FOCUSED ENVIRONMENTAL INVESTIGATION REPORT

RAPLEE PROPERTY
STANWOOD, WASHINGTON

REMEDIAL ACTION GRANT AGREEMENT
NO. TCPRA-2018-STANWO-00027

Prepared for
CITY OF STANWOOD
STANWOOD, WASHINGTON
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Project No. 1030.01.04

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The material and data in this report were prepared under the supervision and direction of the undersigned.

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ACRONYMS AND ABBREVIATIONS

BTEX	benzene, toluene, ethylbenzene, and total xylenes
the City	City of Stanwood
CSM	conceptual site model
CUL	cleanup level
DRO	diesel-range organics
Ecology	Washington State Department of Ecology
FEI	focused environmental investigation
FSDS	field sampling data sheet
GPR	ground-penetrating radar
GRO	gasoline-range organics
IDW	investigation-derived waste
Leidos	Leidos Engineering, LLC
MFA	Maul Foster & Alongi, Inc.
MTCA	Model Toxics Control Act
NWTPH	Northwest Total Petroleum Hydrocarbon
ORO	heavy-oil-range organics
Pinnacle	Pinnacle GeoSciences, Inc.
the Property	9816 271st Street NW in Stanwood, Washington
POC	point of compliance
SAIC	Science Applications International Corporation
TEE	terrestrial ecological evaluation
ug/L	micrograms per liter
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
WAC	Washington Administrative Code

1 INTRODUCTION

Maul Foster & Alongi, Inc. (MFA) has prepared this focused environmental investigation (FEI) report for the City of Stanwood (the City), summarizing the results of the FEI conducted at the Raplee Property at 9816 271st Street NW in Stanwood, Washington (the Property) (Figure 1-1). The Property is owned by Ms. Kathleen Raplee and is currently vacant. Historically, the Property was used for retail automotive fuel operations, including a filling station and a service station.

1.1 Regulatory Framework

This FEI report has been prepared in accordance with remedial action grant agreement No. TCPRA-2018-Stanwo-00027, dated July 6, 2018, between the Washington State Department of Ecology (Ecology) and the City. The agreement provides funding under Ecology's Integrated Planning Grant program.

The FEI work was conducted in general accordance with the Model Toxics Control Act (MTCA) (Washington Administrative Code [WAC] 173-340) and the FEI work plan (MFA, 2018).

1.2 Purpose and Objectives

MFA conducted the FEI at the Property on February 20 and 22, 2019. The purpose of the FEI was to gather preliminary environmental information in the field to provide initial characterization of site conditions, and to support development and evaluation of potential cleanup options. The specific objectives of the FEI are as follows:

- Summarize existing environmental data for the Property
- Generate groundwater data of sufficient quality for risk screening from existing wells.
- Compare analytical results to applicable MTCA cleanup levels (CULs)
- Evaluate the contents of existing underground storage tanks (USTs) located in the alley south of the Property, if feasible.
- Develop a preliminary conceptual site model (CSM).
- Evaluate potential risks to current and reasonably likely future human and ecological receptors.
- Prepare a FEI report that will support initial development and evaluation of potential cleanup options.

2 BACKGROUND

This section describes the physical location and characteristics of the Property, including the geology and hydrogeology, and summarizes the site history.

2.1 Property Description

The Property is located in the southeast quarter of section 24, township 32 north, and range 3 east of the Willamette Meridian (Figure 1-1). The approximately 0.21-acre Property is relatively level, sloping slightly to the northwest. Access to the Property is from 271st Street NW or 270th Street NW, adjacent north and east of the Property, respectively.

The physical address of the Property is 9816 271st Street NW in Stanwood, Washington. The Property is bordered by 271st Street NW, residences, and law offices to the north; the intersection of 271st Street NW and 270th Street NW to the east; an alleyway and restaurant parking lot to the south; and the Stanwood Fannie Mae Duplex to the west. A hardware and lumber store, J E Hamilton & Sons, is adjacent to and southeast of the Property. The Stillaguamish River runs approximately 0.2 mile southwest of the Property. The Property is zoned as Mainstreet Business but is currently vacant.

The Property, surrounded by a chain-link fence, contains grassy areas and partially intact asphalt and concrete surfaces, along with asphalt and concrete rubble and debris from a prior building demolition.

2.2 Property History

According to previous environmental reports, the first recorded sale of the Property was in 1924, when the Lien family sold the Property to J. Norin Hafstad (Science Applications International Corporation [SAIC], 2006). In 1939, Mr. Hafstad sold the Property to Mr. Ed Peterson and his wife. In 1958, Standard Oil obtained a lease on the Property. The Property was the location of a Standard Oil (now Chevron Corporation) service station from approximately 1958 to 1970, when the lease expired. From 1970 to 1998, the Property's ownership passed through many parties. In 1984, the portion of the Property with the south-bounding alleyway was sold to the City. In 1998, Kathleen Raplee purchased the Property (SAIC, 2006).

Based on SAIC's review of a 1941 Sanborn map, the Property had been developed into a filling station by that time, with at least two USTs in the northeast portion of the Property, a greasing facility in the eastern portion of the station structure, and a store in the western section. Therefore, the Property had been developed as a filling station prior to the Standard Oil lease in 1958 (SAIC, 2006).

2.3 Regulatory History

A petroleum hydrocarbon release from an UST at the property was reported to Ecology on January 10, 2005. Pertinent information from Ecology's database is as follows:

- Facility Site ID: 2132059
- Cleanup Site ID: 5275
- UST ID: 619125
- Alternate Names
- Standard 305192
- Standard Oil Station 30-5192 (former)
- Site Status: Cleanup Started

The Chevron Environmental Management Company was party to a Voluntary Cleanup Program agreement with Ecology from June 7, 2006 through July 9, 2012.

2.4 Previous Environmental Investigations

In 2005, Glacier Environmental Services, Inc., decommissioned and removed three USTs in the south-central portion of the Property (see Figure 2-1). During the decommissioning process, Pinnacle GeoSciences, Inc. (Pinnacle) collected soil samples from the sidewalls and the bottom of the excavation area, as well as from below former product piping, dispenser islands, and stockpiles. Analytical results from the excavation soil samples identified concentrations of gasoline-range organics (GRO); heavy-oil-range organics (ORO); and benzene, toluene, ethylbenzene, and total xylenes (BTEX) above their respective MTCA Method A CULs. In addition to these excavation exceedances, concentrations of lead and diesel-range organics (DRO) were identified above their respective MTCA Method A CULs in stockpile samples (Pinnacle, 2005).

In 2006, SAIC performed a site assessment of the Property and identified soil and groundwater impacted by GRO, DRO, ORO, and BTEX near the former UST area (SAIC, 2006). A summary of soil analytical results associated with this investigation is included in Table 2-2. Previous soil borings are shown on Figure 2-2. During this assessment, Apollo Geophysics conducted a ground-penetrating radar (GPR) survey of the Property to identify any anomalies in the subsurface (e.g., USTs). Based on Figure 2 of the 2005 Pinnacle report, the GPR survey showed anomalies indicative of in-place USTs in two areas on and adjacent to the Property (see Figure 2-1). The first GPR anomaly was identified as two USTs to the south of the Property in the alleyway right-of-way, directly under a steel 4-inch-diameter, high-pressure natural gas line. The presence of these USTs was confirmed with an air-knife excavation. SAIC observed that the USTs contained liquid petroleum mixed with water (SAIC, 2006). The second GPR anomaly was identified as one UST in the west-central portion of the Property, as confirmed by SAIC while excavating soil from the area (SAIC, 2006).

From April 2006 to July 2014, Gettler-Ryan Inc., on behalf of Leidos Engineering, LLC (Leidos; formerly SAIC), monitored the groundwater at four wells located on the Property (see Figure 2-1) (Leidos, 2014). The groundwater samples were analyzed for GRO, DRO, ORO, and BTEX. According to the most recent available groundwater monitoring report, only one of the four

monitoring wells, MW-4, had concentrations of DRO and ORO above their respective MTCA Method A CULs. Additionally, MW-4 had measurable free product during sampling events between January 2012 and July 2014, but samples from this well were not collected during those events (Leidos, 2014). There is no available documentation of groundwater monitoring conducted at the Property since the July 2014 groundwater monitoring event. A summary of groundwater analytical results for the Property is included in Table 2-3.

2.5 Geology and Hydrogeology

The Property is located in the Snohomish River valley. According to the Geologic Map of the Stanwood Quadrangle, the Property vicinity is located on Quaternary younger alluvial and estuarine deposits (Minard, 1985). During the 2006 well installation, SAIC encountered subsurface soils consisting primarily of gray silt or a silt/clay mixture (SAIC, 2006). Because of the low hydraulic conductivity of the soil, the monitoring wells on the Property had been observed to have poor groundwater recharge and initially pumped dry during purging (SAIC, 2006). During the February 2019 fieldwork, slow recharge was observed in the sampled monitoring wells, as discussed below in Sections 3.2 and 3.3. SAIC reported the presence of fill in the upper 4 feet of the borings consisting of brown medium sand and sandy silt with fine gravel with trace rounded cobbles (SAIC, 2006). Therefore, it is likely that, during initial development of the Property, fill was placed to raise the grade above flood level.

Groundwater was encountered at depths ranging from 0.8 to 2.33 feet below ground surface (see Table 2-1 and Appendix A). According to previous environmental investigations, shallow groundwater at the Property likely is associated with a shallow, unconfined aquifer. The groundwater at the Property flows northwest, consistent with topography as well as with previous investigation observations (see Figure 2-3) (SAIC, 2006). The groundwater gradient is relatively flat, with less than 2 feet of groundwater elevation difference across the Property (calculated gradient of approximately 0.026 ft/ft), consistent with previous investigation observations (see Figure 2-3) (SAIC, 2006).

3 FIELD AND ANALYTICAL METHODS

The FEI investigation, conducted on February 20 and 22, 2019, focused on site reconnaissance, well redevelopment, and groundwater sample collection from existing monitoring wells on the Property.

3.1 Site Reconnaissance

MFA visually inspected the Property and the alleyway to the south for evidence of potential UST fill ports or other access points. One potential fill port was identified in the alleyway; however, it was severely corroded and MFA staff were unable to remove the cap with non-invasive hand tools. Appendix B includes photographs from the site reconnaissance at the Property.

Four monitoring wells (MW-01 to MW-04) were identified on and adjacent to the Property (see Figure 2-1).

3.2 Well Redevelopment

Since, according to available reports, monitoring wells on the Property had not been sampled since 2014, monitoring wells were redeveloped to ensure a clean sand-pack and a strong connection to the aquifer.

Monitoring wells MW-01 to MW-03 were redeveloped on February 20, 2019. Monitoring well MW-04 was not redeveloped or sampled because there was free product in the well, as discussed below in Section 3.3. Well redevelopment consisted of surging, followed by purging with a peristaltic pump and disposable tubing (see Appendix C). The redeveloped sentry wells were allowed to recharge and stabilize for at least 24 hours before sample collection.

3.3 Groundwater Sampling

Groundwater monitoring activities were conducted in general accordance with industry standard sampling procedures and the FEI sampling and analysis plan (MFA, 2018). Fieldwork included the collection of groundwater samples from three existing monitoring wells located on the Property: MW-01, MW-02, and MW-03 (Figure 2-1). MW-04 was not sampled because there was free product in the well. Monitoring wells with free product are not sampled with the understanding that concentrations are well above applicable screening criteria (e.g., MTCA Method A) and sensitive water quality equipment may be damaged if used to purge and sample the well. Monitoring well installation details are summarized in the 2006 SAIC report (SAIC, 2006).

MFA measured static water levels and collected groundwater samples from the wells, using low-flow sampling methods, a peristaltic pump, and disposable tubing. Water levels in MW-01, MW-02, and MW0-3 were measured with a water level meter, while the water level in MW-04 was measured with an oil-water interface probe because of the presence of free product in the well. Water levels were approximately 1 foot higher during this event than in the previous monitoring event, conducted in July 2014. To date, the lowest water level measurements at the Property were collected in July 2009. Water quality parameters were measured before sample collection and recorded on field sampling data sheets (FSDSs) (Appendix A). A field duplicate sample was collected at MW-01.

Black, viscous free product was encountered in MW-04 during this sampling event. Free product, with a measurable thickness of 0.01 foot, was observed coating the tip of the oil interface probe (see Appendix A). The measurable quantity of free product in the well was too small to be extracted for collection and analysis.

Using standard chain-of-custody procedures, samples were submitted to Friedman & Bruya, Inc., of Seattle, Washington. Groundwater samples were analyzed for the following:

- DRO by Northwest Total Petroleum Hydrocarbon (NWTPH) method NWTPH-Dx
- ORO by NWTPH-Dx

- GRO by NWTPH-Gx
- BTEX by U.S. Environmental Protection Agency (USEPA) method 8021B

Investigation-derived waste (IDW) generated during the February 2019 sampling event was properly drummed and labeled. IDW is temporarily stored on the Property, pending characterization for appropriate off-site disposal.

4 ANALYTICAL RESULTS

Laboratory analytical reports are provided as Appendix D. Analytical data and the laboratory's internal quality assurance and quality control data were reviewed to assess whether they meet project-specific data quality objectives. This review was performed consistent with accepted USEPA procedures for evaluating laboratory analytical data (USEPA, 2017) and appropriate laboratory and method-specific guidelines (FBI, 2015). A data validation memorandum summarizing data evaluation procedures, data usability, and deviations from specific field and/or laboratory methods is included as Appendix E. The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

4.1 Groundwater

Groundwater analytical results from the FEI are summarized in Table 4-1. A summary of all DRO, ORO, GRO, and BTEX data collected on the Property, including historical data, is provided in Table 2-3. Field water quality parameters were recorded on the FSDSs included as Appendix A.

DRO were detected in every sampled monitoring well (MW-01 through MW-04). Concentrations of DRO ranged between 94 and 1,900 micrograms per liter (ug/L). Only one concentration of DRO, found in MW-02, exceeded the MTCA Method A CUL.

ORO were detected in MW-02 at 1,900 ug/L, exceeding the MTCA Method A CUL. All other sampled monitoring wells were non-detect for ORO.

GRO were detected in one monitoring well (MW-02) at 190 ug/L, below the MTCA Method A CUL. All other sampled monitoring wells were non-detect for GRO.

Total xylenes were detected in MW-02 at 3.4 ug/L, which is below the MTCA Method A and Method B CULs (for evaluation of groundwater screening levels for vapor intrusion); benzene, ethylbenzene, and toluene were not detected. All other sampled monitoring wells were non-detect for BTEX.

Analytical results were compared to historical groundwater data collected between 2006 and 2014 (see Table 2-3). Concentrations of DRO, ORO, GRO, and BTEX in groundwater detected in February 2019 were generally consistent with previous results, with the exception of MW-02. Concentrations of DRO and ORO at MW-02 were low to non-detect between 2012 and 2014, but exceeded the respective MTCA Method A CUL in February 2019. However, DRO and ORO exceeded the MTCA

Method A CUL at MW-02 between 2006 and 2011, consistent with the concentrations observed in February 2019.

5 CONCEPTUAL SITE MODEL

A preliminary CSM was developed to describe release mechanisms, environmental transport processes, exposure routes, and receptors for sources identified on the Property. The primary purpose of the CSM is to identify potential pathways by which human and ecological receptors could be exposed to site-related chemicals. A complete exposure pathway consists of four necessary elements: (1) a source and mechanism of chemical release to the environment, (2) an environmental transport medium for a released chemical, (3) a point of potential contact with the impacted medium (referred to as the exposure point), and (4) an exposure route (e.g., soil ingestion) at the exposure point. However, an incomplete exposure pathway does not guarantee that the exposure pathway will always remain incomplete. If the Property is redeveloped, it may be necessary to reevaluate potential exposure pathways. The CSM describes potential exposure scenarios based on information collected during the FEI, including the initial risk screening presented in Section 7. Elements of potentially complete exposure scenarios relevant to human health and ecological receptors are discussed below and are presented in Figure 5-1.

5.1 Source Characterization

Based on documented historical uses described by SAIC, historical soil and groundwater data, and on groundwater data obtained from the FEI, it appears that the following historical operations/uses at the Property and/or at adjoining properties have contributed to contamination at the Property:

- Former leaking USTs on the Property
- Abandoned-in-place USTs on and adjacent to the Property
- Former filling station operations on the Property

Free product and detectable concentrations of DRO, ORO, GRO, and total xylenes were identified in groundwater on and upgradient of the Property near former and potentially abandoned-in-place USTs on and upgradient of the Property.

5.2 Fate and Transport of Contaminants

The primary mechanisms likely to influence the fate and transport of chemicals at the Property include natural biodegradation of organic chemicals, sorption to soil, advection and dispersion in groundwater, volatilization of volatile chemicals from soil or groundwater to air, transformation under changing chemical conditions, and leaching of chemicals from soil to groundwater. The relative importance of these processes varies, depending on the chemical and physical properties of the released contaminant. The properties of soil and the dynamics of groundwater flow also affect contaminant fate and transport.

The Property contains grassy areas and partially intact asphalt and concrete surfaces. It is possible that precipitation infiltrates through permeable ground surfaces at the Property into the vadose-zone soil. Leaching of near-surface soil impacts during precipitation events could result in impacts to shallow groundwater at the Property.

Volatile contaminants may partition to the vapor phase in the source areas or downgradient of the source areas via groundwater transport of dissolved-phase contamination. Contaminant vapors partitioning from contaminated soil or groundwater could result in impacts to indoor (assuming the property is redeveloped with buildings) and outdoor air quality.

5.3 Potential Exposure Scenarios

The following are potential exposure pathways:

- Incidental ingestion of soil or groundwater
- Incidental contact with soil or groundwater
- Inhalation of air vapors emanating from soil or groundwater
- Ingestion, contact, and inhalation via use of groundwater as drinking water, however the Property is connected to municipal drinking water and groundwater is unlikely to be used as a source of drinking water.

5.4 Potential Receptors

The Property is currently vacant and fenced, but is zoned for Mainstreet business (i.e., commercial). Therefore, if the Property is redeveloped, expanded use may include commercial businesses or a public park. The following human receptors could potentially be exposed to chemicals originating from the Property:

- Visitors
- Occupational workers
- Construction workers

5.5 Terrestrial Ecological Evaluation

A simplified terrestrial ecological evaluation (TEE) was completed for the Property to assess the potential for ecological exposure (Appendix F). The intent of a simplified TEE is to ensure protection of terrestrial wildlife at industrial or commercial sites, and of terrestrial plants, soil biota, and terrestrial wildlife at other sites, as provided under WAC 173-340-7490(3)(b). MTCA specifies that the simplified TEE process is intended to identify sites that do not have a substantial potential to pose a threat of significant adverse effects to terrestrial ecological receptors. Therefore, a simplified TEE may be used to remove a site from further ecological consideration during the remedial investigation and cleanup process (WAC 173- 340-7492).

WAC 173-340-7492(2) provides the steps necessary for conducting the simplified TEE. MTCA Table 749-1 may be used to determine whether land use at a site and surrounding area is likely to result in

substantial wildlife exposure. MTCA specifies that if this is demonstrated to be unlikely, no further evaluation is necessary to conclude that a site does not pose a substantial threat to potential ecological receptors.

The completed MTCA Table 749-1 included in Appendix F indicates that the Property is unlikely to pose a threat to ecological receptors and that no further evaluation is necessary. Appendix F includes a table presenting the rationale for the scoring on Table 749-1.

6 CLEANUP STANDARDS

According to MTCA, the cleanup standards for a site have two primary components: chemical-specific CULs and points of compliance (POCs). The CUL is the concentration of a chemical in a specific environmental medium that will not pose unacceptable risks to human health or the environment. The POC is the location where the CUL must be met.

MTCA provides three different options for establishing CULs for human health: Methods A, B, and C. MTCA Method A is designed for cleanups at relatively simple sites, such as small sites that have only a few hazardous substances. Method B can be used at any site. Method C is used primarily for industrial sites.

Preliminary CULs were developed for screening purposes, as discussed below. These CULs are not considered final CULs for the Property; CULs may be redeveloped following additional investigation and characterization of the identified impacts on the Property.

6.1 Soil Cleanup Levels

Soil samples were not collected at the Property as part of this FEI. Soil samples were collected during previous investigations at the Property, as discussed in Section 2.4. Historical soil data was screened to MTCA Method A CULs for unrestricted land use. The Method A values are for protection of human health via the direct contact or ingestion pathways and protection of groundwater via the leaching to groundwater pathway. A summary of historical analytical soil data is presented in Table 2-2.

6.1.1 Points of Compliance in Soil

The soil POC is the depth bgs at which soil CULs shall be attained. The standard POC is soil within 15 feet of the ground surface throughout the entire site. This standard POC is applied to soil on the Property.

6.2 Groundwater Cleanup Levels

Groundwater was screened relative to MTCA Method A CULs. Concentrations of volatile organic compounds (VOCs) detected in groundwater were also compared to groundwater screening levels for

vapor intrusion, from Ecology's guidance on evaluation soil vapor intrusion (Ecology, 2009). Groundwater CULs and vapor screening levels are summarized in Table 4-1. In addition to the comparison of groundwater sample results to MTCA Method A CULs (see Table 4-1), VOCs detected in groundwater were compared to vapor intrusion screening levels for unrestricted land use.

6.2.1 Points of Compliance in Groundwater

For groundwater, the POC is the point or points where the groundwater CULs must be attained for a site to be in compliance with the cleanup standards. Groundwater CULs shall be attained in all groundwater from the POC to the outer boundary of the hazardous-substance plume.

7 RISK SCREENING

Historical soil sample results were compared to MTCA Method A CULs for unrestricted use (see Table 2-2). The groundwater sample results were compared to MTCA Method A CULs (see Table 2-3 and 4-1). VOCs detected in groundwater were also compared to vapor intrusion screening levels for unrestricted land use.

The following sums were calculated for comparison to CULs; one-half the method reporting limit was used in the calculations for non-detect values:

- Heavy oils: sum of diesel- and motor-oil-range TPH

7.1 Soil

The following chemicals were historically detected in soil and exceeded Method A CULs (see Table 2-2):

- GRO
- Total Heavy Oils
- Benzene
- Ethylbenzene
- Toluene
- Total Xylenes

7.2 Groundwater

The following chemicals detected in groundwater exceeded CULs or other screening criteria (see Table 4-1):

- Total Heavy Oils at MW-02 exceeded the MTCA Method A CUL

Free product visually resembling heavy oils was observed in MW-04, indicating an exceedance of heavy oils is present at this monitoring well as well.

8 CONCLUSIONS

The following is a summary of the FEI findings:

- Free product was present in MW-04, but the quantity was too small to extract for analysis.
- Water levels were approximately 1 foot higher during this event than in the previous monitoring event, conducted in July 2014.
- Groundwater was observed to flow to the northwest, consistent with previous environmental reports.
- The presence of an abandoned UST(s) containing free product could not be confirmed via field observations and a corroded top precluded access.
- Monitoring well MW-02 contains concentrations of DRO and ORO above the MTCA Method A CUL.
- Monitoring well MW-04 was not sampled due to the presence of free product, but likely contains concentrations of GRO, DRO, and/or ORO above MTCA Method A CULs.
- No impacts were observed in the downgradient well MW-01 and crossgradient well MW-03.

Based on these findings, the following are concluded:

- There is a potential for human exposure to harmful levels of contamination in soil and groundwater
- Prior soil sampling was conducted and based on the reported results, exceedances of Method A criteria were identified. However, the data are not current and the lateral and vertical extent of soil impacts is unknown.
- The lateral and vertical extent of groundwater impacts to the west and south of the Property is unknown.
- The lateral and vertical extent of groundwater impacts on the north and east portions of the Property appear to be bounded.
- The existing abandoned UST (s) may be an on-going source of contamination.

From the findings and conclusions of this FEI report, MFA will develop a cleanup options report, in accordance with remedial action grant agreement No. TCPRA-2018-Stanwo-00027, dated July 6, 2018, between the Ecology and the City.

LIMITATIONS

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

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TABLES

Table 2-1
Groundwater Level Measurements
Raplee Property
City of Stanwood
Stanwood, Washington

Well ID	Relative Well Elevation[a]	Date	Time	DTP (feet)	DTW (feet)	DTB (feet)
MW-01	98.32	02/22/2019	8:32 AM	--	2.18	14.17
MW-02	99.58	02/22/2019	8:13 AM	--	1.58	14.46
MW-03	99.16	02/22/2019	8:22 AM	--	0.80	13.56
MW-04	100.00	02/22/2019	8:40 AM	2.32	2.33	13.76

NOTES:

DTB = depth to bottom.

DTP = depth to product.

DTW = depth to water.

[a]Well elevations are relative to an arbitrary datum of 100 feet at MW-04, the topographically highest well (SAIC, 2006).

Table 2-2
Summary of Soil Analytical Results
Raplee Property
City of Stanwood
Stanwood, Washington

Location	Sample Name	Sample Depth (feet bgs):	Collection Date:	GRO	DRO	ORO	Total Heavy Oils[a]	Benzene	Ethylbenzene	Toluene	Total Xylenes	Total Lead
MTCA Method A Cleanup Level (mg/kg):				30	2000	2000	2000	0.03	6	7	9	250
SB-2	SB-2-3	3	2/7/2006	**340**	**1200**	**8700**	**9900**	**0.3**	**0.1**	< 0.08	**2.1**	--
	SB-2-14	14	2/7/2006	**48**	**140**	**970**	**1110**	**0.2**	**0.01**	< 0.02	**0.2**	**6.85**
	SB-2-18	18	2/7/2006	< 1.1	< 3.0	< 10	ND	< 0.006	< 0.006	< 0.006	< 0.02	--
SB-3	SB-3-6	6	2/7/2006	< 1.1	**15**	**150**	**165**	< 0.005	< 0.005	< 0.005	< 0.2	**6.03**
	SB-3-15	15	2/7/2006	< 0.9	< 3.0	< 10	ND	< 0.005	< 0.005	< 0.005	< 0.01	--
SB-5	SB-5-18	18	2/7/2006	< 1.0	< 3.0	< 10.0	ND	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-6	SB-6-6	6	2/7/2006	< 1.2	< 3.0	< 10	ND	< 0.006	< 0.006	< 0.006	< 0.02	--
	SB-6-14	14	2/7/2006	< 1.0	< 3.0	< 10	ND	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-8	SB-8-6	6	2/7/2006	< 0.9	< 3.0	**17**	**18.5**	< 0.005	< 0.005	< 0.005	< 0.01	--
SB-10	SB-10-6	6	2/7/2006	< 1.6	< 3.0	< 10	ND	< 0.008	< 0.008	< 0.008	< 0.02	--
	SB-10-16	16	2/7/2006	< 0.9	< 3.0	< 10	ND	< 0.004	< 0.004	< 0.004	< 0.01	--
SB-11	SB-11-4	4	2/7/2006	**2000**	**68**	**230**	**298**	**23**	**44**	**25**	**240**	--
	SB-11-6	6	2/7/2006	**65**	**7.2**	**37**	**44.2**	**3.6**	**0.9**	**0.5**	**9.7**	**4.4**
	SB-11-14	14	2/7/2006	**18**	< 3.0	**13**	**14.5**	**5.6**	**0.4**	**0.2**	**2**	--
	SB-11-19	19	2/7/2006	< 1.0	< 3.0	< 10	ND	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-12	SB-12-17	17	2/7/2006	< 0.9	< 3.0	**11**	**12.5**	< 0.005	< 0.005	< 0.005	< 0.01	--
SB-13	SB-13-10	10	2/7/2006	**5.1**	**27**	**190**	**217**	**0.007**	< 0.004	< 0.004	**0.03**	--
	SB-13-20	20	2/7/2006	< 0.9	< 3.0	< 10	ND	< 0.004	< 0.004	< 0.004	< 0.01	--
SB-14	SB-14-4	4	2/7/2006	**19**	**25**	**73**	**98**	**0.02**	**0.003**	**0.012**	**0.006**	**35.4**
	SB-14-17	17	2/7/2006	< 0.9	< 3.0	**11**	**12.5**	< 0.005	< 0.005	< 0.005	< 0.01	--
SB-15	SB-15-14	14	2/7/2006	< 1.4	< 3.0	< 10	ND	< 0.007	< 0.007	< 0.007	< 0.02	--

Table 2-2
Summary of Soil Analytical Results
Raplee Property
City of Stanwood
Stanwood, Washington

Location	Sample Name	Sample Depth (feet bgs):	Collection Date:	GRO	DRO	ORO	Total Heavy Oils[a]	Benzene	Ethylbenzene	Toluene	Total Xylenes	Total Lead
MTCA Method A Cleanup Level (mg/kg):				30	2000	2000	2000	0.03	6	7	9	250
SB-16	SB-16-4	4	2/7/2006	< 1.3	< 3.0	< 10	ND	< 0.006	< 0.006	< 0.006	< 0.02	--
	SB-16-14	14	2/7/2006	< 1.0	< 3.0	< 10	ND	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-18	SB-18-4	4	2/7/2006	**1.5**	< 3.0	< 10	ND	< 0.005	< 0.005	< 0.005	< 0.02	--
	SB-18-14	14	2/7/2006	< 1.0	< 3.0	< 10	ND	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-19	SB-19-4	4	2/7/2006	< 1.1	--	--	--	< 0.006	< 0.006	< 0.006	< 0.02	--
	SB-19-12	12	2/7/2006	< 1.0	< 3.0	< 10	ND	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-20	SB-20-6	6	2/7/2006	< 1.0	< 3.0	< 10	ND	< 0.005	< 0.005	< 0.005	< 0.02	--
	SB-20-14	14	2/7/2006	< 1.1	< 3.0	< 10	ND	< 0.006	< 0.006	< 0.006	< 0.02	--
SB-21	SB-21-6	6	2/7/2006	< 1.1	< 3.0	< 10	ND	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-22	SB-22-14	14	2/7/2006	< 1.0	< 3.0	< 10	ND	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-23	SB-23-5	5	4/5/2006	**45**	**40**	**170**	**210**	**1.6**	**0.39**	< 0.052	**3.2**	--

NOTES:
Detections are in **bold** font.
Detections above MTCA Method A cleanup levels are shaded.
Results were obtained from the 2006 site assessment by SAIC (SAIC, 2006).
-- = not analyzed.
< = concentration is less than reported value.
DRO = diesel-range hydrocarbons.
GRO = gasoline-range hydrocarbons.
MTCA = Model Toxics Control Act.
ND = not detected.
ORO = motor-oil-range hydrocarbons.
Total xylenes = sum of m,p-xylene and o-xylene.
U = analyte not detected.
ug/L = micrograms per liter (parts per billion).
[a]Total concentrations were calculated using one-half the method reporting limit for non-detects. Where all components were non-detect, the calculated total is "ND."

Table 2-3
Summary of Groundwater Analytical Results
Raplee Property
City of Stanwood
Stanwood, Washington

Location	Collection Date:	GRO	DRO	ORO	Total Heavy Oils[a]	Benzene	Ethylbenzene	Toluene	Total Xylenes
MTCA Method A Cleanup Level (ug/L):		800	500	500	500	5	700	1000	1000
MW-01	05/03/2006	< 240	**310**	**120**	**430**	< 2.5	**4.7**	< 2.5	**11**
	08/02/2006	< 48	**260**	**330**	**590**	< 0.5	< 0.5	< 0.5	< 1.5
	10/10/2006	< 48	**150**	< 100	200	< 0.5	< 0.5	< 0.5	< 1.5
	01/15/2007	< 240	< 160	< 200	ND	< 2.5	< 2.5	< 2.5	< 7.5
	04/25/2007	< 50	**190**	**130**	**320**	< 0.5	< 0.5	< 0.5	< 1.5
	07/15/2007	< 500	< 81	< 100	ND	< 5.0	< 5.0	< 5.0	< 15
	10/03/2007	< 250	**130**	< 100	50	< 2.5	< 2.5	< 2.5	< 7.5
	01/03/2008	< 50	**130**	< 100	50	< 0.5	< 0.5	< 0.5	< 1.5
	02/28/2009	< 50	**610**	**610**	**1220**	< 0.5	< 0.5	< 0.5	< 1.5
	07/22/2009	< 50	**650**	**720**	**1370**	< 0.5	< 0.5	< 0.5	< 1.5
	01/08/2010	< 50	**350**	**160**	**510**	< 0.5	< 0.5	< 0.5	< 1.5
	07/20/2010	< 50	**130**	**100**	**230**	< 0.5	< 0.5	< 0.5	< 1.5
	01/21/2011	< 50	< 160	**650**	**730**	< 0.5	< 0.5	< 0.5	< 1.5
	08/05/2011	< 50	**190**	**130**	**320**	< 0.5	< 0.5	< 0.5	< 1.5
	01/27/2012	< 50	< 30	< 69	ND	< 0.5	< 0.5	< 0.5	< 1.5
	07/02/2012	< 50	< 29	< 68	ND	< 0.5	< 0.5	< 0.5	< 1.5
	01/11/2013	< 50	< 29	< 67	ND	< 0.5	< 0.5	< 0.5	< 1.5
	07/12/2013	< 50	< 29	< 68	ND	< 0.5	< 0.5	< 0.5	< 1.5
	01/10/2014	< 50	< 29	< 67	ND	< 0.5	< 0.5	< 0.5	< 1.5
	07/16/2014	< 50	< 29	< 67	ND	< 0.5	< 0.5	< 0.5	< 1.5
	02/22/2019	100 U	**180**	300 U	**330**	1 U	1 U	1 U	3 U
		100 U	**200**	300 U	**350**	1 U	1 U	1 U	3 U

Table 2-3
Summary of Groundwater Analytical Results
Raplee Property
City of Stanwood
Stanwood, Washington

Location	Collection Date:	GRO	DRO	ORO	Total Heavy Oils[a]	Benzene	Ethylbenzene	Toluene	Total Xylenes
MTCA Method A Cleanup Level (ug/L):		800	500	500	500	5	700	1000	1000
MW-02	05/03/2006	< 240	**1400**	**560**	**1960**	**13**	< 2.5	< 2.5	< 7.5
	08/02/2006	**220**	**2000**	**1800**	**3800**	**20**	< 0.5	< 0.5	**1.6**
	10/10/2006	< 240	**1400**	**790**	**2190**	**16**	< 2.5	< 2.5	< 7.5
	01/15/2007	< 240	**810**	**270**	**1080**	**9.3**	< 2.5	< 2.5	< 7.5
	04/25/2007	**250**	**830**	**480**	**1310**	**13**	< 0.5	< 0.5	< 1.5
	07/15/2007	< 500	**7800**	< 1000	**8300**	**13**	< 5.0	< 5.0	< 15
	10/03/2007	< 250	**1600**	**1100**	**2700**	**4.9**	< 2.5	< 2.5	< 7.5
	01/03/2008	**460**	**1400**	**800**	**2200**	**6.7**	< 0.5	**1.0**	< 1.5
	02/28/2009	**450**	**2700**	**2800**	**5500**	**2.5**	< 0.5	**0.6**	< 1.5
	07/22/2009	**360**	**2500**	**4000**	**6500**	**1.1**	< 0.5	**0.8**	**1.5**
	01/08/2010	**470**	**1800**	**1400**	**3200**	< 0.5	**0.7**	**0.5**	< 1.5
	07/20/2010	**420**	**2000**	**1600**	**3600**	< 0.5	< 0.5	**0.8**	< 1.5
	01/21/2011	**390**	**2000**	**1900**	**3900**	< 0.5	**0.6**	< 0.5	< 1.5
	08/05/2011	< 250	**830**	**880**	**1710**	< 2.5	< 2.5	< 2.5	< 7.5
	01/27/2012	**56**	< 29	< 68	ND	< 0.5	< 0.5	< 0.5	< 1.5
	07/02/2012	< 250	**31**	**110**	**141**	< 2.5	< 2.5	< 2.5	< 7.5
	01/11/2013	**130**	**32**	**160**	**192**	< 0.5	**0.6**	< 0.5	< 1.5
	07/12/2013	< 50	< 29	< 68	ND	< 0.5	< 0.5	< 0.5	< 1.5
	01/10/2014	< 50	< 29	< 67	ND	< 0.5	< 0.5	< 0.5	< 1.5
	07/16/2014	< 50	< 30	< 69	ND	< 2.0	< 0.5	< 0.5	< 1.5
	02/22/2019	**190**	**1900**	**1900**	**3800**	1 U	1 U	1 U	**3.4**

Table 2-3
Summary of Groundwater Analytical Results
Raplee Property
City of Stanwood
Stanwood, Washington

Location	Collection Date:	GRO	DRO	ORO	Total Heavy Oils[a]	Benzene	Ethylbenzene	Toluene	Total Xylenes
MTCA Method A Cleanup Level (ug/L):		800	500	500	500	5	700	1000	1000
MW-03	05/03/2006	< 240	**580**	**240**	**820**	< 2.5	< 2.5	< 2.5	< 7.5
	08/02/2006	< 48	**350**	**380**	**730**	< 0.5	< 0.5	< 0.5	< 1.5
	10/10/2006	< 48	**310**	**140**	**450**	< 0.5	< 0.5	< 0.5	< 1.5
	01/15/2007	< 240	**250**	< 100	**300**	< 2.5	< 2.5	< 2.5	< 7.5
	04/25/2007	< 50	**260**	**110**	**370**	< 0.5	< 0.5	< 0.5	< 1.5
	07/15/2007	< 500	**250**	**150**	**400**	< 5.0	< 5.0	< 5.0	< 15
	10/03/2007	< 250	**330**	**260**	**590**	< 2.5	< 2.5	< 2.5	< 7.5
	01/03/2008	< 50	**280**	**210**	**490**	< 0.5	< 0.5	< 0.5	< 1.5
	02/28/2009	< 50	**290**	**190**	**480**	< 0.5	< 0.5	< 0.5	**1.6**
	07/22/2009	< 50	**780**	**830**	**1610**	< 0.5	< 0.5	< 0.5	< 1.5
	01/08/2010	< 50	**680**	**360**	**1040**	< 0.5	< 0.5	< 0.5	< 1.5
	07/20/2010	< 50	**330**	**190**	**520**	< 0.5	< 0.5	< 0.5	< 1.5
	01/21/2011	< 50	< 160	**630**	**710**	< 0.5	< 1.5	< 0.5	< 1.5
	08/05/2011	< 50	**230**	**210**	**440**	< 0.5	< 0.5	< 0.5	< 1.5
	01/27/2012	< 50	< 30	< 70	ND	< 0.5	< 0.5	< 0.5	< 1.5
	07/02/2012	< 50	< 29	< 67	ND	< 0.5	< 0.5	< 0.5	< 1.5
	01/11/2013	< 50	< 28	< 66	ND	< 0.5	< 0.5	< 0.5	< 1.5
	07/12/2013	< 50	< 29	< 68	ND	< 0.5	< 0.5	< 0.5	< 1.5
	01/10/2014	< 50	< 29	<68	ND	< 0.5	< 0.5	< 0.5	< 1.5
	07/16/2014	< 50	< 29	< 68	ND	< 2.0	< 0.5	< 0.5	< 1.5
	02/22/2019	100 U	**94**	300 U	**244**	1 U	1 U	1 U	3 U

Table 2-3
Summary of Groundwater Analytical Results
Raplee Property
City of Stanwood
Stanwood, Washington

Location	Collection Date:	GRO	DRO	ORO	Total Heavy Oils[a]	Benzene	Ethylbenzene	Toluene	Total Xylenes
MTCA Method A Cleanup Level (ug/L):		800	500	500	500	5	700	1000	1000
MW-04	05/03/2006	< 240	**7900**	< 1000	**8400**	< 2.5	< 2.5	< 2.5	< 7.5
	08/02/2006	**73**	**7300**	< 1000	**7800**	< 0.5	< 0.5	< 0.5	**2.8**
	10/10/2006	< 48	**7900**	**2200**	**10100**	< 0.5	< 0.5	< 0.5	< 1.5
	01/15/2007	< 240	**8300**	**3000**	**11300**	< 2.5	< 2.5	< 2.5	< 7.5
	04/25/2007	**89**	**9300**	**2000**	**11300**	< 0.5	< 0.5	< 0.5	< 1.5
	07/15/2007	< 500	**850**	**320**	**1170**	< 5.0	< 5.0	< 5.0	< 15
	10/03/2007	< 250	**8500**	< 2100	**9550**	< 2.5	< 2.5	< 2.5	< 7.5
	01/03/2008	**61**	**9100**	**2200**	**11300**	< 0.5	< 0.5	< 0.5	< 1.5
	02/28/2009	**56**	**5400**	**2100**	**7500**	< 0.5	< 0.5	< 0.5	< 1.5
	07/22/2009	**100**	**14000**	**7600**	**21600**	< 0.5	< 0.5	< 0.5	< 1.5
	01/08/2010	**75**	**13000**	**18000**	**31000**	< 0.5	< 0.5	< 0.5	< 1.5
	07/20/2010	**69**	**12000**	**13000**	**25000**	< 0.5	< 0.5	< 0.5	< 1.5
	01/21/2011	**50**	**14000**	< 1800	**14900**	< 0.5	< 0.5	< 0.5	< 1.5
	08/05/2011	*Unable to sample because of presence of free product.*							
	01/27/2012	*Unable to sample because of presence of free product.*							
	07/02/2012	*Unable to sample because of presence of free product.*							
	01/11/2013	*Unable to sample because of presence of free product.*							
	07/12/2013	*Unable to sample because of presence of free product.*							
	01/10/2014	*Unable to sample because of presence of free product.*							
	07/16/2014	*Unable to sample because of presence of free product.*							
	02/22/2019	*Unable to sample because of presence of free product.*							

Table 2-3
Summary of Groundwater Analytical Results
Raplee Property
City of Stanwood
Stanwood, Washington

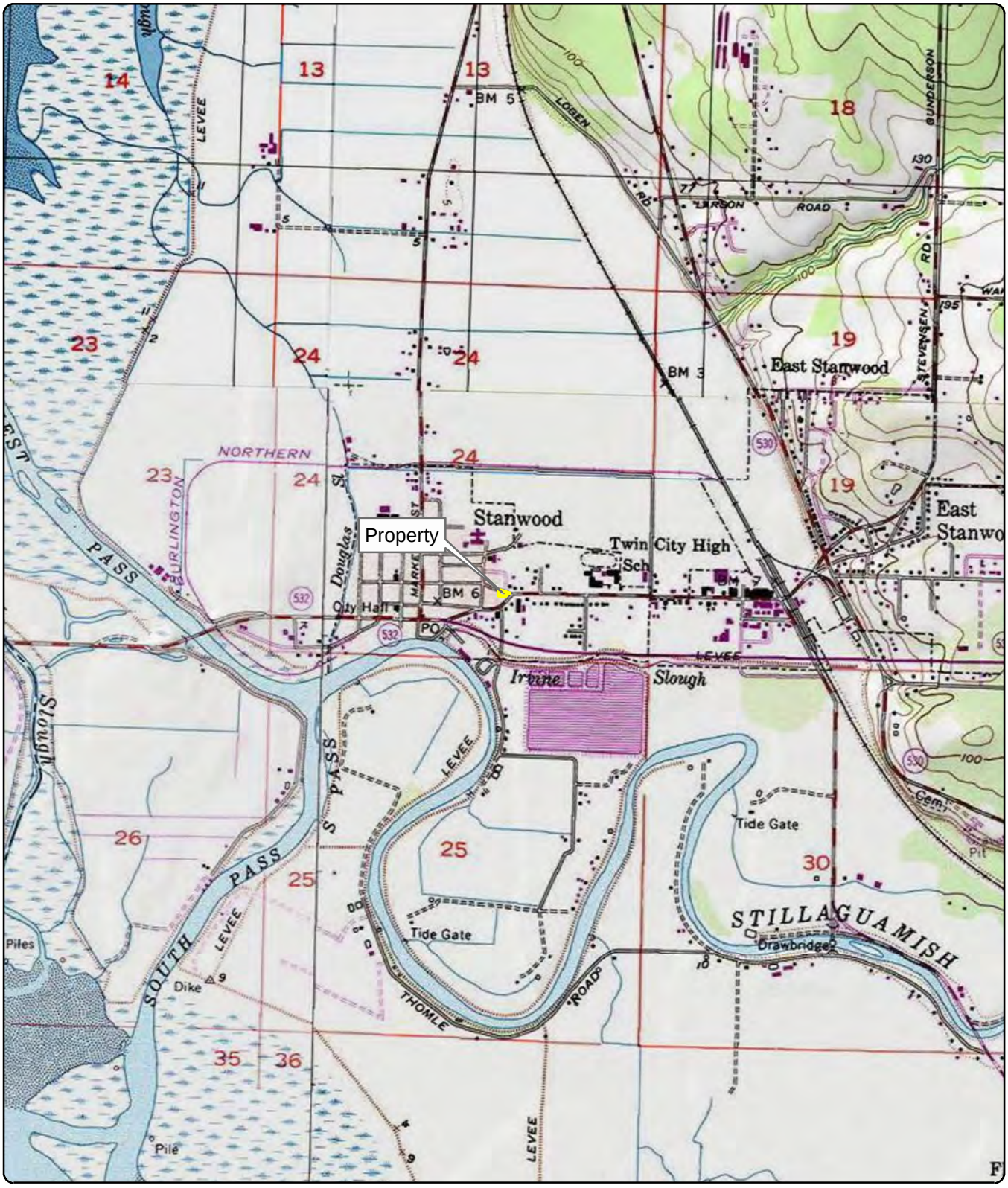
NOTES:
Detections are in **bold** font.
Detections above MTCA Method A cleanup levels are shaded.
Results prior to 2019 were obtained from the August 2014 groundwater report by Leidos (Leidos, 2014).
< = concentration is less than reported value.
DRO = diesel-range hydrocarbons.
GRO = gasoline-range hydrocarbons.
MTCA = Model Toxics Control Act.
ND = not detected.
ORO = motor-oil-range hydrocarbons.
Total xylenes = sum of m,p-xylene and o-xylene.
U = analyte not detected.
ug/L = micrograms per liter (parts per billion).
[a]Total concentrations were calculated using one-half the method reporting limit for non-detects. Where all components were non-detect, the calculated total is "ND."

Table 4-1
2019 Groundwater Analytical Results
Raplee Property
City of Stanwood
Stanwood, Washington

Location:	MTCA Method A Cleanup Level	Screening Level for Protection of Indoor Air (MTCA B)	MW-01		MW-02	MW-03
Sample Name:			MW01-GW-8.18	MWDUP-GW-8.18	MW02-GW-8.02	MW03-GW-7.18
Collection Date:			02/22/2019	02/22/2019	02/22/2019	02/22/2019
VOCs (ug/L)						
Benzene	5	2.4	1 U	1 U	1 U	1 U
Ethylbenzene	700	2780	1 U	1 U	1 U	1 U
Toluene	1000	15600	1 U	1 U	1 U	1 U
Total xylenes	1000	310	3 U	3 U	**3.4**	3 U
TPH (ug/L)						
Gasoline-Range Hydrocarbons	800	NV	100 U	100 U	**190**	100 U
Diesel-Range Hydrocarbons	500	NV	**180**	**200**	**1900**	**94**
Motor-Oil-Range Hydrocarbons	500	NV	300 U	300 U	**1900**	300 U
Total Heavy Oils[a]	500	NV	**330**	**200**	**3800**	**244**

NOTES:
Only results for those chemicals sampled in 2019 are shown in this table.
Detections are in **bold** font.
Detections above MTCA Method A cleanup levels are shaded.
Non-detect results are not evaluated against cleanup levels.
MTCA = Model Toxics Control Act.
NV = no value.
Total xylenes = sum of m,p-xylene and o-xylene.
TPH = total petroleum hydrocarbon.
U = analyte not detected.
ug/L = micrograms per liter (parts per billion).
VOC = volatile organic compound.
[a]Total heavy oil concentrations were calculated using one-half the method reporting limit for non-detects.

FIGURES



Source: US Geological Survey (1969) 7.5-minute topographic quadrangle: Stanwood
SE corner of Section 24, Township 32 North, Range 3 East
Property boundary obtained from Snohomish County GIS.

Legend

Property Parcel

Figure 1-1
Property Location

Raplee Property
Stanwood, Washington

0 1,000 2,000
Feet

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Path: X:\1030.01\Projects\Fig1_Property Location.mxd
Print Date: 9/27/2018
Approved By:
Produced By: mjoseph
Project: 1030.01

Figure 2-1
Property Features

Raplee Property
Stanwood, Washington

Legend

- Monitoring Well
- Former Product Lines
- Tax Lot
- Existing UST (SAIC, 2006)
- Former Building
- Former Service Island
- Former UST (Pinnacle, 2005)
- Property Parcel

Notes:
All property feature locations are approximate.
UST = underground storage tank.

0 25 50
Feet

Source: Aerial photograph obtained from Mapbox. Property boundary obtained from Snohomish County GIS.

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Print Date: 3/27/2019
Approved By:
Produced By: agusse
Project: 1030.01

Figure 2-2
Historical Investigation Locations

Raplee Property
Stanwood, Washington

Legend

- Historical Soil Borings
- Monitoring Well
- Former Product Lines
- Tax Lot
- Existing UST (SAIC, 2006)
- Former Building
- Former Service Island
- Former UST (Pinnacle, 2005)
- Property Parcel

Notes:
All property feature locations are approximate.
UST = underground storage tank.

0 20 40
Feet

Source: Aerial photograph obtained from Mapbox. Property boundary obtained from Snohomish County GIS.

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Print Date: 4/25/2019
Approved By:
Produced By: jputnam
Project: 1030.01

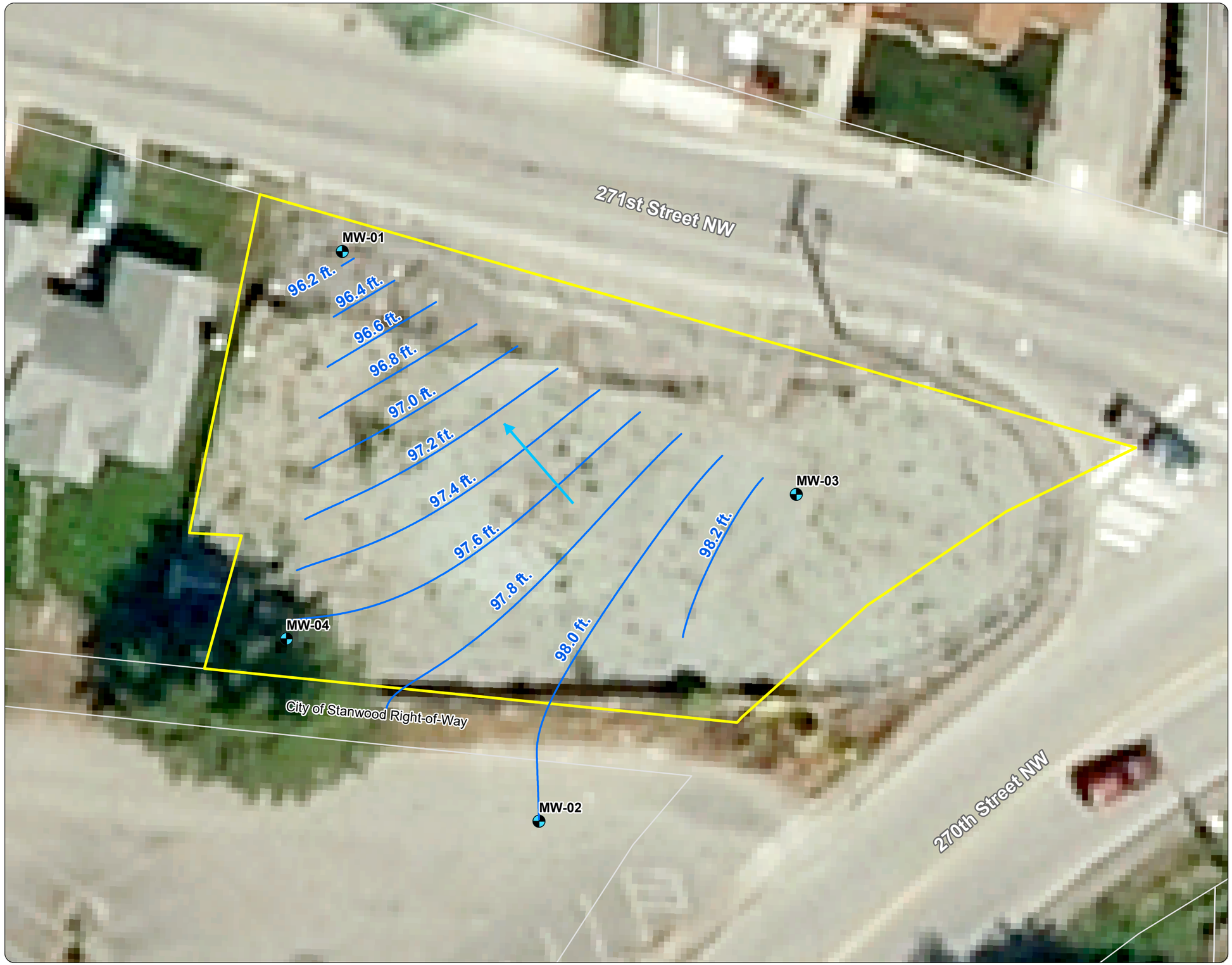

Figure 2-3
Potentiometric Groundwater Contours

Raplee Property
Stanwood, Washington

Legend

- Potentiometric Groundwater Contour
- Approximate Groundwater Flow Direction
- Monitoring Well
- Property Parcel
- Tax Lot

Notes:
All property feature locations are approximate.
TOC elevations are expressed in feet relative to an arbitrary datum of 100.00 feet at MW-1 (SAIC, 2006).
TOC = top of casing.

0 25
Feet

Source: Aerial photograph obtained from Mapbox. Property boundary obtained from Snohomish County GIS.

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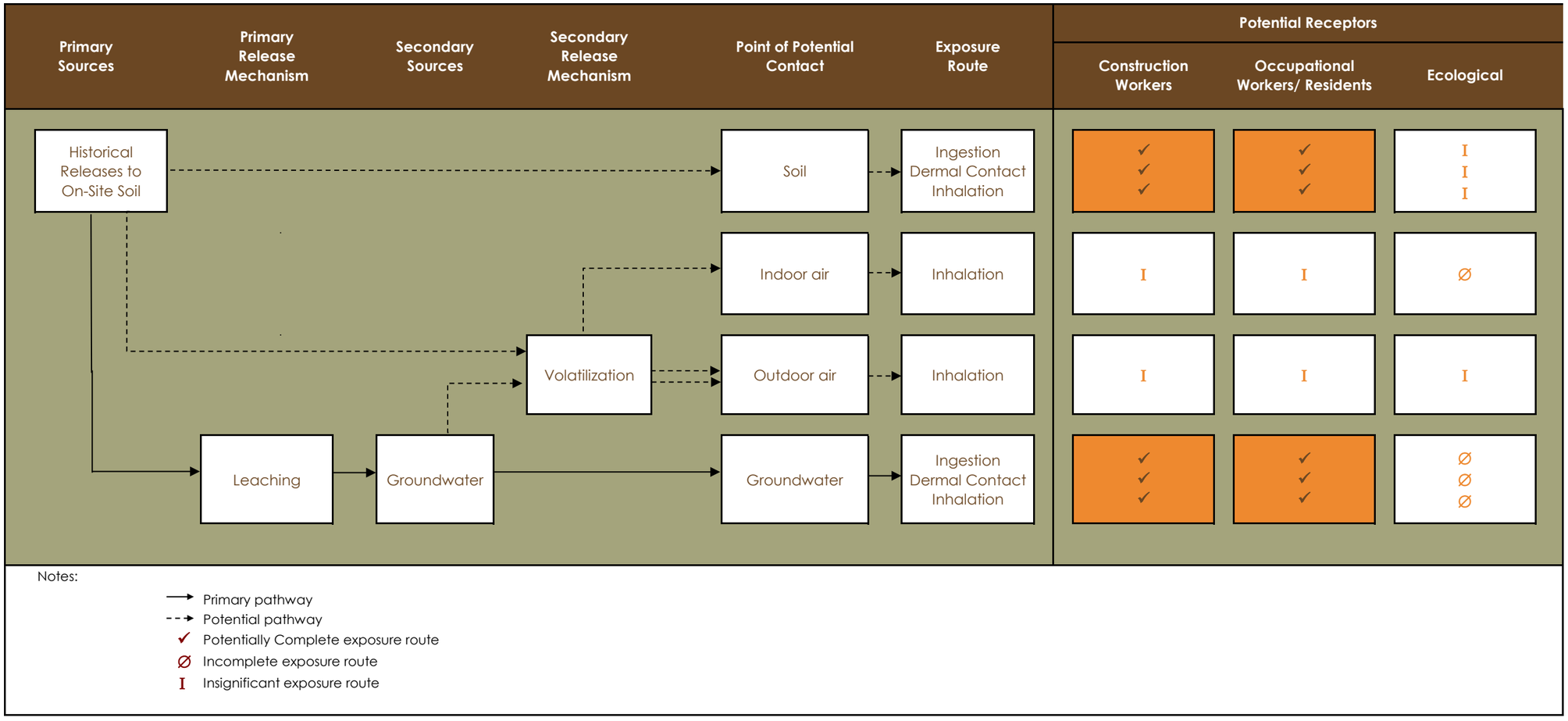
Figure 5-1
Conceptual Site Model
Raplee Property
City of Stanwood
Stanwood, Washington



APPENDIX A

FIELD SAMPLING DATA SHEETS

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1

Water Field Sampling Data Sheet

Client Name	City of Stanwood	**Sample Location**	MW-01
Project #	1030.01.04	**Sampler**	A. Bixby
Project Name	Stillaguamish River Connector IPG	**Sampling Date**	2/22/2019
Sampling Event	February 2019	**Sample Name**	MW01-GW-8.18
Sub Area		**Sample Depth**	8.18
FSDS QA:	N. Bruneel 3/12/2019	**Easting**	**Northing**	**TOC**

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/22/2019	8:32	14.17		2.18		11.99	1.1

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	**Time**	**Purge Vol (gal)**	**Flowrate l/min**	**pH**	**Temp (C)**	**E Cond (uS/cm)**	**DO (mg/L)**	**ORP**	**Turbidity**
(2) Peristaltic Pump	11:35:00 AM	2	0.2	7.27	7.98	2040	8.39	-87.6	17.2
	1:20:00 PM	3.2	0.2	7.37	8.14	2733	2.6	-126.7	11
	1:25:00 PM	3.4	0.2	7.33	9.31	2685	1.62	-141.2	6.37
	1:30:00 PM	3.6	0.2	7.33	9.36	2657	1.47	-146	5.18
Final Field Parameters	1:35:00 PM	3.8	0.2	7.33	9.3	2664	1.41	-149.2	5.03

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

Clear with grayish brown tint; no odor; no visible sheen.

Sample Information

Sampling Method	**Sample Type**	**Sampling Time**	**Container Code/Preservative**	**#**	**Filtered**
(2) Peristaltic Pump	Groundwater	1:40:00 PM	VOA-Glass	3	No
			Amber Glass	1	No
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly		
			Total Bottles	4	

General Sampling Comments

Began purge at 10:20. Well dry at 10:50. Allowed 25 minutes for recharge. Resumed purge at 11:15 with the YSI meter. Well dry again at 11:35. Allow recharge. Resume purge at 13:15.

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1

Water Field Sampling Data Sheet

Client Name	City of Stanwood	**Sample Location**	MW-02				
Project #	1030.01.04	**Sampler**	A. Bixby				
Project Name	Stillaguamish River Connector IPG	**Sampling Date**	2/22/2019				
Sampling Event	February 2019	**Sample Name**	MW02-GW-8.02				
Sub Area		**Sample Depth**	8.02				
FSDS QA:	N. Bruneel 3/12/2019	**Easting**		**Northing**		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/22/2019	8:13	14.46		1.58		12.88	1.2

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	**Time**	**Purge Vol (gal)**	**Flowrate l/min**	**pH**	**Temp (C)**	**E Cond (uS/cm)**	**DO (mg/L)**	**ORP**	**Turbidity**
(2) Peristaltic Pump	4:15:00 PM	1.2	0.2	6.89	8.81	893	5.73	-47.3	126
	4:20:00 PM	1.3	0.2	6.88	8.88	856	5.92	-38.8	63.6
	4:25:00 PM	1.5	0.2	6.88	8.89	850	5.97	-36.8	33.2
	4:30:00 PM	1.7	0.2	6.88	8.87	846	6.01	-34.6	23.2
Final Field Parameters	4:35:00 PM	1.9	0.2	6.87	9	853	5.98	-34.6	19.4

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

Very turbid, brown water. After 45 minutes of purging, turbidity was 140 NTU. No odor; biosheen.

Sample Information

Sampling Method	**Sample Type**	**Sampling Time**	**Container Code/Preservative**	**#**	**Filtered**
(2) Peristaltic Pump	Groundwater	5:05:00 PM	VOA-Glass	3	No
			Amber Glass	1	No
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly		
			Total Bottles	4	

General Sampling Comments

Began purge at 14:00. Well dry at 14:47. Well recharged very slowly. Allowed 80 minutes total for recharge. Resumed purge at 16:10 with the YSI meter.

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1

Water Field Sampling Data Sheet

Client Name	City of Stanwood	**Sample Location**	MW-03				
Project #	1030.01.04	**Sampler**	A. Bixby				
Project Name	Stillaguamish River Connector IPG	**Sampling Date**	2/22/2019				
Sampling Event	February 2019	**Sample Name**	MW03-GW-7.18				
Sub Area		**Sample Depth**	7.18				
FSDS QA:	N. Bruneel 3/12/2019	**Easting**		**Northing**		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/22/2019	8:22	13.56		0.8		12.76	1.2

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	**Time**	**Purge Vol (gal)**	**Flowrate l/min**	**pH**	**Temp (C)**	**E Cond (uS/cm)**	**DO (mg/L)**	**ORP**	**Turbidity**
(2) Peristaltic Pump	9:35:00 AM	1.2	0.2	6.27	7.15	250	2.48	27	10.9
	9:40:00 AM	1.4	0.2	6.35	7.09	240	2.17	-15.4	7.56
	9:45:00 AM	1.6	0.2	6.38	7.04	236	2.14	-37.6	5.95
	9:55:00 AM	2	0.2	6.4	7.22	235	1.92	-62	4.88
	10:00:00 AM	2.2	0.2	6.39	7.25	237	1.95	-68	4.34
Final Field Parameters	10:05:00 AM	2.5	0.2	6.42	7.28	239	1.89	-70.3	4.1

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

Clear; no odor; no visible sheen.

Sample Information

Sampling Method	**Sample Type**	**Sampling Time**	**Container Code/Preservative**	**#**	**Filtered**
(2) Peristaltic Pump	Groundwater	10:10:00 AM	VOA-Glass	3	No
			Amber Glass	1	No
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly		
			Total Bottles	4	

General Sampling Comments

Began purge at 8:55. Paused parameter collection at 9:45 as ORP stabilized.

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1

Water Field Sampling Data Sheet

Client Name	City of Stanwood	**Sample Location**	MW-04				
Project #	1030.01.04	**Sampler**					
Project Name	Stillaguamish River Connector IPG	**Sampling Date**					
Sampling Event	February 2019	**Sample Name**					
Sub Area		**Sample Depth**					
FSDS QA:	N. Bruneel 3/12/2019	**Easting**		**Northing**		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/22/2019	8:40	13.76	2.32	2.33	0.01	11.43	1.1

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	**Time**	**Purge Vol (gal)**	**Flowrate l/min**	**pH**	**Temp (C)**	**E Cond (uS/cm)**	**DO (mg/L)**	**ORP**	**Turbidity**
Final Field Parameters									

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

Sample Information

Sampling Method	**Sample Type**	**Sampling Time**	**Container Code/Preservative**	**#**	**Filtered**
			VOA-Glass		
			Amber Glass		
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly		
			Total Bottles	0	

General Sampling Comments

Well not sampled due to presence of black, viscous free product on interface probe tip.

APPENDIX B

SITE RECONNAISSANCE PHOTOGRAPHS

MAUL FOSTER ALONGI

PHOTOGRAPHS

Project Name: Focused Environmental Investigation Report—Raplee Property
Project Number: 1030.01.04
Location: 9816 271st Street NW in Stanwood, Washington

Photo No. 1.

Description
Southeast corner of the Property, looking east toward monitoring well MW-02.

Photo No. 2.

Description
Southwest corner of the Property, looking west toward monitoring well MW-02.

MAUL FOSTER ALONGI

PHOTOGRAPHS

Project Name: Focused Environmental Investigation Report—Raplee Property
Project Number: 1030.01.04
Location: 9816 271st Street NW in Stanwood, Washington

Photo No. 3.

Description
Cap of potential underground storage tank (UST) access point.

Photo No. 4.

Description
Interior of potential UST access point. Because of corrosion, pipe cap could not be opened without invasive hand tools.

MAUL FOSTER ALONGI

PHOTOGRAPHS

Project Name: Focused Environmental Investigation Report—Raplee Property
Project Number: 1030.01.04
Location: 9816 271st Street NW in Stanwood, Washington

Photo No. 5.

Description
Southwest corner of the Property, looking west toward monitoring well MW-04.

Photo No. 6.

Description
Northeast corner of the Property, looking east.

MAUL FOSTER ALONGI

PHOTOGRAPHS

Project Name: Focused Environmental Investigation Report—Raplee Property
Project Number: 1030.01.04
Location: 9816 271st Street NW in Stanwood, Washington

Photo No. 7.

Description
Northwest corner of the Property, looking west toward monitoring well MW-01.

Photo No. 8.

Description
Southwest corner of the Property, looking southwest toward monitoring well MW-04.

MAUL FOSTER ALONGI

PHOTOGRAPHS

Project Name: Focused Environmental Investigation Report—Raplee Property
Project Number: 1030.01.04
Location: 9816 271st Street NW in Stanwood, Washington

Photo No. 9.

Description
Southwest corner of the Property, looking southwest toward monitoring well MW-04.

Photo No. 10.

Description
Eastern portion of the Property, looking east.

PHOTOGRAPHS

Project Name: Focused Environmental Investigation Report—Raplee Property
Project Number: 1030.01.04
Location: 9816 271st Street NW in Stanwood, Washington

Photo No. 11.

Description
Monitoring well MW-01.

Photo No. 12.

Description
Southwest corner of the Property, looking southwest.

PHOTOGRAPHS

Project Name: Focused Environmental Investigation Report—Raplee Property
Project Number: 1030.01.04
Location: 9816 271st Street NW in Stanwood, Washington

Photo No. 13.

Description
Central portion of the Property, looking east.

Photo No. 14.

Description
Free product coating the interface probe after the water level in monitoring well MW-04 was measured.

APPENDIX C
WELL DEVELOPMENT FORMS

MAUL FOSTER ALONGI

Well Development Form

Project No.	1030.01.04	Date:	2/20/2019
Site Location:	9816 271ST St. NW, Stanwood, WA	Well:	MW-01
Name:	Raplee Environmental Investigation	Initial DTB:	14.01
Development Method:	Surge and purge	Initial DTW:	2.75
Total Water Removed:	3.6 gallons	Pore Volume:	1.04 gallon
Water Contained:	5 gallon buckets	Casing Diameter:	1.5 inch

Time	Cum. Vol Removed	Turbidity (NTU)	pH	Conductivity (uS/cm)	Temp (°C)	DO (mg/L)	ORP (mV)	Comments
1350	--	--	--	--	--	--	--	Surge.
1355	--	--	--	--	--	--	--	Begin purge with peristaltic pump.
1410	1.5	--	--	--	--	--	--	Well dry. Allow recharge.
1430	1.5	16.6	--	--	--	--	--	Resume purge.
1500	2.5	--	--	--	--	--	--	Well dry. Allow recharge.
1545	2.5	--	--	--	--	--	--	Resume purge. Hook up YSI meter.
1550	2.7	6.98	8.03	2122	12.02	1.21	-185.7	
1555	3.0	11.1	7.98	2150	11.90	2.25	-168.7	
1600	3.2	10.0	7.92	2440	11.68	4.80	-159.0	
1605	3.4	9.84	7.93	2478	11.57	4.25	-155.7	
1610	3.6	9.83	7.91	2500	11.57	4.43	-151.1	Complete well redevelopment.

Notes:

DO = dissolved oxygen.

DTB = depth to bottom.

DTW = depth to water.

NTU = nephelometric turbidity unit.

ORP = oxygen reduction potential.

uS/cm = microSiemens per centimeter.

mg/L = milligrams per liter.

mV = millivolts.

MAUL FOSTER ALONGI

Well Development Form

Project No.	1030.01.04	Date:	2/20/2019
Site Location:	9816 271ST St. NW, Stanwood, WA	Well:	MW-02
Name:	Raplee Environmental Investigation	Initial DTB: 14.16	Final DTB: --
Development Method	Surge and purge	Initial DTW: 3.14	Final DTW: --
Total Water Removed:	4.3 gallons	Pore Volume:	1.01 gallon
Water Contained:	5 gallon buckets	Casing Diameter:	1.5 inch

Time	Cum. Vol Removed	Turbidity (NTU)	pH	Conductivity (uS/cm)	Temp (°C)	DO (mg/L)	ORP (mV)	Comments
1010	--	--	--	--	--	--	--	Surge.
1020	--	--	--	--	--	--	--	Begin purge with peristaltic pump.
1030	2.0	--	--	--	--	--	--	Well dry. Allow recharge.
1040	2.0	--	--	--	--	--	--	Resume purge.
1045	2.5	--	--	--	--	--	--	Well dry. Allow recharge.
1130	2.5	--	--	--	--	--	--	Well continues to dry up. Allow recharge.
1300	2.5	--	--	--	--	--	--	Resume purge.
1310	3.0	--	--	--	--	--	--	Well dry. Allow long recharge.
1650	3.0	--	--	--	--	--	--	Resume purge. Hook up YSI meter.
1655	3.2	20.1	7.43	1129	10.40	6.18	-96.7	Slow pumping rate to approximately 0.1 liter/minute.
1700	3.5	19	7.43	1126	10.50	5.89	-96.3	
1705	3.8	17.7	7.42	1129	10.70	5.73	-95.4	
1710	4.1	16.9	7.42	1148	10.74	5.32	-96.6	
1715	4.3	16.3	7.44	1160	10.80	5.21	-100.9	Complete well redevelopment.

Notes:

DO = dissolved oxygen.

DTB = depth to bottom.

DTW = depth to water.

NTU = nephelometric turbidity unit.

ORP = oxygen reduction potential.

uS/cm = microSiemens per centimeter.

mg/L = milligrams per liter.

mV = millivolts.

MAUL FOSTER ALONGI

Well Development Form

Project No.	1030.01.04	Date:	2/20/2019
Site Location:	9816 271ST St. NW, Stanwood, WA	Well:	MW-03
Name:	Raplee Environmental Investigation	Initial DTB:	13.56
Development Method	Surge and purge	Initial DTW:	2.82
Total Water Removed:	6.4 gallons	Pore Volume:	0.99 gallon
Water Contained:	5 gallon buckets	Casing Diameter:	1.5 inch

Time	Cum. Vol Removed	Turbidity (NTU)	pH	Conductivity (uS/cm)	Temp (°C)	DO (mg/L)	ORP (mV)	Comments
1150	--	--	--	--	--	--	--	Water level at 0.5 inch bgs.
1155	--	--	--	--	--	--	--	Surge.
1200	--	--	--	--	--	--	--	Begin purge with peristaltic pump.
1245	4.0	4.51	--	--	--	--	--	Calibrate YSI meter.
1300	4.7	4.48	--	--	--	--	--	Hook up YSI meter.
1315	5.1	4.05	7.08	294	7.99	3.64	-115.7	
1320	5.5	3.89	7.17	297	7.91	3.58	-120.8	
1325	6.0	3.7	7.2	301	7.95	3.26	-124.6	
1330	6.2	3.44	7.26	304	7.98	3.17	-126.4	
1335	6.4	3.44	7.24	308	8.02	3.19	-129.1	Complete well redevelopment.

Notes:

bgs = below ground surface.

DO = dissolved oxygen.

DTB = depth to bottom.

DTW = depth to water.

NTU = nephelometric turbidity unit.

ORP = oxygen reduction potential.

uS/cm = microSiemens per centimeter.

mg/L = milligrams per liter.

mV = millivolts.

APPENDIX D

ANALYTICAL LABORATORY REPORT

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 5, 2019

Amanda Bixby, Project Manager
Maul Foster Alongi
2815 2nd Ave, Suite 540
Seattle, WA 98121

Dear Ms Bixby:

Included is the amended report from the testing of material submitted on February 26, 2019 from the Raplee Environmental Assesment 1030.01.04, F&BI 902374 project. The prefixes in front of the sample IDs have been removed.

We apologize for the inconvenience and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
MFA0304R.DOC

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
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March 4, 2019

Amanda Bixby, Project Manager
Maul Foster Alongi
2815 2nd Ave, Suite 540
Seattle, WA 98121

Dear Ms Bixby:

Included are the results from the testing of material submitted on February 26, 2019 from the Raplee Environmental Assesment 1030.01.04, F&BI 902374 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
MFA0304R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on February 26, 2019 by Friedman & Bruya, Inc. from the Maul Foster Alongi Raplee Environmental Assesment 1030.01.04, F&BI 902374 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Maul Foster Alongi
902374 -01	MW01-GW-8.18
902374 -02	MWDUP-GW-8.18
902374 -03	MW02-GW-8.02
902374 -04	MW03-GW-7.18
902374 -05	Trip Blank

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/04/19
Date Received: 02/26/19
Project: Raplee Environmental Assesment 1030.01.04, F&BI 902374
Date Extracted: 02/27/19
Date Analyzed: 02/27/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
MW01-GW-8.18 902374-01	<1	<1	<1	<3	<100	82
MWDUP-GW-8.18 902374-02	<1	<1	<1	<3	<100	83
MW02-GW-8.02 902374-03	<1	<1	<1	3.4	190	84
MW03-GW-7.18 902374-04	<1	<1	<1	<3	<100	82
Method Blank 09-342 MB	<1	<1	<1	<3	<100	75

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/04/19
Date Received: 02/26/19
Project: Raplee Environmental Assesment 1030.01.04, F&BI 902374
Date Extracted: 02/26/19
Date Analyzed: 02/26/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 51-134)
MW01-GW-8.18 902374-01	180 x	<300	90
MWDUP-GW-8.18 902374-02	200 x	<300	81
MW02-GW-8.02 902374-03	1,900 x	1,900 x	57
MW03-GW-7.18 902374-04	94 x	<300	116
Method Blank 09-407 MB2	<50	<250	104

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/04/19
Date Received: 02/26/19
Project: Raplee Environmental Assesment 1030.01.04, F&BI 902374

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 902373-03 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	230 ve	220 ve	2
Toluene	ug/L (ppb)	460 ve	450 ve	1
Ethylbenzene	ug/L (ppb)	1,200 ve	1,200 ve	0
Xylenes	ug/L (ppb)	2,700 ve	2,700 ve	0
Gasoline	ug/L (ppb)	35,000 ve	35,000 ve	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	96	65-118
Toluene	ug/L (ppb)	50	101	72-122
Ethylbenzene	ug/L (ppb)	50	96	73-126
Xylenes	ug/L (ppb)	150	100	74-118
Gasoline	ug/L (ppb)	1,000	100	69-134

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/04/19
Date Received: 02/26/19
Project: Raplee Environmental Assesment 1030.01.04, F&BI 902374

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	3,000	91	90	63-142	1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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.

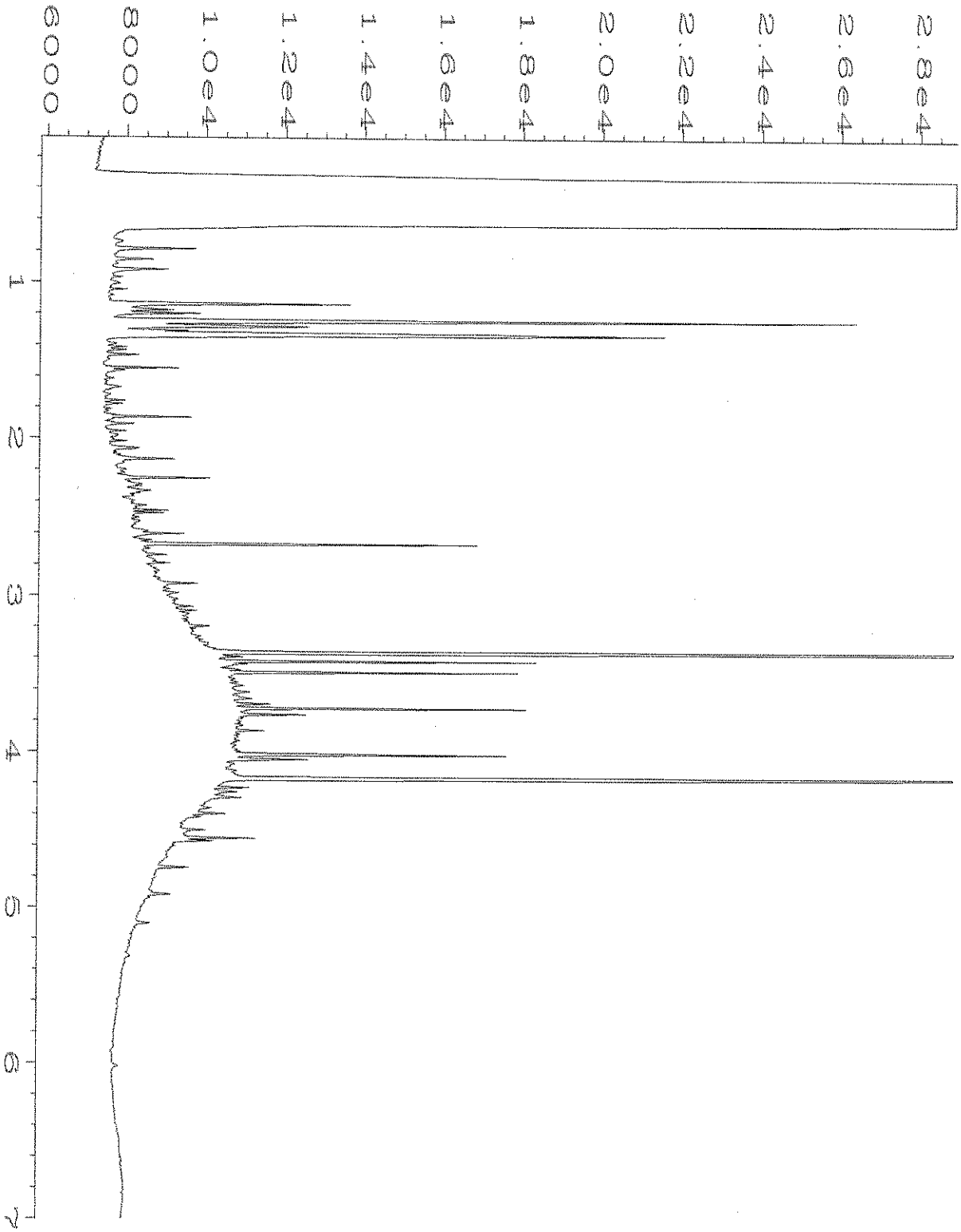
nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

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.

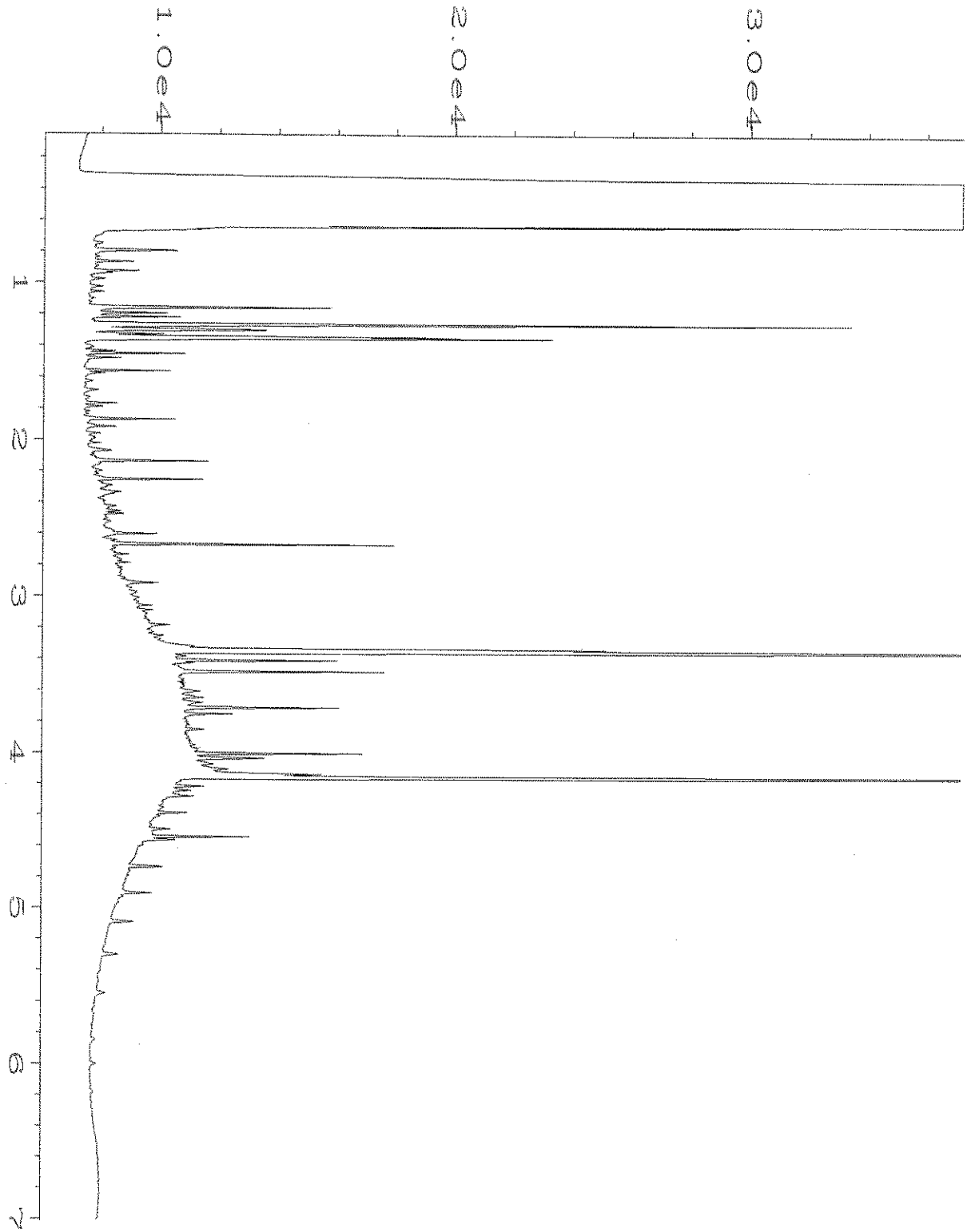
vo - The value reported fell outside the control limits established for this analyte.

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



Data File Name : C:\HPCHEM\6\DATA\02-26-19\033F0301.D
Operator : TL
Instrument : GC6
Sample Name : 902374-01
Run Time Bar Code:
Acquired on : 26 Feb 19 01:47 PM
Report Created on: 27 Feb 19 10:13 AM

Page Number : 1
Vial Number : 33
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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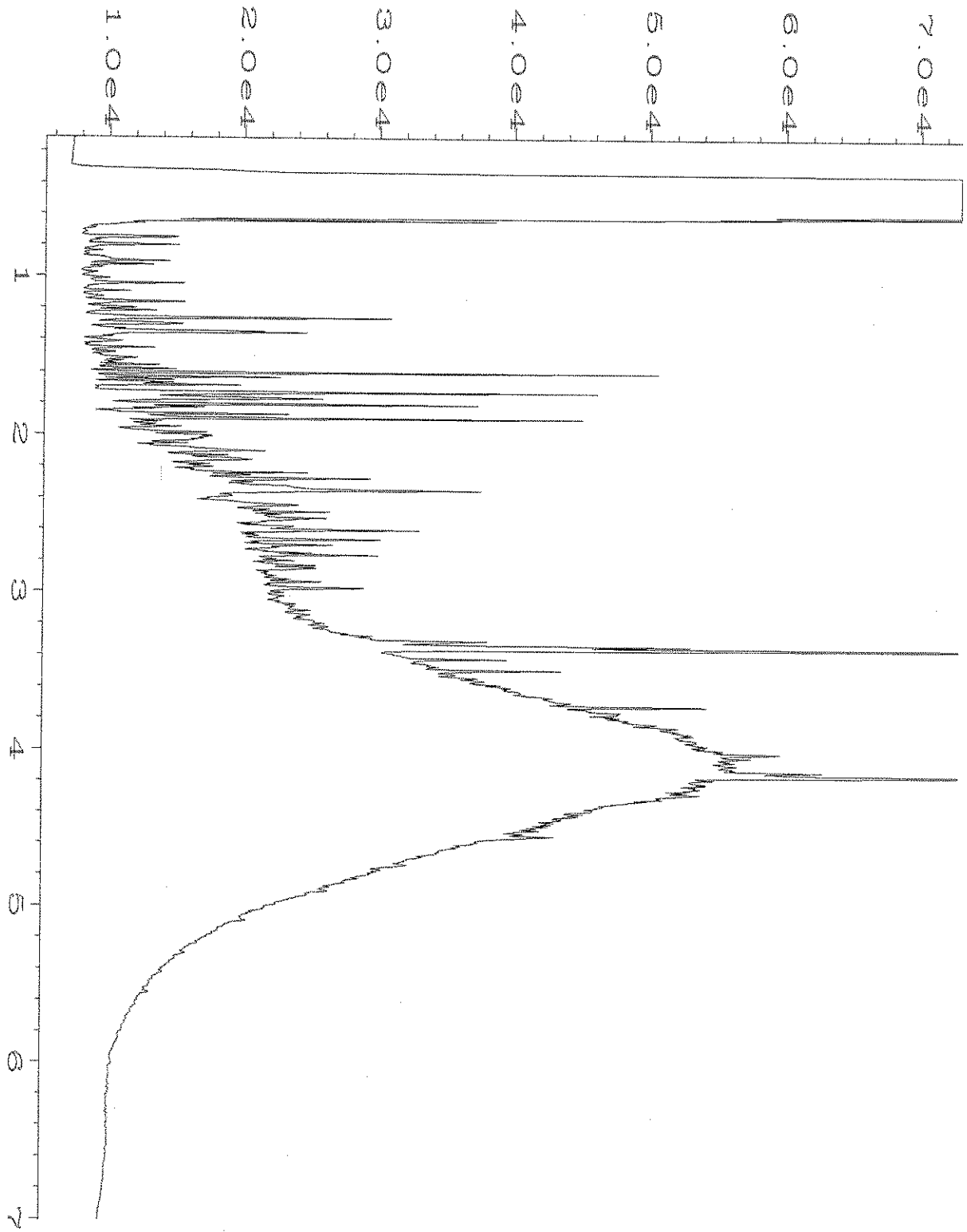
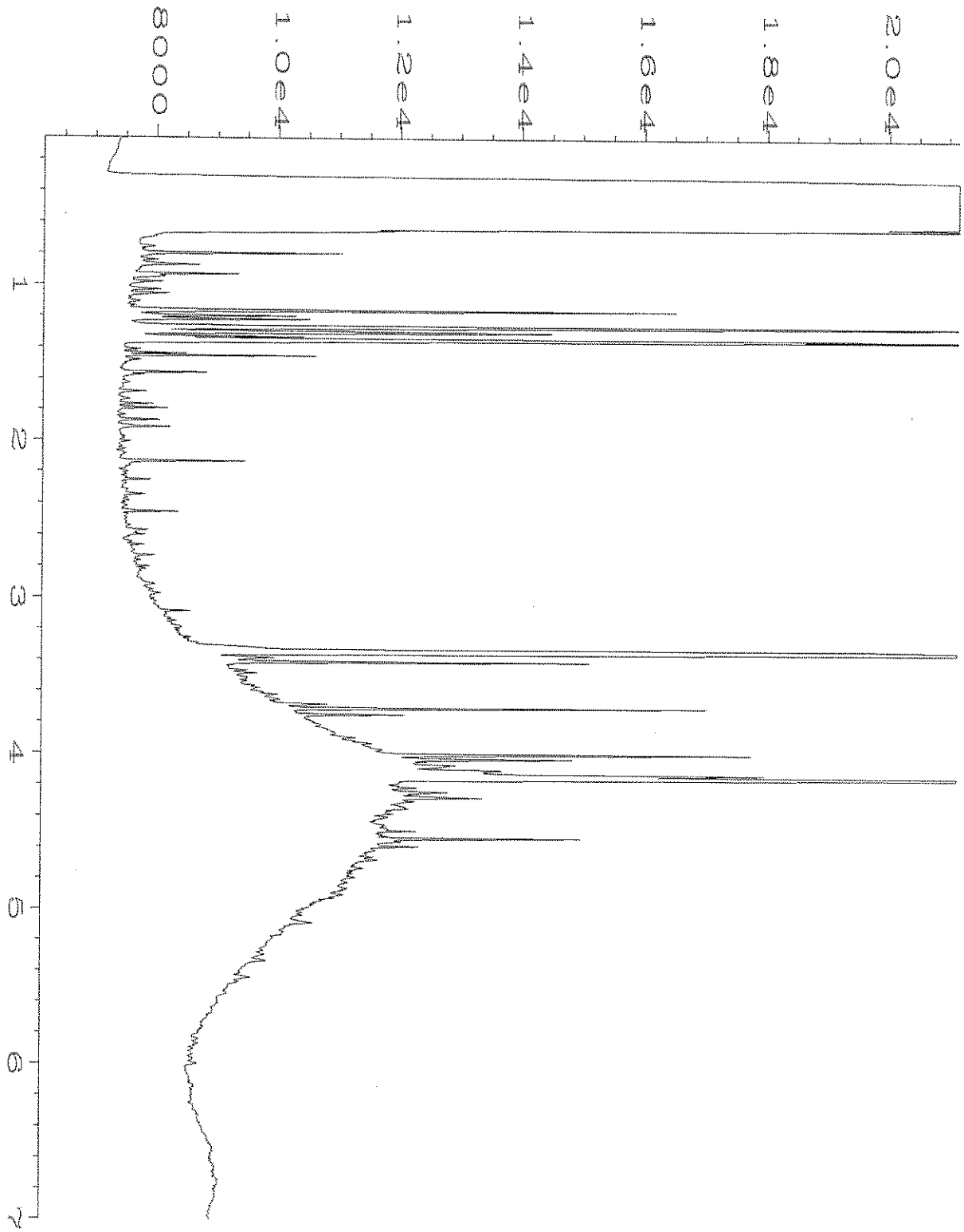
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 34
Sample Name	: 902374-02	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 3
Acquired on	: 26 Feb 19 01:55 PM	Instrument Method	: DX.MTH
Report Created on	: 27 Feb 19 10:13 AM	Analysis Method	: DX.MTH



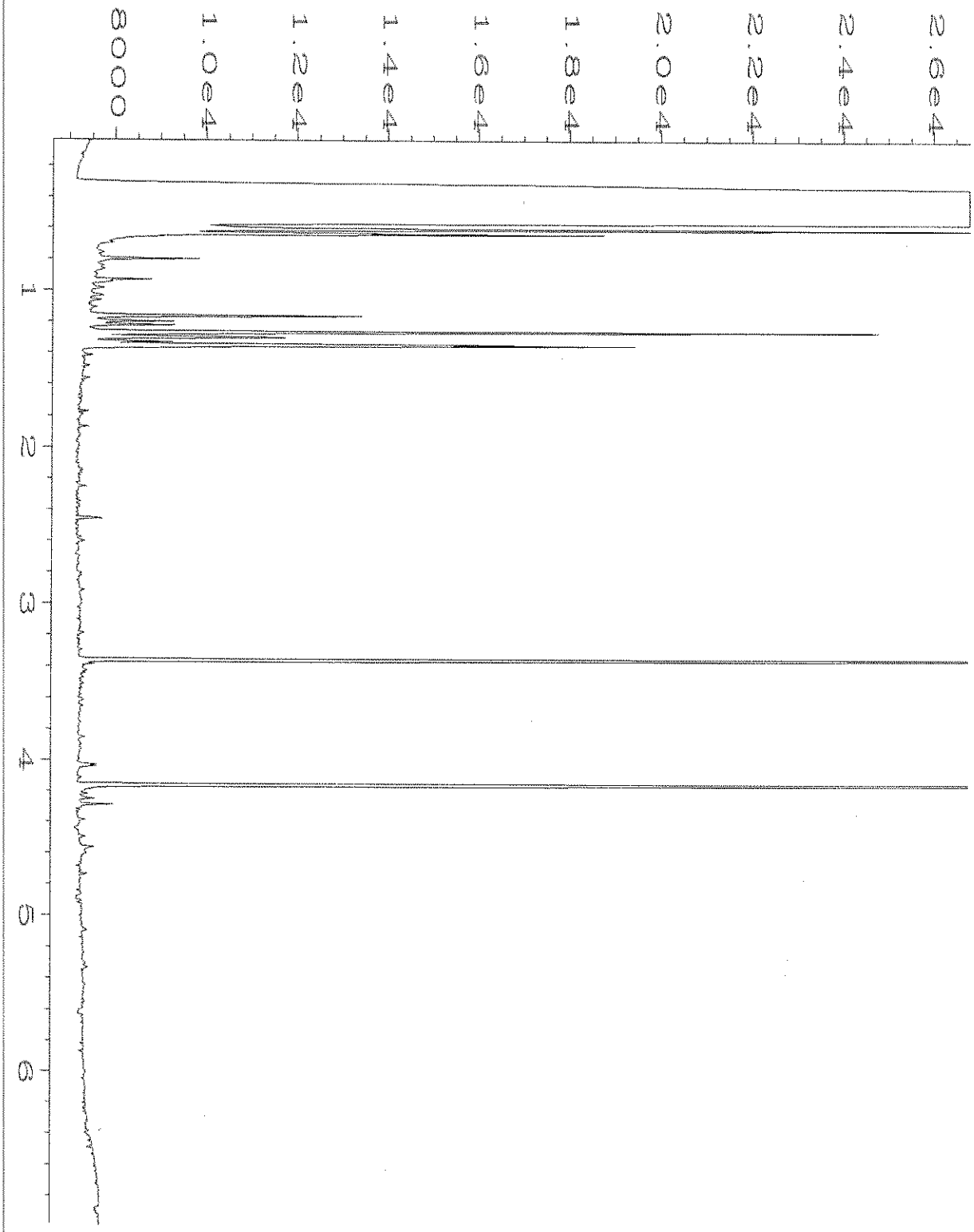
Data File Name : C:\HPCHEM\6\DATA\02-26-19\035F0301.D
Operator : TL
Instrument : GC6
Sample Name : 902374-03
Run Time Bar Code:
Acquired on : 26 Feb 19 02:06 PM
Report Created on: 27 Feb 19 10:14 AM

Page Number : 1
Vial Number : 35
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DX.MTH



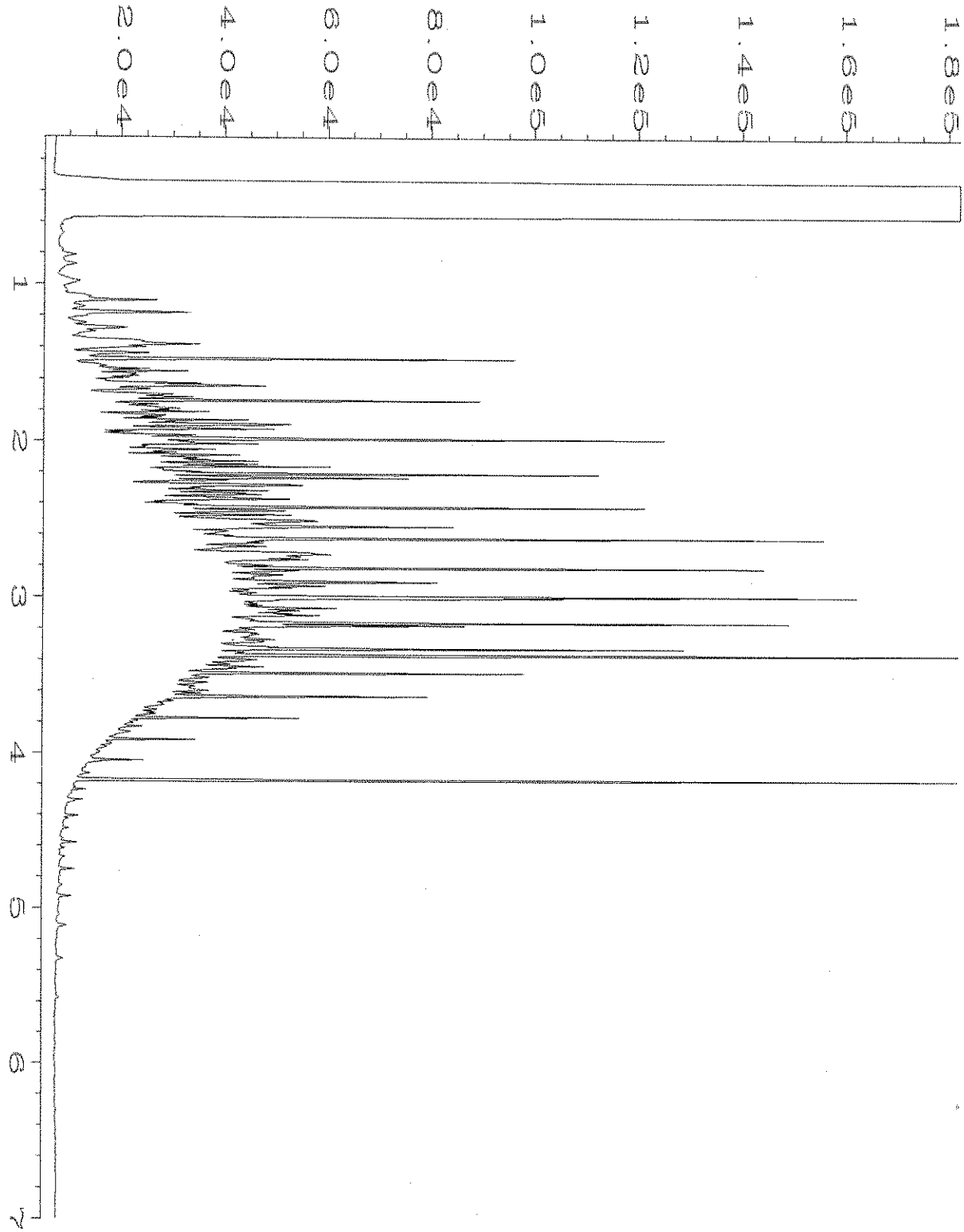
Data File Name : C:\HPCHEM\6\DATA\02-26-19\036F0301.D
Operator : TL
Instrument : GC6
Sample Name : 902374-04
Run Time Bar Code:
Acquired on : 26 Feb 19 02:17 PM
Report Created on: 27 Feb 19 10:15 AM

Page Number : 1
Vial Number : 36
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\6\DATA\02-26-19\020F0301.D
Operator : TL
Instrument : GC6
Sample Name : 09-407 mb2
Run Time Bar Code:
Acquired on : 26 Feb 19 11:15 AM
Report Created on: 27 Feb 19 09:50 AM

Page Number : 1
Vial Number : 20
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\6\DATA\02-26-19\003F0201.D
Operator : TL
Instrument : GC6
Sample Name : 500 Dx 56-21E
Run Time Bar Code:
Acquired on : 26 Feb 19 06:22 AM
Report Created on: 27 Feb 19 09:48 AM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 2
Instrument Method: DX.MTH
Analysis Method : DX.MTH

902374

SAMPLE CHAIN OF CUSTODY

ME 02-26-19

Page # 1 of 1 DO4/

Report To Amanda Bixby

Company Maul Foster Alongi

Address 1329 N State St, Suite 303

City, State, ZIP Bellingham, WA 98225

Phone (360) 635-8371 Email abixby@maulfoster.com

SAMPLERS (*signature*)

PROJECT NAME: Raplee Environmental Assesme 3x

PO #: 1030.01.04

REMARKS: Analysis
GRO by NWTPH-Gx
DRO & ORO by NWTPH-Dx
BTEX by USEPA Method 8021B

INVOICE TO: accounting@maulfoster.com

TURNAROUND TIME VW2
- [x] Standard Turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	ORO by NWTPH-Dx				Notes
						ANALYSES REQUESTED											
MW01-GW-8.18	01 A-D	~~1705~~ 1340	2/22/19	GW	4		X	X	X				X				Time on Sample 13:40 EWB
MWDUP-GW-8.18	02	1340	2/22/19	GW	4		X	X	X				X				Field duplicate
MW02-GW-8.02	03	~~1340~~ 1705	2/22/19	GW	4		X	X	X				X				Time on sample 1705 EWB
MW03-GW-7.18	04	1010	2/22/19	GW	4		X	X	X				X				
Trip Blank	05 A-B																* Added in Lab EWB 2/26
		updated per AB 3/1/19 MG															

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Amanda Bixby	MFA	2/25/19	0800
Received by:	Liz Webber-Bruya	FB1	2/26/19	950
Relinquished by:				
Received by:		Samples received at 2 °C		

Friedman & Bruya, Inc.
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Seattle, WA 98119-2029
Ph. (206) 285-8282

APPENDIX E
DATA VALIDATION REPORT

DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 1030.01.04 | MAY 1, 2019 | CITY OF STANWOOD

Maul Foster & Alongi, Inc. (MFA) conducted an independent review of the quality of analytical results for groundwater samples collected at the Raplee Property at 9816 271st Street NW in Stanwood, Washington. The samples were collected on February 22, 2019.

Friedman & Bruya, Inc. (FBI) performed the analyses. FBI report 902374 was reviewed. The analyses performed and samples analyzed are listed below.

Analysis	Reference
BTEX	USEPA 8021B
Diesel- and Motor-Oil-Range Hydrocarbons	NWTPH-Dx
Gasoline-Range Hydrocarbons	NWTPH-Gx

BTEX = benzene, toluene, ethylbenzene, and total xylenes.
NWTPH = Northwest Total Petroleum Hydrocarbons.
USEPA = U.S. Environmental Protection Agency.

Samples Analyzed
Report 902374
MW01-GW-8.18
MWDUP-GW-8.18
MW02-GW-8.02
MW03-GW-7.18
Trip Blank (hold)

DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2017) and appropriate laboratory and method-specific guidelines (FBI, 2015; USEPA, 1986).

Data validation procedures were modified, as appropriate, to accommodate quality-control requirements for methods not specifically addressed by the USEPA procedures (e.g., NWTPH-Dx).

In report 902374, all detected NWTPH-Dx diesel-range hydrocarbon and motor-oil-range hydrocarbon results were flagged by FBI based on chromatographic patterns that did not resemble the fuel standards used for quantitation. The results were reported as diesel-range and motor-oil-range hydrocarbons instead of specific fuels; thus, no results were qualified by the reviewer.

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

Extractions and analyses were performed within the recommended holding time criteria.

Preservation and Sample Storage

The samples were preserved and stored appropriately.

BLANKS

Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. All laboratory method blanks were non-detect to laboratory reporting limits for all target analytes.

Trip Blanks

Report 902374 states that a trip blank was submitted to FBI but was not recorded on the chain of custody by the sampler. The reviewer confirmed that the trip blank sample was submitted to FBI on hold. No additional action was required.

Equipment Rinsate Blanks

Equipment rinsate blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance on individual samples. All surrogate recoveries were within percent recovery acceptance limits.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. MS/MSD results were not reported; batch precision and accuracy were evaluated with laboratory control sample/laboratory control sample duplicate (LCS/LCSD) and laboratory duplicate sample results.

LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency. Laboratory duplicate results within five times the method reporting limit (MRL) were not evaluated for precision. All laboratory duplicate relative percent differences (RPDs) were within acceptance limits.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

An LCS/LCSD is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency. Where LCSDs were not reported, batch precision was evaluated with laboratory duplicate sample results. All LCS/LCSD results were within acceptance limits for percent recovery and RPD.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. One field duplicate was submitted for analysis (MW01-GW-8.18/MWDUP-GW-8.18). MFA uses acceptance criteria of 100 percent RPD for results that are less than five times the MRL, or 50 percent RPD for results that are greater than five times the MRL. Non-detect data are not used in the evaluation of field duplicate results. All analytes were within the acceptance criteria.

REPORTING LIMITS

FBI used routine laboratory reporting limits for non-detect results. The reviewer confirmed that FBI raised NWTPH-Dx motor-oil-range hydrocarbon reporting limits for samples MW01-GW-8.18, MWDUP-GW-8.18, and MW03-GW-7.18 based on concentrations of diesel-range hydrocarbons present in each sample.

DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies.

The report 902374 chain of custody indicated that samples were received approximately 26 hours after the sampler relinquished them. A sample login form or a shipping waybill was not included in the report. The reviewer confirmed that samples were shipped to FBI. No additional action was required.

No additional issues were found.

REFERENCES

FBI. 2015. Quality assurance manual. Rev. 15. Friedman & Bruya, Inc., Seattle, Washington. December 23.

USEPA. 1986. Test methods for evaluating solid waste, physical/chemical methods. EPA publication SW-846. 3d ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), and VI phase II (2018).

USEPA. 2017. USEPA contract laboratory program, national functional guidelines for Superfund organic methods data review. EPA 540-R-2017-002. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.

APPENDIX F

TERRESTRIAL ECOLOGICAL EVALUATION

Table 749-1

Simplified Terrestrial Ecological Evaluation-Exposure Analysis Procedure

Estimate the area of contiguous (connected) undeveloped land on the site or within 500 feet of any area of the site to the nearest 1/2 acre (1/4 acre if the area is less than 0.5 acre).	
1) From the table below, find the number of points corresponding to the area and enter this number in the field to the right.	
Area (acres) / Points 0.25 or less / 4 0.5 / 5 1.0 / 6 1.5 / 7 2.0 / 8 2.5 / 9 3.0 / 10 3.5 / 11 4.0 or more / 12	4
2) Is this an industrial or commercial property? If yes, enter a score of 3. If no, enter a score of 1	1
3)[a] Enter a score in the box to the right for the habitat quality of the site, using the following rating system[b]. High=1, Intermediate=2, Low=3	3
4) Is the undeveloped land likely to attract wildlife? If yes, enter a score of 1 in the box to the right. If no, enter a score of 2.[c]	1
5) Are there any of the following soil contaminants present: Chlorinated dioxins/furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, pentachlorobenzene? If yes, enter a score of 1 in the box to the right. If no, enter a score of 4.	4
6) Add the numbers in the boxes on lines 2-5 and enter this number in the box to the right. If this number is larger than the number in the box on line 1, the simplified evaluation may be ended.	9

Notes for Table 749-1

[a] It is expected that this habitat evaluation will be undertaken by an experienced field biologist. If this is not the case, enter a conservative score of (1) for questions 3 and 4.

[b] **Habitat rating system.** Rate the quality of the habitat as high, intermediate or low based on your professional judgment as a field biologist. The following are suggested factors to consider in making this evaluation:

> **Low:** Early successional vegetative stands; vegetation predominantly noxious, nonnative, exotic plant species or weeds. Areas severely disturbed by human activity, including intensively cultivated croplands. Areas isolated from other habitat used by wildlife.

High: Area is ecologically significant for one or more of the following reasons: Late-successional native plant communities present; relatively high species diversity; used by an uncommon or rare species; priority habitat (as defined by the Washington Department of fish and Wildlife); part of a larger area of habitat where size or fragmentation may be important for the retention of some species.

Intermediate: Area does not rate as either high or low.

[c] Indicate "yes" if the area attracts wildlife or is likely to do so. Examples: Birds frequently visit the area to feed; evidence of high use b mammals (tracks, scat, etc.); habitat "island" in an industrial area; unusual features of an area that make it important for feeding animals; heavy use during seasonal migrations.

[Area Calculation Aid] [Aerial Photo with Area Designations] [TEE Table 749-1] [Index of Tables]

[Exclusions Main] [TEE Definitions] [Simplified or Site-Specific?] [Simplified Ecological Evaluation] [Site-Specific Ecological Evaluation] [WAC 173-340-7493]

[TEE Home]

Appendix F Table
Simplified TEE Scoresheet
Raplee Property
City of Stanwood
Stanwood, Washington

Line Number	Scoring Parameters	Score	Rationale
1	Estimate the area of contiguous (connected) undeveloped land on the site or within 500 feet of any area of the site to the nearest 1/2 acre (1/4 acre if the area is less than 0.5 acre). From the table below, find the number of points corresponding to the area and enter this number in the field to the right. Area (acres) — Points 0.25 or less — 4 0.5 — 5 1.0 — 6 1.5 — 7 2.0 — 8 2.5 — 9 3.0 — 10 3.5 — 11 4.0 or more — 12	4	The 0.21-acre Property is partially developed and all other land within 500 feet of the site is developed. These areas are unlikely to attract wildlife. The total area of contiguous undeveloped land was conservatively chosen as 0.25 acre or less.
2	Is this an industrial or commercial property? If yes, enter a score of 3. If no, enter a score of 1.	1	The Property is zoned as commercial.
3	Enter a score in the box to the right for the habitat quality of the site, using the following rating system: High=1, Intermediate=2, Low=3.	3	Undeveloped areas of the Property are ruderal vegetation, nonnative species, and grasses. Mature trees/shrubs that would provide some habitat structure are absent.
4	Is the undeveloped land likely to attract wildlife? If yes, enter a score of 1 in the box to the right. If no, enter a score of 2.	1	Habitat quality at the property is low and is surrounded by commercial/residential development. There is some potential for attracting urban wildlife.

Appendix F Table
Simplified TEE Scoresheet
Raplee Property
City of Stanwood
Stanwood, Washington

Line Number	Scoring Parameters	Score	Rationale
5	Are any of the following soil contaminants present: chlorinated dioxins/furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, pentachlorobenzene? If yes, enter a score of 1 in the box to the right. If no, enter a score of 4.	4	None of the listed soil contaminants is present at the Property.
Add the numbers in the boxes on lines 2–5 and enter this number in the box to the right. If this number is larger than the number in the box on line 1, the simplified evaluation may be ended.		9	Simplified evaluation ended. Total score exceeds 4.

NOTES:

Table adapted from Model Toxics Control Act Table 749-1.

PCB = polychlorinated biphenyl.

TEE = terrestrial ecological evaluation.