



*Prepared for*

**Chemtrade Solutions LLC**  
90 East Halsey Road  
Parsippany, New Jersey 07054

**SEMI-ANNUAL GROUNDWATER  
MONITORING REPORT NO. 13  
JULY THROUGH DECEMBER 2014  
CHEMTRADE SOLUTIONS SITE  
EAST POINT, GEORGIA  
HSI# 10498**

*Prepared by*

**Geosyntec**   
consultants

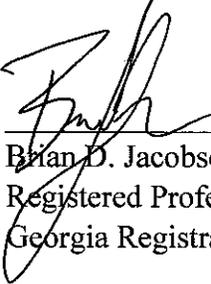
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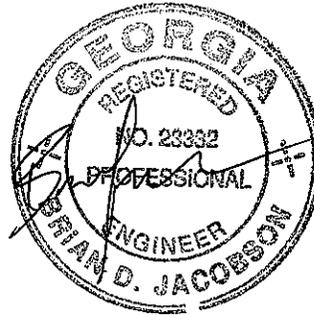
Project Number GR5060

January 2015

## PROFESSIONAL ENGINEER CERTIFICATION

I certify that I am a qualified engineer who has received a baccalaureate or post-graduate degree in the natural science or engineering, and have sufficient training and experience in environmental assessment and corrective measures, as demonstrated by state registration and completion of accredited university courses, that enable me to make sound professional judgments. I further certify that this report was prepared by myself or by a subordinate working under my direction.

  
11/26/15  
\_\_\_\_\_  
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## **1. INTRODUCTION**

### **1.1 Background**

#### **1.1.1 Site Location and Description**

The Chemtrade Solutions LLC (CSL), formerly General Chemical LCC facility (Site) is located on Central Avenue in the City of East Point, Fulton County, Georgia (**Figure 1-1**). The approximate Site location corresponds to latitude of 33.67 and longitude of 84.44. The Site property is bounded by North Martin Street and the Charles A. Green Recreational Facilities on the north side, Randall and Bayard Streets on the east side, Central Avenue and an industrial (metal recycling) facility on the south side, and Central Avenue on the west side. The general area surrounding the CSL facility consists of industrial land uses bordered by some residential properties toward the north and northeast directions. Another industrial site is located on the adjacent property to the northwest of the CSL facility.

The Site, as shown in an aerial view on **Figure 1-1**, consists of a process building, a warehouse structure, and an office building. During operation, there were four Hi-Clay Alumina (HCA) storage cells (herein referred to as HCA cells) located on the Site. These cells were removed during the period of 2003 to 2005, and the area was returned to beneficial use in 2006.

#### **1.1.2 Summary of Recent Regulatory Activities**

Subsequent to the issue of the 2002 Corrective Action Plan (CAP), GCL voluntarily elected to remove the HCA material from the on-site cells.

Following excavation and removal of the HCA, a revised CAP was issued by GCL on 2 October 2006. A Georgia Environmental Protection Division (GaEPD) letter dated 16 January 2007 provided comments and a request for additional work followed by resubmission of the revised CAP.

GCL submitted a revised CAP incorporating GaEPD comments on 30 March 2007.

GaEPD completed review and issued a conditional approval of the revised CAP on 4 September 2007. Pursuant to the revised CAP, groundwater and surface water samples were collected for aluminum and sulfate analysis.

GCL submitted a voluntary remediation plan application (VRPA) in January 2013. The VRPA proposed: (i) delineation of the horizontal extent of sulfate contamination in groundwater; (ii) continued semi-annual sampling of monitoring wells screened in the partially weathered rock (PWR) and surface water sampling locations; (iii) conduct a storm water drain assessment and implement any necessary repairs to prevent groundwater from entering the storm drain system; and (iv) institutional controls on affected properties through the placement of unified environmental covenants.

In a letter dated 10 April 2013, GaEPD approved the VRPA. GaEPD issued comments on the VRPA on 12 April 2013.

General Chemical LLC was acquired by Chemtrade Solutions LLC on 24 January 2014. The General Chemical LLC name will be used when historically accurate and Chemtrade Solutions will be used for activities after the acquisition date.

## **1.2 Objectives and Scope**

The objective of this report is to present the results for the semi-annual groundwater monitoring activities conducted at the CSL site in October 2014. This is the fourth semi-annual report submitted to GaEPD following approval of the VRPA in April 2013. However, this report is issued as “Semi-annual Groundwater Monitoring Report No.13” to avoid confusion with previous reports issued under the CAP. This report provides a summary of the activities performed and the results of the field and laboratory measurements that were obtained during this monitoring period.

This report presents the results of the following activities:

- Sampling of 6 on-site wells (**Figure 1-2**);
- Sampling of 3 off-site wells (**Figure 1-2**); and
- Sampling of surface water at one on-site and three off-site locations (**Figure 1-3**).

### **1.3 Overview**

This semi-annual groundwater monitoring report summarizes the results of field sampling activities performed by Geosyntec in October 2013. The report is organized as follows:

- Section 2 presents a summary of site characterization information including site geology and hydrogeology, field investigations, nature and extent of environmental impact, and site-specific groundwater and contaminant transport conceptual modeling.
- Section 3 presents the results from sampling of monitoring wells and surface water from the Site.
- Section 4 discusses the sampling procedures used to obtain groundwater and stormwater samples from the Site
- Section 5 summarizes the results of quality assurance/quality control (QA/QC) evaluation of the data obtained during this monitoring period.
- Section 6 presents conclusions that are based on the data and provide recommendations for future activities.
- Data from this monitoring period are presented in the Appendices. Analytical laboratory reports for water samples are presented in **Appendix A**. Field Forms used during well sampling are presented in **Appendix B**.

## 2 SITE CHARACTERIZATION

### 2.1 Site Geology and Hydrogeology

This section presents an overview of the Site hydrogeologic conditions. Information on the Site hydrogeology was obtained during the Site investigation activities, conducted in May 1998 in support of the Compliance Status Report (CSR) [Geosyntec, 1999].

The occurrence and movement of groundwater in the Piedmont formation is generally within two hydrogeologic units. A shallow hydrogeologic unit typically occurs within the soils and saprolite (weathered residuum which mantles bedrock). A layer of partially weathered rock (PWR) typically forms a transition between the saprolite and the fractured bedrock. A deeper hydrogeologic unit generally occurs within the fractured bedrock.

Groundwater in the shallow hydrogeologic unit usually occurs under water table (i.e., unconfined) conditions. Groundwater flow is controlled by local topographic features, where recharge occurs in upland areas and discharge occurs in drainage features such as streams, rivers, or lakes. Recharge to the shallow hydrogeologic unit is primarily the result of infiltrating precipitation. Groundwater in the deeper water-bearing zone is associated with secondary porosity (fractures or open spaces) within the crystalline bedrock and flow is controlled by the distribution and degree of interconnection of these openings in the rock. The deeper hydrogeologic unit is fully saturated.

Based on the results of the field investigation, the shallow hydrogeologic unit is conceptualized as an unconfined, homogeneous, and isotropic deposit of sandy clay with a hydraulic conductivity of approximately  $4 \times 10^{-5}$  to  $2 \times 10^{-4}$  cm/s, a hydraulic gradient of approximately 0.003 to 0.03, and an effective porosity of about 20 percent. Groundwater is believed to generally flow at about 16.4 ft per year from west to east across the Site and advection is believed to be the dominant contaminant transport mechanism.

The CSL Site is in an area of relatively steep topography adjacent to a small intermittent stream that discharges to the South River. As can be seen on the aerial photograph of the Site presented in **Figure 1.2**, industrial operations at the Site have resulted in regrading and leveling of a significant portion of the Site (i.e., vegetated areas east of the process buildings). Groundwater flow at the Site is generally west to east.

The lithology of the Site consists primarily of clayey fill material overlying saprolite as depicted on **Figures 2-1 through 2-3**, which illustrate hydrogeologic cross-sections that show the Site features and geology. The fill material, which varies in thickness, covers most of the Site and consists of sandy to gravelly red micaceous clay. The saprolite, encountered in all fourteen of the monitoring wells drilled at the Site, consists of highly weathered schist consisting of orange to red clay with kaolinite and mica. Foliation and other relict rock texture are still well preserved and were visible in samples, but the material comprises mostly clay and mica which is formed by the deep weathering of the feldspar minerals. Competent bedrock, as defined by auger refusal, was generally encountered between 20 to 60 feet below ground surface (bgs).

## **2.2 Summary of Previous Site Investigations**

The aluminum concentrations observed in the Site soil during the course of the CSR investigation are within the range typically seen in Piedmont soils (i.e., 70,000 to 100,000 mg/kg). The samples, in which the aluminum concentrations were elevated, were limited to locations of accumulation of more strongly weathered material. Therefore, based on detected concentrations of aluminum in soil samples, industrial activities at the Site have not resulted in a significant increase in aluminum concentrations in the soil [Geosyntec, 1999].

The HCA was removed between 2003 and 2006. Sulfate concentrations vary according to the nature of the material analyzed and were related to the proximity to former HCA cells. In places where the undisturbed soils directly underlie former HCA cells, sulfate concentrations in these soils were typically higher than those of other undisturbed soils. Following removal of the HCA, underlying soils were sampled and analyzed for sulfate, and soils exhibiting sulfate concentrations over 10,300 mg/kg (95% Upper Confidence Limit for all samples was 3,143 mg/kg) were removed.

### **3. GROUNDWATER AND STORM DRAIN SAMPLING**

This section presents the details of the sampling of six on-site wells, and three off-site groundwater wells and one on-site and three off-site stormwater storm drains.

#### **3.1 Groundwater Potentiometric Conditions**

Groundwater elevations were measured prior to sampling wells during the October sampling event. The measurements were performed on 29 October 2014. All monitoring wells were gauged. The water level measurements from delineation soil borings and PZ-07 were not gauged during this round of sampling. The groundwater sampling and water level measurements from the delineation borings are attached as Addendum 1 to this report. The results of the groundwater elevation measurements are provided in **Table 3-1**.

The potentiometric map for October 2014 readings is shown in **Figure 3-1**. This map shows the typical Piedmont pattern of flow following topography towards surface water features, which act as collectors and discharge points for the groundwater. Since there are no streams at the Site, the groundwater is flowing towards the local topographic low which is aligned parallel with North Martin Street and the storm drain system. The general potentiometric pattern is consistent with the overall drainage flow pattern to the east-southeast towards the South River.

Water level measurements were recorded in wells screened in saprolite and shallow competent rock. In preparing the potentiometric map from water level measurements, generally no distinction was made as to whether the wells were shallow or deep, in saprolite or bedrock. Such distinctions were not appropriate for two reasons: (i) the Piedmont is characterized by a single saturated zone consisting of saprolite and bedrock that are hydraulically connected; and (ii) the vertical components of the head gradient are similar or small compared to the horizontal components.

#### **3.2 Groundwater Sampling**

##### **3.2.1 Introduction**

Groundwater samples were collected on 29-30 December 2014. Groundwater samples were submitted for analysis for sulfate using EPA Method 9056A and aluminum using EPA Method 6010C. The pH was measured in the field using EPA Method 150.1. The

groundwater sampling results are presented in **Table 3-2**. Laboratory results are presented in **Appendix A** and field forms are presented in **Appendix B**.

### 3.2.2 Groundwater Constituent Summary

Sulfate was detected at all monitoring wells except EPW-02 during the October 2014 sampling event. The sulfate concentrations were lower in the off-site wells, 130 mg/l at EPW-01 at the northwestern boundary of the Site, and non-detect at 5.0 mg/l at EPW-02 to the east of the Site. Sulfate concentration in off-site well EPW-03D was 25 mg/l. On-site well OW-1A at the western boundary was measured at 45 mg/l. The background monitoring well GCW-01D at the upgradient edge of the site had 230 mg/l of sulfate. The results indicate groundwater entering the site contains background concentrations of sulfate between 45 to 130 mg/l as measured at OW-1A and EPW-01. These values are also consistent with the upgradient storm drain location SW-09 where sulfate has been measured between <0.1 to 110 mg/l. Sulfate concentrations along the northern property boundary at GCW-04D were 3,000 mg/l. Sulfate at the eastern boundary at GCW-02D and GCW-03D were 1,900 and 3,300 mg/l, respectively. The source area monitoring well (GCW-05) sulfate concentration was 640 mg/l.

Aluminum was detected at seven of the nine monitoring wells during the October 2014 sampling event. The concentrations were low at the off-site wells, 14.2 mg/l at EPW-01 at the northwestern boundary of the Site and <0.1 at EPW-02 and EPW-03D, located to the east and northeast of the Site, respectively. On-site well OW-1A at the western boundary had 0.5 mg/l of aluminum. The background monitoring wells GCW-01D at the upgradient edge of the site contained 5.7 mg/l. The results indicate groundwater entering the site contains background concentrations of aluminum between 0.5 to 14.2 as measured at OW-1A and EPW-01. These values are also consistent with the upgradient storm drain location SW-09 where aluminum has been measured between <0.1 to 4.87 mg/l. The aluminum concentration along the northern property boundary at GCW-04D was 333 mg/l. Aluminum concentrations at the eastern boundary at GCW-02D and GCW-03D were 179 and 312 mg/l, respectively. The source area monitoring well (GCW-05) aluminum concentration was 0.4 mg/l.

The pH measurements were generally consistent across the site. The off-site wells EPW-01, -02, and -03 ranged from 4.8 to 5.9 standard units (s.u.). The upgradient wells GCW-01D and OW-1A were 4.0 and 5.1 s.u. respectively. The northern and eastern

wells were similar and measured at 4.1 s.u. The pH for source area monitoring well (GCW-05) was measured at 7.1 s.u.

### 3.2.3 Comparison to Previous Results for Groundwater

**Table 3-3** summarizes statistical trend analysis of both aluminum and sulfate data in groundwater. Mann-Kendall trend analysis was performed using available data for each monitoring well at a 95% confidence level. The procedure and methodologies employed in the analysis of the data are consistent with Georgia EPD and United States Environmental Protection Agency (EPA) recommended procedures. These methods meet the performance criteria specified in the rules of the Georgia EPD, Chapter 391-3-4-.14(19) and the technical standards described in the EPA "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Unified Guidance," dated March 2009.

Historical trend graphs for sulfate and pH are shown in **Figure 3-2**. Sulfate concentrations generally decreased or were stable in off-site and on-site wells in groundwater. The sulfate concentrations in monitoring wells GCW-01D, GCW-03D, GCW-04D, GCW-05, EPW-03D and OW-1A showed a statistically significant decreasing trend. This is consistent with the previous semi-annual report. Neither decreasing nor increasing trends were calculated for sulfate concentrations in monitoring wells GCW-02D, EPW-01 and EPW-02. Similarly, aluminum concentrations also decreased or were stable in groundwater. A statistically significant decreasing trend was calculated for aluminum in monitoring wells GCW-04D, EPW-02 and OW-01A. Neither decreasing nor increasing trends were calculated for aluminum in the remainder of the wells. The pH measurements were generally stable. The pH measured at on-site wells was generally lower than the pH measured at the off-site wells except for the source area well which had a pH similar to background.

Several conditions not related to the site may slow the return of the site to background concentrations of site constituents, following removal of source materials. These include the following:

- The pH of the groundwater in upgradient wells (OW-1A and GCW-01D) is low. Measured pH values 5.1 and 4.0 s.u. respectively. The low pH condition of groundwater entering the site will slow a return to background conditions for pH and aluminum.

- The pH of rainwater at the site was measured at less than 5 during the HCA removal, therefore infiltrating rainfall will not have a significant effect in terms of raising the groundwater pH in the short-term.
- The area surrounding the site has a number of other sources of sulfate in groundwater resulting from previous operations. Potential sulfate sources include a former battery cracking plant, a former fertilizer manufacturer, two off-site HCA disposal areas operated by others, and a former agricultural chemical manufacturer.

It is encouraging that no significant impacts have been detected at downgradient wells EPW-02 or EPW-03D. The sulfate concentrations at EPW-02 appear stable and are similar to regional background conditions of 46 to 130 mg/l as observed at well EPW-01. EPW-03D is located approximately 200 feet from the site boundary. Sulfate concentrations at EPW-03D are similar to the regional background, and trends are decreasing. The pH trend at the EPW-03D is stable and typical for the Piedmont with measurements generally around 5.5. The decreasing sulfate concentrations and stable pH indicate impacts from the site, if they ever existed, are minimal and decreasing with time. The concentration of constituents of concern from both on-site and off-site sources appear to have attenuated to background levels prior to reaching EPW-02 or EPW-03D.

The removal of the HCA source material appears to be resulting in the site returning to background conditions over time. The sulfate concentrations are in decline at downgradient wells. However, it will take time for residuals to mix with infiltration and incoming groundwater and for geochemical conditions to stabilize.

### **3.3 Storm Drain Sampling**

#### **3.3.1 Introduction**

Storm drain water samples were collected from one on-site and three off-site storm drains in October 2014. Surface water flows in the storm drain system in the following sequence: SW-09, SW-06, SW-02, SW-07 from upstream to downstream. The purpose of the storm drain sampling program was to evaluate potential impacts to the storm drain system as requested by GaEPD. Stormwater samples were submitted for analysis for sulfate using EPA Method 9056A and aluminum using EPA Method 6010C. The

pH was measured in the field using EPA Method 150.1. The stormwater sampling locations are shown on **Figure 1-3**. The stormwater sampling results are presented in **Table 3-4**. Laboratory results are presented in **Appendix A** and field forms are presented in **Appendix B**.

### 3.3.2 Storm Drain Constituent Summary

Sulfate was detected at SW-02, SW-09 and SW-07 during the October 2014 sampling event. A sample was collected cross gradient (SW-06) at a location in the Charles A. Green Recreational Facilities. Sulfate was measured at 2,200 mg/l. At the downgradient and on-site location (SW-02), sulfate was measured at 1,600 mg/l which is a significant decrease from the previous result of 7,300 but similar to the result of 1,500 mg/l from 2013. The discharge of the storm drain to surface water was sampled at SW-07. The sulfate concentration was measured at 98.0 mg/l which is a decrease from the 440 mg/l concentration from last period.

Aluminum was detected at three of the four storm drain water monitoring locations during the October 2014 sampling event. The upgradient (SW-09) aluminum concentration was non-detect this period, which is an increase from the 2.24 mg/l in April but consistent with last year. The sample for aluminum collected cross gradient (SW-06) was measured at 130 mg/l. At the downgradient and on-site location (SW-02) aluminum was measured at 94.8 which is a significant decrease from 593 mg/l in April but consistent with 112 mg/l last year. The discharge of the storm drain to surface water was sampled at SW-07. The aluminum concentration was measured at 1.8 which is a significant decrease from 35.8 mg/l in April.

### 3.3.3 Comparison to Previous Results for Storm Drains

**Table 3-5** summarizes statistical trend analysis of both aluminum and sulfate data in storm drains. Mann-Kendall trend analysis was performed using available data for each monitoring well at a 95% confidence level. The procedure and methodologies employed in the analysis of the data are consistent with Georgia EPD and United States Environmental Protection Agency (EPA) recommended procedures. These methods meet the performance criteria specified in the rules of the Georgia EPD, Chapter 391-3-4-.14(19) and the technical standards described in the EPA "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Unified Guidance," dated March 2009.

Historical trend graphs for sulfate, aluminum and pH are shown in **Figure 3-3**. Sulfate concentrations were generally stable or increasing. Aluminum concentrations were generally stable or increasing between sampling events. The pH measurements were relatively stable showing minor changes between sampling events at the same location.

Several conditions not related to the site may slow the return of the site to background concentrations of site constituents, following removal of source materials. These include the following:

- The pH of rainwater at the site was measured at less than 5 during the HCA removal, therefore infiltrating rainfall will not have a significant effect in terms of raising the stormwater pH.
- The area surrounding the site has a number of other sources of sulfate in groundwater resulting from previous operations. Potential sulfate sources include a former battery cracking plant, a former fertilizer manufacturer, two off-site HCA disposal areas operated by others, and a former agricultural chemical manufacturer.

Identification of an off-site source upgradient of delineation boring DB-5.

## **4. SAMPLE COLLECTION PROCEDURES**

### **4.1 Summary**

In October 2014, samples were collected from 9 monitoring wells. Samples from monitoring wells were collected using dedicated tubing and low-flow purging techniques. Samples were placed in 250 ml polyethylene containers. The containers for aluminum were acidified with approximately 2 ml of nitric acid. Sulfate samples were preserved by refrigeration. The sampling containers and preservatives were provided by Analytical Services, Inc. located in Norcross, Georgia. The containers were labeled and stored on ice in a cooler until time for shipment to the laboratory. The samples were packed in ice in a cooler and shipped by overnight courier or hand delivered to the laboratory. Chain-of-custody documents were completed and included with each shipment.

### **4.2 Monitoring Well Sampling Procedure**

Monitoring wells were sampled using peristaltic pumps. Peristaltic pumps were used since the depth to water was less than 29 ft bgs, which is the maximum practical lift a peristaltic pump can achieve. The advantages of peristaltic pumps are that they produce low rates of flow with minimal surging and can be decontaminated more thoroughly when compared to bailers or other types of pumps by simply replacing the tubing in the pump head. The pump-head tubing is silicone, while the down-hole tubing is polyethylene.

Low flow purging is conducted by purging groundwater from the well at a low, constant rate for an extended period of time with the pump intake set directly opposite the well screen. This method creates a localized flow system in the well directly between the screen and pump intake, eliminating the need to remove large volumes of casing storage while ensuring that the sample collected is representative of the surrounding ground water. For this project, a purge rate of approximately 500 mL/min was extracted until the turbidity was stable at less than 20 NTUs or until other field parameters were stable. Additionally, a purge volume of at least five gallons was removed, when possible, to represent at least three pore volumes of the screened zone of the well.

To ensure that the samples collected are representative of the ground water in the formation, field parameters are measured throughout the purging process. Temperature (°C), conductivity (mS/cm), pH (s.u.), redox potential (mV), and turbidity (NTU) are measured using a Horiba U-52 or equivalent water quality meter. Measurements were taken in an enclosed flow-through cell to minimize the effects of contact with air.

After the field parameters have stabilized, the flow-through cell was disconnected and the sample is collected directly from the pump discharge tubing without adjusting the flow rate. This method ensures that the sample is representative of the ground water surrounding the respective location.

#### **4.3 Groundwater Sampling Decontamination Procedure**

Down well tubing was dedicated to each monitoring well by securing to the well cap and placing the tubing completely in the well when not in use. Pump-head tubing for the peristaltic pump was discarded after each use.

#### **4.4 Storm Drain Sampling Procedure**

Storm drain water was sampled using peristaltic pumps or by hand. The pump-head tubing is silicone, while the down-hole tubing is polyethylene. Three locations were sampled for sulfate during the sewer line inspection which also took place during October 2014. The samples were collected from upstream to downstream so SW Pipe Sample 1 was taken at SW-09, SW Pipe Sample 3 was taken at SW-06 and SW Pipe Sample 5 was taken at SW-02.

Storm drain water sampling was performed at the upgradient (SW-09), on-site (SW-02) and crossgradient (SW-06) locations by lowering tubing into storm drain manholes and placing the end of the tube near the outlet for the manhole. This ensured water from multiple inlets was mixed prior to sample collection. The downgradient (SW-07) sample was collected by hand at the outlet to the storm drain at the discharge to the stream.

For peristaltic pump samples, a purge rate of approximately 500 mL/min was maintained until the turbidity was stable at less than 20 NTUs or until other field parameters were stable. To ensure that the samples collected are representative of the storm drain water, field parameters are measured throughout the purging process. Temperature (°C), conductivity (mS/cm), pH (s.u.), redox potential (mV), and turbidity

(NTU) are measured using a Horiba U-52 or equivalent water quality meter. Measurements were taken in an enclosed flow-through cell to minimize the effects of contact with air.

After the field parameters have stabilized, the flow-through cell was disconnected and the sample is collected directly from the pump discharge tubing without adjusting the flow rate. This method ensures that the sample is representative of the storm drain water surrounding the respective location.

For hand samples, a location near the center of the flow and free of surface debris was selected. The sample was collected from beneath the surface by inserting the container opening down into the water then inverting underwater. The field parameters were measured by inserting the water quality instrument in the flow at the sampling location.

#### **4.5 Storm Drain Sampling Decontamination Procedure**

Drop tubing and pump-head tubing for the peristaltic pump were discarded after each use.

## 5. QUALITY ASSURANCE/QUALITY CONTROL

The field and analytical data from this reported semi-annual groundwater monitoring period was reviewed by Mr. Brian Jacobson with Geosyntec. The data review included evaluation of the field and laboratory quality assurance/quality control (QA/QC) parameters in order to assess the integrity of the data obtained for this project including: documentation, holding times, laboratory control samples, and laboratory matrix spike analyses. The documentation and results of the QA/QC analyses are found in the laboratory reports provided in **Appendix A**. Evaluation of these parameters was used to assess the precision, accuracy, representativeness, comparability, and completeness of the data.

Based on the review of the field and laboratory data, the data obtained from this field investigation are considered to be of acceptable quality and are fully usable with the qualifications as designated by the data validation process. Details of the QA/QC review of the data are presented in the following sections.

### 5.1 Documentation

Field sampling forms and chain-of-custody forms were evaluated for completeness. Field records were considered to be usable and to provide a reasonable record of field activities and samples collected. This review indicated that field sampling and custody transfer procedures were adequately documented and the integrity of the samples was not compromised.

### 5.2 Holding Times

All samples were processed and analyzed by the laboratory using the correct analytical methods and within the prescribed holding times.

### 5.3 Reporting Limits

The laboratory reporting limits for sulfate by Method 9056A varied from 5 to 1000 mg/l depending on the required dilution to measure a result. The laboratory reporting limits for aluminum by Method 6010C varied between 0.1 mg/l and 2 mg/l. The required quantitation limits for this project were met for all data, except in cases where sample dilution was required because of high concentrations of target analytes or matrix interference.

#### **5.4 Accuracy**

The accuracy of the data was evaluated by examining the percent recovery (%R) of matrix spikes and matrix spike duplicate (MS and MSD), and laboratory control samples (LCS). A post digestion spike was also performed for aluminum analysis to evaluate possible matrix effects of the digestate. The %Rs met the laboratory-specific QC limits for the laboratory QC LCS samples. The MS samples for sulfate and aluminum were outside the %R limits for MS and MSD samples as well as for the post digestion spike. The low recoveries were due to the low spike concentration in relation to the actual sample concentration of aluminum and sulfate (sample concentration much greater than the spiked amount). The data were judged acceptable for use based on the acceptable %R for the LCS samples.

#### **5.5 Representativeness**

Representativeness was evaluated to assess the degree to which sample results represent the actual concentrations of constituents in groundwater. Representativeness was evaluated qualitatively by reviewing sampling procedures and laboratory analytical procedures. Based on this review, the samples yielded results that provided a good qualitative representation of constituent concentrations in groundwater.

A qualitative evaluation of representativeness was also performed by examining the analysis of laboratory method blanks. Constituents were not detected above the reporting limit in any of the method blanks. This evaluation further demonstrates that the analytical data are representative of actual conditions.

#### **5.6 Comparability**

The current field and laboratory methods were compared to methods used during past monitoring periods in order to evaluate the comparability of data obtained during the current monitoring period to data previously obtained. The recommended reporting limits were used for all constituents. The data presented in this report are consistent with the data presented in previous reports.

## **5.7 Completeness**

Completeness was measured by determining the percentage of usable data obtained from samples for this project. The project sample results were found to be 100 percent complete and usable without qualification.

## 6. CONCLUSIONS

### 6.1 Groundwater

The results of the six years of data collection indicate concentrations of constituents of concern are generally showing significant decreasing trends for on-site monitoring wells. The HCA source material has been removed for over eight years. While many factors can influence concentrations at any given point in time, (e.g., time since removal of the source, hydrogeologic conditions, and precipitation patterns) it is encouraging to see that concentrations of monitored constituents in the latest round of sampling indicate a decrease and that the general trend is decreasing. Groundwater levels (elevations) have been generally stable since 2008.

Sulfate concentrations show a statistically significant decreasing trend in four of five on-site groundwater wells. The decreasing trends are consistent with source removal followed by natural attenuation of the remaining pore water.

Aluminum concentrations did not vary in a consistent direction between sampling events. Total aluminum concentration is pH dependent and since Piedmont soils contain high levels of naturally occurring aluminum, this phenomenon is not unexpected. Additionally, aluminum hydroxide can migrate as a colloid in groundwater. As shown in **Figure 6-1**, on-site wells consistently had aluminum concentrations above solubility limits indicating solid colloidal aluminum was likely being measured in the groundwater samples. Elimination of the colloidal aluminum would result in at least an order of magnitude reduction in total aluminum measured. For example, as shown on **Figure 6-1**, the measured total aluminum concentration was 29 mg/l, whereas the maximum soluble concentration at pH 4.0 is 0.6 mg/l, a 98 percent decrease from the reported value. The natural filtering of the aluminum floc particles by the soil as the water migrates off site may explain the rapid reduction in observed aluminum concentrations with increasing distance from the former source area.

The pH measurements were generally stable or increasing between the sampling events. While this is encouraging, we believe that local precipitation which has been measured with a pH less than 5 standard units will limit recovery of groundwater pH. The depressed pH will continue to allow naturally occurring aluminum to be mobilized from site soils. However, the aluminum does not appear to migrate off site.

## 6.2 Storm Drains

Seventeen sampling events have been performed for storm drains. Storm drain water and groundwater are related due to leaks in the storm drains that allow the infiltration/exfiltration of stormwater and groundwater depending on the relative water levels. The stormwater constituent concentrations and pH will vary slowly due to the low groundwater flow velocity across the site (previously estimated at 16.4 ft. per year). The potential presence of off-site sources may slow the return of the stormwater to background conditions. Factors that may slow a return to background include the following:

- The pH of the groundwater in upgradient wells (OW-1A and GCW-01D) is low. Measured pH values were 5.1 and 4.0 s.u., respectively. The low pH values of groundwater entering the site will slow a return to background conditions of stormwater mixed with groundwater exiting the site. The pH of stormwater in the cross-gradient sampling location was measured at 3.8 s.u. This water mixes with on-site stormwater lowering the pH.
- The pH of rainwater at the site was measured at less than 5 during the HCA removal, therefore infiltrated rainfall and stormwater will not have a significant effect in terms of raising the stormwater pH in the short-term.
- The area surrounding the site has a number of other sources of sulfate in groundwater resulting from previous operations. These sites may be contributing the elevated sulfate concentrations noted at SW-06 that were measured at 2,200 mg/l. Potential sulfate sources include a former battery cracking plant, a former fertilizer manufacturer, two off-site HCA disposal areas operated by others, and a former agricultural chemical manufacturer.

The sulfate concentrations at the upgradient monitoring point (SW-09) were lower than on-site (SW-02) or cross-gradient (SW-06) monitoring points. Downgradient (SW-07) sulfate concentration at the exit to the storm drain and the start of open channel flow was measured at 98.0 mg/l which is similar to site background concentration of 46 to 51 mg/l.

The on-site (SW-02) concentrations were lower than the upstream cross-gradient (SW-06) during the last sampling event. Since the on-site source has been removed and

potential off-site sources likely remain the relative contribution from the Site would be expected to continue to decrease with time. As presented in **Figure 3-3**, the time trend analysis shows a continued impact from the upstream SW-06, which is consistent with source removal on site and active potential impacts by a residual plume.

## 7. REFERENCES

Geosyntec (1999), “*Compliance Status Report*”, General Chemical Corporation, East Point, Georgia”, prepared by Geosyntec Consultants, February 1999

Geosyntec (2002), “*Revised Corrective Action Plan, General Chemical Corporation, East Point, Georgia*”, prepared by Geosyntec Consultants, February 2002

Geosyntec (2006), “*Site restoration Report, General Chemical Corporation, East Point, Georgia*”, prepared by Geosyntec Consultants, February 2006

Geosyntec (2007), “*Revised Corrective Action Plan, General Chemical Corporation, East Point, Georgia*”, prepared by Geosyntec Consultants, February 2007

Geosyntec (2013), “*Voluntary Remediation Plan Application, General Chemical Corporation, East Point, Georgia*”, prepared by Geosyntec Consultants, January 2013

# TABLES

**Table 3-1**  
**Well Construction Data and Groundwater Elevations**  
**October 2014**  
**Chemtrade Solutions Site**  
**East Point, Georgia**

Location	Well Casing Elevation	Adjacent Soil Elevation	Screen Interval (ft bgs)	Depth to Water (ft)	Groundwater Elevation (ft msl)
				Oct-14	Oct-14
GCW-01S	1023.6	1024.0	15-25	14.0	1009.6
GCW-01M	1023.8	1024.1	34-44	14.0	1009.8
GCW-01D	1023.9	1024.2	58-68	13.2	1010.7
GCW-02S	983.6	983.9	16-26	5.5	978.1
GCW-02D	983.4	983.8	34-44	5.2	978.3
GCW-02V	984.7	985.0	85.5-95.5	5.4	979.3
GCW-03S	981.3	981.6	11-21	5.2	976.0
GCW-03D	981.2	981.6	28-38	5.1	976.1
GCW-04S	996.6	997.0	13-23	10.6	986.0
GCW-04M	997.0	997.4	30-40	10.7	986.3
GCW-04D	996.8	997.1	50-60	10.3	986.5
GCW-04V	996.7	997.0	114-124	10.8	986.0
GCW-05	995.1	994.9	80-90	7.3	987.8
EPW-01	1017.5	1017.7	24.51 <sup>(1)</sup>	20.5	997.1
EPW-02	980.0	980.3	19.41 <sup>(1)</sup>	10.9	969.1
EPW-03S	984.5	984.8	12-22	10.3	974.2
EPW-03M	984.3	984.6	29-39	10.2	974.2
EPW-03D	984.6	984.9	46-56	10.1	974.5
OW-1A <sup>(2)</sup>	1030.6	1027.9	23.5-33.5 <sup>(3)</sup>	16.2	1014.4

**Notes:**

<sup>(1)</sup>: Screen length is unknown. Total depth of the well is indicated in the Table.

<sup>(2)</sup>: Well OW-1A has a casing extending above ground surface 2.7 ft.

<sup>(3)</sup>: Screen interval measured 7 November 2012.

NA: Not available

**Table 3-2  
Groundwater Sampling Results  
April 2014  
General Chemical Site  
East Point, Georgia**

Location	pH (-) EPA 150.1	Sulfate (mg/l) EPA 9056A	Aluminum (mg/l) EPA6010C
GCW-01D	4.0	230	5.7
GCW-02D	4.1	1900	179
GCW-03D	4.1	3300	312
GCW-04D	4.1	3000	333
GCW-05	7.1	640	0.4
EPW-01	5.0	130	14.2
EPW-02	4.8	<5.0	<0.1
EPW-03D	5.9	25	<0.1
OW-1A	5.1	45	0.5
Duplicates	--	2100 <sup>(1)</sup>	179 <sup>(1)</sup>

**Notes:**

<sup>(1)</sup>: Duplicate was taken from GCW-02D

**Table 3-3**  
**Summary of Statistical Trend Analysis**  
**In Groundwater Samples**  
**General Chemical Site**  
**East Point, Georgia**

Well ID	Parameter	Mann-Kendall Trend Analysis at 95% Confidence Level
GCW-01D	Alumimum	No Trend
GCW-02D		No Trend
GCW-03D		No Trend
GCW-04D		Decreasing
GCW-05		No Trend
EPW-01		No Trend
EPW-02		Decreasing
EPW-03D		No Trend
OW-1A		Decreasing
GCW-01D		Sulfate
GCW-02D	No Trend	
GCW-03D	Decreasing	
GCW-04D	Decreasing	
GCW-05	Decreasing	
EPW-01	No Trend	
EPW-02	No Trend	
EPW-03D	Decreasing	
OW-1A	Decreasing	

**Table 3-4  
Storm Drain Sampling Results  
October 2014  
Chemtrade Solutions Site  
East Point, Georgia**

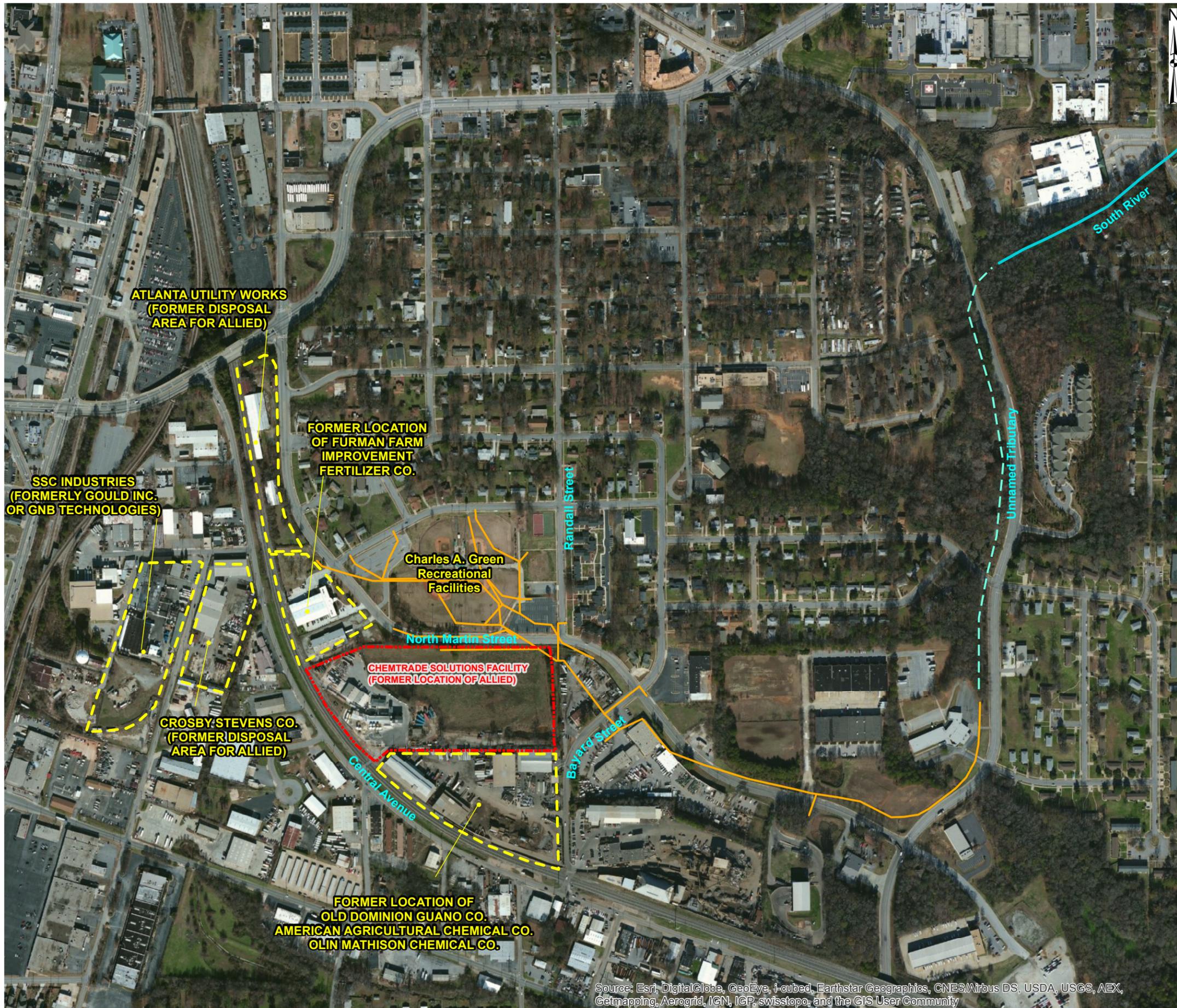
Location	Description	pH (-) EPA 150.1	Sulfate (mg/l) EPA 9056A	Aluminum (mg/l) EPA6010C
SW-02	On-site	4.6	1600.0	94.8
SW-06	Cross-Gradient	4.7	2200.0	130.0
SW-07	Downgradient	6.7	98.0	1.8
SW-09	Upgradient	6.4	110.0	<0.1
Duplicate	Duplicate SW-07	--	95.0	1.8

Note: SW-02 (Sample 5), SW-06 (Sample 4), and SW-09 (Sample 1) were tested for sulfate as part of the stormwater inspection on 24 October 2014.

**Table 3-5**  
**Summary of Statistical Trend Analysis**  
**In Storm Drain Samples**  
**General Chemical Site**  
**East Point, Georgia**

Sample Location	Parameter	Mann-Kendall Trend Analysis at 95% Confidence Level
SW-02	Aluminum	Increasing
SW-06		Increasing
SW-07		No Trend
SW-09		Increasing
SW-02	Sulfate	Increasing
SW-06		Increasing
SW-07		No Trend
SW-09		No Trend

# FIGURES

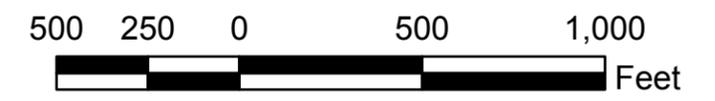


# SITE VICINITY MAP

## Chemtrade Solutions EAST POINT, GEORGIA

### Legend

- - - Approximate Property Line
- · - · - Approximate Site Property
- Storm Drain
- - - Unnamed Tributary
- SouthRiver



**Geosyntec**  
consultants  
ATLANTA, GEORGIA

January 2015	SCALE: 1" = 500'
PROJECT NO. GR5060	FIGURE NO. 1-1
DOCUMENT NO.	FILE NO. Figure 1-2.mxd

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



**Legend**

-  Monitoring Well
-  Approximate Property Boundary

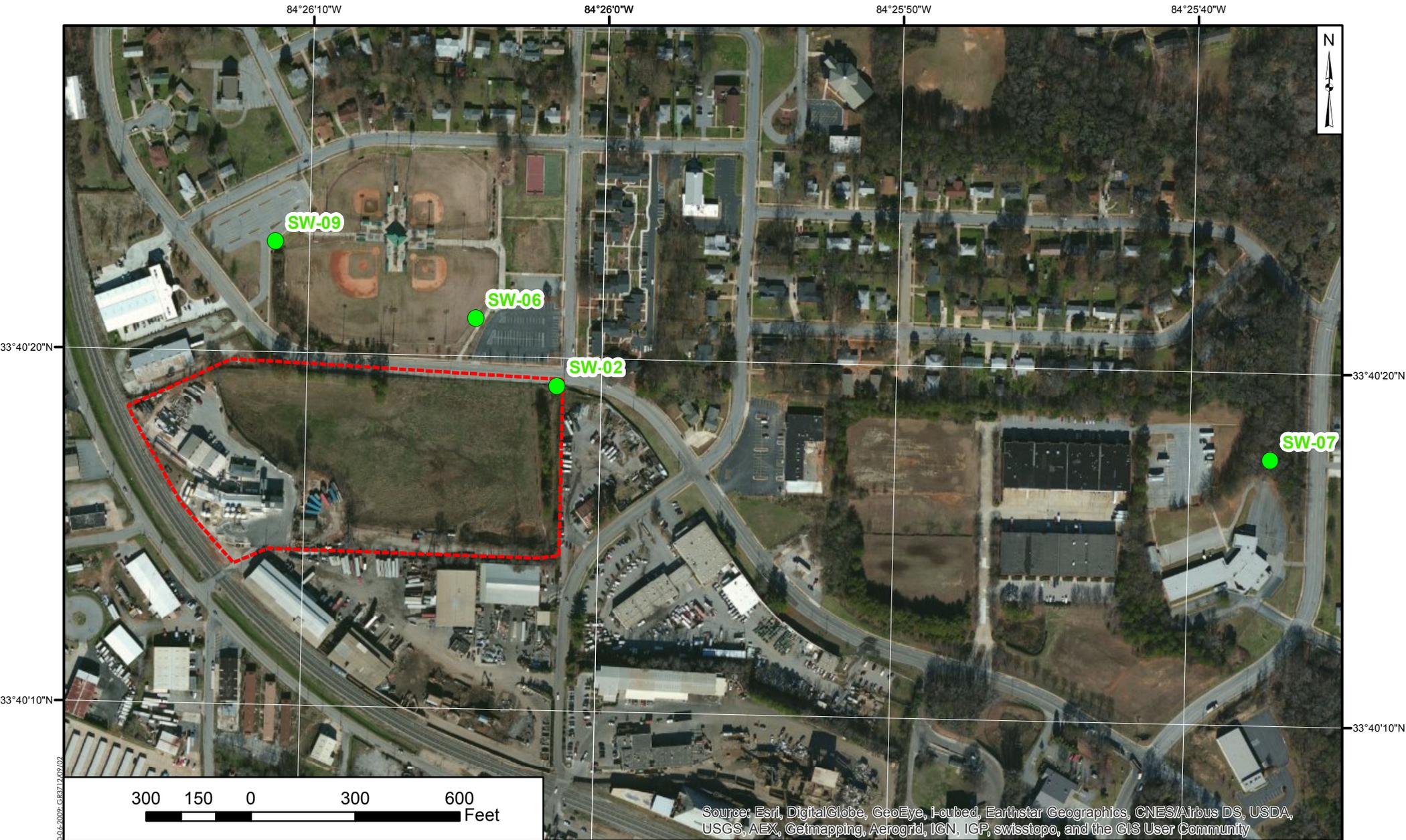
**Geosyntec**  
 consultants  
 Kennesaw, GA  
 December 2014

**MONITORING WELLS LOCATION MAP**

Chemtrade Solutions, East Point, GA

Figure  
 1-2

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Source: Esri, DigitalGlobe, GeoEye, I-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Legend**

- Surface Water Sample Location
- Approximate Property Boundary

**Geosyntec**  
consultants  
Kennesaw, GA

December 2014

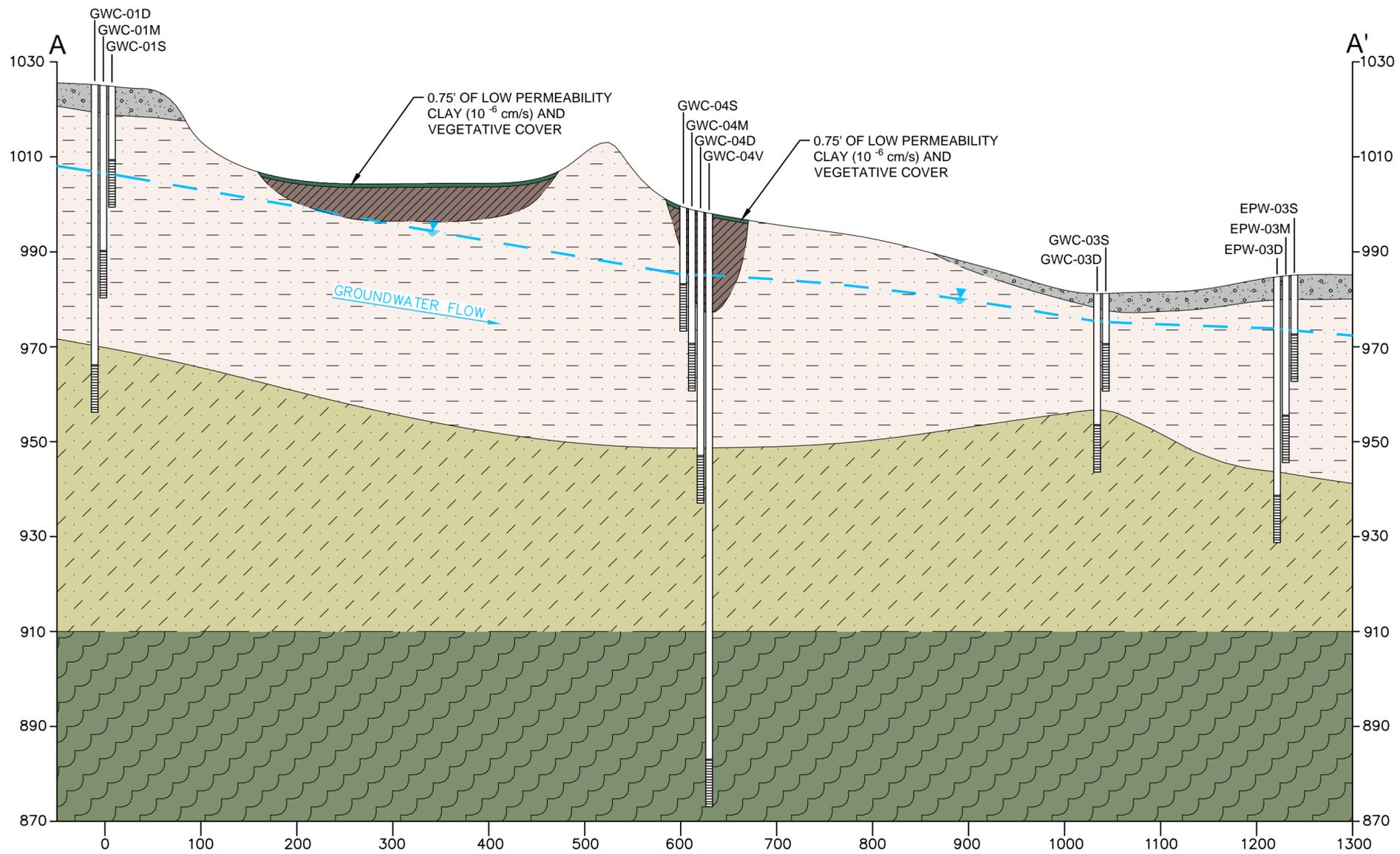
**STORM DRAIN SAMPLE LOCATION MAP**

Chemtrade Solutions, Atlanta, GA

Figure  
**1-3**

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# GEOLOGIC AND HYDROGEOLOGIC CROSS SECTION ALONG A-A'



## KEY MAP



## LEGEND

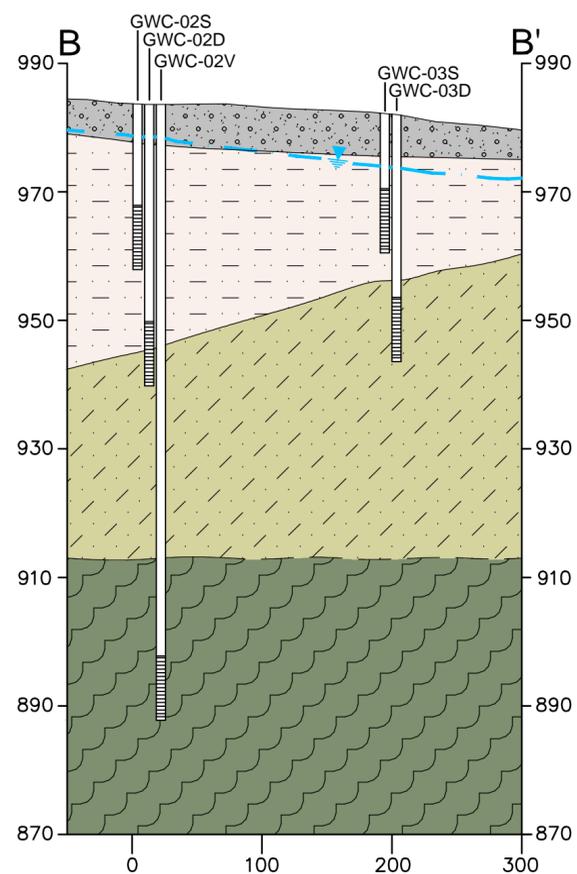
- 0.75' THICK LOW PERMEABILITY CLAY ( $10^{-6}$  cm/s) AND VEGETATIVE COVER
- GRAVELLY CLAY, FILL
- CLAY, FILL AFTER EXCAVATION
- SILTY SAND, RELICT SCHISTOCITY, MICACEOUS (SAPROLITE)
- PARTIALLY WEATHERED SCHIST
- BEDROCK (SCHIST)
- LITHOLOGIC CONTACT, DASHED WHERE INFERRED
- MONITORING WELL SCREEN ZONE WITH WATER ELEVATION (FEET MSL), NOVEMBER, 2012

0    100'    200'  
 HORIZONTAL SCALE IN FEET  
 VERTICAL EXAGGERATION = 5X

**Geosyntec**  
consultants

DATE: JUN-13	SCALE: AS SHOWN
PROJECT NO. GR5060/12	FILE NO. 5060F001
DOCUMENT NO. GA 130020	FIGURE NO. 2-1

# GEOLOGIC AND HYDROGEOLOGIC CROSS SECTION ALONG B-B'



## KEY MAP



## LEGEND

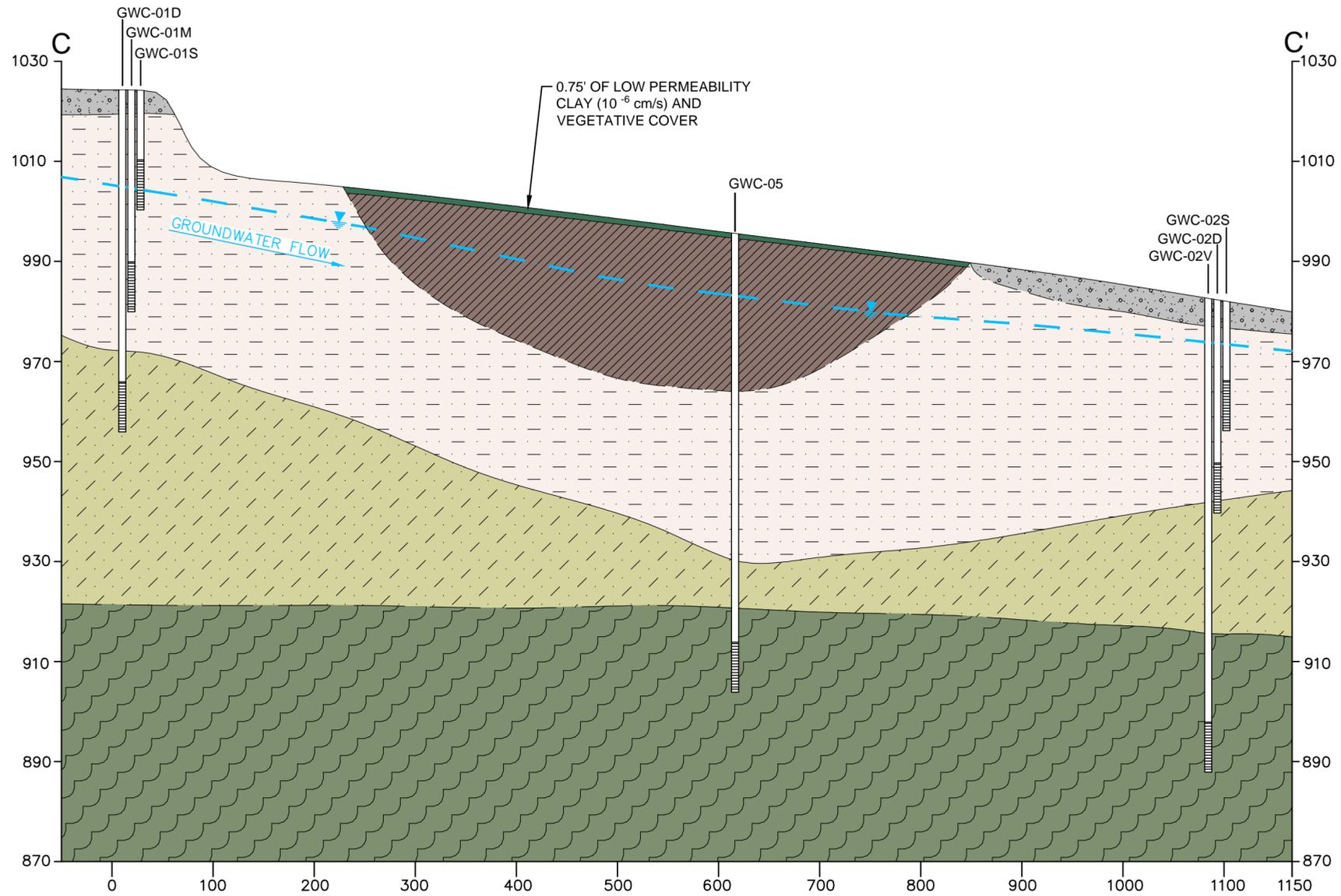
- GRAVELLY CLAY, FILL
- SILTY SAND, RELICT SCHISTOSITY, MICACEOUS (SAPROLITE)
- PARTIALLY WEATHERED SCHIST
- BEDROCK (SCHIST)
- LITHOLOGIC CONTACT, DASHED WHERE INFERRED
- MONITORING WELL SCREEN ZONE WITH WATER ELEVATION (FEET MSL), NOVEMBER, 2012

0      100'      200'  
 HORIZONTAL SCALE IN FEET  
 VERTICAL EXAGGERATION = 5X

**Geosyntec**  
consultants

DATE:	JUN-13	SCALE:	AS SHOWN
PROJECT NO.	GR5060/12	FILE NO.	5060F001
DOCUMENT NO.	GA 130020	FIGURE NO.	2-2

# GEOLOGIC AND HYDROGEOLOGIC CROSS SECTION ALONG C-C'



## KEY MAP



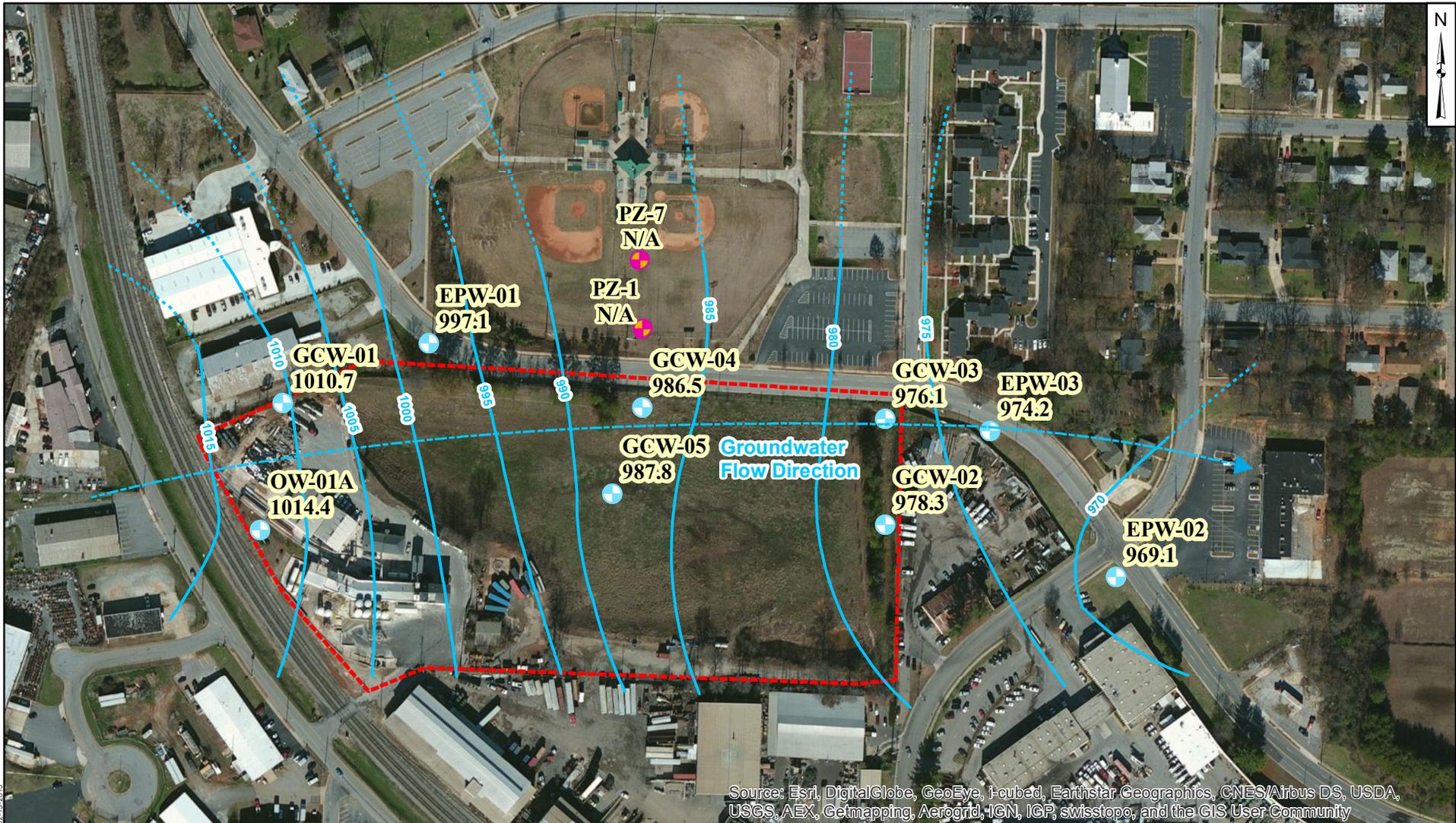
## LEGEND

- 0.75' THICK LOW PERMEABILITY CLAY ( $10^{-6}$  cm/s) AND VEGETATIVE COVER
- GRAVELLY CLAY, FILL
- CLAY, FILL AFTER EXCAVATION
- SILTY SAND, RELICT SCHISTOCITY, MICACEOUS (SAPROLITE)
- PARTIALLY WEATHERED SCHIST
- BEDROCK (SCHIST)
- LITHOLOGIC CONTACT, DASHED WHERE INFERRED
- MONITORING WELL SCREEN ZONE WITH WATER ELEVATION (FEET MSL), NOVEMBER, 2012

0      100'      200'  
 HORIZONTAL SCALE IN FEET  
 VERTICAL EXAGGERATION = 5X

**Geosyntec**  
 consultants

DATE:	JUN-13	SCALE:	AS SHOWN
PROJECT NO.	GR5060/12	FILE NO.	5060F001
DOCUMENT NO.	GA 130020	FIGURE NO.	2-3



**Legend**

-  Piezometer (Data from 2013, Elevation in ft MSL)
-  Monitoring Well (Elevation in ft MSL)
-  April 2014 Groundwater Contours
-  Approximate Property Boundary



**Geosyntec**  
consultants

Kennesaw, GA

December 2014

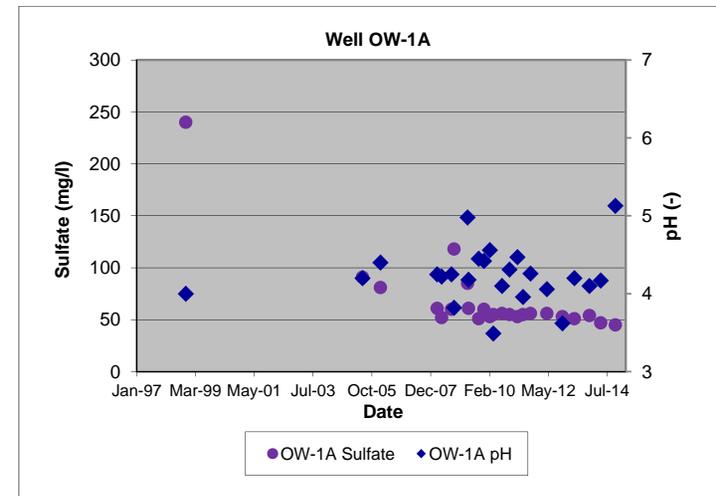
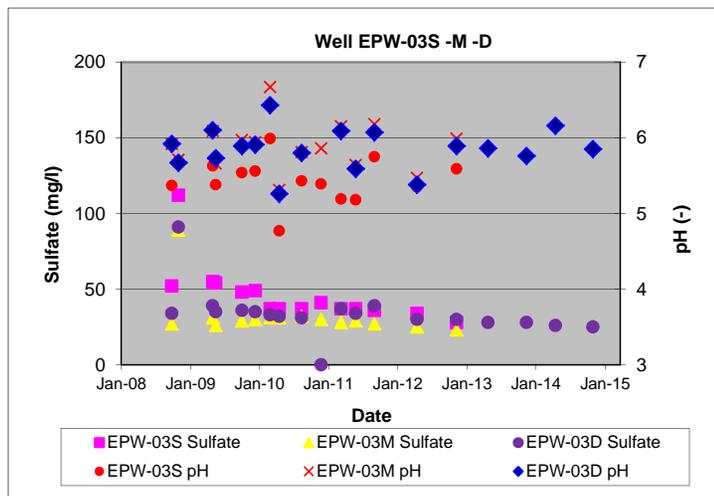
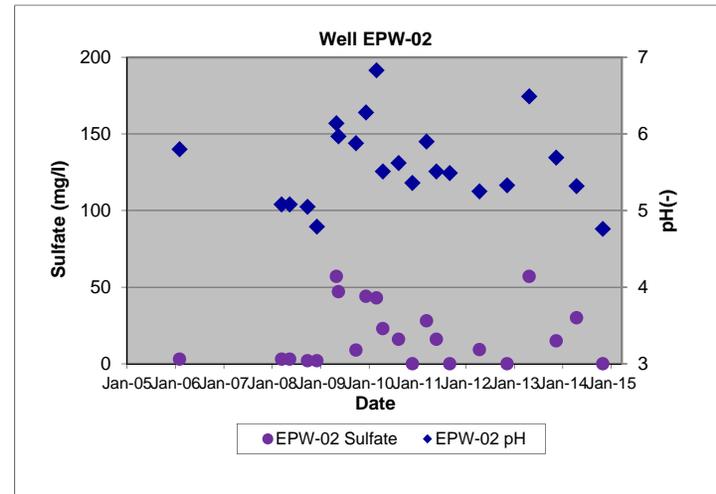
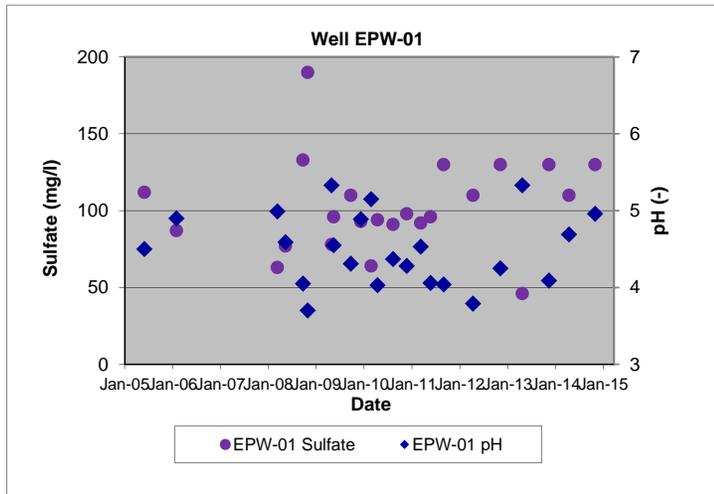
**POTENTIOMETRIC SURFACE MAP**

Chemtrade Solutions, East Point, GA

Figure  
**3-1**

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**Figure 3-2**  
**Monitoring Well Sulfate and pH Trends**  
**General Chemical Site**  
**East Point, Georgia**



**Figure 3-2 (Cont)**  
**Monitoring Well Sulfate and pH Trends**  
**General Chemical Site**  
**East Point, Georgia**

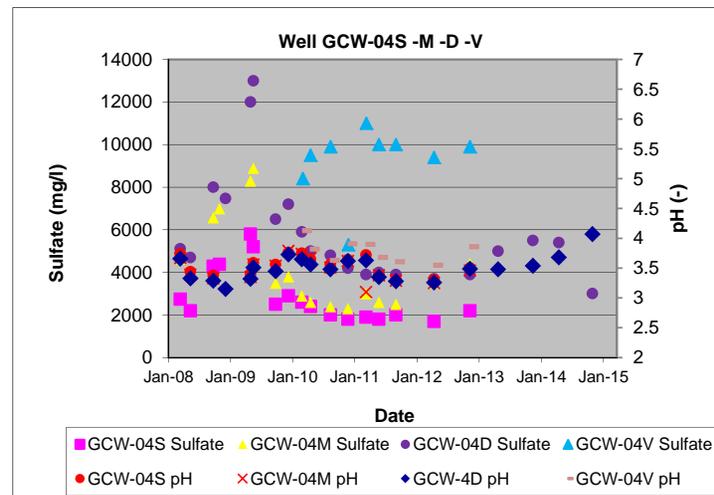
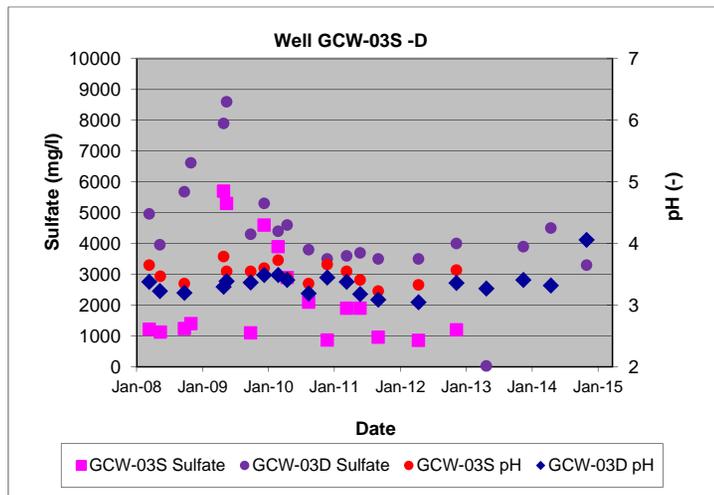
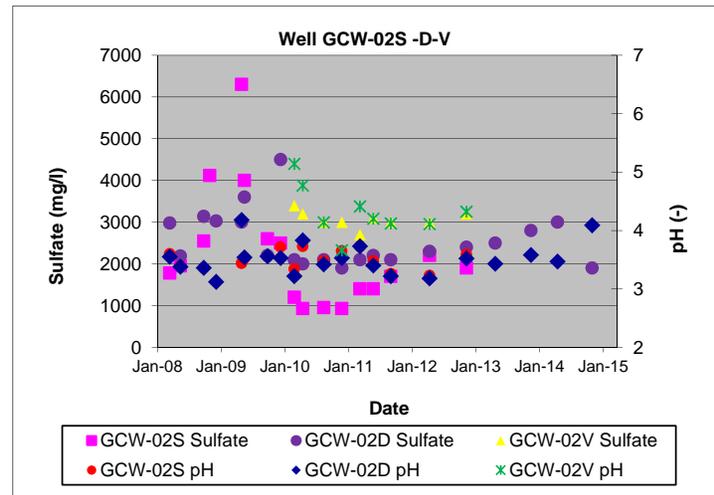
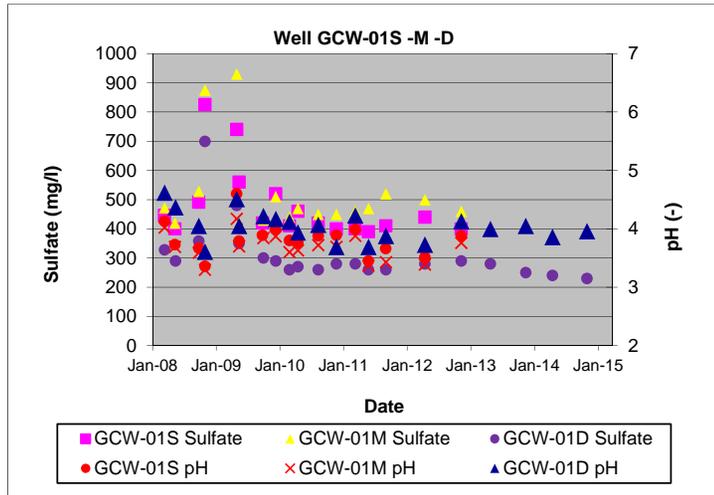
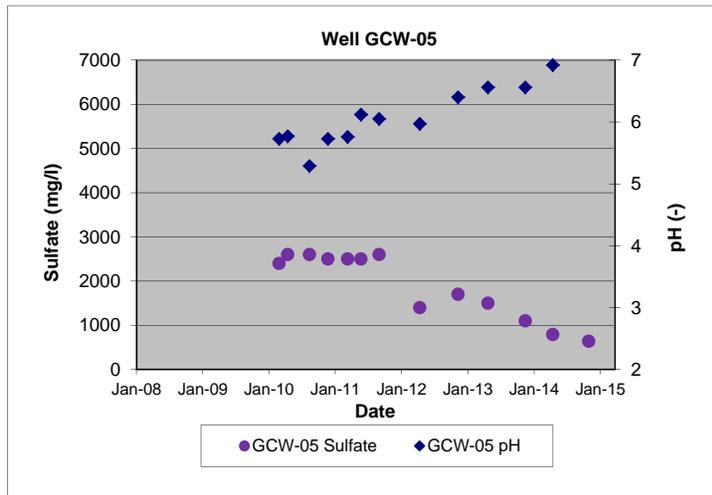
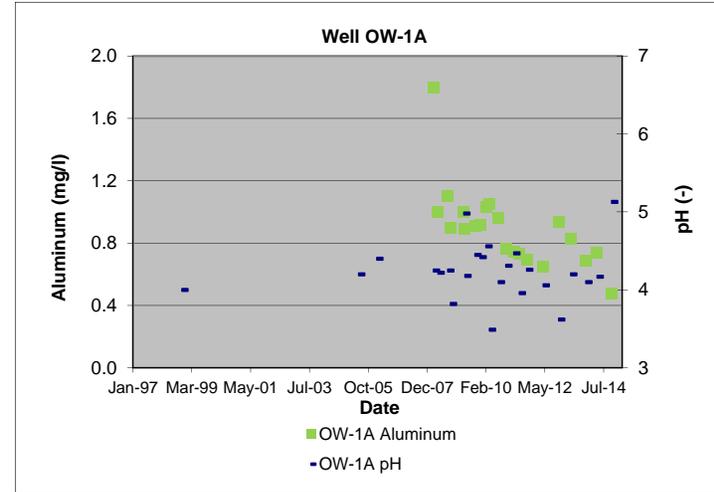
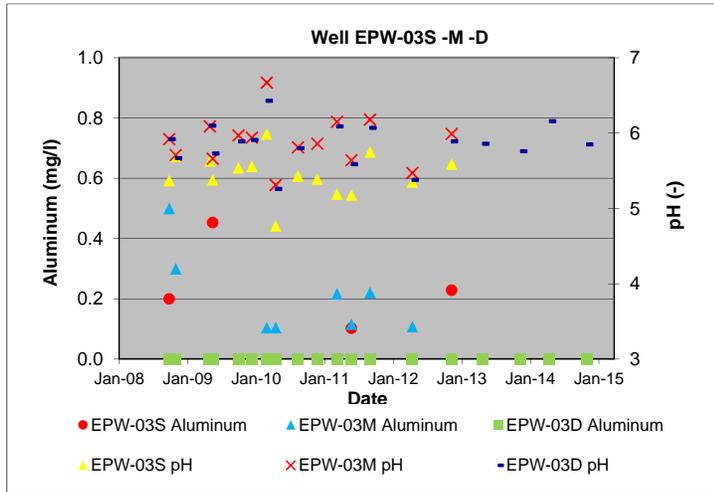
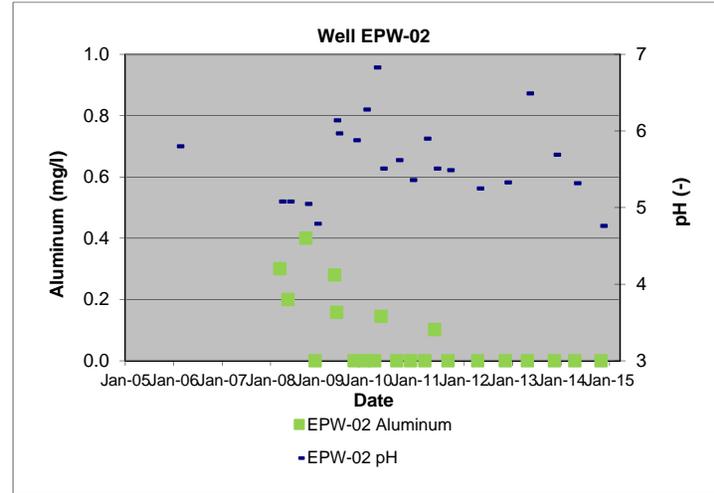
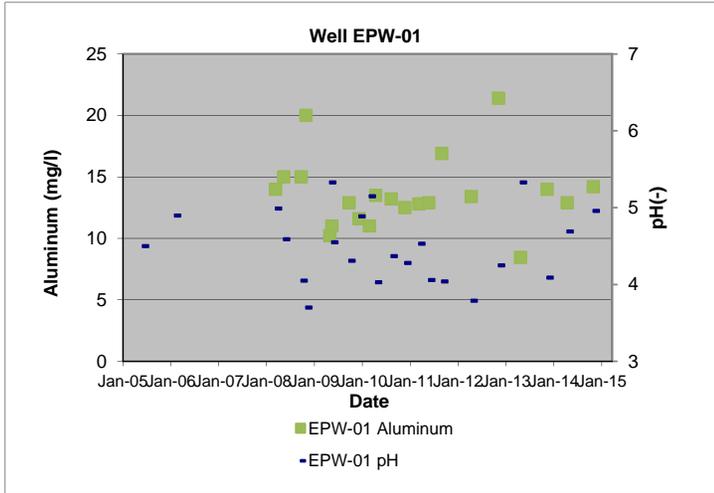


Figure 3-2 (Cont)  
Monitoring Well Sulfate and pH Trends  
General Chemical Site  
East Point, Georgia



**Figure 3-2 (Cont)**  
**Monitoring Well Aluminum and pH Trends**  
**General Chemical Site**  
**East Point, Georgia**



**Figure 3-2 (Cont)**  
**Monitoring Well Aluminum and pH Trends**  
**General Chemical Site**  
**East Point, Georgia**

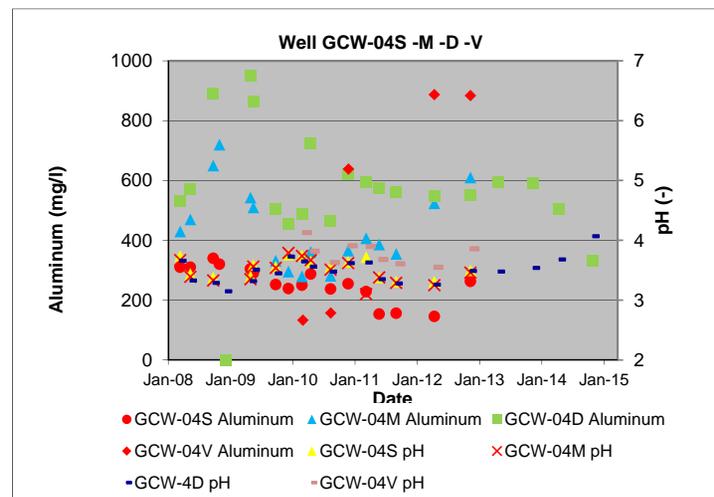
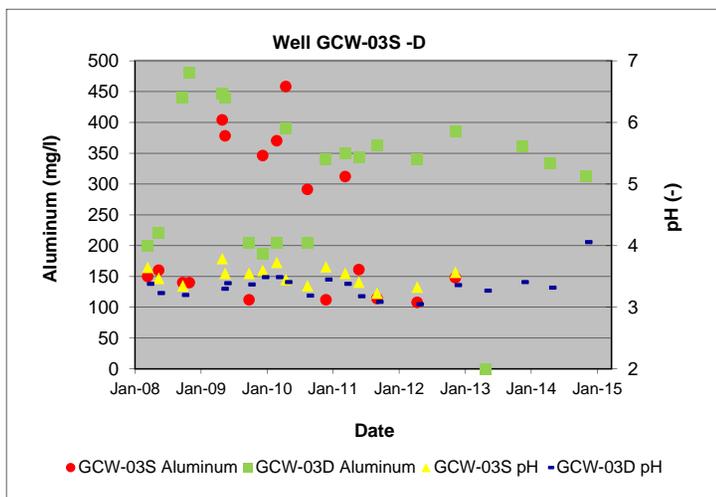
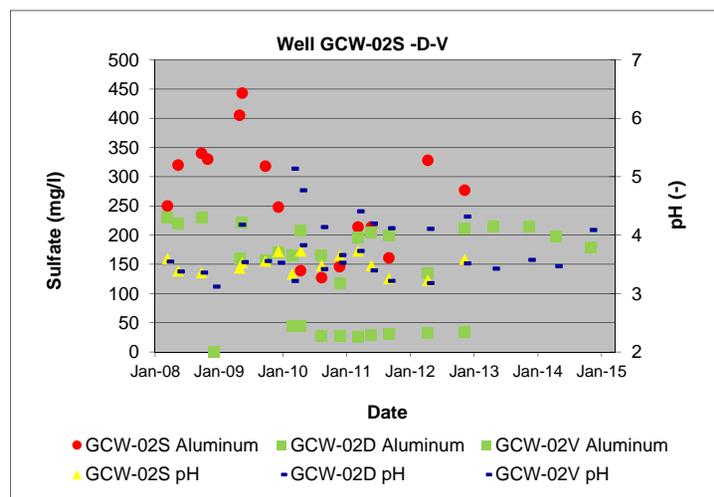
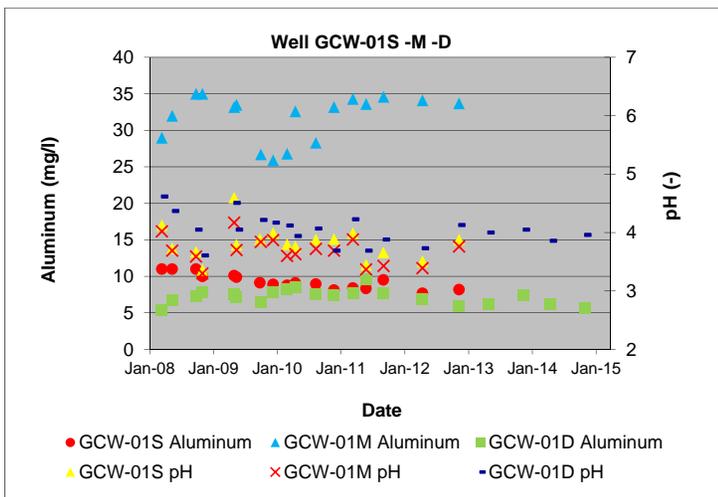
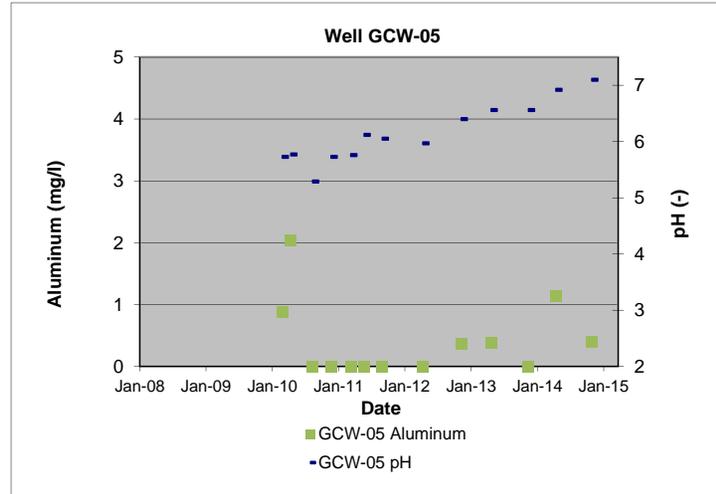
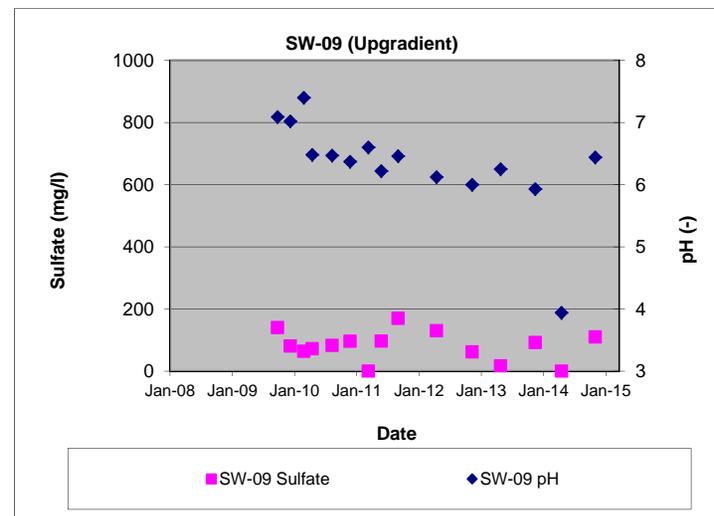
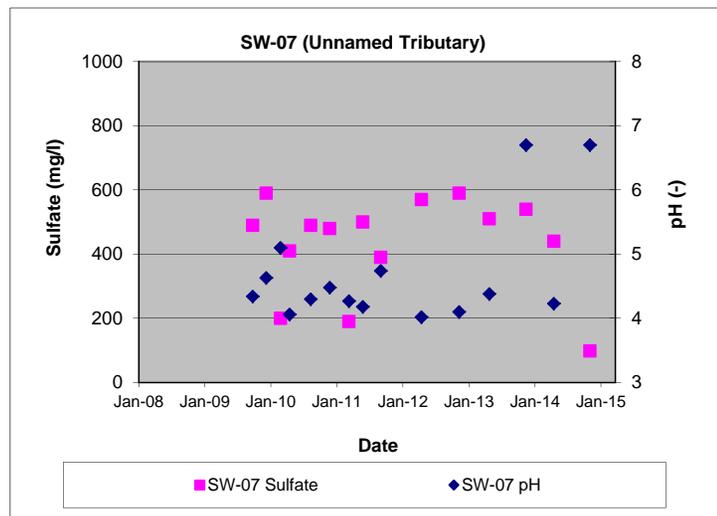
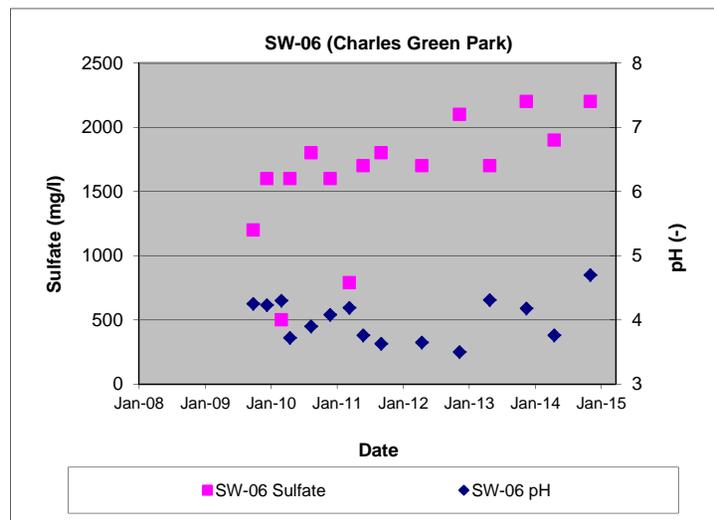
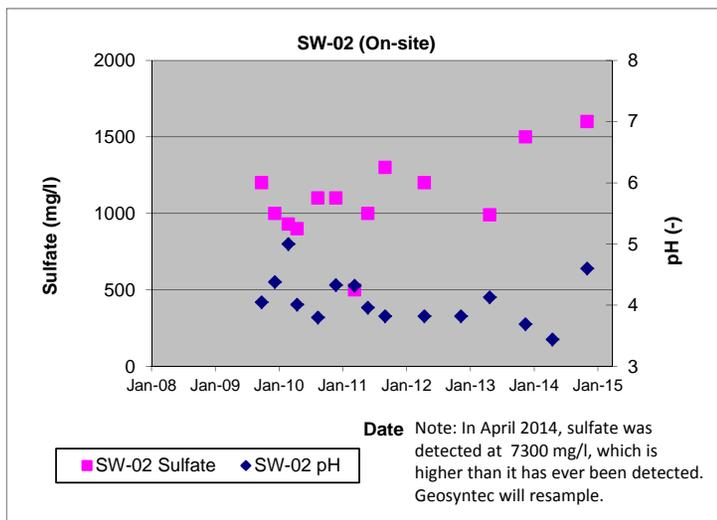


Figure 3-2 (Cont)  
Monitoring Well Aluminum and pH Trends  
General Chemical Site  
East Point, Georgia



**Figure 3-3  
Storm Drain Sulfate and pH Trends  
General Chemical Site  
East Point, Georgia**



**Figure 3-3 (Cont)**  
**Storm Drain Aluminum and pH Trends**  
**General Chemical Site**  
**East Point, Georgia**

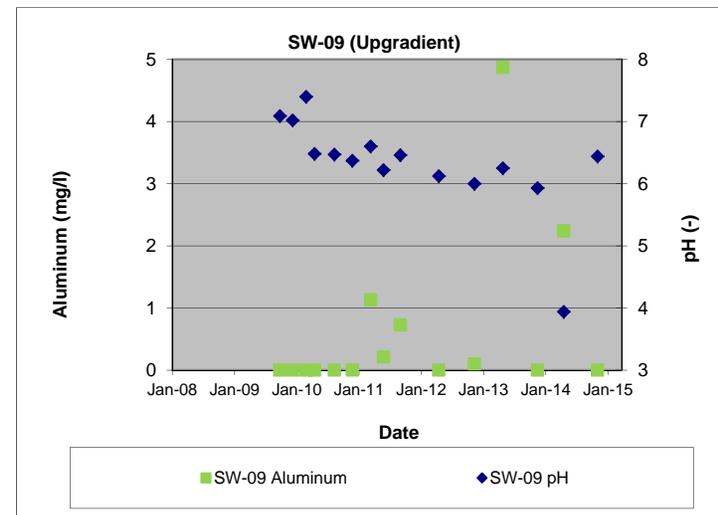
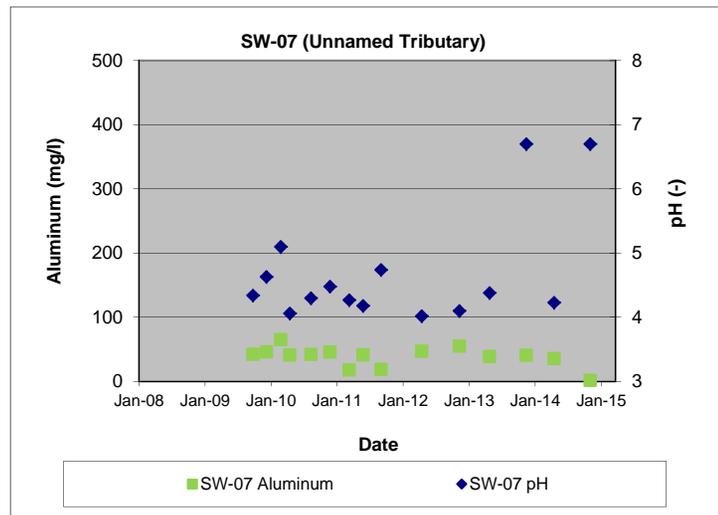
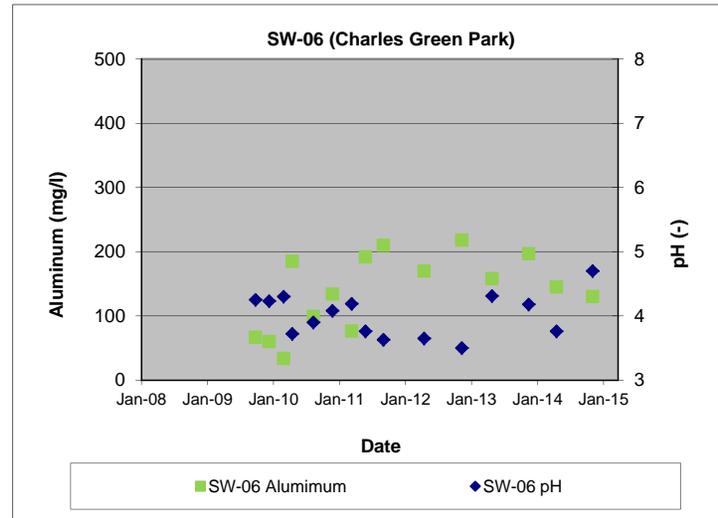
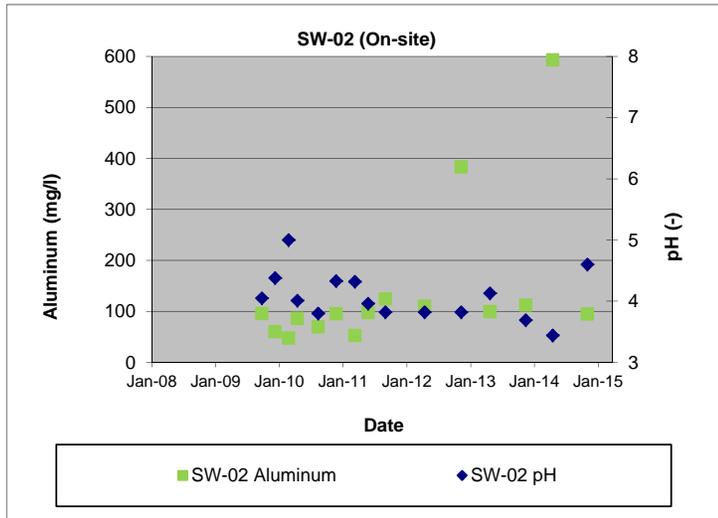
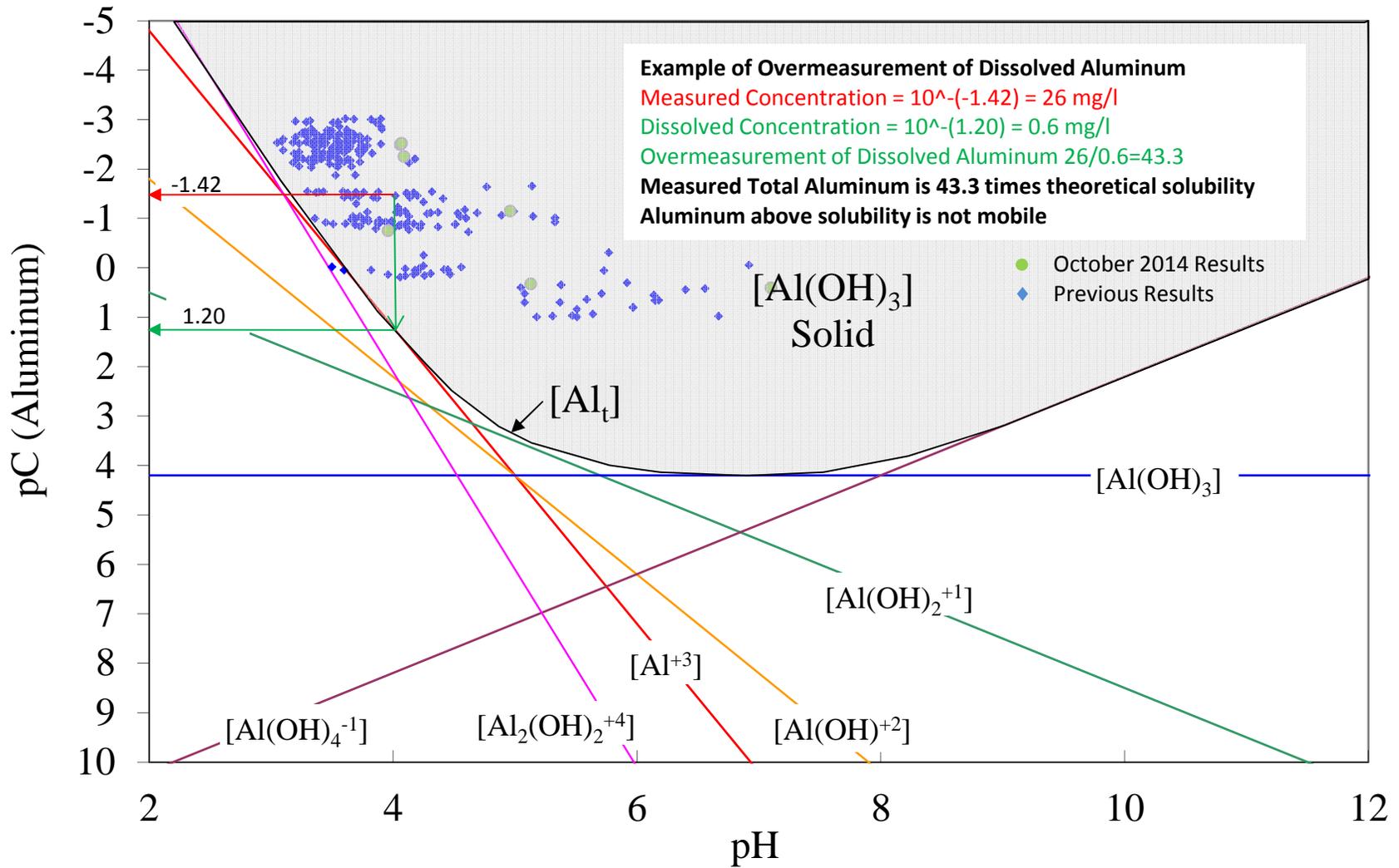


Figure 6-1  
 Chemtrade Solutions  
 Groundwater Sampling  
 October 2014  
 Aluminum Results Analysis



## APPENDIX A

# GROUNDWATER AND STORM DRAIN LABORATORY RESULTS



# ANALYTICAL SERVICES, INC.

Environmental Monitoring & Laboratory Analysis  
110 Technology Parkway, Norcross, GA 30092  
(770) 734-4200 FAX (770) 734-4201

## Laboratory Report

Prepared For:

**Geosyntec Consultants Inc.**  
**1255 Roberts Blvd N.W.**  
**Kennesaw, GA 30144**

**Attention: Mr. Brian Jacobson**

**Report Number: AXJ0800**

**November 03, 2014**

**Project: General Chemical**

**Project #:[none]**

We appreciate the opportunity to provide the analytical support for your project. The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Approved:

Project Manager

This report may not be reproduced, except in full, without written approval from Analytical Services, Inc. Analytical Services, Inc. certifies that the following analytical results meet all requirements of the National Environmental Laboratory Accreditation Conference(NELAC).  
All test results relate only to the samples analyzed.



# ANALYTICAL SERVICES, INC.

Environmental Monitoring & Laboratory Analysis  
110 Technology Parkway, Norcross, GA 30092  
(770) 734-4200 FAX (770) 734-4201

Geosyntec Consultants Inc.  
1255 Roberts Blvd N.W.  
Kennesaw GA, 30144  
Attention: Mr. Brian Jacobson

November 03, 2014

## ANALYTICAL REPORT FOR SAMPLES

<b>Sample ID</b>	<b>Laboratory ID</b>	<b>Matrix</b>	<b>Date Sampled</b>	<b>Date Received</b>
SW Pipe Sample 1	AXJ0800-01	Storm Water	10/24/14 10:30	10/28/14 09:35
SW Pipe Sample 2	AXJ0800-02	Storm Water	10/24/14 11:00	10/28/14 09:35
SW Pipe Sample 3	AXJ0800-03	Storm Water	10/24/14 14:15	10/28/14 09:35
SW Pipe Sample 4	AXJ0800-04	Storm Water	10/24/14 14:30	10/28/14 09:35
SW Pipe Sample 5	AXJ0800-05	Storm Water	10/24/14 15:30	10/28/14 09:35



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1255 Roberts Blvd N.W.  
Kennesaw GA, 30144  
Attention: Mr. Brian Jacobson

November 03, 2014

**Report No.:** AXJ0800

**Client ID:** SW Pipe Sample 1

**Date/Time Sampled:** 10/24/2014 10:30:00AM

**Matrix:** Storm Water

**Project:** General Chemical

**Lab Number ID:** AXJ0800-01

**Date/Time Received:** 10/28/2014 9:35:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	110	25	mg/L	EPA 9056A		5	10/29/14 12:51	10/29/14 12:51	4100643	TAK



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Attention: Mr. Brian Jacobson

November 03, 2014

**Report No.:** AXJ0800

**Project:** General Chemical

**Client ID:** SW Pipe Sample 2

**Lab Number ID:** AXJ0800-02

**Date/Time Sampled:** 10/24/2014 11:00:00AM

**Date/Time Received:** 10/28/2014 9:35:00AM

**Matrix:** Storm Water

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	91	25	mg/L	EPA 9056A		5	10/29/14 13:11	10/29/14 13:11	4100643	TAK



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November 03, 2014

**Report No.:** AXJ0800

**Client ID:** SW Pipe Sample 3

**Date/Time Sampled:** 10/24/2014 2:15:00PM

**Matrix:** Storm Water

**Project:** General Chemical

**Lab Number ID:** AXJ0800-03

**Date/Time Received:** 10/28/2014 9:35:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	2200	250	mg/L	EPA 9056A		50	10/29/14 13:32	10/29/14 13:32	4100643	TAK



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November 03, 2014

**Report No.:** AXJ0800

**Client ID:** SW Pipe Sample 4

**Date/Time Sampled:** 10/24/2014 2:30:00PM

**Matrix:** Storm Water

**Project:** General Chemical

**Lab Number ID:** AXJ0800-04

**Date/Time Received:** 10/28/2014 9:35:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	2200	250	mg/L	EPA 9056A		50	10/29/14 16:58	10/29/14 16:58	4100679	TAK



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November 03, 2014

**Report No.:** AXJ0800

**Client ID:** SW Pipe Sample 5

**Date/Time Sampled:** 10/24/2014 3:30:00PM

**Matrix:** Storm Water

**Project:** General Chemical

**Lab Number ID:** AXJ0800-05

**Date/Time Received:** 10/28/2014 9:35:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	1600	250	mg/L	EPA 9056A		50	10/29/14 17:19	10/29/14 17:19	4100679	TAK



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Attention: Mr. Brian Jacobson

November 03, 2014

Report No.: AXJ0800

## Inorganic Anions - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
<b>Batch 4100643 - EPA 300.0</b>										
<b>Blank (4100643-BLK1)</b>					Prepared & Analyzed: 10/28/14					
Sulfate	ND	5.0	mg/L							
<b>LCS (4100643-BS1)</b>					Prepared & Analyzed: 10/28/14					
Sulfate	10.1	5.0	mg/L	10.000		101	90-110			
<b>Matrix Spike (4100643-MS1)</b>					Source: AXJ0782-01 Prepared & Analyzed: 10/28/14					
Sulfate	10.1	5.0	mg/L	10.000	ND	101	90-110			
<b>Matrix Spike (4100643-MS2)</b>					Source: AXJ0789-01 Prepared & Analyzed: 10/28/14					
Sulfate	44.5	5.0	mg/L	10.000	38.6	59	90-110			QM-02
<b>Matrix Spike Dup (4100643-MSD1)</b>					Source: AXJ0782-01 Prepared & Analyzed: 10/28/14					
Sulfate	10.0	5.0	mg/L	10.000	ND	100	90-110	0.3	15	
<b>Batch 4100679 - EPA 9056A</b>										
<b>Blank (4100679-BLK1)</b>					Prepared & Analyzed: 10/29/14					
Sulfate	ND	5.0	mg/L							
<b>LCS (4100679-BS1)</b>					Prepared & Analyzed: 10/29/14					
Sulfate	10.0	5.0	mg/L	10.000		100	90-110			
<b>Matrix Spike (4100679-MS1)</b>					Source: AXJ0831-01 Prepared & Analyzed: 10/29/14					
Sulfate	13.5	5.0	mg/L	10.000	3.79	97	90-110			
<b>Matrix Spike Dup (4100679-MSD1)</b>					Source: AXJ0831-01 Prepared & Analyzed: 10/29/14					
Sulfate	13.5	5.0	mg/L	10.000	3.79	97	90-110	0.2	15	



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November 03, 2014

## Laboratory Certifications

Code	Description	Number	Expires
LA	Louisiana	02069	06/30/2015
NC	North Carolina	381	12/31/2014
NELAC	FL DOH (Non-Pot. Water, Solids) Eff:: 07/01/2013	E87315	06/30/2015
SC	South Carolina	98011001	06/30/2015
TX	Texas	T104704397-08-TX	03/31/2015
VA	Virginia	1340	12/14/2014



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November 03, 2014

## Legend

### Definition of Laboratory Terms

- ND** - None Detected at the Reporting Limit
- TIC** - Tentatively Identified Compound
- CFU** - Colony Forming Units
- SOP** - Method run per ASI Standard Operating Procedure
- RL** - Reporting Limit
- DF** - Dilution Factor
- \* - Analyte not included in the NELAC list of certified analytes.

### Sample Information

N-Nitrosodiphenylamine breaks down to diphenylamine in the GCMS; both analytes are reported as N-Nitrosodiphenylamine. ASI is not NELAC certified for diphenylamine.

Phthalic acid and phthalic anhydride are reported as dimethyl phthalate

Maleic acid and maleic anhydride are reported as dimethyl malate

1,2-Diphenylhydrazine breaks down to azobenzene in the GCMS; both analytes are reported as azobenzene

### Definition of Qualifiers

- QM-02** The spike recovery is outside acceptance limits due to insignificant spike amount as compared to sample concentration.

**Note: Unless otherwise noted, all results are reported on an as received basis.**







# ANALYTICAL SERVICES, INC.

Environmental Monitoring & Laboratory Analysis  
110 Technology Parkway, Norcross, GA 30092  
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## Laboratory Report

Prepared For:

**Geosyntec Consultants Inc.**  
**1255 Roberts Blvd N.W.**  
**Kennesaw, GA 30144**

**Attention: Mr. Brian Jacobson**

**Report Number: AXK0002**

**November 11, 2014**

**Project: General Chemical**

**Project #:[none]**

We appreciate the opportunity to provide the analytical support for your project. The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Approved:

Project Manager

This report may not be reproduced, except in full, without written approval from Analytical Services, Inc. Analytical Services, Inc. certifies that the following analytical results meet all requirements of the National Environmental Laboratory Accreditation Conference(NELAC).  
All test results relate only to the samples analyzed.



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Attention: Mr. Brian Jacobson

November 11, 2014

## ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SW07-1014	AXK0002-01	Water	10/31/14 09:50	11/01/14 11:25
Dup-2-1014	AXK0002-02	Water	10/31/14 00:00	11/01/14 11:25
SW02-1014	AXK0002-03	Water	10/31/14 09:05	11/01/14 11:25
SW06-1014	AXK0002-04	Water	10/31/14 08:50	11/01/14 11:25
SW09-1014	AXK0002-05	Water	10/31/14 08:30	11/01/14 11:25
OW1A-1014	AXK0002-06	Water	10/30/14 12:15	11/01/14 11:25
GCW03D-1014	AXK0002-07	Water	10/30/14 10:00	11/01/14 11:25
GCW02D-1014	AXK0002-08	Water	10/30/14 08:50	11/01/14 11:25
EPW01-1014	AXK0002-09	Water	10/30/14 10:55	11/01/14 11:25
EPW03D-1014	AXK0002-10	Water	10/29/14 15:50	11/01/14 11:25
GCW04D-1014	AXK0002-11	Water	10/29/14 14:55	11/01/14 11:25
GCW05-1014	AXK0002-12	Water	10/29/14 14:00	11/01/14 11:25
EPW02-1014	AXK0002-13	Water	10/29/14 13:10	11/01/14 11:25
GCW01D-1014	AXK0002-14	Water	10/29/14 11:50	11/01/14 11:25
Dup-1-1014	AXK0002-15	Water	10/29/14 00:00	11/01/14 11:25



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Attention: Mr. Brian Jacobson

November 11, 2014

Report No.: AXK0002

Client ID: SW07-1014

Date/Time Sampled: 10/31/2014 9:50:00AM

Matrix: Water

Project: General Chemical

Lab Number ID: AXK0002-01

Date/Time Received: 11/1/2014 11:25:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	98	50	mg/L	EPA 9056A		10	11/04/14 16:33	11/04/14 16:33	4110042	ANC
<b>Metals, Total</b>										
Aluminum	1.81	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 13:39	4110146	FBS



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Attention: Mr. Brian Jacobson

November 11, 2014

**Report No.:** AXK0002

**Client ID:** Dup-2-1014

**Date/Time Sampled:** 10/31/2014 12:00:00AM

**Matrix:** Water

**Project:** General Chemical

**Lab Number ID:** AXK0002-02

**Date/Time Received:** 11/1/2014 11:25:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	95	25	mg/L	EPA 9056A		5	11/04/14 12:05	11/04/14 12:05	4110042	ANC
<b>Metals, Total</b>										
Aluminum	1.76	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 13:42	4110146	FBS



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Attention: Mr. Brian Jacobson

November 11, 2014

**Report No.:** AXK0002

**Client ID:** SW02-1014

**Date/Time Sampled:** 10/31/2014 9:05:00AM

**Matrix:** Water

**Project:** General Chemical

**Lab Number ID:** AXK0002-03

**Date/Time Received:** 11/1/2014 11:25:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Metals, Total</b>										
Aluminum	94.8	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 13:46	4110146	FBS



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Attention: Mr. Brian Jacobson

November 11, 2014

**Report No.: AXK0002**

**Project: General Chemical**

**Client ID: SW06-1014**

**Lab Number ID: AXK0002-04**

**Date/Time Sampled: 10/31/2014 8:50:00AM**

**Date/Time Received: 11/1/2014 11:25:00AM**

**Matrix: Water**

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Metals, Total</b>										
Aluminum	130	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 13:51	4110146	FBS



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November 11, 2014

**Report No.:** AXK0002

**Client ID:** SW09-1014

**Date/Time Sampled:** 10/31/2014 8:30:00AM

**Matrix:** Water

**Project:** General Chemical

**Lab Number ID:** AXK0002-05

**Date/Time Received:** 11/1/2014 11:25:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Metals, Total</b>										
Aluminum	ND	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 13:35	4110146	FBS



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November 11, 2014

Report No.: AXK0002

Client ID: OW1A-1014

Date/Time Sampled: 10/30/2014 12:15:00PM

Matrix: Water

Project: General Chemical

Lab Number ID: AXK0002-06

Date/Time Received: 11/1/2014 11:25:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	45	10	mg/L	EPA 9056A		2	11/04/14 14:50	11/04/14 14:50	4110042	ANC
<b>Metals, Total</b>										
Aluminum	0.473	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 14:01	4110146	FBS



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November 11, 2014

Report No.: AXK0002

Client ID: GCW03D-1014

Date/Time Sampled: 10/30/2014 10:00:00AM

Matrix: Water

Project: General Chemical

Lab Number ID: AXK0002-07

Date/Time Received: 11/1/2014 11:25:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	3300	500	mg/L	EPA 9056A		100	11/04/14 15:11	11/04/14 15:11	4110042	ANC
<b>Metals, Total</b>										
Aluminum	312	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 14:05	4110146	FBS



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November 11, 2014

Report No.: AXK0002

Client ID: GCW02D-1014

Date/Time Sampled: 10/30/2014 8:50:00AM

Matrix: Water

Project: General Chemical

Lab Number ID: AXK0002-08

Date/Time Received: 11/1/2014 11:25:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	1900	500	mg/L	EPA 9056A		100	11/04/14 15:32	11/04/14 15:32	4110042	ANC
<b>Metals, Total</b>										
Aluminum	179	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 14:08	4110146	FBS



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November 11, 2014

Report No.: AXK0002

Project: General Chemical

Client ID: EPW01-1014

Lab Number ID: AXK0002-09

Date/Time Sampled: 10/30/2014 10:55:00AM

Date/Time Received: 11/1/2014 11:25:00AM

Matrix: Water

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	130	25	mg/L	EPA 9056A		5	11/04/14 15:52	11/04/14 15:52	4110042	ANC
<b>Metals, Total</b>										
Aluminum	14.2	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 14:11	4110146	FBS



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November 11, 2014

Report No.: AXK0002

Client ID: EPW03D-1014

Date/Time Sampled: 10/29/2014 3:50:00PM

Matrix: Water

Project: General Chemical

Lab Number ID: AXK0002-10

Date/Time Received: 11/1/2014 11:25:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	25	5.0	mg/L	EPA 9056A		1	11/04/14 18:37	11/04/14 18:37	4110042	ANC
<b>Metals, Total</b>										
Aluminum	ND	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 14:15	4110146	FBS



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November 11, 2014

Report No.: AXK0002

Client ID: GCW04D-1014

Date/Time Sampled: 10/29/2014 2:55:00PM

Matrix: Water

Project: General Chemical

Lab Number ID: AXK0002-11

Date/Time Received: 11/1/2014 11:25:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	3000	500	mg/L	EPA 9056A		100	11/04/14 20:00	11/04/14 20:00	4110042	ANC
<b>Metals, Total</b>										
Aluminum	333	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 14:18	4110146	FBS



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November 11, 2014

Report No.: AXK0002

Client ID: GCW05-1014

Date/Time Sampled: 10/29/2014 2:00:00PM

Matrix: Water

Project: General Chemical

Lab Number ID: AXK0002-12

Date/Time Received: 11/1/2014 11:25:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	640	500	mg/L	EPA 9056A		100	11/04/14 20:21	11/04/14 20:21	4110042	ANC
<b>Metals, Total</b>										
Aluminum	0.392	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 14:22	4110146	FBS



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November 11, 2014

Report No.: AXK0002

Project: General Chemical

Client ID: EPW02-1014

Lab Number ID: AXK0002-13

Date/Time Sampled: 10/29/2014 1:10:00PM

Date/Time Received: 11/1/2014 11:25:00AM

Matrix: Water

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	ND	5.0	mg/L	EPA 9056A		1	11/05/14 11:46	11/05/14 11:46	4110042	ANC
<b>Metals, Total</b>										
Aluminum	ND	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 14:25	4110146	FBS



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(770) 734-4200 FAX (770) 734-4201

Geosyntec Consultants Inc.  
1255 Roberts Blvd N.W.  
Kennesaw GA, 30144  
Attention: Mr. Brian Jacobson

November 11, 2014

Report No.: AXK0002

Project: General Chemical

Client ID: GCW01D-1014

Lab Number ID: AXK0002-14

Date/Time Sampled: 10/29/2014 11:50:00AM

Date/Time Received: 11/1/2014 11:25:00AM

Matrix: Water

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	230	50	mg/L	EPA 9056A		10	11/04/14 21:02	11/04/14 21:02	4110042	ANC
<b>Metals, Total</b>										
Aluminum	5.66	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 14:29	4110146	FBS



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Geosyntec Consultants Inc.  
1255 Roberts Blvd N.W.  
Kennesaw GA, 30144  
Attention: Mr. Brian Jacobson

November 11, 2014

Report No.: AXK0002

Project: General Chemical

Client ID: Dup-1-1014

Lab Number ID: AXK0002-15

Date/Time Sampled: 10/29/2014 12:00:00AM

Date/Time Received: 11/1/2014 11:25:00AM

Matrix: Water

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	2100	250	mg/L	EPA 9056A		50	11/04/14 16:13	11/04/14 16:13	4110042	ANC
<b>Metals, Total</b>										
Aluminum	179	0.100	mg/L	EPA 6010C		1	11/10/14 10:05	11/10/14 14:32	4110146	FBS



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Kennesaw GA, 30144  
Attention: Mr. Brian Jacobson

November 11, 2014

Report No.: AXK0002

## Inorganic Anions - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
<b>Batch 4110042 - EPA 300.0</b>										
<b>Blank (4110042-BLK1)</b>					Prepared & Analyzed: 11/04/14					
Sulfate	ND	5.0	mg/L							
<b>LCS (4110042-BS1)</b>					Prepared & Analyzed: 11/04/14					
Sulfate	10.2	5.0	mg/L	10.000		102	90-110			
<b>Matrix Spike (4110042-MS1)</b>					Source: AXK0021-01 Prepared & Analyzed: 11/04/14					
Sulfate	13.0	5.0	mg/L	10.000	3.78	92	90-110			
<b>Matrix Spike (4110042-MS2)</b>					Source: AXK0002-10 Prepared & Analyzed: 11/04/14					
Sulfate	33.0	5.0	mg/L	10.000	25.4	77	90-110			QM-02
<b>Matrix Spike Dup (4110042-MSD1)</b>					Source: AXK0021-01 Prepared & Analyzed: 11/04/14					
Sulfate	13.0	5.0	mg/L	10.000	3.78	92	90-110	0.1	15	



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Attention: Mr. Brian Jacobson

November 11, 2014

Report No.: AXK0002

## Metals, Total - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
<b>Batch 4110146 - EPA 3010A</b>										
<b>Blank (4110146-BLK1)</b> Prepared & Analyzed: 11/10/14										
Aluminum	ND	0.100	mg/L							
<b>LCS (4110146-BS1)</b> Prepared & Analyzed: 11/10/14										
Aluminum	0.960	0.100	mg/L	1.0000		96	80-120			
<b>Matrix Spike (4110146-MS1)</b> Source: AXK0002-05 Prepared & Analyzed: 11/10/14										
Aluminum	1.00	0.100	mg/L	1.0000	0.023	98	75-125			
<b>Matrix Spike Dup (4110146-MSD1)</b> Source: AXK0002-05 Prepared & Analyzed: 11/10/14										
Aluminum	1.00	0.100	mg/L	1.0000	0.023	98	75-125	0.09	20	
<b>Post Spike (4110146-PS1)</b> Source: AXK0002-05 Prepared & Analyzed: 11/10/14										
Aluminum	1.00		mg/L	1.0000	0.023	98	80-120			



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Attention: Mr. Brian Jacobson

November 11, 2014

## Laboratory Certifications

Code	Description	Number	Expires
LA	Louisiana	02069	06/30/2015
NC	North Carolina	381	12/31/2014
NELAC	FL DOH (Non-Pot. Water, Solids) Eff:: 07/01/2013	E87315	06/30/2015
SC	South Carolina	98011001	06/30/2015
TX	Texas	T104704397-08-TX	03/31/2015
VA	Virginia	1340	12/14/2014



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November 11, 2014

## Legend

### Definition of Laboratory Terms

- ND** - None Detected at the Reporting Limit
- TIC** - Tentatively Identified Compound
- CFU** - Colony Forming Units
- SOP** - Method run per ASI Standard Operating Procedure
- RL** - Reporting Limit
- DF** - Dilution Factor
- \* - Analyte not included in the NELAC list of certified analytes.

### Sample Information

N-Nitrosodiphenylamine breaks down to diphenylamine in the GCMS; both analytes are reported as N-Nitrosodiphenylamine. ASI is not NELAC certified for diphenylamine.

Phthalic acid and phthalic anhydride are reported as dimethyl phthalate

Maleic acid and maleic anhydride are reported as dimethyl malate

1,2-Diphenylhydrazine breaks down to azobenzene in the GCMS; both analytes are reported as azobenzene

### Definition of Qualifiers

- QM-02** The spike recovery is outside acceptance limits due to insignificant spike amount as compared to sample concentration.

**Note: Unless otherwise noted, all results are reported on an as received basis.**



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Attention: Mr. Brian Jacobson

November 11, 2014

PAGE: 1 OF 2

**ANALYTICAL SERVICES, INC.**  
ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS  
110 TECHNOLOGY PARKWAY, NORCROSS, GA 30092  
(770) 734-4200; FAX (770) 734-4201; www.asi-lab.com



## CHAIN OF CUSTODY RECORD

236323

CLIENT NAME		ANALYSIS REQUESTED		CONTAINER TYPE		PRESERVATION	
Geo Sunk		Sulfate (9050)		P- PLASTIC		1- HC, 5°C	
CLIENT ADDRESS/PHONE NUMBER/FAX NUMBER		# of		A- AMBER GLASS		2- H <sub>2</sub> SO <sub>4</sub> , 5°C	
1655 Roberts Blvd.		3		G- CLEAR GLASS		3- HNO <sub>3</sub>	
REPORT TO:		CONTAINERS		V- VOA VIAL		4- NaOH, 5°C	
Brown Jacobson		Sulfate (9050)		S- STERILE		5- NaOH/ZnAc, 5°C	
Kennesaw, GA 30144		Aluminum (6010)		O- OTHER		6- Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> , 5°C	
REQUESTED COMPLETION DATE		DATE		MATRIX CODE		7- 5°C and frozen	
SA		10/31/14 9:50		C G		MATRIX CODES:	
PROJECT NAME/STATE		TIME		M A		DW- DRINKING WATER S- SOIL	
General Chemical - East Point, GA		9:50		P B		WW- WASTEWATER SL- SLUDGE	
PROJECT #:		SAMPLE IDENTIFICATION		DATE		SW- SURFACE WATER SD- SOLID	
GR5060.2014		SW07-1014		10/31/14 9:05		ST- STORM WATER L- LIQUID	
		Dup-2-1014		10/31/14 8:50		W- WATER P- PRODUCT	
		SW02-1014		10/31/14 8:30		REMARKS/ADDITIONAL INFORMATION	
		SW06-1014		10/30/14 12:15			
		SW09-1014		10/30/14 10:00			
		OW1A-1014		10/30/14 8:50			
		GCW03D-1014		10/30/14 10:55			
		GCW02D-1014		10/29/14 15:50			
		EPW01-1014		10/29/14 14:55			
		EPW03D-1014		10/29/14 14:00			
		GCW04D-1014		10/29/14 14:00			
		GCW05-1014		10/29/14 14:00			

Revised 2013-10-31





# ANALYTICAL SERVICES, INC.

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## LOG-IN CHECKLIST

Printed: 11/11/2014 2:53:51PM

Attn: Mr. Brian Jacobson

Client: Geosyntec Consultants Inc.

Project: General Chemical

Date Received: 11/01/14 11:25

Work Order: AXK0002

Logged In By: Mohammad M. Rahman

### OBSERVATIONS

#Samples: 15

#Containers: 27

Minimum Temp(C): 1.0

Maximum Temp(C): 1.0

Custody Seal(s) Used: Yes

### CHECKLIST ITEMS

COC included with Samples	YES
Sample Container(s) Intact	YES
Chain of Custody Complete	NO
Sample Container(s) Match COC	YES
Custody seal Intact	YES
Temperature in Compliance	YES
Sufficient Sample Volume for Analysis	YES
Zero Headspace Maintained for VOA Analyses	YES
Samples labeled preserved (If Applicable)	YES
Samples received within Allowable Hold Times	YES
Samples Received on Ice	YES
Preservation Confirmed	YES

### **Comments:**

The matrix code and sample type were not listed on the COC. MMR



# ANALYTICAL SERVICES, INC.

Environmental Monitoring & Laboratory Analysis  
110 Technology Parkway, Norcross, GA 30092  
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## Laboratory Report

Prepared For:

**Geosyntec Consultants Inc.**  
**1255 Roberts Blvd N.W.**  
**Kennesaw, GA 30144**

**Attention: Mr. Brian Jacobson**

**Report Number: AXK0074**

**November 07, 2014**

**Project: General Chemical**

**Project #:GR560.06**

We appreciate the opportunity to provide the analytical support for your project. The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Approved:

Project Manager

This report may not be reproduced, except in full, without written approval from Analytical Services, Inc. Analytical Services, Inc. certifies that the following analytical results meet all requirements of the National Environmental Laboratory Accreditation Conference(NELAC).  
All test results relate only to the samples analyzed.



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Geosyntec Consultants Inc.  
1255 Roberts Blvd N.W.  
Kennesaw GA, 30144  
Attention: Mr. Brian Jacobson

November 07, 2014

## ANALYTICAL REPORT FOR SAMPLES

<b>Sample ID</b>	<b>Laboratory ID</b>	<b>Matrix</b>	<b>Date Sampled</b>	<b>Date Received</b>
SW Pipe Sample 6	AXK0074-01	Storm Water	11/03/14 17:45	11/05/14 09:50



# ANALYTICAL SERVICES, INC.

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1255 Roberts Blvd N.W.  
Kennesaw GA, 30144  
Attention: Mr. Brian Jacobson

November 07, 2014

**Report No.:** AXK0074

**Client ID:** SW Pipe Sample 6

**Date/Time Sampled:** 11/3/2014 5:45:00PM

**Matrix:** Storm Water

**Project:** General Chemical

**Lab Number ID:** AXK0074-01

**Date/Time Received:** 11/5/2014 9:50:00AM

Analyte	Result	RL	Units	Method	Qual.	DF	Preparation Date	Analytical Date	Batch	Init.
<b>Inorganic Anions</b>										
Sulfate	690	500	mg/L	EPA 9056A		100	11/05/14 20:43	11/05/14 20:43	4110070	ANC



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1255 Roberts Blvd N.W.  
Kennesaw GA, 30144  
Attention: Mr. Brian Jacobson

November 07, 2014

Report No.: AXK0074

## Inorganic Anions - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
<b>Batch 4110070 - EPA 300.0</b>										
<b>Blank (4110070-BLK1)</b>					Prepared & Analyzed: 11/05/14					
Sulfate	ND	5.0	mg/L							
<b>LCS (4110070-BS1)</b>					Prepared & Analyzed: 11/05/14					
Sulfate	9.96	5.0	mg/L	10.000		100	90-110			
<b>Matrix Spike (4110070-MS1)</b>					Source: AXK0068-03 Prepared & Analyzed: 11/05/14					
Sulfate	14.2	5.0	mg/L	10.000	4.44	98	90-110			
<b>Matrix Spike (4110070-MS2)</b>					Source: AXK0072-03 Prepared & Analyzed: 11/05/14					
Sulfate	9.96	5.0	mg/L	10.000	ND	100	90-110			
<b>Matrix Spike Dup (4110070-MSD1)</b>					Source: AXK0068-03 Prepared & Analyzed: 11/05/14					
Sulfate	14.2	5.0	mg/L	10.000	4.44	98	90-110	0.1	15	



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Attention: Mr. Brian Jacobson

November 07, 2014

## Laboratory Certifications

Code	Description	Number	Expires
LA	Louisiana	02069	06/30/2015
NC	North Carolina	381	12/31/2014
NELAC	FL DOH (Non-Pot. Water, Solids) Eff:: 07/01/2013	E87315	06/30/2015
SC	South Carolina	98011001	06/30/2015
TX	Texas	T104704397-08-TX	03/31/2015
VA	Virginia	1340	12/14/2014



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November 07, 2014

## Legend

### Definition of Laboratory Terms

- ND** - None Detected at the Reporting Limit
- TIC** - Tentatively Identified Compound
- CFU** - Colony Forming Units
- SOP** - Method run per ASI Standard Operating Procedure
- RL** - Reporting Limit
- DF** - Dilution Factor
- \* - Analyte not included in the NELAC list of certified analytes.

### Sample Information

N-Nitrosodiphenylamine breaks down to diphenylamine in the GCMS; both analytes are reported as N-Nitrosodiphenylamine. ASI is not NELAC certified for diphenylamine.

Phthalic acid and phthalic anhydride are reported as dimethyl phthalate

Maleic acid and maleic anhydride are reported as dimethyl malate

1,2-Diphenylhydrazine breaks down to azobenzene in the GCMS; both analytes are reported as azobenzene

### Definition of Qualifiers

**Note: Unless otherwise noted, all results are reported on an as received basis.**





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## LOG-IN CHECKLIST

Printed: 11/7/2014 3:02:38PM

Attn: Mr. Brian Jacobson

Client: Geosyntec Consultants Inc.

Project: General Chemical

Date Received: 11/05/14 09:50

Work Order: AXK0074

Logged In By: Charles Hawks

### OBSERVATIONS

#Samples: 1

#Containers: 1

Minimum Temp(C): 16.0

Maximum Temp(C): 16.0

Custody Seal(s) Used: No

### CHECKLIST ITEMS

COC included with Samples	YES
Sample Container(s) Intact	YES
Chain of Custody Complete	YES
Sample Container(s) Match COC	YES
Custody seal Intact	NO
Temperature in Compliance	NO
Sufficient Sample Volume for Analysis	YES
Zero Headspace Maintained for VOA Analyses	YES
Samples labeled preserved (If Applicable)	YES
Samples received within Allowable Hold Times	YES
Samples Received on Ice	NO
Preservation Confirmed	YES

### **Comments:**

The sample was received out of temperature compliance. CFH

## APPENDIX B

# GROUNDWATER AND STORM DRAIN SAMPLING FORM



## Ground Water Parameters for Low-Flow Sampling

Site: General Chemical Site Project No.: GR5060.2014

Monitoring Well: GCW01D Sampling Date: 10/29/14

Sample ID: GCW01D-1014 Sampler: J. Ivanowski

Time	Start Purge Readings	Start Samp.	End Samp.	Temperature (°C)	pH	Conductivity (mS/cm)	Redox Potential (± mv)	Turbidity (NTU)	DO (mg/L)	Appearance of Water
11:05	X									
11:10	X			20.33	3.80	0.253	465	5.10	7.66	clear
11:25	X			20.09	3.89	0.249	487	1.91	7.13	clear
11:40	X			19.88	3.95	0.243	481	1.90	6.89	clear
11:45	X			19.82	3.95	0.241	482	1.04	6.83	"
11:50	X	X	X	19.75	3.96	0.243	481	0.70	6.78	"
										
Split, Blank, Duplicate, & Filtered Samples									Miscellaneous	
Sample ID		Description							Initial Depth to Water: <u>13.21</u> ft	
									Final Depth to Water: _____ ft	
									Total Purge Volume: <u>5</u> gal	
									Pump Rate: <u>0.125</u> gpm	
Weather: <u>cloudy-rain 64°</u>										
Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)										



Ground Water Parameters for Low-Flow Sampling

Site: General Chemical Site Project No.: GR5060.2014

Monitoring Well: SW-02 Sampling Date: 10/31/14

Sample ID: SW02-1014 Sampler: J. Ivanowski

Time	Start Purge Readings	Start Samp. End Samp.	Temperature (°C)	pH	Conductivity (mS/cm)	Redox Potential (± mv)	Turbidity (NTU)	DO (mg/L)	Appearance of Water
9:00	X X		15.58	4.65	0.584	360	10.20	8.61	clear
9:05	X X X		15.99	4.60	0.660	397	8.61	9.27	clear
<i>Good</i>									
Split, Blank, Duplicate, & Filtered Samples								Miscellaneous	
Sample ID			Description					Initial Depth to Water: <u>    </u> ft	
								Final Depth to Water: <u>    </u> ft	
								Total Purge Volume: <u>    </u> gal	
								Pump Rate: <u>    </u> gpm	
Weather: <u>Clear 45°</u>									
Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)									







## Ground Water Parameters for Low-Flow Sampling

Site: General Chemical Site Project No.: GR5060.2014

Monitoring Well: GCW-03D Sampling Date: 10/30/14

Sample ID: GCW03D-1014 Sampler: J. Ivanowski

Time	Start Purge Readings	Start Samp.	End Samp.	Temperature (°C)	pH	Conductivity (mS/cm)	Redox Potential (± mv)	Turbidity (NTU)	DO (mg/L)	Appearance of Water	
09:05	X										
09:10	X			15.58	3.98	3.38	470	16.2	7.13	clear	
09:20	X			16.65	4.02	3.52	481	10.9	5.89	" "	
09:30	X			16.88	4.03	3.51	486	9.21	5.06	" "	
09:40	X			16.96	4.04	3.49	490	8.27	4.11	" "	
09:50	X			17.10	4.05	3.48	488	6.98	3.51	" "	
09:55	X	X		17.16	4.06	3.47	485	7.14	3.39	" "	
10:05			X								
<i>Full</i>											
Split, Blank, Duplicate, & Filtered Samples										Miscellaneous	
Sample ID		Description								Initial Depth to Water: <u>5.10</u> ft	
										Final Depth to Water: _____ ft	
										Total Purge Volume: <u>6</u> gal	
										Pump Rate: <u>0.250</u> gpm	
Weather: <u>clear, 49°</u>											
Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)											



## Ground Water Parameters for Low-Flow Sampling

Site: General Chemical Site Project No.: GR5060.2014

Monitoring Well: EPW-01 Sampling Date: 10/30/14

Sample ID: EPW01-1014 Sampler: J. Ivanowski

Time	Start Purge Readings	Start Samp.	End Samp.	Temperature (°C)	pH	Conductivity (mS/cm)	Redox Potential (± mv)	Turbidity (NTU)	DO (mg/L)	Appearance of Water
10:15	X									
10:20	X			17.08	4.84	0.203	442	3.42	1.34	clear
10:25	X			17.00	4.93	0.146	429	2.70	0.53	clear
10:30	X			17.03	4.95	0.138	427	1.75	0.30	" "
10:40	X			17.12	4.95	0.136	423	1.59	0.47	" "
10:45	X			17.13	4.96	0.135	419	0.43	0.68	" "
10:50	X	X		17.10	4.96	0.134	409	0.21	0.62	" "
10:55			X							
<i>Purge</i>										
Split, Blank, Duplicate, & Filtered Samples										Miscellaneous
Sample ID					Description					Initial Depth to Water: <u>20.45</u> ft
										Final Depth to Water: _____ ft
										Total Purge Volume: _____ gal
										Pump Rate: <u>0.125</u> gpm
Weather: <u>Sunny 49°</u>										
Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)										



## Ground Water Parameters for Low-Flow Sampling

Site: General Chemical Site Project No.: GR5060.2014

Monitoring Well: GCW-04D Sampling Date: 10/29/14

Sample ID: GCW04D-1014 Sampler: J. Ivanowski

Time	Start Purge Readings	Start Samp.	End Samp.	Temperature (°C)	pH	Conductivity (mS/cm)	Redox Potential (± mv)	Turbidity (NTU)	DO (mg/L)	Appearance of Water
14:20	X									
14:25	X			20.99	5.56	0.119	218	49.5	6.41	clear
14:35	X			20.79	4.04	2.18	428	36.1	5.12	" "
14:45	X			20.25	4.05	2.75	438	29.3	3.34	" "
14:50	X	X		20.08	4.07	2.77	438	26.8	2.48	" "
14:55			X							
<i>J. Ivanowski</i>										
Split, Blank, Duplicate, & Filtered Samples									Miscellaneous	
Sample ID			Description			Initial Depth to Water: <u>10.29</u> ft				
						Final Depth to Water: _____ ft				
						Total Purge Volume: _____ gal				
						Pump Rate: <u>0.250</u> gpm				
Weather: <u>Cloudy 72°</u>										
Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)										

## Ground Water Parameters for Low-Flow Sampling

Site: General Chemical Site Project No.: GR5060.2014

Monitoring Well: GCW-05 Sampling Date: 10/29/14

Sample ID: GCW05-1014 Sampler: J. Ivanowski

Time	Start Purge Readings	Start Samp.	End Samp.	Temperature (°C)	pH	Conductivity (mS/cm)	Redox Potential (± mv)	Turbidity (NTU)	DO (mg/L)	Appearance of Water	
13:20	X										
13:30	X			21.43	6.92	0.351	-49	3.46	0.39	clear	
13:35	X			21.84	7.03	0.483	-57	2.70	0.00	clear	
13:40	X			22.40	7.08	0.509	-62	1.88	0.00	" "	
13:50	X			22.81	7.10	0.576	-64	1.15	0.00	" "	
13:55		X									
14:00			X								
<i>J. Ivanowski</i>											
Split, Blank, Duplicate, & Filtered Samples									Miscellaneous		
Sample ID			Description						Initial Depth to Water: <u>7.33</u> ft		
									Final Depth to Water: _____ ft		
									Total Purge Volume: <u>3.5</u> gal		
									Pump Rate: <u>0.125</u> gpm		
Weather: <u>Sunny 72°</u>											
Notes: (well condition, nearby activities or changes in land use, odors, problems, deviations from plan, etc.)											

