

FINAL REPORT

Sewers and Utility Tunnels as Preferential Pathways For Volatile
Organic Compound Migration Into Buildings: Risk Factors And
Investigation Protocol

ESTCP Project ER-201505

NOVEMBER 2018

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14. ABSTRACT There is growing recognition that preferential pathways can play an important role at sites affected by vapor intrusion (VI). Although this pathway is often mentioned in regulatory guidance documents, there is little information detailing the conceptual model or prevalence of this pathway. There is also limited guidance on how to assess sites for preferential pathways. As a result, preferential pathways are not currently being investigated in a consistent manner. The goal of this ESTCP project was to obtain a better understanding of sewers and utility tunnels as preferential pathways for VI.						
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ACRONYMS AND ABBREVIATIONS

AF	Attenuation factor
AROMA	Autonomous Rugged Optical Multigas Analyzer
ASU	Arizona State University
bgs	below ground surface
BTEX	Benzene, toluene, ethylbenzene, xylenes
CATS	Capillary adsorption tube sampler
CIPP	Cured in-place pipe
COC	Chemical of concern
CCV	Continuing Calibration Verification
CV	Coefficient of variation
CV _{Ln}	Coefficient of variation log-normal
cVOC	Chlorinated volatile organic compound
DCE	Dichloroethene
DoD	Department of Defense
ESTCP	Environmental Security Technology Certification Program
ft	feet
GC/MS	Gas Chromatograph/Mass Spectrometer
HAPSITE	Hazardous Air Pollutants On Site GC/MS Instrument
HASP	Health and Safety Plan
LNAPL	Light nonaqueous phase liquid
µg/L	microgram per liter
µg/m ³	microgram per cubic meter
MEK	Methyl ethyl ketone (2-Butanone)
NAPL	Nonaqueous phase liquid
NAS	Naval Air Station
NASCC	Naval Air Station Corpus Christi
NELAC	National Environmental Laboratory Accreditation Conference
OU	Operable Unit
PCE	Tetrachloroethylene
PFT	Perfluorocarbon (Perfluorinated) tracer
QA	Quality assurance

QAPP	Quality Assurance Project Plan
QC	Quality control
RPD	Relative percent difference
SL _n	Standard deviation after natural log transformation
TCE	Trichloroethylene
TCEQ	Texas Commission on Environmental Quality
USEPA	United States Environmental Protection Agency
UST	Underground storage tank
VC	Vinyl Chloride
VI	Vapor intrusion
VOA	Volatile Organic Analysis
VOC	Volatile organic compound

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ABSTRACT

Introduction and Objectives: There is growing recognition that preferential pathways can play an important role at sites affected by vapor intrusion (VI). Although this pathway is often mentioned in regulatory guidance documents, there is little information detailing the conceptual model or assessment methods. The goal of this ESTCP project was to obtain a better understanding of sewers and utility tunnels as preferential pathways for VI. Specifically, the project involved studying the conceptual model, identifying risk factors, and developing and validating an investigation protocol for sewer/utility tunnel VI. Key questions addressed in this study included: i) what types of samples to collect (liquid vs. vapor), ii) the significance of temporal variability, and iii) the significance of spatial variability.

Technology Description: This project has resulted in refinement of the conceptual model for sewer/utility tunnel VI and development of an investigation protocol:

- Key Elements of the Conceptual Model: Volatile organic compound (VOC) contaminated sites can be categorized as higher risk for sewer/utility tunnel vapor intrusion (sites where a sewer or utility tunnel directly intersects a VOC groundwater plume or vadose zone nonaqueous phase liquid (NAPL) source) or lower risk (sewer or utility tunnel in the vadose zone above a plume). Usually, background sources of VOCs in sewer vapor will not confound the vapor intrusion investigation. Although VOCs are commonly detectable in sewers at background locations away from known subsurface source areas, background concentrations in sewer vapor are usually lower than screening levels recommended for evaluation of VI. VOCs can move from sewer vapor into buildings through a variety of mechanisms that are difficult to predict without site-specific data (e.g., open pipes, plumbing defects).
- Investigation Protocol: The protocol includes initial desktop screening to classify sites as higher risk or lower risk. Early field testing of sewers/utility tunnels is recommended for higher risk sites while conventional VI investigation (including indoor air testing) is recommended for lower risk sites.

Performance and Cost Assessment: The demonstration program validated the various aspects of the conceptual model and protocol. Routine implementation of the initial steps of the protocol is not expected to be cost prohibitive and can result in more standardized evaluation of sewers and utility tunnels during VI investigations.

Implementation Issues: Advantages of the protocol include: i) provides a standardized framework for evaluating sewers and utility tunnels as potential preferential pathways for VI; ii) provides a decision logic for testing based on potential risk of the presence of sewer/utility tunnel VI; and iii) recommends sampling procedures that are practical and relatively simple to implement. Limitations of the protocol include: i) relies on indoor air testing to identify VI impacts at lower risk sites; and ii) does not provide detailed guidance on sewer/utility tunnel mitigation.

Publications:

McHugh, T., et al. (2017). Evidence of a sewer vapor transport pathway at the USEPA vapor intrusion research duplex. *Science of the Total Environment* 598, 772-779.

Additional publications pending

EXECUTIVE SUMMARY

Objectives of the Demonstration

The overall objectives of this project were i) **to develop and validate an effective protocol** to determine the presence or absence of sewer/utility tunnel VI during a VI investigation, ii) **to determine the significance of sewers/utility tunnels** at sites where this pathway has not been previously tested, and iii) **to develop a detailed conceptual model for this pathway that identifies the types of sites at risk and the key mechanisms and processes** involved. Key questions addressed in this study included: i) what types of samples to collect (liquid vs. vapor), ii) the significance of temporal variability, and iii) the significance of spatial variability.

To meet these project objectives, tasks were organized as follows:

- Task 1: Development of a preliminary investigation protocol and application at sites with known sewer/utility tunnel VI. The focus of this task was to determine whether the preliminary protocol would accurately identify the presence of sewer or utility tunnel VI at sites where these pathways were already known to exist based on previous investigations.
- Task 2: Application of investigation procedures to sites without known sewer/utility tunnel VI. The focus of Task 2 was to obtain a better understanding of sewer/utility tunnel VI risk at typical sites where the pathway was not already known to be important. Field testing focused on VOC attenuation between groundwater and sewers and from sewers to buildings.
- Task 3: Updated conceptual model and investigation protocol for sewer/utility tunnel VI. This task utilized the field investigation results from Tasks 1 and 2 along with results available from other sources to develop an updated conceptual model and to finalize the investigation protocol.

Technology Description

The technology developed for this demonstration project is i) a conceptual model for sewer/utility tunnel VI (Appendix F) and ii) a protocol to determine the presence or absence of a sewer/utility tunnel VI as part of an overall VI investigation (Appendix G). Based on results from the Task 1 and 2 field demonstrations and the Task 3 conceptual model development, the protocol includes a step-wise prioritization and decision-making process with the following key steps: i) initial desktop data review and screening, ii) field investigation, and iii) building testing or sewer mitigation.

The protocol utilizes existing sample collection and analysis methods that have been well-validated individually in other contexts. However, the protocol specifies the procedures for applying the methods in order to minimize false negative or false positive conclusions potentially resulting from spatial and temporal variability and other sources of uncertainty in the distribution of VOCs in the sewer/utility tunnel.

Demonstration Results

The field demonstrations for Task 1 and 2 took place between May 2016 and April 2018. The types of sampled sites were groundwater and building demonstration sites. Groundwater demonstration sites were selected based on the presence of documented VOC impacts in shallow groundwater. The Task 1 testing included detailed characterization of VOCs in sewers at 3 sites, while Task 2 involved less intense sampling at more individual plumes. Taken together, manhole vapor and other media (e.g., sewer liquids) were sampled at a total of 8 groundwater demonstration sites, including 38 separate groundwater plumes.

Sewer to building demonstration sites were selected to include a variety of building types. The purpose of the testing was to evaluate vapor communication between sewers and the buildings. This testing was done using perfluorinated tracer (PFT) compounds. A total of 8 residential and small commercial/industrial buildings and 7 commercial/industrial buildings were studied during Task 1 and 2.

Task 3 included compilation of data from other sources. The largest set of supplemental data was provided by Arizona State University (ASU). This dataset included sewer liquid and vapor TCE results collected at the ASU VI Research House for ESTCP Project ER-201501. These data augmented the data collected by GSI at the ASU House as part of Task 1 of this project. In addition, 17 other sewer/utility tunnel VI sites were identified during literature searches. Information from these supplemental sites was combined with the field data from Task 1 and 2 to develop an improved conceptual model for sewer/utility tunnel VI.

Performance Evaluation

With a few exceptions, the project performance objectives were met. Performance objectives were i) collection of quality data, ii) validation of the Investigation Protocol, and iii) evaluation of cost and implementability. The project included the collection of over 400 quantitative measurements consisting mostly of VOC concentrations and PFT concentrations. Although the total number of measurements exceeded the project goals, fewer sewer delineation samples were collected than planned. Data quality goals were attained except for the precision goal for sewer manhole vapor samples. This was not achieved due to high matrix variability. Despite this exception, the data set was determined to be suitable for evaluation of the demonstration performance.

A total of 205 groundwater to sewer attenuation factors were calculated from the field data generated during the demonstration. The impact of the vertical separation between groundwater and sewers was evaluated by grouping results from individual plumes into two categories: Category A (Direct Interaction [e.g., sewer below water table]) and Category B (Indirect Interaction [e.g., sewer above water table]). Median attenuation factors are summarized in Table ES-1. Across the 2 categories, 86% of pairs showed greater than 33× attenuation.

Table ES-1. Groundwater to Sewer Median Attenuation Factors

Site Category	No. Plumes	No. AFs	Attenuation Factor ¹	Attenuation ²
			(Median)	(Median)
A: Direct Interaction (Sewer Below Water Table)	6	65	7.5E-03	130×
B: Indirect Interaction (Sewer Above Water Table)	28	140	1.4E-04	7,300×

Notes: 1) Attenuation factor calculated as sewer vapor concentration divided by equilibrium groundwater concentration. 2) Attenuation is the inverse of attenuation factor. It represents the concentration fold reduction from groundwater to sewer vapor. 3) Table is based on Table 6-4 of the report and summarizes results from primary COC for each site (i.e., the highest-concentration chemical in groundwater for each plume studied) and secondary site COCs (i.e., other chemicals detected a concentration of 15% or more of the primary COC concentration). At most sites, the primary COC was PCE or TCE.

Sewer to building attenuation factors were developed from the results of tracer testing. The tests indicated that concentrations decreased by factors of 20 to more than 1000 from the sewers to the buildings (see Table ES-2). This range was well above the 10× default in the draft protocol. The final protocol presented in this report uses an attenuation factor of 0.03 (33× attenuation) as a reasonable upper-bound for the migration of VOCs in vapor from sewers/utility tunnels into buildings for use in the calculation of sewer to indoor air screening values. In addition, an overall attenuation factor of 0.001 is recommended for groundwater to sewer/utility tunnel to indoor screening values. This overall attenuation factor is based on an upper bound groundwater to sewer attenuation factor of 0.03 and an upper bound sewer to indoor air attenuation factor of 0.03.

Table ES-2. Sewer to Building VOC Attenuation

Building Types	Range of Attenuation
Buildings with Known Sewer/Utility Tunnel VI Issues	30 – 50×, or greater
Buildings with No Known Issues	2 of 12: 20× – 50×, or greater 10 of 12: 100×, or greater

Notes: 1) Table is based on Table 6-11 of the report.

In addition to these performance metrics, data collected for this project were used to validate different aspects of the conceptual model and protocol. For the conceptual model, **background VOC concentrations** in sewers were characterized through samples collected during Task 1 and 2. These VOCs included chemicals that are common target analytes in environmental assessments (e.g., PCE, TCE, and cis-DCE; BTEX). The background sample results showed that VOCs commonly associated with contaminated sites are also commonly detected in sewers not located in close proximity to known VOC plumes. For the VOCs that are most commonly risk drivers at corrective action sites (e.g., benzene, PCE, TCE), the detected concentrations at background sewer locations were typically low (i.e., <20 µg/m³). The relatively high detection frequency (55%) for cis-1,2-DCE (a marker for biodegradation of TCE in the subsurface) suggests that some of the VOC detections in sewers can be attributed to unidentified subsurface sources. However, the higher detection frequency for TCE (70%) and PCE (90%) suggests that direct discharge of VOCs into sewers is another source of VOC vapors in sewers. As discussed in Section 6.3.1, this finding relies on the assumption that the cis-1,2-DCE was not formed as a result of biodegradation of TCE

within the sewer line. However, the short residence time and typically aerobic conditions within sewers are unlikely to support biodegradation of TCE.

Temporal variability in VOC concentrations in sewer manholes was also characterized by sampling manholes multiple times over different time scales. Temporal variability was evaluated at chlorinated solvent plume sites; COCs included PCE, TCE, cis-1,2-DCE, 1,1-DCE, and chloroform. The evaluation was based on project demonstration results and supplemental data from Entanglement Technologies and from ASU researchers (ER-201501). Results from the field sampling and supplemental data indicate that the short-term (1-3 days) variation in concentration was low ($<10\times$ for 79% of manholes), with a median concentration range of $3.5\times$. However, longer-term variation (based on quarterly sampling for one year to 18 months) was much higher. Based on longer-term sampling, 88% of the Houston sanitary manholes, 81% of the Layton sanitary manholes, and 54% of the Layton land drain manholes showed $>10\times$ variation in VOC concentration, with median concentration ranges of $30\times$, $34\times$, and $11\times$, respectively. This difference in variability is also reflected in the coefficient of variation for the datasets. The coefficient of variation (standard deviation divided by the mean) was utilized because it is a common measure of relative variability. The median coefficient of variation for the short-term datasets was 0.59 while the median coefficient of variation for the long-term datasets ranged from 1.3 to 3.7. Thus, the evaluation of temporal variability showed much higher variation in VOC concentrations over a time scale of months compared to a time scale of days. The results suggest that short-term time integrated samples (e.g., 24-hour Summas or 7-day passive samplers) would provide little benefit compared to grab samples for estimation of the long-term average VOC concentration in a sewer. In addition, small quarterly monitoring datasets provide uncertain estimates of the true long-term average VOC concentration.

Based on the groundwater to sewer attenuation factors (described above) and risk factors identified at the supplemental sites, a classification scheme was developed to identify sites with **higher risk and lower risk for sewer/utility tunnel vapor intrusion**. These risk scenarios are summarized in Figure ES-1.

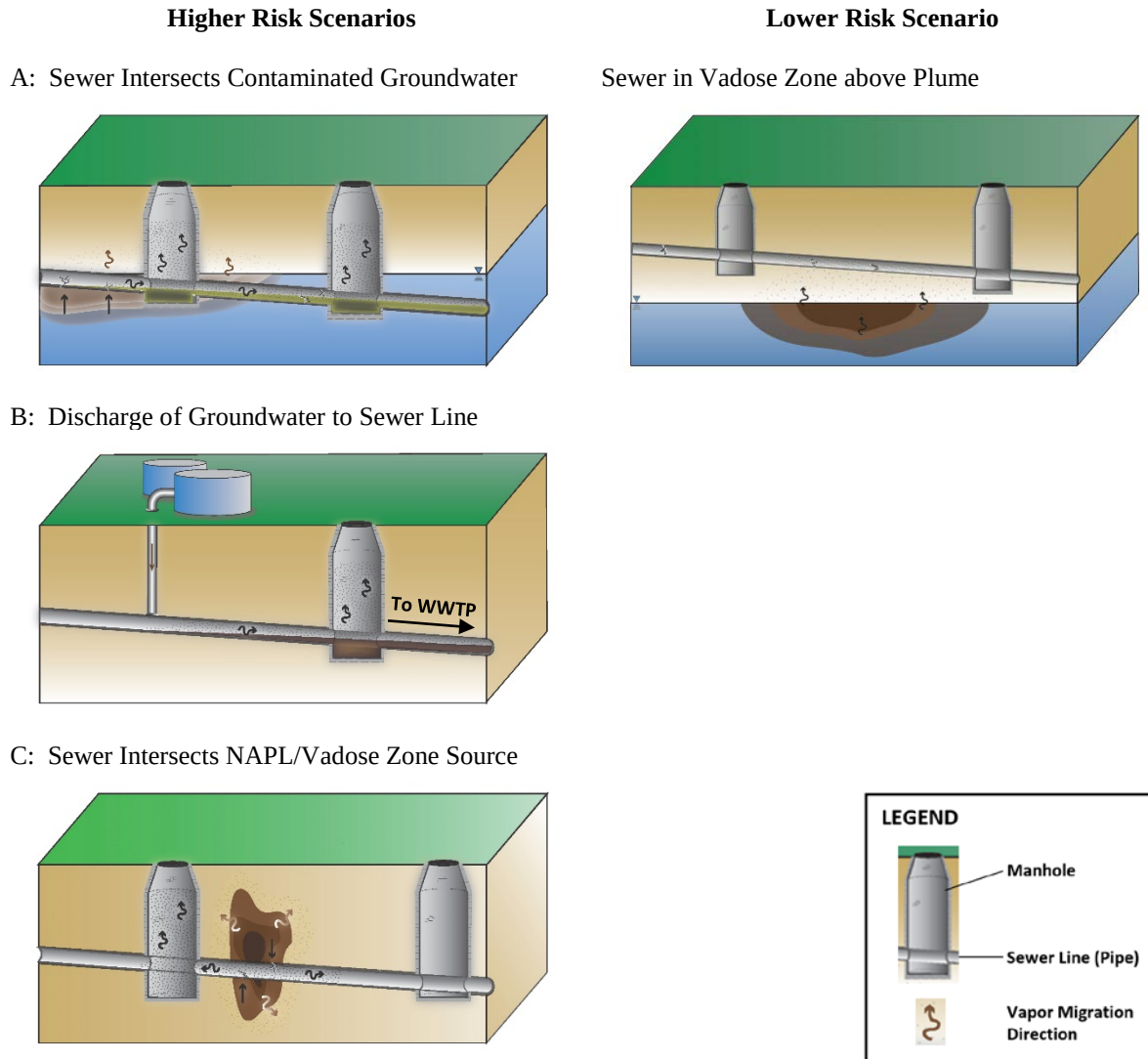


Figure ES-1. Higher and Lower Risk Scenarios for Sewer/Utility Tunnel Vapor Intrusion

The protocol developed as a result of this ESTCP project (see Figure ES-2) recommends a step-wise desktop screening (see Figure ES-3) and initial field sampling process (see Figure ES-4) that factor in the risk scenarios, attenuation factors, and other risk factors.

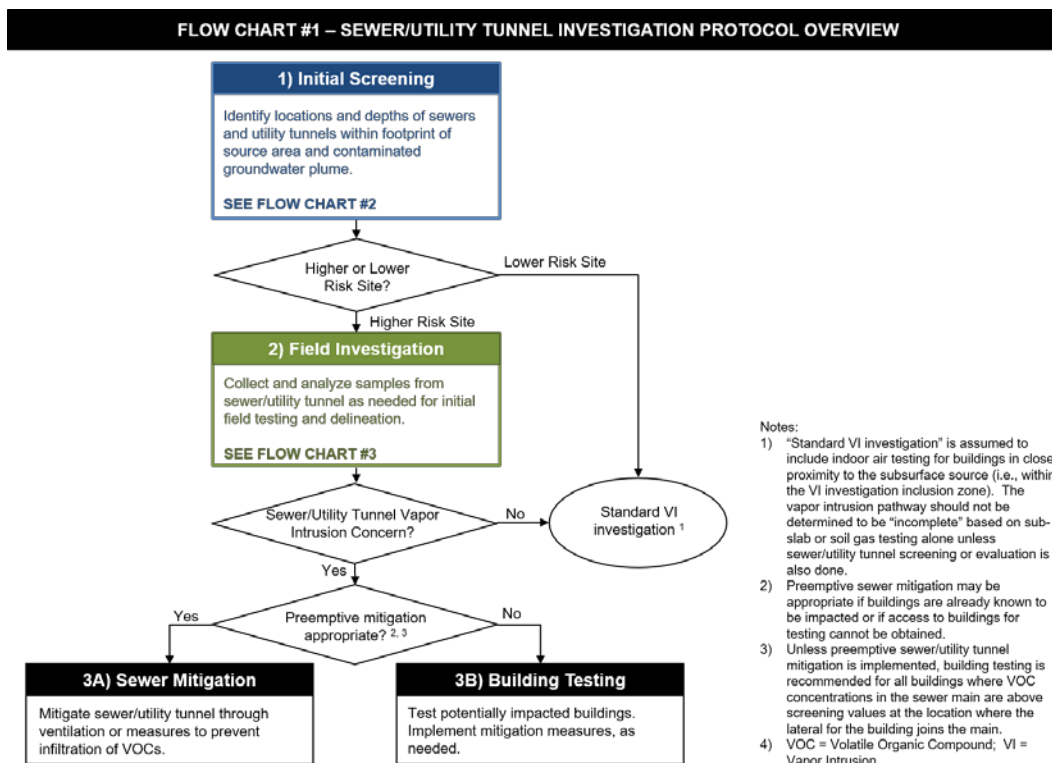


Figure ES-2. Overview of the Investigation Protocol

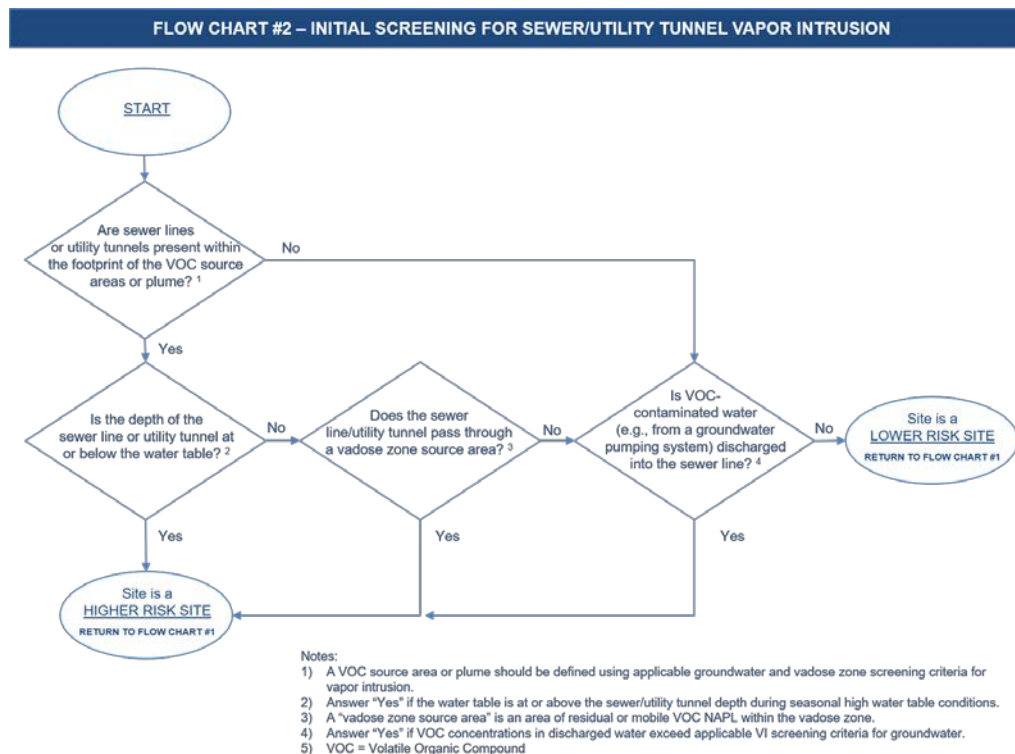


Figure ES-3. Flow Chart for Desktop Screening Portion of the Protocol

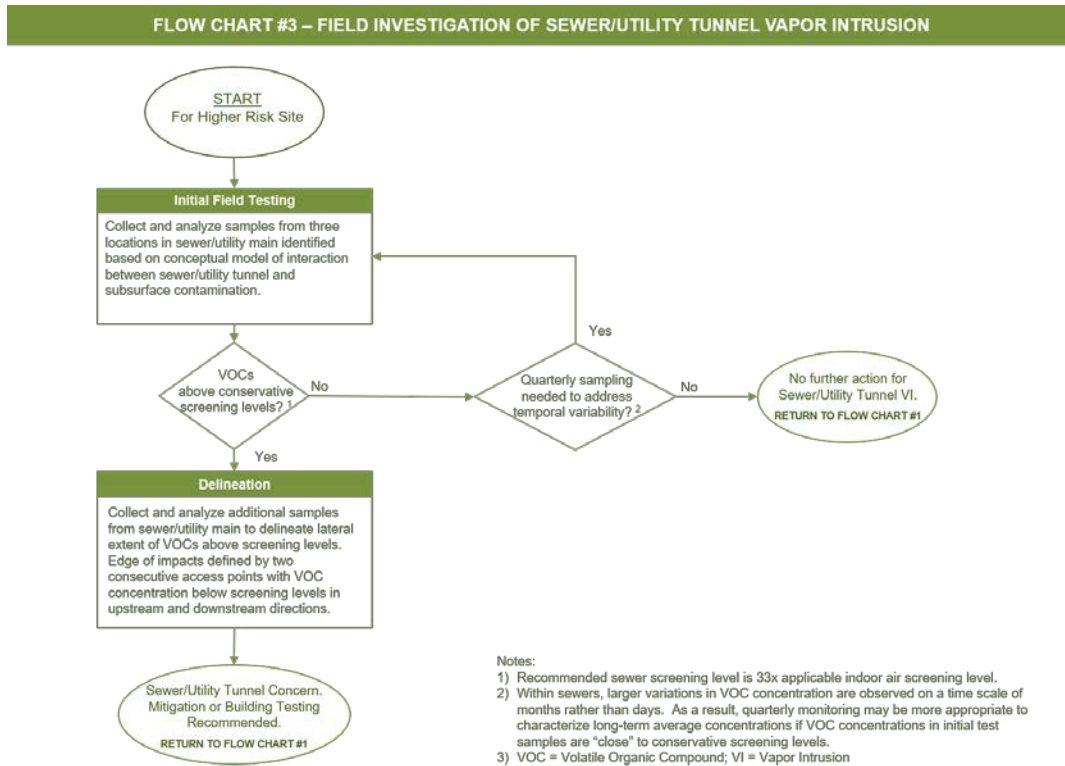


Figure ES-4. Flow Chart for Initial Field Sampling Portion of the Protocol

Implementation Issues

The protocol is intended to supplement work plans for standard VI investigations.

Advantages:

- Provides a standardized framework for evaluating sewers and utility tunnels as potential preferential pathways for VI;
- Provides a decision logic for testing based on potential risk of the presence of sewer/utility tunnel VI; and
- Recommends sampling procedures that are practical and relatively simple to implement.

Limitations:

- Relies on indoor air testing to identify VI impacts at lower risk sites; and
- Does not provide detailed guidance on sewer/utility tunnel mitigation.

Cost Model

Routine implementation of the desktop screening portion of the protocol is estimated to cost about \$1,000, and the initial field testing is estimated at up to about \$5,000. This should increase the cost of a typical VI investigation by less than 25%. The screening step is intended to apply to all sites, and the initial field testing would apply to the subset of sites that are identified as higher risk for sewer/utility tunnel VI. It is important to recognize, however, that the cost estimates do not include

any follow-up testing, for example, to delineate areas where VOCs exceed screening levels in sewers. Because the scope of any follow-up testing is site-specific, the associated costs cannot be generalized.

1.0 INTRODUCTION

In the 1990s, vapor intrusion (VI) into homes and buildings was identified as a potential exposure pathway but was not routinely evaluated during site investigations because there were no accepted and validated evaluation procedures. Today, the same is true for sewer/utility VI at sites undergoing VI assessments. Although not typically tested as part of the VI investigation process, sewers and utility tunnels have been identified as important volatile organic compound (VOC) transport pathways at a small but growing number of sites (e.g., Guo et al. 2015; Riis et al. 2010). It is likely that additional sites have sewer/utility tunnel VI that not yet been identified.

The goal of this ESTCP project was to obtain a better understanding of sewer/utility tunnel VI. Specifically, the project involved developing a conceptual model for this pathway, identifying risk factors, and developing and validating an investigation protocol. Execution of this project involved three key tasks. Task 1 and 2 focused on field demonstrations to validate and refine the protocol. Task 3 was not part of the field demonstration program; rather, it focused on developing the conceptual model and risk factors for this pathway by utilizing data collected during the demonstration as well as literature reviews.

A Task 1 interim report was previously submitted to ESTCP (McHugh et al. 2017a). Based on the Task 1 field demonstration results, the protocol was refined and further validated as part of Task 2. This Final Report presents results of the overall protocol validation process completed under the first 2 tasks. It also includes the updated conceptual model developed under Task 3 (Appendix F) and a finalized protocol for sewer/utility tunnel VI investigations (Appendix G).

1.1 BACKGROUND

Storm sewers, sanitary sewers, and utility tunnels have been identified as important preferential transport pathways for VOC VI at a small but growing number of sites (McHugh and Beckley 2016). Examples include: vinyl chloride VI at a former dry cleaner site (Nielsen et al. 2014), several houses near a tetrachloroethene (PCE) plume in Denmark (Riis et al. 2010), the ASU VI Research House at Hill AFB OU8 (Guo et al. 2015; Johnson 2013), a house at Hill AFB OU2 (McHugh et al. 2011), a Boston area house (Pennell et al. 2013), industrial buildings on two Navy facilities in California (Beckley et al. 2013; McHugh et al. 2012a), and a neighborhood in Niagara Falls, NY (Distler and Mazierski 2010).

At most of these sites, the importance of sewers or utility tunnels as preferential pathways was not recognized until late in the investigation process resulting in wasted investigation efforts and delayed response actions. At some of these sites (e.g., Moffett Field Building 107 (McHugh et al. 2012a)), vapor concentrations of site VOCs were higher in indoor air than in sub-slab samples, creating a misleading suggestion of an indoor source. At the USEPA VI Research Duplex in Indianapolis (USEPA 2012), sewers had been identified as a potentially significant pathway, but VOC concentrations in the sewers were not tested prior to implementation of this research project. These examples highlight the need for a standardized procedure to evaluate sewers and utility tunnels as a normal component of VI investigations.

Currently, little information is available concerning i) what fraction of VI sites have sewer/utility VI, ii) which sites are most likely to have sewer/utility VI, or iii) how to reliably identify sewer/utility VI on a site-specific basis. Understanding these issues is critical particularly for

Department of Defense (DoD) facilities because many of them are located in coastal areas with shallow groundwater that is likely to infiltrate into storm and sanitary sewers. In addition, DoD facilities commonly have large utility tunnel networks that may intersect soil source areas and can vent directly into site buildings. Currently, the most significant barrier to the evaluation of such sewers/utility tunnel VI issues is the absence of a validated sampling protocol to accurately identify the presence or absence of VOCs in the sewer/utility.

When VOCs are present in a sewer or utility tunnel, the available information suggests that mechanisms for entry into buildings (and the associated attenuation factors) are likely to be highly variable and unpredictable. For example, different migration pathways from sewers into buildings have been documented at different sites including: i) through a building foundation French drain, ii) through dry p-traps, iii) diffusion through stagnant p-trap water, and iv) migration through a leaky toilet seal. For these different sites, estimated sewer to indoor air attenuation factors have ranged from less than 0.001 (i.e., more than 1000× reduction in concentration from the sewer to the building) to about 0.1 (i.e., about 10× concentration reduction). However, these attenuation factors were based on limited data.

1.2 OBJECTIVE OF THE DEMONSTRATION

The overall objectives of this project were i) **to develop and validate an effective protocol** to determine the presence or absence of a sewer/utility tunnel VI during a VI investigation, ii) **to determine the significance of sewers/utility tunnel VI** at sites where this pathway has not been previously tested, and iii) **to develop a detailed conceptual model for this pathway that identifies the types of sites at risk and the key mechanisms and processes** involved. To meet these project objectives, three tasks were completed:

Task 1: Development of preliminary investigation protocol and application to sites with known sewer/utility tunnel vapor intrusion. The focus of Task 1 was to determine whether the preliminary investigation protocol (McHugh and Beckley 2015) would accurately identify the presence of a sewer or utility tunnel VI at sites where prior investigation results already provided evidence of such a pathway. For this purpose, the field program focused on i) validation of the sampling techniques used to identify and characterize VOCs within sewers and utility tunnels, ii) characterization of spatial and temporal variability within sewers and utility tunnels, and iii) validation of perfluorinated tracer (PFT) compounds for measuring attenuation between sewers and individual buildings.

Task 2: Application of investigation procedures to sites without known sewer/utility tunnel vapor intrusion. The focus of Task 2 was to obtain a better understanding of the role of sewers and utility tunnels at typical sites (i.e., sites where sewers or utility tunnels were not already known to be important factors in VOC migration in liquids or vapor). For this purpose, the field program applied the investigation methods validated in Task 1 to a larger number of sites. Specifically, the field testing focused on i) groundwater to sewer attenuation and ii) sewer to building attenuation across a broad range of sites without prior evidence of sewer/utility tunnel vapor intrusion.

Task 3: Updated conceptual model and investigation protocol for the sewer/utility tunnel vapor intrusion. Task 3 utilized the field investigation results from Tasks 1 and 2 along with results available from other sources to develop an updated conceptual model for the pathway and to finalize the protocol for investigation of the pathway.

1.3 REGULATORY DRIVERS

The investigation programs recommended in DoD, USEPA, and state VI guidance documents focus on characterization of groundwater, soil gas, and indoor air to identify VI impacts. Most regulatory guidance documents (e.g., USEPA 2015) mention the potential importance of preferential pathways, but provide little or no practical information on how to reliably investigate these pathways at individual sites. In addition, guidance documents commonly discuss a variety of potential preferential pathways such as natural soil fractures, elevator pits, sumps, and utility backfill. However, sewers and utility tunnels are the only preferential pathways that have been documented to cause VI impacts to buildings located outside the screening area for conventional VI (e.g., buildings outside the known footprint of the groundwater plume¹). As a result, sewers and utility tunnels appear to have a unique ability to confound VI investigations.

Although buildings (and their occupants) are the end receptor for VI, the key problem addressed by this project is the reliable identification of sewer/utility VI. Procedures for measuring VOC concentration in indoor air are well defined (e.g., NJDEP 2018) and methods for distinguishing between indoor and subsurface sources of VOCs have been well validated (e.g., through ESTCP Projects ER-201119 and ER-201025). However, there is no guidance available concerning how to reliably identify the presence or absence of VOCs inside sewers/utilities and determine whether these VOCs will result in a VI concern. Key questions addressed in this study included: i) what types of samples to collect (liquid vs. vapor), ii) the significance of temporal variability, and iii) the significance of spatial variability.

1.4 TERMINOLOGY

Key terms used in this report include:

Vapor intrusion	Migration of VOCs from any subsurface source into an overlying building.
Conventional vapor intrusion	Migration of VOCs from a subsurface source into an overlying building by advection and/or diffusion through soil (i.e., not through a preferential pathway). These mechanisms for vapor entry into buildings can also be viewed as “soil gas intrusion.” The term “conventional vapor intrusion” used in this report refers to the standard conceptual model that has historically and most commonly been utilized to describe VOC flux from the subsurface into buildings (see Figure 1-1, left panel).
Preferential pathway	A migration pathway from a subsurface source that supports higher VOC flux/discharge into a building compared to transport through bulk soil. This general term typically includes features such as elevator shafts and dry wells that can enhance vertical transport from

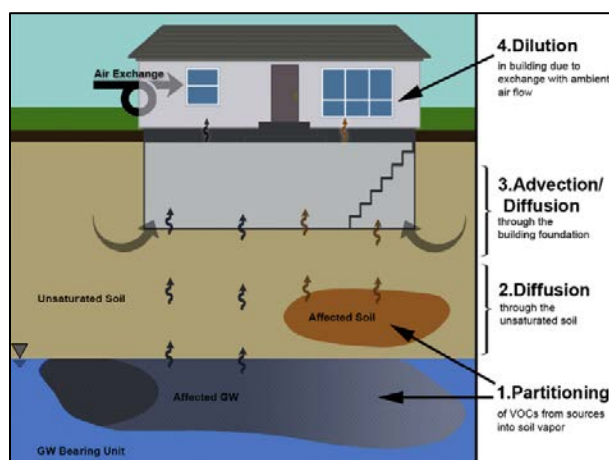
¹ The “screening area,” or the area to consider for conventional vapor intrusion assessments, is typically taken as the footprint of the subsurface VOC source such as impacted groundwater, plus a buffer of up to 100 feet away. This area is also referred to as the “lateral inclusion zone” in regulatory guidance documents such as USEPA (2015).

a VOC source below the building into the building and features such as sewers and utility tunnels that can enhance both lateral and vertical transport of VOCs. The term “sewer/utility tunnel vapor intrusion” or “sewer/utility tunnel VI” used in this report refers to VOC flux from the subsurface into buildings through this specific preferential pathway (see Figure 1-1, right panel).

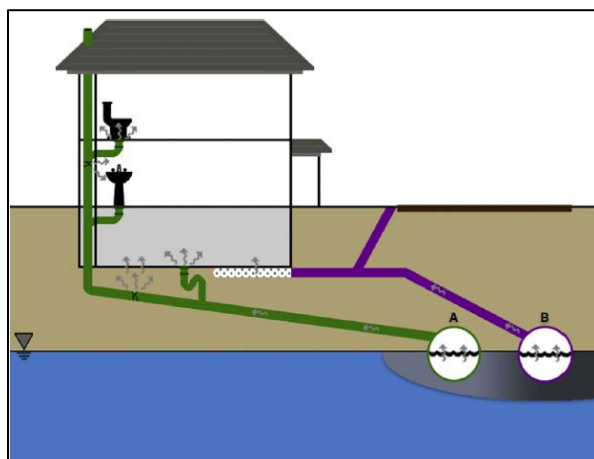
Sewer/utility tunnel
vapor intrusion
(sewer/utility tunnel VI)

A sewer or utility tunnel that supports higher VOC flux/discharge into a building compared to transport through bulk soil. The VOC flux is through the interior of the sewer line or tunnel (see Figure 1-1, right panel). Sewer/utility tunnel vapor intrusion has also been referred to as “pipe VI” (Guo et al. 2015). Sewers or utility tunnels can enhance VOC transport into a building from a VOC source that is laterally separated from the building (i.e., not located directly below the building).

CONVENTIONAL (STANDARD) VI



SEWER/UTILITY TUNNEL VI



Note: Figures from McHugh et al. (2017c)

Figure 1-1. Conventional (Standard) vs. Sewer/Utility Tunnel Vapor Intrusion

2.0 TECHNOLOGY

The technology evaluated in this project is a new investigation protocol that will reliably determine the presence or absence of a sewer/utility tunnel VI as part of a VI investigation.

2.1 TECHNOLOGY DESCRIPTION

The technology developed for this demonstration project is i) a conceptual model for sewer/utility tunnel vapor intrusion (Appendix F) and ii) a protocol to determine the presence or absence of sewer/utility tunnel VI as part of an overall VI investigation (Appendix G). Based on results from the Task 1 and 2 field demonstrations and the Task 3 conceptual model development, the protocol includes a step-wise prioritization and decision-making process. Key steps are i) initial desktop data review and screening, ii) field investigation, and iii) building testing or sewer mitigation.

The investigation protocol utilizes existing sample collection and analysis methods that have been well-validated individually in other contexts. However, the protocol specifies the procedures for applying the methods in order to minimize false negative or false positive conclusions potentially resulting from spatial and temporal variability and other sources of uncertainty in the distribution of VOCs in the sewer/utility.

1. Sample Collection: Samples are collected using validated tools and methods such as Summa canisters (analysis by EPA Method TO-15), Tedlar bags, or passive samplers.
2. Sample Analysis: The investigation protocol supports either exclusive off-site analysis of samples using a commercial laboratory or on-site chemical analysis supplemented by limited confirmatory off-site analysis. Both options have been well validated.

2.2 TECHNOLOGY DEVELOPMENT

Although vapor sample collection and analysis methods have been utilized for decades, the investigation protocol provides guidance on their application to sewers and utility tunnels. In order to develop a protocol for the identification and investigation of sewer/utility VI, we reviewed the available documentation for sites where sewers or utility tunnels have been found to act as preferential pathways for VOC vapors. The preliminary protocol was refined over the course of the project, and the final version is provided in Appendix G.

2.3 ADVANTAGES AND LIMITATIONS OF THE TECHNOLOGY

2.3.1 Advantages of the Technology

Sewers and utility tunnels create unique challenges for vapor intrusion investigations because VOCs may migrate through sewers or utility tunnels resulting in unexpected impacts to buildings laterally off-set from the groundwater plume or other subsurface sources of VOCs. At these types of sites, conventional vapor intrusion investigations focused on buildings within 100 ft of the subsurface source (e.g., after USEPA 2015) may fail to identify some impacted buildings. There are several sites where sewers or utility tunnels have been identified as preferential pathways for VOC transport only late in the investigation process resulting in inefficiencies in the site investigation and delays in effective mitigation (e.g., Guo et al. 2015; McHugh et al. 2017b). There are likely additional sites where the importance of sewers or utility tunnels has not yet been identified.

Although most vapor intrusion guidance documents highlight the importance of considering preferential pathways during a VI investigation, they do not provide specific procedures to identify and evaluate preferential pathways (Eklund et al. 2018). The protocol for evaluation of sewers and utility tunnel vapor intrusion developed through this project will allow for their cost-effective evaluation early in the site characterization process. By accurately determining the importance of sewers/utilities on VI, the cost of site investigations and response actions will be reduced.

For sites where a sewer or utility tunnel is the primary mechanism for VOC entry into buildings, mitigation will likely be pathway-specific. For example, at the ASU Research House, isolation of the sewer line from the house appears to resolve the VI issue. Options for mitigating sewers or utility tunnels include: i) ventilation/depressurization of the sewer/utility, ii) installing a liner (or other technology) to prevent infiltration of contaminated groundwater and soil gas into the sewer/utility, and/or iii) installation of vapor barriers between the sewer main and sewer lateral (Nielsen and Hivdberg 2017). For sites where VI is occurring as a result of VOC transport through a sewer or utility tunnel, response actions specifically targeted to sewers/utilities will be quicker and more effective than conventional mitigation. The use of more effective and quicker mitigation approaches will result in faster removal of VOCs from buildings.

2.3.2 Limitations of the Technology

Because there is currently no standard protocol for evaluation of sewers or utility tunnels, it is likely that the validated protocol developed through this project will be widely accepted. However, any new investigation approach requires regulatory buy-in, which can be an initial challenge to the use of the protocol. The risk of poor regulatory acceptance has been addressed by i) obtaining technical review comments from stakeholders including regulators, ii) utilizing and documenting standard sample and analysis quality assurance/quality control (QA/QC) measures, and iii) presenting the protocol development and validation results through technical conferences, publications, and workgroups.

At some buildings, both conventional and preferential pathway vapor intrusion may be a concern. The protocol focuses on assessment of sewers and utility tunnels as preferential pathways. If multiple underground utility lines are connected to a building (e.g., a sanitary sewer line and a utility tunnel), each should be evaluated in accordance with the protocol. In addition, conventional vapor intrusion should be evaluated in accordance with applicable guidance (e.g., USEPA 2015).

3.0 PERFORMANCE OBJECTIVES

The overall objectives of this project were i) **to develop and validate an effective protocol** to determine the presence or absence of sewer/utility tunnel VI during a VI investigation, ii) **to determine the significance of sewers/utility tunnel VI** at sites where this pathways have not been previously tested, and iii) **to develop a detailed conceptual model for this pathway that identifies the types of sites at risk and the key mechanisms and processes** involved. In addition, specific performance objectives were developed for the Task 1 and Task 2 field programs to support the validation of the sewer/utility tunnel VI investigation protocol.

3.1 OVERVIEW OF TASK 1 PERFORMANCE OBJECTIVES

The overall objective of the Task 1 demonstration was to validate the field investigation portion of the preliminary protocol. The objective of the field demonstration was met by:

1. Applying the field investigation portion of the protocol at three demonstration sites;
2. Conducting additional validation sampling of the sewers and utilities at each of these sites;
3. Conducting more limited supplemental testing at 13 different locations at 3 other demonstration sites; and
4. Comparing the results from the protocol against the more extensive validation dataset.

The results of the Task 1 field investigation were presented in an Interim Report (McHugh et al. 2017a). Specific Task 1 performance objectives and results are summarized in Table 3-1.

Table 3-1. Task 1 Performance Objectives

Performance Objective	Data Requirements	Success Criteria and Results
Task 1 Quantitative Performance Objectives		
1. Attainment of a complete dataset that supports validation of the protocol.	For each demonstration site, collection of the samples required for the protocol plus collection of the additional samples required for validation of the protocol.	<u>Success Criteria:</u> Analytical results for >95% of planned protocol samples and >90% of planned validation samples. <u>Results:</u> The demonstration was completed at only three of four planned demonstration sites. At these sites, more than 95% the planned protocol samples were collected. As discussed in the Task 1 Interim Report (McHugh et al. 2017a), more than 90% of the planned samples were collected for validation of the initial testing and building attenuation aspects of the protocol. Less than 90% of planned samples were collected for validation of the protocol's delineation step because VOCs were more widespread than anticipated at the Task 1 sites. Overall, however, the dataset, along with the dataset from the Task 1 Supplemental Demonstration Sites, was sufficient to focus further work in Task 2. Although the delineation step of the protocol was not fully validated, the protocol's recommendation for delineation (i.e., vapor delineation determined by 2 consecutive manholes with VOC vapor concentrations below sewer screening levels) is consistent with observed attenuation within sewers.
2. Attainment of analytical results representative of constituent concentrations in the collected samples.	Analytical results from on-site GC/MS instrument and samples analyzed by off- site laboratory. Associated QA results (e.g., field QA results, laboratory QA results, duplicate analyses) to demonstrate acceptable field instrument and laboratory performance.	<u>Success Criteria:</u> For >75% of field analyses: Precision: RPD < 30% for field duplicate samples Accuracy: RPD < 90% between CCV standard and on-site result; RPD < 90% for paired samples analyzed on-site and off-site (difference of about 3× between paired samples) For >90% of laboratory analyses: Precision: RPD < 30% for field duplicate samples; RPD <25% for laboratory duplicate results Accuracy: standard laboratory accuracy Sensitivity: target VOC reporting limit less than screening level for liquid and vapor samples <u>Results:</u> Overall, the field and laboratory analyses met QA/QC goals.

Continued on next page.

Table 3-1 Continued

Performance Objective	Data Requirements	Success Criteria and Results
3a. Validation of Sewer/Utility Tunnel VI Investigation Protocol: <i>Initial Testing</i>	Demonstration that the limited testing program specified in the Protocol accurately detects the presence of VOCs above screening levels in sewers and utility tunnels known (based on prior investigation results) to act as a preferential pathway for VI.	<u>Success Criteria:</u> For >90% of initial testing datasets, a determination that further investigation is required (i.e., building testing or mitigation) based on the criteria specified in the preliminary protocol (i.e., VOC concentrations >10× applicable indoor air standards). <u>Results:</u> Validated – 97% of initial testing datasets indicated a need for further investigation.
3b. Validation of Sewer/Utility Tunnel VI Investigation Protocol: <i>Delineation</i>	Demonstration that delineation testing program specified in the protocol accurately defines the area of sewers/utility tunnels where VOC concentrations exceed conservative screening concentrations.	<u>Success Criteria:</u> For >80% of delineation boundaries, accurate delineation of spatial extent of sewer impacts using the delineation criteria specified in the protocol (i.e., two spatially consecutive test locations below criteria based on one round of testing). <u>Results:</u> Not validated – VOCs were more widespread within sewer lines than anticipated. As a result, not enough delineation boundaries were identified to support validation. Although the delineation step of the protocol was not fully validated, the protocol’s recommendation for delineation is consistent with observed attenuation within sewers.
3c. Validation of Sewer/Utility Tunnel VI Investigation Protocol: <i>Building Attenuation</i>	Demonstration that the sewer to building attenuation factor (i.e., 10x attenuation) is appropriately conservative for the development of sewer/utility tunnel screening criteria.	<u>Success Criteria:</u> For >90% of tracer study results, observation of >10× attenuation. <u>Results:</u> Validated – 100% of sewer-building connections tested showed >10× attenuation.
Qualitative Performance Objectives		
4. Ease of implementation of the Protocol.	Field experience implementing the protocol.	<u>Success Criteria:</u> A validated protocol that can be implemented by field sampling personnel with a typical level of qualifications and experience. <u>Results:</u> Carried forward to Task 2. See Table 3-2.
5. Cost effectiveness of the Protocol.	Information on cost of implementing the protocol.	<u>Success Criteria:</u> A validated protocol that will increase the cost of a typical VI field program by less than 25%. <u>Results:</u> Carried forward to Task 2. See Table 3-2.

3.2 TASK 2 PERFORMANCE OBJECTIVES

The objectives of the Task 2 field demonstration were validation of two key components of the investigation protocol: i) the initial screening criteria and ii) the sewer to building attenuation factor. These objectives were met by:

- Measuring the groundwater to sewer/utility manhole attenuation factor at 30 locations (i.e., plumes) at 4 demonstration sites;
- Measuring the sewer/utility tunnel to indoor air attenuation factor at 8 demonstration sites; and,
- Comparing the measured attenuation factors against those used in the preliminary protocol.

Specific Task 2 performance objectives and results are summarized in Table 3-2. A detailed evaluation of these performance objectives is provided in Section 6.2.

Table 3-2. Task 2 Performance Objectives

Performance Objective	Data Requirements	Success Criteria and Results
Task 2 Quantitative Performance Objectives		
1. Collection of a complete dataset that supports validation of the Protocol.	For each demonstration site, collection of the samples required to determine i) the target attenuation factor and ii) temporal variability in the target attenuation factor.	<u>Success Criteria:</u> Analytical results for >95% of planned samples. <u>Results:</u> Overall, this objective was met. The demonstration was completed at 30 of 32 locations (94%) at 4 demonstration sites. Additional manholes were tested and samples collected at the Houston demonstration site, resulting in a full dataset that exceeded the minimum requirements of the demonstration plan (i.e., 85 total samples (normal and QA) collected, out of 62 planned (137%)).
2. Collection of analytical results representative of constituent concentrations in the collected samples.	Analytical results from samples analyzed by an off- site laboratory. Associated QA results (e.g., field QA results, laboratory QA results, duplicate analyses) to demonstrate acceptable field instrument and laboratory performance.	<u>Success Criteria:</u> For >90% of laboratory analyses: Precision: RPD < 30% for field duplicate samples; RPD <25% for laboratory duplicate results Accuracy: standard laboratory accuracy (see Appendix E of the Task 1 Demonstration Plan) Sensitivity: target VOC reporting limit less than screening level. <u>Results:</u> This objective was partially met. The specific objective relating to field duplicate RPD was not met, likely as a result of sewer vapor being a heterogeneous matrix. This issue had no material impact on the project or protocol development because the protocol steps account for variability.

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Table 3-2 Continued

Performance Objective	Data Requirements	Success Criteria and Results
3. Validation of the Groundwater to Sewer Attenuation Factor.	1) Demonstration that the groundwater to sewer/utility attenuation factor (i.e., 100× attenuation) is appropriately conservative for the development of sewer/utility tunnel screening criteria. 2) Demonstration that groundwater to sewer/utility attenuation increases with increasing vertical separation distance between groundwater and the sewer/utility.	<u>Success Criteria:</u> 1) For >90% of paired groundwater/sewer measurements, observation of >100× attenuation. <u>Results:</u> This objective was partially met. 79% of the total paired measurements met the target. The majority of paired measurements that had low attenuation was from sites with direct interaction between the groundwater and the sewers. 86% of the total paired measurements showed >33× attenuation. 2) Observation of a statistically significant positive relationship between vertical separation distance and VOC attenuation. <u>Results:</u> Significantly more attenuation was observed in vadose zone sewers compared to water table sewers (p<0.001 by Mann Whitney U Test).
4. Validation of Sewer/Utility Tunnel to Building Attenuation Factor.	Demonstration that the sewer to building attenuation factor (i.e., 10× attenuation) is appropriately conservative for the development of sewer/utility tunnel screening criteria.	<u>Success Criteria:</u> For >90% of tracer study results, observation of >10× attenuation. <u>Results:</u> This objective was met. 100% of the sewer to building connections showed >10× attenuation. 90% of the sewer to building connections showed >33× attenuation.
Qualitative Performance Objectives (applied to overall demonstration program)		
5. Ease of implementation of the Protocol.	Field experience implementing the protocol.	<u>Success Criteria:</u> A validated protocol that can be implemented by field sampling personnel with a typical level of qualifications and experience. <u>Results:</u> This objective was met. Based on a review of field experience gained over the course of this project, environmental professionals with a typical level of training and experience, and experience with vapor sampling techniques, should be able to apply the protocol under most conditions.
6. Cost effectiveness of the Protocol.	Information on cost of implementing the protocol.	<u>Success Criteria:</u> A validated protocol that will increase the cost of a typical VI field program by less than 25%. <u>Results:</u> This objective was met. We anticipate that implementation of the protocol will increase the cost of a typical VI field program by less than 25%.

4.0 SITE DESCRIPTIONS

A variety of sites was selected to test different aspects of the protocol during Task 1 and Task 2. These included i) “groundwater demonstration sites” used to validate aspects of the protocol relating to migration of contaminants from groundwater into sewer lines, and ii) “building demonstration sites” used to evaluate vapor movement from sewer lines into buildings.

4.1 SITE LOCATIONS AND HISTORY

For the purpose of this report, a “groundwater demonstration site” is a city or county where a demonstration sampling event was conducted. In most cases, the sites included several different specific test locations (e.g., separate groundwater plumes). A “building demonstration site” is defined as a combination of sewers/utility tunnels and associated buildings in a given tracer test.

Table 4-1 summarizes the groundwater demonstration sites utilized for evaluation of VOC migration from groundwater into sewer lines. The key prerequisite for site selection was documented VOC impacts in shallow groundwater.

Table 4-1. Summary of Groundwater to Sewer Demonstration Sites

Site Name	Description	Geology/Hydrogeology	Contaminant Distribution
Layton, UT (Task 1)	Vicinity of Arizona State University (ASU) VI Research House, located in Hill Air Force Base Operable Unit (OU) 8. Testing at this site was done in coordination with ESTCP Project ER-201501.	Shallow stratigraphy at OU8 consists of complex interbedded, laterally discontinuous layers of sands, silty sands, silty/sandy clay, and clay. The depth to groundwater varies depending on the slope of the ground surface compared to the water table, but typically ranges from less than 10 to 20 feet below ground surface (ft bgs).	TCE is the most widespread VOC detected in groundwater at OU8. The ASU Research House is located above impacted groundwater in an area where the plume is approximately 800 ft wide. The plume extends more than 1,600 ft downgradient of the house.
Indianapolis, IN (Task 1)	Vicinity of USEPA VI Research Duplex. Testing at this site was done in coordination with USEPA and included the immediate vicinity of the duplex and two upgradient former dry cleaners.	Shallow stratigraphy consists of topsoil and fill material above 3 – 7 ft of silty/sandy clay. These intervals overlie 7 – 16 ft of coarse gravelly sand with cobbles that serves as the surficial aquifer in the area. Groundwater in the uppermost aquifer is found at depths of about 15 ft bgs.	The primary VOCs found at the site are PCE and chloroform. The source of PCE in groundwater is thought to be releases from historic dry cleaners upgradient of the duplex. The presence of chloroform is due to disinfection byproducts in city drinking water.

Continued on next page.

Table 4-1 Continued

Site Name	Description	Geology/Hydrogeology	Contaminant Distribution
Mountain View, CA (Task 1)	Former NAS Moffett Field.	Shallow stratigraphy at this site consists of interbedded clay, silt, sand, and gravels deposited in a fluvial setting. Depth to the uppermost aquifer is approximately 5 to 15 ft bgs.	The primary VOC is TCE. Cis-1,2-DCE, PCE, and VC are also found in the uppermost aquifer at the site.
Corpus Christi, TX (Task 1)	NAS Corpus Christi.	Shallow stratigraphy consists of interbedded clay, silt, and sand. Depth to groundwater is approximately 5-8 ft bgs.	TCE is the primary VOC detected in groundwater, with concentrations in the study area up to 170,000 µg/L.
Austin, TX (Task 1, 2)	4 separate groundwater plumes associated with historic releases from different dry cleaning operations. The locations were identified using Texas Commission on Environmental Quality (TCEQ) Remediation Division databases.	The shallow geology consists of limestone bedrock beneath interbedded silts and clays. Depths to groundwater range from 5 to 32 ft bgs.	PCE is the primary VOC at the dry cleaner locations, with concentrations up to 960 µg/L.
Houston, TX (Task 1, 2)	10 separate groundwater plumes associated with historic releases from different dry cleaning operations. The locations were identified using TCEQ Remediation Division databases.	Shallow stratigraphy consists of interbedded clay, silt, and sand. Depths to groundwater range from 7 to 30 ft bgs.	PCE is the primary VOC at the dry cleaner locations, with concentrations up to 19,000 µg/L.
San Diego County, CA (Task 2)	9 separate groundwater plumes associated with different industrial and dry cleaning operations. The locations were identified using the GeoTracker database.	Shallow stratigraphy consists of interbedded marine and nonmarine sedimentary rock units composed of interbedded sands, silty sands, silt, and clay. Depths to groundwater range from 13 to 35 ft bgs.	San Diego County site included 1 petroleum LNAPL plume, 6 cVOC plumes, and 2 mixed plumes. Maximum concentrations of key contaminants at each location ranged from approximately 10 µg/L to 170,000 µg/L.
Orange County, CA (Task 2)	9 separate groundwater plumes associated with different industrial and dry cleaning operations. The locations were identified using the GeoTracker database.	Shallow stratigraphy consists primarily of alluvial sediments including sand, silty sand, silt, and clay. Depths to groundwater range from 4 to 30 ft bgs.	The Orange County site included 9 cVOC plumes with maximum concentrations at each location ranging from 160 to 22,000 µg/L.

Table 4-2 summarizes the second category of demonstration sites: sites for evaluating communication between sewers and buildings. For this part of the demonstration, the goal was to

test connections for different types of structures. The presence of contaminants in the subsurface was not a prerequisite.

Table 4-2. Sewer to Building Demonstration Sites

Site Name	Description
Residential and Small Commercial/Industrial Buildings	
ASU VI Research House, Layton, UT (Task 1)	Split-level house with an approximate footprint of 915 sq. ft. The demonstration included testing of the house and associated sanitary sewer and land drain lines. The house is located in Hill Air Force Base Operable Unit (OU) 8. Testing was done in coordination with ESTCP Project ER-201501. The site was selected because of the presence of a previously-identified sewer VI.
USEPA VI Research Duplex, Indianapolis, IN (Task 1)	2-story duplex with basement. The footprint of the structure is approximately 1,800 sq. ft. Both the east and west sides of the duplex were included in the demonstration; house numbers were 422 and 420, respectively. The demonstration included testing of both sides of the duplex and the associated combined storm and sanitary sewer. Testing was done in coordination with USEPA and Arcadis. The site was selected based on review of available data suggesting that indoor air quality was affected by VOC migration via a sewer.
Moffett Building 107, Mountain View, CA (Task 1)	1-story, slab-on-grade, 2,000 sq. ft. office building. The building was selected based on results from a prior ESTCP project (ESTCP ER-200707) that suggested the presence of VOC migration into the building via an underground utility conduit. The building and associated sanitary sewer and utility (telephone) piping were included in the demonstration.
Duplexes, Houston, TX (Task 2)	Adjacent, 1-story, slab-on-grade duplexes connected to the same sanitary sewer line. Duplex #1 (including house number 4708 [north side] and 4706 [south side]) has an approximate footprint of 2,700 sq. ft. and is further away from the sewer main. Duplex #2 is closer to the sewer main. The total footprint is about 2,800 sq. ft.; only the north half of the duplex (house number 4704) was included in the demonstration.
Single-family Homes, San Rafael, CA (Task 2)	Neighboring, 2-story, slab-on-grade houses connected to a sanitary sewer line. The houses have the same floorplan, and each house has an approximate 2,200 sq. ft. footprint. Two manholes were included in the testing. House #1 was located across the street from the upstream manhole. House #2 was located approximately 225 feet away, in the downstream direction. The second manhole was an additional 75 feet downstream.
Apartment Building, NASCC Area 1, Corpus Christi, TX (Task 2)	Multi-story apartment building. Test was conducted between sanitary manhole and closest apartment, a ground-floor, 1 bedroom, 1 bath unit.

Continued on next page.

Table 4-2 Continued

Site Name	Description
Large Commercial/Industrial Buildings	
Office Building with Laboratory, San Diego, CA (Task 2)	2-story office/laboratory building with an approximate footprint of 25,000 sq. ft. The building and associated sanitary sewer and underground electrical tunnel were included in the demonstration.
Hospital, NASCC Area 2, Corpus Christi, TX (Task 2)	Multi-story hospital building on a slab foundation. The footprint of the building was approximately 91,000 sq. ft. The demonstration focused on the sanitary sewer and the closest section of the building (i.e., northwest corner).
Office and Shop Buildings, NASCC Area 3, Corpus Christi, TX (Task 2)	L-shaped, 31,000 sq. ft. building housing administrative offices and a maintenance shop and a second, 9,000 sq. ft. workshop building. The demonstration included the sanitary sewer manhole servicing both buildings, the section of the office/shop building closest to the manhole, and the workshop building further away from the manhole.
Office Building, NASCC Area 4, Corpus Christi, TX (Task 2)	Office/warehouse building with a footprint of approximately 74,000 sq. ft. The demonstration included one of the manholes servicing the building and the northern section of the building closest to the manhole.
Office Building, Burlingame, CA (Task 2)	1-story, slab-on-grade, 15,000 sq. ft. building divided into separate tenant spaces. Two suites and the associated sanitary sewer were included in the demonstration. Unit #1, approximately 1,800 sq. ft. on the west end of the structure, was used as an office and equipment testing/laboratory space. Unit #2, located near the center of the structure, had an approximate area of 1,300 sq. ft. It was used primarily for storage and was not occupied on a regular basis.
Warehouse Building, Houston, TX (Task 2)	1-story, slab-on-grade, 34,000 sq. ft. building divided into separate tenant spaces. The unit used for testing was approximately 5,400 sq. ft. This unit and the associated sanitary sewer were used for the demonstration.

4.2 SITE GEOLOGY/HYDROGEOLOGY

Site geology and hydrogeology is summarized in Table 4-1.

4.3 CONTAMINANT DISTRIBUTION

The presence of VOCs in shallow groundwater was a prerequisite for selection of the groundwater demonstration sites. Key VOCs are summarized in Table 4-1, and additional information is provided in Appendix B, Table B-1.

The presence of contamination was not a prerequisite for the building demonstration sites.

5.0 TEST DESIGN

The goals of this ESTCP project included development of an improved conceptual model for sewer and utility tunnel VI and development and validation of a protocol for assessment of these pathways at VI sites. To this end, three tasks were completed: Task 1 field demonstration to evaluate the preliminary protocol; Task 2 field demonstration to validate refinements of the protocol; and Task 3 literature searches to supplement field investigation efforts.

5.1 CONCEPTUAL EXPERIMENTAL DESIGN

In order to develop a preliminary conceptual model and investigation protocol for the identification and investigation of sewer/utility tunnel VI, we reviewed the available documentation for sites where sewers or utility tunnels have been found to act as preferential pathways for VOC vapors. These examples are summarized in the Task 1 Demonstration Plan (Table 3-1 of Appendix C of McHugh et al., 2016). These examples indicated that sewers and utility lines are of greatest concern as preferential pathways when either i) they directly intersect a groundwater plume or NAPL in the vadose zone or ii) contaminated water is discharged into a sewer. Based on these examples, we developed a preliminary step-wise protocol that included:

- Initial screening: Do sewer lines or utility tunnels intersect contaminated groundwater or NAPL or receive discharge of contaminated water?
- Field testing: Are VOC in vapor samples detectable in the sewer or utility tunnel at concentrations above conservative screening levels?
- Building testing: Are VOC vapors migrating into building?

Fieldwork in Task 1 was aimed at the initial screening and field testing steps of the preliminary protocol. The results from Task 1, however, showed that VOC vapors were more prevalent in sewer lines than expected, including sewer lines that did not intersect groundwater.

Based on the results obtained from Task 1, the Task 2 field demonstration focused on validation of two key components of the protocol: i) refinements of the initial screening criteria through use of VOC concentration in groundwater and the vertical separation distance between groundwater (or NAPL source area) and the sewer/utility line; and ii) the sewer to building attenuation factor. For Task 3, additional published and unpublished studies of sewer and utility tunnel VI were collected in order to supplement field investigation efforts.

As described in Section 6.3 and 6.4 of this report, the results from Task 1, 2, and 3 were utilized to refine and validate the preliminary conceptual model and investigation protocol. The final versions of the conceptual model and investigation protocol are provided as Appendix F and Appendix G of this report.

5.2 BASELINE CHARACTERIZATION

The groundwater demonstration sites had known VOC plumes in shallow groundwater, as discussed in Section 4.1. No additional baseline characterization was required prior to conducting the demonstration.

The building demonstration sites only required connections to sanitary sewers or utility tunnels. Aside from confirming building infrastructure prior to the demonstration, no other baseline characterization was needed.

5.3 TREATABILITY OR LABORATORY STUDY RESULTS

No treatability or laboratory studies were needed prior to the demonstration.

5.4 DESIGN AND LAYOUT OF TECHNOLOGY COMPONENTS

The purpose of this technology demonstration was to validate the sewer/utility tunnel investigation protocol. Task 1 focused on validation of the field investigation portion of the protocol through collection of sewer vapor and sewer liquid samples, as well as completion of tracer studies (McHugh et al. 2017a). The Task 2 demonstration focused on validation of the groundwater to sewer/utility tunnel attenuation factor and the sewer to building attenuation factor. The associated technology components were i) collection of the samples from sewer manholes at sites with VOC plumes in groundwater, ii) application of PFTs to measure sewer to building attenuation, and iii) evaluation of the sample results to determine attenuation factors. The following types of samples were collected during Task 2:

- Sewer Vapor Samples. Summa canisters were used to collect all the vapor phase samples except for the samples in Austin. The Summa canisters were shipped to TestAmerica Laboratories in West Sacramento, California for analysis using USEPA Method TO-15. In Austin, Tedlar bags were used for sample collection, with subsequent analysis using a HAPSITE portable GC/MS instrument. VOC concentrations in sewer vapor and groundwater were used to validate and refine the attenuation factor of 0.001 (1000× attenuation) used in the protocol.
- Tracer Gas Samples. For sewer to building attenuation, tracer compounds were released in the sewers/utility tunnels connected to the buildings of interest. Different tracer compounds were released inside the buildings. Samplers placed in the sewers and buildings were shipped to Brookhaven National Laboratory in Upton, New York for analysis. The measured concentrations of tracer in the sewers and the associated buildings were used to validate and refine the attenuation factor of 0.1 (10× attenuation) used in the preliminary protocol.

5.5 FIELD TESTING

5.5.1 Task 1

The Task 1 field testing program focused on intensive sampling at the demonstration sites over a 3 to 5-day period at each site, as described in the Task 1 Interim Report (McHugh et al. 2017a). The field program included i) collection of sewer/utility tunnel and building samples specified in the protocol, ii) collection of additional validation samples to characterize spatial variability and short-term temporal variability (time scale of hours) within the sewer/utility tunnel, and iii) tracer gas testing to evaluate the sewer to building attenuation. This work, along with sampling at Task 1 supplemental sites, took place between May and November 2016.

5.5.2 Task 2

The Task 2 field programs took place between March 2017 and April 2018.

5.5.2.1 Groundwater to Sewer Demonstration Sites

Existing data from site groundwater monitoring reports were the primary source of VOC concentrations in groundwater. Field sampling at the groundwater demonstration sites focused on vapor samples collected from sewer manholes. At each of the sites, 1-2 manholes were sampled. The priority for manhole selection was to choose the manhole closest to the plume source area (but downstream relative to liquid flow in the sewer). In addition, for each sampling event, 2 “background” sewer vapor samples and a field duplicate were collected.

In accordance with the Task 2 Demonstration Plan, one round of sampling was done in Austin, San Diego County, and Orange County, while multiple rounds of samples were collected in Houston to evaluate temporal (seasonal) variability.

5.5.2.2 Sewer to Building Demonstration Sites

The Task 2 field sampling focused on tracer studies to evaluate airflow between sewers and buildings. At each of the building demonstration sites, PFTs were used to measure the sewer to building attenuation factor using the methods described in Section 5.6.1.

5.6 SAMPLING METHODS

The Task 2 field program focused on collection of sewer vapor and tracer gas samples. The Task 1 field program included these types of samples along with several others: sewer liquid, indoor and outdoor air, soil gas, and groundwater. Sampling methods for both Task 1 and Task 2 are described below. When appropriate, the demonstration data set was supplemented with sample results obtained by other parties such as the local site contractor or other researchers studying the site.

5.6.1 Sample Collection Procedures

Samples were collected as follows:

5.6.1.1 Sewer Vapor Samples – Sewer Main

The typical sampling process included several steps. To minimize disturbance of the sewer vapors, sampling was conducted without removing the manhole cover (if an opening was available) or by partially removing the cover to allow access while minimizing the opening created. The depth to water was measured using a water level meter or weighted measuring tape. Eighth-inch outer diameter nylon tubing was measured and cut to a length that allowed sample collection one foot above the bottom or liquid level, whichever was shallower (see Figure 5-1). A weight was attached to the down-hole end of the tubing so that it would hang vertically for more accurate depth placement. A gas-tight three-way valve was attached to the end of the tubing at the surface to allow for line purging and sample collection.

To collect the vapor samples, the tubing was lowered to the target depth and purged of at least three line volumes. It was then attached to the sample container (e.g., Summa canister) and the assembly was tested for leaks. After verifying the assembly was leak-free, the sample was collected as a grab sample (i.e., no flow controller).

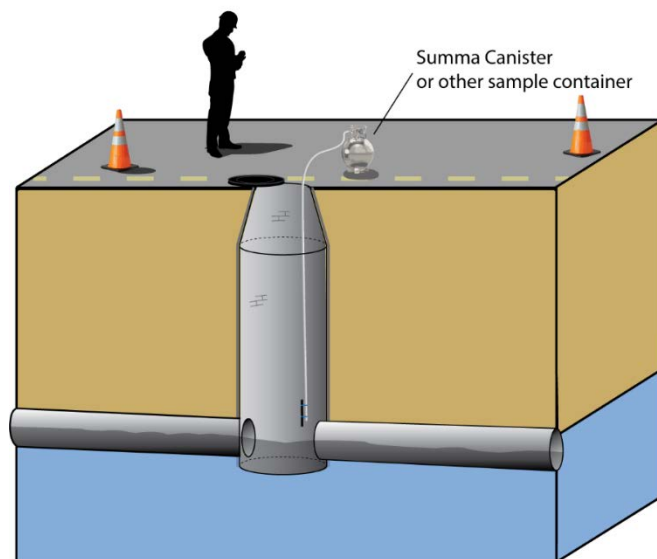


Figure 5-1. Vapor Sample Collection from Sewer

In some cases, access limitations prevented collection of samples near the bottom of the manhole. In those cases, samples were collected at shallower depths (i.e., 1-2 feet bgs) by inserting sample tubing through holes in the manhole covers, purging the line, checking for leaks, and collecting the sample as described above. Samples collected in this manner are flagged as such in the data summary tables and were not used in attenuation factor calculations.

5.6.1.2 Sewer Vapor Samples – Sewer Laterals

Sewer laterals were principally sampled during Task 1. Selection of sampling points was building-specific. At the ASU Research House, there were two types of sewer laterals: land drain and sanitary. The sampling port previously installed in the land drain lateral for SERDP ER-1686 was utilized for this project. A temporary sampling port was installed in the sanitary sewer line by drilling a hole in the line and fitting it with gas-tight tubing and connections. Similarly, a temporary sampling port was installed in the sanitary sewer line in the basement of the USEPA Duplex. At Building 107 at Moffett Field, historical data suggested that the telephone utility (pipe) served as a preferential pathway. Therefore, the pipe in the telephone closet was used to test the connection between the underground utility system and the building. To collect lateral samples in each of these three buildings, tubing and a 3-way valve was used to connect the sampling point to a sample container. Samples lines were purged and leak checked prior to sample collection.

5.6.1.3 Sewer Liquid Samples – Sewer Main

Sewer liquid samples were collected in 40 mL VOA vials using a peristaltic pump.

5.6.1.4 Indoor and Outdoor Air

The Task 1 demonstrations at the ASU Research House, the USEPA Research Duplex, and Moffett Field each included at least one building. Building testing included collection of indoor and outdoor air samples for on-site and off-site VOC analysis. Samples for on-site analysis were either collected and analyzed directly using the HAPSITE or were collected into Tedlar bags using a gas-tight syringe and 3-way valve, for later analysis using the HAPSITE. Samples for off-site laboratory analysis were collected either in 1-Liter, batch-certified Summa canisters or 1-Liter

Tedlar bags. Samples collected into Tedlar bags were shipped overnight to the analytical laboratory which transferred the samples into Summa canisters to avoid exceeding holding times. All indoor and outdoor air samples were collected as grab samples (i.e., without the use of flow controllers).

5.6.1.5 Soil Gas

At the USEPA Research Duplex, soil gas samples were collected from existing, permanent sub-slab and soil gas sampling points. The samples were collected by connecting the sampling point to a Summa canister or Tedlar bag using eighth-inch nylon tubing with a 3-way valve and gas-tight syringe. The sampling train was checked to verify it was leak free, the line was purged of at least 3 line volumes, and the sample was collected by opening the valve to the Summa canister or withdrawing the soil gas using the syringe.

5.6.1.6 Groundwater

At the USEPA Research Duplex and Moffett Field, groundwater samples were collected from existing monitoring wells using a peristaltic pump and low flow methods. For other demonstration sites, groundwater data were obtained from site reports (e.g., site investigation reports from regulatory agency files) or other researchers.

5.6.1.7 Tracer Gas Samples

To evaluate attenuation from sewers/utility tunnels into buildings, arrays of tracer gas emitters and samplers were deployed. Perfluorocarbon tracers (PFTs) and methods developed by Brookhaven National Laboratory were used for the sampling and analysis. PFTs are totally fluorinated cyclic carbon compounds. The tracer compounds are released using passive, constant-rate emitters, and are sampled using capillary adsorption tube samplers (CATS) that are deployed in duplicate (i.e., two sorbent tubes at each sample location). For each of the demonstration sites, the CATS were deployed for a minimum of 3.5 days.

For each test building, emitters and samplers were set up in a minimum of two zones: sanitary sewer manhole and inside a nearby building. The tracer compound was released into the main sewer line at a manhole near the test building, typically by attaching the emitter to a weighted string and suspending it inside the manhole. CATS were installed in the same manhole using similar methods. In the buildings, different tracer compounds were deployed by setting out emitters in different rooms (e.g., kitchen counter, bathroom shelf), with CATS placed across the room. Additional emitters and CATS were deployed depending on building construction features (see Figure 5-2).

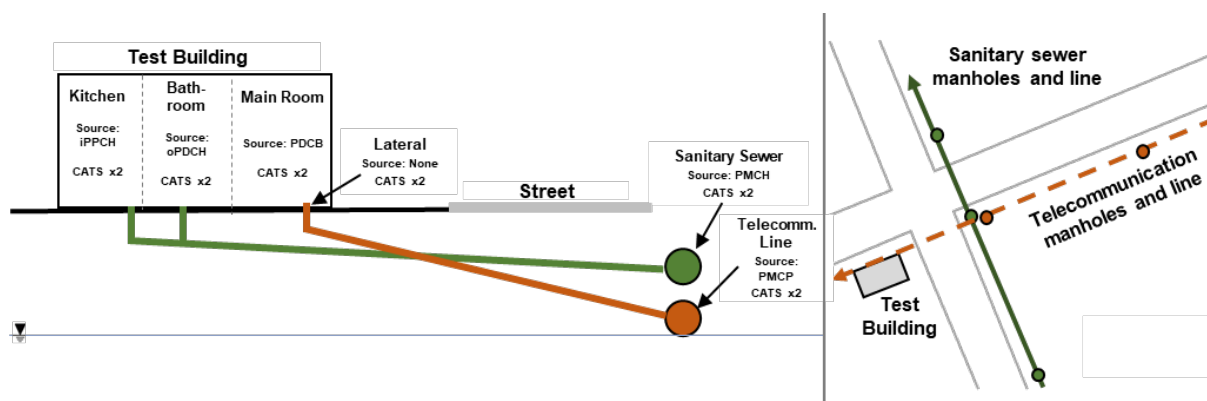


Figure 5-2. Example Tracer Configuration: Testing Two Underground Utility Lines

5.6.2 Analytical Methods

Analytical methods used for the Task 1 and 2 demonstrations are summarized in Table 5-1.

Table 5-1. Analytical Methods

Matrix	Analyte	Method	Container	Preservative	Holding Time
Vapor (On-site analysis)	VOCs	Custom Method (Beckley et al. 2014)	n/a or 1-L Tedlar Bag ¹	None	3 days
Vapor (Off-site Laboratory Analysis)	VOCs	USEPA TO-15	1-L Summa Canister or 1-L Tedlar Bag ²	None	30 days 3 days
Vapor (Tracer)	PFT	BNL GC-ECD Method ³	Sorbent Tubes	None	30 days
Liquid (Task 1 only)	VOCs	USEPA 8260	40 mL VOA vials	Ice	14 days

Notes: 1) Samples were collected directly using the HAPSITE's hand-held probe or were collected into a Tedlar bag for analysis within 1 day of collection. 2) Samples collected in Tedlar bags were shipped overnight to the laboratory. Upon receipt, the laboratory transferred the samples into 1-L Summa canisters to avoid exceeding holding time requirements. 3) Brookhaven National Laboratory GC-Electron Capture Detector (ECD) Method certified through the New York State Department of Health Environmental Laboratory Approval Program.

5.6.3 Quality Assurance Procedures

The integrity of the data generated by this demonstration was maintained by adherence to the following:

- Preliminary Protocol for Validation (Appendix C of Task 1 Demonstration Plan);
- Task 2 Demonstration Plan (Appendix E of Interim Report);
- QAPP for On-Site Measurements (Appendix D of Task 1 Demonstration Plan); and
- QAPP for Off-Site Analysis (Appendix E of Task 1 Demonstration Plan).

The QAPPs identified requirements for QA/QC sampling, detection limits, methods, and field and laboratory performance. In addition, the following measures were taken:

- Decontamination Procedures. All sampling equipment was either i) single-use disposable material or ii) flushed/purged before samples are collected.
- Sample Containers. Samples for off-site analysis were collected in batch-certified Summa canisters provided by the laboratory.
- Sample Documentation. Field documentation was facilitated by pre-printed tables, labels, and log forms that simplified and improved accuracy of note-taking during sampling events. Photographs were taken for visual documentation of project activities. All samples submitted for laboratory analysis were submitted under chain-of-custody control.

The Task 1 data quality review is provided in the Interim Report, while the Task 2 data quality review is provided in Appendix D1 of this report. Additional discussion of data quality is provided in the Performance Assessment (Section 6.2.1 and 6.2.2 below).

5.7 SAMPLING RESULTS

A large set of samples was collected during the Task 1 and Task 2 field programs including samples collected for VOC analysis and samples collected for PFTs. The VOC results make up the principal dataset for characterizing the sites and evaluating the attenuation of chemicals from groundwater to sewers. The PFT results were used to evaluate the migration of VOCs from sewers to buildings.

5.7.1 VOC Results

5.7.1.1 Overview of Samples Collected

Table 5-2 summarizes the samples analyzed for VOC concentrations. The groundwater portion of the dataset was augmented with pre-existing results from groundwater investigation and monitoring reports obtained from regulatory agencies or from other researchers. Results for individual demonstration sites are provided in Appendix B.

Table 5-2. Number of VOC Samples Collected at Each Demonstration Site

Demonstration Site	Groundwater	Sewer Liquid	Soil Gas	Sewer Vapor	Indoor/ Outdoor Air
Layton, UT (Task 1)	0 (+2)	3	0	74	26
Indianapolis, IN (Task 1)	2 (+4)	3	10	36	3
Mountain View, CA (Task 1)	1 (+1)	2	0	104	17
Houston, TX (Task 1, 2)	0 (+24)	0	0	62	0
Austin, TX (Task 1, 2)	0 (+8)	0	0	8	0
Corpus Christi, TX (Task 1)	0 (+2)	0	0	4	2
San Diego County, CA (Task 2)	0 (+14)	0	0	11	0
Orange County, CA (Task 2)	0 (+17)	0	0	12	0

Notes: 1) Samples were collected by GSI as part of ER-201505, except for groundwater samples in parentheses which were compiled from pre-existing site reports. 2) Only primary (normal) samples were included in the totals (i.e., totals do not include QA samples such as field duplicates). 3) Soil Gas includes sub-slab and deeper soil gas samples. 4) Sewer Vapor includes samples from manholes, laterals, and utility tunnels. Some locations were sampled more than once. 5) Table does not include supplemental sewer liquid and vapor samples from ER-201501 (see Section 5.8) or supplemental site data (Section 5.9).

The groundwater data were used to characterize subsurface contaminant plumes (i.e., subsurface VOC sources) and evaluate attenuation between groundwater and vapor in the sewer systems. The following criteria were used to select monitoring wells both for sampling and data mining: i) wells screened in the uppermost aquifer; ii) well closest to the manhole(s) sampled for this project; and iii) well at the core of the contaminant plume, if different from the closest well. For the sites with groundwater results obtained from investigation/monitoring reports, the groundwater monitoring event(s) closest in time to the sewer vapor sampling were selected. Use of non-coincident groundwater data is appropriate because of the way that the resulting attenuation factors have been utilized. The attenuation factors are used to calculate screening levels for sewer/utility tunnel vapor intrusion for VOCs in groundwater. When applied, the screening levels will be used to determine whether VOC concentrations measured in groundwater in the recent past suggest a current preferential pathway concern. In other words, the use of recent (rather than concurrent) groundwater data to calculate attenuation factors is consistent with the use of recent groundwater data for pathway screening.

As discussed in Section 5.5, Task 1 involved intensive sampling at each of the first 3 demonstration sites while Supplemental Task 1 and Task 2 involved focused sampling at a larger number of locations. For Supplemental Task 1 and Task 2, the manholes selected for sampling were those closest to or downstream of the plume source area. Table B-1 in Appendix B summarizes each demonstration site and groundwater plume studied. Detailed results for each site are provided in Appendix B, Tables B.2 through B.10.

5.7.1.2 Manhole Vapor Background

A total of 8 background manholes were sampled during the Task 1 demonstration; 3 were sampled several times, for a total of 17 samples. The background locations were at least 200 feet upstream of the footprint of the plumes, a distance sufficient to ensure that the sample results were not impacted by the localized entry of VOC-containing groundwater associated with the plume. For Task 2, 2 background manholes were tested during each sampling event. Each event consisted of sampling vapor in manholes within the footprints of up to 10 separate plumes in each city or county. The background locations were selected to reflect residential and commercial areas that were not near the Task 2 plumes and were on separate sewer lines from the lines tested at the Task 2 sites. A total of 9 separate background manholes were sampled during Task 2; one was sampled several times, for a total of 11 samples.

The TO-15 analysis included 50 different compounds while the number of COCs actually detected in groundwater at each site was a more focused list of chemicals. Therefore, to augment the background dataset, we included results from non-COC analytes from the site samples (i.e., manhole samples over plume footprints). COCs were identified as i) any analyte detected in site groundwater samples in the project database, and ii) PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride at the sites with chlorinated VOC contamination in groundwater. The full background dataset, summarized in Table B-11 of Appendix B, includes results from a total of 16 to 249 samples per analyte.

5.7.1.3 Manhole Vapor Depth Profiles

The vapor sampling procedure involved sampling near the bottom of the sewers (Section 5.6.1). To confirm that this sampling depth was appropriately conservative, vapor samples were collected at different depths in one land drain manhole at the Layton, Utah demonstration site and two

sanitary sewer manholes at the Moffett Field, California demonstration site. Each vertical profile consisted of 3 to 4 different sampling depths within each manhole.

5.7.1.4 Temporal Variability in Manhole Vapor Concentrations

Short-term temporal variability was evaluated at 5 sewer laterals and 49 manholes at the Layton, Moffett Field, and Indianapolis Demonstration Sites. This was done by sampling the same lateral or manhole multiple times over the course of 1-3 days. Long-term variability was evaluated by sampling 16 sanitary manholes in Houston over a months to year timeframe. Results for individual manholes are summarized in Appendix B, Table B-12.

5.7.1.5 Sewer Liquid

A total of 8 sewer liquid samples were collected during Task 1, and results are shown in Appendix B, Tables B.3.2 (Layton), B.4.2 (Indianapolis), and B.5.2 (Moffett Field).

5.7.2 Tracer Study Results

5.7.2.1 Overview of Samples Collected

Tracer studies were conducted in a total of 8 residential and small commercial/industrial buildings and 7 commercial buildings (see Table 5-3). The majority of connections tested were sanitary sewers. Appendix C provides detailed results from the individual demonstration sites.

Table 5-3. Number of Samples in PFT Dataset

Site Name	No. Buildings Tested	No. Sewer Connections Tested	No. PFT Sources Used	No. Tracer Sample Locations
Residential and Small Commercial/Industrial Buildings				
ASU VI Research House, Layton, UT (Task 1)	1	2	6	8
USEPA VI Research Duplex, Indianapolis, IN (Task 1)	1	2	6	8
Moffett Building 107, Mountain View, CA (Task 1)	1	2	4	5
Duplexes, Houston, TX (Task 2)	2	2	6	10
Single-family Homes, San Rafael, CA (Task 2)	2	4	6	7
Apartment Building, NASCC Area 1, Corpus Christi, TX (Task 2)	1	1	2	2
Large Commercial/Industrial Buildings				
Office Building with Laboratory, San Diego, CA (Task 2)	1	2	6	11
Hospital, NASCC Area 2, Corpus Christi, TX (Task 2)	1	1	3	3
Office and Shop Buildings, NASCC Area 3, Corpus Christi, TX (Task 2)	2	2	5	5
Office Building, NASCC Area 4, Corpus Christi, TX (Task 2)	1	1	2	2
Office Building, Burlingame, CA (Task 2)	1	1	3	7
Warehouse Building, Houston, TX (Task 2)	1	1	3	4

5.7.2.2 Communication from Sewers to Buildings

The communication between sewers and buildings was evaluated by comparing the concentration of the tracer source in each manhole to the concentration of that tracer measured inside the building. In most cases, indoor samplers were placed in multiple rooms (e.g., bathroom and work area). The range of attenuation was calculated by dividing concentration in the sewer by the minimum and maximum concentrations found inside each building. A total of 13 connections were tested for residential and small (<3,000 sq. ft.) commercial buildings and 8 connections were tested at large commercial structures (see Appendix C, Table C-13). Sewer laterals were only accessible in 5 of the buildings tested (see Appendix C, Table C-14).

5.8 SUPPLEMENTAL DATA FROM ER-201501

The ASU VI Research House was the first demonstration site sampled during Task 1. This dataset was augmented with data collected for ESTCP Project ER-201501. The ER-201501 dataset includes 575 sewer liquid and 1400 sewer vapor results for TCE from the 2016 – 2017 timeframe. These results were combined with the results from this project to evaluate temporal variability in TCE concentrations (Section 6.3.2) and relationships between sewer liquid and sewer vapor (Section 6.4.3).

5.9 IDENTIFICATION OF SUPPLEMENTAL SEWER/UTILITY TUNNEL VI SITES

For Task 3, we conducted a search for additional published and unpublished studies of sewer/utility tunnel VI sites. The primary purpose was to provide additional examples and investigation results for support of an improved conceptual model of sewer/utility tunnel vapor intrusion. The search methods included i) a literature search using Google Scholar; ii) solicitation of sewer/utility tunnel VI sites from peers during technical conferences and other interactions, and iii) compilation of investigation results from other GSI projects. This search resulted in the identification of 17 additional sewer/utility tunnel vapor intrusion sites with quantitative or qualitative investigation results applicable to the development of an improved conceptual model (see Appendix E, Table E-1). As summarized in Table 5-4, these supplemental sites have been utilized in the validation of several aspects of the sewer/utility tunnel VI conceptual model (see Section 6.3 for discussion of conceptual model validation).

Table 5-4. Use of Supplemental Sites for Conceptual Model Validation

Conceptual Model Element	Supplemental Sites Used in Validation
Characteristics of “higher risk” sewer/utility tunnel VI sites	1, 2, 5, 6, 8, 9, 10, 14, 17
VOC attenuation within sewers	6, 16, 17
Temporal variability within sewers	9, 12
Mechanisms of VOC entry into buildings	2, 3, 4, 6, 7, 11, 13, 15
Sewer to building attenuation factors	2, 6
Mitigation of sewer / utility tunnel VI	4, 5, 6, 7, 10, 11, 12, 14
Investigation protocol: liquid vs. vapor samples	6, 17
Investigation protocol: vapor sample collection depth	9

Note: See Appendix E, Table E-1 for identification of supplemental sites.

5.10 EVALUATION OF BACKFILL AS A VAPOR MIGRATION PATHWAY

Although this project focused on gaining an improved understanding of “pipe” VI, a literature review was conducted to evaluate backfill as a potential vapor migration pathway. The concept of utility backfill as a pathway for contaminant vapor migration appears most frequently in regulatory guidance documents. As of early 2018, VI guidance documents from 19 States mentioned sampling soil gas in utility backfill as a way to determine whether preferential pathways are important at a given site. In most cases, specific rationale was not provided. In cases where the conceptual model was discussed, the following scenarios or mechanisms were cited:

- NAPL release and migration into backfill, with associated vapor migration (particularly in the context of leaking underground storage tank sites).
- Backfill acting as a preferential pathway because fill material is more permeable than surrounding native soils.

It is not clear, however, that soil gas samples from backfill material are reliable indicators of preferential pathways (Hamilton and McFall 2017). COC concentrations can be relatively high in soil gas collected in backfill (e.g., near source areas). However, it is unlikely that appreciable lateral migration would occur unless the backfill was isolated within an impermeable matrix and a pressure gradient or strong driving force was present within the backfill. Further, at diffusion-dominated sites, transport will not occur preferentially through higher permeability backfill.

Examples of possible vapor migration through fill appear to be associated with pressure-driven methane migration from municipal landfills (USEPA 1991), rather than situations encountered in typical VI site investigations. No published examples of VOC migration through backfill were found in peer-reviewed literature, suggesting that vapor transport through backfill material is not an important pathway. In contrast, numerous examples of sewer/utility tunnel VI have been published (see Table 5-4 and Appendix E, Table E-1). Anecdotally, some practitioners mention VOC transport through backfill; however, these instances appear to involve local migration (e.g., contamination near building slabs). This further suggests that appreciable lateral vapor migration through backfill is not a concern, particularly in the absence of strong pressure gradients.

6.0 PERFORMANCE ASSESSMENT

6.1 OVERVIEW OF TASK 1 PERFORMANCE

A detailed performance assessment of Task 1 was provided in the Interim Report and is summarized in Table 3-1 above. The success criteria included validation of aspects of the preliminary protocol for investigating sewer/utility tunnel VI. Key findings at the conclusion of Task 1 included:

- Validation of the initial testing portion of the protocol. Transport of VOCs through sewers or utility tunnels was known to be important at the 3 Task 1 demonstration sites. 97% of the protocol's initial testing datasets successfully identified the presence of VOCs in sewer lines/utility tunnels at concentrations requiring further testing.
- Incomplete validation of the delineation portion of the protocol. Validation of the delineation portion of the protocol involved demonstration that the proposed limited testing program in the protocol accurately defined the area of sewers/utility tunnels where VOC concentrations exceed conservative screening concentrations. At the 3 Task 1 demonstration sites, VOCs were more widespread within the sewer lines than anticipated. As a result, we were not able to identify enough delineation boundaries to validate this portion of the protocol. Although the delineation step of the protocol was not fully validated, the protocol's recommendation for delineation (i.e., vapor delineation determined by 2 consecutive manholes with VOC vapor concentrations below sewer screening levels) is consistent with observed attenuation within sewers (see Section 6.3.4).
- Validation of the building attenuation portion of the protocol. Sewer to building attenuation was measured at six sewer/utility tunnel to building connections. All of the attenuation factors were less than 0.1 (i.e., $>10\times$ attenuation).

6.2 EVALUATION OF TASK 2 PERFORMANCE

Task 2 performance objectives are summarized in Table 3-2 and include both quantitative and qualitative metrics. An evaluation of these metrics is provided in Section 6.2.1 through 6.2.6, below.

6.2.1 Objective 1: Collection of a Complete Dataset

A complete dataset that supported validation of the protocol was obtained by ensuring, to the degree feasible, that all planned samples were collected and analyzed. The planned Task 2 dataset of analytical results included i) the set of samples collected to evaluate the groundwater to sewer attenuation factor, and ii) the set of samples collected to evaluate the sewer to indoor air attenuation factor. For the former, the Task 2 demonstration plan called for measuring VOC concentrations in manholes at 32 different locations (i.e., separate plumes) at 4 different demonstration sites. Nine locations at the Houston demonstration site were to be sampled a minimum of 3 times to evaluate temporal variability. For the latter, the Task 2 demonstration plan called for PFT (tracer) testing at 8 sites.

6.2.1.1 Data Requirements

To evaluate this performance objective, we compared the minimum number of samples required by the Task 2 demonstration plan to the actual number collected. The dataset for the first

component of the objective, evaluation of the groundwater to sewer attenuation factor, is summarized in Table 6-1.

Table 6-1. Task 2 Requirements for Evaluation of Groundwater to Sewer Vapor Attenuation

Task 2 Groundwater Dem. Sites	No. Locations (Plumes)		No. Manholes ¹		No. Samples ²		No. QA Samples ³	
	Min.	Actual	Min.	Actual	Min.	Actual	Min.	Actual
Houston, Texas	9	10	11	19	27	48	3	3
Austin, Texas	3	2	5	5	5	5	1	3
San Diego Co., California	10	9	12	11	12	11	1	1
Orange Co., California	10	9	12	12	12	12	1	2
Totals:	32	30 (94%)	40	47 (118%)	56	76 (136%)	6	9 (150%)

Notes: 1) The minimum number of manholes includes 2 background manholes per demonstration site. 2) Task 2 samples were collected between 1 March 2017 and 1 April 2018. One normal sample per manhole was required for Austin, San Diego, and Orange Counties. Three rounds of sampling, with one manhole sample per round, was required for Houston. 3) QA samples were required for each sampling event (i.e., 1 field duplicate per event). 4) Detailed results for each site are provided in Appendix B.

The dataset for the second component of the performance objective, evaluation of sewer to indoor air attenuation, is summarized in Table 6-2.

Table 6-2. Task 2 Requirements for Evaluation of Sewer to Indoor Air Attenuation

Site Type	No. Sites / Buildings		No. Connections	
	Minimum	Actual	Minimum	Actual
Residential (and Small Commercial/Industrial)	2 / 2	3 / 5	2	7
Large Commercial/Industrial	6 / 6	6 / 7	6	8

Note: 1) Task 2 Demonstration Plan required 2 residential and 6 commercial/industrial sites. Based on sizes of the buildings tested, small commercial/industrial (<3,000 sq. ft.) buildings were grouped with residences for this report. 2) Each connection includes at least 1 tracer source or sample in a manhole or sewer lateral and 1 tracer source or sample indoors. 3) Detailed results are provided in Appendix C.

6.2.1.2 Success Criteria

The success criteria for this objective was to obtain analytical results for more than 95% of planned samples.

6.2.1.3 Results

For the dataset to evaluate groundwater to sewer vapor attenuation, the overall success criteria were met based on exceeding the minimum number of samples and QA samples needed (see Table 6-1 above). Although the number of samples exceeded the success criteria, fewer locations were tested than planned (30 vs. 32; 94%). Specifically, 18 locations were sampled in San Diego and Orange Counties, out of the 20 original locations planned for California. Deviation from the plan resulted from access limitations. Also, in Austin, some of the specific locations originally planned for testing were not available because manholes had gotten paved over. Because of the access

problems in California and Austin, the Houston field program was expanded. One plume location was added, for a total of 10 Houston locations tested. Also, in Houston, additional manholes were tested at 5 of the 10 locations to evaluate the lateral distribution of VOCs in the sanitary sewers at those locations. Finally, additional samples were collected during collaboration with ER-201501 researchers.

For the dataset to evaluate sewer to indoor air attenuation, the overall success criteria were also met based on exceeding the minimum requirements for both test sites and total connections tested (see Table 6-2).

6.2.2 Objective 2: Collection of Representative Analytical Results

This performance objective focused on data quality and usability.

6.2.2.1 Data Requirements

To evaluate this performance objective, we reviewed field notes and results from QA samples, including field duplicates and standard laboratory QA samples. The data evaluation is provided in Appendix D1 and laboratory reports are provided in Appendix D2 and D3.

6.2.2.2 Success Criteria

Table 6.3 below summarizes precision, accuracy, and sensitivity objectives for the Task 2 dataset.

6.2.2.3 Results

Data collection procedures and analytical results were evaluated against the qualitative and quantitative data quality objectives specified in the Task 2 Demonstration Plan. Key areas considered in this assessment included i) sampling and sample handling procedures; ii) precision; iii) accuracy; iv) sensitivity; v) completeness; vi) representativeness, and vii) comparability. Based on the data review, the Task 2 samples are usable for evaluation of the investigation protocol for sewer/utility tunnel VI. Key elements of the evaluation are summarized in Table 6-3. Minor data quality exceptions occurred but do not limit the usability of the results because corrective action was taken in the field when problems were noted, or data qualifiers were applied as appropriate.

One area of concern noted during data review was that field duplicate RPD tended to be high. For example, the precision goal for field duplicates ($RPD < 30\%$) was met for 26% percent of field duplicate VOC concentration pairs compared to the goal of 90%. Duplicate samples were collected sequentially in a manner intended to limit differences between samples (e.g., minimized opening of manhole covers prior to sampling). Exceedances in the RPD goal were observed for one or more of the detected VOCs in every field duplicate sample collected. In addition, there was no consistent trend in concentration between the primary and duplicate samples; the higher concentration was observed in the primary sample for 68% of the paired measurements and in the duplicate sample (i.e., the second sample collected) for 32% of the pairs. These results suggest that the sewer vapor matrix is inherently heterogeneous making it difficult to attain the standard QA goal for field duplicates. One effect of this heterogeneity is to increase the range of attenuation factors calculated based on point measurements of VOC concentrations in groundwater and sewer manholes. However, the heterogeneity would not impact the central tendency of the attenuation factors (i.e., the median value). Based on the observation of high variability in sewer manhole samples, time-averaged VOC concentrations (e.g., 8-hour or 24-hour) would be expected to be less variable than concentrations measured using grab samples. However, as discussed in Section 6.3.2 of this report,

the variability in VOC concentration over a time-scale of months was found to be much larger than the short-term variability (i.e., time-scale of 1-3 days). As a result, short-term time integrated samples would be expected to provide little value over grab samples for characterization of longer-term average concentrations.

Table 6-3. Summary of Data Quality Evaluation

Success Criteria <i>For >90% of laboratory analyses:</i>	Results
Precision: • RPD < 30% for field duplicate samples • RPD <25% for laboratory duplicate results	The objective of RPD < 30% was met for 26% of field duplicate VOC pairs, less than the goal of 90%. Objective met for laboratory duplicate results.
Accuracy: • Standard laboratory accuracy	Objective met
Sensitivity: • Target VOC reporting limit less than screening level	Objective met

Notes: 1) Table includes objectives specified in Table 3-2. 2) Additional information is provided in Appendix D.

6.2.3 Objective 3: Validation of the Groundwater to Sewer Attenuation Factor

Under the protocol, the groundwater to sewer attenuation factor is used for sites with VOCs in groundwater which require field testing of potential sewer/utility tunnel VI. The Task 2 field demonstration included validation of the groundwater to sewer/utility attenuation factor of 0.01 (i.e., 100× attenuation) to ensure that it is reasonably conservative for the development of screening criteria for use in the protocol. A second goal was to evaluate how attenuation changes with increasing vertical separation distance between groundwater and the sewer/utility.

6.2.3.1 Data Requirements

At each Task 1 and 2 demonstration site, the results of the sewer vapor and groundwater samples were paired and used to calculate groundwater to sewer manhole attenuation factors. For each round of testing, the vapor results from the manhole closest to the core of the plume and the groundwater results from the source area monitoring well were used to determine the attenuation factors. These “near source” manholes typically corresponded to the ones with the highest vapor concentrations at a given location. Selection of these manholes is appropriate because the protocol uses the highest VOC concentration from the initial testing results to define the next step in the sewer investigation.

6.2.3.2 Success Criteria

As specified in Table 3-2, the success criteria for this metric are: i) observations that paired groundwater/sewer measurements show >100× attenuation more than 90% of the time, and ii) observation of a statistically significant difference between attenuation factors for sewers at or below the water table vs sewers within the vadose zone ($p < 0.001$ by the Mann Whitney U Test).

6.2.3.3 Results

Attenuation factors were calculated by first determining the primary and secondary COCs in groundwater. COCs were established by first selecting results from the groundwater monitoring event closest in time to the manhole vapor sampling event(s). The primary COC was defined as

the chemical with the highest concentration in groundwater. Secondary COCs were defined as those detected with at least 15% of the primary concentration. Attenuation factors were then calculated for each primary and secondary COC by dividing the manhole vapor concentration by the equilibrium groundwater concentration. Separate attenuation factors were determined for each temporally-separated round of sewer testing at a given demonstration site. Only vapor samples collected near the bottom of the manholes were used. Individual paired groundwater-vapor samples and attenuation factors are provided in Appendix B, Table B-13.

The impact of the vertical separation between groundwater and sewers was evaluated by grouping results from individual plumes into two categories: Category A (Direct Interaction [i.e., water table shallower than sewers]); and Category B (Indirect Interaction [i.e., sewer above the water table]). Table 6-4 below summarizes attenuation factors and attenuation (inverse of attenuation factor) for each of the categories.

Table 6-4. Groundwater to Sewer Attenuation Factors

Site Category	No. Plumes	No. AFs	Attenuation Factor ¹			Attenuation ²		
			10th	Median	90th	10th	Median	90th
A: Direct Interaction (Sewer Below Water Table)	6	65	8.4E-05	7.5E-03	6.5E-02	12,000x	130x	15x
B: Indirect Interaction (Sewer Above Water Table)	28	140	2.0E-06	1.4E-04	5.9E-03	490,000x	7,300x	170x

Notes: 1) Attenuation factor calculated as sewer vapor concentration divided by equilibrium groundwater concentration. 2) Attenuation is the inverse of attenuation factor. It represents the concentration fold reduction from groundwater to sewer vapor. 3) Detailed results are provided in Appendix B, Table B-13.

A total of 205 attenuation factors were calculated. About 80% (162 of 205 pairs; Table 6-5) showed greater than 100× attenuation. This was less than the 90% target in the performance objective. 86% of pairs showed greater than 33× attenuation from groundwater into sewers supporting a default attenuation factor of 0.03 for the purpose of initial screening.

Table 6-5. Evaluation of Default Groundwater to Sewer Vapor Attenuation Factor

Site Category	No. AFs	No. AFs < 0.01 (i.e., Attenuation >100x)	Percentage with >100x Attenuation
A: Direct Interaction (Sewer Below Water Table)	65	34	52%
B: Indirect Interaction (Sewer Above Water Table)	140	128	91%

Note: Detailed results are provided in Appendix B, Table B-13.

6.2.3.4 Refinement of the Protocol

The final protocol recommends using conventional vapor intrusion screening criteria for groundwater (in addition to consideration of other site factors) during the initial screening step for determining whether a site-specific evaluation of sewer/utility tunnel VI is required. The USEPA bases conventional vapor intrusion screening criteria on a groundwater to indoor air attenuation factor of 0.001 (1000× attenuation). The demonstration results indicate that 0.03 (33× attenuation)

is a reasonable upper-bound attenuation factor for groundwater to sewer and 0.03 (33× attenuation) is a reasonable upper-bound attenuation factor for sewer to indoor air (See Section 6.2.4). Together, these values support the use of groundwater screening concentrations based on an overall attenuation factor of 0.001. The use of conventional vapor intrusion screening criteria for groundwater during the initial screening step results in a simpler screening process compared to the development of different groundwater screening concentrations for possible sewer/utility tunnel VI.

6.2.4 Objective 4: Validation of Sewer/Utility Tunnel to Building Attenuation Factor

Under the protocol, for sites where VOCs are detected in the sewer/utility tunnel, the building attenuation factor is used to identify areas where buildings require testing, or where preemptive sewer mitigation is needed. In other words, the sewer/utility tunnel screening concentrations recommended in the protocol are equal to the applicable indoor air screening concentrations divided by the sewer to building attenuation factor. When VOCs are detected in the sewer at concentrations above the sewer screening level, then building testing or sewer mitigation would be needed. The goal of building attenuation testing in Task 2 was to determine whether the sewer to building attenuation factor used in the preliminary protocol (i.e., 10× attenuation) is reasonably conservative.

6.2.4.1 Data Requirements

To evaluate the appropriateness of this attenuation factor, results from the Task 2 PFT (tracer) studies were combined with the Task 1 results. The full dataset includes results from a total of 8 residential/small commercial buildings and 7 large commercial buildings. Because some buildings had multiple types of utilities (e.g., sanitary sewer and utility tunnel), attenuation factors were calculated for a total of 21 different connections.

6.2.4.2 Success Criteria

As specified in Table 3-2, the default attenuation is considered reasonably conservative if more than 90% of the measured attenuation values are at least 10× (i.e., at least 10-fold concentration reduction).

6.2.4.3 Results

Attenuation factors were calculated by pairing tracer concentrations inside sewer manholes with concentrations inside buildings. As shown in Appendix C, Table C-13, sewer to building concentrations showed 20 to more than 1000-fold reduction, well above the 10× default in the draft protocol. This was true for both residential and small commercial/industrial buildings and large commercial/industrial buildings. 90% of connections (19 of 21) showed attenuation of greater than 33× (AF <0.03). It is important to note that the majority of testing involved sanitary sewers. Only a limited number of other types of underground utility conduits were available for testing. In addition, one-third of the connections tested were at sites with known sewer/utility tunnel VI concerns. Therefore, the resulting sewer to indoor air attenuation factor dataset is likely biased towards stronger (i.e., leaky) connections.

6.2.4.4 Refinement of the Protocol

The demonstration results indicate that an attenuation factor of 0.03 (33× attenuation) is a reasonable upper-bound attenuation factor for the migration of VOCs from sewer/utility tunnels into buildings. The final protocol recommends use of an attenuation factor of 0.03 for the

evaluation of VOC concentrations in sewers and utility tunnels. As a result, when sub-slab to indoor air screening concentrations are based on an attenuation factor of 0.03 (e.g., USEPA 2015), these screening concentrations can be used for the evaluation of sewer/utility tunnel test results.

6.2.5 Objective 5: Ease of Implementation

To encourage wide-spread adoption of the protocol, it should be implementable by environmental professionals with a typical level of training and experience in VI sampling and investigation.

6.2.5.1 Data Requirements

Field experience obtained during the demonstration program was evaluated.

6.2.5.2 Success Criteria

Qualitative success criteria include simplicity or complexity of the protocol implementation relative to the sampling typically included in a conventional VI investigation (e.g., soil gas sampling).

6.2.5.3 Results

Based on review of field experience obtained during the Task 1 and 2 demonstration program, under most conditions, the protocol should be implementable by environmental professionals with a typical level of training and experience. For instance, the initial screening step of the protocol includes desktop data review to determine whether sewer lines or utility tunnels directly intersect contaminated groundwater or NAPL. This activity involves gathering data on VOC source and plume areas as well as information on utility locations, types, and depths. The data gathering process is not unusual for environmental assessment projects. The most common problems are likely to be limited availability of sewer as-built diagrams. This can be alleviated by conducting visual site inspections to identify sewer locations and measuring manhole depths to determine sewer line depths.

If field sampling is required based on initial screening results, the protocol recommends sampling vapor in manholes. Use of Summa or other sampling containers is common practice among VI practitioners and should not be a barrier to implementation of the protocol.

6.2.6 Objective 6: Cost Effectiveness

To encourage wide-spread adoption of the protocol, its inclusion in a VI field investigation should not be cost prohibitive.

6.2.6.1 Data Requirements

The actual costs of the demonstration program were used to estimate the cost of routine implementation of the protocol at typical VI investigation sites. To evaluate the incremental costs of the pathway investigation, the cost of routine implementation was compared to costs of a typical VI investigation program based on project team experience and published sources.

6.2.6.2 Success Criteria

The objective is considered to be met if the protocol is determined to increase the cost of a typical VI field investigation program by less than 25%.

6.2.6.3 Results

Based on a review of tasks and the associated level of effort, implementation of the screening and initial field testing portions of the protocol should not be cost prohibitive. As detailed in Section 7, costs to implement desktop screening is estimated at \$1,000. Initial field testing, if needed, is estimated at less than \$5,000.

Assuming i) the cost of a typical VI investigation is \$25,000 - \$40,000 for several residential buildings or a commercial building (ITRC 2017), and ii) implementation of the screening and initial field testing is about \$6,000, the cost increase for the VI investigation would be 15 - 24%.

It is important to note that this cost evaluation includes basic implementation of protocol steps that would apply to most sites. If initial field sampling results indicate that sewers/utility tunnels act as potential preferential pathways, then additional, site-specific investigation work would likely be needed. Additional information on the cost model is provided in Section 7.3.

6.3 BASIS FOR THE CONCEPTUAL MODEL

In addition to validation of the investigation protocol, data collected for this ESTCP project were utilized to update and refine the conceptual model for sewer/utility tunnel VI. Key refinements include a better understanding of background VOC concentrations in sewers and utility tunnels, temporal variability in VOC concentrations, relative risk associated with different sewer and water table configurations, lateral migration of VOCs within sewers, and migration of VOCs into buildings. Based on the conceptual model for VOC transport, mitigation options were also considered.

The following sections focus on these various aspects of the conceptual model and utilize relevant sub-sets of data described in Section 5.7 to 5.10 (Results) and Section 6.2 (Performance Assessment).

6.3.1 Background VOC Concentrations in Sanitary Sewers

Key Questions:

- What are typical VOC concentrations in sanitary sewer manholes that are NOT located in close proximity to a groundwater plume for that VOC?
- When I test a manhole close to my groundwater plume, what are the odds that I will find someone else's VOCs?

Methods: Background VOC concentrations in sanitary sewers were characterized through the collection and analysis of sewer vapor samples from sanitary sewer manholes not located close to a known groundwater plume for that VOC. Designated background manholes were identified for each demonstration site. In order to be classified as a background manhole, it had to be at least 200 feet upstream of the plume boundary. In addition to designated background manholes, all other manholes at a given demonstration site were considered to be background manholes for all of the VOCs not detected in the groundwater plume. For example, if the groundwater plume contained benzene, then all of the manholes were considered background locations for the purpose of characterizing background concentrations of all other analyzed VOCs (e.g., PCE, etc.). In addition, PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride were excluded from consideration as background at sites with any chlorinated VOC contamination in groundwater.

Results: The background dataset is summarized in Appendix B, Table B-11. A total of 50 chemicals were included in vapor sample analysis. Table 6-6 below summarizes the 19 chemicals that were detected in at least 50% of background samples.

Table 6-6. Typical Background VOC Concentrations in Sewer Vapor

Analyte	No. Manholes Tested	No. Samples	Det Freq (%)	10th (µg/m ³)	Median (µg/m ³)	90th (µg/m ³)	Maximum (µg/m ³)
Common cVOCs at Remediation Sites							
Tetrachloroethene	20	31	90%	0.35	3.2	68	550
Trichloroethene	19	30	70%	0.56	2.6	16	85
Dichloroethene, cis-1,2-	20	31	55%	0.35	0.67	7.5	20
Common Petroleum VOCs at Remediation Sites							
Benzene	55	98	79%	0.32	1.1	4.3	89
Toluene	56	99	98%	1.5	20	280	3300
Ethylbenzene	56	99	74%	0.27	1.4	8.9	190
Xylene, m,p-	57	100	83%	0.82	3.4	21	57
Xylene, o-	58	101	78%	0.34	1.2	4.4	16
Other VOCs							
Acetone	56	99	100%	15	47	200	4000
Bromodichloromethane	58	101	86%	0.44	16	86	540
Butanone, 2- (MEK)	57	100	86%	1.9	4.3	14	66
Carbon disulfide	58	101	99%	3	20	180	940
Carbon tetrachloride	58	101	60%	0.41	0.73	4.4	6
Chloroform	103	249	82%	1	26	360	4000
Chloromethane	58	101	94%	1.1	2	12	100
Dibromochloromethane	58	101	69%	0.67	5.2	33	99
Dichlorodifluoromethane	58	101	77%	1.2	2.3	9.8	38
Methylene Chloride	58	101	97%	0.74	5.1	35	110
Trichlorofluoromethane	58	101	53%	1.1	1.8	11	8.4

Notes: 1) Dataset includes all analytes from the 8 designated Task 1 and 9 designated Task 2 manholes, as well as non-COC analytes from other manholes sampled. 2) Samples were collected from within 1 foot of the bottom of the manholes. 3) Only normal samples were included in the calculations (i.e., QA samples such as field duplicates were not included). 4) The detection limit was substituted for non-detects. Percentiles were calculated if the detection frequency was greater than 10%. 5) See Appendix B, Table B-11 for the full set of VOCs analyzed.

Finding: VOCs commonly associated with contaminated sites (e.g., PCE, TCE, cis-1,2-DCE, and BTEX) are also commonly detected in sewers not located in close proximity to a known VOC plume. For the VOCs that are most commonly risk drivers at corrective action sites (e.g., benzene, PCE, TCE), the detected concentrations at background sewer locations were typically low (i.e., <20 µg/m³). The relatively high detection frequency (55%) for cis-1,2-DCE (a marker for biodegradation of TCE in the subsurface) suggested that some of the VOC detections in sewers can be attributed to unidentified subsurface sources. However, the higher detection frequency for

TCE (70%) and PCE (90%) suggests that direct discharge of VOCs into sewers is another source of VOC vapors in sewers. This conclusion relies on an assumption that the cis-1,2-DCE originated from biodegradation of TCE in groundwater rather than biodegradation of TCE within the sewer line. Although this was not tested, the assumption is reasonable because i) the residence time for TCE within the sewer (i.e., minutes to hours) is likely too short for significant biodegradation and ii) the biodegradation of TCE to cis-1,2-DCE requires anaerobic conditions which are less likely to occur in sewer lines where the flow of shallow water over a rough surface promotes oxygenation.

6.3.2 Temporal Variability in VOC Concentrations

Key Questions:

- In a sewer manhole with VOCs from a subsurface source, how much do VOC concentrations vary over time?
- What is the timescale for temporal variation in sewer manholes (e.g., hours, days, weeks, months)?

Methods: Short-term and long-term variability in sewers was characterized measuring VOC concentrations in sewer manholes multiple times over different time periods:

Short-term Variability: Five sewer laterals and 49 sewer manholes were sampled multiple times over a 1-3 day period to evaluate short-term variability.

Long-term Variability (this demonstration): Eleven manholes near dry-cleaner sites in Houston, Texas were sampled over about a year to evaluate longer-term variability.

Long-term Variability (ER-201501): The ER-201501 research team provided analytical results for 53 manholes at their research site in Layton, UT for which they conducted quarterly sampling for a period of at least one year. This dataset included results from 35 land drain manholes, 16 sanitary manholes, and two storm sewer manholes.

Results: The variation in VOC concentrations over time was characterized in two ways:

- Concentration Range: $Concentration\ Ratio = \frac{Max\ Concentration}{Min\ Concentration}$
- Coefficient of Variation: $CV_{Ln} = \sqrt{e^{S_{Ln}^2} - 1}$

Where:

CV_{Ln} is the coefficient of variation for a data set with a log-normal distribution

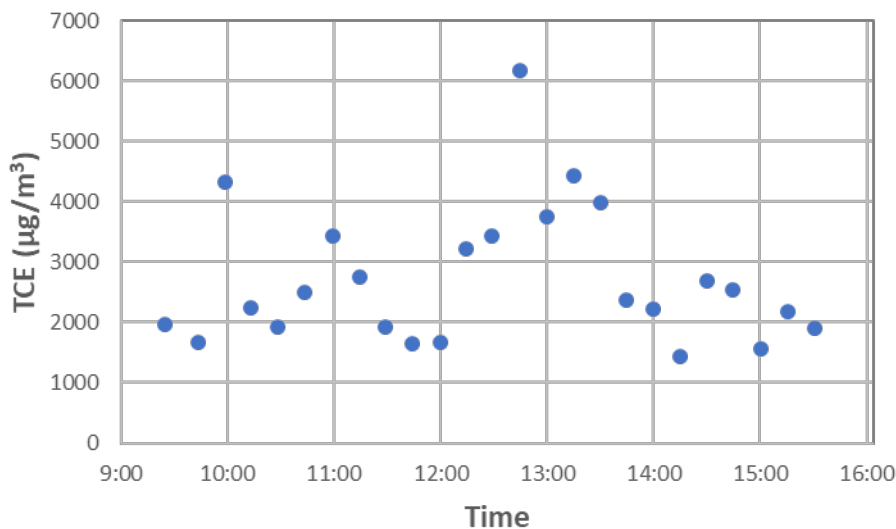
S_{Ln} is the standard deviation of the dataset after natural log transformation

As shown, the coefficient of variation for each monitoring dataset was calculated based on an assumed log-normal distribution. Although each of the individual temporal variability data sets was too small to support a quantitative evaluation of the data distribution, VOC concentrations over time were assumed to be log normally distributed because i) they generally showed a positive skew and ii) environmental monitoring datasets commonly exhibit a positive skew that can be

reasonably approximated as a log-normal distribution (USEPA 1997). For large datasets, the calculation assuming a log-normal distribution yields a value close to the conventional coefficient of variation calculation (i.e., standard deviation/mean). However, for small datasets, the log-normal calculation reduces the influence of individual outlier values on the coefficient of variation for the dataset.

Appendix B, Table B-12 summarizes the concentration ratios found for the short- and long-term timeframes. Short-term variability was measured in sewer laterals and manholes. The laterals exhibited the widest range of ratios, with concentrations varying from 2× to 1,300× over a 1-3 day timespan. Concentration ratios in the sanitary sewer, land drain, and utility tunnel manholes were more stable, with 88% (35 of 40) varying by less than a factor of 10. The 5 manholes with ratios greater than 10 were typically sanitary manholes at major sewer line junctions, although this was not always the case. High variability in the combined storm and sanitary sewer appeared associated with rain events that occurred during the sampling program.

In addition to samples collected by GSI, short-term variability at one manhole at Moffett Field was measured at 15 minute intervals on 24 August 2016. This sampling was done by Entanglement Technologies as part of a field trial of their AROMA instrument, a cavity ring-down spectrometer. The results of this testing are shown in Figure 6-1. The concentration ratio over the course of the day was 4.2.



Data source: Entanglement Technologies, 9/26/2016 calibration

Figure 6-1. Changes in TCE Concentration over a One Day Period at Moffett Field (McCord 1)

Long-term variability over a months to year timeframe was evaluated by i) sampling sanitary manholes near dry cleaner remediation sites in Houston, TX and ii) land drain and sanitary manholes within a large TCE groundwater plume in Layton, UT (data from ER-201501). Concentration ratios for these manholes are also included in Appendix B, Table B-12. While variability was low (less than 10×) for the majority (79%) of manholes sampled over 1-3 days, most of the manholes sampled quarterly over one year or longer had concentrations that varied by

more than a factor of 10 over the course of the study. 88% of the Houston sanitary manholes, 81% of the Layton sanitary manholes, and 54% of the Layton land drain manholes showed >10× variation in VOC concentration over the course of the study. This difference in variability is also reflected in the coefficient of variation for the datasets. The median coefficient of variation for the short-term datasets was 0.59, while the median coefficient of variation for the long-term datasets ranged from 1.3 to 3.7. The results are summarized in Table 6-7.

Table 6-7. Summary of VOC Concentration Changes with Time

No. Locations Tested	Timeframe	Median and Range of Concentration Ratios (Maximum - Minimum)	Median Coefficient of Variation
26 – Sanitary 8 – Land Drain 9 – Combined Storm/Sanitary 6 – Utility Tunnel	1 – 3 days	3.5 (1.1 – 590)	0.59
11 Sanitary Houston, Texas	12 to 18 months	30 (5.2 – 2200)	2.3
16 Sanitary Layton, Utah	12 to 15 months	34 (1.8-750)	3.7
35 Land Drain 2 Storm Sewer Layton, Utah	12 to 15 months	11 (1.3-1300)	1.3

Notes: 1) Coefficient of variation estimated assuming a log-normal distribution. 2) Laterals were not considered in the evaluation. 3) Layton, Utah dataset provided by the ER-201501 project team. 4) Concentration ratios were calculated as the maximum divided by the minimum. 5) Additional information is provided in Appendix B, Table B-12.

Data on temporal variability in sewers was also obtained from two supplemental sites. Roghani et al., 2018 (Supplemental Site 9) observed >100× variation in TCE concentrations in two sanitary sewer manholes near a California superfund site during a three-year study period. Viteri et al., 2018 (Supplemental Site 12) observed >1000× variation in TCE concentration in sewer headspace samples over week- to month- timescale near a remediation site in the San Francisco Bay area, California. These data confirm that large variations in sewer vapor VOC concentrations are common.

As shown in Table 6-7, the evaluation of temporal variability generally showed much higher variation in VOC concentrations over a time scale of months compared to a time scale of days. These results suggest that, for most sites, short-term time integrated samples (e.g., 24-hour Summas or 7-day passive samplers) would provide little benefit compared to grab samples for estimation of the long-term average VOC concentration in a sewer. At the Layton, Utah study site, long-term variability was much higher in sanitary sewers (CV = 3.7) compared to land drain sewers (CV = 1.3). This difference in variability was statistically significant ($p = 0.015$) by the Mann-Whitney U Test. The observation of higher variability in sanitary sewers likely reflects higher variability in liquid flow in sanitary sewers.

The observed short-term and long-term temporal variability were used in a numerical simulation in order to evaluate the accuracy of one or more samples for estimation of the short-term and long-term average VOC concentration. For this purpose, the log-normal simulated monitoring datasets were generated using the random number function in Excel. The datasets were scaled to exhibit the median characteristics observed in the short-term datasets (i.e., CV = 0.59) and long-term datasets (CV = 2.3) from the field demonstration. 5000 simulated datasets were used to evaluate accuracy of one or more measures for estimation of the true mean of the datasets.

The results of these simulations indicated that a single sample provides a reasonable estimate of the short-term VOC concentration. 79% of individual VOC concentration measurements were within a factor of 2 of the short-term average VOC concentration. However, because most of the variation in VOC concentration occurred over longer time periods, multiple measurements (or time-integrated measurements) collected over a time period of days would provide little or no benefit for characterizing the long-term average concentration. Instead, sample events need to be separated by a time period of months (e.g., quarterly monitoring) in order to provide additional information concerning the long-term average VOC concentration in the sewer.

Because the demonstration results showed relatively high long-term temporal variability in VOC concentrations, small quarterly monitoring datasets provide uncertain estimates of the true long-term average VOC concentration. The likely accuracy of small datasets for prediction of the long-term average VOC concentration is summarized in Table 6-8(a – c).

Table 6-8a. Accuracy of Quarterly Sewer Vapor Samples for Estimation of the Long-Term Average Concentration (Based on Magnitude of Variability Observed in Sanitary Sewers at the Houston, Texas Study Sites)

Accuracy Goal:	Probability of Estimated Concentration Being Within Accuracy Goal			
	10X	5X	3X	2X
One Sample	84%	66%	50%	32%
Avg. of Two Samples	96%	82%	65%	43%
Avg. of Three Samples	98%	90%	75%	51%
Avg. of Four Samples	>99%	94%	81%	56%

Note: Analysis based on 5000 simulated quarterly monitoring datasets. Each of the simulated datasets had the same magnitude of quarterly monitoring variability as the median variability observed in the Houston, Texas study sites. For each dataset, the accuracy was evaluated by comparing the average of the selected number of samples to the true average for the dataset. The percentage results reflect the percentage of the 5000 datasets where the average of the samples matched the true average of the dataset within the specified accuracy goal.

Table 6-8b. Accuracy of Quarterly Sewer Vapor Samples for Estimation of the Long-Term Average Concentration (Based on Magnitude of Variability Observed in Sanitary Sewers at the Layton, Utah Study Sites, ER-201501)

Accuracy Goal:	Probability of Estimated Concentration Being Within Accuracy Goal			
	10X	5X	3X	2X
One Sample	69%	55%	38%	23%
Avg. of Two Samples	84%	71%	50%	33%
Avg. of Three Samples	92%	80%	59%	39%
Avg. of Four Samples	96%	85%	65%	45%

Note: Analysis based on 5000 simulated quarterly monitoring datasets. Each of the simulated datasets had the same magnitude of quarterly monitoring variability as the median variability observed in the Layton, Utah Sanitary Sewer study sites. For each dataset, the accuracy was evaluated by comparing the average of the selected number of samples to the true average for the dataset. The percentage results reflect the percentage of the 5000 datasets where the average of the samples matched the true average of the dataset within the specified accuracy goal.

Table 6-8c. Accuracy of Quarterly Sewer Vapor Samples for Estimation of the Long-Term Average Concentration (Based on Magnitude of Variability Observed in Land Drain Sewers at the Layton, Utah Study Sites, ER-201501)

Accuracy Goal:	Probability of Estimated Concentration Being Within Accuracy Goal			
	10X	5X	3X	2X
One Sample	96%	84%	66%	46%
Avg. of Two Samples	>99%	95%	81%	60%
Avg. of Three Samples	>99%	98%	89%	71%
Avg. of Four Samples	>99%	99%	93%	77%

Note: Analysis based on 5000 simulated quarterly monitoring datasets. Each of the simulated datasets had the same magnitude of quarterly monitoring variability as the median variability observed in the Layton, Utah Land Drain study sites. For each dataset, the accuracy was evaluated by comparing the average of the selected number of samples to the true average for the dataset. The percentage results reflect the percentage of the 5000 datasets where the average of the samples matched the true average of the dataset within the specified accuracy goal.

6.3.3 Higher Risk and Lower Risk Sites

Key Question:

- Can we classify sites as “higher risk” vs. “lower risk” for sewer/utility tunnel vapor intrusion?

Methods: In order to identify the types of sites with “higher risk” vs. “lower risk” for sewer/utility tunnel vapor intrusion, we utilized two data sources: i) groundwater to sewer attenuation factors calculated using data obtained from the field demonstration and ii) compilation of risk factors identified in the supplemental literature (i.e., Task 3) sites. The calculation of groundwater to sewer attenuation factors is described in Section 6.2.3. Supplemental sites are described in Section 5.9.

Results: The attenuation factor analysis shows a much higher median groundwater to sewer attenuation for sewers that run through the vadose zone above the groundwater plume (median AF = 0.0075) compared to sewers that directly interact with groundwater plumes (median AF = 0.00014; Table 6-4 above, and Appendix B, Table B-13). However, for both types of sites, the range of attenuation factors was broad resulting in significant overlap in attenuation factors between vadose zone sewers and sewers running directly through groundwater plumes.

In addition to lower median VOC attenuation (i.e., higher VOC concentrations in sewer vapor samples), the review of supplemental literature showed that sewer lines that directly intersect VOC plumes (or which receive a discharge of VOC-containing groundwater) may pose a vapor intrusion risk for buildings located well outside the footprint of the VOC plume. Specifically, when VOC-containing groundwater enters a sewer line, it will flow downstream in the sewer line potentially resulting in high VOC concentrations in sewer vapors within the sewer line in the downstream direction. Examples from the literature are provided in Table 6-9.

Table 6-9. Examples of “Higher Risk” Sewer/Utility Tunnel VI Sites with VOC Vapors in Sewer Downstream of Plumes (i.e., Outside of the Plume Footprint)

Supplemental Site	Observation	Reference
#1. Air Force Base, Utah	In compliance with site permit, cVOC-containing water from pump and treat system was discharged into a municipal sanitary sewer line for treatment at the downstream municipal treatment plant. VOCs were detected in vapor samples collected from a downstream manhole and VI was documented in a residence downstream of the discharge point, well away from the VOC plume.	McHugh et al. (2011)
#2. PCE Plume, Denmark	Groundwater containing cVOCs entered a sanitary sewer line as it passed through the plume. cVOC vapors within the sewer line resulted in VI affecting residences outside the footprint of plume but connected to the sewer downstream of the plume.	Riis et al. (2010)
#5. Petroleum Solvent LNAPL, United Kingdom	LNAPL entered a partially collapsed section of sanitary sewer that passed through an LNAPL source area at the groundwater table. LNAPL entering the sewer line caused VI impacts in connected downstream residences.	Macklin et al. (2014)
#6. TCE Plume, Indianapolis, Indiana	Contaminated groundwater from TCE plume entered as sanitary sewer line as the line passed through the plume within an industrial property. The resulting TCE vapors within the sewer line caused VI impacts to residences connected to the sewer line outside of the plume downstream of the industrial property.	ERM (2017)
#8. Marine Base, South Carolina	PCE/TCE from a former dry cleaner site entered the storm sewer as the sewer passed through the groundwater plume. The contaminated groundwater was transported through the sewer line outside the footprint of the plume resulting in discharge to a near-by creek.	Vroblesky et al. (2011)
#9. Superfund Site, California	cVOC-impacted groundwater entered sewer line via cracks where the sewer line passed through the groundwater plume. cVOCs were detected in sewer liquid and vapor downstream and outside of the plume footprint.	Roghani et al. (2017)
#10. Gas station site, Pennsylvania	Gasoline LNAPL released from UST entered sanitary sewer line resulting in gasoline vapors entering homes located outside the LNAPL area but connected to the downstream sewer line.	Jarvela et al. (2004)
#14. Navy Facility, New Jersey	TCE entered the storm sewer as the sewer passed through the groundwater plume.. The contaminated groundwater was transported through the sewer line to a permitted outfall. TCE concentrations resulted in violation of discharge permit standard.	Turco (1996)
#17. Industrial Site	cVOC-containing groundwater entered sewer line at the edge of an industrial site. cVOCs were detectable in sewer liquids and vapors up to 2,000 ft downstream outside the footprint of the plume.	Confidential site

Note: See Appendix E, Table E-1 for additional information on each supplemental site.

Finding: Sewer lines that directly intersect VOC plumes in groundwater (or sewer lines that receive direct discharge of VOC-impacted groundwater) typically have higher VOC concentrations in sewer vapor than sewer lines that run through the vadose zone above a subsurface VOC source (e.g., contaminated groundwater plume). In addition, when contaminated groundwater enters the sewer, VOC vapors may pose a vapor intrusion risk for buildings connected to the sewer downstream of the VOC entry point. Based on these factors, sites can be classified as higher risk or lower risk with respect to sewer/utility tunnel VI (see Figure 6-2). The protocol (Appendix G) provides different recommendations for sewer/utility tunnel testing for higher risk sites and lower risk sites. Specifically, for higher risk sites, the protocol recommends testing of the sewer line early in the VI investigation in order to evaluate the potential for otherwise unexpected impacts to buildings outside the footprint of the plume but connected to the downstream section of the sewer line.

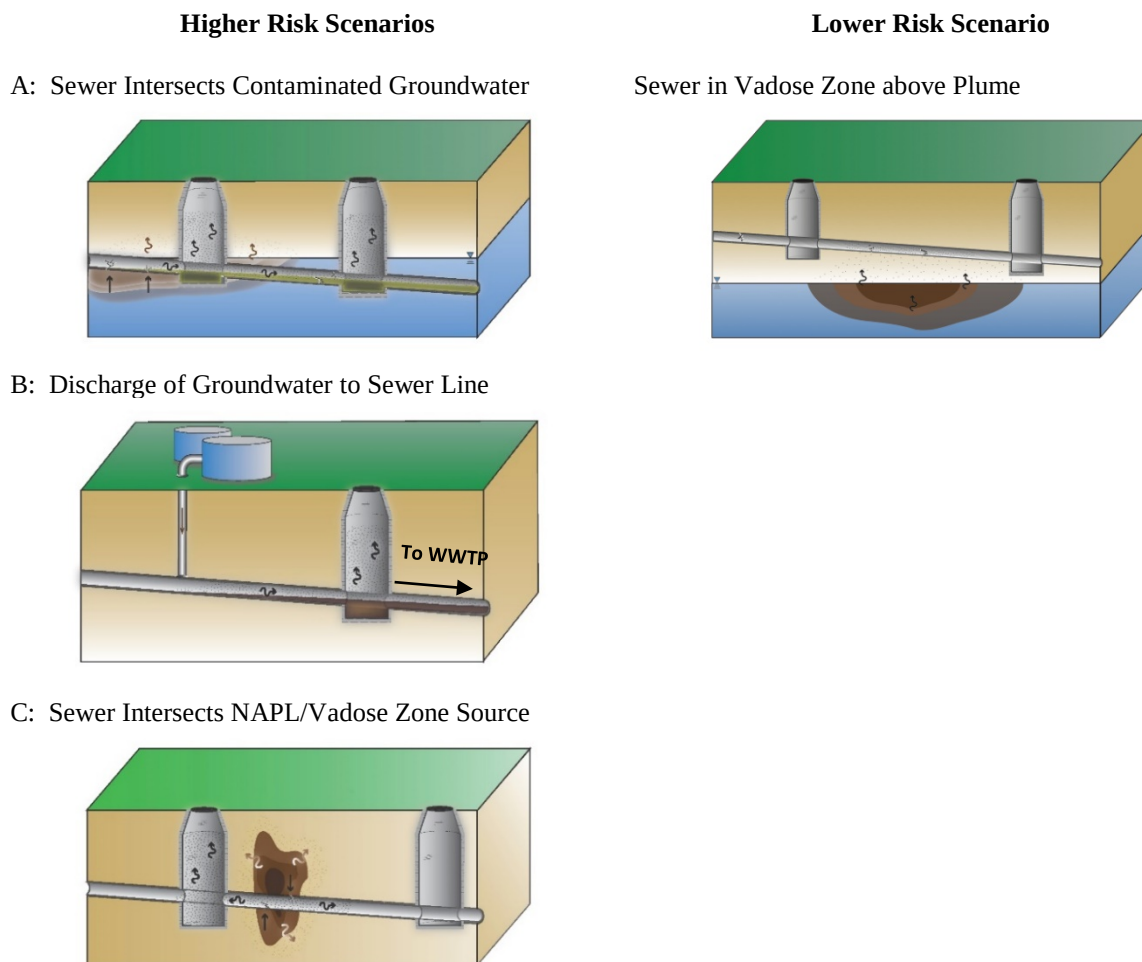


Figure 6-2. Higher and Lower Risk Scenarios for Sewer/Utility Tunnel VI

6.3.4 Migration of VOCs within Sewers

Key Questions:

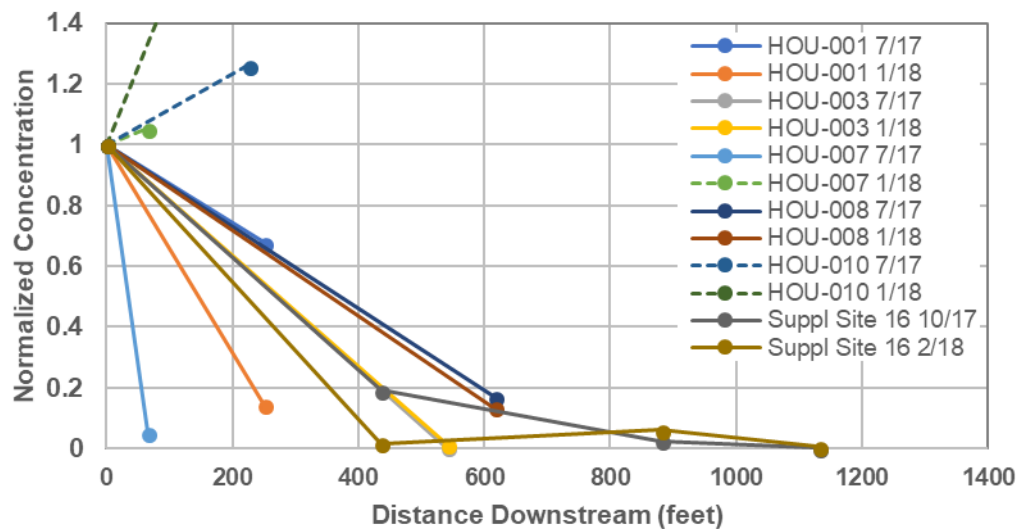
- How does air (and any associated VOC vapors) generally move through sewers?

- How far do VOC vapors migrate within sewers/utility tunnels; how quickly do vapor attenuate?
- How far do VOC vapors migrate when VOC-contaminated groundwater enters the sewer?

Methods: Data from Task 1, Task 2, and supplemental sites were compiled to examine concentration changes within a given sewer line.

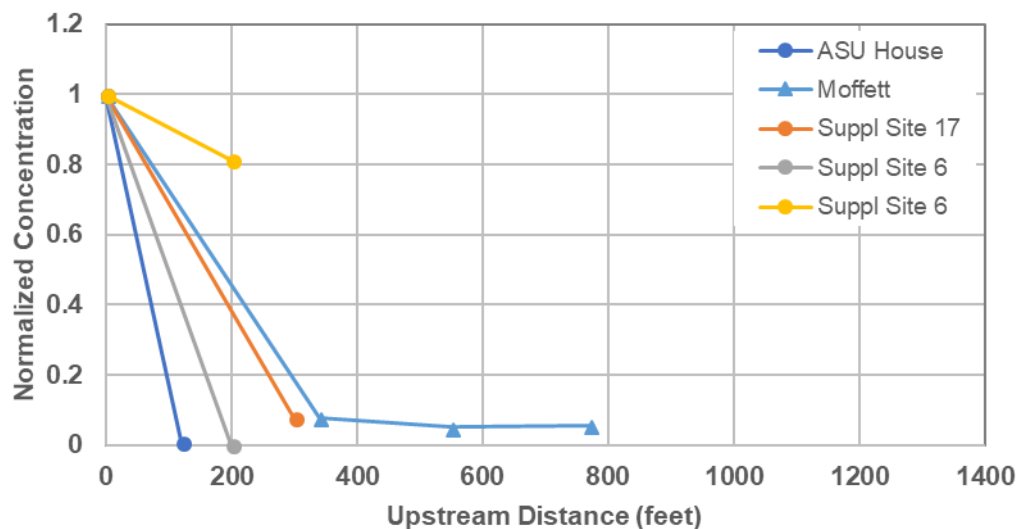
Results/Findings: Although the spatial change in VOC concentration within sewer lines was evaluated at eight sites (including demonstration sites and supplemental sites), the results obtained do not support a quantitative evaluation of VOC attenuation within sewer lines. Uncertainty associated with i) VOC plume delineation and ii) temporal variability in VOC concentrations at individual sewer vapor sampling locations prevented a reliable quantification of VOC attenuation spatially within sewers. However, the dataset and review of supplemental literature do support the following observations:

- Air Flow in Sewer Lines: Although many factors can affect the movement of air within sewer lines, air flow will most commonly occur in the direction of liquid flow because friction at the liquid surface results in movement of air in the same direction (Lowe 2016). As a result, vapor-phase VOC attenuation in the upstream direction will typically be higher than in the downstream direction.
- VOC vapor attenuation (for vadose zone sewers or upstream of areas with VOCs in sewer liquids): When VOCs are present within the sewer vapor phase, but not the sewer liquid phase, VOC concentrations will commonly decrease by 80% or more between a manhole located within the vapor source area and a manhole located outside the source area (i.e., a distance of approximately 500 ft). This attenuation rule of thumb applies to i) sewers located within the vadose zone (Figure 6-3), ii) sewers within groundwater in the upstream direction from the source area, and iii) for branched sewer lines, within a sewer branch line in the upstream direction away from a sewer line with VOC-containing liquids (Figure 6-4). VOC concentrations can be expected to decrease further at greater distances away from the source of VOC vapors.
- VOC vapor attenuation (in the downstream direction for sewers with VOCs in sewer liquids): When liquids containing VOCs are present within the sewer line, these liquids serve as an on-going source of vapors as the liquid migrates through the sewer in the downstream direction. As a result, vapor concentrations will decrease relatively slowly in the downstream direction. Liquid and corresponding vapor concentrations may also be more variable in the downstream direction (e.g., resulting from different ratios of groundwater and sewer liquids present in different sections of the line). The extent of impacts in the downstream direction is likely to depend on a number of site-specific factors and will be difficult to predict.



Notes: 1) Manholes over the plumes (i.e., in the source areas) are plotted at 0 ft. 2) Normalized concentrations calculated as manhole concentrations divided by source area manhole concentration. 3) HOU-007 and HOU-010 have limited plume delineation data in the uppermost water bearing unit.

Figure 6-3. Normalized Concentration vs. Distance Downstream of Source Area (Vadose Sites)



Notes: 1) Source area manholes are plotted at 0 ft. 2) Normalized concentrations calculated as manhole concentrations divided by source area manhole concentration.

Figure 6-4. Normalized Concentration vs. Distance in Upstream Manholes

6.3.5 VOC Migration into Buildings

Key Questions:

- How do VOCs move from sewers and utility tunnels into buildings?
- What is the typical range of sewer to building attenuation factors?

Methods: Mechanisms of migration from sewers and utility tunnels into buildings were identified through review of the supplemental literature sites (See Section 5.9 for identification of supplemental sites). Sewer to building attenuation factors were measured using PFTs (see Section 5.7.2).

Results: Examples of vapor entry mechanisms from the literature and site reports are summarized in Table 6-10.

Table 6-10. Examples of Mechanisms of Vapor Entry from Sewers/Utility Tunnels into Buildings

Supplemental Site	Observation	Reference
ASU Research House, Utah (Site included in this demonstration)	TCE-impacted groundwater enters the land drain system. Vapors migrate up the lateral to a French drain system tied into the sub-slab gravel fill beneath the house. Vapors enter the house primarily through an expansion joint at the edge of the building slab.	Guo et al. (2015)
Moffett Building 107, California (Site included in this demonstration)	cVOC-containing groundwater enters an underground utility (telephone) pipe. Associated vapors migrate into the building via an uncapped pipe that daylights in the phone closet.	McHugh et al. (2012b)
#2. PCE Plume, Denmark	Multiple residences evaluated. Leakage through plumbing connections identified as primary mechanism for VOC migration from sewer to buildings.	Riis et al. (2010)
#3. PCE Plume, Massachusetts	VOC entry into the building via a faulty toilet wax seal.	Pennell et al. (2013)
#4. Dry Cleaner Site, Denmark	High cVOC concentrations in sewer line. In indoor air, cVOC concentrations were higher in 2 nd floor compared to ground floor. Specific entry mechanism not identified.	Nielsen et al. (2014)
#6. TCE Plume, Indianapolis, Indiana	High TCE concentrations detected in sub-slab samples collected from residences located outside the footprint of the plume but connected to the downstream sewer with TCE in sewer liquids and vapor. Evidence suggests leakage of TCE vapors from sewer lateral into soil gas below building foundations.	ERM (2017)
#7. Various Sites, Denmark	Leakage through plumbing connections identified as primary mechanism for VOC migration from sewer to buildings. In one specific case, the sewer vent stack for a multi-story apartment building was vented into the attic rather than above the roof resulting in high cVOC concentrations in the upper level of the building.	Nielsen and Hivdberg (2017)
#11. DoD Facility	cVOC migration from sanitary sewer line into industrial building through i) uncapped pipe and ii) lines with dry or damaged p-traps.	Holton and Simms (2018)
#13. Industrial Site, California	cVOC migration from sanitary sewer line into industrial building restroom via advective air from floor drain.	Confidential Site
#15. Navy Site, California	TCE vapors migrated more than 300 ft through the sewer line into the restroom of an industrial building. Entry points appeared to be at sewer line penetrations through foundation.	Confidential Site

Attenuation factors were calculated to describe VOC migration into buildings (see Appendix C, Table C-13). Prior to this project, the ASU VI Research House, the USEPA VI Research Duplex,

and Moffett Field Building 107 were known or suspected to be affected by sewer/utility tunnel vapor intrusion. There was 30- to 50-fold attenuation in at least one of the connections tested in each of these buildings (Table 6-11). In contrast, most of the other buildings with no known or suspected pathways had high levels of attenuation. 10 of 12 buildings exhibited 100- fold or greater attenuation.

Table 6-11. Sewer to Building Attenuation

Connection		Range of Attenuation
<i>Buildings with Known Sewer/Utility Tunnel Vapor Intrusion (specific sewer line/pipe is shaded)</i>		
Land Drain (Upstream)	ASU VI Research House	40 - 70x
Sanitary Sewer (Upstream)	ASU VI Research House	40 - 60x
Storm/Sanitary Sewer (Upstream)	USEPA VI Research Duplex	160 - >1000x
Storm/Sanitary Sewer (Downstream)	USEPA VI Research Duplex	50 - 100x
Telephone Utility	Moffett Bldg 107	30x
Sanitary Sewer	Moffett Bldg 107	>1000x
<i>Buildings without Known or Suspected Sewer/Utility Tunnel Vapor Intrusion</i>		
Sanitary Sewer	Duplex (Houston #1)	150 - 790x
Sanitary Sewer	Duplex (Houston #2)	470 - 590x
Sanitary Sewer (Upstream)	House (San Rafael #1)	90 - 110x
Sanitary Sewer (Upstream)	House (San Rafael #2)	20 - 50x
Sanitary Sewer (Downstream)	House (San Rafael #1)	>1000x
Sanitary Sewer (Downstream)	House (San Rafael #2)	>1000x
Sanitary Sewer	Apartment (NASCC Area 1)	>1000x
Sanitary Sewer	Office/Lab (San Diego)	>1000x
Electrical Utility	Office/Lab (San Diego)	>1000x
Sanitary Sewer	Hospital (NASCC Area 2)	>1000x
Sanitary Sewer	Office (NASCC Area 3)	>1000x
Sanitary Sewer	Shop (NASCC Area 3)	>1000x
Sanitary Sewer	Office (NASCC Area 4)	>1000x
Sanitary Sewer	Office (Burlingame)	550 - >1000x
Sanitary Sewer	Warehouse (Houston)	50 - 470x

Note: See Appendix C for individual building results.

In addition to the tracer testing conducted for this demonstration, data were identified from two supplemental sites that supported calculation of sewer to indoor air attenuation factors:

- PCE Plume, Denmark (Riis 2010): Paired sewer manhole and indoor air concentration measurements for PCE, TCE, and cis-1,2-DCE for a single-family residence indicate a

sewer to indoor air attenuation factor of 0.018 to 0.023 (44× to 55× attenuation). Sub-slab cVOC concentrations were much lower than indoor air concentrations.

- TCE Plume, Indianapolis, Indiana (Wallace and Friedrich 2017): Sewer manhole and average indoor air TCE concentration results are presented for four residential blocks where the residences were connected to a sanitary line with TCE in sewer liquids and vapors. Average sewer to indoor air attenuation factors (i.e., based on average concentrations for all the residences on a block) ranged from 0.0006 to 0.007 (i.e., 140× to 1700× attenuation).

These attenuation factors are consistent with those measured during the field demonstration. Combined, the sewer to indoor air attenuation dataset supports the selection of 0.03 (33× attenuation) as a reasonable upper-bound attenuation factor.

Access to sewer laterals was available in 5 buildings (see Table 6-12). With the exception of Moffett Building 107 and the ASU House, attenuation between the manhole and lateral was relatively high compared to the attenuation across the lateral. Individual connections within a building could vary (Burlingame Suite #1 4-7× attenuation vs. Suite #2 with >20× attenuation).

Table 6-12. Sewer – Sewer Lateral – Indoor Air Connections

Connection		Manhole to Lateral Attenuation	Lateral to Indoor Attenuation
<i>Known Sewer/Utility Tunnel Vapor Intrusion</i>			
Land Drain (Upstream)	House (ASU VI Research House)	120x	Not calculated
Sanitary Sewer (Upstream)	House (ASU VI Research House)	6x	7 - 9x
Storm/Sanitary Sewer (Upstream)	Duplex (USEPA Duplex 422)	20x	8 - 11x
Storm/Sanitary Sewer (Upstream)	Duplex (USEPA Duplex 420)	20x	>50x
Storm/Sanitary Sewer (Downstream)	Duplex (USEPA Duplex 422)	20x	3 - 4x
Storm/Sanitary Sewer (Downstream)	Duplex (USEPA Duplex 420)	20x	3 - 5x
Telephone Utility	Office (Moffett Bldg 107)	2x	20 - 22x
<i>No Known or Suspected Sewer/Utility Tunnel Vapor Intrusion</i>			
Sanitary Sewer	Duplex (Houston #1, 4708)	790x	Not calculated
Sanitary Sewer	Office (Burlingame Suite #1)	150x	4 - 7x
Sanitary Sewer	Office (Burlingame Suite #2)	150x	>20x

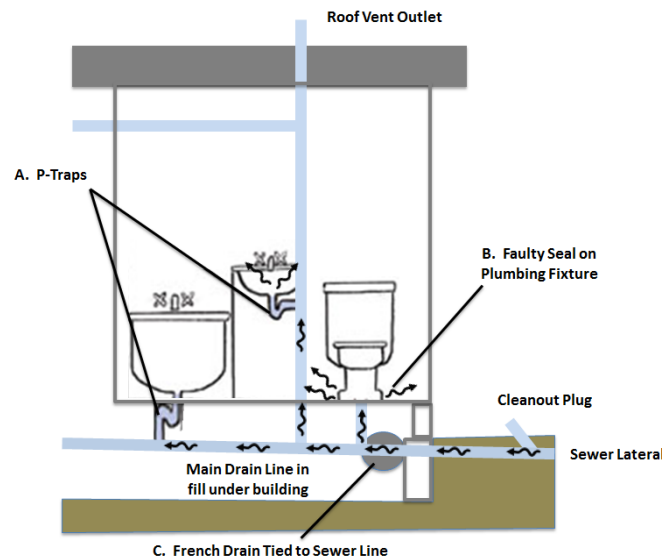
Note: See Appendix C for individual building results.

Findings: The potential for migration of VOCs from sewers or utility tunnels into buildings depends on the integrity of the connection.

- Sanitary Sewer Lines: Because sanitary sewers commonly generate noxious odors, building plumbing systems are engineered to prevent gas flow from the sewer into the

building. However, failures in these systems can allow gas entry through a variety of mechanisms (Figure 6-5). In buildings with properly constructed and functioning plumbing, we commonly observe high attenuation in VOC concentrations between the sewer line and the building (Table 6-11). However, less attenuation is observed in buildings with plumbing failures. For buildings with plumbing failures or faulty connections, the specific type of failure or mechanism of VOC entry is difficult to predict prior to building testing. Examples include: broken laterals below the building foundation, dry or faulty p-traps, bad wax seals, and improperly plumbed vent stacks.

- **Utility Tunnels:** At DoD facilities and other campuses, telephone lines, electrical lines, and other utilities are commonly connected to buildings through utility tunnels. These tunnel connections often do not include systems to limit gas flow because the tunnels may not be an expected source of noxious odors. As a result, VOC attenuation from utility tunnels into buildings is likely to be low compared to buildings with properly functioning sanitary sewer connections (i.e., less decrease in VOC concentration from the utility tunnel into the building compared to the sanitary sewer into the building). For an example, see the results for Moffett Building 107 in Table 6-11.
- **Other Sewer Lines:** Many building foundations have drain systems to prevent the infiltration of shallow groundwater or infiltrating storm water. In some areas, these drain systems are connected to the local storm sewer system (or a separate land drain sewer system). In these cases, VOCs can migrate from the storm sewer line to the building foundation and then migrate through the building foundation via the same mechanisms as with conventional vapor intrusion (for example, see Guo et al., 2015).



Notes: VOCs can move from sewers and utility tunnels into buildings through a variety of features, for example: A. Dry p-traps; B. Faulty seal on plumbing fixture (e.g., Pennell et al. 2013); and C. French drain tied to sewer line (Guo et al. 2015). Utility tunnels can vent directly into buildings.

Figure 6-5. Potential Entry Points into Buildings

6.3.6 Mitigation of Sewer/Utility Tunnel Vapor Intrusion

Key Question:

- What mitigation technologies are used to address sewer/utility tunnel vapor intrusion?

Methods: Technologies used to mitigate sewers and utility tunnel VI were identified through review of the supplemental literature sites (See Section 5.9 for identification of supplemental sites).

Results: Examples of mitigation techniques are summarized in Table 6-13.

Table 6-13. Examples of Sewer Mitigation Methods Used to Control Vapor Intrusion

Supplemental Site	Mitigation Method	Reference
#4. Dry Cleaner Site, Denmark	Depressurization of sewer line	Nielsen et al. (2014)
#5. Petroleum Solvent LNAPL, United Kingdom	Replaced collapsed portion of sanitary sewer line and installed an interior liner to prevent infiltration of LNAPL.	Macklin et al. (2014)
#6. TCE Plume, Indianapolis, Indiana	Relocated sewer line so that it did not intersect the contaminated groundwater plume.	ERM (2017)
#7. Various Sites, Denmark	Paper summarizes several approaches for sewer line mitigation: - Repairing or lining sewer line to prevent infiltration of liquids or vapors - Sealing or repairing leaky/damaged water traps inside of building - Passive ventilation of manholes - Depressurization of sewer system	Nielsen and Hivdberg (2017)
#10. Tranguch Gasoline Site, Pennsylvania	Installed check valves (backflow preventers) in each of 292 sewer lateral lines connecting residences to the sanitary sewer line containing elevated petroleum vapor concentrations. For VI mitigation, the check valve must control both liquid and vapor flow (e.g., Checkmate inline check valve).	Jarvela et al. (2004)
#11. DoD Facility	Sewer line ventilation	Holton and Simms (2018)
#12. TCE Plume, California	Repaired sewer line	Viteri et al. (2018)
#14. Navy Facility, New Jersey	Installed liner (cured in-place pipe; CIPP) inside sewer line to prevent infiltration of contaminated groundwater.	Turco (1996)

6.4 VALIDATION OF INVESTIGATION PROTOCOL

6.4.1 Initial Screening – VOC Concentrations in Groundwater

Overview: The protocol recommends that the applicable groundwater screening concentrations for conventional vapor intrusion also be used for the initial screening of sewer/utility tunnel vapor

intrusion. In other words, a site with VOC concentrations below screening levels for conventional vapor intrusion does not require further evaluation for either conventional vapor intrusion or sewer/utility tunnel vapor intrusion.

Validation: The USEPA groundwater screening concentrations for vapor intrusion are based on an upper-bound attenuation factor of 0.001 (i.e. 1000× attenuation; USEPA 2015, Table 6-1). Our field demonstration results suggest that 0.001 is also a reasonable upper-bound attenuation factor for sewer/utility tunnel vapor intrusion. This finding is based on combining the upper-bound attenuation factors for i) groundwater to sewer attenuation (Section 6.2.3) and ii) sewer to building attenuation (Section 6.2.4). In other words, the results from this demonstration suggest that conventional groundwater screening concentrations for the conventional vapor intrusion pathway are also appropriate for screening of sites with possible sewer/utility tunnel VI.

6.4.2 Initial Screening – Higher vs. Lower Risk

Overview: The initial screening step of the protocol is designed to sort sites into higher risk vs. lower risk sites based on the potential for migration through sewers or utility tunnels to cause impacts to buildings that might not be tested as part of a conventional vapor intrusion investigation. The identification of higher risk sewer/utility tunnel sites is based primarily on the potential for contaminated groundwater to enter the sewer or utility tunnel. In these cases, the contaminated groundwater will move through the sewer by gravity and is likely to migrate outside the footprint of the groundwater plume. The contaminated groundwater within the sewer generates VOC vapors within the sewer due to partitioning between the sewer liquids and the sewer headspace resulting in the potential for vapor intrusion impacts to structures outside of the plume.

Validation: The initial screening step in the protocol has been validated using two datasets: i) groundwater to sewer attenuation factors for higher vs. lower risk sewers and ii) evidence of VOC migration through sewers outside the plume at higher risk sites. These validation results are presented in Section 6.3.3. At lower risk sites, a conventional vapor intrusion investigation that includes indoor air testing is likely to identify all buildings impacted by either conventional vapor intrusion or sewer/utility tunnel vapor intrusion. This is because, at lower risk sites, the buildings at risk of sewer/utility tunnel vapor intrusion are also likely to be located within the inclusion zone for the conventional investigation. At higher risk sites, VOC-containing liquids and vapors may migrate downstream through the sewer or utility tunnel resulting in possible impacts to buildings located outside the inclusion zone but connected to the downstream sewer. Based on this finding, the investigation protocol recommends testing of the sewer/utility tunnel early in the VI field investigation for higher risk sites.

6.4.3 Manhole Testing – Liquid vs. Vapor Samples

Overview: The protocol recommends collection of vapor samples for the characterization of VOC concentrations within the sewer line. The protocol does not discuss or recommend the collection of liquid samples from sewer lines.

Validation: To evaluate the utility of liquid samples for characterization of VOCs in sewers, 14 paired sewer liquid and sewer vapor samples were collected during the field demonstration. In addition, 24 paired samples were obtained from supplemental sites and 263 paired samples were obtained from the ER-201501 project team. This yielded a dataset of 301 paired liquid and vapor

samples from sewers (including sanitary sewers, land drain sewers, and storm sewers). All of these samples were collected from sewer lines known or suspected of being impacted by infiltrating groundwater. The demonstration results are provided in Appendix E, Table E-2. In summary:

- Sensitivity: The site COCs were detected at high frequency in both liquid samples (95%) and vapor samples (83%).
- Accuracy: The VOC concentration in sewer vapors is of primary interest because sewer vapors have the potential to migrate into buildings. The VOC concentration in the liquid sample was not a good predictor of the VOC concentration in the vapor sample. The median VOC concentration in the vapor sample was 6.6% of the concentration that would have been predicted from the liquid sample assuming equilibrium partitioning. However, a wide range of relationships was observed. The 10th percentile concentration was 0.3% of equilibrium while the 90th percentile concentration was 29% of equilibrium. These results indicate that it is difficult to estimate the sewer vapor concentration based on the VOC concentration in the sewer liquid.
- Other Considerations: Collection of sewer liquids is applicable only to sewers that directly intersect the groundwater plume allowing infiltration of contaminated groundwater. VOC concentrations in sewer liquids will not serve to characterize VOCs in sewer vapors attributable to infiltration of soil gas and the sample approach is not applicable to vadose zone sewers. In addition, in sanitary sewers, collection and handling of liquid samples requires precautions to avoid contact with human waste.

Overall, the validation dataset and other considerations support the collection of sewer vapor samples to characterize VOC impacts to sewers.

6.4.4 Manhole Testing – Vapor Sample Collection Procedures

Overview: The protocol specifies the following manhole testing procedures for collection of grab vapor samples:

- If groundwater elevation varies seasonally such that the water table is below the sewer/utility tunnel at some times and at or above the sewer/utility tunnel at other times, then sampling should be conducted during a period of higher water table when the water table is at or above the sewer/utility tunnel.
- For sanitary sewers, samples should be collected between 9 am and 3 pm, when baseline flow is relatively low. For all sewers, samples should not be collected within 48 hours of a rainfall event of more than 0.1 inches.
- Using a water level meter or weighted string, measure the distance from the access point to the bottom of the sewer/utility tunnel or the depth to any liquid (whichever is shallower).
- Collect a vapor sample from a depth of one foot above the bottom or liquid level using nylon or Teflon tubing extended through the access point (see Figure 5-1). The sample can be collected using any appropriate vapor sampling device but will typically be collected using a Summa canister or passive sampler. Typical air sampling quality assurance steps

should be taken. For example, leak testing can be conducted using a shut-in test for the entire sampling train prior to extending the sample tubing into the sewer/utility tunnel. In addition, the sample tubing can be purged of ambient air prior to sampling.

Validation: The results used to validate each of these elements is discussed below:

- **Collection of samples during seasonal high water:** The demonstration program did not directly compare VOC concentrations in sewer lines during higher groundwater conditions with VOC concentrations during lower groundwater conditions. However, the field demonstration did document lower groundwater to sewer attenuation for sewer lines that directly intersect groundwater compared to sewer lines in the vadose zone above a VOC plume (Section 6.3.3). This verifies the conceptual model of higher risk when sewers directly intersect contaminated groundwater and supports the recommendation to conduct testing at times when the groundwater is most likely to be at or above the sewer/utility tunnel.
- **Collection of samples during low flow conditions:** The field demonstration results confirmed that VOC concentrations in combined storm/sanitary sewers are lower following a significant rain event (Table 6-14). The recommendation to avoid testing after rain events has been applied to all sewer lines because rain events commonly cause increased flow in both storm sewer and sanitary sewer lines.

Table 6-14. VOC Concentrations in Sewer Lines Before and After Rain Events

Sample Location	Before		After	
29.5 Central	PCE	353	PCE	0.6J – 6.5
	Chloroform	42	Chloroform	10 - 15
28.5 Central	PCE	210	PCE	6.9
	Chloroform	28	Chloroform	11
28 Central	PCE	102	PCE	22 - 38
	Chloroform	171	Chloroform	1J - 100

Note: 1) Samples from USEPA VI Research Duplex collected on 6/13-14/2016 (before rainfall) and on 6/15-16/2016 (after 2 thunderstorms). 2) Results in $\mu\text{g}/\text{m}^3$. 3) See Appendix B, Table B-4.1 for detailed results.

The field demonstration results do not show a clear pattern of higher VOC concentrations during times of expected low baseline sanitary flow and lower VOC concentrations during times of expected higher baseline flow. However, the results did show high temporal variability in VOC concentrations in sewer lines (see Section 6.3.2) which makes it more difficult to identify specific factors that result in higher or lower VOC concentrations. The recommendation to collect VOC samples from sanitary sewer lines during periods of expected lower baseline flow has been retained in the protocol because i) the demonstration results do confirm that other sources of higher flow (e.g., rain events) do decrease VOC concentrations and ii) the expected period of lower baseline flow (9 am to 3 pm) covers most of the field day and, therefore, imposes only a minor restriction on sample collection.

- **Collection of samples from the bottom of the manhole:** The field demonstration included measuring the vertical VOC concentration profile in three manholes. Two types of profiles were observed: i) relatively uniform VOC concentrations with depth or ii) increasing VOC

concentrations with depth (see Figure 6-6). These profiles demonstrate that collection of VOC samples near the top of the manhole may yield low-biased results.

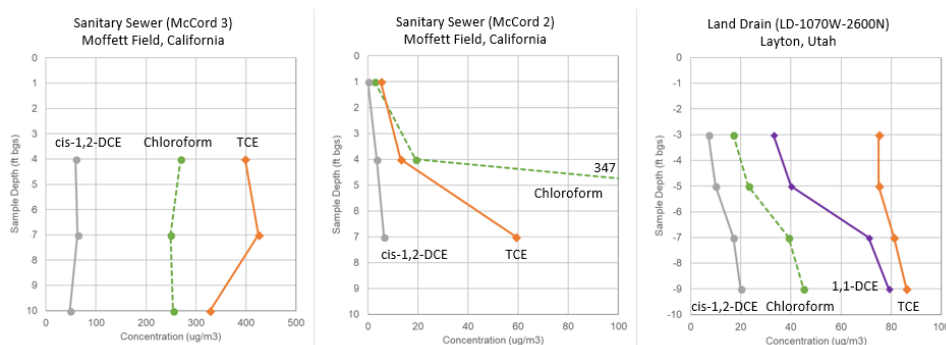


Figure 6-6. VOC Concentration Profiles in Manholes

The effect of sample collection depth was also evaluated at three manholes at one supplemental site (Superfund Site, California; Roghani et al., 2018). At the three manholes, the authors observed no clear relationship between VOC concentration and sample depth and concluded that high temporal variability in VOC concentrations made it difficult to determine the presence or absence of a vertical concentration gradient. Based on data collected for this ESTCP project, however, collection of samples from near the bottom of the sewer manhole is appropriate for most situations because these results will likely be more conservative. It is recommended that samples be collected from the bottom of manholes unless there are site-specific reasons to sample at alternate depths (e.g., access limitations, inlet pipes draining into the manhole at multiple depths).

6.4.5 Manhole Testing – Screening Concentrations

Overview: The protocol (Appendix G) recommends an upper-bound attenuation factor of 0.03 (i.e., 33× attenuation) for the development of sewer vapor screening concentrations. In other words, additional evaluation is recommended if the sewer vapor VOC concentration is more than 30 times the indoor air screening level. When sub-slab screening concentrations are available and are based on the USEPA recommended attenuation factor of 0.03, then these sub-slab screening concentrations can be applied to the sewer vapor test results.

Validation: Validation of the sewer to indoor air attenuation factor was conducted primarily using PFT (tracer) testing. Use of tracer compounds instead of measuring VOC concentrations ensured that the results were truly indicative of sewer to indoor air attenuation rather than other sources or migration pathways. The results of PFT testing are presented in Section 6.3.5 of this report. These results support the selection of 0.03 as a reasonable upper-bound attenuation factor. As discussed in Section 6.3.5, this attenuation factor is also supported by results from two supplemental sites identified through Task 3 of the demonstration.

6.4.6 Manhole Testing – Number of Test Locations for Initial Testing

Overview: The protocol specifies initial testing of sewer/utility tunnels be conducted at the three highest-risk access points (i.e., access points located within or immediately downstream of the area where the sewer or utility tunnel interacts with the contaminated groundwater or NAPL area).

Validation: This recommendation was validated by the Task 1 dataset. The Task 1 demonstration was conducted at three sites with known sewer/utility tunnel VI. Based on multiple rounds of testing conducted at these sites, the investigation program yielded 34 “initial testing” datasets from these known sewer/utility tunnel sites. For 33 of these datasets (97%), the maximum concentration across the three test locations for the primary groundwater VOC was above the screening level indicating that additional investigation would be required. See Section 6.3.1 of the Task 1 Report (McHugh et al. 2017a) for a detailed analysis of this validation dataset.

If the VOC concentrations exceed the sewer screening concentrations, then further testing is required to delineate the extent of vapors within the sewer and to evaluate potential impacts to buildings. If VOC concentrations are close to screening values, then the investigation protocol indicates that quarterly sampling may be appropriate to obtain a better understanding of long-term average VOC concentrations in the sewer.

6.4.7 Manhole Testing – Delineation

Overview: The purpose of delineation is to determine the extent of vapors in the sewer/utility tunnel at concentrations exceeding the sewer screening concentrations. The protocol specifies that delineation should be completed by collecting samples at access points both upstream and downstream of the exceedance locations. Delineation should proceed within the main sewer/utility tunnel(s) until all exceedance locations are bounded by two consecutive locations where VOC concentrations are less than the sewer screening values.

Validation: The final demonstration dataset was not sufficient to validate this portion of the protocol. As discussed in the Task 1 report, at the initial set of demonstration sites (all sites with known sewer/utility tunnel vapor intrusion), VOCs were more widespread within the sewers than anticipated. As a result, an insufficient number of clean boundary delineation locations was identified. Based on the Task 1 results, Task 2 was focused on addressing key uncertainties associated with the site screening and initial testing portions of the protocol. Because these initial portions of the protocol apply to a much large population of sites, validation of these initial steps provided the greatest overall value for support of accurate and cost-effective site investigations.

6.4.8 Manhole Testing – Grab Samples vs. Time Integrated Samples

Overview: The protocol specifies the collection of grab samples from sewers and utility tunnels.

Validation: Section 6.3.2 of this report presents the evaluation of temporal variability in sewer vapor concentrations. The demonstration study results indicate that long-term temporal variability (months to years) is much higher than short-term temporal variability (days). Based on the demonstration results, a single grab sample provides an accurate measure of the short-term average VOC concentration at that location with 79% of grab samples within a factor of 2 of the short-term average. As a result, the collection of a time-integrated sample (e.g., a 24-hour Summa or a 7-day passive sorbent sample) would provide relatively little improvement. However, for many sewer manholes, the collection of time-integrated samples would be significantly more difficult. Most sewer manholes are located within public rights-of-way, often in streets. Collection of time-integrated samples requires installation of the sampling equipment within the manhole for the duration of sampling. This would require a higher level of access permission from the utility

authority. In addition, the equipment may be subject to damage or loss due to storm events, theft, or vandalism.

7.0 COST ASSESSMENT

The costs of implementing the field demonstration programs were tracked and used to estimate the expected cost of implementing the validated protocol at a given site.

7.1 COST MODEL FOR THE DEMONSTRATION

It is important to note that the field demonstrations included additional tasks and associated costs in order to validate the protocol (e.g., Task 1 collection of validation samples in addition to samples required by the protocol). These costs would not be incurred during standard application of the procedure. Section 7.3 describes the cost model for routine implementation of the protocol.

Key elements of the cost model for the demonstration included project planning and preparation, field program implementation, and data evaluation and reporting (see Table 7-1). These elements were relevant to both Tasks 1 and 2.

Table 7-1. Cost Model for Task 1 and 2 Field Demonstration

Cost Element	Data to be Tracked	Examples
1. Project planning and preparation	Labor hours	Senior Project Scientist/Engineer, Project Scientist / Engineer
	Supplies	Calibration gas, Tedlar bags (for HAPSITE)
2. Field program implementation	Labor hours	Senior Project Scientist/Engineer, Project Scientist / Engineer
	Equipment Rental, Supplies, Shipping	Standard sampling equipment rental, operating costs, consumables
	Sample Analysis	Off-site laboratory analysis
3. Data evaluation and reporting	Labor hours	Senior Project Scientist/Engineer, Project Scientist / Engineer

Note: Cost model does not include travel or shipping.

7.1.1 Cost Element: Project Planning and Preparation

Project planning for the field demonstration included reviewing existing site data, obtaining site access, and developing work plans for the different sampling events. The bulk of costs in this element came from labor. For the demonstration, the time required for planning varied widely, and depended on site-specific circumstances such as i) the time needed to identify suitable and accessible locations for testing, and ii) the effort needed to obtain sewer construction information and access (see Table 7-2).

Table 7-2 Typical Consultant Labor Requirements for Project Planning

Cost Element	Sub Category	Representative Amount
Project Planning and Preparation	Labor hours: Senior Project Scientist/Engineer	8-10 hours per site
	Labor hours: Project Scientist/Engineer	25-35 hours per site

Note: Labor hours do not include time required for general tasks (shipping, travel to field site, etc.).

7.1.2 Cost Element: Field Program

Costs for the field program included labor hours associated with sample collection and expenses such as field supplies and sample analysis. Table 7-3 summarizes typical costs for the groundwater demonstration sites that were sampled during Task 2. Each Task 2 sampling event was completed within 1 day. Similar cost categories were used for Task 1 manhole sampling. Task 1, however, involved a more intensive sampling effort with each field program spanning 3-4 full field days. Task 1 labor and supplies costs were proportionally higher.

Table 7-3. Representative Unit Costs for Task 2 Groundwater Demonstration Site

Cost Element	Sub Category	Representative Unit Cost	Representative Unit
Field Program Implementation	Labor hours: Senior Project Scientist/Engineer	4-8	Hours
	Labor hours: Project Scientist/Engineer	8-10	Hours
	Supplies (Tedlar bags, tubing, consumables)	\$100	Dollars per day
	Sample Analysis: Air/gas sample TO-15 analysis at off-site lab	\$240 (\$150 analysis + \$90 lab equipment rental)	Per air/gas sample

Note: Costs do not include labor or expenses for travel to out of town field sites or shipping (e.g., shipping samples to lab).

Costs for the Task 2 building demonstration sites included labor hours associated with deploying the tracer sources and samplers and retrieving the equipment at the end of the sampling period. Deployment and retrieval took less than one day each. Other costs included field supplies and costs for the tracer materials and laboratory analysis as described in Table 7-4. During Task 1, the tracer studies were conducted at the same time as the sewer manhole sampling. Because of this, the tracer studies added half to one day to the field program. Costs for field supplies were shared. However, Task 1 laboratory costs were increased by approximately \$2,600 for the tracer analysis at each demonstration site.

Table 7-4. Representative Unit Costs for Task 2 Building Demonstration Site

Cost Element	Sub Category	Representative Unit Cost	Representative Unit
Field Program Implementation	Labor hours: Senior Project Scientist/Engineer	8-12	Hours
	Labor hours: Project Scientist/Engineer	8-12	Hours
	Supplies (tubing, consumables)	\$50	Dollars per day
	Tracer Study: PFT source rental, sample analysis, final report. Each demonstration site typically included 3-6 different tracer compounds, and 2 – 8 samples per building.	\$2,600	Per demonstration site

Note: Costs do not include labor or expenses for travel to out of town field site or shipping (e.g., shipping samples to lab).

7.1.3 Cost Element: Data Evaluation and Reporting

Following completion of the Task 1 and Task 2 demonstrations, the field notes and analytical results were reviewed and organized into a report. Key elements included data review and validation, data analysis, documentation of the results, and documentation of the overall findings.

Labor constituted the primary cost for this element. Typical time required for data compilation, review, and reporting is summarized in Table 7.5, and varied based on the number of manholes tested at each demonstration site.

Table 7-5. Typical Labor Requirements for Data Evaluation and Reporting

Cost Element	Sub Category	Representative Amount
Data Evaluation and Reporting	Labor hours: Senior Project Scientist/Engineer	10-20 hours per site
	Labor hours: Project Scientist/Engineer	25-40 hours per site

7.2 COST DRIVERS

The investigation protocol is a step-wise process. Screening will apply to all sites evaluated under the protocol. Initial field testing will apply to a subset of sites (i.e., higher risk sites). Costs for these steps are not expected to vary significantly between sites. If additional field activities such as delineation testing are needed, costs will vary based on site-specific factors such as the size of the area of concern and number of potential sewers/utility tunnels and buildings to test. Costs will likely vary more, however, by the manner in which the protocol is implemented. The protocol is written to allow flexibility in sample analysis. If users choose to have samples analyzed by an off-site laboratory, multiple mobilizations would be needed. The most cost-efficient manner in which to implement these steps of the protocol would be to utilize an on-site laboratory or instrument so that field decisions can be made and follow-up sampling done in the same mobilization.

7.3 COST ANALYSIS: ESTIMATES FOR ROUTINE IMPLEMENTATION

Currently, sewers and utility tunnel VI is not evaluated on a regular basis because there are no standard assessment methods. The protocol developed in this ESTCP project (see Appendix G) is intended to fill the gap. It involves a step-wise investigation process based on the conceptual model that was also developed as part of this project (see Appendix F). Costs estimates are given below to give users an idea of the level of effort and costs to implement the protocol. These estimates assume implementation by experienced personnel. As for any procedure or field program, the time required by inexperienced personnel would be significantly higher.

Routine implementation of the protocol will cost less than implementation during the field demonstration because of the additional tasks needed to validate the protocol. In addition, routine application is simplified by a number of factors. For example, in most instances, basic information on sites, site contacts, and utility locations will already be available because this information will have been gathered, at least in part, for other environmental assessment work (e.g., for utility locates needed for site characterization fieldwork).

7.3.1 Estimated Costs for Initial Screening

The protocol begins with an initial screening step. This step focuses on gathering and evaluating existing site information. As such, these costs are not expected to vary significantly between sites. Estimated costs for completing the initial screening are summarized in Table 7-6.

Table 7-6. Estimated Costs for Initial Screening in Routine Protocol Application

Cost Element	Labor Hours	Rate (\$/hour)	Estimated Cost
1. Data Collection and Evaluation: Gather data and identify locations and depths of sewers and utility tunnels within footprint of source area and/or groundwater plume.	8	\$100	\$ 800
2. Documentation: Summarize findings.	2	\$100	\$ 200
Total:			\$1,000

7.3.2 Estimated Costs for Initial Field Testing

Based on the initial screening, some sites will require follow-up field testing. The first step of field testing consists of collecting at least 3 vapor samples. A minimum of 3 samples assumes access to test manholes near the core of the plume or access to test manholes in areas where groundwater intersects sewer lines (i.e., test “worst-case” locations). Additional samples may be needed for plumes with complex geometries, or sites with multiple, independent sets of sewer lines or utility tunnels. Estimated costs are summarized in Table 7-7. The basic cost elements are the same as the elements described for the demonstration. However, for routine application, the initial field testing step will likely be more focused.

Table 7-7. Estimated Cost of Initial Field Testing for Routine Protocol Application

Cost Element	Category	Description	Quantity	Rate⁴	Estimated Cost
Project Planning and Preparation¹					
	Labor	Senior Project Scientist/Engineer	2	150	\$ 300
	Labor	Project Scientist/Engineer	8	100	\$ 800
				Subtotal	\$1,100
Field Program Implementation²					
	Labor	Project Scientist/Engineer	6	100	\$ 600
	Labor	Project Scientist/Engineer	6	100	\$ 600
	Laboratory	Summa canister rental (assume \$90) and TO-15 analysis (assume \$150)	3	240	\$ 720
				Subtotal	\$1,920
Data Evaluation and Reporting³					
	Labor	Senior Project Scientist/Engineer	4	150	\$ 600
	Labor	Project Scientist / Engineer	12	100	\$1,200
				Subtotal	\$1,800
				TOTAL	\$4,820

Notes: 1) Planning tasks include selection of sampling locations based on data compiled in the screening step, obtaining site access, and obtaining sampling supplies; 2) Does not include travel time, travel or shipping expenses; 3) Includes review of laboratory results and preparation of data summary tables; and 4) Rates given in \$/hour (labor) or \$/item (non-labor categories).

The cost estimates above are for the preliminary steps of the protocol. As the protocol is designed, the initial screening step would apply generally to sites subject to VI investigations. The initial field testing step would apply to only a subset of sites. The costs estimates do not include any follow-up testing that may be needed, for example, to delineate areas where VOCs exceed screening levels in sewers. Because the scope of any follow-up testing is site-specific, the associated costs cannot be generalized.

8.0 IMPLEMENTATION ISSUES

This project has resulted in development and validation of a protocol for investigation of sewer/utility tunnel VI. Although preferential pathways are often mentioned in VI guidance documents, instructions on how and where to test or otherwise evaluate them have been limited. One goal of this project was to develop a protocol that can fill this gap. In addition, we have compiled data from this project and others to update the conceptual model for sewer/utility tunnel vapor intrusion. The conceptual model and protocol are useful tools to help users evaluate the risk of sewers/utility tunnels VI, and rapidly identify cases of real sewer/utility tunnel vapor intrusion problems or cases where this is not a concern.

Advantages of the protocol:

- Provides a standardized framework for evaluating sewers and utility tunnels as potential preferential pathways for VI;
- Provides a step-wise decision logic for testing based on potential risk of the presence of sewer/utility tunnel vapor intrusion; and
- Recommends sampling strategies and procedures that are practical and relatively simple to implement (e.g., use of sampling equipment [e.g., Summa canisters] commonly used in VI investigations).

Limitations of the protocol:

- Relies on indoor air testing to identify vapor intrusion impacts at lower risk sites; and
- Does not provide detailed guidance on sewer/utility tunnel mitigation.

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APPENDIX B. TASK 1 AND 2 VOC RESULTS

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TABLE B.1
Groundwater to Sewer Demonstration Sites
Task 1 and 2 Sites

Demonstration Site	Site ID	COC Class	Primary GW COC	Depth to Water (ft bgs)	Maximum Concentration (ug/L)	Type(s) of Sewer/Utility Sampled	Maximum Sewer Vapor Concentration (ug/m3)	Sewer Depth (ft bgs)	Sewer Category
Task 1 Dem 1	ASU House	CVOC	Trichloroethene	4	13.7	Lateral (Land Drain)	4.8	n/a	A
				4		Lateral (Sanitary Sewer)	2.4	n/a	A
				4		Land Drain	1100	11	A
				4		Sanitary Sewer	591	11	A
Task 1 Dem 2	2900 Block Central	CVOC	Tetrachloroethene	14.5	56.3	Combined Storm and Sanitary Sewer	353	6.5	B
	3000 Block Central	CVOC	Tetrachloroethene	15.6	31.2	Combined Storm and Sanitary Sewer	197	7.6	B
	EPA House	CVOC	Chloroform	15.8	2.1	Lateral (Sanitary Sewer)	93	n/a	B
				15.8		Combined Storm and Sanitary Sewer	356	13.5	B
Task 1 Dem 3	Moffett 010	CVOC	Trichloroethene	8	640	Utility tunnel entrance to bldg (=lateral)	156	n/a	A
				8		Utility Tunnel (Steam Distribution System)	140	7.9	A
	Moffett 107	CVOC	Trichloroethene	6	280	Lateral (Telephone Utility Pipe)	1100	n/a	A
				6		Sanitary Sewer	1500	11.7	A
				6		Telephone Utility Tunnel	387	8	A
				6		Utility Tunnel (Steam Distribution System)	70	5.6	A
Corpus Christi	NASCC	CVOC	Trichloroethene	6	173000	Sanitary Sewer	45	7.3	A
Austin	AUS-001	CVOC	Tetrachloroethene	22.3	21.9	Lateral (Sanitary Sewer)	10	4	B
				22.3		Sanitary Sewer	ND	6.1	B
	AUS-002	CVOC	Tetrachloroethene	32.1	8.51	Lateral (Sanitary Sewer)	12	3	B
	AUS-003	CVOC	Dichloroethene, cis-1,2-	3.5	1780	Lateral (Sanitary Sewer)	ND	3	B
	AUS-004	CVOC	Trichloroethene	6.8	55.4	Electrical Utility Tunnel	86	5	B
Houston	HOU-001	CVOC	Tetrachloroethene	14.4	230	Sanitary Sewer	860	11.2	B
	HOU-002	CVOC	Tetrachloroethene	3.8	79.6	Sanitary Sewer	8.3	6.4	A
	HOU-003	CVOC	Tetrachloroethene	16.1	36300	Sanitary Sewer	1500	4.4	B
	HOU-004	CVOC	Tetrachloroethene	17.2	61.7	Sanitary Sewer	280	5.2	B
	HOU-005	CVOC	Dichloroethene, cis-1,2-	14	35	Sanitary Sewer	290	14.1	A
	HOU-006	CVOC	Dichloroethene, cis-1,2-	17	11000	Sanitary Sewer	110	11.5	B
	HOU-007	CVOC	Dichloroethene, cis-1,2-	15.5	794	Sanitary Sewer	820	3.7	B
	HOU-008	CVOC	Dichloroethene, cis-1,2-	12.9	832	Sanitary Sewer	58	5.9	B
	HOU-009	CVOC	Tetrachloroethene	14.6	428	Sanitary Sewer	9.9	13.4	B
	HOU-010	CVOC	Tetrachloroethene	16.9	1400	Sanitary Sewer	12000	10.3	B

TABLE B.1
Groundwater to Sewer Demonstration Sites
Task 1 and 2 Sites

Demonstration Site	Site ID	COC Class	Primary GW COC	Depth to Water (ft bgs)	Maximum Concentration (ug/L)	Type(s) of Sewer/Utility Sampled	Maximum Sewer Vapor Concentration (ug/m3)	Sewer Depth (ft bgs)	Sewer Category
San Diego County	SAN-001	Other (PHC LNAPL)	Dissolved COCs not detected	19.5	n/a	Sanitary Sewer	Benzene 0.78J	5.1	B
	SAN-002	Other (PHC)	Benzene	13.9	3200	Sanitary Sewer	0.7	8	B
	SAN-003	CVOC	Tetrachloroethene	34.8	17000	Sanitary Sewer	2300	5	B
	SAN-004	CVOC	Tetrachloroethene	13.1	3700	Sanitary Sewer	310	5.5	B
	SAN-005	Other/PHC/ CVOC	Butanone, 2- (MEK)	29.7	170000	Sanitary Sewer	9.3	6.2	B
	SAN-006	CVOC	Trichloroethene	14	2500	Sanitary Sewer	10	7.5	B
	SAN-007	CVOC	Tetrachloroethene	13	15	Sanitary Sewer	2	5	B
	SAN-008	CVOC	Trichloroethene	26.6	25	Sanitary Sewer	9	20.7	B
	SAN-009	CVOC	Dichloroethene, cis-1,2-	30.8	19000	Sanitary Sewer	3.7	10.9	B
Orange County	SNA-001	CVOC	Trichloroethene	12.5	6800	Sanitary Sewer	0.61	>5	B
	SNA-002	CVOC	Tetrachloroethene	7	6100	Sanitary Sewer	3.4	5.3	B
	SNA-003	CVOC	Trichloroethene	22	2900	Sanitary Sewer	13	10	B
	SNA-004	CVOC	Dichloroethene, 1,1-	29.2	160	Sanitary Sewer	590	>5	B
	SNA-005	CVOC	Trichloroethene	26.1	22000	Sanitary Sewer	25	>5	B
	SNA-006	CVOC	Trichloroethene	20	482	Sanitary Sewer	630	5.6	B
	SNA-007	CVOC	Tetrachloroethene	3.7	170	Sanitary Sewer	<0.35	>5	A
	SNA-008	CVOC	Dichloroethene, cis-1,2-	7.4	1100	Sanitary Sewer	<0.35	5.6	B
	SNA-009	CVOC	Dichloroethene, cis-1,2-	8.3	780	Sanitary Sewer	<0.35	5.1	B

Notes:

1. The groundwater data were compiled from GSI Task 1 sampling and reports obtained from regulatory agency files. Groundwater monitoring events closest in time to the Task 1 and 2 demonstrations were selected for compilation.
2. Specific monitoring wells selected for compilation at each location included wells screened in the uppermost aquifer that were closest to the sewer vapor sampling locations (manholes). Groundwater results from plume source areas were also compiled if these were different from the nearest well.
3. The primary groundwater chemical of concern (COC) was based on the maximum concentration from the most recent available data from wells specified in Note 2.
4. The depth to water refers to the minimum (shallowest) depth to groundwater from among the wells identified in Note 2.
5. The sewer depth refers to the largest depth value measured in any manhole tested (i.e., deepest point in the sewer line).
6. Light non-aqueous phase liquids have been observed in groundwater at SAN-001. The dissolved phase plume is limited in extent. VOCs were not detected in the monitoring well nearest to the manholes. tested during the demonstration.
7. Due to access limitations, the depth to the bottom of the sewer could not be measured at all sites. Estimates based on nearby sewer lines are provided. Estimated depths are flagged with ">".
8. Sewer Category: A = sewer below water table; B = sewer above water table

TABLE B.2
Groundwater Results
Task 1 and 2 Sites

Demonstration Site Site ID Sewer Category Sample Location Sample Type Collection Date Depth to Water (ft bgs)		Task 1 Dem 1	Task 1 Dem 1	Task 1 Dem 2	Task 1 Dem 2	Task 1 Dem 2	Task 1 Dem 2
		ASU House	ASU House	2900 Block Central	2900 Block Central	3000 Block Central	3000 Block Central
		A	A	B	B	B	B
		Well 4	U8-042	GP-4	GP-5	GP-1	GP-10
		N	N	N	N	N	N
		5/1/2016	10/15/2007	3/24/2010	3/24/2010	2/9/2010	2/9/2010
Analyte		4	7.53	14.51	14.51	15.58	16
Acetone	ug/L	-	-	<100	<100	<100	<100
Benzene	ug/L	-	<0.2	<5	<5	<5	<5
Bromobenzene	ug/L	-	-	-	-	-	-
Bromochloromethane	ug/L	-	-	-	-	-	-
Bromodichloromethane	ug/L	-	<0.2	<5	<5	<5	<5
Bromoform	ug/L	-	-	<5	<5	<5	<5
Bromomethane	ug/L	-	-	<5	<5	<5	<5
Butanone, 2- (MEK)	ug/L	-	-	<10	<10	<10	<10
Butylbenzene, n-	ug/L	-	-	-	-	-	-
Butylbenzene, sec-	ug/L	-	-	-	-	-	-
Butylbenzene, tert-	ug/L	-	-	-	-	-	-
Carbon disulfide	ug/L	-	-	<5	<5	<5	<5
Carbon tetrachloride	ug/L	-	<0.2	<5	<5	<5	<5
Chlorobenzene	ug/L	-	7.9	<5	<5	<5	<5
Chloroethane	ug/L	-	<0.2	<5	<5	<5	<5
Chloroform	ug/L	-	<0.2	<5	<5	8.07	<5
Chloromethane	ug/L	-	-	<5	<5	<5	<5
Chlorotoluene, 2-	ug/L	-	-	-	-	-	-
Chlorotoluene, 4-	ug/L	-	-	-	-	-	-
Dibromo-3-Chloropropane, 1,2-	ug/L	-	-	-	-	-	-
Dibromochloromethane	ug/L	-	-	<5	<5	<5	<5
Dibromoethane, 1,2- (EDB)	ug/L	-	-	<5	<5	<5	<5
Dibromomethane	ug/L	-	-	-	-	-	-
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/L	-	-	-	-	-	-
Dichlorobenzene, 1,2-	ug/L	-	-	<5	<5	<5	<5
Dichlorobenzene, 1,3-	ug/L	-	<0.2	<5	<5	<5	<5
Dichlorobenzene, 1,4-	ug/L	-	<0.2	<5	<5	<5	<5
Dichlorodifluoromethane	ug/L	-	-	<5	<5	<5	<5
Dichloroethane, 1,1-	ug/L	-	3.4	<5	<5	<5	<5
Dichloroethane, 1,2-	ug/L	-	2.8	<5	<5	<5	<5
Dichloroethene, 1,1-	ug/L	-	4.8	<5	<5	<5	<5
Dichloroethene, cis-1,2-	ug/L	-	27	<5	<5	<5	<5
Dichloroethene, trans-1,2-	ug/L	-	12	<5	<5	<5	<5
Dichloropropane, 1,2-	ug/L	-	-	<5	<5	<5	<5
Dichloropropane, 1,3-	ug/L	-	-	-	-	-	-
Dichloropropane, 2,2-	ug/L	-	-	-	-	-	-
Dichloropropene, 1,1-	ug/L	-	-	-	-	-	-
Dichloropropene, cis-1,3-	ug/L	-	-	<5	<5	<5	<5
Dichloropropene, trans-1,3-	ug/L	-	-	<5	<5	<5	<5
Ethylbenzene	ug/L	-	<0.2	<5	<5	<5	<5
Hexachlorobutadiene	ug/L	-	-	<5	<5	<5	<5
Hexanone, 2-	ug/L	-	-	<10	<10	<10	<10
Isopropylbenzene	ug/L	-	-	-	-	-	-
Isopropyltoluene, p-	ug/L	-	-	-	-	-	-
Methyl-2-pentanone, 4- (MIBK)	ug/L	-	-	<10	<10	<10	<10
Methylene Chloride	ug/L	-	<0.5	<5	<5	<5	<5
Naphthalene	ug/L	-	-	-	-	-	-
Propylbenzene, N-	ug/L	-	-	-	-	-	-
Styrene	ug/L	-	-	<5	<5	<5	<5
Tetrachloroethane, 1,1,1,2-	ug/L	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	ug/L	-	-	<5	<5	<5	<5
Tetrachloroethene	ug/L	-	<0.2	<5	56.3	<5	31.2
Toluene	ug/L	-	<0.2	<5	<5	<5	<5
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/L	-	-	-	-	-	-
Trichlorobenzene, 1,2,3-	ug/L	-	-	-	-	-	-
Trichlorobenzene, 1,2,4-	ug/L	-	-	<5	<5	<5	<5
Trichloroethane, 1,1,1-	ug/L	-	<0.2	<5	<5	<5	<5
Trichloroethane, 1,1,2-	ug/L	-	<0.2	<5	<5	<5	<5
Trichloroethene	ug/L	13.7	21	<5	<5	<5	<5
Trichlorofluoromethane	ug/L	-	-	<5	<5	<5	<5
Trichloropropane, 1,2,3-	ug/L	-	-	-	-	-	-
Trimethylbenzene, 1,2,4-	ug/L	-	<0.2	<5	<5	<5	<5
Trimethylbenzene, 1,3,5-	ug/L	-	<0.2	<5	<5	<5	<5
Vinyl acetate	ug/L	-	-	<10	<10	<10	<10
Vinyl chloride	ug/L	-	<0.2	<2	<2	<2	<2
Xylene, m,p-	ug/L	-	<0.5	<5	<5	<5	<5
Xylene, o-	ug/L	-	<0.5	<5	<5	<5	<5

TABLE B.2
Groundwater Results
Task 1 and 2 Sites

Demonstration Site Site ID Sewer Category Sample Location Sample Type Collection Date Depth to Water (ft bgs)	Analyte	ug/L	Task 1 Dem 2	Task 1 Dem 2	Task 1 Dem 3	Corpus Christi	Corpus Christi	Austin	Austin	Austin
			EPA House	EPA House	Moffett	NASCC	NASCC	AUS-001	AUS-002	AUS-002
			B	B	A	A	A	B	B	B
			MW1C	MW1A	W9SC-16	ES-TW-823	ES-TW-842	MW-14	MW-6	MW-2
			N	N	N	N	N	N	N	N
			6/16/2016	6/16/2016	8/25/2016	12/31/2015	12/31/2015	12/18/2015	12/12/2012	12/13/2012
			15.8	15.8	6	30	6	22.32	32.14	35.59
Acetone	ug/L	-	-	-	-	-	-	-	-	-
Benzene	ug/L	<0.13	<0.13	<1.3	-	-	-	-	-	-
Bromobenzene	ug/L	<0.18	<0.18	<1.8	-	-	-	-	-	-
Bromochloromethane	ug/L	<0.14	<0.14	<1.4	-	-	-	-	-	-
Bromodichloromethane	ug/L	<0.14	<0.14	<1.4	-	-	-	-	-	-
Bromoform	ug/L	<0.1	<0.1	<1	-	-	-	-	-	-
Bromomethane	ug/L	<0.29	<0.29	<2.9	-	-	-	-	-	-
Butanone, 2- (MEK)	ug/L	-	-	-	-	-	-	-	-	-
Butylbenzene, n-	ug/L	<0.12	<0.12	<1.2	-	-	-	-	-	-
Butylbenzene, sec-	ug/L	<0.12	<0.12	<1.2	-	-	-	-	-	-
Butylbenzene, tert-	ug/L	<0.14	<0.14	<1.4	-	-	-	-	-	-
Carbon disulfide	ug/L	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	ug/L	<0.15	<0.15	<1.5	-	-	-	-	-	-
Chlorobenzene	ug/L	<0.12	<0.12	<1.2	-	-	-	-	-	-
Chloroethane	ug/L	<0.34	<0.34	<3.4	-	-	-	-	-	-
Chloroform	ug/L	1.7	2.1	<1.2	-	-	-	-	-	-
Chloromethane	ug/L	<0.25	<0.25	<2.5	-	-	-	-	-	-
Chlorotoluene, 2-	ug/L	<0.07	<0.07	<0.7	-	-	-	-	-	-
Chlorotoluene, 4-	ug/L	<0.1	<0.1	<1	-	-	-	-	-	-
Dibromo-3-Chloropropane, 1,2-	ug/L	<0.32	<0.32	<3.2	-	-	-	-	-	-
Dibromochloromethane	ug/L	-	-	-	-	-	-	-	-	-
Dibromoethane, 1,2- (EDB)	ug/L	<0.22	<0.22	<2.2	-	-	-	-	-	-
Dibromomethane	ug/L	<0.21	<0.21	<2.1	-	-	-	-	-	-
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/L	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	ug/L	<0.14	<0.14	<1.4	-	-	-	-	-	-
Dichlorobenzene, 1,3-	ug/L	<0.11	<0.11	<1.1	-	-	-	-	-	-
Dichlorobenzene, 1,4-	ug/L	<0.13	<0.13	<1.3	-	-	-	-	-	-
Dichlorodifluoromethane	ug/L	<0.16	<0.16	<1.6	-	-	-	-	-	-
Dichloroethane, 1,1-	ug/L	<0.1	<0.1	3.5 J	-	-	-	-	-	-
Dichloroethane, 1,2-	ug/L	<0.22	<0.22	<2.2	-	-	-	-	-	-
Dichloroethane, 1,1-	ug/L	<0.14	<0.14	4.6 J	-	-	-	-	-	-
Dichloroethane, cis-1,2-	ug/L	<0.1	<0.1	190	-	-	<1	<1	<1	1.12
Dichloroethane, trans-1,2-	ug/L	<0.11	<0.11	2.3 J	-	-	<1	<1	<1	<1
Dichloropropane, 1,2-	ug/L	<0.15	<0.15	<1.5	-	-	-	-	-	-
Dichloropropane, 1,3-	ug/L	<0.07	<0.07	<0.7	-	-	-	-	-	-
Dichloropropane, 2,2-	ug/L	<0.13	<0.13	<1.3	-	-	-	-	-	-
Dichloropropene, 1,1-	ug/L	<0.14	<0.14	<1.4	-	-	-	-	-	-
Dichloropropene, cis-1,3-	ug/L	<0.22	<0.22	<2.2	-	-	-	-	-	-
Dichloropropene, trans-1,3-	ug/L	<0.08	<0.08	<0.8	-	-	-	-	-	-
Ethylbenzene	ug/L	<0.1	<0.1	<1	-	-	-	-	-	-
Hexachlorobutadiene	ug/L	<0.22	<0.22	<2.2	-	-	-	-	-	-
Hexanone, 2-	ug/L	-	-	-	-	-	-	-	-	-
Isopropylbenzene	ug/L	<0.12	<0.12	<1.2	-	-	-	-	-	-
Isopropyltoluene, p-	ug/L	<0.13	<0.13	<1.3	-	-	-	-	-	-
Methyl-2-pentanone, 4- (MIBK)	ug/L	-	-	-	-	-	-	-	-	-
Methylene Chloride	ug/L	<0.35	<0.35	<3.5	-	-	-	-	-	-
Naphthalene	ug/L	<0.15	<0.15	<1.5	-	-	-	-	-	-
Propylbenzene, N-	ug/L	<0.15	<0.15	<1.5	-	-	-	-	-	-
Styrene	ug/L	<0.15	<0.15	<1.5	-	-	-	-	-	-
Tetrachloroethane, 1,1,1,2-	ug/L	<0.1	<0.1	<1	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	ug/L	<0.09	<0.09	<0.9	-	-	-	-	-	-
Tetrachloroethene	ug/L	0.35 J	<0.1	<1	-	-	21.9	2.73	8.51	-
Toluene	ug/L	<0.25	<0.25	<2.5	-	-	-	-	-	-
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/L	-	-	-	-	-	-	-	-	-
Trichlorobenzene, 1,2,3-	ug/L	<0.14	<0.14	<1.4	-	-	-	-	-	-
Trichlorobenzene, 1,2,4-	ug/L	<0.1	<0.1	<1	-	-	-	-	-	-
Trichloroethane, 1,1,1-	ug/L	<0.19	<0.19	<1.9	-	-	-	-	-	-
Trichloroethane, 1,1,2-	ug/L	<0.31	<0.31	<3.1	-	-	-	-	-	-
Trichloroethene	ug/L	<0.13	<0.13	280	3940	173000	<2	<2	<2	<2
Trichlorofluoromethane	ug/L	<0.23	<0.23	<2.3	-	-	-	-	-	-
Trichloropropane, 1,2,3-	ug/L	<0.13	<0.13	<1.3	-	-	-	-	-	-
Trimethylbenzene, 1,2,4-	ug/L	<0.12	<0.12	<1.2	-	-	-	-	-	-
Trimethylbenzene, 1,3,5-	ug/L	<0.14	<0.14	<1.4	-	-	-	-	-	-
Vinyl acetate	ug/L	-	-	-	-	-	-	-	-	-
Vinyl chloride	ug/L	<0.22	<0.22	<2.2	-	-	<1	<1	<1	<1
Xylene, m,p-	ug/L	<0.18	<0.18	<1.8	-	-	-	-	-	-
Xylene, o-	ug/L	<0.1	<0.1	<1	-	-	-	-	-	-

See notes at end of table.

TABLE B.2
Groundwater Results
Task 1 and 2 Sites

Demonstration Site Site ID Sewer Category Sample Location Sample Type Collection Date Depth to Water (ft bgs)		Austin	Austin	Austin	Austin	Austin	Houston	Houston	Houston
		AUS-003	AUS-003	AUS-004	AUS-004	AUS-004	HOU-001	HOU-002	HOU-002
		B	B	B	B	B	B	A	A
		RC-18	RC-17	MW-6	MW-3	MW-1	MW-2	MW-3	MW-3
		N	N	N	N	N	N	N	N
		6/7/2016	6/6/2016	5/8/2013	5/8/2013	5/8/2013	11/30/2015	2/24/2016	6/30/2016
		3.49	3.6	8.1	6.79	9.18	14.37	7.33	3.84
Analyte									
Acetone	ug/L	-	-	-	-	-	<5	-	-
Benzene	ug/L	-	-	-	-	-	<0.3	-	-
Bromobenzene	ug/L	-	-	-	-	-	-	-	-
Bromochloromethane	ug/L	-	-	-	-	-	-	-	-
Bromodichloromethane	ug/L	-	-	-	-	-	<0.3	-	-
Bromoform	ug/L	-	-	-	-	-	<0.3	-	-
Bromomethane	ug/L	-	-	-	-	-	<0.3	-	-
Butanone, 2- (MEK)	ug/L	-	-	-	-	-	<5.0	-	-
Butylbenzene, n-	ug/L	-	-	-	-	-	-	-	-
Butylbenzene, sec-	ug/L	-	-	-	-	-	-	-	-
Butylbenzene, tert-	ug/L	-	-	-	-	-	-	-	-
Carbon disulfide	ug/L	-	-	-	-	-	<5.0	-	-
Carbon tetrachloride	ug/L	-	-	-	-	-	<0.3	-	-
Chlorobenzene	ug/L	-	-	-	-	-	<0.3	-	-
Chloroethane	ug/L	-	-	-	-	-	<0.3	-	-
Chloroform	ug/L	-	-	-	-	-	<0.3	-	-
Chloromethane	ug/L	-	-	-	-	-	<0.3	-	-
Chlorotoluene, 2-	ug/L	-	-	-	-	-	-	-	-
Chlorotoluene, 4-	ug/L	-	-	-	-	-	-	-	-
Dibromo-3-Chloropropane, 1,2-	ug/L	-	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	-	-	-	-	-	<0.3	-	-
Dibromoethane, 1,2- (EDB)	ug/L	-	-	-	-	-	<0.3	-	-
Dibromomethane	ug/L	-	-	-	-	-	-	-	-
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/L	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	ug/L	-	-	-	-	-	<0.3	-	-
Dichlorobenzene, 1,3-	ug/L	-	-	-	-	-	<0.3	-	-
Dichlorobenzene, 1,4-	ug/L	-	-	-	-	-	<0.3	-	-
Dichlorodifluoromethane	ug/L	-	-	-	-	-	<0.3	-	-
Dichloroethane, 1,1-	ug/L	-	-	-	-	-	<0.3	-	-
Dichloroethane, 1,2-	ug/L	-	-	-	-	-	<0.3	-	-
Dichloroethene, 1,1-	ug/L	-	-	-	-	-	0.597 J	-	-
Dichloroethene, cis-1,2-	ug/L	1780	667	8.45	41.3	11.4	76.2	2230	17.4
Dichloroethene, trans-1,2-	ug/L	9.8 J	2.73	0.48 J	13.7	0.44 J	0.418 J	12.1	<0.3
Dichloropropane, 1,2-	ug/L	-	-	-	-	-	<0.3	-	-
Dichloropropane, 1,3-	ug/L	-	-	-	-	-	-	-	-
Dichloropropane, 2,2-	ug/L	-	-	-	-	-	-	-	-
Dichloropropene, 1,1-	ug/L	-	-	-	-	-	-	-	-
Dichloropropene, cis-1,3-	ug/L	-	-	-	-	-	<0.3	-	-
Dichloropropene, trans-1,3-	ug/L	-	-	-	-	-	<0.3	-	-
Ethylbenzene	ug/L	-	-	-	-	-	<0.3	-	-
Hexachlorobutadiene	ug/L	-	-	-	-	-	<1.0	-	-
Hexanone, 2-	ug/L	-	-	-	-	-	<5.0	-	-
Isopropylbenzene	ug/L	-	-	-	-	-	-	-	-
Isopropyltoluene, p-	ug/L	-	-	-	-	-	-	-	-
Methyl-2-pentanone, 4- (MIBK)	ug/L	-	-	-	-	-	<5.0	-	-
Methylene Chloride	ug/L	-	-	-	-	-	<2.5	-	-
Naphthalene	ug/L	-	-	-	-	-	-	-	-
Propylbenzene, N-	ug/L	-	-	-	-	-	-	-	-
Styrene	ug/L	-	-	-	-	-	<0.3	-	-
Tetrachloroethane, 1,1,1,2-	ug/L	-	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	ug/L	-	-	-	-	-	<0.3	-	-
Tetrachloroethene	ug/L	33.4 J	960	<0.6	29.5	2.69	230	732	79.6
Toluene	ug/L	-	-	-	-	-	<0.6	-	-
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/L	-	-	-	-	-	<5.0	-	-
Trichlorobenzene, 1,2,3-	ug/L	-	-	-	-	-	-	-	-
Trichlorobenzene, 1,2,4-	ug/L	-	-	-	-	-	<1.5	-	-
Trichloroethane, 1,1,1-	ug/L	-	-	-	-	-	<0.3	-	-
Trichloroethane, 1,1,2-	ug/L	-	-	-	-	-	<0.3	-	-
Trichloroethene	ug/L	16.2 J	122	0.73 J	11.4	55.4	39.1	875	7.44
Trichlorofluoromethane	ug/L	-	-	-	-	-	<0.3	-	-
Trichloropropane, 1,2,3-	ug/L	-	-	-	-	-	-	-	-
Trimethylbenzene, 1,2,4-	ug/L	-	-	-	-	-	<1.5	-	-
Trimethylbenzene, 1,3,5-	ug/L	-	-	-	-	-	<1.5	-	-
Vinyl acetate	ug/L	-	-	-	-	-	-	-	-
Vinyl chloride	ug/L	448	5.2	<0.1	<0.1	0.29 J	2.69	11.1	<0.3
Xylene, m,p-	ug/L	-	-	-	-	-	<0.6	-	-
Xylene, o-	ug/L	-	-	-	-	-	<0.3	-	-

See notes at end of table.

TABLE B.2
Groundwater Results
Task 1 and 2 Sites

Demonstration Site		Houston	Houston	Houston	Houston	Houston	Houston	Houston
Site ID		HOU-003	HOU-003	HOU-004	HOU-004	HOU-004	HOU-004	HOU-004
Sewer Category		B	B	B	B	B	B	B
Sample Location		MW-5	MW-5	MW-3	MW-3	MW-3	MW-4	MW-4
Sample Type		N	N	N	N	N	N	N
Collection Date		2/25/2016	7/20/2017	6/5/2013	1/19/2017	7/21/2017	6/5/2013	1/19/2017
Depth to Water (ft bgs)		16.21	16.12	19.22	17.51	17.38	20.91	17.25
Analyte								
Acetone	ug/L	-	-	-	-	-	-	-
Benzene	ug/L	-	-	-	-	-	-	-
Bromobenzene	ug/L	-	-	-	-	-	-	-
Bromochloromethane	ug/L	-	-	-	-	-	-	-
Bromodichloromethane	ug/L	-	-	-	-	-	-	-
Bromoform	ug/L	-	-	-	-	-	-	-
Bromomethane	ug/L	-	-	-	-	-	-	-
Butanone, 2- (MEK)	ug/L	-	-	-	-	-	-	-
Butylbenzene, n-	ug/L	-	-	-	-	-	-	-
Butylbenzene, sec-	ug/L	-	-	-	-	-	-	-
Butylbenzene, tert-	ug/L	-	-	-	-	-	-	-
Carbon disulfide	ug/L	-	-	-	-	-	-	-
Carbon tetrachloride	ug/L	-	-	-	-	-	-	-
Chlorobenzene	ug/L	-	-	-	-	-	-	-
Chloroethane	ug/L	-	-	-	-	-	-	-
Chloroform	ug/L	-	-	-	-	-	-	-
Chloromethane	ug/L	-	-	-	-	-	-	-
Chlorotoluene, 2-	ug/L	-	-	-	-	-	-	-
Chlorotoluene, 4-	ug/L	-	-	-	-	-	-	-
Dibromo-3-Chloropropane, 1,2-	ug/L	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	-	-	-	-	-	-	-
Dibromomethane, 1,2- (EDB)	ug/L	-	-	-	-	-	-	-
Dibromomethane	ug/L	-	-	-	-	-	-	-
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/L	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	ug/L	-	-	-	-	-	-	-
Dichlorobenzene, 1,3-	ug/L	-	-	-	-	-	-	-
Dichlorobenzene, 1,4-	ug/L	-	-	-	-	-	-	-
Dichlorodifluoromethane	ug/L	-	-	-	-	-	-	-
Dichloroethane, 1,1-	ug/L	-	-	-	-	-	-	-
Dichloroethane, 1,2-	ug/L	-	-	-	-	-	-	-
Dichloroethane, 1,1-	ug/L	36	32 J	-	-	-	-	-
Dichloroethane, cis-1,2-	ug/L	5580	4280	1.79	12.2	13.2	9.93	0.78 J
Dichloroethane, trans-1,2-	ug/L	25.4	26.5 J	<5.0	< 0.167	< 0.167	<5.0	< 0.167
Dichloropropane, 1,2-	ug/L	-	-	-	-	-	-	-
Dichloropropane, 1,3-	ug/L	-	-	-	-	-	-	-
Dichloropropane, 2,2-	ug/L	-	-	-	-	-	-	-
Dichloropropene, 1,1-	ug/L	-	-	-	-	-	-	-
Dichloropropene, cis-1,3-	ug/L	-	-	-	-	-	-	-
Dichloropropene, trans-1,3-	ug/L	-	-	-	-	-	-	-
Ethylbenzene	ug/L	-	-	-	-	-	-	-
Hexachlorobutadiene	ug/L	-	-	-	-	-	-	-
Hexanone, 2-	ug/L	-	-	-	-	-	-	-
Isopropylbenzene	ug/L	-	-	-	-	-	-	-
Isopropyltoluene, p-	ug/L	-	-	-	-	-	-	-
Methyl-2-pentanone, 4- (MIBK)	ug/L	-	-	-	-	-	-	-
Methylene Chloride	ug/L	-	-	-	-	-	-	-
Naphthalene	ug/L	-	-	-	-	-	-	-
Propylbenzene, N-	ug/L	-	-	-	-	-	-	-
Styrene	ug/L	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,1,2-	ug/L	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	ug/L	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	19000	36300	8.64	73.2	61.7	244	21
Toluene	ug/L	-	-	-	-	-	-	-
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/L	-	-	-	-	-	-	-
Trichlorobenzene, 1,2,3-	ug/L	-	-	-	-	-	-	-
Trichlorobenzene, 1,2,4-	ug/L	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	ug/L	-	-	-	-	-	-	-
Trichloroethane, 1,1,2-	ug/L	-	-	-	-	-	-	-
Trichloroethene	ug/L	5950	4980	3.71	16.9	16.4	33	2.39 J
Trichlorofluoromethane	ug/L	-	-	-	-	-	-	-
Trichloropropane, 1,2,3-	ug/L	-	-	-	-	-	-	-
Trimethylbenzene, 1,2,4-	ug/L	-	-	-	-	-	-	-
Trimethylbenzene, 1,3,5-	ug/L	-	-	-	-	-	-	-
Vinyl acetate	ug/L	-	-	-	-	-	-	-
Vinyl chloride	ug/L	506	351	<2.0	< 0.232	< 0.232	<2.0	< 0.232
Xylene, m,p-	ug/L	-	-	-	-	-	-	-
Xylene, o-	ug/L	-	-	-	-	-	-	-

See notes at end of table.

TABLE B.2
Groundwater Results
Task 1 and 2 Sites

Demonstration Site		Houston	Houston	Houston	Houston	Houston	Houston	Houston
Site ID		HOU-004	HOU-005	HOU-005	HOU-006	HOU-007	HOU-007	HOU-007
Sewer Category		B	A	A	B	B	B	B
Sample Location		MW-4	MW-9	MW-5	SB-5	MW-3	MW-3	MW-3
Sample Type		N	N	N	N	N	N	N
Collection Date		7/21/2017	8/4/2016	8/4/2016	6/10/2016	3/27/2014	1/20/2017	8/10/2017
Depth to Water (ft bgs)		17.48	19.79	14.03	17	18.05	16.02	15.48
Analyte								
Acetone	ug/L	-	-	-	<20	-	-	-
Benzene	ug/L	-	-	-	<2	-	-	-
Bromobenzene	ug/L	-	-	-	-	-	-	-
Bromochloromethane	ug/L	-	-	-	-	-	-	-
Bromodichloromethane	ug/L	-	-	-	<2	-	-	-
Bromoform	ug/L	-	-	-	<4	-	-	-
Bromomethane	ug/L	-	-	-	<4	-	-	-
Butanone, 2- (MEK)	ug/L	-	-	-	<5	-	-	-
Butylbenzene, n-	ug/L	-	-	-	-	-	-	-
Butylbenzene, sec-	ug/L	-	-	-	-	-	-	-
Butylbenzene, tert-	ug/L	-	-	-	-	-	-	-
Carbon disulfide	ug/L	-	-	-	<6	-	-	-
Carbon tetrachloride	ug/L	-	-	-	<5	-	-	-
Chlorobenzene	ug/L	-	-	-	<3	-	-	-
Chloroethane	ug/L	-	-	-	<3	-	-	-
Chloroform	ug/L	-	-	-	<2	-	-	-
Chloromethane	ug/L	-	-	-	<2	-	-	-
Chlorotoluene, 2-	ug/L	-	-	-	-	-	-	-
Chlorotoluene, 4-	ug/L	-	-	-	-	-	-	-
Dibromo-3-Chloropropane, 1,2-	ug/L	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	-	-	-	<3	-	-	-
Dibromoethane, 1,2- (EDB)	ug/L	-	-	-	<2	-	-	-
Dibromomethane	ug/L	-	-	-	-	-	-	-
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/L	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	ug/L	-	-	-	<5	-	-	-
Dichlorobenzene, 1,3-	ug/L	-	-	-	<4	-	-	-
Dichlorobenzene, 1,4-	ug/L	-	-	-	<4	-	-	-
Dichlorodifluoromethane	ug/L	-	-	-	<3	-	-	-
Dichloroethane, 1,1-	ug/L	-	-	-	<2	<0.2	-	-
Dichloroethane, 1,2-	ug/L	-	-	-	<2	-	-	-
Dichloroethane, 1,1-	ug/L	-	<0.2	<0.2	15	<0.2	-	-
Dichloroethane, cis-1,2-	ug/L	0.44 J	<0.2	35	11000	8.76	572	794
Dichloroethane, trans-1,2-	ug/L	< 0.167	<0.2	<0.2	46	0.5 J	15.5	18.7
Dichloropropane, 1,2-	ug/L	-	-	-	<5	-	-	-
Dichloropropane, 1,3-	ug/L	-	-	-	-	-	-	-
Dichloropropane, 2,2-	ug/L	-	-	-	-	-	-	-
Dichloropropene, 1,1-	ug/L	-	-	-	-	-	-	-
Dichloropropene, cis-1,3-	ug/L	-	-	-	<1	-	-	-
Dichloropropene, trans-1,3-	ug/L	-	-	-	<2	-	-	-
Ethylbenzene	ug/L	-	-	-	<3	-	-	-
Hexachlorobutadiene	ug/L	-	-	-	<10	-	-	-
Hexanone, 2-	ug/L	-	-	-	<10	-	-	-
Isopropylbenzene	ug/L	-	-	-	-	-	-	-
Isopropyltoluene, p-	ug/L	-	-	-	-	-	-	-
Methyl-2-pentanone, 4- (MIBK)	ug/L	-	-	-	<7	-	-	-
Methylene Chloride	ug/L	-	-	-	<10	-	-	-
Naphthalene	ug/L	-	-	-	-	-	-	-
Propylbenzene, N-	ug/L	-	-	-	-	-	-	-
Styrene	ug/L	-	-	-	<3	-	-	-
Tetrachloroethane, 1,1,1,2-	ug/L	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	ug/L	-	-	-	<5	<0.2	-	-
Tetrachloroethene	ug/L	9.63	<0.3	13	5500	25	97.6	53.9
Toluene	ug/L	-	-	-	<2	-	-	-
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/L	-	-	-	<10	<5	-	-
Trichlorobenzene, 1,2,3-	ug/L	-	-	-	-	-	-	-
Trichlorobenzene, 1,2,4-	ug/L	-	-	-	<5	<1.5	-	-
Trichloroethane, 1,1,1-	ug/L	-	-	-	<2	<0.2	-	-
Trichloroethane, 1,1,2-	ug/L	-	-	-	<3	<0.2	-	-
Trichloroethene	ug/L	1.12 J	<0.2	5.2	2500	15.6	11.6	13.6
Trichlorofluoromethane	ug/L	-	-	-	<3	-	-	-
Trichloropropane, 1,2,3-	ug/L	-	-	-	-	-	-	-
Trimethylbenzene, 1,2,4-	ug/L	-	-	-	<3	52	-	-
Trimethylbenzene, 1,3,5-	ug/L	-	-	-	<3	-	-	-
Vinyl acetate	ug/L	-	-	-	-	-	-	-
Vinyl chloride	ug/L	< 0.232	<0.2	<0.2	640	4.79	12.6	28.4
Xylene, m,p-	ug/L	-	-	-	<5	-	-	-
Xylene, o-	ug/L	-	-	-	<3	-	-	-

See notes at end of table.

TABLE B.2
Groundwater Results
Task 1 and 2 Sites

Demonstration Site		Houston	Houston	Houston	Houston	Houston	Houston	Houston
Site ID		HOU-008	HOU-008	HOU-008	HOU-008	HOU-009	HOU-009	HOU-010
Sewer Category		B	B	B	B	B	B	B
Sample Location		MW-3	MW-3	MW-22	MW-22	MW-14	MW-4	MW-1B
Sample Type		N	N	N	N	N	N	N
Collection Date		3/31/2016	3/2/2017	3/31/2016	3/2/2017	11/6/2014	11/6/2014	12/2/2014
Depth to Water (ft bgs)		13.7	13.59	13.13	12.88	16.68	14.6	16.93
Analyte								
Acetone	ug/L	-	-	-	-	-	-	-
Benzene	ug/L	-	-	-	-	-	-	-
Bromobenzene	ug/L	-	-	-	-	-	-	-
Bromochloromethane	ug/L	-	-	-	-	-	-	-
Bromodichloromethane	ug/L	-	-	-	-	-	-	-
Bromoform	ug/L	-	-	-	-	-	-	-
Bromomethane	ug/L	-	-	-	-	-	-	-
Butanone, 2- (MEK)	ug/L	-	-	-	-	-	-	-
Butylbenzene, n-	ug/L	-	-	-	-	-	-	-
Butylbenzene, sec-	ug/L	-	-	-	-	-	-	-
Butylbenzene, tert-	ug/L	-	-	-	-	-	-	-
Carbon disulfide	ug/L	-	-	-	-	-	-	-
Carbon tetrachloride	ug/L	-	-	-	-	-	-	-
Chlorobenzene	ug/L	-	-	-	-	-	-	-
Chloroethane	ug/L	-	-	-	-	-	-	-
Chloroform	ug/L	-	-	-	-	-	-	-
Chloromethane	ug/L	-	-	-	-	-	-	-
Chlorotoluene, 2-	ug/L	-	-	-	-	-	-	-
Chlorotoluene, 4-	ug/L	-	-	-	-	-	-	-
Dibromo-3-Chloropropane, 1,2-	ug/L	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	-	-	-	-	-	-	-
Dibromomethane, 1,2- (EDB)	ug/L	-	-	-	-	-	-	-
Dibromomethane	ug/L	-	-	-	-	-	-	-
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/L	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	ug/L	-	-	-	-	-	-	-
Dichlorobenzene, 1,3-	ug/L	-	-	-	-	-	-	-
Dichlorobenzene, 1,4-	ug/L	-	-	-	-	-	-	-
Dichlorodifluoromethane	ug/L	-	-	-	-	-	-	-
Dichloroethane, 1,1-	ug/L	-	-	-	-	-	-	-
Dichloroethane, 1,2-	ug/L	-	-	-	-	-	-	-
Dichloroethane, 1,1-	ug/L	15.4	12.5	<0.178	-	<0.272	<0.272	-
Dichloroethane, cis-1,2-	ug/L	643	832	2.08	-	67	169	460
Dichloroethane, trans-1,2-	ug/L	4.08	4.04 J	<0.167	-	2.76 J	0.64	2.5
Dichloropropane, 1,2-	ug/L	-	-	-	-	-	-	-
Dichloropropane, 1,3-	ug/L	-	-	-	-	-	-	-
Dichloropropane, 2,2-	ug/L	-	-	-	-	-	-	-
Dichloropropene, 1,1-	ug/L	-	-	-	-	-	-	-
Dichloropropene, cis-1,3-	ug/L	-	-	-	-	-	-	-
Dichloropropene, trans-1,3-	ug/L	-	-	-	-	-	-	-
Ethylbenzene	ug/L	-	-	-	-	-	-	-
Hexachlorobutadiene	ug/L	-	-	-	-	-	-	-
Hexanone, 2-	ug/L	-	-	-	-	-	-	-
Isopropylbenzene	ug/L	-	-	-	-	-	-	-
Isopropyltoluene, p-	ug/L	-	-	-	-	-	-	-
Methyl-2-pentanone, 4- (MIBK)	ug/L	-	-	-	-	-	-	-
Methylene Chloride	ug/L	-	-	-	-	-	-	-
Naphthalene	ug/L	-	-	-	-	-	-	-
Propylbenzene, N-	ug/L	-	-	-	-	-	-	-
Styrene	ug/L	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,1,2-	ug/L	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	ug/L	-	-	-	-	-	-	-
Tetrachloroethene	ug/L	181	69.4	<0.347	-	0.28 J	428	1400
Toluene	ug/L	-	-	-	-	-	-	-
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/L	-	-	-	-	-	-	-
Trichlorobenzene, 1,2,3-	ug/L	-	-	-	-	-	-	-
Trichlorobenzene, 1,2,4-	ug/L	-	-	-	-	-	-	-
Trichloroethane, 1,1,1-	ug/L	-	-	-	-	-	-	-
Trichloroethane, 1,1,2-	ug/L	-	-	-	-	-	-	-
Trichloroethene	ug/L	137	71.1	<0.218	-	53.9	268	570
Trichlorofluoromethane	ug/L	-	-	-	-	-	-	-
Trichloropropane, 1,2,3-	ug/L	-	-	-	-	-	-	-
Trimethylbenzene, 1,2,4-	ug/L	-	-	-	-	-	-	-
Trimethylbenzene, 1,3,5-	ug/L	-	-	-	-	-	-	-
Vinyl acetate	ug/L	-	-	-	-	-	-	-
Vinyl chloride	ug/L	96.1	125	<0.232	-	0.44 J	1.14 J	1.1
Xylene, m,p-	ug/L	-	-	-	-	-	-	-
Xylene, o-	ug/L	-	-	-	-	-	-	-

See notes at end of table.

TABLE B.2
Groundwater Results
Task 1 and 2 Sites

Demonstration Site		San Diego County	San Diego County	San Diego County	San Diego County	San Diego County	San Diego County
Site ID		SAN-001	SAN-002	SAN-002	SAN-003	SAN-004	SAN-004
Sewer Category		B	B	B	B	B	B
Sample Location		FISC-MW14	MW-10	MW-11	MW/GP-23	MW-1	MW-2
Sample Type		N	N	N	N	N	N
Collection Date		1/12/2017	1/27/2014	1/27/2014	3/25/2013	2/17/2017	2/17/2017
Depth to Water (ft bgs)		19.52	13.9	14.54	34.75	14.33	13.08
Analyte							
Acetone	ug/L	-	-	-	<100	<1000	<80
Benzene	ug/L	<0.2	3200	27	<5	<50	<4
Bromobenzene	ug/L	-	-	-	-	-	-
Bromochloromethane	ug/L	-	-	-	-	-	-
Bromodichloromethane	ug/L	-	<20	<2	<5	<50	<4
Bromoform	ug/L	-	<50	<5	<25	<50	<4
Bromomethane	ug/L	-	<50	<5	<15	<100	<8
Butanone, 2- (MEK)	ug/L	-	-	-	<50	<500	<40
Butylbenzene, n-	ug/L	-	-	-	-	-	-
Butylbenzene, sec-	ug/L	-	-	-	-	-	-
Butylbenzene, tert-	ug/L	-	-	-	-	-	-
Carbon disulfide	ug/L	-	-	-	<5	<100	<8
Carbon tetrachloride	ug/L	-	<50	<5	<5	<50	<4
Chlorobenzene	ug/L	-	<20	<2	<5	<50	<4
Chloroethane	ug/L	-	<50	<5	<15	<50	<4
Chloroform	ug/L	-	<20	<2	12.8	<50	<4
Chloromethane	ug/L	-	<50	<5	<15	<50	<4
Chlorotoluene, 2-	ug/L	-	-	-	-	-	-
Chlorotoluene, 4-	ug/L	-	-	-	-	-	-
Dibromo-3-Chloropropane, 1,2-	ug/L	-	-	-	-	-	-
Dibromochloromethane	ug/L	-	<20	<2	<5	<50	<4
Dibromoethane, 1,2- (EDB)	ug/L	-	<20	<2	<5	<50	<4
Dibromomethane	ug/L	-	-	-	-	-	-
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/L	-	-	-	-	-	-
Dichlorobenzene, 1,2-	ug/L	-	<20	<2	<5	<50	<4
Dichlorobenzene, 1,3-	ug/L	-	<20	<2	<5	<50	<4
Dichlorobenzene, 1,4-	ug/L	-	<20	<2	<5	<50	<4
Dichlorodifluoromethane	ug/L	-	<50	<5	<15	<100	<8
Dichloroethane, 1,1-	ug/L	-	81	25	28.6	<50	<4
Dichloroethane, 1,2-	ug/L	-	<20	<2	<5	<50	<4
Dichloroethane, 1,1-	ug/L	-	<50	<5	14.6	<50	<4
Dichloroethene, cis-1,2-	ug/L	-	<20	<2	30.7	1500	250
Dichloroethene, trans-1,2-	ug/L	-	<20	<2	8.2	<50	5.7
Dichloropropane, 1,2-	ug/L	-	<20	<2	<5	<50	<4
Dichloropropane, 1,3-	ug/L	-	-	-	-	-	-
Dichloropropane, 2,2-	ug/L	-	-	-	-	-	-
Dichloropropene, 1,1-	ug/L	-	-	-	-	-	-
Dichloropropene, cis-1,3-	ug/L	-	<20	<2	<5	<50	<4
Dichloropropene, trans-1,3-	ug/L	-	<20	<2	<5	<50	<4
Ethylbenzene	ug/L	<0.2	330	<2	<5	<50	<4
Hexachlorobutadiene	ug/L	-	<50	<5	<15	-	-
Hexanone, 2-	ug/L	-	-	-	<25	<1000	<80
Isopropylbenzene	ug/L	-	-	-	-	-	-
Isopropyltoluene, p-	ug/L	-	-	-	-	-	-
Methyl-2-pentanone, 4- (MIBK)	ug/L	-	-	-	<25	<500	<40
Methylene Chloride	ug/L	-	<50	<5	<20	<100	<8
Naphthalene	ug/L	-	-	-	-	-	-
Propylbenzene, N-	ug/L	-	-	-	-	-	-
Styrene	ug/L	-	<20	<2	<5	<50	<4
Tetrachloroethane, 1,1,1,2-	ug/L	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	ug/L	-	<20	<2	<5	<50	<4
Tetrachloroethene	ug/L	-	<20	<2	17000	3700	200
Toluene	ug/L	<0.2	49	<2	<5	<50	<4
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/L	-	-	-	-	<50	<4
Trichlorobenzene, 1,2,3-	ug/L	-	-	-	-	-	-
Trichlorobenzene, 1,2,4-	ug/L	-	<50	<5	<5	-	-
Trichloroethane, 1,1,1-	ug/L	-	<50	<2	<5	-	-
Trichloroethane, 1,1,2-	ug/L	-	<20	<2	<5	<50	<4
Trichloroethene	ug/L	-	<20	2.5	8660	410	34
Trichlorofluoromethane	ug/L	-	<50	<5	<5	<50	<4
Trichloropropane, 1,2,3-	ug/L	-	-	-	-	-	-
Trimethylbenzene, 1,2,4-	ug/L	-	<20	<2	<5	<50	<4
Trimethylbenzene, 1,3,5-	ug/L	-	40	<2	<5	<50	<4
Vinyl acetate	ug/L	-	-	-	<5	<500	<40
Vinyl chloride	ug/L	-	<50	<5	<5	89	18
Xylene, m,p-	ug/L	<0.4	170	5.5	<10	<50	<4
Xylene, o-	ug/L	<0.2	<20	<2	<5	<50	<4

See notes at end of table.

TABLE B.2
Groundwater Results
Task 1 and 2 Sites

Demonstration Site		San Diego County	San Diego County	San Diego County	San Diego County	San Diego County	San Diego County
Site ID		SAN-005	SAN-005	SAN-006	SAN-006	SAN-007	SAN-007
Sewer Category		B	B	B	B	B	B
Sample Location		MW-15	MW-19	MW-13	MW-20	MW-1	MW-7
Sample Type		N	N	N	N	N	N
Collection Date		10/5/2016	11/27/2012	2/16/2017	10/24/2016	6/14/2014	6/14/2014
Depth to Water (ft bgs)		29.68	32.33	16.15	13.98	13.12	12.99
Analyte							
Acetone	ug/L	62800	-	-	-	<20	<1
Benzene	ug/L	192	100	<10	<1	<0.5	<0.5
Bromobenzene	ug/L	-	-	-	-	-	-
Bromochloromethane	ug/L	-	-	-	-	-	-
Bromodichloromethane	ug/L	<48	-	<10	<1	<1	<1
Bromoform	ug/L	<93	-	<20	<1	<1	<1
Bromomethane	ug/L	-	-	<10	<1	<10	<10
Butanone, 2- (MEK)	ug/L	170000	100000	-	-	<10	<10
Butylbenzene, n-	ug/L	-	-	-	-	-	-
Butylbenzene, sec-	ug/L	-	-	-	-	-	-
Butylbenzene, tert-	ug/L	-	-	-	-	-	-
Carbon disulfide	ug/L	-	-	-	-	<10	<10
Carbon tetrachloride	ug/L	<60	-	<10	<1	<0.5	<0.5
Chlorobenzene	ug/L	<40	-	<10	<1	<1	<1
Chloroethane	ug/L	<130	-	<20	<1	<5	<5
Chloroform	ug/L	<60	-	<10	1.2	<1	<1
Chloromethane	ug/L	-	-	<10	<1	<10	<10
Chlorotoluene, 2-	ug/L	-	-	-	-	-	-
Chlorotoluene, 4-	ug/L	-	-	-	-	-	-
Dibromo-3-Chloropropane, 1,2-	ug/L	-	-	-	-	-	-
Dibromochloromethane	ug/L	<52	-	<10	<1	<1	<1
Dibromoethane, 1,2- (EDB)	ug/L	<66	-	<10	<1	<1	<1
Dibromomethane	ug/L	-	-	-	-	-	-
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/L	-	-	-	-	-	<1
Dichlorobenzene, 1,2-	ug/L	<53	-	<10	<1	<1	<1
Dichlorobenzene, 1,3-	ug/L	<47	-	<10	<1	<1	<1
Dichlorobenzene, 1,4-	ug/L	<78	-	<10	<1	<1	<1
Dichlorodifluoromethane	ug/L	<100	-	<20	<1	<1	<1
Dichloroethane, 1,1-	ug/L	<51	-	<10	<1	<1	<1
Dichloroethane, 1,2-	ug/L	<57	-	<10	<1	<0.5	<0.5
Dichloroethene, 1,1-	ug/L	<43	150	44	120	<1	<1
Dichloroethene, cis-1,2-	ug/L	<62	-	<10	1.2	2.4	<1
Dichloroethene, trans-1,2-	ug/L	<66	-	<10	<1	<1	<1
Dichloropropane, 1,2-	ug/L	<69	-	<10	<1	<1	<1
Dichloropropane, 1,3-	ug/L	-	-	-	-	-	-
Dichloropropane, 2,2-	ug/L	-	-	-	-	-	-
Dichloropropene, 1,1-	ug/L	-	-	-	-	-	-
Dichloropropene, cis-1,3-	ug/L	<53	-	<10	<1	<0.5	<0.5
Dichloropropene, trans-1,3-	ug/L	<49	-	<10	<1	<0.5	<0.5
Ethylbenzene	ug/L	52.6	-	<10	<1	<1	<1
Hexachlorobutadiene	ug/L	<110	-	<10	<1	-	-
Hexanone, 2-	ug/L	<400	-	-	-	<10	<10
Isopropylbenzene	ug/L	-	-	-	-	-	-
Isopropyltoluene, p-	ug/L	-	-	-	-	-	-
Methyl-2-pentanone, 4- (MIBK)	ug/L	886	-	-	-	<10	<10
Methylene Chloride	ug/L	<100	-	<40	<1	<10	<10
Naphthalene	ug/L	-	-	-	-	-	-
Propylbenzene, N-	ug/L	-	-	-	-	-	-
Styrene	ug/L	<48	-	<10	<1	<1	<1
Tetrachloroethane, 1,1,1,2-	ug/L	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	ug/L	<65	-	<10	<1	<1	<1
Tetrachloroethene	ug/L	<61	200	120	<1	15	5.5
Toluene	ug/L	6110	8500	<10	<1	<1	<1
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/L	-	-	-	-	<10	<10
Trichlorobenzene, 1,2,3-	ug/L	-	-	-	-	-	-
Trichlorobenzene, 1,2,4-	ug/L	<100	-	<20	<1	<1	<1
Trichloroethane, 1,1,1-	ug/L	<40	-	<10	<1	<1	<1
Trichloroethane, 1,1,2-	ug/L	<73	-	<10	<1	<1	<1
Trichloroethene	ug/L	<54	100	2500	170	3	5.1
Trichlorofluoromethane	ug/L	<100	-	<10	<1	<10	<10
Trichloropropane, 1,2,3-	ug/L	-	-	-	-	-	-
Trimethylbenzene, 1,2,4-	ug/L	<40	-	<10	<1	<1	<1
Trimethylbenzene, 1,3,5-	ug/L	<40	-	<10	<1	<1	<1
Vinyl acetate	ug/L	-	-	-	-	<10	<10
Vinyl chloride	ug/L	<63	-	<10	<1	<0.5	<0.5
Xylene, m,p-	ug/L	<110	-	<20	<1	<1	<1
Xylene, o-	ug/L	<110	-	<10	<1	<1	<1

See notes at end of table.

TABLE B.2
Groundwater Results
Task 1 and 2 Sites

Demonstration Site		San Diego County	San Diego County	Orange County	Orange County	Orange County	Orange County	Orange County
Site ID		SAN-008	SAN-009	SNA-001	SNA-001	SNA-002	SNA-002	SNA-003
Sewer Category		B	B	B	B	B	B	B
Sample Location		MW-16A	MW-11S	MW-21	MW-22	MW-4S	RMW-6S	RW-21
Sample Type		N	N	N	N	N	N	N
Collection Date		11/18/2016	11/2/2016	3/24/2017	3/24/2017	5/9/2017	5/9/2017	6/7/2016
Depth to Water (ft bgs)		26.55	30.79	13.17	12.48	7.36	6.99	22.05
Analyte								
Acetone	ug/L	3.8	<4000	<1000	<200	<100	<100	<20
Benzene	ug/L	<0.32	<100	<25	<5	<2.5	<2.5	2.4
Bromobenzene	ug/L	-	-	-	-	-	-	-
Bromochloromethane	ug/L	-	-	-	-	-	-	-
Bromodichloromethane	ug/L	<0.2	<200	<50	<10	<5	<5	<1
Bromoform	ug/L	<0.34	<200	<50	<10	<5	<5	<1
Bromomethane	ug/L	<0.38	<2000	<500	<100	<50	<50	<10
Butanone, 2- (MEK)	ug/L	<2.9	<2000	<500	<100	<50	<50	<10
Butylbenzene, n-	ug/L	-	-	-	-	-	-	-
Butylbenzene, sec-	ug/L	-	-	-	-	-	-	-
Butylbenzene, tert-	ug/L	-	-	-	-	-	-	-
Carbon disulfide	ug/L	<0.44	<2000	<500	<100	<50	<50	<10
Carbon tetrachloride	ug/L	<0.22	<100	<25	<5	<2.5	<2.5	<0.5
Chlorobenzene	ug/L	<0.14	<200	<50	<10	<5	<5	<1
Chloroethane	ug/L	<0.34	<1000	<250	<50	<25	<25	<5
Chloroform	ug/L	<0.22	<200	<50	<10	<5	<5	<1
Chloromethane	ug/L	<0.22	<2000	<500	<100	<50	<50	<10
Chlorotoluene, 2-	ug/L	-	-	-	-	-	-	-
Chlorotoluene, 4-	ug/L	-	-	-	-	-	-	-
Dibromo-3-Chloropropane, 1,2-	ug/L	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	<0.24	<200	<50	<10	<5	<5	<1
Dibromoethane, 1,2- (EDB)	ug/L	-	<200	<50	<10	<5	<5	<1
Dibromomethane	ug/L	-	-	-	-	-	-	-
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/L	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	ug/L	<0.17	<200	<50	<10	<5	<5	<1
Dichlorobenzene, 1,3-	ug/L	<0.17	<200	<50	<10	<5	<5	<1
Dichlorobenzene, 1,4-	ug/L	<0.31	<200	<50	<10	<5	<5	<1
Dichlorodifluoromethane	ug/L	<0.24	<200	<50	<10	<5	<5	<1
Dichloroethane, 1,1-	ug/L	<0.19	1300	<50	<10	<5	<5	1.7
Dichloroethane, 1,2-	ug/L	<0.18	120	<25	<5	<2.5	<2.5	24
Dichloroethene, 1,1-	ug/L	<0.20	3500	110	14	<5	18	27
Dichloroethene, cis-1,2-	ug/L	<0.24	19000	<50	<10	7.5	<5	37
Dichloroethene, trans-1,2-	ug/L	<0.26	<200	<50	<10	<5	<5	58
Dichloropropane, 1,2-	ug/L	<0.24	<200	<50	<10	<5	<5	<1
Dichloropropane, 1,3-	ug/L	-	-	-	-	-	-	-
Dichloropropane, 2,2-	ug/L	-	-	-	-	-	-	-
Dichloropropene, 1,1-	ug/L	-	-	-	-	-	-	-
Dichloropropene, cis-1,3-	ug/L	<0.18	<100	<25	<5	<2.5	<2.5	<0.5
Dichloropropene, trans-1,3-	ug/L	<0.35	<100	<25	<5	<2.5	<2.5	<0.5
Ethylbenzene	ug/L	<0.32	<200	<50	<10	<5	<5	<1
Hexachlorobutadiene	ug/L	<0.48	-	-	-	-	-	-
Hexanone, 2-	ug/L	<2.6	<2000	<500	<100	<50	<50	<10
Isopropylbenzene	ug/L	-	-	-	-	-	-	-
Isopropyltoluene, p-	ug/L	-	-	-	-	-	-	-
Methyl-2-pentanone, 4- (MIBK)	ug/L	<2.7	<2000	<500	<100	<50	<50	<10
Methylene Chloride	ug/L	<0.38	<2000	<500	<100	<50	<50	<10
Naphthalene	ug/L	-	-	-	-	-	-	-
Propylbenzene, N-	ug/L	-	-	-	-	-	-	-
Styrene	ug/L	<0.32	<200	<50	<10	<5	<5	<1
Tetrachloroethane, 1,1,1,2-	ug/L	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	ug/L	<0.22	<200	<50	<10	<5	<5	<1
Tetrachloroethene	ug/L	<0.22	2100	<50	10	880	6100	<1
Toluene	ug/L	<0.26	<200	<50	<10	<5	<5	<1
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/L	-	<2000	<500	<100	<50	<50	<10
Trichlorobenzene, 1,2,3-	ug/L	-	-	-	-	-	-	-
Trichlorobenzene, 1,2,4-	ug/L	<0.25	<200	<50	<10	<5	<5	<1
Trichloroethane, 1,1,1-	ug/L	<0.19	<200	<50	<10	<5	<5	<1
Trichloroethane, 1,1,2-	ug/L	<0.32	<200	<50	<10	<5	<5	<1
Trichloroethene	ug/L	25	15000	6800	1800	93	51	460
Trichlorofluoromethane	ug/L	<0.25	<2000	<500	<100	<50	<50	<10
Trichloropropane, 1,2,3-	ug/L	-	-	-	-	-	-	-
Trimethylbenzene, 1,2,4-	ug/L	<0.15	<200	<50	<10	<5	<5	<1
Trimethylbenzene, 1,3,5-	ug/L	<0.33	<200	<50	<10	<5	<5	<1
Vinyl acetate	ug/L	-	<2000	<500	<100	<50	<50	<10
Vinyl chloride	ug/L	<0.27	<2000	<25	<5	<2.5	<2.5	34
Xylene, m,p-	ug/L	<0.24	<200	<50	<10	<5	<5	<1
Xylene, o-	ug/L	<0.39	<200	<50	<10	<5	<5	<1

See notes at end of table.

TABLE B.2
Groundwater Results
Task 1 and 2 Sites

Demonstration Site		Orange County	Orange County	Orange County	Orange County	Orange County	Orange County	Orange County
Site ID		SNA-003	SNA-004	SNA-005	SNA-005	SNA-006	SNA-006	SNA-007
Sewer Category		B	B	B	B	B	B	A
Sample Location		TW-1	MW-3	MW-1A	MW-4A	EP-17A	MW-8	MW-13
Sample Type		N	N	N	N	N	N	N
Collection Date		6/7/2016	3/9/2017	9/23/2016	9/23/2016	1/31/2017	1/24/2017	3/20/2017
Depth to Water (ft bgs)		22.35	29.22	27.02	26.11	21.95	20	4.19
Analyte								
Acetone	ug/L	<20	-	-	-	<20	<50	<10
Benzene	ug/L	<0.5	<0.25	<10	<0.5	<0.5	<1.25	<1
Bromobenzene	ug/L	-	-	-	-	-	-	-
Bromochloromethane	ug/L	-	-	-	-	-	-	-
Bromodichloromethane	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Bromoform	ug/L	<1	<0.4	<10	1.5	<1	<2	<1
Bromomethane	ug/L	<10	<0.25	<20	<1	<0.5	<1.25	<2
Butanone, 2- (MEK)	ug/L	<10	-	<100	<5	<5	<12.5	<5
Butylbenzene, n-	ug/L	-	-	-	-	-	-	-
Butylbenzene, sec-	ug/L	-	-	-	-	-	-	-
Butylbenzene, tert-	ug/L	-	-	-	-	-	-	-
Carbon disulfide	ug/L	<10	-	-	-	<1	<2.5	<1
Carbon tetrachloride	ug/L	<0.5	<0.25	<10	<0.5	<0.5	<1.25	<1
Chlorobenzene	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Chloroethane	ug/L	<5	<0.4	<20	<1	<1	<2	<2
Chloroform	ug/L	3.4	0.31	<10	<0.5	<0.5	2.58	<1
Chloromethane	ug/L	<10	<0.25	<10	<0.5	<0.5	<1.25	<2
Chlorotoluene, 2-	ug/L	-	-	-	-	-	-	-
Chlorotoluene, 4-	ug/L	-	-	-	-	-	-	-
Dibromo-3-Chloropropane, 1,2-	ug/L	-	-	-	-	-	-	-
Dibromochloromethane	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Dibromoethane, 1,2- (EDB)	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Dibromomethane	ug/L	-	-	-	-	-	-	-
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/L	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Dichlorobenzene, 1,3-	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Dichlorobenzene, 1,4-	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Dichlorodifluoromethane	ug/L	<1	<0.4	<10	<0.5	<1	<2	<2
Dichloroethane, 1,1-	ug/L	92	2.9	<10	0.97	<0.5	3.56	<1
Dichloroethane, 1,2-	ug/L	8.6	<0.25	<10	<0.5	0.624	<1.25	<1
Dichloroethane, 1,1-	ug/L	1200	160	32	0.83	3.68	97.4	<1
Dichloroethane, cis-1,2-	ug/L	490	<0.25	84	1.1	10	1.38	31
Dichloroethane, trans-1,2-	ug/L	140	<0.25	14	<0.5	<0.5	<1.25	<1
Dichloropropane, 1,2-	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Dichloropropane, 1,3-	ug/L	-	-	-	-	-	-	-
Dichloropropane, 2,2-	ug/L	-	-	-	-	-	-	-
Dichloropropene, 1,1-	ug/L	-	-	-	-	-	-	-
Dichloropropene, cis-1,3-	ug/L	<0.5	<0.25	<10	<0.5	<0.5	<1.25	<1
Dichloropropene, trans-1,3-	ug/L	<0.5	<0.25	-	-	<0.5	<1.25	<1
Ethylbenzene	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Hexachlorobutadiene	ug/L	-	<0.25	<10	<0.5	<0.5	<1.25	<1
Hexanone, 2-	ug/L	<10	-	-	-	<5	<12.5	<5
Isopropylbenzene	ug/L	-	-	-	-	-	-	-
Isopropyltoluene, p-	ug/L	-	-	-	-	-	-	-
Methyl-2-pentanone, 4- (MIBK)	ug/L	<10	-	-	-	<5	<12.5	<5
Methylene Chloride	ug/L	<10	<0.88	<40	<2	<2	<4.4	<2
Naphthalene	ug/L	-	-	-	-	-	-	-
Propylbenzene, N-	ug/L	-	-	-	-	-	-	-
Styrene	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Tetrachloroethane, 1,1,1,2-	ug/L	-	-	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Tetrachloroethene	ug/L	9.3	12	970	8.1	136	394	170
Toluene	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/L	<10	-	<10	<0.5	6.07	<2.5	<3
Trichlorobenzene, 1,2,3-	ug/L	-	-	-	-	-	-	-
Trichlorobenzene, 1,2,4-	ug/L	<1	<0.4	<10	<0.5	<1	<2	<1
Trichloroethane, 1,1,1-	ug/L	<1	14	<10	<0.5	<0.5	<1.25	<1
Trichloroethane, 1,1,2-	ug/L	8.1	<0.25	<10	<0.5	<0.5	11.1	<1
Trichloroethene	ug/L	2900	150	22000	530	60.8	482	13
Trichlorofluoromethane	ug/L	<10	<0.25	<10	<0.5	<0.5	<1.25	<2
Trichloropropane, 1,2,3-	ug/L	-	-	-	-	-	-	-
Trimethylbenzene, 1,2,4-	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Trimethylbenzene, 1,3,5-	ug/L	<1	<0.25	<10	<0.5	<0.5	<1.25	<1
Vinyl acetate	ug/L	<10	-	-	-	-	-	<2
Vinyl chloride	ug/L	4.9	<0.25	<10	<0.5	<0.5	<1.25	5.6
Xylene, m,p-	ug/L	<1	<0.5	<20	<1	<1	<2.5	<1
Xylene, o-	ug/L	<1	<0.25	<10	<0.5	<1	<2.5	<1

See notes at end of table.

TABLE B.2
Groundwater Results
Task 1 and 2 Sites

Demonstration Site Site ID Sewer Category Sample Location Sample Type Collection Date Depth to Water (ft bgs)		Orange County	Orange County	Orange County	Orange County	Orange County
		SNA-007	SNA-008	SNA-008	SNA-009	SNA-009
		A	B	B	B	B
		MW-15	MW-3	MW-4R	MW-1	MW-11
		N	N	N	N	N
		3/20/2017	1/25/2017	1/25/2017	5/17/2016	5/18/2016
		3.72	7.35	8.47	8.26	9.49
Analyte						
Acetone	ug/L	<10	<10	<20	-	-
Benzene	ug/L	<1	<0.14	<0.28	<1	<0.25
Bromobenzene	ug/L	-	-	-	-	-
Bromochloromethane	ug/L	-	-	-	-	-
Bromodichloromethane	ug/L	<1	<0.21	<0.41	<1	<0.25
Bromoform	ug/L	<1	<0.5	<1	<1.6	<0.4
Bromomethane	ug/L	<2	<3.9	<7.8	<1	<0.25
Butanone, 2- (MEK)	ug/L	<5	<4.4	<8.8	-	-
Butylbenzene, n-	ug/L	-	-	-	-	-
Butylbenzene, sec-	ug/L	-	-	-	-	-
Butylbenzene, tert-	ug/L	-	-	-	-	-
Carbon disulfide	ug/L	<1	<4.1	<8.2	-	-
Carbon tetrachloride	ug/L	<1	<0.23	<0.45	<1	<0.25
Chlorobenzene	ug/L	<1	<0.17	0.59	<1	<0.25
Chloroethane	ug/L	<2	<2.3	<4.6	<1.6	<0.4
Chloroform	ug/L	<1	<3.5	<0.92	<1	<0.25
Chloromethane	ug/L	<2	<0.46	<7.1	-	<0.25
Chlorotoluene, 2-	ug/L	-	-	-	-	-
Chlorotoluene, 4-	ug/L	-	-	-	-	-
Dibromo-3-Chloropropane, 1,2-	ug/L	-	-	-	-	-
Dibromochloromethane	ug/L	<1	<0.25	<0.5	<1	<0.25
Dibromoethane, 1,2- (EDB)	ug/L	<1	<0.36	<0.72	<1	<0.25
Dibromomethane	ug/L	-	-	-	-	-
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/L	-	-	-	-	-
Dichlorobenzene, 1,2-	ug/L	<1	<0.46	<0.91	<1	<0.25
Dichlorobenzene, 1,3-	ug/L	<1	<0.4	<0.8	<1	<0.25
Dichlorobenzene, 1,4-	ug/L	<1	<0.43	<0.86	<1	<0.25
Dichlorodifluoromethane	ug/L	<2	<0.46	<0.91	<1	<0.25
Dichloroethane, 1,1-	ug/L	<1	7.9	17	<1	2.6
Dichloroethane, 1,2-	ug/L	<1	<0.24	<0.48	<1	<0.25
Dichloroethene, 1,1-	ug/L	<1	24	19	1.2	<0.25
Dichloroethene, cis-1,2-	ug/L	<1	740	1100	780	1.25
Dichloroethene, trans-1,2-	ug/L	<1	110	65	33	<0.25
Dichloropropane, 1,2-	ug/L	<1	<0.42	<0.85	<1	<0.25
Dichloropropane, 1,3-	ug/L	-	-	-	-	-
Dichloropropane, 2,2-	ug/L	-	-	-	-	-
Dichloropropene, 1,1-	ug/L	-	-	-	-	-
Dichloropropene, cis-1,3-	ug/L	<1	<0.25	<0.49	<1	<0.25
Dichloropropene, trans-1,3-	ug/L	<1	<0.25	<0.51	<1	<0.25
Ethylbenzene	ug/L	<1	<0.14	<0.28	<1	<0.25
Hexachlorobutadiene	ug/L	<1	-	-	<1	<0.25
Hexanone, 2-	ug/L	<5	<4.2	<8.3	-	-
Isopropylbenzene	ug/L	-	-	-	-	-
Isopropyltoluene, p-	ug/L	-	-	-	-	-
Methyl-2-pentanone, 4- (MIBK)	ug/L	<5	<4.4	<8.8	-	-
Methylene Chloride	ug/L	<2	<3.8	<7.7	<4.4	<1.1
Naphthalene	ug/L	-	-	-	-	-
Propylbenzene, N-	ug/L	-	-	-	-	-
Styrene	ug/L	<1	<0.17	<0.34	<1	<0.25
Tetrachloroethane, 1,1,1,2-	ug/L	-	-	-	-	-
Tetrachloroethane, 1,1,2,2-	ug/L	<1	<0.41	<0.82	<1	<0.25
Tetrachloroethene	ug/L	<1	<0.39	0.79	3.1	<0.25
Toluene	ug/L	<1	<0.24	<0.47	<1	<0.25
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/L	<3	<3.9	<7.8	-	-
Trichlorobenzene, 1,2,3-	ug/L	-	-	-	-	-
Trichlorobenzene, 1,2,4-	ug/L	<1	<0.5	<1	<1.6	<0.4
Trichloroethane, 1,1,1-	ug/L	<1	<0.3	<0.61	<1	<0.25
Trichloroethane, 1,1,2-	ug/L	<1	<0.38	<0.77	<1	<0.25
Trichloroethene	ug/L	<1.2	18	230	5.3	<0.25
Trichlorofluoromethane	ug/L	<2	<3.3	<6.6	<1	<0.25
Trichloropropane, 1,2,3-	ug/L	-	-	-	-	-
Trimethylbenzene, 1,2,4-	ug/L	<1	<0.36	<0.72	<1	<0.25
Trimethylbenzene, 1,3,5-	ug/L	<1	<0.28	<0.57	<1	<0.25
Vinyl acetate	ug/L	<2	<5.6	<11	-	-
Vinyl chloride	ug/L	<2	21	150	3	<0.25
Xylene, m,p-	ug/L	<1	<0.3	<0.6	<2	<0.5
Xylene, o-	ug/L	<1	<0.23	<0.46	<1	<0.25

See notes at end of table.

TABLE B.2
Groundwater Results
Task 1 and 2 Sites

Notes:

1. Groundwater sample results are from sampling conducted by GSI during Task 1 or from site characterization and monitoring reports.
2. Data compilation from site reports focused on monitoring wells near manholes and source areas.
3. Only samples collected close in time to Task 1 or Task 2 were compiled.

TABLE B.3.1
Vapor Sample Results - Layton, Utah
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 1)

Matrix	Sample Location	Task 1 Sample Category	Task 1 Secondary Category, if any	Sample Depth (vertical profiles only)	On-Site (HAPSITE) vs. Off-Site (Laboratory) Result	HAPSITE Run Number / Lab ID	Sample Container	Sample Type	Date	Time	1,1-DCE (ug/m3)	cis-1,2-DCE (ug/m3)	TCE (ug/m3)
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160502_001.hps	n/a	N	5/2/2016	7:45	5.2	U	0.21 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160502_005.hps	n/a	N	5/2/2016	8:59	1.5 J	U	0.14 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160502_008.hps	n/a	N	5/2/2016	11:22	U	U	0.13 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160502_011.hps	n/a	N	5/2/2016	11:56	U	U	0.37 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160502_015.hps	n/a	N	5/2/2016	13:57	U	0.4 J	0.97 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160502_016.hps	n/a	N	5/2/2016	14:05	1.8 UJ	U	0.27 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160502_018.hps	n/a	N	5/2/2016	14:28	U	U	0.3 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160502_025.hps	n/a	N	5/2/2016	15:58	U	0.56 J	1.2 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160503_004.hps	n/a	N	5/3/2016	8:30	2.3	U	0.17 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160503_010.hps	n/a	N	5/3/2016	9:47	1.5 J	U	0.5 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160503_014.hps	n/a	N	5/3/2016	11:09	U	0.26 J	0.4 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160503_026.hps	n/a	N	5/3/2016	13:42	2.3 UJ	U	0.33 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160504_003.hps	n/a	N	5/4/2016	9:23	U	0.29 J	0.35 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160504_007.hps	n/a	N	5/4/2016	9:59	U	0.48 J	1.4 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160504_012.hps	n/a	N	5/4/2016	10:53	U	0.27 J	0.7 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160504_017.hps	n/a	N	5/4/2016	11:52	U	U	0.41 J
AO	Garage Air (door open)	n/a			HAPSITE	SIM_LO_CVOC_10_20160504_030.hps	n/a	N	5/4/2016	14:35	U	0.36 J	0.18 J
AI	Basement	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160503_021.hps	n/a	N	5/3/2016	12:51	U	0.36 J	0.19 J
AI	Basement	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160504_018.hps	n/a	N	5/4/2016	12:05	U	U	0.17 J
AI	Basement Closet	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160503_022.hps	n/a	N	5/3/2016	13:00	U	0.28 J	0.19 J
AI	Basement Closet	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160504_019.hps	n/a	N	5/4/2016	12:17	U	U	0.16 J
AI	Basement Closet	n/a			Laboratory	320-18707-5	1L Summa	FD	5/4/2016	12:25	<0.51	<0.35	<0.56
AI	Basement Closet	Tbl 5.4 - 7 Bldg Atten			Laboratory	320-18707-1	1L Summa	N	5/4/2016	12:25	<0.51	1.1 J	2.9
AI	Kitchen	Daily Blank			HAPSITE	SIM_LO_CVOC_10_20160505_001.hps	n/a	N	5/5/2016	13:22	6.3	U	0.21 J
AI	Kitchen	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160505_013.hps	n/a	N	5/5/2016	15:04	U	U	0.91 J
AI	Kitchen	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160505_015.hps	n/a	N	5/5/2016	15:22	U	U	0.33 J
AI	Kitchen	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160505_021.hps	n/a	N	5/5/2016	16:15	U	U	0.37 J
AI	Kitchen	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160505_023.hps	n/a	N	5/5/2016	16:39	U	3	0.51 J
AI	Kitchen	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160505_027.hps	n/a	N	5/5/2016	17:33	U	U	0.47 J
AI	Kitchen	Daily Blank			HAPSITE	SIM_LO_CVOC_10_20160505_029.hps	n/a	N	5/5/2016	17:49	U	U	0.44 J

TABLE B.3.1
Vapor Sample Results - Layton, Utah
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 1)

Matrix	Sample Location	Task 1 Sample Category	Task 1 Secondary Category, if any	Sample Depth (vertical profiles only)	On-Site (HAPSITE) vs. Off-Site (Laboratory) Result	HAPSITE Run Number / Lab ID	Sample Container	Sample Type	Date	Time	1,1-DCE (ug/m3)	cis-1,2-DCE (ug/m3)	TCE (ug/m3)
U2	LD-SDM Sampling Port	Tbl 5.4 - 7 Bldg Atten - initial			HAPSITE	SIM_LO_CVOC_10_20160502_02 0.hps	1L Tedlar	N	5/2/2016	14:10	0.63 J	0.44 J	4.8
U2	LD-SDM Sampling Port	n/a			HAPSITE	SIM_LO_CVOC_10_20160502_02 2.hps	1L Tedlar	Dup	5/2/2016	14:10	U	0.38 J	4.5
U2	LD-SDM Sampling Port	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160503_02 4.hps	1L Tedlar	N	5/3/2016	13:16	0.37 J	U	2.3 J
U2	LD-SDM Sampling Port	Tbl 5.4 - 7 Bldg Atten			Laboratory	320-18707-2	1L Summa	N	5/4/2016	10:52	<0.51	0.41 J	1.3 J
U2	LD-SDM Sampling Port	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160504_01 4.hps	1L Tedlar	N	5/4/2016	10:52	U	0.83 J	3.4
U1	SN-SDM Lateral	Tbl 5.4 - 7 Bldg Atten - initial			HAPSITE	SIM_LO_CVOC_10_20160503_02 7.hps	1L Tedlar	N	5/3/2016	14:40	0.4 J	U	1.3 J
U1	SN-SDM Lateral	n/a			HAPSITE	SIM_LO_CVOC_10_20160503_02 8.hps	1L Tedlar	Dup	5/3/2016	14:40	U	U	1.4 J
U1	SN-SDM Lateral	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160504_01 3.hps	1L Tedlar	N	5/4/2016	10:23	U	U	2.4 J
U2	LD-1018W-2600N	Tbl 5.3 - 2 Delineation	Tbl 5.4 - 2 Init Test Spat Var // Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_10_20160502_00 9.hps	1L Tedlar	N	5/2/2016	8:15	2.1	1.1 J	6.4
U2	LD-1070W-2600N	Tbl 5.3 - 1 Initial Field Testing			HAPSITE	SIM_LO_CVOC_10_20160502_01 0.hps	1L Tedlar	N	5/2/2016	8:22	103	23	344
U2	LD-1070W-2600N	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160502_02 1.hps	1L Tedlar	N	5/2/2016	14:15	83	19	312
U2	LD-1070W-2600N	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160503_02 5.hps	1L Tedlar	N	5/3/2016	13:00	111	21	333
U2	LD-1070W-2600N	Tbl 5.4 - 3 Initial Testing ST Temporal variability			Laboratory	320-18707-3	1L Summa	N	5/4/2016	11:01	120	25	320
U2	LD-1070W-2600N	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160504_01 6.hps	1L Tedlar	N	5/4/2016	11:01	79	21	306
U2	LD-1070W-2600N	Tbl 5.4 - 3 Initial Testing ST Temporal variability	Vertical profile	9	HAPSITE	SIM_LO_CVOC_10_20160505_02 8.hps	1L Tedlar	N	5/5/2016	16:45	79	20	86 M
U2	LD-1070W-2600N	n/a	Vertical profile	7	HAPSITE	SIM_LO_CVOC_10_20160505_02 6.hps	1L Tedlar	N	5/5/2016	16:47	71	17	81 M
U2	LD-1070W-2600N	n/a	Vertical profile	5	HAPSITE	SIM_LO_CVOC_10_20160505_02 5.hps	1L Tedlar	N	5/5/2016	16:48	40	9.9	75 M
U2	LD-1070W-2600N	n/a	Vertical profile	3	HAPSITE	SIM_LO_CVOC_10_20160505_02 4.hps	1L Tedlar	N	5/5/2016	16:50	33	7.1	75
U2	LD-1100W-2485N	Tbl 5.3 - 1 Initial Field Testing			HAPSITE	SIM_LO_CVOC_10_20160502_01 4.hps	1L Tedlar	N	5/2/2016	13:17	143	226	828
U2	LD-1100W-2485N	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160502_02 4.hps	1L Tedlar	N	5/2/2016	15:11	190	301	903
U2	LD-1100W-2485N	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160503_00 8.hps	1L Tedlar	N	5/3/2016	8:03	139	214	833
U2	LD-1100W-2485N	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160503_01 7.hps	1L Tedlar	N	5/3/2016	10:52	178	238	897
U2	LD-1100W-2485N	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160503_03 3.hps	1L Tedlar	N	5/3/2016	15:00	182	345	957
U2	LD-1100W-2485N	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160504_00 6.hps	1L Tedlar	N	5/4/2016	8:49	139	250	919
U2	LD-1100W-2485N	Tbl 5.4 - 3 Initial Testing ST Temporal variability			Laboratory	320-18707-4	1L Summa	N	5/4/2016	8:50	230	240	1100
U2	LD-608W-2175N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160504_03 1.hps	1L Tedlar	N	5/4/2016	14:03	U	1.1 J	3.7
U2	LD-608W-2175N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_01 6.hps	1L Tedlar	N	5/5/2016	14:50	1.7 J	0.38 J	2.7
U2	LD-665W-2175N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160504_03 2.hps	1L Tedlar	N	5/4/2016	14:09	U	0.48 J	3.1
U2	LD-665W-2175N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_01 7.hps	1L Tedlar	N	5/5/2016	14:55	U	0.27 J	1.5 J
U2	LD-700W-2175N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160504_02 3.hps	1L Tedlar	N	5/4/2016	12:09	U	0.63 J	5.4

TABLE B.3.1
Vapor Sample Results - Layton, Utah
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 1)

Matrix	Sample Location	Task 1 Sample Category	Task 1 Secondary Category, if any	Sample Depth (vertical profiles only)	On-Site (HAPSITE) vs. Off-Site (Laboratory) Result	HAPSITE Run Number / Lab ID	Sample Container	Sample Type	Date	Time	1,1-DCE (ug/m3)	cis-1,2-DCE (ug/m3)	TCE (ug/m3)
U2	LD-700W-2175N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_01 8.hps	1L Tedlar	N	5/5/2016	14:51	3.1 UJ	0.28 J	1.5 J
U2	LD-725W-2175N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160504_02 2.hps	1L Tedlar	N	5/4/2016	12:14	U	35	35
U2	LD-725W-2175N	n/a			HAPSITE	SIM_LO_CVOC_10_20160504_02 4.hps	1L Tedlar	Dup	5/4/2016	12:14	U	36	35
U2	LD-725W-2175N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_01 9.hps	1L Tedlar	N	5/5/2016	14:59	0.35 J	40	39
U2	LD-Church	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160502_01 9.hps	1L Tedlar	N	5/2/2016	13:34	12	56	150
U2	LD-Church	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160502_02 7.hps	1L Tedlar	N	5/2/2016	15:20	16	71	193
U2	LD-Church	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160503_00 5.hps	1L Tedlar	N	5/3/2016	8:11	48	127	398
U2	LD-Church	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160503_01 9.hps	1L Tedlar	N	5/3/2016	11:01	13	59	167
U2	LD-Church	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160503_03 1.hps	1L Tedlar	N	5/3/2016	15:08	12	59	156
U2	LD-Church	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160504_00 5.hps	1L Tedlar	N	5/4/2016	9:14	21	91	263
U2	LD-UnivPk-2460N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160502_01 7.hps	1L Tedlar	N	5/2/2016	13:24	13	30	247
U2	LD-UnivPk-2460N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160502_02 6.hps	1L Tedlar	N	5/2/2016	15:17	15	34	285
U2	LD-UnivPk-2460N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160503_00 9.hps	1L Tedlar	N	5/3/2016	8:07	19	32	301
U2	LD-UnivPk-2460N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160503_01 8.hps	1L Tedlar	N	5/3/2016	11:05	19	33	317
U2	LD-UnivPk-2460N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160503_03 2.hps	1L Tedlar	N	5/3/2016	15:04	17	34	306
U2	LD-UnivPk-2460N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160504_00 4.hps	1L Tedlar	N	5/4/2016	8:57	19	34	333
U2	LD-Weber (background)	Tbl 5.4 - 1 Background			HAPSITE	SIM_LO_CVOC_10_20160505_03 0.hps	1L Tedlar	N	5/5/2016	17:06	U	U	1.2 J
U2	LD-Weber South (background)	Tbl 5.4 - 1 Background			HAPSITE	SIM_LO_CVOC_10_20160505_03 1.hps	1L Tedlar	N	5/5/2016	17:20	U	0.35 J	2.7
U1	SN-1000W-2450N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160503_01 5.hps	1L Tedlar	N	5/3/2016	11:14	U	1.7 J	8.1
U1	SN-1000W-2450N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160504_03 4.hps	1L Tedlar	N	5/4/2016	14:23	U	3.2	9.7
U1	SN-1000W-2450N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_00 6.hps	1L Tedlar	N	5/5/2016	8:06	U	4.4	14
U1	SN-1000W-2554N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160503_01 6.hps	1L Tedlar	N	5/3/2016	11:20	U	0.37 J	3.5
U1	SN-1039W-2600N	Tbl 5.3 - 2 Delineation	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_10_20160502_01 2.hps	1L Tedlar	N	5/2/2016	8:27	U	0.33 J	2 J
U1	SN-1050W-2484N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160503_00 7.hps	1L Tedlar	N	5/3/2016	8:23	U	0.39 J	2.6 J
U1	SN-1050W-2484N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160503_02 0.hps	1L Tedlar	N	5/3/2016	11:50	2.3 UJ	0.91 J	5.9
U1	SN-1055W-2450N	Tbl 5.3 - 2 Delineation	Tbl 5.4 - 2 Init Test Spat Var		HAPSITE	SIM_LO_CVOC_10_20160502_02 3.hps	1L Tedlar	N	5/2/2016	15:23	U	2.4	11
U1	SN-1055W-2450N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160503_00 6.hps	1L Tedlar	N	5/3/2016	8:17	1.3 J	3	13
U1	SN-1055W-2450N	n/a			HAPSITE	SIM_LO_CVOC_10_20160503_01 1.hps	1L Tedlar	Dup	5/3/2016	8:17	U	2.6	12
U1	SN-1055W-2450N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160504_03 5.hps	1L Tedlar	N	5/4/2016	14:27	U	8.7	39
U1	SN-1055W-2450N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_00 7.hps	1L Tedlar	N	5/5/2016	8:01	U	3.4	10

TABLE B.3.1
Vapor Sample Results - Layton, Utah
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 1)

Matrix	Sample Location	Task 1 Sample Category	Task 1 Secondary Category, if any	Sample Depth (vertical profiles only)	On-Site (HAPSITE) vs. Off-Site (Laboratory) Result	HAPSITE Run Number / Lab ID	Sample Container	Sample Type	Date	Time	1,1-DCE (ug/m3)	cis-1,2-DCE (ug/m3)	TCE (ug/m3)
U1	SN-1100W-2450N	Tbl 5.3 - 1 Initial Field Testing			HAPSITE	SIM_LO_CVOC_10_20160504_03 6.hps	1L Tedlar	N	5/4/2016	14:31	5.9	38	328
U1	SN-1100W-2450N	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_00 8.hps	1L Tedlar	N	5/5/2016	8:17	2.6	15	18
U1	SN-1100W-2450N	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_02 0.hps	1L Tedlar	N	5/5/2016	14:43	7.5	25	86 M
U1	SN-1100W-2525N	Tbl 5.3 - 2 Delineation	Tbl 5.4 - 2 Init Test Spat Var		HAPSITE	SIM_LO_CVOC_10_20160504_02 1.hps	1L Tedlar	N	5/4/2016	11:51	6.7	30	360
U1	SN-1100W-2525N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_00 9.hps	1L Tedlar	N	5/5/2016	8:21	7.1	13	64
U1	SN-1109W-2525N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160504_02 0.hps	1L Tedlar	N	5/4/2016	11:45	5.6	34	430
U1	SN-1125W-2600N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160502_01 3.hps	1L Tedlar	N	5/2/2016	8:30	U	U	1.5 J
U1	SN-1125W-2600N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160503_02 3.hps	1L Tedlar	N	5/3/2016	13:08	U	U	3.7
U1	SN-1125W-2600N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160504_01 5.hps	1L Tedlar	N	5/4/2016	10:37	U	0.63 J	6.4
U1	SN-1150W-2562N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160504_01 0.hps	1L Tedlar	N	5/4/2016	9:29	9.1	38	591
U1	SN-1150W-2562N	n/a			HAPSITE	SIM_LO_CVOC_10_20160504_01 1.hps	1L Tedlar	FD	5/4/2016	9:29	7.1	31	489
U1	SN-1150W-2562N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_01 1.hps	1L Tedlar	N	5/5/2016	8:24	11	48	91 M
U1	SN-1150W-2562N	n/a			HAPSITE	SIM_LO_CVOC_10_20160505_01 2.hps	1L Tedlar	Dup	5/5/2016	8:24	11	48	91 M
U1	SN-1165W-2525N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160504_00 9.hps	1L Tedlar	N	5/4/2016	9:52	U	11	134
U1	SN-1165W-2525N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_01 0.hps	1L Tedlar	N	5/5/2016	8:32	0.87 J	5.2	59
U1	SN-1178W-2525N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160504_00 8.hps	1L Tedlar	N	5/4/2016	10:00	U	0.56 J	4.3
U1	SN-1178W-2525N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_00 3.hps	1L Tedlar	N	5/5/2016	8:28	3.9	0.33 J	2.1 J
U1	SN-555W-2350N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160503_03 0.hps	1L Tedlar	N	5/3/2016	15:15	U	0.48 J	3.8
U1	SN-921W-2350N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160503_02 9.hps	1L Tedlar	N	5/3/2016	15:20	1.2 J	1.5 J	5.9
U1	SN-921W-2350N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160504_03 7.hps	1L Tedlar	N	5/4/2016	15:59	U	12	40
U1	SN-921W-2350N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_00 4.hps	1L Tedlar	N	5/5/2016	8:13	5.9	1 J	3.8
U1	SN-963W-2350N	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160504_03 3.hps	1L Tedlar	N	5/4/2016	14:19	U	2.5	9.1
U1	SN-963W-2350N	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160505_00 5.hps	1L Tedlar	N	5/5/2016	8:09	U	2.6	6.4

Notes:

- HAPSITE samples analyzed with Smart Plus (H0008). Date and time in the table above refer to the date and time samples were collected.
- Sample locations: AO = outdoor air; AI = indoor air; U1 = vapor from sanitary sewer; U2 = vapor from land drain.
- HAPSITE data qualifiers:
 - U non-detect
 - J result less than the lower calibration limit of 0.5 ppbV
 - M manual integration
- Lab data qualifiers:
 - B Compound was found in the blank and sample
 - J Result is less than the reporting limit but greater than or equal to the method detection limit
 - * Detected result; LCS or LCSD is outside acceptance limits
 - < Result not detected (i.e., result is less than the method detection limit)
- Table does not include QC (e.g., CCV) samples.
- See laboratory report for additional TO-15 analyte results.

TABLE B.3.2
Liquid Sample Results - Layton, Utah
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 1)

Sample Location:		LD-2460-UnivPk	LD-2485-1100W	LD-Church	QC
Location Type:		Land Drain	Land Drain	Land Drain	Trip Blank
Lab ID:		320-18682-2	320-18682-1	320-18682-3	320-18682-4
Sample Type:		N	N	N	TB
Container:		40 mL VOA	40 mL VOA	40 mL VOA	40 mL VOA
Sample Date:		5/4/2016	5/4/2016	5/4/2016	5/4/2016
Sample Time:		8:57	8:49	9:14	0:00
Analyte					
Benzene	ug/L	<0.13	<0.13	<0.13	<0.13
Bromobenzene	ug/L	<0.18	<0.18	<0.18	<0.18
Bromochloromethane	ug/L	<0.14	<0.14	<0.14	<0.14
Bromodichloromethane	ug/L	<0.14	<0.14	<0.14	<0.14
Bromoform	ug/L	<0.1	<0.1	<0.1	<0.1
Bromomethane	ug/L	<0.29	<0.29	<0.29	<0.29
Butylbenzene, n-	ug/L	<0.12	<0.12	<0.12	<0.12
Butylbenzene, sec-	ug/L	<0.12	<0.12	<0.12	<0.12
Butylbenzene, tert-	ug/L	<0.14	<0.14	<0.14	<0.14
Carbon tetrachloride	ug/L	<0.15	<0.15	<0.15	<0.15
Chlorobenzene	ug/L	<0.12	<0.12	<0.12	<0.12
Chloroethane	ug/L	<0.34	<0.34	<0.34	<0.34
Chloroform	ug/L	0.76 J	<0.12	<0.12	<0.12
Chloromethane	ug/L	<0.25	<0.25	<0.25	<0.25
Chlorotoluene, 2-	ug/L	<0.07	<0.07	<0.07	<0.07
Chlorotoluene, 4-	ug/L	<0.1	<0.1	<0.1	<0.1
Dibromo-3-Chloropropane, 1,2-	ug/L	<0.32	<0.32	<0.32	<0.32
Dibromoethane, 1,2- (EDB)	ug/L	<0.22	<0.22	<0.22	<0.22
Dibromomethane	ug/L	<0.21	<0.21	<0.21	<0.21
Dichlorobenzene, 1,2-	ug/L	<0.14	<0.14	<0.14	<0.14
Dichlorobenzene, 1,3-	ug/L	<0.11	<0.11	<0.11	<0.11
Dichlorobenzene, 1,4-	ug/L	<0.13	<0.13	<0.13	<0.13
Dichlorodifluoromethane	ug/L	<0.16	<0.16	<0.16	<0.16
Dichloroethane, 1,1-	ug/L	0.19 J	0.51 J	0.55 J	<0.1
Dichloroethane, 1,2-	ug/L	<0.22	0.62 J	0.6 J	<0.22
Dichloroethene, 1,1-	ug/L	0.16 J	0.58 J	0.66 J	<0.14
Dichloroethene, cis-1,2-	ug/L	0.62 J	4.3	4.2	<0.1
Dichloroethene, trans-1,2-	ug/L	<0.11	0.91 J	0.88 J	<0.11
Dichloropropane, 1,2-	ug/L	<0.15	<0.15	<0.15	<0.15
Dichloropropane, 1,3-	ug/L	<0.07	<0.07	<0.07	<0.07
Dichloropropane, 2,2-	ug/L	<0.13	<0.13	<0.13	<0.13
Dichloropropene, 1,1-	ug/L	<0.14	<0.14	<0.14	<0.14
Dichloropropene, cis-1,3-	ug/L	<0.22	<0.22	<0.22	<0.22
Dichloropropene, trans-1,3-	ug/L	<0.08	<0.08	<0.08	<0.08
Ethylbenzene	ug/L	<0.1	<0.1	<0.1	<0.1
Hexachlorobutadiene	ug/L	<0.22	<0.22	<0.22	<0.22
Isopropylbenzene	ug/L	<0.12	<0.12	<0.12	<0.12
Isopropyltoluene, p-	ug/L	<0.13	<0.13	<0.13	<0.13
Methylene Chloride	ug/L	<0.35	<0.35	<0.35	<0.35
Naphthalene	ug/L	<0.15	<0.15	<0.15	<0.15
Propylbenzene, N-	ug/L	<0.15	<0.15	<0.15	<0.15
Styrene	ug/L	<0.15	<0.15	<0.15	<0.15
Tetrachloroethane, 1,1,1,2-	ug/L	<0.1	<0.1	<0.1	<0.1
Tetrachloroethane, 1,1,2,2-	ug/L	<0.09	<0.09	<0.09	<0.09
Tetrachloroethene	ug/L	0.29 J	0.48 J	0.53 J	<0.1
Toluene	ug/L	<0.25	<0.25	<0.25	<0.25
Trichlorobenzene, 1,2,3-	ug/L	<0.14	<0.14	<0.14	<0.14
Trichlorobenzene, 1,2,4-	ug/L	<0.1	<0.1	<0.1	<0.1
Trichloroethane, 1,1,1-	ug/L	0.21 J	0.24 J	0.25 J	<0.19
Trichloroethane, 1,1,2-	ug/L	<0.31	<0.31	<0.31	<0.31
Trichloroethene	ug/L	2.7	6.1	6.8	<0.13
Trichlorofluoromethane	ug/L	<0.23	<0.23	<0.23	<0.23
Trichloropropane, 1,2,3-	ug/L	<0.13	<0.13	<0.13	<0.13
Trimethylbenzene, 1,2,4-	ug/L	<0.12	<0.12	<0.12	<0.12
Trimethylbenzene, 1,3,5-	ug/L	<0.14	<0.14	<0.14	<0.14
Vinyl chloride	ug/L	<0.22	<0.22	<0.22	<0.22
Xylene, m,p-	ug/L	<0.18	<0.18	<0.18	<0.18
Xylene, o-	ug/L	<0.1	<0.1	<0.1	<0.1

Notes:

- Analysis by USEPA Method 8260 at TestAmerica Laboratory, Sacramento, CA.
- Data qualifiers:
 - J Result is less than the reporting limit but greater than or equal to the method detection limit
 - < Result not detected (i.e., result is less than the method detection limit)
- Samples were received by the laboratory in good condition. The temperature of the cooler at receipt was 7.3 degrees Celcius.

TABLE B.4.1
Vapor Sample Results - Indianapolis, Indiana
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 2)

Matrix	Sample Location	Task 1 Sample Category	Task 2 Secondary Category, if any	Sample Depth (vertical profiles only)	On-Site (HAPSITE) vs. Off-Site (Laboratory) Result	HAPSITE Run Number / Lab ID	Sample Container	Sample Type	Date	Time	Chloroform (ug/m3)	PCE (ug/m3)
AO	Outdoor Air	n/a			HAPSITE	SIM_LO_CVOC_05_20160615_010.hps	1L Tedlar	N	6/14/2016	12:00	0.24 J	1.7 J
AI	422 Basement	Tbl 5.4 - 7 Bldg Atten			Laboratory	320-19798-1	1L Summa	N	6/15/2016	7:41	0.48 J	0.71 J
AI	422 Basement	Tbl 5.4 - 7 Bldg Atten			Laboratory	320-19798-2	1L Summa	N	6/16/2016	15:17	<0.46	0.5 J
SS	SSP-1	n/a			HAPSITE	SIM_LO_CVOC_05_20160613_003.hps	1L Tedlar	N	6/13/2016	9:00	17	50
SS	SSP-1	n/a			HAPSITE	SIM_LO_CVOC_05_20160615_020.hps	1L Tedlar	N	6/15/2016	14:15	13	58
SS	SSP-1	n/a			HAPSITE	SIM_LO_CVOC_05_20160616_003.hps	1L Tedlar	N	6/16/2016	7:54	14	75
SS	SSP-1	n/a			Laboratory	320-19798-4	1L Summa	N	6/16/2016	15:29	11	24
GS	SGP 8-06	n/a			HAPSITE	SIM_LO_CVOC_05_20160612_004.hps	1L Tedlar	N	6/12/2016	15:15	19	57
GS	SGP 8-06	n/a			HAPSITE	SIM_LO_CVOC_05_20160615_021.hps	1L Tedlar	N	6/15/2016	14:25	21	102
GS	SGP 8-06	n/a			HAPSITE	SIM_LO_CVOC_05_20160616_004.hps	1L Tedlar	N	6/16/2016	7:57	23	102
GS	SGP 8-09	n/a			HAPSITE	SIM_LO_CVOC_05_20160613_004.hps	1L Tedlar	N	6/13/2016	9:15	43	115
GS	SGP 8-13	n/a			HAPSITE	SIM_LO_CVOC_05_20160615_022.hps	1L Tedlar	N	6/15/2016	14:29	59	197
GS	SGP 8-13	n/a			Laboratory	320-19675-3	1L Tedlar	N	6/16/2016	15:31	52	60
U1	SN Lateral	Tbl 5.4 - 7 Bldg Atten - initial			HAPSITE	SIM_LO_CVOC_05_20160613_010.hps	1L Tedlar	N	6/13/2016	12:00	93	49
U1	SN Lateral	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_05_20160615_001.hps	1L Tedlar	N	6/15/2016	7:45	20	30
U1	SN Lateral	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_05_20160615_019.hps	1L Tedlar	N	6/15/2016	14:10	6.3	33
U1	SN Lateral	n/a			HAPSITE	SIM_LO_CVOC_05_20160615_030.hps	1L Tedlar	DUP	6/15/2016	14:10	6.3	34
U1	SN Lateral	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_05_20160616_002.hps	1L Tedlar	N	6/16/2016	7:50	2.8	24
U1	SN Lateral	Tbl 5.4 - 7 Bldg Atten			Laboratory	320-19798-3	1L Summa	N	6/16/2016	15:23	4.1	9.9
U3	28 Central	Tbl 5.3 - 2 Delineation	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_05_20160613_005.hps	1L Tedlar	N	6/13/2016	10:00	171	102
U3	28 Central	Tbl 5.4 - 7 Bldg Atten	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_05_20160615_003.hps	1L Tedlar	N	6/15/2016	8:03	137	36

TABLE B.4.1
Vapor Sample Results - Indianapolis, Indiana
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 2)

Matrix	Sample Location	Task 1 Sample Category	Task 2 Secondary Category, if any	Sample Depth (vertical profiles only)	On-Site (HAPSITE) vs. Off-Site (Laboratory) Result	HAPSITE Run Number / Lab ID	Sample Container	Sample Type	Date	Time	Chloroform (ug/m3)	PCE (ug/m3)
U3	28 Central	Tbl 5.4 - 6 Delineation - Temporal	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_05_20160615_023.hps	1L Tedlar	N	6/15/2016	14:35	356	156
U3	28 Central	Tbl 5.4 - 6 Delineation - Temporal	Tbl 5.4 - 7 Bldg Atten		Laboratory	320-19675-1	1L Tedlar	N	6/16/2016	8:06	100	22
U3	28 Central	Tbl 5.4 - 6 Delineation - Temporal	Tbl 5.4 - 7 Bldg Atten		Laboratory	320-19798-5	1L Summa	N	6/16/2016	15:54	1 J	38
U3	28 New Jersey	Tbl 5.3 - 2 Delineation	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_05_20160615_002.hps	1L Tedlar	N	6/15/2016	7:56	186	28
U3	28 New Jersey	Tbl 5.4 - 6 Delineation - Temporal	Tbl 5.4 - 7 Bldg Atten		Laboratory	320-19675-4	1L Tedlar	N	6/16/2016	15:41	55	<0.35
U3	28.5 Central	Tbl 5.3 - 2 Delineation	Tbl 5.4 - 2 Init Test Spat Var		HAPSITE	SIM_LO_CVOC_05_20160613_009.hps	1L Tedlar	N	6/13/2016	11:15	28	210
U3	28.5 Central	Tbl 5.4 - 6 Delineation - Temporal			HAPSITE	SIM_LO_CVOC_05_20160615_004.hps	1L Tedlar	N	6/15/2016	8:10	8.3	6.8
U3	28.5 Central	Tbl 5.4 - 6 Delineation - Temporal			Laboratory	320-19675-5	1L Tedlar	N	6/16/2016	16:20	11	6.9
U3	29.5 Central	Tbl 5.3 - 1 Initial Field Testing			HAPSITE	SIM_LO_CVOC_05_20160613_008.hps	1L Tedlar	N	6/13/2016	11:00	42	353
U3	29.5 Central	Tbl 5.4 - 3 Initial Testing ST			HAPSITE	SIM_LO_CVOC_05_20160615_005.hps	1L Tedlar	N	6/15/2016	8:15	15	39
U3	29.5 Central	Tbl 5.4 - 3 Initial Testing ST			HAPSITE	SIM_LO_CVOC_05_20160615_027.hps	1L Tedlar	N	6/15/2016	14:42	68	312
U3	29.5 Central	Tbl 5.4 - 3 Initial Testing ST			Laboratory	320-19675-2	1L Tedlar	N	6/16/2016	8:17	15	6.5
U3	29.5 Central	Tbl 5.4 - 3 Initial Testing ST			Laboratory	320-19798-6	1L Summa	N	6/16/2016	16:27	10	0.6 J
U3	29.5 New Jersey	Tbl 5.3 - 2 Delineation	Tbl 5.4 - 2 Init Test Spat Var		HAPSITE	SIM_LO_CVOC_05_20160615_017.hps	1L Tedlar	N	6/15/2016	15:15	127	3.7
U3	29.5 Park	Tbl 5.3 - 2 Delineation	Tbl 5.4 - 2 Init Test Spat Var		HAPSITE	SIM_LO_CVOC_05_20160615_018.hps	1L Tedlar	N	6/15/2016	15:10	45	21
U3	29.5 Ruckle	Tbl 5.3 - 1 Initial Field Testing			HAPSITE	SIM_LO_CVOC_05_20160615_009.hps	1L Tedlar	N	6/15/2016	8:46	200	27
U3	29.5 Ruckle	Tbl 5.4 - 3 Initial Testing ST			Laboratory	320-19675-10	1L Tedlar	N	6/16/2016	8:56	150	2.7
U3	30.5 Central	Tbl 5.3 - 1 Initial Field Testing			HAPSITE	SIM_LO_CVOC_05_20160613_007.hps	1L Tedlar	N	6/13/2016	10:51	63	115
U3	30.5 Central	Tbl 5.4 - 3 Initial Testing ST			HAPSITE	SIM_LO_CVOC_05_20160615_006.hps	1L Tedlar	N	6/15/2016	8:21	49	170
U3	30.5 Central	n/a			HAPSITE	SIM_LO_CVOC_05_20160615_012.hps	1L Tedlar	DUP	6/15/2016	8:21	59	197

TABLE B.4.1
Vapor Sample Results - Indianapolis, Indiana
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 2)

Matrix	Sample Location	Task 1 Sample Category	Task 2 Secondary Category, if any	Sample Depth (vertical profiles only)	On-Site (HAPSITE) vs. Off-Site (Laboratory) Result	HAPSITE Run Number / Lab ID	Sample Container	Sample Type	Date	Time	Chloroform (ug/m3)	PCE (ug/m3)
U3	31 Central	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_05_20160613_006.hps	1L Tedlar	N	6/13/2016	10:40	73	60
U3	31 Central	Tbl 5.4 - 0 Delineation - temporal			HAPSITE	SIM_LO_CVOC_05_20160615_007.hps	1L Tedlar	N	6/15/2016	8:27	59	142
U3	31.5 Central	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_05_20160615_008.hps	1L Tedlar	N	6/15/2016	8:35	68	170
U3	31.5 Central	Tbl 5.4 - 0 Delineation - temporal			HAPSITE	SIM_LO_CVOC_05_20160615_024.hps	1L Tedlar	N	6/15/2016	14:48	137	210
U3	32.5 Central	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_05_20160615_025.hps	1L Tedlar	N	6/15/2016	14:54	103	57
U3	33.5 Central	Tbl 5.4 - 1 Background			HAPSITE	SIM_LO_CVOC_05_20160615_026.hps	1L Tedlar	N	6/15/2016	15:00	200	122
U3	33.5 Central	Tbl 5.4 - 1 Background			Laboratory	320-19675-7	1L Tedlar	N	6/16/2016	8:24	170	27
U3	33.5 Central	Tbl 5.4 - 1 Background			Laboratory	320-19675-6	1L Tedlar	N	6/16/2016	16:43	4.4	1.5 J
U3	35 Central	Tbl 5.4 - 1 Background			Laboratory	320-19675-8	1L Tedlar	N	6/16/2016	8:34	39	4.4
U3	36 Central	Tbl 5.4 - 1 Background			Laboratory	320-19675-9	1L Tedlar	N	6/16/2016	8:46	50	20

Notes:

1. HAPSITE samples analyzed with Smart Plus (H0008). Date and time in the table above refer to the date and time samples were collected. Adjusted values shown.

2. Sample locations: AO = outdoor air; AI = indoor air; U1 = sanitary sewer; U3 = combined sanitary and storm sewer.

3. HAPSITE Data qualifiers:

- U non-detect
- J result less than the lower calibration limit of 0.5 ppbV

Lab data qualifiers:

- B Compound was found in the blank and sample
- J Result is less than the reporting limit but greater than or equal to the method detection limit
- * Detected result; LCS or LCSD is outside acceptance limits
- < Result not detected (i.e., result is less than the method detection limit)

4. Table does not include QC (e.g., CCV) samples.

5. See laboratory report for additional TO-15 analyte results.

TABLE B.4.2
Liquid Sample Results - Indianapolis, Indiana
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 2)

Analyte	Sample Location:	MW1A	MW1C	28 Central	28 Central	29.5 Central	33.5 Central	QC
	Location Type:	GW	GW	Sanitary/Storm Sewer	Sanitary/Storm Sewer	Sanitary/Storm Sewer	Sanitary/Storm Sewer	Trip Blank
	Lab ID:	320-19645-2	320-19645-1	320-19645-3	320-19645-6	320-19645-4	320-19645-5	320-19645-7
	Sample Type:	N	N	N	FD	N	N	TB
	Container:	40 mL VOA	40 mL VOA	40 mL VOA	40 mL VOA	40 mL VOA	40 mL VOA	40 mL VOA
	Sample Date:	6/16/2016	6/16/2016	6/16/2016	6/16/2016	6/16/2016	6/16/2016	6/16/2016
	Sample Time:	15:03	14:55	16:05	16:05	16:32	16:45	12:00
Benzene	ug/L	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13
Bromobenzene	ug/L	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Bromochloromethane	ug/L	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
Bromodichloromethane	ug/L	<0.14	<0.14	0.9 J	0.94 J	0.22 J	1.1	<0.14
Bromoform	ug/L	<0.1	<0.1	0.25 J	0.27 J	<0.1	<0.1	<0.1
Bromomethane	ug/L	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29
Butylbenzene, n-	ug/L	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Butylbenzene, sec-	ug/L	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Butylbenzene, tert-	ug/L	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
Carbon tetrachloride	ug/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Chlorobenzene	ug/L	<0.12	<0.12	<0.12	<0.12	0.26 J	<0.12	<0.12
Chloroethane	ug/L	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34
Chloroform	ug/L	2.1	1.7	4.3	4.5	3.6	3.9	<0.12
Chloromethane	ug/L	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Chlorotoluene, 2-	ug/L	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Chlorotoluene, 4-	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibromo-3-Chloropropane, 1,2-	ug/L	<0.32	<0.32	<0.32	<0.32	<0.32	<0.32	<0.32
Dibromoethane, 1,2- (EDB)	ug/L	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22
Dibromomethane	ug/L	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21
Dichlorobenzene, 1,2-	ug/L	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
Dichlorobenzene, 1,3-	ug/L	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11
Dichlorobenzene, 1,4-	ug/L	<0.13	<0.13	1	1.1	1.1	<0.13	<0.13
Dichlorodifluoromethane	ug/L	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16
Dichloroethane, 1,1-	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichloroethane, 1,2-	ug/L	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22
Dichloroethene, 1,1-	ug/L	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
Dichloroethene, cis-1,2-	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichloroethene, trans-1,2-	ug/L	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11
Dichloropropane, 1,2-	ug/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Dichloropropane, 1,3-	ug/L	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Dichloropropane, 2,2-	ug/L	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13
Dichloropropene, 1,1-	ug/L	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
Dichloropropene, cis-1,3-	ug/L	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22
Dichloropropene, trans-1,3-	ug/L	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Ethylbenzene	ug/L	<0.1	<0.1	0.16 J	0.16 J	<0.1	<0.1	<0.1
Hexachlorobutadiene	ug/L	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22
Isopropylbenzene	ug/L	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Isopropyltoluene, p-	ug/L	<0.13	<0.13	0.16 J	0.17 J	<0.13	<0.13	<0.13
Methylene Chloride	ug/L	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
Naphthalene	ug/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Propylbenzene, N-	ug/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Styrene	ug/L	<0.15	<0.15	0.29 J	0.32 J	0.2 J	<0.15	<0.15
Tetrachloroethane, 1,1,1,2-	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tetrachloroethane, 1,1,2,2-	ug/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Tetrachloroethene	ug/L	<0.1	0.35 J	<0.1	<0.1	<0.1	0.2 J	<0.1
Toluene	ug/L	<0.25	<0.25	1.2	1.2	<0.25	<0.25	<0.25
Trichlorobenzene, 1,2,3-	ug/L	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
Trichlorobenzene, 1,2,4-	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Trichloroethane, 1,1,1-	ug/L	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19
Trichloroethane, 1,1,2-	ug/L	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31
Trichloroethene	ug/L	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13
Trichlorofluoromethane	ug/L	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23	<0.23
Trichloropropane, 1,2,3-	ug/L	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13
Trimethylbenzene, 1,2,4-	ug/L	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Trimethylbenzene, 1,3,5-	ug/L	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
Vinyl chloride	ug/L	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22
Xylene, m,p-	ug/L	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Xylene, o-	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Notes:

- Analysis by USEPA Method 8260 at TestAmerica Laboratory, Sacramento, CA.
- Data qualifiers:
 - J Result is less than the reporting limit but greater than or equal to the method detection limit
 - < Result not detected at stated value (MDL)

TABLE B.5.1
Vapor Sample Results - Moffett Field, California
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 3)

Matrix	Sample Location	Task 1 Sample Category	Task 1 Secondary Category, if any	Sample Depth (vertical profiles only)	On-Site (HAPSITE) vs. Off-Site (Laboratory) Result	HAPSITE Run Number / Lab ID	Sample Container	Sample Type	Date	Time	cis-1,2-DCE (ug/m3)	TCE (ug/m3)
AO	107 outdoor air	n/a			HAPSITE	SIM_LO_CVOC_10_20160823_013.hps	n/a	N	8/23/2016	9:38	0.27 J	0.38 J
AI	10 indoor air	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160822_015.hps	1L Tedlar	N	8/22/2016	14:21	0.59 J	4.9
AI	10 indoor air	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160823_027.hps	1L Tedlar	N	8/23/2016	11:54	1.2 J	7.5
AI	10 indoor air	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160824_023.hps	1L Tedlar	N	8/24/2016	10:45	1.7 J	8.6
AI	10 indoor air	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160825_014.hps	1L Tedlar	N	8/25/2016	9:11	1.2 J	9.7
AI	10 indoor air	n/a			HAPSITE	SIM_LO_CVOC_10_20160825_015.hps	1L Tedlar	Dup	8/25/2016	9:11	1.4 J	10
AI	107 indoor air conf room	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160822_003.hps	n/a	N	8/22/2016	11:05	U	0.26 J
AI	107 indoor air conf room	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160822_005.hps	n/a	N	8/22/2016	11:28	U	0.25 J
AI	107 indoor air conf room	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160822_012.hps	n/a	N	8/22/2016	12:32	0.26 J	0.44 J
AI	107 indoor air conf room	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160823_001.hps	n/a	N	8/23/2016	7:46	0.63 J	3.4
AI	107 indoor air conf room	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160823_015.hps	n/a	N	8/23/2016	9:57	0.56 J	2.3 J
AI	107 indoor air conf room	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160823_035.hps	n/a	N	8/23/2016	15:01	0.67 J	1.4 J
AI	107 indoor air conf room	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160824_002.hps	n/a	N	8/24/2016	8:30	0.34 J	1 J
AI	107 indoor air conf room	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160824_026.hps	n/a	N	8/24/2016	12:11	0.34 J	0.54 J
AI	107 indoor air conf room	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160824_029.hps	n/a	N	8/24/2016	14:08	0.34 J	0.26 J
AI	107 indoor air conf room	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160825_031.hps	n/a	N	8/25/2016	13:52	0.38 J	0.37 J
AI	107 indoor air conf room	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160825_047.hps	n/a	N	8/25/2016	16:16	0.44 J	0.41 J
AI	107 indoor air near pipe	Tbl 5.4 - 7 Bldg Atten			Laboratory	320-21297-2	1L Summa	N	8/25/2016	8:05	<0.35	1.8 J
AI	107 indoor air near pipe	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160825_003.hps	n/a	N	8/25/2016	8:10	0.37 J	1.8 J
U4	107 pipe	Tbl 5.4 - 7 Bldg Atten - initial			HAPSITE	SIM_LO_CVOC_10_20160822_006.hps	n/a	N	8/22/2016	11:37	123	656 E
U4	107 pipe	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160822_018.hps	n/a	N	8/22/2016	15:25	U	0.86 J
U4	107 pipe	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160823_003.hps	n/a	N	8/23/2016	8:05	266	763 E
U4	107 pipe	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160823_011.hps	n/a	N	8/23/2016	9:22	274	763 E
U4	107 pipe	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160823_023.hps	n/a	N	8/23/2016	12:00	5.2	27

TABLE B.5.1
Vapor Sample Results - Moffett Field, California
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 3)

Matrix	Sample Location	Task 1 Sample Category	Task 1 Secondary Category, if any	Sample Depth (vertical profiles only)	On-Site (HAPSITE) vs. Off-Site (Laboratory) Result	HAPSITE Run Number / Lab ID	Sample Container	Sample Type	Date	Time	cis-1,2-DCE (ug/m3)	TCE (ug/m3)
U4	107 pipe	Tbl 5.4 - 7 Bldg Atten	Pipe profile		HAPSITE	SIM_LO_CVOC_10_20160823_041.hps	1L Tedlar	N	8/23/2016	15:25	95	699 E
U4	107 pipe	Tbl 5.4 - 7 Bldg Atten	Pipe profile		HAPSITE	SIM_LO_CVOC_10_20160823_043.hps	1L Tedlar	N	8/23/2016	15:27	95	693 E
U4	107 pipe	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160824_006.hps	1L Tedlar	N	8/24/2016	7:37	186	758 E
U4	107 pipe	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160824_018.hps	1L Tedlar	N	8/24/2016	10:45	174	629 E
U4	107 pipe	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160824_034.hps	1L Tedlar	N	8/24/2016	14:04	17	86
U4	107 pipe	Tbl 5.4 - 7 Bldg Atten			Laboratory	320-21297-4	1L Summa	N	8/25/2016	8:18	200	1100
U4	107 pipe	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160825_004.hps	n/a	N	8/25/2016	8:19	159	725 E
U4	107 pipe	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160825_026.hps	n/a	N	8/25/2016	13:04	79	527
U5	Tunnel entrance	Tbl 5.4 - 7 Bldg Atten - initial			HAPSITE	SIM_LO_CVOC_10_20160822_016.hps	1L Tedlar	N	8/22/2016	14:22	6.7	134
U5	Tunnel entrance	n/a			HAPSITE	SIM_LO_CVOC_10_20160822_017.hps	1L Tedlar	Dup	8/22/2016	14:22	6.7	134
U5	Tunnel entrance	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160823_026.hps	1L Tedlar	N	8/23/2016	12:00	9.9	134
U5	Tunnel entrance	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160824_024.hps	1L Tedlar	N	8/24/2016	10:55	9.9	124
U5	Tunnel entrance	n/a			HAPSITE	SIM_LO_CVOC_10_20160824_025.hps	1L Tedlar	Dup	8/24/2016	10:55	10	124
U5	Tunnel entrance	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160824_033.hps	1L Tedlar	N	8/24/2016	13:54	11	156
U5	Tunnel entrance	Tbl 5.4 - 7 Bldg Atten			HAPSITE	SIM_LO_CVOC_10_20160825_016.hps	1L Tedlar	N	8/25/2016	9:13	4.4	86
U5	107 steam tunnel	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160823_045.hps	1L Tedlar	N	8/23/2016	15:46	5.2	70
U5	107 steam tunnel	n/a			HAPSITE	SIM_LO_CVOC_10_20160823_046.hps	1L Tedlar	Dup	8/23/2016	15:46	5.2	70
U5	Tunnel Concrete	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160822_013.hps	1L Tedlar	N	8/22/2016	13:54	4.4	16
U5	Tunnel Concrete	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160823_024.hps	1L Tedlar	N	8/23/2016	11:40	6.3	20
U5	Tunnel Concrete	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_020.hps	1L Tedlar	N	8/24/2016	10:20	6.7	16
U5	Tunnel Concrete	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_011.hps	1L Tedlar	N	8/25/2016	8:52	R	R
U5	Tunnel EA wall	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160824_022.hps	1L Tedlar	N	8/24/2016	10:50	19	37
U5	Tunnel EA wall	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_013.hps	1L Tedlar	N	8/25/2016	9:05	20	134
U5	Tunnel Vault SA-V1	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160822_014.hps	1L Tedlar	N	8/22/2016	14:00	7.9	28

TABLE B.5.1
Vapor Sample Results - Moffett Field, California
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 3)

Matrix	Sample Location	Task 1 Sample Category	Task 1 Secondary Category, if any	Sample Depth (vertical profiles only)	On-Site (HAPSITE) vs. Off-Site (Laboratory) Result	HAPSITE Run Number / Lab ID	Sample Container	Sample Type	Date	Time	cis-1,2-DCE (ug/m3)	TCE (ug/m3)
U5	Tunnel Vault SA-V1	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160823_025.hps	1L Tedlar	N	8/23/2016	11:48	11	21
U5	Tunnel Vault SA-V1	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_021.hps	1L Tedlar	N	8/24/2016	10:25	12	20
U5	Tunnel Vault SA-V1	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_012.hps	1L Tedlar	N	8/25/2016	9:00	15	140
U4	Telephone T-11	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160824_011.hps	1L Tedlar	N	8/24/2016	9:05	163	183
U4	Telephone T-11	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_046.hps	n/a	N	8/24/2016	16:17	107	70
U4	Telephone T-11	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_022.hps	1L Tedlar	N	8/25/2016	10:11	182	156
U4	Telephone T-15	Tbl 5.3 - 2 Delineation	Tbl 5.4 - 2 Init Test Spat Var		HAPSITE	SIM_LO_CVOC_10_20160824_010.hps	1L Tedlar	N	8/24/2016	9:40	R	R
U4	Telephone T-15	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_047.hps	n/a	N	8/24/2016	16:13	123	355
U4	Telephone T-15	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_024.hps	1L Tedlar	N	8/25/2016	10:32	178	387
U4	Telephone T-20	Tbl 5.3 - 2 Delineation	Tbl 5.4 - 2 Init Test Spat Var //		HAPSITE	SIM_LO_CVOC_10_20160822_010.hps	1L Tedlar	N	8/22/2016	11:54	44	97
U4	Telephone T-20	Tbl 5.4 - 6 Delineation - temporal variability	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_10_20160823_008.hps	1L Tedlar	N	8/23/2016	8:15	147	199
U4	Telephone T-20	Tbl 5.4 - 6 Delineation - temporal variability	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_10_20160824_009.hps	1L Tedlar	N	8/24/2016	8:40	111	156
U4	Telephone T-20	Tbl 5.4 - 6 Delineation - temporal variability	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_10_20160824_048.hps	n/a	N	8/24/2016	16:08	17	86
U4	Telephone T-20	n/a			Laboratory	320-21297-5	1L Summa	FD	8/25/2016	8:10	120	220
U4	Telephone T-20	Tbl 5.4 - 6 Delineation - temporal variability	Tbl 5.4 - 7 Bldg Atten		Laboratory	320-21297-3	1L Summa	N	8/25/2016	8:10	110	230
U4	Telephone T-20	Tbl 5.4 - 6 Delineation - temporal variability	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_10_20160825_007.hps	1L Tedlar	N	8/25/2016	8:10	83	177
U1	McCord 1	Tbl 5.3 - 1 Initial Field Testing			HAPSITE	SIM_LO_CVOC_10_20160822_008.hps	1L Tedlar	N	8/22/2016	11:39	12	344
U1	McCord 1	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160823_005.hps	1L Tedlar	N	8/23/2016	8:06	83	1112 E
U1	McCord 1	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_007.hps	1L Tedlar	N	8/24/2016	8:15	71	1026 E
U1	McCord 1	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_009.hps	1L Tedlar	N	8/25/2016	7:42	87	1182 E
U1	McCord 2	Tbl 5.3 - 1 Initial Field Testing	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_10_20160822_009.hps	1L Tedlar	N	8/22/2016	11:46	1.9 J	30
U1	McCord 2	Tbl 5.4 - 3 Initial Testing ST Temporal variability	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_10_20160823_007.hps	1L Tedlar	N	8/23/2016	8:12	2	38
U1	McCord 2	Tbl 5.4 - 3 Initial Testing ST Temporal variability	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_10_20160824_004.hps	1L Tedlar	N	8/24/2016	8:20	14	59
U1	McCord 2	Tbl 5.4 - 3 Initial Testing ST Temporal variability	Tbl 5.4 - 7 Bldg Atten // Vertical	7	HAPSITE	SIM_LO_CVOC_10_20160824_038.hps	1L Tedlar	N	8/24/2016	14:10	6.3	59

TABLE B.5.1
Vapor Sample Results - Moffett Field, California
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 3)

Matrix	Sample Location	Task 1 Sample Category	Task 1 Secondary Category, if any	Sample Depth (vertical profiles only)	On-Site (HAPSITE) vs. Off-Site (Laboratory) Result	HAPSITE Run Number / Lab ID	Sample Container	Sample Type	Date	Time	cis-1,2-DCE (ug/m3)	TCE (ug/m3)
U1	McCord 2	n/a	Tbl 5.4 - 7 Bldg Atten // Vertical	4	HAPSITE	SIM_LO_CVOC_10_20160824_037.hps	1L Tedlar	N	8/24/2016	14:11	3.4	13
U1	McCord 2	n/a	Tbl 5.4 - 7 Bldg Atten // Vertical	1	HAPSITE	SIM_LO_CVOC_10_20160824_036.hps	1L Tedlar	N	8/24/2016	14:12	R	5.1
U1	McCord 2	Tbl 5.4 - 3 Initial Testing ST Temporal variability	Tbl 5.4 - 7 Bldg Atten		Laboratory	320-21297-1	1L Summa	N	8/24/2016	15:50	1.8	19
U1	McCord 2	Tbl 5.4 - 3 Initial Testing ST Temporal variability	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_10_20160824_041.hps	1L Tedlar	N	8/24/2016	15:50	4.4	37
U1	McCord 2	Tbl 5.4 - 3 Initial Testing ST Temporal variability	Tbl 5.4 - 7 Bldg Atten		HAPSITE	SIM_LO_CVOC_10_20160825_006.hps	1L Tedlar	N	8/25/2016	7:46	4	70
U1	McCord 3	Tbl 5.3 - 1 Initial Field Testing			HAPSITE	SIM_LO_CVOC_10_20160822_011.hps	1L Tedlar	N	8/22/2016	12:01	79	414
U1	McCord 3	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160823_009.hps	1L Tedlar	N	8/23/2016	8:20	71	339
U1	McCord 3	Tbl 5.4 - 3 Initial Testing ST Temporal variability	Vertical profile	10	HAPSITE	SIM_LO_CVOC_10_20160823_030.hps	1L Tedlar	N	8/23/2016	13:10	48	328
U1	McCord 3	n/a	Vertical profile	7	HAPSITE	SIM_LO_CVOC_10_20160823_029.hps	1L Tedlar	N	8/23/2016	13:12	63	425
U1	McCord 3	n/a	Vertical profile	4	HAPSITE	SIM_LO_CVOC_10_20160823_028.hps	1L Tedlar	N	8/23/2016	13:14	59	398
U1	McCord 3	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_005.hps	1L Tedlar	N	8/24/2016	8:23	52	279
U1	McCord 3	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_039.hps	1L Tedlar	N	8/24/2016	14:15	44	301
U1	McCord 3	Tbl 5.4 - 3 Initial Testing ST Temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_008.hps	1L Tedlar	N	8/25/2016	7:48	75	398
U1	MH SAN 0132	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160823_019.hps	1L Tedlar	N	8/23/2016	10:10	741	613 E
U1	MH SAN 0132	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_043.hps	1L Tedlar	N	8/24/2016	15:18	408	446 E
U1	MH SAN 0132	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_023.hps	1L Tedlar	N	8/25/2016	9:49	385	425
U1	MH SAN 0132	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_043.hps	1L Tedlar	N	8/25/2016	14:27	646	758 E
U1	SS413	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160823_021.hps	1L Tedlar	N	8/23/2016	10:18	559	758 E
U1	SS414	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160822_023.hps	1L Tedlar	N	8/22/2016	15:45	622	822 E
U1	SS414	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160823_020.hps	1L Tedlar	N	8/23/2016	10:14	571	634 E
U1	SS415	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160824_013.hps	1L Tedlar	N	8/24/2016	9:38	1.7 J	12
U1	SS415	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_031.hps	1L Tedlar	N	8/24/2016	13:43	4	19
U1	SS415	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_019.hps	1L Tedlar	N	8/25/2016	9:40	3.1	17
U1	SS415	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_040.hps	1L Tedlar	N	8/25/2016	14:20	3.9	20

TABLE B.5.1
Vapor Sample Results - Moffett Field, California
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 3)

Matrix	Sample Location	Task 1 Sample Category	Task 1 Secondary Category, if any	Sample Depth (vertical profiles only)	On-Site (HAPSITE) vs. Off-Site (Laboratory) Result	HAPSITE Run Number / Lab ID	Sample Container	Sample Type	Date	Time	cis-1,2-DCE (ug/m3)	TCE (ug/m3)
U1	SS416	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160822_022.hps	1L Tedlar	N	8/22/2016	15:41	13	7.5
U1	SS416	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160823_018.hps	1L Tedlar	N	8/23/2016	10:05	262	177
U1	SS416	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_014.hps	1L Tedlar	N	8/24/2016	9:42	896 E	666 E
U1	SS416	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_035.hps	1L Tedlar	N	8/24/2016	13:47	14	8.1
U1	SS416	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_040.hps	1L Tedlar	N	8/24/2016	15:21	37	21
U1	SS416	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_020.hps	1L Tedlar	N	8/25/2016	9:41	400	349
U1	SS416	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_039.hps	1L Tedlar	N	8/25/2016	14:23	44	32
U1	SS417	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160823_017.hps	1L Tedlar	N	8/23/2016	10:00	484	376
U1	SS417	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_042.hps	1L Tedlar	N	8/24/2016	15:24	714 E	645 E
U1	SS417	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_021.hps	1L Tedlar	N	8/25/2016	9:45	464	355
U1	SS417	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_041.hps	1L Tedlar	N	8/25/2016	14:30	289	236
U1	SS417	n/a			HAPSITE	SIM_LO_CVOC_10_20160825_042.hps	1L Tedlar	Dup	8/25/2016	14:30	285	236
U1	SS418	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160823_016.hps	1L Tedlar	N	8/23/2016	9:55	345	269
U1	SS436	Tbl 5.3 - 2 Delineation	Tbl 5.4 - 2 Init Test Spat Var		HAPSITE	SIM_LO_CVOC_10_20160822_019.hps	1L Tedlar	N	8/22/2016	15:07	313	430 E
U1	SS436	n/a			HAPSITE	SIM_LO_CVOC_10_20160822_024.hps	1L Tedlar	Dup	8/22/2016	15:07	313	435
U1	SS455	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160823_039.hps	1L Tedlar	N	8/23/2016	14:21	1701 E	1225 E
U1	SS455	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_044.hps	1L Tedlar	N	8/25/2016	13:25	975 E	688 E
U1	SS458	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160824_045.hps	1L Tedlar	N	8/24/2016	14:47	5.6	193
U1	SS458	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_032.hps	1L Tedlar	N	8/25/2016	13:11	3.2	33
U1	SS460	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160823_038.hps	1L Tedlar	N	8/23/2016	14:12	9.5	33
U1	SS460	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_034.hps	1L Tedlar	N	8/25/2016	13:20	1.1 J	2.4 J
U1	SS461	Tbl 5.3 - 2 Delineation			HAPSITE	SIM_LO_CVOC_10_20160823_036.hps	1L Tedlar	N	8/23/2016	14:07	26	59
U1	SS461	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160824_049.hps	1L Tedlar	N	8/24/2016	14:53	5.2	12

TABLE B.5.1
Vapor Sample Results - Moffett Field, California
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 3)

Matrix	Sample Location	Task 1 Sample Category	Task 1 Secondary Category, if any	Sample Depth (vertical profiles only)	On-Site (HAPSITE) vs. Off-Site (Laboratory) Result	HAPSITE Run Number / Lab ID	Sample Container	Sample Type	Date	Time	cis-1,2-DCE (ug/m3)	TCE (ug/m3)
U1	SS461	n/a			HAPSITE	SIM_LO_CVOC_10_20160824_050.hps	1L Tedlar	Dup	8/24/2016	14:53	5.6	14
U1	SS461	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_033.hps	1L Tedlar	N	8/25/2016	13:17	6.3	6.4
U1	SS464	Tbl 5.3 - 2 Delineation	Tbl 5.4 - 2 Init Test Spat Var		HAPSITE	SIM_LO_CVOC_10_20160823_032.hps	1L Tedlar	N	8/23/2016	13:54	1281	E
U1	SS464	Tbl 5.4 - 6 Delineation - temporal variability			HAPSITE	SIM_LO_CVOC_10_20160825_035.hps	1L Tedlar	N	8/25/2016	13:34	1610 E	1494 E
U1	SS785	Tbl 5.4 - 1 Background			HAPSITE	SIM_LO_CVOC_10_20160822_020.hps	1L Tedlar	N	8/22/2016	15:25	1.6 J	5.1
U1	SS790	Tbl 5.4 - 1 Background			HAPSITE	SIM_LO_CVOC_10_20160822_021.hps	1L Tedlar	N	8/22/2016	15:31	2.1	3.6
U1	SS790	Tbl 5.4 - 1 Background			HAPSITE	SIM_LO_CVOC_10_20160824_016.hps	1L Tedlar	N	8/24/2016	9:25	3.6	16
U1	SS790	Tbl 5.4 - 1 Background			HAPSITE	SIM_LO_CVOC_10_20160824_030.hps	1L Tedlar	N	8/24/2016	13:30	2.9	11
U1	SS790	Tbl 5.4 - 1 Background			HAPSITE	SIM_LO_CVOC_10_20160825_017.hps	1L Tedlar	N	8/25/2016	9:30	1.9 J	4.6
U1	SS790	Tbl 5.4 - 1 Background			HAPSITE	SIM_LO_CVOC_10_20160825_037.hps	1L Tedlar	N	8/25/2016	14:10	9.1	16
U1	SS791	Tbl 5.4 - 1 Background			HAPSITE	SIM_LO_CVOC_10_20160824_017.hps	1L Tedlar	N	8/24/2016	9:32	5.6	12
U1	SS791	Tbl 5.4 - 1 Background			HAPSITE	SIM_LO_CVOC_10_20160824_032.hps	1L Tedlar	N	8/24/2016	13:40	18	17
U1	SS791	Tbl 5.4 - 1 Background			HAPSITE	SIM_LO_CVOC_10_20160825_018.hps	1L Tedlar	N	8/25/2016	9:35	1.1 J	5.9
U1	SS791	Tbl 5.4 - 1 Background			HAPSITE	SIM_LO_CVOC_10_20160825_038.hps	1L Tedlar	N	8/25/2016	14:15	3.3	10

Notes:

1. HAPSITE samples analyzed with Smart Plus (H1040). Date and time in the table above refer to the date and time samples were collected.

2. Sample locations: AO = outdoor air; AI = indoor air; U1 = sanitary sewer; U4 = telephone utility; U5 = utility tunnel

3. HAPSITE Data qualifiers:

- U non-detect
- J result less than the lower calibration limit of 0.5 ppbV
- E saturated
- R rejected

Lab data qualifiers:

- B Compound was found in the blank and sample
- J Result is less than the reporting limit but greater than or equal to the method detection limit
- * Detected result; LCS or LCSD is outside acceptance limits
- < Result not detected (i.e., result is less than the method detection limit)

4. Table does not include QC (e.g., CCV) samples.

5. See laboratory report for additional TO-15 analyte results.

TABLE B.5.2
Liquid Sample Results - Moffett Field, California
Groundwater to Sewer Demonstration Site (Task 1, Demonstration Site 3)

Sample Location:		W95C16	Telephone T-11	Telephone T-15	QC
Location Type:		Groundwater	Utility, Telephone	Utility, Telephone	Trip Blank
Lab ID:		320-21303-2	320-21303-1	320-21303-3	320-21303-4
Sample Type:		N	N	N	TB
Container:		40 mL VOA	40 mL VOA	40 mL VOA	40 mL VOA
Sample Date:		8/25/2016	8/25/2016	8/25/2016	8/25/2016
Sample Time:		10:30	10:11	10:37	0:00
Analyte					
Benzene	ug/L	<1.3	<0.65	<1.3	<0.13
Bromobenzene	ug/L	<1.8	<0.9	<1.8	<0.18
Bromochloromethane	ug/L	<1.4	<0.7	<1.4	<0.14
Bromodichloromethane	ug/L	<1.4	<0.7	<1.4	<0.14
Bromoform	ug/L	<1	<0.5	<1	<0.1
Bromomethane	ug/L	<2.9	<1.5	<2.9	<0.29
Butylbenzene, n-	ug/L	<1.2	<0.6	<1.2	<0.12
Butylbenzene, sec-	ug/L	<1.2	<0.6	<1.2	<0.12
Butylbenzene, tert-	ug/L	<1.4	<0.7	<1.4	<0.14
Carbon tetrachloride	ug/L	<1.5	<0.75	<1.5	<0.15
Chlorobenzene	ug/L	<1.2	<0.6	<1.2	<0.12
Chloroethane	ug/L	<3.4	<1.7	<3.4	<0.34
Chloroform	ug/L	<1.2	<0.6	<1.2	<0.12
Chloromethane	ug/L	<2.5	<1.3	<2.5	<0.25
Chlorotoluene, 2-	ug/L	<0.7	<0.35	<0.7	<0.07
Chlorotoluene, 4-	ug/L	<1	<0.5	<1	<0.1
Dibromo-3-Chloropropane, 1,2-	ug/L	<3.2	<1.6	<3.2	<0.32
Dibromoethane, 1,2- (EDB)	ug/L	<2.2	<1.1	<2.2	<0.22
Dibromomethane	ug/L	<2.1	<1.1	<2.1	<0.21
Dichlorobenzene, 1,2-	ug/L	<1.4	<0.7	<1.4	<0.14
Dichlorobenzene, 1,3-	ug/L	<1.1	<0.55	<1.1	<0.11
Dichlorobenzene, 1,4-	ug/L	<1.3	<0.65	<1.3	<0.13
Dichlorodifluoromethane	ug/L	<1.6	<0.8	<1.6	<0.16
Dichloroethane, 1,1-	ug/L	3.5 J	3.2 J	<1	<0.1
Dichloroethane, 1,2-	ug/L	<2.2	<1.1	<2.2	<0.22
Dichloroethene, 1,1-	ug/L	4.6 J	<0.7	<1.4	<0.14
Dichloroethene, cis-1,2-	ug/L	190	210	1.1 J	<0.1
Dichloroethene, trans-1,2-	ug/L	2.3 J	1.7 J	<1.1	<0.11
Dichloropropane, 1,2-	ug/L	<1.5	<0.75	<1.5	<0.15
Dichloropropane, 1,3-	ug/L	<0.7	<0.35	<0.7	<0.07
Dichloropropane, 2,2-	ug/L	<1.3	<0.65	<1.3	<0.13
Dichloropropene, 1,1-	ug/L	<1.4	<0.7	<1.4	<0.14
Dichloropropene, cis-1,3-	ug/L	<2.2	<1.1	<2.2	<0.22
Dichloropropene, trans-1,3-	ug/L	<0.8	<0.4	<0.8	<0.08
Ethylbenzene	ug/L	<1	<0.5	<1	<0.1
Hexachlorobutadiene	ug/L	<2.2	<1.1	<2.2	<0.22
Isopropylbenzene	ug/L	<1.2	<0.6	<1.2	<0.12
Isopropyltoluene, p-	ug/L	<1.3	<0.65	<1.3	<0.13
Methylene Chloride	ug/L	<3.5	<1.8	<3.5	<0.35
Naphthalene	ug/L	<1.5	<0.75	<1.5	<0.15
Propylbenzene, N-	ug/L	<1.5	<0.75	<1.5	<0.15
Styrene	ug/L	<1.5	<0.75	<1.5	<0.15
Tetrachloroethane, 1,1,1,2-	ug/L	<1	<0.5	<1	<0.1
Tetrachloroethane, 1,1,2,2-	ug/L	<0.9	<0.45	<0.9	<0.09
Tetrachloroethene	ug/L	<1	5.5	<1	<0.1
Toluene	ug/L	<2.5	<1.3	<2.5	<0.25
Trichlorobenzene, 1,2,3-	ug/L	<1.4	<0.7	<1.4	<0.14
Trichlorobenzene, 1,2,4-	ug/L	<1	<0.5	<1	<0.1
Trichloroethane, 1,1,1-	ug/L	<1.9	<0.95	<1.9	<0.19
Trichloroethane, 1,1,2-	ug/L	<3.1	<1.6	<3.1	<0.31
Trichloroethene	ug/L	280	15	<1.3	<0.13
Trichlorofluoromethane	ug/L	<2.3	<1.2	<2.3	<0.23
Trichloropropane, 1,2,3-	ug/L	<1.3	<0.65	<1.3	<0.13
Trimethylbenzene, 1,2,4-	ug/L	<1.2	<0.6	<1.2	<0.12
Trimethylbenzene, 1,3,5-	ug/L	<1.4	<0.7	<1.4	<0.14
Vinyl chloride	ug/L	<2.2	6.8	<2.2	<0.22
Xylene, m,p-	ug/L	<1.8	<0.9	<1.8	<0.18
Xylene, o-	ug/L	<1	<0.5	<1	<0.1

Notes:

- Analysis by USEPA Method 8260 at TestAmerica Laboratory, Sacramento, CA.
- Data qualifiers:
 - J Result is less than the reporting limit but greater than or equal to the method detection limit
 - < Result not detected (i.e., result is less than the method detection limit)

TABLE B.6
Vapor Sample Results - Corpus Christi, Texas
Groundwater to Sewer Demonstration Site (Task 1)

Site ID:		NASCC	NASCC	NASCC	NASCC	NASCC	NASCC
Site Type:		CVOC	CVOC	CVOC	CVOC	CVOC	CVOC
Sewer Category:		A	A	A	A	A	A
Sample Location ID:		MH N of Bldg 8 Admin	MH near hanger	MH Ocean Drive	MH S of Bldg 8 Admin	Bldg 8 in covered sump	Bldg 8 in wall gap
Sewer Type:		Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Air, Indoor	Air, Indoor
Sample Collected:		9/14/2016 11:40	9/14/2016 11:45	9/14/2016 11:30	9/14/2016 11:55	9/14/2016 14:12	9/14/2016 14:30
Sample Type:		N	N	N	N	N	N
Container:		1L Tedlar	1L Tedlar	1L Tedlar	1L Tedlar	1L Tedlar	1L Tedlar
Manhole Sample Depth:		Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom
Sewer Depth (ft bgs):		7.34	7.3	4.4	6.06	n/a	n/a
Analyzed By:		Lab	Lab	Lab	Lab	Lab	Lab
Lab ID:		320-21813-2	320-21813-3	320-21813-1	320-21813-4	320-21813-5	320-21813-6
Analyte	ug/m3	47	58	49	110	<2500	98 J
Acetone	ug/m3	0.75 J	1 J	1 J	1.1 J	<1500	140
Benzene	ug/m3	<0.84	<0.84	<0.84	<1.3	<4900	<17
Benzyl chloride	ug/m3	<0.44	70	<0.44	21	<2600	<8.8
Bromodichloromethane	ug/m3	<0.72	8.9	<0.72	2 J	<4200	<14
Bromoform	ug/m3	<1.3	<1.3	<1.3	<2	<7500	<26
Bromomethane	ug/m3	3.3	6.9	2.9	5.4	<3400	<12
Butanone, 2- (MEK)	ug/m3	12	25	23	11	<1400	14 J
Carbon disulfide	ug/m3	0.54 J	1.3 J	0.82 J	0.82 J	<2300	<8
Carbon tetrachloride	ug/m3	0.44 J	0.34 J	0.38 J	<0.44	<1700	<5.8
Chlorobenzene	ug/m3	<0.81	<0.81	<0.81	<1.2	<4700	<16
Chloroethane	ug/m3	1.9	51	1.3 J	26	6300 J	13 J
Chloroform	ug/m3	1.5 J	2.3	2.1	2 J	<2400	<8.1
Chloromethane	ug/m3	<0.67	39	<0.67	9.8	<3900	<13
Dibromochloromethane	ug/m3	<0.58	<0.58	<0.58	<0.86	<3300	<11
Dibromoethane, 1,2- (EDB)	ug/m3	<1.1	<1.1	<1.1	<1.6	<6300	<21
Dichloro-1,1,2,2-tetrafluoroethane, 1,2	ug/m3	<0.78	<0.78	<0.78	<1.2	<4500	<15
Dichlorobenzene, 1,2-	ug/m3	<0.66	<0.66	<0.66	<0.99	<3800	<13
Dichlorobenzene, 1,3-	ug/m3	2.8	4.4	1.4 J	3.1 J	<5200	<18
Dichlorobenzene, 1,4-	ug/m3	2.4	1.6 J	3.6	2.3 J	<4200	<14
Dichlorodifluoromethane	ug/m3	<0.29	<0.29	<0.29	<0.44	<1700	<5.8
Dichloroethane, 1,1-	ug/m3	0.38 J	0.47 J	0.41 J	0.58 J	<2100	<7.1
Dichloroethane, 1,2-	ug/m3	<0.51	<0.51	<0.51	<0.77	<3000	<10
Dichloroethene, 1,1-	ug/m3	<0.35	19	<0.35	1.4 J	<2000	<7
Dichloroethene, cis-1,2-	ug/m3	<0.4	0.47 J	<0.4	2.7	<2300	<7.9
Dichloroethene, trans-1,2-	ug/m3	<1.1	<1.1	<1.1	<1.7	<6400	<22
Dichloropropane, 1,2-	ug/m3	<0.47	<0.47	<0.47	<0.71	<2700	<9.3
Dichloropropene, cis-1,3-	ug/m3	<0.4	<0.4	<0.4	<0.6	<2300	<7.9
Dichloropropene, trans-1,3-	ug/m3	3.1	3.4	2.7	3.1	<1600	59
Ethylbenzene	ug/m3	<0.92	<0.92	<0.92	<1.4	<5300	<18
Ethyltoluene, 4-	ug/m3	<4.6	<4.6	<4.6	<6.9	<27000	<91
Hexachlorobutadiene	ug/m3	<0.36	<0.36	<0.36	<0.53	<2100	<7.1
Hexanone, 2-	ug/m3	<0.55	<0.55	<0.55	<0.83	<3200	<11
Methyl-2-pentanone, 4- (MIBK)	ug/m3	1.8	8	12	6	<1500	<5
Methylene Chloride	ug/m3	4.7	4.2	2.4	3.7	<1500	6.5 J
Styrene	ug/m3	<0.47	<0.47	<0.47	<0.71	<2700	<9.4
Tetrachloroethane, 1,1,2,2-	ug/m3	1 J	1.1 J	0.94 J	0.95 J	<2000	<6.8
Tetrachloroethene	ug/m3	24	220	20	25	<1100	180
Toluene	ug/m3	<1.2	<1.2	<1.2	13	49000	<25
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/m3	<3.2	<3.2	<3.2	<4.8	<19000	<64
Trichlorobenzene, 1,2,4-	ug/m3	<0.35	<0.35	<0.35	<0.53	<2100	<7
Trichloroethane, 1,1,1-	ug/m3	<0.37	<0.37	<0.37	<0.55	<2100	<7.2
Trichloroethane, 1,1,2-	ug/m3	2.6	29	2.4	45	1500000	4700
Trichloroethene	ug/m3	1.3 J	<1.1	2.1 J	<1.7	<6400	<22
Trichlorofluoromethane	ug/m3	1.3 J	1.3 J	1 J	1.4 J	<4600	<16
Trimethylbenzene, 1,2,4-	ug/m3	<0.61	<0.61	<0.61	<0.92	<3600	<12
Trimethylbenzene, 1,3,5-	ug/m3	0.53 J	<0.51	<0.51	<0.77	<3000	<10
Vinyl acetate	ug/m3	<0.31	3.5	<0.31	<0.46	<1800	<6.1
Vinyl chloride	ug/m3	8.5	8.7	6.9	8.4	<2500	120
Xylene, m,p-	ug/m3	3.3	3.3	2.7	3.3	<1400	25 J
Xylene, o-	ug/m3						

Notes:

1. Tedlar bags were shipped for overnight delivery to the TestAmerica laboratory in West Sacramento, California for analysis using USEPA Method TO-15.
2. Lab data qualifiers:
 - J Result is less than the reporting limit but greater than or equal to the method detection limit
 - < Result not detected (i.e., result is less than the method detection limit)
3. Sewer depths were obtained from site GIS maps.
4. Sewer Category: A = sewer below water table; B = sewer above water table
5. Manholes were sampled within 1 foot of bottom, unless noted.

TABLE B.7
Vapor Sample Results - Austin, Texas
Groundwater to Sewer Demonstration Site (Task 1 and Task 2)

Site ID:		n/a (background)		AUS-001				AUS-002	AUS-003	AUS-004		
Site Type:		n/a		CVOC				CVOC	CVOC	CVOC		
Sewer Category:		n/a		B				B	B	B		
Sample Location ID:		AUS Commercial Bkg (behind strip mall)	AUS Residential Bkg (cul de sac)	AUS-001B	AUS-001A			AUS-002	AUS-003	AUS-004		
Sewer Type:		Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Utility lateral, sanitary sewer			Utility lateral, sanitary sewer	Utility lateral, sanitary sewer	Utility, tunnel	Utility, tunnel	
Sample Collected:		6/21/17 13:15	6/21/17 10:21	6/21/17 9:52	10/20/16 14:40	6/21/17 9:45		10/20/16 15:25	10/20/16 15:50	6/21/17 10:51	6/21/17 10:51	
Sample Type:		N	DUP	N	N	N	DUP	N	N	N	DUP	
Container:		1L Tedlar	1L Tedlar	1L Tedlar	1L Tedlar	1L Tedlar	1L Tedlar	1L Tedlar	1L Tedlar	1L Tedlar	1L Tedlar	
Manhole Sample Depth:		Near bottom		Near bottom	Near bottom	Near bottom		Near bottom	Near bottom	Near bottom	Near bottom	
Sewer Depth (ft bgs):		12.58		6.17	6.09	4	3	3	3	5	5	
Lab or HAPSITE Analysis:		HAPSITE	HAPSITE	HAPSITE	HAPSITE	Lab	HAPSITE	HAPSITE	Lab	Lab	HAPSITE	
Lab ID:		SIM_LO_CVOC_10_20_170621_008.hps	SIM_LO_CVOC_10_20_170621_011.hps	SIM_LO_CVOC_10_20_170621_005.hps	SIM_LO_CVOC_10_20_170621_004.hps	320-22890-1	SIM_LO_CVOC_10_20_170621_001.hps	SIM_LO_CVOC_10_20_170621_003.hps	320-22890-2	320-22890-3	SIM_LO_CVOC_10_20_170621_007.hps	
Analyte												
Acetone	ug/m3	-	-	-	-	20	-	-	16	24	-	-
Benzene	ug/m3	-	-	-	-	4.2	-	-	1.4	<0.25	-	-
Benzyl chloride	ug/m3	-	-	-	-	<1	-	-	<0.84	<0.84	-	-
Bromodichloromethane	ug/m3	-	-	-	-	0.75 J	-	-	<0.44	<0.44	-	-
Bromoform	ug/m3	-	-	-	-	<0.85	-	-	<0.72	<0.72	-	-
Bromomethane	ug/m3	-	-	-	-	<1.5	-	-	<1.3	<1.3	-	-
Butanone, 2- (MEK)	ug/m3	-	-	-	-	3.4	-	-	3	38	-	-
Carbon disulfide	ug/m3	-	-	-	-	0.36 J	-	-	0.77 J	0.52 J	-	-
Carbon tetrachloride	ug/m3	-	-	-	-	<0.48	-	-	0.4 J	<0.4	-	-
Chlorobenzene	ug/m3	-	-	-	-	<0.35	-	-	<0.29	<0.29	-	-
Chloroethane	ug/m3	-	-	-	-	<0.96	-	-	<0.81	<0.81	-	-
Chloroform	ug/m3	UJ	UJ	229 J	12 J	8.8	14 J	13 J	<0.46	24	UJ	UJ
Chloromethane	ug/m3	-	-	-	-	0.78 J	-	-	0.86 J	0.97 J	-	-
Dibromochloromethane	ug/m3	-	-	-	-	<0.79	-	-	<0.67	<0.67	-	-
Dibromoethane, 1,2- (EDB)	ug/m3	-	-	-	-	<0.68	-	-	<0.58	<0.58	-	-
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/m3	-	-	-	-	<1.3	-	-	<1.1	<1.1	-	-
Dichlorobenzene, 1,2-	ug/m3	-	-	-	-	<0.92	-	-	<0.78	<0.78	-	-
Dichlorobenzene, 1,3-	ug/m3	-	-	-	-	<0.78	-	-	<0.66	<0.66	-	-
Dichlorobenzene, 1,4-	ug/m3	-	-	-	-	2.7 J	-	-	<0.9	<0.9	-	-
Dichlorodifluoromethane	ug/m3	-	-	-	-	2 J	-	-	1.7 J	2.1	-	-
Dichloroethane, 1,1-	ug/m3	-	-	-	-	<0.34	-	-	<0.29	<0.29	-	-
Dichloroethane, 1,2-	ug/m3	-	-	-	-	2.8 J	-	-	2.1 J	1.5 J	-	-
Dichloroethene, 1,1-	ug/m3	UJ	UJ	UJ	UJ	<0.6	UJ	UJ	<0.51	<0.51	UJ	UJ
Dichloroethene, cis-1,2-	ug/m3	UJ	UJ	UJ	UJ	1.4 J	UJ	UJ	<0.35	<0.35	UJ	UJ
Dichloroethene, trans-1,2-	ug/m3	-	-	-	-	<0.47	-	-	<0.4	<0.4	-	-
Dichloropropane, 1,2-	ug/m3	-	-	-	-	<1.3	-	-	<1.1	<1.1	-	-
Dichloropropene, cis-1,3-	ug/m3	-	-	-	-	<0.56	-	-	<0.47	<0.47	-	-
Dichloropropene, trans-1,3-	ug/m3	-	-	-	-	<0.47	-	-	<0.4	<0.4	-	-
Ethylbenzene	ug/m3	-	-	-	-	11	-	-	1.9	0.68 J	-	-
Ethyltoluene, 4-	ug/m3	-	-	-	-	1.7 J	-	-	<0.92	<0.92	-	-
Hexachlorobutadiene	ug/m3	-	-	-	-	<5.4	-	-	<4.6	<4.6	-	-
Hexanone, 2-	ug/m3	-	-	-	-	<0.42	-	-	0.51 J	<0.36	-	-
Methyl-2-pentanone, 4- (MIBK)	ug/m3	-	-	-	-	<0.65	-	-	<0.55	<0.55	-	-
Methylene Chloride	ug/m3	-	-	-	-	8.7	-	-	8.6	7.8	-	-
Styrene	ug/m3	-	-	-	-	<0.3	-	-	0.65 J	0.3 J	-	-
Tetrachloroethane, 1,1,2,2-	ug/m3	-	-	-	-	<0.56	-	-	<0.47	<0.47	-	-
Tetrachloroethene	ug/m3	33 J	27 J	UJ	UJ	10	UJ	UJ	12	21	1878 JE	1898 JE
Toluene	ug/m3	-	-	-	-	22	-	-	15	35	-	-
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/m3	-	-	-	-	<1.5	-	-	<1.2	<1.2	-	-
Trichlorobenzene, 1,2,4-	ug/m3	-	-	-	-	<3.8	-	-	<3.2	<3.2	-	-
Trichloroethane, 1,1,1-	ug/m3	-	-	-	-	<0.42	-	-	<0.35	<0.35	-	-
Trichloroethane, 1,1,2-	ug/m3	-	-	-	-	<0.43	-	-	<0.37	<0.37	-	-
Trichloroethene	ug/m3	UJ	UJ	UJ	UJ	1.9 J	UJ	UJ	0.61 J	0.97 J	86 J	86 J
Trichlorofluoromethane	ug/m3	-	-	-	-	<1.3	-	-	<1.1	1.2 J	-	-
Trimethylbenzene, 1,2,4-	ug/m3	-	-	-	-	3.6 J	-	-	<0.8	<0.8	-	-
Trimethylbenzene, 1,3,5-	ug/m3	-	-	-	-	2.2 J	-	-	<0.61	<0.61	-	-
Vinyl acetate	ug/m3	-	-	-	-	<0.6	-	-	<0.51	<0.51	-	-
Vinyl chloride	ug/m3	-	-	-	-	<0.36	-	-	<0.31	<0.31	-	-
Xylene, m,p-	ug/m3	-	-	-	-	70	-	-	7.6	1.8 J	-	-
Xylene, o-	ug/m3	-	-	-	-	18	-	-	2	0.62 J	-	-

Notes:

1. Samples were analyzed by TestAmerica Laboratory, Sacramento, CA using USEPA Method TO-15, or were analyted using a HAPSITE Smart Plus instrument.

2. Data qualifiers:

Lab

J Estimated result between the method detection limit and reporting limit
< Result not detected (i.e., result less than the method detection limit)

HAPSITE

UJ Analyte not detected
JE Estimated result

3. Sewer Category: A = sewer below water table; B = sewer above water table

4. Manholes were sampled within 1 foot of bottom, unless noted.
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TABLE B.8
Vapor Sample Results - Houston, Texas
Groundwater to Sewer Demonstration Site (Task 1 and Task 2)

Site ID: Site Type: Sewer Category: Sample Location ID: Sewer Type: Sample Collected: Sample Type: Container: Manhole Sample Depth: Sewer Depth (ft bgs): Analyzed By: Lab ID:		n/a (background)						HOU-001						
		n/a						CVOC						
		n/a						B						
		HOU Com Bkg 1 (Norfolk)			HOU Com Bkg 2 (Rice Village)	HOU Com Bkg 3 (Morningside and South)	HOU Res Bkg 1 (Merwin)	HOU-001					HOU-001B	
		Utility, sanitary sewer			Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer					Utility, sanitary sewer	
		4/27/17 15:15	7/27/17 7:58	1/11/18 9:10	7/27/17 10:53	1/11/18 8:45	4/27/17 17:25	10/14/16 9:20	4/27/17 15:45	7/27/17 10:34	1/11/18 8:15	1/11/18 8:15	7/27/17 10:42	1/11/18 8:22
		N	N	N	N	N	N	N	N	N	N	FD	N	N
		1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Tedlar	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa
		Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom
		10.3	10.3	10.3	9.6	nm	7.1	11.2	11.2	11.2	11.2	11.2	10.6	10.6
		Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab
		320-27995-11	320-30325-16	320-35129-16	320-30325-17	320-35129-17	320-27995-12	320-22714-1	320-27995-1	320-30325-1	320-35129-10	320-35129-18	320-30325-2	320-35129-11
Analyte														
Acetone	ug/m3	65	63	42	640	20 J	43	27 J	97	150 J	31 J	25 J	200	35 J
Benzene	ug/m3	0.7 J	3.4 J	2.2	<4.8	2.8	0.83 J	1.2 J	3.2 J	<3.5	4.9 J	4.7 J	<4.2	5.2 J
Benzyl chloride	ug/m3	<1.5	<4	<0.84	<16	<1.8	<0.84	<2.3	<5.5	<12	<9.4	<7.5	<14	<8.1
Bromodichloromethane	ug/m3	86	110	30	220	40	9.2	190	150	490	77	79	540	92
Bromoform	ug/m3	2.3 J	<3.5	<0.72	<14	<1.6	<0.72	<2	<4.7	<9.9	<8	<6.5	<12	<7
Bromomethane	ug/m3	<2.4	<6.2	<1.3	<25	<2.8	<1.3	<3.6	<8.5	<18	<14	<12	<22	<13
Butanone, 2- (MEK)	ug/m3	3.8 J	13	4.8	61	1.9 J	3.5	3.5 J	<3.8	<8	<6.5	<5.2	<9.9	<5.6
Carbon disulfide	ug/m3	49	100	130	230	140	51	22	20	34	280	250	63	85
Carbon tetrachloride	ug/m3	<0.74	<1.9	0.59 J	<7.7	4.4 J	<0.4	4.3 J	<2.6	<5.5	<4.5	<3.6	<6.8	<3.9
Chlorobenzene	ug/m3	2.1 J	12	2.3	<5.6	2.7 J	3.1	<0.8	<1.9	<4	<3.3	<2.6	<4.9	<2.8
Chloroethane	ug/m3	1.9 J	<3.9	<0.81	<16	3.4 J	<0.81	2.6 J	<5.3	<11	16 J	17 J	<14	16 J
Chloroform	ug/m3	240	610	87	2300	420	31	690	1200	3100	1400	1400	4000	1200
Chloromethane	ug/m3	3.9	8.6	2.7	16 J	6.8	1.6 J	3.7 J	5.7 J	12 J	5 J	4.7 J	17 J	4.2 J
Dibromochloromethane	ug/m3	23	26	6.6	46 J	7.1 J	2.3 J	36	33	93	11 J	12 J	99	14 J
Dibromoethane, 1,2- (EDB)	ug/m3	<1.1	<2.8	<0.58	<11	<1.3	<0.58	<1.6	<3.8	<7.9	<6.4	<5.1	<9.7	<5.5
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/m3	<2	<5.2	<1.1	<21	<2.4	<1.1	<3	<7.1	<15	<12	<9.7	<18	<10
Dichlorobenzene, 1,2-	ug/m3	<1.4	<3.7	<0.78	<15	<1.7	<0.78	<2.1	<5.1	<11	<8.7	<7	<13	<7.5
Dichlorobenzene, 1,3-	ug/m3	<1.2	<3.2	<0.66	<13	<1.4	<0.66	<1.8	<4.3	<9.1	<7.3	<5.9	<11	<6.4
Dichlorobenzene, 1,4-	ug/m3	10	52	4.2	<17	37	<12	4.6	<2.4	<12	<9.9	<8	<15	<8.6
Dichlorodifluoromethane	ug/m3	2 J	<3.4	<0.72	<14	<1.6	1.5 J	3 J	<4.7	<9.8	<8	<6.4	<12	<6.9
Dichloroethane, 1,1-	ug/m3	<0.53	<1.4	<0.29	<5.6	1.1 J	<0.29	<0.8	<1.9	<4	<3.2	<2.6	<4.9	<2.8
Dichloroethane, 1,2-	ug/m3	<0.65	<1.7	<0.36	<6.8	<0.78	<0.36	8.5 J	<2.3	<4.9	<4	<3.2	<6	<3.4
Dichloroethene, 1,1-	ug/m3	<0.94	2.9 J	<0.51	<9.8	4.2 J	<0.51	<1.4	<3.3	<7	7.9 J	8.1 J	<8.6	7.1 J
Dichloroethene, cis-1,2-	ug/m3	<0.65	7.5	0.43 J	<6.7	20	<0.35	36	45	10 J	4.4 J	3.1 J	21 J	<3.4
Dichloroethene, trans-1,2-	ug/m3	<0.73	<1.9	<0.4	<7.6	<0.87	<0.4	1.6 J	<2.6	<5.4	<4.4	<3.5	<6.7	<3.8
Dichloropropane, 1,2-	ug/m3	<2	<5.3	<1.1	<21	<2.4	<1.1	<3	<7.3	<15	<12	<9.9	<19	<11
Dichloropropene, cis-1,3-	ug/m3	<0.86	<2.3	<0.47	<9	<1	<0.47	<1.3	<3.1	<6.5	<5.2	<4.2	<7.9	<4.5
Dichloropropene, trans-1,3-	ug/m3	<0.73	<1.9	<0.4	<7.6	<0.87	<0.4	<1.1	<2.6	<5.5	<4.4	<3.6	<6.7	<3.8
Ethylbenzene	ug/m3	2.8 J	190	1.3 J	5.8 J	72	0.53 J	2.6 J	7.2 J	3.9 J	<3	3.1 J	<4.6	<2.6
Ethyltoluene, 4-	ug/m3	<1.7	<4.4	<0.92	<18	2.3 J	<0.92	<2.5	<6	<13	<10	<8.2	<15	<8.8
Hexachlorobutadiene	ug/m3	<8.4	<22	<4.6	<88	<10	<4.6	<13	<30	<63	<51	<41	<77	<44
Hexanone, 2-	ug/m3	<0.65	<1.7	<0.36	<6.8	<0.78	<0.36	<0.97	<2.3	<4.9	<4	<3.2	<6	<3.4
Methyl-2-pentanone, 4- (MIBK)	ug/m3	<1	<2.6	<0.55	<11	<1.2	<0.55	<1.5	<3.6	<7.6	<6.1	<4.9	<9.3	<5.3
Methylene Chloride	ug/m3	18	77	13	45	43	5.7	17	12	21	43	55	27	37
Styrene	ug/m3	0.61 J	8.1	0.27 J	<4.8	11	0.35 J	2.1 J	<1.6	<3.4	<2.8	<2.2	<4.2	<2.4
Tetrachloroethane, 1,1,2,2-	ug/m3	<0.87	<2.3	<0.47	<9	<1	<0.47	<1.3	<3.1	<6.5	<5.3	<4.2	<8	<4.6
Tetrachloroethene	ug/m3	7.4	35	2 J	<6.6	550	0.59 J	860	13 J	9 J	28 J	12 J	6.1 J	4 J
Toluene	ug/m3	54	180	50	350	500	7.6	43	51	120	1200	1200	160	1100
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/m3	<2.3	<6	<1.2	<24	39	<1.2	<3.4	<8.2	<17	<14	<11	<21	<12
Trichlorobenzene, 1,2,4-	ug/m3	<5.9	<15	<3.2	<61	<7	<3.2	<8.8	<21	<44	<36	<29	<54	<31
Trichloroethane, 1,1,1-	ug/m3	<0.65	<1.7	<0.35	<6.8	<0.78	<0.35	<0.97	<2.3	<4.9	<3.9	<3.2	<6	<3.4
Trichloroethane, 1,1,2-	ug/m3	<0.67	<1.8	<0.37	<7	<0.8	<0.37	<1	<2.4	<5	<4.1	<3.3	<6.1	<3.5
Trichloroethene	ug/m3	4.2	8.1 J	1.3 J	85	28	<0.56	44	<3.7	<7.7	<6.3	13 J	<9.5	<5.4
Trichlorofluoromethane	ug/m3	<2	<5.3	3.5	<21	4.4 J	1.2 J	<3	<7.2	<15	<12	<9.8	<19	<11
Trimethylbenzene, 1,2,4-	ug/m3	3.5 J	4.3 J	2.4 J	<15	9.9	2.2 J	<2.2	7.9 J	<11	<8.8	<7.1	<13	<7.7
Trimethylbenzene, 1,3,5-	ug/m3	<1.1	<2.9	0.84 J	<12	5.5	<0.61	<1.7	4.5 J	<8.4	<6.8	<5.5	<10	<5.9
Vinyl acetate	ug/m3	<0.93	<2.4	<0.51	<9.8	<1.1	<0.51	<1.4	<3.3	<7	<5.7	<4.6	<8.6	<4.9
Vinyl chloride	ug/m3	<0.56	2.8 J	<0.31	<5.9	3.3	<0.31	8.7	7.7	<4.2	<3.4	<2.7	<5.2	<3
Xylene, m,p-	ug/m3	10	9.7 J	2.8 J	15 J	57	1.7 J	6 J	29	<5.9	<4.8	5.8 J	<7.3	4.5 J
Xylene, o-	ug/m3	3.3	3.1 J	1.1 J	5.5 J	16	0.63 J	3 J	15	<3.2	<2.6	<2.1	<3.9	<2.3

See notes at end of table.

TABLE B.8
Vapor Sample Results - Houston, Texas
Groundwater to Sewer Demonstration Site (Task 1 and Task 2)

Site ID: Site Type: Sewer Category: Sample Location ID: Sewer Type: Sample Collected: Sample Type: Container: Manhole Sample Depth: Sewer Depth (ft bgs): Analyzed By: Lab ID:		HOU-002				HOU-003							
		CVOC				CVOC							
		A				B							
		HOU-002				HOU-003						HOU-003B	
		Utility, sanitary sewer				Utility, sanitary sewer						Utility, sanitary sewer	
		10/14/16 9:40	4/27/17 16:00	7/27/17 10:24	1/11/18 8:35	10/14/16 10:00	11/30/16 12:25	11/30/16 12:25	4/27/17 14:35	7/27/17 10:05	1/11/18 8:57	7/27/17 10:15	1/11/18 9:04
		N	N	N	N	N	N	SP	N	N	N	N	N
		1L Tedlar	1L Summa	1L Summa	1L Summa	1L Tedlar	1L Tedlar	1L Tedlar	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa
Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	
6.4	6.4	6.4	6.4	3.6	3.6	3.6	3.5	3.6	3.6	4.35	4.35		
Lab	Lab	Lab	Lab	Lab	Lab	HAPSITE	Lab	Lab	Lab	Lab	Lab		
Lab ID:	320-22714-2	320-27995-2	320-30325-3	320-35129-12	320-22714-3	320-23910-1	320-23910-1	320-27995-3	320-30325-4	320-35129-13	320-30325-5	320-35129-14	
Analyte													
Acetone	ug/m3	37	38	19	16	50	23	-	50	36 J	18	130	29
Benzene	ug/m3	2.2	1.9	0.96 J	0.61 J	1.2 J	0.54 J	-	1.2 J	1.4 J	1.5	0.47 J	1.9
Benzyl chloride	ug/m3	<0.87	<0.84	<0.84	<0.84	<3.3	<0.84	-	<0.84	<2.8	<0.84	<1.4	<0.84
Bromodichloromethane	ug/m3	1 J	<0.44	1.3 J	<0.44	14	0.93 J	-	9.6	2.2 J	13	61	12
Bromoform	ug/m3	<0.75	<0.72	<0.72	<0.72	<2.8	<0.72	-	<0.72	<2.4	<0.72	1.2 J	<0.72
Bromomethane	ug/m3	<1.3	<1.3	<1.3	<1.3	<5.1	<1.3	-	<1.3	<4.3	<1.3	<2.2	<1.3
Butanone, 2- (MEK)	ug/m3	11	3.6	3.7	2.7	3.3 J	<0.59	-	2.7	5.5 J	3.4	4.8	3.9
Carbon disulfide	ug/m3	5.3	25	9.9	6.3	3.6 J	0.65 J	-	2.8	940	17	48	67
Carbon tetrachloride	ug/m3	0.44 J	<0.4	0.59 J	0.43 J	<1.6	0.4 J	-	0.56 J	<1.3	0.52 J	1.1 J	0.51 J
Chlorobenzene	ug/m3	<0.3	<0.29	<0.29	<0.29	<1.2	<0.29	-	<0.29	<0.98	<0.29	<0.49	1.1 J
Chloroethane	ug/m3	<0.84	<0.81	<0.81	<0.81	<3.2	<0.81	-	<0.81	<2.7	<0.81	<1.3	1.5 J
Chloroform	ug/m3	2.2	1.8	56	1.6	59	6	5.4	38	58	28	360	50
Chloromethane	ug/m3	1.5 J	1.8	2.2	2.4	2.3 J	0.68 J	-	1.8	<1.4	1.3 J	3.4	3.1
Dibromochloromethane	ug/m3	<0.69	<0.67	<0.67	<0.67	4.1 J	<0.67	-	3.2 J	<2.2	3 J	15	2.5 J
Dibromoethane, 1,2- (EDB)	ug/m3	<0.59	<0.58	<0.58	<0.58	<2.3	<0.58	-	<0.58	<1.9	<0.58	<0.96	<0.58
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/m3	<1.1	<1.1	<1.1	<1.1	<4.2	<1.1	-	<1.1	<3.6	<1.1	<1.8	<1.1
Dichlorobenzene, 1,2-	ug/m3	<0.81	<0.78	<0.78	<0.78	<3.1	<0.78	-	<0.78	<2.6	<0.78	<1.3	<0.78
Dichlorobenzene, 1,3-	ug/m3	<0.68	<0.66	<0.66	<0.66	<2.6	<0.66	-	<0.66	<2.2	<0.66	<1.1	<0.66
Dichlorobenzene, 1,4-	ug/m3	<0.92	1.1 J	<0.9	<0.9	<3.5	<0.9	-	<0.9	<3	<0.9	<1.5	7.3
Dichlorodifluoromethane	ug/m3	2 J	1.4 J	1.5 J	2.4	<2.8	2	-	1.1 J	<2.4	2.2	1.9 J	2.2
Dichloroethane, 1,1-	ug/m3	<0.3	<0.29	<0.29	<0.29	<1.1	<0.29	-	<0.29	<0.97	<0.29	<0.48	<0.29
Dichloroethane, 1,2-	ug/m3	6.6	<0.36	<0.36	<0.36	6.7 J	1.1 J	-	<0.36	<1.2	<0.36	10	0.41 J
Dichloroethene, 1,1-	ug/m3	<0.53	<0.51	<0.51	<0.51	<2	<0.51	0.31 UJ	<0.51	<1.7	<0.51	<0.85	<0.51
Dichloroethene, cis-1,2-	ug/m3	<0.36	<0.35	<0.35	<0.35	43	6.5	11	16	48	19	3.3	0.82 J
Dichloroethene, trans-1,2-	ug/m3	0.45 J	<0.4	<0.4	<0.4	<1.6	<0.4	-	<0.4	<1.3	<0.4	<0.66	<0.4
Dichloropropane, 1,2-	ug/m3	<1.1	<1.1	<1.1	<1.1	<4.3	<1.1	-	<1.1	<3.7	<1.1	<1.8	<1.1
Dichloropropene, cis-1,3-	ug/m3	<0.49	<0.47	<0.47	<0.47	<1.8	<0.47	-	<0.47	<1.6	<0.47	<0.78	<0.47
Dichloropropene, trans-1,3-	ug/m3	<0.41	<0.4	<0.4	<0.4	<1.6	<0.4	-	<0.4	<1.3	<0.4	<0.66	<0.4
Ethylbenzene	ug/m3	2.1	0.52 J	0.38 J	<0.27	1.6 J	0.98 J	-	0.39 J	<0.91	0.43 J	0.63 J	2.2
Ethyltoluene, 4-	ug/m3	<0.95	<0.92	<0.92	<0.92	<3.6	<0.92	-	<0.92	<3.1	<0.92	<1.5	<0.92
Hexachlorobutadiene	ug/m3	<4.7	<4.6	<4.6	<4.6	<18	<4.6	-	<4.6	16 J	<4.6	<7.6	<4.6
Hexanone, 2-	ug/m3	1.9	0.54 J	<0.36	<0.36	<1.4	<0.36	-	<0.36	<1.2	<0.36	<0.59	<0.36
Methyl-2-pentanone, 4- (MIBK)	ug/m3	2.7	1.1 J	<0.55	<0.55	<2.2	<0.55	-	<0.55	<1.8	<0.55	<0.92	<0.55
Methylene Chloride	ug/m3	0.74 J	0.71 J	0.65 J	0.8 J	27	8.4	-	110	2.5 J	8.4	3	5.1
Styrene	ug/m3	0.84 J	0.29 J	<0.25	<0.25	2 J	0.8 J	-	0.27 J	<0.84	<0.25	<0.42	<0.25
Tetrachloroethane, 1,1,2,2-	ug/m3	<0.49	<0.47	<0.47	<0.47	<1.9	<0.47	-	<0.47	<1.6	<0.47	<0.79	<0.47
Tetrachloroethene	ug/m3	8.3	<0.35	0.79 J	4.2	1400	39	81	190	1500	310	5.5	4.7
Toluene	ug/m3	26	4.2	3.1	2.9	27	7.3	-	4.6	2.9 J	4.7	7.6	17
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/m3	<1.3	<1.2	<1.2	<1.2	<4.9	<1.2	-	<1.2	<4.2	<1.2	<2.1	<1.2
Trichlorobenzene, 1,2,4-	ug/m3	<3.3	<3.2	<3.2	<3.2	<13	<3.2	-	<3.2	17 J	<3.2	<5.3	<3.2
Trichloroethane, 1,1,1-	ug/m3	<0.37	<0.35	<0.35	<0.35	<1.4	<0.35	-	<0.35	<1.2	<0.35	<0.59	<0.35
Trichloroethane, 1,1,2-	ug/m3	<0.38	<0.37	<0.37	<0.37	<1.4	<0.37	-	<0.37	<1.2	<0.37	<0.61	<0.37
Trichloroethene	ug/m3	34	<0.56	<0.56	<0.56	88	8.7	3.4 J	14	36	10	1.3 J	1.2 J
Trichlorofluoromethane	ug/m3	1.2 J	1.4 J	<1.1	2 J	<4.3	<1.1	-	1.4 J	<3.7	2.3	<1.8	1.9 J
Trimethylbenzene, 1,2,4-	ug/m3	1.5 J	0.84 J	<0.8	<0.8	<3.1	<0.8	-	<0.8	<2.7	<0.8	<1.3	10
Trimethylbenzene, 1,3,5-	ug/m3	<0.63	<0.61	<0.61	<0.61	<2.4	<0.61	-	<0.61	<2.1	<0.61	<1	1.5 J
Vinyl acetate	ug/m3	<0.53	<0.51	<0.51	<0.51	<2	<0.51	-	<0.51	<1.7	<0.51	<0.85	<0.51
Vinyl chloride	ug/m3	<0.32	<0.31	<0.31	<0.31	<1.2	<0.31	-	<0.31	<1	1.8	<0.51	<0.31
Xylene, m,p-	ug/m3	5.8	1.6 J	1.1 J	<0.43	4.2 J	2.2 J	-	0.97 J	<1.5	1 J	2 J	7.3
Xylene, o-	ug/m3	2.9	0.67 J	0.45 J	0.46 J	2 J	1.2 J	-	0.45 J	<0.78	0.68 J	0.74 J	2.2

See notes at end of table.

TABLE B.8
Vapor Sample Results - Houston, Texas
Groundwater to Sewer Demonstration Site (Task 1 and Task 2)

Site ID:		HOU-004						HOU-005				HOU-006				
		CVOC						CVOC				CVOC				
		B						A				B				
		HOU-004						HOU-005				HOU-006				
		Utility, sanitary sewer						Utility, sanitary sewer				Utility, sanitary sewer				
Sample Collected:		10/14/16 10:15	11/30/16 12:48	4/27/17 14:20	7/27/17 8:14	1/11/18 7:52	3/27/18 10:55	10/14/16 10:30	4/27/17 14:05	7/27/17 9:58	1/10/18 15:10	4/27/17 13:52	4/27/17 13:52	7/27/17 9:52	1/10/18 15:00	3/27/18 11:11
Sample Type:		N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N
Container:		1L Tedlar	1L Tedlar	1L Summa	1L Summa	1L Summa	1L Summa	1L Tedlar	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa
Manhole Sample Depth:		Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom
Sewer Depth (ft bgs):		5.2	5.2	5	5.2	5.2	5.2	14.1	13.2	14.1	14.1	11.5	11.5	11.5	11.5	11.5
Analyzed By:		Lab	HAPSITE	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab
Lab ID:		320-22714-4	320-22714-5	320-27995-4	320-30325-6	320-35129-15	320-37835-1	320-22714-5	320-27995-5	320-30325-7	320-35129-1	320-27995-6	320-27995-13	320-30325-8	320-35129-2	320-37835-2
Analyte																
Acetone	ug/m3	33	-	40	22	18	24	470	510	79	92	3800	3700	48	620	3.8 J
Benzene	ug/m3	0.73 J	-	<0.26	<0.25	1.8	<0.25	1.1 J	<5.8	0.49 J	1.1 J	<2.5	<10	0.37 J	<2.5	0.82 J
Benzyl chloride	ug/m3	<0.84	-	<0.87	<0.84	<0.84	<0.84	<2.4	<19	<1.4	5.5 J	<8.5	<34	<0.84	<8.5	<2.1
Bromodichloromethane	ug/m3	16	-	3.6	9.2	19	76	53	60	19	130	65	35	<18	32	56
Bromoform	ug/m3	<0.72	-	<0.75	<0.72	<0.72	0.73 J	<2.1	<16	2.5 J	<2.8	<7.3	<29	0.74 J	<7.3	<1.8
Bromomethane	ug/m3	<1.3	-	<1.3	<1.3	<1.3	<1.3	<3.8	<30	<2.2	<5.1	<13	<53	<1.3	<13	<3.3
Butanone, 2- (MEK)	ug/m3	3.9	-	4.7	5.9	2.5	3.7	10	25 J	5	11	66	40 J	7.5	43	<1.5
Carbon disulfide	ug/m3	2.1 J	-	25	13	21	43	55	74	32	100	210	130	59	340	230
Carbon tetrachloride	ug/m3	0.72 J	-	<0.41	0.42 J	0.52 J	0.57 J	1.8 J	<9.2	1.6 J	2.2 J	<4.1	<16	1.3 J	<4.1	<1
Chlorobenzene	ug/m3	<0.29	-	<0.3	<0.29	<0.29	<0.29	<0.85	<6.7	0.73 J	<1.2	<3	<12	<0.29	3.2 J	<0.74
Chloroethane	ug/m3	<0.81	-	<0.84	<0.81	<0.81	<0.81	14	<19	3.1 J	17	<8.2	<33	3.4	48	22
Chloroform	ug/m3	44	20	79	38	48	230	840	760	470	630	500	230	250	2000	1500
Chloromethane	ug/m3	0.96 J	-	1.1 J	0.8 J	1.1 J	1.3 J	12	16 J	7.5	15	15 J	16 J	<17	12	100
Dibromochloromethane	ug/m3	3.5	-	<0.69	2.2 J	3.7	12	11	<15	28	11 J	8.1 J	<27	8.2	9 J	6.7 J
Dibromoethane, 1,2- (EDB)	ug/m3	<0.58	-	<0.59	<0.58	<0.58	<0.58	<1.7	<13	<0.97	<2.3	<5.8	<23	<0.58	<5.8	<1.4
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/m3	<1.1	-	<1.1	<1.1	<1.1	<1.1	<3.1	<25	<1.8	<4.3	<11	<44	<1.1	<11	<2.7
Dichlorobenzene, 1,2-	ug/m3	<0.78	-	<0.81	<0.78	<0.78	<0.78	<2.3	<18	<1.3	<3.1	<7.9	<32	<0.78	<7.9	<2
Dichlorobenzene, 1,3-	ug/m3	<0.66	-	<0.68	<0.66	<0.66	<0.66	<1.9	<15	<1.1	<2.6	<6.7	<27	<0.66	<6.7	<1.7
Dichlorobenzene, 1,4-	ug/m3	<0.9	-	0.87 J	2.8	<0.9	<0.9	<2.6	<20	<3.5	<9	<36	20	<9	<9	5.2 J
Dichlorodifluoromethane	ug/m3	2	-	1 J	1.3 J	2.3	0.95 J	2.6 J	<16	1.9 J	<2.8	<7.2	<29	1.2 J	<7.2	<1.8
Dichloroethane, 1,1-	ug/m3	<0.29	-	<0.3	<0.29	<0.29	<0.29	<0.84	<6.6	<0.49	<1.1	<2.9	<12	<0.29	<2.9	<0.73
Dichloroethane, 1,2-	ug/m3	6.4	-	<0.37	<0.36	0.37 J	<0.36	6.4 J	<8.1	<0.6	<1.4	<3.6	<14	<0.36	<3.6	<0.89
Dichloroethene, 1,1-	ug/m3	<0.51	U	<0.53	<0.51	<0.51	<0.51	1.5 J	<12	<0.86	<2	<5.2	<21	0.59 J	<5.2	<1.3
Dichloroethene, cis-1,2-	ug/m3	0.86 J	0.56 J	<0.36	1.4 J	15	1.3 J	290	35 J	83	6.3	36	16 J	110	16	55
Dichloroethene, trans-1,2-	ug/m3	0.42 J	-	<0.41	<0.4	<0.4	<0.4	3.1 J	<9	<0.67	<1.6	<4	<16	1.3 J	<4	<1
Dichloropropane, 1,2-	ug/m3	<1.1	-	<1.1	<1.1	<1.1	<1.1	<3.2	<25	<1.9	<4.4	<11	<45	<1.1	<11	<2.8
Dichloropropene, cis-1,3-	ug/m3	<0.47	-	<0.49	<0.47	<0.47	<0.47	<1.4	<11	<0.79	<1.9	<4.8	<19	<0.47	<4.8	<1.2
Dichloropropene, trans-1,3-	ug/m3	<0.4	-	<0.41	<0.4	<0.4	<0.4	<1.2	<9.1	<0.67	<1.6	<4	<16	<0.4	<4	<1
Ethylbenzene	ug/m3	1.5 J	-	0.86 J	0.55 J	0.42 J	<0.27	2 J	7.5 J	3.8	2.2 J	<2.8	<11	0.55 J	<2.8	4.5
Ethyltoluene, 4-	ug/m3	<0.92	-	<0.95	<0.92	<0.92	<0.92	<2.7	<21	<1.5	<3.6	<9.3	<37	<0.92	<9.3	<2.3
Hexachlorobutadiene	ug/m3	<4.6	-	<4.7	<4.6	<4.6	<4.6	<13	<110	<7.7	<18	<47	<190	<4.6	<47	<12
Hexanone, 2-	ug/m3	0.42 J	-	<0.37	0.67 J	<0.36	<0.36	<1	<8.1	<0.6	<1.4	<3.6	<15	0.53 J	<3.6	<0.89
Methyl-2-pentanone, 4- (MIBK)	ug/m3	0.67 J	-	<0.57	<0.55	<0.55	<0.55	<1.6	<13	<0.93	<2.2	<5.6	<23	<0.55	<5.6	<1.4
Methylene Chloride	ug/m3	2	-	1.6	4.3	4.4	3.9 B	35	37	24	24	44	27 J	8.2	61	73 B
Styrene	ug/m3	1.8	-	<0.26	0.32 J	<0.25	<0.25	1.7 J	<5.7	<0.42	1.6 J	<2.5	<10	<0.25	<2.5	<0.63
Tetrachloroethane, 1,1,2,2-	ug/m3	<0.47	-	<0.49	<0.47	<0.47	<0.47	<1.4	<11	<0.8	<1.9	<4.8	<19	<0.47	<4.8	<1.2
Tetrachloroethene	ug/m3	21	176	13	280	180	9.8	22	<7.9	26	1.4 J	6.7 J	<14	28	5.4 J	10
Toluene	ug/m3	43	-	57	39	24	36	850	3300	130	460	2100	930	27	1400	260
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/m3	<1.2	-	<1.3	<1.2	<1.2	<1.2	<3.6	<28	<2.1	<4.9	<13	<51	<1.2	<13	<3.1
Trichlorobenzene, 1,2,4-	ug/m3	<3.2	-	<3.3	<3.2	<3.2	<3.2	<9.3	<73	<5.4	<13	<32	<130	<3.2	<32	<8.1
Trichloroethane, 1,1,1-	ug/m3	<0.35	-	<0.37	<0.35	<0.35	<0.35	<1	<8.1	<0.6	<1.4	<3.6	<14	<0.35	<3.6	<0.89
Trichloroethane, 1,1,2-	ug/m3	<0.37	-	<0.38	<0.37	<0.37	<0.37	<1.1	<8.3	<0.61	<1.4	<3.7	<15	<0.37	<3.7	<0.92
Trichloroethene	ug/m3	31	3.4 J	0.69 J	4.2	9.5	2.9	31	23 J	4.5	5.9 J	10 J	<23	3.6	<5.7	54
Trichlorofluoromethane	ug/m3	1.3 J	-	1.3 J	1.2 J	2.6	1.2 J	<3.2	<25	<1.9	<4.3	<11	<45	1.2 J	<11	<2.8
Trimethylbenzene, 1,2,4-	ug/m3	<0.8	-	<0.82	<0.8	<0.8	<0.8	<2.3	31 J	2.7 J	<3.1	<8	<32	0.81 J	<8	<2
Trimethylbenzene, 1,3,5-	ug/m3	<0.61	-	<0.63	<0.61	<0.61	<0.61	<1.8	17 J	1.5 J	<2.4	<6.2	<25	<0.61	<6.2	<1.5
Vinyl acetate	ug/m3	<0.51	-	<0.53	<0.51	<0.51	<0.51	<1.5	<12	<0.86	<2	<5.2	<21	<0.51	<5.2	<1.3
Vinyl chloride	ug/m3	0.31 J	-	<0.32	<0.31	0.41 J	<0.31	<0.89	<7	1.3 J	<1.2	<3.1	<12	<0.31	<3.1	1.6 J
Xylene, m,p-	ug/m3	4.1	-	0.85 J	1 J	1.6 J	<0.43	5 J	32 J	16	3.3 J	7.7 J	<18	1.9 J	<4.4	1.7 J
Xylene, o-	ug/m3	1.9	-	0.34 J	0.41 J	0.59 J	<0.23	2.2 J	13 J	4	1.4 J	3.6 J	<9.5	0.57 J	<2.4	0.63 J

See notes at end of table.

TABLE B.8
Vapor Sample Results - Houston, Texas
Groundwater to Sewer Demonstration Site (Task 1 and Task 2)

Site ID:		HOU-007								HOU-008							
		CVOC								CVOC							
		B								B							
		HOU-007				HOU-007B				HOU-008						HOU-008B	
		Utility, sanitary sewer				Utility, sanitary sewer				Utility, sanitary sewer						Utility, sanitary sewer	
		10/14/16 11:20	11/30/16 12:55	4/27/17 13:25	7/27/17 9:33	1/10/18 15:25	7/27/17 9:42	7/27/17 9:42	1/10/18 15:27	10/14/16 11:40	11/30/16 13:08	11/30/16 13:08	4/27/17 13:13	7/27/17 9:14	1/10/18 15:40	7/27/17 9:22	1/10/18 15:50
		N	N	N	N	N	N	FD	N	N	N	DUP	N	N	N	N	N
		1L Tedlar	1L Tedlar	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Tedlar	1L Tedlar	1L Tedlar	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa
		Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom
		2.3	2.3	2.3	2.3	2.3	3.7	3.7	3.7	4.8	4.9	4.9	4.9	4.9	4.9	5.9	5.9
		Lab	HAPSITE	Lab	Lab	Lab	Lab	Lab	Lab	Lab	HAPSITE	HAPSITE	Lab	Lab	Lab	Lab	Lab
		Lab ID:	320-22714-6	320-27995-7	320-30325-9	320-35129-3	320-30325-10	320-30325-18	320-35129-4	320-22714-7	320-27995-8	320-30325-11	320-35129-5	320-30325-12	320-35129-6		
Analyte																	
Acetone	ug/m3	180	-	100	100	47	52 *	93	37	270	-	-	240	180	71	49	36
Benzene	ug/m3	1.8 J	-	0.96 J	<0.78	1.1 J	0.74 J	<2	1.5	1.1 J	-	-	3.8 J	0.56 J	0.85 J	0.39 J	0.64 J
Benzyl chloride	ug/m3	3.6 J	-	<0.84	<2.6	<0.84	<1.9	<6.6	<0.84	<1.8	-	-	<3.1	<1.3	<0.84	<0.84	<0.84
Bromodichloromethane	ug/m3	83	-	76	37	42	20	33	41	45	-	-	10	30	3.3	12	2.6
Bromoform	ug/m3	<2.4	-	2.3 J	<2.2	<0.72	<1.6	<5.7	<0.72	<1.5	-	-	<2.7	<1.1	<0.72	<0.72	<0.72
Bromomethane	ug/m3	<4.2	-	<1.3	<4	<1.3	<3	<10	<1.3	<2.7	-	-	<4.8	<2	<1.3	<1.3	<1.3
Butanone, 2- (MEK)	ug/m3	7.7	-	5.6	5.7 J	5.4	4.8 J *	<4.6	4.7	4.7 J	-	-	12	24	3.4	5.9	3.8
Carbon disulfide	ug/m3	30	-	100	33	62	15 *	56	180	2.3 J	-	-	12	36	13	15	2.8
Carbon tetrachloride	ug/m3	<1.3	-	0.82 J	1.3 J	0.58 J	<0.92	<3.1	0.53 J	<0.84	-	-	<1.5	0.73 J	0.72 J	0.5 J	0.68 J
Chlorobenzene	ug/m3	<0.96	-	<0.29	<0.91	<0.29	<0.67	<2.3	<0.29	<0.61	-	-	<1.1	<0.44	<0.29	<0.29	<0.29
Chloroethane	ug/m3	3.8 J	-	<0.81	<2.5	<0.81	<1.9	<6.3	<0.81	<1.7	-	-	<3	<1.2	<0.81	<0.81	<0.81
Chloroform	ug/m3	530	U	180	240	140	59 *	110	120	120	2.1 J	2 J	25	110	31	56	17
Chloromethane	ug/m3	5.2 J	-	3.2	3.3 J	2.4	1.7 J *	<3.2	2.6	1.3 J	-	-	2.5 J	2.1 J	1.4 J	1.5 J	1.2 J
Dibromochloromethane	ug/m3	15	-	19	9.2 J	8.1	5.2 J	7.9 J	8.1	11	-	-	3.5 J	7.8	0.8 J	3.3 J	<0.67
Dibromoethane, 1,2- (EDB)	ug/m3	<1.9	-	<0.58	<1.8	<0.58	<1.3	<4.5	<0.58	<1.2	-	-	<2.1	<0.87	<0.58	<0.58	<0.58
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/m3	<3.5	-	<1.1	<3.3	<1.1	<2.5	<8.5	<1.1	<2.3	-	-	<4	<1.6	<1.1	<1.1	<1.1
Dichlorobenzene, 1,2-	ug/m3	<2.5	-	0.9 J	<2.4	<0.78	<1.8	<6.1	<0.78	<1.6	-	-	<2.9	<1.2	<0.78	<0.78	<0.78
Dichlorobenzene, 1,3-	ug/m3	<2.1	-	<0.66	<2	<0.66	<1.5	<5.2	<0.66	<1.4	-	-	<2.4	<1	<0.66	<0.66	<0.66
Dichlorobenzene, 1,4-	ug/m3	<2.9	-	90	<2.8	<0.9	<2	<7	<0.9	<1.9	-	-	<3.3	<1.4	<0.9	<0.9	<0.9
Dichlorodifluoromethane	ug/m3	2.5 J	-	1.1 J	<2.2	2.9	1.7 J *	<5.6	3.9	2.6 J	-	-	2.8 J	1.7 J	2.2	1 J	<0.72
Dichloroethane, 1,1-	ug/m3	<0.95	-	<0.29	<0.9	<0.29	<0.66	<2.3	<0.29	<0.61	-	-	<1.1	<0.44	<0.29	<0.29	<0.29
Dichloroethane, 1,2-	ug/m3	5.8 J	-	<0.36	<1.1	<0.36	<0.81	<2.8	<0.36	5.7 J	-	-	<1.3	<0.54	<0.36	<0.36	<0.36
Dichloroethene, 1,1-	ug/m3	<1.7	1.8 J	<0.51	2.2 J	<0.51	<1.2	<4	<0.51	<1.1	U	U	<1.9	<0.77	<0.51	<0.51	<0.51
Dichloroethene, cis-1,2-	ug/m3	260	35	62	710	190	370 *	820	200	15	1.9 J	1.9 J	58	8.2	11	1.4 J	1.5 J
Dichloroethene, trans-1,2-	ug/m3	7.6	-	1.7	11	2.6	4.5 *	13	1.9	<0.82	-	-	<1.5	<0.6	<0.4	<0.4	<0.4
Dichloropropane, 1,2-	ug/m3	<3.6	-	<1.1	<3.4	<1.1	<2.5	<8.7	<1.1	<2.3	-	-	<4.1	<1.7	<1.1	<1.1	<1.1
Dichloropropene, cis-1,3-	ug/m3	<1.5	-	<0.47	<1.5	<0.47	<1.1	<3.7	<0.47	<0.98	-	-	<1.7	<0.71	<0.47	<0.47	<0.47
Dichloropropene, trans-1,3-	ug/m3	<1.3	-	<0.4	<1.2	<0.4	<0.91	<3.1	<0.4	<0.83	-	-	<1.5	<0.6	<0.4	<0.4	<0.4
Ethylbenzene	ug/m3	3 J	-	0.66 J	2.4 J	0.65 J	2.9 J	<2.1	0.74 J	1.6 J	-	-	<1	1.3 J	0.41 J	0.32 J	0.3 J
Ethyltoluene, 4-	ug/m3	<3	-	<0.92	<2.8	<0.92	<2.1	<7.2	<0.92	<1.9	-	-	10	<1.4	<0.92	<0.92	<0.92
Hexachlorobutadiene	ug/m3	<15	-	<4.6	<14	<4.6	<11	<36	<4.6	<9.6	-	-	<17	<7	<4.6	<4.6	<4.6
Hexanone, 2-	ug/m3	<1.2	-	0.66 J	<1.1	<0.36	<0.81	<2.8	<0.36	<0.74	-	-	<1.3	<0.54	<0.36	0.48 J	<0.36
Methyl-2-pentanone, 4- (MIBK)	ug/m3	<1.8	-	<0.55	<1.7	<0.55	<1.3	<4.3	<0.55	<1.2	-	-	<2	<0.84	<0.55	<0.55	<0.55
Methylene Chloride	ug/m3	25	-	8	6.7	7.2	4.2 *	7.4 J	7.3	6	-	-	20	9.8	1.4 J	1.9	1.6
Styrene	ug/m3	2.2 J	-	1.4 J	1.4 J	0.39 J	1.3 J	<2	<0.25	2.2 J	-	-	<0.92	<0.38	<0.25	<0.25	<0.25
Tetrachloroethane, 1,1,2,2-	ug/m3	<1.5	-	0.61 J	<1.5	<0.47	<1.1	<3.7	<0.47	<0.99	-	-	<1.7	<0.72	<0.47	<0.47	<0.47
Tetrachloroethene	ug/m3	1500	210	140	370	140	39	140	10	220	28	28	490	590	100	8.4	3.1
Toluene	ug/m3	50	-	22	12	24	15	13	22	47	-	-	51	59	7.6	7.4	8.5
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/m3	<4.1	-	<1.2	<3.9	<1.2	<2.8	<9.8	<1.2	<2.6	-	-	<4.6	<1.9	<1.2	<1.2	<1.2
Trichlorobenzene, 1,2,4-	ug/m3	<10	-	<3.2	<9.9	<3.2	<7.3	<25	<3.2	<6.7	-	-	<12	<4.9	<3.2	<3.2	<3.2
Trichloroethane, 1,1,1-	ug/m3	<1.2	-	<0.35	<1.1	<0.35	<0.81	<2.8	<0.35	<0.74	-	-	<1.3	<0.54	<0.35	<0.35	<0.35
Trichloroethane, 1,1,2-	ug/m3	<1.2	-	<0.37	<1.1	<0.37	<0.83	<2.9	<0.37	<0.76	-	-	<1.3	<0.55	<0.37	<0.37	<0.37
Trichloroethene	ug/m3	180	22	19	58	19	23	42	4.2	43	2.1 J	2.1 J	58	48	9.6	<0.56	<0.56
Trichlorofluoromethane	ug/m3	<3.6	-	1.3 J	<3.4	1.3 J	<2.5	<8.6	1.4 J	<2.3	-	-	<4	<1.7	1.5 J	1.1 J	1.2 J
Trimethylbenzene, 1,2,4-	ug/m3	<2.6	-	1.1 J	<2.5	0.83 J	6.3 J	<6.2	<0.8	<1.7	-	-	<2.9	1.5 J	<0.8	<0.8	<0.8
Trimethylbenzene, 1,3,5-	ug/m3	<2	-	<0.61	<1.9	<0.61	1.7 J	<4.8	<0.61	<1.3	-	-	<2.3	<0.93	<0.61	<0.61	<0.61
Vinyl acetate	ug/m3	<1.7	-	<0.51	<1.6	<0.51	<1.2	<4	<0.51	<1.1	-	-	<1.9	<0.77	<0.51	<0.51	<0.51
Vinyl chloride	ug/m3	33	-	7.6	52	13	19 *	71	11	<0.64	-	-	<1.1	0.62 J	0.42 J	<0.31	<0.31
Xylene, m,p-	ug/m3	9.7 J	-	1.8 J	7.4 J	1.6 J	6 J	<3.4	1.4 J	4.3 J	-	-	4.6 J	7.8	1.2 J	0.9 J	0.96 J
Xylene, o-	ug/m3	<0.76	-	0.8 J	2.1 J	0.86 J	2.4 J	<1.8	0.68 J	2.1 J	-	-	1.7 J	3.8	0.54 J	0.44 J	0.5 J

See notes at end of table.

TABLE B.8
Vapor Sample Results - Houston, Texas
Groundwater to Sewer Demonstration Site (Task 1 and Task 2)

Site ID: Site Type: Sewer Category: Sample Location ID: Sewer Type: Sample Collected: Sample Type: Container: Manhole Sample Depth: Sewer Depth (ft bgs): Analyzed By: Lab ID:		HOU-009						HOU-010					
		CVOC						CVOC					
		B						B					
		HOU-009						HOU-010				HOU-010B	
		Utility, sanitary sewer						Utility, sanitary sewer				Utility, sanitary sewer	
		10/14/16 12:10	11/30/16 13:12	11/30/16 13:12	4/27/17 12:59	7/27/17 9:07	1/10/18 15:35	10/14/16 12:30	4/27/17 12:36	7/27/17 8:38	1/10/18 16:03	7/27/17 8:53	1/10/18 16:24
		N	N	SP	N	N	N	N	N	N	N	N	N
		1L Tedlar	1L Tedlar	1L Tedlar	1L Summa	1L Summa	1L Summa	1L Tedlar	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa
		Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom
		13.4	13.4	13.4	13.4	13.4	13.4	10.3	10.2	10.2	10.3	8.9	8.9
Analyte		Lab	Lab	HAPSITE	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab
		320-22714-8	320-23910-2	320-23910-2	320-27995-9	320-30325-13	320-35129-7	320-22714-9	320-27995-10	320-30325-14	320-35129-8	320-30325-15	320-35129-9
Acetone	ug/m3	40	28	-	61	200	25	4000	120	36	30 J	87 J	25 J
Benzene	ug/m3	1.1 J	0.7 J	-	<0.51	2 J	0.41 J	<8.1	<1.7	0.25 J	<6	<4.6	<8.4
Benzyl chloride	ug/m3	<1.3	<0.84	-	<1.7	<1.7	<0.84	<27	<5.6	<0.84	<20	<15	<28
Bromodichloromethane	ug/m3	36	16	-	53	33	30	58 J	36	100	15 J	110	22 J
Bromoform	ug/m3	<1.1	<0.72	-	2.5 J	<1.4	<0.72	<23	<4.8	2.1 J	<17	<13	<24
Bromomethane	ug/m3	<2	<1.3	-	<2.6	<2.6	<1.3	<41	<8.7	<1.3	<31	<24	<43
Butanone, 2- (MEK)	ug/m3	2.9 J	<0.59	-	2.4 J	24	2.7	<19	<3.9	4.3	<14	16 J	<19
Carbon disulfide	ug/m3	15	5.6	-	30	480	18	28 J	78	20	16 J	74	44 J
Carbon tetrachloride	ug/m3	6 J	0.67 J	-	<0.82	<0.81	3.1 J	<13	<2.7	2.4 J	<9.5	<7.3	<13
Chlorobenzene	ug/m3	<0.44	<0.29	-	<0.6	<0.59	0.37 J	<9.4	<2	<0.29	<7	<5.3	<9.8
Chloroethane	ug/m3	<1.2	<0.81	-	<1.6	<1.6	<0.81	<26	<5.4	1.2 J	<19	<15	<27
Chloroform	ug/m3	240	68	146	220	150	230	290	100	280	57	470	89
Chloromethane	ug/m3	3.3	2.8	-	3.6	6.4	2.9	<13	4.4 J	4.2	<9.6	7.8 J	<13
Dibromochloromethane	ug/m3	6.9	3.8	-	15	8	5.1	<21	7 J	21	<16	27 J	<22
Dibromoethane, 1,2- (EDB)	ug/m3	<0.86	<0.58	-	<1.2	<1.2	<0.58	<18	<3.8	<0.58	<14	<10	<19
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/m3	<1.6	<1.1	-	<2.2	<2.2	<1.1	<35	<7.2	<1.1	<26	<20	<36
Dichlorobenzene, 1,2-	ug/m3	<1.2	<0.78	-	<1.6	<1.6	<0.78	<25	<5.2	<0.78	<18	<14	<26
Dichlorobenzene, 1,3-	ug/m3	<0.99	<0.66	-	<1.3	<1.3	<0.66	<21	<4.4	<0.66	<16	<12	<22
Dichlorobenzene, 1,4-	ug/m3	<1.3	<0.9	-	5.5	2.6 J	<0.9	<29	<6	<0.9	<21	<16	<30
Dichlorodifluoromethane	ug/m3	2.1 J	1.6 J	-	1.7 J	1.6 J	1.8 J	<23	<4.8	1.1 J	<17	<13	<24
Dichloroethane, 1,1-	ug/m3	<0.44	<0.29	-	<0.59	<0.58	<0.29	<9.3	<1.9	<0.29	<6.9	<5.3	<9.6
Dichloroethane, 1,2-	ug/m3	5.3	1.4 J	-	<0.72	<0.71	<0.36	<11	<2.4	0.82 J	<8.4	<6.4	<12
Dichloroethene, 1,1-	ug/m3	<0.77	<0.51	U	<1	<1	<0.51	<16	<3.4	<0.51	<12	<9.3	<17
Dichloroethene, cis-1,2-	ug/m3	<0.53	<0.35	0.75 J	<0.72	<0.71	<0.35	<11	1100	0.63 J	1400	<6.4	1300
Dichloroethene, trans-1,2-	ug/m3	<0.59	<0.4	-	<0.8	<0.79	<0.4	<13	8.4 J	<0.4	<9.4	<7.2	<13
Dichloropropane, 1,2-	ug/m3	<1.7	<1.1	-	<2.3	<2.2	<1.1	<35	<7.4	<1.1	<26	<20	<37
Dichloropropene, cis-1,3-	ug/m3	<0.71	<0.47	-	<0.96	<0.94	<0.47	<15	<3.1	<0.47	<11	<8.5	<16
Dichloropropene, trans-1,3-	ug/m3	<0.6	<0.4	-	<0.81	<0.8	<0.4	<13	<2.7	<0.4	<9.4	<7.2	<13
Ethylbenzene	ug/m3	3.1	2.1	-	2.9 J	1.7 J	1.1 J	<8.7	<1.8	<0.27	<6.5	<5	<9.1
Ethyltoluene, 4-	ug/m3	2.2 J	<0.92	-	<1.9	<1.8	<0.92	<29	<6.1	<0.92	<22	<17	<30
Hexachlorobutadiene	ug/m3	<6.9	<4.6	-	<9.4	<9.2	<4.6	<150	<31	<4.6	<110	<83	<150
Hexanone, 2-	ug/m3	<0.53	<0.36	-	<0.72	<0.71	<0.36	<11	<2.4	<0.36	<8.4	<6.5	<12
Methyl-2-pentanone, 4- (MIBK)	ug/m3	0.83 J	<0.55	-	<1.1	<1.1	<0.55	<18	<3.7	<0.55	<13	<10	<18
Methylene Chloride	ug/m3	24	15	-	35	24	28	<8	11	18	7.5 J	18 J	13 J
Styrene	ug/m3	4.4	2.4	-	9.7	3.7	2.5	<8	<1.7	<0.25	<5.9	<4.5	<8.3
Tetrachloroethane, 1,1,2,2-	ug/m3	<0.71	<0.47	-	<0.96	<0.95	<0.47	<15	<3.2	<0.47	<11	<8.6	<16
Tetrachloroethene	ug/m3	9.9	4.5	2.7 J	5.4 J	<0.69	0.47 J	18 J	1900	5	5600	<6.3	12000
Toluene	ug/m3	150	180	-	390	57	200	120	7.1 J	13	9.8 J	250	110
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/m3	<1.9	<1.2	-	<2.5	<2.5	<1.2	<40	<8.3	4.2	<29	<23	<41
Trichlorobenzene, 1,2,4-	ug/m3	<4.8	<3.2	-	<6.5	<6.4	<3.2	<100	<21	<3.2	<76	62 J	<110
Trichloroethane, 1,1,1-	ug/m3	<0.53	<0.35	-	<0.72	<0.71	<0.35	<11	<2.4	<0.35	<8.4	<6.4	<12
Trichloroethane, 1,1,2-	ug/m3	<0.55	<0.37	-	<0.74	<0.73	<0.37	<12	<2.4	<0.37	<8.6	<6.6	<12
Trichloroethene	ug/m3	27	8.3	0.49 J	<1.1	<1.1	<0.56	31 J	450	1.1 J	1100	<10	1400
Trichlorofluoromethane	ug/m3	<1.7	<1.1	-	<2.2	<2.2	1.2 J	<35	<7.3	<1.1	<26	<20	<36
Trimethylbenzene, 1,2,4-	ug/m3	2.7 J	<0.8	-	3.1 J	2.3 J	1.1 J	<25	<5.3	<0.8	<19	<14	<26
Trimethylbenzene, 1,3,5-	ug/m3	1.4 J	<0.61	-	1.4 J	1.6 J	0.84 J	<20	<4.1	<0.61	<15	<11	<20
Vinyl acetate	ug/m3	<0.77	<0.51	-	<1	<1	<0.51	<16	<3.4	<0.51	<12	<9.2	<17
Vinyl chloride	ug/m3	<0.46	<0.31	-	<0.62	<0.61	<0.31	<9.8	11	<0.31	22 J	<5.6	20 J
Xylene, m,p-	ug/m3	5.4	4	-	3.5 J	2 J	1.5 J	<14	<2.9	<0.43	<10	<7.9	<14
Xylene, o-	ug/m3	2.9	1.8	-	1.6 J	0.95 J	0.65 J	<7.5	<1.6	<0.23	<5.5	<4.2	<7.8

See notes at end of table.

TABLE B.9
Vapor Sample Results - San Diego County, California
Groundwater to Sewer Demonstration Site (Task 2)

Site ID:		n/a (background)	SAN-001	SAN-002	SAN-003		SAN-004	SAN-005	SAN-006	SAN-007	SAN-008	SAN-009	SAN-009
Site Type:		n/a	Other (PHC LNAPL)	Other (PHC)	CVOC		CVOC	Other	CVOC	CVOC	CVOC	CVOC	CVOC
Sewer Category:		n/a	B	B	B		B	B	B	B	B	B	B
Sample Location ID:		SAN Residential Bkg	SAN-001	SAN-002	SAN-003		SAN-004	SAN-005	SAN-006	SAN-007	SAN-008	SAN-009A	SAN-009B
Sewer Type:		Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer		Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer
Sample Collected:		6/27/17 11:25	6/26/17 13:57	6/27/17 10:43	6/27/17 11:04	6/27/17 11:04	6/27/17 11:55	6/27/17 14:39	6/27/17 15:30	6/27/17 16:05	6/27/17 16:52	6/27/17 17:47	6/27/17 18:01
Sample Type:		N	N	N	N	FD	N	N	N	N	N	N	N
Container:		1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa
Manhole Sample Depth:		Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom
Sewer Depth (ft bgs):		8	5.1	8	5	5	5.5	6.2	7.5	5	20.7	10.9	5.3
Analyzed By:		Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab
Analyte	Lab ID:	320-29669-10	320-29669-1	320-29669-2	320-29669-3	320-29669-12	320-29669-4	320-29669-5	320-29669-6	320-29669-7	320-29669-8	320-29669-9	320-29669-11
Acetone	ug/m3	15	7.9 J	12 J	15 J	12 J	9.1 J	18 J	14 J	360	7.6 J	14	15
Benzene	ug/m3	5.5	0.78 J	0.7 J	<2.1	2.3 J	0.56 J	1.5 J	0.45 J	<0.9	0.31 J	0.6 J	1.8
Benzyl chloride	ug/m3	<0.84	<0.84	<0.84	<6.9	<1.9	<1.4	<2.5	<1.4	<3	<0.84	<0.84	<0.84
Bromodichloromethane	ug/m3	1.9 J	5.2	6.8	<3.6	<1	1 J	67	<0.73	59	85	6.4	<0.44
Bromoform	ug/m3	<0.72	2 J	1.5 J	<5.9	<1.7	2.2 J	7.3 J	<1.2	8.3 J	11	1.4 J	<0.72
Bromomethane	ug/m3	<1.3	<1.3	<1.3	<11	<3	<2.1	<3.9	<2.1	<4.6	<1.3	<1.3	<1.3
Butanone, 2- (MEK)	ug/m3	2.1 J	1.8 J	1.9 J	<4.8	1.7 J	1.5 J	9.3	2.7 J	<2.1	1.1 J	1.7 J	2.2 J
Carbon disulfide	ug/m3	3.1	3.7	31	5.9 J	23	5.9	68	230	27	21	70	260
Carbon tetrachloride	ug/m3	0.51 J	1.4 J	0.84 J	<3.3	<0.93	<0.66	<1.2	<0.66	<1.4	0.96 J	0.51 J	<0.4
Chlorobenzene	ug/m3	<0.29	0.69 J	<0.48	<2.4	<0.68	<0.89	<0.48	<0.68	<1.1	<0.29	<0.29	<0.29
Chloroethane	ug/m3	<0.81	<0.81	<0.81	<6.7	<1.9	<1.3	<2.4	<1.3	<2.9	<0.81	<0.81	<0.81
Chloroform	ug/m3	6.6	7.3	8.9	5.5 J	1.2 J	2.2 J	79	0.91 J	75	96	23	<0.46
Chloromethane	ug/m3	2	1.5 J	1.4 J	<3.3	1.5 J	1.4 J	1.3 J	<0.67	4.1 J	1.1 J	1.9	1.2 J
Dibromochloromethane	ug/m3	1.9 J	3.8	4.9	<5.5	<1.5	1.9 J	37	<1.1	40	65	5.2	<0.67
Dibromoethane, 1,2- (EDB)	ug/m3	<0.58	1 J	<0.58	<4.7	<1.3	<0.95	<1.7	<0.95	<2.1	<0.58	<0.58	<0.58
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/m3	<1.1	1.4 J	<1.1	<8.9	<2.5	<1.8	<3.3	<1.8	<3.9	<1.1	<1.1	<1.1
Dichlorobenzene, 1,2-	ug/m3	<0.78	0.94 J	<0.78	<6.4	<1.8	<1.3	<2.4	<1.3	<2.8	<0.78	<0.78	<0.78
Dichlorobenzene, 1,3-	ug/m3	<0.66	0.92 J	<1.1	<5.4	<1.5	<1.1	<2	<1.1	<2.4	<0.66	<0.66	<0.66
Dichlorobenzene, 1,4-	ug/m3	<0.9	1.1 J	<0.9	<7.3	<2.1	<1.5	3.4 J	<1.5	<3.2	<0.9	<0.9	<0.9
Dichlorodifluoromethane	ug/m3	1.3 J	12	2	38	1.9 J	14	2.3 J	1.4 J	2.8 J	1.2 J	1.3 J	1.1 J
Dichloroethane, 1,1-	ug/m3	<0.29	1.4	0.32 J	4.4 J	0.67 J	0.74 J	1.9 J	<0.48	<1	<0.29	0.48 J	<0.29
Dichloroethane, 1,2-	ug/m3	<0.36	0.63 J	<0.36	<2.9	<0.82	<0.58	<1.1	<0.58	<1.3	<0.36	<0.36	<0.36
Dichloroethene, 1,1-	ug/m3	<0.51	3.1 J	<0.51	5.7 J	<1.2	2.4 J	<1.5	<0.84	<1.8	0.84 J	130	<0.51
Dichloroethene, cis-1,2-	ug/m3	<0.35	0.67 J	<0.35	<2.9	<0.81	<0.58	1.9 J	<0.58	<1.3	0.47 J	3.7	<0.35
Dichloroethene, trans-1,2-	ug/m3	<0.4	0.65 J	<0.4	<3.3	<0.91	<0.65	<1.2	<0.65	<1.4	<0.4	<0.4	<0.4
Dichloropropane, 1,2-	ug/m3	<1.1	<1.1	<1.1	<9.1	<2.6	<1.8	<3.3	<1.8	<4	<1.1	<1.1	<1.1
Dichloropropene, cis-1,3-	ug/m3	<0.47	0.7 J	<0.47	<3.9	<1.1	<0.77	<1.4	<0.77	<1.7	<0.47	<0.47	<0.47
Dichloropropene, trans-1,3-	ug/m3	<0.4	0.68 J	<0.4	<3.3	<0.92	<0.66	<1.2	<0.66	<1.4	<0.4	<0.4	<0.4
Ethylbenzene	ug/m3	0.44 J	0.8 J	0.47 J	<2.2	<0.63	0.53 J	19	<0.45	<0.98	<0.27	0.3 J	1.6 J
Ethyltoluene, 4-	ug/m3	<0.92	<0.92	<0.92	<7.5	<2.1	<1.5	3.9 J	<1.5	<3.3	<0.92	<0.92	<0.92
Hexachlorobutadiene	ug/m3	<4.6	<4.6	<4.6	<38	<11	<7.6	<14	<7.6	<16	<4.6	<4.6	<4.6
Hexanone, 2-	ug/m3	<0.36	0.79 J	<0.36	<2.9	<0.82	<0.58	<1.1	<0.58	<1.3	<0.36	<0.36	<0.36
Methyl-2-pentanone, 4- (MIBK)	ug/m3	<0.55	3.9	<0.55	<4.5	<1.3	<0.91	<1.7	<0.91	<2	<0.55	<0.55	<0.55
Methylene Chloride	ug/m3	0.76 J	4.6	1.8	7.9 J	0.68 J	4.2	6.7	0.75 J	2.7 J	5.5	1.5	0.45 J
Styrene	ug/m3	<0.25	0.83 J	0.3 J	<2.1	<0.58	<0.41	<0.76	<0.41	<0.9	<0.25	<0.25	<0.25
Tetrachloroethane, 1,1,2,2-	ug/m3	<0.47	0.97 J	<0.47	<3.9	<1.1	<0.78	<1.4	<0.78	<1.7	<0.47	<0.47	<0.47
Tetrachloroethene	ug/m3	2.1 J	1.8 J	0.88 J	2300	470	310	3.3 J	1.8 J	2 J	0.92 J	190	2.2 J
Toluene	ug/m3	1.3 J	1.6	5.7	<1.6	0.97 J	1.9 J	130	1.2 J	5 J	1.2 J	2.9	1 J
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/m3	<1.2	19	1.8 J	440	100	11	<3.8	11	<4.5	3.6	2.7 J	99
Trichlorobenzene, 1,2,4-	ug/m3	<3.2	<3.2	<3.2	<26	<7.4	<5.3	<9.7	<5.3	<11	<3.2	<3.2	<3.2
Trichloroethane, 1,1,1-	ug/m3	<0.35	0.89 J	<0.35	<2.9	<0.82	<0.58	9.7	<0.58	<1.3	<0.35	0.47 J	<0.35
Trichloroethane, 1,1,2-	ug/m3	<0.37	0.79 J	<0.37	<3	<0.84	<0.6	<1.1	<0.6	<1.3	<0.37	<0.37	<0.37
Trichloroethene	ug/m3	0.72 J	2.4	1.6 J	570	130	5.1	<1.7	10	<2	9	290	1.1 J
Trichlorofluoromethane	ug/m3	1.1 J	2.9	1.4 J	<9	<2.5	2 J	<3.3	<1.8	<3.9	8.4	1.4 J	1.1 J
Trimethylbenzene, 1,2,4-	ug/m3	<0.8	0.84 J	<0.8	<6.5	<1.8	1.4 J	6.7 J	<1.3	<2.8	<0.8	<0.8	1.6 J
Trimethylbenzene, 1,3,5-	ug/m3	<0.61	0.73 J	<0.61	<5	<1.4	1 J	4 J	<1	<2.2	<0.61	<0.61	0.78 J
Vinyl acetate	ug/m3	<0.51	0.53 J	<0.51	<4.2	<1.2	<0.84	<1.5	<0.84	<1.8	<0.51	<0.51	<0.51
Vinyl chloride	ug/m3	<0.31	0.79 J	<0.31	<2.5	<0.71	0.55 J	<0.92	<0.5	<1.1	<0.31	0.33 J	<0.31
Xylene, m,p-	ug/m3	1 J	1.7 J	1.1 J	<3.6	<1	1.6 J	48	0.74 J	<1.6	<0.43	1.2 J	4.9
Xylene, o-	ug/m3	0.47 J	0.82 J	0.52 J	<1.9	<0.54	1 J	15	<0.38	<0.84	<0.23	0.56 J	1.6 J

Notes:

- Samples were analyzed by TestAmerica Laboratory, Sacramento, CA using USEPA Method TO-15.
- Data qualifiers:
 - J Estimated result between the method detection limit and reporting limit
 - < Result not detected (i.e., result less than the method detection limit)
- Sewer Category: A = sewer below water table; B = sewer above water table
- Manholes were sampled within 1 foot of bottom, unless noted.

TABLE B.10
Vapor Sample Results - Orange County, California
Groundwater to Sewer Demonstration Site (Task 2)

Site ID:		n/a (background)			SNA-001	SNA-002		SNA-003	SNA-004	SNA-005	SNA-006		SNA-007	SNA-008	SNA-009
Site Type:		n/a			CVOC	CVOC		CVOC	CVOC	CVOC	CVOC		CVOC	CVOC	CVOC
Sewer Category:		n/a			B	B		B	B	B	B	B	A	B	B
Sample Location ID:		SNA Commercial Bkg	SNA Residential Bkg		SNA-001	SNA-002		SNA-003	SNA-004	SNA-005	SNA-006A	SNA-006B	SNA-007	SNA-008	SNA-009
Sewer Type:		Utility, sanitary sewer	Utility, sanitary sewer		Utility, sanitary sewer	Utility, sanitary sewer		Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer	Utility, sanitary sewer
Sample Collected:		6/28/17 14:17	6/28/17 14:34	6/28/17 14:46	6/28/17 9:00	6/28/17 9:32	6/28/17 9:32	6/28/17 10:02	6/28/17 10:25	6/28/17 11:05	6/28/17 11:21	6/28/17 11:33	6/28/17 12:04	6/28/17 13:33	6/28/17 13:55
Sample Type:		N	N	FD	N	N	FD	N	N	N	N	N	N	N	N
Container:		1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa	1L Summa
Manhole Sample Depth:		Near bottom	Near bottom	Near bottom	1 ft bgs	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom	Near bottom
Sewer Depth (ft bgs):		nm	5.5		nm	5.3		10	>5	>5	>5	5.6	>5	5.6	5.1
Analyzed By:		Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab
Lab ID:		320-29669-23	320-29669-24	320-29669-25	320-29669-13	320-29669-14	320-29669-26	320-29669-15	320-29669-16	320-29669-17	320-29669-18	320-29669-19	320-29669-20	320-29669-21	320-29669-22
Analyte															
Acetone	ug/m3	19	43	7.4 J	17	44	19	79	30	89	200	37	48	16	35
Benzene	ug/m3	0.32 J	0.87 J	2.4	0.37 J	0.56 J	0.7 J	1.1 J	0.46 J	89	1.4	1.3	0.66 J	3.7	0.5 J
Benzyl chloride	ug/m3	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84
Bromodichloromethane	ug/m3	<0.44	<0.44	<0.44	17	2.4	<0.44	19	<0.44	35	4.4	<0.44	8.3	<0.44	7.3
Bromoform	ug/m3	<0.72	<0.72	<0.72	4.7	1 J	<0.72	41	<0.72	22	4.3	<0.72	1.9 J	<0.72	5.3
Bromomethane	ug/m3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
Butanone, 2- (MEK)	ug/m3	2.6	5.6	0.81 J	2.2 J	11	3.9	14	2.7	5.6	2.3 J	4.3	2.2 J	2.1 J	2.1 J
Carbon disulfide	ug/m3	0.34 J	230	19	3.4	18	32	80	14	14	4.9	6	7.5	3.7	22
Carbon tetrachloride	ug/m3	<0.4	<0.4	<0.4	0.42 J	0.62 J	<0.4	2.6 J	0.51 J	0.45 J	<0.4	0.97 J	0.49 J	<0.4	<0.4
Chlorobenzene	ug/m3	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29
Chloroethane	ug/m3	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81	<0.81
Chloroform	ug/m3	<0.46	<0.46	<0.46	32	29	3.7	33	1.5	28	4.1	<0.46	12	<0.46	7
Chloromethane	ug/m3	1.5 J	1.4 J	0.99 J	1.5 J	2.3	1.2 J	1.4 J	2.2	1.7	1.2 J	2.6	1.4 J	1.5 J	1.6 J
Dibromochloromethane	ug/m3	<0.67	<0.67	<0.67	17	2.9 J	<0.67	33	<0.67	39	5.8	<0.67	7.2	<0.67	9
Dibromoethane, 1,2- (EDB)	ug/m3	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58	<0.58
Dichloro-1,1,2,2-tetrafluoroethane, 1,2-	ug/m3	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Dichlorobenzene, 1,2-	ug/m3	<0.78	<0.78	<0.78	<0.78	<0.78	<0.78	<0.78	<0.78	<0.78	<0.78	<0.78	<0.78	<0.78	<0.78
Dichlorobenzene, 1,3-	ug/m3	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66
Dichlorobenzene, 1,4-	ug/m3	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	2.2 J	<0.9	<0.9	<0.9	<0.9	<0.9
Dichlorodifluoromethane	ug/m3	2.3	2.3	1.2 J	1.3 J	2.5	1.3 J	2.3	2.6	2.1	2.3	4.5	2.1	2.4	2.4
Dichloroethane, 1,1-	ug/m3	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29	17	<0.29	<0.29	<0.29	<0.29	<0.29	<0.29
Dichloroethane, 1,2-	ug/m3	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	0.63 J	2.3 J	<0.36	<0.36	<0.36	<0.36	<0.36
Dichloroethene, 1,1-	ug/m3	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	590	<0.51	19	40	<0.51	<0.51	<0.51
Dichloroethene, cis-1,2-	ug/m3	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	0.45 J	<0.35	2	3.7	<0.35	<0.35	<0.35
Dichloroethene, trans-1,2-	ug/m3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Dichloropropane, 1,2-	ug/m3	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Dichloropropene, cis-1,3-	ug/m3	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47
Dichloropropene, trans-1,3-	ug/m3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Ethylbenzene	ug/m3	0.4 J	0.64 J	0.31 J	0.82 J	0.47 J	<0.27	1.4 J	<0.27	0.7 J	0.72 J	0.69 J	0.65 J	1.3 J	1 J
Ethyltoluene, 4-	ug/m3	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	<0.92	0.92 J
Hexachlorobutadiene	ug/m3	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6
Hexanone, 2-	ug/m3	<0.36	0.6 J	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	0.79 J	<0.36	<0.36	<0.36	<0.36	<0.36
Methyl-2-pentanone, 4- (MIBK)	ug/m3	<0.55	<0.55	<0.55	<0.55	3.7	<0.55	1.9	<0.55	0.82 J	<0.55	<0.55	<0.55	<0.55	<0.55
Methylene Chloride	ug/m3	<0.25	0.7 J	0.43 J	1.4 J	1.6	1.1 J	35	0.65 J	3.9	0.83 J	1.2 J	1.2 J	<0.25	1.2 J
Styrene	ug/m3	<0.25	<0.25	<0.25	<0.25	0.31 J	<0.25	0.38 J	<0.25	0.31 J	<0.25	0.46 J	<0.25	<0.25	<0.25
Tetrachloroethane, 1,1,2,2-	ug/m3	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47
Tetrachloroethene	ug/m3	2.1 J	<0.35	0.55 J	0.8 J	3.4	0.65 J	1.2 J	0.9 J	10	54	110	<0.35	<0.35	2.7
Toluene	ug/m3	<0.19	0.95 J	0.94 J	2.4	2.1	0.74 J	1.9	1.5	4.1	7.2	2.7	2.1	0.65 J	1.7
Trichloro-1,2,2-trifluoroethane, 1,1,2-	ug/m3	<1.2	<1.2	<1.2	16	1.2 J	<1.2	<1.2	26	<1.2	11	49	<1.2	<1.2	<1.2
Trichlorobenzene, 1,2,4-	ug/m3	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2
Trichloroethane, 1,1,1-	ug/m3	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	24	<0.35	1.7	1.3 J	<0.35	<0.35	<0.35
Trichloroethane, 1,1,2-	ug/m3	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37
Trichloroethene	ug/m3	0.69 J	<0.56	<0.56	0.61 J	<0.56	<0.56	13	0.62 J	25	260	630 E	<0.56	<0.56	<0.56
Trichlorofluoromethane	ug/m3	1.3 J	1.3 J	<1.1	<1.1	1.5 J	<1.1	1.4 J	2.2 J	1.6 J	1.3 J	2.5	<1.1	1.4 J	1.3 J
Trimethylbenzene, 1,2,4-	ug/m3	0.83 J	<0.8	<0.8	0.88 J	<0.8	<0.8	1.8 J	<0.8	1.8 J	0.94 J	0.8 J	1.1 J	<0.8	2.6 J
Trimethylbenzene, 1,3,5-	ug/m3	<0.61	<0.61	<0.61	<0.61	<0.61	<0.61	<0.61	<0.61	<0.61	<0.61	<0.61	<0.61	<0.61	0.63 J
Vinyl acetate	ug/m3	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51
Vinyl chloride	ug/m3	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31
Xylene, m,p-	ug/m3	1.1 J	2.1 J	0.93 J	1.1 J	1.2 J	<0.43	3.6	0.77 J	2.2 J	2.3 J	1.8 J	2.2 J	0.93 J	3.6
Xylene, o-	ug/m3	0.42 J	0.57 J	0.33 J	0.44 J	0.52 J	<0.23	1.6 J	0.3 J	0.95 J	0.91 J	0.67 J	0.81 J	0.51 J	1.3 J

- Notes:
1. Samples were analyzed by TestAmerica Laboratory, Sacramento, CA using USEPA Method TO-15.
 2. Data qualifiers:
 - J Estimated result between the method detection limit and reporting limit
 - < Result not detected (i.e., result less than the method detection limit)
 3. Sewer Category: A = sewer below water table; B = sewer above water table
 4. Manholes were sampled within 1 foot of bottom, unless noted.
 5. nm = sewer depth not measured due to access limitations. For attenuation factor calculations, samples collected at 5 ft bgs were grouped with samples collected near the bottom of manholes based on typical sewer depths in the area.

TABLE B.11
Background VOC Concentrations in Manhole Vapor
Task 1 and 2 Sites

Analyte	No. Manholes Tested	No. Samples	Det Freq (%)	10th (ug/m3)	Median (ug/m3)	90th (ug/m3)	Maximum (ug/m3)
Acetone	56	99	100%	15	47	200	4000
Benzene	55	98	79%	0.32	1.1	4.3	89
Benzyl chloride	58	101	2%	-	-	-	5.5
Bromodichloromethane	58	101	86%	0.44	16	86	540
Bromoform	57	100	23%	0.72	1.2	9	41
Bromomethane	58	101	0%	-	-	-	-
Butanone, 2- (MEK)	57	100	86%	1.9	4.3	14	66
Carbon disulfide	58	101	99%	3	20	180	940
Carbon tetrachloride	58	101	60%	0.41	0.73	4.4	6
Chlorobenzene	57	100	20%	0.29	0.44	3.2	12
Chloroethane	58	101	15%	0.81	0.81	15	48
Chloroform	103	249	82%	1	26	360	4000
Chloromethane	58	101	94%	1.1	2	12	100
Dibromochloromethane	58	101	69%	0.67	5.2	33	99
Dibromoethane, 1,2- (EDB)	58	101	1%	-	-	-	1
Dichloro-1,1,2,2-tetrafluoroethane, 1,2	58	101	1%	-	-	-	1.4
Dichlorobenzene, 1,2-	58	101	3%	-	-	-	1.5
Dichlorobenzene, 1,3-	58	101	1%	-	-	-	0.92
Dichlorobenzene, 1,4-	58	101	34%	0.9	2.4	16	90
Dichlorodifluoromethane	58	101	77%	1.2	2.3	9.8	38
Dichloroethane, 1,1-	47	90	7%	-	-	-	66
Dichloroethane, 1,2-	53	96	26%	0.36	0.59	6.5	16
Dichloroethene, 1,1-	74	164	33%	0.51	1	17	230
Dichloroethene, cis-1,2-	20	31	55%	0.35	0.67	7.5	20
Dichloroethene, trans-1,2-	13	16	6%	-	-	-	0.65
Dichloropropane, 1,2-	58	101	0%	-	-	-	-
Dichloropropene, cis-1,3-	58	101	1%	-	-	-	0.7
Dichloropropene, trans-1,3-	58	101	1%	-	-	-	0.68
Ethylbenzene	56	99	74%	0.27	1.4	8.9	190
Ethyltoluene, 4-	58	101	14%	0.92	0.95	9.3	10
Hexachlorobutadiene	58	101	1%	-	-	-	16
Hexanone, 2-	58	101	14%	0.36	0.48	3.6	1.9
Methyl-2-pentanone, 4- (MIBK)	57	100	8%	-	-	-	3.9
Methylene Chloride	58	101	97%	0.74	5.1	35	110
Styrene	58	101	47%	0.25	0.83	6.4	140
Tetrachloroethane, 1,1,2,2-	58	101	4%	-	-	-	1.8
Tetrachloroethene	20	31	90%	0.35	3.2	68	550
Toluene	56	99	98%	1.5	20	280	3300
Trichloro-1,2,2-trifluoroethane, 1,1,2-	56	99	17%	1.2	1.9	21	440
Trichlorobenzene, 1,2,4-	58	101	2%	-	-	-	62
Trichloroethane, 1,1,1-	57	100	10%	0.35	0.37	5	81
Trichloroethane, 1,1,2-	57	100	1%	-	-	-	0.79
Trichloroethene	19	30	70%	0.56	2.6	16	85
Trichlorofluoromethane	58	101	53%	1.1	1.8	11	8.4
Trimethylbenzene, 1,2,4-	58	101	46%	0.8	1.6	10	31
Trimethylbenzene, 1,3,5-	57	100	26%	0.61	0.88	6.3	17
Vinyl acetate	58	101	2%	-	-	-	0.53
Vinyl chloride	13	16	19%	0.31	0.31	3.1	3.3
Xylene, m,p-	57	100	83%	0.82	3.4	21	57
Xylene, o-	58	101	78%	0.34	1.2	4.4	16

Notes:

1. Dataset includes all analytes from the 8 designated Task 1 and 9 designated Task 2 manholes, plus non-COC analytes from other manholes sampled.
2. Samples were collected from within 1 foot of the bottom of the manholes.
3. Only normal samples were used (i.e., QA samples such as field duplicates were not included in the calculations). The detection limit was substituted for non-detects. Percentiles were calculated if the detection frequency was greater than 10%.

TABLE B.12
Temporal Variability in Sewer Vapor Concentrations
Task 1 and 2 Sites

Demonstration Site	Sampling Location	Type	Time-span (days)	No. Spls	Primary Site COC	Conc. Range (ug/m3)	Ratio (Max / Min)
Short-term Variability in Sewer Laterals							
Task 1 Dem 1	SN-SDM Lateral	LU1	0.8	2	Trichloroethene	1.3 - 2.4	2
Task 1 Dem 2	SN Lateral	LU1	3.1	5	Chloroform	2.8 - 93	33
Task 1 Dem 1	LD-SDM Sampling Port	LU2	1.9	3	Trichloroethene	1.3 - 4.8	4
Task 1 Dem 3	107 pipe	LU4	3.1	12	Trichloroethene	0.86 - 1100	1279
Task 1 Dem 3	Tunnel entrance	LU5	2.8	5	Trichloroethene	86 - 156	2
Short-term Variability in Manholes							
Task 1 Dem 3	SS464	U1	2.0	2	Trichloroethene	1494 - 1500	1
Task 1 Dem 3	SS414	U1	0.8	2	Trichloroethene	634 - 822	1
Task 1 Dem 1	SN-963W-2350N	U1	0.7	2	Trichloroethene	6.4 - 9.1	1
Task 1 Dem 3	McCord 3	U1	2.8	8	Trichloroethene	279 - 425	2
Task 1 Dem 3	SS415	U1	1.2	4	Trichloroethene	12 - 20	2
Task 1 Dem 1	SN-1000W-2450N	U1	1.9	3	Trichloroethene	8.1 - 14	2
Task 1 Dem 3	SS455	U1	2.0	2	Trichloroethene	688 - 1225	2
Task 1 Dem 3	MH SAN 0132	U1	2.2	4	Trichloroethene	425 - 758	2
Task 1 Dem 1	SN-1178W-2525N	U1	0.9	2	Trichloroethene	2.1 - 4.3	2
Task 1 Dem 1	SN-1050W-2484N	U1	0.1	2	Trichloroethene	2.6 - 5.9	2
Task 1 Dem 1	SN-1165W-2525N	U1	0.9	2	Trichloroethene	59 - 134	2
Task 1 Dem 3	SS417	U1	2.2	4	Trichloroethene	236 - 645	3
Task 1 Dem 3	Moffett SS791	U1	1.2	4	Trichloroethene	5.9 - 17	3
Task 1 Dem 3	McCord 1	U1	2.8	4	Trichloroethene	344 - 1182	3
Task 1 Dem 1	SN-1055W-2450N	U1	2.7	4	Trichloroethene	10 - 39	4
Task 1 Dem 1	SN-1125W-2600N	U1	2.1	3	Trichloroethene	1.5 - 6.4	4
Task 1 Dem 3	Moffett SS790	U1	2.9	5	Trichloroethene	3.6 - 16	4
Task 1 Dem 1	SN-1100W-2525N	U1	0.9	2	Trichloroethene	64 - 360	6
Task 1 Dem 3	SS458	U1	0.9	2	Trichloroethene	33 - 193	6
Task 1 Dem 1	SN-1150W-2562N	U1	1.0	2	Trichloroethene	91 - 591	6
Task 1 Dem 3	SS461	U1	2.0	3	Trichloroethene	6.4 - 59	9
Task 1 Dem 1	SN-921W-2350N	U1	1.7	3	Trichloroethene	3.8 - 40	11
Task 1 Dem 3	McCord 2	U1	2.8	8	Trichloroethene	5.1 - 70	14
Task 1 Dem 3	SS460	U1	2.0	2	Trichloroethene	2.4 - 33	14
Task 1 Dem 1	SN-1100W-2450N	U1	1.0	3	Trichloroethene	18 - 328	18
Task 1 Dem 3	SS416	U1	2.9	7	Trichloroethene	7.5 - 666	89
Task 1 Dem 1	LD-725W-2175N	U2	1.1	2	Trichloroethene	35 - 39	1
Task 1 Dem 1	LD-1100W-2485N	U2	1.8	6	Trichloroethene	828 - 1100	1
Task 1 Dem 1	LD-UnivPk-2460N	U2	1.8	6	Trichloroethene	247 - 333	1
Task 1 Dem 1	LD-608W-2175N	U2	1.0	2	Trichloroethene	2.7 - 3.7	1
Task 1 Dem 1	LD-665W-2175N	U2	1.0	2	Trichloroethene	1.5 - 3.1	2
Task 1 Dem 1	LD-Church	U2	1.8	6	Trichloroethene	150 - 398	3
Task 1 Dem 1	LD-700W-2175N	U2	1.1	2	Trichloroethene	1.5 - 5.4	4
Task 1 Dem 1	LD-1070W-2600N	U2	3.4	8	Trichloroethene	75 - 344	5
Task 1 Dem 3	Telephone T-11	U4	1.0	3	Trichloroethene	70 - 183	3
Task 1 Dem 3	Telephone T-20	U4	2.8	5	Trichloroethene	86 - 230	3
Task 1 Dem 3	Telephone T-15	U4	1.0	2	Trichloroethene	355 - 387	1
Task 1 Dem 3	Tunnel EA wall	U5	0.9	2	Trichloroethene	37 - 134	4
Task 1 Dem 3	Tunnel Vault SA-V1	U5	2.8	4	Trichloroethene	20 - 140	7
Task 1 Dem 3	Tunnel Concrete Manway-2	U5	2.8	3	Trichloroethene	16 - 20	1
Task 1 Dem 2	31 Central	U3	1.9	2	Chloroform	59 - 73	1
Task 1 Dem 2	29.5 Ruckle	U3	1.0	2	Chloroform	150 - 200	1
Task 1 Dem 2	30.5 Central	U3	1.9	2	Tetrachloroethene	115 - 170	1
Task 1 Dem 2	31.5 Central	U3	0.3	2	Chloroform	68 - 137	2
Task 1 Dem 2	28.5 Central	U3	3.2	3	Chloroform	8.3 - 28	3
Task 1 Dem 2	28 New Jersey	U3	1.3	2	Chloroform	55 - 186	3
Task 1 Dem 2	33.5 Central	U3	1.1	3	Chloroform	4.4 - 200	45
Task 1 Dem 2	28 Central	U3	3.2	5	Chloroform	1 - 356	356
Task 1 Dem 2	29.5 Central	U3	3.2	5	Tetrachloroethene	0.6 - 353	588

TABLE B.12
Temporal Variability in Sewer Vapor Concentrations
Task 1 and 2 Sites

Demonstration Site	Sampling Location	Type	Time-span (days)	No. Spls	Primary Site COC	Conc. Range (ug/m3)	Ratio (Max / Min)
Long-term Variability in Manholes							
Houston	HOU-001	U1	454.0	4	Tetrachloroethene	9 - 860	96
Houston	HOU-001B	U1	167.9	2	Tetrachloroethene	4 - 6.1	2
Houston	HOU-002	U1	454.0	4	Tetrachloroethene	0.35 - 8.3	24
Houston	HOU-003	U1	454.0	5	Tetrachloroethene	39 - 1500	38
Houston	HOU-003B	U1	168.0	2	Tetrachloroethene	4.7 - 5.5	1
Houston	HOU-004	U1	529.0	6	Tetrachloroethene	9.8 - 280	29
Houston	HOU-005	U1	453.2	4	Dichloroethene, cis-1,2-	6.3 - 290	46
Houston	HOU-006	U1	333.9	4	Dichloroethene, cis-1,2-	16 - 110	7
Houston	HOU-007	U1	453.2	5	Dichloroethene, cis-1,2-	35 - 710	20
Houston	HOU-007B	U1	167.2	2	Dichloroethene, cis-1,2-	200 - 370	2
Houston	HOU-008	U1	453.2	5	Dichloroethene, cis-1,2-	1.9 - 58	31
Houston	HOU-008B	U1	167.3	2	Dichloroethene, cis-1,2-	1.4 - 1.5	1
Houston	HOU-009	U1	453.1	5	Tetrachloroethene	0.47 - 9.9	21
Houston	HOU-010	U1	453.1	4	Tetrachloroethene	5 - 5600	1120
Houston	HOU-010B	U1	167.3	2	Tetrachloroethene	6.3 - 12000	1905
Background							
Houston	Comm Background (Norfolk)	U1	259.0	3	Tetrachloroethene	2 - 35	18

Notes:

1. Tables include manholes or laterals sampled more than once.
2. Samples were collected from within 1 foot of the bottom of the manholes.
3. Normal samples only. The detection limit was substituted for non-detects.
4. Sampling Location Type: U1 = sanitary sewer; U2 = land drain; U3 = combined storm and sanitary sewer; U4 / U5 = utility tunnels.

TABLE B.13
Groundwater to Sewer Vapor Attenuation Factors
Task 1 and 2 Sites

Site Information						Groundwater Information			Paired Manhole Vapor Sample						Summary											
Sewer Category	Demonstration Site	SiteID	SiteType	Analyte	COC Category	Depth to Water (ft bgs)	GW Concentration (ug/L)	Henry's Constant	Manhole ID	Sewer Type	Lateral Distance from MW (ft)	Vapor Sample Collection	Depth to Bottom (ft bgs)	Sewer Vapor Conc (ug/m3)	GW Equil Vapor Conc (ug/m3)	AF (Sewer Vapor Concentration / GW Equil Conc)	Sewer Category	No. Sites (Plumes)	No. AFs	Min	10th	Median	90th	Max		
A	Corpus Christi	NASCC	CVOC	Trichloroethene	Primary	6	173000	0.43	NASCC08 SS near hanger	U1	80	9/14/2016 11:45	7.3	29	74,073,585	3.92E-07	A	6	65	3.9E-07	8.4E-05	7.5E-03	6.5E-02	1.2E-01		
A	Corpus Christi	NASCC	CVOC	Trichloroethene	Primary	30	3940	0.43	NASCC08 SS Ocean Drive	U1	20	9/14/2016 11:30	4.4	2.4	1,686,994	1.42E-06										
A	Orange County	SNA-007	CVOC	Tetrachloroethene	Primary	4.19	170	0.76	SNA-007	U1	60	6/28/2017 12:04	>5	<0.35	130,031	2.69E-06										
A	Houston	HOU-002	CVOC	Tetrachloroethene	Primary	3.84	79.6	0.76	HOU-002	U1	290	4/27/2017 16:00	6.4	<0.35	60,885	5.75E-06										
A	Houston	HOU-002	CVOC	Tetrachloroethene	Primary	3.84	79.6	0.76	HOU-002	U1	290	7/27/2017 10:24	6.4	0.79 J	60,885	1.30E-05										
A	Orange County	SNA-007	CVOC	Dichloroethene, cis-1,2-	Secondary	4.19	31	0.19	SNA-007	U1	60	6/28/2017 12:04	>5	<0.35	5,812	6.02E-05										
A	Houston	HOU-002	CVOC	Tetrachloroethene	Primary	3.84	79.6	0.76	HOU-002	U1	290	1/11/2018 8:35	6.4	4.2	60,885	6.90E-05										
A	Houston	HOU-002	CVOC	Dichloroethene, cis-1,2-	Secondary	3.84	17.4	0.19	HOU-002	U1	290	4/27/2017 16:00	6.4	<0.35	3,262	1.07E-04										
A	Houston	HOU-002	CVOC	Dichloroethene, cis-1,2-	Secondary	3.84	17.4	0.19	HOU-002	U1	290	7/27/2017 10:24	6.4	<0.35	3,262	1.07E-04										
A	Houston	HOU-002	CVOC	Dichloroethene, cis-1,2-	Secondary	3.84	17.4	0.19	HOU-002	U1	290	1/11/2018 8:35	6.4	<0.35	3,262	1.07E-04										
A	Houston	HOU-002	CVOC	Dichloroethene, cis-1,2-	Secondary	3.84	17.4	0.19	HOU-002	U1	290	10/14/2016 9:40	6.4	<0.36	3,262	1.10E-04										
A	Houston	HOU-002	CVOC	Tetrachloroethene	Primary	3.84	79.6	0.76	HOU-002	U1	290	10/14/2016 9:40	6.4	8.3	60,885	1.36E-04										
A	Houston	HOU-005	CVOC	Tetrachloroethene	Secondary	14.03	13	0.76	HOU-005	U1	175	1/10/2018 15:10	14.1	1.4 J	9,944	1.41E-04										
A	Task 1 Dem 1	ASU House	CVOC	Trichloroethene	Secondary	4	13.7	0.43	SN-1039W-2600N	U1	110	5/2/2016 8:27	11	2 J	5,866	3.41E-04										
A	Task 1 Dem 1	ASU House	CVOC	Dichloroethene, 1,1-	Secondary	7.53	4.8	1.06	SN-1100W-2450N	U1	45	5/5/2016 8:17	7.8	2.6	5,068	5.13E-04										
A	Task 1 Dem 3	Moffett	CVOC	Trichloroethene	Primary	6	280	0.43	Telephone T-11	U4	40	8/24/2016 16:17	7.1	70	119,888	5.84E-04										
A	Houston	HOU-005	CVOC	Tetrachloroethene	Secondary	14.03	13	0.76	HOU-005	U1	175	4/27/2017 14:05	13.2	<7.9	9,944	7.94E-04										
A	Houston	HOU-005	CVOC	Dichloroethene, cis-1,2-	Primary	14.03	35	0.19	HOU-005	U1	175	1/10/2018 15:10	14.1	6.3	6,562	9.60E-04										
A	Task 1 Dem 1	ASU House	CVOC	Dichloroethene, 1,1-	Secondary	7.53	4.8	1.06	SN-1100W-2450N	U1	45	5/4/2016 14:31	7.8	5.9	5,068	1.16E-03										
A	Task 1 Dem 3	Moffett	CVOC	Trichloroethene	Primary	6	280	0.43	Telephone T-11	U4	40	8/25/2016 10:11	7.1	156	119,888	1.30E-03										
A	Task 1 Dem 1	ASU House	CVOC	Dichloroethene, 1,1-	Secondary	7.53	4.8	1.06	SN-1100W-2450N	U1	45	5/5/2016 14:43	7.8	7.5	5,068	1.48E-03										
A	Task 1 Dem 3	Moffett	CVOC	Trichloroethene	Primary	6	280	0.43	Telephone T-11	U4	40	8/24/2016 9:05	7.1	183	119,888	1.53E-03										
A	Task 1 Dem 1	ASU House	CVOC	Chlorobenzene	Secondary	7.53	7.9	0.18	LD-1100W-2485N	U2	45	5/4/2016 8:50	9.6	2.7	1,435	1.88E-03										
A	Task 1 Dem 1	ASU House	CVOC	Trichloroethene	Secondary	7.53	21	0.43	SN-1100W-2450N	U1	45	5/5/2016 8:17	7.8	18	8,992	2.00E-03										
A	Houston	HOU-005	CVOC	Tetrachloroethene	Secondary	14.03	13	0.76	HOU-005	U1	175	10/14/2016 10:30	14.1	22	9,944	2.21E-03										
A	Houston	HOU-005	CVOC	Tetrachloroethene	Secondary	14.03	13	0.76	HOU-005	U1	175	7/27/2017 9:58	14.1	26	9,944	2.61E-03										
A	Task 1 Dem 1	ASU House	CVOC	Dichloroethene, cis-1,2-	Primary	7.53	27	0.19	SN-1100W-2450N	U1	45	5/5/2016 8:17	7.8	15	5,062	2.96E-03										
A	Task 1 Dem 3	Moffett	CVOC	Dichloroethene, cis-1,2-	Secondary	6	190	0.19	Telephone T-11	U4	40	8/24/2016 16:17	7.1	107	35,621	3.00E-03										
A	Task 1 Dem 3	Moffett	CVOC	Dichloroethene, cis-1,2-	Secondary	6	190	0.19	Telephone T-11	U4	40	8/24/2016 9:05	7.1	163	35,621	4.58E-03										
A	Task 1 Dem 1	ASU House	CVOC	Dichloroethene, cis-1,2-	Primary	7.53	27	0.19	SN-1100W-2450N	U1	45	5/5/2016 14:43	7.8	25	5,062	4.94E-03										
A	Task 1 Dem 3	Moffett	CVOC	Dichloroethene, cis-1,2-	Secondary	6	190	0.19	Telephone T-11	U4	40	8/25/2016 10:11	7.1	182	35,621	5.11E-03										
A	Houston	HOU-005	CVOC	Dichloroethene, cis-1,2-	Primary	14.03	35	0.19	HOU-005	U1	175	4/27/2017 14:05	13.2	35 J	6,562	5.33E-03										
A	Task 1 Dem 1	ASU House	CVOC	Dichloroethene, cis-1,2-	Primary	7.53	27	0.19	SN-1100W-2450N	U1	45	5/4/2016 14:31	7.8	38	5,062	7.51E-03										
A	Task 1 Dem 1	ASU House	CVOC	Trichloroethene	Secondary	7.53	21	0.43	SN-1100W-2450N	U1	45	5/5/2016 14:43	7.8	86 M	8,992	9.56E-03										
A	Task 1 Dem 3	Moffett	CVOC	Trichloroethene	Primary	6	280	0.43	SS464	U1	80	8/25/2016 13:34	6.7	1494 E	119,888	1.25E-02										
A	Task 1 Dem 3	Moffett	CVOC	Trichloroethene	Primary	6	280	0.43	SS464	U1	80	8/23/2016 13:54	6.7	1500 E	119,888	1.25E-02										
A	Houston	HOU-005	CVOC	Dichloroethene, cis-1,2-	Primary	14.03	35	0.19	HOU-005	U1	175	7/27/2017 9:58	14.1	83	6,562	1.26E-02										
A	Task 1 Dem 1	ASU House	CVOC	Trichloroethene	Secondary	4	13.7	0.43	LD-1070W-2600N	U2	70	5/5/2016 16:45	9.5	86 M	5,866	1.47E-02										
A	Task 1 Dem 1	ASU House	CVOC	Dichloroethene, trans-1,2-	Secondary	7.53	12	0.39	LD-1100W-2485N	U2	45	5/4/2016 8:50	9.6	120	4,679	2.56E-02										
A	Task 1 Dem 1	ASU House	CVOC	Dichloroethene, 1,1-	Secondary	7.53	4.8	1.06	LD-1100W-2485N	U2	45	5/3/2016 8:03	9.6	139												

TABLE B.13
Groundwater to Sewer Vapor Attenuation Factors
Task 1 and 2 Sites

Site Information						Groundwater Information			Paired Manhole Vapor Sample						Summary											
Sewer Category	Demonstration Site	SiteID	SiteType	Analyte	COC Category	Depth to Water (ft bgs)	GW Concentration (ug/L)	Henry's Constant	Manhole ID	Sewer Type	Lateral Distance from MW (ft)	Vapor Sample Collection	Depth to Bottom (ft bgs)	Sewer Vapor Conc (ug/m3)	GW Equil Vapor Conc (ug/m3)	AF (Sewer Vapor Concentration / GW Equil Conc)	Sewer Category	No. Sites (Plumes)	No. AFs	Min	10th	Median	90th	Max		
B	Houston	HOU-008	CVOC	Vinyl chloride	Secondary	13.59	125	3.49	HOU-008	U1	30	4/27/2017 13:13	4.9	<1.1	436,485	2.52E-06										
B	Orange County	SNA-005	CVOC	Trichloroethene	Primary	27.02	22000	0.43	SNA-005	U1	110	6/28/2017 11:05	>5	25	9,419,762	2.65E-06										
B	Houston	HOU-006	CVOC	Trichloroethene	Secondary	17	2500	0.43	HOU-006	U1	115	7/27/2017 9:52	11.5	3.6	1,070,428	3.36E-06										
B	Orange County	SNA-003	CVOC	Dichloroethene, cis-1,2-	Secondary	22.35	490	0.19	SNA-003	U1	260	6/28/2017 10:02	10	<0.35	91,866	3.81E-06										
B	Houston	HOU-010	CVOC	Trichloroethene	Secondary	16.93	570	0.43	HOU-010	U1	40	7/27/2017 8:38	10.2	1.1 J	244,057	4.51E-06										
B	Houston	HOU-010	CVOC	Tetrachloroethene	Primary	16.93	1400	0.76	HOU-010	U1	40	7/27/2017 8:38	10.2	5	1,070,843	4.67E-06										
B	Houston	HOU-009	CVOC	Trichloroethene	Secondary	14.6	268	0.43	HOU-009	U1	960	1/10/2018 15:35	13.4	<0.56	114,750	4.88E-06										
B	Orange County	SNA-002	CVOC	Tetrachloroethene	Primary	7.36	880	0.76	SNA-002	U1	125	6/28/2017 9:32	5.3	3.4	673,101	5.05E-06										
B	Houston	HOU-006	CVOC	Trichloroethene	Secondary	17	2500	0.43	HOU-006	U1	115	1/10/2018 15:00	11.5	<5.7	1,070,428	5.32E-06										
B	Orange County	SNA-008	CVOC	Trichloroethene	Secondary	8.47	230	0.43	SNA-008	U1	350	6/28/2017 13:33	5.6	<0.56	98,479	5.69E-06										
B	Houston	HOU-006	CVOC	Tetrachloroethene	Secondary	17	5500	0.76	HOU-006	U1	115	7/27/2017 9:52	11.5	28	4,206,884	6.66E-06										
B	Houston	HOU-003	CVOC	Tetrachloroethene	Primary	16.12	36300	0.76	HOU-003	U1	10	4/27/2017 14:35	3.5	190	27,765,434	6.84E-06										
B	Houston	HOU-010	CVOC	Dichloroethene, cis-1,2-	Secondary	16.93	460	0.19	HOU-010	U1	40	7/27/2017 8:38	10.2	0.63 J	86,241	7.31E-06										
B	Houston	HOU-006	CVOC	Dichloroethene, cis-1,2-	Primary	17	11000	0.19	HOU-006	U1	115	1/10/2018 15:00	11.5	16	2,062,288	7.76E-06										
B	Houston	HOU-006	CVOC	Trichloroethene	Secondary	17	2500	0.43	HOU-006	U1	115	4/27/2017 13:52	11.5	10 J	1,070,428	9.34E-06										
B	San Diego County	SAN-006	CVOC	Trichloroethene	Primary	16.15	2500	0.43	SAN-006	U1	2000	6/27/2017 15:30	7.5	10	1,070,428	9.34E-06										
B	Houston	HOU-009	CVOC	Trichloroethene	Secondary	14.6	268	0.43	HOU-009	U1	960	4/27/2017 12:59	13.4	<1.1	114,750	9.59E-06										
B	Houston	HOU-009	CVOC	Trichloroethene	Secondary	14.6	268	0.43	HOU-009	U1	960	7/27/2017 9:07	13.4	<1.1	114,750	9.59E-06										
B	Orange County	SNA-004	CVOC	Trichloroethene	Secondary	29.22	150	0.43	SNA-004	U1	100	6/28/2017 10:25	>5	0.62 J	64,226	9.65E-06										
B	Orange County	SNA-003	CVOC	Trichloroethene	Primary	22.35	2900	0.43	SNA-003	U1	260	6/28/2017 10:02	10	13	1,241,696	1.05E-05										
B	Houston	HOU-009	CVOC	Dichloroethene, cis-1,2-	Secondary	14.6	169	0.19	HOU-009	U1	960	1/10/2018 15:35	13.4	<0.35	31,684	1.10E-05										
B	Houston	HOU-009	CVOC	Dichloroethene, cis-1,2-	Secondary	14.6	169	0.19	HOU-009	U1	960	11/30/2016 13:12	13.4	<0.35	31,684	1.10E-05										
B	Houston	HOU-003	CVOC	Tetrachloroethene	Primary	16.12	36300	0.76	HOU-003	U1	10	1/11/2018 8:57	3.6	310	27,765,434	1.12E-05										
B	Houston	HOU-008	CVOC	Dichloroethene, cis-1,2-	Primary	13.59	832	0.19	HOU-008	U1	30	11/30/2016 13:08	4.9	1.9 J	155,984	1.22E-05										
B	Houston	HOU-009	CVOC	Tetrachloroethene	Primary	14.6	428	0.76	HOU-009	U1	960	11/30/2016 13:12	13.4	4.5	327,372	1.37E-05										
B	Houston	HOU-009	CVOC	Tetrachloroethene	Primary	14.6	428	0.76	HOU-009	U1	960	4/27/2017 12:59	13.4	5.4 J	327,372	1.65E-05										
B	Houston	HOU-009	CVOC	Dichloroethene, cis-1,2-	Secondary	14.6	169	0.19	HOU-009	U1	960	10/14/2016 12:10	13.4	<0.53	31,684	1.67E-05										
B	Houston	HOU-010	CVOC	Tetrachloroethene	Primary	16.93	1400	0.76	HOU-010	U1	40	10/14/2016 12:30	10.3	18 J	1,070,843	1.68E-05										
B	Houston	HOU-006	CVOC	Dichloroethene, cis-1,2-	Primary	17	11000	0.19	HOU-006	U1	115	4/27/2017 13:52	11.5	36	2,062,288	1.75E-05										
B	Houston	HOU-009	CVOC	Dichloroethene, cis-1,2-	Secondary	14.6	169	0.19	HOU-009	U1	960	7/27/2017 9:07	13.4	<0.71	31,684	2.24E-05										
B	Houston	HOU-009	CVOC	Dichloroethene, cis-1,2-	Secondary	14.6	169	0.19	HOU-009	U1	960	4/27/2017 12:59	13.4	<0.72	31,684	2.27E-05										
B	Task 1 Dem 2	3000 Block Central	CVOC	Tetrachloroethene	Primary	16	31.2	0.76	29.5 Central	U3	200	6/16/2016 16:27	6.4	0.6 J	23,865	2.51E-05										
B	Houston	HOU-006	CVOC	Dichloroethene, cis-1,2-	Primary	17	11000	0.19	HOU-006	U1	115	3/27/2018 11:11	11.5	55	2,062,288	2.67E-05										
B	San Diego County	SAN-005	Other	Butanone, 2- (MEK)	Primary	29.68	170000	0.0019	SAN-005	U1	120	6/27/2017 14:39	6.2	9.3	329,318	2.82E-05										
B	Houston	HOU-009	CVOC	Tetrachloroethene	Primary	14.6	428	0.76	HOU-009	U1	960	10/14/2016 12:10	13.4	9.9	327,372	3.02E-05										
B	San Diego County	SAN-009	CVOC	Dichloroethene, 1,1-	Secondary	30.79	3500	1.06	SAN-009A	U1	140	6/27/2017 17:47	10.9	130	3,695,300	3.52E-05										
B	San Diego County	SAN-009	CVOC	Trichloroethene	Secondary	30.79	15000	0.43	SAN-009A	U1	140	6/27/2017 17:47	10.9	290	6,422,565	4.52E-05										
B	Houston	HOU-003	CVOC	Tetrachloroethene	Primary	16.12	36300	0.76	HOU-003	U1	10	10/14/2016 10:00	3.6	1400	27,765,434	5.04E-05										
B	Houston	HOU-006	CVOC	Trichloroethene	Secondary	17	2500	0.43	HOU-006	U1	115	3/27/2018 11:11	11.5	54	1,070,428	5.04E-05										
B	Houston</																									

TABLE B.13
Groundwater to Sewer Vapor Attenuation Factors
Task 1 and 2 Sites

Site Information						Groundwater Information			Paired Manhole Vapor Sample					Summary										
Sewer Category	Demonstration Site	SiteID	SiteType	Analyte	COC Category	Depth to Water (ft bgs)	GW Concentration (ug/L)	Henry's Constant	Manhole ID	Sewer Type	Lateral Distance from MW (ft)	Vapor Sample Collection	Depth to Bottom (ft bgs)	Sewer Vapor Conc (ug/m3)	GW Equil Vapor Conc (ug/m3)	AF (Sewer Vapor Concentration / GW Equil Conc)	Sewer Category	No. Sites (Plumes)	No. AFs	Min	10th	Median	90th	Max
B	Houston	HOU-007	CVOC	Dichloroethene, cis-1,2-	Primary	15.48	794	0.19	HOU-007	U1	50	1/10/2018 15:25	2.3	190	148,860	1.28E-03								
B	Houston	HOU-004	CVOC	Trichloroethene	Secondary	17.38	16.4	0.43	HOU-004	U1	130	1/11/2018 7:52	5.2	9.5	7,022	1.35E-03								
B	San Diego County	SAN-007	CVOC	Trichloroethene	Secondary	13.12	3	0.43	SAN-007	U1	320	6/27/2017 16:05	5	<2	1,285	1.56E-03								
B	Task 1 Dem 2	3000 Block Central	CVOC	Tetrachloroethene	Primary	16	31.2	0.76	29.5 Central	U3	200	6/15/2016 8:15	6.49	39	23,865	1.63E-03								
B	Houston	HOU-007	CVOC	Dichloroethene, cis-1,2-	Primary	15.48	794	0.19	HOU-007	U1	50	10/14/2016 11:20	2.3	260	148,860	1.75E-03								
B	Houston	HOU-010	CVOC	Tetrachloroethene	Primary	16.93	1400	0.76	HOU-010	U1	40	4/27/2017 12:36	10.2	1900	1,070,843	1.77E-03								
B	Houston	HOU-010	CVOC	Trichloroethene	Secondary	16.93	570	0.43	HOU-010	U1	40	4/27/2017 12:36	10.2	450	244,057	1.84E-03								
B	Houston	HOU-001	CVOC	Dichloroethene, cis-1,2-	Secondary	14.37	76.2	0.19	HOU-001	U1	30	10/14/2016 9:20	11.2	36	14,286	2.52E-03								
B	Houston	HOU-001	CVOC	Trichloroethene	Secondary	14.37	39.1	0.43	HOU-001	U1	30	10/14/2016 9:20	11.2	44	16,741	2.63E-03								
B	Task 1 Dem 2	2900 Block Central	CVOC	Tetrachloroethene	Primary	14.51	56.3	0.76	30.5 Central	U3	80	6/13/2016 10:51	7.55	115	43,063	2.67E-03								
B	San Diego County	SAN-007	CVOC	Dichloroethene, cis-1,2-	Secondary	13.12	2.4	0.19	SAN-007	U1	320	6/27/2017 16:05	5	<1.3	450	2.89E-03								
B	Orange County	SNA-006	CVOC	Trichloroethene	Primary	20	482	0.43	SNA-006B	U1	100	6/28/2017 11:33	5.6	630 E	206,378	3.05E-03								
B	Houston	HOU-001	CVOC	Dichloroethene, cis-1,2-	Secondary	14.37	76.2	0.19	HOU-001	U1	30	4/27/2017 15:45	11.2	45	14,286	3.15E-03								
B	Orange County	SNA-004	CVOC	Dichloroethene, 1,1-	Primary	29.22	160	1.06	SNA-004	U1	100	6/28/2017 10:25	>5	590	168,928	3.49E-03								
B	Austin	AUS-004	CVOC	Trichloroethene	Primary	9.18	55.4	0.43	AUS-004	U5	87	6/21/2017 10:51	5	86 J	23,721	3.63E-03								
B	Houston	HOU-004	CVOC	Tetrachloroethene	Primary	17.38	61.7	0.76	HOU-004	U1	130	11/30/2016 12:48	5.2	176	47,194	3.73E-03								
B	Houston	HOU-004	CVOC	Tetrachloroethene	Primary	17.38	61.7	0.76	HOU-004	U1	130	1/11/2018 7:52	5.2	180	47,194	3.81E-03								
B	Task 1 Dem 2	2900 Block Central	CVOC	Tetrachloroethene	Primary	14.51	56.3	0.76	30.5 Central	U3	80	6/15/2016 8:21	7.6	170	43,063	3.95E-03								
B	Houston	HOU-004	CVOC	Trichloroethene	Secondary	17.38	16.4	0.43	HOU-004	U1	130	10/14/2016 10:15	5.2	31	7,022	4.41E-03								
B	Houston	HOU-010	CVOC	Trichloroethene	Secondary	16.93	570	0.43	HOU-010	U1	40	1/10/2018 16:03	10.3	1100	244,057	4.51E-03								
B	Houston	HOU-007	CVOC	Dichloroethene, cis-1,2-	Primary	15.48	794	0.19	HOU-007	U1	50	7/27/2017 9:33	2.3	710	148,860	4.77E-03								
B	Houston	HOU-001	CVOC	Tetrachloroethene	Primary	14.37	230	0.76	HOU-001	U1	30	10/14/2016 9:20	11.2	860	175,924	4.89E-03								
B	Orange County	SNA-006	CVOC	Dichloroethene, 1,1-	Secondary	21.95	3.68	1.06	SNA-006A	U1	40	6/28/2017 11:21	5.6	19	3,885	4.89E-03								
B	Houston	HOU-010	CVOC	Tetrachloroethene	Primary	16.93	1400	0.76	HOU-010	U1	40	1/10/2018 16:03	10.3	5600	1,070,843	5.23E-03								
B	Houston	HOU-004	CVOC	Tetrachloroethene	Primary	17.38	61.7	0.76	HOU-004	U1	130	7/27/2017 8:14	5.2	280	47,194	5.93E-03								
B	Houston	HOU-004	CVOC	Dichloroethene, cis-1,2-	Secondary	17.38	13.2	0.19	HOU-004	U1	130	1/11/2018 7:52	5.2	15	2,475	6.06E-03								
B	Orange County	SNA-006	CVOC	Trichloroethene	Primary	21.95	60.8	0.43	SNA-006A	U1	40	6/28/2017 11:21	5.6	260	26,033	9.99E-03								
B	Houston	HOU-010	CVOC	Dichloroethene, cis-1,2-	Secondary	16.93	460	0.19	HOU-010	U1	40	4/27/2017 12:36	10.2	1100	86,241	1.28E-02								
B	Task 1 Dem 2	3000 Block Central	CVOC	Tetrachloroethene	Primary	16	31.2	0.76	29.5 Central	U3	200	6/15/2016 14:42	6.5	312	23,865	1.31E-02								
B	Task 1 Dem 2	3000 Block Central	CVOC	Chloroform	Secondary	16	<5	0.15	29.5 Central	U3	200	6/16/2016 16:27	6.4	10	763	1.31E-02								
B	Task 1 Dem 2	EPA House	CVOC	Tetrachloroethene	Secondary	15.8	0.35 J	0.76	29.5 New Jersey	U3	200	6/15/2016 15:15	6	3.7	268	1.38E-02								
B	Task 1 Dem 2	3000 Block Central	CVOC	Tetrachloroethene	Primary	16	31.2	0.76	29.5 Central	U3	200	6/13/2016 11:00	6.35	353	23,865	1.48E-02								
B	Houston	HOU-010	CVOC	Dichloroethene, cis-1,2-	Secondary	16.93	460	0.19	HOU-010	U1	40	1/10/2018 16:03	10.3	1400	86,241	1.62E-02								
B	Task 1 Dem 2	3000 Block Central	CVOC	Chloroform	Secondary	16	<5	0.15	29.5 Central	U3	200	6/15/2016 8:15	6.49	15	763	1.97E-02								
B	Task 1 Dem 2	3000 Block Central	CVOC	Chloroform	Secondary	16	<5	0.15	29.5 Central	U3	200	6/16/2016 8:17	6.3	15	763	1.97E-02								
B	Task 1 Dem 2	3000 Block Central	CVOC	Chloroform	Secondary	16	<5	0.15	29.5 Central	U3	200	6/13/2016 11:00	6.35	42	763	5.51E-02								
B	Task 1 Dem 2	3000 Block Central	CVOC	Chloroform	Secondary	16	<5	0.15	29.5 Central	U3	200	6/15/2016 14:42	6.5	68	763	8.91E-02								
B	Task 1 Dem 2	EPA House	CVOC	Chloroform	Primary	15.8	1.7	0.15	29.5 New Jersey	U3	200	6/15/2016 15:15	6	127	259	4.90E-01								
B	Austin	AUS-004	CVOC	Tetrachloroethene	Secondary	9.18	2.69	0.76	AUS-004	U5	87	6/21/2017 10:51	5	1878 JE	2,058	9.13E-01								

The following record was excluded. Because acetone was found at low concentrations in groundwater and it is a common lab contaminant, it is unlikely to be a site COC.

n/a	San Diego County	SAN-008	CVOC	Acetone	Secondary	26.55	3.8	0.0016	SAN-008	U1	20	6/27/2017 16:52	20.7	7.6 J	6	1.24E+00								

- Notes:
- Groundwater results are from the most recent sample. Analytes included the VOC found at the highest concentration at the site (primary COC), and VOCs found at 15% or more of the max concentration (secondary COCs).
 - Table includes only manholes sampled near the bottom. Table does not include second Houston (downstream) manholes or manholes not directly associated with a monitoring well.
 - Manhole types included. U1 = sanitary, U2 = land drain, U3 = combined storm and sanitary, U4 = telephone or other utility, U6 = Storm drain. Table does not include laterals.
 - Sewer Category: A = sewer below water table; B = sewer above water table
 - Detection limit was substituted for non-detect results. Detection limit was assumed to be 1 for HAPSITE-analyzed results.
 - Henry's Law Constant was from TCEQ 2018 TRRP PCL tables.
 - Bold-italics indicate attenuation factor greater than 0.01.

APPENDIX C. TASK 1 AND 2 TRACER TEST RESULTS

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TABLE C.1
ASU VI RESEARCH HOUSE - LAYTON, UTAH
Sewer to Building Demonstration Site (Task 1, Demonstration Site 1)

Zone	Source Placed in Zone	CATS ID	PDCB (pL/L)	PTCH (pL/L)	ocPDCH (pL/L)	iPPCH (pL/L)	PMCH (pL/L)	PMCP (pL/L)
Bedroom	PTCH	9084	67.7	51.22	7.53	33.39	7.6	13.24
		10599	66.92	59.16	7.77	43.47	7.67	18.98
Main Floor	PDCB	10057	66.53	36.5	7.59	34.68	6.23	16.29
		2857	66.52	37.76	7.44	36.98	6.18	12.85
Basement Closet	ocPDCH	11606	18.96	10.45	47.69	54.18	5.26	14.73
		1583	18.48	10.18	42.2	47.34	5.33	9.96
Basement	iPPCH	8377	16.74	9.29	12.87	52.37	4.61	12.73
		12262	15.94	10.21	12.69	55.32	4.46	10.62
ASU Land Drain Lateral	None	4276	11.12	6.43	21.78	9.97	2.42	15.08
ASU Sanitary Lateral	None	7553	0.68	0.37	1.2	2.38	0.41	113.41
Sanitary Sewer	PMCP	11910	0	0	0	0	0	58.06
		1685	0	0	0	0	0	38.54
Land Drain	PMCH	8609	0	0	0	0	0	213.3
		1656	0	0	0	0	0	199.9

Notes:

1. Samples collected 2-6 May 2016. Analysis completed by Brookhaven National Laboratory.
2. PFT Sources:
PDCB: P-dimethylcyclobutane
PTCH: P-trimethylcyclohexane
o-PDCH: ortho-P-dimethylcyclohexane (ocPDCH isomer reported)
iPPCH: P-isopropylcyclohexane
PMCH: P-methylcyclohexane
PMCP: P-methylcyclopentane
3. CATS = capillary adsorption tube sampler
4. Shaded cells indicate the PFT result from samplers placed in the same room or manhole as the specified source. For example, CATS ID 9084 and 10599 were placed side-by-side in the 2nd floor bedroom, across the room from the PTCH source.
4. Sanitary sewer source placed in SN-1039W-2600N (upstream) ; CATS placed in SN-1125W-2600N (downstream)
5. Land drain source placed in LD-1018W-2600N (upstream); CATS placed in LD-1070W-2600N (downstream)

TABLE C.2
USEPA VI RESEARCH DUPLEX - INDIANAPOLIS, INDIANA
Sewer to Building Demonstration Site (Task 1, Demonstration Site 2)

Zone	Source Placed in Zone	CATS ID	PDCB (pL/L)	iPPCH (pL/L)	PTCH (pL/L)	ocPDCH (pL/L)	PMCH (pL/L)	PMCP (pL/L)
422 Main	PDCB	10708	168	8.2	0	0.3	0.5	16.9
		00126	168	8.4	0	0.3	0.6	20.1
422 Basement	iPPCH	10251	4.3	47.4	0	0.8	0.4	14.1
		05395	4.2	47.6	0	0.8	0.4	16.6
422 SN Lateral	PTCH	00300 ^(Note 4)	0	3.8	133.6	1.1	5.4	76.3
		05778	0	3.1	87.2	1	4.3	57.5
420 Main	None	02783	0	0	0	2.3	0	19.9
		10249	0	0	0	2.4	0	23.3
420 Basement	ocPDCH	07471	0.1	0	0	7.9	0	12.3
		04441	0.1	0	0	7.4	0	9
420 SN Lateral	None ^(Note 5)	10397	0	4.7	252.6	1.8	4.9	61.3
		04295	0	2	233.4	1.7	4.8	48.9
SN Main Upstream	PMCH	07658	0	0	0	0	90	9.5
		01403 ^(Note 4)	0	0	0	0	106.7	16.2
SN Main Downstream	PMCP	07694	0	0	0	4.6	9.2	1051.3
		10689	0	0	0	1.1	7.2	261.4

Notes:

1. Samples collected 13-17 June 2016. Analysis completed by Brookhaven National Laboratory.
2. PFT Sources:
PDCB: P-dimethylcyclobutane
PTCH: P-trimethylcyclohexane
o-PDCH: ortho-P-dimethylcyclohexane (ocPDCH isomer reported)
iPPCH: P-isopropylcyclohexane
PMCH: P-methylcyclohexane
PMCP: P-methylcyclopentane
3. CATS = capillary adsorption tube sampler
4. Shaded cells indicate the PFT result from samplers placed in the same room or manhole as the specified source.
4. The stop time for CATs 00300 and 01403 was 15 June 2016, 11:30. These tubes are treated as independent samples (i.e., 00300 and 05778 are two separate samples and 01403 and 07658 are two separate samples). Concentrations have been corrected for the different sample times on the CATs.
5. One sewer lateral line serves both sides of the duplex (420 and 422). CATs were placed in the sewer line lateral on both sides. The source (PTCH) was placed on the 422 side.
6. The sources and CATS in the Sanitary Main Manholes were inundated with storm water on the afternoon of 14 June and again on the afternoon of 15 June.
7. SN main upstream manhole at 28 Central; downstream manhole at 28 New Jersey

TABLE C.3
MOFFETT BUILDING 107 - MOUNTAIN VIEW, CALIFORNIA
Sewer to Building Demonstration Site (Task 1, Demonstration Site 3)

Zone	Source Placed in Zone	CATS Location	CATS ID	PDCB (pL/L)	oPDCH (pL/L)	PMCH (pL/L)	PMCP (pL/L)
1 (Main Room)	PDCB	Main Room	6255	9.5	1.2	0.2	21.2
			1653	9.3	1.1	0.2	21.9
		Kitchen	3675	6.4	1.2	0.2	21.4
			9483	6.5	1.3	0.2	20.2
		Phone Closet/Pipe	11879	0.4	2.1	0	438.5
			12497	0.4	2	0	453
2 (Bathroom)	oPDCH	Bathroom	11829	5	14.9	0	21.2
			7975	4.9	16.1	0	23.4
3 (Sanitary Main Manhole)	PMCH	Sanitary Main Manhole	8950	0	0.4	246.8	65.7
			9253	0	0.3	258.6	37.9
4 (Telephone Utility Manhole)	PMCP	None	-	-	-	-	-

Notes:

1. Samples collected 22-26 August 2016. Analysis completed by Brookhaven National Laboratory.
2. PFT Sources:
 PDCB: P-dimethylcyclobutane
 o-PDCH: ortho-P-dimethylcyclohexane
 PMCH: P-methylcyclohexane
 PMCP: P-methylcyclopentane
3. CATS = capillary adsorption tube sampler
4. Sanitary and Telephone manholes at McCord 2 location

TABLE C.4
DUPLEXES - HOUSTON, TEXAS
Sewer to Building Demonstration Site (Task 2)

Zone	Source Placed in Zone	CATS ID	PDCB (pL/L)	PTCH (pL/L)	ocPDCH (pL/L)	iPPCH (pL/L)	PMCH (pL/L)	PMCP (pL/L)
Outdoors								
Back porch of Duplex #1	None	9515	0.1	0	0	0.1	0.5	0.7
Duplex #1 (100 ft from manhole)								
4706 Living Room	PDCB	7162	22	1.2	0.1	1.3	0.3	0
4708 Living Room	PTCH	136	11.8	11.5	0.3	13.1	1.3	0.8
4708 Bedroom 2	iPPCH	8344	10.8	7.9	0.3	20.3	1.6	0.9
4708 Kitchen Sink Drain	ocPDCH	None	-	-	-	-	-	-
4708 Sewer Cleanout	None	10155	1.3	0	0	0.2	0.3	0.4
Duplex #2 (50 ft from manhole)								
4704 Living Room	PMCP	10268	0	0.1	0.2	0.2	0.5	25.2
4704 Bathroom	None	12230	0	0.1	0.2	0.2	0.4	21.7
4704 Bedroom	None	1516	0	0.1	0.2	0.1	0.4	19.7
Sewer								
Sanitary Sewer Manhole	PMCH	8683	0.6	1.5	0.6	2.3	235.8	4.3

Notes:

1. Samples were collected 27 April - 5 May 2017, except for 4708 Living Room, 4708 Bedroom 2, and 4706 Living Room which were started on 29 April. Sources had previously been stored in Duplex #1. The start of sampling was delayed to allow time for the unit to air out.
 Analysis completed by Brookhaven National Laboratory.
2. PFT Sources:
 PDCB: P-dimethylcyclobutane
 PTCH: P-trimethylcyclohexane
 o-PDCH: ortho-P-dimethylcyclohexane (ocPDCH isomer reported)
 iPPCH: P-isopropylcyclohexane
 PMCH: P-methylcyclohexane
 PMCP: P-methylcyclopentane
3. CATS = capillary adsorption tube sampler
4. Shaded cells indicate the PFT result from samplers placed in the same zone as the specified source.
5. All sample locations had duplicate samples with one being analyzed and the second kept in reserve in case of problems with the first sample.

TABLE C.5
SINGLE-FAMILY HOMES - SAN RAFAEL, CALIFORNIA
Sewer to Building Demonstration Site (Task 2)

Zone	Source Placed in Zone	CATS ID	PDCB (pL/L)	PTCH (pL/L)	ocPDCH (pL/L)	iPPCH (pL/L)	PMCH (pL/L)	PMCP (pL/L)
Outdoors - Front Porch of House #1								
Outdoors	None	11140	Not analyzed (Note 6)					
		10233	0	0	0	0	4.5	0.02
House #1 (near upstream manhole; house number 27)								
Dining Room	iPPCH	08450	0	5.8	0.1	6.2	3.2	0.1
		08822	0	5	0.1	5.4	3.8	0.2
Bathroom	PTCH	08803	0	8.3	0.1	5.2	3.4	0.1
		01961	0.02	5.4	0.1	3.3	2.1	0.2
House #2 (near downstream manhole; house number 38)								
Kitchen/ Living Room	o-PDCH	07505	0.06	0	1.9	0.2	6.1	0.6
		06955	CATS lost in shipping (Note 5)					
Bathroom	PMCP (Note 4)	08735	0	0	1.6	0.2	13.9	0.6
		12183	0	0	1.7	0.2	15.4	0.6
Sanitary Sewer Manholes								
Upstream Manhole	PMCH	11546	CATS lost in shipping (Note 5)					
		01696	"					
Downstream Manhole	PDCB	12370	"					
		04477	"					

Notes:

1. Samples collected 6-14 February 2018. Analysis completed by Brookhaven National Laboratory.
2. PFT Sources:
 PDCB: P-dimethylcyclobutane
 PTCH: P-trimethylcyclohexane
 o-PDCH: ortho-P-dimethylcyclohexane (ocPDCH isomer reported)
 iPPCH: P-isopropylcyclohexane
 PMCH: P-methylcyclohexane
 PMCP: P-methylcyclopentane
3. CATS = capillary adsorption tube sampler
4. Shaded cells indicate samplers placed in the same zone as the source (i.e., across the room from the source).
5. The PMCP source was inadvertently removed two days after the start of the test. PMCP concentrations would have been higher if the source had remained for the entire test period.
6. The sample shipment was damaged enroute to the laboratory. Five sample tubes were lost (i.e., both tubes for the manholes and one tube from the Kitchen/Living Room in House #2).
7. Tube not analyzed due to laboratory equipment issue.

TABLE C.6
APARTMENT BUILDING, NASCC AREA 1 - CORPUS CHRISTI, TEXAS
Sewer to Building Demonstration Site (Task 2)

Zone	Source Placed in Zone	CATS ID	PDCB (pL/L)	PTCH (pL/L)	ocPDCH (pL/L)	iPPCH (pL/L)	PMCH (pL/L)	PMCP (pL/L)
Outdoors								
Smoking Area/Gazebo in Apartment Building Courtyard	n/a	7632	0	not used	0	0	0	0
		4143	0		0	0	0	0
AREA 1								
Apartment Building (Unaccompanied Housing)								
Apt E102 Bathroom	ocPDCH	8800	0	not used	1.1	0	0.2	0.1
		10677	0	not used	1.2	0	0.2	0
Sewer								
Sanitary Sewer Manhole	PMCP	7668	ND	not used	ND	ND	ND	910.4
		282	ND	not used	ND	ND	ND	1017.9

Notes:

1. Samples collected 4-13 October 2017. Analysis completed by Brookhaven National Laboratory.
2. PFT Sources:
 - PDCB: P-dimethylcyclobutane
 - PTCH: P-trimethylcyclohexane (not used at this site)
 - o-PDCH: ortho-P-dimethylcyclohexane (ocPDCH isomer reported)
 - iPPCH: P-isopropylcyclohexane
 - PMCH: P-methylcyclohexane
 - PMCP: P-methylcyclopentane
3. CATS = capillary adsorption tube sampler
4. Shading indicates the PFT result from samplers placed in the same zone as specified source.
5. Table shows results adjusted for source impurities.

TABLE C.7
OFFICE BUILDING WITH LABORATORY - SAN DIEGO, CALIFORNIA
Sewer to Building Demonstration Site (Task 2)

Zone	Source Placed in Zone	CATS ID	PDCB (pL/L)	PTCH (pL/L)	ocPDCH (pL/L)	iPPCH (pL/L)	PMCH (pL/L)	PMCP (pL/L)
Outdoors								
Southeast of Building	n/a	9633	0	0	0	0	0.02	Note 5
		12074	0	0	0	0	0.02	"
Indoors								
Zone 6; 2nd Floor Rm 264	None	4114	0	0	0	0.01	0	"
		11749	0	0	0	0	0.01	"
Zone 6; 2nd Floor Rm 217 Kitchen	PDCB	4594	8.95	0.01	0.01	0.03	0.15	"
		7333	8.66	0.01	0.01	0.03	0.14	"
Zone 6; 2nd Floor Central Core	None	10078	0.06	0.02	0	0.05	0.24	"
		7632	0.05	0.02	0	0.05	0.1	"
Zone 3; 1st Floor Central Core	iPPCH	10866	GC Failure					
		10480	GC Failure					
Zone 3; 1st Floor Rm 112 Restroom	None	11142	0.07	0.01	0	0.01	0.04	"
		10519	0.07	0	0	0.01	0.02	"
Zone 3; 1st Floor Hall 144	None	7119	0.04	0	0	0	0.03	"
		7162	0.04	0	0	0.01	0	"
Zone 4; 1st Floor Rm 115 Lab	PTCH	7880	0.07	0.28	0.07	0.08	0.48	"
		3800	0.07	0.2	0.06	0.06	0.44	"
1st Floor, Inside Standpipe in Rm 115	ocPDCH	None	-	-	-	-	-	-
Sewers								
Zone 1; Sanitary Manhole	PMCH	2031	2.47	2.46	1.77	5.02	591.58	"
		4475	2.65	3.04	2.28	6.83	673.25	"
Zone 2; Electrical Manhole	PMCP	2436	sample wet; tube not analyzed					
		20	0	0.09	0.5	0.22	1.15	36.9
QA Sample								
Field Blank								
n/a	n/a	7684	0.01	0	0	0	0.05	0.02
		12470	0.01	0	0	0	0.04	0.02

Notes:

1. Samples collected 26 June - 7 July 2017. Analysis completed by Brookhaven National Laboratory.
2. PFT Sources:
PDCB: P-dimethylcyclobutane
PTCH: P-trimethylcyclohexane
o-PDCH: ortho-P-dimethylcyclohexane (ocPDCH isomer reported)
iPPCH: P-isopropylcyclohexane
PMCH: P-methylcyclohexane
PMCP: P-methylcyclopentane
3. CATS = capillary adsorption tube sampler
4. Shading indicates the PFT result from samplers placed in the same zone as specified source.
5. PMCP was found in the sewer (i.e., in the same manhole as the source). However, based on a source impurity study conducted by Brookhaven, PMCP reported in the other samples resulted from impurities (i.e., other tracer sources contaminated with PMCP). The results above have been corrected for the PMCP source impurity.

TABLE C.8
HOSPITAL, NASCC AREA 2 - CORPUS CHRISTI, TEXAS
Sewer to Building Demonstration Site (Task 2)

Zone	Source Placed in Zone	CATS ID	PDCB (pL/L)	PTCH (pL/L)	ocPDCH (pL/L)	iPPCH (pL/L)	PMCH (pL/L)	PMCP (pL/L)
AREA 2								
Hospital								
Utility Closet with sink and floor drain	PDCB	1689	5.1	not used	0	0	0	ND
		10405	6.3	not used	0	0	0	ND
Break/Conference Room	iPPCH	10519	0.1	not used	0.1	5.2	0.2	0.1
		11947	0.1	not used	0.1	5.7	0.2	0.2
Sewer								
Sanitary Sewer Manhole	PMCH	7162	15.5	not used	1.1	0	228.5	0.8
		10866	18	not used	0.9	ND	250.4	0.9

Notes:

1. Samples collected 4-13 October 2017. Analysis completed by Brookhaven National Laboratory.
2. PFT Sources:
 PDCB: P-dimethylcyclobutane
 PTCH: P-trimethylcyclohexane (not used at this site)
 o-PDCH: ortho-P-dimethylcyclohexane (ocPDCH isomer reported)
 iPPCH: P-isopropylcyclohexane
 PMCH: P-methylcyclohexane
 PMCP: P-methylcyclopentane
3. CATS = capillary adsorption tube sampler
4. Shading indicates the PFT result from samplers placed in the same zone as specified source.
5. Table shows results adjusted for source impurities.

TABLE C.9
OFFICE AND SHOP BUILDINGS, NASCC AREA 3 - CORPUS CHRISTI, TEXAS
Sewer to Building Demonstration Site (Task 2)

Zone	Source Placed in Zone	CATS ID	PDCB (pL/L)	PTCH (pL/L)	ocPDCH (pL/L)	iPPCH (pL/L)	PMCH (pL/L)	PMCP (pL/L)
AREA 3								
Building 1: Public Works								
Public Works Building (Maintenance Shop)	ocPDCH	4594	0	not used	0.4	0.2	0.1	0.1
		3800	0	not used	0.4	0.2	0.1	0.1
Public Works Building (Men's Locker Room)	iPPCH	11479	0	not used	0.4	3.5	0.2	0.1
		7880	0.1	not used	0.4	3.5	0.2	0.2
Building 2: ELECMX Workshop								
Workshop with bay doors; fans in use for air circulation	PMCH	7119	0	not used	0	0	0.6	0.6
		8776	0	not used	0	0	0.7	0.8
Mens Restroom	PMCP	7836	ND	not used	ND	ND	0.2	53.3
		4475	ND	not used	ND	ND	0.1	62.3
Sewer								
Sanitary Sewer Manhole	PDCB	12023	442.3	not used	0.4	0.7	1.7	ND
		10822	604.6	not used	0.7	1.4	2	ND

Notes:

1. Samples collected 4-13 October 2017. Analysis completed by Brookhaven National Laboratory.
2. PFT Sources:
 - PDCB: P-dimethylcyclobutane
 - PTCH: P-trimethylcyclohexane (not used at this site)
 - o-PDCH: ortho-P-dimethylcyclohexane (ocPDCH isomer reported)
 - iPPCH: P-isopropylcyclohexane
 - PMCH: P-methylcyclohexane
 - PMCP: P-methylcyclopentane
3. CATS = capillary adsorption tube sampler
4. Shading indicates the PFT result from samplers placed in the same zone as specified source.
5. Table shows results adjusted for source impurities.

TABLE C.10
OFFICE BUILDING, NASCC AREA 4 - CORPUS CHRISTI, TEXAS
Sewer to Building Demonstration Site (Task 2)

Zone	Source Placed in Zone	CATS ID	PDCB (pL/L)	PTCH (pL/L)	ocPDCH (pL/L)	iPPCH (pL/L)	PMCH (pL/L)	PMCP (pL/L)
AREA 4								
Office Building (Communication Center)								
Women's Locker Room	iPPCH	10349	processing error					
		7089	0.3	not used	0.2	19.7	0.5	ND
Sewer								
Sanitary Sewer Manhole	PMCH	10078	ND	not used	ND	ND	577.8	0.4
		20	ND	not used	ND	ND	586.8	1.1
QA Sample								
Field Blanks								
n/a	n/a	11126	0.003	not used	0.002	0	0	0
		11890	0.004	not used	0.003	0	0.001	0

Notes:

1. Samples collected 4-13 October 2017. Analysis completed by Brookhaven National Laboratory.
2. PFT Sources:
 PDCB: P-dimethylcyclobutane
 PTCH: P-trimethylcyclohexane (not used at this site)
 o-PDCH: ortho-P-dimethylcyclohexane (ocPDCH isomer reported)
 iPPCH: P-isopropylcyclohexane
 PMCH: P-methylcyclohexane
 PMCP: P-methylcyclopentane
3. CATS = capillary adsorption tube sampler
4. Shading indicates the PFT result from samplers placed in the same zone as specified source.
5. Table shows results adjusted for source impurities.

TABLE C.11
OFFICE BUILDING - BURLINGAME, CALIFORNIA
Sewer to Building Demonstration Site (Task 2)

Zone	Source Placed in Zone	CATS ID	PDCB (pL/L)	PTCH (pL/L)	ocPDCH (pL/L)	iPPCH (pL/L)	PMCH (pL/L)	PMCP (pL/L)
Outdoors								
Outdoors, behind Unit #1	None	11853	1.5	-	-	0	0	-
		11952	0.4	-	-	0	0	-
Unit #1								
Work Area (Lab)	PDCB	08473	12.3	-	-	0.3	0.3	-
		11860	12	-	-	0.2	0.3	-
Bathroom	iPPCH	07689	9.2	-	-	15.8	0.4	-
		10035	9.5	-	-	15.4	0.7	-
Unit #2								
Office	None	12234	0	-	-	0	0	-
		07013	0.1	-	-	0	0	-
Bathroom	None	12427	0	-	-	0	0	-
		04240	0.1	-	-	0	0	-
Sanitary Sewer								
Sewer Lateral	None	12382	0	-	-	0	1.9	-
		11962	0	-	-	0	2	-
Sanitary Manhole in cul-de-sac	PMCH (Note 4)	01749	CATS not recovered (Note 4)					
		11178	CATS not recovered (Note 4)					

Notes:

1. Samples collected 6-14 February 2018. Analysis completed by Brookhaven National Laboratory.
2. PFT Sources:
PDCB: P-dimethylcyclobutane
PTCH: P-trimethylcyclohexane (not used in this test)
o-PDCH: ortho-P-dimethylcyclohexane (ocPDCH isomer reported) (not used in this test)
iPPCH: P-isopropylcyclohexane
PMCH: P-methylcyclohexane
PMCP: P-methylcyclopentane (not used in this test)
3. CATS = capillary adsorption tube sampler
4. Shaded cells indicate samplers placed in the same zone as the source (i.e., across the room from the source). For the sewer lateral, the CATS were attached to a rod lowered into the cleanout. Inside the manhole, CATS were attached to a rod suspended in the manhole, across from the source.
5. The PMCH source and the CATS placed inside the manhole were missing at the end of the sampling period.

TABLE C.12
WAREHOUSE BUILDING - HOUSTON, TEXAS
Sewer to Building Demonstration Site (Task 2)

Zone	Source Placed in Zone	CATS ID	PDCB (pL/L)	PTCH (pL/L)	ocPDCH (pL/L)	iPPCH (pL/L)	PMCH (pL/L)	PMCP (pL/L)
Outdoors								
Outdoors	None	06457	0.005	-	0.001	-	0.012	-
		11253	0.007	-	0.004	-	0.015	-
Unit #1								
Warehouse/Office (Note 4)	PDCB	10001	0.56	-	0.51	-	0.11	-
		02220	0.53	-	0.47	-	0.1	-
Bathroom	ocPDCH	11122	0.66	-	31.96	-	1.07	-
		08538	0.65	-	31.74	-	1.06	-
Sanitary Sewer								
Manhole	PMCH	12423	0	-	0	-	52.22	-
		03616	0	-	0	-	50.75	-

Notes:

1. Samples collected 16-23 April 2018. Analysis completed by Brookhaven National Laboratory.
2. PFT Sources:
 PDCB: P-dimethylcyclobutane
 PTCH: P-trimethylcyclohexane (not used in this test)
 o-PDCH: ortho-P-dimethylcyclohexane (ocPDCH isomer reported)
 iPPCH: P-isopropylcyclohexane
 PMCH: P-methylcyclohexane
 PMCP: P-methylcyclopentane (not used in this test)
3. CATS = capillary adsorption tube sampler
4. Shaded cells indicate samplers placed in the same zone as the source (i.e., across the room from the source). Inside the manhole, CATS were attached to a rod and suspended across from the source.
5. Source placed in warehouse; CATS placed in office.
6. Both sample tubes in the manhole and one tube outside had water in them when they were picked up. The sample tubes likely got wet on 21 April 2018 when it rained in the area.
7. Concentrations have been adjusted for source impurities

TABLE C.13
SEWER TO BUILDING ATTENUATION
Task 1 and 2 Sites

Connection		Sewer Result	Indoor Results		Range of Attenuation
		Conc. (pL/L)	No. Measurements	Conc. Range (pL/L)	
Residential and Small Commercial/Industrial Buildings (Previously Known Preferential Pathways shown in shaded rows)					
Land Drain (Upstream)	ASU VI Research House	300*	4	4.5 - 7.6	40 - 70x
Sanitary Sewer (Upsteam)	ASU VI Research House	680*	4	12 - 16	40 - 60x
Storm/Sanitary Sewer (Upstream)	USEPA VI Research Duplex	90	4	ND - 0.55	160 - >1000x
Storm/Sanitary Sewer (Downstream)	USEPA VI Research Duplex	1051	4	10.7 - 21.6	50 - 100x
Telephone Utility	Moffett Bldg 107	680*	3	20.6 - 22.3	30x
Sanitary Sewer	Moffett Bldg 107	250	3	ND - 0.2	>1000x
Sanitary Sewer	Duplex (Houston #1)	236	3	0.3 - 1.6	150 - 790x
Sanitary Sewer	Duplex (Houston #2)	236	3	0.4 - 0.5	470 - 590x
Sanitary Sewer (Upsteam)	House (San Rafael #1)	300*	2	2.75 - 3.5	90 - 110x
Sanitary Sewer (Upsteam)	House (San Rafael #2)	300*	2	6.1 - 14.75	20 - 50x
Sanitary Sewer (Downstream)	House (San Rafael #1)	520*	2	ND - 0.01	>1000x
Sanitary Sewer (Downstream)	House (San Rafael #2)	520*	2	ND - 0.06	>1000x
Sanitary Sewer	Apartment (NASCC Area 1)	964	1	0.05	>1000x
Large Commercial/Industrial Buildings					
Sanitary Sewer	Office/Lab (San Diego)	633	6	0.01 - 0.46	>1000x
Electrical Utility	Office/Lab (San Diego)	37	6	ND - ND	>1000x
Sanitary Sewer	Hospital (NASCC Area 2)	240	2	ND - 0.2	>1000x
Sanitary Sewer	Office (NASCC Area 3)	524	2	ND - 0.05	>1000x
Sanitary Sewer	Shop (NASCC Area 3)	524	2	ND - ND	>1000x
Sanitary Sewer	Office (NASCC Area 4)	583	1	0.50	>1000x
Sanitary Sewer	Office (Burlingame)	300*	4	ND - 0.55	550 - >1000x
Sanitary Sewer	Warehouse (Houston)	52	2	0.11 - 1.07	50 - 470x

Note:

1. Asterisks (*) denote estimated source concentrations.

TABLE C.14
SEWER – SEWER LATERAL – INDOOR AIR CONNECTIONS
Task 1 and 2 Sites

Connection		Sewer Result	Lateral Result	Indoor Results		Manhole to Lateral Attenuation	Lateral to Indoor Attenuation
		Conc. (pL/L)	Conc (pL/L)	No. Measurements	Conc. Range (pL/L)		
Land Drain (Upstream)	House (ASU VI Research House)	300*	2.42	4	4.5 - 7.6	120x	Not calculated
Sanitary Sewer (Upstream)	House (ASU VI Research House)	680*	113	4	12 - 16	6x	7 - 9x
Storm/Sanitary Sewer (Upstream)	Duplex (USEPA Duplex 422)	90	4.3	2	0.4 - 0.55	20x	8 - 11x
Storm/Sanitary Sewer (Upstream)	Duplex (USEPA Duplex 420)	90	4.85	2	ND - ND	20x	>50x
Storm/Sanitary Sewer (Downstream)	Duplex (USEPA Duplex 422)	1051	57.5	2	15.4 - 18.5	20x	3 - 4x
Storm/Sanitary Sewer (Downstream)	Duplex (USEPA Duplex 4208)	1051	55.1	2	10.7 - 21.6	20x	3 - 5x
Sanitary Sewer	Duplex (Houston #1, 4708)	236	0.3	2	1.3 - 1.6	790x	Not calculated
Telephone Utility	Office (Moffett Bldg 107)	680*	445	3	20.6 - 22.3	2x	20 - 22x
Sanitary Sewer	Office (Burlingame Suite #1)	300*	1.95	2	0.3 - 0.55	150x	4 - 7x
Sanitary Sewer	Office (Burlingame Suite #2)	300*	1.95	2	ND - ND	150x	>20x

Note:

1. Asterisks (*) denote estimated source concentrations.

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FIGURE C.1
TASK 1 TRACER TEST: ASU VI RESEARCH HOUSE
Layton, UT
May 2016

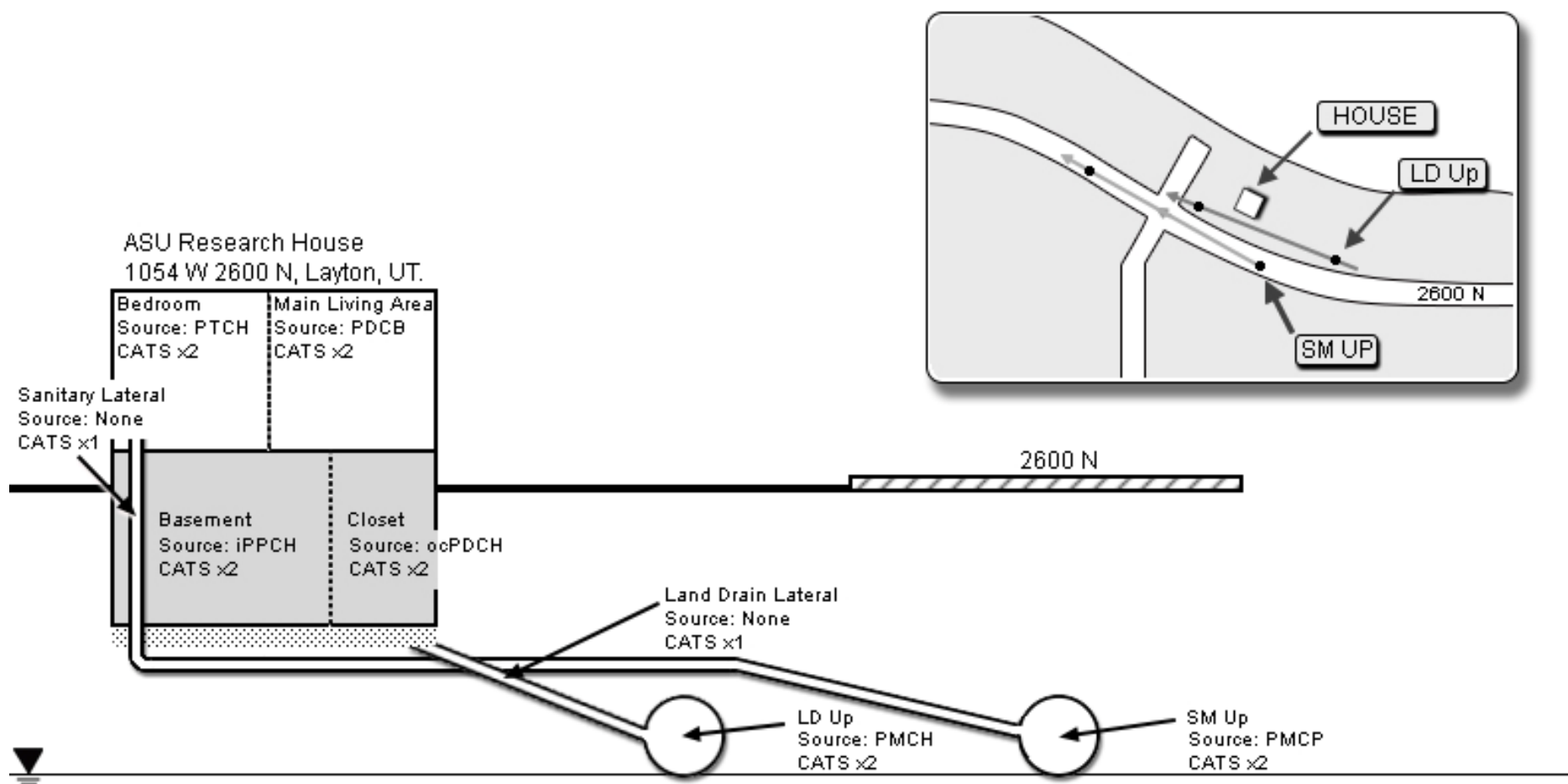


FIGURE C.2
TASK 1 TRACER TEST: USEPA VI RESEARCH DUPLEX
Indianapolis, IN
June 2016

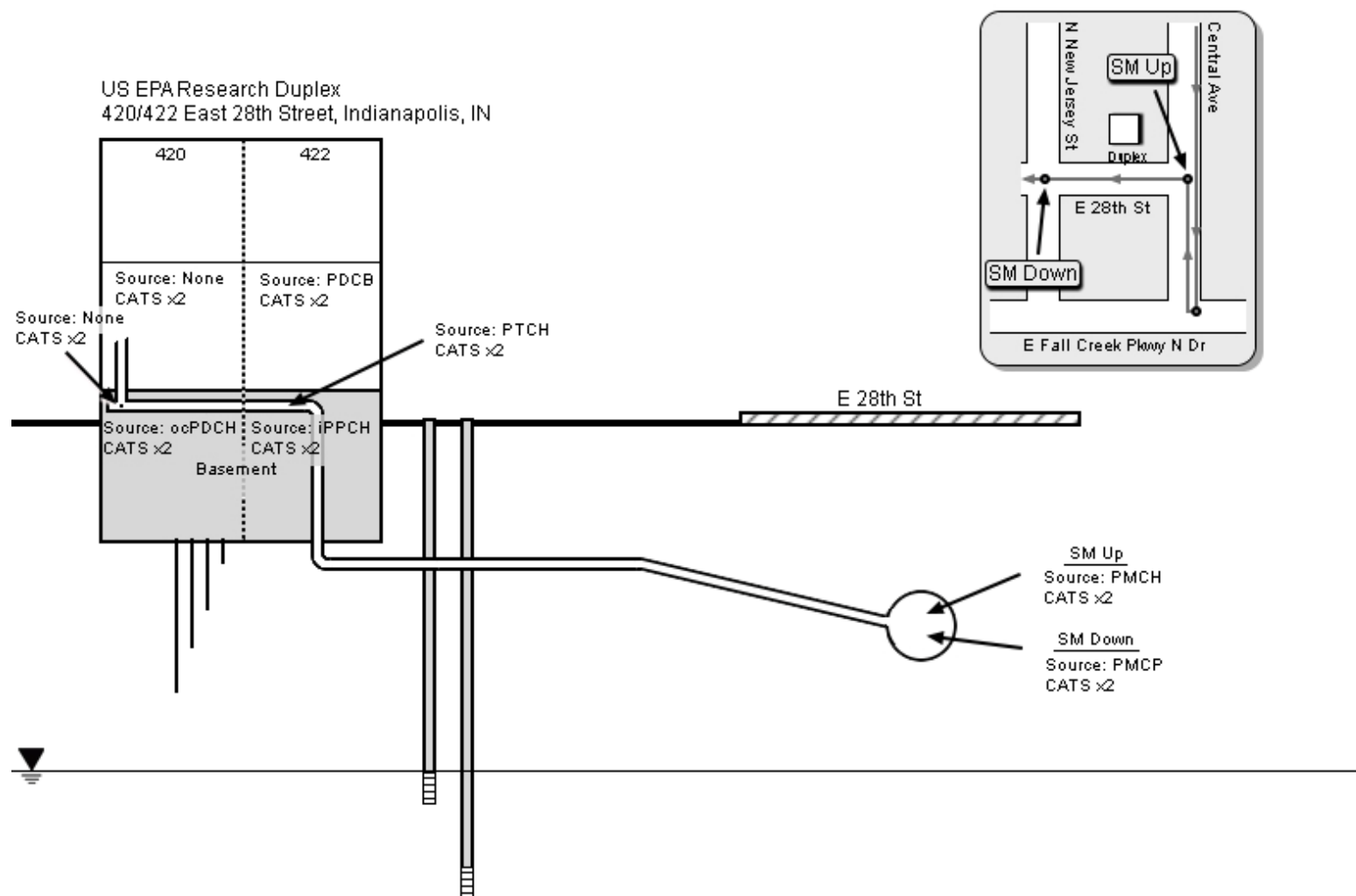


FIGURE C.3
TASK 1 TRACER TEST: MOFFETT FIELD BUILDING 107
Mountain View, CA
August 2016

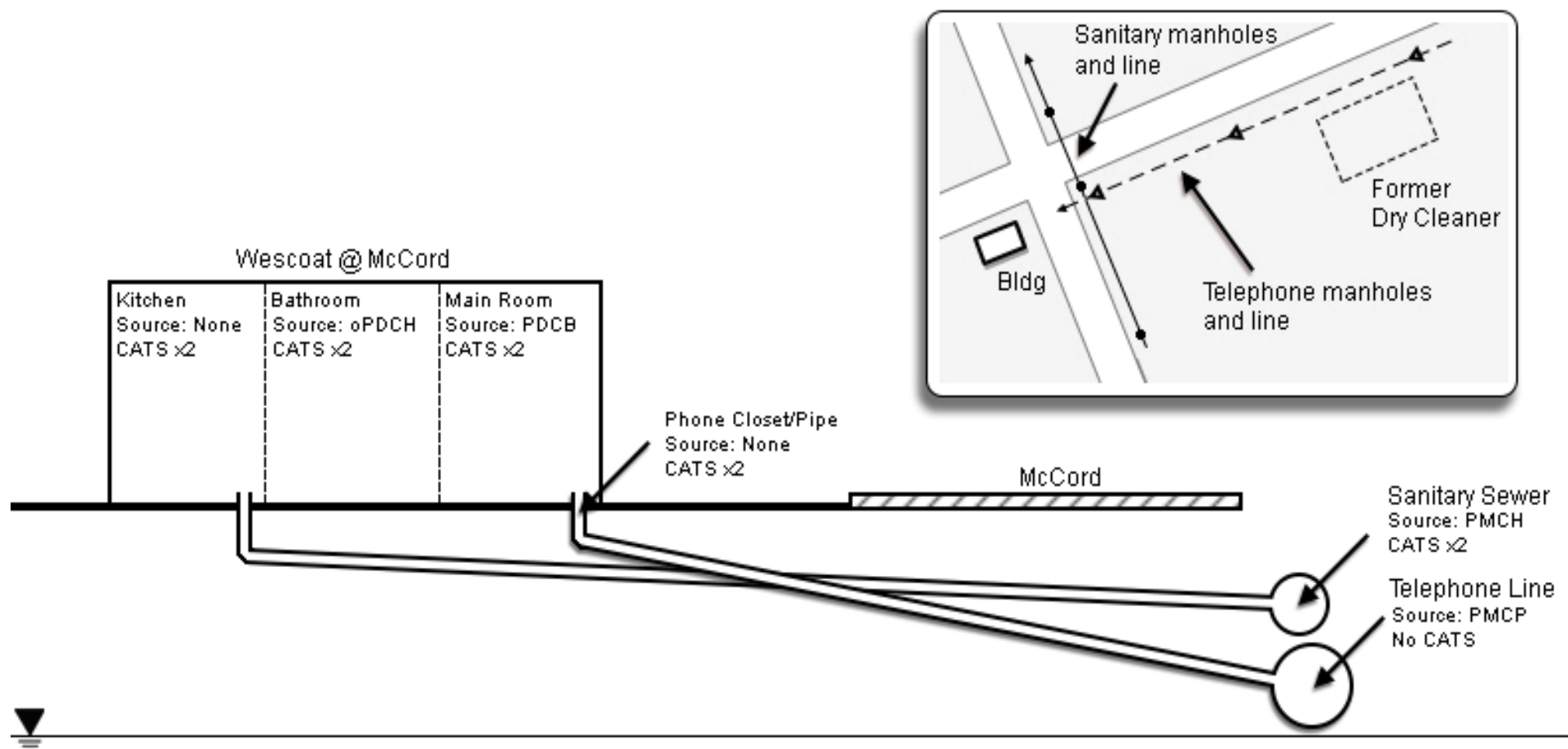
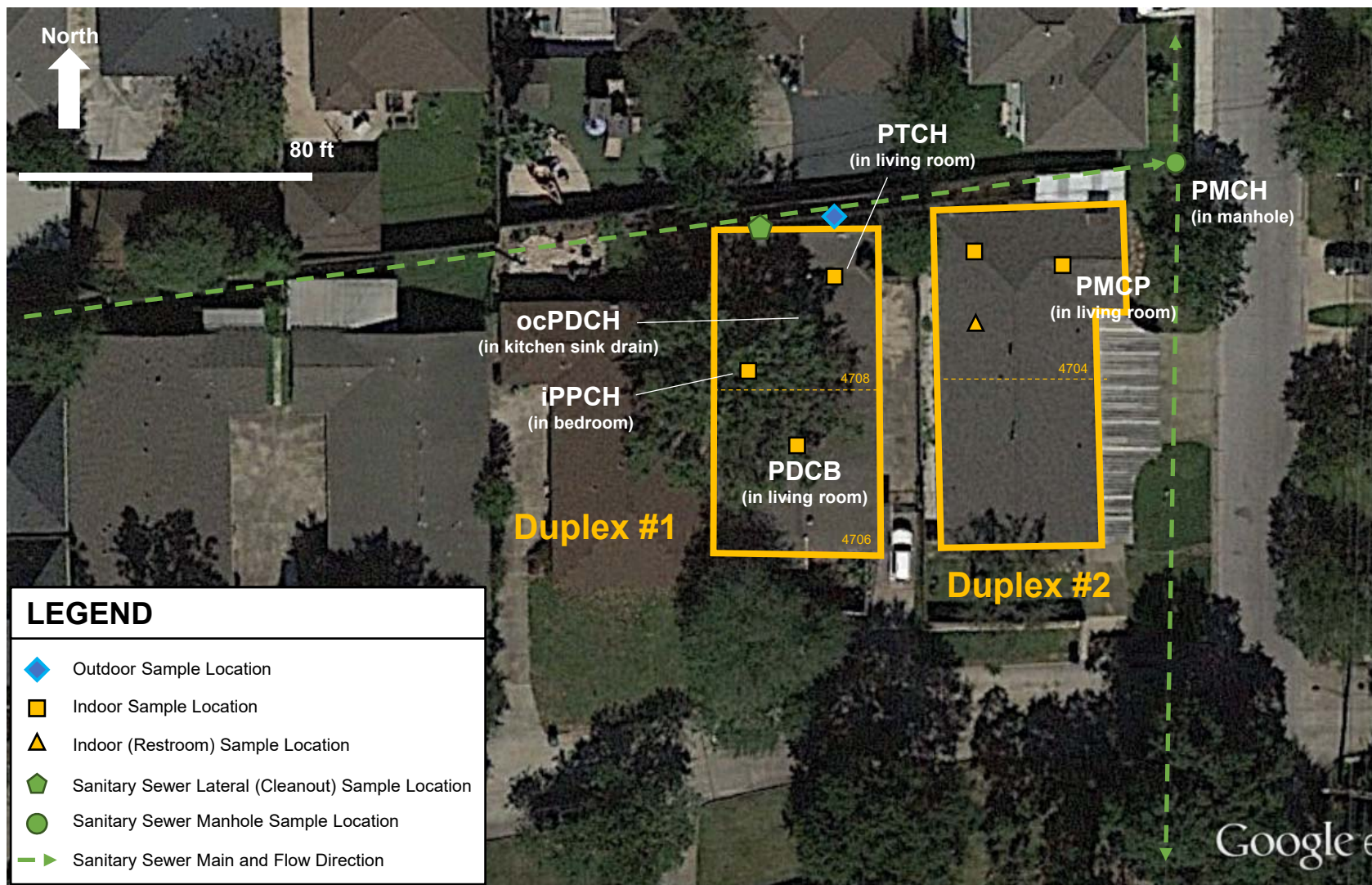


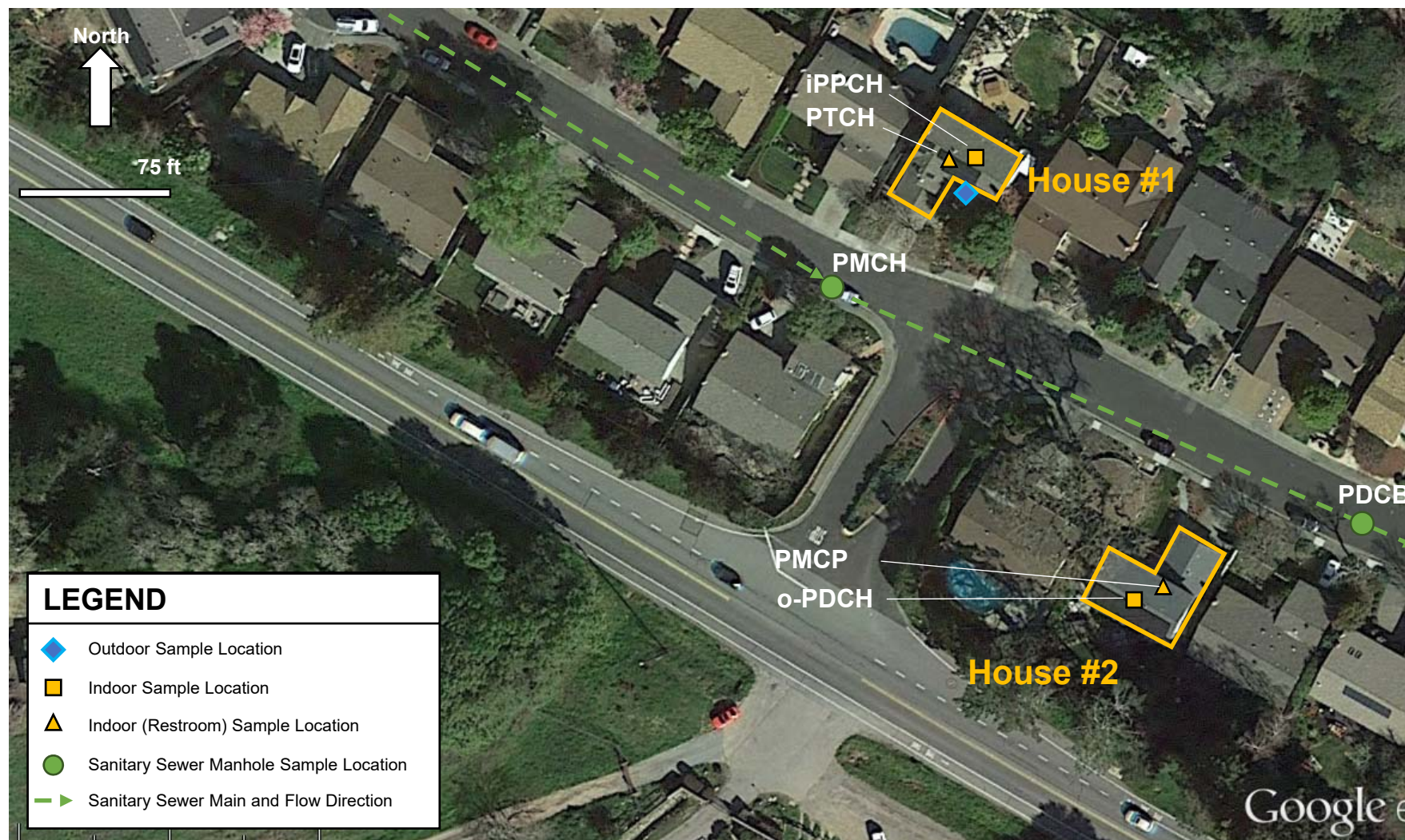
FIGURE C.4
TASK 2 TRACER TEST: DUPLEXES
Houston, TX
April-May 2017



Notes:

1. Sample locations are approximate.
2. Sources were placed across the room (or manhole) from the samplers. See table for tracer source (e.g., PMCH) definitions.

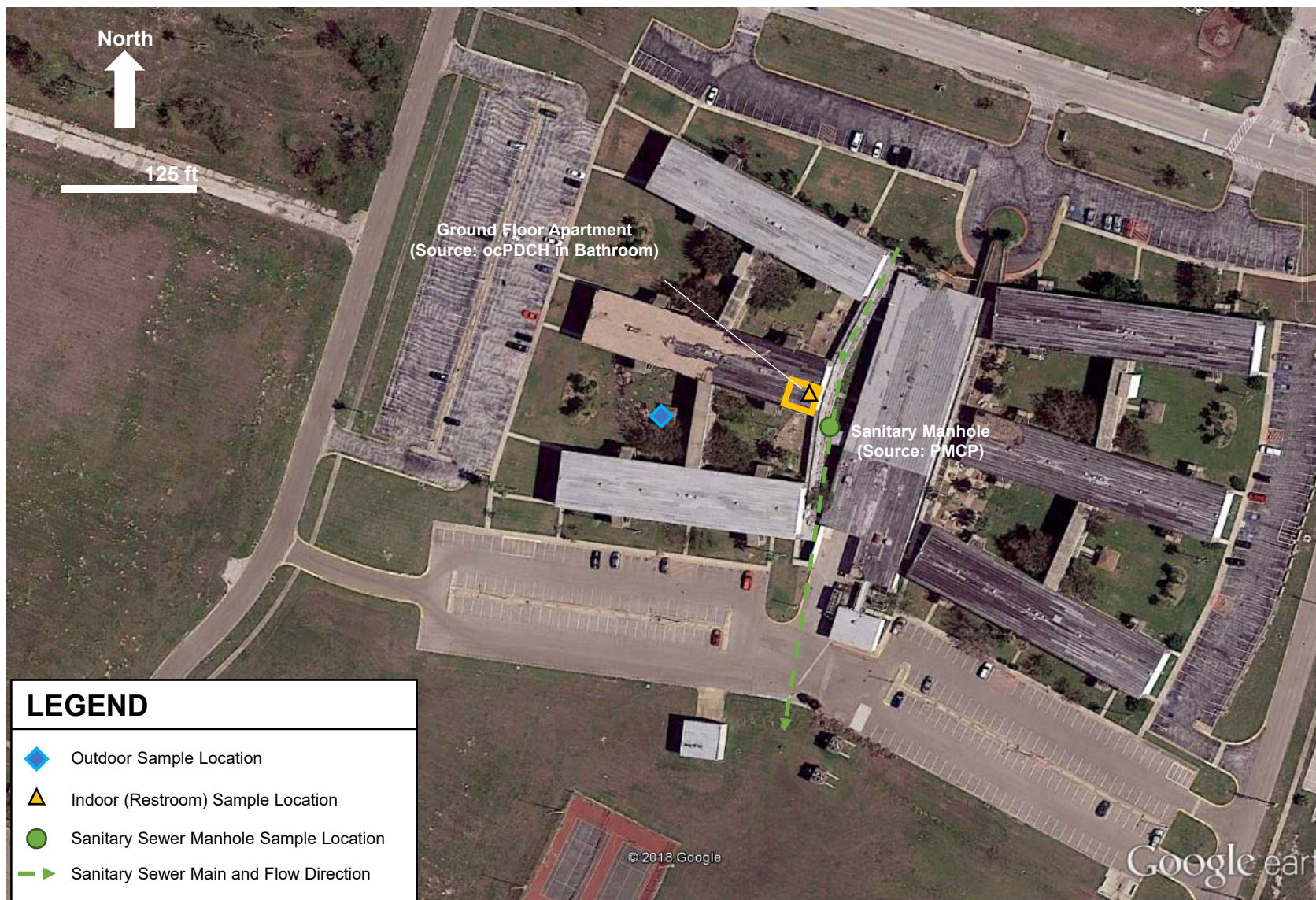
FIGURE C.5
TASK 2 TRACER TEST: SINGLE-FAMILY HOMES
San Rafael, CA
February 2018



Notes:

1. Sample locations are approximate.
2. Sources were placed across the room (or manhole) from samplers. See table for tracer source (e.g., PMCP) definitions.

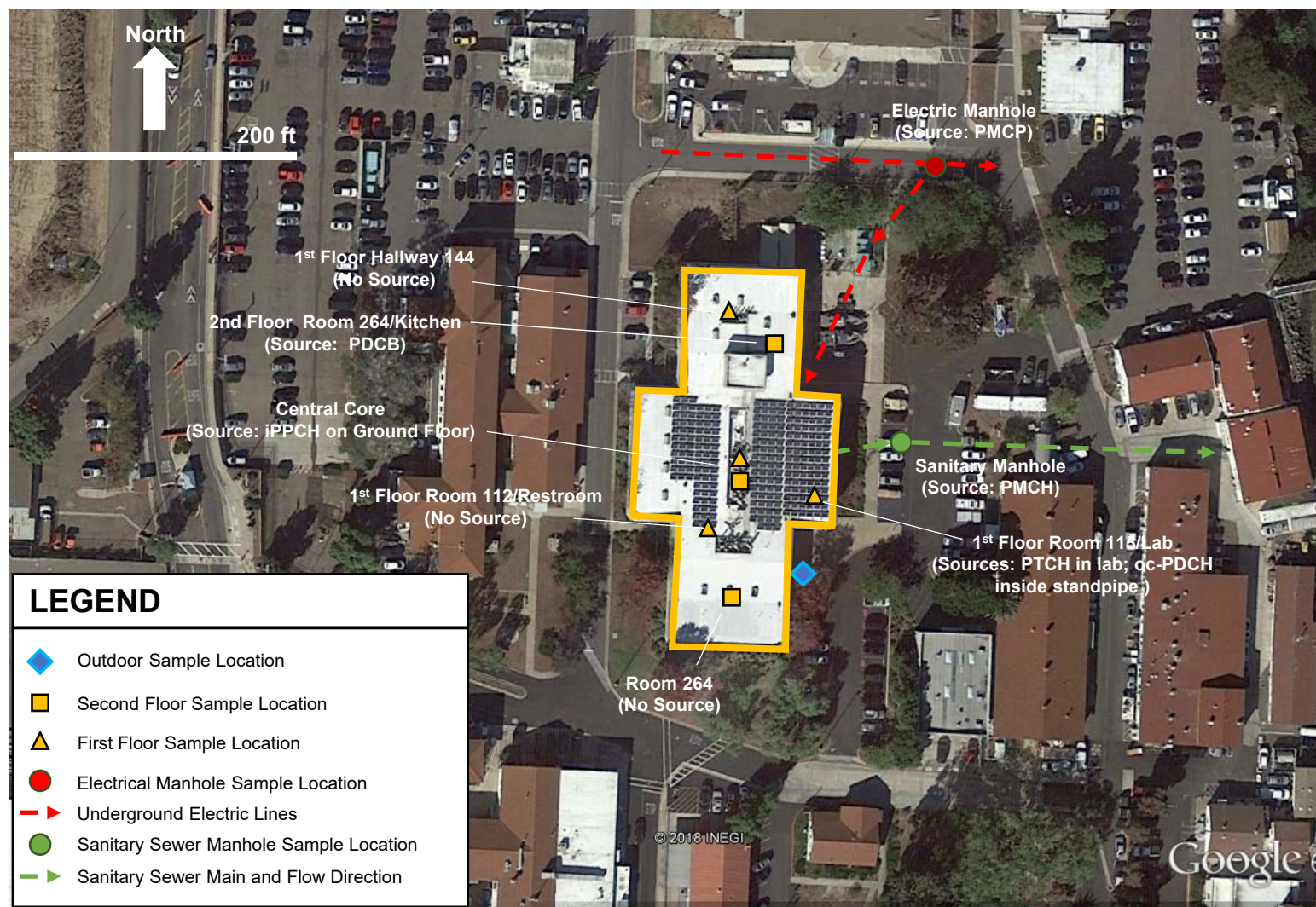
FIGURE C.6
TASK 2 TRACER TEST: APARTMENT BUILDING
NASCC Area 1, Corpus Christi, TX
October 2017



Notes:

1. Sample locations are approximate.
2. Sources were placed across the room (or manhole) from samplers. See table for tracer source (e.g., PMCP) definitions.

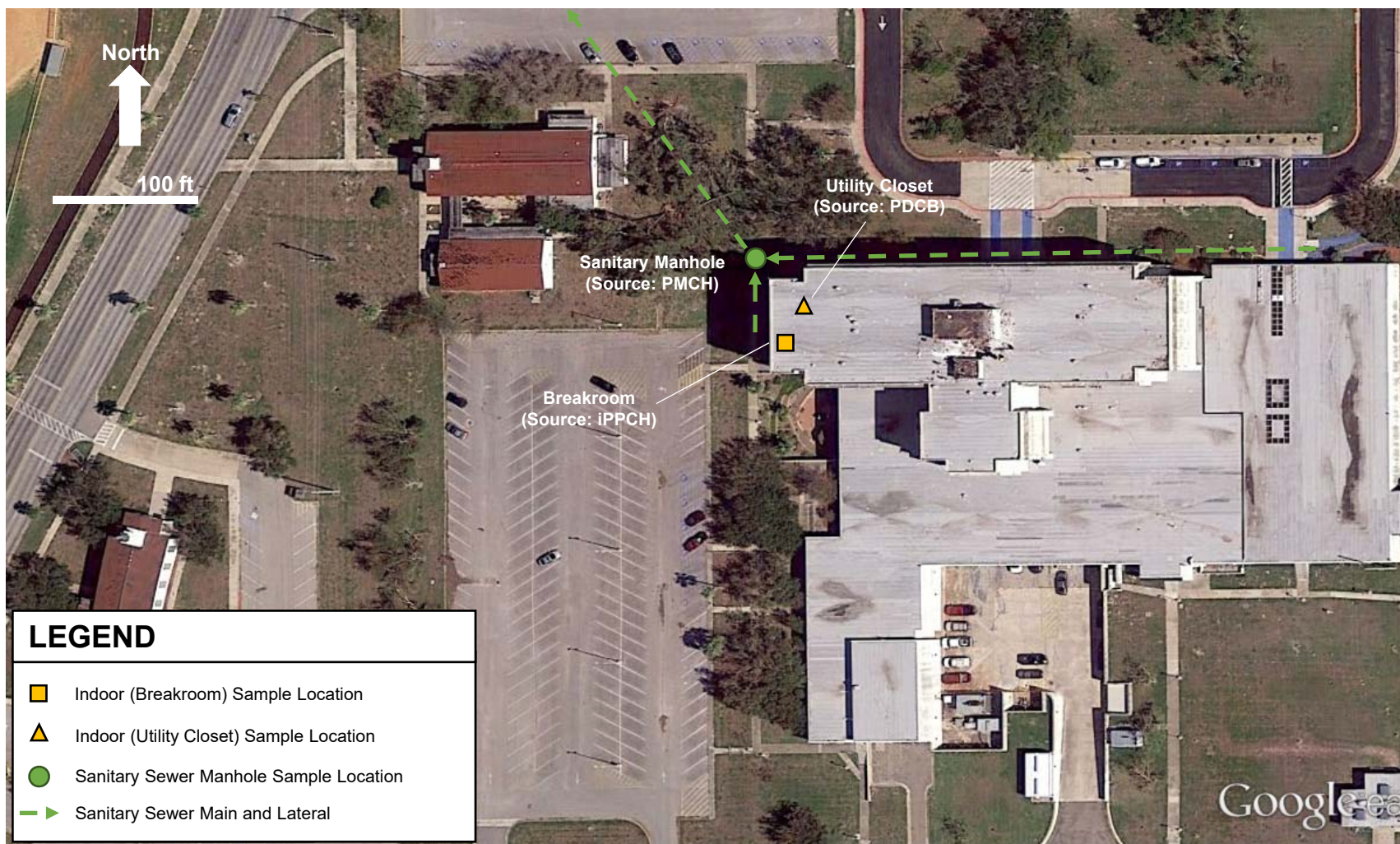
FIGURE C.7
TASK 2 TRACER TEST: OFFICE BUILDING WITH LABORATORY
San Diego, CA
June-July 2017



Notes:

1. Tracer source and sampler locations are approximate. Only the sewer line segments tested are shown.
2. Sources were placed across the room (or manhole) from the samplers. See table for tracer source (e.g., PMCH) definitions.

FIGURE C.8
TASK 2 TRACER TEST: HOSPITAL
NASCC Area 2, Corpus Christi, TX
October 2017



Notes:

1. Sample locations are approximate.
2. Sources were placed across the room (or manhole) from samplers. See table for tracer source (e.g., PDCB) definitions.

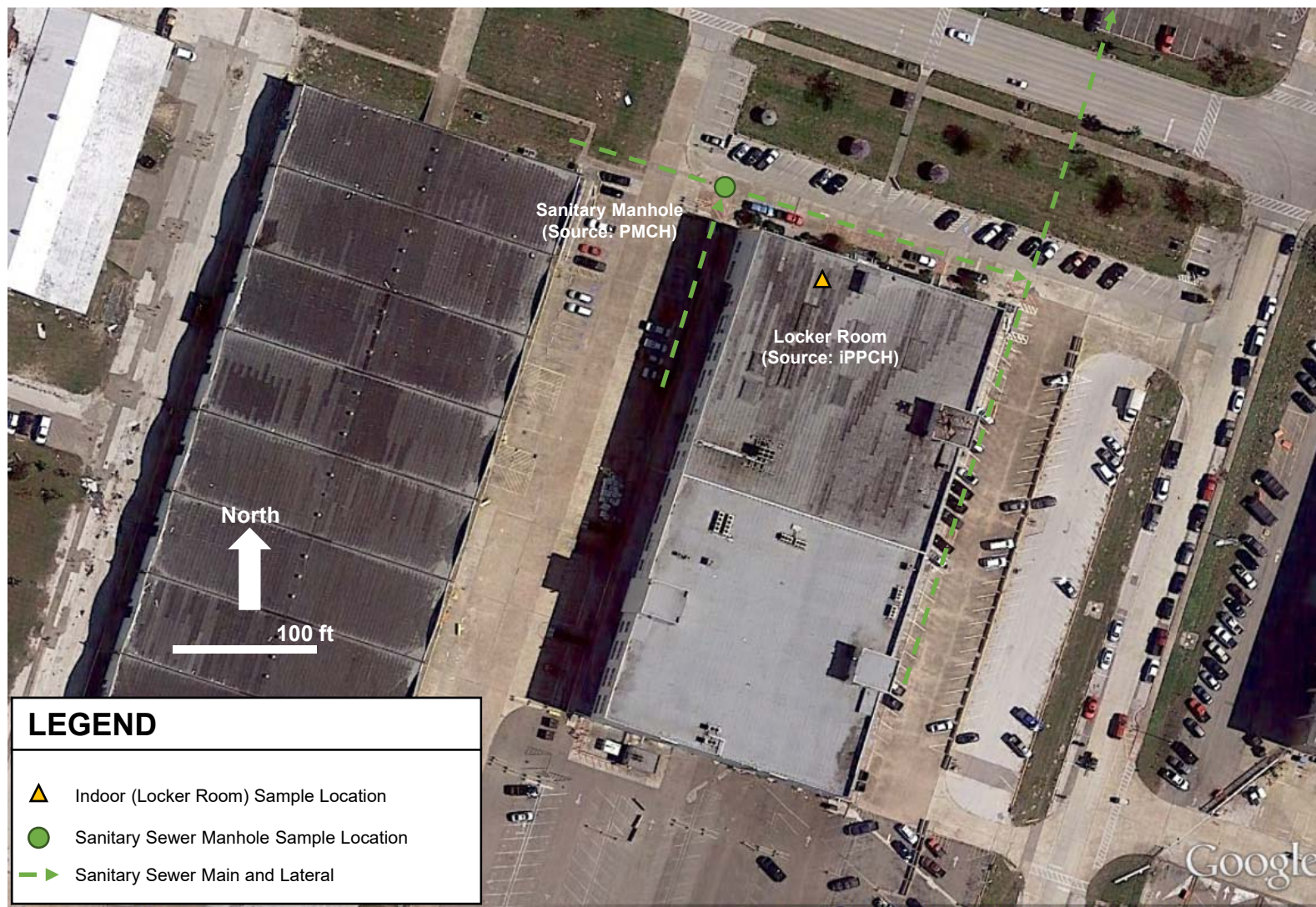
FIGURE C.9
TASK 2 TRACER TEST: OFFICE AND SHOP BUILDINGS
NASCC Area 3, Corpus Christi, TX
October 2017



Notes:

1. Sample locations are approximate.
2. Sources were placed across the room (or manhole) from samplers. See table for tracer source (e.g., PDCB) definitions.

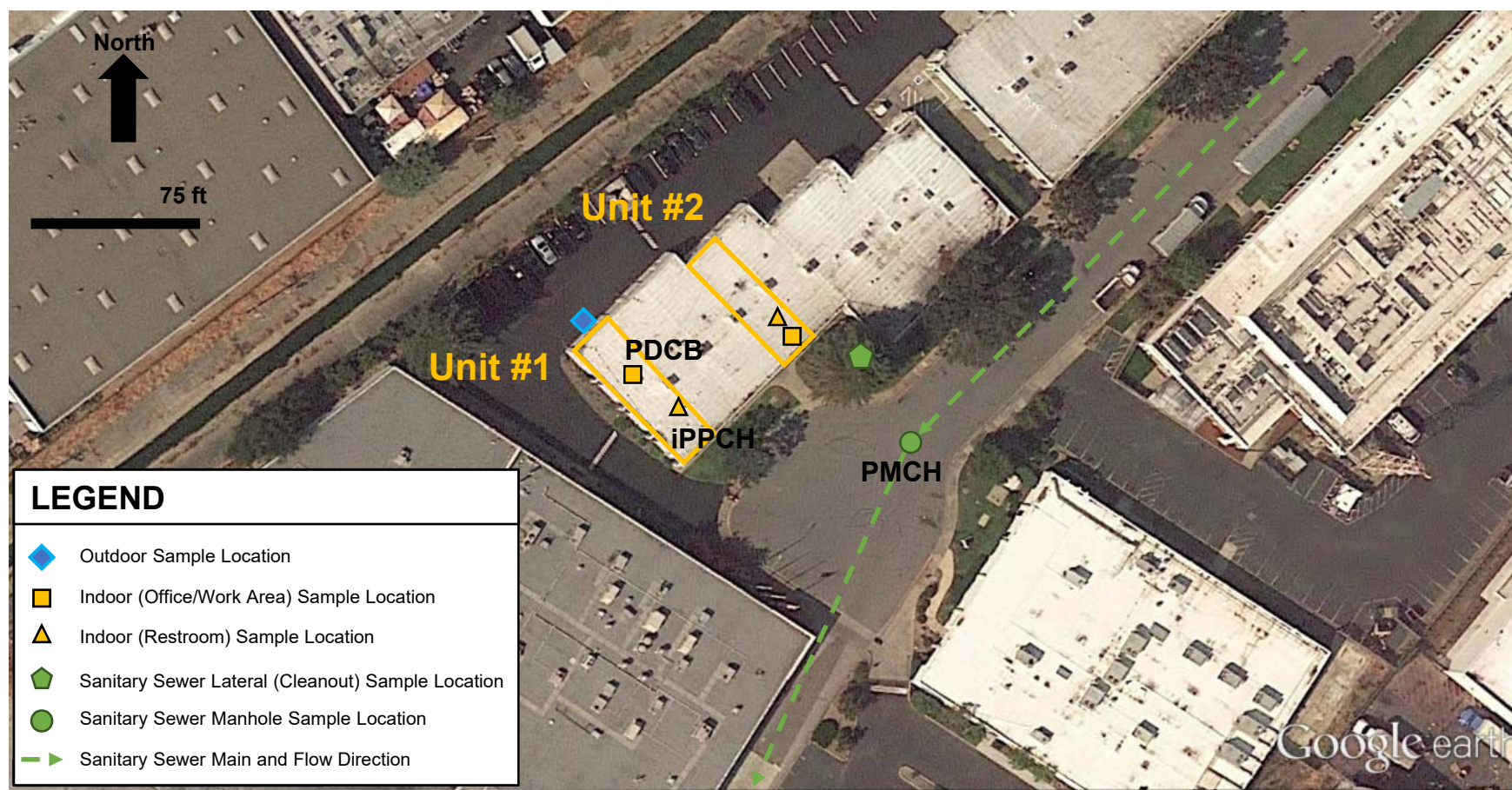
FIGURE C.10
TASK 2 TRACER TEST: OFFICE BUILDING
NASCC Area 4, Corpus Christi, TX
October 2017



Notes:

1. Sample locations are approximate.
2. Sources were placed across the room (or manhole) from samplers. See table for tracer source (e.g., PDCB) definitions.

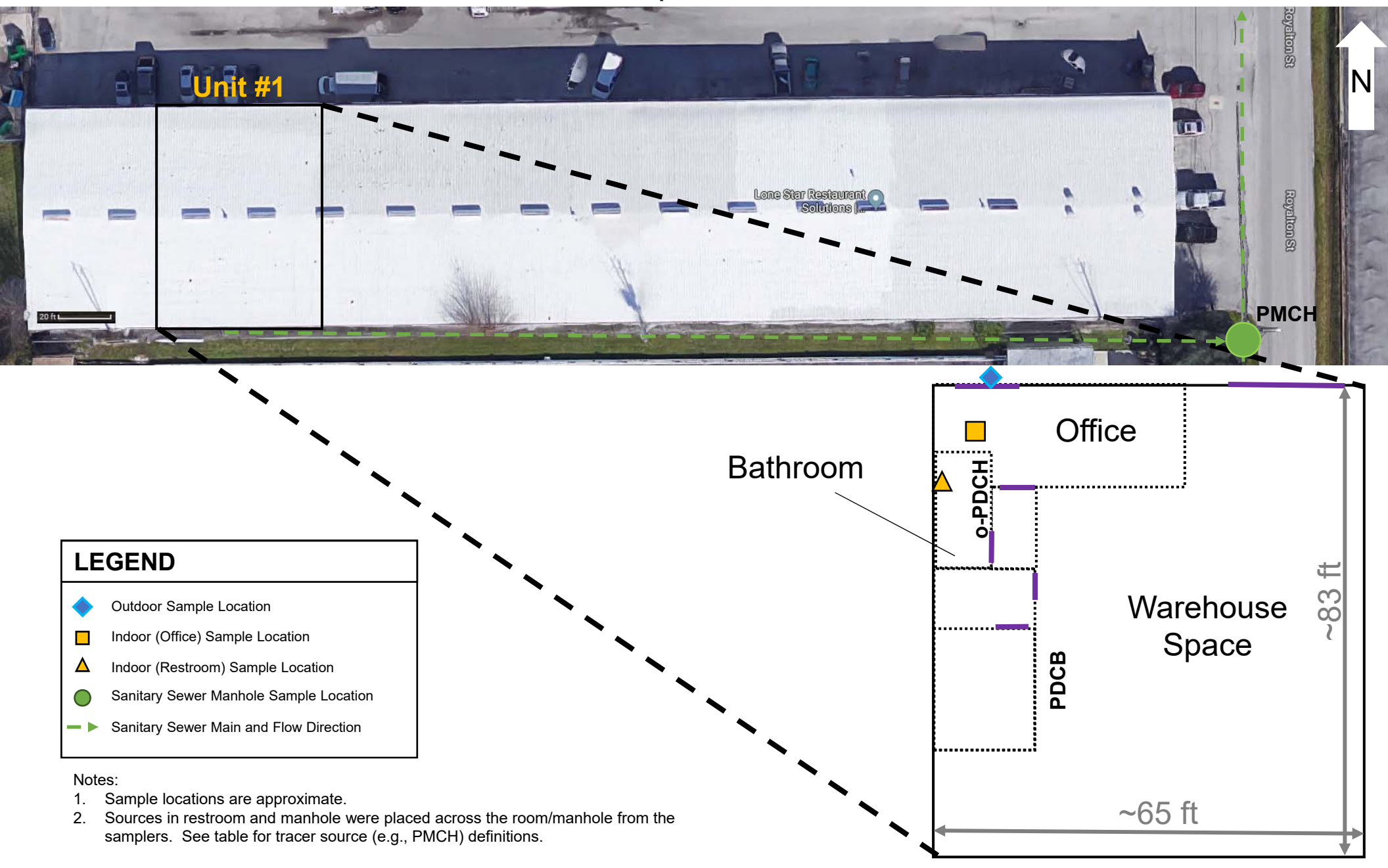
FIGURE C.11
TASK 2 TRACER TEST: OFFICE BUILDING
Burlingame, CA
February 2018



Notes:

1. Sample locations are approximate.
2. Sources were placed across the room (or manhole) from samplers. See table for tracer source (e.g., PMCH) definitions.

FIGURE C.12
TASK 2 TRACER TEST: WAREHOUSE BUILDING
Houston, TX
April 2018



APPENDIX D. TASK 2 DATA QUALITY REVIEW AND LABORATORY REPORTS

CONTENTS

Appendix D1	Task 2 Data Quality Review
Appendix D2	Laboratory Reports – VOC Analysis
Appendix D3	Laboratory Reports – Tracer Studies

Appendix D1: Task 2 Data Quality Review

APPENDIX D1

TASK 2 DATA QUALITY REVIEW

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1.0 INTRODUCTION

This appendix summarizes a data quality review completed for samples collected between March 2017 and April 2018 for Task 2 of ESTCP Project ER-201505. Key areas considered in this assessment included i) sampling and sample handling procedures; ii) precision assessment; iii) accuracy assessment; iv) sensitivity; v) completeness; vi) representativeness, and vii) comparability. This evaluation was done in support of Task 2 Performance Objective 2 (Collection of Representative Analytical Results).

2.0 QUALITY ASSURANCE PROCEDURES

The integrity of the data generated during the field demonstration was maintained by adherence to the following:

- Task 1 Demonstration Protocol (Appendix C of Task 1 Demonstration Plan);
- Task 2 Demonstration Plan (Appendix E of Task 1 Interim Report);
- QAPP for On-Site Measurements (Appendix D of Task 1 Demonstration Plan); and
- QAPP for Off-Site Analysis (Appendix E of Task 1 Demonstration Plan).

The Quality Assurance Project Plans (QAPPs) identified requirements for sampling, detection limits, methods, and field and laboratory performance. Example field procedures used to ensure collection of useable data included:

- **Decontamination Procedures.** All sampling equipment was either i) single-use disposable material or ii) flushed/purged before samples were collected.
- **Sample Containers.** Samples for off-site analysis were collected in batch-certified clean Summa canisters provided by the laboratory.
- **Sample Documentation.** Field documentation was facilitated by pre-printed tables, labels, and log forms that simplified and allowed for precise notation of data collection during sampling events. Photographs were taken for visual documentation of project activities. All samples submitted for laboratory analysis were submitted under chain-of-custody control.

3.0 DATA QUALITY REVIEW

The data review and validation process included examination of field notes and results from quality assurance (QA) samples (e.g., field duplicates and standard laboratory QA samples). During Task 2, two categories of vapor samples were collected: i) samples for analysis of volatile organic compounds (VOCs), and ii) perfluorinated tracer (PFT) samples. This data quality review covers both categories. Copies of associated laboratory reports are provided in Appendix D2 (VOCs) and Appendix D3 (PFTs).

3.1 SAMPLING AND SAMPLE HANDLING PROCEDURES

Samples were collected in accordance with standard operating procedures (SOPs) routinely utilized by GSI or methods validated during previous field programs, as detailed in the project QAPPs. The samples for VOC analysis were shipped to TestAmerica in West Sacramento, California under chain-of-custody control, were received in good condition, and were analyzed within holding times. For the PFT testing, GSI followed SOPs provided by Brookhaven National Laboratory for sample collection and shipping. These samples were also analyzed within holding times.

During the field programs covered by this report, the following deviations from planned procedures occurred:

VOC Samples and Sample Locations

- The Task 2 Demonstration Plan contemplated sampling 32 locations at four “groundwater to sewer” demonstration sites located in Austin and Houston, Texas, and Northern and Southern California. Because of access limitations, the specific mix of sites was modified so that enough data could be collected to meet project objectives. In California, 18 locations were sampled in San Diego and Orange Counties, rather than the originally-planned 20 locations in Southern and Northern California. In Austin, not all the locations originally planned for testing were available because manholes had gotten paved over. Because of these access problems, the Houston field program was expanded. One additional plume location was added, for a total of 10 Houston locations tested.
- For the groundwater to sewer vapor demonstration sites, the Task 2 Demonstration Plan called for sampling vapor from two background manhole locations during each sampling event. During the June 2017 sampling event in San Diego County, two locations were sampled as planned. After completion of the sampling event, however, it was determined that one was too close to the groundwater plume to be considered true background. This manhole (SAN-009B) was, therefore, grouped with the non-background samples for data analysis.
- During collaboration with ESTCP ER-201501, the GSI and ASU teams re-sampled two manholes in Houston in March 2018 (HOU-004 and HOU-006). This was an extra sampling event beyond what was required for the temporal variability aspect of the demonstration. Background and duplicate samples were not collected as this was an abbreviated sampling program. The results were included in the data analysis for this project; data quality review for these results focused on sampling procedures and laboratory QA/QC.

Tracer Studies

- During the San Diego PFT study, one indoor air sample was not analyzed due to GC equipment failure. This equipment failure issue affected both sorbent tubes. Although the sample was lost, it did not adversely affect the study because other indoor air samples were available for use (i.e., results from other indoor air samples were available to calculate sewer to building attenuation factors).

- Brookhaven determined that the tracer sources used for the San Diego demonstration site had impurities. In other words, rather than emitting a single PFT compound, the sources included low concentrations of other PFTs. The final results provided in the laboratory report includes corrections to subtract out the effect of the impurities. A new set of sources was used for subsequent tracer tests, with impurities taken into consideration in Brookhaven's reporting process. Samples with adjusted concentrations are flagged in the Appendix C summary tables.
- During the Burlingame PFT study, the tracer source and samplers installed inside the sanitary manhole were missing when the equipment was retrieved at the end of the sampling period. The tracer source was in place long enough for measurable concentrations to be found in samplers placed in the sewer lateral and indoors in the adjacent building. However, the date and time the manhole source was removed is unknown. The manhole PFT source concentration was, therefore, estimated by using an average of available manhole concentrations for the tracer from other demonstration sites. The estimated PFT concentration in the Burlingame manhole was qualified accordingly.
- Samples were shipped via FedEx to the Brookhaven National Laboratory in Upton, New York for analysis. All samples were received in good condition except for the PFT samplers shipped from the San Rafael demonstration site. This package was damaged during shipment and 5 sorbent tubes were destroyed. These sorbent tubes included the 2 samples from the sanitary manholes (one tube plus a duplicate for each sample) and the duplicate tube from the kitchen/living room (indoor air) sample from House #2. In addition, at House #2 at the San Rafael site, one tracer source (PMCP) placed indoors was inadvertently removed two days into the 8-day test. As a result of these issues, the PFT concentration in the manhole was estimated using the same method used for the Burlingame site. The missing duplicate sorbent tube at House #2 did not have a material impact on the study because the other tube was available for analysis. The missing indoor tracer source (PMCP) also did not have a material impact on the study since a separate source (o-PDCH) had been placed in another room in the building.

3.2 PRECISION ASSESSMENT

The precision assessment evaluates the agreement in analytical results between duplicate samples (i.e., field duplicates and lab duplicates). Precision was evaluated by calculating the relative percent difference (RPD) between paired samples.

VOC Analysis

For the VOC analysis (i.e., analysis of manhole vapor samples), the precision objective for field duplicates was an RPD of less than 30% for at least 90% of laboratory analyses. Six field duplicates were collected for TO-15 analysis over the course of Task 2. To evaluate precision, we paired normal and duplicate results and calculated RPDs when a given chemical was detected in both samples. A total of 62 pairs and RPD values were generated (see Table D1.1). Only 26% of the pairs (16 of 62 values) met the 30% RPD target. Duplicate samples were collected sequentially in a manner intended to limit differences between samples (e.g., manhole vapor samples were collected in a manner to minimize opening manhole covers). Exceedances in the RPD goal were

observed for one of more of the detected VOCs in every field duplicate sample collected. In addition, there was no consistent trend in concentration between the primary and duplicate samples; the higher concentration was observed in the primary sample for 68% of the paired measurements and in the duplicate sample (i.e., the second sample collected) for 32% of the pairs. These results suggest that the sewer vapor matrix is inherently heterogeneous making it difficult to attain the standard QA goal for field duplicates.

Laboratory precision of vapor samples was evaluated by RPD values calculated for the laboratory duplicates (e.g., duplicate analysis of laboratory control samples). All RPD values met the laboratory's criteria of $\leq 25\%$ (see Table D1.2). Duplicate HAPSITE analyses were done for the June 2017 Austin manhole vapor samples. A comparison of the three HAPSITE normal-duplicate sample pairs is provided in Table D1.3. The HAPSITE data matched well, with RPD values less than 20% (note the RPD goal was $<30\%$ for on-site analysis).

Based on a review of data collection methods and field and laboratory duplicate variability, it appears that variability in the sewer vapor matrix is the primary source of the differences between the normal and field duplicate results. For calculations and data interpretation presented in the final project report, the normal result was used.

Tracer Studies

For the tracer studies, samples were collected in duplicate, with two sorbent tubes placed side by side for sample collection. According to the Task 2 demonstration plan, one tube was to be analyzed, with the second tube kept in reserve in case of problems with the first sample. For the first Task 2 demonstration site, only the first tube was analyzed for each sample. Subsequently, Brookhaven opted to analyze both tubes, if available. RPDs were calculated when a given tracer compound was detected in both tubes. 55 of the 74 RPDs (74%) were less than 30%. Since the majority of samples in this dataset were analyzed in duplicate, results were averaged for use in calculations and data interpretation presented in the final project report.

3.3 ACCURACY ASSESSMENT

The laboratory accuracy assessment evaluated the agreement between an observed value and an accepted reference value. For the TO-15 analyses, assessments of accuracy focused on laboratory QA/QC results from method blanks, surrogate spike recovery, and laboratory control samples. No analytes were detected in method blanks analyzed for each batch of demonstration site samples. Surrogate spike recovery and laboratory control sample (spike) recovery were within the lab's acceptance limits for each set of demonstration site samples (see lab reports in Appendix D2). Laboratory surrogate spike recovery acceptance limits were 70-130%. Laboratory control sample recovery acceptance limits varied by analyte and were typically in the range of 60-140%. The HAPSITE accuracy assessment was done by comparing results from blanks. As shown in Table D1.4, the key target analyte for the dry cleaner sites, PCE, was not found in the blank air samples. Continuing calibration verification (CCV) results were not available for the day that the Austin samples were analyzed. Table D1.5 shows results from CCV samples analyzed before and after the Austin sample runs. As shown in the table, the PCE RPD was less than or equal to 35% in both calibration check samples.

Tracer QA measures were evaluated by Brookhaven. During analysis of the San Diego samples, Brookhaven determined that there were trace impurities in the PFT sources. An impurity study was completed, and results adjusted accordingly (see Appendix D3).

3.4 SENSITIVITY

The sensitivity objective for Task 2 was to obtain target VOC reporting limits less than screening levels for sewer vapor (assumed to be $10 \times$ indoor air screening levels). To evaluate this objective, we took the key chemical of concern (COC) for each location (i.e., plume) as the chemical with highest concentrations in groundwater. We then reviewed the manhole vapor results for that chemical. As shown in Table D1.6, the analytical methods were sensitive enough to detect the COC in manhole vapors for 83% (24 of 29) of the plumes. The chemical was not detected at 5 locations. For these locations, however, the detection limit was less than 1 ug/m³ which is less than typical indoor air screening levels.

The sensitivity of the sorbent analysis was typically less than 0.1 pL/L. This was sufficiently sensitive to allow calculations of 1000-fold sewer to building attenuation.

3.5 COMPLETENESS

Completeness is the ratio of the number of valid sample results to the total number of samples planned. The completeness objective for field samples was at least 95%. For the VOC samples, a minimum of 56 samples were planned at the groundwater to sewer demonstration sites. A total of 76 samples were collected (not including QA samples), exceeding the objective.

Tracer testing was conducted at the sewer to indoor air demonstration sites. Sample results were obtained for 92% (48 of 52) of planned sorbent samples. In one case (San Diego), GC equipment failed during analysis of an indoor air sample. In another case (Burlingame), the sample was not recovered at the end of the test period. In two other cases (San Rafael), the samples were destroyed during shipping. Although these samples were lost, the overall objective was met because other samples were available for use in sewer to building attenuation factor calculations (e.g., other indoor air samples were collected in the San Diego building so loss of one sample was not critical; an average of tracer concentrations from other sites was used for the tracer “source” concentrations in Burlingame and San Rafael).

3.6 REPRESENTATIVENESS

Representativeness is a qualitative parameter that expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. As such, representativeness describes whether samples collected are sufficient in number, type, location, frequency, and size to be characteristic of the substance analyzed. Field representativeness objectives were met by generally following project QAPPs and demonstration plans. Representativeness of laboratory data was supported by use of proper analytical and QA procedures, meeting sample holding times, and analyzing QA samples. Data qualifiers were applied as appropriate.

3.7 COMPARABILITY

Comparability is an expression of the confidence with which one data set can be compared to another. Comparability of field and laboratory data was supported through the use of standard sampling procedures and calibration standards.

4.0 SUMMARY

Overall, the Task 2 samples met the qualitative and quantitative performance objectives for the project. Minor data quality exceptions occurred but do not limit the usability of the results because corrective action was taken in the field when problems were noted, or data were qualified as appropriate. The most notable data quality exception was precision in the field duplicates. The results suggest that the sewer vapor matrix is inherently heterogeneous, making it difficult to attain the QA goal.

Summary of Data Quality Evaluation

Success Criteria <i>For >90% of laboratory analyses:</i>	Results
Precision: - RPD < 30% for field duplicate samples - RPD <25% for laboratory duplicate results	Objective <u>not met</u> for field duplicate samples. Objective <u>met</u> for laboratory duplicate results.
Accuracy: Standard laboratory accuracy	Objective <u>met</u>
Sensitivity: Target VOC reporting limit less than screening level	Objective <u>met</u>

Note: Table summarizes objectives specified in Table 3.2 of the final report.

TABLE D1.1
Precision Assessment: Field Duplicate RPD
ESTCP Project ER-201505 Task 2 Data Validation

Demonstration Site	Sample Date	Sample Time	Sample Location	Matrix	Analyte	Normal Sample		Duplicate		RPD (%)
						Laboratory Sample ID	Result (ug/m3)	Laboratory Sample ID	Result (ug/m3)	
Houston Sites	4/27/2017	13:52	HOU-006	U1	Acetone	320-27995-6	3800	320-27995-13	3700	3%
					Butanone, 2- (MEK)	320-27995-6	66	320-27995-13	40 J	49%
					Carbon disulfide	320-27995-6	210	320-27995-13	130	47%
					Chloroform	320-27995-6	500	320-27995-13	230	74%
					Dichloroethene, cis-1,2-	320-27995-6	36	320-27995-13	16 J	77%
					Methylene Chloride	320-27995-6	44	320-27995-13	27 J	48%
Houston Sites	7/27/2017	9:42	HOU-007B	U1	Toluene	320-27995-6	2100	320-27995-13	930	77%
					Acetone	320-30325-10	52 *	320-30325-18	93	-57%
					Bromodichloromethane	320-30325-10	20	320-30325-18	33	-49%
					Carbon disulfide	320-30325-10	15 *	320-30325-18	56	-115%
					Chloroform	320-30325-10	59 *	320-30325-18	110	-60%
					Dibromochloromethane	320-30325-10	5.2 J	320-30325-18	7.9 J	-41%
					Dichloroethene, cis-1,2-	320-30325-10	370 *	320-30325-18	820	-76%
					Dichloroethene, trans-1,2-	320-30325-10	4.5 *	320-30325-18	13	-97%
					Methylene Chloride	320-30325-10	4.2 *	320-30325-18	7.4 J	-55%
					Tetrachloroethene	320-30325-10	39	320-30325-18	140	-113%
					Toluene	320-30325-10	15	320-30325-18	13	14%
					Trichloroethene	320-30325-10	23	320-30325-18	42	-58%
Houston Sites	1/11/2018	8:15	HOU-001	U1	Vinyl chloride	320-30325-10	19 *	320-30325-18	71	-116%
					Acetone	320-35129-10	31 J	320-35129-18	25 J	21%
					Benzene	320-35129-10	4.9 J	320-35129-18	4.7 J	4%
					Bromodichloromethane	320-35129-10	77	320-35129-18	79	-3%
					Carbon disulfide	320-35129-10	280	320-35129-18	250	11%
					Chloroethane	320-35129-10	16 J	320-35129-18	17 J	-6%
					Chloroform	320-35129-10	1400	320-35129-18	1400	0%
					Chloromethane	320-35129-10	5 J	320-35129-18	4.7 J	6%
					Dibromochloromethane	320-35129-10	11 J	320-35129-18	12 J	-9%
					Dichloroethene, 1,1-	320-35129-10	7.9 J	320-35129-18	8.1 J	-2%
					Dichloroethene, cis-1,2-	320-35129-10	4.4 J	320-35129-18	3.1 J	35%
					Methylene Chloride	320-35129-10	43	320-35129-18	55	-24%
					Tetrachloroethene	320-35129-10	28 J	320-35129-18	12 J	80%
					Toluene	320-35129-10	1200	320-35129-18	1200	0%

TABLE D1.1
Precision Assessment: Field Duplicate RPD
ESTCP Project ER-201505 Task 2 Data Validation

Demonstration	Sample	Sample	Sample Location	Matrix	Analyte	Normal Sample		Duplicate		RPD (%)
Task 2 Orange County Sites	6/28/2017	9:32	SNA-002	U1	Acetone	320-29669-14	44	320-29669-26	19	79%
					Benzene	320-29669-14	0.56 J	320-29669-26	0.7 J	-22%
					Butanone, 2- (MEK)	320-29669-14	11	320-29669-26	3.9	95%
					Carbon disulfide	320-29669-14	18	320-29669-26	32	-56%
					Chloroform	320-29669-14	29	320-29669-26	3.7	155%
					Chloromethane	320-29669-14	2.3	320-29669-26	1.2 J	63%
					Dichlorodifluoromethane	320-29669-14	2.5	320-29669-26	1.3 J	63%
					Methylene Chloride	320-29669-14	1.6	320-29669-26	1.1 J	37%
					Tetrachloroethene	320-29669-14	3.4	320-29669-26	0.65 J	136%
					Toluene	320-29669-14	2.1	320-29669-26	0.74 J	96%
Task 2 Orange County Sites	6/28/2017	14:34	SNA Residential Bkg	U1	Acetone	320-29669-24	43	320-29669-25	7.4 J	141%
					Benzene	320-29669-24	0.87 J	320-29669-25	2.4	-94%
					Butanone, 2- (MEK)	320-29669-24	5.6	320-29669-25	0.81 J	149%
					Carbon disulfide	320-29669-24	230	320-29669-25	19	169%
					Chloromethane	320-29669-24	1.4 J	320-29669-25	0.99 J	34%
					Dichlorodifluoromethane	320-29669-24	2.3	320-29669-25	1.2 J	63%
					Ethylbenzene	320-29669-24	0.64 J	320-29669-25	0.31 J	69%
					Methylene Chloride	320-29669-24	0.7 J	320-29669-25	0.43 J	48%
					Toluene	320-29669-24	0.95 J	320-29669-25	0.94 J	1%
					Xylene, m,p-	320-29669-24	2.1 J	320-29669-25	0.93 J	77%
					Xylene, o-	320-29669-24	0.57 J	320-29669-25	0.33 J	53%
Task 2 San Diego Sites	6/27/2017	11:04	SAN-003	U1	Acetone	320-29669-3	15 J	320-29669-12	12 J	22%
					Carbon disulfide	320-29669-3	5.9 J	320-29669-12	23	-118%
					Chloroform	320-29669-3	5.5 J	320-29669-12	1.2 J	128%
					Dichlorodifluoromethane	320-29669-3	38	320-29669-12	1.9 J	181%
					Dichloroethane, 1,1-	320-29669-3	4.4 J	320-29669-12	0.67 J	147%
					Methylene Chloride	320-29669-3	7.9 J	320-29669-12	0.68 J	168%
					Tetrachloroethene	320-29669-3	2300	320-29669-12	470	132%
					Trichloro-1,2,2-trifluoroethane, 1,1,2-	320-29669-3	440	320-29669-12	100	126%
					Trichloroethene	320-29669-3	570	320-29669-12	130	126%

- Notes:
1. Relative percent difference (RPD) calculated as the normal minus the duplicate result, divided by the average of the 2 values. The data quality objective was an absolute value of the RPD < 30%, for 90% of analyses.
 2. The RPD was calculated if the analyte was detected in both the normal and duplicate samples.
 3. Data qualifiers:
 J estimated result between the detection limit and reporting limit; * = Internal standard response or retention time outside acceptable limits
 4. Matrix: U1 = Sanitary Sewer

TABLE D1.2
Precision Assessment: Laboratory Duplicate RPD
ESTCP Project ER-201505 Task 2 Data Validation

Analyte	Normal Sample		Duplicate		RPD (%)
	Laboratory Sample ID	Result (ug/m3)	Laboratory Sample ID	Result (ug/m3)	
Tetrachloroethene	LCS 320-164489/4	146	LCSD 320-164489/5	145	1%
Tetrachloroethene	LCS 320-164530/3	126	LCSD 320-164530/4	126	0%
Tetrachloroethene	LCS 320-174951/4	119	LCSD 320-174951/5	122	-2%
Tetrachloroethene	LCS 320-174974/3	119	LCSD 320-174974/4	118	1%
Tetrachloroethene	LCS 320-178844/3	114	LCSD 320-178844/4	117	-3%
Tetrachloroethene	LCS 320-179415/3	115	LCSD 320-179415/3	120	-4%
Tetrachloroethene	LCS 320-205880/3	128	LCSD 320-205880/4	126	2%
Tetrachloroethene	LCS 320-206093/3	123	LCSD 320-206093/4	123	0%
Tetrachloroethene	LCS 320-206344/3	126	LCSD 320-206344/4	122	3%

Notes:

1. Relative percent difference (RPD) calculated as the normal minus the duplicate result, divided by the average of the 2 values. The data quality objective is an absolute value of the RPD < 25%, for 90% of analyses.
2. The RPD was evaluated for the key target analyte (PCE), and was calculated if the analyte was detected in both the normal and duplicate samples.
3. Matrix: Air

TABLE D1.3
HAPSITE Precision Assessment: Duplicate RPD
ESTCP Project ER-201505 Task 2 Data Validation

Dem. Site	Sample Date	Sample Time	Sample Location	Matrix	Analyte	Normal Sample		Duplicate Sample		RPD (%)
						HAPSITE Run No.	Result (ug/m3)	HAPSITE Run No.	Result (ug/m3)	
Austin	6/21/2017	13:15	AUS Commercial Background	U1	Tetrachloroethene	SIM_LO_CVOC_10_2017 0621_008.hps	33 J	SIM_LO_CVOC_10_2017 0621_011.hps	27 J	20%
Austin	6/21/2017	9:45	AUS-001A	U1	Tetrachloroethene	SIM_LO_CVOC_10_2017 0621_001.hps	UJ	SIM_LO_CVOC_10_2017 0621_003.hps	UJ	-
Austin	6/21/2017	10:51	AUS-004	U1	Tetrachloroethene	SIM_LO_CVOC_10_2017 0621_007.hps	1878 JE	SIM_LO_CVOC_10_2017 0621_009.hps	1898 JE	-1%

- Notes:
1. Relative percent difference (RPD) calculated as the normal minus the duplicate result, divided by the average of the 2 values. The data quality objective was an absolute value of the RPD < 30% for 90% of analyses.
 2. The RPD was evaluated for the key target analyte (PCE), and was calculated if the analyte was detected in both the normal and duplicate samples.
 3. Data qualifiers:
 J result less than the lower calibration limit
 JE estimated; instrument detector likely saturated
 UJ not detected
 4. Matrix: U1 = Sanitary Sewer

TABLE D1.4
HAPSITE Accuracy Assessment: Method Blanks
ESTCP Project ER-201505 Task 2 Data Validation

Dem. Site	Analysis Date	Analysis Time	HAPSITE Run No.	Matrix	Analyte	Result (ppbV)
Austin	6/21/2017	14:15	SIM_LO_CVOC_10_20170621_002.hps	AI	Tetrachloroethene	U
Austin	6/21/2017	15:39	SIM_LO_CVOC_10_20170621_010.hps	AI	Tetrachloroethene	U
Austin	6/21/2017	16:06	SIM_LO_CVOC_10_20170621_012.hps	AI	Tetrachloroethene	U

Notes:

1. The Austin Task 2 samples were collected and analyzed using a HAPSITE SmartPlus (H0008) on 21 June 2017.
2. Blanks were evaluated for the key target analyte (PCE).
3. Data qualifiers:
 - J result less than the lower calibration limit
 - U not detected
4. Matrix: AI = Indoor Air

TABLE D1.5
HAPSITE Accuracy Assessment: Continuing Calibration Verification
ESTCP Project ER-201505 Task 2 Data Validation

Dem. Site	Analysis Date	Expected Concentration (ppbV)	Analyte	Result (ppbV)	RPD (%)
Austin	6/8/2017	1 ppbV	Tetrachloroethene	1.4	33%
Austin	10/22/2017	1 ppbV	Tetrachloroethene	0.7	35%

Notes:

1. The Austin Task 2 samples were collected and analyzed using the HAPSITE on 21 June 2017. The table shows calibration check samples analyzed using the same analytical method and calibration curve used for the 21 June samples.
2. Relative percent difference (RPD) calculated as the absolute value of the measured minus the expected result, divided by the average of the 2 values. The data quality objective is an absolute value of the RPD < 90%.
3. CCVs evaluated for key target analyte (PCE).

TABLE D1.6
Sensitivity Assessment
ESTCP Project ER-201505 Task 2 Data Validation

Location	Primary Chemical of Concern	Manhole Vapor Results (ug/m3)	Sensitivity Assessment
AUS-001	Tetrachloroethene	ND	COC not detected in any sample; HAPSITE sensitivity <1 ug/m3
AUS-004	Tetrachloroethene	1878	COC detected; HAPSITE sensitivity <1 ug/m3
HOU-001	Tetrachloroethene	4 - 28	Key COC detected
HOU-002	Dichloroethene, cis-1,2-	<0.35	Detection limit less than screening level
HOU-003	Tetrachloroethene	4.7 - 1500	Key COC detected
HOU-004	Tetrachloroethene	9.8 - 280	Key COC detected
HOU-005	Dichloroethene, cis-1,2-	6.3 - 83	Key COC detected
HOU-006	Dichloroethene, cis-1,2-	16 - 110	Key COC detected
HOU-007	Trimethylbenzene, 1,2,4-	0.83 - 6.3	Key COC detected
HOU-008	Dichloroethene, cis-1,2-	1.4 - 58	Key COC detected
HOU-009	Tetrachloroethene	0.47 - 5.4	Key COC detected
HOU-010	Tetrachloroethene	5 - 12000	Key COC detected
SAN-002	Benzene	0.7	Key COC detected
SAN-003	Tetrachloroethene	470 - 2300	Key COC detected
SAN-004	Tetrachloroethene	310	Key COC detected
SAN-005	Butanone, 2- (MEK)	9.3	Key COC detected
SAN-006	Trichloroethene	10	Key COC detected
SAN-007	Tetrachloroethene	2	Key COC detected
SAN-008	Trichloroethene	9	Key COC detected
SAN-009	Dichloroethene, cis-1,2-	3.7	Key COC detected
SNA-001	Trichloroethene	0.61	Key COC detected
SNA-002	Tetrachloroethene	0.65 - 3.4	Key COC detected
SNA-003	Trichloroethene	13	Key COC detected
SNA-004	Dichloroethene, 1,1-	590	Key COC detected
SNA-005	Trichloroethene	25	Key COC detected
SNA-006	Trichloroethene	260 - 630	Key COC detected
SNA-007	Tetrachloroethene	<0.35	Detection limit less than screening level
SNA-008	Dichloroethene, cis-1,2-	<0.35	Detection limit less than screening level
SNA-009	Dichloroethene, cis-1,2-	<0.35	Detection limit less than screening level

Notes:

1. Primary Chemical of Concern (COC) corresponds to the highest-concentration contaminant at each location.
2. AUS-002 and AUS-003 were sampled during Task 1.

Appendix D2: Laboratory Reports – VOC Analysis

CONTENTS

April 2017 Sampling Event: Houston

June 2017 Sampling Event: San Diego and Orange Counties

July 2017 Sampling Event: Houston

January 2018 Sampling Event: Houston

March 2018 Sampling Event: Houston

Note: Laboratory reports for Task 1 demonstration and supplemental sites were provided in the Interim Report (McHugh, 2017).

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

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West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-27995-1

Client Project/Site: ESTCP Vapor Intrusion Research

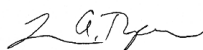
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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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

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Definitions/Glossary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

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

Case Narrative

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Job ID: 320-27995-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-27995-1

Comments

No additional comments.

Receipt

The samples were received on 5/4/2017 9:35 AM; the samples arrived in good condition.

Air - GC/MS VOA

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

VOA Prep

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

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-01

Lab Sample ID: 320-27995-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	41		33	1.2	ppb v/v	6.54		TO-15	Total/NA
Benzene	0.99	J	2.6	0.52	ppb v/v	6.54		TO-15	Total/NA
Bromodichloromethane	23		2.0	0.43	ppb v/v	6.54		TO-15	Total/NA
Carbon disulfide	6.3		5.2	0.51	ppb v/v	6.54		TO-15	Total/NA
Dibromochloromethane	3.9		2.6	0.52	ppb v/v	6.54		TO-15	Total/NA
Chloroform	240		2.0	0.62	ppb v/v	6.54		TO-15	Total/NA
Chloromethane	2.8	J	5.2	1.3	ppb v/v	6.54		TO-15	Total/NA
1,4-Dichlorobenzene	2.3	J	2.6	0.97	ppb v/v	6.54		TO-15	Total/NA
cis-1,2-Dichloroethene	11		2.6	0.58	ppb v/v	6.54		TO-15	Total/NA
Ethylbenzene	1.7	J	2.6	0.41	ppb v/v	6.54		TO-15	Total/NA
Methylene Chloride	3.5		2.6	0.47	ppb v/v	6.54		TO-15	Total/NA
Tetrachloroethene	1.9	J	2.6	0.33	ppb v/v	6.54		TO-15	Total/NA
Toluene	13		2.6	0.33	ppb v/v	6.54		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.6	J	5.2	1.1	ppb v/v	6.54		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.91	J	2.6	0.82	ppb v/v	6.54		TO-15	Total/NA
Vinyl chloride	3.0		2.6	0.78	ppb v/v	6.54		TO-15	Total/NA
m,p-Xylene	6.7		5.2	0.65	ppb v/v	6.54		TO-15	Total/NA
o-Xylene	3.5		2.6	0.35	ppb v/v	6.54		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	97		78	2.8	ug/m3	6.54		TO-15	Total/NA
Benzene	3.2	J	8.4	1.7	ug/m3	6.54		TO-15	Total/NA
Bromodichloromethane	150		13	2.9	ug/m3	6.54		TO-15	Total/NA
Carbon disulfide	20		16	1.6	ug/m3	6.54		TO-15	Total/NA
Dibromochloromethane	33		22	4.4	ug/m3	6.54		TO-15	Total/NA
Chloroform	1200		9.6	3.0	ug/m3	6.54		TO-15	Total/NA
Chloromethane	5.7	J	11	2.7	ug/m3	6.54		TO-15	Total/NA
1,4-Dichlorobenzene	14	J	16	5.9	ug/m3	6.54		TO-15	Total/NA
cis-1,2-Dichloroethene	45		10	2.3	ug/m3	6.54		TO-15	Total/NA
Ethylbenzene	7.2	J	11	1.8	ug/m3	6.54		TO-15	Total/NA
Methylene Chloride	12		9.1	1.6	ug/m3	6.54		TO-15	Total/NA
Tetrachloroethene	13	J	18	2.3	ug/m3	6.54		TO-15	Total/NA
Toluene	51		9.9	1.3	ug/m3	6.54		TO-15	Total/NA
1,2,4-Trimethylbenzene	7.9	J	26	5.2	ug/m3	6.54		TO-15	Total/NA
1,3,5-Trimethylbenzene	4.5	J	13	4.0	ug/m3	6.54		TO-15	Total/NA
Vinyl chloride	7.7		6.7	2.0	ug/m3	6.54		TO-15	Total/NA
m,p-Xylene	29		23	2.8	ug/m3	6.54		TO-15	Total/NA
o-Xylene	15		11	1.5	ug/m3	6.54		TO-15	Total/NA

Client Sample ID: HOU-02

Lab Sample ID: 320-27995-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	16		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.61		0.40	0.079	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.2		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	7.9		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Chloroform	0.38		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.89		0.80	0.20	ppb v/v	1		TO-15	Total/NA
1,4-Dichlorobenzene	0.18	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.29	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.12	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-02 (Continued)

Lab Sample ID: 320-27995-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Hexanone	0.13	J	0.40	0.087	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.21	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.28	J	0.40	0.14	ppb v/v	1		TO-15	Total/NA
Styrene	0.068	J	0.40	0.059	ppb v/v	1		TO-15	Total/NA
Toluene	1.1		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.24	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.17	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.38	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.16	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	38		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	1.9		1.3	0.25	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	3.6		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	25		2.5	0.24	ug/m3	1		TO-15	Total/NA
Chloroform	1.8		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.8		1.7	0.41	ug/m3	1		TO-15	Total/NA
1,4-Dichlorobenzene	1.1	J	2.4	0.90	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.4	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.52	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
2-Hexanone	0.54	J	1.6	0.36	ug/m3	1		TO-15	Total/NA
Methylene Chloride	0.71	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	1.1	J	1.6	0.55	ug/m3	1		TO-15	Total/NA
Styrene	0.29	J	1.7	0.25	ug/m3	1		TO-15	Total/NA
Toluene	4.2		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.84	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.6	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.67	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-03

Lab Sample ID: 320-27995-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	21		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.37	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	1.4		0.30	0.066	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.90		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	0.89		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.088	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.38	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	7.7		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.85		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.23	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	4.1		0.40	0.089	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.090	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	32		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Styrene	0.064	J	0.40	0.059	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	28		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	1.2		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	2.6		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.25	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-03 (Continued)

Lab Sample ID: 320-27995-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
m,p-Xylene	0.22	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.10	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	50		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	1.2	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	9.6		2.0	0.44	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	2.7		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	2.8		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.56	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	3.2	J	3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	38		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.8		1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.1	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	16		1.6	0.35	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.39	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	110		1.4	0.25	ug/m3	1		TO-15	Total/NA
Styrene	0.27	J	1.7	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	190		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	4.6		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	14		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
m,p-Xylene	0.97	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.45	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-04

Lab Sample ID: 320-27995-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	17		5.2	0.18	ppb v/v	1.03		TO-15	Total/NA
Bromodichloromethane	0.53		0.31	0.068	ppb v/v	1.03		TO-15	Total/NA
2-Butanone (MEK)	1.6		0.82	0.20	ppb v/v	1.03		TO-15	Total/NA
Carbon disulfide	8.1		0.82	0.080	ppb v/v	1.03		TO-15	Total/NA
Chloroform	16		0.31	0.098	ppb v/v	1.03		TO-15	Total/NA
Chloromethane	0.52	J	0.82	0.20	ppb v/v	1.03		TO-15	Total/NA
1,4-Dichlorobenzene	0.15	J	0.41	0.15	ppb v/v	1.03		TO-15	Total/NA
Dichlorodifluoromethane	0.20	J	0.41	0.15	ppb v/v	1.03		TO-15	Total/NA
Ethylbenzene	0.20	J	0.41	0.065	ppb v/v	1.03		TO-15	Total/NA
Methylene Chloride	0.47		0.41	0.074	ppb v/v	1.03		TO-15	Total/NA
Tetrachloroethene	1.9		0.41	0.053	ppb v/v	1.03		TO-15	Total/NA
Toluene	15		0.41	0.053	ppb v/v	1.03		TO-15	Total/NA
Trichloroethene	0.13	J	0.41	0.11	ppb v/v	1.03		TO-15	Total/NA
Trichlorofluoromethane	0.24	J	0.41	0.20	ppb v/v	1.03		TO-15	Total/NA
m,p-Xylene	0.20	J	0.82	0.10	ppb v/v	1.03		TO-15	Total/NA
o-Xylene	0.077	J	0.41	0.056	ppb v/v	1.03		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	40		12	0.44	ug/m3	1.03		TO-15	Total/NA
Bromodichloromethane	3.6		2.1	0.46	ug/m3	1.03		TO-15	Total/NA
2-Butanone (MEK)	4.7		2.4	0.60	ug/m3	1.03		TO-15	Total/NA
Carbon disulfide	25		2.6	0.25	ug/m3	1.03		TO-15	Total/NA
Chloroform	79		1.5	0.48	ug/m3	1.03		TO-15	Total/NA
Chloromethane	1.1	J	1.7	0.42	ug/m3	1.03		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-04 (Continued)

Lab Sample ID: 320-27995-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dichlorobenzene	0.87	J	2.5	0.92	ug/m3	1.03		TO-15	Total/NA
Dichlorodifluoromethane	1.0	J	2.0	0.74	ug/m3	1.03		TO-15	Total/NA
Ethylbenzene	0.86	J	1.8	0.28	ug/m3	1.03		TO-15	Total/NA
Methylene Chloride	1.6		1.4	0.26	ug/m3	1.03		TO-15	Total/NA
Tetrachloroethene	13		2.8	0.36	ug/m3	1.03		TO-15	Total/NA
Toluene	57		1.6	0.20	ug/m3	1.03		TO-15	Total/NA
Trichloroethene	0.69	J	2.2	0.58	ug/m3	1.03		TO-15	Total/NA
Trichlorofluoromethane	1.3	J	2.3	1.1	ug/m3	1.03		TO-15	Total/NA
m,p-Xylene	0.85	J	3.6	0.45	ug/m3	1.03		TO-15	Total/NA
o-Xylene	0.34	J	1.8	0.24	ug/m3	1.03		TO-15	Total/NA

Client Sample ID: HOU-05

Lab Sample ID: 320-27995-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	220		110	4.1	ppb v/v	22.8		TO-15	Total/NA
Bromodichloromethane	8.9		6.8	1.5	ppb v/v	22.8		TO-15	Total/NA
2-Butanone (MEK)	8.5	J	18	4.5	ppb v/v	22.8		TO-15	Total/NA
Carbon disulfide	24		18	1.8	ppb v/v	22.8		TO-15	Total/NA
Chloroform	160		6.8	2.2	ppb v/v	22.8		TO-15	Total/NA
Chloromethane	7.6	J	18	4.5	ppb v/v	22.8		TO-15	Total/NA
cis-1,2-Dichloroethene	8.9	J	9.1	2.0	ppb v/v	22.8		TO-15	Total/NA
Ethylbenzene	1.7	J	9.1	1.4	ppb v/v	22.8		TO-15	Total/NA
Methylene Chloride	11		9.1	1.6	ppb v/v	22.8		TO-15	Total/NA
Toluene	880		9.1	1.2	ppb v/v	22.8		TO-15	Total/NA
Trichloroethene	4.2	J	9.1	2.4	ppb v/v	22.8		TO-15	Total/NA
1,2,4-Trimethylbenzene	6.3	J	18	3.7	ppb v/v	22.8		TO-15	Total/NA
1,3,5-Trimethylbenzene	3.5	J	9.1	2.9	ppb v/v	22.8		TO-15	Total/NA
m,p-Xylene	7.3	J	18	2.3	ppb v/v	22.8		TO-15	Total/NA
o-Xylene	3.0	J	9.1	1.2	ppb v/v	22.8		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	510		270	9.6	ug/m3	22.8		TO-15	Total/NA
Bromodichloromethane	60		46	10	ug/m3	22.8		TO-15	Total/NA
2-Butanone (MEK)	25	J	54	13	ug/m3	22.8		TO-15	Total/NA
Carbon disulfide	74		57	5.5	ug/m3	22.8		TO-15	Total/NA
Chloroform	760		33	11	ug/m3	22.8		TO-15	Total/NA
Chloromethane	16	J	38	9.3	ug/m3	22.8		TO-15	Total/NA
cis-1,2-Dichloroethene	35	J	36	8.0	ug/m3	22.8		TO-15	Total/NA
Ethylbenzene	7.5	J	40	6.2	ug/m3	22.8		TO-15	Total/NA
Methylene Chloride	37		32	5.7	ug/m3	22.8		TO-15	Total/NA
Toluene	3300		34	4.4	ug/m3	22.8		TO-15	Total/NA
Trichloroethene	23	J	49	13	ug/m3	22.8		TO-15	Total/NA
1,2,4-Trimethylbenzene	31	J	90	18	ug/m3	22.8		TO-15	Total/NA
1,3,5-Trimethylbenzene	17	J	45	14	ug/m3	22.8		TO-15	Total/NA
m,p-Xylene	32	J	79	9.9	ug/m3	22.8		TO-15	Total/NA
o-Xylene	13	J	40	5.3	ug/m3	22.8		TO-15	Total/NA

Client Sample ID: HOU-06

Lab Sample ID: 320-27995-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Bromodichloromethane	5.2		3.0	0.67	ppb v/v	10.1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-06 (Continued)

Lab Sample ID: 320-27995-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Butanone (MEK)	22		8.1	2.0	ppb v/v	10.1		TO-15	Total/NA
Carbon disulfide	66		8.1	0.79	ppb v/v	10.1		TO-15	Total/NA
Dibromochloromethane	0.95	J	4.0	0.80	ppb v/v	10.1		TO-15	Total/NA
Chloroform	100		3.0	0.96	ppb v/v	10.1		TO-15	Total/NA
Chloromethane	7.1	J	8.1	2.0	ppb v/v	10.1		TO-15	Total/NA
cis-1,2-Dichloroethene	9.1		4.0	0.90	ppb v/v	10.1		TO-15	Total/NA
Methylene Chloride	13		4.0	0.73	ppb v/v	10.1		TO-15	Total/NA
Tetrachloroethene	0.99	J	4.0	0.52	ppb v/v	10.1		TO-15	Total/NA
Toluene	560		4.0	0.52	ppb v/v	10.1		TO-15	Total/NA
Trichloroethene	1.9	J	4.0	1.1	ppb v/v	10.1		TO-15	Total/NA
m,p-Xylene	1.8	J	8.1	1.0	ppb v/v	10.1		TO-15	Total/NA
o-Xylene	0.83	J	4.0	0.55	ppb v/v	10.1		TO-15	Total/NA
Acetone - DL	1600		240	8.5	ppb v/v	47.8		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Bromodichloromethane	35		20	4.5	ug/m3	10.1		TO-15	Total/NA
2-Butanone (MEK)	66		24	5.9	ug/m3	10.1		TO-15	Total/NA
Carbon disulfide	210		25	2.5	ug/m3	10.1		TO-15	Total/NA
Dibromochloromethane	8.1	J	34	6.8	ug/m3	10.1		TO-15	Total/NA
Chloroform	500		15	4.7	ug/m3	10.1		TO-15	Total/NA
Chloromethane	15	J	17	4.1	ug/m3	10.1		TO-15	Total/NA
cis-1,2-Dichloroethene	36		16	3.6	ug/m3	10.1		TO-15	Total/NA
Methylene Chloride	44		14	2.5	ug/m3	10.1		TO-15	Total/NA
Tetrachloroethene	6.7	J	27	3.5	ug/m3	10.1		TO-15	Total/NA
Toluene	2100		15	1.9	ug/m3	10.1		TO-15	Total/NA
Trichloroethene	10	J	22	5.7	ug/m3	10.1		TO-15	Total/NA
m,p-Xylene	7.7	J	35	4.4	ug/m3	10.1		TO-15	Total/NA
o-Xylene	3.6	J	18	2.4	ug/m3	10.1		TO-15	Total/NA
Acetone - DL	3800		570	20	ug/m3	47.8		TO-15	Total/NA

Client Sample ID: HOU-07

Lab Sample ID: 320-27995-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	42		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.30	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	11		0.30	0.066	ppb v/v	1		TO-15	Total/NA
Bromoform	0.22	J	0.40	0.070	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.9		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	33		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.13	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	2.2		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	36		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	1.6		0.80	0.20	ppb v/v	1		TO-15	Total/NA
1,2-Dichlorobenzene	0.15	J	0.40	0.13	ppb v/v	1		TO-15	Total/NA
1,4-Dichlorobenzene	15		0.40	0.15	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.23	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	16		0.40	0.089	ppb v/v	1		TO-15	Total/NA
trans-1,2-Dichloroethene	0.44		0.40	0.10	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.15	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
2-Hexanone	0.16	J	0.40	0.087	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	2.3		0.40	0.072	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-07 (Continued)

Lab Sample ID: 320-27995-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Styrene	0.34	J	0.40	0.059	ppb v/v	1		TO-15	Total/NA
1,1,2,2-Tetrachloroethane	0.089	J	0.40	0.069	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	21		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	5.9		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	3.6		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.23	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.21	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
Vinyl chloride	3.0		0.40	0.12	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.41	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.18	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	100		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.96	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	76		2.0	0.44	ug/m3	1		TO-15	Total/NA
Bromoform	2.3	J	4.1	0.72	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	5.6		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	100		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.82	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	19		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	180		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	3.2		1.7	0.41	ug/m3	1		TO-15	Total/NA
1,2-Dichlorobenzene	0.90	J	2.4	0.78	ug/m3	1		TO-15	Total/NA
1,4-Dichlorobenzene	90		2.4	0.90	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.1	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	62		1.6	0.35	ug/m3	1		TO-15	Total/NA
trans-1,2-Dichloroethene	1.7		1.6	0.40	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.66	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
2-Hexanone	0.66	J	1.6	0.36	ug/m3	1		TO-15	Total/NA
Methylene Chloride	8.0		1.4	0.25	ug/m3	1		TO-15	Total/NA
Styrene	1.4	J	1.7	0.25	ug/m3	1		TO-15	Total/NA
1,1,2,2-Tetrachloroethane	0.61	J	2.7	0.47	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	140		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	22		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	19		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.1	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
Vinyl chloride	7.6		1.0	0.31	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.8	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.80	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-08

Lab Sample ID: 320-27995-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	100		18	0.65	ppb v/v	3.67		TO-15	Total/NA
Benzene	1.2	J	1.5	0.29	ppb v/v	3.67		TO-15	Total/NA
Bromodichloromethane	1.6		1.1	0.24	ppb v/v	3.67		TO-15	Total/NA
2-Butanone (MEK)	4.0		2.9	0.73	ppb v/v	3.67		TO-15	Total/NA
Carbon disulfide	3.9		2.9	0.29	ppb v/v	3.67		TO-15	Total/NA
Dibromochloromethane	0.41	J	1.5	0.29	ppb v/v	3.67		TO-15	Total/NA
Chloroform	5.1		1.1	0.35	ppb v/v	3.67		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-08 (Continued)

Lab Sample ID: 320-27995-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloromethane	1.2	J	2.9	0.72	ppb v/v	3.67		TO-15	Total/NA
Dichlorodifluoromethane	0.57	J	1.5	0.53	ppb v/v	3.67		TO-15	Total/NA
cis-1,2-Dichloroethene	15		1.5	0.33	ppb v/v	3.67		TO-15	Total/NA
4-Ethyltoluene	2.1		1.5	0.69	ppb v/v	3.67		TO-15	Total/NA
Methylene Chloride	5.7		1.5	0.26	ppb v/v	3.67		TO-15	Total/NA
Tetrachloroethene	72		1.5	0.19	ppb v/v	3.67		TO-15	Total/NA
Toluene	14		1.5	0.19	ppb v/v	3.67		TO-15	Total/NA
Trichloroethene	11		1.5	0.39	ppb v/v	3.67		TO-15	Total/NA
m,p-Xylene	1.1	J	2.9	0.37	ppb v/v	3.67		TO-15	Total/NA
o-Xylene	0.38	J	1.5	0.20	ppb v/v	3.67		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	240		44	1.6	ug/m3	3.67		TO-15	Total/NA
Benzene	3.8	J	4.7	0.93	ug/m3	3.67		TO-15	Total/NA
Bromodichloromethane	10		7.4	1.6	ug/m3	3.67		TO-15	Total/NA
2-Butanone (MEK)	12		8.7	2.2	ug/m3	3.67		TO-15	Total/NA
Carbon disulfide	12		9.1	0.89	ug/m3	3.67		TO-15	Total/NA
Dibromochloromethane	3.5	J	13	2.5	ug/m3	3.67		TO-15	Total/NA
Chloroform	25		5.4	1.7	ug/m3	3.67		TO-15	Total/NA
Chloromethane	2.5	J	6.1	1.5	ug/m3	3.67		TO-15	Total/NA
Dichlorodifluoromethane	2.8	J	7.3	2.6	ug/m3	3.67		TO-15	Total/NA
cis-1,2-Dichloroethene	58		5.8	1.3	ug/m3	3.67		TO-15	Total/NA
4-Ethyltoluene	10		7.2	3.4	ug/m3	3.67		TO-15	Total/NA
Methylene Chloride	20		5.1	0.92	ug/m3	3.67		TO-15	Total/NA
Tetrachloroethene	490		10	1.3	ug/m3	3.67		TO-15	Total/NA
Toluene	51		5.5	0.71	ug/m3	3.67		TO-15	Total/NA
Trichloroethene	58		7.9	2.1	ug/m3	3.67		TO-15	Total/NA
m,p-Xylene	4.6	J	13	1.6	ug/m3	3.67		TO-15	Total/NA
o-Xylene	1.7	J	6.4	0.86	ug/m3	3.67		TO-15	Total/NA

Client Sample ID: HOU-09

Lab Sample ID: 320-27995-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	26		10	0.36	ppb v/v	2.03		TO-15	Total/NA
Bromodichloromethane	7.9		0.61	0.13	ppb v/v	2.03		TO-15	Total/NA
Bromoform	0.25	J	0.81	0.14	ppb v/v	2.03		TO-15	Total/NA
2-Butanone (MEK)	0.82	J	1.6	0.40	ppb v/v	2.03		TO-15	Total/NA
Carbon disulfide	9.6		1.6	0.16	ppb v/v	2.03		TO-15	Total/NA
Dibromochloromethane	1.7		0.81	0.16	ppb v/v	2.03		TO-15	Total/NA
Chloroform	44		0.61	0.19	ppb v/v	2.03		TO-15	Total/NA
Chloromethane	1.7		1.6	0.40	ppb v/v	2.03		TO-15	Total/NA
1,4-Dichlorobenzene	0.91		0.81	0.30	ppb v/v	2.03		TO-15	Total/NA
Dichlorodifluoromethane	0.35	J	0.81	0.29	ppb v/v	2.03		TO-15	Total/NA
Ethylbenzene	0.66	J	0.81	0.13	ppb v/v	2.03		TO-15	Total/NA
Methylene Chloride	9.9		0.81	0.15	ppb v/v	2.03		TO-15	Total/NA
Styrene	2.3		0.81	0.12	ppb v/v	2.03		TO-15	Total/NA
Tetrachloroethene	0.79	J	0.81	0.10	ppb v/v	2.03		TO-15	Total/NA
Toluene	100		0.81	0.10	ppb v/v	2.03		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.63	J	1.6	0.33	ppb v/v	2.03		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.27	J	0.81	0.25	ppb v/v	2.03		TO-15	Total/NA
m,p-Xylene	0.81	J	1.6	0.20	ppb v/v	2.03		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-09 (Continued)

Lab Sample ID: 320-27995-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
o-Xylene	0.36	J	0.81	0.11	ppb v/v	2.03		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	61		24	0.86	ug/m3	2.03		TO-15	Total/NA
Bromodichloromethane	53		4.1	0.90	ug/m3	2.03		TO-15	Total/NA
Bromoform	2.5	J	8.4	1.5	ug/m3	2.03		TO-15	Total/NA
2-Butanone (MEK)	2.4	J	4.8	1.2	ug/m3	2.03		TO-15	Total/NA
Carbon disulfide	30		5.1	0.49	ug/m3	2.03		TO-15	Total/NA
Dibromochloromethane	15		6.9	1.4	ug/m3	2.03		TO-15	Total/NA
Chloroform	220		3.0	0.94	ug/m3	2.03		TO-15	Total/NA
Chloromethane	3.6		3.4	0.83	ug/m3	2.03		TO-15	Total/NA
1,4-Dichlorobenzene	5.5		4.9	1.8	ug/m3	2.03		TO-15	Total/NA
Dichlorodifluoromethane	1.7	J	4.0	1.5	ug/m3	2.03		TO-15	Total/NA
Ethylbenzene	2.9	J	3.5	0.56	ug/m3	2.03		TO-15	Total/NA
Methylene Chloride	35		2.8	0.51	ug/m3	2.03		TO-15	Total/NA
Styrene	9.7		3.5	0.51	ug/m3	2.03		TO-15	Total/NA
Tetrachloroethene	5.4	J	5.5	0.70	ug/m3	2.03		TO-15	Total/NA
Toluene	390		3.1	0.39	ug/m3	2.03		TO-15	Total/NA
1,2,4-Trimethylbenzene	3.1	J	8.0	1.6	ug/m3	2.03		TO-15	Total/NA
1,3,5-Trimethylbenzene	1.4	J	4.0	1.2	ug/m3	2.03		TO-15	Total/NA
m,p-Xylene	3.5	J	7.1	0.88	ug/m3	2.03		TO-15	Total/NA
o-Xylene	1.6	J	3.5	0.48	ug/m3	2.03		TO-15	Total/NA

Client Sample ID: HOU-10

Lab Sample ID: 320-27995-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	49		33	1.2	ppb v/v	6.65		TO-15	Total/NA
Bromodichloromethane	5.3		2.0	0.44	ppb v/v	6.65		TO-15	Total/NA
Carbon disulfide	25		5.3	0.52	ppb v/v	6.65		TO-15	Total/NA
Dibromochloromethane	0.82	J	2.7	0.53	ppb v/v	6.65		TO-15	Total/NA
Chloroform	21		2.0	0.63	ppb v/v	6.65		TO-15	Total/NA
Chloromethane	2.1	J	5.3	1.3	ppb v/v	6.65		TO-15	Total/NA
cis-1,2-Dichloroethene	270		2.7	0.59	ppb v/v	6.65		TO-15	Total/NA
trans-1,2-Dichloroethene	2.1	J	2.7	0.67	ppb v/v	6.65		TO-15	Total/NA
Methylene Chloride	3.1		2.7	0.48	ppb v/v	6.65		TO-15	Total/NA
Tetrachloroethene	280		2.7	0.34	ppb v/v	6.65		TO-15	Total/NA
Toluene	1.9	J	2.7	0.34	ppb v/v	6.65		TO-15	Total/NA
Trichloroethene	83		2.7	0.70	ppb v/v	6.65		TO-15	Total/NA
Vinyl chloride	4.3		2.7	0.80	ppb v/v	6.65		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	120		79	2.8	ug/m3	6.65		TO-15	Total/NA
Bromodichloromethane	36		13	2.9	ug/m3	6.65		TO-15	Total/NA
Carbon disulfide	78		17	1.6	ug/m3	6.65		TO-15	Total/NA
Dibromochloromethane	7.0	J	23	4.5	ug/m3	6.65		TO-15	Total/NA
Chloroform	100		9.7	3.1	ug/m3	6.65		TO-15	Total/NA
Chloromethane	4.4	J	11	2.7	ug/m3	6.65		TO-15	Total/NA
cis-1,2-Dichloroethene	1100		11	2.3	ug/m3	6.65		TO-15	Total/NA
trans-1,2-Dichloroethene	8.4	J	11	2.6	ug/m3	6.65		TO-15	Total/NA
Methylene Chloride	11		9.2	1.7	ug/m3	6.65		TO-15	Total/NA
Tetrachloroethene	1900		18	2.3	ug/m3	6.65		TO-15	Total/NA
Toluene	7.1	J	10	1.3	ug/m3	6.65		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-10 (Continued)

Lab Sample ID: 320-27995-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	450		14	3.8	ug/m3	6.65		TO-15	Total/NA
Vinyl chloride	11		6.8	2.0	ug/m3	6.65		TO-15	Total/NA

Client Sample ID: HOU BKG-1

Lab Sample ID: 320-27995-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	27		9.2	0.33	ppb v/v	1.83		TO-15	Total/NA
Benzene	0.22	J	0.73	0.14	ppb v/v	1.83		TO-15	Total/NA
Bromodichloromethane	13		0.55	0.12	ppb v/v	1.83		TO-15	Total/NA
Bromoform	0.22	J	0.73	0.13	ppb v/v	1.83		TO-15	Total/NA
2-Butanone (MEK)	1.3	J	1.5	0.36	ppb v/v	1.83		TO-15	Total/NA
Carbon disulfide	16		1.5	0.14	ppb v/v	1.83		TO-15	Total/NA
Chlorobenzene	0.45	J	0.55	0.12	ppb v/v	1.83		TO-15	Total/NA
Dibromochloromethane	2.7		0.73	0.14	ppb v/v	1.83		TO-15	Total/NA
Chloroethane	0.72	J	1.5	0.56	ppb v/v	1.83		TO-15	Total/NA
Chloroform	49		0.55	0.17	ppb v/v	1.83		TO-15	Total/NA
Chloromethane	1.9		1.5	0.36	ppb v/v	1.83		TO-15	Total/NA
1,4-Dichlorobenzene	1.7		0.73	0.27	ppb v/v	1.83		TO-15	Total/NA
Dichlorodifluoromethane	0.40	J	0.73	0.27	ppb v/v	1.83		TO-15	Total/NA
Ethylbenzene	0.63	J	0.73	0.12	ppb v/v	1.83		TO-15	Total/NA
Methylene Chloride	5.1		0.73	0.13	ppb v/v	1.83		TO-15	Total/NA
Styrene	0.14	J	0.73	0.11	ppb v/v	1.83		TO-15	Total/NA
Tetrachloroethene	1.1		0.73	0.093	ppb v/v	1.83		TO-15	Total/NA
Toluene	14		0.73	0.093	ppb v/v	1.83		TO-15	Total/NA
Trichloroethene	0.79		0.73	0.19	ppb v/v	1.83		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.72	J	1.5	0.30	ppb v/v	1.83		TO-15	Total/NA
m,p-Xylene	2.3		1.5	0.18	ppb v/v	1.83		TO-15	Total/NA
o-Xylene	0.75		0.73	0.099	ppb v/v	1.83		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	65		22	0.77	ug/m3	1.83		TO-15	Total/NA
Benzene	0.70	J	2.3	0.46	ug/m3	1.83		TO-15	Total/NA
Bromodichloromethane	86		3.7	0.81	ug/m3	1.83		TO-15	Total/NA
Bromoform	2.3	J	7.6	1.3	ug/m3	1.83		TO-15	Total/NA
2-Butanone (MEK)	3.8	J	4.3	1.1	ug/m3	1.83		TO-15	Total/NA
Carbon disulfide	49		4.6	0.44	ug/m3	1.83		TO-15	Total/NA
Chlorobenzene	2.1	J	2.5	0.54	ug/m3	1.83		TO-15	Total/NA
Dibromochloromethane	23		6.2	1.2	ug/m3	1.83		TO-15	Total/NA
Chloroethane	1.9	J	3.9	1.5	ug/m3	1.83		TO-15	Total/NA
Chloroform	240		2.7	0.85	ug/m3	1.83		TO-15	Total/NA
Chloromethane	3.9		3.0	0.74	ug/m3	1.83		TO-15	Total/NA
1,4-Dichlorobenzene	10		4.4	1.6	ug/m3	1.83		TO-15	Total/NA
Dichlorodifluoromethane	2.0	J	3.6	1.3	ug/m3	1.83		TO-15	Total/NA
Ethylbenzene	2.8	J	3.2	0.50	ug/m3	1.83		TO-15	Total/NA
Methylene Chloride	18		2.5	0.46	ug/m3	1.83		TO-15	Total/NA
Styrene	0.61	J	3.1	0.46	ug/m3	1.83		TO-15	Total/NA
Tetrachloroethene	7.4		5.0	0.63	ug/m3	1.83		TO-15	Total/NA
Toluene	54		2.8	0.35	ug/m3	1.83		TO-15	Total/NA
Trichloroethene	4.2		3.9	1.0	ug/m3	1.83		TO-15	Total/NA
1,2,4-Trimethylbenzene	3.5	J	7.2	1.5	ug/m3	1.83		TO-15	Total/NA
m,p-Xylene	10		6.4	0.79	ug/m3	1.83		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU BKG-1 (Continued)

Lab Sample ID: 320-27995-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
o-Xylene	3.3		3.2	0.43	ug/m3	1.83		TO-15	Total/NA

Client Sample ID: HOU BKG-2

Lab Sample ID: 320-27995-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	18		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.26	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	1.4		0.30	0.066	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.2		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	16		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Chlorobenzene	0.67		0.30	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.27	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	6.3		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.77	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
1,4-Dichlorobenzene	0.76		0.40	0.15	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.29	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.12	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	1.7		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Styrene	0.083	J	0.40	0.059	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.086	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	2.0		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.21	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.46	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.39	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.15	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	43		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.83	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	9.2		2.0	0.44	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	3.5		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	51		2.5	0.24	ug/m3	1		TO-15	Total/NA
Chlorobenzene	3.1		1.4	0.29	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	2.3	J	3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	31		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.6	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
1,4-Dichlorobenzene	4.6		2.4	0.90	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.5	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.53	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	5.7		1.4	0.25	ug/m3	1		TO-15	Total/NA
Styrene	0.35	J	1.7	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	0.59	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	7.6		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.2	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	2.2	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.7	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.63	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: DUP-1

Lab Sample ID: 320-27995-13

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: DUP-1 (Continued)

Lab Sample ID: 320-27995-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	1600		200	7.2	ppb v/v	40.7		TO-15	Total/NA
2-Butanone (MEK)	14	J	33	8.1	ppb v/v	40.7		TO-15	Total/NA
Carbon disulfide	41		33	3.2	ppb v/v	40.7		TO-15	Total/NA
Chloroform	47		12	3.9	ppb v/v	40.7		TO-15	Total/NA
cis-1,2-Dichloroethene	4.1	J	16	3.6	ppb v/v	40.7		TO-15	Total/NA
Methylene Chloride	7.9	J	16	2.9	ppb v/v	40.7		TO-15	Total/NA
Toluene	250		16	2.1	ppb v/v	40.7		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	3700		480	17	ug/m3	40.7		TO-15	Total/NA
2-Butanone (MEK)	40	J	96	24	ug/m3	40.7		TO-15	Total/NA
Carbon disulfide	130		100	9.9	ug/m3	40.7		TO-15	Total/NA
Chloroform	230		60	19	ug/m3	40.7		TO-15	Total/NA
cis-1,2-Dichloroethene	16	J	65	14	ug/m3	40.7		TO-15	Total/NA
Methylene Chloride	27	J	57	10	ug/m3	40.7		TO-15	Total/NA
Toluene	930		61	7.8	ug/m3	40.7		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-01

Date Collected: 04/27/17 15:45

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-1

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	41		33	1.2	ppb v/v			05/15/17 22:23	6.54
Benzene	0.99	J	2.6	0.52	ppb v/v			05/15/17 22:23	6.54
Benzyl chloride	ND		5.2	1.1	ppb v/v			05/15/17 22:23	6.54
Bromodichloromethane	23		2.0	0.43	ppb v/v			05/15/17 22:23	6.54
Bromoform	ND		2.6	0.46	ppb v/v			05/15/17 22:23	6.54
Bromomethane	ND		5.2	2.2	ppb v/v			05/15/17 22:23	6.54
2-Butanone (MEK)	ND		5.2	1.3	ppb v/v			05/15/17 22:23	6.54
Carbon disulfide	6.3		5.2	0.51	ppb v/v			05/15/17 22:23	6.54
Carbon tetrachloride	ND		5.2	0.42	ppb v/v			05/15/17 22:23	6.54
Chlorobenzene	ND		2.0	0.42	ppb v/v			05/15/17 22:23	6.54
Dibromochloromethane	3.9		2.6	0.52	ppb v/v			05/15/17 22:23	6.54
Chloroethane	ND		5.2	2.0	ppb v/v			05/15/17 22:23	6.54
Chloroform	240		2.0	0.62	ppb v/v			05/15/17 22:23	6.54
Chloromethane	2.8	J	5.2	1.3	ppb v/v			05/15/17 22:23	6.54
1,2-Dibromoethane (EDB)	ND		5.2	0.49	ppb v/v			05/15/17 22:23	6.54
1,2-Dichlorobenzene	ND		2.6	0.85	ppb v/v			05/15/17 22:23	6.54
1,3-Dichlorobenzene	ND		2.6	0.72	ppb v/v			05/15/17 22:23	6.54
1,4-Dichlorobenzene	2.3	J	2.6	0.97	ppb v/v			05/15/17 22:23	6.54
Dichlorodifluoromethane	ND		2.6	0.95	ppb v/v			05/15/17 22:23	6.54
1,1-Dichloroethane	ND		2.0	0.47	ppb v/v			05/15/17 22:23	6.54
1,2-Dichloroethane	ND		5.2	0.58	ppb v/v			05/15/17 22:23	6.54
1,1-Dichloroethene	ND		5.2	0.84	ppb v/v			05/15/17 22:23	6.54
cis-1,2-Dichloroethene	11		2.6	0.58	ppb v/v			05/15/17 22:23	6.54
trans-1,2-Dichloroethene	ND		2.6	0.65	ppb v/v			05/15/17 22:23	6.54
1,2-Dichloropropane	ND		2.6	1.6	ppb v/v			05/15/17 22:23	6.54
cis-1,3-Dichloropropene	ND		2.6	0.68	ppb v/v			05/15/17 22:23	6.54
trans-1,3-Dichloropropene	ND		2.6	0.58	ppb v/v			05/15/17 22:23	6.54
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.6	1.0	ppb v/v			05/15/17 22:23	6.54
Ethylbenzene	1.7	J	2.6	0.41	ppb v/v			05/15/17 22:23	6.54
4-Ethyltoluene	ND		2.6	1.2	ppb v/v			05/15/17 22:23	6.54
Hexachlorobutadiene	ND		13	2.8	ppb v/v			05/15/17 22:23	6.54
2-Hexanone	ND		2.6	0.57	ppb v/v			05/15/17 22:23	6.54
Methylene Chloride	3.5		2.6	0.47	ppb v/v			05/15/17 22:23	6.54
4-Methyl-2-pentanone (MIBK)	ND		2.6	0.88	ppb v/v			05/15/17 22:23	6.54
Styrene	ND		2.6	0.39	ppb v/v			05/15/17 22:23	6.54
1,1,2,2-Tetrachloroethane	ND		2.6	0.45	ppb v/v			05/15/17 22:23	6.54
Tetrachloroethene	1.9	J	2.6	0.33	ppb v/v			05/15/17 22:23	6.54
Toluene	13		2.6	0.33	ppb v/v			05/15/17 22:23	6.54
1,2,4-Trichlorobenzene	ND		13	2.8	ppb v/v			05/15/17 22:23	6.54
1,1,1-Trichloroethane	ND		2.0	0.43	ppb v/v			05/15/17 22:23	6.54
1,1,2-Trichloroethane	ND		2.6	0.44	ppb v/v			05/15/17 22:23	6.54
Trichloroethene	ND		2.6	0.69	ppb v/v			05/15/17 22:23	6.54
Trichlorofluoromethane	ND		2.6	1.3	ppb v/v			05/15/17 22:23	6.54
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.6	1.1	ppb v/v			05/15/17 22:23	6.54
1,2,4-Trimethylbenzene	1.6	J	5.2	1.1	ppb v/v			05/15/17 22:23	6.54
1,3,5-Trimethylbenzene	0.91	J	2.6	0.82	ppb v/v			05/15/17 22:23	6.54
Vinyl acetate	ND		5.2	0.95	ppb v/v			05/15/17 22:23	6.54
Vinyl chloride	3.0		2.6	0.78	ppb v/v			05/15/17 22:23	6.54

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-01

Lab Sample ID: 320-27995-1

Date Collected: 04/27/17 15:45

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	6.7		5.2	0.65	ppb v/v			05/15/17 22:23	6.54
o-Xylene	3.5		2.6	0.35	ppb v/v			05/15/17 22:23	6.54
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	97		78	2.8	ug/m3			05/15/17 22:23	6.54
Benzene	3.2	J	8.4	1.7	ug/m3			05/15/17 22:23	6.54
Benzyl chloride	ND		27	5.5	ug/m3			05/15/17 22:23	6.54
Bromodichloromethane	150		13	2.9	ug/m3			05/15/17 22:23	6.54
Bromoform	ND		27	4.7	ug/m3			05/15/17 22:23	6.54
Bromomethane	ND		20	8.5	ug/m3			05/15/17 22:23	6.54
2-Butanone (MEK)	ND		15	3.8	ug/m3			05/15/17 22:23	6.54
Carbon disulfide	20		16	1.6	ug/m3			05/15/17 22:23	6.54
Carbon tetrachloride	ND		33	2.6	ug/m3			05/15/17 22:23	6.54
Chlorobenzene	ND		9.0	1.9	ug/m3			05/15/17 22:23	6.54
Dibromochloromethane	33		22	4.4	ug/m3			05/15/17 22:23	6.54
Chloroethane	ND		14	5.3	ug/m3			05/15/17 22:23	6.54
Chloroform	1200		9.6	3.0	ug/m3			05/15/17 22:23	6.54
Chloromethane	5.7	J	11	2.7	ug/m3			05/15/17 22:23	6.54
1,2-Dibromoethane (EDB)	ND		40	3.8	ug/m3			05/15/17 22:23	6.54
1,2-Dichlorobenzene	ND		16	5.1	ug/m3			05/15/17 22:23	6.54
1,3-Dichlorobenzene	ND		16	4.3	ug/m3			05/15/17 22:23	6.54
1,4-Dichlorobenzene	14	J	16	5.9	ug/m3			05/15/17 22:23	6.54
Dichlorodifluoromethane	ND		13	4.7	ug/m3			05/15/17 22:23	6.54
1,1-Dichloroethane	ND		7.9	1.9	ug/m3			05/15/17 22:23	6.54
1,2-Dichloroethane	ND		21	2.3	ug/m3			05/15/17 22:23	6.54
1,1-Dichloroethene	ND		21	3.3	ug/m3			05/15/17 22:23	6.54
cis-1,2-Dichloroethene	45		10	2.3	ug/m3			05/15/17 22:23	6.54
trans-1,2-Dichloroethene	ND		10	2.6	ug/m3			05/15/17 22:23	6.54
1,2-Dichloropropane	ND		12	7.3	ug/m3			05/15/17 22:23	6.54
cis-1,3-Dichloropropene	ND		12	3.1	ug/m3			05/15/17 22:23	6.54
trans-1,3-Dichloropropene	ND		12	2.6	ug/m3			05/15/17 22:23	6.54
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		18	7.1	ug/m3			05/15/17 22:23	6.54
Ethylbenzene	7.2	J	11	1.8	ug/m3			05/15/17 22:23	6.54
4-Ethyltoluene	ND		13	6.0	ug/m3			05/15/17 22:23	6.54
Hexachlorobutadiene	ND		140	30	ug/m3			05/15/17 22:23	6.54
2-Hexanone	ND		11	2.3	ug/m3			05/15/17 22:23	6.54
Methylene Chloride	12		9.1	1.6	ug/m3			05/15/17 22:23	6.54
4-Methyl-2-pentanone (MIBK)	ND		11	3.6	ug/m3			05/15/17 22:23	6.54
Styrene	ND		11	1.6	ug/m3			05/15/17 22:23	6.54
1,1,2,2-Tetrachloroethane	ND		18	3.1	ug/m3			05/15/17 22:23	6.54
Tetrachloroethene	13	J	18	2.3	ug/m3			05/15/17 22:23	6.54
Toluene	51		9.9	1.3	ug/m3			05/15/17 22:23	6.54
1,2,4-Trichlorobenzene	ND		97	21	ug/m3			05/15/17 22:23	6.54
1,1,1-Trichloroethane	ND		11	2.3	ug/m3			05/15/17 22:23	6.54
1,1,2-Trichloroethane	ND		14	2.4	ug/m3			05/15/17 22:23	6.54
Trichloroethene	ND		14	3.7	ug/m3			05/15/17 22:23	6.54
Trichlorofluoromethane	ND		15	7.2	ug/m3			05/15/17 22:23	6.54
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		20	8.2	ug/m3			05/15/17 22:23	6.54
1,2,4-Trimethylbenzene	7.9	J	26	5.2	ug/m3			05/15/17 22:23	6.54

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-01

Date Collected: 04/27/17 15:45

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-1

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	4.5	J	13	4.0	ug/m3			05/15/17 22:23	6.54
Vinyl acetate	ND		18	3.3	ug/m3			05/15/17 22:23	6.54
Vinyl chloride	7.7		6.7	2.0	ug/m3			05/15/17 22:23	6.54
m,p-Xylene	29		23	2.8	ug/m3			05/15/17 22:23	6.54
o-Xylene	15		11	1.5	ug/m3			05/15/17 22:23	6.54
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130					05/15/17 22:23	6.54
1,2-Dichloroethane-d4 (Surr)	90		70 - 130					05/15/17 22:23	6.54
Toluene-d8 (Surr)	100		70 - 130					05/15/17 22:23	6.54

Client Sample ID: HOU-02

Date Collected: 04/27/17 16:00

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	16		5.0	0.18	ppb v/v			05/15/17 23:20	1
Benzene	0.61		0.40	0.079	ppb v/v			05/15/17 23:20	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/15/17 23:20	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			05/15/17 23:20	1
Bromoform	ND		0.40	0.070	ppb v/v			05/15/17 23:20	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/15/17 23:20	1
2-Butanone (MEK)	1.2		0.80	0.20	ppb v/v			05/15/17 23:20	1
Carbon disulfide	7.9		0.80	0.078	ppb v/v			05/15/17 23:20	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			05/15/17 23:20	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			05/15/17 23:20	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			05/15/17 23:20	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/15/17 23:20	1
Chloroform	0.38		0.30	0.095	ppb v/v			05/15/17 23:20	1
Chloromethane	0.89		0.80	0.20	ppb v/v			05/15/17 23:20	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/15/17 23:20	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			05/15/17 23:20	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/15/17 23:20	1
1,4-Dichlorobenzene	0.18	J	0.40	0.15	ppb v/v			05/15/17 23:20	1
Dichlorodifluoromethane	0.29	J	0.40	0.15	ppb v/v			05/15/17 23:20	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/15/17 23:20	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/15/17 23:20	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			05/15/17 23:20	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			05/15/17 23:20	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			05/15/17 23:20	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/15/17 23:20	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/15/17 23:20	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/15/17 23:20	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			05/15/17 23:20	1
Ethylbenzene	0.12	J	0.40	0.063	ppb v/v			05/15/17 23:20	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/15/17 23:20	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/15/17 23:20	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-02

Date Collected: 04/27/17 16:00

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	0.13	J	0.40	0.087	ppb v/v			05/15/17 23:20	1
Methylene Chloride	0.21	J	0.40	0.072	ppb v/v			05/15/17 23:20	1
4-Methyl-2-pentanone (MIBK)	0.28	J	0.40	0.14	ppb v/v			05/15/17 23:20	1
Styrene	0.068	J	0.40	0.059	ppb v/v			05/15/17 23:20	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			05/15/17 23:20	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			05/15/17 23:20	1
Toluene	1.1		0.40	0.051	ppb v/v			05/15/17 23:20	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/15/17 23:20	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/15/17 23:20	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/15/17 23:20	1
Trichloroethene	ND		0.40	0.11	ppb v/v			05/15/17 23:20	1
Trichlorofluoromethane	0.24	J	0.40	0.20	ppb v/v			05/15/17 23:20	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/15/17 23:20	1
1,2,4-Trimethylbenzene	0.17	J	0.80	0.16	ppb v/v			05/15/17 23:20	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/15/17 23:20	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			05/15/17 23:20	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			05/15/17 23:20	1
m,p-Xylene	0.38	J	0.80	0.10	ppb v/v			05/15/17 23:20	1
o-Xylene	0.16	J	0.40	0.054	ppb v/v			05/15/17 23:20	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	38		12	0.42	ug/m3			05/15/17 23:20	1
Benzene	1.9		1.3	0.25	ug/m3			05/15/17 23:20	1
Benzyl chloride	ND		4.1	0.84	ug/m3			05/15/17 23:20	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			05/15/17 23:20	1
Bromoform	ND		4.1	0.72	ug/m3			05/15/17 23:20	1
Bromomethane	ND		3.1	1.3	ug/m3			05/15/17 23:20	1
2-Butanone (MEK)	3.6		2.4	0.59	ug/m3			05/15/17 23:20	1
Carbon disulfide	25		2.5	0.24	ug/m3			05/15/17 23:20	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			05/15/17 23:20	1
Chlorobenzene	ND		1.4	0.29	ug/m3			05/15/17 23:20	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			05/15/17 23:20	1
Chloroethane	ND		2.1	0.81	ug/m3			05/15/17 23:20	1
Chloroform	1.8		1.5	0.46	ug/m3			05/15/17 23:20	1
Chloromethane	1.8		1.7	0.41	ug/m3			05/15/17 23:20	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			05/15/17 23:20	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			05/15/17 23:20	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			05/15/17 23:20	1
1,4-Dichlorobenzene	1.1	J	2.4	0.90	ug/m3			05/15/17 23:20	1
Dichlorodifluoromethane	1.4	J	2.0	0.72	ug/m3			05/15/17 23:20	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			05/15/17 23:20	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			05/15/17 23:20	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			05/15/17 23:20	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			05/15/17 23:20	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			05/15/17 23:20	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			05/15/17 23:20	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			05/15/17 23:20	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			05/15/17 23:20	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			05/15/17 23:20	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-02

Date Collected: 04/27/17 16:00

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	0.52	J	1.7	0.27	ug/m3			05/15/17 23:20	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			05/15/17 23:20	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			05/15/17 23:20	1
2-Hexanone	0.54	J	1.6	0.36	ug/m3			05/15/17 23:20	1
Methylene Chloride	0.71	J	1.4	0.25	ug/m3			05/15/17 23:20	1
4-Methyl-2-pentanone (MIBK)	1.1	J	1.6	0.55	ug/m3			05/15/17 23:20	1
Styrene	0.29	J	1.7	0.25	ug/m3			05/15/17 23:20	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			05/15/17 23:20	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			05/15/17 23:20	1
Toluene	4.2		1.5	0.19	ug/m3			05/15/17 23:20	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			05/15/17 23:20	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			05/15/17 23:20	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			05/15/17 23:20	1
Trichloroethene	ND		2.1	0.56	ug/m3			05/15/17 23:20	1
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3			05/15/17 23:20	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			05/15/17 23:20	1
1,2,4-Trimethylbenzene	0.84	J	3.9	0.80	ug/m3			05/15/17 23:20	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			05/15/17 23:20	1
Vinyl acetate	ND		2.8	0.51	ug/m3			05/15/17 23:20	1
Vinyl chloride	ND		1.0	0.31	ug/m3			05/15/17 23:20	1
m,p-Xylene	1.6	J	3.5	0.43	ug/m3			05/15/17 23:20	1
o-Xylene	0.67	J	1.7	0.23	ug/m3			05/15/17 23:20	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130					05/15/17 23:20	1
1,2-Dichloroethane-d4 (Surr)	91		70 - 130					05/15/17 23:20	1
Toluene-d8 (Surr)	102		70 - 130					05/15/17 23:20	1

Client Sample ID: HOU-03

Date Collected: 04/27/17 14:35

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-3

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	21		5.0	0.18	ppb v/v			05/16/17 00:17	1
Benzene	0.37	J	0.40	0.079	ppb v/v			05/16/17 00:17	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/16/17 00:17	1
Bromodichloromethane	1.4		0.30	0.066	ppb v/v			05/16/17 00:17	1
Bromoform	ND		0.40	0.070	ppb v/v			05/16/17 00:17	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/16/17 00:17	1
2-Butanone (MEK)	0.90		0.80	0.20	ppb v/v			05/16/17 00:17	1
Carbon disulfide	0.89		0.80	0.078	ppb v/v			05/16/17 00:17	1
Carbon tetrachloride	0.088	J	0.80	0.064	ppb v/v			05/16/17 00:17	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			05/16/17 00:17	1
Dibromochloromethane	0.38	J	0.40	0.079	ppb v/v			05/16/17 00:17	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/16/17 00:17	1
Chloroform	7.7		0.30	0.095	ppb v/v			05/16/17 00:17	1
Chloromethane	0.85		0.80	0.20	ppb v/v			05/16/17 00:17	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-03

Lab Sample ID: 320-27995-3

Date Collected: 04/27/17 14:35

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/16/17 00:17	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			05/16/17 00:17	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/16/17 00:17	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			05/16/17 00:17	1
Dichlorodifluoromethane	0.23	J	0.40	0.15	ppb v/v			05/16/17 00:17	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/16/17 00:17	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/16/17 00:17	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			05/16/17 00:17	1
cis-1,2-Dichloroethene	4.1		0.40	0.089	ppb v/v			05/16/17 00:17	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			05/16/17 00:17	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/16/17 00:17	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/16/17 00:17	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/16/17 00:17	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			05/16/17 00:17	1
Ethylbenzene	0.090	J	0.40	0.063	ppb v/v			05/16/17 00:17	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/16/17 00:17	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/16/17 00:17	1
2-Hexanone	ND		0.40	0.087	ppb v/v			05/16/17 00:17	1
Methylene Chloride	32		0.40	0.072	ppb v/v			05/16/17 00:17	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			05/16/17 00:17	1
Styrene	0.064	J	0.40	0.059	ppb v/v			05/16/17 00:17	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			05/16/17 00:17	1
Tetrachloroethene	28		0.40	0.051	ppb v/v			05/16/17 00:17	1
Toluene	1.2		0.40	0.051	ppb v/v			05/16/17 00:17	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/16/17 00:17	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/16/17 00:17	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/16/17 00:17	1
Trichloroethene	2.6		0.40	0.11	ppb v/v			05/16/17 00:17	1
Trichlorofluoromethane	0.25	J	0.40	0.20	ppb v/v			05/16/17 00:17	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/16/17 00:17	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			05/16/17 00:17	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/16/17 00:17	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			05/16/17 00:17	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			05/16/17 00:17	1
m,p-Xylene	0.22	J	0.80	0.10	ppb v/v			05/16/17 00:17	1
o-Xylene	0.10	J	0.40	0.054	ppb v/v			05/16/17 00:17	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	50		12	0.42	ug/m3			05/16/17 00:17	1
Benzene	1.2	J	1.3	0.25	ug/m3			05/16/17 00:17	1
Benzyl chloride	ND		4.1	0.84	ug/m3			05/16/17 00:17	1
Bromodichloromethane	9.6		2.0	0.44	ug/m3			05/16/17 00:17	1
Bromoform	ND		4.1	0.72	ug/m3			05/16/17 00:17	1
Bromomethane	ND		3.1	1.3	ug/m3			05/16/17 00:17	1
2-Butanone (MEK)	2.7		2.4	0.59	ug/m3			05/16/17 00:17	1
Carbon disulfide	2.8		2.5	0.24	ug/m3			05/16/17 00:17	1
Carbon tetrachloride	0.56	J	5.0	0.40	ug/m3			05/16/17 00:17	1
Chlorobenzene	ND		1.4	0.29	ug/m3			05/16/17 00:17	1
Dibromochloromethane	3.2	J	3.4	0.67	ug/m3			05/16/17 00:17	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-03

Lab Sample ID: 320-27995-3

Date Collected: 04/27/17 14:35

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		2.1	0.81	ug/m3			05/16/17 00:17	1
Chloroform	38		1.5	0.46	ug/m3			05/16/17 00:17	1
Chloromethane	1.8		1.7	0.41	ug/m3			05/16/17 00:17	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			05/16/17 00:17	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			05/16/17 00:17	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			05/16/17 00:17	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			05/16/17 00:17	1
Dichlorodifluoromethane	1.1	J	2.0	0.72	ug/m3			05/16/17 00:17	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			05/16/17 00:17	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			05/16/17 00:17	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			05/16/17 00:17	1
cis-1,2-Dichloroethene	16		1.6	0.35	ug/m3			05/16/17 00:17	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			05/16/17 00:17	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			05/16/17 00:17	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			05/16/17 00:17	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			05/16/17 00:17	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			05/16/17 00:17	1
Ethylbenzene	0.39	J	1.7	0.27	ug/m3			05/16/17 00:17	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			05/16/17 00:17	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			05/16/17 00:17	1
2-Hexanone	ND		1.6	0.36	ug/m3			05/16/17 00:17	1
Methylene Chloride	110		1.4	0.25	ug/m3			05/16/17 00:17	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			05/16/17 00:17	1
Styrene	0.27	J	1.7	0.25	ug/m3			05/16/17 00:17	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			05/16/17 00:17	1
Tetrachloroethene	190		2.7	0.35	ug/m3			05/16/17 00:17	1
Toluene	4.6		1.5	0.19	ug/m3			05/16/17 00:17	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			05/16/17 00:17	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			05/16/17 00:17	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			05/16/17 00:17	1
Trichloroethene	14		2.1	0.56	ug/m3			05/16/17 00:17	1
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3			05/16/17 00:17	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			05/16/17 00:17	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			05/16/17 00:17	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			05/16/17 00:17	1
Vinyl acetate	ND		2.8	0.51	ug/m3			05/16/17 00:17	1
Vinyl chloride	ND		1.0	0.31	ug/m3			05/16/17 00:17	1
m,p-Xylene	0.97	J	3.5	0.43	ug/m3			05/16/17 00:17	1
o-Xylene	0.45	J	1.7	0.23	ug/m3			05/16/17 00:17	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130		05/16/17 00:17	1
1,2-Dichloroethane-d4 (Surr)	96		70 - 130		05/16/17 00:17	1
Toluene-d8 (Surr)	99		70 - 130		05/16/17 00:17	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-04

Lab Sample ID: 320-27995-4

Date Collected: 04/27/17 14:20

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	17		5.2	0.18	ppb v/v			05/16/17 01:18	1.03
Benzene	ND		0.41	0.081	ppb v/v			05/16/17 01:18	1.03
Benzyl chloride	ND		0.82	0.17	ppb v/v			05/16/17 01:18	1.03
Bromodichloromethane	0.53		0.31	0.068	ppb v/v			05/16/17 01:18	1.03
Bromoform	ND		0.41	0.072	ppb v/v			05/16/17 01:18	1.03
Bromomethane	ND		0.82	0.35	ppb v/v			05/16/17 01:18	1.03
2-Butanone (MEK)	1.6		0.82	0.20	ppb v/v			05/16/17 01:18	1.03
Carbon disulfide	8.1		0.82	0.080	ppb v/v			05/16/17 01:18	1.03
Carbon tetrachloride	ND		0.82	0.066	ppb v/v			05/16/17 01:18	1.03
Chlorobenzene	ND		0.31	0.066	ppb v/v			05/16/17 01:18	1.03
Dibromochloromethane	ND		0.41	0.081	ppb v/v			05/16/17 01:18	1.03
Chloroethane	ND		0.82	0.32	ppb v/v			05/16/17 01:18	1.03
Chloroform	16		0.31	0.098	ppb v/v			05/16/17 01:18	1.03
Chloromethane	0.52	J	0.82	0.20	ppb v/v			05/16/17 01:18	1.03
1,2-Dibromoethane (EDB)	ND		0.82	0.077	ppb v/v			05/16/17 01:18	1.03
1,2-Dichlorobenzene	ND		0.41	0.13	ppb v/v			05/16/17 01:18	1.03
1,3-Dichlorobenzene	ND		0.41	0.11	ppb v/v			05/16/17 01:18	1.03
1,4-Dichlorobenzene	0.15	J	0.41	0.15	ppb v/v			05/16/17 01:18	1.03
Dichlorodifluoromethane	0.20	J	0.41	0.15	ppb v/v			05/16/17 01:18	1.03
1,1-Dichloroethane	ND		0.31	0.074	ppb v/v			05/16/17 01:18	1.03
1,2-Dichloroethane	ND		0.82	0.091	ppb v/v			05/16/17 01:18	1.03
1,1-Dichloroethene	ND		0.82	0.13	ppb v/v			05/16/17 01:18	1.03
cis-1,2-Dichloroethene	ND		0.41	0.092	ppb v/v			05/16/17 01:18	1.03
trans-1,2-Dichloroethene	ND		0.41	0.10	ppb v/v			05/16/17 01:18	1.03
1,2-Dichloropropane	ND		0.41	0.25	ppb v/v			05/16/17 01:18	1.03
cis-1,3-Dichloropropene	ND		0.41	0.11	ppb v/v			05/16/17 01:18	1.03
trans-1,3-Dichloropropene	ND		0.41	0.091	ppb v/v			05/16/17 01:18	1.03
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.41	0.16	ppb v/v			05/16/17 01:18	1.03
Ethylbenzene	0.20	J	0.41	0.065	ppb v/v			05/16/17 01:18	1.03
4-Ethyltoluene	ND		0.41	0.19	ppb v/v			05/16/17 01:18	1.03
Hexachlorobutadiene	ND		2.1	0.44	ppb v/v			05/16/17 01:18	1.03
2-Hexanone	ND		0.41	0.090	ppb v/v			05/16/17 01:18	1.03
Methylene Chloride	0.47		0.41	0.074	ppb v/v			05/16/17 01:18	1.03
4-Methyl-2-pentanone (MIBK)	ND		0.41	0.14	ppb v/v			05/16/17 01:18	1.03
Styrene	ND		0.41	0.061	ppb v/v			05/16/17 01:18	1.03
1,1,2,2-Tetrachloroethane	ND		0.41	0.071	ppb v/v			05/16/17 01:18	1.03
Tetrachloroethene	1.9		0.41	0.053	ppb v/v			05/16/17 01:18	1.03
Toluene	15		0.41	0.053	ppb v/v			05/16/17 01:18	1.03
1,2,4-Trichlorobenzene	ND		2.1	0.45	ppb v/v			05/16/17 01:18	1.03
1,1,1-Trichloroethane	ND		0.31	0.067	ppb v/v			05/16/17 01:18	1.03
1,1,2-Trichloroethane	ND		0.41	0.069	ppb v/v			05/16/17 01:18	1.03
Trichloroethene	0.13	J	0.41	0.11	ppb v/v			05/16/17 01:18	1.03
Trichlorofluoromethane	0.24	J	0.41	0.20	ppb v/v			05/16/17 01:18	1.03
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.41	0.17	ppb v/v			05/16/17 01:18	1.03
1,2,4-Trimethylbenzene	ND		0.82	0.17	ppb v/v			05/16/17 01:18	1.03
1,3,5-Trimethylbenzene	ND		0.41	0.13	ppb v/v			05/16/17 01:18	1.03
Vinyl acetate	ND		0.82	0.15	ppb v/v			05/16/17 01:18	1.03
Vinyl chloride	ND		0.41	0.12	ppb v/v			05/16/17 01:18	1.03

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-04

Lab Sample ID: 320-27995-4

Date Collected: 04/27/17 14:20

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.20	J	0.82	0.10	ppb v/v			05/16/17 01:18	1.03
o-Xylene	0.077	J	0.41	0.056	ppb v/v			05/16/17 01:18	1.03
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	40		12	0.44	ug/m3			05/16/17 01:18	1.03
Benzene	ND		1.3	0.26	ug/m3			05/16/17 01:18	1.03
Benzyl chloride	ND		4.3	0.87	ug/m3			05/16/17 01:18	1.03
Bromodichloromethane	3.6		2.1	0.46	ug/m3			05/16/17 01:18	1.03
Bromoform	ND		4.3	0.75	ug/m3			05/16/17 01:18	1.03
Bromomethane	ND		3.2	1.3	ug/m3			05/16/17 01:18	1.03
2-Butanone (MEK)	4.7		2.4	0.60	ug/m3			05/16/17 01:18	1.03
Carbon disulfide	25		2.6	0.25	ug/m3			05/16/17 01:18	1.03
Carbon tetrachloride	ND		5.2	0.41	ug/m3			05/16/17 01:18	1.03
Chlorobenzene	ND		1.4	0.30	ug/m3			05/16/17 01:18	1.03
Dibromochloromethane	ND		3.5	0.69	ug/m3			05/16/17 01:18	1.03
Chloroethane	ND		2.2	0.84	ug/m3			05/16/17 01:18	1.03
Chloroform	79		1.5	0.48	ug/m3			05/16/17 01:18	1.03
Chloromethane	1.1	J	1.7	0.42	ug/m3			05/16/17 01:18	1.03
1,2-Dibromoethane (EDB)	ND		6.3	0.59	ug/m3			05/16/17 01:18	1.03
1,2-Dichlorobenzene	ND		2.5	0.81	ug/m3			05/16/17 01:18	1.03
1,3-Dichlorobenzene	ND		2.5	0.68	ug/m3			05/16/17 01:18	1.03
1,4-Dichlorobenzene	0.87	J	2.5	0.92	ug/m3			05/16/17 01:18	1.03
Dichlorodifluoromethane	1.0	J	2.0	0.74	ug/m3			05/16/17 01:18	1.03
1,1-Dichloroethane	ND		1.3	0.30	ug/m3			05/16/17 01:18	1.03
1,2-Dichloroethane	ND		3.3	0.37	ug/m3			05/16/17 01:18	1.03
1,1-Dichloroethene	ND		3.3	0.53	ug/m3			05/16/17 01:18	1.03
cis-1,2-Dichloroethene	ND		1.6	0.36	ug/m3			05/16/17 01:18	1.03
trans-1,2-Dichloroethene	ND		1.6	0.41	ug/m3			05/16/17 01:18	1.03
1,2-Dichloropropane	ND		1.9	1.1	ug/m3			05/16/17 01:18	1.03
cis-1,3-Dichloropropene	ND		1.9	0.49	ug/m3			05/16/17 01:18	1.03
trans-1,3-Dichloropropene	ND		1.9	0.41	ug/m3			05/16/17 01:18	1.03
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.9	1.1	ug/m3			05/16/17 01:18	1.03
Ethylbenzene	0.86	J	1.8	0.28	ug/m3			05/16/17 01:18	1.03
4-Ethyltoluene	ND		2.0	0.95	ug/m3			05/16/17 01:18	1.03
Hexachlorobutadiene	ND		22	4.7	ug/m3			05/16/17 01:18	1.03
2-Hexanone	ND		1.7	0.37	ug/m3			05/16/17 01:18	1.03
Methylene Chloride	1.6		1.4	0.26	ug/m3			05/16/17 01:18	1.03
4-Methyl-2-pentanone (MIBK)	ND		1.7	0.57	ug/m3			05/16/17 01:18	1.03
Styrene	ND		1.8	0.26	ug/m3			05/16/17 01:18	1.03
1,1,2,2-Tetrachloroethane	ND		2.8	0.49	ug/m3			05/16/17 01:18	1.03
Tetrachloroethene	13		2.8	0.36	ug/m3			05/16/17 01:18	1.03
Toluene	57		1.6	0.20	ug/m3			05/16/17 01:18	1.03
1,2,4-Trichlorobenzene	ND		15	3.3	ug/m3			05/16/17 01:18	1.03
1,1,1-Trichloroethane	ND		1.7	0.37	ug/m3			05/16/17 01:18	1.03
1,1,2-Trichloroethane	ND		2.2	0.38	ug/m3			05/16/17 01:18	1.03
Trichloroethene	0.69	J	2.2	0.58	ug/m3			05/16/17 01:18	1.03
Trichlorofluoromethane	1.3	J	2.3	1.1	ug/m3			05/16/17 01:18	1.03
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.2	1.3	ug/m3			05/16/17 01:18	1.03
1,2,4-Trimethylbenzene	ND		4.1	0.82	ug/m3			05/16/17 01:18	1.03

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-04

Date Collected: 04/27/17 14:20

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-4

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND		2.0	0.63	ug/m3			05/16/17 01:18	1.03
Vinyl acetate	ND		2.9	0.53	ug/m3			05/16/17 01:18	1.03
Vinyl chloride	ND		1.1	0.32	ug/m3			05/16/17 01:18	1.03
m,p-Xylene	0.85	J	3.6	0.45	ug/m3			05/16/17 01:18	1.03
o-Xylene	0.34	J	1.8	0.24	ug/m3			05/16/17 01:18	1.03
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130					05/16/17 01:18	1.03
1,2-Dichloroethane-d4 (Surr)	90		70 - 130					05/16/17 01:18	1.03
Toluene-d8 (Surr)	98		70 - 130					05/16/17 01:18	1.03

Client Sample ID: HOU-05

Date Collected: 04/27/17 14:05

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-5

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	220		110	4.1	ppb v/v			05/16/17 02:10	22.8
Benzene	ND		9.1	1.8	ppb v/v			05/16/17 02:10	22.8
Benzyl chloride	ND		18	3.7	ppb v/v			05/16/17 02:10	22.8
Bromodichloromethane	8.9		6.8	1.5	ppb v/v			05/16/17 02:10	22.8
Bromoform	ND		9.1	1.6	ppb v/v			05/16/17 02:10	22.8
Bromomethane	ND		18	7.6	ppb v/v			05/16/17 02:10	22.8
2-Butanone (MEK)	8.5	J	18	4.5	ppb v/v			05/16/17 02:10	22.8
Carbon disulfide	24		18	1.8	ppb v/v			05/16/17 02:10	22.8
Carbon tetrachloride	ND		18	1.5	ppb v/v			05/16/17 02:10	22.8
Chlorobenzene	ND		6.8	1.5	ppb v/v			05/16/17 02:10	22.8
Dibromochloromethane	ND		9.1	1.8	ppb v/v			05/16/17 02:10	22.8
Chloroethane	ND		18	7.0	ppb v/v			05/16/17 02:10	22.8
Chloroform	160		6.8	2.2	ppb v/v			05/16/17 02:10	22.8
Chloromethane	7.6	J	18	4.5	ppb v/v			05/16/17 02:10	22.8
1,2-Dibromoethane (EDB)	ND		18	1.7	ppb v/v			05/16/17 02:10	22.8
1,2-Dichlorobenzene	ND		9.1	3.0	ppb v/v			05/16/17 02:10	22.8
1,3-Dichlorobenzene	ND		9.1	2.5	ppb v/v			05/16/17 02:10	22.8
1,4-Dichlorobenzene	ND		9.1	3.4	ppb v/v			05/16/17 02:10	22.8
Dichlorodifluoromethane	ND		9.1	3.3	ppb v/v			05/16/17 02:10	22.8
1,1-Dichloroethane	ND		6.8	1.6	ppb v/v			05/16/17 02:10	22.8
1,2-Dichloroethane	ND		18	2.0	ppb v/v			05/16/17 02:10	22.8
1,1-Dichloroethene	ND		18	2.9	ppb v/v			05/16/17 02:10	22.8
cis-1,2-Dichloroethene	8.9	J	9.1	2.0	ppb v/v			05/16/17 02:10	22.8
trans-1,2-Dichloroethene	ND		9.1	2.3	ppb v/v			05/16/17 02:10	22.8
1,2-Dichloropropane	ND		9.1	5.5	ppb v/v			05/16/17 02:10	22.8
cis-1,3-Dichloropropene	ND		9.1	2.4	ppb v/v			05/16/17 02:10	22.8
trans-1,3-Dichloropropene	ND		9.1	2.0	ppb v/v			05/16/17 02:10	22.8
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		9.1	3.5	ppb v/v			05/16/17 02:10	22.8
Ethylbenzene	1.7	J	9.1	1.4	ppb v/v			05/16/17 02:10	22.8
4-Ethyltoluene	ND		9.1	4.3	ppb v/v			05/16/17 02:10	22.8
Hexachlorobutadiene	ND		46	9.8	ppb v/v			05/16/17 02:10	22.8

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-05

Date Collected: 04/27/17 14:05

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-5

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		9.1	2.0	ppb v/v			05/16/17 02:10	22.8
Methylene Chloride	11		9.1	1.6	ppb v/v			05/16/17 02:10	22.8
4-Methyl-2-pentanone (MIBK)	ND		9.1	3.1	ppb v/v			05/16/17 02:10	22.8
Styrene	ND		9.1	1.3	ppb v/v			05/16/17 02:10	22.8
1,1,2,2-Tetrachloroethane	ND		9.1	1.6	ppb v/v			05/16/17 02:10	22.8
Tetrachloroethene	ND		9.1	1.2	ppb v/v			05/16/17 02:10	22.8
Toluene	880		9.1	1.2	ppb v/v			05/16/17 02:10	22.8
1,2,4-Trichlorobenzene	ND		46	9.9	ppb v/v			05/16/17 02:10	22.8
1,1,1-Trichloroethane	ND		6.8	1.5	ppb v/v			05/16/17 02:10	22.8
1,1,2-Trichloroethane	ND		9.1	1.5	ppb v/v			05/16/17 02:10	22.8
Trichloroethene	4.2 J		9.1	2.4	ppb v/v			05/16/17 02:10	22.8
Trichlorofluoromethane	ND		9.1	4.5	ppb v/v			05/16/17 02:10	22.8
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		9.1	3.7	ppb v/v			05/16/17 02:10	22.8
1,2,4-Trimethylbenzene	6.3 J		18	3.7	ppb v/v			05/16/17 02:10	22.8
1,3,5-Trimethylbenzene	3.5 J		9.1	2.9	ppb v/v			05/16/17 02:10	22.8
Vinyl acetate	ND		18	3.3	ppb v/v			05/16/17 02:10	22.8
Vinyl chloride	ND		9.1	2.7	ppb v/v			05/16/17 02:10	22.8
m,p-Xylene	7.3 J		18	2.3	ppb v/v			05/16/17 02:10	22.8
o-Xylene	3.0 J		9.1	1.2	ppb v/v			05/16/17 02:10	22.8
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	510		270	9.6	ug/m3			05/16/17 02:10	22.8
Benzene	ND		29	5.8	ug/m3			05/16/17 02:10	22.8
Benzyl chloride	ND		94	19	ug/m3			05/16/17 02:10	22.8
Bromodichloromethane	60		46	10	ug/m3			05/16/17 02:10	22.8
Bromoform	ND		94	16	ug/m3			05/16/17 02:10	22.8
Bromomethane	ND		71	30	ug/m3			05/16/17 02:10	22.8
2-Butanone (MEK)	25 J		54	13	ug/m3			05/16/17 02:10	22.8
Carbon disulfide	74		57	5.5	ug/m3			05/16/17 02:10	22.8
Carbon tetrachloride	ND		110	9.2	ug/m3			05/16/17 02:10	22.8
Chlorobenzene	ND		31	6.7	ug/m3			05/16/17 02:10	22.8
Dibromochloromethane	ND		78	15	ug/m3			05/16/17 02:10	22.8
Chloroethane	ND		48	19	ug/m3			05/16/17 02:10	22.8
Chloroform	760		33	11	ug/m3			05/16/17 02:10	22.8
Chloromethane	16 J		38	9.3	ug/m3			05/16/17 02:10	22.8
1,2-Dibromoethane (EDB)	ND		140	13	ug/m3			05/16/17 02:10	22.8
1,2-Dichlorobenzene	ND		55	18	ug/m3			05/16/17 02:10	22.8
1,3-Dichlorobenzene	ND		55	15	ug/m3			05/16/17 02:10	22.8
1,4-Dichlorobenzene	ND		55	20	ug/m3			05/16/17 02:10	22.8
Dichlorodifluoromethane	ND		45	16	ug/m3			05/16/17 02:10	22.8
1,1-Dichloroethane	ND		28	6.6	ug/m3			05/16/17 02:10	22.8
1,2-Dichloroethane	ND		74	8.1	ug/m3			05/16/17 02:10	22.8
1,1-Dichloroethene	ND		72	12	ug/m3			05/16/17 02:10	22.8
cis-1,2-Dichloroethene	35 J		36	8.0	ug/m3			05/16/17 02:10	22.8
trans-1,2-Dichloroethene	ND		36	9.0	ug/m3			05/16/17 02:10	22.8
1,2-Dichloropropane	ND		42	25	ug/m3			05/16/17 02:10	22.8
cis-1,3-Dichloropropene	ND		41	11	ug/m3			05/16/17 02:10	22.8
trans-1,3-Dichloropropene	ND		41	9.1	ug/m3			05/16/17 02:10	22.8
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		64	25	ug/m3			05/16/17 02:10	22.8

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-05

Date Collected: 04/27/17 14:05

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-5

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	7.5	J	40	6.2	ug/m3			05/16/17 02:10	22.8
4-Ethyltoluene	ND		45	21	ug/m3			05/16/17 02:10	22.8
Hexachlorobutadiene	ND		490	110	ug/m3			05/16/17 02:10	22.8
2-Hexanone	ND		37	8.1	ug/m3			05/16/17 02:10	22.8
Methylene Chloride	37		32	5.7	ug/m3			05/16/17 02:10	22.8
4-Methyl-2-pentanone (MIBK)	ND		37	13	ug/m3			05/16/17 02:10	22.8
Styrene	ND		39	5.7	ug/m3			05/16/17 02:10	22.8
1,1,2,2-Tetrachloroethane	ND		63	11	ug/m3			05/16/17 02:10	22.8
Tetrachloroethene	ND		62	7.9	ug/m3			05/16/17 02:10	22.8
Toluene	3300		34	4.4	ug/m3			05/16/17 02:10	22.8
1,2,4-Trichlorobenzene	ND		340	73	ug/m3			05/16/17 02:10	22.8
1,1,1-Trichloroethane	ND		37	8.1	ug/m3			05/16/17 02:10	22.8
1,1,2-Trichloroethane	ND		50	8.3	ug/m3			05/16/17 02:10	22.8
Trichloroethene	23	J	49	13	ug/m3			05/16/17 02:10	22.8
Trichlorofluoromethane	ND		51	25	ug/m3			05/16/17 02:10	22.8
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		70	28	ug/m3			05/16/17 02:10	22.8
1,2,4-Trimethylbenzene	31	J	90	18	ug/m3			05/16/17 02:10	22.8
1,3,5-Trimethylbenzene	17	J	45	14	ug/m3			05/16/17 02:10	22.8
Vinyl acetate	ND		64	12	ug/m3			05/16/17 02:10	22.8
Vinyl chloride	ND		23	7.0	ug/m3			05/16/17 02:10	22.8
m,p-Xylene	32	J	79	9.9	ug/m3			05/16/17 02:10	22.8
o-Xylene	13	J	40	5.3	ug/m3			05/16/17 02:10	22.8
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		70 - 130					05/16/17 02:10	22.8
1,2-Dichloroethane-d4 (Surr)	93		70 - 130					05/16/17 02:10	22.8
Toluene-d8 (Surr)	99		70 - 130					05/16/17 02:10	22.8

Client Sample ID: HOU-06

Date Collected: 04/27/17 13:52

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-6

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		4.0	0.80	ppb v/v			05/16/17 03:01	10.1
Benzyl chloride	ND		8.1	1.6	ppb v/v			05/16/17 03:01	10.1
Bromodichloromethane	5.2		3.0	0.67	ppb v/v			05/16/17 03:01	10.1
Bromoform	ND		4.0	0.71	ppb v/v			05/16/17 03:01	10.1
Bromomethane	ND		8.1	3.4	ppb v/v			05/16/17 03:01	10.1
2-Butanone (MEK)	22		8.1	2.0	ppb v/v			05/16/17 03:01	10.1
Carbon disulfide	66		8.1	0.79	ppb v/v			05/16/17 03:01	10.1
Carbon tetrachloride	ND		8.1	0.65	ppb v/v			05/16/17 03:01	10.1
Chlorobenzene	ND		3.0	0.65	ppb v/v			05/16/17 03:01	10.1
Dibromochloromethane	0.95	J	4.0	0.80	ppb v/v			05/16/17 03:01	10.1
Chloroethane	ND		8.1	3.1	ppb v/v			05/16/17 03:01	10.1
Chloroform	100		3.0	0.96	ppb v/v			05/16/17 03:01	10.1
Chloromethane	7.1	J	8.1	2.0	ppb v/v			05/16/17 03:01	10.1
1,2-Dibromoethane (EDB)	ND		8.1	0.76	ppb v/v			05/16/17 03:01	10.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-06

Date Collected: 04/27/17 13:52

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-6

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene	ND		4.0	1.3	ppb v/v			05/16/17 03:01	10.1
1,3-Dichlorobenzene	ND		4.0	1.1	ppb v/v			05/16/17 03:01	10.1
1,4-Dichlorobenzene	ND		4.0	1.5	ppb v/v			05/16/17 03:01	10.1
Dichlorodifluoromethane	ND		4.0	1.5	ppb v/v			05/16/17 03:01	10.1
1,1-Dichloroethane	ND		3.0	0.73	ppb v/v			05/16/17 03:01	10.1
1,2-Dichloroethane	ND		8.1	0.89	ppb v/v			05/16/17 03:01	10.1
1,1-Dichloroethene	ND		8.1	1.3	ppb v/v			05/16/17 03:01	10.1
cis-1,2-Dichloroethene	9.1		4.0	0.90	ppb v/v			05/16/17 03:01	10.1
trans-1,2-Dichloroethene	ND		4.0	1.0	ppb v/v			05/16/17 03:01	10.1
1,2-Dichloropropane	ND		4.0	2.4	ppb v/v			05/16/17 03:01	10.1
cis-1,3-Dichloropropene	ND		4.0	1.1	ppb v/v			05/16/17 03:01	10.1
trans-1,3-Dichloropropene	ND		4.0	0.89	ppb v/v			05/16/17 03:01	10.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.0	1.6	ppb v/v			05/16/17 03:01	10.1
Ethylbenzene	ND		4.0	0.64	ppb v/v			05/16/17 03:01	10.1
4-Ethyltoluene	ND		4.0	1.9	ppb v/v			05/16/17 03:01	10.1
Hexachlorobutadiene	ND		20	4.4	ppb v/v			05/16/17 03:01	10.1
2-Hexanone	ND		4.0	0.88	ppb v/v			05/16/17 03:01	10.1
Methylene Chloride	13		4.0	0.73	ppb v/v			05/16/17 03:01	10.1
4-Methyl-2-pentanone (MIBK)	ND		4.0	1.4	ppb v/v			05/16/17 03:01	10.1
Styrene	ND		4.0	0.60	ppb v/v			05/16/17 03:01	10.1
1,1,2,2-Tetrachloroethane	ND		4.0	0.70	ppb v/v			05/16/17 03:01	10.1
Tetrachloroethene	0.99 J		4.0	0.52	ppb v/v			05/16/17 03:01	10.1
Toluene	560		4.0	0.52	ppb v/v			05/16/17 03:01	10.1
1,2,4-Trichlorobenzene	ND		20	4.4	ppb v/v			05/16/17 03:01	10.1
1,1,1-Trichloroethane	ND		3.0	0.66	ppb v/v			05/16/17 03:01	10.1
1,1,2-Trichloroethane	ND		4.0	0.68	ppb v/v			05/16/17 03:01	10.1
Trichloroethene	1.9 J		4.0	1.1	ppb v/v			05/16/17 03:01	10.1
Trichlorofluoromethane	ND		4.0	2.0	ppb v/v			05/16/17 03:01	10.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		4.0	1.6	ppb v/v			05/16/17 03:01	10.1
1,2,4-Trimethylbenzene	ND		8.1	1.6	ppb v/v			05/16/17 03:01	10.1
1,3,5-Trimethylbenzene	ND		4.0	1.3	ppb v/v			05/16/17 03:01	10.1
Vinyl acetate	ND		8.1	1.5	ppb v/v			05/16/17 03:01	10.1
Vinyl chloride	ND		4.0	1.2	ppb v/v			05/16/17 03:01	10.1
m,p-Xylene	1.8 J		8.1	1.0	ppb v/v			05/16/17 03:01	10.1
o-Xylene	0.83 J		4.0	0.55	ppb v/v			05/16/17 03:01	10.1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		13	2.5	ug/m3			05/16/17 03:01	10.1
Benzyl chloride	ND		42	8.5	ug/m3			05/16/17 03:01	10.1
Bromodichloromethane	35		20	4.5	ug/m3			05/16/17 03:01	10.1
Bromoform	ND		42	7.3	ug/m3			05/16/17 03:01	10.1
Bromomethane	ND		31	13	ug/m3			05/16/17 03:01	10.1
2-Butanone (MEK)	66		24	5.9	ug/m3			05/16/17 03:01	10.1
Carbon disulfide	210		25	2.5	ug/m3			05/16/17 03:01	10.1
Carbon tetrachloride	ND		51	4.1	ug/m3			05/16/17 03:01	10.1
Chlorobenzene	ND		14	3.0	ug/m3			05/16/17 03:01	10.1
Dibromochloromethane	8.1 J		34	6.8	ug/m3			05/16/17 03:01	10.1
Chloroethane	ND		21	8.2	ug/m3			05/16/17 03:01	10.1
Chloroform	500		15	4.7	ug/m3			05/16/17 03:01	10.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-06

Date Collected: 04/27/17 13:52

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-6

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloromethane	15	J	17	4.1	ug/m3			05/16/17 03:01	10.1
1,2-Dibromoethane (EDB)	ND		62	5.8	ug/m3			05/16/17 03:01	10.1
1,2-Dichlorobenzene	ND		24	7.9	ug/m3			05/16/17 03:01	10.1
1,3-Dichlorobenzene	ND		24	6.7	ug/m3			05/16/17 03:01	10.1
1,4-Dichlorobenzene	ND		24	9.0	ug/m3			05/16/17 03:01	10.1
Dichlorodifluoromethane	ND		20	7.2	ug/m3			05/16/17 03:01	10.1
1,1-Dichloroethane	ND		12	2.9	ug/m3			05/16/17 03:01	10.1
1,2-Dichloroethane	ND		33	3.6	ug/m3			05/16/17 03:01	10.1
1,1-Dichloroethene	ND		32	5.2	ug/m3			05/16/17 03:01	10.1
cis-1,2-Dichloroethene	36		16	3.6	ug/m3			05/16/17 03:01	10.1
trans-1,2-Dichloroethene	ND		16	4.0	ug/m3			05/16/17 03:01	10.1
1,2-Dichloropropane	ND		19	11	ug/m3			05/16/17 03:01	10.1
cis-1,3-Dichloropropene	ND		18	4.8	ug/m3			05/16/17 03:01	10.1
trans-1,3-Dichloropropene	ND		18	4.0	ug/m3			05/16/17 03:01	10.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		28	11	ug/m3			05/16/17 03:01	10.1
Ethylbenzene	ND		18	2.8	ug/m3			05/16/17 03:01	10.1
4-Ethyltoluene	ND		20	9.3	ug/m3			05/16/17 03:01	10.1
Hexachlorobutadiene	ND		220	47	ug/m3			05/16/17 03:01	10.1
2-Hexanone	ND		17	3.6	ug/m3			05/16/17 03:01	10.1
Methylene Chloride	44		14	2.5	ug/m3			05/16/17 03:01	10.1
4-Methyl-2-pentanone (MIBK)	ND		17	5.6	ug/m3			05/16/17 03:01	10.1
Styrene	ND		17	2.5	ug/m3			05/16/17 03:01	10.1
1,1,2,2-Tetrachloroethane	ND		28	4.8	ug/m3			05/16/17 03:01	10.1
Tetrachloroethene	6.7	J	27	3.5	ug/m3			05/16/17 03:01	10.1
Toluene	2100		15	1.9	ug/m3			05/16/17 03:01	10.1
1,2,4-Trichlorobenzene	ND		150	32	ug/m3			05/16/17 03:01	10.1
1,1,1-Trichloroethane	ND		17	3.6	ug/m3			05/16/17 03:01	10.1
1,1,2-Trichloroethane	ND		22	3.7	ug/m3			05/16/17 03:01	10.1
Trichloroethene	10	J	22	5.7	ug/m3			05/16/17 03:01	10.1
Trichlorofluoromethane	ND		23	11	ug/m3			05/16/17 03:01	10.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		31	13	ug/m3			05/16/17 03:01	10.1
1,2,4-Trimethylbenzene	ND		40	8.0	ug/m3			05/16/17 03:01	10.1
1,3,5-Trimethylbenzene	ND		20	6.2	ug/m3			05/16/17 03:01	10.1
Vinyl acetate	ND		28	5.2	ug/m3			05/16/17 03:01	10.1
Vinyl chloride	ND		10	3.1	ug/m3			05/16/17 03:01	10.1
m,p-Xylene	7.7	J	35	4.4	ug/m3			05/16/17 03:01	10.1
o-Xylene	3.6	J	18	2.4	ug/m3			05/16/17 03:01	10.1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130		05/16/17 03:01	10.1
1,2-Dichloroethane-d4 (Surr)	95		70 - 130		05/16/17 03:01	10.1
Toluene-d8 (Surr)	99		70 - 130		05/16/17 03:01	10.1

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1600		240	8.5	ppb v/v			05/16/17 08:30	47.8
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3800		570	20	ug/m3			05/16/17 08:30	47.8

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-06

Date Collected: 04/27/17 13:52

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-6

Matrix: Air

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		70 - 130		05/16/17 08:30	47.8
1,2-Dichloroethane-d4 (Surr)	93		70 - 130		05/16/17 08:30	47.8
Toluene-d8 (Surr)	101		70 - 130		05/16/17 08:30	47.8

Client Sample ID: HOU-07

Date Collected: 04/27/17 13:25

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-7

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	42		5.0	0.18	ppb v/v			05/16/17 03:58	1
Benzene	0.30	J	0.40	0.079	ppb v/v			05/16/17 03:58	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/16/17 03:58	1
Bromodichloromethane	11		0.30	0.066	ppb v/v			05/16/17 03:58	1
Bromoform	0.22	J	0.40	0.070	ppb v/v			05/16/17 03:58	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/16/17 03:58	1
2-Butanone (MEK)	1.9		0.80	0.20	ppb v/v			05/16/17 03:58	1
Carbon disulfide	33		0.80	0.078	ppb v/v			05/16/17 03:58	1
Carbon tetrachloride	0.13	J	0.80	0.064	ppb v/v			05/16/17 03:58	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			05/16/17 03:58	1
Dibromochloromethane	2.2		0.40	0.079	ppb v/v			05/16/17 03:58	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/16/17 03:58	1
Chloroform	36		0.30	0.095	ppb v/v			05/16/17 03:58	1
Chloromethane	1.6		0.80	0.20	ppb v/v			05/16/17 03:58	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/16/17 03:58	1
1,2-Dichlorobenzene	0.15	J	0.40	0.13	ppb v/v			05/16/17 03:58	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/16/17 03:58	1
1,4-Dichlorobenzene	15		0.40	0.15	ppb v/v			05/16/17 03:58	1
Dichlorodifluoromethane	0.23	J	0.40	0.15	ppb v/v			05/16/17 03:58	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/16/17 03:58	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/16/17 03:58	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			05/16/17 03:58	1
cis-1,2-Dichloroethene	16		0.40	0.089	ppb v/v			05/16/17 03:58	1
trans-1,2-Dichloroethene	0.44		0.40	0.10	ppb v/v			05/16/17 03:58	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/16/17 03:58	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/16/17 03:58	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/16/17 03:58	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			05/16/17 03:58	1
Ethylbenzene	0.15	J	0.40	0.063	ppb v/v			05/16/17 03:58	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/16/17 03:58	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/16/17 03:58	1
2-Hexanone	0.16	J	0.40	0.087	ppb v/v			05/16/17 03:58	1
Methylene Chloride	2.3		0.40	0.072	ppb v/v			05/16/17 03:58	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			05/16/17 03:58	1
Styrene	0.34	J	0.40	0.059	ppb v/v			05/16/17 03:58	1
1,1,2,2-Tetrachloroethane	0.089	J	0.40	0.069	ppb v/v			05/16/17 03:58	1
Tetrachloroethene	21		0.40	0.051	ppb v/v			05/16/17 03:58	1
Toluene	5.9		0.40	0.051	ppb v/v			05/16/17 03:58	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-07

Date Collected: 04/27/17 13:25

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-7

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/16/17 03:58	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/16/17 03:58	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/16/17 03:58	1
Trichloroethene	3.6		0.40	0.11	ppb v/v			05/16/17 03:58	1
Trichlorofluoromethane	0.23	J	0.40	0.20	ppb v/v			05/16/17 03:58	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/16/17 03:58	1
1,2,4-Trimethylbenzene	0.21	J	0.80	0.16	ppb v/v			05/16/17 03:58	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/16/17 03:58	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			05/16/17 03:58	1
Vinyl chloride	3.0		0.40	0.12	ppb v/v			05/16/17 03:58	1
m,p-Xylene	0.41	J	0.80	0.10	ppb v/v			05/16/17 03:58	1
o-Xylene	0.18	J	0.40	0.054	ppb v/v			05/16/17 03:58	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	100		12	0.42	ug/m3			05/16/17 03:58	1
Benzene	0.96	J	1.3	0.25	ug/m3			05/16/17 03:58	1
Benzyl chloride	ND		4.1	0.84	ug/m3			05/16/17 03:58	1
Bromodichloromethane	76		2.0	0.44	ug/m3			05/16/17 03:58	1
Bromoform	2.3	J	4.1	0.72	ug/m3			05/16/17 03:58	1
Bromomethane	ND		3.1	1.3	ug/m3			05/16/17 03:58	1
2-Butanone (MEK)	5.6		2.4	0.59	ug/m3			05/16/17 03:58	1
Carbon disulfide	100		2.5	0.24	ug/m3			05/16/17 03:58	1
Carbon tetrachloride	0.82	J	5.0	0.40	ug/m3			05/16/17 03:58	1
Chlorobenzene	ND		1.4	0.29	ug/m3			05/16/17 03:58	1
Dibromochloromethane	19		3.4	0.67	ug/m3			05/16/17 03:58	1
Chloroethane	ND		2.1	0.81	ug/m3			05/16/17 03:58	1
Chloroform	180		1.5	0.46	ug/m3			05/16/17 03:58	1
Chloromethane	3.2		1.7	0.41	ug/m3			05/16/17 03:58	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			05/16/17 03:58	1
1,2-Dichlorobenzene	0.90	J	2.4	0.78	ug/m3			05/16/17 03:58	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			05/16/17 03:58	1
1,4-Dichlorobenzene	90		2.4	0.90	ug/m3			05/16/17 03:58	1
Dichlorodifluoromethane	1.1	J	2.0	0.72	ug/m3			05/16/17 03:58	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			05/16/17 03:58	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			05/16/17 03:58	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			05/16/17 03:58	1
cis-1,2-Dichloroethene	62		1.6	0.35	ug/m3			05/16/17 03:58	1
trans-1,2-Dichloroethene	1.7		1.6	0.40	ug/m3			05/16/17 03:58	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			05/16/17 03:58	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			05/16/17 03:58	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			05/16/17 03:58	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			05/16/17 03:58	1
Ethylbenzene	0.66	J	1.7	0.27	ug/m3			05/16/17 03:58	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			05/16/17 03:58	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			05/16/17 03:58	1
2-Hexanone	0.66	J	1.6	0.36	ug/m3			05/16/17 03:58	1
Methylene Chloride	8.0		1.4	0.25	ug/m3			05/16/17 03:58	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			05/16/17 03:58	1
Styrene	1.4	J	1.7	0.25	ug/m3			05/16/17 03:58	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-07

Date Collected: 04/27/17 13:25

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-7

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	0.61	J	2.7	0.47	ug/m3			05/16/17 03:58	1
Tetrachloroethene	140		2.7	0.35	ug/m3			05/16/17 03:58	1
Toluene	22		1.5	0.19	ug/m3			05/16/17 03:58	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			05/16/17 03:58	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			05/16/17 03:58	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			05/16/17 03:58	1
Trichloroethene	19		2.1	0.56	ug/m3			05/16/17 03:58	1
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3			05/16/17 03:58	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			05/16/17 03:58	1
1,2,4-Trimethylbenzene	1.1	J	3.9	0.80	ug/m3			05/16/17 03:58	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			05/16/17 03:58	1
Vinyl acetate	ND		2.8	0.51	ug/m3			05/16/17 03:58	1
Vinyl chloride	7.6		1.0	0.31	ug/m3			05/16/17 03:58	1
m,p-Xylene	1.8	J	3.5	0.43	ug/m3			05/16/17 03:58	1
o-Xylene	0.80	J	1.7	0.23	ug/m3			05/16/17 03:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		70 - 130					05/16/17 03:58	1
1,2-Dichloroethane-d4 (Surr)	94		70 - 130					05/16/17 03:58	1
Toluene-d8 (Surr)	100		70 - 130					05/16/17 03:58	1

Client Sample ID: HOU-08

Date Collected: 04/27/17 13:13

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-8

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	100		18	0.65	ppb v/v			05/16/17 04:50	3.67
Benzene	1.2	J	1.5	0.29	ppb v/v			05/16/17 04:50	3.67
Benzyl chloride	ND		2.9	0.60	ppb v/v			05/16/17 04:50	3.67
Bromodichloromethane	1.6		1.1	0.24	ppb v/v			05/16/17 04:50	3.67
Bromoform	ND		1.5	0.26	ppb v/v			05/16/17 04:50	3.67
Bromomethane	ND		2.9	1.2	ppb v/v			05/16/17 04:50	3.67
2-Butanone (MEK)	4.0		2.9	0.73	ppb v/v			05/16/17 04:50	3.67
Carbon disulfide	3.9		2.9	0.29	ppb v/v			05/16/17 04:50	3.67
Carbon tetrachloride	ND		2.9	0.23	ppb v/v			05/16/17 04:50	3.67
Chlorobenzene	ND		1.1	0.23	ppb v/v			05/16/17 04:50	3.67
Dibromochloromethane	0.41	J	1.5	0.29	ppb v/v			05/16/17 04:50	3.67
Chloroethane	ND		2.9	1.1	ppb v/v			05/16/17 04:50	3.67
Chloroform	5.1		1.1	0.35	ppb v/v			05/16/17 04:50	3.67
Chloromethane	1.2	J	2.9	0.72	ppb v/v			05/16/17 04:50	3.67
1,2-Dibromoethane (EDB)	ND		2.9	0.28	ppb v/v			05/16/17 04:50	3.67
1,2-Dichlorobenzene	ND		1.5	0.48	ppb v/v			05/16/17 04:50	3.67
1,3-Dichlorobenzene	ND		1.5	0.40	ppb v/v			05/16/17 04:50	3.67
1,4-Dichlorobenzene	ND		1.5	0.55	ppb v/v			05/16/17 04:50	3.67
Dichlorodifluoromethane	0.57	J	1.5	0.53	ppb v/v			05/16/17 04:50	3.67
1,1-Dichloroethane	ND		1.1	0.26	ppb v/v			05/16/17 04:50	3.67
1,2-Dichloroethane	ND		2.9	0.32	ppb v/v			05/16/17 04:50	3.67

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-08

Lab Sample ID: 320-27995-8

Date Collected: 04/27/17 13:13

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		2.9	0.47	ppb v/v			05/16/17 04:50	3.67
cis-1,2-Dichloroethene	15		1.5	0.33	ppb v/v			05/16/17 04:50	3.67
trans-1,2-Dichloroethene	ND		1.5	0.37	ppb v/v			05/16/17 04:50	3.67
1,2-Dichloropropane	ND		1.5	0.88	ppb v/v			05/16/17 04:50	3.67
cis-1,3-Dichloropropene	ND		1.5	0.38	ppb v/v			05/16/17 04:50	3.67
trans-1,3-Dichloropropene	ND		1.5	0.32	ppb v/v			05/16/17 04:50	3.67
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.5	0.57	ppb v/v			05/16/17 04:50	3.67
Ethylbenzene	ND		1.5	0.23	ppb v/v			05/16/17 04:50	3.67
4-Ethyltoluene	2.1		1.5	0.69	ppb v/v			05/16/17 04:50	3.67
Hexachlorobutadiene	ND		7.3	1.6	ppb v/v			05/16/17 04:50	3.67
2-Hexanone	ND		1.5	0.32	ppb v/v			05/16/17 04:50	3.67
Methylene Chloride	5.7		1.5	0.26	ppb v/v			05/16/17 04:50	3.67
4-Methyl-2-pentanone (MIBK)	ND		1.5	0.50	ppb v/v			05/16/17 04:50	3.67
Styrene	ND		1.5	0.22	ppb v/v			05/16/17 04:50	3.67
1,1,2,2-Tetrachloroethane	ND		1.5	0.25	ppb v/v			05/16/17 04:50	3.67
Tetrachloroethene	72		1.5	0.19	ppb v/v			05/16/17 04:50	3.67
Toluene	14		1.5	0.19	ppb v/v			05/16/17 04:50	3.67
1,2,4-Trichlorobenzene	ND		7.3	1.6	ppb v/v			05/16/17 04:50	3.67
1,1,1-Trichloroethane	ND		1.1	0.24	ppb v/v			05/16/17 04:50	3.67
1,1,2-Trichloroethane	ND		1.5	0.25	ppb v/v			05/16/17 04:50	3.67
Trichloroethene	11		1.5	0.39	ppb v/v			05/16/17 04:50	3.67
Trichlorofluoromethane	ND		1.5	0.72	ppb v/v			05/16/17 04:50	3.67
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.5	0.60	ppb v/v			05/16/17 04:50	3.67
1,2,4-Trimethylbenzene	ND		2.9	0.59	ppb v/v			05/16/17 04:50	3.67
1,3,5-Trimethylbenzene	ND		1.5	0.46	ppb v/v			05/16/17 04:50	3.67
Vinyl acetate	ND		2.9	0.53	ppb v/v			05/16/17 04:50	3.67
Vinyl chloride	ND		1.5	0.44	ppb v/v			05/16/17 04:50	3.67
m,p-Xylene	1.1 J		2.9	0.37	ppb v/v			05/16/17 04:50	3.67
o-Xylene	0.38 J		1.5	0.20	ppb v/v			05/16/17 04:50	3.67
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	240		44	1.6	ug/m3			05/16/17 04:50	3.67
Benzene	3.8 J		4.7	0.93	ug/m3			05/16/17 04:50	3.67
Benzyl chloride	ND		15	3.1	ug/m3			05/16/17 04:50	3.67
Bromodichloromethane	10		7.4	1.6	ug/m3			05/16/17 04:50	3.67
Bromoform	ND		15	2.7	ug/m3			05/16/17 04:50	3.67
Bromomethane	ND		11	4.8	ug/m3			05/16/17 04:50	3.67
2-Butanone (MEK)	12		8.7	2.2	ug/m3			05/16/17 04:50	3.67
Carbon disulfide	12		9.1	0.89	ug/m3			05/16/17 04:50	3.67
Carbon tetrachloride	ND		18	1.5	ug/m3			05/16/17 04:50	3.67
Chlorobenzene	ND		5.1	1.1	ug/m3			05/16/17 04:50	3.67
Dibromochloromethane	3.5 J		13	2.5	ug/m3			05/16/17 04:50	3.67
Chloroethane	ND		7.7	3.0	ug/m3			05/16/17 04:50	3.67
Chloroform	25		5.4	1.7	ug/m3			05/16/17 04:50	3.67
Chloromethane	2.5 J		6.1	1.5	ug/m3			05/16/17 04:50	3.67
1,2-Dibromoethane (EDB)	ND		23	2.1	ug/m3			05/16/17 04:50	3.67
1,2-Dichlorobenzene	ND		8.8	2.9	ug/m3			05/16/17 04:50	3.67
1,3-Dichlorobenzene	ND		8.8	2.4	ug/m3			05/16/17 04:50	3.67
1,4-Dichlorobenzene	ND		8.8	3.3	ug/m3			05/16/17 04:50	3.67

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-08

Date Collected: 04/27/17 13:13

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-8

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	2.8	J	7.3	2.6	ug/m3			05/16/17 04:50	3.67
1,1-Dichloroethane	ND		4.5	1.1	ug/m3			05/16/17 04:50	3.67
1,2-Dichloroethane	ND		12	1.3	ug/m3			05/16/17 04:50	3.67
1,1-Dichloroethene	ND		12	1.9	ug/m3			05/16/17 04:50	3.67
cis-1,2-Dichloroethene	58		5.8	1.3	ug/m3			05/16/17 04:50	3.67
trans-1,2-Dichloroethene	ND		5.8	1.5	ug/m3			05/16/17 04:50	3.67
1,2-Dichloropropane	ND		6.8	4.1	ug/m3			05/16/17 04:50	3.67
cis-1,3-Dichloropropene	ND		6.7	1.7	ug/m3			05/16/17 04:50	3.67
trans-1,3-Dichloropropene	ND		6.7	1.5	ug/m3			05/16/17 04:50	3.67
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		10	4.0	ug/m3			05/16/17 04:50	3.67
Ethylbenzene	ND		6.4	1.0	ug/m3			05/16/17 04:50	3.67
4-Ethyltoluene	10		7.2	3.4	ug/m3			05/16/17 04:50	3.67
Hexachlorobutadiene	ND		78	17	ug/m3			05/16/17 04:50	3.67
2-Hexanone	ND		6.0	1.3	ug/m3			05/16/17 04:50	3.67
Methylene Chloride	20		5.1	0.92	ug/m3			05/16/17 04:50	3.67
4-Methyl-2-pentanone (MIBK)	ND		6.0	2.0	ug/m3			05/16/17 04:50	3.67
Styrene	ND		6.3	0.92	ug/m3			05/16/17 04:50	3.67
1,1,2,2-Tetrachloroethane	ND		10	1.7	ug/m3			05/16/17 04:50	3.67
Tetrachloroethene	490		10	1.3	ug/m3			05/16/17 04:50	3.67
Toluene	51		5.5	0.71	ug/m3			05/16/17 04:50	3.67
1,2,4-Trichlorobenzene	ND		54	12	ug/m3			05/16/17 04:50	3.67
1,1,1-Trichloroethane	ND		6.0	1.3	ug/m3			05/16/17 04:50	3.67
1,1,2-Trichloroethane	ND		8.0	1.3	ug/m3			05/16/17 04:50	3.67
Trichloroethene	58		7.9	2.1	ug/m3			05/16/17 04:50	3.67
Trichlorofluoromethane	ND		8.2	4.0	ug/m3			05/16/17 04:50	3.67
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		11	4.6	ug/m3			05/16/17 04:50	3.67
1,2,4-Trimethylbenzene	ND		14	2.9	ug/m3			05/16/17 04:50	3.67
1,3,5-Trimethylbenzene	ND		7.2	2.3	ug/m3			05/16/17 04:50	3.67
Vinyl acetate	ND		10	1.9	ug/m3			05/16/17 04:50	3.67
Vinyl chloride	ND		3.8	1.1	ug/m3			05/16/17 04:50	3.67
m,p-Xylene	4.6	J	13	1.6	ug/m3			05/16/17 04:50	3.67
o-Xylene	1.7	J	6.4	0.86	ug/m3			05/16/17 04:50	3.67
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130					05/16/17 04:50	3.67
1,2-Dichloroethane-d4 (Surr)	96		70 - 130					05/16/17 04:50	3.67
Toluene-d8 (Surr)	100		70 - 130					05/16/17 04:50	3.67

Client Sample ID: HOU-09

Date Collected: 04/27/17 12:59

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-9

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	26		10	0.36	ppb v/v			05/16/17 06:47	2.03
Benzene	ND		0.81	0.16	ppb v/v			05/16/17 06:47	2.03
Benzyl chloride	ND		1.6	0.33	ppb v/v			05/16/17 06:47	2.03
Bromodichloromethane	7.9		0.61	0.13	ppb v/v			05/16/17 06:47	2.03

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-09

Date Collected: 04/27/17 12:59

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-9

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromoform	0.25	J	0.81	0.14	ppb v/v			05/16/17 06:47	2.03
Bromomethane	ND		1.6	0.68	ppb v/v			05/16/17 06:47	2.03
2-Butanone (MEK)	0.82	J	1.6	0.40	ppb v/v			05/16/17 06:47	2.03
Carbon disulfide	9.6		1.6	0.16	ppb v/v			05/16/17 06:47	2.03
Carbon tetrachloride	ND		1.6	0.13	ppb v/v			05/16/17 06:47	2.03
Chlorobenzene	ND		0.61	0.13	ppb v/v			05/16/17 06:47	2.03
Dibromochloromethane	1.7		0.81	0.16	ppb v/v			05/16/17 06:47	2.03
Chloroethane	ND		1.6	0.63	ppb v/v			05/16/17 06:47	2.03
Chloroform	44		0.61	0.19	ppb v/v			05/16/17 06:47	2.03
Chloromethane	1.7		1.6	0.40	ppb v/v			05/16/17 06:47	2.03
1,2-Dibromoethane (EDB)	ND		1.6	0.15	ppb v/v			05/16/17 06:47	2.03
1,2-Dichlorobenzene	ND		0.81	0.26	ppb v/v			05/16/17 06:47	2.03
1,3-Dichlorobenzene	ND		0.81	0.22	ppb v/v			05/16/17 06:47	2.03
1,4-Dichlorobenzene	0.91		0.81	0.30	ppb v/v			05/16/17 06:47	2.03
Dichlorodifluoromethane	0.35	J	0.81	0.29	ppb v/v			05/16/17 06:47	2.03
1,1-Dichloroethane	ND		0.61	0.15	ppb v/v			05/16/17 06:47	2.03
1,2-Dichloroethane	ND		1.6	0.18	ppb v/v			05/16/17 06:47	2.03
1,1-Dichloroethene	ND		1.6	0.26	ppb v/v			05/16/17 06:47	2.03
cis-1,2-Dichloroethene	ND		0.81	0.18	ppb v/v			05/16/17 06:47	2.03
trans-1,2-Dichloroethene	ND		0.81	0.20	ppb v/v			05/16/17 06:47	2.03
1,2-Dichloropropane	ND		0.81	0.49	ppb v/v			05/16/17 06:47	2.03
cis-1,3-Dichloropropene	ND		0.81	0.21	ppb v/v			05/16/17 06:47	2.03
trans-1,3-Dichloropropene	ND		0.81	0.18	ppb v/v			05/16/17 06:47	2.03
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.81	0.31	ppb v/v			05/16/17 06:47	2.03
Ethylbenzene	0.66	J	0.81	0.13	ppb v/v			05/16/17 06:47	2.03
4-Ethyltoluene	ND		0.81	0.38	ppb v/v			05/16/17 06:47	2.03
Hexachlorobutadiene	ND		4.1	0.88	ppb v/v			05/16/17 06:47	2.03
2-Hexanone	ND		0.81	0.18	ppb v/v			05/16/17 06:47	2.03
Methylene Chloride	9.9		0.81	0.15	ppb v/v			05/16/17 06:47	2.03
4-Methyl-2-pentanone (MIBK)	ND		0.81	0.27	ppb v/v			05/16/17 06:47	2.03
Styrene	2.3		0.81	0.12	ppb v/v			05/16/17 06:47	2.03
1,1,1,2-Tetrachloroethane	ND		0.81	0.14	ppb v/v			05/16/17 06:47	2.03
Tetrachloroethene	0.79	J	0.81	0.10	ppb v/v			05/16/17 06:47	2.03
Toluene	100		0.81	0.10	ppb v/v			05/16/17 06:47	2.03
1,2,4-Trichlorobenzene	ND		4.1	0.88	ppb v/v			05/16/17 06:47	2.03
1,1,1-Trichloroethane	ND		0.61	0.13	ppb v/v			05/16/17 06:47	2.03
1,1,2-Trichloroethane	ND		0.81	0.14	ppb v/v			05/16/17 06:47	2.03
Trichloroethene	ND		0.81	0.21	ppb v/v			05/16/17 06:47	2.03
Trichlorofluoromethane	ND		0.81	0.40	ppb v/v			05/16/17 06:47	2.03
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.81	0.33	ppb v/v			05/16/17 06:47	2.03
1,2,4-Trimethylbenzene	0.63	J	1.6	0.33	ppb v/v			05/16/17 06:47	2.03
1,3,5-Trimethylbenzene	0.27	J	0.81	0.25	ppb v/v			05/16/17 06:47	2.03
Vinyl acetate	ND		1.6	0.29	ppb v/v			05/16/17 06:47	2.03
Vinyl chloride	ND		0.81	0.24	ppb v/v			05/16/17 06:47	2.03
m,p-Xylene	0.81	J	1.6	0.20	ppb v/v			05/16/17 06:47	2.03
o-Xylene	0.36	J	0.81	0.11	ppb v/v			05/16/17 06:47	2.03
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	61		24	0.86	ug/m3			05/16/17 06:47	2.03

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-09

Date Collected: 04/27/17 12:59

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-9

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.6	0.51	ug/m3			05/16/17 06:47	2.03
Benzyl chloride	ND		8.4	1.7	ug/m3			05/16/17 06:47	2.03
Bromodichloromethane	53		4.1	0.90	ug/m3			05/16/17 06:47	2.03
Bromoform	2.5	J	8.4	1.5	ug/m3			05/16/17 06:47	2.03
Bromomethane	ND		6.3	2.6	ug/m3			05/16/17 06:47	2.03
2-Butanone (MEK)	2.4	J	4.8	1.2	ug/m3			05/16/17 06:47	2.03
Carbon disulfide	30		5.1	0.49	ug/m3			05/16/17 06:47	2.03
Carbon tetrachloride	ND		10	0.82	ug/m3			05/16/17 06:47	2.03
Chlorobenzene	ND		2.8	0.60	ug/m3			05/16/17 06:47	2.03
Dibromochloromethane	15		6.9	1.4	ug/m3			05/16/17 06:47	2.03
Chloroethane	ND		4.3	1.6	ug/m3			05/16/17 06:47	2.03
Chloroform	220		3.0	0.94	ug/m3			05/16/17 06:47	2.03
Chloromethane	3.6		3.4	0.83	ug/m3			05/16/17 06:47	2.03
1,2-Dibromoethane (EDB)	ND		12	1.2	ug/m3			05/16/17 06:47	2.03
1,2-Dichlorobenzene	ND		4.9	1.6	ug/m3			05/16/17 06:47	2.03
1,3-Dichlorobenzene	ND		4.9	1.3	ug/m3			05/16/17 06:47	2.03
1,4-Dichlorobenzene	5.5		4.9	1.8	ug/m3			05/16/17 06:47	2.03
Dichlorodifluoromethane	1.7	J	4.0	1.5	ug/m3			05/16/17 06:47	2.03
1,1-Dichloroethane	ND		2.5	0.59	ug/m3			05/16/17 06:47	2.03
1,2-Dichloroethane	ND		6.6	0.72	ug/m3			05/16/17 06:47	2.03
1,1-Dichloroethene	ND		6.4	1.0	ug/m3			05/16/17 06:47	2.03
cis-1,2-Dichloroethene	ND		3.2	0.72	ug/m3			05/16/17 06:47	2.03
trans-1,2-Dichloroethene	ND		3.2	0.80	ug/m3			05/16/17 06:47	2.03
1,2-Dichloropropane	ND		3.8	2.3	ug/m3			05/16/17 06:47	2.03
cis-1,3-Dichloropropene	ND		3.7	0.96	ug/m3			05/16/17 06:47	2.03
trans-1,3-Dichloropropene	ND		3.7	0.81	ug/m3			05/16/17 06:47	2.03
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		5.7	2.2	ug/m3			05/16/17 06:47	2.03
Ethylbenzene	2.9	J	3.5	0.56	ug/m3			05/16/17 06:47	2.03
4-Ethyltoluene	ND		4.0	1.9	ug/m3			05/16/17 06:47	2.03
Hexachlorobutadiene	ND		43	9.4	ug/m3			05/16/17 06:47	2.03
2-Hexanone	ND		3.3	0.72	ug/m3			05/16/17 06:47	2.03
Methylene Chloride	35		2.8	0.51	ug/m3			05/16/17 06:47	2.03
4-Methyl-2-pentanone (MIBK)	ND		3.3	1.1	ug/m3			05/16/17 06:47	2.03
Styrene	9.7		3.5	0.51	ug/m3			05/16/17 06:47	2.03
1,1,2,2-Tetrachloroethane	ND		5.6	0.96	ug/m3			05/16/17 06:47	2.03
Tetrachloroethene	5.4	J	5.5	0.70	ug/m3			05/16/17 06:47	2.03
Toluene	390		3.1	0.39	ug/m3			05/16/17 06:47	2.03
1,2,4-Trichlorobenzene	ND		30	6.5	ug/m3			05/16/17 06:47	2.03
1,1,1-Trichloroethane	ND		3.3	0.72	ug/m3			05/16/17 06:47	2.03
1,1,2-Trichloroethane	ND		4.4	0.74	ug/m3			05/16/17 06:47	2.03
Trichloroethene	ND		4.4	1.1	ug/m3			05/16/17 06:47	2.03
Trichlorofluoromethane	ND		4.6	2.2	ug/m3			05/16/17 06:47	2.03
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		6.2	2.5	ug/m3			05/16/17 06:47	2.03
1,2,4-Trimethylbenzene	3.1	J	8.0	1.6	ug/m3			05/16/17 06:47	2.03
1,3,5-Trimethylbenzene	1.4	J	4.0	1.2	ug/m3			05/16/17 06:47	2.03
Vinyl acetate	ND		5.7	1.0	ug/m3			05/16/17 06:47	2.03
Vinyl chloride	ND		2.1	0.62	ug/m3			05/16/17 06:47	2.03
m,p-Xylene	3.5	J	7.1	0.88	ug/m3			05/16/17 06:47	2.03

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-09

Date Collected: 04/27/17 12:59

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-9

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Xylene	1.6	J	3.5	0.48	ug/m3			05/16/17 06:47	2.03
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					05/16/17 06:47	2.03
1,2-Dichloroethane-d4 (Surr)	97		70 - 130					05/16/17 06:47	2.03
Toluene-d8 (Surr)	100		70 - 130					05/16/17 06:47	2.03

Client Sample ID: HOU-10

Date Collected: 04/27/17 12:36

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-10

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	49		33	1.2	ppb v/v			05/16/17 07:39	6.65
Benzene	ND		2.7	0.53	ppb v/v			05/16/17 07:39	6.65
Benzyl chloride	ND		5.3	1.1	ppb v/v			05/16/17 07:39	6.65
Bromodichloromethane	5.3		2.0	0.44	ppb v/v			05/16/17 07:39	6.65
Bromoform	ND		2.7	0.47	ppb v/v			05/16/17 07:39	6.65
Bromomethane	ND		5.3	2.2	ppb v/v			05/16/17 07:39	6.65
2-Butanone (MEK)	ND		5.3	1.3	ppb v/v			05/16/17 07:39	6.65
Carbon disulfide	25		5.3	0.52	ppb v/v			05/16/17 07:39	6.65
Carbon tetrachloride	ND		5.3	0.43	ppb v/v			05/16/17 07:39	6.65
Chlorobenzene	ND		2.0	0.43	ppb v/v			05/16/17 07:39	6.65
Dibromochloromethane	0.82	J	2.7	0.53	ppb v/v			05/16/17 07:39	6.65
Chloroethane	ND		5.3	2.0	ppb v/v			05/16/17 07:39	6.65
Chloroform	21		2.0	0.63	ppb v/v			05/16/17 07:39	6.65
Chloromethane	2.1	J	5.3	1.3	ppb v/v			05/16/17 07:39	6.65
1,2-Dibromoethane (EDB)	ND		5.3	0.50	ppb v/v			05/16/17 07:39	6.65
1,2-Dichlorobenzene	ND		2.7	0.86	ppb v/v			05/16/17 07:39	6.65
1,3-Dichlorobenzene	ND		2.7	0.73	ppb v/v			05/16/17 07:39	6.65
1,4-Dichlorobenzene	ND		2.7	0.99	ppb v/v			05/16/17 07:39	6.65
Dichlorodifluoromethane	ND		2.7	0.96	ppb v/v			05/16/17 07:39	6.65
1,1-Dichloroethane	ND		2.0	0.48	ppb v/v			05/16/17 07:39	6.65
1,2-Dichloroethane	ND		5.3	0.59	ppb v/v			05/16/17 07:39	6.65
1,1-Dichloroethene	ND		5.3	0.86	ppb v/v			05/16/17 07:39	6.65
cis-1,2-Dichloroethene	270		2.7	0.59	ppb v/v			05/16/17 07:39	6.65
trans-1,2-Dichloroethene	2.1	J	2.7	0.67	ppb v/v			05/16/17 07:39	6.65
1,2-Dichloropropane	ND		2.7	1.6	ppb v/v			05/16/17 07:39	6.65
cis-1,3-Dichloropropene	ND		2.7	0.69	ppb v/v			05/16/17 07:39	6.65
trans-1,3-Dichloropropene	ND		2.7	0.59	ppb v/v			05/16/17 07:39	6.65
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.7	1.0	ppb v/v			05/16/17 07:39	6.65
Ethylbenzene	ND		2.7	0.42	ppb v/v			05/16/17 07:39	6.65
4-Ethyltoluene	ND		2.7	1.2	ppb v/v			05/16/17 07:39	6.65
Hexachlorobutadiene	ND		13	2.9	ppb v/v			05/16/17 07:39	6.65
2-Hexanone	ND		2.7	0.58	ppb v/v			05/16/17 07:39	6.65
Methylene Chloride	3.1		2.7	0.48	ppb v/v			05/16/17 07:39	6.65
4-Methyl-2-pentanone (MIBK)	ND		2.7	0.90	ppb v/v			05/16/17 07:39	6.65
Styrene	ND		2.7	0.39	ppb v/v			05/16/17 07:39	6.65

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-10

Lab Sample ID: 320-27995-10

Date Collected: 04/27/17 12:36

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	ND		2.7	0.46	ppb v/v			05/16/17 07:39	6.65
Tetrachloroethene	280		2.7	0.34	ppb v/v			05/16/17 07:39	6.65
Toluene	1.9	J	2.7	0.34	ppb v/v			05/16/17 07:39	6.65
1,2,4-Trichlorobenzene	ND		13	2.9	ppb v/v			05/16/17 07:39	6.65
1,1,1-Trichloroethane	ND		2.0	0.43	ppb v/v			05/16/17 07:39	6.65
1,1,2-Trichloroethane	ND		2.7	0.45	ppb v/v			05/16/17 07:39	6.65
Trichloroethene	83		2.7	0.70	ppb v/v			05/16/17 07:39	6.65
Trichlorofluoromethane	ND		2.7	1.3	ppb v/v			05/16/17 07:39	6.65
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		2.7	1.1	ppb v/v			05/16/17 07:39	6.65
1,2,4-Trimethylbenzene	ND		5.3	1.1	ppb v/v			05/16/17 07:39	6.65
1,3,5-Trimethylbenzene	ND		2.7	0.83	ppb v/v			05/16/17 07:39	6.65
Vinyl acetate	ND		5.3	0.96	ppb v/v			05/16/17 07:39	6.65
Vinyl chloride	4.3		2.7	0.80	ppb v/v			05/16/17 07:39	6.65
m,p-Xylene	ND		5.3	0.67	ppb v/v			05/16/17 07:39	6.65
o-Xylene	ND		2.7	0.36	ppb v/v			05/16/17 07:39	6.65
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	120		79	2.8	ug/m3			05/16/17 07:39	6.65
Benzene	ND		8.5	1.7	ug/m3			05/16/17 07:39	6.65
Benzyl chloride	ND		28	5.6	ug/m3			05/16/17 07:39	6.65
Bromodichloromethane	36		13	2.9	ug/m3			05/16/17 07:39	6.65
Bromoform	ND		27	4.8	ug/m3			05/16/17 07:39	6.65
Bromomethane	ND		21	8.7	ug/m3			05/16/17 07:39	6.65
2-Butanone (MEK)	ND		16	3.9	ug/m3			05/16/17 07:39	6.65
Carbon disulfide	78		17	1.6	ug/m3			05/16/17 07:39	6.65
Carbon tetrachloride	ND		33	2.7	ug/m3			05/16/17 07:39	6.65
Chlorobenzene	ND		9.2	2.0	ug/m3			05/16/17 07:39	6.65
Dibromochloromethane	7.0	J	23	4.5	ug/m3			05/16/17 07:39	6.65
Chloroethane	ND		14	5.4	ug/m3			05/16/17 07:39	6.65
Chloroform	100		9.7	3.1	ug/m3			05/16/17 07:39	6.65
Chloromethane	4.4	J	11	2.7	ug/m3			05/16/17 07:39	6.65
1,2-Dibromoethane (EDB)	ND		41	3.8	ug/m3			05/16/17 07:39	6.65
1,2-Dichlorobenzene	ND		16	5.2	ug/m3			05/16/17 07:39	6.65
1,3-Dichlorobenzene	ND		16	4.4	ug/m3			05/16/17 07:39	6.65
1,4-Dichlorobenzene	ND		16	6.0	ug/m3			05/16/17 07:39	6.65
Dichlorodifluoromethane	ND		13	4.8	ug/m3			05/16/17 07:39	6.65
1,1-Dichloroethane	ND		8.1	1.9	ug/m3			05/16/17 07:39	6.65
1,2-Dichloroethane	ND		22	2.4	ug/m3			05/16/17 07:39	6.65
1,1-Dichloroethene	ND		21	3.4	ug/m3			05/16/17 07:39	6.65
cis-1,2-Dichloroethene	1100		11	2.3	ug/m3			05/16/17 07:39	6.65
trans-1,2-Dichloroethene	8.4	J	11	2.6	ug/m3			05/16/17 07:39	6.65
1,2-Dichloropropane	ND		12	7.4	ug/m3			05/16/17 07:39	6.65
cis-1,3-Dichloropropene	ND		12	3.1	ug/m3			05/16/17 07:39	6.65
trans-1,3-Dichloropropene	ND		12	2.7	ug/m3			05/16/17 07:39	6.65
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		19	7.2	ug/m3			05/16/17 07:39	6.65
Ethylbenzene	ND		12	1.8	ug/m3			05/16/17 07:39	6.65
4-Ethyltoluene	ND		13	6.1	ug/m3			05/16/17 07:39	6.65
Hexachlorobutadiene	ND		140	31	ug/m3			05/16/17 07:39	6.65
2-Hexanone	ND		11	2.4	ug/m3			05/16/17 07:39	6.65

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-10

Lab Sample ID: 320-27995-10

Date Collected: 04/27/17 12:36

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Chloride	11		9.2	1.7	ug/m3			05/16/17 07:39	6.65
4-Methyl-2-pentanone (MIBK)	ND		11	3.7	ug/m3			05/16/17 07:39	6.65
Styrene	ND		11	1.7	ug/m3			05/16/17 07:39	6.65
1,1,2,2-Tetrachloroethane	ND		18	3.2	ug/m3			05/16/17 07:39	6.65
Tetrachloroethene	1900		18	2.3	ug/m3			05/16/17 07:39	6.65
Toluene	7.1 J		10	1.3	ug/m3			05/16/17 07:39	6.65
1,2,4-Trichlorobenzene	ND		99	21	ug/m3			05/16/17 07:39	6.65
1,1,1-Trichloroethane	ND		11	2.4	ug/m3			05/16/17 07:39	6.65
1,1,2-Trichloroethane	ND		15	2.4	ug/m3			05/16/17 07:39	6.65
Trichloroethene	450		14	3.8	ug/m3			05/16/17 07:39	6.65
Trichlorofluoromethane	ND		15	7.3	ug/m3			05/16/17 07:39	6.65
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		20	8.3	ug/m3			05/16/17 07:39	6.65
1,2,4-Trimethylbenzene	ND		26	5.3	ug/m3			05/16/17 07:39	6.65
1,3,5-Trimethylbenzene	ND		13	4.1	ug/m3			05/16/17 07:39	6.65
Vinyl acetate	ND		19	3.4	ug/m3			05/16/17 07:39	6.65
Vinyl chloride	11		6.8	2.0	ug/m3			05/16/17 07:39	6.65
m,p-Xylene	ND		23	2.9	ug/m3			05/16/17 07:39	6.65
o-Xylene	ND		12	1.6	ug/m3			05/16/17 07:39	6.65
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		70 - 130					05/16/17 07:39	6.65
1,2-Dichloroethane-d4 (Surr)	89		70 - 130					05/16/17 07:39	6.65
Toluene-d8 (Surr)	101		70 - 130					05/16/17 07:39	6.65

Client Sample ID: HOU BKG-1

Lab Sample ID: 320-27995-11

Date Collected: 04/27/17 15:15

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	27		9.2	0.33	ppb v/v			05/16/17 03:53	1.83
Benzene	0.22 J		0.73	0.14	ppb v/v			05/16/17 03:53	1.83
Benzyl chloride	ND		1.5	0.30	ppb v/v			05/16/17 03:53	1.83
Bromodichloromethane	13		0.55	0.12	ppb v/v			05/16/17 03:53	1.83
Bromoform	0.22 J		0.73	0.13	ppb v/v			05/16/17 03:53	1.83
Bromomethane	ND		1.5	0.61	ppb v/v			05/16/17 03:53	1.83
2-Butanone (MEK)	1.3 J		1.5	0.36	ppb v/v			05/16/17 03:53	1.83
Carbon disulfide	16		1.5	0.14	ppb v/v			05/16/17 03:53	1.83
Carbon tetrachloride	ND		1.5	0.12	ppb v/v			05/16/17 03:53	1.83
Chlorobenzene	0.45 J		0.55	0.12	ppb v/v			05/16/17 03:53	1.83
Dibromochloromethane	2.7		0.73	0.14	ppb v/v			05/16/17 03:53	1.83
Chloroethane	0.72 J		1.5	0.56	ppb v/v			05/16/17 03:53	1.83
Chloroform	49		0.55	0.17	ppb v/v			05/16/17 03:53	1.83
Chloromethane	1.9		1.5	0.36	ppb v/v			05/16/17 03:53	1.83
1,2-Dibromoethane (EDB)	ND		1.5	0.14	ppb v/v			05/16/17 03:53	1.83
1,2-Dichlorobenzene	ND		0.73	0.24	ppb v/v			05/16/17 03:53	1.83
1,3-Dichlorobenzene	ND		0.73	0.20	ppb v/v			05/16/17 03:53	1.83
1,4-Dichlorobenzene	1.7		0.73	0.27	ppb v/v			05/16/17 03:53	1.83

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU BKG-1

Lab Sample ID: 320-27995-11

Date Collected: 04/27/17 15:15

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	0.40	J	0.73	0.27	ppb v/v			05/16/17 03:53	1.83
1,1-Dichloroethane	ND		0.55	0.13	ppb v/v			05/16/17 03:53	1.83
1,2-Dichloroethane	ND		1.5	0.16	ppb v/v			05/16/17 03:53	1.83
1,1-Dichloroethene	ND		1.5	0.24	ppb v/v			05/16/17 03:53	1.83
cis-1,2-Dichloroethene	ND		0.73	0.16	ppb v/v			05/16/17 03:53	1.83
trans-1,2-Dichloroethene	ND		0.73	0.18	ppb v/v			05/16/17 03:53	1.83
1,2-Dichloropropane	ND		0.73	0.44	ppb v/v			05/16/17 03:53	1.83
cis-1,3-Dichloropropene	ND		0.73	0.19	ppb v/v			05/16/17 03:53	1.83
trans-1,3-Dichloropropene	ND		0.73	0.16	ppb v/v			05/16/17 03:53	1.83
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.73	0.28	ppb v/v			05/16/17 03:53	1.83
Ethylbenzene	0.63	J	0.73	0.12	ppb v/v			05/16/17 03:53	1.83
4-Ethyltoluene	ND		0.73	0.34	ppb v/v			05/16/17 03:53	1.83
Hexachlorobutadiene	ND		3.7	0.79	ppb v/v			05/16/17 03:53	1.83
2-Hexanone	ND		0.73	0.16	ppb v/v			05/16/17 03:53	1.83
Methylene Chloride	5.1		0.73	0.13	ppb v/v			05/16/17 03:53	1.83
4-Methyl-2-pentanone (MIBK)	ND		0.73	0.25	ppb v/v			05/16/17 03:53	1.83
Styrene	0.14	J	0.73	0.11	ppb v/v			05/16/17 03:53	1.83
1,1,2,2-Tetrachloroethane	ND		0.73	0.13	ppb v/v			05/16/17 03:53	1.83
Tetrachloroethene	1.1		0.73	0.093	ppb v/v			05/16/17 03:53	1.83
Toluene	14		0.73	0.093	ppb v/v			05/16/17 03:53	1.83
1,2,4-Trichlorobenzene	ND		3.7	0.79	ppb v/v			05/16/17 03:53	1.83
1,1,1-Trichloroethane	ND		0.55	0.12	ppb v/v			05/16/17 03:53	1.83
1,1,2-Trichloroethane	ND		0.73	0.12	ppb v/v			05/16/17 03:53	1.83
Trichloroethene	0.79		0.73	0.19	ppb v/v			05/16/17 03:53	1.83
Trichlorofluoromethane	ND		0.73	0.36	ppb v/v			05/16/17 03:53	1.83
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.73	0.30	ppb v/v			05/16/17 03:53	1.83
1,2,4-Trimethylbenzene	0.72	J	1.5	0.30	ppb v/v			05/16/17 03:53	1.83
1,3,5-Trimethylbenzene	ND		0.73	0.23	ppb v/v			05/16/17 03:53	1.83
Vinyl acetate	ND		1.5	0.27	ppb v/v			05/16/17 03:53	1.83
Vinyl chloride	ND		0.73	0.22	ppb v/v			05/16/17 03:53	1.83
m,p-Xylene	2.3		1.5	0.18	ppb v/v			05/16/17 03:53	1.83
o-Xylene	0.75		0.73	0.099	ppb v/v			05/16/17 03:53	1.83
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	65		22	0.77	ug/m3			05/16/17 03:53	1.83
Benzene	0.70	J	2.3	0.46	ug/m3			05/16/17 03:53	1.83
Benzyl chloride	ND		7.6	1.5	ug/m3			05/16/17 03:53	1.83
Bromodichloromethane	86		3.7	0.81	ug/m3			05/16/17 03:53	1.83
Bromoform	2.3	J	7.6	1.3	ug/m3			05/16/17 03:53	1.83
Bromomethane	ND		5.7	2.4	ug/m3			05/16/17 03:53	1.83
2-Butanone (MEK)	3.8	J	4.3	1.1	ug/m3			05/16/17 03:53	1.83
Carbon disulfide	49		4.6	0.44	ug/m3			05/16/17 03:53	1.83
Carbon tetrachloride	ND		9.2	0.74	ug/m3			05/16/17 03:53	1.83
Chlorobenzene	2.1	J	2.5	0.54	ug/m3			05/16/17 03:53	1.83
Dibromochloromethane	23		6.2	1.2	ug/m3			05/16/17 03:53	1.83
Chloroethane	1.9	J	3.9	1.5	ug/m3			05/16/17 03:53	1.83
Chloroform	240		2.7	0.85	ug/m3			05/16/17 03:53	1.83
Chloromethane	3.9		3.0	0.74	ug/m3			05/16/17 03:53	1.83
1,2-Dibromoethane (EDB)	ND		11	1.1	ug/m3			05/16/17 03:53	1.83

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU BKG-1

Lab Sample ID: 320-27995-11

Date Collected: 04/27/17 15:15

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene	ND		4.4	1.4	ug/m3			05/16/17 03:53	1.83
1,3-Dichlorobenzene	ND		4.4	1.2	ug/m3			05/16/17 03:53	1.83
1,4-Dichlorobenzene	10		4.4	1.6	ug/m3			05/16/17 03:53	1.83
Dichlorodifluoromethane	2.0	J	3.6	1.3	ug/m3			05/16/17 03:53	1.83
1,1-Dichloroethane	ND		2.2	0.53	ug/m3			05/16/17 03:53	1.83
1,2-Dichloroethane	ND		5.9	0.65	ug/m3			05/16/17 03:53	1.83
1,1-Dichloroethene	ND		5.8	0.94	ug/m3			05/16/17 03:53	1.83
cis-1,2-Dichloroethene	ND		2.9	0.65	ug/m3			05/16/17 03:53	1.83
trans-1,2-Dichloroethene	ND		2.9	0.73	ug/m3			05/16/17 03:53	1.83
1,2-Dichloropropane	ND		3.4	2.0	ug/m3			05/16/17 03:53	1.83
cis-1,3-Dichloropropene	ND		3.3	0.86	ug/m3			05/16/17 03:53	1.83
trans-1,3-Dichloropropene	ND		3.3	0.73	ug/m3			05/16/17 03:53	1.83
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		5.1	2.0	ug/m3			05/16/17 03:53	1.83
Ethylbenzene	2.8	J	3.2	0.50	ug/m3			05/16/17 03:53	1.83
4-Ethyltoluene	ND		3.6	1.7	ug/m3			05/16/17 03:53	1.83
Hexachlorobutadiene	ND		39	8.4	ug/m3			05/16/17 03:53	1.83
2-Hexanone	ND		3.0	0.65	ug/m3			05/16/17 03:53	1.83
Methylene Chloride	18		2.5	0.46	ug/m3			05/16/17 03:53	1.83
4-Methyl-2-pentanone (MIBK)	ND		3.0	1.0	ug/m3			05/16/17 03:53	1.83
Styrene	0.61	J	3.1	0.46	ug/m3			05/16/17 03:53	1.83
1,1,2,2-Tetrachloroethane	ND		5.0	0.87	ug/m3			05/16/17 03:53	1.83
Tetrachloroethene	7.4		5.0	0.63	ug/m3			05/16/17 03:53	1.83
Toluene	54		2.8	0.35	ug/m3			05/16/17 03:53	1.83
1,2,4-Trichlorobenzene	ND		27	5.9	ug/m3			05/16/17 03:53	1.83
1,1,1-Trichloroethane	ND		3.0	0.65	ug/m3			05/16/17 03:53	1.83
1,1,2-Trichloroethane	ND		4.0	0.67	ug/m3			05/16/17 03:53	1.83
Trichloroethene	4.2		3.9	1.0	ug/m3			05/16/17 03:53	1.83
Trichlorofluoromethane	ND		4.1	2.0	ug/m3			05/16/17 03:53	1.83
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		5.6	2.3	ug/m3			05/16/17 03:53	1.83
1,2,4-Trimethylbenzene	3.5	J	7.2	1.5	ug/m3			05/16/17 03:53	1.83
1,3,5-Trimethylbenzene	ND		3.6	1.1	ug/m3			05/16/17 03:53	1.83
Vinyl acetate	ND		5.2	0.93	ug/m3			05/16/17 03:53	1.83
Vinyl chloride	ND		1.9	0.56	ug/m3			05/16/17 03:53	1.83
m,p-Xylene	10		6.4	0.79	ug/m3			05/16/17 03:53	1.83
o-Xylene	3.3		3.2	0.43	ug/m3			05/16/17 03:53	1.83
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130					05/16/17 03:53	1.83
1,2-Dichloroethane-d4 (Surr)	92		70 - 130					05/16/17 03:53	1.83
Toluene-d8 (Surr)	101		70 - 130					05/16/17 03:53	1.83

Client Sample ID: HOU BKG-2

Lab Sample ID: 320-27995-12

Date Collected: 04/27/17 17:25

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	18		5.0	0.18	ppb v/v			05/16/17 04:49	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU BKG-2

Lab Sample ID: 320-27995-12

Date Collected: 04/27/17 17:25

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.26	J	0.40	0.079	ppb v/v			05/16/17 04:49	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/16/17 04:49	1
Bromodichloromethane	1.4		0.30	0.066	ppb v/v			05/16/17 04:49	1
Bromoform	ND		0.40	0.070	ppb v/v			05/16/17 04:49	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/16/17 04:49	1
2-Butanone (MEK)	1.2		0.80	0.20	ppb v/v			05/16/17 04:49	1
Carbon disulfide	16		0.80	0.078	ppb v/v			05/16/17 04:49	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			05/16/17 04:49	1
Chlorobenzene	0.67		0.30	0.064	ppb v/v			05/16/17 04:49	1
Dibromochloromethane	0.27	J	0.40	0.079	ppb v/v			05/16/17 04:49	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/16/17 04:49	1
Chloroform	6.3		0.30	0.095	ppb v/v			05/16/17 04:49	1
Chloromethane	0.77	J	0.80	0.20	ppb v/v			05/16/17 04:49	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/16/17 04:49	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			05/16/17 04:49	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/16/17 04:49	1
1,4-Dichlorobenzene	0.76		0.40	0.15	ppb v/v			05/16/17 04:49	1
Dichlorodifluoromethane	0.29	J	0.40	0.15	ppb v/v			05/16/17 04:49	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/16/17 04:49	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/16/17 04:49	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			05/16/17 04:49	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			05/16/17 04:49	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			05/16/17 04:49	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/16/17 04:49	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/16/17 04:49	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/16/17 04:49	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			05/16/17 04:49	1
Ethylbenzene	0.12	J	0.40	0.063	ppb v/v			05/16/17 04:49	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/16/17 04:49	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/16/17 04:49	1
2-Hexanone	ND		0.40	0.087	ppb v/v			05/16/17 04:49	1
Methylene Chloride	1.7		0.40	0.072	ppb v/v			05/16/17 04:49	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			05/16/17 04:49	1
Styrene	0.083	J	0.40	0.059	ppb v/v			05/16/17 04:49	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			05/16/17 04:49	1
Tetrachloroethene	0.086	J	0.40	0.051	ppb v/v			05/16/17 04:49	1
Toluene	2.0		0.40	0.051	ppb v/v			05/16/17 04:49	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/16/17 04:49	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/16/17 04:49	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/16/17 04:49	1
Trichloroethene	ND		0.40	0.11	ppb v/v			05/16/17 04:49	1
Trichlorofluoromethane	0.21	J	0.40	0.20	ppb v/v			05/16/17 04:49	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/16/17 04:49	1
1,2,4-Trimethylbenzene	0.46	J	0.80	0.16	ppb v/v			05/16/17 04:49	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/16/17 04:49	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			05/16/17 04:49	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			05/16/17 04:49	1
m,p-Xylene	0.39	J	0.80	0.10	ppb v/v			05/16/17 04:49	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU BKG-2

Lab Sample ID: 320-27995-12

Date Collected: 04/27/17 17:25

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Xylene	0.15	J	0.40	0.054	ppb v/v			05/16/17 04:49	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	43		12	0.42	ug/m3			05/16/17 04:49	1
Benzene	0.83	J	1.3	0.25	ug/m3			05/16/17 04:49	1
Benzyl chloride	ND		4.1	0.84	ug/m3			05/16/17 04:49	1
Bromodichloromethane	9.2		2.0	0.44	ug/m3			05/16/17 04:49	1
Bromoform	ND		4.1	0.72	ug/m3			05/16/17 04:49	1
Bromomethane	ND		3.1	1.3	ug/m3			05/16/17 04:49	1
2-Butanone (MEK)	3.5		2.4	0.59	ug/m3			05/16/17 04:49	1
Carbon disulfide	51		2.5	0.24	ug/m3			05/16/17 04:49	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			05/16/17 04:49	1
Chlorobenzene	3.1		1.4	0.29	ug/m3			05/16/17 04:49	1
Dibromochloromethane	2.3	J	3.4	0.67	ug/m3			05/16/17 04:49	1
Chloroethane	ND		2.1	0.81	ug/m3			05/16/17 04:49	1
Chloroform	31		1.5	0.46	ug/m3			05/16/17 04:49	1
Chloromethane	1.6	J	1.7	0.41	ug/m3			05/16/17 04:49	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			05/16/17 04:49	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			05/16/17 04:49	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			05/16/17 04:49	1
1,4-Dichlorobenzene	4.6		2.4	0.90	ug/m3			05/16/17 04:49	1
Dichlorodifluoromethane	1.5	J	2.0	0.72	ug/m3			05/16/17 04:49	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			05/16/17 04:49	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			05/16/17 04:49	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			05/16/17 04:49	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			05/16/17 04:49	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			05/16/17 04:49	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			05/16/17 04:49	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			05/16/17 04:49	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			05/16/17 04:49	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			05/16/17 04:49	1
Ethylbenzene	0.53	J	1.7	0.27	ug/m3			05/16/17 04:49	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			05/16/17 04:49	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			05/16/17 04:49	1
2-Hexanone	ND		1.6	0.36	ug/m3			05/16/17 04:49	1
Methylene Chloride	5.7		1.4	0.25	ug/m3			05/16/17 04:49	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			05/16/17 04:49	1
Styrene	0.35	J	1.7	0.25	ug/m3			05/16/17 04:49	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			05/16/17 04:49	1
Tetrachloroethene	0.59	J	2.7	0.35	ug/m3			05/16/17 04:49	1
Toluene	7.6		1.5	0.19	ug/m3			05/16/17 04:49	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			05/16/17 04:49	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			05/16/17 04:49	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			05/16/17 04:49	1
Trichloroethene	ND		2.1	0.56	ug/m3			05/16/17 04:49	1
Trichlorofluoromethane	1.2	J	2.2	1.1	ug/m3			05/16/17 04:49	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			05/16/17 04:49	1
1,2,4-Trimethylbenzene	2.2	J	3.9	0.80	ug/m3			05/16/17 04:49	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			05/16/17 04:49	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU BKG-2

Lab Sample ID: 320-27995-12

Date Collected: 04/27/17 17:25

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl acetate	ND		2.8	0.51	ug/m3			05/16/17 04:49	1
Vinyl chloride	ND		1.0	0.31	ug/m3			05/16/17 04:49	1
m,p-Xylene	1.7	J	3.5	0.43	ug/m3			05/16/17 04:49	1
o-Xylene	0.63	J	1.7	0.23	ug/m3			05/16/17 04:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	105		70 - 130					05/16/17 04:49	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 130					05/16/17 04:49	1
Toluene-d8 (Surr)	100		70 - 130					05/16/17 04:49	1

Client Sample ID: DUP-1

Lab Sample ID: 320-27995-13

Date Collected: 04/27/17 13:52

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1600		200	7.2	ppb v/v			05/16/17 05:41	40.7
Benzene	ND		16	3.2	ppb v/v			05/16/17 05:41	40.7
Benzyl chloride	ND		33	6.6	ppb v/v			05/16/17 05:41	40.7
Bromodichloromethane	ND		12	2.7	ppb v/v			05/16/17 05:41	40.7
Bromoform	ND		16	2.8	ppb v/v			05/16/17 05:41	40.7
Bromomethane	ND		33	14	ppb v/v			05/16/17 05:41	40.7
2-Butanone (MEK)	14	J	33	8.1	ppb v/v			05/16/17 05:41	40.7
Carbon disulfide	41		33	3.2	ppb v/v			05/16/17 05:41	40.7
Carbon tetrachloride	ND		33	2.6	ppb v/v			05/16/17 05:41	40.7
Chlorobenzene	ND		12	2.6	ppb v/v			05/16/17 05:41	40.7
Dibromochloromethane	ND		16	3.2	ppb v/v			05/16/17 05:41	40.7
Chloroethane	ND		33	13	ppb v/v			05/16/17 05:41	40.7
Chloroform	47		12	3.9	ppb v/v			05/16/17 05:41	40.7
Chloromethane	ND		33	8.0	ppb v/v			05/16/17 05:41	40.7
1,2-Dibromoethane (EDB)	ND		33	3.1	ppb v/v			05/16/17 05:41	40.7
1,2-Dichlorobenzene	ND		16	5.3	ppb v/v			05/16/17 05:41	40.7
1,3-Dichlorobenzene	ND		16	4.5	ppb v/v			05/16/17 05:41	40.7
1,4-Dichlorobenzene	ND		16	6.1	ppb v/v			05/16/17 05:41	40.7
Dichlorodifluoromethane	ND		16	5.9	ppb v/v			05/16/17 05:41	40.7
1,1-Dichloroethane	ND		12	2.9	ppb v/v			05/16/17 05:41	40.7
1,2-Dichloroethane	ND		33	3.6	ppb v/v			05/16/17 05:41	40.7
1,1-Dichloroethene	ND		33	5.3	ppb v/v			05/16/17 05:41	40.7
cis-1,2-Dichloroethene	4.1	J	16	3.6	ppb v/v			05/16/17 05:41	40.7
trans-1,2-Dichloroethene	ND		16	4.1	ppb v/v			05/16/17 05:41	40.7
1,2-Dichloropropane	ND		16	9.8	ppb v/v			05/16/17 05:41	40.7
cis-1,3-Dichloropropene	ND		16	4.2	ppb v/v			05/16/17 05:41	40.7
trans-1,3-Dichloropropene	ND		16	3.6	ppb v/v			05/16/17 05:41	40.7
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		16	6.3	ppb v/v			05/16/17 05:41	40.7
Ethylbenzene	ND		16	2.6	ppb v/v			05/16/17 05:41	40.7
4-Ethyltoluene	ND		16	7.6	ppb v/v			05/16/17 05:41	40.7
Hexachlorobutadiene	ND		81	18	ppb v/v			05/16/17 05:41	40.7
2-Hexanone	ND		16	3.5	ppb v/v			05/16/17 05:41	40.7

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: DUP-1

Date Collected: 04/27/17 13:52

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-27995-13

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Chloride	7.9	J	16	2.9	ppb v/v			05/16/17 05:41	40.7
4-Methyl-2-pentanone (MIBK)	ND		16	5.5	ppb v/v			05/16/17 05:41	40.7
Styrene	ND		16	2.4	ppb v/v			05/16/17 05:41	40.7
1,1,2,2-Tetrachloroethane	ND		16	2.8	ppb v/v			05/16/17 05:41	40.7
Tetrachloroethene	ND		16	2.1	ppb v/v			05/16/17 05:41	40.7
Toluene	250		16	2.1	ppb v/v			05/16/17 05:41	40.7
1,2,4-Trichlorobenzene	ND		81	18	ppb v/v			05/16/17 05:41	40.7
1,1,1-Trichloroethane	ND		12	2.6	ppb v/v			05/16/17 05:41	40.7
1,1,2-Trichloroethane	ND		16	2.7	ppb v/v			05/16/17 05:41	40.7
Trichloroethene	ND		16	4.3	ppb v/v			05/16/17 05:41	40.7
Trichlorofluoromethane	ND		16	8.0	ppb v/v			05/16/17 05:41	40.7
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		16	6.6	ppb v/v			05/16/17 05:41	40.7
1,2,4-Trimethylbenzene	ND		33	6.6	ppb v/v			05/16/17 05:41	40.7
1,3,5-Trimethylbenzene	ND		16	5.1	ppb v/v			05/16/17 05:41	40.7
Vinyl acetate	ND		33	5.9	ppb v/v			05/16/17 05:41	40.7
Vinyl chloride	ND		16	4.9	ppb v/v			05/16/17 05:41	40.7
m,p-Xylene	ND		33	4.1	ppb v/v			05/16/17 05:41	40.7
o-Xylene	ND		16	2.2	ppb v/v			05/16/17 05:41	40.7
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3700		480	17	ug/m3			05/16/17 05:41	40.7
Benzene	ND		52	10	ug/m3			05/16/17 05:41	40.7
Benzyl chloride	ND		170	34	ug/m3			05/16/17 05:41	40.7
Bromodichloromethane	ND		82	18	ug/m3			05/16/17 05:41	40.7
Bromoform	ND		170	29	ug/m3			05/16/17 05:41	40.7
Bromomethane	ND		130	53	ug/m3			05/16/17 05:41	40.7
2-Butanone (MEK)	40	J	96	24	ug/m3			05/16/17 05:41	40.7
Carbon disulfide	130		100	9.9	ug/m3			05/16/17 05:41	40.7
Carbon tetrachloride	ND		200	16	ug/m3			05/16/17 05:41	40.7
Chlorobenzene	ND		56	12	ug/m3			05/16/17 05:41	40.7
Dibromochloromethane	ND		140	27	ug/m3			05/16/17 05:41	40.7
Chloroethane	ND		86	33	ug/m3			05/16/17 05:41	40.7
Chloroform	230		60	19	ug/m3			05/16/17 05:41	40.7
Chloromethane	ND		67	17	ug/m3			05/16/17 05:41	40.7
1,2-Dibromoethane (EDB)	ND		250	23	ug/m3			05/16/17 05:41	40.7
1,2-Dichlorobenzene	ND		98	32	ug/m3			05/16/17 05:41	40.7
1,3-Dichlorobenzene	ND		98	27	ug/m3			05/16/17 05:41	40.7
1,4-Dichlorobenzene	ND		98	36	ug/m3			05/16/17 05:41	40.7
Dichlorodifluoromethane	ND		81	29	ug/m3			05/16/17 05:41	40.7
1,1-Dichloroethane	ND		49	12	ug/m3			05/16/17 05:41	40.7
1,2-Dichloroethane	ND		130	14	ug/m3			05/16/17 05:41	40.7
1,1-Dichloroethene	ND		130	21	ug/m3			05/16/17 05:41	40.7
cis-1,2-Dichloroethene	16	J	65	14	ug/m3			05/16/17 05:41	40.7
trans-1,2-Dichloroethene	ND		65	16	ug/m3			05/16/17 05:41	40.7
1,2-Dichloropropane	ND		75	45	ug/m3			05/16/17 05:41	40.7
cis-1,3-Dichloropropene	ND		74	19	ug/m3			05/16/17 05:41	40.7
trans-1,3-Dichloropropene	ND		74	16	ug/m3			05/16/17 05:41	40.7
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		110	44	ug/m3			05/16/17 05:41	40.7
Ethylbenzene	ND		71	11	ug/m3			05/16/17 05:41	40.7

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: DUP-1

Lab Sample ID: 320-27995-13

Date Collected: 04/27/17 13:52

Matrix: Air

Date Received: 05/04/17 09:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Ethyltoluene	ND		80	37	ug/m3			05/16/17 05:41	40.7
Hexachlorobutadiene	ND		870	190	ug/m3			05/16/17 05:41	40.7
2-Hexanone	ND		67	15	ug/m3			05/16/17 05:41	40.7
Methylene Chloride	27	J	57	10	ug/m3			05/16/17 05:41	40.7
4-Methyl-2-pentanone (MIBK)	ND		67	23	ug/m3			05/16/17 05:41	40.7
Styrene	ND		69	10	ug/m3			05/16/17 05:41	40.7
1,1,2,2-Tetrachloroethane	ND		110	19	ug/m3			05/16/17 05:41	40.7
Tetrachloroethene	ND		110	14	ug/m3			05/16/17 05:41	40.7
Toluene	930		61	7.8	ug/m3			05/16/17 05:41	40.7
1,2,4-Trichlorobenzene	ND		600	130	ug/m3			05/16/17 05:41	40.7
1,1,1-Trichloroethane	ND		67	14	ug/m3			05/16/17 05:41	40.7
1,1,2-Trichloroethane	ND		89	15	ug/m3			05/16/17 05:41	40.7
Trichloroethene	ND		87	23	ug/m3			05/16/17 05:41	40.7
Trichlorofluoromethane	ND		91	45	ug/m3			05/16/17 05:41	40.7
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		120	51	ug/m3			05/16/17 05:41	40.7
1,2,4-Trimethylbenzene	ND		160	32	ug/m3			05/16/17 05:41	40.7
1,3,5-Trimethylbenzene	ND		80	25	ug/m3			05/16/17 05:41	40.7
Vinyl acetate	ND		110	21	ug/m3			05/16/17 05:41	40.7
Vinyl chloride	ND		42	12	ug/m3			05/16/17 05:41	40.7
m,p-Xylene	ND		140	18	ug/m3			05/16/17 05:41	40.7
o-Xylene	ND		71	9.5	ug/m3			05/16/17 05:41	40.7
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130					05/16/17 05:41	40.7
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					05/16/17 05:41	40.7
Toluene-d8 (Surr)	101		70 - 130					05/16/17 05:41	40.7

Surrogate Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		BFB (70-130)	12DCE (70-130)	TOL (70-130)
320-27995-1	HOU-01	97	90	100
320-27995-2	HOU-02	99	91	102
320-27995-3	HOU-03	97	96	99
320-27995-4	HOU-04	97	90	98
320-27995-5	HOU-05	91	93	99
320-27995-6	HOU-06	94	95	99
320-27995-6 - DL	HOU-06	87	93	101
320-27995-7	HOU-07	101	94	100
320-27995-8	HOU-08	95	96	100
320-27995-9	HOU-09	96	97	100
320-27995-10	HOU-10	88	89	101
320-27995-11	HOU BKG-1	104	92	101
320-27995-12	HOU BKG-2	105	95	100
320-27995-13	DUP-1	100	103	101
LCS 320-164489/4	Lab Control Sample	103	94	100
LCS 320-164530/3	Lab Control Sample	108	96	101
LCSD 320-164489/5	Lab Control Sample Dup	103	93	102
LCSD 320-164530/4	Lab Control Sample Dup	108	98	103
MB 320-164489/9	Method Blank	92	92	101
MB 320-164530/6	Method Blank	107	104	105

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

12DCE = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-164489/9

Matrix: Air

Analysis Batch: 164489

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			05/15/17 18:51	1
Benzene	ND		0.40	0.079	ppb v/v			05/15/17 18:51	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/15/17 18:51	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			05/15/17 18:51	1
Bromoform	ND		0.40	0.070	ppb v/v			05/15/17 18:51	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/15/17 18:51	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			05/15/17 18:51	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			05/15/17 18:51	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			05/15/17 18:51	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			05/15/17 18:51	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			05/15/17 18:51	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/15/17 18:51	1
Chloroform	ND		0.30	0.095	ppb v/v			05/15/17 18:51	1
Chloromethane	ND		0.80	0.20	ppb v/v			05/15/17 18:51	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/15/17 18:51	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			05/15/17 18:51	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/15/17 18:51	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			05/15/17 18:51	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			05/15/17 18:51	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/15/17 18:51	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/15/17 18:51	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			05/15/17 18:51	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			05/15/17 18:51	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			05/15/17 18:51	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/15/17 18:51	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/15/17 18:51	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/15/17 18:51	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			05/15/17 18:51	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			05/15/17 18:51	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/15/17 18:51	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/15/17 18:51	1
2-Hexanone	ND		0.40	0.087	ppb v/v			05/15/17 18:51	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			05/15/17 18:51	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			05/15/17 18:51	1
Styrene	ND		0.40	0.059	ppb v/v			05/15/17 18:51	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			05/15/17 18:51	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			05/15/17 18:51	1
Toluene	ND		0.40	0.051	ppb v/v			05/15/17 18:51	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/15/17 18:51	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/15/17 18:51	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/15/17 18:51	1
Trichloroethene	ND		0.40	0.11	ppb v/v			05/15/17 18:51	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			05/15/17 18:51	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/15/17 18:51	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			05/15/17 18:51	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/15/17 18:51	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			05/15/17 18:51	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			05/15/17 18:51	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-164489/9

Matrix: Air

Analysis Batch: 164489

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		0.80	0.10	ppb v/v			05/15/17 18:51	1
o-Xylene	ND		0.40	0.054	ppb v/v			05/15/17 18:51	1
Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		12	0.42	ug/m3			05/15/17 18:51	1
Benzene	ND		1.3	0.25	ug/m3			05/15/17 18:51	1
Benzyl chloride	ND		4.1	0.84	ug/m3			05/15/17 18:51	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			05/15/17 18:51	1
Bromoform	ND		4.1	0.72	ug/m3			05/15/17 18:51	1
Bromomethane	ND		3.1	1.3	ug/m3			05/15/17 18:51	1
2-Butanone (MEK)	ND		2.4	0.59	ug/m3			05/15/17 18:51	1
Carbon disulfide	ND		2.5	0.24	ug/m3			05/15/17 18:51	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			05/15/17 18:51	1
Chlorobenzene	ND		1.4	0.29	ug/m3			05/15/17 18:51	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			05/15/17 18:51	1
Chloroethane	ND		2.1	0.81	ug/m3			05/15/17 18:51	1
Chloroform	ND		1.5	0.46	ug/m3			05/15/17 18:51	1
Chloromethane	ND		1.7	0.41	ug/m3			05/15/17 18:51	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			05/15/17 18:51	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			05/15/17 18:51	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			05/15/17 18:51	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			05/15/17 18:51	1
Dichlorodifluoromethane	ND		2.0	0.72	ug/m3			05/15/17 18:51	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			05/15/17 18:51	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			05/15/17 18:51	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			05/15/17 18:51	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			05/15/17 18:51	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			05/15/17 18:51	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			05/15/17 18:51	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			05/15/17 18:51	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			05/15/17 18:51	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			05/15/17 18:51	1
Ethylbenzene	ND		1.7	0.27	ug/m3			05/15/17 18:51	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			05/15/17 18:51	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			05/15/17 18:51	1
2-Hexanone	ND		1.6	0.36	ug/m3			05/15/17 18:51	1
Methylene Chloride	ND		1.4	0.25	ug/m3			05/15/17 18:51	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			05/15/17 18:51	1
Styrene	ND		1.7	0.25	ug/m3			05/15/17 18:51	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			05/15/17 18:51	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			05/15/17 18:51	1
Toluene	ND		1.5	0.19	ug/m3			05/15/17 18:51	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			05/15/17 18:51	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			05/15/17 18:51	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			05/15/17 18:51	1
Trichloroethene	ND		2.1	0.56	ug/m3			05/15/17 18:51	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			05/15/17 18:51	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			05/15/17 18:51	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-164489/9

Matrix: Air

Analysis Batch: 164489

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			05/15/17 18:51	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			05/15/17 18:51	1
Vinyl acetate	ND		2.8	0.51	ug/m3			05/15/17 18:51	1
Vinyl chloride	ND		1.0	0.31	ug/m3			05/15/17 18:51	1
m,p-Xylene	ND		3.5	0.43	ug/m3			05/15/17 18:51	1
o-Xylene	ND		1.7	0.23	ug/m3			05/15/17 18:51	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		70 - 130		05/15/17 18:51	1
1,2-Dichloroethane-d4 (Surr)	92		70 - 130		05/15/17 18:51	1
Toluene-d8 (Surr)	101		70 - 130		05/15/17 18:51	1

Lab Sample ID: LCS 320-164489/4

Matrix: Air

Analysis Batch: 164489

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	17.7		ppb v/v		88	71 - 131
Benzene	20.0	20.3		ppb v/v		101	68 - 128
Benzyl chloride	20.0	18.4		ppb v/v		92	58 - 120
Bromodichloromethane	20.0	20.4		ppb v/v		102	65 - 130
Bromoform	20.0	22.6		ppb v/v		113	64 - 144
Bromomethane	20.0	22.6		ppb v/v		113	70 - 131
2-Butanone (MEK)	20.0	21.5		ppb v/v		108	71 - 131
Carbon disulfide	20.0	19.9		ppb v/v		100	63 - 123
Carbon tetrachloride	20.0	19.3		ppb v/v		96	67 - 127
Chlorobenzene	20.0	21.7		ppb v/v		109	70 - 132
Dibromochloromethane	20.0	21.9		ppb v/v		110	68 - 128
Chloroethane	20.0	22.2		ppb v/v		111	70 - 131
Chloroform	20.0	20.6		ppb v/v		103	69 - 129
Chloromethane	20.0	20.7		ppb v/v		104	67 - 127
1,2-Dibromoethane (EDB)	20.0	22.0		ppb v/v		110	68 - 131
1,2-Dichlorobenzene	20.0	23.0		ppb v/v		115	73 - 143
1,3-Dichlorobenzene	20.0	23.8		ppb v/v		119	77 - 136
1,4-Dichlorobenzene	20.0	23.6		ppb v/v		118	73 - 143
Dichlorodifluoromethane	20.0	19.0		ppb v/v		95	69 - 129
1,1-Dichloroethane	20.0	19.8		ppb v/v		99	65 - 125
1,2-Dichloroethane	20.0	19.5		ppb v/v		98	71 - 131
1,1-Dichloroethene	20.0	18.6		ppb v/v		93	53 - 128
cis-1,2-Dichloroethene	20.0	20.7		ppb v/v		104	68 - 128
trans-1,2-Dichloroethene	20.0	20.0		ppb v/v		100	70 - 130
1,2-Dichloropropane	20.0	21.2		ppb v/v		106	74 - 128
cis-1,3-Dichloropropene	20.0	22.0		ppb v/v		110	78 - 132
trans-1,3-Dichloropropene	20.0	20.4		ppb v/v		102	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	21.9		ppb v/v		109	64 - 124
Ethylbenzene	20.0	21.6		ppb v/v		108	76 - 136
4-Ethyltoluene	20.0	21.8		ppb v/v		109	62 - 136

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-164489/4

Matrix: Air

Analysis Batch: 164489

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexachlorobutadiene	20.0	18.6		ppb v/v		93	42 - 150
2-Hexanone	20.0	21.6		ppb v/v		108	70 - 128
Methylene Chloride	20.0	17.1		ppb v/v		86	65 - 125
4-Methyl-2-pentanone (MIBK)	20.0	19.3		ppb v/v		97	73 - 133
Styrene	20.0	24.3		ppb v/v		121	76 - 144
1,1,2,2-Tetrachloroethane	20.0	21.4		ppb v/v		107	75 - 135
Tetrachloroethene	20.0	21.5		ppb v/v		108	56 - 138
Toluene	20.0	21.1		ppb v/v		105	71 - 132
1,2,4-Trichlorobenzene	20.0	19.4		ppb v/v		97	59 - 150
1,1,1-Trichloroethane	20.0	20.1		ppb v/v		101	65 - 124
1,1,2-Trichloroethane	20.0	21.6		ppb v/v		108	71 - 131
Trichloroethene	20.0	22.3		ppb v/v		111	64 - 127
Trichlorofluoromethane	20.0	21.0		ppb v/v		105	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	19.8		ppb v/v		99	50 - 132
1,2,4-Trimethylbenzene	20.0	23.1		ppb v/v		116	61 - 145
1,3,5-Trimethylbenzene	20.0	21.8		ppb v/v		109	65 - 136
Vinyl acetate	20.0	20.0		ppb v/v		100	77 - 134
Vinyl chloride	20.0	23.4		ppb v/v		117	69 - 129
m,p-Xylene	40.0	44.1		ppb v/v		110	75 - 138
o-Xylene	20.0	22.0		ppb v/v		110	77 - 132
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	48	42.0		ug/m3		88	71 - 131
Benzene	64	64.8		ug/m3		101	68 - 128
Benzyl chloride	100	95.2		ug/m3		92	58 - 120
Bromodichloromethane	130	136		ug/m3		102	65 - 130
Bromoform	210	233		ug/m3		113	64 - 144
Bromomethane	78	87.9		ug/m3		113	70 - 131
2-Butanone (MEK)	59	63.4		ug/m3		108	71 - 131
Carbon disulfide	62	62.0		ug/m3		100	63 - 123
Carbon tetrachloride	130	121		ug/m3		96	67 - 127
Chlorobenzene	92	100		ug/m3		109	70 - 132
Dibromochloromethane	170	187		ug/m3		110	68 - 128
Chloroethane	53	58.5		ug/m3		111	70 - 131
Chloroform	98	101		ug/m3		103	69 - 129
Chloromethane	41	42.8		ug/m3		104	67 - 127
1,2-Dibromoethane (EDB)	150	169		ug/m3		110	68 - 131
1,2-Dichlorobenzene	120	138		ug/m3		115	73 - 143
1,3-Dichlorobenzene	120	143		ug/m3		119	77 - 136
1,4-Dichlorobenzene	120	142		ug/m3		118	73 - 143
Dichlorodifluoromethane	99	94.0		ug/m3		95	69 - 129
1,1-Dichloroethane	81	80.0		ug/m3		99	65 - 125
1,2-Dichloroethane	81	78.9		ug/m3		98	71 - 131
1,1-Dichloroethene	79	73.7		ug/m3		93	53 - 128
cis-1,2-Dichloroethene	79	82.2		ug/m3		104	68 - 128
trans-1,2-Dichloroethene	79	79.4		ug/m3		100	70 - 130
1,2-Dichloropropane	92	97.8		ug/m3		106	74 - 128

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-164489/4

Matrix: Air

Analysis Batch: 164489

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,3-Dichloropropene	91	100		ug/m3		110	78 - 132
trans-1,3-Dichloropropene	91	92.7		ug/m3		102	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	153		ug/m3		109	64 - 124
Ethylbenzene	87	93.9		ug/m3		108	76 - 136
4-Ethyltoluene	98	107		ug/m3		109	62 - 136
Hexachlorobutadiene	210	198		ug/m3		93	42 - 150
2-Hexanone	82	88.3		ug/m3		108	70 - 128
Methylene Chloride	69	59.5		ug/m3		86	65 - 125
4-Methyl-2-pentanone (MIBK)	82	79.2		ug/m3		97	73 - 133
Styrene	85	103		ug/m3		121	76 - 144
1,1,2,2-Tetrachloroethane	140	147		ug/m3		107	75 - 135
Tetrachloroethene	140	146		ug/m3		108	56 - 138
Toluene	75	79.4		ug/m3		105	71 - 132
1,2,4-Trichlorobenzene	150	144		ug/m3		97	59 - 150
1,1,1-Trichloroethane	110	110		ug/m3		101	65 - 124
1,1,2-Trichloroethane	110	118		ug/m3		108	71 - 131
Trichloroethene	110	120		ug/m3		111	64 - 127
Trichlorofluoromethane	110	118		ug/m3		105	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	150	152		ug/m3		99	50 - 132
1,2,4-Trimethylbenzene	98	114		ug/m3		116	61 - 145
1,3,5-Trimethylbenzene	98	107		ug/m3		109	65 - 136
Vinyl acetate	70	70.3		ug/m3		100	77 - 134
Vinyl chloride	51	59.9		ug/m3		117	69 - 129
m,p-Xylene	170	192		ug/m3		110	75 - 138
o-Xylene	87	95.7		ug/m3		110	77 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	103		70 - 130
1,2-Dichloroethane-d4 (Surr)	94		70 - 130
Toluene-d8 (Surr)	100		70 - 130

Lab Sample ID: LCSD 320-164489/5

Matrix: Air

Analysis Batch: 164489

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	20.0	17.7		ppb v/v		88	71 - 131	0	25
Benzene	20.0	20.4		ppb v/v		102	68 - 128	1	25
Benzyl chloride	20.0	18.6		ppb v/v		93	58 - 120	1	25
Bromodichloromethane	20.0	20.4		ppb v/v		102	65 - 130	0	25
Bromoform	20.0	22.7		ppb v/v		113	64 - 144	0	25
Bromomethane	20.0	23.7		ppb v/v		119	70 - 131	5	25
2-Butanone (MEK)	20.0	21.6		ppb v/v		108	71 - 131	0	25
Carbon disulfide	20.0	20.2		ppb v/v		101	63 - 123	1	25
Carbon tetrachloride	20.0	19.6		ppb v/v		98	67 - 127	2	25
Chlorobenzene	20.0	21.8		ppb v/v		109	70 - 132	0	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-164489/5

Matrix: Air

Analysis Batch: 164489

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dibromochloromethane	20.0	21.8		ppb v/v		109	68 - 128	1	25
Chloroethane	20.0	23.0		ppb v/v		115	70 - 131	4	25
Chloroform	20.0	20.8		ppb v/v		104	69 - 129	1	25
Chloromethane	20.0	18.3		ppb v/v		91	67 - 127	12	25
1,2-Dibromoethane (EDB)	20.0	21.9		ppb v/v		110	68 - 131	0	25
1,2-Dichlorobenzene	20.0	23.3		ppb v/v		117	73 - 143	2	25
1,3-Dichlorobenzene	20.0	24.2		ppb v/v		121	77 - 136	1	25
1,4-Dichlorobenzene	20.0	24.0		ppb v/v		120	73 - 143	2	25
Dichlorodifluoromethane	20.0	21.0		ppb v/v		105	69 - 129	10	25
1,1-Dichloroethane	20.0	20.1		ppb v/v		101	65 - 125	2	25
1,2-Dichloroethane	20.0	19.5		ppb v/v		98	71 - 131	0	25
1,1-Dichloroethene	20.0	18.9		ppb v/v		94	53 - 128	1	25
cis-1,2-Dichloroethene	20.0	20.6		ppb v/v		103	68 - 128	0	25
trans-1,2-Dichloroethene	20.0	20.4		ppb v/v		102	70 - 130	2	25
1,2-Dichloropropane	20.0	21.1		ppb v/v		105	74 - 128	0	25
cis-1,3-Dichloropropene	20.0	22.2		ppb v/v		111	78 - 132	1	25
trans-1,3-Dichloropropene	20.0	20.1		ppb v/v		100	56 - 136	2	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	22.4		ppb v/v		112	64 - 124	2	25
Ethylbenzene	20.0	21.7		ppb v/v		109	76 - 136	0	25
4-Ethyltoluene	20.0	22.9		ppb v/v		114	62 - 136	4	25
Hexachlorobutadiene	20.0	19.7		ppb v/v		99	42 - 150	6	25
2-Hexanone	20.0	21.5		ppb v/v		108	70 - 128	0	25
Methylene Chloride	20.0	17.5		ppb v/v		88	65 - 125	2	25
4-Methyl-2-pentanone (MIBK)	20.0	19.5		ppb v/v		98	73 - 133	1	25
Styrene	20.0	24.3		ppb v/v		122	76 - 144	0	25
1,1,2,2-Tetrachloroethane	20.0	21.7		ppb v/v		108	75 - 135	1	25
Tetrachloroethene	20.0	21.4		ppb v/v		107	56 - 138	1	25
Toluene	20.0	21.3		ppb v/v		107	71 - 132	1	25
1,2,4-Trichlorobenzene	20.0	20.3		ppb v/v		102	59 - 150	5	25
1,1,1-Trichloroethane	20.0	20.0		ppb v/v		100	65 - 124	1	25
1,1,2-Trichloroethane	20.0	21.3		ppb v/v		107	71 - 131	1	25
Trichloroethene	20.0	22.4		ppb v/v		112	64 - 127	0	25
Trichlorofluoromethane	20.0	21.2		ppb v/v		106	68 - 128	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	20.1		ppb v/v		101	50 - 132	2	25
1,2,4-Trimethylbenzene	20.0	23.6		ppb v/v		118	61 - 145	2	25
1,3,5-Trimethylbenzene	20.0	22.1		ppb v/v		110	65 - 136	1	25
Vinyl acetate	20.0	19.8		ppb v/v		99	77 - 134	1	25
Vinyl chloride	20.0	22.4		ppb v/v		112	69 - 129	5	25
m,p-Xylene	40.0	44.4		ppb v/v		111	75 - 138	1	25
o-Xylene	20.0	21.9		ppb v/v		110	77 - 132	0	25
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	48	42.0		ug/m3		88	71 - 131	0	25
Benzene	64	65.3		ug/m3		102	68 - 128	1	25
Benzyl chloride	100	96.2		ug/m3		93	58 - 120	1	25
Bromodichloromethane	130	137		ug/m3		102	65 - 130	0	25
Bromoform	210	234		ug/m3		113	64 - 144	0	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-164489/5

Matrix: Air

Analysis Batch: 164489

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromomethane	78	92.1		ug/m3		119	70 - 131	5	25
2-Butanone (MEK)	59	63.7		ug/m3		108	71 - 131	0	25
Carbon disulfide	62	62.8		ug/m3		101	63 - 123	1	25
Carbon tetrachloride	130	123		ug/m3		98	67 - 127	2	25
Chlorobenzene	92	100		ug/m3		109	70 - 132	0	25
Dibromochloromethane	170	186		ug/m3		109	68 - 128	1	25
Chloroethane	53	60.7		ug/m3		115	70 - 131	4	25
Chloroform	98	102		ug/m3		104	69 - 129	1	25
Chloromethane	41	37.8		ug/m3		91	67 - 127	12	25
1,2-Dibromoethane (EDB)	150	168		ug/m3		110	68 - 131	0	25
1,2-Dichlorobenzene	120	140		ug/m3		117	73 - 143	2	25
1,3-Dichlorobenzene	120	145		ug/m3		121	77 - 136	1	25
1,4-Dichlorobenzene	120	144		ug/m3		120	73 - 143	2	25
Dichlorodifluoromethane	99	104		ug/m3		105	69 - 129	10	25
1,1-Dichloroethane	81	81.4		ug/m3		101	65 - 125	2	25
1,2-Dichloroethane	81	79.1		ug/m3		98	71 - 131	0	25
1,1-Dichloroethene	79	74.8		ug/m3		94	53 - 128	1	25
cis-1,2-Dichloroethene	79	81.9		ug/m3		103	68 - 128	0	25
trans-1,2-Dichloroethene	79	80.7		ug/m3		102	70 - 130	2	25
1,2-Dichloropropane	92	97.5		ug/m3		105	74 - 128	0	25
cis-1,3-Dichloropropene	91	101		ug/m3		111	78 - 132	1	25
trans-1,3-Dichloropropene	91	91.1		ug/m3		100	56 - 136	2	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	156		ug/m3		112	64 - 124	2	25
Ethylbenzene	87	94.3		ug/m3		109	76 - 136	0	25
4-Ethyltoluene	98	112		ug/m3		114	62 - 136	4	25
Hexachlorobutadiene	210	211		ug/m3		99	42 - 150	6	25
2-Hexanone	82	88.3		ug/m3		108	70 - 128	0	25
Methylene Chloride	69	60.9		ug/m3		88	65 - 125	2	25
4-Methyl-2-pentanone (MIBK)	82	80.0		ug/m3		98	73 - 133	1	25
Styrene	85	104		ug/m3		122	76 - 144	0	25
1,1,2,2-Tetrachloroethane	140	149		ug/m3		108	75 - 135	1	25
Tetrachloroethene	140	145		ug/m3		107	56 - 138	1	25
Toluene	75	80.4		ug/m3		107	71 - 132	1	25
1,2,4-Trichlorobenzene	150	151		ug/m3		102	59 - 150	5	25
1,1,1-Trichloroethane	110	109		ug/m3		100	65 - 124	1	25
1,1,2-Trichloroethane	110	116		ug/m3		107	71 - 131	1	25
Trichloroethene	110	120		ug/m3		112	64 - 127	0	25
Trichlorofluoromethane	110	119		ug/m3		106	68 - 128	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	154		ug/m3		101	50 - 132	2	25
1,2,4-Trimethylbenzene	98	116		ug/m3		118	61 - 145	2	25
1,3,5-Trimethylbenzene	98	109		ug/m3		110	65 - 136	1	25
Vinyl acetate	70	69.8		ug/m3		99	77 - 134	1	25
Vinyl chloride	51	57.2		ug/m3		112	69 - 129	5	25
m,p-Xylene	170	193		ug/m3		111	75 - 138	1	25
o-Xylene	87	95.3		ug/m3		110	77 - 132	0	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-164489/5

Matrix: Air

Analysis Batch: 164489

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	103		70 - 130
1,2-Dichloroethane-d4 (Surr)	93		70 - 130
Toluene-d8 (Surr)	102		70 - 130

Lab Sample ID: MB 320-164530/6

Matrix: Air

Analysis Batch: 164530

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			05/15/17 19:54	1
Benzene	ND		0.40	0.079	ppb v/v			05/15/17 19:54	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			05/15/17 19:54	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			05/15/17 19:54	1
Bromoform	ND		0.40	0.070	ppb v/v			05/15/17 19:54	1
Bromomethane	ND		0.80	0.34	ppb v/v			05/15/17 19:54	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			05/15/17 19:54	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			05/15/17 19:54	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			05/15/17 19:54	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			05/15/17 19:54	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			05/15/17 19:54	1
Chloroethane	ND		0.80	0.31	ppb v/v			05/15/17 19:54	1
Chloroform	ND		0.30	0.095	ppb v/v			05/15/17 19:54	1
Chloromethane	ND		0.80	0.20	ppb v/v			05/15/17 19:54	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			05/15/17 19:54	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			05/15/17 19:54	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			05/15/17 19:54	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			05/15/17 19:54	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			05/15/17 19:54	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			05/15/17 19:54	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			05/15/17 19:54	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			05/15/17 19:54	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			05/15/17 19:54	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			05/15/17 19:54	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			05/15/17 19:54	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			05/15/17 19:54	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			05/15/17 19:54	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			05/15/17 19:54	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			05/15/17 19:54	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			05/15/17 19:54	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			05/15/17 19:54	1
2-Hexanone	ND		0.40	0.087	ppb v/v			05/15/17 19:54	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			05/15/17 19:54	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			05/15/17 19:54	1
Styrene	ND		0.40	0.059	ppb v/v			05/15/17 19:54	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			05/15/17 19:54	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			05/15/17 19:54	1
Toluene	ND		0.40	0.051	ppb v/v			05/15/17 19:54	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			05/15/17 19:54	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-164530/6

Matrix: Air

Analysis Batch: 164530

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			05/15/17 19:54	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			05/15/17 19:54	1
Trichloroethene	ND		0.40	0.11	ppb v/v			05/15/17 19:54	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			05/15/17 19:54	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			05/15/17 19:54	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			05/15/17 19:54	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			05/15/17 19:54	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			05/15/17 19:54	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			05/15/17 19:54	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			05/15/17 19:54	1
o-Xylene	ND		0.40	0.054	ppb v/v			05/15/17 19:54	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		12	0.42	ug/m3			05/15/17 19:54	1
Benzene	ND		1.3	0.25	ug/m3			05/15/17 19:54	1
Benzyl chloride	ND		4.1	0.84	ug/m3			05/15/17 19:54	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			05/15/17 19:54	1
Bromoform	ND		4.1	0.72	ug/m3			05/15/17 19:54	1
Bromomethane	ND		3.1	1.3	ug/m3			05/15/17 19:54	1
2-Butanone (MEK)	ND		2.4	0.59	ug/m3			05/15/17 19:54	1
Carbon disulfide	ND		2.5	0.24	ug/m3			05/15/17 19:54	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			05/15/17 19:54	1
Chlorobenzene	ND		1.4	0.29	ug/m3			05/15/17 19:54	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			05/15/17 19:54	1
Chloroethane	ND		2.1	0.81	ug/m3			05/15/17 19:54	1
Chloroform	ND		1.5	0.46	ug/m3			05/15/17 19:54	1
Chloromethane	ND		1.7	0.41	ug/m3			05/15/17 19:54	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			05/15/17 19:54	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			05/15/17 19:54	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			05/15/17 19:54	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			05/15/17 19:54	1
Dichlorodifluoromethane	ND		2.0	0.72	ug/m3			05/15/17 19:54	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			05/15/17 19:54	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			05/15/17 19:54	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			05/15/17 19:54	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			05/15/17 19:54	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			05/15/17 19:54	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			05/15/17 19:54	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			05/15/17 19:54	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			05/15/17 19:54	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			05/15/17 19:54	1
Ethylbenzene	ND		1.7	0.27	ug/m3			05/15/17 19:54	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			05/15/17 19:54	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			05/15/17 19:54	1
2-Hexanone	ND		1.6	0.36	ug/m3			05/15/17 19:54	1
Methylene Chloride	ND		1.4	0.25	ug/m3			05/15/17 19:54	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			05/15/17 19:54	1
Styrene	ND		1.7	0.25	ug/m3			05/15/17 19:54	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-164530/6

Matrix: Air

Analysis Batch: 164530

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			05/15/17 19:54	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			05/15/17 19:54	1
Toluene	ND		1.5	0.19	ug/m3			05/15/17 19:54	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			05/15/17 19:54	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			05/15/17 19:54	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			05/15/17 19:54	1
Trichloroethene	ND		2.1	0.56	ug/m3			05/15/17 19:54	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			05/15/17 19:54	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			05/15/17 19:54	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			05/15/17 19:54	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			05/15/17 19:54	1
Vinyl acetate	ND		2.8	0.51	ug/m3			05/15/17 19:54	1
Vinyl chloride	ND		1.0	0.31	ug/m3			05/15/17 19:54	1
m,p-Xylene	ND		3.5	0.43	ug/m3			05/15/17 19:54	1
o-Xylene	ND		1.7	0.23	ug/m3			05/15/17 19:54	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	107		70 - 130		05/15/17 19:54	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 130		05/15/17 19:54	1
Toluene-d8 (Surr)	105		70 - 130		05/15/17 19:54	1

Lab Sample ID: LCS 320-164530/3

Matrix: Air

Analysis Batch: 164530

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	16.7		ppb v/v		84	71 - 131
Benzene	20.0	17.4		ppb v/v		87	68 - 128
Benzyl chloride	20.0	16.5		ppb v/v		82	58 - 120
Bromodichloromethane	20.0	18.4		ppb v/v		92	65 - 130
Bromoform	20.0	19.7		ppb v/v		99	64 - 144
Bromomethane	20.0	19.3		ppb v/v		97	70 - 131
2-Butanone (MEK)	20.0	15.3		ppb v/v		76	71 - 131
Carbon disulfide	20.0	16.6		ppb v/v		83	63 - 123
Carbon tetrachloride	20.0	20.2		ppb v/v		101	67 - 127
Chlorobenzene	20.0	17.7		ppb v/v		88	70 - 132
Dibromochloromethane	20.0	18.3		ppb v/v		91	68 - 128
Chloroethane	20.0	18.5		ppb v/v		93	70 - 131
Chloroform	20.0	17.9		ppb v/v		89	69 - 129
Chloromethane	20.0	18.8		ppb v/v		94	67 - 127
1,2-Dibromoethane (EDB)	20.0	18.4		ppb v/v		92	68 - 131
1,2-Dichlorobenzene	20.0	18.7		ppb v/v		94	73 - 143
1,3-Dichlorobenzene	20.0	18.9		ppb v/v		94	77 - 136
1,4-Dichlorobenzene	20.0	19.0		ppb v/v		95	73 - 143
Dichlorodifluoromethane	20.0	19.2		ppb v/v		96	69 - 129
1,1-Dichloroethane	20.0	17.5		ppb v/v		87	65 - 125
1,2-Dichloroethane	20.0	18.7		ppb v/v		93	71 - 131
1,1-Dichloroethene	20.0	16.3		ppb v/v		82	53 - 128

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-164530/3

Matrix: Air

Analysis Batch: 164530

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	20.0	18.1		ppb v/v		90	68 - 128
trans-1,2-Dichloroethene	20.0	17.4		ppb v/v		87	70 - 130
1,2-Dichloropropane	20.0	18.7		ppb v/v		93	74 - 128
cis-1,3-Dichloropropene	20.0	19.4		ppb v/v		97	78 - 132
trans-1,3-Dichloropropene	20.0	16.3		ppb v/v		81	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	19.0		ppb v/v		95	64 - 124
Ethylbenzene	20.0	17.4		ppb v/v		87	76 - 136
4-Ethyltoluene	20.0	17.3		ppb v/v		87	62 - 136
Hexachlorobutadiene	20.0	21.8		ppb v/v		109	42 - 150
2-Hexanone	20.0	14.3		ppb v/v		71	70 - 128
Methylene Chloride	20.0	16.6		ppb v/v		83	65 - 125
4-Methyl-2-pentanone (MIBK)	20.0	15.3		ppb v/v		76	73 - 133
Styrene	20.0	18.1		ppb v/v		90	76 - 144
1,1,2,2-Tetrachloroethane	20.0	17.6		ppb v/v		88	75 - 135
Tetrachloroethene	20.0	18.6		ppb v/v		93	56 - 138
Toluene	20.0	18.2		ppb v/v		91	71 - 132
1,2,4-Trichlorobenzene	20.0	21.5		ppb v/v		108	59 - 150
1,1,1-Trichloroethane	20.0	19.0		ppb v/v		95	65 - 124
1,1,2-Trichloroethane	20.0	18.0		ppb v/v		90	71 - 131
Trichloroethene	20.0	19.1		ppb v/v		96	64 - 127
Trichlorofluoromethane	20.0	19.3		ppb v/v		97	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	16.8		ppb v/v		84	50 - 132
1,2,4-Trimethylbenzene	20.0	19.3		ppb v/v		96	61 - 145
1,3,5-Trimethylbenzene	20.0	17.7		ppb v/v		88	65 - 136
Vinyl acetate	20.0	19.8		ppb v/v		99	77 - 134
Vinyl chloride	20.0	18.4		ppb v/v		92	69 - 129
m,p-Xylene	40.0	35.5		ppb v/v		89	75 - 138
o-Xylene	20.0	17.7		ppb v/v		88	77 - 132

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	48	39.8		ug/m3		84	71 - 131
Benzene	64	55.6		ug/m3		87	68 - 128
Benzyl chloride	100	85.4		ug/m3		82	58 - 120
Bromodichloromethane	130	123		ug/m3		92	65 - 130
Bromoform	210	204		ug/m3		99	64 - 144
Bromomethane	78	75.0		ug/m3		97	70 - 131
2-Butanone (MEK)	59	45.0		ug/m3		76	71 - 131
Carbon disulfide	62	51.8		ug/m3		83	63 - 123
Carbon tetrachloride	130	127		ug/m3		101	67 - 127
Chlorobenzene	92	81.4		ug/m3		88	70 - 132
Dibromochloromethane	170	156		ug/m3		91	68 - 128
Chloroethane	53	48.8		ug/m3		93	70 - 131
Chloroform	98	87.2		ug/m3		89	69 - 129
Chloromethane	41	38.8		ug/m3		94	67 - 127
1,2-Dibromoethane (EDB)	150	141		ug/m3		92	68 - 131
1,2-Dichlorobenzene	120	113		ug/m3		94	73 - 143
1,3-Dichlorobenzene	120	113		ug/m3		94	77 - 136

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-164530/3

Matrix: Air

Analysis Batch: 164530

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dichlorobenzene	120	114		ug/m3		95	73 - 143
Dichlorodifluoromethane	99	95.0		ug/m3		96	69 - 129
1,1-Dichloroethane	81	70.7		ug/m3		87	65 - 125
1,2-Dichloroethane	81	75.6		ug/m3		93	71 - 131
1,1-Dichloroethene	79	64.7		ug/m3		82	53 - 128
cis-1,2-Dichloroethene	79	71.7		ug/m3		90	68 - 128
trans-1,2-Dichloroethene	79	69.1		ug/m3		87	70 - 130
1,2-Dichloropropane	92	86.3		ug/m3		93	74 - 128
cis-1,3-Dichloropropene	91	87.9		ug/m3		97	78 - 132
trans-1,3-Dichloropropene	91	73.8		ug/m3		81	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	133		ug/m3		95	64 - 124
Ethylbenzene	87	75.5		ug/m3		87	76 - 136
4-Ethyltoluene	98	85.1		ug/m3		87	62 - 136
Hexachlorobutadiene	210	233		ug/m3		109	42 - 150
2-Hexanone	82	58.6		ug/m3		71	70 - 128
Methylene Chloride	69	57.5		ug/m3		83	65 - 125
4-Methyl-2-pentanone (MIBK)	82	62.6		ug/m3		76	73 - 133
Styrene	85	76.9		ug/m3		90	76 - 144
1,1,2,2-Tetrachloroethane	140	121		ug/m3		88	75 - 135
Tetrachloroethene	140	126		ug/m3		93	56 - 138
Toluene	75	68.5		ug/m3		91	71 - 132
1,2,4-Trichlorobenzene	150	160		ug/m3		108	59 - 150
1,1,1-Trichloroethane	110	104		ug/m3		95	65 - 124
1,1,2-Trichloroethane	110	98.4		ug/m3		90	71 - 131
Trichloroethene	110	103		ug/m3		96	64 - 127
Trichlorofluoromethane	110	109		ug/m3		97	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	150	128		ug/m3		84	50 - 132
1,2,4-Trimethylbenzene	98	94.8		ug/m3		96	61 - 145
1,3,5-Trimethylbenzene	98	86.9		ug/m3		88	65 - 136
Vinyl acetate	70	69.5		ug/m3		99	77 - 134
Vinyl chloride	51	47.0		ug/m3		92	69 - 129
m,p-Xylene	170	154		ug/m3		89	75 - 138
o-Xylene	87	76.7		ug/m3		88	77 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	108		70 - 130
1,2-Dichloroethane-d4 (Surr)	96		70 - 130
Toluene-d8 (Surr)	101		70 - 130

Lab Sample ID: LCSD 320-164530/4

Matrix: Air

Analysis Batch: 164530

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	20.0	16.6		ppb v/v		83	71 - 131	1	25
Benzene	20.0	17.6		ppb v/v		88	68 - 128	1	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-164530/4

Matrix: Air

Analysis Batch: 164530

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzyl chloride	20.0	16.5		ppb v/v		83	58 - 120	0	25
Bromodichloromethane	20.0	18.4		ppb v/v		92	65 - 130	0	25
Bromoform	20.0	19.8		ppb v/v		99	64 - 144	1	25
Bromomethane	20.0	19.2		ppb v/v		96	70 - 131	1	25
2-Butanone (MEK)	20.0	15.2		ppb v/v		76	71 - 131	0	25
Carbon disulfide	20.0	16.8		ppb v/v		84	63 - 123	1	25
Carbon tetrachloride	20.0	20.4		ppb v/v		102	67 - 127	1	25
Chlorobenzene	20.0	17.7		ppb v/v		88	70 - 132	0	25
Dibromochloromethane	20.0	18.3		ppb v/v		92	68 - 128	0	25
Chloroethane	20.0	18.7		ppb v/v		94	70 - 131	1	25
Chloroform	20.0	17.8		ppb v/v		89	69 - 129	0	25
Chloromethane	20.0	18.9		ppb v/v		94	67 - 127	1	25
1,2-Dibromoethane (EDB)	20.0	18.3		ppb v/v		92	68 - 131	0	25
1,2-Dichlorobenzene	20.0	18.7		ppb v/v		94	73 - 143	0	25
1,3-Dichlorobenzene	20.0	18.9		ppb v/v		94	77 - 136	0	25
1,4-Dichlorobenzene	20.0	18.8		ppb v/v		94	73 - 143	1	25
Dichlorodifluoromethane	20.0	19.8		ppb v/v		99	69 - 129	3	25
1,1-Dichloroethane	20.0	17.6		ppb v/v		88	65 - 125	1	25
1,2-Dichloroethane	20.0	18.6		ppb v/v		93	71 - 131	0	25
1,1-Dichloroethene	20.0	16.4		ppb v/v		82	53 - 128	0	25
cis-1,2-Dichloroethene	20.0	17.9		ppb v/v		89	68 - 128	1	25
trans-1,2-Dichloroethene	20.0	17.5		ppb v/v		87	70 - 130	0	25
1,2-Dichloropropane	20.0	18.9		ppb v/v		94	74 - 128	1	25
cis-1,3-Dichloropropene	20.0	19.4		ppb v/v		97	78 - 132	0	25
trans-1,3-Dichloropropene	20.0	16.2		ppb v/v		81	56 - 136	0	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	19.1		ppb v/v		96	64 - 124	1	25
Ethylbenzene	20.0	17.6		ppb v/v		88	76 - 136	1	25
4-Ethyltoluene	20.0	17.4		ppb v/v		87	62 - 136	0	25
Hexachlorobutadiene	20.0	21.8		ppb v/v		109	42 - 150	0	25
2-Hexanone	20.0	14.2		ppb v/v		71	70 - 128	1	25
Methylene Chloride	20.0	16.6		ppb v/v		83	65 - 125	0	25
4-Methyl-2-pentanone (MIBK)	20.0	15.3		ppb v/v		77	73 - 133	0	25
Styrene	20.0	18.1		ppb v/v		91	76 - 144	0	25
1,1,2,2-Tetrachloroethane	20.0	17.7		ppb v/v		88	75 - 135	0	25
Tetrachloroethene	20.0	18.6		ppb v/v		93	56 - 138	0	25
Toluene	20.0	18.2		ppb v/v		91	71 - 132	0	25
1,2,4-Trichlorobenzene	20.0	21.5		ppb v/v		107	59 - 150	0	25
1,1,1-Trichloroethane	20.0	19.0		ppb v/v		95	65 - 124	0	25
1,1,2-Trichloroethane	20.0	18.1		ppb v/v		90	71 - 131	0	25
Trichloroethene	20.0	19.2		ppb v/v		96	64 - 127	0	25
Trichlorofluoromethane	20.0	19.5		ppb v/v		98	68 - 128	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	17.0		ppb v/v		85	50 - 132	1	25
1,2,4-Trimethylbenzene	20.0	19.3		ppb v/v		97	61 - 145	0	25
1,3,5-Trimethylbenzene	20.0	17.5		ppb v/v		88	65 - 136	1	25
Vinyl acetate	20.0	19.7		ppb v/v		99	77 - 134	0	25
Vinyl chloride	20.0	18.0		ppb v/v		90	69 - 129	2	25
m,p-Xylene	40.0	35.6		ppb v/v		89	75 - 138	0	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-164530/4

Matrix: Air

Analysis Batch: 164530

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
o-Xylene	20.0	17.8		ppb v/v		89	77 - 132	1	25
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	48	39.5		ug/m3		83	71 - 131	1	25
Benzene	64	56.2		ug/m3		88	68 - 128	1	25
Benzyl chloride	100	85.6		ug/m3		83	58 - 120	0	25
Bromodichloromethane	130	124		ug/m3		92	65 - 130	0	25
Bromoform	210	205		ug/m3		99	64 - 144	1	25
Bromomethane	78	74.5		ug/m3		96	70 - 131	1	25
2-Butanone (MEK)	59	44.9		ug/m3		76	71 - 131	0	25
Carbon disulfide	62	52.4		ug/m3		84	63 - 123	1	25
Carbon tetrachloride	130	128		ug/m3		102	67 - 127	1	25
Chlorobenzene	92	81.4		ug/m3		88	70 - 132	0	25
Dibromochloromethane	170	156		ug/m3		92	68 - 128	0	25
Chloroethane	53	49.4		ug/m3		94	70 - 131	1	25
Chloroform	98	87.1		ug/m3		89	69 - 129	0	25
Chloromethane	41	39.0		ug/m3		94	67 - 127	1	25
1,2-Dibromoethane (EDB)	150	141		ug/m3		92	68 - 131	0	25
1,2-Dichlorobenzene	120	112		ug/m3		94	73 - 143	0	25
1,3-Dichlorobenzene	120	113		ug/m3		94	77 - 136	0	25
1,4-Dichlorobenzene	120	113		ug/m3		94	73 - 143	1	25
Dichlorodifluoromethane	99	98.0		ug/m3		99	69 - 129	3	25
1,1-Dichloroethane	81	71.1		ug/m3		88	65 - 125	1	25
1,2-Dichloroethane	81	75.4		ug/m3		93	71 - 131	0	25
1,1-Dichloroethene	79	64.9		ug/m3		82	53 - 128	0	25
cis-1,2-Dichloroethene	79	70.9		ug/m3		89	68 - 128	1	25
trans-1,2-Dichloroethene	79	69.2		ug/m3		87	70 - 130	0	25
1,2-Dichloropropane	92	87.2		ug/m3		94	74 - 128	1	25
cis-1,3-Dichloropropene	91	88.0		ug/m3		97	78 - 132	0	25
trans-1,3-Dichloropropene	91	73.5		ug/m3		81	56 - 136	0	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	134		ug/m3		96	64 - 124	1	25
Ethylbenzene	87	76.3		ug/m3		88	76 - 136	1	25
4-Ethyltoluene	98	85.3		ug/m3		87	62 - 136	0	25
Hexachlorobutadiene	210	232		ug/m3		109	42 - 150	0	25
2-Hexanone	82	58.1		ug/m3		71	70 - 128	1	25
Methylene Chloride	69	57.6		ug/m3		83	65 - 125	0	25
4-Methyl-2-pentanone (MIBK)	82	62.7		ug/m3		77	73 - 133	0	25
Styrene	85	77.3		ug/m3		91	76 - 144	0	25
1,1,1,2-Tetrachloroethane	140	121		ug/m3		88	75 - 135	0	25
Tetrachloroethene	140	126		ug/m3		93	56 - 138	0	25
Toluene	75	68.7		ug/m3		91	71 - 132	0	25
1,2,4-Trichlorobenzene	150	159		ug/m3		107	59 - 150	0	25
1,1,1-Trichloroethane	110	104		ug/m3		95	65 - 124	0	25
1,1,2-Trichloroethane	110	98.7		ug/m3		90	71 - 131	0	25
Trichloroethene	110	103		ug/m3		96	64 - 127	0	25
Trichlorofluoromethane	110	110		ug/m3		98	68 - 128	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	130		ug/m3		85	50 - 132	1	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-164530/4

Matrix: Air

Analysis Batch: 164530

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trimethylbenzene	98	95.0		ug/m3		97	61 - 145	0	25
1,3,5-Trimethylbenzene	98	86.1		ug/m3		88	65 - 136	1	25
Vinyl acetate	70	69.5		ug/m3		99	77 - 134	0	25
Vinyl chloride	51	45.9		ug/m3		90	69 - 129	2	25
m,p-Xylene	170	154		ug/m3		89	75 - 138	0	25
o-Xylene	87	77.4		ug/m3		89	77 - 132	1	25

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
4-Bromofluorobenzene (Surr)	108		70 - 130
1,2-Dichloroethane-d4 (Surr)	98		70 - 130
Toluene-d8 (Surr)	103		70 - 130

QC Association Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Air - GC/MS VOA

Analysis Batch: 164489

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-27995-1	HOU-01	Total/NA	Air	TO-15	
320-27995-2	HOU-02	Total/NA	Air	TO-15	
320-27995-3	HOU-03	Total/NA	Air	TO-15	
320-27995-4	HOU-04	Total/NA	Air	TO-15	
320-27995-5	HOU-05	Total/NA	Air	TO-15	
320-27995-6	HOU-06	Total/NA	Air	TO-15	
320-27995-6 - DL	HOU-06	Total/NA	Air	TO-15	
320-27995-7	HOU-07	Total/NA	Air	TO-15	
320-27995-8	HOU-08	Total/NA	Air	TO-15	
320-27995-9	HOU-09	Total/NA	Air	TO-15	
320-27995-10	HOU-10	Total/NA	Air	TO-15	
MB 320-164489/9	Method Blank	Total/NA	Air	TO-15	
LCS 320-164489/4	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-164489/5	Lab Control Sample Dup	Total/NA	Air	TO-15	

Analysis Batch: 164530

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-27995-11	HOU BKG-1	Total/NA	Air	TO-15	
320-27995-12	HOU BKG-2	Total/NA	Air	TO-15	
320-27995-13	DUP-1	Total/NA	Air	TO-15	
MB 320-164530/6	Method Blank	Total/NA	Air	TO-15	
LCS 320-164530/3	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-164530/4	Lab Control Sample Dup	Total/NA	Air	TO-15	

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-01

Date Collected: 04/27/17 15:45

Date Received: 05/04/17 09:35

Lab Sample ID: 320-27995-1

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		6.54	70 mL	250 mL	164489	05/15/17 22:23	AP1	TAL SAC

Client Sample ID: HOU-02

Date Collected: 04/27/17 16:00

Date Received: 05/04/17 09:35

Lab Sample ID: 320-27995-2

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	498 mL	250 mL	164489	05/15/17 23:20	AP1	TAL SAC

Client Sample ID: HOU-03

Date Collected: 04/27/17 14:35

Date Received: 05/04/17 09:35

Lab Sample ID: 320-27995-3

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	446 mL	250 mL	164489	05/16/17 00:17	AP1	TAL SAC

Client Sample ID: HOU-04

Date Collected: 04/27/17 14:20

Date Received: 05/04/17 09:35

Lab Sample ID: 320-27995-4

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.03	750 mL	250 mL	164489	05/16/17 01:18	AP1	TAL SAC

Client Sample ID: HOU-05

Date Collected: 04/27/17 14:05

Date Received: 05/04/17 09:35

Lab Sample ID: 320-27995-5

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		22.8	20 mL	250 mL	164489	05/16/17 02:10	AP1	TAL SAC

Client Sample ID: HOU-06

Date Collected: 04/27/17 13:52

Date Received: 05/04/17 09:35

Lab Sample ID: 320-27995-6

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		10.1	45 mL	250 mL	164489	05/16/17 03:01	AP1	TAL SAC
Total/NA	Analysis	TO-15	DL	47.8	9.48 mL	250 mL	164489	05/16/17 08:30	AP1	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: HOU-07

Date Collected: 04/27/17 13:25

Date Received: 05/04/17 09:35

Lab Sample ID: 320-27995-7

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	468 mL	250 mL	164489	05/16/17 03:58	AP1	TAL SAC

Client Sample ID: HOU-08

Date Collected: 04/27/17 13:13

Date Received: 05/04/17 09:35

Lab Sample ID: 320-27995-8

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		3.67	125 mL	250 mL	164489	05/16/17 04:50	AP1	TAL SAC

Client Sample ID: HOU-09

Date Collected: 04/27/17 12:59

Date Received: 05/04/17 09:35

Lab Sample ID: 320-27995-9

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		2.03	225 mL	250 mL	164489	05/16/17 06:47	AP1	TAL SAC

Client Sample ID: HOU-10

Date Collected: 04/27/17 12:36

Date Received: 05/04/17 09:35

Lab Sample ID: 320-27995-10

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		6.65	70 mL	250 mL	164489	05/16/17 07:39	AP1	TAL SAC

Client Sample ID: HOU BKG-1

Date Collected: 04/27/17 15:15

Date Received: 05/04/17 09:35

Lab Sample ID: 320-27995-11

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.83	250 mL	250 mL	164530	05/16/17 03:53	AP1	TAL SAC

Client Sample ID: HOU BKG-2

Date Collected: 04/27/17 17:25

Date Received: 05/04/17 09:35

Lab Sample ID: 320-27995-12

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	472 mL	250 mL	164530	05/16/17 04:49	AP1	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Client Sample ID: DUP-1

Lab Sample ID: 320-27995-13

Date Collected: 04/27/17 13:52

Matrix: Air

Date Received: 05/04/17 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		40.7	11.3 mL	250 mL	164530	05/16/17 05:41	AP1	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Laboratory: TestAmerica Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-28-18

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17

Method Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-27995-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-27995-1	HOU-01	Air	04/27/17 15:45	05/04/17 09:35
320-27995-2	HOU-02	Air	04/27/17 16:00	05/04/17 09:35
320-27995-3	HOU-03	Air	04/27/17 14:35	05/04/17 09:35
320-27995-4	HOU-04	Air	04/27/17 14:20	05/04/17 09:35
320-27995-5	HOU-05	Air	04/27/17 14:05	05/04/17 09:35
320-27995-6	HOU-06	Air	04/27/17 13:52	05/04/17 09:35
320-27995-7	HOU-07	Air	04/27/17 13:25	05/04/17 09:35
320-27995-8	HOU-08	Air	04/27/17 13:13	05/04/17 09:35
320-27995-9	HOU-09	Air	04/27/17 12:59	05/04/17 09:35
320-27995-10	HOU-10	Air	04/27/17 12:36	05/04/17 09:35
320-27995-11	HOU BKG-1	Air	04/27/17 15:15	05/04/17 09:35
320-27995-12	HOU BKG-2	Air	04/27/17 17:25	05/04/17 09:35
320-27995-13	DUP-1	Air	04/27/17 13:52	05/04/17 09:35

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica Laboratories, Inc.

Client Contact Information		Project Manager: Lila Beckley		Samples Collected By: TEM/MB		COC No: 1 of 1 COCs															
Company Name: GSI Environmental		Phone: 512-346-4474																			
Address: 9600 Great Hills Trail Ste 350E		Email: lbeckley@gsi-net.com																			
City/State/Zip: Austin, TX 78759																					
Phone: 512-346-4474		Site Contact: n/a																			
FAX:		TA Contact: Laura Turpen																			
Project Name: ESTCP ER-201505		Analysis Turnaround Time																			
Site/Location: Houston TX		Standard (Specific): X																			
PO # 4262		Rush (Specify):																			
Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, 'Hg (Start)	Canister Vacuum in Field, 'Hg (Stop)	Flow Controller ID	Canister ID	TO-15 (Med / Std / Low / SIM)	MA-APH	EPA 3C	EPA 25C / 25.3	ASTM D-1946 / 1945 / 3588	EPA 15/16 - H2S	TO-3	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)
HOU-01	4/27/2017	1545		-29.2	-1.3	8/2	Notes	Y													34000574 Grab sample
HOU-02		1600		-29.2	-1.9																34001624
HOU-03		1435		-29.2	-0.5																34001025
HOU-04		1410		-29.2	-1.2																34000057
HOU-05		1405		-29.2	-1.4																8290
HOU-06		1352		-29.2	-0.6																34000951
HOU-07		1305		-29.2	-1.7																34000748
HOU-08		1313		-29.2	-0.8																34000897
HOU-09		1259		-29.2	-0.9																34000732
HOU-10		1236		-29.2	-1.6																34000902
		Temperature (Fahrenheit)																			
Start		Interior		Ambient																	
Stop																					
		Temperature (Fahrenheit)																			
Start		Interior		Ambient																	
Stop																					
Special Instructions/QC Requirements & Comments:																					
Samples Shipped by: <i>Definitely</i>		Date / Time: 9/24/2017 10:30		Samples Received by: <i>John Nelson</i>		Date / Time: 5/17/2017 9:35															
Samples Relinquished by:		Date / Time:		Received by:		Date / Time:															
Relinquished by:		Date / Time:		Received by:		Date / Time:															
Lab Use Only:		Shipper Name:		Opened by:		Condition:															



320-27995 Chain of Custody

Canister Samples Chain of Custody Record

8880 Riverside Parkway

West Sacramento, CA 95605
phone 916.373.5600 fax

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information						Project Manager: Lila Beckley Phone: 512-346-4474 Email: lbeckley@gsi-net.com		Samples Collected By: TEM/LMB								COC No: <u>2</u> of <u>2</u> COCs												
Company Name: GSI Environmental Address: 9600 Great Hills Trail Ste 350E City/State/Zip: Austin, TX 78759 Phone: 512-346-4474 FAX:						Site Contact: n/a TA Contact: Laura Turpen Analysis Turnaround Time Standard (Specific): X Rush (Specify):																						
Sample Identification						Sample Date(s)		Time Start	Time Stop	Canister Vacuum Field, "Hg (Start)"	Canister Vacuum in Field, "Hg (Stop)"	Flow Controller ID	Canister ID	TO-15 (Med / Sid / Low / SIM) MA-APH EPA 3C EPA 25C / 25.3 ASTM D-1946 / 1945 / 3588 EPA 15/16 - H2S TO-3								Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)
HOU BKG-1	4/27/2017		1515	-29.2	-0.6	n/a	See Notes	y																		34000028 Grab sample		
HOU BKG-2	↓		1705	-29.2	-1.6	↓	↓	✓																		34000229		
DUP-1	↓		1352	-29.2	-0.8	↓	↓	✓																		34001967		
Temperature (Fahrenheit) Start Interior Ambient Stop																												
Temperature (Fahrenheit) Start Interior Ambient Stop																												
Special Instructions/QC Requirements & Comments: <i>returning 13 samples + 1 unused can</i>																												
Samples Shipped by: <i>GSI Beckley</i>												Date / Time: <i>4/28/2017 1050 (Friday)</i>																
Samples Relinquished by:												Received by:																
Relinquished by:												Received by:																
Lab Use Only: Shipper Name:												Opened by: Condition:																

Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013

JOB # 320-27995
Sample # 1

Client/Project:		VFR ID:		
Canister Serial #:	34000974	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.63	05/12/17	FD
FINAL PRESSURE (PSIA)		24.95	05/12/17	FD
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.83		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.83		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		5/15/2017	MS7	
Canister DF =	1.83	X	Load DF =	3.5714286
				250
				70
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.83	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.83	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

JOB # 320-27995
Sample # 2

Client/Project:		VFR ID:		
Canister Serial #:	34001624	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.35	05/12/17	FD
FINAL PRESSURE (PSIA)		26.60	05/12/17	FD
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.99		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.99		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		5/15/2017	MS7							
Canister DF =	1.99	X	Load DF =	0.502008	X	Bag DF =	1	=	FINAL DF	1.000255704
				250			BVf (mLs)			
				498			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.99	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.99	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			

Sacramento

JOB # 320-27995

Sample #	3

Client/Project:		VFR ID:		
Canister Serial #:	34001025	Duration:		Hrs Min
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☒ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.90	05/12/17	FD
FINAL PRESSURE (PSIA)		24.80	05/12/17	FD
Pressurization Gas: ☒ N2 ☒ He		SCREENED ☒	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =	1.78			

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.78		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors	

				Date	Instr.	File #
				5/15/2017	MS7	
				FINAL DF		
Canister DF =	1.78	X	Load DF =	0.5605381	X	Bag DF =
				250		=
				446		1.000096784
				BVf (mLs)		
				Bvi (mL/s)		

Date	Instr.	File #
		FINAL DF

Canister DF = 1.78 X Load DF = #DIV/0! X Bag DF = 1 = #DIV/0!

LVf (mLs)
LVi (mLs)
BVf (mLs)
Bvi (mLs)

Date	Instr.	File #
		FINAL DF

Canister DF = 1.78 X Load DF = #DIV/0! X Bag DF = 1 = #DIV/0!

LVf (mLs)
LVi (mL s)

BVf (mLs)
BVi (mL s)

JOB # 320-27995
Sample # 4

Client/Project:		VFR ID:		
Canister Serial #:	34000657	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.68	05/12/17	FD
FINAL PRESSURE (PSIA)		24.88	05/12/17	FD
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.82		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
05/15/17	14.91	25.33	1.82	LHS	3.09
			3.09		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		5/15/2017	MS7							
Canister DF =	3.09	X	Load DF =	0.3333333	X	Bag DF =	1	=	FINAL DF	1.029913072
				250			BVf (mLs)			
				750			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.82	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.82	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			

JOB # 320-27995
Sample # 5

Client/Project:		VFR ID:		
Canister Serial #:	8290	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.57	05/12/17	FD
FINAL PRESSURE (PSIA)		24.73	05/12/17	FD
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.82		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.82		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		5/15/2017	MS7	
Canister DF =	1.82	X	Load DF =	12.5
				250
				20
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.82	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.82	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

JOB # 320-27995
Sample # 6

Client/Project:		VFR ID:		
Canister Serial #:	34000951	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.94	05/12/17	FD
FINAL PRESSURE (PSIA)		25.27	05/12/17	FD
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.81		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
05/16/17	14.70	31.04	1.81	LHS	3.83
			3.83		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors									
		Date	Instr.	File #					
		5/15/2017	MS7						
Canister DF =	1.81	X	Load DF =	5.5555556	X	Bag DF =	1	=	FINAL DF
				250			BVf (mLs)		10.07093894
				45			Bvi (mLs)		
		Date	Instr.	File #					
		5/16/2017	MS7						
Canister DF =	3.83	X	Load DF =	12.5	X	Bag DF =	1	=	FINAL DF
				250			BVf (mLs)		47.84723646
				20			Bvi (mLs)		
		Date	Instr.	File #					
Canister DF =	3.83	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF
							BVf (mLs)		#DIV/0!
							Bvi (mLs)		

JOB # 320-27995
Sample # 7

Client/Project:		VFR ID:		
Canister Serial #:	34000748	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.41	05/12/17	FD
FINAL PRESSURE (PSIA)		25.15	05/12/17	FD
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.88		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.88		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		5/15/2017	MS7							
Canister DF =	1.88	X	Load DF =	0.534188	X	Bag DF =	1	=	FINAL DF	1.001851533
				250			BVf (mLs)			
				468			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.88	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.88	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			

JOB # 320-27995
Sample # 8

Client/Project:		VFR ID:		
Canister Serial #:	34000897	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.91	05/12/17	FD
FINAL PRESSURE (PSIA)		25.54	05/12/17	FD
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.84		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.84		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		5/15/2017	MS7	
Canister DF =	1.84	X	Load DF =	2
				250
				125
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.84	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.84	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

JOB # 320-27995
Sample # 9

Client/Project:		VFR ID:		
Canister Serial #:	34000732	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.82	05/12/17	FD
FINAL PRESSURE (PSIA)		25.25	05/12/17	FD
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.83		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.83		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		5/15/2017	MS7	
Canister DF =	1.83	X	Load DF =	1.1111111
				250
				225
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.83	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.83	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

JOB # 320-27995
Sample # 10

Client/Project:		VFR ID:		
Canister Serial #:	34000902	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.47	05/12/17	FD
FINAL PRESSURE (PSIA)		25.08	05/12/17	FD
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.86		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.86		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		5/15/2017	MS7							
Canister DF =	1.86	X	Load DF =	3.5714286	X	Bag DF =	1	=	FINAL DF	6.649697741
				250			BVf (mLs)			
				70			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.86	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.86	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			

JOB # 320-27995
Sample # 11

Client/Project:		VFR ID:		
Canister Serial #:	34000628	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING	PRESS.	DATE	INITIALS	
INITIAL VACUUM CHECK (INCHES Hg)	29.8		JMT	
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)	13.99	05/12/17	FD	
FINAL PRESSURE (PSIA)	25.60	05/12/17	FD	
Pressurization Gas: ☐ N2 ☐ He	SCREENED ☐	SCRN DIL. VS 250mLs:		
Initial Canister Dilution Factor =	1.83			

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.83		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors						
		Date	Instr.	File #		
		5/15/2017	ATMS9			
Canister DF =	1.83	X	Load DF =	1	X	Bag DF =
				250		BVf (mLs)
				250		Bvi (mLs)
				FINAL DF		
				1.829878485		
		Date	Instr.	File #		
Canister DF =	1.83	X	Load DF =	#DIV/0!	X	Bag DF =
			LVf (mLs)			BVf (mLs)
			LVi (mLs)			Bvi (mLs)
				FINAL DF		
				#DIV/0!		
		Date	Instr.	File #		
Canister DF =	1.83	X	Load DF =	#DIV/0!	X	Bag DF =
			LVf (mLs)			BVf (mLs)
			LVi (mLs)			Bvi (mLs)
				FINAL DF		
				#DIV/0!		

JOB # 320-27995
Sample # 12

Client/Project:		VFR ID:		
Canister Serial #:	34001229	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.48	05/12/17	FD
FINAL PRESSURE (PSIA)		25.47	05/12/17	FD
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.89		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.89		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		5/15/2017	ATMS9	
Canister DF =	1.89	X	Load DF =	0.529661
				250
				472
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.89	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.89	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

JOB # 320-27995
Sample # 13

Client/Project:		VFR ID:		
Canister Serial #:	34001967	Duration:		☐ Hrs ☐ Min
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.83	05/12/17	FD
FINAL PRESSURE (PSIA)		25.50	05/12/17	FD
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.84		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.84		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors									
		Date	Instr.	File #					
		5/15/2017	ATMS9						
Canister DF =	1.84	X	Load DF =	7.3529412	X	Bag DF =	3	=	FINAL DF
				250			BVf (mLs)	3	
				34			Bvi (mLs)	1	
		Date	Instr.	File #					
Canister DF =	1.84	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF
				LVf (mLs)			BVf (mLs)		
				LVi (mLs)			Bvi (mLs)		
		Date	Instr.	File #					
Canister DF =	1.84	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF
				LVf (mLs)			BVf (mLs)		
				LVi (mLs)			Bvi (mLs)		

Login Sample Receipt Checklist

Client: GSI Environmental, Inc

Job Number: 320-27995-1

Login Number: 27995

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Certification Type TO-15 SCAN
Date Cleaned/Batch ID 004017-17 320-27505
Date of QC 4/18/2017
Data File Number C:\msdchem\1\DATA\170418\



320-27505 Chain of Custody

MS6041825-d
CANISTER ID NUMBERS

160109

*34001051	34001229	
34000628	34001025	
34001907	34000897	
34000337	34000740	
34000951	34001034 ²⁴ 4-17-18	
34000732	34000902	
34000974	8514	
34000057	8290	

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

[Signature] 4/19/17
1st level Reviewed By: Date:
[Signature] 4/24/17
2nd level Reviewed By: Date:

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-27505-1
 SDG No.: _____
 Client Sample ID: 34001051 Lab Sample ID: 320-27505-1
 Matrix: Air Lab File ID: MS6041825.D
 Analysis Method: TO-15 Date Collected: 04/17/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 04/19/2017 07:26
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 160109 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	ND		5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-27505-1
 SDG No.: _____
 Client Sample ID: 34001051 Lab Sample ID: 320-27505-1
 Matrix: Air Lab File ID: MS6041825.D
 Analysis Method: TO-15 Date Collected: 04/17/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 04/19/2017 07:26
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 160109 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	ND		0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-27505-1
 SDG No.: _____
 Client Sample ID: 34001051 Lab Sample ID: 320-27505-1
 Matrix: Air Lab File ID: MS6041825.D
 Analysis Method: TO-15 Date Collected: 04/17/2017 00:00
 Sample wt/vol: 500(mL) Date Analyzed: 04/19/2017 07:26
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 160109 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	105		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	106		70-130
2037-26-5	Toluene-d8 (Surr)	103		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170418-42032.b\MS6041825.D
 Lims ID: 320-27505-A-1
 Client ID: 34001051
 Sample Type: Client
 Inject. Date: 19-Apr-2017 07:26:30 ALS Bottle#: 5 Worklist Smp#: 25
 Purge Vol: 25.000 mL Dil. Factor: 1.0000
 Sample Info: 320-27495-A-1
 Misc. Info.: 500 mL CAN CERT
 Operator ID: LHS Instrument ID: ATMS6
 Method: \\ChromNA\Sacramento\ChromData\ATMS6\20170418-42032.b\TO15_ATMS6.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 19-Apr-2017 08:17:33 Calib Date: 02-Mar-2017 08:41:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS6\20170301-40364.b\MS6030123.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK004

First Level Reviewer: leeh

Date: 19-Apr-2017 08:17:33

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	13.100	13.100	0.000	96	31241	4.00	
* 2 1,4-Difluorobenzene	114	15.248	15.242	0.006	96	121969	4.00	
* 3 Chlorobenzene-d5 (IS)	117	21.982	21.982	0.000	91	109500	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	14.305	14.299	0.006	99	63215	4.23	
\$ 5 Toluene-d8 (Surr)	100	18.697	18.697	0.000	96	71431	4.13	
\$ 6 4-Bromofluorobenzene (Surr	95	24.549	24.544	0.005	85	71043	4.21	

Reagents:

VAMSIS20_00002

Amount Added: 50.00

Units: mL

Run Reagent

Report Date: 19-Apr-2017 08:17:51

Chrom Revision: 2.2 18-Apr-2017 07:43:58

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170418-42032.b\MS6041825.D

Injection Date: 19-Apr-2017 07:26:30

Instrument ID: ATMS6

Operator ID: LHS

Lims ID: 320-27505-A-1

Lab Sample ID: 320-27505-1

Worklist Smp#: 25

Client ID: 34001051

Purge Vol: 25.000 mL

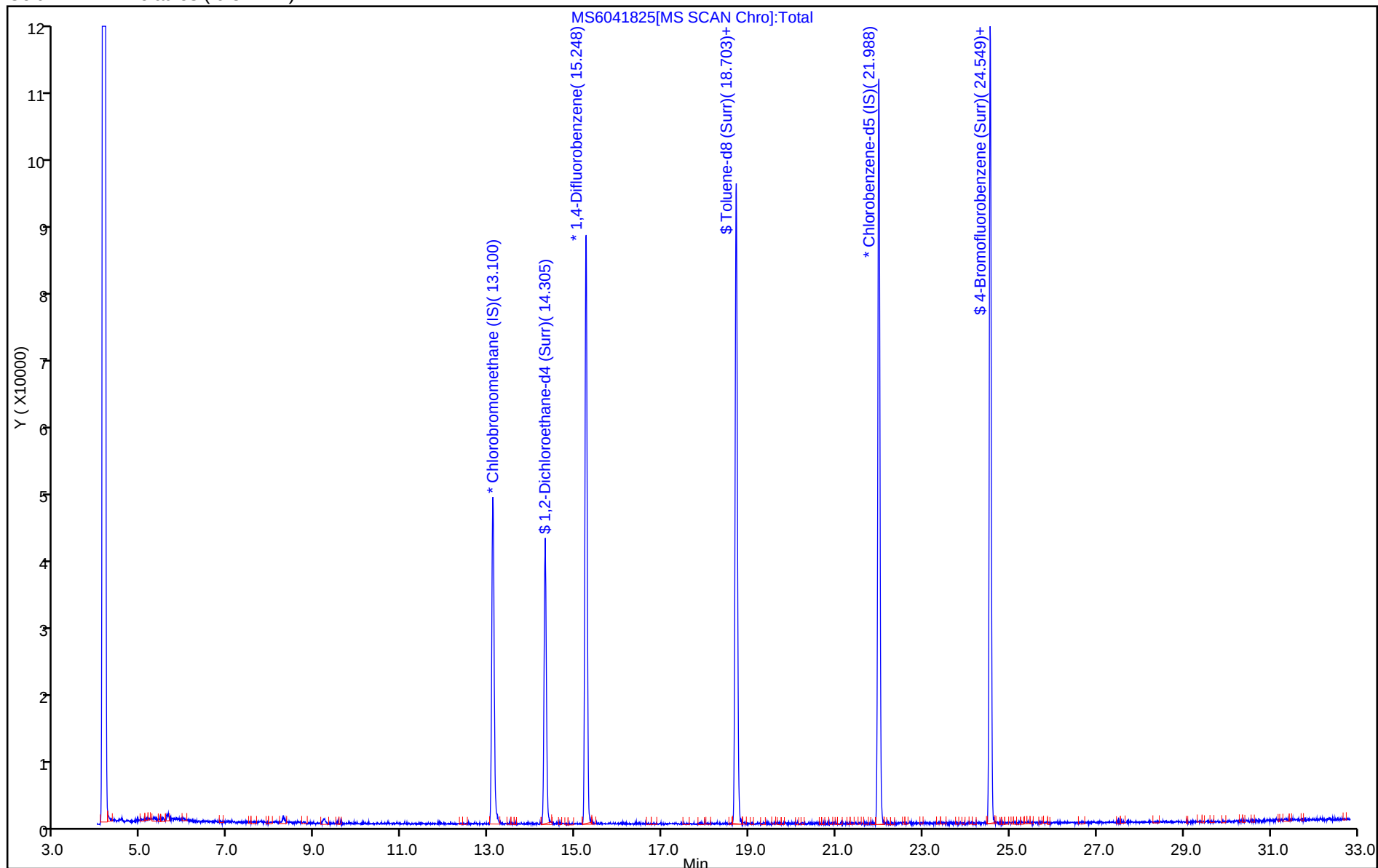
Dil. Factor: 1.0000

ALS Bottle#: 5

Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-29669-1

Client Project/Site: ESTCP Vapor Intrusion Research

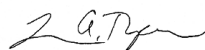
For:

GSI Environmental, Inc

9600 Great Hills Trail, Ste 350E

Austin, Texas 78759

Attn: Lila M Beckley



Authorized for release by:

7/20/2017 4:54:33 PM

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

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Definitions/Glossary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
E	Result exceeded calibration range.

Glossary

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

Case Narrative

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Job ID: 320-29669-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-29669-1

Comments

No additional comments.

Receipt

The samples were received on 7/6/2017 10:30 AM; the samples arrived in good condition.

Canisters

Canisters that were batch certified to the MDL were provided for sample collection by TestAmerica. Two batches had j-flag detections in them affecting the following analytes and samples:

Acetone (0.3J ppb v/v) and Methylene Chloride (0.13J ppb v/v)

Samples SD-01, OC-04, OC-05, OC-06A, OC-06B, OC-08, OC-BKG-01, and OC-BKG-02B (320-29669-1, -14, -17, -18, -19, -21, -23, and -25)

Methylene chloride (0.11J ppb v/v)

Samples SD-02, SD-09, OC-03, OC-09 (320-29669-2, -9, -15, and -22)

Low level detections of these analytes in these samples should be considered estimated.

Air - GC/MS VOA

Method(s) TO-15: The following sample was diluted due to the abundance of non-target analytes: SD-05 (320-29669-5). Elevated reporting limits (RLs) are provided.

Method(s) TO-15: Initial analysis for this sample was over-range for Trichloroethene. Reanalysis at a lower load volume was attempted, but the results did not match with the initial analysis due to insufficient volume in the sample canister. PM was notified and the original analysis will be reported with appropriate flagging for Trichloroethene.

OC-06B (320-29669-19)

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

VOA Prep

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

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-01

Lab Sample ID: 320-29669-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Acetone	3.3	J	5.0	0.18	ppb v/v	1			TO-15	Total/NA
Benzene	0.24	J	0.40	0.079	ppb v/v	1			TO-15	Total/NA
Bromodichloromethane	0.77		0.30	0.066	ppb v/v	1			TO-15	Total/NA
Bromoform	0.19	J	0.40	0.070	ppb v/v	1			TO-15	Total/NA
2-Butanone (MEK)	0.61	J	0.80	0.20	ppb v/v	1			TO-15	Total/NA
Carbon disulfide	1.2		0.80	0.078	ppb v/v	1			TO-15	Total/NA
Carbon tetrachloride	0.22	J	0.80	0.064	ppb v/v	1			TO-15	Total/NA
Chlorobenzene	0.15	J	0.30	0.064	ppb v/v	1			TO-15	Total/NA
Dibromochloromethane	0.44		0.40	0.079	ppb v/v	1			TO-15	Total/NA
Chloroform	1.5		0.30	0.095	ppb v/v	1			TO-15	Total/NA
Chloromethane	0.72	J	0.80	0.20	ppb v/v	1			TO-15	Total/NA
1,2-Dibromoethane (EDB)	0.13	J	0.80	0.075	ppb v/v	1			TO-15	Total/NA
1,2-Dichlorobenzene	0.16	J	0.40	0.13	ppb v/v	1			TO-15	Total/NA
1,3-Dichlorobenzene	0.15	J	0.40	0.11	ppb v/v	1			TO-15	Total/NA
1,4-Dichlorobenzene	0.18	J	0.40	0.15	ppb v/v	1			TO-15	Total/NA
Dichlorodifluoromethane	2.4		0.40	0.15	ppb v/v	1			TO-15	Total/NA
1,1-Dichloroethane	0.33		0.30	0.072	ppb v/v	1			TO-15	Total/NA
1,2-Dichloroethane	0.16	J	0.80	0.088	ppb v/v	1			TO-15	Total/NA
1,1-Dichloroethene	0.78	J	0.80	0.13	ppb v/v	1			TO-15	Total/NA
cis-1,2-Dichloroethene	0.17	J	0.40	0.089	ppb v/v	1			TO-15	Total/NA
trans-1,2-Dichloroethene	0.16	J	0.40	0.10	ppb v/v	1			TO-15	Total/NA
cis-1,3-Dichloropropene	0.15	J	0.40	0.10	ppb v/v	1			TO-15	Total/NA
trans-1,3-Dichloropropene	0.15	J	0.40	0.088	ppb v/v	1			TO-15	Total/NA
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.20	J	0.40	0.16	ppb v/v	1			TO-15	Total/NA
Ethylbenzene	0.18	J	0.40	0.063	ppb v/v	1			TO-15	Total/NA
2-Hexanone	0.19	J	0.40	0.087	ppb v/v	1			TO-15	Total/NA
Methylene Chloride	1.3		0.40	0.072	ppb v/v	1			TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.94		0.40	0.14	ppb v/v	1			TO-15	Total/NA
Styrene	0.19	J	0.40	0.059	ppb v/v	1			TO-15	Total/NA
1,1,1,2-Tetrachloroethane	0.14	J	0.40	0.069	ppb v/v	1			TO-15	Total/NA
Tetrachloroethene	0.26	J	0.40	0.051	ppb v/v	1			TO-15	Total/NA
Toluene	0.43		0.40	0.051	ppb v/v	1			TO-15	Total/NA
1,1,1-Trichloroethane	0.16	J	0.30	0.065	ppb v/v	1			TO-15	Total/NA
1,1,2-Trichloroethane	0.14	J	0.40	0.067	ppb v/v	1			TO-15	Total/NA
Trichloroethene	0.44		0.40	0.11	ppb v/v	1			TO-15	Total/NA
Trichlorofluoromethane	0.51		0.40	0.20	ppb v/v	1			TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	2.5		0.40	0.16	ppb v/v	1			TO-15	Total/NA
1,2,4-Trimethylbenzene	0.17	J	0.80	0.16	ppb v/v	1			TO-15	Total/NA
1,3,5-Trimethylbenzene	0.15	J	0.40	0.13	ppb v/v	1			TO-15	Total/NA
Vinyl acetate	0.15	J	0.80	0.15	ppb v/v	1			TO-15	Total/NA
Vinyl chloride	0.31	J	0.40	0.12	ppb v/v	1			TO-15	Total/NA
m,p-Xylene	0.39	J	0.80	0.10	ppb v/v	1			TO-15	Total/NA
o-Xylene	0.19	J	0.40	0.054	ppb v/v	1			TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Acetone	7.9	J	12	0.42	ug/m3	1			TO-15	Total/NA
Benzene	0.78	J	1.3	0.25	ug/m3	1			TO-15	Total/NA
Bromodichloromethane	5.2		2.0	0.44	ug/m3	1			TO-15	Total/NA
Bromoform	2.0	J	4.1	0.72	ug/m3	1			TO-15	Total/NA
2-Butanone (MEK)	1.8	J	2.4	0.59	ug/m3	1			TO-15	Total/NA
Carbon disulfide	3.7		2.5	0.24	ug/m3	1			TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-01 (Continued)

Lab Sample ID: 320-29669-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon tetrachloride	1.4	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Chlorobenzene	0.69	J	1.4	0.29	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	3.8		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	7.3		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.5	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
1,2-Dibromoethane (EDB)	1.0	J	6.1	0.58	ug/m3	1		TO-15	Total/NA
1,2-Dichlorobenzene	0.94	J	2.4	0.78	ug/m3	1		TO-15	Total/NA
1,3-Dichlorobenzene	0.92	J	2.4	0.66	ug/m3	1		TO-15	Total/NA
1,4-Dichlorobenzene	1.1	J	2.4	0.90	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	12		2.0	0.72	ug/m3	1		TO-15	Total/NA
1,1-Dichloroethane	1.4		1.2	0.29	ug/m3	1		TO-15	Total/NA
1,2-Dichloroethane	0.63	J	3.2	0.36	ug/m3	1		TO-15	Total/NA
1,1-Dichloroethene	3.1	J	3.2	0.51	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.67	J	1.6	0.35	ug/m3	1		TO-15	Total/NA
trans-1,2-Dichloroethene	0.65	J	1.6	0.40	ug/m3	1		TO-15	Total/NA
cis-1,3-Dichloropropene	0.70	J	1.8	0.47	ug/m3	1		TO-15	Total/NA
trans-1,3-Dichloropropene	0.68	J	1.8	0.40	ug/m3	1		TO-15	Total/NA
1,2-Dichloro-1,1,2,2-tetrafluoroethane	1.4	J	2.8	1.1	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.80	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
2-Hexanone	0.79	J	1.6	0.36	ug/m3	1		TO-15	Total/NA
Methylene Chloride	4.6		1.4	0.25	ug/m3	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	3.9		1.6	0.55	ug/m3	1		TO-15	Total/NA
Styrene	0.83	J	1.7	0.25	ug/m3	1		TO-15	Total/NA
1,1,2,2-Tetrachloroethane	0.97	J	2.7	0.47	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	1.8	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	1.6		1.5	0.19	ug/m3	1		TO-15	Total/NA
1,1,1-Trichloroethane	0.89	J	1.6	0.35	ug/m3	1		TO-15	Total/NA
1,1,2-Trichloroethane	0.79	J	2.2	0.37	ug/m3	1		TO-15	Total/NA
Trichloroethene	2.4		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	2.9		2.2	1.1	ug/m3	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	19		3.1	1.2	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.84	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.73	J	2.0	0.61	ug/m3	1		TO-15	Total/NA
Vinyl acetate	0.53	J	2.8	0.51	ug/m3	1		TO-15	Total/NA
Vinyl chloride	0.79	J	1.0	0.31	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.7	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.82	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: SD-02

Lab Sample ID: 320-29669-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	4.9	J	5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.22	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	1.0		0.30	0.066	ppb v/v	1		TO-15	Total/NA
Bromoform	0.14	J	0.40	0.070	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.66	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	9.9		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.13	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.58		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	1.8		0.30	0.095	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-02 (Continued)

Lab Sample ID: 320-29669-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloromethane	0.68	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.40		0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethane	0.079	J	0.30	0.072	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.11	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.53		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Styrene	0.070	J	0.40	0.059	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.13	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	1.5		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.29	J	0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.24	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	0.23	J	0.40	0.16	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.26	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.12	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	12	J	12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.70	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	6.8		2.0	0.44	ug/m3	1		TO-15	Total/NA
Bromoform	1.5	J	4.1	0.72	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	1.9	J	2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	31		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.84	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	4.9		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	8.9		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.4	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.0		2.0	0.72	ug/m3	1		TO-15	Total/NA
1,1-Dichloroethane	0.32	J	1.2	0.29	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.47	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.8		1.4	0.25	ug/m3	1		TO-15	Total/NA
Styrene	0.30	J	1.7	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	0.88	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	5.7		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	1.6	J	2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	1.8	J	3.1	1.2	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.1	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.52	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: SD-03

Lab Sample ID: 320-29669-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	6.2	J	41	1.5	ppb v/v	8.2		TO-15	Total/NA
Carbon disulfide	1.9	J	6.6	0.64	ppb v/v	8.2		TO-15	Total/NA
Chloroform	1.1	J	2.5	0.78	ppb v/v	8.2		TO-15	Total/NA
Dichlorodifluoromethane	7.7		3.3	1.2	ppb v/v	8.2		TO-15	Total/NA
1,1-Dichloroethane	1.1	J	2.5	0.59	ppb v/v	8.2		TO-15	Total/NA
1,1-Dichloroethene	1.4	J	6.6	1.1	ppb v/v	8.2		TO-15	Total/NA
Methylene Chloride	2.3	J	3.3	0.59	ppb v/v	8.2		TO-15	Total/NA
Tetrachloroethene	340		3.3	0.42	ppb v/v	8.2		TO-15	Total/NA
Trichloroethene	110		3.3	0.86	ppb v/v	8.2		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	57		3.3	1.3	ppb v/v	8.2		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-03 (Continued)

Lab Sample ID: 320-29669-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	15	J	97	3.5	ug/m3	8.2		TO-15	Total/NA
Carbon disulfide	5.9	J	20	2.0	ug/m3	8.2		TO-15	Total/NA
Chloroform	5.5	J	12	3.8	ug/m3	8.2		TO-15	Total/NA
Dichlorodifluoromethane	38		16	5.9	ug/m3	8.2		TO-15	Total/NA
1,1-Dichloroethane	4.4	J	10	2.4	ug/m3	8.2		TO-15	Total/NA
1,1-Dichloroethene	5.7	J	26	4.2	ug/m3	8.2		TO-15	Total/NA
Methylene Chloride	7.9	J	11	2.1	ug/m3	8.2		TO-15	Total/NA
Tetrachloroethene	2300		22	2.8	ug/m3	8.2		TO-15	Total/NA
Trichloroethene	570		18	4.6	ug/m3	8.2		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	440		25	10	ug/m3	8.2		TO-15	Total/NA

Client Sample ID: SD-04

Lab Sample ID: 320-29669-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	3.8	J	8.2	0.29	ppb v/v	1.64		TO-15	Total/NA
Benzene	0.17	J	0.66	0.13	ppb v/v	1.64		TO-15	Total/NA
Bromodichloromethane	0.16	J	0.49	0.11	ppb v/v	1.64		TO-15	Total/NA
Bromoform	0.21	J	0.66	0.11	ppb v/v	1.64		TO-15	Total/NA
2-Butanone (MEK)	0.51	J	1.3	0.33	ppb v/v	1.64		TO-15	Total/NA
Carbon disulfide	1.9		1.3	0.13	ppb v/v	1.64		TO-15	Total/NA
Dibromochloromethane	0.22	J	0.66	0.13	ppb v/v	1.64		TO-15	Total/NA
Chloroform	0.45	J	0.49	0.16	ppb v/v	1.64		TO-15	Total/NA
Chloromethane	0.66	J	1.3	0.32	ppb v/v	1.64		TO-15	Total/NA
Dichlorodifluoromethane	2.9		0.66	0.24	ppb v/v	1.64		TO-15	Total/NA
1,1-Dichloroethane	0.18	J	0.49	0.12	ppb v/v	1.64		TO-15	Total/NA
1,1-Dichloroethene	0.60	J	1.3	0.21	ppb v/v	1.64		TO-15	Total/NA
Ethylbenzene	0.12	J	0.66	0.10	ppb v/v	1.64		TO-15	Total/NA
Methylene Chloride	1.2		0.66	0.12	ppb v/v	1.64		TO-15	Total/NA
Tetrachloroethene	46		0.66	0.084	ppb v/v	1.64		TO-15	Total/NA
Toluene	0.49	J	0.66	0.084	ppb v/v	1.64		TO-15	Total/NA
Trichloroethene	0.96		0.66	0.17	ppb v/v	1.64		TO-15	Total/NA
Trichlorofluoromethane	0.35	J	0.66	0.32	ppb v/v	1.64		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	1.5		0.66	0.27	ppb v/v	1.64		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.29	J	1.3	0.27	ppb v/v	1.64		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.21	J	0.66	0.21	ppb v/v	1.64		TO-15	Total/NA
Vinyl chloride	0.22	J	0.66	0.20	ppb v/v	1.64		TO-15	Total/NA
m,p-Xylene	0.37	J	1.3	0.16	ppb v/v	1.64		TO-15	Total/NA
o-Xylene	0.23	J	0.66	0.089	ppb v/v	1.64		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	9.1	J	19	0.69	ug/m3	1.64		TO-15	Total/NA
Benzene	0.56	J	2.1	0.41	ug/m3	1.64		TO-15	Total/NA
Bromodichloromethane	1.0	J	3.3	0.73	ug/m3	1.64		TO-15	Total/NA
Bromoform	2.2	J	6.8	1.2	ug/m3	1.64		TO-15	Total/NA
2-Butanone (MEK)	1.5	J	3.9	0.96	ug/m3	1.64		TO-15	Total/NA
Carbon disulfide	5.9		4.1	0.40	ug/m3	1.64		TO-15	Total/NA
Dibromochloromethane	1.9	J	5.6	1.1	ug/m3	1.64		TO-15	Total/NA
Chloroform	2.2	J	2.4	0.76	ug/m3	1.64		TO-15	Total/NA
Chloromethane	1.4	J	2.7	0.67	ug/m3	1.64		TO-15	Total/NA
Dichlorodifluoromethane	14		3.2	1.2	ug/m3	1.64		TO-15	Total/NA
1,1-Dichloroethane	0.74	J	2.0	0.48	ug/m3	1.64		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-04 (Continued)

Lab Sample ID: 320-29669-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethene	2.4	J	5.2	0.84	ug/m3	1.64		TO-15	Total/NA
Ethylbenzene	0.53	J	2.8	0.45	ug/m3	1.64		TO-15	Total/NA
Methylene Chloride	4.2		2.3	0.41	ug/m3	1.64		TO-15	Total/NA
Tetrachloroethene	310		4.4	0.57	ug/m3	1.64		TO-15	Total/NA
Toluene	1.9	J	2.5	0.32	ug/m3	1.64		TO-15	Total/NA
Trichloroethene	5.1		3.5	0.93	ug/m3	1.64		TO-15	Total/NA
Trichlorofluoromethane	2.0	J	3.7	1.8	ug/m3	1.64		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	11		5.0	2.0	ug/m3	1.64		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.4	J	6.4	1.3	ug/m3	1.64		TO-15	Total/NA
1,3,5-Trimethylbenzene	1.0	J	3.2	1.0	ug/m3	1.64		TO-15	Total/NA
Vinyl chloride	0.55	J	1.7	0.50	ug/m3	1.64		TO-15	Total/NA
m,p-Xylene	1.6	J	5.7	0.71	ug/m3	1.64		TO-15	Total/NA
o-Xylene	1.0	J	2.8	0.38	ug/m3	1.64		TO-15	Total/NA

Client Sample ID: SD-05

Lab Sample ID: 320-29669-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	7.4	J	15	0.54	ppb v/v	3.01		TO-15	Total/NA
Benzene	0.48	J	1.2	0.24	ppb v/v	3.01		TO-15	Total/NA
Bromodichloromethane	10		0.90	0.20	ppb v/v	3.01		TO-15	Total/NA
Bromoform	0.70	J	1.2	0.21	ppb v/v	3.01		TO-15	Total/NA
2-Butanone (MEK)	3.2		2.4	0.60	ppb v/v	3.01		TO-15	Total/NA
Carbon disulfide	22		2.4	0.23	ppb v/v	3.01		TO-15	Total/NA
Dibromochloromethane	4.3		1.2	0.24	ppb v/v	3.01		TO-15	Total/NA
Chloroform	16		0.90	0.29	ppb v/v	3.01		TO-15	Total/NA
Chloromethane	0.65	J	2.4	0.59	ppb v/v	3.01		TO-15	Total/NA
1,4-Dichlorobenzene	0.56	J	1.2	0.45	ppb v/v	3.01		TO-15	Total/NA
Dichlorodifluoromethane	0.46	J	1.2	0.44	ppb v/v	3.01		TO-15	Total/NA
1,1-Dichloroethane	0.47	J	0.90	0.22	ppb v/v	3.01		TO-15	Total/NA
cis-1,2-Dichloroethene	0.47	J	1.2	0.27	ppb v/v	3.01		TO-15	Total/NA
Ethylbenzene	4.4		1.2	0.19	ppb v/v	3.01		TO-15	Total/NA
4-Ethyltoluene	0.80	J	1.2	0.56	ppb v/v	3.01		TO-15	Total/NA
Methylene Chloride	1.9		1.2	0.22	ppb v/v	3.01		TO-15	Total/NA
Tetrachloroethene	0.49	J	1.2	0.15	ppb v/v	3.01		TO-15	Total/NA
Toluene	34		1.2	0.15	ppb v/v	3.01		TO-15	Total/NA
1,1,1-Trichloroethane	1.8		0.90	0.20	ppb v/v	3.01		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.4	J	2.4	0.49	ppb v/v	3.01		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.80	J	1.2	0.38	ppb v/v	3.01		TO-15	Total/NA
m,p-Xylene	11		2.4	0.30	ppb v/v	3.01		TO-15	Total/NA
o-Xylene	3.4		1.2	0.16	ppb v/v	3.01		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	18	J	36	1.3	ug/m3	3.01		TO-15	Total/NA
Benzene	1.5	J	3.8	0.76	ug/m3	3.01		TO-15	Total/NA
Bromodichloromethane	67		6.1	1.3	ug/m3	3.01		TO-15	Total/NA
Bromoform	7.3	J	12	2.2	ug/m3	3.01		TO-15	Total/NA
2-Butanone (MEK)	9.3		7.1	1.8	ug/m3	3.01		TO-15	Total/NA
Carbon disulfide	68		7.5	0.73	ug/m3	3.01		TO-15	Total/NA
Dibromochloromethane	37		10	2.0	ug/m3	3.01		TO-15	Total/NA
Chloroform	79		4.4	1.4	ug/m3	3.01		TO-15	Total/NA
Chloromethane	1.3	J	5.0	1.2	ug/m3	3.01		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-05 (Continued)

Lab Sample ID: 320-29669-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dichlorobenzene	3.4	J	7.2	2.7	ug/m3	3.01		TO-15	Total/NA
Dichlorodifluoromethane	2.3	J	6.0	2.2	ug/m3	3.01		TO-15	Total/NA
1,1-Dichloroethane	1.9	J	3.7	0.88	ug/m3	3.01		TO-15	Total/NA
cis-1,2-Dichloroethene	1.9	J	4.8	1.1	ug/m3	3.01		TO-15	Total/NA
Ethylbenzene	19		5.2	0.82	ug/m3	3.01		TO-15	Total/NA
4-Ethyltoluene	3.9	J	5.9	2.8	ug/m3	3.01		TO-15	Total/NA
Methylene Chloride	6.7		4.2	0.75	ug/m3	3.01		TO-15	Total/NA
Tetrachloroethene	3.3	J	8.2	1.0	ug/m3	3.01		TO-15	Total/NA
Toluene	130		4.5	0.58	ug/m3	3.01		TO-15	Total/NA
1,1,1-Trichloroethane	9.7		4.9	1.1	ug/m3	3.01		TO-15	Total/NA
1,2,4-Trimethylbenzene	6.7	J	12	2.4	ug/m3	3.01		TO-15	Total/NA
1,3,5-Trimethylbenzene	4.0	J	5.9	1.8	ug/m3	3.01		TO-15	Total/NA
m,p-Xylene	48		10	1.3	ug/m3	3.01		TO-15	Total/NA
o-Xylene	15		5.2	0.71	ug/m3	3.01		TO-15	Total/NA

Client Sample ID: SD-06

Lab Sample ID: 320-29669-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	5.8	J	8.2	0.29	ppb v/v	1.64		TO-15	Total/NA
Benzene	0.14	J	0.66	0.13	ppb v/v	1.64		TO-15	Total/NA
2-Butanone (MEK)	0.91	J	1.3	0.33	ppb v/v	1.64		TO-15	Total/NA
Carbon disulfide	74		1.3	0.13	ppb v/v	1.64		TO-15	Total/NA
Chloroform	0.19	J	0.49	0.16	ppb v/v	1.64		TO-15	Total/NA
Dichlorodifluoromethane	0.28	J	0.66	0.24	ppb v/v	1.64		TO-15	Total/NA
Methylene Chloride	0.22	J	0.66	0.12	ppb v/v	1.64		TO-15	Total/NA
Tetrachloroethene	0.27	J	0.66	0.084	ppb v/v	1.64		TO-15	Total/NA
Toluene	0.31	J	0.66	0.084	ppb v/v	1.64		TO-15	Total/NA
Trichloroethene	1.9		0.66	0.17	ppb v/v	1.64		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	1.4		0.66	0.27	ppb v/v	1.64		TO-15	Total/NA
m,p-Xylene	0.17	J	1.3	0.16	ppb v/v	1.64		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	14	J	19	0.69	ug/m3	1.64		TO-15	Total/NA
Benzene	0.45	J	2.1	0.41	ug/m3	1.64		TO-15	Total/NA
2-Butanone (MEK)	2.7	J	3.9	0.96	ug/m3	1.64		TO-15	Total/NA
Carbon disulfide	230		4.1	0.40	ug/m3	1.64		TO-15	Total/NA
Chloroform	0.91	J	2.4	0.76	ug/m3	1.64		TO-15	Total/NA
Dichlorodifluoromethane	1.4	J	3.2	1.2	ug/m3	1.64		TO-15	Total/NA
Methylene Chloride	0.75	J	2.3	0.41	ug/m3	1.64		TO-15	Total/NA
Tetrachloroethene	1.8	J	4.4	0.57	ug/m3	1.64		TO-15	Total/NA
Toluene	1.2	J	2.5	0.32	ug/m3	1.64		TO-15	Total/NA
Trichloroethene	10		3.5	0.93	ug/m3	1.64		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	11		5.0	2.0	ug/m3	1.64		TO-15	Total/NA
m,p-Xylene	0.74	J	5.7	0.71	ug/m3	1.64		TO-15	Total/NA

Client Sample ID: SD-07

Lab Sample ID: 320-29669-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	150		18	0.64	ppb v/v	3.57		TO-15	Total/NA
Bromodichloromethane	8.9		1.1	0.24	ppb v/v	3.57		TO-15	Total/NA
Bromoform	0.81	J	1.4	0.25	ppb v/v	3.57		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-07 (Continued)

Lab Sample ID: 320-29669-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon disulfide	8.6		2.9	0.28	ppb v/v	3.57		TO-15	Total/NA
Dibromochloromethane	4.7		1.4	0.28	ppb v/v	3.57		TO-15	Total/NA
Chloroform	15		1.1	0.34	ppb v/v	3.57		TO-15	Total/NA
Chloromethane	2.0	J	2.9	0.70	ppb v/v	3.57		TO-15	Total/NA
Dichlorodifluoromethane	0.56	J	1.4	0.52	ppb v/v	3.57		TO-15	Total/NA
Methylene Chloride	0.79	J	1.4	0.26	ppb v/v	3.57		TO-15	Total/NA
Tetrachloroethene	0.29	J	1.4	0.18	ppb v/v	3.57		TO-15	Total/NA
Toluene	1.3	J	1.4	0.18	ppb v/v	3.57		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	360		42	1.5	ug/m3	3.57		TO-15	Total/NA
Bromodichloromethane	59		7.2	1.6	ug/m3	3.57		TO-15	Total/NA
Bromoform	8.3	J	15	2.6	ug/m3	3.57		TO-15	Total/NA
Carbon disulfide	27		8.9	0.87	ug/m3	3.57		TO-15	Total/NA
Dibromochloromethane	40		12	2.4	ug/m3	3.57		TO-15	Total/NA
Chloroform	75		5.2	1.7	ug/m3	3.57		TO-15	Total/NA
Chloromethane	4.1	J	5.9	1.5	ug/m3	3.57		TO-15	Total/NA
Dichlorodifluoromethane	2.8	J	7.1	2.6	ug/m3	3.57		TO-15	Total/NA
Methylene Chloride	2.7	J	5.0	0.89	ug/m3	3.57		TO-15	Total/NA
Tetrachloroethene	2.0	J	9.7	1.2	ug/m3	3.57		TO-15	Total/NA
Toluene	5.0	J	5.4	0.69	ug/m3	3.57		TO-15	Total/NA

Client Sample ID: SD-08

Lab Sample ID: 320-29669-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	3.2	J	5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.098	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	13		0.30	0.066	ppb v/v	1		TO-15	Total/NA
Bromoform	1.1		0.40	0.070	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.38	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	6.6		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.15	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	7.7		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	20		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.53	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.24	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethene	0.21	J	0.80	0.13	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.12	J	0.40	0.089	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	1.6		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.14	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.31	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	1.7		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	1.5		0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	0.47		0.40	0.16	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	7.6	J	12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.31	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	85		2.0	0.44	ug/m3	1		TO-15	Total/NA
Bromoform	11		4.1	0.72	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	1.1	J	2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	21		2.5	0.24	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-08 (Continued)

Lab Sample ID: 320-29669-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon tetrachloride	0.96	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	65		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	96		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.1	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.2	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
1,1-Dichloroethene	0.84	J	3.2	0.51	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.47	J	1.6	0.35	ug/m3	1		TO-15	Total/NA
Methylene Chloride	5.5		1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	0.92	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	1.2	J	1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	9.0		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	8.4		2.2	1.1	ug/m3	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	3.6		3.1	1.2	ug/m3	1		TO-15	Total/NA

Client Sample ID: SD-09

Lab Sample ID: 320-29669-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	5.8		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.19	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	0.95		0.30	0.066	ppb v/v	1		TO-15	Total/NA
Bromoform	0.13	J	0.40	0.070	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.59	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	22		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.082	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.61		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	4.8		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.92		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.27	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethane	0.12	J	0.30	0.072	ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethene	33		0.80	0.13	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.94		0.40	0.089	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.070	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.43		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	29		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.77		0.40	0.051	ppb v/v	1		TO-15	Total/NA
1,1,1-Trichloroethane	0.087	J	0.30	0.065	ppb v/v	1		TO-15	Total/NA
Trichloroethene	53		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.24	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	0.35	J	0.40	0.16	ppb v/v	1		TO-15	Total/NA
Vinyl chloride	0.13	J	0.40	0.12	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.28	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.13	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	14		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.60	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	6.4		2.0	0.44	ug/m3	1		TO-15	Total/NA
Bromoform	1.4	J	4.1	0.72	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	1.7	J	2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	70		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.51	J	5.0	0.40	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-09 (Continued)

Lab Sample ID: 320-29669-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Dibromochloromethane	5.2		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	23		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.9		1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.3	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
1,1-Dichloroethane	0.48	J	1.2	0.29	ug/m3	1		TO-15	Total/NA
1,1-Dichloroethene	130		3.2	0.51	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	3.7		1.6	0.35	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.30	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.5		1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	190		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	2.9		1.5	0.19	ug/m3	1		TO-15	Total/NA
1,1,1-Trichloroethane	0.47	J	1.6	0.35	ug/m3	1		TO-15	Total/NA
Trichloroethene	290		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	2.7	J	3.1	1.2	ug/m3	1		TO-15	Total/NA
Vinyl chloride	0.33	J	1.0	0.31	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.2	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.56	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: SD-BKG-01

Lab Sample ID: 320-29669-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	6.4		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	1.7		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	0.28	J	0.30	0.066	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.72	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	0.98		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.081	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.22	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	1.4		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.97		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.26	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.10	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.22	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.31	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.35	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.13	J	0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.20	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.24	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.11	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	15		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	5.5		1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	1.9	J	2.0	0.44	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	2.1	J	2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	3.1		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.51	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	1.9	J	3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	6.6		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	2.0		1.7	0.41	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-BKG-01 (Continued)

Lab Sample ID: 320-29669-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Dichlorodifluoromethane	1.3	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.44	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	0.76	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	2.1	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	1.3	J	1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	0.72	J	2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.1	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.0	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.47	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: SD-BKG-02

Lab Sample ID: 320-29669-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	6.4		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.58		0.40	0.079	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.75	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.58	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.23	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.36	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.13	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.32	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.27	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.20	J	0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.20	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	13		0.40	0.16	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.33	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.16	J	0.40	0.13	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	1.1		0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.36	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Carbon disulfide - DL	84		1.6	0.16	ppb v/v	1.99		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	15		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	1.8		1.3	0.25	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	2.2	J	2.4	0.59	ug/m3	1		TO-15	Total/NA
Chloromethane	1.2	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.1	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	1.6	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	0.45	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	2.2	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	1.0	J	1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	1.1	J	2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.1	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	99		3.1	1.2	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.6	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.78	J	2.0	0.61	ug/m3	1		TO-15	Total/NA
m,p-Xylene	4.9		3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	1.6	J	1.7	0.23	ug/m3	1		TO-15	Total/NA
Carbon disulfide - DL	260		5.0	0.48	ug/m3	1.99		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-DUP

Lab Sample ID: 320-29669-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	4.9	J	12	0.41	ppb v/v	2.3		TO-15	Total/NA
Benzene	0.71	J	0.92	0.18	ppb v/v	2.3		TO-15	Total/NA
2-Butanone (MEK)	0.59	J	1.8	0.46	ppb v/v	2.3		TO-15	Total/NA
Carbon disulfide	7.3		1.8	0.18	ppb v/v	2.3		TO-15	Total/NA
Chloroform	0.25	J	0.69	0.22	ppb v/v	2.3		TO-15	Total/NA
Chloromethane	0.71	J	1.8	0.45	ppb v/v	2.3		TO-15	Total/NA
Dichlorodifluoromethane	0.39	J	0.92	0.33	ppb v/v	2.3		TO-15	Total/NA
1,1-Dichloroethane	0.17	J	0.69	0.17	ppb v/v	2.3		TO-15	Total/NA
Methylene Chloride	0.20	J	0.92	0.17	ppb v/v	2.3		TO-15	Total/NA
Tetrachloroethene	70		0.92	0.12	ppb v/v	2.3		TO-15	Total/NA
Toluene	0.26	J	0.92	0.12	ppb v/v	2.3		TO-15	Total/NA
Trichloroethene	24		0.92	0.24	ppb v/v	2.3		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	13		0.92	0.37	ppb v/v	2.3		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	12	J	27	0.97	ug/m3	2.3		TO-15	Total/NA
Benzene	2.3	J	2.9	0.58	ug/m3	2.3		TO-15	Total/NA
2-Butanone (MEK)	1.7	J	5.4	1.3	ug/m3	2.3		TO-15	Total/NA
Carbon disulfide	23		5.7	0.56	ug/m3	2.3		TO-15	Total/NA
Chloroform	1.2	J	3.4	1.1	ug/m3	2.3		TO-15	Total/NA
Chloromethane	1.5	J	3.8	0.94	ug/m3	2.3		TO-15	Total/NA
Dichlorodifluoromethane	1.9	J	4.5	1.6	ug/m3	2.3		TO-15	Total/NA
1,1-Dichloroethane	0.67	J	2.8	0.67	ug/m3	2.3		TO-15	Total/NA
Methylene Chloride	0.68	J	3.2	0.58	ug/m3	2.3		TO-15	Total/NA
Tetrachloroethene	470		6.2	0.80	ug/m3	2.3		TO-15	Total/NA
Toluene	0.97	J	3.5	0.44	ug/m3	2.3		TO-15	Total/NA
Trichloroethene	130		4.9	1.3	ug/m3	2.3		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	100		7.1	2.9	ug/m3	2.3		TO-15	Total/NA

Client Sample ID: OC-01

Lab Sample ID: 320-29669-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	7.0		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.12	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	2.5		0.30	0.066	ppb v/v	1		TO-15	Total/NA
Bromoform	0.46		0.40	0.070	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.74	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	1.1		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.067	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	2.0		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	6.6		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.73	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.25	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.19	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.39	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.12	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.64		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.11	J	0.40	0.11	ppb v/v	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	2.1		0.40	0.16	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.18	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.25	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-01 (Continued)

Lab Sample ID: 320-29669-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
o-Xylene	0.10	J	0.40	0.054	ppb v/v	1			TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Acetone	17		12	0.42	ug/m3	1			TO-15	Total/NA
Benzene	0.37	J	1.3	0.25	ug/m3	1			TO-15	Total/NA
Bromodichloromethane	17		2.0	0.44	ug/m3	1			TO-15	Total/NA
Bromoform	4.7		4.1	0.72	ug/m3	1			TO-15	Total/NA
2-Butanone (MEK)	2.2	J	2.4	0.59	ug/m3	1			TO-15	Total/NA
Carbon disulfide	3.4		2.5	0.24	ug/m3	1			TO-15	Total/NA
Carbon tetrachloride	0.42	J	5.0	0.40	ug/m3	1			TO-15	Total/NA
Dibromochloromethane	17		3.4	0.67	ug/m3	1			TO-15	Total/NA
Chloroform	32		1.5	0.46	ug/m3	1			TO-15	Total/NA
Chloromethane	1.5	J	1.7	0.41	ug/m3	1			TO-15	Total/NA
Dichlorodifluoromethane	1.3	J	2.0	0.72	ug/m3	1			TO-15	Total/NA
Ethylbenzene	0.82	J	1.7	0.27	ug/m3	1			TO-15	Total/NA
Methylene Chloride	1.4	J	1.4	0.25	ug/m3	1			TO-15	Total/NA
Tetrachloroethene	0.80	J	2.7	0.35	ug/m3	1			TO-15	Total/NA
Toluene	2.4		1.5	0.19	ug/m3	1			TO-15	Total/NA
Trichloroethene	0.61	J	2.1	0.56	ug/m3	1			TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	16		3.1	1.2	ug/m3	1			TO-15	Total/NA
1,2,4-Trimethylbenzene	0.88	J	3.9	0.80	ug/m3	1			TO-15	Total/NA
m,p-Xylene	1.1	J	3.5	0.43	ug/m3	1			TO-15	Total/NA
o-Xylene	0.44	J	1.7	0.23	ug/m3	1			TO-15	Total/NA

Client Sample ID: OC-02

Lab Sample ID: 320-29669-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Acetone	19		5.0	0.18	ppb v/v	1			TO-15	Total/NA
Benzene	0.18	J	0.40	0.079	ppb v/v	1			TO-15	Total/NA
Bromodichloromethane	0.36		0.30	0.066	ppb v/v	1			TO-15	Total/NA
Bromoform	0.10	J	0.40	0.070	ppb v/v	1			TO-15	Total/NA
2-Butanone (MEK)	3.8		0.80	0.20	ppb v/v	1			TO-15	Total/NA
Carbon disulfide	5.7		0.80	0.078	ppb v/v	1			TO-15	Total/NA
Carbon tetrachloride	0.099	J	0.80	0.064	ppb v/v	1			TO-15	Total/NA
Dibromochloromethane	0.34	J	0.40	0.079	ppb v/v	1			TO-15	Total/NA
Chloroform	5.9		0.30	0.095	ppb v/v	1			TO-15	Total/NA
Chloromethane	1.1		0.80	0.20	ppb v/v	1			TO-15	Total/NA
Dichlorodifluoromethane	0.50		0.40	0.15	ppb v/v	1			TO-15	Total/NA
Ethylbenzene	0.11	J	0.40	0.063	ppb v/v	1			TO-15	Total/NA
Methylene Chloride	0.46		0.40	0.072	ppb v/v	1			TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.91		0.40	0.14	ppb v/v	1			TO-15	Total/NA
Styrene	0.074	J	0.40	0.059	ppb v/v	1			TO-15	Total/NA
Tetrachloroethene	0.50		0.40	0.051	ppb v/v	1			TO-15	Total/NA
Toluene	0.55		0.40	0.051	ppb v/v	1			TO-15	Total/NA
Trichlorofluoromethane	0.27	J	0.40	0.20	ppb v/v	1			TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	0.16	J	0.40	0.16	ppb v/v	1			TO-15	Total/NA
m,p-Xylene	0.29	J	0.80	0.10	ppb v/v	1			TO-15	Total/NA
o-Xylene	0.12	J	0.40	0.054	ppb v/v	1			TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Acetone	44		12	0.42	ug/m3	1			TO-15	Total/NA
Benzene	0.56	J	1.3	0.25	ug/m3	1			TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-02 (Continued)

Lab Sample ID: 320-29669-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Bromodichloromethane	2.4		2.0	0.44	ug/m3	1		TO-15	Total/NA
Bromoform	1.0	J	4.1	0.72	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	11		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	18		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.62	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	2.9	J	3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	29		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	2.3		1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.5		2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.47	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.6		1.4	0.25	ug/m3	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	3.7		1.6	0.55	ug/m3	1		TO-15	Total/NA
Styrene	0.31	J	1.7	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	3.4		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	2.1		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.5	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	1.2	J	3.1	1.2	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.2	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.52	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: OC-03

Lab Sample ID: 320-29669-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	33		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.34	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	2.8		0.30	0.066	ppb v/v	1		TO-15	Total/NA
Bromoform	4.0		0.40	0.070	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	4.7		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	26		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.42	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	3.9		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	6.7		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.69	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.47		0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.33	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	10		0.40	0.072	ppb v/v	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.47		0.40	0.14	ppb v/v	1		TO-15	Total/NA
Styrene	0.088	J	0.40	0.059	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.18	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.49		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	2.5		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.25	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.36	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.84		0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.36	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	79		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	1.1	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	19		2.0	0.44	ug/m3	1		TO-15	Total/NA
Bromoform	41		4.1	0.72	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-03 (Continued)

Lab Sample ID: 320-29669-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Butanone (MEK)	14		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	80		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	2.6	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	33		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	33		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.4	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.3		2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	1.4	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	35		1.4	0.25	ug/m3	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	1.9		1.6	0.55	ug/m3	1		TO-15	Total/NA
Styrene	0.38	J	1.7	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	1.2	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	1.9		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	13		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.8	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
m,p-Xylene	3.6		3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	1.6	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: OC-04

Lab Sample ID: 320-29669-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	12		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.14	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.90		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	4.5		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.082	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Chloroform	0.30		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	1.1		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.52		0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethane	4.2		0.30	0.072	ppb v/v	1		TO-15	Total/NA
1,2-Dichloroethane	0.16	J	0.80	0.088	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.11	J	0.40	0.089	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.19	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.13	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.40		0.40	0.051	ppb v/v	1		TO-15	Total/NA
1,1,1-Trichloroethane	4.4		0.30	0.065	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.12	J	0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.39	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	3.4		0.40	0.16	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.18	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.070	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethene - DL	150		4.4	0.71	ppb v/v	5.54		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	30		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.46	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	2.7		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	14		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.51	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Chloroform	1.5		1.5	0.46	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-04 (Continued)

Lab Sample ID: 320-29669-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloromethane	2.2		1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.6		2.0	0.72	ug/m3	1		TO-15	Total/NA
1,1-Dichloroethane	17		1.2	0.29	ug/m3	1		TO-15	Total/NA
1,2-Dichloroethane	0.63	J	3.2	0.36	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.45	J	1.6	0.35	ug/m3	1		TO-15	Total/NA
Methylene Chloride	0.65	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	0.90	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	1.5		1.5	0.19	ug/m3	1		TO-15	Total/NA
1,1,1-Trichloroethane	24		1.6	0.35	ug/m3	1		TO-15	Total/NA
Trichloroethene	0.62	J	2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	2.2	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	26		3.1	1.2	ug/m3	1		TO-15	Total/NA
m,p-Xylene	0.77	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.30	J	1.7	0.23	ug/m3	1		TO-15	Total/NA
1,1-Dichloroethene - DL	590		18	2.8	ug/m3	5.54		TO-15	Total/NA

Client Sample ID: OC-05

Lab Sample ID: 320-29669-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	37		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	28		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	5.2		0.30	0.066	ppb v/v	1		TO-15	Total/NA
Bromoform	2.1		0.40	0.070	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.9		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	4.4		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.071	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	4.6		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	5.6		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.84		0.80	0.20	ppb v/v	1		TO-15	Total/NA
1,4-Dichlorobenzene	0.37	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.43		0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,2-Dichloroethane	0.57	J	0.80	0.088	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.16	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
2-Hexanone	0.19	J	0.40	0.087	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	1.1		0.40	0.072	ppb v/v	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.20	J	0.40	0.14	ppb v/v	1		TO-15	Total/NA
Styrene	0.074	J	0.40	0.059	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	1.5		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	1.1		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	4.6		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.28	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.37	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.51	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.22	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	89		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	89		1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	35		2.0	0.44	ug/m3	1		TO-15	Total/NA
Bromoform	22		4.1	0.72	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	5.6		2.4	0.59	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-05 (Continued)

Lab Sample ID: 320-29669-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon disulfide	14		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.45	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	39		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	28		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.7		1.7	0.41	ug/m3	1		TO-15	Total/NA
1,4-Dichlorobenzene	2.2	J	2.4	0.90	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.1		2.0	0.72	ug/m3	1		TO-15	Total/NA
1,2-Dichloroethane	2.3	J	3.2	0.36	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.70	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
2-Hexanone	0.79	J	1.6	0.36	ug/m3	1		TO-15	Total/NA
Methylene Chloride	3.9		1.4	0.25	ug/m3	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.82	J	1.6	0.55	ug/m3	1		TO-15	Total/NA
Styrene	0.31	J	1.7	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	10		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	4.1		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	25		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.6	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.8	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
m,p-Xylene	2.2	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.95	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: OC-06A

Lab Sample ID: 320-29669-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	84		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.44		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	0.66		0.30	0.066	ppb v/v	1		TO-15	Total/NA
Bromoform	0.41		0.40	0.070	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.77	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	1.6		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.68		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	0.84		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.60	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.47		0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethene	4.9		0.80	0.13	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.51		0.40	0.089	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.17	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.24	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	8.0		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	1.9		0.40	0.051	ppb v/v	1		TO-15	Total/NA
1,1,1-Trichloroethane	0.31		0.30	0.065	ppb v/v	1		TO-15	Total/NA
Trichloroethene	49		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.23	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	1.4		0.40	0.16	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.19	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.54	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.21	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	200		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	1.4		1.3	0.25	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-06A (Continued)

Lab Sample ID: 320-29669-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Bromodichloromethane	4.4		2.0	0.44	ug/m3	1		TO-15	Total/NA
Bromoform	4.3		4.1	0.72	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	2.3	J	2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	4.9		2.5	0.24	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	5.8		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	4.1		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.2	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.3		2.0	0.72	ug/m3	1		TO-15	Total/NA
1,1-Dichloroethene	19		3.2	0.51	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	2.0		1.6	0.35	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.72	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	0.83	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	54		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	7.2		1.5	0.19	ug/m3	1		TO-15	Total/NA
1,1,1-Trichloroethane	1.7		1.6	0.35	ug/m3	1		TO-15	Total/NA
Trichloroethene	260		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	11		3.1	1.2	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.94	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
m,p-Xylene	2.3	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.91	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: OC-06B

Lab Sample ID: 320-29669-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	15		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.42		0.40	0.079	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.5		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	1.9		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.15	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Chloromethane	1.3		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.90		0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethene	10		0.80	0.13	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.93		0.40	0.089	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.16	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.34	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Styrene	0.11	J	0.40	0.059	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	16		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.70		0.40	0.051	ppb v/v	1		TO-15	Total/NA
1,1,1-Trichloroethane	0.24	J	0.30	0.065	ppb v/v	1		TO-15	Total/NA
Trichloroethene	120	E	0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.44		0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	6.4		0.40	0.16	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.16	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.41	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.15	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	37		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	1.3		1.3	0.25	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	4.3		2.4	0.59	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-06B (Continued)

Lab Sample ID: 320-29669-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon disulfide	6.0		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.97	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Chloromethane	2.6		1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	4.5		2.0	0.72	ug/m3	1		TO-15	Total/NA
1,1-Dichloroethene	40		3.2	0.51	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	3.7		1.6	0.35	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.69	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.2	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
Styrene	0.46	J	1.7	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	110		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	2.7		1.5	0.19	ug/m3	1		TO-15	Total/NA
1,1,1-Trichloroethane	1.3	J	1.6	0.35	ug/m3	1		TO-15	Total/NA
Trichloroethene	630	E	2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	2.5		2.2	1.1	ug/m3	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	49		3.1	1.2	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.80	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.8	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.67	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: OC-07

Lab Sample ID: 320-29669-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	20		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.21	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	1.2		0.30	0.066	ppb v/v	1		TO-15	Total/NA
Bromoform	0.19	J	0.40	0.070	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.73	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	2.4		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.078	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.84		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	2.4		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.66	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.43		0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.15	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.34	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Toluene	0.56		0.40	0.051	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.22	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.51	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.19	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	48		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.66	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	8.3		2.0	0.44	ug/m3	1		TO-15	Total/NA
Bromoform	1.9	J	4.1	0.72	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	2.2	J	2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	7.5		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.49	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	7.2		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	12		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.4	J	1.7	0.41	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-07 (Continued)

Lab Sample ID: 320-29669-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Dichlorodifluoromethane	2.1		2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.65	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.2	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
Toluene	2.1		1.5	0.19	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.1	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
m,p-Xylene	2.2	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.81	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: OC-08

Lab Sample ID: 320-29669-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	6.6		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	1.2		0.40	0.079	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.70	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	1.2		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.70	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.48		0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.29	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Toluene	0.17	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.25	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.21	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.12	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	16		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	3.7		1.3	0.25	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	2.1	J	2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	3.7		2.5	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.5	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.4		2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	1.3	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Toluene	0.65	J	1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
m,p-Xylene	0.93	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.51	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: OC-09

Lab Sample ID: 320-29669-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	15		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.16	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	1.1		0.30	0.066	ppb v/v	1		TO-15	Total/NA
Bromoform	0.51		0.40	0.070	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.71	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	7.2		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	1.1		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	1.4		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.79	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.48		0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.23	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
4-Ethyltoluene	0.19	J	0.40	0.19	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-09 (Continued)

Lab Sample ID: 320-29669-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.34	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.40		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.45		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.24	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.52	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.13	J	0.40	0.13	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.83		0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.29	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	35		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.50	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	7.3		2.0	0.44	ug/m3	1		TO-15	Total/NA
Bromoform	5.3		4.1	0.72	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	2.1	J	2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	22		2.5	0.24	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	9.0		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	7.0		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.6	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.4		2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	1.0	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
4-Ethyltoluene	0.92	J	2.0	0.92	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.2	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	2.7		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	1.7		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	2.6	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.63	J	2.0	0.61	ug/m3	1		TO-15	Total/NA
m,p-Xylene	3.6		3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	1.3	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: OC-BKG-01

Lab Sample ID: 320-29669-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	8.2		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.10	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.89		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	0.11	J	0.80	0.078	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.73	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.47		0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.091	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.30	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.13	J	0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.24	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.17	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.25	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.096	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	19		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.32	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	2.6		2.4	0.59	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-BKG-01 (Continued)

Lab Sample ID: 320-29669-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon disulfide	0.34	J	2.5	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.5	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.3		2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.40	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	2.1	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Trichloroethene	0.69	J	2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.83	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.1	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.42	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: OC-BKG-02A

Lab Sample ID: 320-29669-24

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	18		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.27	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.9		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	75		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.66	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.46		0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.15	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
2-Hexanone	0.15	J	0.40	0.087	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.20	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Toluene	0.25	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.23	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.48	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.13	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	43		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.87	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	5.6		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	230		2.5	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	1.4	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.3		2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.64	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
2-Hexanone	0.60	J	1.6	0.36	ug/m3	1		TO-15	Total/NA
Methylene Chloride	0.70	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
Toluene	0.95	J	1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
m,p-Xylene	2.1	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.57	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: OC-BKG-02B

Lab Sample ID: 320-29669-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	3.1	J	5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.75		0.40	0.079	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.27	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	6.2		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.48	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-BKG-02B (Continued)

Lab Sample ID: 320-29669-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Dichlorodifluoromethane	0.24	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.072	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.12	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.081	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.25	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.21	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.077	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	7.4	J	12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	2.4		1.3	0.25	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	0.81	J	2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	19		2.5	0.24	ug/m3	1		TO-15	Total/NA
Chloromethane	0.99	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.2	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.31	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	0.43	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	0.55	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	0.94	J	1.5	0.19	ug/m3	1		TO-15	Total/NA
m,p-Xylene	0.93	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.33	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: OC-DUP

Lab Sample ID: 320-29669-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	8.0		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.22	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.3		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	10		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Chloroform	0.75		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.57	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.27	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.32	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.096	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.20	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	19		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.70	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	3.9		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	32		2.5	0.24	ug/m3	1		TO-15	Total/NA
Chloroform	3.7		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.2	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.3	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.1	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	0.65	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	0.74	J	1.5	0.19	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-01

Date Collected: 06/26/17 13:57

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-1

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3.3	J	5.0	0.18	ppb v/v			07/19/17 19:56	1
Benzene	0.24	J	0.40	0.079	ppb v/v			07/19/17 19:56	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/19/17 19:56	1
Bromodichloromethane	0.77		0.30	0.066	ppb v/v			07/19/17 19:56	1
Bromoform	0.19	J	0.40	0.070	ppb v/v			07/19/17 19:56	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/19/17 19:56	1
2-Butanone (MEK)	0.61	J	0.80	0.20	ppb v/v			07/19/17 19:56	1
Carbon disulfide	1.2		0.80	0.078	ppb v/v			07/19/17 19:56	1
Carbon tetrachloride	0.22	J	0.80	0.064	ppb v/v			07/19/17 19:56	1
Chlorobenzene	0.15	J	0.30	0.064	ppb v/v			07/19/17 19:56	1
Dibromochloromethane	0.44		0.40	0.079	ppb v/v			07/19/17 19:56	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/19/17 19:56	1
Chloroform	1.5		0.30	0.095	ppb v/v			07/19/17 19:56	1
Chloromethane	0.72	J	0.80	0.20	ppb v/v			07/19/17 19:56	1
1,2-Dibromoethane (EDB)	0.13	J	0.80	0.075	ppb v/v			07/19/17 19:56	1
1,2-Dichlorobenzene	0.16	J	0.40	0.13	ppb v/v			07/19/17 19:56	1
1,3-Dichlorobenzene	0.15	J	0.40	0.11	ppb v/v			07/19/17 19:56	1
1,4-Dichlorobenzene	0.18	J	0.40	0.15	ppb v/v			07/19/17 19:56	1
Dichlorodifluoromethane	2.4		0.40	0.15	ppb v/v			07/19/17 19:56	1
1,1-Dichloroethane	0.33		0.30	0.072	ppb v/v			07/19/17 19:56	1
1,2-Dichloroethane	0.16	J	0.80	0.088	ppb v/v			07/19/17 19:56	1
1,1-Dichloroethene	0.78	J	0.80	0.13	ppb v/v			07/19/17 19:56	1
cis-1,2-Dichloroethene	0.17	J	0.40	0.089	ppb v/v			07/19/17 19:56	1
trans-1,2-Dichloroethene	0.16	J	0.40	0.10	ppb v/v			07/19/17 19:56	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/19/17 19:56	1
cis-1,3-Dichloropropene	0.15	J	0.40	0.10	ppb v/v			07/19/17 19:56	1
trans-1,3-Dichloropropene	0.15	J	0.40	0.088	ppb v/v			07/19/17 19:56	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.20	J	0.40	0.16	ppb v/v			07/19/17 19:56	1
Ethylbenzene	0.18	J	0.40	0.063	ppb v/v			07/19/17 19:56	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/19/17 19:56	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/19/17 19:56	1
2-Hexanone	0.19	J	0.40	0.087	ppb v/v			07/19/17 19:56	1
Methylene Chloride	1.3		0.40	0.072	ppb v/v			07/19/17 19:56	1
4-Methyl-2-pentanone (MIBK)	0.94		0.40	0.14	ppb v/v			07/19/17 19:56	1
Styrene	0.19	J	0.40	0.059	ppb v/v			07/19/17 19:56	1
1,1,2,2-Tetrachloroethane	0.14	J	0.40	0.069	ppb v/v			07/19/17 19:56	1
Tetrachloroethene	0.26	J	0.40	0.051	ppb v/v			07/19/17 19:56	1
Toluene	0.43		0.40	0.051	ppb v/v			07/19/17 19:56	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/19/17 19:56	1
1,1,1-Trichloroethane	0.16	J	0.30	0.065	ppb v/v			07/19/17 19:56	1
1,1,2-Trichloroethane	0.14	J	0.40	0.067	ppb v/v			07/19/17 19:56	1
Trichloroethene	0.44		0.40	0.11	ppb v/v			07/19/17 19:56	1
Trichlorofluoromethane	0.51		0.40	0.20	ppb v/v			07/19/17 19:56	1
1,1,2-Trichloro-1,2,2-trifluoroethane	2.5		0.40	0.16	ppb v/v			07/19/17 19:56	1
1,2,4-Trimethylbenzene	0.17	J	0.80	0.16	ppb v/v			07/19/17 19:56	1
1,3,5-Trimethylbenzene	0.15	J	0.40	0.13	ppb v/v			07/19/17 19:56	1
Vinyl acetate	0.15	J	0.80	0.15	ppb v/v			07/19/17 19:56	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-01

Lab Sample ID: 320-29669-1

Date Collected: 06/26/17 13:57

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.31	J	0.40	0.12	ppb v/v			07/19/17 19:56	1
m,p-Xylene	0.39	J	0.80	0.10	ppb v/v			07/19/17 19:56	1
o-Xylene	0.19	J	0.40	0.054	ppb v/v			07/19/17 19:56	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.9	J	12	0.42	ug/m3			07/19/17 19:56	1
Benzene	0.78	J	1.3	0.25	ug/m3			07/19/17 19:56	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/19/17 19:56	1
Bromodichloromethane	5.2		2.0	0.44	ug/m3			07/19/17 19:56	1
Bromoform	2.0	J	4.1	0.72	ug/m3			07/19/17 19:56	1
Bromomethane	ND		3.1	1.3	ug/m3			07/19/17 19:56	1
2-Butanone (MEK)	1.8	J	2.4	0.59	ug/m3			07/19/17 19:56	1
Carbon disulfide	3.7		2.5	0.24	ug/m3			07/19/17 19:56	1
Carbon tetrachloride	1.4	J	5.0	0.40	ug/m3			07/19/17 19:56	1
Chlorobenzene	0.69	J	1.4	0.29	ug/m3			07/19/17 19:56	1
Dibromochloromethane	3.8		3.4	0.67	ug/m3			07/19/17 19:56	1
Chloroethane	ND		2.1	0.81	ug/m3			07/19/17 19:56	1
Chloroform	7.3		1.5	0.46	ug/m3			07/19/17 19:56	1
Chloromethane	1.5	J	1.7	0.41	ug/m3			07/19/17 19:56	1
1,2-Dibromoethane (EDB)	1.0	J	6.1	0.58	ug/m3			07/19/17 19:56	1
1,2-Dichlorobenzene	0.94	J	2.4	0.78	ug/m3			07/19/17 19:56	1
1,3-Dichlorobenzene	0.92	J	2.4	0.66	ug/m3			07/19/17 19:56	1
1,4-Dichlorobenzene	1.1	J	2.4	0.90	ug/m3			07/19/17 19:56	1
Dichlorodifluoromethane	12		2.0	0.72	ug/m3			07/19/17 19:56	1
1,1-Dichloroethane	1.4		1.2	0.29	ug/m3			07/19/17 19:56	1
1,2-Dichloroethane	0.63	J	3.2	0.36	ug/m3			07/19/17 19:56	1
1,1-Dichloroethene	3.1	J	3.2	0.51	ug/m3			07/19/17 19:56	1
cis-1,2-Dichloroethene	0.67	J	1.6	0.35	ug/m3			07/19/17 19:56	1
trans-1,2-Dichloroethene	0.65	J	1.6	0.40	ug/m3			07/19/17 19:56	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/19/17 19:56	1
cis-1,3-Dichloropropene	0.70	J	1.8	0.47	ug/m3			07/19/17 19:56	1
trans-1,3-Dichloropropene	0.68	J	1.8	0.40	ug/m3			07/19/17 19:56	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	1.4	J	2.8	1.1	ug/m3			07/19/17 19:56	1
Ethylbenzene	0.80	J	1.7	0.27	ug/m3			07/19/17 19:56	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/19/17 19:56	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/19/17 19:56	1
2-Hexanone	0.79	J	1.6	0.36	ug/m3			07/19/17 19:56	1
Methylene Chloride	4.6		1.4	0.25	ug/m3			07/19/17 19:56	1
4-Methyl-2-pentanone (MIBK)	3.9		1.6	0.55	ug/m3			07/19/17 19:56	1
Styrene	0.83	J	1.7	0.25	ug/m3			07/19/17 19:56	1
1,1,2,2-Tetrachloroethane	0.97	J	2.7	0.47	ug/m3			07/19/17 19:56	1
Tetrachloroethene	1.8	J	2.7	0.35	ug/m3			07/19/17 19:56	1
Toluene	1.6		1.5	0.19	ug/m3			07/19/17 19:56	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/19/17 19:56	1
1,1,1-Trichloroethane	0.89	J	1.6	0.35	ug/m3			07/19/17 19:56	1
1,1,2-Trichloroethane	0.79	J	2.2	0.37	ug/m3			07/19/17 19:56	1
Trichloroethene	2.4		2.1	0.56	ug/m3			07/19/17 19:56	1
Trichlorofluoromethane	2.9		2.2	1.1	ug/m3			07/19/17 19:56	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-01

Date Collected: 06/26/17 13:57

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-1

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2-Trichloro-1,2,2-trifluoroethane	19		3.1	1.2	ug/m3			07/19/17 19:56	1
1,2,4-Trimethylbenzene	0.84	J	3.9	0.80	ug/m3			07/19/17 19:56	1
1,3,5-Trimethylbenzene	0.73	J	2.0	0.61	ug/m3			07/19/17 19:56	1
Vinyl acetate	0.53	J	2.8	0.51	ug/m3			07/19/17 19:56	1
Vinyl chloride	0.79	J	1.0	0.31	ug/m3			07/19/17 19:56	1
m,p-Xylene	1.7	J	3.5	0.43	ug/m3			07/19/17 19:56	1
o-Xylene	0.82	J	1.7	0.23	ug/m3			07/19/17 19:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130					07/19/17 19:56	1
1,2-Dichloroethane-d4 (Surr)	97		70 - 130					07/19/17 19:56	1
Toluene-d8 (Surr)	108		70 - 130					07/19/17 19:56	1

Client Sample ID: SD-02

Date Collected: 06/27/17 10:43

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	4.9	J	5.0	0.18	ppb v/v			07/19/17 20:51	1
Benzene	0.22	J	0.40	0.079	ppb v/v			07/19/17 20:51	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/19/17 20:51	1
Bromodichloromethane	1.0		0.30	0.066	ppb v/v			07/19/17 20:51	1
Bromoform	0.14	J	0.40	0.070	ppb v/v			07/19/17 20:51	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/19/17 20:51	1
2-Butanone (MEK)	0.66	J	0.80	0.20	ppb v/v			07/19/17 20:51	1
Carbon disulfide	9.9		0.80	0.078	ppb v/v			07/19/17 20:51	1
Carbon tetrachloride	0.13	J	0.80	0.064	ppb v/v			07/19/17 20:51	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/19/17 20:51	1
Dibromochloromethane	0.58		0.40	0.079	ppb v/v			07/19/17 20:51	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/19/17 20:51	1
Chloroform	1.8		0.30	0.095	ppb v/v			07/19/17 20:51	1
Chloromethane	0.68	J	0.80	0.20	ppb v/v			07/19/17 20:51	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/19/17 20:51	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/19/17 20:51	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/19/17 20:51	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/19/17 20:51	1
Dichlorodifluoromethane	0.40		0.40	0.15	ppb v/v			07/19/17 20:51	1
1,1-Dichloroethane	0.079	J	0.30	0.072	ppb v/v			07/19/17 20:51	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/19/17 20:51	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/19/17 20:51	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/19/17 20:51	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/19/17 20:51	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/19/17 20:51	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/19/17 20:51	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/19/17 20:51	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/19/17 20:51	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-02

Date Collected: 06/27/17 10:43

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	0.11	J	0.40	0.063	ppb v/v			07/19/17 20:51	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/19/17 20:51	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/19/17 20:51	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/19/17 20:51	1
Methylene Chloride	0.53		0.40	0.072	ppb v/v			07/19/17 20:51	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/19/17 20:51	1
Styrene	0.070	J	0.40	0.059	ppb v/v			07/19/17 20:51	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/19/17 20:51	1
Tetrachloroethene	0.13	J	0.40	0.051	ppb v/v			07/19/17 20:51	1
Toluene	1.5		0.40	0.051	ppb v/v			07/19/17 20:51	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/19/17 20:51	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/19/17 20:51	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/19/17 20:51	1
Trichloroethene	0.29	J	0.40	0.11	ppb v/v			07/19/17 20:51	1
Trichlorofluoromethane	0.24	J	0.40	0.20	ppb v/v			07/19/17 20:51	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.23	J	0.40	0.16	ppb v/v			07/19/17 20:51	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			07/19/17 20:51	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/19/17 20:51	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/19/17 20:51	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/19/17 20:51	1
m,p-Xylene	0.26	J	0.80	0.10	ppb v/v			07/19/17 20:51	1
o-Xylene	0.12	J	0.40	0.054	ppb v/v			07/19/17 20:51	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	12	J	12	0.42	ug/m3			07/19/17 20:51	1
Benzene	0.70	J	1.3	0.25	ug/m3			07/19/17 20:51	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/19/17 20:51	1
Bromodichloromethane	6.8		2.0	0.44	ug/m3			07/19/17 20:51	1
Bromoform	1.5	J	4.1	0.72	ug/m3			07/19/17 20:51	1
Bromomethane	ND		3.1	1.3	ug/m3			07/19/17 20:51	1
2-Butanone (MEK)	1.9	J	2.4	0.59	ug/m3			07/19/17 20:51	1
Carbon disulfide	31		2.5	0.24	ug/m3			07/19/17 20:51	1
Carbon tetrachloride	0.84	J	5.0	0.40	ug/m3			07/19/17 20:51	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/19/17 20:51	1
Dibromochloromethane	4.9		3.4	0.67	ug/m3			07/19/17 20:51	1
Chloroethane	ND		2.1	0.81	ug/m3			07/19/17 20:51	1
Chloroform	8.9		1.5	0.46	ug/m3			07/19/17 20:51	1
Chloromethane	1.4	J	1.7	0.41	ug/m3			07/19/17 20:51	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/19/17 20:51	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/19/17 20:51	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/19/17 20:51	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/19/17 20:51	1
Dichlorodifluoromethane	2.0		2.0	0.72	ug/m3			07/19/17 20:51	1
1,1-Dichloroethane	0.32	J	1.2	0.29	ug/m3			07/19/17 20:51	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/19/17 20:51	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/19/17 20:51	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/19/17 20:51	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/19/17 20:51	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-02

Date Collected: 06/27/17 10:43

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/19/17 20:51	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/19/17 20:51	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/19/17 20:51	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/19/17 20:51	1
Ethylbenzene	0.47	J	1.7	0.27	ug/m3			07/19/17 20:51	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/19/17 20:51	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/19/17 20:51	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/19/17 20:51	1
Methylene Chloride	1.8		1.4	0.25	ug/m3			07/19/17 20:51	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/19/17 20:51	1
Styrene	0.30	J	1.7	0.25	ug/m3			07/19/17 20:51	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/19/17 20:51	1
Tetrachloroethene	0.88	J	2.7	0.35	ug/m3			07/19/17 20:51	1
Toluene	5.7		1.5	0.19	ug/m3			07/19/17 20:51	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/19/17 20:51	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/19/17 20:51	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/19/17 20:51	1
Trichloroethene	1.6	J	2.1	0.56	ug/m3			07/19/17 20:51	1
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3			07/19/17 20:51	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.8	J	3.1	1.2	ug/m3			07/19/17 20:51	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			07/19/17 20:51	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/19/17 20:51	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/19/17 20:51	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/19/17 20:51	1
m,p-Xylene	1.1	J	3.5	0.43	ug/m3			07/19/17 20:51	1
o-Xylene	0.52	J	1.7	0.23	ug/m3			07/19/17 20:51	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130					07/19/17 20:51	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 130					07/19/17 20:51	1
Toluene-d8 (Surr)	107		70 - 130					07/19/17 20:51	1

Client Sample ID: SD-03

Date Collected: 06/27/17 11:04

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-3

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	6.2	J	41	1.5	ppb v/v			07/19/17 21:42	8.2
Benzene	ND		3.3	0.65	ppb v/v			07/19/17 21:42	8.2
Benzyl chloride	ND		6.6	1.3	ppb v/v			07/19/17 21:42	8.2
Bromodichloromethane	ND		2.5	0.54	ppb v/v			07/19/17 21:42	8.2
Bromoform	ND		3.3	0.57	ppb v/v			07/19/17 21:42	8.2
Bromomethane	ND		6.6	2.7	ppb v/v			07/19/17 21:42	8.2
2-Butanone (MEK)	ND		6.6	1.6	ppb v/v			07/19/17 21:42	8.2
Carbon disulfide	1.9	J	6.6	0.64	ppb v/v			07/19/17 21:42	8.2
Carbon tetrachloride	ND		6.6	0.52	ppb v/v			07/19/17 21:42	8.2

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-03

Date Collected: 06/27/17 11:04

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-3

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	ND		2.5	0.52	ppb v/v			07/19/17 21:42	8.2
Dibromochloromethane	ND		3.3	0.65	ppb v/v			07/19/17 21:42	8.2
Chloroethane	ND		6.6	2.5	ppb v/v			07/19/17 21:42	8.2
Chloroform	1.1	J	2.5	0.78	ppb v/v			07/19/17 21:42	8.2
Chloromethane	ND		6.6	1.6	ppb v/v			07/19/17 21:42	8.2
1,2-Dibromoethane (EDB)	ND		6.6	0.62	ppb v/v			07/19/17 21:42	8.2
1,2-Dichlorobenzene	ND		3.3	1.1	ppb v/v			07/19/17 21:42	8.2
1,3-Dichlorobenzene	ND		3.3	0.90	ppb v/v			07/19/17 21:42	8.2
1,4-Dichlorobenzene	ND		3.3	1.2	ppb v/v			07/19/17 21:42	8.2
Dichlorodifluoromethane	7.7		3.3	1.2	ppb v/v			07/19/17 21:42	8.2
1,1-Dichloroethane	1.1	J	2.5	0.59	ppb v/v			07/19/17 21:42	8.2
1,2-Dichloroethane	ND		6.6	0.72	ppb v/v			07/19/17 21:42	8.2
1,1-Dichloroethene	1.4	J	6.6	1.1	ppb v/v			07/19/17 21:42	8.2
cis-1,2-Dichloroethene	ND		3.3	0.73	ppb v/v			07/19/17 21:42	8.2
trans-1,2-Dichloroethene	ND		3.3	0.82	ppb v/v			07/19/17 21:42	8.2
1,2-Dichloropropane	ND		3.3	2.0	ppb v/v			07/19/17 21:42	8.2
cis-1,3-Dichloropropene	ND		3.3	0.85	ppb v/v			07/19/17 21:42	8.2
trans-1,3-Dichloropropene	ND		3.3	0.72	ppb v/v			07/19/17 21:42	8.2
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.3	1.3	ppb v/v			07/19/17 21:42	8.2
Ethylbenzene	ND		3.3	0.52	ppb v/v			07/19/17 21:42	8.2
4-Ethyltoluene	ND		3.3	1.5	ppb v/v			07/19/17 21:42	8.2
Hexachlorobutadiene	ND		16	3.5	ppb v/v			07/19/17 21:42	8.2
2-Hexanone	ND		3.3	0.71	ppb v/v			07/19/17 21:42	8.2
Methylene Chloride	2.3	J	3.3	0.59	ppb v/v			07/19/17 21:42	8.2
4-Methyl-2-pentanone (MIBK)	ND		3.3	1.1	ppb v/v			07/19/17 21:42	8.2
Styrene	ND		3.3	0.48	ppb v/v			07/19/17 21:42	8.2
1,1,2,2-Tetrachloroethane	ND		3.3	0.57	ppb v/v			07/19/17 21:42	8.2
Tetrachloroethene	340		3.3	0.42	ppb v/v			07/19/17 21:42	8.2
Toluene	ND		3.3	0.42	ppb v/v			07/19/17 21:42	8.2
1,2,4-Trichlorobenzene	ND		16	3.6	ppb v/v			07/19/17 21:42	8.2
1,1,1-Trichloroethane	ND		2.5	0.53	ppb v/v			07/19/17 21:42	8.2
1,1,2-Trichloroethane	ND		3.3	0.55	ppb v/v			07/19/17 21:42	8.2
Trichloroethene	110		3.3	0.86	ppb v/v			07/19/17 21:42	8.2
Trichlorofluoromethane	ND		3.3	1.6	ppb v/v			07/19/17 21:42	8.2
1,1,2-Trichloro-1,2,2-trifluoroethane	57		3.3	1.3	ppb v/v			07/19/17 21:42	8.2
1,2,4-Trimethylbenzene	ND		6.6	1.3	ppb v/v			07/19/17 21:42	8.2
1,3,5-Trimethylbenzene	ND		3.3	1.0	ppb v/v			07/19/17 21:42	8.2
Vinyl acetate	ND		6.6	1.2	ppb v/v			07/19/17 21:42	8.2
Vinyl chloride	ND		3.3	0.98	ppb v/v			07/19/17 21:42	8.2
m,p-Xylene	ND		6.6	0.82	ppb v/v			07/19/17 21:42	8.2
o-Xylene	ND		3.3	0.44	ppb v/v			07/19/17 21:42	8.2
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	15	J	97	3.5	ug/m3			07/19/17 21:42	8.2
Benzene	ND		10	2.1	ug/m3			07/19/17 21:42	8.2
Benzyl chloride	ND		34	6.9	ug/m3			07/19/17 21:42	8.2
Bromodichloromethane	ND		16	3.6	ug/m3			07/19/17 21:42	8.2
Bromoform	ND		34	5.9	ug/m3			07/19/17 21:42	8.2

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-03

Date Collected: 06/27/17 11:04

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-3

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromomethane	ND		25	11	ug/m3			07/19/17 21:42	8.2
2-Butanone (MEK)	ND		19	4.8	ug/m3			07/19/17 21:42	8.2
Carbon disulfide	5.9	J	20	2.0	ug/m3			07/19/17 21:42	8.2
Carbon tetrachloride	ND		41	3.3	ug/m3			07/19/17 21:42	8.2
Chlorobenzene	ND		11	2.4	ug/m3			07/19/17 21:42	8.2
Dibromochloromethane	ND		28	5.5	ug/m3			07/19/17 21:42	8.2
Chloroethane	ND		17	6.7	ug/m3			07/19/17 21:42	8.2
Chloroform	5.5	J	12	3.8	ug/m3			07/19/17 21:42	8.2
Chloromethane	ND		14	3.3	ug/m3			07/19/17 21:42	8.2
1,2-Dibromoethane (EDB)	ND		50	4.7	ug/m3			07/19/17 21:42	8.2
1,2-Dichlorobenzene	ND		20	6.4	ug/m3			07/19/17 21:42	8.2
1,3-Dichlorobenzene	ND		20	5.4	ug/m3			07/19/17 21:42	8.2
1,4-Dichlorobenzene	ND		20	7.3	ug/m3			07/19/17 21:42	8.2
Dichlorodifluoromethane	38		16	5.9	ug/m3			07/19/17 21:42	8.2
1,1-Dichloroethane	4.4	J	10	2.4	ug/m3			07/19/17 21:42	8.2
1,2-Dichloroethane	ND		27	2.9	ug/m3			07/19/17 21:42	8.2
1,1-Dichloroethene	5.7	J	26	4.2	ug/m3			07/19/17 21:42	8.2
cis-1,2-Dichloroethene	ND		13	2.9	ug/m3			07/19/17 21:42	8.2
trans-1,2-Dichloroethene	ND		13	3.3	ug/m3			07/19/17 21:42	8.2
1,2-Dichloropropane	ND		15	9.1	ug/m3			07/19/17 21:42	8.2
cis-1,3-Dichloropropene	ND		15	3.9	ug/m3			07/19/17 21:42	8.2
trans-1,3-Dichloropropene	ND		15	3.3	ug/m3			07/19/17 21:42	8.2
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		23	8.9	ug/m3			07/19/17 21:42	8.2
Ethylbenzene	ND		14	2.2	ug/m3			07/19/17 21:42	8.2
4-Ethyltoluene	ND		16	7.5	ug/m3			07/19/17 21:42	8.2
Hexachlorobutadiene	ND		170	38	ug/m3			07/19/17 21:42	8.2
2-Hexanone	ND		13	2.9	ug/m3			07/19/17 21:42	8.2
Methylene Chloride	7.9	J	11	2.1	ug/m3			07/19/17 21:42	8.2
4-Methyl-2-pentanone (MIBK)	ND		13	4.5	ug/m3			07/19/17 21:42	8.2
Styrene	ND		14	2.1	ug/m3			07/19/17 21:42	8.2
1,1,2,2-Tetrachloroethane	ND		23	3.9	ug/m3			07/19/17 21:42	8.2
Tetrachloroethene	2300		22	2.8	ug/m3			07/19/17 21:42	8.2
Toluene	ND		12	1.6	ug/m3			07/19/17 21:42	8.2
1,2,4-Trichlorobenzene	ND		120	26	ug/m3			07/19/17 21:42	8.2
1,1,1-Trichloroethane	ND		13	2.9	ug/m3			07/19/17 21:42	8.2
1,1,2-Trichloroethane	ND		18	3.0	ug/m3			07/19/17 21:42	8.2
Trichloroethene	570		18	4.6	ug/m3			07/19/17 21:42	8.2
Trichlorofluoromethane	ND		18	9.0	ug/m3			07/19/17 21:42	8.2
1,1,2-Trichloro-1,2,2-trifluoroethane	440		25	10	ug/m3			07/19/17 21:42	8.2
1,2,4-Trimethylbenzene	ND		32	6.5	ug/m3			07/19/17 21:42	8.2
1,3,5-Trimethylbenzene	ND		16	5.0	ug/m3			07/19/17 21:42	8.2
Vinyl acetate	ND		23	4.2	ug/m3			07/19/17 21:42	8.2
Vinyl chloride	ND		8.4	2.5	ug/m3			07/19/17 21:42	8.2
m,p-Xylene	ND		28	3.6	ug/m3			07/19/17 21:42	8.2
o-Xylene	ND		14	1.9	ug/m3			07/19/17 21:42	8.2

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		70 - 130		07/19/17 21:42	8.2

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-03

Date Collected: 06/27/17 11:04

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-3

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		70 - 130		07/19/17 21:42	8.2
Toluene-d8 (Surr)	101		70 - 130		07/19/17 21:42	8.2

Client Sample ID: SD-04

Date Collected: 06/27/17 11:55

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-4

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3.8	J	8.2	0.29	ppb v/v			07/19/17 22:36	1.64
Benzene	0.17	J	0.66	0.13	ppb v/v			07/19/17 22:36	1.64
Benzyl chloride	ND		1.3	0.27	ppb v/v			07/19/17 22:36	1.64
Bromodichloromethane	0.16	J	0.49	0.11	ppb v/v			07/19/17 22:36	1.64
Bromoform	0.21	J	0.66	0.11	ppb v/v			07/19/17 22:36	1.64
Bromomethane	ND		1.3	0.55	ppb v/v			07/19/17 22:36	1.64
2-Butanone (MEK)	0.51	J	1.3	0.33	ppb v/v			07/19/17 22:36	1.64
Carbon disulfide	1.9		1.3	0.13	ppb v/v			07/19/17 22:36	1.64
Carbon tetrachloride	ND		1.3	0.10	ppb v/v			07/19/17 22:36	1.64
Chlorobenzene	ND		0.49	0.10	ppb v/v			07/19/17 22:36	1.64
Dibromochloromethane	0.22	J	0.66	0.13	ppb v/v			07/19/17 22:36	1.64
Chloroethane	ND		1.3	0.51	ppb v/v			07/19/17 22:36	1.64
Chloroform	0.45	J	0.49	0.16	ppb v/v			07/19/17 22:36	1.64
Chloromethane	0.66	J	1.3	0.32	ppb v/v			07/19/17 22:36	1.64
1,2-Dibromoethane (EDB)	ND		1.3	0.12	ppb v/v			07/19/17 22:36	1.64
1,2-Dichlorobenzene	ND		0.66	0.21	ppb v/v			07/19/17 22:36	1.64
1,3-Dichlorobenzene	ND		0.66	0.18	ppb v/v			07/19/17 22:36	1.64
1,4-Dichlorobenzene	ND		0.66	0.24	ppb v/v			07/19/17 22:36	1.64
Dichlorodifluoromethane	2.9		0.66	0.24	ppb v/v			07/19/17 22:36	1.64
1,1-Dichloroethane	0.18	J	0.49	0.12	ppb v/v			07/19/17 22:36	1.64
1,2-Dichloroethane	ND		1.3	0.14	ppb v/v			07/19/17 22:36	1.64
1,1-Dichloroethene	0.60	J	1.3	0.21	ppb v/v			07/19/17 22:36	1.64
cis-1,2-Dichloroethene	ND		0.66	0.15	ppb v/v			07/19/17 22:36	1.64
trans-1,2-Dichloroethene	ND		0.66	0.16	ppb v/v			07/19/17 22:36	1.64
1,2-Dichloropropane	ND		0.66	0.39	ppb v/v			07/19/17 22:36	1.64
cis-1,3-Dichloropropene	ND		0.66	0.17	ppb v/v			07/19/17 22:36	1.64
trans-1,3-Dichloropropene	ND		0.66	0.14	ppb v/v			07/19/17 22:36	1.64
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.66	0.25	ppb v/v			07/19/17 22:36	1.64
Ethylbenzene	0.12	J	0.66	0.10	ppb v/v			07/19/17 22:36	1.64
4-Ethyltoluene	ND		0.66	0.31	ppb v/v			07/19/17 22:36	1.64
Hexachlorobutadiene	ND		3.3	0.71	ppb v/v			07/19/17 22:36	1.64
2-Hexanone	ND		0.66	0.14	ppb v/v			07/19/17 22:36	1.64
Methylene Chloride	1.2		0.66	0.12	ppb v/v			07/19/17 22:36	1.64
4-Methyl-2-pentanone (MIBK)	ND		0.66	0.22	ppb v/v			07/19/17 22:36	1.64
Styrene	ND		0.66	0.097	ppb v/v			07/19/17 22:36	1.64
1,1,2,2-Tetrachloroethane	ND		0.66	0.11	ppb v/v			07/19/17 22:36	1.64
Tetrachloroethene	46		0.66	0.084	ppb v/v			07/19/17 22:36	1.64
Toluene	0.49	J	0.66	0.084	ppb v/v			07/19/17 22:36	1.64

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-04

Lab Sample ID: 320-29669-4

Date Collected: 06/27/17 11:55

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trichlorobenzene	ND		3.3	0.71	ppb v/v			07/19/17 22:36	1.64
1,1,1-Trichloroethane	ND		0.49	0.11	ppb v/v			07/19/17 22:36	1.64
1,1,2-Trichloroethane	ND		0.66	0.11	ppb v/v			07/19/17 22:36	1.64
Trichloroethene	0.96		0.66	0.17	ppb v/v			07/19/17 22:36	1.64
Trichlorofluoromethane	0.35	J	0.66	0.32	ppb v/v			07/19/17 22:36	1.64
1,1,2-Trichloro-1,2,2-trifluoroethane	1.5		0.66	0.27	ppb v/v			07/19/17 22:36	1.64
1,2,4-Trimethylbenzene	0.29	J	1.3	0.27	ppb v/v			07/19/17 22:36	1.64
1,3,5-Trimethylbenzene	0.21	J	0.66	0.21	ppb v/v			07/19/17 22:36	1.64
Vinyl acetate	ND		1.3	0.24	ppb v/v			07/19/17 22:36	1.64
Vinyl chloride	0.22	J	0.66	0.20	ppb v/v			07/19/17 22:36	1.64
m,p-Xylene	0.37	J	1.3	0.16	ppb v/v			07/19/17 22:36	1.64
o-Xylene	0.23	J	0.66	0.089	ppb v/v			07/19/17 22:36	1.64
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	9.1	J	19	0.69	ug/m3			07/19/17 22:36	1.64
Benzene	0.56	J	2.1	0.41	ug/m3			07/19/17 22:36	1.64
Benzyl chloride	ND		6.8	1.4	ug/m3			07/19/17 22:36	1.64
Bromodichloromethane	1.0	J	3.3	0.73	ug/m3			07/19/17 22:36	1.64
Bromoform	2.2	J	6.8	1.2	ug/m3			07/19/17 22:36	1.64
Bromomethane	ND		5.1	2.1	ug/m3			07/19/17 22:36	1.64
2-Butanone (MEK)	1.5	J	3.9	0.96	ug/m3			07/19/17 22:36	1.64
Carbon disulfide	5.9		4.1	0.40	ug/m3			07/19/17 22:36	1.64
Carbon tetrachloride	ND		8.3	0.66	ug/m3			07/19/17 22:36	1.64
Chlorobenzene	ND		2.3	0.48	ug/m3			07/19/17 22:36	1.64
Dibromochloromethane	1.9	J	5.6	1.1	ug/m3			07/19/17 22:36	1.64
Chloroethane	ND		3.5	1.3	ug/m3			07/19/17 22:36	1.64
Chloroform	2.2	J	2.4	0.76	ug/m3			07/19/17 22:36	1.64
Chloromethane	1.4	J	2.7	0.67	ug/m3			07/19/17 22:36	1.64
1,2-Dibromoethane (EDB)	ND		10	0.95	ug/m3			07/19/17 22:36	1.64
1,2-Dichlorobenzene	ND		3.9	1.3	ug/m3			07/19/17 22:36	1.64
1,3-Dichlorobenzene	ND		3.9	1.1	ug/m3			07/19/17 22:36	1.64
1,4-Dichlorobenzene	ND		3.9	1.5	ug/m3			07/19/17 22:36	1.64
Dichlorodifluoromethane	14		3.2	1.2	ug/m3			07/19/17 22:36	1.64
1,1-Dichloroethane	0.74	J	2.0	0.48	ug/m3			07/19/17 22:36	1.64
1,2-Dichloroethane	ND		5.3	0.58	ug/m3			07/19/17 22:36	1.64
1,1-Dichloroethene	2.4	J	5.2	0.84	ug/m3			07/19/17 22:36	1.64
cis-1,2-Dichloroethene	ND		2.6	0.58	ug/m3			07/19/17 22:36	1.64
trans-1,2-Dichloroethene	ND		2.6	0.65	ug/m3			07/19/17 22:36	1.64
1,2-Dichloropropane	ND		3.0	1.8	ug/m3			07/19/17 22:36	1.64
cis-1,3-Dichloropropene	ND		3.0	0.77	ug/m3			07/19/17 22:36	1.64
trans-1,3-Dichloropropene	ND		3.0	0.66	ug/m3			07/19/17 22:36	1.64
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.6	1.8	ug/m3			07/19/17 22:36	1.64
Ethylbenzene	0.53	J	2.8	0.45	ug/m3			07/19/17 22:36	1.64
4-Ethyltoluene	ND		3.2	1.5	ug/m3			07/19/17 22:36	1.64
Hexachlorobutadiene	ND		35	7.6	ug/m3			07/19/17 22:36	1.64
2-Hexanone	ND		2.7	0.58	ug/m3			07/19/17 22:36	1.64
Methylene Chloride	4.2		2.3	0.41	ug/m3			07/19/17 22:36	1.64
4-Methyl-2-pentanone (MIBK)	ND		2.7	0.91	ug/m3			07/19/17 22:36	1.64

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-04

Date Collected: 06/27/17 11:55

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-4

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		2.8	0.41	ug/m3			07/19/17 22:36	1.64
1,1,2,2-Tetrachloroethane	ND		4.5	0.78	ug/m3			07/19/17 22:36	1.64
Tetrachloroethene	310		4.4	0.57	ug/m3			07/19/17 22:36	1.64
Toluene	1.9	J	2.5	0.32	ug/m3			07/19/17 22:36	1.64
1,2,4-Trichlorobenzene	ND		24	5.3	ug/m3			07/19/17 22:36	1.64
1,1,1-Trichloroethane	ND		2.7	0.58	ug/m3			07/19/17 22:36	1.64
1,1,2-Trichloroethane	ND		3.6	0.60	ug/m3			07/19/17 22:36	1.64
Trichloroethene	5.1		3.5	0.93	ug/m3			07/19/17 22:36	1.64
Trichlorofluoromethane	2.0	J	3.7	1.8	ug/m3			07/19/17 22:36	1.64
1,1,2-Trichloro-1,2,2-trifluoroethane	11		5.0	2.0	ug/m3			07/19/17 22:36	1.64
1,2,4-Trimethylbenzene	1.4	J	6.4	1.3	ug/m3			07/19/17 22:36	1.64
1,3,5-Trimethylbenzene	1.0	J	3.2	1.0	ug/m3			07/19/17 22:36	1.64
Vinyl acetate	ND		4.6	0.84	ug/m3			07/19/17 22:36	1.64
Vinyl chloride	0.55	J	1.7	0.50	ug/m3			07/19/17 22:36	1.64
m,p-Xylene	1.6	J	5.7	0.71	ug/m3			07/19/17 22:36	1.64
o-Xylene	1.0	J	2.8	0.38	ug/m3			07/19/17 22:36	1.64
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		70 - 130					07/19/17 22:36	1.64
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					07/19/17 22:36	1.64
Toluene-d8 (Surr)	102		70 - 130					07/19/17 22:36	1.64

Client Sample ID: SD-05

Date Collected: 06/27/17 14:39

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-5

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.4	J	15	0.54	ppb v/v			07/19/17 23:29	3.01
Benzene	0.48	J	1.2	0.24	ppb v/v			07/19/17 23:29	3.01
Benzyl chloride	ND		2.4	0.49	ppb v/v			07/19/17 23:29	3.01
Bromodichloromethane	10		0.90	0.20	ppb v/v			07/19/17 23:29	3.01
Bromoform	0.70	J	1.2	0.21	ppb v/v			07/19/17 23:29	3.01
Bromomethane	ND		2.4	1.0	ppb v/v			07/19/17 23:29	3.01
2-Butanone (MEK)	3.2		2.4	0.60	ppb v/v			07/19/17 23:29	3.01
Carbon disulfide	22		2.4	0.23	ppb v/v			07/19/17 23:29	3.01
Carbon tetrachloride	ND		2.4	0.19	ppb v/v			07/19/17 23:29	3.01
Chlorobenzene	ND		0.90	0.19	ppb v/v			07/19/17 23:29	3.01
Dibromochloromethane	4.3		1.2	0.24	ppb v/v			07/19/17 23:29	3.01
Chloroethane	ND		2.4	0.93	ppb v/v			07/19/17 23:29	3.01
Chloroform	16		0.90	0.29	ppb v/v			07/19/17 23:29	3.01
Chloromethane	0.65	J	2.4	0.59	ppb v/v			07/19/17 23:29	3.01
1,2-Dibromoethane (EDB)	ND		2.4	0.23	ppb v/v			07/19/17 23:29	3.01
1,2-Dichlorobenzene	ND		1.2	0.39	ppb v/v			07/19/17 23:29	3.01
1,3-Dichlorobenzene	ND		1.2	0.33	ppb v/v			07/19/17 23:29	3.01
1,4-Dichlorobenzene	0.56	J	1.2	0.45	ppb v/v			07/19/17 23:29	3.01
Dichlorodifluoromethane	0.46	J	1.2	0.44	ppb v/v			07/19/17 23:29	3.01

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-05

Date Collected: 06/27/17 14:39

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-5

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	0.47	J	0.90	0.22	ppb v/v			07/19/17 23:29	3.01
1,2-Dichloroethane	ND		2.4	0.26	ppb v/v			07/19/17 23:29	3.01
1,1-Dichloroethene	ND		2.4	0.39	ppb v/v			07/19/17 23:29	3.01
cis-1,2-Dichloroethene	0.47	J	1.2	0.27	ppb v/v			07/19/17 23:29	3.01
trans-1,2-Dichloroethene	ND		1.2	0.30	ppb v/v			07/19/17 23:29	3.01
1,2-Dichloropropane	ND		1.2	0.72	ppb v/v			07/19/17 23:29	3.01
cis-1,3-Dichloropropene	ND		1.2	0.31	ppb v/v			07/19/17 23:29	3.01
trans-1,3-Dichloropropene	ND		1.2	0.26	ppb v/v			07/19/17 23:29	3.01
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.2	0.47	ppb v/v			07/19/17 23:29	3.01
Ethylbenzene	4.4		1.2	0.19	ppb v/v			07/19/17 23:29	3.01
4-Ethyltoluene	0.80	J	1.2	0.56	ppb v/v			07/19/17 23:29	3.01
Hexachlorobutadiene	ND		6.0	1.3	ppb v/v			07/19/17 23:29	3.01
2-Hexanone	ND		1.2	0.26	ppb v/v			07/19/17 23:29	3.01
Methylene Chloride	1.9		1.2	0.22	ppb v/v			07/19/17 23:29	3.01
4-Methyl-2-pentanone (MIBK)	ND		1.2	0.41	ppb v/v			07/19/17 23:29	3.01
Styrene	ND		1.2	0.18	ppb v/v			07/19/17 23:29	3.01
1,1,2,2-Tetrachloroethane	ND		1.2	0.21	ppb v/v			07/19/17 23:29	3.01
Tetrachloroethene	0.49	J	1.2	0.15	ppb v/v			07/19/17 23:29	3.01
Toluene	34		1.2	0.15	ppb v/v			07/19/17 23:29	3.01
1,2,4-Trichlorobenzene	ND		6.0	1.3	ppb v/v			07/19/17 23:29	3.01
1,1,1-Trichloroethane	1.8		0.90	0.20	ppb v/v			07/19/17 23:29	3.01
1,1,2-Trichloroethane	ND		1.2	0.20	ppb v/v			07/19/17 23:29	3.01
Trichloroethene	ND		1.2	0.32	ppb v/v			07/19/17 23:29	3.01
Trichlorofluoromethane	ND		1.2	0.59	ppb v/v			07/19/17 23:29	3.01
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.2	0.49	ppb v/v			07/19/17 23:29	3.01
1,2,4-Trimethylbenzene	1.4	J	2.4	0.49	ppb v/v			07/19/17 23:29	3.01
1,3,5-Trimethylbenzene	0.80	J	1.2	0.38	ppb v/v			07/19/17 23:29	3.01
Vinyl acetate	ND		2.4	0.44	ppb v/v			07/19/17 23:29	3.01
Vinyl chloride	ND		1.2	0.36	ppb v/v			07/19/17 23:29	3.01
m,p-Xylene	11		2.4	0.30	ppb v/v			07/19/17 23:29	3.01
o-Xylene	3.4		1.2	0.16	ppb v/v			07/19/17 23:29	3.01
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	18	J	36	1.3	ug/m3			07/19/17 23:29	3.01
Benzene	1.5	J	3.8	0.76	ug/m3			07/19/17 23:29	3.01
Benzyl chloride	ND		12	2.5	ug/m3			07/19/17 23:29	3.01
Bromodichloromethane	67		6.1	1.3	ug/m3			07/19/17 23:29	3.01
Bromoform	7.3	J	12	2.2	ug/m3			07/19/17 23:29	3.01
Bromomethane	ND		9.4	3.9	ug/m3			07/19/17 23:29	3.01
2-Butanone (MEK)	9.3		7.1	1.8	ug/m3			07/19/17 23:29	3.01
Carbon disulfide	68		7.5	0.73	ug/m3			07/19/17 23:29	3.01
Carbon tetrachloride	ND		15	1.2	ug/m3			07/19/17 23:29	3.01
Chlorobenzene	ND		4.2	0.89	ug/m3			07/19/17 23:29	3.01
Dibromochloromethane	37		10	2.0	ug/m3			07/19/17 23:29	3.01
Chloroethane	ND		6.4	2.4	ug/m3			07/19/17 23:29	3.01
Chloroform	79		4.4	1.4	ug/m3			07/19/17 23:29	3.01
Chloromethane	1.3	J	5.0	1.2	ug/m3			07/19/17 23:29	3.01
1,2-Dibromoethane (EDB)	ND		19	1.7	ug/m3			07/19/17 23:29	3.01
1,2-Dichlorobenzene	ND		7.2	2.4	ug/m3			07/19/17 23:29	3.01

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-05

Date Collected: 06/27/17 14:39

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-5

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3-Dichlorobenzene	ND		7.2	2.0	ug/m3			07/19/17 23:29	3.01
1,4-Dichlorobenzene	3.4	J	7.2	2.7	ug/m3			07/19/17 23:29	3.01
Dichlorodifluoromethane	2.3	J	6.0	2.2	ug/m3			07/19/17 23:29	3.01
1,1-Dichloroethane	1.9	J	3.7	0.88	ug/m3			07/19/17 23:29	3.01
1,2-Dichloroethane	ND		9.7	1.1	ug/m3			07/19/17 23:29	3.01
1,1-Dichloroethene	ND		9.5	1.5	ug/m3			07/19/17 23:29	3.01
cis-1,2-Dichloroethene	1.9	J	4.8	1.1	ug/m3			07/19/17 23:29	3.01
trans-1,2-Dichloroethene	ND		4.8	1.2	ug/m3			07/19/17 23:29	3.01
1,2-Dichloropropane	ND		5.6	3.3	ug/m3			07/19/17 23:29	3.01
cis-1,3-Dichloropropene	ND		5.5	1.4	ug/m3			07/19/17 23:29	3.01
trans-1,3-Dichloropropene	ND		5.5	1.2	ug/m3			07/19/17 23:29	3.01
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		8.4	3.3	ug/m3			07/19/17 23:29	3.01
Ethylbenzene	19		5.2	0.82	ug/m3			07/19/17 23:29	3.01
4-Ethyltoluene	3.9	J	5.9	2.8	ug/m3			07/19/17 23:29	3.01
Hexachlorobutadiene	ND		64	14	ug/m3			07/19/17 23:29	3.01
2-Hexanone	ND		4.9	1.1	ug/m3			07/19/17 23:29	3.01
Methylene Chloride	6.7		4.2	0.75	ug/m3			07/19/17 23:29	3.01
4-Methyl-2-pentanone (MIBK)	ND		4.9	1.7	ug/m3			07/19/17 23:29	3.01
Styrene	ND		5.1	0.76	ug/m3			07/19/17 23:29	3.01
1,1,2,2-Tetrachloroethane	ND		8.3	1.4	ug/m3			07/19/17 23:29	3.01
Tetrachloroethene	3.3	J	8.2	1.0	ug/m3			07/19/17 23:29	3.01
Toluene	130		4.5	0.58	ug/m3			07/19/17 23:29	3.01
1,2,4-Trichlorobenzene	ND		45	9.7	ug/m3			07/19/17 23:29	3.01
1,1,1-Trichloroethane	9.7		4.9	1.1	ug/m3			07/19/17 23:29	3.01
1,1,2-Trichloroethane	ND		6.6	1.1	ug/m3			07/19/17 23:29	3.01
Trichloroethene	ND		6.5	1.7	ug/m3			07/19/17 23:29	3.01
Trichlorofluoromethane	ND		6.8	3.3	ug/m3			07/19/17 23:29	3.01
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		9.2	3.8	ug/m3			07/19/17 23:29	3.01
1,2,4-Trimethylbenzene	6.7	J	12	2.4	ug/m3			07/19/17 23:29	3.01
1,3,5-Trimethylbenzene	4.0	J	5.9	1.8	ug/m3			07/19/17 23:29	3.01
Vinyl acetate	ND		8.5	1.5	ug/m3			07/19/17 23:29	3.01
Vinyl chloride	ND		3.1	0.92	ug/m3			07/19/17 23:29	3.01
m,p-Xylene	48		10	1.3	ug/m3			07/19/17 23:29	3.01
o-Xylene	15		5.2	0.71	ug/m3			07/19/17 23:29	3.01
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					07/19/17 23:29	3.01
1,2-Dichloroethane-d4 (Surr)	90		70 - 130					07/19/17 23:29	3.01
Toluene-d8 (Surr)	105		70 - 130					07/19/17 23:29	3.01

Client Sample ID: SD-06

Date Collected: 06/27/17 15:30

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-6

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	5.8	J	8.2	0.29	ppb v/v			07/20/17 00:23	1.64
Benzene	0.14	J	0.66	0.13	ppb v/v			07/20/17 00:23	1.64

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-06

Date Collected: 06/27/17 15:30

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-6

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzyl chloride	ND		1.3	0.27	ppb v/v			07/20/17 00:23	1.64
Bromodichloromethane	ND		0.49	0.11	ppb v/v			07/20/17 00:23	1.64
Bromoform	ND		0.66	0.11	ppb v/v			07/20/17 00:23	1.64
Bromomethane	ND		1.3	0.55	ppb v/v			07/20/17 00:23	1.64
2-Butanone (MEK)	0.91	J	1.3	0.33	ppb v/v			07/20/17 00:23	1.64
Carbon disulfide	74		1.3	0.13	ppb v/v			07/20/17 00:23	1.64
Carbon tetrachloride	ND		1.3	0.10	ppb v/v			07/20/17 00:23	1.64
Chlorobenzene	ND		0.49	0.10	ppb v/v			07/20/17 00:23	1.64
Dibromochloromethane	ND		0.66	0.13	ppb v/v			07/20/17 00:23	1.64
Chloroethane	ND		1.3	0.51	ppb v/v			07/20/17 00:23	1.64
Chloroform	0.19	J	0.49	0.16	ppb v/v			07/20/17 00:23	1.64
Chloromethane	ND		1.3	0.32	ppb v/v			07/20/17 00:23	1.64
1,2-Dibromoethane (EDB)	ND		1.3	0.12	ppb v/v			07/20/17 00:23	1.64
1,2-Dichlorobenzene	ND		0.66	0.21	ppb v/v			07/20/17 00:23	1.64
1,3-Dichlorobenzene	ND		0.66	0.18	ppb v/v			07/20/17 00:23	1.64
1,4-Dichlorobenzene	ND		0.66	0.24	ppb v/v			07/20/17 00:23	1.64
Dichlorodifluoromethane	0.28	J	0.66	0.24	ppb v/v			07/20/17 00:23	1.64
1,1-Dichloroethane	ND		0.49	0.12	ppb v/v			07/20/17 00:23	1.64
1,2-Dichloroethane	ND		1.3	0.14	ppb v/v			07/20/17 00:23	1.64
1,1-Dichloroethene	ND		1.3	0.21	ppb v/v			07/20/17 00:23	1.64
cis-1,2-Dichloroethene	ND		0.66	0.15	ppb v/v			07/20/17 00:23	1.64
trans-1,2-Dichloroethene	ND		0.66	0.16	ppb v/v			07/20/17 00:23	1.64
1,2-Dichloropropane	ND		0.66	0.39	ppb v/v			07/20/17 00:23	1.64
cis-1,3-Dichloropropene	ND		0.66	0.17	ppb v/v			07/20/17 00:23	1.64
trans-1,3-Dichloropropene	ND		0.66	0.14	ppb v/v			07/20/17 00:23	1.64
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.66	0.25	ppb v/v			07/20/17 00:23	1.64
Ethylbenzene	ND		0.66	0.10	ppb v/v			07/20/17 00:23	1.64
4-Ethyltoluene	ND		0.66	0.31	ppb v/v			07/20/17 00:23	1.64
Hexachlorobutadiene	ND		3.3	0.71	ppb v/v			07/20/17 00:23	1.64
2-Hexanone	ND		0.66	0.14	ppb v/v			07/20/17 00:23	1.64
Methylene Chloride	0.22	J	0.66	0.12	ppb v/v			07/20/17 00:23	1.64
4-Methyl-2-pentanone (MIBK)	ND		0.66	0.22	ppb v/v			07/20/17 00:23	1.64
Styrene	ND		0.66	0.097	ppb v/v			07/20/17 00:23	1.64
1,1,2,2-Tetrachloroethane	ND		0.66	0.11	ppb v/v			07/20/17 00:23	1.64
Tetrachloroethene	0.27	J	0.66	0.084	ppb v/v			07/20/17 00:23	1.64
Toluene	0.31	J	0.66	0.084	ppb v/v			07/20/17 00:23	1.64
1,2,4-Trichlorobenzene	ND		3.3	0.71	ppb v/v			07/20/17 00:23	1.64
1,1,1-Trichloroethane	ND		0.49	0.11	ppb v/v			07/20/17 00:23	1.64
1,1,2-Trichloroethane	ND		0.66	0.11	ppb v/v			07/20/17 00:23	1.64
Trichloroethene	1.9		0.66	0.17	ppb v/v			07/20/17 00:23	1.64
Trichlorofluoromethane	ND		0.66	0.32	ppb v/v			07/20/17 00:23	1.64
1,1,2-Trichloro-1,2,2-trifluoroethane	1.4		0.66	0.27	ppb v/v			07/20/17 00:23	1.64
1,2,4-Trimethylbenzene	ND		1.3	0.27	ppb v/v			07/20/17 00:23	1.64
1,3,5-Trimethylbenzene	ND		0.66	0.21	ppb v/v			07/20/17 00:23	1.64
Vinyl acetate	ND		1.3	0.24	ppb v/v			07/20/17 00:23	1.64
Vinyl chloride	ND		0.66	0.20	ppb v/v			07/20/17 00:23	1.64
m,p-Xylene	0.17	J	1.3	0.16	ppb v/v			07/20/17 00:23	1.64
o-Xylene	ND		0.66	0.089	ppb v/v			07/20/17 00:23	1.64

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	14	J	19	0.69	ug/m3			07/20/17 00:23	1.64
Benzene	0.45	J	2.1	0.41	ug/m3			07/20/17 00:23	1.64
Benzyl chloride	ND		6.8	1.4	ug/m3			07/20/17 00:23	1.64
Bromodichloromethane	ND		3.3	0.73	ug/m3			07/20/17 00:23	1.64
Bromoform	ND		6.8	1.2	ug/m3			07/20/17 00:23	1.64
Bromomethane	ND		5.1	2.1	ug/m3			07/20/17 00:23	1.64
2-Butanone (MEK)	2.7	J	3.9	0.96	ug/m3			07/20/17 00:23	1.64
Carbon disulfide	230		4.1	0.40	ug/m3			07/20/17 00:23	1.64
Carbon tetrachloride	ND		8.3	0.66	ug/m3			07/20/17 00:23	1.64
Chlorobenzene	ND		2.3	0.48	ug/m3			07/20/17 00:23	1.64
Dibromochloromethane	ND		5.6	1.1	ug/m3			07/20/17 00:23	1.64
Chloroethane	ND		3.5	1.3	ug/m3			07/20/17 00:23	1.64
Chloroform	0.91	J	2.4	0.76	ug/m3			07/20/17 00:23	1.64
Chloromethane	ND		2.7	0.67	ug/m3			07/20/17 00:23	1.64
1,2-Dibromoethane (EDB)	ND		10	0.95	ug/m3			07/20/17 00:23	1.64
1,2-Dichlorobenzene	ND		3.9	1.3	ug/m3			07/20/17 00:23	1.64
1,3-Dichlorobenzene	ND		3.9	1.1	ug/m3			07/20/17 00:23	1.64
1,4-Dichlorobenzene	ND		3.9	1.5	ug/m3			07/20/17 00:23	1.64
Dichlorodifluoromethane	1.4	J	3.2	1.2	ug/m3			07/20/17 00:23	1.64
1,1-Dichloroethane	ND		2.0	0.48	ug/m3			07/20/17 00:23	1.64
1,2-Dichloroethane	ND		5.3	0.58	ug/m3			07/20/17 00:23	1.64
1,1-Dichloroethene	ND		5.2	0.84	ug/m3			07/20/17 00:23	1.64
cis-1,2-Dichloroethene	ND		2.6	0.58	ug/m3			07/20/17 00:23	1.64
trans-1,2-Dichloroethene	ND		2.6	0.65	ug/m3			07/20/17 00:23	1.64
1,2-Dichloropropane	ND		3.0	1.8	ug/m3			07/20/17 00:23	1.64
cis-1,3-Dichloropropene	ND		3.0	0.77	ug/m3			07/20/17 00:23	1.64
trans-1,3-Dichloropropene	ND		3.0	0.66	ug/m3			07/20/17 00:23	1.64
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.6	1.8	ug/m3			07/20/17 00:23	1.64
Ethylbenzene	ND		2.8	0.45	ug/m3			07/20/17 00:23	1.64
4-Ethyltoluene	ND		3.2	1.5	ug/m3			07/20/17 00:23	1.64
Hexachlorobutadiene	ND		35	7.6	ug/m3			07/20/17 00:23	1.64
2-Hexanone	ND		2.7	0.58	ug/m3			07/20/17 00:23	1.64
Methylene Chloride	0.75	J	2.3	0.41	ug/m3			07/20/17 00:23	1.64
4-Methyl-2-pentanone (MIBK)	ND		2.7	0.91	ug/m3			07/20/17 00:23	1.64
Styrene	ND		2.8	0.41	ug/m3			07/20/17 00:23	1.64
1,1,2,2-Tetrachloroethane	ND		4.5	0.78	ug/m3			07/20/17 00:23	1.64
Tetrachloroethene	1.8	J	4.4	0.57	ug/m3			07/20/17 00:23	1.64
Toluene	1.2	J	2.5	0.32	ug/m3			07/20/17 00:23	1.64
1,2,4-Trichlorobenzene	ND		24	5.3	ug/m3			07/20/17 00:23	1.64
1,1,1-Trichloroethane	ND		2.7	0.58	ug/m3			07/20/17 00:23	1.64
1,1,2-Trichloroethane	ND		3.6	0.60	ug/m3			07/20/17 00:23	1.64
Trichloroethene	10		3.5	0.93	ug/m3			07/20/17 00:23	1.64
Trichlorofluoromethane	ND		3.7	1.8	ug/m3			07/20/17 00:23	1.64
1,1,2-Trichloro-1,2,2-trifluoroethane	11		5.0	2.0	ug/m3			07/20/17 00:23	1.64
1,2,4-Trimethylbenzene	ND		6.4	1.3	ug/m3			07/20/17 00:23	1.64
1,3,5-Trimethylbenzene	ND		3.2	1.0	ug/m3			07/20/17 00:23	1.64
Vinyl acetate	ND		4.6	0.84	ug/m3			07/20/17 00:23	1.64
Vinyl chloride	ND		1.7	0.50	ug/m3			07/20/17 00:23	1.64
m,p-Xylene	0.74	J	5.7	0.71	ug/m3			07/20/17 00:23	1.64
o-Xylene	ND		2.8	0.38	ug/m3			07/20/17 00:23	1.64
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130					07/20/17 00:23	1.64
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					07/20/17 00:23	1.64

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-06

Date Collected: 06/27/17 15:30

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-6

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	103		70 - 130		07/20/17 00:23	1.64

Client Sample ID: SD-07

Date Collected: 06/27/17 16:05

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-7

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	150		18	0.64	ppb v/v			07/20/17 01:15	3.57
Benzene	ND		1.4	0.28	ppb v/v			07/20/17 01:15	3.57
Benzyl chloride	ND		2.9	0.58	ppb v/v			07/20/17 01:15	3.57
Bromodichloromethane	8.9		1.1	0.24	ppb v/v			07/20/17 01:15	3.57
Bromoform	0.81	J	1.4	0.25	ppb v/v			07/20/17 01:15	3.57
Bromomethane	ND		2.9	1.2	ppb v/v			07/20/17 01:15	3.57
2-Butanone (MEK)	ND		2.9	0.71	ppb v/v			07/20/17 01:15	3.57
Carbon disulfide	8.6		2.9	0.28	ppb v/v			07/20/17 01:15	3.57
Carbon tetrachloride	ND		2.9	0.23	ppb v/v			07/20/17 01:15	3.57
Chlorobenzene	ND		1.1	0.23	ppb v/v			07/20/17 01:15	3.57
Dibromochloromethane	4.7		1.4	0.28	ppb v/v			07/20/17 01:15	3.57
Chloroethane	ND		2.9	1.1	ppb v/v			07/20/17 01:15	3.57
Chloroform	15		1.1	0.34	ppb v/v			07/20/17 01:15	3.57
Chloromethane	2.0	J	2.9	0.70	ppb v/v			07/20/17 01:15	3.57
1,2-Dibromoethane (EDB)	ND		2.9	0.27	ppb v/v			07/20/17 01:15	3.57
1,2-Dichlorobenzene	ND		1.4	0.46	ppb v/v			07/20/17 01:15	3.57
1,3-Dichlorobenzene	ND		1.4	0.39	ppb v/v			07/20/17 01:15	3.57
1,4-Dichlorobenzene	ND		1.4	0.53	ppb v/v			07/20/17 01:15	3.57
Dichlorodifluoromethane	0.56	J	1.4	0.52	ppb v/v			07/20/17 01:15	3.57
1,1-Dichloroethane	ND		1.1	0.26	ppb v/v			07/20/17 01:15	3.57
1,2-Dichloroethane	ND		2.9	0.31	ppb v/v			07/20/17 01:15	3.57
1,1-Dichloroethene	ND		2.9	0.46	ppb v/v			07/20/17 01:15	3.57
cis-1,2-Dichloroethene	ND		1.4	0.32	ppb v/v			07/20/17 01:15	3.57
trans-1,2-Dichloroethene	ND		1.4	0.36	ppb v/v			07/20/17 01:15	3.57
1,2-Dichloropropane	ND		1.4	0.86	ppb v/v			07/20/17 01:15	3.57
cis-1,3-Dichloropropene	ND		1.4	0.37	ppb v/v			07/20/17 01:15	3.57
trans-1,3-Dichloropropene	ND		1.4	0.31	ppb v/v			07/20/17 01:15	3.57
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.4	0.55	ppb v/v			07/20/17 01:15	3.57
Ethylbenzene	ND		1.4	0.22	ppb v/v			07/20/17 01:15	3.57
4-Ethyltoluene	ND		1.4	0.67	ppb v/v			07/20/17 01:15	3.57
Hexachlorobutadiene	ND		7.1	1.5	ppb v/v			07/20/17 01:15	3.57
2-Hexanone	ND		1.4	0.31	ppb v/v			07/20/17 01:15	3.57
Methylene Chloride	0.79	J	1.4	0.26	ppb v/v			07/20/17 01:15	3.57
4-Methyl-2-pentanone (MIBK)	ND		1.4	0.48	ppb v/v			07/20/17 01:15	3.57
Styrene	ND		1.4	0.21	ppb v/v			07/20/17 01:15	3.57
1,1,2,2-Tetrachloroethane	ND		1.4	0.25	ppb v/v			07/20/17 01:15	3.57
Tetrachloroethene	0.29	J	1.4	0.18	ppb v/v			07/20/17 01:15	3.57
Toluene	1.3	J	1.4	0.18	ppb v/v			07/20/17 01:15	3.57
1,2,4-Trichlorobenzene	ND		7.1	1.5	ppb v/v			07/20/17 01:15	3.57

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-07

Date Collected: 06/27/17 16:05

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-7

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.1	0.23	ppb v/v			07/20/17 01:15	3.57
1,1,2-Trichloroethane	ND		1.4	0.24	ppb v/v			07/20/17 01:15	3.57
Trichloroethene	ND		1.4	0.37	ppb v/v			07/20/17 01:15	3.57
Trichlorofluoromethane	ND		1.4	0.70	ppb v/v			07/20/17 01:15	3.57
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.4	0.58	ppb v/v			07/20/17 01:15	3.57
1,2,4-Trimethylbenzene	ND		2.9	0.58	ppb v/v			07/20/17 01:15	3.57
1,3,5-Trimethylbenzene	ND		1.4	0.45	ppb v/v			07/20/17 01:15	3.57
Vinyl acetate	ND		2.9	0.52	ppb v/v			07/20/17 01:15	3.57
Vinyl chloride	ND		1.4	0.43	ppb v/v			07/20/17 01:15	3.57
m,p-Xylene	ND		2.9	0.36	ppb v/v			07/20/17 01:15	3.57
o-Xylene	ND		1.4	0.19	ppb v/v			07/20/17 01:15	3.57
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	360		42	1.5	ug/m3			07/20/17 01:15	3.57
Benzene	ND		4.6	0.90	ug/m3			07/20/17 01:15	3.57
Benzyl chloride	ND		15	3.0	ug/m3			07/20/17 01:15	3.57
Bromodichloromethane	59		7.2	1.6	ug/m3			07/20/17 01:15	3.57
Bromoform	8.3 J		15	2.6	ug/m3			07/20/17 01:15	3.57
Bromomethane	ND		11	4.6	ug/m3			07/20/17 01:15	3.57
2-Butanone (MEK)	ND		8.4	2.1	ug/m3			07/20/17 01:15	3.57
Carbon disulfide	27		8.9	0.87	ug/m3			07/20/17 01:15	3.57
Carbon tetrachloride	ND		18	1.4	ug/m3			07/20/17 01:15	3.57
Chlorobenzene	ND		4.9	1.1	ug/m3			07/20/17 01:15	3.57
Dibromochloromethane	40		12	2.4	ug/m3			07/20/17 01:15	3.57
Chloroethane	ND		7.5	2.9	ug/m3			07/20/17 01:15	3.57
Chloroform	75		5.2	1.7	ug/m3			07/20/17 01:15	3.57
Chloromethane	4.1 J		5.9	1.5	ug/m3			07/20/17 01:15	3.57
1,2-Dibromoethane (EDB)	ND		22	2.1	ug/m3			07/20/17 01:15	3.57
1,2-Dichlorobenzene	ND		8.6	2.8	ug/m3			07/20/17 01:15	3.57
1,3-Dichlorobenzene	ND		8.6	2.4	ug/m3			07/20/17 01:15	3.57
1,4-Dichlorobenzene	ND		8.6	3.2	ug/m3			07/20/17 01:15	3.57
Dichlorodifluoromethane	2.8 J		7.1	2.6	ug/m3			07/20/17 01:15	3.57
1,1-Dichloroethane	ND		4.3	1.0	ug/m3			07/20/17 01:15	3.57
1,2-Dichloroethane	ND		12	1.3	ug/m3			07/20/17 01:15	3.57
1,1-Dichloroethene	ND		11	1.8	ug/m3			07/20/17 01:15	3.57
cis-1,2-Dichloroethene	ND		5.7	1.3	ug/m3			07/20/17 01:15	3.57
trans-1,2-Dichloroethene	ND		5.7	1.4	ug/m3			07/20/17 01:15	3.57
1,2-Dichloropropane	ND		6.6	4.0	ug/m3			07/20/17 01:15	3.57
cis-1,3-Dichloropropene	ND		6.5	1.7	ug/m3			07/20/17 01:15	3.57
trans-1,3-Dichloropropene	ND		6.5	1.4	ug/m3			07/20/17 01:15	3.57
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		10	3.9	ug/m3			07/20/17 01:15	3.57
Ethylbenzene	ND		6.2	0.98	ug/m3			07/20/17 01:15	3.57
4-Ethyltoluene	ND		7.0	3.3	ug/m3			07/20/17 01:15	3.57
Hexachlorobutadiene	ND		76	16	ug/m3			07/20/17 01:15	3.57
2-Hexanone	ND		5.9	1.3	ug/m3			07/20/17 01:15	3.57
Methylene Chloride	2.7 J		5.0	0.89	ug/m3			07/20/17 01:15	3.57
4-Methyl-2-pentanone (MIBK)	ND		5.8	2.0	ug/m3			07/20/17 01:15	3.57
Styrene	ND		6.1	0.90	ug/m3			07/20/17 01:15	3.57
1,1,2,2-Tetrachloroethane	ND		9.8	1.7	ug/m3			07/20/17 01:15	3.57

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-07

Date Collected: 06/27/17 16:05

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-7

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	2.0	J	9.7	1.2	ug/m3			07/20/17 01:15	3.57
Toluene	5.0	J	5.4	0.69	ug/m3			07/20/17 01:15	3.57
1,2,4-Trichlorobenzene	ND		53	11	ug/m3			07/20/17 01:15	3.57
1,1,1-Trichloroethane	ND		5.8	1.3	ug/m3			07/20/17 01:15	3.57
1,1,2-Trichloroethane	ND		7.8	1.3	ug/m3			07/20/17 01:15	3.57
Trichloroethene	ND		7.7	2.0	ug/m3			07/20/17 01:15	3.57
Trichlorofluoromethane	ND		8.0	3.9	ug/m3			07/20/17 01:15	3.57
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		11	4.5	ug/m3			07/20/17 01:15	3.57
1,2,4-Trimethylbenzene	ND		14	2.8	ug/m3			07/20/17 01:15	3.57
1,3,5-Trimethylbenzene	ND		7.0	2.2	ug/m3			07/20/17 01:15	3.57
Vinyl acetate	ND		10	1.8	ug/m3			07/20/17 01:15	3.57
Vinyl chloride	ND		3.7	1.1	ug/m3			07/20/17 01:15	3.57
m,p-Xylene	ND		12	1.6	ug/m3			07/20/17 01:15	3.57
o-Xylene	ND		6.2	0.84	ug/m3			07/20/17 01:15	3.57
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130					07/20/17 01:15	3.57
1,2-Dichloroethane-d4 (Surr)	98		70 - 130					07/20/17 01:15	3.57
Toluene-d8 (Surr)	102		70 - 130					07/20/17 01:15	3.57

Client Sample ID: SD-08

Date Collected: 06/27/17 16:52

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-8

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3.2	J	5.0	0.18	ppb v/v			07/20/17 02:11	1
Benzene	0.098	J	0.40	0.079	ppb v/v			07/20/17 02:11	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/20/17 02:11	1
Bromodichloromethane	13		0.30	0.066	ppb v/v			07/20/17 02:11	1
Bromoform	1.1		0.40	0.070	ppb v/v			07/20/17 02:11	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/20/17 02:11	1
2-Butanone (MEK)	0.38	J	0.80	0.20	ppb v/v			07/20/17 02:11	1
Carbon disulfide	6.6		0.80	0.078	ppb v/v			07/20/17 02:11	1
Carbon tetrachloride	0.15	J	0.80	0.064	ppb v/v			07/20/17 02:11	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/20/17 02:11	1
Dibromochloromethane	7.7		0.40	0.079	ppb v/v			07/20/17 02:11	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/20/17 02:11	1
Chloroform	20		0.30	0.095	ppb v/v			07/20/17 02:11	1
Chloromethane	0.53	J	0.80	0.20	ppb v/v			07/20/17 02:11	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/20/17 02:11	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/20/17 02:11	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/20/17 02:11	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/20/17 02:11	1
Dichlorodifluoromethane	0.24	J	0.40	0.15	ppb v/v			07/20/17 02:11	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/20/17 02:11	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/20/17 02:11	1
1,1-Dichloroethene	0.21	J	0.80	0.13	ppb v/v			07/20/17 02:11	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-08

Date Collected: 06/27/17 16:52

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-8

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.12	J	0.40	0.089	ppb v/v	-		07/20/17 02:11	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/20/17 02:11	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/20/17 02:11	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/20/17 02:11	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/20/17 02:11	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 02:11	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			07/20/17 02:11	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/20/17 02:11	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/20/17 02:11	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/20/17 02:11	1
Methylene Chloride	1.6		0.40	0.072	ppb v/v			07/20/17 02:11	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/20/17 02:11	1
Styrene	ND		0.40	0.059	ppb v/v			07/20/17 02:11	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/20/17 02:11	1
Tetrachloroethene	0.14	J	0.40	0.051	ppb v/v			07/20/17 02:11	1
Toluene	0.31	J	0.40	0.051	ppb v/v			07/20/17 02:11	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/20/17 02:11	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/20/17 02:11	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/20/17 02:11	1
Trichloroethene	1.7		0.40	0.11	ppb v/v			07/20/17 02:11	1
Trichlorofluoromethane	1.5		0.40	0.20	ppb v/v			07/20/17 02:11	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.47		0.40	0.16	ppb v/v			07/20/17 02:11	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			07/20/17 02:11	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/20/17 02:11	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/20/17 02:11	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/20/17 02:11	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			07/20/17 02:11	1
o-Xylene	ND		0.40	0.054	ppb v/v			07/20/17 02:11	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.6	J	12	0.42	ug/m3	-		07/20/17 02:11	1
Benzene	0.31	J	1.3	0.25	ug/m3			07/20/17 02:11	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/20/17 02:11	1
Bromodichloromethane	85		2.0	0.44	ug/m3			07/20/17 02:11	1
Bromoform	11		4.1	0.72	ug/m3			07/20/17 02:11	1
Bromomethane	ND		3.1	1.3	ug/m3			07/20/17 02:11	1
2-Butanone (MEK)	1.1	J	2.4	0.59	ug/m3			07/20/17 02:11	1
Carbon disulfide	21		2.5	0.24	ug/m3			07/20/17 02:11	1
Carbon tetrachloride	0.96	J	5.0	0.40	ug/m3			07/20/17 02:11	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/20/17 02:11	1
Dibromochloromethane	65		3.4	0.67	ug/m3			07/20/17 02:11	1
Chloroethane	ND		2.1	0.81	ug/m3			07/20/17 02:11	1
Chloroform	96		1.5	0.46	ug/m3			07/20/17 02:11	1
Chloromethane	1.1	J	1.7	0.41	ug/m3			07/20/17 02:11	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/20/17 02:11	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/20/17 02:11	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/20/17 02:11	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/20/17 02:11	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-08

Date Collected: 06/27/17 16:52

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-8

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	1.2	J	2.0	0.72	ug/m3			07/20/17 02:11	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/20/17 02:11	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/20/17 02:11	1
1,1-Dichloroethene	0.84	J	3.2	0.51	ug/m3			07/20/17 02:11	1
cis-1,2-Dichloroethene	0.47	J	1.6	0.35	ug/m3			07/20/17 02:11	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/20/17 02:11	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/20/17 02:11	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/20/17 02:11	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/20/17 02:11	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/20/17 02:11	1
Ethylbenzene	ND		1.7	0.27	ug/m3			07/20/17 02:11	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/20/17 02:11	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/20/17 02:11	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/20/17 02:11	1
Methylene Chloride	5.5		1.4	0.25	ug/m3			07/20/17 02:11	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/20/17 02:11	1
Styrene	ND		1.7	0.25	ug/m3			07/20/17 02:11	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/20/17 02:11	1
Tetrachloroethene	0.92	J	2.7	0.35	ug/m3			07/20/17 02:11	1
Toluene	1.2	J	1.5	0.19	ug/m3			07/20/17 02:11	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/20/17 02:11	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/20/17 02:11	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/20/17 02:11	1
Trichloroethene	9.0		2.1	0.56	ug/m3			07/20/17 02:11	1
Trichlorofluoromethane	8.4		2.2	1.1	ug/m3			07/20/17 02:11	1
1,1,2-Trichloro-1,2,2-trifluoroethane	3.6		3.1	1.2	ug/m3			07/20/17 02:11	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			07/20/17 02:11	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/20/17 02:11	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/20/17 02:11	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/20/17 02:11	1
m,p-Xylene	ND		3.5	0.43	ug/m3			07/20/17 02:11	1
o-Xylene	ND		1.7	0.23	ug/m3			07/20/17 02:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130		07/20/17 02:11	1
1,2-Dichloroethane-d4 (Surr)	83		70 - 130		07/20/17 02:11	1
Toluene-d8 (Surr)	101		70 - 130		07/20/17 02:11	1

Client Sample ID: SD-09

Date Collected: 06/27/17 17:47

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-9

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	5.8		5.0	0.18	ppb v/v			07/20/17 03:07	1
Benzene	0.19	J	0.40	0.079	ppb v/v			07/20/17 03:07	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/20/17 03:07	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-09

Lab Sample ID: 320-29669-9

Date Collected: 06/27/17 17:47

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	0.95		0.30	0.066	ppb v/v			07/20/17 03:07	1
Bromoform	0.13	J	0.40	0.070	ppb v/v			07/20/17 03:07	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/20/17 03:07	1
2-Butanone (MEK)	0.59	J	0.80	0.20	ppb v/v			07/20/17 03:07	1
Carbon disulfide	22		0.80	0.078	ppb v/v			07/20/17 03:07	1
Carbon tetrachloride	0.082	J	0.80	0.064	ppb v/v			07/20/17 03:07	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/20/17 03:07	1
Dibromochloromethane	0.61		0.40	0.079	ppb v/v			07/20/17 03:07	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/20/17 03:07	1
Chloroform	4.8		0.30	0.095	ppb v/v			07/20/17 03:07	1
Chloromethane	0.92		0.80	0.20	ppb v/v			07/20/17 03:07	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/20/17 03:07	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/20/17 03:07	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/20/17 03:07	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/20/17 03:07	1
Dichlorodifluoromethane	0.27	J	0.40	0.15	ppb v/v			07/20/17 03:07	1
1,1-Dichloroethane	0.12	J	0.30	0.072	ppb v/v			07/20/17 03:07	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/20/17 03:07	1
1,1-Dichloroethene	33		0.80	0.13	ppb v/v			07/20/17 03:07	1
cis-1,2-Dichloroethene	0.94		0.40	0.089	ppb v/v			07/20/17 03:07	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/20/17 03:07	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/20/17 03:07	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/20/17 03:07	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/20/17 03:07	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 03:07	1
Ethylbenzene	0.070	J	0.40	0.063	ppb v/v			07/20/17 03:07	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/20/17 03:07	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/20/17 03:07	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/20/17 03:07	1
Methylene Chloride	0.43		0.40	0.072	ppb v/v			07/20/17 03:07	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/20/17 03:07	1
Styrene	ND		0.40	0.059	ppb v/v			07/20/17 03:07	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/20/17 03:07	1
Tetrachloroethene	29		0.40	0.051	ppb v/v			07/20/17 03:07	1
Toluene	0.77		0.40	0.051	ppb v/v			07/20/17 03:07	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/20/17 03:07	1
1,1,1-Trichloroethane	0.087	J	0.30	0.065	ppb v/v			07/20/17 03:07	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/20/17 03:07	1
Trichloroethene	53		0.40	0.11	ppb v/v			07/20/17 03:07	1
Trichlorofluoromethane	0.24	J	0.40	0.20	ppb v/v			07/20/17 03:07	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.35	J	0.40	0.16	ppb v/v			07/20/17 03:07	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			07/20/17 03:07	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/20/17 03:07	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/20/17 03:07	1
Vinyl chloride	0.13	J	0.40	0.12	ppb v/v			07/20/17 03:07	1
m,p-Xylene	0.28	J	0.80	0.10	ppb v/v			07/20/17 03:07	1
o-Xylene	0.13	J	0.40	0.054	ppb v/v			07/20/17 03:07	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-09

Lab Sample ID: 320-29669-9

Date Collected: 06/27/17 17:47

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	14		12	0.42	ug/m3			07/20/17 03:07	1
Benzene	0.60	J	1.3	0.25	ug/m3			07/20/17 03:07	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/20/17 03:07	1
Bromodichloromethane	6.4		2.0	0.44	ug/m3			07/20/17 03:07	1
Bromoform	1.4	J	4.1	0.72	ug/m3			07/20/17 03:07	1
Bromomethane	ND		3.1	1.3	ug/m3			07/20/17 03:07	1
2-Butanone (MEK)	1.7	J	2.4	0.59	ug/m3			07/20/17 03:07	1
Carbon disulfide	70		2.5	0.24	ug/m3			07/20/17 03:07	1
Carbon tetrachloride	0.51	J	5.0	0.40	ug/m3			07/20/17 03:07	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/20/17 03:07	1
Dibromochloromethane	5.2		3.4	0.67	ug/m3			07/20/17 03:07	1
Chloroethane	ND		2.1	0.81	ug/m3			07/20/17 03:07	1
Chloroform	23		1.5	0.46	ug/m3			07/20/17 03:07	1
Chloromethane	1.9		1.7	0.41	ug/m3			07/20/17 03:07	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/20/17 03:07	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/20/17 03:07	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/20/17 03:07	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/20/17 03:07	1
Dichlorodifluoromethane	1.3	J	2.0	0.72	ug/m3			07/20/17 03:07	1
1,1-Dichloroethane	0.48	J	1.2	0.29	ug/m3			07/20/17 03:07	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/20/17 03:07	1
1,1-Dichloroethene	130		3.2	0.51	ug/m3			07/20/17 03:07	1
cis-1,2-Dichloroethene	3.7		1.6	0.35	ug/m3			07/20/17 03:07	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/20/17 03:07	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/20/17 03:07	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/20/17 03:07	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/20/17 03:07	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/20/17 03:07	1
Ethylbenzene	0.30	J	1.7	0.27	ug/m3			07/20/17 03:07	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/20/17 03:07	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/20/17 03:07	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/20/17 03:07	1
Methylene Chloride	1.5		1.4	0.25	ug/m3			07/20/17 03:07	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/20/17 03:07	1
Styrene	ND		1.7	0.25	ug/m3			07/20/17 03:07	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/20/17 03:07	1
Tetrachloroethene	190		2.7	0.35	ug/m3			07/20/17 03:07	1
Toluene	2.9		1.5	0.19	ug/m3			07/20/17 03:07	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/20/17 03:07	1
1,1,1-Trichloroethane	0.47	J	1.6	0.35	ug/m3			07/20/17 03:07	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/20/17 03:07	1
Trichloroethene	290		2.1	0.56	ug/m3			07/20/17 03:07	1
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3			07/20/17 03:07	1
1,1,2-Trichloro-1,2,2-trifluoroethane	2.7	J	3.1	1.2	ug/m3			07/20/17 03:07	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			07/20/17 03:07	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/20/17 03:07	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/20/17 03:07	1
Vinyl chloride	0.33	J	1.0	0.31	ug/m3			07/20/17 03:07	1
m,p-Xylene	1.2	J	3.5	0.43	ug/m3			07/20/17 03:07	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-09

Date Collected: 06/27/17 17:47

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-9

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Xylene	0.56	J	1.7	0.23	ug/m3			07/20/17 03:07	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					07/20/17 03:07	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 130					07/20/17 03:07	1
Toluene-d8 (Surr)	101		70 - 130					07/20/17 03:07	1

Client Sample ID: SD-BKG-01

Date Collected: 06/27/17 11:25

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-10

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	6.4		5.0	0.18	ppb v/v			07/20/17 04:03	1
Benzene	1.7		0.40	0.079	ppb v/v			07/20/17 04:03	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/20/17 04:03	1
Bromodichloromethane	0.28	J	0.30	0.066	ppb v/v			07/20/17 04:03	1
Bromoform	ND		0.40	0.070	ppb v/v			07/20/17 04:03	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/20/17 04:03	1
2-Butanone (MEK)	0.72	J	0.80	0.20	ppb v/v			07/20/17 04:03	1
Carbon disulfide	0.98		0.80	0.078	ppb v/v			07/20/17 04:03	1
Carbon tetrachloride	0.081	J	0.80	0.064	ppb v/v			07/20/17 04:03	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/20/17 04:03	1
Dibromochloromethane	0.22	J	0.40	0.079	ppb v/v			07/20/17 04:03	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/20/17 04:03	1
Chloroform	1.4		0.30	0.095	ppb v/v			07/20/17 04:03	1
Chloromethane	0.97		0.80	0.20	ppb v/v			07/20/17 04:03	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/20/17 04:03	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/20/17 04:03	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/20/17 04:03	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/20/17 04:03	1
Dichlorodifluoromethane	0.26	J	0.40	0.15	ppb v/v			07/20/17 04:03	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/20/17 04:03	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/20/17 04:03	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/20/17 04:03	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/20/17 04:03	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/20/17 04:03	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/20/17 04:03	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/20/17 04:03	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/20/17 04:03	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 04:03	1
Ethylbenzene	0.10	J	0.40	0.063	ppb v/v			07/20/17 04:03	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/20/17 04:03	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/20/17 04:03	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/20/17 04:03	1
Methylene Chloride	0.22	J	0.40	0.072	ppb v/v			07/20/17 04:03	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/20/17 04:03	1
Styrene	ND		0.40	0.059	ppb v/v			07/20/17 04:03	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-BKG-01

Lab Sample ID: 320-29669-10

Date Collected: 06/27/17 11:25

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/20/17 04:03	1
Tetrachloroethene	0.31	J	0.40	0.051	ppb v/v			07/20/17 04:03	1
Toluene	0.35	J	0.40	0.051	ppb v/v			07/20/17 04:03	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/20/17 04:03	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/20/17 04:03	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/20/17 04:03	1
Trichloroethene	0.13	J	0.40	0.11	ppb v/v			07/20/17 04:03	1
Trichlorofluoromethane	0.20	J	0.40	0.20	ppb v/v			07/20/17 04:03	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 04:03	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			07/20/17 04:03	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/20/17 04:03	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/20/17 04:03	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/20/17 04:03	1
m,p-Xylene	0.24	J	0.80	0.10	ppb v/v			07/20/17 04:03	1
o-Xylene	0.11	J	0.40	0.054	ppb v/v			07/20/17 04:03	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	15		12	0.42	ug/m3			07/20/17 04:03	1
Benzene	5.5		1.3	0.25	ug/m3			07/20/17 04:03	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/20/17 04:03	1
Bromodichloromethane	1.9	J	2.0	0.44	ug/m3			07/20/17 04:03	1
Bromoform	ND		4.1	0.72	ug/m3			07/20/17 04:03	1
Bromomethane	ND		3.1	1.3	ug/m3			07/20/17 04:03	1
2-Butanone (MEK)	2.1	J	2.4	0.59	ug/m3			07/20/17 04:03	1
Carbon disulfide	3.1		2.5	0.24	ug/m3			07/20/17 04:03	1
Carbon tetrachloride	0.51	J	5.0	0.40	ug/m3			07/20/17 04:03	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/20/17 04:03	1
Dibromochloromethane	1.9	J	3.4	0.67	ug/m3			07/20/17 04:03	1
Chloroethane	ND		2.1	0.81	ug/m3			07/20/17 04:03	1
Chloroform	6.6		1.5	0.46	ug/m3			07/20/17 04:03	1
Chloromethane	2.0		1.7	0.41	ug/m3			07/20/17 04:03	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/20/17 04:03	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/20/17 04:03	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/20/17 04:03	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/20/17 04:03	1
Dichlorodifluoromethane	1.3	J	2.0	0.72	ug/m3			07/20/17 04:03	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/20/17 04:03	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/20/17 04:03	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/20/17 04:03	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/20/17 04:03	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/20/17 04:03	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/20/17 04:03	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/20/17 04:03	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/20/17 04:03	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/20/17 04:03	1
Ethylbenzene	0.44	J	1.7	0.27	ug/m3			07/20/17 04:03	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/20/17 04:03	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/20/17 04:03	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/20/17 04:03	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-BKG-01

Lab Sample ID: 320-29669-10

Date Collected: 06/27/17 11:25

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Chloride	0.76	J	1.4	0.25	ug/m3			07/20/17 04:03	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/20/17 04:03	1
Styrene	ND		1.7	0.25	ug/m3			07/20/17 04:03	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/20/17 04:03	1
Tetrachloroethene	2.1	J	2.7	0.35	ug/m3			07/20/17 04:03	1
Toluene	1.3	J	1.5	0.19	ug/m3			07/20/17 04:03	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/20/17 04:03	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/20/17 04:03	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/20/17 04:03	1
Trichloroethene	0.72	J	2.1	0.56	ug/m3			07/20/17 04:03	1
Trichlorofluoromethane	1.1	J	2.2	1.1	ug/m3			07/20/17 04:03	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			07/20/17 04:03	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			07/20/17 04:03	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/20/17 04:03	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/20/17 04:03	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/20/17 04:03	1
m,p-Xylene	1.0	J	3.5	0.43	ug/m3			07/20/17 04:03	1
o-Xylene	0.47	J	1.7	0.23	ug/m3			07/20/17 04:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					07/20/17 04:03	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					07/20/17 04:03	1
Toluene-d8 (Surr)	102		70 - 130					07/20/17 04:03	1

Client Sample ID: SD-BKG-02

Lab Sample ID: 320-29669-11

Date Collected: 06/27/17 18:01

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	6.4		5.0	0.18	ppb v/v			07/20/17 05:00	1
Benzene	0.58		0.40	0.079	ppb v/v			07/20/17 05:00	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/20/17 05:00	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			07/20/17 05:00	1
Bromoform	ND		0.40	0.070	ppb v/v			07/20/17 05:00	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/20/17 05:00	1
2-Butanone (MEK)	0.75	J	0.80	0.20	ppb v/v			07/20/17 05:00	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			07/20/17 05:00	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/20/17 05:00	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			07/20/17 05:00	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/20/17 05:00	1
Chloroform	ND		0.30	0.095	ppb v/v			07/20/17 05:00	1
Chloromethane	0.58	J	0.80	0.20	ppb v/v			07/20/17 05:00	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/20/17 05:00	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/20/17 05:00	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/20/17 05:00	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/20/17 05:00	1
Dichlorodifluoromethane	0.23	J	0.40	0.15	ppb v/v			07/20/17 05:00	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-BKG-02

Lab Sample ID: 320-29669-11

Date Collected: 06/27/17 18:01

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/20/17 05:00	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/20/17 05:00	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/20/17 05:00	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/20/17 05:00	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/20/17 05:00	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/20/17 05:00	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/20/17 05:00	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/20/17 05:00	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 05:00	1
Ethylbenzene	0.36	J	0.40	0.063	ppb v/v			07/20/17 05:00	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/20/17 05:00	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/20/17 05:00	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/20/17 05:00	1
Methylene Chloride	0.13	J	0.40	0.072	ppb v/v			07/20/17 05:00	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/20/17 05:00	1
Styrene	ND		0.40	0.059	ppb v/v			07/20/17 05:00	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/20/17 05:00	1
Tetrachloroethene	0.32	J	0.40	0.051	ppb v/v			07/20/17 05:00	1
Toluene	0.27	J	0.40	0.051	ppb v/v			07/20/17 05:00	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/20/17 05:00	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/20/17 05:00	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/20/17 05:00	1
Trichloroethene	0.20	J	0.40	0.11	ppb v/v			07/20/17 05:00	1
Trichlorofluoromethane	0.20	J	0.40	0.20	ppb v/v			07/20/17 05:00	1
1,1,2-Trichloro-1,2,2-trifluoroethane	13		0.40	0.16	ppb v/v			07/20/17 05:00	1
1,2,4-Trimethylbenzene	0.33	J	0.80	0.16	ppb v/v			07/20/17 05:00	1
1,3,5-Trimethylbenzene	0.16	J	0.40	0.13	ppb v/v			07/20/17 05:00	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/20/17 05:00	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/20/17 05:00	1
m,p-Xylene	1.1		0.80	0.10	ppb v/v			07/20/17 05:00	1
o-Xylene	0.36	J	0.40	0.054	ppb v/v			07/20/17 05:00	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	15		12	0.42	ug/m3			07/20/17 05:00	1
Benzene	1.8		1.3	0.25	ug/m3			07/20/17 05:00	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/20/17 05:00	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			07/20/17 05:00	1
Bromoform	ND		4.1	0.72	ug/m3			07/20/17 05:00	1
Bromomethane	ND		3.1	1.3	ug/m3			07/20/17 05:00	1
2-Butanone (MEK)	2.2	J	2.4	0.59	ug/m3			07/20/17 05:00	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			07/20/17 05:00	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/20/17 05:00	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			07/20/17 05:00	1
Chloroethane	ND		2.1	0.81	ug/m3			07/20/17 05:00	1
Chloroform	ND		1.5	0.46	ug/m3			07/20/17 05:00	1
Chloromethane	1.2	J	1.7	0.41	ug/m3			07/20/17 05:00	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/20/17 05:00	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/20/17 05:00	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-BKG-02

Lab Sample ID: 320-29669-11

Date Collected: 06/27/17 18:01

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/20/17 05:00	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/20/17 05:00	1
Dichlorodifluoromethane	1.1	J	2.0	0.72	ug/m3			07/20/17 05:00	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/20/17 05:00	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/20/17 05:00	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/20/17 05:00	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/20/17 05:00	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/20/17 05:00	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/20/17 05:00	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/20/17 05:00	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/20/17 05:00	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/20/17 05:00	1
Ethylbenzene	1.6	J	1.7	0.27	ug/m3			07/20/17 05:00	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/20/17 05:00	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/20/17 05:00	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/20/17 05:00	1
Methylene Chloride	0.45	J	1.4	0.25	ug/m3			07/20/17 05:00	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/20/17 05:00	1
Styrene	ND		1.7	0.25	ug/m3			07/20/17 05:00	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/20/17 05:00	1
Tetrachloroethene	2.2	J	2.7	0.35	ug/m3			07/20/17 05:00	1
Toluene	1.0	J	1.5	0.19	ug/m3			07/20/17 05:00	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/20/17 05:00	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/20/17 05:00	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/20/17 05:00	1
Trichloroethene	1.1	J	2.1	0.56	ug/m3			07/20/17 05:00	1
Trichlorofluoromethane	1.1	J	2.2	1.1	ug/m3			07/20/17 05:00	1
1,1,2-Trichloro-1,2,2-trifluoroethane	99		3.1	1.2	ug/m3			07/20/17 05:00	1
1,2,4-Trimethylbenzene	1.6	J	3.9	0.80	ug/m3			07/20/17 05:00	1
1,3,5-Trimethylbenzene	0.78	J	2.0	0.61	ug/m3			07/20/17 05:00	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/20/17 05:00	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/20/17 05:00	1
m,p-Xylene	4.9		3.5	0.43	ug/m3			07/20/17 05:00	1
o-Xylene	1.6	J	1.7	0.23	ug/m3			07/20/17 05:00	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		70 - 130		07/20/17 05:00	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		07/20/17 05:00	1
Toluene-d8 (Surr)	103		70 - 130		07/20/17 05:00	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon disulfide	84		1.6	0.16	ppb v/v			07/20/17 11:05	1.99
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon disulfide	260		5.0	0.48	ug/m3			07/20/17 11:05	1.99

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		70 - 130		07/20/17 11:05	1.99

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-BKG-02

Lab Sample ID: 320-29669-11

Date Collected: 06/27/17 18:01

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	104		70 - 130		07/20/17 11:05	1.99
Toluene-d8 (Surr)	105		70 - 130		07/20/17 11:05	1.99

Client Sample ID: SD-DUP

Lab Sample ID: 320-29669-12

Date Collected: 06/27/17 00:00

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	4.9	J	12	0.41	ppb v/v			07/20/17 05:53	2.3
Benzene	0.71	J	0.92	0.18	ppb v/v			07/20/17 05:53	2.3
Benzyl chloride	ND		1.8	0.37	ppb v/v			07/20/17 05:53	2.3
Bromodichloromethane	ND		0.69	0.15	ppb v/v			07/20/17 05:53	2.3
Bromoform	ND		0.92	0.16	ppb v/v			07/20/17 05:53	2.3
Bromomethane	ND		1.8	0.77	ppb v/v			07/20/17 05:53	2.3
2-Butanone (MEK)	0.59	J	1.8	0.46	ppb v/v			07/20/17 05:53	2.3
Carbon disulfide	7.3		1.8	0.18	ppb v/v			07/20/17 05:53	2.3
Carbon tetrachloride	ND		1.8	0.15	ppb v/v			07/20/17 05:53	2.3
Chlorobenzene	ND		0.69	0.15	ppb v/v			07/20/17 05:53	2.3
Dibromochloromethane	ND		0.92	0.18	ppb v/v			07/20/17 05:53	2.3
Chloroethane	ND		1.8	0.71	ppb v/v			07/20/17 05:53	2.3
Chloroform	0.25	J	0.69	0.22	ppb v/v			07/20/17 05:53	2.3
Chloromethane	0.71	J	1.8	0.45	ppb v/v			07/20/17 05:53	2.3
1,2-Dibromoethane (EDB)	ND		1.8	0.17	ppb v/v			07/20/17 05:53	2.3
1,2-Dichlorobenzene	ND		0.92	0.30	ppb v/v			07/20/17 05:53	2.3
1,3-Dichlorobenzene	ND		0.92	0.25	ppb v/v			07/20/17 05:53	2.3
1,4-Dichlorobenzene	ND		0.92	0.34	ppb v/v			07/20/17 05:53	2.3
Dichlorodifluoromethane	0.39	J	0.92	0.33	ppb v/v			07/20/17 05:53	2.3
1,1-Dichloroethane	0.17	J	0.69	0.17	ppb v/v			07/20/17 05:53	2.3
1,2-Dichloroethane	ND		1.8	0.20	ppb v/v			07/20/17 05:53	2.3
1,1-Dichloroethene	ND		1.8	0.30	ppb v/v			07/20/17 05:53	2.3
cis-1,2-Dichloroethene	ND		0.92	0.20	ppb v/v			07/20/17 05:53	2.3
trans-1,2-Dichloroethene	ND		0.92	0.23	ppb v/v			07/20/17 05:53	2.3
1,2-Dichloropropane	ND		0.92	0.55	ppb v/v			07/20/17 05:53	2.3
cis-1,3-Dichloropropene	ND		0.92	0.24	ppb v/v			07/20/17 05:53	2.3
trans-1,3-Dichloropropene	ND		0.92	0.20	ppb v/v			07/20/17 05:53	2.3
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.92	0.36	ppb v/v			07/20/17 05:53	2.3
Ethylbenzene	ND		0.92	0.14	ppb v/v			07/20/17 05:53	2.3
4-Ethyltoluene	ND		0.92	0.43	ppb v/v			07/20/17 05:53	2.3
Hexachlorobutadiene	ND		4.6	0.99	ppb v/v			07/20/17 05:53	2.3
2-Hexanone	ND		0.92	0.20	ppb v/v			07/20/17 05:53	2.3
Methylene Chloride	0.20	J	0.92	0.17	ppb v/v			07/20/17 05:53	2.3
4-Methyl-2-pentanone (MIBK)	ND		0.92	0.31	ppb v/v			07/20/17 05:53	2.3
Styrene	ND		0.92	0.14	ppb v/v			07/20/17 05:53	2.3
1,1,2,2-Tetrachloroethane	ND		0.92	0.16	ppb v/v			07/20/17 05:53	2.3
Tetrachloroethene	70		0.92	0.12	ppb v/v			07/20/17 05:53	2.3
Toluene	0.26	J	0.92	0.12	ppb v/v			07/20/17 05:53	2.3

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-DUP

Lab Sample ID: 320-29669-12

Date Collected: 06/27/17 00:00

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trichlorobenzene	ND		4.6	1.0	ppb v/v			07/20/17 05:53	2.3
1,1,1-Trichloroethane	ND		0.69	0.15	ppb v/v			07/20/17 05:53	2.3
1,1,2-Trichloroethane	ND		0.92	0.15	ppb v/v			07/20/17 05:53	2.3
Trichloroethene	24		0.92	0.24	ppb v/v			07/20/17 05:53	2.3
Trichlorofluoromethane	ND		0.92	0.45	ppb v/v			07/20/17 05:53	2.3
1,1,2-Trichloro-1,2,2-trifluoroethane	13		0.92	0.37	ppb v/v			07/20/17 05:53	2.3
1,2,4-Trimethylbenzene	ND		1.8	0.37	ppb v/v			07/20/17 05:53	2.3
1,3,5-Trimethylbenzene	ND		0.92	0.29	ppb v/v			07/20/17 05:53	2.3
Vinyl acetate	ND		1.8	0.33	ppb v/v			07/20/17 05:53	2.3
Vinyl chloride	ND		0.92	0.28	ppb v/v			07/20/17 05:53	2.3
m,p-Xylene	ND		1.8	0.23	ppb v/v			07/20/17 05:53	2.3
o-Xylene	ND		0.92	0.12	ppb v/v			07/20/17 05:53	2.3
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	12	J	27	0.97	ug/m3			07/20/17 05:53	2.3
Benzene	2.3	J	2.9	0.58	ug/m3			07/20/17 05:53	2.3
Benzyl chloride	ND		9.5	1.9	ug/m3			07/20/17 05:53	2.3
Bromodichloromethane	ND		4.6	1.0	ug/m3			07/20/17 05:53	2.3
Bromoform	ND		9.5	1.7	ug/m3			07/20/17 05:53	2.3
Bromomethane	ND		7.1	3.0	ug/m3			07/20/17 05:53	2.3
2-Butanone (MEK)	1.7	J	5.4	1.3	ug/m3			07/20/17 05:53	2.3
Carbon disulfide	23		5.7	0.56	ug/m3			07/20/17 05:53	2.3
Carbon tetrachloride	ND		12	0.93	ug/m3			07/20/17 05:53	2.3
Chlorobenzene	ND		3.2	0.68	ug/m3			07/20/17 05:53	2.3
Dibromochloromethane	ND		7.8	1.5	ug/m3			07/20/17 05:53	2.3
Chloroethane	ND		4.9	1.9	ug/m3			07/20/17 05:53	2.3
Chloroform	1.2	J	3.4	1.1	ug/m3			07/20/17 05:53	2.3
Chloromethane	1.5	J	3.8	0.94	ug/m3			07/20/17 05:53	2.3
1,2-Dibromoethane (EDB)	ND		14	1.3	ug/m3			07/20/17 05:53	2.3
1,2-Dichlorobenzene	ND		5.5	1.8	ug/m3			07/20/17 05:53	2.3
1,3-Dichlorobenzene	ND		5.5	1.5	ug/m3			07/20/17 05:53	2.3
1,4-Dichlorobenzene	ND		5.5	2.1	ug/m3			07/20/17 05:53	2.3
Dichlorodifluoromethane	1.9	J	4.5	1.6	ug/m3			07/20/17 05:53	2.3
1,1-Dichloroethane	0.67	J	2.8	0.67	ug/m3			07/20/17 05:53	2.3
1,2-Dichloroethane	ND		7.4	0.82	ug/m3			07/20/17 05:53	2.3
1,1-Dichloroethene	ND		7.3	1.2	ug/m3			07/20/17 05:53	2.3
cis-1,2-Dichloroethene	ND		3.6	0.81	ug/m3			07/20/17 05:53	2.3
trans-1,2-Dichloroethene	ND		3.6	0.91	ug/m3			07/20/17 05:53	2.3
1,2-Dichloropropane	ND		4.3	2.6	ug/m3			07/20/17 05:53	2.3
cis-1,3-Dichloropropene	ND		4.2	1.1	ug/m3			07/20/17 05:53	2.3
trans-1,3-Dichloropropene	ND		4.2	0.92	ug/m3			07/20/17 05:53	2.3
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		6.4	2.5	ug/m3			07/20/17 05:53	2.3
Ethylbenzene	ND		4.0	0.63	ug/m3			07/20/17 05:53	2.3
4-Ethyltoluene	ND		4.5	2.1	ug/m3			07/20/17 05:53	2.3
Hexachlorobutadiene	ND		49	11	ug/m3			07/20/17 05:53	2.3
2-Hexanone	ND		3.8	0.82	ug/m3			07/20/17 05:53	2.3
Methylene Chloride	0.68	J	3.2	0.58	ug/m3			07/20/17 05:53	2.3
4-Methyl-2-pentanone (MIBK)	ND		3.8	1.3	ug/m3			07/20/17 05:53	2.3

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-DUP

Lab Sample ID: 320-29669-12

Date Collected: 06/27/17 00:00

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		3.9	0.58	ug/m3			07/20/17 05:53	2.3
1,1,2,2-Tetrachloroethane	ND		6.3	1.1	ug/m3			07/20/17 05:53	2.3
Tetrachloroethene	470		6.2	0.80	ug/m3			07/20/17 05:53	2.3
Toluene	0.97	J	3.5	0.44	ug/m3			07/20/17 05:53	2.3
1,2,4-Trichlorobenzene	ND		34	7.4	ug/m3			07/20/17 05:53	2.3
1,1,1-Trichloroethane	ND		3.8	0.82	ug/m3			07/20/17 05:53	2.3
1,1,2-Trichloroethane	ND		5.0	0.84	ug/m3			07/20/17 05:53	2.3
Trichloroethene	130		4.9	1.3	ug/m3			07/20/17 05:53	2.3
Trichlorofluoromethane	ND		5.2	2.5	ug/m3			07/20/17 05:53	2.3
1,1,2-Trichloro-1,2,2-trifluoroethane	100		7.1	2.9	ug/m3			07/20/17 05:53	2.3
1,2,4-Trimethylbenzene	ND		9.0	1.8	ug/m3			07/20/17 05:53	2.3
1,3,5-Trimethylbenzene	ND		4.5	1.4	ug/m3			07/20/17 05:53	2.3
Vinyl acetate	ND		6.5	1.2	ug/m3			07/20/17 05:53	2.3
Vinyl chloride	ND		2.4	0.71	ug/m3			07/20/17 05:53	2.3
m,p-Xylene	ND		8.0	1.0	ug/m3			07/20/17 05:53	2.3
o-Xylene	ND		4.0	0.54	ug/m3			07/20/17 05:53	2.3
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130					07/20/17 05:53	2.3
1,2-Dichloroethane-d4 (Surr)	102		70 - 130					07/20/17 05:53	2.3
Toluene-d8 (Surr)	98		70 - 130					07/20/17 05:53	2.3

Client Sample ID: OC-01

Lab Sample ID: 320-29669-13

Date Collected: 06/28/17 09:00

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.0		5.0	0.18	ppb v/v			07/20/17 06:50	1
Benzene	0.12	J	0.40	0.079	ppb v/v			07/20/17 06:50	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/20/17 06:50	1
Bromodichloromethane	2.5		0.30	0.066	ppb v/v			07/20/17 06:50	1
Bromoform	0.46		0.40	0.070	ppb v/v			07/20/17 06:50	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/20/17 06:50	1
2-Butanone (MEK)	0.74	J	0.80	0.20	ppb v/v			07/20/17 06:50	1
Carbon disulfide	1.1		0.80	0.078	ppb v/v			07/20/17 06:50	1
Carbon tetrachloride	0.067	J	0.80	0.064	ppb v/v			07/20/17 06:50	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/20/17 06:50	1
Dibromochloromethane	2.0		0.40	0.079	ppb v/v			07/20/17 06:50	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/20/17 06:50	1
Chloroform	6.6		0.30	0.095	ppb v/v			07/20/17 06:50	1
Chloromethane	0.73	J	0.80	0.20	ppb v/v			07/20/17 06:50	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/20/17 06:50	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/20/17 06:50	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/20/17 06:50	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/20/17 06:50	1
Dichlorodifluoromethane	0.25	J	0.40	0.15	ppb v/v			07/20/17 06:50	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-01

Date Collected: 06/28/17 09:00

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-13

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/20/17 06:50	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/20/17 06:50	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/20/17 06:50	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/20/17 06:50	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/20/17 06:50	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/20/17 06:50	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/20/17 06:50	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/20/17 06:50	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 06:50	1
Ethylbenzene	0.19	J	0.40	0.063	ppb v/v			07/20/17 06:50	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/20/17 06:50	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/20/17 06:50	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/20/17 06:50	1
Methylene Chloride	0.39	J	0.40	0.072	ppb v/v			07/20/17 06:50	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/20/17 06:50	1
Styrene	ND		0.40	0.059	ppb v/v			07/20/17 06:50	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/20/17 06:50	1
Tetrachloroethene	0.12	J	0.40	0.051	ppb v/v			07/20/17 06:50	1
Toluene	0.64		0.40	0.051	ppb v/v			07/20/17 06:50	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/20/17 06:50	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/20/17 06:50	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/20/17 06:50	1
Trichloroethene	0.11	J	0.40	0.11	ppb v/v			07/20/17 06:50	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			07/20/17 06:50	1
1,1,2-Trichloro-1,2,2-trifluoroethane	2.1		0.40	0.16	ppb v/v			07/20/17 06:50	1
1,2,4-Trimethylbenzene	0.18	J	0.80	0.16	ppb v/v			07/20/17 06:50	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/20/17 06:50	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/20/17 06:50	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/20/17 06:50	1
m,p-Xylene	0.25	J	0.80	0.10	ppb v/v			07/20/17 06:50	1
o-Xylene	0.10	J	0.40	0.054	ppb v/v			07/20/17 06:50	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	17		12	0.42	ug/m3			07/20/17 06:50	1
Benzene	0.37	J	1.3	0.25	ug/m3			07/20/17 06:50	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/20/17 06:50	1
Bromodichloromethane	17		2.0	0.44	ug/m3			07/20/17 06:50	1
Bromoform	4.7		4.1	0.72	ug/m3			07/20/17 06:50	1
Bromomethane	ND		3.1	1.3	ug/m3			07/20/17 06:50	1
2-Butanone (MEK)	2.2	J	2.4	0.59	ug/m3			07/20/17 06:50	1
Carbon disulfide	3.4		2.5	0.24	ug/m3			07/20/17 06:50	1
Carbon tetrachloride	0.42	J	5.0	0.40	ug/m3			07/20/17 06:50	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/20/17 06:50	1
Dibromochloromethane	17		3.4	0.67	ug/m3			07/20/17 06:50	1
Chloroethane	ND		2.1	0.81	ug/m3			07/20/17 06:50	1
Chloroform	32		1.5	0.46	ug/m3			07/20/17 06:50	1
Chloromethane	1.5	J	1.7	0.41	ug/m3			07/20/17 06:50	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/20/17 06:50	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-01

Lab Sample ID: 320-29669-13

Date Collected: 06/28/17 09:00

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/20/17 06:50	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/20/17 06:50	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/20/17 06:50	1
Dichlorodifluoromethane	1.3	J	2.0	0.72	ug/m3			07/20/17 06:50	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/20/17 06:50	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/20/17 06:50	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/20/17 06:50	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/20/17 06:50	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/20/17 06:50	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/20/17 06:50	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/20/17 06:50	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/20/17 06:50	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/20/17 06:50	1
Ethylbenzene	0.82	J	1.7	0.27	ug/m3			07/20/17 06:50	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/20/17 06:50	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/20/17 06:50	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/20/17 06:50	1
Methylene Chloride	1.4	J	1.4	0.25	ug/m3			07/20/17 06:50	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/20/17 06:50	1
Styrene	ND		1.7	0.25	ug/m3			07/20/17 06:50	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/20/17 06:50	1
Tetrachloroethene	0.80	J	2.7	0.35	ug/m3			07/20/17 06:50	1
Toluene	2.4		1.5	0.19	ug/m3			07/20/17 06:50	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/20/17 06:50	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/20/17 06:50	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/20/17 06:50	1
Trichloroethene	0.61	J	2.1	0.56	ug/m3			07/20/17 06:50	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			07/20/17 06:50	1
1,1,2-Trichloro-1,2,2-trifluoroethane	16		3.1	1.2	ug/m3			07/20/17 06:50	1
1,2,4-Trimethylbenzene	0.88	J	3.9	0.80	ug/m3			07/20/17 06:50	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/20/17 06:50	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/20/17 06:50	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/20/17 06:50	1
m,p-Xylene	1.1	J	3.5	0.43	ug/m3			07/20/17 06:50	1
o-Xylene	0.44	J	1.7	0.23	ug/m3			07/20/17 06:50	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130		07/20/17 06:50	1
1,2-Dichloroethane-d4 (Surr)	96		70 - 130		07/20/17 06:50	1
Toluene-d8 (Surr)	101		70 - 130		07/20/17 06:50	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-02

Lab Sample ID: 320-29669-14

Date Collected: 06/28/17 09:32

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	19		5.0	0.18	ppb v/v			07/19/17 19:57	1
Benzene	0.18	J	0.40	0.079	ppb v/v			07/19/17 19:57	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/19/17 19:57	1
Bromodichloromethane	0.36		0.30	0.066	ppb v/v			07/19/17 19:57	1
Bromoform	0.10	J	0.40	0.070	ppb v/v			07/19/17 19:57	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/19/17 19:57	1
2-Butanone (MEK)	3.8		0.80	0.20	ppb v/v			07/19/17 19:57	1
Carbon disulfide	5.7		0.80	0.078	ppb v/v			07/19/17 19:57	1
Carbon tetrachloride	0.099	J	0.80	0.064	ppb v/v			07/19/17 19:57	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/19/17 19:57	1
Dibromochloromethane	0.34	J	0.40	0.079	ppb v/v			07/19/17 19:57	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/19/17 19:57	1
Chloroform	5.9		0.30	0.095	ppb v/v			07/19/17 19:57	1
Chloromethane	1.1		0.80	0.20	ppb v/v			07/19/17 19:57	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/19/17 19:57	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/19/17 19:57	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/19/17 19:57	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/19/17 19:57	1
Dichlorodifluoromethane	0.50		0.40	0.15	ppb v/v			07/19/17 19:57	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/19/17 19:57	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/19/17 19:57	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/19/17 19:57	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/19/17 19:57	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/19/17 19:57	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/19/17 19:57	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/19/17 19:57	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/19/17 19:57	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/19/17 19:57	1
Ethylbenzene	0.11	J	0.40	0.063	ppb v/v			07/19/17 19:57	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/19/17 19:57	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/19/17 19:57	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/19/17 19:57	1
Methylene Chloride	0.46		0.40	0.072	ppb v/v			07/19/17 19:57	1
4-Methyl-2-pentanone (MIBK)	0.91		0.40	0.14	ppb v/v			07/19/17 19:57	1
Styrene	0.074	J	0.40	0.059	ppb v/v			07/19/17 19:57	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/19/17 19:57	1
Tetrachloroethene	0.50		0.40	0.051	ppb v/v			07/19/17 19:57	1
Toluene	0.55		0.40	0.051	ppb v/v			07/19/17 19:57	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/19/17 19:57	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/19/17 19:57	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/19/17 19:57	1
Trichloroethene	ND		0.40	0.11	ppb v/v			07/19/17 19:57	1
Trichlorofluoromethane	0.27	J	0.40	0.20	ppb v/v			07/19/17 19:57	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.16	J	0.40	0.16	ppb v/v			07/19/17 19:57	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			07/19/17 19:57	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/19/17 19:57	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/19/17 19:57	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/19/17 19:57	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-02

Lab Sample ID: 320-29669-14

Date Collected: 06/28/17 09:32

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.29	J	0.80	0.10	ppb v/v			07/19/17 19:57	1
o-Xylene	0.12	J	0.40	0.054	ppb v/v			07/19/17 19:57	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	44		12	0.42	ug/m3			07/19/17 19:57	1
Benzene	0.56	J	1.3	0.25	ug/m3			07/19/17 19:57	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/19/17 19:57	1
Bromodichloromethane	2.4		2.0	0.44	ug/m3			07/19/17 19:57	1
Bromoform	1.0	J	4.1	0.72	ug/m3			07/19/17 19:57	1
Bromomethane	ND		3.1	1.3	ug/m3			07/19/17 19:57	1
2-Butanone (MEK)	11		2.4	0.59	ug/m3			07/19/17 19:57	1
Carbon disulfide	18		2.5	0.24	ug/m3			07/19/17 19:57	1
Carbon tetrachloride	0.62	J	5.0	0.40	ug/m3			07/19/17 19:57	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/19/17 19:57	1
Dibromochloromethane	2.9	J	3.4	0.67	ug/m3			07/19/17 19:57	1
Chloroethane	ND		2.1	0.81	ug/m3			07/19/17 19:57	1
Chloroform	29		1.5	0.46	ug/m3			07/19/17 19:57	1
Chloromethane	2.3		1.7	0.41	ug/m3			07/19/17 19:57	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/19/17 19:57	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/19/17 19:57	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/19/17 19:57	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/19/17 19:57	1
Dichlorodifluoromethane	2.5		2.0	0.72	ug/m3			07/19/17 19:57	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/19/17 19:57	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/19/17 19:57	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/19/17 19:57	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/19/17 19:57	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/19/17 19:57	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/19/17 19:57	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/19/17 19:57	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/19/17 19:57	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/19/17 19:57	1
Ethylbenzene	0.47	J	1.7	0.27	ug/m3			07/19/17 19:57	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/19/17 19:57	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/19/17 19:57	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/19/17 19:57	1
Methylene Chloride	1.6		1.4	0.25	ug/m3			07/19/17 19:57	1
4-Methyl-2-pentanone (MIBK)	3.7		1.6	0.55	ug/m3			07/19/17 19:57	1
Styrene	0.31	J	1.7	0.25	ug/m3			07/19/17 19:57	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/19/17 19:57	1
Tetrachloroethene	3.4		2.7	0.35	ug/m3			07/19/17 19:57	1
Toluene	2.1		1.5	0.19	ug/m3			07/19/17 19:57	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/19/17 19:57	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/19/17 19:57	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/19/17 19:57	1
Trichloroethene	ND		2.1	0.56	ug/m3			07/19/17 19:57	1
Trichlorofluoromethane	1.5	J	2.2	1.1	ug/m3			07/19/17 19:57	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.2	J	3.1	1.2	ug/m3			07/19/17 19:57	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-02

Date Collected: 06/28/17 09:32

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-14

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			07/19/17 19:57	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/19/17 19:57	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/19/17 19:57	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/19/17 19:57	1
m,p-Xylene	1.2	J	3.5	0.43	ug/m3			07/19/17 19:57	1
o-Xylene	0.52	J	1.7	0.23	ug/m3			07/19/17 19:57	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		70 - 130					07/19/17 19:57	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					07/19/17 19:57	1
Toluene-d8 (Surr)	98		70 - 130					07/19/17 19:57	1

Client Sample ID: OC-03

Date Collected: 06/28/17 10:02

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-15

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	33		5.0	0.18	ppb v/v			07/19/17 20:47	1
Benzene	0.34	J	0.40	0.079	ppb v/v			07/19/17 20:47	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/19/17 20:47	1
Bromodichloromethane	2.8		0.30	0.066	ppb v/v			07/19/17 20:47	1
Bromoform	4.0		0.40	0.070	ppb v/v			07/19/17 20:47	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/19/17 20:47	1
2-Butanone (MEK)	4.7		0.80	0.20	ppb v/v			07/19/17 20:47	1
Carbon disulfide	26		0.80	0.078	ppb v/v			07/19/17 20:47	1
Carbon tetrachloride	0.42	J	0.80	0.064	ppb v/v			07/19/17 20:47	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/19/17 20:47	1
Dibromochloromethane	3.9		0.40	0.079	ppb v/v			07/19/17 20:47	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/19/17 20:47	1
Chloroform	6.7		0.30	0.095	ppb v/v			07/19/17 20:47	1
Chloromethane	0.69	J	0.80	0.20	ppb v/v			07/19/17 20:47	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/19/17 20:47	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/19/17 20:47	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/19/17 20:47	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/19/17 20:47	1
Dichlorodifluoromethane	0.47		0.40	0.15	ppb v/v			07/19/17 20:47	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/19/17 20:47	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/19/17 20:47	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/19/17 20:47	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/19/17 20:47	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/19/17 20:47	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/19/17 20:47	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/19/17 20:47	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/19/17 20:47	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/19/17 20:47	1
Ethylbenzene	0.33	J	0.40	0.063	ppb v/v			07/19/17 20:47	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/19/17 20:47	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-03

Date Collected: 06/28/17 10:02

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-15

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/19/17 20:47	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/19/17 20:47	1
Methylene Chloride	10		0.40	0.072	ppb v/v			07/19/17 20:47	1
4-Methyl-2-pentanone (MIBK)	0.47		0.40	0.14	ppb v/v			07/19/17 20:47	1
Styrene	0.088	J	0.40	0.059	ppb v/v			07/19/17 20:47	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/19/17 20:47	1
Tetrachloroethene	0.18	J	0.40	0.051	ppb v/v			07/19/17 20:47	1
Toluene	0.49		0.40	0.051	ppb v/v			07/19/17 20:47	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/19/17 20:47	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/19/17 20:47	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/19/17 20:47	1
Trichloroethene	2.5		0.40	0.11	ppb v/v			07/19/17 20:47	1
Trichlorofluoromethane	0.25	J	0.40	0.20	ppb v/v			07/19/17 20:47	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			07/19/17 20:47	1
1,2,4-Trimethylbenzene	0.36	J	0.80	0.16	ppb v/v			07/19/17 20:47	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/19/17 20:47	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/19/17 20:47	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/19/17 20:47	1
m,p-Xylene	0.84		0.80	0.10	ppb v/v			07/19/17 20:47	1
o-Xylene	0.36	J	0.40	0.054	ppb v/v			07/19/17 20:47	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	79		12	0.42	ug/m3			07/19/17 20:47	1
Benzene	1.1	J	1.3	0.25	ug/m3			07/19/17 20:47	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/19/17 20:47	1
Bromodichloromethane	19		2.0	0.44	ug/m3			07/19/17 20:47	1
Bromoform	41		4.1	0.72	ug/m3			07/19/17 20:47	1
Bromomethane	ND		3.1	1.3	ug/m3			07/19/17 20:47	1
2-Butanone (MEK)	14		2.4	0.59	ug/m3			07/19/17 20:47	1
Carbon disulfide	80		2.5	0.24	ug/m3			07/19/17 20:47	1
Carbon tetrachloride	2.6	J	5.0	0.40	ug/m3			07/19/17 20:47	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/19/17 20:47	1
Dibromochloromethane	33		3.4	0.67	ug/m3			07/19/17 20:47	1
Chloroethane	ND		2.1	0.81	ug/m3			07/19/17 20:47	1
Chloroform	33		1.5	0.46	ug/m3			07/19/17 20:47	1
Chloromethane	1.4	J	1.7	0.41	ug/m3			07/19/17 20:47	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/19/17 20:47	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/19/17 20:47	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/19/17 20:47	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/19/17 20:47	1
Dichlorodifluoromethane	2.3		2.0	0.72	ug/m3			07/19/17 20:47	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/19/17 20:47	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/19/17 20:47	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/19/17 20:47	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/19/17 20:47	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/19/17 20:47	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/19/17 20:47	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/19/17 20:47	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/19/17 20:47	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-03

Date Collected: 06/28/17 10:02

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-15

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/19/17 20:47	1
Ethylbenzene	1.4	J	1.7	0.27	ug/m3			07/19/17 20:47	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/19/17 20:47	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/19/17 20:47	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/19/17 20:47	1
Methylene Chloride	35		1.4	0.25	ug/m3			07/19/17 20:47	1
4-Methyl-2-pentanone (MIBK)	1.9		1.6	0.55	ug/m3			07/19/17 20:47	1
Styrene	0.38	J	1.7	0.25	ug/m3			07/19/17 20:47	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/19/17 20:47	1
Tetrachloroethene	1.2	J	2.7	0.35	ug/m3			07/19/17 20:47	1
Toluene	1.9		1.5	0.19	ug/m3			07/19/17 20:47	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/19/17 20:47	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/19/17 20:47	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/19/17 20:47	1
Trichloroethene	13		2.1	0.56	ug/m3			07/19/17 20:47	1
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3			07/19/17 20:47	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			07/19/17 20:47	1
1,2,4-Trimethylbenzene	1.8	J	3.9	0.80	ug/m3			07/19/17 20:47	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/19/17 20:47	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/19/17 20:47	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/19/17 20:47	1
m,p-Xylene	3.6		3.5	0.43	ug/m3			07/19/17 20:47	1
o-Xylene	1.6	J	1.7	0.23	ug/m3			07/19/17 20:47	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130					07/19/17 20:47	1
1,2-Dichloroethane-d4 (Surr)	96		70 - 130					07/19/17 20:47	1
Toluene-d8 (Surr)	94		70 - 130					07/19/17 20:47	1

Client Sample ID: OC-04

Date Collected: 06/28/17 10:25

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-16

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	12		5.0	0.18	ppb v/v			07/19/17 21:38	1
Benzene	0.14	J	0.40	0.079	ppb v/v			07/19/17 21:38	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/19/17 21:38	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			07/19/17 21:38	1
Bromoform	ND		0.40	0.070	ppb v/v			07/19/17 21:38	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/19/17 21:38	1
2-Butanone (MEK)	0.90		0.80	0.20	ppb v/v			07/19/17 21:38	1
Carbon disulfide	4.5		0.80	0.078	ppb v/v			07/19/17 21:38	1
Carbon tetrachloride	0.082	J	0.80	0.064	ppb v/v			07/19/17 21:38	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/19/17 21:38	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			07/19/17 21:38	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/19/17 21:38	1
Chloroform	0.30		0.30	0.095	ppb v/v			07/19/17 21:38	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-04

Date Collected: 06/28/17 10:25

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-16

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloromethane	1.1		0.80	0.20	ppb v/v			07/19/17 21:38	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/19/17 21:38	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/19/17 21:38	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/19/17 21:38	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/19/17 21:38	1
Dichlorodifluoromethane	0.52		0.40	0.15	ppb v/v			07/19/17 21:38	1
1,1-Dichloroethane	4.2		0.30	0.072	ppb v/v			07/19/17 21:38	1
1,2-Dichloroethane	0.16	J	0.80	0.088	ppb v/v			07/19/17 21:38	1
cis-1,2-Dichloroethene	0.11	J	0.40	0.089	ppb v/v			07/19/17 21:38	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/19/17 21:38	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/19/17 21:38	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/19/17 21:38	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/19/17 21:38	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/19/17 21:38	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			07/19/17 21:38	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/19/17 21:38	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/19/17 21:38	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/19/17 21:38	1
Methylene Chloride	0.19	J	0.40	0.072	ppb v/v			07/19/17 21:38	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/19/17 21:38	1
Styrene	ND		0.40	0.059	ppb v/v			07/19/17 21:38	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/19/17 21:38	1
Tetrachloroethene	0.13	J	0.40	0.051	ppb v/v			07/19/17 21:38	1
Toluene	0.40		0.40	0.051	ppb v/v			07/19/17 21:38	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/19/17 21:38	1
1,1,1-Trichloroethane	4.4		0.30	0.065	ppb v/v			07/19/17 21:38	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/19/17 21:38	1
Trichloroethene	0.12	J	0.40	0.11	ppb v/v			07/19/17 21:38	1
Trichlorofluoromethane	0.39	J	0.40	0.20	ppb v/v			07/19/17 21:38	1
1,1,2-Trichloro-1,2,2-trifluoroethane	3.4		0.40	0.16	ppb v/v			07/19/17 21:38	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			07/19/17 21:38	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/19/17 21:38	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/19/17 21:38	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/19/17 21:38	1
m,p-Xylene	0.18	J	0.80	0.10	ppb v/v			07/19/17 21:38	1
o-Xylene	0.070	J	0.40	0.054	ppb v/v			07/19/17 21:38	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	30		12	0.42	ug/m3			07/19/17 21:38	1
Benzene	0.46	J	1.3	0.25	ug/m3			07/19/17 21:38	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/19/17 21:38	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			07/19/17 21:38	1
Bromoform	ND		4.1	0.72	ug/m3			07/19/17 21:38	1
Bromomethane	ND		3.1	1.3	ug/m3			07/19/17 21:38	1
2-Butanone (MEK)	2.7		2.4	0.59	ug/m3			07/19/17 21:38	1
Carbon disulfide	14		2.5	0.24	ug/m3			07/19/17 21:38	1
Carbon tetrachloride	0.51	J	5.0	0.40	ug/m3			07/19/17 21:38	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/19/17 21:38	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-04

Lab Sample ID: 320-29669-16

Date Collected: 06/28/17 10:25

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromochloromethane	ND		3.4	0.67	ug/m3			07/19/17 21:38	1
Chloroethane	ND		2.1	0.81	ug/m3			07/19/17 21:38	1
Chloroform	1.5		1.5	0.46	ug/m3			07/19/17 21:38	1
Chloromethane	2.2		1.7	0.41	ug/m3			07/19/17 21:38	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/19/17 21:38	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/19/17 21:38	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/19/17 21:38	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/19/17 21:38	1
Dichlorodifluoromethane	2.6		2.0	0.72	ug/m3			07/19/17 21:38	1
1,1-Dichloroethane	17		1.2	0.29	ug/m3			07/19/17 21:38	1
1,2-Dichloroethane	0.63	J	3.2	0.36	ug/m3			07/19/17 21:38	1
cis-1,2-Dichloroethene	0.45	J	1.6	0.35	ug/m3			07/19/17 21:38	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/19/17 21:38	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/19/17 21:38	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/19/17 21:38	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/19/17 21:38	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/19/17 21:38	1
Ethylbenzene	ND		1.7	0.27	ug/m3			07/19/17 21:38	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/19/17 21:38	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/19/17 21:38	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/19/17 21:38	1
Methylene Chloride	0.65	J	1.4	0.25	ug/m3			07/19/17 21:38	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/19/17 21:38	1
Styrene	ND		1.7	0.25	ug/m3			07/19/17 21:38	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/19/17 21:38	1
Tetrachloroethene	0.90	J	2.7	0.35	ug/m3			07/19/17 21:38	1
Toluene	1.5		1.5	0.19	ug/m3			07/19/17 21:38	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/19/17 21:38	1
1,1,1-Trichloroethane	24		1.6	0.35	ug/m3			07/19/17 21:38	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/19/17 21:38	1
Trichloroethene	0.62	J	2.1	0.56	ug/m3			07/19/17 21:38	1
Trichlorofluoromethane	2.2	J	2.2	1.1	ug/m3			07/19/17 21:38	1
1,1,2-Trichloro-1,2,2-trifluoroethane	26		3.1	1.2	ug/m3			07/19/17 21:38	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			07/19/17 21:38	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/19/17 21:38	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/19/17 21:38	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/19/17 21:38	1
m,p-Xylene	0.77	J	3.5	0.43	ug/m3			07/19/17 21:38	1
o-Xylene	0.30	J	1.7	0.23	ug/m3			07/19/17 21:38	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130		07/19/17 21:38	1
1,2-Dichloroethane-d4 (Surr)	98		70 - 130		07/19/17 21:38	1
Toluene-d8 (Surr)	94		70 - 130		07/19/17 21:38	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	150		4.4	0.71	ppb v/v			07/20/17 11:32	5.54

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-04

Date Collected: 06/28/17 10:25

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-16

Matrix: Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	590		18	2.8	ug/m3			07/20/17 11:32	5.54
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	109		70 - 130					07/20/17 11:32	5.54
1,2-Dichloroethane-d4 (Surr)	99		70 - 130					07/20/17 11:32	5.54
Toluene-d8 (Surr)	96		70 - 130					07/20/17 11:32	5.54

Client Sample ID: OC-05

Date Collected: 06/28/17 11:05

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-17

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	37		5.0	0.18	ppb v/v			07/19/17 22:34	1
Benzene	28		0.40	0.079	ppb v/v			07/19/17 22:34	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/19/17 22:34	1
Bromodichloromethane	5.2		0.30	0.066	ppb v/v			07/19/17 22:34	1
Bromoform	2.1		0.40	0.070	ppb v/v			07/19/17 22:34	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/19/17 22:34	1
2-Butanone (MEK)	1.9		0.80	0.20	ppb v/v			07/19/17 22:34	1
Carbon disulfide	4.4		0.80	0.078	ppb v/v			07/19/17 22:34	1
Carbon tetrachloride	0.071 J		0.80	0.064	ppb v/v			07/19/17 22:34	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/19/17 22:34	1
Dibromochloromethane	4.6		0.40	0.079	ppb v/v			07/19/17 22:34	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/19/17 22:34	1
Chloroform	5.6		0.30	0.095	ppb v/v			07/19/17 22:34	1
Chloromethane	0.84		0.80	0.20	ppb v/v			07/19/17 22:34	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/19/17 22:34	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/19/17 22:34	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/19/17 22:34	1
1,4-Dichlorobenzene	0.37 J		0.40	0.15	ppb v/v			07/19/17 22:34	1
Dichlorodifluoromethane	0.43		0.40	0.15	ppb v/v			07/19/17 22:34	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/19/17 22:34	1
1,2-Dichloroethane	0.57 J		0.80	0.088	ppb v/v			07/19/17 22:34	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/19/17 22:34	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/19/17 22:34	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/19/17 22:34	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/19/17 22:34	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/19/17 22:34	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/19/17 22:34	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/19/17 22:34	1
Ethylbenzene	0.16 J		0.40	0.063	ppb v/v			07/19/17 22:34	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/19/17 22:34	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/19/17 22:34	1
2-Hexanone	0.19 J		0.40	0.087	ppb v/v			07/19/17 22:34	1
Methylene Chloride	1.1		0.40	0.072	ppb v/v			07/19/17 22:34	1
4-Methyl-2-pentanone (MIBK)	0.20 J		0.40	0.14	ppb v/v			07/19/17 22:34	1
Styrene	0.074 J		0.40	0.059	ppb v/v			07/19/17 22:34	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/19/17 22:34	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-05

Lab Sample ID: 320-29669-17

Date Collected: 06/28/17 11:05

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	1.5		0.40	0.051	ppb v/v			07/19/17 22:34	1
Toluene	1.1		0.40	0.051	ppb v/v			07/19/17 22:34	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/19/17 22:34	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/19/17 22:34	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/19/17 22:34	1
Trichloroethene	4.6		0.40	0.11	ppb v/v			07/19/17 22:34	1
Trichlorofluoromethane	0.28	J	0.40	0.20	ppb v/v			07/19/17 22:34	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			07/19/17 22:34	1
1,2,4-Trimethylbenzene	0.37	J	0.80	0.16	ppb v/v			07/19/17 22:34	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/19/17 22:34	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/19/17 22:34	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/19/17 22:34	1
m,p-Xylene	0.51	J	0.80	0.10	ppb v/v			07/19/17 22:34	1
o-Xylene	0.22	J	0.40	0.054	ppb v/v			07/19/17 22:34	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	89		12	0.42	ug/m3			07/19/17 22:34	1
Benzene	89		1.3	0.25	ug/m3			07/19/17 22:34	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/19/17 22:34	1
Bromodichloromethane	35		2.0	0.44	ug/m3			07/19/17 22:34	1
Bromoform	22		4.1	0.72	ug/m3			07/19/17 22:34	1
Bromomethane	ND		3.1	1.3	ug/m3			07/19/17 22:34	1
2-Butanone (MEK)	5.6		2.4	0.59	ug/m3			07/19/17 22:34	1
Carbon disulfide	14		2.5	0.24	ug/m3			07/19/17 22:34	1
Carbon tetrachloride	0.45	J	5.0	0.40	ug/m3			07/19/17 22:34	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/19/17 22:34	1
Dibromochloromethane	39		3.4	0.67	ug/m3			07/19/17 22:34	1
Chloroethane	ND		2.1	0.81	ug/m3			07/19/17 22:34	1
Chloroform	28		1.5	0.46	ug/m3			07/19/17 22:34	1
Chloromethane	1.7		1.7	0.41	ug/m3			07/19/17 22:34	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/19/17 22:34	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/19/17 22:34	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/19/17 22:34	1
1,4-Dichlorobenzene	2.2	J	2.4	0.90	ug/m3			07/19/17 22:34	1
Dichlorodifluoromethane	2.1		2.0	0.72	ug/m3			07/19/17 22:34	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/19/17 22:34	1
1,2-Dichloroethane	2.3	J	3.2	0.36	ug/m3			07/19/17 22:34	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/19/17 22:34	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/19/17 22:34	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/19/17 22:34	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/19/17 22:34	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/19/17 22:34	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/19/17 22:34	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/19/17 22:34	1
Ethylbenzene	0.70	J	1.7	0.27	ug/m3			07/19/17 22:34	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/19/17 22:34	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/19/17 22:34	1
2-Hexanone	0.79	J	1.6	0.36	ug/m3			07/19/17 22:34	1
Methylene Chloride	3.9		1.4	0.25	ug/m3			07/19/17 22:34	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-05

Date Collected: 06/28/17 11:05

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-17

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Methyl-2-pentanone (MIBK)	0.82	J	1.6	0.55	ug/m3			07/19/17 22:34	1
Styrene	0.31	J	1.7	0.25	ug/m3			07/19/17 22:34	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/19/17 22:34	1
Tetrachloroethene	10		2.7	0.35	ug/m3			07/19/17 22:34	1
Toluene	4.1		1.5	0.19	ug/m3			07/19/17 22:34	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/19/17 22:34	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/19/17 22:34	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/19/17 22:34	1
Trichloroethene	25		2.1	0.56	ug/m3			07/19/17 22:34	1
Trichlorofluoromethane	1.6	J	2.2	1.1	ug/m3			07/19/17 22:34	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			07/19/17 22:34	1
1,2,4-Trimethylbenzene	1.8	J	3.9	0.80	ug/m3			07/19/17 22:34	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/19/17 22:34	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/19/17 22:34	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/19/17 22:34	1
m,p-Xylene	2.2	J	3.5	0.43	ug/m3			07/19/17 22:34	1
o-Xylene	0.95	J	1.7	0.23	ug/m3			07/19/17 22:34	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130					07/19/17 22:34	1
1,2-Dichloroethane-d4 (Surr)	82		70 - 130					07/19/17 22:34	1
Toluene-d8 (Surr)	94		70 - 130					07/19/17 22:34	1

Client Sample ID: OC-06A

Date Collected: 06/28/17 11:21

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-18

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	84		5.0	0.18	ppb v/v			07/19/17 23:25	1
Benzene	0.44		0.40	0.079	ppb v/v			07/19/17 23:25	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/19/17 23:25	1
Bromodichloromethane	0.66		0.30	0.066	ppb v/v			07/19/17 23:25	1
Bromoform	0.41		0.40	0.070	ppb v/v			07/19/17 23:25	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/19/17 23:25	1
2-Butanone (MEK)	0.77	J	0.80	0.20	ppb v/v			07/19/17 23:25	1
Carbon disulfide	1.6		0.80	0.078	ppb v/v			07/19/17 23:25	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			07/19/17 23:25	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/19/17 23:25	1
Dibromochloromethane	0.68		0.40	0.079	ppb v/v			07/19/17 23:25	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/19/17 23:25	1
Chloroform	0.84		0.30	0.095	ppb v/v			07/19/17 23:25	1
Chloromethane	0.60	J	0.80	0.20	ppb v/v			07/19/17 23:25	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/19/17 23:25	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/19/17 23:25	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/19/17 23:25	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/19/17 23:25	1
Dichlorodifluoromethane	0.47		0.40	0.15	ppb v/v			07/19/17 23:25	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-06A

Lab Sample ID: 320-29669-18

Date Collected: 06/28/17 11:21

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/19/17 23:25	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/19/17 23:25	1
1,1-Dichloroethene	4.9		0.80	0.13	ppb v/v			07/19/17 23:25	1
cis-1,2-Dichloroethene	0.51		0.40	0.089	ppb v/v			07/19/17 23:25	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/19/17 23:25	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/19/17 23:25	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/19/17 23:25	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/19/17 23:25	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/19/17 23:25	1
Ethylbenzene	0.17	J	0.40	0.063	ppb v/v			07/19/17 23:25	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/19/17 23:25	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/19/17 23:25	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/19/17 23:25	1
Methylene Chloride	0.24	J	0.40	0.072	ppb v/v			07/19/17 23:25	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/19/17 23:25	1
Styrene	ND		0.40	0.059	ppb v/v			07/19/17 23:25	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/19/17 23:25	1
Tetrachloroethene	8.0		0.40	0.051	ppb v/v			07/19/17 23:25	1
Toluene	1.9		0.40	0.051	ppb v/v			07/19/17 23:25	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/19/17 23:25	1
1,1,1-Trichloroethane	0.31		0.30	0.065	ppb v/v			07/19/17 23:25	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/19/17 23:25	1
Trichloroethene	49		0.40	0.11	ppb v/v			07/19/17 23:25	1
Trichlorofluoromethane	0.23	J	0.40	0.20	ppb v/v			07/19/17 23:25	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1.4		0.40	0.16	ppb v/v			07/19/17 23:25	1
1,2,4-Trimethylbenzene	0.19	J	0.80	0.16	ppb v/v			07/19/17 23:25	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/19/17 23:25	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/19/17 23:25	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/19/17 23:25	1
m,p-Xylene	0.54	J	0.80	0.10	ppb v/v			07/19/17 23:25	1
o-Xylene	0.21	J	0.40	0.054	ppb v/v			07/19/17 23:25	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	200		12	0.42	ug/m3			07/19/17 23:25	1
Benzene	1.4		1.3	0.25	ug/m3			07/19/17 23:25	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/19/17 23:25	1
Bromodichloromethane	4.4		2.0	0.44	ug/m3			07/19/17 23:25	1
Bromoform	4.3		4.1	0.72	ug/m3			07/19/17 23:25	1
Bromomethane	ND		3.1	1.3	ug/m3			07/19/17 23:25	1
2-Butanone (MEK)	2.3	J	2.4	0.59	ug/m3			07/19/17 23:25	1
Carbon disulfide	4.9		2.5	0.24	ug/m3			07/19/17 23:25	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			07/19/17 23:25	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/19/17 23:25	1
Dibromochloromethane	5.8		3.4	0.67	ug/m3			07/19/17 23:25	1
Chloroethane	ND		2.1	0.81	ug/m3			07/19/17 23:25	1
Chloroform	4.1		1.5	0.46	ug/m3			07/19/17 23:25	1
Chloromethane	1.2	J	1.7	0.41	ug/m3			07/19/17 23:25	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/19/17 23:25	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-06A

Lab Sample ID: 320-29669-18

Date Collected: 06/28/17 11:21

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/19/17 23:25	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/19/17 23:25	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/19/17 23:25	1
Dichlorodifluoromethane	2.3		2.0	0.72	ug/m3			07/19/17 23:25	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/19/17 23:25	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/19/17 23:25	1
1,1-Dichloroethene	19		3.2	0.51	ug/m3			07/19/17 23:25	1
cis-1,2-Dichloroethene	2.0		1.6	0.35	ug/m3			07/19/17 23:25	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/19/17 23:25	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/19/17 23:25	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/19/17 23:25	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/19/17 23:25	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/19/17 23:25	1
Ethylbenzene	0.72	J	1.7	0.27	ug/m3			07/19/17 23:25	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/19/17 23:25	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/19/17 23:25	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/19/17 23:25	1
Methylene Chloride	0.83	J	1.4	0.25	ug/m3			07/19/17 23:25	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/19/17 23:25	1
Styrene	ND		1.7	0.25	ug/m3			07/19/17 23:25	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/19/17 23:25	1
Tetrachloroethene	54		2.7	0.35	ug/m3			07/19/17 23:25	1
Toluene	7.2		1.5	0.19	ug/m3			07/19/17 23:25	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/19/17 23:25	1
1,1,1-Trichloroethane	1.7		1.6	0.35	ug/m3			07/19/17 23:25	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/19/17 23:25	1
Trichloroethene	260		2.1	0.56	ug/m3			07/19/17 23:25	1
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3			07/19/17 23:25	1
1,1,2-Trichloro-1,2,2-trifluoroethane	11		3.1	1.2	ug/m3			07/19/17 23:25	1
1,2,4-Trimethylbenzene	0.94	J	3.9	0.80	ug/m3			07/19/17 23:25	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/19/17 23:25	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/19/17 23:25	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/19/17 23:25	1
m,p-Xylene	2.3	J	3.5	0.43	ug/m3			07/19/17 23:25	1
o-Xylene	0.91	J	1.7	0.23	ug/m3			07/19/17 23:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130					07/19/17 23:25	1
1,2-Dichloroethane-d4 (Surr)	96		70 - 130					07/19/17 23:25	1
Toluene-d8 (Surr)	95		70 - 130					07/19/17 23:25	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-06B

Lab Sample ID: 320-29669-19

Date Collected: 06/28/17 11:33

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	15		5.0	0.18	ppb v/v			07/20/17 00:21	1
Benzene	0.42		0.40	0.079	ppb v/v			07/20/17 00:21	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/20/17 00:21	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			07/20/17 00:21	1
Bromoform	ND		0.40	0.070	ppb v/v			07/20/17 00:21	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/20/17 00:21	1
2-Butanone (MEK)	1.5		0.80	0.20	ppb v/v			07/20/17 00:21	1
Carbon disulfide	1.9		0.80	0.078	ppb v/v			07/20/17 00:21	1
Carbon tetrachloride	0.15	J	0.80	0.064	ppb v/v			07/20/17 00:21	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/20/17 00:21	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			07/20/17 00:21	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/20/17 00:21	1
Chloroform	ND		0.30	0.095	ppb v/v			07/20/17 00:21	1
Chloromethane	1.3		0.80	0.20	ppb v/v			07/20/17 00:21	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/20/17 00:21	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/20/17 00:21	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/20/17 00:21	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/20/17 00:21	1
Dichlorodifluoromethane	0.90		0.40	0.15	ppb v/v			07/20/17 00:21	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/20/17 00:21	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/20/17 00:21	1
1,1-Dichloroethene	10		0.80	0.13	ppb v/v			07/20/17 00:21	1
cis-1,2-Dichloroethene	0.93		0.40	0.089	ppb v/v			07/20/17 00:21	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/20/17 00:21	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/20/17 00:21	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/20/17 00:21	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/20/17 00:21	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 00:21	1
Ethylbenzene	0.16	J	0.40	0.063	ppb v/v			07/20/17 00:21	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/20/17 00:21	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/20/17 00:21	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/20/17 00:21	1
Methylene Chloride	0.34	J	0.40	0.072	ppb v/v			07/20/17 00:21	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/20/17 00:21	1
Styrene	0.11	J	0.40	0.059	ppb v/v			07/20/17 00:21	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/20/17 00:21	1
Tetrachloroethene	16		0.40	0.051	ppb v/v			07/20/17 00:21	1
Toluene	0.70		0.40	0.051	ppb v/v			07/20/17 00:21	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/20/17 00:21	1
1,1,1-Trichloroethane	0.24	J	0.30	0.065	ppb v/v			07/20/17 00:21	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/20/17 00:21	1
Trichloroethene	120	E	0.40	0.11	ppb v/v			07/20/17 00:21	1
Trichlorofluoromethane	0.44		0.40	0.20	ppb v/v			07/20/17 00:21	1
1,1,2-Trichloro-1,2,2-trifluoroethane	6.4		0.40	0.16	ppb v/v			07/20/17 00:21	1
1,2,4-Trimethylbenzene	0.16	J	0.80	0.16	ppb v/v			07/20/17 00:21	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/20/17 00:21	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/20/17 00:21	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/20/17 00:21	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-06B

Lab Sample ID: 320-29669-19

Date Collected: 06/28/17 11:33

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.41	J	0.80	0.10	ppb v/v			07/20/17 00:21	1
o-Xylene	0.15	J	0.40	0.054	ppb v/v			07/20/17 00:21	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	37		12	0.42	ug/m3			07/20/17 00:21	1
Benzene	1.3		1.3	0.25	ug/m3			07/20/17 00:21	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/20/17 00:21	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			07/20/17 00:21	1
Bromoform	ND		4.1	0.72	ug/m3			07/20/17 00:21	1
Bromomethane	ND		3.1	1.3	ug/m3			07/20/17 00:21	1
2-Butanone (MEK)	4.3		2.4	0.59	ug/m3			07/20/17 00:21	1
Carbon disulfide	6.0		2.5	0.24	ug/m3			07/20/17 00:21	1
Carbon tetrachloride	0.97	J	5.0	0.40	ug/m3			07/20/17 00:21	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/20/17 00:21	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			07/20/17 00:21	1
Chloroethane	ND		2.1	0.81	ug/m3			07/20/17 00:21	1
Chloroform	ND		1.5	0.46	ug/m3			07/20/17 00:21	1
Chloromethane	2.6		1.7	0.41	ug/m3			07/20/17 00:21	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/20/17 00:21	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/20/17 00:21	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/20/17 00:21	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/20/17 00:21	1
Dichlorodifluoromethane	4.5		2.0	0.72	ug/m3			07/20/17 00:21	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/20/17 00:21	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/20/17 00:21	1
1,1-Dichloroethene	40		3.2	0.51	ug/m3			07/20/17 00:21	1
cis-1,2-Dichloroethene	3.7		1.6	0.35	ug/m3			07/20/17 00:21	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/20/17 00:21	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/20/17 00:21	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/20/17 00:21	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/20/17 00:21	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/20/17 00:21	1
Ethylbenzene	0.69	J	1.7	0.27	ug/m3			07/20/17 00:21	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/20/17 00:21	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/20/17 00:21	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/20/17 00:21	1
Methylene Chloride	1.2	J	1.4	0.25	ug/m3			07/20/17 00:21	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/20/17 00:21	1
Styrene	0.46	J	1.7	0.25	ug/m3			07/20/17 00:21	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/20/17 00:21	1
Tetrachloroethene	110		2.7	0.35	ug/m3			07/20/17 00:21	1
Toluene	2.7		1.5	0.19	ug/m3			07/20/17 00:21	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/20/17 00:21	1
1,1,1-Trichloroethane	1.3	J	1.6	0.35	ug/m3			07/20/17 00:21	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/20/17 00:21	1
Trichloroethene	630	E	2.1	0.56	ug/m3			07/20/17 00:21	1
Trichlorofluoromethane	2.5		2.2	1.1	ug/m3			07/20/17 00:21	1
1,1,2-Trichloro-1,2,2-trifluoroethane	49		3.1	1.2	ug/m3			07/20/17 00:21	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-06B

Date Collected: 06/28/17 11:33

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-19

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trimethylbenzene	0.80	J	3.9	0.80	ug/m3			07/20/17 00:21	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/20/17 00:21	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/20/17 00:21	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/20/17 00:21	1
m,p-Xylene	1.8	J	3.5	0.43	ug/m3			07/20/17 00:21	1
o-Xylene	0.67	J	1.7	0.23	ug/m3			07/20/17 00:21	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130					07/20/17 00:21	1
1,2-Dichloroethane-d4 (Surr)	98		70 - 130					07/20/17 00:21	1
Toluene-d8 (Surr)	95		70 - 130					07/20/17 00:21	1

Client Sample ID: OC-07

Date Collected: 06/28/17 12:04

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-20

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20		5.0	0.18	ppb v/v			07/20/17 07:23	1
Benzene	0.21	J	0.40	0.079	ppb v/v			07/20/17 07:23	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/20/17 07:23	1
Bromodichloromethane	1.2		0.30	0.066	ppb v/v			07/20/17 07:23	1
Bromoform	0.19	J	0.40	0.070	ppb v/v			07/20/17 07:23	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/20/17 07:23	1
2-Butanone (MEK)	0.73	J	0.80	0.20	ppb v/v			07/20/17 07:23	1
Carbon disulfide	2.4		0.80	0.078	ppb v/v			07/20/17 07:23	1
Carbon tetrachloride	0.078	J	0.80	0.064	ppb v/v			07/20/17 07:23	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/20/17 07:23	1
Dibromochloromethane	0.84		0.40	0.079	ppb v/v			07/20/17 07:23	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/20/17 07:23	1
Chloroform	2.4		0.30	0.095	ppb v/v			07/20/17 07:23	1
Chloromethane	0.66	J	0.80	0.20	ppb v/v			07/20/17 07:23	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/20/17 07:23	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/20/17 07:23	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/20/17 07:23	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/20/17 07:23	1
Dichlorodifluoromethane	0.43		0.40	0.15	ppb v/v			07/20/17 07:23	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/20/17 07:23	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/20/17 07:23	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/20/17 07:23	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/20/17 07:23	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/20/17 07:23	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/20/17 07:23	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/20/17 07:23	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/20/17 07:23	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 07:23	1
Ethylbenzene	0.15	J	0.40	0.063	ppb v/v			07/20/17 07:23	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/20/17 07:23	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-07

Date Collected: 06/28/17 12:04

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-20

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/20/17 07:23	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/20/17 07:23	1
Methylene Chloride	0.34	J	0.40	0.072	ppb v/v			07/20/17 07:23	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/20/17 07:23	1
Styrene	ND		0.40	0.059	ppb v/v			07/20/17 07:23	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/20/17 07:23	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			07/20/17 07:23	1
Toluene	0.56		0.40	0.051	ppb v/v			07/20/17 07:23	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/20/17 07:23	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/20/17 07:23	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/20/17 07:23	1
Trichloroethene	ND		0.40	0.11	ppb v/v			07/20/17 07:23	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			07/20/17 07:23	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 07:23	1
1,2,4-Trimethylbenzene	0.22	J	0.80	0.16	ppb v/v			07/20/17 07:23	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/20/17 07:23	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/20/17 07:23	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/20/17 07:23	1
m,p-Xylene	0.51	J	0.80	0.10	ppb v/v			07/20/17 07:23	1
o-Xylene	0.19	J	0.40	0.054	ppb v/v			07/20/17 07:23	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	48		12	0.42	ug/m3			07/20/17 07:23	1
Benzene	0.66	J	1.3	0.25	ug/m3			07/20/17 07:23	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/20/17 07:23	1
Bromodichloromethane	8.3		2.0	0.44	ug/m3			07/20/17 07:23	1
Bromoform	1.9	J	4.1	0.72	ug/m3			07/20/17 07:23	1
Bromomethane	ND		3.1	1.3	ug/m3			07/20/17 07:23	1
2-Butanone (MEK)	2.2	J	2.4	0.59	ug/m3			07/20/17 07:23	1
Carbon disulfide	7.5		2.5	0.24	ug/m3			07/20/17 07:23	1
Carbon tetrachloride	0.49	J	5.0	0.40	ug/m3			07/20/17 07:23	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/20/17 07:23	1
Dibromochloromethane	7.2		3.4	0.67	ug/m3			07/20/17 07:23	1
Chloroethane	ND		2.1	0.81	ug/m3			07/20/17 07:23	1
Chloroform	12		1.5	0.46	ug/m3			07/20/17 07:23	1
Chloromethane	1.4	J	1.7	0.41	ug/m3			07/20/17 07:23	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/20/17 07:23	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/20/17 07:23	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/20/17 07:23	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/20/17 07:23	1
Dichlorodifluoromethane	2.1		2.0	0.72	ug/m3			07/20/17 07:23	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/20/17 07:23	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/20/17 07:23	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/20/17 07:23	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/20/17 07:23	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/20/17 07:23	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/20/17 07:23	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/20/17 07:23	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/20/17 07:23	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-07

Date Collected: 06/28/17 12:04

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-20

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/20/17 07:23	1
Ethylbenzene	0.65	J	1.7	0.27	ug/m3			07/20/17 07:23	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/20/17 07:23	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/20/17 07:23	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/20/17 07:23	1
Methylene Chloride	1.2	J	1.4	0.25	ug/m3			07/20/17 07:23	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/20/17 07:23	1
Styrene	ND		1.7	0.25	ug/m3			07/20/17 07:23	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/20/17 07:23	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			07/20/17 07:23	1
Toluene	2.1		1.5	0.19	ug/m3			07/20/17 07:23	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/20/17 07:23	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/20/17 07:23	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/20/17 07:23	1
Trichloroethene	ND		2.1	0.56	ug/m3			07/20/17 07:23	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			07/20/17 07:23	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			07/20/17 07:23	1
1,2,4-Trimethylbenzene	1.1	J	3.9	0.80	ug/m3			07/20/17 07:23	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/20/17 07:23	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/20/17 07:23	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/20/17 07:23	1
m,p-Xylene	2.2	J	3.5	0.43	ug/m3			07/20/17 07:23	1
o-Xylene	0.81	J	1.7	0.23	ug/m3			07/20/17 07:23	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		70 - 130					07/20/17 07:23	1
1,2-Dichloroethane-d4 (Surr)	97		70 - 130					07/20/17 07:23	1
Toluene-d8 (Surr)	97		70 - 130					07/20/17 07:23	1

Client Sample ID: OC-08

Date Collected: 06/28/17 13:33

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-21

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	6.6		5.0	0.18	ppb v/v			07/20/17 08:14	1
Benzene	1.2		0.40	0.079	ppb v/v			07/20/17 08:14	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/20/17 08:14	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			07/20/17 08:14	1
Bromoform	ND		0.40	0.070	ppb v/v			07/20/17 08:14	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/20/17 08:14	1
2-Butanone (MEK)	0.70	J	0.80	0.20	ppb v/v			07/20/17 08:14	1
Carbon disulfide	1.2		0.80	0.078	ppb v/v			07/20/17 08:14	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			07/20/17 08:14	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/20/17 08:14	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			07/20/17 08:14	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/20/17 08:14	1
Chloroform	ND		0.30	0.095	ppb v/v			07/20/17 08:14	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-08

Date Collected: 06/28/17 13:33

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-21

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloromethane	0.70	J	0.80	0.20	ppb v/v			07/20/17 08:14	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/20/17 08:14	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/20/17 08:14	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/20/17 08:14	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/20/17 08:14	1
Dichlorodifluoromethane	0.48		0.40	0.15	ppb v/v			07/20/17 08:14	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/20/17 08:14	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/20/17 08:14	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/20/17 08:14	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/20/17 08:14	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/20/17 08:14	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/20/17 08:14	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/20/17 08:14	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/20/17 08:14	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 08:14	1
Ethylbenzene	0.29	J	0.40	0.063	ppb v/v			07/20/17 08:14	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/20/17 08:14	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/20/17 08:14	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/20/17 08:14	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			07/20/17 08:14	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/20/17 08:14	1
Styrene	ND		0.40	0.059	ppb v/v			07/20/17 08:14	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/20/17 08:14	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			07/20/17 08:14	1
Toluene	0.17	J	0.40	0.051	ppb v/v			07/20/17 08:14	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/20/17 08:14	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/20/17 08:14	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/20/17 08:14	1
Trichloroethene	ND		0.40	0.11	ppb v/v			07/20/17 08:14	1
Trichlorofluoromethane	0.25	J	0.40	0.20	ppb v/v			07/20/17 08:14	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 08:14	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			07/20/17 08:14	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/20/17 08:14	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/20/17 08:14	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/20/17 08:14	1
m,p-Xylene	0.21	J	0.80	0.10	ppb v/v			07/20/17 08:14	1
o-Xylene	0.12	J	0.40	0.054	ppb v/v			07/20/17 08:14	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	16		12	0.42	ug/m3			07/20/17 08:14	1
Benzene	3.7		1.3	0.25	ug/m3			07/20/17 08:14	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/20/17 08:14	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			07/20/17 08:14	1
Bromoform	ND		4.1	0.72	ug/m3			07/20/17 08:14	1
Bromomethane	ND		3.1	1.3	ug/m3			07/20/17 08:14	1
2-Butanone (MEK)	2.1	J	2.4	0.59	ug/m3			07/20/17 08:14	1
Carbon disulfide	3.7		2.5	0.24	ug/m3			07/20/17 08:14	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			07/20/17 08:14	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/20/17 08:14	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-08

Date Collected: 06/28/17 13:33

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-21

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromochloromethane	ND		3.4	0.67	ug/m3			07/20/17 08:14	1
Chloroethane	ND		2.1	0.81	ug/m3			07/20/17 08:14	1
Chloroform	ND		1.5	0.46	ug/m3			07/20/17 08:14	1
Chloromethane	1.5	J	1.7	0.41	ug/m3			07/20/17 08:14	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/20/17 08:14	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/20/17 08:14	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/20/17 08:14	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/20/17 08:14	1
Dichlorodifluoromethane	2.4		2.0	0.72	ug/m3			07/20/17 08:14	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/20/17 08:14	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/20/17 08:14	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/20/17 08:14	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/20/17 08:14	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/20/17 08:14	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/20/17 08:14	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/20/17 08:14	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/20/17 08:14	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/20/17 08:14	1
Ethylbenzene	1.3	J	1.7	0.27	ug/m3			07/20/17 08:14	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/20/17 08:14	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/20/17 08:14	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/20/17 08:14	1
Methylene Chloride	ND		1.4	0.25	ug/m3			07/20/17 08:14	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/20/17 08:14	1
Styrene	ND		1.7	0.25	ug/m3			07/20/17 08:14	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/20/17 08:14	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			07/20/17 08:14	1
Toluene	0.65	J	1.5	0.19	ug/m3			07/20/17 08:14	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/20/17 08:14	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/20/17 08:14	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/20/17 08:14	1
Trichloroethene	ND		2.1	0.56	ug/m3			07/20/17 08:14	1
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3			07/20/17 08:14	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			07/20/17 08:14	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			07/20/17 08:14	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/20/17 08:14	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/20/17 08:14	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/20/17 08:14	1
m,p-Xylene	0.93	J	3.5	0.43	ug/m3			07/20/17 08:14	1
o-Xylene	0.51	J	1.7	0.23	ug/m3			07/20/17 08:14	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	107		70 - 130		07/20/17 08:14	1
1,2-Dichloroethane-d4 (Surr)	98		70 - 130		07/20/17 08:14	1
Toluene-d8 (Surr)	93		70 - 130		07/20/17 08:14	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-09

Lab Sample ID: 320-29669-22

Date Collected: 06/28/17 13:55

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	15		5.0	0.18	ppb v/v			07/20/17 09:04	1
Benzene	0.16	J	0.40	0.079	ppb v/v			07/20/17 09:04	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/20/17 09:04	1
Bromodichloromethane	1.1		0.30	0.066	ppb v/v			07/20/17 09:04	1
Bromoform	0.51		0.40	0.070	ppb v/v			07/20/17 09:04	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/20/17 09:04	1
2-Butanone (MEK)	0.71	J	0.80	0.20	ppb v/v			07/20/17 09:04	1
Carbon disulfide	7.2		0.80	0.078	ppb v/v			07/20/17 09:04	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			07/20/17 09:04	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/20/17 09:04	1
Dibromochloromethane	1.1		0.40	0.079	ppb v/v			07/20/17 09:04	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/20/17 09:04	1
Chloroform	1.4		0.30	0.095	ppb v/v			07/20/17 09:04	1
Chloromethane	0.79	J	0.80	0.20	ppb v/v			07/20/17 09:04	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/20/17 09:04	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/20/17 09:04	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/20/17 09:04	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/20/17 09:04	1
Dichlorodifluoromethane	0.48		0.40	0.15	ppb v/v			07/20/17 09:04	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/20/17 09:04	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/20/17 09:04	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/20/17 09:04	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/20/17 09:04	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/20/17 09:04	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/20/17 09:04	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/20/17 09:04	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/20/17 09:04	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 09:04	1
Ethylbenzene	0.23	J	0.40	0.063	ppb v/v			07/20/17 09:04	1
4-Ethyltoluene	0.19	J	0.40	0.19	ppb v/v			07/20/17 09:04	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/20/17 09:04	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/20/17 09:04	1
Methylene Chloride	0.34	J	0.40	0.072	ppb v/v			07/20/17 09:04	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/20/17 09:04	1
Styrene	ND		0.40	0.059	ppb v/v			07/20/17 09:04	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/20/17 09:04	1
Tetrachloroethene	0.40		0.40	0.051	ppb v/v			07/20/17 09:04	1
Toluene	0.45		0.40	0.051	ppb v/v			07/20/17 09:04	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/20/17 09:04	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/20/17 09:04	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/20/17 09:04	1
Trichloroethene	ND		0.40	0.11	ppb v/v			07/20/17 09:04	1
Trichlorofluoromethane	0.24	J	0.40	0.20	ppb v/v			07/20/17 09:04	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 09:04	1
1,2,4-Trimethylbenzene	0.52	J	0.80	0.16	ppb v/v			07/20/17 09:04	1
1,3,5-Trimethylbenzene	0.13	J	0.40	0.13	ppb v/v			07/20/17 09:04	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/20/17 09:04	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/20/17 09:04	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-09

Lab Sample ID: 320-29669-22

Date Collected: 06/28/17 13:55

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.83		0.80	0.10	ppb v/v			07/20/17 09:04	1
o-Xylene	0.29	J	0.40	0.054	ppb v/v			07/20/17 09:04	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	35		12	0.42	ug/m3			07/20/17 09:04	1
Benzene	0.50	J	1.3	0.25	ug/m3			07/20/17 09:04	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/20/17 09:04	1
Bromodichloromethane	7.3		2.0	0.44	ug/m3			07/20/17 09:04	1
Bromoform	5.3		4.1	0.72	ug/m3			07/20/17 09:04	1
Bromomethane	ND		3.1	1.3	ug/m3			07/20/17 09:04	1
2-Butanone (MEK)	2.1	J	2.4	0.59	ug/m3			07/20/17 09:04	1
Carbon disulfide	22		2.5	0.24	ug/m3			07/20/17 09:04	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			07/20/17 09:04	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/20/17 09:04	1
Dibromochloromethane	9.0		3.4	0.67	ug/m3			07/20/17 09:04	1
Chloroethane	ND		2.1	0.81	ug/m3			07/20/17 09:04	1
Chloroform	7.0		1.5	0.46	ug/m3			07/20/17 09:04	1
Chloromethane	1.6	J	1.7	0.41	ug/m3			07/20/17 09:04	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/20/17 09:04	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/20/17 09:04	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/20/17 09:04	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/20/17 09:04	1
Dichlorodifluoromethane	2.4		2.0	0.72	ug/m3			07/20/17 09:04	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/20/17 09:04	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/20/17 09:04	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/20/17 09:04	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/20/17 09:04	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/20/17 09:04	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/20/17 09:04	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/20/17 09:04	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/20/17 09:04	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/20/17 09:04	1
Ethylbenzene	1.0	J	1.7	0.27	ug/m3			07/20/17 09:04	1
4-Ethyltoluene	0.92	J	2.0	0.92	ug/m3			07/20/17 09:04	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/20/17 09:04	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/20/17 09:04	1
Methylene Chloride	1.2	J	1.4	0.25	ug/m3			07/20/17 09:04	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/20/17 09:04	1
Styrene	ND		1.7	0.25	ug/m3			07/20/17 09:04	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/20/17 09:04	1
Tetrachloroethene	2.7		2.7	0.35	ug/m3			07/20/17 09:04	1
Toluene	1.7		1.5	0.19	ug/m3			07/20/17 09:04	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/20/17 09:04	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/20/17 09:04	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/20/17 09:04	1
Trichloroethene	ND		2.1	0.56	ug/m3			07/20/17 09:04	1
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3			07/20/17 09:04	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			07/20/17 09:04	1
1,2,4-Trimethylbenzene	2.6	J	3.9	0.80	ug/m3			07/20/17 09:04	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-09

Date Collected: 06/28/17 13:55

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-22

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	0.63	J	2.0	0.61	ug/m3			07/20/17 09:04	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/20/17 09:04	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/20/17 09:04	1
m,p-Xylene	3.6		3.5	0.43	ug/m3			07/20/17 09:04	1
o-Xylene	1.3	J	1.7	0.23	ug/m3			07/20/17 09:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130					07/20/17 09:04	1
1,2-Dichloroethane-d4 (Surr)	96		70 - 130					07/20/17 09:04	1
Toluene-d8 (Surr)	93		70 - 130					07/20/17 09:04	1

Client Sample ID: OC-BKG-01

Date Collected: 06/28/17 14:17

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Lab Sample ID: 320-29669-23

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	8.2		5.0	0.18	ppb v/v			07/20/17 09:55	1
Benzene	0.10	J	0.40	0.079	ppb v/v			07/20/17 09:55	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/20/17 09:55	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			07/20/17 09:55	1
Bromoform	ND		0.40	0.070	ppb v/v			07/20/17 09:55	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/20/17 09:55	1
2-Butanone (MEK)	0.89		0.80	0.20	ppb v/v			07/20/17 09:55	1
Carbon disulfide	0.11	J	0.80	0.078	ppb v/v			07/20/17 09:55	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			07/20/17 09:55	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/20/17 09:55	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			07/20/17 09:55	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/20/17 09:55	1
Chloroform	ND		0.30	0.095	ppb v/v			07/20/17 09:55	1
Chloromethane	0.73	J	0.80	0.20	ppb v/v			07/20/17 09:55	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/20/17 09:55	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/20/17 09:55	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/20/17 09:55	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/20/17 09:55	1
Dichlorodifluoromethane	0.47		0.40	0.15	ppb v/v			07/20/17 09:55	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/20/17 09:55	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/20/17 09:55	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/20/17 09:55	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/20/17 09:55	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/20/17 09:55	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/20/17 09:55	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/20/17 09:55	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/20/17 09:55	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 09:55	1
Ethylbenzene	0.091	J	0.40	0.063	ppb v/v			07/20/17 09:55	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/20/17 09:55	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/20/17 09:55	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-BKG-01

Lab Sample ID: 320-29669-23

Date Collected: 06/28/17 14:17

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		0.40	0.087	ppb v/v			07/20/17 09:55	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			07/20/17 09:55	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/20/17 09:55	1
Styrene	ND		0.40	0.059	ppb v/v			07/20/17 09:55	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/20/17 09:55	1
Tetrachloroethene	0.30	J	0.40	0.051	ppb v/v			07/20/17 09:55	1
Toluene	ND		0.40	0.051	ppb v/v			07/20/17 09:55	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/20/17 09:55	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/20/17 09:55	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/20/17 09:55	1
Trichloroethene	0.13	J	0.40	0.11	ppb v/v			07/20/17 09:55	1
Trichlorofluoromethane	0.24	J	0.40	0.20	ppb v/v			07/20/17 09:55	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 09:55	1
1,2,4-Trimethylbenzene	0.17	J	0.80	0.16	ppb v/v			07/20/17 09:55	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/20/17 09:55	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/20/17 09:55	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/20/17 09:55	1
m,p-Xylene	0.25	J	0.80	0.10	ppb v/v			07/20/17 09:55	1
o-Xylene	0.096	J	0.40	0.054	ppb v/v			07/20/17 09:55	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	19		12	0.42	ug/m3			07/20/17 09:55	1
Benzene	0.32	J	1.3	0.25	ug/m3			07/20/17 09:55	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/20/17 09:55	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			07/20/17 09:55	1
Bromoform	ND		4.1	0.72	ug/m3			07/20/17 09:55	1
Bromomethane	ND		3.1	1.3	ug/m3			07/20/17 09:55	1
2-Butanone (MEK)	2.6		2.4	0.59	ug/m3			07/20/17 09:55	1
Carbon disulfide	0.34	J	2.5	0.24	ug/m3			07/20/17 09:55	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			07/20/17 09:55	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/20/17 09:55	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			07/20/17 09:55	1
Chloroethane	ND		2.1	0.81	ug/m3			07/20/17 09:55	1
Chloroform	ND		1.5	0.46	ug/m3			07/20/17 09:55	1
Chloromethane	1.5	J	1.7	0.41	ug/m3			07/20/17 09:55	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/20/17 09:55	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/20/17 09:55	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/20/17 09:55	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/20/17 09:55	1
Dichlorodifluoromethane	2.3		2.0	0.72	ug/m3			07/20/17 09:55	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/20/17 09:55	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/20/17 09:55	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/20/17 09:55	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/20/17 09:55	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/20/17 09:55	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/20/17 09:55	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/20/17 09:55	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/20/17 09:55	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/20/17 09:55	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-BKG-01

Lab Sample ID: 320-29669-23

Date Collected: 06/28/17 14:17

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	0.40	J	1.7	0.27	ug/m3			07/20/17 09:55	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/20/17 09:55	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/20/17 09:55	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/20/17 09:55	1
Methylene Chloride	ND		1.4	0.25	ug/m3			07/20/17 09:55	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/20/17 09:55	1
Styrene	ND		1.7	0.25	ug/m3			07/20/17 09:55	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/20/17 09:55	1
Tetrachloroethene	2.1	J	2.7	0.35	ug/m3			07/20/17 09:55	1
Toluene	ND		1.5	0.19	ug/m3			07/20/17 09:55	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/20/17 09:55	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/20/17 09:55	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/20/17 09:55	1
Trichloroethene	0.69	J	2.1	0.56	ug/m3			07/20/17 09:55	1
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3			07/20/17 09:55	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			07/20/17 09:55	1
1,2,4-Trimethylbenzene	0.83	J	3.9	0.80	ug/m3			07/20/17 09:55	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/20/17 09:55	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/20/17 09:55	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/20/17 09:55	1
m,p-Xylene	1.1	J	3.5	0.43	ug/m3			07/20/17 09:55	1
o-Xylene	0.42	J	1.7	0.23	ug/m3			07/20/17 09:55	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	107		70 - 130					07/20/17 09:55	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 130					07/20/17 09:55	1
Toluene-d8 (Surr)	96		70 - 130					07/20/17 09:55	1

Client Sample ID: OC-BKG-02A

Lab Sample ID: 320-29669-24

Date Collected: 06/28/17 14:34

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	18		5.0	0.18	ppb v/v			07/20/17 10:46	1
Benzene	0.27	J	0.40	0.079	ppb v/v			07/20/17 10:46	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/20/17 10:46	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			07/20/17 10:46	1
Bromoform	ND		0.40	0.070	ppb v/v			07/20/17 10:46	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/20/17 10:46	1
2-Butanone (MEK)	1.9		0.80	0.20	ppb v/v			07/20/17 10:46	1
Carbon disulfide	75		0.80	0.078	ppb v/v			07/20/17 10:46	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			07/20/17 10:46	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/20/17 10:46	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			07/20/17 10:46	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/20/17 10:46	1
Chloroform	ND		0.30	0.095	ppb v/v			07/20/17 10:46	1
Chloromethane	0.66	J	0.80	0.20	ppb v/v			07/20/17 10:46	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-BKG-02A

Lab Sample ID: 320-29669-24

Date Collected: 06/28/17 14:34

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/20/17 10:46	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/20/17 10:46	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/20/17 10:46	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/20/17 10:46	1
Dichlorodifluoromethane	0.46		0.40	0.15	ppb v/v			07/20/17 10:46	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/20/17 10:46	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/20/17 10:46	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/20/17 10:46	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/20/17 10:46	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/20/17 10:46	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/20/17 10:46	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/20/17 10:46	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/20/17 10:46	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 10:46	1
Ethylbenzene	0.15	J	0.40	0.063	ppb v/v			07/20/17 10:46	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/20/17 10:46	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/20/17 10:46	1
2-Hexanone	0.15	J	0.40	0.087	ppb v/v			07/20/17 10:46	1
Methylene Chloride	0.20	J	0.40	0.072	ppb v/v			07/20/17 10:46	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/20/17 10:46	1
Styrene	ND		0.40	0.059	ppb v/v			07/20/17 10:46	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/20/17 10:46	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			07/20/17 10:46	1
Toluene	0.25	J	0.40	0.051	ppb v/v			07/20/17 10:46	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/20/17 10:46	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/20/17 10:46	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/20/17 10:46	1
Trichloroethene	ND		0.40	0.11	ppb v/v			07/20/17 10:46	1
Trichlorofluoromethane	0.23	J	0.40	0.20	ppb v/v			07/20/17 10:46	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 10:46	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			07/20/17 10:46	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/20/17 10:46	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/20/17 10:46	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/20/17 10:46	1
m,p-Xylene	0.48	J	0.80	0.10	ppb v/v			07/20/17 10:46	1
o-Xylene	0.13	J	0.40	0.054	ppb v/v			07/20/17 10:46	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	43		12	0.42	ug/m3			07/20/17 10:46	1
Benzene	0.87	J	1.3	0.25	ug/m3			07/20/17 10:46	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/20/17 10:46	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			07/20/17 10:46	1
Bromoform	ND		4.1	0.72	ug/m3			07/20/17 10:46	1
Bromomethane	ND		3.1	1.3	ug/m3			07/20/17 10:46	1
2-Butanone (MEK)	5.6		2.4	0.59	ug/m3			07/20/17 10:46	1
Carbon disulfide	230		2.5	0.24	ug/m3			07/20/17 10:46	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			07/20/17 10:46	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/20/17 10:46	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			07/20/17 10:46	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-BKG-02A

Lab Sample ID: 320-29669-24

Date Collected: 06/28/17 14:34

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		2.1	0.81	ug/m3			07/20/17 10:46	1
Chloroform	ND		1.5	0.46	ug/m3			07/20/17 10:46	1
Chloromethane	1.4	J	1.7	0.41	ug/m3			07/20/17 10:46	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/20/17 10:46	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/20/17 10:46	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/20/17 10:46	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/20/17 10:46	1
Dichlorodifluoromethane	2.3		2.0	0.72	ug/m3			07/20/17 10:46	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/20/17 10:46	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/20/17 10:46	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/20/17 10:46	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/20/17 10:46	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/20/17 10:46	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/20/17 10:46	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/20/17 10:46	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/20/17 10:46	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/20/17 10:46	1
Ethylbenzene	0.64	J	1.7	0.27	ug/m3			07/20/17 10:46	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/20/17 10:46	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/20/17 10:46	1
2-Hexanone	0.60	J	1.6	0.36	ug/m3			07/20/17 10:46	1
Methylene Chloride	0.70	J	1.4	0.25	ug/m3			07/20/17 10:46	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/20/17 10:46	1
Styrene	ND		1.7	0.25	ug/m3			07/20/17 10:46	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/20/17 10:46	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			07/20/17 10:46	1
Toluene	0.95	J	1.5	0.19	ug/m3			07/20/17 10:46	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/20/17 10:46	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/20/17 10:46	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/20/17 10:46	1
Trichloroethene	ND		2.1	0.56	ug/m3			07/20/17 10:46	1
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3			07/20/17 10:46	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			07/20/17 10:46	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			07/20/17 10:46	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/20/17 10:46	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/20/17 10:46	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/20/17 10:46	1
m,p-Xylene	2.1	J	3.5	0.43	ug/m3			07/20/17 10:46	1
o-Xylene	0.57	J	1.7	0.23	ug/m3			07/20/17 10:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	112		70 - 130					07/20/17 10:46	1
1,2-Dichloroethane-d4 (Surr)	98		70 - 130					07/20/17 10:46	1
Toluene-d8 (Surr)	97		70 - 130					07/20/17 10:46	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-BKG-02B

Lab Sample ID: 320-29669-25

Date Collected: 06/28/17 14:46

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3.1	J	5.0	0.18	ppb v/v			07/20/17 09:15	1
Benzene	0.75		0.40	0.079	ppb v/v			07/20/17 09:15	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/20/17 09:15	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			07/20/17 09:15	1
Bromoform	ND		0.40	0.070	ppb v/v			07/20/17 09:15	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/20/17 09:15	1
2-Butanone (MEK)	0.27	J	0.80	0.20	ppb v/v			07/20/17 09:15	1
Carbon disulfide	6.2		0.80	0.078	ppb v/v			07/20/17 09:15	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			07/20/17 09:15	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/20/17 09:15	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			07/20/17 09:15	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/20/17 09:15	1
Chloroform	ND		0.30	0.095	ppb v/v			07/20/17 09:15	1
Chloromethane	0.48	J	0.80	0.20	ppb v/v			07/20/17 09:15	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/20/17 09:15	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/20/17 09:15	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/20/17 09:15	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/20/17 09:15	1
Dichlorodifluoromethane	0.24	J	0.40	0.15	ppb v/v			07/20/17 09:15	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/20/17 09:15	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/20/17 09:15	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/20/17 09:15	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/20/17 09:15	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/20/17 09:15	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/20/17 09:15	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/20/17 09:15	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/20/17 09:15	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 09:15	1
Ethylbenzene	0.072	J	0.40	0.063	ppb v/v			07/20/17 09:15	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/20/17 09:15	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/20/17 09:15	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/20/17 09:15	1
Methylene Chloride	0.12	J	0.40	0.072	ppb v/v			07/20/17 09:15	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/20/17 09:15	1
Styrene	ND		0.40	0.059	ppb v/v			07/20/17 09:15	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/20/17 09:15	1
Tetrachloroethene	0.081	J	0.40	0.051	ppb v/v			07/20/17 09:15	1
Toluene	0.25	J	0.40	0.051	ppb v/v			07/20/17 09:15	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/20/17 09:15	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/20/17 09:15	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/20/17 09:15	1
Trichloroethene	ND		0.40	0.11	ppb v/v			07/20/17 09:15	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			07/20/17 09:15	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 09:15	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			07/20/17 09:15	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/20/17 09:15	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/20/17 09:15	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/20/17 09:15	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-BKG-02B

Lab Sample ID: 320-29669-25

Date Collected: 06/28/17 14:46

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.21	J	0.80	0.10	ppb v/v			07/20/17 09:15	1
o-Xylene	0.077	J	0.40	0.054	ppb v/v			07/20/17 09:15	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.4	J	12	0.42	ug/m3			07/20/17 09:15	1
Benzene	2.4		1.3	0.25	ug/m3			07/20/17 09:15	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/20/17 09:15	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			07/20/17 09:15	1
Bromoform	ND		4.1	0.72	ug/m3			07/20/17 09:15	1
Bromomethane	ND		3.1	1.3	ug/m3			07/20/17 09:15	1
2-Butanone (MEK)	0.81	J	2.4	0.59	ug/m3			07/20/17 09:15	1
Carbon disulfide	19		2.5	0.24	ug/m3			07/20/17 09:15	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			07/20/17 09:15	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/20/17 09:15	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			07/20/17 09:15	1
Chloroethane	ND		2.1	0.81	ug/m3			07/20/17 09:15	1
Chloroform	ND		1.5	0.46	ug/m3			07/20/17 09:15	1
Chloromethane	0.99	J	1.7	0.41	ug/m3			07/20/17 09:15	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/20/17 09:15	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/20/17 09:15	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/20/17 09:15	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/20/17 09:15	1
Dichlorodifluoromethane	1.2	J	2.0	0.72	ug/m3			07/20/17 09:15	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/20/17 09:15	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/20/17 09:15	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/20/17 09:15	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/20/17 09:15	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/20/17 09:15	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/20/17 09:15	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/20/17 09:15	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/20/17 09:15	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/20/17 09:15	1
Ethylbenzene	0.31	J	1.7	0.27	ug/m3			07/20/17 09:15	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/20/17 09:15	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/20/17 09:15	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/20/17 09:15	1
Methylene Chloride	0.43	J	1.4	0.25	ug/m3			07/20/17 09:15	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/20/17 09:15	1
Styrene	ND		1.7	0.25	ug/m3			07/20/17 09:15	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/20/17 09:15	1
Tetrachloroethene	0.55	J	2.7	0.35	ug/m3			07/20/17 09:15	1
Toluene	0.94	J	1.5	0.19	ug/m3			07/20/17 09:15	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/20/17 09:15	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/20/17 09:15	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/20/17 09:15	1
Trichloroethene	ND		2.1	0.56	ug/m3			07/20/17 09:15	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			07/20/17 09:15	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			07/20/17 09:15	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			07/20/17 09:15	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-BKG-02B

Lab Sample ID: 320-29669-25

Date Collected: 06/28/17 14:46

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/20/17 09:15	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/20/17 09:15	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/20/17 09:15	1
m,p-Xylene	0.93	J	3.5	0.43	ug/m3			07/20/17 09:15	1
o-Xylene	0.33	J	1.7	0.23	ug/m3			07/20/17 09:15	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130					07/20/17 09:15	1
1,2-Dichloroethane-d4 (Surr)	98		70 - 130					07/20/17 09:15	1
Toluene-d8 (Surr)	103		70 - 130					07/20/17 09:15	1

Client Sample ID: OC-DUP

Lab Sample ID: 320-29669-26

Date Collected: 06/28/17 00:00

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	8.0		5.0	0.18	ppb v/v			07/20/17 10:10	1
Benzene	0.22	J	0.40	0.079	ppb v/v			07/20/17 10:10	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/20/17 10:10	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			07/20/17 10:10	1
Bromoform	ND		0.40	0.070	ppb v/v			07/20/17 10:10	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/20/17 10:10	1
2-Butanone (MEK)	1.3		0.80	0.20	ppb v/v			07/20/17 10:10	1
Carbon disulfide	10		0.80	0.078	ppb v/v			07/20/17 10:10	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			07/20/17 10:10	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/20/17 10:10	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			07/20/17 10:10	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/20/17 10:10	1
Chloroform	0.75		0.30	0.095	ppb v/v			07/20/17 10:10	1
Chloromethane	0.57	J	0.80	0.20	ppb v/v			07/20/17 10:10	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/20/17 10:10	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/20/17 10:10	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/20/17 10:10	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/20/17 10:10	1
Dichlorodifluoromethane	0.27	J	0.40	0.15	ppb v/v			07/20/17 10:10	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/20/17 10:10	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/20/17 10:10	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/20/17 10:10	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/20/17 10:10	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/20/17 10:10	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/20/17 10:10	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/20/17 10:10	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/20/17 10:10	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 10:10	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			07/20/17 10:10	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/20/17 10:10	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/20/17 10:10	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-DUP

Lab Sample ID: 320-29669-26

Date Collected: 06/28/17 00:00

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		0.40	0.087	ppb v/v			07/20/17 10:10	1
Methylene Chloride	0.32	J	0.40	0.072	ppb v/v			07/20/17 10:10	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/20/17 10:10	1
Styrene	ND		0.40	0.059	ppb v/v			07/20/17 10:10	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/20/17 10:10	1
Tetrachloroethene	0.096	J	0.40	0.051	ppb v/v			07/20/17 10:10	1
Toluene	0.20	J	0.40	0.051	ppb v/v			07/20/17 10:10	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/20/17 10:10	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/20/17 10:10	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/20/17 10:10	1
Trichloroethene	ND		0.40	0.11	ppb v/v			07/20/17 10:10	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			07/20/17 10:10	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			07/20/17 10:10	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			07/20/17 10:10	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/20/17 10:10	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/20/17 10:10	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/20/17 10:10	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			07/20/17 10:10	1
o-Xylene	ND		0.40	0.054	ppb v/v			07/20/17 10:10	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	19		12	0.42	ug/m3			07/20/17 10:10	1
Benzene	0.70	J	1.3	0.25	ug/m3			07/20/17 10:10	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/20/17 10:10	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			07/20/17 10:10	1
Bromoform	ND		4.1	0.72	ug/m3			07/20/17 10:10	1
Bromomethane	ND		3.1	1.3	ug/m3			07/20/17 10:10	1
2-Butanone (MEK)	3.9		2.4	0.59	ug/m3			07/20/17 10:10	1
Carbon disulfide	32		2.5	0.24	ug/m3			07/20/17 10:10	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			07/20/17 10:10	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/20/17 10:10	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			07/20/17 10:10	1
Chloroethane	ND		2.1	0.81	ug/m3			07/20/17 10:10	1
Chloroform	3.7		1.5	0.46	ug/m3			07/20/17 10:10	1
Chloromethane	1.2	J	1.7	0.41	ug/m3			07/20/17 10:10	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/20/17 10:10	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/20/17 10:10	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/20/17 10:10	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/20/17 10:10	1
Dichlorodifluoromethane	1.3	J	2.0	0.72	ug/m3			07/20/17 10:10	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/20/17 10:10	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/20/17 10:10	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/20/17 10:10	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/20/17 10:10	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/20/17 10:10	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/20/17 10:10	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/20/17 10:10	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/20/17 10:10	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/20/17 10:10	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-DUP

Lab Sample ID: 320-29669-26

Date Collected: 06/28/17 00:00

Matrix: Air

Date Received: 07/06/17 10:30

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		1.7	0.27	ug/m3			07/20/17 10:10	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/20/17 10:10	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/20/17 10:10	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/20/17 10:10	1
Methylene Chloride	1.1	J	1.4	0.25	ug/m3			07/20/17 10:10	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/20/17 10:10	1
Styrene	ND		1.7	0.25	ug/m3			07/20/17 10:10	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/20/17 10:10	1
Tetrachloroethene	0.65	J	2.7	0.35	ug/m3			07/20/17 10:10	1
Toluene	0.74	J	1.5	0.19	ug/m3			07/20/17 10:10	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/20/17 10:10	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/20/17 10:10	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/20/17 10:10	1
Trichloroethene	ND		2.1	0.56	ug/m3			07/20/17 10:10	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			07/20/17 10:10	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			07/20/17 10:10	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			07/20/17 10:10	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/20/17 10:10	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/20/17 10:10	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/20/17 10:10	1
m,p-Xylene	ND		3.5	0.43	ug/m3			07/20/17 10:10	1
o-Xylene	ND		1.7	0.23	ug/m3			07/20/17 10:10	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					07/20/17 10:10	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 130					07/20/17 10:10	1
Toluene-d8 (Surr)	101		70 - 130					07/20/17 10:10	1

TestAmerica Sacramento

Surrogate Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		BFB (70-130)	12DCE (70-130)	TOL (70-130)
320-29669-1	SD-01	103	97	108
320-29669-2	SD-02	99	95	107
320-29669-3	SD-03	101	100	101
320-29669-4	SD-04	102	100	102
320-29669-5	SD-05	98	90	105
320-29669-6	SD-06	97	103	103
320-29669-7	SD-07	97	98	102
320-29669-8	SD-08	98	83	101
320-29669-9	SD-09	98	99	101
320-29669-10	SD-BKG-01	96	100	102
320-29669-11	SD-BKG-02	102	103	103
320-29669-11 - DL	SD-BKG-02	106	104	105
320-29669-12	SD-DUP	97	102	98
320-29669-13	OC-01	95	96	101
320-29669-14	OC-02	106	101	98
320-29669-15	OC-03	104	96	94
320-29669-16	OC-04	103	98	94
320-29669-16 - DL	OC-04	109	99	96
320-29669-17	OC-05	103	82	94
320-29669-18	OC-06A	100	96	95
320-29669-19	OC-06B	103	98	95
320-29669-20	OC-07	106	97	97
320-29669-21	OC-08	107	98	93
320-29669-22	OC-09	103	96	93
320-29669-23	OC-BKG-01	107	99	96
320-29669-24	OC-BKG-02A	112	98	97
320-29669-25	OC-BKG-02B	93	98	103
320-29669-26	OC-DUP	96	103	101
LCS 320-174951/4	Lab Control Sample	111	99	105
LCS 320-174974/3	Lab Control Sample	107	104	105
LCSD 320-174951/5	Lab Control Sample Dup	111	99	105
LCSD 320-174974/4	Lab Control Sample Dup	106	102	105
MB 320-174951/7	Method Blank	107	100	99
MB 320-174974/6	Method Blank	102	101	106

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

12DCE = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-174951/7

Matrix: Air

Analysis Batch: 174951

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			07/19/17 19:06	1
Benzene	ND		0.40	0.079	ppb v/v			07/19/17 19:06	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/19/17 19:06	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			07/19/17 19:06	1
Bromoform	ND		0.40	0.070	ppb v/v			07/19/17 19:06	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/19/17 19:06	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			07/19/17 19:06	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			07/19/17 19:06	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			07/19/17 19:06	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/19/17 19:06	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			07/19/17 19:06	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/19/17 19:06	1
Chloroform	ND		0.30	0.095	ppb v/v			07/19/17 19:06	1
Chloromethane	ND		0.80	0.20	ppb v/v			07/19/17 19:06	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/19/17 19:06	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/19/17 19:06	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/19/17 19:06	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/19/17 19:06	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			07/19/17 19:06	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/19/17 19:06	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/19/17 19:06	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/19/17 19:06	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/19/17 19:06	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/19/17 19:06	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/19/17 19:06	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/19/17 19:06	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/19/17 19:06	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/19/17 19:06	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			07/19/17 19:06	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/19/17 19:06	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/19/17 19:06	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/19/17 19:06	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			07/19/17 19:06	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/19/17 19:06	1
Styrene	ND		0.40	0.059	ppb v/v			07/19/17 19:06	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/19/17 19:06	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			07/19/17 19:06	1
Toluene	ND		0.40	0.051	ppb v/v			07/19/17 19:06	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/19/17 19:06	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/19/17 19:06	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/19/17 19:06	1
Trichloroethene	ND		0.40	0.11	ppb v/v			07/19/17 19:06	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			07/19/17 19:06	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			07/19/17 19:06	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			07/19/17 19:06	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/19/17 19:06	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/19/17 19:06	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/19/17 19:06	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-174951/7

Matrix: Air

Analysis Batch: 174951

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		0.80	0.10	ppb v/v			07/19/17 19:06	1
o-Xylene	ND		0.40	0.054	ppb v/v			07/19/17 19:06	1
Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		12	0.42	ug/m3			07/19/17 19:06	1
Benzene	ND		1.3	0.25	ug/m3			07/19/17 19:06	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/19/17 19:06	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			07/19/17 19:06	1
Bromoform	ND		4.1	0.72	ug/m3			07/19/17 19:06	1
Bromomethane	ND		3.1	1.3	ug/m3			07/19/17 19:06	1
2-Butanone (MEK)	ND		2.4	0.59	ug/m3			07/19/17 19:06	1
Carbon disulfide	ND		2.5	0.24	ug/m3			07/19/17 19:06	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			07/19/17 19:06	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/19/17 19:06	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			07/19/17 19:06	1
Chloroethane	ND		2.1	0.81	ug/m3			07/19/17 19:06	1
Chloroform	ND		1.5	0.46	ug/m3			07/19/17 19:06	1
Chloromethane	ND		1.7	0.41	ug/m3			07/19/17 19:06	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/19/17 19:06	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/19/17 19:06	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/19/17 19:06	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/19/17 19:06	1
Dichlorodifluoromethane	ND		2.0	0.72	ug/m3			07/19/17 19:06	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/19/17 19:06	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/19/17 19:06	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/19/17 19:06	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/19/17 19:06	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/19/17 19:06	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/19/17 19:06	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/19/17 19:06	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/19/17 19:06	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/19/17 19:06	1
Ethylbenzene	ND		1.7	0.27	ug/m3			07/19/17 19:06	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/19/17 19:06	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/19/17 19:06	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/19/17 19:06	1
Methylene Chloride	ND		1.4	0.25	ug/m3			07/19/17 19:06	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/19/17 19:06	1
Styrene	ND		1.7	0.25	ug/m3			07/19/17 19:06	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/19/17 19:06	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			07/19/17 19:06	1
Toluene	ND		1.5	0.19	ug/m3			07/19/17 19:06	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/19/17 19:06	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/19/17 19:06	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/19/17 19:06	1
Trichloroethene	ND		2.1	0.56	ug/m3			07/19/17 19:06	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			07/19/17 19:06	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			07/19/17 19:06	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-174951/7

Matrix: Air

Analysis Batch: 174951

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			07/19/17 19:06	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/19/17 19:06	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/19/17 19:06	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/19/17 19:06	1
m,p-Xylene	ND		3.5	0.43	ug/m3			07/19/17 19:06	1
o-Xylene	ND		1.7	0.23	ug/m3			07/19/17 19:06	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	107		70 - 130		07/19/17 19:06	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 130		07/19/17 19:06	1
Toluene-d8 (Surr)	99		70 - 130		07/19/17 19:06	1

Lab Sample ID: LCS 320-174951/4

Matrix: Air

Analysis Batch: 174951

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	21.8		ppb v/v		109	71 - 131
Benzene	20.0	18.4		ppb v/v		92	68 - 128
Benzyl chloride	16.0	16.8		ppb v/v		105	58 - 120
Bromodichloromethane	20.0	18.6		ppb v/v		93	65 - 130
Bromoform	20.0	16.3		ppb v/v		82	64 - 144
Bromomethane	20.0	19.1		ppb v/v		96	70 - 131
2-Butanone (MEK)	20.0	21.1		ppb v/v		106	71 - 131
Carbon disulfide	20.0	20.5		ppb v/v		103	63 - 123
Carbon tetrachloride	20.0	15.3		ppb v/v		77	67 - 127
Chlorobenzene	20.0	16.8		ppb v/v		84	70 - 132
Dibromochloromethane	20.0	17.5		ppb v/v		87	68 - 128
Chloroethane	20.0	20.3		ppb v/v		101	70 - 131
Chloroform	20.0	18.7		ppb v/v		94	69 - 129
Chloromethane	20.0	19.3		ppb v/v		96	67 - 127
1,2-Dibromoethane (EDB)	20.0	17.0		ppb v/v		85	68 - 131
1,2-Dichlorobenzene	20.0	17.9		ppb v/v		90	73 - 143
1,3-Dichlorobenzene	20.0	18.0		ppb v/v		90	77 - 136
1,4-Dichlorobenzene	20.0	18.3		ppb v/v		91	73 - 143
Dichlorodifluoromethane	20.0	19.6		ppb v/v		98	69 - 129
1,1-Dichloroethane	20.0	18.4		ppb v/v		92	65 - 125
1,2-Dichloroethane	20.0	18.4		ppb v/v		92	71 - 131
1,1-Dichloroethene	20.0	18.4		ppb v/v		92	53 - 128
cis-1,2-Dichloroethene	20.0	18.5		ppb v/v		93	68 - 128
trans-1,2-Dichloroethene	20.0	18.0		ppb v/v		90	70 - 130
1,2-Dichloropropane	20.0	18.1		ppb v/v		91	74 - 128
cis-1,3-Dichloropropene	20.0	18.6		ppb v/v		93	78 - 132
trans-1,3-Dichloropropene	20.0	17.9		ppb v/v		89	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	19.4		ppb v/v		97	64 - 124
Ethylbenzene	20.0	18.3		ppb v/v		92	76 - 136
4-Ethyltoluene	20.0	18.8		ppb v/v		94	62 - 136

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-174951/4

Matrix: Air

Analysis Batch: 174951

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexachlorobutadiene	20.0	16.1		ppb v/v		80	42 - 150
2-Hexanone	20.0	20.9		ppb v/v		104	70 - 128
Methylene Chloride	20.0	18.0		ppb v/v		90	65 - 125
4-Methyl-2-pentanone (MIBK)	20.0	21.7		ppb v/v		109	73 - 133
Styrene	20.0	18.6		ppb v/v		93	76 - 144
1,1,2,2-Tetrachloroethane	20.0	18.2		ppb v/v		91	75 - 135
Tetrachloroethene	20.0	17.5		ppb v/v		88	56 - 138
Toluene	20.0	19.0		ppb v/v		95	71 - 132
1,2,4-Trichlorobenzene	20.0	18.0		ppb v/v		90	59 - 150
1,1,1-Trichloroethane	20.0	18.6		ppb v/v		93	65 - 124
1,1,2-Trichloroethane	20.0	17.3		ppb v/v		86	71 - 131
Trichloroethene	20.0	19.3		ppb v/v		97	64 - 127
Trichlorofluoromethane	20.0	19.1		ppb v/v		96	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	17.8		ppb v/v		89	50 - 132
1,2,4-Trimethylbenzene	20.0	19.1		ppb v/v		96	61 - 145
1,3,5-Trimethylbenzene	20.0	18.5		ppb v/v		92	65 - 136
Vinyl acetate	20.0	20.4		ppb v/v		102	77 - 134
Vinyl chloride	20.0	18.5		ppb v/v		92	69 - 129
m,p-Xylene	40.0	36.8		ppb v/v		92	75 - 138
o-Xylene	20.0	18.7		ppb v/v		93	77 - 132
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	48	51.8		ug/m3		109	71 - 131
Benzene	64	58.9		ug/m3		92	68 - 128
Benzyl chloride	83	86.9		ug/m3		105	58 - 120
Bromodichloromethane	130	124		ug/m3		93	65 - 130
Bromoform	210	169		ug/m3		82	64 - 144
Bromomethane	78	74.3		ug/m3		96	70 - 131
2-Butanone (MEK)	59	62.3		ug/m3		106	71 - 131
Carbon disulfide	62	63.9		ug/m3		103	63 - 123
Carbon tetrachloride	130	96.5		ug/m3		77	67 - 127
Chlorobenzene	92	77.5		ug/m3		84	70 - 132
Dibromochloromethane	170	149		ug/m3		87	68 - 128
Chloroethane	53	53.6		ug/m3		101	70 - 131
Chloroform	98	91.4		ug/m3		94	69 - 129
Chloromethane	41	39.8		ug/m3		96	67 - 127
1,2-Dibromoethane (EDB)	150	131		ug/m3		85	68 - 131
1,2-Dichlorobenzene	120	108		ug/m3		90	73 - 143
1,3-Dichlorobenzene	120	108		ug/m3		90	77 - 136
1,4-Dichlorobenzene	120	110		ug/m3		91	73 - 143
Dichlorodifluoromethane	99	96.9		ug/m3		98	69 - 129
1,1-Dichloroethane	81	74.6		ug/m3		92	65 - 125
1,2-Dichloroethane	81	74.3		ug/m3		92	71 - 131
1,1-Dichloroethene	79	73.1		ug/m3		92	53 - 128
cis-1,2-Dichloroethene	79	73.4		ug/m3		93	68 - 128
trans-1,2-Dichloroethene	79	71.3		ug/m3		90	70 - 130
1,2-Dichloropropane	92	83.7		ug/m3		91	74 - 128

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-174951/4

Matrix: Air

Analysis Batch: 174951

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,3-Dichloropropene	91	84.3		ug/m3		93	78 - 132
trans-1,3-Dichloropropene	91	81.2		ug/m3		89	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	136		ug/m3		97	64 - 124
Ethylbenzene	87	79.6		ug/m3		92	76 - 136
4-Ethyltoluene	98	92.2		ug/m3		94	62 - 136
Hexachlorobutadiene	210	171		ug/m3		80	42 - 150
2-Hexanone	82	85.6		ug/m3		104	70 - 128
Methylene Chloride	69	62.4		ug/m3		90	65 - 125
4-Methyl-2-pentanone (MIBK)	82	88.9		ug/m3		109	73 - 133
Styrene	85	79.1		ug/m3		93	76 - 144
1,1,2,2-Tetrachloroethane	140	125		ug/m3		91	75 - 135
Tetrachloroethene	140	119		ug/m3		88	56 - 138
Toluene	75	71.4		ug/m3		95	71 - 132
1,2,4-Trichlorobenzene	150	134		ug/m3		90	59 - 150
1,1,1-Trichloroethane	110	101		ug/m3		93	65 - 124
1,1,2-Trichloroethane	110	94.3		ug/m3		86	71 - 131
Trichloroethene	110	104		ug/m3		97	64 - 127
Trichlorofluoromethane	110	107		ug/m3		96	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	150	137		ug/m3		89	50 - 132
1,2,4-Trimethylbenzene	98	94.0		ug/m3		96	61 - 145
1,3,5-Trimethylbenzene	98	90.9		ug/m3		92	65 - 136
Vinyl acetate	70	71.8		ug/m3		102	77 - 134
Vinyl chloride	51	47.3		ug/m3		92	69 - 129
m,p-Xylene	170	160		ug/m3		92	75 - 138
o-Xylene	87	81.0		ug/m3		93	77 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	111		70 - 130
1,2-Dichloroethane-d4 (Surr)	99		70 - 130
Toluene-d8 (Surr)	105		70 - 130

Lab Sample ID: LCSD 320-174951/5

Matrix: Air

Analysis Batch: 174951

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	20.0	21.6		ppb v/v		108	71 - 131	1	25
Benzene	20.0	19.3		ppb v/v		97	68 - 128	5	25
Benzyl chloride	16.0	16.4		ppb v/v		102	58 - 120	2	25
Bromodichloromethane	20.0	19.2		ppb v/v		96	65 - 130	3	25
Bromoform	20.0	17.0		ppb v/v		85	64 - 144	4	25
Bromomethane	20.0	18.9		ppb v/v		95	70 - 131	1	25
2-Butanone (MEK)	20.0	20.7		ppb v/v		103	71 - 131	2	25
Carbon disulfide	20.0	21.1		ppb v/v		105	63 - 123	3	25
Carbon tetrachloride	20.0	15.7		ppb v/v		79	67 - 127	3	25
Chlorobenzene	20.0	17.4		ppb v/v		87	70 - 132	4	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-174951/5

Matrix: Air

Analysis Batch: 174951

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dibromochloromethane	20.0	18.2		ppb v/v		91	68 - 128	4	25
Chloroethane	20.0	20.6		ppb v/v		103	70 - 131	1	25
Chloroform	20.0	19.2		ppb v/v		96	69 - 129	3	25
Chloromethane	20.0	19.3		ppb v/v		96	67 - 127	0	25
1,2-Dibromoethane (EDB)	20.0	17.6		ppb v/v		88	68 - 131	4	25
1,2-Dichlorobenzene	20.0	17.9		ppb v/v		90	73 - 143	0	25
1,3-Dichlorobenzene	20.0	18.2		ppb v/v		91	77 - 136	1	25
1,4-Dichlorobenzene	20.0	18.2		ppb v/v		91	73 - 143	0	25
Dichlorodifluoromethane	20.0	19.7		ppb v/v		98	69 - 129	1	25
1,1-Dichloroethane	20.0	19.0		ppb v/v		95	65 - 125	3	25
1,2-Dichloroethane	20.0	19.6		ppb v/v		98	71 - 131	7	25
1,1-Dichloroethene	20.0	18.9		ppb v/v		95	53 - 128	3	25
cis-1,2-Dichloroethene	20.0	18.7		ppb v/v		94	68 - 128	1	25
trans-1,2-Dichloroethene	20.0	18.3		ppb v/v		92	70 - 130	2	25
1,2-Dichloropropane	20.0	19.0		ppb v/v		95	74 - 128	5	25
cis-1,3-Dichloropropene	20.0	19.3		ppb v/v		96	78 - 132	4	25
trans-1,3-Dichloropropene	20.0	18.6		ppb v/v		93	56 - 136	4	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	19.4		ppb v/v		97	64 - 124	0	25
Ethylbenzene	20.0	19.2		ppb v/v		96	76 - 136	5	25
4-Ethyltoluene	20.0	18.5		ppb v/v		92	62 - 136	1	25
Hexachlorobutadiene	20.0	16.2		ppb v/v		81	42 - 150	1	25
2-Hexanone	20.0	20.6		ppb v/v		103	70 - 128	1	25
Methylene Chloride	20.0	18.5		ppb v/v		92	65 - 125	3	25
4-Methyl-2-pentanone (MIBK)	20.0	21.5		ppb v/v		107	73 - 133	1	25
Styrene	20.0	19.1		ppb v/v		96	76 - 144	3	25
1,1,2,2-Tetrachloroethane	20.0	18.4		ppb v/v		92	75 - 135	1	25
Tetrachloroethene	20.0	18.0		ppb v/v		90	56 - 138	3	25
Toluene	20.0	19.5		ppb v/v		98	71 - 132	3	25
1,2,4-Trichlorobenzene	20.0	17.8		ppb v/v		89	59 - 150	1	25
1,1,1-Trichloroethane	20.0	19.1		ppb v/v		96	65 - 124	3	25
1,1,2-Trichloroethane	20.0	18.1		ppb v/v		91	71 - 131	5	25
Trichloroethene	20.0	19.9		ppb v/v		99	64 - 127	3	25
Trichlorofluoromethane	20.0	19.6		ppb v/v		98	68 - 128	2	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	18.3		ppb v/v		91	50 - 132	2	25
1,2,4-Trimethylbenzene	20.0	18.8		ppb v/v		94	61 - 145	2	25
1,3,5-Trimethylbenzene	20.0	18.8		ppb v/v		94	65 - 136	1	25
Vinyl acetate	20.0	20.4		ppb v/v		102	77 - 134	0	25
Vinyl chloride	20.0	18.5		ppb v/v		92	69 - 129	0	25
m,p-Xylene	40.0	38.3		ppb v/v		96	75 - 138	4	25
o-Xylene	20.0	19.2		ppb v/v		96	77 - 132	3	25
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	48	51.2		ug/m3		108	71 - 131	1	25
Benzene	64	61.7		ug/m3		97	68 - 128	5	25
Benzyl chloride	83	84.8		ug/m3		102	58 - 120	2	25
Bromodichloromethane	130	128		ug/m3		96	65 - 130	3	25
Bromoform	210	176		ug/m3		85	64 - 144	4	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-174951/5

Matrix: Air

Analysis Batch: 174951

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromomethane	78	73.5		ug/m3		95	70 - 131	1	25
2-Butanone (MEK)	59	61.0		ug/m3		103	71 - 131	2	25
Carbon disulfide	62	65.6		ug/m3		105	63 - 123	3	25
Carbon tetrachloride	130	99.0		ug/m3		79	67 - 127	3	25
Chlorobenzene	92	80.3		ug/m3		87	70 - 132	4	25
Dibromochloromethane	170	155		ug/m3		91	68 - 128	4	25
Chloroethane	53	54.3		ug/m3		103	70 - 131	1	25
Chloroform	98	93.7		ug/m3		96	69 - 129	3	25
Chloromethane	41	39.8		ug/m3		96	67 - 127	0	25
1,2-Dibromoethane (EDB)	150	136		ug/m3		88	68 - 131	4	25
1,2-Dichlorobenzene	120	108		ug/m3		90	73 - 143	0	25
1,3-Dichlorobenzene	120	109		ug/m3		91	77 - 136	1	25
1,4-Dichlorobenzene	120	110		ug/m3		91	73 - 143	0	25
Dichlorodifluoromethane	99	97.4		ug/m3		98	69 - 129	1	25
1,1-Dichloroethane	81	76.7		ug/m3		95	65 - 125	3	25
1,2-Dichloroethane	81	79.4		ug/m3		98	71 - 131	7	25
1,1-Dichloroethene	79	75.0		ug/m3		95	53 - 128	3	25
cis-1,2-Dichloroethene	79	74.2		ug/m3		94	68 - 128	1	25
trans-1,2-Dichloroethene	79	72.6		ug/m3		92	70 - 130	2	25
1,2-Dichloropropane	92	88.0		ug/m3		95	74 - 128	5	25
cis-1,3-Dichloropropene	91	87.5		ug/m3		96	78 - 132	4	25
trans-1,3-Dichloropropene	91	84.2		ug/m3		93	56 - 136	4	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	135		ug/m3		97	64 - 124	0	25
Ethylbenzene	87	83.6		ug/m3		96	76 - 136	5	25
4-Ethyltoluene	98	90.9		ug/m3		92	62 - 136	1	25
Hexachlorobutadiene	210	172		ug/m3		81	42 - 150	1	25
2-Hexanone	82	84.4		ug/m3		103	70 - 128	1	25
Methylene Chloride	69	64.2		ug/m3		92	65 - 125	3	25
4-Methyl-2-pentanone (MIBK)	82	88.0		ug/m3		107	73 - 133	1	25
Styrene	85	81.4		ug/m3		96	76 - 144	3	25
1,1,2,2-Tetrachloroethane	140	126		ug/m3		92	75 - 135	1	25
Tetrachloroethene	140	122		ug/m3		90	56 - 138	3	25
Toluene	75	73.6		ug/m3		98	71 - 132	3	25
1,2,4-Trichlorobenzene	150	132		ug/m3		89	59 - 150	1	25
1,1,1-Trichloroethane	110	104		ug/m3		96	65 - 124	3	25
1,1,2-Trichloroethane	110	98.9		ug/m3		91	71 - 131	5	25
Trichloroethene	110	107		ug/m3		99	64 - 127	3	25
Trichlorofluoromethane	110	110		ug/m3		98	68 - 128	2	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	140		ug/m3		91	50 - 132	2	25
1,2,4-Trimethylbenzene	98	92.3		ug/m3		94	61 - 145	2	25
1,3,5-Trimethylbenzene	98	92.2		ug/m3		94	65 - 136	1	25
Vinyl acetate	70	71.9		ug/m3		102	77 - 134	0	25
Vinyl chloride	51	47.3		ug/m3		92	69 - 129	0	25
m,p-Xylene	170	166		ug/m3		96	75 - 138	4	25
o-Xylene	87	83.3		ug/m3		96	77 - 132	3	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-174951/5

Matrix: Air

Analysis Batch: 174951

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	111		70 - 130
1,2-Dichloroethane-d4 (Surr)	99		70 - 130
Toluene-d8 (Surr)	105		70 - 130

Lab Sample ID: MB 320-174974/6

Matrix: Air

Analysis Batch: 174974

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			07/19/17 19:01	1
Benzene	ND		0.40	0.079	ppb v/v			07/19/17 19:01	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			07/19/17 19:01	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			07/19/17 19:01	1
Bromoform	ND		0.40	0.070	ppb v/v			07/19/17 19:01	1
Bromomethane	ND		0.80	0.34	ppb v/v			07/19/17 19:01	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			07/19/17 19:01	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			07/19/17 19:01	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			07/19/17 19:01	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			07/19/17 19:01	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			07/19/17 19:01	1
Chloroethane	ND		0.80	0.31	ppb v/v			07/19/17 19:01	1
Chloroform	ND		0.30	0.095	ppb v/v			07/19/17 19:01	1
Chloromethane	ND		0.80	0.20	ppb v/v			07/19/17 19:01	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			07/19/17 19:01	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			07/19/17 19:01	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			07/19/17 19:01	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			07/19/17 19:01	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			07/19/17 19:01	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			07/19/17 19:01	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			07/19/17 19:01	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			07/19/17 19:01	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			07/19/17 19:01	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			07/19/17 19:01	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			07/19/17 19:01	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			07/19/17 19:01	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			07/19/17 19:01	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			07/19/17 19:01	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			07/19/17 19:01	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			07/19/17 19:01	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			07/19/17 19:01	1
2-Hexanone	ND		0.40	0.087	ppb v/v			07/19/17 19:01	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			07/19/17 19:01	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			07/19/17 19:01	1
Styrene	ND		0.40	0.059	ppb v/v			07/19/17 19:01	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			07/19/17 19:01	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			07/19/17 19:01	1
Toluene	ND		0.40	0.051	ppb v/v			07/19/17 19:01	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			07/19/17 19:01	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-174974/6

Matrix: Air

Analysis Batch: 174974

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			07/19/17 19:01	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			07/19/17 19:01	1
Trichloroethene	ND		0.40	0.11	ppb v/v			07/19/17 19:01	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			07/19/17 19:01	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			07/19/17 19:01	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			07/19/17 19:01	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			07/19/17 19:01	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			07/19/17 19:01	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			07/19/17 19:01	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			07/19/17 19:01	1
o-Xylene	ND		0.40	0.054	ppb v/v			07/19/17 19:01	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		12	0.42	ug/m3			07/19/17 19:01	1
Benzene	ND		1.3	0.25	ug/m3			07/19/17 19:01	1
Benzyl chloride	ND		4.1	0.84	ug/m3			07/19/17 19:01	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			07/19/17 19:01	1
Bromoform	ND		4.1	0.72	ug/m3			07/19/17 19:01	1
Bromomethane	ND		3.1	1.3	ug/m3			07/19/17 19:01	1
2-Butanone (MEK)	ND		2.4	0.59	ug/m3			07/19/17 19:01	1
Carbon disulfide	ND		2.5	0.24	ug/m3			07/19/17 19:01	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			07/19/17 19:01	1
Chlorobenzene	ND		1.4	0.29	ug/m3			07/19/17 19:01	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			07/19/17 19:01	1
Chloroethane	ND		2.1	0.81	ug/m3			07/19/17 19:01	1
Chloroform	ND		1.5	0.46	ug/m3			07/19/17 19:01	1
Chloromethane	ND		1.7	0.41	ug/m3			07/19/17 19:01	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			07/19/17 19:01	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			07/19/17 19:01	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			07/19/17 19:01	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			07/19/17 19:01	1
Dichlorodifluoromethane	ND		2.0	0.72	ug/m3			07/19/17 19:01	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			07/19/17 19:01	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			07/19/17 19:01	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			07/19/17 19:01	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			07/19/17 19:01	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			07/19/17 19:01	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			07/19/17 19:01	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			07/19/17 19:01	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			07/19/17 19:01	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			07/19/17 19:01	1
Ethylbenzene	ND		1.7	0.27	ug/m3			07/19/17 19:01	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			07/19/17 19:01	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			07/19/17 19:01	1
2-Hexanone	ND		1.6	0.36	ug/m3			07/19/17 19:01	1
Methylene Chloride	ND		1.4	0.25	ug/m3			07/19/17 19:01	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			07/19/17 19:01	1
Styrene	ND		1.7	0.25	ug/m3			07/19/17 19:01	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-174974/6

Matrix: Air

Analysis Batch: 174974

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			07/19/17 19:01	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			07/19/17 19:01	1
Toluene	ND		1.5	0.19	ug/m3			07/19/17 19:01	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			07/19/17 19:01	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			07/19/17 19:01	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			07/19/17 19:01	1
Trichloroethene	ND		2.1	0.56	ug/m3			07/19/17 19:01	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			07/19/17 19:01	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			07/19/17 19:01	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			07/19/17 19:01	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			07/19/17 19:01	1
Vinyl acetate	ND		2.8	0.51	ug/m3			07/19/17 19:01	1
Vinyl chloride	ND		1.0	0.31	ug/m3			07/19/17 19:01	1
m,p-Xylene	ND		3.5	0.43	ug/m3			07/19/17 19:01	1
o-Xylene	ND		1.7	0.23	ug/m3			07/19/17 19:01	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		70 - 130		07/19/17 19:01	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130		07/19/17 19:01	1
Toluene-d8 (Surr)	106		70 - 130		07/19/17 19:01	1

Lab Sample ID: LCS 320-174974/3

Matrix: Air

Analysis Batch: 174974

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	19.6		ppb v/v		98	71 - 131
Benzene	20.0	18.5		ppb v/v		92	68 - 128
Benzyl chloride	16.0	15.4		ppb v/v		96	58 - 120
Bromodichloromethane	20.0	18.9		ppb v/v		94	65 - 130
Bromoform	20.0	18.1		ppb v/v		90	64 - 144
Bromomethane	20.0	19.4		ppb v/v		97	70 - 131
2-Butanone (MEK)	20.0	20.2		ppb v/v		101	71 - 131
Carbon disulfide	20.0	19.1		ppb v/v		95	63 - 123
Carbon tetrachloride	20.0	18.8		ppb v/v		94	67 - 127
Chlorobenzene	20.0	17.2		ppb v/v		86	70 - 132
Dibromochloromethane	20.0	18.1		ppb v/v		90	68 - 128
Chloroethane	20.0	19.1		ppb v/v		95	70 - 131
Chloroform	20.0	19.1		ppb v/v		95	69 - 129
Chloromethane	20.0	18.6		ppb v/v		93	67 - 127
1,2-Dibromoethane (EDB)	20.0	17.6		ppb v/v		88	68 - 131
1,2-Dichlorobenzene	20.0	18.2		ppb v/v		91	73 - 143
1,3-Dichlorobenzene	20.0	18.4		ppb v/v		92	77 - 136
1,4-Dichlorobenzene	20.0	18.3		ppb v/v		92	73 - 143
Dichlorodifluoromethane	20.0	19.2		ppb v/v		96	69 - 129
1,1-Dichloroethane	20.0	19.0		ppb v/v		95	65 - 125
1,2-Dichloroethane	20.0	18.6		ppb v/v		93	71 - 131
1,1-Dichloroethene	20.0	18.7		ppb v/v		94	53 - 128

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-174974/3

Matrix: Air

Analysis Batch: 174974

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	20.0	19.2		ppb v/v		96	68 - 128
trans-1,2-Dichloroethene	20.0	19.0		ppb v/v		95	70 - 130
1,2-Dichloropropane	20.0	18.7		ppb v/v		94	74 - 128
cis-1,3-Dichloropropene	20.0	18.9		ppb v/v		94	78 - 132
trans-1,3-Dichloropropene	20.0	17.8		ppb v/v		89	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	19.3		ppb v/v		97	64 - 124
Ethylbenzene	20.0	17.4		ppb v/v		87	76 - 136
4-Ethyltoluene	20.0	18.1		ppb v/v		90	62 - 136
Hexachlorobutadiene	20.0	20.4		ppb v/v		102	42 - 150
2-Hexanone	20.0	18.8		ppb v/v		94	70 - 128
Methylene Chloride	20.0	17.7		ppb v/v		89	65 - 125
4-Methyl-2-pentanone (MIBK)	20.0	19.4		ppb v/v		97	73 - 133
Styrene	20.0	18.2		ppb v/v		91	76 - 144
1,1,2,2-Tetrachloroethane	20.0	17.6		ppb v/v		88	75 - 135
Tetrachloroethene	20.0	17.6		ppb v/v		88	56 - 138
Toluene	20.0	18.6		ppb v/v		93	71 - 132
1,2,4-Trichlorobenzene	20.0	20.7		ppb v/v		104	59 - 150
1,1,1-Trichloroethane	20.0	19.3		ppb v/v		96	65 - 124
1,1,2-Trichloroethane	20.0	17.6		ppb v/v		88	71 - 131
Trichloroethene	20.0	18.8		ppb v/v		94	64 - 127
Trichlorofluoromethane	20.0	19.4		ppb v/v		97	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	19.2		ppb v/v		96	50 - 132
1,2,4-Trimethylbenzene	20.0	18.0		ppb v/v		90	61 - 145
1,3,5-Trimethylbenzene	20.0	17.6		ppb v/v		88	65 - 136
Vinyl acetate	20.0	20.4		ppb v/v		102	77 - 134
Vinyl chloride	20.0	19.1		ppb v/v		95	69 - 129
m,p-Xylene	40.0	34.8		ppb v/v		87	75 - 138
o-Xylene	20.0	17.5		ppb v/v		87	77 - 132
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	48	46.6		ug/m3		98	71 - 131
Benzene	64	59.0		ug/m3		92	68 - 128
Benzyl chloride	83	79.7		ug/m3		96	58 - 120
Bromodichloromethane	130	126		ug/m3		94	65 - 130
Bromoform	210	187		ug/m3		90	64 - 144
Bromomethane	78	75.3		ug/m3		97	70 - 131
2-Butanone (MEK)	59	59.6		ug/m3		101	71 - 131
Carbon disulfide	62	59.4		ug/m3		95	63 - 123
Carbon tetrachloride	130	118		ug/m3		94	67 - 127
Chlorobenzene	92	79.0		ug/m3		86	70 - 132
Dibromochloromethane	170	154		ug/m3		90	68 - 128
Chloroethane	53	50.3		ug/m3		95	70 - 131
Chloroform	98	93.1		ug/m3		95	69 - 129
Chloromethane	41	38.4		ug/m3		93	67 - 127
1,2-Dibromoethane (EDB)	150	136		ug/m3		88	68 - 131
1,2-Dichlorobenzene	120	109		ug/m3		91	73 - 143
1,3-Dichlorobenzene	120	111		ug/m3		92	77 - 136

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-174974/3

Matrix: Air

Analysis Batch: 174974

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dichlorobenzene	120	110		ug/m3		92	73 - 143
Dichlorodifluoromethane	99	95.1		ug/m3		96	69 - 129
1,1-Dichloroethane	81	77.1		ug/m3		95	65 - 125
1,2-Dichloroethane	81	75.3		ug/m3		93	71 - 131
1,1-Dichloroethene	79	74.2		ug/m3		94	53 - 128
cis-1,2-Dichloroethene	79	76.2		ug/m3		96	68 - 128
trans-1,2-Dichloroethene	79	75.2		ug/m3		95	70 - 130
1,2-Dichloropropane	92	86.5		ug/m3		94	74 - 128
cis-1,3-Dichloropropene	91	85.7		ug/m3		94	78 - 132
trans-1,3-Dichloropropene	91	81.0		ug/m3		89	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	135		ug/m3		97	64 - 124
Ethylbenzene	87	75.4		ug/m3		87	76 - 136
4-Ethyltoluene	98	88.8		ug/m3		90	62 - 136
Hexachlorobutadiene	210	218		ug/m3		102	42 - 150
2-Hexanone	82	77.2		ug/m3		94	70 - 128
Methylene Chloride	69	61.6		ug/m3		89	65 - 125
4-Methyl-2-pentanone (MIBK)	82	79.3		ug/m3		97	73 - 133
Styrene	85	77.4		ug/m3		91	76 - 144
1,1,2,2-Tetrachloroethane	140	121		ug/m3		88	75 - 135
Tetrachloroethene	140	119		ug/m3		88	56 - 138
Toluene	75	70.1		ug/m3		93	71 - 132
1,2,4-Trichlorobenzene	150	154		ug/m3		104	59 - 150
1,1,1-Trichloroethane	110	105		ug/m3		96	65 - 124
1,1,2-Trichloroethane	110	96.2		ug/m3		88	71 - 131
Trichloroethene	110	101		ug/m3		94	64 - 127
Trichlorofluoromethane	110	109		ug/m3		97	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	150	147		ug/m3		96	50 - 132
1,2,4-Trimethylbenzene	98	88.6		ug/m3		90	61 - 145
1,3,5-Trimethylbenzene	98	86.4		ug/m3		88	65 - 136
Vinyl acetate	70	71.8		ug/m3		102	77 - 134
Vinyl chloride	51	48.8		ug/m3		95	69 - 129
m,p-Xylene	170	151		ug/m3		87	75 - 138
o-Xylene	87	75.9		ug/m3		87	77 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	107		70 - 130
1,2-Dichloroethane-d4 (Surr)	104		70 - 130
Toluene-d8 (Surr)	105		70 - 130

Lab Sample ID: LCSD 320-174974/4

Matrix: Air

Analysis Batch: 174974

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	20.0	19.0		ppb v/v		95	71 - 131	3	25
Benzene	20.0	18.8		ppb v/v		94	68 - 128	2	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-174974/4

Matrix: Air

Analysis Batch: 174974

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzyl chloride	16.0	15.3		ppb v/v		95	58 - 120	1	25
Bromodichloromethane	20.0	19.1		ppb v/v		96	65 - 130	1	25
Bromoform	20.0	18.2		ppb v/v		91	64 - 144	1	25
Bromomethane	20.0	19.0		ppb v/v		95	70 - 131	2	25
2-Butanone (MEK)	20.0	19.7		ppb v/v		98	71 - 131	3	25
Carbon disulfide	20.0	18.9		ppb v/v		94	63 - 123	1	25
Carbon tetrachloride	20.0	19.0		ppb v/v		95	67 - 127	1	25
Chlorobenzene	20.0	17.2		ppb v/v		86	70 - 132	0	25
Dibromochloromethane	20.0	18.0		ppb v/v		90	68 - 128	1	25
Chloroethane	20.0	18.9		ppb v/v		95	70 - 131	1	25
Chloroform	20.0	18.9		ppb v/v		95	69 - 129	1	25
Chloromethane	20.0	18.4		ppb v/v		92	67 - 127	1	25
1,2-Dibromoethane (EDB)	20.0	17.7		ppb v/v		88	68 - 131	0	25
1,2-Dichlorobenzene	20.0	18.1		ppb v/v		90	73 - 143	1	25
1,3-Dichlorobenzene	20.0	18.3		ppb v/v		91	77 - 136	1	25
1,4-Dichlorobenzene	20.0	18.3		ppb v/v		91	73 - 143	0	25
Dichlorodifluoromethane	20.0	19.6		ppb v/v		98	69 - 129	2	25
1,1-Dichloroethane	20.0	18.8		ppb v/v		94	65 - 125	2	25
1,2-Dichloroethane	20.0	18.8		ppb v/v		94	71 - 131	1	25
1,1-Dichloroethene	20.0	18.6		ppb v/v		93	53 - 128	1	25
cis-1,2-Dichloroethene	20.0	18.9		ppb v/v		95	68 - 128	1	25
trans-1,2-Dichloroethene	20.0	18.8		ppb v/v		94	70 - 130	1	25
1,2-Dichloropropane	20.0	18.8		ppb v/v		94	74 - 128	0	25
cis-1,3-Dichloropropene	20.0	19.0		ppb v/v		95	78 - 132	1	25
trans-1,3-Dichloropropene	20.0	17.7		ppb v/v		89	56 - 136	1	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	19.3		ppb v/v		96	64 - 124	0	25
Ethylbenzene	20.0	17.2		ppb v/v		86	76 - 136	1	25
4-Ethyltoluene	20.0	18.0		ppb v/v		90	62 - 136	0	25
Hexachlorobutadiene	20.0	20.2		ppb v/v		101	42 - 150	1	25
2-Hexanone	20.0	18.7		ppb v/v		93	70 - 128	1	25
Methylene Chloride	20.0	17.5		ppb v/v		88	65 - 125	1	25
4-Methyl-2-pentanone (MIBK)	20.0	19.3		ppb v/v		97	73 - 133	0	25
Styrene	20.0	18.0		ppb v/v		90	76 - 144	1	25
1,1,2,2-Tetrachloroethane	20.0	17.7		ppb v/v		88	75 - 135	0	25
Tetrachloroethene	20.0	17.4		ppb v/v		87	56 - 138	1	25
Toluene	20.0	18.8		ppb v/v		94	71 - 132	1	25
1,2,4-Trichlorobenzene	20.0	20.6		ppb v/v		103	59 - 150	1	25
1,1,1-Trichloroethane	20.0	19.0		ppb v/v		95	65 - 124	1	25
1,1,2-Trichloroethane	20.0	17.6		ppb v/v		88	71 - 131	0	25
Trichloroethene	20.0	19.0		ppb v/v		95	64 - 127	1	25
Trichlorofluoromethane	20.0	19.3		ppb v/v		96	68 - 128	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	18.9		ppb v/v		95	50 - 132	1	25
1,2,4-Trimethylbenzene	20.0	18.0		ppb v/v		90	61 - 145	0	25
1,3,5-Trimethylbenzene	20.0	17.4		ppb v/v		87	65 - 136	1	25
Vinyl acetate	20.0	20.1		ppb v/v		100	77 - 134	2	25
Vinyl chloride	20.0	18.9		ppb v/v		95	69 - 129	1	25
m,p-Xylene	40.0	34.8		ppb v/v		87	75 - 138	0	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-174974/4

Matrix: Air

Analysis Batch: 174974

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
o-Xylene	20.0	17.5		ppb v/v		87	77 - 132	0	25
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	48	45.2		ug/m3		95	71 - 131	3	25
Benzene	64	59.9		ug/m3		94	68 - 128	2	25
Benzyl chloride	83	79.1		ug/m3		95	58 - 120	1	25
Bromodichloromethane	130	128		ug/m3		96	65 - 130	1	25
Bromoform	210	188		ug/m3		91	64 - 144	1	25
Bromomethane	78	73.9		ug/m3		95	70 - 131	2	25
2-Butanone (MEK)	59	58.0		ug/m3		98	71 - 131	3	25
Carbon disulfide	62	58.8		ug/m3		94	63 - 123	1	25
Carbon tetrachloride	130	120		ug/m3		95	67 - 127	1	25
Chlorobenzene	92	79.1		ug/m3		86	70 - 132	0	25
Dibromochloromethane	170	153		ug/m3		90	68 - 128	1	25
Chloroethane	53	50.0		ug/m3		95	70 - 131	1	25
Chloroform	98	92.5		ug/m3		95	69 - 129	1	25
Chloromethane	41	38.1		ug/m3		92	67 - 127	1	25
1,2-Dibromoethane (EDB)	150	136		ug/m3		88	68 - 131	0	25
1,2-Dichlorobenzene	120	109		ug/m3		90	73 - 143	1	25
1,3-Dichlorobenzene	120	110		ug/m3		91	77 - 136	1	25
1,4-Dichlorobenzene	120	110		ug/m3		91	73 - 143	0	25
Dichlorodifluoromethane	99	96.9		ug/m3		98	69 - 129	2	25
1,1-Dichloroethane	81	75.9		ug/m3		94	65 - 125	2	25
1,2-Dichloroethane	81	76.2		ug/m3		94	71 - 131	1	25
1,1-Dichloroethene	79	73.7		ug/m3		93	53 - 128	1	25
cis-1,2-Dichloroethene	79	75.1		ug/m3		95	68 - 128	1	25
trans-1,2-Dichloroethene	79	74.4		ug/m3		94	70 - 130	1	25
1,2-Dichloropropane	92	86.9		ug/m3		94	74 - 128	0	25
cis-1,3-Dichloropropene	91	86.2		ug/m3		95	78 - 132	1	25
trans-1,3-Dichloropropene	91	80.5		ug/m3		89	56 - 136	1	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	135		ug/m3		96	64 - 124	0	25
Ethylbenzene	87	74.8		ug/m3		86	76 - 136	1	25
4-Ethyltoluene	98	88.4		ug/m3		90	62 - 136	0	25
Hexachlorobutadiene	210	216		ug/m3		101	42 - 150	1	25
2-Hexanone	82	76.6		ug/m3		93	70 - 128	1	25
Methylene Chloride	69	60.9		ug/m3		88	65 - 125	1	25
4-Methyl-2-pentanone (MIBK)	82	79.3		ug/m3		97	73 - 133	0	25
Styrene	85	76.7		ug/m3		90	76 - 144	1	25
1,1,1,2-Tetrachloroethane	140	121		ug/m3		88	75 - 135	0	25
Tetrachloroethene	140	118		ug/m3		87	56 - 138	1	25
Toluene	75	70.9		ug/m3		94	71 - 132	1	25
1,2,4-Trichlorobenzene	150	153		ug/m3		103	59 - 150	1	25
1,1,1-Trichloroethane	110	104		ug/m3		95	65 - 124	1	25
1,1,2-Trichloroethane	110	96.0		ug/m3		88	71 - 131	0	25
Trichloroethene	110	102		ug/m3		95	64 - 127	1	25
Trichlorofluoromethane	110	108		ug/m3		96	68 - 128	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	145		ug/m3		95	50 - 132	1	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-174974/4

Matrix: Air

Analysis Batch: 174974

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trimethylbenzene	98	88.4		ug/m3		90	61 - 145	0	25
1,3,5-Trimethylbenzene	98	85.7		ug/m3		87	65 - 136	1	25
Vinyl acetate	70	70.7		ug/m3		100	77 - 134	2	25
Vinyl chloride	51	48.3		ug/m3		95	69 - 129	1	25
m,p-Xylene	170	151		ug/m3		87	75 - 138	0	25
o-Xylene	87	75.9		ug/m3		87	77 - 132	0	25

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
4-Bromofluorobenzene (Surr)	106		70 - 130
1,2-Dichloroethane-d4 (Surr)	102		70 - 130
Toluene-d8 (Surr)	105		70 - 130

TestAmerica Sacramento

QC Association Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Air - GC/MS VOA

Analysis Batch: 174951

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-29669-14	OC-02	Total/NA	Air	TO-15	
320-29669-15	OC-03	Total/NA	Air	TO-15	
320-29669-16	OC-04	Total/NA	Air	TO-15	
320-29669-16 - DL	OC-04	Total/NA	Air	TO-15	
320-29669-17	OC-05	Total/NA	Air	TO-15	
320-29669-18	OC-06A	Total/NA	Air	TO-15	
320-29669-19	OC-06B	Total/NA	Air	TO-15	
320-29669-20	OC-07	Total/NA	Air	TO-15	
320-29669-21	OC-08	Total/NA	Air	TO-15	
320-29669-22	OC-09	Total/NA	Air	TO-15	
320-29669-23	OC-BKG-01	Total/NA	Air	TO-15	
320-29669-24	OC-BKG-02A	Total/NA	Air	TO-15	
MB 320-174951/7	Method Blank	Total/NA	Air	TO-15	
LCS 320-174951/4	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-174951/5	Lab Control Sample Dup	Total/NA	Air	TO-15	

Analysis Batch: 174974

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-29669-1	SD-01	Total/NA	Air	TO-15	
320-29669-2	SD-02	Total/NA	Air	TO-15	
320-29669-3	SD-03	Total/NA	Air	TO-15	
320-29669-4	SD-04	Total/NA	Air	TO-15	
320-29669-5	SD-05	Total/NA	Air	TO-15	
320-29669-6	SD-06	Total/NA	Air	TO-15	
320-29669-7	SD-07	Total/NA	Air	TO-15	
320-29669-8	SD-08	Total/NA	Air	TO-15	
320-29669-9	SD-09	Total/NA	Air	TO-15	
320-29669-10	SD-BKG-01	Total/NA	Air	TO-15	
320-29669-11	SD-BKG-02	Total/NA	Air	TO-15	
320-29669-11 - DL	SD-BKG-02	Total/NA	Air	TO-15	
320-29669-12	SD-DUP	Total/NA	Air	TO-15	
320-29669-13	OC-01	Total/NA	Air	TO-15	
320-29669-25	OC-BKG-02B	Total/NA	Air	TO-15	
320-29669-26	OC-DUP	Total/NA	Air	TO-15	
MB 320-174974/6	Method Blank	Total/NA	Air	TO-15	
LCS 320-174974/3	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-174974/4	Lab Control Sample Dup	Total/NA	Air	TO-15	

TestAmerica Sacramento

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-01

Date Collected: 06/26/17 13:57

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-1

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	367 mL	250 mL	174974	07/19/17 19:56	AP1	TAL SAC

Client Sample ID: SD-02

Date Collected: 06/27/17 10:43

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-2

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	382 mL	250 mL	174974	07/19/17 20:51	AP1	TAL SAC

Client Sample ID: SD-03

Date Collected: 06/27/17 11:04

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-3

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		8.2	48 mL	250 mL	174974	07/19/17 21:42	AP1	TAL SAC

Client Sample ID: SD-04

Date Collected: 06/27/17 11:55

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-4

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.64	250 mL	250 mL	174974	07/19/17 22:36	AP1	TAL SAC

Client Sample ID: SD-05

Date Collected: 06/27/17 14:39

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-5

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		3.01	140 mL	250 mL	174974	07/19/17 23:29	AP1	TAL SAC

Client Sample ID: SD-06

Date Collected: 06/27/17 15:30

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-6

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.64	250 mL	250 mL	174974	07/20/17 00:23	AP1	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: SD-07

Date Collected: 06/27/17 16:05

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-7

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		3.57	113 mL	250 mL	174974	07/20/17 01:15	AP1	TAL SAC

Client Sample ID: SD-08

Date Collected: 06/27/17 16:52

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-8

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	408 mL	250 mL	174974	07/20/17 02:11	AP1	TAL SAC

Client Sample ID: SD-09

Date Collected: 06/27/17 17:47

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-9

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	402 mL	250 mL	174974	07/20/17 03:07	AP1	TAL SAC

Client Sample ID: SD-BKG-01

Date Collected: 06/27/17 11:25

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-10

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	250 mL	250 mL	174974	07/20/17 04:03	AP1	TAL SAC

Client Sample ID: SD-BKG-02

Date Collected: 06/27/17 18:01

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-11

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	397 mL	250 mL	174974	07/20/17 05:00	AP1	TAL SAC
Total/NA	Analysis	TO-15	DL	1.99	200 mL	250 mL	174974	07/20/17 11:05	AP1	TAL SAC

Client Sample ID: SD-DUP

Date Collected: 06/27/17 00:00

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-12

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		2.3	175 mL	250 mL	174974	07/20/17 05:53	AP1	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-01

Date Collected: 06/28/17 09:00

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-13

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	392 mL	250 mL	174974	07/20/17 06:50	AP1	TAL SAC

Client Sample ID: OC-02

Date Collected: 06/28/17 09:32

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-14

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	367 mL	250 mL	174951	07/19/17 19:57	AP1	TAL SAC

Client Sample ID: OC-03

Date Collected: 06/28/17 10:02

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-15

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	369 mL	250 mL	174951	07/19/17 20:47	AP1	TAL SAC

Client Sample ID: OC-04

Date Collected: 06/28/17 10:25

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-16

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	387 mL	250 mL	174951	07/19/17 21:38	AP1	TAL SAC
Total/NA	Analysis	TO-15	DL	5.54	70 mL	250 mL	174951	07/20/17 11:32	AP1	TAL SAC

Client Sample ID: OC-05

Date Collected: 06/28/17 11:05

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-17

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	579 mL	250 mL	174951	07/19/17 22:34	AP1	TAL SAC

Client Sample ID: OC-06A

Date Collected: 06/28/17 11:21

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-18

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	387 mL	250 mL	174951	07/19/17 23:25	AP1	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-06B

Date Collected: 06/28/17 11:33

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-19

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	388 mL	250 mL	174951	07/20/17 00:21	AP1	TAL SAC

Client Sample ID: OC-07

Date Collected: 06/28/17 12:04

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-20

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	388 mL	250 mL	174951	07/20/17 07:23	AP1	TAL SAC

Client Sample ID: OC-08

Date Collected: 06/28/17 13:33

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-21

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	406 mL	250 mL	174951	07/20/17 08:14	AP1	TAL SAC

Client Sample ID: OC-09

Date Collected: 06/28/17 13:55

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-22

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	387 mL	250 mL	174951	07/20/17 09:04	AP1	TAL SAC

Client Sample ID: OC-BKG-01

Date Collected: 06/28/17 14:17

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-23

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	387 mL	250 mL	174951	07/20/17 09:55	AP1	TAL SAC

Client Sample ID: OC-BKG-02A

Date Collected: 06/28/17 14:34

Date Received: 07/06/17 10:30

Lab Sample ID: 320-29669-24

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	388 mL	250 mL	174951	07/20/17 10:46	AP1	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Client Sample ID: OC-BKG-02B

Lab Sample ID: 320-29669-25

Date Collected: 06/28/17 14:46

Matrix: Air

Date Received: 07/06/17 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	388 mL	250 mL	174974	07/20/17 09:15	AP1	TAL SAC

Client Sample ID: OC-DUP

Lab Sample ID: 320-29669-26

Date Collected: 06/28/17 00:00

Matrix: Air

Date Received: 07/06/17 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	386 mL	250 mL	174974	07/20/17 10:10	AP1	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Laboratory: TestAmerica Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-28-18

- 1
- 2
- 3
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- 7
- 8
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- 10
- 11
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- 17

Method Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-29669-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-29669-1	SD-01	Air	06/26/17 13:57	07/06/17 10:30
320-29669-2	SD-02	Air	06/27/17 10:43	07/06/17 10:30
320-29669-3	SD-03	Air	06/27/17 11:04	07/06/17 10:30
320-29669-4	SD-04	Air	06/27/17 11:55	07/06/17 10:30
320-29669-5	SD-05	Air	06/27/17 14:39	07/06/17 10:30
320-29669-6	SD-06	Air	06/27/17 15:30	07/06/17 10:30
320-29669-7	SD-07	Air	06/27/17 16:05	07/06/17 10:30
320-29669-8	SD-08	Air	06/27/17 16:52	07/06/17 10:30
320-29669-9	SD-09	Air	06/27/17 17:47	07/06/17 10:30
320-29669-10	SD-BKG-01	Air	06/27/17 11:25	07/06/17 10:30
320-29669-11	SD-BKG-02	Air	06/27/17 18:01	07/06/17 10:30
320-29669-12	SD-DUP	Air	06/27/17 00:00	07/06/17 10:30
320-29669-13	OC-01	Air	06/28/17 09:00	07/06/17 10:30
320-29669-14	OC-02	Air	06/28/17 09:32	07/06/17 10:30
320-29669-15	OC-03	Air	06/28/17 10:02	07/06/17 10:30
320-29669-16	OC-04	Air	06/28/17 10:25	07/06/17 10:30
320-29669-17	OC-05	Air	06/28/17 11:05	07/06/17 10:30
320-29669-18	OC-06A	Air	06/28/17 11:21	07/06/17 10:30
320-29669-19	OC-06B	Air	06/28/17 11:33	07/06/17 10:30
320-29669-20	OC-07	Air	06/28/17 12:04	07/06/17 10:30
320-29669-21	OC-08	Air	06/28/17 13:33	07/06/17 10:30
320-29669-22	OC-09	Air	06/28/17 13:55	07/06/17 10:30
320-29669-23	OC-BKG-01	Air	06/28/17 14:17	07/06/17 10:30
320-29669-24	OC-BKG-02A	Air	06/28/17 14:34	07/06/17 10:30
320-29669-25	OC-BKG-02B	Air	06/28/17 14:46	07/06/17 10:30
320-29669-26	OC-DUP	Air	06/28/17 00:00	07/06/17 10:30

TestAmerica Sacramento

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

West Sacramento, CA 95605
phone 916.374.4378 fax 916.372.1059

TestAmerica Laboratories, Inc.

Client Contact Information						Project Manager: Lila Buckley		Samples Collected By: LMB / IRD / CSS		COC No: 1 of 3 COCs																	
Company Name: QSI		Phone: 718-367-4975		Email: lila.buckley@qsi.com																							
Address: 9600 Grand Central Ave.																											
City/State/Zip: Astoria OR 97103																											
Phone: 503-346-4474																											
FAX:																											
Project Name: ESTEP Senior VI																											
Site/Location: PO# 4262																											
Sample Identification						Sample Date(s)	Time Start	Time Stop	Canister Vacuum Field, "Hg (Start)"	Canister Vacuum in Field, "Hg (Stop)"	Flow Controller ID	Canister ID	TO-15 (Med / Std / Low / SIM)	MA-APH	EPA 3C	EPA 25C / 25.3	ASTM D-1946 / 1945 / 3588	EPA 15/16	TO-3	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)	
SD-01						6/26/17	1355	1357	-29.6	-1.1	Notes																34000601
SD-02						6/27	1041	1043	-29.7	-1.0																	34001106
SD-03						6/27	1102	1104	-29.7	-0.9																	34001622
SD-04						6/27	1153	1155	-29.7	-0.9																	34000326
SD-05						6/27	1437	1439	-29.7	-1.5																	34001068
SD-06						6/27	1528	1530	-29.7	-2.6																	34000656
SD-07						6/27	1603	1605	-29.7	-2.5																	34001190
SD-08						6/27	1650	1652	-29.7	-1.7																	34001652
SD-09						6/27	1745	1747	-29.8	-0.9																	34001596
SD-BKG-01						6/27	1123	1125	-29.7	-1.5																	34001100
						Temperature (Fahrenheit)																					
						Start	Interior	Stop	Ambient																		
						Temperature (Fahrenheit)						320-29669 Chain of Custody															
						Start	Interior	Stop	Ambient																		
Special Instructions/QC Requirements & Comments: 26 samples + 2 can returned unused																											
Samples Shipped by: Properly (Fedex)						Date / Time: 6/28/2017 1700						Samples Received by: Laura Wilson 7/6/17 1000 PMS															
Samples Relinquished by:						Date / Time:						Received by:															
Relinquished by:						Date / Time:						Received by:															
Lab Use Only:						Shipped Name:						Condition:															

TestAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605
phone 916.374.4378 fax 916.372.1059

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information		Project Manager: <u>Michelle Gentry</u>		Samples Collected By: <u>MB/IR-D/CSS</u>		COC No: <u>2</u> of <u>2</u> COCs	
Company Name: <u>GSI</u>		Phone: <u>713 307 4775</u>					
Address: <u>4600 Grant Hills Trl</u>		Email: <u>mb@gsi.com</u>					
City/State/Zip: <u>Arden TX 78759</u>							
Phone: <u>512 346 4474</u>		Site Contact: <u>Lance Tonder</u>					
FAX: <u>512 346 4474</u>		TA Contact: <u>Lance Tonder</u>					
Project Name: <u>ESRP 2010-11</u>		Analysis Turnaround Time: <u> </u>					
Site/Location: <u> </u>		Standard (Specific): <u> </u>					
P.O.# <u>4202</u>		Rush (Specify): <u> </u>					
Sample Identification		Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, "Hg (Start)	Canister Vacuum in Field, "Hg (Stop)	Canister ID
SD-BK-02		6/27/17	1759	1801	-29.7	-0.9	34000680
SD-DUP		6/27			-29.7	-0.8	34000757
OC-01		6/28	0858	0903	-29.7	-0.1	34001013
OC-02		6/28	0910	0932	-29.8	-0.1	34001188
OC-03		6/28	1000	1002	-29.7	-0.2	8504
OC-04		6/28	1023	1025	-29.7	-0.3	34001032
OC-05		6/28	1103	1105	-29.7	-0.7	34001789
OC-06A		6/28	1119	1121	-29.8	-0.5	34000228
OC-06B		6/28	1131	1133	-29.8	-0.7	34001667
OC-07		6/28	1200	1204	-29.7	-0.7	34001074
		Start	Interior	Stop	Temperature (Fahrenheit)		
					Ambient		
		Start	Interior	Stop	Temperature (Fahrenheit)		
					Ambient		
Special Instructions/QC Requirements & Comments:							
Samples Shipped by: <u>Properly (GSI)</u>		Date / Time: <u>6/28/17 1700</u>		Samples Received by: <u>MB/IR-D/CSS</u>			
Samples Relinquished by:		Date / Time:		Received by:			
Relinquished by:		Date / Time:		Received by:			
Lab Use Only:		Shipped Name:		Condition:			

Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013

Canister Samples Chain of Custody Record

West Sacramento, CA 95605
phone 916.374.4378 fax 916.372.1059

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information				Project Manager: <i>Calg Beckley</i>		Samples Collected By: <i>LMB/12/1/55</i>										COC No: <i>3</i> of <i>3</i> COCs																									
Company Name: <i>GSI</i>				Phone: <i>713-267-4775</i>		<table border="1"> <tr> <th>Other (Please specify in notes section)</th> <th>Sample Type</th> <th>Indoor Air</th> <th>Soil Gas</th> <th>Landfill Gas</th> <th>Other (Please specify in notes section)</th> </tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>										Other (Please specify in notes section)	Sample Type	Indoor Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)																			COC No: <i>3</i> of <i>3</i> COCs	
Other (Please specify in notes section)	Sample Type	Indoor Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)																																				
Address: <i>9600 Great Hills Trl 300E</i>				Email: <i>imbeckley@gsi.com</i>		For Lab Use Only:																																			
City/State/Zip: <i>Austin TX 78759</i>				Phone: <i>512 346 4474</i>		Walk-in Client:																																			
FAX: <i>512 346 4474</i>				Site Contact: <i>LABORATORY</i>		Lab Sampling:																																			
Project Name: <i>4500 Spence</i>				TA Contact: <i>LABORATORY</i>		Job / SDG No.:																																			
Site/Location:				Standard (Specific):		(See below for Add'l Items)																																			
PO # <i>4262</i>				Rush (Specify):																																					
Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, 'Hg (Start)	Canister Vacuum in Field, 'Hg (Stop)	Flow Controller ID	Canister ID	TO-15 (Med / Std / Low / SIM)	MA-APH	EPA 3C	EPA 25C / 25.3	ASTM D-1946 / 1945 / 3588	EPA 15/16	TO-3	Other (Please specify in notes section)	Sample Type	Indoor Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)																					
<i>OC-08</i>	<i>6/28/17</i>	<i>1331</i>	<i>1333</i>	<i>-27.7</i>	<i>-0.3</i>	<i>W/A</i>	<i>See Notes</i>	☒												<i>34001228</i>																					
<i>OC-09</i>	<i>6/28</i>	<i>1353</i>	<i>1355</i>	<i>-27.7</i>	<i>-0.5</i>															<i>34001498</i>																					
<i>OC-BKG-01</i>	<i>6/28</i>	<i>1415</i>	<i>1417</i>	<i>-27.7</i>	<i>-0.7</i>															<i>34001086</i>																					
<i>OC-BKG-02A</i>	<i>6/28</i>	<i>1432</i>	<i>1434</i>	<i>-27.8</i>	<i>-0.7</i>															<i>34000319</i>																					
<i>OC-BKG-02B</i>	<i>6/28</i>	<i>1444</i>	<i>1446</i>	<i>-27.7</i>	<i>-0.7</i>															<i>34001137</i>																					
<i>OC-DUP</i>	<i>6/28</i>			<i>-27.7</i>	<i>-0.2</i>			☒												<i>8515</i>																					
Temperature (Fahrenheit) <table border="1"> <tr><td>Start</td><td>Interior</td><td>Ambient</td></tr> <tr><td>Stop</td><td></td><td></td></tr> </table> Temperature (Fahrenheit) <table border="1"> <tr><td>Start</td><td>Interior</td><td>Ambient</td></tr> <tr><td>Stop</td><td></td><td></td></tr> </table>																					Start	Interior	Ambient	Stop			Start	Interior	Ambient	Stop											
Start	Interior	Ambient																																							
Stop																																									
Start	Interior	Ambient																																							
Stop																																									
Special Instructions/QC Requirements & Comments:																																									
Samples Shipped by: <i>gsi</i> Date / Time: <i>6/28/2017 1700</i> Samples Relinquished by: Date / Time: Relinquished by: Date / Time:																																									
Samples Received by: <i>LMB/12/1/55</i> Date / Time: <i>7/6/17 1030</i> Received by: Date / Time: Received by: Date / Time:																																									
Lab Use Only: Shipped Name: Opened by: Condition:																																									

Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013

JOB # 320-29669
Sample # 1

Client/Project:		VFR ID:		
Canister Serial #:	34000601	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.07	07/15/17	GKI
FINAL PRESSURE (PSIA)		20.65	07/15/17	GKI
Pressurization Gas: ☒ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.47		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.47		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors						
		Date	Instr.	File #		
		7/19/2017	atms9			
Canister DF =	1.47	X	Load DF =	0.6811989	X	Bag DF =
				250		BVf (mLs)
				367		Bvi (mLs)
						FINAL DF
						1.000124955
		Date	Instr.	File #		
Canister DF =	1.47	X	Load DF =	#DIV/0!	X	Bag DF =
			LVf (mLs)			BVf (mLs)
			LVi (mLs)			Bvi (mLs)
						FINAL DF
						#DIV/0!
		Date	Instr.	File #		
Canister DF =	1.47	X	Load DF =	#DIV/0!	X	Bag DF =
			LVf (mLs)			BVf (mLs)
			LVi (mLs)			Bvi (mLs)
						FINAL DF
						#DIV/0!

JOB # 320-29669
Sample # 2

Client/Project:		VFR ID:		
Canister Serial #:	34001106	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.11	07/15/17	GKI
FINAL PRESSURE (PSIA)		21.63	07/15/17	GKI
Pressurization Gas: ☒ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.53		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.53		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors						
		Date	Instr.	File #		
		7/19/2017	atms9			
Canister DF =	1.53	X	Load DF =	0.6544503	X	Bag DF =
				250		BVf (mLs)
				382		Bvi (mLs)
				FINAL DF		
				1.003243031		
		Date	Instr.	File #		
Canister DF =	1.53	X	Load DF =	#DIV/0!	X	Bag DF =
			LVf (mLs)			BVf (mLs)
			LVi (mLs)			Bvi (mLs)
				FINAL DF		
				#DIV/0!		
		Date	Instr.	File #		
Canister DF =	1.53	X	Load DF =	#DIV/0!	X	Bag DF =
			LVf (mLs)			BVf (mLs)
			LVi (mLs)			Bvi (mLs)
				FINAL DF		
				#DIV/0!		

JOB # 320-29669
Sample # 4

Client/Project:		VFR ID:		
Canister Serial #:	34000326	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.19	07/15/17	GKI
FINAL PRESSURE (PSIA)		23.24	07/15/17	GKI
Pressurization Gas: ☒ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.64		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.64		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors						
		Date	Instr.	File #		
		7/19/2017	atms9			
Canister DF =	1.64	X	Load DF =	1	X	Bag DF =
				250		BVf (mLs)
				250		Bvi (mLs)
				FINAL DF		
				1.63777308		
		Date	Instr.	File #		
Canister DF =	1.64	X	Load DF =	#DIV/0!	X	Bag DF =
			LVf (mLs)			BVf (mLs)
			LVi (mLs)			Bvi (mLs)
				FINAL DF		
				#DIV/0!		
		Date	Instr.	File #		
Canister DF =	1.64	X	Load DF =	#DIV/0!	X	Bag DF =
			LVf (mLs)			BVf (mLs)
			LVi (mLs)			Bvi (mLs)
				FINAL DF		
				#DIV/0!		

JOB # 320-29669
Sample # 5

Client/Project:		VFR ID:		
Canister Serial #:	34001068	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.98	07/17/17	srs for AZ
FINAL PRESSURE (PSIA)		23.59	07/17/17	srs for AZ
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.69		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.69		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		7/19/2017	ATMS9	
Canister DF =	1.69	X	Load DF =	1.7857143
				250
				140
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.69	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.69	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

JOB # 320-29669
Sample # 6

Client/Project:		VFR ID:		
Canister Serial #:	34000656	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.47	07/17/17	srs for AZ
FINAL PRESSURE (PSIA)		22.14	07/17/17	srs for AZ
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.64		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
07/18/17	15.01	18.25	1.64	gki	2.00
			2.00		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
Canister DF =	1.64	X	Load DF =	1
				250
				250
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				1.643652561
		Date	Instr.	File #
Canister DF =	1.64	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				#DIV/0!
		Date	Instr.	File #
Canister DF =	1.64	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				#DIV/0!

JOB # 320-29669
Sample # 7

Client/Project:		VFR ID:		
Canister Serial #:	34001190	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.55	07/17/17	srs for AZ
FINAL PRESSURE (PSIA)		21.87	07/17/17	srs for AZ
Pressurization Gas: ☒ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.61		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.61		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors						
		Date	Instr.	File #		
		7/19/2017	ATMS9			
Canister DF =	1.61	X	Load DF =	2.2123894	X	Bag DF =
				250		BVf (mLs)
				113		Bvi (mLs)
				FINAL DF		
				3.570845443		
		Date	Instr.	File #		
Canister DF =	1.61	X	Load DF =	#DIV/0!	X	Bag DF =
			LVf (mLs)			BVf (mLs)
			LVi (mLs)			Bvi (mLs)
				FINAL DF		
				#DIV/0!		
		Date	Instr.	File #		
Canister DF =	1.61	X	Load DF =	#DIV/0!	X	Bag DF =
			LVf (mLs)			BVf (mLs)
			LVi (mLs)			Bvi (mLs)
				FINAL DF		
				#DIV/0!		

JOB # 320-29669
Sample # 8

Client/Project:		VFR ID:		
Canister Serial #:	34001652	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.89	07/17/17	srs for AZ
FINAL PRESSURE (PSIA)		22.71	07/17/17	srs for AZ
Pressurization Gas: ☒ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.63		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.63		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		7/19/2017	ATMS9	
Canister DF =	1.63	X	Load DF =	0.6127451
				250
				408
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.63	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.63	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

JOB # 320-29669
Sample # 9

Client/Project:		VFR ID:		
Canister Serial #:	34001596	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.28	07/17/17	srs for AZ
FINAL PRESSURE (PSIA)		22.95	07/17/17	srs for AZ
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.61		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.61		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		7/19/2017	ATMS9	
Canister DF =	1.61	X	Load DF =	0.6218905
				250
				402
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.61	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.61	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

JOB # 320-29669
Sample # 10

Client/Project:		VFR ID:		
Canister Serial #:	34001100	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.02	07/17/17	srs for AZ
FINAL PRESSURE (PSIA)		22.46	07/17/17	srs for AZ
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.60		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.60		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors									
		Date	Instr.	File #					
		7/19/2017	ATMS9						
Canister DF =	1.60	X	Load DF =	0.625	X	Bag DF =	1	=	FINAL DF
				250			BVf (mLs)		1.001248217
				400			Bvi (mLs)		
		Date	Instr.	File #					
Canister DF =	1.60	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF
				LVf (mLs)			BVf (mLs)		#DIV/0!
				LVi (mLs)			Bvi (mLs)		
		Date	Instr.	File #					
Canister DF =	1.60	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF
				LVf (mLs)			BVf (mLs)		#DIV/0!
				LVi (mLs)			Bvi (mLs)		

JOB # 320-29669
Sample # 11

Client/Project:		VFR ID:		
Canister Serial #:	34000680	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING	PRESS.	DATE	INITIALS	
INITIAL VACUUM CHECK (INCHES Hg)	29.8		JMT	
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)	14.32	07/17/17	srs for AZ	
FINAL PRESSURE (PSIA)	22.83	07/17/17	srs for AZ	
Pressurization Gas: ☐ N2 ☐ He	SCREENED ☐	SCRN DIL. VS 250mLs:		
Initial Canister Dilution Factor =	1.59			

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.59		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors						
		Date	Instr.	File #		
		7/19/2017	ATMS9			
Canister DF =	1.59	X	Load DF =	0.6297229	X	Bag DF =
				250		BVf (mLs)
				397		Bvi (mLs)
		Date	Instr.	File #		
		7/20/2017	ATMS9			
Canister DF =	1.59	X	Load DF =	1.25	X	Bag DF =
			LVf (mLs)	250		BVf (mLs)
			LVi (mLs)	200		Bvi (mLs)
		Date	Instr.	File #		
Canister DF =	1.59	X	Load DF =	#DIV/0!	X	Bag DF =
			LVf (mLs)			BVf (mLs)
			LVi (mLs)			Bvi (mLs)

JOB # 320-29669
Sample # 12

Client/Project:		VFR ID:		
Canister Serial #:	34000757	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.36	07/17/17	srs for AZ
FINAL PRESSURE (PSIA)		23.09	07/17/17	srs for AZ
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.61		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.61		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		7/19/2017	ATMS9	
Canister DF =	1.61	X	Load DF =	1.4285714
				250
				175
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.61	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.61	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

JOB # 320-29669
Sample # 13

Client/Project:		VFR ID:		
Canister Serial #:	34001013	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.49	07/17/17	srs for AZ
FINAL PRESSURE (PSIA)		22.79	07/17/17	srs for AZ
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.57		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.57		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		7/19/2017	ATMS9	
Canister DF =	1.57	X	Load DF =	0.6377551
				250
				392
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	0
			LVf (mLs)	
			LVi (mLs)	200
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.57	X	Load DF =	#DIV/0!

JOB # 320-29669

Sample #	14

Client/Project:		VFR ID:		
Canister Serial #:	34001188	Duration:		Hrs Min
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.57	07/17/17	srs for AZ
FINAL PRESSURE (PSIA)		21.44	07/17/17	srs for AZ
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =	1.47			

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.47		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors									
						Date	Instr.	File #	
						7/19/2017	MS11		
Canister DF =	1.47	X	Load DF =	0.6811989	X	Bag DF =	1	=	FINAL DF
				250		BVf (mLs)			1.002395651
				367		Bvi (mLs)			

	Date	Instr.	File #
Canister DF = 1.47 X Load DF = #DIV/0! X Bag DF = 1 = FINAL DF #DIV/0!			
LVf (mLs)			
LVi (mLs)			
BVf (mLs)			
BVi (mLs)			

		Date	Instr.	File #
Canister DF =	1.47	X		
Load DF =	#DIV/0!	X		
LVf (mLs)				
LVi (mL s)				
Bag DF =	1	=		
BVf (mLs)				
BVi (mL s)				
				FINAL DF
				#DIV/0!

JOB # 320-29669
Sample # 15

Client/Project:		VFR ID:		
Canister Serial #:	8504	Duration:		☐ Hrs ☐ Min
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.51	07/17/17	srs for AZ
FINAL PRESSURE (PSIA)		21.47	07/17/17	srs for AZ
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.48		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.48		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		7/19/2017	MS11	
Canister DF =	1.48	X	Load DF =	0.6775068
				250
				369
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.48	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.48	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

Sacramento

JOB # 320-29669

Sample # 16

Client/Project:		VFR ID:		
Canister Serial #:	34001032	Duration:		Hrs Min
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.58	07/17/17	srs
FINAL PRESSURE (PSIA)		22.60	07/17/17	srs
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =	1.55			

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.55		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors									
				Date		Instr.		File #	
				7/19/2017		MS11			
								FINAL DF	
Canister DF =	1.55	X	Load DF =	0.6459948	X	Bag DF =	1	=	1.001336297
				250		BVf (mLs)			
				387		Bvj (mL s)			

Canister DF = 1.55		X	Load DF = 3.5714286		X	Bag DF = 1		=	5.53595924				
LVf (mLs)			250			BVf (mLs)							
LVi (mLs)			70			BVi (mLs)							

						Date	Instr.	File #	
Canister DF =	1.55	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF
			LVf (mLs)			BVf (mLs)			#DIV/0!
			LVi (mL s)			BVi (mL s)			

Sacramento

JOB # 320-29669

Sample # 17

Client/Project:		VFR ID:		
Canister Serial #:	34001789	Duration:		Hrs Min
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☒ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.40	07/17/17	srs
FINAL PRESSURE (PSIA)		22.40	07/17/17	srs
Pressurization Gas: ☒ N2 ☒ He		SCREENED ☒	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =	1.56			

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
07/19/17	14.64	21.82	1.56	LHS	2.32
			2.32		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors									
				Date		Instr.		File #	
				7/19/2017		MS11			
								FINAL DF	
Canister DF =	2.32	X	Load DF =	0.4317789	X	Bag DF =	1	=	1.001061227
				250		BVf (mLs)			
				579		Bvj (mLs)			

Date	Instr.	File #
		FINAL DF
Canister DF = 2.32	X	Load DF = #DIV/0!
		LVf (mLs)
		LVi (mLs)
		Bag DF = 1
		BVf (mLs)
		BVi (mLs)
		= #DIV/0!

Date	Instr.	File #
FINAL DF		
Canister DF = 2.32	X	Load DF = #DIV/0!
		LVf (mLs)
		LVi (mLs)
		Bag DF = 1
		BVf (mLs)
		BVi (mLs)
		= #DIV/0!

JOB # 320-29669
Sample # 18

Client/Project:		VFR ID:		
Canister Serial #:	34000228	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.50	07/17/17	srs
FINAL PRESSURE (PSIA)		22.50	07/17/17	srs
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.55		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.55		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		7/19/2017	MS11	
Canister DF =	1.55	X	Load DF =	0.6459948
				250
				387
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.55	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.55	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

JOB # 320-29669
Sample # 19

Client/Project:		VFR ID:		
Canister Serial #:	34001667	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.45	07/17/17	srs
FINAL PRESSURE (PSIA)		22.45	07/17/17	srs
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.55		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
07/20/17	5.14	19.70	1.55	srs	5.95
			5.95		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		7/19/2017	MS11							
Canister DF =	1.55	X	Load DF =	0.6443299	X	Bag DF =	1	=	FINAL DF	1.001052331
				250			BVf (mLs)			
				388			Bvi (mLs)			
		Date	Instr.	File #						
		7/20/2017	MS9							
Canister DF =	1.55	X	Load DF =	2.5	X	Bag DF =	1	=	FINAL DF	3.884083045
				250			BVf (mLs)			
				100			Bvi (mLs)			
		Date	Instr.	File #						
		7/20/2017	ATMS9							
Canister DF =	5.95	X	Load DF =	0.625	X	Bag DF =	1	=	FINAL DF	3.721616536
				250			BVf (mLs)			
				400			Bvi (mLs)			

JOB # 320-29669
Sample # 20

Client/Project:		VFR ID:		
Canister Serial #:	34001094	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.43	07/17/17	srs
FINAL PRESSURE (PSIA)		22.43	07/17/17	srs
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.55		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.55		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		7/19/2017	MS11	
Canister DF =	1.55	X	Load DF =	0.6443299
				250
				388
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.55	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.55	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

JOB # 320-29669
Sample # 22

Client/Project:		VFR ID:		
Canister Serial #:	34001498	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.53	07/17/17	srs
FINAL PRESSURE (PSIA)		22.53	07/17/17	srs
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.55		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.55		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		7/19/2017	MS11	
Canister DF =	1.55	X	Load DF =	0.6459948
				250
				387
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.55	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.55	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

JOB # 320-29669
Sample # 23

Client/Project:		VFR ID:		
Canister Serial #:	34001086	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.53	07/17/17	srs
FINAL PRESSURE (PSIA)		22.53	07/17/17	srs
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.55		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.55		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		7/19/2017	MS11							
Canister DF =	1.55	X	Load DF =	0.6459948	X	Bag DF =	1	=	FINAL DF	1.001669894
				250			BVf (mLs)			
				387			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.55	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.55	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			

JOB # 320-29669
Sample # 24

Client/Project:		VFR ID:		
Canister Serial #:	34000319	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.43	07/17/17	srs
FINAL PRESSURE (PSIA)		22.43	07/17/17	srs
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.55		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.55		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		7/19/2017	MS11							
Canister DF =	1.55	X	Load DF =	0.6443299	X	Bag DF =	1	=	FINAL DF	1.001546749
				250			BVf (mLs)			
				388			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.55	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.55	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			

JOB # 320-29669
Sample # 25

Client/Project:		VFR ID:		
Canister Serial #:	34001137	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.45	07/17/17	srs
FINAL PRESSURE (PSIA)		22.45	07/17/17	srs
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.55		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.55		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		7/19/2017	MS9	
Canister DF =	1.55	X	Load DF =	0.6443299
				250
				388
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.55	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		Date	Instr.	File #
Canister DF =	1.55	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	

JOB # 320-29669
Sample # 26

Client/Project:		VFR ID:		
Canister Serial #:	8515	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.69	07/17/17	srs
FINAL PRESSURE (PSIA)		22.69	07/17/17	srs
Pressurization Gas: ☐ N2 ☐ He		SCREENED ☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.54		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.54		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		7/19/2017	MS9							
Canister DF =	1.54	X	Load DF =	0.6476684	X	Bag DF =	1	=	FINAL DF	1.00038093
				250			BVf (mLs)			
				386			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.54	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.54	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
				LVf (mLs)			BVf (mLs)			
				LVi (mLs)			Bvi (mLs)			

Login Sample Receipt Checklist

Client: GSI Environmental, Inc

Job Number: 320-29669-1

Login Number: 29669

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Sacramento Canister QC Certification Batch Certification

Certification Type

10-15 BATCH (SCAN)

Date Cleaned/Batch ID

061917

Date of QC

6/20/17

Data File Number

MS6062005



320-29129 Chain of Custody

CANISTER ID NUMBERS

* 34002056	34000994	
34001188	34000327	
34001006	34001228	
34000601	34001075	
34000228	34001789	
34000324	34001653	
34001137	34001667	
34001086	34000768	

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

N for AP
1st level Reviewed By:

6/26/17
Date:

[Signature]
2nd level Reviewed By:

7/2/17
Date:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Sacramento Canister QC Certification Batch Certification

Certification Type

TD-15 (SPAN)

Date Cleaned/Batch ID

000617 320-29211

Date of QC

6/20/17

Data File Number

MB6062007



320-29211 Chain of Custody

CANISTER ID NUMBERS

34000960

34001100

34000326

34000757

34000680

34001032

34000656

34001190

34001599

34001094

34001068

34001652

34001013

34001622

34000319

8515

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

*** INDICATES THE CAN OR CANS WHICH WERE SCREENED.**

for AP
1st level Reviewed By:

6/26/17
Date:

[Signature]
2nd level Reviewed By:

7/7/17
Date:

Q:\FORMS\QA-814 BATCH CAN QC 20130729.DOC
QA-814

ERS 7/29/2013

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Sacramento
Canister QC Certification
Batch Certification

Certification Type

10-15 (SCAN)

Date Cleaned/Batch ID

DOG-16-17 320-29212

Date of QC

6/20/17

Data File Number

M56062008



320-29212 Chain of Custody

CANISTER ID NUMBERS

* 34001134	34000913	
34001490	34001052	
34001930	34000702	
34001590	34000915	
34001949	0524	
34000670	0504	
34001106	09814	
34000734	10522	

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

du for AP

1st level Reviewed By:

6/26/17

Date:

2nd level Reviewed By:

7/2/17

Date:

Q:\FORMS\QA-814 BATCH CAN QC 20130729.DOC
QA-814

ERS 7/29/2013

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29129-1
 SDG No.: _____
 Client Sample ID: 34002056 Lab Sample ID: 320-29129-1
 Matrix: Air Lab File ID: MS6062005.D
 Analysis Method: TO-15 Date Collected: 06/15/2017 00:00
 Sample wt/vol: 250 (mL) Date Analyzed: 06/20/2017 12:42
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 170075 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.30	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29129-1
 SDG No.: _____
 Client Sample ID: 34002056 Lab Sample ID: 320-29129-1
 Matrix: Air Lab File ID: MS6062005.D
 Analysis Method: TO-15 Date Collected: 06/15/2017 00:00
 Sample wt/vol: 250 (mL) Date Analyzed: 06/20/2017 12:42
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 170075 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	0.13	J B	0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29129-1
 SDG No.: _____
 Client Sample ID: 34002056 Lab Sample ID: 320-29129-1
 Matrix: Air Lab File ID: MS6062005.D
 Analysis Method: TO-15 Date Collected: 06/15/2017 00:00
 Sample wt/vol: 250 (mL) Date Analyzed: 06/20/2017 12:42
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 170075 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	96		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	97		70-130
2037-26-5	Toluene-d8 (Surr)	97		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\MS6062005.D
 Lims ID: 320-29129-A-1
 Client ID: 34002056
 Sample Type: Client
 Inject. Date: 20-Jun-2017 12:42:30 ALS Bottle#: 4 Worklist Smp#: 23
 Purge Vol: 25.000 mL Dil. Factor: 1.0000
 Sample Info: 320-29129-A-1
 Misc. Info.: 500 CAN CERT
 Operator ID: SV Instrument ID: ATMS6
 Method: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\TO15_ATMS6.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 20-Jun-2017 14:27:53 Calib Date: 20-Jun-2017 09:47:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\MS6062002.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK025

First Level Reviewer: vanommens

Date:

20-Jun-2017 14:27:53

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	13.100	13.100	0.000	92	48155	4.00	
* 2 1,4-Difluorobenzene	114	15.248	15.242	0.006	95	164568	4.00	
* 3 Chlorobenzene-d5 (IS)	117	21.989	21.988	0.000	89	152919	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	14.305	14.299	0.006	98	88623	3.90	
\$ 5 Toluene-d8 (Surr)	100	18.697	18.703	-0.006	98	106732	3.89	
\$ 6 4-Bromofluorobenzene (Surr	95	24.550	24.549	0.001	87	116108	3.83	
32 Acetone	43	8.270	8.264	0.006	96	6361	0.2990	
39 Methylene Chloride	49	9.505	9.523	-0.018	46	2705	0.1313	

Reagents:

VAMSIS20_00002

Amount Added: 50.00

Units: mL

Run Reagent

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\MS6062005.D

Injection Date: 20-Jun-2017 12:42:30

Instrument ID: ATMS6

Operator ID: SV

Lims ID: 320-29129-A-1

Lab Sample ID: 320-29129-1

Worklist Smp#: 23

Client ID: 34002056

Purge Vol: 25.000 mL

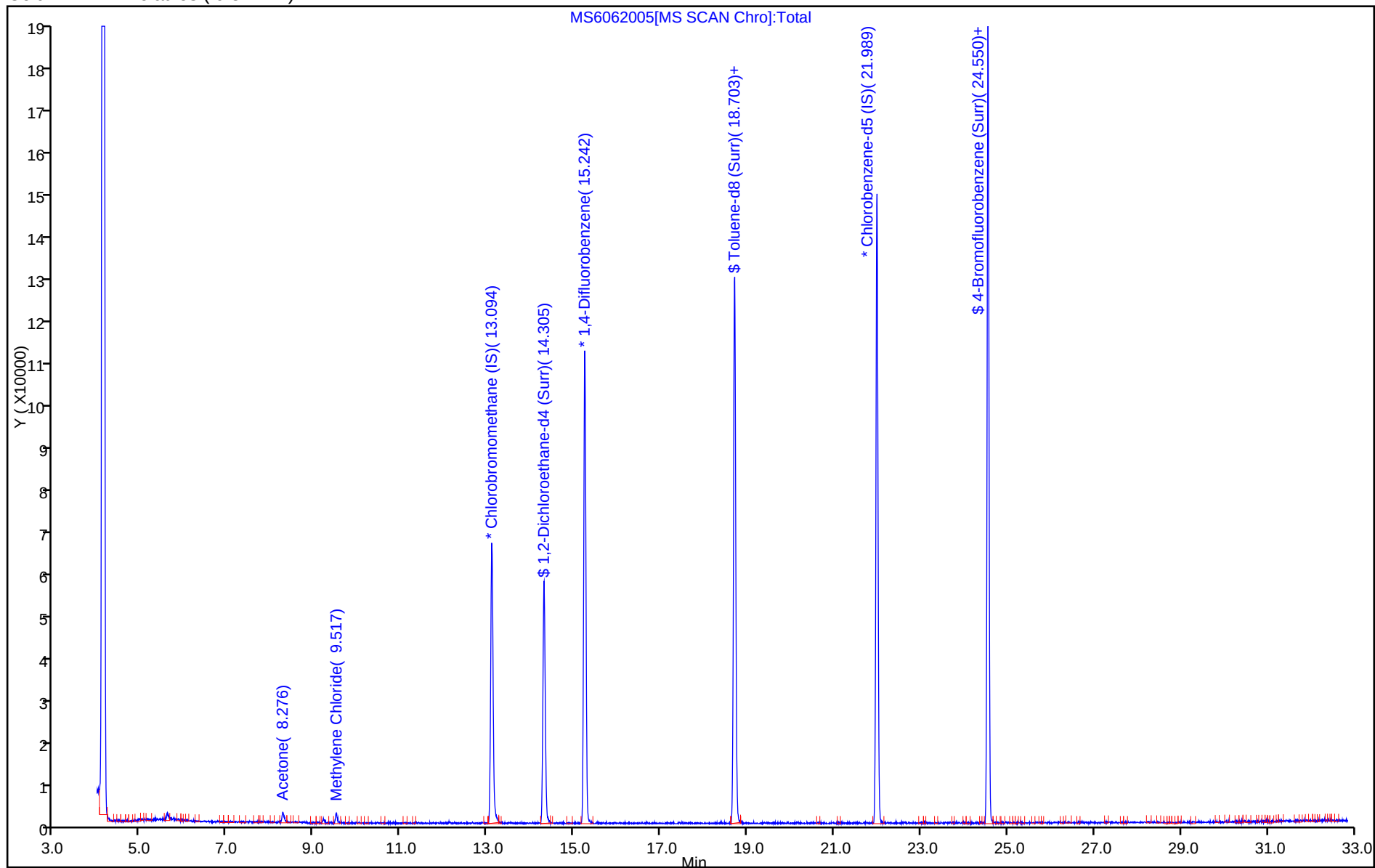
Dil. Factor: 1.0000

ALS Bottle#: 4

Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\MS6062005.D

Injection Date: 20-Jun-2017 12:42:30

Instrument ID: ATMS6

Lims ID: 320-29129-A-1

Lab Sample ID: 320-29129-1

Client ID: 34002056

Operator ID: SV

ALS Bottle#: 4 Worklist Smp#: 23

Purge Vol: 25.000 mL

Dil. Factor: 1.0000

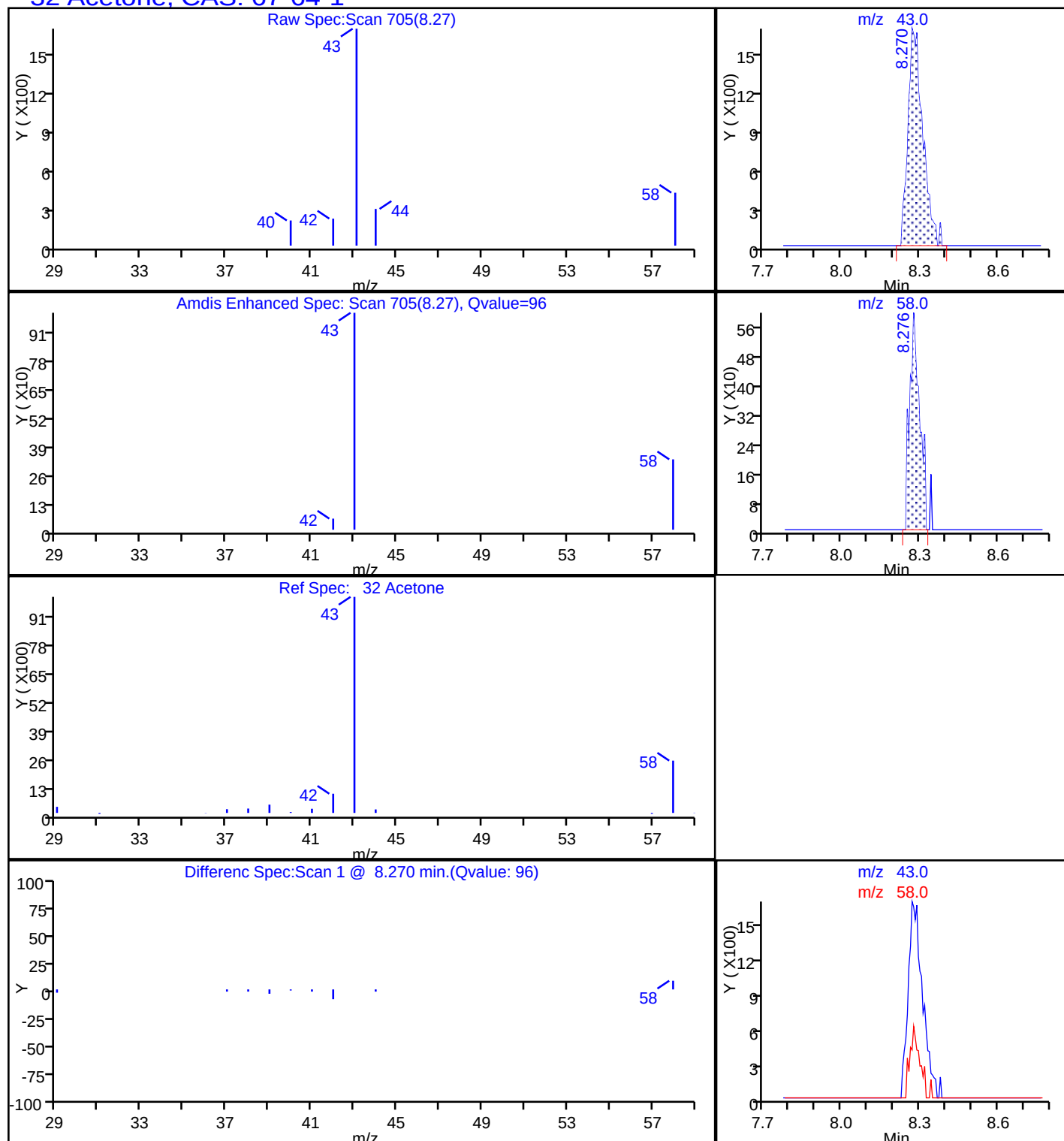
Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

32 Acetone, CAS: 67-64-1



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\MS6062005.D

Injection Date: 20-Jun-2017 12:42:30

Instrument ID: ATMS6

Lims ID: 320-29129-A-1

Lab Sample ID: 320-29129-1

Client ID: 34002056

Operator ID: SV

ALS Bottle#: 4 Worklist Smp#: 23

Purge Vol: 25.000 mL

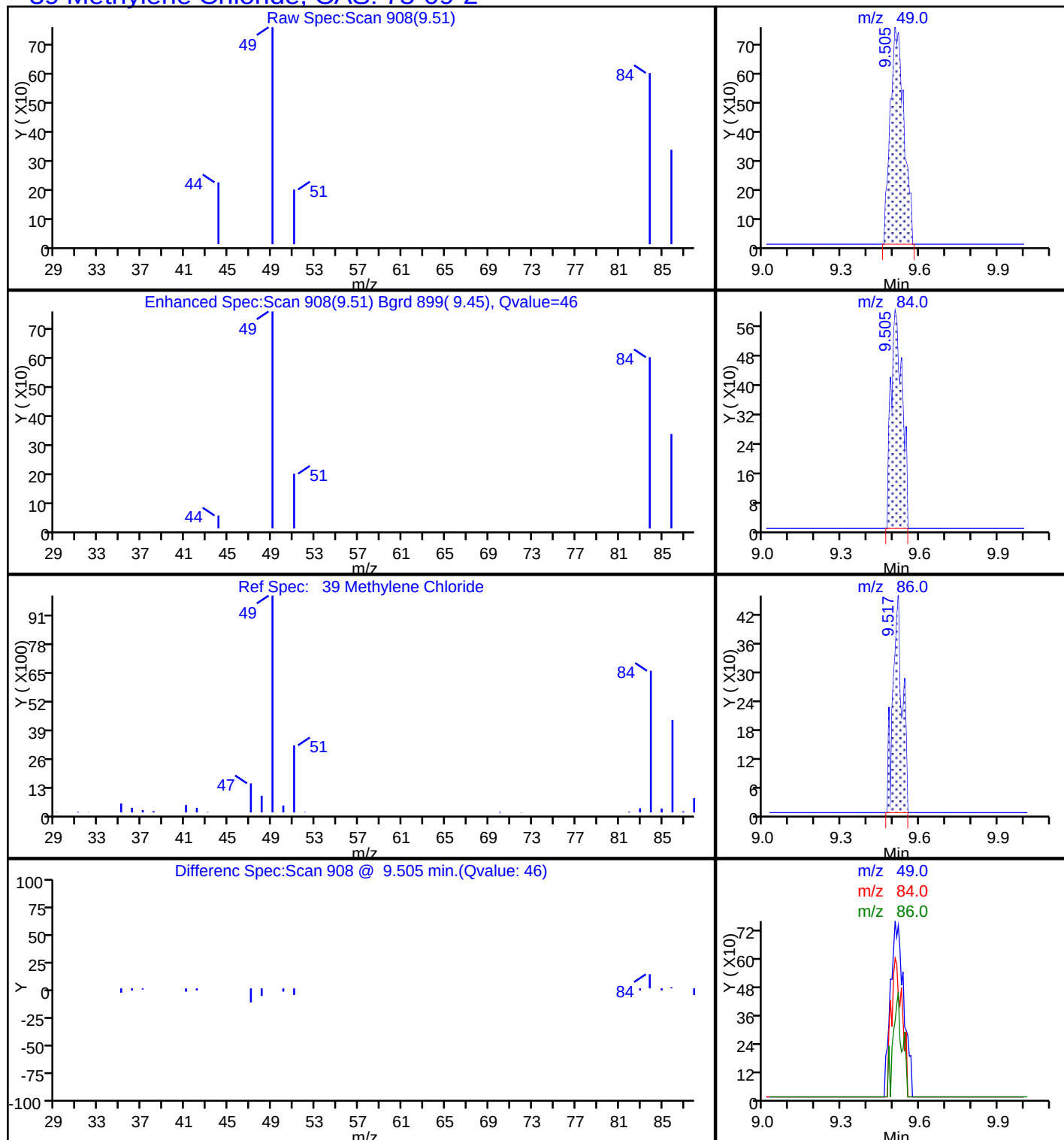
Dil. Factor: 1.0000

Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

39 Methylene Chloride, CAS: 75-09-2

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29211-1
 SDG No.: _____
 Client Sample ID: 34000960 Lab Sample ID: 320-29211-1
 Matrix: Air Lab File ID: MS6062007.D
 Analysis Method: TO-15 Date Collected: 06/16/2017 00:00
 Sample wt/vol: 250 (mL) Date Analyzed: 06/20/2017 14:42
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 170075 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	ND		5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29211-1
 SDG No.: _____
 Client Sample ID: 34000960 Lab Sample ID: 320-29211-1
 Matrix: Air Lab File ID: MS6062007.D
 Analysis Method: TO-15 Date Collected: 06/16/2017 00:00
 Sample wt/vol: 250 (mL) Date Analyzed: 06/20/2017 14:42
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 170075 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	ND		0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29211-1
 SDG No.: _____
 Client Sample ID: 34000960 Lab Sample ID: 320-29211-1
 Matrix: Air Lab File ID: MS6062007.D
 Analysis Method: TO-15 Date Collected: 06/16/2017 00:00
 Sample wt/vol: 250 (mL) Date Analyzed: 06/20/2017 14:42
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 170075 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	98		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	99		70-130
2037-26-5	Toluene-d8 (Surr)	96		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\MS6062007.D
 Lims ID: 320-29211-A-1
 Client ID: 34000960
 Sample Type: Client
 Inject. Date: 20-Jun-2017 14:42:30 ALS Bottle#: 6 Worklist Smp#: 25
 Purge Vol: 25.000 mL Dil. Factor: 1.0000
 Sample Info: 320-29211-A-1
 Misc. Info.: 500 CAN CERT
 Operator ID: SV Instrument ID: ATMS6
 Method: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\TO15_ATMS6.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 20-Jun-2017 15:37:46 Calib Date: 20-Jun-2017 09:47:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\MS6062002.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK025

First Level Reviewer: vanommens

Date: 20-Jun-2017 15:37:46

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	13.113	13.100	0.013	94	47160	4.00	
* 2 1,4-Difluorobenzene	114	15.248	15.242	0.006	95	166005	4.00	
* 3 Chlorobenzene-d5 (IS)	117	21.988	21.988	0.000	89	155583	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	14.305	14.299	0.006	98	91084	3.97	
\$ 5 Toluene-d8 (Surr)	100	18.703	18.703	0.000	98	106932	3.86	
\$ 6 4-Bromofluorobenzene (Surr	95	24.550	24.549	0.001	87	121299	3.93	

Reagents:

VAMSIS20_00002 Amount Added: 50.00 Units: mL Run Reagent

Report Date: 20-Jun-2017 15:37:47

Chrom Revision: 2.2 15-Jun-2017 15:51:40

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\MS6062007.D

Injection Date: 20-Jun-2017 14:42:30

Instrument ID: ATMS6

Operator ID: SV

Lims ID: 320-29211-A-1

Lab Sample ID: 320-29211-1

Worklist Smp#: 25

Client ID: 34000960

Purge Vol: 25.000 mL

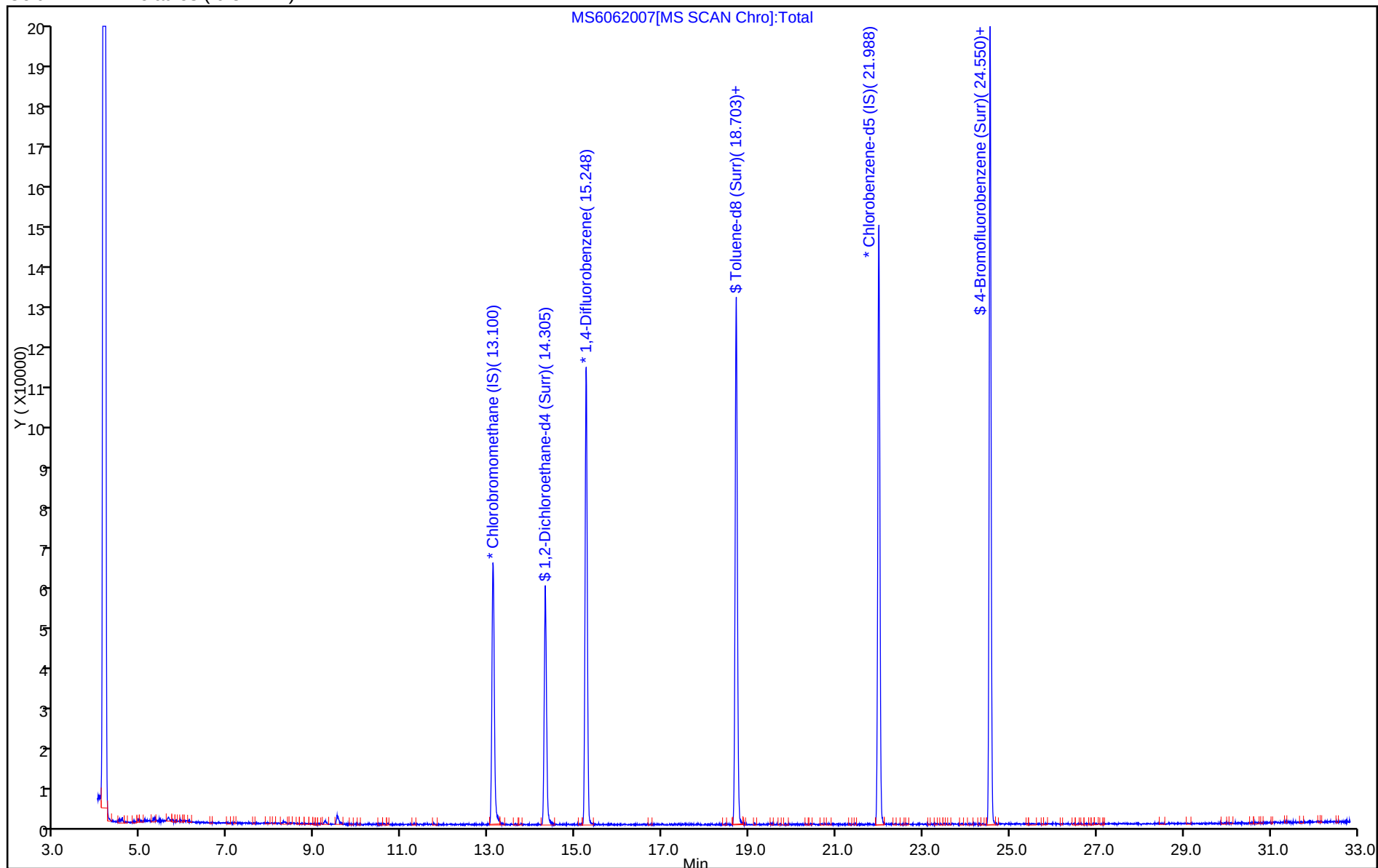
Dil. Factor: 1.0000

ALS Bottle#: 6

Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)



FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29212-1
 SDG No.: _____
 Client Sample ID: 34001134 Lab Sample ID: 320-29212-1
 Matrix: Air Lab File ID: MS6062008.D
 Analysis Method: TO-15 Date Collected: 06/16/2017 00:00
 Sample wt/vol: 250 (mL) Date Analyzed: 06/20/2017 15:43
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 170075 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	ND		5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29212-1
 SDG No.: _____
 Client Sample ID: 34001134 Lab Sample ID: 320-29212-1
 Matrix: Air Lab File ID: MS6062008.D
 Analysis Method: TO-15 Date Collected: 06/16/2017 00:00
 Sample wt/vol: 250 (mL) Date Analyzed: 06/20/2017 15:43
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 170075 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	0.11	J B	0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29212-1
 SDG No.: _____
 Client Sample ID: 34001134 Lab Sample ID: 320-29212-1
 Matrix: Air Lab File ID: MS6062008.D
 Analysis Method: TO-15 Date Collected: 06/16/2017 00:00
 Sample wt/vol: 250 (mL) Date Analyzed: 06/20/2017 15:43
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 170075 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	103		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	98		70-130
2037-26-5	Toluene-d8 (Surr)	96		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\MS6062008.D
 Lims ID: 320-29212-A-1
 Client ID: 34001134
 Sample Type: Client
 Inject. Date: 20-Jun-2017 15:43:30 ALS Bottle#: 7 Worklist Smp#: 26
 Purge Vol: 25.000 mL Dil. Factor: 1.0000
 Sample Info: 320-29212-A-1
 Misc. Info.: 500 CAN CERT
 Operator ID: SV Instrument ID: ATMS6
 Method: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\TO15_ATMS6.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 21-Jun-2017 13:28:11 Calib Date: 20-Jun-2017 09:47:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\MS6062002.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK031

First Level Reviewer: vanommens

Date:

20-Jun-2017 16:33:55

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	13.088	13.100	-0.012	92	47500	4.00	
* 2 1,4-Difluorobenzene	114	15.236	15.242	-0.006	95	165069	4.00	
* 3 Chlorobenzene-d5 (IS)	117	21.988	21.988	0.000	89	153000	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	14.299	14.299	0.000	98	89470	3.92	
\$ 5 Toluene-d8 (Surr)	100	18.691	18.703	-0.012	97	106177	3.85	
\$ 6 4-Bromofluorobenzene (Surr	95	24.543	24.549	-0.006	86	124696	4.11	
32 Acetone	43	8.270	8.264	0.006	93	2944	0.1403	
39 Methylene Chloride	49	9.505	9.523	-0.018	62	2186	0.1075	

Reagents:

VAMSIS20_00002

Amount Added: 50.00

Units: mL

Run Reagent

Report Date: 21-Jun-2017 13:31:34

Chrom Revision: 2.2 20-Jun-2017 07:42:38

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\MS6062008.D

Injection Date: 20-Jun-2017 15:43:30

Instrument ID: ATMS6

Operator ID: SV

Lims ID: 320-29212-A-1

Lab Sample ID: 320-29212-1

Worklist Smp#: 26

Client ID: 34001134

Purge Vol: 25.000 mL

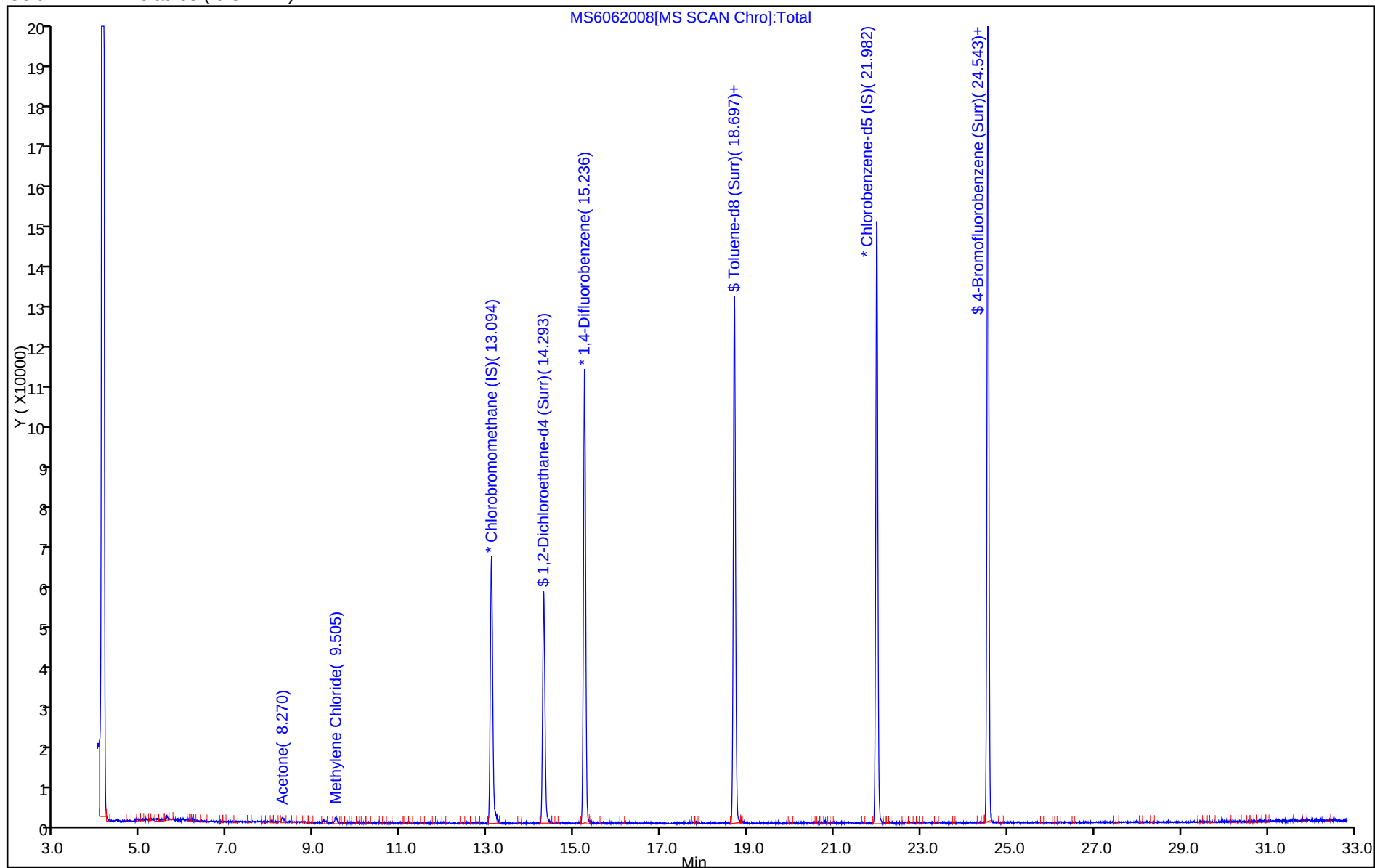
Dil. Factor: 1.0000

ALS Bottle#: 7

Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20170620-44477.b\MS6062008.D

Injection Date: 20-Jun-2017 15:43:30

Instrument ID: ATMS6

Lims ID: 320-29212-A-1

Lab Sample ID: 320-29212-1

Client ID: 34001134

Operator ID: SV

ALS Bottle#: 7

Worklist Smp#: 26

Purge Vol: 25.000 mL

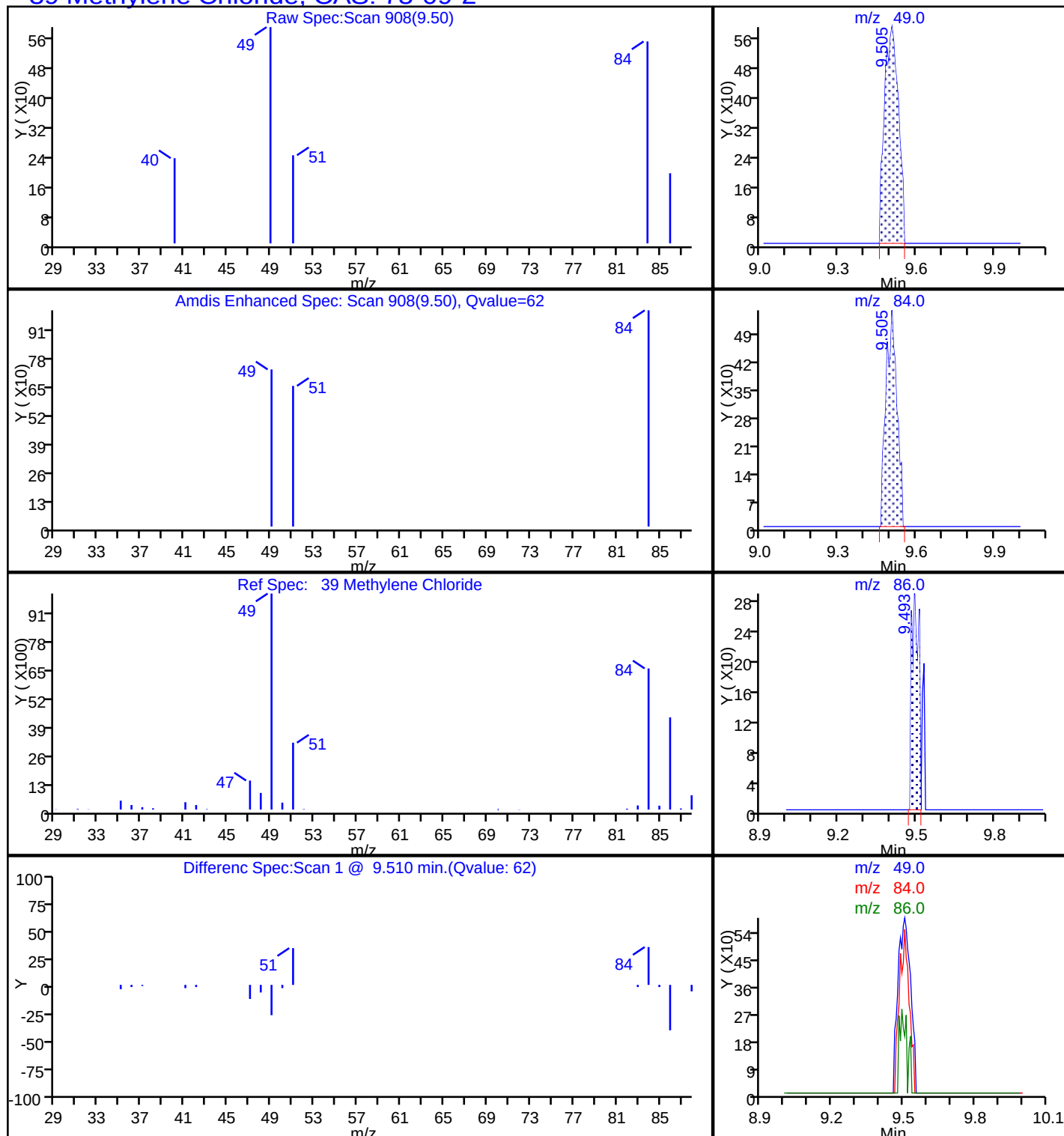
Dil. Factor: 1.0000

Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

39 Methylene Chloride, CAS: 75-09-2

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-30325-1

Client Project/Site: ESTCP Vapor Intrusion Research

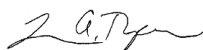
For:

GSI Environmental, Inc

9600 Great Hills Trail, Ste 350E

Austin, Texas 78759

Attn: Lila M Beckley



Authorized for release by:

8/16/2017 1:51:26 PM

Laura Turpen, Project Manager I

(916)374-4414

laura.turpen@testamericainc.com

LINKS

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

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

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

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Definitions/Glossary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
*	ISTD response or retention time outside acceptable limits

Glossary

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

Case Narrative

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Job ID: 320-30325-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-30325-1

Comments

No additional comments.

Receipt

The samples were received on 8/2/2017 10:35 AM; the samples arrived in good condition.

Canisters

Canisters that were batch certified to the MDL were provided for sample collection by TestAmerica. Two batches had j-flag detections in them affecting the following analytes and samples:

Acetone (0.38J ppb v/v)

Samples HOU-01, HOU-05, and HOU-BKG-02 (320-30325-1, -7, and -17)

Acetone (0.52J ppb v/v) and Methylene chloride (0.11J ppb v/v)

Samples HOU-01B, HOU-02, HOU-03, HOU-03B, HOU-04, HOU-06, HOU-07, HOU-07B, HOU-08, HOU-08B, HOU-09, HOU-10, HOU-10B, HOU-BKG-01, and Dup-1 (320-30325-2, -3, -4, -5, -6, -8, -9, -10, -11, -12, -13, -14, -15, -16, and -18)

Low level detections of these analytes in these samples should be considered estimated.

Air - GC/MS VOA

Method(s) TO-15: The following sample was diluted due to the abundance of non-target analytes: HOU-10B (320-30325-15). Elevated reporting limits (RLs) are provided.

Method(s) TO-15: Internal standard (ISTD) response for the following sample was outside control limits: HOU-07B (320-30325-10). The sample was re-extracted and/or re-analyzed with concurring results, and the data have been reported.

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

VOA Prep

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

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-01

Lab Sample ID: 320-30325-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	61	J	69	2.4	ppb v/v	13.7		TO-15	Total/NA
Bromodichloromethane	73		4.1	0.90	ppb v/v	13.7		TO-15	Total/NA
Carbon disulfide	11		11	1.1	ppb v/v	13.7		TO-15	Total/NA
Dibromochloromethane	11		5.5	1.1	ppb v/v	13.7		TO-15	Total/NA
Chloroform	640		4.1	1.3	ppb v/v	13.7		TO-15	Total/NA
Chloromethane	6.0	J	11	2.7	ppb v/v	13.7		TO-15	Total/NA
cis-1,2-Dichloroethene	2.6	J	5.5	1.2	ppb v/v	13.7		TO-15	Total/NA
Ethylbenzene	0.90	J	5.5	0.86	ppb v/v	13.7		TO-15	Total/NA
Methylene Chloride	6.2		5.5	0.99	ppb v/v	13.7		TO-15	Total/NA
Tetrachloroethene	1.3	J	5.5	0.70	ppb v/v	13.7		TO-15	Total/NA
Toluene	31		5.5	0.70	ppb v/v	13.7		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	150	J	160	5.8	ug/m3	13.7		TO-15	Total/NA
Bromodichloromethane	490		28	6.1	ug/m3	13.7		TO-15	Total/NA
Carbon disulfide	34		34	3.3	ug/m3	13.7		TO-15	Total/NA
Dibromochloromethane	93		47	9.2	ug/m3	13.7		TO-15	Total/NA
Chloroform	3100		20	6.4	ug/m3	13.7		TO-15	Total/NA
Chloromethane	12	J	23	5.6	ug/m3	13.7		TO-15	Total/NA
cis-1,2-Dichloroethene	10	J	22	4.8	ug/m3	13.7		TO-15	Total/NA
Ethylbenzene	3.9	J	24	3.7	ug/m3	13.7		TO-15	Total/NA
Methylene Chloride	21		19	3.4	ug/m3	13.7		TO-15	Total/NA
Tetrachloroethene	9.0	J	37	4.7	ug/m3	13.7		TO-15	Total/NA
Toluene	120		21	2.6	ug/m3	13.7		TO-15	Total/NA

Client Sample ID: HOU-01B

Lab Sample ID: 320-30325-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	84		84	3.0	ppb v/v	16.8		TO-15	Total/NA
Bromodichloromethane	81		5.0	1.1	ppb v/v	16.8		TO-15	Total/NA
Carbon disulfide	20		13	1.3	ppb v/v	16.8		TO-15	Total/NA
Dibromochloromethane	12		6.7	1.3	ppb v/v	16.8		TO-15	Total/NA
Chloroform	810		5.0	1.6	ppb v/v	16.8		TO-15	Total/NA
Chloromethane	8.1	J	13	3.3	ppb v/v	16.8		TO-15	Total/NA
cis-1,2-Dichloroethene	5.3	J	6.7	1.5	ppb v/v	16.8		TO-15	Total/NA
Methylene Chloride	7.9		6.7	1.2	ppb v/v	16.8		TO-15	Total/NA
Tetrachloroethene	0.90	J	6.7	0.86	ppb v/v	16.8		TO-15	Total/NA
Toluene	43		6.7	0.86	ppb v/v	16.8		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	200		200	7.1	ug/m3	16.8		TO-15	Total/NA
Bromodichloromethane	540		34	7.4	ug/m3	16.8		TO-15	Total/NA
Carbon disulfide	63		42	4.1	ug/m3	16.8		TO-15	Total/NA
Dibromochloromethane	99		57	11	ug/m3	16.8		TO-15	Total/NA
Chloroform	4000		25	7.8	ug/m3	16.8		TO-15	Total/NA
Chloromethane	17	J	28	6.8	ug/m3	16.8		TO-15	Total/NA
cis-1,2-Dichloroethene	21	J	27	5.9	ug/m3	16.8		TO-15	Total/NA
Methylene Chloride	27		23	4.2	ug/m3	16.8		TO-15	Total/NA
Tetrachloroethene	6.1	J	46	5.8	ug/m3	16.8		TO-15	Total/NA
Toluene	160		25	3.2	ug/m3	16.8		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-02

Lab Sample ID: 320-30325-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	8.2		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.30	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	0.19	J	0.30	0.066	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.3		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	3.2		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.094	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Chloroform	11		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	1.0		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.30	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.087	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.19	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.12	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.82		0.40	0.051	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.26	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.10	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	19		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.96	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	1.3	J	2.0	0.44	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	3.7		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	9.9		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.59	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Chloroform	56		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	2.2		1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.5	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.38	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	0.65	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	0.79	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	3.1		1.5	0.19	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.1	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.45	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-03

Lab Sample ID: 320-30325-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	15	J	17	0.59	ppb v/v	3.34		TO-15	Total/NA
Benzene	0.44	J	1.3	0.26	ppb v/v	3.34		TO-15	Total/NA
Bromodichloromethane	0.32	J	1.0	0.22	ppb v/v	3.34		TO-15	Total/NA
2-Butanone (MEK)	1.9	J	2.7	0.66	ppb v/v	3.34		TO-15	Total/NA
Carbon disulfide	300		2.7	0.26	ppb v/v	3.34		TO-15	Total/NA
Chloroform	12		1.0	0.32	ppb v/v	3.34		TO-15	Total/NA
cis-1,2-Dichloroethene	12		1.3	0.30	ppb v/v	3.34		TO-15	Total/NA
Hexachlorobutadiene	1.5	J	6.7	1.4	ppb v/v	3.34		TO-15	Total/NA
Methylene Chloride	0.72	J	1.3	0.24	ppb v/v	3.34		TO-15	Total/NA
Tetrachloroethene	210		1.3	0.17	ppb v/v	3.34		TO-15	Total/NA
Toluene	0.76	J	1.3	0.17	ppb v/v	3.34		TO-15	Total/NA
1,2,4-Trichlorobenzene	2.3	J	6.7	1.4	ppb v/v	3.34		TO-15	Total/NA
Trichloroethene	6.7		1.3	0.35	ppb v/v	3.34		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	36	J	40	1.4	ug/m3	3.34		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-03 (Continued)

Lab Sample ID: 320-30325-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	1.4	J	4.3	0.84	ug/m3	3.34		TO-15	Total/NA
Bromodichloromethane	2.2	J	6.7	1.5	ug/m3	3.34		TO-15	Total/NA
2-Butanone (MEK)	5.5	J	7.9	2.0	ug/m3	3.34		TO-15	Total/NA
Carbon disulfide	940		8.3	0.81	ug/m3	3.34		TO-15	Total/NA
Chloroform	58		4.9	1.5	ug/m3	3.34		TO-15	Total/NA
cis-1,2-Dichloroethene	48		5.3	1.2	ug/m3	3.34		TO-15	Total/NA
Hexachlorobutadiene	16	J	71	15	ug/m3	3.34		TO-15	Total/NA
Methylene Chloride	2.5	J	4.6	0.84	ug/m3	3.34		TO-15	Total/NA
Tetrachloroethene	1500		9.1	1.2	ug/m3	3.34		TO-15	Total/NA
Toluene	2.9	J	5.0	0.64	ug/m3	3.34		TO-15	Total/NA
1,2,4-Trichlorobenzene	17	J	50	11	ug/m3	3.34		TO-15	Total/NA
Trichloroethene	36		7.2	1.9	ug/m3	3.34		TO-15	Total/NA

Client Sample ID: HOU-03B

Lab Sample ID: 320-30325-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	56		8.3	0.30	ppb v/v	1.66		TO-15	Total/NA
Benzene	0.15	J	0.66	0.13	ppb v/v	1.66		TO-15	Total/NA
Bromodichloromethane	9.1		0.50	0.11	ppb v/v	1.66		TO-15	Total/NA
Bromoform	0.12	J	0.66	0.12	ppb v/v	1.66		TO-15	Total/NA
2-Butanone (MEK)	1.6		1.3	0.33	ppb v/v	1.66		TO-15	Total/NA
Carbon disulfide	15		1.3	0.13	ppb v/v	1.66		TO-15	Total/NA
Carbon tetrachloride	0.17	J	1.3	0.11	ppb v/v	1.66		TO-15	Total/NA
Dibromochloromethane	1.7		0.66	0.13	ppb v/v	1.66		TO-15	Total/NA
Chloroform	75		0.50	0.16	ppb v/v	1.66		TO-15	Total/NA
Chloromethane	1.6		1.3	0.33	ppb v/v	1.66		TO-15	Total/NA
Dichlorodifluoromethane	0.39	J	0.66	0.24	ppb v/v	1.66		TO-15	Total/NA
1,2-Dichloroethane	2.5		1.3	0.15	ppb v/v	1.66		TO-15	Total/NA
cis-1,2-Dichloroethene	0.83		0.66	0.15	ppb v/v	1.66		TO-15	Total/NA
Ethylbenzene	0.15	J	0.66	0.10	ppb v/v	1.66		TO-15	Total/NA
Methylene Chloride	0.87		0.66	0.12	ppb v/v	1.66		TO-15	Total/NA
Tetrachloroethene	0.81		0.66	0.085	ppb v/v	1.66		TO-15	Total/NA
Toluene	2.0		0.66	0.085	ppb v/v	1.66		TO-15	Total/NA
Trichloroethene	0.25	J	0.66	0.17	ppb v/v	1.66		TO-15	Total/NA
m,p-Xylene	0.45	J	1.3	0.17	ppb v/v	1.66		TO-15	Total/NA
o-Xylene	0.17	J	0.66	0.090	ppb v/v	1.66		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	130		20	0.70	ug/m3	1.66		TO-15	Total/NA
Benzene	0.47	J	2.1	0.42	ug/m3	1.66		TO-15	Total/NA
Bromodichloromethane	61		3.3	0.73	ug/m3	1.66		TO-15	Total/NA
Bromoform	1.2	J	6.9	1.2	ug/m3	1.66		TO-15	Total/NA
2-Butanone (MEK)	4.8		3.9	0.97	ug/m3	1.66		TO-15	Total/NA
Carbon disulfide	48		4.1	0.40	ug/m3	1.66		TO-15	Total/NA
Carbon tetrachloride	1.1	J	8.4	0.67	ug/m3	1.66		TO-15	Total/NA
Dibromochloromethane	15		5.7	1.1	ug/m3	1.66		TO-15	Total/NA
Chloroform	360		2.4	0.77	ug/m3	1.66		TO-15	Total/NA
Chloromethane	3.4		2.7	0.68	ug/m3	1.66		TO-15	Total/NA
Dichlorodifluoromethane	1.9	J	3.3	1.2	ug/m3	1.66		TO-15	Total/NA
1,2-Dichloroethane	10		5.4	0.59	ug/m3	1.66		TO-15	Total/NA
cis-1,2-Dichloroethene	3.3		2.6	0.59	ug/m3	1.66		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-03B (Continued)

Lab Sample ID: 320-30325-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	0.63	J	2.9	0.45	ug/m3	1.66		TO-15	Total/NA
Methylene Chloride	3.0		2.3	0.42	ug/m3	1.66		TO-15	Total/NA
Tetrachloroethene	5.5		4.5	0.57	ug/m3	1.66		TO-15	Total/NA
Toluene	7.6		2.5	0.32	ug/m3	1.66		TO-15	Total/NA
Trichloroethene	1.3	J	3.6	0.94	ug/m3	1.66		TO-15	Total/NA
m,p-Xylene	2.0	J	5.8	0.72	ug/m3	1.66		TO-15	Total/NA
o-Xylene	0.74	J	2.9	0.39	ug/m3	1.66		TO-15	Total/NA

Client Sample ID: HOU-04

Lab Sample ID: 320-30325-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	9.5		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	1.4		0.30	0.066	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	2.0		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	4.1		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.067	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.26	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	7.8		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.39	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
1,4-Dichlorobenzene	0.46		0.40	0.15	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.26	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.34	J	0.40	0.089	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.13	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
2-Hexanone	0.16	J	0.40	0.087	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	1.2		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Styrene	0.075	J	0.40	0.059	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	42		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	10		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.79		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.22	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.23	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.094	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	22		12	0.42	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	9.2		2.0	0.44	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	5.9		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	13		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.42	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	2.2	J	3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	38		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	0.80	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
1,4-Dichlorobenzene	2.8		2.4	0.90	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.3	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	1.4	J	1.6	0.35	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.55	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
2-Hexanone	0.67	J	1.6	0.36	ug/m3	1		TO-15	Total/NA
Methylene Chloride	4.3		1.4	0.25	ug/m3	1		TO-15	Total/NA
Styrene	0.32	J	1.7	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	280		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	39		1.5	0.19	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-04 (Continued)

Lab Sample ID: 320-30325-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	4.2		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.2	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.0	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.41	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-05

Lab Sample ID: 320-30325-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	33		8.4	0.30	ppb v/v	1.68		TO-15	Total/NA
Benzene	0.15	J	0.67	0.13	ppb v/v	1.68		TO-15	Total/NA
Bromodichloromethane	19		0.50	0.11	ppb v/v	1.68		TO-15	Total/NA
Bromoform	0.24	J	0.67	0.12	ppb v/v	1.68		TO-15	Total/NA
2-Butanone (MEK)	1.7		1.3	0.33	ppb v/v	1.68		TO-15	Total/NA
Carbon disulfide	10		1.3	0.13	ppb v/v	1.68		TO-15	Total/NA
Carbon tetrachloride	0.25	J	1.3	0.11	ppb v/v	1.68		TO-15	Total/NA
Chlorobenzene	0.16	J	0.50	0.11	ppb v/v	1.68		TO-15	Total/NA
Dibromochloromethane	3.3		0.67	0.13	ppb v/v	1.68		TO-15	Total/NA
Chloroethane	1.2	J	1.3	0.52	ppb v/v	1.68		TO-15	Total/NA
Chloroform	96		0.50	0.16	ppb v/v	1.68		TO-15	Total/NA
Chloromethane	3.6		1.3	0.33	ppb v/v	1.68		TO-15	Total/NA
1,4-Dichlorobenzene	3.3		0.67	0.25	ppb v/v	1.68		TO-15	Total/NA
Dichlorodifluoromethane	0.39	J	0.67	0.24	ppb v/v	1.68		TO-15	Total/NA
cis-1,2-Dichloroethene	21		0.67	0.15	ppb v/v	1.68		TO-15	Total/NA
Ethylbenzene	0.88		0.67	0.11	ppb v/v	1.68		TO-15	Total/NA
Methylene Chloride	7.0		0.67	0.12	ppb v/v	1.68		TO-15	Total/NA
Tetrachloroethene	3.8		0.67	0.086	ppb v/v	1.68		TO-15	Total/NA
Toluene	35		0.67	0.086	ppb v/v	1.68		TO-15	Total/NA
Trichloroethene	0.83		0.67	0.18	ppb v/v	1.68		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.56	J	1.3	0.27	ppb v/v	1.68		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.31	J	0.67	0.21	ppb v/v	1.68		TO-15	Total/NA
Vinyl chloride	0.50	J	0.67	0.20	ppb v/v	1.68		TO-15	Total/NA
m,p-Xylene	3.8		1.3	0.17	ppb v/v	1.68		TO-15	Total/NA
o-Xylene	0.93		0.67	0.091	ppb v/v	1.68		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	79		20	0.71	ug/m3	1.68		TO-15	Total/NA
Benzene	0.49	J	2.1	0.42	ug/m3	1.68		TO-15	Total/NA
Bromodichloromethane	130		3.4	0.74	ug/m3	1.68		TO-15	Total/NA
Bromoform	2.5	J	6.9	1.2	ug/m3	1.68		TO-15	Total/NA
2-Butanone (MEK)	5.0		4.0	0.99	ug/m3	1.68		TO-15	Total/NA
Carbon disulfide	32		4.2	0.41	ug/m3	1.68		TO-15	Total/NA
Carbon tetrachloride	1.6	J	8.5	0.68	ug/m3	1.68		TO-15	Total/NA
Chlorobenzene	0.73	J	2.3	0.49	ug/m3	1.68		TO-15	Total/NA
Dibromochloromethane	28		5.7	1.1	ug/m3	1.68		TO-15	Total/NA
Chloroethane	3.1	J	3.5	1.4	ug/m3	1.68		TO-15	Total/NA
Chloroform	470		2.5	0.78	ug/m3	1.68		TO-15	Total/NA
Chloromethane	7.5		2.8	0.68	ug/m3	1.68		TO-15	Total/NA
1,4-Dichlorobenzene	20		4.0	1.5	ug/m3	1.68		TO-15	Total/NA
Dichlorodifluoromethane	1.9	J	3.3	1.2	ug/m3	1.68		TO-15	Total/NA
cis-1,2-Dichloroethene	83		2.7	0.59	ug/m3	1.68		TO-15	Total/NA
Ethylbenzene	3.8		2.9	0.46	ug/m3	1.68		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-05 (Continued)

Lab Sample ID: 320-30325-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	24		2.3	0.42	ug/m3	1.68		TO-15	Total/NA
Tetrachloroethene	26		4.6	0.58	ug/m3	1.68		TO-15	Total/NA
Toluene	130		2.5	0.32	ug/m3	1.68		TO-15	Total/NA
Trichloroethene	4.5		3.6	0.95	ug/m3	1.68		TO-15	Total/NA
1,2,4-Trimethylbenzene	2.7	J	6.6	1.3	ug/m3	1.68		TO-15	Total/NA
1,3,5-Trimethylbenzene	1.5	J	3.3	1.0	ug/m3	1.68		TO-15	Total/NA
Vinyl chloride	1.3	J	1.7	0.52	ug/m3	1.68		TO-15	Total/NA
m,p-Xylene	16		5.8	0.73	ug/m3	1.68		TO-15	Total/NA
o-Xylene	4.0		2.9	0.39	ug/m3	1.68		TO-15	Total/NA

Client Sample ID: HOU-06

Lab Sample ID: 320-30325-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	20		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.12	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	4.8		0.30	0.066	ppb v/v	1		TO-15	Total/NA
Bromoform	0.071	J	0.40	0.070	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	2.5		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	19		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.21	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.96		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroethane	1.3		0.80	0.31	ppb v/v	1		TO-15	Total/NA
Chloroform	52		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	5.6		0.80	0.20	ppb v/v	1		TO-15	Total/NA
1,4-Dichlorobenzene	0.70		0.40	0.15	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.25	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,1-Dichloroethene	0.15	J	0.80	0.13	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	27		0.40	0.089	ppb v/v	1		TO-15	Total/NA
trans-1,2-Dichloroethene	0.34	J	0.40	0.10	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.13	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
2-Hexanone	0.13	J	0.40	0.087	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	2.4		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	4.1		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	7.1		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.67		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.21	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.16	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.43	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.13	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	48		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.37	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	32		2.0	0.44	ug/m3	1		TO-15	Total/NA
Bromoform	0.74	J	4.1	0.72	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	7.5		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	59		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	1.3	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	8.2		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroethane	3.4		2.1	0.81	ug/m3	1		TO-15	Total/NA
Chloroform	250		1.5	0.46	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-06 (Continued)

Lab Sample ID: 320-30325-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloromethane	12		1.7	0.41	ug/m3	1		TO-15	Total/NA
1,4-Dichlorobenzene	4.2		2.4	0.90	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.2	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
1,1-Dichloroethene	0.59	J	3.2	0.51	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	110		1.6	0.35	ug/m3	1		TO-15	Total/NA
trans-1,2-Dichloroethene	1.3	J	1.6	0.40	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.55	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
2-Hexanone	0.53	J	1.6	0.36	ug/m3	1		TO-15	Total/NA
Methylene Chloride	8.2		1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	28		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	27		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	3.6		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.2	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.81	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.9	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.57	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-07

Lab Sample ID: 320-30325-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	42		15	0.55	ppb v/v	3.09		TO-15	Total/NA
Bromodichloromethane	5.5		0.93	0.20	ppb v/v	3.09		TO-15	Total/NA
2-Butanone (MEK)	1.9	J	2.5	0.61	ppb v/v	3.09		TO-15	Total/NA
Carbon disulfide	11		2.5	0.24	ppb v/v	3.09		TO-15	Total/NA
Carbon tetrachloride	0.21	J	2.5	0.20	ppb v/v	3.09		TO-15	Total/NA
Dibromochloromethane	1.1	J	1.2	0.24	ppb v/v	3.09		TO-15	Total/NA
Chloroform	49		0.93	0.29	ppb v/v	3.09		TO-15	Total/NA
Chloromethane	1.6	J	2.5	0.61	ppb v/v	3.09		TO-15	Total/NA
1,1-Dichloroethene	0.55	J	2.5	0.40	ppb v/v	3.09		TO-15	Total/NA
cis-1,2-Dichloroethene	180		1.2	0.28	ppb v/v	3.09		TO-15	Total/NA
trans-1,2-Dichloroethene	2.6		1.2	0.31	ppb v/v	3.09		TO-15	Total/NA
Ethylbenzene	0.56	J	1.2	0.19	ppb v/v	3.09		TO-15	Total/NA
Methylene Chloride	1.9		1.2	0.22	ppb v/v	3.09		TO-15	Total/NA
Styrene	0.33	J	1.2	0.18	ppb v/v	3.09		TO-15	Total/NA
Tetrachloroethene	54		1.2	0.16	ppb v/v	3.09		TO-15	Total/NA
Toluene	3.1		1.2	0.16	ppb v/v	3.09		TO-15	Total/NA
Trichloroethene	11		1.2	0.32	ppb v/v	3.09		TO-15	Total/NA
Vinyl chloride	20		1.2	0.37	ppb v/v	3.09		TO-15	Total/NA
m,p-Xylene	1.7	J	2.5	0.31	ppb v/v	3.09		TO-15	Total/NA
o-Xylene	0.49	J	1.2	0.17	ppb v/v	3.09		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	100		37	1.3	ug/m3	3.09		TO-15	Total/NA
Bromodichloromethane	37		6.2	1.4	ug/m3	3.09		TO-15	Total/NA
2-Butanone (MEK)	5.7	J	7.3	1.8	ug/m3	3.09		TO-15	Total/NA
Carbon disulfide	33		7.7	0.75	ug/m3	3.09		TO-15	Total/NA
Carbon tetrachloride	1.3	J	16	1.2	ug/m3	3.09		TO-15	Total/NA
Dibromochloromethane	9.2	J	11	2.1	ug/m3	3.09		TO-15	Total/NA
Chloroform	240		4.5	1.4	ug/m3	3.09		TO-15	Total/NA
Chloromethane	3.3	J	5.1	1.3	ug/m3	3.09		TO-15	Total/NA
1,1-Dichloroethene	2.2	J	9.8	1.6	ug/m3	3.09		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-07 (Continued)

Lab Sample ID: 320-30325-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	710		4.9	1.1	ug/m3	3.09		TO-15	Total/NA
trans-1,2-Dichloroethene	11		4.9	1.2	ug/m3	3.09		TO-15	Total/NA
Ethylbenzene	2.4	J	5.4	0.85	ug/m3	3.09		TO-15	Total/NA
Methylene Chloride	6.7		4.3	0.77	ug/m3	3.09		TO-15	Total/NA
Styrene	1.4	J	5.3	0.78	ug/m3	3.09		TO-15	Total/NA
Tetrachloroethene	370		8.4	1.1	ug/m3	3.09		TO-15	Total/NA
Toluene	12		4.7	0.59	ug/m3	3.09		TO-15	Total/NA
Trichloroethene	58		6.6	1.7	ug/m3	3.09		TO-15	Total/NA
Vinyl chloride	52		3.2	0.95	ug/m3	3.09		TO-15	Total/NA
m,p-Xylene	7.4	J	11	1.3	ug/m3	3.09		TO-15	Total/NA
o-Xylene	2.1	J	5.4	0.72	ug/m3	3.09		TO-15	Total/NA

Client Sample ID: HOU-07B

Lab Sample ID: 320-30325-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	22	*	11	0.41	ppb v/v	2.28		TO-15	Total/NA
Benzene	0.23	J	0.91	0.18	ppb v/v	2.28		TO-15	Total/NA
Bromodichloromethane	3.0		0.68	0.15	ppb v/v	2.28		TO-15	Total/NA
2-Butanone (MEK)	1.6	J *	1.8	0.45	ppb v/v	2.28		TO-15	Total/NA
Carbon disulfide	4.7	*	1.8	0.18	ppb v/v	2.28		TO-15	Total/NA
Dibromochloromethane	0.61	J	0.91	0.18	ppb v/v	2.28		TO-15	Total/NA
Chloroform	12	*	0.68	0.22	ppb v/v	2.28		TO-15	Total/NA
Chloromethane	0.83	J *	1.8	0.45	ppb v/v	2.28		TO-15	Total/NA
Dichlorodifluoromethane	0.35	J *	0.91	0.33	ppb v/v	2.28		TO-15	Total/NA
cis-1,2-Dichloroethene	93	*	0.91	0.20	ppb v/v	2.28		TO-15	Total/NA
trans-1,2-Dichloroethene	1.1	*	0.91	0.23	ppb v/v	2.28		TO-15	Total/NA
Ethylbenzene	0.66	J	0.91	0.14	ppb v/v	2.28		TO-15	Total/NA
Methylene Chloride	1.2	*	0.91	0.16	ppb v/v	2.28		TO-15	Total/NA
Styrene	0.31	J	0.91	0.13	ppb v/v	2.28		TO-15	Total/NA
Tetrachloroethene	5.7		0.91	0.12	ppb v/v	2.28		TO-15	Total/NA
Toluene	3.9		0.91	0.12	ppb v/v	2.28		TO-15	Total/NA
Trichloroethene	4.3		0.91	0.24	ppb v/v	2.28		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.3	J	1.8	0.37	ppb v/v	2.28		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.35	J	0.91	0.29	ppb v/v	2.28		TO-15	Total/NA
Vinyl chloride	7.3	*	0.91	0.27	ppb v/v	2.28		TO-15	Total/NA
m,p-Xylene	1.4	J	1.8	0.23	ppb v/v	2.28		TO-15	Total/NA
o-Xylene	0.55	J	0.91	0.12	ppb v/v	2.28		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	52	*	27	0.96	ug/m3	2.28		TO-15	Total/NA
Benzene	0.74	J	2.9	0.58	ug/m3	2.28		TO-15	Total/NA
Bromodichloromethane	20		4.6	1.0	ug/m3	2.28		TO-15	Total/NA
2-Butanone (MEK)	4.8	J *	5.4	1.3	ug/m3	2.28		TO-15	Total/NA
Carbon disulfide	15	*	5.7	0.55	ug/m3	2.28		TO-15	Total/NA
Dibromochloromethane	5.2	J	7.8	1.5	ug/m3	2.28		TO-15	Total/NA
Chloroform	59	*	3.3	1.1	ug/m3	2.28		TO-15	Total/NA
Chloromethane	1.7	J *	3.8	0.93	ug/m3	2.28		TO-15	Total/NA
Dichlorodifluoromethane	1.7	J *	4.5	1.6	ug/m3	2.28		TO-15	Total/NA
cis-1,2-Dichloroethene	370	*	3.6	0.80	ug/m3	2.28		TO-15	Total/NA
trans-1,2-Dichloroethene	4.5	*	3.6	0.90	ug/m3	2.28		TO-15	Total/NA
Ethylbenzene	2.9	J	4.0	0.62	ug/m3	2.28		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-07B (Continued)

Lab Sample ID: 320-30325-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	4.2	*	3.2	0.57	ug/m3	2.28		TO-15	Total/NA
Styrene	1.3	J	3.9	0.57	ug/m3	2.28		TO-15	Total/NA
Tetrachloroethene	39		6.2	0.79	ug/m3	2.28		TO-15	Total/NA
Toluene	15		3.4	0.44	ug/m3	2.28		TO-15	Total/NA
Trichloroethene	23		4.9	1.3	ug/m3	2.28		TO-15	Total/NA
1,2,4-Trimethylbenzene	6.3	J	9.0	1.8	ug/m3	2.28		TO-15	Total/NA
1,3,5-Trimethylbenzene	1.7	J	4.5	1.4	ug/m3	2.28		TO-15	Total/NA
Vinyl chloride	19	*	2.3	0.70	ug/m3	2.28		TO-15	Total/NA
m,p-Xylene	6.0	J	7.9	0.99	ug/m3	2.28		TO-15	Total/NA
o-Xylene	2.4	J	4.0	0.53	ug/m3	2.28		TO-15	Total/NA

Client Sample ID: HOU-08

Lab Sample ID: 320-30325-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	77		7.6	0.27	ppb v/v	1.51		TO-15	Total/NA
Benzene	0.18	J	0.60	0.12	ppb v/v	1.51		TO-15	Total/NA
Bromodichloromethane	4.4		0.45	0.10	ppb v/v	1.51		TO-15	Total/NA
2-Butanone (MEK)	8.1		1.2	0.30	ppb v/v	1.51		TO-15	Total/NA
Carbon disulfide	12		1.2	0.12	ppb v/v	1.51		TO-15	Total/NA
Carbon tetrachloride	0.12	J	1.2	0.097	ppb v/v	1.51		TO-15	Total/NA
Dibromochloromethane	0.91		0.60	0.12	ppb v/v	1.51		TO-15	Total/NA
Chloroform	23		0.45	0.14	ppb v/v	1.51		TO-15	Total/NA
Chloromethane	1.0	J	1.2	0.30	ppb v/v	1.51		TO-15	Total/NA
Dichlorodifluoromethane	0.33	J	0.60	0.22	ppb v/v	1.51		TO-15	Total/NA
cis-1,2-Dichloroethene	2.1		0.60	0.13	ppb v/v	1.51		TO-15	Total/NA
Ethylbenzene	0.30	J	0.60	0.095	ppb v/v	1.51		TO-15	Total/NA
Methylene Chloride	2.8		0.60	0.11	ppb v/v	1.51		TO-15	Total/NA
Tetrachloroethene	87		0.60	0.077	ppb v/v	1.51		TO-15	Total/NA
Toluene	16		0.60	0.077	ppb v/v	1.51		TO-15	Total/NA
Trichloroethene	8.8		0.60	0.16	ppb v/v	1.51		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.30	J	1.2	0.24	ppb v/v	1.51		TO-15	Total/NA
Vinyl chloride	0.24	J	0.60	0.18	ppb v/v	1.51		TO-15	Total/NA
m,p-Xylene	1.8		1.2	0.15	ppb v/v	1.51		TO-15	Total/NA
o-Xylene	0.87		0.60	0.082	ppb v/v	1.51		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	180		18	0.64	ug/m3	1.51		TO-15	Total/NA
Benzene	0.56	J	1.9	0.38	ug/m3	1.51		TO-15	Total/NA
Bromodichloromethane	30		3.0	0.67	ug/m3	1.51		TO-15	Total/NA
2-Butanone (MEK)	24		3.6	0.89	ug/m3	1.51		TO-15	Total/NA
Carbon disulfide	36		3.8	0.37	ug/m3	1.51		TO-15	Total/NA
Carbon tetrachloride	0.73	J	7.6	0.61	ug/m3	1.51		TO-15	Total/NA
Dibromochloromethane	7.8		5.1	1.0	ug/m3	1.51		TO-15	Total/NA
Chloroform	110		2.2	0.70	ug/m3	1.51		TO-15	Total/NA
Chloromethane	2.1	J	2.5	0.61	ug/m3	1.51		TO-15	Total/NA
Dichlorodifluoromethane	1.7	J	3.0	1.1	ug/m3	1.51		TO-15	Total/NA
cis-1,2-Dichloroethene	8.2		2.4	0.53	ug/m3	1.51		TO-15	Total/NA
Ethylbenzene	1.3	J	2.6	0.41	ug/m3	1.51		TO-15	Total/NA
Methylene Chloride	9.8		2.1	0.38	ug/m3	1.51		TO-15	Total/NA
Tetrachloroethene	590		4.1	0.52	ug/m3	1.51		TO-15	Total/NA
Toluene	59		2.3	0.29	ug/m3	1.51		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-08 (Continued)

Lab Sample ID: 320-30325-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	48		3.2	0.85	ug/m3	1.51		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.5	J	5.9	1.2	ug/m3	1.51		TO-15	Total/NA
Vinyl chloride	0.62	J	1.5	0.46	ug/m3	1.51		TO-15	Total/NA
m,p-Xylene	7.8		5.2	0.66	ug/m3	1.51		TO-15	Total/NA
o-Xylene	3.8		2.6	0.35	ug/m3	1.51		TO-15	Total/NA

Client Sample ID: HOU-08B

Lab Sample ID: 320-30325-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	20		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.12	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	1.8		0.30	0.066	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	2.0		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	4.7		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.080	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.39	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	12		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.74	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.20	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.34	J	0.40	0.089	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.073	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
2-Hexanone	0.12	J	0.40	0.087	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.56		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	1.2		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	2.0		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.20	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.21	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.10	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	49		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.39	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	12		2.0	0.44	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	5.9		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	15		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.50	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	3.3	J	3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	56		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.5	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.0	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	1.4	J	1.6	0.35	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.32	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
2-Hexanone	0.48	J	1.6	0.36	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.9		1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	8.4		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	7.4		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.1	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
m,p-Xylene	0.90	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.44	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-09

Lab Sample ID: 320-30325-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	85		10	0.36	ppb v/v	2		TO-15	Total/NA
Benzene	0.61	J	0.80	0.16	ppb v/v	2		TO-15	Total/NA
Bromodichloromethane	4.9		0.60	0.13	ppb v/v	2		TO-15	Total/NA
2-Butanone (MEK)	8.3		1.6	0.40	ppb v/v	2		TO-15	Total/NA
Carbon disulfide	150		1.6	0.16	ppb v/v	2		TO-15	Total/NA
Dibromochloromethane	0.94		0.80	0.16	ppb v/v	2		TO-15	Total/NA
Chloroform	31		0.60	0.19	ppb v/v	2		TO-15	Total/NA
Chloromethane	3.1		1.6	0.39	ppb v/v	2		TO-15	Total/NA
1,4-Dichlorobenzene	0.43	J	0.80	0.30	ppb v/v	2		TO-15	Total/NA
Dichlorodifluoromethane	0.32	J	0.80	0.29	ppb v/v	2		TO-15	Total/NA
Ethylbenzene	0.39	J	0.80	0.13	ppb v/v	2		TO-15	Total/NA
Methylene Chloride	7.0		0.80	0.14	ppb v/v	2		TO-15	Total/NA
Styrene	0.88		0.80	0.12	ppb v/v	2		TO-15	Total/NA
Toluene	15		0.80	0.10	ppb v/v	2		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.46	J	1.6	0.32	ppb v/v	2		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.32	J	0.80	0.25	ppb v/v	2		TO-15	Total/NA
m,p-Xylene	0.45	J	1.6	0.20	ppb v/v	2		TO-15	Total/NA
o-Xylene	0.22	J	0.80	0.11	ppb v/v	2		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	200		24	0.85	ug/m3	2		TO-15	Total/NA
Benzene	2.0	J	2.6	0.50	ug/m3	2		TO-15	Total/NA
Bromodichloromethane	33		4.0	0.88	ug/m3	2		TO-15	Total/NA
2-Butanone (MEK)	24		4.7	1.2	ug/m3	2		TO-15	Total/NA
Carbon disulfide	480		5.0	0.49	ug/m3	2		TO-15	Total/NA
Dibromochloromethane	8.0		6.8	1.3	ug/m3	2		TO-15	Total/NA
Chloroform	150		2.9	0.93	ug/m3	2		TO-15	Total/NA
Chloromethane	6.4		3.3	0.81	ug/m3	2		TO-15	Total/NA
1,4-Dichlorobenzene	2.6	J	4.8	1.8	ug/m3	2		TO-15	Total/NA
Dichlorodifluoromethane	1.6	J	4.0	1.4	ug/m3	2		TO-15	Total/NA
Ethylbenzene	1.7	J	3.5	0.55	ug/m3	2		TO-15	Total/NA
Methylene Chloride	24		2.8	0.50	ug/m3	2		TO-15	Total/NA
Styrene	3.7		3.4	0.50	ug/m3	2		TO-15	Total/NA
Toluene	57		3.0	0.38	ug/m3	2		TO-15	Total/NA
1,2,4-Trimethylbenzene	2.3	J	7.9	1.6	ug/m3	2		TO-15	Total/NA
1,3,5-Trimethylbenzene	1.6	J	3.9	1.2	ug/m3	2		TO-15	Total/NA
m,p-Xylene	2.0	J	6.9	0.87	ug/m3	2		TO-15	Total/NA
o-Xylene	0.95	J	3.5	0.47	ug/m3	2		TO-15	Total/NA

Client Sample ID: HOU-10

Lab Sample ID: 320-30325-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	15		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.079	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	15		0.30	0.066	ppb v/v	1		TO-15	Total/NA
Bromoform	0.20	J	0.40	0.070	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.5		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	6.6		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.38	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	2.4		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroethane	0.46	J	0.80	0.31	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-10 (Continued)

Lab Sample ID: 320-30325-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	58		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	2.0		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.22	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,2-Dichloroethane	0.20	J	0.80	0.088	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.16	J	0.40	0.089	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	5.2		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.73		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	3.4		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.20	J	0.40	0.11	ppb v/v	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	0.55		0.40	0.16	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	36		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.25	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	100		2.0	0.44	ug/m3	1		TO-15	Total/NA
Bromoform	2.1	J	4.1	0.72	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	4.3		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	20		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	2.4	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	21		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroethane	1.2	J	2.1	0.81	ug/m3	1		TO-15	Total/NA
Chloroform	280		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	4.2		1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.1	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
1,2-Dichloroethane	0.82	J	3.2	0.36	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.63	J	1.6	0.35	ug/m3	1		TO-15	Total/NA
Methylene Chloride	18		1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	5.0		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	13		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	1.1	J	2.1	0.56	ug/m3	1		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	4.2		3.1	1.2	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-10B

Lab Sample ID: 320-30325-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	37	J	91	3.2	ppb v/v	18.1		TO-15	Total/NA
Bromodichloromethane	17		5.4	1.2	ppb v/v	18.1		TO-15	Total/NA
2-Butanone (MEK)	5.5	J	14	3.6	ppb v/v	18.1		TO-15	Total/NA
Carbon disulfide	24		14	1.4	ppb v/v	18.1		TO-15	Total/NA
Dibromochloromethane	3.2	J	7.2	1.4	ppb v/v	18.1		TO-15	Total/NA
Chloroform	96		5.4	1.7	ppb v/v	18.1		TO-15	Total/NA
Chloromethane	3.8	J	14	3.6	ppb v/v	18.1		TO-15	Total/NA
Methylene Chloride	5.2	J	7.2	1.3	ppb v/v	18.1		TO-15	Total/NA
Toluene	67		7.2	0.92	ppb v/v	18.1		TO-15	Total/NA
1,2,4-Trichlorobenzene	8.4	J	36	7.8	ppb v/v	18.1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	87	J	210	7.7	ug/m3	18.1		TO-15	Total/NA
Bromodichloromethane	110		36	8.0	ug/m3	18.1		TO-15	Total/NA
2-Butanone (MEK)	16	J	43	11	ug/m3	18.1		TO-15	Total/NA
Carbon disulfide	74		45	4.4	ug/m3	18.1		TO-15	Total/NA
Dibromochloromethane	27	J	62	12	ug/m3	18.1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-10B (Continued)

Lab Sample ID: 320-30325-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	470		27	8.4	ug/m3	18.1		TO-15	Total/NA
Chloromethane	7.8	J	30	7.4	ug/m3	18.1		TO-15	Total/NA
Methylene Chloride	18	J	25	4.5	ug/m3	18.1		TO-15	Total/NA
Toluene	250		27	3.5	ug/m3	18.1		TO-15	Total/NA
1,2,4-Trichlorobenzene	62	J	270	58	ug/m3	18.1		TO-15	Total/NA

Client Sample ID: HOU-BKG-01

Lab Sample ID: 320-30325-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	26		24	0.85	ppb v/v	4.79		TO-15	Total/NA
Benzene	1.1	J	1.9	0.38	ppb v/v	4.79		TO-15	Total/NA
Bromodichloromethane	17		1.4	0.32	ppb v/v	4.79		TO-15	Total/NA
2-Butanone (MEK)	4.2		3.8	0.95	ppb v/v	4.79		TO-15	Total/NA
Carbon disulfide	33		3.8	0.37	ppb v/v	4.79		TO-15	Total/NA
Chlorobenzene	2.6		1.4	0.31	ppb v/v	4.79		TO-15	Total/NA
Dibromochloromethane	3.1		1.9	0.38	ppb v/v	4.79		TO-15	Total/NA
Chloroform	130		1.4	0.46	ppb v/v	4.79		TO-15	Total/NA
Chloromethane	4.2		3.8	0.94	ppb v/v	4.79		TO-15	Total/NA
1,4-Dichlorobenzene	8.7		1.9	0.71	ppb v/v	4.79		TO-15	Total/NA
1,1-Dichloroethene	0.74	J	3.8	0.62	ppb v/v	4.79		TO-15	Total/NA
cis-1,2-Dichloroethene	1.9		1.9	0.43	ppb v/v	4.79		TO-15	Total/NA
Ethylbenzene	45		1.9	0.30	ppb v/v	4.79		TO-15	Total/NA
Methylene Chloride	22		1.9	0.34	ppb v/v	4.79		TO-15	Total/NA
Styrene	1.9		1.9	0.28	ppb v/v	4.79		TO-15	Total/NA
Tetrachloroethene	5.1		1.9	0.24	ppb v/v	4.79		TO-15	Total/NA
Toluene	49		1.9	0.24	ppb v/v	4.79		TO-15	Total/NA
Trichloroethene	1.5	J	1.9	0.50	ppb v/v	4.79		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.87	J	3.8	0.78	ppb v/v	4.79		TO-15	Total/NA
Vinyl chloride	1.1	J	1.9	0.57	ppb v/v	4.79		TO-15	Total/NA
m,p-Xylene	2.2	J	3.8	0.48	ppb v/v	4.79		TO-15	Total/NA
o-Xylene	0.73	J	1.9	0.26	ppb v/v	4.79		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	63		57	2.0	ug/m3	4.79		TO-15	Total/NA
Benzene	3.4	J	6.1	1.2	ug/m3	4.79		TO-15	Total/NA
Bromodichloromethane	110		9.6	2.1	ug/m3	4.79		TO-15	Total/NA
2-Butanone (MEK)	13		11	2.8	ug/m3	4.79		TO-15	Total/NA
Carbon disulfide	100		12	1.2	ug/m3	4.79		TO-15	Total/NA
Chlorobenzene	12		6.6	1.4	ug/m3	4.79		TO-15	Total/NA
Dibromochloromethane	26		16	3.2	ug/m3	4.79		TO-15	Total/NA
Chloroform	610		7.0	2.2	ug/m3	4.79		TO-15	Total/NA
Chloromethane	8.6		7.9	1.9	ug/m3	4.79		TO-15	Total/NA
1,4-Dichlorobenzene	52		12	4.3	ug/m3	4.79		TO-15	Total/NA
1,1-Dichloroethene	2.9	J	15	2.4	ug/m3	4.79		TO-15	Total/NA
cis-1,2-Dichloroethene	7.5		7.6	1.7	ug/m3	4.79		TO-15	Total/NA
Ethylbenzene	190		8.3	1.3	ug/m3	4.79		TO-15	Total/NA
Methylene Chloride	77		6.7	1.2	ug/m3	4.79		TO-15	Total/NA
Styrene	8.1		8.2	1.2	ug/m3	4.79		TO-15	Total/NA
Tetrachloroethene	35		13	1.7	ug/m3	4.79		TO-15	Total/NA
Toluene	180		7.2	0.92	ug/m3	4.79		TO-15	Total/NA
Trichloroethene	8.1	J	10	2.7	ug/m3	4.79		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-BKG-01 (Continued)

Lab Sample ID: 320-30325-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,2,4-Trimethylbenzene	4.3	J	19	3.8	ug/m3	4.79		TO-15	Total/NA
Vinyl chloride	2.8	J	4.9	1.5	ug/m3	4.79		TO-15	Total/NA
m,p-Xylene	9.7	J	17	2.1	ug/m3	4.79		TO-15	Total/NA
o-Xylene	3.1	J	8.3	1.1	ug/m3	4.79		TO-15	Total/NA

Client Sample ID: HOU-BKG-02

Lab Sample ID: 320-30325-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	270		96	3.4	ppb v/v	19.1		TO-15	Total/NA
Bromodichloromethane	32		5.7	1.3	ppb v/v	19.1		TO-15	Total/NA
2-Butanone (MEK)	21		15	3.8	ppb v/v	19.1		TO-15	Total/NA
Carbon disulfide	75		15	1.5	ppb v/v	19.1		TO-15	Total/NA
Dibromochloromethane	5.4	J	7.6	1.5	ppb v/v	19.1		TO-15	Total/NA
Chloroform	470		5.7	1.8	ppb v/v	19.1		TO-15	Total/NA
Chloromethane	7.8	J	15	3.8	ppb v/v	19.1		TO-15	Total/NA
Ethylbenzene	1.3	J	7.6	1.2	ppb v/v	19.1		TO-15	Total/NA
Methylene Chloride	13		7.6	1.4	ppb v/v	19.1		TO-15	Total/NA
Toluene	92		7.6	0.97	ppb v/v	19.1		TO-15	Total/NA
Trichloroethene	16		7.6	2.0	ppb v/v	19.1		TO-15	Total/NA
m,p-Xylene	3.4	J	15	1.9	ppb v/v	19.1		TO-15	Total/NA
o-Xylene	1.3	J	7.6	1.0	ppb v/v	19.1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	640		230	8.1	ug/m3	19.1		TO-15	Total/NA
Bromodichloromethane	220		38	8.4	ug/m3	19.1		TO-15	Total/NA
2-Butanone (MEK)	61		45	11	ug/m3	19.1		TO-15	Total/NA
Carbon disulfide	230		48	4.6	ug/m3	19.1		TO-15	Total/NA
Dibromochloromethane	46	J	65	13	ug/m3	19.1		TO-15	Total/NA
Chloroform	2300		28	8.9	ug/m3	19.1		TO-15	Total/NA
Chloromethane	16	J	32	7.8	ug/m3	19.1		TO-15	Total/NA
Ethylbenzene	5.8	J	33	5.2	ug/m3	19.1		TO-15	Total/NA
Methylene Chloride	45		27	4.8	ug/m3	19.1		TO-15	Total/NA
Toluene	350		29	3.7	ug/m3	19.1		TO-15	Total/NA
Trichloroethene	85		41	11	ug/m3	19.1		TO-15	Total/NA
m,p-Xylene	15	J	66	8.3	ug/m3	19.1		TO-15	Total/NA
o-Xylene	5.5	J	33	4.5	ug/m3	19.1		TO-15	Total/NA

Client Sample ID: DUP-1

Lab Sample ID: 320-30325-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	39		39	1.4	ppb v/v	7.81		TO-15	Total/NA
Bromodichloromethane	5.0		2.3	0.52	ppb v/v	7.81		TO-15	Total/NA
Carbon disulfide	18		6.2	0.61	ppb v/v	7.81		TO-15	Total/NA
Dibromochloromethane	0.93	J	3.1	0.62	ppb v/v	7.81		TO-15	Total/NA
Chloroform	23		2.3	0.74	ppb v/v	7.81		TO-15	Total/NA
cis-1,2-Dichloroethene	210		3.1	0.70	ppb v/v	7.81		TO-15	Total/NA
trans-1,2-Dichloroethene	3.4		3.1	0.78	ppb v/v	7.81		TO-15	Total/NA
Methylene Chloride	2.1	J	3.1	0.56	ppb v/v	7.81		TO-15	Total/NA
Tetrachloroethene	20		3.1	0.40	ppb v/v	7.81		TO-15	Total/NA
Toluene	3.6		3.1	0.40	ppb v/v	7.81		TO-15	Total/NA
Trichloroethene	7.8		3.1	0.82	ppb v/v	7.81		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: DUP-1 (Continued)

Lab Sample ID: 320-30325-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	28		3.1	0.94	ppb v/v	7.81		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	93		93	3.3	ug/m3	7.81		TO-15	Total/NA
Bromodichloromethane	33		16	3.5	ug/m3	7.81		TO-15	Total/NA
Carbon disulfide	56		19	1.9	ug/m3	7.81		TO-15	Total/NA
Dibromochloromethane	7.9	J	27	5.3	ug/m3	7.81		TO-15	Total/NA
Chloroform	110		11	3.6	ug/m3	7.81		TO-15	Total/NA
cis-1,2-Dichloroethene	820		12	2.8	ug/m3	7.81		TO-15	Total/NA
trans-1,2-Dichloroethene	13		12	3.1	ug/m3	7.81		TO-15	Total/NA
Methylene Chloride	7.4	J	11	2.0	ug/m3	7.81		TO-15	Total/NA
Tetrachloroethene	140		21	2.7	ug/m3	7.81		TO-15	Total/NA
Toluene	13		12	1.5	ug/m3	7.81		TO-15	Total/NA
Trichloroethene	42		17	4.4	ug/m3	7.81		TO-15	Total/NA
Vinyl chloride	71		8.0	2.4	ug/m3	7.81		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-01

Date Collected: 07/27/17 10:34

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-1

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	61	J	69	2.4	ppb v/v			08/10/17 18:29	13.7
Benzene	ND		5.5	1.1	ppb v/v			08/10/17 18:29	13.7
Benzyl chloride	ND		11	2.2	ppb v/v			08/10/17 18:29	13.7
Bromodichloromethane	73		4.1	0.90	ppb v/v			08/10/17 18:29	13.7
Bromoform	ND		5.5	0.96	ppb v/v			08/10/17 18:29	13.7
Bromomethane	ND		11	4.6	ppb v/v			08/10/17 18:29	13.7
2-Butanone (MEK)	ND		11	2.7	ppb v/v			08/10/17 18:29	13.7
Carbon disulfide	11		11	1.1	ppb v/v			08/10/17 18:29	13.7
Carbon tetrachloride	ND		11	0.88	ppb v/v			08/10/17 18:29	13.7
Chlorobenzene	ND		4.1	0.88	ppb v/v			08/10/17 18:29	13.7
Dibromochloromethane	11		5.5	1.1	ppb v/v			08/10/17 18:29	13.7
Chloroethane	ND		11	4.2	ppb v/v			08/10/17 18:29	13.7
Chloroform	640		4.1	1.3	ppb v/v			08/10/17 18:29	13.7
Chloromethane	6.0	J	11	2.7	ppb v/v			08/10/17 18:29	13.7
1,2-Dibromoethane (EDB)	ND		11	1.0	ppb v/v			08/10/17 18:29	13.7
1,2-Dichlorobenzene	ND		5.5	1.8	ppb v/v			08/10/17 18:29	13.7
1,3-Dichlorobenzene	ND		5.5	1.5	ppb v/v			08/10/17 18:29	13.7
1,4-Dichlorobenzene	ND		5.5	2.0	ppb v/v			08/10/17 18:29	13.7
Dichlorodifluoromethane	ND		5.5	2.0	ppb v/v			08/10/17 18:29	13.7
1,1-Dichloroethane	ND		4.1	0.99	ppb v/v			08/10/17 18:29	13.7
1,2-Dichloroethane	ND		11	1.2	ppb v/v			08/10/17 18:29	13.7
1,1-Dichloroethene	ND		11	1.8	ppb v/v			08/10/17 18:29	13.7
cis-1,2-Dichloroethene	2.6	J	5.5	1.2	ppb v/v			08/10/17 18:29	13.7
trans-1,2-Dichloroethene	ND		5.5	1.4	ppb v/v			08/10/17 18:29	13.7
1,2-Dichloropropane	ND		5.5	3.3	ppb v/v			08/10/17 18:29	13.7
cis-1,3-Dichloropropene	ND		5.5	1.4	ppb v/v			08/10/17 18:29	13.7
trans-1,3-Dichloropropene	ND		5.5	1.2	ppb v/v			08/10/17 18:29	13.7
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		5.5	2.1	ppb v/v			08/10/17 18:29	13.7
Ethylbenzene	0.90	J	5.5	0.86	ppb v/v			08/10/17 18:29	13.7
4-Ethyltoluene	ND		5.5	2.6	ppb v/v			08/10/17 18:29	13.7
Hexachlorobutadiene	ND		27	5.9	ppb v/v			08/10/17 18:29	13.7
2-Hexanone	ND		5.5	1.2	ppb v/v			08/10/17 18:29	13.7
Methylene Chloride	6.2		5.5	0.99	ppb v/v			08/10/17 18:29	13.7
4-Methyl-2-pentanone (MIBK)	ND		5.5	1.8	ppb v/v			08/10/17 18:29	13.7
Styrene	ND		5.5	0.81	ppb v/v			08/10/17 18:29	13.7
1,1,2,2-Tetrachloroethane	ND		5.5	0.95	ppb v/v			08/10/17 18:29	13.7
Tetrachloroethene	1.3	J	5.5	0.70	ppb v/v			08/10/17 18:29	13.7
Toluene	31		5.5	0.70	ppb v/v			08/10/17 18:29	13.7
1,2,4-Trichlorobenzene	ND		27	5.9	ppb v/v			08/10/17 18:29	13.7
1,1,1-Trichloroethane	ND		4.1	0.89	ppb v/v			08/10/17 18:29	13.7
1,1,2-Trichloroethane	ND		5.5	0.92	ppb v/v			08/10/17 18:29	13.7
Trichloroethene	ND		5.5	1.4	ppb v/v			08/10/17 18:29	13.7
Trichlorofluoromethane	ND		5.5	2.7	ppb v/v			08/10/17 18:29	13.7
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		5.5	2.2	ppb v/v			08/10/17 18:29	13.7
1,2,4-Trimethylbenzene	ND		11	2.2	ppb v/v			08/10/17 18:29	13.7
1,3,5-Trimethylbenzene	ND		5.5	1.7	ppb v/v			08/10/17 18:29	13.7
Vinyl acetate	ND		11	2.0	ppb v/v			08/10/17 18:29	13.7
Vinyl chloride	ND		5.5	1.6	ppb v/v			08/10/17 18:29	13.7

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-01

Date Collected: 07/27/17 10:34

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-1

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		11	1.4	ppb v/v			08/10/17 18:29	13.7
o-Xylene	ND		5.5	0.74	ppb v/v			08/10/17 18:29	13.7
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	150	J	160	5.8	ug/m3			08/10/17 18:29	13.7
Benzene	ND		18	3.5	ug/m3			08/10/17 18:29	13.7
Benzyl chloride	ND		57	12	ug/m3			08/10/17 18:29	13.7
Bromodichloromethane	490		28	6.1	ug/m3			08/10/17 18:29	13.7
Bromoform	ND		57	9.9	ug/m3			08/10/17 18:29	13.7
Bromomethane	ND		43	18	ug/m3			08/10/17 18:29	13.7
2-Butanone (MEK)	ND		32	8.0	ug/m3			08/10/17 18:29	13.7
Carbon disulfide	34		34	3.3	ug/m3			08/10/17 18:29	13.7
Carbon tetrachloride	ND		69	5.5	ug/m3			08/10/17 18:29	13.7
Chlorobenzene	ND		19	4.0	ug/m3			08/10/17 18:29	13.7
Dibromochloromethane	93		47	9.2	ug/m3			08/10/17 18:29	13.7
Chloroethane	ND		29	11	ug/m3			08/10/17 18:29	13.7
Chloroform	3100		20	6.4	ug/m3			08/10/17 18:29	13.7
Chloromethane	12	J	23	5.6	ug/m3			08/10/17 18:29	13.7
1,2-Dibromoethane (EDB)	ND		84	7.9	ug/m3			08/10/17 18:29	13.7
1,2-Dichlorobenzene	ND		33	11	ug/m3			08/10/17 18:29	13.7
1,3-Dichlorobenzene	ND		33	9.1	ug/m3			08/10/17 18:29	13.7
1,4-Dichlorobenzene	ND		33	12	ug/m3			08/10/17 18:29	13.7
Dichlorodifluoromethane	ND		27	9.8	ug/m3			08/10/17 18:29	13.7
1,1-Dichloroethane	ND		17	4.0	ug/m3			08/10/17 18:29	13.7
1,2-Dichloroethane	ND		44	4.9	ug/m3			08/10/17 18:29	13.7
1,1-Dichloroethene	ND		43	7.0	ug/m3			08/10/17 18:29	13.7
cis-1,2-Dichloroethene	10	J	22	4.8	ug/m3			08/10/17 18:29	13.7
trans-1,2-Dichloroethene	ND		22	5.4	ug/m3			08/10/17 18:29	13.7
1,2-Dichloropropane	ND		25	15	ug/m3			08/10/17 18:29	13.7
cis-1,3-Dichloropropene	ND		25	6.5	ug/m3			08/10/17 18:29	13.7
trans-1,3-Dichloropropene	ND		25	5.5	ug/m3			08/10/17 18:29	13.7
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		38	15	ug/m3			08/10/17 18:29	13.7
Ethylbenzene	3.9	J	24	3.7	ug/m3			08/10/17 18:29	13.7
4-Ethyltoluene	ND		27	13	ug/m3			08/10/17 18:29	13.7
Hexachlorobutadiene	ND		290	63	ug/m3			08/10/17 18:29	13.7
2-Hexanone	ND		22	4.9	ug/m3			08/10/17 18:29	13.7
Methylene Chloride	21		19	3.4	ug/m3			08/10/17 18:29	13.7
4-Methyl-2-pentanone (MIBK)	ND		22	7.6	ug/m3			08/10/17 18:29	13.7
Styrene	ND		23	3.4	ug/m3			08/10/17 18:29	13.7
1,1,2,2-Tetrachloroethane	ND		38	6.5	ug/m3			08/10/17 18:29	13.7
Tetrachloroethene	9.0	J	37	4.7	ug/m3			08/10/17 18:29	13.7
Toluene	120		21	2.6	ug/m3			08/10/17 18:29	13.7
1,2,4-Trichlorobenzene	ND		200	44	ug/m3			08/10/17 18:29	13.7
1,1,1-Trichloroethane	ND		22	4.9	ug/m3			08/10/17 18:29	13.7
1,1,2-Trichloroethane	ND		30	5.0	ug/m3			08/10/17 18:29	13.7
Trichloroethene	ND		29	7.7	ug/m3			08/10/17 18:29	13.7
Trichlorofluoromethane	ND		31	15	ug/m3			08/10/17 18:29	13.7
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		42	17	ug/m3			08/10/17 18:29	13.7
1,2,4-Trimethylbenzene	ND		54	11	ug/m3			08/10/17 18:29	13.7

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-01

Date Collected: 07/27/17 10:34

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-1

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND		27	8.4	ug/m3			08/10/17 18:29	13.7
Vinyl acetate	ND		39	7.0	ug/m3			08/10/17 18:29	13.7
Vinyl chloride	ND		14	4.2	ug/m3			08/10/17 18:29	13.7
m,p-Xylene	ND		48	5.9	ug/m3			08/10/17 18:29	13.7
o-Xylene	ND		24	3.2	ug/m3			08/10/17 18:29	13.7

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130		08/10/17 18:29	13.7
1,2-Dichloroethane-d4 (Surr)	94		70 - 130		08/10/17 18:29	13.7
Toluene-d8 (Surr)	101		70 - 130		08/10/17 18:29	13.7

Client Sample ID: HOU-01B

Date Collected: 07/27/17 10:42

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	84		84	3.0	ppb v/v			08/10/17 19:21	16.8
Benzene	ND		6.7	1.3	ppb v/v			08/10/17 19:21	16.8
Benzyl chloride	ND		13	2.7	ppb v/v			08/10/17 19:21	16.8
Bromodichloromethane	81		5.0	1.1	ppb v/v			08/10/17 19:21	16.8
Bromoform	ND		6.7	1.2	ppb v/v			08/10/17 19:21	16.8
Bromomethane	ND		13	5.6	ppb v/v			08/10/17 19:21	16.8
2-Butanone (MEK)	ND		13	3.3	ppb v/v			08/10/17 19:21	16.8
Carbon disulfide	20		13	1.3	ppb v/v			08/10/17 19:21	16.8
Carbon tetrachloride	ND		13	1.1	ppb v/v			08/10/17 19:21	16.8
Chlorobenzene	ND		5.0	1.1	ppb v/v			08/10/17 19:21	16.8
Dibromochloromethane	12		6.7	1.3	ppb v/v			08/10/17 19:21	16.8
Chloroethane	ND		13	5.2	ppb v/v			08/10/17 19:21	16.8
Chloroform	810		5.0	1.6	ppb v/v			08/10/17 19:21	16.8
Chloromethane	8.1 J		13	3.3	ppb v/v			08/10/17 19:21	16.8
1,2-Dibromoethane (EDB)	ND		13	1.3	ppb v/v			08/10/17 19:21	16.8
1,2-Dichlorobenzene	ND		6.7	2.2	ppb v/v			08/10/17 19:21	16.8
1,3-Dichlorobenzene	ND		6.7	1.8	ppb v/v			08/10/17 19:21	16.8
1,4-Dichlorobenzene	ND		6.7	2.5	ppb v/v			08/10/17 19:21	16.8
Dichlorodifluoromethane	ND		6.7	2.4	ppb v/v			08/10/17 19:21	16.8
1,1-Dichloroethane	ND		5.0	1.2	ppb v/v			08/10/17 19:21	16.8
1,2-Dichloroethane	ND		13	1.5	ppb v/v			08/10/17 19:21	16.8
1,1-Dichloroethene	ND		13	2.2	ppb v/v			08/10/17 19:21	16.8
cis-1,2-Dichloroethene	5.3 J		6.7	1.5	ppb v/v			08/10/17 19:21	16.8
trans-1,2-Dichloroethene	ND		6.7	1.7	ppb v/v			08/10/17 19:21	16.8
1,2-Dichloropropane	ND		6.7	4.0	ppb v/v			08/10/17 19:21	16.8
cis-1,3-Dichloropropene	ND		6.7	1.7	ppb v/v			08/10/17 19:21	16.8
trans-1,3-Dichloropropene	ND		6.7	1.5	ppb v/v			08/10/17 19:21	16.8
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		6.7	2.6	ppb v/v			08/10/17 19:21	16.8
Ethylbenzene	ND		6.7	1.1	ppb v/v			08/10/17 19:21	16.8
4-Ethyltoluene	ND		6.7	3.1	ppb v/v			08/10/17 19:21	16.8
Hexachlorobutadiene	ND		34	7.3	ppb v/v			08/10/17 19:21	16.8

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-01B

Lab Sample ID: 320-30325-2

Date Collected: 07/27/17 10:42

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		6.7	1.5	ppb v/v			08/10/17 19:21	16.8
Methylene Chloride	7.9		6.7	1.2	ppb v/v			08/10/17 19:21	16.8
4-Methyl-2-pentanone (MIBK)	ND		6.7	2.3	ppb v/v			08/10/17 19:21	16.8
Styrene	ND		6.7	0.99	ppb v/v			08/10/17 19:21	16.8
1,1,2,2-Tetrachloroethane	ND		6.7	1.2	ppb v/v			08/10/17 19:21	16.8
Tetrachloroethene	0.90	J	6.7	0.86	ppb v/v			08/10/17 19:21	16.8
Toluene	43		6.7	0.86	ppb v/v			08/10/17 19:21	16.8
1,2,4-Trichlorobenzene	ND		34	7.3	ppb v/v			08/10/17 19:21	16.8
1,1,1-Trichloroethane	ND		5.0	1.1	ppb v/v			08/10/17 19:21	16.8
1,1,2-Trichloroethane	ND		6.7	1.1	ppb v/v			08/10/17 19:21	16.8
Trichloroethene	ND		6.7	1.8	ppb v/v			08/10/17 19:21	16.8
Trichlorofluoromethane	ND		6.7	3.3	ppb v/v			08/10/17 19:21	16.8
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		6.7	2.7	ppb v/v			08/10/17 19:21	16.8
1,2,4-Trimethylbenzene	ND		13	2.7	ppb v/v			08/10/17 19:21	16.8
1,3,5-Trimethylbenzene	ND		6.7	2.1	ppb v/v			08/10/17 19:21	16.8
Vinyl acetate	ND		13	2.4	ppb v/v			08/10/17 19:21	16.8
Vinyl chloride	ND		6.7	2.0	ppb v/v			08/10/17 19:21	16.8
m,p-Xylene	ND		13	1.7	ppb v/v			08/10/17 19:21	16.8
o-Xylene	ND		6.7	0.91	ppb v/v			08/10/17 19:21	16.8
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	200		200	7.1	ug/m3			08/10/17 19:21	16.8
Benzene	ND		21	4.2	ug/m3			08/10/17 19:21	16.8
Benzyl chloride	ND		70	14	ug/m3			08/10/17 19:21	16.8
Bromodichloromethane	540		34	7.4	ug/m3			08/10/17 19:21	16.8
Bromoform	ND		69	12	ug/m3			08/10/17 19:21	16.8
Bromomethane	ND		52	22	ug/m3			08/10/17 19:21	16.8
2-Butanone (MEK)	ND		40	9.9	ug/m3			08/10/17 19:21	16.8
Carbon disulfide	63		42	4.1	ug/m3			08/10/17 19:21	16.8
Carbon tetrachloride	ND		85	6.8	ug/m3			08/10/17 19:21	16.8
Chlorobenzene	ND		23	4.9	ug/m3			08/10/17 19:21	16.8
Dibromochloromethane	99		57	11	ug/m3			08/10/17 19:21	16.8
Chloroethane	ND		35	14	ug/m3			08/10/17 19:21	16.8
Chloroform	4000		25	7.8	ug/m3			08/10/17 19:21	16.8
Chloromethane	17	J	28	6.8	ug/m3			08/10/17 19:21	16.8
1,2-Dibromoethane (EDB)	ND		100	9.7	ug/m3			08/10/17 19:21	16.8
1,2-Dichlorobenzene	ND		40	13	ug/m3			08/10/17 19:21	16.8
1,3-Dichlorobenzene	ND		40	11	ug/m3			08/10/17 19:21	16.8
1,4-Dichlorobenzene	ND		40	15	ug/m3			08/10/17 19:21	16.8
Dichlorodifluoromethane	ND		33	12	ug/m3			08/10/17 19:21	16.8
1,1-Dichloroethane	ND		20	4.9	ug/m3			08/10/17 19:21	16.8
1,2-Dichloroethane	ND		54	6.0	ug/m3			08/10/17 19:21	16.8
1,1-Dichloroethene	ND		53	8.6	ug/m3			08/10/17 19:21	16.8
cis-1,2-Dichloroethene	21	J	27	5.9	ug/m3			08/10/17 19:21	16.8
trans-1,2-Dichloroethene	ND		27	6.7	ug/m3			08/10/17 19:21	16.8
1,2-Dichloropropane	ND		31	19	ug/m3			08/10/17 19:21	16.8
cis-1,3-Dichloropropene	ND		30	7.9	ug/m3			08/10/17 19:21	16.8
trans-1,3-Dichloropropene	ND		30	6.7	ug/m3			08/10/17 19:21	16.8
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		47	18	ug/m3			08/10/17 19:21	16.8

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-01B

Date Collected: 07/27/17 10:42

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		29	4.6	ug/m3			08/10/17 19:21	16.8
4-Ethyltoluene	ND		33	15	ug/m3			08/10/17 19:21	16.8
Hexachlorobutadiene	ND		360	77	ug/m3			08/10/17 19:21	16.8
2-Hexanone	ND		28	6.0	ug/m3			08/10/17 19:21	16.8
Methylene Chloride	27		23	4.2	ug/m3			08/10/17 19:21	16.8
4-Methyl-2-pentanone (MIBK)	ND		28	9.3	ug/m3			08/10/17 19:21	16.8
Styrene	ND		29	4.2	ug/m3			08/10/17 19:21	16.8
1,1,2,2-Tetrachloroethane	ND		46	8.0	ug/m3			08/10/17 19:21	16.8
Tetrachloroethene	6.1	J	46	5.8	ug/m3			08/10/17 19:21	16.8
Toluene	160		25	3.2	ug/m3			08/10/17 19:21	16.8
1,2,4-Trichlorobenzene	ND		250	54	ug/m3			08/10/17 19:21	16.8
1,1,1-Trichloroethane	ND		28	6.0	ug/m3			08/10/17 19:21	16.8
1,1,2-Trichloroethane	ND		37	6.1	ug/m3			08/10/17 19:21	16.8
Trichloroethene	ND		36	9.5	ug/m3			08/10/17 19:21	16.8
Trichlorofluoromethane	ND		38	19	ug/m3			08/10/17 19:21	16.8
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		52	21	ug/m3			08/10/17 19:21	16.8
1,2,4-Trimethylbenzene	ND		66	13	ug/m3			08/10/17 19:21	16.8
1,3,5-Trimethylbenzene	ND		33	10	ug/m3			08/10/17 19:21	16.8
Vinyl acetate	ND		47	8.6	ug/m3			08/10/17 19:21	16.8
Vinyl chloride	ND		17	5.2	ug/m3			08/10/17 19:21	16.8
m,p-Xylene	ND		58	7.3	ug/m3			08/10/17 19:21	16.8
o-Xylene	ND		29	3.9	ug/m3			08/10/17 19:21	16.8
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130					08/10/17 19:21	16.8
1,2-Dichloroethane-d4 (Surr)	95		70 - 130					08/10/17 19:21	16.8
Toluene-d8 (Surr)	103		70 - 130					08/10/17 19:21	16.8

Client Sample ID: HOU-02

Date Collected: 07/27/17 10:24

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-3

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	8.2		5.0	0.18	ppb v/v			08/10/17 20:16	1
Benzene	0.30	J	0.40	0.079	ppb v/v			08/10/17 20:16	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			08/10/17 20:16	1
Bromodichloromethane	0.19	J	0.30	0.066	ppb v/v			08/10/17 20:16	1
Bromoform	ND		0.40	0.070	ppb v/v			08/10/17 20:16	1
Bromomethane	ND		0.80	0.34	ppb v/v			08/10/17 20:16	1
2-Butanone (MEK)	1.3		0.80	0.20	ppb v/v			08/10/17 20:16	1
Carbon disulfide	3.2		0.80	0.078	ppb v/v			08/10/17 20:16	1
Carbon tetrachloride	0.094	J	0.80	0.064	ppb v/v			08/10/17 20:16	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			08/10/17 20:16	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			08/10/17 20:16	1
Chloroethane	ND		0.80	0.31	ppb v/v			08/10/17 20:16	1
Chloroform	11		0.30	0.095	ppb v/v			08/10/17 20:16	1
Chloromethane	1.0		0.80	0.20	ppb v/v			08/10/17 20:16	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-02

Date Collected: 07/27/17 10:24

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-3

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			08/10/17 20:16	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			08/10/17 20:16	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			08/10/17 20:16	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			08/10/17 20:16	1
Dichlorodifluoromethane	0.30	J	0.40	0.15	ppb v/v			08/10/17 20:16	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			08/10/17 20:16	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			08/10/17 20:16	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			08/10/17 20:16	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			08/10/17 20:16	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			08/10/17 20:16	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			08/10/17 20:16	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			08/10/17 20:16	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			08/10/17 20:16	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			08/10/17 20:16	1
Ethylbenzene	0.087	J	0.40	0.063	ppb v/v			08/10/17 20:16	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			08/10/17 20:16	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			08/10/17 20:16	1
2-Hexanone	ND		0.40	0.087	ppb v/v			08/10/17 20:16	1
Methylene Chloride	0.19	J	0.40	0.072	ppb v/v			08/10/17 20:16	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			08/10/17 20:16	1
Styrene	ND		0.40	0.059	ppb v/v			08/10/17 20:16	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			08/10/17 20:16	1
Tetrachloroethene	0.12	J	0.40	0.051	ppb v/v			08/10/17 20:16	1
Toluene	0.82		0.40	0.051	ppb v/v			08/10/17 20:16	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			08/10/17 20:16	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			08/10/17 20:16	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			08/10/17 20:16	1
Trichloroethene	ND		0.40	0.11	ppb v/v			08/10/17 20:16	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			08/10/17 20:16	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			08/10/17 20:16	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			08/10/17 20:16	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			08/10/17 20:16	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			08/10/17 20:16	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			08/10/17 20:16	1
m,p-Xylene	0.26	J	0.80	0.10	ppb v/v			08/10/17 20:16	1
o-Xylene	0.10	J	0.40	0.054	ppb v/v			08/10/17 20:16	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	19		12	0.42	ug/m3			08/10/17 20:16	1
Benzene	0.96	J	1.3	0.25	ug/m3			08/10/17 20:16	1
Benzyl chloride	ND		4.1	0.84	ug/m3			08/10/17 20:16	1
Bromodichloromethane	1.3	J	2.0	0.44	ug/m3			08/10/17 20:16	1
Bromoform	ND		4.1	0.72	ug/m3			08/10/17 20:16	1
Bromomethane	ND		3.1	1.3	ug/m3			08/10/17 20:16	1
2-Butanone (MEK)	3.7		2.4	0.59	ug/m3			08/10/17 20:16	1
Carbon disulfide	9.9		2.5	0.24	ug/m3			08/10/17 20:16	1
Carbon tetrachloride	0.59	J	5.0	0.40	ug/m3			08/10/17 20:16	1
Chlorobenzene	ND		1.4	0.29	ug/m3			08/10/17 20:16	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			08/10/17 20:16	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-02

Date Collected: 07/27/17 10:24

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-3

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		2.1	0.81	ug/m3			08/10/17 20:16	1
Chloroform	56		1.5	0.46	ug/m3			08/10/17 20:16	1
Chloromethane	2.2		1.7	0.41	ug/m3			08/10/17 20:16	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			08/10/17 20:16	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			08/10/17 20:16	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			08/10/17 20:16	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			08/10/17 20:16	1
Dichlorodifluoromethane	1.5 J		2.0	0.72	ug/m3			08/10/17 20:16	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			08/10/17 20:16	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			08/10/17 20:16	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			08/10/17 20:16	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			08/10/17 20:16	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			08/10/17 20:16	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			08/10/17 20:16	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			08/10/17 20:16	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			08/10/17 20:16	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			08/10/17 20:16	1
Ethylbenzene	0.38 J		1.7	0.27	ug/m3			08/10/17 20:16	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			08/10/17 20:16	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			08/10/17 20:16	1
2-Hexanone	ND		1.6	0.36	ug/m3			08/10/17 20:16	1
Methylene Chloride	0.65 J		1.4	0.25	ug/m3			08/10/17 20:16	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			08/10/17 20:16	1
Styrene	ND		1.7	0.25	ug/m3			08/10/17 20:16	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			08/10/17 20:16	1
Tetrachloroethene	0.79 J		2.7	0.35	ug/m3			08/10/17 20:16	1
Toluene	3.1		1.5	0.19	ug/m3			08/10/17 20:16	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			08/10/17 20:16	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			08/10/17 20:16	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			08/10/17 20:16	1
Trichloroethene	ND		2.1	0.56	ug/m3			08/10/17 20:16	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			08/10/17 20:16	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			08/10/17 20:16	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			08/10/17 20:16	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			08/10/17 20:16	1
Vinyl acetate	ND		2.8	0.51	ug/m3			08/10/17 20:16	1
Vinyl chloride	ND		1.0	0.31	ug/m3			08/10/17 20:16	1
m,p-Xylene	1.1 J		3.5	0.43	ug/m3			08/10/17 20:16	1
o-Xylene	0.45 J		1.7	0.23	ug/m3			08/10/17 20:16	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130		08/10/17 20:16	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 130		08/10/17 20:16	1
Toluene-d8 (Surr)	103		70 - 130		08/10/17 20:16	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-03

Lab Sample ID: 320-30325-4

Date Collected: 07/27/17 10:05

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	15	J	17	0.59	ppb v/v			08/10/17 21:08	3.34
Benzene	0.44	J	1.3	0.26	ppb v/v			08/10/17 21:08	3.34
Benzyl chloride	ND		2.7	0.54	ppb v/v			08/10/17 21:08	3.34
Bromodichloromethane	0.32	J	1.0	0.22	ppb v/v			08/10/17 21:08	3.34
Bromoform	ND		1.3	0.23	ppb v/v			08/10/17 21:08	3.34
Bromomethane	ND		2.7	1.1	ppb v/v			08/10/17 21:08	3.34
2-Butanone (MEK)	1.9	J	2.7	0.66	ppb v/v			08/10/17 21:08	3.34
Carbon disulfide	300		2.7	0.26	ppb v/v			08/10/17 21:08	3.34
Carbon tetrachloride	ND		2.7	0.21	ppb v/v			08/10/17 21:08	3.34
Chlorobenzene	ND		1.0	0.21	ppb v/v			08/10/17 21:08	3.34
Dibromochloromethane	ND		1.3	0.26	ppb v/v			08/10/17 21:08	3.34
Chloroethane	ND		2.7	1.0	ppb v/v			08/10/17 21:08	3.34
Chloroform	12		1.0	0.32	ppb v/v			08/10/17 21:08	3.34
Chloromethane	ND		2.7	0.66	ppb v/v			08/10/17 21:08	3.34
1,2-Dibromoethane (EDB)	ND		2.7	0.25	ppb v/v			08/10/17 21:08	3.34
1,2-Dichlorobenzene	ND		1.3	0.43	ppb v/v			08/10/17 21:08	3.34
1,3-Dichlorobenzene	ND		1.3	0.37	ppb v/v			08/10/17 21:08	3.34
1,4-Dichlorobenzene	ND		1.3	0.50	ppb v/v			08/10/17 21:08	3.34
Dichlorodifluoromethane	ND		1.3	0.48	ppb v/v			08/10/17 21:08	3.34
1,1-Dichloroethane	ND		1.0	0.24	ppb v/v			08/10/17 21:08	3.34
1,2-Dichloroethane	ND		2.7	0.29	ppb v/v			08/10/17 21:08	3.34
1,1-Dichloroethene	ND		2.7	0.43	ppb v/v			08/10/17 21:08	3.34
cis-1,2-Dichloroethene	12		1.3	0.30	ppb v/v			08/10/17 21:08	3.34
trans-1,2-Dichloroethene	ND		1.3	0.33	ppb v/v			08/10/17 21:08	3.34
1,2-Dichloropropane	ND		1.3	0.80	ppb v/v			08/10/17 21:08	3.34
cis-1,3-Dichloropropene	ND		1.3	0.35	ppb v/v			08/10/17 21:08	3.34
trans-1,3-Dichloropropene	ND		1.3	0.29	ppb v/v			08/10/17 21:08	3.34
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.3	0.52	ppb v/v			08/10/17 21:08	3.34
Ethylbenzene	ND		1.3	0.21	ppb v/v			08/10/17 21:08	3.34
4-Ethyltoluene	ND		1.3	0.62	ppb v/v			08/10/17 21:08	3.34
Hexachlorobutadiene	1.5	J	6.7	1.4	ppb v/v			08/10/17 21:08	3.34
2-Hexanone	ND		1.3	0.29	ppb v/v			08/10/17 21:08	3.34
Methylene Chloride	0.72	J	1.3	0.24	ppb v/v			08/10/17 21:08	3.34
4-Methyl-2-pentanone (MIBK)	ND		1.3	0.45	ppb v/v			08/10/17 21:08	3.34
Styrene	ND		1.3	0.20	ppb v/v			08/10/17 21:08	3.34
1,1,2,2-Tetrachloroethane	ND		1.3	0.23	ppb v/v			08/10/17 21:08	3.34
Tetrachloroethene	210		1.3	0.17	ppb v/v			08/10/17 21:08	3.34
Toluene	0.76	J	1.3	0.17	ppb v/v			08/10/17 21:08	3.34
1,2,4-Trichlorobenzene	2.3	J	6.7	1.4	ppb v/v			08/10/17 21:08	3.34
1,1,1-Trichloroethane	ND		1.0	0.22	ppb v/v			08/10/17 21:08	3.34
1,1,2-Trichloroethane	ND		1.3	0.22	ppb v/v			08/10/17 21:08	3.34
Trichloroethene	6.7		1.3	0.35	ppb v/v			08/10/17 21:08	3.34
Trichlorofluoromethane	ND		1.3	0.65	ppb v/v			08/10/17 21:08	3.34
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.3	0.54	ppb v/v			08/10/17 21:08	3.34
1,2,4-Trimethylbenzene	ND		2.7	0.54	ppb v/v			08/10/17 21:08	3.34
1,3,5-Trimethylbenzene	ND		1.3	0.42	ppb v/v			08/10/17 21:08	3.34
Vinyl acetate	ND		2.7	0.48	ppb v/v			08/10/17 21:08	3.34
Vinyl chloride	ND		1.3	0.40	ppb v/v			08/10/17 21:08	3.34

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-03

Lab Sample ID: 320-30325-4

Date Collected: 07/27/17 10:05

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		2.7	0.33	ppb v/v			08/10/17 21:08	3.34
o-Xylene	ND		1.3	0.18	ppb v/v			08/10/17 21:08	3.34
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	36	J	40	1.4	ug/m3			08/10/17 21:08	3.34
Benzene	1.4	J	4.3	0.84	ug/m3			08/10/17 21:08	3.34
Benzyl chloride	ND		14	2.8	ug/m3			08/10/17 21:08	3.34
Bromodichloromethane	2.2	J	6.7	1.5	ug/m3			08/10/17 21:08	3.34
Bromoform	ND		14	2.4	ug/m3			08/10/17 21:08	3.34
Bromomethane	ND		10	4.3	ug/m3			08/10/17 21:08	3.34
2-Butanone (MEK)	5.5	J	7.9	2.0	ug/m3			08/10/17 21:08	3.34
Carbon disulfide	940		8.3	0.81	ug/m3			08/10/17 21:08	3.34
Carbon tetrachloride	ND		17	1.3	ug/m3			08/10/17 21:08	3.34
Chlorobenzene	ND		4.6	0.98	ug/m3			08/10/17 21:08	3.34
Dibromochloromethane	ND		11	2.2	ug/m3			08/10/17 21:08	3.34
Chloroethane	ND		7.1	2.7	ug/m3			08/10/17 21:08	3.34
Chloroform	58		4.9	1.5	ug/m3			08/10/17 21:08	3.34
Chloromethane	ND		5.5	1.4	ug/m3			08/10/17 21:08	3.34
1,2-Dibromoethane (EDB)	ND		21	1.9	ug/m3			08/10/17 21:08	3.34
1,2-Dichlorobenzene	ND		8.0	2.6	ug/m3			08/10/17 21:08	3.34
1,3-Dichlorobenzene	ND		8.0	2.2	ug/m3			08/10/17 21:08	3.34
1,4-Dichlorobenzene	ND		8.0	3.0	ug/m3			08/10/17 21:08	3.34
Dichlorodifluoromethane	ND		6.6	2.4	ug/m3			08/10/17 21:08	3.34
1,1-Dichloroethane	ND		4.1	0.97	ug/m3			08/10/17 21:08	3.34
1,2-Dichloroethane	ND		11	1.2	ug/m3			08/10/17 21:08	3.34
1,1-Dichloroethene	ND		11	1.7	ug/m3			08/10/17 21:08	3.34
cis-1,2-Dichloroethene	48		5.3	1.2	ug/m3			08/10/17 21:08	3.34
trans-1,2-Dichloroethene	ND		5.3	1.3	ug/m3			08/10/17 21:08	3.34
1,2-Dichloropropane	ND		6.2	3.7	ug/m3			08/10/17 21:08	3.34
cis-1,3-Dichloropropene	ND		6.1	1.6	ug/m3			08/10/17 21:08	3.34
trans-1,3-Dichloropropene	ND		6.1	1.3	ug/m3			08/10/17 21:08	3.34
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		9.3	3.6	ug/m3			08/10/17 21:08	3.34
Ethylbenzene	ND		5.8	0.91	ug/m3			08/10/17 21:08	3.34
4-Ethyltoluene	ND		6.6	3.1	ug/m3			08/10/17 21:08	3.34
Hexachlorobutadiene	16	J	71	15	ug/m3			08/10/17 21:08	3.34
2-Hexanone	ND		5.5	1.2	ug/m3			08/10/17 21:08	3.34
Methylene Chloride	2.5	J	4.6	0.84	ug/m3			08/10/17 21:08	3.34
4-Methyl-2-pentanone (MIBK)	ND		5.5	1.8	ug/m3			08/10/17 21:08	3.34
Styrene	ND		5.7	0.84	ug/m3			08/10/17 21:08	3.34
1,1,2,2-Tetrachloroethane	ND		9.2	1.6	ug/m3			08/10/17 21:08	3.34
Tetrachloroethene	1500		9.1	1.2	ug/m3			08/10/17 21:08	3.34
Toluene	2.9	J	5.0	0.64	ug/m3			08/10/17 21:08	3.34
1,2,4-Trichlorobenzene	17	J	50	11	ug/m3			08/10/17 21:08	3.34
1,1,1-Trichloroethane	ND		5.5	1.2	ug/m3			08/10/17 21:08	3.34
1,1,2-Trichloroethane	ND		7.3	1.2	ug/m3			08/10/17 21:08	3.34
Trichloroethene	36		7.2	1.9	ug/m3			08/10/17 21:08	3.34
Trichlorofluoromethane	ND		7.5	3.7	ug/m3			08/10/17 21:08	3.34
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		10	4.2	ug/m3			08/10/17 21:08	3.34
1,2,4-Trimethylbenzene	ND		13	2.7	ug/m3			08/10/17 21:08	3.34

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-03

Date Collected: 07/27/17 10:05

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-4

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND		6.6	2.1	ug/m3			08/10/17 21:08	3.34
Vinyl acetate	ND		9.4	1.7	ug/m3			08/10/17 21:08	3.34
Vinyl chloride	ND		3.4	1.0	ug/m3			08/10/17 21:08	3.34
m,p-Xylene	ND		12	1.5	ug/m3			08/10/17 21:08	3.34
o-Xylene	ND		5.8	0.78	ug/m3			08/10/17 21:08	3.34
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					08/10/17 21:08	3.34
1,2-Dichloroethane-d4 (Surr)	99		70 - 130					08/10/17 21:08	3.34
Toluene-d8 (Surr)	103		70 - 130					08/10/17 21:08	3.34

Client Sample ID: HOU-03B

Date Collected: 07/27/17 10:15

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-5

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	56		8.3	0.30	ppb v/v			08/10/17 22:02	1.66
Benzene	0.15	J	0.66	0.13	ppb v/v			08/10/17 22:02	1.66
Benzyl chloride	ND		1.3	0.27	ppb v/v			08/10/17 22:02	1.66
Bromodichloromethane	9.1		0.50	0.11	ppb v/v			08/10/17 22:02	1.66
Bromoform	0.12	J	0.66	0.12	ppb v/v			08/10/17 22:02	1.66
Bromomethane	ND		1.3	0.56	ppb v/v			08/10/17 22:02	1.66
2-Butanone (MEK)	1.6		1.3	0.33	ppb v/v			08/10/17 22:02	1.66
Carbon disulfide	15		1.3	0.13	ppb v/v			08/10/17 22:02	1.66
Carbon tetrachloride	0.17	J	1.3	0.11	ppb v/v			08/10/17 22:02	1.66
Chlorobenzene	ND		0.50	0.11	ppb v/v			08/10/17 22:02	1.66
Dibromochloromethane	1.7		0.66	0.13	ppb v/v			08/10/17 22:02	1.66
Chloroethane	ND		1.3	0.51	ppb v/v			08/10/17 22:02	1.66
Chloroform	75		0.50	0.16	ppb v/v			08/10/17 22:02	1.66
Chloromethane	1.6		1.3	0.33	ppb v/v			08/10/17 22:02	1.66
1,2-Dibromoethane (EDB)	ND		1.3	0.12	ppb v/v			08/10/17 22:02	1.66
1,2-Dichlorobenzene	ND		0.66	0.22	ppb v/v			08/10/17 22:02	1.66
1,3-Dichlorobenzene	ND		0.66	0.18	ppb v/v			08/10/17 22:02	1.66
1,4-Dichlorobenzene	ND		0.66	0.25	ppb v/v			08/10/17 22:02	1.66
Dichlorodifluoromethane	0.39	J	0.66	0.24	ppb v/v			08/10/17 22:02	1.66
1,1-Dichloroethane	ND		0.50	0.12	ppb v/v			08/10/17 22:02	1.66
1,2-Dichloroethane	2.5		1.3	0.15	ppb v/v			08/10/17 22:02	1.66
1,1-Dichloroethene	ND		1.3	0.21	ppb v/v			08/10/17 22:02	1.66
cis-1,2-Dichloroethene	0.83		0.66	0.15	ppb v/v			08/10/17 22:02	1.66
trans-1,2-Dichloroethene	ND		0.66	0.17	ppb v/v			08/10/17 22:02	1.66
1,2-Dichloropropane	ND		0.66	0.40	ppb v/v			08/10/17 22:02	1.66
cis-1,3-Dichloropropene	ND		0.66	0.17	ppb v/v			08/10/17 22:02	1.66
trans-1,3-Dichloropropene	ND		0.66	0.15	ppb v/v			08/10/17 22:02	1.66
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.66	0.26	ppb v/v			08/10/17 22:02	1.66
Ethylbenzene	0.15	J	0.66	0.10	ppb v/v			08/10/17 22:02	1.66
4-Ethyltoluene	ND		0.66	0.31	ppb v/v			08/10/17 22:02	1.66
Hexachlorobutadiene	ND		3.3	0.72	ppb v/v			08/10/17 22:02	1.66

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-03B

Lab Sample ID: 320-30325-5

Date Collected: 07/27/17 10:15

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		0.66	0.14	ppb v/v			08/10/17 22:02	1.66
Methylene Chloride	0.87		0.66	0.12	ppb v/v			08/10/17 22:02	1.66
4-Methyl-2-pentanone (MIBK)	ND		0.66	0.22	ppb v/v			08/10/17 22:02	1.66
Styrene	ND		0.66	0.098	ppb v/v			08/10/17 22:02	1.66
1,1,2,2-Tetrachloroethane	ND		0.66	0.11	ppb v/v			08/10/17 22:02	1.66
Tetrachloroethene	0.81		0.66	0.085	ppb v/v			08/10/17 22:02	1.66
Toluene	2.0		0.66	0.085	ppb v/v			08/10/17 22:02	1.66
1,2,4-Trichlorobenzene	ND		3.3	0.72	ppb v/v			08/10/17 22:02	1.66
1,1,1-Trichloroethane	ND		0.50	0.11	ppb v/v			08/10/17 22:02	1.66
1,1,2-Trichloroethane	ND		0.66	0.11	ppb v/v			08/10/17 22:02	1.66
Trichloroethene	0.25	J	0.66	0.17	ppb v/v			08/10/17 22:02	1.66
Trichlorofluoromethane	ND		0.66	0.33	ppb v/v			08/10/17 22:02	1.66
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.66	0.27	ppb v/v			08/10/17 22:02	1.66
1,2,4-Trimethylbenzene	ND		1.3	0.27	ppb v/v			08/10/17 22:02	1.66
1,3,5-Trimethylbenzene	ND		0.66	0.21	ppb v/v			08/10/17 22:02	1.66
Vinyl acetate	ND		1.3	0.24	ppb v/v			08/10/17 22:02	1.66
Vinyl chloride	ND		0.66	0.20	ppb v/v			08/10/17 22:02	1.66
m,p-Xylene	0.45	J	1.3	0.17	ppb v/v			08/10/17 22:02	1.66
o-Xylene	0.17	J	0.66	0.090	ppb v/v			08/10/17 22:02	1.66
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	130		20	0.70	ug/m3			08/10/17 22:02	1.66
Benzene	0.47	J	2.1	0.42	ug/m3			08/10/17 22:02	1.66
Benzyl chloride	ND		6.9	1.4	ug/m3			08/10/17 22:02	1.66
Bromodichloromethane	61		3.3	0.73	ug/m3			08/10/17 22:02	1.66
Bromoform	1.2	J	6.9	1.2	ug/m3			08/10/17 22:02	1.66
Bromomethane	ND		5.2	2.2	ug/m3			08/10/17 22:02	1.66
2-Butanone (MEK)	4.8		3.9	0.97	ug/m3			08/10/17 22:02	1.66
Carbon disulfide	48		4.1	0.40	ug/m3			08/10/17 22:02	1.66
Carbon tetrachloride	1.1	J	8.4	0.67	ug/m3			08/10/17 22:02	1.66
Chlorobenzene	ND		2.3	0.49	ug/m3			08/10/17 22:02	1.66
Dibromochloromethane	15		5.7	1.1	ug/m3			08/10/17 22:02	1.66
Chloroethane	ND		3.5	1.3	ug/m3			08/10/17 22:02	1.66
Chloroform	360		2.4	0.77	ug/m3			08/10/17 22:02	1.66
Chloromethane	3.4		2.7	0.68	ug/m3			08/10/17 22:02	1.66
1,2-Dibromoethane (EDB)	ND		10	0.96	ug/m3			08/10/17 22:02	1.66
1,2-Dichlorobenzene	ND		4.0	1.3	ug/m3			08/10/17 22:02	1.66
1,3-Dichlorobenzene	ND		4.0	1.1	ug/m3			08/10/17 22:02	1.66
1,4-Dichlorobenzene	ND		4.0	1.5	ug/m3			08/10/17 22:02	1.66
Dichlorodifluoromethane	1.9	J	3.3	1.2	ug/m3			08/10/17 22:02	1.66
1,1-Dichloroethane	ND		2.0	0.48	ug/m3			08/10/17 22:02	1.66
1,2-Dichloroethane	10		5.4	0.59	ug/m3			08/10/17 22:02	1.66
1,1-Dichloroethene	ND		5.3	0.85	ug/m3			08/10/17 22:02	1.66
cis-1,2-Dichloroethene	3.3		2.6	0.59	ug/m3			08/10/17 22:02	1.66
trans-1,2-Dichloroethene	ND		2.6	0.66	ug/m3			08/10/17 22:02	1.66
1,2-Dichloropropane	ND		3.1	1.8	ug/m3			08/10/17 22:02	1.66
cis-1,3-Dichloropropene	ND		3.0	0.78	ug/m3			08/10/17 22:02	1.66
trans-1,3-Dichloropropene	ND		3.0	0.66	ug/m3			08/10/17 22:02	1.66
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.6	1.8	ug/m3			08/10/17 22:02	1.66

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-03B

Lab Sample ID: 320-30325-5

Date Collected: 07/27/17 10:15

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	0.63	J	2.9	0.45	ug/m3			08/10/17 22:02	1.66
4-Ethyltoluene	ND		3.3	1.5	ug/m3			08/10/17 22:02	1.66
Hexachlorobutadiene	ND		35	7.6	ug/m3			08/10/17 22:02	1.66
2-Hexanone	ND		2.7	0.59	ug/m3			08/10/17 22:02	1.66
Methylene Chloride	3.0		2.3	0.42	ug/m3			08/10/17 22:02	1.66
4-Methyl-2-pentanone (MIBK)	ND		2.7	0.92	ug/m3			08/10/17 22:02	1.66
Styrene	ND		2.8	0.42	ug/m3			08/10/17 22:02	1.66
1,1,2,2-Tetrachloroethane	ND		4.6	0.79	ug/m3			08/10/17 22:02	1.66
Tetrachloroethene	5.5		4.5	0.57	ug/m3			08/10/17 22:02	1.66
Toluene	7.6		2.5	0.32	ug/m3			08/10/17 22:02	1.66
1,2,4-Trichlorobenzene	ND		25	5.3	ug/m3			08/10/17 22:02	1.66
1,1,1-Trichloroethane	ND		2.7	0.59	ug/m3			08/10/17 22:02	1.66
1,1,2-Trichloroethane	ND		3.6	0.61	ug/m3			08/10/17 22:02	1.66
Trichloroethene	1.3	J	3.6	0.94	ug/m3			08/10/17 22:02	1.66
Trichlorofluoromethane	ND		3.7	1.8	ug/m3			08/10/17 22:02	1.66
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		5.1	2.1	ug/m3			08/10/17 22:02	1.66
1,2,4-Trimethylbenzene	ND		6.5	1.3	ug/m3			08/10/17 22:02	1.66
1,3,5-Trimethylbenzene	ND		3.3	1.0	ug/m3			08/10/17 22:02	1.66
Vinyl acetate	ND		4.7	0.85	ug/m3			08/10/17 22:02	1.66
Vinyl chloride	ND		1.7	0.51	ug/m3			08/10/17 22:02	1.66
m,p-Xylene	2.0	J	5.8	0.72	ug/m3			08/10/17 22:02	1.66
o-Xylene	0.74	J	2.9	0.39	ug/m3			08/10/17 22:02	1.66
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130					08/10/17 22:02	1.66
1,2-Dichloroethane-d4 (Surr)	99		70 - 130					08/10/17 22:02	1.66
Toluene-d8 (Surr)	101		70 - 130					08/10/17 22:02	1.66

Client Sample ID: HOU-04

Lab Sample ID: 320-30325-6

Date Collected: 07/27/17 08:14

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	9.5		5.0	0.18	ppb v/v			08/10/17 22:58	1
Benzene	ND		0.40	0.079	ppb v/v			08/10/17 22:58	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			08/10/17 22:58	1
Bromodichloromethane	1.4		0.30	0.066	ppb v/v			08/10/17 22:58	1
Bromoform	ND		0.40	0.070	ppb v/v			08/10/17 22:58	1
Bromomethane	ND		0.80	0.34	ppb v/v			08/10/17 22:58	1
2-Butanone (MEK)	2.0		0.80	0.20	ppb v/v			08/10/17 22:58	1
Carbon disulfide	4.1		0.80	0.078	ppb v/v			08/10/17 22:58	1
Carbon tetrachloride	0.067	J	0.80	0.064	ppb v/v			08/10/17 22:58	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			08/10/17 22:58	1
Dibromochloromethane	0.26	J	0.40	0.079	ppb v/v			08/10/17 22:58	1
Chloroethane	ND		0.80	0.31	ppb v/v			08/10/17 22:58	1
Chloroform	7.8		0.30	0.095	ppb v/v			08/10/17 22:58	1
Chloromethane	0.39	J	0.80	0.20	ppb v/v			08/10/17 22:58	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-04

Date Collected: 07/27/17 08:14

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-6

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			08/10/17 22:58	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			08/10/17 22:58	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			08/10/17 22:58	1
1,4-Dichlorobenzene	0.46		0.40	0.15	ppb v/v			08/10/17 22:58	1
Dichlorodifluoromethane	0.26	J	0.40	0.15	ppb v/v			08/10/17 22:58	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			08/10/17 22:58	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			08/10/17 22:58	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			08/10/17 22:58	1
cis-1,2-Dichloroethene	0.34	J	0.40	0.089	ppb v/v			08/10/17 22:58	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			08/10/17 22:58	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			08/10/17 22:58	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			08/10/17 22:58	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			08/10/17 22:58	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			08/10/17 22:58	1
Ethylbenzene	0.13	J	0.40	0.063	ppb v/v			08/10/17 22:58	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			08/10/17 22:58	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			08/10/17 22:58	1
2-Hexanone	0.16	J	0.40	0.087	ppb v/v			08/10/17 22:58	1
Methylene Chloride	1.2		0.40	0.072	ppb v/v			08/10/17 22:58	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			08/10/17 22:58	1
Styrene	0.075	J	0.40	0.059	ppb v/v			08/10/17 22:58	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			08/10/17 22:58	1
Tetrachloroethene	42		0.40	0.051	ppb v/v			08/10/17 22:58	1
Toluene	10		0.40	0.051	ppb v/v			08/10/17 22:58	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			08/10/17 22:58	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			08/10/17 22:58	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			08/10/17 22:58	1
Trichloroethene	0.79		0.40	0.11	ppb v/v			08/10/17 22:58	1
Trichlorofluoromethane	0.22	J	0.40	0.20	ppb v/v			08/10/17 22:58	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			08/10/17 22:58	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			08/10/17 22:58	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			08/10/17 22:58	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			08/10/17 22:58	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			08/10/17 22:58	1
m,p-Xylene	0.23	J	0.80	0.10	ppb v/v			08/10/17 22:58	1
o-Xylene	0.094	J	0.40	0.054	ppb v/v			08/10/17 22:58	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	22		12	0.42	ug/m3			08/10/17 22:58	1
Benzene	ND		1.3	0.25	ug/m3			08/10/17 22:58	1
Benzyl chloride	ND		4.1	0.84	ug/m3			08/10/17 22:58	1
Bromodichloromethane	9.2		2.0	0.44	ug/m3			08/10/17 22:58	1
Bromoform	ND		4.1	0.72	ug/m3			08/10/17 22:58	1
Bromomethane	ND		3.1	1.3	ug/m3			08/10/17 22:58	1
2-Butanone (MEK)	5.9		2.4	0.59	ug/m3			08/10/17 22:58	1
Carbon disulfide	13		2.5	0.24	ug/m3			08/10/17 22:58	1
Carbon tetrachloride	0.42	J	5.0	0.40	ug/m3			08/10/17 22:58	1
Chlorobenzene	ND		1.4	0.29	ug/m3			08/10/17 22:58	1
Dibromochloromethane	2.2	J	3.4	0.67	ug/m3			08/10/17 22:58	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-04

Date Collected: 07/27/17 08:14

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-6

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		2.1	0.81	ug/m3			08/10/17 22:58	1
Chloroform	38		1.5	0.46	ug/m3			08/10/17 22:58	1
Chloromethane	0.80	J	1.7	0.41	ug/m3			08/10/17 22:58	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			08/10/17 22:58	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			08/10/17 22:58	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			08/10/17 22:58	1
1,4-Dichlorobenzene	2.8		2.4	0.90	ug/m3			08/10/17 22:58	1
Dichlorodifluoromethane	1.3	J	2.0	0.72	ug/m3			08/10/17 22:58	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			08/10/17 22:58	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			08/10/17 22:58	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			08/10/17 22:58	1
cis-1,2-Dichloroethene	1.4	J	1.6	0.35	ug/m3			08/10/17 22:58	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			08/10/17 22:58	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			08/10/17 22:58	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			08/10/17 22:58	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			08/10/17 22:58	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			08/10/17 22:58	1
Ethylbenzene	0.55	J	1.7	0.27	ug/m3			08/10/17 22:58	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			08/10/17 22:58	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			08/10/17 22:58	1
2-Hexanone	0.67	J	1.6	0.36	ug/m3			08/10/17 22:58	1
Methylene Chloride	4.3		1.4	0.25	ug/m3			08/10/17 22:58	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			08/10/17 22:58	1
Styrene	0.32	J	1.7	0.25	ug/m3			08/10/17 22:58	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			08/10/17 22:58	1
Tetrachloroethene	280		2.7	0.35	ug/m3			08/10/17 22:58	1
Toluene	39		1.5	0.19	ug/m3			08/10/17 22:58	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			08/10/17 22:58	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			08/10/17 22:58	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			08/10/17 22:58	1
Trichloroethene	4.2		2.1	0.56	ug/m3			08/10/17 22:58	1
Trichlorofluoromethane	1.2	J	2.2	1.1	ug/m3			08/10/17 22:58	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			08/10/17 22:58	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			08/10/17 22:58	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			08/10/17 22:58	1
Vinyl acetate	ND		2.8	0.51	ug/m3			08/10/17 22:58	1
Vinyl chloride	ND		1.0	0.31	ug/m3			08/10/17 22:58	1
m,p-Xylene	1.0	J	3.5	0.43	ug/m3			08/10/17 22:58	1
o-Xylene	0.41	J	1.7	0.23	ug/m3			08/10/17 22:58	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130		08/10/17 22:58	1
1,2-Dichloroethane-d4 (Surr)	96		70 - 130		08/10/17 22:58	1
Toluene-d8 (Surr)	102		70 - 130		08/10/17 22:58	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-05

Date Collected: 07/27/17 09:58

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-7

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	33		8.4	0.30	ppb v/v			08/10/17 23:51	1.68
Benzene	0.15	J	0.67	0.13	ppb v/v			08/10/17 23:51	1.68
Benzyl chloride	ND		1.3	0.27	ppb v/v			08/10/17 23:51	1.68
Bromodichloromethane	19		0.50	0.11	ppb v/v			08/10/17 23:51	1.68
Bromoform	0.24	J	0.67	0.12	ppb v/v			08/10/17 23:51	1.68
Bromomethane	ND		1.3	0.56	ppb v/v			08/10/17 23:51	1.68
2-Butanone (MEK)	1.7		1.3	0.33	ppb v/v			08/10/17 23:51	1.68
Carbon disulfide	10		1.3	0.13	ppb v/v			08/10/17 23:51	1.68
Carbon tetrachloride	0.25	J	1.3	0.11	ppb v/v			08/10/17 23:51	1.68
Chlorobenzene	0.16	J	0.50	0.11	ppb v/v			08/10/17 23:51	1.68
Dibromochloromethane	3.3		0.67	0.13	ppb v/v			08/10/17 23:51	1.68
Chloroethane	1.2	J	1.3	0.52	ppb v/v			08/10/17 23:51	1.68
Chloroform	96		0.50	0.16	ppb v/v			08/10/17 23:51	1.68
Chloromethane	3.6		1.3	0.33	ppb v/v			08/10/17 23:51	1.68
1,2-Dibromoethane (EDB)	ND		1.3	0.13	ppb v/v			08/10/17 23:51	1.68
1,2-Dichlorobenzene	ND		0.67	0.22	ppb v/v			08/10/17 23:51	1.68
1,3-Dichlorobenzene	ND		0.67	0.18	ppb v/v			08/10/17 23:51	1.68
1,4-Dichlorobenzene	3.3		0.67	0.25	ppb v/v			08/10/17 23:51	1.68
Dichlorodifluoromethane	0.39	J	0.67	0.24	ppb v/v			08/10/17 23:51	1.68
1,1-Dichloroethane	ND		0.50	0.12	ppb v/v			08/10/17 23:51	1.68
1,2-Dichloroethane	ND		1.3	0.15	ppb v/v			08/10/17 23:51	1.68
1,1-Dichloroethene	ND		1.3	0.22	ppb v/v			08/10/17 23:51	1.68
cis-1,2-Dichloroethene	21		0.67	0.15	ppb v/v			08/10/17 23:51	1.68
trans-1,2-Dichloroethene	ND		0.67	0.17	ppb v/v			08/10/17 23:51	1.68
1,2-Dichloropropane	ND		0.67	0.40	ppb v/v			08/10/17 23:51	1.68
cis-1,3-Dichloropropene	ND		0.67	0.17	ppb v/v			08/10/17 23:51	1.68
trans-1,3-Dichloropropene	ND		0.67	0.15	ppb v/v			08/10/17 23:51	1.68
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.67	0.26	ppb v/v			08/10/17 23:51	1.68
Ethylbenzene	0.88		0.67	0.11	ppb v/v			08/10/17 23:51	1.68
4-Ethyltoluene	ND		0.67	0.31	ppb v/v			08/10/17 23:51	1.68
Hexachlorobutadiene	ND		3.4	0.73	ppb v/v			08/10/17 23:51	1.68
2-Hexanone	ND		0.67	0.15	ppb v/v			08/10/17 23:51	1.68
Methylene Chloride	7.0		0.67	0.12	ppb v/v			08/10/17 23:51	1.68
4-Methyl-2-pentanone (MIBK)	ND		0.67	0.23	ppb v/v			08/10/17 23:51	1.68
Styrene	ND		0.67	0.099	ppb v/v			08/10/17 23:51	1.68
1,1,2,2-Tetrachloroethane	ND		0.67	0.12	ppb v/v			08/10/17 23:51	1.68
Tetrachloroethene	3.8		0.67	0.086	ppb v/v			08/10/17 23:51	1.68
Toluene	35		0.67	0.086	ppb v/v			08/10/17 23:51	1.68
1,2,4-Trichlorobenzene	ND		3.4	0.73	ppb v/v			08/10/17 23:51	1.68
1,1,1-Trichloroethane	ND		0.50	0.11	ppb v/v			08/10/17 23:51	1.68
1,1,2-Trichloroethane	ND		0.67	0.11	ppb v/v			08/10/17 23:51	1.68
Trichloroethene	0.83		0.67	0.18	ppb v/v			08/10/17 23:51	1.68
Trichlorofluoromethane	ND		0.67	0.33	ppb v/v			08/10/17 23:51	1.68
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.67	0.27	ppb v/v			08/10/17 23:51	1.68
1,2,4-Trimethylbenzene	0.56	J	1.3	0.27	ppb v/v			08/10/17 23:51	1.68
1,3,5-Trimethylbenzene	0.31	J	0.67	0.21	ppb v/v			08/10/17 23:51	1.68
Vinyl acetate	ND		1.3	0.24	ppb v/v			08/10/17 23:51	1.68
Vinyl chloride	0.50	J	0.67	0.20	ppb v/v			08/10/17 23:51	1.68

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-05

Lab Sample ID: 320-30325-7

Date Collected: 07/27/17 09:58

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	3.8		1.3	0.17	ppb v/v			08/10/17 23:51	1.68
o-Xylene	0.93		0.67	0.091	ppb v/v			08/10/17 23:51	1.68
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	79		20	0.71	ug/m3			08/10/17 23:51	1.68
Benzene	0.49	J	2.1	0.42	ug/m3			08/10/17 23:51	1.68
Benzyl chloride	ND		7.0	1.4	ug/m3			08/10/17 23:51	1.68
Bromodichloromethane	130		3.4	0.74	ug/m3			08/10/17 23:51	1.68
Bromoform	2.5	J	6.9	1.2	ug/m3			08/10/17 23:51	1.68
Bromomethane	ND		5.2	2.2	ug/m3			08/10/17 23:51	1.68
2-Butanone (MEK)	5.0		4.0	0.99	ug/m3			08/10/17 23:51	1.68
Carbon disulfide	32		4.2	0.41	ug/m3			08/10/17 23:51	1.68
Carbon tetrachloride	1.6	J	8.5	0.68	ug/m3			08/10/17 23:51	1.68
Chlorobenzene	0.73	J	2.3	0.49	ug/m3			08/10/17 23:51	1.68
Dibromochloromethane	28		5.7	1.1	ug/m3			08/10/17 23:51	1.68
Chloroethane	3.1	J	3.5	1.4	ug/m3			08/10/17 23:51	1.68
Chloroform	470		2.5	0.78	ug/m3			08/10/17 23:51	1.68
Chloromethane	7.5		2.8	0.68	ug/m3			08/10/17 23:51	1.68
1,2-Dibromoethane (EDB)	ND		10	0.97	ug/m3			08/10/17 23:51	1.68
1,2-Dichlorobenzene	ND		4.0	1.3	ug/m3			08/10/17 23:51	1.68
1,3-Dichlorobenzene	ND		4.0	1.1	ug/m3			08/10/17 23:51	1.68
1,4-Dichlorobenzene	20		4.0	1.5	ug/m3			08/10/17 23:51	1.68
Dichlorodifluoromethane	1.9	J	3.3	1.2	ug/m3			08/10/17 23:51	1.68
1,1-Dichloroethane	ND		2.0	0.49	ug/m3			08/10/17 23:51	1.68
1,2-Dichloroethane	ND		5.4	0.60	ug/m3			08/10/17 23:51	1.68
1,1-Dichloroethene	ND		5.3	0.86	ug/m3			08/10/17 23:51	1.68
cis-1,2-Dichloroethene	83		2.7	0.59	ug/m3			08/10/17 23:51	1.68
trans-1,2-Dichloroethene	ND		2.7	0.67	ug/m3			08/10/17 23:51	1.68
1,2-Dichloropropane	ND		3.1	1.9	ug/m3			08/10/17 23:51	1.68
cis-1,3-Dichloropropene	ND		3.0	0.79	ug/m3			08/10/17 23:51	1.68
trans-1,3-Dichloropropene	ND		3.0	0.67	ug/m3			08/10/17 23:51	1.68
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.7	1.8	ug/m3			08/10/17 23:51	1.68
Ethylbenzene	3.8		2.9	0.46	ug/m3			08/10/17 23:51	1.68
4-Ethyltoluene	ND		3.3	1.5	ug/m3			08/10/17 23:51	1.68
Hexachlorobutadiene	ND		36	7.7	ug/m3			08/10/17 23:51	1.68
2-Hexanone	ND		2.8	0.60	ug/m3			08/10/17 23:51	1.68
Methylene Chloride	24		2.3	0.42	ug/m3			08/10/17 23:51	1.68
4-Methyl-2-pentanone (MIBK)	ND		2.8	0.93	ug/m3			08/10/17 23:51	1.68
Styrene	ND		2.9	0.42	ug/m3			08/10/17 23:51	1.68
1,1,2,2-Tetrachloroethane	ND		4.6	0.80	ug/m3			08/10/17 23:51	1.68
Tetrachloroethene	26		4.6	0.58	ug/m3			08/10/17 23:51	1.68
Toluene	130		2.5	0.32	ug/m3			08/10/17 23:51	1.68
1,2,4-Trichlorobenzene	ND		25	5.4	ug/m3			08/10/17 23:51	1.68
1,1,1-Trichloroethane	ND		2.8	0.60	ug/m3			08/10/17 23:51	1.68
1,1,2-Trichloroethane	ND		3.7	0.61	ug/m3			08/10/17 23:51	1.68
Trichloroethene	4.5		3.6	0.95	ug/m3			08/10/17 23:51	1.68
Trichlorofluoromethane	ND		3.8	1.9	ug/m3			08/10/17 23:51	1.68
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		5.2	2.1	ug/m3			08/10/17 23:51	1.68
1,2,4-Trimethylbenzene	2.7	J	6.6	1.3	ug/m3			08/10/17 23:51	1.68

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-05

Date Collected: 07/27/17 09:58

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-7

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	1.5	J	3.3	1.0	ug/m3			08/10/17 23:51	1.68
Vinyl acetate	ND		4.7	0.86	ug/m3			08/10/17 23:51	1.68
Vinyl chloride	1.3	J	1.7	0.52	ug/m3			08/10/17 23:51	1.68
m,p-Xylene	16		5.8	0.73	ug/m3			08/10/17 23:51	1.68
o-Xylene	4.0		2.9	0.39	ug/m3			08/10/17 23:51	1.68
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					08/10/17 23:51	1.68
1,2-Dichloroethane-d4 (Surr)	86		70 - 130					08/10/17 23:51	1.68
Toluene-d8 (Surr)	102		70 - 130					08/10/17 23:51	1.68

Client Sample ID: HOU-06

Date Collected: 07/27/17 09:52

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-8

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20		5.0	0.18	ppb v/v			08/11/17 00:47	1
Benzene	0.12	J	0.40	0.079	ppb v/v			08/11/17 00:47	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			08/11/17 00:47	1
Bromodichloromethane	4.8		0.30	0.066	ppb v/v			08/11/17 00:47	1
Bromoform	0.071	J	0.40	0.070	ppb v/v			08/11/17 00:47	1
Bromomethane	ND		0.80	0.34	ppb v/v			08/11/17 00:47	1
2-Butanone (MEK)	2.5		0.80	0.20	ppb v/v			08/11/17 00:47	1
Carbon disulfide	19		0.80	0.078	ppb v/v			08/11/17 00:47	1
Carbon tetrachloride	0.21	J	0.80	0.064	ppb v/v			08/11/17 00:47	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			08/11/17 00:47	1
Dibromochloromethane	0.96		0.40	0.079	ppb v/v			08/11/17 00:47	1
Chloroethane	1.3		0.80	0.31	ppb v/v			08/11/17 00:47	1
Chloroform	52		0.30	0.095	ppb v/v			08/11/17 00:47	1
Chloromethane	5.6		0.80	0.20	ppb v/v			08/11/17 00:47	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			08/11/17 00:47	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			08/11/17 00:47	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			08/11/17 00:47	1
1,4-Dichlorobenzene	0.70		0.40	0.15	ppb v/v			08/11/17 00:47	1
Dichlorodifluoromethane	0.25	J	0.40	0.15	ppb v/v			08/11/17 00:47	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			08/11/17 00:47	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			08/11/17 00:47	1
1,1-Dichloroethene	0.15	J	0.80	0.13	ppb v/v			08/11/17 00:47	1
cis-1,2-Dichloroethene	27		0.40	0.089	ppb v/v			08/11/17 00:47	1
trans-1,2-Dichloroethene	0.34	J	0.40	0.10	ppb v/v			08/11/17 00:47	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			08/11/17 00:47	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			08/11/17 00:47	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			08/11/17 00:47	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			08/11/17 00:47	1
Ethylbenzene	0.13	J	0.40	0.063	ppb v/v			08/11/17 00:47	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			08/11/17 00:47	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			08/11/17 00:47	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-06

Date Collected: 07/27/17 09:52

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-8

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	0.13	J	0.40	0.087	ppb v/v			08/11/17 00:47	1
Methylene Chloride	2.4		0.40	0.072	ppb v/v			08/11/17 00:47	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			08/11/17 00:47	1
Styrene	ND		0.40	0.059	ppb v/v			08/11/17 00:47	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			08/11/17 00:47	1
Tetrachloroethene	4.1		0.40	0.051	ppb v/v			08/11/17 00:47	1
Toluene	7.1		0.40	0.051	ppb v/v			08/11/17 00:47	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			08/11/17 00:47	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			08/11/17 00:47	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			08/11/17 00:47	1
Trichloroethene	0.67		0.40	0.11	ppb v/v			08/11/17 00:47	1
Trichlorofluoromethane	0.21	J	0.40	0.20	ppb v/v			08/11/17 00:47	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			08/11/17 00:47	1
1,2,4-Trimethylbenzene	0.16	J	0.80	0.16	ppb v/v			08/11/17 00:47	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			08/11/17 00:47	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			08/11/17 00:47	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			08/11/17 00:47	1
m,p-Xylene	0.43	J	0.80	0.10	ppb v/v			08/11/17 00:47	1
o-Xylene	0.13	J	0.40	0.054	ppb v/v			08/11/17 00:47	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	48		12	0.42	ug/m3			08/11/17 00:47	1
Benzene	0.37	J	1.3	0.25	ug/m3			08/11/17 00:47	1
Benzyl chloride	ND		4.1	0.84	ug/m3			08/11/17 00:47	1
Bromodichloromethane	32		2.0	0.44	ug/m3			08/11/17 00:47	1
Bromoform	0.74	J	4.1	0.72	ug/m3			08/11/17 00:47	1
Bromomethane	ND		3.1	1.3	ug/m3			08/11/17 00:47	1
2-Butanone (MEK)	7.5		2.4	0.59	ug/m3			08/11/17 00:47	1
Carbon disulfide	59		2.5	0.24	ug/m3			08/11/17 00:47	1
Carbon tetrachloride	1.3	J	5.0	0.40	ug/m3			08/11/17 00:47	1
Chlorobenzene	ND		1.4	0.29	ug/m3			08/11/17 00:47	1
Dibromochloromethane	8.2		3.4	0.67	ug/m3			08/11/17 00:47	1
Chloroethane	3.4		2.1	0.81	ug/m3			08/11/17 00:47	1
Chloroform	250		1.5	0.46	ug/m3			08/11/17 00:47	1
Chloromethane	12		1.7	0.41	ug/m3			08/11/17 00:47	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			08/11/17 00:47	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			08/11/17 00:47	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			08/11/17 00:47	1
1,4-Dichlorobenzene	4.2		2.4	0.90	ug/m3			08/11/17 00:47	1
Dichlorodifluoromethane	1.2	J	2.0	0.72	ug/m3			08/11/17 00:47	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			08/11/17 00:47	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			08/11/17 00:47	1
1,1-Dichloroethene	0.59	J	3.2	0.51	ug/m3			08/11/17 00:47	1
cis-1,2-Dichloroethene	110		1.6	0.35	ug/m3			08/11/17 00:47	1
trans-1,2-Dichloroethene	1.3	J	1.6	0.40	ug/m3			08/11/17 00:47	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			08/11/17 00:47	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			08/11/17 00:47	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			08/11/17 00:47	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			08/11/17 00:47	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-06

Date Collected: 07/27/17 09:52

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-8

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	0.55	J	1.7	0.27	ug/m3			08/11/17 00:47	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			08/11/17 00:47	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			08/11/17 00:47	1
2-Hexanone	0.53	J	1.6	0.36	ug/m3			08/11/17 00:47	1
Methylene Chloride	8.2		1.4	0.25	ug/m3			08/11/17 00:47	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			08/11/17 00:47	1
Styrene	ND		1.7	0.25	ug/m3			08/11/17 00:47	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			08/11/17 00:47	1
Tetrachloroethene	28		2.7	0.35	ug/m3			08/11/17 00:47	1
Toluene	27		1.5	0.19	ug/m3			08/11/17 00:47	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			08/11/17 00:47	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			08/11/17 00:47	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			08/11/17 00:47	1
Trichloroethene	3.6		2.1	0.56	ug/m3			08/11/17 00:47	1
Trichlorofluoromethane	1.2	J	2.2	1.1	ug/m3			08/11/17 00:47	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			08/11/17 00:47	1
1,2,4-Trimethylbenzene	0.81	J	3.9	0.80	ug/m3			08/11/17 00:47	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			08/11/17 00:47	1
Vinyl acetate	ND		2.8	0.51	ug/m3			08/11/17 00:47	1
Vinyl chloride	ND		1.0	0.31	ug/m3			08/11/17 00:47	1
m,p-Xylene	1.9	J	3.5	0.43	ug/m3			08/11/17 00:47	1
o-Xylene	0.57	J	1.7	0.23	ug/m3			08/11/17 00:47	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130					08/11/17 00:47	1
1,2-Dichloroethane-d4 (Surr)	92		70 - 130					08/11/17 00:47	1
Toluene-d8 (Surr)	101		70 - 130					08/11/17 00:47	1

Client Sample ID: HOU-07

Date Collected: 07/27/17 09:33

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-9

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	42		15	0.55	ppb v/v			08/11/17 01:39	3.09
Benzene	ND		1.2	0.24	ppb v/v			08/11/17 01:39	3.09
Benzyl chloride	ND		2.5	0.50	ppb v/v			08/11/17 01:39	3.09
Bromodichloromethane	5.5		0.93	0.20	ppb v/v			08/11/17 01:39	3.09
Bromoform	ND		1.2	0.22	ppb v/v			08/11/17 01:39	3.09
Bromomethane	ND		2.5	1.0	ppb v/v			08/11/17 01:39	3.09
2-Butanone (MEK)	1.9	J	2.5	0.61	ppb v/v			08/11/17 01:39	3.09
Carbon disulfide	11		2.5	0.24	ppb v/v			08/11/17 01:39	3.09
Carbon tetrachloride	0.21	J	2.5	0.20	ppb v/v			08/11/17 01:39	3.09
Chlorobenzene	ND		0.93	0.20	ppb v/v			08/11/17 01:39	3.09
Dibromochloromethane	1.1	J	1.2	0.24	ppb v/v			08/11/17 01:39	3.09
Chloroethane	ND		2.5	0.95	ppb v/v			08/11/17 01:39	3.09
Chloroform	49		0.93	0.29	ppb v/v			08/11/17 01:39	3.09
Chloromethane	1.6	J	2.5	0.61	ppb v/v			08/11/17 01:39	3.09

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-07

Date Collected: 07/27/17 09:33

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-9

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		2.5	0.23	ppb v/v			08/11/17 01:39	3.09
1,2-Dichlorobenzene	ND		1.2	0.40	ppb v/v			08/11/17 01:39	3.09
1,3-Dichlorobenzene	ND		1.2	0.34	ppb v/v			08/11/17 01:39	3.09
1,4-Dichlorobenzene	ND		1.2	0.46	ppb v/v			08/11/17 01:39	3.09
Dichlorodifluoromethane	ND		1.2	0.45	ppb v/v			08/11/17 01:39	3.09
1,1-Dichloroethane	ND		0.93	0.22	ppb v/v			08/11/17 01:39	3.09
1,2-Dichloroethane	ND		2.5	0.27	ppb v/v			08/11/17 01:39	3.09
1,1-Dichloroethene	0.55	J	2.5	0.40	ppb v/v			08/11/17 01:39	3.09
cis-1,2-Dichloroethene	180		1.2	0.28	ppb v/v			08/11/17 01:39	3.09
trans-1,2-Dichloroethene	2.6		1.2	0.31	ppb v/v			08/11/17 01:39	3.09
1,2-Dichloropropane	ND		1.2	0.74	ppb v/v			08/11/17 01:39	3.09
cis-1,3-Dichloropropene	ND		1.2	0.32	ppb v/v			08/11/17 01:39	3.09
trans-1,3-Dichloropropene	ND		1.2	0.27	ppb v/v			08/11/17 01:39	3.09
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.2	0.48	ppb v/v			08/11/17 01:39	3.09
Ethylbenzene	0.56	J	1.2	0.19	ppb v/v			08/11/17 01:39	3.09
4-Ethyltoluene	ND		1.2	0.58	ppb v/v			08/11/17 01:39	3.09
Hexachlorobutadiene	ND		6.2	1.3	ppb v/v			08/11/17 01:39	3.09
2-Hexanone	ND		1.2	0.27	ppb v/v			08/11/17 01:39	3.09
Methylene Chloride	1.9		1.2	0.22	ppb v/v			08/11/17 01:39	3.09
4-Methyl-2-pentanone (MIBK)	ND		1.2	0.42	ppb v/v			08/11/17 01:39	3.09
Styrene	0.33	J	1.2	0.18	ppb v/v			08/11/17 01:39	3.09
1,1,2,2-Tetrachloroethane	ND		1.2	0.21	ppb v/v			08/11/17 01:39	3.09
Tetrachloroethene	54		1.2	0.16	ppb v/v			08/11/17 01:39	3.09
Toluene	3.1		1.2	0.16	ppb v/v			08/11/17 01:39	3.09
1,2,4-Trichlorobenzene	ND		6.2	1.3	ppb v/v			08/11/17 01:39	3.09
1,1,1-Trichloroethane	ND		0.93	0.20	ppb v/v			08/11/17 01:39	3.09
1,1,2-Trichloroethane	ND		1.2	0.21	ppb v/v			08/11/17 01:39	3.09
Trichloroethene	11		1.2	0.32	ppb v/v			08/11/17 01:39	3.09
Trichlorofluoromethane	ND		1.2	0.61	ppb v/v			08/11/17 01:39	3.09
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.2	0.50	ppb v/v			08/11/17 01:39	3.09
1,2,4-Trimethylbenzene	ND		2.5	0.50	ppb v/v			08/11/17 01:39	3.09
1,3,5-Trimethylbenzene	ND		1.2	0.39	ppb v/v			08/11/17 01:39	3.09
Vinyl acetate	ND		2.5	0.45	ppb v/v			08/11/17 01:39	3.09
Vinyl chloride	20		1.2	0.37	ppb v/v			08/11/17 01:39	3.09
m,p-Xylene	1.7	J	2.5	0.31	ppb v/v			08/11/17 01:39	3.09
o-Xylene	0.49	J	1.2	0.17	ppb v/v			08/11/17 01:39	3.09
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	100		37	1.3	ug/m3			08/11/17 01:39	3.09
Benzene	ND		3.9	0.78	ug/m3			08/11/17 01:39	3.09
Benzyl chloride	ND		13	2.6	ug/m3			08/11/17 01:39	3.09
Bromodichloromethane	37		6.2	1.4	ug/m3			08/11/17 01:39	3.09
Bromoform	ND		13	2.2	ug/m3			08/11/17 01:39	3.09
Bromomethane	ND		9.6	4.0	ug/m3			08/11/17 01:39	3.09
2-Butanone (MEK)	5.7	J	7.3	1.8	ug/m3			08/11/17 01:39	3.09
Carbon disulfide	33		7.7	0.75	ug/m3			08/11/17 01:39	3.09
Carbon tetrachloride	1.3	J	16	1.2	ug/m3			08/11/17 01:39	3.09
Chlorobenzene	ND		4.3	0.91	ug/m3			08/11/17 01:39	3.09
Dibromochloromethane	9.2	J	11	2.1	ug/m3			08/11/17 01:39	3.09

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-07

Date Collected: 07/27/17 09:33

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-9

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		6.5	2.5	ug/m3			08/11/17 01:39	3.09
Chloroform	240		4.5	1.4	ug/m3			08/11/17 01:39	3.09
Chloromethane	3.3	J	5.1	1.3	ug/m3			08/11/17 01:39	3.09
1,2-Dibromoethane (EDB)	ND		19	1.8	ug/m3			08/11/17 01:39	3.09
1,2-Dichlorobenzene	ND		7.4	2.4	ug/m3			08/11/17 01:39	3.09
1,3-Dichlorobenzene	ND		7.4	2.0	ug/m3			08/11/17 01:39	3.09
1,4-Dichlorobenzene	ND		7.4	2.8	ug/m3			08/11/17 01:39	3.09
Dichlorodifluoromethane	ND		6.1	2.2	ug/m3			08/11/17 01:39	3.09
1,1-Dichloroethane	ND		3.8	0.90	ug/m3			08/11/17 01:39	3.09
1,2-Dichloroethane	ND		10	1.1	ug/m3			08/11/17 01:39	3.09
1,1-Dichloroethene	2.2	J	9.8	1.6	ug/m3			08/11/17 01:39	3.09
cis-1,2-Dichloroethene	710		4.9	1.1	ug/m3			08/11/17 01:39	3.09
trans-1,2-Dichloroethene	11		4.9	1.2	ug/m3			08/11/17 01:39	3.09
1,2-Dichloropropane	ND		5.7	3.4	ug/m3			08/11/17 01:39	3.09
cis-1,3-Dichloropropene	ND		5.6	1.5	ug/m3			08/11/17 01:39	3.09
trans-1,3-Dichloropropene	ND		5.6	1.2	ug/m3			08/11/17 01:39	3.09
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		8.6	3.3	ug/m3			08/11/17 01:39	3.09
Ethylbenzene	2.4	J	5.4	0.85	ug/m3			08/11/17 01:39	3.09
4-Ethyltoluene	ND		6.1	2.8	ug/m3			08/11/17 01:39	3.09
Hexachlorobutadiene	ND		66	14	ug/m3			08/11/17 01:39	3.09
2-Hexanone	ND		5.1	1.1	ug/m3			08/11/17 01:39	3.09
Methylene Chloride	6.7		4.3	0.77	ug/m3			08/11/17 01:39	3.09
4-Methyl-2-pentanone (MIBK)	ND		5.1	1.7	ug/m3			08/11/17 01:39	3.09
Styrene	1.4	J	5.3	0.78	ug/m3			08/11/17 01:39	3.09
1,1,2,2-Tetrachloroethane	ND		8.5	1.5	ug/m3			08/11/17 01:39	3.09
Tetrachloroethene	370		8.4	1.1	ug/m3			08/11/17 01:39	3.09
Toluene	12		4.7	0.59	ug/m3			08/11/17 01:39	3.09
1,2,4-Trichlorobenzene	ND		46	9.9	ug/m3			08/11/17 01:39	3.09
1,1,1-Trichloroethane	ND		5.1	1.1	ug/m3			08/11/17 01:39	3.09
1,1,2-Trichloroethane	ND		6.7	1.1	ug/m3			08/11/17 01:39	3.09
Trichloroethene	58		6.6	1.7	ug/m3			08/11/17 01:39	3.09
Trichlorofluoromethane	ND		6.9	3.4	ug/m3			08/11/17 01:39	3.09
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		9.5	3.9	ug/m3			08/11/17 01:39	3.09
1,2,4-Trimethylbenzene	ND		12	2.5	ug/m3			08/11/17 01:39	3.09
1,3,5-Trimethylbenzene	ND		6.1	1.9	ug/m3			08/11/17 01:39	3.09
Vinyl acetate	ND		8.7	1.6	ug/m3			08/11/17 01:39	3.09
Vinyl chloride	52		3.2	0.95	ug/m3			08/11/17 01:39	3.09
m,p-Xylene	7.4	J	11	1.3	ug/m3			08/11/17 01:39	3.09
o-Xylene	2.1	J	5.4	0.72	ug/m3			08/11/17 01:39	3.09

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130		08/11/17 01:39	3.09
1,2-Dichloroethane-d4 (Surr)	93		70 - 130		08/11/17 01:39	3.09
Toluene-d8 (Surr)	99		70 - 130		08/11/17 01:39	3.09

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-07B

Lab Sample ID: 320-30325-10

Date Collected: 07/27/17 09:42

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	22	*	11	0.41	ppb v/v			08/16/17 03:33	2.28
Benzene	0.23	J	0.91	0.18	ppb v/v			08/16/17 03:33	2.28
Benzyl chloride	ND		1.8	0.37	ppb v/v			08/16/17 03:33	2.28
Bromodichloromethane	3.0		0.68	0.15	ppb v/v			08/16/17 03:33	2.28
Bromoform	ND		0.91	0.16	ppb v/v			08/16/17 03:33	2.28
Bromomethane	ND	*	1.8	0.76	ppb v/v			08/16/17 03:33	2.28
2-Butanone (MEK)	1.6	J *	1.8	0.45	ppb v/v			08/16/17 03:33	2.28
Carbon disulfide	4.7	*	1.8	0.18	ppb v/v			08/16/17 03:33	2.28
Carbon tetrachloride	ND		1.8	0.15	ppb v/v			08/16/17 03:33	2.28
Chlorobenzene	ND		0.68	0.15	ppb v/v			08/16/17 03:33	2.28
Dibromochloromethane	0.61	J	0.91	0.18	ppb v/v			08/16/17 03:33	2.28
Chloroethane	ND	*	1.8	0.70	ppb v/v			08/16/17 03:33	2.28
Chloroform	12	*	0.68	0.22	ppb v/v			08/16/17 03:33	2.28
Chloromethane	0.83	J *	1.8	0.45	ppb v/v			08/16/17 03:33	2.28
1,2-Dibromoethane (EDB)	ND		1.8	0.17	ppb v/v			08/16/17 03:33	2.28
1,2-Dichlorobenzene	ND		0.91	0.30	ppb v/v			08/16/17 03:33	2.28
1,3-Dichlorobenzene	ND		0.91	0.25	ppb v/v			08/16/17 03:33	2.28
1,4-Dichlorobenzene	ND		0.91	0.34	ppb v/v			08/16/17 03:33	2.28
Dichlorodifluoromethane	0.35	J *	0.91	0.33	ppb v/v			08/16/17 03:33	2.28
1,1-Dichloroethane	ND	*	0.68	0.16	ppb v/v			08/16/17 03:33	2.28
1,2-Dichloroethane	ND		1.8	0.20	ppb v/v			08/16/17 03:33	2.28
1,1-Dichloroethene	ND	*	1.8	0.29	ppb v/v			08/16/17 03:33	2.28
cis-1,2-Dichloroethene	93	*	0.91	0.20	ppb v/v			08/16/17 03:33	2.28
trans-1,2-Dichloroethene	1.1	*	0.91	0.23	ppb v/v			08/16/17 03:33	2.28
1,2-Dichloropropane	ND		0.91	0.55	ppb v/v			08/16/17 03:33	2.28
cis-1,3-Dichloropropene	ND		0.91	0.24	ppb v/v			08/16/17 03:33	2.28
trans-1,3-Dichloropropene	ND		0.91	0.20	ppb v/v			08/16/17 03:33	2.28
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	0.91	0.35	ppb v/v			08/16/17 03:33	2.28
Ethylbenzene	0.66	J	0.91	0.14	ppb v/v			08/16/17 03:33	2.28
4-Ethyltoluene	ND		0.91	0.43	ppb v/v			08/16/17 03:33	2.28
Hexachlorobutadiene	ND		4.6	0.98	ppb v/v			08/16/17 03:33	2.28
2-Hexanone	ND		0.91	0.20	ppb v/v			08/16/17 03:33	2.28
Methylene Chloride	1.2	*	0.91	0.16	ppb v/v			08/16/17 03:33	2.28
4-Methyl-2-pentanone (MIBK)	ND		0.91	0.31	ppb v/v			08/16/17 03:33	2.28
Styrene	0.31	J	0.91	0.13	ppb v/v			08/16/17 03:33	2.28
1,1,2,2-Tetrachloroethane	ND		0.91	0.16	ppb v/v			08/16/17 03:33	2.28
Tetrachloroethene	5.7		0.91	0.12	ppb v/v			08/16/17 03:33	2.28
Toluene	3.9		0.91	0.12	ppb v/v			08/16/17 03:33	2.28
1,2,4-Trichlorobenzene	ND		4.6	0.99	ppb v/v			08/16/17 03:33	2.28
1,1,1-Trichloroethane	ND	*	0.68	0.15	ppb v/v			08/16/17 03:33	2.28
1,1,2-Trichloroethane	ND		0.91	0.15	ppb v/v			08/16/17 03:33	2.28
Trichloroethene	4.3		0.91	0.24	ppb v/v			08/16/17 03:33	2.28
Trichlorofluoromethane	ND	*	0.91	0.45	ppb v/v			08/16/17 03:33	2.28
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	*	0.91	0.37	ppb v/v			08/16/17 03:33	2.28
1,2,4-Trimethylbenzene	1.3	J	1.8	0.37	ppb v/v			08/16/17 03:33	2.28
1,3,5-Trimethylbenzene	0.35	J	0.91	0.29	ppb v/v			08/16/17 03:33	2.28
Vinyl acetate	ND	*	1.8	0.33	ppb v/v			08/16/17 03:33	2.28
Vinyl chloride	7.3	*	0.91	0.27	ppb v/v			08/16/17 03:33	2.28

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-07B

Lab Sample ID: 320-30325-10

Date Collected: 07/27/17 09:42

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	1.4	J	1.8	0.23	ppb v/v			08/16/17 03:33	2.28
o-Xylene	0.55	J	0.91	0.12	ppb v/v			08/16/17 03:33	2.28
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	52	*	27	0.96	ug/m3			08/16/17 03:33	2.28
Benzene	0.74	J	2.9	0.58	ug/m3			08/16/17 03:33	2.28
Benzyl chloride	ND		9.4	1.9	ug/m3			08/16/17 03:33	2.28
Bromodichloromethane	20		4.6	1.0	ug/m3			08/16/17 03:33	2.28
Bromoform	ND		9.4	1.6	ug/m3			08/16/17 03:33	2.28
Bromomethane	ND	*	7.1	3.0	ug/m3			08/16/17 03:33	2.28
2-Butanone (MEK)	4.8	J *	5.4	1.3	ug/m3			08/16/17 03:33	2.28
Carbon disulfide	15	*	5.7	0.55	ug/m3			08/16/17 03:33	2.28
Carbon tetrachloride	ND		11	0.92	ug/m3			08/16/17 03:33	2.28
Chlorobenzene	ND		3.1	0.67	ug/m3			08/16/17 03:33	2.28
Dibromochloromethane	5.2	J	7.8	1.5	ug/m3			08/16/17 03:33	2.28
Chloroethane	ND	*	4.8	1.9	ug/m3			08/16/17 03:33	2.28
Chloroform	59	*	3.3	1.1	ug/m3			08/16/17 03:33	2.28
Chloromethane	1.7	J *	3.8	0.93	ug/m3			08/16/17 03:33	2.28
1,2-Dibromoethane (EDB)	ND		14	1.3	ug/m3			08/16/17 03:33	2.28
1,2-Dichlorobenzene	ND		5.5	1.8	ug/m3			08/16/17 03:33	2.28
1,3-Dichlorobenzene	ND		5.5	1.5	ug/m3			08/16/17 03:33	2.28
1,4-Dichlorobenzene	ND		5.5	2.0	ug/m3			08/16/17 03:33	2.28
Dichlorodifluoromethane	1.7	J *	4.5	1.6	ug/m3			08/16/17 03:33	2.28
1,1-Dichloroethane	ND	*	2.8	0.66	ug/m3			08/16/17 03:33	2.28
1,2-Dichloroethane	ND		7.4	0.81	ug/m3			08/16/17 03:33	2.28
1,1-Dichloroethene	ND	*	7.2	1.2	ug/m3			08/16/17 03:33	2.28
cis-1,2-Dichloroethene	370	*	3.6	0.80	ug/m3			08/16/17 03:33	2.28
trans-1,2-Dichloroethene	4.5	*	3.6	0.90	ug/m3			08/16/17 03:33	2.28
1,2-Dichloropropane	ND		4.2	2.5	ug/m3			08/16/17 03:33	2.28
cis-1,3-Dichloropropene	ND		4.1	1.1	ug/m3			08/16/17 03:33	2.28
trans-1,3-Dichloropropene	ND		4.1	0.91	ug/m3			08/16/17 03:33	2.28
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	*	6.4	2.5	ug/m3			08/16/17 03:33	2.28
Ethylbenzene	2.9	J	4.0	0.62	ug/m3			08/16/17 03:33	2.28
4-Ethyltoluene	ND		4.5	2.1	ug/m3			08/16/17 03:33	2.28
Hexachlorobutadiene	ND		49	11	ug/m3			08/16/17 03:33	2.28
2-Hexanone	ND		3.7	0.81	ug/m3			08/16/17 03:33	2.28
Methylene Chloride	4.2	*	3.2	0.57	ug/m3			08/16/17 03:33	2.28
4-Methyl-2-pentanone (MIBK)	ND		3.7	1.3	ug/m3			08/16/17 03:33	2.28
Styrene	1.3	J	3.9	0.57	ug/m3			08/16/17 03:33	2.28
1,1,2,2-Tetrachloroethane	ND		6.3	1.1	ug/m3			08/16/17 03:33	2.28
Tetrachloroethene	39		6.2	0.79	ug/m3			08/16/17 03:33	2.28
Toluene	15		3.4	0.44	ug/m3			08/16/17 03:33	2.28
1,2,4-Trichlorobenzene	ND		34	7.3	ug/m3			08/16/17 03:33	2.28
1,1,1-Trichloroethane	ND	*	3.7	0.81	ug/m3			08/16/17 03:33	2.28
1,1,2-Trichloroethane	ND		5.0	0.83	ug/m3			08/16/17 03:33	2.28
Trichloroethene	23		4.9	1.3	ug/m3			08/16/17 03:33	2.28
Trichlorofluoromethane	ND	*	5.1	2.5	ug/m3			08/16/17 03:33	2.28
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	*	7.0	2.8	ug/m3			08/16/17 03:33	2.28
1,2,4-Trimethylbenzene	6.3	J	9.0	1.8	ug/m3			08/16/17 03:33	2.28

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-07B

Date Collected: 07/27/17 09:42

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-10

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	1.7	J	4.5	1.4	ug/m3			08/16/17 03:33	2.28
Vinyl acetate	ND	*	6.4	1.2	ug/m3			08/16/17 03:33	2.28
Vinyl chloride	19	*	2.3	0.70	ug/m3			08/16/17 03:33	2.28
m,p-Xylene	6.0	J	7.9	0.99	ug/m3			08/16/17 03:33	2.28
o-Xylene	2.4	J	4.0	0.53	ug/m3			08/16/17 03:33	2.28
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130					08/16/17 03:33	2.28
1,2-Dichloroethane-d4 (Surr)	100	*	70 - 130					08/16/17 03:33	2.28
Toluene-d8 (Surr)	100		70 - 130					08/16/17 03:33	2.28

Client Sample ID: HOU-08

Date Collected: 07/27/17 09:14

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-11

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	77		7.6	0.27	ppb v/v			08/11/17 03:25	1.51
Benzene	0.18	J	0.60	0.12	ppb v/v			08/11/17 03:25	1.51
Benzyl chloride	ND		1.2	0.25	ppb v/v			08/11/17 03:25	1.51
Bromodichloromethane	4.4		0.45	0.10	ppb v/v			08/11/17 03:25	1.51
Bromoform	ND		0.60	0.11	ppb v/v			08/11/17 03:25	1.51
Bromomethane	ND		1.2	0.51	ppb v/v			08/11/17 03:25	1.51
2-Butanone (MEK)	8.1		1.2	0.30	ppb v/v			08/11/17 03:25	1.51
Carbon disulfide	12		1.2	0.12	ppb v/v			08/11/17 03:25	1.51
Carbon tetrachloride	0.12	J	1.2	0.097	ppb v/v			08/11/17 03:25	1.51
Chlorobenzene	ND		0.45	0.097	ppb v/v			08/11/17 03:25	1.51
Dibromochloromethane	0.91		0.60	0.12	ppb v/v			08/11/17 03:25	1.51
Chloroethane	ND		1.2	0.47	ppb v/v			08/11/17 03:25	1.51
Chloroform	23		0.45	0.14	ppb v/v			08/11/17 03:25	1.51
Chloromethane	1.0	J	1.2	0.30	ppb v/v			08/11/17 03:25	1.51
1,2-Dibromoethane (EDB)	ND		1.2	0.11	ppb v/v			08/11/17 03:25	1.51
1,2-Dichlorobenzene	ND		0.60	0.20	ppb v/v			08/11/17 03:25	1.51
1,3-Dichlorobenzene	ND		0.60	0.17	ppb v/v			08/11/17 03:25	1.51
1,4-Dichlorobenzene	ND		0.60	0.22	ppb v/v			08/11/17 03:25	1.51
Dichlorodifluoromethane	0.33	J	0.60	0.22	ppb v/v			08/11/17 03:25	1.51
1,1-Dichloroethane	ND		0.45	0.11	ppb v/v			08/11/17 03:25	1.51
1,2-Dichloroethane	ND		1.2	0.13	ppb v/v			08/11/17 03:25	1.51
1,1-Dichloroethene	ND		1.2	0.19	ppb v/v			08/11/17 03:25	1.51
cis-1,2-Dichloroethene	2.1		0.60	0.13	ppb v/v			08/11/17 03:25	1.51
trans-1,2-Dichloroethene	ND		0.60	0.15	ppb v/v			08/11/17 03:25	1.51
1,2-Dichloropropane	ND		0.60	0.36	ppb v/v			08/11/17 03:25	1.51
cis-1,3-Dichloropropene	ND		0.60	0.16	ppb v/v			08/11/17 03:25	1.51
trans-1,3-Dichloropropene	ND		0.60	0.13	ppb v/v			08/11/17 03:25	1.51
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.60	0.23	ppb v/v			08/11/17 03:25	1.51
Ethylbenzene	0.30	J	0.60	0.095	ppb v/v			08/11/17 03:25	1.51
4-Ethyltoluene	ND		0.60	0.28	ppb v/v			08/11/17 03:25	1.51
Hexachlorobutadiene	ND		3.0	0.65	ppb v/v			08/11/17 03:25	1.51

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-08

Lab Sample ID: 320-30325-11

Date Collected: 07/27/17 09:14

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		0.60	0.13	ppb v/v			08/11/17 03:25	1.51
Methylene Chloride	2.8		0.60	0.11	ppb v/v			08/11/17 03:25	1.51
4-Methyl-2-pentanone (MIBK)	ND		0.60	0.20	ppb v/v			08/11/17 03:25	1.51
Styrene	ND		0.60	0.089	ppb v/v			08/11/17 03:25	1.51
1,1,2,2-Tetrachloroethane	ND		0.60	0.10	ppb v/v			08/11/17 03:25	1.51
Tetrachloroethene	87		0.60	0.077	ppb v/v			08/11/17 03:25	1.51
Toluene	16		0.60	0.077	ppb v/v			08/11/17 03:25	1.51
1,2,4-Trichlorobenzene	ND		3.0	0.65	ppb v/v			08/11/17 03:25	1.51
1,1,1-Trichloroethane	ND		0.45	0.098	ppb v/v			08/11/17 03:25	1.51
1,1,2-Trichloroethane	ND		0.60	0.10	ppb v/v			08/11/17 03:25	1.51
Trichloroethene	8.8		0.60	0.16	ppb v/v			08/11/17 03:25	1.51
Trichlorofluoromethane	ND		0.60	0.30	ppb v/v			08/11/17 03:25	1.51
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.60	0.25	ppb v/v			08/11/17 03:25	1.51
1,2,4-Trimethylbenzene	0.30	J	1.2	0.24	ppb v/v			08/11/17 03:25	1.51
1,3,5-Trimethylbenzene	ND		0.60	0.19	ppb v/v			08/11/17 03:25	1.51
Vinyl acetate	ND		1.2	0.22	ppb v/v			08/11/17 03:25	1.51
Vinyl chloride	0.24	J	0.60	0.18	ppb v/v			08/11/17 03:25	1.51
m,p-Xylene	1.8		1.2	0.15	ppb v/v			08/11/17 03:25	1.51
o-Xylene	0.87		0.60	0.082	ppb v/v			08/11/17 03:25	1.51
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	180		18	0.64	ug/m3			08/11/17 03:25	1.51
Benzene	0.56	J	1.9	0.38	ug/m3			08/11/17 03:25	1.51
Benzyl chloride	ND		6.3	1.3	ug/m3			08/11/17 03:25	1.51
Bromodichloromethane	30		3.0	0.67	ug/m3			08/11/17 03:25	1.51
Bromoform	ND		6.2	1.1	ug/m3			08/11/17 03:25	1.51
Bromomethane	ND		4.7	2.0	ug/m3			08/11/17 03:25	1.51
2-Butanone (MEK)	24		3.6	0.89	ug/m3			08/11/17 03:25	1.51
Carbon disulfide	36		3.8	0.37	ug/m3			08/11/17 03:25	1.51
Carbon tetrachloride	0.73	J	7.6	0.61	ug/m3			08/11/17 03:25	1.51
Chlorobenzene	ND		2.1	0.44	ug/m3			08/11/17 03:25	1.51
Dibromochloromethane	7.8		5.1	1.0	ug/m3			08/11/17 03:25	1.51
Chloroethane	ND		3.2	1.2	ug/m3			08/11/17 03:25	1.51
Chloroform	110		2.2	0.70	ug/m3			08/11/17 03:25	1.51
Chloromethane	2.1	J	2.5	0.61	ug/m3			08/11/17 03:25	1.51
1,2-Dibromoethane (EDB)	ND		9.3	0.87	ug/m3			08/11/17 03:25	1.51
1,2-Dichlorobenzene	ND		3.6	1.2	ug/m3			08/11/17 03:25	1.51
1,3-Dichlorobenzene	ND		3.6	1.0	ug/m3			08/11/17 03:25	1.51
1,4-Dichlorobenzene	ND		3.6	1.4	ug/m3			08/11/17 03:25	1.51
Dichlorodifluoromethane	1.7	J	3.0	1.1	ug/m3			08/11/17 03:25	1.51
1,1-Dichloroethane	ND		1.8	0.44	ug/m3			08/11/17 03:25	1.51
1,2-Dichloroethane	ND		4.9	0.54	ug/m3			08/11/17 03:25	1.51
1,1-Dichloroethene	ND		4.8	0.77	ug/m3			08/11/17 03:25	1.51
cis-1,2-Dichloroethene	8.2		2.4	0.53	ug/m3			08/11/17 03:25	1.51
trans-1,2-Dichloroethene	ND		2.4	0.60	ug/m3			08/11/17 03:25	1.51
1,2-Dichloropropane	ND		2.8	1.7	ug/m3			08/11/17 03:25	1.51
cis-1,3-Dichloropropene	ND		2.7	0.71	ug/m3			08/11/17 03:25	1.51
trans-1,3-Dichloropropene	ND		2.7	0.60	ug/m3			08/11/17 03:25	1.51
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.2	1.6	ug/m3			08/11/17 03:25	1.51

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-08

Date Collected: 07/27/17 09:14

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-11

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	1.3	J	2.6	0.41	ug/m3			08/11/17 03:25	1.51
4-Ethyltoluene	ND		3.0	1.4	ug/m3			08/11/17 03:25	1.51
Hexachlorobutadiene	ND		32	7.0	ug/m3			08/11/17 03:25	1.51
2-Hexanone	ND		2.5	0.54	ug/m3			08/11/17 03:25	1.51
Methylene Chloride	9.8		2.1	0.38	ug/m3			08/11/17 03:25	1.51
4-Methyl-2-pentanone (MIBK)	ND		2.5	0.84	ug/m3			08/11/17 03:25	1.51
Styrene	ND		2.6	0.38	ug/m3			08/11/17 03:25	1.51
1,1,2,2-Tetrachloroethane	ND		4.1	0.72	ug/m3			08/11/17 03:25	1.51
Tetrachloroethene	590		4.1	0.52	ug/m3			08/11/17 03:25	1.51
Toluene	59		2.3	0.29	ug/m3			08/11/17 03:25	1.51
1,2,4-Trichlorobenzene	ND		22	4.9	ug/m3			08/11/17 03:25	1.51
1,1,1-Trichloroethane	ND		2.5	0.54	ug/m3			08/11/17 03:25	1.51
1,1,2-Trichloroethane	ND		3.3	0.55	ug/m3			08/11/17 03:25	1.51
Trichloroethene	48		3.2	0.85	ug/m3			08/11/17 03:25	1.51
Trichlorofluoromethane	ND		3.4	1.7	ug/m3			08/11/17 03:25	1.51
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		4.6	1.9	ug/m3			08/11/17 03:25	1.51
1,2,4-Trimethylbenzene	1.5	J	5.9	1.2	ug/m3			08/11/17 03:25	1.51
1,3,5-Trimethylbenzene	ND		3.0	0.93	ug/m3			08/11/17 03:25	1.51
Vinyl acetate	ND		4.3	0.77	ug/m3			08/11/17 03:25	1.51
Vinyl chloride	0.62	J	1.5	0.46	ug/m3			08/11/17 03:25	1.51
m,p-Xylene	7.8		5.2	0.66	ug/m3			08/11/17 03:25	1.51
o-Xylene	3.8		2.6	0.35	ug/m3			08/11/17 03:25	1.51
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130					08/11/17 03:25	1.51
1,2-Dichloroethane-d4 (Surr)	93		70 - 130					08/11/17 03:25	1.51
Toluene-d8 (Surr)	100		70 - 130					08/11/17 03:25	1.51

Client Sample ID: HOU-08B

Date Collected: 07/27/17 09:22

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-12

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20		5.0	0.18	ppb v/v			08/11/17 04:20	1
Benzene	0.12	J	0.40	0.079	ppb v/v			08/11/17 04:20	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			08/11/17 04:20	1
Bromodichloromethane	1.8		0.30	0.066	ppb v/v			08/11/17 04:20	1
Bromoform	ND		0.40	0.070	ppb v/v			08/11/17 04:20	1
Bromomethane	ND		0.80	0.34	ppb v/v			08/11/17 04:20	1
2-Butanone (MEK)	2.0		0.80	0.20	ppb v/v			08/11/17 04:20	1
Carbon disulfide	4.7		0.80	0.078	ppb v/v			08/11/17 04:20	1
Carbon tetrachloride	0.080	J	0.80	0.064	ppb v/v			08/11/17 04:20	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			08/11/17 04:20	1
Dibromochloromethane	0.39	J	0.40	0.079	ppb v/v			08/11/17 04:20	1
Chloroethane	ND		0.80	0.31	ppb v/v			08/11/17 04:20	1
Chloroform	12		0.30	0.095	ppb v/v			08/11/17 04:20	1
Chloromethane	0.74	J	0.80	0.20	ppb v/v			08/11/17 04:20	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-08B

Lab Sample ID: 320-30325-12

Date Collected: 07/27/17 09:22

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			08/11/17 04:20	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			08/11/17 04:20	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			08/11/17 04:20	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			08/11/17 04:20	1
Dichlorodifluoromethane	0.20	J	0.40	0.15	ppb v/v			08/11/17 04:20	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			08/11/17 04:20	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			08/11/17 04:20	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			08/11/17 04:20	1
cis-1,2-Dichloroethene	0.34	J	0.40	0.089	ppb v/v			08/11/17 04:20	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			08/11/17 04:20	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			08/11/17 04:20	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			08/11/17 04:20	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			08/11/17 04:20	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			08/11/17 04:20	1
Ethylbenzene	0.073	J	0.40	0.063	ppb v/v			08/11/17 04:20	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			08/11/17 04:20	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			08/11/17 04:20	1
2-Hexanone	0.12	J	0.40	0.087	ppb v/v			08/11/17 04:20	1
Methylene Chloride	0.56		0.40	0.072	ppb v/v			08/11/17 04:20	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			08/11/17 04:20	1
Styrene	ND		0.40	0.059	ppb v/v			08/11/17 04:20	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			08/11/17 04:20	1
Tetrachloroethene	1.2		0.40	0.051	ppb v/v			08/11/17 04:20	1
Toluene	2.0		0.40	0.051	ppb v/v			08/11/17 04:20	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			08/11/17 04:20	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			08/11/17 04:20	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			08/11/17 04:20	1
Trichloroethene	ND		0.40	0.11	ppb v/v			08/11/17 04:20	1
Trichlorofluoromethane	0.20	J	0.40	0.20	ppb v/v			08/11/17 04:20	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			08/11/17 04:20	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			08/11/17 04:20	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			08/11/17 04:20	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			08/11/17 04:20	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			08/11/17 04:20	1
m,p-Xylene	0.21	J	0.80	0.10	ppb v/v			08/11/17 04:20	1
o-Xylene	0.10	J	0.40	0.054	ppb v/v			08/11/17 04:20	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	49		12	0.42	ug/m3			08/11/17 04:20	1
Benzene	0.39	J	1.3	0.25	ug/m3			08/11/17 04:20	1
Benzyl chloride	ND		4.1	0.84	ug/m3			08/11/17 04:20	1
Bromodichloromethane	12		2.0	0.44	ug/m3			08/11/17 04:20	1
Bromoform	ND		4.1	0.72	ug/m3			08/11/17 04:20	1
Bromomethane	ND		3.1	1.3	ug/m3			08/11/17 04:20	1
2-Butanone (MEK)	5.9		2.4	0.59	ug/m3			08/11/17 04:20	1
Carbon disulfide	15		2.5	0.24	ug/m3			08/11/17 04:20	1
Carbon tetrachloride	0.50	J	5.0	0.40	ug/m3			08/11/17 04:20	1
Chlorobenzene	ND		1.4	0.29	ug/m3			08/11/17 04:20	1
Dibromochloromethane	3.3	J	3.4	0.67	ug/m3			08/11/17 04:20	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-08B

Lab Sample ID: 320-30325-12

Date Collected: 07/27/17 09:22

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		2.1	0.81	ug/m3			08/11/17 04:20	1
Chloroform	56		1.5	0.46	ug/m3			08/11/17 04:20	1
Chloromethane	1.5	J	1.7	0.41	ug/m3			08/11/17 04:20	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			08/11/17 04:20	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			08/11/17 04:20	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			08/11/17 04:20	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			08/11/17 04:20	1
Dichlorodifluoromethane	1.0	J	2.0	0.72	ug/m3			08/11/17 04:20	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			08/11/17 04:20	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			08/11/17 04:20	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			08/11/17 04:20	1
cis-1,2-Dichloroethene	1.4	J	1.6	0.35	ug/m3			08/11/17 04:20	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			08/11/17 04:20	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			08/11/17 04:20	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			08/11/17 04:20	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			08/11/17 04:20	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			08/11/17 04:20	1
Ethylbenzene	0.32	J	1.7	0.27	ug/m3			08/11/17 04:20	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			08/11/17 04:20	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			08/11/17 04:20	1
2-Hexanone	0.48	J	1.6	0.36	ug/m3			08/11/17 04:20	1
Methylene Chloride	1.9		1.4	0.25	ug/m3			08/11/17 04:20	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			08/11/17 04:20	1
Styrene	ND		1.7	0.25	ug/m3			08/11/17 04:20	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			08/11/17 04:20	1
Tetrachloroethene	8.4		2.7	0.35	ug/m3			08/11/17 04:20	1
Toluene	7.4		1.5	0.19	ug/m3			08/11/17 04:20	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			08/11/17 04:20	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			08/11/17 04:20	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			08/11/17 04:20	1
Trichloroethene	ND		2.1	0.56	ug/m3			08/11/17 04:20	1
Trichlorofluoromethane	1.1	J	2.2	1.1	ug/m3			08/11/17 04:20	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			08/11/17 04:20	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			08/11/17 04:20	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			08/11/17 04:20	1
Vinyl acetate	ND		2.8	0.51	ug/m3			08/11/17 04:20	1
Vinyl chloride	ND		1.0	0.31	ug/m3			08/11/17 04:20	1
m,p-Xylene	0.90	J	3.5	0.43	ug/m3			08/11/17 04:20	1
o-Xylene	0.44	J	1.7	0.23	ug/m3			08/11/17 04:20	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130		08/11/17 04:20	1
1,2-Dichloroethane-d4 (Surr)	92		70 - 130		08/11/17 04:20	1
Toluene-d8 (Surr)	102		70 - 130		08/11/17 04:20	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-09

Lab Sample ID: 320-30325-13

Date Collected: 07/27/17 09:07

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	85		10	0.36	ppb v/v			08/11/17 05:13	2
Benzene	0.61	J	0.80	0.16	ppb v/v			08/11/17 05:13	2
Benzyl chloride	ND		1.6	0.33	ppb v/v			08/11/17 05:13	2
Bromodichloromethane	4.9		0.60	0.13	ppb v/v			08/11/17 05:13	2
Bromoform	ND		0.80	0.14	ppb v/v			08/11/17 05:13	2
Bromomethane	ND		1.6	0.67	ppb v/v			08/11/17 05:13	2
2-Butanone (MEK)	8.3		1.6	0.40	ppb v/v			08/11/17 05:13	2
Carbon disulfide	150		1.6	0.16	ppb v/v			08/11/17 05:13	2
Carbon tetrachloride	ND		1.6	0.13	ppb v/v			08/11/17 05:13	2
Chlorobenzene	ND		0.60	0.13	ppb v/v			08/11/17 05:13	2
Dibromochloromethane	0.94		0.80	0.16	ppb v/v			08/11/17 05:13	2
Chloroethane	ND		1.6	0.62	ppb v/v			08/11/17 05:13	2
Chloroform	31		0.60	0.19	ppb v/v			08/11/17 05:13	2
Chloromethane	3.1		1.6	0.39	ppb v/v			08/11/17 05:13	2
1,2-Dibromoethane (EDB)	ND		1.6	0.15	ppb v/v			08/11/17 05:13	2
1,2-Dichlorobenzene	ND		0.80	0.26	ppb v/v			08/11/17 05:13	2
1,3-Dichlorobenzene	ND		0.80	0.22	ppb v/v			08/11/17 05:13	2
1,4-Dichlorobenzene	0.43	J	0.80	0.30	ppb v/v			08/11/17 05:13	2
Dichlorodifluoromethane	0.32	J	0.80	0.29	ppb v/v			08/11/17 05:13	2
1,1-Dichloroethane	ND		0.60	0.14	ppb v/v			08/11/17 05:13	2
1,2-Dichloroethane	ND		1.6	0.18	ppb v/v			08/11/17 05:13	2
1,1-Dichloroethene	ND		1.6	0.26	ppb v/v			08/11/17 05:13	2
cis-1,2-Dichloroethene	ND		0.80	0.18	ppb v/v			08/11/17 05:13	2
trans-1,2-Dichloroethene	ND		0.80	0.20	ppb v/v			08/11/17 05:13	2
1,2-Dichloropropane	ND		0.80	0.48	ppb v/v			08/11/17 05:13	2
cis-1,3-Dichloropropene	ND		0.80	0.21	ppb v/v			08/11/17 05:13	2
trans-1,3-Dichloropropene	ND		0.80	0.18	ppb v/v			08/11/17 05:13	2
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.80	0.31	ppb v/v			08/11/17 05:13	2
Ethylbenzene	0.39	J	0.80	0.13	ppb v/v			08/11/17 05:13	2
4-Ethyltoluene	ND		0.80	0.37	ppb v/v			08/11/17 05:13	2
Hexachlorobutadiene	ND		4.0	0.86	ppb v/v			08/11/17 05:13	2
2-Hexanone	ND		0.80	0.17	ppb v/v			08/11/17 05:13	2
Methylene Chloride	7.0		0.80	0.14	ppb v/v			08/11/17 05:13	2
4-Methyl-2-pentanone (MIBK)	ND		0.80	0.27	ppb v/v			08/11/17 05:13	2
Styrene	0.88		0.80	0.12	ppb v/v			08/11/17 05:13	2
1,1,2,2-Tetrachloroethane	ND		0.80	0.14	ppb v/v			08/11/17 05:13	2
Tetrachloroethene	ND		0.80	0.10	ppb v/v			08/11/17 05:13	2
Toluene	15		0.80	0.10	ppb v/v			08/11/17 05:13	2
1,2,4-Trichlorobenzene	ND		4.0	0.87	ppb v/v			08/11/17 05:13	2
1,1,1-Trichloroethane	ND		0.60	0.13	ppb v/v			08/11/17 05:13	2
1,1,2-Trichloroethane	ND		0.80	0.13	ppb v/v			08/11/17 05:13	2
Trichloroethene	ND		0.80	0.21	ppb v/v			08/11/17 05:13	2
Trichlorofluoromethane	ND		0.80	0.39	ppb v/v			08/11/17 05:13	2
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.80	0.33	ppb v/v			08/11/17 05:13	2
1,2,4-Trimethylbenzene	0.46	J	1.6	0.32	ppb v/v			08/11/17 05:13	2
1,3,5-Trimethylbenzene	0.32	J	0.80	0.25	ppb v/v			08/11/17 05:13	2
Vinyl acetate	ND		1.6	0.29	ppb v/v			08/11/17 05:13	2
Vinyl chloride	ND		0.80	0.24	ppb v/v			08/11/17 05:13	2

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-09

Lab Sample ID: 320-30325-13

Date Collected: 07/27/17 09:07

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.45	J	1.6	0.20	ppb v/v			08/11/17 05:13	2
o-Xylene	0.22	J	0.80	0.11	ppb v/v			08/11/17 05:13	2
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	200		24	0.85	ug/m3			08/11/17 05:13	2
Benzene	2.0	J	2.6	0.50	ug/m3			08/11/17 05:13	2
Benzyl chloride	ND		8.3	1.7	ug/m3			08/11/17 05:13	2
Bromodichloromethane	33		4.0	0.88	ug/m3			08/11/17 05:13	2
Bromoform	ND		8.3	1.4	ug/m3			08/11/17 05:13	2
Bromomethane	ND		6.2	2.6	ug/m3			08/11/17 05:13	2
2-Butanone (MEK)	24		4.7	1.2	ug/m3			08/11/17 05:13	2
Carbon disulfide	480		5.0	0.49	ug/m3			08/11/17 05:13	2
Carbon tetrachloride	ND		10	0.81	ug/m3			08/11/17 05:13	2
Chlorobenzene	ND		2.8	0.59	ug/m3			08/11/17 05:13	2
Dibromochloromethane	8.0		6.8	1.3	ug/m3			08/11/17 05:13	2
Chloroethane	ND		4.2	1.6	ug/m3			08/11/17 05:13	2
Chloroform	150		2.9	0.93	ug/m3			08/11/17 05:13	2
Chloromethane	6.4		3.3	0.81	ug/m3			08/11/17 05:13	2
1,2-Dibromoethane (EDB)	ND		12	1.2	ug/m3			08/11/17 05:13	2
1,2-Dichlorobenzene	ND		4.8	1.6	ug/m3			08/11/17 05:13	2
1,3-Dichlorobenzene	ND		4.8	1.3	ug/m3			08/11/17 05:13	2
1,4-Dichlorobenzene	2.6	J	4.8	1.8	ug/m3			08/11/17 05:13	2
Dichlorodifluoromethane	1.6	J	4.0	1.4	ug/m3			08/11/17 05:13	2
1,1-Dichloroethane	ND		2.4	0.58	ug/m3			08/11/17 05:13	2
1,2-Dichloroethane	ND		6.5	0.71	ug/m3			08/11/17 05:13	2
1,1-Dichloroethene	ND		6.3	1.0	ug/m3			08/11/17 05:13	2
cis-1,2-Dichloroethene	ND		3.2	0.71	ug/m3			08/11/17 05:13	2
trans-1,2-Dichloroethene	ND		3.2	0.79	ug/m3			08/11/17 05:13	2
1,2-Dichloropropane	ND		3.7	2.2	ug/m3			08/11/17 05:13	2
cis-1,3-Dichloropropene	ND		3.6	0.94	ug/m3			08/11/17 05:13	2
trans-1,3-Dichloropropene	ND		3.6	0.80	ug/m3			08/11/17 05:13	2
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		5.6	2.2	ug/m3			08/11/17 05:13	2
Ethylbenzene	1.7	J	3.5	0.55	ug/m3			08/11/17 05:13	2
4-Ethyltoluene	ND		3.9	1.8	ug/m3			08/11/17 05:13	2
Hexachlorobutadiene	ND		43	9.2	ug/m3			08/11/17 05:13	2
2-Hexanone	ND		3.3	0.71	ug/m3			08/11/17 05:13	2
Methylene Chloride	24		2.8	0.50	ug/m3			08/11/17 05:13	2
4-Methyl-2-pentanone (MIBK)	ND		3.3	1.1	ug/m3			08/11/17 05:13	2
Styrene	3.7		3.4	0.50	ug/m3			08/11/17 05:13	2
1,1,2,2-Tetrachloroethane	ND		5.5	0.95	ug/m3			08/11/17 05:13	2
Tetrachloroethene	ND		5.4	0.69	ug/m3			08/11/17 05:13	2
Toluene	57		3.0	0.38	ug/m3			08/11/17 05:13	2
1,2,4-Trichlorobenzene	ND		30	6.4	ug/m3			08/11/17 05:13	2
1,1,1-Trichloroethane	ND		3.3	0.71	ug/m3			08/11/17 05:13	2
1,1,2-Trichloroethane	ND		4.4	0.73	ug/m3			08/11/17 05:13	2
Trichloroethene	ND		4.3	1.1	ug/m3			08/11/17 05:13	2
Trichlorofluoromethane	ND		4.5	2.2	ug/m3			08/11/17 05:13	2
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		6.1	2.5	ug/m3			08/11/17 05:13	2
1,2,4-Trimethylbenzene	2.3	J	7.9	1.6	ug/m3			08/11/17 05:13	2

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-09

Date Collected: 07/27/17 09:07

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-13

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	1.6	J	3.9	1.2	ug/m3			08/11/17 05:13	2
Vinyl acetate	ND		5.6	1.0	ug/m3			08/11/17 05:13	2
Vinyl chloride	ND		2.0	0.61	ug/m3			08/11/17 05:13	2
m,p-Xylene	2.0	J	6.9	0.87	ug/m3			08/11/17 05:13	2
o-Xylene	0.95	J	3.5	0.47	ug/m3			08/11/17 05:13	2
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					08/11/17 05:13	2
1,2-Dichloroethane-d4 (Surr)	80		70 - 130					08/11/17 05:13	2
Toluene-d8 (Surr)	100		70 - 130					08/11/17 05:13	2

Client Sample ID: HOU-10

Date Collected: 07/27/17 08:38

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Lab Sample ID: 320-30325-14

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	15		5.0	0.18	ppb v/v			08/11/17 07:40	1
Benzene	0.079	J	0.40	0.079	ppb v/v			08/11/17 07:40	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			08/11/17 07:40	1
Bromodichloromethane	15		0.30	0.066	ppb v/v			08/11/17 07:40	1
Bromoform	0.20	J	0.40	0.070	ppb v/v			08/11/17 07:40	1
Bromomethane	ND		0.80	0.34	ppb v/v			08/11/17 07:40	1
2-Butanone (MEK)	1.5		0.80	0.20	ppb v/v			08/11/17 07:40	1
Carbon disulfide	6.6		0.80	0.078	ppb v/v			08/11/17 07:40	1
Carbon tetrachloride	0.38	J	0.80	0.064	ppb v/v			08/11/17 07:40	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			08/11/17 07:40	1
Dibromochloromethane	2.4		0.40	0.079	ppb v/v			08/11/17 07:40	1
Chloroethane	0.46	J	0.80	0.31	ppb v/v			08/11/17 07:40	1
Chloroform	58		0.30	0.095	ppb v/v			08/11/17 07:40	1
Chloromethane	2.0		0.80	0.20	ppb v/v			08/11/17 07:40	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			08/11/17 07:40	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			08/11/17 07:40	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			08/11/17 07:40	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			08/11/17 07:40	1
Dichlorodifluoromethane	0.22	J	0.40	0.15	ppb v/v			08/11/17 07:40	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			08/11/17 07:40	1
1,2-Dichloroethane	0.20	J	0.80	0.088	ppb v/v			08/11/17 07:40	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			08/11/17 07:40	1
cis-1,2-Dichloroethene	0.16	J	0.40	0.089	ppb v/v			08/11/17 07:40	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			08/11/17 07:40	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			08/11/17 07:40	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			08/11/17 07:40	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			08/11/17 07:40	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			08/11/17 07:40	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			08/11/17 07:40	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			08/11/17 07:40	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			08/11/17 07:40	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-10

Lab Sample ID: 320-30325-14

Date Collected: 07/27/17 08:38

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		0.40	0.087	ppb v/v			08/11/17 07:40	1
Methylene Chloride	5.2		0.40	0.072	ppb v/v			08/11/17 07:40	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			08/11/17 07:40	1
Styrene	ND		0.40	0.059	ppb v/v			08/11/17 07:40	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			08/11/17 07:40	1
Tetrachloroethene	0.73		0.40	0.051	ppb v/v			08/11/17 07:40	1
Toluene	3.4		0.40	0.051	ppb v/v			08/11/17 07:40	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			08/11/17 07:40	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			08/11/17 07:40	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			08/11/17 07:40	1
Trichloroethene	0.20	J	0.40	0.11	ppb v/v			08/11/17 07:40	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			08/11/17 07:40	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.55		0.40	0.16	ppb v/v			08/11/17 07:40	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			08/11/17 07:40	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			08/11/17 07:40	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			08/11/17 07:40	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			08/11/17 07:40	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			08/11/17 07:40	1
o-Xylene	ND		0.40	0.054	ppb v/v			08/11/17 07:40	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	36		12	0.42	ug/m3			08/11/17 07:40	1
Benzene	0.25	J	1.3	0.25	ug/m3			08/11/17 07:40	1
Benzyl chloride	ND		4.1	0.84	ug/m3			08/11/17 07:40	1
Bromodichloromethane	100		2.0	0.44	ug/m3			08/11/17 07:40	1
Bromoform	2.1	J	4.1	0.72	ug/m3			08/11/17 07:40	1
Bromomethane	ND		3.1	1.3	ug/m3			08/11/17 07:40	1
2-Butanone (MEK)	4.3		2.4	0.59	ug/m3			08/11/17 07:40	1
Carbon disulfide	20		2.5	0.24	ug/m3			08/11/17 07:40	1
Carbon tetrachloride	2.4	J	5.0	0.40	ug/m3			08/11/17 07:40	1
Chlorobenzene	ND		1.4	0.29	ug/m3			08/11/17 07:40	1
Dibromochloromethane	21		3.4	0.67	ug/m3			08/11/17 07:40	1
Chloroethane	1.2	J	2.1	0.81	ug/m3			08/11/17 07:40	1
Chloroform	280		1.5	0.46	ug/m3			08/11/17 07:40	1
Chloromethane	4.2		1.7	0.41	ug/m3			08/11/17 07:40	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			08/11/17 07:40	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			08/11/17 07:40	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			08/11/17 07:40	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			08/11/17 07:40	1
Dichlorodifluoromethane	1.1	J	2.0	0.72	ug/m3			08/11/17 07:40	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			08/11/17 07:40	1
1,2-Dichloroethane	0.82	J	3.2	0.36	ug/m3			08/11/17 07:40	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			08/11/17 07:40	1
cis-1,2-Dichloroethene	0.63	J	1.6	0.35	ug/m3			08/11/17 07:40	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			08/11/17 07:40	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			08/11/17 07:40	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			08/11/17 07:40	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			08/11/17 07:40	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-10

Lab Sample ID: 320-30325-14

Date Collected: 07/27/17 08:38

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			08/11/17 07:40	1
Ethylbenzene	ND		1.7	0.27	ug/m3			08/11/17 07:40	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			08/11/17 07:40	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			08/11/17 07:40	1
2-Hexanone	ND		1.6	0.36	ug/m3			08/11/17 07:40	1
Methylene Chloride	18		1.4	0.25	ug/m3			08/11/17 07:40	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			08/11/17 07:40	1
Styrene	ND		1.7	0.25	ug/m3			08/11/17 07:40	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			08/11/17 07:40	1
Tetrachloroethene	5.0		2.7	0.35	ug/m3			08/11/17 07:40	1
Toluene	13		1.5	0.19	ug/m3			08/11/17 07:40	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			08/11/17 07:40	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			08/11/17 07:40	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			08/11/17 07:40	1
Trichloroethene	1.1 J		2.1	0.56	ug/m3			08/11/17 07:40	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			08/11/17 07:40	1
1,1,2-Trichloro-1,2,2-trifluoroethane	4.2		3.1	1.2	ug/m3			08/11/17 07:40	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			08/11/17 07:40	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			08/11/17 07:40	1
Vinyl acetate	ND		2.8	0.51	ug/m3			08/11/17 07:40	1
Vinyl chloride	ND		1.0	0.31	ug/m3			08/11/17 07:40	1
m,p-Xylene	ND		3.5	0.43	ug/m3			08/11/17 07:40	1
o-Xylene	ND		1.7	0.23	ug/m3			08/11/17 07:40	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130					08/11/17 07:40	1
1,2-Dichloroethane-d4 (Surr)	73		70 - 130					08/11/17 07:40	1
Toluene-d8 (Surr)	103		70 - 130					08/11/17 07:40	1

Client Sample ID: HOU-10B

Lab Sample ID: 320-30325-15

Date Collected: 07/27/17 08:53

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	37 J		91	3.2	ppb v/v			08/11/17 08:32	18.1
Benzene	ND		7.2	1.4	ppb v/v			08/11/17 08:32	18.1
Benzyl chloride	ND		14	3.0	ppb v/v			08/11/17 08:32	18.1
Bromodichloromethane	17		5.4	1.2	ppb v/v			08/11/17 08:32	18.1
Bromoform	ND		7.2	1.3	ppb v/v			08/11/17 08:32	18.1
Bromomethane	ND		14	6.1	ppb v/v			08/11/17 08:32	18.1
2-Butanone (MEK)	5.5 J		14	3.6	ppb v/v			08/11/17 08:32	18.1
Carbon disulfide	24		14	1.4	ppb v/v			08/11/17 08:32	18.1
Carbon tetrachloride	ND		14	1.2	ppb v/v			08/11/17 08:32	18.1
Chlorobenzene	ND		5.4	1.2	ppb v/v			08/11/17 08:32	18.1
Dibromochloromethane	3.2 J		7.2	1.4	ppb v/v			08/11/17 08:32	18.1
Chloroethane	ND		14	5.6	ppb v/v			08/11/17 08:32	18.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-10B

Lab Sample ID: 320-30325-15

Date Collected: 07/27/17 08:53

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	96		5.4	1.7	ppb v/v			08/11/17 08:32	18.1
Chloromethane	3.8	J	14	3.6	ppb v/v			08/11/17 08:32	18.1
1,2-Dibromoethane (EDB)	ND		14	1.4	ppb v/v			08/11/17 08:32	18.1
1,2-Dichlorobenzene	ND		7.2	2.4	ppb v/v			08/11/17 08:32	18.1
1,3-Dichlorobenzene	ND		7.2	2.0	ppb v/v			08/11/17 08:32	18.1
1,4-Dichlorobenzene	ND		7.2	2.7	ppb v/v			08/11/17 08:32	18.1
Dichlorodifluoromethane	ND		7.2	2.6	ppb v/v			08/11/17 08:32	18.1
1,1-Dichloroethane	ND		5.4	1.3	ppb v/v			08/11/17 08:32	18.1
1,2-Dichloroethane	ND		14	1.6	ppb v/v			08/11/17 08:32	18.1
1,1-Dichloroethene	ND		14	2.3	ppb v/v			08/11/17 08:32	18.1
cis-1,2-Dichloroethene	ND		7.2	1.6	ppb v/v			08/11/17 08:32	18.1
trans-1,2-Dichloroethene	ND		7.2	1.8	ppb v/v			08/11/17 08:32	18.1
1,2-Dichloropropane	ND		7.2	4.3	ppb v/v			08/11/17 08:32	18.1
cis-1,3-Dichloropropene	ND		7.2	1.9	ppb v/v			08/11/17 08:32	18.1
trans-1,3-Dichloropropene	ND		7.2	1.6	ppb v/v			08/11/17 08:32	18.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		7.2	2.8	ppb v/v			08/11/17 08:32	18.1
Ethylbenzene	ND		7.2	1.1	ppb v/v			08/11/17 08:32	18.1
4-Ethyltoluene	ND		7.2	3.4	ppb v/v			08/11/17 08:32	18.1
Hexachlorobutadiene	ND		36	7.8	ppb v/v			08/11/17 08:32	18.1
2-Hexanone	ND		7.2	1.6	ppb v/v			08/11/17 08:32	18.1
Methylene Chloride	5.2	J	7.2	1.3	ppb v/v			08/11/17 08:32	18.1
4-Methyl-2-pentanone (MIBK)	ND		7.2	2.4	ppb v/v			08/11/17 08:32	18.1
Styrene	ND		7.2	1.1	ppb v/v			08/11/17 08:32	18.1
1,1,2,2-Tetrachloroethane	ND		7.2	1.2	ppb v/v			08/11/17 08:32	18.1
Tetrachloroethene	ND		7.2	0.92	ppb v/v			08/11/17 08:32	18.1
Toluene	67		7.2	0.92	ppb v/v			08/11/17 08:32	18.1
1,2,4-Trichlorobenzene	8.4	J	36	7.8	ppb v/v			08/11/17 08:32	18.1
1,1,1-Trichloroethane	ND		5.4	1.2	ppb v/v			08/11/17 08:32	18.1
1,1,2-Trichloroethane	ND		7.2	1.2	ppb v/v			08/11/17 08:32	18.1
Trichloroethene	ND		7.2	1.9	ppb v/v			08/11/17 08:32	18.1
Trichlorofluoromethane	ND		7.2	3.5	ppb v/v			08/11/17 08:32	18.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		7.2	3.0	ppb v/v			08/11/17 08:32	18.1
1,2,4-Trimethylbenzene	ND		14	2.9	ppb v/v			08/11/17 08:32	18.1
1,3,5-Trimethylbenzene	ND		7.2	2.3	ppb v/v			08/11/17 08:32	18.1
Vinyl acetate	ND		14	2.6	ppb v/v			08/11/17 08:32	18.1
Vinyl chloride	ND		7.2	2.2	ppb v/v			08/11/17 08:32	18.1
m,p-Xylene	ND		14	1.8	ppb v/v			08/11/17 08:32	18.1
o-Xylene	ND		7.2	0.98	ppb v/v			08/11/17 08:32	18.1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	87	J	210	7.7	ug/m3			08/11/17 08:32	18.1
Benzene	ND		23	4.6	ug/m3			08/11/17 08:32	18.1
Benzyl chloride	ND		75	15	ug/m3			08/11/17 08:32	18.1
Bromodichloromethane	110		36	8.0	ug/m3			08/11/17 08:32	18.1
Bromoform	ND		75	13	ug/m3			08/11/17 08:32	18.1
Bromomethane	ND		56	24	ug/m3			08/11/17 08:32	18.1
2-Butanone (MEK)	16	J	43	11	ug/m3			08/11/17 08:32	18.1
Carbon disulfide	74		45	4.4	ug/m3			08/11/17 08:32	18.1
Carbon tetrachloride	ND		91	7.3	ug/m3			08/11/17 08:32	18.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-10B

Lab Sample ID: 320-30325-15

Date Collected: 07/27/17 08:53

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	ND		25	5.3	ug/m3			08/11/17 08:32	18.1
Dibromochloromethane	27	J	62	12	ug/m3			08/11/17 08:32	18.1
Chloroethane	ND		38	15	ug/m3			08/11/17 08:32	18.1
Chloroform	470		27	8.4	ug/m3			08/11/17 08:32	18.1
Chloromethane	7.8	J	30	7.4	ug/m3			08/11/17 08:32	18.1
1,2-Dibromoethane (EDB)	ND		110	10	ug/m3			08/11/17 08:32	18.1
1,2-Dichlorobenzene	ND		44	14	ug/m3			08/11/17 08:32	18.1
1,3-Dichlorobenzene	ND		44	12	ug/m3			08/11/17 08:32	18.1
1,4-Dichlorobenzene	ND		44	16	ug/m3			08/11/17 08:32	18.1
Dichlorodifluoromethane	ND		36	13	ug/m3			08/11/17 08:32	18.1
1,1-Dichloroethane	ND		22	5.3	ug/m3			08/11/17 08:32	18.1
1,2-Dichloroethane	ND		59	6.4	ug/m3			08/11/17 08:32	18.1
1,1-Dichloroethene	ND		57	9.3	ug/m3			08/11/17 08:32	18.1
cis-1,2-Dichloroethene	ND		29	6.4	ug/m3			08/11/17 08:32	18.1
trans-1,2-Dichloroethene	ND		29	7.2	ug/m3			08/11/17 08:32	18.1
1,2-Dichloropropane	ND		33	20	ug/m3			08/11/17 08:32	18.1
cis-1,3-Dichloropropene	ND		33	8.5	ug/m3			08/11/17 08:32	18.1
trans-1,3-Dichloropropene	ND		33	7.2	ug/m3			08/11/17 08:32	18.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		51	20	ug/m3			08/11/17 08:32	18.1
Ethylbenzene	ND		31	5.0	ug/m3			08/11/17 08:32	18.1
4-Ethyltoluene	ND		36	17	ug/m3			08/11/17 08:32	18.1
Hexachlorobutadiene	ND		390	83	ug/m3			08/11/17 08:32	18.1
2-Hexanone	ND		30	6.5	ug/m3			08/11/17 08:32	18.1
Methylene Chloride	18	J	25	4.5	ug/m3			08/11/17 08:32	18.1
4-Methyl-2-pentanone (MIBK)	ND		30	10	ug/m3			08/11/17 08:32	18.1
Styrene	ND		31	4.5	ug/m3			08/11/17 08:32	18.1
1,1,2,2-Tetrachloroethane	ND		50	8.6	ug/m3			08/11/17 08:32	18.1
Tetrachloroethene	ND		49	6.3	ug/m3			08/11/17 08:32	18.1
Toluene	250		27	3.5	ug/m3			08/11/17 08:32	18.1
1,2,4-Trichlorobenzene	62	J	270	58	ug/m3			08/11/17 08:32	18.1
1,1,1-Trichloroethane	ND		30	6.4	ug/m3			08/11/17 08:32	18.1
1,1,2-Trichloroethane	ND		40	6.6	ug/m3			08/11/17 08:32	18.1
Trichloroethene	ND		39	10	ug/m3			08/11/17 08:32	18.1
Trichlorofluoromethane	ND		41	20	ug/m3			08/11/17 08:32	18.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		55	23	ug/m3			08/11/17 08:32	18.1
1,2,4-Trimethylbenzene	ND		71	14	ug/m3			08/11/17 08:32	18.1
1,3,5-Trimethylbenzene	ND		36	11	ug/m3			08/11/17 08:32	18.1
Vinyl acetate	ND		51	9.2	ug/m3			08/11/17 08:32	18.1
Vinyl chloride	ND		19	5.6	ug/m3			08/11/17 08:32	18.1
m,p-Xylene	ND		63	7.9	ug/m3			08/11/17 08:32	18.1
o-Xylene	ND		31	4.2	ug/m3			08/11/17 08:32	18.1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130		08/11/17 08:32	18.1
1,2-Dichloroethane-d4 (Surr)	93		70 - 130		08/11/17 08:32	18.1
Toluene-d8 (Surr)	100		70 - 130		08/11/17 08:32	18.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-BKG-01

Lab Sample ID: 320-30325-16

Date Collected: 07/27/17 07:58

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	26		24	0.85	ppb v/v			08/11/17 09:23	4.79
Benzene	1.1	J	1.9	0.38	ppb v/v			08/11/17 09:23	4.79
Benzyl chloride	ND		3.8	0.78	ppb v/v			08/11/17 09:23	4.79
Bromodichloromethane	17		1.4	0.32	ppb v/v			08/11/17 09:23	4.79
Bromoform	ND		1.9	0.34	ppb v/v			08/11/17 09:23	4.79
Bromomethane	ND		3.8	1.6	ppb v/v			08/11/17 09:23	4.79
2-Butanone (MEK)	4.2		3.8	0.95	ppb v/v			08/11/17 09:23	4.79
Carbon disulfide	33		3.8	0.37	ppb v/v			08/11/17 09:23	4.79
Carbon tetrachloride	ND		3.8	0.31	ppb v/v			08/11/17 09:23	4.79
Chlorobenzene	2.6		1.4	0.31	ppb v/v			08/11/17 09:23	4.79
Dibromochloromethane	3.1		1.9	0.38	ppb v/v			08/11/17 09:23	4.79
Chloroethane	ND		3.8	1.5	ppb v/v			08/11/17 09:23	4.79
Chloroform	130		1.4	0.46	ppb v/v			08/11/17 09:23	4.79
Chloromethane	4.2		3.8	0.94	ppb v/v			08/11/17 09:23	4.79
1,2-Dibromoethane (EDB)	ND		3.8	0.36	ppb v/v			08/11/17 09:23	4.79
1,2-Dichlorobenzene	ND		1.9	0.62	ppb v/v			08/11/17 09:23	4.79
1,3-Dichlorobenzene	ND		1.9	0.53	ppb v/v			08/11/17 09:23	4.79
1,4-Dichlorobenzene	8.7		1.9	0.71	ppb v/v			08/11/17 09:23	4.79
Dichlorodifluoromethane	ND		1.9	0.69	ppb v/v			08/11/17 09:23	4.79
1,1-Dichloroethane	ND		1.4	0.34	ppb v/v			08/11/17 09:23	4.79
1,2-Dichloroethane	ND		3.8	0.42	ppb v/v			08/11/17 09:23	4.79
1,1-Dichloroethene	0.74	J	3.8	0.62	ppb v/v			08/11/17 09:23	4.79
cis-1,2-Dichloroethene	1.9		1.9	0.43	ppb v/v			08/11/17 09:23	4.79
trans-1,2-Dichloroethene	ND		1.9	0.48	ppb v/v			08/11/17 09:23	4.79
1,2-Dichloropropane	ND		1.9	1.1	ppb v/v			08/11/17 09:23	4.79
cis-1,3-Dichloropropene	ND		1.9	0.50	ppb v/v			08/11/17 09:23	4.79
trans-1,3-Dichloropropene	ND		1.9	0.42	ppb v/v			08/11/17 09:23	4.79
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.9	0.74	ppb v/v			08/11/17 09:23	4.79
Ethylbenzene	45		1.9	0.30	ppb v/v			08/11/17 09:23	4.79
4-Ethyltoluene	ND		1.9	0.90	ppb v/v			08/11/17 09:23	4.79
Hexachlorobutadiene	ND		9.6	2.1	ppb v/v			08/11/17 09:23	4.79
2-Hexanone	ND		1.9	0.42	ppb v/v			08/11/17 09:23	4.79
Methylene Chloride	22		1.9	0.34	ppb v/v			08/11/17 09:23	4.79
4-Methyl-2-pentanone (MIBK)	ND		1.9	0.65	ppb v/v			08/11/17 09:23	4.79
Styrene	1.9		1.9	0.28	ppb v/v			08/11/17 09:23	4.79
1,1,2,2-Tetrachloroethane	ND		1.9	0.33	ppb v/v			08/11/17 09:23	4.79
Tetrachloroethene	5.1		1.9	0.24	ppb v/v			08/11/17 09:23	4.79
Toluene	49		1.9	0.24	ppb v/v			08/11/17 09:23	4.79
1,2,4-Trichlorobenzene	ND		9.6	2.1	ppb v/v			08/11/17 09:23	4.79
1,1,1-Trichloroethane	ND		1.4	0.31	ppb v/v			08/11/17 09:23	4.79
1,1,2-Trichloroethane	ND		1.9	0.32	ppb v/v			08/11/17 09:23	4.79
Trichloroethene	1.5	J	1.9	0.50	ppb v/v			08/11/17 09:23	4.79
Trichlorofluoromethane	ND		1.9	0.94	ppb v/v			08/11/17 09:23	4.79
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.9	0.78	ppb v/v			08/11/17 09:23	4.79
1,2,4-Trimethylbenzene	0.87	J	3.8	0.78	ppb v/v			08/11/17 09:23	4.79
1,3,5-Trimethylbenzene	ND		1.9	0.60	ppb v/v			08/11/17 09:23	4.79
Vinyl acetate	ND		3.8	0.69	ppb v/v			08/11/17 09:23	4.79
Vinyl chloride	1.1	J	1.9	0.57	ppb v/v			08/11/17 09:23	4.79

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-BKG-01

Lab Sample ID: 320-30325-16

Date Collected: 07/27/17 07:58

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	2.2	J	3.8	0.48	ppb v/v			08/11/17 09:23	4.79
o-Xylene	0.73	J	1.9	0.26	ppb v/v			08/11/17 09:23	4.79
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	63		57	2.0	ug/m3			08/11/17 09:23	4.79
Benzene	3.4	J	6.1	1.2	ug/m3			08/11/17 09:23	4.79
Benzyl chloride	ND		20	4.0	ug/m3			08/11/17 09:23	4.79
Bromodichloromethane	110		9.6	2.1	ug/m3			08/11/17 09:23	4.79
Bromoform	ND		20	3.5	ug/m3			08/11/17 09:23	4.79
Bromomethane	ND		15	6.2	ug/m3			08/11/17 09:23	4.79
2-Butanone (MEK)	13		11	2.8	ug/m3			08/11/17 09:23	4.79
Carbon disulfide	100		12	1.2	ug/m3			08/11/17 09:23	4.79
Carbon tetrachloride	ND		24	1.9	ug/m3			08/11/17 09:23	4.79
Chlorobenzene	12		6.6	1.4	ug/m3			08/11/17 09:23	4.79
Dibromochloromethane	26		16	3.2	ug/m3			08/11/17 09:23	4.79
Chloroethane	ND		10	3.9	ug/m3			08/11/17 09:23	4.79
Chloroform	610		7.0	2.2	ug/m3			08/11/17 09:23	4.79
Chloromethane	8.6		7.9	1.9	ug/m3			08/11/17 09:23	4.79
1,2-Dibromoethane (EDB)	ND		29	2.8	ug/m3			08/11/17 09:23	4.79
1,2-Dichlorobenzene	ND		12	3.7	ug/m3			08/11/17 09:23	4.79
1,3-Dichlorobenzene	ND		12	3.2	ug/m3			08/11/17 09:23	4.79
1,4-Dichlorobenzene	52		12	4.3	ug/m3			08/11/17 09:23	4.79
Dichlorodifluoromethane	ND		9.5	3.4	ug/m3			08/11/17 09:23	4.79
1,1-Dichloroethane	ND		5.8	1.4	ug/m3			08/11/17 09:23	4.79
1,2-Dichloroethane	ND		16	1.7	ug/m3			08/11/17 09:23	4.79
1,1-Dichloroethene	2.9	J	15	2.4	ug/m3			08/11/17 09:23	4.79
cis-1,2-Dichloroethene	7.5		7.6	1.7	ug/m3			08/11/17 09:23	4.79
trans-1,2-Dichloroethene	ND		7.6	1.9	ug/m3			08/11/17 09:23	4.79
1,2-Dichloropropane	ND		8.9	5.3	ug/m3			08/11/17 09:23	4.79
cis-1,3-Dichloropropene	ND		8.7	2.3	ug/m3			08/11/17 09:23	4.79
trans-1,3-Dichloropropene	ND		8.7	1.9	ug/m3			08/11/17 09:23	4.79
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		13	5.2	ug/m3			08/11/17 09:23	4.79
Ethylbenzene	190		8.3	1.3	ug/m3			08/11/17 09:23	4.79
4-Ethyltoluene	ND		9.4	4.4	ug/m3			08/11/17 09:23	4.79
Hexachlorobutadiene	ND		100	22	ug/m3			08/11/17 09:23	4.79
2-Hexanone	ND		7.9	1.7	ug/m3			08/11/17 09:23	4.79
Methylene Chloride	77		6.7	1.2	ug/m3			08/11/17 09:23	4.79
4-Methyl-2-pentanone (MIBK)	ND		7.8	2.6	ug/m3			08/11/17 09:23	4.79
Styrene	8.1		8.2	1.2	ug/m3			08/11/17 09:23	4.79
1,1,2,2-Tetrachloroethane	ND		13	2.3	ug/m3			08/11/17 09:23	4.79
Tetrachloroethene	35		13	1.7	ug/m3			08/11/17 09:23	4.79
Toluene	180		7.2	0.92	ug/m3			08/11/17 09:23	4.79
1,2,4-Trichlorobenzene	ND		71	15	ug/m3			08/11/17 09:23	4.79
1,1,1-Trichloroethane	ND		7.8	1.7	ug/m3			08/11/17 09:23	4.79
1,1,2-Trichloroethane	ND		10	1.8	ug/m3			08/11/17 09:23	4.79
Trichloroethene	8.1	J	10	2.7	ug/m3			08/11/17 09:23	4.79
Trichlorofluoromethane	ND		11	5.3	ug/m3			08/11/17 09:23	4.79
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		15	6.0	ug/m3			08/11/17 09:23	4.79
1,2,4-Trimethylbenzene	4.3	J	19	3.8	ug/m3			08/11/17 09:23	4.79

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-BKG-01

Lab Sample ID: 320-30325-16

Date Collected: 07/27/17 07:58

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND		9.4	2.9	ug/m3			08/11/17 09:23	4.79
Vinyl acetate	ND		13	2.4	ug/m3			08/11/17 09:23	4.79
Vinyl chloride	2.8	J	4.9	1.5	ug/m3			08/11/17 09:23	4.79
m,p-Xylene	9.7	J	17	2.1	ug/m3			08/11/17 09:23	4.79
o-Xylene	3.1	J	8.3	1.1	ug/m3			08/11/17 09:23	4.79
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130					08/11/17 09:23	4.79
1,2-Dichloroethane-d4 (Surr)	84		70 - 130					08/11/17 09:23	4.79
Toluene-d8 (Surr)	102		70 - 130					08/11/17 09:23	4.79

Client Sample ID: HOU-BKG-02

Lab Sample ID: 320-30325-17

Date Collected: 07/27/17 10:53

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	270		96	3.4	ppb v/v			08/11/17 10:15	19.1
Benzene	ND		7.6	1.5	ppb v/v			08/11/17 10:15	19.1
Benzyl chloride	ND		15	3.1	ppb v/v			08/11/17 10:15	19.1
Bromodichloromethane	32		5.7	1.3	ppb v/v			08/11/17 10:15	19.1
Bromoform	ND		7.6	1.3	ppb v/v			08/11/17 10:15	19.1
Bromomethane	ND		15	6.4	ppb v/v			08/11/17 10:15	19.1
2-Butanone (MEK)	21		15	3.8	ppb v/v			08/11/17 10:15	19.1
Carbon disulfide	75		15	1.5	ppb v/v			08/11/17 10:15	19.1
Carbon tetrachloride	ND		15	1.2	ppb v/v			08/11/17 10:15	19.1
Chlorobenzene	ND		5.7	1.2	ppb v/v			08/11/17 10:15	19.1
Dibromochloromethane	5.4	J	7.6	1.5	ppb v/v			08/11/17 10:15	19.1
Chloroethane	ND		15	5.9	ppb v/v			08/11/17 10:15	19.1
Chloroform	470		5.7	1.8	ppb v/v			08/11/17 10:15	19.1
Chloromethane	7.8	J	15	3.8	ppb v/v			08/11/17 10:15	19.1
1,2-Dibromoethane (EDB)	ND		15	1.4	ppb v/v			08/11/17 10:15	19.1
1,2-Dichlorobenzene	ND		7.6	2.5	ppb v/v			08/11/17 10:15	19.1
1,3-Dichlorobenzene	ND		7.6	2.1	ppb v/v			08/11/17 10:15	19.1
1,4-Dichlorobenzene	ND		7.6	2.8	ppb v/v			08/11/17 10:15	19.1
Dichlorodifluoromethane	ND		7.6	2.8	ppb v/v			08/11/17 10:15	19.1
1,1-Dichloroethane	ND		5.7	1.4	ppb v/v			08/11/17 10:15	19.1
1,2-Dichloroethane	ND		15	1.7	ppb v/v			08/11/17 10:15	19.1
1,1-Dichloroethene	ND		15	2.5	ppb v/v			08/11/17 10:15	19.1
cis-1,2-Dichloroethene	ND		7.6	1.7	ppb v/v			08/11/17 10:15	19.1
trans-1,2-Dichloroethene	ND		7.6	1.9	ppb v/v			08/11/17 10:15	19.1
1,2-Dichloropropane	ND		7.6	4.6	ppb v/v			08/11/17 10:15	19.1
cis-1,3-Dichloropropene	ND		7.6	2.0	ppb v/v			08/11/17 10:15	19.1
trans-1,3-Dichloropropene	ND		7.6	1.7	ppb v/v			08/11/17 10:15	19.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		7.6	3.0	ppb v/v			08/11/17 10:15	19.1
Ethylbenzene	1.3	J	7.6	1.2	ppb v/v			08/11/17 10:15	19.1
4-Ethyltoluene	ND		7.6	3.6	ppb v/v			08/11/17 10:15	19.1
Hexachlorobutadiene	ND		38	8.3	ppb v/v			08/11/17 10:15	19.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-BKG-02

Lab Sample ID: 320-30325-17

Date Collected: 07/27/17 10:53

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		7.6	1.7	ppb v/v			08/11/17 10:15	19.1
Methylene Chloride	13		7.6	1.4	ppb v/v			08/11/17 10:15	19.1
4-Methyl-2-pentanone (MIBK)	ND		7.6	2.6	ppb v/v			08/11/17 10:15	19.1
Styrene	ND		7.6	1.1	ppb v/v			08/11/17 10:15	19.1
1,1,2,2-Tetrachloroethane	ND		7.6	1.3	ppb v/v			08/11/17 10:15	19.1
Tetrachloroethene	ND		7.6	0.97	ppb v/v			08/11/17 10:15	19.1
Toluene	92		7.6	0.97	ppb v/v			08/11/17 10:15	19.1
1,2,4-Trichlorobenzene	ND		38	8.3	ppb v/v			08/11/17 10:15	19.1
1,1,1-Trichloroethane	ND		5.7	1.2	ppb v/v			08/11/17 10:15	19.1
1,1,2-Trichloroethane	ND		7.6	1.3	ppb v/v			08/11/17 10:15	19.1
Trichloroethene	16		7.6	2.0	ppb v/v			08/11/17 10:15	19.1
Trichlorofluoromethane	ND		7.6	3.7	ppb v/v			08/11/17 10:15	19.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		7.6	3.1	ppb v/v			08/11/17 10:15	19.1
1,2,4-Trimethylbenzene	ND		15	3.1	ppb v/v			08/11/17 10:15	19.1
1,3,5-Trimethylbenzene	ND		7.6	2.4	ppb v/v			08/11/17 10:15	19.1
Vinyl acetate	ND		15	2.8	ppb v/v			08/11/17 10:15	19.1
Vinyl chloride	ND		7.6	2.3	ppb v/v			08/11/17 10:15	19.1
m,p-Xylene	3.4 J		15	1.9	ppb v/v			08/11/17 10:15	19.1
o-Xylene	1.3 J		7.6	1.0	ppb v/v			08/11/17 10:15	19.1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	640		230	8.1	ug/m3			08/11/17 10:15	19.1
Benzene	ND		24	4.8	ug/m3			08/11/17 10:15	19.1
Benzyl chloride	ND		79	16	ug/m3			08/11/17 10:15	19.1
Bromodichloromethane	220		38	8.4	ug/m3			08/11/17 10:15	19.1
Bromoform	ND		79	14	ug/m3			08/11/17 10:15	19.1
Bromomethane	ND		59	25	ug/m3			08/11/17 10:15	19.1
2-Butanone (MEK)	61		45	11	ug/m3			08/11/17 10:15	19.1
Carbon disulfide	230		48	4.6	ug/m3			08/11/17 10:15	19.1
Carbon tetrachloride	ND		96	7.7	ug/m3			08/11/17 10:15	19.1
Chlorobenzene	ND		26	5.6	ug/m3			08/11/17 10:15	19.1
Dibromochloromethane	46 J		65	13	ug/m3			08/11/17 10:15	19.1
Chloroethane	ND		40	16	ug/m3			08/11/17 10:15	19.1
Chloroform	2300		28	8.9	ug/m3			08/11/17 10:15	19.1
Chloromethane	16 J		32	7.8	ug/m3			08/11/17 10:15	19.1
1,2-Dibromoethane (EDB)	ND		120	11	ug/m3			08/11/17 10:15	19.1
1,2-Dichlorobenzene	ND		46	15	ug/m3			08/11/17 10:15	19.1
1,3-Dichlorobenzene	ND		46	13	ug/m3			08/11/17 10:15	19.1
1,4-Dichlorobenzene	ND		46	17	ug/m3			08/11/17 10:15	19.1
Dichlorodifluoromethane	ND		38	14	ug/m3			08/11/17 10:15	19.1
1,1-Dichloroethane	ND		23	5.6	ug/m3			08/11/17 10:15	19.1
1,2-Dichloroethane	ND		62	6.8	ug/m3			08/11/17 10:15	19.1
1,1-Dichloroethene	ND		61	9.8	ug/m3			08/11/17 10:15	19.1
cis-1,2-Dichloroethene	ND		30	6.7	ug/m3			08/11/17 10:15	19.1
trans-1,2-Dichloroethene	ND		30	7.6	ug/m3			08/11/17 10:15	19.1
1,2-Dichloropropane	ND		35	21	ug/m3			08/11/17 10:15	19.1
cis-1,3-Dichloropropene	ND		35	9.0	ug/m3			08/11/17 10:15	19.1
trans-1,3-Dichloropropene	ND		35	7.6	ug/m3			08/11/17 10:15	19.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		53	21	ug/m3			08/11/17 10:15	19.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-BKG-02

Lab Sample ID: 320-30325-17

Date Collected: 07/27/17 10:53

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	5.8	J	33	5.2	ug/m3			08/11/17 10:15	19.1
4-Ethyltoluene	ND		38	18	ug/m3			08/11/17 10:15	19.1
Hexachlorobutadiene	ND		410	88	ug/m3			08/11/17 10:15	19.1
2-Hexanone	ND		31	6.8	ug/m3			08/11/17 10:15	19.1
Methylene Chloride	45		27	4.8	ug/m3			08/11/17 10:15	19.1
4-Methyl-2-pentanone (MIBK)	ND		31	11	ug/m3			08/11/17 10:15	19.1
Styrene	ND		33	4.8	ug/m3			08/11/17 10:15	19.1
1,1,2,2-Tetrachloroethane	ND		52	9.0	ug/m3			08/11/17 10:15	19.1
Tetrachloroethene	ND		52	6.6	ug/m3			08/11/17 10:15	19.1
Toluene	350		29	3.7	ug/m3			08/11/17 10:15	19.1
1,2,4-Trichlorobenzene	ND		280	61	ug/m3			08/11/17 10:15	19.1
1,1,1-Trichloroethane	ND		31	6.8	ug/m3			08/11/17 10:15	19.1
1,1,2-Trichloroethane	ND		42	7.0	ug/m3			08/11/17 10:15	19.1
Trichloroethene	85		41	11	ug/m3			08/11/17 10:15	19.1
Trichlorofluoromethane	ND		43	21	ug/m3			08/11/17 10:15	19.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		59	24	ug/m3			08/11/17 10:15	19.1
1,2,4-Trimethylbenzene	ND		75	15	ug/m3			08/11/17 10:15	19.1
1,3,5-Trimethylbenzene	ND		38	12	ug/m3			08/11/17 10:15	19.1
Vinyl acetate	ND		54	9.8	ug/m3			08/11/17 10:15	19.1
Vinyl chloride	ND		20	5.9	ug/m3			08/11/17 10:15	19.1
m,p-Xylene	15	J	66	8.3	ug/m3			08/11/17 10:15	19.1
o-Xylene	5.5	J	33	4.5	ug/m3			08/11/17 10:15	19.1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					08/11/17 10:15	19.1
1,2-Dichloroethane-d4 (Surr)	96		70 - 130					08/11/17 10:15	19.1
Toluene-d8 (Surr)	100		70 - 130					08/11/17 10:15	19.1

Client Sample ID: DUP-1

Lab Sample ID: 320-30325-18

Date Collected: 07/27/17 00:00

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	39		39	1.4	ppb v/v			08/11/17 11:06	7.81
Benzene	ND		3.1	0.62	ppb v/v			08/11/17 11:06	7.81
Benzyl chloride	ND		6.2	1.3	ppb v/v			08/11/17 11:06	7.81
Bromodichloromethane	5.0		2.3	0.52	ppb v/v			08/11/17 11:06	7.81
Bromoform	ND		3.1	0.55	ppb v/v			08/11/17 11:06	7.81
Bromomethane	ND		6.2	2.6	ppb v/v			08/11/17 11:06	7.81
2-Butanone (MEK)	ND		6.2	1.6	ppb v/v			08/11/17 11:06	7.81
Carbon disulfide	18		6.2	0.61	ppb v/v			08/11/17 11:06	7.81
Carbon tetrachloride	ND		6.2	0.50	ppb v/v			08/11/17 11:06	7.81
Chlorobenzene	ND		2.3	0.50	ppb v/v			08/11/17 11:06	7.81
Dibromochloromethane	0.93	J	3.1	0.62	ppb v/v			08/11/17 11:06	7.81
Chloroethane	ND		6.2	2.4	ppb v/v			08/11/17 11:06	7.81
Chloroform	23		2.3	0.74	ppb v/v			08/11/17 11:06	7.81
Chloromethane	ND		6.2	1.5	ppb v/v			08/11/17 11:06	7.81

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: DUP-1

Lab Sample ID: 320-30325-18

Date Collected: 07/27/17 00:00

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		6.2	0.59	ppb v/v			08/11/17 11:06	7.81
1,2-Dichlorobenzene	ND		3.1	1.0	ppb v/v			08/11/17 11:06	7.81
1,3-Dichlorobenzene	ND		3.1	0.86	ppb v/v			08/11/17 11:06	7.81
1,4-Dichlorobenzene	ND		3.1	1.2	ppb v/v			08/11/17 11:06	7.81
Dichlorodifluoromethane	ND		3.1	1.1	ppb v/v			08/11/17 11:06	7.81
1,1-Dichloroethane	ND		2.3	0.56	ppb v/v			08/11/17 11:06	7.81
1,2-Dichloroethane	ND		6.2	0.69	ppb v/v			08/11/17 11:06	7.81
1,1-Dichloroethene	ND		6.2	1.0	ppb v/v			08/11/17 11:06	7.81
cis-1,2-Dichloroethene	210		3.1	0.70	ppb v/v			08/11/17 11:06	7.81
trans-1,2-Dichloroethene	3.4		3.1	0.78	ppb v/v			08/11/17 11:06	7.81
1,2-Dichloropropane	ND		3.1	1.9	ppb v/v			08/11/17 11:06	7.81
cis-1,3-Dichloropropene	ND		3.1	0.81	ppb v/v			08/11/17 11:06	7.81
trans-1,3-Dichloropropene	ND		3.1	0.69	ppb v/v			08/11/17 11:06	7.81
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.1	1.2	ppb v/v			08/11/17 11:06	7.81
Ethylbenzene	ND		3.1	0.49	ppb v/v			08/11/17 11:06	7.81
4-Ethyltoluene	ND		3.1	1.5	ppb v/v			08/11/17 11:06	7.81
Hexachlorobutadiene	ND		16	3.4	ppb v/v			08/11/17 11:06	7.81
2-Hexanone	ND		3.1	0.68	ppb v/v			08/11/17 11:06	7.81
Methylene Chloride	2.1 J		3.1	0.56	ppb v/v			08/11/17 11:06	7.81
4-Methyl-2-pentanone (MIBK)	ND		3.1	1.1	ppb v/v			08/11/17 11:06	7.81
Styrene	ND		3.1	0.46	ppb v/v			08/11/17 11:06	7.81
1,1,2,2-Tetrachloroethane	ND		3.1	0.54	ppb v/v			08/11/17 11:06	7.81
Tetrachloroethene	20		3.1	0.40	ppb v/v			08/11/17 11:06	7.81
Toluene	3.6		3.1	0.40	ppb v/v			08/11/17 11:06	7.81
1,2,4-Trichlorobenzene	ND		16	3.4	ppb v/v			08/11/17 11:06	7.81
1,1,1-Trichloroethane	ND		2.3	0.51	ppb v/v			08/11/17 11:06	7.81
1,1,2-Trichloroethane	ND		3.1	0.52	ppb v/v			08/11/17 11:06	7.81
Trichloroethene	7.8		3.1	0.82	ppb v/v			08/11/17 11:06	7.81
Trichlorofluoromethane	ND		3.1	1.5	ppb v/v			08/11/17 11:06	7.81
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.3	ppb v/v			08/11/17 11:06	7.81
1,2,4-Trimethylbenzene	ND		6.2	1.3	ppb v/v			08/11/17 11:06	7.81
1,3,5-Trimethylbenzene	ND		3.1	0.98	ppb v/v			08/11/17 11:06	7.81
Vinyl acetate	ND		6.2	1.1	ppb v/v			08/11/17 11:06	7.81
Vinyl chloride	28		3.1	0.94	ppb v/v			08/11/17 11:06	7.81
m,p-Xylene	ND		6.2	0.78	ppb v/v			08/11/17 11:06	7.81
o-Xylene	ND		3.1	0.42	ppb v/v			08/11/17 11:06	7.81

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	93		93	3.3	ug/m3			08/11/17 11:06	7.81
Benzene	ND		10	2.0	ug/m3			08/11/17 11:06	7.81
Benzyl chloride	ND		32	6.6	ug/m3			08/11/17 11:06	7.81
Bromodichloromethane	33		16	3.5	ug/m3			08/11/17 11:06	7.81
Bromoform	ND		32	5.7	ug/m3			08/11/17 11:06	7.81
Bromomethane	ND		24	10	ug/m3			08/11/17 11:06	7.81
2-Butanone (MEK)	ND		18	4.6	ug/m3			08/11/17 11:06	7.81
Carbon disulfide	56		19	1.9	ug/m3			08/11/17 11:06	7.81
Carbon tetrachloride	ND		39	3.1	ug/m3			08/11/17 11:06	7.81
Chlorobenzene	ND		11	2.3	ug/m3			08/11/17 11:06	7.81
Dibromochloromethane	7.9 J		27	5.3	ug/m3			08/11/17 11:06	7.81

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: DUP-1

Lab Sample ID: 320-30325-18

Date Collected: 07/27/17 00:00

Matrix: Air

Date Received: 08/02/17 10:35

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		16	6.3	ug/m3			08/11/17 11:06	7.81
Chloroform	110		11	3.6	ug/m3			08/11/17 11:06	7.81
Chloromethane	ND		13	3.2	ug/m3			08/11/17 11:06	7.81
1,2-Dibromoethane (EDB)	ND		48	4.5	ug/m3			08/11/17 11:06	7.81
1,2-Dichlorobenzene	ND		19	6.1	ug/m3			08/11/17 11:06	7.81
1,3-Dichlorobenzene	ND		19	5.2	ug/m3			08/11/17 11:06	7.81
1,4-Dichlorobenzene	ND		19	7.0	ug/m3			08/11/17 11:06	7.81
Dichlorodifluoromethane	ND		15	5.6	ug/m3			08/11/17 11:06	7.81
1,1-Dichloroethane	ND		9.5	2.3	ug/m3			08/11/17 11:06	7.81
1,2-Dichloroethane	ND		25	2.8	ug/m3			08/11/17 11:06	7.81
1,1-Dichloroethene	ND		25	4.0	ug/m3			08/11/17 11:06	7.81
cis-1,2-Dichloroethene	820		12	2.8	ug/m3			08/11/17 11:06	7.81
trans-1,2-Dichloroethene	13		12	3.1	ug/m3			08/11/17 11:06	7.81
1,2-Dichloropropane	ND		14	8.7	ug/m3			08/11/17 11:06	7.81
cis-1,3-Dichloropropene	ND		14	3.7	ug/m3			08/11/17 11:06	7.81
trans-1,3-Dichloropropene	ND		14	3.1	ug/m3			08/11/17 11:06	7.81
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		22	8.5	ug/m3			08/11/17 11:06	7.81
Ethylbenzene	ND		14	2.1	ug/m3			08/11/17 11:06	7.81
4-Ethyltoluene	ND		15	7.2	ug/m3			08/11/17 11:06	7.81
Hexachlorobutadiene	ND		170	36	ug/m3			08/11/17 11:06	7.81
2-Hexanone	ND		13	2.8	ug/m3			08/11/17 11:06	7.81
Methylene Chloride	7.4 J		11	2.0	ug/m3			08/11/17 11:06	7.81
4-Methyl-2-pentanone (MIBK)	ND		13	4.3	ug/m3			08/11/17 11:06	7.81
Styrene	ND		13	2.0	ug/m3			08/11/17 11:06	7.81
1,1,2,2-Tetrachloroethane	ND		21	3.7	ug/m3			08/11/17 11:06	7.81
Tetrachloroethene	140		21	2.7	ug/m3			08/11/17 11:06	7.81
Toluene	13		12	1.5	ug/m3			08/11/17 11:06	7.81
1,2,4-Trichlorobenzene	ND		120	25	ug/m3			08/11/17 11:06	7.81
1,1,1-Trichloroethane	ND		13	2.8	ug/m3			08/11/17 11:06	7.81
1,1,2-Trichloroethane	ND		17	2.9	ug/m3			08/11/17 11:06	7.81
Trichloroethene	42		17	4.4	ug/m3			08/11/17 11:06	7.81
Trichlorofluoromethane	ND		18	8.6	ug/m3			08/11/17 11:06	7.81
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		24	9.8	ug/m3			08/11/17 11:06	7.81
1,2,4-Trimethylbenzene	ND		31	6.2	ug/m3			08/11/17 11:06	7.81
1,3,5-Trimethylbenzene	ND		15	4.8	ug/m3			08/11/17 11:06	7.81
Vinyl acetate	ND		22	4.0	ug/m3			08/11/17 11:06	7.81
Vinyl chloride	71		8.0	2.4	ug/m3			08/11/17 11:06	7.81
m,p-Xylene	ND		27	3.4	ug/m3			08/11/17 11:06	7.81
o-Xylene	ND		14	1.8	ug/m3			08/11/17 11:06	7.81

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130		08/11/17 11:06	7.81
1,2-Dichloroethane-d4 (Surr)	97		70 - 130		08/11/17 11:06	7.81
Toluene-d8 (Surr)	105		70 - 130		08/11/17 11:06	7.81

TestAmerica Sacramento

Surrogate Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		BFB (70-130)	12DCE (70-130)	TOL (70-130)
320-30325-1	HOU-01	100	94	101
320-30325-2	HOU-01B	99	95	103
320-30325-3	HOU-02	100	100	103
320-30325-4	HOU-03	98	99	103
320-30325-5	HOU-03B	97	99	101
320-30325-6	HOU-04	99	96	102
320-30325-7	HOU-05	98	86	102
320-30325-8	HOU-06	99	92	101
320-30325-9	HOU-07	96	93	99
320-30325-10	HOU-07B	104	100 *	100
320-30325-11	HOU-08	99	93	100
320-30325-12	HOU-08B	95	92	102
320-30325-13	HOU-09	98	80	100
320-30325-14	HOU-10	100	73	103
320-30325-15	HOU-10B	98	93	100
320-30325-16	HOU-BKG-01	97	84	102
320-30325-17	HOU-BKG-02	98	96	100
320-30325-18	DUP-1	98	97	105
LCS 320-178844/3	Lab Control Sample	103	94	100
LCS 320-179415/3	Lab Control Sample	112	109	111
LCSD 320-178844/4	Lab Control Sample Dup	101	93	99
LCSD 320-179415/4	Lab Control Sample Dup	112	108	111
MB 320-178844/6	Method Blank	100	95	103
MB 320-179415/9	Method Blank	112	101	107

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

12DCE = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-178844/6

Matrix: Air

Analysis Batch: 178844

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			08/10/17 17:38	1
Benzene	ND		0.40	0.079	ppb v/v			08/10/17 17:38	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			08/10/17 17:38	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			08/10/17 17:38	1
Bromoform	ND		0.40	0.070	ppb v/v			08/10/17 17:38	1
Bromomethane	ND		0.80	0.34	ppb v/v			08/10/17 17:38	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			08/10/17 17:38	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			08/10/17 17:38	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			08/10/17 17:38	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			08/10/17 17:38	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			08/10/17 17:38	1
Chloroethane	ND		0.80	0.31	ppb v/v			08/10/17 17:38	1
Chloroform	ND		0.30	0.095	ppb v/v			08/10/17 17:38	1
Chloromethane	ND		0.80	0.20	ppb v/v			08/10/17 17:38	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			08/10/17 17:38	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			08/10/17 17:38	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			08/10/17 17:38	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			08/10/17 17:38	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			08/10/17 17:38	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			08/10/17 17:38	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			08/10/17 17:38	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			08/10/17 17:38	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			08/10/17 17:38	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			08/10/17 17:38	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			08/10/17 17:38	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			08/10/17 17:38	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			08/10/17 17:38	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			08/10/17 17:38	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			08/10/17 17:38	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			08/10/17 17:38	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			08/10/17 17:38	1
2-Hexanone	ND		0.40	0.087	ppb v/v			08/10/17 17:38	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			08/10/17 17:38	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			08/10/17 17:38	1
Styrene	ND		0.40	0.059	ppb v/v			08/10/17 17:38	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			08/10/17 17:38	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			08/10/17 17:38	1
Toluene	ND		0.40	0.051	ppb v/v			08/10/17 17:38	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			08/10/17 17:38	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			08/10/17 17:38	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			08/10/17 17:38	1
Trichloroethene	ND		0.40	0.11	ppb v/v			08/10/17 17:38	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			08/10/17 17:38	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			08/10/17 17:38	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			08/10/17 17:38	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			08/10/17 17:38	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			08/10/17 17:38	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			08/10/17 17:38	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-178844/6

Matrix: Air

Analysis Batch: 178844

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		0.80	0.10	ppb v/v			08/10/17 17:38	1
o-Xylene	ND		0.40	0.054	ppb v/v			08/10/17 17:38	1
Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		12	0.42	ug/m3			08/10/17 17:38	1
Benzene	ND		1.3	0.25	ug/m3			08/10/17 17:38	1
Benzyl chloride	ND		4.1	0.84	ug/m3			08/10/17 17:38	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			08/10/17 17:38	1
Bromoform	ND		4.1	0.72	ug/m3			08/10/17 17:38	1
Bromomethane	ND		3.1	1.3	ug/m3			08/10/17 17:38	1
2-Butanone (MEK)	ND		2.4	0.59	ug/m3			08/10/17 17:38	1
Carbon disulfide	ND		2.5	0.24	ug/m3			08/10/17 17:38	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			08/10/17 17:38	1
Chlorobenzene	ND		1.4	0.29	ug/m3			08/10/17 17:38	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			08/10/17 17:38	1
Chloroethane	ND		2.1	0.81	ug/m3			08/10/17 17:38	1
Chloroform	ND		1.5	0.46	ug/m3			08/10/17 17:38	1
Chloromethane	ND		1.7	0.41	ug/m3			08/10/17 17:38	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			08/10/17 17:38	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			08/10/17 17:38	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			08/10/17 17:38	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			08/10/17 17:38	1
Dichlorodifluoromethane	ND		2.0	0.72	ug/m3			08/10/17 17:38	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			08/10/17 17:38	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			08/10/17 17:38	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			08/10/17 17:38	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			08/10/17 17:38	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			08/10/17 17:38	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			08/10/17 17:38	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			08/10/17 17:38	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			08/10/17 17:38	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			08/10/17 17:38	1
Ethylbenzene	ND		1.7	0.27	ug/m3			08/10/17 17:38	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			08/10/17 17:38	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			08/10/17 17:38	1
2-Hexanone	ND		1.6	0.36	ug/m3			08/10/17 17:38	1
Methylene Chloride	ND		1.4	0.25	ug/m3			08/10/17 17:38	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			08/10/17 17:38	1
Styrene	ND		1.7	0.25	ug/m3			08/10/17 17:38	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			08/10/17 17:38	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			08/10/17 17:38	1
Toluene	ND		1.5	0.19	ug/m3			08/10/17 17:38	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			08/10/17 17:38	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			08/10/17 17:38	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			08/10/17 17:38	1
Trichloroethene	ND		2.1	0.56	ug/m3			08/10/17 17:38	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			08/10/17 17:38	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			08/10/17 17:38	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-178844/6

Matrix: Air

Analysis Batch: 178844

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			08/10/17 17:38	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			08/10/17 17:38	1
Vinyl acetate	ND		2.8	0.51	ug/m3			08/10/17 17:38	1
Vinyl chloride	ND		1.0	0.31	ug/m3			08/10/17 17:38	1
m,p-Xylene	ND		3.5	0.43	ug/m3			08/10/17 17:38	1
o-Xylene	ND		1.7	0.23	ug/m3			08/10/17 17:38	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130		08/10/17 17:38	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 130		08/10/17 17:38	1
Toluene-d8 (Surr)	103		70 - 130		08/10/17 17:38	1

Lab Sample ID: LCS 320-178844/3

Matrix: Air

Analysis Batch: 178844

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	16.3		ppb v/v		81	71 - 131
Benzene	20.0	16.8		ppb v/v		84	68 - 128
Benzyl chloride	16.0	13.9		ppb v/v		87	58 - 120
Bromodichloromethane	20.0	16.6		ppb v/v		83	65 - 130
Bromoform	20.0	16.8		ppb v/v		84	64 - 144
Bromomethane	20.0	17.2		ppb v/v		86	70 - 131
2-Butanone (MEK)	20.0	17.1		ppb v/v		85	71 - 131
Carbon disulfide	20.0	17.2		ppb v/v		86	63 - 123
Carbon tetrachloride	20.0	16.9		ppb v/v		84	67 - 127
Chlorobenzene	20.0	15.9		ppb v/v		79	70 - 132
Dibromochloromethane	20.0	16.6		ppb v/v		83	68 - 128
Chloroethane	20.0	17.9		ppb v/v		90	70 - 131
Chloroform	20.0	17.0		ppb v/v		85	69 - 129
Chloromethane	20.0	16.7		ppb v/v		84	67 - 127
1,2-Dibromoethane (EDB)	20.0	16.4		ppb v/v		82	68 - 131
1,2-Dichlorobenzene	20.0	16.3		ppb v/v		81	73 - 143
1,3-Dichlorobenzene	20.0	16.4		ppb v/v		82	77 - 136
1,4-Dichlorobenzene	20.0	16.6		ppb v/v		83	73 - 143
Dichlorodifluoromethane	20.0	14.8		ppb v/v		74	69 - 129
1,1-Dichloroethane	20.0	16.9		ppb v/v		84	65 - 125
1,2-Dichloroethane	20.0	16.3		ppb v/v		82	71 - 131
1,1-Dichloroethene	20.0	17.1		ppb v/v		85	53 - 128
cis-1,2-Dichloroethene	20.0	16.9		ppb v/v		84	68 - 128
trans-1,2-Dichloroethene	20.0	16.9		ppb v/v		84	70 - 130
1,2-Dichloropropane	20.0	16.9		ppb v/v		84	74 - 128
cis-1,3-Dichloropropene	20.0	16.6		ppb v/v		83	78 - 132
trans-1,3-Dichloropropene	20.0	16.2		ppb v/v		81	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	17.7		ppb v/v		88	64 - 124
Ethylbenzene	20.0	15.8		ppb v/v		79	76 - 136
4-Ethyltoluene	20.0	16.1		ppb v/v		80	62 - 136

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-178844/3

Matrix: Air

Analysis Batch: 178844

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexachlorobutadiene	20.0	18.1		ppb v/v		90	42 - 150
2-Hexanone	20.0	16.9		ppb v/v		84	70 - 128
Methylene Chloride	20.0	15.8		ppb v/v		79	65 - 125
4-Methyl-2-pentanone (MIBK)	20.0	16.5		ppb v/v		82	73 - 133
Styrene	20.0	16.5		ppb v/v		82	76 - 144
1,1,2,2-Tetrachloroethane	20.0	16.2		ppb v/v		81	75 - 135
Tetrachloroethene	20.0	16.8		ppb v/v		84	56 - 138
Toluene	20.0	16.1		ppb v/v		81	71 - 132
1,2,4-Trichlorobenzene	20.0	19.1		ppb v/v		95	59 - 150
1,1,1-Trichloroethane	20.0	16.7		ppb v/v		83	65 - 124
1,1,2-Trichloroethane	20.0	16.2		ppb v/v		81	71 - 131
Trichloroethene	20.0	16.7		ppb v/v		83	64 - 127
Trichlorofluoromethane	20.0	16.8		ppb v/v		84	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	17.5		ppb v/v		87	50 - 132
1,2,4-Trimethylbenzene	20.0	14.6		ppb v/v		73	61 - 145
1,3,5-Trimethylbenzene	20.0	16.3		ppb v/v		82	65 - 136
Vinyl acetate	20.0	17.2		ppb v/v		86	77 - 134
Vinyl chloride	20.0	17.1		ppb v/v		86	69 - 129
m,p-Xylene	40.0	31.2		ppb v/v		78	75 - 138
o-Xylene	20.0	15.7		ppb v/v		79	77 - 132
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	48	38.6		ug/m3		81	71 - 131
Benzene	64	53.6		ug/m3		84	68 - 128
Benzyl chloride	83	72.1		ug/m3		87	58 - 120
Bromodichloromethane	130	111		ug/m3		83	65 - 130
Bromoform	210	174		ug/m3		84	64 - 144
Bromomethane	78	66.7		ug/m3		86	70 - 131
2-Butanone (MEK)	59	50.3		ug/m3		85	71 - 131
Carbon disulfide	62	53.5		ug/m3		86	63 - 123
Carbon tetrachloride	130	106		ug/m3		84	67 - 127
Chlorobenzene	92	73.0		ug/m3		79	70 - 132
Dibromochloromethane	170	141		ug/m3		83	68 - 128
Chloroethane	53	47.3		ug/m3		90	70 - 131
Chloroform	98	82.9		ug/m3		85	69 - 129
Chloromethane	41	34.5		ug/m3		84	67 - 127
1,2-Dibromoethane (EDB)	150	126		ug/m3		82	68 - 131
1,2-Dichlorobenzene	120	97.9		ug/m3		81	73 - 143
1,3-Dichlorobenzene	120	98.7		ug/m3		82	77 - 136
1,4-Dichlorobenzene	120	99.6		ug/m3		83	73 - 143
Dichlorodifluoromethane	99	73.1		ug/m3		74	69 - 129
1,1-Dichloroethane	81	68.3		ug/m3		84	65 - 125
1,2-Dichloroethane	81	66.0		ug/m3		82	71 - 131
1,1-Dichloroethene	79	67.8		ug/m3		85	53 - 128
cis-1,2-Dichloroethene	79	67.0		ug/m3		84	68 - 128
trans-1,2-Dichloroethene	79	66.9		ug/m3		84	70 - 130
1,2-Dichloropropane	92	77.9		ug/m3		84	74 - 128

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-178844/3

Matrix: Air

Analysis Batch: 178844

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,3-Dichloropropene	91	75.3		ug/m3		83	78 - 132
trans-1,3-Dichloropropene	91	73.7		ug/m3		81	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	124		ug/m3		88	64 - 124
Ethylbenzene	87	68.7		ug/m3		79	76 - 136
4-Ethyltoluene	98	79.0		ug/m3		80	62 - 136
Hexachlorobutadiene	210	193		ug/m3		90	42 - 150
2-Hexanone	82	69.1		ug/m3		84	70 - 128
Methylene Chloride	69	54.9		ug/m3		79	65 - 125
4-Methyl-2-pentanone (MIBK)	82	67.4		ug/m3		82	73 - 133
Styrene	85	70.3		ug/m3		82	76 - 144
1,1,2,2-Tetrachloroethane	140	111		ug/m3		81	75 - 135
Tetrachloroethene	140	114		ug/m3		84	56 - 138
Toluene	75	60.8		ug/m3		81	71 - 132
1,2,4-Trichlorobenzene	150	141		ug/m3		95	59 - 150
1,1,1-Trichloroethane	110	90.9		ug/m3		83	65 - 124
1,1,2-Trichloroethane	110	88.1		ug/m3		81	71 - 131
Trichloroethene	110	89.7		ug/m3		83	64 - 127
Trichlorofluoromethane	110	94.2		ug/m3		84	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	150	134		ug/m3		87	50 - 132
1,2,4-Trimethylbenzene	98	71.9		ug/m3		73	61 - 145
1,3,5-Trimethylbenzene	98	80.2		ug/m3		82	65 - 136
Vinyl acetate	70	60.5		ug/m3		86	77 - 134
Vinyl chloride	51	43.8		ug/m3		86	69 - 129
m,p-Xylene	170	135		ug/m3		78	75 - 138
o-Xylene	87	68.3		ug/m3		79	77 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	103		70 - 130
1,2-Dichloroethane-d4 (Surr)	94		70 - 130
Toluene-d8 (Surr)	100		70 - 130

Lab Sample ID: LCSD 320-178844/4

Matrix: Air

Analysis Batch: 178844

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	20.0	16.0		ppb v/v		80	71 - 131	2	25
Benzene	20.0	17.2		ppb v/v		86	68 - 128	2	25
Benzyl chloride	16.0	14.2		ppb v/v		88	58 - 120	2	25
Bromodichloromethane	20.0	17.2		ppb v/v		86	65 - 130	3	25
Bromoform	20.0	17.1		ppb v/v		85	64 - 144	2	25
Bromomethane	20.0	17.1		ppb v/v		86	70 - 131	0	25
2-Butanone (MEK)	20.0	17.3		ppb v/v		86	71 - 131	1	25
Carbon disulfide	20.0	17.1		ppb v/v		86	63 - 123	0	25
Carbon tetrachloride	20.0	17.3		ppb v/v		86	67 - 127	2	25
Chlorobenzene	20.0	16.3		ppb v/v		81	70 - 132	3	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-178844/4

Matrix: Air

Analysis Batch: 178844

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dibromochloromethane	20.0	16.8		ppb v/v		84	68 - 128	1	25
Chloroethane	20.0	17.9		ppb v/v		89	70 - 131	0	25
Chloroform	20.0	16.7		ppb v/v		84	69 - 129	1	25
Chloromethane	20.0	16.9		ppb v/v		84	67 - 127	1	25
1,2-Dibromoethane (EDB)	20.0	16.7		ppb v/v		84	68 - 131	2	25
1,2-Dichlorobenzene	20.0	16.7		ppb v/v		84	73 - 143	3	25
1,3-Dichlorobenzene	20.0	16.8		ppb v/v		84	77 - 136	2	25
1,4-Dichlorobenzene	20.0	17.0		ppb v/v		85	73 - 143	3	25
Dichlorodifluoromethane	20.0	14.6		ppb v/v		73	69 - 129	1	25
1,1-Dichloroethane	20.0	17.1		ppb v/v		85	65 - 125	1	25
1,2-Dichloroethane	20.0	16.7		ppb v/v		83	71 - 131	2	25
1,1-Dichloroethene	20.0	17.0		ppb v/v		85	53 - 128	1	25
cis-1,2-Dichloroethene	20.0	16.9		ppb v/v		85	68 - 128	0	25
trans-1,2-Dichloroethene	20.0	16.8		ppb v/v		84	70 - 130	1	25
1,2-Dichloropropane	20.0	17.0		ppb v/v		85	74 - 128	1	25
cis-1,3-Dichloropropene	20.0	17.0		ppb v/v		85	78 - 132	2	25
trans-1,3-Dichloropropene	20.0	16.5		ppb v/v		82	56 - 136	1	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	17.6		ppb v/v		88	64 - 124	1	25
Ethylbenzene	20.0	16.1		ppb v/v		80	76 - 136	2	25
4-Ethyltoluene	20.0	16.0		ppb v/v		80	62 - 136	0	25
Hexachlorobutadiene	20.0	18.8		ppb v/v		94	42 - 150	4	25
2-Hexanone	20.0	17.2		ppb v/v		86	70 - 128	2	25
Methylene Chloride	20.0	15.9		ppb v/v		79	65 - 125	0	25
4-Methyl-2-pentanone (MIBK)	20.0	16.9		ppb v/v		85	73 - 133	3	25
Styrene	20.0	16.8		ppb v/v		84	76 - 144	2	25
1,1,2,2-Tetrachloroethane	20.0	16.6		ppb v/v		83	75 - 135	3	25
Tetrachloroethene	20.0	17.2		ppb v/v		86	56 - 138	2	25
Toluene	20.0	16.6		ppb v/v		83	71 - 132	3	25
1,2,4-Trichlorobenzene	20.0	19.8		ppb v/v		99	59 - 150	4	25
1,1,1-Trichloroethane	20.0	16.8		ppb v/v		84	65 - 124	1	25
1,1,2-Trichloroethane	20.0	16.6		ppb v/v		83	71 - 131	3	25
Trichloroethene	20.0	17.2		ppb v/v		86	64 - 127	3	25
Trichlorofluoromethane	20.0	16.7		ppb v/v		83	68 - 128	0	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	17.4		ppb v/v		87	50 - 132	0	25
1,2,4-Trimethylbenzene	20.0	16.8		ppb v/v		84	61 - 145	14	25
1,3,5-Trimethylbenzene	20.0	16.6		ppb v/v		83	65 - 136	2	25
Vinyl acetate	20.0	17.0		ppb v/v		85	77 - 134	1	25
Vinyl chloride	20.0	16.7		ppb v/v		83	69 - 129	3	25
m,p-Xylene	40.0	31.9		ppb v/v		80	75 - 138	2	25
o-Xylene	20.0	16.1		ppb v/v		81	77 - 132	3	25
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	48	38.0		ug/m3		80	71 - 131	2	25
Benzene	64	54.8		ug/m3		86	68 - 128	2	25
Benzyl chloride	83	73.3		ug/m3		88	58 - 120	2	25
Bromodichloromethane	130	115		ug/m3		86	65 - 130	3	25
Bromoform	210	177		ug/m3		85	64 - 144	2	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-178844/4

Matrix: Air

Analysis Batch: 178844

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromomethane	78	66.5		ug/m3		86	70 - 131	0	25
2-Butanone (MEK)	59	50.9		ug/m3		86	71 - 131	1	25
Carbon disulfide	62	53.3		ug/m3		86	63 - 123	0	25
Carbon tetrachloride	130	109		ug/m3		86	67 - 127	2	25
Chlorobenzene	92	74.9		ug/m3		81	70 - 132	3	25
Dibromochloromethane	170	143		ug/m3		84	68 - 128	1	25
Chloroethane	53	47.1		ug/m3		89	70 - 131	0	25
Chloroform	98	81.7		ug/m3		84	69 - 129	1	25
Chloromethane	41	34.8		ug/m3		84	67 - 127	1	25
1,2-Dibromoethane (EDB)	150	128		ug/m3		84	68 - 131	2	25
1,2-Dichlorobenzene	120	101		ug/m3		84	73 - 143	3	25
1,3-Dichlorobenzene	120	101		ug/m3		84	77 - 136	2	25
1,4-Dichlorobenzene	120	102		ug/m3		85	73 - 143	3	25
Dichlorodifluoromethane	99	72.2		ug/m3		73	69 - 129	1	25
1,1-Dichloroethane	81	69.1		ug/m3		85	65 - 125	1	25
1,2-Dichloroethane	81	67.6		ug/m3		83	71 - 131	2	25
1,1-Dichloroethene	79	67.3		ug/m3		85	53 - 128	1	25
cis-1,2-Dichloroethene	79	67.2		ug/m3		85	68 - 128	0	25
trans-1,2-Dichloroethene	79	66.5		ug/m3		84	70 - 130	1	25
1,2-Dichloropropane	92	78.5		ug/m3		85	74 - 128	1	25
cis-1,3-Dichloropropene	91	77.1		ug/m3		85	78 - 132	2	25
trans-1,3-Dichloropropene	91	74.8		ug/m3		82	56 - 136	1	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	123		ug/m3		88	64 - 124	1	25
Ethylbenzene	87	69.9		ug/m3		80	76 - 136	2	25
4-Ethyltoluene	98	78.8		ug/m3		80	62 - 136	0	25
Hexachlorobutadiene	210	200		ug/m3		94	42 - 150	4	25
2-Hexanone	82	70.7		ug/m3		86	70 - 128	2	25
Methylene Chloride	69	55.1		ug/m3		79	65 - 125	0	25
4-Methyl-2-pentanone (MIBK)	82	69.2		ug/m3		85	73 - 133	3	25
Styrene	85	71.5		ug/m3		84	76 - 144	2	25
1,1,2,2-Tetrachloroethane	140	114		ug/m3		83	75 - 135	3	25
Tetrachloroethene	140	117		ug/m3		86	56 - 138	2	25
Toluene	75	62.7		ug/m3		83	71 - 132	3	25
1,2,4-Trichlorobenzene	150	147		ug/m3		99	59 - 150	4	25
1,1,1-Trichloroethane	110	91.5		ug/m3		84	65 - 124	1	25
1,1,2-Trichloroethane	110	90.7		ug/m3		83	71 - 131	3	25
Trichloroethene	110	92.2		ug/m3		86	64 - 127	3	25
Trichlorofluoromethane	110	93.8		ug/m3		83	68 - 128	0	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	134		ug/m3		87	50 - 132	0	25
1,2,4-Trimethylbenzene	98	82.5		ug/m3		84	61 - 145	14	25
1,3,5-Trimethylbenzene	98	81.5		ug/m3		83	65 - 136	2	25
Vinyl acetate	70	59.8		ug/m3		85	77 - 134	1	25
Vinyl chloride	51	42.6		ug/m3		83	69 - 129	3	25
m,p-Xylene	170	139		ug/m3		80	75 - 138	2	25
o-Xylene	87	70.1		ug/m3		81	77 - 132	3	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-178844/4

Matrix: Air

Analysis Batch: 178844

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	101		70 - 130
1,2-Dichloroethane-d4 (Surr)	93		70 - 130
Toluene-d8 (Surr)	99		70 - 130

Lab Sample ID: MB 320-179415/9

Matrix: Air

Analysis Batch: 179415

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			08/15/17 15:50	1
Benzene	ND		0.40	0.079	ppb v/v			08/15/17 15:50	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			08/15/17 15:50	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			08/15/17 15:50	1
Bromoform	ND		0.40	0.070	ppb v/v			08/15/17 15:50	1
Bromomethane	ND		0.80	0.34	ppb v/v			08/15/17 15:50	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			08/15/17 15:50	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			08/15/17 15:50	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			08/15/17 15:50	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			08/15/17 15:50	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			08/15/17 15:50	1
Chloroethane	ND		0.80	0.31	ppb v/v			08/15/17 15:50	1
Chloroform	ND		0.30	0.095	ppb v/v			08/15/17 15:50	1
Chloromethane	ND		0.80	0.20	ppb v/v			08/15/17 15:50	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			08/15/17 15:50	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			08/15/17 15:50	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			08/15/17 15:50	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			08/15/17 15:50	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			08/15/17 15:50	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			08/15/17 15:50	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			08/15/17 15:50	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			08/15/17 15:50	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			08/15/17 15:50	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			08/15/17 15:50	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			08/15/17 15:50	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			08/15/17 15:50	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			08/15/17 15:50	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			08/15/17 15:50	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			08/15/17 15:50	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			08/15/17 15:50	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			08/15/17 15:50	1
2-Hexanone	ND		0.40	0.087	ppb v/v			08/15/17 15:50	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			08/15/17 15:50	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			08/15/17 15:50	1
Styrene	ND		0.40	0.059	ppb v/v			08/15/17 15:50	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			08/15/17 15:50	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			08/15/17 15:50	1
Toluene	ND		0.40	0.051	ppb v/v			08/15/17 15:50	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			08/15/17 15:50	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-179415/9

Matrix: Air

Analysis Batch: 179415

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			08/15/17 15:50	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			08/15/17 15:50	1
Trichloroethene	ND		0.40	0.11	ppb v/v			08/15/17 15:50	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			08/15/17 15:50	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			08/15/17 15:50	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			08/15/17 15:50	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			08/15/17 15:50	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			08/15/17 15:50	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			08/15/17 15:50	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			08/15/17 15:50	1
o-Xylene	ND		0.40	0.054	ppb v/v			08/15/17 15:50	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		12	0.42	ug/m3			08/15/17 15:50	1
Benzene	ND		1.3	0.25	ug/m3			08/15/17 15:50	1
Benzyl chloride	ND		4.1	0.84	ug/m3			08/15/17 15:50	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			08/15/17 15:50	1
Bromoform	ND		4.1	0.72	ug/m3			08/15/17 15:50	1
Bromomethane	ND		3.1	1.3	ug/m3			08/15/17 15:50	1
2-Butanone (MEK)	ND		2.4	0.59	ug/m3			08/15/17 15:50	1
Carbon disulfide	ND		2.5	0.24	ug/m3			08/15/17 15:50	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			08/15/17 15:50	1
Chlorobenzene	ND		1.4	0.29	ug/m3			08/15/17 15:50	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			08/15/17 15:50	1
Chloroethane	ND		2.1	0.81	ug/m3			08/15/17 15:50	1
Chloroform	ND		1.5	0.46	ug/m3			08/15/17 15:50	1
Chloromethane	ND		1.7	0.41	ug/m3			08/15/17 15:50	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			08/15/17 15:50	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			08/15/17 15:50	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			08/15/17 15:50	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			08/15/17 15:50	1
Dichlorodifluoromethane	ND		2.0	0.72	ug/m3			08/15/17 15:50	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			08/15/17 15:50	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			08/15/17 15:50	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			08/15/17 15:50	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			08/15/17 15:50	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			08/15/17 15:50	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			08/15/17 15:50	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			08/15/17 15:50	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			08/15/17 15:50	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			08/15/17 15:50	1
Ethylbenzene	ND		1.7	0.27	ug/m3			08/15/17 15:50	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			08/15/17 15:50	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			08/15/17 15:50	1
2-Hexanone	ND		1.6	0.36	ug/m3			08/15/17 15:50	1
Methylene Chloride	ND		1.4	0.25	ug/m3			08/15/17 15:50	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			08/15/17 15:50	1
Styrene	ND		1.7	0.25	ug/m3			08/15/17 15:50	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-179415/9

Matrix: Air

Analysis Batch: 179415

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			08/15/17 15:50	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			08/15/17 15:50	1
Toluene	ND		1.5	0.19	ug/m3			08/15/17 15:50	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			08/15/17 15:50	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			08/15/17 15:50	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			08/15/17 15:50	1
Trichloroethene	ND		2.1	0.56	ug/m3			08/15/17 15:50	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			08/15/17 15:50	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			08/15/17 15:50	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			08/15/17 15:50	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			08/15/17 15:50	1
Vinyl acetate	ND		2.8	0.51	ug/m3			08/15/17 15:50	1
Vinyl chloride	ND		1.0	0.31	ug/m3			08/15/17 15:50	1
m,p-Xylene	ND		3.5	0.43	ug/m3			08/15/17 15:50	1
o-Xylene	ND		1.7	0.23	ug/m3			08/15/17 15:50	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	112		70 - 130		08/15/17 15:50	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130		08/15/17 15:50	1
Toluene-d8 (Surr)	107		70 - 130		08/15/17 15:50	1

Lab Sample ID: LCS 320-179415/3

Matrix: Air

Analysis Batch: 179415

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	17.7		ppb v/v		89	71 - 131
Benzene	20.0	18.4		ppb v/v		92	68 - 128
Benzyl chloride	16.0	14.2		ppb v/v		89	58 - 120
Bromodichloromethane	20.0	19.6		ppb v/v		98	65 - 130
Bromoform	20.0	19.2		ppb v/v		96	64 - 144
Bromomethane	20.0	20.2		ppb v/v		101	70 - 131
2-Butanone (MEK)	20.0	18.7		ppb v/v		94	71 - 131
Carbon disulfide	20.0	19.5		ppb v/v		98	63 - 123
Carbon tetrachloride	20.0	18.6		ppb v/v		93	67 - 127
Chlorobenzene	20.0	17.2		ppb v/v		86	70 - 132
Dibromochloromethane	20.0	18.5		ppb v/v		93	68 - 128
Chloroethane	20.0	20.5		ppb v/v		103	70 - 131
Chloroform	20.0	19.2		ppb v/v		96	69 - 129
Chloromethane	20.0	22.3		ppb v/v		112	67 - 127
1,2-Dibromoethane (EDB)	20.0	18.1		ppb v/v		90	68 - 131
1,2-Dichlorobenzene	20.0	17.3		ppb v/v		86	73 - 143
1,3-Dichlorobenzene	20.0	17.7		ppb v/v		89	77 - 136
1,4-Dichlorobenzene	20.0	17.6		ppb v/v		88	73 - 143
Dichlorodifluoromethane	20.0	21.3		ppb v/v		107	69 - 129
1,1-Dichloroethane	20.0	19.8		ppb v/v		99	65 - 125
1,2-Dichloroethane	20.0	19.7		ppb v/v		99	71 - 131
1,1-Dichloroethene	20.0	20.2		ppb v/v		101	53 - 128

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-179415/3

Matrix: Air

Analysis Batch: 179415

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	20.0	19.1		ppb v/v		96	68 - 128
trans-1,2-Dichloroethene	20.0	19.8		ppb v/v		99	70 - 130
1,2-Dichloropropane	20.0	20.0		ppb v/v		100	74 - 128
cis-1,3-Dichloropropene	20.0	19.9		ppb v/v		100	78 - 132
trans-1,3-Dichloropropene	20.0	19.0		ppb v/v		95	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	19.9		ppb v/v		99	64 - 124
Ethylbenzene	20.0	18.3		ppb v/v		92	76 - 136
4-Ethyltoluene	20.0	18.2		ppb v/v		91	62 - 136
Hexachlorobutadiene	20.0	16.5		ppb v/v		82	42 - 150
2-Hexanone	20.0	19.3		ppb v/v		96	70 - 128
Methylene Chloride	20.0	20.2		ppb v/v		101	65 - 125
4-Methyl-2-pentanone (MIBK)	20.0	21.6		ppb v/v		108	73 - 133
Styrene	20.0	18.9		ppb v/v		94	76 - 144
1,1,2,2-Tetrachloroethane	20.0	18.8		ppb v/v		94	75 - 135
Tetrachloroethene	20.0	17.0		ppb v/v		85	56 - 138
Toluene	20.0	19.2		ppb v/v		96	71 - 132
1,2,4-Trichlorobenzene	20.0	16.0		ppb v/v		80	59 - 150
1,1,1-Trichloroethane	20.0	18.9		ppb v/v		94	65 - 124
1,1,2-Trichloroethane	20.0	18.2		ppb v/v		91	71 - 131
Trichloroethene	20.0	17.8		ppb v/v		89	64 - 127
Trichlorofluoromethane	20.0	19.3		ppb v/v		97	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	19.0		ppb v/v		95	50 - 132
1,2,4-Trimethylbenzene	20.0	16.9		ppb v/v		84	61 - 145
1,3,5-Trimethylbenzene	20.0	17.9		ppb v/v		90	65 - 136
Vinyl acetate	20.0	20.2		ppb v/v		101	77 - 134
Vinyl chloride	20.0	22.5		ppb v/v		113	69 - 129
m,p-Xylene	40.0	36.5		ppb v/v		91	75 - 138
o-Xylene	20.0	18.2		ppb v/v		91	77 - 132
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	48	42.1		ug/m3		89	71 - 131
Benzene	64	58.6		ug/m3		92	68 - 128
Benzyl chloride	83	73.7		ug/m3		89	58 - 120
Bromodichloromethane	130	132		ug/m3		98	65 - 130
Bromoform	210	198		ug/m3		96	64 - 144
Bromomethane	78	78.6		ug/m3		101	70 - 131
2-Butanone (MEK)	59	55.2		ug/m3		94	71 - 131
Carbon disulfide	62	60.8		ug/m3		98	63 - 123
Carbon tetrachloride	130	117		ug/m3		93	67 - 127
Chlorobenzene	92	79.4		ug/m3		86	70 - 132
Dibromochloromethane	170	158		ug/m3		93	68 - 128
Chloroethane	53	54.2		ug/m3		103	70 - 131
Chloroform	98	93.5		ug/m3		96	69 - 129
Chloromethane	41	46.1		ug/m3		112	67 - 127
1,2-Dibromoethane (EDB)	150	139		ug/m3		90	68 - 131
1,2-Dichlorobenzene	120	104		ug/m3		86	73 - 143
1,3-Dichlorobenzene	120	106		ug/m3		89	77 - 136

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-179415/3

Matrix: Air

Analysis Batch: 179415

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dichlorobenzene	120	106		ug/m3		88	73 - 143
Dichlorodifluoromethane	99	105		ug/m3		107	69 - 129
1,1-Dichloroethane	81	80.1		ug/m3		99	65 - 125
1,2-Dichloroethane	81	79.8		ug/m3		99	71 - 131
1,1-Dichloroethene	79	80.0		ug/m3		101	53 - 128
cis-1,2-Dichloroethene	79	75.9		ug/m3		96	68 - 128
trans-1,2-Dichloroethene	79	78.7		ug/m3		99	70 - 130
1,2-Dichloropropane	92	92.3		ug/m3		100	74 - 128
cis-1,3-Dichloropropene	91	90.5		ug/m3		100	78 - 132
trans-1,3-Dichloropropene	91	86.3		ug/m3		95	56 - 136
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	139		ug/m3		99	64 - 124
Ethylbenzene	87	79.6		ug/m3		92	76 - 136
4-Ethyltoluene	98	89.5		ug/m3		91	62 - 136
Hexachlorobutadiene	210	176		ug/m3		82	42 - 150
2-Hexanone	82	78.9		ug/m3		96	70 - 128
Methylene Chloride	69	70.3		ug/m3		101	65 - 125
4-Methyl-2-pentanone (MIBK)	82	88.4		ug/m3		108	73 - 133
Styrene	85	80.3		ug/m3		94	76 - 144
1,1,2,2-Tetrachloroethane	140	129		ug/m3		94	75 - 135
Tetrachloroethene	140	115		ug/m3		85	56 - 138
Toluene	75	72.5		ug/m3		96	71 - 132
1,2,4-Trichlorobenzene	150	119		ug/m3		80	59 - 150
1,1,1-Trichloroethane	110	103		ug/m3		94	65 - 124
1,1,2-Trichloroethane	110	99.6		ug/m3		91	71 - 131
Trichloroethene	110	95.8		ug/m3		89	64 - 127
Trichlorofluoromethane	110	109		ug/m3		97	68 - 128
1,1,2-Trichloro-1,2,2-trifluoroethane	150	146		ug/m3		95	50 - 132
1,2,4-Trimethylbenzene	98	82.9		ug/m3		84	61 - 145
1,3,5-Trimethylbenzene	98	88.2		ug/m3		90	65 - 136
Vinyl acetate	70	71.0		ug/m3		101	77 - 134
Vinyl chloride	51	57.5		ug/m3		113	69 - 129
m,p-Xylene	170	159		ug/m3		91	75 - 138
o-Xylene	87	79.0		ug/m3		91	77 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	112		70 - 130
1,2-Dichloroethane-d4 (Surr)	109		70 - 130
Toluene-d8 (Surr)	111		70 - 130

Lab Sample ID: LCSD 320-179415/4

Matrix: Air

Analysis Batch: 179415

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	20.0	20.0		ppb v/v		100	71 - 131	12	25
Benzene	20.0	20.0		ppb v/v		100	68 - 128	9	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-179415/4

Matrix: Air

Analysis Batch: 179415

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzyl chloride	16.0	14.4		ppb v/v		90	58 - 120	1	25
Bromodichloromethane	20.0	21.0		ppb v/v		105	65 - 130	7	25
Bromoform	20.0	19.4		ppb v/v		97	64 - 144	1	25
Bromomethane	20.0	21.4		ppb v/v		107	70 - 131	5	25
2-Butanone (MEK)	20.0	20.4		ppb v/v		102	71 - 131	9	25
Carbon disulfide	20.0	21.3		ppb v/v		107	63 - 123	9	25
Carbon tetrachloride	20.0	20.4		ppb v/v		102	67 - 127	9	25
Chlorobenzene	20.0	17.8		ppb v/v		89	70 - 132	3	25
Dibromochloromethane	20.0	19.3		ppb v/v		96	68 - 128	4	25
Chloroethane	20.0	22.4		ppb v/v		112	70 - 131	9	25
Chloroform	20.0	20.5		ppb v/v		103	69 - 129	7	25
Chloromethane	20.0	22.5		ppb v/v		112	67 - 127	1	25
1,2-Dibromoethane (EDB)	20.0	18.9		ppb v/v		94	68 - 131	4	25
1,2-Dichlorobenzene	20.0	17.1		ppb v/v		86	73 - 143	1	25
1,3-Dichlorobenzene	20.0	17.3		ppb v/v		87	77 - 136	2	25
1,4-Dichlorobenzene	20.0	17.3		ppb v/v		86	73 - 143	2	25
Dichlorodifluoromethane	20.0	21.3		ppb v/v		106	69 - 129	0	25
1,1-Dichloroethane	20.0	21.6		ppb v/v		108	65 - 125	9	25
1,2-Dichloroethane	20.0	21.3		ppb v/v		107	71 - 131	8	25
1,1-Dichloroethene	20.0	22.2		ppb v/v		111	53 - 128	10	25
cis-1,2-Dichloroethene	20.0	20.8		ppb v/v		104	68 - 128	8	25
trans-1,2-Dichloroethene	20.0	21.6		ppb v/v		108	70 - 130	9	25
1,2-Dichloropropane	20.0	21.6		ppb v/v		108	74 - 128	8	25
cis-1,3-Dichloropropene	20.0	21.4		ppb v/v		107	78 - 132	7	25
trans-1,3-Dichloropropene	20.0	19.8		ppb v/v		99	56 - 136	4	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	21.5		ppb v/v		108	64 - 124	8	25
Ethylbenzene	20.0	18.9		ppb v/v		94	76 - 136	3	25
4-Ethyltoluene	20.0	18.2		ppb v/v		91	62 - 136	0	25
Hexachlorobutadiene	20.0	16.3		ppb v/v		81	42 - 150	1	25
2-Hexanone	20.0	19.7		ppb v/v		99	70 - 128	3	25
Methylene Chloride	20.0	22.2		ppb v/v		111	65 - 125	9	25
4-Methyl-2-pentanone (MIBK)	20.0	22.7		ppb v/v		114	73 - 133	5	25
Styrene	20.0	19.2		ppb v/v		96	76 - 144	2	25
1,1,2,2-Tetrachloroethane	20.0	18.9		ppb v/v		95	75 - 135	1	25
Tetrachloroethene	20.0	17.6		ppb v/v		88	56 - 138	4	25
Toluene	20.0	20.6		ppb v/v		103	71 - 132	7	25
1,2,4-Trichlorobenzene	20.0	15.9		ppb v/v		80	59 - 150	1	25
1,1,1-Trichloroethane	20.0	20.3		ppb v/v		101	65 - 124	7	25
1,1,2-Trichloroethane	20.0	18.9		ppb v/v		95	71 - 131	4	25
Trichloroethene	20.0	19.3		ppb v/v		96	64 - 127	8	25
Trichlorofluoromethane	20.0	21.3		ppb v/v		107	68 - 128	10	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	20.6		ppb v/v		103	50 - 132	8	25
1,2,4-Trimethylbenzene	20.0	17.1		ppb v/v		85	61 - 145	1	25
1,3,5-Trimethylbenzene	20.0	18.3		ppb v/v		91	65 - 136	2	25
Vinyl acetate	20.0	22.7		ppb v/v		114	77 - 134	12	25
Vinyl chloride	20.0	22.8		ppb v/v		114	69 - 129	1	25
m,p-Xylene	40.0	37.6		ppb v/v		94	75 - 138	3	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-179415/4

Matrix: Air

Analysis Batch: 179415

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
o-Xylene	20.0	18.8		ppb v/v		94	77 - 132	3	25
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	48	47.6		ug/m3		100	71 - 131	12	25
Benzene	64	64.0		ug/m3		100	68 - 128	9	25
Benzyl chloride	83	74.7		ug/m3		90	58 - 120	1	25
Bromodichloromethane	130	141		ug/m3		105	65 - 130	7	25
Bromoform	210	201		ug/m3		97	64 - 144	1	25
Bromomethane	78	83.0		ug/m3		107	70 - 131	5	25
2-Butanone (MEK)	59	60.3		ug/m3		102	71 - 131	9	25
Carbon disulfide	62	66.4		ug/m3		107	63 - 123	9	25
Carbon tetrachloride	130	128		ug/m3		102	67 - 127	9	25
Chlorobenzene	92	82.2		ug/m3		89	70 - 132	3	25
Dibromochloromethane	170	164		ug/m3		96	68 - 128	4	25
Chloroethane	53	59.2		ug/m3		112	70 - 131	9	25
Chloroform	98	100		ug/m3		103	69 - 129	7	25
Chloromethane	41	46.4		ug/m3		112	67 - 127	1	25
1,2-Dibromoethane (EDB)	150	145		ug/m3		94	68 - 131	4	25
1,2-Dichlorobenzene	120	103		ug/m3		86	73 - 143	1	25
1,3-Dichlorobenzene	120	104		ug/m3		87	77 - 136	2	25
1,4-Dichlorobenzene	120	104		ug/m3		86	73 - 143	2	25
Dichlorodifluoromethane	99	105		ug/m3		106	69 - 129	0	25
1,1-Dichloroethane	81	87.3		ug/m3		108	65 - 125	9	25
1,2-Dichloroethane	81	86.4		ug/m3		107	71 - 131	8	25
1,1-Dichloroethene	79	88.1		ug/m3		111	53 - 128	10	25
cis-1,2-Dichloroethene	79	82.3		ug/m3		104	68 - 128	8	25
trans-1,2-Dichloroethene	79	85.7		ug/m3		108	70 - 130	9	25
1,2-Dichloropropane	92	99.7		ug/m3		108	74 - 128	8	25
cis-1,3-Dichloropropene	91	97.0		ug/m3		107	78 - 132	7	25
trans-1,3-Dichloropropene	91	90.0		ug/m3		99	56 - 136	4	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	150		ug/m3		108	64 - 124	8	25
Ethylbenzene	87	81.9		ug/m3		94	76 - 136	3	25
4-Ethyltoluene	98	89.5		ug/m3		91	62 - 136	0	25
Hexachlorobutadiene	210	174		ug/m3		81	42 - 150	1	25
2-Hexanone	82	80.9		ug/m3		99	70 - 128	3	25
Methylene Chloride	69	77.2		ug/m3		111	65 - 125	9	25
4-Methyl-2-pentanone (MIBK)	82	93.1		ug/m3		114	73 - 133	5	25
Styrene	85	81.6		ug/m3		96	76 - 144	2	25
1,1,1,2-Tetrachloroethane	140	130		ug/m3		95	75 - 135	1	25
Tetrachloroethene	140	120		ug/m3		88	56 - 138	4	25
Toluene	75	77.5		ug/m3		103	71 - 132	7	25
1,2,4-Trichlorobenzene	150	118		ug/m3		80	59 - 150	1	25
1,1,1-Trichloroethane	110	111		ug/m3		101	65 - 124	7	25
1,1,2-Trichloroethane	110	103		ug/m3		95	71 - 131	4	25
Trichloroethene	110	103		ug/m3		96	64 - 127	8	25
Trichlorofluoromethane	110	120		ug/m3		107	68 - 128	10	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	158		ug/m3		103	50 - 132	8	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-179415/4

Matrix: Air

Analysis Batch: 179415

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trimethylbenzene	98	84.1		ug/m3		85	61 - 145	1	25
1,3,5-Trimethylbenzene	98	89.7		ug/m3		91	65 - 136	2	25
Vinyl acetate	70	79.9		ug/m3		114	77 - 134	12	25
Vinyl chloride	51	58.3		ug/m3		114	69 - 129	1	25
m,p-Xylene	170	163		ug/m3		94	75 - 138	3	25
o-Xylene	87	81.4		ug/m3		94	77 - 132	3	25

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
4-Bromofluorobenzene (Surr)	112		70 - 130
1,2-Dichloroethane-d4 (Surr)	108		70 - 130
Toluene-d8 (Surr)	111		70 - 130

TestAmerica Sacramento

QC Association Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Air - GC/MS VOA

Analysis Batch: 178844

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-30325-1	HOU-01	Total/NA	Air	TO-15	
320-30325-2	HOU-01B	Total/NA	Air	TO-15	
320-30325-3	HOU-02	Total/NA	Air	TO-15	
320-30325-4	HOU-03	Total/NA	Air	TO-15	
320-30325-5	HOU-03B	Total/NA	Air	TO-15	
320-30325-6	HOU-04	Total/NA	Air	TO-15	
320-30325-7	HOU-05	Total/NA	Air	TO-15	
320-30325-8	HOU-06	Total/NA	Air	TO-15	
320-30325-9	HOU-07	Total/NA	Air	TO-15	
320-30325-11	HOU-08	Total/NA	Air	TO-15	
320-30325-12	HOU-08B	Total/NA	Air	TO-15	
320-30325-13	HOU-09	Total/NA	Air	TO-15	
320-30325-14	HOU-10	Total/NA	Air	TO-15	
320-30325-15	HOU-10B	Total/NA	Air	TO-15	
320-30325-16	HOU-BKG-01	Total/NA	Air	TO-15	
320-30325-17	HOU-BKG-02	Total/NA	Air	TO-15	
320-30325-18	DUP-1	Total/NA	Air	TO-15	
MB 320-178844/6	Method Blank	Total/NA	Air	TO-15	
LCS 320-178844/3	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-178844/4	Lab Control Sample Dup	Total/NA	Air	TO-15	

Analysis Batch: 179415

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-30325-10	HOU-07B	Total/NA	Air	TO-15	
MB 320-179415/9	Method Blank	Total/NA	Air	TO-15	
LCS 320-179415/3	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-179415/4	Lab Control Sample Dup	Total/NA	Air	TO-15	

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-01

Date Collected: 07/27/17 10:34

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-1

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		13.7	30 mL	250 mL	178844	08/10/17 18:29	SRS	TAL SAC

Client Sample ID: HOU-01B

Date Collected: 07/27/17 10:42

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-2

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		16.8	25 mL	250 mL	178844	08/10/17 19:21	SRS	TAL SAC

Client Sample ID: HOU-02

Date Collected: 07/27/17 10:24

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-3

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	396 mL	250 mL	178844	08/10/17 20:16	SRS	TAL SAC

Client Sample ID: HOU-03

Date Collected: 07/27/17 10:05

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-4

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		3.34	125 mL	250 mL	178844	08/10/17 21:08	SRS	TAL SAC

Client Sample ID: HOU-03B

Date Collected: 07/27/17 10:15

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-5

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.66	250 mL	250 mL	178844	08/10/17 22:02	SRS	TAL SAC

Client Sample ID: HOU-04

Date Collected: 07/27/17 08:14

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-6

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	426 mL	250 mL	178844	08/10/17 22:58	SRS	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-05

Date Collected: 07/27/17 09:58

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-7

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.68	250 mL	250 mL	178844	08/10/17 23:51	SRS	TAL SAC

Client Sample ID: HOU-06

Date Collected: 07/27/17 09:52

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-8

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	405 mL	250 mL	178844	08/11/17 00:47	SRS	TAL SAC

Client Sample ID: HOU-07

Date Collected: 07/27/17 09:33

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-9

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		3.09	125 mL	250 mL	178844	08/11/17 01:39	SRS	TAL SAC

Client Sample ID: HOU-07B

Date Collected: 07/27/17 09:42

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-10

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		2.28	175 mL	250 mL	179415	08/16/17 03:33	AP1	TAL SAC

Client Sample ID: HOU-08

Date Collected: 07/27/17 09:14

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-11

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1.51	250 mL	250 mL	178844	08/11/17 03:25	SRS	TAL SAC

Client Sample ID: HOU-08B

Date Collected: 07/27/17 09:22

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-12

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	329 mL	250 mL	178844	08/11/17 04:20	SRS	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Client Sample ID: HOU-09

Date Collected: 07/27/17 09:07

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-13

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		2	175 mL	250 mL	178844	08/11/17 05:13	SRS	TAL SAC

Client Sample ID: HOU-10

Date Collected: 07/27/17 08:38

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-14

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	372 mL	250 mL	178844	08/11/17 07:40	SRS	TAL SAC

Client Sample ID: HOU-10B

Date Collected: 07/27/17 08:53

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-15

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		18.1	20 mL	250 mL	178844	08/11/17 08:32	SRS	TAL SAC

Client Sample ID: HOU-BKG-01

Date Collected: 07/27/17 07:58

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-16

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		4.79	75 mL	250 mL	178844	08/11/17 09:23	SRS	TAL SAC

Client Sample ID: HOU-BKG-02

Date Collected: 07/27/17 10:53

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-17

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		19.1	20 mL	250 mL	178844	08/11/17 10:15	SRS	TAL SAC

Client Sample ID: DUP-1

Date Collected: 07/27/17 00:00

Date Received: 08/02/17 10:35

Lab Sample ID: 320-30325-18

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		7.81	50 mL	250 mL	178844	08/11/17 11:06	SRS	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

TestAmerica Sacramento

Accreditation/Certification Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Laboratory: TestAmerica Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-28-18

1
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15
16

Method Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-30325-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-30325-1	HOU-01	Air	07/27/17 10:34	08/02/17 10:35
320-30325-2	HOU-01B	Air	07/27/17 10:42	08/02/17 10:35
320-30325-3	HOU-02	Air	07/27/17 10:24	08/02/17 10:35
320-30325-4	HOU-03	Air	07/27/17 10:05	08/02/17 10:35
320-30325-5	HOU-03B	Air	07/27/17 10:15	08/02/17 10:35
320-30325-6	HOU-04	Air	07/27/17 08:14	08/02/17 10:35
320-30325-7	HOU-05	Air	07/27/17 09:58	08/02/17 10:35
320-30325-8	HOU-06	Air	07/27/17 09:52	08/02/17 10:35
320-30325-9	HOU-07	Air	07/27/17 09:33	08/02/17 10:35
320-30325-10	HOU-07B	Air	07/27/17 09:42	08/02/17 10:35
320-30325-11	HOU-08	Air	07/27/17 09:14	08/02/17 10:35
320-30325-12	HOU-08B	Air	07/27/17 09:22	08/02/17 10:35
320-30325-13	HOU-09	Air	07/27/17 09:07	08/02/17 10:35
320-30325-14	HOU-10	Air	07/27/17 08:38	08/02/17 10:35
320-30325-15	HOU-10B	Air	07/27/17 08:53	08/02/17 10:35
320-30325-16	HOU-BKG-01	Air	07/27/17 07:58	08/02/17 10:35
320-30325-17	HOU-BKG-02	Air	07/27/17 10:53	08/02/17 10:35
320-30325-18	DUP-1	Air	07/27/17 00:00	08/02/17 10:35

TestAmerica Sacramento

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

phone 916.374.4378 fax 916.372.1059

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information		Project Manager: <i>Lila Buckley</i>		Samples Collected By: <i>Tem/LMB</i>		COC No:																
Company Name: <i>CSI</i>		Phone: <i>713 867 4475</i>				1 of 2 COCs																
Address: <i>2211 Norwalk St 1500</i>		Email: <i>lila.buckley@csi.com</i>																				
City/State/Zip: <i>Houston TX 77098</i>																						
Phone: <i>713 522 6350</i>		Site Contact: <i>-</i>																				
FAX: <i>-</i>		TA Contact: <i>Laura Turpin</i>																				
Project Name: <i>ESTCP Saver</i>		Analysis Turnaround Time																				
Site/Location: <i>Houston TX</i>		Standard (Specific): <i>-</i>																				
PO #: <i>4262</i>		Rush (Specify): <i>-</i>																				
Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, 'Hg (Start)'	Canister Vacuum in Field, 'Hg (Stop)'	Flow Controller ID	Canister ID	TO-15 (Med / Std / Low / SIM)	MA-APH	EPA 3C	EPA 25C / 25.3	ASTM D-1946 / 1945 / 3588	EPA 15/16	TO-3	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)	Sample Specific Notes:
HOU-01	7/27/17	1034		-29.8	-1.1	-																34000801
HOU-01B		1042		-29.7	-1.1	-																34001952
HOU-02		1024		-29.8	-1.3	-																34001079
~~HOU-03~~ HOU-03		1005		-29.7	-0.8	-																34002183
HOU-03B		1015		-29.7	-1.3	-																34000643
HOU-04		0814		-29.7	-0.5	-																34000683
HOU-05		0958		-29.6	-1.3	-																34000645
HOU-06		0952		-29.6	-1.2	-																34000911
HOU-07		0933		-29.8	-1.2	-																34000743
HOU-07B		0942		-29.8	-1.1	-																34001635
		Temperature (Fahrenheit)																				
		Start	Interior	Ambient																		
		Stop																				
		Temperature (Fahrenheit)																				
		Start	Interior	Ambient																		
		Stop																				
Special Instructions/QC Requirements & Comments: <i>18 samples total</i>																						
Samples Shipped by: <i>J.M. Buckley, R. Davis</i>		Date / Time: <i>7/27/2017 1830</i>		Samples Received by: <i>L. P. G.</i>		<i>8/2/17 1035</i>																
Samples Relinquished by:		Date / Time:		Received by:																		
Relinquished by:		Date / Time:		Received by:																		
Lab Use Only: Shipper Name:		Opened by:		Condition:																		



320-30325 Chain of Custody

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

phone 916.374.4378 fax 916.372.1059

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information		Project Manager: <i>Lita Beckley</i>		Samples Collected By: <i>TEM/LMB</i>		COC No:																											
Company Name: <i>351</i>		Phone: <i>713 367 4775</i>				<i>2</i> of <i>2</i> COCs																											
Address: <i>2241 N. State St. 1000</i>		Email: <i>lbeckley@goi-net.com</i>																															
City/State/Zip: <i>Houston TX 77098</i>																																	
Phone: <i>713 522 6300</i>		Site Contact: <i>-</i>																															
FAX: <i>-</i>		TA Contact: <i>Laura Turpin</i>																															
Project Name: <i>ESTCP Dwyer</i>		Analysis Turnaround Time																															
Site/Location: <i>Houston TX</i>		Standard (Specific): <i>✓</i>																															
PO #: <i>4262</i>		Rush (Specify): <i>-</i>																															
Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, 'Hg (Start)'	Canister Vacuum in Field, 'Hg (Stop)'	Flow Controller ID	Canister ID	TO-15 (Med / Std / Low / SIM)	MA-APH	EPA 3C	EPA 25C / 25.3	ASTM D-1946 / 1945 / 3588	EPA 15/16	TO-3	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)	For Lab Use Only: Walk-in Client: ☐ Lab Sampling: ☐											
																							Job / SDG No.: (See below for Add'l Items)										
																					Sample Specific Notes:												
<i>H00-08</i>	<i>7/27/17</i>	<i>0914</i>		<i>-29.7</i>	<i>-1.1</i>	<i>-</i>	<i>212 notes</i>	☒													<i>34000668</i>												
<i>H00-08B</i>	<i>1</i>	<i>0922</i>		<i>-29.7</i>	<i>-0.9</i>	<i>-</i>	<i>1</i>	☒													<i>34001108</i>												
<i>H00-09</i>	<i>1</i>	<i>0907</i>		<i>-29.7</i>	<i>-0.9</i>	<i>-</i>	<i>1</i>	☒													<i>34000081</i>												
<i>H00-10</i>	<i>1</i>	<i>0838</i>		<i>-29.7</i>	<i>-1.0</i>	<i>-</i>	<i>1</i>	☒													<i>34001986</i>												
<i>H00-10B</i>	<i>1</i>	<i>0853</i>		<i>-29.7</i>	<i>-1.3</i>	<i>-</i>	<i>1</i>	☒													<i>34000934</i>												
<i>H00-BKG-01</i>	<i>1</i>	<i>0758</i>		<i>-29.8</i>	<i>-0.9</i>	<i>-</i>	<i>1</i>	☒													<i>34001793</i>												
<i>H00-BKG-02</i>	<i>1</i>	<i>1053</i>		<i>-29.7</i>	<i>-1.7</i>	<i>-</i>	<i>1</i>	☒													<i>34001053</i>												
<i>DUP-1</i>	<i>1</i>			<i>-29.7</i>	<i>-1.1</i>	<i>-</i>	<i>1</i>	☒													<i>34001634</i>												
<table border="1"> <tr> <th colspan="4">Temperature (Fahrenheit)</th> </tr> <tr> <td>Start</td> <td>Interior</td> <td>Ambient</td> <td></td> </tr> <tr> <td>Stop</td> <td></td> <td></td> <td></td> </tr> </table>																						Temperature (Fahrenheit)				Start	Interior	Ambient		Stop			
Temperature (Fahrenheit)																																	
Start	Interior	Ambient																															
Stop																																	
<table border="1"> <tr> <th colspan="4">Temperature (Fahrenheit)</th> </tr> <tr> <td>Start</td> <td>Interior</td> <td>Ambient</td> <td></td> </tr> <tr> <td>Stop</td> <td></td> <td></td> <td></td> </tr> </table>																						Temperature (Fahrenheit)				Start	Interior	Ambient		Stop			
Temperature (Fahrenheit)																																	
Start	Interior	Ambient																															
Stop																																	
Special Instructions/QC Requirements & Comments:																																	
Samples Shipped by: <i>Impendly (LMB)</i>		Date / Time: <i>7/27/2017 1534</i>		Samples Received by: <i>2.5L</i>		Date / Time: <i>8/2/17 1035</i>																											
Samples Relinquished by:		Date / Time:		Received by:																													
Relinquished by:		Date / Time:		Received by:																													
Lab Use Only:		Shipper Name:		Opened by:		Condition:																											

Login Sample Receipt Checklist

Client: GSI Environmental, Inc

Job Number: 320-30325-1

Login Number: 30325

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Certification Type

TO-15 (SCAN)

Date Cleaned/Batch ID

0070317 320-29663

Date of QC

7/10/2017

Data File Number

C:\MSDCHEM\1\DATA\170710



320-29663 Chain of Custody

MS9071018.d

CANISTER ID NUMBERS

* 34000906	34001053	
34000687	34000993	
34000801	34000956	
34000803	34000908	
34001113	34000229	
34000754	34001096	
34000746	34000947	
34000665	8516	

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

* INDICATES THE CAN OR CANS WHICH WERE SCREENED.

1st level Reviewed By:

Date:

2nd level Reviewed By:

Date:

Certification Type

TO-15 (SCAN)

Date Cleaned/Batch ID

5070617 320-29674

Date of QC

7/10/2017

Data File Number

C:\MSDCHEM\1\DATA\170710

MS9071019.d

CANISTER ID NUMBERS



320-29674 Chain of Custody

* 34000983	34001634	
34001936	34000668	
34001635	34001079	
34000934	34001952	
34000643	34000681	
34002183	34000683	
34001793	34001108	
34000911	34000743	

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

* INDICATES THE CAN OR CANS WHICH WERE SCREENED.

[Signature]
1st level Reviewed By:

7/17/17
Date:

[Signature]
2nd level Reviewed By:

7/25/17
Date:

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FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29663-1
 SDG No.: _____
 Client Sample ID: 34000986 Lab Sample ID: 320-29663-1
 Matrix: Air Lab File ID: MS9071018.D
 Analysis Method: TO-15 Date Collected: 07/03/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 07/11/2017 01:36
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 173198 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.38	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29663-1
 SDG No.: _____
 Client Sample ID: 34000986 Lab Sample ID: 320-29663-1
 Matrix: Air Lab File ID: MS9071018.D
 Analysis Method: TO-15 Date Collected: 07/03/2017 00:00
 Sample wt/vol: 500(mL) Date Analyzed: 07/11/2017 01:36
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 173198 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	ND		0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29663-1
 SDG No.: _____
 Client Sample ID: 34000986 Lab Sample ID: 320-29663-1
 Matrix: Air Lab File ID: MS9071018.D
 Analysis Method: TO-15 Date Collected: 07/03/2017 00:00
 Sample wt/vol: 500(mL) Date Analyzed: 07/11/2017 01:36
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 173198 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	87		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	109		70-130
2037-26-5	Toluene-d8 (Surr)	101		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20170710-45226.b\MS9071018.D
 Lims ID: 320-29663-A-1
 Client ID: 34000986
 Sample Type: Client
 Inject. Date: 11-Jul-2017 01:36:30 ALS Bottle#: 1 Worklist Smp#: 18
 Purge Vol: 5.000 mL Dil. Factor: 1.0000
 Sample Info: 320-29663-A-1
 Misc. Info.: 500 CAN CERT
 Operator ID: SV Instrument ID: ATMS9
 Method: \\ChromNA\Sacramento\ChromData\ATMS9\20170710-45226.b\TO15_ATMS9N.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 11-Jul-2017 16:24:35 Calib Date: 20-Jun-2017 19:30:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS9\20170621-44546.b\MS9062012.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK002

First Level Reviewer: phanthasena

Date: 11-Jul-2017 16:24:35

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	12.314	12.327	-0.013	97	70164	4.00	
* 2 1,4-Difluorobenzene	114	14.407	14.419	-0.012	96	279328	4.00	
* 3 Chlorobenzene-d5 (IS)	117	20.326	20.327	-0.001	89	169038	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	13.488	13.495	-0.007	97	111176	4.37	
\$ 5 Toluene-d8 (Surr)	100	17.564	17.571	-0.007	99	127672	4.04	
\$ 6 4-Bromofluorobenzene (Surr	174	22.255	22.255	0.000	88	78500	3.50	
14 Propene	41	4.302	4.278	0.024	40	1076	0.0848	
15 Dichlorodifluoromethane	85	4.357	4.339	0.018	36	1266	0.0351	
19 1,2-Dichloro-1,1,2,2-tetra	135	4.594	4.601	-0.007	4	132	0.004842	
31 Acetone	43	7.709	7.642	0.067	97	11111	0.3844	
47 Methylene Chloride	49	8.908	8.908	0.000	48	1316	0.0567	
126 1,2,4-Trichlorobenzene	180	26.702	26.690	0.012	1	317	0.008681	

Reagents:

VAMSIS20_00019

Amount Added: 50.00

Units: mL

Run Reagent

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20170710-45226.b\MS9071018.D

Injection Date: 11-Jul-2017 01:36:30

Instrument ID: ATMS9

Operator ID: SV

Lims ID: 320-29663-A-1

Lab Sample ID: 320-29663-1

Worklist Smp#: 18

Client ID: 34000986

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

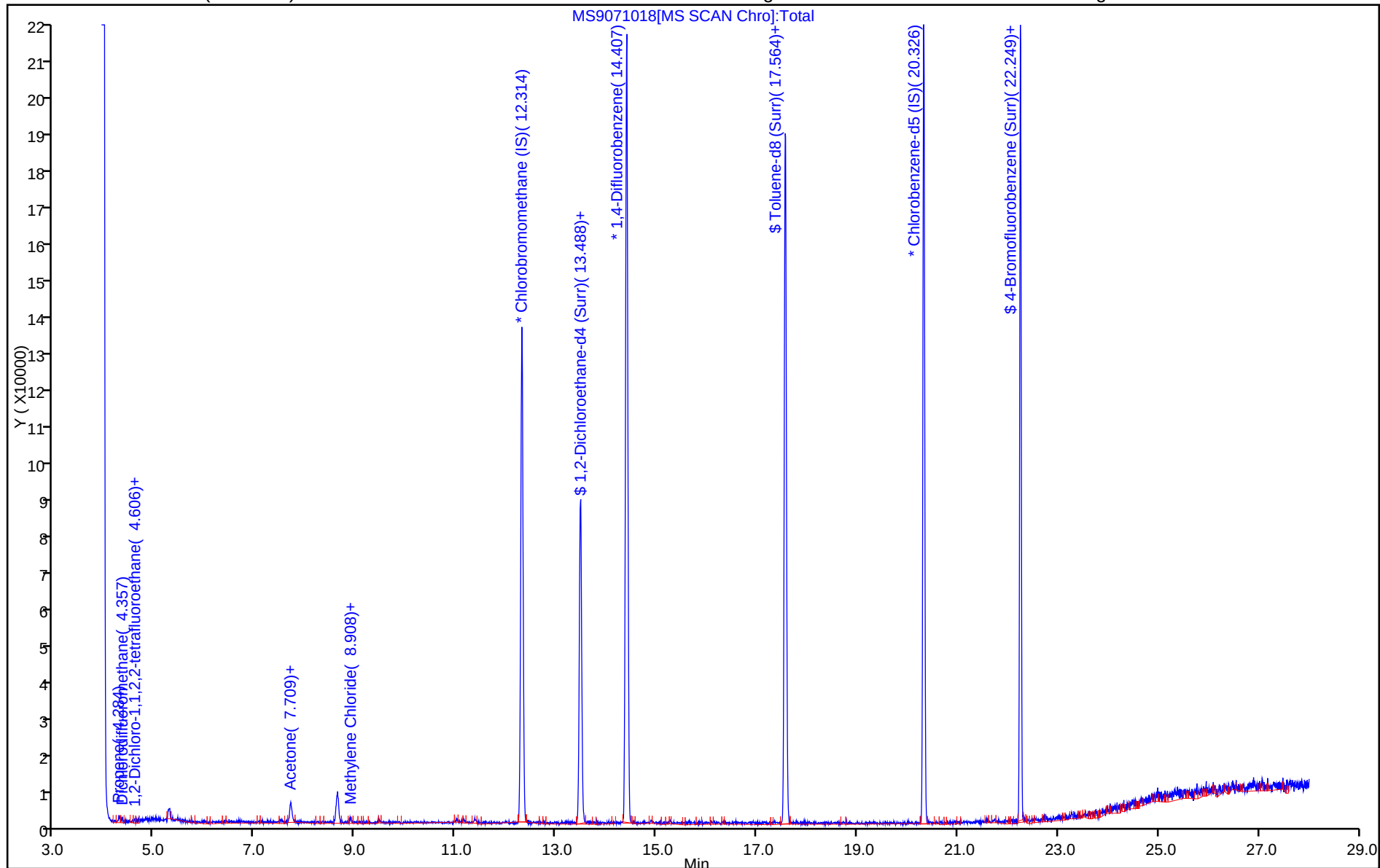
ALS Bottle#: 1

Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Y Scaling: Method Defined: Scale to the Nth Largest Peak: 2



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20170710-45226.b\MS9071018.D

Injection Date: 11-Jul-2017 01:36:30

Instrument ID: ATMS9

Lims ID: 320-29663-A-1

Lab Sample ID: 320-29663-1

Client ID: 34000986

Operator ID: SV

ALS Bottle#: 1

Worklist Smp#: 18

Purge Vol: 5.000 mL

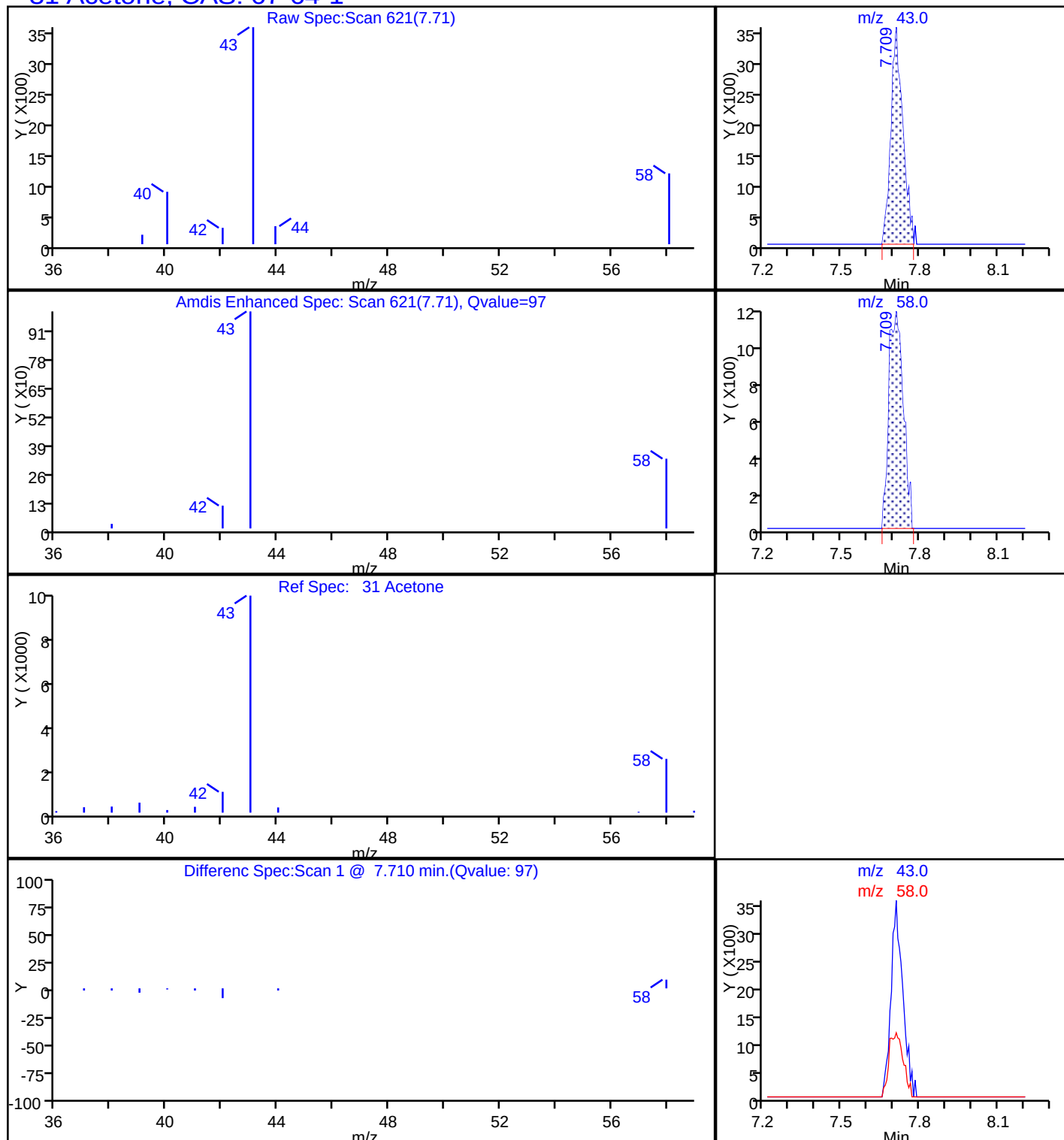
Dil. Factor: 1.0000

Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

31 Acetone, CAS: 67-64-1

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-29674-1</u>
SDG No.: _____	
Client Sample ID: <u>34000983</u>	Lab Sample ID: <u>320-29674-1</u>
Matrix: <u>Air</u>	Lab File ID: <u>MS9071019.D</u>
Analysis Method: <u>TO-15</u>	Date Collected: <u>07/06/2017 00:00</u>
Sample wt/vol: <u>500 (mL)</u>	Date Analyzed: <u>07/11/2017 02:33</u>
Soil Aliquot Vol: _____	Dilution Factor: <u>1</u>
Soil Extract Vol.: _____	GC Column: <u>RTX-Volatiles</u> ID: <u>0.32 (mm)</u>
% Moisture: _____	Level: (low/med) <u>Low</u>
Analysis Batch No.: <u>173198</u>	Units: <u>ppb v/v</u>

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.52	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29674-1
 SDG No.: _____
 Client Sample ID: 34000983 Lab Sample ID: 320-29674-1
 Matrix: Air Lab File ID: MS9071019.D
 Analysis Method: TO-15 Date Collected: 07/06/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 07/11/2017 02:33
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 173198 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	0.11	J B	0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-29674-1
 SDG No.: _____
 Client Sample ID: 34000983 Lab Sample ID: 320-29674-1
 Matrix: Air Lab File ID: MS9071019.D
 Analysis Method: TO-15 Date Collected: 07/06/2017 00:00
 Sample wt/vol: 500(mL) Date Analyzed: 07/11/2017 02:33
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 173198 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	89		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	110		70-130
2037-26-5	Toluene-d8 (Surr)	102		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20170710-45226.b\MS9071019.D
 Lims ID: 320-29674-A-1
 Client ID: 34000983
 Sample Type: Client
 Inject. Date: 11-Jul-2017 02:33:30 ALS Bottle#: 3 Worklist Smp#: 19
 Purge Vol: 5.000 mL Dil. Factor: 1.0000
 Sample Info: 320-29674-A-1
 Misc. Info.: 500 CAN CERT
 Operator ID: SV Instrument ID: ATMS9
 Method: \\ChromNA\Sacramento\ChromData\ATMS9\20170710-45226.b\TO15_ATMS9N.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 11-Jul-2017 17:23:24 Calib Date: 20-Jun-2017 19:30:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS9\20170621-44546.b\MS9062012.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK025

First Level Reviewer: phanthasena

Date: 11-Jul-2017 17:23:24

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	12.321	12.327	-0.006	97	69337	4.00	
* 2 1,4-Difluorobenzene	114	14.401	14.419	-0.018	96	271710	4.00	
* 3 Chlorobenzene-d5 (IS)	117	20.327	20.327	0.000	88	163585	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	13.483	13.495	-0.012	97	110541	4.40	
\$ 5 Toluene-d8 (Surr)	100	17.565	17.571	-0.006	98	125680	4.09	
\$ 6 4-Bromofluorobenzene (Surr	174	22.249	22.255	-0.006	88	77645	3.58	
14 Propene	41	4.290	4.278	0.012	52	930	0.0742	
15 Dichlorodifluoromethane	85	4.351	4.339	0.012	89	1675	0.0470	
22 Butane	43	5.020	5.014	0.006	34	583	0.0237	
28 Trichlorofluoromethane	101	6.748	6.754	-0.006	17	234	0.005693	
31 Acetone	43	7.703	7.642	0.061	95	14953	0.5234	
47 Methylene Chloride	49	8.896	8.908	-0.012	91	2455	0.1070	
48 Carbon disulfide	76	8.950	8.962	-0.012	94	1776	0.0452	
54 2-Butanone (MEK)	72	11.365	11.323	0.042	60	261	0.0315	
126 1,2,4-Trichlorobenzene	180	26.684	26.690	-0.006	1	363	0.0103	

Reagents:

VAMSIS20_00019 Amount Added: 50.00 Units: mL Run Reagent

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20170710-45226.b\MS9071019.D

Injection Date: 11-Jul-2017 02:33:30

Instrument ID: ATMS9

Operator ID: SV

Lims ID: 320-29674-A-1

Lab Sample ID: 320-29674-1

Worklist Smp#: 19

Client ID: 34000983

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

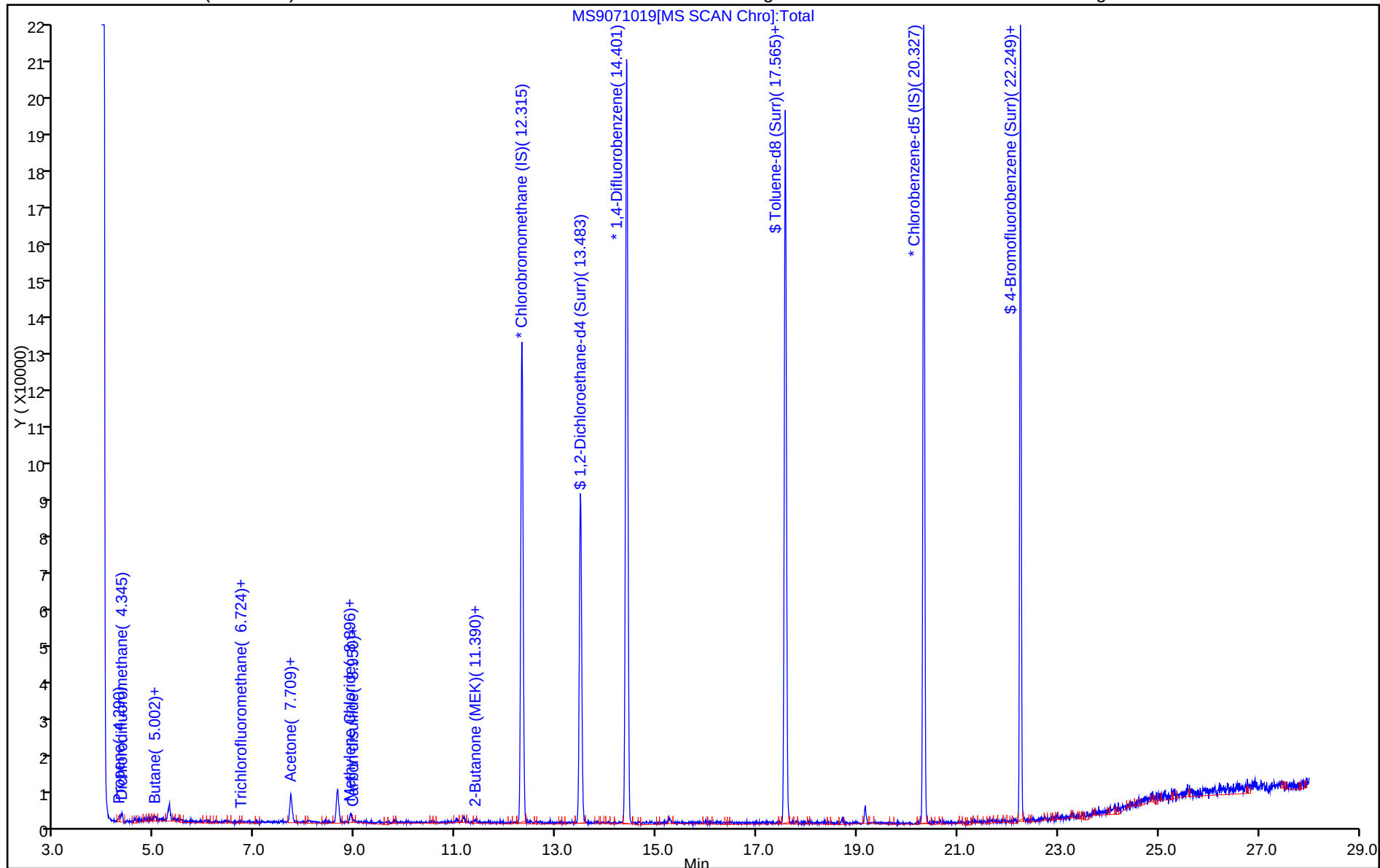
ALS Bottle#: 3

Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Y Scaling: Method Defined: Scale to the Nth Largest Peak: 2



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20170710-45226.b\MS9071019.D

Injection Date: 11-Jul-2017 02:33:30

Instrument ID: ATMS9

Lims ID: 320-29674-A-1

Lab Sample ID: 320-29674-1

Client ID: 34000983

Operator ID: SV

ALS Bottle#: 3

Worklist Smp#: 19

Purge Vol: 5.000 mL

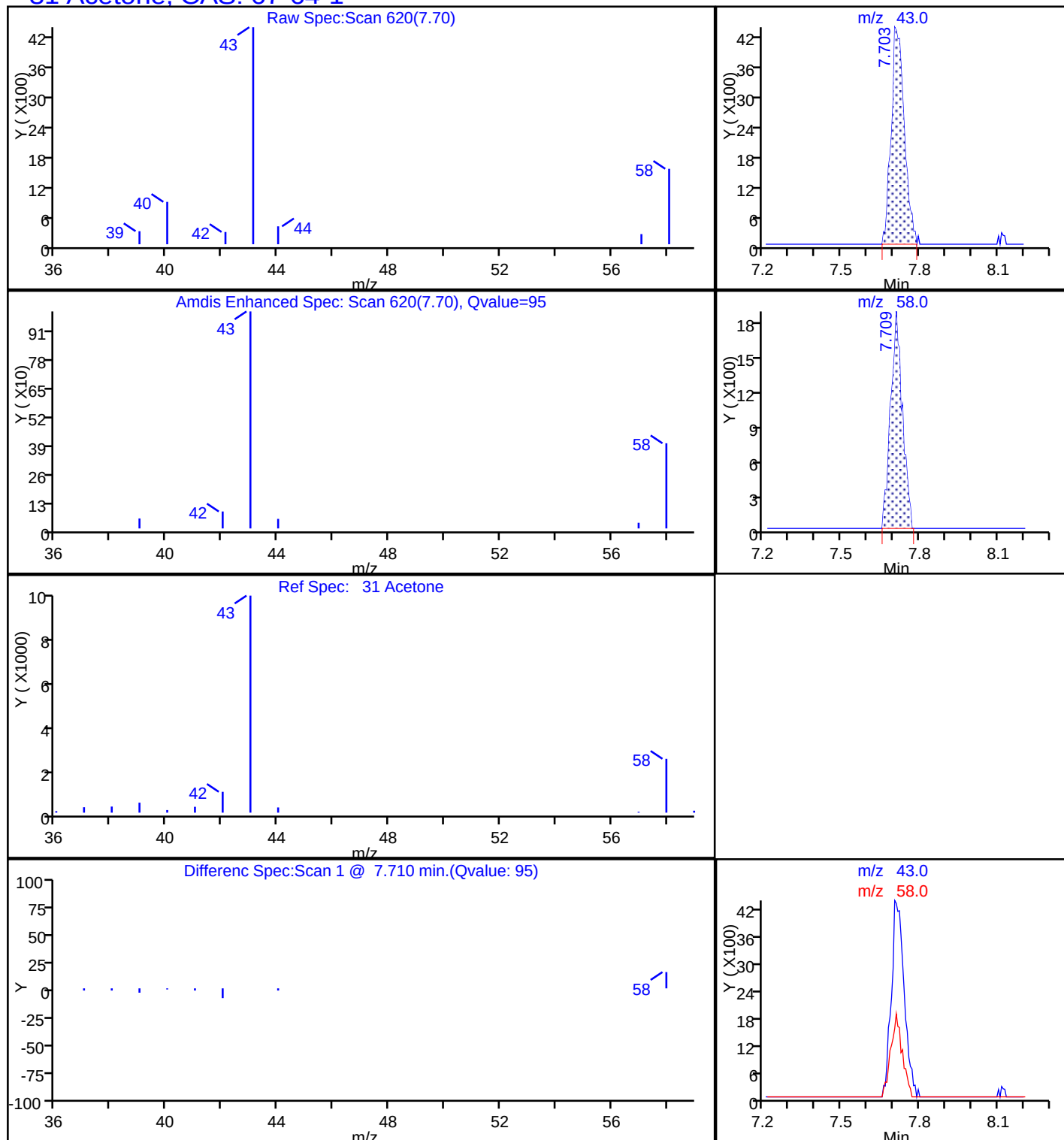
Dil. Factor: 1.0000

Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

31 Acetone, CAS: 67-64-1

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20170710-45226.b\MS9071019.D

Injection Date: 11-Jul-2017 02:33:30

Instrument ID: ATMS9

Lims ID: 320-29674-A-1

Lab Sample ID: 320-29674-1

Client ID: 34000983

Operator ID: SV

ALS Bottle#: 3

Worklist Smp#: 19

Purge Vol: 5.000 mL

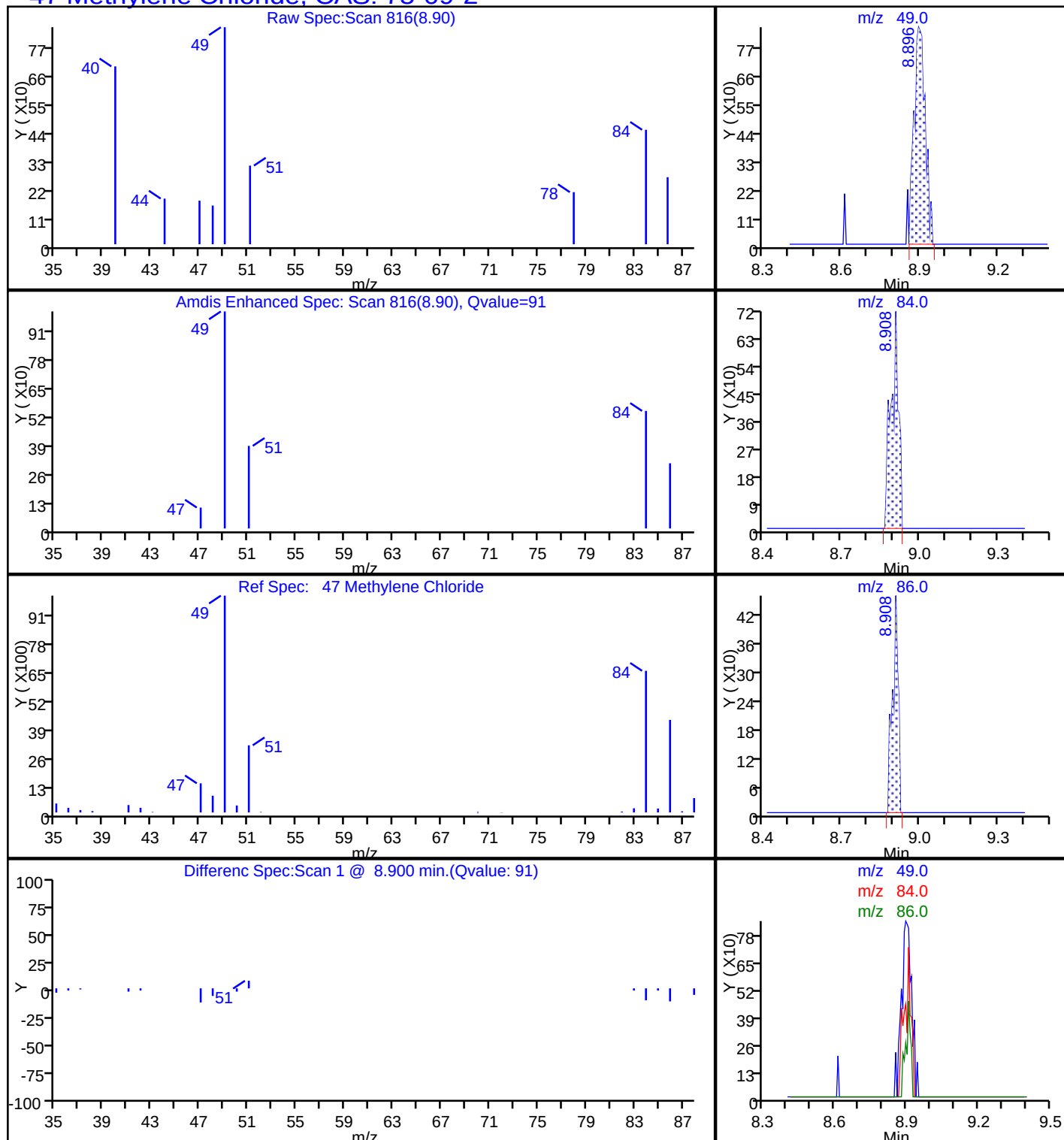
Dil. Factor: 1.0000

Method: TO15_ATMS9N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

47 Methylene Chloride, CAS: 75-09-2

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-35129-1

Client Project/Site: ESTCP Vapor Intrusion Research

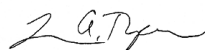
For:

GSI Environmental, Inc

9600 Great Hills Trail, Ste 350E

Austin, Texas 78759

Attn: Lila M Beckley



Authorized for release by:

2/1/2018 3:28:08 PM

Laura Turpen, Project Manager I

(916)374-4414

laura.turpen@testamericainc.com

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

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

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

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Definitions/Glossary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

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

Case Narrative

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Job ID: 320-35129-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-35129-1

Comments

No additional comments.

Receipt

The samples were received on 1/17/2018 10:19 AM; the samples arrived in good condition.

Receipt Exceptions

Client used only Start time of sampling as identification on Samples tags and in COC with no stop time.

Air - GC/MS VOA

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

VOA Prep

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

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-05

Lab Sample ID: 320-35129-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	39		20	0.70	ppb v/v	3.93		TO-15	Total/NA
Benzene	0.35	J	1.6	0.31	ppb v/v	3.93		TO-15	Total/NA
Benzyl chloride	1.1	J	3.1	0.64	ppb v/v	3.93		TO-15	Total/NA
Bromodichloromethane	9.7		1.2	0.26	ppb v/v	3.93		TO-15	Total/NA
2-Butanone (MEK)	3.7		3.1	0.78	ppb v/v	3.93		TO-15	Total/NA
Carbon disulfide	33		3.1	0.31	ppb v/v	3.93		TO-15	Total/NA
Carbon tetrachloride	0.36	J	3.1	0.25	ppb v/v	3.93		TO-15	Total/NA
Dibromochloromethane	1.3	J	1.6	0.31	ppb v/v	3.93		TO-15	Total/NA
Chloroethane	6.3		3.1	1.2	ppb v/v	3.93		TO-15	Total/NA
Chloroform	130		1.2	0.37	ppb v/v	3.93		TO-15	Total/NA
Chloromethane	7.3		3.1	0.77	ppb v/v	3.93		TO-15	Total/NA
cis-1,2-Dichloroethene	1.6		1.6	0.35	ppb v/v	3.93		TO-15	Total/NA
Ethylbenzene	0.50	J	1.6	0.25	ppb v/v	3.93		TO-15	Total/NA
Methylene Chloride	6.8		1.6	0.28	ppb v/v	3.93		TO-15	Total/NA
Styrene	0.38	J	1.6	0.23	ppb v/v	3.93		TO-15	Total/NA
Tetrachloroethene	0.21	J	1.6	0.20	ppb v/v	3.93		TO-15	Total/NA
Toluene	120		1.6	0.20	ppb v/v	3.93		TO-15	Total/NA
Trichloroethene	1.1	J	1.6	0.41	ppb v/v	3.93		TO-15	Total/NA
m,p-Xylene	0.76	J	3.1	0.39	ppb v/v	3.93		TO-15	Total/NA
o-Xylene	0.33	J	1.6	0.21	ppb v/v	3.93		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	92		47	1.7	ug/m3	3.93		TO-15	Total/NA
Benzene	1.1	J	5.0	0.99	ug/m3	3.93		TO-15	Total/NA
Benzyl chloride	5.5	J	16	3.3	ug/m3	3.93		TO-15	Total/NA
Bromodichloromethane	65		7.9	1.7	ug/m3	3.93		TO-15	Total/NA
2-Butanone (MEK)	11		9.3	2.3	ug/m3	3.93		TO-15	Total/NA
Carbon disulfide	100		9.8	0.95	ug/m3	3.93		TO-15	Total/NA
Carbon tetrachloride	2.2	J	20	1.6	ug/m3	3.93		TO-15	Total/NA
Dibromochloromethane	11	J	13	2.6	ug/m3	3.93		TO-15	Total/NA
Chloroethane	17		8.3	3.2	ug/m3	3.93		TO-15	Total/NA
Chloroform	630		5.8	1.8	ug/m3	3.93		TO-15	Total/NA
Chloromethane	15		6.5	1.6	ug/m3	3.93		TO-15	Total/NA
cis-1,2-Dichloroethene	6.3		6.2	1.4	ug/m3	3.93		TO-15	Total/NA
Ethylbenzene	2.2	J	6.8	1.1	ug/m3	3.93		TO-15	Total/NA
Methylene Chloride	24		5.5	0.98	ug/m3	3.93		TO-15	Total/NA
Styrene	1.6	J	6.7	0.99	ug/m3	3.93		TO-15	Total/NA
Tetrachloroethene	1.4	J	11	1.4	ug/m3	3.93		TO-15	Total/NA
Toluene	460		5.9	0.76	ug/m3	3.93		TO-15	Total/NA
Trichloroethene	5.9	J	8.4	2.2	ug/m3	3.93		TO-15	Total/NA
m,p-Xylene	3.3	J	14	1.7	ug/m3	3.93		TO-15	Total/NA
o-Xylene	1.4	J	6.8	0.92	ug/m3	3.93		TO-15	Total/NA

Client Sample ID: HOU-06

Lab Sample ID: 320-35129-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	260		51	1.8	ppb v/v	10.1		TO-15	Total/NA
Bromodichloromethane	8.4		3.0	0.67	ppb v/v	10.1		TO-15	Total/NA
2-Butanone (MEK)	15		8.1	2.0	ppb v/v	10.1		TO-15	Total/NA
Carbon disulfide	110		8.1	0.79	ppb v/v	10.1		TO-15	Total/NA
Chlorobenzene	0.69	J	3.0	0.65	ppb v/v	10.1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-06 (Continued)

Lab Sample ID: 320-35129-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Dibromochloromethane	1.1	J	4.0	0.80	ppb v/v	10.1		TO-15	Total/NA
Chloroethane	18		8.1	3.1	ppb v/v	10.1		TO-15	Total/NA
Chloroform	400		3.0	0.96	ppb v/v	10.1		TO-15	Total/NA
Chloromethane	50		8.1	2.0	ppb v/v	10.1		TO-15	Total/NA
cis-1,2-Dichloroethene	4.0		4.0	0.90	ppb v/v	10.1		TO-15	Total/NA
Methylene Chloride	18		4.0	0.73	ppb v/v	10.1		TO-15	Total/NA
Tetrachloroethene	0.80	J	4.0	0.52	ppb v/v	10.1		TO-15	Total/NA
Toluene	380		4.0	0.52	ppb v/v	10.1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	620		120	4.3	ug/m3	10.1		TO-15	Total/NA
Bromodichloromethane	56		20	4.5	ug/m3	10.1		TO-15	Total/NA
2-Butanone (MEK)	43		24	5.9	ug/m3	10.1		TO-15	Total/NA
Carbon disulfide	340		25	2.5	ug/m3	10.1		TO-15	Total/NA
Chlorobenzene	3.2	J	14	3.0	ug/m3	10.1		TO-15	Total/NA
Dibromochloromethane	9.0	J	34	6.8	ug/m3	10.1		TO-15	Total/NA
Chloroethane	48		21	8.2	ug/m3	10.1		TO-15	Total/NA
Chloroform	2000		15	4.7	ug/m3	10.1		TO-15	Total/NA
Chloromethane	100		17	4.1	ug/m3	10.1		TO-15	Total/NA
cis-1,2-Dichloroethene	16		16	3.6	ug/m3	10.1		TO-15	Total/NA
Methylene Chloride	61		14	2.5	ug/m3	10.1		TO-15	Total/NA
Tetrachloroethene	5.4	J	27	3.5	ug/m3	10.1		TO-15	Total/NA
Toluene	1400		15	1.9	ug/m3	10.1		TO-15	Total/NA

Client Sample ID: HOU-07

Lab Sample ID: 320-35129-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	20		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.34	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	6.3		0.30	0.066	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.8		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	20		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.092	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.95		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	29		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	1.2		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.58		0.40	0.15	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	47		0.40	0.089	ppb v/v	1		TO-15	Total/NA
trans-1,2-Dichloroethene	0.66		0.40	0.10	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.15	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	2.1		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Styrene	0.093	J	0.40	0.059	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	21		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	6.5		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	3.6		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.23	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.17	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
Vinyl chloride	5.1		0.40	0.12	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.37	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.20	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-07 (Continued)

Lab Sample ID: 320-35129-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Acetone	47		12	0.42	ug/m3	1			TO-15	Total/NA
Benzene	1.1	J	1.3	0.25	ug/m3	1			TO-15	Total/NA
Bromodichloromethane	42		2.0	0.44	ug/m3	1			TO-15	Total/NA
2-Butanone (MEK)	5.4		2.4	0.59	ug/m3	1			TO-15	Total/NA
Carbon disulfide	62		2.5	0.24	ug/m3	1			TO-15	Total/NA
Carbon tetrachloride	0.58	J	5.0	0.40	ug/m3	1			TO-15	Total/NA
Dibromochloromethane	8.1		3.4	0.67	ug/m3	1			TO-15	Total/NA
Chloroform	140		1.5	0.46	ug/m3	1			TO-15	Total/NA
Chloromethane	2.4		1.7	0.41	ug/m3	1			TO-15	Total/NA
Dichlorodifluoromethane	2.9		2.0	0.72	ug/m3	1			TO-15	Total/NA
cis-1,2-Dichloroethene	190		1.6	0.35	ug/m3	1			TO-15	Total/NA
trans-1,2-Dichloroethene	2.6		1.6	0.40	ug/m3	1			TO-15	Total/NA
Ethylbenzene	0.65	J	1.7	0.27	ug/m3	1			TO-15	Total/NA
Methylene Chloride	7.2		1.4	0.25	ug/m3	1			TO-15	Total/NA
Styrene	0.39	J	1.7	0.25	ug/m3	1			TO-15	Total/NA
Tetrachloroethene	140		2.7	0.35	ug/m3	1			TO-15	Total/NA
Toluene	24		1.5	0.19	ug/m3	1			TO-15	Total/NA
Trichloroethene	19		2.1	0.56	ug/m3	1			TO-15	Total/NA
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3	1			TO-15	Total/NA
1,2,4-Trimethylbenzene	0.83	J	3.9	0.80	ug/m3	1			TO-15	Total/NA
Vinyl chloride	13		1.0	0.31	ug/m3	1			TO-15	Total/NA
m,p-Xylene	1.6	J	3.5	0.43	ug/m3	1			TO-15	Total/NA
o-Xylene	0.86	J	1.7	0.23	ug/m3	1			TO-15	Total/NA

Client Sample ID: HOU-07B

Lab Sample ID: 320-35129-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Acetone	16		5.0	0.18	ppb v/v	1			TO-15	Total/NA
Benzene	0.46		0.40	0.079	ppb v/v	1			TO-15	Total/NA
Bromodichloromethane	6.1		0.30	0.066	ppb v/v	1			TO-15	Total/NA
2-Butanone (MEK)	1.6		0.80	0.20	ppb v/v	1			TO-15	Total/NA
Carbon disulfide	56		0.80	0.078	ppb v/v	1			TO-15	Total/NA
Carbon tetrachloride	0.085	J	0.80	0.064	ppb v/v	1			TO-15	Total/NA
Dibromochloromethane	0.96		0.40	0.079	ppb v/v	1			TO-15	Total/NA
Chloroform	25		0.30	0.095	ppb v/v	1			TO-15	Total/NA
Chloromethane	1.3		0.80	0.20	ppb v/v	1			TO-15	Total/NA
Dichlorodifluoromethane	0.79		0.40	0.15	ppb v/v	1			TO-15	Total/NA
cis-1,2-Dichloroethene	52		0.40	0.089	ppb v/v	1			TO-15	Total/NA
trans-1,2-Dichloroethene	0.48		0.40	0.10	ppb v/v	1			TO-15	Total/NA
Ethylbenzene	0.17	J	0.40	0.063	ppb v/v	1			TO-15	Total/NA
Methylene Chloride	2.1		0.40	0.072	ppb v/v	1			TO-15	Total/NA
Tetrachloroethene	1.5		0.40	0.051	ppb v/v	1			TO-15	Total/NA
Toluene	5.8		0.40	0.051	ppb v/v	1			TO-15	Total/NA
Trichloroethene	0.78		0.40	0.11	ppb v/v	1			TO-15	Total/NA
Trichlorofluoromethane	0.25	J	0.40	0.20	ppb v/v	1			TO-15	Total/NA
Vinyl chloride	4.4		0.40	0.12	ppb v/v	1			TO-15	Total/NA
m,p-Xylene	0.32	J	0.80	0.10	ppb v/v	1			TO-15	Total/NA
o-Xylene	0.16	J	0.40	0.054	ppb v/v	1			TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Acetone	37		12	0.42	ug/m3	1			TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-07B (Continued)

Lab Sample ID: 320-35129-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Benzene	1.5		1.3	0.25	ug/m3	1			TO-15	Total/NA
Bromodichloromethane	41		2.0	0.44	ug/m3	1			TO-15	Total/NA
2-Butanone (MEK)	4.7		2.4	0.59	ug/m3	1			TO-15	Total/NA
Carbon disulfide	180		2.5	0.24	ug/m3	1			TO-15	Total/NA
Carbon tetrachloride	0.53	J	5.0	0.40	ug/m3	1			TO-15	Total/NA
Dibromochloromethane	8.1		3.4	0.67	ug/m3	1			TO-15	Total/NA
Chloroform	120		1.5	0.46	ug/m3	1			TO-15	Total/NA
Chloromethane	2.6		1.7	0.41	ug/m3	1			TO-15	Total/NA
Dichlorodifluoromethane	3.9		2.0	0.72	ug/m3	1			TO-15	Total/NA
cis-1,2-Dichloroethene	200		1.6	0.35	ug/m3	1			TO-15	Total/NA
trans-1,2-Dichloroethene	1.9		1.6	0.40	ug/m3	1			TO-15	Total/NA
Ethylbenzene	0.74	J	1.7	0.27	ug/m3	1			TO-15	Total/NA
Methylene Chloride	7.3		1.4	0.25	ug/m3	1			TO-15	Total/NA
Tetrachloroethene	10		2.7	0.35	ug/m3	1			TO-15	Total/NA
Toluene	22		1.5	0.19	ug/m3	1			TO-15	Total/NA
Trichloroethene	4.2		2.1	0.56	ug/m3	1			TO-15	Total/NA
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3	1			TO-15	Total/NA
Vinyl chloride	11		1.0	0.31	ug/m3	1			TO-15	Total/NA
m,p-Xylene	1.4	J	3.5	0.43	ug/m3	1			TO-15	Total/NA
o-Xylene	0.68	J	1.7	0.23	ug/m3	1			TO-15	Total/NA

Client Sample ID: HOU-08

Lab Sample ID: 320-35129-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Acetone	30		5.0	0.18	ppb v/v	1			TO-15	Total/NA
Benzene	0.27	J	0.40	0.079	ppb v/v	1			TO-15	Total/NA
Bromodichloromethane	0.49		0.30	0.066	ppb v/v	1			TO-15	Total/NA
2-Butanone (MEK)	1.2		0.80	0.20	ppb v/v	1			TO-15	Total/NA
Carbon disulfide	4.2		0.80	0.078	ppb v/v	1			TO-15	Total/NA
Carbon tetrachloride	0.11	J	0.80	0.064	ppb v/v	1			TO-15	Total/NA
Dibromochloromethane	0.093	J	0.40	0.079	ppb v/v	1			TO-15	Total/NA
Chloroform	6.3		0.30	0.095	ppb v/v	1			TO-15	Total/NA
Chloromethane	0.69	J	0.80	0.20	ppb v/v	1			TO-15	Total/NA
Dichlorodifluoromethane	0.44		0.40	0.15	ppb v/v	1			TO-15	Total/NA
cis-1,2-Dichloroethene	2.8		0.40	0.089	ppb v/v	1			TO-15	Total/NA
Ethylbenzene	0.094	J	0.40	0.063	ppb v/v	1			TO-15	Total/NA
Methylene Chloride	0.39	J	0.40	0.072	ppb v/v	1			TO-15	Total/NA
Tetrachloroethene	15		0.40	0.051	ppb v/v	1			TO-15	Total/NA
Toluene	2.0		0.40	0.051	ppb v/v	1			TO-15	Total/NA
Trichloroethene	1.8		0.40	0.11	ppb v/v	1			TO-15	Total/NA
Trichlorofluoromethane	0.26	J	0.40	0.20	ppb v/v	1			TO-15	Total/NA
Vinyl chloride	0.16	J	0.40	0.12	ppb v/v	1			TO-15	Total/NA
m,p-Xylene	0.28	J	0.80	0.10	ppb v/v	1			TO-15	Total/NA
o-Xylene	0.12	J	0.40	0.054	ppb v/v	1			TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Acetone	71		12	0.42	ug/m3	1			TO-15	Total/NA
Benzene	0.85	J	1.3	0.25	ug/m3	1			TO-15	Total/NA
Bromodichloromethane	3.3		2.0	0.44	ug/m3	1			TO-15	Total/NA
2-Butanone (MEK)	3.4		2.4	0.59	ug/m3	1			TO-15	Total/NA
Carbon disulfide	13		2.5	0.24	ug/m3	1			TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-08 (Continued)

Lab Sample ID: 320-35129-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon tetrachloride	0.72	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	0.80	J	3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	31		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.4	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.2		2.0	0.72	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	11		1.6	0.35	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.41	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.4	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	100		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	7.6		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	9.6		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.5	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
Vinyl chloride	0.42	J	1.0	0.31	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.2	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.54	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-08B

Lab Sample ID: 320-35129-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	15		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.20	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	0.39		0.30	0.066	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.3		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	0.90		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.11	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Chloroform	3.6		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.59	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.39	J	0.40	0.089	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.070	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.45		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.46		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	2.3		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.22	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.22	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.11	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	36		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.64	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	2.6		2.0	0.44	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	3.8		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	2.8		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.68	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Chloroform	17		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.2	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	1.5	J	1.6	0.35	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.30	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.6		1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	3.1		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	8.5		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.2	J	2.2	1.1	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-08B (Continued)

Lab Sample ID: 320-35129-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
m,p-Xylene	0.96	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.50	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-09

Lab Sample ID: 320-35129-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	11		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.13	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	4.6		0.30	0.066	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.92		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	5.8		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.49	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Chlorobenzene	0.080	J	0.30	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.60		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	47		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	1.4		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.37	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.26	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	8.1		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Styrene	0.60		0.40	0.059	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.070	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	53		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.22	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.23	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.17	J	0.40	0.13	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.33	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.15	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	25		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.41	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	30		2.0	0.44	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	2.7		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	18		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	3.1	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Chlorobenzene	0.37	J	1.4	0.29	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	5.1		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	230		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	2.9		1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.8	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
Ethylbenzene	1.1	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	28		1.4	0.25	ug/m3	1		TO-15	Total/NA
Styrene	2.5		1.7	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	0.47	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	200		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.2	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	1.1	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.84	J	2.0	0.61	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.5	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.65	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-10

Lab Sample ID: 320-35129-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	13	J	120	4.2	ppb v/v	23.6		TO-15	Total/NA
Bromodichloromethane	2.3	J	7.1	1.6	ppb v/v	23.6		TO-15	Total/NA
Carbon disulfide	5.2	J	19	1.8	ppb v/v	23.6		TO-15	Total/NA
Chloroform	12		7.1	2.2	ppb v/v	23.6		TO-15	Total/NA
cis-1,2-Dichloroethene	340		9.4	2.1	ppb v/v	23.6		TO-15	Total/NA
Methylene Chloride	2.2	J	9.4	1.7	ppb v/v	23.6		TO-15	Total/NA
Tetrachloroethene	830		9.4	1.2	ppb v/v	23.6		TO-15	Total/NA
Toluene	2.6	J	9.4	1.2	ppb v/v	23.6		TO-15	Total/NA
Trichloroethene	210		9.4	2.5	ppb v/v	23.6		TO-15	Total/NA
Vinyl chloride	8.8	J	9.4	2.8	ppb v/v	23.6		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	30	J	280	10	ug/m3	23.6		TO-15	Total/NA
Bromodichloromethane	15	J	47	10	ug/m3	23.6		TO-15	Total/NA
Carbon disulfide	16	J	59	5.7	ug/m3	23.6		TO-15	Total/NA
Chloroform	57		35	11	ug/m3	23.6		TO-15	Total/NA
cis-1,2-Dichloroethene	1400		37	8.3	ug/m3	23.6		TO-15	Total/NA
Methylene Chloride	7.5	J	33	5.9	ug/m3	23.6		TO-15	Total/NA
Tetrachloroethene	5600		64	8.2	ug/m3	23.6		TO-15	Total/NA
Toluene	9.8	J	36	4.5	ug/m3	23.6		TO-15	Total/NA
Trichloroethene	1100		51	13	ug/m3	23.6		TO-15	Total/NA
Vinyl chloride	22	J	24	7.2	ug/m3	23.6		TO-15	Total/NA

Client Sample ID: HOU-10B

Lab Sample ID: 320-35129-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	11	J	170	5.9	ppb v/v	33.1		TO-15	Total/NA
Bromodichloromethane	3.2	J	9.9	2.2	ppb v/v	33.1		TO-15	Total/NA
Carbon disulfide	14	J	26	2.6	ppb v/v	33.1		TO-15	Total/NA
Chloroform	18		9.9	3.1	ppb v/v	33.1		TO-15	Total/NA
cis-1,2-Dichloroethene	320		13	2.9	ppb v/v	33.1		TO-15	Total/NA
Methylene Chloride	3.7	J	13	2.4	ppb v/v	33.1		TO-15	Total/NA
Tetrachloroethene	1700		13	1.7	ppb v/v	33.1		TO-15	Total/NA
Toluene	29		13	1.7	ppb v/v	33.1		TO-15	Total/NA
Trichloroethene	250		13	3.5	ppb v/v	33.1		TO-15	Total/NA
Vinyl chloride	7.9	J	13	4.0	ppb v/v	33.1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	25	J	390	14	ug/m3	33.1		TO-15	Total/NA
Bromodichloromethane	22	J	67	15	ug/m3	33.1		TO-15	Total/NA
Carbon disulfide	44	J	82	8.0	ug/m3	33.1		TO-15	Total/NA
Chloroform	89		48	15	ug/m3	33.1		TO-15	Total/NA
cis-1,2-Dichloroethene	1300		52	12	ug/m3	33.1		TO-15	Total/NA
Methylene Chloride	13	J	46	8.3	ug/m3	33.1		TO-15	Total/NA
Tetrachloroethene	12000		90	11	ug/m3	33.1		TO-15	Total/NA
Toluene	110		50	6.4	ug/m3	33.1		TO-15	Total/NA
Trichloroethene	1400		71	19	ug/m3	33.1		TO-15	Total/NA
Vinyl chloride	20	J	34	10	ug/m3	33.1		TO-15	Total/NA

Client Sample ID: HOU-01

Lab Sample ID: 320-35129-10

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-01 (Continued)

Lab Sample ID: 320-35129-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	13	J	56	2.0	ppb v/v	11.1		TO-15	Total/NA
Benzene	1.5	J	4.4	0.88	ppb v/v	11.1		TO-15	Total/NA
Bromodichloromethane	11		3.3	0.73	ppb v/v	11.1		TO-15	Total/NA
Carbon disulfide	89		8.9	0.87	ppb v/v	11.1		TO-15	Total/NA
Dibromochloromethane	1.3	J	4.4	0.88	ppb v/v	11.1		TO-15	Total/NA
Chloroethane	6.2	J	8.9	3.4	ppb v/v	11.1		TO-15	Total/NA
Chloroform	290		3.3	1.1	ppb v/v	11.1		TO-15	Total/NA
Chloromethane	2.4	J	8.9	2.2	ppb v/v	11.1		TO-15	Total/NA
1,1-Dichloroethene	2.0	J	8.9	1.4	ppb v/v	11.1		TO-15	Total/NA
cis-1,2-Dichloroethene	1.1	J	4.4	0.99	ppb v/v	11.1		TO-15	Total/NA
Methylene Chloride	13		4.4	0.80	ppb v/v	11.1		TO-15	Total/NA
Tetrachloroethene	4.1	J	4.4	0.57	ppb v/v	11.1		TO-15	Total/NA
Toluene	310		4.4	0.57	ppb v/v	11.1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	31	J	130	4.7	ug/m3	11.1		TO-15	Total/NA
Benzene	4.9	J	14	2.8	ug/m3	11.1		TO-15	Total/NA
Bromodichloromethane	77		22	4.9	ug/m3	11.1		TO-15	Total/NA
Carbon disulfide	280		28	2.7	ug/m3	11.1		TO-15	Total/NA
Dibromochloromethane	11	J	38	7.5	ug/m3	11.1		TO-15	Total/NA
Chloroethane	16	J	23	9.0	ug/m3	11.1		TO-15	Total/NA
Chloroform	1400		16	5.1	ug/m3	11.1		TO-15	Total/NA
Chloromethane	5.0	J	18	4.5	ug/m3	11.1		TO-15	Total/NA
1,1-Dichloroethene	7.9	J	35	5.7	ug/m3	11.1		TO-15	Total/NA
cis-1,2-Dichloroethene	4.4	J	18	3.9	ug/m3	11.1		TO-15	Total/NA
Methylene Chloride	43		15	2.8	ug/m3	11.1		TO-15	Total/NA
Tetrachloroethene	28	J	30	3.8	ug/m3	11.1		TO-15	Total/NA
Toluene	1200		17	2.1	ug/m3	11.1		TO-15	Total/NA

Client Sample ID: HOU-01B

Lab Sample ID: 320-35129-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	15	J	48	1.7	ppb v/v	9.62		TO-15	Total/NA
Benzene	1.6	J	3.8	0.76	ppb v/v	9.62		TO-15	Total/NA
Bromodichloromethane	14		2.9	0.63	ppb v/v	9.62		TO-15	Total/NA
Carbon disulfide	27		7.7	0.75	ppb v/v	9.62		TO-15	Total/NA
Dibromochloromethane	1.7	J	3.8	0.76	ppb v/v	9.62		TO-15	Total/NA
Chloroethane	6.2	J	7.7	3.0	ppb v/v	9.62		TO-15	Total/NA
Chloroform	250		2.9	0.91	ppb v/v	9.62		TO-15	Total/NA
Chloromethane	2.0	J	7.7	1.9	ppb v/v	9.62		TO-15	Total/NA
1,1-Dichloroethene	1.8	J	7.7	1.2	ppb v/v	9.62		TO-15	Total/NA
Methylene Chloride	11		3.8	0.69	ppb v/v	9.62		TO-15	Total/NA
Tetrachloroethene	0.59	J	3.8	0.49	ppb v/v	9.62		TO-15	Total/NA
Toluene	300		3.8	0.49	ppb v/v	9.62		TO-15	Total/NA
m,p-Xylene	1.0	J	7.7	0.96	ppb v/v	9.62		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	35	J	110	4.1	ug/m3	9.62		TO-15	Total/NA
Benzene	5.2	J	12	2.4	ug/m3	9.62		TO-15	Total/NA
Bromodichloromethane	92		19	4.3	ug/m3	9.62		TO-15	Total/NA
Carbon disulfide	85		24	2.3	ug/m3	9.62		TO-15	Total/NA
Dibromochloromethane	14	J	33	6.5	ug/m3	9.62		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-01B (Continued)

Lab Sample ID: 320-35129-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroethane	16	J	20	7.8	ug/m3	9.62		TO-15	Total/NA
Chloroform	1200		14	4.5	ug/m3	9.62		TO-15	Total/NA
Chloromethane	4.2	J	16	3.9	ug/m3	9.62		TO-15	Total/NA
1,1-Dichloroethene	7.1	J	31	4.9	ug/m3	9.62		TO-15	Total/NA
Methylene Chloride	37		13	2.4	ug/m3	9.62		TO-15	Total/NA
Tetrachloroethene	4.0	J	26	3.3	ug/m3	9.62		TO-15	Total/NA
Toluene	1100		15	1.8	ug/m3	9.62		TO-15	Total/NA
m,p-Xylene	4.5	J	33	4.2	ug/m3	9.62		TO-15	Total/NA

Client Sample ID: HOU-02

Lab Sample ID: 320-35129-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	6.7		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.19	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.92		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	2.0		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.069	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Chloroform	0.34		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	1.1		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.48		0.40	0.15	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.23	J	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.62		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.78		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.36	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.11	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	16		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.61	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	2.7		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	6.3		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.43	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Chloroform	1.6		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	2.4		1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.4		2.0	0.72	ug/m3	1		TO-15	Total/NA
Methylene Chloride	0.80	J	1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	4.2		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	2.9		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	2.0	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
o-Xylene	0.46	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-03

Lab Sample ID: 320-35129-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	7.5		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.47		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	1.9		0.30	0.066	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.2		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	5.4		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.083	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.35	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-03 (Continued)

Lab Sample ID: 320-35129-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	5.7		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.62	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.45		0.40	0.15	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	4.9		0.40	0.089	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.10	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	2.4		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	46		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	1.3		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	1.9		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.41		0.40	0.20	ppb v/v	1		TO-15	Total/NA
Vinyl chloride	0.71		0.40	0.12	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.24	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.16	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	18		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	1.5		1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	13		2.0	0.44	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	3.4		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	17		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.52	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	3.0	J	3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	28		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.3	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.2		2.0	0.72	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	19		1.6	0.35	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.43	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	8.4		1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	310		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	4.7		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	10		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	2.3		2.2	1.1	ug/m3	1		TO-15	Total/NA
Vinyl chloride	1.8		1.0	0.31	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.0	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.68	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-03B

Lab Sample ID: 320-35129-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	12		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.61		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	1.7		0.30	0.066	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.3		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	21		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.081	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Chlorobenzene	0.23	J	0.30	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.29	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroethane	0.57	J	0.80	0.31	ppb v/v	1		TO-15	Total/NA
Chloroform	10		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	1.5		0.80	0.20	ppb v/v	1		TO-15	Total/NA
1,4-Dichlorobenzene	1.2		0.40	0.15	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-03B (Continued)

Lab Sample ID: 320-35129-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Dichlorodifluoromethane	0.44		0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,2-Dichloroethane	0.10	J	0.80	0.088	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.21	J	0.40	0.089	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.50		0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	1.5		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.69		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	4.5		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.23	J	0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.33	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	2.1		0.80	0.16	ppb v/v	1		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.30	J	0.40	0.13	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	1.7		0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.51		0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	29		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	1.9		1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	12		2.0	0.44	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	3.9		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	67		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.51	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Chlorobenzene	1.1	J	1.4	0.29	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	2.5	J	3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroethane	1.5	J	2.1	0.81	ug/m3	1		TO-15	Total/NA
Chloroform	50		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	3.1		1.7	0.41	ug/m3	1		TO-15	Total/NA
1,4-Dichlorobenzene	7.3		2.4	0.90	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.2		2.0	0.72	ug/m3	1		TO-15	Total/NA
1,2-Dichloroethane	0.41	J	3.2	0.36	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.82	J	1.6	0.35	ug/m3	1		TO-15	Total/NA
Ethylbenzene	2.2		1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	5.1		1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	4.7		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	17		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	1.2	J	2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.9	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	10		3.9	0.80	ug/m3	1		TO-15	Total/NA
1,3,5-Trimethylbenzene	1.5	J	2.0	0.61	ug/m3	1		TO-15	Total/NA
m,p-Xylene	7.3		3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	2.2		1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-04

Lab Sample ID: 320-35129-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	7.6		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.57		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	2.9		0.30	0.066	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.83		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	6.7		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.082	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.44		0.40	0.079	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-04 (Continued)

Lab Sample ID: 320-35129-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	9.8		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.53	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.47		0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,2-Dichloroethane	0.092	J	0.80	0.088	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	3.9		0.40	0.089	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.097	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	1.3		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	26		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	6.4		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	1.8		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.46		0.40	0.20	ppb v/v	1		TO-15	Total/NA
Vinyl chloride	0.16	J	0.40	0.12	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.36	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.14	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	18		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	1.8		1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	19		2.0	0.44	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	2.5		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	21		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.52	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	3.7		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	48		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.1	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	2.3		2.0	0.72	ug/m3	1		TO-15	Total/NA
1,2-Dichloroethane	0.37	J	3.2	0.36	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	15		1.6	0.35	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.42	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	4.4		1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	180		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	24		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	9.5		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	2.6		2.2	1.1	ug/m3	1		TO-15	Total/NA
Vinyl chloride	0.41	J	1.0	0.31	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.6	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.59	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-BKG-01

Lab Sample ID: 320-35129-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	18		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.68		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	4.5		0.30	0.066	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.6		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	40		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.095	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Chlorobenzene	0.50		0.30	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	0.78		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	18		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	1.3		0.80	0.20	ppb v/v	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-BKG-01 (Continued)

Lab Sample ID: 320-35129-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dichlorobenzene	0.70		0.40	0.15	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.11	J	0.40	0.089	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.29	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	3.6		0.40	0.072	ppb v/v	1		TO-15	Total/NA
Styrene	0.064	J	0.40	0.059	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.30	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	13		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.24	J	0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.62		0.40	0.20	ppb v/v	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.48	J	0.80	0.16	ppb v/v	1		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.17	J	0.40	0.13	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.65	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.26	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	42		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	2.2		1.3	0.25	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	30		2.0	0.44	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	4.8		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	130		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.59	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Chlorobenzene	2.3		1.4	0.29	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	6.6		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	87		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	2.7		1.7	0.41	ug/m3	1		TO-15	Total/NA
1,4-Dichlorobenzene	4.2		2.4	0.90	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.43	J	1.6	0.35	ug/m3	1		TO-15	Total/NA
Ethylbenzene	1.3	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
Methylene Chloride	13		1.4	0.25	ug/m3	1		TO-15	Total/NA
Styrene	0.27	J	1.7	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	2.0	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	50		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	1.3	J	2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	3.5		2.2	1.1	ug/m3	1		TO-15	Total/NA
1,2,4-Trimethylbenzene	2.4	J	3.9	0.80	ug/m3	1		TO-15	Total/NA
1,3,5-Trimethylbenzene	0.84	J	2.0	0.61	ug/m3	1		TO-15	Total/NA
m,p-Xylene	2.8	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	1.1	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: HOU-BKG-02

Lab Sample ID: 320-35129-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	8.5	J	11	0.39	ppb v/v	2.19		TO-15	Total/NA
Benzene	0.89		0.88	0.17	ppb v/v	2.19		TO-15	Total/NA
Bromodichloromethane	6.0		0.66	0.14	ppb v/v	2.19		TO-15	Total/NA
2-Butanone (MEK)	0.64	J	1.8	0.44	ppb v/v	2.19		TO-15	Total/NA
Carbon disulfide	45		1.8	0.17	ppb v/v	2.19		TO-15	Total/NA
Carbon tetrachloride	0.70	J	1.8	0.14	ppb v/v	2.19		TO-15	Total/NA
Chlorobenzene	0.58	J	0.66	0.14	ppb v/v	2.19		TO-15	Total/NA
Dibromochloromethane	0.83	J	0.88	0.17	ppb v/v	2.19		TO-15	Total/NA
Chloroethane	1.3	J	1.8	0.67	ppb v/v	2.19		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-BKG-02 (Continued)

Lab Sample ID: 320-35129-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	85		0.66	0.21	ppb v/v	2.19		TO-15	Total/NA
Chloromethane	3.3		1.8	0.43	ppb v/v	2.19		TO-15	Total/NA
1,4-Dichlorobenzene	6.1		0.88	0.33	ppb v/v	2.19		TO-15	Total/NA
1,1-Dichloroethane	0.27	J	0.66	0.16	ppb v/v	2.19		TO-15	Total/NA
1,1-Dichloroethene	1.1	J	1.8	0.28	ppb v/v	2.19		TO-15	Total/NA
cis-1,2-Dichloroethene	4.9		0.88	0.19	ppb v/v	2.19		TO-15	Total/NA
Ethylbenzene	17		0.88	0.14	ppb v/v	2.19		TO-15	Total/NA
4-Ethyltoluene	0.47	J	0.88	0.41	ppb v/v	2.19		TO-15	Total/NA
Methylene Chloride	12		0.88	0.16	ppb v/v	2.19		TO-15	Total/NA
Styrene	2.6		0.88	0.13	ppb v/v	2.19		TO-15	Total/NA
Tetrachloroethene	80		0.88	0.11	ppb v/v	2.19		TO-15	Total/NA
Trichloroethene	5.1		0.88	0.23	ppb v/v	2.19		TO-15	Total/NA
Trichlorofluoromethane	0.78	J	0.88	0.43	ppb v/v	2.19		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	5.1		0.88	0.36	ppb v/v	2.19		TO-15	Total/NA
1,2,4-Trimethylbenzene	2.0		1.8	0.35	ppb v/v	2.19		TO-15	Total/NA
1,3,5-Trimethylbenzene	1.1		0.88	0.27	ppb v/v	2.19		TO-15	Total/NA
Vinyl chloride	1.3		0.88	0.26	ppb v/v	2.19		TO-15	Total/NA
m,p-Xylene	13		1.8	0.22	ppb v/v	2.19		TO-15	Total/NA
o-Xylene	3.7		0.88	0.12	ppb v/v	2.19		TO-15	Total/NA
Toluene - DL	130		1.4	0.17	ppb v/v	3.38		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	20	J	26	0.93	ug/m3	2.19		TO-15	Total/NA
Benzene	2.8		2.8	0.55	ug/m3	2.19		TO-15	Total/NA
Bromodichloromethane	40		4.4	0.97	ug/m3	2.19		TO-15	Total/NA
2-Butanone (MEK)	1.9	J	5.2	1.3	ug/m3	2.19		TO-15	Total/NA
Carbon disulfide	140		5.5	0.53	ug/m3	2.19		TO-15	Total/NA
Carbon tetrachloride	4.4	J	11	0.88	ug/m3	2.19		TO-15	Total/NA
Chlorobenzene	2.7	J	3.0	0.65	ug/m3	2.19		TO-15	Total/NA
Dibromochloromethane	7.1	J	7.5	1.5	ug/m3	2.19		TO-15	Total/NA
Chloroethane	3.4	J	4.6	1.8	ug/m3	2.19		TO-15	Total/NA
Chloroform	420		3.2	1.0	ug/m3	2.19		TO-15	Total/NA
Chloromethane	6.8		3.6	0.89	ug/m3	2.19		TO-15	Total/NA
1,4-Dichlorobenzene	37		5.3	2.0	ug/m3	2.19		TO-15	Total/NA
1,1-Dichloroethane	1.1	J	2.7	0.64	ug/m3	2.19		TO-15	Total/NA
1,1-Dichloroethene	4.2	J	6.9	1.1	ug/m3	2.19		TO-15	Total/NA
cis-1,2-Dichloroethene	20		3.5	0.77	ug/m3	2.19		TO-15	Total/NA
Ethylbenzene	72		3.8	0.60	ug/m3	2.19		TO-15	Total/NA
4-Ethyltoluene	2.3	J	4.3	2.0	ug/m3	2.19		TO-15	Total/NA
Methylene Chloride	43		3.0	0.55	ug/m3	2.19		TO-15	Total/NA
Styrene	11		3.7	0.55	ug/m3	2.19		TO-15	Total/NA
Tetrachloroethene	550		5.9	0.76	ug/m3	2.19		TO-15	Total/NA
Trichloroethene	28		4.7	1.2	ug/m3	2.19		TO-15	Total/NA
Trichlorofluoromethane	4.4	J	4.9	2.4	ug/m3	2.19		TO-15	Total/NA
1,1,2-Trichloro-1,2,2-trifluoroethane	39		6.7	2.7	ug/m3	2.19		TO-15	Total/NA
1,2,4-Trimethylbenzene	9.9		8.6	1.7	ug/m3	2.19		TO-15	Total/NA
1,3,5-Trimethylbenzene	5.5		4.3	1.3	ug/m3	2.19		TO-15	Total/NA
Vinyl chloride	3.3		2.2	0.67	ug/m3	2.19		TO-15	Total/NA
m,p-Xylene	57		7.6	0.95	ug/m3	2.19		TO-15	Total/NA
o-Xylene	16		3.8	0.51	ug/m3	2.19		TO-15	Total/NA
Toluene - DL	500		5.1	0.65	ug/m3	3.38		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: DUP-1

Lab Sample ID: 320-35129-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	11	J	45	1.6	ppb v/v	8.93		TO-15	Total/NA
Benzene	1.5	J	3.6	0.71	ppb v/v	8.93		TO-15	Total/NA
Bromodichloromethane	12		2.7	0.59	ppb v/v	8.93		TO-15	Total/NA
Carbon disulfide	80		7.1	0.70	ppb v/v	8.93		TO-15	Total/NA
Dibromochloromethane	1.4	J	3.6	0.71	ppb v/v	8.93		TO-15	Total/NA
Chloroethane	6.5	J	7.1	2.8	ppb v/v	8.93		TO-15	Total/NA
Chloroform	300		2.7	0.85	ppb v/v	8.93		TO-15	Total/NA
Chloromethane	2.3	J	7.1	1.8	ppb v/v	8.93		TO-15	Total/NA
1,1-Dichloroethene	2.1	J	7.1	1.2	ppb v/v	8.93		TO-15	Total/NA
cis-1,2-Dichloroethene	0.79	J	3.6	0.79	ppb v/v	8.93		TO-15	Total/NA
Ethylbenzene	0.72	J	3.6	0.56	ppb v/v	8.93		TO-15	Total/NA
Methylene Chloride	16		3.6	0.64	ppb v/v	8.93		TO-15	Total/NA
Tetrachloroethene	1.8	J	3.6	0.46	ppb v/v	8.93		TO-15	Total/NA
Toluene	310		3.6	0.46	ppb v/v	8.93		TO-15	Total/NA
Trichloroethene	2.5	J	3.6	0.94	ppb v/v	8.93		TO-15	Total/NA
m,p-Xylene	1.3	J	7.1	0.89	ppb v/v	8.93		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	25	J	110	3.8	ug/m3	8.93		TO-15	Total/NA
Benzene	4.7	J	11	2.3	ug/m3	8.93		TO-15	Total/NA
Bromodichloromethane	79		18	3.9	ug/m3	8.93		TO-15	Total/NA
Carbon disulfide	250		22	2.2	ug/m3	8.93		TO-15	Total/NA
Dibromochloromethane	12	J	30	6.0	ug/m3	8.93		TO-15	Total/NA
Chloroethane	17	J	19	7.3	ug/m3	8.93		TO-15	Total/NA
Chloroform	1400		13	4.1	ug/m3	8.93		TO-15	Total/NA
Chloromethane	4.7	J	15	3.6	ug/m3	8.93		TO-15	Total/NA
1,1-Dichloroethene	8.1	J	28	4.6	ug/m3	8.93		TO-15	Total/NA
cis-1,2-Dichloroethene	3.1	J	14	3.2	ug/m3	8.93		TO-15	Total/NA
Ethylbenzene	3.1	J	16	2.4	ug/m3	8.93		TO-15	Total/NA
Methylene Chloride	55		12	2.2	ug/m3	8.93		TO-15	Total/NA
Tetrachloroethene	12	J	24	3.1	ug/m3	8.93		TO-15	Total/NA
Toluene	1200		13	1.7	ug/m3	8.93		TO-15	Total/NA
Trichloroethene	13	J	19	5.0	ug/m3	8.93		TO-15	Total/NA
m,p-Xylene	5.8	J	31	3.9	ug/m3	8.93		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-05

Date Collected: 01/10/18 15:10

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-1

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	39		20	0.70	ppb v/v			01/31/18 16:08	3.93
Benzene	0.35	J	1.6	0.31	ppb v/v			01/31/18 16:08	3.93
Benzyl chloride	1.1	J	3.1	0.64	ppb v/v			01/31/18 16:08	3.93
Bromodichloromethane	9.7		1.2	0.26	ppb v/v			01/31/18 16:08	3.93
Bromoform	ND		1.6	0.28	ppb v/v			01/31/18 16:08	3.93
Bromomethane	ND		3.1	1.3	ppb v/v			01/31/18 16:08	3.93
2-Butanone (MEK)	3.7		3.1	0.78	ppb v/v			01/31/18 16:08	3.93
Carbon disulfide	33		3.1	0.31	ppb v/v			01/31/18 16:08	3.93
Carbon tetrachloride	0.36	J	3.1	0.25	ppb v/v			01/31/18 16:08	3.93
Chlorobenzene	ND		1.2	0.25	ppb v/v			01/31/18 16:08	3.93
Dibromochloromethane	1.3	J	1.6	0.31	ppb v/v			01/31/18 16:08	3.93
Chloroethane	6.3		3.1	1.2	ppb v/v			01/31/18 16:08	3.93
Chloroform	130		1.2	0.37	ppb v/v			01/31/18 16:08	3.93
Chloromethane	7.3		3.1	0.77	ppb v/v			01/31/18 16:08	3.93
1,2-Dibromoethane (EDB)	ND		3.1	0.29	ppb v/v			01/31/18 16:08	3.93
1,2-Dichlorobenzene	ND		1.6	0.51	ppb v/v			01/31/18 16:08	3.93
1,3-Dichlorobenzene	ND		1.6	0.43	ppb v/v			01/31/18 16:08	3.93
1,4-Dichlorobenzene	ND		1.6	0.59	ppb v/v			01/31/18 16:08	3.93
Dichlorodifluoromethane	ND		1.6	0.57	ppb v/v			01/31/18 16:08	3.93
1,1-Dichloroethane	ND		1.2	0.28	ppb v/v			01/31/18 16:08	3.93
1,2-Dichloroethane	ND		3.1	0.35	ppb v/v			01/31/18 16:08	3.93
1,1-Dichloroethene	ND		3.1	0.51	ppb v/v			01/31/18 16:08	3.93
cis-1,2-Dichloroethene	1.6		1.6	0.35	ppb v/v			01/31/18 16:08	3.93
trans-1,2-Dichloroethene	ND		1.6	0.39	ppb v/v			01/31/18 16:08	3.93
1,2-Dichloropropane	ND		1.6	0.94	ppb v/v			01/31/18 16:08	3.93
cis-1,3-Dichloropropene	ND		1.6	0.41	ppb v/v			01/31/18 16:08	3.93
trans-1,3-Dichloropropene	ND		1.6	0.35	ppb v/v			01/31/18 16:08	3.93
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.6	0.61	ppb v/v			01/31/18 16:08	3.93
Ethylbenzene	0.50	J	1.6	0.25	ppb v/v			01/31/18 16:08	3.93
4-Ethyltoluene	ND		1.6	0.73	ppb v/v			01/31/18 16:08	3.93
Hexachlorobutadiene	ND		7.9	1.7	ppb v/v			01/31/18 16:08	3.93
2-Hexanone	ND		1.6	0.34	ppb v/v			01/31/18 16:08	3.93
Methylene Chloride	6.8		1.6	0.28	ppb v/v			01/31/18 16:08	3.93
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.53	ppb v/v			01/31/18 16:08	3.93
Styrene	0.38	J	1.6	0.23	ppb v/v			01/31/18 16:08	3.93
1,1,2,2-Tetrachloroethane	ND		1.6	0.27	ppb v/v			01/31/18 16:08	3.93
Tetrachloroethene	0.21	J	1.6	0.20	ppb v/v			01/31/18 16:08	3.93
Toluene	120		1.6	0.20	ppb v/v			01/31/18 16:08	3.93
1,2,4-Trichlorobenzene	ND		7.9	1.7	ppb v/v			01/31/18 16:08	3.93
1,1,1-Trichloroethane	ND		1.2	0.26	ppb v/v			01/31/18 16:08	3.93
1,1,2-Trichloroethane	ND		1.6	0.26	ppb v/v			01/31/18 16:08	3.93
Trichloroethene	1.1	J	1.6	0.41	ppb v/v			01/31/18 16:08	3.93
Trichlorofluoromethane	ND		1.6	0.77	ppb v/v			01/31/18 16:08	3.93
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.6	0.64	ppb v/v			01/31/18 16:08	3.93
1,2,4-Trimethylbenzene	ND		3.1	0.64	ppb v/v			01/31/18 16:08	3.93
1,3,5-Trimethylbenzene	ND		1.6	0.49	ppb v/v			01/31/18 16:08	3.93
Vinyl acetate	ND		3.1	0.57	ppb v/v			01/31/18 16:08	3.93
Vinyl chloride	ND		1.6	0.47	ppb v/v			01/31/18 16:08	3.93

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-05

Lab Sample ID: 320-35129-1

Date Collected: 01/10/18 15:10

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.76	J	3.1	0.39	ppb v/v			01/31/18 16:08	3.93
o-Xylene	0.33	J	1.6	0.21	ppb v/v			01/31/18 16:08	3.93
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	92		47	1.7	ug/m3			01/31/18 16:08	3.93
Benzene	1.1	J	5.0	0.99	ug/m3			01/31/18 16:08	3.93
Benzyl chloride	5.5	J	16	3.3	ug/m3			01/31/18 16:08	3.93
Bromodichloromethane	65		7.9	1.7	ug/m3			01/31/18 16:08	3.93
Bromoform	ND		16	2.8	ug/m3			01/31/18 16:08	3.93
Bromomethane	ND		12	5.1	ug/m3			01/31/18 16:08	3.93
2-Butanone (MEK)	11		9.3	2.3	ug/m3			01/31/18 16:08	3.93
Carbon disulfide	100		9.8	0.95	ug/m3			01/31/18 16:08	3.93
Carbon tetrachloride	2.2	J	20	1.6	ug/m3			01/31/18 16:08	3.93
Chlorobenzene	ND		5.4	1.2	ug/m3			01/31/18 16:08	3.93
Dibromochloromethane	11	J	13	2.6	ug/m3			01/31/18 16:08	3.93
Chloroethane	17		8.3	3.2	ug/m3			01/31/18 16:08	3.93
Chloroform	630		5.8	1.8	ug/m3			01/31/18 16:08	3.93
Chloromethane	15		6.5	1.6	ug/m3			01/31/18 16:08	3.93
1,2-Dibromoethane (EDB)	ND		24	2.3	ug/m3			01/31/18 16:08	3.93
1,2-Dichlorobenzene	ND		9.5	3.1	ug/m3			01/31/18 16:08	3.93
1,3-Dichlorobenzene	ND		9.5	2.6	ug/m3			01/31/18 16:08	3.93
1,4-Dichlorobenzene	ND		9.5	3.5	ug/m3			01/31/18 16:08	3.93
Dichlorodifluoromethane	ND		7.8	2.8	ug/m3			01/31/18 16:08	3.93
1,1-Dichloroethane	ND		4.8	1.1	ug/m3			01/31/18 16:08	3.93
1,2-Dichloroethane	ND		13	1.4	ug/m3			01/31/18 16:08	3.93
1,1-Dichloroethene	ND		12	2.0	ug/m3			01/31/18 16:08	3.93
cis-1,2-Dichloroethene	6.3		6.2	1.4	ug/m3			01/31/18 16:08	3.93
trans-1,2-Dichloroethene	ND		6.2	1.6	ug/m3			01/31/18 16:08	3.93
1,2-Dichloropropane	ND		7.3	4.4	ug/m3			01/31/18 16:08	3.93
cis-1,3-Dichloropropene	ND		7.1	1.9	ug/m3			01/31/18 16:08	3.93
trans-1,3-Dichloropropene	ND		7.1	1.6	ug/m3			01/31/18 16:08	3.93
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		11	4.3	ug/m3			01/31/18 16:08	3.93
Ethylbenzene	2.2	J	6.8	1.1	ug/m3			01/31/18 16:08	3.93
4-Ethyltoluene	ND		7.7	3.6	ug/m3			01/31/18 16:08	3.93
Hexachlorobutadiene	ND		84	18	ug/m3			01/31/18 16:08	3.93
2-Hexanone	ND		6.4	1.4	ug/m3			01/31/18 16:08	3.93
Methylene Chloride	24		5.5	0.98	ug/m3			01/31/18 16:08	3.93
4-Methyl-2-pentanone (MIBK)	ND		6.4	2.2	ug/m3			01/31/18 16:08	3.93
Styrene	1.6	J	6.7	0.99	ug/m3			01/31/18 16:08	3.93
1,1,2,2-Tetrachloroethane	ND		11	1.9	ug/m3			01/31/18 16:08	3.93
Tetrachloroethene	1.4	J	11	1.4	ug/m3			01/31/18 16:08	3.93
Toluene	460		5.9	0.76	ug/m3			01/31/18 16:08	3.93
1,2,4-Trichlorobenzene	ND		58	13	ug/m3			01/31/18 16:08	3.93
1,1,1-Trichloroethane	ND		6.4	1.4	ug/m3			01/31/18 16:08	3.93
1,1,2-Trichloroethane	ND		8.6	1.4	ug/m3			01/31/18 16:08	3.93
Trichloroethene	5.9	J	8.4	2.2	ug/m3			01/31/18 16:08	3.93
Trichlorofluoromethane	ND		8.8	4.3	ug/m3			01/31/18 16:08	3.93
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		12	4.9	ug/m3			01/31/18 16:08	3.93
1,2,4-Trimethylbenzene	ND		15	3.1	ug/m3			01/31/18 16:08	3.93

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-05

Date Collected: 01/10/18 15:10

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-1

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND		7.7	2.4	ug/m3			01/31/18 16:08	3.93
Vinyl acetate	ND		11	2.0	ug/m3			01/31/18 16:08	3.93
Vinyl chloride	ND		4.0	1.2	ug/m3			01/31/18 16:08	3.93
m,p-Xylene	3.3	J	14	1.7	ug/m3			01/31/18 16:08	3.93
o-Xylene	1.4	J	6.8	0.92	ug/m3			01/31/18 16:08	3.93

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130		01/31/18 16:08	3.93
1,2-Dichloroethane-d4 (Surr)	100		70 - 130		01/31/18 16:08	3.93
Toluene-d8 (Surr)	100		70 - 130		01/31/18 16:08	3.93

Client Sample ID: HOU-06

Date Collected: 01/10/18 15:00

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	260		51	1.8	ppb v/v			01/30/18 18:17	10.1
Benzene	ND		4.0	0.80	ppb v/v			01/30/18 18:17	10.1
Benzyl chloride	ND		8.1	1.6	ppb v/v			01/30/18 18:17	10.1
Bromodichloromethane	8.4		3.0	0.67	ppb v/v			01/30/18 18:17	10.1
Bromoform	ND		4.0	0.71	ppb v/v			01/30/18 18:17	10.1
Bromomethane	ND		8.1	3.4	ppb v/v			01/30/18 18:17	10.1
2-Butanone (MEK)	15		8.1	2.0	ppb v/v			01/30/18 18:17	10.1
Carbon disulfide	110		8.1	0.79	ppb v/v			01/30/18 18:17	10.1
Carbon tetrachloride	ND		8.1	0.65	ppb v/v			01/30/18 18:17	10.1
Chlorobenzene	0.69	J	3.0	0.65	ppb v/v			01/30/18 18:17	10.1
Dibromochloromethane	1.1	J	4.0	0.80	ppb v/v			01/30/18 18:17	10.1
Chloroethane	18		8.1	3.1	ppb v/v			01/30/18 18:17	10.1
Chloroform	400		3.0	0.96	ppb v/v			01/30/18 18:17	10.1
Chloromethane	50		8.1	2.0	ppb v/v			01/30/18 18:17	10.1
1,2-Dibromoethane (EDB)	ND		8.1	0.76	ppb v/v			01/30/18 18:17	10.1
1,2-Dichlorobenzene	ND		4.0	1.3	ppb v/v			01/30/18 18:17	10.1
1,3-Dichlorobenzene	ND		4.0	1.1	ppb v/v			01/30/18 18:17	10.1
1,4-Dichlorobenzene	ND		4.0	1.5	ppb v/v			01/30/18 18:17	10.1
Dichlorodifluoromethane	ND		4.0	1.5	ppb v/v			01/30/18 18:17	10.1
1,1-Dichloroethane	ND		3.0	0.73	ppb v/v			01/30/18 18:17	10.1
1,2-Dichloroethane	ND		8.1	0.89	ppb v/v			01/30/18 18:17	10.1
1,1-Dichloroethene	ND		8.1	1.3	ppb v/v			01/30/18 18:17	10.1
cis-1,2-Dichloroethene	4.0		4.0	0.90	ppb v/v			01/30/18 18:17	10.1
trans-1,2-Dichloroethene	ND		4.0	1.0	ppb v/v			01/30/18 18:17	10.1
1,2-Dichloropropane	ND		4.0	2.4	ppb v/v			01/30/18 18:17	10.1
cis-1,3-Dichloropropene	ND		4.0	1.1	ppb v/v			01/30/18 18:17	10.1
trans-1,3-Dichloropropene	ND		4.0	0.89	ppb v/v			01/30/18 18:17	10.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.0	1.6	ppb v/v			01/30/18 18:17	10.1
Ethylbenzene	ND		4.0	0.64	ppb v/v			01/30/18 18:17	10.1
4-Ethyltoluene	ND		4.0	1.9	ppb v/v			01/30/18 18:17	10.1
Hexachlorobutadiene	ND		20	4.4	ppb v/v			01/30/18 18:17	10.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-06

Date Collected: 01/10/18 15:00

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		4.0	0.88	ppb v/v			01/30/18 18:17	10.1
Methylene Chloride	18		4.0	0.73	ppb v/v			01/30/18 18:17	10.1
4-Methyl-2-pentanone (MIBK)	ND		4.0	1.4	ppb v/v			01/30/18 18:17	10.1
Styrene	ND		4.0	0.60	ppb v/v			01/30/18 18:17	10.1
1,1,2,2-Tetrachloroethane	ND		4.0	0.70	ppb v/v			01/30/18 18:17	10.1
Tetrachloroethene	0.80	J	4.0	0.52	ppb v/v			01/30/18 18:17	10.1
Toluene	380		4.0	0.52	ppb v/v			01/30/18 18:17	10.1
1,2,4-Trichlorobenzene	ND		20	4.4	ppb v/v			01/30/18 18:17	10.1
1,1,1-Trichloroethane	ND		3.0	0.66	ppb v/v			01/30/18 18:17	10.1
1,1,2-Trichloroethane	ND		4.0	0.68	ppb v/v			01/30/18 18:17	10.1
Trichloroethene	ND		4.0	1.1	ppb v/v			01/30/18 18:17	10.1
Trichlorofluoromethane	ND		4.0	2.0	ppb v/v			01/30/18 18:17	10.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		4.0	1.6	ppb v/v			01/30/18 18:17	10.1
1,2,4-Trimethylbenzene	ND		8.1	1.6	ppb v/v			01/30/18 18:17	10.1
1,3,5-Trimethylbenzene	ND		4.0	1.3	ppb v/v			01/30/18 18:17	10.1
Vinyl acetate	ND		8.1	1.5	ppb v/v			01/30/18 18:17	10.1
Vinyl chloride	ND		4.0	1.2	ppb v/v			01/30/18 18:17	10.1
m,p-Xylene	ND		8.1	1.0	ppb v/v			01/30/18 18:17	10.1
o-Xylene	ND		4.0	0.55	ppb v/v			01/30/18 18:17	10.1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	620		120	4.3	ug/m3			01/30/18 18:17	10.1
Benzene	ND		13	2.5	ug/m3			01/30/18 18:17	10.1
Benzyl chloride	ND		42	8.5	ug/m3			01/30/18 18:17	10.1
Bromodichloromethane	56		20	4.5	ug/m3			01/30/18 18:17	10.1
Bromoform	ND		42	7.3	ug/m3			01/30/18 18:17	10.1
Bromomethane	ND		31	13	ug/m3			01/30/18 18:17	10.1
2-Butanone (MEK)	43		24	5.9	ug/m3			01/30/18 18:17	10.1
Carbon disulfide	340		25	2.5	ug/m3			01/30/18 18:17	10.1
Carbon tetrachloride	ND		51	4.1	ug/m3			01/30/18 18:17	10.1
Chlorobenzene	3.2	J	14	3.0	ug/m3			01/30/18 18:17	10.1
Dibromochloromethane	9.0	J	34	6.8	ug/m3			01/30/18 18:17	10.1
Chloroethane	48		21	8.2	ug/m3			01/30/18 18:17	10.1
Chloroform	2000		15	4.7	ug/m3			01/30/18 18:17	10.1
Chloromethane	100		17	4.1	ug/m3			01/30/18 18:17	10.1
1,2-Dibromoethane (EDB)	ND		62	5.8	ug/m3			01/30/18 18:17	10.1
1,2-Dichlorobenzene	ND		24	7.9	ug/m3			01/30/18 18:17	10.1
1,3-Dichlorobenzene	ND		24	6.7	ug/m3			01/30/18 18:17	10.1
1,4-Dichlorobenzene	ND		24	9.0	ug/m3			01/30/18 18:17	10.1
Dichlorodifluoromethane	ND		20	7.2	ug/m3			01/30/18 18:17	10.1
1,1-Dichloroethane	ND		12	2.9	ug/m3			01/30/18 18:17	10.1
1,2-Dichloroethane	ND		33	3.6	ug/m3			01/30/18 18:17	10.1
1,1-Dichloroethene	ND		32	5.2	ug/m3			01/30/18 18:17	10.1
cis-1,2-Dichloroethene	16		16	3.6	ug/m3			01/30/18 18:17	10.1
trans-1,2-Dichloroethene	ND		16	4.0	ug/m3			01/30/18 18:17	10.1
1,2-Dichloropropane	ND		19	11	ug/m3			01/30/18 18:17	10.1
cis-1,3-Dichloropropene	ND		18	4.8	ug/m3			01/30/18 18:17	10.1
trans-1,3-Dichloropropene	ND		18	4.0	ug/m3			01/30/18 18:17	10.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		28	11	ug/m3			01/30/18 18:17	10.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-06

Date Collected: 01/10/18 15:00

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		18	2.8	ug/m3			01/30/18 18:17	10.1
4-Ethyltoluene	ND		20	9.3	ug/m3			01/30/18 18:17	10.1
Hexachlorobutadiene	ND		220	47	ug/m3			01/30/18 18:17	10.1
2-Hexanone	ND		17	3.6	ug/m3			01/30/18 18:17	10.1
Methylene Chloride	61		14	2.5	ug/m3			01/30/18 18:17	10.1
4-Methyl-2-pentanone (MIBK)	ND		17	5.6	ug/m3			01/30/18 18:17	10.1
Styrene	ND		17	2.5	ug/m3			01/30/18 18:17	10.1
1,1,2,2-Tetrachloroethane	ND		28	4.8	ug/m3			01/30/18 18:17	10.1
Tetrachloroethene	5.4	J	27	3.5	ug/m3			01/30/18 18:17	10.1
Toluene	1400		15	1.9	ug/m3			01/30/18 18:17	10.1
1,2,4-Trichlorobenzene	ND		150	32	ug/m3			01/30/18 18:17	10.1
1,1,1-Trichloroethane	ND		17	3.6	ug/m3			01/30/18 18:17	10.1
1,1,2-Trichloroethane	ND		22	3.7	ug/m3			01/30/18 18:17	10.1
Trichloroethene	ND		22	5.7	ug/m3			01/30/18 18:17	10.1
Trichlorofluoromethane	ND		23	11	ug/m3			01/30/18 18:17	10.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		31	13	ug/m3			01/30/18 18:17	10.1
1,2,4-Trimethylbenzene	ND		40	8.0	ug/m3			01/30/18 18:17	10.1
1,3,5-Trimethylbenzene	ND		20	6.2	ug/m3			01/30/18 18:17	10.1
Vinyl acetate	ND		28	5.2	ug/m3			01/30/18 18:17	10.1
Vinyl chloride	ND		10	3.1	ug/m3			01/30/18 18:17	10.1
m,p-Xylene	ND		35	4.4	ug/m3			01/30/18 18:17	10.1
o-Xylene	ND		18	2.4	ug/m3			01/30/18 18:17	10.1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		70 - 130					01/30/18 18:17	10.1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					01/30/18 18:17	10.1
Toluene-d8 (Surr)	100		70 - 130					01/30/18 18:17	10.1

Client Sample ID: HOU-07

Date Collected: 01/10/18 15:25

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-3

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20		5.0	0.18	ppb v/v			01/30/18 19:19	1
Benzene	0.34	J	0.40	0.079	ppb v/v			01/30/18 19:19	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/30/18 19:19	1
Bromodichloromethane	6.3		0.30	0.066	ppb v/v			01/30/18 19:19	1
Bromoform	ND		0.40	0.070	ppb v/v			01/30/18 19:19	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/30/18 19:19	1
2-Butanone (MEK)	1.8		0.80	0.20	ppb v/v			01/30/18 19:19	1
Carbon disulfide	20		0.80	0.078	ppb v/v			01/30/18 19:19	1
Carbon tetrachloride	0.092	J	0.80	0.064	ppb v/v			01/30/18 19:19	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			01/30/18 19:19	1
Dibromochloromethane	0.95		0.40	0.079	ppb v/v			01/30/18 19:19	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/30/18 19:19	1
Chloroform	29		0.30	0.095	ppb v/v			01/30/18 19:19	1
Chloromethane	1.2		0.80	0.20	ppb v/v			01/30/18 19:19	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-07

Date Collected: 01/10/18 15:25

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-3

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/30/18 19:19	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/30/18 19:19	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/30/18 19:19	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			01/30/18 19:19	1
Dichlorodifluoromethane	0.58		0.40	0.15	ppb v/v			01/30/18 19:19	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/30/18 19:19	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			01/30/18 19:19	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/30/18 19:19	1
cis-1,2-Dichloroethene	47		0.40	0.089	ppb v/v			01/30/18 19:19	1
trans-1,2-Dichloroethene	0.66		0.40	0.10	ppb v/v			01/30/18 19:19	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/30/18 19:19	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/30/18 19:19	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/30/18 19:19	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 19:19	1
Ethylbenzene	0.15	J	0.40	0.063	ppb v/v			01/30/18 19:19	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/30/18 19:19	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/30/18 19:19	1
2-Hexanone	ND		0.40	0.087	ppb v/v			01/30/18 19:19	1
Methylene Chloride	2.1		0.40	0.072	ppb v/v			01/30/18 19:19	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/30/18 19:19	1
Styrene	0.093	J	0.40	0.059	ppb v/v			01/30/18 19:19	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/30/18 19:19	1
Tetrachloroethene	21		0.40	0.051	ppb v/v			01/30/18 19:19	1
Toluene	6.5		0.40	0.051	ppb v/v			01/30/18 19:19	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/30/18 19:19	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/30/18 19:19	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/30/18 19:19	1
Trichloroethene	3.6		0.40	0.11	ppb v/v			01/30/18 19:19	1
Trichlorofluoromethane	0.23	J	0.40	0.20	ppb v/v			01/30/18 19:19	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 19:19	1
1,2,4-Trimethylbenzene	0.17	J	0.80	0.16	ppb v/v			01/30/18 19:19	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			01/30/18 19:19	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			01/30/18 19:19	1
Vinyl chloride	5.1		0.40	0.12	ppb v/v			01/30/18 19:19	1
m,p-Xylene	0.37	J	0.80	0.10	ppb v/v			01/30/18 19:19	1
o-Xylene	0.20	J	0.40	0.054	ppb v/v			01/30/18 19:19	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	47		12	0.42	ug/m3			01/30/18 19:19	1
Benzene	1.1	J	1.3	0.25	ug/m3			01/30/18 19:19	1
Benzyl chloride	ND		4.1	0.84	ug/m3			01/30/18 19:19	1
Bromodichloromethane	42		2.0	0.44	ug/m3			01/30/18 19:19	1
Bromoform	ND		4.1	0.72	ug/m3			01/30/18 19:19	1
Bromomethane	ND		3.1	1.3	ug/m3			01/30/18 19:19	1
2-Butanone (MEK)	5.4		2.4	0.59	ug/m3			01/30/18 19:19	1
Carbon disulfide	62		2.5	0.24	ug/m3			01/30/18 19:19	1
Carbon tetrachloride	0.58	J	5.0	0.40	ug/m3			01/30/18 19:19	1
Chlorobenzene	ND		1.4	0.29	ug/m3			01/30/18 19:19	1
Dibromochloromethane	8.1		3.4	0.67	ug/m3			01/30/18 19:19	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-07

Date Collected: 01/10/18 15:25

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-3

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		2.1	0.81	ug/m3			01/30/18 19:19	1
Chloroform	140		1.5	0.46	ug/m3			01/30/18 19:19	1
Chloromethane	2.4		1.7	0.41	ug/m3			01/30/18 19:19	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			01/30/18 19:19	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			01/30/18 19:19	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			01/30/18 19:19	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			01/30/18 19:19	1
Dichlorodifluoromethane	2.9		2.0	0.72	ug/m3			01/30/18 19:19	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			01/30/18 19:19	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			01/30/18 19:19	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			01/30/18 19:19	1
cis-1,2-Dichloroethene	190		1.6	0.35	ug/m3			01/30/18 19:19	1
trans-1,2-Dichloroethene	2.6		1.6	0.40	ug/m3			01/30/18 19:19	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			01/30/18 19:19	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			01/30/18 19:19	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			01/30/18 19:19	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			01/30/18 19:19	1
Ethylbenzene	0.65 J		1.7	0.27	ug/m3			01/30/18 19:19	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			01/30/18 19:19	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			01/30/18 19:19	1
2-Hexanone	ND		1.6	0.36	ug/m3			01/30/18 19:19	1
Methylene Chloride	7.2		1.4	0.25	ug/m3			01/30/18 19:19	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			01/30/18 19:19	1
Styrene	0.39 J		1.7	0.25	ug/m3			01/30/18 19:19	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			01/30/18 19:19	1
Tetrachloroethene	140		2.7	0.35	ug/m3			01/30/18 19:19	1
Toluene	24		1.5	0.19	ug/m3			01/30/18 19:19	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			01/30/18 19:19	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			01/30/18 19:19	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			01/30/18 19:19	1
Trichloroethene	19		2.1	0.56	ug/m3			01/30/18 19:19	1
Trichlorofluoromethane	1.3 J		2.2	1.1	ug/m3			01/30/18 19:19	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			01/30/18 19:19	1
1,2,4-Trimethylbenzene	0.83 J		3.9	0.80	ug/m3			01/30/18 19:19	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			01/30/18 19:19	1
Vinyl acetate	ND		2.8	0.51	ug/m3			01/30/18 19:19	1
Vinyl chloride	13		1.0	0.31	ug/m3			01/30/18 19:19	1
m,p-Xylene	1.6 J		3.5	0.43	ug/m3			01/30/18 19:19	1
o-Xylene	0.86 J		1.7	0.23	ug/m3			01/30/18 19:19	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130		01/30/18 19:19	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130		01/30/18 19:19	1
Toluene-d8 (Surr)	102		70 - 130		01/30/18 19:19	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-07B

Lab Sample ID: 320-35129-4

Date Collected: 01/10/18 15:27

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	16		5.0	0.18	ppb v/v			01/30/18 20:18	1
Benzene	0.46		0.40	0.079	ppb v/v			01/30/18 20:18	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/30/18 20:18	1
Bromodichloromethane	6.1		0.30	0.066	ppb v/v			01/30/18 20:18	1
Bromoform	ND		0.40	0.070	ppb v/v			01/30/18 20:18	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/30/18 20:18	1
2-Butanone (MEK)	1.6		0.80	0.20	ppb v/v			01/30/18 20:18	1
Carbon disulfide	56		0.80	0.078	ppb v/v			01/30/18 20:18	1
Carbon tetrachloride	0.085	J	0.80	0.064	ppb v/v			01/30/18 20:18	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			01/30/18 20:18	1
Dibromochloromethane	0.96		0.40	0.079	ppb v/v			01/30/18 20:18	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/30/18 20:18	1
Chloroform	25		0.30	0.095	ppb v/v			01/30/18 20:18	1
Chloromethane	1.3		0.80	0.20	ppb v/v			01/30/18 20:18	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/30/18 20:18	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/30/18 20:18	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/30/18 20:18	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			01/30/18 20:18	1
Dichlorodifluoromethane	0.79		0.40	0.15	ppb v/v			01/30/18 20:18	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/30/18 20:18	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			01/30/18 20:18	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/30/18 20:18	1
cis-1,2-Dichloroethene	52		0.40	0.089	ppb v/v			01/30/18 20:18	1
trans-1,2-Dichloroethene	0.48		0.40	0.10	ppb v/v			01/30/18 20:18	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/30/18 20:18	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/30/18 20:18	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/30/18 20:18	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 20:18	1
Ethylbenzene	0.17	J	0.40	0.063	ppb v/v			01/30/18 20:18	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/30/18 20:18	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/30/18 20:18	1
2-Hexanone	ND		0.40	0.087	ppb v/v			01/30/18 20:18	1
Methylene Chloride	2.1		0.40	0.072	ppb v/v			01/30/18 20:18	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/30/18 20:18	1
Styrene	ND		0.40	0.059	ppb v/v			01/30/18 20:18	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/30/18 20:18	1
Tetrachloroethene	1.5		0.40	0.051	ppb v/v			01/30/18 20:18	1
Toluene	5.8		0.40	0.051	ppb v/v			01/30/18 20:18	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/30/18 20:18	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/30/18 20:18	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/30/18 20:18	1
Trichloroethene	0.78		0.40	0.11	ppb v/v			01/30/18 20:18	1
Trichlorofluoromethane	0.25	J	0.40	0.20	ppb v/v			01/30/18 20:18	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 20:18	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			01/30/18 20:18	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			01/30/18 20:18	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			01/30/18 20:18	1
Vinyl chloride	4.4		0.40	0.12	ppb v/v			01/30/18 20:18	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-07B

Lab Sample ID: 320-35129-4

Date Collected: 01/10/18 15:27

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.32	J	0.80	0.10	ppb v/v			01/30/18 20:18	1
o-Xylene	0.16	J	0.40	0.054	ppb v/v			01/30/18 20:18	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	37		12	0.42	ug/m3			01/30/18 20:18	1
Benzene	1.5		1.3	0.25	ug/m3			01/30/18 20:18	1
Benzyl chloride	ND		4.1	0.84	ug/m3			01/30/18 20:18	1
Bromodichloromethane	41		2.0	0.44	ug/m3			01/30/18 20:18	1
Bromoform	ND		4.1	0.72	ug/m3			01/30/18 20:18	1
Bromomethane	ND		3.1	1.3	ug/m3			01/30/18 20:18	1
2-Butanone (MEK)	4.7		2.4	0.59	ug/m3			01/30/18 20:18	1
Carbon disulfide	180		2.5	0.24	ug/m3			01/30/18 20:18	1
Carbon tetrachloride	0.53	J	5.0	0.40	ug/m3			01/30/18 20:18	1
Chlorobenzene	ND		1.4	0.29	ug/m3			01/30/18 20:18	1
Dibromochloromethane	8.1		3.4	0.67	ug/m3			01/30/18 20:18	1
Chloroethane	ND		2.1	0.81	ug/m3			01/30/18 20:18	1
Chloroform	120		1.5	0.46	ug/m3			01/30/18 20:18	1
Chloromethane	2.6		1.7	0.41	ug/m3			01/30/18 20:18	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			01/30/18 20:18	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			01/30/18 20:18	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			01/30/18 20:18	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			01/30/18 20:18	1
Dichlorodifluoromethane	3.9		2.0	0.72	ug/m3			01/30/18 20:18	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			01/30/18 20:18	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			01/30/18 20:18	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			01/30/18 20:18	1
cis-1,2-Dichloroethene	200		1.6	0.35	ug/m3			01/30/18 20:18	1
trans-1,2-Dichloroethene	1.9		1.6	0.40	ug/m3			01/30/18 20:18	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			01/30/18 20:18	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			01/30/18 20:18	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			01/30/18 20:18	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			01/30/18 20:18	1
Ethylbenzene	0.74	J	1.7	0.27	ug/m3			01/30/18 20:18	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			01/30/18 20:18	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			01/30/18 20:18	1
2-Hexanone	ND		1.6	0.36	ug/m3			01/30/18 20:18	1
Methylene Chloride	7.3		1.4	0.25	ug/m3			01/30/18 20:18	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			01/30/18 20:18	1
Styrene	ND		1.7	0.25	ug/m3			01/30/18 20:18	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			01/30/18 20:18	1
Tetrachloroethene	10		2.7	0.35	ug/m3			01/30/18 20:18	1
Toluene	22		1.5	0.19	ug/m3			01/30/18 20:18	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			01/30/18 20:18	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			01/30/18 20:18	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			01/30/18 20:18	1
Trichloroethene	4.2		2.1	0.56	ug/m3			01/30/18 20:18	1
Trichlorofluoromethane	1.4	J	2.2	1.1	ug/m3			01/30/18 20:18	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			01/30/18 20:18	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			01/30/18 20:18	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-07B

Lab Sample ID: 320-35129-4

Date Collected: 01/10/18 15:27

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			01/30/18 20:18	1
Vinyl acetate	ND		2.8	0.51	ug/m3			01/30/18 20:18	1
Vinyl chloride	11		1.0	0.31	ug/m3			01/30/18 20:18	1
m,p-Xylene	1.4	J	3.5	0.43	ug/m3			01/30/18 20:18	1
o-Xylene	0.68	J	1.7	0.23	ug/m3			01/30/18 20:18	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					01/30/18 20:18	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					01/30/18 20:18	1
Toluene-d8 (Surr)	101		70 - 130					01/30/18 20:18	1

Client Sample ID: HOU-08

Lab Sample ID: 320-35129-5

Date Collected: 01/10/18 15:40

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	30		5.0	0.18	ppb v/v			01/30/18 21:16	1
Benzene	0.27	J	0.40	0.079	ppb v/v			01/30/18 21:16	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/30/18 21:16	1
Bromodichloromethane	0.49		0.30	0.066	ppb v/v			01/30/18 21:16	1
Bromoform	ND		0.40	0.070	ppb v/v			01/30/18 21:16	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/30/18 21:16	1
2-Butanone (MEK)	1.2		0.80	0.20	ppb v/v			01/30/18 21:16	1
Carbon disulfide	4.2		0.80	0.078	ppb v/v			01/30/18 21:16	1
Carbon tetrachloride	0.11	J	0.80	0.064	ppb v/v			01/30/18 21:16	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			01/30/18 21:16	1
Dibromochloromethane	0.093	J	0.40	0.079	ppb v/v			01/30/18 21:16	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/30/18 21:16	1
Chloroform	6.3		0.30	0.095	ppb v/v			01/30/18 21:16	1
Chloromethane	0.69	J	0.80	0.20	ppb v/v			01/30/18 21:16	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/30/18 21:16	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/30/18 21:16	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/30/18 21:16	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			01/30/18 21:16	1
Dichlorodifluoromethane	0.44		0.40	0.15	ppb v/v			01/30/18 21:16	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/30/18 21:16	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			01/30/18 21:16	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/30/18 21:16	1
cis-1,2-Dichloroethene	2.8		0.40	0.089	ppb v/v			01/30/18 21:16	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			01/30/18 21:16	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/30/18 21:16	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/30/18 21:16	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/30/18 21:16	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 21:16	1
Ethylbenzene	0.094	J	0.40	0.063	ppb v/v			01/30/18 21:16	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/30/18 21:16	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/30/18 21:16	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-08

Date Collected: 01/10/18 15:40

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-5

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		0.40	0.087	ppb v/v			01/30/18 21:16	1
Methylene Chloride	0.39	J	0.40	0.072	ppb v/v			01/30/18 21:16	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/30/18 21:16	1
Styrene	ND		0.40	0.059	ppb v/v			01/30/18 21:16	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/30/18 21:16	1
Tetrachloroethene	15		0.40	0.051	ppb v/v			01/30/18 21:16	1
Toluene	2.0		0.40	0.051	ppb v/v			01/30/18 21:16	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/30/18 21:16	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/30/18 21:16	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/30/18 21:16	1
Trichloroethene	1.8		0.40	0.11	ppb v/v			01/30/18 21:16	1
Trichlorofluoromethane	0.26	J	0.40	0.20	ppb v/v			01/30/18 21:16	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 21:16	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			01/30/18 21:16	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			01/30/18 21:16	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			01/30/18 21:16	1
Vinyl chloride	0.16	J	0.40	0.12	ppb v/v			01/30/18 21:16	1
m,p-Xylene	0.28	J	0.80	0.10	ppb v/v			01/30/18 21:16	1
o-Xylene	0.12	J	0.40	0.054	ppb v/v			01/30/18 21:16	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	71		12	0.42	ug/m3			01/30/18 21:16	1
Benzene	0.85	J	1.3	0.25	ug/m3			01/30/18 21:16	1
Benzyl chloride	ND		4.1	0.84	ug/m3			01/30/18 21:16	1
Bromodichloromethane	3.3		2.0	0.44	ug/m3			01/30/18 21:16	1
Bromoform	ND		4.1	0.72	ug/m3			01/30/18 21:16	1
Bromomethane	ND		3.1	1.3	ug/m3			01/30/18 21:16	1
2-Butanone (MEK)	3.4		2.4	0.59	ug/m3			01/30/18 21:16	1
Carbon disulfide	13		2.5	0.24	ug/m3			01/30/18 21:16	1
Carbon tetrachloride	0.72	J	5.0	0.40	ug/m3			01/30/18 21:16	1
Chlorobenzene	ND		1.4	0.29	ug/m3			01/30/18 21:16	1
Dibromochloromethane	0.80	J	3.4	0.67	ug/m3			01/30/18 21:16	1
Chloroethane	ND		2.1	0.81	ug/m3			01/30/18 21:16	1
Chloroform	31		1.5	0.46	ug/m3			01/30/18 21:16	1
Chloromethane	1.4	J	1.7	0.41	ug/m3			01/30/18 21:16	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			01/30/18 21:16	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			01/30/18 21:16	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			01/30/18 21:16	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			01/30/18 21:16	1
Dichlorodifluoromethane	2.2		2.0	0.72	ug/m3			01/30/18 21:16	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			01/30/18 21:16	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			01/30/18 21:16	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			01/30/18 21:16	1
cis-1,2-Dichloroethene	11		1.6	0.35	ug/m3			01/30/18 21:16	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			01/30/18 21:16	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			01/30/18 21:16	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			01/30/18 21:16	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			01/30/18 21:16	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			01/30/18 21:16	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-08

Date Collected: 01/10/18 15:40

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-5

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	0.41	J	1.7	0.27	ug/m3			01/30/18 21:16	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			01/30/18 21:16	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			01/30/18 21:16	1
2-Hexanone	ND		1.6	0.36	ug/m3			01/30/18 21:16	1
Methylene Chloride	1.4	J	1.4	0.25	ug/m3			01/30/18 21:16	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			01/30/18 21:16	1
Styrene	ND		1.7	0.25	ug/m3			01/30/18 21:16	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			01/30/18 21:16	1
Tetrachloroethene	100		2.7	0.35	ug/m3			01/30/18 21:16	1
Toluene	7.6		1.5	0.19	ug/m3			01/30/18 21:16	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			01/30/18 21:16	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			01/30/18 21:16	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			01/30/18 21:16	1
Trichloroethene	9.6		2.1	0.56	ug/m3			01/30/18 21:16	1
Trichlorofluoromethane	1.5	J	2.2	1.1	ug/m3			01/30/18 21:16	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			01/30/18 21:16	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			01/30/18 21:16	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			01/30/18 21:16	1
Vinyl acetate	ND		2.8	0.51	ug/m3			01/30/18 21:16	1
Vinyl chloride	0.42	J	1.0	0.31	ug/m3			01/30/18 21:16	1
m,p-Xylene	1.2	J	3.5	0.43	ug/m3			01/30/18 21:16	1
o-Xylene	0.54	J	1.7	0.23	ug/m3			01/30/18 21:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130					01/30/18 21:16	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					01/30/18 21:16	1
Toluene-d8 (Surr)	100		70 - 130					01/30/18 21:16	1

Client Sample ID: HOU-08B

Date Collected: 01/10/18 15:50

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-6

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	15		5.0	0.18	ppb v/v			01/30/18 22:16	1
Benzene	0.20	J	0.40	0.079	ppb v/v			01/30/18 22:16	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/30/18 22:16	1
Bromodichloromethane	0.39		0.30	0.066	ppb v/v			01/30/18 22:16	1
Bromoform	ND		0.40	0.070	ppb v/v			01/30/18 22:16	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/30/18 22:16	1
2-Butanone (MEK)	1.3		0.80	0.20	ppb v/v			01/30/18 22:16	1
Carbon disulfide	0.90		0.80	0.078	ppb v/v			01/30/18 22:16	1
Carbon tetrachloride	0.11	J	0.80	0.064	ppb v/v			01/30/18 22:16	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			01/30/18 22:16	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			01/30/18 22:16	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/30/18 22:16	1
Chloroform	3.6		0.30	0.095	ppb v/v			01/30/18 22:16	1
Chloromethane	0.59	J	0.80	0.20	ppb v/v			01/30/18 22:16	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/30/18 22:16	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-08B

Date Collected: 01/10/18 15:50

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-6

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/30/18 22:16	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/30/18 22:16	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			01/30/18 22:16	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			01/30/18 22:16	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/30/18 22:16	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			01/30/18 22:16	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/30/18 22:16	1
cis-1,2-Dichloroethene	0.39	J	0.40	0.089	ppb v/v			01/30/18 22:16	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			01/30/18 22:16	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/30/18 22:16	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/30/18 22:16	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/30/18 22:16	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 22:16	1
Ethylbenzene	0.070	J	0.40	0.063	ppb v/v			01/30/18 22:16	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/30/18 22:16	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/30/18 22:16	1
2-Hexanone	ND		0.40	0.087	ppb v/v			01/30/18 22:16	1
Methylene Chloride	0.45		0.40	0.072	ppb v/v			01/30/18 22:16	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/30/18 22:16	1
Styrene	ND		0.40	0.059	ppb v/v			01/30/18 22:16	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/30/18 22:16	1
Tetrachloroethene	0.46		0.40	0.051	ppb v/v			01/30/18 22:16	1
Toluene	2.3		0.40	0.051	ppb v/v			01/30/18 22:16	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/30/18 22:16	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/30/18 22:16	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/30/18 22:16	1
Trichloroethene	ND		0.40	0.11	ppb v/v			01/30/18 22:16	1
Trichlorofluoromethane	0.22	J	0.40	0.20	ppb v/v			01/30/18 22:16	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 22:16	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			01/30/18 22:16	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			01/30/18 22:16	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			01/30/18 22:16	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			01/30/18 22:16	1
m,p-Xylene	0.22	J	0.80	0.10	ppb v/v			01/30/18 22:16	1
o-Xylene	0.11	J	0.40	0.054	ppb v/v			01/30/18 22:16	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	36		12	0.42	ug/m3			01/30/18 22:16	1
Benzene	0.64	J	1.3	0.25	ug/m3			01/30/18 22:16	1
Benzyl chloride	ND		4.1	0.84	ug/m3			01/30/18 22:16	1
Bromodichloromethane	2.6		2.0	0.44	ug/m3			01/30/18 22:16	1
Bromoform	ND		4.1	0.72	ug/m3			01/30/18 22:16	1
Bromomethane	ND		3.1	1.3	ug/m3			01/30/18 22:16	1
2-Butanone (MEK)	3.8		2.4	0.59	ug/m3			01/30/18 22:16	1
Carbon disulfide	2.8		2.5	0.24	ug/m3			01/30/18 22:16	1
Carbon tetrachloride	0.68	J	5.0	0.40	ug/m3			01/30/18 22:16	1
Chlorobenzene	ND		1.4	0.29	ug/m3			01/30/18 22:16	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			01/30/18 22:16	1
Chloroethane	ND		2.1	0.81	ug/m3			01/30/18 22:16	1
Chloroform	17		1.5	0.46	ug/m3			01/30/18 22:16	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-08B

Lab Sample ID: 320-35129-6

Date Collected: 01/10/18 15:50

Matrix: Air

Date Received: 01/17/18 10:19

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloromethane	1.2	J	1.7	0.41	ug/m3			01/30/18 22:16	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			01/30/18 22:16	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			01/30/18 22:16	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			01/30/18 22:16	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			01/30/18 22:16	1
Dichlorodifluoromethane	ND		2.0	0.72	ug/m3			01/30/18 22:16	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			01/30/18 22:16	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			01/30/18 22:16	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			01/30/18 22:16	1
cis-1,2-Dichloroethene	1.5	J	1.6	0.35	ug/m3			01/30/18 22:16	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			01/30/18 22:16	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			01/30/18 22:16	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			01/30/18 22:16	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			01/30/18 22:16	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			01/30/18 22:16	1
Ethylbenzene	0.30	J	1.7	0.27	ug/m3			01/30/18 22:16	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			01/30/18 22:16	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			01/30/18 22:16	1
2-Hexanone	ND		1.6	0.36	ug/m3			01/30/18 22:16	1
Methylene Chloride	1.6		1.4	0.25	ug/m3			01/30/18 22:16	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			01/30/18 22:16	1
Styrene	ND		1.7	0.25	ug/m3			01/30/18 22:16	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			01/30/18 22:16	1
Tetrachloroethene	3.1		2.7	0.35	ug/m3			01/30/18 22:16	1
Toluene	8.5		1.5	0.19	ug/m3			01/30/18 22:16	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			01/30/18 22:16	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			01/30/18 22:16	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			01/30/18 22:16	1
Trichloroethene	ND		2.1	0.56	ug/m3			01/30/18 22:16	1
Trichlorofluoromethane	1.2	J	2.2	1.1	ug/m3			01/30/18 22:16	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			01/30/18 22:16	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			01/30/18 22:16	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			01/30/18 22:16	1
Vinyl acetate	ND		2.8	0.51	ug/m3			01/30/18 22:16	1
Vinyl chloride	ND		1.0	0.31	ug/m3			01/30/18 22:16	1
m,p-Xylene	0.96	J	3.5	0.43	ug/m3			01/30/18 22:16	1
o-Xylene	0.50	J	1.7	0.23	ug/m3			01/30/18 22:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130					01/30/18 22:16	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					01/30/18 22:16	1
Toluene-d8 (Surr)	100		70 - 130					01/30/18 22:16	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-09

Lab Sample ID: 320-35129-7

Date Collected: 01/10/18 15:35

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	11		5.0	0.18	ppb v/v			01/30/18 23:14	1
Benzene	0.13	J	0.40	0.079	ppb v/v			01/30/18 23:14	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/30/18 23:14	1
Bromodichloromethane	4.6		0.30	0.066	ppb v/v			01/30/18 23:14	1
Bromoform	ND		0.40	0.070	ppb v/v			01/30/18 23:14	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/30/18 23:14	1
2-Butanone (MEK)	0.92		0.80	0.20	ppb v/v			01/30/18 23:14	1
Carbon disulfide	5.8		0.80	0.078	ppb v/v			01/30/18 23:14	1
Carbon tetrachloride	0.49	J	0.80	0.064	ppb v/v			01/30/18 23:14	1
Chlorobenzene	0.080	J	0.30	0.064	ppb v/v			01/30/18 23:14	1
Dibromochloromethane	0.60		0.40	0.079	ppb v/v			01/30/18 23:14	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/30/18 23:14	1
Chloroform	47		0.30	0.095	ppb v/v			01/30/18 23:14	1
Chloromethane	1.4		0.80	0.20	ppb v/v			01/30/18 23:14	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/30/18 23:14	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/30/18 23:14	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/30/18 23:14	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			01/30/18 23:14	1
Dichlorodifluoromethane	0.37	J	0.40	0.15	ppb v/v			01/30/18 23:14	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/30/18 23:14	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			01/30/18 23:14	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/30/18 23:14	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			01/30/18 23:14	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			01/30/18 23:14	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/30/18 23:14	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/30/18 23:14	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/30/18 23:14	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 23:14	1
Ethylbenzene	0.26	J	0.40	0.063	ppb v/v			01/30/18 23:14	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/30/18 23:14	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/30/18 23:14	1
2-Hexanone	ND		0.40	0.087	ppb v/v			01/30/18 23:14	1
Methylene Chloride	8.1		0.40	0.072	ppb v/v			01/30/18 23:14	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/30/18 23:14	1
Styrene	0.60		0.40	0.059	ppb v/v			01/30/18 23:14	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/30/18 23:14	1
Tetrachloroethene	0.070	J	0.40	0.051	ppb v/v			01/30/18 23:14	1
Toluene	53		0.40	0.051	ppb v/v			01/30/18 23:14	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/30/18 23:14	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/30/18 23:14	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/30/18 23:14	1
Trichloroethene	ND		0.40	0.11	ppb v/v			01/30/18 23:14	1
Trichlorofluoromethane	0.22	J	0.40	0.20	ppb v/v			01/30/18 23:14	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 23:14	1
1,2,4-Trimethylbenzene	0.23	J	0.80	0.16	ppb v/v			01/30/18 23:14	1
1,3,5-Trimethylbenzene	0.17	J	0.40	0.13	ppb v/v			01/30/18 23:14	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			01/30/18 23:14	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			01/30/18 23:14	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-09

Lab Sample ID: 320-35129-7

Date Collected: 01/10/18 15:35

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.33	J	0.80	0.10	ppb v/v			01/30/18 23:14	1
o-Xylene	0.15	J	0.40	0.054	ppb v/v			01/30/18 23:14	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	25		12	0.42	ug/m3			01/30/18 23:14	1
Benzene	0.41	J	1.3	0.25	ug/m3			01/30/18 23:14	1
Benzyl chloride	ND		4.1	0.84	ug/m3			01/30/18 23:14	1
Bromodichloromethane	30		2.0	0.44	ug/m3			01/30/18 23:14	1
Bromoform	ND		4.1	0.72	ug/m3			01/30/18 23:14	1
Bromomethane	ND		3.1	1.3	ug/m3			01/30/18 23:14	1
2-Butanone (MEK)	2.7		2.4	0.59	ug/m3			01/30/18 23:14	1
Carbon disulfide	18		2.5	0.24	ug/m3			01/30/18 23:14	1
Carbon tetrachloride	3.1	J	5.0	0.40	ug/m3			01/30/18 23:14	1
Chlorobenzene	0.37	J	1.4	0.29	ug/m3			01/30/18 23:14	1
Dibromochloromethane	5.1		3.4	0.67	ug/m3			01/30/18 23:14	1
Chloroethane	ND		2.1	0.81	ug/m3			01/30/18 23:14	1
Chloroform	230		1.5	0.46	ug/m3			01/30/18 23:14	1
Chloromethane	2.9		1.7	0.41	ug/m3			01/30/18 23:14	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			01/30/18 23:14	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			01/30/18 23:14	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			01/30/18 23:14	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			01/30/18 23:14	1
Dichlorodifluoromethane	1.8	J	2.0	0.72	ug/m3			01/30/18 23:14	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			01/30/18 23:14	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			01/30/18 23:14	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			01/30/18 23:14	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			01/30/18 23:14	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			01/30/18 23:14	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			01/30/18 23:14	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			01/30/18 23:14	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			01/30/18 23:14	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			01/30/18 23:14	1
Ethylbenzene	1.1	J	1.7	0.27	ug/m3			01/30/18 23:14	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			01/30/18 23:14	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			01/30/18 23:14	1
2-Hexanone	ND		1.6	0.36	ug/m3			01/30/18 23:14	1
Methylene Chloride	28		1.4	0.25	ug/m3			01/30/18 23:14	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			01/30/18 23:14	1
Styrene	2.5		1.7	0.25	ug/m3			01/30/18 23:14	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			01/30/18 23:14	1
Tetrachloroethene	0.47	J	2.7	0.35	ug/m3			01/30/18 23:14	1
Toluene	200		1.5	0.19	ug/m3			01/30/18 23:14	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			01/30/18 23:14	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			01/30/18 23:14	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			01/30/18 23:14	1
Trichloroethene	ND		2.1	0.56	ug/m3			01/30/18 23:14	1
Trichlorofluoromethane	1.2	J	2.2	1.1	ug/m3			01/30/18 23:14	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			01/30/18 23:14	1
1,2,4-Trimethylbenzene	1.1	J	3.9	0.80	ug/m3			01/30/18 23:14	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-09

Date Collected: 01/10/18 15:35

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-7

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	0.84	J	2.0	0.61	ug/m3			01/30/18 23:14	1
Vinyl acetate	ND		2.8	0.51	ug/m3			01/30/18 23:14	1
Vinyl chloride	ND		1.0	0.31	ug/m3			01/30/18 23:14	1
m,p-Xylene	1.5	J	3.5	0.43	ug/m3			01/30/18 23:14	1
o-Xylene	0.65	J	1.7	0.23	ug/m3			01/30/18 23:14	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					01/30/18 23:14	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					01/30/18 23:14	1
Toluene-d8 (Surr)	100		70 - 130					01/30/18 23:14	1

Client Sample ID: HOU-10

Date Collected: 01/10/18 16:03

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-8

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	13	J	120	4.2	ppb v/v			01/31/18 00:09	23.6
Benzene	ND		9.4	1.9	ppb v/v			01/31/18 00:09	23.6
Benzyl chloride	ND		19	3.8	ppb v/v			01/31/18 00:09	23.6
Bromodichloromethane	2.3	J	7.1	1.6	ppb v/v			01/31/18 00:09	23.6
Bromoform	ND		9.4	1.7	ppb v/v			01/31/18 00:09	23.6
Bromomethane	ND		19	7.9	ppb v/v			01/31/18 00:09	23.6
2-Butanone (MEK)	ND		19	4.7	ppb v/v			01/31/18 00:09	23.6
Carbon disulfide	5.2	J	19	1.8	ppb v/v			01/31/18 00:09	23.6
Carbon tetrachloride	ND		19	1.5	ppb v/v			01/31/18 00:09	23.6
Chlorobenzene	ND		7.1	1.5	ppb v/v			01/31/18 00:09	23.6
Dibromochloromethane	ND		9.4	1.9	ppb v/v			01/31/18 00:09	23.6
Chloroethane	ND		19	7.3	ppb v/v			01/31/18 00:09	23.6
Chloroform	12		7.1	2.2	ppb v/v			01/31/18 00:09	23.6
Chloromethane	ND		19	4.6	ppb v/v			01/31/18 00:09	23.6
1,2-Dibromoethane (EDB)	ND		19	1.8	ppb v/v			01/31/18 00:09	23.6
1,2-Dichlorobenzene	ND		9.4	3.1	ppb v/v			01/31/18 00:09	23.6
1,3-Dichlorobenzene	ND		9.4	2.6	ppb v/v			01/31/18 00:09	23.6
1,4-Dichlorobenzene	ND		9.4	3.5	ppb v/v			01/31/18 00:09	23.6
Dichlorodifluoromethane	ND		9.4	3.4	ppb v/v			01/31/18 00:09	23.6
1,1-Dichloroethane	ND		7.1	1.7	ppb v/v			01/31/18 00:09	23.6
1,2-Dichloroethane	ND		19	2.1	ppb v/v			01/31/18 00:09	23.6
1,1-Dichloroethene	ND		19	3.0	ppb v/v			01/31/18 00:09	23.6
cis-1,2-Dichloroethene	340		9.4	2.1	ppb v/v			01/31/18 00:09	23.6
trans-1,2-Dichloroethene	ND		9.4	2.4	ppb v/v			01/31/18 00:09	23.6
1,2-Dichloropropane	ND		9.4	5.7	ppb v/v			01/31/18 00:09	23.6
cis-1,3-Dichloropropene	ND		9.4	2.5	ppb v/v			01/31/18 00:09	23.6
trans-1,3-Dichloropropene	ND		9.4	2.1	ppb v/v			01/31/18 00:09	23.6
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		9.4	3.7	ppb v/v			01/31/18 00:09	23.6
Ethylbenzene	ND		9.4	1.5	ppb v/v			01/31/18 00:09	23.6
4-Ethyltoluene	ND		9.4	4.4	ppb v/v			01/31/18 00:09	23.6
Hexachlorobutadiene	ND		47	10	ppb v/v			01/31/18 00:09	23.6

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-10

Date Collected: 01/10/18 16:03

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-8

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		9.4	2.1	ppb v/v			01/31/18 00:09	23.6
Methylene Chloride	2.2	J	9.4	1.7	ppb v/v			01/31/18 00:09	23.6
4-Methyl-2-pentanone (MIBK)	ND		9.4	3.2	ppb v/v			01/31/18 00:09	23.6
Styrene	ND		9.4	1.4	ppb v/v			01/31/18 00:09	23.6
1,1,2,2-Tetrachloroethane	ND		9.4	1.6	ppb v/v			01/31/18 00:09	23.6
Tetrachloroethene	830		9.4	1.2	ppb v/v			01/31/18 00:09	23.6
Toluene	2.6	J	9.4	1.2	ppb v/v			01/31/18 00:09	23.6
1,2,4-Trichlorobenzene	ND		47	10	ppb v/v			01/31/18 00:09	23.6
1,1,1-Trichloroethane	ND		7.1	1.5	ppb v/v			01/31/18 00:09	23.6
1,1,2-Trichloroethane	ND		9.4	1.6	ppb v/v			01/31/18 00:09	23.6
Trichloroethene	210		9.4	2.5	ppb v/v			01/31/18 00:09	23.6
Trichlorofluoromethane	ND		9.4	4.6	ppb v/v			01/31/18 00:09	23.6
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		9.4	3.8	ppb v/v			01/31/18 00:09	23.6
1,2,4-Trimethylbenzene	ND		19	3.8	ppb v/v			01/31/18 00:09	23.6
1,3,5-Trimethylbenzene	ND		9.4	3.0	ppb v/v			01/31/18 00:09	23.6
Vinyl acetate	ND		19	3.4	ppb v/v			01/31/18 00:09	23.6
Vinyl chloride	8.8	J	9.4	2.8	ppb v/v			01/31/18 00:09	23.6
m,p-Xylene	ND		19	2.4	ppb v/v			01/31/18 00:09	23.6
o-Xylene	ND		9.4	1.3	ppb v/v			01/31/18 00:09	23.6
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	30	J	280	10	ug/m3			01/31/18 00:09	23.6
Benzene	ND		30	6.0	ug/m3			01/31/18 00:09	23.6
Benzyl chloride	ND		98	20	ug/m3			01/31/18 00:09	23.6
Bromodichloromethane	15	J	47	10	ug/m3			01/31/18 00:09	23.6
Bromoform	ND		98	17	ug/m3			01/31/18 00:09	23.6
Bromomethane	ND		73	31	ug/m3			01/31/18 00:09	23.6
2-Butanone (MEK)	ND		56	14	ug/m3			01/31/18 00:09	23.6
Carbon disulfide	16	J	59	5.7	ug/m3			01/31/18 00:09	23.6
Carbon tetrachloride	ND		120	9.5	ug/m3			01/31/18 00:09	23.6
Chlorobenzene	ND		33	7.0	ug/m3			01/31/18 00:09	23.6
Dibromochloromethane	ND		80	16	ug/m3			01/31/18 00:09	23.6
Chloroethane	ND		50	19	ug/m3			01/31/18 00:09	23.6
Chloroform	57		35	11	ug/m3			01/31/18 00:09	23.6
Chloromethane	ND		39	9.6	ug/m3			01/31/18 00:09	23.6
1,2-Dibromoethane (EDB)	ND		150	14	ug/m3			01/31/18 00:09	23.6
1,2-Dichlorobenzene	ND		57	18	ug/m3			01/31/18 00:09	23.6
1,3-Dichlorobenzene	ND		57	16	ug/m3			01/31/18 00:09	23.6
1,4-Dichlorobenzene	ND		57	21	ug/m3			01/31/18 00:09	23.6
Dichlorodifluoromethane	ND		47	17	ug/m3			01/31/18 00:09	23.6
1,1-Dichloroethane	ND		29	6.9	ug/m3			01/31/18 00:09	23.6
1,2-Dichloroethane	ND		76	8.4	ug/m3			01/31/18 00:09	23.6
1,1-Dichloroethene	ND		75	12	ug/m3			01/31/18 00:09	23.6
cis-1,2-Dichloroethene	1400		37	8.3	ug/m3			01/31/18 00:09	23.6
trans-1,2-Dichloroethene	ND		37	9.4	ug/m3			01/31/18 00:09	23.6
1,2-Dichloropropane	ND		44	26	ug/m3			01/31/18 00:09	23.6
cis-1,3-Dichloropropene	ND		43	11	ug/m3			01/31/18 00:09	23.6
trans-1,3-Dichloropropene	ND		43	9.4	ug/m3			01/31/18 00:09	23.6
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		66	26	ug/m3			01/31/18 00:09	23.6

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-10

Date Collected: 01/10/18 16:03

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-8

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		41	6.5	ug/m3			01/31/18 00:09	23.6
4-Ethyltoluene	ND		46	22	ug/m3			01/31/18 00:09	23.6
Hexachlorobutadiene	ND		500	110	ug/m3			01/31/18 00:09	23.6
2-Hexanone	ND		39	8.4	ug/m3			01/31/18 00:09	23.6
Methylene Chloride	7.5	J	33	5.9	ug/m3			01/31/18 00:09	23.6
4-Methyl-2-pentanone (MIBK)	ND		39	13	ug/m3			01/31/18 00:09	23.6
Styrene	ND		40	5.9	ug/m3			01/31/18 00:09	23.6
1,1,2,2-Tetrachloroethane	ND		65	11	ug/m3			01/31/18 00:09	23.6
Tetrachloroethene	5600		64	8.2	ug/m3			01/31/18 00:09	23.6
Toluene	9.8	J	36	4.5	ug/m3			01/31/18 00:09	23.6
1,2,4-Trichlorobenzene	ND		350	76	ug/m3			01/31/18 00:09	23.6
1,1,1-Trichloroethane	ND		39	8.4	ug/m3			01/31/18 00:09	23.6
1,1,2-Trichloroethane	ND		52	8.6	ug/m3			01/31/18 00:09	23.6
Trichloroethene	1100		51	13	ug/m3			01/31/18 00:09	23.6
Trichlorofluoromethane	ND		53	26	ug/m3			01/31/18 00:09	23.6
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		72	29	ug/m3			01/31/18 00:09	23.6
1,2,4-Trimethylbenzene	ND		93	19	ug/m3			01/31/18 00:09	23.6
1,3,5-Trimethylbenzene	ND		46	15	ug/m3			01/31/18 00:09	23.6
Vinyl acetate	ND		66	12	ug/m3			01/31/18 00:09	23.6
Vinyl chloride	22	J	24	7.2	ug/m3			01/31/18 00:09	23.6
m,p-Xylene	ND		82	10	ug/m3			01/31/18 00:09	23.6
o-Xylene	ND		41	5.5	ug/m3			01/31/18 00:09	23.6
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	84		70 - 130					01/31/18 00:09	23.6
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					01/31/18 00:09	23.6
Toluene-d8 (Surr)	98		70 - 130					01/31/18 00:09	23.6

Client Sample ID: HOU-10B

Date Collected: 01/10/18 16:24

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-9

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	11	J	170	5.9	ppb v/v			01/31/18 01:05	33.1
Benzene	ND		13	2.6	ppb v/v			01/31/18 01:05	33.1
Benzyl chloride	ND		26	5.4	ppb v/v			01/31/18 01:05	33.1
Bromodichloromethane	3.2	J	9.9	2.2	ppb v/v			01/31/18 01:05	33.1
Bromoform	ND		13	2.3	ppb v/v			01/31/18 01:05	33.1
Bromomethane	ND		26	11	ppb v/v			01/31/18 01:05	33.1
2-Butanone (MEK)	ND		26	6.6	ppb v/v			01/31/18 01:05	33.1
Carbon disulfide	14	J	26	2.6	ppb v/v			01/31/18 01:05	33.1
Carbon tetrachloride	ND		26	2.1	ppb v/v			01/31/18 01:05	33.1
Chlorobenzene	ND		9.9	2.1	ppb v/v			01/31/18 01:05	33.1
Dibromochloromethane	ND		13	2.6	ppb v/v			01/31/18 01:05	33.1
Chloroethane	ND		26	10	ppb v/v			01/31/18 01:05	33.1
Chloroform	18		9.9	3.1	ppb v/v			01/31/18 01:05	33.1
Chloromethane	ND		26	6.5	ppb v/v			01/31/18 01:05	33.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-10B

Lab Sample ID: 320-35129-9

Date Collected: 01/10/18 16:24

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		26	2.5	ppb v/v			01/31/18 01:05	33.1
1,2-Dichlorobenzene	ND		13	4.3	ppb v/v			01/31/18 01:05	33.1
1,3-Dichlorobenzene	ND		13	3.6	ppb v/v			01/31/18 01:05	33.1
1,4-Dichlorobenzene	ND		13	4.9	ppb v/v			01/31/18 01:05	33.1
Dichlorodifluoromethane	ND		13	4.8	ppb v/v			01/31/18 01:05	33.1
1,1-Dichloroethane	ND		9.9	2.4	ppb v/v			01/31/18 01:05	33.1
1,2-Dichloroethane	ND		26	2.9	ppb v/v			01/31/18 01:05	33.1
1,1-Dichloroethene	ND		26	4.3	ppb v/v			01/31/18 01:05	33.1
cis-1,2-Dichloroethene	320		13	2.9	ppb v/v			01/31/18 01:05	33.1
trans-1,2-Dichloroethene	ND		13	3.3	ppb v/v			01/31/18 01:05	33.1
1,2-Dichloropropane	ND		13	7.9	ppb v/v			01/31/18 01:05	33.1
cis-1,3-Dichloropropene	ND		13	3.4	ppb v/v			01/31/18 01:05	33.1
trans-1,3-Dichloropropene	ND		13	2.9	ppb v/v			01/31/18 01:05	33.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		13	5.1	ppb v/v			01/31/18 01:05	33.1
Ethylbenzene	ND		13	2.1	ppb v/v			01/31/18 01:05	33.1
4-Ethyltoluene	ND		13	6.2	ppb v/v			01/31/18 01:05	33.1
Hexachlorobutadiene	ND		66	14	ppb v/v			01/31/18 01:05	33.1
2-Hexanone	ND		13	2.9	ppb v/v			01/31/18 01:05	33.1
Methylene Chloride	3.7 J		13	2.4	ppb v/v			01/31/18 01:05	33.1
4-Methyl-2-pentanone (MIBK)	ND		13	4.5	ppb v/v			01/31/18 01:05	33.1
Styrene	ND		13	2.0	ppb v/v			01/31/18 01:05	33.1
1,1,2,2-Tetrachloroethane	ND		13	2.3	ppb v/v			01/31/18 01:05	33.1
Tetrachloroethene	1700		13	1.7	ppb v/v			01/31/18 01:05	33.1
Toluene	29		13	1.7	ppb v/v			01/31/18 01:05	33.1
1,2,4-Trichlorobenzene	ND		66	14	ppb v/v			01/31/18 01:05	33.1
1,1,1-Trichloroethane	ND		9.9	2.2	ppb v/v			01/31/18 01:05	33.1
1,1,2-Trichloroethane	ND		13	2.2	ppb v/v			01/31/18 01:05	33.1
Trichloroethene	250		13	3.5	ppb v/v			01/31/18 01:05	33.1
Trichlorofluoromethane	ND		13	6.5	ppb v/v			01/31/18 01:05	33.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		13	5.4	ppb v/v			01/31/18 01:05	33.1
1,2,4-Trimethylbenzene	ND		26	5.4	ppb v/v			01/31/18 01:05	33.1
1,3,5-Trimethylbenzene	ND		13	4.1	ppb v/v			01/31/18 01:05	33.1
Vinyl acetate	ND		26	4.8	ppb v/v			01/31/18 01:05	33.1
Vinyl chloride	7.9 J		13	4.0	ppb v/v			01/31/18 01:05	33.1
m,p-Xylene	ND		26	3.3	ppb v/v			01/31/18 01:05	33.1
o-Xylene	ND		13	1.8	ppb v/v			01/31/18 01:05	33.1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	25 J		390	14	ug/m3			01/31/18 01:05	33.1
Benzene	ND		42	8.4	ug/m3			01/31/18 01:05	33.1
Benzyl chloride	ND		140	28	ug/m3			01/31/18 01:05	33.1
Bromodichloromethane	22 J		67	15	ug/m3			01/31/18 01:05	33.1
Bromoform	ND		140	24	ug/m3			01/31/18 01:05	33.1
Bromomethane	ND		100	43	ug/m3			01/31/18 01:05	33.1
2-Butanone (MEK)	ND		78	19	ug/m3			01/31/18 01:05	33.1
Carbon disulfide	44 J		82	8.0	ug/m3			01/31/18 01:05	33.1
Carbon tetrachloride	ND		170	13	ug/m3			01/31/18 01:05	33.1
Chlorobenzene	ND		46	9.8	ug/m3			01/31/18 01:05	33.1
Dibromochloromethane	ND		110	22	ug/m3			01/31/18 01:05	33.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-10B

Lab Sample ID: 320-35129-9

Date Collected: 01/10/18 16:24

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		70	27	ug/m3			01/31/18 01:05	33.1
Chloroform	89		48	15	ug/m3			01/31/18 01:05	33.1
Chloromethane	ND		55	13	ug/m3			01/31/18 01:05	33.1
1,2-Dibromoethane (EDB)	ND		200	19	ug/m3			01/31/18 01:05	33.1
1,2-Dichlorobenzene	ND		80	26	ug/m3			01/31/18 01:05	33.1
1,3-Dichlorobenzene	ND		80	22	ug/m3			01/31/18 01:05	33.1
1,4-Dichlorobenzene	ND		80	30	ug/m3			01/31/18 01:05	33.1
Dichlorodifluoromethane	ND		65	24	ug/m3			01/31/18 01:05	33.1
1,1-Dichloroethane	ND		40	9.6	ug/m3			01/31/18 01:05	33.1
1,2-Dichloroethane	ND		110	12	ug/m3			01/31/18 01:05	33.1
1,1-Dichloroethene	ND		100	17	ug/m3			01/31/18 01:05	33.1
cis-1,2-Dichloroethene	1300		52	12	ug/m3			01/31/18 01:05	33.1
trans-1,2-Dichloroethene	ND		52	13	ug/m3			01/31/18 01:05	33.1
1,2-Dichloropropane	ND		61	37	ug/m3			01/31/18 01:05	33.1
cis-1,3-Dichloropropene	ND		60	16	ug/m3			01/31/18 01:05	33.1
trans-1,3-Dichloropropene	ND		60	13	ug/m3			01/31/18 01:05	33.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		93	36	ug/m3			01/31/18 01:05	33.1
Ethylbenzene	ND		57	9.1	ug/m3			01/31/18 01:05	33.1
4-Ethyltoluene	ND		65	30	ug/m3			01/31/18 01:05	33.1
Hexachlorobutadiene	ND		710	150	ug/m3			01/31/18 01:05	33.1
2-Hexanone	ND		54	12	ug/m3			01/31/18 01:05	33.1
Methylene Chloride	13 J		46	8.3	ug/m3			01/31/18 01:05	33.1
4-Methyl-2-pentanone (MIBK)	ND		54	18	ug/m3			01/31/18 01:05	33.1
Styrene	ND		56	8.3	ug/m3			01/31/18 01:05	33.1
1,1,2,2-Tetrachloroethane	ND		91	16	ug/m3			01/31/18 01:05	33.1
Tetrachloroethene	12000		90	11	ug/m3			01/31/18 01:05	33.1
Toluene	110		50	6.4	ug/m3			01/31/18 01:05	33.1
1,2,4-Trichlorobenzene	ND		490	110	ug/m3			01/31/18 01:05	33.1
1,1,1-Trichloroethane	ND		54	12	ug/m3			01/31/18 01:05	33.1
1,1,2-Trichloroethane	ND		72	12	ug/m3			01/31/18 01:05	33.1
Trichloroethene	1400		71	19	ug/m3			01/31/18 01:05	33.1
Trichlorofluoromethane	ND		74	36	ug/m3			01/31/18 01:05	33.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		100	41	ug/m3			01/31/18 01:05	33.1
1,2,4-Trimethylbenzene	ND		130	26	ug/m3			01/31/18 01:05	33.1
1,3,5-Trimethylbenzene	ND		65	20	ug/m3			01/31/18 01:05	33.1
Vinyl acetate	ND		93	17	ug/m3			01/31/18 01:05	33.1
Vinyl chloride	20 J		34	10	ug/m3			01/31/18 01:05	33.1
m,p-Xylene	ND		110	14	ug/m3			01/31/18 01:05	33.1
o-Xylene	ND		57	7.8	ug/m3			01/31/18 01:05	33.1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85		70 - 130		01/31/18 01:05	33.1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130		01/31/18 01:05	33.1
Toluene-d8 (Surr)	99		70 - 130		01/31/18 01:05	33.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-01

Lab Sample ID: 320-35129-10

Date Collected: 01/11/18 08:15

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	13	J	56	2.0	ppb v/v			01/31/18 02:03	11.1
Benzene	1.5	J	4.4	0.88	ppb v/v			01/31/18 02:03	11.1
Benzyl chloride	ND		8.9	1.8	ppb v/v			01/31/18 02:03	11.1
Bromodichloromethane	11		3.3	0.73	ppb v/v			01/31/18 02:03	11.1
Bromoform	ND		4.4	0.78	ppb v/v			01/31/18 02:03	11.1
Bromomethane	ND		8.9	3.7	ppb v/v			01/31/18 02:03	11.1
2-Butanone (MEK)	ND		8.9	2.2	ppb v/v			01/31/18 02:03	11.1
Carbon disulfide	89		8.9	0.87	ppb v/v			01/31/18 02:03	11.1
Carbon tetrachloride	ND		8.9	0.71	ppb v/v			01/31/18 02:03	11.1
Chlorobenzene	ND		3.3	0.71	ppb v/v			01/31/18 02:03	11.1
Dibromochloromethane	1.3	J	4.4	0.88	ppb v/v			01/31/18 02:03	11.1
Chloroethane	6.2	J	8.9	3.4	ppb v/v			01/31/18 02:03	11.1
Chloroform	290		3.3	1.1	ppb v/v			01/31/18 02:03	11.1
Chloromethane	2.4	J	8.9	2.2	ppb v/v			01/31/18 02:03	11.1
1,2-Dibromoethane (EDB)	ND		8.9	0.83	ppb v/v			01/31/18 02:03	11.1
1,2-Dichlorobenzene	ND		4.4	1.4	ppb v/v			01/31/18 02:03	11.1
1,3-Dichlorobenzene	ND		4.4	1.2	ppb v/v			01/31/18 02:03	11.1
1,4-Dichlorobenzene	ND		4.4	1.7	ppb v/v			01/31/18 02:03	11.1
Dichlorodifluoromethane	ND		4.4	1.6	ppb v/v			01/31/18 02:03	11.1
1,1-Dichloroethane	ND		3.3	0.80	ppb v/v			01/31/18 02:03	11.1
1,2-Dichloroethane	ND		8.9	0.98	ppb v/v			01/31/18 02:03	11.1
1,1-Dichloroethene	2.0	J	8.9	1.4	ppb v/v			01/31/18 02:03	11.1
cis-1,2-Dichloroethene	1.1	J	4.4	0.99	ppb v/v			01/31/18 02:03	11.1
trans-1,2-Dichloroethene	ND		4.4	1.1	ppb v/v			01/31/18 02:03	11.1
1,2-Dichloropropane	ND		4.4	2.7	ppb v/v			01/31/18 02:03	11.1
cis-1,3-Dichloropropene	ND		4.4	1.2	ppb v/v			01/31/18 02:03	11.1
trans-1,3-Dichloropropene	ND		4.4	0.98	ppb v/v			01/31/18 02:03	11.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		4.4	1.7	ppb v/v			01/31/18 02:03	11.1
Ethylbenzene	ND		4.4	0.70	ppb v/v			01/31/18 02:03	11.1
4-Ethyltoluene	ND		4.4	2.1	ppb v/v			01/31/18 02:03	11.1
Hexachlorobutadiene	ND		22	4.8	ppb v/v			01/31/18 02:03	11.1
2-Hexanone	ND		4.4	0.97	ppb v/v			01/31/18 02:03	11.1
Methylene Chloride	13		4.4	0.80	ppb v/v			01/31/18 02:03	11.1
4-Methyl-2-pentanone (MIBK)	ND		4.4	1.5	ppb v/v			01/31/18 02:03	11.1
Styrene	ND		4.4	0.65	ppb v/v			01/31/18 02:03	11.1
1,1,2,2-Tetrachloroethane	ND		4.4	0.77	ppb v/v			01/31/18 02:03	11.1
Tetrachloroethene	4.1	J	4.4	0.57	ppb v/v			01/31/18 02:03	11.1
Toluene	310		4.4	0.57	ppb v/v			01/31/18 02:03	11.1
1,2,4-Trichlorobenzene	ND		22	4.8	ppb v/v			01/31/18 02:03	11.1
1,1,1-Trichloroethane	ND		3.3	0.72	ppb v/v			01/31/18 02:03	11.1
1,1,2-Trichloroethane	ND		4.4	0.74	ppb v/v			01/31/18 02:03	11.1
Trichloroethene	ND		4.4	1.2	ppb v/v			01/31/18 02:03	11.1
Trichlorofluoromethane	ND		4.4	2.2	ppb v/v			01/31/18 02:03	11.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		4.4	1.8	ppb v/v			01/31/18 02:03	11.1
1,2,4-Trimethylbenzene	ND		8.9	1.8	ppb v/v			01/31/18 02:03	11.1
1,3,5-Trimethylbenzene	ND		4.4	1.4	ppb v/v			01/31/18 02:03	11.1
Vinyl acetate	ND		8.9	1.6	ppb v/v			01/31/18 02:03	11.1
Vinyl chloride	ND		4.4	1.3	ppb v/v			01/31/18 02:03	11.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-01

Lab Sample ID: 320-35129-10

Date Collected: 01/11/18 08:15

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		8.9	1.1	ppb v/v			01/31/18 02:03	11.1
o-Xylene	ND		4.4	0.60	ppb v/v			01/31/18 02:03	11.1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	31	J	130	4.7	ug/m3			01/31/18 02:03	11.1
Benzene	4.9	J	14	2.8	ug/m3			01/31/18 02:03	11.1
Benzyl chloride	ND		46	9.4	ug/m3			01/31/18 02:03	11.1
Bromodichloromethane	77		22	4.9	ug/m3			01/31/18 02:03	11.1
Bromoform	ND		46	8.0	ug/m3			01/31/18 02:03	11.1
Bromomethane	ND		34	14	ug/m3			01/31/18 02:03	11.1
2-Butanone (MEK)	ND		26	6.5	ug/m3			01/31/18 02:03	11.1
Carbon disulfide	280		28	2.7	ug/m3			01/31/18 02:03	11.1
Carbon tetrachloride	ND		56	4.5	ug/m3			01/31/18 02:03	11.1
Chlorobenzene	ND		15	3.3	ug/m3			01/31/18 02:03	11.1
Dibromochloromethane	11	J	38	7.5	ug/m3			01/31/18 02:03	11.1
Chloroethane	16	J	23	9.0	ug/m3			01/31/18 02:03	11.1
Chloroform	1400		16	5.1	ug/m3			01/31/18 02:03	11.1
Chloromethane	5.0	J	18	4.5	ug/m3			01/31/18 02:03	11.1
1,2-Dibromoethane (EDB)	ND		68	6.4	ug/m3			01/31/18 02:03	11.1
1,2-Dichlorobenzene	ND		27	8.7	ug/m3			01/31/18 02:03	11.1
1,3-Dichlorobenzene	ND		27	7.3	ug/m3			01/31/18 02:03	11.1
1,4-Dichlorobenzene	ND		27	9.9	ug/m3			01/31/18 02:03	11.1
Dichlorodifluoromethane	ND		22	8.0	ug/m3			01/31/18 02:03	11.1
1,1-Dichloroethane	ND		13	3.2	ug/m3			01/31/18 02:03	11.1
1,2-Dichloroethane	ND		36	4.0	ug/m3			01/31/18 02:03	11.1
1,1-Dichloroethene	7.9	J	35	5.7	ug/m3			01/31/18 02:03	11.1
cis-1,2-Dichloroethene	4.4	J	18	3.9	ug/m3			01/31/18 02:03	11.1
trans-1,2-Dichloroethene	ND		18	4.4	ug/m3			01/31/18 02:03	11.1
1,2-Dichloropropane	ND		21	12	ug/m3			01/31/18 02:03	11.1
cis-1,3-Dichloropropene	ND		20	5.2	ug/m3			01/31/18 02:03	11.1
trans-1,3-Dichloropropene	ND		20	4.4	ug/m3			01/31/18 02:03	11.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		31	12	ug/m3			01/31/18 02:03	11.1
Ethylbenzene	ND		19	3.0	ug/m3			01/31/18 02:03	11.1
4-Ethyltoluene	ND		22	10	ug/m3			01/31/18 02:03	11.1
Hexachlorobutadiene	ND		240	51	ug/m3			01/31/18 02:03	11.1
2-Hexanone	ND		18	4.0	ug/m3			01/31/18 02:03	11.1
Methylene Chloride	43		15	2.8	ug/m3			01/31/18 02:03	11.1
4-Methyl-2-pentanone (MIBK)	ND		18	6.1	ug/m3			01/31/18 02:03	11.1
Styrene	ND		19	2.8	ug/m3			01/31/18 02:03	11.1
1,1,2,2-Tetrachloroethane	ND		30	5.3	ug/m3			01/31/18 02:03	11.1
Tetrachloroethene	28	J	30	3.8	ug/m3			01/31/18 02:03	11.1
Toluene	1200		17	2.1	ug/m3			01/31/18 02:03	11.1
1,2,4-Trichlorobenzene	ND		160	36	ug/m3			01/31/18 02:03	11.1
1,1,1-Trichloroethane	ND		18	3.9	ug/m3			01/31/18 02:03	11.1
1,1,2-Trichloroethane	ND		24	4.1	ug/m3			01/31/18 02:03	11.1
Trichloroethene	ND		24	6.3	ug/m3			01/31/18 02:03	11.1
Trichlorofluoromethane	ND		25	12	ug/m3			01/31/18 02:03	11.1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		34	14	ug/m3			01/31/18 02:03	11.1
1,2,4-Trimethylbenzene	ND		44	8.8	ug/m3			01/31/18 02:03	11.1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-01

Date Collected: 01/11/18 08:15

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-10

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND		22	6.8	ug/m3			01/31/18 02:03	11.1
Vinyl acetate	ND		31	5.7	ug/m3			01/31/18 02:03	11.1
Vinyl chloride	ND		11	3.4	ug/m3			01/31/18 02:03	11.1
m,p-Xylene	ND		39	4.8	ug/m3			01/31/18 02:03	11.1
o-Xylene	ND		19	2.6	ug/m3			01/31/18 02:03	11.1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		70 - 130					01/31/18 02:03	11.1
1,2-Dichloroethane-d4 (Surr)	99		70 - 130					01/31/18 02:03	11.1
Toluene-d8 (Surr)	101		70 - 130					01/31/18 02:03	11.1

Client Sample ID: HOU-01B

Date Collected: 01/11/18 08:22

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-11

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	15	J	48	1.7	ppb v/v			01/29/18 19:38	9.62
Benzene	1.6	J	3.8	0.76	ppb v/v			01/29/18 19:38	9.62
Benzyl chloride	ND		7.7	1.6	ppb v/v			01/29/18 19:38	9.62
Bromodichloromethane	14		2.9	0.63	ppb v/v			01/29/18 19:38	9.62
Bromoform	ND		3.8	0.67	ppb v/v			01/29/18 19:38	9.62
Bromomethane	ND		7.7	3.2	ppb v/v			01/29/18 19:38	9.62
2-Butanone (MEK)	ND		7.7	1.9	ppb v/v			01/29/18 19:38	9.62
Carbon disulfide	27		7.7	0.75	ppb v/v			01/29/18 19:38	9.62
Carbon tetrachloride	ND		7.7	0.62	ppb v/v			01/29/18 19:38	9.62
Chlorobenzene	ND		2.9	0.62	ppb v/v			01/29/18 19:38	9.62
Dibromochloromethane	1.7	J	3.8	0.76	ppb v/v			01/29/18 19:38	9.62
Chloroethane	6.2	J	7.7	3.0	ppb v/v			01/29/18 19:38	9.62
Chloroform	250		2.9	0.91	ppb v/v			01/29/18 19:38	9.62
Chloromethane	2.0	J	7.7	1.9	ppb v/v			01/29/18 19:38	9.62
1,2-Dibromoethane (EDB)	ND		7.7	0.72	ppb v/v			01/29/18 19:38	9.62
1,2-Dichlorobenzene	ND		3.8	1.3	ppb v/v			01/29/18 19:38	9.62
1,3-Dichlorobenzene	ND		3.8	1.1	ppb v/v			01/29/18 19:38	9.62
1,4-Dichlorobenzene	ND		3.8	1.4	ppb v/v			01/29/18 19:38	9.62
Dichlorodifluoromethane	ND		3.8	1.4	ppb v/v			01/29/18 19:38	9.62
1,1-Dichloroethane	ND		2.9	0.69	ppb v/v			01/29/18 19:38	9.62
1,2-Dichloroethane	ND		7.7	0.85	ppb v/v			01/29/18 19:38	9.62
1,1-Dichloroethene	1.8	J	7.7	1.2	ppb v/v			01/29/18 19:38	9.62
cis-1,2-Dichloroethene	ND		3.8	0.86	ppb v/v			01/29/18 19:38	9.62
trans-1,2-Dichloroethene	ND		3.8	0.96	ppb v/v			01/29/18 19:38	9.62
1,2-Dichloropropane	ND		3.8	2.3	ppb v/v			01/29/18 19:38	9.62
cis-1,3-Dichloropropene	ND		3.8	1.0	ppb v/v			01/29/18 19:38	9.62
trans-1,3-Dichloropropene	ND		3.8	0.85	ppb v/v			01/29/18 19:38	9.62
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.8	1.5	ppb v/v			01/29/18 19:38	9.62
Ethylbenzene	ND		3.8	0.61	ppb v/v			01/29/18 19:38	9.62
4-Ethyltoluene	ND		3.8	1.8	ppb v/v			01/29/18 19:38	9.62
Hexachlorobutadiene	ND		19	4.2	ppb v/v			01/29/18 19:38	9.62

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-01B

Lab Sample ID: 320-35129-11

Date Collected: 01/11/18 08:22

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		3.8	0.84	ppb v/v			01/29/18 19:38	9.62
Methylene Chloride	11		3.8	0.69	ppb v/v			01/29/18 19:38	9.62
4-Methyl-2-pentanone (MIBK)	ND		3.8	1.3	ppb v/v			01/29/18 19:38	9.62
Styrene	ND		3.8	0.57	ppb v/v			01/29/18 19:38	9.62
1,1,2,2-Tetrachloroethane	ND		3.8	0.66	ppb v/v			01/29/18 19:38	9.62
Tetrachloroethene	0.59	J	3.8	0.49	ppb v/v			01/29/18 19:38	9.62
Toluene	300		3.8	0.49	ppb v/v			01/29/18 19:38	9.62
1,2,4-Trichlorobenzene	ND		19	4.2	ppb v/v			01/29/18 19:38	9.62
1,1,1-Trichloroethane	ND		2.9	0.63	ppb v/v			01/29/18 19:38	9.62
1,1,2-Trichloroethane	ND		3.8	0.64	ppb v/v			01/29/18 19:38	9.62
Trichloroethene	ND		3.8	1.0	ppb v/v			01/29/18 19:38	9.62
Trichlorofluoromethane	ND		3.8	1.9	ppb v/v			01/29/18 19:38	9.62
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.8	1.6	ppb v/v			01/29/18 19:38	9.62
1,2,4-Trimethylbenzene	ND		7.7	1.6	ppb v/v			01/29/18 19:38	9.62
1,3,5-Trimethylbenzene	ND		3.8	1.2	ppb v/v			01/29/18 19:38	9.62
Vinyl acetate	ND		7.7	1.4	ppb v/v			01/29/18 19:38	9.62
Vinyl chloride	ND		3.8	1.2	ppb v/v			01/29/18 19:38	9.62
m,p-Xylene	1.0	J	7.7	0.96	ppb v/v			01/29/18 19:38	9.62
o-Xylene	ND		3.8	0.52	ppb v/v			01/29/18 19:38	9.62
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	35	J	110	4.1	ug/m3			01/29/18 19:38	9.62
Benzene	5.2	J	12	2.4	ug/m3			01/29/18 19:38	9.62
Benzyl chloride	ND		40	8.1	ug/m3			01/29/18 19:38	9.62
Bromodichloromethane	92		19	4.3	ug/m3			01/29/18 19:38	9.62
Bromoform	ND		40	7.0	ug/m3			01/29/18 19:38	9.62
Bromomethane	ND		30	13	ug/m3			01/29/18 19:38	9.62
2-Butanone (MEK)	ND		23	5.6	ug/m3			01/29/18 19:38	9.62
Carbon disulfide	85		24	2.3	ug/m3			01/29/18 19:38	9.62
Carbon tetrachloride	ND		48	3.9	ug/m3			01/29/18 19:38	9.62
Chlorobenzene	ND		13	2.8	ug/m3			01/29/18 19:38	9.62
Dibromochloromethane	14	J	33	6.5	ug/m3			01/29/18 19:38	9.62
Chloroethane	16	J	20	7.8	ug/m3			01/29/18 19:38	9.62
Chloroform	1200		14	4.5	ug/m3			01/29/18 19:38	9.62
Chloromethane	4.2	J	16	3.9	ug/m3			01/29/18 19:38	9.62
1,2-Dibromoethane (EDB)	ND		59	5.5	ug/m3			01/29/18 19:38	9.62
1,2-Dichlorobenzene	ND		23	7.5	ug/m3			01/29/18 19:38	9.62
1,3-Dichlorobenzene	ND		23	6.4	ug/m3			01/29/18 19:38	9.62
1,4-Dichlorobenzene	ND		23	8.6	ug/m3			01/29/18 19:38	9.62
Dichlorodifluoromethane	ND		19	6.9	ug/m3			01/29/18 19:38	9.62
1,1-Dichloroethane	ND		12	2.8	ug/m3			01/29/18 19:38	9.62
1,2-Dichloroethane	ND		31	3.4	ug/m3			01/29/18 19:38	9.62
1,1-Dichloroethene	7.1	J	31	4.9	ug/m3			01/29/18 19:38	9.62
cis-1,2-Dichloroethene	ND		15	3.4	ug/m3			01/29/18 19:38	9.62
trans-1,2-Dichloroethene	ND		15	3.8	ug/m3			01/29/18 19:38	9.62
1,2-Dichloropropane	ND		18	11	ug/m3			01/29/18 19:38	9.62
cis-1,3-Dichloropropene	ND		17	4.5	ug/m3			01/29/18 19:38	9.62
trans-1,3-Dichloropropene	ND		17	3.8	ug/m3			01/29/18 19:38	9.62
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		27	10	ug/m3			01/29/18 19:38	9.62

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-01B

Lab Sample ID: 320-35129-11

Date Collected: 01/11/18 08:22

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		17	2.6	ug/m3			01/29/18 19:38	9.62
4-Ethyltoluene	ND		19	8.8	ug/m3			01/29/18 19:38	9.62
Hexachlorobutadiene	ND		210	44	ug/m3			01/29/18 19:38	9.62
2-Hexanone	ND		16	3.4	ug/m3			01/29/18 19:38	9.62
Methylene Chloride	37		13	2.4	ug/m3			01/29/18 19:38	9.62
4-Methyl-2-pentanone (MIBK)	ND		16	5.3	ug/m3			01/29/18 19:38	9.62
Styrene	ND		16	2.4	ug/m3			01/29/18 19:38	9.62
1,1,2,2-Tetrachloroethane	ND		26	4.6	ug/m3			01/29/18 19:38	9.62
Tetrachloroethene	4.0	J	26	3.3	ug/m3			01/29/18 19:38	9.62
Toluene	1100		15	1.8	ug/m3			01/29/18 19:38	9.62
1,2,4-Trichlorobenzene	ND		140	31	ug/m3			01/29/18 19:38	9.62
1,1,1-Trichloroethane	ND		16	3.4	ug/m3			01/29/18 19:38	9.62
1,1,2-Trichloroethane	ND		21	3.5	ug/m3			01/29/18 19:38	9.62
Trichloroethene	ND		21	5.4	ug/m3			01/29/18 19:38	9.62
Trichlorofluoromethane	ND		22	11	ug/m3			01/29/18 19:38	9.62
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		29	12	ug/m3			01/29/18 19:38	9.62
1,2,4-Trimethylbenzene	ND		38	7.7	ug/m3			01/29/18 19:38	9.62
1,3,5-Trimethylbenzene	ND		19	5.9	ug/m3			01/29/18 19:38	9.62
Vinyl acetate	ND		27	4.9	ug/m3			01/29/18 19:38	9.62
Vinyl chloride	ND		9.8	3.0	ug/m3			01/29/18 19:38	9.62
m,p-Xylene	4.5	J	33	4.2	ug/m3			01/29/18 19:38	9.62
o-Xylene	ND		17	2.3	ug/m3			01/29/18 19:38	9.62
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		70 - 130					01/29/18 19:38	9.62
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					01/29/18 19:38	9.62
Toluene-d8 (Surr)	106		70 - 130					01/29/18 19:38	9.62

Client Sample ID: HOU-02

Lab Sample ID: 320-35129-12

Date Collected: 01/11/18 08:35

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	6.7		5.0	0.18	ppb v/v			01/29/18 20:37	1
Benzene	0.19	J	0.40	0.079	ppb v/v			01/29/18 20:37	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/29/18 20:37	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			01/29/18 20:37	1
Bromoform	ND		0.40	0.070	ppb v/v			01/29/18 20:37	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/29/18 20:37	1
2-Butanone (MEK)	0.92		0.80	0.20	ppb v/v			01/29/18 20:37	1
Carbon disulfide	2.0		0.80	0.078	ppb v/v			01/29/18 20:37	1
Carbon tetrachloride	0.069	J	0.80	0.064	ppb v/v			01/29/18 20:37	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			01/29/18 20:37	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			01/29/18 20:37	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/29/18 20:37	1
Chloroform	0.34		0.30	0.095	ppb v/v			01/29/18 20:37	1
Chloromethane	1.1		0.80	0.20	ppb v/v			01/29/18 20:37	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-02

Lab Sample ID: 320-35129-12

Date Collected: 01/11/18 08:35

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/29/18 20:37	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/29/18 20:37	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/29/18 20:37	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			01/29/18 20:37	1
Dichlorodifluoromethane	0.48		0.40	0.15	ppb v/v			01/29/18 20:37	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/29/18 20:37	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			01/29/18 20:37	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/29/18 20:37	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			01/29/18 20:37	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			01/29/18 20:37	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/29/18 20:37	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/29/18 20:37	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/29/18 20:37	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/29/18 20:37	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			01/29/18 20:37	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/29/18 20:37	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/29/18 20:37	1
2-Hexanone	ND		0.40	0.087	ppb v/v			01/29/18 20:37	1
Methylene Chloride	0.23 J		0.40	0.072	ppb v/v			01/29/18 20:37	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/29/18 20:37	1
Styrene	ND		0.40	0.059	ppb v/v			01/29/18 20:37	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/29/18 20:37	1
Tetrachloroethene	0.62		0.40	0.051	ppb v/v			01/29/18 20:37	1
Toluene	0.78		0.40	0.051	ppb v/v			01/29/18 20:37	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/29/18 20:37	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/29/18 20:37	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/29/18 20:37	1
Trichloroethene	ND		0.40	0.11	ppb v/v			01/29/18 20:37	1
Trichlorofluoromethane	0.36 J		0.40	0.20	ppb v/v			01/29/18 20:37	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/29/18 20:37	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			01/29/18 20:37	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			01/29/18 20:37	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			01/29/18 20:37	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			01/29/18 20:37	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			01/29/18 20:37	1
o-Xylene	0.11 J		0.40	0.054	ppb v/v			01/29/18 20:37	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	16		12	0.42	ug/m3			01/29/18 20:37	1
Benzene	0.61 J		1.3	0.25	ug/m3			01/29/18 20:37	1
Benzyl chloride	ND		4.1	0.84	ug/m3			01/29/18 20:37	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			01/29/18 20:37	1
Bromoform	ND		4.1	0.72	ug/m3			01/29/18 20:37	1
Bromomethane	ND		3.1	1.3	ug/m3			01/29/18 20:37	1
2-Butanone (MEK)	2.7		2.4	0.59	ug/m3			01/29/18 20:37	1
Carbon disulfide	6.3		2.5	0.24	ug/m3			01/29/18 20:37	1
Carbon tetrachloride	0.43 J		5.0	0.40	ug/m3			01/29/18 20:37	1
Chlorobenzene	ND		1.4	0.29	ug/m3			01/29/18 20:37	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			01/29/18 20:37	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-02

Lab Sample ID: 320-35129-12

Date Collected: 01/11/18 08:35

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		2.1	0.81	ug/m3			01/29/18 20:37	1
Chloroform	1.6		1.5	0.46	ug/m3			01/29/18 20:37	1
Chloromethane	2.4		1.7	0.41	ug/m3			01/29/18 20:37	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			01/29/18 20:37	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			01/29/18 20:37	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			01/29/18 20:37	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			01/29/18 20:37	1
Dichlorodifluoromethane	2.4		2.0	0.72	ug/m3			01/29/18 20:37	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			01/29/18 20:37	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			01/29/18 20:37	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			01/29/18 20:37	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			01/29/18 20:37	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			01/29/18 20:37	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			01/29/18 20:37	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			01/29/18 20:37	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			01/29/18 20:37	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			01/29/18 20:37	1
Ethylbenzene	ND		1.7	0.27	ug/m3			01/29/18 20:37	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			01/29/18 20:37	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			01/29/18 20:37	1
2-Hexanone	ND		1.6	0.36	ug/m3			01/29/18 20:37	1
Methylene Chloride	0.80 J		1.4	0.25	ug/m3			01/29/18 20:37	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			01/29/18 20:37	1
Styrene	ND		1.7	0.25	ug/m3			01/29/18 20:37	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			01/29/18 20:37	1
Tetrachloroethene	4.2		2.7	0.35	ug/m3			01/29/18 20:37	1
Toluene	2.9		1.5	0.19	ug/m3			01/29/18 20:37	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			01/29/18 20:37	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			01/29/18 20:37	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			01/29/18 20:37	1
Trichloroethene	ND		2.1	0.56	ug/m3			01/29/18 20:37	1
Trichlorofluoromethane	2.0 J		2.2	1.1	ug/m3			01/29/18 20:37	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			01/29/18 20:37	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			01/29/18 20:37	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			01/29/18 20:37	1
Vinyl acetate	ND		2.8	0.51	ug/m3			01/29/18 20:37	1
Vinyl chloride	ND		1.0	0.31	ug/m3			01/29/18 20:37	1
m,p-Xylene	ND		3.5	0.43	ug/m3			01/29/18 20:37	1
o-Xylene	0.46 J		1.7	0.23	ug/m3			01/29/18 20:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		70 - 130					01/29/18 20:37	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					01/29/18 20:37	1
Toluene-d8 (Surr)	101		70 - 130					01/29/18 20:37	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-03

Lab Sample ID: 320-35129-13

Date Collected: 01/11/18 08:57

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.5		5.0	0.18	ppb v/v			01/29/18 21:37	1
Benzene	0.47		0.40	0.079	ppb v/v			01/29/18 21:37	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/29/18 21:37	1
Bromodichloromethane	1.9		0.30	0.066	ppb v/v			01/29/18 21:37	1
Bromoform	ND		0.40	0.070	ppb v/v			01/29/18 21:37	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/29/18 21:37	1
2-Butanone (MEK)	1.2		0.80	0.20	ppb v/v			01/29/18 21:37	1
Carbon disulfide	5.4		0.80	0.078	ppb v/v			01/29/18 21:37	1
Carbon tetrachloride	0.083	J	0.80	0.064	ppb v/v			01/29/18 21:37	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			01/29/18 21:37	1
Dibromochloromethane	0.35	J	0.40	0.079	ppb v/v			01/29/18 21:37	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/29/18 21:37	1
Chloroform	5.7		0.30	0.095	ppb v/v			01/29/18 21:37	1
Chloromethane	0.62	J	0.80	0.20	ppb v/v			01/29/18 21:37	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/29/18 21:37	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/29/18 21:37	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/29/18 21:37	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			01/29/18 21:37	1
Dichlorodifluoromethane	0.45		0.40	0.15	ppb v/v			01/29/18 21:37	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/29/18 21:37	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			01/29/18 21:37	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/29/18 21:37	1
cis-1,2-Dichloroethene	4.9		0.40	0.089	ppb v/v			01/29/18 21:37	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			01/29/18 21:37	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/29/18 21:37	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/29/18 21:37	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/29/18 21:37	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/29/18 21:37	1
Ethylbenzene	0.10	J	0.40	0.063	ppb v/v			01/29/18 21:37	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/29/18 21:37	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/29/18 21:37	1
2-Hexanone	ND		0.40	0.087	ppb v/v			01/29/18 21:37	1
Methylene Chloride	2.4		0.40	0.072	ppb v/v			01/29/18 21:37	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/29/18 21:37	1
Styrene	ND		0.40	0.059	ppb v/v			01/29/18 21:37	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/29/18 21:37	1
Tetrachloroethene	46		0.40	0.051	ppb v/v			01/29/18 21:37	1
Toluene	1.3		0.40	0.051	ppb v/v			01/29/18 21:37	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/29/18 21:37	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/29/18 21:37	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/29/18 21:37	1
Trichloroethene	1.9		0.40	0.11	ppb v/v			01/29/18 21:37	1
Trichlorofluoromethane	0.41		0.40	0.20	ppb v/v			01/29/18 21:37	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/29/18 21:37	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			01/29/18 21:37	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			01/29/18 21:37	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			01/29/18 21:37	1
Vinyl chloride	0.71		0.40	0.12	ppb v/v			01/29/18 21:37	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-03

Lab Sample ID: 320-35129-13

Date Collected: 01/11/18 08:57

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.24	J	0.80	0.10	ppb v/v			01/29/18 21:37	1
o-Xylene	0.16	J	0.40	0.054	ppb v/v			01/29/18 21:37	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	18		12	0.42	ug/m3			01/29/18 21:37	1
Benzene	1.5		1.3	0.25	ug/m3			01/29/18 21:37	1
Benzyl chloride	ND		4.1	0.84	ug/m3			01/29/18 21:37	1
Bromodichloromethane	13		2.0	0.44	ug/m3			01/29/18 21:37	1
Bromoform	ND		4.1	0.72	ug/m3			01/29/18 21:37	1
Bromomethane	ND		3.1	1.3	ug/m3			01/29/18 21:37	1
2-Butanone (MEK)	3.4		2.4	0.59	ug/m3			01/29/18 21:37	1
Carbon disulfide	17		2.5	0.24	ug/m3			01/29/18 21:37	1
Carbon tetrachloride	0.52	J	5.0	0.40	ug/m3			01/29/18 21:37	1
Chlorobenzene	ND		1.4	0.29	ug/m3			01/29/18 21:37	1
Dibromochloromethane	3.0	J	3.4	0.67	ug/m3			01/29/18 21:37	1
Chloroethane	ND		2.1	0.81	ug/m3			01/29/18 21:37	1
Chloroform	28		1.5	0.46	ug/m3			01/29/18 21:37	1
Chloromethane	1.3	J	1.7	0.41	ug/m3			01/29/18 21:37	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			01/29/18 21:37	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			01/29/18 21:37	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			01/29/18 21:37	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			01/29/18 21:37	1
Dichlorodifluoromethane	2.2		2.0	0.72	ug/m3			01/29/18 21:37	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			01/29/18 21:37	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			01/29/18 21:37	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			01/29/18 21:37	1
cis-1,2-Dichloroethene	19		1.6	0.35	ug/m3			01/29/18 21:37	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			01/29/18 21:37	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			01/29/18 21:37	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			01/29/18 21:37	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			01/29/18 21:37	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			01/29/18 21:37	1
Ethylbenzene	0.43	J	1.7	0.27	ug/m3			01/29/18 21:37	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			01/29/18 21:37	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			01/29/18 21:37	1
2-Hexanone	ND		1.6	0.36	ug/m3			01/29/18 21:37	1
Methylene Chloride	8.4		1.4	0.25	ug/m3			01/29/18 21:37	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			01/29/18 21:37	1
Styrene	ND		1.7	0.25	ug/m3			01/29/18 21:37	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			01/29/18 21:37	1
Tetrachloroethene	310		2.7	0.35	ug/m3			01/29/18 21:37	1
Toluene	4.7		1.5	0.19	ug/m3			01/29/18 21:37	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			01/29/18 21:37	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			01/29/18 21:37	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			01/29/18 21:37	1
Trichloroethene	10		2.1	0.56	ug/m3			01/29/18 21:37	1
Trichlorofluoromethane	2.3		2.2	1.1	ug/m3			01/29/18 21:37	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			01/29/18 21:37	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			01/29/18 21:37	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-03

Lab Sample ID: 320-35129-13

Date Collected: 01/11/18 08:57

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			01/29/18 21:37	1
Vinyl acetate	ND		2.8	0.51	ug/m3			01/29/18 21:37	1
Vinyl chloride	1.8		1.0	0.31	ug/m3			01/29/18 21:37	1
m,p-Xylene	1.0	J	3.5	0.43	ug/m3			01/29/18 21:37	1
o-Xylene	0.68	J	1.7	0.23	ug/m3			01/29/18 21:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130					01/29/18 21:37	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					01/29/18 21:37	1
Toluene-d8 (Surr)	101		70 - 130					01/29/18 21:37	1

Client Sample ID: HOU-03B

Lab Sample ID: 320-35129-14

Date Collected: 01/11/18 09:04

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	12		5.0	0.18	ppb v/v			01/29/18 22:37	1
Benzene	0.61		0.40	0.079	ppb v/v			01/29/18 22:37	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/29/18 22:37	1
Bromodichloromethane	1.7		0.30	0.066	ppb v/v			01/29/18 22:37	1
Bromoform	ND		0.40	0.070	ppb v/v			01/29/18 22:37	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/29/18 22:37	1
2-Butanone (MEK)	1.3		0.80	0.20	ppb v/v			01/29/18 22:37	1
Carbon disulfide	21		0.80	0.078	ppb v/v			01/29/18 22:37	1
Carbon tetrachloride	0.081	J	0.80	0.064	ppb v/v			01/29/18 22:37	1
Chlorobenzene	0.23	J	0.30	0.064	ppb v/v			01/29/18 22:37	1
Dibromochloromethane	0.29	J	0.40	0.079	ppb v/v			01/29/18 22:37	1
Chloroethane	0.57	J	0.80	0.31	ppb v/v			01/29/18 22:37	1
Chloroform	10		0.30	0.095	ppb v/v			01/29/18 22:37	1
Chloromethane	1.5		0.80	0.20	ppb v/v			01/29/18 22:37	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/29/18 22:37	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/29/18 22:37	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/29/18 22:37	1
1,4-Dichlorobenzene	1.2		0.40	0.15	ppb v/v			01/29/18 22:37	1
Dichlorodifluoromethane	0.44		0.40	0.15	ppb v/v			01/29/18 22:37	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/29/18 22:37	1
1,2-Dichloroethane	0.10	J	0.80	0.088	ppb v/v			01/29/18 22:37	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/29/18 22:37	1
cis-1,2-Dichloroethene	0.21	J	0.40	0.089	ppb v/v			01/29/18 22:37	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			01/29/18 22:37	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/29/18 22:37	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/29/18 22:37	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/29/18 22:37	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/29/18 22:37	1
Ethylbenzene	0.50		0.40	0.063	ppb v/v			01/29/18 22:37	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/29/18 22:37	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/29/18 22:37	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-03B

Lab Sample ID: 320-35129-14

Date Collected: 01/11/18 09:04

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		0.40	0.087	ppb v/v			01/29/18 22:37	1
Methylene Chloride	1.5		0.40	0.072	ppb v/v			01/29/18 22:37	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/29/18 22:37	1
Styrene	ND		0.40	0.059	ppb v/v			01/29/18 22:37	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/29/18 22:37	1
Tetrachloroethene	0.69		0.40	0.051	ppb v/v			01/29/18 22:37	1
Toluene	4.5		0.40	0.051	ppb v/v			01/29/18 22:37	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/29/18 22:37	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/29/18 22:37	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/29/18 22:37	1
Trichloroethene	0.23	J	0.40	0.11	ppb v/v			01/29/18 22:37	1
Trichlorofluoromethane	0.33	J	0.40	0.20	ppb v/v			01/29/18 22:37	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/29/18 22:37	1
1,2,4-Trimethylbenzene	2.1		0.80	0.16	ppb v/v			01/29/18 22:37	1
1,3,5-Trimethylbenzene	0.30	J	0.40	0.13	ppb v/v			01/29/18 22:37	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			01/29/18 22:37	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			01/29/18 22:37	1
m,p-Xylene	1.7		0.80	0.10	ppb v/v			01/29/18 22:37	1
o-Xylene	0.51		0.40	0.054	ppb v/v			01/29/18 22:37	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	29		12	0.42	ug/m3			01/29/18 22:37	1
Benzene	1.9		1.3	0.25	ug/m3			01/29/18 22:37	1
Benzyl chloride	ND		4.1	0.84	ug/m3			01/29/18 22:37	1
Bromodichloromethane	12		2.0	0.44	ug/m3			01/29/18 22:37	1
Bromoform	ND		4.1	0.72	ug/m3			01/29/18 22:37	1
Bromomethane	ND		3.1	1.3	ug/m3			01/29/18 22:37	1
2-Butanone (MEK)	3.9		2.4	0.59	ug/m3			01/29/18 22:37	1
Carbon disulfide	67		2.5	0.24	ug/m3			01/29/18 22:37	1
Carbon tetrachloride	0.51	J	5.0	0.40	ug/m3			01/29/18 22:37	1
Chlorobenzene	1.1	J	1.4	0.29	ug/m3			01/29/18 22:37	1
Dibromochloromethane	2.5	J	3.4	0.67	ug/m3			01/29/18 22:37	1
Chloroethane	1.5	J	2.1	0.81	ug/m3			01/29/18 22:37	1
Chloroform	50		1.5	0.46	ug/m3			01/29/18 22:37	1
Chloromethane	3.1		1.7	0.41	ug/m3			01/29/18 22:37	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			01/29/18 22:37	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			01/29/18 22:37	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			01/29/18 22:37	1
1,4-Dichlorobenzene	7.3		2.4	0.90	ug/m3			01/29/18 22:37	1
Dichlorodifluoromethane	2.2		2.0	0.72	ug/m3			01/29/18 22:37	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			01/29/18 22:37	1
1,2-Dichloroethane	0.41	J	3.2	0.36	ug/m3			01/29/18 22:37	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			01/29/18 22:37	1
cis-1,2-Dichloroethene	0.82	J	1.6	0.35	ug/m3			01/29/18 22:37	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			01/29/18 22:37	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			01/29/18 22:37	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			01/29/18 22:37	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			01/29/18 22:37	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			01/29/18 22:37	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-03B

Lab Sample ID: 320-35129-14

Date Collected: 01/11/18 09:04

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	2.2		1.7	0.27	ug/m3			01/29/18 22:37	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			01/29/18 22:37	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			01/29/18 22:37	1
2-Hexanone	ND		1.6	0.36	ug/m3			01/29/18 22:37	1
Methylene Chloride	5.1		1.4	0.25	ug/m3			01/29/18 22:37	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			01/29/18 22:37	1
Styrene	ND		1.7	0.25	ug/m3			01/29/18 22:37	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			01/29/18 22:37	1
Tetrachloroethene	4.7		2.7	0.35	ug/m3			01/29/18 22:37	1
Toluene	17		1.5	0.19	ug/m3			01/29/18 22:37	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			01/29/18 22:37	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			01/29/18 22:37	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			01/29/18 22:37	1
Trichloroethene	1.2	J	2.1	0.56	ug/m3			01/29/18 22:37	1
Trichlorofluoromethane	1.9	J	2.2	1.1	ug/m3			01/29/18 22:37	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			01/29/18 22:37	1
1,2,4-Trimethylbenzene	10		3.9	0.80	ug/m3			01/29/18 22:37	1
1,3,5-Trimethylbenzene	1.5	J	2.0	0.61	ug/m3			01/29/18 22:37	1
Vinyl acetate	ND		2.8	0.51	ug/m3			01/29/18 22:37	1
Vinyl chloride	ND		1.0	0.31	ug/m3			01/29/18 22:37	1
m,p-Xylene	7.3		3.5	0.43	ug/m3			01/29/18 22:37	1
o-Xylene	2.2		1.7	0.23	ug/m3			01/29/18 22:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					01/29/18 22:37	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					01/29/18 22:37	1
Toluene-d8 (Surr)	101		70 - 130					01/29/18 22:37	1

Client Sample ID: HOU-04

Lab Sample ID: 320-35129-15

Date Collected: 01/11/18 07:52

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.6		5.0	0.18	ppb v/v			01/29/18 23:36	1
Benzene	0.57		0.40	0.079	ppb v/v			01/29/18 23:36	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/29/18 23:36	1
Bromodichloromethane	2.9		0.30	0.066	ppb v/v			01/29/18 23:36	1
Bromoform	ND		0.40	0.070	ppb v/v			01/29/18 23:36	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/29/18 23:36	1
2-Butanone (MEK)	0.83		0.80	0.20	ppb v/v			01/29/18 23:36	1
Carbon disulfide	6.7		0.80	0.078	ppb v/v			01/29/18 23:36	1
Carbon tetrachloride	0.082	J	0.80	0.064	ppb v/v			01/29/18 23:36	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			01/29/18 23:36	1
Dibromochloromethane	0.44		0.40	0.079	ppb v/v			01/29/18 23:36	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/29/18 23:36	1
Chloroform	9.8		0.30	0.095	ppb v/v			01/29/18 23:36	1
Chloromethane	0.53	J	0.80	0.20	ppb v/v			01/29/18 23:36	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-04

Lab Sample ID: 320-35129-15

Date Collected: 01/11/18 07:52

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/29/18 23:36	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/29/18 23:36	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/29/18 23:36	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			01/29/18 23:36	1
Dichlorodifluoromethane	0.47		0.40	0.15	ppb v/v			01/29/18 23:36	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/29/18 23:36	1
1,2-Dichloroethane	0.092	J	0.80	0.088	ppb v/v			01/29/18 23:36	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/29/18 23:36	1
cis-1,2-Dichloroethene	3.9		0.40	0.089	ppb v/v			01/29/18 23:36	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			01/29/18 23:36	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/29/18 23:36	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/29/18 23:36	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/29/18 23:36	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/29/18 23:36	1
Ethylbenzene	0.097	J	0.40	0.063	ppb v/v			01/29/18 23:36	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/29/18 23:36	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/29/18 23:36	1
2-Hexanone	ND		0.40	0.087	ppb v/v			01/29/18 23:36	1
Methylene Chloride	1.3		0.40	0.072	ppb v/v			01/29/18 23:36	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/29/18 23:36	1
Styrene	ND		0.40	0.059	ppb v/v			01/29/18 23:36	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/29/18 23:36	1
Tetrachloroethene	26		0.40	0.051	ppb v/v			01/29/18 23:36	1
Toluene	6.4		0.40	0.051	ppb v/v			01/29/18 23:36	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/29/18 23:36	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/29/18 23:36	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/29/18 23:36	1
Trichloroethene	1.8		0.40	0.11	ppb v/v			01/29/18 23:36	1
Trichlorofluoromethane	0.46		0.40	0.20	ppb v/v			01/29/18 23:36	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/29/18 23:36	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			01/29/18 23:36	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			01/29/18 23:36	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			01/29/18 23:36	1
Vinyl chloride	0.16	J	0.40	0.12	ppb v/v			01/29/18 23:36	1
m,p-Xylene	0.36	J	0.80	0.10	ppb v/v			01/29/18 23:36	1
o-Xylene	0.14	J	0.40	0.054	ppb v/v			01/29/18 23:36	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	18		12	0.42	ug/m3			01/29/18 23:36	1
Benzene	1.8		1.3	0.25	ug/m3			01/29/18 23:36	1
Benzyl chloride	ND		4.1	0.84	ug/m3			01/29/18 23:36	1
Bromodichloromethane	19		2.0	0.44	ug/m3			01/29/18 23:36	1
Bromoform	ND		4.1	0.72	ug/m3			01/29/18 23:36	1
Bromomethane	ND		3.1	1.3	ug/m3			01/29/18 23:36	1
2-Butanone (MEK)	2.5		2.4	0.59	ug/m3			01/29/18 23:36	1
Carbon disulfide	21		2.5	0.24	ug/m3			01/29/18 23:36	1
Carbon tetrachloride	0.52	J	5.0	0.40	ug/m3			01/29/18 23:36	1
Chlorobenzene	ND		1.4	0.29	ug/m3			01/29/18 23:36	1
Dibromochloromethane	3.7		3.4	0.67	ug/m3			01/29/18 23:36	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-04

Lab Sample ID: 320-35129-15

Date Collected: 01/11/18 07:52

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		2.1	0.81	ug/m3			01/29/18 23:36	1
Chloroform	48		1.5	0.46	ug/m3			01/29/18 23:36	1
Chloromethane	1.1	J	1.7	0.41	ug/m3			01/29/18 23:36	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			01/29/18 23:36	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			01/29/18 23:36	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			01/29/18 23:36	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			01/29/18 23:36	1
Dichlorodifluoromethane	2.3		2.0	0.72	ug/m3			01/29/18 23:36	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			01/29/18 23:36	1
1,2-Dichloroethane	0.37	J	3.2	0.36	ug/m3			01/29/18 23:36	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			01/29/18 23:36	1
cis-1,2-Dichloroethene	15		1.6	0.35	ug/m3			01/29/18 23:36	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			01/29/18 23:36	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			01/29/18 23:36	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			01/29/18 23:36	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			01/29/18 23:36	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			01/29/18 23:36	1
Ethylbenzene	0.42	J	1.7	0.27	ug/m3			01/29/18 23:36	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			01/29/18 23:36	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			01/29/18 23:36	1
2-Hexanone	ND		1.6	0.36	ug/m3			01/29/18 23:36	1
Methylene Chloride	4.4		1.4	0.25	ug/m3			01/29/18 23:36	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			01/29/18 23:36	1
Styrene	ND		1.7	0.25	ug/m3			01/29/18 23:36	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			01/29/18 23:36	1
Tetrachloroethene	180		2.7	0.35	ug/m3			01/29/18 23:36	1
Toluene	24		1.5	0.19	ug/m3			01/29/18 23:36	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			01/29/18 23:36	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			01/29/18 23:36	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			01/29/18 23:36	1
Trichloroethene	9.5		2.1	0.56	ug/m3			01/29/18 23:36	1
Trichlorofluoromethane	2.6		2.2	1.1	ug/m3			01/29/18 23:36	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			01/29/18 23:36	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			01/29/18 23:36	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			01/29/18 23:36	1
Vinyl acetate	ND		2.8	0.51	ug/m3			01/29/18 23:36	1
Vinyl chloride	0.41	J	1.0	0.31	ug/m3			01/29/18 23:36	1
m,p-Xylene	1.6	J	3.5	0.43	ug/m3			01/29/18 23:36	1
o-Xylene	0.59	J	1.7	0.23	ug/m3			01/29/18 23:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130		01/29/18 23:36	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 130		01/29/18 23:36	1
Toluene-d8 (Surr)	101		70 - 130		01/29/18 23:36	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-BKG-01

Lab Sample ID: 320-35129-16

Date Collected: 01/11/18 09:10

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	18		5.0	0.18	ppb v/v			01/30/18 00:36	1
Benzene	0.68		0.40	0.079	ppb v/v			01/30/18 00:36	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/30/18 00:36	1
Bromodichloromethane	4.5		0.30	0.066	ppb v/v			01/30/18 00:36	1
Bromoform	ND		0.40	0.070	ppb v/v			01/30/18 00:36	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/30/18 00:36	1
2-Butanone (MEK)	1.6		0.80	0.20	ppb v/v			01/30/18 00:36	1
Carbon disulfide	40		0.80	0.078	ppb v/v			01/30/18 00:36	1
Carbon tetrachloride	0.095	J	0.80	0.064	ppb v/v			01/30/18 00:36	1
Chlorobenzene	0.50		0.30	0.064	ppb v/v			01/30/18 00:36	1
Dibromochloromethane	0.78		0.40	0.079	ppb v/v			01/30/18 00:36	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/30/18 00:36	1
Chloroform	18		0.30	0.095	ppb v/v			01/30/18 00:36	1
Chloromethane	1.3		0.80	0.20	ppb v/v			01/30/18 00:36	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/30/18 00:36	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/30/18 00:36	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/30/18 00:36	1
1,4-Dichlorobenzene	0.70		0.40	0.15	ppb v/v			01/30/18 00:36	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			01/30/18 00:36	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/30/18 00:36	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			01/30/18 00:36	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/30/18 00:36	1
cis-1,2-Dichloroethene	0.11	J	0.40	0.089	ppb v/v			01/30/18 00:36	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			01/30/18 00:36	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/30/18 00:36	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/30/18 00:36	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/30/18 00:36	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 00:36	1
Ethylbenzene	0.29	J	0.40	0.063	ppb v/v			01/30/18 00:36	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/30/18 00:36	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/30/18 00:36	1
2-Hexanone	ND		0.40	0.087	ppb v/v			01/30/18 00:36	1
Methylene Chloride	3.6		0.40	0.072	ppb v/v			01/30/18 00:36	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/30/18 00:36	1
Styrene	0.064	J	0.40	0.059	ppb v/v			01/30/18 00:36	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/30/18 00:36	1
Tetrachloroethene	0.30	J	0.40	0.051	ppb v/v			01/30/18 00:36	1
Toluene	13		0.40	0.051	ppb v/v			01/30/18 00:36	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/30/18 00:36	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/30/18 00:36	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/30/18 00:36	1
Trichloroethene	0.24	J	0.40	0.11	ppb v/v			01/30/18 00:36	1
Trichlorofluoromethane	0.62		0.40	0.20	ppb v/v			01/30/18 00:36	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 00:36	1
1,2,4-Trimethylbenzene	0.48	J	0.80	0.16	ppb v/v			01/30/18 00:36	1
1,3,5-Trimethylbenzene	0.17	J	0.40	0.13	ppb v/v			01/30/18 00:36	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			01/30/18 00:36	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			01/30/18 00:36	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-BKG-01

Lab Sample ID: 320-35129-16

Date Collected: 01/11/18 09:10

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	0.65	J	0.80	0.10	ppb v/v			01/30/18 00:36	1
o-Xylene	0.26	J	0.40	0.054	ppb v/v			01/30/18 00:36	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	42		12	0.42	ug/m3			01/30/18 00:36	1
Benzene	2.2		1.3	0.25	ug/m3			01/30/18 00:36	1
Benzyl chloride	ND		4.1	0.84	ug/m3			01/30/18 00:36	1
Bromodichloromethane	30		2.0	0.44	ug/m3			01/30/18 00:36	1
Bromoform	ND		4.1	0.72	ug/m3			01/30/18 00:36	1
Bromomethane	ND		3.1	1.3	ug/m3			01/30/18 00:36	1
2-Butanone (MEK)	4.8		2.4	0.59	ug/m3			01/30/18 00:36	1
Carbon disulfide	130		2.5	0.24	ug/m3			01/30/18 00:36	1
Carbon tetrachloride	0.59	J	5.0	0.40	ug/m3			01/30/18 00:36	1
Chlorobenzene	2.3		1.4	0.29	ug/m3			01/30/18 00:36	1
Dibromochloromethane	6.6		3.4	0.67	ug/m3			01/30/18 00:36	1
Chloroethane	ND		2.1	0.81	ug/m3			01/30/18 00:36	1
Chloroform	87		1.5	0.46	ug/m3			01/30/18 00:36	1
Chloromethane	2.7		1.7	0.41	ug/m3			01/30/18 00:36	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			01/30/18 00:36	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			01/30/18 00:36	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			01/30/18 00:36	1
1,4-Dichlorobenzene	4.2		2.4	0.90	ug/m3			01/30/18 00:36	1
Dichlorodifluoromethane	ND		2.0	0.72	ug/m3			01/30/18 00:36	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			01/30/18 00:36	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			01/30/18 00:36	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			01/30/18 00:36	1
cis-1,2-Dichloroethene	0.43	J	1.6	0.35	ug/m3			01/30/18 00:36	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			01/30/18 00:36	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			01/30/18 00:36	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			01/30/18 00:36	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			01/30/18 00:36	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			01/30/18 00:36	1
Ethylbenzene	1.3	J	1.7	0.27	ug/m3			01/30/18 00:36	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			01/30/18 00:36	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			01/30/18 00:36	1
2-Hexanone	ND		1.6	0.36	ug/m3			01/30/18 00:36	1
Methylene Chloride	13		1.4	0.25	ug/m3			01/30/18 00:36	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			01/30/18 00:36	1
Styrene	0.27	J	1.7	0.25	ug/m3			01/30/18 00:36	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			01/30/18 00:36	1
Tetrachloroethene	2.0	J	2.7	0.35	ug/m3			01/30/18 00:36	1
Toluene	50		1.5	0.19	ug/m3			01/30/18 00:36	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			01/30/18 00:36	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			01/30/18 00:36	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			01/30/18 00:36	1
Trichloroethene	1.3	J	2.1	0.56	ug/m3			01/30/18 00:36	1
Trichlorofluoromethane	3.5		2.2	1.1	ug/m3			01/30/18 00:36	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			01/30/18 00:36	1
1,2,4-Trimethylbenzene	2.4	J	3.9	0.80	ug/m3			01/30/18 00:36	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-BKG-01

Lab Sample ID: 320-35129-16

Date Collected: 01/11/18 09:10

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	0.84	J	2.0	0.61	ug/m3			01/30/18 00:36	1
Vinyl acetate	ND		2.8	0.51	ug/m3			01/30/18 00:36	1
Vinyl chloride	ND		1.0	0.31	ug/m3			01/30/18 00:36	1
m,p-Xylene	2.8	J	3.5	0.43	ug/m3			01/30/18 00:36	1
o-Xylene	1.1	J	1.7	0.23	ug/m3			01/30/18 00:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130					01/30/18 00:36	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 130					01/30/18 00:36	1
Toluene-d8 (Surr)	100		70 - 130					01/30/18 00:36	1

Client Sample ID: HOU-BKG-02

Lab Sample ID: 320-35129-17

Date Collected: 01/11/18 08:45

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	8.5	J	11	0.39	ppb v/v			01/30/18 01:33	2.19
Benzene	0.89		0.88	0.17	ppb v/v			01/30/18 01:33	2.19
Benzyl chloride	ND		1.8	0.36	ppb v/v			01/30/18 01:33	2.19
Bromodichloromethane	6.0		0.66	0.14	ppb v/v			01/30/18 01:33	2.19
Bromoform	ND		0.88	0.15	ppb v/v			01/30/18 01:33	2.19
Bromomethane	ND		1.8	0.73	ppb v/v			01/30/18 01:33	2.19
2-Butanone (MEK)	0.64	J	1.8	0.44	ppb v/v			01/30/18 01:33	2.19
Carbon disulfide	45		1.8	0.17	ppb v/v			01/30/18 01:33	2.19
Carbon tetrachloride	0.70	J	1.8	0.14	ppb v/v			01/30/18 01:33	2.19
Chlorobenzene	0.58	J	0.66	0.14	ppb v/v			01/30/18 01:33	2.19
Dibromochloromethane	0.83	J	0.88	0.17	ppb v/v			01/30/18 01:33	2.19
Chloroethane	1.3	J	1.8	0.67	ppb v/v			01/30/18 01:33	2.19
Chloroform	85		0.66	0.21	ppb v/v			01/30/18 01:33	2.19
Chloromethane	3.3		1.8	0.43	ppb v/v			01/30/18 01:33	2.19
1,2-Dibromoethane (EDB)	ND		1.8	0.16	ppb v/v			01/30/18 01:33	2.19
1,2-Dichlorobenzene	ND		0.88	0.28	ppb v/v			01/30/18 01:33	2.19
1,3-Dichlorobenzene	ND		0.88	0.24	ppb v/v			01/30/18 01:33	2.19
1,4-Dichlorobenzene	6.1		0.88	0.33	ppb v/v			01/30/18 01:33	2.19
Dichlorodifluoromethane	ND		0.88	0.32	ppb v/v			01/30/18 01:33	2.19
1,1-Dichloroethane	0.27	J	0.66	0.16	ppb v/v			01/30/18 01:33	2.19
1,2-Dichloroethane	ND		1.8	0.19	ppb v/v			01/30/18 01:33	2.19
1,1-Dichloroethene	1.1	J	1.8	0.28	ppb v/v			01/30/18 01:33	2.19
cis-1,2-Dichloroethene	4.9		0.88	0.19	ppb v/v			01/30/18 01:33	2.19
trans-1,2-Dichloroethene	ND		0.88	0.22	ppb v/v			01/30/18 01:33	2.19
1,2-Dichloropropane	ND		0.88	0.53	ppb v/v			01/30/18 01:33	2.19
cis-1,3-Dichloropropene	ND		0.88	0.23	ppb v/v			01/30/18 01:33	2.19
trans-1,3-Dichloropropene	ND		0.88	0.19	ppb v/v			01/30/18 01:33	2.19
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.88	0.34	ppb v/v			01/30/18 01:33	2.19
Ethylbenzene	17		0.88	0.14	ppb v/v			01/30/18 01:33	2.19
4-Ethyltoluene	0.47	J	0.88	0.41	ppb v/v			01/30/18 01:33	2.19
Hexachlorobutadiene	ND		4.4	0.95	ppb v/v			01/30/18 01:33	2.19

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-BKG-02

Lab Sample ID: 320-35129-17

Date Collected: 01/11/18 08:45

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		0.88	0.19	ppb v/v			01/30/18 01:33	2.19
Methylene Chloride	12		0.88	0.16	ppb v/v			01/30/18 01:33	2.19
4-Methyl-2-pentanone (MIBK)	ND		0.88	0.30	ppb v/v			01/30/18 01:33	2.19
Styrene	2.6		0.88	0.13	ppb v/v			01/30/18 01:33	2.19
1,1,2,2-Tetrachloroethane	ND		0.88	0.15	ppb v/v			01/30/18 01:33	2.19
Tetrachloroethene	80		0.88	0.11	ppb v/v			01/30/18 01:33	2.19
1,2,4-Trichlorobenzene	ND		4.4	0.95	ppb v/v			01/30/18 01:33	2.19
1,1,1-Trichloroethane	ND		0.66	0.14	ppb v/v			01/30/18 01:33	2.19
1,1,2-Trichloroethane	ND		0.88	0.15	ppb v/v			01/30/18 01:33	2.19
Trichloroethene	5.1		0.88	0.23	ppb v/v			01/30/18 01:33	2.19
Trichlorofluoromethane	0.78 J		0.88	0.43	ppb v/v			01/30/18 01:33	2.19
1,1,2-Trichloro-1,2,2-trifluoroethane	5.1		0.88	0.36	ppb v/v			01/30/18 01:33	2.19
1,2,4-Trimethylbenzene	2.0		1.8	0.35	ppb v/v			01/30/18 01:33	2.19
1,3,5-Trimethylbenzene	1.1		0.88	0.27	ppb v/v			01/30/18 01:33	2.19
Vinyl acetate	ND		1.8	0.32	ppb v/v			01/30/18 01:33	2.19
Vinyl chloride	1.3		0.88	0.26	ppb v/v			01/30/18 01:33	2.19
m,p-Xylene	13		1.8	0.22	ppb v/v			01/30/18 01:33	2.19
o-Xylene	3.7		0.88	0.12	ppb v/v			01/30/18 01:33	2.19
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	20 J		26	0.93	ug/m3			01/30/18 01:33	2.19
Benzene	2.8		2.8	0.55	ug/m3			01/30/18 01:33	2.19
Benzyl chloride	ND		9.1	1.8	ug/m3			01/30/18 01:33	2.19
Bromodichloromethane	40		4.4	0.97	ug/m3			01/30/18 01:33	2.19
Bromoform	ND		9.1	1.6	ug/m3			01/30/18 01:33	2.19
Bromomethane	ND		6.8	2.8	ug/m3			01/30/18 01:33	2.19
2-Butanone (MEK)	1.9 J		5.2	1.3	ug/m3			01/30/18 01:33	2.19
Carbon disulfide	140		5.5	0.53	ug/m3			01/30/18 01:33	2.19
Carbon tetrachloride	4.4 J		11	0.88	ug/m3			01/30/18 01:33	2.19
Chlorobenzene	2.7 J		3.0	0.65	ug/m3			01/30/18 01:33	2.19
Dibromochloromethane	7.1 J		7.5	1.5	ug/m3			01/30/18 01:33	2.19
Chloroethane	3.4 J		4.6	1.8	ug/m3			01/30/18 01:33	2.19
Chloroform	420		3.2	1.0	ug/m3			01/30/18 01:33	2.19
Chloromethane	6.8		3.6	0.89	ug/m3			01/30/18 01:33	2.19
1,2-Dibromoethane (EDB)	ND		13	1.3	ug/m3			01/30/18 01:33	2.19
1,2-Dichlorobenzene	ND		5.3	1.7	ug/m3			01/30/18 01:33	2.19
1,3-Dichlorobenzene	ND		5.3	1.4	ug/m3			01/30/18 01:33	2.19
1,4-Dichlorobenzene	37		5.3	2.0	ug/m3			01/30/18 01:33	2.19
Dichlorodifluoromethane	ND		4.3	1.6	ug/m3			01/30/18 01:33	2.19
1,1-Dichloroethane	1.1 J		2.7	0.64	ug/m3			01/30/18 01:33	2.19
1,2-Dichloroethane	ND		7.1	0.78	ug/m3			01/30/18 01:33	2.19
1,1-Dichloroethene	4.2 J		6.9	1.1	ug/m3			01/30/18 01:33	2.19
cis-1,2-Dichloroethene	20		3.5	0.77	ug/m3			01/30/18 01:33	2.19
trans-1,2-Dichloroethene	ND		3.5	0.87	ug/m3			01/30/18 01:33	2.19
1,2-Dichloropropane	ND		4.0	2.4	ug/m3			01/30/18 01:33	2.19
cis-1,3-Dichloropropene	ND		4.0	1.0	ug/m3			01/30/18 01:33	2.19
trans-1,3-Dichloropropene	ND		4.0	0.87	ug/m3			01/30/18 01:33	2.19
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		6.1	2.4	ug/m3			01/30/18 01:33	2.19

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-BKG-02

Lab Sample ID: 320-35129-17

Date Collected: 01/11/18 08:45

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	72		3.8	0.60	ug/m3			01/30/18 01:33	2.19
4-Ethyltoluene	2.3	J	4.3	2.0	ug/m3			01/30/18 01:33	2.19
Hexachlorobutadiene	ND		47	10	ug/m3			01/30/18 01:33	2.19
2-Hexanone	ND		3.6	0.78	ug/m3			01/30/18 01:33	2.19
Methylene Chloride	43		3.0	0.55	ug/m3			01/30/18 01:33	2.19
4-Methyl-2-pentanone (MIBK)	ND		3.6	1.2	ug/m3			01/30/18 01:33	2.19
Styrene	11		3.7	0.55	ug/m3			01/30/18 01:33	2.19
1,1,2,2-Tetrachloroethane	ND		6.0	1.0	ug/m3			01/30/18 01:33	2.19
Tetrachloroethene	550		5.9	0.76	ug/m3			01/30/18 01:33	2.19
1,2,4-Trichlorobenzene	ND		33	7.0	ug/m3			01/30/18 01:33	2.19
1,1,1-Trichloroethane	ND		3.6	0.78	ug/m3			01/30/18 01:33	2.19
1,1,2-Trichloroethane	ND		4.8	0.80	ug/m3			01/30/18 01:33	2.19
Trichloroethene	28		4.7	1.2	ug/m3			01/30/18 01:33	2.19
Trichlorofluoromethane	4.4	J	4.9	2.4	ug/m3			01/30/18 01:33	2.19
1,1,2-Trichloro-1,2,2-trifluoroethane	39		6.7	2.7	ug/m3			01/30/18 01:33	2.19
1,2,4-Trimethylbenzene	9.9		8.6	1.7	ug/m3			01/30/18 01:33	2.19
1,3,5-Trimethylbenzene	5.5		4.3	1.3	ug/m3			01/30/18 01:33	2.19
Vinyl acetate	ND		6.2	1.1	ug/m3			01/30/18 01:33	2.19
Vinyl chloride	3.3		2.2	0.67	ug/m3			01/30/18 01:33	2.19
m,p-Xylene	57		7.6	0.95	ug/m3			01/30/18 01:33	2.19
o-Xylene	16		3.8	0.51	ug/m3			01/30/18 01:33	2.19
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		70 - 130					01/30/18 01:33	2.19
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					01/30/18 01:33	2.19
Toluene-d8 (Surr)	104		70 - 130					01/30/18 01:33	2.19

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toluene	130		1.4	0.17	ppb v/v			01/31/18 02:58	3.38
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toluene	500		5.1	0.65	ug/m3			01/31/18 02:58	3.38
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	105		70 - 130					01/31/18 02:58	3.38
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					01/31/18 02:58	3.38
Toluene-d8 (Surr)	103		70 - 130					01/31/18 02:58	3.38

Client Sample ID: DUP-1

Lab Sample ID: 320-35129-18

Date Collected: 01/11/18 00:00

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	11	J	45	1.6	ppb v/v			01/30/18 02:29	8.93
Benzene	1.5	J	3.6	0.71	ppb v/v			01/30/18 02:29	8.93
Benzyl chloride	ND		7.1	1.5	ppb v/v			01/30/18 02:29	8.93

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: DUP-1

Lab Sample ID: 320-35129-18

Date Collected: 01/11/18 00:00

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromodichloromethane	12		2.7	0.59	ppb v/v			01/30/18 02:29	8.93
Bromoform	ND		3.6	0.63	ppb v/v			01/30/18 02:29	8.93
Bromomethane	ND		7.1	3.0	ppb v/v			01/30/18 02:29	8.93
2-Butanone (MEK)	ND		7.1	1.8	ppb v/v			01/30/18 02:29	8.93
Carbon disulfide	80		7.1	0.70	ppb v/v			01/30/18 02:29	8.93
Carbon tetrachloride	ND		7.1	0.57	ppb v/v			01/30/18 02:29	8.93
Chlorobenzene	ND		2.7	0.57	ppb v/v			01/30/18 02:29	8.93
Dibromochloromethane	1.4 J		3.6	0.71	ppb v/v			01/30/18 02:29	8.93
Chloroethane	6.5 J		7.1	2.8	ppb v/v			01/30/18 02:29	8.93
Chloroform	300		2.7	0.85	ppb v/v			01/30/18 02:29	8.93
Chloromethane	2.3 J		7.1	1.8	ppb v/v			01/30/18 02:29	8.93
1,2-Dibromoethane (EDB)	ND		7.1	0.67	ppb v/v			01/30/18 02:29	8.93
1,2-Dichlorobenzene	ND		3.6	1.2	ppb v/v			01/30/18 02:29	8.93
1,3-Dichlorobenzene	ND		3.6	0.98	ppb v/v			01/30/18 02:29	8.93
1,4-Dichlorobenzene	ND		3.6	1.3	ppb v/v			01/30/18 02:29	8.93
Dichlorodifluoromethane	ND		3.6	1.3	ppb v/v			01/30/18 02:29	8.93
1,1-Dichloroethane	ND		2.7	0.64	ppb v/v			01/30/18 02:29	8.93
1,2-Dichloroethane	ND		7.1	0.79	ppb v/v			01/30/18 02:29	8.93
1,1-Dichloroethene	2.1 J		7.1	1.2	ppb v/v			01/30/18 02:29	8.93
cis-1,2-Dichloroethene	0.79 J		3.6	0.79	ppb v/v			01/30/18 02:29	8.93
trans-1,2-Dichloroethene	ND		3.6	0.89	ppb v/v			01/30/18 02:29	8.93
1,2-Dichloropropane	ND		3.6	2.1	ppb v/v			01/30/18 02:29	8.93
cis-1,3-Dichloropropene	ND		3.6	0.93	ppb v/v			01/30/18 02:29	8.93
trans-1,3-Dichloropropene	ND		3.6	0.79	ppb v/v			01/30/18 02:29	8.93
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		3.6	1.4	ppb v/v			01/30/18 02:29	8.93
Ethylbenzene	0.72 J		3.6	0.56	ppb v/v			01/30/18 02:29	8.93
4-Ethyltoluene	ND		3.6	1.7	ppb v/v			01/30/18 02:29	8.93
Hexachlorobutadiene	ND		18	3.9	ppb v/v			01/30/18 02:29	8.93
2-Hexanone	ND		3.6	0.78	ppb v/v			01/30/18 02:29	8.93
Methylene Chloride	16		3.6	0.64	ppb v/v			01/30/18 02:29	8.93
4-Methyl-2-pentanone (MIBK)	ND		3.6	1.2	ppb v/v			01/30/18 02:29	8.93
Styrene	ND		3.6	0.53	ppb v/v			01/30/18 02:29	8.93
1,1,2,2-Tetrachloroethane	ND		3.6	0.62	ppb v/v			01/30/18 02:29	8.93
Tetrachloroethene	1.8 J		3.6	0.46	ppb v/v			01/30/18 02:29	8.93
Toluene	310		3.6	0.46	ppb v/v			01/30/18 02:29	8.93
1,2,4-Trichlorobenzene	ND		18	3.9	ppb v/v			01/30/18 02:29	8.93
1,1,1-Trichloroethane	ND		2.7	0.58	ppb v/v			01/30/18 02:29	8.93
1,1,2-Trichloroethane	ND		3.6	0.60	ppb v/v			01/30/18 02:29	8.93
Trichloroethene	2.5 J		3.6	0.94	ppb v/v			01/30/18 02:29	8.93
Trichlorofluoromethane	ND		3.6	1.8	ppb v/v			01/30/18 02:29	8.93
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.6	1.5	ppb v/v			01/30/18 02:29	8.93
1,2,4-Trimethylbenzene	ND		7.1	1.4	ppb v/v			01/30/18 02:29	8.93
1,3,5-Trimethylbenzene	ND		3.6	1.1	ppb v/v			01/30/18 02:29	8.93
Vinyl acetate	ND		7.1	1.3	ppb v/v			01/30/18 02:29	8.93
Vinyl chloride	ND		3.6	1.1	ppb v/v			01/30/18 02:29	8.93
m,p-Xylene	1.3 J		7.1	0.89	ppb v/v			01/30/18 02:29	8.93
o-Xylene	ND		3.6	0.48	ppb v/v			01/30/18 02:29	8.93

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: DUP-1

Lab Sample ID: 320-35129-18

Date Collected: 01/11/18 00:00

Matrix: Air

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	25	J	110	3.8	ug/m3			01/30/18 02:29	8.93
Benzene	4.7	J	11	2.3	ug/m3			01/30/18 02:29	8.93
Benzyl chloride	ND		37	7.5	ug/m3			01/30/18 02:29	8.93
Bromodichloromethane	79		18	3.9	ug/m3			01/30/18 02:29	8.93
Bromoform	ND		37	6.5	ug/m3			01/30/18 02:29	8.93
Bromomethane	ND		28	12	ug/m3			01/30/18 02:29	8.93
2-Butanone (MEK)	ND		21	5.2	ug/m3			01/30/18 02:29	8.93
Carbon disulfide	250		22	2.2	ug/m3			01/30/18 02:29	8.93
Carbon tetrachloride	ND		45	3.6	ug/m3			01/30/18 02:29	8.93
Chlorobenzene	ND		12	2.6	ug/m3			01/30/18 02:29	8.93
Dibromochloromethane	12	J	30	6.0	ug/m3			01/30/18 02:29	8.93
Chloroethane	17	J	19	7.3	ug/m3			01/30/18 02:29	8.93
Chloroform	1400		13	4.1	ug/m3			01/30/18 02:29	8.93
Chloromethane	4.7	J	15	3.6	ug/m3			01/30/18 02:29	8.93
1,2-Dibromoethane (EDB)	ND		55	5.1	ug/m3			01/30/18 02:29	8.93
1,2-Dichlorobenzene	ND		21	7.0	ug/m3			01/30/18 02:29	8.93
1,3-Dichlorobenzene	ND		21	5.9	ug/m3			01/30/18 02:29	8.93
1,4-Dichlorobenzene	ND		21	8.0	ug/m3			01/30/18 02:29	8.93
Dichlorodifluoromethane	ND		18	6.4	ug/m3			01/30/18 02:29	8.93
1,1-Dichloroethane	ND		11	2.6	ug/m3			01/30/18 02:29	8.93
1,2-Dichloroethane	ND		29	3.2	ug/m3			01/30/18 02:29	8.93
1,1-Dichloroethene	8.1	J	28	4.6	ug/m3			01/30/18 02:29	8.93
cis-1,2-Dichloroethene	3.1	J	14	3.2	ug/m3			01/30/18 02:29	8.93
trans-1,2-Dichloroethene	ND		14	3.5	ug/m3			01/30/18 02:29	8.93
1,2-Dichloropropane	ND		17	9.9	ug/m3			01/30/18 02:29	8.93
cis-1,3-Dichloropropene	ND		16	4.2	ug/m3			01/30/18 02:29	8.93
trans-1,3-Dichloropropene	ND		16	3.6	ug/m3			01/30/18 02:29	8.93
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		25	9.7	ug/m3			01/30/18 02:29	8.93
Ethylbenzene	3.1	J	16	2.4	ug/m3			01/30/18 02:29	8.93
4-Ethyltoluene	ND		18	8.2	ug/m3			01/30/18 02:29	8.93
Hexachlorobutadiene	ND		190	41	ug/m3			01/30/18 02:29	8.93
2-Hexanone	ND		15	3.2	ug/m3			01/30/18 02:29	8.93
Methylene Chloride	55		12	2.2	ug/m3			01/30/18 02:29	8.93
4-Methyl-2-pentanone (MIBK)	ND		15	4.9	ug/m3			01/30/18 02:29	8.93
Styrene	ND		15	2.2	ug/m3			01/30/18 02:29	8.93
1,1,2,2-Tetrachloroethane	ND		25	4.2	ug/m3			01/30/18 02:29	8.93
Tetrachloroethene	12	J	24	3.1	ug/m3			01/30/18 02:29	8.93
Toluene	1200		13	1.7	ug/m3			01/30/18 02:29	8.93
1,2,4-Trichlorobenzene	ND		130	29	ug/m3			01/30/18 02:29	8.93
1,1,1-Trichloroethane	ND		15	3.2	ug/m3			01/30/18 02:29	8.93
1,1,2-Trichloroethane	ND		19	3.3	ug/m3			01/30/18 02:29	8.93
Trichloroethene	13	J	19	5.0	ug/m3			01/30/18 02:29	8.93
Trichlorofluoromethane	ND		20	9.8	ug/m3			01/30/18 02:29	8.93
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		27	11	ug/m3			01/30/18 02:29	8.93
1,2,4-Trimethylbenzene	ND		35	7.1	ug/m3			01/30/18 02:29	8.93
1,3,5-Trimethylbenzene	ND		18	5.5	ug/m3			01/30/18 02:29	8.93
Vinyl acetate	ND		25	4.6	ug/m3			01/30/18 02:29	8.93
Vinyl chloride	ND		9.1	2.7	ug/m3			01/30/18 02:29	8.93
m,p-Xylene	5.8	J	31	3.9	ug/m3			01/30/18 02:29	8.93

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: DUP-1

Date Collected: 01/11/18 00:00

Date Received: 01/17/18 10:19

Sample Container: Summa Canister 1L

Lab Sample ID: 320-35129-18

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
o-Xylene	ND		16	2.1	ug/m3	-		01/30/18 02:29	8.93
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130					01/30/18 02:29	8.93
1,2-Dichloroethane-d4 (Surr)	98		70 - 130					01/30/18 02:29	8.93
Toluene-d8 (Surr)	100		70 - 130					01/30/18 02:29	8.93

Surrogate Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		BFB (70-130)	DCA (70-130)	TOL (70-130)
320-35129-1	HOU-05	100	100	100
320-35129-2	HOU-06	97	101	100
320-35129-3	HOU-07	99	101	102
320-35129-4	HOU-07B	96	101	101
320-35129-5	HOU-08	93	100	100
320-35129-6	HOU-08B	93	101	100
320-35129-7	HOU-09	98	101	100
320-35129-8	HOU-10	84	100	98
320-35129-9	HOU-10B	85	101	99
320-35129-10	HOU-01	91	99	101
320-35129-11	HOU-01B	91	100	106
320-35129-12	HOU-02	92	100	101
320-35129-13	HOU-03	93	101	101
320-35129-14	HOU-03B	98	100	101
320-35129-15	HOU-04	93	100	101
320-35129-16	HOU-BKG-01	95	99	100
320-35129-17	HOU-BKG-02	102	101	104
320-35129-17 - DL	HOU-BKG-02	105	100	103
320-35129-18	DUP-1	93	98	100
LCS 320-205880/3	Lab Control Sample	108	106	104
LCS 320-206093/3	Lab Control Sample	110	103	103
LCS 320-206344/3	Lab Control Sample	113	106	102
LCSD 320-205880/4	Lab Control Sample Dup	106	101	102
LCSD 320-206093/4	Lab Control Sample Dup	111	106	102
LCSD 320-206344/4	Lab Control Sample Dup	111	108	103
MB 320-205880/6	Method Blank	88	99	98
MB 320-206093/6	Method Blank	91	100	98
MB 320-206344/6	Method Blank	94	99	97

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

DCA = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-205880/6

Matrix: Air

Analysis Batch: 205880

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			01/29/18 11:43	1
Benzene	ND		0.40	0.079	ppb v/v			01/29/18 11:43	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/29/18 11:43	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			01/29/18 11:43	1
Bromoform	ND		0.40	0.070	ppb v/v			01/29/18 11:43	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/29/18 11:43	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			01/29/18 11:43	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			01/29/18 11:43	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			01/29/18 11:43	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			01/29/18 11:43	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			01/29/18 11:43	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/29/18 11:43	1
Chloroform	ND		0.30	0.095	ppb v/v			01/29/18 11:43	1
Chloromethane	ND		0.80	0.20	ppb v/v			01/29/18 11:43	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/29/18 11:43	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/29/18 11:43	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/29/18 11:43	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			01/29/18 11:43	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			01/29/18 11:43	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/29/18 11:43	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			01/29/18 11:43	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/29/18 11:43	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			01/29/18 11:43	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			01/29/18 11:43	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/29/18 11:43	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/29/18 11:43	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/29/18 11:43	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/29/18 11:43	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			01/29/18 11:43	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/29/18 11:43	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/29/18 11:43	1
2-Hexanone	ND		0.40	0.087	ppb v/v			01/29/18 11:43	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			01/29/18 11:43	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/29/18 11:43	1
Styrene	ND		0.40	0.059	ppb v/v			01/29/18 11:43	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/29/18 11:43	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			01/29/18 11:43	1
Toluene	ND		0.40	0.051	ppb v/v			01/29/18 11:43	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/29/18 11:43	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/29/18 11:43	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/29/18 11:43	1
Trichloroethene	ND		0.40	0.11	ppb v/v			01/29/18 11:43	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			01/29/18 11:43	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/29/18 11:43	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			01/29/18 11:43	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			01/29/18 11:43	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			01/29/18 11:43	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			01/29/18 11:43	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-205880/6

Matrix: Air

Analysis Batch: 205880

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		0.80	0.10	ppb v/v			01/29/18 11:43	1
o-Xylene	ND		0.40	0.054	ppb v/v			01/29/18 11:43	1
Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		12	0.42	ug/m3			01/29/18 11:43	1
Benzene	ND		1.3	0.25	ug/m3			01/29/18 11:43	1
Benzyl chloride	ND		4.1	0.84	ug/m3			01/29/18 11:43	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			01/29/18 11:43	1
Bromoform	ND		4.1	0.72	ug/m3			01/29/18 11:43	1
Bromomethane	ND		3.1	1.3	ug/m3			01/29/18 11:43	1
2-Butanone (MEK)	ND		2.4	0.59	ug/m3			01/29/18 11:43	1
Carbon disulfide	ND		2.5	0.24	ug/m3			01/29/18 11:43	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			01/29/18 11:43	1
Chlorobenzene	ND		1.4	0.29	ug/m3			01/29/18 11:43	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			01/29/18 11:43	1
Chloroethane	ND		2.1	0.81	ug/m3			01/29/18 11:43	1
Chloroform	ND		1.5	0.46	ug/m3			01/29/18 11:43	1
Chloromethane	ND		1.7	0.41	ug/m3			01/29/18 11:43	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			01/29/18 11:43	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			01/29/18 11:43	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			01/29/18 11:43	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			01/29/18 11:43	1
Dichlorodifluoromethane	ND		2.0	0.72	ug/m3			01/29/18 11:43	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			01/29/18 11:43	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			01/29/18 11:43	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			01/29/18 11:43	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			01/29/18 11:43	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			01/29/18 11:43	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			01/29/18 11:43	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			01/29/18 11:43	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			01/29/18 11:43	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			01/29/18 11:43	1
Ethylbenzene	ND		1.7	0.27	ug/m3			01/29/18 11:43	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			01/29/18 11:43	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			01/29/18 11:43	1
2-Hexanone	ND		1.6	0.36	ug/m3			01/29/18 11:43	1
Methylene Chloride	ND		1.4	0.25	ug/m3			01/29/18 11:43	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			01/29/18 11:43	1
Styrene	ND		1.7	0.25	ug/m3			01/29/18 11:43	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			01/29/18 11:43	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			01/29/18 11:43	1
Toluene	ND		1.5	0.19	ug/m3			01/29/18 11:43	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			01/29/18 11:43	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			01/29/18 11:43	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			01/29/18 11:43	1
Trichloroethene	ND		2.1	0.56	ug/m3			01/29/18 11:43	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			01/29/18 11:43	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			01/29/18 11:43	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-205880/6

Matrix: Air

Analysis Batch: 205880

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			01/29/18 11:43	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			01/29/18 11:43	1
Vinyl acetate	ND		2.8	0.51	ug/m3			01/29/18 11:43	1
Vinyl chloride	ND		1.0	0.31	ug/m3			01/29/18 11:43	1
m,p-Xylene	ND		3.5	0.43	ug/m3			01/29/18 11:43	1
o-Xylene	ND		1.7	0.23	ug/m3			01/29/18 11:43	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		70 - 130		01/29/18 11:43	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 130		01/29/18 11:43	1
Toluene-d8 (Surr)	98		70 - 130		01/29/18 11:43	1

Lab Sample ID: LCS 320-205880/3

Matrix: Air

Analysis Batch: 205880

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	19.9		ppb v/v		99	65 - 125
Benzene	20.0	19.9		ppb v/v		100	68 - 128
Benzyl chloride	16.0	15.8		ppb v/v		99	67 - 127
Bromodichloromethane	20.0	20.7		ppb v/v		103	71 - 131
Bromoform	20.0	21.7		ppb v/v		108	66 - 126
Bromomethane	20.0	20.3		ppb v/v		101	73 - 134
2-Butanone (MEK)	20.0	21.7		ppb v/v		109	73 - 133
Carbon disulfide	20.0	20.7		ppb v/v		103	71 - 131
Carbon tetrachloride	20.0	20.2		ppb v/v		101	63 - 126
Chlorobenzene	20.0	19.6		ppb v/v		98	63 - 123
Dibromochloromethane	20.0	20.3		ppb v/v		101	66 - 126
Chloroethane	20.0	21.1		ppb v/v		105	73 - 133
Chloroform	20.0	20.1		ppb v/v		100	70 - 130
Chloromethane	20.0	19.5		ppb v/v		97	61 - 140
1,2-Dibromoethane (EDB)	20.0	20.3		ppb v/v		102	64 - 124
1,2-Dichlorobenzene	20.0	21.8		ppb v/v		109	62 - 126
1,3-Dichlorobenzene	20.0	21.9		ppb v/v		110	59 - 130
1,4-Dichlorobenzene	20.0	22.3		ppb v/v		112	58 - 132
Dichlorodifluoromethane	20.0	19.9		ppb v/v		99	69 - 129
1,1-Dichloroethane	20.0	20.7		ppb v/v		104	71 - 131
1,2-Dichloroethane	20.0	19.7		ppb v/v		99	71 - 131
1,1-Dichloroethene	20.0	21.0		ppb v/v		105	72 - 132
cis-1,2-Dichloroethene	20.0	21.2		ppb v/v		106	70 - 130
trans-1,2-Dichloroethene	20.0	22.2		ppb v/v		111	72 - 132
1,2-Dichloropropane	20.0	20.1		ppb v/v		101	72 - 132
cis-1,3-Dichloropropene	20.0	22.0		ppb v/v		110	72 - 132
trans-1,3-Dichloropropene	20.0	21.2		ppb v/v		106	66 - 126
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	19.4		ppb v/v		97	74 - 134
Ethylbenzene	20.0	20.6		ppb v/v		103	64 - 124
4-Ethyltoluene	20.0	22.0		ppb v/v		110	66 - 129

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-205880/3

Matrix: Air

Analysis Batch: 205880

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexachlorobutadiene	20.0	21.3		ppb v/v		107	58 - 131
2-Hexanone	20.0	22.1		ppb v/v		110	69 - 129
Methylene Chloride	20.0	20.7		ppb v/v		104	67 - 127
4-Methyl-2-pentanone (MIBK)	20.0	22.5		ppb v/v		112	74 - 134
Styrene	20.0	22.2		ppb v/v		111	67 - 127
1,1,2,2-Tetrachloroethane	20.0	21.9		ppb v/v		109	64 - 124
Tetrachloroethene	20.0	18.8		ppb v/v		94	63 - 123
Toluene	20.0	20.2		ppb v/v		101	68 - 128
1,2,4-Trichlorobenzene	20.0	18.2		ppb v/v		91	58 - 138
1,1,1-Trichloroethane	20.0	19.7		ppb v/v		99	69 - 129
1,1,2-Trichloroethane	20.0	19.9		ppb v/v		100	64 - 124
Trichloroethene	20.0	20.3		ppb v/v		101	70 - 130
Trichlorofluoromethane	20.0	19.7		ppb v/v		99	71 - 131
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	20.2		ppb v/v		101	70 - 130
1,2,4-Trimethylbenzene	20.0	21.0		ppb v/v		105	60 - 132
1,3,5-Trimethylbenzene	20.0	20.7		ppb v/v		104	65 - 125
Vinyl acetate	20.0	21.5		ppb v/v		107	65 - 134
Vinyl chloride	20.0	19.3		ppb v/v		96	59 - 152
m,p-Xylene	40.0	41.9		ppb v/v		105	65 - 125
o-Xylene	20.0	20.7		ppb v/v		104	65 - 125
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	48	47.3		ug/m3		99	65 - 125
Benzene	64	63.6		ug/m3		100	68 - 128
Benzyl chloride	83	82.0		ug/m3		99	67 - 127
Bromodichloromethane	130	139		ug/m3		103	71 - 131
Bromoform	210	224		ug/m3		108	66 - 126
Bromomethane	78	78.7		ug/m3		101	73 - 134
2-Butanone (MEK)	59	64.0		ug/m3		109	73 - 133
Carbon disulfide	62	64.4		ug/m3		103	71 - 131
Carbon tetrachloride	130	127		ug/m3		101	63 - 126
Chlorobenzene	92	90.3		ug/m3		98	63 - 123
Dibromochloromethane	170	173		ug/m3		101	66 - 126
Chloroethane	53	55.7		ug/m3		105	73 - 133
Chloroform	98	98.1		ug/m3		100	70 - 130
Chloromethane	41	40.2		ug/m3		97	61 - 140
1,2-Dibromoethane (EDB)	150	156		ug/m3		102	64 - 124
1,2-Dichlorobenzene	120	131		ug/m3		109	62 - 126
1,3-Dichlorobenzene	120	132		ug/m3		110	59 - 130
1,4-Dichlorobenzene	120	134		ug/m3		112	58 - 132
Dichlorodifluoromethane	99	98.4		ug/m3		99	69 - 129
1,1-Dichloroethane	81	83.9		ug/m3		104	71 - 131
1,2-Dichloroethane	81	79.8		ug/m3		99	71 - 131
1,1-Dichloroethene	79	83.1		ug/m3		105	72 - 132
cis-1,2-Dichloroethene	79	84.2		ug/m3		106	70 - 130
trans-1,2-Dichloroethene	79	87.9		ug/m3		111	72 - 132
1,2-Dichloropropane	92	93.0		ug/m3		101	72 - 132

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-205880/3

Matrix: Air

Analysis Batch: 205880

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,3-Dichloropropene	91	100		ug/m3		110	72 - 132
trans-1,3-Dichloropropene	91	96.4		ug/m3		106	66 - 126
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	135		ug/m3		97	74 - 134
Ethylbenzene	87	89.3		ug/m3		103	64 - 124
4-Ethyltoluene	98	108		ug/m3		110	66 - 129
Hexachlorobutadiene	210	228		ug/m3		107	58 - 131
2-Hexanone	82	90.4		ug/m3		110	69 - 129
Methylene Chloride	69	72.1		ug/m3		104	67 - 127
4-Methyl-2-pentanone (MIBK)	82	92.0		ug/m3		112	74 - 134
Styrene	85	94.6		ug/m3		111	67 - 127
1,1,2,2-Tetrachloroethane	140	150		ug/m3		109	64 - 124
Tetrachloroethene	140	128		ug/m3		94	63 - 123
Toluene	75	76.3		ug/m3		101	68 - 128
1,2,4-Trichlorobenzene	150	135		ug/m3		91	58 - 138
1,1,1-Trichloroethane	110	108		ug/m3		99	69 - 129
1,1,2-Trichloroethane	110	109		ug/m3		100	64 - 124
Trichloroethene	110	109		ug/m3		101	70 - 130
Trichlorofluoromethane	110	111		ug/m3		99	71 - 131
1,1,2-Trichloro-1,2,2-trifluoroethane	150	155		ug/m3		101	70 - 130
1,2,4-Trimethylbenzene	98	103		ug/m3		105	60 - 132
1,3,5-Trimethylbenzene	98	102		ug/m3		104	65 - 125
Vinyl acetate	70	75.6		ug/m3		107	65 - 134
Vinyl chloride	51	49.3		ug/m3		96	59 - 152
m,p-Xylene	170	182		ug/m3		105	65 - 125
o-Xylene	87	90.0		ug/m3		104	65 - 125

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	108		70 - 130
1,2-Dichloroethane-d4 (Surr)	106		70 - 130
Toluene-d8 (Surr)	104		70 - 130

Lab Sample ID: LCSD 320-205880/4

Matrix: Air

Analysis Batch: 205880

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	20.0	18.6		ppb v/v		93	65 - 125	7	25
Benzene	20.0	19.3		ppb v/v		97	68 - 128	3	25
Benzyl chloride	16.0	16.2		ppb v/v		101	67 - 127	2	25
Bromodichloromethane	20.0	20.1		ppb v/v		100	71 - 131	3	25
Bromoform	20.0	21.2		ppb v/v		106	66 - 126	2	25
Bromomethane	20.0	19.1		ppb v/v		96	73 - 134	6	25
2-Butanone (MEK)	20.0	20.6		ppb v/v		103	73 - 133	5	25
Carbon disulfide	20.0	19.6		ppb v/v		98	71 - 131	6	25
Carbon tetrachloride	20.0	19.7		ppb v/v		99	63 - 126	2	25
Chlorobenzene	20.0	19.2		ppb v/v		96	63 - 123	2	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-205880/4

Matrix: Air

Analysis Batch: 205880

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dibromochloromethane	20.0	19.9		ppb v/v		99	66 - 126	2	25
Chloroethane	20.0	19.7		ppb v/v		98	73 - 133	7	25
Chloroform	20.0	19.3		ppb v/v		96	70 - 130	4	25
Chloromethane	20.0	18.1		ppb v/v		91	61 - 140	7	25
1,2-Dibromoethane (EDB)	20.0	19.9		ppb v/v		99	64 - 124	2	25
1,2-Dichlorobenzene	20.0	21.5		ppb v/v		108	62 - 126	1	25
1,3-Dichlorobenzene	20.0	21.3		ppb v/v		107	59 - 130	3	25
1,4-Dichlorobenzene	20.0	21.7		ppb v/v		109	58 - 132	3	25
Dichlorodifluoromethane	20.0	18.7		ppb v/v		93	69 - 129	6	25
1,1-Dichloroethane	20.0	19.6		ppb v/v		98	71 - 131	6	25
1,2-Dichloroethane	20.0	19.3		ppb v/v		97	71 - 131	2	25
1,1-Dichloroethene	20.0	19.8		ppb v/v		99	72 - 132	6	25
cis-1,2-Dichloroethene	20.0	20.6		ppb v/v		103	70 - 130	3	25
trans-1,2-Dichloroethene	20.0	21.9		ppb v/v		110	72 - 132	1	25
1,2-Dichloropropane	20.0	19.7		ppb v/v		98	72 - 132	2	25
cis-1,3-Dichloropropene	20.0	21.3		ppb v/v		106	72 - 132	3	25
trans-1,3-Dichloropropene	20.0	20.8		ppb v/v		104	66 - 126	2	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	18.4		ppb v/v		92	74 - 134	5	25
Ethylbenzene	20.0	20.0		ppb v/v		100	64 - 124	3	25
4-Ethyltoluene	20.0	21.8		ppb v/v		109	66 - 129	1	25
Hexachlorobutadiene	20.0	20.5		ppb v/v		102	58 - 131	4	25
2-Hexanone	20.0	21.3		ppb v/v		107	69 - 129	3	25
Methylene Chloride	20.0	19.0		ppb v/v		95	67 - 127	9	25
4-Methyl-2-pentanone (MIBK)	20.0	21.4		ppb v/v		107	74 - 134	5	25
Styrene	20.0	21.6		ppb v/v		108	67 - 127	3	25
1,1,2,2-Tetrachloroethane	20.0	21.2		ppb v/v		106	64 - 124	3	25
Tetrachloroethene	20.0	18.5		ppb v/v		93	63 - 123	2	25
Toluene	20.0	19.6		ppb v/v		98	68 - 128	3	25
1,2,4-Trichlorobenzene	20.0	17.2		ppb v/v		86	58 - 138	6	25
1,1,1-Trichloroethane	20.0	19.0		ppb v/v		95	69 - 129	4	25
1,1,2-Trichloroethane	20.0	19.5		ppb v/v		97	64 - 124	2	25
Trichloroethene	20.0	19.9		ppb v/v		100	70 - 130	2	25
Trichlorofluoromethane	20.0	18.7		ppb v/v		94	71 - 131	5	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	19.2		ppb v/v		96	70 - 130	5	25
1,2,4-Trimethylbenzene	20.0	20.9		ppb v/v		105	60 - 132	0	25
1,3,5-Trimethylbenzene	20.0	20.2		ppb v/v		101	65 - 125	3	25
Vinyl acetate	20.0	20.5		ppb v/v		102	65 - 134	5	25
Vinyl chloride	20.0	18.0		ppb v/v		90	59 - 152	7	25
m,p-Xylene	40.0	40.8		ppb v/v		102	65 - 125	3	25
o-Xylene	20.0	20.2		ppb v/v		101	65 - 125	3	25
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	48	44.3		ug/m3		93	65 - 125	7	25
Benzene	64	61.7		ug/m3		97	68 - 128	3	25
Benzyl chloride	83	84.0		ug/m3		101	67 - 127	2	25
Bromodichloromethane	130	134		ug/m3		100	71 - 131	3	25
Bromoform	210	219		ug/m3		106	66 - 126	2	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-205880/4

Matrix: Air

Analysis Batch: 205880

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromomethane	78	74.2		ug/m3		96	73 - 134	6	25
2-Butanone (MEK)	59	60.6		ug/m3		103	73 - 133	5	25
Carbon disulfide	62	60.9		ug/m3		98	71 - 131	6	25
Carbon tetrachloride	130	124		ug/m3		99	63 - 126	2	25
Chlorobenzene	92	88.2		ug/m3		96	63 - 123	2	25
Dibromochloromethane	170	169		ug/m3		99	66 - 126	2	25
Chloroethane	53	51.9		ug/m3		98	73 - 133	7	25
Chloroform	98	94.1		ug/m3		96	70 - 130	4	25
Chloromethane	41	37.4		ug/m3		91	61 - 140	7	25
1,2-Dibromoethane (EDB)	150	153		ug/m3		99	64 - 124	2	25
1,2-Dichlorobenzene	120	129		ug/m3		108	62 - 126	1	25
1,3-Dichlorobenzene	120	128		ug/m3		107	59 - 130	3	25
1,4-Dichlorobenzene	120	131		ug/m3		109	58 - 132	3	25
Dichlorodifluoromethane	99	92.3		ug/m3		93	69 - 129	6	25
1,1-Dichloroethane	81	79.3		ug/m3		98	71 - 131	6	25
1,2-Dichloroethane	81	78.3		ug/m3		97	71 - 131	2	25
1,1-Dichloroethene	79	78.6		ug/m3		99	72 - 132	6	25
cis-1,2-Dichloroethene	79	81.7		ug/m3		103	70 - 130	3	25
trans-1,2-Dichloroethene	79	86.9		ug/m3		110	72 - 132	1	25
1,2-Dichloropropane	92	91.0		ug/m3		98	72 - 132	2	25
cis-1,3-Dichloropropene	91	96.7		ug/m3		106	72 - 132	3	25
trans-1,3-Dichloropropene	91	94.6		ug/m3		104	66 - 126	2	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	128		ug/m3		92	74 - 134	5	25
Ethylbenzene	87	87.0		ug/m3		100	64 - 124	3	25
4-Ethyltoluene	98	107		ug/m3		109	66 - 129	1	25
Hexachlorobutadiene	210	219		ug/m3		102	58 - 131	4	25
2-Hexanone	82	87.3		ug/m3		107	69 - 129	3	25
Methylene Chloride	69	66.2		ug/m3		95	67 - 127	9	25
4-Methyl-2-pentanone (MIBK)	82	87.6		ug/m3		107	74 - 134	5	25
Styrene	85	92.2		ug/m3		108	67 - 127	3	25
1,1,2,2-Tetrachloroethane	140	146		ug/m3		106	64 - 124	3	25
Tetrachloroethene	140	126		ug/m3		93	63 - 123	2	25
Toluene	75	73.8		ug/m3		98	68 - 128	3	25
1,2,4-Trichlorobenzene	150	128		ug/m3		86	58 - 138	6	25
1,1,1-Trichloroethane	110	103		ug/m3		95	69 - 129	4	25
1,1,2-Trichloroethane	110	106		ug/m3		97	64 - 124	2	25
Trichloroethene	110	107		ug/m3		100	70 - 130	2	25
Trichlorofluoromethane	110	105		ug/m3		94	71 - 131	5	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	147		ug/m3		96	70 - 130	5	25
1,2,4-Trimethylbenzene	98	103		ug/m3		105	60 - 132	0	25
1,3,5-Trimethylbenzene	98	99.3		ug/m3		101	65 - 125	3	25
Vinyl acetate	70	72.1		ug/m3		102	65 - 134	5	25
Vinyl chloride	51	46.0		ug/m3		90	59 - 152	7	25
m,p-Xylene	170	177		ug/m3		102	65 - 125	3	25
o-Xylene	87	87.6		ug/m3		101	65 - 125	3	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-205880/4

Matrix: Air

Analysis Batch: 205880

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	106		70 - 130
1,2-Dichloroethane-d4 (Surr)	101		70 - 130
Toluene-d8 (Surr)	102		70 - 130

Lab Sample ID: MB 320-206093/6

Matrix: Air

Analysis Batch: 206093

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			01/30/18 13:07	1
Benzene	ND		0.40	0.079	ppb v/v			01/30/18 13:07	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/30/18 13:07	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			01/30/18 13:07	1
Bromoform	ND		0.40	0.070	ppb v/v			01/30/18 13:07	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/30/18 13:07	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			01/30/18 13:07	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			01/30/18 13:07	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			01/30/18 13:07	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			01/30/18 13:07	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			01/30/18 13:07	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/30/18 13:07	1
Chloroform	ND		0.30	0.095	ppb v/v			01/30/18 13:07	1
Chloromethane	ND		0.80	0.20	ppb v/v			01/30/18 13:07	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/30/18 13:07	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/30/18 13:07	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/30/18 13:07	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			01/30/18 13:07	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			01/30/18 13:07	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/30/18 13:07	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			01/30/18 13:07	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/30/18 13:07	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			01/30/18 13:07	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			01/30/18 13:07	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/30/18 13:07	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/30/18 13:07	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/30/18 13:07	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 13:07	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			01/30/18 13:07	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/30/18 13:07	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/30/18 13:07	1
2-Hexanone	ND		0.40	0.087	ppb v/v			01/30/18 13:07	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			01/30/18 13:07	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/30/18 13:07	1
Styrene	ND		0.40	0.059	ppb v/v			01/30/18 13:07	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/30/18 13:07	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			01/30/18 13:07	1
Toluene	ND		0.40	0.051	ppb v/v			01/30/18 13:07	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/30/18 13:07	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-206093/6

Matrix: Air

Analysis Batch: 206093

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/30/18 13:07	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/30/18 13:07	1
Trichloroethene	ND		0.40	0.11	ppb v/v			01/30/18 13:07	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			01/30/18 13:07	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/30/18 13:07	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			01/30/18 13:07	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			01/30/18 13:07	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			01/30/18 13:07	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			01/30/18 13:07	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			01/30/18 13:07	1
o-Xylene	ND		0.40	0.054	ppb v/v			01/30/18 13:07	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		12	0.42	ug/m3			01/30/18 13:07	1
Benzene	ND		1.3	0.25	ug/m3			01/30/18 13:07	1
Benzyl chloride	ND		4.1	0.84	ug/m3			01/30/18 13:07	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			01/30/18 13:07	1
Bromoform	ND		4.1	0.72	ug/m3			01/30/18 13:07	1
Bromomethane	ND		3.1	1.3	ug/m3			01/30/18 13:07	1
2-Butanone (MEK)	ND		2.4	0.59	ug/m3			01/30/18 13:07	1
Carbon disulfide	ND		2.5	0.24	ug/m3			01/30/18 13:07	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			01/30/18 13:07	1
Chlorobenzene	ND		1.4	0.29	ug/m3			01/30/18 13:07	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			01/30/18 13:07	1
Chloroethane	ND		2.1	0.81	ug/m3			01/30/18 13:07	1
Chloroform	ND		1.5	0.46	ug/m3			01/30/18 13:07	1
Chloromethane	ND		1.7	0.41	ug/m3			01/30/18 13:07	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			01/30/18 13:07	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			01/30/18 13:07	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			01/30/18 13:07	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			01/30/18 13:07	1
Dichlorodifluoromethane	ND		2.0	0.72	ug/m3			01/30/18 13:07	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			01/30/18 13:07	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			01/30/18 13:07	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			01/30/18 13:07	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			01/30/18 13:07	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			01/30/18 13:07	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			01/30/18 13:07	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			01/30/18 13:07	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			01/30/18 13:07	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			01/30/18 13:07	1
Ethylbenzene	ND		1.7	0.27	ug/m3			01/30/18 13:07	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			01/30/18 13:07	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			01/30/18 13:07	1
2-Hexanone	ND		1.6	0.36	ug/m3			01/30/18 13:07	1
Methylene Chloride	ND		1.4	0.25	ug/m3			01/30/18 13:07	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			01/30/18 13:07	1
Styrene	ND		1.7	0.25	ug/m3			01/30/18 13:07	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-206093/6

Matrix: Air

Analysis Batch: 206093

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			01/30/18 13:07	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			01/30/18 13:07	1
Toluene	ND		1.5	0.19	ug/m3			01/30/18 13:07	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			01/30/18 13:07	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			01/30/18 13:07	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			01/30/18 13:07	1
Trichloroethene	ND		2.1	0.56	ug/m3			01/30/18 13:07	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			01/30/18 13:07	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			01/30/18 13:07	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			01/30/18 13:07	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			01/30/18 13:07	1
Vinyl acetate	ND		2.8	0.51	ug/m3			01/30/18 13:07	1
Vinyl chloride	ND		1.0	0.31	ug/m3			01/30/18 13:07	1
m,p-Xylene	ND		3.5	0.43	ug/m3			01/30/18 13:07	1
o-Xylene	ND		1.7	0.23	ug/m3			01/30/18 13:07	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		70 - 130		01/30/18 13:07	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 130		01/30/18 13:07	1
Toluene-d8 (Surr)	98		70 - 130		01/30/18 13:07	1

Lab Sample ID: LCS 320-206093/3

Matrix: Air

Analysis Batch: 206093

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	18.7		ppb v/v		94	65 - 125
Benzene	20.0	19.3		ppb v/v		97	68 - 128
Benzyl chloride	16.0	15.4		ppb v/v		96	67 - 127
Bromodichloromethane	20.0	20.0		ppb v/v		100	71 - 131
Bromoform	20.0	20.8		ppb v/v		104	66 - 126
Bromomethane	20.0	19.4		ppb v/v		97	73 - 134
2-Butanone (MEK)	20.0	20.6		ppb v/v		103	73 - 133
Carbon disulfide	20.0	20.6		ppb v/v		103	71 - 131
Carbon tetrachloride	20.0	19.7		ppb v/v		99	63 - 126
Chlorobenzene	20.0	18.9		ppb v/v		94	63 - 123
Dibromochloromethane	20.0	19.5		ppb v/v		97	66 - 126
Chloroethane	20.0	19.9		ppb v/v		100	73 - 133
Chloroform	20.0	19.4		ppb v/v		97	70 - 130
Chloromethane	20.0	18.3		ppb v/v		92	61 - 140
1,2-Dibromoethane (EDB)	20.0	19.5		ppb v/v		98	64 - 124
1,2-Dichlorobenzene	20.0	20.9		ppb v/v		104	62 - 126
1,3-Dichlorobenzene	20.0	20.9		ppb v/v		104	59 - 130
1,4-Dichlorobenzene	20.0	21.2		ppb v/v		106	58 - 132
Dichlorodifluoromethane	20.0	18.8		ppb v/v		94	69 - 129
1,1-Dichloroethane	20.0	19.8		ppb v/v		99	71 - 131
1,2-Dichloroethane	20.0	19.3		ppb v/v		97	71 - 131
1,1-Dichloroethene	20.0	20.0		ppb v/v		100	72 - 132

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-206093/3

Matrix: Air

Analysis Batch: 206093

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,2-Dichloroethene	20.0	20.7		ppb v/v		103	70 - 130
trans-1,2-Dichloroethene	20.0	21.2		ppb v/v		106	72 - 132
1,2-Dichloropropane	20.0	19.6		ppb v/v		98	72 - 132
cis-1,3-Dichloropropene	20.0	21.3		ppb v/v		106	72 - 132
trans-1,3-Dichloropropene	20.0	20.4		ppb v/v		102	66 - 126
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	18.7		ppb v/v		93	74 - 134
Ethylbenzene	20.0	19.7		ppb v/v		99	64 - 124
4-Ethyltoluene	20.0	20.9		ppb v/v		105	66 - 129
Hexachlorobutadiene	20.0	20.0		ppb v/v		100	58 - 131
2-Hexanone	20.0	20.8		ppb v/v		104	69 - 129
Methylene Chloride	20.0	19.7		ppb v/v		98	67 - 127
4-Methyl-2-pentanone (MIBK)	20.0	21.4		ppb v/v		107	74 - 134
Styrene	20.0	21.2		ppb v/v		106	67 - 127
1,1,2,2-Tetrachloroethane	20.0	20.8		ppb v/v		104	64 - 124
Tetrachloroethene	20.0	18.2		ppb v/v		91	63 - 123
Toluene	20.0	19.5		ppb v/v		98	68 - 128
1,2,4-Trichlorobenzene	20.0	16.8		ppb v/v		84	58 - 138
1,1,1-Trichloroethane	20.0	19.1		ppb v/v		95	69 - 129
1,1,2-Trichloroethane	20.0	19.2		ppb v/v		96	64 - 124
Trichloroethene	20.0	19.9		ppb v/v		99	70 - 130
Trichlorofluoromethane	20.0	19.0		ppb v/v		95	71 - 131
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	19.3		ppb v/v		97	70 - 130
1,2,4-Trimethylbenzene	20.0	20.0		ppb v/v		100	60 - 132
1,3,5-Trimethylbenzene	20.0	19.8		ppb v/v		99	65 - 125
Vinyl acetate	20.0	20.4		ppb v/v		102	65 - 134
Vinyl chloride	20.0	18.3		ppb v/v		91	59 - 152
m,p-Xylene	40.0	40.2		ppb v/v		101	65 - 125
o-Xylene	20.0	19.9		ppb v/v		99	65 - 125
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	48	44.4		ug/m3		94	65 - 125
Benzene	64	61.8		ug/m3		97	68 - 128
Benzyl chloride	83	79.7		ug/m3		96	67 - 127
Bromodichloromethane	130	134		ug/m3		100	71 - 131
Bromoform	210	215		ug/m3		104	66 - 126
Bromomethane	78	75.5		ug/m3		97	73 - 134
2-Butanone (MEK)	59	60.9		ug/m3		103	73 - 133
Carbon disulfide	62	64.2		ug/m3		103	71 - 131
Carbon tetrachloride	130	124		ug/m3		99	63 - 126
Chlorobenzene	92	86.9		ug/m3		94	63 - 123
Dibromochloromethane	170	166		ug/m3		97	66 - 126
Chloroethane	53	52.5		ug/m3		100	73 - 133
Chloroform	98	94.6		ug/m3		97	70 - 130
Chloromethane	41	37.8		ug/m3		92	61 - 140
1,2-Dibromoethane (EDB)	150	150		ug/m3		98	64 - 124
1,2-Dichlorobenzene	120	126		ug/m3		104	62 - 126
1,3-Dichlorobenzene	120	126		ug/m3		104	59 - 130

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-206093/3

Matrix: Air

Analysis Batch: 206093

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dichlorobenzene	120	128		ug/m3		106	58 - 132
Dichlorodifluoromethane	99	92.9		ug/m3		94	69 - 129
1,1-Dichloroethane	81	80.3		ug/m3		99	71 - 131
1,2-Dichloroethane	81	78.3		ug/m3		97	71 - 131
1,1-Dichloroethene	79	79.4		ug/m3		100	72 - 132
cis-1,2-Dichloroethene	79	82.0		ug/m3		103	70 - 130
trans-1,2-Dichloroethene	79	83.9		ug/m3		106	72 - 132
1,2-Dichloropropane	92	90.6		ug/m3		98	72 - 132
cis-1,3-Dichloropropene	91	96.7		ug/m3		106	72 - 132
trans-1,3-Dichloropropene	91	92.5		ug/m3		102	66 - 126
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	131		ug/m3		93	74 - 134
Ethylbenzene	87	85.7		ug/m3		99	64 - 124
4-Ethyltoluene	98	103		ug/m3		105	66 - 129
Hexachlorobutadiene	210	214		ug/m3		100	58 - 131
2-Hexanone	82	85.3		ug/m3		104	69 - 129
Methylene Chloride	69	68.3		ug/m3		98	67 - 127
4-Methyl-2-pentanone (MIBK)	82	87.5		ug/m3		107	74 - 134
Styrene	85	90.4		ug/m3		106	67 - 127
1,1,2,2-Tetrachloroethane	140	143		ug/m3		104	64 - 124
Tetrachloroethene	140	123		ug/m3		91	63 - 123
Toluene	75	73.7		ug/m3		98	68 - 128
1,2,4-Trichlorobenzene	150	125		ug/m3		84	58 - 138
1,1,1-Trichloroethane	110	104		ug/m3		95	69 - 129
1,1,2-Trichloroethane	110	105		ug/m3		96	64 - 124
Trichloroethene	110	107		ug/m3		99	70 - 130
Trichlorofluoromethane	110	107		ug/m3		95	71 - 131
1,1,2-Trichloro-1,2,2-trifluoroethane	150	148		ug/m3		97	70 - 130
1,2,4-Trimethylbenzene	98	98.5		ug/m3		100	60 - 132
1,3,5-Trimethylbenzene	98	97.6		ug/m3		99	65 - 125
Vinyl acetate	70	71.8		ug/m3		102	65 - 134
Vinyl chloride	51	46.7		ug/m3		91	59 - 152
m,p-Xylene	170	175		ug/m3		101	65 - 125
o-Xylene	87	86.3		ug/m3		99	65 - 125

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	110		70 - 130
1,2-Dichloroethane-d4 (Surr)	103		70 - 130
Toluene-d8 (Surr)	103		70 - 130

Lab Sample ID: LCSD 320-206093/4

Matrix: Air

Analysis Batch: 206093

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	20.0	18.6		ppb v/v		93	65 - 125	1	25
Benzene	20.0	19.2		ppb v/v		96	68 - 128	1	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-206093/4

Matrix: Air

Analysis Batch: 206093

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzyl chloride	16.0	15.2		ppb v/v		95	67 - 127	1	25
Bromodichloromethane	20.0	19.9		ppb v/v		100	71 - 131	0	25
Bromoform	20.0	20.7		ppb v/v		103	66 - 126	0	25
Bromomethane	20.0	19.2		ppb v/v		96	73 - 134	1	25
2-Butanone (MEK)	20.0	20.5		ppb v/v		103	73 - 133	0	25
Carbon disulfide	20.0	19.3		ppb v/v		96	71 - 131	7	25
Carbon tetrachloride	20.0	19.7		ppb v/v		99	63 - 126	0	25
Chlorobenzene	20.0	18.8		ppb v/v		94	63 - 123	0	25
Dibromochloromethane	20.0	19.5		ppb v/v		98	66 - 126	0	25
Chloroethane	20.0	19.5		ppb v/v		98	73 - 133	2	25
Chloroform	20.0	19.2		ppb v/v		96	70 - 130	1	25
Chloromethane	20.0	18.1		ppb v/v		91	61 - 140	1	25
1,2-Dibromoethane (EDB)	20.0	19.4		ppb v/v		97	64 - 124	1	25
1,2-Dichlorobenzene	20.0	20.8		ppb v/v		104	62 - 126	1	25
1,3-Dichlorobenzene	20.0	20.7		ppb v/v		104	59 - 130	1	25
1,4-Dichlorobenzene	20.0	21.0		ppb v/v		105	58 - 132	1	25
Dichlorodifluoromethane	20.0	18.5		ppb v/v		92	69 - 129	2	25
1,1-Dichloroethane	20.0	19.6		ppb v/v		98	71 - 131	1	25
1,2-Dichloroethane	20.0	19.4		ppb v/v		97	71 - 131	0	25
1,1-Dichloroethene	20.0	19.8		ppb v/v		99	72 - 132	1	25
cis-1,2-Dichloroethene	20.0	20.5		ppb v/v		103	70 - 130	1	25
trans-1,2-Dichloroethene	20.0	21.6		ppb v/v		108	72 - 132	2	25
1,2-Dichloropropane	20.0	19.6		ppb v/v		98	72 - 132	0	25
cis-1,3-Dichloropropene	20.0	21.2		ppb v/v		106	72 - 132	0	25
trans-1,3-Dichloropropene	20.0	20.4		ppb v/v		102	66 - 126	0	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	18.3		ppb v/v		91	74 - 134	2	25
Ethylbenzene	20.0	19.6		ppb v/v		98	64 - 124	1	25
4-Ethyltoluene	20.0	21.2		ppb v/v		106	66 - 129	1	25
Hexachlorobutadiene	20.0	19.8		ppb v/v		99	58 - 131	1	25
2-Hexanone	20.0	20.7		ppb v/v		103	69 - 129	1	25
Methylene Chloride	20.0	19.2		ppb v/v		96	67 - 127	2	25
4-Methyl-2-pentanone (MIBK)	20.0	21.1		ppb v/v		106	74 - 134	1	25
Styrene	20.0	21.1		ppb v/v		106	67 - 127	0	25
1,1,2,2-Tetrachloroethane	20.0	20.6		ppb v/v		103	64 - 124	1	25
Tetrachloroethene	20.0	18.2		ppb v/v		91	63 - 123	0	25
Toluene	20.0	19.5		ppb v/v		97	68 - 128	0	25
1,2,4-Trichlorobenzene	20.0	16.5		ppb v/v		82	58 - 138	2	25
1,1,1-Trichloroethane	20.0	19.0		ppb v/v		95	69 - 129	0	25
1,1,2-Trichloroethane	20.0	19.1		ppb v/v		96	64 - 124	0	25
Trichloroethene	20.0	19.8		ppb v/v		99	70 - 130	0	25
Trichlorofluoromethane	20.0	18.9		ppb v/v		94	71 - 131	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	19.3		ppb v/v		96	70 - 130	0	25
1,2,4-Trimethylbenzene	20.0	19.9		ppb v/v		99	60 - 132	1	25
1,3,5-Trimethylbenzene	20.0	19.7		ppb v/v		98	65 - 125	1	25
Vinyl acetate	20.0	20.1		ppb v/v		101	65 - 134	1	25
Vinyl chloride	20.0	18.0		ppb v/v		90	59 - 152	1	25
m,p-Xylene	40.0	39.9		ppb v/v		100	65 - 125	1	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-206093/4

Matrix: Air

Analysis Batch: 206093

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
o-Xylene	20.0	19.7		ppb v/v		99	65 - 125	1	25
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	48	44.2		ug/m3		93	65 - 125	1	25
Benzene	64	61.4		ug/m3		96	68 - 128	1	25
Benzyl chloride	83	78.9		ug/m3		95	67 - 127	1	25
Bromodichloromethane	130	134		ug/m3		100	71 - 131	0	25
Bromoform	210	214		ug/m3		103	66 - 126	0	25
Bromomethane	78	74.6		ug/m3		96	73 - 134	1	25
2-Butanone (MEK)	59	60.6		ug/m3		103	73 - 133	0	25
Carbon disulfide	62	60.0		ug/m3		96	71 - 131	7	25
Carbon tetrachloride	130	124		ug/m3		99	63 - 126	0	25
Chlorobenzene	92	86.6		ug/m3		94	63 - 123	0	25
Dibromochloromethane	170	166		ug/m3		98	66 - 126	0	25
Chloroethane	53	51.6		ug/m3		98	73 - 133	2	25
Chloroform	98	93.7		ug/m3		96	70 - 130	1	25
Chloromethane	41	37.4		ug/m3		91	61 - 140	1	25
1,2-Dibromoethane (EDB)	150	149		ug/m3		97	64 - 124	1	25
1,2-Dichlorobenzene	120	125		ug/m3		104	62 - 126	1	25
1,3-Dichlorobenzene	120	125		ug/m3		104	59 - 130	1	25
1,4-Dichlorobenzene	120	126		ug/m3		105	58 - 132	1	25
Dichlorodifluoromethane	99	91.3		ug/m3		92	69 - 129	2	25
1,1-Dichloroethane	81	79.3		ug/m3		98	71 - 131	1	25
1,2-Dichloroethane	81	78.5		ug/m3		97	71 - 131	0	25
1,1-Dichloroethene	79	78.4		ug/m3		99	72 - 132	1	25
cis-1,2-Dichloroethene	79	81.4		ug/m3		103	70 - 130	1	25
trans-1,2-Dichloroethene	79	85.6		ug/m3		108	72 - 132	2	25
1,2-Dichloropropane	92	90.5		ug/m3		98	72 - 132	0	25
cis-1,3-Dichloropropene	91	96.3		ug/m3		106	72 - 132	0	25
trans-1,3-Dichloropropene	91	92.6		ug/m3		102	66 - 126	0	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	128		ug/m3		91	74 - 134	2	25
Ethylbenzene	87	85.2		ug/m3		98	64 - 124	1	25
4-Ethyltoluene	98	104		ug/m3		106	66 - 129	1	25
Hexachlorobutadiene	210	211		ug/m3		99	58 - 131	1	25
2-Hexanone	82	84.8		ug/m3		103	69 - 129	1	25
Methylene Chloride	69	66.8		ug/m3		96	67 - 127	2	25
4-Methyl-2-pentanone (MIBK)	82	86.6		ug/m3		106	74 - 134	1	25
Styrene	85	90.1		ug/m3		106	67 - 127	0	25
1,1,2,2-Tetrachloroethane	140	141		ug/m3		103	64 - 124	1	25
Tetrachloroethene	140	123		ug/m3		91	63 - 123	0	25
Toluene	75	73.3		ug/m3		97	68 - 128	0	25
1,2,4-Trichlorobenzene	150	122		ug/m3		82	58 - 138	2	25
1,1,1-Trichloroethane	110	104		ug/m3		95	69 - 129	0	25
1,1,2-Trichloroethane	110	104		ug/m3		96	64 - 124	0	25
Trichloroethene	110	107		ug/m3		99	70 - 130	0	25
Trichlorofluoromethane	110	106		ug/m3		94	71 - 131	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	148		ug/m3		96	70 - 130	0	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-206093/4

Matrix: Air

Analysis Batch: 206093

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trimethylbenzene	98	97.8		ug/m3		99	60 - 132	1	25
1,3,5-Trimethylbenzene	98	96.8		ug/m3		98	65 - 125	1	25
Vinyl acetate	70	70.9		ug/m3		101	65 - 134	1	25
Vinyl chloride	51	46.0		ug/m3		90	59 - 152	1	25
m,p-Xylene	170	173		ug/m3		100	65 - 125	1	25
o-Xylene	87	85.7		ug/m3		99	65 - 125	1	25

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	111		70 - 130
1,2-Dichloroethane-d4 (Surr)	106		70 - 130
Toluene-d8 (Surr)	102		70 - 130

Lab Sample ID: MB 320-206344/6

Matrix: Air

Analysis Batch: 206344

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			01/31/18 14:49	1
Benzene	ND		0.40	0.079	ppb v/v			01/31/18 14:49	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			01/31/18 14:49	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			01/31/18 14:49	1
Bromoform	ND		0.40	0.070	ppb v/v			01/31/18 14:49	1
Bromomethane	ND		0.80	0.34	ppb v/v			01/31/18 14:49	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			01/31/18 14:49	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			01/31/18 14:49	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			01/31/18 14:49	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			01/31/18 14:49	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			01/31/18 14:49	1
Chloroethane	ND		0.80	0.31	ppb v/v			01/31/18 14:49	1
Chloroform	ND		0.30	0.095	ppb v/v			01/31/18 14:49	1
Chloromethane	ND		0.80	0.20	ppb v/v			01/31/18 14:49	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			01/31/18 14:49	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			01/31/18 14:49	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			01/31/18 14:49	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			01/31/18 14:49	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			01/31/18 14:49	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			01/31/18 14:49	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			01/31/18 14:49	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			01/31/18 14:49	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			01/31/18 14:49	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			01/31/18 14:49	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			01/31/18 14:49	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			01/31/18 14:49	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			01/31/18 14:49	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			01/31/18 14:49	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			01/31/18 14:49	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			01/31/18 14:49	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			01/31/18 14:49	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-206344/6

Matrix: Air

Analysis Batch: 206344

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Hexanone	ND		0.40	0.087	ppb v/v			01/31/18 14:49	1
Methylene Chloride	ND		0.40	0.072	ppb v/v			01/31/18 14:49	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			01/31/18 14:49	1
Styrene	ND		0.40	0.059	ppb v/v			01/31/18 14:49	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			01/31/18 14:49	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			01/31/18 14:49	1
Toluene	ND		0.40	0.051	ppb v/v			01/31/18 14:49	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			01/31/18 14:49	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			01/31/18 14:49	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			01/31/18 14:49	1
Trichloroethene	ND		0.40	0.11	ppb v/v			01/31/18 14:49	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			01/31/18 14:49	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			01/31/18 14:49	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			01/31/18 14:49	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			01/31/18 14:49	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			01/31/18 14:49	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			01/31/18 14:49	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			01/31/18 14:49	1
o-Xylene	ND		0.40	0.054	ppb v/v			01/31/18 14:49	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		12	0.42	ug/m3			01/31/18 14:49	1
Benzene	ND		1.3	0.25	ug/m3			01/31/18 14:49	1
Benzyl chloride	ND		4.1	0.84	ug/m3			01/31/18 14:49	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			01/31/18 14:49	1
Bromoform	ND		4.1	0.72	ug/m3			01/31/18 14:49	1
Bromomethane	ND		3.1	1.3	ug/m3			01/31/18 14:49	1
2-Butanone (MEK)	ND		2.4	0.59	ug/m3			01/31/18 14:49	1
Carbon disulfide	ND		2.5	0.24	ug/m3			01/31/18 14:49	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			01/31/18 14:49	1
Chlorobenzene	ND		1.4	0.29	ug/m3			01/31/18 14:49	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			01/31/18 14:49	1
Chloroethane	ND		2.1	0.81	ug/m3			01/31/18 14:49	1
Chloroform	ND		1.5	0.46	ug/m3			01/31/18 14:49	1
Chloromethane	ND		1.7	0.41	ug/m3			01/31/18 14:49	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			01/31/18 14:49	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			01/31/18 14:49	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			01/31/18 14:49	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			01/31/18 14:49	1
Dichlorodifluoromethane	ND		2.0	0.72	ug/m3			01/31/18 14:49	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			01/31/18 14:49	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			01/31/18 14:49	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			01/31/18 14:49	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			01/31/18 14:49	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			01/31/18 14:49	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			01/31/18 14:49	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			01/31/18 14:49	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			01/31/18 14:49	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-206344/6

Matrix: Air

Analysis Batch: 206344

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			01/31/18 14:49	1
Ethylbenzene	ND		1.7	0.27	ug/m3			01/31/18 14:49	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			01/31/18 14:49	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			01/31/18 14:49	1
2-Hexanone	ND		1.6	0.36	ug/m3			01/31/18 14:49	1
Methylene Chloride	ND		1.4	0.25	ug/m3			01/31/18 14:49	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			01/31/18 14:49	1
Styrene	ND		1.7	0.25	ug/m3			01/31/18 14:49	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			01/31/18 14:49	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			01/31/18 14:49	1
Toluene	ND		1.5	0.19	ug/m3			01/31/18 14:49	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			01/31/18 14:49	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			01/31/18 14:49	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			01/31/18 14:49	1
Trichloroethene	ND		2.1	0.56	ug/m3			01/31/18 14:49	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			01/31/18 14:49	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			01/31/18 14:49	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			01/31/18 14:49	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			01/31/18 14:49	1
Vinyl acetate	ND		2.8	0.51	ug/m3			01/31/18 14:49	1
Vinyl chloride	ND		1.0	0.31	ug/m3			01/31/18 14:49	1
m,p-Xylene	ND		3.5	0.43	ug/m3			01/31/18 14:49	1
o-Xylene	ND		1.7	0.23	ug/m3			01/31/18 14:49	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130		01/31/18 14:49	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 130		01/31/18 14:49	1
Toluene-d8 (Surr)	97		70 - 130		01/31/18 14:49	1

Lab Sample ID: LCS 320-206344/3

Matrix: Air

Analysis Batch: 206344

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	18.5		ppb v/v		92	65 - 125
Benzene	20.0	19.5		ppb v/v		98	68 - 128
Benzyl chloride	16.0	15.3		ppb v/v		96	67 - 127
Bromodichloromethane	20.0	20.4		ppb v/v		102	71 - 131
Bromoform	20.0	21.1		ppb v/v		106	66 - 126
Bromomethane	20.0	19.4		ppb v/v		97	73 - 134
2-Butanone (MEK)	20.0	20.5		ppb v/v		103	73 - 133
Carbon disulfide	20.0	20.6		ppb v/v		103	71 - 131
Carbon tetrachloride	20.0	20.0		ppb v/v		100	63 - 126
Chlorobenzene	20.0	19.1		ppb v/v		95	63 - 123
Dibromochloromethane	20.0	19.8		ppb v/v		99	66 - 126
Chloroethane	20.0	19.8		ppb v/v		99	73 - 133
Chloroform	20.0	19.5		ppb v/v		97	70 - 130
Chloromethane	20.0	18.2		ppb v/v		91	61 - 140

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-206344/3

Matrix: Air

Analysis Batch: 206344

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dibromoethane (EDB)	20.0	19.8		ppb v/v		99	64 - 124
1,2-Dichlorobenzene	20.0	20.9		ppb v/v		105	62 - 126
1,3-Dichlorobenzene	20.0	21.0		ppb v/v		105	59 - 130
1,4-Dichlorobenzene	20.0	21.4		ppb v/v		107	58 - 132
Dichlorodifluoromethane	20.0	18.7		ppb v/v		93	69 - 129
1,1-Dichloroethane	20.0	19.7		ppb v/v		99	71 - 131
1,2-Dichloroethane	20.0	19.7		ppb v/v		99	71 - 131
1,1-Dichloroethene	20.0	19.9		ppb v/v		99	72 - 132
cis-1,2-Dichloroethene	20.0	20.7		ppb v/v		103	70 - 130
trans-1,2-Dichloroethene	20.0	21.1		ppb v/v		105	72 - 132
1,2-Dichloropropane	20.0	20.1		ppb v/v		100	72 - 132
cis-1,3-Dichloropropene	20.0	21.5		ppb v/v		108	72 - 132
trans-1,3-Dichloropropene	20.0	20.7		ppb v/v		104	66 - 126
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	18.5		ppb v/v		93	74 - 134
Ethylbenzene	20.0	19.8		ppb v/v		99	64 - 124
4-Ethyltoluene	20.0	21.6		ppb v/v		108	66 - 129
Hexachlorobutadiene	20.0	20.1		ppb v/v		101	58 - 131
2-Hexanone	20.0	20.6		ppb v/v		103	69 - 129
Methylene Chloride	20.0	18.9		ppb v/v		94	67 - 127
4-Methyl-2-pentanone (MIBK)	20.0	21.1		ppb v/v		105	74 - 134
Styrene	20.0	21.3		ppb v/v		106	67 - 127
1,1,2,2-Tetrachloroethane	20.0	20.6		ppb v/v		103	64 - 124
Tetrachloroethene	20.0	18.6		ppb v/v		93	63 - 123
Toluene	20.0	19.9		ppb v/v		99	68 - 128
1,2,4-Trichlorobenzene	20.0	17.3		ppb v/v		87	58 - 138
1,1,1-Trichloroethane	20.0	19.3		ppb v/v		96	69 - 129
1,1,2-Trichloroethane	20.0	19.3		ppb v/v		96	64 - 124
Trichloroethene	20.0	20.3		ppb v/v		101	70 - 130
Trichlorofluoromethane	20.0	19.0		ppb v/v		95	71 - 131
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	19.4		ppb v/v		97	70 - 130
1,2,4-Trimethylbenzene	20.0	20.4		ppb v/v		102	60 - 132
1,3,5-Trimethylbenzene	20.0	19.9		ppb v/v		99	65 - 125
Vinyl acetate	20.0	20.0		ppb v/v		100	65 - 134
Vinyl chloride	20.0	18.2		ppb v/v		91	59 - 152
m,p-Xylene	40.0	40.3		ppb v/v		101	65 - 125
o-Xylene	20.0	19.9		ppb v/v		99	65 - 125
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	48	43.9		ug/m3		92	65 - 125
Benzene	64	62.3		ug/m3		98	68 - 128
Benzyl chloride	83	79.5		ug/m3		96	67 - 127
Bromodichloromethane	130	136		ug/m3		102	71 - 131
Bromoform	210	218		ug/m3		106	66 - 126
Bromomethane	78	75.5		ug/m3		97	73 - 134
2-Butanone (MEK)	59	60.5		ug/m3		103	73 - 133
Carbon disulfide	62	64.2		ug/m3		103	71 - 131
Carbon tetrachloride	130	126		ug/m3		100	63 - 126

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-206344/3

Matrix: Air

Analysis Batch: 206344

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorobenzene	92	87.8		ug/m3		95	63 - 123
Dibromochloromethane	170	169		ug/m3		99	66 - 126
Chloroethane	53	52.3		ug/m3		99	73 - 133
Chloroform	98	95.0		ug/m3		97	70 - 130
Chloromethane	41	37.6		ug/m3		91	61 - 140
1,2-Dibromoethane (EDB)	150	152		ug/m3		99	64 - 124
1,2-Dichlorobenzene	120	126		ug/m3		105	62 - 126
1,3-Dichlorobenzene	120	126		ug/m3		105	59 - 130
1,4-Dichlorobenzene	120	129		ug/m3		107	58 - 132
Dichlorodifluoromethane	99	92.3		ug/m3		93	69 - 129
1,1-Dichloroethane	81	79.8		ug/m3		99	71 - 131
1,2-Dichloroethane	81	79.8		ug/m3		99	71 - 131
1,1-Dichloroethene	79	78.8		ug/m3		99	72 - 132
cis-1,2-Dichloroethene	79	81.9		ug/m3		103	70 - 130
trans-1,2-Dichloroethene	79	83.6		ug/m3		105	72 - 132
1,2-Dichloropropane	92	92.7		ug/m3		100	72 - 132
cis-1,3-Dichloropropene	91	97.7		ug/m3		108	72 - 132
trans-1,3-Dichloropropene	91	94.0		ug/m3		104	66 - 126
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	129		ug/m3		93	74 - 134
Ethylbenzene	87	86.1		ug/m3		99	64 - 124
4-Ethyltoluene	98	106		ug/m3		108	66 - 129
Hexachlorobutadiene	210	215		ug/m3		101	58 - 131
2-Hexanone	82	84.4		ug/m3		103	69 - 129
Methylene Chloride	69	65.6		ug/m3		94	67 - 127
4-Methyl-2-pentanone (MIBK)	82	86.2		ug/m3		105	74 - 134
Styrene	85	90.6		ug/m3		106	67 - 127
1,1,2,2-Tetrachloroethane	140	141		ug/m3		103	64 - 124
Tetrachloroethene	140	126		ug/m3		93	63 - 123
Toluene	75	74.8		ug/m3		99	68 - 128
1,2,4-Trichlorobenzene	150	129		ug/m3		87	58 - 138
1,1,1-Trichloroethane	110	105		ug/m3		96	69 - 129
1,1,2-Trichloroethane	110	105		ug/m3		96	64 - 124
Trichloroethene	110	109		ug/m3		101	70 - 130
Trichlorofluoromethane	110	107		ug/m3		95	71 - 131
1,1,2-Trichloro-1,2,2-trifluoroethane	150	149		ug/m3		97	70 - 130
1,2,4-Trimethylbenzene	98	100		ug/m3		102	60 - 132
1,3,5-Trimethylbenzene	98	97.8		ug/m3		99	65 - 125
Vinyl acetate	70	70.4		ug/m3		100	65 - 134
Vinyl chloride	51	46.5		ug/m3		91	59 - 152
m,p-Xylene	170	175		ug/m3		101	65 - 125
o-Xylene	87	86.3		ug/m3		99	65 - 125

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	113		70 - 130
1,2-Dichloroethane-d4 (Surr)	106		70 - 130
Toluene-d8 (Surr)	102		70 - 130

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-206344/4

Matrix: Air

Analysis Batch: 206344

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	20.0	17.9		ppb v/v		90	65 - 125	3	25
Benzene	20.0	18.7		ppb v/v		94	68 - 128	4	25
Benzyl chloride	16.0	14.6		ppb v/v		92	67 - 127	5	25
Bromodichloromethane	20.0	19.8		ppb v/v		99	71 - 131	3	25
Bromoform	20.0	20.4		ppb v/v		102	66 - 126	3	25
Bromomethane	20.0	18.7		ppb v/v		93	73 - 134	4	25
2-Butanone (MEK)	20.0	19.9		ppb v/v		100	73 - 133	3	25
Carbon disulfide	20.0	19.9		ppb v/v		100	71 - 131	3	25
Carbon tetrachloride	20.0	19.6		ppb v/v		98	63 - 126	2	25
Chlorobenzene	20.0	18.4		ppb v/v		92	63 - 123	3	25
Dibromochloromethane	20.0	19.2		ppb v/v		96	66 - 126	4	25
Chloroethane	20.0	19.0		ppb v/v		95	73 - 133	4	25
Chloroform	20.0	18.9		ppb v/v		95	70 - 130	3	25
Chloromethane	20.0	17.8		ppb v/v		89	61 - 140	2	25
1,2-Dibromoethane (EDB)	20.0	18.9		ppb v/v		95	64 - 124	4	25
1,2-Dichlorobenzene	20.0	20.1		ppb v/v		100	62 - 126	4	25
1,3-Dichlorobenzene	20.0	20.1		ppb v/v		101	59 - 130	4	25
1,4-Dichlorobenzene	20.0	20.5		ppb v/v		103	58 - 132	4	25
Dichlorodifluoromethane	20.0	18.1		ppb v/v		90	69 - 129	3	25
1,1-Dichloroethane	20.0	19.0		ppb v/v		95	71 - 131	3	25
1,2-Dichloroethane	20.0	19.3		ppb v/v		97	71 - 131	2	25
1,1-Dichloroethene	20.0	19.2		ppb v/v		96	72 - 132	3	25
cis-1,2-Dichloroethene	20.0	20.1		ppb v/v		100	70 - 130	3	25
trans-1,2-Dichloroethene	20.0	20.2		ppb v/v		101	72 - 132	4	25
1,2-Dichloropropane	20.0	19.5		ppb v/v		97	72 - 132	3	25
cis-1,3-Dichloropropene	20.0	20.8		ppb v/v		104	72 - 132	3	25
trans-1,3-Dichloropropene	20.0	19.9		ppb v/v		100	66 - 126	4	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	18.1		ppb v/v		91	74 - 134	2	25
Ethylbenzene	20.0	18.9		ppb v/v		95	64 - 124	5	25
4-Ethyltoluene	20.0	20.7		ppb v/v		104	66 - 129	4	25
Hexachlorobutadiene	20.0	19.5		ppb v/v		97	58 - 131	3	25
2-Hexanone	20.0	19.4		ppb v/v		97	69 - 129	6	25
Methylene Chloride	20.0	18.3		ppb v/v		91	67 - 127	3	25
4-Methyl-2-pentanone (MIBK)	20.0	20.1		ppb v/v		100	74 - 134	5	25
Styrene	20.0	20.4		ppb v/v		102	67 - 127	4	25
1,1,2,2-Tetrachloroethane	20.0	19.5		ppb v/v		98	64 - 124	5	25
Tetrachloroethene	20.0	18.0		ppb v/v		90	63 - 123	3	25
Toluene	20.0	19.1		ppb v/v		95	68 - 128	4	25
1,2,4-Trichlorobenzene	20.0	16.4		ppb v/v		82	58 - 138	6	25
1,1,1-Trichloroethane	20.0	18.9		ppb v/v		94	69 - 129	2	25
1,1,2-Trichloroethane	20.0	18.5		ppb v/v		93	64 - 124	4	25
Trichloroethene	20.0	19.8		ppb v/v		99	70 - 130	3	25
Trichlorofluoromethane	20.0	18.6		ppb v/v		93	71 - 131	2	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	18.9		ppb v/v		95	70 - 130	3	25
1,2,4-Trimethylbenzene	20.0	19.5		ppb v/v		97	60 - 132	5	25
1,3,5-Trimethylbenzene	20.0	19.1		ppb v/v		95	65 - 125	4	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-206344/4

Matrix: Air

Analysis Batch: 206344

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Vinyl acetate	20.0	19.1		ppb v/v		95	65 - 134	5	25
Vinyl chloride	20.0	17.8		ppb v/v		89	59 - 152	2	25
m,p-Xylene	40.0	38.7		ppb v/v		97	65 - 125	4	25
o-Xylene	20.0	19.0		ppb v/v		95	65 - 125	5	25
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	48	42.6		ug/m3		90	65 - 125	3	25
Benzene	64	59.9		ug/m3		94	68 - 128	4	25
Benzyl chloride	83	75.8		ug/m3		92	67 - 127	5	25
Bromodichloromethane	130	133		ug/m3		99	71 - 131	3	25
Bromoform	210	211		ug/m3		102	66 - 126	3	25
Bromomethane	78	72.5		ug/m3		93	73 - 134	4	25
2-Butanone (MEK)	59	58.7		ug/m3		100	73 - 133	3	25
Carbon disulfide	62	62.1		ug/m3		100	71 - 131	3	25
Carbon tetrachloride	130	123		ug/m3		98	63 - 126	2	25
Chlorobenzene	92	84.8		ug/m3		92	63 - 123	3	25
Dibromochloromethane	170	163		ug/m3		96	66 - 126	4	25
Chloroethane	53	50.1		ug/m3		95	73 - 133	4	25
Chloroform	98	92.4		ug/m3		95	70 - 130	3	25
Chloromethane	41	36.8		ug/m3		89	61 - 140	2	25
1,2-Dibromoethane (EDB)	150	146		ug/m3		95	64 - 124	4	25
1,2-Dichlorobenzene	120	121		ug/m3		100	62 - 126	4	25
1,3-Dichlorobenzene	120	121		ug/m3		101	59 - 130	4	25
1,4-Dichlorobenzene	120	123		ug/m3		103	58 - 132	4	25
Dichlorodifluoromethane	99	89.4		ug/m3		90	69 - 129	3	25
1,1-Dichloroethane	81	77.1		ug/m3		95	71 - 131	3	25
1,2-Dichloroethane	81	78.3		ug/m3		97	71 - 131	2	25
1,1-Dichloroethene	79	76.3		ug/m3		96	72 - 132	3	25
cis-1,2-Dichloroethene	79	79.5		ug/m3		100	70 - 130	3	25
trans-1,2-Dichloroethene	79	80.3		ug/m3		101	72 - 132	4	25
1,2-Dichloropropane	92	90.0		ug/m3		97	72 - 132	3	25
cis-1,3-Dichloropropene	91	94.3		ug/m3		104	72 - 132	3	25
trans-1,3-Dichloropropene	91	90.4		ug/m3		100	66 - 126	4	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	127		ug/m3		91	74 - 134	2	25
Ethylbenzene	87	82.2		ug/m3		95	64 - 124	5	25
4-Ethyltoluene	98	102		ug/m3		104	66 - 129	4	25
Hexachlorobutadiene	210	208		ug/m3		97	58 - 131	3	25
2-Hexanone	82	79.4		ug/m3		97	69 - 129	6	25
Methylene Chloride	69	63.5		ug/m3		91	67 - 127	3	25
4-Methyl-2-pentanone (MIBK)	82	82.1		ug/m3		100	74 - 134	5	25
Styrene	85	87.1		ug/m3		102	67 - 127	4	25
1,1,2,2-Tetrachloroethane	140	134		ug/m3		98	64 - 124	5	25
Tetrachloroethene	140	122		ug/m3		90	63 - 123	3	25
Toluene	75	71.9		ug/m3		95	68 - 128	4	25
1,2,4-Trichlorobenzene	150	122		ug/m3		82	58 - 138	6	25
1,1,1-Trichloroethane	110	103		ug/m3		94	69 - 129	2	25
1,1,2-Trichloroethane	110	101		ug/m3		93	64 - 124	4	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-206344/4

Matrix: Air

Analysis Batch: 206344

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Trichloroethene	110	106		ug/m3		99	70 - 130	3	25
Trichlorofluoromethane	110	104		ug/m3		93	71 - 131	2	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	145		ug/m3		95	70 - 130	3	25
1,2,4-Trimethylbenzene	98	95.8		ug/m3		97	60 - 132	5	25
1,3,5-Trimethylbenzene	98	93.8		ug/m3		95	65 - 125	4	25
Vinyl acetate	70	67.1		ug/m3		95	65 - 134	5	25
Vinyl chloride	51	45.4		ug/m3		89	59 - 152	2	25
m,p-Xylene	170	168		ug/m3		97	65 - 125	4	25
o-Xylene	87	82.5		ug/m3		95	65 - 125	5	25

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	111		70 - 130
1,2-Dichloroethane-d4 (Surr)	108		70 - 130
Toluene-d8 (Surr)	103		70 - 130

TestAmerica Sacramento

QC Association Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Air - GC/MS VOA

Analysis Batch: 205880

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-35129-11	HOU-01B	Total/NA	Air	TO-15	
320-35129-12	HOU-02	Total/NA	Air	TO-15	
320-35129-13	HOU-03	Total/NA	Air	TO-15	
320-35129-14	HOU-03B	Total/NA	Air	TO-15	
320-35129-15	HOU-04	Total/NA	Air	TO-15	
320-35129-16	HOU-BKG-01	Total/NA	Air	TO-15	
320-35129-17	HOU-BKG-02	Total/NA	Air	TO-15	
320-35129-18	DUP-1	Total/NA	Air	TO-15	
MB 320-205880/6	Method Blank	Total/NA	Air	TO-15	
LCS 320-205880/3	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-205880/4	Lab Control Sample Dup	Total/NA	Air	TO-15	

Analysis Batch: 206093

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-35129-2	HOU-06	Total/NA	Air	TO-15	
320-35129-3	HOU-07	Total/NA	Air	TO-15	
320-35129-4	HOU-07B	Total/NA	Air	TO-15	
320-35129-5	HOU-08	Total/NA	Air	TO-15	
320-35129-6	HOU-08B	Total/NA	Air	TO-15	
320-35129-7	HOU-09	Total/NA	Air	TO-15	
320-35129-8	HOU-10	Total/NA	Air	TO-15	
320-35129-9	HOU-10B	Total/NA	Air	TO-15	
320-35129-10	HOU-01	Total/NA	Air	TO-15	
320-35129-17 - DL	HOU-BKG-02	Total/NA	Air	TO-15	
MB 320-206093/6	Method Blank	Total/NA	Air	TO-15	
LCS 320-206093/3	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-206093/4	Lab Control Sample Dup	Total/NA	Air	TO-15	

Analysis Batch: 206344

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-35129-1	HOU-05	Total/NA	Air	TO-15	
MB 320-206344/6	Method Blank	Total/NA	Air	TO-15	
LCS 320-206344/3	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-206344/4	Lab Control Sample Dup	Total/NA	Air	TO-15	

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-05

Date Collected: 01/10/18 15:10

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-1

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		3.93	100 mL	250 mL	206344	01/31/18 16:08	RS1	TAL SAC

Client Sample ID: HOU-06

Date Collected: 01/10/18 15:00

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-2

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		10.1	40 mL	250 mL	206093	01/30/18 18:17	AP1	TAL SAC

Client Sample ID: HOU-07

Date Collected: 01/10/18 15:25

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-3

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	382 mL	250 mL	206093	01/30/18 19:19	AP1	TAL SAC

Client Sample ID: HOU-07B

Date Collected: 01/10/18 15:27

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-4

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	385 mL	250 mL	206093	01/30/18 20:18	AP1	TAL SAC

Client Sample ID: HOU-08

Date Collected: 01/10/18 15:40

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-5

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	377 mL	250 mL	206093	01/30/18 21:16	AP1	TAL SAC

Client Sample ID: HOU-08B

Date Collected: 01/10/18 15:50

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-6

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	390 mL	250 mL	206093	01/30/18 22:16	AP1	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-09

Date Collected: 01/10/18 15:35

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-7

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	390 mL	250 mL	206093	01/30/18 23:14	AP1	TAL SAC

Client Sample ID: HOU-10

Date Collected: 01/10/18 16:03

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-8

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		23.6	16.7 mL	250 mL	206093	01/31/18 00:09	AP1	TAL SAC

Client Sample ID: HOU-10B

Date Collected: 01/10/18 16:24

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-9

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		33.1	11.7 mL	250 mL	206093	01/31/18 01:05	AP1	TAL SAC

Client Sample ID: HOU-01

Date Collected: 01/11/18 08:15

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-10

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		11.1	35 mL	250 mL	206093	01/31/18 02:03	AP1	TAL SAC

Client Sample ID: HOU-01B

Date Collected: 01/11/18 08:22

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-11

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		9.62	40 mL	250 mL	205880	01/29/18 19:38	AP1	TAL SAC

Client Sample ID: HOU-02

Date Collected: 01/11/18 08:35

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-12

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	391 mL	250 mL	205880	01/29/18 20:37	AP1	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Client Sample ID: HOU-03

Date Collected: 01/11/18 08:57

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-13

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	398 mL	250 mL	205880	01/29/18 21:37	AP1	TAL SAC

Client Sample ID: HOU-03B

Date Collected: 01/11/18 09:04

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-14

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	400 mL	250 mL	205880	01/29/18 22:37	AP1	TAL SAC

Client Sample ID: HOU-04

Date Collected: 01/11/18 07:52

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-15

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	393 mL	250 mL	205880	01/29/18 23:36	AP1	TAL SAC

Client Sample ID: HOU-BKG-01

Date Collected: 01/11/18 09:10

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-16

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	396 mL	250 mL	205880	01/30/18 00:36	AP1	TAL SAC

Client Sample ID: HOU-BKG-02

Date Collected: 01/11/18 08:45

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-17

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		2.19	185 mL	250 mL	205880	01/30/18 01:33	AP1	TAL SAC
Total/NA	Analysis	TO-15	DL	3.38	120 mL	250 mL	206093	01/31/18 02:58	AP1	TAL SAC

Client Sample ID: DUP-1

Date Collected: 01/11/18 00:00

Date Received: 01/17/18 10:19

Lab Sample ID: 320-35129-18

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		8.93	45 mL	250 mL	205880	01/30/18 02:29	AP1	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

TestAmerica Sacramento

Accreditation/Certification Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Laboratory: TestAmerica Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-29-20

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Method Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-35129-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-35129-1	HOU-05	Air	01/10/18 15:10	01/17/18 10:19
320-35129-2	HOU-06	Air	01/10/18 15:00	01/17/18 10:19
320-35129-3	HOU-07	Air	01/10/18 15:25	01/17/18 10:19
320-35129-4	HOU-07B	Air	01/10/18 15:27	01/17/18 10:19
320-35129-5	HOU-08	Air	01/10/18 15:40	01/17/18 10:19
320-35129-6	HOU-08B	Air	01/10/18 15:50	01/17/18 10:19
320-35129-7	HOU-09	Air	01/10/18 15:35	01/17/18 10:19
320-35129-8	HOU-10	Air	01/10/18 16:03	01/17/18 10:19
320-35129-9	HOU-10B	Air	01/10/18 16:24	01/17/18 10:19
320-35129-10	HOU-01	Air	01/11/18 08:15	01/17/18 10:19
320-35129-11	HOU-01B	Air	01/11/18 08:22	01/17/18 10:19
320-35129-12	HOU-02	Air	01/11/18 08:35	01/17/18 10:19
320-35129-13	HOU-03	Air	01/11/18 08:57	01/17/18 10:19
320-35129-14	HOU-03B	Air	01/11/18 09:04	01/17/18 10:19
320-35129-15	HOU-04	Air	01/11/18 07:52	01/17/18 10:19
320-35129-16	HOU-BKG-01	Air	01/11/18 09:10	01/17/18 10:19
320-35129-17	HOU-BKG-02	Air	01/11/18 08:45	01/17/18 10:19
320-35129-18	DUP-1	Air	01/11/18 00:00	01/17/18 10:19

TestAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605
phone 916.374.4378 fax 916.372.1059

Canister Samples Chain of Custody Record

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information				Project Manager: <i>Lila Beckley</i>				Samples Collected By: <i>TEM</i>				COC No: <i>1</i> of <i>2</i> COCs																	
Company Name: <i>GSI</i>	Address: <i>2211 North St. 1000</i>	City/State/Zip: <i>Houston TX 77078</i>	Phone: <i>713 367 4775</i>	Email: <i>lbeckley@gsi.net</i>	Site Contact: <i>Laura Turpin</i>	TA Contact: <i>Laura Turpin</i>	Standard (Specific):	Rush (Specify):	Analysis Turnaround Time	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)													
Project Name: <i>25th St Sewer VI</i>	Site/Location: <i>Houston TX</i>	P O #: <i>4262</i>	Sample Date(s)	Time Start	Time Stop	Canister Vacuum Field, "Hg (Start)	Canister Vacuum in Field, "Hg (Stop)	Flow Controller ID	Canister ID	TO-15 (Med / Sid / Low / SIM)	MA-APH	EPA 3C	EPA 25C / 25.3	ASTM D-1946 / 1945 / 3588	EPA 15/16	TO-3	Other (Please specify in notes section)												
<i>H2U-05</i>	<i>1/10/2018</i>	<i>1540</i>	<i>-29.5</i>	<i>0</i>	<i>11/10</i>												<i>Low ID 34001547</i>												
<i>H2U-06</i>	<i>"</i>	<i>1500</i>	<i>-29.5</i>	<i>0</i>													<i>34000732</i>												
<i>H2U-07</i>	<i>"</i>	<i>1525</i>	<i>-29.5</i>	<i>0</i>													<i>34000794</i>												
<i>H2U-07B</i>	<i>"</i>	<i>1527</i>	<i>-29.7</i>	<i>0</i>													<i>7706</i>												
<i>H2U-08</i>	<i>"</i>	<i>1540</i>	<i>-29.6</i>	<i>0</i>													<i>34000658</i>												
<i>H2U-08B</i>	<i>"</i>	<i>1550</i>	<i>-29.7</i>	<i>0</i>													<i>8962</i>												
<i>H2U-09</i>	<i>"</i>	<i>1535</i>	<i>-29.6</i>	<i>0</i>													<i>34001106</i>												
<i>H2U-10</i>	<i>"</i>	<i>1603</i>	<i>-29.8</i>	<i>0</i>													<i>34001105</i>												
<i>H2U-10B</i>	<i>"</i>	<i>1624</i>	<i>-29.7</i>	<i>0</i>													<i>34001077</i>												
<i>H2U-01</i>	<i>1/11/2018</i>	<i>0815</i>	<i>-29.7</i>	<i>0</i>													<i>34000977</i>												
Temperature (Fahrenheit) <table><tr><td>Start</td><td>Interior</td><td>Ambient</td></tr><tr><td>Stop</td><td></td><td></td></tr></table> Temperature (Fahrenheit) <table><tr><td>Start</td><td>Interior</td><td>Ambient</td></tr><tr><td>Stop</td><td></td><td></td></tr></table>																		Start	Interior	Ambient	Stop			Start	Interior	Ambient	Stop		
																		Start	Interior	Ambient									
Stop																													
Start	Interior	Ambient																											
Stop																													
Special Instructions/OC Requirements & Comments: <i>18 samples + 2 cans not used</i>																													
Samples Shipped by: <i>Lila Beckley</i>				Date / Time: <i>1/11/2018 1500 (Reln)</i>				Samples Received by: <i>Cabrera Thier 1/17/18 TA-GAC 10:19 am</i>																					
Samples Relinquished by:				Date / Time:				Received by:																					
Relinquished by:				Date / Time:				Received by:																					
Lab Use Only: Shipper Name:				Opened by:				Condition:																					

Sacramento

JOB # 320-35129

Sample #	1

Client/Project:		VFR ID:		
Canister Serial #:	34001947	Duration:		Hrs Min
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.63	01/19/18	GKI
FINAL PRESSURE (PSIA)		22.99	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =	1.57			

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.57		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors									
				Date		Instr.		File #	
				1/30/2018		ATMS6			
								FINAL DF	
Canister DF =	1.57	X	Load DF =	1.8939394	X	Bag DF =	1	=	2.976190476
			LVf (mLs)	250		BVf (mLs)			
			LVl (mLs)	132		Bvl (mLs)			

Date	Instr.	File #
1/31/2018	ATMS6	
FINAL DF		
Canister DF = 1.57	X	Load DF = 2.5
		LVf (mLs) 250
		LVi (mLs) 100
	X	Bag DF = 1
		BVf (mLs)
		Bvi (mLs)
	=	3.928571429

Date	Instr.	File #
		FINAL DF
Canister DF = 1.57	X	Load DF = #DIV/0!
		LVf (mLs)
		LVl (mL s)
		Bag DF = 1
		BVf (mLs)
		BVl (mL s)
		= #DIV/0!

JOB # 320-35129
Sample # 2

Client/Project:		VFR ID:		
Canister Serial #:	34000732	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.63	01/19/18	GKI
FINAL PRESSURE (PSIA)		23.70	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.62		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.62		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		1/30/2018	ATMS6	
Canister DF =	1.62	X	Load DF =	6.25
			LVf (mLs)	250
			LVi (mLs)	40
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
			=	FINAL DF
				10.12474368
		Date	Instr.	File #
Canister DF =	1.62	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
			=	FINAL DF
				#DIV/0!
		Date	Instr.	File #
Canister DF =	1.62	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
			=	FINAL DF
				#DIV/0!

JOB # 320-35129
Sample # 3

Client/Project:		VFR ID:		
Canister Serial #:	34000994	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.61	01/19/18	GKI
FINAL PRESSURE (PSIA)		22.40	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.53		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.53		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		1/30/2018	ATMS6							
Canister DF =	1.53	X	Load DF =	0.6544503	X	Bag DF =	1	=	FINAL DF	1.003400812
			LVf (mLs)	250			BVf (mLs)			
			LVi (mLs)	382			BVi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.53	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
			LVf (mLs)				BVf (mLs)			
			LVi (mLs)				BVi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.53	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
			LVf (mLs)				BVf (mLs)			
			LVi (mLs)				BVi (mLs)			

JOB # 320-35129
Sample # 4

Client/Project:		VFR ID:		
Canister Serial #:	7706	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.58	01/19/18	GKI
FINAL PRESSURE (PSIA)		22.39	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.54		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.54		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		1/30/2018	ATMS6	
Canister DF =	1.54	X	Load DF =	0.6493506
			LVf (mLs)	250
			LVi (mLs)	385
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				0.997185256
		Date	Instr.	File #
Canister DF =	1.54	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				#DIV/0!
		Date	Instr.	File #
Canister DF =	1.54	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				#DIV/0!

JOB # 320-35129
Sample # 5

Client/Project:		VFR ID:		
Canister Serial #:	34000658	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.58	01/19/18	GKI
FINAL PRESSURE (PSIA)		21.97	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.51		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.51		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		1/30/2018	ATMS6	
Canister DF =	1.51	X	Load DF =	0.66313
			LVf (mLs)	250
			LVi (mLs)	377
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
			=	FINAL DF
				0.999243177
		Date	Instr.	File #
Canister DF =	1.51	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
			=	FINAL DF
				#DIV/0!
		Date	Instr.	File #
Canister DF =	1.51	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
			=	FINAL DF
				#DIV/0!

JOB # 320-35129
Sample # 6

Client/Project:		VFR ID:		
Canister Serial #:	8962	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.63	01/19/18	GKI
FINAL PRESSURE (PSIA)		22.84	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.56		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.56		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		1/30/2018	ATMS6							
Canister DF =	1.56	X	Load DF =	0.6410256	X	Bag DF =	1	=	FINAL DF	1.000753632
			LVf (mLs)	250			BVf (mLs)			
			LVi (mLs)	390			BVi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.56	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
			LVf (mLs)				BVf (mLs)			
			LVi (mLs)				BVi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.56	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
			LVf (mLs)				BVf (mLs)			
			LVi (mLs)				BVi (mLs)			

JOB # 320-35129
Sample # 7

Client/Project:		VFR ID:		
Canister Serial #:	34001106	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.60	01/19/18	GKI
FINAL PRESSURE (PSIA)		22.72	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.56		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.56		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		1/30/2018	ATMS6	
Canister DF =	1.56	X	Load DF =	0.6410256
			LVf (mLs)	250
			LVi (mLs)	390
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				0.997541272
		Date	Instr.	File #
Canister DF =	1.56	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				#DIV/0!
		Date	Instr.	File #
Canister DF =	1.56	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				#DIV/0!

Sample # 8

JOB # 320-35129
Sample # 9

Client/Project:		VFR ID:		
Canister Serial #:	34001077	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.72	01/19/18	GKI
FINAL PRESSURE (PSIA)		22.74	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.54		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.54		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors									
				Date	Instr.	File #			
				1/30/2018	ATMS6				
Canister DF =	1.54	X	Load DF =	7.1428571	X	Bag DF =	3	=	FINAL DF
			LVf (mLs)	250		BVf (mLs)	3		33.10364907
			LVi (mLs)	35		BVi (mLs)	1		
				Date	Instr.	File #			
Canister DF =	1.54	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF
			LVf (mLs)			BVf (mLs)			#DIV/0!
			LVi (mLs)			BVi (mLs)			
				Date	Instr.	File #			
Canister DF =	1.54	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF
			LVf (mLs)			BVf (mLs)			#DIV/0!
			LVi (mLs)			BVi (mLs)			

JOB # 320-35129
Sample # 10

Client/Project:		VFR ID:		
Canister Serial #:	34000977	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.60	01/19/18	GKI
FINAL PRESSURE (PSIA)		22.60	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.55		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.55		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		1/30/2018	ATMS6							
Canister DF =	1.55	X	Load DF =	7.1428571	X	Bag DF =	1	=	FINAL DF	11.05675147
			LVf (mLs)	250			BVf (mLs)			
			LVi (mLs)	35			BVi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.55	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
			LVf (mLs)				BVf (mLs)			
			LVi (mLs)				BVi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.55	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
			LVf (mLs)				BVf (mLs)			
			LVi (mLs)				BVi (mLs)			

JOB # 320-35129
Sample # 11

Client/Project:		VFR ID:		
Canister Serial #:	34001649	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.63	01/19/18	GKI
FINAL PRESSURE (PSIA)		22.53	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.54		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.54		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors									
		Date	Instr.	File #					
		1/29/2018	MS6						
Canister DF =	1.54	X	Load DF =	6.25	X	Bag DF =	1	=	FINAL DF
			LVf (mLs)	250		BVf (mLs)			9.624914559
			LVi (mLs)	40		Bvi (mLs)			
		Date	Instr.	File #					
Canister DF =	1.54	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF
			LVf (mLs)			BVf (mLs)			#DIV/0!
			LVi (mLs)			Bvi (mLs)			
		Date	Instr.	File #					
Canister DF =	1.54	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF
			LVf (mLs)			BVf (mLs)			#DIV/0!
			LVi (mLs)			Bvi (mLs)			

Sacramento

JOB # 320-35129

Sample #	12

Client/Project:		VFR ID:		
Canister Serial #:	34001058	Duration:		Hrs Min
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.57	01/19/18	GKI
FINAL PRESSURE (PSIA)		22.81	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =	1.57			

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.57		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors									
		Date	Instr.			File #			
		1/29/2018	MS6						
						FINAL DF			
Canister DF =	1.57	X	Load DF =	0.6393862	X	Bag DF =	1	=	1.000988262
			LVf (mLs)	250		BVf (mLs)			
			LVl (mL s)	391		Bvl (mL s)			

Date	Instr.	File #
		FINAL DF

Canister DF = 1.57 X Load DF = #DIV/0! X Bag DF = 1 = #DIV/0!

LVf (mLS)
LVi (mLS)
BVf (mLS)
BVi (mLS)

	Date	Instr.	File #
Canister DF = 1.57 X Load DF = #DIV/0! X Bag DF = 1 = FINAL DF #DIV/0!			
LVf (mLs)			
LVi (ml s)			
BVf (mLs)			
BVi (ml s)			

Sacramento

JOB # 320-35129

Sample #	13

Client/Project:		VFR ID:		
Canister Serial #:	34000908	Duration:		Hrs Min
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.57	01/19/18	GKI
FINAL PRESSURE (PSIA)		23.24	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =	1.60			

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.60		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors									
				Date		Instr.		File #	
				1/29/2018		MS6			
								FINAL DF	
Canister DF =	1.60	X	Load DF =	0.6281407	X	Bag DF =	1	=	1.001921067
			LVf (mLs)	250		BVf (mLs)			
			LVl (mL s)	398		Bvl (mL s)			

Date	Instr.	File #
		FINAL DF

Canister DF = 1.60 X Load DF = #DIV/0! X Bag DF = 1 = #DIV/0!

LVf (mLs)

LVl (mLs)

BVf (mLs)

Bvl (mLs)

Date	Instr.	File #		FINAL DF
Canister DF = 1.60	X		Load DF = #DIV/0!	X
			LVf (mLs)	
			LVi (mL s)	
			Bag DF = 1	=
			BVf (mLs)	#DIV/0!
			Bvi (mL s)	

Sample # 14

Sacramento

JOB # 320-35129

Sample #	15

Client/Project:		VFR ID:		
Canister Serial #:	34000968	Duration:		Hrs Min
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.61	01/19/18	GKI
FINAL PRESSURE (PSIA)		22.97	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =	1.57			

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.57		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors	

						Date	Instr.	File #	
						1/29/2018	MS6		
						FINAL DF			
Canister DF =	1.57	X	Load DF =	0.6361323	X	Bag DF =	1	=	1.000134106
			LVf (mLs)	250		BVf (mLs)			
			LVi (mL s)	393		BVi (mL s)			

						Date	Instr.	File #	
Canister DF =	1.57	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF
			LVf (mLs)			BVf (mLs)			#DIV/0!
			LVi (mL s)			BVi (mL s)			

Canister DF = 1.57	X	Load DF = #DIV/0!	X	Bag DF = 1	=	FINAL DF = #DIV/0!
		LVf (mLs)		BVf (mLs)		
		LVi (mLs)		BVi (mLs)		

JOB # 320-35129
Sample # 16

Client/Project:		VFR ID:		
Canister Serial #:	34000771	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.60	01/19/18	GKI
FINAL PRESSURE (PSIA)		23.15	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.59		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.59		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		1/29/2018	MS6							
Canister DF =	1.59	X	Load DF =	0.6313131	X	Bag DF =	1	=	FINAL DF	1.001020479
			LVf (mLs)	250			BVf (mLs)			
			LVi (mLs)	396			Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.59	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
			LVf (mLs)				BVf (mLs)			
			LVi (mLs)				Bvi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.59	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
			LVf (mLs)				BVf (mLs)			
			LVi (mLs)				Bvi (mLs)			

JOB # 320-35129
Sample # 17

Client/Project:		VFR ID:		
Canister Serial #:	34000628	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.49	01/19/18	GKI
FINAL PRESSURE (PSIA)		23.50	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.62		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.62		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		1/29/2018	MS6							
Canister DF =	1.62	X	Load DF =	1.3513514	X	Bag DF =	1	=	FINAL DF	2.191632626
			LVf (mLs)	250			BVf (mLs)			
			LVi (mLs)	185			BVi (mLs)			
		Date	Instr.	File #						
		1/30/2018	ATMS6							
Canister DF =	1.62	X	Load DF =	2.0833333	X	Bag DF =	1	=	FINAL DF	3.378766966
			LVf (mLs)	250			BVf (mLs)			
			LVi (mLs)	120			BVi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.62	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
			LVf (mLs)				BVf (mLs)			
			LVi (mLs)				BVi (mLs)			

JOB # 320-35129
Sample # 18

Client/Project:		VFR ID:		
Canister Serial #:	34000932	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.59	01/19/18	GKI
FINAL PRESSURE (PSIA)		23.45	01/19/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.61		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.61		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		1/29/2018	MS6	
Canister DF =	1.61	X	Load DF =	5.5555556
			LVf (mLs)	250
			LVi (mLs)	45
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				8.92925139
		Date	Instr.	File #
Canister DF =	1.61	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				#DIV/0!
		Date	Instr.	File #
Canister DF =	1.61	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				#DIV/0!

Login Sample Receipt Checklist

Client: GSI Environmental, Inc

Job Number: 320-35129-1

Login Number: 35129

List Source: TestAmerica Sacramento

List Number: 1

Creator: Iliev, Gabriela K

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Date Cleaned/Batch ID

12-13-17 320-34272

Date of QC

12/19/2017

Data File Number

C:\MSDCHEM\1\DATA\12191

MS7121922.d

(File ID for certification analysis of canister designated below)



320-34272 Chain of Custody

CANISTER ID NUMBERS

*	34001006
	34000977
	34000771
	34000932
	838
	34000688
	34000968
	7706

	8962
	34001649
	34001110
	34001077
	34001058
	34001106
	34001947
	34001086

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

[Signature]
1st level Reviewed By:

12/20/17
Date:

[Signature]
2nd level Reviewed By:

12/21/17
Date:

Date Cleaned/Batch ID 1-2-18 320-34811
Date of QC 1/4/18
Data File Number C:\MSD\data\1\DATA\180104\
ms6010413.d
(File ID for certification analysis of canister designated below)



320-34811 Chain of Custody

CANISTER ID NUMBERS

*	8524
	34000732
	34000755
	34000659
	34000906
	34001671
	34001108
	34000628

	34000908
	34000235
	34000658
	34000967
	8518
	34000994
	34001105
	8934

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

[Signature]
1st level Reviewed By:

1/5/18
Date:

[Signature]
2nd level Reviewed By:

1/5/18
Date:

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-34272-1</u>
SDG No.: _____	
Client Sample ID: <u>34001006</u>	Lab Sample ID: <u>320-34272-1</u>
Matrix: <u>Air</u>	Lab File ID: <u>MS7121922.D</u>
Analysis Method: <u>TO-15</u>	Date Collected: <u>12/13/2017 00:00</u>
Sample wt/vol: <u>500 (mL)</u>	Date Analyzed: <u>12/20/2017 07:33</u>
Soil Aliquot Vol: _____	Dilution Factor: <u>1</u>
Soil Extract Vol.: _____	GC Column: <u>RTX-Volatiles</u> ID: <u>0.32 (mm)</u>
% Moisture: _____	Level: (low/med) <u>Low</u>
Analysis Batch No.: <u>200468</u>	Units: <u>ppb v/v</u>

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.30	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	0.26	J	0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-34272-1
 SDG No.: _____
 Client Sample ID: 34001006 Lab Sample ID: 320-34272-1
 Matrix: Air Lab File ID: MS7121922.D
 Analysis Method: TO-15 Date Collected: 12/13/2017 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 12/20/2017 07:33
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 200468 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	ND		0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-34272-1
 SDG No.: _____
 Client Sample ID: 34001006 Lab Sample ID: 320-34272-1
 Matrix: Air Lab File ID: MS7121922.D
 Analysis Method: TO-15 Date Collected: 12/13/2017 00:00
 Sample wt/vol: 500(mL) Date Analyzed: 12/20/2017 07:33
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 200468 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	72		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	95		70-130
2037-26-5	Toluene-d8 (Surr)	93		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS7\20171219-51910.b\MS7121922.D
 Lims ID: 320-34272-A-1
 Client ID: 34001006
 Sample Type: Client
 Inject. Date: 20-Dec-2017 07:33:30 ALS Bottle#: 3 Worklist Smp#: 22
 Purge Vol: 5.000 mL Dil. Factor: 1.0000
 Sample Info: 320-33759-B-5
 Misc. Info.: 27 mL
 Operator ID: LHS Instrument ID: ATMS7
 Method: \\ChromNA\Sacramento\ChromData\ATMS7\20171219-51910.b\TO15_ATMS7N.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 20-Dec-2017 08:36:03 Calib Date: 16-Dec-2017 23:28:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS7\20171215-51788.b\MS7121423.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK001

First Level Reviewer: leeh

Date:

20-Dec-2017 08:36:03

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	12.217	12.260	-0.043	96	49344	4.00	
* 2 1,4-Difluorobenzene	114	14.377	14.413	-0.036	95	209164	4.00	
* 3 Chlorobenzene-d5 (IS)	117	21.063	21.087	-0.024	87	183268	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	13.422	13.424	-0.036	96	64727	3.78	
\$ 5 Toluene-d8 (Surr)	100	17.784	17.763	-0.024	99	133412	3.72	
\$ 6 4-Bromofluorobenzene (Surr	95	23.606	23.603	-0.024	92	86719	2.88	
17 Butane	43	4.570	4.576	-0.025	1	750	0.0654	
32 Acetone	43	7.369	7.297	0.043	95	5694	0.3041	
40 Carbon disulfide	76	8.707	8.703	-0.030	95	7886	0.2572	
87 m-Xylene & p-Xylene	91	21.507	21.507	-0.012	1	1810	0.0324	

Reagents:

VAMSIS20_00084

Amount Added: 50.00

Units: mL

Run Reagent

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS7\20171219-51910.b\MS7121922.D

Injection Date: 20-Dec-2017 07:33:30

Instrument ID: ATMS7

Operator ID: LHS

Lims ID: 320-34272-A-1

Lab Sample ID: 320-34272-1

Worklist Smp#: 22

Client ID: 34001006

Purge Vol: 5.000 mL

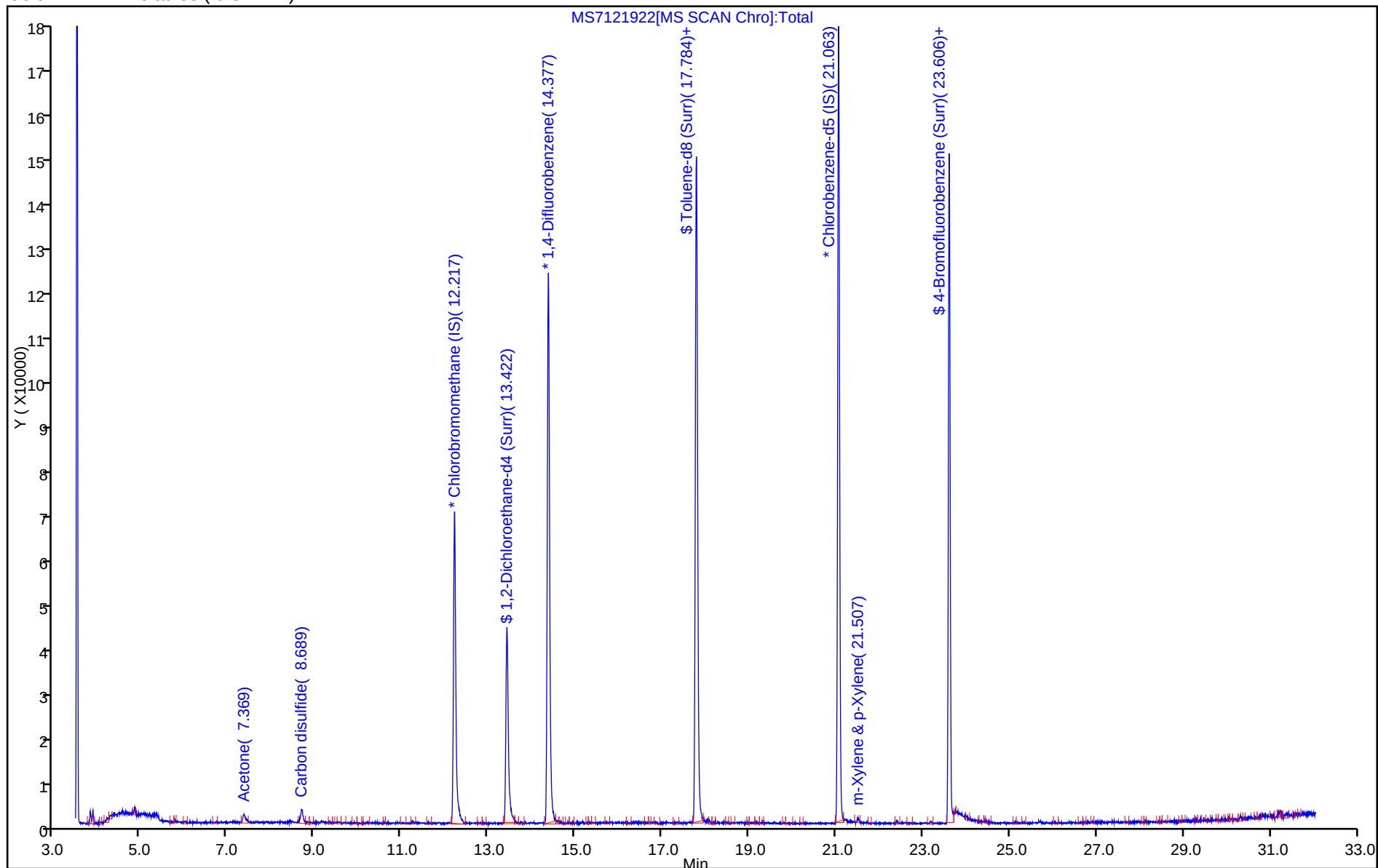
Dil. Factor: 1.0000

ALS Bottle#: 3

Method: TO15_ATMS7N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS7\20171219-51910.b\MS7121922.D

Injection Date: 20-Dec-2017 07:33:30

Instrument ID: ATMS7

Lims ID: 320-34272-A-1

Lab Sample ID: 320-34272-1

Client ID: 34001006

Operator ID: LHS

ALS Bottle#: 3

Worklist Smp#: 22

Purge Vol: 5.000 mL

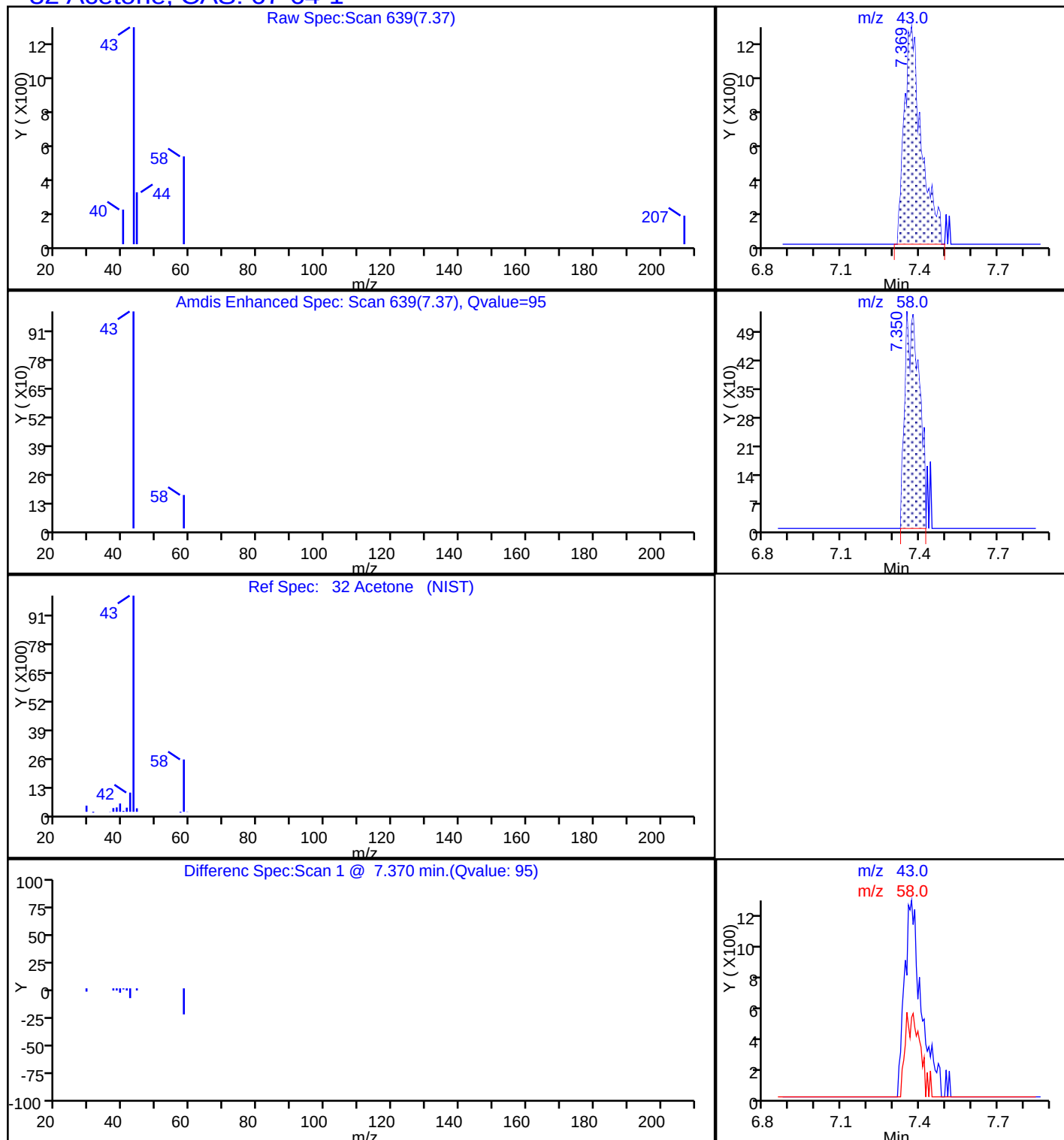
Dil. Factor: 1.0000

Method: TO15_ATMS7N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

32 Acetone, CAS: 67-64-1

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS7\20171219-51910.b\MS7121922.D

Injection Date: 20-Dec-2017 07:33:30

Instrument ID: ATMS7

Lims ID: 320-34272-A-1

Lab Sample ID: 320-34272-1

Client ID: 34001006

Operator ID: LHS

ALS Bottle#: 3

Worklist Smp#: 22

Purge Vol: 5.000 mL

Dil. Factor: 1.0000

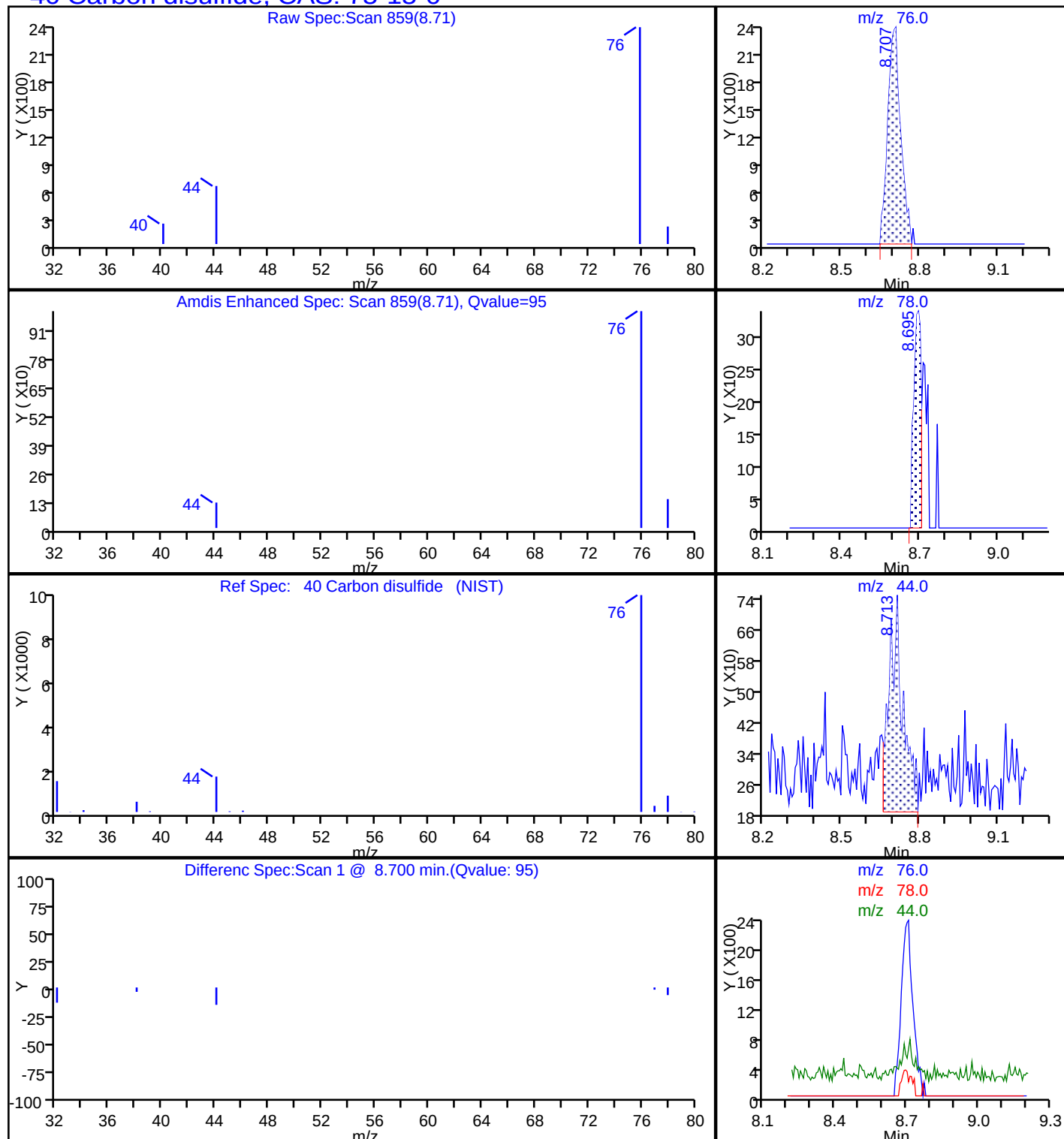
Method: TO15_ATMS7N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

40 Carbon disulfide, CAS: 75-15-0



FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-34811-1
SDG No.: _____
Client Sample ID: 8524 RA Lab Sample ID: 320-34811-1 RA
Matrix: Air Lab File ID: MS6010413.D
Analysis Method: TO-15 Date Collected: 01/02/2018 00:00
Sample wt/vol: 500 (mL) Date Analyzed: 01/04/2018 20:10
Soil Aliquot Vol: _____ Dilution Factor: 1
Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
% Moisture: _____ Level: (low/med) Low
Analysis Batch No.: 202478 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.29	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-34811-1</u>
SDG No.: _____	
Client Sample ID: <u>8524 RA</u>	Lab Sample ID: <u>320-34811-1 RA</u>
Matrix: <u>Air</u>	Lab File ID: <u>MS6010413.D</u>
Analysis Method: <u>TO-15</u>	Date Collected: <u>01/02/2018 00:00</u>
Sample wt/vol: <u>500 (mL)</u>	Date Analyzed: <u>01/04/2018 20:10</u>
Soil Aliquot Vol: _____	Dilution Factor: <u>1</u>
Soil Extract Vol.: _____	GC Column: <u>RTX-Volatiles</u> ID: <u>0.32 (mm)</u>
% Moisture: _____	Level: (low/med) <u>Low</u>
Analysis Batch No.: <u>202478</u>	Units: <u>ppb v/v</u>

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	0.11	J B	0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-34811-1
 SDG No.: _____
 Client Sample ID: 8524 RA Lab Sample ID: 320-34811-1 RA
 Matrix: Air Lab File ID: MS6010413.D
 Analysis Method: TO-15 Date Collected: 01/02/2018 00:00
 Sample wt/vol: 500(mL) Date Analyzed: 01/04/2018 20:10
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 202478 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	99		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	106		70-130
2037-26-5	Toluene-d8 (Surr)	99		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20180104-52443.b\MS6010413.D
 Lims ID: 320-34811-A-1
 Client ID: 8524
 Sample Type: Client
 Inject. Date: 04-Jan-2018 20:10:30 ALS Bottle#: 8 Worklist Smp#: 13
 Purge Vol: 25.000 mL Dil. Factor: 1.0000
 Sample Info: 320-34811-A-1
 Misc. Info.: 500 mL
 Operator ID: LHS Instrument ID: ATMS6
 Method: \\ChromNA\Sacramento\ChromData\ATMS6\20180104-52443.b\TO15_ATMS6.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 05-Jan-2018 14:25:45 Calib Date: 04-Jan-2018 11:33:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS6\20180104-52443.b\MS6010404.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK004

First Level Reviewer: sanjumnair

Date: 05-Jan-2018 14:24:00

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	13.295	13.295	0.000	98	49237	4.00	
* 2 1,4-Difluorobenzene	114	15.430	15.431	0.000	96	220626	4.00	
* 3 Chlorobenzene-d5 (IS)	117	22.159	22.159	0.000	88	358076	4.00	
\$ 4 1,2-Dichloroethane-d4 (Surr	65	14.500	14.488	0.012	34	105247	4.26	
\$ 5 Toluene-d8 (Surr)	100	18.880	18.881	0.000	99	227497	3.95	
\$ 6 4-Bromofluorobenzene (Surr	95	24.714	24.715	0.000	94	259904	3.96	
12 Chlorodifluoromethane	51	4.663	4.633	0.031	88	6448	0.1132	
17 Butane	43	5.466	5.436	0.030	84	6023	0.0979	
32 Acetone	43	8.447	8.429	0.018	97	19506	0.2907	
39 Methylene Chloride	49	9.700	9.688	0.012	95	3807	0.1137	
75 Toluene	91	19.044	19.044	-0.007	15	1300	0.0193	7

QC Flag Legend

Processing Flags

7 - Failed Limit of Detection

Reagents:

VAMSIS20_00090

Amount Added: 50.00

Units: mL

Run Reagent

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20180104-52443.b\MS6010413.D

Injection Date: 04-Jan-2018 20:10:30

Instrument ID: ATMS6

Operator ID: LHS

Lims ID: 320-34811-A-1

Lab Sample ID: 320-34811-1

Worklist Smp#: 13

Client ID: 8524

Purge Vol: 25.000 mL

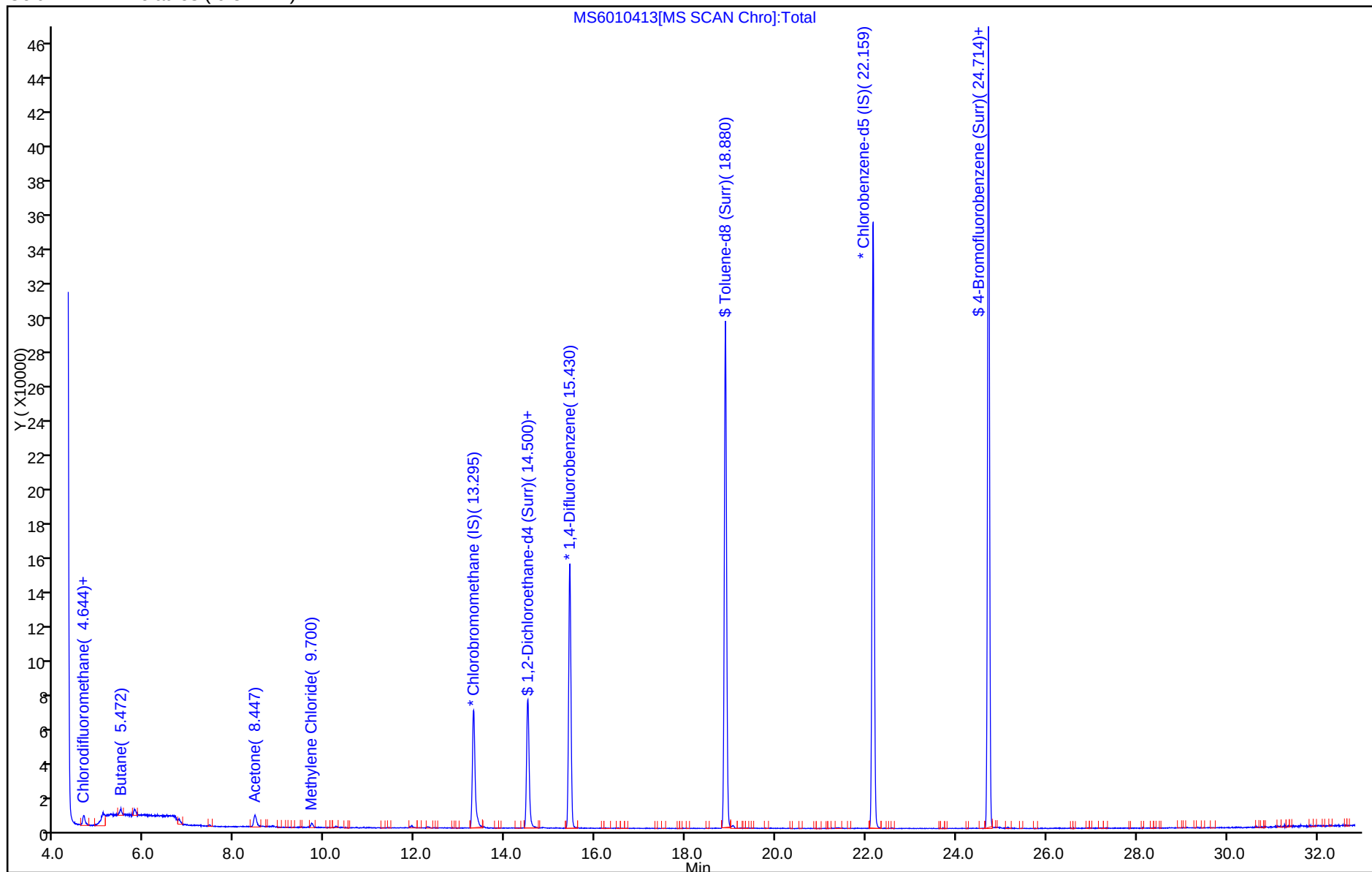
Dil. Factor: 1.0000

ALS Bottle#: 8

Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)



TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20180104-52443.b\MS6010413.D

Injection Date: 04-Jan-2018 20:10:30

Instrument ID: ATMS6

Lims ID: 320-34811-A-1

Lab Sample ID: 320-34811-1

Client ID: 8524

Operator ID: LHS

ALS Bottle#: 8 Worklist Smp#: 13

Purge Vol: 25.000 mL

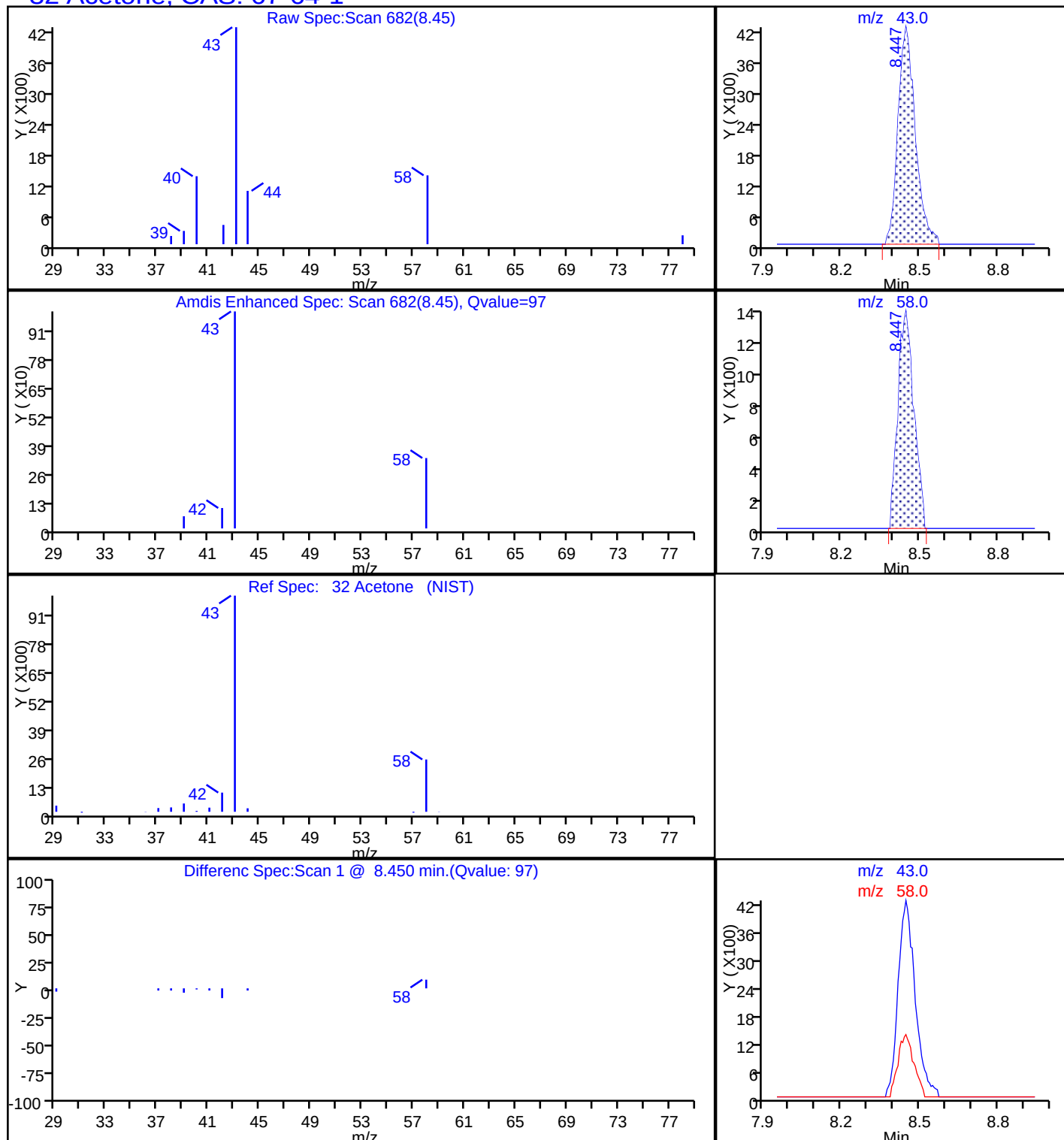
Dil. Factor: 1.0000

Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

32 Acetone, CAS: 67-64-1

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20180104-52443.b\MS6010413.D

Injection Date: 04-Jan-2018 20:10:30

Instrument ID: ATMS6

Lims ID: 320-34811-A-1

Lab Sample ID: 320-34811-1

Client ID: 8524

Operator ID: LHS

ALS Bottle#: 8

Worklist Smp#: 13

Purge Vol: 25.000 mL

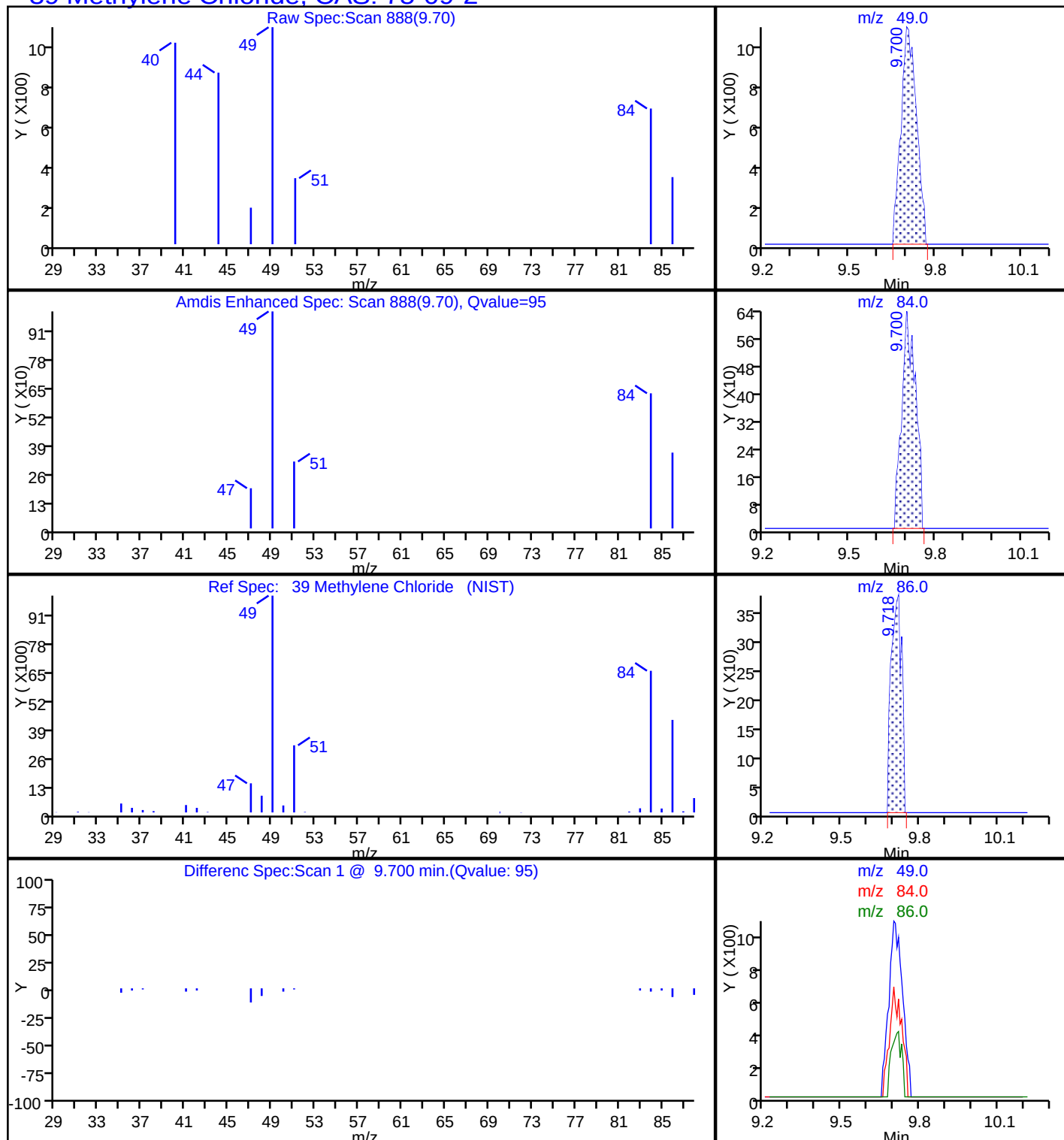
Dil. Factor: 1.0000

Method: TO15_ATMS6

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

Detector: MS SCAN

39 Methylene Chloride, CAS: 75-09-2

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-37835-1

Client Project/Site: ESTCP Vapor Intrusion Research

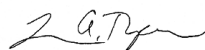
For:

GSI Environmental, Inc

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Authorized for release by:

4/20/2018 2:08:17 PM

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

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

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Definitions/Glossary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.

Glossary

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

Case Narrative

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Job ID: 320-37835-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-37835-1

Comments

No additional comments.

Receipt

The samples were received on 4/4/2018 12:43 PM; the samples arrived in good condition.

Receipt Exceptions

The container labels for the following samples did not match the information listed on the Chain-of-Custody (COC): 10th floor (320-37835-3) and 10th floor 29 March (320-37835-5). The container labels list a sample time of 17:32 for sample #3 and 12:26 for sample #5, while the COC lists a sample time of 17:30 for sample #3 and 12:32 for sample #5. The sample times were logged in per the COC.

Air - GC/MS VOA

Method(s) TO-15: The method blank for analytical batch 320-218773 contained Benzyl chloride and 1,2,4-Trichlorobenzene above the method detection limit (MDL). None of the samples associated with this method blank contained these target compounds; therefore, re-extraction and/or re-analysis of samples were not performed.

Method(s) TO-15: The method blank for analytical batch 320-218773 contained Methylene Chloride above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

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

VOA Prep

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

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: Hou-4

Lab Sample ID: 320-37835-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	10		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Bromodichloromethane	11		0.30	0.066	ppb v/v	1		TO-15	Total/NA
Bromoform	0.071	J	0.40	0.070	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.3		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	14		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.090	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Dibromochloromethane	1.4		0.40	0.079	ppb v/v	1		TO-15	Total/NA
Chloroform	47		0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.64	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.19	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
cis-1,2-Dichloroethene	0.33	J	0.40	0.089	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	1.1	B	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	1.4		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	9.5		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	0.55		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.22	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	24		12	0.42	ug/m3	1		TO-15	Total/NA
Bromodichloromethane	76		2.0	0.44	ug/m3	1		TO-15	Total/NA
Bromoform	0.73	J	4.1	0.72	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	3.7		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	43		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.57	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Dibromochloromethane	12		3.4	0.67	ug/m3	1		TO-15	Total/NA
Chloroform	230		1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.3	J	1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	0.95	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
cis-1,2-Dichloroethene	1.3	J	1.6	0.35	ug/m3	1		TO-15	Total/NA
Methylene Chloride	3.9	B	1.4	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	9.8		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	36		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	2.9		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.2	J	2.2	1.1	ug/m3	1		TO-15	Total/NA

Client Sample ID: Hou-6

Lab Sample ID: 320-37835-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	1.6	J	13	0.45	ppb v/v	2.51		TO-15	Total/NA
Benzene	0.26	J	1.0	0.20	ppb v/v	2.51		TO-15	Total/NA
Bromodichloromethane	6.8		0.75	0.17	ppb v/v	2.51		TO-15	Total/NA
Carbon disulfide	74		2.0	0.20	ppb v/v	2.51		TO-15	Total/NA
Dibromochloromethane	0.78	J	1.0	0.20	ppb v/v	2.51		TO-15	Total/NA
Chloroethane	8.3		2.0	0.77	ppb v/v	2.51		TO-15	Total/NA
Chloromethane	12		2.0	0.49	ppb v/v	2.51		TO-15	Total/NA
1,4-Dichlorobenzene	0.87	J	1.0	0.37	ppb v/v	2.51		TO-15	Total/NA
cis-1,2-Dichloroethene	14		1.0	0.22	ppb v/v	2.51		TO-15	Total/NA
Ethylbenzene	1.0		1.0	0.16	ppb v/v	2.51		TO-15	Total/NA
Methylene Chloride	21	B	1.0	0.18	ppb v/v	2.51		TO-15	Total/NA
Tetrachloroethene	1.5		1.0	0.13	ppb v/v	2.51		TO-15	Total/NA
Toluene	70		1.0	0.13	ppb v/v	2.51		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: Hou-6 (Continued)

Lab Sample ID: 320-37835-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	10		1.0	0.26	ppb v/v	2.51		TO-15	Total/NA
Vinyl chloride	0.64	J	1.0	0.30	ppb v/v	2.51		TO-15	Total/NA
m,p-Xylene	0.40	J	2.0	0.25	ppb v/v	2.51		TO-15	Total/NA
o-Xylene	0.15	J	1.0	0.14	ppb v/v	2.51		TO-15	Total/NA
Chloroform - DL	300		1.5	0.48	ppb v/v	5.08		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	3.8	J	30	1.1	ug/m3	2.51		TO-15	Total/NA
Benzene	0.82	J	3.2	0.63	ug/m3	2.51		TO-15	Total/NA
Bromodichloromethane	46		5.0	1.1	ug/m3	2.51		TO-15	Total/NA
Carbon disulfide	230		6.3	0.61	ug/m3	2.51		TO-15	Total/NA
Dibromochloromethane	6.7	J	8.6	1.7	ug/m3	2.51		TO-15	Total/NA
Chloroethane	22		5.3	2.0	ug/m3	2.51		TO-15	Total/NA
Chloromethane	24		4.1	1.0	ug/m3	2.51		TO-15	Total/NA
1,4-Dichlorobenzene	5.2	J	6.0	2.2	ug/m3	2.51		TO-15	Total/NA
cis-1,2-Dichloroethene	55		4.0	0.89	ug/m3	2.51		TO-15	Total/NA
Ethylbenzene	4.5		4.4	0.69	ug/m3	2.51		TO-15	Total/NA
Methylene Chloride	73	B	3.5	0.63	ug/m3	2.51		TO-15	Total/NA
Tetrachloroethene	10		6.8	0.87	ug/m3	2.51		TO-15	Total/NA
Toluene	260		3.8	0.48	ug/m3	2.51		TO-15	Total/NA
Trichloroethene	54		5.4	1.4	ug/m3	2.51		TO-15	Total/NA
Vinyl chloride	1.6	J	2.6	0.77	ug/m3	2.51		TO-15	Total/NA
m,p-Xylene	1.7	J	8.7	1.1	ug/m3	2.51		TO-15	Total/NA
o-Xylene	0.63	J	4.4	0.59	ug/m3	2.51		TO-15	Total/NA
Chloroform - DL	1500		7.4	2.4	ug/m3	5.08		TO-15	Total/NA

Client Sample ID: 10th floor

Lab Sample ID: 320-37835-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	80		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.16	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.8		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	23		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.065	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Chloroform	0.27	J	0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.95		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.24	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,2-Dichloroethane	0.16	J	0.80	0.088	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.23	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
2-Hexanone	0.10	J	0.40	0.087	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.46	B	0.40	0.072	ppb v/v	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	2.2		0.40	0.14	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.072	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	1.1		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	19		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.22	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.65	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.28	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	190		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.50	J	1.3	0.25	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: 10th floor (Continued)

Lab Sample ID: 320-37835-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Butanone (MEK)	5.4		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	73		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.41	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Chloroform	1.3	J	1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	2.0		1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.2	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
1,2-Dichloroethane	0.64	J	3.2	0.36	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.98	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
2-Hexanone	0.42	J	1.6	0.36	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.6	B	1.4	0.25	ug/m3	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	9.1		1.6	0.55	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	0.49	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	4.1		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	100		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
m,p-Xylene	2.8	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	1.2	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: 7th floor

Lab Sample ID: 320-37835-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	36		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.15	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	0.74	J	0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	0.31	J	0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.088	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Chloroform	0.14	J	0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.91		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.27	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,2-Dichloroethane	0.17	J	0.80	0.088	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.11	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	1.8	B	0.40	0.072	ppb v/v	1		TO-15	Total/NA
Styrene	0.092	J	0.40	0.059	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.094	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	0.69		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	25		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.28	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.23	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.095	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	85		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.48	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	2.2	J	2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	0.96	J	2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.55	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Chloroform	0.68	J	1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	1.9		1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.3	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
1,2-Dichloroethane	0.69	J	3.2	0.36	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.46	J	1.7	0.27	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: 7th floor (Continued)

Lab Sample ID: 320-37835-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	6.1	B	1.4	0.25	ug/m3	1		TO-15	Total/NA
Styrene	0.39	J	1.7	0.25	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	0.64	J	2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	2.6		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	130		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.6	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
m,p-Xylene	0.99	J	3.5	0.43	ug/m3	1		TO-15	Total/NA
o-Xylene	0.41	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

Client Sample ID: 10th floor 29 March

Lab Sample ID: 320-37835-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	94		5.0	0.18	ppb v/v	1		TO-15	Total/NA
Benzene	0.26	J	0.40	0.079	ppb v/v	1		TO-15	Total/NA
2-Butanone (MEK)	1.9		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Carbon disulfide	40		0.80	0.078	ppb v/v	1		TO-15	Total/NA
Carbon tetrachloride	0.069	J	0.80	0.064	ppb v/v	1		TO-15	Total/NA
Chloroform	0.24	J	0.30	0.095	ppb v/v	1		TO-15	Total/NA
Chloromethane	0.95		0.80	0.20	ppb v/v	1		TO-15	Total/NA
Dichlorodifluoromethane	0.28	J	0.40	0.15	ppb v/v	1		TO-15	Total/NA
1,2-Dichloroethane	0.17	J	0.80	0.088	ppb v/v	1		TO-15	Total/NA
Ethylbenzene	0.15	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
2-Hexanone	0.10	J	0.40	0.087	ppb v/v	1		TO-15	Total/NA
Methylene Chloride	0.50	B	0.40	0.072	ppb v/v	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.20	J	0.40	0.14	ppb v/v	1		TO-15	Total/NA
Tetrachloroethene	0.76		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Toluene	1.4		0.40	0.051	ppb v/v	1		TO-15	Total/NA
Trichloroethene	8.2		0.40	0.11	ppb v/v	1		TO-15	Total/NA
Trichlorofluoromethane	0.23	J	0.40	0.20	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.40	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.16	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	220		12	0.42	ug/m3	1		TO-15	Total/NA
Benzene	0.84	J	1.3	0.25	ug/m3	1		TO-15	Total/NA
2-Butanone (MEK)	5.6		2.4	0.59	ug/m3	1		TO-15	Total/NA
Carbon disulfide	120		2.5	0.24	ug/m3	1		TO-15	Total/NA
Carbon tetrachloride	0.43	J	5.0	0.40	ug/m3	1		TO-15	Total/NA
Chloroform	1.2	J	1.5	0.46	ug/m3	1		TO-15	Total/NA
Chloromethane	2.0		1.7	0.41	ug/m3	1		TO-15	Total/NA
Dichlorodifluoromethane	1.4	J	2.0	0.72	ug/m3	1		TO-15	Total/NA
1,2-Dichloroethane	0.70	J	3.2	0.36	ug/m3	1		TO-15	Total/NA
Ethylbenzene	0.66	J	1.7	0.27	ug/m3	1		TO-15	Total/NA
2-Hexanone	0.42	J	1.6	0.36	ug/m3	1		TO-15	Total/NA
Methylene Chloride	1.7	B	1.4	0.25	ug/m3	1		TO-15	Total/NA
4-Methyl-2-pentanone (MIBK)	0.83	J	1.6	0.55	ug/m3	1		TO-15	Total/NA
Tetrachloroethene	5.2		2.7	0.35	ug/m3	1		TO-15	Total/NA
Toluene	5.4		1.5	0.19	ug/m3	1		TO-15	Total/NA
Trichloroethene	44		2.1	0.56	ug/m3	1		TO-15	Total/NA
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3	1		TO-15	Total/NA
m,p-Xylene	1.7	J	3.5	0.43	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: 10th floor 29 March (Continued)

Lab Sample ID: 320-37835-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
o-Xylene	0.71	J	1.7	0.23	ug/m3	1		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: Hou-4

Date Collected: 03/27/18 10:55

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Lab Sample ID: 320-37835-1

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	10		5.0	0.18	ppb v/v			04/19/18 22:21	1
Benzene	ND		0.40	0.079	ppb v/v			04/19/18 22:21	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			04/19/18 22:21	1
Bromodichloromethane	11		0.30	0.066	ppb v/v			04/19/18 22:21	1
Bromoform	0.071	J	0.40	0.070	ppb v/v			04/19/18 22:21	1
Bromomethane	ND		0.80	0.34	ppb v/v			04/19/18 22:21	1
2-Butanone (MEK)	1.3		0.80	0.20	ppb v/v			04/19/18 22:21	1
Carbon disulfide	14		0.80	0.078	ppb v/v			04/19/18 22:21	1
Carbon tetrachloride	0.090	J	0.80	0.064	ppb v/v			04/19/18 22:21	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			04/19/18 22:21	1
Dibromochloromethane	1.4		0.40	0.079	ppb v/v			04/19/18 22:21	1
Chloroethane	ND		0.80	0.31	ppb v/v			04/19/18 22:21	1
Chloroform	47		0.30	0.095	ppb v/v			04/19/18 22:21	1
Chloromethane	0.64	J	0.80	0.20	ppb v/v			04/19/18 22:21	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			04/19/18 22:21	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			04/19/18 22:21	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			04/19/18 22:21	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			04/19/18 22:21	1
Dichlorodifluoromethane	0.19	J	0.40	0.15	ppb v/v			04/19/18 22:21	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			04/19/18 22:21	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			04/19/18 22:21	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			04/19/18 22:21	1
cis-1,2-Dichloroethene	0.33	J	0.40	0.089	ppb v/v			04/19/18 22:21	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			04/19/18 22:21	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			04/19/18 22:21	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			04/19/18 22:21	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			04/19/18 22:21	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			04/19/18 22:21	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			04/19/18 22:21	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			04/19/18 22:21	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			04/19/18 22:21	1
2-Hexanone	ND		0.40	0.087	ppb v/v			04/19/18 22:21	1
Methylene Chloride	1.1	B	0.40	0.072	ppb v/v			04/19/18 22:21	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			04/19/18 22:21	1
Styrene	ND		0.40	0.059	ppb v/v			04/19/18 22:21	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			04/19/18 22:21	1
Tetrachloroethene	1.4		0.40	0.051	ppb v/v			04/19/18 22:21	1
Toluene	9.5		0.40	0.051	ppb v/v			04/19/18 22:21	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			04/19/18 22:21	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			04/19/18 22:21	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			04/19/18 22:21	1
Trichloroethene	0.55		0.40	0.11	ppb v/v			04/19/18 22:21	1
Trichlorofluoromethane	0.22	J	0.40	0.20	ppb v/v			04/19/18 22:21	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			04/19/18 22:21	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			04/19/18 22:21	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			04/19/18 22:21	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			04/19/18 22:21	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			04/19/18 22:21	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: Hou-4

Lab Sample ID: 320-37835-1

Date Collected: 03/27/18 10:55

Matrix: Air

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		0.80	0.10	ppb v/v			04/19/18 22:21	1
o-Xylene	ND		0.40	0.054	ppb v/v			04/19/18 22:21	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	24		12	0.42	ug/m3			04/19/18 22:21	1
Benzene	ND		1.3	0.25	ug/m3			04/19/18 22:21	1
Benzyl chloride	ND		4.1	0.84	ug/m3			04/19/18 22:21	1
Bromodichloromethane	76		2.0	0.44	ug/m3			04/19/18 22:21	1
Bromoform	0.73	J	4.1	0.72	ug/m3			04/19/18 22:21	1
Bromomethane	ND		3.1	1.3	ug/m3			04/19/18 22:21	1
2-Butanone (MEK)	3.7		2.4	0.59	ug/m3			04/19/18 22:21	1
Carbon disulfide	43		2.5	0.24	ug/m3			04/19/18 22:21	1
Carbon tetrachloride	0.57	J	5.0	0.40	ug/m3			04/19/18 22:21	1
Chlorobenzene	ND		1.4	0.29	ug/m3			04/19/18 22:21	1
Dibromochloromethane	12		3.4	0.67	ug/m3			04/19/18 22:21	1
Chloroethane	ND		2.1	0.81	ug/m3			04/19/18 22:21	1
Chloroform	230		1.5	0.46	ug/m3			04/19/18 22:21	1
Chloromethane	1.3	J	1.7	0.41	ug/m3			04/19/18 22:21	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			04/19/18 22:21	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			04/19/18 22:21	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			04/19/18 22:21	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			04/19/18 22:21	1
Dichlorodifluoromethane	0.95	J	2.0	0.72	ug/m3			04/19/18 22:21	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			04/19/18 22:21	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			04/19/18 22:21	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			04/19/18 22:21	1
cis-1,2-Dichloroethene	1.3	J	1.6	0.35	ug/m3			04/19/18 22:21	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			04/19/18 22:21	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			04/19/18 22:21	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			04/19/18 22:21	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			04/19/18 22:21	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			04/19/18 22:21	1
Ethylbenzene	ND		1.7	0.27	ug/m3			04/19/18 22:21	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			04/19/18 22:21	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			04/19/18 22:21	1
2-Hexanone	ND		1.6	0.36	ug/m3			04/19/18 22:21	1
Methylene Chloride	3.9	B	1.4	0.25	ug/m3			04/19/18 22:21	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			04/19/18 22:21	1
Styrene	ND		1.7	0.25	ug/m3			04/19/18 22:21	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			04/19/18 22:21	1
Tetrachloroethene	9.8		2.7	0.35	ug/m3			04/19/18 22:21	1
Toluene	36		1.5	0.19	ug/m3			04/19/18 22:21	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			04/19/18 22:21	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			04/19/18 22:21	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			04/19/18 22:21	1
Trichloroethene	2.9		2.1	0.56	ug/m3			04/19/18 22:21	1
Trichlorofluoromethane	1.2	J	2.2	1.1	ug/m3			04/19/18 22:21	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			04/19/18 22:21	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			04/19/18 22:21	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: Hou-4

Date Collected: 03/27/18 10:55

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Lab Sample ID: 320-37835-1

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			04/19/18 22:21	1
Vinyl acetate	ND		2.8	0.51	ug/m3			04/19/18 22:21	1
Vinyl chloride	ND		1.0	0.31	ug/m3			04/19/18 22:21	1
m,p-Xylene	ND		3.5	0.43	ug/m3			04/19/18 22:21	1
o-Xylene	ND		1.7	0.23	ug/m3			04/19/18 22:21	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130		04/19/18 22:21	1
1,2-Dichloroethane-d4 (Surr)	98		70 - 130		04/19/18 22:21	1
Toluene-d8 (Surr)	109		70 - 130		04/19/18 22:21	1

Client Sample ID: Hou-6

Date Collected: 03/27/18 11:11

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Lab Sample ID: 320-37835-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1.6	J	13	0.45	ppb v/v			04/19/18 23:12	2.51
Benzene	0.26	J	1.0	0.20	ppb v/v			04/19/18 23:12	2.51
Benzyl chloride	ND		2.0	0.41	ppb v/v			04/19/18 23:12	2.51
Bromodichloromethane	6.8		0.75	0.17	ppb v/v			04/19/18 23:12	2.51
Bromoform	ND		1.0	0.18	ppb v/v			04/19/18 23:12	2.51
Bromomethane	ND		2.0	0.84	ppb v/v			04/19/18 23:12	2.51
2-Butanone (MEK)	ND		2.0	0.50	ppb v/v			04/19/18 23:12	2.51
Carbon disulfide	74		2.0	0.20	ppb v/v			04/19/18 23:12	2.51
Carbon tetrachloride	ND		2.0	0.16	ppb v/v			04/19/18 23:12	2.51
Chlorobenzene	ND		0.75	0.16	ppb v/v			04/19/18 23:12	2.51
Dibromochloromethane	0.78	J	1.0	0.20	ppb v/v			04/19/18 23:12	2.51
Chloroethane	8.3		2.0	0.77	ppb v/v			04/19/18 23:12	2.51
Chloromethane	12		2.0	0.49	ppb v/v			04/19/18 23:12	2.51
1,2-Dibromoethane (EDB)	ND		2.0	0.19	ppb v/v			04/19/18 23:12	2.51
1,2-Dichlorobenzene	ND		1.0	0.33	ppb v/v			04/19/18 23:12	2.51
1,3-Dichlorobenzene	ND		1.0	0.28	ppb v/v			04/19/18 23:12	2.51
1,4-Dichlorobenzene	0.87	J	1.0	0.37	ppb v/v			04/19/18 23:12	2.51
Dichlorodifluoromethane	ND		1.0	0.36	ppb v/v			04/19/18 23:12	2.51
1,1-Dichloroethane	ND		0.75	0.18	ppb v/v			04/19/18 23:12	2.51
1,2-Dichloroethane	ND		2.0	0.22	ppb v/v			04/19/18 23:12	2.51
1,1-Dichloroethene	ND		2.0	0.32	ppb v/v			04/19/18 23:12	2.51
cis-1,2-Dichloroethene	14		1.0	0.22	ppb v/v			04/19/18 23:12	2.51
trans-1,2-Dichloroethene	ND		1.0	0.25	ppb v/v			04/19/18 23:12	2.51
1,2-Dichloropropane	ND		1.0	0.60	ppb v/v			04/19/18 23:12	2.51
cis-1,3-Dichloropropene	ND		1.0	0.26	ppb v/v			04/19/18 23:12	2.51
trans-1,3-Dichloropropene	ND		1.0	0.22	ppb v/v			04/19/18 23:12	2.51
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		1.0	0.39	ppb v/v			04/19/18 23:12	2.51
Ethylbenzene	1.0		1.0	0.16	ppb v/v			04/19/18 23:12	2.51
4-Ethyltoluene	ND		1.0	0.47	ppb v/v			04/19/18 23:12	2.51
Hexachlorobutadiene	ND		5.0	1.1	ppb v/v			04/19/18 23:12	2.51
2-Hexanone	ND		1.0	0.22	ppb v/v			04/19/18 23:12	2.51

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: Hou-6

Date Collected: 03/27/18 11:11

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Lab Sample ID: 320-37835-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Chloride	21	B	1.0	0.18	ppb v/v			04/19/18 23:12	2.51
4-Methyl-2-pentanone (MIBK)	ND		1.0	0.34	ppb v/v			04/19/18 23:12	2.51
Styrene	ND		1.0	0.15	ppb v/v			04/19/18 23:12	2.51
1,1,2,2-Tetrachloroethane	ND		1.0	0.17	ppb v/v			04/19/18 23:12	2.51
Tetrachloroethene	1.5		1.0	0.13	ppb v/v			04/19/18 23:12	2.51
Toluene	70		1.0	0.13	ppb v/v			04/19/18 23:12	2.51
1,2,4-Trichlorobenzene	ND		5.0	1.1	ppb v/v			04/19/18 23:12	2.51
1,1,1-Trichloroethane	ND		0.75	0.16	ppb v/v			04/19/18 23:12	2.51
1,1,2-Trichloroethane	ND		1.0	0.17	ppb v/v			04/19/18 23:12	2.51
Trichloroethene	10		1.0	0.26	ppb v/v			04/19/18 23:12	2.51
Trichlorofluoromethane	ND		1.0	0.49	ppb v/v			04/19/18 23:12	2.51
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		1.0	0.41	ppb v/v			04/19/18 23:12	2.51
1,2,4-Trimethylbenzene	ND		2.0	0.41	ppb v/v			04/19/18 23:12	2.51
1,3,5-Trimethylbenzene	ND		1.0	0.31	ppb v/v			04/19/18 23:12	2.51
Vinyl acetate	ND		2.0	0.36	ppb v/v			04/19/18 23:12	2.51
Vinyl chloride	0.64	J	1.0	0.30	ppb v/v			04/19/18 23:12	2.51
m,p-Xylene	0.40	J	2.0	0.25	ppb v/v			04/19/18 23:12	2.51
o-Xylene	0.15	J	1.0	0.14	ppb v/v			04/19/18 23:12	2.51
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	3.8	J	30	1.1	ug/m3			04/19/18 23:12	2.51
Benzene	0.82	J	3.2	0.63	ug/m3			04/19/18 23:12	2.51
Benzyl chloride	ND		10	2.1	ug/m3			04/19/18 23:12	2.51
Bromodichloromethane	46		5.0	1.1	ug/m3			04/19/18 23:12	2.51
Bromoform	ND		10	1.8	ug/m3			04/19/18 23:12	2.51
Bromomethane	ND		7.8	3.3	ug/m3			04/19/18 23:12	2.51
2-Butanone (MEK)	ND		5.9	1.5	ug/m3			04/19/18 23:12	2.51
Carbon disulfide	230		6.3	0.61	ug/m3			04/19/18 23:12	2.51
Carbon tetrachloride	ND		13	1.0	ug/m3			04/19/18 23:12	2.51
Chlorobenzene	ND		3.5	0.74	ug/m3			04/19/18 23:12	2.51
Dibromochloromethane	6.7	J	8.6	1.7	ug/m3			04/19/18 23:12	2.51
Chloroethane	22		5.3	2.0	ug/m3			04/19/18 23:12	2.51
Chloromethane	24		4.1	1.0	ug/m3			04/19/18 23:12	2.51
1,2-Dibromoethane (EDB)	ND		15	1.4	ug/m3			04/19/18 23:12	2.51
1,2-Dichlorobenzene	ND		6.0	2.0	ug/m3			04/19/18 23:12	2.51
1,3-Dichlorobenzene	ND		6.0	1.7	ug/m3			04/19/18 23:12	2.51
1,4-Dichlorobenzene	5.2	J	6.0	2.2	ug/m3			04/19/18 23:12	2.51
Dichlorodifluoromethane	ND		5.0	1.8	ug/m3			04/19/18 23:12	2.51
1,1-Dichloroethane	ND		3.0	0.73	ug/m3			04/19/18 23:12	2.51
1,2-Dichloroethane	ND		8.1	0.89	ug/m3			04/19/18 23:12	2.51
1,1-Dichloroethene	ND		8.0	1.3	ug/m3			04/19/18 23:12	2.51
cis-1,2-Dichloroethene	55		4.0	0.89	ug/m3			04/19/18 23:12	2.51
trans-1,2-Dichloroethene	ND		4.0	1.0	ug/m3			04/19/18 23:12	2.51
1,2-Dichloropropane	ND		4.6	2.8	ug/m3			04/19/18 23:12	2.51
cis-1,3-Dichloropropene	ND		4.6	1.2	ug/m3			04/19/18 23:12	2.51
trans-1,3-Dichloropropene	ND		4.6	1.0	ug/m3			04/19/18 23:12	2.51
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		7.0	2.7	ug/m3			04/19/18 23:12	2.51
Ethylbenzene	4.5		4.4	0.69	ug/m3			04/19/18 23:12	2.51
4-Ethyltoluene	ND		4.9	2.3	ug/m3			04/19/18 23:12	2.51

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: Hou-6

Date Collected: 03/27/18 11:11

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Lab Sample ID: 320-37835-2

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexachlorobutadiene	ND		54	12	ug/m3			04/19/18 23:12	2.51
2-Hexanone	ND		4.1	0.89	ug/m3			04/19/18 23:12	2.51
Methylene Chloride	73	B	3.5	0.63	ug/m3			04/19/18 23:12	2.51
4-Methyl-2-pentanone (MIBK)	ND		4.1	1.4	ug/m3			04/19/18 23:12	2.51
Styrene	ND		4.3	0.63	ug/m3			04/19/18 23:12	2.51
1,1,2,2-Tetrachloroethane	ND		6.9	1.2	ug/m3			04/19/18 23:12	2.51
Tetrachloroethene	10		6.8	0.87	ug/m3			04/19/18 23:12	2.51
Toluene	260		3.8	0.48	ug/m3			04/19/18 23:12	2.51
1,2,4-Trichlorobenzene	ND		37	8.1	ug/m3			04/19/18 23:12	2.51
1,1,1-Trichloroethane	ND		4.1	0.89	ug/m3			04/19/18 23:12	2.51
1,1,2-Trichloroethane	ND		5.5	0.92	ug/m3			04/19/18 23:12	2.51
Trichloroethene	54		5.4	1.4	ug/m3			04/19/18 23:12	2.51
Trichlorofluoromethane	ND		5.6	2.8	ug/m3			04/19/18 23:12	2.51
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		7.7	3.1	ug/m3			04/19/18 23:12	2.51
1,2,4-Trimethylbenzene	ND		9.9	2.0	ug/m3			04/19/18 23:12	2.51
1,3,5-Trimethylbenzene	ND		4.9	1.5	ug/m3			04/19/18 23:12	2.51
Vinyl acetate	ND		7.1	1.3	ug/m3			04/19/18 23:12	2.51
Vinyl chloride	1.6	J	2.6	0.77	ug/m3			04/19/18 23:12	2.51
m,p-Xylene	1.7	J	8.7	1.1	ug/m3			04/19/18 23:12	2.51
o-Xylene	0.63	J	4.4	0.59	ug/m3			04/19/18 23:12	2.51
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					04/19/18 23:12	2.51
1,2-Dichloroethane-d4 (Surr)	96		70 - 130					04/19/18 23:12	2.51
Toluene-d8 (Surr)	107		70 - 130					04/19/18 23:12	2.51

Method: TO-15 - Volatile Organic Compounds in Ambient Air - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	300		1.5	0.48	ppb v/v			04/20/18 09:20	5.08
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	1500		7.4	2.4	ug/m3			04/20/18 09:20	5.08
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		70 - 130					04/20/18 09:20	5.08
1,2-Dichloroethane-d4 (Surr)	99		70 - 130					04/20/18 09:20	5.08
Toluene-d8 (Surr)	107		70 - 130					04/20/18 09:20	5.08

Client Sample ID: 10th floor

Date Collected: 03/27/18 17:30

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Lab Sample ID: 320-37835-3

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	80		5.0	0.18	ppb v/v			04/20/18 00:05	1
Benzene	0.16	J	0.40	0.079	ppb v/v			04/20/18 00:05	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			04/20/18 00:05	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			04/20/18 00:05	1
Bromoform	ND		0.40	0.070	ppb v/v			04/20/18 00:05	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: 10th floor

Lab Sample ID: 320-37835-3

Date Collected: 03/27/18 17:30

Matrix: Air

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bromomethane	ND		0.80	0.34	ppb v/v			04/20/18 00:05	1
2-Butanone (MEK)	1.8		0.80	0.20	ppb v/v			04/20/18 00:05	1
Carbon disulfide	23		0.80	0.078	ppb v/v			04/20/18 00:05	1
Carbon tetrachloride	0.065	J	0.80	0.064	ppb v/v			04/20/18 00:05	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			04/20/18 00:05	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			04/20/18 00:05	1
Chloroethane	ND		0.80	0.31	ppb v/v			04/20/18 00:05	1
Chloroform	0.27	J	0.30	0.095	ppb v/v			04/20/18 00:05	1
Chloromethane	0.95		0.80	0.20	ppb v/v			04/20/18 00:05	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			04/20/18 00:05	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			04/20/18 00:05	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			04/20/18 00:05	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			04/20/18 00:05	1
Dichlorodifluoromethane	0.24	J	0.40	0.15	ppb v/v			04/20/18 00:05	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			04/20/18 00:05	1
1,2-Dichloroethane	0.16	J	0.80	0.088	ppb v/v			04/20/18 00:05	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			04/20/18 00:05	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			04/20/18 00:05	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			04/20/18 00:05	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			04/20/18 00:05	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			04/20/18 00:05	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			04/20/18 00:05	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			04/20/18 00:05	1
Ethylbenzene	0.23	J	0.40	0.063	ppb v/v			04/20/18 00:05	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			04/20/18 00:05	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			04/20/18 00:05	1
2-Hexanone	0.10	J	0.40	0.087	ppb v/v			04/20/18 00:05	1
Methylene Chloride	0.46	B	0.40	0.072	ppb v/v			04/20/18 00:05	1
4-Methyl-2-pentanone (MIBK)	2.2		0.40	0.14	ppb v/v			04/20/18 00:05	1
Styrene	ND		0.40	0.059	ppb v/v			04/20/18 00:05	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			04/20/18 00:05	1
Tetrachloroethene	0.072	J	0.40	0.051	ppb v/v			04/20/18 00:05	1
Toluene	1.1		0.40	0.051	ppb v/v			04/20/18 00:05	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			04/20/18 00:05	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			04/20/18 00:05	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			04/20/18 00:05	1
Trichloroethene	19		0.40	0.11	ppb v/v			04/20/18 00:05	1
Trichlorofluoromethane	0.22	J	0.40	0.20	ppb v/v			04/20/18 00:05	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			04/20/18 00:05	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			04/20/18 00:05	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			04/20/18 00:05	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			04/20/18 00:05	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			04/20/18 00:05	1
m,p-Xylene	0.65	J	0.80	0.10	ppb v/v			04/20/18 00:05	1
o-Xylene	0.28	J	0.40	0.054	ppb v/v			04/20/18 00:05	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	190		12	0.42	ug/m3			04/20/18 00:05	1
Benzene	0.50	J	1.3	0.25	ug/m3			04/20/18 00:05	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: 10th floor

Lab Sample ID: 320-37835-3

Date Collected: 03/27/18 17:30

Matrix: Air

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzyl chloride	ND		4.1	0.84	ug/m3			04/20/18 00:05	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			04/20/18 00:05	1
Bromoform	ND		4.1	0.72	ug/m3			04/20/18 00:05	1
Bromomethane	ND		3.1	1.3	ug/m3			04/20/18 00:05	1
2-Butanone (MEK)	5.4		2.4	0.59	ug/m3			04/20/18 00:05	1
Carbon disulfide	73		2.5	0.24	ug/m3			04/20/18 00:05	1
Carbon tetrachloride	0.41	J	5.0	0.40	ug/m3			04/20/18 00:05	1
Chlorobenzene	ND		1.4	0.29	ug/m3			04/20/18 00:05	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			04/20/18 00:05	1
Chloroethane	ND		2.1	0.81	ug/m3			04/20/18 00:05	1
Chloroform	1.3	J	1.5	0.46	ug/m3			04/20/18 00:05	1
Chloromethane	2.0		1.7	0.41	ug/m3			04/20/18 00:05	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			04/20/18 00:05	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			04/20/18 00:05	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			04/20/18 00:05	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			04/20/18 00:05	1
Dichlorodifluoromethane	1.2	J	2.0	0.72	ug/m3			04/20/18 00:05	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			04/20/18 00:05	1
1,2-Dichloroethane	0.64	J	3.2	0.36	ug/m3			04/20/18 00:05	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			04/20/18 00:05	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			04/20/18 00:05	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			04/20/18 00:05	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			04/20/18 00:05	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			04/20/18 00:05	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			04/20/18 00:05	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			04/20/18 00:05	1
Ethylbenzene	0.98	J	1.7	0.27	ug/m3			04/20/18 00:05	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			04/20/18 00:05	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			04/20/18 00:05	1
2-Hexanone	0.42	J	1.6	0.36	ug/m3			04/20/18 00:05	1
Methylene Chloride	1.6	B	1.4	0.25	ug/m3			04/20/18 00:05	1
4-Methyl-2-pentanone (MIBK)	9.1		1.6	0.55	ug/m3			04/20/18 00:05	1
Styrene	ND		1.7	0.25	ug/m3			04/20/18 00:05	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			04/20/18 00:05	1
Tetrachloroethene	0.49	J	2.7	0.35	ug/m3			04/20/18 00:05	1
Toluene	4.1		1.5	0.19	ug/m3			04/20/18 00:05	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			04/20/18 00:05	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			04/20/18 00:05	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			04/20/18 00:05	1
Trichloroethene	100		2.1	0.56	ug/m3			04/20/18 00:05	1
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3			04/20/18 00:05	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			04/20/18 00:05	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			04/20/18 00:05	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			04/20/18 00:05	1
Vinyl acetate	ND		2.8	0.51	ug/m3			04/20/18 00:05	1
Vinyl chloride	ND		1.0	0.31	ug/m3			04/20/18 00:05	1
m,p-Xylene	2.8	J	3.5	0.43	ug/m3			04/20/18 00:05	1
o-Xylene	1.2	J	1.7	0.23	ug/m3			04/20/18 00:05	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: 10th floor

Date Collected: 03/27/18 17:30

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Lab Sample ID: 320-37835-3

Matrix: Air

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130		04/20/18 00:05	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		04/20/18 00:05	1
Toluene-d8 (Surr)	108		70 - 130		04/20/18 00:05	1

Client Sample ID: 7th floor

Date Collected: 03/27/18 17:40

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Lab Sample ID: 320-37835-4

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	36		5.0	0.18	ppb v/v			04/20/18 01:02	1
Benzene	0.15	J	0.40	0.079	ppb v/v			04/20/18 01:02	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			04/20/18 01:02	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			04/20/18 01:02	1
Bromoform	ND		0.40	0.070	ppb v/v			04/20/18 01:02	1
Bromomethane	ND		0.80	0.34	ppb v/v			04/20/18 01:02	1
2-Butanone (MEK)	0.74	J	0.80	0.20	ppb v/v			04/20/18 01:02	1
Carbon disulfide	0.31	J	0.80	0.078	ppb v/v			04/20/18 01:02	1
Carbon tetrachloride	0.088	J	0.80	0.064	ppb v/v			04/20/18 01:02	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			04/20/18 01:02	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			04/20/18 01:02	1
Chloroethane	ND		0.80	0.31	ppb v/v			04/20/18 01:02	1
Chloroform	0.14	J	0.30	0.095	ppb v/v			04/20/18 01:02	1
Chloromethane	0.91		0.80	0.20	ppb v/v			04/20/18 01:02	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			04/20/18 01:02	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			04/20/18 01:02	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			04/20/18 01:02	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			04/20/18 01:02	1
Dichlorodifluoromethane	0.27	J	0.40	0.15	ppb v/v			04/20/18 01:02	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			04/20/18 01:02	1
1,2-Dichloroethane	0.17	J	0.80	0.088	ppb v/v			04/20/18 01:02	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			04/20/18 01:02	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			04/20/18 01:02	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			04/20/18 01:02	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			04/20/18 01:02	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			04/20/18 01:02	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			04/20/18 01:02	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			04/20/18 01:02	1
Ethylbenzene	0.11	J	0.40	0.063	ppb v/v			04/20/18 01:02	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			04/20/18 01:02	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			04/20/18 01:02	1
2-Hexanone	ND		0.40	0.087	ppb v/v			04/20/18 01:02	1
Methylene Chloride	1.8	B	0.40	0.072	ppb v/v			04/20/18 01:02	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			04/20/18 01:02	1
Styrene	0.092	J	0.40	0.059	ppb v/v			04/20/18 01:02	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			04/20/18 01:02	1
Tetrachloroethene	0.094	J	0.40	0.051	ppb v/v			04/20/18 01:02	1
Toluene	0.69		0.40	0.051	ppb v/v			04/20/18 01:02	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: 7th floor

Date Collected: 03/27/18 17:40

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Lab Sample ID: 320-37835-4

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			04/20/18 01:02	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			04/20/18 01:02	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			04/20/18 01:02	1
Trichloroethene	25		0.40	0.11	ppb v/v			04/20/18 01:02	1
Trichlorofluoromethane	0.28	J	0.40	0.20	ppb v/v			04/20/18 01:02	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			04/20/18 01:02	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			04/20/18 01:02	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			04/20/18 01:02	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			04/20/18 01:02	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			04/20/18 01:02	1
m,p-Xylene	0.23	J	0.80	0.10	ppb v/v			04/20/18 01:02	1
o-Xylene	0.095	J	0.40	0.054	ppb v/v			04/20/18 01:02	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	85		12	0.42	ug/m3			04/20/18 01:02	1
Benzene	0.48	J	1.3	0.25	ug/m3			04/20/18 01:02	1
Benzyl chloride	ND		4.1	0.84	ug/m3			04/20/18 01:02	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			04/20/18 01:02	1
Bromoform	ND		4.1	0.72	ug/m3			04/20/18 01:02	1
Bromomethane	ND		3.1	1.3	ug/m3			04/20/18 01:02	1
2-Butanone (MEK)	2.2	J	2.4	0.59	ug/m3			04/20/18 01:02	1
Carbon disulfide	0.96	J	2.5	0.24	ug/m3			04/20/18 01:02	1
Carbon tetrachloride	0.55	J	5.0	0.40	ug/m3			04/20/18 01:02	1
Chlorobenzene	ND		1.4	0.29	ug/m3			04/20/18 01:02	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			04/20/18 01:02	1
Chloroethane	ND		2.1	0.81	ug/m3			04/20/18 01:02	1
Chloroform	0.68	J	1.5	0.46	ug/m3			04/20/18 01:02	1
Chloromethane	1.9		1.7	0.41	ug/m3			04/20/18 01:02	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			04/20/18 01:02	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			04/20/18 01:02	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			04/20/18 01:02	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			04/20/18 01:02	1
Dichlorodifluoromethane	1.3	J	2.0	0.72	ug/m3			04/20/18 01:02	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			04/20/18 01:02	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			04/20/18 01:02	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			04/20/18 01:02	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			04/20/18 01:02	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			04/20/18 01:02	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			04/20/18 01:02	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			04/20/18 01:02	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			04/20/18 01:02	1
Ethylbenzene	0.46	J	1.7	0.27	ug/m3			04/20/18 01:02	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			04/20/18 01:02	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			04/20/18 01:02	1
2-Hexanone	ND		1.6	0.36	ug/m3			04/20/18 01:02	1
Methylene Chloride	6.1	B	1.4	0.25	ug/m3			04/20/18 01:02	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			04/20/18 01:02	1
Styrene	0.39	J	1.7	0.25	ug/m3			04/20/18 01:02	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: 7th floor

Date Collected: 03/27/18 17:40

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Lab Sample ID: 320-37835-4

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			04/20/18 01:02	1
Tetrachloroethene	0.64	J	2.7	0.35	ug/m3			04/20/18 01:02	1
Toluene	2.6		1.5	0.19	ug/m3			04/20/18 01:02	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			04/20/18 01:02	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			04/20/18 01:02	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			04/20/18 01:02	1
Trichloroethene	130		2.1	0.56	ug/m3			04/20/18 01:02	1
Trichlorofluoromethane	1.6	J	2.2	1.1	ug/m3			04/20/18 01:02	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			04/20/18 01:02	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			04/20/18 01:02	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			04/20/18 01:02	1
Vinyl acetate	ND		2.8	0.51	ug/m3			04/20/18 01:02	1
Vinyl chloride	ND		1.0	0.31	ug/m3			04/20/18 01:02	1
m,p-Xylene	0.99	J	3.5	0.43	ug/m3			04/20/18 01:02	1
o-Xylene	0.41	J	1.7	0.23	ug/m3			04/20/18 01:02	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130					04/20/18 01:02	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 130					04/20/18 01:02	1
Toluene-d8 (Surr)	107		70 - 130					04/20/18 01:02	1

Client Sample ID: 10th floor 29 March

Date Collected: 03/29/18 12:32

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Lab Sample ID: 320-37835-5

Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	94		5.0	0.18	ppb v/v			04/20/18 01:56	1
Benzene	0.26	J	0.40	0.079	ppb v/v			04/20/18 01:56	1
Benzyl chloride	ND		0.80	0.16	ppb v/v			04/20/18 01:56	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			04/20/18 01:56	1
Bromoform	ND		0.40	0.070	ppb v/v			04/20/18 01:56	1
Bromomethane	ND		0.80	0.34	ppb v/v			04/20/18 01:56	1
2-Butanone (MEK)	1.9		0.80	0.20	ppb v/v			04/20/18 01:56	1
Carbon disulfide	40		0.80	0.078	ppb v/v			04/20/18 01:56	1
Carbon tetrachloride	0.069	J	0.80	0.064	ppb v/v			04/20/18 01:56	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			04/20/18 01:56	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			04/20/18 01:56	1
Chloroethane	ND		0.80	0.31	ppb v/v			04/20/18 01:56	1
Chloroform	0.24	J	0.30	0.095	ppb v/v			04/20/18 01:56	1
Chloromethane	0.95		0.80	0.20	ppb v/v			04/20/18 01:56	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			04/20/18 01:56	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			04/20/18 01:56	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			04/20/18 01:56	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			04/20/18 01:56	1
Dichlorodifluoromethane	0.28	J	0.40	0.15	ppb v/v			04/20/18 01:56	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			04/20/18 01:56	1
1,2-Dichloroethane	0.17	J	0.80	0.088	ppb v/v			04/20/18 01:56	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: 10th floor 29 March

Lab Sample ID: 320-37835-5

Date Collected: 03/29/18 12:32

Matrix: Air

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			04/20/18 01:56	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			04/20/18 01:56	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			04/20/18 01:56	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			04/20/18 01:56	1
cis-1,3-Dichloropropane	ND		0.40	0.10	ppb v/v			04/20/18 01:56	1
trans-1,3-Dichloropropane	ND		0.40	0.088	ppb v/v			04/20/18 01:56	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			04/20/18 01:56	1
Ethylbenzene	0.15	J	0.40	0.063	ppb v/v			04/20/18 01:56	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			04/20/18 01:56	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			04/20/18 01:56	1
2-Hexanone	0.10	J	0.40	0.087	ppb v/v			04/20/18 01:56	1
Methylene Chloride	0.50	B	0.40	0.072	ppb v/v			04/20/18 01:56	1
4-Methyl-2-pentanone (MIBK)	0.20	J	0.40	0.14	ppb v/v			04/20/18 01:56	1
Styrene	ND		0.40	0.059	ppb v/v			04/20/18 01:56	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			04/20/18 01:56	1
Tetrachloroethene	0.76		0.40	0.051	ppb v/v			04/20/18 01:56	1
Toluene	1.4		0.40	0.051	ppb v/v			04/20/18 01:56	1
1,2,4-Trichlorobenzene	ND		2.0	0.43	ppb v/v			04/20/18 01:56	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			04/20/18 01:56	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			04/20/18 01:56	1
Trichloroethene	8.2		0.40	0.11	ppb v/v			04/20/18 01:56	1
Trichlorofluoromethane	0.23	J	0.40	0.20	ppb v/v			04/20/18 01:56	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			04/20/18 01:56	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			04/20/18 01:56	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			04/20/18 01:56	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			04/20/18 01:56	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			04/20/18 01:56	1
m,p-Xylene	0.40	J	0.80	0.10	ppb v/v			04/20/18 01:56	1
o-Xylene	0.16	J	0.40	0.054	ppb v/v			04/20/18 01:56	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	220		12	0.42	ug/m3			04/20/18 01:56	1
Benzene	0.84	J	1.3	0.25	ug/m3			04/20/18 01:56	1
Benzyl chloride	ND		4.1	0.84	ug/m3			04/20/18 01:56	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			04/20/18 01:56	1
Bromoform	ND		4.1	0.72	ug/m3			04/20/18 01:56	1
Bromomethane	ND		3.1	1.3	ug/m3			04/20/18 01:56	1
2-Butanone (MEK)	5.6		2.4	0.59	ug/m3			04/20/18 01:56	1
Carbon disulfide	120		2.5	0.24	ug/m3			04/20/18 01:56	1
Carbon tetrachloride	0.43	J	5.0	0.40	ug/m3			04/20/18 01:56	1
Chlorobenzene	ND		1.4	0.29	ug/m3			04/20/18 01:56	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			04/20/18 01:56	1
Chloroethane	ND		2.1	0.81	ug/m3			04/20/18 01:56	1
Chloroform	1.2	J	1.5	0.46	ug/m3			04/20/18 01:56	1
Chloromethane	2.0		1.7	0.41	ug/m3			04/20/18 01:56	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			04/20/18 01:56	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			04/20/18 01:56	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			04/20/18 01:56	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			04/20/18 01:56	1

TestAmerica Sacramento

Client Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: 10th floor 29 March

Lab Sample ID: 320-37835-5

Date Collected: 03/29/18 12:32

Matrix: Air

Date Received: 04/04/18 12:43

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	1.4	J	2.0	0.72	ug/m3			04/20/18 01:56	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			04/20/18 01:56	1
1,2-Dichloroethane	0.70	J	3.2	0.36	ug/m3			04/20/18 01:56	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			04/20/18 01:56	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			04/20/18 01:56	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			04/20/18 01:56	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			04/20/18 01:56	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			04/20/18 01:56	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			04/20/18 01:56	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			04/20/18 01:56	1
Ethylbenzene	0.66	J	1.7	0.27	ug/m3			04/20/18 01:56	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			04/20/18 01:56	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			04/20/18 01:56	1
2-Hexanone	0.42	J	1.6	0.36	ug/m3			04/20/18 01:56	1
Methylene Chloride	1.7	B	1.4	0.25	ug/m3			04/20/18 01:56	1
4-Methyl-2-pentanone (MIBK)	0.83	J	1.6	0.55	ug/m3			04/20/18 01:56	1
Styrene	ND		1.7	0.25	ug/m3			04/20/18 01:56	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			04/20/18 01:56	1
Tetrachloroethene	5.2		2.7	0.35	ug/m3			04/20/18 01:56	1
Toluene	5.4		1.5	0.19	ug/m3			04/20/18 01:56	1
1,2,4-Trichlorobenzene	ND		15	3.2	ug/m3			04/20/18 01:56	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			04/20/18 01:56	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			04/20/18 01:56	1
Trichloroethene	44		2.1	0.56	ug/m3			04/20/18 01:56	1
Trichlorofluoromethane	1.3	J	2.2	1.1	ug/m3			04/20/18 01:56	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			04/20/18 01:56	1
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			04/20/18 01:56	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			04/20/18 01:56	1
Vinyl acetate	ND		2.8	0.51	ug/m3			04/20/18 01:56	1
Vinyl chloride	ND		1.0	0.31	ug/m3			04/20/18 01:56	1
m,p-Xylene	1.7	J	3.5	0.43	ug/m3			04/20/18 01:56	1
o-Xylene	0.71	J	1.7	0.23	ug/m3			04/20/18 01:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		70 - 130					04/20/18 01:56	1
1,2-Dichloroethane-d4 (Surr)	102		70 - 130					04/20/18 01:56	1
Toluene-d8 (Surr)	108		70 - 130					04/20/18 01:56	1

TestAmerica Sacramento

Surrogate Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		BFB (70-130)	DCA (70-130)	TOL (70-130)
320-37835-1	Hou-4	96	98	109
320-37835-2	Hou-6	96	96	107
320-37835-2 - DL	Hou-6	90	99	107
320-37835-3	10th floor	93	103	108
320-37835-4	7th floor	93	100	107
320-37835-5	10th floor 29 March	93	102	108
LCS 320-218773/3	Lab Control Sample	111	110	114
LCSD 320-218773/4	Lab Control Sample Dup	110	110	114
MB 320-218773/6	Method Blank	95	103	110

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

DCA = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-218773/6

Matrix: Air

Analysis Batch: 218773

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		5.0	0.18	ppb v/v			04/19/18 16:31	1
Benzene	ND		0.40	0.079	ppb v/v			04/19/18 16:31	1
Benzyl chloride	0.286	J	0.80	0.16	ppb v/v			04/19/18 16:31	1
Bromodichloromethane	ND		0.30	0.066	ppb v/v			04/19/18 16:31	1
Bromoform	ND		0.40	0.070	ppb v/v			04/19/18 16:31	1
Bromomethane	ND		0.80	0.34	ppb v/v			04/19/18 16:31	1
2-Butanone (MEK)	ND		0.80	0.20	ppb v/v			04/19/18 16:31	1
Carbon disulfide	ND		0.80	0.078	ppb v/v			04/19/18 16:31	1
Carbon tetrachloride	ND		0.80	0.064	ppb v/v			04/19/18 16:31	1
Chlorobenzene	ND		0.30	0.064	ppb v/v			04/19/18 16:31	1
Dibromochloromethane	ND		0.40	0.079	ppb v/v			04/19/18 16:31	1
Chloroethane	ND		0.80	0.31	ppb v/v			04/19/18 16:31	1
Chloroform	ND		0.30	0.095	ppb v/v			04/19/18 16:31	1
Chloromethane	ND		0.80	0.20	ppb v/v			04/19/18 16:31	1
1,2-Dibromoethane (EDB)	ND		0.80	0.075	ppb v/v			04/19/18 16:31	1
1,2-Dichlorobenzene	ND		0.40	0.13	ppb v/v			04/19/18 16:31	1
1,3-Dichlorobenzene	ND		0.40	0.11	ppb v/v			04/19/18 16:31	1
1,4-Dichlorobenzene	ND		0.40	0.15	ppb v/v			04/19/18 16:31	1
Dichlorodifluoromethane	ND		0.40	0.15	ppb v/v			04/19/18 16:31	1
1,1-Dichloroethane	ND		0.30	0.072	ppb v/v			04/19/18 16:31	1
1,2-Dichloroethane	ND		0.80	0.088	ppb v/v			04/19/18 16:31	1
1,1-Dichloroethene	ND		0.80	0.13	ppb v/v			04/19/18 16:31	1
cis-1,2-Dichloroethene	ND		0.40	0.089	ppb v/v			04/19/18 16:31	1
trans-1,2-Dichloroethene	ND		0.40	0.10	ppb v/v			04/19/18 16:31	1
1,2-Dichloropropane	ND		0.40	0.24	ppb v/v			04/19/18 16:31	1
cis-1,3-Dichloropropene	ND		0.40	0.10	ppb v/v			04/19/18 16:31	1
trans-1,3-Dichloropropene	ND		0.40	0.088	ppb v/v			04/19/18 16:31	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16	ppb v/v			04/19/18 16:31	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			04/19/18 16:31	1
4-Ethyltoluene	ND		0.40	0.19	ppb v/v			04/19/18 16:31	1
Hexachlorobutadiene	ND		2.0	0.43	ppb v/v			04/19/18 16:31	1
2-Hexanone	ND		0.40	0.087	ppb v/v			04/19/18 16:31	1
Methylene Chloride	0.0764	J	0.40	0.072	ppb v/v			04/19/18 16:31	1
4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14	ppb v/v			04/19/18 16:31	1
Styrene	ND		0.40	0.059	ppb v/v			04/19/18 16:31	1
1,1,2,2-Tetrachloroethane	ND		0.40	0.069	ppb v/v			04/19/18 16:31	1
Tetrachloroethene	ND		0.40	0.051	ppb v/v			04/19/18 16:31	1
Toluene	ND		0.40	0.051	ppb v/v			04/19/18 16:31	1
1,2,4-Trichlorobenzene	0.433	J	2.0	0.43	ppb v/v			04/19/18 16:31	1
1,1,1-Trichloroethane	ND		0.30	0.065	ppb v/v			04/19/18 16:31	1
1,1,2-Trichloroethane	ND		0.40	0.067	ppb v/v			04/19/18 16:31	1
Trichloroethene	ND		0.40	0.11	ppb v/v			04/19/18 16:31	1
Trichlorofluoromethane	ND		0.40	0.20	ppb v/v			04/19/18 16:31	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16	ppb v/v			04/19/18 16:31	1
1,2,4-Trimethylbenzene	ND		0.80	0.16	ppb v/v			04/19/18 16:31	1
1,3,5-Trimethylbenzene	ND		0.40	0.13	ppb v/v			04/19/18 16:31	1
Vinyl acetate	ND		0.80	0.15	ppb v/v			04/19/18 16:31	1
Vinyl chloride	ND		0.40	0.12	ppb v/v			04/19/18 16:31	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-218773/6

Matrix: Air

Analysis Batch: 218773

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m,p-Xylene	ND		0.80	0.10	ppb v/v			04/19/18 16:31	1
o-Xylene	ND		0.40	0.054	ppb v/v			04/19/18 16:31	1
Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		12	0.42	ug/m3			04/19/18 16:31	1
Benzene	ND		1.3	0.25	ug/m3			04/19/18 16:31	1
Benzyl chloride	1.48	J	4.1	0.84	ug/m3			04/19/18 16:31	1
Bromodichloromethane	ND		2.0	0.44	ug/m3			04/19/18 16:31	1
Bromoform	ND		4.1	0.72	ug/m3			04/19/18 16:31	1
Bromomethane	ND		3.1	1.3	ug/m3			04/19/18 16:31	1
2-Butanone (MEK)	ND		2.4	0.59	ug/m3			04/19/18 16:31	1
Carbon disulfide	ND		2.5	0.24	ug/m3			04/19/18 16:31	1
Carbon tetrachloride	ND		5.0	0.40	ug/m3			04/19/18 16:31	1
Chlorobenzene	ND		1.4	0.29	ug/m3			04/19/18 16:31	1
Dibromochloromethane	ND		3.4	0.67	ug/m3			04/19/18 16:31	1
Chloroethane	ND		2.1	0.81	ug/m3			04/19/18 16:31	1
Chloroform	ND		1.5	0.46	ug/m3			04/19/18 16:31	1
Chloromethane	ND		1.7	0.41	ug/m3			04/19/18 16:31	1
1,2-Dibromoethane (EDB)	ND		6.1	0.58	ug/m3			04/19/18 16:31	1
1,2-Dichlorobenzene	ND		2.4	0.78	ug/m3			04/19/18 16:31	1
1,3-Dichlorobenzene	ND		2.4	0.66	ug/m3			04/19/18 16:31	1
1,4-Dichlorobenzene	ND		2.4	0.90	ug/m3			04/19/18 16:31	1
Dichlorodifluoromethane	ND		2.0	0.72	ug/m3			04/19/18 16:31	1
1,1-Dichloroethane	ND		1.2	0.29	ug/m3			04/19/18 16:31	1
1,2-Dichloroethane	ND		3.2	0.36	ug/m3			04/19/18 16:31	1
1,1-Dichloroethene	ND		3.2	0.51	ug/m3			04/19/18 16:31	1
cis-1,2-Dichloroethene	ND		1.6	0.35	ug/m3			04/19/18 16:31	1
trans-1,2-Dichloroethene	ND		1.6	0.40	ug/m3			04/19/18 16:31	1
1,2-Dichloropropane	ND		1.8	1.1	ug/m3			04/19/18 16:31	1
cis-1,3-Dichloropropene	ND		1.8	0.47	ug/m3			04/19/18 16:31	1
trans-1,3-Dichloropropene	ND		1.8	0.40	ug/m3			04/19/18 16:31	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		2.8	1.1	ug/m3			04/19/18 16:31	1
Ethylbenzene	ND		1.7	0.27	ug/m3			04/19/18 16:31	1
4-Ethyltoluene	ND		2.0	0.92	ug/m3			04/19/18 16:31	1
Hexachlorobutadiene	ND		21	4.6	ug/m3			04/19/18 16:31	1
2-Hexanone	ND		1.6	0.36	ug/m3			04/19/18 16:31	1
Methylene Chloride	0.265	J	1.4	0.25	ug/m3			04/19/18 16:31	1
4-Methyl-2-pentanone (MIBK)	ND		1.6	0.55	ug/m3			04/19/18 16:31	1
Styrene	ND		1.7	0.25	ug/m3			04/19/18 16:31	1
1,1,2,2-Tetrachloroethane	ND		2.7	0.47	ug/m3			04/19/18 16:31	1
Tetrachloroethene	ND		2.7	0.35	ug/m3			04/19/18 16:31	1
Toluene	ND		1.5	0.19	ug/m3			04/19/18 16:31	1
1,2,4-Trichlorobenzene	3.22	J	15	3.2	ug/m3			04/19/18 16:31	1
1,1,1-Trichloroethane	ND		1.6	0.35	ug/m3			04/19/18 16:31	1
1,1,2-Trichloroethane	ND		2.2	0.37	ug/m3			04/19/18 16:31	1
Trichloroethene	ND		2.1	0.56	ug/m3			04/19/18 16:31	1
Trichlorofluoromethane	ND		2.2	1.1	ug/m3			04/19/18 16:31	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		3.1	1.2	ug/m3			04/19/18 16:31	1

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 320-218773/6

Matrix: Air

Analysis Batch: 218773

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trimethylbenzene	ND		3.9	0.80	ug/m3			04/19/18 16:31	1
1,3,5-Trimethylbenzene	ND		2.0	0.61	ug/m3			04/19/18 16:31	1
Vinyl acetate	ND		2.8	0.51	ug/m3			04/19/18 16:31	1
Vinyl chloride	ND		1.0	0.31	ug/m3			04/19/18 16:31	1
m,p-Xylene	ND		3.5	0.43	ug/m3			04/19/18 16:31	1
o-Xylene	ND		1.7	0.23	ug/m3			04/19/18 16:31	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		70 - 130		04/19/18 16:31	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 130		04/19/18 16:31	1
Toluene-d8 (Surr)	110		70 - 130		04/19/18 16:31	1

Lab Sample ID: LCS 320-218773/3

Matrix: Air

Analysis Batch: 218773

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	20.0	23.9		ppb v/v		119	65 - 125
Benzene	20.0	21.5		ppb v/v		108	68 - 128
Benzyl chloride	16.0	13.4		ppb v/v		84	67 - 127
Bromodichloromethane	20.0	22.0		ppb v/v		110	71 - 131
Bromoform	20.0	19.8		ppb v/v		99	66 - 126
Bromomethane	20.0	22.7		ppb v/v		114	73 - 134
2-Butanone (MEK)	20.0	23.1		ppb v/v		116	73 - 133
Carbon disulfide	20.0	21.8		ppb v/v		109	71 - 131
Carbon tetrachloride	20.0	21.3		ppb v/v		106	63 - 126
Chlorobenzene	20.0	19.0		ppb v/v		95	63 - 123
Dibromochloromethane	20.0	19.1		ppb v/v		95	66 - 126
Chloroethane	20.0	23.3		ppb v/v		116	73 - 133
Chloroform	20.0	22.5		ppb v/v		113	70 - 130
Chloromethane	20.0	22.7		ppb v/v		114	61 - 140
1,2-Dibromoethane (EDB)	20.0	18.8		ppb v/v		94	64 - 124
1,2-Dichlorobenzene	20.0	19.3		ppb v/v		96	62 - 126
1,3-Dichlorobenzene	20.0	19.5		ppb v/v		97	59 - 130
1,4-Dichlorobenzene	20.0	19.7		ppb v/v		98	58 - 132
Dichlorodifluoromethane	20.0	23.6		ppb v/v		118	69 - 129
1,1-Dichloroethane	20.0	22.7		ppb v/v		114	71 - 131
1,2-Dichloroethane	20.0	21.8		ppb v/v		109	71 - 131
1,1-Dichloroethene	20.0	22.9		ppb v/v		114	72 - 132
cis-1,2-Dichloroethene	20.0	22.5		ppb v/v		113	70 - 130
trans-1,2-Dichloroethene	20.0	23.1		ppb v/v		115	72 - 132
1,2-Dichloropropane	20.0	22.0		ppb v/v		110	72 - 132
cis-1,3-Dichloropropene	20.0	22.4		ppb v/v		112	72 - 132
trans-1,3-Dichloropropene	20.0	19.0		ppb v/v		95	66 - 126
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	22.4		ppb v/v		112	74 - 134
Ethylbenzene	20.0	19.1		ppb v/v		95	64 - 124
4-Ethyltoluene	20.0	19.3		ppb v/v		96	66 - 129

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-218773/3

Matrix: Air

Analysis Batch: 218773

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexachlorobutadiene	20.0	19.5		ppb v/v		97	58 - 131
2-Hexanone	20.0	19.7		ppb v/v		98	69 - 129
Methylene Chloride	20.0	22.7		ppb v/v		113	67 - 127
4-Methyl-2-pentanone (MIBK)	20.0	23.5		ppb v/v		117	74 - 134
Styrene	20.0	20.2		ppb v/v		101	67 - 127
1,1,2,2-Tetrachloroethane	20.0	19.3		ppb v/v		97	64 - 124
Tetrachloroethene	20.0	18.4		ppb v/v		92	63 - 123
Toluene	20.0	21.9		ppb v/v		109	68 - 128
1,2,4-Trichlorobenzene	20.0	16.2		ppb v/v		81	58 - 138
1,1,1-Trichloroethane	20.0	22.3		ppb v/v		111	69 - 129
1,1,2-Trichloroethane	20.0	18.7		ppb v/v		93	64 - 124
Trichloroethene	20.0	21.5		ppb v/v		107	70 - 130
Trichlorofluoromethane	20.0	22.3		ppb v/v		111	71 - 131
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	22.3		ppb v/v		111	70 - 130
1,2,4-Trimethylbenzene	20.0	19.8		ppb v/v		99	60 - 132
1,3,5-Trimethylbenzene	20.0	19.2		ppb v/v		96	65 - 125
Vinyl acetate	20.0	24.4		ppb v/v		122	65 - 134
Vinyl chloride	20.0	22.5		ppb v/v		113	59 - 152
m,p-Xylene	40.0	39.0		ppb v/v		98	65 - 125
o-Xylene	20.0	19.4		ppb v/v		97	65 - 125
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	48	56.7		ug/m3		119	65 - 125
Benzene	64	68.7		ug/m3		108	68 - 128
Benzyl chloride	83	69.5		ug/m3		84	67 - 127
Bromodichloromethane	130	148		ug/m3		110	71 - 131
Bromoform	210	204		ug/m3		99	66 - 126
Bromomethane	78	88.2		ug/m3		114	73 - 134
2-Butanone (MEK)	59	68.2		ug/m3		116	73 - 133
Carbon disulfide	62	67.8		ug/m3		109	71 - 131
Carbon tetrachloride	130	134		ug/m3		106	63 - 126
Chlorobenzene	92	87.3		ug/m3		95	63 - 123
Dibromochloromethane	170	163		ug/m3		95	66 - 126
Chloroethane	53	61.4		ug/m3		116	73 - 133
Chloroform	98	110		ug/m3		113	70 - 130
Chloromethane	41	46.9		ug/m3		114	61 - 140
1,2-Dibromoethane (EDB)	150	145		ug/m3		94	64 - 124
1,2-Dichlorobenzene	120	116		ug/m3		96	62 - 126
1,3-Dichlorobenzene	120	117		ug/m3		97	59 - 130
1,4-Dichlorobenzene	120	118		ug/m3		98	58 - 132
Dichlorodifluoromethane	99	117		ug/m3		118	69 - 129
1,1-Dichloroethane	81	91.9		ug/m3		114	71 - 131
1,2-Dichloroethane	81	88.3		ug/m3		109	71 - 131
1,1-Dichloroethene	79	90.6		ug/m3		114	72 - 132
cis-1,2-Dichloroethene	79	89.2		ug/m3		113	70 - 130
trans-1,2-Dichloroethene	79	91.4		ug/m3		115	72 - 132
1,2-Dichloropropane	92	102		ug/m3		110	72 - 132

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 320-218773/3

Matrix: Air

Analysis Batch: 218773

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
cis-1,3-Dichloropropene	91	102		ug/m3		112	72 - 132
trans-1,3-Dichloropropene	91	86.2		ug/m3		95	66 - 126
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	156		ug/m3		112	74 - 134
Ethylbenzene	87	82.8		ug/m3		95	64 - 124
4-Ethyltoluene	98	94.7		ug/m3		96	66 - 129
Hexachlorobutadiene	210	208		ug/m3		97	58 - 131
2-Hexanone	82	80.7		ug/m3		98	69 - 129
Methylene Chloride	69	78.8		ug/m3		113	67 - 127
4-Methyl-2-pentanone (MIBK)	82	96.1		ug/m3		117	74 - 134
Styrene	85	86.1		ug/m3		101	67 - 127
1,1,2,2-Tetrachloroethane	140	133		ug/m3		97	64 - 124
Tetrachloroethene	140	125		ug/m3		92	63 - 123
Toluene	75	82.4		ug/m3		109	68 - 128
1,2,4-Trichlorobenzene	150	121		ug/m3		81	58 - 138
1,1,1-Trichloroethane	110	122		ug/m3		111	69 - 129
1,1,2-Trichloroethane	110	102		ug/m3		93	64 - 124
Trichloroethene	110	115		ug/m3		107	70 - 130
Trichlorofluoromethane	110	125		ug/m3		111	71 - 131
1,1,2-Trichloro-1,2,2-trifluoroethane	150	171		ug/m3		111	70 - 130
1,2,4-Trimethylbenzene	98	97.2		ug/m3		99	60 - 132
1,3,5-Trimethylbenzene	98	94.2		ug/m3		96	65 - 125
Vinyl acetate	70	86.0		ug/m3		122	65 - 134
Vinyl chloride	51	57.5		ug/m3		113	59 - 152
m,p-Xylene	170	169		ug/m3		98	65 - 125
o-Xylene	87	84.3		ug/m3		97	65 - 125

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	111		70 - 130
1,2-Dichloroethane-d4 (Surr)	110		70 - 130
Toluene-d8 (Surr)	114		70 - 130

Lab Sample ID: LCSD 320-218773/4

Matrix: Air

Analysis Batch: 218773

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	20.0	23.2		ppb v/v		116	65 - 125	3	25
Benzene	20.0	21.7		ppb v/v		109	68 - 128	1	25
Benzyl chloride	16.0	13.6		ppb v/v		85	67 - 127	1	25
Bromodichloromethane	20.0	22.1		ppb v/v		111	71 - 131	0	25
Bromoform	20.0	19.9		ppb v/v		99	66 - 126	1	25
Bromomethane	20.0	22.9		ppb v/v		115	73 - 134	1	25
2-Butanone (MEK)	20.0	23.5		ppb v/v		117	73 - 133	2	25
Carbon disulfide	20.0	22.0		ppb v/v		110	71 - 131	1	25
Carbon tetrachloride	20.0	21.5		ppb v/v		107	63 - 126	1	25
Chlorobenzene	20.0	19.2		ppb v/v		96	63 - 123	1	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-218773/4

Matrix: Air

Analysis Batch: 218773

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dibromochloromethane	20.0	19.3		ppb v/v		97	66 - 126	1	25
Chloroethane	20.0	23.6		ppb v/v		118	73 - 133	1	25
Chloroform	20.0	22.6		ppb v/v		113	70 - 130	0	25
Chloromethane	20.0	22.6		ppb v/v		113	61 - 140	0	25
1,2-Dibromoethane (EDB)	20.0	19.1		ppb v/v		95	64 - 124	1	25
1,2-Dichlorobenzene	20.0	19.4		ppb v/v		97	62 - 126	1	25
1,3-Dichlorobenzene	20.0	19.9		ppb v/v		99	59 - 130	2	25
1,4-Dichlorobenzene	20.0	20.0		ppb v/v		100	58 - 132	2	25
Dichlorodifluoromethane	20.0	23.6		ppb v/v		118	69 - 129	0	25
1,1-Dichloroethane	20.0	23.0		ppb v/v		115	71 - 131	1	25
1,2-Dichloroethane	20.0	21.9		ppb v/v		109	71 - 131	0	25
1,1-Dichloroethene	20.0	22.9		ppb v/v		115	72 - 132	0	25
cis-1,2-Dichloroethene	20.0	22.9		ppb v/v		114	70 - 130	2	25
trans-1,2-Dichloroethene	20.0	23.2		ppb v/v		116	72 - 132	1	25
1,2-Dichloropropane	20.0	22.2		ppb v/v		111	72 - 132	1	25
cis-1,3-Dichloropropene	20.0	22.6		ppb v/v		113	72 - 132	1	25
trans-1,3-Dichloropropene	20.0	19.1		ppb v/v		96	66 - 126	1	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	20.0	22.7		ppb v/v		113	74 - 134	1	25
Ethylbenzene	20.0	19.3		ppb v/v		97	64 - 124	1	25
4-Ethyltoluene	20.0	20.8		ppb v/v		104	66 - 129	8	25
Hexachlorobutadiene	20.0	19.7		ppb v/v		99	58 - 131	1	25
2-Hexanone	20.0	19.7		ppb v/v		99	69 - 129	0	25
Methylene Chloride	20.0	22.6		ppb v/v		113	67 - 127	0	25
4-Methyl-2-pentanone (MIBK)	20.0	23.4		ppb v/v		117	74 - 134	0	25
Styrene	20.0	20.5		ppb v/v		102	67 - 127	1	25
1,1,2,2-Tetrachloroethane	20.0	19.4		ppb v/v		97	64 - 124	1	25
Tetrachloroethene	20.0	18.6		ppb v/v		93	63 - 123	1	25
Toluene	20.0	22.1		ppb v/v		111	68 - 128	1	25
1,2,4-Trichlorobenzene	20.0	16.5		ppb v/v		82	58 - 138	1	25
1,1,1-Trichloroethane	20.0	22.5		ppb v/v		112	69 - 129	1	25
1,1,2-Trichloroethane	20.0	19.0		ppb v/v		95	64 - 124	1	25
Trichloroethene	20.0	21.8		ppb v/v		109	70 - 130	2	25
Trichlorofluoromethane	20.0	22.6		ppb v/v		113	71 - 131	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	22.5		ppb v/v		113	70 - 130	1	25
1,2,4-Trimethylbenzene	20.0	20.0		ppb v/v		100	60 - 132	1	25
1,3,5-Trimethylbenzene	20.0	19.2		ppb v/v		96	65 - 125	0	25
Vinyl acetate	20.0	24.3		ppb v/v		122	65 - 134	0	25
Vinyl chloride	20.0	22.6		ppb v/v		113	59 - 152	1	25
m,p-Xylene	40.0	39.4		ppb v/v		99	65 - 125	1	25
o-Xylene	20.0	19.6		ppb v/v		98	65 - 125	1	25
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	48	55.1		ug/m3		116	65 - 125	3	25
Benzene	64	69.4		ug/m3		109	68 - 128	1	25
Benzyl chloride	83	70.3		ug/m3		85	67 - 127	1	25
Bromodichloromethane	130	148		ug/m3		111	71 - 131	0	25
Bromoform	210	205		ug/m3		99	66 - 126	1	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-218773/4

Matrix: Air

Analysis Batch: 218773

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Bromomethane	78	89.0		ug/m3		115	73 - 134	1	25
2-Butanone (MEK)	59	69.2		ug/m3		117	73 - 133	2	25
Carbon disulfide	62	68.5		ug/m3		110	71 - 131	1	25
Carbon tetrachloride	130	135		ug/m3		107	63 - 126	1	25
Chlorobenzene	92	88.3		ug/m3		96	63 - 123	1	25
Dibromochloromethane	170	164		ug/m3		97	66 - 126	1	25
Chloroethane	53	62.2		ug/m3		118	73 - 133	1	25
Chloroform	98	110		ug/m3		113	70 - 130	0	25
Chloromethane	41	46.8		ug/m3		113	61 - 140	0	25
1,2-Dibromoethane (EDB)	150	146		ug/m3		95	64 - 124	1	25
1,2-Dichlorobenzene	120	117		ug/m3		97	62 - 126	1	25
1,3-Dichlorobenzene	120	119		ug/m3		99	59 - 130	2	25
1,4-Dichlorobenzene	120	120		ug/m3		100	58 - 132	2	25
Dichlorodifluoromethane	99	117		ug/m3		118	69 - 129	0	25
1,1-Dichloroethane	81	93.0		ug/m3		115	71 - 131	1	25
1,2-Dichloroethane	81	88.6		ug/m3		109	71 - 131	0	25
1,1-Dichloroethene	79	90.9		ug/m3		115	72 - 132	0	25
cis-1,2-Dichloroethene	79	90.7		ug/m3		114	70 - 130	2	25
trans-1,2-Dichloroethene	79	92.2		ug/m3		116	72 - 132	1	25
1,2-Dichloropropane	92	103		ug/m3		111	72 - 132	1	25
cis-1,3-Dichloropropene	91	103		ug/m3		113	72 - 132	1	25
trans-1,3-Dichloropropene	91	86.8		ug/m3		96	66 - 126	1	25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	140	158		ug/m3		113	74 - 134	1	25
Ethylbenzene	87	83.8		ug/m3		97	64 - 124	1	25
4-Ethyltoluene	98	102		ug/m3		104	66 - 129	8	25
Hexachlorobutadiene	210	210		ug/m3		99	58 - 131	1	25
2-Hexanone	82	80.8		ug/m3		99	69 - 129	0	25
Methylene Chloride	69	78.6		ug/m3		113	67 - 127	0	25
4-Methyl-2-pentanone (MIBK)	82	95.7		ug/m3		117	74 - 134	0	25
Styrene	85	87.3		ug/m3		102	67 - 127	1	25
1,1,2,2-Tetrachloroethane	140	133		ug/m3		97	64 - 124	1	25
Tetrachloroethene	140	126		ug/m3		93	63 - 123	1	25
Toluene	75	83.4		ug/m3		111	68 - 128	1	25
1,2,4-Trichlorobenzene	150	122		ug/m3		82	58 - 138	1	25
1,1,1-Trichloroethane	110	123		ug/m3		112	69 - 129	1	25
1,1,2-Trichloroethane	110	103		ug/m3		95	64 - 124	1	25
Trichloroethene	110	117		ug/m3		109	70 - 130	2	25
Trichlorofluoromethane	110	127		ug/m3		113	71 - 131	1	25
1,1,2-Trichloro-1,2,2-trifluoroethane	150	173		ug/m3		113	70 - 130	1	25
1,2,4-Trimethylbenzene	98	98.1		ug/m3		100	60 - 132	1	25
1,3,5-Trimethylbenzene	98	94.6		ug/m3		96	65 - 125	0	25
Vinyl acetate	70	85.6		ug/m3		122	65 - 134	0	25
Vinyl chloride	51	57.8		ug/m3		113	59 - 152	1	25
m,p-Xylene	170	171		ug/m3		99	65 - 125	1	25
o-Xylene	87	85.1		ug/m3		98	65 - 125	1	25

TestAmerica Sacramento

QC Sample Results

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-218773/4

Matrix: Air

Analysis Batch: 218773

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

Surrogate	LCSD	LCSD	Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	110		70 - 130
1,2-Dichloroethane-d4 (Surr)	110		70 - 130
Toluene-d8 (Surr)	114		70 - 130

QC Association Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Air - GC/MS VOA

Analysis Batch: 218773

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-37835-1	Hou-4	Total/NA	Air	TO-15	
320-37835-2	Hou-6	Total/NA	Air	TO-15	
320-37835-2 - DL	Hou-6	Total/NA	Air	TO-15	
320-37835-3	10th floor	Total/NA	Air	TO-15	
320-37835-4	7th floor	Total/NA	Air	TO-15	
320-37835-5	10th floor 29 March	Total/NA	Air	TO-15	
MB 320-218773/6	Method Blank	Total/NA	Air	TO-15	
LCS 320-218773/3	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-218773/4	Lab Control Sample Dup	Total/NA	Air	TO-15	

Lab Chronicle

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Client Sample ID: Hou-4

Date Collected: 03/27/18 10:55

Date Received: 04/04/18 12:43

Lab Sample ID: 320-37835-1

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	415 mL	250 mL	218773	04/19/18 22:21	AP1	TAL SAC

Client Sample ID: Hou-6

Date Collected: 03/27/18 11:11

Date Received: 04/04/18 12:43

Lab Sample ID: 320-37835-2

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		2.51	166 mL	250 mL	218773	04/19/18 23:12	AP1	TAL SAC
Total/NA	Analysis	TO-15	DL	5.08	82 mL	250 mL	218773	04/20/18 09:20	AP1	TAL SAC

Client Sample ID: 10th floor

Date Collected: 03/27/18 17:30

Date Received: 04/04/18 12:43

Lab Sample ID: 320-37835-3

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	410 mL	250 mL	218773	04/20/18 00:05	AP1	TAL SAC

Client Sample ID: 7th floor

Date Collected: 03/27/18 17:40

Date Received: 04/04/18 12:43

Lab Sample ID: 320-37835-4

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	400 mL	250 mL	218773	04/20/18 01:02	AP1	TAL SAC

Client Sample ID: 10th floor 29 March

Date Collected: 03/29/18 12:32

Date Received: 04/04/18 12:43

Lab Sample ID: 320-37835-5

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	425 mL	250 mL	218773	04/20/18 01:56	AP1	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Laboratory: TestAmerica Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-29-19

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Method Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GSI Environmental, Inc
Project/Site: ESTCP Vapor Intrusion Research

TestAmerica Job ID: 320-37835-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-37835-1	Hou-4	Air	03/27/18 10:55	04/04/18 12:43
320-37835-2	Hou-6	Air	03/27/18 11:11	04/04/18 12:43
320-37835-3	10th floor	Air	03/27/18 17:30	04/04/18 12:43
320-37835-4	7th floor	Air	03/27/18 17:40	04/04/18 12:43
320-37835-5	10th floor 29 March	Air	03/29/18 12:32	04/04/18 12:43

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact Information				Project Manager: Lila Beckley				Samples Collected By: TEM				COC No: 1 of 1 COCs																					
Company Name: GSI				Phone: 512 346 4474																													
Address: 2211 Northgate #1500				Email: lbeckley@gsi-net.com																													
City/State/Zip: Houston TX 77058				Site Contact: Laura Turpin																													
Phone: 542 713 5226				TA Contact: Laura Turpin																													
FAX: 542 713 5226				Analysis Turnaround Time																													
Project Name: GSI				Standard (Specific):																													
Site/Location: Houston				Rush (Specific):																													
PO #: 4262																																	
Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum Field, 'Hg (Start)	Canister Vacuum Field, 'Hg (Stop)	Flow Controller -dB	Canister ID	TO-15 (Med / Std / Low / SIM)	MA-APH	EPA 3C	EPA 25C / 25.3	ASTM D-1946 / 1945 / 3588	EPA 15/16	TO-3	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)	Sample Specific Notes:											
HOU-4	3/27/18	10:55		-30	-0.7	3400	1075	✓													grab sewer pipe												
HOU-6	3/27/18	11:11		-29.8	-1.9	3400	857	✓													"												
10th floor	3/27/18	17:30		-29.8	-0.8	3400	688	✓													grab indoor air												
7th floor	3/27/18	17:40		-29.5	-0.57	3400	614	✓													"												
10th floor 29 March	3/29/18	12:32		-29.9	0	3400	1013	✓													"												
Temperature (Fahrenheit) <table border="1"> <tr> <td>Start</td> <td>Interior</td> <td>Ambient</td> </tr> <tr> <td>Stop</td> <td></td> <td></td> </tr> </table> Temperature (Fahrenheit) <table border="1"> <tr> <td>Start</td> <td>Interior</td> <td>Ambient</td> </tr> <tr> <td>Stop</td> <td></td> <td></td> </tr> </table>																						Start	Interior	Ambient	Stop			Start	Interior	Ambient	Stop		
Start	Interior	Ambient																															
Stop																																	
Start	Interior	Ambient																															
Stop																																	
Special Instructions/QC Requirements & Comments: 5 samples + 1 canister returned unused. Barcode 320-37835 Chain of Custody																																	
Samples Shipped by: Lila Beckley (Feds) Date / Time: 3/29/2018 13:00 Samples Relinquished by: Date / Time: Relinquished by: Date / Time:																																	
Lab Use Only: Shipper Name: Samples Received by: GSI Date / Time: 4/9/18 12:43 Received by: Date / Time: Condition:																																	

① Sample time on canister is 12:26
② sample time on canister is 17:32

Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013

JOB # 320-37835
Sample # 1

Client/Project:		VFR ID:		
Canister Serial #:	34001075	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.03	04/12/18	GKI
FINAL PRESSURE (PSIA)		23.26	04/12/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.66		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.66		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors						
			Date	Instr.	File #	
			4/19/2018	ATMS9		
Canister DF =	1.66	X	Load DF =	0.6024096	X	Bag DF =
			LVf (mLs)	250		BVf (mLs)
			LVi (mLs)	415		Bvi (mLs)
			FINAL DF			
			0.99872047			
			Date	Instr.	File #	
Canister DF =	1.66	X	Load DF =	#DIV/0!	X	Bag DF =
			LVf (mLs)			BVf (mLs)
			LVi (mLs)			Bvi (mLs)
			FINAL DF			
			#DIV/0!			
			Date	Instr.	File #	
Canister DF =	1.66	X	Load DF =	#DIV/0!	X	Bag DF =
			LVf (mLs)			BVf (mLs)
			LVi (mLs)			Bvi (mLs)
			FINAL DF			
			#DIV/0!			

Sample #	2

		Date	Instr.	File #
Canister DF =	1.67	X		
Load DF =	#DIV/0!	X		
LVf (mLs)				
LVi (mL s)				
Bag DF =	1	=		
BVf (mLs)				
BVi (mL s)				
				FINAL DF
				#DIV/0!

JOB # 320-37835
Sample # 3

Client/Project:		VFR ID:		
Canister Serial #:	34000688	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		13.95	04/12/18	GKI
FINAL PRESSURE (PSIA)		22.88	04/12/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.64		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.64		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		4/19/2018	ATMS9	
Canister DF =	1.64	X	Load DF =	0.6097561
			LVf (mLs)	250
			LVi (mLs)	410
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				1.00008742
		Date	Instr.	File #
Canister DF =	1.64	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				#DIV/0!
		Date	Instr.	File #
Canister DF =	1.64	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
				FINAL DF
				#DIV/0!

JOB # 320-37835
Sample # 4

Client/Project:		VFR ID:		
Canister Serial #:	34001614	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.39	04/12/18	GKI
FINAL PRESSURE (PSIA)		23.03	04/12/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.60		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.60		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors				
		Date	Instr.	File #
		4/19/2018	ATMS9	
Canister DF =	1.60	X	Load DF =	0.625
			LVf (mLs)	250
			LVi (mLs)	400
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		FINAL DF		
		1.000260598		
		Date	Instr.	File #
Canister DF =	1.60	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		FINAL DF		
		#DIV/0!		
		Date	Instr.	File #
Canister DF =	1.60	X	Load DF =	#DIV/0!
			LVf (mLs)	
			LVi (mLs)	
			Bag DF =	1
			BVf (mLs)	
			Bvi (mLs)	
		FINAL DF		
		#DIV/0!		

JOB # 320-37835
Sample # 5

Client/Project:		VFR ID:		
Canister Serial #:	34001013	Duration:	☐ Hrs ☐ Min	
Cleaning Job:		Flow:		mL/min
Client ID:		Initials:		
Site Location:				

FIELD				
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY				
READING		PRESS.	DATE	INITIALS
INITIAL VACUUM CHECK (INCHES Hg)		29.8		JMT
☐ Helium Pre-dilution - Final Pressure (INCHES Hg)				
INITIAL PRESSURE (PSIA)		14.43	04/12/18	GKI
FINAL PRESSURE (PSIA)		24.54	04/12/18	GKI
Pressurization Gas: ☐ N2 ☐ He		☐	SCRN DIL. VS 250mLs:	
Initial Canister Dilution Factor =		1.70		

CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF
			1.70		#DIV/0!
			#DIV/0!		#DIV/0!
			#DIV/0!		#DIV/0!

Analytical Dilution Factors										
		Date	Instr.	File #						
		4/19/2018	ATMS9							
Canister DF =	1.70	X	Load DF =	0.5882353	X	Bag DF =	1	=	FINAL DF	1.000366883
			LVf (mLs)	250			BVf (mLs)			
			LVi (mLs)	425			BVi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.70	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
			LVf (mLs)				BVf (mLs)			
			LVi (mLs)				BVi (mLs)			
		Date	Instr.	File #						
Canister DF =	1.70	X	Load DF =	#DIV/0!	X	Bag DF =	1	=	FINAL DF	#DIV/0!
			LVf (mLs)				BVf (mLs)			
			LVi (mLs)				BVi (mLs)			

Login Sample Receipt Checklist

Client: GSI Environmental, Inc

Job Number: 320-37835-1

Login Number: 37835

List Source: TestAmerica Sacramento

List Number: 1

Creator: James, Emily M

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Times on containers do not match the COC. Logged in per COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Date Cleaned/Batch ID D03-20-18 320-37263

Date of QC 3/21/18

Data File Number C:\MSDCHEM\1\DATA\180321\



320-37263 Chain of Custody

(File ID for certification analysis of canister designated below)

CANISTER ID NUMBERS

*	8521 <i>ms7032122-d</i>
	34001978
	34001614
	34001974
	34000857
	34001977
	34001976
	34001013

	8512
	34001955
	34000934
	34001627
	34000997
	34001075
	34000688
	34000865

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

[Signature]
1st level Reviewed By:

3/22/18
Date:

[Signature]
2nd level Reviewed By:

3/27/18
Date:

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37263-1
SDG No.: _____
Client Sample ID: 8521 Lab Sample ID: 320-37263-1
Matrix: Air Lab File ID: MS7032121.D
Analysis Method: TO-15 Date Collected: 03/20/2018 00:00
Sample wt/vol: 500 (mL) Date Analyzed: 03/22/2018 09:18
Soil Aliquot Vol: _____ Dilution Factor: 1
Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
% Moisture: _____ Level: (low/med) Low
Analysis Batch No.: 214084 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	ND		5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: <u>TestAmerica Sacramento</u>	Job No.: <u>320-37263-1</u>
SDG No.: _____	
Client Sample ID: <u>8521</u>	Lab Sample ID: <u>320-37263-1</u>
Matrix: <u>Air</u>	Lab File ID: <u>MS7032121.D</u>
Analysis Method: <u>TO-15</u>	Date Collected: <u>03/20/2018 00:00</u>
Sample wt/vol: <u>500 (mL)</u>	Date Analyzed: <u>03/22/2018 09:18</u>
Soil Aliquot Vol: _____	Dilution Factor: <u>1</u>
Soil Extract Vol.: _____	GC Column: <u>RTX-Volatiles</u> ID: <u>0.32 (mm)</u>
% Moisture: _____	Level: (low/med) <u>Low</u>
Analysis Batch No.: <u>214084</u>	Units: <u>ppb v/v</u>

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	ND		0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37263-1
 SDG No.: _____
 Client Sample ID: 8521 Lab Sample ID: 320-37263-1
 Matrix: Air Lab File ID: MS7032121.D
 Analysis Method: TO-15 Date Collected: 03/20/2018 00:00
 Sample wt/vol: 500 (mL) Date Analyzed: 03/22/2018 09:18
 Soil Aliquot Vol: _____ Dilution Factor: 1
 Soil Extract Vol.: _____ GC Column: RTX-Volatiles ID: 0.32 (mm)
 % Moisture: _____ Level: (low/med) Low
 Analysis Batch No.: 214084 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054
1330-20-7	Xylenes, Total	ND		1.2	0.074

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	79		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	111		70-130
2037-26-5	Toluene-d8 (Surr)	99		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS7\20180321-55620.b\MS7032121.D
 Lims ID: 320-37263-A-1
 Client ID: 8521
 Sample Type: Client
 Inject. Date: 22-Mar-2018 09:18:30 ALS Bottle#: 4 Worklist Smp#: 21
 Purge Vol: 5.000 mL Dil. Factor: 1.0000
 Sample Info: 320-37170-A-1
 Misc. Info.: 500 mL CAN CERT
 Operator ID: LHS Instrument ID: ATMS7
 Method: \\ChromNA\Sacramento\ChromData\ATMS7\20180321-55620.b\TO15_ATMS7N.m
 Limit Group: MSA - TO15 - ICAL
 Last Update: 22-Mar-2018 09:57:58 Calib Date: 15-Mar-2018 21:16:30
 Integrator: RTE ID Type: Deconvolution ID
 Quant Method: Internal Standard Quant By: Initial Calibration
 Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS7\20180315-55361.b\MS7031511.D
 Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN
 Process Host: XAWRK026

First Level Reviewer: leeh

Date:

22-Mar-2018 09:57:58

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	12.308	12.296	0.012	93	32138	4.00	
* 2 1,4-Difluorobenzene	114	14.450	14.444	0.006	96	141277	4.00	
* 3 Chlorobenzene-d5 (IS)	117	21.117	21.111	0.006	91	141356	4.00	
\$ 4 1,2-Dichloroethane-d4 (Sur	65	13.507	13.500	0.012	96	59049	4.43	
\$ 5 Toluene-d8 (Surr)	100	17.857	17.852	0.013	97	97228	3.95	
\$ 6 4-Bromofluorobenzene (Surr	95	23.660	23.667	0.000	87	83024	3.16	
11 Propene	41	3.901	3.878	0.024	79	455	0.0588	

Reagents:

VAMSIS20_00126

Amount Added: 50.00

Units: mL

Run Reagent

Report Date: 22-Mar-2018 09:58:12

Chrom Revision: 2.2 13-Mar-2018 08:45:20

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS7\20180321-55620.b\MS7032121.D

Injection Date: 22-Mar-2018 09:18:30

Instrument ID: ATMS7

Operator ID: LHS

Lims ID: 320-37263-A-1

Lab Sample ID: 320-37263-1

Worklist Smp#: 21

Client ID: 8521

Purge Vol: 5.000 mL

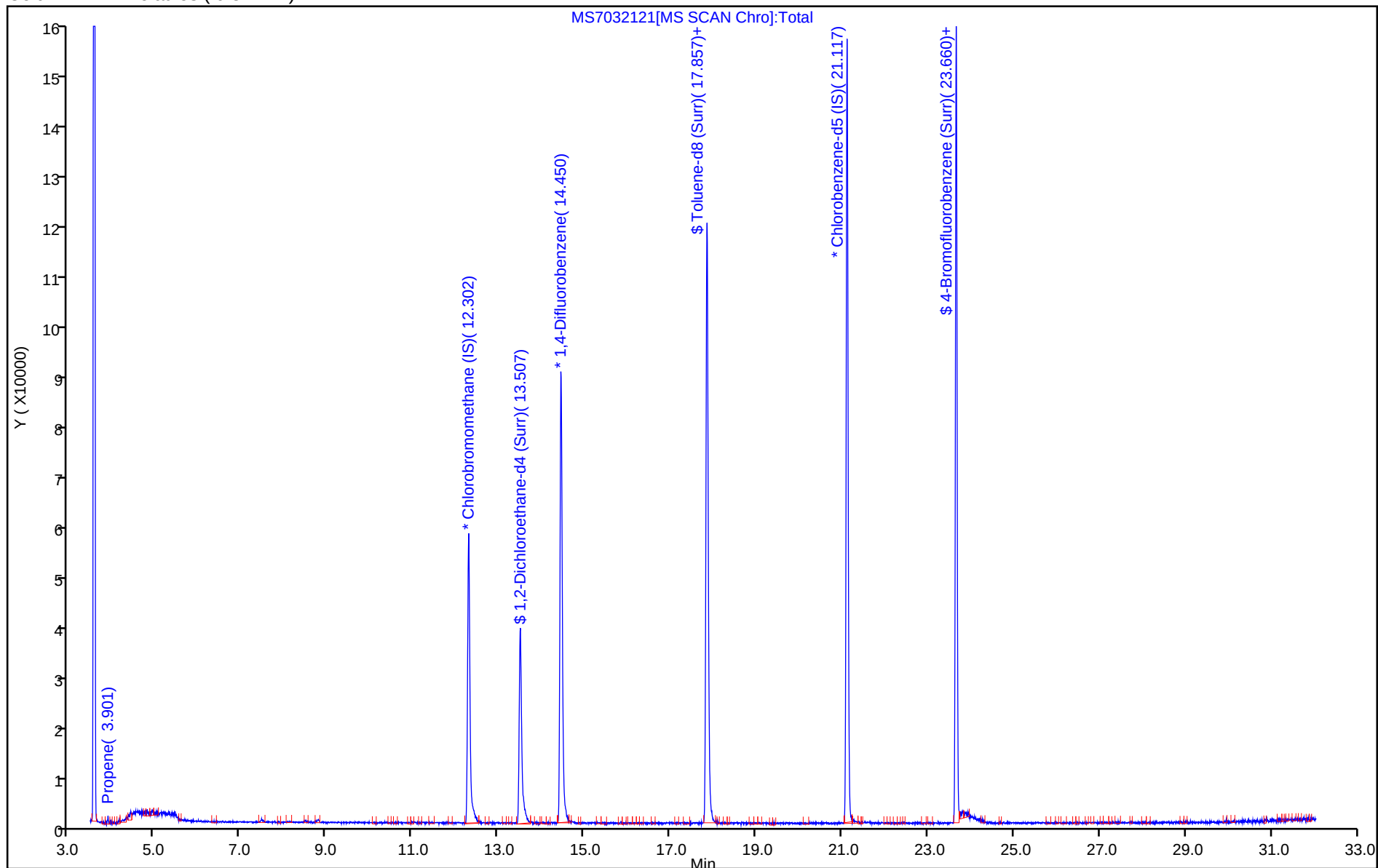
Dil. Factor: 1.0000

ALS Bottle#: 4

Method: TO15_ATMS7N

Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)

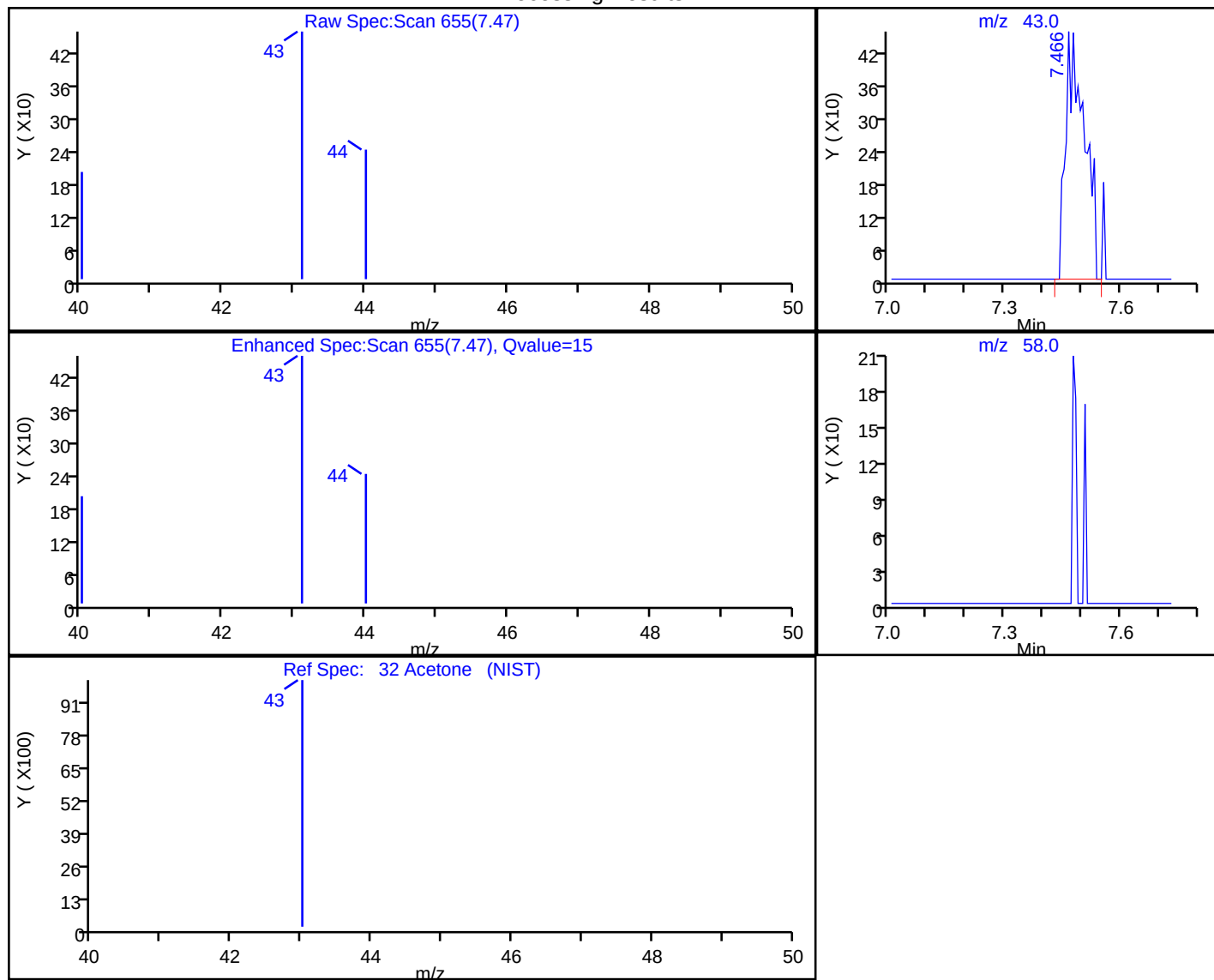


TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS7\20180321-55620.b\MS7032121.D
Injection Date: 22-Mar-2018 09:18:30 Instrument ID: ATMS7
Lims ID: 320-37263-A-1 Lab Sample ID: 320-37263-1
Client ID: 8521
Operator ID: LHS ALS Bottle#: 4 Worklist Smp#: 21
Purge Vol: 5.000 mL Dil. Factor: 1.0000
Method: TO15_ATMS7N Limit Group: MSA - TO15 - ICAL
Column: RTX Volatiles (0.32 mm) Detector MS SCAN

32 Acetone, CAS: 67-64-1

Processing Results



RT	Mass	Response	Amount
7.47	43.00	1552	0.102802
7.37	58.00	0	

Reviewer: leeh, 22-Mar-2018 09:57:58

Audit Action: Marked Compound Undetected

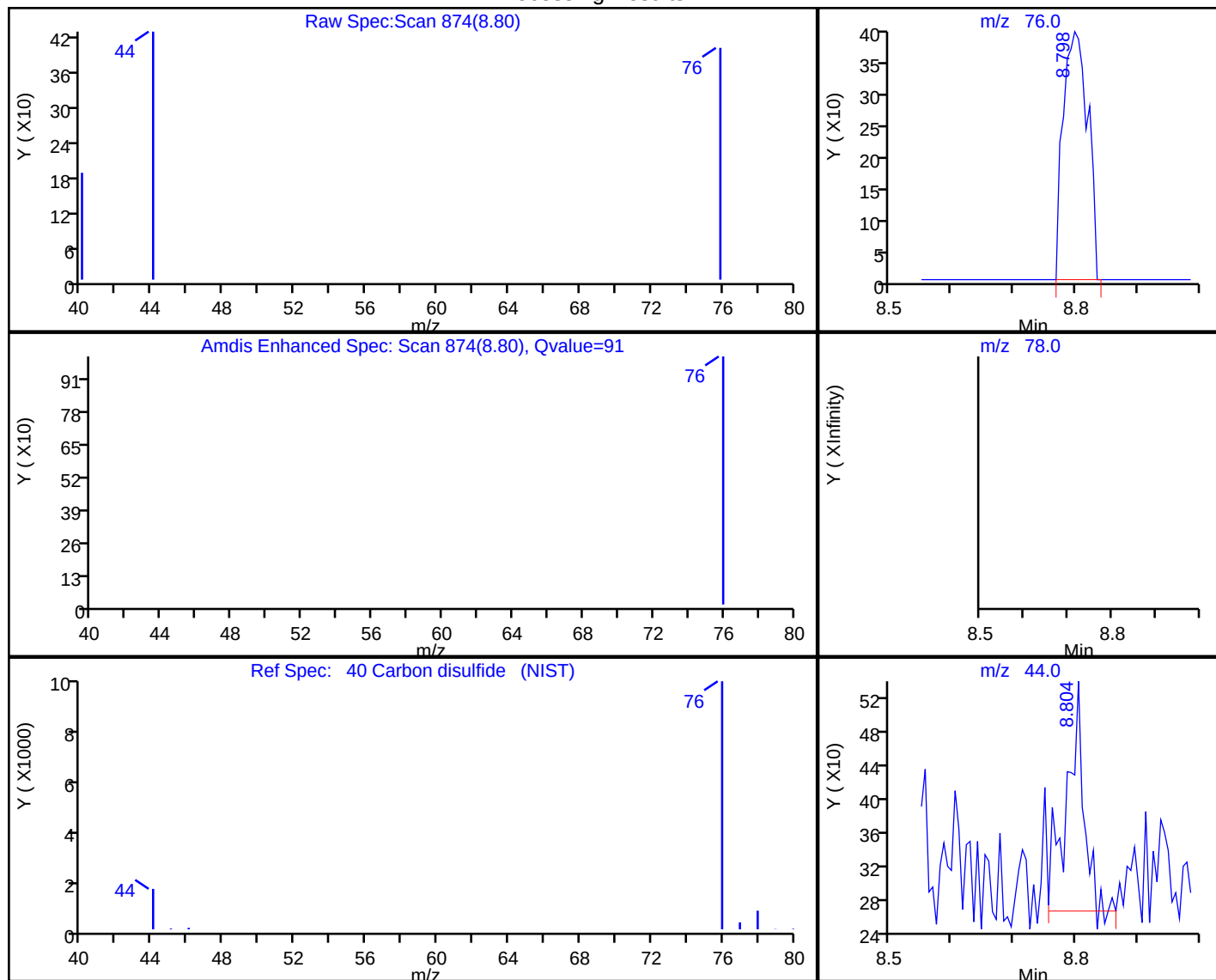
Audit Reason: Invalid Compound ID

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS7\20180321-55620.b\MS7032121.D
Injection Date: 22-Mar-2018 09:18:30 Instrument ID: ATMS7
Lims ID: 320-37263-A-1 Lab Sample ID: 320-37263-1
Client ID: 8521
Operator ID: LHS ALS Bottle#: 4 Worklist Smp#: 21
Purge Vol: 5.000 mL Dil. Factor: 1.0000
Method: TO15_ATMS7N Limit Group: MSA - TO15 - ICAL
Column: RTX Volatiles (0.32 mm) Detector MS SCAN

40 Carbon disulfide, CAS: 75-15-0

Processing Results



RT	Mass	Response	Amount
8.80	76.00	1105	0.073259
8.77	78.00	0	
8.80	44.00	534	

Reviewer: leeh, 22-Mar-2018 09:57:58

Audit Action: Marked Compound Undetected

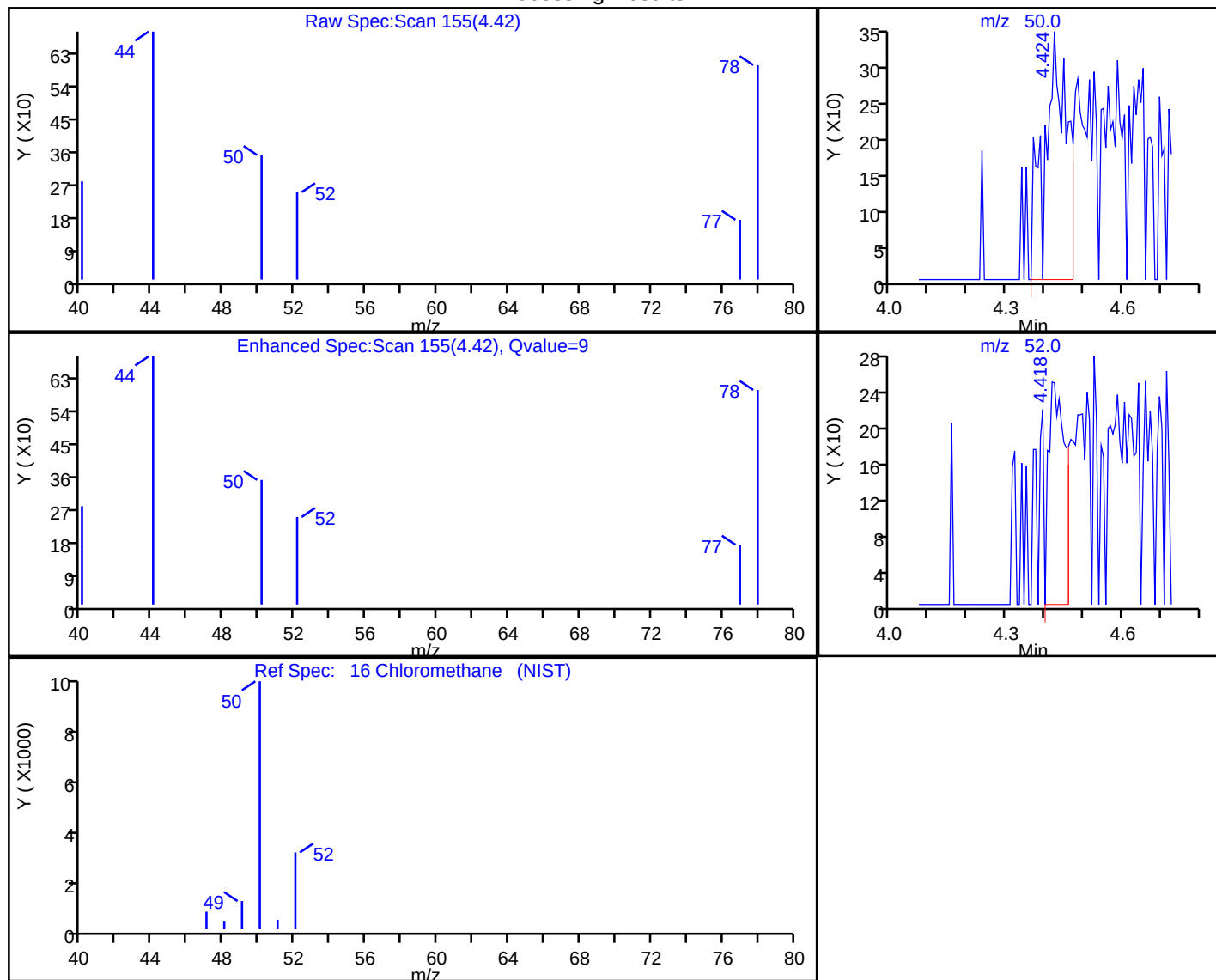
Audit Reason: Invalid Compound ID

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS7\20180321-55620.b\MS7032121.D
Injection Date: 22-Mar-2018 09:18:30 Instrument ID: ATMS7
Lims ID: 320-37263-A-1 Lab Sample ID: 320-37263-1
Client ID: 8521
Operator ID: LHS ALS Bottle#: 4 Worklist Smp#: 21
Purge Vol: 5.000 mL Dil. Factor: 1.0000
Method: TO15_ATMS7N Limit Group: MSA - TO15 - ICAL
Column: RTX Volatiles (0.32 mm) Detector MS SCAN

16 Chloromethane, CAS: 74-87-3

Processing Results



RT	Mass	Response	Amount
4.42	50.00	1382	0.198990
4.42	52.00	722	

Reviewer: leeh, 22-Mar-2018 09:57:58

Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

Appendix D3: Laboratory Reports – Tracer Studies

CONTENTS

April 2017: Houston Duplexes

June 2017: SPAWAR San Diego Office Building with Laboratory

September 2017 Source Term Impurities Report

October 2017: NAS Corpus Christi Residential and Commercial/Industrial Buildings

February 2018: San Rafael Residences and Burlingame Commercial/Industrial Buildings

April 2018: Houston Warehouse/Office Building

Note: Laboratory reports for Task 1 demonstration sites were provided in the Interim Report (McHugh, 2017).

PFT DATA for August test by GSI.

Terry Sullivan
Brookhaven National Laboratory
May 29, 2017

Introduction

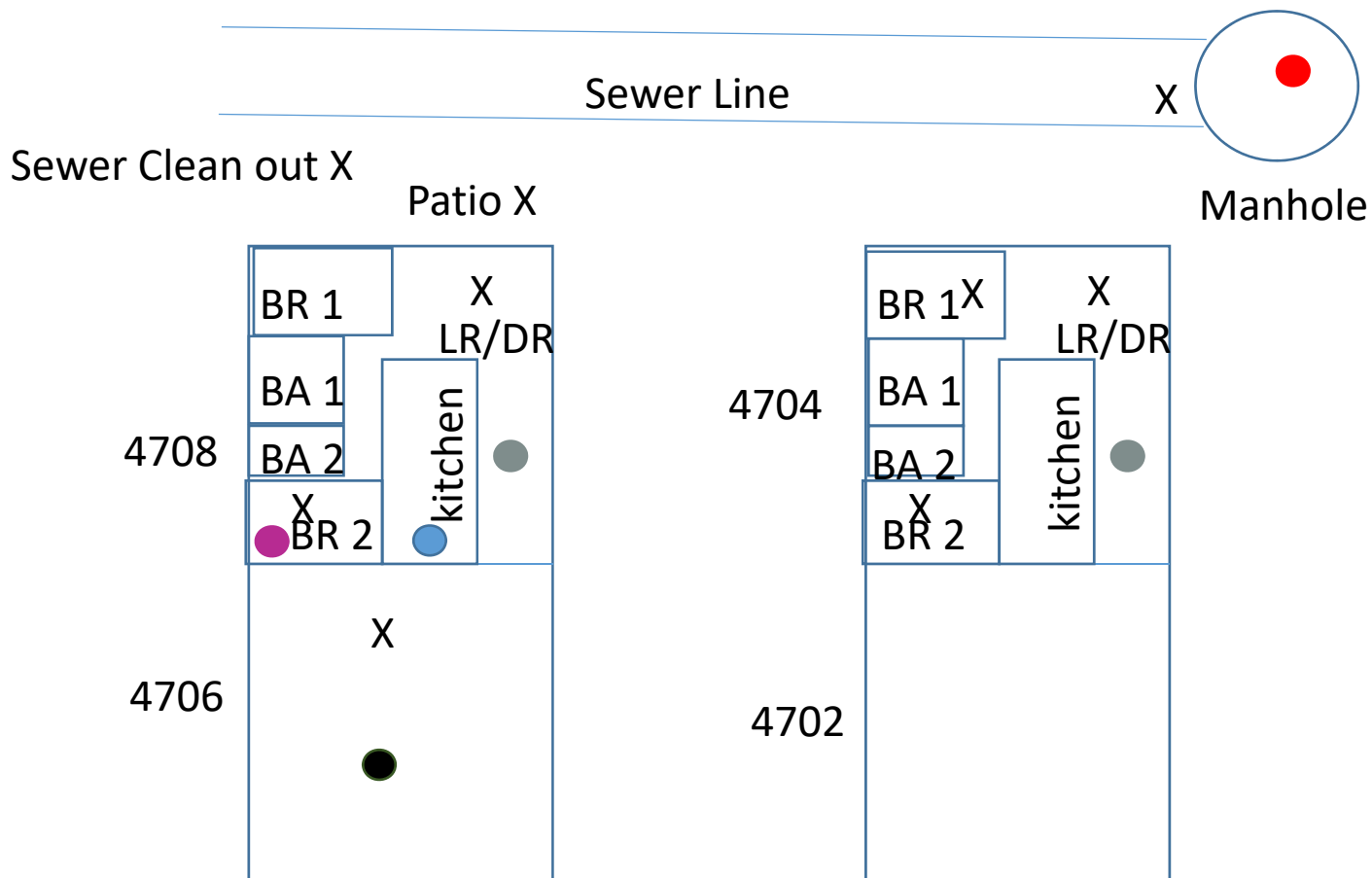
A test was conducted April 27th – May 5th, 2017 at two duplex buildings (house number 4702/4704 [Duplex #2] and 4706/4708 [Duplex #1]). Six tracers were used in the test. In the 4702/4704 residence, one PMCH source was placed in the 4704 section of the building with three sampling locations. In the 4706/4708 residence, three iPPCH sources were placed in the 4708 bedroom, three PTCH sources were placed in the living room, and one ocPDCH source was placed in the kitchen sink drain line. Samples were collected in both rooms with a source. Additionally, one sample was collected outside on the patio of the 4708 residence and one sample was collected from the sewer clean out. In the 4706 section of the duplex a single PDCB source was deployed and one sample location was placed in this residence. Finally, PMCH was released in the sewer line at a manhole location closest to the 4702/4704 duplex. A sample was also collected near this source location in the sewer line. Table 1 provides a summary of the source and sample locations, the sample duration and sample IDs (CATS #). Figure 1 provides a schematic of the layout.

Table 1 Source and Sample locations for the Duplex tests.

Location	PFT Source	CATS #1	CATS #2	Start Time	End Time
Sewer Manhole	Red/PMCH	08683	09375	4/27/17 17:30	5/5/17 13:00
4702/4704 Residence					
4704 Living/Dining	Brass/PMCP	07694	10268	4/27/17 17:40	5/5/17 12:40
4704 Back Bathroom	None	12230	06287	4/27/17 17:40	5/5/17 12:40
4704 Back Salon	None	01516	04770	4/27/17 17:40	5/5/17 12:40
4706/4708 Residence					
4708 Back yard Sewer Cleanout	None	10155	07781	4/27/17 17:55	5/5/17 13:00
4708 Outdoor (Control)	None	09515	03364	4/27/17 17:55	5/5/17 13:00
Kitchen Sink Sewer Cleanout	Blue/ o-PDCH	None	None	N/A	N/A
4708 Living/Dining*	Aluminum/ PTCH	00136	12305	4/29/17 9:00	5/5/17 13:00
4708 Bedroom 2**	Purple/ i-PPCH	08344	11294	4/29/17 9:00	5/5/17 13:00
4706 Living/Dining**	Brown/PDCB	07162	01398	4/29/17 9:00	5/5/17 13:00

1) * = These three samples started on 4/29/17.

- 2) ** = Samples started on 4/29/17 and chosen to match field diagram as opposed to the summary table. These locations matched the measured data.



X – Sample location, Colored Circle – Source location

BA – Bathroom, BR – Bedroom, LR/DR – Living Room/Dining

Figure 1 Schematic of source and sampler layout.

Results

All locations had duplicate samples with one being analyzed and the second kept in reserve in case of problems in the analysis of the first sample. The measured concentrations are provided in Table 1.

Table 2 Measured concentrations (pL/L)

Source	Location	CATS ID	PDCB pL/L	PMCP pL/L	PMCH pL/L	ocPDCH ¹ pL/L	iPPCH pL/L	1+2 PTCH pL/L
PMCH	Sewer	8683	0.6	4.3	235.8	0.6	2.3	1.5
PMCP	4704 LR	10268	0.0	25.2	0.5	0.2	0.2	0.1
	4704 BA 2	12230	0.0	21.7	0.4	0.2	0.2	0.1
	4704 BR 2	1516	0.0	19.7	0.4	0.2	0.1	0.1
	Sewer							
None	cleanout	10155	1.3	0.4	0.3	0.0	0.2	0.0
None	Outdoors	9515	0.1	0.7	0.5	0.0	0.1	0.0
PTCH	4708 LR	136	11.8	0.8	1.3	0.3	13.1	11.5
iPPCH	4708 BR 2	8344	10.8	0.9	1.6	0.3	20.3	7.9
PDCB	4706 LR	7162	22.0	0.0	0.3	0.1	1.3	1.2

1) ocPDCH was placed in the Kitchen sink drain in the 4708 Building.

A discussion for each tracer follows.

PMCH - Sewer Line

PMCH was released in the sewer line. A high concentration (~ 236 pL/L) was measured in the sewer line. PMCH was found in all locations at concentrations ranging from 0.3 to 1.6 pL/L. The data suggests some transfer from the sewer lines into both duplexes. The location with the lowest measured value of PMCH is the 4706 residence. A low value of 0.3 pL/L was also found in the sewer cleanout location.

PMCP – Building 4704

PMCP was released in the 4704 building that is connected to 4702 as part of the duplex. The highest concentration in 4704 was measured in the Living Room at 25.2 pL/L. This location is closest to the source in this building. The other two locations in 4704 were slightly lower with measured concentrations of 21.7 and 19.7 pL/L. A value of 4.3 pL/L was detected in the sewer. This is about 1/6 of the peak value in the house, suggesting a strong connection from building 4704 to the sewer. PMCP was found in small amounts (~1 pL/L) in building 4708 and was not detected in building 4706.

PTCH – Building 4708 Living Room/Dining Room

PTCH was released in the living room/dining room of 4708 building that is connected to 4706 as part of the duplex. The highest concentration was measured in the living room of building 4708,

where it was released, and the measured value was 11.5 pL/L. A slightly lower value, 7.9 pL/L was found in the second bedroom in building 4708. PTCH was found in the sewer at a level of 1.5 pL/L, approximately 1/8 of the value in the room with the source. This indicates a strong connection from the residence into the sewer. A PTCH value of 1.2 pL/L was measured in the other half of the duplex in building 4706. Low values of PTCH, 0.1 pL/L, were found at all three sampling locations in building 4704.

iPPCH – Building 4708 Bedroom 2

iPPCH was released in the second bedroom of the 4708 building. The highest concentration was measured in the bedroom with the source in building 4708 and the measured value was 20.3 pL/L. A slightly lower value, 13.1 pL/L was found in the living room/dining room in building 4708. iPPCH was found in the sewer at a level of 2.3 pL/L, approximately 1/9 of the value in the room with the source. This indicates a strong connection from the residence into the sewer. An iPPCH value of 1.3 pL/L was measured in the other half of the duplex in building 4706. Low values of iPPCH, 0.2 pL/L on average, were found at all three sampling locations in building 4704.

PDCB – Building 4706

PDCB was released in the 4706 building. The measured value in this building was 22 pL/L. In the adjacent part of the duplex in building 4708 the two measured values were 10.8 and 11.8 pL/L or approximately 50% of the value in the region it was released. This indicates a strong flow of air from building 4706 to building 4708. Recall that the two tracers released in building 4708 were found in building 4706 at approximately 10% of the value in building 4708. This indicates the flow is stronger from 4706 to 4708. PDCB was not found in the adjacent duplex in the 4704 building. PDCB was found in the sewer sample location at 0.6 pL/L, less than 5% of the value found in the residence. This indicates that the connection from building 4706 to the sewer is not as strong as from the 4708 and 4704 residences.

ocPDCH – Building 4708 sink drain

ocPDCH was released in the kitchen sink drain line in building 4708. The highest measured value for ocPDCH was in the sewer, 0.6 pL/L. ocPDCH. found at 0.3 pL/L at the two sample locations in building 4708. Values averaging 0.2 pL/L were found in building 4704 in the duplex next door. This suggests a connection between the two kitchen sink drains in buildings 4708 and 4704. A low value of 0.1 was measured in the adjacent part of the duplex in building 4706.

Sewer cleanout location

PDCB had the highest measured concentration of 1.4 pL/L in the sewer cleanout. PMCP, released in the 4704 building was the next highest with a concentration of 0.4 pL/L. PMCH, released in the sewer had a concentration of 0.3 pL/L and all others were lower.

Outdoor Patio Building 4708

An outdoor sample was placed on the patio of building 4708 as a control. PMCP released in the adjacent building, 4704, showed the highest concentration of 0.7 pL/L. One might expect that concentrations of tracers released in building 4708 would be higher. The PMCH concentration was 0.5 pL/L at this location. It is released from the sewer. Both of these concentrations are above background values of 0.001 to 0.012 pL/L for PFT tracers. The other tracers were found at much lower levels.

Air flow in the Sewer Line

The concentrations in the sewer of tracers released in the duplex at 4608 and 4604 were roughly 10% of the value in the residence. This suggests a strong coupling from these residences to the sewer line. In contrast, the concentrations of PMCP released in the sewer were less than 1% of the sewer sample value in these two residences. This shows the coupling is stronger from the house to the sewer location. This suggests that flow in the sewer line was from 4708/4706 to 4704/4702 to the source location in the sewer. That is the source in the sewer was upstream of the dominant air flow direction in the sewer.

PFT DATA for August test by GSI.

Terry Sullivan
Brookhaven National Laboratory
August 28, 2017

Introduction

A test was conducted June 26th – July 7th in a large office building with laboratories labeled Building 111. Six tracers were used in the test. PMCH, was released in the sanitary sewer system outside of the building. PMCP was released in an electric manhole outside of the building. In the building iPPCH was released in the hallway of the first floor in the central core; PTCH was released in a laboratory, Room 115; ocPDCH was also released in this room, but it was placed in a standpipe and the top of the pipe was sealed with tape; PDCB was released in room 217, which is a kitchen on the second floor above room 115. Sample tubes were placed in the vicinity of each source. Two additional samplers were placed on the first floor, one in the hallway near room 144 and one in the women's bathroom, room 112. Two additional samplers were placed on the second floor. One in room 264, Cube N and the other in the Central Core hallway. A final sample was located outside on the wall near room 101.

Results

All locations had duplicate samples and the measured concentrations are provided in Table 1. This was a large office/laboratory building. The source strengths for this size building are low compared to the building volume. Based on the building volume, uniform mixing within the building, and an air change rate of 0.1 to 0.3 per hour, the average concentration of the tracers released in the building should be less than 1pL/L. Typically the tests are sized to give values around 10 pL/L. Concentrations are expected to be substantially higher when the source and CATS sample tubes are in the same room.

Table 1 Measured concentrations (pL/L)

	Sample	PDCB	PMCP	PMCH	ocPDCH	iPPCH	PTCH	
Zone #	Name	pL/L	pL/L	pL/L	pL/L	pL/L	pL/L	
1	2031	2.47	12.53	591.58	1.77	5.02	2.46	source PMCH Sanitary Manhole
1	4475	2.65	13.73	673.25	2.28	6.83	3.04	source PMCH Sanitary Manhole
2	2436	0.00	0.00	0.00	0.00	0.00	0.00	sample wet
2	20	0.00	55.90	1.15	0.50	0.22	0.09	source PMCP Electric Manhole
3	10866							GC Failure 1st floor central core
3	10480							GC Failure 1st floor central core
6	10078	0.06	4.90	0.24	0.00	0.05	0.02	2nd floor Central core
6	7632	0.05	8.37	0.10	0.00	0.05	0.02	2nd floor Central core
4	7880	0.07	7.79	0.48	0.07	0.08	0.28	Source PTCH Lab 115
4	3800	0.07	5.77	0.44	0.06	0.06	0.20	Source PTCH lab 115
3	7119	0.04	2.69	0.03	0.00	0.00	0.00	1st floor Hall 144
3	7162	0.04	3.06	0.00	0.00	0.01	0.00	1st floor Hall 144
3	11142	0.07	5.45	0.04	0.00	0.01	0.01	1st floor Womens room 112
3	10519	0.07	6.11	0.02	0.00	0.01	0.00	1st floor Womens room 112
6	4594	8.95	7.13	0.15	0.01	0.03	0.01	source PDCB Kitchen 217
6	7333	8.66	5.54	0.14	0.01	0.03	0.01	source PDCB Kitchen 217
6	4114	0.00	6.43	0.00	0.00	0.01	0.00	2nd floor 264
6	11749	0.00	5.82	0.01	0.00	0.00	0.00	2nd floor 264
	9633	0.00	10.48	0.02	0.00	0.00	0.00	outside near 101
	12074	0.00	10.71	0.02	0.00	0.00	0.00	outside near 101
	7684	0.01	0.02	0.05	0.00	0.00	0.00	Field Blanks
	12470	0.01	0.02	0.04	0.00	0.00	0.00	Field Blanks

Examining the results the duplicates shows reasonable agreement in all cases.

The results at the two manhole locations will be discussed first and then the results will be discussed for each tracer released in the building.

Sanitary Sewer Manhole (PMCH)

PMCH was released in this manhole and the concentration values are quite high, averaging 630 pL/L at this location. All other tracers were measured in the range of 1 to 13 pL/L. These values appear to be high compared with the building values for all of the tracers. It is possible that these values are from having an impure source. In 2014 when measuring the release from one set of PMCH sources it was found that it was 98.9% PMCH with the remaining 1.7% being a combination of PDCB and PMCP. This level of impurity is not enough to explain the measured values. It would be useful to measure the impurity levels of the sources used in the test.

PMCH was observed at several locations inside the building with concentrations ranging from 0.03 to 0.5 pL/L. This indicates that there is some transfer from the sewer line into the building.

Electric Manhole (PMCP)

PMCP was released in this manhole and the measured concentration was 56 pL/L. The duplicate sample was wet and this caused a measurement of zero for all tracers. Low amounts of all tracers were found at this location. Similar to PMCH, it is not clear if these values are real or due to low levels of contamination in the source. In the 2014 data set the PMCP was found to be 98.3% pure with the rest a combination of the other tracers.

PMCP was observed in all samples in the building at values between 5 and 8 pL/L. This suggests a very high rate of transfer from the electric manhole to the building. The outside concentration was above 10 pL/L for PMCP.

Outside

The duplicate outside samples showed zero levels for all tracers released in the building. PMCH, released in the sanitary manhole, had a concentration of 0.02 pL/L, which is just above the expected background for this tracer (0.01 pL/L). The level of quantitation for this analysis was about 0.05 pL/L for all tracers. PMCP, released in the electrical manhole had a concentration value near 10.5 pL/L in both of the duplicate samples. This high value is consistent with the tracer release location and the high values of PMCP found throughout the building.

Field Blanks

The field blanks were blank to within the level of quantitation. Low amounts of PDCB, PMCP, and PMCH were detected and may have been present.

PDCB

PDCB was released in the kitchen, Room 214 on the second floor. The sample tubes in the kitchen showed high levels of PDCB, as expected. The values here were around 8.8 pL/L. Trace amounts were found in all other locations in the building.

iPPCH

iPPCH was released on the first floor in the Central Core hallway. Unfortunately, due to machine malfunction, the two samples closest to this source were unable to be evaluated. Trace amounts of iPPCH ranging from 0.03 to 0.08 pL/L were found in the three nearest sample locations (Room 115 lab, 2nd floor Central Core Hallway, and Room 214 Kitchen). Samples in the building further from the source did not have measurable quantities of iPPCH.

PTCH

PTCH was released in the laboratory area of room 115. Concentration values of PTCH in this room were 0.24 pL/L. Trace amounts of PTCH were observed in the kitchen, Room 214, and the 2nd floor Central Core hallway above the release location.

oPDCH

oPDCH was released in a standpipe sealed with tape in room 115. Concentration values around 0.07 pL/L were measured in this room. Other areas in the building did not show evidence of oPDCH.

Source Term Impurities Report

Terry Sullivan
9/25/17

Introduction

Generally tests are sized to give a peak uniform concentration that is the same for all tracers used in a test. In some cases, sources need to be placed in confined places which lead to high concentrations in the source zone. For example if the concentration of source A in the confined zone is 1000 ppt, and the source (B) in another zone is scaled to provide a concentration of 10 ppt (a typical value for building studies, a 1% contamination level of source B in the confined zone would provide a reading of 10 ppt. Thus, it is not clear what the rate of transfer from zone B to the confined zone is.

It is known that there are trace impurities of other PFTs in the sources of up to a few percent. To quantify this issue and improve data interpretation in high concentration zones a series of samples were analyzed for each source type routinely used for building studies. Three samples were collected for each source and analyzed on GC3. The results have been stored in the Excel file GC3 TW1 Standards and sources Cross Contamination Sept 22, 2017. The results of this study are presented next.

Results

Table 1 contains the average value in pL of three samples for each tracer. The standard deviation was less than 5% in the three samples for the source tracer. The table can be interpreted as the amount of each other tracer in the source tracer. For example, reading across in the PDCB row, the concentration of PDCB in the PDCB source is 9.22 pL, the amount of PMCP in the PDCB tracer is 0 pL, the amount of PMCH in the PDCB tracer is 0.02 pL, etc.

Table 1 PFT concentrations (pL) in each PFT source.

Source/Measured Value	PDCB	PMCP	PMCH	ocPDCH	iPPCH	PTCH
PDCB	9.22	0.00	0.02	0.00	0.01	0.01
PMCP	0.01	12.63	0.11	0.27	0.09	0.04
PMCH	0.02	0.05	5.73	0.02	0.05	0.03
ocPDCH	0.02	0.01	0.15	0.96	0.03	0.00
iPPCH	0.01	0.00	0.01	0.01	2.09	0.01
PTCH	0.02	0.01	0.02	0.01	0.02	1.20

The percent impurity in each source is calculated by dividing the amount of the PFT in pL by the amount of the source PFT and multiplying by 100. The percent impurity for each source is provided in Table 2.

Table 2 Percentage of PFT impurities in each source.

	PDCB	PMCP	PMCH	ocPDCH	iPPCH	PTCH	
PDCB	N//A	0	0.17	0.03	0.14	0.07	% Impurity in PDCB source
PMCP	0.09	N//A	0.85	2.14	0.71	0.34	% Impurity in PMCP source
PMCH	0.40	0.79	N/A	0.38	0.94	0.57	% Impurity in PMCH source
ocPDCH	2.39	1.29	15.78	N/A	3.30	0.47	% Impurity in ocPDCH source
iPPCH	0.43	0.21	0.51	0.35	N//A	0.49	% impurity in iPPCH source
PTCH	1.55	0.65	1.74	0.60	2.00	N//A	% impurity in PTCH source

Discussion

If a need arises to place a source in a confined zone, an effort should be made to use a source with minimal impurities of other tracers. For this reason, PDCB is the best choice this situation. iPPCH is also a good choice. However, the source emission rate is about $\frac{1}{4}$ that of PDCB. Thus in sizing tests, 4 iPPCH should be used for each PDCB in a confined space. This can be adjusted for volume differences in the confined space. If it is not practical to place the larger number of iPPCH sources in the confined space, PMCH, which has impurity levels of less than 1% for all tracers is the next best choice. Measured concentrations in the confined space should be adjusted for impurities to determine if transfer is occurring from other zones in the test.

Review of Perfluorocarbon Tracer (PFT) data collected at the Naval Air Station in Corpus Christy (NASCC)

Terry Sullivan
Brookhaven National Laboratory
November 3, 2017

Introduction

PFT testing was conducted at four locations on the NASCC with the objective of determining the air flow between the sewer system and associated buildings. These four locations are physically separated such that they are all independent tests. Testing was conducted by placing a PFT source in a sewer manhole near to the building under study and placing passive Capillary Absorption Tube Samplers (CATS) at locations within the building. The test locations were:

- Unaccompanied Housing
- Hospital
- Public Works and Building 4: ELECMX Workshop
- COMMC/NASCC Building 10

The samplers were left out for approximately nine days from October 4 – October 13th, 2017.

Test Layout

Table 1 provides the sample location, PFT source in that region, CATS ID number, and sample duration. All samples were taken in duplicate.

Table 1 Source Location, Source Type, CATS ID, and Sampling Time

Sample Location	Source	CATS ID	Sample duration (h)
Unaccompanied Housing			
Sanitary sewer Manhole	PMCP	7668	216.75
		282	216.75
Apt E102 Bathroom	ocPDCH	8800	216.93
		10677	216.93
Outdoor Smoking Gazebo	None	7632	216.70
		4143	216.70
Hospital			
Sanitary sewer Manhole	PMCH	7162	216.33

		10866	216.33
Janitors Closet	PDCB	1689	213.88
		10405	213.88
Conference Room	iPPCH	10519	213.90
		11947	213.90

Public Works and Building 4, ELECMX Workshop

Sanitary sewer Manhole	PDCB	12023	215.07
		10822	215.07
Public Works Building Mens Locker Room	iPPCH	11479	212.18
		7880	212.18
Public Wojrks Building Maintenance Area	oPDCH	4594	212.15
		3800	212.15
ELECMX Building Mans Bathroom	PMCP	7836	212.60
		4475	212.60
ELECMX Building Workshop	PMCH	7119	212.65
		8776	212.65

COMMCTR NASCC Building 10

Sanitary sewer Manhole	PMCH	10078	214.18
		20	214.18
Womens Locker Room	iPPCH	10349	211.50
		7089	211.50

Test Results

Table 2 presents the concentration in pL/L of the tracer based on the raw data for each location and for the two field blanks that were collected. Recent studies have measured the impurities in each of the PFT sources. They typically are around 1%, but for ocPDCH the PMCH impurity is over 15%. In the manholes, the tracer concentrations are often several hundred pL/L which can lead to erroneous detection of the impurity tracers in this zone. Table 3 presents the data adjusted for known impurities in the tracers. A value of ND means the adjusted value was less than zero.

Table 2 Measured concentrations (pL/L)

Location	Source	Sample ID	PDCB	PMCP	PMCH	ocPDCH	iPPCH
Field Blank							
		11126	0.003	0.000	0.000	0.002	0.000
		11890	0.004	0.000	0.001	0.003	0.000
Unaccompanied Housing							
Sanitary sewer Manhole	PMCP	7668	ND	910.4	7.3	9.0	3.0
		282	ND	1017.9	7.8	12.2	4.2
Apt E102 Bathroom	ocPDCH	8800	0.0	0.1	0.4	1.3	0.0
		10677	0.0	0.0	0.4	1.3	0.0
Outdoor Smoking Gazebo	None	7632	0.0	0.0	0.0	0.0	0.0
		4143	0.0	0.0	0.0	0.0	0.0
Hospital							
Sanitary sewer Manhole	PMCH	7162	16.5	2.6	245.5	2.2	2.6
		10866	19.2	2.9	269.0	2.1	2.8
Janitors Closet	PDCB	1689	5.1	0.0	0.0	0.0	0.0
		10405	6.4	0.0	0.0	0.0	0.0
Conference Room	iPPCH	10519	0.1	0.1	0.2	0.1	6.3
		11947	0.1	0.2	0.2	0.1	6.9
Sanitary sewer Manhole	PDCB	12023	446.4	0.0	2.6	0.7	1.7
		10822	610.2	0.0	3.3	1.1	2.8
Public Works Building	iPPCH	11479	0.0	0.1	0.2	0.5	4.2

Mens Locker Room		7880	0.1	0.2	0.2	0.5	4.2
Public Works Building Maintenance Area	ocPDCH	4594	0.0	0.1	0.1	0.5	0.3
		3800	0.0	0.1	0.1	0.4	0.2
ELECMX Building Mans Bathroom	PMCP	7836	0.0	53.3	0.7	0.5	0.1
		4475	0.0	62.3	0.7	0.4	0.1
ELECMX Building Workshop	PMCH	7119	0.0	0.6	0.6	0.0	0.0
		8776	0.0	0.8	0.7	0.0	0.0
COMMCTR/NASCC Building 10							
Sanitary sewer Manhole	PMCH	10078	0.9	4.9	621.0	1.9	4.0
		20	1.1	5.8	630.6	1.7	3.2
Womens Locker Room	iPPCH	10349	0.0	0.0	0.0	0.0	0.0
		7089	0.3	0.0	0.7	0.3	24.1

Table 3 PFT concentrations (pL/L) adjusted for impurities

Location	Source	Sample ID	PDCB	PMCP	PMCH	ocPDCH	iPPCH
Field Blank							
		11126	0.003	0.000	0.000	0.002	0.000
		11890	0.004	0.000	0.001	0.003	0.000
Unaccompanied Housing							
Sanitary sewer Manhole	PMCP	7668	ND	910.4	ND	ND	ND
		282	ND	1017.9	ND	ND	ND
Apt E102 Bathroom	ocPDCH	8800	0.0	0.1	0.2	1.1	0.0
		10677	0.0	0.0	0.2	1.2	0.0
Outdoor Smoking Gazebo	None	7632	0.0	0.0	0.0	0.0	0.0
		4143	0.0	0.0	0.0	0.0	0.0
Hospital							
Sanitary sewer Manhole	PMCH	7162	15.5	0.8	228.5	1.1	0.0
		10866	18.0	0.9	250.4	0.9	ND
Janitors Closet	PDCB	1689	5.1	ND	0.0	0.0	0.0
		10405	6.3	ND	0.0	0.0	0.0
Conference Room	iPPCH	10519	0.1	0.1	0.2	0.1	5.2
		11947	0.1	0.2	0.2	0.1	5.7
Public Works and Building 4							
Sanitary sewer Manhole	PDCB	12023	442.3	ND	1.7	0.4	0.7
		10822	604.6	ND	2.0	0.7	1.4
Public Works Building Mens Locker Room	iPPCH	11479	0.0	0.1	0.2	0.4	3.5
		7880	0.1	0.2	0.2	0.4	3.5

Public Works Building Maintenance Area	ocPDCH	4594	0.0	0.1	0.1	0.4	0.2
		3800	0.0	0.1	0.1	0.4	0.2
ELECMX Building Mans Bathroom	PMCP	7836	ND	53.3	0.2	ND	ND
		4475	ND	62.3	0.1	ND	ND
ELECMX Building Workshop	PMCH	7119	0.0	0.6	0.6	0.0	0.0
		8776	0.0	0.8	0.7	0.0	0.0
COMMCTR/NASCC Building 10							
Sanitary sewer Manhole	PMCH	10078	ND	0.4	577.8	ND	ND
		20	ND	1.1	586.8	ND	ND
Womens Locker Room	iPPCH	10349	Not analyzed; data processing error				
		7089	0.3	ND	0.5	0.2	19.7

Discussion

Field Blanks

The Field Blanks did not show any sign of the PFTs as expected.

Unaccompanied Housing

The concentrations of PMCP in the sewer manhole were extremely high (~1000 pL/L) and other PFT tracers were not detected in the manhole. This might be due to the impurity levels in the tracer as the raw data (Table 2) shows several pL/L for many of the tracers.

ocPDCH was released in Apartment E102 in this building and was detected there. There was some evidence of a trace amount of PMCP at this location (one sample had 0.1 pL/L and one had about 0.04 pL/L). Even after correcting for impurities, PMCH was also identified at this location at a value of 0.2 pL/L. This is surprising as there is no direct source of PMCH to this location and thus the finding is suspect.

The outdoor sample in the gazebo did not show any of the tracers above background.

Hospital

PMCH was released in the manhole and is found at concentrations of around 240 pL/L. All tracers except iPPCH were found in the manhole after correcting for impurities. For PDCB, there is a strong signal (30 pL/L) indicating a connection with the building. However, the concentration was greater than in the room where it was released. So, this is suspect. For PMCH and PMCP, although it appears to be present, the correction reduced the measured concentration by more than 50%, so these are suspect.

In the Hospital, PDCB was released in a Janitors Closet but not found elsewhere in the building. iPPCH was released in the conference room and trace amounts of all five PFTs were observed.

Public Works and Building 4

PDCB was released in the sewer manhole and the four other tracers in the building. In the manhole, trace amounts of PFTs released in the building were observed after correcting for impurities. However, over two thirds of the measured value could be attributed to impurities.

PDCB, released in the manhole, was not detected in the building. PMCH and PMCP were observed throughout the building, with the highest concentrations in the area where they were released. iPPCH and ocPDCH released in the Public Works building was not observed in the ELECMX area of the building.

COMMCTR/NASCC Building 10

PMCH was released in the manhole sewer. Trace amounts of PMCP were also observed here. iPPCH, released in Building 10 was not observed in the manhole location.

One of the iPPCH samples, sample ID 10349, had a processing error in the analysis and the data were lost. The other sample showed PMCP possibly from the sewer. It also showed low values of PDCB and ocPDCH. This is unexpected.

PFT DATA for February, 2018 test by GSI.

Terry Sullivan
Brookhaven National Laboratory
March 17, 2018

Introduction

A test was conducted February 6th – February 14th at two locations in California, San Raphael and Burlingame. The intent of these tests was to examine for in-leakage to buildings from the sanitary sewer line. Sources were placed in the sanitary line and in the buildings to understand air flow between these systems.

San Rafael used six tracers and two houses at 27 and 38 XXX Court [House #1 and #2]. PMCH, was released in the sanitary sewer system upstream of these buildings and PDCB was released downstream of these buildings. 27 XXX Court was close to the PMCH source location and downstream of the source. 38 XXX Court was close to the PDCB source location, but upstream of the source. At 27 XXX Court, iPPCH was released on the first floor in the living room and PTCH was released on the first floor in the bathroom. At 38 XXX Court, ocPDCH was released on the first floor in the kitchen/living room and PMCP was released in the first floor in the bathroom. Duplicate samplers were placed on each level in these two houses and in the sanitary sewer line. During the test, the PMCP source was accidentally removed sometime on February 8th, two days in to the eight day test. During shipment back to Brookhaven, there was damage to the shipping container and all four samples in the sanitary line were lost.

The Burlingame site used three tracers. PMCH was released in the sanitary sewer line upstream from the two test buildings. 42 YYY Court [Unit #1] released PDCB on the first floor in the Lab and iPPCH in a first floor bathroom. 36 YYY Court [Unit #2] did not have any sources, but did have samplers in an office and bathroom. In addition to samplers near the PMCH source, a second set of samplers were placed in the sanitary line in front of Unit #2. During the test, the PMCH source and nearby samplers were lost. Thus, the time that the source was present is not known.

Results

All locations had duplicate samples and the measured concentrations are provided in Table 1, San Rafael, and Table 2, Burlingame. Concentrations were estimated by assuming a sampling rate of 0.2 l/d for 8.25 days giving a total volume of 1.65 liters. The nominal sampling rate is between 0.18 and 0.22 l/d based on the PFT.

The sources do contain low levels, on the order of a few percent, of the other PFTs in this study. However, in this study, all concentrations are roughly the same order of magnitude and correction for these impurities would change the concentrations be less than a percent.

Table 1 Measured concentrations (pL/L) at the San Rafael site.

			PDCB	PMCH	PMCP	ocPDCH	iPPCH	PTCH
	Location	CATS ID	pL/L	pL/L	pL/L	pL/L	pL/L	pL/L
Source	San Rafael outdoors	10233	0	4.5	0.02	0.00	0.00	0
iPPCH	Dining Room 27	8450	0	3.2	0.1	0.1	6.2	5.8
		8822	0	3.8	0.2	0.1	5.4	5.0
PTCH	Bathroom 27	8803	0	3.4	0.1	0.1	5.2	8.3
		1961	0.02	2.1	0.2	0.1	3.3	5.4
ocPDCH	Kitchen 38	7505	0.06	6.1	0.6	1.9	0.2	0
PMCP	Bathroom 38	8735	0	13.9	0.6	1.6	0.2	0.0
		12183	0	15.4	0.6	1.7	0.2	0.0

Table 2 Measured concentrations (pL/L) at the Burlingame site.

		CATS	PDCB	PMCH	iPPCH
Source	Location	ID	pL/L	pL/L	pL/L
	Burlingame outdoor	11853	1.5	0.0	0.0
		11952	0.4	0.0	0.0
PDCB	Lab	8473	12.3	0.3	0.3
	42 YYY Court	11860	12.0	0.3	0.2
iPPCH	Bathroom	7689	9.2	0.4	15.8
	42 YYY Court	10035	9.5	0.7	15.4
None	Office	12234	0.0	0.0	0.0
	35 YYY Court	7013	0.1	0.0	0.0
None	Bathroom	12427	0.0	0.0	0.0
	35 YYY Court	4240	0.1	0.0	0.0
	Lateral Line	12382	0.0	1.9	0.0
	Lateral Line	11962	0.0	2.0	0.0

Examining the results indicates that the duplicates shows reasonable agreement in most cases. .

San Rafael

PMCH, released in the sanitary sewer line, was observed in both buildings at elevated concentrations. The highest concentrations were observed at 38 XXX Court in the bathroom with a value of around 14 pL/L PMCH. The PMCH value at 27 XXX Court was around 3 pL/L. These values are well above background levels of 0.01 pL/L and suggest that there is some transfer of air from the sewer line to these houses. The two samples in the sewer line were lost in shipping so the relative difference between the sewer line and the houses cannot be determined.

PDCB released in the sanitary line but downstream of the two houses was not observed at levels much above background in either house.

PMCP released in the bathroom at 38 XXX Court was uniformly mixed throughout this house with a measured value of 0.6 pL/L. This source was removed after two days and the concentration would have been higher had the source remained for the entire period. ocPDCH

released on the first floor of this house was also uniformly distributed through the house with a concentration just under 2 pL/L. Trace amounts (~ 0.1 pL/L) of these two PFTs were found at 27 XXX Court suggesting that there may be some transfer to this house.

At 27 XXX Court, iPPCH was released on the first floor, and PTCH was released in a second floor bathroom. Both tracers are found at both locations with each location having slightly higher values of the tracer that was released nearest to the sampler. In general, the house is well mixed.

It is interesting to note that the PMCH concentrations at 38 XXX Court are larger than the values of the tracers released in the building and that the bathroom has a much higher concentration than the first floor.

Burlingame

The Burlingame study was limited by the loss of the PMCH source in the sanitary line at some point during the test. Nevertheless, PMCH was observed at the lateral sewer line location away from the source at a value near 2 pL/L and in 42 YYY Court where the bathroom had a value of 0.55 and the first floor a value of 0.3 pL/L. It was not observed at 36 YYY Court. In fact, none of the 3 tracers were observed in anything much above background at this location.

At 42 YYY Court, PDCB, released on the first floor, was fairly uniformly mixed in the house with a value of 12.2 pL/L on the first floor and 9.3 pL/L in the 2nd floor bathroom. PDCB was also observed at the outdoor location on the porch at 42 YYY Court at a level near 1 pL/L. iPPCH released in the first floor bathroom, had a value of 15.6 pL/L in the bathroom, but was much lower at the other location on the first floor (0.3 pL/L). It was not observed outside.

Warehouse Test Houston, TX

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May 3, 2018

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Introduction

GSI Environmental conducted a perfluorocarbon (PFT) tracer test at a warehouse in Houston, Texas from April 16 – April 23, 2018. Three PFTs were used in this study: PMCH; PDCB; and ocPDCH. PMCH was released exterior to the building in a sewer manhole. ocPDCH was released in the bathroom of the warehouse and PDCB was released in the warehouse about 30 feet away from the bathroom. Duplicate samples were collected at 4 locations: in the manhole near the PMCH source, in the bathroom near the ocPDCH source, in an office adjacent to the bathroom, and outside this office on the top of the door sill.

Both samples in the manhole and one outside sample had water in them. If the capillary pores of the CATS (Capillary Absorption Tube Sampler) are filled with water, there is no uptake of PFTs from the air. Thus, the sample time for these may be less than one week, which would skew the results to be lower than they are in the field. A rough estimate of when the samples became wet could be obtained from precipitation records during the sample period.

Results

Table 1 presents the concentration results (pL/L) from the samples based on their total exposure time and sampling rate. These concentrations have been adjusted to account for source impurities.

The outside samples are typical for background concentrations of PFTs which range from 0.001 to 0.1 pL/L depending on the PFT.

PMCH was released in the manhole and there is evidence of in-leakage into the bathroom with a concentration about 100 times the background level and subsequent transport and dilution to the receptor in the office (concentration about 10 times background). After correction for source impurities there is no evidence for transfer of the two tracers released in the warehouse (PDCB or ocPDCH) at the sample in the sewer line.

PDCB which was released in the middle of the warehouse away from the two sample locations shows a relatively uniform concentration in the two sampling locations in the warehouse.

ocPDCH released in the bathroom shows a very high concentration in the sample taken in that room. This is expected due to the close proximity of the source and sampler. It has decreased substantially by the time it reaches the measurement location in the office.

The data and analysis are provided in the EXCEL file GC1 R1 177C GSI Warehouse Samples May 3 2018.xlsx.

Table 1 PFT concentrations (pL/L)

Sample Name	PDCB pL/L	PMCH pL/L	ocPDCH pL/L	Location
6457	0.005	0.012	0.001	Outside, Top of Door Frame
11253	0.007	0.015	0.004	
10001	0.56	0.11	0.51	Office Top of Shelf
2220	0.53	0.10	0.47	
11122	0.66	1.07	31.96	Bathroom top of mirror
8538	0.65	1.06	31.74	
12423	0.00	52.22	0.00	Manhole
3616	0.00	50.75	0.00	

APPENDIX E. TASK 3 SUPPLEMENTAL SITES AND EVALUATIONS

CONTENTS

Table E.1	ER-201505 Supplemental Sites and References
Table E.2	Paired Sewer Liquid and Vapor Results

TABLE E.1
ER-201505 Supplemental Sites and References

Site	Reference	Pathway Description	Conceptual Model Elements (Section 5.9 Table)
Additional References for Task 1 and 2 Demonstration Sites			
ASU Research House, Utah	Guo, et al., 2015. Identification of Alternative Vapor Intrusion Pathways Using Controlled Pressure Testing, Soil Gas Monitoring, and Screening Model Calculations, Environ. Sci. Technol., DOI: 10.1021/acs.est.5b03564	The storm sewer system passes through a TCE plume. Water containing TCE and other chlorinated solvents enters the storm sewer. Vapors migrate up the lateral to a French drain system tied into the sub-slab gravel pack of the residence. Vapors enter the residence primarily through an expansion joint at edge of building slab.	
Moffett Building 10, California	Accord, 2014. Draft Technical Memorandum, Building 10 Utility Tunnel Closure/Sealing Evaluation.	The vapor migration pathway was via a subsurface utility/steam line tunnel connected to the building. Groundwater was observed flowing into the tunnel through small holes and cracks. An interim action consisting of installation of a blower and wall in the tunnel reduced indoor concentrations to below screening levels.	
Moffett Building 107, California	McHugh, et al., 2012. Evaluation of Vapor Intrusion using Controlled Building Pressure, ES&T, 46, 4792-4799.	Evidence of VOC transport from the subsurface into the building via a utility pipe supported by pressure control studies during ESTCP ER-200707 and ER-201119.	
USEPA VI Research Duplex, Indiana	McHugh, et al., 2017. Evidence of a sewer vapor transport pathway at the USEPA vapor intrusion research duplex, Sci Total Environ, 598, 772-779.	Combined storm and sanitary sewer line serves as local preferential pathway for VOC migration from sewer main into the building.	
Task 3 Supplemental Sites			
1. Hill AFB OU2, Utah	McHugh, et al., 2011. Application of CSIA to Distinguish between Vapor Intrusion and Indoor Sources of VOCs, ES&T.	VOC-containing water from pump and treat system discharged into municipal sewer line. VOCs were detected in vapor samples collected from a downstream manhole. VI was documented in a residence downstream of the discharge point and well away from the VOC plume. Sewer line was mitigated using negative pressure ventilation.	- Characteristics of "higher risk" preferential pathway sites
2. PCE Plume, Denmark	Riis et al., 2010. Vapor Intrusion through Sewer Systems: Migration Pathways of Chlorinated Solvents from Groundwater to Indoor Air, G-021, in Remediation of Chlorinated and Recalcitrant Compounds. Seventh International Conference on Remediation of Chlorinated and Recalcitrant Compounds (Monterey, CA; May 2010). ISBN 978-0-9819730-2-9.	The sanitary sewer passes through a PCE plume. Water containing PCE and other chlorinated solvents enters the sewer. Vapors migrate up laterals to residences and enter residences through a variety of mechanisms. Vapor intrusion was found to affect several residences outside the footprint of the PCE plume but connected to the sewer downstream of the plume.	- Characteristics of "higher risk" preferential pathway sites - Mechanisms for VOC entry into buildings - Sewer to building attenuation factors
3. PCE Plume, Massachusetts	Pennell et al., 2013. Sewer Gas: An Indoor Air Source of PCE to Consider During Vapor Intrusion Investigations, Groundwater Monitoring and Remediation, Vol. 33, No. 3, pp 119-126.	The sanitary sewer passes through a PCE plume. Water containing PCE and other chlorinated solvents enters the sewer. Vapors migrate up the lateral to a residence and enter the residences through a faulty toilet seal in the first floor bathroom resulting in PCE concentrations on the first floor higher than in the basement.	- Mechanisms for VOC entry into buildings

TABLE E.1
ER-201505 Supplemental Sites and References

Site	Reference	Pathway Description	Conceptual Model Elements (Section 5.9 Table)
4. PCE in Mixed Use Building Connected to Septic System, Denmark	Nielsen, et al., 2014. Vinyl Chloride in the Indoor Air Solved by Depressurization of the Sewer, Ninth International Conference on Remediation of Chlorinated and Recalcitrant Compounds (Monterey, CA; May 2014). www.battelle.org/chlorcon .	PCE and vinyl chloride migrated from the septic system through connecting pipes into multiple units of a mixed-use commercial/residential building. The migration pathway resulted in an unexpected distribution of vapors in the building with PCE/VC concentrations higher on the second floor than the first floor. Vapor intrusion was mitigated through depressurization of sewer lines connecting the building to the septic system.	- Mechanisms for VOC entry into buildings - Mitigation of sewer/utility tunnel preferential pathway
5. Petroleum Solvent LNAPL, United Kingdom	Macklin, et al., 2014. Sewers, culverts and other underground pipes - an under recognized pathway for chemical exposures in acute incidents: case series. Chemical Hazards and Poisons Report. From the Centre for Radiation, Chemical and Environmental Hazards. September 2014 Issue 24.	Complaints of petroleum odors in residences were traced to a petroleum solvent (toluene and xylene) LNAPL plume entering a collapsed section of the sewer line. As a short-term measure, local residents were advised to ventilate their properties. The collapsed section of the sewer was repaired and the remainder relined to prevent the contaminated groundwater entering the sewer. The repair measures resolved the complaints and no further odor issues were identified.	- Characteristics of "higher risk" preferential pathway sites - Mitigation of sewer/utility tunnel preferential pathway
6. TCE Plume, Indianapolis, Indiana	ERM, 2017. Vapor Intrusion Evaluation Activities Summary Report - February to December 2016. Indianapolis, IN (see also ERM 2017, 2018 AEHS presentations).	Contaminated GW from TCE plume enters sewer line resulting in vapor intrusion impacts for off-site (downstream) residences. High TCE in sub-slab and indoor air at residences.	- Characteristics of "higher risk" preferential pathway sites - VOC attenuation within sewers - Mechanisms for VOC entry into buildings - Sewer to building attenuation factors - Mitigation of sewer/utility tunnel preferential pathway - Investigation protocol: liquid vs. vapor samples
7. Multiple sewer VI sites in Denmark	Nielsen and Hvidberg, 2017. Remediation techniques for mitigating vapor intrusion from sewer systems to indoor air. Remediation 2017 Vol. 27, pp. 67-73	Overall conceptual model for sewer VI. Data on sewer to building entry mechanisms for a few sites.	- Mitigation of sewer/utility tunnel preferential pathway
8. Site 45, Parris Island Marine Corps Recruit Depot, South Carolina	Vrobesky et al., 2011. Sewers as a Source and Sink of Chlorinated-Solvent Groundwater Contamination, Marine Corps Recruit Depot, Parris Island, South Carolina GWMR Vol 31, No. 4, 63-69.	PCE/TCE plume from former dry cleaner. Contaminated GW enters storm sewer and discharges into creek.	- Characteristics of "higher risk" preferential pathway sites
9. MEW Superfund Site, Mountain View, California	Roghani et al., 2018. Occurrence of chlorinated volatile organic compounds (VOCs) in a sanitary sewer system: Implications for assessing vapor intrusion alternative pathways. Science of the Total Environment. Doi: 10.1016/j.scitotenv.2017.10.205.	Contaminated groundwater enters sewers through defects in the lines. Contaminants found in sewer liquid and vapor outside (and downstream) of the groundwater plume footprint.	- Characteristics of "higher risk" preferential pathway sites - VOC attenuation within sewers - Temporal variability within sewers - Investigation protocol: vapor sample collection depth
10. Tranguch Gasoline Site, Pennsylvania	Jarvela et al., 2004. Tranguch Gasoline Site Case History.	Gasoline LNAPL released from UST entered sewer line resulting in gasoline vapors entering numerous homes. Issue mitigated by installing "sewer vent traps" at 292 residences.	- Characteristics of "higher risk" preferential pathway sites - Mitigation of sewer/utility tunnel preferential pathway

TABLE E.1
ER-201505 Supplemental Sites and References

Site	Reference	Pathway Description	Conceptual Model Elements (Section 5.9 Table)
11. DoD Installation Site A	Holton and Simms, 2018. A Review of Preferential Pathway Case Studies: Lessons-Learned for Vapor Intrusion Site Assessment, Midwestern States Environmental Consultants Assoc Spring Seminar, Indianapolis, IN. (Cites Hallberg et al., 2018 Battelle Presentation)	Upgradient source area with PCE and TCE in groundwater and residual soil NAPL; TCE periodically detected in indoor air. HAPSITE investigation determined that source was an uncapped pipe and dry/damaged p-traps. Sewer ventilization pilot study reduced PCE, TCE, cis-DCE concentrations in manholes, plumbing	- Mechanisms for VOC entry into buildings - Mitigation of sewer/utility tunnel preferential pathway
12. San Francisco Bay Area Site #2, California	Viteri, 2018. Rapid, Real-Time TCE Measurements of Sewer Headspace: Characterizing Spatial and Temporal Variability, AEHS West Coast Conference, San Diego, CA, March 2018.	1000x TCE variability in sewer headspace concentrations on week-time scale. Highest TCE concentrations observed when water table and sewers are at the same depth. TCE concentrations decreased after sewer maintenance/repairs were completed.	- Mitigation of sewer/utility tunnel preferential pathway
13. Industrial Site, California	Confidential	On-site (HAPSITE) measurements showed elevated PCE/TCE concentrations in 1 restroom in the building, at a floor drain and crack in the floor. Building was visibly depressurized during testing. Mylar sheets taped down over the drain visibly filled with air and expanded. Inward flow of air was noted when the restroom door was slightly opened; this did not occur in the other restrooms.	- Mechanisms for VOC entry into buildings
14. Navy Site, Trenton, New Jersey	Turco, 1996. Rehabilitation of TCE-contaminated Underground Storm Water System using Trenchless Technology, Proceedings of the Tri-Service Environmental Technology Workshop, "Enhancing Readiness through Environmental quality Technology," Hershey, PA, May 1996.	TCE was found in groundwater and water discharging from the facility's storm water outfalls. Cured-in-place pipe (CIPP) technology was used to repair the sewer lines. After sewer rehabilitation, there was an approximate 25-fold decrease in TCE concentrations at the outfall (90 ug/L vs. 4 ug/L).	- Characteristics of "higher risk" preferential pathway sites - Mitigation of sewer/utility tunnel preferential pathway
15. Navy Site, San Diego, California	Confidential	Vapor intrusion was occurring in the part of a large building with restrooms and an adjacent breakroom. The pathway was determined to be sewer line penetrations. The sewer utility corridor intersected a vadose zone TCE plume near the edge of the building footprint (approximately 300 ft from the restrooms). Groundwater contamination is also present.	- Mechanisms for VOC entry into buildings
16. Industrial Site	Confidential	cVOC-impacted soil gas entry into sewer line via cracks in line	- VOC attenuation within sewers
17. Industrial Site	Confidential	cVOC-impacted groundwater entry into sewer line via defects in line	- Characteristics of "higher risk" preferential pathway sites - VOC attenuation within sewers

TABLE E.2
Paired Sewer Liquid and Vapor Results
Task 1, 2, and 3 Sites

Collected By	Demonstration Site	Manhole ID	Matrix	Analyte	Henry's Constant	Liquid Sample Date	Liquid Result (ug/L)	Vapor Sample Date	Vapor Result (ug/m3)	Ratio (Vapor / Liquid Equilibrium Concentration)
GSI	Task 1 Dem 1	ASU Ld 16/LD-UnivPk-2460N	U2	Dichloroethene, cis-1,2-	1.87E-01	5/4/2016 8:57	0.62 J	5/4/2016 8:57	34	0.2925
GSI	Task 1 Dem 1	ASU Ld 16/LD-UnivPk-2460N	U2	Trichloroethene	4.28E-01	5/4/2016 8:57	2.7	5/4/2016 8:57	333	0.2880
GSI	Task 1 Dem 1	ASU Ld 17/LD-Church	U2	Dichloroethene, cis-1,2-	1.87E-01	5/4/2016 9:14	4.2	5/4/2016 9:14	91	0.1156
GSI	Task 1 Dem 1	ASU Ld 17/LD-Church	U2	Trichloroethene	4.28E-01	5/4/2016 9:14	6.8	5/4/2016 9:14	263	0.0903
GSI	Task 1 Dem 1	ASU Ld 14/LD-1100W-2485N	U2	Trichloroethene	4.28E-01	5/4/2016 8:49	6.1	5/4/2016 8:50	1100	0.4212
GSI	Task 1 Dem 1	ASU Ld 14/LD-1100W-2485N	U2	Dichloroethene, cis-1,2-	1.87E-01	5/4/2016 8:49	4.3	5/4/2016 8:50	240	0.2977
GSI	Task 1 Dem 2	33.5 Central	U3	Chloroform	1.53E-01	6/16/2016 16:45	3.9	6/16/2016 16:43	4.4	0.0074
GSI	Task 1 Dem 2	28 Central	U3	Chloroform	1.53E-01	6/16/2016 16:05	4.3	6/16/2016 8:06	100	0.1524
GSI	Task 1 Dem 2	28 Central	U3	Chloroform	1.53E-01	6/16/2016 16:05	4.3	6/16/2016 15:54	1 J	0.0015
GSI	Task 1 Dem 2	33.5 Central	U3	Chloroform	1.53E-01	6/16/2016 16:45	3.9	6/16/2016 8:24	170	0.2857
GSI	Task 1 Dem 2	29.5 Central	U3	Chloroform	1.53E-01	6/16/2016 16:32	3.6	6/16/2016 8:17	15	0.0273
GSI	Task 1 Dem 2	29.5 Central	U3	Chloroform	1.53E-01	6/16/2016 16:32	3.6	6/16/2016 16:27	10	0.0182
GSI	Task 1 Dem 3	Telephone T-15	U4	Dichloroethene, cis-1,2-	1.87E-01	8/25/2016 10:37	1.1 J	8/25/2016 10:32	178	0.8631
GSI	Task 1 Dem 3	Telephone T-11	U4	Dichloroethene, cis-1,2-	1.87E-01	8/25/2016 10:11	210	8/25/2016 10:11	182	0.0046
ASU	Task 1 Dem 1	ASU Ld 18	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	3	5/1/2016 0:00	160	0.1246
ASU	Task 1 Dem 1	ASU Ld 13	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	3.3	12/1/2016 0:00	280	0.1982
ASU	Task 1 Dem 1	ASU Ld 13	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	3.5	4/17/2017 0:00	370	0.2469
ASU	Task 1 Dem 1	ASU Ld 15	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	11	8/1/2016 0:00	400	0.0849
ASU	Task 1 Dem 1	ASU Ld 15	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	9.5	12/1/2016 0:00	1400	0.3442
ASU	Task 1 Dem 1	ASU Ld 15	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	8.4	4/17/2017 0:00	1300	0.3614
ASU	Task 1 Dem 1	ASU Ld 18	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	5.7	1/1/2016 0:00	71	0.0291
ASU	Task 1 Dem 1	ASU Ld 18	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	6	8/1/2016 0:00	150	0.0584
ASU	Task 1 Dem 1	ASU Ld 18	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	12	12/1/2016 0:00	36	0.0070
ASU	Task 1 Dem 1	ASU Ld 18	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	3.2	4/17/2017 0:00	140	0.1022
ASU	Task 1 Dem 1	ASU Ld 27	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	35	8/1/2016 0:00	19	0.0013
ASU	Task 1 Dem 1	ASU Ld 13	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	4.6	8/1/2016 0:00	530	0.2691
ASU	Task 1 Dem 1	ASU Ld 27	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	33	4/17/2017 0:00	36	0.0025
ASU	Task 1 Dem 1	ASU Ld 11	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	15	8/1/2016 0:00	2200	0.3425
ASU	Task 1 Dem 1	ASU Ld 27	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	29	12/1/2016 0:00	600	0.0483
ASU	Task 1 Dem 1	ASU Ld 12	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	3.8	4/17/2017 0:00	580	0.3565
ASU	Task 1 Dem 1	ASU Ld 12	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	4.7	12/1/2016 0:00	48	0.0239
ASU	Task 1 Dem 1	ASU Ld 12	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	3.9	8/1/2016 0:00	21	0.0126
ASU	Task 1 Dem 1	ASU Ld 12	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	6.1	5/1/2016 0:00	48	0.0184
ASU	Task 1 Dem 1	ASU Ld 12	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	6.3	1/1/2016 0:00	56	0.0208
ASU	Task 1 Dem 1	ASU Ld 28	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	5.6	8/1/2016 0:00	270	0.1126
ASU	Task 1 Dem 1	ASU Ld 11	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	13	12/1/2016 0:00	210	0.0377
ASU	Task 1 Dem 1	ASU Ld 31	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	8.1	8/1/2016 0:00	180	0.0519
ASU	Task 1 Dem 1	ASU Ld 11	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	19	5/1/2016 0:00	13	0.0016
ASU	Task 1 Dem 1	ASU Ld 10	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	9.1	4/17/2017 0:00	660	0.1694
ASU	Task 1 Dem 1	ASU Ld 10	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	9.1	12/1/2016 0:00	510	0.1309
ASU	Task 1 Dem 1	ASU Ld 10	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	14	8/1/2016 0:00	2600	0.4337
ASU	Task 1 Dem 1	ASU Ld 10	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	33	5/1/2016 0:00	1200	0.0849
ASU	Task 1 Dem 1	ASU Ld 09	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	18	4/17/2017 0:00	63	0.0082
ASU	Task 1 Dem 1	ASU Ld 11	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	17	4/17/2017 0:00	77	0.0106
ASU	Task 1 Dem 1	ASU Ld 35	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	5.7	12/1/2016 0:00	300	0.1229
ASU	Task 1 Dem 1	ASU Ld 30	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	15	12/1/2016 0:00	640	0.0996
ASU	Task 1 Dem 1	ASU Ld 34	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	0.41 J	8/1/2016 0:00	180	1.0253
ASU	Task 1 Dem 1	ASU Ld 34	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	0.55 J	12/1/2016 0:00	240	1.0191
ASU	Task 1 Dem 1	ASU Ld 34	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.38 J	4/17/2017 0:00	130	0.7990
ASU	Task 1 Dem 1	ASU Ld 35	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	7.9	1/1/2016 0:00	300	0.0887
ASU	Task 1 Dem 1	ASU Ld 33	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	6.4	4/17/2017 0:00	260	0.0949
ASU	Task 1 Dem 1	ASU Ld 35	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	4.8	8/1/2016 0:00	170	0.0827

TABLE E.2
Paired Sewer Liquid and Vapor Results
Task 1, 2, and 3 Sites

Collected By	Demonstration Site	Manhole ID	Matrix	Analyte	Henry's Constant	Liquid Sample Date	Liquid Result (ug/L)	Vapor Sample Date	Vapor Result (ug/m3)	Ratio (Vapor / Liquid Equilibrium Concentration)
ASU	Task 1 Dem 1	ASU Ld 33	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	7.9	12/1/2016 0:00	440	0.1301
ASU	Task 1 Dem 1	ASU Ld 35	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	6.6	4/17/2017 0:00	49	0.0173
ASU	Task 1 Dem 1	ASU Ld 36	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	20	1/1/2016 0:00	160	0.0187
ASU	Task 1 Dem 1	ASU Ld 36	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	7.7	5/1/2016 0:00	220	0.0667
ASU	Task 1 Dem 1	ASU Ld 36	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	4.4	8/1/2016 0:00	16	0.0085
ASU	Task 1 Dem 1	ASU Ld 36	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	5.3	12/1/2016 0:00	100	0.0441
ASU	Task 1 Dem 1	ASU Ld 36	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	4.1	4/17/2017 0:00	4.7 J	0.0027
ASU	Task 1 Dem 1	ASU Ld 35	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	9.7	5/1/2016 0:00	20	0.0048
ASU	Task 1 Dem 1	ASU Ld 31	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	11	12/1/2016 0:00	260	0.0552
ASU	Task 1 Dem 1	ASU Ld 28	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	13	4/17/2017 0:00	240	0.0431
ASU	Task 1 Dem 1	ASU Ld 29	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	7.7	12/1/2016 0:00	500	0.1517
ASU	Task 1 Dem 1	ASU Ld 29	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	7.9	4/17/2017 0:00	49	0.0145
ASU	Task 1 Dem 1	ASU Ld 30	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	10	8/1/2016 0:00	<1.6	0.0004
ASU	Task 1 Dem 1	ASU Ld 09	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	18	12/1/2016 0:00	440	0.0571
ASU	Task 1 Dem 1	ASU Ld 34	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	0.9	5/1/2016 0:00	140	0.3633
ASU	Task 1 Dem 1	ASU Ld 08	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	46	1/1/2016 0:00	200	0.0102
ASU	Task 1 Dem 1	ASU Ld 28	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	13	12/1/2016 0:00	1300	0.2336
ASU	Task 1 Dem 1	ASU Ld 31	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	9.2	4/17/2017 0:00	250	0.0635
ASU	Task 1 Dem 1	ASU Ld 32	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	8.9	8/1/2016 0:00	170	0.0446
ASU	Task 1 Dem 1	ASU Ld 32	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	9.3	12/1/2016 0:00	530	0.1331
ASU	Task 1 Dem 1	ASU Ld 32	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	8.1	4/17/2017 0:00	450	0.1298
ASU	Task 1 Dem 1	ASU Ld 33	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	11	5/1/2016 0:00	18	0.0038
ASU	Task 1 Dem 1	ASU Ld 33	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	6.4	8/1/2016 0:00	<1.6	0.0006
ASU	Task 1 Dem 1	ASU Ld 30	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	11	4/17/2017 0:00	320	0.0679
ASU	Task 1 Dem 1	ASU Ld 14/LD-1100W-2485N	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	10	4/17/2017 0:00	1400	0.3270
ASU	Task 1 Dem 1	ASU Ld 08	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	20	8/1/2016 0:00	23	0.0027
ASU	Task 1 Dem 1	ASU Ld 89/LD-700W-2175N	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	2.2	12/1/2016 0:00	<1.6	0.0017
ASU	Task 1 Dem 1	ASU Ld 89/LD-700W-2175N	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	0.99	8/1/2016 0:00	<1.6	0.0038
ASU	Task 1 Dem 1	ASU Ld 89/LD-700W-2175N	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	20	5/1/2016 0:00	<1.6	0.0002
ASU	Task 1 Dem 1	ASU Ld 90/LD-665W-2175N	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.073 J	4/17/2017 0:00	<1.6	0.0512
ASU	Task 1 Dem 1	ASU Ld 90/LD-665W-2175N	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	0.31 J	12/1/2016 0:00	<1.6	0.0121
ASU	Task 1 Dem 1	ASU Ld 91/LD-608W-2175N	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	0.14 J	12/1/2016 0:00	<1.6	0.0267
ASU	Task 1 Dem 1	ASU Ld 17/LD-Church	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	6.3	4/17/2017 0:00	97	0.0360
ASU	Task 1 Dem 1	ASU Ld 17/LD-Church	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	7.5	12/1/2016 0:00	140	0.0436
ASU	Task 1 Dem 1	ASU Ld 17/LD-Church	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	6.9	8/1/2016 0:00	53	0.0179
ASU	Task 1 Dem 1	ASU Ld 16/LD-UnivPk-2460N	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	3.5	4/17/2017 0:00	390	0.2602
ASU	Task 1 Dem 1	ASU Ld 16/LD-UnivPk-2460N	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	3.5	12/1/2016 0:00	370	0.2469
ASU	Task 1 Dem 1	ASU Ld 16/LD-UnivPk-2460N	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	3.3	8/1/2016 0:00	420	0.2972
ASU	Task 1 Dem 1	ASU Ld 87/LD-725W-2175N	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	1.7	1/1/2016 0:00	74	0.1017
ASU	Task 1 Dem 1	ASU Ld 03/LD-1070W-2600N	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	13	12/1/2016 0:00	260	0.0467
ASU	Task 1 Dem 1	ASU Ld 02/LD-1018W-2600N	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	2.9	5/1/2016 0:00	<1.6	0.0013
ASU	Task 1 Dem 1	ASU Ld 02/LD-1018W-2600N	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	<0.1	8/1/2016 0:00	<1.6	Not calculated (Liquid and Vapor ND)
ASU	Task 1 Dem 1	ASU Ld 02/LD-1018W-2600N	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	0.92	12/1/2016 0:00	34	0.0863
ASU	Task 1 Dem 1	ASU Ld 02/LD-1018W-2600N	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	2.3	4/17/2017 0:00	<1.6	0.0016
ASU	Task 1 Dem 1	ASU Ld 03/LD-1070W-2600N	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	2.7	1/1/2016 0:00	540	0.4671
ASU	Task 1 Dem 1	ASU Ld 16/LD-UnivPk-2460N	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	6.6	5/1/2016 0:00	470	0.1663
ASU	Task 1 Dem 1	ASU Ld 03/LD-1070W-2600N	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	1.2	8/1/2016 0:00	500	0.9731
ASU	Task 1 Dem 1	ASU Ld 16/LD-UnivPk-2460N	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	9.1	1/1/2016 0:00	430	0.1104
ASU	Task 1 Dem 1	ASU Ld 03/LD-1070W-2600N	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	1.9	4/17/2017 0:00	510	0.6269
ASU	Task 1 Dem 1	ASU Ld 14/LD-1100W-2485N	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	13	1/1/2016 0:00	1600	0.2874
ASU	Task 1 Dem 1	ASU Ld 14/LD-1100W-2485N	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	12	5/1/2016 0:00	1000	0.1946
ASU	Task 1 Dem 1	ASU Ld 14/LD-1100W-2485N	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	17	8/1/2016 0:00	2000	0.2748

TABLE E.2
Paired Sewer Liquid and Vapor Results
Task 1, 2, and 3 Sites

Collected By	Demonstration Site	Manhole ID	Matrix	Analyte	Henry's Constant	Liquid Sample Date	Liquid Result (ug/L)	Vapor Sample Date	Vapor Result (ug/m3)	Ratio (Vapor / Liquid Equilibrium Concentration)
ASU	Task 1 Dem 1	ASU Ld 14/LD-1100W-2485N	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	9.2	12/1/2016 0:00	1400	0.3554
ASU	Task 1 Dem 1	ASU Ld 87/LD-725W-2175N	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	4.6	8/1/2016 0:00	20	0.0102
ASU	Task 1 Dem 1	ASU Ld 03/LD-1070W-2600N	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	10	5/1/2016 0:00	550	0.1285
ASU	Task 1 Dem 1	ASU Ld 05	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	2.1	12/1/2016 0:00	190	0.2113
ASU	Task 1 Dem 1	ASU Ld 09	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	22	5/1/2016 0:00	110	0.0117
ASU	Task 1 Dem 1	ASU Ld 09	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	25	1/1/2016 0:00	1400	0.1308
ASU	Task 1 Dem 1	ASU Ld 08	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	14	4/17/2017 0:00	240	0.0400
ASU	Task 1 Dem 1	ASU Ld 08	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	19	12/1/2016 0:00	270	0.0332
ASU	Task 1 Dem 1	ASU Ld 08	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	30	5/1/2016 0:00	330	0.0257
ASU	Task 1 Dem 1	ASU Ld 37	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	5.5	4/17/2017 0:00	<1.6	0.0007
ASU	Task 1 Dem 1	ASU Ld 07	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	10	4/17/2017 0:00	1000	0.2336
ASU	Task 1 Dem 1	ASU Ld 07	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	18	12/1/2016 0:00	780	0.1012
ASU	Task 1 Dem 1	ASU Ld 07	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	16	8/1/2016 0:00	88	0.0128
ASU	Task 1 Dem 1	ASU Ld 07	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	15	1/1/2016 0:00	1000	0.1557
ASU	Task 1 Dem 1	ASU Ld 06	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	6.1	4/17/2017 0:00	300	0.1149
ASU	Task 1 Dem 1	ASU Ld 06	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	9.1	12/1/2016 0:00	2100	0.5390
ASU	Task 1 Dem 1	ASU Ld 06	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	0.53 J	8/1/2016 0:00	10	0.0441
ASU	Task 1 Dem 1	ASU Ld 89/LD-700W-2175N	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.36 J	4/17/2017 0:00	<1.6	0.0104
ASU	Task 1 Dem 1	ASU Ld 04	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	5	8/1/2016 0:00	240	0.1121
ASU	Task 1 Dem 1	ASU Ld 87/LD-725W-2175N	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	1.7	12/1/2016 0:00	<1.6	0.0022
ASU	Task 1 Dem 1	ASU Ld 87/LD-725W-2175N	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.32 J	4/17/2017 0:00	11	0.0803
ASU	Task 1 Dem 1	ASU Ld 01	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	1.6	1/1/2016 0:00	23	0.0336
ASU	Task 1 Dem 1	ASU Ld 01	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	4.1	5/1/2016 0:00	<1.6	0.0009
ASU	Task 1 Dem 1	ASU Ld 01	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	1.9	12/1/2016 0:00	<1.6	0.0020
ASU	Task 1 Dem 1	ASU Ld 06	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	16	5/1/2016 0:00	<1.6	0.0002
ASU	Task 1 Dem 1	ASU Ld 04	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	7.4	5/1/2016 0:00	240	0.0757
ASU	Task 1 Dem 1	ASU Ld 05	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	1.2	4/17/2017 0:00	210	0.4087
ASU	Task 1 Dem 1	ASU Ld 04	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	6.8	12/1/2016 0:00	190	0.0653
ASU	Task 1 Dem 1	ASU Ld 04	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	4.6	4/17/2017 0:00	390	0.1980
ASU	Task 1 Dem 1	ASU Ld 05	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	32	1/1/2016 0:00	320	0.0234
ASU	Task 1 Dem 1	ASU Ld 05	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	6.2	5/1/2016 0:00	260	0.0979
ASU	Task 1 Dem 1	ASU Ld 05	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	2	8/1/2016 0:00	120	0.1401
ASU	Task 1 Dem 1	ASU Ld 09	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	24	8/1/2016 0:00	<1.6	0.0002
ASU	Task 1 Dem 1	ASU Ld 01	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	<0.1	4/17/2017 0:00	34	0.7941
ASU	Task 1 Dem 1	ASU Ld 93	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.28 J	4/17/2017 0:00	<1.6	0.0133
ASU	Task 1 Dem 1	ASU Ld 37	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	4.2	8/1/2016 0:00	130	0.0723
ASU	Task 1 Dem 1	ASU Ld 92	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	0.96	8/1/2016 0:00	39	0.0949
ASU	Task 1 Dem 1	ASU Ld 92	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	1.2	12/1/2016 0:00	<1.6	0.0031
ASU	Task 1 Dem 1	ASU Ld 92	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.48 J	4/17/2017 0:00	<1.6	0.0078
ASU	Task 1 Dem 1	ASU Ld 93	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	1	1/1/2016 0:00	8.6	0.0201
ASU	Task 1 Dem 1	ASU Ld 93	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	1.1	5/1/2016 0:00	31	0.0658
ASU	Task 1 Dem 1	ASU Ld 92	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	12	1/1/2016 0:00	28	0.0054
ASU	Task 1 Dem 1	ASU Ld 93	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	0.31 J	12/1/2016 0:00	<1.6	0.0121
ASU	Task 1 Dem 1	ASU Ld 88	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.16 J	4/17/2017 0:00	7.5 J	0.1095
ASU	Task 1 Dem 1	ASU Ld 94	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	1.2	8/1/2016 0:00	<1.6	0.0031
ASU	Task 1 Dem 1	ASU Ld 94	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	1.4	12/1/2016 0:00	24	0.0400
ASU	Task 1 Dem 1	ASU Ld 94	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	1.6	4/17/2017 0:00	40	0.0584
ASU	Task 1 Dem 1	ASU Ld 95	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	2.5	5/1/2016 0:00	38	0.0355
ASU	Task 1 Dem 1	ASU Ld 95	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	0.47 J	8/1/2016 0:00	<1.6	0.0080
ASU	Task 1 Dem 1	ASU Ld 95	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	1.3	12/1/2016 0:00	54	0.0970
ASU	Task 1 Dem 1	ASU Ld 93	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	2.2	8/1/2016 0:00	<1.6	0.0017
ASU	Task 1 Dem 1	ASU Ld 81	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	0.97	5/1/2016 0:00	9.7	0.0234

TABLE E.2
Paired Sewer Liquid and Vapor Results
Task 1, 2, and 3 Sites

Collected By	Demonstration Site	Manhole ID	Matrix	Analyte	Henry's Constant	Liquid Sample Date	Liquid Result (ug/L)	Vapor Sample Date	Vapor Result (ug/m3)	Ratio (Vapor / Liquid Equilibrium Concentration)
ASU	Task 1 Dem 1	ASU Ld 69	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	6	12/1/2016 0:00	540	0.2102
ASU	Task 1 Dem 1	ASU Ld 69	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	5.5	4/17/2017 0:00	680	0.2888
ASU	Task 1 Dem 1	ASU Ld 80	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	2.9	1/1/2016 0:00	<1.6	0.0013
ASU	Task 1 Dem 1	ASU Ld 80	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	2.6	5/1/2016 0:00	<1.6	0.0014
ASU	Task 1 Dem 1	ASU Ld 80	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	2.7	8/1/2016 0:00	<1.6	0.0014
ASU	Task 1 Dem 1	ASU Ld 80	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	2.4	12/1/2016 0:00	59	0.0574
ASU	Task 1 Dem 1	ASU Ld 92	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	22	5/1/2016 0:00	12	0.0013
ASU	Task 1 Dem 1	ASU Ld 81	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	4	1/1/2016 0:00	25	0.0146
ASU	Task 1 Dem 1	ASU Ld 96	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	6.8	4/17/2017 0:00	92	0.0316
ASU	Task 1 Dem 1	ASU Ld 81	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	1.9	8/1/2016 0:00	50	0.0615
ASU	Task 1 Dem 1	ASU Ld 81	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	1.9	12/1/2016 0:00	26	0.0320
ASU	Task 1 Dem 1	ASU Ld 81	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	1.4	4/17/2017 0:00	91	0.1518
ASU	Task 1 Dem 1	ASU Ld 82	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	2	12/1/2016 0:00	16	0.0187
ASU	Task 1 Dem 1	ASU Ld 82	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	1.6	4/17/2017 0:00	68	0.0993
ASU	Task 1 Dem 1	ASU Ld 88	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	0.33 J	12/1/2016 0:00	4 J	0.0283
ASU	Task 1 Dem 1	ASU Ld 80	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	2.3	4/17/2017 0:00	<1.6	0.0016
ASU	Task 1 Dem 1	ASU Stm 15	U6	Trichloroethene	4.28E-01	12/1/2016 0:00	0.63 J	12/1/2016 0:00	18	0.0667
ASU	Task 1 Dem 1	ASU Stm 13	U6	Trichloroethene	4.28E-01	8/1/2016 0:00	0.69 J	8/1/2016 0:00	19	0.0643
ASU	Task 1 Dem 1	ASU Stm 13	U6	Trichloroethene	4.28E-01	12/1/2016 0:00	0.88	12/1/2016 0:00	8.6	0.0228
ASU	Task 1 Dem 1	ASU Stm 13	U6	Trichloroethene	4.28E-01	4/17/2017 0:00	1.1	4/17/2017 0:00	19	0.0403
ASU	Task 1 Dem 1	ASU Stm 14	U6	Trichloroethene	4.28E-01	1/1/2016 0:00	1.3	1/1/2016 0:00	44	0.0790
ASU	Task 1 Dem 1	ASU Stm 14	U6	Trichloroethene	4.28E-01	8/1/2016 0:00	0.24 J	8/1/2016 0:00	32	0.3114
ASU	Task 1 Dem 1	ASU Stm 14	U6	Trichloroethene	4.28E-01	12/1/2016 0:00	0.65 J	12/1/2016 0:00	11	0.0395
ASU	Task 1 Dem 1	ASU Ld 95	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.47 J	4/17/2017 0:00	7.5 J	0.0373
ASU	Task 1 Dem 1	ASU Stm 15	U6	Trichloroethene	4.28E-01	8/1/2016 0:00	0.22 J	8/1/2016 0:00	27	0.2866
ASU	Task 1 Dem 1	ASU Stm 12	U6	Trichloroethene	4.28E-01	12/1/2016 0:00	1.4	12/1/2016 0:00	8.3	0.0138
ASU	Task 1 Dem 1	ASU Stm 15	U6	Trichloroethene	4.28E-01	4/17/2017 0:00	0.76	4/17/2017 0:00	<1.6	0.0049
ASU	Task 1 Dem 1	ASU Stm 2	U6	Trichloroethene	4.28E-01	8/1/2016 0:00	0.59 J	8/1/2016 0:00	26	0.1029
ASU	Task 1 Dem 1	ASU Stm 2	U6	Trichloroethene	4.28E-01	4/17/2017 0:00	1.7	4/17/2017 0:00	5.6 J	0.0077
ASU	Task 1 Dem 1	ASU Stm 5	U6	Trichloroethene	4.28E-01	4/17/2017 0:00	0.38 J	4/17/2017 0:00	<1.6	0.0098
ASU	Task 1 Dem 1	ASU Stm 8	U6	Trichloroethene	4.28E-01	8/1/2016 0:00	1.2	8/1/2016 0:00	24	0.0467
ASU	Task 1 Dem 1	ASU Stm 8	U6	Trichloroethene	4.28E-01	12/1/2016 0:00	1	12/1/2016 0:00	<1.6	0.0037
ASU	Task 1 Dem 1	ASU Stm 14	U6	Trichloroethene	4.28E-01	4/17/2017 0:00	0.54 J	4/17/2017 0:00	17	0.0735
ASU	Task 1 Dem 1	ASU Ld 99	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	8.9	4/17/2017 0:00	76	0.0199
ASU	Task 1 Dem 1	ASU Ld 66	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.51 J	4/17/2017 0:00	11	0.0504
ASU	Task 1 Dem 1	ASU Ld 97	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	0.29 J	8/1/2016 0:00	<1.6	0.0129
ASU	Task 1 Dem 1	ASU Ld 97	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	3.2	12/1/2016 0:00	25	0.0182
ASU	Task 1 Dem 1	ASU Ld 97	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	1.7	4/17/2017 0:00	<1.6	0.0022
ASU	Task 1 Dem 1	ASU Ld 98	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	1.7	1/1/2016 0:00	28	0.0385
ASU	Task 1 Dem 1	ASU Ld 98	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	<0.1	8/1/2016 0:00	<1.6	Not calculated (Liquid and Vapor ND)
ASU	Task 1 Dem 1	ASU Stm 13	U6	Trichloroethene	4.28E-01	5/1/2016 0:00	0.6 J	5/1/2016 0:00	<1.6	0.0062
ASU	Task 1 Dem 1	ASU Ld 99	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	7.4	12/1/2016 0:00	52	0.0164
ASU	Task 1 Dem 1	ASU Stm 12	U6	Trichloroethene	4.28E-01	4/17/2017 0:00	0.34 J	4/17/2017 0:00	12	0.0824
ASU	Task 1 Dem 1	ASU Stm 10	U6	Trichloroethene	4.28E-01	12/1/2016 0:00	2.5	12/1/2016 0:00	23	0.0215
ASU	Task 1 Dem 1	ASU Stm 10	U6	Trichloroethene	4.28E-01	4/17/2017 0:00	0.83	4/17/2017 0:00	31	0.0872
ASU	Task 1 Dem 1	ASU Stm 11	U6	Trichloroethene	4.28E-01	8/1/2016 0:00	0.86	8/1/2016 0:00	16	0.0435
ASU	Task 1 Dem 1	ASU Stm 11	U6	Trichloroethene	4.28E-01	12/1/2016 0:00	0.72	12/1/2016 0:00	12	0.0389
ASU	Task 1 Dem 1	ASU Stm 11	U6	Trichloroethene	4.28E-01	4/17/2017 0:00	0.73	4/17/2017 0:00	14	0.0448
ASU	Task 1 Dem 1	ASU Stm 12	U6	Trichloroethene	4.28E-01	8/1/2016 0:00	0.44 J	8/1/2016 0:00	48	0.2548
ASU	Task 1 Dem 1	ASU Ld 96	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	7	12/1/2016 0:00	16	0.0053
ASU	Task 1 Dem 1	ASU Ld 98	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	0.59 J	12/1/2016 0:00	<1.6	0.0063
ASU	Task 1 Dem 1	ASU Ld 45	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	<0.1	4/17/2017 0:00	<1.6	Not calculated (Liquid and Vapor ND)

TABLE E.2
Paired Sewer Liquid and Vapor Results
Task 1, 2, and 3 Sites

Collected By	Demonstration Site	Manhole ID	Matrix	Analyte	Henry's Constant	Liquid Sample Date	Liquid Result (ug/L)	Vapor Sample Date	Vapor Result (ug/m3)	Ratio (Vapor / Liquid Equilibrium Concentration)
ASU	Task 1 Dem 1	ASU Ld 44	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	0.6 J	5/1/2016 0:00	<1.6	0.0062
ASU	Task 1 Dem 1	ASU Ld 44	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	1.1	8/1/2016 0:00	<1.6	0.0034
ASU	Task 1 Dem 1	ASU Ld 44	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	0.67 J	12/1/2016 0:00	11	0.0383
ASU	Task 1 Dem 1	ASU Ld 44	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.3 J	4/17/2017 0:00	10	0.0779
ASU	Task 1 Dem 1	ASU Ld 45	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	3.7	1/1/2016 0:00	5.9 J	0.0037
ASU	Task 1 Dem 1	ASU Ld 45	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	16	5/1/2016 0:00	19	0.0028
ASU	Task 1 Dem 1	ASU Ld 49	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	6.2	5/1/2016 0:00	<1.6	0.0006
ASU	Task 1 Dem 1	ASU Ld 45	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	1.4	12/1/2016 0:00	7.4 J	0.0123
ASU	Task 1 Dem 1	ASU Ld 42	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	3.9	12/1/2016 0:00	280	0.1677
ASU	Task 1 Dem 1	ASU Ld 46	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	<0.1	8/1/2016 0:00	<1.6	Not calculated (Liquid and Vapor ND)
ASU	Task 1 Dem 1	ASU Ld 46	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	0.38 J	12/1/2016 0:00	4.8 J	0.0295
ASU	Task 1 Dem 1	ASU Ld 46	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	<0.1	4/17/2017 0:00	<1.6	Not calculated (Liquid and Vapor ND)
ASU	Task 1 Dem 1	ASU Ld 47	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	0.4 J	8/1/2016 0:00	<1.6	0.0093
ASU	Task 1 Dem 1	ASU Ld 48	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.34 J	4/17/2017 0:00	7.5 J	0.0515
ASU	Task 1 Dem 1	ASU Ld 69	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	4.8	8/1/2016 0:00	460	0.2238
ASU	Task 1 Dem 1	ASU Ld 45	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	<0.1	8/1/2016 0:00	<1.6	Not calculated (Liquid and Vapor ND)
ASU	Task 1 Dem 1	ASU Ld 41	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	4.9	1/1/2016 0:00	260	0.1239
ASU	Task 1 Dem 1	ASU Stm 8	U6	Trichloroethene	4.28E-01	4/17/2017 0:00	1.5	4/17/2017 0:00	52	0.0810
ASU	Task 1 Dem 1	ASU Ld 39	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	4.1	12/1/2016 0:00	18	0.0103
ASU	Task 1 Dem 1	ASU Ld 39	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	4.6	4/17/2017 0:00	<1.6	0.0008
ASU	Task 1 Dem 1	ASU Ld 40	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	5.3	1/1/2016 0:00	160	0.0705
ASU	Task 1 Dem 1	ASU Ld 40	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	4.8	5/1/2016 0:00	77	0.0375
ASU	Task 1 Dem 1	ASU Ld 40	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	3.1	8/1/2016 0:00	170	0.1281
ASU	Task 1 Dem 1	ASU Ld 44	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	14	1/1/2016 0:00	<1.6	0.0003
ASU	Task 1 Dem 1	ASU Ld 40	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	3.4	4/17/2017 0:00	180	0.1236
ASU	Task 1 Dem 1	ASU Ld 42	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	5.4	4/17/2017 0:00	55	0.0238
ASU	Task 1 Dem 1	ASU Ld 41	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	9	5/1/2016 0:00	200	0.0519
ASU	Task 1 Dem 1	ASU Ld 41	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	3.9	8/1/2016 0:00	73	0.0437
ASU	Task 1 Dem 1	ASU Ld 41	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	3.3	12/1/2016 0:00	170	0.1203
ASU	Task 1 Dem 1	ASU Ld 41	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	3.7	4/17/2017 0:00	100	0.0631
ASU	Task 1 Dem 1	ASU Ld 42	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	5.5	5/1/2016 0:00	460	0.1953
ASU	Task 1 Dem 1	ASU Ld 42	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	5.4	8/1/2016 0:00	430	0.1860
ASU	Task 1 Dem 1	ASU Ld 49	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	0.22 J	8/1/2016 0:00	<1.6	0.0170
ASU	Task 1 Dem 1	ASU Ld 40	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	3.3	12/1/2016 0:00	53	0.0375
ASU	Task 1 Dem 1	ASU Ld 64	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	0.88	12/1/2016 0:00	8.3	0.0220
ASU	Task 1 Dem 1	ASU Ld 56	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	6.7	12/1/2016 0:00	430	0.1499
ASU	Task 1 Dem 1	ASU Ld 56	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	10	4/17/2017 0:00	480	0.1121
ASU	Task 1 Dem 1	ASU Ld 60	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	1.3	8/1/2016 0:00	16	0.0287
ASU	Task 1 Dem 1	ASU Ld 61	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	2.5	12/1/2016 0:00	46	0.0430
ASU	Task 1 Dem 1	ASU Ld 61	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	1.9	4/17/2017 0:00	14	0.0172
ASU	Task 1 Dem 1	ASU Ld 62	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	1.9	8/1/2016 0:00	160	0.1967
ASU	Task 1 Dem 1	ASU Ld 49	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	0.9	1/1/2016 0:00	<1.6	0.0042
ASU	Task 1 Dem 1	ASU Ld 64	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	0.25 J	8/1/2016 0:00	27	0.2522
ASU	Task 1 Dem 1	ASU Ld 55	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	20	4/17/2017 0:00	480	0.0561
ASU	Task 1 Dem 1	ASU Ld 64	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	1.6	4/17/2017 0:00	<1.6	0.0023
ASU	Task 1 Dem 1	ASU Ld 65	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	1.9	12/1/2016 0:00	13	0.0160
ASU	Task 1 Dem 1	ASU Ld 65	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.44 J	4/17/2017 0:00	24	0.1274
ASU	Task 1 Dem 1	ASU Ld 66	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	0.77	8/1/2016 0:00	<1.6	0.0049
ASU	Task 1 Dem 1	ASU Ld 66	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	1.6	12/1/2016 0:00	8	0.0117
ASU	Task 1 Dem 1	ASU Ld 37	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	4.6	12/1/2016 0:00	9.7	0.0049
ASU	Task 1 Dem 1	ASU Ld 63	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.3 J	4/17/2017 0:00	11	0.0856
ASU	Task 1 Dem 1	ASU Ld 53	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	1	4/17/2017 0:00	59	0.1378

TABLE E.2
Paired Sewer Liquid and Vapor Results
Task 1, 2, and 3 Sites

Collected By	Demonstration Site	Manhole ID	Matrix	Analyte	Henry's Constant	Liquid Sample Date	Liquid Result (ug/L)	Vapor Sample Date	Vapor Result (ug/m3)	Ratio (Vapor / Liquid Equilibrium Concentration)
ASU	Task 1 Dem 1	ASU Ld 49	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	2.8	12/1/2016 0:00	<1.6	0.0013
ASU	Task 1 Dem 1	ASU Ld 49	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.52 J	4/17/2017 0:00	15	0.0674
ASU	Task 1 Dem 1	ASU Ld 51	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	4.3	12/1/2016 0:00	46	0.0250
ASU	Task 1 Dem 1	ASU Ld 52	U2	Trichloroethene	4.28E-01	1/1/2016 0:00	2.9	1/1/2016 0:00	170	0.1369
ASU	Task 1 Dem 1	ASU Ld 52	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	6	5/1/2016 0:00	4.8 J	0.0019
ASU	Task 1 Dem 1	ASU Ld 52	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	0.91	8/1/2016 0:00	77	0.1976
ASU	Task 1 Dem 1	ASU Ld 56	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	7.5	8/1/2016 0:00	560	0.1744
ASU	Task 1 Dem 1	ASU Ld 52	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	0.73	4/17/2017 0:00	47	0.1504
ASU	Task 1 Dem 1	ASU Ld 56	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	9.3	5/1/2016 0:00	1000	0.2511
ASU	Task 1 Dem 1	ASU Ld 54	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	19	5/1/2016 0:00	360	0.0443
ASU	Task 1 Dem 1	ASU Ld 54	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	20	8/1/2016 0:00	880	0.1028
ASU	Task 1 Dem 1	ASU Ld 54	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	21	12/1/2016 0:00	350	0.0389
ASU	Task 1 Dem 1	ASU Ld 54	U2	Trichloroethene	4.28E-01	4/17/2017 0:00	20	4/17/2017 0:00	53	0.0062
ASU	Task 1 Dem 1	ASU Ld 55	U2	Trichloroethene	4.28E-01	8/1/2016 0:00	25	8/1/2016 0:00	2900	0.2709
ASU	Task 1 Dem 1	ASU Ld 55	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	29	12/1/2016 0:00	28	0.0023
ASU	Task 1 Dem 1	ASU Ld 69	U2	Trichloroethene	4.28E-01	5/1/2016 0:00	6.4	5/1/2016 0:00	360	0.1314
ASU	Task 1 Dem 1	ASU Ld 52	U2	Trichloroethene	4.28E-01	12/1/2016 0:00	2.5	12/1/2016 0:00	110	0.1028
ERM	Suppl Site 6	MH-113267	U1	Trichloroethene	4.28E-01	8/11/2016	599	8/11/2016	47,700	0.1860
ERM	Suppl Site 6	MH-113267	U1	Trichloroethene	4.28E-01	9/7/2016	515	9/7/2016	27,700	0.1256
ERM	Suppl Site 6	MH-113267	U1	Trichloroethene	4.28E-01	10/5/2016	740	10/5/2016	115,000	0.3630
ERM	Suppl Site 6	MH-113266	U1	Trichloroethene	4.28E-01	8/11/2016	312	8/11/2016	50,800	0.3803
ERM	Suppl Site 6	MH-113266	U1	Trichloroethene	4.28E-01	9/7/2016	402	9/7/2016	1,730	0.0101
ERM	Suppl Site 6	MH-113266	U1	Trichloroethene	4.28E-01	10/5/2016	547	10/5/2016	5,950	0.0254
ERM	Suppl Site 6	MH-113265	U1	Trichloroethene	4.28E-01	8/11/2016	80	8/11/2016	21,900	0.6393
ERM	Suppl Site 6	MH-113265	U1	Trichloroethene	4.28E-01	9/7/2016	236	9/7/2016	18,100	0.1791
ERM	Suppl Site 6	MH-113265	U1	Trichloroethene	4.28E-01	10/5/2016	432	10/5/2016	2,100	0.0114
ERM	Suppl Site 6	MH-113264	U1	Trichloroethene	4.28E-01	8/11/2016	184	8/11/2016	6,030	0.0765
ERM	Suppl Site 6	MH-113264	U1	Trichloroethene	4.28E-01	9/7/2016	306	9/7/2016	31,400	0.2397
ERM	Suppl Site 6	MH-113264	U1	Trichloroethene	4.28E-01	10/5/2016	349	10/5/2016	10,300	0.0689
ERM	Suppl Site 6	MH-112655	U1	Trichloroethene	4.28E-01	10/5/2016	<5	10/5/2016	22	0.0102
ERM	Suppl Site 6	MH-113263	U1	Trichloroethene	4.28E-01	10/5/2016	259	10/5/2016	9,810	0.0885
ERM	Suppl Site 6	MH-112608	U1	Trichloroethene	4.28E-01	10/5/2016	<5	10/5/2016	7,990	3.7322
ERM	Suppl Site 6	MH-112035	U1	Trichloroethene	4.28E-01	10/5/2016	204	10/5/2016	2,020	0.0231
GSI	Suppl Site 17	MH A	U1	Trichloroethene	4.28E-01	10/18/2017	1.4J	10/18/2017	38.3	0.0639
GSI	Suppl Site 17	MH A	U1	Dichloroethene, cis-1,2-	1.87E-01	10/18/2017	169	10/18/2017	2830	0.0893
GSI	Suppl Site 17	MH B	U1	Trichloroethene	4.28E-01	10/18/2017	<1	10/18/2017	35.1	0.0820
GSI	Suppl Site 17	MH B	U1	Dichloroethene, cis-1,2-	1.87E-01	10/18/2017	<2.5	10/18/2017	8.8	0.0188
GSI	Suppl Site 17	MH C	U1	Trichloroethene	4.28E-01	10/18/2017	<1	10/18/2017	2.8	0.0065
GSI	Suppl Site 17	MH C	U1	Dichloroethene, cis-1,2-	1.87E-01	10/18/2017	3.2J	10/18/2017	5.4	0.0090
GSI	Suppl Site 17	MH D	U1	Trichloroethene	4.28E-01	10/18/2017	<1	10/18/2017	6.8	0.0159
GSI	Suppl Site 17	MH D	U1	Dichloroethene, cis-1,2-	1.87E-01	10/18/2017	<2.5	10/18/2017	2.5	0.0053

Notes:

1. Dataset includes paired results for sewer liquid and sewer vapor. Samples were paired by manhole and collection date. Only normal samples were included (i.e., table does not include field duplicates).
2. For calculations, a detection limit substitution was done for groundwater samples. Attenuation factors were not calculated if the the liquid and vapor results were both below detection limits.
3. The table includes primary and secondary COCs. To determine the COCs, the maximum VOC concentrations in sewer liquids were determined for each site. The primary COC was defined as the VOC with the highest max concentration; secondary COCs were defined as those found at 15% or more of the primary concentration.
4. Henry's Law Constant from TCEQ TRRP PCL Tables (2018).
5. Liquid equilibrium concentration calculated as liquid result (ug/L) x H (unitless) x 1000 (L/m3).
6. Matrix U1 = sanitary sewer, U2 = land drain, U3 = combined storm and sanitary sewer, U4 = utility tunnel, U6 = storm sewer

APPENDIX F. CONCEPTUAL MODEL FOR SEWER/UTILITY TUNNEL VAPOR INTRUSION



CONCEPTUAL MODEL FOR SEWER/ UTILITY TUNNEL VAPOR INTRUSION

**Sewers and Utility Tunnels as Preferential Pathways for
Volatile Organic Compound Migration into Buildings:
Risk Factors and Investigation Protocol**

ESTCP Project ER-201505

November 2018

Version 2

Thomas McHugh and Lila Beckley



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LIST OF ACRONYMS

COC.....	Chemical of concern
DCE.....	Dichloroethene
DoD.....	Department of Defense
ESTCP.....	Environmental Security Technology Certification Program
ft.....	Feet
NAPL.....	Nonaqueous phase liquid
PCE.....	Tetrachloroethene
TCE.....	Trichloroethene
µg/m ³	micrograms per cubic meter
USEPA.....	United States Environmental Protection Agency
VI.....	Vapor intrusion
VOC.....	Volatile organic compound

KEY TERMS USED IN THIS DOCUMENT

Vapor intrusion	Migration of VOCs from any subsurface source into an overlying building.
Conventional vapor intrusion	Migration of VOCs from a subsurface source into an overlying building by advection and/or diffusion through soil (i.e., not through a preferential pathway). These mechanisms for vapor entry into buildings can also be viewed as “soil gas intrusion.” The term “conventional vapor intrusion” used in this document refers to the standard conceptual model that has historically and most commonly been utilized to describe VOC flux from the subsurface into buildings.
Preferential pathway	A migration pathway from a subsurface source that supports higher VOC flux/discharge into a building compared to transport through bulk soil. This general term typically includes features such as elevator shafts and dry wells that can enhance vertical transport from a VOC source below the building into the building and features such as sewers and utility tunnels that can enhance both lateral and vertical transport of VOCs. The term “sewer/utility tunnel vapor intrusion” or “sewer/utility tunnel VI” used in this document refers to VOC flux from the subsurface into buildings through this specific preferential pathway.
Sewer/utility tunnel vapor intrusion (sewer/utility tunnel VI)	A sewer or utility tunnel that supports higher VOC flux/discharge into a building compared to transport through bulk soil. The VOC flux is through the interior of the sewer line or tunnel. Sewer/utility tunnel vapor intrusion has also been referred to as “pipe VI” (Guo et al. 2015). Sewers or utility tunnels can enhance VOC transport into a building from a VOC source that is laterally separated from the building (i.e., not located directly below the building).

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1.0 INTRODUCTION

In recent years, a number of sites have been identified with sewer or utility tunnel VI. In many cases, the importance of the sewer or utility tunnel was identified only after extensive site characterization and vapor intrusion testing based on the conventional, or standard, vapor intrusion conceptual model (see Figure 1.1, left panel). We have utilized field investigation results obtained through ESTCP Project ER-201505 along with information compiled from other published and unpublished sources to develop a conceptual model for sewer/utility tunnel vapor intrusion (see Figure 1.1, right panel). Supporting documentation for this conceptual model is provided in the ESTCP Project ER-201505 Final Report (McHugh and Beckley 2018a). The Final Report also includes a recommended protocol for evaluation of sewer/utility tunnel VI as part of vapor intrusion investigations (McHugh and Beckley 2018b).

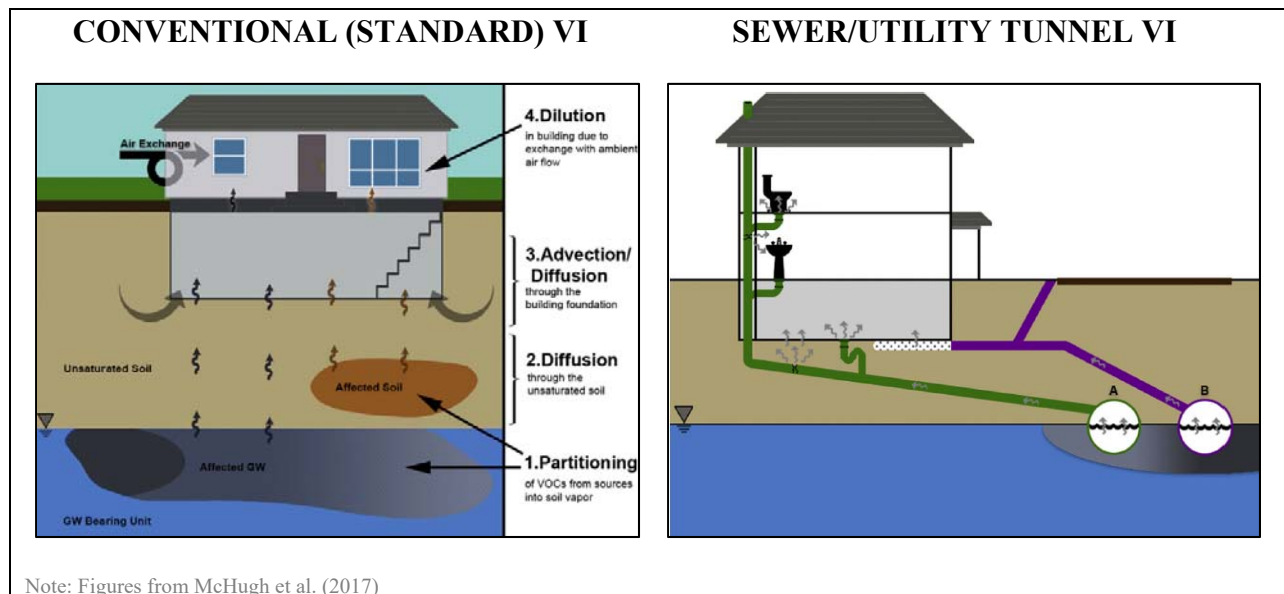


Figure 1.1 Conceptual Model for Conventional (Standard) Vapor Intrusion vs. Sewer/Utility Tunnel Vapor Intrusion

Sewer/utility tunnel VI requires:

- A subsurface source of VOCs (i.e., NAPL, soil contamination, or a groundwater plume);
- A sewer line or utility tunnel connecting the subsurface source to a building; and
- A mechanism for VOC entry from the sewer/utility tunnel into the building.

This conceptual model focuses on VOC migration through the interior of sewers and utilities (i.e., inside “pipes” rather than through utility backfill material). The conceptual model also covers: i) typical background concentrations of VOCs in sanitary sewers, ii) variability in VOC concentrations through time, iii) sites with higher risk and lower risk for sewer/utility tunnel vapor intrusion, iv) migration of VOCs within sewers/utility tunnels, and v) VOC migration from sewers and utility tunnels into buildings.

2.0 BACKGROUND VOC CONCENTRATIONS IN SANITARY SEWERS

Because most buildings are connected to sanitary sewers, sanitary sewers are the most common conduit for sewer/utility tunnel VI. In addition to acting as preferential pathways for vapor intrusion, sanitary sewers may contain VOCs from other sources such as the permitted or non-permitted disposal of VOC-containing waste. Typical background concentrations of VOCs in sewers are summarized in Table 2.1.

Table 2.1 Typical Background VOC Concentrations in Sewer Vapor

Analyte	No. Manholes Tested	No. Samples	Det Freq (%)	10th (µg/m³)	Median (µg/m³)	90th (µg/m³)	Maximum (µg/m³)
Common Chlorinated VOCs at Remediation Sites							
Tetrachloroethene	20	31	90%	0.35	3.2	68	550
Trichloroethene	19	30	70%	0.56	2.6	16	85
Dichloroethene, cis-1,2-	20	31	55%	0.35	0.67	7.5	20
Common Petroleum VOCs at Remediation Sites							
Benzene	55	98	79%	0.32	1.1	4.3	89
Toluene	56	99	98%	1.5	20	280	3300
Ethylbenzene	56	99	74%	0.27	1.4	8.9	190
Xylene, m,p-	57	100	83%	0.82	3.4	21	57
Xylene, o-	58	101	78%	0.34	1.2	4.4	16
Other VOCs							
Acetone	56	99	100%	15	47	200	4000
Bromodichloromethane	58	101	86%	0.44	16	86	540
Butanone, 2- (MEK)	57	100	86%	1.9	4.3	14	66
Carbon disulfide	58	101	99%	3	20	180	940
Carbon tetrachloride	58	101	60%	0.41	0.73	4.4	6
Chloroform	103	249	82%	1	26	360	4000
Chloromethane	58	101	94%	1.1	2	12	100
Dibromochloromethane	58	101	69%	0.67	5.2	33	99
Dichlorodifluoromethane	58	101	77%	1.2	2.3	9.8	38
Methylene Chloride	58	101	97%	0.74	5.1	35	110
Trichlorofluoromethane	58	101	53%	1.1	1.8	11	8.4

Notes: 1) Vapor samples were collected from background manhole locations. 2) Detection frequency was calculated as the number of detected results divided by the total number of samples, multiplied by 100. 3) For the percentile calculations, the detection limit was substituted for non-detects. Percentiles were only calculated if the detection frequency was greater than 10%. 4) See McHugh and Beckley (2018a) for details on the data underlying this table.

As shown in Table 2.1, a number of VOCs are commonly detected in vapor samples collected from sewer manholes not in close proximity (i.e., >200 ft) to known groundwater plumes containing those VOCs. Cis-1,2-DCE, a product of biodegradation of TCE in the subsurface, was detected in 55% of samples suggesting that unidentified subsurface VOC sources are an important source of VOC detections in background sewer manholes. This conclusion relies on an assumption that the cis-1,2-DCE originated from biodegradation of TCE in groundwater rather than biodegradation of TCE within the sewer line. Although this was not directly tested in the ESTCP project, the assumption is reasonable because i) the residence time for TCE within the sewer (i.e., minutes to hours) is likely too short for significant biodegradation and ii) the biodegradation of TCE to cis-1,2-DCE requires anaerobic conditions which are less likely to occur in sewer lines where the flow of shallow water over a rough surface promotes oxygenation.

Other VOCs such as acetone, toluene, and PCE were detected in 90% or more of samples indicating that direct disposal of VOCs into sewers is also an important source of the VOCs detected. For the VOCs that are most commonly risk drivers at corrective action sites (e.g., benzene, PCE, TCE), the concentrations detected in background were typically low (i.e., median <20 µg/m³).

3.0 TEMPORAL VARIABILITY IN SEWER VAPOR VOC CONCENTRATIONS

In sewers and utility tunnels, temporal variability in VOC vapor concentrations is relatively high. As shown in Table 3.1, VOC concentrations commonly vary by >10× across quarterly monitoring events. This variability is likely associated with i) variations in VOC entry into the sewer/utility tunnel particularly when it is within the zone of groundwater fluctuation and ii) variations in ventilation associated with wind, temperature gradients, and other ambient factors. Recommendations to address temporal variability (e.g., sampling frequency) are provided in the protocol for evaluation of sewer/utility tunnel VI (McHugh and Beckley 2018b).

Table 3.1 Summary of VOC Concentration Changes over Different Time Scales

No. Locations Tested	Timeframe	Median and Range of Concentration Ratios (Minimum - Maximum)	Median Coefficient of Variation
26 – Sanitary 8 – Land Drain 9 – Combined Storm/Sanitary 6 – Utility Tunnel	1 – 3 days	3.5 (1.1 – 590)	0.59
11 Sanitary Houston, Texas	12 to 18 months	30 (5.2 – 2200)	2.3
16 Sanitary Layton, Utah	12 to 15 months	34 (1.8-750)	3.7
35 Land Drain 2 Storm Sewer Layton, Utah	12 to 15 months	11 (1.3-1300)	1.3

Notes: 1) Concentration Ratios were calculated as the maximum divided by the minimum VOC concentration measured in a given manhole over the course of the test period. 2) Coefficient of variation estimated assuming a log-normal distribution. 3) Laterals were not considered in the evaluation. 4) See McHugh and Beckley (2018a) for details on the data underlying this table.

4.0 HIGHER RISK AND LOWER RISK SITES

There is some sewer/utility tunnel vapor intrusion concern at sites with both i) a subsurface VOC source and ii) sewers or utility tunnels connected to buildings. These sites, however, can be grouped into higher risk and lower risk categories (see Figure 4.1) based on the interaction between the sewer and the VOC source such as contaminated groundwater.

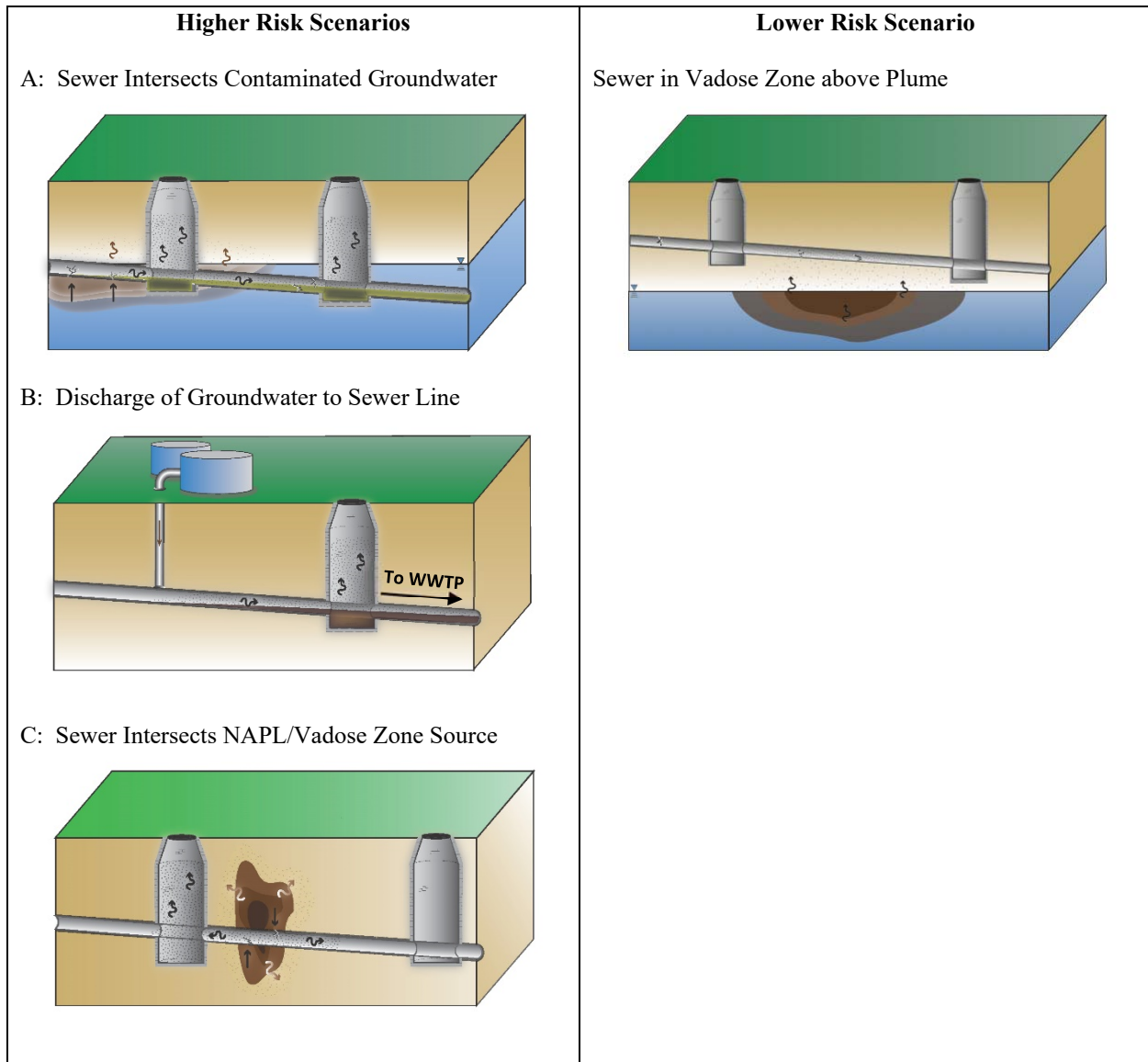


Figure 4.1 Higher Risk and Lower Risk Scenarios for Sewer/Utility Tunnel Vapor Intrusion

As shown in Figure 4.1, higher risk sites are characterized by direct interaction between the subsurface source and the preferential pathway (e.g., the sewer line or tunnel is below the water table) while lower risk sites are characterized by an indirect interaction between the subsurface

source and the preferential pathway (i.e., the sewer or utility tunnel is located in the vadose zone above the groundwater plume or other VOC source). Migration of VOCs from groundwater plumes into the sewer/utility tunnel can occur at both higher risk sites and lower risk sites (see Table 4.1). However, less attenuation of VOC concentrations between groundwater and the sewer vapors was observed at the higher risk sites (i.e., groundwater to sewer attenuation factors were closer to one) compared to the lower risk sites.

Table 4.1 Groundwater to Sewer Attenuation Factors

Site Category	No. Plumes	No. AFs	Attenuation Factor ¹	Attenuation ²
			Median (10 th – 90 th percentiles)	Median (10 th – 90 th percentiles)
A: Direct Interaction (Sewer Below Water Table)	6	65	7.5E-03 (8.4E-05 – 6.5E-02)	130× (12,000× - 15×)
B: Indirect Interaction (Sewer Above Water Table)	28	140	1.4E-04 (2.0E-06 – 5.9E-03)	7,300× (490,000× - 170×)

Notes: 1) Attenuation factor calculated as sewer vapor concentration divided by equilibrium groundwater concentration. 2) Attenuation is the inverse of attenuation factor. 3) See McHugh and Beckley (2018a) for details on the data underlying this table.

For conventional vapor intrusion investigations, focus areas are typically designated as areas above the footprint of subsurface impacts plus a buffer, commonly taken as 100 feet (USEPA 2015), as shown in the left panel of Figure 4.2. At sites where contaminated groundwater enters the sewer (i.e., direct interaction sites), downstream VOC migration in sewer liquid and vapor may result in impacts to buildings located away from the subsurface VOC source (i.e., beyond the 100 ft screening distance commonly used to identify buildings at risk for vapor intrusion (Figure 4.2, right panel).



Figure 4.2 Sewer/Utility Tunnel Vapor Intrusion Risk Area

5.0 MIGRATION OF VOCs WITHIN SEWERS

The migration of VOCs within sewer lines depends on whether the VOCs enter the sewer in the liquid phase or the vapor phase. When contaminated groundwater enters a sewer line, it will flow downstream with the liquid flow in the sewer. VOCs partitioning from the liquid phase into the vapor phase can result in vapor impacts for an extended distance downstream of the subsurface source area. In these cases, the extent of downstream impacts will depend on a number of factors and will be difficult to predict; however, it is possible for these downstream impacts to extend well outside the footprint of the VOC plume in groundwater.

VOCs in the sewer vapor phase can result from partitioning from sewer liquids or from direct vapor entry (i.e., contaminated soil gas). Once in the vapor phase, the direction of movement within a sewer or utility tunnel is somewhat less predictable compared to the liquids. If there are liquids in the sewer, these liquids will flow downslope under the influence of gravity. Friction at the liquid surface commonly creates an advective flow of air within the sewer in the direction of liquid flow (i.e., drag). However, transient pressure gradients can drive air flow upstream or through sewer laterals. Regardless of the direction of vapor movement, when VOCs are not present in sewer liquids, the VOC concentrations in the vapor phase will typically decrease quickly with distance away from the subsurface source (see Figures 5.1 and 5.2). This is because sewers and utility tunnels are vented, allowing both dilution of vapors with ambient air and escape of VOC vapors to the atmosphere.

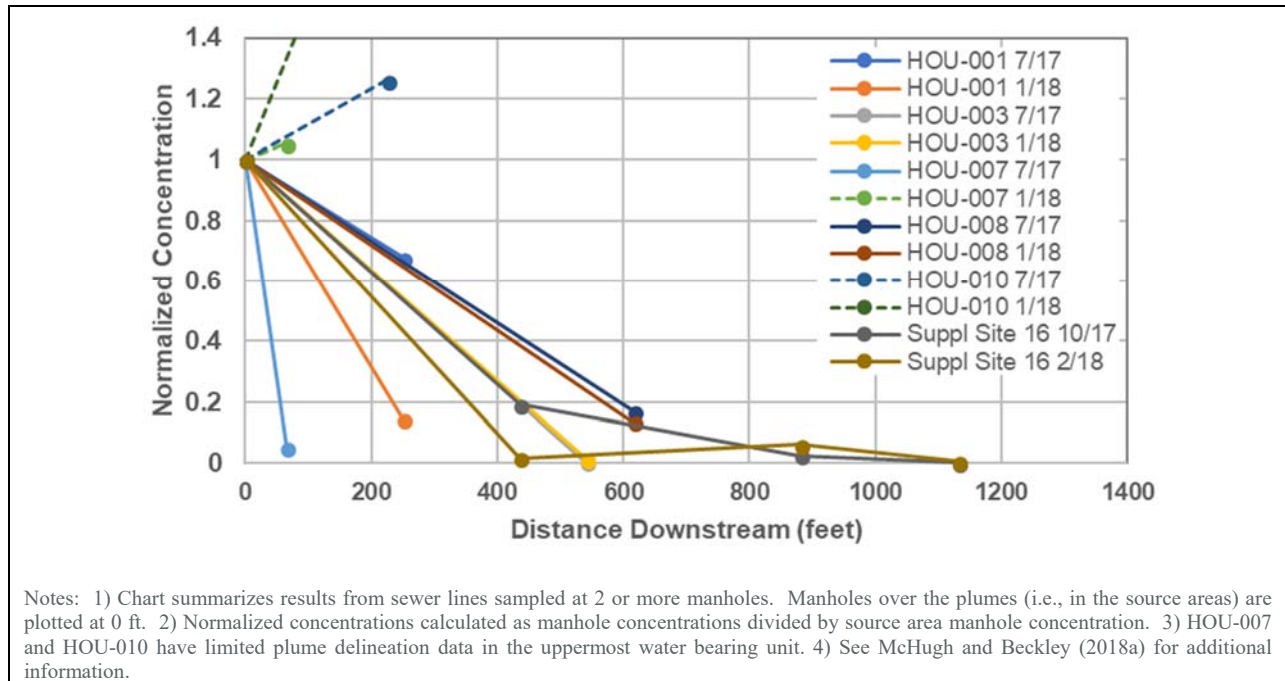


Figure 5.1 Normalized Concentration vs. Distance Downstream of Source Area (Vadose Sites)

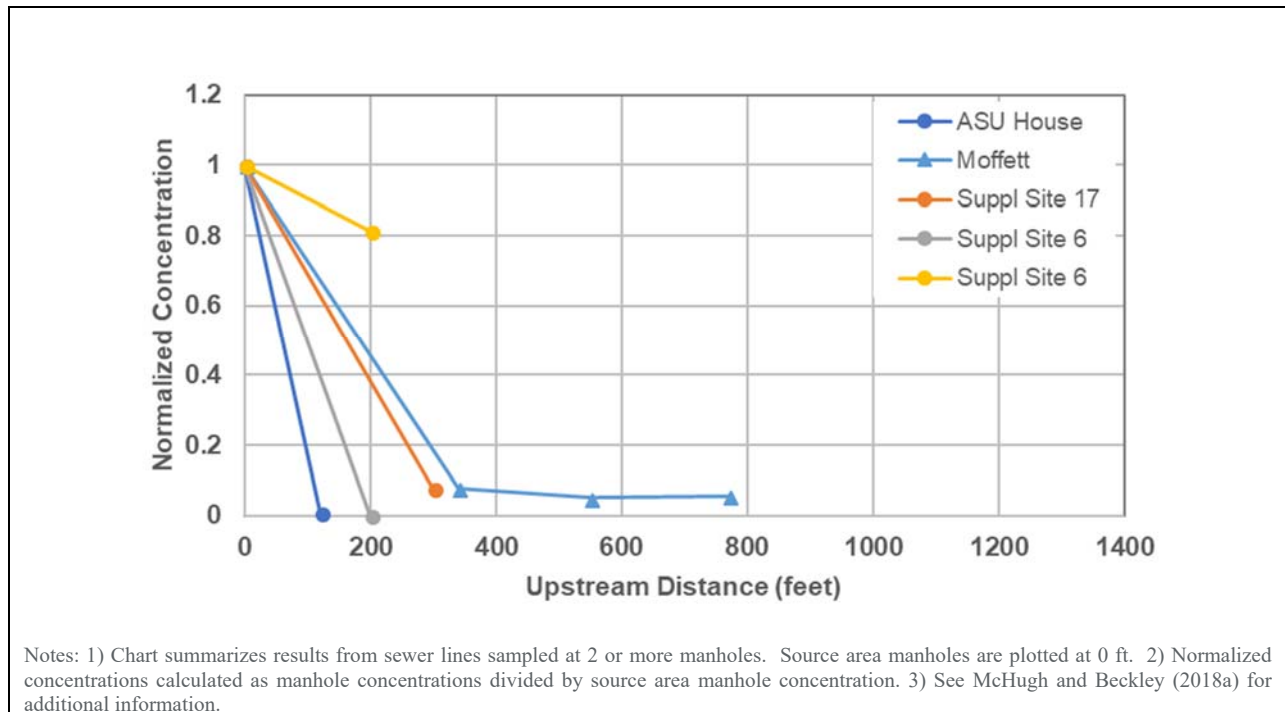


Figure 5.2 Normalized Concentration vs. Distance in Upstream Manholes

6.0 VOC MIGRATION INTO BUILDINGS

The potential for migration of VOCs from sewers or utility tunnels into buildings depends on the integrity of the connections.

Sanitary Sewer Lines: Because sanitary sewers commonly generate noxious odors, building plumbing systems are engineered to prevent gas flow from the sewer into the building. However, failures in these systems can allow gas entry through a variety of mechanisms (Figure 6.1). In buildings with properly constructed and functioning plumbing, we commonly observe high attenuation in VOC concentrations between the sewer line and the building. However, less attenuation is observed in buildings with plumbing failures.

Utility Tunnels: At DoD facilities and other campuses, telephone lines, electrical lines, and other utilities are commonly connected to buildings through utility tunnels. These tunnel connections often do not include systems to limit gas flow because the tunnels may not be an expected source of noxious odors. As a result, VOC attenuation from utility tunnels into buildings is likely to be low compared to buildings with properly functioning sanitary sewer connections (i.e., less decrease in VOC concentration from the utility tunnel into the building compared to the sanitary sewer into the building).

Other Sewer Lines: Many building foundations have drain systems to prevent the infiltration of shallow groundwater or infiltrating storm water. In some areas, these drain systems are connected to the local storm sewer system (or a separate land drain sewer system). In these cases, VOCs can migrate from the storm sewer line to the building foundation and then migrate through the building foundation via the same mechanisms as with conventional vapor intrusion (for example, see Guo et al. (2015)).

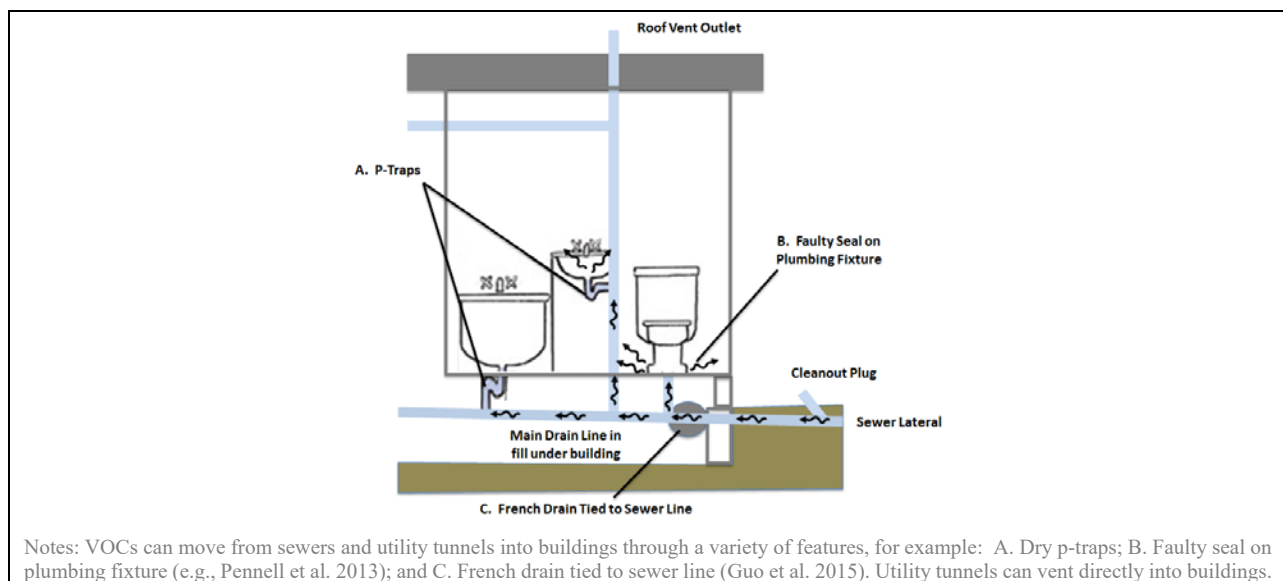


Figure 6.1 Potential Entry Points into Buildings

Observed attenuation of VOCs in vapors from sewers into building indoor air is summarized in Table 6.1.

Table 6.1 Sewer to Building VOC Attenuation

Building Types	Range of Attenuation
Buildings with Known Sewer/Utility Tunnel VI Issues	30 – 50×, or greater
Buildings with No Known Issues	2 of 12 buildings: 20× – 50×, or greater 10 of 12 buildings: 100×, or greater

Notes: 1) See McHugh and Beckley (2018a) for details on the data underlying this table.

7.0 OVERVIEW OF SEWER/UTILITY TUNNEL VI MITIGATION

Sewer/utility tunnel VI may be mitigated at any of three steps along the VOC transport route: i) entry of VOCs into the sewer, ii) the sewer main line, or iii) migration of VOCs from the sewer into the building (see Table 7.1).

Entry of VOCs into Sewer or Utility Tunnel: Contaminated groundwater commonly enters a sewer line or utility line through cracks or unsealed joints present in the area where the line passes through the contaminant plume or source area. The infiltration of contaminated groundwater can be reduced or eliminated by installing a plastic liner in the sewer line and manholes within the plume area. Replacement of damaged sewer lines can also be done. Alternatively, sewer lines can be re-routed to avoid the contaminated area.

Ventilation of the Sewer Main or Utility Tunnel: VOC migration from sewers and utility tunnels into buildings can be controlled by negative pressure ventilation of the sewer line. Within the depressurization zone, this will draw vapors from the sewer to the ventilation points allowing for treatment and/or discharge to the atmosphere.

Migration of VOCs from the Sewer into the Building: For some buildings, repair or proper maintenance of the building plumbing (e.g., adding water to a dry p-trap) may be sufficient to prevent VOC migration from the sewer into the building. Alternatively, a check valve (for both liquids and gas) can be installed within the sewer line. A liquid and gas check valve allows the flow of liquid down the sewer line but prevents the flow of either liquids or gas upwards. This type of check valve can be installed in the sewer lateral to protect an individual building or within a sewer main line (upstream of the VOC source) to protect all structures upstream of the check valve.

Table 7.1 Examples of Sewer Mitigation Methods Used to Control Vapor Intrusion

Site	Mitigation Method	Reference
#4. Dry Cleaner Site, Denmark	Depressurization of sewer line	Nielsen et al. (2014)
#5. Petroleum Solvent LNAPL, United Kingdom	Replaced collapsed portion of sanitary sewer line and installed an interior liner to prevent infiltration of LNAPL	Macklin et al. (2014)
#6. TCE Plume, Indianapolis, Indiana	Relocated sewer line so that it did not intersect the contaminated groundwater plume	ERM (2017)
#7. Various Sites, Denmark	Paper summarizes several approaches for sewer line mitigation: - Repairing or lining sewer line to prevent infiltration of liquids or vapors - Sealing or repairing leaky/damaged water traps inside of building - Passive ventilation of manholes - Depressurization of sewer system	Nielsen and Hivdberg (2017)
#10. Tranguch Gasoline Site, Pennsylvania	Installed check valves (backflow preventers) in each of 292 sewer lateral lines connecting residences to the sanitary sewer line containing elevated petroleum vapor concentrations. For VI mitigation, the check valve must control both liquid and vapor flow (e.g., Checkmate inline check valve).	Jarvela et al. (2004)
#11. DoD Facility	Sewer line ventilation	Riis et al. (2010) Nielsen and Hivdberg (2017) ERM (2017) Holton and Simms (2018)
#12. TCE Plume, California	Repaired sewer line	Viteri et al. (2018)
#14. Navy Facility, New Jersey	Installed liner (cured in-place pipe (CIPP)) inside sewer line to prevent infiltration of contaminated groundwater	Turco (1996)

Notes: 1) See McHugh and Beckley (2018a) for more information.

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APPENDIX G. PROTOCOL FOR SEWER/UTILITY TUNNEL VAPOR INTRUSION INVESTIGATIONS



PROTOCOL FOR SEWER/UTILITY TUNNEL VAPOR INTRUSION INVESTIGATIONS

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LIST OF ACRONYMS

AFB	Air Force Base
ASU	Arizona State University
COC	Chemical of concern
DoD	Department of Defense
ESTCP	Environmental Security Technology Certification Program
GC/MS	Gas Chromatograph/Mass Spectrometer
NAPL	Nonaqueous phase liquid
OU	Operable unit
PCE	Tetrachloroethylene
QA	Quality assurance
QC	Quality control
USEPA	United States Environmental Protection Agency
VI	Vapor intrusion
VOC	Volatile organic compound

KEY TERMS USED IN THIS DOCUMENT

Vapor intrusion	Migration of VOCs from any subsurface source into an overlying building.
Conventional vapor intrusion	Migration of VOCs from a subsurface source into an overlying building by advection and/or diffusion through soil (i.e., not through a preferential pathway). These mechanisms for vapor entry into buildings can also be viewed as “soil gas intrusion.” The term “conventional vapor intrusion” used in this document refers to the standard conceptual model that has historically and most commonly been utilized to describe VOC flux from the subsurface into buildings.
Preferential pathway	A migration pathway from a subsurface source that supports higher VOC flux/discharge into a building compared to transport through bulk soil. This general term typically includes features such as elevator shafts and dry wells that can enhance vertical transport from a VOC source below the building into the building and features such as sewers and utility tunnels that can enhance both lateral and vertical transport of VOCs. The term “sewer/utility tunnel vapor intrusion” or “sewer/utility tunnel VI” used in this document refers to VOC flux from the subsurface into buildings through this specific preferential pathway.
Sewer/utility tunnel vapor intrusion (sewer/utility tunnel VI)	A sewer or utility tunnel that supports higher VOC flux/discharge into a building compared to transport through bulk soil. The VOC flux is through the interior of the sewer line or tunnel. Sewer/utility tunnel vapor intrusion has also been referred to as “pipe VI” (Guo et al. 2015). Sewers or utility tunnels can enhance VOC transport into a building from a VOC source that is laterally separated from the building (i.e., not located directly below the building).

Acknowledgements: This research is supported by the U.S. Department of Defense, through ESTCP Project ER-201505. This project would not have been possible without the support and contribution of numerous individuals and organizations. The authors thank project team members Ignacio Rivera-Duarte (Navy Space and Naval Warfare Systems Center Pacific), Steve Hammett and Travis Lewis (NAVFAC EXWC), Dan Groher (USACE), Rich Kapuscinski (USEPA), and Alana Lee (USEPA Region 9). For invaluable project support, we also thank Andrea Leeson and ESTCP program staff at Noblis; the ER-201501 project team including Yuanming Guo and Paul Dahlen (ASU) and Paul Johnson (Colorado School of Mines); Tony Miller and the Entanglement Technologies team; Terry Sullivan (Brookhaven National Laboratory); and Laura Turpen (TestAmerica Laboratories). We are also grateful for the many people involved with demonstration site access and support, including Gary Munekawa, Wilson Doctor, Karen Campbell, and Wes Baumann (Navy); Rob Scofield (GSI); John DeWitt (EKI Environmental); and Chris Lutes (CH2M), Rob Uppencamp (Arcadis) and the USEPA VI Research Duplex team.

EXECUTIVE SUMMARY

The potential for sewers and utility tunnels to act as preferential pathways for vapor intrusion (VI) should be evaluated in conjunction with standard VI investigations. The goal of this document is to provide a step-wise procedure for this evaluation. This sewer/utility tunnel VI investigation protocol is based on research findings from ESTCP Project ER-201505 (McHugh and Beckley 2018b). It includes i) initial screening, ii) field investigation of sewers/utility tunnels, and iii) building testing (see Figure ES.1).

The protocol is intended to supplement work plans for standard VI investigations. Users are expected to be familiar with basic sampling techniques (e.g., collecting air samples in Summa-type canisters) prior to use of this protocol. Guidance on basic techniques is provided elsewhere in a variety of documents (ITRC 2014; USEPA 2015) and state-specific VI guides.

No investigation protocol can fully account for all possible site conditions and factors. The user of this protocol should rely on professional judgement when applying it to ensure adequate evaluation of sewer/utility tunnel vapor intrusion.

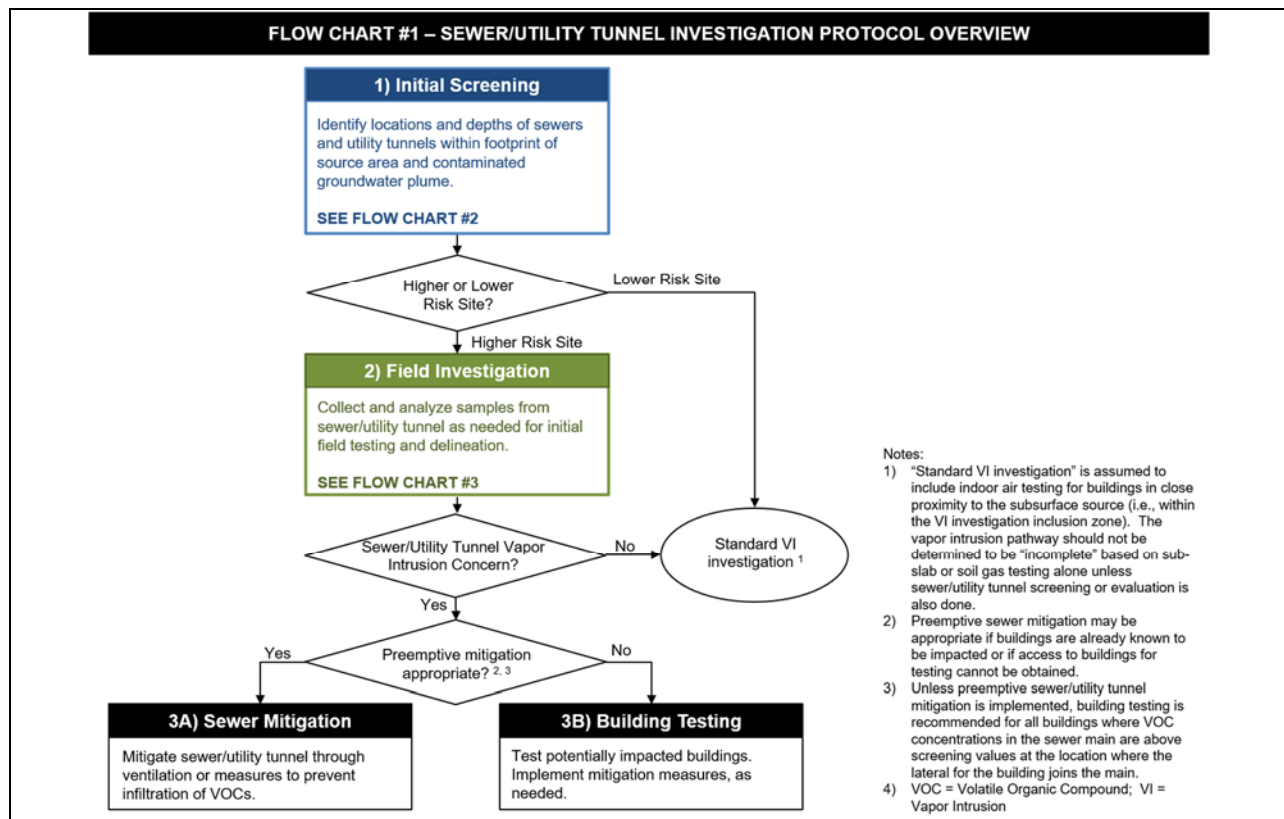


Figure ES.1 Sewer/Utility Tunnel VI Investigation Protocol

INITIAL SCREENING

Initial screening is a desktop exercise to categorize sites as higher risk or lower risk with respect to sewer/utility tunnel VI. Higher risk sites include sites where i) higher VOC concentrations may occur within the sewer or tunnel based on its proximity to the source and ii) VOCs may migrate through the sewer or tunnel (e.g., due to the entry of contaminated groundwater (see Figure ES.2)) resulting in possible VI risks for buildings located away from the subsurface source (i.e., outside of standard VI screening distances).

Higher risk sites merit sampling of the sewer/utility tunnel during the initial field investigation phase of the VI investigation. For lower risk sites, a conventional VI investigation (including testing of indoor air) is recommended without initial sampling of the sewer or utility tunnel. Further consideration of the sewer or utility tunnel may be warranted if conventional investigation results suggest that preferential pathways are a concern.

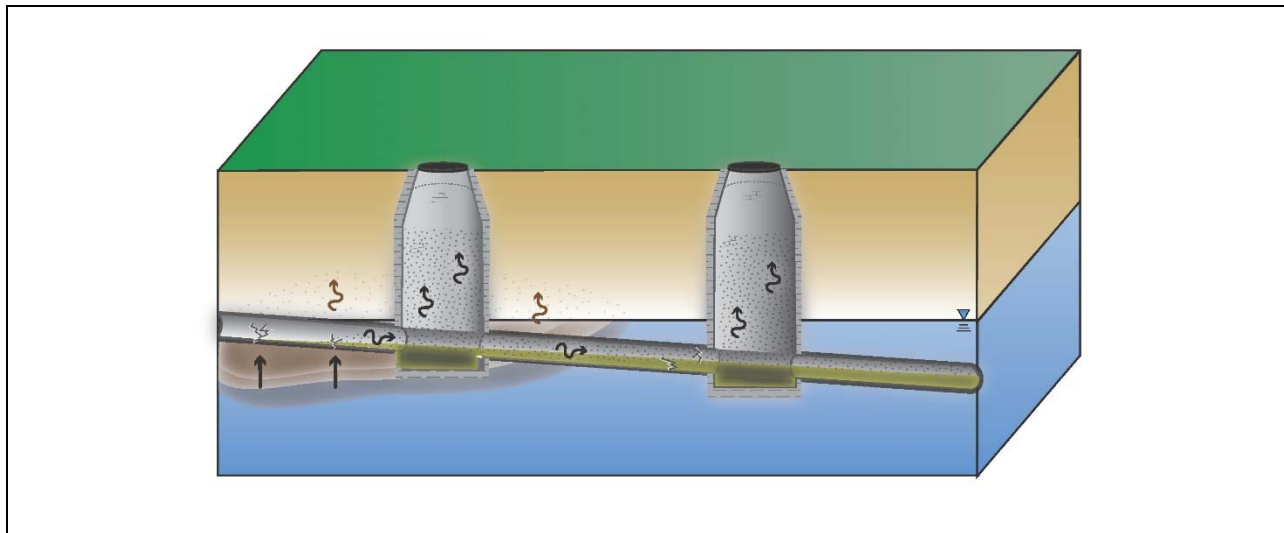


Figure ES.2 Example Higher Risk Scenario for Sewer/Utility Tunnel Vapor Intrusion

FIELD INVESTIGATION

Sewer/utility tunnel sampling is recommended for higher risk sites. The initial field testing consists of collecting vapor samples from the three highest risk locations identified. The highest risk locations are access points located within or immediately downstream of the area where the sewer or utility tunnel interacts with the contaminated groundwater or NAPL area (see Figure ES.3). Access points are typically manholes or other locations where a sample line (tubing) can be run for sample collection. The protocol emphasizes sampling vapor within sewers or utility tunnels. Sampling procedures are provided in Section 3.2.

Initial field test results should be compared against conservative screening values. Our field demonstration results suggest that worst-case sewer to indoor air attenuation factors are similar to

sub-slab to indoor air attenuation factors. These results indicate that use of screening values equal to sub-slab screening values would be conservative and protective for evaluation of sewer vapor testing results. If COC concentrations are above conservative screening values, then further action is warranted to delineate and address the sewer/utility tunnel impacts. Although not addressed in detail in this protocol, an overview of options for building testing and preemptive sewer mitigation is provided in the ESTCP Project ER-201505 Final Report, Section 6.3.6.

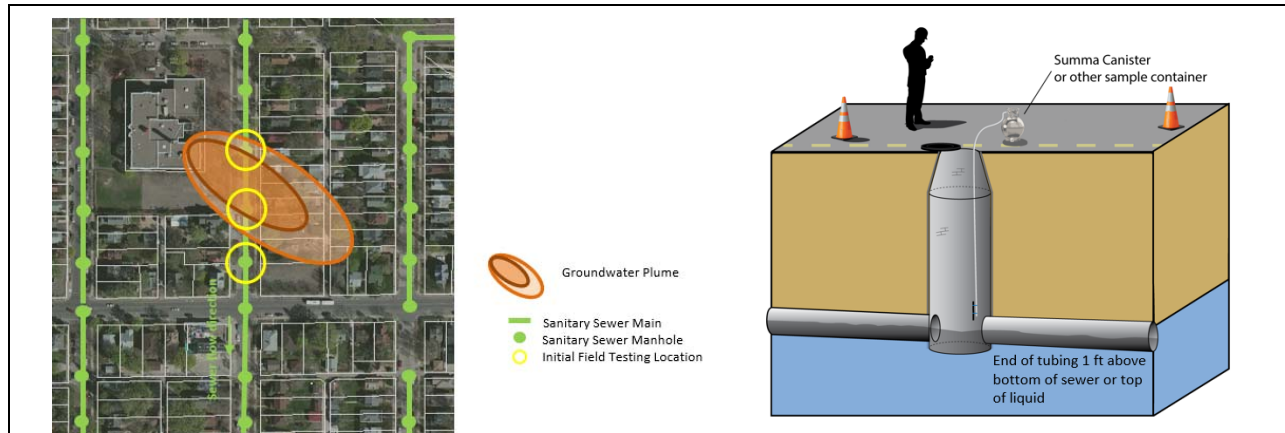


Figure ES.3 Example Initial Field Investigation Sample Locations

1.0 APPLICABILITY

Storm sewers, sanitary sewers, and utility tunnels have been identified as important preferential transport pathways for volatile organic compound (VOC) vapor intrusion (VI) at a small but growing number of sites. Examples include: vinyl chloride VI at a former dry cleaner site (Nielsen et al. 2014), several houses near a tetrachloroethene (PCE) plume in Denmark (Riis et al. 2010), the Arizona State University (ASU) VI Research House at Hill Air Force Base (AFB) Operable Unit (OU) 8 (Johnson 2013), a house at Hill AFB OU 2 (McHugh et al. 2011), and many others. At most of these sites, the importance of sewer/utility tunnel VI was not recognized until late in the investigation process resulting in wasted investigation efforts and delayed response actions. At some of these sites (e.g., Moffett Field Building 107, (McHugh et al. 2012)), vapor concentrations of site VOCs were higher in indoor air than in sub-slab samples, creating a misleading suggestion of an indoor source.

These examples highlight the need to evaluate sewer and utility tunnel VI in conjunction with standard VI investigations. The goal of this document is to provide a step-wise procedure for this evaluation. Users of this document may also wish to use the companion document, Conceptual Model for Sewer/Utility Tunnel Vapor Intrusion (McHugh and Beckley 2018a). The conceptual model document provides additional detail concerning our current understanding of VOC migration through sewers and utility tunnels into buildings. Validation of this investigation protocol and the conceptual model are described in the ESTCP Project ER-201505 Final Report (McHugh and Beckley 2018b).

The screening and investigation procedures recommended in this document were based on field testing conducted under ESTCP Project ER-201505 and other published information on sewer/utility tunnel investigations. The recommended procedures in this protocol may not be appropriate for all sites and are not intended to supersede the use of professional judgement by site environmental practitioners.

1.1 SITE-SPECIFIC CONSIDERATIONS

This investigation protocol is applicable to all sites where a site-specific evaluation of vapor intrusion is necessary. It is expected that most sites have a lower risk for sewer/utility tunnel VI and can be screened out during the initial site screening process. At most sites where sewer/utility VI has been identified to date, the sewer or utility line directly intersects contaminated groundwater. We do not expect this to be a common situation because, at many sites, sewer lines run through the vadose zone above the water table.

1.2 COST

The investigation protocol is a step-wise process. Cost estimates are given below to give the reader an idea of the level of effort and costs for implementation. These estimates assume implementation by experienced personnel. As for any procedure or field program, the time required by inexperienced personnel would be significantly higher.

1.2.1 Initial Screening

The protocol begins with an initial desktop screening step. This step focuses on gathering and evaluating existing site information. These costs are not expected to vary significantly between sites. Estimated costs for completing the initial screening are summarized in Table 1.1.

Table 1.1 Estimated Costs for Initial Screening

Cost Element	Labor Hours	Rate (\$/hour)	Estimated Cost
1. Data Collection and Evaluation: Gather data and identify locations and depths of sewers and utility tunnels within footprint of source area and/or groundwater plume.	8	\$100	\$ 800
2. Documentation: Summarize findings.	2	\$100	\$ 200
Total:			\$1,000

1.2.2 Field Investigation

Based on the initial screening, follow-up field testing is recommended for some sites. The first step of field testing consists of collecting at least 3 vapor samples. Estimated costs are summarized in Table 1.2.

Table 1.2 Estimated Cost of Initial Field Testing

Cost Element	Category	Description	Quantity	Rate (\$)	Estimated Cost
Project Planning and Preparation¹					
	Labor	Senior Project Scientist/Engineer	2	150/hr	\$ 300
	Labor	Project Scientist/Engineer	8	100/hr	\$ 800
		Subtotal			\$1,100
Field Program Implementation²					
	Labor	Project Scientist/Engineer	6	100/hr	\$ 600
	Labor	Project Scientist/Engineer	6	100/hr	\$ 600
	Laboratory	Summa canister rental (assume \$90) and TO-15 analysis (assume \$150) ¹	3	240/sample	\$ 720
		Subtotal			\$1,920
Data Evaluation and Reporting³					
	Labor	Senior Project Scientist/Engineer	4	150/hr	\$ 600
	Labor	Project Scientist / Engineer	12	100/hr	\$1,200
		Subtotal			\$1,800
		TOTAL			\$4,820

Notes: 1) Planning tasks include selection of sampling locations based on data compiled in the screening step, obtaining site access, and obtaining sampling supplies; 2) Does not include travel time, travel or shipping expenses. Collection of 3 sewer vapor samples is assumed, and is based on access to test manholes near the core of the plume or access to test manholes in areas where groundwater intersects sewer lines (i.e., test “worst-case” locations). Additional samples may be needed for plumes with complex geometries, or sites with multiple, independent sets of sewer lines or utility tunnels; 3) Includes review of laboratory results and preparation of data summary tables; and 4) Rates given in \$/hour (labor) or \$/item (non-labor categories).

These estimates consider implementation of the protocol itself (e.g., selecting sample locations, obtaining site access, collecting vapor samples from manholes, etc.). They do not include travel time, expenses, or other general costs unrelated to the protocol itself.

Depending on the results of initial field testing, follow-up delineation testing and other fieldwork may be needed. Costs will vary based on site-specific factors such as the size of the area of concern and number of potential sewers/utility tunnels and buildings to test. Costs will likely vary more, however, by the manner in which the protocol is implemented. The protocol is written to allow flexibility in sample analysis. If users choose to have samples analyzed by an off-site laboratory, multiple mobilizations may be needed. The most cost-efficient manner in which to implement these steps of the protocol would be to utilize an on-site laboratory or instrument so that field decisions can be made and follow-up sampling done in the same mobilization.

2.0 CONCEPTUAL MODEL

Sewers and utility tunnels are more likely to act as preferential pathways primarily in cases where they directly intersect contaminated groundwater or nonaqueous phase liquid (NAPL) or otherwise interact with high strength source material (e.g., discharge of VOC-impacted water into the sewer) (see Figure 2.1). Sewers and utility tunnels present exclusively in the vadose zone above the contaminated groundwater or NAPL are less likely to act as a preferential pathway (see Figure 2.1, right panel).

Some VI guidance documents suggest that vapors may migrate through the fill material around a sewer line as an alternative to transport through the sewer/utility line. However, for the available examples of sites with sewer/utility tunnel VI, the VOCs have been documented within the sewer pipe itself, rather than the backfill. Although methane from landfills (or other pressurized sources) may migrate through backfill in some cases, this may not be a concern at contaminated sites where no pressure gradient is present to drive flow through the backfill. Backfill material is commonly higher permeability than surrounding native material such that advective flow may occur preferentially within the backfill material. However, for diffusive transport, the VOC concentration gradient and the porosity of the material are more important than the permeability of the material. As a result, diffusive transport through the vadose zone (which is the most common transport mechanism at contaminated sites) is less likely to be influenced by a permeability contrast between backfill and the native material. In addition, in contrast to sewers and utility tunnels, backfill does not typically provide a direct conduit into a building. Although some practitioners have anecdotally mentioned local migration through backfill (e.g., contaminated backfill next to a building), to date, we have not been able to identify published examples of sites with appreciable VOC migration in the fill material but not inside the

What is a Utility Tunnel?

*A **utility tunnel** or **utility corridor** is a passage built underground or aboveground to carry utility lines such as electricity, water, and sewer pipes. Communication utilities like fiber optics, cable television, and telephone cables are also sometimes carried. They may also be referred to as a **services tunnel**, **services trench**, **services vault**, or **cable vault**. Utility tunnels are often installed in large military facilities as well as industrial plants, large institutions, such as universities, hospitals, research labs, and other facilities managed in common. They are not commonly installed in residential areas.*

*A directly buried utility line is **not** a utility tunnel.*

sewer/utility line itself. As a result, we do not recommend a specific focus on testing of backfill as part of a sewer/utility tunnel vapor intrusion investigation.

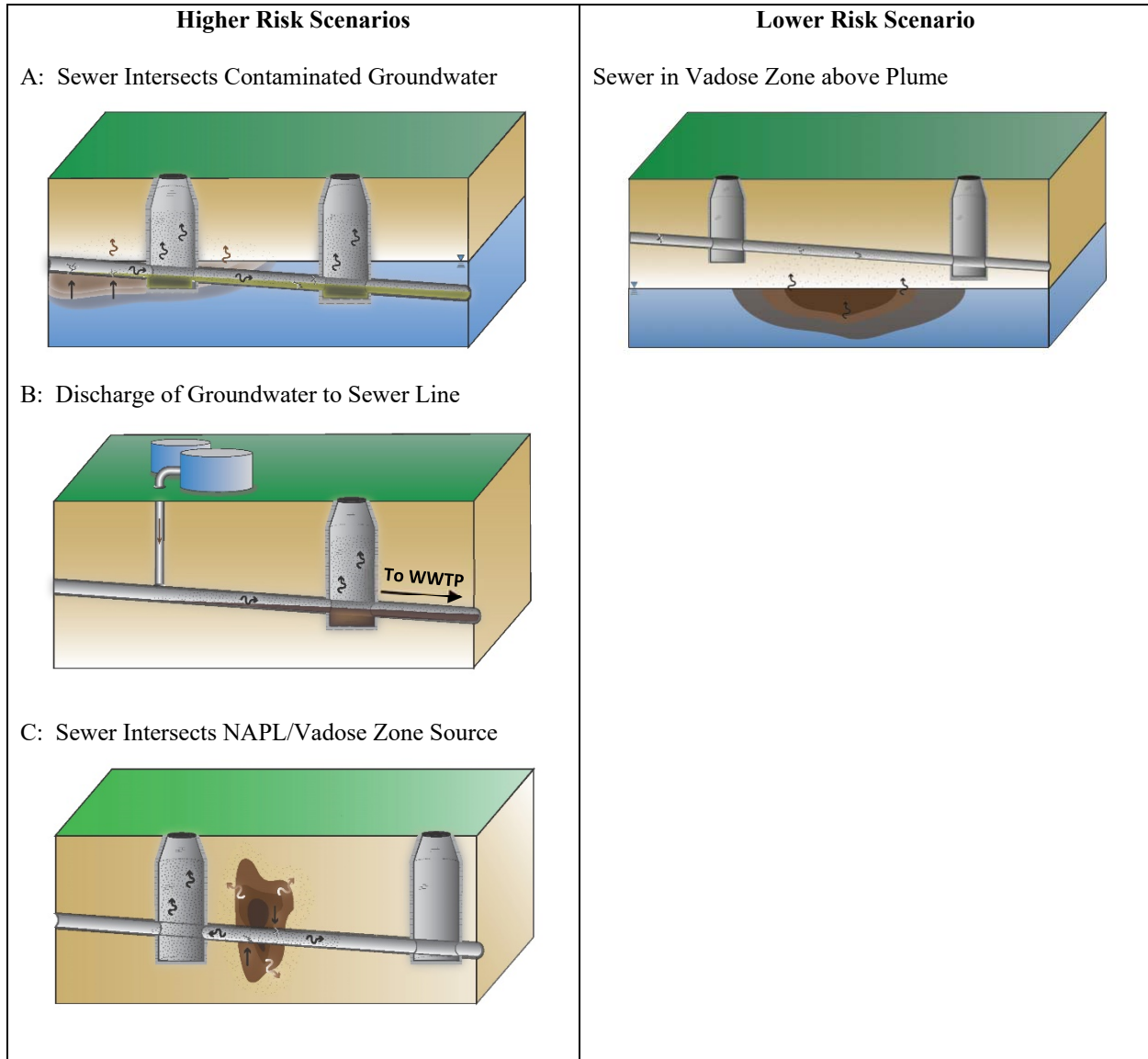


Figure 2.1 Higher and Lower Risk Sites for Sewers/Utility Tunnel Vapor Intrusion

3.0 INVESTIGATION PROTOCOL

The investigation protocol for evaluation of sewer/utility tunnel vapor intrusion is illustrated in Figure 3.1.

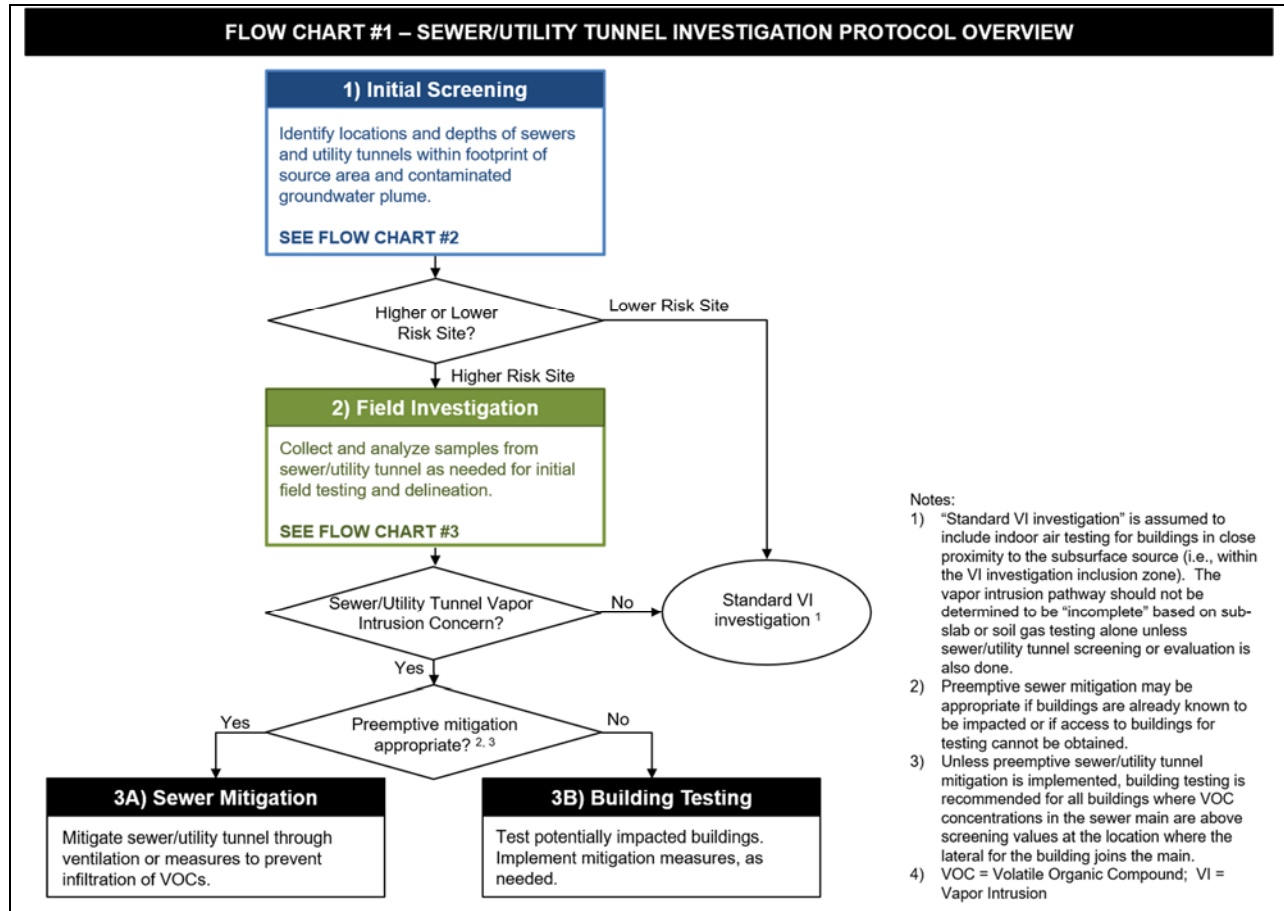


Figure 3.1 Overview of Investigation Protocol

3.1 INITIAL SCREENING

Initial screening is Step 1 from Figure 3.1. The goal of initial screening is to classify sites as higher risk or lower risk for sewer/utility tunnel vapor intrusion. The initial screening has 2 steps:

1. Gather Information (Table 3.1); and
2. Review Information (Figure 3.2).

Table 3.1 Initial Screening Step 1: Gather Required Information

Information	Example Source(s)
1) VOC Source Areas and Plumes: Identify the locations of all VOC source areas (NAPL or other high concentration materials in the vadose zone or in the saturated zone). Identify the extent of VOC plumes in groundwater using applicable groundwater screening values for VI.	Site investigation reports, plume maps.
2) Sewer Lines and Utility Tunnels: Identify the locations of sewer lines and utility tunnels present.	Sewer and/or utility tunnel plat maps. For DoD facilities, contact the base Facilities Manager. For municipal utilities, contact the municipal utility or public works office. If maps are not available, identify lines and tunnels in the area of concern through visual identification of manholes, storm drains, and utility tunnel access points. Use a depth gauge to determine depths of lines and tunnels if necessary.

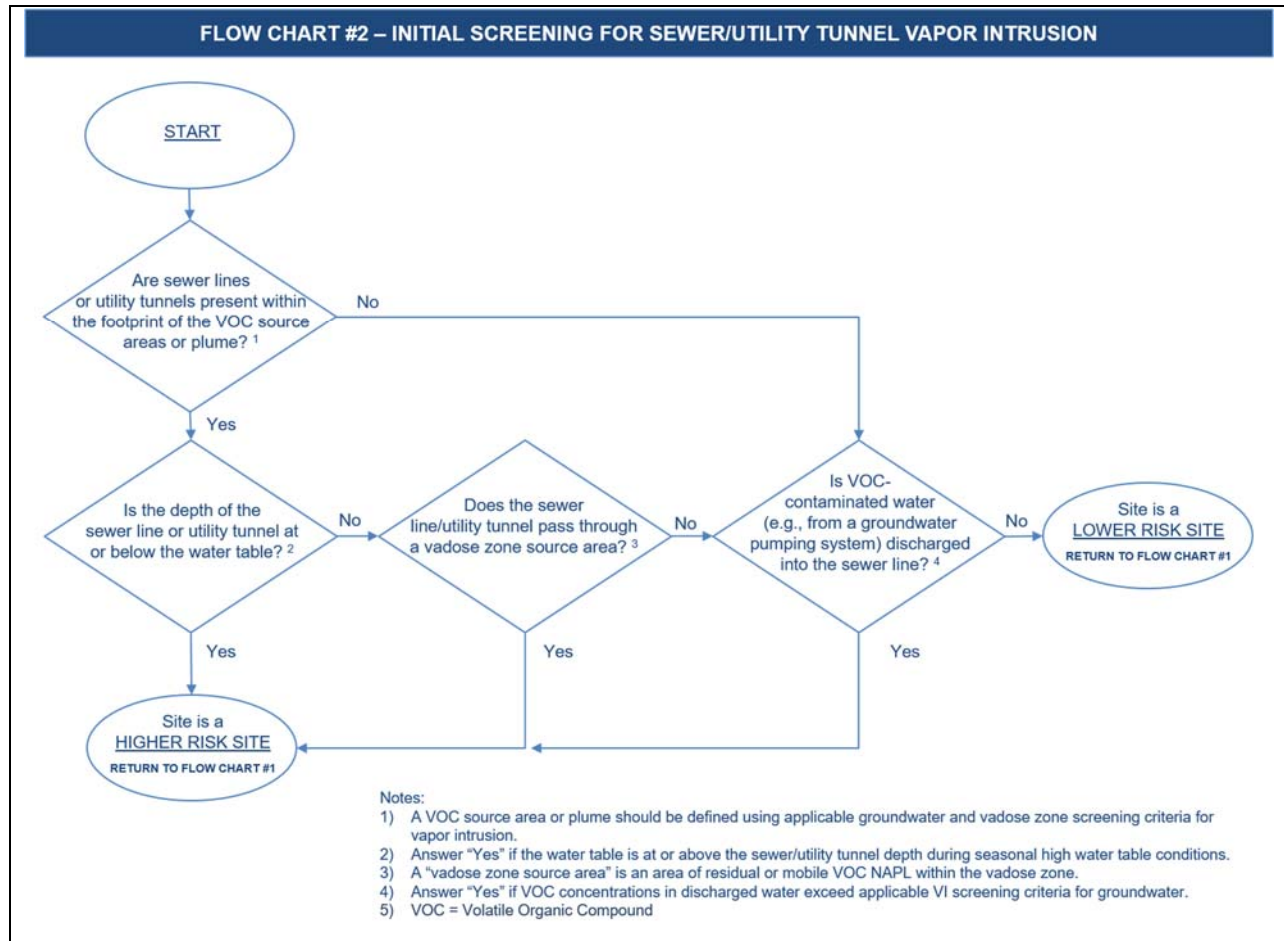


Figure 3.2 Initial Screening Step 2: Review Information using Screening Flow Chart

When sewer/utility tunnel vapor intrusion occurs at lower risk sites, the impacted buildings are typically limited to those within the inclusion area defined for a conventional VI investigation. This is because, at lower risk sites, VOC-containing liquids are not likely to enter the sewer or utility tunnel. As a result, the highest area of VOC vapors will be confined to the immediate vicinity of the subsurface source (i.e., within the VI inclusion area). Therefore, a conventional VI investigation that includes indoor air testing should be sufficient to identify buildings impacted by either conventional or sewer/utility tunnel VI. At lower risk sites, field investigation of sewers/utility tunnels is not recommended unless results from conventional testing suggest VOC entry through a sewer or utility tunnel.

3.2 FIELD INVESTIGATION FOR HIGHER RISK SITES

For higher risk sites, testing of the sewer/utility tunnel is recommended to determine the presence or absence of VOCs within the sewer/tunnel (i.e., Step 2 from Figure 3.1). The field investigation program consists of i) initial testing to determine the presence or absence of VOCs, ii) delineation of sewer/utility impacts, and iii) testing of buildings connected to affected sewers/tunnels (see Figure 3.3). If more than one separate sewer system or utility tunnel is potentially impacted, then the initial field testing program should be conducted in each system (i.e., test three locations from each system).

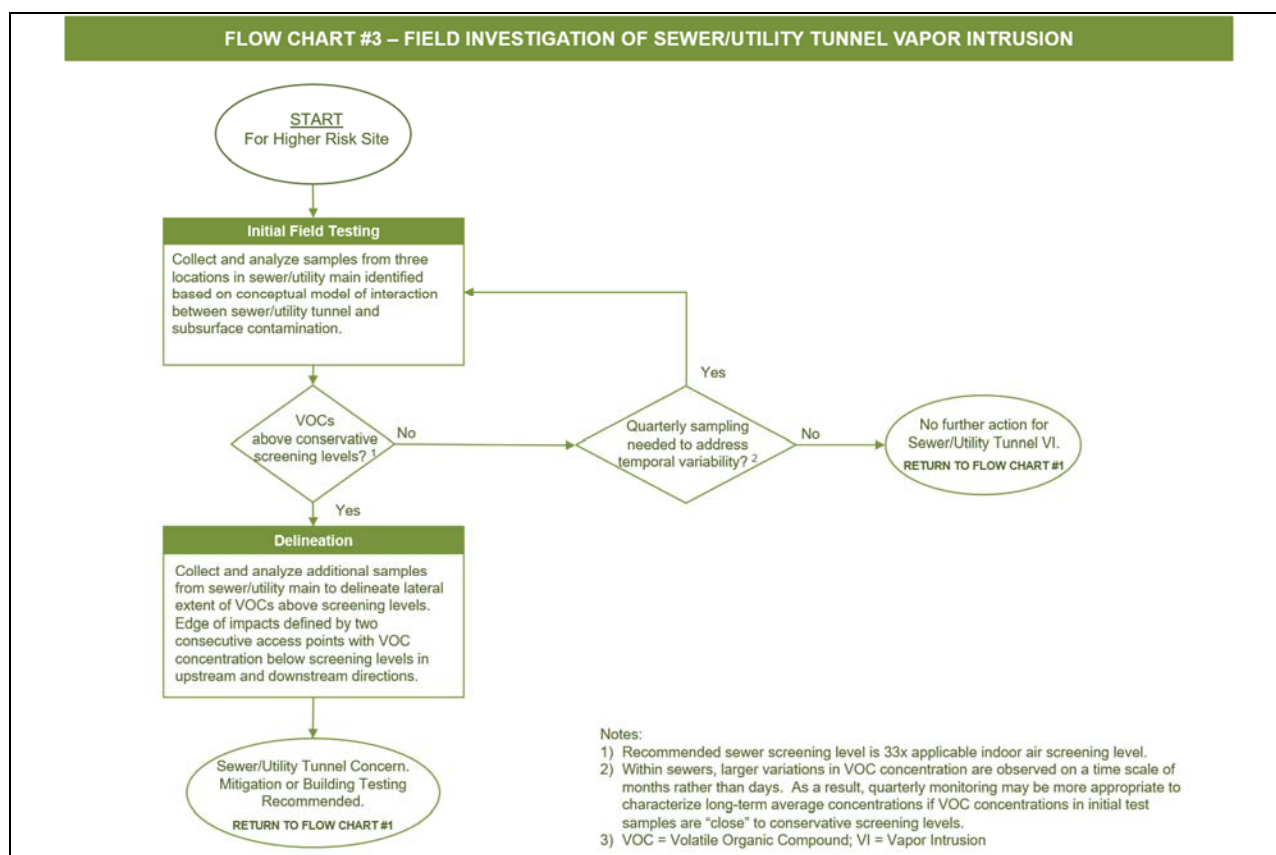


Figure 3.3 Sewer/Utility Investigation Program (i.e., Step 2 from Figure 3.1)

Initial Field Testing: For sites retained after the initial screening step, the initial field testing consists of collecting vapor samples from the three highest risk locations identified. The highest risk locations are access points located within or immediately downstream of the area where the sewer or utility tunnel interacts with the contaminated groundwater or NAPL area (see Figure 3.4). Access points are typically manholes or other locations where a sample line can be run for sample collection. If more than three access points are available, the three points within or downstream of the highest concentration groundwater/NAPL area should be selected. The site conceptual model, groundwater investigation results, and plume maps should be used to identify the area of highest groundwater concentration/NAPL.



Figure 3.4 Example Initial Field Testing Locations

For each sample location, samples are collected as follows:

- If the groundwater elevation varies seasonally such that the water table is below the sewer/utility tunnel at some times and at or above the sewer/utility tunnel at other times, then sampling should be conducted during the period with the higher water table.
- For sanitary sewers, samples should be collected between 9 am and 3 pm, when baseline flow is relatively low. For all sewers, samples should not be collected within 48 hours of a rainfall event of more than 0.1 inches.
- Minimize opening manhole covers prior to sampling by threading measurement or sampling equipment through vent holes, or opening covers just enough to insert the equipment into the manhole.
- Using a water level meter or weighted string, measure the distance from the access point to the bottom of the sewer/utility tunnel or the depth to any liquid (whichever is shallower).
- Collect a grab vapor sample from a depth of one foot above the bottom or liquid level using nylon or Teflon tubing extended through the access point (see Figure 3.5). The sample can be collected using any appropriate vapor sampling device but will typically be collected using a Summa-type canister. Typical air sampling quality assurance steps should be taken. For example, leak testing can be conducted using a shut-in test for the entire sampling train prior to extending the sample tubing into the sewer/utility tunnel. In addition, the sample

tubing can be purged of ambient air prior to sampling. When using a Summa-type canister for sample collection, a flow controller is not required.

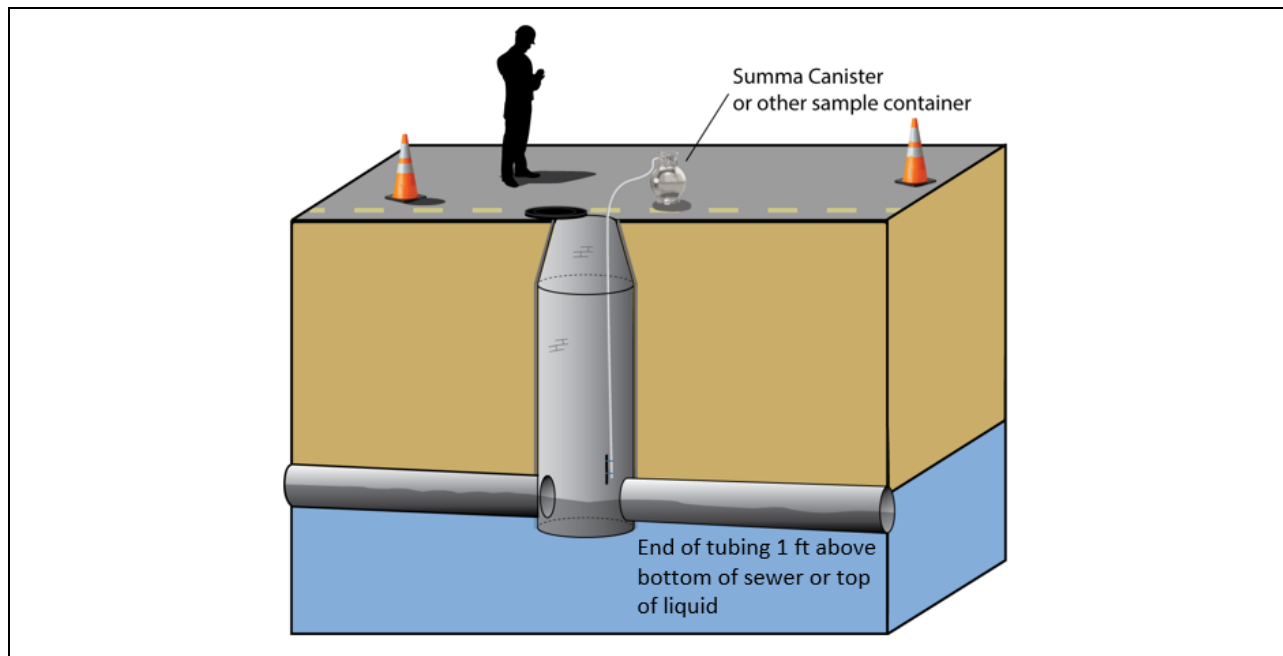


Figure 3.5 Vapor Sample Collection from Sewer

Evaluation of Initial Test Results: Tracer testing conducted for ESTCP Project ER-201505 indicated that an attenuation factor of 0.03 (33x attenuation) is a reasonable upper-bound attenuation factor for evaluation of VOC concentrations in sewers. As a result, sub-slab screening concentrations that have been developed based on an attenuation factor of 0.03 can also be applied to sewer test results.

When three sewer locations are included in the initial testing, the maximum VOC concentration across the three locations should be compared to screening values. Use of the maximum concentration from three locations serves to off-set some of the uncertainty associated with both spatial and temporal variability in VOC concentration. If the VOC concentrations exceed the sewer screening concentrations, then further testing is recommended to delineate the extent of vapors within the sewer and to evaluate potential impacts to buildings.

Consideration of Temporal Variability in Sewer Vapor VOC Concentrations: Results from ESTCP Project ER-201505 served to characterize temporal variability in VOC concentrations over two timescales: i) 1 to 3 days and ii) 12 to 18 months (McHugh and Beckley 2018b). These data showed much higher variations in VOC concentration over a timescale of months compared to a timescale of days. Among other implications, these results indicate that short-term time-integrated samples (e.g., 24-hour Summa canisters or 1-week passive sorbent samples) provide little value over grab samples.

- Uncertainty Associated with a Single Grab Sample: A single grab sample provides a good estimate of the short-term (1 to 3 days) average VOC concentration. 80% of individual

grab samples have VOC concentrations within a factor of 2 of the short-term average concentration. However, a single sample provides a less certain estimate of the long-term (12 to 18 months) average VOC concentration. Only 33% of individual samples have VOC concentrations within a factor of 2 of the long-term average concentration but 84% of individual samples have VOC concentrations within a factor of 10 of the long-term average.

- **Uncertainty Associated with Multiple Samples:** A more accurate estimate of the long-term average VOC concentration in a sewer can be obtained through quarterly sampling. When four quarterly samples are collected from a sewer, the average of these four samples will be within a factor of 3 of the average long-term concentration 80% of the time.

If VOC concentrations measured during the initial testing step are close to screening values, quarterly sampling may be appropriate to obtain a better understanding of long-term average VOC concentrations in the sewer. Resampling within a few days of the initial testing is unlikely to provide a significantly more accurate understanding of the long-term average VOC concentration in the sewer line.

Delineation: The purpose of delineation is to determine the extent of vapors in the sewer/utility tunnel at concentrations exceeding the sewer screening concentrations. The delineation step focuses on main sewer lines and utility tunnels. Laterals (i.e., the connections between the main lines and individual buildings) are evaluated as part of building testing.

Delineation should be completed by collecting samples at access points both upstream and downstream of the exceedance locations. Delineation should proceed within the main sewer/utility tunnel(s) until all exceedance locations are bounded by two consecutive locations where VOC concentrations are less than the sewer screening values (see Figure 3.6, left panel). The sample collection procedures are the same as for initial field testing. The use of on-site analysis may make delineation more efficient by supporting real-time evaluation of whether delineation has been completed. On-site analysis can be conducted using a field-portable GC/MS instrument (e.g., Inficon HAPSITE, Syracuse, NY) or a mobile laboratory.

Evaluation of Delineation Results: Delineation results are used to identify areas where there may be a concern for sewer/utility tunnel VI and where additional characterization or mitigation efforts may be needed (see Figure 3.6, right panel).

3.3 SEWER MITIGATION

If potential sewer/utility tunnel VI is a concern based on sewer vapor sample results exceeding conservative screening criteria, preemptive sewer mitigation (Protocol Step 3A) may be a viable next step, depending on site-specific circumstances. Sewer mitigation can involve ventilation or taking measures to prevent VOCs from infiltrating the sewers. Examples of sewer mitigation are provided in the ESTCP Project ER-201505 Final Report, Section 6.3.6.

3.4 BUILDING TESTING

The field investigation and delineation process may identify buildings for which testing for vapor intrusion is appropriate (Protocol Step 3B). In the absence of sewer mitigation, testing should be done in all buildings where VOC concentrations in the main are greater than the sewer screening values at the location where the lateral for the building joins the main (see Figure 3.6, right panel).

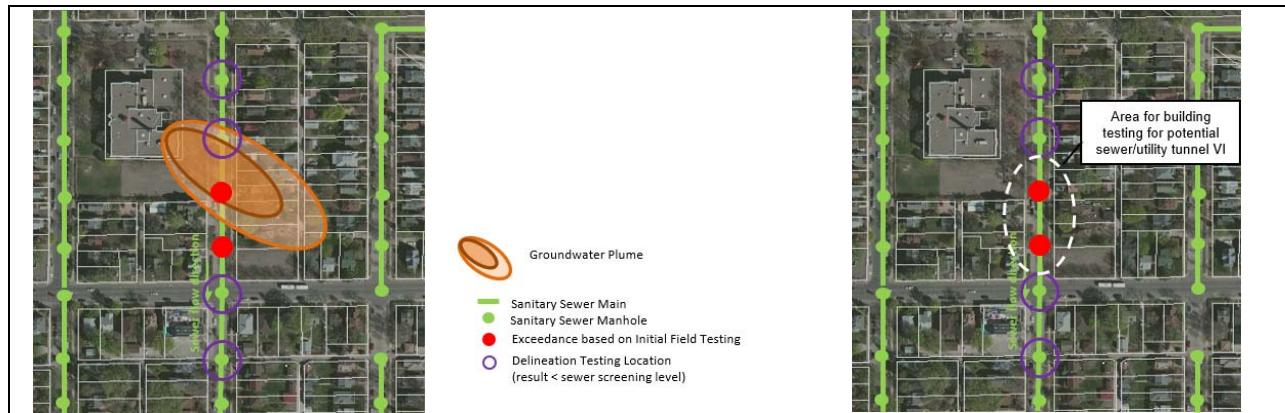


Figure 3.6 Example Delineation Results and Identification of Buildings to Test

Testing Program: VOCs from a sewer line or utility tunnel can enter a building through a variety of mechanisms and/or entry points that can be difficult to identify based on visual inspection of the building (Figure 3.7).

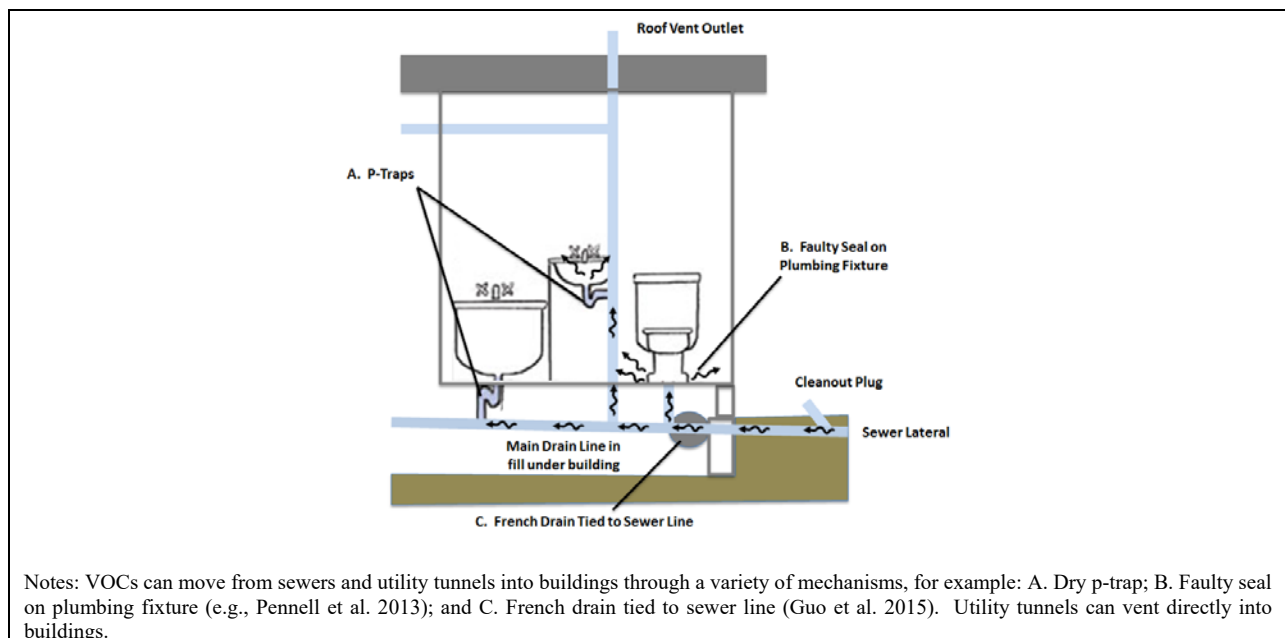


Figure 3.7 Potential Entry Points into Buildings

The goals of building testing are i) to determine whether VOC concentrations in indoor air are above applicable indoor air screening values, and, if so, ii) verify that the source is vapor intrusion (i.e., indoor sources vs. vapor intrusion). Multiple approaches have been developed for testing buildings for vapor intrusion (Table 3.2). Any of these approaches may be appropriate. Selection of the specific approach depends on a number of factors including the complexity of the building, the availability of equipment (i.e., field portable GC/MS), and the experience of the project team.

Table 3.2 General Building Testing Approaches

Approach	References
Typical Multiple Lines of Evidence	ITRC (2014) USEPA (2015) NJDEP (2013)
On-Site GC/MS Analysis	Beckley et al. (2014a) Beckley et al. (2014b) Gorder and Dettenmaier (2011)
Building Pressure Cycling	McHugh et al. (2012) Holton et al. (2015)

Although the approaches for building testing listed in Table 3.2 were originally developed for testing of buildings potentially impacted by conventional vapor intrusion (i.e., migration of VOCs through the vadose zone), these approaches are also appropriate for investigation of buildings potentially impacted by sewer/utility tunnel VI. For example, building pressure cycling can be used to “turn on” (negative building pressure) and “turn off” (positive building pressure) sewer/utility tunnel VI in the same way the approach is applied to conventional VI.

Although existing building testing protocols can be used for testing buildings potentially impacted by sewer/utility tunnel VI, **in buildings potentially impacted by sewer/utility tunnel VI, the sewer/utility lateral should be tested in addition to other samples collected for a given approach.** In other words, when an investigation approach specifies the collection of sub-slab samples, then both sub-slab and sewer/utility lateral samples should be collected. The collection of sewer/utility lateral samples is illustrated in Figure 3.8 (left panel). If access to the lateral is not available, then samples may be collected inside the building, for example, at p-traps (Figure 3.8 (right panel)).

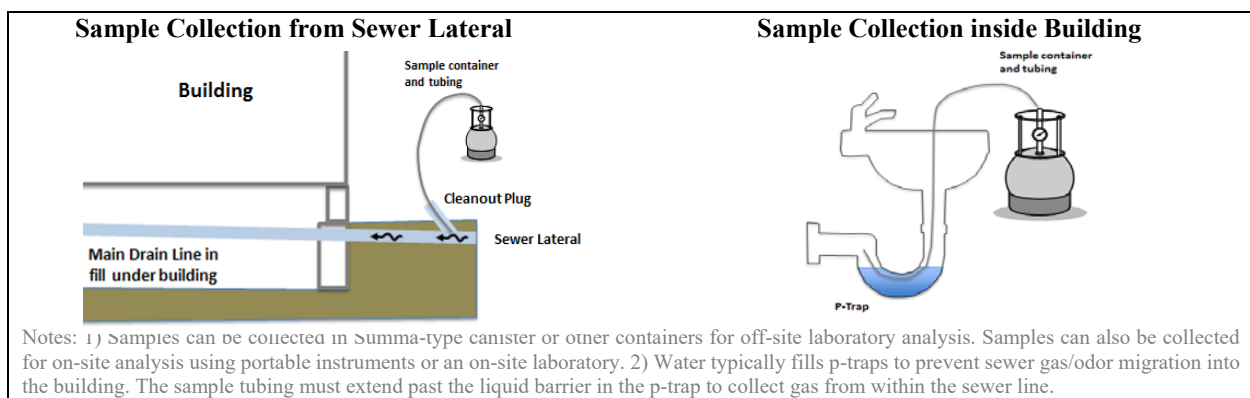


Figure 3.8 Sample Collection from Sewer Lateral Connected to Building

4.0 DOCUMENTATION

4.1 INITIAL SCREENING (APPLICABLE TO ALL SITES EVALUATED BY THIS PROTOCOL)

The following topics should be addressed in project documentation:

- Locations and depths of VOC source areas, including the extent of groundwater impacts above applicable groundwater screening values for conventional vapor intrusion;
- Locations, depths, and types of sewers and utility tunnels relative to the source area or groundwater plume;
- Descriptions of the sewers and utility tunnels (age, materials(s), diameter of lines, direction of flow, etc.)
- Description of whether the sewers/utility tunnels intersect the source area/plume; and
- Results from the initial screening (higher or lower risk scenario; no further action vs. field investigation needed).

In addition, maps of the plume and sewer/utility tunnel plans should be included and produced at the same scale, if possible. Cross-sections should also be included illustrating the relationship of the sewers/utility tunnels and buildings to the source area/plume.

4.2 FIELD INVESTIGATION

The results of the field evaluation should be documented through field notes and a report that presents the sampling methods, analytical results, interpretation, and overall conclusions.

4.2.1 *Field Notes*

Much of the information to record in field notes is typical of any investigation program (i.e., dates, times, activities, locations, and personnel). Additional information relevant to the sewer/utility tunnel VI investigation includes, but is not limited to:

- Weather conditions, including barometric pressure, wind, and recent rainfall/runoff (and observations of surface water flow (e.g., note if runoff drains into the sewers being assessed));
- Sampling equipment specifications (field instrument types, manufacturer, model, calibration, QA/QC measures);
- Sampling container specifications and sample collection methods (including how manholes are accessed (e.g., via vent holes in manhole covers));
- Detailed sample location descriptions (sketch, description of location type (e.g., main, lateral), depth to the bottom of the sewer/tunnel or depth to liquid, sampling depth); and
- Observations of conditions of the area or structure being sampled (e.g., construction, presence of liquid in manholes, flow direction, condition of line or plumbing seals).

4.2.2 *Report*

The field investigation report should include the following:

- **Introduction:** Identify the purpose and context of the investigation program. Provide a description of the sewers/utility tunnels and relationship to the plume. Discuss the scope of the investigation.
- **Methods:** Describe the sampling methods, sampling locations and rationale for location selection. Describe the investigation process. Instrument calibration and QA procedures should be documented in an appendix or by reference to an existing document.
- **Results:** Tabulate results and summarize them on maps and figures. Include applicable screening levels.
- **Data Interpretation:** Discuss the results from each step in the investigation process and identify and describe any field decisions. Discuss the overall conclusion regarding the presence or absence of current or potential preferential pathways for vapor intrusion (mechanisms for vapor migration, etc.). Discuss next steps (additional characterization of the sewer or buildings, mitigation, etc.).
- **Appendices:** Field notes, laboratory analytical reports, and investigation details should be provided in appendices, as appropriate.

4.3 OTHER DOCUMENTATION

The protocol focuses on initial screening and field investigation to determine whether sewer/utility tunnel vapor intrusion is a concern. Possible steps after the field investigation include proposals of no further evaluation of sewer/utility tunnel VI, mitigation, or building testing. Reporting should be tailored to site-specific needs and follow guidelines of regulatory oversight agencies, as appropriate.

5.0 REFERENCES

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