24/21 18:23	EHS	TAL SAV
TCLP	Analysis	8081B/8082A		1			661843	03/29/21 17:26	JCK	TAL SAV
Instrument ID: CSGK										
TCLP	Leach	1311			100.02 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	3010A			5 mL	50 mL	661130	03/24/21 12:07	BCB	TAL SAV
TCLP	Analysis	6010C		1			661329	03/24/21 19:44	BCB	TAL SAV
Instrument ID: ICPE										
TCLP	Leach	1311			100.02 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	7470A			0.50 mL	50 mL	660994	03/23/21 15:49	JKL	TAL SAV
TCLP	Analysis	7470A		1			661174	03/24/21 13:52	JKL	TAL SAV
Instrument ID: LEEMAN2										
Total/NA	Analysis	1030		1			660419	03/19/21 11:55	SM	TAL SAV
Instrument ID: SPC8										

Eurofins TestAmerica, Savannah

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Client Sample ID: IDW-S-2

## Lab Sample ID: 680-196387-5

Date Collected: 03/16/21 12:05

Matrix: Solid

Date Received: 03/17/21 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			25.02 g	500 mL	660980	03/23/21 16:22	JEB	TAL SAV
TCLP	Analysis	8260B		20	5 mL	5 mL	661698	03/28/21 13:29	P1C	TAL SAV
Instrument ID: CMSAA										
TCLP	Leach	1311			100.00 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	3520C			200.5 mL	1 mL	661013	03/23/21 19:51	EHS	TAL SAV
TCLP	Analysis	8270D		1			661361	03/25/21 21:07	T1C	TAL SAV
Instrument ID: CMSG										
TCLP	Leach	1311			100.00 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	3520C			21.0 mL	5 mL	661180	03/24/21 18:23	EHS	TAL SAV
TCLP	Analysis	8081B/8082A		1			661843	03/29/21 17:42	JCK	TAL SAV
Instrument ID: CSGK										
TCLP	Leach	1311			100.00 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	3010A			5 mL	50 mL	661130	03/24/21 12:07	BCB	TAL SAV
TCLP	Analysis	6010C		1			661329	03/24/21 20:19	BCB	TAL SAV
Instrument ID: ICPE										
TCLP	Leach	1311			100.00 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	7470A			0.50 mL	50 mL	660994	03/23/21 15:49	JKL	TAL SAV
TCLP	Analysis	7470A		1			661174	03/24/21 14:15	JKL	TAL SAV
Instrument ID: LEEMAN2										
Total/NA	Analysis	1030		1			660419	03/19/21 11:55	SM	TAL SAV
Instrument ID: SPC8										

## Client Sample ID: IDW-S-3

## Lab Sample ID: 680-196387-6

Date Collected: 03/16/21 12:20

Matrix: Solid

Date Received: 03/17/21 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			25.00 g	500 mL	660980	03/23/21 16:22	JEB	TAL SAV
TCLP	Analysis	8260B		20	5 mL	5 mL	661698	03/28/21 13:55	P1C	TAL SAV
Instrument ID: CMSAA										
TCLP	Leach	1311			100.00 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	3520C			200.1 mL	1 mL	661013	03/23/21 19:51	EHS	TAL SAV
TCLP	Analysis	8270D		1			661361	03/25/21 21:28	T1C	TAL SAV
Instrument ID: CMSG										
TCLP	Leach	1311			100.00 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	3520C			22.7 mL	5 mL	661180	03/24/21 18:23	EHS	TAL SAV
TCLP	Analysis	8081B/8082A		1			661843	03/29/21 17:58	JCK	TAL SAV
Instrument ID: CSGK										
TCLP	Leach	1311			100.00 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	3010A			5 mL	50 mL	661130	03/24/21 12:07	BCB	TAL SAV
TCLP	Analysis	6010C		1			661329	03/24/21 20:24	BCB	TAL SAV
Instrument ID: ICPE										
TCLP	Leach	1311			100.00 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	7470A			0.50 mL	50 mL	660994	03/23/21 15:49	JKL	TAL SAV
TCLP	Analysis	7470A		1			661174	03/24/21 14:20	JKL	TAL SAV
Instrument ID: LEEMAN2										

Eurofins TestAmerica, Savannah



# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Client Sample ID: IDW-S-3

Date Collected: 03/16/21 12:20

Date Received: 03/17/21 10:30

## Lab Sample ID: 680-196387-6

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	1030		1			660419	03/19/21 11:55	SM	TAL SAV

## Client Sample ID: IDW-S-4

Date Collected: 03/16/21 12:30

Date Received: 03/17/21 10:30

## Lab Sample ID: 680-196387-7

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			25.00 g	500 mL	660980	03/23/21 16:22	JEB	TAL SAV
TCLP	Analysis	8260B		20	5 mL	5 mL	661698	03/28/21 14:20	P1C	TAL SAV
Instrument ID: CMSAA										
TCLP	Leach	1311			100.00 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	3520C			202.7 mL	1 mL	661013	03/23/21 19:51	EHS	TAL SAV
TCLP	Analysis	8270D		1			661361	03/25/21 21:49	T1C	TAL SAV
Instrument ID: CMSG										
TCLP	Leach	1311			100.00 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	3520C			21.2 mL	5 mL	661180	03/24/21 18:23	EHS	TAL SAV
TCLP	Analysis	8081B/8082A		1			661843	03/29/21 18:14	JCK	TAL SAV
Instrument ID: CSGK										
TCLP	Leach	1311			100.00 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	3010A			5 mL	50 mL	661130	03/24/21 12:07	BCB	TAL SAV
TCLP	Analysis	6010C		1			661329	03/24/21 20:28	BCB	TAL SAV
Instrument ID: ICPE										
TCLP	Leach	1311			100.00 g	2000 mL	660636	03/22/21 11:45	JEB	TAL SAV
TCLP	Prep	7470A			0.50 mL	50 mL	660994	03/23/21 15:49	JKL	TAL SAV
TCLP	Analysis	7470A		1			661174	03/24/21 14:24	JKL	TAL SAV
Instrument ID: LEEMAN2										
Total/NA	Analysis	1030		1			660419	03/19/21 11:55	SM	TAL SAV
Instrument ID: SPC8										

### Laboratory References:

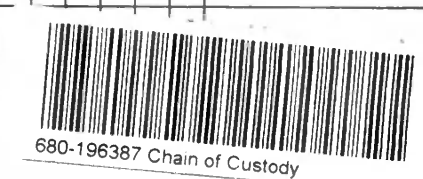
TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Address: \_\_\_\_\_

Regulatory Program:  DW  NPDES  RCRA  Other:

TAL-8210

<b>Client Contact</b> Company Name: <u>Geosyntec Consultants</u> Address: <u>1255 Roberts Blvd NW Ste 200</u> City/State/Zip: <u>Kennesaw / GA / 30144</u> Phone: <u>678-202-9564</u> Fax: <u>-</u> Project Name: <u>Hercules - Brunswick site</u> Site: <u>Hercules - Brunswick, GA</u> PO #: <u>-</u>		<b>Project Manager:</b> <u>Adria Keimley</u> Tel/Email: <u>678-202-9564</u> <b>Analysis Turnaround Time</b> <input checked="" type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS TAT if different from Below <input checked="" type="checkbox"/> 2 weeks <input type="checkbox"/> 1 week <input type="checkbox"/> 2 days <input type="checkbox"/> 1 day		<b>Site Contact:</b> <u>A. Ramsey</u> Date: <u>3/16/21</u> Lab Contact: Carrier:		COC No: _____ of _____ COCs Sampler: <u>A. Ramsey</u> For Lab Use Only: Walk-in Client: _____ Lab Sampling: _____ Job / SDG No.: _____ Sample Specific Notes:													
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	8260B - TELP VOC	8081B - TELP Pest r PCB	8210D - TELP SVOC	6010C - TELP Metal	7470A - TELP Hg	1030 - lymtability						
1DW-W-1	3/16/21	1310	C	W	7	2	2	X	X	X	X	X							
1DW-W-2		1325						X	X	X	X	X							
1DW-W-3		1350						X	X	X	X	X							
<del>1DW-W-4</del>								X	X	X	X	X							
1DW-S-1		1158		S	6			X	X	X	X	X							
1DW-S-2		1205						X	X	X	X	X							
1DW-S-3		1220						X	X	X	X	X							
1DW-S-4		1230						X	X	X	X	X							
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____						Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample. <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown													
Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months						Special Instructions/QC Requirements & Comments: <p style="text-align: center; font-size: 2em;">1.3/1.2 (CF) 1.5/1.4<sup>2</sup></p>													
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.: _____		Cooler Temp. (°C): Ops'd: _____ Corr'd: _____ Therm ID No.: _____		Relinquished by: <u>Ashley Ramsey</u> Company: <u>Geosyntec</u> Date/Time: <u>3-16-21</u> Received by: <u>Sp Janda</u> Company: <u>03-17-21</u> Date/Time: <u>1030</u>													
Relinquished by: _____		Company: _____		Date/Time: _____		Received by: _____		Company: _____		Date/Time: _____		Relinquished by: _____				Company: _____		Date/Time: _____	



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4/9/2021



## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-196387-1

**Login Number: 196387**

**List Number: 1**

**Creator: Banda, Christy S**

**List Source: Eurofins TestAmerica, Savannah**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Received Trip Blank(s) not listed on COC - TB not required.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	False	HCL vials submitted for TCLP VOCs.
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick - Wells

Job ID: 680-196387-1

## Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87052	06-30-21
Georgia	State	E87052	06-30-21

- 1
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- 12
- 13
- 14
- 15

## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858

Laboratory Job ID: 680-198384-1  
Client Project/Site: Hercules Brunswick Wells

For:  
Geosyntec Consultants, Inc.  
1255 Roberts Blvd, NW  
Suite 200  
Kennesaw, Georgia 30144

Attn: Adria Reimer



Authorized for release by:  
5/13/2021 1:33:40 PM

Eddie Barnett, Project Manager I  
(912)250-0280  
[Eddie.Barnett@Eurofinset.com](mailto:Eddie.Barnett@Eurofinset.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

**Job ID: 680-198384-1**

**Laboratory: Eurofins TestAmerica, Savannah**

## Narrative

**CASE NARRATIVE**  
**Client: Geosyntec Consultants, Inc.**  
**Project: Hercules Brunswick Wells**

**Report Number: 680-198384-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

### RECEIPT

The samples were received on 05/04/2021; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 3.9° C.

Sample IDW-W-8-20210503 (680-198384-5) was submitted for analysis; however, the volume was lost during preparation of the sample during the pressurization process and insufficient volume remained for analysis.

### TCLP VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples IDW-W-4-20210503 (680-198384-1), IDW-W-5-20210503 (680-198384-2), IDW-W-6-20210503 (680-198384-3) and IDW-W-7-20210503 (680-198384-4) were analyzed for TCLP volatile organic compounds (GC-MS) in accordance with EPA SW-846 Methods 1311/8260B. The samples were leached on 05/05/2021 and analyzed on 05/12/2021.

2-Butanone (MEK) recovered high for LCS 680-668198/3. This analyte was biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported. Refer to the QC report for details.

Samples IDW-W-4-20210503 (680-198384-1)[20X], IDW-W-5-20210503 (680-198384-2)[20X], IDW-W-6-20210503 (680-198384-3)[20X] and IDW-W-7-20210503 (680-198384-4)[20X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Sample Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-198384-1	IDW-W-4-20210503	Water	05/03/21 15:30	05/04/21 11:40	
680-198384-2	IDW-W-5-20210503	Water	05/03/21 15:40	05/04/21 11:40	
680-198384-3	IDW-W-6-20210503	Water	05/03/21 15:50	05/04/21 11:40	
680-198384-4	IDW-W-7-20210503	Water	05/03/21 16:00	05/04/21 11:40	

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# Method Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
1311	TCLP Extraction	SW846	TAL SAV
5030B	Purge and Trap	SW846	TAL SAV

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858



# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

**Client Sample ID: IDW-W-4-20210503**

**Lab Sample ID: 680-198384-1**

No Detections.

**Client Sample ID: IDW-W-5-20210503**

**Lab Sample ID: 680-198384-2**

No Detections.

**Client Sample ID: IDW-W-6-20210503**

**Lab Sample ID: 680-198384-3**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	0.077		0.020		mg/L	20		8260B	TCLP
Benzene	0.11		0.020		mg/L	20		8260B	TCLP

**Client Sample ID: IDW-W-7-20210503**

**Lab Sample ID: 680-198384-4**

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

**Client Sample ID: IDW-W-4-20210503**

**Lab Sample ID: 680-198384-1**

Date Collected: 05/03/21 15:30

Matrix: Water

Date Received: 05/04/21 11:40

**Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	0.020	U	0.020		mg/L			05/12/21 17:23	20
Chlorobenzene	0.020	U	0.020		mg/L			05/12/21 17:23	20
Tetrachloroethene	0.020	U	0.020		mg/L			05/12/21 17:23	20
Carbon tetrachloride	0.020	U	0.020		mg/L			05/12/21 17:23	20
Chloroform	0.020	U	0.020		mg/L			05/12/21 17:23	20
Benzene	0.020	U	0.020		mg/L			05/12/21 17:23	20
Vinyl chloride	0.020	U	0.020		mg/L			05/12/21 17:23	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			05/12/21 17:23	20
2-Butanone (MEK)	0.20	U *+	0.20		mg/L			05/12/21 17:23	20
Trichloroethene	0.020	U	0.020		mg/L			05/12/21 17:23	20
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		70 - 130					05/12/21 17:23	20
1,2-Dichloroethane-d4 (Surr)	89		60 - 124					05/12/21 17:23	20
Dibromofluoromethane (Surr)	96		70 - 130					05/12/21 17:23	20
4-Bromofluorobenzene (Surr)	94		70 - 130					05/12/21 17:23	20

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

**Client Sample ID: IDW-W-5-20210503**

**Lab Sample ID: 680-198384-2**

Date Collected: 05/03/21 15:40

Matrix: Water

Date Received: 05/04/21 11:40

**Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	0.020	U	0.020		mg/L			05/12/21 17:00	20
Chlorobenzene	0.020	U	0.020		mg/L			05/12/21 17:00	20
Tetrachloroethene	0.020	U	0.020		mg/L			05/12/21 17:00	20
Carbon tetrachloride	0.020	U	0.020		mg/L			05/12/21 17:00	20
Chloroform	0.020	U	0.020		mg/L			05/12/21 17:00	20
Benzene	0.020	U	0.020		mg/L			05/12/21 17:00	20
Vinyl chloride	0.020	U	0.020		mg/L			05/12/21 17:00	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			05/12/21 17:00	20
2-Butanone (MEK)	0.20	U *+	0.20		mg/L			05/12/21 17:00	20
Trichloroethene	0.020	U	0.020		mg/L			05/12/21 17:00	20
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		70 - 130					05/12/21 17:00	20
1,2-Dichloroethane-d4 (Surr)	87		60 - 124					05/12/21 17:00	20
Dibromofluoromethane (Surr)	95		70 - 130					05/12/21 17:00	20
4-Bromofluorobenzene (Surr)	95		70 - 130					05/12/21 17:00	20

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

**Client Sample ID: IDW-W-6-20210503**

**Lab Sample ID: 680-198384-3**

Date Collected: 05/03/21 15:50

Matrix: Water

Date Received: 05/04/21 11:40

**Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	0.020	U	0.020		mg/L			05/12/21 16:37	20
<b>Chlorobenzene</b>	<b>0.077</b>		0.020		mg/L			05/12/21 16:37	20
Tetrachloroethene	0.020	U	0.020		mg/L			05/12/21 16:37	20
Carbon tetrachloride	0.020	U	0.020		mg/L			05/12/21 16:37	20
Chloroform	0.020	U	0.020		mg/L			05/12/21 16:37	20
<b>Benzene</b>	<b>0.11</b>		0.020		mg/L			05/12/21 16:37	20
Vinyl chloride	0.020	U	0.020		mg/L			05/12/21 16:37	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			05/12/21 16:37	20
2-Butanone (MEK)	0.20	U *+	0.20		mg/L			05/12/21 16:37	20
Trichloroethene	0.020	U	0.020		mg/L			05/12/21 16:37	20
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		70 - 130					05/12/21 16:37	20
1,2-Dichloroethane-d4 (Surr)	87		60 - 124					05/12/21 16:37	20
Dibromofluoromethane (Surr)	96		70 - 130					05/12/21 16:37	20
4-Bromofluorobenzene (Surr)	96		70 - 130					05/12/21 16:37	20

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

**Client Sample ID: IDW-W-7-20210503**

**Lab Sample ID: 680-198384-4**

Date Collected: 05/03/21 16:00

Matrix: Water

Date Received: 05/04/21 11:40

**Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	0.020	U	0.020		mg/L			05/12/21 18:31	20
Chlorobenzene	0.020	U	0.020		mg/L			05/12/21 18:31	20
Tetrachloroethene	0.020	U	0.020		mg/L			05/12/21 18:31	20
Carbon tetrachloride	0.020	U	0.020		mg/L			05/12/21 18:31	20
Chloroform	0.020	U	0.020		mg/L			05/12/21 18:31	20
Benzene	0.020	U	0.020		mg/L			05/12/21 18:31	20
Vinyl chloride	0.020	U	0.020		mg/L			05/12/21 18:31	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			05/12/21 18:31	20
2-Butanone (MEK)	0.20	U *+	0.20		mg/L			05/12/21 18:31	20
Trichloroethene	0.020	U	0.020		mg/L			05/12/21 18:31	20
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
<i>Toluene-d8 (Surr)</i>	94		70 - 130					05/12/21 18:31	20
<i>1,2-Dichloroethane-d4 (Surr)</i>	87		60 - 124					05/12/21 18:31	20
<i>Dibromofluoromethane (Surr)</i>	71		70 - 130					05/12/21 18:31	20
<i>4-Bromofluorobenzene (Surr)</i>	95		70 - 130					05/12/21 18:31	20

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		TOL (70-130)	DCA (60-124)	DBFM (70-130)	BFB (70-130)
LCS 680-668198/3	Lab Control Sample	103	105	104	94
LCS D 680-668198/4	Lab Control Sample Dup	105	103	104	99
MB 680-668198/8	Method Blank	95	89	94	93

**Surrogate Legend**

TOL = Toluene-d8 (Surr)  
DCA = 1,2-Dichloroethane-d4 (Surr)  
DBFM = Dibromofluoromethane (Surr)  
BFB = 4-Bromofluorobenzene (Surr)

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: TCLP

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		TOL (70-130)	DCA (60-124)	DBFM (70-130)	BFB (70-130)
680-198384-1	IDW-W-4-20210503	97	89	96	94
680-198384-2	IDW-W-5-20210503	97	87	95	95
680-198384-3	IDW-W-6-20210503	97	87	96	96
680-198384-4	IDW-W-7-20210503	94	87	71	95
LB 680-667084/1-A	Method Blank	98	89	97	96

**Surrogate Legend**

TOL = Toluene-d8 (Surr)  
DCA = 1,2-Dichloroethane-d4 (Surr)  
DBFM = Dibromofluoromethane (Surr)  
BFB = 4-Bromofluorobenzene (Surr)



# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 680-668198/8

Matrix: Water

Analysis Batch: 668198

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
1,2-Dichloroethane	0.0010	U	0.0010		mg/L			05/12/21 14:01	1
Chlorobenzene	0.0010	U	0.0010		mg/L			05/12/21 14:01	1
Tetrachloroethene	0.0010	U	0.0010		mg/L			05/12/21 14:01	1
Carbon tetrachloride	0.0010	U	0.0010		mg/L			05/12/21 14:01	1
Chloroform	0.0010	U	0.0010		mg/L			05/12/21 14:01	1
Benzene	0.0010	U	0.0010		mg/L			05/12/21 14:01	1
Vinyl chloride	0.0010	U	0.0010		mg/L			05/12/21 14:01	1
1,1-Dichloroethene	0.0010	U	0.0010		mg/L			05/12/21 14:01	1
2-Butanone (MEK)	0.010	U	0.010		mg/L			05/12/21 14:01	1
Trichloroethene	0.0010	U	0.0010		mg/L			05/12/21 14:01	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Toluene-d8 (Surr)	95		70 - 130		05/12/21 14:01	1
1,2-Dichloroethane-d4 (Surr)	89		60 - 124		05/12/21 14:01	1
Dibromofluoromethane (Surr)	94		70 - 130		05/12/21 14:01	1
4-Bromofluorobenzene (Surr)	93		70 - 130		05/12/21 14:01	1

Lab Sample ID: LCS 680-668198/3

Matrix: Water

Analysis Batch: 668198

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
1,2-Dichloroethane	0.0500	0.0548		mg/L		110	70 - 130
Chlorobenzene	0.0500	0.0535		mg/L		107	70 - 130
Tetrachloroethene	0.0500	0.0466		mg/L		93	70 - 130
Carbon tetrachloride	0.0500	0.0453		mg/L		91	70 - 130
Chloroform	0.0500	0.0499		mg/L		100	70 - 130
Benzene	0.0500	0.0547		mg/L		109	70 - 130
Vinyl chloride	0.0500	0.0482		mg/L		96	66 - 129
1,1-Dichloroethene	0.0500	0.0449		mg/L		90	70 - 130
2-Butanone (MEK)	0.250	0.292	*+	mg/L		117	69 - 114
Trichloroethene	0.0500	0.0458		mg/L		92	70 - 130

Surrogate	LCS	LCS	Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	103		70 - 130
1,2-Dichloroethane-d4 (Surr)	105		60 - 124
Dibromofluoromethane (Surr)	104		70 - 130
4-Bromofluorobenzene (Surr)	94		70 - 130

Lab Sample ID: LCSD 680-668198/4

Matrix: Water

Analysis Batch: 668198

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
		Result	Qualifier						
1,2-Dichloroethane	0.0500	0.0538		mg/L		108	70 - 130	2	50
Chlorobenzene	0.0500	0.0552		mg/L		110	70 - 130	3	30
Tetrachloroethene	0.0500	0.0482		mg/L		96	70 - 130	3	30
Carbon tetrachloride	0.0500	0.0467		mg/L		93	70 - 130	3	30

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 680-668198/4

Matrix: Water

Analysis Batch: 668198

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloroform	0.0500	0.0496		mg/L		99	70 - 130	1	30
Benzene	0.0500	0.0546		mg/L		109	70 - 130	0	30
Vinyl chloride	0.0500	0.0494		mg/L		99	66 - 129	2	30
1,1-Dichloroethene	0.0500	0.0463		mg/L		93	70 - 130	3	20
2-Butanone (MEK)	0.250	0.278		mg/L		111	69 - 114	5	30
Trichloroethene	0.0500	0.0480		mg/L		96	70 - 130	5	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	105		70 - 130
1,2-Dichloroethane-d4 (Surr)	103		60 - 124
Dibromofluoromethane (Surr)	104		70 - 130
4-Bromofluorobenzene (Surr)	99		70 - 130

Lab Sample ID: LB 680-667084/1-A

Matrix: Water

Analysis Batch: 668198

Client Sample ID: Method Blank

Prep Type: TCLP

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	0.020	U	0.020		mg/L			05/12/21 15:07	20
Chlorobenzene	0.020	U	0.020		mg/L			05/12/21 15:07	20
Tetrachloroethene	0.020	U	0.020		mg/L			05/12/21 15:07	20
Carbon tetrachloride	0.020	U	0.020		mg/L			05/12/21 15:07	20
Chloroform	0.020	U	0.020		mg/L			05/12/21 15:07	20
Benzene	0.020	U	0.020		mg/L			05/12/21 15:07	20
Vinyl chloride	0.020	U	0.020		mg/L			05/12/21 15:07	20
1,1-Dichloroethene	0.020	U	0.020		mg/L			05/12/21 15:07	20
2-Butanone (MEK)	0.20	U	0.20		mg/L			05/12/21 15:07	20
Trichloroethene	0.020	U	0.020		mg/L			05/12/21 15:07	20

Surrogate	LB %Recovery	LB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		70 - 130		05/12/21 15:07	20
1,2-Dichloroethane-d4 (Surr)	89		60 - 124		05/12/21 15:07	20
Dibromofluoromethane (Surr)	97		70 - 130		05/12/21 15:07	20
4-Bromofluorobenzene (Surr)	96		70 - 130		05/12/21 15:07	20

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

## GC/MS VOA

### Leach Batch: 667084

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 680-667084/1-A	Method Blank	TCLP	Water	1311	

### Leach Batch: 667306

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-198384-1	IDW-W-4-20210503	TCLP	Water	1311	
680-198384-2	IDW-W-5-20210503	TCLP	Water	1311	
680-198384-3	IDW-W-6-20210503	TCLP	Water	1311	
680-198384-4	IDW-W-7-20210503	TCLP	Water	1311	

### Analysis Batch: 668198

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-198384-1	IDW-W-4-20210503	TCLP	Water	8260B	667306
680-198384-2	IDW-W-5-20210503	TCLP	Water	8260B	667306
680-198384-3	IDW-W-6-20210503	TCLP	Water	8260B	667306
680-198384-4	IDW-W-7-20210503	TCLP	Water	8260B	667306
LB 680-667084/1-A	Method Blank	TCLP	Water	8260B	667084
MB 680-668198/8	Method Blank	Total/NA	Water	8260B	
LCS 680-668198/3	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-668198/4	Lab Control Sample Dup	Total/NA	Water	8260B	



# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

## Client Sample ID: IDW-W-4-20210503

Lab Sample ID: 680-198384-1

Date Collected: 05/03/21 15:30

Matrix: Water

Date Received: 05/04/21 11:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			100 mL	100 mL	667306	05/05/21 12:10	JEB	TAL SAV
TCLP	Analysis	8260B		20	5 mL	5 mL	668198	05/12/21 17:23	SMP	TAL SAV
Instrument ID: CMSO2										

## Client Sample ID: IDW-W-5-20210503

Lab Sample ID: 680-198384-2

Date Collected: 05/03/21 15:40

Matrix: Water

Date Received: 05/04/21 11:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			100 mL	100 mL	667306	05/05/21 12:10	JEB	TAL SAV
TCLP	Analysis	8260B		20	5 mL	5 mL	668198	05/12/21 17:00	SMP	TAL SAV
Instrument ID: CMSO2										

## Client Sample ID: IDW-W-6-20210503

Lab Sample ID: 680-198384-3

Date Collected: 05/03/21 15:50

Matrix: Water

Date Received: 05/04/21 11:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			100 mL	100 mL	667306	05/05/21 12:10	JEB	TAL SAV
TCLP	Analysis	8260B		20	5 mL	5 mL	668198	05/12/21 16:37	SMP	TAL SAV
Instrument ID: CMSO2										

## Client Sample ID: IDW-W-7-20210503

Lab Sample ID: 680-198384-4

Date Collected: 05/03/21 16:00

Matrix: Water

Date Received: 05/04/21 11:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			100 mL	100 mL	667306	05/05/21 12:10	JEB	TAL SAV
TCLP	Analysis	8260B		20	5 mL	5 mL	668198	05/12/21 18:31	SMP	TAL SAV
Instrument ID: CMSO2										

**Laboratory References:**

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

# Chain of Custody Record

# 525921



Environment Testing  
TestAmerica

Address: \_\_\_\_\_

TAL-8210

Regulatory Program:  DW  NPDES  RCRA  Other:

<b>Client Contact</b>		<b>Project Manager:</b> <u>Adria Reimer</u>		<b>Site Contact:</b>		<b>Date:</b> <u>05-03-2021</u>		<b>COC No.:</b>			
Company Name: <u>Geosyntec Consultants</u>		Tel/Email: <u>AReimer@geosyntec.com</u>		Lab Contact:		Carrier:		____ / ____ of ____ COCs			
Address: <u>1255 Roberts Blvd. NW suit 200</u>		<b>Analysis Turnaround Time</b>									
City/State/Zip: <u>Kennesaw, GA 30144</u>		<input type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS		Filtered Sample (Y/N) Perform MS / MSD (Y/N) <u>TCLP 1065 82603</u> <u>05-03-2021</u>						Sampler: <b>For Lab Use Only:</b> Walk-in Client: _____ Lab Sampling: _____ Job / SDG No.: _____	
Phone: <u>678-202-9500</u>		TAT if different from Below _____									
Fax: _____		<input type="checkbox"/> 2 weeks									
Project Name: <u><del>Fort Hercules</del> Hercules Brunswick-Walks</u>		<input type="checkbox"/> 1 week									
Site: <u>Fort Hercules / Pinonville Brunswick, GA Security</u>		<input type="checkbox"/> 2 days								Sample Specific Notes:	
P O # <u>GR6881P</u>		<input type="checkbox"/> 1 day									

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP 1065 82603	05-03-2021
IDW-W-4-20210503	5/3/21	1530	G	WW	3	N	N		
IDW-W-5-20210503	5/3/21	1540	G	WW	3	N	N		
IDW-W-6-20210503	5/3/21	1550	G	WW	3	N	N		
IDW-W-7-20210503	5/3/21	1600	G	WW	3	N	N		
IDW-W-8-20210503	5/3/21	1610	G	WW	3	N	N		



Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____	
<b>Possible Hazard Identification:</b> Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.	<b>Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)</b>
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown	<input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab <input type="checkbox"/> Archive for _____ Months

**Special Instructions/QC Requirements & Comments:**

Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____		Corr'd: _____		Therm ID No.:	
Relinquished by: <u>DAN GIBBS</u>	Company: <u>Geosyntec</u>	Date/Time: <u>5/3/2021 1645</u>	Received by: <u>[Signature]</u>	Company: <u>[Signature]</u>	Date/Time: <u>05-04-21</u>	Received by:	Company:	Date/Time: <u>1140</u>	
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:	
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:				

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5/13/2021



## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-198384-1

**Login Number: 198384**

**List Number: 1**

**Creator: Banda, Christy S**

**List Source: Eurofins TestAmerica, Savannah**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Hercules Brunswick Wells

Job ID: 680-198384-1

## Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87052	06-30-21
Georgia	State	E87052	06-30-21

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ATTACHMENTS TO APPENDIX B  
PROVIDED ON DIGITAL DISC

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INTERIM CORRECTIVE MEASURE  
WORK PLAN, NOVEMBER 2021