



## Atlanta Environmental Consultants

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February 25, 2014

Mr. Yue Han  
Response and Remediation Program  
Land Protection Branch  
Georgia Environmental Protection Division  
2 Martin Luther King, Jr. Drive, SE  
Atlanta, GA 30334-9000

**CERTIFIED MAIL No. 7013 2630 0000 5635 3008**  
**RETURN RECEIPT REQUESTED**

**Re: Semiannual Status Report – January 2014**  
**Voluntary Remediation Program**  
**Former Dry Cleaning Depot, HSI Site No. 10880**  
**Roswell, Fulton County, Georgia**  
**Tax Parcel ID No. 12-1902-0412-049-1**

AEC Report ECC-3051.06

Dear Mr. Han:

Atlanta Environmental Consultants (AEC), on behalf of Mr. Edwin Chang, K.I.C. Management, LLC, former Dry Cleaning Depot, 1073 Alpharetta Street, Roswell, Fulton County, Georgia, is pleased to present the fifth Semiannual Status Report for the above referenced facility. The Georgia Environmental Protection Division (Georgia EPD) accepted the former Dry Cleaning Depot into the Voluntary Remediation Program (VRP) in a letter dated July 10, 2011. Progress in the Voluntary Remediation Program (VRP) is summarized in this letter report and the updated Conceptual Site Model (CSM), enclosed. Responses to the Georgia Environmental Protection Division (EPD) correspondence are presented below in a Comment and Response format.

### **GEORGIA EPD CORRESPONDENCE**

#### **Previous Submittals**

The previous Semiannual Status Report (SASR) was submitted in July 2013. The following schedule was specified in the SASR:

- The July 10, 2012 semiannual progress report shall demonstrate horizontal delineation on the qualifying property;
- The July 10, 2013 semiannual progress report shall demonstrate complete horizontal delineation; and
- The January 10, 2014 semiannual progress report shall demonstrate complete horizontal and vertical delineation, finalize the remediation plan and provide a preliminary cost estimate for

implementation of remediation and associated continuing actions. EPD recommends that the participant finalize approval of cleanup standards for all regulated substances prior to this submittal.

- By July 10, 2016, a Compliance Status Report (CSR) must be submitted, including certifications.

**Georgia EPD Correspondence dated October 18, 2013**

This letter, received in October 2013, included the following Comments:

**Comment 1. Please be advised that the down-gradient Frazier Street Apartments property submitted a Prospective Purchase Corrective Action Plan (PPCAP) on June 24, 2013. The PPCAP provided recent (March 2013) soil and groundwater data collected in the Frazier Street Apartments property. Those data can be used for your investigation and delineation of contamination for the Former Dry Cleaning Depot site.**

Atlanta Environmental Consultants (AEC) has obtained a copy and reviewed the report and data contained in the Frazier Street Apartment PPCAP. Although the sample collection dates did not coincide exactly with AEC's sample collection dates, the data do demonstrate, in a general sense, that contaminant trends and current concentrations offsite reflect contaminant trends and concentrations onsite. This, when compared to previous data collected both onsite and on the Frazier Street property, gives a general overview of progress in cleanup over an approximately five to six year time period. Maps are presented as figures in the updated Conceptual Site Model (CSM) included in the current submittal. Detailed discussion of concentrations and trends is presented in the CSM.

Review of the PPCAP prepared by Terracon and a Prospective Purchaser Compliance Status Report (PPCSR) prepared by ATC Associates in 2007, both covering the Frazier Street Apartments Property, indicates that average groundwater tetrachloroethene (PCE) concentrations decrease from 2007 to 2013 by an average of 90%. This, combined with average PCE concentration decreases over a roughly comparable timeframe onsite on the former Dry Cleaning Depot property averaging 88% suggests that Monitored Natural Attenuation (MNA) is the most appropriate and effective remedy, and is, therefore, the recommended remedy for this site.

**Comment 2. EPD concurs with your response to the submittal of a cost estimate for the implementation of the VRP along with a financial assurance instrument. EPD now expects to receive those documents no later than January 10, 2014.**

AEC has developed a cost estimate for implementation of the VRP through completion of the Compliance Status Report (CSR). The cost estimate and details are presented below, near the end of this Semi-Annual Status Report (SASR).

**Comment 3. EPD conducted a site inspection at this site on October 7, 2013. Based on our observation of the current conditions of the site, we have concluded that additional soil sampling inside the building is necessary and feasible as well. Therefore, EPD requests that you collect several soil samples inside the building at the**



**site to identify possible source at the site. Another groundwater monitoring well as marked as MW-A in the attached figure should be installed to provide more information about source area.**

AEC has investigated the building construction extensively. If you look at the sides and rear of the building, you will note the floor slab, which is a few inches above ground surface in the front, is more the 2 ½ feet above grade in the rear. The building does not have 2 ½ feet thick concrete or other solid material under the floor in the rear (i.e., this building was not constructed as an industrial building). As previously stated, AEC has identified an access hole on the south side of the building. One can insert a stiff wire, a thin stick or stiff tubing, and move it around freely, clearly demonstrating that a void space (not concrete or soil or any other solid material) exists in what is commonly referred to as a crawl space, under the building. Thus, the building's floor is not in contact with soil. The floor is in contact with air under the floor. Therefore, the most relevant sampling approach is sampling volatile organic vapor content of the air under the slab. As I have discussed with you, this is what AEC has recommended, and this is what AEC has completed.

A sub-slab vapor sample was collected in a SUMMA Canister and analyzed for TO-15 Target Compounds, Tentatively Identified Compounds (TICs), and Total Volatile Organic Compounds (TVOC). The laboratory report, tabulated results, and interpretation of the results are presented in the CSM.

MW-7 was installed at the location you marked as MW-A. The location had to be offset by a few feet due to the presence of a natural gas line under the location marked "MW-A". The location was additionally offset by a few feet after another shallow pipe (purpose unknown; whether currently in service or not is unknown) was identified at the first offset boring location.

## **PROGRESS REPORT UPDATE**

### **Updated Conceptual Site Model**

An updated Conceptual Site Model report was prepared following completion of horizontal delineation as referenced above.

As stated above, a void space (crawl space) clearly exists under the building. This implies that the floor, as much as 2 ½ feet above grade at the rear of the building, must have a structural support system. The building configuration (e.g., a floor elevated well above grade) suggests that structural members of unknown design and location exist. Drilling holes through the floor of the building is not advisable, as doing so could potentially compromise the structural integrity of structural members that are supporting the elevated floor slab. The very low VOC concentrations identified in sub-slab vapor, and the fact that this is a vented crawl space suggest that further investigation of vapor migration from sub-slab into the building is not warranted. All available data, including previously developed data from a variety of sources, onsite and offsite, has been reviewed to assist in developing a more complete picture of the site and site area. The



Georgia EPD's comments are acknowledged and will be appropriately addressed in light of available data, and as additional data and information becomes available. Due to the age of the building and the site's history of multiple building owners over the years, no building construction plans were available. Furthermore, as stated above, the building's floor is in contact with air, not soil. Therefore, a sub-floor vapor sample was collected; analytical results are presented in the updated CSM.

Additional revisions and updates will be made to the CSM in accordance with the Schedule as specified in the Approval letter, dated July 10, 2011.

### **Preliminary Cost Estimate for Implementation of Remediation and Associated Actions**

In consideration of the brief descriptions of the proposed remedies for soil and groundwater above and the more thorough discussion in the attached CSM, AEC presents the following preliminary cost estimate for implementation of remediation and associated actions:

This cost estimate assumes Georgia EPD evaluation of our Updated CSM, including our justification for our recommendation of Monitored Natural Attenuation as the proposed remedy for the former Dry Cleaning Depot facility, and Georgia EPD approval of MNA as the remedy for the former Dry Cleaning Depot facility.

1. Install asphalt pavement in unpaved areas, if shallow soil contamination exceeding applicable standards is still present. Seal existing asphalt pavement in the area of the soil contamination, if any, at the rear of the building and property. \$2,500.00
2. Implement Monitored Natural Attenuation program and conduct the first semi-annual sampling and submittal of the results, with Conclusions and Recommendations, July 2014 Includes SASR and Updated CSM. \$2,795.00
3. Second semi-annual sampling and submittal of the results, with Conclusions and Recommendations, January 2015. Includes SASR and Updated CSM. \$2,695.00
4. Third semi-annual sampling and submittal of the results, with Conclusions and Recommendations, July 2015. Includes SASR and Updated CSM. \$2,695.00
5. Fourth semi-annual sampling and submittal of the results, with Conclusions and Recommendations, January 2016. Includes SASR and Updated CSM. \$2,695.00
6. Fifth semi-annual sampling and submittal of the results, with Conclusions and Recommendations. Prepare and submit a Compliance Status Report.  
July 2016 \$5,595.00

**TOTAL PRELIMINARY ESTIMATE**

**\$18,975.00**




Please do not hesitate to contact us should you have any questions.

Thank you.

Sincerely,

ATLANTA ENVIRONMENTAL CONSULTANTS




Peter T. Kallay, P.E.  
Manager, Environmental Services

02/25/14

pc: Edwin Chang, K.I.C. Management  
Richard A. Wingate, Esq., Hallman & Wingate LLC

AEC Proj. No. ECC-3054  
 Client K.I.C. Management LLC  
 Client/File No. HSI Site No. 10880  
 Time Period Oct 2013 to Feb. 2014

**Atlanta Environmental Consultants**  
**TIME SUMMARY REPORT**

Site Loc 1073 Alpharetta St., Roswell, GA  
 Signature   
 Date February 20, 2014

DATE	HOURS	ACTIVITY DESCRIPTION
10/26	1.00	Receive, Review GAEPD Letter. Start developing responses to comments; planning and preparation for additional assessment.
11/1	0.75	Planning and preparation for well design for additional assessment. Contact drillers to request proposals.
11/21	1.75	Receive signed proposal. Active planning and preparation to move forward with project. Order SUMMA Canister for vapor sampling.
11/29	2.25	Prepare for vapor sampling. Go to site, set up Summa Canister; collect 15-minute sub-slab vapor sample; package; ship to EMSL.
12/5	1.00	Communications and correspondence with Kilman Brothers: Well drilling in rock planning and scheduling.
12/6	1.25	Order sample bottles and kit. Order rental field equipment. Make a list of tools, equipment, materials and supplies for the field.
12/9	1.50	Finalize drilling schedule. Assemble tools, equipment, materials and supplies for the field. Prepare detailed plan for field activity.
12/10	1.25	Final planning and preparation for field activity. Pick up field equipment and sample kits for soil and groundwater sampling.
12/11	6.50	Field day. Log soil borings and rock drilling. Collect duplicate soil samples. Run PID on one set and select samples for lab.
		Complete labeling on samples for lab analysis; place samples on ice in a cooler. Discuss drilling w/John Kilman. Demobe.
12/12	6.25	Drive to site, open wells, allow to equilibrate. Set up low-flow pump with clean, new tubing. Start purging wells. Purge some wells (water is too deep to purge with Geopump) using bailers. Gauge wells; record. Collect groundwater parameter data. Log data on forms. Label jars; collect groundwater samples; place on ice. Demobe; take samples to lab. Return rental equipment.
12/13	1.25	Arrange and organize field notes. Start computing water table elevations. Start drafting Figures. Complete demobilization.
12/14	1.75	Start drafting relevant section of Semi-Annual Status Report and Conceptual Site Model. Enter data into tables.
12/16	0.75	Receive and begin review of sub-slab vapor analytical report. Communications with EMSL Analytical.
12/17	0.50	Start entering sub-slab vapor analytical data on tables and further evaluation of data.
1/8	0.25	Draft date extension letter: mother's health serious; time to visit her required.
1/20	1.75	Draft remaining sections of Semi-Annual Status Report and Conceptual Site Model. Enter data into tables. Draft Figures.
1/23	1.25	Tabulate groundwater data onsite and offsite, current and previous data sets; evaluate trends. Draft, review, revise reports.
1/24	6.25	Continue drafting reports, figures, tables and attachments; review and revise. Continue evaluation of data. POD well needed. Drive to the site. Identify POD well location. Install TMW-9, develop, purge and sample. Take sample to lab.
2/12	3.00	Review and revise and update SASR, CSM, Figures, tables and attachments. Review and revise. Final check, and send Draft reports and attachments to professional reviewers to review. Incorporate POD well data in reports.
2/13	0.75	Communications and correspondence with report reviewers.
	41.00	



## **PROJECTED MILESTONE SCHEDULE**

**Former Dry Cleaning Depot  
1073 Alpharetta Street  
Roswell, Fulton County, Georgia 30075  
HSI #10880**

Reviewed and Updated: February 24, 2014

The following listing presents the projected Milestone Schedule for implementation of the Voluntary Remediation Program (VRP) at property containing the former Dry Cleaning Depot, 1073 Alpharetta Street, Roswell, Fulton County, Georgia. HSI #10880.

<u>Plan, Report or Action</u>	<u>Date to be Submitted</u>	
Submit Preliminary Conceptual Site Model	at time of VRP Application	√
Complete Horizontal Delineation where Access is Available	12 months after enrollment	√
Complete Horizontal Delineation where Access is not Available	24 months	√
Complete Vertical Delineation	30 months	√
Final Voluntary Remediation Plan	30 months	√
Preliminary Cost Estimate for Implementation of Remediation and Associated Actions	30 months	√
Submit Compliance Status Report Including Required Certifications	60 months	
Semi-Annual Status Reports with Updated Conceptual Site Model	Every 6 months	√ √ √ √ √

# CONCEPTUAL SITE MODEL

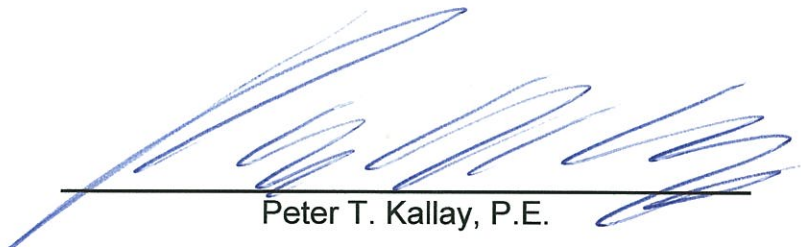
**FORMER DRY CLEANING DEPOT  
1073 Alpharetta Street  
Roswell, Fulton County, Georgia 30075  
HSI #10880**

**Prepared For:**

**Mr. Edwin Chang  
K.I.C. Management, LLC  
2270 Evergreen Lane  
Lawrenceville, Georgia 30043**

**February 2014**

**AEC Project Number ECC-3054**



Peter T. Kallay, P.E.



**Atlanta Environmental Consultants  
3440 Blue Springs Road, Suite 503  
Kennesaw, Georgia 30144**

**Phone (678) 738-7004  
Fax (678) 569-2419**



### Registered Professional Engineer Certification

I certify under penalty of law that this report and all attachments were prepared by me or under my direct supervision in accordance with the Voluntary Remediation Program Act (O.C.G.A. Section 12-8-101, et. seq.). I am a professional engineer who is registered with the Georgia State Board of Registration for Professional Engineers and Land Surveyors and I have the necessary experience and am in charge of the investigation and remediation of this release of regulated substances.

Furthermore, to document my direct oversight of the Voluntary and Investigation Remediation Plan development, implementation of corrective action, and long term monitoring, I have attached a monthly summary of hours invoiced and description of services provided by me to the Voluntary Remediation Program participant since the previous submittal to the Georgia Environmental Protection Division.

The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name Peter T. Kallay, P.E.

Signature 

Date 02/25/2014

  
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Georgia Stamp or Seal

## **Site Description**

The site is a commercial property in the City of Roswell, Fulton County Tax Parcel # 12-1902-0412-049-1, and contains one single-story commercial concrete block building located at 1073 Alpharetta Street (also known as Georgia Highway 9 and Georgia Highway 120), Roswell, Fulton County, Georgia 30075. The building is slab-on-grade at the storefront facing Alpharetta Street, but has an elevated floor with a crawl space underlying most of the building's footprint. The building has been used primarily as a dry cleaners, operating under the names One Hour Martinizing, O'Hara's Cleaners, Care Cleaners, and Dry Cleaning Depot. During the later years of dry cleaners operation, the use of a dry cleaning machine and PCE onsite was discontinued, and the dry cleaning establishment became a drop-off/pick-up location only. The dry cleaning machine was removed from the building prior to Atlanta Environmental Consultants' (AEC) first site visit. The building was vacant from approximately 2006 to 2009. The building then housed Stargate Technologies, a computer store. The building is currently occupied by Metro PCS and A Second Chance Bail Bonds.

## **Site Surface and Subsurface Physical Setting**

The site is situated on fill material (soil), averaging approximately 2 to 3 feet deep overlying native silt and clayey silt soils. Partially weathered rock occurs at 15 to 20 feet deep under much of the site except near Alpharetta Street, where rock is deeper. Competent rock underlies much of the site at 20 to 25 feet deep except near Alpharetta Street. Competent rock is progressively deeper from the rear of the property toward Alpharetta Street, approximately 30 feet deep at the rear of the building onsite, and deeper than the completion depth of MW-1 near the front of the site, 45 feet. The site is underlain by the Powers Ferry Formation, in the Sandy Spring Group in the Northern Piedmont physiographic province of Georgia. The Powers Ferry Formation consists of undifferentiated biotite-quartz-plagioclase gneiss (metagraywacke), mica schist and amphibolite; a mappable mica schist unit; and a banded iron formation (McConnell and Abrams 1984).

The front of the site facing Alpharetta Street has the highest elevation onsite, and the property slopes down toward the rear, toward Frazier Street. Stormwater onsite generally flows toward Frazier Street, then flows north along Frazier Street in the gutter, and then into a curbside storm drain.

## **Environmental Assessment and Graphical 3-Dimensional Conceptual Site Model**

Environmental Assessment indicated the presence of tetrachloroethene (PCE) in soils and groundwater. Minor degradation of PCE was found; a single groundwater sample had a minimal detectable quantity of trichloroethene (TCE) in 2008. Groundwater samples were collected on March 31, 2008, June 28, 2012, June 21, 2013 and December 12, 2013. All samples were analyzed by Advanced Chemistry Labs, Inc., a qualified analytical laboratory, and reported on April 7, 2008, July 13, 2012, July 8, 2013 and December 23, 2013. A point-of demonstration well was installed near Hog Wallow Creek on January 24, 2014 and sampled.

Soil sampling on December 11, 2013 indicated the presence of 0.017 mg/kg PCE in the 5-foot sample from soil boring B-7 (completed as MW-7). The soil boring logs are in Appendix I,



and the groundwater well purging and sampling data is in Appendix II. Soil analyses are summarized in Table 1. Groundwater sampling on December 12, 2013 indicated the highest PCE concentration onsite was 0.102 mg/l in MW-4. MW-5, the down-gradient well, had 0.074 mg/l PCE. The new shallow monitoring well MW-7, located at the location marked "MW-A" in EPD correspondence, had 0.079 mg/l. MW-8, a new deep vertical delineation well, had 0.015 mg/l PCE. PCE was the only VOC detected in any monitoring well onsite. No other VOCs on the EPA Method 8260B analyte list were identified in any of the groundwater samples. Groundwater analytical results are in Appendix IV. Groundwater gauging data is summarized in Table 2 and Figure 6; groundwater analyses are summarized in Table 3 and Figure 5. No VOCs were detected in MW-1, MW-2, MW-3 or TMW-9, the POD well.

The attached Figures show a graphical three-dimensional representation of the surface and subsurface setting, potential sources of contamination, contaminant concentration contours, expected contaminant movement, receptors and pathways (Figures 7, 8 and 9).

The former dry cleaning machine location, former dumpster location and underground utility lines including sanitary sewer have been investigated by the installation of MW-6 at the down-gradient corner of the building (southeast corner) in the area most likely to be impacted by PCE, and, now, MW-7 at the northeast corner of the building. These locations are at, near, and/or down-gradient of the most likely former locations of drum loading and unloading, drum storage, dry cleaning machine, filter handling, temporary storage, removal and disposal, former dumpster location, and other associated activities.

The presence of an elevated floor, with unknown design, detail and locations of floor structural support system members, over much of the building's footprint, including areas likely to have been involved in former dry cleaning activities, precludes drilling through the building's floor. Since the elevated floor is in contact with air, not soil, a vapor sample is most relevant; a vapor sample was collected from the air space under the floor and analyzed.

A sub-slab vapor sample was collected in a SUMMA Canister and analyzed for TO-15 Target Compounds, Tentatively Identified Compounds (TICs), and Total Volatile Organic Compounds (TVOC). Analysis of the vapor sample indicated the presence of 51 parts per billion by volume (ppbv) or 350 micrograms per cubic meter (ug/m<sup>3</sup>) of PCE. TCE, DCE (including both cis- and trans-) and VC were not detected. Minor concentrations of several other compounds were detected; the highest was 11 ppbv or 31 ug/m<sup>3</sup> acetone. The laboratory report is attached (Appendix V), and results are tabulated in Table 4.

### **Vapor Intrusion Pathway**

Photoionization detector (PID) readings taken in and around the building on July 27-28, 2012 did not exceed 0.3 ppm. Previous PID readings in and around the building have indicated VOC concentrations up to 1.0 ppm, most likely from use of minor quantities of VOCs in spray cans typically used in cleaning computer equipment, by the computer store, Stargate Technologies, then located in the building. MW-6 was located as close as practical to the corner of the building nearest where PCE would most likely have been released. The PID reading of soils 1 foot deep was 0.6 ppm. No PCE or PCE degradation compounds were detected in the shallowest soil sample, at the 5-foot depth. Available data does not suggest



the presence of any significant PCE or PCE-related compounds in vapor or adsorbed phases at or near the building footprint.

On June 21, 2013, it was confirmed that a crawl space exists under the floor slab. While the front of the building is slab-on-grade, most of the building's footprint appears to consist of a structurally supported elevated floor slab overlying a crawl space. No original building plans are available. The presence of an elevated floor, with unknown detail and locations of floor structural support system members, over much of the building's footprint, including areas that were likely formerly involved in dry cleaning activities, precludes safe drilling through the building's floor. Drilling holes through the floor of the building is not advisable, as doing so could potentially compromise the integrity of structural members that are supporting the elevated floor slab.

AEC has identified an access hole on the south side of the building. One can insert a stiff wire, a thin stick or stiff tubing, and move it around freely, clearly demonstrating that a void space (not concrete or soil or any other solid material) exists, commonly referred to as a crawl space, under the building. Thus, the building's floor is not in contact with soil. The floor is in contact with air under the floor. Therefore, the most relevant sampling approach to evaluate potential for PCE migration into the building is sampling the volatile organic vapor content of the air under the floor slab.

In order to make a preliminary estimate of VOC concentrations underlying the floor slab, a length of tubing attached to a PID probe tip was inserted into the crawl space through an access hole identified on the south side of the building. The PID was operated until readings stabilized, as air concentrations in the PID's chamber equilibrated with crawl space concentrations. A maximum concentration of 0.4 ppm was obtained on the PID, a Mini-RAE 2000 instrument with a lamp capable of detecting PCE and associated compounds. Note that this is less than some readings that have been previously identified inside or at doorways in the building. The well-below-1-ppm reading in the crawl space does not suggest significant potential for vapor migration of significant concentrations of PCE from the crawl space into the building. Furthermore, as the crawl space is vented, there is no potential for pressure buildup in the crawl space that would create a pressure gradient from the crawl space into the building. It is Mr. Kallay's professional opinion that such a low total VOC concentration combined with lack of any likely scenario resulting in a sub-slab to building interior pressure gradient does not suggest that any further vapor migration investigation of the former dry cleaners building is warranted at this time.

All sources of PCE and other VOCs have been removed from the site. Remaining VOC concentrations, including PCE in vapor form, are expected to decrease over time.

Sub-slab vapor phase concentrations results were confirmed by laboratory analysis of an air sample (Table 4). PCE was detected at 51 ppbv or 350 ug/m<sup>3</sup>. The total of all VOCs detected (including PCE, other TO-15 target compounds and tentatively identified compounds (TICs)) was 100 ppbv or 455 ug/m<sup>3</sup>. These low concentrations do not present significant potential for significant concentrations of PCE vapor migrating into the building. Nevertheless, AEC recommends installation of a blower to vent the sub-floor air space to preclude any vapor gradient toward the interior of the building, and/or vapor entry into the building.



### **Potential Exposure during Potential Utility or other Subsurface Construction**

AEC will resample soils in the area in which soils previously exceeded Notification Concentration (NC) for PCE. If soil concentrations exceed standards (including site-specific utility and construction worker cleanup standards) and significant work onsite occurs or is proposed, remediation of soils may be implemented if data indicate exposure. Site-specific utility and construction worker cleanup standards will be calculated and compared to soil and groundwater concentrations. In the event any current concentrations exceed applicable standards, workers onsite shall be notified of the presence of soil VOC concentrations prior to beginning work and shall be aware of, and be trained in, appropriate implementation of, and use of, engineering controls, work practices, use of personal protective equipment (PPE) or other appropriate means of precluding or minimizing contact with contaminated soils. Construction areas, if any, shall be barricaded, surrounded with construction fencing and/or employ other appropriate means to preclude access by unauthorized persons.

### **Surface Water**

Hog Wallow Creek is the nearest potential point of exposure. The U.S. Geological Survey (USGS) 7.5-minute series topographic map, Roswell, GA Quadrangle (Figure 1) shows a distance of approximately 1,400 feet in the direction of groundwater flow (east-southeast, turning eastward past the Frazier Street Apartments property) from the source to Hog Wallow Creek. Figure 2 presents a site plan; the site area is shown on Figure 3. Available data does not suggest that any concentrations exceeding applicable standards will reach Hog Wallow Creek or any other surface water body. A Point-of-Demonstration (POD) well, TMW-9, was installed near Hog Wallow Creek. The well was developed, purged and sampled. Analysis for EPA 8260 analytes did not detect the presence of PCE or any other Method 8260 analytes. Groundwater flow direction determined using potentiometric contour mapping is shown on Figure 6. No other point of withdrawal between the site and Hog Wallow Creek has been identified. At the average rates of decrease in PCE concentrations of 88% onsite and 90% offsite, concentrations offsite are expected to approach non-detectable concentrations before any PCE concentrations reach the nearest surface water. No groundwater use between the site and Hog Wallow Creek is known. Natural attenuation appears to be an effective mechanism in reducing remaining PCE concentrations. It is likely that concentrations will continue to decrease, and it is also likely that concentrations will decrease to below detection limits, as well as applicable standards, before any detectable concentrations reach Hog Wallow Creek. The groundwater pathway appears likely to be incomplete.

### **Potential Pathways and Potential Receptors**

Limited soil concentrations appear to be located in areas mostly covered by asphalt. Only one location showed the presence of soil concentrations exceeding Georgia Notification Concentrations (NC). Soil conditions onsite (sandy soils with little fines) suggest that concentrations in soils likely have already decreased to below NC, or, if not, will do so in the near future. There is no likelihood of contact by any individual, other than a utility worker. In unpaved areas, no significant soil concentrations exist.



No potential sources of contact with groundwater exist between the site and Hog Wallow Creek, located approximately 1,400 feet east of the site. Groundwater sampling results collected on the former Dry Cleaning Depot property indicated an over 90% decrease in the highest groundwater concentrations detected onsite from 1.040 mg/l in March 2008 to 0.102 mg/l in December 2013. Natural attenuation mechanisms are anticipated to continue decreasing concentrations. No detectable concentrations are anticipated to reach Hog Wallow Creek. Therefore, the groundwater pathway appears to be incomplete.

Soil concentrations are present primarily under the rear of the property, where no structures are located (Figure 4; Table 1). Vapor intrusion is very unlikely, based upon very low VOC concentrations in the crawl space and the venting of the crawl space, which precludes a vapor gradient from the sub-slab into the building. Recent soil sampling, within the last two years, has detected negligible soil concentrations, all well below Georgia Notification Concentrations (NC). Only one soil sample, the 2-foot deep soil sample collected at MW-2 on March 27, 2008, indicated concentrations exceeding Risk Reduction Standards (RRS) for soils. Soils at this site are mostly clean sand, with relatively low fines content. Vapors tend to dissipate in these soils more rapidly than groundwater concentrations have been decreasing onsite. It is very likely that soils within 5 feet of the ground surface now have non-detectable to very low concentrations of PCE and products, all below RRS. Therefore, the soil pathway appears to be incomplete, as no soils exceeding risk reduction standards appear to be present at the site. This will be confirmed before the Compliance Status Report is completed.

Vapor concentrations of PCE under the building floor slab have been sampled and analyzed, and found to be very low (Table 4). The crawl space is vented, and, therefore, there is virtually no probability of a vapor gradient from the sub-slab void space into the building. Nevertheless, AEC recommends installation of a blower to vent the sub-floor air space to preclude any potential vapor gradient toward the interior of the building, and/or vapor entry into the building. Continuous 24-hour operation of the blower, producing a vacuum in the crawl space, will provide an additional level of protection from any possible vapor gradient into the building. The blower will also assist with gradual reduction and eventual elimination of any detectable PCE in vapor form from the crawl space and soils under the crawl space. Therefore, the vapor migration pathway appears to be incomplete due to lack of a vapor gradient. Any possibility of vapor migration will be eventually be eliminated by the elimination of any vapor concentrations from the crawl space.

In 2013, Terracon recently prepared a Prospective Purchaser Corrective Action Plan (PPCAP) for the Frazier Street Apartments property, located hydraulically down-gradient of the former Dry Cleaning Depot site. The Terracon PPCAP is attached, in Appendix VI. In 2007, ATC Associates prepared a Prospective Purchase Compliance Status Report (PPCSR) for the Frazier Street Apartments property. Neither the ATC nor the Terracon report indicated the presence of any detectable concentrations of PCE or any other EPA Method 8260 analytes in soils on the Frazier Street Apartments property.

Groundwater concentrations of PCE have been demonstrated to be decreasing in the range of 90% over a time period of between five and six years. Natural attenuation appears to be an effective mechanism in reducing remaining PCE concentrations onsite and offsite. It is likely that concentrations will continue to decrease. It is also likely that concentrations will decrease



to below detection limits, as well as below applicable standards, before any detectable concentrations reach Hog Wallow Creek. Thus, the groundwater pathway appears likely to be incomplete. Monitoring at a Point-of-Demonstration (POD) well near Hog Wallow Creek will assist in confirming that groundwater entering Hog Wallow Creek contains no PCE concentrations exceeding applicable standards.

### **Suspected or Potential Sources of Regulated Substances**

The Subject Property was the location of dry cleaning operations for approximately 40 years. PCE may have entered the environment during delivery and handling of containers (e.g., drums and buckets), pouring PCE into dry cleaning machines, draining spent PCE, sweeping and mopping of floors, PCE that vaporized, drips and spills, PCE-containing filters, rags, mops, etc. that may have been disposed, spent PCE storage and handling, etc. The level of care exercised in properly containing PCE, including spent PCE, preventing or minimizing spills, and promptly cleaning up spills, if any, when they occurred was commensurate with regulatory requirements at the time. Regulation of PCE was non-existent to very minimal 40 years ago, as compared to today.

Pest USA is located across Alpharetta Street and a former Esso service station, which was later operated as an independent service station, formerly existed adjacent to the south side of the former Dry Cleaning Depot site. Other businesses exist or previously existed nearby and up-gradient of the Subject Property on the busy commercial highway and local thoroughfare known as Alpharetta Street (also known as Georgia Highway 9 and Georgia Highway 120).

### **Proposed Additional Assessment and Risk Reduction Standards**

Soil concentrations of PCE have been very low to non-detectable in soil borings conducted on site in recent years. Groundwater has been delineated to appropriate concentrations representing appropriate standards for commercial property with no receptors or completed pathways within 1,400 feet of the site, or as determined at the time of final selection of the remedy. The most current Risk Reduction Standards, rules and concentrations (or concentrations developed using a RRS Evaluation) as adopted by the Georgia Environmental Protection Division (EPD) at the time of the delineation will be utilized.

Exposure pathways have been, and will continue to be evaluated to include human and ecological receptors. AEC has prepared and presented a figure showing the most likely point of entry of groundwater into surface water (see Figure attached).

Additional assessment will be conducted as warranted, including re-sampling of soils at the single location onsite where PCE concentrations exceeding NC were identified in 2008. It is proposed that the investigation will be conducted to the following site-specific delineation criteria:

Site delineation will be completed to Voluntary Remediation Program Type I Residential Risk Reduction Standards.



### **Additional Delineation Where Access is Available**

AEC installed MW-6 in 2012 at the hydraulically down-gradient corner of the building (southeast corner) in the area most likely to be down-gradient of any former dry cleaning machine(s), PCE drum storage location(s), loading and unloading of drums, disposal of spent filters and associated activities. In December 2013, MW-7 was installed at the northeast corner of the building. The former dumpster was believed to have been located in the area at the northeast corner of the building. Any release in this area would likely be detected in groundwater in MW-7, MW-3, MW-4 and/or MW-6. The location of these monitoring wells is depicted in Figures 2, 3, 4 and 5.

On December 12, 2013, AEC conducted additional delineation where access was available to evaluate potential sources that may have been formerly located in or adjacent to the building located onsite. Dry cleaners operating onsite during the most recent years (2005 and some years previous) that dry cleaners have operated onsite reportedly operated only a drop-off/pickup store; no dry cleaning was conducted onsite. Both the dry cleaning machine and the dumpster had been removed from the property before AEC's initial site visit, and previous business and/or property owners were not available to verify site-specific information during their previous occupancies. Therefore, exact locations of the former dry cleaning machine(s) and dumpster could not be definitively determined. MW-7 was installed at the location marked "MW-A" in Georgia EPD correspondence. MW-6 and MW-7 together cover areas near the building at which all or almost all of the activities that would be likely sources of PCE were most likely located.

A vertical delineation well, MW-8, was installed to 60 feet deep in rock. This well provides good vertical delineation. A PCE concentration of 0.015 mg/l in MW-8, as compared to concentrations of 0.074 mg/l in MW-5 and 0.102 mg/l in MW-4, the nearest wells to MW-4, demonstrates a rapid and substantial decrease in PCE concentrations with depth at this site.

Groundwater samples collected on December 12, 2013 from monitoring wells onsite identified the highest concentrations of PCE at MW-4, a down-gradient well, at 0.102 mg/l. Concentrations indicated an average 90% decrease in groundwater concentrations from the 2008 sampling event results, in both this well and the highest groundwater concentration of PCE detected onsite. No other VOC detection, besides PCE, was identified in any groundwater sample onsite. It is likely that the higher than average rainfall to date this year assisted in effectively flushing some PCE concentrations out of the source area, and then down-gradient. Overall, all monitoring wells onsite have shown a decrease in PCE concentrations, generally a substantial decrease, since the initial sampling event in 2008, up to the most recent sampling event in December 2013. Averaging the concentrations in wells MW-1 through MW-5 (which have been onsite since 2008), groundwater PCE concentrations onsite have decreased by an average of 88%. The highest PCE concentration onsite in 2008, 1.040 mg/l in MW-5, compared to the highest groundwater PCE concentration onsite during the most recent groundwater sampling event, was 0.102 mg/l in MW-4. This represents a 90% decrease in the highest PCE concentration onsite over a time period of between five and six years.



### **Delineation Where Access is not Available**

ATC Associates prepared a Prospective Purchaser Compliance Status Report (PPCSR) for the Frazier Street Apartments and Minkert Residence properties, dated August 2, 2007.

Terracon recently prepared a Prospective Purchaser Corrective Action Plan (PPCAP) for the Frazier Street Apartments property hydraulically down-gradient of the former Dry Cleaning Depot site, dated June 24, 2013. Terracon's groundwater analytical data indicated a decrease in PCE concentrations in the range of 90% from 2007 groundwater concentrations presented in ATC's report for the same property. Groundwater concentrations are essentially delineated offsite. To complete delineation, AEC collected a groundwater sample from TMW-9, a Point of Demonstration well located near Hog Wallow Creek.

In both the ATC and Terracon reports, no detectable PCE or any other EPA Method 8260 analytes were detected in soils. By comparing the groundwater samples collected by Terracon to each corresponding groundwater sample collected by ATC, one can draw general conclusions regarding groundwater concentration trends. The average concentrations in the three most closely matched pairs (TW-5 and MW-4; TW-6 and MW-1; and TW-7 and MW-2), decreased by 90% from 2007 to 2013. The highest concentration offsite decreased from 0.330 mg/l (TW-6) to 0.040 mg/l (MW-7), or 88%. This indicates that groundwater concentrations offsite are decreasing at similar percentage rates as concentrations onsite. The ATC and Terracon data is reproduced in groundwater concentrations figures following Figure 9. The Terracon report is also attached

In order to demonstrate concentrations down-gradient of these wells, a temporary well, TMW-9, was installed down-gradient of the other wells, near Hog Wallow Creek as a Point of Demonstration (POD) well. A groundwater sample was collected and analyzed. The results indicated no detectable PCE concentrations. No EPA Method 8260 analytes were detected in this sample. This well delineates the down-gradient side of the plume. Evaluating the years of data available, it appears very likely that natural attenuation factors will reduce remaining concentrations of PCE to below detectable concentrations and to below applicable standards long before any concentrations approach Hog Wallow Creek.

### **Risk Reduction Standards Proposed**

Risk Reduction Standards (RRS) proposed for groundwater are as follows, from Table 1 of Appendix III unless otherwise noted:

<b>Constituent</b>	<b>Delineation of Groundwater (mg/l)</b>
Tetrachloroethene (PCE)	0.005
Trichloroethene (TCE)	0.005
Cis-Dichloroethene (cis-DCE)	0.07*
Trans-DCE	0.1
Vinyl Chloride	0.002

\* Federal Maximum Contaminant Level (MCL).

Risk Reduction Standards for soils are as follows, from Appendix I:

Constituent	Delineation of Soil (mg/kg)
PCE	0.18
TCE	0.13
Cis-DCE	0.53
Trans-DCE	0.53

## **VOLUNTARY REMEDIATION PLAN**

### **Site Delineation Concentration Criteria**

Site delineation has been completed to Voluntary Remediation Program Type III Risk Reduction Standards. Risk Reduction Standards (RRS) proposed for groundwater are as follows, from Table 1 of Appendix III unless otherwise noted:

Constituent	Delineation of Groundwater Stds (mg/l)
Tetrachloroethene (PCE)	0.005
Trichloroethene (TCE)	0.005
Cis-Dichloroethene (cis-DCE)	0.07*
Trans-DCE	0.1
Vinyl Chloride	0.002

\* Federal Maximum Contaminant Level (MCL).

Risk Reduction Standards proposed for soils are as follows, as discussed in Risk Reduction Standards guidance issued by the Georgia EPD and available on its website.

Constituent	Delineation of Soil Standards (mg/kg)
PCE	0.50
TCE	0.50
Cis-DCE	7.00
Trans-DCE	10.00

### **Proposed Engineering Controls**

#### **Soils**

Engineering Control, in the form of an asphalt cap, is the primary proposed remedy in the event any significant shallow soil concentrations remain onsite. Recent soil sampling has indicated all soil concentrations are well below Georgia NC. In the event any data shows any significant shallow soil concentrations, and engineering controls are proposed or utilized, a long-term maintenance and monitoring plan will be included as part of the proposed engineering controls remedy.



## **Evaluation of Remediation Alternatives**

### **Groundwater**

A number of approaches to remediation of dry cleaning compounds, consisting of PCE, exist. Following is a summary of the most significant approaches that were considered:

**Groundwater Pump and Treat.** Groundwater pump-and-treat can be used to pump out and treat impacted groundwater. However, Groundwater Pump and Treat systems require design, operational costs and disposal of treated groundwater. This is not the most cost-effective approach, and is not recommended remedy at this time.

**Vapor Extraction to include the vicinity and depth of the water table.** Groundwater in reasonably close proximity to the water table can also be remediated by extracting vapors from just above the water table, particularly where air flow through soils is good. This removes PCE-containing vapors, encourages PCE partitioning from groundwater to vapor, and will thus clean up the site. However, costs associated with this approach do not make this the most cost-effective remedy. This is not the recommended remedy at this time.

**Monitored Natural Attenuation (MNA).** Monitored Natural Attenuation is an accepted remedy where it has been demonstrated to effectively reduce concentration. At the Subject Property, years of monitoring have demonstrated the ability of natural attenuation processes to decrease groundwater concentrations. Groundwater concentrations naturally attenuate via a number of mechanisms, including vaporization and subsequent evaporation, chemical and biological decomposition, dilution, and other processes. Monitored Natural Attenuation is the recommended remedy for concentrations of PCE identified onsite and in the site area.

The most significant likely former source (s) onsite is (are) in the vicinity of MW-6 and/or MW-7, near the rear of the building used as a dry cleaners. Concentrations in MW-6 have decreased substantially, as well as in all other monitoring wells onsite, most likely due, at least in part, to a large increase in rainfall recently. This likely resulted in increased groundwater flow through the area.

Review of the PPCAP prepared by Terracon and a Prospective Purchaser Compliance Status Report (PPCSR) prepared by ATC Associates in 2007, both covering the Frazier Street Apartments Property, indicates an average groundwater tetrachloroethene (PCE) concentrations decrease from 2007 to 2013 of 90% offsite. This, combined with average PCE concentration decreases over a roughly comparable timeframe averaging 88% onsite suggests that Monitored Natural Attenuation (MNA) is the most appropriate and effective remedy, and is, therefore, the recommended remedy for groundwater at the former Dry Cleaning Depot site.

Without a new source of PCE, PCE is naturally decreasing in both quantity and concentrations onsite and offsite, due to the various Natural Attenuation mechanisms.

We propose monitoring the continuing Natural Attenuation processes (e.g., Monitored Natural Attenuation) as concentrations are expected to continue decreasing over time. Monitored Natural Attenuation is the selected remedy for groundwater at this site.



## Soils

**Monitored Natural Attenuation.** Monitored Natural Attenuation can be an effective remedy if soils allow enough air and vapor movement through them; e.g., the soils are relatively coarse sandy soils, and the soils are open to the atmosphere. Natural Attenuation appears to have already reduced soil concentrations to below NC. No soil remediation is proposed at this time.

## CONCLUSIONS

Completion of Additional Assessment and previous assessments at the Subject Property, on which the former Dry Cleaning Depot was located, 1073 Alpharetta Street, Roswell, Fulton County, Georgia 30075 suggests the following conclusions:

- Installation of Monitoring Well MW-7 down-gradient of some potential sources, the dumpster, and other potential related former sources, indicated the presence of minor soil concentrations of PCE, below Georgia NC. No other related compounds or any VOCs were detected in shallow soils at this location adjacent to the side of the building that was the likely location of a former dumpster and related equipment and activities. Installation of deep well MW-8 at the down-gradient end of the property indicated no PCE or related compounds in shallow soils at this location.
- Groundwater sampling of all monitoring wells on the former Dry Cleaning Depot property indicated PCE concentrations have generally decreased in concentration since the monitoring wells have been installed. The highest PCE concentration in groundwater onsite decreased from 1.040 mg/l in 2008 to 0.102 mg/l in 2013, a decrease of 90%. Groundwater concentrations in all monitoring wells onsite have decreased since the wells were installed; average PCE concentrations in wells present onsite for over 5 years have decreased by an average of 88% over this time.
- Groundwater flow direction onsite has been determined to be toward the southeast. This groundwater flow direction has been consistently southeast, with variation of no more than a few degrees during gauging events conducted over several years in the permanent monitoring wells installed onsite. Groundwater flow, as it passes through the Frazier Street Apartments property, appears to transition to an eastward direction, toward Hog Wallow Creek.
- On June 21, 2013, it was confirmed that a crawl space exists under the floor slab. No original building plans are available. The presence of an elevated floor, with unknown detail and locations of floor structural support system members, over much of the building's footprint, including areas likely involved in dry cleaning activities, precludes safe drilling through the building's floor. Air, not concrete or soil, is in contact with the underside of the floor slab. A vapor sample was collected from under the building's floor. Analysis of the vapor sample indicated the presence of 51 parts per billion by volume (ppbv) or 350 micrograms per cubic meter (ug/m3) of PCE. Neither TCE, DCE (including both cis-DCE and trans-DCE) nor VC were detected.



- The 88% average decrease in PCE concentrations onsite and 90% decrease in the highest concentration of PCE onsite over 5 years suggests that Natural Attenuation is effectively reducing PCE concentrations at this site, and Monitored Natural Attenuation (MNA) is recommended as the remedy for this site.
- The 90% average decrease in PCE concentrations offsite and 88% decrease in the highest concentration of PCE offsite over a time period of between 5 and 6 years suggests that Natural Attenuation is effectively reducing PCE concentrations at this site, as well as offsite. Monitored Natural Attenuation (MNA) is recommended as the remedy for this site, including offsite.

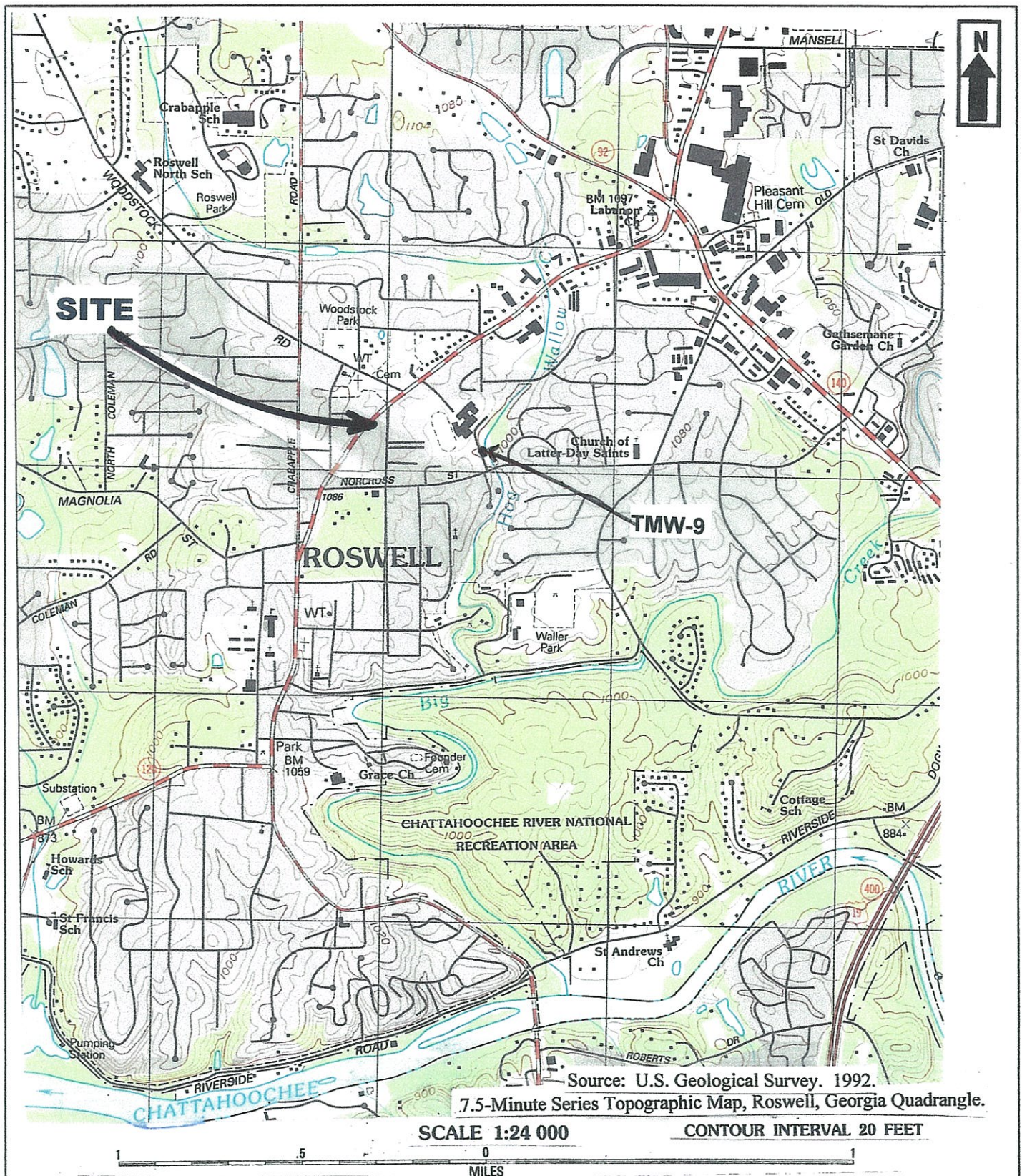
## RECOMMENDATIONS

Completion of Additional Assessment and previous assessments at the former Dry Cleaning Depot property, 1073 Alpharetta Street, Roswell, Fulton County, Georgia 30075 suggests the following Recommendations:

- Horizontal delineation has been effectively completed where access is available, with the original source generally appearing to be inside or around the rear of the building. Decreasing groundwater concentrations both onsite and offsite have demonstrated the effectiveness of Monitored Natural Attenuation. MNA is recommended for selection as the remedy for the former Dry Cleaning Depot site.
- Horizontal delineation where access is not available has been effectively completed by installation of TMW-9 near Hog Wallow Creek, hydraulically down-gradient of the former Dry Cleaning Depot site, as well as the Frazier Street Apartments. No detectable concentrations of PCE or other EPA Method 8260 analytes was identified. MNA is also recommended for selection as the remedy for remaining offsite concentrations, with sampling of the POD well providing a check that no detectable concentrations of PCE are migrating toward Hog Wallow Creek.
- It is recommended that a blower be installed to vent the air space under the building and to create a gradient to preclude any possibility of migration of vapor phase PCE into the occupied building. This will provide additional protection for the building's occupants, and will also assist in removing minor concentrations of vapor phase PCE from the building's crawl space.

## **FIGURES**







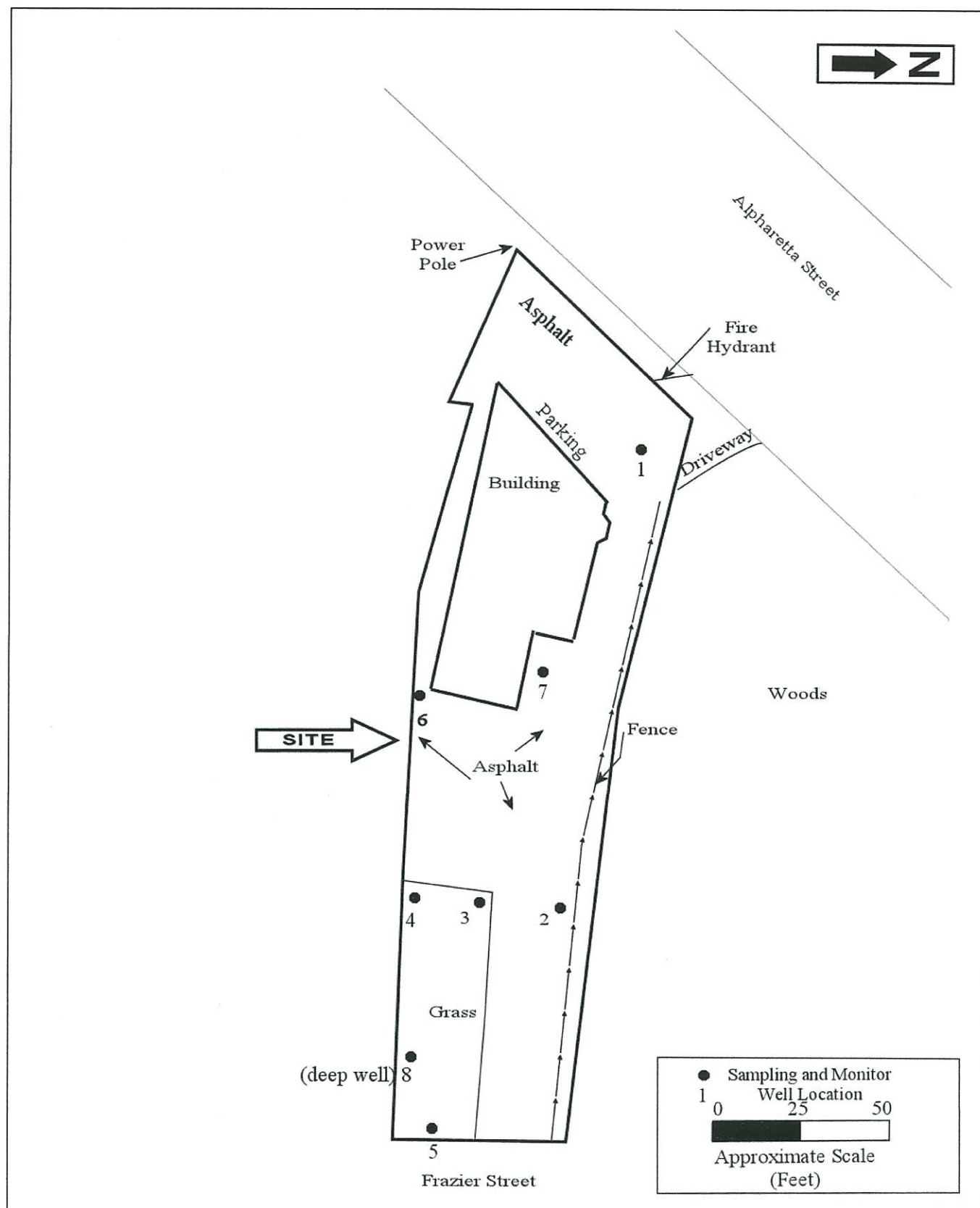


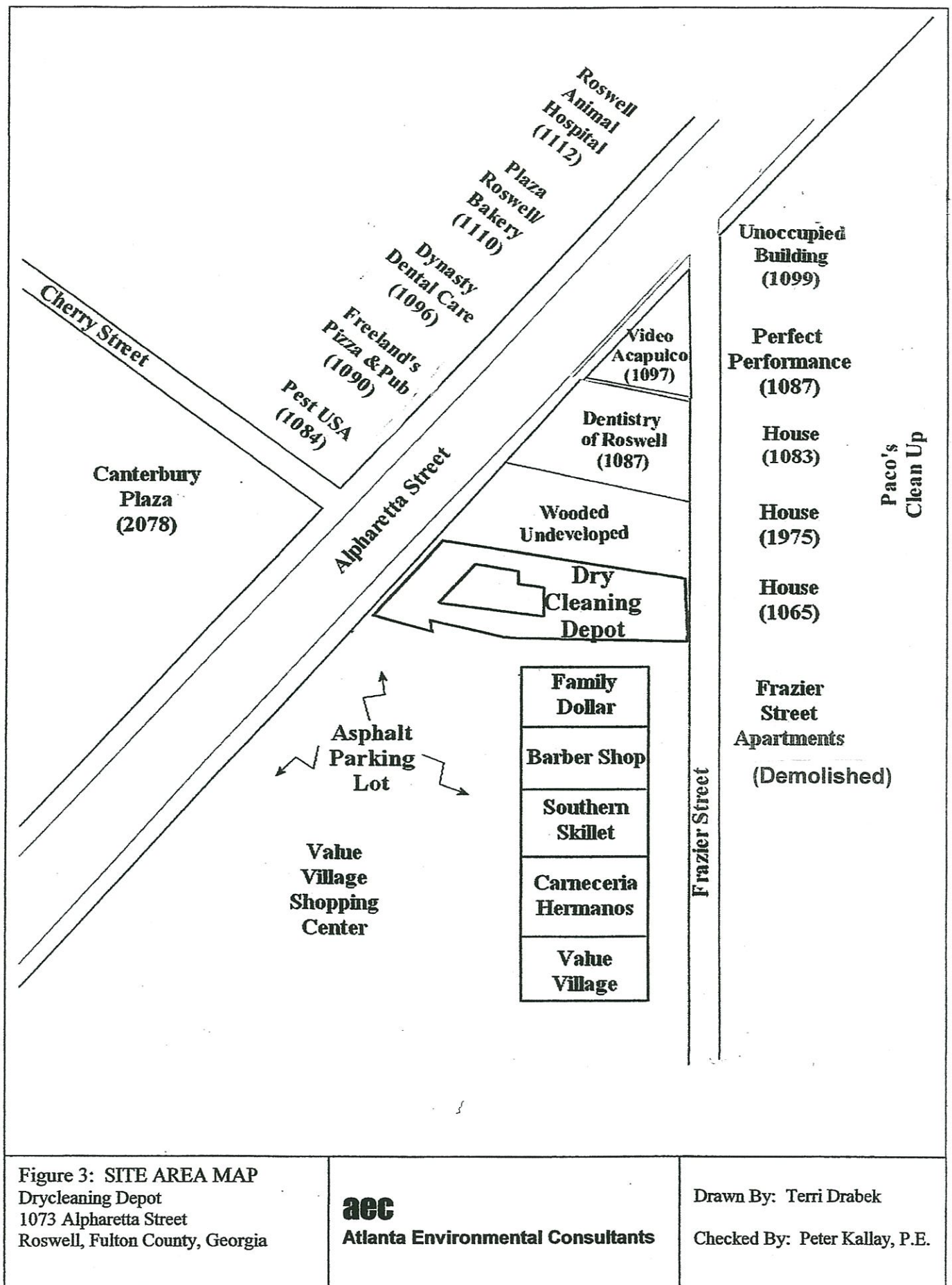
Figure 2: Site Plan

Former Dry Cleaning Depot  
1073 Alpharetta Street  
Roswell, Fulton County, Georgia

**aec**  
**Atlanta Environmental Consultants**

Drawn By: Terri Drabek  
Checked By: Peter Kallay,  
P.E.





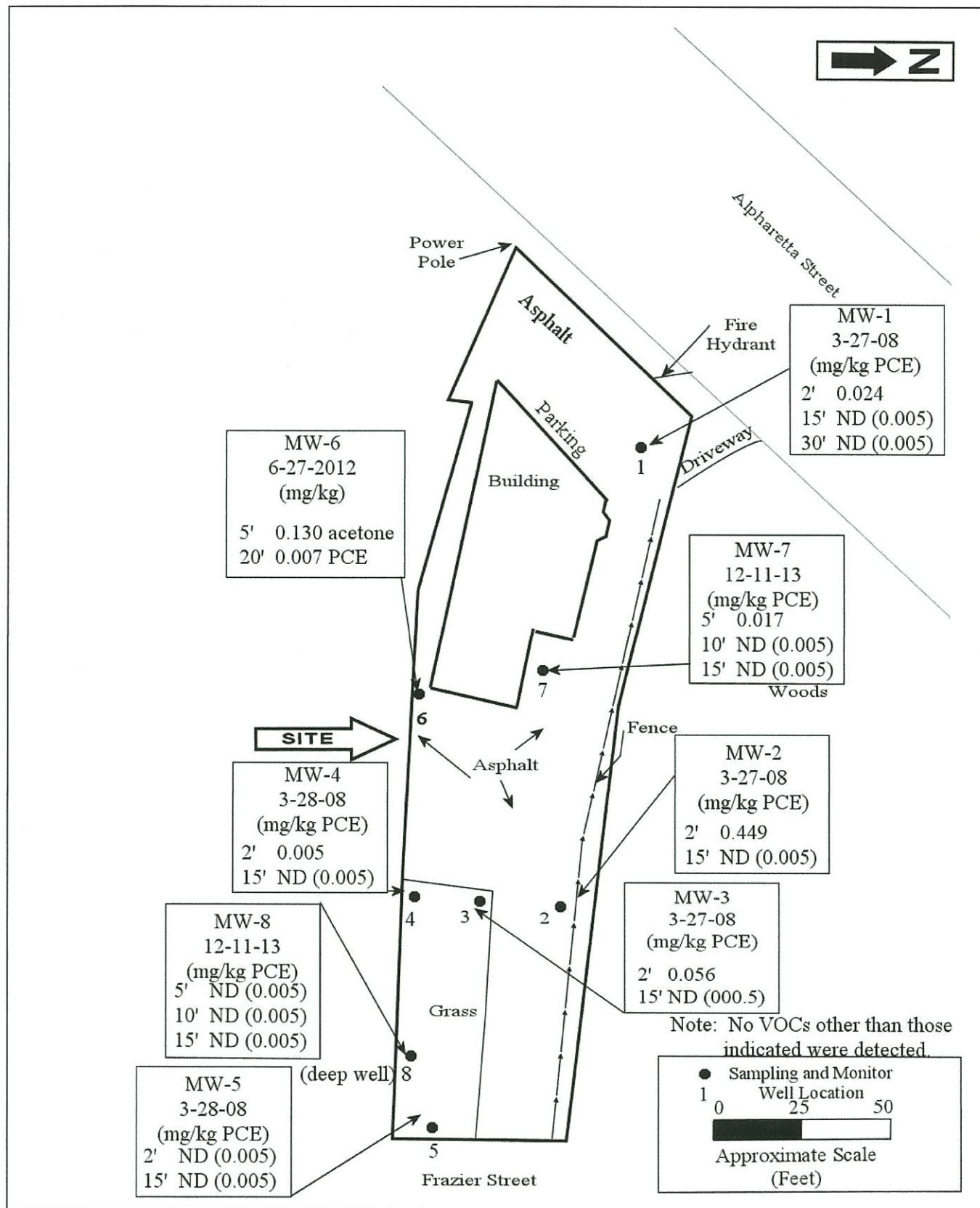


Figure 4: Soil Boring Results

Former Dry Cleaning Depot  
1073 Alpharetta Street  
Roswell, Fulton County, Georgia

**aec**  
**Atlanta Environmental Consultants**

Drawn By: Terri Drabek

Checked By: Peter Kallay,  
P.E.



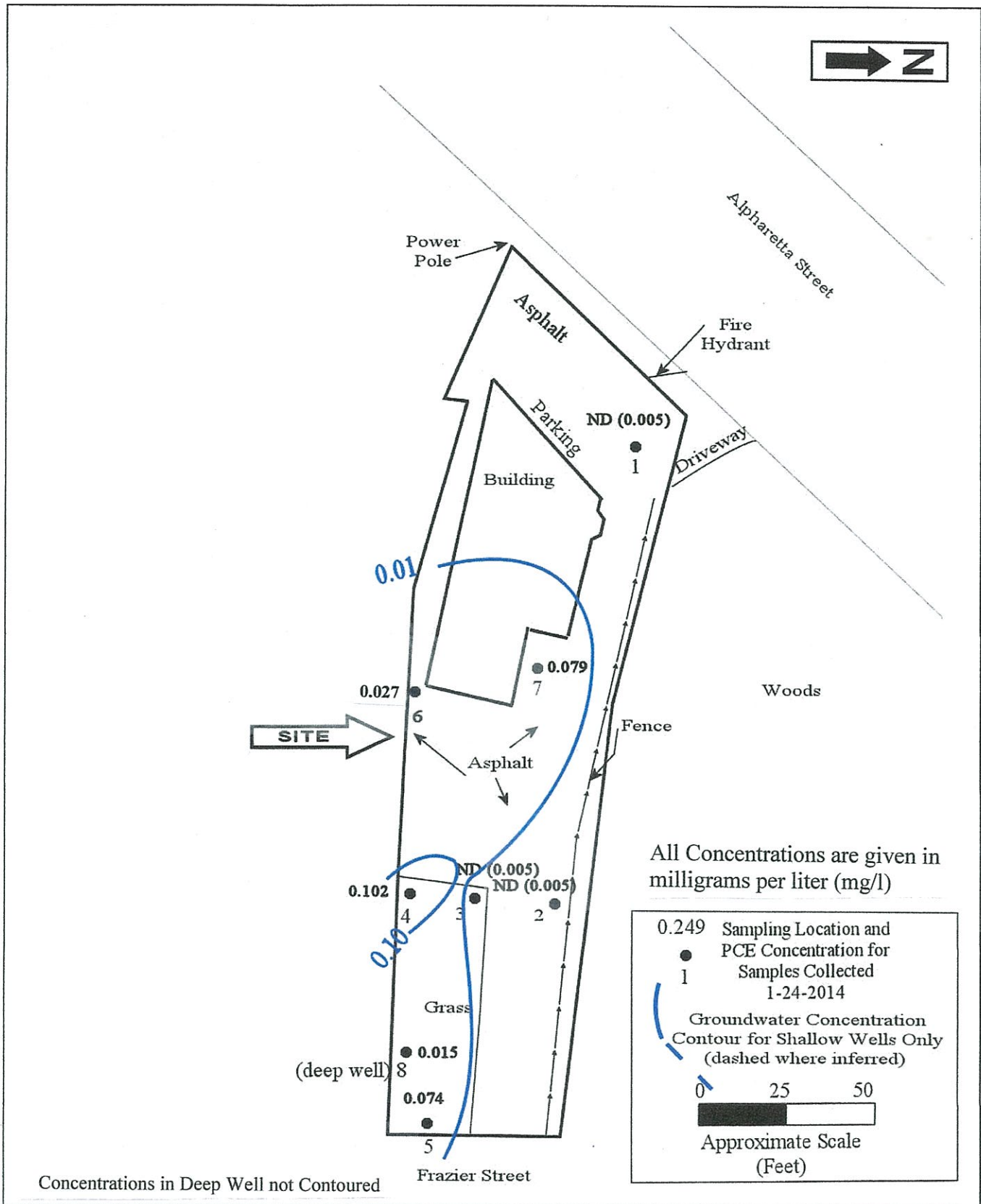


Figure 5: Groundwater PCE Results

Former Dry Cleaning Depot  
1073 Alpharetta Street  
Roswell, Fulton County, Georgia

**aec**  
**Atlanta Environmental Consultants**

Drawn By: Terri Drabek

Checked By: Peter Kallay,  
P.E.

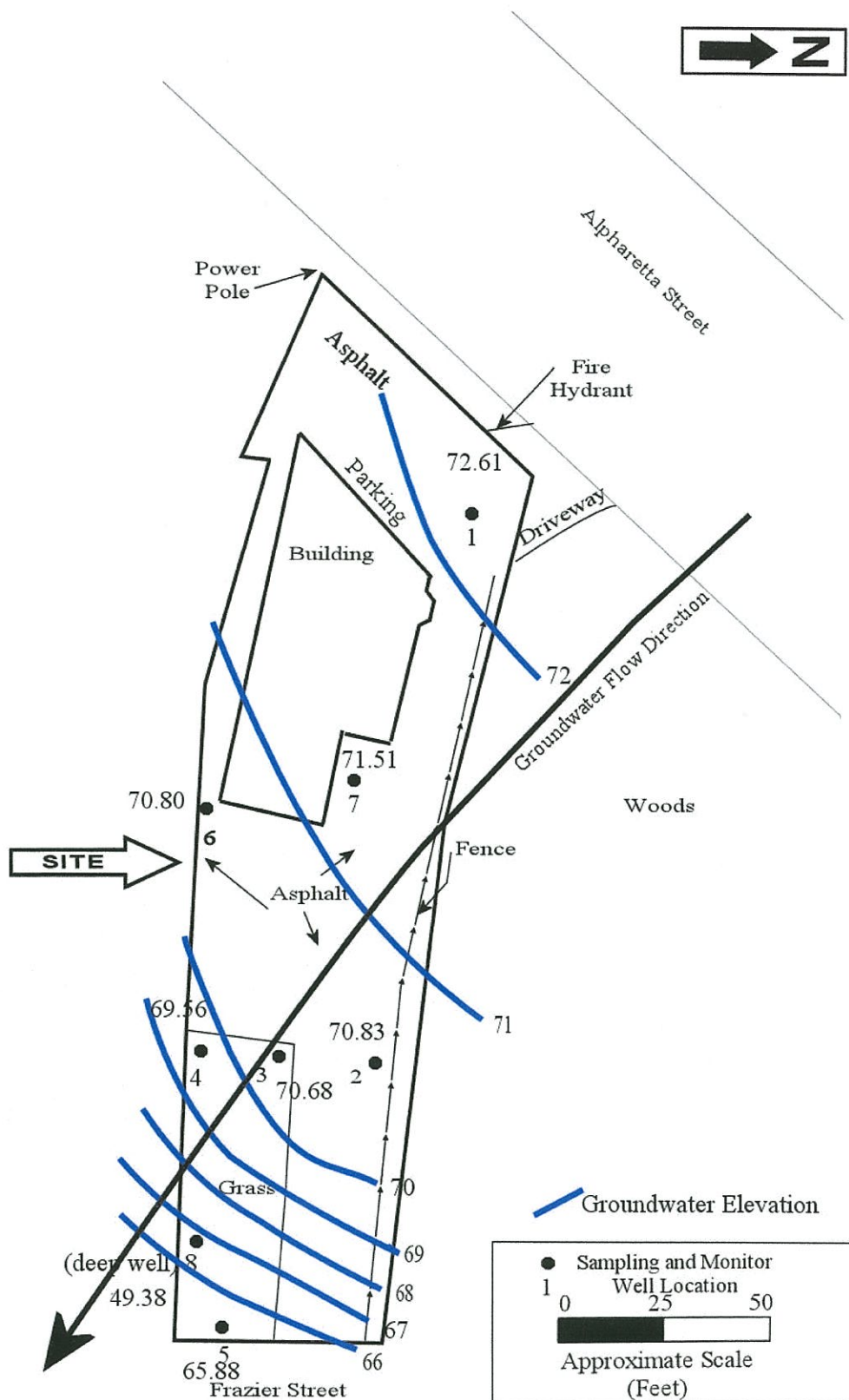


Figure 6: Groundwater Potentiometric Contours  
Former Dry Cleaning Depot  
1073 Alpharetta Street  
Roswell, Fulton County, Georgia

**aec**  
**Atlanta Environmental Consultants**

Drawn By: Terri Drabek  
Checked By: Peter Kallay, P.E.



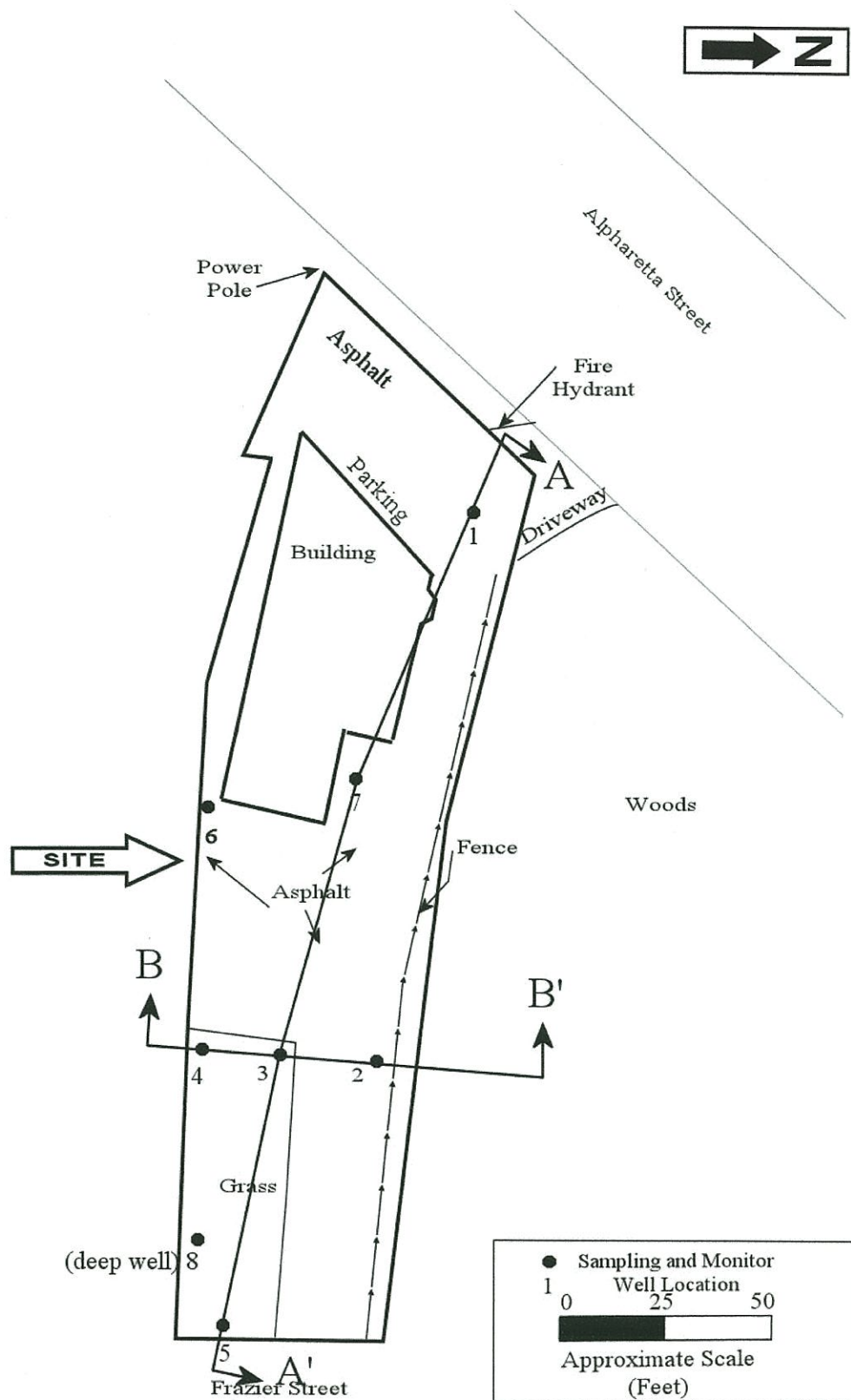


Figure 7: Cross-Section Locations

Former Dry Cleaning Depot  
1073 Alpharetta Street  
Roswell, Fulton County, Georgia

**aec**  
**Atlanta Environmental Consultants**

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P.E.

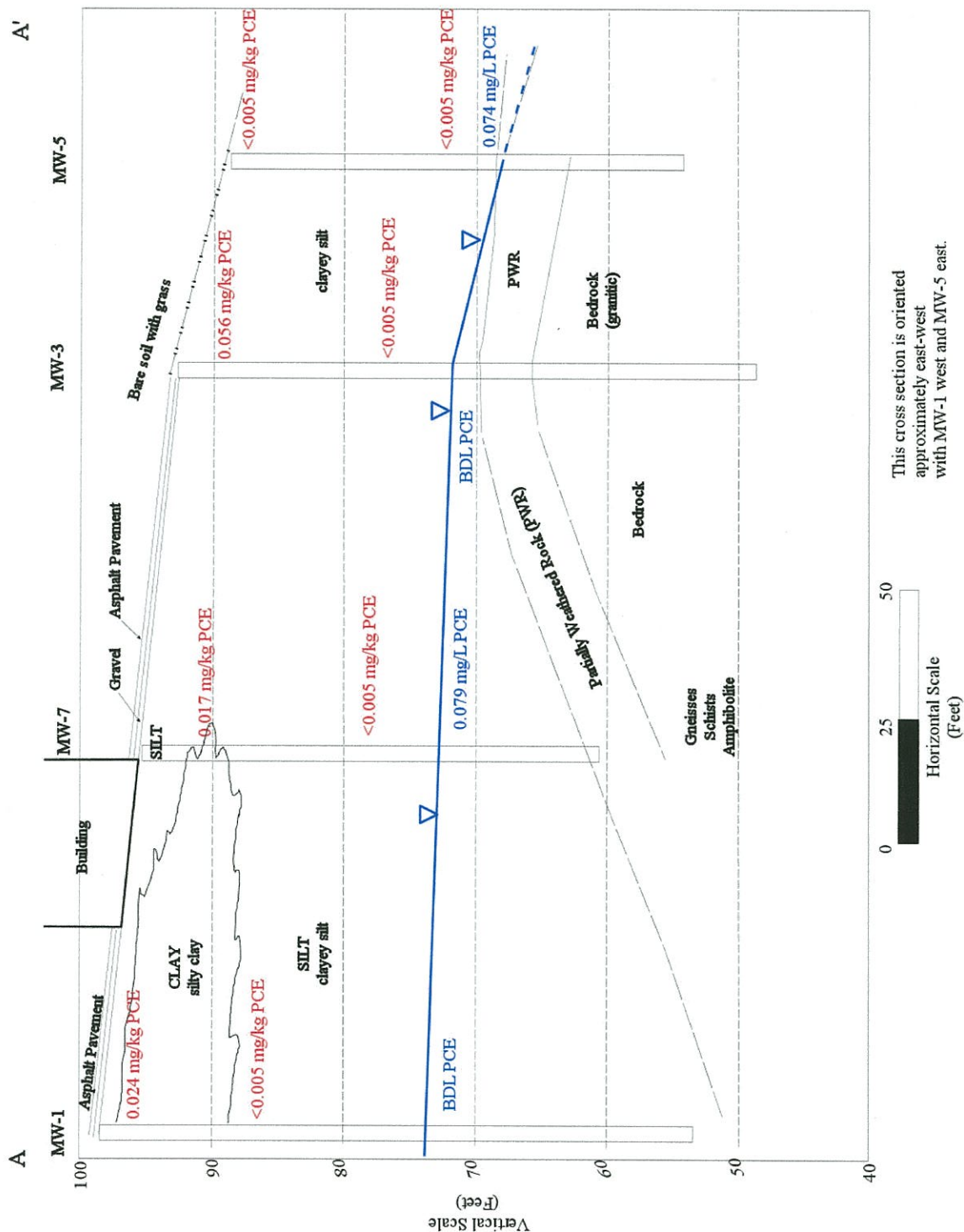


Figure 8: Cross-Section A-A'

Former Dry Cleaning Depot  
1073 Alpharetta Street  
Roswell, Fulton County, Georgia

**aec**  
**Atlanta Environmental Consultants**

Drawn By: Terri Drabek

Checked By: Peter Kallay,  
P.E.



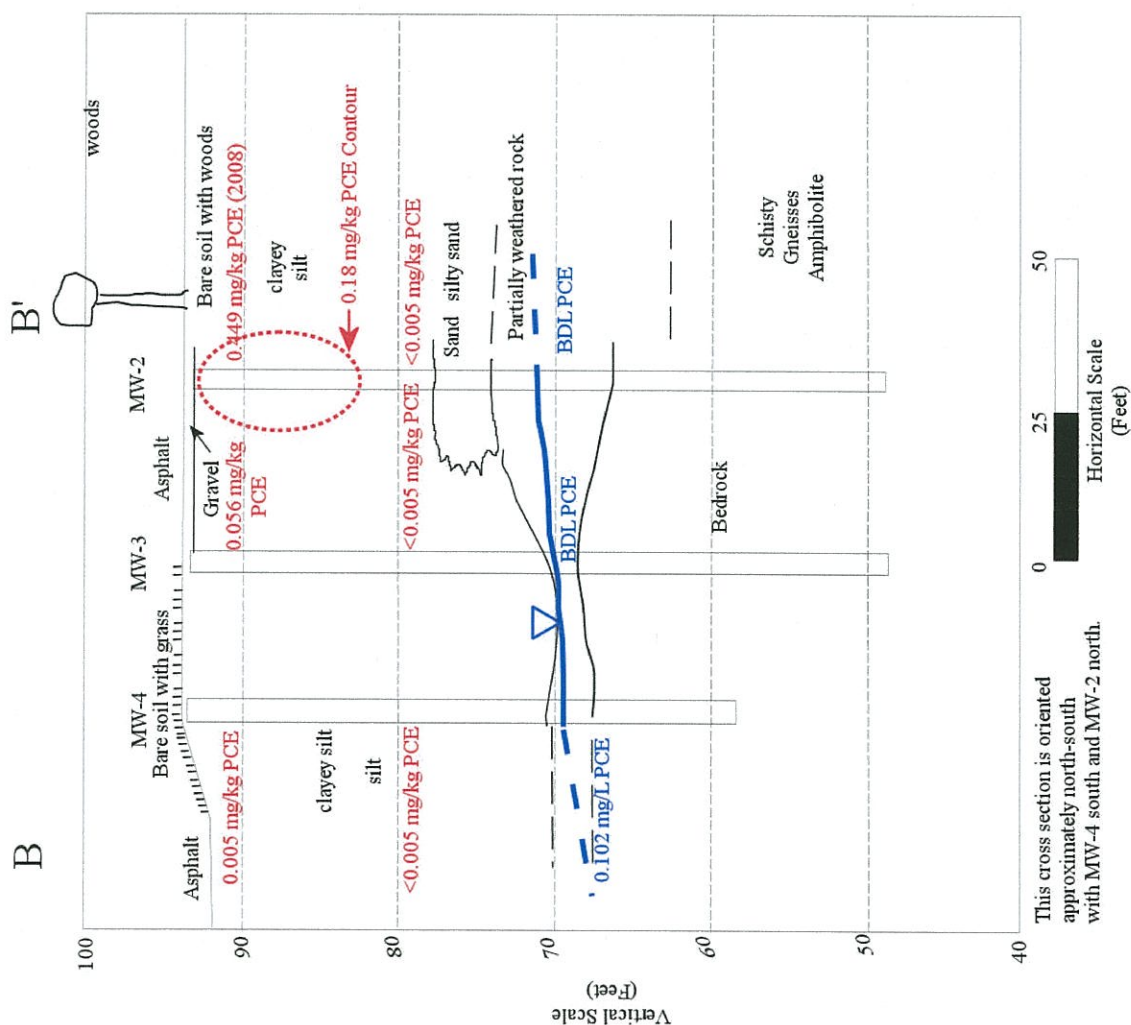


Figure 9: Cross-Section B-B''

Former Dry Cleaning Depot  
1073 Alpharetta Street  
Roswell, Fulton County, Georgia

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Drawn By: Terri Drabek

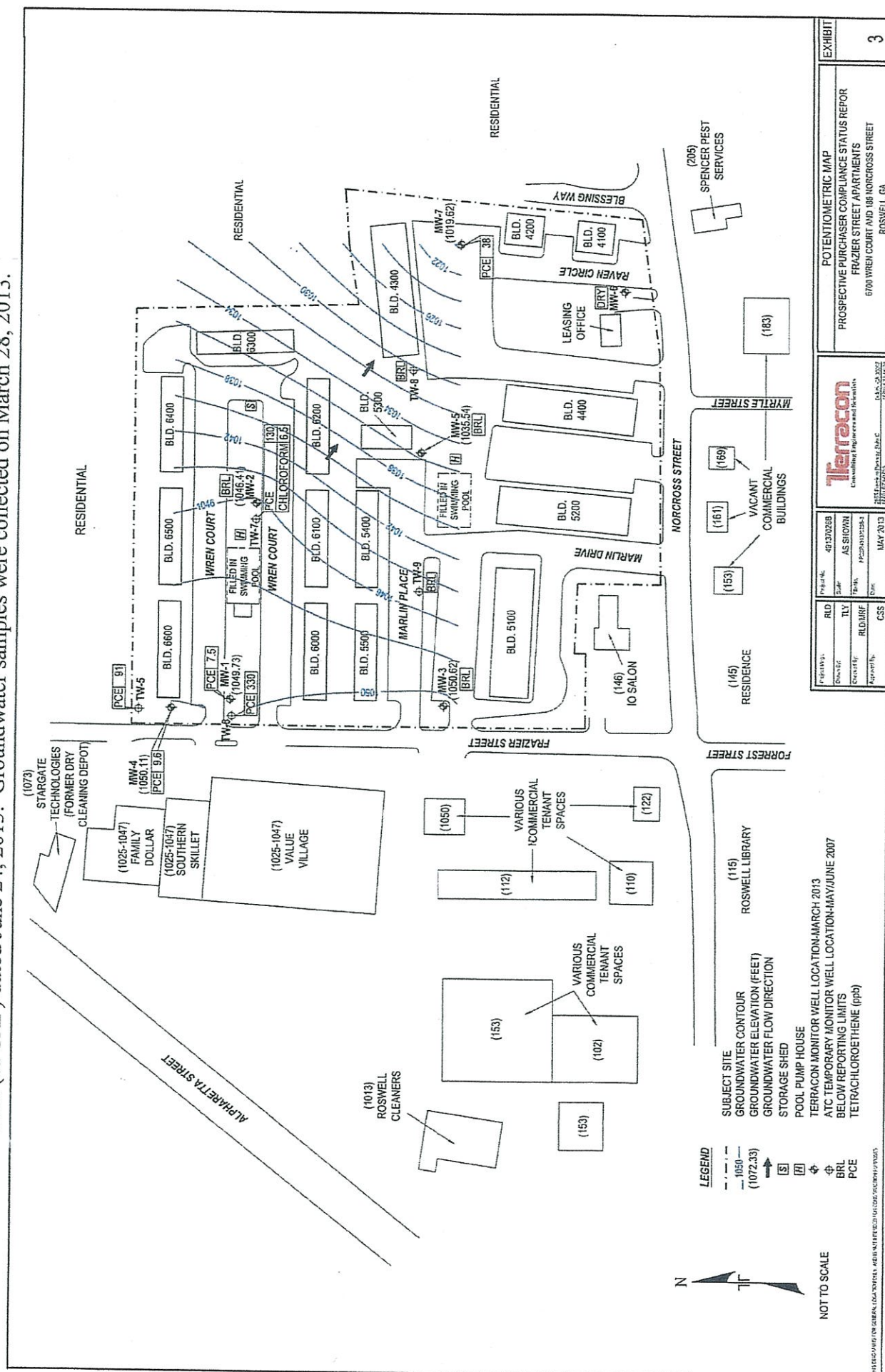
Checked By: Peter Kallay,  
P.E.

TW-6	5/17/07
TETRACHLOROETHENE	330
PAHs	NS





This Figure (Figure 3) was reproduced from Terracon Prospective Purchaser Corrective Action Plan (PPCAP) dated June 24, 2013. Groundwater samples were collected on March 28, 2013.



Project:	RD	Project No:	48130228
Owner:	TLV	Site:	AS SHOWN
Contract:	R/D/INF	Date:	16/02/2017
Agreement:	CSS	Issue:	MAY 2013



**Terracon**  
Consulting Engineers and Architects

DATE: 16/02/2017  
BY: [Signature]  
FOR: [Signature]

<p>POTENTIOMETRIC MAP</p> <p>PROSPECTIVE PURCHASER COMPLIANCE STATUS REPORT</p> <p>FRAZIER STREET APARTMENTS</p> <p>6100 WREN COURT AND 188 NORCROSS STREET</p> <p>ROSWELL, GA</p>	<p>EXHIBIT</p> <p>3</p>
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## **TABLES**



**TABLE 1. Soil Analytical Results**  
**Former Dry Cleaning Depot**  
**1073 Alpharetta Street**  
**Roswell, Fulton County, Georgia 30075**

SAMPLE ID	SAMPLE DEPTH (ft)	SAMPLE DATE	ANALYTICAL RESULTS - Milligrams Per Kilogram (mg/kg)			
			PCE	TCE	OTHER COMPOUNDS	NOTES
MW-1 2'	2'	3/27/2008	0.024	ND (0.005)	ND	
MW-1 15'	15'	3/27/2008	ND (0.005)	ND (0.005)	ND	
MW-1 30'	30'	3/27/2008	ND (0.005)	ND (0.005)	ND	
MW-2 2'	2'	3/27/2008	0.449	ND (0.005)	ND	
MW-2 15'	15'	3/27/2008	0.071	ND (0.005)	ND	
MW-3 2'	2'	3/27/2008	0.056	ND (0.005)	ND	
MW-3 15'	15'	3/27/2008	ND (0.005)	ND (0.005)	ND	
MW-4 2'	2'	3/28/2008	0.005	ND (0.005)	ND	
MW-4 15'	15'	3/28/2008	ND (0.005)	ND (0.005)	ND	
MW-5 2'	2'	3/28/2008	ND (0.005)	ND (0.005)	ND	
MW-5 15'	15'	3/28/2008	ND (0.005)	ND (0.005)	ND	
MW-6 5'	5'	6/27/2012	ND	ND (0.005)	0.130	Acetone
MW-6 20'	20'	6/27/2012	0.007	ND (0.005)	ND	
MW-7 5'	5'	12/11/2013	0.017	ND (0.005)	ND	
MW-7 10'	10'	12/11/2013	ND (0.005)	ND (0.005)	ND	
MW-7 20'	20'	12/11/2013	ND (0.005)	ND (0.005)	ND	
MW-8 5'	5'	12/11/2013	ND (0.005)	ND (0.005)	ND	
MW-8 10'	10'	12/11/2013	ND (0.005)	ND (0.005)	ND	
MW-8 15'	15'	12/11/2013	ND (0.005)	ND (0.005)	ND	

**NOTES:**

Concentrations are given in milligrams per kilogram (mg/kg).

Volatile Organic Compounds (VOC) were extracted by EPA Method 5035 and were analyzed by EPA Method 8260B

ND = Not Detected (I.e., compound, if present, is Below Quantitation Limits)

PCE = Tetrachloroethene, also known as perchloroethylene, tetrachloroethylene, or perc

TCE = Trichloroethene, also known as trichloroethylene

**Table 2. Water Table Elevations  
Former Dry Cleaning Depot  
1073 Alpharetta Street  
Roswell, Fulton County, Georgia**

MONITORING WELL	DATE MEASURED	TOP-OF-CASING ELEVATION	DEPTH TO WATER	WATER TABLE ELEVATION	NOTES
		(feet)	(feet)	(feet)	
MW-1	3/28/2008	98.72	29.73	68.99	
MW-1	3/31/2008	98.72	29.64	69.08	
MW-1	6/27/2012	98.72	27.89	70.83	
MW-1	6/28/2012	98.72	27.88	70.84	
MW-1	6/21/2013	98.72	24.90	73.82	
MW-1	12/12/2013	98.72	26.11	72.61	
MW-2	3/28/2008	93.77	26.54	67.23	
MW-2	3/31/2008	93.77	26.49	67.28	
MW-2	6/27/2012	93.77	24.89	68.88	
MW-2	6/28/2012	93.77	24.91	68.86	
MW-2	6/21/2013	93.77	21.25	72.52	
MW-2	12/12/2013	93.77	22.94	70.83	
MW-3	3/28/2008	93.51	27.56	65.95	
MW-3	3/31/2008	93.51	27.12	66.39	
MW-3	6/27/2012	93.51	24.91	68.60	
MW-3	6/28/2012	93.51	25.01	68.50	
MW-3	6/21/2013	93.51	21.27	72.24	
MW-3	12/12/2013	93.51	22.83	70.68	
MW-4	3/28/2008	93.39	33.47	59.92	
MW-4	3/31/2008	93.39	27.50	65.89	
MW-4	6/27/2012	93.39	25.25	68.14	
MW-4	6/28/2012	93.39	25.29	68.10	
MW-4	6/21/2013	93.39	22.54	70.85	
MW-4	12/12/2013	93.39	23.83	69.56	
MW-5	3/28/2008	89.37	26.42	62.95	
MW-5	3/31/2008	89.37	26.38	62.99	
MW-5	6/27/2012	89.37	24.88	64.49	
MW-5	6/28/2012	89.37	24.89	64.48	
MW-5	6/21/2013	89.37	21.37	68.00	
MW-5	12/12/2013	89.37	23.49	65.88	
MW-6	6/27/2012	96.71	32.53	64.18	
MW-6	6/28/2012	96.71	27.83	68.88	
MW-6	6/21/2013	96.71	24.43	72.28	
MW-6	12/12/2013	96.71	25.91	70.80	
MW-7	12/12/2013	97.23	25.72	71.51	New Well
MW-8D	12/12/2013	90.34	40.96	49.38	New deep well
TMW-9	1/24/2014	*	1.93	*	See note 4.

Note: Footnotes are on the following page.



**FOOTNOTES for Table 2:**

1. Top of Casing Elevations are relative elevations, relative to an assumed height of instrument (H.I.) of 100.00 feet (on the initial elevation survey)
2. On subsequent elevation surveys, the difference between the Height of Instrument (H.I.) and H.I. in the current survey is calculated. All newly determined elevations are computed to properly correlate to the original set of elevations before entering them on the Table.
2. MW-7 and MW-8D were installed on December 12, 2013.
3. MW-8D is a deep well set at 60 feet deep.
4. TMW-9 is a temporary well installed near Hog Wallow Creek as a Point-of-Demonstration (POD) well. A precise elevation was not determined. The USGS topographic map indicates the area of TMW-9 is approximately 80 feet lower elevation than the center of the former Dry Cleaning Depot property. Therefore, the well's TOC is at approximately 13 feet relative elevation, and groundwater is at approximately 11 feet relative elevation.

**TABLE 3. Groundwater Analytical Results  
Former Dry Cleaning Depot  
1073 Alpharetta Street  
Roswell, Fulton County, Georgia 30075**

SAMPLE ID and DATE sampled	ANALYTICAL RESULTS - Milligrams Per Liter (mg/L)			
	PCE	TCE	OTHER COMPOUNDS	NOTES
MW-1 3-31-08	0.006	ND(0.005)	ND	
MW-1 6-28-12	ND(0.005)	ND(0.005)	ND	
MW-1 6-21-13	ND(0.005)	ND(0.005)	ND	
MW-1 12-12-13	ND(0.005)	ND(0.005)	ND	No 8260 VOCs detected
MW-2 3-31-08	0.109	ND(0.005)	ND	
MW-2 6-28-12	ND(0.005)	ND(0.005)	ND	
MW-2 6-21-13	0.0031 J	ND(0.005)	ND	
MW-2 12-12-13	ND(0.005)	ND(0.005)	ND	No 8260 VOCs detected
MW-3 3-31-08	0.089	ND(0.005)	ND	
MW-3 6-28-12	0.086	ND(0.005)	ND	
MW-3 6-21-13	0.014	ND(0.005)	ND	
MW-3 12-12-13	ND(0.005)	ND(0.005)	ND	No 8260 VOCs detected
MW-4 3-31-08	0.244	ND(0.005)	ND	
MW-4 6-28-12	0.195	ND(0.005)	ND	
MW-4 6-21-13	0.256	ND(0.005)	ND	
MW-4 12-12-13	0.102	ND(0.005)	ND	
MW-5 3-31-08	1.040	0.005	ND	
MW-5 6-28-12	0.249	ND(0.005)	ND	
MW-5 6-21-13	0.309	ND(0.005)	ND	
MW-5 12-12-13	0.074	ND(0.005)	ND	
MW-6 6-28-12	0.145	ND(0.005)	ND	
MW-6 6-21-13	0.085	ND(0.005)	ND	
MW-6 12-12-13	0.027	ND(0.005)	ND	
MW-7 12-12-13	0.079	ND(0.005)	ND	
MW-8 12-12-13	0.015	ND(0.005)	ND	
TMW-9 01-24-14	ND(0.005)	ND(0.005)	ND	No 8260 VOCs detected

**NOTES:**

Concentrations are given in milligrams per liter (mg/L)

Volatile Organic Compounds (VOC) were analyzed by EPA Method 8260B

ND = Not Detected (Below Quantitation Limits)

PCE = Tetrachloroethene, also known as perchloroethylene, tetrachloroethylene, or perc

TCE = Trichloroethene, also known as trichloroethylene



**TABLE 4. Sub-Slab Soil Vapor Analytical Results**  
**Former Dry Cleaning Depot**  
**1073 Alpharetta Street**  
**Roswell, Fulton County, Georgia 30075**

SAMPLE ID	Compound	SUB-SLAB VAPOR SAMPLE ANALYTICAL RESULTS		
		parts per billion by volume(ppbv)	micrograms/cubic meter (ug/m3)	NOTES
	<b><u>PRIMARY TARGET COMPOUNDS</u></b>			
SSV-1	Tetrachloroethene (PCE)	51.00	350.00	
SSV-1	Trichloroethene (TCE)	ND(5.0)	ND(2.7)	not detected
SSV-1	cis-1,2-Dichloroethene	ND(5.0)	ND(2.0)	not detected
SSV-1	trans-1,2-Dichloroethene	ND(5.0)	ND(2.0)	not detected
SSV-1	Vinyl Chloride	ND(5.0)	ND(1.3)	not detected
	<b><u>OTHER TO-15 TARGET COMPOUNDS</u></b>			
SSV-1	Acetone	13.00	31.00	
SSV-1	Ethanol	8.40	16.00	
SSV-1	Cyclohexane	5.80	20.00	
	<b><u>TENTATIVELY IDENTIFIED COMPOUNDS (TICs)</u></b>			
SSV-1	Decane	11.00	62.00	
SSV-1	Undecane	11.00	73.00	
	<b><u>Total Volatile Organic Compounds</u></b>			
SSV-1	TVOC TO-15 Target Compounds	78.00	420.00	
SSV-1	TVOC TICs only	22.00	135.00	
SSV-1	TVOC Total of all VOCs detected	100.00	455.00	

**NOTES:** ND = Not Detected

1. Concentrations are given in parts per billion by volume (ppbv) and micrograms per cubic meter (ug/m3)
2. Compounds not detected are not listed (except primary targets). See Laboratory Analytical Report.
4. The number of decimal places are equalized to improve comparisons between relative concentrations. Number of decimal places shown do not necessarily represent number of significant figures (see lab report).

**APPENDIX I**  
**SOIL BORING LOG**



# aec SOIL BORING LOG

## Atlanta Environmental Consultants

Field Rep. Peter T. Kallay, P.E.  
 Project No. Fmr Dry Cleaning Depot Addl Assess ECC-3054  
 Driller Kilman Bros Inc.  
 Drilling Eqpt. CME 550X

Boring No. B-7  
 Date Dec. 11, 2013  
 Crew Robert Kilman, Marcel Sacilli,  
 Bill Pook and David Oliver

Depth		Soil Description	Time	Type	1st	2nd	3rd	Reco-	PID/
From	To				6"	6"	6"	very	FID
0	0.25	Surface: Asphalt Pavement	8:27	CUT					
		NOTE: Drilled 5' using Hand Auger, then HSA							
		NOTE: Offest boring due to (a) marked natural gas line; (b) unmarked pipe w/ unk use/contents							
0.25	1	Grey GRAVEL with sand, asphalt sub-base.	9:05	HA					
		dry to slightly damp, no odor. FILL							
		underlain by red clayey SILT.							
3.5	5	Red silty CLAY, relatively hard, damp,	9:15	SPT	7	10	14	95%	0.6
		no odor							
8.5	10	Tan and various shades of brown horizontally	9:20	SPT	7	8	15	80%	0.1
		stratified thin layers of sandy SILT with mica.							
		Partially weathered rock. Damp. No odor.							
13.5	15	Same as above, sandy SILT.	9:30	SPT	15	24	26	85%	0.1
		Partially weathered rock. Damp. No odor.							
18.5	20	Same as above, sandy SILT.	9:40	SPT	50/6			20%	0.8
		Partially weathered rock. Damp. No odor.							
23.5	25	Same as above, but more SILT with less sand.	9:45	SPT	14	26	50/2	75%	0.2
		Partially weathered rock. Damp. No odor.							
28.5	30	Increasingly hard partially weathered rock.	9:55	SPT	50/0			0%	
		No recovery							
33.5	35	Increasingly hard partially weathered rock.	10:05	SPT	50/0			0%	
		grading into competent rock. No recovery.							
		BORING TERMINATED AT 35 FEET							

Method:

Auger ☒ Size 6 1/4 OD  
 AirHa ☐  
 Core ☐ Size \_\_\_\_\_ OD  
 Casing Size: 2"  
 Undisturbed Samples: SPT  
 Water Loss \_\_\_\_\_ Gallons

Weather Clear, sunny, warm, no rain.  
 Standby Time none  
 Water Level 30 feet (25.72' next day).  
 Borehole Depth 35 feet  
 Date Completed Dec. 11, 2013

# aec **SOIL BORING LOG**

## Atlanta Environmental Consultants

Field Rep. Peter T. Kallay, P.E.  
 Project No. Fmr Dry Cleaning Depot Addl Assess ECC-3054  
 Driller Kilman Bros Inc.  
 Drilling Eqpt. CME 550X

Boring No. B-8  
 Date Dec. 11, 2013  
 Crew Robert Kilman, Marcel Sacilli,  
 Bill Pook and David Oliver

Depth		Soil Description	Time	Type	1st	2nd	3rd	Reco-	PID/
From	To				6"	6"	6"	very	FID
0	0.25	Surface: Bare soil with some grass and weeds. NOTE: Drilled 5' using Hand Auger, then HSA	10:23	CUT					
0.25	1	Light brown sandy SILT, topsoil containing grass roots. Damp. No odor.	10:25	HA					
3.5	5	Red clayey SILT, relatively hard, damp, no odor	10:30	SPT	7	13	13	90%	0.4
8.5	10	red and brown foliated layered sandy SILT with mica; partially weathered rock. Damp. No odor.	10:40	SPT	15	16	20	85%	0.3
13.5	15	brown color various shades layered sandy SILT partially weathered rock. Damp. No odor.	10:45	SPT	7	13	13	80%	0.5
18.5	20	Brown, red and beige layered sandy SILT Foliated partially weathered rock; damp; no odor.	10:55	SPT	9	11	11	85%	0.2
23.5	25	Increasingly hard partially weathered rock. No recovery	11:05	SPT	50/0			0%	
28.5	30	Increasingly hard partially weathered rock. grading into competent rock. No recovery. AUGER REFUSAL AT 30 FEET Switch to AIR HAMMER at 30 feet.	11:20	SPT	50/0			0%	
30	60	Rock comes up mostly as sand or smaller size particles with a few gravel size pieces. Rock appears consistent with geologic description of rock underlying the site - gneiss and/or schist with biotite (black) and mica.  BORING TERMINATED AT 60 FEET	12:30	AirHa					1.8

Method:

Auger ☒ Size 6 1/4 OD  
 AirHa ☒ Air Hammer Bit 3 7/8 OD  
 Core ☐ Size        OD  
 Casing Size: 2"  
 Undisturbed Samples: SPT  
 Water Loss        Gallons

Weather Clear, sunny, warm, no rain.  
 Standby Time none  
 Water Level 55 feet (40.96' next day)  
 Borehole Depth 60 feet  
 Date Completed Dec. 11, 2013



**aec**

## Atlanta Environmental Consultants

Boring No. B-9

Date 24-Jan-14

Crew Peter T. Kallay, P.E.

[illegible]

Auger ☒ 3 1/4

AirHa

## Core

Casino

Casing size. . . . 2

Undisturbed Samples:

Water Loss	Gallons
------------	---------

Weather Clear, cold, calm, sunny.

Standby Time \_\_\_\_\_ none

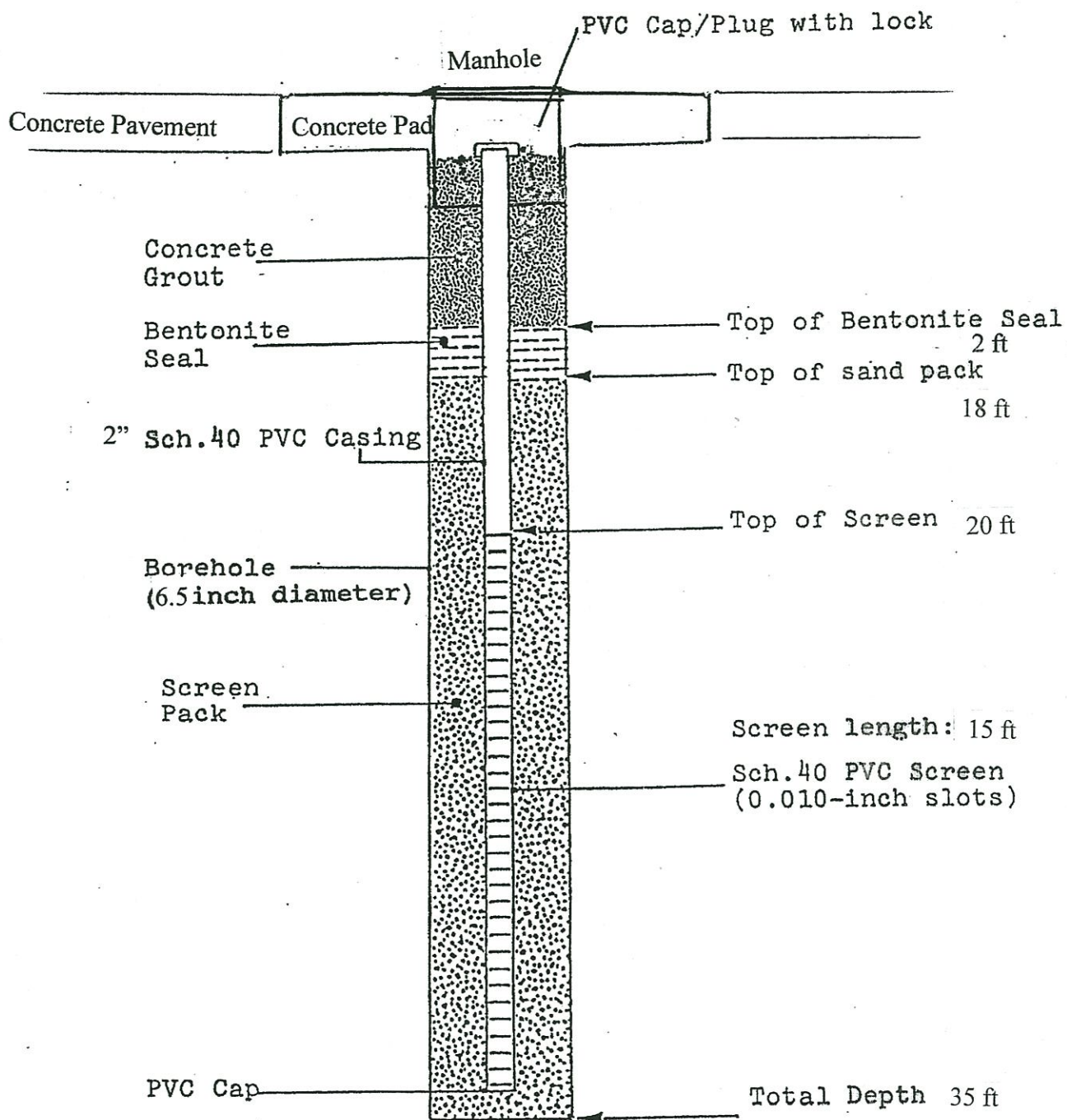
Water Level 1.93 feet

Borehole Depth 5 feet

Date Completed            January 24, 2014

# MONITORING WELL SCHEMATIC DIAGRAM

## FLUSH-MOUNTED MANHOLE WELL COMPLETION



All Depths referenced from Ground Surface

Not to scale

**acc**

Atlanta Environmental Consultants

Drawn by: Ever Guillen

Reviewed by: Peter T. Kallay, P.E.

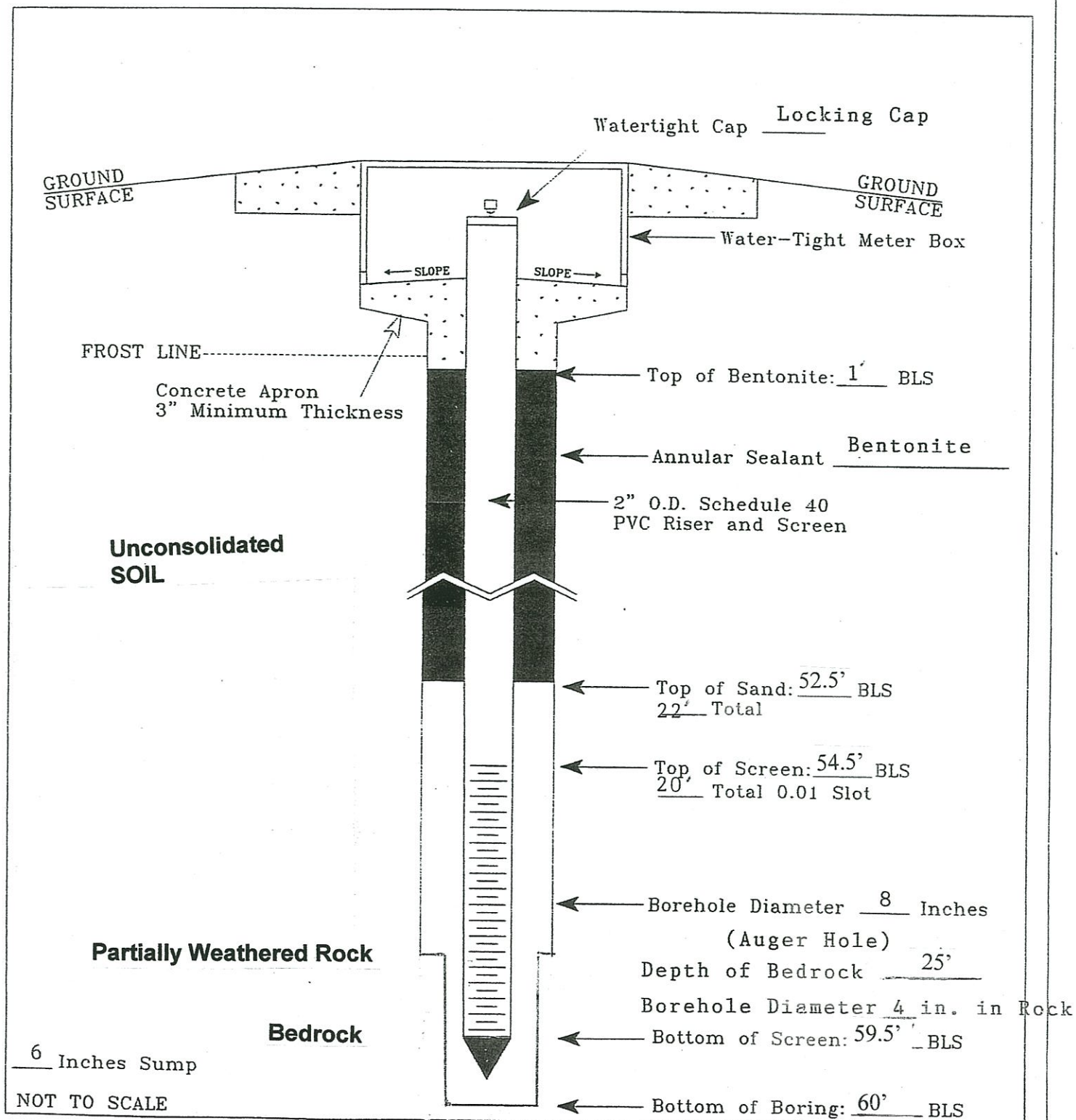
Schematic Diagram of  
Monitoring Well

MW-7



## WELL COMPLETION REPORT MW-8D

Drilling Co.: Kilman Brothers Date: Dec. 11, 2013  
 Driller: Bob Kilman Boring No.: B-8  
 Drilling Method: Hollow Stem Auger/Air Hammer Type of Rig: CME-550X  
 Geologist/Engineer: Peter T. Kallay, P.E. Drilling Fluid: N/A



## **APPENDIX II**

### **FIELD PURGING AND SAMPLING DATA**



## WELL PURGING AND SAMPLING DATA

[illegible]

VOLUME OF WATER IN 1 FOOT: 0.0102 Gal in 1/2 inch 0.023 Gal in 3/4 inch 0.041 Gal in 1" DIA pipe  
0.17 Gal in 2" inch 0.65 Gal in 4 inch 1.47 Gal in 6 inch DIA pipe



## WELL PURGING AND SAMPLING DATA

[illegible]

VOLUME OF WATER IN 1 FOOT: 0.0102 Gal in 1/2 inch 0.023 Gal in 3/4 inch 0.041 Gal in 1" DIA pipe  
0.17 Gal in 2" inch 0.65 Gal in 4 inch 1.47 Gal in 6 inch DIA pipe



## WELL PURGING AND SAMPLING DATA

[illegible]

VOLUME OF WATER IN 1 FOOT: 0.0102 Gal in 1/2 inch    0.023 Gal in 3/4 inch    0.041 Gal in 1" DIA pipe  
0.17 Gal in 2" inch    0.65 Gal in 4 inch    1.47 Gal in 6 inch DIA pipe



## WELL PURGING AND SAMPLING DATA

[illegible]

VOLUME OF WATER IN 1 FOOT: 0.0102 Gal in 1/2 inch    0.023 Gal in 3/4 inch    0.041 Gal in 1" DIA pipe  
0.17 Gal in 2" inch    0.65 Gal in 4 inch    1.47 Gal in 6 inch DIA pipe



## WELL PURGING AND SAMPLING DATA

[illegible]

VOLUME OF WATER IN 1 FOOT: 0.0102 Gal in 1/2 inch 0.023 Gal in 3/4 inch 0.041 Gal in 1" DIA pipe  
0.17 Gal in 2" inch 0.65 Gal in 4 inch 1.47 Gal in 6 inch DIA pipe



## WELL PURGING AND SAMPLING DATA

[illegible]

VOLUME OF WATER IN 1 FOOT: 0.0102 Gal in 1/2 inch 0.023 Gal in 3/4 inch 0.041 Gal in 1" DIA pipe  
0.17 Gal in 2" inch 0.65 Gal in 4 inch 1.47 Gal in 6 inch DIA pipe



## WELL PURGING AND SAMPLING DATA

[illegible]

VOLUME OF WATER IN 1 FOOT: 0.0102 Gal in 1/2 inch 0.023 Gal in 3/4 inch 0.041 Gal in 1" DIA pipe  
0.17 Gal in 2" inch 0.65 Gal in 4 inch 1.47 Gal in 6 inch DIA pipe



## WELL PURGING AND SAMPLING DATA

[illegible]

VOLUME OF WATER IN 1 FOOT: 0.0102 Gal in 1/2 inch 0.023 Gal in 3/4 inch 0.041 Gal in 1" DIA pipe  
0.17 Gal in 2" inch 0.65 Gal in 4 inch 1.47 Gal in 6 inch DIA pipe



### **APPENDIX III**

## **LABORATORY ANALYTICAL REPORT: SOILS**

## Laboratory Report

**ACL Project #: 66012**

**Client Proj #: ECC-3048 / Dry Cleaning Depot**

**Prepared For:**

Atlanta Environmental Consultants  
3440 Blue Springs Rd.  
Suite 503  
Kennesaw, GA 30144-0000

**Attention:** Mr. Peter Kallay

**Report Date:** 12/23/2013

**This report contains 10 pages.**  
(including this cover page and chain of custody)

  
John Andros  
Technical Director



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## **Explanation of Symbols and Abbreviations**

Listed below are common symbols and abbreviations typically used in reporting technical data:

PQL	Practical Quantitation Limit	MDL	Method Detection Limit
BQL	Below Quantitation Limit	BDL	Below Method Detection Limit
MPN	Most Probable Number	TNTC	Too Numerous To Count
NTU	Nephelometric Turbidity Units	BTU	British Thermal Units
°C	Degrees Centigrade	°F	Degrees Fahrenheit
μmhos/cm	micromhos/cm	cfu	Colony Forming Unit
DF	Dilution Factor	meq	milliequivalents
kg	kilogram(s)	g	gram(s)
mg	milligram(s)	μg	microgram(s)
l or L	liter(s)	ml or mL	milliliter(s)
μl or μL	microliter(s)	m <sup>3</sup>	cubic meter(s)
lb	pound(s)	ft <sup>3</sup>	cubic foot(feet)
ft	foot(feet)	su	Standard Units
<	Less than	>	Greater than

mg/L, mg/kg      Units of concentration in milligrams per liter for liquids and milligrams per kilogram for solids. Also referred to as parts per million or "ppm" when the assumption is made that the specific gravity or density is one (1 g/mL).

μg/L, μg/kg      Units of concentration in micrograms per liter for liquids and micrograms per kilogram for solids. Also referred to as parts per billion or "ppb" when the assumption is made that the specific gravity or density is one (1 g/mL).

wt %      Units of concentration expressed on a weight/weight basis (e.g. grams per 100 grams).

Surrogate      Compound(s) added by the laboratory for quality control monitoring.

mg/kg,dw      Units of concentration in milligrams per kilogram (dry weight basis).

### **Data Qualifiers:**

B	Analyte was also detected in the method blank
E	Estimated value - analyte was detected at concentration greater than upper calibration limit
F	Estimated value - analyte should have been tested as a field parameter
H	Estimated value - sample was analyzed beyond the accepted holding time
J	Estimated value - analyte was detected < PQL and ≥ MDL
L	The batch-specific LCS and/or LCSD was not within lab control limits for this analyte
M	The batch-specific MS and/or MSD was not within lab control limits for this analyte
R	The RPD between batch-specific sample/dup or MS/MSD was not within lab control limits for this analyte
S	The surrogate recovery was not within quality control limits
Z	Laboratory specific qualifier – refer to case narrative
*	Performed in strict accordance with the procedures and controls of the ACL quality system, but not currently in the NELAC list of certified analytes/methods

Solid samples (i.e. soil, sludge, solid waste) are reported on a wet weight basis unless otherwise noted. Estimated uncertainty values are available upon request.

**Representation and Limitation of Liability** – The accuracy of all analytical results for samples begins as it is received by the laboratory. The integrity of the sample begins at the time it is placed in the possession of authorized ACL personnel. All other warranties, expressed or implied, are disclaimed. Liability is limited to the cost of the analysis.

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**Client:** Atlanta Environmental Consultants  
 3440 Blue Springs Rd.  
 Suite 503  
 Kennesaw, GA 30144-0000

**Client Proj #:** ECC-3048 / Dry Cleaning Depot  
**ACL Project #:** 66012  
**Date Received:** 12/12/2013  
**Date Reported:** 12/23/2013

**Contact:** Mr. Peter Kallay

### Volatile Organics (5035/8260B)

**Sample ID:** B-7-5'

**Matrix:** Soil

**ACL Sample #:** 301152

**Date Sampled:** 12/11/2013 9:25

**Date Prepared:** 12/11/2013

**Date Analyzed:** 12/18/2013

**Units:** mg/kg

**Analyst:** JG

Analyte	Result	PQL	Analyte	Result	PQL
Acetone	BQL	0.100	1,3-Dichloropropane	BQL	0.005
Acrolein	BQL	0.050	2,2-Dichloropropane	BQL	0.005
Acrylonitrile	BQL	0.050	1,1-Dichloropropene	BQL	0.005
Benzene	BQL	0.005	cis-1,3-Dichloropropene	BQL	0.005
Bromobenzene	BQL	0.005	trans-1,3-Dichloropropene	BQL	0.005
Bromochloromethane	BQL	0.005	Ethylbenzene	BQL	0.005
Bromodichloromethane	BQL	0.005	Hexachlorobutadiene	BQL	0.005
Bromoform	BQL	0.005	2-Hexanone	BQL	0.050
Bromomethane	BQL	0.010	Isopropylbenzene	BQL	0.005
2-Butanone	BQL	0.100	p-Isopropyltoluene	BQL	0.005
n-Butylbenzene	BQL	0.005	4-Methyl-2-pentanone	BQL	0.050
sec-Butylbenzene	BQL	0.005	Methylene chloride	BQL	0.005
tert-Butylbenzene	BQL	0.005	Naphthalene	BQL	0.005
Carbon disulfide	BQL	0.005	n-Propylbenzene	BQL	0.005
Carbon tetrachloride	BQL	0.005	Styrene	BQL	0.005
Chlorobenzene	BQL	0.005	1,1,1,2-Tetrachloroethane	BQL	0.005
Chloroethane	BQL	0.010	1,1,2,2-Tetrachloroethane	BQL	0.005
2-Chloroethylvinyl ether	BQL	0.010	Tetrachloroethene	0.017	0.005
Chloroform	BQL	0.005	Toluene	BQL	0.005
Chloromethane	BQL	0.010	1,2,3-Trichlorobenzene	BQL	0.005
2-Chlorotoluene	BQL	0.005	1,2,4-Trichlorobenzene	BQL	0.005
4-Chlorotoluene	BQL	0.005	1,1,1-Trichloroethane	BQL	0.005
1,2-Dibromo-3-chloropropane	BQL	0.005	1,1,2-Trichloroethane	BQL	0.005
Dibromochloromethane	BQL	0.005	Trichloroethene	BQL	0.005
1,2-Dibromoethane	BQL	0.005	Trichlorofluoromethane	BQL	0.005
Dibromomethane	BQL	0.005	1,2,3-Trichloropropane	BQL	0.005
1,2-Dichlorobenzene	BQL	0.005	1,2,4-Trimethylbenzene	BQL	0.005
1,3-Dichlorobenzene	BQL	0.005	1,3,5-Trimethylbenzene	BQL	0.005
1,4-Dichlorobenzene	BQL	0.005	Vinyl acetate	BQL	0.050
Dichlorodifluoromethane	BQL	0.010	Vinyl chloride	BQL	0.010
1,1-Dichloroethane	BQL	0.005	m,p-Xylene	BQL	0.010
1,2-Dichloroethane	BQL	0.005	o-Xylene	BQL	0.005
1,1-Dichloroethene	BQL	0.005			
cis-1,2-Dichloroethene	BQL	0.005			
trans-1,2-Dichloroethene	BQL	0.005			
1,2-Dichloropropane	BQL	0.005			



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**Client:** Atlanta Environmental Consultants  
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Kennesaw, GA 30144-0000

**Client Proj #:** ECC-3048 / Dry Cleaning Depot  
**ACL Project #:** 66012  
**Date Received:** 12/12/2013  
**Date Reported:** 12/23/2013

**Contact:** Mr. Peter Kallay

### **Volatile Organics (5035/8260B)**

**Sample ID:** B-7-10'

**Matrix:** Soil

**ACL Sample #:** 301153

**Date Sampled:** 12/11/2013 9:30

**Date Prepared:** 12/11/2013

**Date Analyzed:** 12/18/2013

**Units:** mg/kg

**Analyst:** JG

<b>Analyte</b>	<b>Result</b>	<b>PQL</b>	<b>Analyte</b>	<b>Result</b>	<b>PQL</b>
Acetone	BQL	0.100	1,3-Dichloropropane	BQL	0.005
Acrolein	BQL	0.050	2,2-Dichloropropane	BQL	0.005
Acrylonitrile	BQL	0.050	1,1-Dichloropropene	BQL	0.005
Benzene	BQL	0.005	cis-1,3-Dichloropropene	BQL	0.005
Bromobenzene	BQL	0.005	trans-1,3-Dichloropropene	BQL	0.005
Bromochloromethane	BQL	0.005	Ethylbenzene	BQL	0.005
Bromodichloromethane	BQL	0.005	Hexachlorobutadiene	BQL	0.005
Bromoform	BQL	0.005	2-Hexanone	BQL	0.050
Bromomethane	BQL	0.010	Isopropylbenzene	BQL	0.005
2-Butanone	BQL	0.100	p-Isopropyltoluene	BQL	0.005
n-Butylbenzene	BQL	0.005	4-Methyl-2-pentanone	BQL	0.050
sec-Butylbenzene	BQL	0.005	Methylene chloride	BQL	0.005
tert-Butylbenzene	BQL	0.005	Naphthalene	BQL	0.005
Carbon disulfide	BQL	0.005	n-Propylbenzene	BQL	0.005
Carbon tetrachloride	BQL	0.005	Styrene	BQL	0.005
Chlorobenzene	BQL	0.005	1,1,1,2-Tetrachloroethane	BQL	0.005
Chloroethane	BQL	0.010	1,1,2,2-Tetrachloroethane	BQL	0.005
2-Chloroethylvinyl ether	BQL	0.010	Tetrachloroethene	BQL	0.005
Chloroform	BQL	0.005	Toluene	BQL	0.005
Chloromethane	BQL	0.010	1,2,3-Trichlorobenzene	BQL	0.005
2-Chlorotoluene	BQL	0.005	1,2,4-Trichlorobenzene	BQL	0.005
4-Chlorotoluene	BQL	0.005	1,1,1-Trichloroethane	BQL	0.005
1,2-Dibromo-3-chloropropane	BQL	0.005	1,1,2-Trichloroethane	BQL	0.005
Dibromochloromethane	BQL	0.005	Trichloroethene	BQL	0.005
1,2-Dibromoethane	BQL	0.005	Trichlorofluoromethane	BQL	0.005
Dibromomethane	BQL	0.005	1,2,3-Trichloropropane	BQL	0.005
1,2-Dichlorobenzene	BQL	0.005	1,2,4-Trimethylbenzene	BQL	0.005
1,3-Dichlorobenzene	BQL	0.005	1,3,5-Trimethylbenzene	BQL	0.005
1,4-Dichlorobenzene	BQL	0.005	Vinyl acetate	BQL	0.050
Dichlorodifluoromethane	BQL	0.010	Vinyl chloride	BQL	0.010
1,1-Dichloroethane	BQL	0.005	m,p-Xylene	BQL	0.010
1,2-Dichloroethane	BQL	0.005	o-Xylene	BQL	0.005
1,1-Dichloroethene	BQL	0.005			
cis-1,2-Dichloroethene	BQL	0.005			
trans-1,2-Dichloroethene	BQL	0.005			
1,2-Dichloropropane	BQL	0.005			

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**Date Received:** 12/12/2013  
**Date Reported:** 12/23/2013

**Contact:** Mr. Peter Kallay

### Volatile Organics (5035/8260B)

**Sample ID:** B-7-20'

**Matrix:** Soil

**ACL Sample #:** 301154

**Date Sampled:** 12/11/2013 9:45

**Date Prepared:** 12/11/2013

**Date Analyzed:** 12/18/2013

**Units:** mg/kg

**Analyst:** JG

Analyte	Result	PQL	Analyte	Result	PQL
Acetone	BQL	0.100	1,3-Dichloropropane	BQL	0.005
Acrolein	BQL	0.050	2,2-Dichloropropane	BQL	0.005
Acrylonitrile	BQL	0.050	1,1-Dichloropropene	BQL	0.005
Benzene	BQL	0.005	cis-1,3-Dichloropropene	BQL	0.005
Bromobenzene	BQL	0.005	trans-1,3-Dichloropropene	BQL	0.005
Bromochloromethane	BQL	0.005	Ethylbenzene	BQL	0.005
Bromodichloromethane	BQL	0.005	Hexachlorobutadiene	BQL	0.005
Bromoform	BQL	0.005	2-Hexanone	BQL	0.050
Bromomethane	BQL	0.010	Isopropylbenzene	BQL	0.005
2-Butanone	BQL	0.100	p-Isopropyltoluene	BQL	0.005
n-Butylbenzene	BQL	0.005	4-Methyl-2-pentanone	BQL	0.050
sec-Butylbenzene	BQL	0.005	Methylene chloride	BQL	0.005
tert-Butylbenzene	BQL	0.005	Naphthalene	BQL	0.005
Carbon disulfide	BQL	0.005	n-Propylbenzene	BQL	0.005
Carbon tetrachloride	BQL	0.005	Styrene	BQL	0.005
Chlorobenzene	BQL	0.005	1,1,1,2-Tetrachloroethane	BQL	0.005
Chloroethane	BQL	0.010	1,1,2,2-Tetrachloroethane	BQL	0.005
2-Chloroethylvinyl ether	BQL	0.010	Tetrachloroethene	BQL	0.005
Chloroform	BQL	0.005	Toluene	BQL	0.005
Chloromethane	BQL	0.010	1,2,3-Trichlorobenzene	BQL	0.005
2-Chlorotoluene	BQL	0.005	1,2,4-Trichlorobenzene	BQL	0.005
4-Chlorotoluene	BQL	0.005	1,1,1-Trichloroethane	BQL	0.005
1,2-Dibromo-3-chloropropane	BQL	0.005	1,1,2-Trichloroethane	BQL	0.005
Dibromochloromethane	BQL	0.005	Trichloroethene	BQL	0.005
1,2-Dibromoethane	BQL	0.005	Trichlorofluoromethane	BQL	0.005
Dibromomethane	BQL	0.005	1,2,3-Trichloropropane	BQL	0.005
1,2-Dichlorobenzene	BQL	0.005	1,2,4-Trimethylbenzene	BQL	0.005
1,3-Dichlorobenzene	BQL	0.005	1,3,5-Trimethylbenzene	BQL	0.005
1,4-Dichlorobenzene	BQL	0.005	Vinyl acetate	BQL	0.050
Dichlorodifluoromethane	BQL	0.010	Vinyl chloride	BQL	0.010
1,1-Dichloroethane	BQL	0.005	m,p-Xylene	BQL	0.010
1,2-Dichloroethane	BQL	0.005	o-Xylene	BQL	0.005
1,1-Dichloroethene	BQL	0.005			
cis-1,2-Dichloroethene	BQL	0.005			
trans-1,2-Dichloroethene	BQL	0.005			
1,2-Dichloropropane	BQL	0.005			



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**Client:** Atlanta Environmental Consultants  
 3440 Blue Springs Rd.  
 Suite 503  
 Kennesaw, GA 30144-0000

**Client Proj #:** ECC-3048 / Dry Cleaning Depot  
**ACL Project #:** 66012  
**Date Received:** 12/12/2013  
**Date Reported:** 12/23/2013

**Contact:** Mr. Peter Kallay

### Volatile Organics (5035/8260B)

**Sample ID:** B-8-5'

**Matrix:** Soil

**ACL Sample #:** 301155

**Date Sampled:** 12/11/2013 10:05

**Date Prepared:** 12/11/2013

**Date Analyzed:** 12/18/2013

**Units:** mg/kg

**Analyst:** JG

Analyte	Result	PQL	Analyte	Result	PQL
Acetone	BQL	0.100	1,3-Dichloropropane	BQL	0.005
Acrolein	BQL	0.050	2,2-Dichloropropane	BQL	0.005
Acrylonitrile	BQL	0.050	1,1-Dichloropropene	BQL	0.005
Benzene	BQL	0.005	cis-1,3-Dichloropropene	BQL	0.005
Bromobenzene	BQL	0.005	trans-1,3-Dichloropropene	BQL	0.005
Bromochloromethane	BQL	0.005	Ethylbenzene	BQL	0.005
Bromodichloromethane	BQL	0.005	Hexachlorobutadiene	BQL	0.005
Bromoform	BQL	0.005	2-Hexanone	BQL	0.050
Bromomethane	BQL	0.010	Isopropylbenzene	BQL	0.005
2-Butanone	BQL	0.100	p-Isopropyltoluene	BQL	0.005
n-Butylbenzene	BQL	0.005	4-Methyl-2-pentanone	BQL	0.050
sec-Butylbenzene	BQL	0.005	Methylene chloride	BQL	0.005
tert-Butylbenzene	BQL	0.005	Naphthalene	BQL	0.005
Carbon disulfide	BQL	0.005	n-Propylbenzene	BQL	0.005
Carbon tetrachloride	BQL	0.005	Styrene	BQL	0.005
Chlorobenzene	BQL	0.005	1,1,1,2-Tetrachloroethane	BQL	0.005
Chloroethane	BQL	0.010	1,1,2,2-Tetrachloroethane	BQL	0.005
2-Chloroethylvinyl ether	BQL	0.010	Tetrachloroethene	BQL	0.005
Chloroform	BQL	0.005	Toluene	BQL	0.005
Chloromethane	BQL	0.010	1,2,3-Trichlorobenzene	BQL	0.005
2-Chlorotoluene	BQL	0.005	1,2,4-Trichlorobenzene	BQL	0.005
4-Chlorotoluene	BQL	0.005	1,1,1-Trichloroethane	BQL	0.005
1,2-Dibromo-3-chloropropane	BQL	0.005	1,1,2-Trichloroethane	BQL	0.005
Dibromochloromethane	BQL	0.005	Trichloroethene	BQL	0.005
1,2-Dibromoethane	BQL	0.005	Trichlorofluoromethane	BQL	0.005
Dibromomethane	BQL	0.005	1,2,3-Trichloropropane	BQL	0.005
1,2-Dichlorobenzene	BQL	0.005	1,2,4-Trimethylbenzene	BQL	0.005
1,3-Dichlorobenzene	BQL	0.005	1,3,5-Trimethylbenzene	BQL	0.005
1,4-Dichlorobenzene	BQL	0.005	Vinyl acetate	BQL	0.050
Dichlorodifluoromethane	BQL	0.010	Vinyl chloride	BQL	0.010
1,1-Dichloroethane	BQL	0.005	m,p-Xylene	BQL	0.010
1,2-Dichloroethane	BQL	0.005	o-Xylene	BQL	0.005
1,1-Dichloroethene	BQL	0.005			
cis-1,2-Dichloroethene	BQL	0.005			
trans-1,2-Dichloroethene	BQL	0.005			
1,2-Dichloropropane	BQL	0.005			

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**Client:** Atlanta Environmental Consultants  
3440 Blue Springs Rd.  
Suite 503  
Kennesaw, GA 30144-0000

**Client Proj #:** ECC-3048 / Dry Cleaning Depot  
**ACL Project #:** 66012  
**Date Received:** 12/12/2013  
**Date Reported:** 12/23/2013

**Contact:** Mr. Peter Kallay

### Volatile Organics (5035/8260B)

**Sample ID:** B-8-10'

**Matrix:** Soil

**ACL Sample #:** 301156

**Date Sampled:** 12/11/2013 10:15

**Date Prepared:** 12/11/2013

**Date Analyzed:** 12/18/2013

**Units:** mg/kg

**Analyst:** JG

Analyte	Result	PQL	Analyte	Result	PQL
Acetone	BQL	0.100	1,3-Dichloropropane	BQL	0.005
Acrolein	BQL	0.050	2,2-Dichloropropane	BQL	0.005
Acrylonitrile	BQL	0.050	1,1-Dichloropropene	BQL	0.005
Benzene	BQL	0.005	cis-1,3-Dichloropropene	BQL	0.005
Bromobenzene	BQL	0.005	trans-1,3-Dichloropropene	BQL	0.005
Bromochloromethane	BQL	0.005	Ethylbenzene	BQL	0.005
Bromodichloromethane	BQL	0.005	Hexachlorobutadiene	BQL	0.005
Bromoform	BQL	0.005	2-Hexanone	BQL	0.050
Bromomethane	BQL	0.010	Isopropylbenzene	BQL	0.005
2-Butanone	BQL	0.100	p-Isopropyltoluene	BQL	0.005
n-Butylbenzene	BQL	0.005	4-Methyl-2-pentanone	BQL	0.050
sec-Butylbenzene	BQL	0.005	Methylene chloride	BQL	0.005
tert-Butylbenzene	BQL	0.005	Naphthalene	BQL	0.005
Carbon disulfide	BQL	0.005	n-Propylbenzene	BQL	0.005
Carbon tetrachloride	BQL	0.005	Styrene	BQL	0.005
Chlorobenzene	BQL	0.005	1,1,1,2-Tetrachloroethane	BQL	0.005
Chloroethane	BQL	0.010	1,1,2,2-Tetrachloroethane	BQL	0.005
2-Chloroethylvinyl ether	BQL	0.010	Tetrachloroethene	BQL	0.005
Chloroform	BQL	0.005	Toluene	BQL	0.005
Chloromethane	BQL	0.010	1,2,3-Trichlorobenzene	BQL	0.005
2-Chlorotoluene	BQL	0.005	1,2,4-Trichlorobenzene	BQL	0.005
4-Chlorotoluene	BQL	0.005	1,1,1-Trichloroethane	BQL	0.005
1,2-Dibromo-3-chloropropane	BQL	0.005	1,1,2-Trichloroethane	BQL	0.005
Dibromochloromethane	BQL	0.005	Trichloroethene	BQL	0.005
1,2-Dibromoethane	BQL	0.005	Trichlorofluoromethane	BQL	0.005
Dibromomethane	BQL	0.005	1,2,3-Trichloropropane	BQL	0.005
1,2-Dichlorobenzene	BQL	0.005	1,2,4-Trimethylbenzene	BQL	0.005
1,3-Dichlorobenzene	BQL	0.005	1,3,5-Trimethylbenzene	BQL	0.005
1,4-Dichlorobenzene	BQL	0.005	Vinyl acetate	BQL	0.050
Dichlorodifluoromethane	BQL	0.010	Vinyl chloride	BQL	0.010
1,1-Dichloroethane	BQL	0.005	m,p-Xylene	BQL	0.010
1,2-Dichloroethane	BQL	0.005	o-Xylene	BQL	0.005
1,1-Dichloroethene	BQL	0.005			
cis-1,2-Dichloroethene	BQL	0.005			
trans-1,2-Dichloroethene	BQL	0.005			
1,2-Dichloropropane	BQL	0.005			



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**Client:** Atlanta Environmental Consultants  
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**Client Proj #:** ECC-3048 / Dry Cleaning Depot  
**ACL Project #:** 66012  
**Date Received:** 12/12/2013  
**Date Reported:** 12/23/2013

**Contact:** Mr. Peter Kallay

### Volatile Organics (5035/8260B)

**Sample ID:** B-8-15'

**Matrix:** Soil

**ACL Sample #:** 301157

**Date Sampled:** 12/11/2013 10:20

**Date Prepared:** 12/11/2013

**Date Analyzed:** 12/18/2013

**Units:** mg/kg

**Analyst:** JG

<u>Analyte</u>	<u>Result</u>	<u>PQL</u>	<u>Analyte</u>	<u>Result</u>	<u>PQL</u>
Acetone	BQL	0.100	1,3-Dichloropropane	BQL	0.005
Acrolein	BQL	0.050	2,2-Dichloropropane	BQL	0.005
Acrylonitrile	BQL	0.050	1,1-Dichloropropene	BQL	0.005
Benzene	BQL	0.005	cis-1,3-Dichloropropene	BQL	0.005
Bromobenzene	BQL	0.005	trans-1,3-Dichloropropene	BQL	0.005
Bromochloromethane	BQL	0.005	Ethylbenzene	BQL	0.005
Bromodichloromethane	BQL	0.005	Hexachlorobutadiene	BQL	0.005
Bromoform	BQL	0.005	2-Hexanone	BQL	0.050
Bromomethane	BQL	0.010	Isopropylbenzene	BQL	0.005
2-Butanone	BQL	0.100	p-Isopropyltoluene	BQL	0.005
n-Butylbenzene	BQL	0.005	4-Methyl-2-pentanone	BQL	0.050
sec-Butylbenzene	BQL	0.005	Methylene chloride	BQL	0.005
tert-Butylbenzene	BQL	0.005	Naphthalene	BQL	0.005
Carbon disulfide	BQL	0.005	n-Propylbenzene	BQL	0.005
Carbon tetrachloride	BQL	0.005	Styrene	BQL	0.005
Chlorobenzene	BQL	0.005	1,1,1,2-Tetrachloroethane	BQL	0.005
Chloroethane	BQL	0.010	1,1,2,2-Tetrachloroethane	BQL	0.005
2-Chloroethylvinyl ether	BQL	0.010	Tetrachloroethene	BQL	0.005
Chloroform	BQL	0.005	Toluene	BQL	0.005
Chloromethane	BQL	0.010	1,2,3-Trichlorobenzene	BQL	0.005
2-Chlorotoluene	BQL	0.005	1,2,4-Trichlorobenzene	BQL	0.005
4-Chlorotoluene	BQL	0.005	1,1,1-Trichloroethane	BQL	0.005
1,2-Dibromo-3-chloropropane	BQL	0.005	1,1,2-Trichloroethane	BQL	0.005
Dibromochloromethane	BQL	0.005	Trichloroethene	BQL	0.005
1,2-Dibromoethane	BQL	0.005	Trichlorofluoromethane	BQL	0.005
Dibromomethane	BQL	0.005	1,2,3-Trichloropropane	BQL	0.005
1,2-Dichlorobenzene	BQL	0.005	1,2,4-Trimethylbenzene	BQL	0.005
1,3-Dichlorobenzene	BQL	0.005	1,3,5-Trimethylbenzene	BQL	0.005
1,4-Dichlorobenzene	BQL	0.005	Vinyl acetate	BQL	0.050
Dichlorodifluoromethane	BQL	0.010	Vinyl chloride	BQL	0.010
1,1-Dichloroethane	BQL	0.005	m,p-Xylene	BQL	0.010
1,2-Dichloroethane	BQL	0.005	o-Xylene	BQL	0.005
1,1-Dichloroethene	BQL	0.005			
cis-1,2-Dichloroethene	BQL	0.005			
trans-1,2-Dichloroethene	BQL	0.005			
1,2-Dichloropropane	BQL	0.005			

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## Sample Log-in Checklist

**Client Name:** Atlanta Environmental Consultants

**ACL Project Number:** 66012

### Cooler Check

Ice Present? Yes ☒ No ☐  
Temperature 4 °C

Evidence Tape Present? Yes ☐ No ☒  
Evidence Tape Intact? ☐ ☒

For coolers with a temperature greater than 6°C or with a damaged evidence seal, the bottles affected are identified below.

Chain-of-Custody Form Included? Yes ☒ No ☐  
Field Sampling Sheet Included? ☐ ☒

### Cooler Shipping and Receipt

**Shipping Method:** Delivered by Customer

**Tracking Number:**

**Receipt Date:** 12/12/2013

**Receipt Time:** 4:47 PM

### Bottle Check

Acid Preserved Sample (pH Check): pH<2? Yes  
(pH for VO vials to be checked upon analysis)

Base Preserved Samples (pH Check): pH>12? N/A

Chlorine Check (Positive, Negative, N/A): N/A

### Condition of Containers:

Evidence Tape Present on Bottles? Yes ☐ No ☒  
Evidence Tape Intact? ☐ ☒  
Loose Caps? ☐ ☒  
Broken Bottles? ☐ ☒

**Cooler Unpacked/Checked By:** JA

**Logged In By:** JA

**Log-in Date:** 12/12/2013

**Comments (if any):**



**ADVANCED CHEMISTRY LABS, INC.**

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## CHAIN-OF-CUSTODY RECORD

## ANALYSIS REQUEST

Page 10 of 10

## **APPENDIX IV**

### **LABORATORY ANALYTICAL REPORT: GROUNDWATER**



## Laboratory Report

**ACL Project #: 66011**

**Client Proj #: ECC-3054 / Dry Cleaning Depot**

**Prepared For:**

Atlanta Environmental Consultants  
3440 Blue Springs Rd.  
Suite 503  
Kennesaw, GA 30144-0000

**Attention:** Mr. Peter Kallay

**Report Date:** 12/23/2013

**This report contains 12 pages.**  
(including this cover page and chain of custody)

  
John Andros  
Technical Director



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All test results relate only to the samples analyzed. Unless otherwise noted, all analyses performed under NELAP certification have complied with all the requirements of the NELAC standard. This report may not be reproduced, except in full, without the written permission of ACL (Advanced Chemistry Labs, Inc). ACL maintains the following certifications: NELAC (E87212)

## **Explanation of Symbols and Abbreviations**

Listed below are common symbols and abbreviations typically used in reporting technical data:

PQL	Practical Quantitation Limit	MDL	Method Detection Limit
BQL	Below Quantitation Limit	BDL	Below Method Detection Limit
MPN	Most Probable Number	TNTC	Too Numerous To Count
NTU	Nephelometric Turbidity Units	BTU	British Thermal Units
°C	Degrees Centigrade	°F	Degrees Fahrenheit
$\mu$ mhos/cm	micromhos/cm	cfu	Colony Forming Unit
DF	Dilution Factor	meq	milliequivalents
kg	kilogram(s)	g	gram(s)
mg	milligram(s)	$\mu$ g	microgram(s)
l or L	liter(s)	ml or mL	milliliter(s)
$\mu$ l or $\mu$ L	microliter(s)	m <sup>3</sup>	cubic meter(s)
lb	pound(s)	ft <sup>3</sup>	cubic foot(feet)
ft	foot(feet)	su	Standard Units
<	Less than	>	Greater than

mg/L, mg/kg      Units of concentration in milligrams per liter for liquids and milligrams per kilogram for solids. Also referred to as parts per million or "ppm" when the assumption is made that the specific gravity or density is one (1 g/mL).

$\mu$ g/L,  $\mu$ g/kg      Units of concentration in micrograms per liter for liquids and micrograms per kilogram for solids. Also referred to as parts per billion or "ppb" when the assumption is made that the specific gravity or density is one (1 g/mL).

wt %      Units of concentration expressed on a weight/weight basis (e.g. grams per 100 grams).

Surrogate      Compound(s) added by the laboratory for quality control monitoring.

mg/kg,dw      Units of concentration in milligrams per kilogram (dry weight basis).

### **Data Qualifiers:**

B	Analyte was also detected in the method blank
E	Estimated value - analyte was detected at concentration greater than upper calibration limit
F	Estimated value - analyte should have been tested as a field parameter
H	Estimated value - sample was analyzed beyond the accepted holding time
J	Estimated value - analyte was detected < PQL and $\geq$ MDL
L	The batch-specific LCS and/or LCSD was not within lab control limits for this analyte
M	The batch-specific MS and/or MSD was not within lab control limits for this analyte
R	The RPD between batch-specific sample/dup or MS/MSD was not within lab control limits for this analyte
S	The surrogate recovery was not within quality control limits
Z	Laboratory specific qualifier – refer to case narrative
*	Performed in strict accordance with the procedures and controls of the ACL quality system, but not currently in the NELAC list of certified analytes/methods

Solid samples (i.e. soil, sludge, solid waste) are reported on a wet weight basis unless otherwise noted. Estimated uncertainty values are available upon request.

**Representation and Limitation of Liability** – The accuracy of all analytical results for samples begins as it is received by the laboratory. The integrity of the sample begins at the time it is placed in the possession of authorized ACL personnel. All other warranties, expressed or implied, are disclaimed. Liability is limited to the cost of the analysis.



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**Client:** Atlanta Environmental Consultants  
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 Suite 503  
 Kennesaw, GA 30144-0000

**Client Proj #:** ECC-3054 / Dry Cleaning Depot  
**ACL Project #:** 66011  
**Date Received:** 12/12/2013  
**Date Reported:** 12/23/2013

**Contact:** Mr. Peter Kallay

### Volatile Organics (8260B)

**Sample ID:** MW-1

**Matrix:** Water

**ACL Sample #:** 301144

**Date Sampled:** 12/12/2013 10:15

**Date Prepared:**

**Date Analyzed:** 12/18/2013

**Units:** µg/L

**Analyst:** JG

Analyte	Result	PQL	Analyte	Result	PQL
Acetone	BQL	100	1,3-Dichloropropane	BQL	5.0
Acrolein	BQL	50	2,2-Dichloropropane	BQL	5.0
Acrylonitrile	BQL	50	1,1-Dichloropropene	BQL	5.0
Benzene	BQL	5.0	cis-1,3-Dichloropropene	BQL	5.0
Bromobenzene	BQL	5.0	trans-1,3-Dichloropropene	BQL	5.0
Bromochloromethane	BQL	5.0	Ethylbenzene	BQL	5.0
Bromodichloromethane	BQL	5.0	Hexachlorobutadiene	BQL	5.0
Bromoform	BQL	5.0	2-Hexanone	BQL	50
Bromomethane	BQL	10	Isopropylbenzene	BQL	5.0
2-Butanone	BQL	100	p-Isopropyltoluene	BQL	5.0
n-Butylbenzene	BQL	5.0	4-Methyl-2-pentanone	BQL	50
sec-Butylbenzene	BQL	5.0	Methylene chloride	BQL	5.0
tert-Butylbenzene	BQL	5.0	Naphthalene	BQL	5.0
Carbon disulfide	BQL	5.0	n-Propylbenzene	BQL	5.0
Carbon tetrachloride	BQL	5.0	Styrene	BQL	5.0
Chlorobenzene	BQL	5.0	1,1,1,2-Tetrachloroethane	BQL	5.0
Chloroethane	BQL	10	1,1,2,2-Tetrachloroethane	BQL	5.0
2-Chloroethylvinyl ether	BQL	10	Tetrachloroethene	BQL	5.0
Chloroform	BQL	5.0	Toluene	BQL	5.0
Chloromethane	BQL	10	1,2,3-Trichlorobenzene	BQL	5.0
2-Chlorotoluene	BQL	5.0	1,2,4-Trichlorobenzene	BQL	5.0
4-Chlorotoluene	BQL	5.0	1,1,1-Trichloroethane	BQL	5.0
1,2-Dibromo-3-chloropropane	BQL	5.0	1,1,2-Trichloroethane	BQL	5.0
Dibromochloromethane	BQL	5.0	Trichloroethene	BQL	5.0
1,2-Dibromoethane	BQL	5.0	Trichlorofluoromethane	BQL	5.0
Dibromomethane	BQL	5.0	1,2,3-Trichloropropane	BQL	5.0
1,2-Dichlorobenzene	BQL	5.0	1,2,4-Trimethylbenzene	BQL	5.0
1,3-Dichlorobenzene	BQL	5.0	1,3,5-Trimethylbenzene	BQL	5.0
1,4-Dichlorobenzene	BQL	5.0	Vinyl acetate	BQL	50
Dichlorodifluoromethane	BQL	10	Vinyl chloride	BQL	2.0
1,1-Dichloroethane	BQL	5.0	m,p-Xylene	BQL	10
1,2-Dichloroethane	BQL	5.0	o-Xylene	BQL	5.0
1,1-Dichloroethene	BQL	5.0			
cis-1,2-Dichloroethene	BQL	5.0			
trans-1,2-Dichloroethene	BQL	5.0			
1,2-Dichloropropane	BQL	5.0			

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**Client:** Atlanta Environmental Consultants  
 3440 Blue Springs Rd.  
 Suite 503  
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**Client Proj #:** ECC-3054 / Dry Cleaning Depot  
**ACL Project #:** 66011  
**Date Received:** 12/12/2013  
**Date Reported:** 12/23/2013

**Contact:** Mr. Peter Kallay

### Volatile Organics (8260B)

**Sample ID:** MW-2

**Matrix:** Water

**ACL Sample #:** 301145

**Date Sampled:** 12/12/2013 10:35

**Date Prepared:**

**Date Analyzed:** 12/18/2013

**Units:** µg/L

**Analyst:** JG

Analyte	Result	PQL	Analyte	Result	PQL
Acetone	BQL	100	1,3-Dichloropropane	BQL	5.0
Acrolein	BQL	50	2,2-Dichloropropane	BQL	5.0
Acrylonitrile	BQL	50	1,1-Dichloropropene	BQL	5.0
Benzene	BQL	5.0	cis-1,3-Dichloropropene	BQL	5.0
Bromobenzene	BQL	5.0	trans-1,3-Dichloropropene	BQL	5.0
Bromochloromethane	BQL	5.0	Ethylbenzene	BQL	5.0
Bromodichloromethane	BQL	5.0	Hexachlorobutadiene	BQL	5.0
Bromoform	BQL	5.0	2-Hexanone	BQL	50
Bromomethane	BQL	10	Isopropylbenzene	BQL	5.0
2-Butanone	BQL	100	p-Isopropyltoluene	BQL	5.0
n-Butylbenzene	BQL	5.0	4-Methyl-2-pentanone	BQL	50
sec-Butylbenzene	BQL	5.0	Methylene chloride	BQL	5.0
tert-Butylbenzene	BQL	5.0	Naphthalene	BQL	5.0
Carbon disulfide	BQL	5.0	n-Propylbenzene	BQL	5.0
Carbon tetrachloride	BQL	5.0	Styrene	BQL	5.0
Chlorobenzene	BQL	5.0	1,1,1,2-Tetrachloroethane	BQL	5.0
Chloroethane	BQL	10	1,1,2,2-Tetrachloroethane	BQL	5.0
2-Chloroethylvinyl ether	BQL	10	Tetrachloroethene	BQL	5.0
Chloroform	BQL	5.0	Toluene	BQL	5.0
Chloromethane	BQL	10	1,2,3-Trichlorobenzene	BQL	5.0
2-Chlorotoluene	BQL	5.0	1,2,4-Trichlorobenzene	BQL	5.0
4-Chlorotoluene	BQL	5.0	1,1,1-Trichloroethane	BQL	5.0
1,2-Dibromo-3-chloropropane	BQL	5.0	1,1,2-Trichloroethane	BQL	5.0
Dibromochloromethane	BQL	5.0	Trichloroethene	BQL	5.0
1,2-Dibromoethane	BQL	5.0	Trichlorofluoromethane	BQL	5.0
Dibromomethane	BQL	5.0	1,2,3-Trichloropropane	BQL	5.0
1,2-Dichlorobenzene	BQL	5.0	1,2,4-Trimethylbenzene	BQL	5.0
1,3-Dichlorobenzene	BQL	5.0	1,3,5-Trimethylbenzene	BQL	5.0
1,4-Dichlorobenzene	BQL	5.0	Vinyl acetate	BQL	50
Dichlorodifluoromethane	BQL	10	Vinyl chloride	BQL	2.0
1,1-Dichloroethane	BQL	5.0	m,p-Xylene	BQL	10
1,2-Dichloroethane	BQL	5.0	o-Xylene	BQL	5.0
1,1-Dichloroethene	BQL	5.0			
cis-1,2-Dichloroethene	BQL	5.0			
trans-1,2-Dichloroethene	BQL	5.0			
1,2-Dichloropropane	BQL	5.0			



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**Client Proj #:** ECC-3054 / Dry Cleaning Depot  
**ACL Project #:** 66011  
**Date Received:** 12/12/2013  
**Date Reported:** 12/23/2013

**Contact:** Mr. Peter Kallay

### Volatile Organics (8260B)

**Sample ID:** MW-3

**Matrix:** Water

**ACL Sample #:** 301146

**Date Sampled:** 12/12/2013 11:10

**Date Prepared:**

**Date Analyzed:** 12/18/2013

**Units:** µg/L

**Analyst:** JG

Analyte	Result	PQL	Analyte	Result	PQL
Acetone	BQL	100	1,3-Dichloropropane	BQL	5.0
Acrolein	BQL	50	2,2-Dichloropropane	BQL	5.0
Acrylonitrile	BQL	50	1,1-Dichloropropene	BQL	5.0
Benzene	BQL	5.0	cis-1,3-Dichloropropene	BQL	5.0
Bromobenzene	BQL	5.0	trans-1,3-Dichloropropene	BQL	5.0
Bromochloromethane	BQL	5.0	Ethylbenzene	BQL	5.0
Bromodichloromethane	BQL	5.0	Hexachlorobutadiene	BQL	5.0
Bromoform	BQL	5.0	2-Hexanone	BQL	50
Bromomethane	BQL	10	Isopropylbenzene	BQL	5.0
2-Butanone	BQL	100	p-Isopropyltoluene	BQL	5.0
n-Butylbenzene	BQL	5.0	4-Methyl-2-pentanone	BQL	50
sec-Butylbenzene	BQL	5.0	Methylene chloride	BQL	5.0
tert-Butylbenzene	BQL	5.0	Naphthalene	BQL	5.0
Carbon disulfide	BQL	5.0	n-Propylbenzene	BQL	5.0
Carbon tetrachloride	BQL	5.0	Styrene	BQL	5.0
Chlorobenzene	BQL	5.0	1,1,1,2-Tetrachloroethane	BQL	5.0
Chloroethane	BQL	10	1,1,2,2-Tetrachloroethane	BQL	5.0
2-Chloroethylvinyl ether	BQL	10	Tetrachloroethene	BQL	5.0
Chloroform	BQL	5.0	Toluene	BQL	5.0
Chloromethane	BQL	10	1,2,3-Trichlorobenzene	BQL	5.0
2-Chlorotoluene	BQL	5.0	1,2,4-Trichlorobenzene	BQL	5.0
4-Chlorotoluene	BQL	5.0	1,1,1-Trichloroethane	BQL	5.0
1,2-Dibromo-3-chloropropane	BQL	5.0	1,1,2-Trichloroethane	BQL	5.0
Dibromochloromethane	BQL	5.0	Trichloroethene	BQL	5.0
1,2-Dibromoethane	BQL	5.0	Trichlorofluoromethane	BQL	5.0
Dibromomethane	BQL	5.0	1,2,3-Trichloropropane	BQL	5.0
1,2-Dichlorobenzene	BQL	5.0	1,2,4-Trimethylbenzene	BQL	5.0
1,3-Dichlorobenzene	BQL	5.0	1,3,5-Trimethylbenzene	BQL	5.0
1,4-Dichlorobenzene	BQL	5.0	Vinyl acetate	BQL	50
Dichlorodifluoromethane	BQL	10	Vinyl chloride	BQL	2.0
1,1-Dichloroethane	BQL	5.0	m,p-Xylene	BQL	10
1,2-Dichloroethane	BQL	5.0	o-Xylene	BQL	5.0
1,1-Dichloroethene	BQL	5.0			
cis-1,2-Dichloroethene	BQL	5.0			
trans-1,2-Dichloroethene	BQL	5.0			
1,2-Dichloropropane	BQL	5.0			

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**Client Proj #:** ECC-3054 / Dry Cleaning Depot  
**ACL Project #:** 66011  
**Date Received:** 12/12/2013  
**Date Reported:** 12/23/2013

**Contact:** Mr. Peter Kallay

### Volatile Organics (8260B)

**Sample ID:** MW-4

**Matrix:** Water

**ACL Sample #:** 301147

**Date Sampled:** 12/12/2013 11:30

**Date Prepared:**

**Date Analyzed:** 12/18/2013

**Units:** µg/L

**Analyst:** JG

Analyte	Result	PQL	Analyte	Result	PQL
Acetone	BQL	100	1,3-Dichloropropane	BQL	5.0
Acrolein	BQL	50	2,2-Dichloropropane	BQL	5.0
Acrylonitrile	BQL	50	1,1-Dichloropropene	BQL	5.0
Benzene	BQL	5.0	cis-1,3-Dichloropropene	BQL	5.0
Bromobenzene	BQL	5.0	trans-1,3-Dichloropropene	BQL	5.0
Bromochloromethane	BQL	5.0	Ethylbenzene	BQL	5.0
Bromodichloromethane	BQL	5.0	Hexachlorobutadiene	BQL	5.0
Bromoform	BQL	5.0	2-Hexanone	BQL	50
Bromomethane	BQL	10	Isopropylbenzene	BQL	5.0
2-Butanone	BQL	100	p-Isopropyltoluene	BQL	5.0
n-Butylbenzene	BQL	5.0	4-Methyl-2-pentanone	BQL	50
sec-Butylbenzene	BQL	5.0	Methylene chloride	BQL	5.0
tert-Butylbenzene	BQL	5.0	Naphthalene	BQL	5.0
Carbon disulfide	BQL	5.0	n-Propylbenzene	BQL	5.0
Carbon tetrachloride	BQL	5.0	Styrene	BQL	5.0
Chlorobenzene	BQL	5.0	1,1,1,2-Tetrachloroethane	BQL	5.0
Chloroethane	BQL	10	1,1,2,2-Tetrachloroethane	BQL	5.0
2-Chloroethylvinyl ether	BQL	10	Tetrachloroethene	102	5.0
Chloroform	BQL	5.0	Toluene	BQL	5.0
Chloromethane	BQL	10	1,2,3-Trichlorobenzene	BQL	5.0
2-Chlorotoluene	BQL	5.0	1,2,4-Trichlorobenzene	BQL	5.0
4-Chlorotoluene	BQL	5.0	1,1,1-Trichloroethane	BQL	5.0
1,2-Dibromo-3-chloropropane	BQL	5.0	1,1,2-Trichloroethane	BQL	5.0
Dibromochloromethane	BQL	5.0	Trichloroethene	BQL	5.0
1,2-Dibromoethane	BQL	5.0	Trichlorofluoromethane	BQL	5.0
Dibromomethane	BQL	5.0	1,2,3-Trichloropropane	BQL	5.0
1,2-Dichlorobenzene	BQL	5.0	1,2,4-Trimethylbenzene	BQL	5.0
1,3-Dichlorobenzene	BQL	5.0	1,3,5-Trimethylbenzene	BQL	5.0
1,4-Dichlorobenzene	BQL	5.0	Vinyl acetate	BQL	50
Dichlorodifluoromethane	BQL	10	Vinyl chloride	BQL	2.0
1,1-Dichloroethane	BQL	5.0	m,p-Xylene	BQL	10
1,2-Dichloroethane	BQL	5.0	o-Xylene	BQL	5.0
1,1-Dichloroethene	BQL	5.0			
cis-1,2-Dichloroethene	BQL	5.0			
trans-1,2-Dichloroethene	BQL	5.0			
1,2-Dichloropropane	BQL	5.0			



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**Client Proj #:** ECC-3054 / Dry Cleaning Depot  
**ACL Project #:** 66011  
**Date Received:** 12/12/2013  
**Date Reported:** 12/23/2013

**Contact:** Mr. Peter Kallay

### Volatile Organics (8260B)

**Sample ID:** MW-5

**Matrix:** Water

**ACL Sample #:** 301148

**Date Sampled:** 12/12/2013 11:55

**Date Prepared:**

**Date Analyzed:** 12/18/2013

**Units:** µg/L

**Analyst:** JG

Analyte	Result	PQL	Analyte	Result	PQL
Acetone	BQL	100	1,3-Dichloropropane	BQL	5.0
Acrolein	BQL	50	2,2-Dichloropropane	BQL	5.0
Acrylonitrile	BQL	50	1,1-Dichloropropene	BQL	5.0
Benzene	BQL	5.0	cis-1,3-Dichloropropene	BQL	5.0
Bromobenzene	BQL	5.0	trans-1,3-Dichloropropene	BQL	5.0
Bromochloromethane	BQL	5.0	Ethylbenzene	BQL	5.0
Bromodichloromethane	BQL	5.0	Hexachlorobutadiene	BQL	5.0
Bromoform	BQL	5.0	2-Hexanone	BQL	50
Bromomethane	BQL	10	Isopropylbenzene	BQL	5.0
2-Butanone	BQL	100	p-Isopropyltoluene	BQL	5.0
n-Butylbenzene	BQL	5.0	4-Methyl-2-pentanone	BQL	50
sec-Butylbenzene	BQL	5.0	Methylene chloride	BQL	5.0
tert-Butylbenzene	BQL	5.0	Naphthalene	BQL	5.0
Carbon disulfide	BQL	5.0	n-Propylbenzene	BQL	5.0
Carbon tetrachloride	BQL	5.0	Styrene	BQL	5.0
Chlorobenzene	BQL	5.0	1,1,1,2-Tetrachloroethane	BQL	5.0
Chloroethane	BQL	10	1,1,2,2-Tetrachloroethane	BQL	5.0
2-Chloroethylvinyl ether	BQL	10	Tetrachloroethene	74	5.0
Chloroform	BQL	5.0	Toluene	BQL	5.0
Chloromethane	BQL	10	1,2,3-Trichlorobenzene	BQL	5.0
2-Chlorotoluene	BQL	5.0	1,2,4-Trichlorobenzene	BQL	5.0
4-Chlorotoluene	BQL	5.0	1,1,1-Trichloroethane	BQL	5.0
1,2-Dibromo-3-chloropropane	BQL	5.0	1,1,2-Trichloroethane	BQL	5.0
Dibromochloromethane	BQL	5.0	Trichloroethene	BQL	5.0
1,2-Dibromoethane	BQL	5.0	Trichlorofluoromethane	BQL	5.0
Dibromomethane	BQL	5.0	1,2,3-Trichloropropane	BQL	5.0
1,2-Dichlorobenzene	BQL	5.0	1,2,4-Trimethylbenzene	BQL	5.0
1,3-Dichlorobenzene	BQL	5.0	1,3,5-Trimethylbenzene	BQL	5.0
1,4-Dichlorobenzene	BQL	5.0	Vinyl acetate	BQL	50
Dichlorodifluoromethane	BQL	10	Vinyl chloride	BQL	2.0
1,1-Dichloroethane	BQL	5.0	m,p-Xylene	BQL	10
1,2-Dichloroethane	BQL	5.0	o-Xylene	BQL	5.0
1,1-Dichloroethene	BQL	5.0			
cis-1,2-Dichloroethene	BQL	5.0			
trans-1,2-Dichloroethene	BQL	5.0			
1,2-Dichloropropane	BQL	5.0			

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**Client Proj #:** ECC-3054 / Dry Cleaning Depot  
**ACL Project #:** 66011  
**Date Received:** 12/12/2013  
**Date Reported:** 12/23/2013

**Contact:** Mr. Peter Kallay

### Volatile Organics (8260B)

**Sample ID:** MW-6

**Matrix:** Water

**ACL Sample #:** 301149

**Date Sampled:** 12/12/2013 12:20

**Date Prepared:**

**Date Analyzed:** 12/18/2013

**Units:** µg/L

**Analyst:** JG

Analyte	Result	PQL	Analyte	Result	PQL
Acetone	BQL	100	1,3-Dichloropropane	BQL	5.0
Acrolein	BQL	50	2,2-Dichloropropane	BQL	5.0
Acrylonitrile	BQL	50	1,1-Dichloropropene	BQL	5.0
Benzene	BQL	5.0	cis-1,3-Dichloropropene	BQL	5.0
Bromobenzene	BQL	5.0	trans-1,3-Dichloropropene	BQL	5.0
Bromochloromethane	BQL	5.0	Ethylbenzene	BQL	5.0
Bromodichloromethane	BQL	5.0	Hexachlorobutadiene	BQL	5.0
Bromoform	BQL	5.0	2-Hexanone	BQL	50
Bromomethane	BQL	10	Isopropylbenzene	BQL	5.0
2-Butanone	BQL	100	p-Isopropyltoluene	BQL	5.0
n-Butylbenzene	BQL	5.0	4-Methyl-2-pentanone	BQL	50
sec-Butylbenzene	BQL	5.0	Methylene chloride	BQL	5.0
tert-Butylbenzene	BQL	5.0	Naphthalene	BQL	5.0
Carbon disulfide	BQL	5.0	n-Propylbenzene	BQL	5.0
Carbon tetrachloride	BQL	5.0	Styrene	BQL	5.0
Chlorobenzene	BQL	5.0	1,1,1,2-Tetrachloroethane	BQL	5.0
Chloroethane	BQL	10	1,1,2,2-Tetrachloroethane	BQL	5.0
2-Chloroethylvinyl ether	BQL	10	Tetrachloroethene	27	5.0
Chloroform	BQL	5.0	Toluene	BQL	5.0
Chloromethane	BQL	10	1,2,3-Trichlorobenzene	BQL	5.0
2-Chlorotoluene	BQL	5.0	1,2,4-Trichlorobenzene	BQL	5.0
4-Chlorotoluene	BQL	5.0	1,1,1-Trichloroethane	BQL	5.0
1,2-Dibromo-3-chloropropane	BQL	5.0	1,1,2-Trichloroethane	BQL	5.0
Dibromochloromethane	BQL	5.0	Trichloroethene	BQL	5.0
1,2-Dibromoethane	BQL	5.0	Trichlorofluoromethane	BQL	5.0
Dibromomethane	BQL	5.0	1,2,3-Trichloropropane	BQL	5.0
1,2-Dichlorobenzene	BQL	5.0	1,2,4-Trimethylbenzene	BQL	5.0
1,3-Dichlorobenzene	BQL	5.0	1,3,5-Trimethylbenzene	BQL	5.0
1,4-Dichlorobenzene	BQL	5.0	Vinyl acetate	BQL	50
Dichlorodifluoromethane	BQL	10	Vinyl chloride	BQL	2.0
1,1-Dichloroethane	BQL	5.0	m,p-Xylene	BQL	10
1,2-Dichloroethane	BQL	5.0	o-Xylene	BQL	5.0
1,1-Dichloroethene	BQL	5.0			
cis-1,2-Dichloroethene	BQL	5.0			
trans-1,2-Dichloroethene	BQL	5.0			
1,2-Dichloropropane	BQL	5.0			



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**ACL Project #:** 66011  
**Date Received:** 12/12/2013  
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**Contact:** Mr. Peter Kallay

### Volatile Organics (8260B)

**Sample ID:** MW-7

**Matrix:** Water

**ACL Sample #:** 301150

**Date Sampled:** 12/12/2013 13:20

**Date Prepared:**

**Date Analyzed:** 12/18/2013

**Units:** µg/L

**Analyst:** JG

Analyte	Result	PQL	Analyte	Result	PQL
Acetone	BQL	100	1,3-Dichloropropane	BQL	5.0
Acrolein	BQL	50	2,2-Dichloropropane	BQL	5.0
Acrylonitrile	BQL	50	1,1-Dichloropropene	BQL	5.0
Benzene	BQL	5.0	cis-1,3-Dichloropropene	BQL	5.0
Bromobenzene	BQL	5.0	trans-1,3-Dichloropropene	BQL	5.0
Bromochloromethane	BQL	5.0	Ethylbenzene	BQL	5.0
Bromodichloromethane	BQL	5.0	Hexachlorobutadiene	BQL	5.0
Bromoform	BQL	5.0	2-Hexanone	BQL	50
Bromomethane	BQL	10	Isopropylbenzene	BQL	5.0
2-Butanone	BQL	100	p-Isopropyltoluene	BQL	5.0
n-Butylbenzene	BQL	5.0	4-Methyl-2-pentanone	BQL	50
sec-Butylbenzene	BQL	5.0	Methylene chloride	BQL	5.0
tert-Butylbenzene	BQL	5.0	Naphthalene	BQL	5.0
Carbon disulfide	BQL	5.0	n-Propylbenzene	BQL	5.0
Carbon tetrachloride	BQL	5.0	Styrene	BQL	5.0
Chlorobenzene	BQL	5.0	1,1,1,2-Tetrachloroethane	BQL	5.0
Chloroethane	BQL	10	1,1,2,2-Tetrachloroethane	BQL	5.0
2-Chloroethylvinyl ether	BQL	10	Tetrachloroethene	79	5.0
Chloroform	BQL	5.0	Toluene	BQL	5.0
Chloromethane	BQL	10	1,2,3-Trichlorobenzene	BQL	5.0
2-Chlorotoluene	BQL	5.0	1,2,4-Trichlorobenzene	BQL	5.0
4-Chlorotoluene	BQL	5.0	1,1,1-Trichloroethane	BQL	5.0
1,2-Dibromo-3-chloropropane	BQL	5.0	1,1,2-Trichloroethane	BQL	5.0
Dibromochloromethane	BQL	5.0	Trichloroethene	BQL	5.0
1,2-Dibromoethane	BQL	5.0	Trichlorofluoromethane	BQL	5.0
Dibromomethane	BQL	5.0	1,2,3-Trichloropropane	BQL	5.0
1,2-Dichlorobenzene	BQL	5.0	1,2,4-Trimethylbenzene	BQL	5.0
1,3-Dichlorobenzene	BQL	5.0	1,3,5-Trimethylbenzene	BQL	5.0
1,4-Dichlorobenzene	BQL	5.0	Vinyl acetate	BQL	50
Dichlorodifluoromethane	BQL	10	Vinyl chloride	BQL	2.0
1,1-Dichloroethane	BQL	5.0	m,p-Xylene	BQL	10
1,2-Dichloroethane	BQL	5.0	o-Xylene	BQL	5.0
1,1-Dichloroethene	BQL	5.0			
cis-1,2-Dichloroethene	BQL	5.0			
trans-1,2-Dichloroethene	BQL	5.0			
1,2-Dichloropropane	BQL	5.0			

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 www.acl-labs.com

**Client:** Atlanta Environmental Consultants  
 3440 Blue Springs Rd.  
 Suite 503  
 Kennesaw, GA 30144-0000

**Client Proj #:** ECC-3054 / Dry Cleaning Depot  
**ACL Project #:** 66011  
**Date Received:** 12/12/2013  
**Date Reported:** 12/23/2013

**Contact:** Mr. Peter Kallay

### Volatile Organics (8260B)

**Sample ID:** MW-8

**Matrix:** Water

**ACL Sample #:** 301151

**Date Sampled:** 12/12/2013 13:50

**Date Prepared:**

**Date Analyzed:** 12/18/2013

**Units:** µg/L

**Analyst:** JG

Analyte	Result	PQL	Analyte	Result	PQL
Acetone	BQL	100	1,3-Dichloropropane	BQL	5.0
Acrolein	BQL	50	2,2-Dichloropropane	BQL	5.0
Acrylonitrile	BQL	50	1,1-Dichloropropene	BQL	5.0
Benzene	BQL	5.0	cis-1,3-Dichloropropene	BQL	5.0
Bromobenzene	BQL	5.0	trans-1,3-Dichloropropene	BQL	5.0
Bromochloromethane	BQL	5.0	Ethylbenzene	BQL	5.0
Bromodichloromethane	BQL	5.0	Hexachlorobutadiene	BQL	5.0
Bromoform	BQL	5.0	2-Hexanone	BQL	50
Bromomethane	BQL	10	Isopropylbenzene	BQL	5.0
2-Butanone	BQL	100	p-Isopropyltoluene	BQL	5.0
n-Butylbenzene	BQL	5.0	4-Methyl-2-pentanone	BQL	50
sec-Butylbenzene	BQL	5.0	Methylene chloride	BQL	5.0
tert-Butylbenzene	BQL	5.0	Naphthalene	BQL	5.0
Carbon disulfide	BQL	5.0	n-Propylbenzene	BQL	5.0
Carbon tetrachloride	BQL	5.0	Styrene	BQL	5.0
Chlorobenzene	BQL	5.0	1,1,1,2-Tetrachloroethane	BQL	5.0
Chloroethane	BQL	10	1,1,2,2-Tetrachloroethane	BQL	5.0
2-Chloroethylvinyl ether	BQL	10	Tetrachloroethene	15	5.0
Chloroform	BQL	5.0	Toluene	BQL	5.0
Chloromethane	BQL	10	1,2,3-Trichlorobenzene	BQL	5.0
2-Chlorotoluene	BQL	5.0	1,2,4-Trichlorobenzene	BQL	5.0
4-Chlorotoluene	BQL	5.0	1,1,1-Trichloroethane	BQL	5.0
1,2-Dibromo-3-chloropropane	BQL	5.0	1,1,2-Trichloroethane	BQL	5.0
Dibromochloromethane	BQL	5.0	Trichloroethene	BQL	5.0
1,2-Dibromoethane	BQL	5.0	Trichlorofluoromethane	BQL	5.0
Dibromomethane	BQL	5.0	1,2,3-Trichloropropane	BQL	5.0
1,2-Dichlorobenzene	BQL	5.0	1,2,4-Trimethylbenzene	BQL	5.0
1,3-Dichlorobenzene	BQL	5.0	1,3,5-Trimethylbenzene	BQL	5.0
1,4-Dichlorobenzene	BQL	5.0	Vinyl acetate	BQL	50
Dichlorodifluoromethane	BQL	10	Vinyl chloride	BQL	2.0
1,1-Dichloroethane	BQL	5.0	m,p-Xylene	BQL	10
1,2-Dichloroethane	BQL	5.0	o-Xylene	BQL	5.0
1,1-Dichloroethene	BQL	5.0			
cis-1,2-Dichloroethene	BQL	5.0			
trans-1,2-Dichloroethene	BQL	5.0			
1,2-Dichloropropane	BQL	5.0			



Phone: (770) 409-1444  
Fax: (770) 409-1844  
e-mail: acl@acl-labs.net

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P.O. Box 88610 • Atlanta, GA 30356  
www.acl-labs.com

## Sample Log-in Checklist

Client Name: Atlanta Environmental Consultants

ACL Project Number: **66011**

### Cooler Check

Ice Present? Yes ☒ No ☐  
Temperature 4 °C

Evidence Tape Present? Yes ☐ No ☒  
Evidence Tape Intact? ☐ ☒

For coolers with a temperature greater than 6°C or with a damaged evidence seal, the bottles affected are identified below.

Chain-of-Custody Form Included? Yes ☒ No ☐  
Field Sampling Sheet Included? ☐ ☒

### Cooler Shipping and Receipt

Shipping Method: Delivered by Customer

Tracking Number:

Receipt Date: 12/12/2013

Receipt Time: 4:47 PM

### Bottle Check

Acid Preserved Sample (pH Check): pH<2? Yes  
(pH for VO vials to be checked upon analysis)

Base Preserved Samples (pH Check): pH>12? N/A

Chlorine Check (Positive, Negative, N/A): N/A

### Condition of Containers:

Evidence Tape Present on Bottles? Yes ☐ No ☒  
Evidence Tape Intact? ☐ ☒  
Loose Caps? ☐ ☒  
Broken Bottles? ☐ ☒

Cooler Unpacked/Checked By: JA

Logged In By: JA

Log-in Date: 12/12/2013

Comments (if any):

**ADVANCED CHEMISTRY LABS, INC.**

Company Name: <b>ATLANTA ENVIRONMENTAL CONSULTANTS</b>		Phone #: <b>770-529-0386</b> Fax #: <b>678-589-2419</b>											
Address: <b>3440 BLUE SPRING RD. SUITE 203 KENNESAW, GA 30144</b>		Site Location: <b>Turn Key Cleaning Depot</b>											
Project Manager: <b>PETER T. KAVAY</b>		Project #: <b>EC-3054</b>											
I attest that the proper field sampling procedures were used during the collection of these samples.		Project Name: <b>Turn Key Cleaning Depot</b> Sampler Name (Print): <b>PETER T. KAVAY</b>											
Field Sample ID	# of Containers	Matrix	Method Preserved	Sampling			Remarks						
				NaHSO <sub>4</sub>	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>		NaOH	None	Date	Time	Grab	Comp
MW-1	2	Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
MW-2	2	Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
MW-3	2	Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
MW-4	2	Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
MW-5	2	Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
MW-6	2	Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
MW-7	2	Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
MW-8	2	Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Special Detection Limits													
Remarks:													
Special Reporting Requirements													
Lab Use Only: <b>666011</b> Cooler Temp. <b>4</b> °C													
ACL Project #: <b>666011</b>													
Special Handling													
TAT													
Next Bus. Day <input type="checkbox"/> ACL Contract <input type="checkbox"/>													
2nd Bus. Day <input type="checkbox"/> Quote # <input type="checkbox"/>													
3rd Bus. Day <input type="checkbox"/> P.O. <input type="checkbox"/>													
Normal <input checked="" type="checkbox"/>													
QA/QC Level													
Level 1 <input type="checkbox"/> Level 2 <input type="checkbox"/> Other <input type="checkbox"/>													
Received by: <b>[Signature]</b> Date: <b>12/12/13</b> Time: <b>4:47</b>													
Relinquished by: <b>[Signature]</b> Date: <b>12/12/13</b> Time: <b>4:47</b>													
Relinquished by: <b>[Signature]</b> Date: <b>12/12/13</b> Time: <b>4:47</b>													
CUSTODY RECORD													



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## Laboratory Report

**ACL Project #: 66131**

**Client Proj #: ECC-3054 / Roswell, GA**


**Prepared For:**

Atlanta Environmental Consultants  
3440 Blue Springs Rd.  
Suite 503  
Kennesaw, GA 30144-0000

**Attention:** Mr. Peter Kallay

**Report Date:** 01/29/2014

**This report contains 5 pages.**  
(including this cover page and chain of custody)

  
\_\_\_\_\_  
John Andros  
Technical Director



*Advanced Chemistry Labs is a woman-owned, small business concern.*

All test results relate only to the samples analyzed. Unless otherwise noted, all analyses performed under NELAP certification have complied with all the requirements of the NELAC standard. This report may not be reproduced, except in full, without the written permission of ACL (Advanced Chemistry Labs, Inc). ACL maintains the following certifications: NELAC (E87212)

## Explanation of Symbols and Abbreviations

Listed below are common symbols and abbreviations typically used in reporting technical data:

PQL	Practical Quantitation Limit	MDL	Method Detection Limit
BQL	Below Quantitation Limit	BDL	Below Method Detection Limit
MPN	Most Probable Number	TNTC	Too Numerous To Count
NTU	Nephelometric Turbidity Units	BTU	British Thermal Units
°C	Degrees Centigrade	°F	Degrees Fahrenheit
μmhos/cm	micromhos/cm	cfu	Colony Forming Unit
DF	Dilution Factor	meq	milliequivalents
kg	kilogram(s)	g	gram(s)
mg	milligram(s)	μg	microgram(s)
l or L	liter(s)	ml or mL	milliliter(s)
μl or μL	microliter(s)	m <sup>3</sup>	cubic meter(s)
lb	pound(s)	ft <sup>3</sup>	cubic foot(feet)
ft	foot(feet)	su	Standard Units
<	Less than	>	Greater than

mg/L, mg/kg      Units of concentration in milligrams per liter for liquids and milligrams per kilogram for solids. Also referred to as parts per million or "ppm" when the assumption is made that the specific gravity or density is one (1 g/mL).

μg/L, μg/kg      Units of concentration in micrograms per liter for liquids and micrograms per kilogram for solids. Also referred to as parts per billion or "ppb" when the assumption is made that the specific gravity or density is one (1 g/mL).

wt %      Units of concentration expressed on a weight/weight basis (e.g. grams per 100 grams).

Surrogate      Compound(s) added by the laboratory for quality control monitoring.

mg/kg,dw      Units of concentration in milligrams per kilogram (dry weight basis).

### Data Qualifiers:

B	Analyte was also detected in the method blank
E	Estimated value - analyte was detected at concentration greater than upper calibration limit
F	Estimated value - analyte should have been tested as a field parameter
H	Estimated value - sample was analyzed beyond the accepted holding time
J	Estimated value - analyte was detected < PQL and ≥ MDL
L	The batch-specific LCS and/or LCSD was not within lab control limits for this analyte
M	The batch-specific MS and/or MSD was not within lab control limits for this analyte
R	The RPD between batch-specific sample/dup or MS/MSD was not within lab control limits for this analyte
S	The surrogate recovery was not within quality control limits
Z	Laboratory specific qualifier – refer to case narrative
*	Performed in strict accordance with the procedures and controls of the ACL quality system, but not currently in the NELAC list of certified analytes/methods

Solid samples (i.e. soil, sludge, solid waste) are reported on a wet weight basis unless otherwise noted. Estimated uncertainty values are available upon request.

Representation and Limitation of Liability – The accuracy of all analytical results for samples begins as it is received by the laboratory. The integrity of the sample begins at the time it is placed in the possession of authorized ACL personnel. All other warranties, expressed or implied, are disclaimed. Liability is limited to the cost of the analysis.



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**Client:** Atlanta Environmental Consultants  
3440 Blue Springs Rd.  
Suite 503  
Kennesaw, GA 30144-0000

**Client Proj #:** ECC-3054 / Roswell, GA  
**ACL Project #:** 66131  
**Date Received:** 01/24/2014  
**Date Reported:** 01/29/2014

**Contact:** Mr. Peter Kallay

### Volatile Organics (8260B)

**Sample ID:** TMW-9

**Matrix:** Water

**ACL Sample #:** 301394

**Date Sampled:** 01/24/2014 15:45

**Date Prepared:**

**Date Analyzed:** 01/24/2014

**Units:** µg/L

**Analyst:** JG

Analyte	Result	PQL	Analyte	Result	PQL
Acetone	BQL	100	1,3-Dichloropropane	BQL	5.0
Acrolein	BQL	50	2,2-Dichloropropane	BQL	5.0
Acrylonitrile	BQL	50	1,1-Dichloropropene	BQL	5.0
Benzene	BQL	5.0	cis-1,3-Dichloropropene	BQL	5.0
Bromobenzene	BQL	5.0	trans-1,3-Dichloropropene	BQL	5.0
Bromochloromethane	BQL	5.0	Ethylbenzene	BQL	5.0
Bromodichloromethane	BQL	5.0	Hexachlorobutadiene	BQL	5.0
Bromoform	BQL	5.0	2-Hexanone	BQL	50
Bromomethane	BQL	10	Isopropylbenzene	BQL	5.0
2-Butanone	BQL	100	p-Isopropyltoluene	BQL	5.0
n-Butylbenzene	BQL	5.0	4-Methyl-2-pentanone	BQL	50
sec-Butylbenzene	BQL	5.0	Methylene chloride	BQL	5.0
tert-Butylbenzene	BQL	5.0	Naphthalene	BQL	5.0
Carbon disulfide	BQL	5.0	n-Propylbenzene	BQL	5.0
Carbon tetrachloride	BQL	5.0	Styrene	BQL	5.0
Chlorobenzene	BQL	5.0	1,1,1,2-Tetrachloroethane	BQL	5.0
Chloroethane	BQL	10	1,1,2,2-Tetrachloroethane	BQL	5.0
2-Chloroethylvinyl ether	BQL	10	Tetrachloroethene	BQL	5.0
Chloroform	BQL	5.0	Toluene	BQL	5.0
Chloromethane	BQL	10	1,2,3-Trichlorobenzene	BQL	5.0
2-Chlorotoluene	BQL	5.0	1,2,4-Trichlorobenzene	BQL	5.0
4-Chlorotoluene	BQL	5.0	1,1,1-Trichloroethane	BQL	5.0
1,2-Dibromo-3-chloropropane	BQL	5.0	1,1,2-Trichloroethane	BQL	5.0
Dibromochloromethane	BQL	5.0	Trichloroethene	BQL	5.0
1,2-Dibromoethane	BQL	5.0	Trichlorofluoromethane	BQL	5.0
Dibromomethane	BQL	5.0	1,2,3-Trichloropropane	BQL	5.0
1,2-Dichlorobenzene	BQL	5.0	1,2,4-Trimethylbenzene	BQL	5.0
1,3-Dichlorobenzene	BQL	5.0	1,3,5-Trimethylbenzene	BQL	5.0
1,4-Dichlorobenzene	BQL	5.0	Vinyl acetate	BQL	50
Dichlorodifluoromethane	BQL	10	Vinyl chloride	BQL	2.0
1,1-Dichloroethane	BQL	5.0	m,p-Xylene	BQL	10
1,2-Dichloroethane	BQL	5.0	o-Xylene	BQL	5.0
1,1-Dichloroethene	BQL	5.0			
cis-1,2-Dichloroethene	BQL	5.0			
trans-1,2-Dichloroethene	BQL	5.0			
1,2-Dichloropropane	BQL	5.0			

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P.O. Box 88610 • Atlanta, GA 30356  
[www.acl-labs.com](http://www.acl-labs.com)

### Sample Log-in Checklist

**Client Name:** Atlanta Environmental Consultants

**ACL Project Number:** 66131

#### Cooler Check

Ice Present? Yes ☒ No ☐  
Temperature 4 °C

Evidence Tape Present? Yes ☐ No ☒  
Evidence Tape Intact? ☐ ☒

For coolers with a temperature greater than 6°C or with a damaged evidence seal, the bottles affected are identified below.

Chain-of-Custody Form Included? Yes ☒ No ☐  
Field Sampling Sheet Included? ☐ ☒

#### Cooler Shipping and Receipt

**Shipping Method:** Delivered by Customer

**Tracking Number:**

**Receipt Date:** 1/24/2014

**Receipt Time:** 4:35 PM

#### Bottle Check

Acid Preserved Sample (pH Check): pH<2? Yes  
(pH for VO vials to be checked upon analysis)

Base Preserved Samples (pH Check): pH>12? N/A

Chlorine Check (Positive, Negative, N/A): N/A

#### Condition of Containers:

Evidence Tape Present on Bottles? Yes ☐ No ☒  
Evidence Tape Intact? ☐ ☒  
Loose Caps? ☐ ☒  
Broken Bottles? ☐ ☒

**Cooler Unpacked/Checked By:** JA

**Logged In By:** JA

**Log-in Date:** 1/24/2014

**Comments (if any):**





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Page 5 of 5

**APPENDIX V**

**LABORATORY ANALYTICAL REPORT: SUB-SLAB VAPOR**





ProjectID:

Report Date: 12/16/2013



**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077  
 Phone/Fax: (856)858-4800/ (856)858-4571  
<http://www.EMSL.com> TO-15 Lab@emsl.com

EMSL Order: 491301224  
 EMSL Sample ID: 491301224-0001  
 Received Date: 12/02/2013  
 Report Date: 12/16/2013

Project: Dry Cleaning Depot  
 Client Sample ID: SSV-1

Sampling Date: 11/29/2013  
 Canister ID: HD2248

Lab File ID: K7828.D  
 Sample Vol(ml): 25  
 Dilution Factor: 10

Analysis Date: 12/15/2013  
 Instrument ID: 5973K  
 Analyst Initials: KW

**Target Compound Results Summary**

USEPA: Compendium Method TO-15, "Determination of Volatile Organic Compounds (VOCs) in Air..." Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS), January 1999, (EPA/625/R-96/010b).

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3
Propylene	115-07-1	58.08	ND	10		ND	24
Freon 12(Dichlorodifluoromethane)	75-71-8	120.9	ND	5.0		ND	25
Freon 114(1,2-Dichlorotetrafluoroethane)	76-14-2	170.9	ND	5.0		ND	35
Chloromethane	74-87-3	50.49	ND	5.0		ND	10
n-Butane	106-97-8	58.12	ND	5.0		ND	12
Vinyl chloride	75-01-4	62.50	ND	5.0		ND	13
1,3-Butadiene	106-99-0	54.09	ND	5.0		ND	11
Bromomethane	74-83-9	94.94	ND	5.0		ND	19
Chloroethane	75-00-3	64.52	ND	5.0		ND	13
Ethanol	64-17-5	46.07	8.4	5.0		16	9.4
Bromoethene(Vinyl bromide)	593-60-2	106.9	ND	5.0		ND	22
Freon 11(Trichlorofluoromethane)	75-69-4	137.4	ND	5.0		ND	28
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	ND	5.0		ND	12
Freon 113(1,1,2-Trichlorotrifluoroethane)	76-13-1	187.4	ND	5.0		ND	38
Acetone	67-64-1	58.08	13	5.0		31	12
1,1-Dichloroethene	75-35-4	96.94	ND	5.0		ND	20
Acetonitrile	75-05-8	41.00	ND	5.0		ND	8.4
Tertiary butyl alcohol(TBA)	75-65-0	74.12	ND	5.0		ND	15
Bromoethane(Ethyl bromide)	74-96-4	108.0	ND	5.0		ND	22
3-Chloropropene(Allyl chloride)	107-05-1	76.53	ND	5.0		ND	16
Carbon disulfide	75-15-0	76.14	ND	5.0		ND	16
Methylene chloride	75-09-2	84.94	ND	5.0		ND	17
Acrylonitrile	107-13-1	53.00	ND	5.0		ND	11
Methyl-tert-butyl ether(MTBE)	1634-04-4	88.15	ND	5.0		ND	18
trans-1,2-Dichloroethene	156-60-5	96.94	ND	5.0		ND	20
n-Hexane	110-54-3	86.17	ND	5.0		ND	18
1,1-Dichloroethane	75-34-3	98.96	ND	5.0		ND	20
Vinyl acetate	108-05-4	86.00	ND	5.0		ND	18
2-Butanone(MEK)	78-93-3	72.10	ND	5.0		ND	15
cis-1,2-Dichloroethene	156-59-2	96.94	ND	5.0		ND	20
Ethyl acetate	141-78-6	88.10	ND	5.0		ND	18



**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077  
 Phone/Fax: (856)858-4800/ (856)858-4571  
<http://www.EMSL.com> TO-15 Lab@emsl.com

EMSL Order: 491301224  
 EMSL Sample ID: 491301224-0001  
 Received Date: 12/02/2013  
 Report Date: 12/16/2013

Project: Dry Cleaning Depot  
 Client Sample ID: SSV-1

Sampling Date: 11/29/2013  
 Canister ID: HD2248

Lab File ID: K7828.D  
 Sample Vol(ml): 25  
 Dilution Factor: 10

Analysis Date: 12/15/2013  
 Instrument ID: 5973K  
 Analyst Initials: KW

**Target Compound Results Summary**

USEPA: Compendium Method TO-15, "Determination of Volatile Organic Compounds (VOCs) in Air..." Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS), January 1999, (EPA/625/R-96/010b).

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3
Chloroform	67-66-3	119.4	ND	5.0		ND	24
Tetrahydrofuran	109-99-9	72.11	ND	5.0		ND	15
1,1,1-Trichloroethane	71-55-6	133.4	ND	5.0		ND	27
Cyclohexane	110-82-7	84.16	5.8	5.0		20	17
2,2,4-Trimethylpentane(Isooctane)	540-84-1	114.2	ND	5.0		ND	23
Carbon tetrachloride	56-23-5	153.8	ND	5.0		ND	31
n-Heptane	142-82-5	100.2	ND	5.0		ND	20
1,2-Dichloroethane	107-06-2	98.96	ND	5.0		ND	20
Benzene	71-43-2	78.11	ND	5.0		ND	16
Trichloroethene	79-01-6	131.4	ND	5.0		ND	27
1,2-Dichloropropane	78-87-5	113.0	ND	5.0		ND	23
Methyl Methacrylate	80-62-6	100.12	ND	5.0		ND	20
Bromodichloromethane	75-27-4	163.8	ND	5.0		ND	33
1,4-Dioxane	123-91-1	88.12	ND	5.0		ND	18
4-Methyl-2-pentanone(MIBK)	108-10-1	100.2	ND	5.0		ND	20
cis-1,3-Dichloropropene	10061-01-5	111.0	ND	5.0		ND	23
Toluene	108-88-3	92.14	ND	5.0		ND	19
trans-1,3-Dichloropropene	10061-02-6	111.0	ND	5.0		ND	23
1,1,2-Trichloroethane	79-00-5	133.4	ND	5.0		ND	27
2-Hexanone(MBK)	591-78-6	100.1	ND	5.0		ND	20
Tetrachloroethene	127-18-4	165.8	51	5.0		350	34
Dibromochloromethane	124-48-1	208.3	ND	5.0		ND	43
1,2-Dibromoethane	106-93-4	187.8	ND	5.0		ND	38
Chlorobenzene	108-90-7	112.6	ND	5.0		ND	23
Ethylbenzene	100-41-4	106.2	ND	5.0		ND	22
Xylene (p,m)	1330-20-7	106.2	ND	10		ND	43
Xylene (Ortho)	95-47-6	106.2	ND	5.0		ND	22
Styrene	100-42-5	104.1	ND	5.0		ND	21
Isopropylbenzene (cumene)	98-82-8	120.19	ND	5.0		ND	25
Bromoform	75-25-2	252.8	ND	5.0		ND	52
1,1,2,2-Tetrachloroethane	79-34-5	167.9	ND	5.0		ND	34



**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077  
 Phone/Fax: (856)858-4800/ (856)858-4571  
<http://www.EMSL.com> TO-15 Lab@emsl.com

EMSL Order: 491301224  
 EMSL Sample ID: 491301224-0001  
 Received Date: 12/02/2013  
 Report Date: 12/16/2013

Project: Dry Cleaning Depot  
 Client Sample ID: SSV-1

Lab File ID: K7828.D  
 Sample Vol(ml): 25  
 Dilution Factor: 10

Sampling Date: 11/29/2013  
 Canister ID: HD2248

Analysis Date: 12/15/2013  
 Instrument ID: 5973K  
 Analyst Initials: KW

**Target Compound Results Summary**

USEPA: Compendium Method TO-15, "Determination of Volatile Organic Compounds (VOCs) in Air..." Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS), January 1999, (EPA/625/R-96/010b).

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3
4-Ethyltoluene	622-96-8	120.2	ND	5.0		ND	25
1,3,5-Trimethylbenzene	108-67-8	120.2	ND	5.0		ND	25
2-Chlorotoluene	95-49-8	126.6	ND	5.0		ND	26
1,2,4-Trimethylbenzene	95-63-6	120.2	ND	5.0		ND	25
1,3-Dichlorobenzene	541-73-1	147.0	ND	5.0		ND	30
1,4-Dichlorobenzene	106-46-7	147.0	ND	5.0		ND	30
Benzyl chloride	100-44-7	126.0	ND	5.0		ND	26
1,2-Dichlorobenzene	95-50-1	147.0	ND	5.0		ND	30
1,2,4-Trichlorobenzene	120-82-1	181.5	ND	5.0		ND	37
Hexachloro-1,3-butadiene	87-68-3	260.8	ND	5.0		ND	53
Naphthalene	91-20-3	128.17	ND	5.0		ND	26

ND = Non Detect

**Surrogate**

4-Bromofluorobenzene

**Result**

10.9

**Spike**

10

**Recovery**

109%

**Qualifier Definitions**

B = Compound also found in method blank.

E= Estimated concentration exceeding upper calibration range.

D= Result reported from diluted analysis.



NJDEP Certification #: 03036

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**EMSL Analytical, Inc.**

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<http://www.EMSL.com> TO-15 Lab@emsl.com

EMSL Order: 491301224  
EMSL Sample ID: 491301224-0001  
Received Date: 12/02/2013  
Report Date: 12/16/2013

Project: Dry Cleaning Depot  
Client Sample ID: SSV-1

Sampling Date: 11/29/2013  
Canister ID: HD2248

Lab File ID: K7828.D  
Sample Vol(ml): 25  
Dilution Factor: 10

Analysis Date: 12/15/2013  
Instrument ID: 5973K  
Analyst Initials: KW

### Tentatively Identified Compound Results Summary



USEPA: Compendium Method TO-15, "Determination of Volatile Organic Compounds (VOCs) in Air..." Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS), January 1999. (EPA/625/R-96/010b).

[illegible]

## Qualifier Definitions

(1) = If unknown, MW is assigned as equivalent Toluene (92) for ug/m3 conversion purposes.

B = Compound also found in method blank.

[= Estimated value based on a 1:1 response to internal standard.

N= Presumptive evidence of compound based on library match.



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**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / 786-0262

<http://www.emsl.com>

EMSL Order: 491301224  
EMSL Sample ID: 491301224-0001  
Received Date: 12/02/2013  
Report Date: 12/16/2013

Project: Dry Cleaning Depot  
Client Sample ID: SSV-1

Sampling Date: 11/29/2013  
Canister ID: HD2248

Lab File ID: K7828.D  
Sample Vol(ml): 25  
Dilution Factor: 10

Analysis Date: 12/15/2013  
Instrument ID: 5973K  
Analyst Initials: KW

**Total Volatile Organic Compound (TVOC) Summary**

USEPA: Compendium Method TO-15, "Determination of Volatile Organic Compounds (VOCs) in Air..." Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS), January 1999, (EPA/625/R-96/010b).

HITs Summary Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	Comment
Ethanol	64-17-5	46.07	8.4		16	
Acetone	67-64-1	58.08	13		31	
Cyclohexane	110-82-7	84.16	5.8		20	
Tetrachloroethene	127-18-4	165.80	51		350	
Target TVOCs:					78	ppbv
					420	ug/m3

**Qualifier Definitions**

B = Compound also found in method blank.

E = Estimated concentration exceeding upper calibration

D = Result reported from diluted analysis.

HITs Summary Tentatively Identified Compounds	CAS#	MW (1)	Result ppbv	Q	Result ug/m3	Comments
Decane	000124-18-5	142	11	JN	62	
Undecane	001120-21-4	156	11	JN	73	
TIC TVOCs:					22	ppbv
					140	ug/m3

**Qualifier Definitions**

(1) = If unknown, MW is assigned as equivalent Toluene (92) for ug/m3 conversion purposes.

B = Compound also found in method blank.

I = Estimated value based on a 1:1 response to internal standard.

N = Presumptive evidence of compound based on library match.

**Total Volatile Organic Compounds (TVOCs):**

100 ppbv

550 ug/m3



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# USEPA TO-15

## External Chain of Custody/ Field Test Data Sheet

**EMSL Analytical, Inc.**  
200 Route 130 North  
Cinnaminson, NJ 08077  
Ph. (800) 220-3675  
Fax (856) 786-0327

[illegible]



4913 01224

## TO-15 Sample Information

Please fill out this worksheet in addition to the Chain of Custody form. This information helps us to best analyze your samples and achieve requested TAT

Company:

*Atlanta Environmental Consultants*

Contact Person:

Name:

*Peter T. Kallay*

E-mail:

*Atlanta ENViro@cs.com*

Additional E-mail:

*pckallay97@earthlink.net.*

Telephone #:

*770-529-0386*

Fax:

*678-569-2419*

Do you want your results emailed?

☒ YES ☐ NO

Library Search requested:

☒ YES ☐ NO

A library search will identify up to 20 of the largest, non-target peaks that are not part of the standard TO-15 list of 74 compounds. If you are performing an Indoor Air Quality or odor investigation the library search is recommended. If you will need help interpreting your report the library search is REQUIRED.

Sample Type:

☐ Indoor Air Quality (Home/Office)  
☐ IAQ (Industrial)

☐ Vent Gas  
☐ Other: \_\_\_\_\_

☒ Soil Gas

Description of sample (Important for the lab to achieve your requested turnaround time):

Are there any special detection limits, specific set of compounds, or any other specifics you need in your report?

☐ OSHA/NIOSH RELS

☐ EPA PELs\_Circle: Residential Industrial

☐ NJ DEP\_Circle: Indoor Air Soil Gas

☐ NC DNER\_Circle: Residential Industrial

☐ PA DEP\_Circle: Residential Industrial

☐ Possible Sources of Contaminants

☒ TVOC

☐ Other (Please list or attach separate sheet)

☐ NO

Do you need any additional analysis on the canister sample?, Indicate below (additional charges will apply)

Draeger CMS Analyzer:

CO ; CO<sub>2</sub> ; SO<sub>2</sub> ; EtO ; NH<sub>3</sub> ; Cl<sub>2</sub> ; H<sub>2</sub>S ; NO<sub>2</sub> ; NO<sub>x</sub> ; O<sub>2</sub> ; Pet. Hydrocarbs ; Phosgene ; Phosphene

US EPA TO-3:

C<sub>1</sub>-C<sub>6</sub> hydrocarbons ; Methane only

ASTM-D5504:

Sulfur Scan (H<sub>2</sub>S, COS, MeSH, EtSH, DMS) ; H<sub>2</sub>S only

**Sample Retention Policy:** All canisters are guaranteed to be retained for one day after results are reported. Please review your results promptly to ensure that your project scope is fully addressed. Cans may be retained for a longer period of time but arrangements to hold your cans must be made through your customer account representative quickly. Thank you.

00 8 2 - 330 000

00 8 2 - 330 000



**APPENDIX VI**

**ATTACHMENT: TERRACON**

**PROSPECTIVE PURCHASER CORRECTIVE ACTION PLAN  
(PPCAP)**

**FRAZIER STREET APARTMENTS**

# Prospective Purchaser Corrective Action Plan

**Frazier Street Apartments  
6700 Wren Court and 188 Norcross Street  
Roswell, Fulton County, Georgia**

June 24, 2013

**Terracon** Project No. 49137028B



**Prepared for:**

Lennar Multifamily Investors, LLC  
Atlanta, Georgia

**Prepared by:**

Terracon Consultants, Inc.  
Duluth, Georgia

Offices Nationwide  
Employee-Owned

Established in 1965  
terracon.com

# Terracon

Geotechnical   ■   Environmental   ■   Construction Materials   ■   Facilities





June 24, 2013

Mr. Don Hellein  
Lennar Multifamily Investors, LLC  
6285 Barfield Road, Suite 300  
Atlanta, Georgia 30328

Email: don.hellein@lennar.com

Re: Prospective Purchaser Corrective Action Plan  
Frazier Street Apartments  
6700 Wren Court and 188 Norcross Street  
Roswell, Fulton County, Georgia  
**Terracon** Project No. 49137028B

Dear Mr. Hellein:

Terracon Consultants, Inc. (Terracon) is pleased to submit the following Brownfield Prospective Purchaser Corrective Action Plan (PPCAP) for the above-referenced site. This investigation was performed in accordance with Terracon Proposal No. NA130060R, dated March 11, 2013, and Supplemental Agreement, dated May 21, 2013.

We appreciate the opportunity to be of continued service to Lennar Multifamily Investors, LLC. Please contact either of the undersigned at 770-623-0755 if you have questions regarding the information provided in the report.

Sincerely,

**Terracon**

Robert L. Deal, Jr., P.G.  
Senior Geologist

Christopher S. Srock, P. E.  
Senior Principal

Enclosure



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- Figure 2 – Site and Boring Location Diagram
- Figure 3 – Potentiometric Map

### Appendix B – Laboratory Analytical Reports and Sample Chains-of-Custody

### Appendix C – Soil Boring Logs and Monitoring Well Construction Diagrams

### Appendix D – Site Photographs

### Appendix E – EPD Letter Accepting Site into Brownfield Program, September 24, 2007

### Appendix F – HSRA Release Determination Letter, dated January 31, 2008

### Appendix G – Legal Description

### Appendix H – Vapor Intrusion Barrier and Venting System

### Appendix I – J&E Model Results

**Prospective Purchaser Corrective Action Plan**

Frazier Street Apartments ■ Roswell, Georgia

June 24, 2013 ■ Terracon Project No. 49137028B

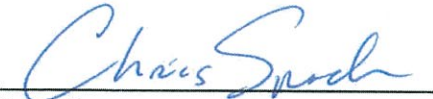
**Terracon**

**GROUNDWATER SCIENTIST PROFESSIONAL CERTIFICATION**

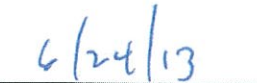
"I certify that I am a qualified groundwater scientist who has received baccalaureate or post-graduate degree in the natural sciences or engineering, and have sufficient training and experience in groundwater hydrology and related fields, as demonstrated by state registration and completion of accredited university courses, that enable me to make sound professional judgments regarding groundwater monitoring and contaminant fate-and-transport. I further certify that this report was prepared by myself or by a subordinate working under my direction."



Signature



Print Name



Date



Seal

Project: Prospective Purchaser Corrective Action Plan  
Frazier Street Apartments  
6700 Wren Court and 188 Norcross Street  
Roswell, Fulton County, Georgia  
Terracon Project No. 49137028B



# PROSPECTIVE PURCHASER CORRECTIVE ACTION PLAN

FRAZIER STREET APARTMENTS  
6700 WREN COURT AND 188 NORCROSS STREET  
ROSWELL, FULTON COUNTY, GEORGIA

**Terracon** Project No. 49137028B  
June 7, 2013

## 1.0 SUMMARY OF FINDINGS

Terracon Consultants, Inc. (Terracon), on behalf of Lennar Multifamily Investors, LLC, has prepared the following Brownfield Prospective Purchaser Corrective Action Plan (PPCAP) for the Frazier Street Apartments site located at 6700 Wren Court and 188 Norcross Street in Roswell, Fulton County, Georgia (the site). A prior PPCSR was prepared for the site by others, dated July 26, 2007. The site was entered into the Brownfield program and a Limitation of Liability (LOL) was issued by the Georgia Environmental Protection Division (EPD) for tetrachloroethene. This PPCAP certifies compliance with the applicable risk reduction standards (RRS).

The site is currently in use as an apartment complex with the site location and features illustrated in Figures 1 and 2, Appendix A. In February 2013, Terracon completed a Phase I Environmental Site Assessment (ESA) of the site. The site consisted of three tracts of land developed with 17 buildings and totaling approximately 10.68 acres. Terracon's ESA identified two offsite facilities of concern and evidence of groundwater impact to the site reported by others in 2007. Terracon conducted a Limited Site Investigation (LSI) at the site in April 2013. Terracon's LSI consisted of the advancement of seven borings at the site with conversion to permanent groundwater monitoring wells (permanent wells). Soil and groundwater samples were collected for analysis and shallow groundwater flow direction was determined. Soil analytical results did not indicate detectable concentrations of analyzed compounds. Groundwater analytical results confirmed the presence of tetrachloroethene in site groundwater. Chloroform, previously detected in site groundwater by others in 2007, was not detected.

Terracon has prepared the following PPCAP for the site.

Based on the results of this investigation, Terracon concludes the following:

- Volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs) were not detected in the 15 soil samples analyzed. Seven soil samples were analyzed by Terracon, and eight were analyzed by others. VOCs and PAHs were reported by others as not detected in soil samples analyzed during a 2007 investigation. No soils on site have been identified exhibiting concentrations of regulated substances above EPD Chapter 391-3-19 Appendix I Notification-Triggering Concentrations.

## Prospective Purchaser Corrective Action Plan

Frazier Street Apartments ■ Roswell, Georgia

June 24, 2013 ■ Terracon Project No. 49137028B



- Terracon collected groundwater samples from site wells on March 28, 2013. Tetrachloroethene, a VOC, was detected in three of six groundwater samples analyzed at concentrations ranging from 7.5 to 38 ug/L. Other VOCs were not detected above laboratory reporting limits in groundwater samples tested. Groundwater samples were collected by others in 2007, and analytical results from that investigation identified tetrachloroethene in three of five wells at concentrations ranging from 91 to 330 ug/L and chloroform in one well at a concentration of 6.5 ug/L. Therefore, concentrations appear to have decreased over time.
- Potential receptors in the form of public or private drinking water wells or surface water bodies were not identified on site. A public drinking water well was identified within 1.4 miles of the site, and a surface water withdrawal point for the City of Roswell water system was identified within 0.55 miles of the site.
- Sources of the chlorinated solvent identified in site groundwater are believed to be located offsite to the northwest and west of the site. Confirmed releases have been reported from multiple facilities located upgradient and crossgradient from the site. The GDNr has determined that the Frazier Street Apartment site has been impacted by a release from the former Dry Cleaning Depot (HSI# 10880).
- Chlorinated solvents have not been used or stored on the site. No sources other than these current and former dry cleaners are known at this time.
- Calculated shallow groundwater flow direction at the site is to the southeast.
- Analysis of samples indicates that soils at the site are currently in compliance with Type 1 RRS (VOC and PAH compounds).
- The J&E model predicted an indoor air concentration of 0.0202 ppbv. The OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Quality from Groundwater and Soils, Generic Screening Level at residential risk level of  $10^{-6}$  (Table 2c) for tetrachloroethene is 0.12 ppbv; indicating a predicted vapor concentration below the indoor air action level at the most conservative risk level.

Terracon recommends no additional investigation at the site on behalf of its client, Lennar Multifamily Investors, LLC.

## 2.0 INTRODUCTION

This PPCAP has been prepared for the site, Frazier Street Apartments, located at 6700 Wren Court and 188 Norcross Street in Roswell, Fulton County, Georgia. The site consist of an approximately 10.68-acre tract of land improved with 16 apartment buildings, a leasing office,



## Prospective Purchaser Corrective Action Plan

Frazier Street Apartments ■ Roswell, Georgia

June 24, 2013 ■ Terracon Project No. 49137028B



two filled in swimming pools and associated pump houses, paved parking, and landscaped areas. Available information indicates that the site was agricultural/grassed land and single family residences from at least 1938 until construction of the apartment complex in 1968. The site is located in zip code 30075, at approximately 31° 01' 36" north latitude and 84° 21' 21" west longitude. The site consists of Tax Parcels 12 200404260391 (southern portion), 12 200404260359 (northern portion), and 12 200404260185 (small parcel within southern portion parcel) in Fulton County, Georgia.

Field work for the sampling associated with the prior PPCSR was conducted in 2007 by others. Five temporary wells were installed at the site and groundwater samples were analyzed for VOCs and PAHs. Tetrachloroethene and chloroform were detected in groundwater. Six soil borings were advanced and soil samples were collected for analysis from depths of five, ten, and fifteen feet below ground surface (bgs) and were analyzed for VOCs, PAHs, and RCRA metals. Barium, chromium, and lead were detected in all soil samples analyzed and mercury was detected in one soil sample. Metals concentrations in soil were reported as below notification concentrations. Shallow groundwater flow was determined to be toward the southeast, with a hydraulic gradient of 0.012 feet/foot. The authors of the 2007 PPCSR concluded that the source of the tetrachloroethene and chloroform identified in site groundwater was an offsite former dry cleaning business located at 1073 Alpharetta Street, approximately 200 feet northwest of and hydraulically upgradient from the site. The 2007 PPCSR stated that soils at the site were in compliance with all RRS and recommended no additional actions.

Terracon was retained to perform an ESA of the site in February 2013. The site consisted of three parcel of land. Historical information reviewed during the ESA indicated that the site was agricultural or single-family residential land prior to 1968, when the site was developed with the existing apartment buildings. Environmental regulatory database information reviewed indicated that the site was not a listed facility. The suspected source property mentioned in the 2007 PPCSR was listed as a State Hazardous Waste (SHWS) facility in environmental regulatory databases reviewed during the ESA. Terracon's ESA identified several offsite facilities of concern in records reviewed. These facilities, which have the potential to impact site groundwater, include the following:

- Drycleaning Depot, a SHWS facility (HSI# 10880), was identified approximately 145 feet west-northwest of and hydraulically upgradient from the site. Due to a documented tetrachloroethene groundwater plume originating from this facility, Terracon's ESA identified it as a recognized environmental condition (REC).
- Terracon's ESA also identified another dry cleaning facility, Roswell Cleaners, as a REC. Roswell Cleaners is located approximately 435 feet west of the site, and chlorinated solvents were identified in groundwater at the facility, including vinyl chloride. Shallow groundwater flow maps for the site and other nearby regulated facilities indicated that groundwater from Roswell Cleaners could be impacting the site.



Terracon's ESA recommended additional investigation of the offsite environmental concerns mentioned above.

In April 2013, Terracon performed a LSI at the site. Terracon's LSI included the advancement of seven soil borings (MW-1 through MW-7) to depths ranging from 16 to 35 feet bgs. Borings were advanced using direct push and hollow stem rotary auger drilling techniques. Soil samples were collected continuously and field-screened using an organic vapor analyzer (OVA). Following completion of soil sampling activities, the seven borings were converted to permanent groundwater monitoring wells (permanent wells). One well (MW-6) was found to be dry and later abandoned. Depth to groundwater in site wells was measured between 15 and 22 feet bgs. Shallow groundwater flow across the site was determined. Soil and groundwater samples were analyzed for VOCs by EPA Method 8260.

Soil analytical results did not indicate the presence of detectable concentrations of VOCs. Groundwater analytical results indicated the presence of the chlorinated solvent tetrachloroethene in three wells. The remaining three groundwater samples did not exhibit detectable concentrations of VOCs. Since the concentrations of tetrachloroethene detected were not indicative of a new release, and since the presence of tetrachloroethene in site groundwater had already been reported, notification to EPD regarding the identification of regulated substances in site groundwater was not performed.

### **3.0 SOURCES CONTRIBUTING TO A RELEASE**

#### **3.1 Source Description**

On-site sources were not identified. Soil sampling and analysis conducted on-site did not identify sources of chlorinated solvents in site soil. Two offsite sources were identified, both dry cleaning facilities located hydraulically upgradient to crossgradient relative to the site. Terracon therefore believes that the contaminants identified in site groundwater originate from offsite sources. No sources other than the dry cleaners identified are known at this time.

#### **3.2 Location of Source**

Source properties identified for the contamination identified in site groundwater include:

- Former dry cleaner located at 1073 Alpharetta Street from 1968 until 2007 (39 years), approximately 145 feet west-northwest of the site; and
- Dry cleaner located at 1013 Alpharetta Street from 1966 to the present (47 years) approximately 435 feet west of the site.



The locations of these addresses are illustrated on Figure 2.

### **3.3 Regulated Substances Released**

Regulated substances identified at the site include the following.

- Compounds in site soil: barium, chromium, lead, and mercury (detected in 2007 by others). The detected concentrations of these compounds did not exceed Chapter 391-3-19 Appendix I notification-triggering concentrations, so a release of these compounds to site soil has not occurred.
- Compounds in site groundwater: tetrachloroethene and chloroform.

No other regulated substances have been detected in soil and/or groundwater samples collected from the site and analyzed. For a complete list of concentrations of compounds detected in site groundwater by Terracon, please refer to Table 3 in Section 6.7. For complete soil and groundwater laboratory analytical results, please refer to Appendix B.

### **3.4 Chronology of Each Release**

The chronology of releases is unknown; however, the following events have been documented. The 2007 PPCSR states that the release from the 1073 Alpharetta Street facility was believed to have occurred sometime after 1992. Groundwater samples collected from the site by others identified the presence of tetrachloroethene in site groundwater in 2007.

Complete laboratory analytical reports and sample chain-of-custody are included in Appendix B.

## **4.0 SOIL INVESTIGATION**

Details of the procedures used to collect and analyze soil samples at the site are presented below. Details presented below refer to samples collected by Terracon in 2013. For information concerning samples collected by others in 2007, please refer to the prior PPCSR previously submitted to the GDNR.

### **4.1 General Approach Used**

Terracon collected soil samples at the site in March 2013. The objective of Terracon's soil investigation was to identify potential source areas and impacted soils at the site. Terracon collected seven soil samples for laboratory analysis. Added to the soil samples collected in 2007 by others, 15 soil samples have been collected and analyzed from the site. Combined, the 15 soil samples provide good coverage of potential source areas at the site.

## **4.2 Soil Analytical Parameters**

Since RECs identified involve former dry cleaners, soil samples collected by Terracon were analyzed for VOCs by SW846 EPA Method 8260.

## **4.3 Location of Samples**

As noted above, eight soil borings were advanced at the site by others in 2007. Terracon advanced seven soil borings at locations across the site not previously assessed in 2007. Borings for MW-1 and MW-2 were advanced in the northern portion of the site. Borings for MW-3 and MW-5 were advanced in the central portion of the site. Borings for MW-6 and MW-7 were advanced in the southeastern portion of the site. Locations of all soil borings are illustrated on Figure 2.

## **4.4 Soil Sample Analysis**

### ***4.4.1 Sampling Equipment and Collection Techniques***

Terracon's soil samples were collected using hand auger or direct push drilling techniques. Soil samples collected by hand auger were collected continuously at one foot intervals to depths of between five and ten feet. Below five feet bgs, soil samples were collected by direct push drilling techniques. Soil samples collected by direct push (Geoprobe®) drilling methods were collected continuously at five-foot intervals to terminal depth using a track-mounted Geoprobe® sampling spoon with acetate liners. No drilling fluids or water were added to the boreholes as the addition of these fluids could interfere with sample integrity. Soil samples collected were field-screened with a field screening device (see Section 5.4.2).

Soil samples were collected from the hand auger barrel or the Geoprobe® sample liner using a clean, decontaminated stainless steel spoon and laboratory-provided soil syringes. Soil samples were preserved in the field using laboratory-provided containers filled with sodium bisulfate or methanol, in accordance with SW846 EPA Method 5035 for VOCs. An additional volume of soil was placed in laboratory-supplied unpreserved sample jars with Teflon™-sealed lids. The remaining soil was placed in a dedicated container to be used for field screening purposes. The hand auger barrel or stainless steel Geoprobe® sampling spoon was decontaminated prior to reuse by washing the equipment in a solution of distilled water and Liquinox® detergent, then washing the equipment in distilled water, and then rinsing it with distilled water. Geoprobe® acetate liners were new from the manufacturer and were dedicated for single use.

Recovered soils were visually logged for lithologic characteristics such as soil type, color, grain-size, texture, and water content using the Unified Soil Classification System (USCS) by a qualified Terracon scientist (please refer to Section 6.2 for additional information regarding



characterization of soils at the site). Soil samples were collected for analysis from the following depths:

**Table 1: Soil Samples and Depth Collected**

Soil Sample	Date Collected	Depth Collected (feet bgs)
MW-1	3/18/13	3 to 5
MW-2	3/19/13	3 to 5
MW-3	3/19/13	3 to 5
MW-4	3/20/13	3 to 5
MW-5	3/20/13	3 to 5
MW-6	3/21/13	3 to 5
MW-7	3/21/13	3 to 5

Please refer to Section 5.4.2 for an explanation of how the above soil samples were selected for laboratory analysis.

#### ***4.4.2 Field Screening Techniques***

Screening of soils was conducted in the field to determine the presence or absence of volatile organic vapors (VOVs). Soil collected into dedicated containers for field-screening was allowed to rest, undisturbed, for approximately 10 minutes at ambient temperature to allow sufficient time for any VOVs to volatilize into the headspace of the container. After approximately 10 minutes, the air in the container was tested with an organic vapor analyzer equipped with a photoionization detector (OVA/PID). The OVA/PID probe was inserted into the headspace of the container and the maximum reading was noted in the field book. The OVA/PID devices used for this procedure were either a RAE Systems™ Model MiniRAE 2000 or a RAE Systems™ Model MiniRAE 3000, both equipped with a 10.6 eV lamp. Both OVA/PIDs were calibrated in the field according to manufacturer instructions prior to soil screening activities.

For soil samples collected, field screening results from all borings gave no indications of elevated concentrations of VOVs. Indications of possible impact in the form of odors was also not noted in soil samples collected. Therefore, soil samples were collected for laboratory analysis based upon field conditions, generally from the upper five feet of soil across the site.

#### ***4.4.3 Sample Handling and Preservation Techniques***

Soil samples collected and intended for analyses other than VOCs were homogenized in the field in accordance with EPA protocol SESDPROC-300-R2, dated December 20, 2011, for soil sampling. Soil samples were collected into a dedicated container and mixed together. Following mixing, an aliquot of the mixed soil was removed from the dedicated container and placed into a laboratory-provided sample container which was sealed and labeled.

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Upon filling laboratory-provided sample containers, samples were placed into a laboratory-supplied cooler containing ice. Samples were preserved on ice in the cooler until all soil samples had been collected. Upon completion of soil sampling activities, the cooler was re-packed with ice and was sealed for shipment under proper Chain-of-Custody (COC) protocol to the testing laboratory. Sealed coolers containing soil samples were hand-delivered to the testing laboratory, Analytical Environmental Services, Inc. (AES) in Atlanta, Georgia.

### ***4.4.4 Chain-of-Custody Procedures***

Samples were logged into the COC form upon collection. The completed COC form was sealed in a waterproof bag and placed into the cooler containing soil samples for delivery to the testing laboratory. Upon receipt at the laboratory, a representative from sample receiving signed the COC form and assumed custody of the samples for analysis.

### ***4.4.5 Laboratory Analytical Techniques***

Soil samples collected and analyzed during this investigation were analyzed for the following:

- VOCs by SW846 EPA Method 8260.

Soil samples collected for VOC analysis were processed at the testing laboratory by SW846 EPA Method 5035-direct purge, and analyzed by gas chromatograph/mass spectrometer (GC/MS).

The analytical laboratory performed quality assurance/quality control (QA/QC) tests on their equipment during the analysis of the soil samples analyzed during this investigation. To calibrate the GC/MS, the instrument is used to test at least five known standards and a multi-point calibration curve is generated. Before analysis of Terracon's soil samples, the testing laboratory analyzed a soil reagent blank (performed using pure silica sand), a matrix spike and a matrix spike duplicate, and a laboratory control sample to ensure analysis results. The soil reagent blank is analyzed to ensure that target analytes are not being introduced through the analytical process and that the instrument is not retaining VOCs, causing "carryover" of contaminants and creating false positive test results. A matrix spike and matrix spike duplicate are tested to verify proper sample extraction procedures and to check for matrix interference. A laboratory control sample is similar to a matrix spike, but is performed using organic-free or laboratory-grade pure water. The laboratory control sample is used to verify instrument performance should difficult matrix problems be encountered in soil samples. It is the policy of the testing laboratory utilized during this investigation to perform continuing calibration verifications every 12 hours when analyzing media for organic compounds.

Available information concerning analytical testing and QA/QC procedures conducted by the analytical laboratory noted no QA/QC problems associated with Terracon's soil samples.



#### **4.5 Background Concentrations**

Since VOCs are not naturally-occurring compounds, background levels are defined by the EPD as below laboratory reporting limits. Therefore, background concentrations of compounds tested for during this investigation were considered to be below laboratory reporting limits.

#### **4.6 Soil Analytical Summary**

VOCs were not detected in soil samples analyzed. Seven soil samples were analyzed by Terracon, and eight were analyzed by others for a total of 15 soil samples analyzed during this investigation. VOCs and PAHs were reported by others as not detected in soil samples analyzed during the 2007 investigation. Since no compounds were detected in soil samples analyzed, soils at the site are in compliance with Type 1 RRS for VOC and PAH compounds. Note that soil samples collected in 2013 were not tested for metals, while soil samples collected in 2007 were tested for metals. Compliance with RRS for metals was addressed in the 2007 PPCSR, and is not addressed herein. Complete laboratory analytical results from samples analyzed by Terracon are presented in Appendix B.

### **5.0 GROUNDWATER INVESTIGATION**

Details of the procedures used to collect and analyze groundwater samples at the site are presented below. Details presented below refer to samples collected by Terracon in 2013. For information concerning samples collected by others in 2007, please refer to the prior PPCSR.

#### **5.1 Groundwater Analytical Parameters**

Terracon collected groundwater samples from the site in March 2013. Terracon's groundwater samples were analyzed for the following:

- VOCs by SW846 EPA Method 8260.

#### **5.2 Characterization of Subsurface Geology**

During installation of soil borings, soil samples were collected at regular intervals and their geologic characteristics were noted using a visual-manual procedure, similar to the American Society for Testing and Materials (ASTM) Standard D2488 ("Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)"), and recorded. Soil boring logs for the borings installed on the site during the course of the investigation are presented in Appendix C.

According to Geology of the Greater Atlanta Region (McConnell and Abrams, 1984), the site is underlain by undifferentiated biotite-quartz-plagioclase gneiss, mica schist, and amphibolite of the Powers Ferry Formation. The U.S. Department of Agriculture (USDA) characterizes soils at

the site as Urban Land, which consists of soils that have been disturbed through cutting and filling activities to the extent that they no longer fit into a recognizable soil type. Soils encountered during the advancement of soil borings at the site consisted generally of sandy silt and silty clay. Auger refusal on probable bedrock was encountered in all borings at depths ranging from 16 to 35 feet bgs.

### **5.3 Characterization of Groundwater Flow**

Permanent well casing elevations were surveyed relative to an arbitrary on-site benchmark to determine elevations relative to each other. Permanent well locations were plotted on a site map using an x-y coordinate system. Depth to groundwater measurements were made in each monitoring well using an electronic water level indicator graduated to the nearest 0.01-foot. Well casing elevations were used in conjunction with depth-to-groundwater measurements to determine groundwater elevations in each well. Groundwater elevation data and well position coordinates were used to create a groundwater flow map for the site.

Based on data generated in March 2013, shallow groundwater flow at the site was determined to be toward the southeast. A groundwater flow map for the site is presented in Figure 3.

### **5.4 Well Locations and Construction**

Terracon drilled seven soil borings that were converted to monitoring wells at the site in March 2013. Construction details for Terracon's wells are presented in Appendix C, and in Table 2, below. All wells are flush-mounted permanent wells.

Boreholes for the wells were advanced using direct push and, upon direct push refusal, hollow stem auger methods. Augers utilized were approximately 8.5 inches outer diameter and approximately 4.25 inches inner diameter. Monitoring wells were constructed in the auger prior to removal of the auger sections from the borehole. All wells were screened in the shallow or first groundwater aquifer. A scaled map showing the locations of soil borings and monitoring wells is presented in Figure 2.

Monitoring wells installed during Terracon's groundwater investigation were constructed of two-inch diameter, 0.010-inch machine-slotted polyvinylchloride (PVC) well screen and solid PVC riser sections. Pre-fabricated screen sections (5 and 10-foot lengths) were assembled and set in the ground for the construction of each permanent well. A filter pack of clean, graded, silica sand was placed in the annular space beneath and around the well screen, extending a minimum of two feet above the top of the well screen. The silica sand was gradually introduced into the annulus while the augers were retrieved. A solid (not screened) bottom cap approximately 6 inches in length was affixed to the bottom of the well screen sections.



A seal composed of bentonite chips, approximately two feet in thickness, was placed above the sand pack and hydrated in monitoring wells to prevent possible vertical migration of contaminants or debris from above. A Portland cement-bentonite grout slurry was used to seal the remaining annular space around the well casing.

Wells were finished to grade with a concrete pad, approximately 2' x 2' x 4" in size. Flush-mounted, traffic-rated, cast-iron covers were placed over the well casing risers to prevent unauthorized entry to the permanent wells. In addition, wells were fitted with expanding caps and a new padlock. Soil boring logs and well diagrams illustrating the construction details of monitoring wells are presented in Appendix C.

## 5.5 Groundwater Sample Analysis

### 5.5.1 Groundwater Gauging

During Terracon's investigation, groundwater levels in monitoring wells were measured in March 2013. Water levels for each permanent well were measured to the nearest 0.01-foot. To measure water levels in site wells, Terracon personnel lowered a decontaminated, electronic water level indicator probe into each permanent well and the interface level between the water level and the probe was located when the instrument emitted a continuous signal of sound. Depth to groundwater was recorded relative to the reference point on the side of the top edge of each well riser. Groundwater gauging data, and well construction and elevation information is presented in Table 2, below.

**Table 2: Permanent Well Construction and Groundwater Elevation**

Monitoring Well	TOC Elevation* (feet)	Screened Interval (feet btoc)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet)
MW-1	1071.53	15 – 35	21.80	1049.73
MW-2	1062.76	15 – 30	16.35	1046.41
MW-3	1065.71	7 – 27	15.09	1050.62
MW-4	1072.33	15 – 30	22.22	1050.11
MW-5	1051.11	10 – 25	15.57	1035.54
MW-6	NM	Dry	Dry	--
MW-7	1039.50	10 – 30	19.88	1019.62

Notes:

TOC – top of [well] casing

BTOC – below top of [well] casing

NM – not measured

\*Elevation listed is relative to arbitrary on-site datum

### ***5.5.2 Well Purging***

Monitoring wells were purged (prior to the collection of groundwater samples) using a peristaltic pump and new, dedicated, disposable tubing. Each permanent was purged of approximately five well volumes of water or until the well ran dry, at which point purging was considered complete. Purged water was contained on-site in 55-gallon, steel DOT-approved drums.

### ***5.5.3 Sample Collection Techniques***

Groundwater samples were collected from monitoring wells using a peristaltic pump and new, dedicated, disposable tubing. Two 40-mL vials were filled for each VOC sample. Once each VOC sample vial was filled to a level which created a meniscus of water at the top of the sample vial, the container was sealed. Each sample vial was observed to ensure that there was no headspace within the container, evidenced by bubbles within it. The sample vials were then placed into a cooler in accordance with the handling and preservation techniques described in Section 6.5.4.

### ***5.5.4 Sample Handling and Preservation Techniques***

Groundwater samples collected for VOCs analysis were preserved with hydrochloric acid.

Upon collection, all sample containers were placed into a laboratory-supplied cooler containing ice. Samples were preserved on ice in the cooler until all groundwater samples had been collected. Upon completion of groundwater sampling, the cooler was re-packed with ice and was hand-delivered under COC protocol to the testing laboratory.

### ***5.5.5 Chain-of-Custody Procedures***

Samples were logged into the COC form upon collection. The completed COC form was sealed in a waterproof bag and placed into the cooler containing groundwater samples for delivery to the testing laboratory. Upon receipt at the laboratory, a representative from sample receiving signed the COC form and assumed custody of the samples for analysis.

### ***5.5.6 Laboratory Analytical Techniques***

All groundwater samples analyzed during this investigation were tested for VOCs by SW846 EPA Method 8260. VOCs samples collected were extracted at the testing laboratory by SW846 EPA Method 8260 direct injection/purge and trap, and analyzed at the testing laboratory by GC/MS.

The testing laboratory performed QA/QC tests on their equipment during the analysis of the groundwater samples analyzed during this investigation. To calibrate the GC/MS, the instrument was used to test at least five known standards and a multi-point calibration curve was



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generated. Before analysis of Terracon's groundwater samples, the testing laboratory analyzed a water reagent blank (performed using deionized water), a matrix spike and a matrix spike duplicate, and a laboratory control sample to ensure analysis results. The water reagent blank is analyzed to ensure that target analytes are not being introduced through the analytical process and that the instrument is not retaining VOCs, causing "carryover" of contaminants and creating false positive test results. A matrix spike and matrix spike duplicate are tested to verify proper sample extraction procedures and to check for matrix interference. A laboratory control sample is similar to a matrix spike, but is performed using organic-free or laboratory grade pure water. The laboratory control sample is used to verify instrument performance should difficult matrix problems be encountered in groundwater samples. It is the policy of the testing laboratory utilized during this investigation to perform continuing calibration verifications every 12 hours when analyzing media for organic compounds.

Available information concerning analytical testing and QA/QC procedures conducted by the analytical laboratory noted no QA/QC problems associated with Terracon's groundwater samples.

### **5.6 Background Concentrations**

Chlorinated solvents are not naturally-occurring compounds, so background levels are defined by the EPD as below laboratory reporting limits. Background concentrations of chlorinated solvents for this investigation were considered to be below laboratory reporting limits. Since these investigation results are part of a PPCSR, groundwater samples were not used to determine compliance with RRS.

### **5.7 Groundwater Analytical Summary**

Terracon collected groundwater samples from site wells on March 28, 2013. Tetrachloroethene, a VOC, was detected in three of six groundwater samples analyzed (MW-1 at 7.5 ug/L; MW-4 at 9.6 ug/L; and MW-7 at 38 ug/L). Other VOCs were not detected above laboratory reporting limits in groundwater samples tested. Groundwater analytical results are presented in Table 3, below.

**Table 3: Summary of Compounds Detected in Groundwater**

Well	Sample Date	Tetrachloroethene (ug/L)
MW-1	3/28/13	<b>7.5</b>
MW-2	3/28/13	<5
MW-3	3/28/13	<5
MW-4	3/28/13	<b>9.6</b>
MW-5	3/28/13	<5
MW-6	3/28/13	Dry
MW-7	3/28/13	<b>38</b>
Regulatory Threshold		DL*

Notes:

ug/L – micrograms per liter or parts per billion (ppb); mg/L – milligrams per liter or ppm

DL – Any detectable concentration of this compound above naturally occurring background concentrations is reportable per Georgia Rules for Hazardous Site Response, Chapter 391-3-19-.04(a)

**Bold results exceed regulatory thresholds**

Groundwater samples were collected by others in 2007, and analytical results from that investigation identified tetrachloroethene in three of five wells at concentrations ranging from 91 to 330 ug/L and chloroform in one well at a concentration of 6.5 ug/L.

Groundwater samples were collected during this investigation to provide a picture of groundwater quality at the site.

The source(s) of the tetrachloroethene identified in site groundwater is believed to be the nearby offsite former dry cleaners (Dry Cleaning Depot and Roswell Cleaners).

Laboratory QA/QC procedures are summarized in Section 6.5.6. Complete laboratory analytical results are presented in Appendix B.

## **6.0 SITE AND AREA INFORMATION**

### **6.1 Potential Receptors**

Potential receptors for regulated substances at the site, in the form of public or private drinking water wells or surface water bodies, were not identified on site. Other potential on site receptors would include employees, customers, and contractors. Terracon understands that the site is currently in use as an apartment complex. As part of the redevelopment of the site by the prospective purchaser, the existing buildings will be demolished and new buildings constructed.

A one-mile radius potable water well and receptor survey of the site and surrounding area was performed by others. The potable water well survey identified no potable water wells within one mile of the site. Terracon contacted the City of Roswell Water Department (CRWD). According



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to representatives of the CRWD, the site is provided municipal water by the CRWD. The CRWD municipal water supply system acquires water for its system from three sources: a surface water withdrawal at Big Creek, a public potable water well at the intersection of Marietta Highway and Willeo Road, and Fulton County's water system. The surface water withdrawal is at the corner of Oxbo Road and Dobbs Drive approximately 0.55 miles southeast of and downgradient from the site. The CRWD well is located approximately 1.4 miles to the southwest and crossgradient from the site. The CRWD utilizes water from Fulton County when demand is too high for their system to provide enough water. Fulton County's water system gets its water from the Chattahoochee River, and the withdrawal point for the county system is not located within a mile of the site.

Based on the depths to groundwater and lack of impact to soils, we do not anticipate issues with contractor's worker safety or disturbance of materials impacted by regulated substances.

### **6.2 Site Property**

The site is located east of Frazier Street and north of Norcross Street, in Roswell, Fulton County, Georgia, 30075. The site consists of three parcels of land comprising approximately 10.828 acres. The site currently has two addresses, 6700 Wren Court and 188 Norcross Street. The site is improved with 17 buildings, and is located at approximately s located. The site is located at approximately 31° 01' 36" north latitude and 84° 21' 21" west longitude. The site consists of Tax Parcels 12 200404260391 (southern portion), 12 200404260359 (northern portion), and 12 200404260185 (small parcel within southern portion parcel) in Fulton County, Georgia. Available information indicates that the site buildings were constructed in approximately 1968. The area where the site is located has been developed for residential or commercial use since 1973. The current site owner is Roswell Commons Group LP.

## **7.0 CORRECTIVE ACTION PLAN**

### **7.1 Vapor Intrusion Assessment**

Terracon modeled the potential for vapor intrusion at the site utilizing Version 3.1 of the Johnson and Ettinger (1991) model (J&E) consistent with the OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Quality from Groundwater and Soils dated November 25, 2002. A worst case scenario was evaluated assuming a portion of the building would be directly over the highest concentration detected at the site (which will not be the case pursuant to the proposed redevelopment plans).

#### **J&E Model Input References**

The following input values were utilized with the J&E model:

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- Ground water worst-case initial concentration: **38 mg/L** tetrachloroethene; MW-7 data, Terracon Limited Site Investigation dated April 8, 2013.
- Average soil temperature (approximated from GW temp): conservatively **65 degrees F**; [http://www.epa.gov/athens/learn2model/part-two/onsite/ex/jne\\_henrys\\_map.html](http://www.epa.gov/athens/learn2model/part-two/onsite/ex/jne_henrys_map.html).
- Depth below grade to bottom of enclosed space floor: **6 inches**; J-E default value for slab-on-grade construction.
- Depth below grade to water table: **19.88 feet**; MW-7 data, Terracon Limited Site Investigation dated April 8, 2013.
- Thickness of soil stratum A: **19.88 feet**; silty sand from B-7 data Terracon Limited Site Investigation dated April 8, 2013. Note silty sand within context of the J-E model equates to "loamy sand". Only 1 soil stratum was used.
- Enclosed space floor thickness: **4 inches**; conservative value for slab thickness assumed.
- Soil-bldg. pressure differential: **4 Pa**; default value suggested by model.
- Building length/width/height: **216 feet/68feet/8feet**; used longest leg of the "L" shaped building closest to MW-7, and ceiling height assumes 1<sup>st</sup> floor has greatest exposure risk.
- Floor-wall seam crack width: **0.1 cm**; default value suggested by model.
- Exposure duration: **30 years**; conservative residential value assumed.
- Exposure frequency (EF): **365 days/year**; conservative residential value assumed.
- Hours Exposed per EF day: **18 hours/day**; conservative residential value assumed.
- Risk level: **10<sup>-6</sup>**; standard risk level for residential scenario.

### J&E Predicted Indoor Air Concentration (assuming *infinite* source)

The J&E model predicted an indoor air concentration of 0.0202 parts per billion by volume (ppbv). The OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Quality from Groundwater and Soils, Generic Screening Level at residential risk level of 10<sup>-6</sup> (Table 2c) for tetrachloroethene is 0.12 ppbv; indicating a predicted vapor concentration below the indoor air action level at the most conservative risk level. Note that the predicted indoor air concentration is likely below laboratory method detection limits. Please refer to Appendix I for a copy of the J&E Model results.

## 7.2 Vapor Barrier Installation

The proposed redevelopment at the site includes installation of a chemical-resistant vapor barrier and venting system beneath of the slab of each building. The system will consist of Geo-Seal and will be installed as outlined in the specifications provided in Appendix H. The vapor barrier will be comprised of high density polyethylene (HDPE) and spray applied asphalt latex installed over a venting system. The system will be installed by a trained and certified installer. Installation, quality assurance procedures and warranty information is also attached. Once



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installed, the integrity of the system will be verified by smoke testing as outlined in Section 3.9 E of the specifications. To assure removal of any vapors that could accumulate beneath the barrier, a vapor vent gas collection system, in accordance with the specifications attached as Appendix H, will be installed beneath the barrier. This venting system will prevent potential pressure differentials from developing beneath the slab by releasing gas to the exterior of the structure. Based upon on the installation of the system outlined herein, no future sampling of ambient air in the buildings or soil gas beneath the slabs will be required.

### 8.0 QUALIFICATIONS OF SITE AND PROSPECTIVE PURCHASER

The Georgia Hazardous Site Reuse and Redevelopment Act sets forth certain criteria for a prospective purchaser (Lennar Multifamily Investors, LLC) and property to qualify for limitation of liability. The subject property (site) and prospective purchaser both met these criteria and qualify, as described below.

The subject property:

- Has a pre-existing release;
- Does not have any lien filed under subsection (e) of Code Section 12-8-96 or subsection (b) of Code Section 12-13-12;
- Is not listed on the federal National Priorities List;
- Is not currently undergoing response activities required by an order of the regional administrator of the Environmental Protection Agency; and
- Is not a hazardous waste facility as defined in Code Section 12-8-62.

The prospective purchaser (Lennar Multifamily Investors, LLC):

- Is not a person who has contributed or who is contributing to a release at the subject property;
- Is not a current or former subsidiary, division, parent company, or partner, the employer or former employer, or otherwise affiliated with the current owner of the subject property or any person who has contributed or is contributing to a release at the subject property;
- Is not in violation of any order, judgment, statute, rule, or regulation subject to the enforcement authority of the director of EPD.

## **9.0 CONCLUSIONS**

Terracon has conducted soil and groundwater investigation activities at the site required to complete the PPCSR. Based on the results of this investigation, Terracon concludes the following:

- VOCs and PAHs were not detected in a total of 15 soil samples analyzed. Seven soil samples were analyzed by Terracon, and eight were analyzed by others. VOCs and PAHs were reported by others as not detected in soil samples analyzed during a 2007 investigation. No soils on site have been identified exhibiting concentrations of regulated substances above EPD Chapter 391-3-19 Appendix I Notification-Triggering Concentrations.
- Terracon collected groundwater samples from site wells on March 28, 2013. Tetrachloroethene, a VOC, was detected in three of six groundwater samples analyzed at concentrations ranging from 7.5 to 38 ug/L. Other VOCs were not detected above laboratory reporting limits in groundwater samples tested. Groundwater samples were collected by others in 2007, and analytical results from that investigation identified tetrachloroethene in three of five wells at concentrations ranging from 91 to 330 ug/L and chloroform in one well at a concentration of 6.5 ug/L.
- Potential receptors in the form of public or private drinking water wells or surface water bodies were not identified on site. A public drinking water well was identified within 1.4 miles of the site, and a surface water withdrawal point for the City of Roswell water system was identified within 0.55 miles of the site.
- Sources of the chlorinated solvent identified in site groundwater are believed to be located offsite to the northwest and west of the site. Confirmed releases have been reported from multiple facilities located upgradient and crossgradient from the site. Chlorinated solvents have not been used or stored on site. No sources other than these current and former dry cleaners are known at this time.
- Calculated shallow groundwater flow direction at the site is to the southeast.
- Analysis of samples indicates that soils at the site are currently in compliance with Type 1 RRS (VOC and PAH compounds).
- Redevelopment contingency plans have been incorporated as outlined in Section 8.2.
- The J&E model predicted an indoor air concentration of 0.0202 ppbv. The OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Quality from Groundwater and Soils, Generic Screening Level at residential risk level of  $10^{-6}$  (Table 2c) for



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tetrachloroethene is 0.12 ppbv; indicating a predicted vapor concentration below the indoor air action level at the most conservative risk level.

**10.0 SCHEDULE**

We anticipate that the corrective action described herein will be completed within three years of approval of this PPCAP.

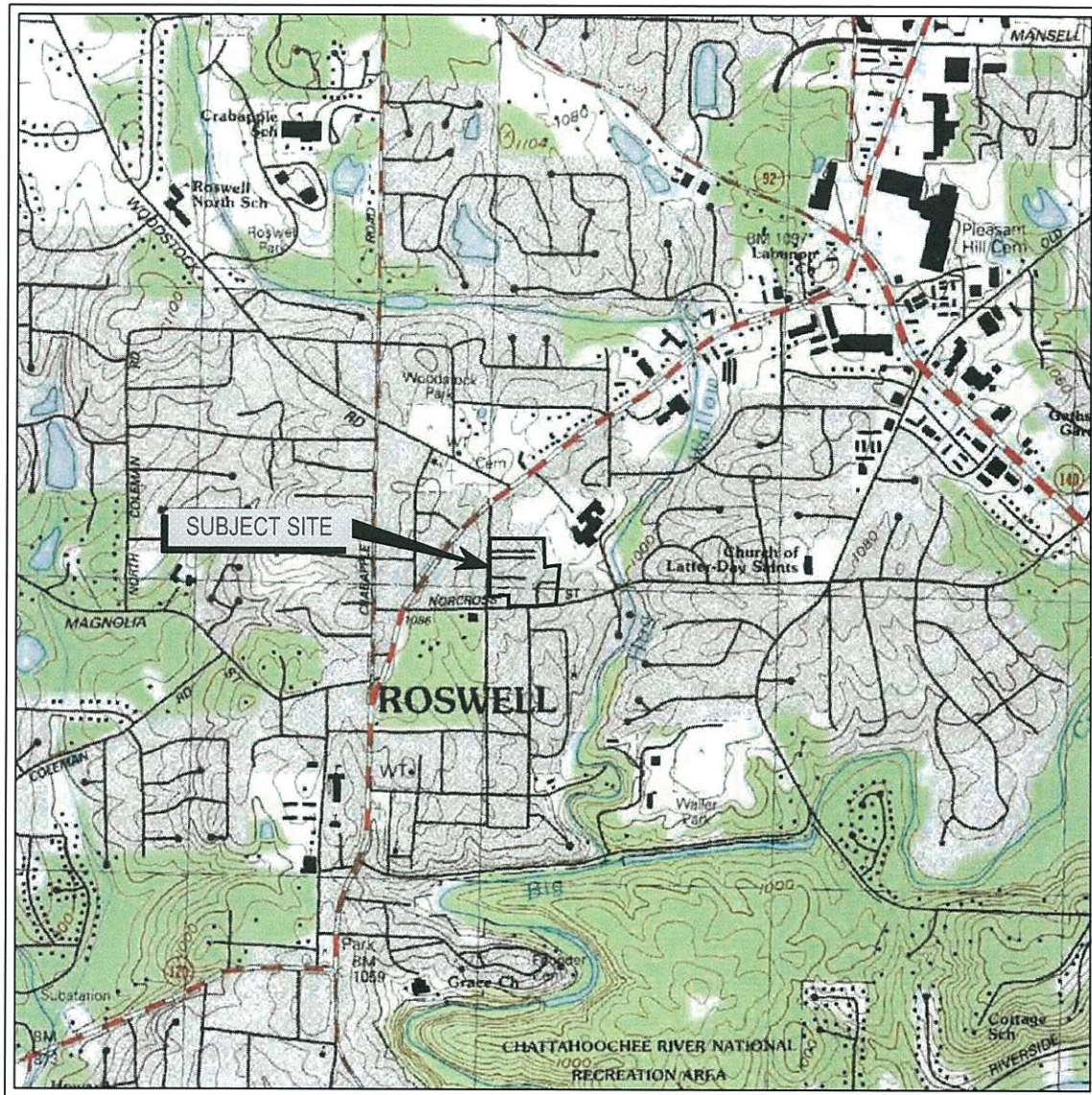
**11.0 PREPARATION OF COMPLIANCE STATUS REPORT**

Prospective purchaser will submit a Compliance Status Report upon completion of the site redevelopment documenting installation of the of the vapor barrier described herein with certification provided by an engineer, manufacturer, and/or installer of the system confirming installation of the system per the specifications for the vapor barrier system.

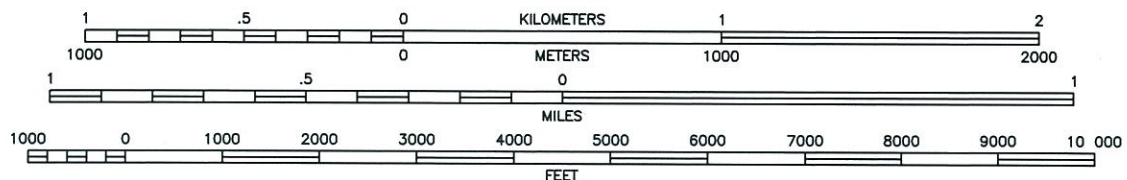
# Appendix A



UNITED STATES — DEPARTMENT OF THE INTERIOR — GEOLOGICAL SURVEY



SCALE 1:24 000



CONTOUR INTERVAL 20 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929

QUADRANGLE  
ROSWELL, GA  
1992

7.5 MINUTE SERIES (TOPOGRAPHIC)

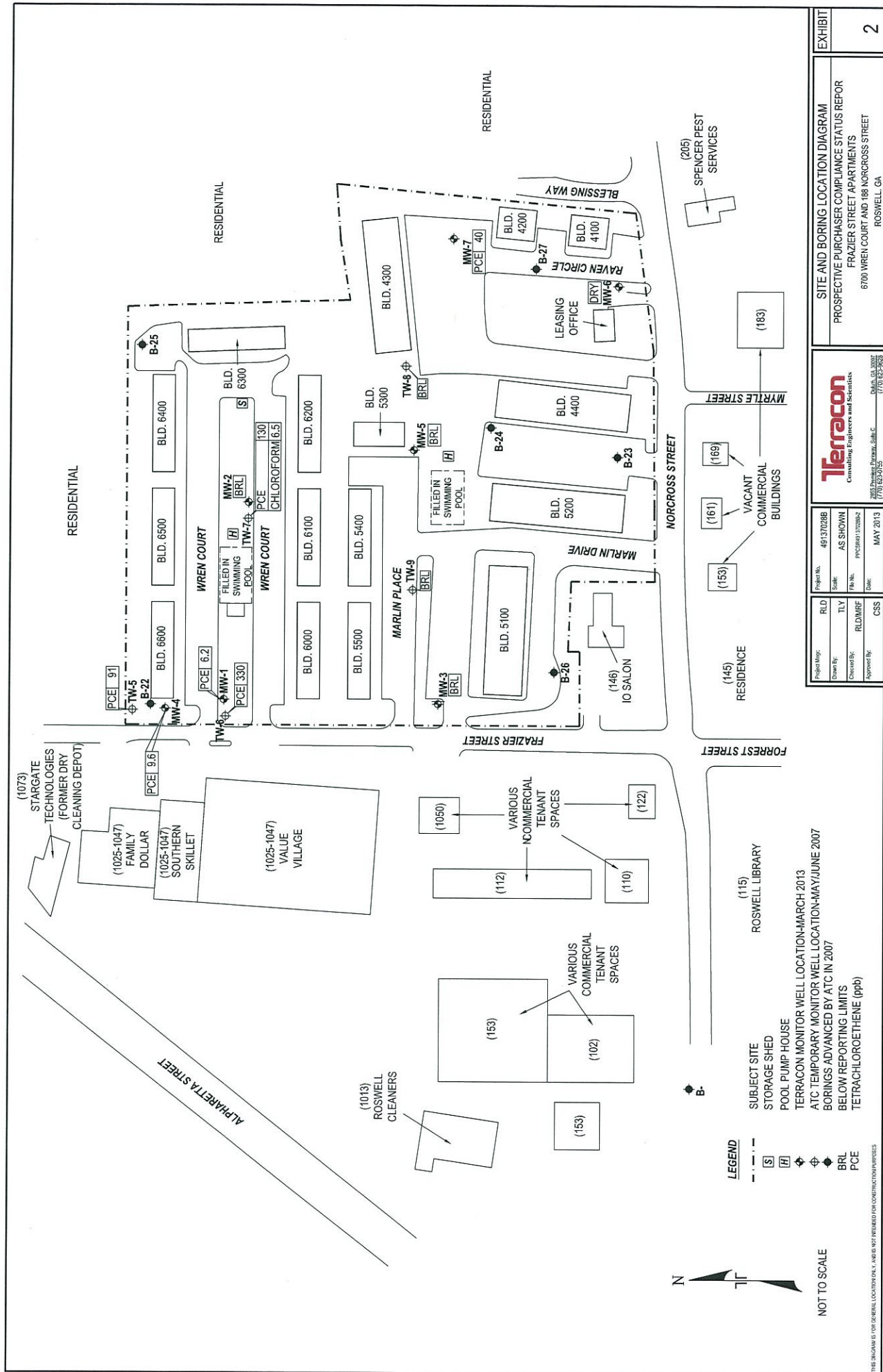


Project Mng:	RLD	Project No.	49137028B	TOPOGRAPHIC VICINITY MAP	EXHIBIT
Drawn By:	TLY	Scale:	AS SHOWN	PROSPECTIVE PURCHASER COMPLIANCE STATUS REPORT	
Checked By:	RLD/MRF	File No.	PPCSR49137028B-1	FRAZIER STREET APARTMENTS	
Approved By:	CSS	Date:	MAY 2013	6700 WREN COURT AND 188 NORCROSS STREET	
				ROSWELL, GA	1

**Terracon**  
Consulting Engineers and Scientists

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# Appendix B





ANALYTICAL ENVIRONMENTAL SERVICES, INC.

March 27, 2013

Conor Dowling  
Terracon  
2855 Premiere Parkway  
Duluth GA 30097

TEL: (770) 623-0755  
FAX: (770) 623-9628

RE: Frazier St

Dear Conor Dowling:

Order No: 1303J71

Analytical Environmental Services, Inc. received 8 samples on 3/22/2013 3:50:00 PM for the analyses presented in following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative.

AES' certifications are as follows:

- NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water Microbiology, effective 07/01/12-06/30/13.
- AIHA Certification ID #100671 for Industrial Hygiene samples (Organics, Inorganics), Environmental Lead (Paint, Soil, Dust Wipes, Air), and Environmental Microbiology (Fungal) effective until 09/01/13.

These results relate only to the items tested. This report may only be reproduced in full.

If you have any questions regarding these test results, please feel free to call.

Nicole Jessup  
Project Manager





**Client:** Terracon  
**Project:** Frazier St  
**Lab ID:** 1303J71

**Case Narrative**

Volatile Organic Compounds Analysis by Method 8260B:

Trichloroethene value for the QC sample 1303J74-006AMS/MSD is "E" qualified indicating estimated value over linear calibration range due to the level of target analyte present in the unspiked sample.

## Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
 Project Name: Frazier St  
 Lab ID: 1303J71-001

Client Sample ID: MW-1(3-5)  
 Collection Date: 3/18/2013 11:00:00 AM  
 Matrix: Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				(SW5035)				
1,1,1-Trichloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
1,1,2,2-Tetrachloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
1,1,2-Trichloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
1,1-Dichloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
1,1-Dichloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
1,2,4-Trichlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
1,2-Dibromo-3-chloropropane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
1,2-Dibromoethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
1,2-Dichlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
1,2-Dichloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
1,2-Dichloropropane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
1,3-Dichlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
1,4-Dichlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
2-Butanone	BRL	0.041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
2-Hexanone	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
4-Methyl-2-pentanone	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Acetone	BRL	0.083		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Benzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Bromodichloromethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Bromoform	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Bromomethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Carbon disulfide	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Carbon tetrachloride	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Chlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Chloroethane	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Chloroform	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Chloromethane	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
cis-1,2-Dichloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
cis-1,3-Dichloropropene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Cyclohexane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Dibromochloromethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Dichlorodifluoromethane	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Ethylbenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Freon-113	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Isopropylbenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
m,p-Xylene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Methyl acetate	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Methyl tert-butyl ether	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Methylcyclohexane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Methylene chloride	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
o-Xylene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD

Qualifiers: \* Value exceeds maximum contaminant level  
 BRL Below reporting limit  
 H Holding times for preparation or analysis exceeded  
 N Analyte not NELAC certified  
 B Analyte detected in the associated method blank  
 > Greater than Result value

E Estimated (value above quantitation range)  
 S Spike Recovery outside limits due to matrix  
 Narr See case narrative  
 NC Not confirmed  
 < Less than Result value  
 J Estimated value detected below Reporting Limit



## Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
 Project Name: Frazier St  
 Lab ID: 1303J71-001

Client Sample ID: MW-1(3-5)  
 Collection Date: 3/18/2013 11:00:00 AM  
 Matrix: Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
<b>TCL VOLATILE ORGANICS SW8260B</b>				<b>(SW5035)</b>				
Styrene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Tetrachloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Toluene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
trans-1,2-Dichloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
trans-1,3-Dichloropropene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Trichloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Trichlorofluoromethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Vinyl chloride	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 19:56	MD
Surr: 4-Bromofluorobenzene	111	63.8-133		%REC	173776	1	03/25/2013 19:56	MD
Surr: Dibromofluoromethane	122	74.3-130		%REC	173776	1	03/25/2013 19:56	MD
Surr: Toluene-d8	102	72.8-122		%REC	173776	1	03/25/2013 19:56	MD
<b>PERCENT MOISTURE D2216</b>								
Percent Moisture	21.1	0		wt%	R240981	1	03/27/2013 11:30	AS

**Qualifiers:**

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- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

## Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
 Project Name: Frazier St  
 Lab ID: 1303J71-002

Client Sample ID: MW-2(3-5)  
 Collection Date: 3/19/2013 9:45:00 AM  
 Matrix: Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5035)</b>			
1,1,1-Trichloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
1,1,2,2-Tetrachloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
1,1,2-Trichloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
1,1-Dichloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
1,1-Dichloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
1,2,4-Trichlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
1,2-Dibromo-3-chloropropane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
1,2-Dibromoethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
1,2-Dichlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
1,2-Dichloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
1,2-Dichloropropane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
1,3-Dichlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
1,4-Dichlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
2-Butanone	BRL	0.041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
2-Hexanone	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
4-Methyl-2-pentanone	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Acetone	BRL	0.083		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Benzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Bromodichloromethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Bromoform	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Bromomethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Carbon disulfide	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Carbon tetrachloride	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Chlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Chloroethane	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Chloroform	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Chloromethane	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
cis-1,2-Dichloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
cis-1,3-Dichloropropene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Cyclohexane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Dibromochloromethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Dichlorodifluoromethane	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Ethylbenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Freon-113	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Isopropylbenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
m,p-Xylene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Methyl acetate	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Methyl tert-butyl ether	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Methylcyclohexane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Methylene chloride	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
o-Xylene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD

**Qualifiers:**

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- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
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- > Greater than Result value

- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit



## Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
 Project Name: Frazier St  
 Lab ID: 1303J71-002

Client Sample ID: MW-2(3-5)  
 Collection Date: 3/19/2013 9:45:00 AM  
 Matrix: Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
<b>TCL VOLATILE ORGANICS SW8260B</b>				<b>(SW5035)</b>				
Styrene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Tetrachloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Toluene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
trans-1,2-Dichloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
trans-1,3-Dichloropropene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Trichloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Trichlorofluoromethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Vinyl chloride	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 20:24	MD
Surr: 4-Bromofluorobenzene	107	63.8-133		%REC	173776	1	03/25/2013 20:24	MD
Surr: Dibromofluoromethane	111	74.3-130		%REC	173776	1	03/25/2013 20:24	MD
Surr: Toluene-d8	97.6	72.8-122		%REC	173776	1	03/25/2013 20:24	MD
<b>PERCENT MOISTURE D2216</b>								
Percent Moisture	23.6	0		wt%	R240981	1	03/27/2013 11:30	AS

**Qualifiers:**

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- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value

- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

## Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
 Project Name: Frazier St  
 Lab ID: 1303J71-003

Client Sample ID: MW-3(3-5)  
 Collection Date: 3/19/2013 2:00:00 PM  
 Matrix: Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				(SW5035)				
1,1,1-Trichloroethane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
1,1,2,2-Tetrachloroethane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
1,1,2-Trichloroethane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
1,1-Dichloroethane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
1,1-Dichloroethene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
1,2,4-Trichlorobenzene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
1,2-Dibromo-3-chloropropane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
1,2-Dibromoethane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
1,2-Dichlorobenzene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
1,2-Dichloroethane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
1,2-Dichloropropane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
1,3-Dichlorobenzene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
1,4-Dichlorobenzene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
2-Butanone	BRL	0.054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
2-Hexanone	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
4-Methyl-2-pentanone	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Acetone	BRL	0.11		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Benzene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Bromodichloromethane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Bromoform	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Bromomethane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Carbon disulfide	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Carbon tetrachloride	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Chlorobenzene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Chloroethane	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Chloroform	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Chloromethane	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
cis-1,2-Dichloroethene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
cis-1,3-Dichloropropene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Cyclohexane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Dibromochloromethane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Dichlorodifluoromethane	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Ethylbenzene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Freon-113	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Isopropylbenzene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
m,p-Xylene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Methyl acetate	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Methyl tert-butyl ether	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Methylcyclohexane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Methylene chloride	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
o-Xylene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD

Qualifiers: \* Value exceeds maximum contaminant level  
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E Estimated (value above quantitation range)  
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 J Estimated value detected below Reporting Limit



## Analytical Environmental Services, Inc

Date: 27-Mar-13

<b>Client:</b>	Terracon	<b>Client Sample ID:</b>	MW-3(3-5)
<b>Project Name:</b>	Frazier St	<b>Collection Date:</b>	3/19/2013 2:00:00 PM
<b>Lab ID:</b>	1303J71-003	<b>Matrix:</b>	Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
<b>TCL VOLATILE ORGANICS SW8260B</b>				<b>(SW5035)</b>				
Styrene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Tetrachloroethene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Toluene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
trans-1,2-Dichloroethene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
trans-1,3-Dichloropropene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Trichloroethene	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Trichlorofluoromethane	BRL	0.0054		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Vinyl chloride	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 20:52	MD
Surr: 4-Bromofluorobenzene	105	63.8-133		%REC	173776	1	03/25/2013 20:52	MD
Surr: Dibromofluoromethane	122	74.3-130		%REC	173776	1	03/25/2013 20:52	MD
Surr: Toluene-d8	96.4	72.8-122		%REC	173776	1	03/25/2013 20:52	MD
<b>PERCENT MOISTURE D2216</b>								
Percent Moisture	17.0	0		wt%	R240981	1	03/27/2013 11:30	AS

**Qualifiers:**

- \* Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value

- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

## Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
 Project Name: Frazier St  
 Lab ID: 1303J71-004

Client Sample ID: MW-4(3-5)  
 Collection Date: 3/20/2013 10:10:00 AM  
 Matrix: Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				(SW5035)				
1,1,1-Trichloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
1,1,2,2-Tetrachloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
1,1,2-Trichloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
1,1-Dichloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
1,1-Dichloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
1,2,4-Trichlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
1,2-Dibromo-3-chloropropane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
1,2-Dibromoethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
1,2-Dichlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
1,2-Dichloroethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
1,2-Dichloropropane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
1,3-Dichlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
1,4-Dichlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
2-Butanone	BRL	0.041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
2-Hexanone	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
4-Methyl-2-pentanone	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Acetone	BRL	0.083		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Benzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Bromodichloromethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Bromoform	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Bromomethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Carbon disulfide	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Carbon tetrachloride	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Chlorobenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Chloroethane	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Chloroform	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Chloromethane	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
cis-1,2-Dichloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
cis-1,3-Dichloropropene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Cyclohexane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Dibromochloromethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Dichlorodifluoromethane	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Ethylbenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Freon-113	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Isopropylbenzene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
m,p-Xylene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Methyl acetate	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Methyl tert-butyl ether	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Methylcyclohexane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Methylene chloride	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
o-Xylene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD

Qualifiers: \* Value exceeds maximum contaminant level  
 BRL Below reporting limit  
 H Holding times for preparation or analysis exceeded  
 N Analyte not NELAC certified  
 B Analyte detected in the associated method blank  
 > Greater than Result value

E Estimated (value above quantitation range)  
 S Spike Recovery outside limits due to matrix  
 Narr See case narrative  
 NC Not confirmed  
 < Less than Result value  
 J Estimated value detected below Reporting Limit



## Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
 Project Name: Frazier St  
 Lab ID: 1303J71-004

Client Sample ID: MW-4(3-5)  
 Collection Date: 3/20/2013 10:10:00 AM  
 Matrix: Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
<b>TCL VOLATILE ORGANICS SW8260B</b>				<b>(SW5035)</b>				
Styrene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Tetrachloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Toluene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
trans-1,2-Dichloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
trans-1,3-Dichloropropene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Trichloroethene	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Trichlorofluoromethane	BRL	0.0041		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Vinyl chloride	BRL	0.0083		mg/Kg-dry	173776	1	03/25/2013 21:20	MD
Surr: 4-Bromofluorobenzene	104	63.8-133		%REC	173776	1	03/25/2013 21:20	MD
Surr: Dibromofluoromethane	114	74.3-130		%REC	173776	1	03/25/2013 21:20	MD
Surr: Toluene-d8	101	72.8-122		%REC	173776	1	03/25/2013 21:20	MD
<b>PERCENT MOISTURE D2216</b>								
Percent Moisture	16.6	0		wt%	R240981	1	03/27/2013 11:30	AS

## Qualifiers:

\* Value exceeds maximum contaminant level  
 BRL Below reporting limit  
 H Holding times for preparation or analysis exceeded  
 N Analyte not NELAC certified  
 B Analyte detected in the associated method blank  
 > Greater than Result value

E Estimated (value above quantitation range)  
 S Spike Recovery outside limits due to matrix  
 Narr See case narrative  
 NC Not confirmed  
 < Less than Result value  
 J Estimated value detected below Reporting Limit

**Analytical Environmental Services, Inc**
**Date:** 27-Mar-13

**Client:** Terracon  
**Project Name:** Frazier St  
**Lab ID:** 1303J71-005

**Client Sample ID:** MW-5(3-5)  
**Collection Date:** 3/20/2013 11:00:00 AM  
**Matrix:** Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
<b>TCL VOLATILE ORGANICS SW8260B</b>			<b>(SW5035)</b>					
1,1,1-Trichloroethane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
1,1,2,2-Tetrachloroethane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
1,1,2-Trichloroethane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
1,1-Dichloroethane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
1,1-Dichloroethene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
1,2,4-Trichlorobenzene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
1,2-Dibromo-3-chloropropane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
1,2-Dibromoethane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
1,2-Dichlorobenzene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
1,2-Dichloroethane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
1,2-Dichloropropane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
1,3-Dichlorobenzene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
1,4-Dichlorobenzene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
2-Butanone	BRL	0.036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
2-Hexanone	BRL	0.0073		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
4-Methyl-2-pentanone	BRL	0.0073		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Acetone	BRL	0.073		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Benzene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Bromodichloromethane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Bromoform	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Bromomethane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Carbon disulfide	BRL	0.0073		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Carbon tetrachloride	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Chlorobenzene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Chloroethane	BRL	0.0073		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Chloroform	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Chloromethane	BRL	0.0073		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
cis-1,2-Dichloroethene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
cis-1,3-Dichloropropene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Cyclohexane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Dibromochloromethane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Dichlorodifluoromethane	BRL	0.0073		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Ethylbenzene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Freon-113	BRL	0.0073		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Isopropylbenzene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
m,p-Xylene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Methyl acetate	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Methyl tert-butyl ether	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Methylcyclohexane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Methylene chloride	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
o-Xylene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD

**Qualifiers:** \* Value exceeds maximum contaminant level  
 BRL Below reporting limit  
 H Holding times for preparation or analysis exceeded  
 N Analyte not NELAC certified  
 B Analyte detected in the associated method blank  
 > Greater than Result value

E Estimated (value above quantitation range)  
 S Spike Recovery outside limits due to matrix  
 Narr See case narrative  
 NC Not confirmed  
 < Less than Result value  
 J Estimated value detected below Reporting Limit



**Analytical Environmental Services, Inc**
**Date:** 27-Mar-13

**Client:** Terracon  
**Project Name:** Frazier St  
**Lab ID:** 1303J71-005

**Client Sample ID:** MW-5(3-5)  
**Collection Date:** 3/20/2013 11:00:00 AM  
**Matrix:** Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
<b>TCL VOLATILE ORGANICS SW8260B</b>			<b>(SW5035)</b>					
Styrene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Tetrachloroethene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Toluene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
trans-1,2-Dichloroethene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
trans-1,3-Dichloropropene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Trichloroethene	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Trichlorofluoromethane	BRL	0.0036		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Vinyl chloride	BRL	0.0073		mg/Kg-dry	173776	1	03/25/2013 21:49	MD
Surr: 4-Bromofluorobenzene	103	63.8-133		%REC	173776	1	03/25/2013 21:49	MD
Surr: Dibromofluoromethane	114	74.3-130		%REC	173776	1	03/25/2013 21:49	MD
Surr: Toluene-d8	100	72.8-122		%REC	173776	1	03/25/2013 21:49	MD
<b>PERCENT MOISTURE D2216</b>								
Percent Moisture	22.1	0		wt%	R240981	1	03/27/2013 11:30	AS

**Qualifiers:** \* Value exceeds maximum contaminant level  
 BRL Below reporting limit  
 H Holding times for preparation or analysis exceeded  
 N Analyte not NELAC certified  
 B Analyte detected in the associated method blank  
 > Greater than Result value

E Estimated (value above quantitation range)  
 S Spike Recovery outside limits due to matrix  
 Narr See case narrative  
 NC Not confirmed  
 < Less than Result value  
 J Estimated value detected below Reporting Limit

**Analytical Environmental Services, Inc**
**Date:** 27-Mar-13

**Client:** Terracon  
**Project Name:** Frazier St  
**Lab ID:** 1303J71-006

**Client Sample ID:** MW-6(3-5)  
**Collection Date:** 3/21/2013 10:00:00 AM  
**Matrix:** Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
<b>TCL VOLATILE ORGANICS SW8260B</b>				<b>(SW5035)</b>				
1,1,1-Trichloroethane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
1,1,2,2-Tetrachloroethane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
1,1,2-Trichloroethane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
1,1-Dichloroethane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
1,1-Dichloroethene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
1,2,4-Trichlorobenzene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
1,2-Dibromo-3-chloropropane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
1,2-Dibromoethane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
1,2-Dichlorobenzene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
1,2-Dichloroethane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
1,2-Dichloropropane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
1,3-Dichlorobenzene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
1,4-Dichlorobenzene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
2-Butanone	BRL	0.056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
2-Hexanone	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
4-Methyl-2-pentanone	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Acetone	BRL	0.11		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Benzene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Bromodichloromethane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Bromoform	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Bromomethane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Carbon disulfide	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Carbon tetrachloride	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Chlorobenzene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Chloroethane	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Chloroform	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Chloromethane	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
cis-1,2-Dichloroethene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
cis-1,3-Dichloropropene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Cyclohexane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Dibromochloromethane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Dichlorodifluoromethane	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Ethylbenzene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Freon-113	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Isopropylbenzene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
m,p-Xylene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Methyl acetate	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Methyl tert-butyl ether	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Methylcyclohexane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Methylene chloride	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
o-Xylene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD

**Qualifiers:** \* Value exceeds maximum contaminant level  
 BRL Below reporting limit  
 H Holding times for preparation or analysis exceeded  
 N Analyte not NELAC certified  
 B Analyte detected in the associated method blank  
 > Greater than Result value

E Estimated (value above quantitation range)  
 S Spike Recovery outside limits due to matrix  
 Narr See case narrative  
 NC Not confirmed  
 < Less than Result value  
 J Estimated value detected below Reporting Limit



## Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
 Project Name: Frazier St  
 Lab ID: 1303J71-006

Client Sample ID: MW-6(3-5)  
 Collection Date: 3/21/2013 10:00:00 AM  
 Matrix: Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
<b>TCL VOLATILE ORGANICS SW8260B</b>				<b>(SW5035)</b>				
Styrene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Tetrachloroethene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Toluene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
trans-1,2-Dichloroethene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
trans-1,3-Dichloropropene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Trichloroethene	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Trichlorofluoromethane	BRL	0.0056		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Vinyl chloride	BRL	0.011		mg/Kg-dry	173776	1	03/25/2013 22:17	MD
Surr: 4-Bromofluorobenzene	107	63.8-133		%REC	173776	1	03/25/2013 22:17	MD
Surr: Dibromofluoromethane	118	74.3-130		%REC	173776	1	03/25/2013 22:17	MD
Surr: Toluene-d8	100	72.8-122		%REC	173776	1	03/25/2013 22:17	MD
<b>PERCENT MOISTURE D2216</b>								
Percent Moisture	28.7	0		wt%	R240981	1	03/27/2013 11:30	AS

## Qualifiers:

\* Value exceeds maximum contaminant level  
 BRL Below reporting limit  
 H Holding times for preparation or analysis exceeded  
 N Analyte not NELAC certified  
 B Analyte detected in the associated method blank  
 > Greater than Result value

E Estimated (value above quantitation range)  
 S Spike Recovery outside limits due to matrix  
 Narr See case narrative  
 NC Not confirmed  
 < Less than Result value  
 J Estimated value detected below Reporting Limit

**Analytical Environmental Services, Inc**
**Date:** 27-Mar-13

**Client:** Terracon  
**Project Name:** Frazier St  
**Lab ID:** 1303J71-007

**Client Sample ID:** MW-7(3-5)  
**Collection Date:** 3/21/2013 12:30:00 PM  
**Matrix:** Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5035)</b>			
1,1,1-Trichloroethane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
1,1,2,2-Tetrachloroethane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
1,1,2-Trichloroethane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
1,1-Dichloroethane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
1,1-Dichloroethene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
1,2,4-Trichlorobenzene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
1,2-Dibromo-3-chloropropane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
1,2-Dibromoethane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
1,2-Dichlorobenzene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
1,2-Dichloroethane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
1,2-Dichloropropane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
1,3-Dichlorobenzene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
1,4-Dichlorobenzene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
2-Butanone	BRL	0.068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
2-Hexanone	BRL	0.014		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
4-Methyl-2-pentanone	BRL	0.014		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Acetone	BRL	0.14		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Benzene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Bromodichloromethane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Bromoform	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Bromomethane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Carbon disulfide	BRL	0.014		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Carbon tetrachloride	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Chlorobenzene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Chloroethane	BRL	0.014		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Chloroform	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Chloromethane	BRL	0.014		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
cis-1,2-Dichloroethene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
cis-1,3-Dichloropropene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Cyclohexane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Dibromochloromethane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Dichlorodifluoromethane	BRL	0.014		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Ethylbenzene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Freon-113	BRL	0.014		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Isopropylbenzene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
m,p-Xylene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Methyl acetate	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Methyl tert-butyl ether	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Methylcyclohexane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Methylene chloride	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
o-Xylene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD

**Qualifiers:** \* Value exceeds maximum contaminant level  
 BRL Below reporting limit  
 H Holding times for preparation or analysis exceeded  
 N Analyte not NELAC certified  
 B Analyte detected in the associated method blank  
 > Greater than Result value

E Estimated (value above quantitation range)  
 S Spike Recovery outside limits due to matrix  
 Narr See case narrative  
 NC Not confirmed  
 < Less than Result value  
 J Estimated value detected below Reporting Limit



## Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
 Project Name: Frazier St  
 Lab ID: 1303J71-007

Client Sample ID: MW-7(3-5)  
 Collection Date: 3/21/2013 12:30:00 PM  
 Matrix: Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
<b>TCL VOLATILE ORGANICS SW8260B</b>				<b>(SW5035)</b>				
Styrene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Tetrachloroethene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Toluene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
trans-1,2-Dichloroethene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
trans-1,3-Dichloropropene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Trichloroethene	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Trichlorofluoromethane	BRL	0.0068		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Vinyl chloride	BRL	0.014		mg/Kg-dry	173776	1	03/25/2013 22:45	MD
Surr: 4-Bromofluorobenzene	98.8	63.8-133		%REC	173776	1	03/25/2013 22:45	MD
Surr: Dibromofluoromethane	126	74.3-130		%REC	173776	1	03/25/2013 22:45	MD
Surr: Toluene-d8	99.2	72.8-122		%REC	173776	1	03/25/2013 22:45	MD
<b>PERCENT MOISTURE D2216</b>								
Percent Moisture	14.9	0		wt%	R240981	1	03/27/2013 11:30	AS

## Qualifiers:

\* Value exceeds maximum contaminant level  
 BRL Below reporting limit  
 H Holding times for preparation or analysis exceeded  
 N Analyte not NELAC certified  
 B Analyte detected in the associated method blank  
 > Greater than Result value

E Estimated (value above quantitation range)  
 S Spike Recovery outside limits due to matrix  
 Narr See case narrative  
 NC Not confirmed  
 < Less than Result value  
 J Estimated value detected below Reporting Limit

## Analytical Environmental Services, Inc

Date: 27-Mar-13

<b>Client:</b>	Terracon	<b>Client Sample ID:</b>	TRIP BLANK
<b>Project Name:</b>	Frazier St	<b>Collection Date:</b>	3/21/2013
<b>Lab ID:</b>	1303J71-008	<b>Matrix:</b>	Aqueous

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
<b>TCL VOLATILE ORGANICS SW8260B</b>				<b>(SW5030B)</b>				
1,1,1-Trichloroethane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
1,1,2-Trichloroethane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
1,1-Dichloroethane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
1,1-Dichloroethene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
1,2-Dibromoethane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
1,2-Dichlorobenzene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
1,2-Dichloroethane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
1,2-Dichloropropane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
1,3-Dichlorobenzene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
1,4-Dichlorobenzene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
2-Butanone	BRL	50		ug/L	173937	1	03/25/2013 20:46	YT
2-Hexanone	BRL	10		ug/L	173937	1	03/25/2013 20:46	YT
4-Methyl-2-pentanone	BRL	10		ug/L	173937	1	03/25/2013 20:46	YT
Acetone	BRL	50		ug/L	173937	1	03/25/2013 20:46	YT
Benzene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Bromodichloromethane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Bromoform	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Bromomethane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Carbon disulfide	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Carbon tetrachloride	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Chlorobenzene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Chloroethane	BRL	10		ug/L	173937	1	03/25/2013 20:46	YT
Chloroform	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Chloromethane	BRL	10		ug/L	173937	1	03/25/2013 20:46	YT
cis-1,2-Dichloroethene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
cis-1,3-Dichloropropene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Cyclohexane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Dibromochloromethane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Dichlorodifluoromethane	BRL	10		ug/L	173937	1	03/25/2013 20:46	YT
Ethylbenzene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Freon-113	BRL	10		ug/L	173937	1	03/25/2013 20:46	YT
Isopropylbenzene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
m,p-Xylene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Methyl acetate	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Methyl tert-butyl ether	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Methylcyclohexane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Methylene chloride	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
o-Xylene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT

Qualifiers: \* Value exceeds maximum contaminant level

BRL Below reporting limit

H Holding times for preparation or analysis exceeded

N Analyte not NELAC certified

B Analyte detected in the associated method blank

&gt; Greater than Result value

E Estimated (value above quantitation range)

S Spike Recovery outside limits due to matrix

Narr See case narrative

NC Not confirmed

&lt; Less than Result value

J Estimated value detected below Reporting Limit



## Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
 Project Name: Frazier St  
 Lab ID: 1303J71-008

Client Sample ID: TRIP BLANK  
 Collection Date: 3/21/2013  
 Matrix: Aqueous

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				(SW5030B)				
Styrene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Tetrachloroethene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Toluene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
trans-1,2-Dichloroethene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
trans-1,3-Dichloropropene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Trichloroethene	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Trichlorofluoromethane	BRL	5.0		ug/L	173937	1	03/25/2013 20:46	YT
Vinyl chloride	BRL	2.0		ug/L	173937	1	03/25/2013 20:46	YT
Surr: 4-Bromofluorobenzene	78.9	64.6-123		%REC	173937	1	03/25/2013 20:46	YT
Surr: Dibromofluoromethane	101	76.6-133		%REC	173937	1	03/25/2013 20:46	YT
Surr: Toluene-d8	94.3	77.8-120		%REC	173937	1	03/25/2013 20:46	YT

**Qualifiers:**

- \* Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value

- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc.

Sample/Cooler Receipt Checklist

Client Teravan

Work Order Number 1303571

Checklist completed by [Signature] 3/22/13  
Signature Date

Carrier name: FedEx ☐ UPS ☐ Courier ☒ Client ☐ US Mail ☐ Other ☐

Shipping container/cooler in good condition? Yes ☒ No ☐ Not Present ☐

Custody seals intact on shipping container/cooler? Yes ☒ No ☐ Not Present ☒ 3/22/13

Custody seals intact on sample bottles? Yes ☐ No ☐ Not Present ☒

Container/Temp Blank temperature in compliance? ( $4^{\circ}\text{C} \pm 2$ )\* Yes ☒ No ☐

Cooler #1 3.1 Cooler #2 ☐ Cooler #3 ☐ Cooler #4 ☐ Cooler #5 ☐ Cooler #6 ☐

Chain of custody present? Yes ☒ No ☐

Chain of custody signed when relinquished and received? Yes ☒ No ☐

Chain of custody agrees with sample labels? Yes ☒ No ☐

Samples in proper container/bottle? Yes ☒ No ☐

Sample containers intact? Yes ☒ No ☐

Sufficient sample volume for indicated test? Yes ☒ No ☐

All samples received within holding time? Yes ☒ No ☐

Was TAT marked on the COC? Yes ☒ No ☐

Proceed with Standard TAT as per project history? Yes ☐ No ☐ Not Applicable ☒

Water - VOA vials have zero headspace? No VOA vials submitted ☐ Yes ☒ No ☐

Water - pH acceptable upon receipt? Yes ☒ No ☐ Not Applicable ☐

Adjusted? ☐ Checked by ☐

Sample Condition: Good ☒ Other(Explain) ☐

(For diffusive samples or AIHA lead) Is a known blank included? Yes ☐ No ☒

See Case Narrative for resolution of the Non-Conformance.

\* Samples do not have to comply with the given range for certain parameters.

\\Quality Assurance\Checklists Procedures Sign-Off Templates\Checklists\Sample Receipt Checklists\Sample\_Cooler\_Receipt\_Checklist



# Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
Project Name: Frazier St  
Workorder: 1303J71

## ANALYTICAL QC SUMMARY REPORT

BatchID: 173776

Sample ID: MB-173776		Client ID:		Units: mg/Kg		Prep Date: 03/25/2013		Run No: 240776			
Sample Type: MBLK		Test Code: TCL VOLATILE ORGANICS		Batch ID: 173776		Analysis Date: 03/25/2013		Seq No: 5039992			
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	BRL	0.0050	0	0	0	0	0	0	0	0	0
1,1,2,2-Tetrachloroethane	BRL	0.0050	0	0	0	0	0	0	0	0	0
1,1,2-Trichloroethane	BRL	0.0050	0	0	0	0	0	0	0	0	0
1,1-Dichloroethane	BRL	0.0050	0	0	0	0	0	0	0	0	0
1,1-Dichloroethene	BRL	0.0050	0	0	0	0	0	0	0	0	0
1,2,4-Trichlorobenzene	BRL	0.0050	0	0	0	0	0	0	0	0	0
1,2-Dibromo-3-chloropropane	BRL	0.0050	0	0	0	0	0	0	0	0	0
1,2-Dibromoethane	BRL	0.0050	0	0	0	0	0	0	0	0	0
1,2-Dichlorobenzene	BRL	0.0050	0	0	0	0	0	0	0	0	0
1,2-Dichloroethane	BRL	0.0050	0	0	0	0	0	0	0	0	0
1,2-Dichloropropane	BRL	0.0050	0	0	0	0	0	0	0	0	0
1,3-Dichlorobenzene	BRL	0.0050	0	0	0	0	0	0	0	0	0
1,4-Dichlorobenzene	BRL	0.0050	0	0	0	0	0	0	0	0	0
2-Butanone	BRL	0.050	0	0	0	0	0	0	0	0	0
2-Hexanone	BRL	0.010	0	0	0	0	0	0	0	0	0
4-Methyl-2-pentanone	BRL	0.010	0	0	0	0	0	0	0	0	0
Acetone	BRL	0.10	0	0	0	0	0	0	0	0	0
Benzene	BRL	0.0050	0	0	0	0	0	0	0	0	0
Bromodichloromethane	BRL	0.0050	0	0	0	0	0	0	0	0	0
Bromoform	BRL	0.0050	0	0	0	0	0	0	0	0	0
Bromomethane	BRL	0.0050	0	0	0	0	0	0	0	0	0
Carbon disulfide	BRL	0.010	0	0	0	0	0	0	0	0	0
Carbon tetrachloride	BRL	0.0050	0	0	0	0	0	0	0	0	0
Chlorobenzene	BRL	0.0050	0	0	0	0	0	0	0	0	0
Chloroethane	BRL	0.010	0	0	0	0	0	0	0	0	0
Chloroform	BRL	0.0050	0	0	0	0	0	0	0	0	0
Chloromethane	BRL	0.010	0	0	0	0	0	0	0	0	0

Qualifiers:		Greater than Result value	Less than Result value	B		Analyte detected in the associated method blank	
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	H	Holding times for preparation or analysis exceeded	
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	R	RPD outside limits due to matrix	
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix				

# Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
Project Name: Frazier St  
Workorder: 1303J71

## ANALYTICAL QC SUMMARY REPORT

BatchID: 173776

Sample ID: MB-173776		Client ID:		Units: mg/Kg		Prep Date: 03/25/2013		Run No: 240776			
Sample Type: MBLK		Test Code: TCL VOLATILE ORGANICS		Batch ID: 173776		Analysis Date: 03/25/2013		Seq No: 5039992			
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
cis-1,2-Dichloroethene	BRL	0.0050	0	0	0	0	0	0	0	0	0
cis-1,3-Dichloropropene	BRL	0.0050	0	0	0	0	0	0	0	0	0
Cyclohexane	BRL	0.0050	0	0	0	0	0	0	0	0	0
Dibromochloromethane	BRL	0.0050	0	0	0	0	0	0	0	0	0
Dichlorodifluoromethane	BRL	0.010	0	0	0	0	0	0	0	0	0
Ethylbenzene	BRL	0.0050	0	0	0	0	0	0	0	0	0
Freon-113	BRL	0.010	0	0	0	0	0	0	0	0	0
Isopropylbenzene	BRL	0.0050	0	0	0	0	0	0	0	0	0
m,p-Xylene	BRL	0.0050	0	0	0	0	0	0	0	0	0
Methyl acetate	BRL	0.0050	0	0	0	0	0	0	0	0	0
Methyl tert-butyl ether	BRL	0.0050	0	0	0	0	0	0	0	0	0
Methylcyclohexane	BRL	0.0050	0	0	0	0	0	0	0	0	0
Methylene chloride	BRL	0.0050	0	0	0	0	0	0	0	0	0
o-Xylene	BRL	0.0050	0	0	0	0	0	0	0	0	0
Styrene	BRL	0.0050	0	0	0	0	0	0	0	0	0
Tetrachloroethene	BRL	0.0050	0	0	0	0	0	0	0	0	0
Toluene	BRL	0.0050	0	0	0	0	0	0	0	0	0
trans-1,2-Dichloroethene	BRL	0.0050	0	0	0	0	0	0	0	0	0
trans-1,3-Dichloropropene	BRL	0.0050	0	0	0	0	0	0	0	0	0
Trichloroethene	BRL	0.0050	0	0	0	0	0	0	0	0	0
Trichlorofluoromethane	BRL	0.0050	0	0	0	0	0	0	0	0	0
Vinyl chloride	BRL	0.010	0	0	0	0	0	0	0	0	0
Surr: 4-Bromofluorobenzene	0.05518	0	0.05	0	110	63.8	133	0	0	0	0
Surr: Dibromofluoromethane	0.05896	0	0.05	0	118	74.3	130	0	0	0	0
Surr: Toluene-d8	0.04987	0	0.05	0	99.7	72.8	122	0	0	0	0

Qualifiers:		>		<		B	
Greater than Result value		Less than Result value		Analyte detected in the associated method blank			
BRL Below reporting limit		E Estimated (value above quantitation range)		H Holding times for preparation or analysis exceeded			
J Estimated value detected below Reporting Limit		N Analyte not NELAC certified		R RPD outside limits due to matrix			
Rpt Lim Reporting Limit		S Spike Recovery outside limits due to matrix					



# Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
Project Name: Frazier St  
Workorder: 1303J71

## ANALYTICAL QC SUMMARY REPORT

BatchID: 173776

Sample ID: LCS-173776	Client ID:	Units: mg/Kg	Prep Date: 03/25/2013	Run No: 240776							
Sample Type: LCS	Test Code: TCL VOLATILE ORGANICS SW8260B	Batch ID: 173776	Analysis Date: 03/25/2013	Seq No: 5039993							
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual

1,1-Dichloroethene	0.05141	0.0050	0.05	0	103	63.1	140	0	0	0	0
Benzene	0.04717	0.0050	0.05	0	94.3	70.2	130	0	0	0	0
Chlorobenzene	0.04323	0.0050	0.05	0	86.5	70	126	0	0	0	0
Toluene	0.04902	0.0050	0.05	0	98	70.5	130	0	0	0	0
Trichloroethene	0.04977	0.0050	0.05	0	99.5	70	135	0	0	0	0
Surr: 4-Bromofluorobenzene	0.05490	0	0.05	0	110	63.8	133	0	0	0	0
Surr: Dibromofluoromethane	0.05434	0	0.05	0	109	74.3	130	0	0	0	0
Surr: Toluene-d8	0.04984	0	0.05	0	99.7	72.8	122	0	0	0	0

Sample ID: 1303J51-002AMS	Client ID:	Units: mg/Kg-dry	Prep Date: 03/25/2013	Run No: 240776							
SampleType: MS	TestCode: TCL VOLATILE ORGANICS SW8260B	BatchID: 173776	Analysis Date: 03/25/2013	Seq No: 5040000							
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual

1,1-Dichloroethene	0.06361	0.0060	0.0596	0	107	58.8	157	0	0	0	0
Benzene	0.05653	0.0060	0.0596	0	94.9	66.3	139	0	0	0	0
Chlorobenzene	0.04940	0.0060	0.0596	0	82.9	67.8	131	0	0	0	0
Toluene	0.05600	0.0060	0.0596	0	94	66	138	0	0	0	0
Trichloroethene	0.05944	0.0060	0.0596	0	99.7	72.5	141	0	0	0	0
Surr: 4-Bromofluorobenzene	0.06817	0	0.0596	0	114	63.8	133	0	0	0	0
Surr: Dibromofluoromethane	0.06996	0	0.0596	0	117	74.3	130	0	0	0	0
Surr: Toluene-d8	0.06027	0	0.0596	0	101	72.8	122	0	0	0	0

Sample ID: 1303J51-002AMSD	Client ID:	Units: mg/Kg-dry	Prep Date: 03/25/2013	Run No: 240776							
Sample Type: MSD	Test(Code): TCL VOLATILE ORGANICS SW8260B	BatchID: 173776	Analysis Date: 03/25/2013	Seq No: 5040003							
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual

1,1-Dichloroethene	0.06483	0.0060	0.0596	0	109	58.8	157	0.06361	1.91	21.9	
Benzene	0.05618	0.0060	0.0596	0	94.3	66.3	139	0.05653	0.613	22.3	

Qualifiers:	>	Greater than Result value	<	Less than Result value							
BRL		Below reporting limit	E	Estimated (value above quantitation range)		B	Analyte detected in the associated method blank				
J		Estimated value detected below Reporting Limit	N	Analyte not NELAC certified		H	Holding times for preparation or analysis exceeded				
Rpt Lim		Reporting Limit	S	Spike Recovery outside limits due to matrix		R	RPD outside limits due to matrix				

# Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
Project Name: Frazier St  
Workorder: 1303J71

## ANALYTICAL QC SUMMARY REPORT

BatchID: 173776

Sample ID: 1303J51-002AMSD	Client ID:	Units: mg/Kg-dry		Prep Date: 03/25/2013	Run No: 240776						
Sample Type: MSD	Test Code: TCL VOLATILE ORGANICS SW8260B	BatchID: 173776		Analysis Date: 03/25/2013	Seq No: 5040003						
Analyte	Result	RPT Limit	SPK value	SPK RefVal	%REC	Low Limit	High Limit	RPD RefVal	%RPD	RPD Limit	Qual
Chlorobenzene	0.04895	0.0060	0.0596	0	82.1	67.8	131	0.04940	0.921	17.3	
Toluene	0.05631	0.0060	0.0596	0	94.5	66	138	0.05600	0.552	18.1	
Trichloroethene	0.05808	0.0060	0.0596	0	97.5	72.5	141	0.05944	2.31	18.7	
Surr: 4-Bromofluorobenzene	0.06663	0	0.0596	0	112	63.8	133	0.06817	0	0	
Surr: Dibromofluoromethane	0.06737	0	0.0596	0	113	74.3	130	0.06996	0	0	
Surr: Toluene-d8	0.05928	0	0.0596	0	99.5	72.8	122	0.06027	0	0	

Qualifiers:	>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit		E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit		N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit		S	Spike Recovery outside limits due to matrix		



# Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
Project Name: Frazier St  
Workorder: 1303J71

## ANALYTICAL QC SUMMARY REPORT

BatchID: 173937

Sample ID: MB-173937		Client ID:		Units: ug/L		Prep Date:		Run No: 240669			
Sample Type: MBLK		Test Code: TCL VOLATILE ORGANICS		BatchID: 173937		Analysis Date: 03/22/2013		Seq No: 5038704			
Analyte		RPT Limit	SPK value	SPK RefVal	%REC	Low Limit	High Limit	RPD RefVal	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane		5.0	0	0	0	0	0	0	0	0	0
1,1,2,2-Tetrachloroethane		5.0	0	0	0	0	0	0	0	0	0
1,1,2-Trichloroethane		5.0	0	0	0	0	0	0	0	0	0
1,1-Dichloroethane		5.0	0	0	0	0	0	0	0	0	0
1,1-Dichloroethene		5.0	0	0	0	0	0	0	0	0	0
1,2,4-Trichlorobenzene		5.0	0	0	0	0	0	0	0	0	0
1,2-Dibromo-3-chloropropane		5.0	0	0	0	0	0	0	0	0	0
1,2-Dibromoethane		5.0	0	0	0	0	0	0	0	0	0
1,2-Dichlorobenzene		5.0	0	0	0	0	0	0	0	0	0
1,2-Dichloroethane		5.0	0	0	0	0	0	0	0	0	0
1,2-Dichloropropane		5.0	0	0	0	0	0	0	0	0	0
1,3-Dichlorobenzene		5.0	0	0	0	0	0	0	0	0	0
1,4-Dichlorobenzene		5.0	0	0	0	0	0	0	0	0	0
2-Butanone		50	0	0	0	0	0	0	0	0	0
2-Hexanone		10	0	0	0	0	0	0	0	0	0
4-Methyl-2-pentanone		10	0	0	0	0	0	0	0	0	0
Acetone		50	0	0	0	0	0	0	0	0	0
Benzene		5.0	0	0	0	0	0	0	0	0	0
Bromodichloromethane		5.0	0	0	0	0	0	0	0	0	0
Bromoform		5.0	0	0	0	0	0	0	0	0	0
Bromomethane		5.0	0	0	0	0	0	0	0	0	0
Carbon disulfide		5.0	0	0	0	0	0	0	0	0	0
Carbon tetrachloride		5.0	0	0	0	0	0	0	0	0	0
Chlorobenzene		5.0	0	0	0	0	0	0	0	0	0
Chloroethane		10	0	0	0	0	0	0	0	0	0
Chloroform		5.0	0	0	0	0	0	0	0	0	0
Chloromethane		10	0	0	0	0	0	0	0	0	0

Qualifiers:		> Greater than Result value		< Less than Result value		B Analyte detected in the associated method blank	
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded		
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix		
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix				

# Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
Project Name: Frazier St  
Workorder: 1303J71

## ANALYTICAL QC SUMMARY REPORT

BatchID: 173937

Sample ID: MB-173937		Client ID:		TCL VOLATILE ORGANICS		SW8260B		Units: ug/L		Prep Date: 03/22/2013		Run No: 240669	
Sample Type: MBLK		Test Code:		RPT Limit		SPK value		SPK Ref Val		%REC		Batch ID: 173937	
Analyte		Result		RPT Limit		SPK value		SPK Ref Val		%REC		Batch ID: 173937	
cis-1,2-Dichloroethene		BRL		5.0		0		0		0		0	
cis-1,3-Dichloropropene		BRL		5.0		0		0		0		0	
Cyclohexane		BRL		5.0		0		0		0		0	
Dibromochloromethane		BRL		5.0		0		0		0		0	
Dichlorodifluoromethane		BRL		10		0		0		0		0	
Ethylbenzene		BRL		5.0		0		0		0		0	
Freon-113		BRL		10		0		0		0		0	
Isopropylbenzene		BRL		5.0		0		0		0		0	
m,p-Xylene		BRL		5.0		0		0		0		0	
Methyl acetate		BRL		5.0		0		0		0		0	
Methyl tert-butyl ether		BRL		5.0		0		0		0		0	
Methylcyclohexane		BRL		5.0		0		0		0		0	
Methylene chloride		BRL		5.0		0		0		0		0	
o-Xylene		BRL		5.0		0		0		0		0	
Styrene		BRL		5.0		0		0		0		0	
Tetrachloroethene		BRL		5.0		0		0		0		0	
Toluene		BRL		5.0		0		0		0		0	
trans-1,2-Dichloroethene		BRL		5.0		0		0		0		0	
trans-1,3-Dichloropropene		BRL		5.0		0		0		0		0	
Trichloroethene		BRL		5.0		0		0		0		0	
Trichlorofluoromethane		BRL		5.0		0		0		0		0	
Vinyl chloride		BRL		2.0		0		0		0		0	
Surr: 4-Bromofluorobenzene		42.99		0		50		0		86		64.6	
Surr: Dibromofluoromethane		55.00		0		50		0		110		76.6	
Surr: Toluene-d8		50.21		0		50		0		100		77.8	

Qualifiers:		>		<		Less than Result value		B		Analyte detected in the associated method blank	
BRL		Greater than Result value		E		Estimated (value above quantitation range)		H		Holding times for preparation or analysis exceeded	
J		Below reporting limit		N		Analyte not NELAC certified		R		RPD outside limits due to matrix	
Rpt Lim		Reporting Limit		S		Spike Recovery outside limits due to matrix					



# Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
Project Name: Frazier St  
Workorder: 1303J71

## ANALYTICAL QC SUMMARY REPORT

BatchID: 173937

Sample ID: LCS-173937	Client ID:	Units: ug/L	Prep Date: 03/22/2013	Run No: 240669							
SampleType: LCS	TestCode: TCL VOLATILE ORGANICS SW8260B	BatchID: 173937	Analysis Date: 03/22/2013	Seq No: 5038701							
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual

1,1-Dichloroethene	52.67	5.0	50	0	105	61.1	142	0	0	0	0
Benzene	52.01	5.0	50	0	104	73.5	130	0	0	0	0
Chlorobenzene	43.46	5.0	50	0	86.9	72.4	123	0	0	0	0
Toluene	51.64	5.0	50	0	103	73.6	130	0	0	0	0
Trichloroethene	51.01	5.0	50	0	102	70	135	0	0	0	0
Surr: 4-Bromofluorobenzene	52.35	0	50	0	105	64.6	123	0	0	0	0
Surr: Dibromofluoromethane	54.40	0	50	0	109	76.6	133	0	0	0	0
Surr: Toluene-d8	52.05	0	50	0	104	77.8	120	0	0	0	0

Sample ID: 1303J74-006AMS	Client ID:	Units: ug/L	Prep Date: 03/22/2013	Run No: 240669							
Sample Type: MS	TestCode: TCL VOLATILE ORGANICS SW8260B	BatchID: 173937	Analysis Date: 03/22/2013	Seq No: 5038702							
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual

1,1-Dichloroethene	57.25	5.0	50	4.710	105	60	168	0	0	0	0
Benzene	61.65	5.0	50	0	123	66.6	148	0	0	0	0
Chlorobenzene	51.83	5.0	50	0	104	71.9	135	0	0	0	0
Toluene	60.56	5.0	50	0	121	68	149	0	0	0	0
Trichloroethene	981.4	5.0	50	1007	-51.9	71.1	154	0	0	0	SE
Surr: 4-Bromofluorobenzene	51.94	0	50	0	104	64.6	123	0	0	0	0
Surr: Dibromofluoromethane	53.36	0	50	0	107	76.6	133	0	0	0	0
Surr: Toluene-d8	49.70	0	50	0	99.4	77.8	120	0	0	0	0

Sample ID: 1303J74-006AMSD	Client ID:	Units: ug/L	Prep Date: 03/22/2013	Run No: 240669							
Sample Type: MSD	TestCode: TCL VOLATILE ORGANICS SW8260B	BatchID: 173937	Analysis Date: 03/22/2013	Seq No: 5038703							
Analyte	Result	RPT Limit	SPK value	SPK RefVal	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual

1,1-Dichloroethene	57.04	5.0	50	4.710	105	60	168	57.25	0.367	18.6	
Benzene	58.73	5.0	50	0	117	66.6	148	61.65	4.85	20	

Qualifiers:	>	Greater than Result value	<	Less than Result value							
BRL		Below reporting limit	E	Estimated (value above quantitation range)		B	Analyte detected in the associated method blank				
J		Estimated value detected below Reporting Limit	N	Analyte not NELAC certified		H	Holding times for preparation or analysis exceeded				
Rpt Lim		Reporting Limit	S	Spike Recovery outside limits due to matrix		R	RPD outside limits due to matrix				

# Analytical Environmental Services, Inc

Date: 27-Mar-13

Client: Terracon  
Project Name: Frazier St  
Workorder: 1303171

## ANALYTICAL QC SUMMARY REPORT

BatchID: 173937

Sample ID: 1303174-006AMSD	Client ID:	Units: ug/L	Prep Date: 03/22/2013	Run No: 240669							
Sample Type: MSD	TestCode: TCL VOLATILE ORGANICS SW8260B	BatchID: 173937	Analysis Date: 03/22/2013	Seq No: 5038703							
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Chlorobenzene	49.21	5.0	50	0	98.4	71.9	135	51.83	5.19	20	
Toluene	58.59	5.0	50	0	117	68	149	60.56	3.31	20	
Trichloroethene	938.1	5.0	50	1007	-139	71.1	154	981.4	4.51	20	SE
Surr: 4-Bromofluorobenzene	51.42	0	50	0	103	64.6	123	51.94	0	0	
Surr: Dibromofluoromethane	52.73	0	50	0	105	76.6	133	53.36	0	0	
Surr: Toluene-d8	49.86	0	50	0	99.7	77.8	120	49.70	0	0	

Qualifiers:	>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit		E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit		N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit		S	Spike Recovery outside limits due to matrix		





ANALYTICAL ENVIRONMENTAL SERVICES, INC.

April 01, 2013

Conor Dowling  
Terracon  
2855 Premiere Parkway  
Duluth GA 30097

TEL: (770) 623-0755  
FAX: (770) 623-9628

RE: Frazier St

Dear Conor Dowling:

Order No: 1303N30

Analytical Environmental Services, Inc. received 7 samples on 3/28/2013 12:20:00 PM for the analyses presented in following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative.

AES' certifications are as follows:

- NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water Microbiology, effective 07/01/12-06/30/13.
- AIHA Certification ID #100671 for Industrial Hygiene samples (Organics, Inorganics), Environmental Lead (Paint, Soil, Dust Wipes, Air), and Environmental Microbiology (Fungal) effective until 09/01/13.

These results relate only to the items tested. This report may only be reproduced in full.

If you have any questions regarding these test results, please feel free to call.



Nicole Jessup  
Project Manager



Work Order: 1303N30

**AES** TEL.: (770) 457-8177 / TOLL-FREE (800) 972-4889 / FAX: (770) 457-8188

Date: 3/28 Page 1 of 1

<b>COMPANY:</b> Tenscon		<b>ADDRESS:</b> 2855 Premiere Pkwy Duluth GA		<b>PHONE:</b>  		<b>FAX:</b>  		<b>SAMPLED BY:</b> Connor Dowling		<b>SIGNATURE:</b> 		<b>Visit our website</b> <a href="http://www.aesatlanta.com">www.aesatlanta.com</a> to check on the status of your results, place bottle orders, etc.		<b>No # of Containers</b>	
<b>SAMPLE ID</b>		<b>SAMPLED</b>		<b>DATE</b>		<b>TIME</b>		<b>Grab</b>		<b>Composite</b>		<b>PRESERVATION (See codes)</b>		<b>REMARKS</b>	
1 MW-7		3/28		9:45		✓		✓		✓		✓		X Rush	
2 MW-5		3/28		10:20		✓		✓		✓		✓		✓	
3 MW-3		3/28		10:40		✓		✓		✓		✓		✓	
4 MW-2		3/28		11:00		✓		✓		✓		✓		✓	
5 MW-1		3/28		11:30		✓		✓		✓		✓		✓	
6 MW-4		3/28		12:00		✓		✓		✓		✓		✓	
7 Trip Blank		3/28		12:00		✓		✓		✓		✓		✓	
8		3/28		12:00		✓		✓		✓		✓		✓	
9		3/28		12:00		✓		✓		✓		✓		✓	
10		3/28		12:00		✓		✓		✓		✓		✓	
11		3/28		12:00		✓		✓		✓		✓		✓	
12		3/28		12:00		✓		✓		✓		✓		✓	
13		3/28		12:00		✓		✓		✓		✓		✓	
14		3/28		12:00		✓		✓		✓		✓		✓	
<b>RELINQUISHED BY</b> 		<b>DATE/TIME</b> 3/28 12:20		<b>RECEIVED BY</b> 3/28 12:20		<b>DATE/TIME</b> 3/28 12:20		<b>PROJECT INFORMATION</b> PROJECT NAME: Frazier St		<b>RECEIPT</b> Total # of Containers		Turnaround Time Request Standard 5 Business Days 2 Business Day Rush Next Business Day Rush Same Day Rush (auth req.) Other		STATE PROGRAM (if any): E-mail? Y/N; Fax? Y/N DATA PACKAGE: I II III IV	
<b>SPECIAL INSTRUCTIONS/COMMENTS:</b>		<b>SHIPMENT METHOD</b> OUT / / VIA: IN / / VIA: CLIENT FedEx UPS MAIL COURIER GREYHOUND OTHER		<b>QUOTE #:</b>		<b>PO #:</b>		<b>INVOICE TO:</b> (IF DIFFERENT FROM ABOVE)		<b>SEND REPORT TO:</b>		<b>SITE ADDRESS:</b>		<b>PROJECT #:</b>	
Samples received after 3PM or Saturday are considered as received on the next business day. If no TAT is marked on COC AES will proceed as standard TAT.		Samples are disposed of 30 days after completion of report unless other arrangements are made.		Samples received after 3PM or Saturday are considered as received on the next business day. If no TAT is marked on COC AES will proceed as standard TAT.		Samples are disposed of 30 days after completion of report unless other arrangements are made.		Samples received after 3PM or Saturday are considered as received on the next business day. If no TAT is marked on COC AES will proceed as standard TAT.		Samples are disposed of 30 days after completion of report unless other arrangements are made.		Samples received after 3PM or Saturday are considered as received on the next business day. If no TAT is marked on COC AES will proceed as standard TAT.		Samples are disposed of 30 days after completion of report unless other arrangements are made.	

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) DW = Drinking Water (Blanks) O = Other (specify) WW = Waste Water

PRESERVATIVE CODES: H+1 = Hydrochloric acid + ice I = Ice only N = Nitric acid S+1 = Sulfuric acid + ice S/M+1 = Sodium Bisulfate/Methanol + ice O = Other (specify) NA = None

White Copy - Original; Yellow Copy - Client



# Analytical Environmental Services, Inc.

Date: 04-Apr-13

CLIENT: Terracon  
Project: Frazier St  
Lab ID: 1303N30-001

Client Sample ID: MW-7  
Collection Date: 3/28/2013 9:45:00 AM  
Matrix: GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		Analyst: GKK
1,1,1-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
1,1,2-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
1,1-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
1,1-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
1,2-Dibromoethane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
1,2-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
1,2-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
1,2-Dichloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
1,3-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
1,4-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
2-Butanone	BRL	50		ug/L	174416	1	4/4/2013 12:11 PM
2-Hexanone	BRL	10		ug/L	174416	1	4/4/2013 12:11 PM
4-Methyl-2-pentanone	BRL	10		ug/L	174416	1	4/4/2013 12:11 PM
Acetone	BRL	50		ug/L	174416	1	4/4/2013 12:11 PM
Benzene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Bromodichloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Bromoform	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Bromomethane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Carbon disulfide	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Carbon tetrachloride	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Chlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Chloroethane	BRL	10		ug/L	174416	1	4/4/2013 12:11 PM
Chloroform	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Chloromethane	BRL	10		ug/L	174416	1	4/4/2013 12:11 PM
cis-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
cis-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Cyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Dibromochloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Dichlorodifluoromethane	BRL	10		ug/L	174416	1	4/4/2013 12:11 PM
Ethylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Freon-113	BRL	10		ug/L	174416	1	4/4/2013 12:11 PM
Isopropylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
m,p-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Methyl acetate	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Methyl tert-butyl ether	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Methylcyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Methylene chloride	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
o-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level	E	Estimated (Value above quantitation range)
	BRL	Below Reporting Limit	S	Spike Recovery outside limits due to matrix
	H	Holding times for preparation or analysis exceeded	Narr	See Case Narrative
	N	Analyte not NELAC certified	NC	Not Confirmed
	B	Analyte detected in the associated Method Blank	<	Less than Result value
	>	Greater than Result value		

**Analytical Environmental Services, Inc.**

Date: 04-Apr-13

CLIENT: Terracon  
Project: Frazier St  
Lab ID: 1303N30-001

Client Sample ID: MW-7  
Collection Date: 3/28/2013 9:45:00 AM  
Matrix: GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		Analyst: GKK
Styrene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Tetrachloroethene	38	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Toluene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
trans-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
trans-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Trichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Trichlorofluoromethane	BRL	5.0		ug/L	174416	1	4/4/2013 12:11 PM
Vinyl chloride	BRL	2.0		ug/L	174416	1	4/4/2013 12:11 PM
Surr: 4-Bromofluorobenzene	89.5	64.6-123		%REC	174416	1	4/4/2013 12:11 PM
Surr: Dibromofluoromethane	98.6	76.6-133		%REC	174416	1	4/4/2013 12:11 PM
Surr: Toluene-d8	99.0	77.8-120		%REC	174416	1	4/4/2013 12:11 PM

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level	E	Estimated (Value above quantitation range)
	BRL	Below Reporting Limit	S	Spike Recovery outside limits due to matrix
	H	Holding times for preparation or analysis exceeded	Narr	See Case Narrative
	N	Analyte not NELAC certified	NC	Not Confirmed
	B	Analyte detected in the associated Method Blank	<	Less than Result value
	>	Greater than Result value		



# Analytical Environmental Services, Inc.

Date: 04-Apr-13

**CLIENT:** Terracon  
**Project:** Frazier St  
**Lab ID:** 1303N30-002

**Client Sample ID:** MW-5  
**Collection Date:** 3/28/2013 10:20:00 AM  
**Matrix:** GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		Analyst: GKK
1,1,1-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
1,1,2-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
1,1-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
1,1-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
1,2-Dibromoethane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
1,2-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
1,2-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
1,2-Dichloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
1,3-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
1,4-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
2-Butanone	BRL	50		ug/L	174416	1	4/4/2013 1:40 PM
2-Hexanone	BRL	10		ug/L	174416	1	4/4/2013 1:40 PM
4-Methyl-2-pentanone	BRL	10		ug/L	174416	1	4/4/2013 1:40 PM
Acetone	BRL	50		ug/L	174416	1	4/4/2013 1:40 PM
Benzene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Bromodichloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Bromoform	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Bromomethane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Carbon disulfide	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Carbon tetrachloride	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Chlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Chloroethane	BRL	10		ug/L	174416	1	4/4/2013 1:40 PM
Chloroform	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Chloromethane	BRL	10		ug/L	174416	1	4/4/2013 1:40 PM
cis-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
cis-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Cyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Dibromochloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Dichlorodifluoromethane	BRL	10		ug/L	174416	1	4/4/2013 1:40 PM
Ethylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Freon-113	BRL	10		ug/L	174416	1	4/4/2013 1:40 PM
Isopropylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
m,p-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Methyl acetate	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Methyl tert-butyl ether	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Methylcyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Methylene chloride	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
o-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM

**Qualifiers:** \* Value exceeds Maximum Contaminant Level  
 BRL Below Reporting Limit  
 H Holding times for preparation or analysis exceeded  
 N Analyte not NELAC certified  
 B Analyte detected in the associated Method Blank  
 > Greater than Result value

E Estimated (Value above quantitation range)  
 S Spike Recovery outside limits due to matrix  
 Narr See Case Narrative  
 NC Not Confirmed  
 < Less than Result value

**Analytical Environmental Services, Inc.**

Date: 04-Apr-13

**CLIENT:** Terracon  
**Project:** Frazier St  
**Lab ID:** 1303N30-002

**Client Sample ID:** MW-5  
**Collection Date:** 3/28/2013 10:20:00 AM  
**Matrix:** GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		Analyst: GKK
Styrene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Tetrachloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Toluene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
trans-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
trans-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Trichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Trichlorofluoromethane	BRL	5.0		ug/L	174416	1	4/4/2013 1:40 PM
Vinyl chloride	BRL	2.0		ug/L	174416	1	4/4/2013 1:40 PM
Surr: 4-Bromofluorobenzene	89.4	64.6-123		%REC	174416	1	4/4/2013 1:40 PM
Surr: Dibromofluoromethane	99.7	76.6-133		%REC	174416	1	4/4/2013 1:40 PM
Surr: Toluene-d8	97.6	77.8-120		%REC	174416	1	4/4/2013 1:40 PM

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level	E	Estimated (Value above quantitation range)
	BRL	Below Reporting Limit	S	Spike Recovery outside limits due to matrix
	H	Holding times for preparation or analysis exceeded	Narr	See Case Narrative
	N	Analyte not NELAC certified	NC	Not Confirmed
	B	Analyte detected in the associated Method Blank	<	Less than Result value
	>	Greater than Result value		



# Analytical Environmental Services, Inc.

Date: 04-Apr-13

CLIENT: Terracon  
Project: Frazier St  
Lab ID: 1303N30-003

Client Sample ID: MW-3  
Collection Date: 3/28/2013 10:40:00 AM  
Matrix: GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		Analyst: GKK
1,1,1-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
1,1,2-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
1,1-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
1,1-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
1,2-Dibromoethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
1,2-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
1,2-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
1,2-Dichloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
1,3-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
1,4-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
2-Butanone	BRL	50		ug/L	174416	1	4/4/2013 2:10 PM
2-Hexanone	BRL	10		ug/L	174416	1	4/4/2013 2:10 PM
4-Methyl-2-pentanone	BRL	10		ug/L	174416	1	4/4/2013 2:10 PM
Acetone	BRL	50		ug/L	174416	1	4/4/2013 2:10 PM
Benzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Bromodichloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Bromoform	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Bromomethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Carbon disulfide	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Carbon tetrachloride	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Chlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Chloroethane	BRL	10		ug/L	174416	1	4/4/2013 2:10 PM
Chloroform	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Chloromethane	BRL	10		ug/L	174416	1	4/4/2013 2:10 PM
cis-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
cis-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Cyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Dibromochloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Dichlorodifluoromethane	BRL	10		ug/L	174416	1	4/4/2013 2:10 PM
Ethylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Freon-113	BRL	10		ug/L	174416	1	4/4/2013 2:10 PM
Isopropylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
m,p-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Methyl acetate	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Methyl tert-butyl ether	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Methylcyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Methylene chloride	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
o-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level	E	Estimated (Value above quantitation range)
	BRL	Below Reporting Limit	S	Spike Recovery outside limits due to matrix
	H	Holding times for preparation or analysis exceeded	Narr	See Case Narrative
	N	Analyte not NELAC certified	NC	Not Confirmed
	B	Analyte detected in the associated Method Blank	<	Less than Result value
	>	Greater than Result value		

**Analytical Environmental Services, Inc.**

Date: 04-Apr-13

**CLIENT:** Terracon  
**Project:** Frazier St  
**Lab ID:** 1303N30-003

**Client Sample ID:** MW-3  
**Collection Date:** 3/28/2013 10:40:00 AM  
**Matrix:** GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		Analyst: <b>GKK</b>
Styrene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Tetrachloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Toluene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
trans-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
trans-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Trichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Trichlorofluoromethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:10 PM
Vinyl chloride	BRL	2.0		ug/L	174416	1	4/4/2013 2:10 PM
Surr: 4-Bromofluorobenzene	91.3	64.6-123		%REC	174416	1	4/4/2013 2:10 PM
Surr: Dibromofluoromethane	102	76.6-133		%REC	174416	1	4/4/2013 2:10 PM
Surr: Toluene-d8	100	77.8-120		%REC	174416	1	4/4/2013 2:10 PM

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level
- BRL Below Reporting Limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated Method Blank
- > Greater than Result value

- E Estimated (Value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See Case Narrative
- NC Not Confirmed
- < Less than Result value



# Analytical Environmental Services, Inc.

Date: 04-Apr-13

**CLIENT:** Terracon  
**Project:** Frazier St  
**Lab ID:** 1303N30-004

**Client Sample ID:** MW-2  
**Collection Date:** 3/28/2013 11:00:00 AM  
**Matrix:** GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		Analyst: GKK
1,1,1-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
1,1,2-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
1,1-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
1,1-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
1,2-Dibromoethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
1,2-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
1,2-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
1,2-Dichloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
1,3-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
1,4-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
2-Butanone	BRL	50		ug/L	174416	1	4/4/2013 2:40 PM
2-Hexanone	BRL	10		ug/L	174416	1	4/4/2013 2:40 PM
4-Methyl-2-pentanone	BRL	10		ug/L	174416	1	4/4/2013 2:40 PM
Acetone	BRL	50		ug/L	174416	1	4/4/2013 2:40 PM
Benzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Bromodichloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Bromoform	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Bromomethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Carbon disulfide	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Carbon tetrachloride	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Chlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Chloroethane	BRL	10		ug/L	174416	1	4/4/2013 2:40 PM
Chloroform	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Chloromethane	BRL	10		ug/L	174416	1	4/4/2013 2:40 PM
cis-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
cis-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Cyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Dibromochloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Dichlorodifluoromethane	BRL	10		ug/L	174416	1	4/4/2013 2:40 PM
Ethylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Freon-113	BRL	10		ug/L	174416	1	4/4/2013 2:40 PM
Isopropylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
m,p-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Methyl acetate	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Methyl tert-butyl ether	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Methylcyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Methylene chloride	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
o-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level
- BRL Below Reporting Limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated Method Blank
- > Greater than Result value

- E Estimated (Value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See Case Narrative
- NC Not Confirmed
- < Less than Result value

**Analytical Environmental Services, Inc.**

Date: 04-Apr-13

**CLIENT:** Terracon  
**Project:** Frazier St  
**Lab ID:** 1303N30-004

**Client Sample ID:** MW-2  
**Collection Date:** 3/28/2013 11:00:00 AM  
**Matrix:** GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		Analyst: GKK
Styrene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Tetrachloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Toluene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
trans-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
trans-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Trichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Trichlorofluoromethane	BRL	5.0		ug/L	174416	1	4/4/2013 2:40 PM
Vinyl chloride	BRL	2.0		ug/L	174416	1	4/4/2013 2:40 PM
Surr: 4-Bromofluorobenzene	88.5	64.6-123		%REC	174416	1	4/4/2013 2:40 PM
Surr: Dibromofluoromethane	99.0	76.6-133		%REC	174416	1	4/4/2013 2:40 PM
Surr: Toluene-d8	100	77.8-120		%REC	174416	1	4/4/2013 2:40 PM

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level	E	Estimated (Value above quantitation range)
	BRL	Below Reporting Limit	S	Spike Recovery outside limits due to matrix
	H	Holding times for preparation or analysis exceeded	Narr	See Case Narrative
	N	Analyte not NELAC certified	NC	Not Confirmed
	B	Analyte detected in the associated Method Blank	<	Less than Result value
	>	Greater than Result value		



# Analytical Environmental Services, Inc.

Date: 04-Apr-13

**CLIENT:** Terracon  
**Project:** Frazier St  
**Lab ID:** 1303N30-005

**Client Sample ID:** MW-1  
**Collection Date:** 3/28/2013 11:30:00 AM  
**Matrix:** GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		<b>Analyst: GKK</b>
1,1,1-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
1,1,2-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
1,1-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
1,1-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
1,2-Dibromoethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
1,2-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
1,2-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
1,2-Dichloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
1,3-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
1,4-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
2-Butanone	BRL	50		ug/L	174416	1	4/4/2013 3:10 PM
2-Hexanone	BRL	10		ug/L	174416	1	4/4/2013 3:10 PM
4-Methyl-2-pentanone	BRL	10		ug/L	174416	1	4/4/2013 3:10 PM
Acetone	BRL	50		ug/L	174416	1	4/4/2013 3:10 PM
Benzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Bromodichloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Bromoform	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Bromomethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Carbon disulfide	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Carbon tetrachloride	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Chlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Chloroethane	BRL	10		ug/L	174416	1	4/4/2013 3:10 PM
Chloroform	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Chloromethane	BRL	10		ug/L	174416	1	4/4/2013 3:10 PM
cis-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
cis-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Cyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Dibromochloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Dichlorodifluoromethane	BRL	10		ug/L	174416	1	4/4/2013 3:10 PM
Ethylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Freon-113	BRL	10		ug/L	174416	1	4/4/2013 3:10 PM
Isopropylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
m,p-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Methyl acetate	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Methyl tert-butyl ether	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Methylcyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Methylene chloride	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
o-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level	E	Estimated (Value above quantitation range)
	BRL	Below Reporting Limit	S	Spike Recovery outside limits due to matrix
	H	Holding times for preparation or analysis exceeded	Narr	See Case Narrative
	N	Analyte not NELAC certified	NC	Not Confirmed
	B	Analyte detected in the associated Method Blank	<	Less than Result value
	>	Greater than Result value		

**Analytical Environmental Services, Inc.**

Date: 04-Apr-13

**CLIENT:** Terracon  
**Project:** Frazier St  
**Lab ID:** 1303N30-005

**Client Sample ID:** MW-1  
**Collection Date:** 3/28/2013 11:30:00 AM  
**Matrix:** GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		Analyst: <b>GKK</b>
Styrene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Tetrachloroethene	7.5	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Toluene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
trans-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
trans-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Trichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Trichlorofluoromethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:10 PM
Vinyl chloride	BRL	2.0		ug/L	174416	1	4/4/2013 3:10 PM
Surr: 4-Bromofluorobenzene	89.3	64.6-123		%REC	174416	1	4/4/2013 3:10 PM
Surr: Dibromofluoromethane	102	76.6-133		%REC	174416	1	4/4/2013 3:10 PM
Surr: Toluene-d8	101	77.8-120		%REC	174416	1	4/4/2013 3:10 PM

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level
- BRL Below Reporting Limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated Method Blank
- > Greater than Result value

- E Estimated (Value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See Case Narrative
- NC Not Confirmed
- < Less than Result value



# Analytical Environmental Services, Inc.

Date: 04-Apr-13

**CLIENT:** Terracon  
**Project:** Frazier St  
**Lab ID:** 1303N30-006

**Client Sample ID:** MW-4  
**Collection Date:** 3/28/2013 12:00:00 PM  
**Matrix:** GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		Analyst: GKK
1,1,1-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
1,1,2-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
1,1-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
1,1-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
1,2-Dibromoethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
1,2-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
1,2-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
1,2-Dichloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
1,3-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
1,4-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
2-Butanone	BRL	50		ug/L	174416	1	4/4/2013 3:40 PM
2-Hexanone	BRL	10		ug/L	174416	1	4/4/2013 3:40 PM
4-Methyl-2-pentanone	BRL	10		ug/L	174416	1	4/4/2013 3:40 PM
Acetone	BRL	50		ug/L	174416	1	4/4/2013 3:40 PM
Benzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Bromodichloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Bromoform	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Bromomethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Carbon disulfide	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Carbon tetrachloride	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Chlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Chloroethane	BRL	10		ug/L	174416	1	4/4/2013 3:40 PM
Chloroform	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Chloromethane	BRL	10		ug/L	174416	1	4/4/2013 3:40 PM
cis-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
cis-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Cyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Dibromochloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Dichlorodifluoromethane	BRL	10		ug/L	174416	1	4/4/2013 3:40 PM
Ethylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Freon-113	BRL	10		ug/L	174416	1	4/4/2013 3:40 PM
Isopropylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
m,p-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Methyl acetate	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Methyl tert-butyl ether	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Methylcyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Methylene chloride	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
o-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM

**Qualifiers:** \* Value exceeds Maximum Contaminant Level  
 BRL Below Reporting Limit  
 H Holding times for preparation or analysis exceeded  
 N Analyte not NELAC certified  
 B Analyte detected in the associated Method Blank  
 > Greater than Result value

E Estimated (Value above quantitation range)  
 S Spike Recovery outside limits due to matrix  
 Narr See Case Narrative  
 NC Not Confirmed  
 < Less than Result value

**Analytical Environmental Services, Inc.**

Date: 04-Apr-13

**CLIENT:** Terracon  
**Project:** Frazier St  
**Lab ID:** 1303N30-006

**Client Sample ID:** MW-4  
**Collection Date:** 3/28/2013 12:00:00 PM  
**Matrix:** GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		Analyst: <b>GKK</b>
Styrene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Tetrachloroethene	9.6	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Toluene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
trans-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
trans-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Trichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Trichlorofluoromethane	BRL	5.0		ug/L	174416	1	4/4/2013 3:40 PM
Vinyl chloride	BRL	2.0		ug/L	174416	1	4/4/2013 3:40 PM
Surr: 4-Bromofluorobenzene	88.4	64.6-123		%REC	174416	1	4/4/2013 3:40 PM
Surr: Dibromofluoromethane	101	76.6-133		%REC	174416	1	4/4/2013 3:40 PM
Surr: Toluene-d8	103	77.8-120		%REC	174416	1	4/4/2013 3:40 PM

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level
- BRL Below Reporting Limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated Method Blank
- > Greater than Result value

- E Estimated (Value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See Case Narrative
- NC Not Confirmed
- < Less than Result value



# Analytical Environmental Services, Inc.

Date: 04-Apr-13

CLIENT: Terracon  
Project: Frazier St  
Lab ID: 1303N30-007

Client Sample ID: TRIP BLANK  
Collection Date: 3/28/2013  
Matrix: GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		Analyst: GKK
1,1,1-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
1,1,2-Trichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
1,1-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
1,1-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
1,2-Dibromoethane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
1,2-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
1,2-Dichloroethane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
1,2-Dichloropropane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
1,3-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
1,4-Dichlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
2-Butanone	BRL	50		ug/L	174416	1	4/4/2013 4:10 PM
2-Hexanone	BRL	10		ug/L	174416	1	4/4/2013 4:10 PM
4-Methyl-2-pentanone	BRL	10		ug/L	174416	1	4/4/2013 4:10 PM
Acetone	BRL	50		ug/L	174416	1	4/4/2013 4:10 PM
Benzene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Bromodichloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Bromoform	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Bromomethane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Carbon disulfide	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Carbon tetrachloride	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Chlorobenzene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Chloroethane	BRL	10		ug/L	174416	1	4/4/2013 4:10 PM
Chloroform	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Chloromethane	BRL	10		ug/L	174416	1	4/4/2013 4:10 PM
cis-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
cis-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Cyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Dibromochloromethane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Dichlorodifluoromethane	BRL	10		ug/L	174416	1	4/4/2013 4:10 PM
Ethylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Freon-113	BRL	10		ug/L	174416	1	4/4/2013 4:10 PM
Isopropylbenzene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
m,p-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Methyl acetate	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Methyl tert-butyl ether	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Methylcyclohexane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Methylene chloride	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
o-Xylene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM

**Qualifiers:** \* Value exceeds Maximum Contaminant Level  
BRL Below Reporting Limit  
H Holding times for preparation or analysis exceeded  
N Analyte not NELAC certified  
B Analyte detected in the associated Method Blank  
> Greater than Result value

E Estimated (Value above quantitation range)  
S Spike Recovery outside limits due to matrix  
Narr See Case Narrative  
NC Not Confirmed  
< Less than Result value

# Analytical Environmental Services, Inc.

Date: 04-Apr-13

CLIENT: Terracon  
Project: Frazier St  
Lab ID: 1303N30-007

Client Sample ID: TRIP BLANK  
Collection Date: 3/28/2013  
Matrix: GROUNDWATER

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
<b>TCL VOLATILE ORGANICS SW8260B</b>					<b>(SW5030B)</b>		Analyst: GKK
Styrene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Tetrachloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Toluene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
trans-1,2-Dichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
trans-1,3-Dichloropropene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Trichloroethene	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Trichlorofluoromethane	BRL	5.0		ug/L	174416	1	4/4/2013 4:10 PM
Vinyl chloride	BRL	2.0		ug/L	174416	1	4/4/2013 4:10 PM
Surr: 4-Bromofluorobenzene	88.8	64.6-123		%REC	174416	1	4/4/2013 4:10 PM
Surr: Dibromofluoromethane	101	76.6-133		%REC	174416	1	4/4/2013 4:10 PM
Surr: Toluene-d8	100	77.8-120		%REC	174416	1	4/4/2013 4:10 PM

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level
- BRL Below Reporting Limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated Method Blank
- > Greater than Result value

- E Estimated (Value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See Case Narrative
- NC Not Confirmed
- < Less than Result value



Analytical Environmental Services, Inc.

Sample/Cooler Receipt Checklist

Client Terracon

Work Order Number 1303N30

Checklist completed by Jam B 3/28/13  
Signature Date

Carrier name: FedEx ☐ UPS ☐ Courier ☐ Client ☒ US Mail ☐ Other ☐

Shipping container/cooler in good condition? Yes ☒ No ☐ Not Present ☐

Custody seals intact on shipping container/cooler? Yes ☐ No ☐ Not Present ☒

Custody seals intact on sample bottles? Yes ☐ No ☐ Not Present ☒

Container/Temp Blank temperature in compliance? ( $4^{\circ}\text{C} \pm 2$ )\* Yes ☒ No ☐

Cooler #1 3.2 Cooler #2 ☐ Cooler #3 ☐ Cooler #4 ☐ Cooler #5 ☐ Cooler #6 ☐

Chain of custody present? Yes ☒ No ☐

Chain of custody signed when relinquished and received? Yes ☒ No ☐

Chain of custody agrees with sample labels? Yes ☒ No ☐

Samples in proper container/bottle? Yes ☒ No ☐

Sample containers intact? Yes ☒ No ☐

Sufficient sample volume for indicated test? Yes ☒ No ☐

All samples received within holding time? Yes ☒ No ☐

Was TAT marked on the COC? Yes ☒ No ☐

Proceed with Standard TAT as per project history? Yes ☐ No ☐ Not Applicable ☒

Water - VOA vials have zero headspace? No VOA vials submitted ☐ Yes ☒ No ☐

Water - pH acceptable upon receipt? Yes ☒ No ☐ Not Applicable ☐

Adjusted? ☐ Checked by ☐

Sample Condition: Good ☒ Other(Explain) ☐

(For diffusive samples or AIHA lead) Is a known blank included? Yes ☐ No ☒

See Case Narrative for resolution of the Non-Conformance.

\* Samples do not have to comply with the given range for certain parameters.

\\Quality Assurance\Checklists Procedures Sign-Off Templates\Checklists\Sample Receipt Checklists\Sample\_Cooler\_Receipt\_Checklist

**CLIENT:** Terracon  
**Work Order:** 1303N30  
**Project:** Frazier St

**ANALYTICAL QC SUMMARY REPORT****TestCode: TCL VOLATILE ORGANICS SW8260B**

Sample ID: MB-174416	SampType: MBLK	Batch ID: 174416	Units: ug/L	Prep Date: 4/4/2013	RunNo: 241466						
Client ID:	TestCode: TCL VOLATILE ORGANICS	SW8260B		Analysis Date: 4/4/2013	SeqNo: 5055858						
Analyte	Result	RPT Limit	SPK value	SPK RefVal	%REC	LowLimit	HighLimit	RPD RefVal	%RPD	RPDLimit	Qual
1,1,1-Trichloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,1,2,2-Tetrachloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,1,2-Trichloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,1-Dichloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,1-Dichloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
1,2,4-Trichlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dibromo-3-chloropropane	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dibromoethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dichlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dichloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dichloropropane	BRL	5.0	0	0	0	0	0	0	0	0	
1,3-Dichlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
1,4-Dichlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
2-Butanone	BRL	50	0	0	0	0	0	0	0	0	
2-Hexanone	BRL	10	0	0	0	0	0	0	0	0	
4-Methyl-2-pentanone	BRL	10	0	0	0	0	0	0	0	0	
Acetone	BRL	50	0	0	0	0	0	0	0	0	
Benzene	BRL	5.0	0	0	0	0	0	0	0	0	
Bromodichloromethane	BRL	5.0	0	0	0	0	0	0	0	0	
Bromoform	BRL	5.0	0	0	0	0	0	0	0	0	
Bromomethane	BRL	5.0	0	0	0	0	0	0	0	0	
Carbon disulfide	BRL	5.0	0	0	0	0	0	0	0	0	
Carbon tetrachloride	BRL	5.0	0	0	0	0	0	0	0	0	
Chlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
Chloroethane	BRL	10	0	0	0	0	0	0	0	0	
Chloroform	BRL	5.0	0	0	0	0	0	0	0	0	
Chloromethane	BRL	10	0	0	0	0	0	0	0	0	

**Qualifiers:**

<	Less than Result value	>	Greater than Result value	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Estimated value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		



CLIENT: Terracon  
Work Order: 1303N30  
Project: Frazier St

# ANALYTICAL QC SUMMARY REPORT

TestCode: TCL VOLATILE ORGANICS SW8260B

Sample ID: MB-174416	SampType: MBLK	Batch ID: 174416	Units: ug/L	Prep Date: 4/4/2013	RunNo: 241466						
Client ID:	TestCode: TCL VOLATILE ORGANICS	SW8260B		Analysis Date: 4/4/2013	SeqNo: 5055858						
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
cis-1,3-Dichloropropene	BRL	5.0	0	0	0	0	0	0	0	0	
Cyclohexane	BRL	5.0	0	0	0	0	0	0	0	0	
Dibromochloromethane	BRL	5.0	0	0	0	0	0	0	0	0	
Dichlorodifluoromethane	BRL	10	0	0	0	0	0	0	0	0	
Ethylbenzene	BRL	5.0	0	0	0	0	0	0	0	0	
Freon-113	BRL	10	0	0	0	0	0	0	0	0	
Isopropylbenzene	BRL	5.0	0	0	0	0	0	0	0	0	
m,p-Xylene	BRL	5.0	0	0	0	0	0	0	0	0	
Methyl acetate	BRL	5.0	0	0	0	0	0	0	0	0	
Methyl tert-butyl ether	BRL	5.0	0	0	0	0	0	0	0	0	
Methylcyclohexane	BRL	5.0	0	0	0	0	0	0	0	0	
Methylene chloride	BRL	5.0	0	0	0	0	0	0	0	0	
o-Xylene	BRL	5.0	0	0	0	0	0	0	0	0	
Styrene	BRL	5.0	0	0	0	0	0	0	0	0	
Tetrachloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
Toluene	BRL	5.0	0	0	0	0	0	0	0	0	
trans-1,2-Dichloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
trans-1,3-Dichloropropene	BRL	5.0	0	0	0	0	0	0	0	0	
Trichloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
Trichlorofluoromethane	BRL	5.0	0	0	0	0	0	0	0	0	
Vinyl chloride	BRL	2.0	0	0	0	0	0	0	0	0	
Surr: 4-Bromofluorobenzene	44.18	0	50	0	88.4	64.6	123	0	0	0	
Surr: Dibromofluoromethane	49.1	0	50	0	98.2	76.6	133	0	0	0	
Surr: Toluene-d8	49.76	0	50	0	99.5	77.8	120	0	0	0	

Qualifiers:	<	Less than Result value	>	Greater than Result value	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Estimated value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
	Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

**CLIENT:** Terracon  
**Work Order:** 1303N30  
**Project:** Frazier St

# ANALYTICAL QC SUMMARY REPORT

**TestCode:** TCL VOLATILE ORGANICS SW8260B

Sample ID: LCS-174416		SampType: LCS		Batch ID: 174416		Units: ug/L		Prep Date: 4/4/2013		RunNo: 241466	
Client ID:		TestCode: TCL VOLATILE ORGANICS		SW8260B				Analysis Date: 4/4/2013		SeqNo: 5055746	
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	53.38	5.0	50	0	107	61.1	142	0	0		
Benzene	44.05	5.0	50	0	88.1	73.5	130	0	0		
Chlorobenzene	42.99	5.0	50	0	86	72.4	123	0	0		
Toluene	43.37	5.0	50	0	86.7	73.6	130	0	0		
Trichloroethene	43.44	5.0	50	0	86.9	70	135	0	0		
Surr: 4-Bromofluorobenzene	44.15	0	50	0	88.3	64.6	123	0	0		
Surr: Dibromofluoromethane	50.14	0	50	0	100	76.6	133	0	0		
Surr: Toluene-d8	50.05	0	50	0	100	77.8	120	0	0		

Sample ID: 1303N30-001AMS		SampType: MS		Batch ID: 174416		Units: ug/L		Prep Date: 4/4/2013		RunNo: 241466	
Client ID: MW-7		TestCode: TCL VOLATILE ORGANICS		SW8260B				Analysis Date: 4/4/2013		SeqNo: 5055914	
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	54.03	5.0	50	0	108	60	168	0	0		
Benzene	49.81	5.0	50	0	99.6	66.6	148	0	0		
Chlorobenzene	47.94	5.0	50	0	95.9	71.9	135	0	0		
Toluene	49.75	5.0	50	0	99.5	68	149	0	0		
Trichloroethene	49.76	5.0	50	0	99.5	71.1	154	0	0		
Surr: 4-Bromofluorobenzene	46.59	0	50	0	93.2	64.6	123	0	0		
Surr: Dibromofluoromethane	51.19	0	50	0	102	76.6	133	0	0		
Surr: Toluene-d8	50.15	0	50	0	100	77.8	120	0	0		

Sample ID: 1303N30-001AMSD		SampType: MSD	Batch ID: 174416		Units: ug/L		Prep Date: 4/4/2013		RunNo: 241466		
Client ID: MW-7		TestCode: TCL VOLATILE ORGANICS SW8260B					Analysis Date: 4/4/2013		SeqNo: 5056003		
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	55.41	5.0	50	0	111	60	168	54.03	2.52	18.6	
Benzene	48.86	5.0	50	0	97.7	66.6	148	49.81	1.93	20	

**Qualifiers:**

<	Less than Result value	>	Greater than Result value	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Estimated value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		



CLIENT: Terracon  
 Work Order: 1303N30  
 Project: Frazier St

# ANALYTICAL QC SUMMARY REPORT

TestCode: TCL VOLATILE ORGANICS SW8260B

Sample ID: 1303N30-001A		MSD	Batch ID: 174416		Units: ug/L		Prep Date: 4/4/2013		RunNo: 241466		
Client ID: MW-7		TestCode: TCL VOLATILE ORGANICS		SW8260B		Analysis Date: 4/4/2013		SeqNo: 5056003			
Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	48	5.0	50	0	96	71.9	135	47.94	0.125	20	
Toluene	48.6	5.0	50	0	97.2	68	149	49.75	2.34	20	
Trichloroethene	49.38	5.0	50	0	98.8	71.1	154	49.76	0.767	20	
Surr: 4-Bromofluorobenzene	46.27	0	50	0	92.5	64.6	123	46.59	0	0	
Surr: Dibromofluoromethane	51.17	0	50	0	102	76.6	133	51.19	0	0	
Surr: Toluene-d8	50.22	0	50	0	100	77.8	120	50.15	0	0	

Qualifiers:	<	Less than Result value	>	Greater than Result value	B	Analyte detected in the associated Method Blank
BRL		Below Reporting Limit	E	Estimated value above quantitation range	H	Holding times for preparation or analysis exceeded
J		Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim		Reporting Limit	S	Spike Recovery outside limits due to matrix		

# Appendix C



# WELL LOG NO. MW-1

Page 1 of 1

PROJECT: Frazier Street Apartments

CLIENT: Lennar Multifamily Investors, LLC

SITE: 6700 Wren Court & 188 Norcross Street  
Roswell, Georgia

GRAPHIC LOG	LOCATION: See Exhibit A-2	INSTALLATION DETAILS	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
	Surface Elev.: 1071.53 (Ft.)					
	DEPTH ELEVATION (Ft.)					
	Grown Grass into <b>SANDY SILT</b> , brown	11' CONC./ GROUT				
	5.0 1066.5		5			
	<b>SANDY SILT (ML)</b> , brown					
	10.0 1061.5		10			
	<b>SANDY SILT (ML)</b> , brown	2' BENTONITE				
	15.0 1056.5	12' SAND	15			
	<b>SANDY SILT (ML)</b> , brown	20' SCREEN				
	20.0 1051.5		20			
	<b>SANDY SILT (ML)</b> , brown					
	25.0 1046.5		25			
	<b>SANDY SILT (ML)</b> , brown					
	30.0 1041.5		30			
	<b>SANDY SILT (ML)</b> , brown					
	35.0 1036.5		35			
	<b>Auger Refusal at 35 Feet</b>					

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:  
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:

Abandonment Method:

## WATER LEVEL OBSERVATIONS

Stabilized

**Terracon**  
2855 Premiere Parkway, Suite C  
Duluth, Georgia

Well Started: 3/18/2013

Well Completed: 3/18/2013

Drill Rig: Geoprobe

Driller:

Project No.: 49137028B

Exhibit: B-1

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT.

# WELL LOG NO. MW-2

Page 1 of 1

PROJECT: Frazier Street Apartments

CLIENT: Lennar Multifamily Investors, LLC

SITE: 6700 Wren Court & 188 Norcross Street  
Roswell, Georgia

GRAPHIC LOG	LOCATION: See Exhibit A-2	INSTALLATION DETAILS	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
	Surface Elev.: 1062.76 (Ft.)					
	DEPTH ELEVATION (Ft.)					
	Grown Grass into <b>SANDY SILT</b> , brown	11' CONC./ GROUT				
	5.0 1058		5			
	<b>SANDY SILT (ML)</b> , brown					
	10.0 1053		10			
	<b>SANDY SILT (ML)</b> , brown, some partially weathered rock	2' BENTONITE				
	15.0 1048	12' SAND	15			
	<b>SANDY SILT (ML)</b> , brown, some partially weathered rock	20' SCREEN				
	20.0 1043		20			
	<b>SANDY SILT (ML)</b> , brown, some partially weathered rock					
	25.0 1038		25			
	<b>SANDY SILT (ML)</b> , brown, some partially weathered rock					
	30.0 1033		30			
	<b>Auger Refusal at 30 Feet</b>					

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:  
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:

Abandonment Method:

## WATER LEVEL OBSERVATIONS

Stabilized

**Terracon**  
2855 Premiere Parkway, Suite C  
Duluth, Georgia

Well Started: 3/19/2013

Well Completed: 3/19/2013

Drill Rig: Geoprobe

Driller:

Project No.: 49137028B

Exhibit: B-2

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT.



# WELL LOG NO. MW-3

Page 1 of 1

PROJECT: Frazier Street Apartments

CLIENT: Lennar Multifamily Investors, LLC

SITE: 6700 Wren Court & 188 Norcross Street  
Roswell, Georgia

GRAPHIC LOG	LOCATION: See Exhibit A-2	INSTALLATION DETAILS	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
	DEPTH	ELEVATION (Ft.)				
	Grown Grass into <b>SILTY CLAY</b> , brown	3' CONC./ GROUT				
	5.0	1060.5	5			
	<b>SANDY SILT (ML)</b> , brown	2' BENTONITE				
	10.0	1055.5	10			
	<b>SANDY SILT (ML)</b> , with partially weathered rock, brown	12' SAND				
	15.0	1050.5	15			
	<b>SANDY SILT (ML)</b> , with gravel, brown	20' SCREEN				
	20.0	1045.5	20			
	<b>SANDY SILT (ML)</b> , with partially weathered rock, brown		25			
	27.0	1038.5				
	<b>Auger Refusal at 27 Feet</b>					

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:  
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:

Abandonment Method:

## WATER LEVEL OBSERVATIONS

Stabilized

**Terracon**  
2855 Premiere Parkway, Suite C  
Duluth, Georgia

Well Started: 3/19/2013

Well Completed: 3/19/2013

Drill Rig: Geoprobe

Driller:

Project No.: 49137028B

Exhibit: B-3

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT.

# WELL LOG NO. MW-4

Page 1 of 1

PROJECT: Frazier Street Apartments

CLIENT: Lennar Multifamily Investors, LLC

SITE: 6700 Wren Court & 188 Norcross Street  
Roswell, Georgia

GRAPHIC LOG	LOCATION: See Exhibit A-2	INSTALLATION DETAILS	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
	Surface Elev.: 1072.33 (Ft.) ELEVATION (Ft.)					
	DEPTH					
	Grown Grass into <b>SILTY CLAY</b> , red	11' CONC./ GROUT				
	5.0 1067.5		5			
	<b>SANDY SILT (ML)</b> , red					
	10.0 1062.5		10			
	<b>SANDY SILT (ML)</b> , brown	2' BENTONITE				
	15.0 1057.5	12' SAND	15			
	<b>SANDY SILT (ML)</b> , brown	20' SCREEN				
	20.0 1052.5		20			
	<b>SANDY SILT (ML)</b> , brown					
	25.0 1047.5		25			
	<b>SANDY SILT (ML)</b> , brown					
	30.0 1042.5		30			
	<b>Auger Refusal at 30 Feet</b>					

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:  
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:

Abandonment Method:

## WATER LEVEL OBSERVATIONS

Stabilized

**Terracon**  
2855 Premiere Parkway, Suite C  
Duluth, Georgia

Well Started: 3/20/2013

Well Completed: 3/20/2013

Drill Rig: Geoprobe

Driller:

Project No.: 49137028B

Exhibit: B-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT.



# WELL LOG NO. MW-5

Page 1 of 1

PROJECT: Frazier Street Apartments

CLIENT: Lennar Multifamily Investors, LLC

SITE: 6700 Wren Court & 188 Norcross Street  
Roswell, Georgia

GRAPHIC LOG	LOCATION: See Exhibit A-2	INSTALLATION DETAILS	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
	Surface Elev.: 1051.11 (Ft.) ELEVATION (Ft.)					
	Grass into <u>SANDY SILT</u> , red	6' BENTONITE/ GROUT				
		2' BENTONITE	5			
	10.0 1041	17' SAND	10			
	<u>SANDY SILT/SAPROLITIC</u> , brown	15' SCREEN	15			
	20.0 1031		20			
	<u>SANDY SILT/SAPROLITIC (ML)</u> , some partially weathered rock, brown					
	23.5 1027.5					
	<u>SANDY SILT/SAPROLITIC (ML)</u>					
	25.0 1026		25			
	Auger Refusal at 25 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:  
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:

Abandonment Method:

## WATER LEVEL OBSERVATIONS

 Stabilized

**Terracon**  
2855 Premiere Parkway, Suite C  
Duluth, Georgia

Well Started: 3/20/2013

Well Completed: 3/20/2013

Drill Rig: Geoprobe

Driller:

Project No.: 49137028B

Exhibit: B-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT.

# WELL LOG NO. MW-6

Page 1 of 1

PROJECT: Frazier Street Apartments

CLIENT: Lennar Multifamily Investors, LLC

SITE: 6700 Wren Court & 188 Norcross Street  
Roswell, Georgia

GRAPHIC LOG	LOCATION: See Exhibit A-2	INSTALLATION DETAILS	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
	DEPTH					
	Gravel into <u>SILTY CLAY</u> , red	2' CONC./ GROUT				
	5.0	2' BENTONITE				
	6.0	12' SAND	5			
	<u>SAPROLITE</u> , brown					
	<u>SANDY SILT (ML)</u> , brown	10' SCREEN	10			
	16.0		15			
	<b>Auger Refusal at 16 Feet</b>					
Stratification lines are approximate. In-situ, the transition may be gradual.						
Advancement Method: Hollow Stem Auger		See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.		Notes:		
Abandonment Method:						
<b>WATER LEVEL OBSERVATIONS</b>		Well Started: 3/21/2013		Well Completed: 3/21/2013		
Dry While Drilling		Drill Rig: Geoprobe		Driller:		
		Project No.: 49137028B		Exhibit: B-6		

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT.

**Terracon**  
2855 Premiere Parkway, Suite C  
Duluth, Georgia



# WELL LOG NO. MW-7

Page 1 of 1

PROJECT: Frazier Street Apartments

CLIENT: Lennar Multifamily Investors, LLC

SITE: 6700 Wren Court & 188 Norcross Street  
Roswell, Georgia

GRAPHIC LOG	LOCATION: See Exhibit A-2	INSTALLATION DETAILS	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
	Surface Elev.: 1039.50 (Ft.)					
	DEPTH ELEVATION (Ft.)					
0.2	ASPHALT, 2"	6' CONC./GROUT				
	SANDY SILT (ML), brown					
5.0		2' BENTONITE	5			
	SANDY SILT (ML), brown					
10.0		22' SAND	10			
	SANDY SILT (ML), as partially weathered rock	20' SCREEN				
15.0			15			
	SANDY SILT (ML), as partially weathered rock increasing, brown					
20.0			20			
	SANDY SILT (ML), with some partially weathered rock increasing, brown					
22.0						
	SANDY SILT (ML), brown		25			
30.0			30			
	Auger Refusal at 30 Feet					

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:  
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:

Abandonment Method:

## WATER LEVEL OBSERVATIONS

Stabilized

**Terracon**  
2855 Premiere Parkway, Suite C  
Duluth, Georgia

Well Started: 3/21/2013

Well Completed: 3/21/2013

Drill Rig: Geoprobe

Driller:

Project No.: 49137028B

Exhibit: B-7

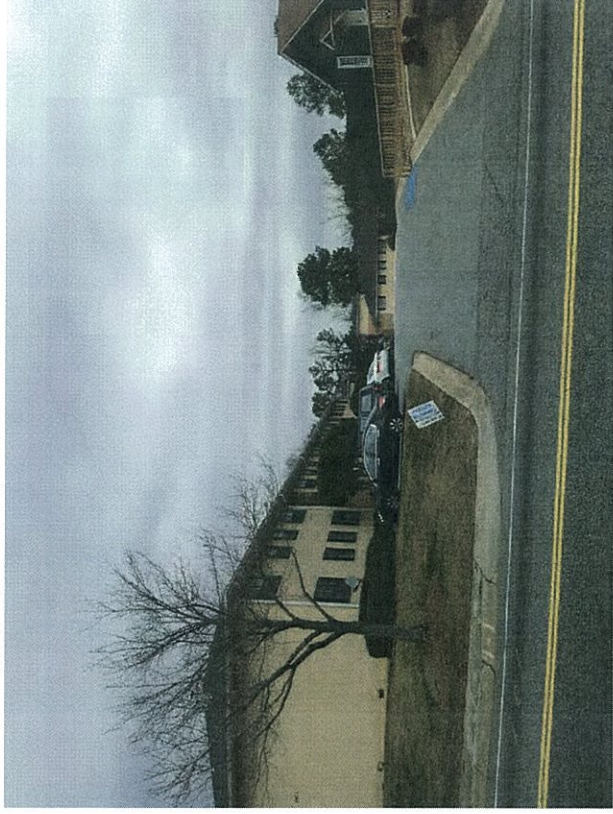
THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT.

# Appendix D





**Photo 1:** Facing northeast towards the site leasing office.



**Photo 2:** Facing north towards the site.



**Photo 3:** View along the eastern site boundary, facing north.



**Photo 4:** View facing west from the eastern portion of the site, towards Frazier St.

**PPCSR - Terracon Project No. 49137028**

**Project Name: Frazier St Apartments**

**Date Photos Taken: 2/5/2013**





**Photo 5:** View from the center of the site facing north towards the filled in swimming pool and pump house.



**Photo 7:** View along the southwestern site boundary facing east.



**Photo 6:** View of the site facing north along Frazier Street.



**Photo 8:** View along the northeastern site boundary facing north.





**Photo 9:** Paved/gravel area behind former residence/site leasing office.



**Photo 10:** Typical interior view of site apartments.



**Photo 11:** Typical interior view of site apartments.



**Photo 12:** On-site UST.





**Photo 13:** View of site breezeway.



**Photo 15:** View of culvert in the east-central portion of the site, which directs stormwater off-site to the east.



**Photo 14:** View of building on the southern portion of the site.



**Photo 16:** View of primarily vacant adjacent properties to the south.





Photo 17: Adjacent salon to the south/west of the site.



Photo 18: The rear of the adjacent shopping center to the west across Frazier Street.



Photo 19: View of adjacent residences to the east of the site.



Photo 20: Adjacent residences to the east and north of the site.





Photo 21: View of an adjacent residence to the north along Frazier Street.



Photo 22: Adjacent properties to the south across Norcross Street.



# Appendix E

**Georgia Department of Natural Resources**

2 Martin Luther King Jr. Dr., S.W. Suite 1154 East, Atlanta, Georgia 30334-9000

Noel Holcomb, Commissioner

Environmental Protection Division

Carol A. Couch, PhD., Director

Hazardous Waste Management Branch

Phone 404/565-7802 FAX 404/651-9425

September 24, 2007

Mr. John Lundeen  
Roswell Commons Group, L.P.  
400 Northcreek, Suite 100  
3715 Northside Parkway  
Atlanta, GA 30327

**CERTIFIED MAIL**  
**Return Receipt Requested**

RE: Limitation of Liability for Frazier Street Apartments & Minkert Residence, 6700 Wren Court  
& 188 Norcross Street, Roswell, Fulton County, Georgia

Dear Mr. Lundeen:

The Georgia Environmental Protection Division (EPD) has completed its review of the prospective purchaser compliance status report (CSR) submitted by McKenna Long & Aldridge L.L.P. on behalf of Roswell Commons Group, L.P. for the above-referenced property. The CSR, including the certification of compliance with risk reduction standards, was submitted on August 10, 2007 for a limitation of liability pursuant to Section 12-8-200 et seq. of the Hazardous Site Reuse and Redevelopment Act (Act). The subject property, deemed to be a qualifying property, consists of three tracts described as "ALL that tract of land lying and being in Land Lot 426, 1st District, 2nd Section of Fulton County, Georgia and..." The full legal description of the property is provided as an attachment to this letter.

On the basis of the data submitted in the CSR and certified by Roswell Commons Group, L.P., EPD concurs with the certification that soil on the property is in compliance with the Type 1 soil risk reduction standards (RRS) for regulated substances listed in Section 391-3-19-.07 of the Hazardous Site Response Rules (Rules). Section 12-8-207 of the Act, as amended and effective July 1, 2002, states that upon the Director's approval of the prospective purchaser corrective action plan or concurrence with the certification of compliance with risk reduction standards for soil and source material contained in Section 391-3-19-.07 of the Rules, whichever first occurs, a prospective purchaser shall not be liable to the state or any third party for costs incurred in the remediation of, equitable relief relating to, or damages resultant from the preexisting release, nor shall the prospective purchaser be required to certify compliance with the RRS for groundwater, perform corrective action, or otherwise be liable for any preexisting releases to groundwater associated with the qualifying property.

This letter provides the Director's concurrence with the certification of compliance for the subject property and therefore grants the limitation of liability discussed above to the prospective purchaser, Roswell Commons Group, L.P. As stated in Section 12-8-208(c) of the Act, "[t]he limitation of liability provided by this article shall be fully transferable to the heirs, assigns, and designees of the person to whom such limitation of liability is granted; provided, however, that in no event shall the Director's approval of a corrective action plan or concurrence with a certification of compliance operate to absolve from liability any party deemed to be a person who has contributed to or is contributing to a release at the qualifying property. A transfer of the title to the qualifying property or any portion thereof from the prospective purchaser back to the owner of the property from which the property was purchased, any other party deemed to be a



Roswell Commons Group, L.P.  
September 24, 2007  
Page 2

person who has contributed or is contributing to a release at the property, or any person disqualified from obtaining a limitation of liability under Code Section 12-8-206 shall terminate any limitation of liability applicable to the transfer or under this article." This limitation of liability applies to all releases addressed in the CSR and is subject to all conditions set forth in the Act.

If you have any questions, or need further assistance, please contact Kent Pierce at 404/656-7802.

Sincerely,

Carol A. Couch, Ph.D.  
Director

Attachment: Legal Description

cc: Ms. Carol Geiger Esq., McKenna Long & Aldridge L.L.P.  
file: Frazier Street Apartments

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ALL that tract of land lying and being in Land Lot 426, 1st District, 2<sup>nd</sup> Section of Fulton County, Georgia and being more particularly described as follows:

Commencing at the intersection of the northerly right-of-way of Norcross Street (variable right-of-way) and the easterly right-of-way line of Fraizer Street (variable right-of-way); Thence northerly along the right-of-way line of Fraizer Street, a distance of 96.51 feet, to the point of beginning; Thence continuing along said Fraizer Street right-of-way line the following courses: North 88 degrees 31 minutes 16 seconds West, a distance of 10.05 feet, to a ½" rebar; Thence North 00 degrees 18 minutes 57 seconds East, a distance of 619.09 feet, to a ½" rebar; Thence leaving said right-of-way line, South 89 degrees 30 minutes 24 seconds East, a distance of 584.40 feet, to a ½" rebar; Thence South 01 degrees 43 minutes 24 seconds East, a distance of 306.20 feet, to a ½" rebar; Thence North 81 degrees 48 minutes 27 seconds East, a distance of 85.73 feet; Thence North 86 degrees 15 minutes 00 seconds East, a distance of 78.20 feet, to a 1" open top pipe; Thence South 05 degrees 38 minutes 00 seconds West, a distance of 412.00 feet, to a ½" rebar on the northerly right-of-way line of Norcross Street; Thence along said right-of-way line the following courses: South 82 degrees 17 minutes 37 seconds West, a distance of 115.00 feet; Thence South 84 degrees 52 minutes 45 seconds West, a distance of 84.99 feet, to a ½" rebar; Thence South 89 degrees 59 minutes 02 seconds West, a distance of 319.25 feet, to a ½" rebar; Thence leaving said right-of-way line, North 00 degrees 09 minutes 00 seconds West, a distance of 116.00 feet, to a ½" rebar; Thence North 87 degrees 06 minutes 15 seconds West, a distance of 98.18 feet, to a ½" rebar; Thence South 00 degrees 52 minutes 19 seconds East, a distance of 15.84 feet, to a ½" rebar; Thence North 88 degrees 31 minutes 16 seconds west, a distance of 93.45 feet to the point of beginning

Said parcel contains 10.68 acres (465,410 square feet) more or less.

Reswell Commons Group L.P.



# Appendix F

# Georgia Department of Natural Resources

2 Martin Luther King Jr. Drive, SE, Suite 1462 East Atlanta, Georgia 30334

Noel Holcomb, Commissioner

Environmental Protection Division

Carol A. Couch, Ph.D., Director

Hazardous Waste Management Branch

404-657-8600

January 31, 2008

**CERTIFIED MAIL  
RETURN RECEIPT REQUESTED**

**FILE COPY**

Mr. John W. Lundeen  
Roswell Commons LLC  
400 Northcreek, Suite 100  
3715 Northside Parkway  
Atlanta, Georgia 30327

RE: Frazier Street Apartments  
6700 Wren Court  
Roswell, Fulton County, Georgia  
HSI Site No. 10880

Dear Mr. Lundeen:

The Georgia Environmental Protection Division (EPD) has evaluated your November 16, 2007 release notification for the above referenced property.

Based on that release notification and other information available to EPD, EPD concurs your property has been affected by a site currently listed on the Hazardous Site Inventory, the former Dry Cleaning Depot (HSI # 10880). Therefore, your property will be sublisted as part of the former Dry Cleaning Depot site.

The responsible parties for the former Dry Cleaning Depot will need access to your property to determine the full extent of the contamination that is originating from their property. As long as you cooperate with the responsible parties to allow them access, and comply with the requirements of the Hazardous Site Reuse and Redevelopment Act, additional information is not required from you at this time.

If you have any questions or comments regarding this correspondence, please contact Allan Nix at 404/657-8600.

Sincerely,

Carol A. Couch, Ph.D.  
Director

Enclosures: (1) HSI summary  
(2) Introduction to the HSI

c: Mr. Edwin Chang, Dry Cleaning Depot (former)

File: HSI# 10880

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# Appendix G

ALL that tract of land lying and being in Land Lot 426, 1st District, 2<sup>nd</sup> Section of Fulton County, Georgia and being more particularly described as follows:

Commencing at the intersection of the northerly right-of-way of Norcross Street (variable right-of-way) and the easterly right-of-way line of Fraizer Street (variable right-of-way); Thence northerly along the right-of-way line of Fraizer Street, a distance of 96.51 feet, to the point of beginning; Thence continuing along said Fraizer Street right-of-way line the following courses: North 88 degrees 31 minutes 16 seconds West, a distance of 10.05 feet, to a ½" rebar; Thence North 00 degrees 18 minutes 57 seconds East, a distance of 619.09 feet, to a ½" rebar; Thence leaving said right-of-way line, South 89 degrees 30 minutes 24 seconds East, a distance of 584.40 feet, to a ½" rebar; Thence South 01 degrees 43 minutes 24 seconds East, a distance of 306.20 feet, to a ½" rebar; Thence North 81 degrees 48 minutes 27 seconds East, a distance of 85.73 feet; Thence North 86 degrees 15 minutes 00 seconds East, a distance of 78.20 feet, to a 1" open top pipe; Thence South 05 degrees 38 minutes 00 seconds West, a distance of 412.00 feet, to a ½" rebar on the northerly right-of-way line of Norcross Street; Thence along said right-of-way line the following courses: South 82 degrees 17 minutes 37 seconds West, a distance of 115.00 feet; Thence South 84 degrees 52 minutes 45 seconds West, a distance of 84.99 feet, to a ½" rebar; Thence South 89 degrees 59 minutes 02 seconds West, a distance of 319.25 feet, to a ½" rebar; Thence leaving said right-of-way line, North 00 degrees 09 minutes 00 seconds West, a distance of 116.00 feet, to a ½" rebar; Thence North 87 degrees 06 minutes 15 seconds West, a distance of 98.18 feet, to a ½" rebar; Thence South 00 degrees 52 minutes 19 seconds East, a distance of 15.84 feet, to a ½" rebar; Thence North 88 degrees 31 minutes 16 seconds west, a distance of 93.45 feet to the point of beginning

Said parcel contains 10.68 acres (465,410 square feet) more or less.

Reswell Commons Group L.P.



# Appendix H



*Geo-Seal*® is an advanced composite gas vapor management technology (patent pending) designed to eliminate potential indoor air quality health risks associated with subsurface contaminant vapor intrusion.

*Geo-Seal* is an ideal gas vapor management technology designed for use on Brownfields or any type of environmentally impaired site, i.e. manufacturing facilities, dry cleaners, gasoline service stations, landfills, etc. *Geo-Seal* is placed between the foundation of the building and the soil pad to eliminate vapor exposure pathways and stop contaminated vapors from permeating through the slab. Vapor management systems incorporating both *Geo-Seal* vapor barrier and *Vapor-Vent* ventilation provide industry leading sub-foundation vapor mitigation technology. By deploying these systems developers ensure a healthy indoor environment while reducing the cost of site remediation and expediting site construction.

### Triple-Layer Protection

The triple-layer system used in *Geo-Seal* provides maximum redundancy and protection against the formation of vapor pathways both during and after installation. Such pathways can result from chemically induced materials breakdown, punctures, and seam weaknesses resulting from poor detail work and/or application installation imperfections around penetrations. *Geo-Seal* also provides unmatched protection from a range of contaminant vapors including those from petroleum-based products and chlorinated hydrocarbons.

### Field-Proven Technology

*Geo-Seal* is manufactured in partnership with E-Pro™ Systems which has over 20 years experience in the building products industry and a leading track record in barrier systems for vapor and waterproofing applications.





Diagram

### Diagram labels

**1** *Geo-Seal* BASE - The BASE layer is rolled out geotextile facing down, which allows *Geo-Seal* CORE to be applied directly to the high density polyethylene. The BASE layer provides the ultimate substrate and enables the spray layer to be free of shadowing and pinholes.

**2** *Geo-Seal* CORE - The CORE is applied at 60 mils, is sprayed to the base layer, seals around penetrations and seals the seams of the BASE layer.

**3** *Geo-Seal* BOND - A proprietary protection layer is placed over the CORE layer to enhance the curing of the membrane and increase puncture resistance.

### **4** Vapor-Vent:

- Eliminates the need for trenching
- Cost-effective compared to pipe and gravel systems
- Eliminates long-term costs when configured as a passive system
- Allows for rapid installation
- When used with *Geo-Seal* provides maximum protection against contaminated vapor



**Geo-Seal® Vapor Intrusion Barrier**  
**02 56 19.13**  
**Fluid-Applied Gas Barrier**  
**Version 1.30**

*Note: If membrane will be subjected to hydrostatic pressure, please contact Land Science Technologies™ for proper recommendations.*

**PART 1 – GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 specification sections, apply to this section.

**1.2 SUMMARY**

- A. This section includes the following:
  - 1. Substrate preparation:
  - 2. Vapor intrusion barrier components:
  - 3. Seam sealer and accessories.
- B. Related Sections: The following sections contain requirements that relate to this section:
  - 1. Division 2 Section "Earthwork", "Pipe Materials", "Sub-drainage Systems", "Gas Collection Systems":
  - 2. Division 3 Section "Cast-in-Place Concrete" for concrete placement, curing, and finishing:
  - 3. Division 5 Section "Expansion Joint Cover Assemblies", for expansion-joint covers assemblies and installation.

**1.3 PERFORMANCE REQUIREMENTS**

NA

**1.4 SUBMITTALS**

NA

**1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced installer who has been trained and certified in writing by the membrane manufacturer, Land Science Technologies™ for the installation of the Geo-Seal® System.
- B. Manufacturer Qualification: Obtain vapor intrusion barrier materials and system components from a single manufacturer source Land Science Technologies.
- C. Field Sample: Apply vapor intrusion barrier system field sample to 100 ft<sup>2</sup> (9.3 m<sup>2</sup>) of field area demonstrate application, detailing, thickness, texture, and standard of workmanship.
  - 1. Notify engineer or special inspector one week in advance of the dates and times when field sample will be prepared.
  - 2. If engineer or special inspector determines that field sample, does not meet requirements, reapply field sample until field sample is approved.
  - 3. Retain and maintain approved field sample during construction in an undisturbed condition as a standard for judging the completed methane and vapor intrusion barrier. An undamaged field sample may become part of the completed work.
- D. Pre-installation Conference: A pre-installation conference shall be held prior to application of the vapor intrusion barrier system to assure proper site and installation conditions, to include contractor, applicator, architect/engineer, other trades influenced by vapor intrusion barrier installation and special inspector (if any).



## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site as specified by manufacturer labeled with manufacturer's name, product brand name and type, date of manufacture, shelf life, and directions for storing and mixing with other components.
- B. Store materials as specified by the manufacturer in a clean, dry, protected location and within the temperature range required by manufacturer. Protect stored materials from direct sunlight. If freezing temperatures are expected, necessary steps should be taken to prevent the freezing of the Geo-Seal CORE and Geo-Seal CORE Detail components.
- C. Remove and replace material that cannot be applied within its stated shelf life.

## 1.7 PROJECT CONDITIONS

- A. Protect all adjacent areas not to be installed on. Where necessary, apply masking to prevent staining of surfaces to remain exposed wherever membrane abuts to other finish surfaces.
- B. Perform work only when existing and forecasted weather conditions are within manufacturer's recommendations for the material and application method used.
- C. Minimum clearance of 24 inches is required for application of product. For areas with less than 24-inch clearance, the membrane may be applied by hand using Geo-Seal CORE Detail.
- D. Ambient temperature shall be within manufacturer's specifications. (Greater than +45°F/+7°C.) Consult manufacturer for the proper requirements when desiring to apply Geo-Seal CORE below 45°F/7°C.
- E. All plumbing, electrical, mechanical and structural items to be under or passing through the vapor intrusion barrier system shall be positively secured in their proper positions and appropriately protected prior to membrane application.
- F. Vapor intrusion barrier shall be installed before placement of fill material and reinforcing steel. When not possible, all exposed reinforcing steel shall be masked by general contractor prior to membrane application.
- G. Stakes used to secure the concrete forms **shall not penetrate** the vapor intrusion barrier system after it has been installed. If stakes need to puncture the vapor intrusion barrier system after it has been installed, the necessary repairs need to be made by a certified Geo-Seal applicator. To confirm the staking procedure is in agreement with the manufactures recommendation, contact Land Science Technologies.

## 1.8 WARRANTY

- A. General Warranty: The special warranty specified in this article shall not deprive the owner of other rights the owner may have under other provisions of the contract documents, and shall be in addition to, and run concurrent with, other warranties made by the contractor under requirements of the contract documents.
- B. Special Warranty: Submit a written warranty signed by vapor intrusion barrier manufacturer agreeing to repair or replace vapor intrusion barrier that does not meet requirements or that does not remain methane gas and/or volatile organic compound vapor tight within the specified warranty period. Warranty does not include failure of vapor intrusion barrier due to failure of substrate prepared and treated according to requirements or formation of new joints and cracks in the attached to structures that exceed 1/16 inch (1.58 mm) in width.
  - 1. Warranty Period: 1 year after date of substantial completion. Longer warranty periods are available upon request to the manufacturer.
- C. Labor and material warranties are available upon request to the manufacturer.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS

- A. Geo-Seal; Land Science Technologies™, San Clemente, CA. (949) 481-8118
  - 1. Geo-Seal BASE sheet layer
  - 2. Geo-Seal CORE spray layer and Geo-Seal CORE Detail
  - 3. Geo-Seal BOND protection layer

### 2.2 VAPOR INTRUSION BARRIER SPRAY MATERIALS

- A. Fluid applied vapor intrusion barrier system – Geo-Seal CORE; a single course, high build, polymer modified, asphalt emulsion. Waterborne and spray applied at ambient temperatures. A nominal thickness of 60 dry mils, unless specified otherwise. Non-toxic and odorless. Geo-Seal CORE Detail has similar properties with greater viscosity and is roller or brush applied. Manufactured by Land Science Technologies.

- B. Fluid applied vapor intrusion barrier physical properties.

Geo-Seal CORE – TYPICAL CURED PROPERTIES

Properties	Test Method	Results
Tensile Strength - CORE only	ASTM 412	32 psi
Tensile Strength - Geo-Seal System	ASTM 412	662 psi
Elongation	ASTM 412	4140%
Resistance to Decay	ASTM E 154 Section 13	4% Perm Loss
Accelerated Aging	ASTM G 23	No Effect
Moisture Vapor Transmission	ASTM E 96	.026 g/ft <sup>2</sup> /hr
Hydrostatic Water Pressure	ASTM D 751	26 psi
Perm rating	ASTM E 96 (US Perms)	0.21
Methane transmission rate	ASTM D 1434	Passed
Adhesion to Concrete & Masonry	ASTM C 836 & ASTM C 704	11 lbf./inch
Hardness	ASTM C 836	80
Crack Bridging	ASTM C 836	No Cracking
Heat Aging	ASTM D 4068	Passed
Environmental Stress Cracking	ASTM D 1693	Passed
Oil Resistance	ASTM D543	Passed
Soil Burial	ASTM D 4068	Passed
Low Temp. Flexibility	ASTM C 836-00	No Cracking at -20°C
Resistance to Acids:		
Acetic		30%
Sulfuric and Hydrochloric		13%
Temperature Effect:		
Stable		248°F
Flexible		13°F

Geo-Seal CORE Detail – TYPICAL CURED PROPERTIES

Properties	Test Method	Results
Tensile Strength	ASTM 412	32 psi
Elongation	ASTM 412	3860%
Resistance to Decay	ASTM E 154 Section 13	9% Perm Loss
Accelerated Aging	ASTM G 23	No Effect
Moisture Vapor Transmission	ASTM E 96	.026 g/ft <sup>2</sup> /hr
Hydrostatic Water Pressure	ASTM D 751	28 psi
Perm rating (US Perms)	ASTM E 96	0.17
Methane transmission rate	ASTM D 1434	Passed
Adhesion to Concrete & Masonry	ASTM C 836	7 lbf./inch
Hardness	ASTM C 836	85
Crack Bridging	ASTM C 836	No Cracking
Low Temp. Flexibility	ASTM C 836-00	No Cracking at -20°C
Resistance to Acids:		
Acetic		30%
Sulfuric and Hydrochloric		13%
Temperature Effect:		
Stable		248°F
Flexible		13°F

### 2.3 VAPOR INTRUSION BARRIER SHEET MATERIALS

- A. The Geo-Seal BASE layer and Geo-Seal BOND layer are chemically resistant sheets comprised of a 5 mil high density polyethylene sheet thermally bonded to a 3 ounce non woven geotextile.
- B. Sheet Course Usage
- As foundation base layer, use Geo-Seal BASE course and/or other base sheet as required or approved by the manufacturer.
  - As top protective layer, use Geo-Seal BOND layer and/or other protection as required or approved by the manufacturer.



C. Geo-Seal BOND and Geo-Seal BASE physical properties.

Properties	Test Method	Results
Film Thickness		5 mil
Composite Thickness		18 mil
Water Vapor Permeability	ASTM E 96	0.214
Adhesion to Concrete	ASTM D 1970	9.2 lbs/inch <sup>2</sup>
Dart Impact	ASTM D 1790	>1070 gms, method A
		594 gms, method B
Puncture Properties Tear	ASTM B 2582 MD	11,290 gms
	ASTM B 2582 TD	13,150 gms

## 2.4 AXILLARY MATERIALS

- A. Sheet Flashing: 60-mil reinforced modified asphalt sheet good with double-sided adhesive.
- B. Reinforcing Strip: Manufacturer's recommended polypropylene and polyester fabric.
- C. Gas Venting Materials: Geo-Seal Vapor-Vent HD or Geo-Seal Vapor-Vent Poly, and associated fittings.
- D. Seam Detailing Sealant Mastic: Geo-Seal CORE Detail, a high or medium viscosity polymer modified water based asphalt material.
  - 1. Back Rod: Closed-cell polyethylene foam.

## PART 3 – EXECUTION

### 3.1 AUXILIARY MATERIALS

- A. Examine substrates, areas, and conditions under which vapor intrusion barrier will be applied, with installer present, for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 SUBGRADE SURFACE PREPARATION

- A. Verify substrate is prepared according to manufacturer's recommendations. On a horizontal surface, the substrate should be free from material that can potentially puncture the vapor intrusion barrier. Additional protection or cushion layers might be required if the earth or gravel substrate contains too many jagged points and edges that could puncture one or more of the system components. Contact manufacturer to confirm substrate is within manufactures recommendations.
- B. Geo-Seal can accommodate a wide range of substrates, including but not limited to compacted earth, sand, aggregate, and mudslabs.
  - 1. Compacted Earth: Remove pieces of debris, gravel and/or any other material that can potentially puncture the Geo-Seal BASE. Remove any debris from substrate that can potentially puncture the Geo-Seal system prior to application.
  - 2. Sand: A sand subgrade requires no additional preparation, provided any material that can potentially puncture the Geo-Seal BASE layer is not present.
  - 3. Aggregate: Contact the manufacturer to ensure the aggregate layer will not be detrimental to the membrane. **The gravel layer must be compacted and rolled flat.** Ideally a ¾" minus gravel layer with rounded edges should be specified; however the Geo-Seal system can accommodate a wide variety of different substrates. Contact Land Science Technologies if there are questions regarding the compatibility of Geo-Seal and the utilized substrate. Exercise caution when specifying pea gravel under the membrane, if not compacted properly, pea gravel can become an unstable substrate.
  - 4. Mudslabs: The use of a mudslab under the Geo-Seal system is acceptable, contact Land Science Technologies for job specific requirements.
- C. Mask off adjoining surface not receiving the vapor intrusion barrier system to prevent the spillage or over spray affecting other construction.
- D. Earth, sand or gravel subgrades should be prepared and compacted to local building code requirements.

### 3.3 CONCRETE SURFACE PREPARATION

- A. Clean and prepare concrete surface to manufacturer's recommendations. In general, only apply the Geo-Seal CORE material to dry, clean and uniform substrates. Concrete surfaces must be a light trowel, light broom or equivalent finish. Remove fins, ridges and other projections and fill honeycomb, aggregate pockets, grout joints and tie holes, and other voids with hydraulic

cement or rapid-set grout. It is the applicator's responsibility to point out unacceptable substrate conditions to the general contractor and ensure the proper repairs are made.

- B. When applying the Geo-Seal CORE or Geo-Seal CORE Detail material to concrete it is important to not apply the product over standing water. Applying over standing water will result in the membrane not setting up properly on the substrate
- C. Surfaces may need to be wiped down or cleaned prior to application. This includes, but is not limited to, the removal of forming oils, concrete curing agents, dirt accumulation, and other debris. Contact form release agent manufacturer or concrete curing agent manufacturer for VOC content and proper methods for removing the respective agent.
- D. Applying the Geo-Seal CORE to "green" concrete is acceptable and can be advantageous in creating a superior bond to the concrete surface. To help reduce blistering, apply a primer coat of only the asphalt component of the Geo-Seal CORE system. Some blistering of the membrane will occur and may be more severe on walls exposed to direct sunlight. Blistering is normal and will subside over time. Using a needle nose depth gauge confirm that the specified mil thickness has been applied.

#### 3.4 PREPARATIONS AND TREATMENT OF TERMINATIONS

- A. Prepare the substrate surface in accordance with Section 3.3 of this document. Concrete surfaces that are not a light trowel, light broom or equivalent finish, will need to be repaired.
- B. Terminations on horizontal and vertical surfaces should extend 6" onto the termination surface. Job specific conditions may prevent a 6" termination. In these conditions, contact manufacturer for recommendations.
- C. Apply 30 mils of Geo-Seal CORE to the terminating surface and then embed the Geo-Seal BASE layer by pressing it firmly into the Geo-Seal CORE layer. Next, apply 60 mils of Geo-Seal CORE to the BASE layer. When complete, apply the Geo-Seal BOND layer. After the placement of the Geo-Seal BOND layer is complete, apply a final 30 mil seal of the Geo-Seal CORE layer over the edge of the termination. For further clarification, refer to the termination detail provided by manufacturer.
- D. The stated termination process is appropriate for terminating the membrane onto exterior footings, pile caps, interior footings and grade beams. When terminating the membrane to stem walls or vertical surfaces the same process should be used.

#### 3.5 PREPARATIONS AND TREATMENT OF PENETRATIONS

- A. All pipe penetrations should be securely in place prior to the installation of the Geo-Seal system. Any loose penetrations should be secured prior to Geo-Seal application, as loose penetrations could potentially exert pressure on the membrane and damage the membrane after installation.
- B. To properly seal around penetrations, cut a piece of the Geo-Seal BASE layer that will extend 6" beyond the outside perimeter of the penetration. Cut a hole in the Geo-Seal BASE layer just big enough to slide over the penetration, ensuring the Geo-Seal BASE layer fits snug against the penetration, this can be done by cutting an "X" no larger than the inside diameter of the penetration. There should not be a gap larger than a 1/8" between the Geo-Seal BASE layer and the penetration. Other methods can also be utilized, provided, there is not a gap larger than 1/8" between the Geo-Seal BASE layer and the penetration.
- C. Seal the Geo-Seal BASE layer using Geo-Seal CORE or Geo-Seal CORE Detail to the underlying Geo-Seal BASE layer.
- D. Apply one coat of Geo-Seal CORE Detail or Geo-Seal CORE spray to the Geo-Seal BASE layer and around the penetration at a thickness of 30 mils. Penetrations should be treated in a 6-inch radius around penetration and 3 inches onto penetrating object.
- E. Embed a fabric reinforcing strip after the first application of the Geo-Seal CORE spray or Geo-Seal CORE Detail material and then apply a second 30 mil coat over the embedded joint reinforcing strip ensuring its complete saturation of the embedded strip and tight seal around the penetration.
- F. After the placement of the Geo-Seal BOND layer, a cable tie should then be placed around the finished penetration. The cable tie should be snug, but not overly tight so as to slice into the finished seal.

OPTION: A final application of Geo-Seal CORE may be used to provide a finishing seal after the Geo-Seal BOND layer has been installed.

NOTE: Metal or other slick penetration surfaces may require treatment in order to achieve proper adhesion. For plastic pipes, sand paper may be used to achieve a profile, an emery cloth is more appropriate for metal surfaces. An emery cloth should also be used to remove any rust on metal surfaces.

#### 3.6 GEO-SEAL BASE LAYER INSTALLATION

- A. Install the Geo-Seal BASE layer over substrate material in one direction with six-inch overlaps and the geotextile (fabric side) facing down.
- B. Secure the Geo-Seal BASE seams by applying 60 mils of Geo-Seal CORE between the 6" overlapped sheets with the geotextile side down.
- C. Visually verify there are no gaps/fish-mouths in seams.



- D. For best results, install an equal amount of Geo-Seal BASE and Geo-Seal CORE in one day. Leaving unsprayed Geo-Seal BASE overnight might allow excess moisture to collect on the Geo-Seal BASE. If excess moisture collects, it needs to be removed.

NOTE: In windy conditions it might be necessary to encapsulate the seam by spraying the Geo-Seal CORE layer over the completed Geo-Seal BASE seam.

### 3.7 GEO-SEAL CORE APPLICATION

- A. Set up spray equipment according to manufacturer's instructions.
- B. Mix and prepare materials according to manufacturer's instructions.
- C. The two catalyst nozzles (8001) should be adjusted to cross at about 18" from the end of the wand. This apex of catalyst and emulsion spray should then be less than 24" but greater than 12" from the desired surface when spraying. When properly sprayed the fan pattern of the catalyst should range between 65° and 80°.
- D. Adjust the amount of catalyst used based on the ambient air temperature and surface temperature of the substrate receiving the membrane. In hot weather use less catalyst as hot conditions will quickly "break" the emulsion and facilitate the curing of the membrane. In cold conditions and on vertical surfaces use more catalyst to "break" the emulsion quicker to expedite curing and set up time in cold conditions.
- E. To spray the Geo-Seal CORE layer, pull the trigger on the gun. A 42° fan pattern should form when properly sprayed. Apply one spray coat of Geo-Seal CORE to obtain a seamless membrane free from pinholes or shadows, with an average dry film thickness of 60 mils (1.52 mm).
- F. Apply the Geo-Seal CORE layer in a spray pattern that is perpendicular to the application surface. The concern when spraying at an angle is that an area might be missed. Using a perpendicular spray pattern will limit voids and thin spots, and will also create a uniform and consistent membrane.
- G. Verify film thickness of vapor intrusion barrier every 500 ft<sup>2</sup>. (46.45 m<sup>2</sup>), for information regarding Geo-Seal quality control measures, refer to the quality control procedures in Section 3.9 of this specification.
- H. The membrane will generally cure in 24 to 48 hours. As a rule, when temperature decreases or humidity increases, the curing of the membrane will be prolonged. The membrane does not need to be fully cured prior the placement of the Geo-Seal BOND layer, provided mil thickness has been verified and a smoke test will be conducted.
- I. **Do not penetrate** membrane after it has been installed. If membrane is penetrated after the membrane is installed, it is the responsibility of the general contractor to notify the certified installer to make repairs.
- J. If applying to a vertical concrete wall, apply Geo-Seal CORE directly to concrete surface and use manufacturer's recommended protection material based on site specific conditions. If applying Geo-Seal against shoring, contact manufacturer for site specific installation instructions.

NOTE: Care should be taken to not trap moisture between the layers of the membrane. Trapping moisture may occur from applying a second coat prior to the membrane curing. Repairs and detailing may be done over the Geo-Seal CORE layer when not fully cured.

### 3.8 GEO-SEAL BOND PROTECTION COURSE INSTALLATION

- A. Install Geo-Seal BOND protection course perpendicular to the direction of the Geo-Seal BASE course with overlapped seams over nominally cured membrane no later than recommended by manufacturer and before starting subsequent construction operations.
- B. Sweep off any water that has collected on the surface of the Geo-Seal CORE layer, prior to the placement of the Geo-Seal BOND layer.
- C. Overlap and seam the Geo-Seal BOND layer in the same manner as the Geo-Seal BASE layer.
- D. To expedite the construction process, the Geo-Seal BOND layer can be placed over the Geo-Seal CORE immediately after the spray application is complete, provided the Geo-Seal CORE mil thickness has been verified.

### 3.9 QUALITY ASSURANCE

- A. The Geo-Seal system must be installed by a trained and certified installer approved by Land Science Technologies.
- B. For projects that will require a material or labor material warranty, Land Science Technologies will require a manufacturer's representative or certified 3<sup>rd</sup> party inspector to inspect and verify that the membrane has been installed per the manufacturer's recommendations.

The certified installer is responsible for contacting the inspector for inspection. Prior to application of the membrane, a notice period for inspection should be agreed upon between the applicator and inspector.

- C. The measurement tools listed below will help verify the thickness of the Geo-Seal CORE layer. As measurement verification experience is gained, these tools will help confirm thickness measurements that can be obtained by pressing one's fingers into the Geo-Seal CORE membrane.

To verify the mil thickness of the Geo-Seal CORE, the following measurement devices are required.

1. Mil reading caliper: Calipers are used to measure the thickness of coupon samples. To measure coupon samples correctly, the thickness of the Geo-Seal sheet layers (18 mils each) must be taken into account. Mark sample area for repair.
2. Wet mil thickness gauge: A wet mil thickness gauge may be used to quickly measure the mil thickness of the Geo-Seal CORE layer. The thickness of the Geo-Seal sheet layers do not factor into the mil thickness reading.  
  
NOTE: When first using a wet mil thickness gauge on a project, collect coupon samples to verify the wet mil gauge thickness readings.
3. Needle nose digital depth gauge: A needle nose depth gauge should be used when measuring the Geo-Seal CORE thickness on vertical walls or in field measurements. Mark measurement area for repair.

To obtain a proper wet mil thickness reading, take into account the 5 to 10 percent shrinkage that will occur as the membrane fully cures. Not taking into account the thickness of the sheet layers, a freshly sprayed membrane should have a minimum wet thickness of 63 (5%) to 66 (10%) mils.

Methods on how to properly conduct Geo-Seal CORE thickness sampling can be obtained by reviewing literature prepared by Land Science Technologies.

- D. It should be noted that taking too many destructive samples can be detrimental to the membrane. Areas where coupon samples have been removed need to be marked for repair.
- E. Smoke Testing is highly recommended and is the ideal way to test the seal created around penetrations and terminations. Smoke Testing is conducted by pumping non-toxic smoke underneath the Geo-Seal vapor intrusion barrier and then repairing the areas where smoke appears. Refer to smoke testing protocol provided by Land Science Technologies. For projects that will require a material or labor material warranty, Land Science Technologies will require a smoke test.
- F. Visual inspections prior to placement of concrete, but after the installation of concrete reinforcing, is recommended to identify any punctures that may have occurred during the installation of rebar, post tension cables, etc. Punctures in the Geo-Seal system should be easy to identify due to the color contrasting layers of the system.



**Vapor-Vent™**  
**SOIL GAS COLLECTION SYSTEM**  
**Version 1.5**

**SECTION 02 56 19 – GAS CONTROL**

**PART 1 – GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Substrate preparation.
  - 2. Vapor-Vent™ installation.
  - 3. Vapor-Vent accessories.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 2 Section "Earthwork", "Pipe Materials", "Sub-drainage systems", "Gas Control System", "Fluid-Applied gas barrier".
  - 2. Division 3 Section "Cast-in-Place Concrete" for concrete placement, curing, and finishing.
  - 3. Division 5 Section "Expansion Joint Cover Assemblies", for expansion-joint covers assemblies and installation.

**1.3 PERFORMANCE REQUIREMENTS**

- A. General: Provide a gas venting material that collects gas vapors and directs them to discharge or to collection points as specified in the gas vapor collection system drawings and complies with the physical requirements set forth by the manufacturer.

**1.4 SUBMITTALS**

- A. Submit Product Data for each type of gas venting system specified, including manufacturer's specifications.
- B. Sample – Submit representative samples of the following for approval:
  - 1. Gas venting, Vapor-Vent.
  - 2. Vapor-Vent accessories.

**1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced Installer who is certified in writing and approved by vapor intrusion barrier manufacturer Land Science Technologies for the installation of the Geo-Seal® vapor intrusion barrier system.
- B. Manufacturer Qualification: Obtain gas venting, vapor intrusion barrier and system components from a single manufacturer Land Science Technologies
- C. Pre-installation Conference: A pre-installation conference shall be held prior to installation of the venting system, vapor intrusion barrier and waterproofing system to assure proper site and installation conditions, to include contractor, applicator, architect/engineer and special inspector (if any).

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to project site as specified by manufacturer labeled with manufacturer's name, product brand name and type, date of manufacture, shelf life, and directions for handling.

- B. Store materials as specified by the manufacturer in a clean, dry, protected location and within the temperature range required by manufacturer. Protect stored materials from direct sunlight.
- C. Remove and replace material that is damaged.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURER

- A. Land Science Technologies, San Clemente, CA. (949) 481-8118

- 1. Vapor-Vent™

### 2.2 GAS VENT MATERIALS

- A. Vapor-Vent – Vapor-Vent is a low profile, trenchless, flexible, sub slab vapor collection system used in lieu or in conjunction with perforated piping. Vapor-Vent is offered with two different core materials, Vapor-Vent POLY is recommended for sites with inert methane gas and Vapor-Vent is recommended for sites with aggressive chlorinated volatile organic or petroleum vapors. Manufactured by Land Science Technologies
- B. Vapor-Vent physical properties

VENT PROPERTIES	TEST METHOD	VAPOR-VENT POLY	VAPOR-VENT
Material		Polystyrene	HDPE
Comprehensive Strength	ASTM D-1621	9,000 lbs / ft <sup>2</sup>	11,400 lbs / ft <sup>2</sup>
In-plane flow (Hydraulic gradient-0.1)	ASTM D-4716	30 gpm / ft of width	30 gpm / ft of width
Chemical Resistance		N/A	Excellent
FABRIC PROPERTIES	TEST METHOD	VAPOR-VENT POLY	VAPOR-VENT
Grab Tensile Strength	ASTM D-4632	100 lbs.	110 lbs.
Puncture Strength	ASTM D-4833	65 lbs.	30 lbs.
Mullen Burst Strength	ASTM D-3786	N/A	90 PSI
AOS	ASTM D-4751	70 U.S. Sieve	50 U.S. Sieve
Flow Rate	ASTM D-4491	140 gpm / ft <sup>2</sup>	95 gpm / ft <sup>2</sup>
UV Stability (500 hours)	ASTM D-4355	N/A	70% Retained
DIMENSIONAL DATA			
Thickness		1"	1"
Standard Widths		12"	12"
Roll Length		165 ft	165 ft
Roll Weight		65 lbs	68 lbs

### 2.3 AUXILIARY MATERIALS

- A. Vapor-Vent End Out
- B. Reinforced Tape.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which gas vent system will be installed, with installer present, for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 SUBSTRATE PREPARATION

- A. Verify substrate is prepared according to project requirements.



### 3.3 PREPARATION FOR STRIP COMPOSITE

- A. Mark the layout of strip geocomposite per layout design developed by engineer.

### 3.4 STRIP GEOCOMPOSITE INSTALLATION

- A. Install Vapor-Vent over substrate material where designated on drawings with the flat base of the core placed down and shall be overlapped in accordance with manufacturer's recommendations.
- B. At areas where Vapor-Vent strips intersect cut and fold back fabric to expose the dimpled core. Arrange the strips so that the top strip interconnects into the bottom strip. Unfold fabric to cover the core and use reinforcing tape, as approved by the manufacturer, to seal the connection to prevent sand or gravel from entering the core.
- C. When crossing Vapor-Vent over footings or grade beams, **consult with the specifying environmental engineer and structural engineer for appropriate use and placement of solid pipe materials**. Place solid pipe over or through concrete surface and attach a Vapor-Vent End Out at both ends of the pipe before connecting the Vapor-Vent to the pipe reducer. Seal the Vapor-Vent to the Vapor-Vent End Out using fabric reinforcement tape. Refer to Vapor-Vent detail provided by Land Science Technologies.
- D. Place vent risers per specifying engineer's project specifications. Connect Vapor-Vent to Vapor-Vent End Out and seal with fabric reinforced tape. Use Vapor-Vent End Out with the specified diameter piping as shown on system drawings.

### 3.5 PLACEMENT OF OVERLYING AND ADJACENT MATERIALS

- A. All overlying and adjacent material shall be placed or installed using approved procedures and guidelines to prevent damage to the strip geocomposite.
- B. Equipment shall not be directly driven over and stakes or any other materials may not be driven through the strip geocomposite.

# Appendix I



# FRAZIER STREET APTS.

## Worst-case PCE concentration VI model

Terracon Consultants- June 2013

### Contaminant of Concern:

Tetrachloroethylene

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_{a,A}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_{a,B}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_{a,C}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{fe}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{ra}$ (cm <sup>2</sup> )	Stratum A effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)
7.10E+08	590.7024	0.313	#N/A	#N/A	0.079	1.65E-08	0.957	1.58E-08	18.75	0.38867925	0.086	0.303	17.313

Bldg. ventilation rate, $Q_{avg}$ (cm <sup>3</sup> /s)	Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack- to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A	Stratum B	Stratum C	Capillary zone	Total overall effective diffusion coefficient, $D_{eff,T}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
								$D_{eff,A}$ (cm <sup>2</sup> /s)	$D_{eff,B}$ (cm <sup>2</sup> /s)	$D_{eff,C}$ (cm <sup>2</sup> /s)	$D_{eff,c}$ (cm <sup>2</sup> /s)		
9.24E+05	1.39E+07	1.24E-04	15.24	9.469	1.27E-02	5.32E-01	1.78E-04	0.00E+00	1.37E-04	3.04E-03	590.7024		

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (µg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D_{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $exp(Pe)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Infinite source bldg. conc., $C_{building}$ ppbv	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15.24	2.02E+04	0.1	6.74E+00	9.93E-03	1.73E+03	5.37E+01	6.78E-06	1.37E-01	2.02E-02	3.0E-06	NA

### Predicted Interior Concentration:

2.02E-02 ppbv

Caution: Air concentrations less than 0.5 ppbv are not detectable with air sampling equipment!