VAPOR INTRUSION ASSESSMENT REPORT

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RGI PROJECT NO. 2016-023C

VAPOR INTRUSION ASSESSMENT REPORT

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1 INTRODUCTION

The Riley Group, Inc. (RGI) is pleased to present this Vapor Intrusion Assessment (VIA) Report documenting the assessment of soil vapor and indoor air on the property located at 9635 Des Moines Memorial Drive South in Seattle, Washington (herein referred to as the Property). The general location of the Property is depicted on Figure 1.

The Property is owned by SeaMar Community Health Center, LLC (Client) and consists of a 3.49-acre tax parcel identified by the King County Assessor as tax parcel number 56242003710. The Property is used exclusively for commercial purposes. A commercial building occupies the western portion of the Property and the northern portion of the building was undergoing renovations during the timeframe the VIA was conducted. A Red Apple grocery store occupies the southern portion of the Property.

Groundwater on the western portion of the Property has been adversely impacted with halogenated volatile organic compounds (HVOCs) including trichloroethene (TCE), vinyl chloride (VC), and cis 1,2 dichloroethene (cis 1,2-DCE) as a result of release(s) on the west-adjoining property. The west-adjoining property is currently owned by Beckwith & Kuffel (B&K) and the Washington Department of Ecology (Ecology) identifies the property as part of the FMH Materials and Handling Solutions Site (FMH Site) with Voluntary Cleanup Program (VCP) project No. NW3119. The estimated extent of groundwater impacts extending onto the western portion of the Property as a result of the release at the FMH Site is depicted on Figure 2.

It should be noted that the Property is currently enrolled in the VCP and identified by Ecology as the Sea Mar Community Health Center (NW3172). The VIA documented in this report was conducted to assess potential vapor intrusion impacts to the Property building as a result of the TCE release on the west-adjoining FMH Site that has adversely impacted the Property. The work described herein is not associated with the former petroleum impacts, which have been remediated on the Property.

The Client has requested that RGI perform this VIA to determine if the release from the FMH Site has adversely impacted indoor air in the Property building. The scope of work for this project was performed in general accordance with RGI's *Vapor Intrusion Work Plan* (VIA Work Plan) dated July 25, 2018. The work was authorized by the Client under *Change Order No. 2* dated July 2, 2018 and *Change Order No. 4* dated February 19, 2019 by RGI.

2 PROJECT BACKGROUND

RGI previously completed subsurface investigations on the Property, which identified the presence of TCE and related degradation compounds in groundwater at concentrations exceeding applicable Model Toxics Control Act (MTCA) Cleanup Levels for Groundwater on the western portion of the Property. RGI determined that these groundwater impacts were the result of release(s) on the west-adjoining property FMH Site. A summary of previous investigations conducted on the Property considered relevant to this VIA is provided the following reports.

- *Draft Environmental Status Report*, prepared for Sea Mar Community Health Center and dated September 12, 2018 by RGI.
- *Vapor Intrusion Assessment Work Plan*, prepared for Sea Mar Community Health Center and dated July 25, 2018 by RGI.
- *Well Installation Report* (MW17A and MW21), prepared for Sea Mar Community Health Center and dated May 9, 2018 by RGI.

- *Remedial Investigation/Feasibility Study and Remedial Action Report* (RI/FS/RA Report), prepared for Sea Mar Community Health Center and dated March 13, 2017 by RGI.
- *4th Quarter 2016 Groundwater Monitoring Report* prepared for Sea Mar and dated January 11, 2017.
- *3rd Quarter 2016 Groundwater Monitoring Report* prepared for Sea Mar and dated October 27, 2016.
- *2nd Quarter 2016 Groundwater Monitoring Report* prepared for Sea Mar and dated August 17, 2016.
- *Phase II Subsurface Investigation* (Phase II), prepared for HomeStreet Bank and dated March 28, 2016.

The reader is directed to refer to the above-mentioned reports for details pertaining to previous investigations. Previous investigations identified TCE in groundwater at concentrations that exceeded the applicable MTCA groundwater cleanup levels and soil vapor screening levels Ecology considers protective of indoor air. These impacts were the result of a release on the west-adjoining FMH Site. The location of TCE impacted groundwater that has migrated onto the Property and previous groundwater sample locations and analytical data are displayed on Figure 3.

In 2016, RGI installed one soil vapor well (SV1-A) on the west-central portion of the Property building approximately 15 feet west of the western edge of the building. SV1-A was also situated directly above the TCE impacted groundwater plume that extends onto the western portion of the Property. Soil vapor analytical data obtained from SV1 indicated that TCE was present in soil vapor at a concentration 140 µg/m^3, which exceeded the soil vapor screening level (SVSL) that Ecology considered protective of indoor air of 12.3 µg/m^3. The location of SV1-A and associated analytical data are displayed on Figure 4.

Environmental work associated with the cleanup of the TCE release on the west-adjoining property is currently managed by the west adjoining property owner (Buckwith & Kuffel) and their environmental consultant (Landau Associates). In January 2017, Landau Associates performed a chemical injection of approximately 8,500-gallons of LactOil™ on the west-adjoining property in an attempt to remediate TCE impacted groundwater impacts on the west-adjoining property and the western portion of the Property. The injection was not effective at reducing TCE groundwater concentrations on the western portion of the Property.

3 VAPOR INTRUSION REGULATIONS IN WASHINGTON STATE

WAC 173-340-740(3)(C) stipulates that the soil to vapor pathway must be evaluated for volatile organic compounds and gasoline range organics whenever the concentration of volatile organic compounds, including petroleum components, is significantly higher than a concentration derived for protection of groundwater for drinking water beneficial use.

In 2009, Ecology published the *Draft Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial* (Draft Ecology VI Guidance). The Ecology VI Guidance provides guidelines for evaluating the vapor intrusion pathway in Washington State and is consistent with MTCA rule requirements.

In addition to the Draft Ecology VI Guidance, RGI utilized the following resources to conduct the VIA:

- Ecology *Cleanup Level and Risk Calculation* (CLARC) database last revised by Ecology in August of 2020;

- *Trichloroethylene (TCE): Deriving Cleanup Levels under the Model Toxics Control Act (MTCA)* dated 2011 and revised January 2020 by Ecology;
- *Implementation Memorandum No. 22* dated October 1, 2019 by Ecology;
- *Implementation Memorandum No. 21* dated November 15, 2018 by Ecology;
- *OSWER Technical Guide For Assessing and Mitigating the Vapor Intrusion Pathway From Subsurface Vapor Sources to Indoor Air* (2015 EPA VI Guidance) dated June 2015 by the U.S. Environmental Protection Agency (EPA), and
- Model Toxics Control Act (Chapter 173-340 WAC).

The VIA scope of work was executed in accordance with applicable guidance and regulations provided in the above-mentioned documents. The VIA consisted of soil vapor sampling in August of 2018 and indoor air sampling in March of 2020. Significant changes to the vapor intrusion regulations occurred during this timeframe and these regulation changes are discussed in further detail in Section 4.3. RGI utilized the most current information available at the time to conduct the VIA and evaluate soil vapor and indoor air data.

4 VAPOR INTRUSION ASSESSMENT

VIA activities were performed at the Property in July, August, and October of 2018 and March of 2020. This section documents soil vapor and air sampling performed, data evaluation, and changes to vapor intrusion regulations that occurred during the course of the VIA. Pertinent features pertaining to the VIA are depicted on Figures 2 through 4.

4.1 SOIL VAPOR ASSESSMENT

Soil vapor sampling activities were performed at the Property in July, August and October of 2018 and are described below.

4.1.1 UTILITY LOCATING

Prior to installation of soil vapor wells, RGI located public and privately owned underground utilities and cored concrete in drilling locations. In addition, RGI reviewed site plans and sewer cards to verify the locations of sanitary sewers.

Prior to drilling, RGI contacted One-Call to locate publicly-owned underground utilities (electric, natural gas, telecommunications, etc.). RGI personnel marked soil vapor well locations with white paint prior to contacting the public locator.

On July 30, 2018 RGI retained the services of Applied Professional Services, Inc. (APS) to locate privately owned utilities such as water, electric, and other privately-owned utilities.

4.1.2 SOIL VAPOR WELL INSTALLATION

On August 7, 2018 and October 2, 2018, RGI advanced a total of six soil vapor probes (SVW1 through SVW6) to depths between 38 to 40 inches adjacent to the west side of the Property building using limited access direct push drilling techniques. Each probe was completed as a permanent soil vapor sampling well. Soil vapor wells SVW1 through SVW5 were installed on August 7, 2018 and SVW6 was installed on October 2, 2018.

Prior to drilling, Evergreen Concrete Cutting was retained to remove an 8-inch diameter 2 to 3 inch thick layer of concrete at each soil vapor well location to allow for installation. Due to the presence of

abandoned utilities, which were not identified by the utility locator, it was necessary to core additional concrete at locations SVW4 and SVW5.

Each well location was drilled to approximately 3 feet below ground surface (bgs) after which, the drill rod was removed, which exposed the approximately 2 ¼- inch diameter borehole. Approximately 7 inches of 10/20 silica sand was placed at the bottom of the borehole and a 1-inch stainless steel implant filter was placed on top of the sand and an additional 7-inches of sand were added on top of the implant. 1/8-inch Nylflow tubing was attached to each implant that extended up through the center of the borehole to approximately 2' above the surface. A three-way valve was attached to the end of the tubing. 6-inches of dry granular bentonite was placed on top of the sand above which 9-inches of neat cement was placed. A 7-inch deep monument with cover was then placed in the borehole and the well was completed with an additional 7-inches of neat cement and approximately 2 inches of concrete. The concrete filled the original 8-inch diameter area of the concrete core.

Soil vapor wells were given a minimum of 12 hours to equilibrate after installation prior to sampling. A schematic displaying the typical construction of soil vapor wells is included in Appendix A.

4.1.3 SOIL VAPOR SAMPLING

On August 8, 2018, RGI collected soil vapor samples from soil vapor wells SVW1 through SVW5, which were completed on August 7, 2018. The tubing present at the surface of each well was attached to a sample train supplied by H&P Mobile Geochemistry (H&P). Three-way valves were used throughout the system to direct soil vapor flow. The sample train included a flow regulator and a vacuum gauge. Nuts and Swagelok barb fittings were used to make connections and keep the sample train airtight.

A shut-in test was performed to verify that there were no leaks present in the sample train. The shut in test was conducted by attaching an in-line vacuum gauge to the three way valve at the end of the sample train then attaching a 60 mL syringe to another 3 way valve in order to draw air through the system. Valves were then be set to the appropriate positions to allow a vacuum to be created while drawing air through the syringe until the vacuum gauge read approximately 10-inches of mercury (Hg). The valve was then closed, and the system was allowed to sit for five minutes to observe if the vacuum pressure dropped. The vacuum pressure did not drop for any of the wells, which indicated there were no leaks in the sample train.

A helium leak detection test was also performed at each well to verify the integrity of the surface seal. A shroud was placed over the soil vapor well, which consisted of a 4-inch PVC cap with a brass barb fitting screwed through the top and two approximately ¼ inch holes in the sides. The tubing extending from the soil vapor well was placed through the side of the shroud. Non-VOC putty was used to seal areas where the shroud meets the ground and where tubing is run through the shroud to prevent ambient air from entering the shroud. The shroud was filled with helium at a known concentration and monitored using a helium meter until the concentration of helium in the shroud stabilized. The helium meter was then be removed from the shroud and the hole was sealed with non-VOC putty.

Three volumes of soil vapor were purged from each well. One purge volume was calculated based on the area of the sand, dry bentonite, and tubing and equal to approximately 5,500 milliliters (mL) of soil vapor. Wells were purged at a flow rate that did not exceed 200 milliliters/minute (mL/min). Soil vapor was purged through the helium filled shroud and collected in a tedlar bag. The helium meter was used to measure helium concentrations in the tedlar bag and determine if there were any leaks in the soil vapor well and/or concrete seal. The concentration of helium in the tedlar bag for each well was less than 10% of the concentration in the shroud, which indicated that the surface seal at each location was sufficient and the soil vapor wells were ready for sampling.

Soil vapor samples were collected by setting valves to direct soil vapor flow through the tubing leading to the pressurized 400 mL laboratory supplied individually certified Summa canisters. The starting mercury (Hg) level and time was recorded, and the Summa canister valve was opened. The flow regulator in the sampling assembly restricted the flow rate to not exceed 150 mL/min and sampling continued until the canister was full and the Hg level dropped to zero. Canisters were filled in approximately 3 minutes and the sample start time and end time was recorded in the field log book.

Soil vapor samples were transported to H&P Mobile Geochemistry, Inc. (H&P) in Carlsbad, California in accordance using standard chain of custody protocols.

4.2 SOIL VAPOR ANALYSIS & DATA EVALUATION

This section describes soil vapor sample analysis and the methodology used to evaluate soil vapor data.

4.2.1 SOIL VAPOR ANALYTICAL DATA

Seven soil vapor samples (including one duplicate sample) were submitted to H&P laboratory for the following analyses:

- Tetrachloroethene (PCE), TCE, cis 1,2-dichloroethene (cis 1,2-DCE), trans 1,2-DCE, 1,1 DCE and vinyl chloride using EPA Method TO-15.

Copies of final analytical laboratory reports are included in Appendix B. Soil vapor analytical data and applicable SVSLs are summarized in Table 1 and soil vapor analytical data is displayed on Figure 4.

TCE was detected in soil vapor in wells SVW5 and SVW6 at concentrations of 13 µg/m^3 and 16 µg/m^3, respectively. These concentrations exceeded the Ecology SVSL of 12.3 µg/m^3 at that time. Ecology considered this conservative SVSL protective of MTCA Method B Indoor Air Cleanup Levels (Method B IACULs) at that time. This SVSL is used to evaluate the vapor intrusion risk in a residential scenario. TCE soil vapor concentrations were below this SVSL in SVW1 through SVW4.

In November of 2018, Ecology released Implementation Memorandum No 21, which includes a method for calculating a Method B Indoor Air Screening Level (IASL) considered appropriate in a commercial exposure scenario. Since the Property building is used exclusively for commercial use, the Commercial Method B SVSL was considered appropriate for evaluating soil vapor data on the Property. Therefore, RGI calculated the Commercial Method B IASL for TCE used this IASL to calculate the Commercial Method B SVSL using the methodology described in Section 4.2.2.

In location SVW1, the laboratory detection limit was elevated (<27 µg/m^3) and this concentration exceeded the Ecology SVSL for TCE in a residential exposure scenario. However, this concentration along with all other detected TCE concentrations were below the Commercial Method B SVSLs and this is discussed further in the following sections.

4.2.2 CALCULATION OF COMMERCIAL METHOD B IASLS AND SVSLS

RGI calculated a Commercial Method B SVSLs for all COPCs. Since TCE was the only compound detected in soil vapor on the Property, this section describes the methodology for calculating the IASL and SVSL for TCE in order to determine if TCE soil vapor concentrations represented a health risk to building occupants. The first step was to calculate the Commercial Method B IASL for TCE then derive the Commercial Method B SVSL from the Commercial Method B IASL.

4.2.2.1 COMMERCIAL METHOD B INDOOR AIR CLEANUP LEVEL CALCULATION

RGI utilized the following documents to calculate the Commercial Method B IASL for TCE. Note that these documents were the most current information at the time the evaluation was performed in early 2019:

- ***MTCA Equation 750-2*** – This equation is contained in the MTCA regulation and used to calculate indoor air cleanup levels for carcinogenic substances.
- ***Implementation Memorandum No. 21 (November 2018)*** – This document provides guidance on calculating Commercial Method B IASLs. Question No. 17 in this document pertains to calculating indoor air cleanup levels for commercial buildings. Ecology indicates that, for commercial buildings that do not meet the definition of an industrial property, the exposure frequency (EF) in MTCA Equation 750-2 can be modified to better represent the amount of time workers are actually present (e.g. 50/hours/week x 50 weeks/year = 0.3 vs. a default of value 1.0)
- ***Ecology Cleanup Level and Risk Calculation (CLARC) Database (January 2019)*** – The CLARC database provides a wide range of Ecology accepted technical information used for calculating soil, groundwater, and air cleanup levels.
- ***Trichloroethylene (TCE): Deriving Cleanup Levels under the Model Toxics Control Act (MTCA)* dated 2011 by Ecology** (2011 TCE Cleanup Level Calculation Guidance) **–** This document was obtained from the Ecology CLARC database and contains revised data necessary for calculating the Commercial Method B IASL for TCE. This data consisted of the revised inhalation cancer potency factors (CPF_i's) for kidney cancer, non-Hodgkin lymphoma, and liver cancer, which were published in the EPA's Integrated Risk Information System (IRIS) on September 28, 2011.

MTCA Equation 750-2 was used to calculate the Commercial Method B IASL for TCE. The generic equation is expressed as follows:

$$\mathbf{CIA = \frac{RISK \times ABW \times AT \times UCF}{CPF_i \times BR \times ABS \times ED \times EF}}$$

Where:

- CIA = Commercial Method B IASL (µg/m^3).
- RISK= Acceptable cancer risk level (default value of 1 in 1,000,000) unitless
- ABW = Average body weight over exposure duration (default value of 70 kg)
- AT = Average time (default value of 75 years)
- UCF = Unit conversion factor (1,000 µg/mg) unitless
- CPF_i = Inhalation cancer potency factor as specified in WAC 173-340-708)(8) (0.00091 kg-day/mg for PCE obtained from CLARC). The EPA Unit Risk Factor (URF) was converted to CPF_i.
- BR = Breathing rate (default value of 20 m^3/day)
- ABS= Inhalation absorption fraction (default value of 1.0) unitless
- ED = Exposure duration (default value of 30 years)
- EF= Exposure frequency (modified to 0.3 per Memorandum No. 21) unitless
- Note: Default values listed above were obtained from the Model Toxics Control Act.

CLARC TCE Toxicity Data describes the method for using the revised EPA CPF_i's for kidney cancer, non-Hodgkin lymphoma, and liver cancer in order to calculate the MTCA Method B IASL using MTCA equation 750-2. The Method B IASL for each form of cancer was first calculated separately. After which, the harmonic mean of the three Commercial Method B IASLs provided the Commercial Method B IASL for TCE. The calculation is described in two steps below

The CLARC database provides the following modified MTCA Equation 750-2 for calculating the Commercial Method B IASL for kidney cancer. Note that the early life exposure adjustment factor (ELE) is omitted for the commercial IASL calculation as it does not apply to children:

$$\mathbf{CIA_{KIDNEY/TCE} = \frac{RISK \times AT \times UCF}{CPF_i \times ABS \times EF}}$$

Where:

$CIA_{KIDNEY/TCE}$ = TCE Commercial Method B IASL for kidney cancer (µg/m³).
CPF_i = Cancer potency factor (0.0035 kg-day/mg for PCE obtained from CLARC TCE Toxicity Data). The EPA URF was converted to CPF_i.
EF= Exposure frequency (modified to 0.3 per Memorandum No. 21) unitless

The Commercial Method B IASL for kidney cancer was calculated using MTCA Equation 750-2, a CPF_i value of 0.0035 kg-day/mg as described in the CLARC database and the modified EF of 0.3 per Memorandum No. 21. The calculation was executed as follows:

$$\mathbf{CIA_{KIDNEY/TCE} = \frac{(10^{-6})(75\ yrs.)(1{,}000)}{(0.0035\ kg\text{-}day/mg)(1.0)(0.3)} = 7.14\ \mu g/m^3}$$

The Commercial Method B IASL for non-Hodgkin lymphoma was calculated using MTCA Equation 750-2, a CPF_i value of 0.007 kg-day/mg as described in the CLARC database and the modified EF of 0.3 per Memorandum No. 21. The calculation was executed as follows:

$$\mathbf{CIA_{LYMPHOMA/TCE} = \frac{(10^{-6})(70kg)(75\ yrs.)(1{,}000)}{(0.007\ kg\text{-}day/mg)\ (20\ m^3/day)(1.0)(30\ yrs.)(0.3)} = 4.12\ \mu g/m^3}$$

The Commercial Method B IASL for liver cancer was calculated using MTCA Equation 750-2, a CPF_i value of 0.0035 kg-day/mg as described in the CLARC database and the modified EF of 0.3 per Memorandum No. 21. The calculation was executed as follows:

$$\mathbf{CIA_{LIVER/TCE} = \frac{(10^{-6})(70kg)(75\ yrs.)(1{,}000)}{(0.0035\ kg\text{-}day/mg)(20\ m^3/day)(1.0)(30\ yrs.)(0.3)} = 8.33\ \mu g/m^3}$$

The Commercial Method B IASL for TCE was then determined by calculating the harmonic mean of the three Commercial Method B IASLs described above. The equation is expressed as follows:

$$\mathbf{CIA_{TCE} = 1/[(1/CIA_{KIDNEY})+(1/CIA_{LYMPHOMA})+(1/CIA_{LIVER})]}$$

Using this equation, the Commercial Method B IASL for TCE is calculated as follows:

$$\mathbf{CIA_{TCE} = 1/[(1/7.14\ \mu g/m^3)+(1/4.12\ \mu g/m^3)+(1/8.33\ \mu g/m^3)] = 1.22\ \mu g/m^3}$$

Executing the calculations described above provided a Commercial Method B IASL for TCE of 2.67 µg/m³ and this IASL was considered appropriate for evaluating indoor air concentrations of TCE at that time. This IASL was then used to calculate the Commercial Method B SVSL for TCE and evaluate soil vapor concentrations of TCE at the Property.

4.2.2.2 COMMERCIAL METHOD B SOIL VAPOR SCREENING LEVEL CALCULATION

The Commercial Method B SVSL was calculated based on the Commercial Method B IASL described Section 4.2.2.1. RGI utilized the following information to calculate the Commercial Method B SVSL for TCE in early 2019:

- Commercial Method B IASL for TCE of 2.67 µg/m³ and
- Vapor attenuation factor (VAF) of 0.03 obtained from the Ecology CLARC database, and

The Commercial Method B SVSL for TCE was calculated as follows:

$$\mathbf{CSVSL = \frac{Commercial\ Method\ B\ IASL}{VAF}}$$

Where:

CSVSL = Commercial soil vapor screening level protective of the Commercial Method B IASL (µg/m³).
Commercial Method B IASL = Commercial Method B Indoor Air Cleanup Level described in Section 4.2.1.1 (µg/m³).

VAF = Vapor attenuation factor (unitless), which is defined as the indoor air concentration, due to vapor intrusion, divided by the subsurface soil vapor concentration. The Ecology default VAF is 0.03 and is based on data obtained from the EPA.

Therefore, the Commercial Method B SVSL TCE is calculated as follows:

$$\mathbf{CSVSL_{TCE} = \frac{2.67\ \mu g/m^3}{0.03} = 89\ \mu g/m^3}$$

The Commercial Method B SVSL of 89 µg/m^3 was considered appropriate for evaluating the vapor intrusion risk to the Property building at that time and was used to evaluate soil vapor data obtained during the soil vapor assessment.

4.2.3 SOIL VAPOR DATA EVALUATION

In early 2019, RGI used the Commercial Method B SVSL of 89 µg/m^3 to evaluate all soil vapor data obtained during the soil vapor assessment. Since the Property building is used exclusively for commercial purposes, the Commercial Method B SVSL was considered appropriate for evaluating the vapor intrusion risk to the Property building.

TCE was the only contaminant detected in soil vapor and all of the detected TCE soil vapor concentrations obtained from soil vapor wells SVW1 through SVW6 were below the Commercial Method B SVSL. Based on this evaluation, RGI determined that there was no health risk to occupants of the Property building at that time.

Due to the fact that use of the Commercial Method B IASL or SVSL requires that an Environmental Covenant (EC) be obtained before Ecology will issue a No Further Action (NFA) determination, the Client indicated that their preference was to pursue an unrestricted NFA without an EC. Therefore, the Client requested that RGI evaluate the vapor intrusion risk in a residential scenario in order to determine if the Property would eligible for a NFA without an EC. Since no health risks were posed to building occupants by the presence of TCE in soil vapor, the Client placed work on hold with the understanding that air sampling would be conducted at a later date to complete the evaluation.

4.3 REVISIONS TO VAPOR INTRUSION REGULATIONS

During the timeframe between the SVA in 2018 and the Indoor Air Assessment (IAA) in 2020 (discussed in the following section), Ecology released the following information that was considered pertinent to the VIA:

- ***Trichloroethylene (TCE): Deriving Cleanup Levels under the Model Toxics Control Act (MTCA)*** revised January 2020 by Ecology (2020 TCE Cleanup Level Calculation Guidance) **–** This document was revised in 2020 and provided a revised method for calculating Commercial Method B Indoor Air Cleanup Level for TCE in conjunction with Implementation Memorandum No. 21 and MTCA Equation 750-2.
- ***Implementation Memorandum No 21*** **[Exposure Frequency (EF) and (Exposure Duration [ED] adjustments)** RGI corresponded with Ecology in March and November of 2020 regarding calculation of commercial IASLs. Ecology indicated that, along with the adjustments outlined in Implementation Memorandum No. 21, Question 17, it was also appropriate to use an EF of 0.29 instead of 0.3 and an ED of 25 instead of 30 to represent a commercial scenario.
- ***Implementation Memorandum No. 22*** **(Memorandum No. 22)** dated October 1, 2019 by Ecology. This document provides a Short Term Indoor Air Action (STAA) level established by the EPA. The STAA is primarily used to determine health risks for pregnant women. The document indicates that if the TCE indoor air concentration exceeded 7.5 µg/m^3 over a 3 week period that immediate

action should be taken to mitigate indoor air concentrations of TCE due to potential health risks to building occupants.

Based on the above information, RGI revised the Commercial Method B SVSLs and IASLs accordingly. This included revising the method for calculating the TCE IASL and revising the EF and ED for all compounds. The result was a slight decrease in the Commercial Method B IASL for TCE from 2.67 µg/m^3 to 2.5 µg/m^3 and slight decrease in the Commercial Method B SVSL from 89 µg/m^3 to 83 µg/m^3.

The revised IASLs and SVSLs were not significantly different than the IASLs previously calculated and did not impact RGI's conclusions or decision making process during the VIA. Therefore, details pertaining to the revised calculations are not described here. The Commercial Method B SVSL of 83 µg/m^3 for TCE was used for evaluating all soil vapor data obtained for the Property during the VIA. The standard Method B IACUL was used for evaluated all indoor air data on the Property in or determine if the Property would qualify for a NFA without an EC. The residential and commercial IASLs and SVSLs are summarized in Tables 1 and 2, respectively.

RGI also evaluated the observed TCE soil vapor concentrations relative to the commercial STIAA for TCE of 7.5 µg/m^3 described in Implementation Memorandum No. 22. The STIAA applies to a short term three week average, not the long term carcinogenic effects associated with the Commercial Method B IASL. RGI used the conservative VAF of 0.03 presented in the Draft Ecology VI Guidance to determine that a soil vapor concentration of at least 250 µg/m^3 would be necessary to result in a TCE indoor air concentration of 7.5 µg/m^3 or greater based on the Ecology VAF.

The highest detected TCE soil vapor concentration on the Property was 16 µg/m^3 in SVW-6. In addition, RGI has found the amount of attenuation that occurs as contaminants move from soil vapor to indoor air is typically much greater than the VAF of 0.03 represents. This VAF indicates that contaminant concentration would attenuate approximately 33 times while migrating from soil vapor to indoor air. Based on RGIs evaluation of soil vapor and indoor air data on other projects and a number of published studies, RGI considers a VAF of 0.002 (500 times attenuation) to be more realistic VAF for evaluating the actual vapor intrusion risk at most properties. Using a VAF of 0.002, a TCE soil vapor concentration of 3,750 µg/m^3 in soil vapor would be required to result in a TCE indoor air concentration of 7.5 µg/m^3. Based on these factors, RGI determined that there was no risk of the TCE soil vapor concentrations on the Property resulting in an indoor air concentration that exceeded the STIAA of 7.5 µg/m^3. Therefore, no further action was recommended regarding evaluation of Short Term TCE impacts discussed in Implementation Memorandum No. 22.

4.4 INDOOR AIR ASSESSMENT

Work associated with the Vapor Intrusion Assessment resumed in March of 2020. This section describes work associated with the assessment of indoor air and subsequent data evaluation.

4.4.1 BUILDING INSPECTION

On March 18, 2020, RGI visited the Property to perform the building inspection. The purpose of the inspection was to assess indoor air sample locations, discuss the indoor air sampling scope of work with the building occupants, and identify any materials/chemicals that could potentially be a source of TCE to indoor air and complicate the evaluation of indoor air data.

During the building inspection, RGI visually inspected all areas of the building where indoor air sample sampling was planned and documented observations in the field log book. RGI utilized a photoionization detector (PID) that was calibrated for TCE and provided measurements in parts per billion (ppb) in order to identify areas where volatile contaminants were present. RGI first obtained an exterior background

reading from the PID and determined that no significant background concentrations of volatile contaminants were present.

RGI then used the PID to obtain measurements in all areas of the building where indoor air sampling was planned. RGI identified storage areas in the southern portion of the building where cleaning and painting related chemicals were present and elevated PID readings were observed, which indicated the presence of volatile compounds (not necessarily TCE). Although none of these chemicals were confirmed to contain TCE, RGI requested that these chemicals be removed from the air sampling area six days prior to commencing with the air sampling as a conservative approach. The building inspection did not identify any other issues/materials that would be thought to complicate the indoor air sampling planned for March 24, 2020. The locations of pertinent features associated with the building inspection are displayed on Figure 4.

4.4.2 INDOOR AIR SAMPLING EVENT

On March 24, 2020, RGI collected four indoor air samples inside the Property building and one outdoor/background air sample outside near the southwest portion of the building, which was considered upwind of the air sample locations on that date. The locations of indoor air and outdoor air/background samples are displayed on Figure 4.

Air samples were collected using individually certified 6-liter Summa canisters equipped with a vacuum gauge and a flow controller provided by FBI. The flow controller was calibrated by the laboratory and to allow for sample collection in a 6-liter canister over an 8-hour period. Samples were situated approximately 4 to 5 feet off the ground in order to be representative of the breathing space.

Air sampling commenced when the valve on the canister was fully opened and the sample start time and initial vacuum was recorded in the field logbook. The temperature and atmospheric pressure at the time of sampling were also recorded in the field logbook. Each canister was inspected periodically to record the vacuum level during the 8-hour sampling period and ensure there were no problems with the canisters. At the end of the 8-hour sample interval, the canisters were closed and the time of completion and final vacuum was recorded.

A total of five air samples (four indoor air samples and one outdoor/background air sample) were transported to Friedman & Bruya, Inc. laboratory in accordance with standard chain of custody protocols.

4.4.3 INDOOR AIR ANALYSIS & DATA EVALUATION

Four indoor air samples and one outdoor/background air sample were submitted to Friedman & Bruya, Inc (FBI) in Seattle, Washington for the following analyses:

- PCE, TCE, cis 1,2-DCE, trans 1,2-DCE, 1,1 DCE and vinyl chloride using EPA Method TO-15 Select Ion Monitoring (SIM).

A copy of final analytical laboratory report is included in Appendix B. Air analytical data and applicable IASLs are summarized in Table 2 and air analytical data are displayed on Figure 4.

PCE, TCE, cis 1,2-DCE, trans 1,2-DCE, 1,1 DCE and vinyl chloride were not detected at concentrations above the laboratory method detection limits in any of the four indoor air samples or the outdoor/background air sample. Therefore, indoor air has not been adversely impacted by the release on the west-adjoining FHM Site and no further vapor intrusion investigation is warranted.

In addition, since the laboratory detection limits were below the stringent Method B IACULs (intended for residential exposure scenarios), the Property should qualify for an unrestricted NFA determination provided that all of Ecology's requirements (apart from vapor intrusion) were met.

5 CONCLUSION

Based on the findings of this Vapor Intrusion Assessment, RGI draws the following conclusions.

- The Property is used exclusively for commercial purposes. Therefore, the Commercial Method B Soil Vapor Screening Levels (SVSLs) and Indoor Air Cleanup Levels (IASLs) are appropriate for evaluating soil vapor and indoor air data at the Property.
- The TCE soil vapor concentrations detected in SVW2, SVW5, and SVW6 were below the Commercial Method B SVSL for TCE of 83 µg/m^3. Therefore, these soil vapor concentrations do not represent a health risk to building occupants.
- TCE soil vapor concentrations on the Property are well below soil vapor concentrations that pose a short term health risk due to TCE exposure described in Implementation Memorandum No. 22. No further evaluation of the short term health risks due to TCE exposure is required at the Property.
- No contaminants of concern were detected in indoor air at concentrations above the laboratory detection limit and no further vapor intrusion investigation is warranted for the Property. Since the laboratory detection limits associated with indoor air samples were below the stringent Method B IACULs (intended for residential exposure scenarios), the Property should qualify for an unrestricted NFA determination provided that all of Ecology's requirements (apart from vapor intrusion) were met.

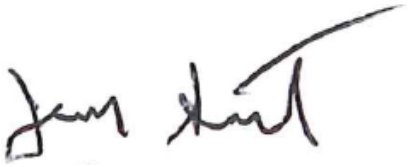
6 LIMITATIONS

This VIA was performed by RGI on behalf of Sea Mar (the Client). The VIA was completed in accordance with generally acceptable professional practices for the nature and conditions of work completed in the same or similar localities, at the time the VIA was completed. This report does not represent a legal opinion. No other warranty, express or implied, is made.

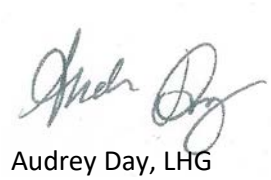
If we may provide you with any additional information or clarification of this work, please contact the undersigned at (425) 415-0551.

Sincerely,

THE RILEY GROUP, INC.

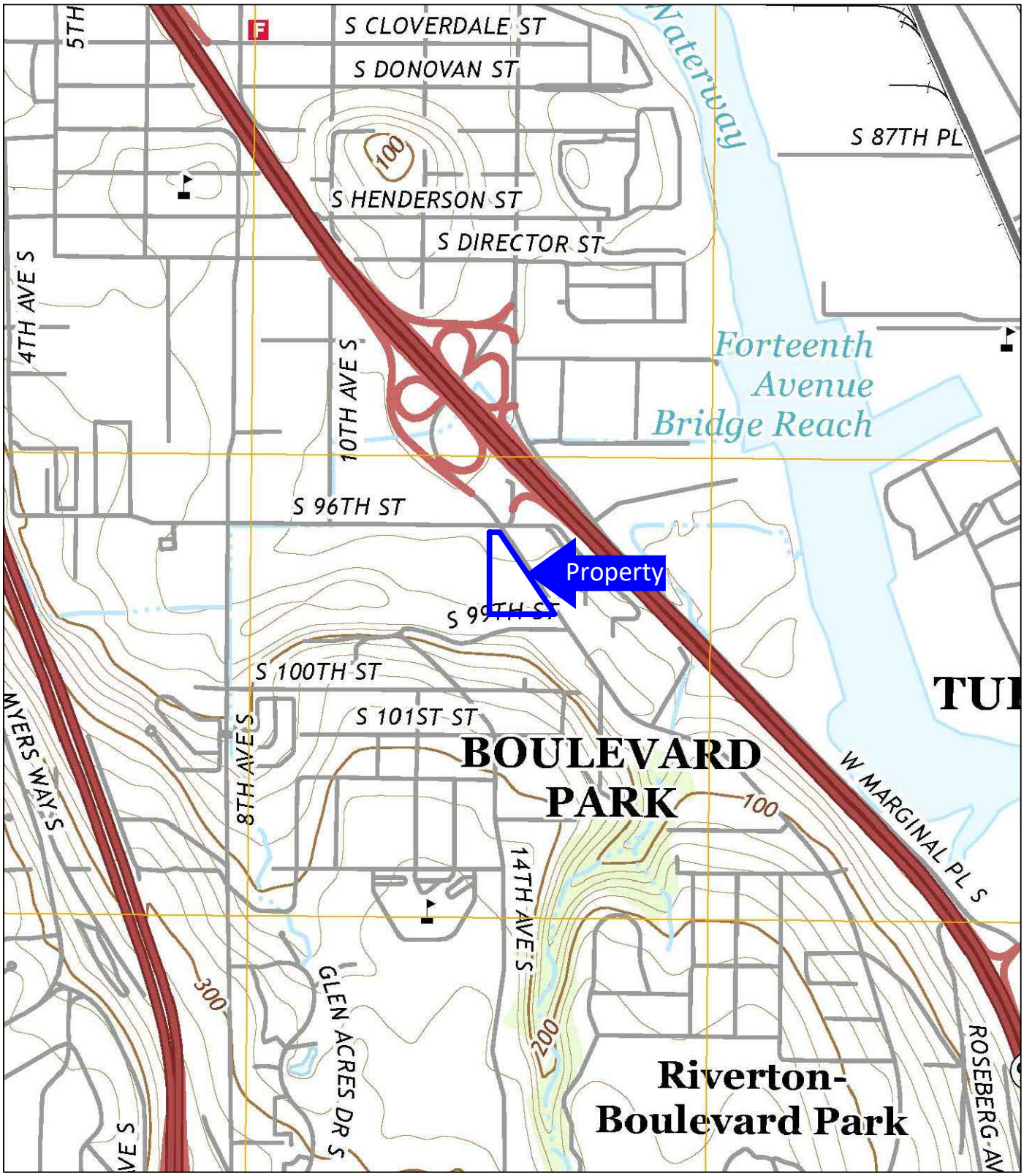


Jerry Sawetz
Senior Environmental Scientist



Audrey Day, LHG
Senior Environmental Manager

Distribution: Mr. Mike Leong, Sea Mar Community Health Center, LLC (electronic PDF)



USGS, 2017, Seattle South, Washington
7.5-Minute Quadrangle

Approximate Scale: 1"=1000'

0 500 1000 2000

N

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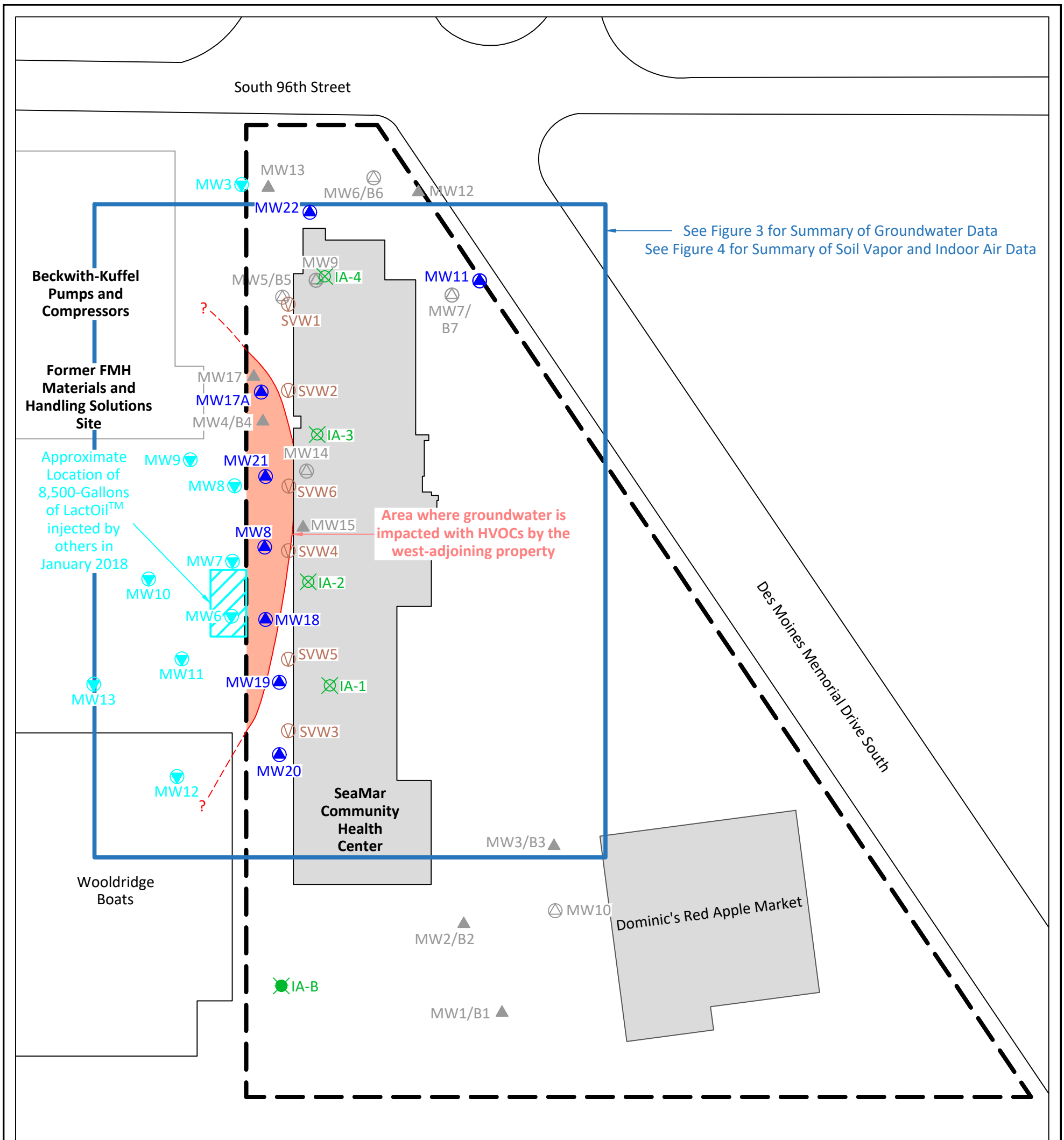
Sea Mar Community Health Center		Figure 1
RGI Project Number 2016-023C	Property Vicinity Map	Date Drawn: 11/2020
Address: 9635 Des Moines Memorial Drive South, Seattle, Washington 98108		



Note: Not all previous sampling locations on Property or west-adjoining property are shown here.

HVOC = Halogenated volatile organic compounds. Trichloroethene and vinyl chloride are present in groundwater at the western portion of the Property at concentrations exceeding applicable MTCA groundwater cleanup levels.

= Indoor air sample location by RGI

= Outdoor air/background sample location by RGI

= Soil vapor well location by RGI

= Monitoring well on west-adjoining property installed by others

= Monitoring well properly decommissioned by RGI

= Monitoring well destroyed or covered during construction

= (in blue) Existing groundwater monitoring well previously installed by RGI

= Property boundary

Approximate Scale: 1"=60'

0 30 60 120

N

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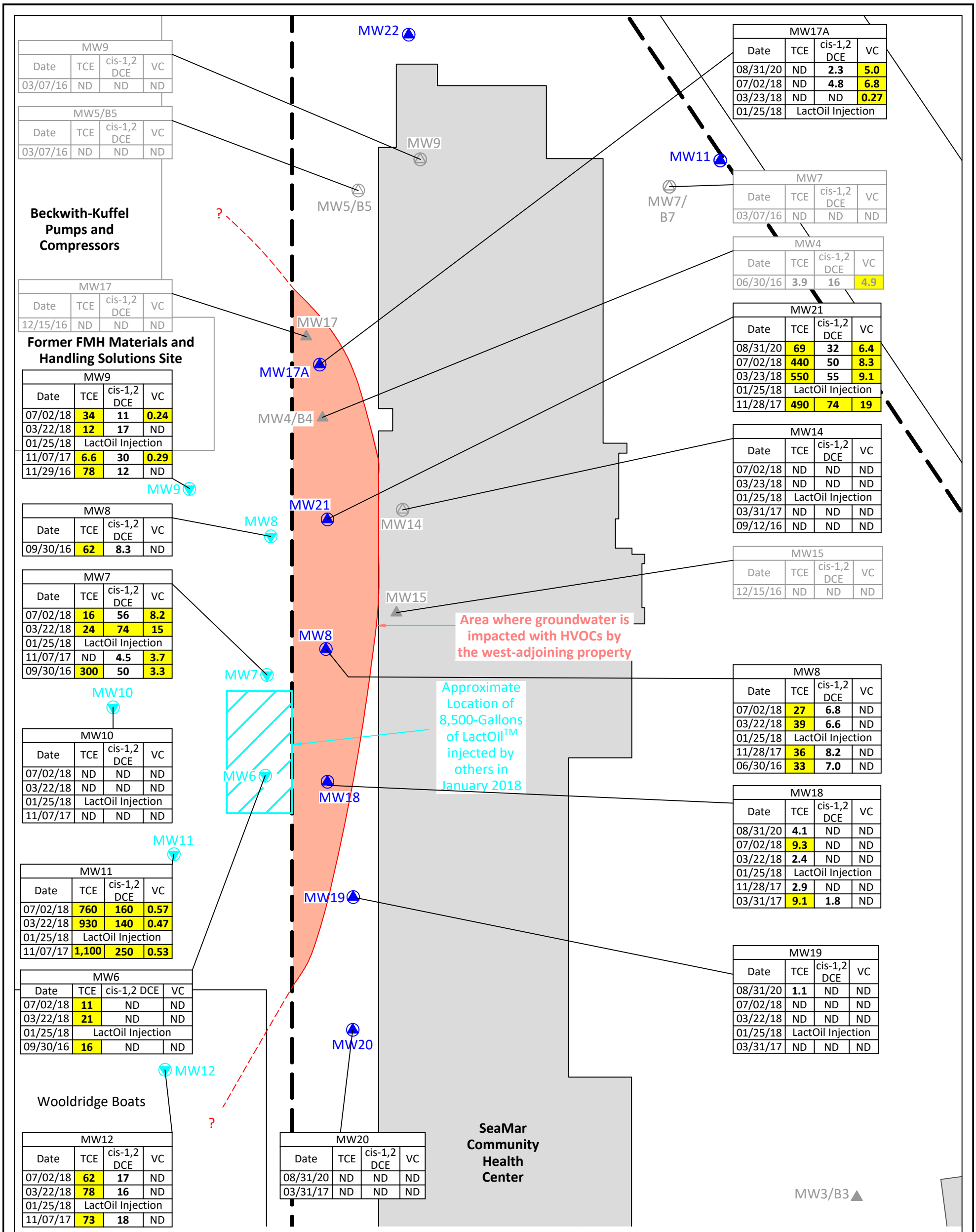
Sea Mar Community Health Center		Figure 2
RGI Project Number 2016-023C	Property Representation with Groundwater, Soil Vapor, and Air Sample Locations	Date Drawn: 11/2020
Address: 9635 Des Moines Memorial Drive South, Seattle, Washington 98108		



MW9

Date	TCE	cis-1,2 DCE	VC
03/07/16	ND	ND	ND

MW5/B5

Date	TCE	cis-1,2 DCE	VC
03/07/16	ND	ND	ND

MW17

Date	TCE	cis-1,2 DCE	VC
12/15/16	ND	ND	ND

MW9

Date	TCE	cis-1,2 DCE	VC
07/02/18	**34**	**11**	**0.24**
03/22/18	**12**	**17**	ND
01/25/18	LactOil Injection		
11/07/17	**6.6**	**30**	**0.29**
11/29/16	**78**	**12**	ND

MW8

Date	TCE	cis-1,2 DCE	VC
09/30/16	**62**	**8.3**	ND

MW7

Date	TCE	cis-1,2 DCE	VC
07/02/18	**16**	**56**	**8.2**
03/22/18	**24**	**74**	**15**
01/25/18	LactOil Injection		
11/07/17	ND	**4.5**	**3.7**
09/30/16	**300**	**50**	**3.3**

MW10

Date	TCE	cis-1,2 DCE	VC
07/02/18	ND	ND	ND
03/22/18	ND	ND	ND
01/25/18	LactOil Injection		
11/07/17	ND	ND	ND

MW11

Date	TCE	cis-1,2 DCE	VC
07/02/18	**760**	**160**	**0.57**
03/22/18	**930**	**140**	**0.47**
01/25/18	LactOil Injection		
11/07/17	**1,100**	**250**	**0.53**

MW6

Date	TCE	cis-1,2 DCE	VC
07/02/18	**11**	ND	ND
03/22/18	**21**	ND	ND
01/25/18	LactOil Injection		
09/30/16	**16**	ND	ND

MW12

Date	TCE	cis-1,2 DCE	VC
07/02/18	**62**	**17**	ND
03/22/18	**78**	**16**	ND
01/25/18	LactOil Injection		
11/07/17	**73**	**18**	ND

MW20

Date	TCE	cis-1,2 DCE	VC
08/31/20	ND	ND	ND
03/31/17	ND	ND	ND

MW17A

Date	TCE	cis-1,2 DCE	VC
08/31/20	ND	**2.3**	**5.0**
07/02/18	ND	**4.8**	**6.8**
03/23/18	ND	ND	**0.27**
01/25/18	LactOil Injection		

MW7

Date	TCE	cis-1,2 DCE	VC
03/07/16	ND	ND	ND

MW4

Date	TCE	cis-1,2 DCE	VC
06/30/16	**3.9**	**16**	**4.9**

MW21

Date	TCE	cis-1,2 DCE	VC
08/31/20	**69**	**32**	**6.4**
07/02/18	**440**	**50**	**8.3**
03/23/18	**550**	**55**	**9.1**
01/25/18	LactOil Injection		
11/28/17	**490**	**74**	**19**

MW14

Date	TCE	cis-1,2 DCE	VC
07/02/18	ND	ND	ND
03/23/18	ND	ND	ND
01/25/18	LactOil Injection		
03/31/17	ND	ND	ND
09/12/16	ND	ND	ND

MW15

Date	TCE	cis-1,2 DCE	VC
12/15/16	ND	ND	ND

MW8

Date	TCE	cis-1,2 DCE	VC
07/02/18	**27**	**6.8**	ND
03/22/18	**39**	**6.6**	ND
01/25/18	LactOil Injection		
11/28/17	**36**	**8.2**	ND
06/30/16	**33**	**7.0**	ND

MW18

Date	TCE	cis-1,2 DCE	VC
08/31/20	**4.1**	ND	ND
07/02/18	**9.3**	ND	ND
03/22/18	**2.4**	ND	ND
01/25/18	LactOil Injection		
11/28/17	**2.9**	ND	ND
03/31/17	**9.1**	**1.8**	ND

MW19

Date	TCE	cis-1,2 DCE	VC
08/31/20	**1.1**	ND	ND
07/02/18	ND	ND	ND
03/22/18	ND	ND	ND
01/25/18	LactOil Injection		
03/31/17	ND	ND	ND

= Groundwater Analytical Results in micrograms/liter (ug/L);

TCE = Trichloroethane, cis-1,2-DCE = cis-1,2-Dichloroethene, VC = Vinyl Chloride

ND = Not detected above laboratory detection limits

Bold and yellow highlight indicates the detected groundwater concentration exceeds the MTCA Method A Cleanup Level for Groundwater and/or Applicable or Relevant and Appropriate Requirements (ARAR).

= (in cyan) Monitoring well on west-adjoining property installed by others

= (in gray) Monitoring well properly decommissioned by RGI

= (in gray) Monitoring well destroyed during construction

= (in blue) Existing groundwater monitoring well previously installed by RGI

= Property boundary

Approximate Scale: 1"=30'

0 15 30 60

N

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Sea Mar Community Health Center		Figure 3
RGI Project Number 2016-023C	Groundwater Monitoring Well Locations with HVOC Analytical Data	Date Drawn: 11/2020
Address: 9635 Des Moines Memorial Drive South, Seattle, Washington 98108		

SVW1 (Soil Vapor)						
Date	PCE	TCE	cis-1,2-DCE	trans-1, 2-DCE	1,1-DCE	VC
08/08/18	ND	ND	ND	ND	ND	ND

SVW2 (Soil Vapor)						
Date	PCE	TCE	cis-1,2-DCE	trans-1, 2-DCE	1,1-DCE	VC
08/08/18	ND	**5.7**	ND	ND	ND	ND

SV1-A (2016) (Soil Vapor)						
Date	PCE	TCE	cis-1,2-DCE	trans-1, 2-DCE	1,1-DCE	VC
03/07/16	**7.9**	**140**	ND	ND	ND	ND

SVW6 (Soil Vapor)						
Date	PCE	TCE	cis-1,2-DCE	trans-1, 2-DCE	1,1-DCE	VC
08/08/18	ND	**16**	ND	ND	ND	ND

IA-4 (Indoor Air)						
Date	PCE	TCE	cis-1,2-DCE	trans-1, 2-DCE	1,1-DCE	VC
03/24/20	ND	ND	ND	ND	ND	ND

IA-3 (Indoor Air)						
Date	PCE	TCE	cis-1,2-DCE	trans-1, 2-DCE	1,1-DCE	VC
03/24/20	ND	ND	ND	ND	ND	ND

SVW4 (Soil Vapor)						
Date	PCE	TCE	cis-1,2-DCE	trans-1, 2-DCE	1,1-DCE	VC
08/08/18	ND	ND	ND	ND	ND	ND

IA-2 (Indoor Air)						
Date	PCE	TCE	cis-1,2-DCE	trans-1, 2-DCE	1,1-DCE	VC
03/24/20	ND	ND	ND	ND	ND	ND

SVW5 (Soil Vapor)						
Date	PCE	TCE	cis-1,2-DCE	trans-1, 2-DCE	1,1-DCE	VC
08/08/18	ND	**13**	ND	ND	ND	ND

IA-1 (Indoor Air)						
Date	PCE	TCE	cis-1,2-DCE	trans-1, 2-DCE	1,1-DCE	VC
03/24/20	ND	ND	ND	ND	ND	ND

SVW3 (Soil Vapor)						
Date	PCE	TCE	cis-1,2-DCE	trans-1, 2-DCE	1,1-DCE	VC
08/08/18	ND	ND	ND	ND	ND	ND

MW22, MW11, MW9, IA-4, MW5/B5, SVW1, MW7/B7, Storage, Open Space/Educational Outreach Area, Beckwith-Kuffel Pumps and Compressors, ?, MW17, SVW2, MW17A, Storage, Former FMH Materials and Handling Solutions Site, MW4/B4, Storage, IA-3, Kitchen, Elevator, Electrical, MW9, MW21, MW8, MW14, SV1, SVW6, Museum (North Gallery), Stairs, MW15, Approximate Location of 8,500-Gallons of LactOil™ injected by others in January 2018, MW8, SVW4, Restrooms, MW7, MW10, IA-2, Area where groundwater is impacted with HVOCs by the west-adjoining property, Electrical Room, MW6, MW18, Storage, MW11, SVW5, Storage, Museum (South Gallery), MW19, IA-1, Locations where cleaning and painting supplies were stored and elevated PID readings were observed. The chemicals were removed from these locations prior to indoor air sampling., SVW3, Storage, MW20, Restrooms, MW12, ?, Wooldridge Boats, SeaMar Community Health Center, MW3/B3

= Soil Vapor Analytical results in micrograms/cubic meter (ug/m³); Indoor Air Analytical results in micrograms/cubic meter (ug/m³);

PCE = Tetrachloroethene, TCE = trichloroethane, cis-1,2-DCE = cis-1,2-dichloroethene, trans-1,2-DCE = trans-1,2-dichloroethene, 1,1-DCE = 1,1-dichloroethene, VC = vinyl chloride

ND = Not detected above laboratory detection limits

PID = Photoionization detector

Bold and yellow highlight indicates the detected concentration exceeded either the Commercial Method B Soil Vapor Screening Level or the Method B Indoor Air Cleanup Level

Notes: Ground floor building layout obtained from Bazan Architects.
Outdoor/background air sample IA-B is situated outside the area displayed on this figure approximately 134 feet south of well MW20. No contaminants were detected at concentrations above laboratory detection limits in this background air sample.

= (in green) Indoor air sample location by RGI
= (in brown) Soil vapor well by RGI
= (in gray) 2016 Soil vapor well destroyed during construction
= (in cyan) Monitoring well on west-adjoining property installed by others
= (in gray) Monitoring well properly decommissioned by RGI
= (in gray) Monitoring well destroyed during construction
= (in blue) Existing groundwater monitoring well previously installed by RGI
= Property boundary

Approximate Scale: 1"=30'
0 15 30 60
N

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Bothell, Washington 98011
Phone: 425.415.0551
Fax: 425.415.0311

Sea Mar Community Health Center | Figure 4

RGI Project Number 2016-023C | Soil Vapor and Indoor Air Sample Locations with Analytical Data | Date Drawn: 11/2020

Address: 9635 Des Moines Memorial Drive South, Seattle, Washington 98108

Table 1. Summary of Soil Vapor Sample Analytical Results
Sea Mar Community Health Center
9635 Des Moines Memorial Drive South, Seattle, Washington 98108
The Riley Group, Inc. Project No. 2016-023C

Sample Number	Sample Date	Sample Depth (feet below concrete slab)	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	VC
2018 Sampling Event								
SVW1[1]	08/08/18	3	ND<34	ND<27	ND<20	ND<40	ND<20	ND<13
SVW2	08/08/18	3	ND<6.9	**5.7**	ND<4.0	ND<8.0	ND<4.0	ND<2.6
SVW3	08/08/18	3	ND<6.9	ND<5.5	ND<4.0	ND<8.0	ND<4.0	ND<2.6
SVW4	08/08/18	3	ND<6.9	ND<5.5	ND<4.0	ND<8.0	ND<4.0	ND<2.6
SVW5	08/08/18	3	ND<6.9	**13**	ND<4.0	ND<8.0	ND<4.0	ND<2.6
SVW6	10/10/18	3	ND<6.9	**16**	ND<4.0	ND<8.0	ND<4.0	ND<2.6
2016 Sampling Event								
SV1-A	03/07/16	3	**7.9**	**140**	ND<4.0	ND<8.0	ND<4.0	ND<2.6
Method B Soil Vapor Screening Level (Residential Exposure Scenario)[2]			**320**	**11**	**NVE**	**NVE**	**3,000**	**9.5**
Commercial Method B Soil Vapor Screening Level (Commercial Exposure Scenario)[3]			**1,326**	**83**	**NVE**	**NVE**	**68,913**	**39**

Notes:

Unless otherwise noted, all analytical results are given in micrograms per cubic meter (ug/m^3).

PCE (tetrachloroethene), TCE (trichloroethene), cis-1,2-DCE (cis-1,2-dichlorothene), trans-1,2-DCE (trans-1,2-dichloroethene), 1,1 DCE (1,1-dichloroethene), and VC (vinyl chloride) determined using EPA Method TO-15.

ND = Not detected above the laboratory detection limit.

NVE = No value established.

[1] The laboratory detection limit was elevated in SVW1, but the detection limit was below applicable Commercial Method B SVSL for the Property.

[2] Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) Method B Soil Vapor Screening Levels (SVSLs) obtained from the Ecology Cleanup Level and Risk Calculation (CLARC) database revised in August 2020. The carcinogenic SVSL was referenced for all contaminants except 1,1-DCE as no carcinogenic SVSL has been established for this compound.

[3] Commercial Method B SVSL calculated using the Commercial Method B Indoor Air Screening Levels (IASLs) summarized in Table 2 and a vapor attenuation factor (VAF) of 0.03. See Section 4.2.2.2 of report for details pertaining to the calculations.

Bold results indicate concentrations above laboratory detection limits.

Bold and highlighted results indicate any detected soil vapor concentrations that exceed the Commercial Method B SVSL Ecology considers protective of Commercial Method B Indoor Air Screening Levels.

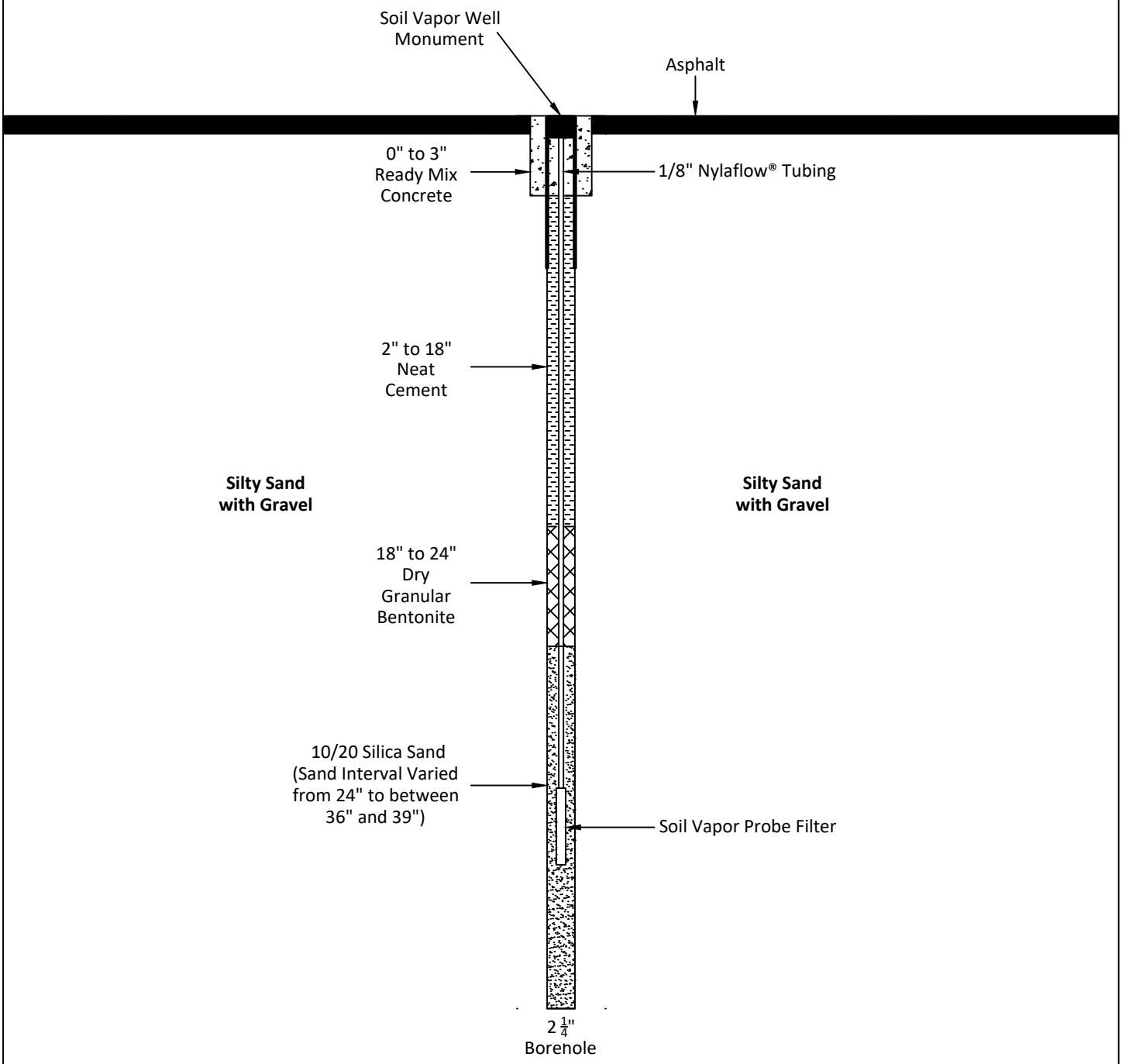
Table 2. Summary of Indoor Air Sample Analytical Results
Sea Mar Community Health Center
9635 Des Moines Memorial Drive South, Seattle, Washington 98108
The Riley Group, Inc. Project No. 2016-023C

Sample Number	Sample Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	VC
IA-1	03/24/20	ND<6.8	ND<0.27	ND<0.4	ND<0.4	ND<0.4	ND<0.26
IA-2	03/24/20	ND<6.8	ND<0.27	ND<0.4	ND<0.4	ND<0.4	ND<0.26
IA-3	03/24/20	ND<6.8	ND<0.27	ND<0.4	ND<0.4	ND<0.4	ND<0.26
IA-4	03/24/20	ND<6.8	ND<0.27	ND<0.4	ND<0.4	ND<0.4	ND<0.26
IA-B[1]	03/24/20	ND<6.8	ND<0.27	ND<0.4	ND<0.4	ND<0.4	ND<0.26
Method B Indoor Air Cleanup Level (Residential Exposure Scenario)[2]		**9.62**	**0.33**	**NVE**	**NVE**	**91**	**0.28**
Commercial Method B Indoor Air Screening Level (Commercial Exposure Scenario)[3]		**39.79**	**2.5**	**NVE**	**NVE**	**2,067**	**1.17**

Notes:
Unless otherwise noted, all analytical results are given in micrograms per cubic meter (ug/m^3).
PCE (tetrachloroethene), TCE (trichloroethene), cis-1,2-DCE (cis-1,2-dichlorothene), trans-1,2-DCE (trans-1,2-dichloroethene), 1,1 DCE (1,1-dichloroethene), and VC (vinyl chloride) determined using EPA Method TO-15.
ND = Not detected above the laboratory detection limit.
NVE = No value established.
[1] Outdoor air sample used to represent background concentrations of contaminants.

[2] MTCA Method B Indoor Air Cleanup (IACULs) obtained from the Ecology Cleanup Level and Risk Calculation (CLARC) database revised in August 2020. The carcinogenic IACUL was referenced for all contaminants except 1,1-DCE as no carcinogenic IACUL has been established for this compound.

[3] Commercial Method B Indoor Air Screening Levels (IASLs) calculated using MTCA equation 750-1 for non-carcinogenic compounds and 750-2 for carcinogenic compounds in conjunction with information provided by Ecology in Implementation Memorandum No. 21 and the Ecology CLARC database. See Section 4.2.2.1 of report for details pertaining to the calculations.
Indoor/outdoor air samples were collected over an 8 hour period in accordance with the Draft Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remediation dated October 2009 by Ecology.
Bold results indicate concentrations above laboratory detection limits.
Bold and highlighted results indicate any detected air concentrations that exceeded MTCA Method B IACULs for residential exposure scenarios.



Not to Scale

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Sea Mar Community Health Center		Figure A-1
RGI Project Number: 2016-023C	Permanent Soil Vapor Well Construction	Date Drawn: 11/2020
Address: 9635 Des Moines Memorial Drive South, Seattle, Washington 98108		

H&P Mobile Geochemistry Inc.

24 August 2018

Mr. Jerry Sawetz
The Riley Group, Inc. (RGI)
17522 Bothell Way NE, Suite A
Bothell, WA 98011

H&P Project: RG081418-12 Rev
Client Project: SeaMar Community Health Center

Dear Mr. Jerry Sawetz:

Enclosed is the analytical report for the above referenced project. The data herein applies to samples as received by H&P Mobile Geochemistry, Inc. on 14-Aug-18 which were analyzed in accordance with the attached Chain of Custody record(s).

The results for all sample analyses and required QA/QC analyses are presented in the following sections and summarized in the documents:

- Sample Summary
- Case Narrative (if applicable)
- Sample Results
- Quality Control Summary
- Notes and Definitions / Appendix
- Chain of Custody
- Sampling Logs (if applicable)

Unless otherwise noted, I certify that all analyses were performed and reviewed in compliance with our Quality Systems Manual and Standard Operating Procedures. This report shall not be reproduced, except in full, without the written approval of H&P Mobile Geochemistry, Inc.

We at H&P Mobile Geochemistry, Inc. sincerely appreciate the opportunity to provide analytical services to you on this project. If you have any questions or concerns regarding this analytical report, please contact me at your convenience at 760-804-9678.

Sincerely,

Janis La Roux
Laboratory Director

H&P Mobile Geochemistry, Inc. is certified under the California ELAP and the National Environmental Laboratory Accreditation Conference (NELAC). H&P is approved as an Environmental Testing Laboratory and Mobile Laboratory in accordance with the DoD-ELAP Program and ISO/IEC 17025:2005 programs, accreditation number 69070 for EPA Method TO-15, H&P Method TO-15, EPA Method 8260B and H&P 8260SV.

H&P Mobile
Geochemistry Inc.

2470 Impala Drive
Carlsbad, CA 92010
760-804-9678 Phone
760-804-9159 Fax

The Riley Group, Inc. (RGI)	Project:	RG081418-12 Rev	
17522 Bothell Way NE, Suite A	Project Number:	SeaMar Community Health Center	Reported:
Bothell, WA 98011	Project Manager:	Mr. Jerry Sawetz	24-Aug-18 12:16

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SVW-1	E808048-01	Vapor	08-Aug-18	14-Aug-18
SVW-2	E808048-02	Vapor	08-Aug-18	14-Aug-18
SVW-3	E808048-03	Vapor	08-Aug-18	14-Aug-18
SVW-4	E808048-04	Vapor	08-Aug-18	14-Aug-18
SVW-5	E808048-05	Vapor	08-Aug-18	14-Aug-18
SVW-D	E808048-06	Vapor	08-Aug-18	14-Aug-18

H&P Mobile
Geochemistry Inc.

2470 Impala Drive
Carlsbad, CA 92010
760-804-9678 Phone
760-804-9159 Fax

The Riley Group, Inc. (RGI)	Project: RG081418-12 Rev	
17522 Bothell Way NE, Suite A	Project Number: SeaMar Community Health Center	Reported:
Bothell, WA 98011	Project Manager: Mr. Jerry Sawetz	24-Aug-18 12:16

DETECTIONS SUMMARY

Sample ID: **SVW-1** Laboratory ID: **E808048-01**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SVW-2** Laboratory ID: **E808048-02**

Analyte	Result	Reporting Limit	Units	Method	Notes
Trichloroethene	**5.7**	5.5	ug/m3	EPA TO-15	

Sample ID: **SVW-3** Laboratory ID: **E808048-03**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SVW-4** Laboratory ID: **E808048-04**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

Sample ID: **SVW-5** Laboratory ID: **E808048-05**

Analyte	Result	Reporting Limit	Units	Method	Notes
Trichloroethene	**13**	5.5	ug/m3	EPA TO-15	

Sample ID: **SVW-D** Laboratory ID: **E808048-06**

Analyte	Result	Reporting Limit	Units	Method	Notes
No Detections Reported					

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The Riley Group, Inc. (RGI)	Project: RG081418-12 Rev	
17522 Bothell Way NE, Suite A	Project Number: SeaMar Community Health Center	Reported:
Bothell, WA 98011	Project Manager: Mr. Jerry Sawetz	24-Aug-18 12:16

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SVW-1 (E808048-01) Vapor Sampled: 08-Aug-18 Received: 14-Aug-18									**R-05**
Vinyl chloride	ND	13	ug/m3	5	EH82305	23-Aug-18	24-Aug-18	EPA TO-15	
1,1-Dichloroethene	ND	20	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	40	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	20	"	"	"	"	"	"	
Trichloroethene	ND	27	"	"	"	"	"	"	
Tetrachloroethene	ND	34	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*101 %*		*76-134*	"	"	"	"	
Surrogate: Toluene-d8		*110 %*		*78-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*86.2 %*		*77-127*	"	"	"	"	
SVW-2 (E808048-02) Vapor Sampled: 08-Aug-18 Received: 14-Aug-18									
Vinyl chloride	ND	2.6	ug/m3	1	EH82305	23-Aug-18	23-Aug-18	EPA TO-15	
1,1-Dichloroethene	ND	4.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	8.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	4.0	"	"	"	"	"	"	
Trichloroethene	**5.7**	5.5	"	"	"	"	"	"	
Tetrachloroethene	ND	6.9	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*102 %*		*76-134*	"	"	"	"	
Surrogate: Toluene-d8		*113 %*		*78-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*98.5 %*		*77-127*	"	"	"	"	
SVW-3 (E808048-03) Vapor Sampled: 08-Aug-18 Received: 14-Aug-18									
Vinyl chloride	ND	2.6	ug/m3	1	EH82305	23-Aug-18	23-Aug-18	EPA TO-15	
1,1-Dichloroethene	ND	4.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	8.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	4.0	"	"	"	"	"	"	
Trichloroethene	ND	5.5	"	"	"	"	"	"	
Tetrachloroethene	ND	6.9	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*99.0 %*		*76-134*	"	"	"	"	
Surrogate: Toluene-d8		*91.2 %*		*78-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*100 %*		*77-127*	"	"	"	"	

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The Riley Group, Inc. (RGI)	Project: RG081418-12 Rev	
17522 Bothell Way NE, Suite A	Project Number: SeaMar Community Health Center	Reported:
Bothell, WA 98011	Project Manager: Mr. Jerry Sawetz	24-Aug-18 12:16

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SVW-4 (E808048-04) Vapor Sampled: 08-Aug-18 Received: 14-Aug-18									
Vinyl chloride	ND	2.6	ug/m3	1	EH82305	23-Aug-18	23-Aug-18	EPA TO-15	
1,1-Dichloroethene	ND	4.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	8.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	4.0	"	"	"	"	"	"	
Trichloroethene	ND	5.5	"	"	"	"	"	"	
Tetrachloroethene	ND	6.9	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*101 %*		*76-134*	"	"	"	"	
Surrogate: Toluene-d8		*101 %*		*78-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*94.3 %*		*77-127*	"	"	"	"	
SVW-5 (E808048-05) Vapor Sampled: 08-Aug-18 Received: 14-Aug-18									
Vinyl chloride	ND	2.6	ug/m3	1	EH82305	23-Aug-18	23-Aug-18	EPA TO-15	
1,1-Dichloroethene	ND	4.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	8.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	4.0	"	"	"	"	"	"	
Trichloroethene	**13**	5.5	"	"	"	"	"	"	
Tetrachloroethene	ND	6.9	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*102 %*		*76-134*	"	"	"	"	
Surrogate: Toluene-d8		*108 %*		*78-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*101 %*		*77-127*	"	"	"	"	
SVW-D (E808048-06) Vapor Sampled: 08-Aug-18 Received: 14-Aug-18									
Vinyl chloride	ND	2.6	ug/m3	1	EH82305	23-Aug-18	23-Aug-18	EPA TO-15	
1,1-Dichloroethene	ND	4.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	8.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	4.0	"	"	"	"	"	"	
Trichloroethene	ND	5.5	"	"	"	"	"	"	
Tetrachloroethene	ND	6.9	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*106 %*		*76-134*	"	"	"	"	
Surrogate: Toluene-d8		*109 %*		*78-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*98.0 %*		*77-127*	"	"	"	"	

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The Riley Group, Inc. (RGI)	Project: RG081418-12 Rev	
17522 Bothell Way NE, Suite A	Project Number: SeaMar Community Health Center	Reported:
Bothell, WA 98011	Project Manager: Mr. Jerry Sawetz	24-Aug-18 12:16

Volatile Organic Compounds by EPA TO-15 - Quality Control

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EH82305 - TO-15										
Blank (EH82305-BLK1)				Prepared & Analyzed: 23-Aug-18						
Vinyl chloride	ND	2.6	ug/m3							
1,1-Dichloroethene	ND	4.0	"							
trans-1,2-Dichloroethene	ND	8.0	"							
cis-1,2-Dichloroethene	ND	4.0	"							
Trichloroethene	ND	5.5	"							
Tetrachloroethene	ND	6.9	"							
Surrogate: 1,2-Dichloroethane-d4	*43.9*		*"*	*42.9*		*102*	*76-134*			
Surrogate: Toluene-d8	*40.8*		*"*	*41.4*		*98.5*	*78-125*			
Surrogate: 4-Bromofluorobenzene	*66.8*		*"*	*72.9*		*91.6*	*77-127*			
LCS (EH82305-BS1)				Prepared & Analyzed: 23-Aug-18						
Vinyl chloride	44	2.6	ug/m3	52.0		84.2	64-127			
1,1-Dichloroethene	70	4.0	"	80.8		86.9	61-133			
trans-1,2-Dichloroethene	77	8.0	"	80.8		95.9	67-124			
cis-1,2-Dichloroethene	82	4.0	"	80.0		102	70-121			
Trichloroethene	110	5.5	"	110		102	71-123			
Tetrachloroethene	130	6.9	"	138		94.2	66-124			
Surrogate: 1,2-Dichloroethane-d4	*46.8*		*"*	*42.9*		*109*	*76-134*			
Surrogate: Toluene-d8	*42.0*		*"*	*41.4*		*101*	*78-125*			
Surrogate: 4-Bromofluorobenzene	*76.6*		*"*	*72.9*		*105*	*77-127*			
LCS Dup (EH82305-BSD1)				Prepared & Analyzed: 23-Aug-18						
Vinyl chloride	49	2.6	ug/m3	52.0		94.0	64-127	11.0	25	
1,1-Dichloroethene	74	4.0	"	80.8		92.0	61-133	5.62	25	
trans-1,2-Dichloroethene	74	8.0	"	80.8		91.4	67-124	4.78	25	
cis-1,2-Dichloroethene	82	4.0	"	80.0		102	70-121	0.0982	25	
Trichloroethene	110	5.5	"	110		102	71-123	0.340	25	
Tetrachloroethene	130	6.9	"	138		90.7	66-124	3.78	25	
Surrogate: 1,2-Dichloroethane-d4	*45.4*		*"*	*42.9*		*106*	*76-134*			
Surrogate: Toluene-d8	*43.8*		*"*	*41.4*		*106*	*78-125*			
Surrogate: 4-Bromofluorobenzene	*74.2*		*"*	*72.9*		*102*	*77-127*			

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The Riley Group, Inc. (RGI)	Project: RG081418-12 Rev	
17522 Bothell Way NE, Suite A	Project Number: SeaMar Community Health Center	Reported:
Bothell, WA 98011	Project Manager: Mr. Jerry Sawetz	24-Aug-18 12:16

Volatile Organic Compounds by EPA TO-15 - Quality Control

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Batch EH82305 - TO-15

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The Riley Group, Inc. (RGI)	Project: RG081418-12 Rev	
17522 Bothell Way NE, Suite A	Project Number: SeaMar Community Health Center	Reported:
Bothell, WA 98011	Project Manager: Mr. Jerry Sawetz	24-Aug-18 12:16

Notes and Definitions

R-05	The sample was diluted due to the presence of high levels of non-target analytes resulting in elevated reporting limits.
LCC	Leak Check Compound
ND	Analyte NOT DETECTED at or above the reporting limit
MDL	Method Detection Limit
%REC	Percent Recovery
RPD	Relative Percent Difference

All soil results are reported in wet weight.

Appendix

H&P Mobile Geochemistry, Inc. is approved as an Environmental Testing Laboratory and Mobile Laboratory in accordance with the DoD-ELAP Program and ISO/IEC 17025:2005 programs through PJLA, accreditation number 69070 for EPA Method TO-15, H&P Method TO-15, EPA Method 8260B and H&P 8260SV.

H&P is approved by the State of Arizona as an Environmental Testing Laboratory and Mobile Laboratory, certification numbers AZM758 and AZ0779.

H&P is approved by the State of California as an Environmental Laboratory and Mobile Laboratory in conformance with the Environmental Laboratory Accreditation Program (ELAP) for the category of Volatile and Semi-Volatile Organic Chemistry of Hazardous Waste, certification numbers 2740, 2741, 2743, 2744, 2745, 2754 & 2930.

H&P is approved by the State of Florida Department of Health under the National Environmental Laboratory Accreditation Conference (NELAC) certification number E871100.

The complete list of stationary and mobile laboratory certifications along with the fields of testing (FOTs) and analyte lists are available at www.handpmg.com/about/certifications.

Mobile Geochemistry, Inc.
2470 Impala Drive, Carlsbad, CA 92010
& Field Office - Signal Hill, CA
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VAPOR / AIR Chain of Custody

DATE: 8/9/18
Page 1 of 1

Lab Client and Project Information

Lab Client/Consultant: Riley Group Inc.
Lab Client Project Manager: Jerry Sawetz
Lab Client Address: 17522 Bothell Way NE
Lab Client City, State, Zip: Bothell, WA 98011
Phone Number: 425-415-0551

Project Name / #: SeaMar Community Health Center
Project Location: Seattle, WA
Report E-Mail(s): jsawetz@riley-group.com

Sample Receipt (Lab Use Only)

Date Rec'd: 8/14/18 Control #: 180666.01
H&P Project # RG081418-12
Lab Work Order # E8080048
Sample Intact: ☒ Yes ☐ No ☐ See Notes Below
Receipt Gauge ID: 30005 Temp: RT
Outside Lab:
Receipt Notes/Tracking #: 1293TT6190508817l0
Lab PM Initials: KB

Reporting Requirements

☒ Standard Report ☐ Level III ☐ Level IV
☐ Excel EDD ☐ Other EDD:
☐ CA Geotracker Global ID:

Turnaround Time

☒ 5-7 day Stnd ☐ 24-Hr Rush
☐ 3-day Rush ☐ Mobile Lab
☐ 48-Hr Rush ☐ Other:

Sampler Information

Sampler(s): Logan Chinn
Signature:
Date: 8/8/2018

Additional Instructions to Laboratory: Short list = tetrachloroethene, trichloroethene, cis 1,2 DCE, trans 1,2 DCE, 1,1 DCE, and vinyl chloride by EPA method TO-15

*** Preferred VOC units (please choose one):** ☐ µg/L ☒ µg/m³ ☐ ppbv ☐ ppmv

SAMPLE NAME	FIELD POINT NAME (if applicable)	DATE mm/dd/yy	TIME 24hr clock	SAMPLE TYPE Indoor Air (IA), Ambient Air (AA), Subslab (SS), Soil Vapor (SV)	CONTAINER SIZE & TYPE 400mL/1L/6L Summa, Tedlar, Tube, etc.	CONTAINER ID (###)	Lab use only: Receipt Vac	VOCs Standard Full List ☐ 8260SV ☐ TO-15	VOCs Short List / Project List ☒ 8260SV ☒ TO-15	Oxygenates ☐ 8260SV ☐ TO-15	Naphthalene ☐ 8260SV ☐ TO-15	TPHv as Gas ☐ 8260SVm ☐ TO-15m	Aromatic/Aliphatic Fractions ☐ 8260SVm ☐ TO-15m	Leak Check Compound ☐ DFA ☐ IPA ☐ He	Methane by EPA 8015m	Fixed Gases by ASTM D1945 ☐ CO2 ☐ O2 ☐ N2				
SVW-1		8/8/18	0900	SV	400mL	328	-.06		X											
SVW-2			0945			148	-.04		X											
SVW-3			1200			153	-.93		X											
SVW-4			1030		:39	~~086~~	-.264		X											
SVW-5			1115			086	-.42		X											
SVW-D		↓	1245	↓	↓	143	-.143		X											

Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Jerry Sawetz	RGI	8/9/18	1130	Jon Illowsky	H+P	8/14/18	10:40
Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

*Approval constitutes as authorization to proceed with analysis and acceptance of conditions on back

H&P Mobile Geochemistry Inc.

22 October 2018

Mr. Jerry Sawetz
The Riley Group, Inc. (RGI)
17522 Bothell Way NE, Suite A
Bothell, WA 98011

H&P Project: RG101518-12 Rev
Client Project: SeaMar Community Health Center

Dear Mr. Jerry Sawetz:

Enclosed is the analytical report for the above referenced project. The data herein applies to samples as received by H&P Mobile Geochemistry, Inc. on 15-Oct-18 which were analyzed in accordance with the attached Chain of Custody record(s).

The results for all sample analyses and required QA/QC analyses are presented in the following sections and summarized in the documents:

- Sample Summary
- Case Narrative (if applicable)
- Sample Results
- Quality Control Summary
- Notes and Definitions / Appendix
- Chain of Custody
- Sampling Logs (if applicable)

Unless otherwise noted, I certify that all analyses were performed and reviewed in compliance with our Quality Systems Manual and Standard Operating Procedures. This report shall not be reproduced, except in full, without the written approval of H&P Mobile Geochemistry, Inc.

We at H&P Mobile Geochemistry, Inc. sincerely appreciate the opportunity to provide analytical services to you on this project. If you have any questions or concerns regarding this analytical report, please contact me at your convenience at 760-804-9678.

Sincerely,

Janis La Roux
Laboratory Director

H&P Mobile Geochemistry, Inc. is certified under the California ELAP and the National Environmental Laboratory Accreditation Conference (NELAC). H&P is approved as an Environmental Testing Laboratory and Mobile Laboratory in accordance with the DoD-ELAP Program and ISO/IEC 17025:2005 programs, accreditation number 69070 for EPA Method TO-15, H&P Method TO-15, EPA Method 8260B and H&P 8260SV.

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The Riley Group, Inc. (RGI)	Project:	RG101518-12 Rev	
17522 Bothell Way NE, Suite A	Project Number:	SeaMar Community Health Center	Reported:
Bothell, WA 98011	Project Manager:	Mr. Jerry Sawetz	22-Oct-18 15:50

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SVW-6	E810063-01	Vapor	10-Oct-18	15-Oct-18

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The Riley Group, Inc. (RGI)	Project: RG101518-12 Rev	
17522 Bothell Way NE, Suite A	Project Number: SeaMar Community Health Center	Reported:
Bothell, WA 98011	Project Manager: Mr. Jerry Sawetz	22-Oct-18 15:50

DETECTIONS SUMMARY

Sample ID: **SVW-6** Laboratory ID: **E810063-01**

Analyte	Result	Reporting Limit	Units	Method	Notes
Trichloroethene	**16**	5.5	ug/m3	EPA TO-15	

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The Riley Group, Inc. (RGI)	Project: RG101518-12 Rev	
17522 Bothell Way NE, Suite A	Project Number: SeaMar Community Health Center	Reported:
Bothell, WA 98011	Project Manager: Mr. Jerry Sawetz	22-Oct-18 15:50

Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
SVW-6 (E810063-01) Vapor Sampled: 10-Oct-18 Received: 15-Oct-18									
Vinyl chloride	ND	2.6	ug/m3	1	EJ81804	18-Oct-18	18-Oct-18	EPA TO-15	
1,1-Dichloroethene	ND	4.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	8.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	4.0	"	"	"	"	"	"	
Trichloroethene	**16**	5.5	"	"	"	"	"	"	
Tetrachloroethene	ND	6.9	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*95.9 %*		*76-134*	"	"	"	"	
Surrogate: Toluene-d8		*99.5 %*		*78-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*93.8 %*		*77-127*	"	"	"	"	

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The Riley Group, Inc. (RGI)	Project: RG101518-12 Rev	
17522 Bothell Way NE, Suite A	Project Number: SeaMar Community Health Center	Reported:
Bothell, WA 98011	Project Manager: Mr. Jerry Sawetz	22-Oct-18 15:50

Volatile Organic Compounds by EPA TO-15 - Quality Control

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EJ81804 - TO-15										
Blank (EJ81804-BLK1)				Prepared & Analyzed: 18-Oct-18						
Vinyl chloride	ND	2.6	ug/m3							
1,1-Dichloroethene	ND	4.0	"							
trans-1,2-Dichloroethene	ND	8.0	"							
cis-1,2-Dichloroethene	ND	4.0	"							
Trichloroethene	ND	5.5	"							
Tetrachloroethene	ND	6.9	"							
Surrogate: 1,2-Dichloroethane-d4	*41.0*		*"*	*42.9*		*95.7*	*76-134*			
Surrogate: Toluene-d8	*40.4*		*"*	*41.4*		*97.5*	*78-125*			
Surrogate: 4-Bromofluorobenzene	*72.2*		*"*	*72.9*		*99.1*	*77-127*			
LCS (EJ81804-BS1)				Prepared & Analyzed: 18-Oct-18						
Vinyl chloride	41	2.6	ug/m3	52.0		78.4	64-127			
1,1-Dichloroethene	78	4.0	"	80.8		96.4	61-133			
trans-1,2-Dichloroethene	69	8.0	"	80.8		85.6	67-124			
cis-1,2-Dichloroethene	59	4.0	"	80.0		74.0	70-121			
Trichloroethene	100	5.5	"	110		91.4	71-123			
Tetrachloroethene	130	6.9	"	138		93.3	66-124			
Surrogate: 1,2-Dichloroethane-d4	*41.0*		*"*	*42.9*		*95.8*	*76-134*			
Surrogate: Toluene-d8	*35.7*		*"*	*41.4*		*86.1*	*78-125*			
Surrogate: 4-Bromofluorobenzene	*73.3*		*"*	*72.9*		*101*	*77-127*			
LCS Dup (EJ81804-BSD1)				Prepared & Analyzed: 18-Oct-18						
Vinyl chloride	39	2.6	ug/m3	52.0		75.9	64-127	3.23	25	
1,1-Dichloroethene	68	4.0	"	80.8		84.3	61-133	13.4	25	
trans-1,2-Dichloroethene	58	8.0	"	80.8		71.6	67-124	17.9	25	
cis-1,2-Dichloroethene	60	4.0	"	80.0		75.4	70-121	1.82	25	
Trichloroethene	99	5.5	"	110		90.1	71-123	1.53	25	
Tetrachloroethene	130	6.9	"	138		92.5	66-124	0.967	25	
Surrogate: 1,2-Dichloroethane-d4	*42.6*		*"*	*42.9*		*99.3*	*76-134*			
Surrogate: Toluene-d8	*35.8*		*"*	*41.4*		*86.5*	*78-125*			
Surrogate: 4-Bromofluorobenzene	*70.6*		*"*	*72.9*		*96.9*	*77-127*			

H&P Mobile
Geochemistry Inc.

2470 Impala Drive
Carlsbad, CA 92010
760-804-9678 Phone
760-804-9159 Fax

The Riley Group, Inc. (RGI)	Project: RG101518-12 Rev	
17522 Bothell Way NE, Suite A	Project Number: SeaMar Community Health Center	Reported:
Bothell, WA 98011	Project Manager: Mr. Jerry Sawetz	22-Oct-18 15:50

Volatile Organic Compounds by EPA TO-15 - Quality Control

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

Batch EJ81804 - TO-15

H&P Mobile
Geochemistry Inc.

2470 Impala Drive
Carlsbad, CA 92010
760-804-9678 Phone
760-804-9159 Fax

The Riley Group, Inc. (RGI)	Project: RG101518-12 Rev	
17522 Bothell Way NE, Suite A	Project Number: SeaMar Community Health Center	Reported:
Bothell, WA 98011	Project Manager: Mr. Jerry Sawetz	22-Oct-18 15:50

Notes and Definitions

LCC	Leak Check Compound
ND	Analyte NOT DETECTED at or above the reporting limit
MDL	Method Detection Limit
%REC	Percent Recovery
RPD	Relative Percent Difference

All soil results are reported in wet weight.

Appendix

H&P Mobile Geochemistry, Inc. is approved as an Environmental Testing Laboratory and Mobile Laboratory in accordance with the DoD-ELAP Program and ISO/IEC 17025:2005 programs through PJLA, accreditation number 69070 for EPA Method TO-15, H&P Method TO-15, EPA Method 8260B and H&P 8260SV.

H&P is approved by the State of Arizona as an Environmental Testing Laboratory, certification number AZ0779.

H&P is approved by the State of California as an Environmental Laboratory and Mobile Laboratory in conformance with the Environmental Laboratory Accreditation Program (ELAP) for the category of Volatile and Semi-Volatile Organic Chemistry of Hazardous Waste, certification numbers 2740, 2741, 2743 & 2745.

H&P is approved by the State of Louisiana Department of Environmental Quality under the National Environmental Laboratory Accreditation Conference (NELAC) certification number 04138

The complete list of stationary and mobile laboratory certifications along with the fields of testing (FOTs) and analyte lists are available at www.handpmg.com/about/certifications.

Mobile Geochemistry, Inc.
2470 Impala Drive, Carlsbad, CA 92010
& Field Office - Signal Hill, CA
W handpmg.com E info@handpmg.com
P 760.804.9678 F 760.804.9159

VAPOR / AIR Chain of Custody

DATE: 10/11/18
Page 1 of 1

Lab Client and Project Information

Lab Client/Consultant: Riley Group Inc	Project Name / #: SeaMar Community Health Center
Lab Client Project Manager: Jerry Sawetz	Project Location: Seattle, WA
Lab Client Address: 17522 Bothell Way NE	Report E-Mail(s): jsawetz@riley-group.com
Lab Client City, State, Zip: Bothell, WA 98011	
Phone Number: 425-415-0551	

Sample Receipt (Lab Use Only)

Date Rec'd: 10/15/18	Control #: 180823.02
H&P Project #: RG101518-12	
Lab Work Order #: E8100063	
Sample Intact: ☒ Yes ☐ No ☐ See Notes Below	
Receipt Gauge ID: 30005	Temp: RT
Outside Lab:	
Receipt Notes/Tracking #: 1Z93TT619051877054	
Lab PM Initials: NB	

Reporting Requirements

☒ Standard Report ☐ Level III ☐ Level IV
☐ Excel EDD ☐ Other EDD: _____
☐ CA Geotracker Global ID: _____

Turnaround Time

☒ 5-7 day Stnd ☐ 24-Hr Rush
☐ 3-day Rush ☐ Mobile Lab
☐ 48-Hr Rush ☐ Other: _____

Sampler Information

Sampler(s): Logan Chiny
Signature: [signature]
Date: 10/11/18

Additional Instructions to Laboratory: Short list = tetrachloroethene, trichloroethene cis 1,2 DCE, trans 1,2 DCE, 1,1 DCE, and vinyl chloride by EPA method TO-15

Preferred VOC units (please choose one):
☐ µg/L ☒ µg/m³ ☐ ppbv ☐ ppmv

SAMPLE NAME	FIELD POINT NAME (if applicable)	DATE mm/dd/yy	TIME 24hr clock	SAMPLE TYPE Indoor Air (IA), Ambient Air (AA), Subslab (SS), Soil Vapor (SV)	CONTAINER SIZE & TYPE 400mL/1L/6L Summa, Tedlar, Tube, etc.	CONTAINER ID (###)	Lab use only: Receipt Vac	VOCs Standard Full List ☐ 8260SV ☐ TO-15	VOCs Short List / Project List ☒ 8260SV ☒ TO-15	Oxygenates ☐ 8260SV ☐ TO-15	Naphthalene ☐ 8260SV ☐ TO-15	TPHv as Gas ☐ 8260SVm ☐ TO-15m	Aromatic/Aliphatic Fractions ☐ 8260SVm ☐ TO-15m	Leak Check Compound ☐ DFA ☐ IPA ☐ He	Methane by EPA 8015m	Fixed Gases by ASTM D1945 ☐ CO2 ☐ O2 ☐ N2				
SVW-6		10/10/18	12:30	SV	400 mL	365	-.06		X											

Approved/Relinquished by: [signature]	Company: RGI	Date: 10/11/18	Time: 17:00	Received by: [signature]	Company: H&P	Date: 10/15/18	Time: 1145
Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

*Approval constitutes as authorization to proceed with analysis and acceptance of conditions on back

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 30, 2020

Jerry Sawetz, Project Manager
The Riley Group, Inc.
17522 Bothell Way NE
Bothell, WA 98011

Dear Mr Sawetz:

Included are the results from the testing of material submitted on March 24, 2020 from the 2016-023C, F&BI 003382 project. There are 9 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
TRG0330R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 24, 2020 by Friedman & Bruya, Inc. from the The Riley Group 2016-023C, F&BI 003382 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	The Riley Group
003382 -01	IA-1
003382 -02	IA-2
003382 -03	IA-3
003382 -04	IA-4
003382 -05	IA-B

All quality control requirements were acceptable.

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-1	Client:	The Riley Group
Date Received:	03/24/20	Project:	2016-023C, F&BI 003382
Date Collected:	03/23/20	Lab ID:	003382-01
Date Analyzed:	03/25/20	Data File:	032511.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	106	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
Trichloroethene	<0.27	<0.05
Tetrachloroethene	<6.8	<1

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-2	Client:	The Riley Group
Date Received:	03/24/20	Project:	2016-023C, F&BI 003382
Date Collected:	03/23/20	Lab ID:	003382-02
Date Analyzed:	03/25/20	Data File:	032512.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	102	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
Trichloroethene	<0.27	<0.05
Tetrachloroethene	<6.8	<1

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-3	Client:	The Riley Group
Date Received:	03/24/20	Project:	2016-023C, F&BI 003382
Date Collected:	03/23/20	Lab ID:	003382-03
Date Analyzed:	03/26/20	Data File:	032513.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	105	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
Trichloroethene	<0.27	<0.05
Tetrachloroethene	<6.8	<1

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-4	Client:	The Riley Group
Date Received:	03/24/20	Project:	2016-023C, F&BI 003382
Date Collected:	03/23/20	Lab ID:	003382-04
Date Analyzed:	03/26/20	Data File:	032514.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	105	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
Trichloroethene	<0.27	<0.05
Tetrachloroethene	<6.8	<1

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-B	Client:	The Riley Group
Date Received:	03/24/20	Project:	2016-023C, F&BI 003382
Date Collected:	03/23/20	Lab ID:	003382-05
Date Analyzed:	03/26/20	Data File:	032515.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	94	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
Trichloroethene	<0.27	<0.05
Tetrachloroethene	<6.8	<1

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Method Blank	Client:	The Riley Group
Date Received:	Not Applicable	Project:	2016-023C, F&BI 003382
Date Collected:	Not Applicable	Lab ID:	00-0717 mb
Date Analyzed:	03/25/20	Data File:	032510.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	100	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
Trichloroethene	<0.27	<0.05
Tetrachloroethene	<6.8	<1

Date of Report: 03/30/20
Date Received: 03/24/20
Project: 2016-023C, F&BI 003382

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: 003334-03 1/7.3 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
Vinyl chloride	ug/m3	<1.9	<1.9	nm
1,1-Dichloroethene	ug/m3	<2.9	<2.9	nm
trans-1,2-Dichloroethene	ug/m3	<2.9	<2.9	nm
cis-1,2-Dichloroethene	ug/m3	<2.9	<2.9	nm
Trichloroethene	ug/m3	<2	<2	nm
Tetrachloroethene	ug/m3	<50	<50	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	ug/m3	35	96	70-130
1,1-Dichloroethene	ug/m3	54	100	70-130
trans-1,2-Dichloroethene	ug/m3	54	99	70-130
cis-1,2-Dichloroethene	ug/m3	54	102	70-130
Trichloroethene	ug/m3	73	85	70-130
Tetrachloroethene	ug/m3	92	85	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

003382

[redacted]

SAMPLE CHAIN OF COUSTODY

ME 03/24/20

Report To: Jerry Sawitz
Company: The Riley Group
Address: 17522 Bothell Way NE
City, State, ZIP: Bothell WA 98011
Phone: ______ Email: ______

SAMPLERS (*signature*): [signature]

PROJECT NAME & ADDRESS: 2016-023C

PO #:

NOTES:

INVOICE TO:

[redacted]age # 1 of —

TURNAROUND TIME
☑ Standard
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Default: Clean after 3 days
☐ Archive (Fee may apply)

SAMPLE INFORMATION / ANALYSIS REQUESTED

Sample Name	Lab ID	Canister ID	Flow Cont. ID	Reporting Level: IA=Indoor Air SG=Soil Gas (Circle One)	Date Sampled	Initial Vac. ("Hg)	Field Initial Time	Final Vac. ("Hg)	Field Final Time	PCE ~~TO15 Full Scan~~	TCE ~~TO15 BTEXN~~	cis 1,2 DCE ~~TO15 cVOCs~~	Trans 1,2 DCE ~~APH~~	1,1 DCE ~~Helium~~	vinyl chloride	Notes: BY TO-15
IA-1	01	35331	05356	(IA) / SG	3/23/20	30	800	7	1600	X	X	X	X	X	X	VC = need Detection
IA-2	02	18578	04847	(IA) / SG	↓	30	805	6	1605	X	X	X	X	X	X	limit of
IA-3	03	20556	08183	(IA) / SG	↓	27	810	4	1610	X	X	X	X	X	X	0.35 ug/m
IA-4	04	20552	07849	(IA) / SG	↓	29	815	9	1615	X	X	X	X	X	X	
IA-B	05	18568	06604	(IA) / SG	↓	30	820	8	1620	X	X	X	X	X	X	TCE: need Detect
				IA / SG												limit of
				IA / SG												0.33 ug/m3
				IA / SG												

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Stafford		3/24/20	0925
Received by: [signature]	Nhan Phan	F&BI	3/24/20	0925
Relinquished by:				
Received by:		Samples received at 19 °C		