2020 ANNUAL REPORT

Remedy Implementation
Crownhill Elementary School Site

Prepared for: Bremerton School District

Project No. 100094-007-01 • March 3, 2021

Aspect CONSULTING

earth + water

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1 Introduction

1.1 General

Historical landfill activities at the Bremerton School District (BSD) Crownhill Elementary School site (Site) have resulted in soil and groundwater contamination, including the presence of light nonaqueous-phase liquid (LNAPL) floating on the water table. The Washington State Department of Ecology (Ecology) and BSD entered into two Agreed Orders (AOs) to provide for remedial action at the Site. The first AO (No. DE7916) required BSD to conduct a Remedial Investigation (RI) and Feasibility Study (FS) in accordance with the Washington State Model Toxics Control Act (MTCA) Cleanup Regulation (Washington Administrative Code [WAC] 173-340). Upon completion of those activities in 2014, Ecology selected a cleanup remedy and prepared a Cleanup Action Plan (CAP) for the Site (Ecology, 2014). As documented in the CAP, requirements of the selected remedy include the following:

- Periodic monitoring of groundwater quality and LNAPL layer thickness
- Periodic removal and off-Site recycling/disposal of LNAPL from existing wells
- Periodic inspection and maintenance of the existing cover system to prevent direct contact exposures to landfilled materials and impacted soils
- Running the HVAC system in the main school building continuously during the school day (to address the soil vapor intrusion pathway)
- Periodic subslab soil vapor and/or indoor air sampling to reconfirm that vapor intrusion is not a concern[1]
- Defining requirements for performing invasive work in soil[2]

The second AO (No. DE11107) required BSD to develop Site-specific work plans addressing the above requirements, and to implement the cleanup remedy in accordance with those work plans. The following remedy implementation work plans were prepared by BSD and approved by Ecology in 2015:

- "Groundwater/LNAPL Monitoring and Contingency Plan" (Aspect, 2015a)
- "LNAPL Removal Work Plan" (Aspect, 2015b)
- "Cover System Inspection and Maintenance Plan" (Aspect, 2015c)

[1] Requirements for sampling subslab soil vapor are specified in the Cover System Inspection and Maintenance Plan (Aspect, 2015a). Subslab soil vapor sampling was last conducted in November 2015 and is next required in November 2020. If subslab sampling indicates a potential vapor intrusion concern, then follow-up indoor air sampling may be warranted.

[2] Requirements for performing invasive work in soil are specified in Appendix A of the Cover System Inspection and Maintenance Plan (Aspect, 2015a).

In October 2018, Ecology provided a letter to BSD (Ecology, 2018) stating that *no further remedial action is necessary to clean up contamination at the Site, other than further operation and maintenance of the final remedy (including removal of LNAPL, continuous operation of the HVAC system during school hours, and institutional controls and monitoring), and periodically reviewing conditions at the Site*.

Annual reports documenting remedy implementation activities completed by BSD for the calendar year are submitted to Ecology in January of the following year. Annual reports for 2015 through 2019 (Aspect, 2016 through Aspect, 2020) are referenced in Section 6 of this report. This report documents activities completed in 2020.

1.2 Project Background

Located in Bremerton, Washington, the Site includes both the Crownhill Elementary School (School) property at 1500 Rocky Point Road and the northern portion of the Bremerton United Methodist Church (BUMC) property at 1150 Marine Drive. A Site Plan is provided as Figure 1. The Site was used for sand and gravel mining up to the 1930s, and the mined area was backfilled with municipal and industrial wastes in the 1930s and 1940s. The original school building was constructed in 1956, and partially burned down in 1993. A series of environmental investigations were conducted during the period between that fire and construction of the current school building, which was completed in 1996. Additional investigations were conducted beginning in 2009, culminating in preparation of the "Remedial Investigation Report" (Aspect, 2014a; herein referred to as the RI report).

The purpose of the RI was to collect data necessary to adequately characterize the nature and extent of Site contamination. Using multiple lines of evidence (e.g., historical photographs, Site assessment activity, construction observations), the RI identified two generalized areas of landfill accumulation, designated the 'north' and 'south' landfill areas. Figure 1 shows the interpreted boundaries of these two areas. Landfilled materials were found at up to 40-foot depth in the north landfill area, and at up to 20-foot depth in the south landfill area. Extensive sampling identified the following constituents of potential concern (COPCs) in Site soils:

- Total petroleum hydrocarbon (TPH) in the diesel and motor-oil ranges
- Trichloroethene (TCE)
- Carcinogenic polycyclic aromatic hydrocarbons (cPAHs)
- The metals/metalloids antimony, arsenic, chromium III, copper, lead, and zinc

Three monitoring wells (MW-1 through MW-3) were installed at the Site in December 1994/January 1995, and another 13 wells (MW-4 through MW-16) during the RI (between March 2011 and October 2012; refer to Figure 1 for well locations). This network of 2-inch-diameter wells was used to periodically monitor groundwater, which is encountered beneath the Site at roughly 110-foot depth, for a wide range of contaminants. Monitoring identified TPH in the diesel and motor oil ranges, TCE, arsenic, and lead as COPCs dissolved in groundwater in the northern portion of the Site.

In addition to dissolved contaminants, separate-phase oil was observed floating on the groundwater table (as LNAPL) in well MW-8, which is installed in the north landfill

area. The primary reason for installing the last five RI monitoring wells (MW-12 through MW-16) was to investigate the areal extent and thickness of the LNAPL accumulation. LNAPL was observed in three of these wells (MW-13, MW-14, and MW-16), and periodic removal of LNAPL via bailing began in November 2012. At the recommendation of Ecology, a 4-inch-diameter well designed specifically for LNAPL extraction (EW-17) was installed in October 2015.

Site cleanup alternatives were developed and comparatively evaluated with respect to MTCA-specified criteria in the "Feasibility Study" report (FS; Aspect, 2014b). Based on the information provided in the RI report and on the FS evaluation, the CAP (Ecology, 2014) then established Site-specific cleanup levels for constituents of concern (COCs) in Site soil, groundwater, and air, and selected a cleanup remedy for implementation. Figure 1 shows the estimated TPH, TCE, and arsenic plumes[3] (i.e., areas where concentrations in groundwater exceed the respective groundwater cleanup levels) as depicted in the CAP. Refer to the CAP for a full description of the selected cleanup remedy for the Site.

2 Routine Activities Completed in 2020

This section documents routine cleanup-related activities completed by BSD during the 2020 calendar year. Periodic monitoring of groundwater and LNAPL thickness is documented in Section 2.1, LNAPL removal in Section 2.2, and Site inspections in Section 2.3.

2.1 Periodic Monitoring Activities

2.1.1 Groundwater Monitoring

Semiannual groundwater monitoring was conducted on April 10 and October 15 and 19, 2020, in general accordance with the requirements of the Groundwater/LNAPL Monitoring and Contingency Plan. Well locations are shown on Figure 1. Table 1 identifies which Site wells are included in the monitoring program, which of those wells contain LNAPL, and the specific COCs analyzed in groundwater samples collected from the wells that do not contain LNAPL. Monitoring results for the non-LNAPL wells are summarized in Table 2. Recent results (going back to December 2013) are included in Table 2; refer to the RI report for results prior to December 2013 and for information on Site wells not included in the monitoring program. Laboratory reports for groundwater samples submitted for analysis in April and October 2020, are provided in Appendix D.

Groundwater cleanup levels are 500 micrograms per liter (µg/L) for diesel- and motor oil-range TPH, and 5 µg/L for TCE and total arsenic. Well MW-10 is the conditional point of compliance for achieving these cleanup levels. This well has been sampled on 23 occasions through October 2020, and arsenic is the only COC detected in any of those sampling rounds. Well MW-6, the only well with arsenic cleanup level exceedances since

[3] Lead is also a COC in groundwater. However, as discussed in the *Groundwater/LNAPL Monitoring and Contingency Plan* (Aspect, 2015a), compliance with the groundwater cleanup level for lead has been demonstrated. Therefore, lead is not included in the groundwater monitoring program.

early 2012,1F,4 is located approximately 130 feet upgradient of MW-10 and serves as a sentinel well for dissolved contaminant plume migration. The Groundwater/LNAPL Monitoring and Contingency Plan specifies contingency actions that will be taken if arsenic is detected above 40 µg/L at MW-6 or above 4.5 µg/L at MW-10. Neither of these concentration limits was exceeded in 2020.

Figure 2 shows arsenic concentrations measured at MW-6 and MW-10 since those wells were installed. Concentrations at MW-6 exhibited an increasing trend through the April 2016 monitoring round. More recent results have fluctuated widely, but the increasing trend has resumed since April 2019. The April 2020 result (35.3 µg/L) was the highest concentration measured to date. The cause(s) of arsenic concentration fluctuation at MW-6 is unknown.

The arsenic concentrations measured at MW-10 in 2020 are slightly higher than the 2019 measurements, but remain well below the contingency action trigger level of 4.5 µg/L.

MW-9 is the only well with TCE cleanup level exceedances. TCE concentrations measured at this well decreased marginally from 2019 to 2020 and remain within the range of previous measurements.

MW-15 is located immediately downgradient of the LNAPL area and serves as a sentinel well for TPH plume migration.25 Diesel-range TPH was detected at this well in the April 2020 monitoring round at a concentration of 64 µg/L, however groundwater levels in October 2020 were below the pump intake and a sample could not be collected. The April 2020 round marks the fourth time diesel-range TPH has been detected at MW-15; the previous detections were in November 2012 (at an estimated 70 µg/L), April 2018 (at 53 µg/L), and April 2019 (at 61 µg/L). Consistent with previous years, motor oil-range TPH was not detected at MW-15 in 2020.

Beginning in 2015, TPH in the diesel and motor oil ranges has been measured on just an annual basis at wells MW-5 and MW-12. The motor-oil-range TPH concentration measured at MW-12 in October 2020 (1,400 µg/L) is the highest to date. The other TPH results are within the range of previous detections. Diesel- and motor oil-range TPH concentrations at both wells remain above the corresponding groundwater cleanup levels.

Water samples collected from the McKinney domestic well (sampled in both 2020 monitoring rounds) are analyzed for TCE only. As shown in Table 2, TCE has never been detected in any of the water samples collected from the McKinney well.

2.1.2 LNAPL Thickness Monitoring

LNAPL thickness monitoring was conducted concurrent with groundwater monitoring in April and October 2020. Consistent with previous monitoring rounds, LNAPL was detected in five wells (MW-8, MW-13, MW-14, MW-16, and EW-17). Table 3 summarizes LNAPL thicknesses measured in these wells since they were installed.

[4] As shown on Figure 2, the arsenic cleanup level was also exceeded at MW-10 the first two times it was sampled following its installation in December 2011. Arsenic at MW-10 has been consistently below its cleanup level in the last 17 monitoring rounds.

[5] Well MW-15 is also the conditional point of compliance for LNAPL migration.

Thicknesses measured in 2020 ranged from 0.15 feet in MW-14 to 3.0 feet in MW-13 (April measurements).

2.1.3 Soil Vapor Monitoring

Soil vapor monitoring was conducted on November 20, 2020, in general accordance with the requirements of the July 2010 "Soil Vapor Intrusion Assessment Work Plan" (Aspect, 2010) which is included as Appendix B of the Cover System Inspection and Maintenance Plan. The purpose of soil vapor monitoring is to evaluate whether the potential exists for the school's indoor air to be unacceptably impacted by vapor intrusion (VI). This represents the fourth round of subslab vapor sampling using six permanent sampling points (SSV-1 through SSV-6) installed in the floor slab of the main school building at the locations shown on Figure 4. Previous rounds were conducted in August and November 2010, and November 2015 as documented in the Soil Vapor Intrusion Assessment Work Plan and "2015 Annual Report" (Aspect, 2016).

Results for all three subslab soil vapor sampling events completed to date are summarized in Table 5. PCOC detections are bolded. None of the detections exceed the corresponding screening level. In addition, all laboratory reporting limits for PCOCs that were not detected are also below the corresponding screening levels.

Table 4 lists the 16 compounds (15 volatile organic compounds [VOCs] and hydrogen sulfide) that were identified in 2010 as potential compounds of concern (PCOCs) in soil vapor at the Site. Laboratory-supplied evacuated 1-liter Summa canisters were used to collect 5-minute time-integrated samples for analysis of VOCs, and samples for hydrogen sulfide analysis were collected in 1-liter Tedlar® bags. The School's HVAC system is always operated during the school day (a CAP requirement) and was operated during the sampling period. The filled canisters and Tedlar® bags were delivered to Friedman & Bruya, Inc., in Seattle, for analysis of the PCOCs using EPA Method TO-15. The laboratory report is provided as Appendix D.

Sampling and leak testing were conducted in accordance with the *SOP for Installing and Sampling Permanent Subslab Soil Vapor Monitoring Points (November 2015 Revision)*, which is provided in Appendix C of the Cover System Inspection and Maintenance Plan. The SSV-6 Tedlar® bag sample collected on November 20, 2020 was analyzed for helium (He), as well as hydrogen sulfide, and helium was detected in the SSV-6 sample at a concentration of 14 percent He. This indicated a failure in the vapor point seal and the sampling was repeated on January 27, 2021. Prior to this sampling, Aspect performed repairs to the vapor point seals. Each sample was analyzed for helium, which was not detected in any subslab vapor sample, having a reporting limit of 0.6 percent He. This indicates that cross-contamination from indoor air is negligible. Refer to Appendices B and C of the Cover System Inspection and Maintenance Plan for additional detail regarding sampling methodology and leak testing. Weather conditions for the January 2021 resampling event is presented in Appendix E.

MTCA Method B air cleanup levels (for both carcinogens and non-carcinogens) and subslab screening levels for the PCOCs are listed in Table 4. Sampling results were compared against "current" subslab screening levels as described in the CLARC Master

Table[6] for Subslab Soil Gas, if possible, or were obtained by dividing the most stringent current Method B cleanup levels for Air by 0.03 to conservatively account for soil vapor attenuation across the floor slab in accordance with Ecology guidance. Table 4 also lists the subslab screening levels that sampling results were compared against in 2015. At that time, Ecology guidance specified that a cross-slab attenuation factor of 0.03 be used to calculate screening levels, rather than listing them explicitly, so many screening levels have changed slightly.

As documented in the Soil Vapor Intrusion Assessment Work Plan, the HVAC system was not operated during the August 2010 sampling round, and several screening level exceedances were detected in that round (chloroform at SSV-5 and hydrogen sulfide at SSV-1 and SSV-6).[7] Based on current screening levels; however, none of the three sampling rounds completed to date has indicated a potential for the school's indoor air to be unacceptably impacted by VI.

The next subslab soil vapor sampling round is scheduled for late 2025.

2.2 LNAPL Removal

Bottom-filling bailers are used to periodically remove LNAPL from Site wells. LNAPL removal is attempted whenever an LNAPL layer thickness of at least 0.3 foot is measured in a well (prior to bailing). In 2020, LNAPL removal was conducted concurrent with the two LNAPL thickness/groundwater monitoring rounds discussed above, in general accordance with the requirements of the LNAPL Removal Work Plan. Bailing was attempted from all five LNAPL-containing wells (MW-8, MW-13, MW-14, MW-16, and EW-17) in both the April and October rounds. Table 3 shows estimated LNAPL volumes bailed from each well during each removal event, and Figure 3 plots cumulative LNAPL removal on an annual basis. An estimated total of 2.3 liters of LNAPL was bailed in 2020. Since bailing began in 2012, an estimated total of nearly 26 liters of LNAPL have been removed.

2.3 Site Inspections

Semiannual Site inspections were conducted on June 11 and December 16, 2020, in accordance with the requirements of the Cover System Inspection and Maintenance Plan. The completed inspection records are provided in Appendices A and B, along with photos taken during the inspections. The photos were taken from four specific vantage points, identified on Figure 1, to provide photo-documentation of the following cover features:

- **Photo Location 1 –** Pavement in the parking area along Bertha Avenue NW, where an RI soil sample collected from beneath the pavement (composite sample to 3-foot depth) contained lead at a concentration exceeding the cleanup level.
- **Photo Locations 2 and 4 –** Soil/sod covers next to the portable classroom building and in the southeast corner of the School property, where lead cleanup

[6] Cleanup Levels and Risk Calculation (CLARC) Master Table was updated in August 2020.

[7] As a result, the CAP includes a requirement that the HVAC system be operated continuously during the school day.

level exceedances were identified in soil samples collected from the 1- to 3-foot depth range. In summer 2013, these two areas were covered with a geotextile fabric (placed directly on the undisturbed ground surface) and an additional 1-foot thickness of fill soil was imported and hydroseeded to supplement the pre-existing clean soil cover layer.

- **Photo Location 3 –** A soil/sod cover in the northwest corner of the BUMC property (and extending approximately 10 feet onto the School property), where an interim action was completed in spring 2012 in which contaminated surface soils were removed to a 1-foot depth, a geotextile fabric was placed on remaining contaminated soils, and a 1-foot thickness of fill soil was imported and hydroseeded.

In July 2018, asphalt repairs were completed at three locations in the Bertha Ave NW parking area (Photo Location 1) after potholes were observed (documented in Aspect, 2019). The parking area appeared to be in excellent condition and the soil/sod cover at Photo Locations 2 through 4 appeared to be in good condition during both 2020 inspection events. The 2020 inspections did not identify any cover system deficiencies in other areas of the Site or other action items.

3 Nonroutine Activities Completed in 2020

3.1 Perimeter Fence

In August 2020, a chain link fence was constructed around the perimeter of the Site. In places where the fence line intersects with the area restricted under the Environmental Covenant, the footings were designed to penetrate the ground less than 1 foot. Under these conditions, BSD were not required to apply to Ecology for project approval under the terms of the Environmental Covenant. However, prior to construction, Aspect notified Ecology regarding the fence construction plans to provide an opportunity to raise concerns and provide feedback. The Environmental Covenant Area with fence line are presented on Figure 5.

4 Statement of Compliance

On behalf of BSD, Aspect certifies that the remedy implementation activities completed at the Site in 2020 complied with the requirements of the CAP, Agreed Order No. DE11107, and the remedy implementation work plans approved by Ecology.

5 Plans for 2021

The following remedy implementation activities are planned for 2020:

- Conduct semiannual rounds of groundwater/LNAPL monitoring and LNAPL removal (scheduled for April and October 2020)[8]
- Conduct semiannual Site inspections (scheduled for June and December 2020)
- Conduct subslab soil vapor sampling (scheduled for November 2020)

Other activities, as specified in the remedy implementation work plans, may also be required based on monitoring and/or inspection results.

6 References

Aspect Consulting, LLC (Aspect), 2010, Soil Vapor Intrusion Assessment, November 2010 Sub-Slab Sampling, Crownhill Elementary School, prepared for Bremerton School District, dated December 22, 2010.

Aspect Consulting, LLC (Aspect), 2014a, Remedial Investigation, Crownhill Elementary School, prepared for Bremerton School District, November 2014.

Aspect Consulting, LLC (Aspect), 2014b, Feasibility Study, Crownhill Elementary School, prepared for Bremerton School District, October 21, 2014.

Aspect Consulting, LLC (Aspect), 2015a, Groundwater/LNAPL Monitoring and Contingency Plan, Crownhill Elementary School Site, prepared for Bremerton School District, November 19, 2015.

Aspect Consulting, LLC (Aspect), 2015b, LNAPL Removal Work Plan, Crownhill Elementary School Site, prepared for Bremerton School District, November 19, 2015.

Aspect Consulting, LLC (Aspect), 2015c, Cover System Inspection and Maintenance Plan, Crownhill Elementary School Site, prepared for Bremerton School District, December 17, 2015.

Aspect Consulting, LLC (Aspect), 2016, 2015 Annual Report, Remedy Implementation, Crownhill Elementary School Site, prepared for Bremerton School District, January 14, 2016.

Aspect Consulting, LLC (Aspect), 2017, 2016 Annual Report, Remedy Implementation, Crownhill Elementary School Site, prepared for Bremerton School District, January 9, 2017.

[8] If an LNAPL thickness greater than 4 feet is measured in the April monitoring round, an LNAPL removal round will also be required in July 2020.

Aspect Consulting, LLC (Aspect), 2018, 2017 Annual Report, Remedy Implementation, Crownhill Elementary School Site, prepared for Bremerton School District, January 29, 2018.

Aspect Consulting, LLC (Aspect), 2019, 2018 Annual Report, Remedy Implementation, Crownhill Elementary School Site, prepared for Bremerton School District, January 22, 2019.

Aspect Consulting, LLC (Aspect), 2020, 2019 Annual Report, Remedy Implementation, Crownhill Elementary School Site, prepared for Bremerton School District, January 14, 2019.

Washington State Department of Ecology (Ecology), 2014, Cleanup Action Plan, Bremerton School District, Crownhill Elementary School Site, December 10, 2014.

Washington State Department of Ecology (Ecology), 2018, Letter to D. Herrington, Bremerton School District, regarding Status of Agreed Order No. DE11107 and No Further Action to complete Cleanup of the Crownhill Elementary School Site, October 15, 2018.

7 Limitations

Work for this project was performed for the Bremerton School District (Client), and this report was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

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Please refer to Appendix F titled "Report Limitations and Guidelines for Use" for additional information governing the use of this report.

TABLES

Table 1. 2020 Well Monitoring Program Summary

Project No. 100094-006-01, Crownhill Elementary, Bremerton, Washington

Well Included in Monitoring Program[1]	LNAPL Present in Well[2]	Groundwater Samples Collected for Analysis of COCs[1]			Additional Notes
		TPH[3]	Total Arsenic[4]	TCE[5]	
MW-5		spring			
MW-6			spring/fall		6
MW-8	X				
MW-9				spring/fall	
MW-10		spring/fall	spring/fall	spring/fall	7
MW-12		fall			
MW-13	X				
MW-14	X				
MW-15		spring/fall			8
MW-16	X				
EW-17	X				
McKinney				spring/fall	9

COC constituent of concern
LNAPL light non-aqueous-phase liquid
TCE trichloroethene
TPH total petroleum hydrocarbon

Notes

1) The *Groundwater/LNAPL Monitoring and Contingency Plan* (Aspect, 2015a) provides the rationale for including a well in the monitoring program, and for selecting well-specific COC analytes. Refer to Table 2 for groundwater monitoring results.

2) All wells except McKinney are monitored for LNAPL. If LNAPL is detected, its thickness is measured (refer to Table 3) and groundwater samples are not collected for analysis.

3) TPH is analyzed for using Method NWTPH-Dx. Both diesel-range TPH and motor-oil-range TPH are COCs.

4) Total arsenic is analyzed for using EPA Method 6010.

5) TCE is analyzed for using EPA Method 8260.

6) Well MW-6 provides early warning of potential arsenic migration.

7) Well MW-10 is the conditional point of compliance for achieving groundwater cleanup levels.

8) Well MW-15 is the conditional point of compliance for LNAPL migration.

9) The McKinney domestic well water sample is collected from the outdoor faucet on the north side of the residence at 1724 Dora Ave NW.

Table 2. Groundwater Monitoring Data Summary

Project No. 100094-006-01, Crownhill Elementary, Bremerton, Washington

Well ID and Top-of-Casing Elevation[1,2]	Date	Depth to Water (feet below top-of-casing)	Groundwater Elevation (feet)[2]	Constituent of Concern/Concentration[3]			
				Diesel-Range TPH	Motor-Oil-Range TPH	TCE	Total Arsenic
MW-5 136.95 ft	12/18/13	117.36	19.59	**2,100 x**	**750 x**	1.8	1.0
	04/03/14	117.17	19.78	**2,400 x**	**770 x**	na	1.2
	07/01/14	116.23	20.72	**2,000 x**	490 x	na	1.0
	10/13/14	117.56	19.39	**1,300**	260 x	na	1.0
	04/07/15	116.49	20.46	**2,000**	430 x	na	na
	04/05/16	113.41	23.54	**1,800**	**600 x**	na	na
	04/04/17	112.13	24.82	**2,200 x**	**750 x**	na	na
	04/05/18	113.16	23.79	**2,600 x**	**1,100 x**	na	na
	04/04/19	116.24	20.71	**1,600 x**	**520 x**	na	na
	04/10/20	117.97	18.98	**2,400 x**	**660 x**	na	na
MW-6 133.87 ft	12/18/13	124.36	9.51	50 U	250 U	1.0 U	**16.6**
	04/03/14	124.70	9.17	50 U	250 U	na	**20.5**
	07/01/14	124.40	9.47	50 U	250 U	na	**19.9**
	10/13/14	124.54	9.33	50 U	250 U	na	**20.4**
	04/07/15	124.61	9.26	na	na	na	**26.7**
	10/28/15	124.84	9.03	na	na	na	**22.8**
	04/05/16	124.54	9.33	na	na	na	**29.1**
	10/28/16	123.70	10.17	na	na	na	**23.3**
	04/04/17	123.21	10.66	na	na	na	**12.5**
	10/27/17	122.79	11.08	na	na	na	**29.3**
	04/05/18	123.31	10.56	na	na	na	**29.7**
	10/26/18	123.71	10.16	na	na	na	**23.0**
	04/04/19	124.14	9.73	na	na	na	**19.4**
	10/14/19	124.77	9.10	na	na	na	**21.9**
	04/10/20	125.10	8.77	na	na	na	**28.5**
	10/15/20	125.45	8.42	na	na	na	**35.3**
MW-9 134.39 ft	12/17/13	114.49	19.90	110 x	250 U	**11**	1.0 U
	04/03/14	114.35	20.04	210 x	280 x	**11**	1.0 U
	07/01/14	113.44	20.95	180 x	250 U	**12**	1.0 U
	10/13/14	114.71	19.68	180 x	250 U	**10**	1.0 U
	04/07/15	114.50	19.89	na	na	**11**	na
	10/28/15	115.30	19.09	na	na	**10**	na
	04/05/16	110.60	23.79	na	na	**11**	na
	10/28/16	112.35	22.04	na	na	**8.6**	na
	04/04/17	109.23	25.16	na	na	**9.5**	na
	10/27/17	110.58	23.81	na	na	**6.8**	na
	05/02/18	110.35	24.04	na	na	**7.1**	na
	10/26/18	112.98	21.41	na	na	**7.9**	na
	04/04/19	113.39	21.00	na	na	**9.7**	na
	10/14/19	nm[4]	--	na	na	**8.0**	na
	04/10/20	nm[4]	--	na	na	**7.1**	na
	10/15/20	nm[4]	--	na	na	**5.0**	na
MW-10 132.33 ft	12/18/13	120.87	11.46	50 U	250 U	1.0 U	3.3
	04/03/14	121.21	11.12	50 U	250 U	1.0 U	3.9
	07/01/14	120.55	11.78	50 U	250 U	1.0 U	3.0
	10/13/14	121.48	10.85	50 U	250 U	1.0 U	3.0
	04/07/15	120.60	11.73	50 U	250 U	1.0 U	2.8
	10/28/15	121.30	11.03	80 U	400 U	1.0 U	2.7
	04/05/16	119.33	13.00	50 U	250 U	1.0 U	2.6
	10/28/16	120.35	11.98	50 U	250 U	1.0 U	2.6
	04/04/17	118.58	13.75	50 U	250 U	1.0 U	2.2
	10/27/17	119.30	13.03	50 U	250 U	1.0 U	2.1
	04/05/18	122.04	10.29	50 U	250 U	1.0 U	1.9
	10/26/18	120.62	11.71	50 U	250 U	1.0 U	1.8
	04/04/19	120.85	11.48	50 U	250 U	1.0 U	2.0
	10/14/19	121.79	10.54	50 U	250 U	1.0 U	2.1
	04/10/20	121.68	10.65	50 U	250 U	1.0 U	2.0
	10/15/20	121.66	10.67	50 U	250 U	1.0 U	2.4
MW-12 133.87 ft	12/17/13	114.24	19.63	**2,000 x**	**800 x**	1.0 U	1.5
	04/03/14	114.11	19.76	**2,800 x**	**850 x**	na	1.4
	07/01/14	113.17	20.70	**1,800 x**	420 x	na	1.7
	10/13/14	114.45	19.42	**1,600**	250 U	na	1.7
	10/28/15	115.02	18.85	**2,400 x**	**620 x**	na	na
	10/28/16	112.19	21.68	**1,500 x**	**680 x**	na	na
	10/27/17	110.40	23.47	**1,700 x**	**570 x**	na	na
	10/26/18	112.76	21.11	**2,200 x**	**510 x**	na	na
	10/14/19	115.37	18.50	**1,900 x**	**1,200 x**	na	na
	10/15/20	116.54	17.33	**1,600 x**	**1,400 x**	na	na
MW-15 133.37 ft	12/17/13	nm[4]	--	50 U	250 U	1.0 U	4.6
	04/03/14	nm[4]	--	50 U	250 U	na	1.2
	07/01/14	nm[4]	--	50 U	250 U	na	1.0 U
	10/13/14	nm[4]	--	50 U	250 U	na	1.1
	04/07/15	nm[4]	--	50 U	250 U	na	na
	10/28/15	nm[4]	--	50 U	250 U	na	na
	04/05/16	109.88	23.49	50 U	250 U	na	na
	10/28/16	111.65	21.72	50 U	250 U	na	na
	04/04/17	109.61	23.76	50 U	250 U	na	na
	10/27/17	109.90	23.47	50 U	250 U	na	na
	04/05/18	109.65	23.72	53 x	250 U	na	na
	10/26/18	nm[4]	--	60 U	300 U	na	na
	04/04/19	nm[4]	--	61 x	250 U	na	na
	10/14/19	nm[4]	--	50 U	250 U	na	na
	04/10/20	nm[4]	--	64 x	260 U	na	na
	10/15/20	nm[4]	--	nm[6]	nm[6]	nm[6]	nm[6]
McKinney (domestic well)	10/6/14[5]	nm	--	100 U	200 U	0.2 U	0.4
	2/19/15[5]	nm	--	100 U	200 U	0.2 U	0.4
	6/1/2015[5]	nm	--	100 U	200 U	0.2 U	0.3
	10/28/15	nm	--	na	na	1.0 U	na
	04/05/16	nm	--	na	na	1.0 U	na
	10/28/16	nm	--	na	na	1.0 U	na
	04/04/17	nm	--	na	na	1.0 U	na
	10/27/17	nm	--	na	na	1.0 U	na
	04/04/18	nm	--	na	na	1.0 U	na
	10/26/18	nm	--	na	na	1.0 U	na
	04/04/19	nm	--	na	na	1.0 U	na
	10/14/19	nm	--	na	na	1.0 U	na
	04/10/20	nm	--	na	na	1.0 U	na
	10/15/20	nm	--	na	na	1.0 U	na

na not analyzed
nm not measured
TCE trichloroethene
TPH total petroleum hydrocarbon
U analyte not detected at or above the reported result
x sample chromatographic pattern does not resemble the fuel standard used for quantitation

Notes

1) Only wells included in the current monitoring program that do not contain LNAPL are shown in this table. Refer to Table 3 for wells containing LNAPL. Refer to the *Remedial Investigation Report* (Aspect, 2014a) for data prior to December 2013 and for information on other wells.

2) Elevations are based on NAVD88 vertical datum.

3) All concentrations are in micrograms per liter (µg/L). Cleanup levels are 500 µg/L for diesel- and motor-oil-range TPH, and 5 µg/L for TCE and total arsenic. Cleanup level exceedances are bolded.

4) Water level was below top of pump and could not be measured.

5) Sample was collected for analysis by the Kitsap Public Health District and analyzed by Analytical Resources, Inc.

6) Water level was below pump intake and sample could not be collected.

Table 3. LNAPL Thickness Measurements and Removal Summary

Project No. 100094-006-01, Crownhill Elementary, Bremerton, Washington

Well ID	Date	Initial Thickness in ft[1]	LNAPL Removal in Liters[2]	Notes
MW-8	10/26/12	0.20		Well installed on 12/20/11.
	11/21/12	nm		
	01/31/13	0.10		
	05/03/13	0.03		
	08/07/13	0.23		
	12/17/13	0.86		
	04/02/14	0.39	0.18	(Note 5)
	05/23/14	0.38	0.11	(Note 4)
	07/01/14	0.23		
	10/13/14	0.28		
	04/07/15	0.27		Not bailed because initial thickness was <0.3 feet.
	10/28/15	0.90	0.36	(Note 4)
	01/18/16	0.10		Not bailed because initial thickness was <0.3 feet.
	04/05/16	0.01		Not bailed because initial thickness was <0.3 feet.
	10/28/16	0.40	0.01	(Note 4)
	04/04/17	0.13		Not bailed because initial thickness was <0.3 feet.
	10/27/17	0.15		Not bailed because initial thickness was <0.3 feet.
	04/03/18	(Note 6)	0.02	(Note 4)
	10/26/18	1.70	0.75	(Note 4)
	04/04/19	0.40	0.23	(Note 4)
	10/14/19	1.15	0.18	(Note 4)
	04/10/20	0.95	0.38	(Note 4)
	10/15/20	1.08	0.16	(Note 4)
Cumulative LNAPL Removal			2.38	
MW-13	11/01/12	1.46		Well installed on 10/25/12.
	11/21/12	0.99	0.90	(Note 4)
	01/31/13	0.10		
	05/03/13	0.31		
	08/07/13	0.49		
	12/17/13	4.90		
	04/02/14	1.35	0.02	Water detected above LNAPL. (Note 4)
	05/23/14	2.08	0.18	Water detected above LNAPL. (Note 4)
	07/01/14	0.84		
	10/13/14	3.39		
	04/07/15	1.00	0.17	(Note 4)
	10/28/15	4.15	0.02	(Note 4)
	01/18/16	1.39	0.52	(Note 4)
	04/05/16	1.31	0.26	(Note 4)
	10/28/16	0.05		Not bailed because initial thickness was <0.3 feet.
	04/04/17	0.20		Not bailed because initial thickness was <0.3 feet.
	10/27/17	0.04		Not bailed because initial thickness was <0.3 feet.
	04/03/18	1.70	0.35	(Note 4)
	10/26/18	2.00	1.05	(Note 4)
	04/04/19	1.70	0.22	(Note 4)
	10/14/19	1.10	0.10	(Note 4)
	04/10/20	2.95	0.13	(Note 4)
	10/15/20	1.22	0.38	(Note 4)
Cumulative LNAPL Removal			4.29	
MW-14	11/01/12	nd		Well installed on 10/26/12.
	01/31/13	nd		
	05/03/13	nd		
	08/07/13	0.12		
	12/17/13	0.10		
	04/02/14	0.08		Not bailed because initial thickness was <0.1 feet.
	05/23/14	0.09		Not bailed because initial thickness was <0.1 feet.
	07/01/14	0.46		
	10/13/14	0.71		
	04/07/15	0.23		Not bailed because initial thickness was <0.3 feet.
	10/28/15	1.48	0.35	(Note 4)
	01/18/16	0.32	0.20	(Note 4)
	04/05/16	0.01		Not bailed because initial thickness was <0.3 feet.
	10/28/16	0.37	0.03	(Note 5)
	04/04/17	0.77	0.32	(Note 4)
	10/27/17	0.60	0.64	(Note 5)
	04/03/18	0.70	0.06	(Note 5)
	10/26/18	2.40	1.65	(Note 5)
	04/04/19	1.20	0.71	(Note 4)
	10/14/19	2.90	0.27	(Note 4)
	04/10/20	0.15		Not bailed because initial thickness was <0.3 feet.
	10/15/20	0.45	0.24	
Cumulative LNAPL Removal			4.46	
MW-16	11/01/12	nd		Well installed on 10/26/12.
	01/31/13	0.50		
	05/03/13	0.48		
	08/07/13	2.61		
	12/17/13	2.83		
	04/02/14	3.02	0.85	(Note 5)
	05/23/14	4.25	2.06	(Note 5)
	07/01/14	3.79		
	10/13/14	3.25		
	04/07/15	2.64	1.19	(Note 5)
	10/28/15	2.18	0.35	(Note 4)
	01/18/16	0.45	0.17	Bailing was stopped after measuring <0.01 foot LNAPL thickness.
	04/05/16	0.39	0.00	Four bailing attempts recovered only a trace of LNAPL.
	10/28/16	0.87	0.10	Third bailing attempt recovered only 20 ml of LNAPL.
	04/04/17	0.24		Not bailed because initial thickness was <0.3 feet.
	10/27/17	2.15	1.35	(Note 4)
	04/03/18	(Note 6)	0.30	(Note 4)
	10/26/18	3.25	1.55	(Note 5)
	04/04/19	2.30	0.27	(Note 4)
	10/14/19	1.10	0.15	(Note 4)
	04/10/20	2.30	0.16	(Note 4)
	10/15/20	2.46	0.40	(Note 4)
Cumulative LNAPL Removal			8.90	
EW-17	10/28/15	0.45	0.03	Well installed on 10/13/15.
	01/18/16	0.40	0.21	LNAPL observed to be much more viscous (sludge-like) than in other wells. (Note 4)
	04/05/16	0.44	1.66	LNAPL appears to be less viscous than in previous rounds. (Note 4)
	10/28/16	0.47	0.11	Fourth bailing attempt recovered only 5 ml of LNAPL.
	04/04/17	1.95	0.52	Initial thickness measurements ranged from 0.23 to 3.45 ft. (Note 4)
	10/27/17	0.85	0.12	(Note 4)
	04/03/18	(Note 6)	0.60	(Note 4)
	10/26/18	1.90	1.11	(Note 5)
	04/04/19	3.00	0.18	(Note 4)
	10/14/19	1.30	0.14	(Note 4)
	04/10/20	0.40	0.13	(Note 4)
	10/15/20	0.60	0.32	(Note 4)
Cumulative LNAPL Removal			5.12	
TOTAL LNAPL REMOVED			**25.1**	**(ALL WELLS)**

LNAPL light non-aqueous-phase liquid nd no detectable LNAPL thickness nm not measured

Notes:

1) The viscous, sticky nature of the LNAPL results in inconsistent readings of the interface probe (used to measure depth-to-LNAPL and depth-to-water). Therefore, the reported LNAPL thicknesses can only be regarded as estimates.
2) Water has been observed to separate out from LNAPL samples over a period of months. Therefore, actual volumes of non-aqueous-phase liquid removed from the subsurface are likely less than the LNAPL volumes reported in this table.
3) Well EW-17 (4-inch ID) has a unit volume of approximately 2.5 liters per vertical foot of well casing. All other wells are 2-inch ID and have unit volumes of approximately 0.62 liter per vertical foot of well casing.
4) Bailing was stopped after bailer retrieved a relatively large volume of water with little or no LNAPL.
5) Bailing was stopped because bailer would no longer go down well due to LNAPL buildup on inside well casing.
6) Unable to determine initial thickness of LNAPL. Bailing was attempted.

Table 4. Cleanup Levels and Screening Levels for Vapor-Phase PCOCs

Project No. 100094-003-03, Crownhill Elementary School, Bremerton, Washington

Potential Compound of Concern (PCOC)	Current (August 2020) MTCA Method B Sub-Slab Soil Gas Screening Levels[2]		November 2015 Sub-Slab Screening Level[3]
	Non-Carcinogen	Carcinogen	
Freon 12	1500	--	1,520
Vinyl chloride	1500	9.50	9.33
1,1-Dichloroethene	3000	--	3,050
trans-1,2-Dichloroethene[5]	--	--	--
1,1-Dichloroethane	--	52	52
cis-1,2-Dichloroethene[5]	--	--	--
Chloroform	1500	3.6	3.63
Benzene	460	11	10.7
1,2-Dichloroethane	110	3.2	3.21
Trichloroethene (TCE)	30	11	12.3
Tetrachloroethene (PCE)	610	320	321
Ethylbenzene	15,000	--	15,200
Xylenes (total)	1500	--	1,520
1,2,4-Trimethylbenzene	910	--	107
Naphthalene	46.0	2.5	2.45
Hydrogen sulfide[4]	30.3	--	30.5

Notes

1) All concentrations are in units of micrograms per cubic meter (ug/m^3).

2) Current (August 2020) MTCA Method B sub-slab soil gas screening levels were obtained from the CLARC Master Table on 01/15/21.

3) When sub-slab sampling was conducted in November 2015, results were compared to the sub-slab screening levels in this column.

4) Current (August 2020) sub-slab screening levels for hydrogen sulfide were obtained by dividing the most stringent MTCA Method B air cleanup level (0.91 ug/m^3) by 0.03, to conservatively account for soil vapor attenuation across the floor slab in accordance with Ecology guidance.

5) Chemical has been removed from Ecology's vapor intrusion (VI) list because toxicity values are no longer available in CLARC.

Table 5. Summary of Sub-Slab Vapor Sampling Results

Project No. 100094-003-03, Crownhill Elementary School, Bremerton, Washington

Potential Compound of Concern (PCOC)	Current Screening Level (3)	Sub-Slab Vapor Sampling Location[2]																			
		SSV-1								SSV-2								SSV-3			
		8/19/2010		11/17/2010		11/11/2015		1/27/2021		8/19/2010		11/17/2010		11/11/2015		1/27/2021		8/19/2010		11/17/2010		11/11/2015		1/27/2021	
Freon 12	1500	**2.8**		**0.71**		**3.5**		**2.6**		**3**		**0.58**		**3.6**		**2.9**		**2.4**		**0.47**		**3.5**		**2.2**	
Vinyl Chloride	9.5	0.42	U	0.47	U	0.51	U	0.89	U	0.4	U	0.46	U	0.51	U	0.87	U	0.39	U	0.47	U	0.51	U	0.82	U
1,1-Dichloroethene	3000	0.65	U	0.72	U	0.79	U	1.4	U	0.61	U	0.71	U	0.79	U	1.3	U	0.6	U	0.72	U	0.79	U	1.3	U
trans-1,2-Dichloroethene	--	0.65	U	0.72	U	0.79	U	1.4	U	0.61	U	0.71	U	0.79	U	1.3	U	0.6	U	0.72	U	0.79	U	1.3	U
1,1-Dichloroethane	52	0.66	U	0.74	U	0.81	U	1.4	U	0.63	U	0.72	U	0.81	U	1.4	U	0.62	U	0.74	U	0.81	U	1.3	U
cis-1,2-Dichloroethene	--	0.65	U	0.72	U	0.79	U	1.4	U	0.61	U	0.71	U	0.79	U	1.3	U	0.6	U	0.72	U	0.79	U	1.3	U
Chloroform	3.6	0.8	U	0.89	U	0.98	U	0.17	U	**1.1**		0.87	U	0.98	U	0.17	U	0.74	U	0.89	U	0.98	U	0.16	U
Benzene	11	0.52	U	0.58	U	0.64	U	1.1	U	0.5	U	0.57	U	**0.67**		1.1	U	0.48	U	0.58	U	0.64	U	1	U
1,2-Dichloroethane	3.2	0.66	U	0.74	U	0.81	U	0.14	U	0.63	U	0.72	U	0.81	U	0.14	U	0.62	U	0.74	U	0.81	U	0.13	U
Trichloroethene (TCE)	11	0.88	U	0.98	U	1.1	U	0.38	U	0.83	U	0.96	U	1.1	U	0.37	U	0.82	U	0.98	U	1.1	U	**0.48**	
Tetrachloroethene (PCE)	320	1.1	U	1.2	U	1.4	U	24	U	**1.5**		**0.38**		**3.7**		23	U	1	U	1.2	U	**1.7**		22	U
Ethylbenzene	15,000	0.71	U	**0.21**		**0.87**		1.5	U	0.67	U	**0.33**		0.87	U	1.5	U	0.66	U	**0.6**		0.87	U	1.4	U
Total Xylenes	1500	--		--		**4.1**		**3.5**		--		--		2.6	U	**3.2**		--		--		2.6	U	**7.7**	
1,2,4-Trimethylbenzene	910	0.81	U	0.9	U	**2.7**		8.6	U	0.76	U	**0.33**		**1.1**		8.4	U	0.75	U	0.9	U	**1.4**		7.9	U
Naphthalene	2.5	4.3	U	4.8	U	1	U	**1.1**		4.1	U	4.7	U	1	U	0.89	U	4	U	4.8	U	1	U	**0.92**	
Hydrogen Sulfide	30.3	**17**		5.7	U	7	U	13.9	U	5.7	U	5.7	U	7	U	13.9	U	5.7	U	5.7	U	7	U	13.9	U

U analyte not detected at or above the reported result

Notes

1) All concentrations are in units of micrograms per cubic meter (ug/m^3).

2) Refer to Figure 4 for sub-slab vapor sampling locations.

3) Refer to Table 4 for derivation of current (August 2020) sub-slab screening levels.

4) Analyte detections are bolded. None of the detections exceed the current screening levels.

Table 5. Summary of Sub-Slab Vapor Sampling Results

Project No. 100094-003-03, Crownhill Elementary School, Bremerton, Washington

Potential Compound of Concern (PCOC)	Current Screening Level (3)	Sub-Slab Vapor Sampling Location[2]																			
		SSV-4								SSV-5								SSV-6			
		8/19/2010		11/17/2010		11/11/2015		1/27/2021		8/19/2010		11/17/2010		11/11/2015		1/27/2021		8/19/2010		11/17/2010		11/11/2015		1/27/2021	
Freon 12	1500	**2.8**		**0.58**		**3.6**		**2.7**		**3.6**		**0.65**		**4.8**		**3.1**		**2.4**		**0.66**		**3.3**		**2.1**	
Vinyl Chloride	9.5	0.39	U	0.47	U	0.51	U	0.89	U	0.48	U	0.47	U	0.51	U	0.87	U	0.43	U	0.43	U	0.51	U	0.84	U
1,1-Dichloroethene	3000	0.6	U	0.72	U	0.79	U	1.4	U	0.74	U	0.72	U	0.79	U	1.3	U	0.67	U	0.67	U	0.79	U	1.3	U
trans-1,2-Dichloroethene	--	0.6	U	0.72	U	0.79	U	1.4	U	0.74	U	0.72	U	0.79	U	1.3	U	0.67	U	0.67	U	0.79	U	1.3	U
1,1-Dichloroethane	52	0.62	U	0.74	U	0.81	U	1.4	U	0.76	U	0.74	U	0.81	U	1.4	U	0.68	U	0.68	U	0.81	U	1.3	U
cis-1,2-Dichloroethene	--	0.6	U	0.72	U	0.79	U	1.4	U	0.74	U	0.72	U	0.79	U	1.3	U	0.67	U	0.67	U	0.79	U	1.3	U
Chloroform	3.6	0.74	U	0.89	U	0.98	U	0.17	U	**1.5**		0.89	U	0.98	U	0.17	U	**0.97**		0.82	U	0.98	U	0.16	U
Benzene	11	**0.56**		0.58	U	0.64	U	1.1	U	**0.76**		0.58	U	0.64	U	1.1	U	0.54	U	**0.27**		**0.73**		1.1	U
1,2-Dichloroethane	3.2	0.62	U	0.74	U	0.81	U	0.14	U	0.76	U	0.74	U	0.81	U	0.14	U	0.68	U	0.68	U	0.81	U	0.13	U
Trichloroethene (TCE)	11	0.82	U	0.98	U	1.1	U	0.38	U	1	U	0.98	U	1.1	U	0.37	U	0.9	U	0.9	U	1.1	U	0.35	U
Tetrachloroethene (PCE)	320	**1.5**		**0.44**		**3.9**		24	U	1.3	U	**0.2**		**1.8**		23	U	1.1	U	**0.22**		1.4	U	22	U
Ethylbenzene	15,000	**0.71**		**0.2**		0.87	U	1.5	U	0.81	U	**2.5**		**1**		1.5	U	0.73	U	**0.28**		**8.2**		1.4	U
Total Xylenes	1500	--		--		2.6	U	**6**		--		--		**5**		**6.1**		--		--		**32**		**6.9**	
1,2,4-Trimethylbenzene	910	0.75	U	0.9	U	**1.7**		8.6	U	0.92	U	**0.3**		**4.3**		8.4	U	0.82	U	**0.34**		**2.8**		8.1	U
Naphthalene	2.5	4	U	4.8	U	1	U	**1.2**		4.9	U	4.8	U	1	U	**1**		4.4	U	4.4	U	1	U	**1**	
Hydrogen Sulfide	30.3	5.7	U	5.7	U	7	U	13.9	U	5.7	U	5.7	U	7	U	13.9	U	**6.7**		5.7	U	7	U	13.9	U

U analyte not detected at or above the reported result

Notes

1) All concentrations are in units of micrograms per cubic meter (ug/m^3).

2) Refer to Figure 4 for sub-slab vapor sampling locations.

3) Refer to Table 4 for derivation of current (August 2020) sub-slab screening levels.

4) Analyte detections are bolded. None of the detections exceed the current screening levels.

FIGURES

1724 Dora Avenue NW (Note 2)

North Landfill Area

MW-2

Estimated Extent of TPH Cleanup Level Exceedance

MW-9

Estimated Extent of TCE Cleanup Level Exceedance

BERTHA AVE NW

MW-16 (Note 1) MW-14

EW-17 MW-13

MW-12

MW-8

MW-15 MW-5

Geotextile at 1 Foot Below Ground Surface (Summer 2013 Interim Action)

Estimated Extent of Arsenic Cleanup Level Exceedance

ROCKY POINT RD

PORTABLE CLASSROOM BUILDING

Bertha Ave NW Parking Area

MW-4

MW-6

MAIN SCHOOL BUILDING

MW-3

MW-10

South Landfill Area

MW-1

Geotextile at 1 Foot Below Ground Surface (Summer 2013 Interim Action)

MW-7

Geotextile at 1 Foot Below Ground Surface (Spring 2012 Interim Action)

MW-11

MARINE DR

DORA AVE

0 100 200 Feet

Well Locations:

- Extraction Well Included in Monitoring Program
- Monitoring Well Included in Monitoring Program
- Monitoring Well Not Included in Monitoring Program
- McKinney Domestic Well (Note 2)
- Approximate photo location & orientation for semiannual cover system inspections

Other Site Features and Interpretation:

- Interpreted Extent of Landfill Activity
- Estimated Extent of Groundwater Cleanup Level Exceedances in 2014 (Ecology, 2014)
- Bremerton School District Property Boundary
- Bremerton United Methodist Church Property Boundary
- Inferred Direction of Groundwater Flow

Note:

(1) LNAPL has been observed in Wells EW-17, MW-8, MW-13, MW-14, and MW-16.
(2) The McKinney well water sample is collected from the outdoor faucet on the north side of the residence at 1724 Dora Avenue NW.

Site Plan

2019 Annual Report
Crownhill Elementary
Bremerton, Washington

Aspect Consulting	JAN-2020	BY: DLH / PPW	FIGURE NO. 1
	PROJECT NO. 100094	REVISED BY: EAC	

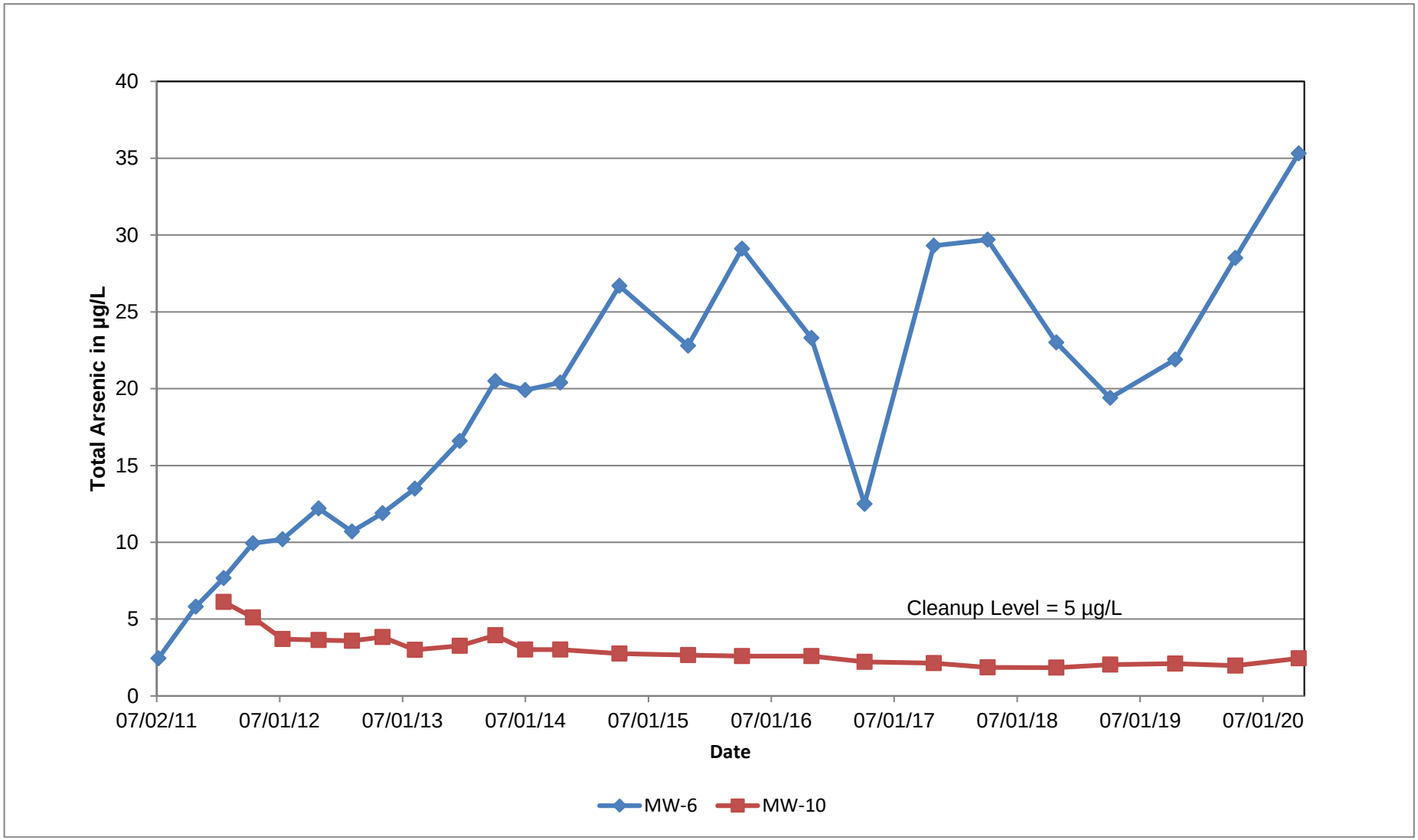
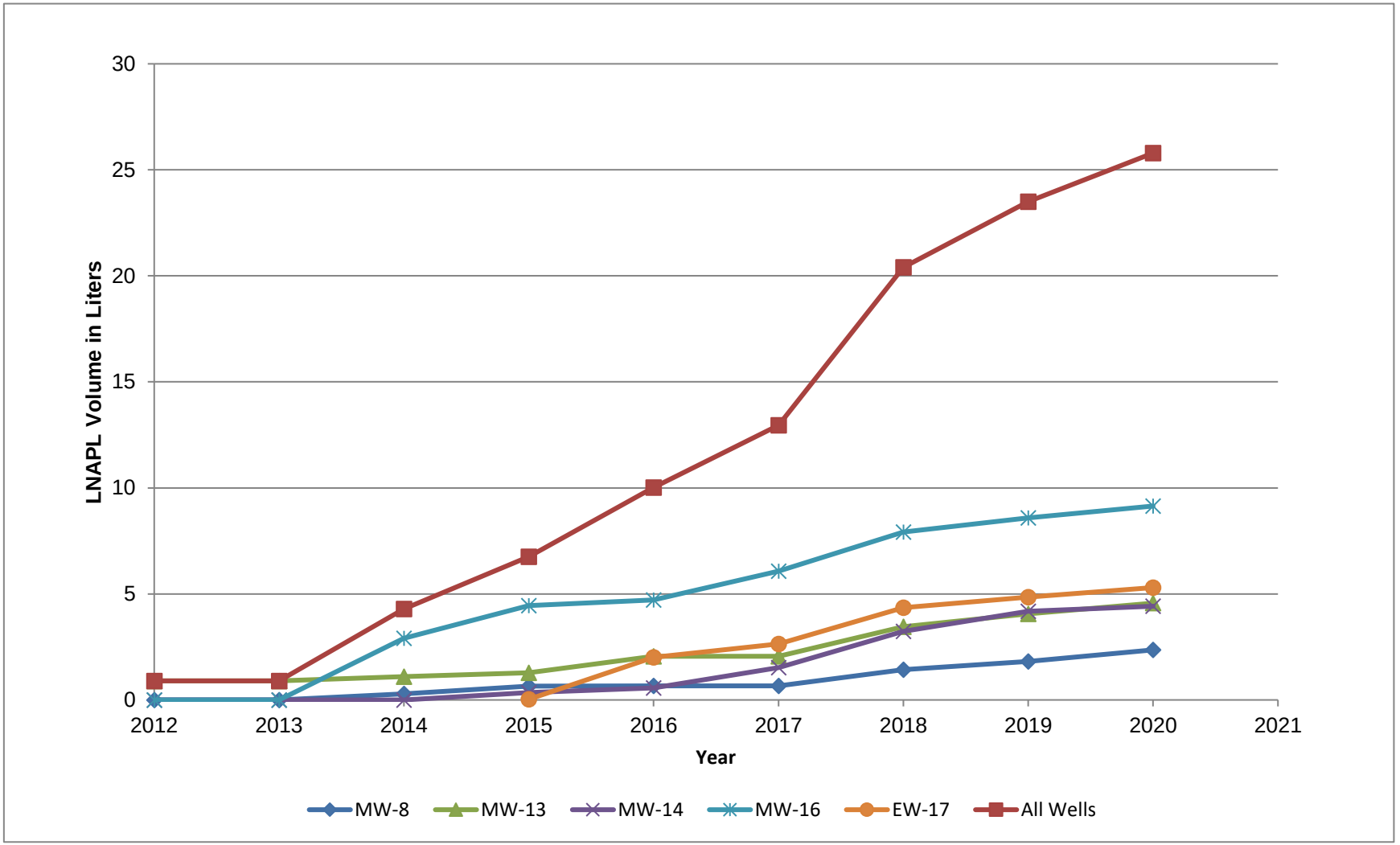


Figure 2. Arsenic in Wells MW-6 MW-10

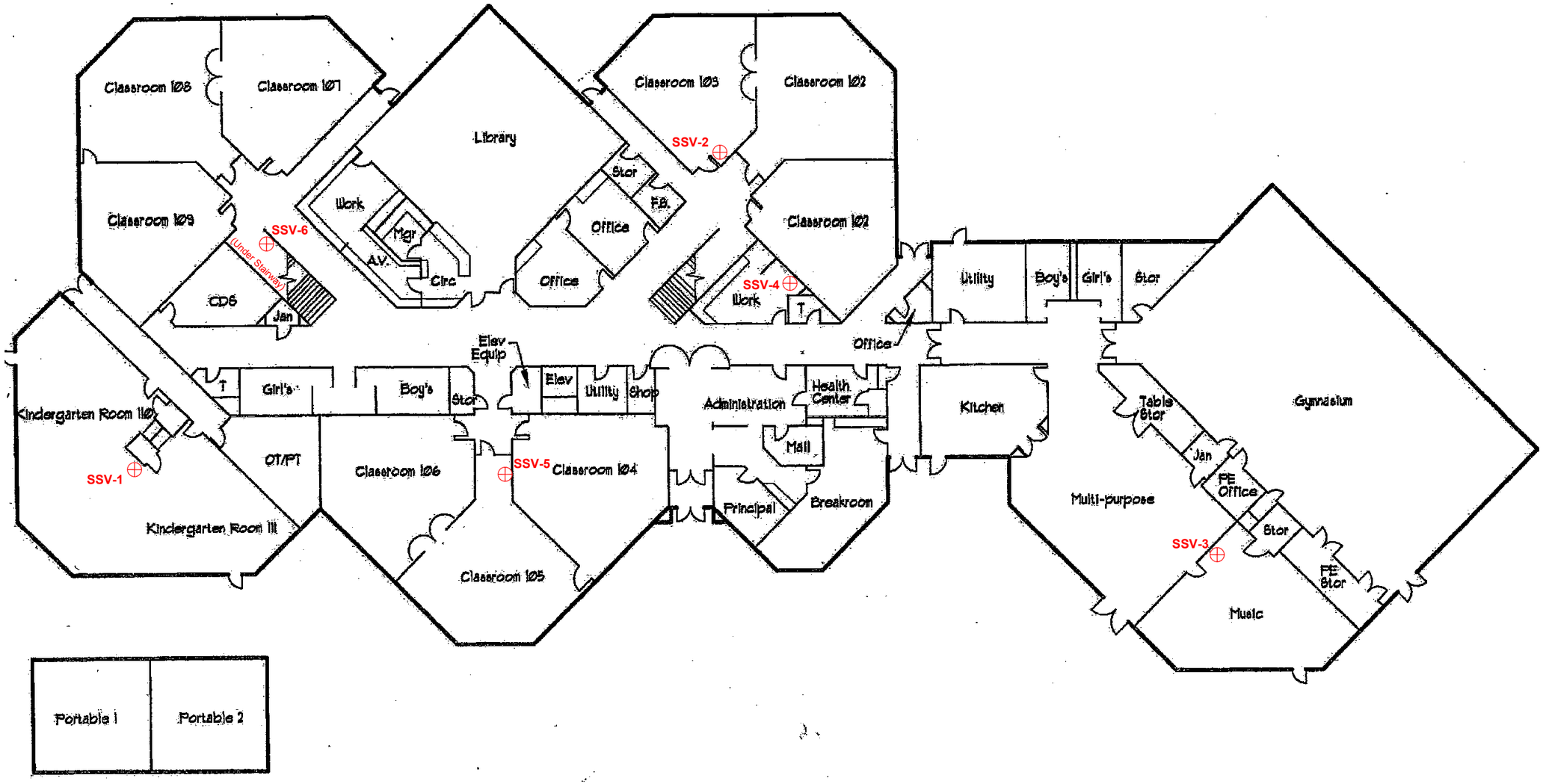


Aspect Consulting

3/3/2021

V:\100094 BSD Crownhill Elementary RIFS\Deliverables\Remediation Implementation\2020 Annual Report\Tables and Figures\Tbls 1-3 and Figs 2-3

Figure 3. Cumulative LNAPL Removal Over Time



⊕ Sub-Slab Vapor Sampling Location

N

0 25 50

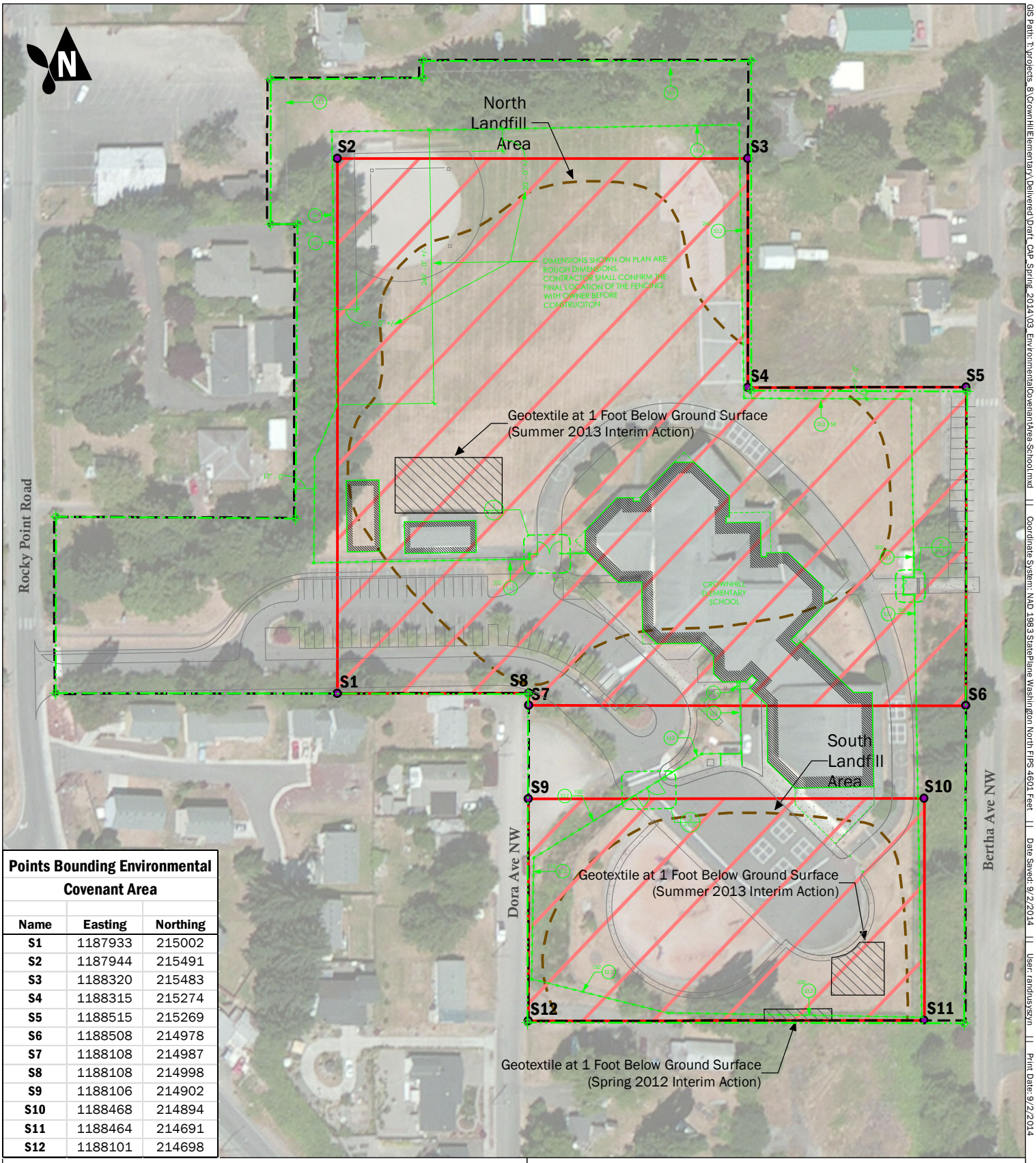
Approximate Scale in Feet

Sub-Slab Vapor Sampling Locations

2020 Annual Report

Crownhill Elementary, Bremerton, Washington

Aspect CONSULTING	JAN-2020	BY: DLH/SCC	FIGURE NO. 4
	PROJECT NO. 100094	REV BY: SCC	



Points Bounding Environmental Covenant Area

Name	Easting	Northing
S1	1187933	215002
S2	1187944	215491
S3	1188320	215483
S4	1188315	215274
S5	1188515	215269
S6	1188508	214978
S7	1188108	214987
S8	1188108	214998
S9	1188106	214902
S10	1188468	214894
S11	1188464	214691
S12	1188101	214698

Area of Environmental Covenant Soil and Structure Prohibitions

Interpreted Extent of Landfill Activity

Bremerton School District Property Boundary

0 120 240

Feet

Environmental Covenant Area, School Property

Crownhill Elementary CAP
Bremerton, Washington

Aspect Consulting	NOV-2014	BY: HRL	FIGURE NO. 5
	PROJECT NO. 100094	REV BY: SCC	

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

APPENDIX A

June 2020 Inspection Record and Photos

Aspect CONSULTING

Project Name: **Crownhill Elementary School**	Date: 6/11/2020
Project No.: 100094	Inspector's Name: Matthew M. Lewis
Weather Conditions: Sunny, low 70's	Inspector's Signature: Matthew M Lewis
	Inspector's Title/Affiliation: [illegible] / Aspect

FORM 1 - INSPECTION RECORD

INSPECTION ITEM	YES	NO	COMMENTS/NOTES
1. North Environmental Covenant Area			
a. Building or pavement modifications since last inspection?		X	
b. Pavement deterioration/damage along Bertha Ave NW?[1]		X	
c. Evidence of soil disturbance?		X	
d. Geotextile fabric visible in interim action area?		X	
2. South Environmental Covenant Area			
a. Building or pavement modifications since last inspection?		X	
b. Evidence of soil disturbance?		X	
c. Geotextile fabric visible in interim action areas?		X	
3. Other Inspection Items			
a. Are all wells (MW-1 through EW-17) accessible?	X		
b. Evidence of well monument damage/tampering?		X	
c. HVAC system operates continuously during school day?[2]	X		System is always circulating air, heating & cooling as needed.

Deficient Action Items & Other Comments:

HVAC system operation confirmed by custodian (via phone) on 6/11/2020.

Notes

1. Item 1b refers to the paved parking area described in Section 1.3.
2. The inspector should describe under COMMENTS/NOTES how the determination is made regarding HVAC system operation.

Revision: December 2015

Photo Location 1. 6/11/2020 site inspection

Photo Location 2. 6/11/2020 site inspection

Photo Location 3. 6/11/2020 site inspection

Photo Location 4. 6/11/2020 site inspection

APPENDIX B

December 2020 Inspection Record and Photos

Aspect CONSULTING

Project Name: **Crownhill Elementary School**

Project No.: 100094

Weather Conditions: Overcast/Sprinkling 40°FS

Date: 12/16/2020

Inspector's Name: Matthew Lewis

Inspector's Signature: Matthew M Lewis

Inspector's Title/Affiliation: Proj. Hydrogeologist, Aspect

FORM 1 - INSPECTION RECORD

INSPECTION ITEM	YES	NO	COMMENTS/NOTES
1. North Environmental Covenant Area			
a. Building or pavement modifications since last inspection?		X	
b. Pavement deterioration/damage along Bertha Ave NW?[1]		X	
c. Evidence of soil disturbance?		X	
d. Geotextile fabric visible in interim action area?		X	
2. South Environmental Covenant Area			
a. Building or pavement modifications since last inspection?		X	
b. Evidence of soil disturbance?		X	
c. Geotextile fabric visible in interim action areas?		X	
3. Other Inspection Items			
a. Are all wells (MW-1 through EW-17) accessible?	X		
b. Evidence of well monument damage/tampering?		X	
c. HVAC system operates continuously during school day?[2]	X		System always circulating air, heating/cooling as needed.

Deficient Action Items & Other Comments:

HVAC system operation confirmed by custodian.
Phone call on 12/16/20

Notes

Revision: December 2015

1. Item 1b refers to the paved parking area described in Section 1.3.
2. The inspector should describe under COMMENTS/NOTES how the determination is made regarding HVAC system operation.

Photo Location 1. 12/16/2020 site inspection

Photo Location 2. 12/16/2020 site inspection

Photo Location 3. 12/16/2020 site inspection

Photo Location 4. 12/16/2020 site inspection

APPENDIX C

Laboratory Reports, 2020
Groundwater Sampling

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

April 22, 2020

Dave Heffner, Project Manager
Aspect Consulting, LLC
710 2nd Ave S, Suite 550
Seattle, WA 98104

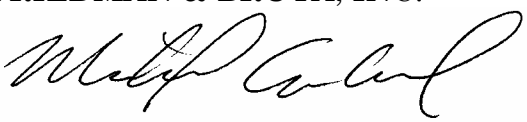
Dear Mr Heffner:

Included are the results from the testing of material submitted on April 10, 2020 from the Crownhill Elementary 100094, F&BI 004119 project. There are 15 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 have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Data Aspect
ASP0422R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 10, 2020 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Crownhill Elementary 100094, F&BI 004119 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
004119 -01	MW-5-041020
004119 -02	MW-6-041020
004119 -03	MW-9-041020
004119 -04	MW-10-041020
004119 -05	MW-15-041020
004119 -06	McKinney-041020

All quality control requirements were acceptable.

Date of Report: 04/22/20
Date Received: 04/10/20
Project: Crownhill Elementary 100094, F&BI 004119
Date Extracted: 04/13/20
Date Analyzed: 04/13/20

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 41-152)
MW-5-041020 004119-01	2,400 x	660 x	150
MW-10-041020 004119-04 1/1.4	<70	<350	115
MW-15-041020 004119-05	64 x	<260	114
Method Blank 00-897 MB	<50	<250	97

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-6-041020	Client:	Aspect Consulting, LLC
Date Received:	04/10/20	Project:	Crownhill Elementary 100094
Date Extracted:	04/15/20	Lab ID:	004119-02
Date Analyzed:	04/17/20	Data File:	004119-02.074
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	28.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-10-041020	Client:	Aspect Consulting, LLC
Date Received:	04/10/20	Project:	Crownhill Elementary 100094
Date Extracted:	04/15/20	Lab ID:	004119-04
Date Analyzed:	04/17/20	Data File:	004119-04.075
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.98

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	Crownhill Elementary 100094
Date Extracted:	04/15/20	Lab ID:	I0-221 mb
Date Analyzed:	04/16/20	Data File:	I0-221 mb.035
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW-9-041020	Client:	Aspect Consulting, LLC
Date Received:	04/10/20	Project:	Crownhill Elementary 100094
Date Extracted:	04/13/20	Lab ID:	004119-03
Date Analyzed:	04/17/20	Data File:	041710.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	106	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration ug/L (ppb)
Trichloroethene	7.1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW-10-041020	Client:	Aspect Consulting, LLC
Date Received:	04/10/20	Project:	Crownhill Elementary 100094
Date Extracted:	04/15/20	Lab ID:	004119-04
Date Analyzed:	04/17/20	Data File:	041711.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	105	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	McKinney-041020	Client:	Aspect Consulting, LLC
Date Received:	04/10/20	Project:	Crownhill Elementary 100094
Date Extracted:	04/13/20	Lab ID:	004119-06
Date Analyzed:	04/17/20	Data File:	041712.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	94	50	150

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Crownhill Elementary 100094
Date Extracted:	04/13/20	Lab ID:	00-817 mb
Date Analyzed:	04/13/20	Data File:	041311.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	103	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Crownhill Elementary 100094
Date Extracted:	04/15/20	Lab ID:	00-811 mb
Date Analyzed:	04/17/20	Data File:	041642.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	90	50	150

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<1

Date of Report: 04/22/20
Date Received: 04/10/20
Project: Crownhill Elementary 100094, F&BI 004119

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)	2,500	100	100	63-142	0

Date of Report: 04/22/20
Date Received: 04/10/20
Project: Crownhill Elementary 100094, F&BI 004119

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 004119-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	28.9	84 b	67 b	75-125	23 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	93	80-120

Date of Report: 04/22/20
Date Received: 04/10/20
Project: Crownhill Elementary 100094, F&BI 004119

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 004120-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Trichloroethene	ug/L (ppb)	50	<1	96	66-135

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Trichloroethene	ug/L (ppb)	50	97	100	79-113	3

Date of Report: 04/22/20
Date Received: 04/10/20
Project: Crownhill Elementary 100094, F&BI 004119

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 004141-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Trichloroethene	ug/L (ppb)	50	<1	82	66-135

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Trichloroethene	ug/L (ppb)	50	87	98	79-113	12

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.

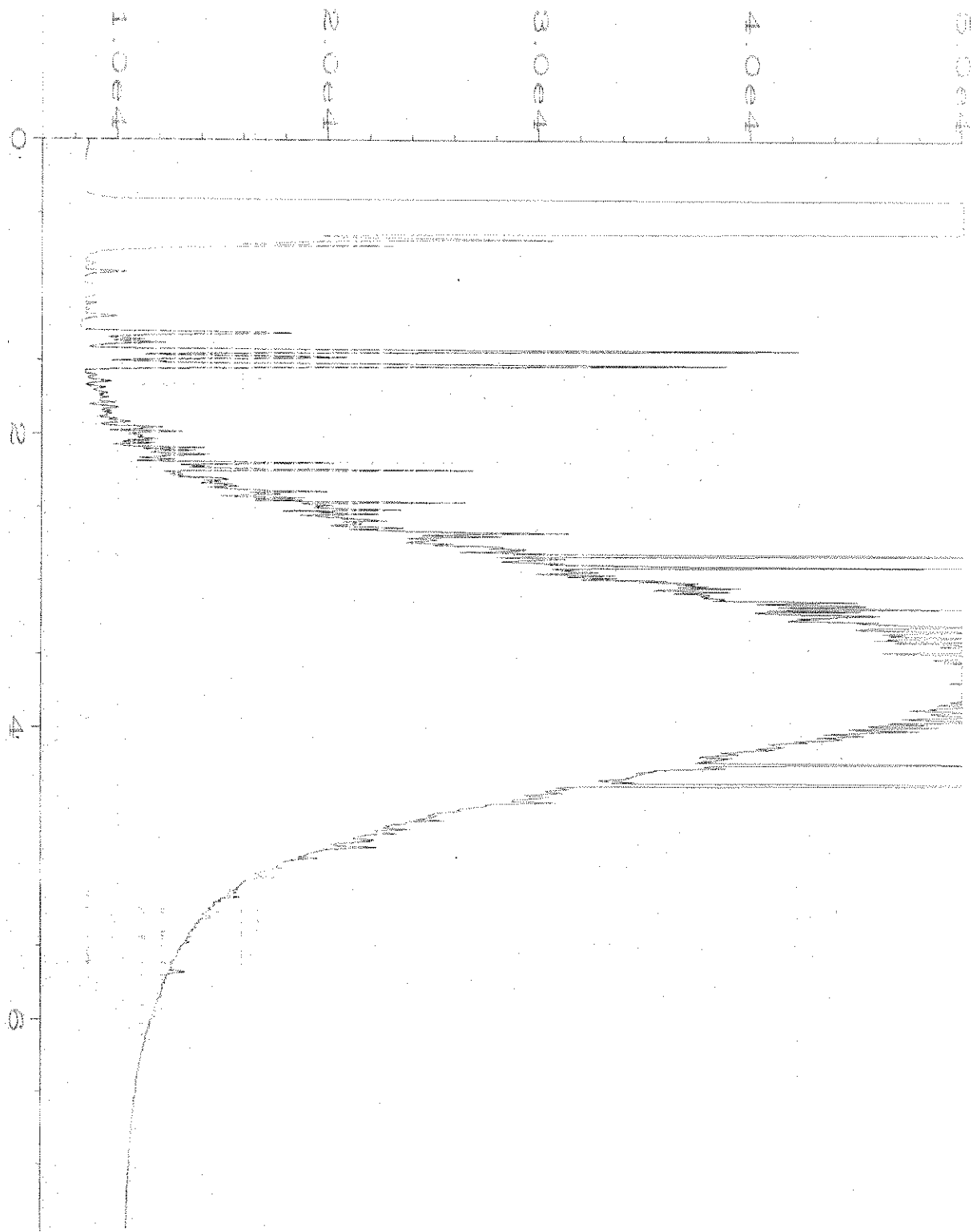
nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

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.

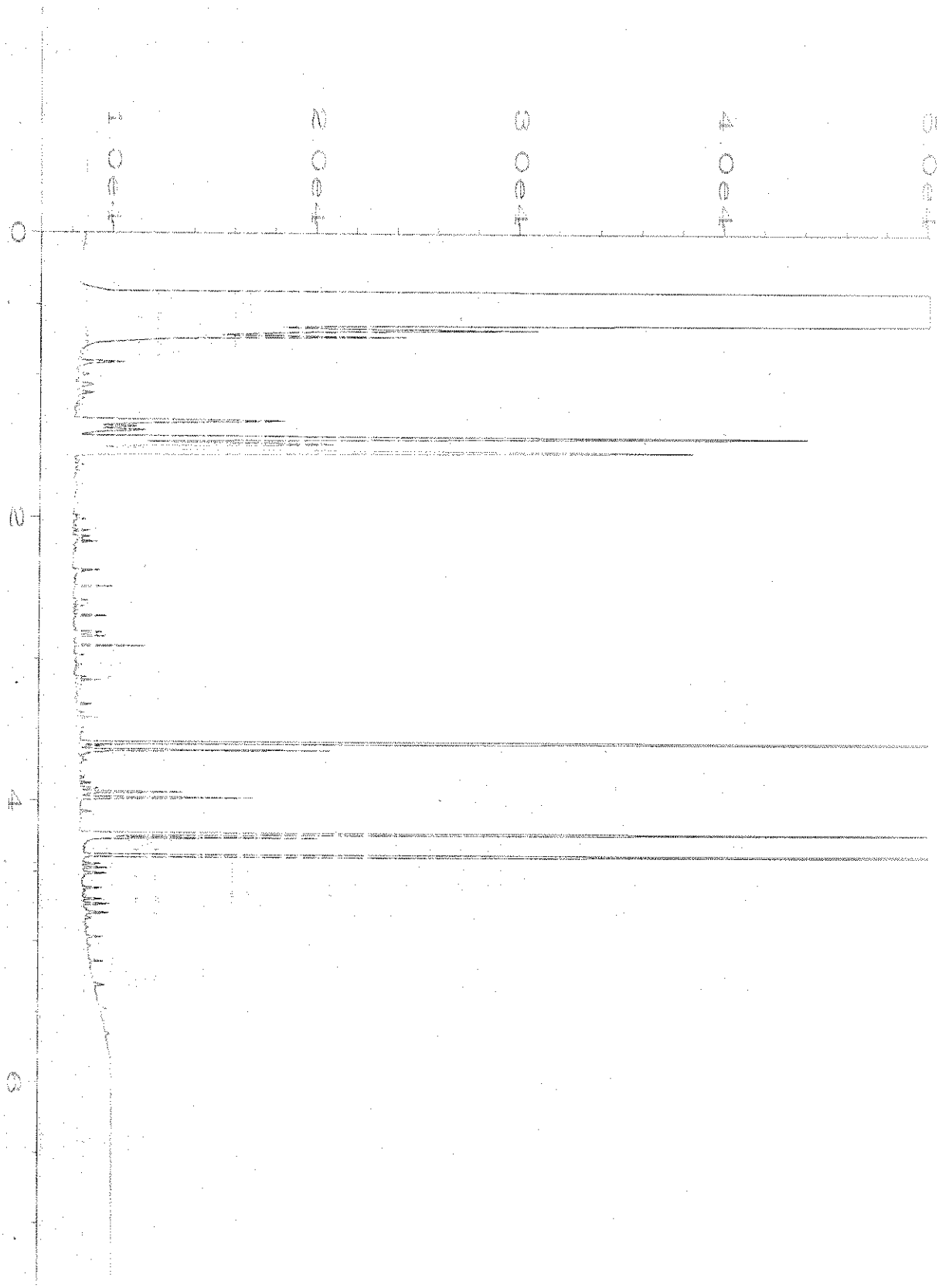
vo - The value reported fell outside the control limits established for this analyte.

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



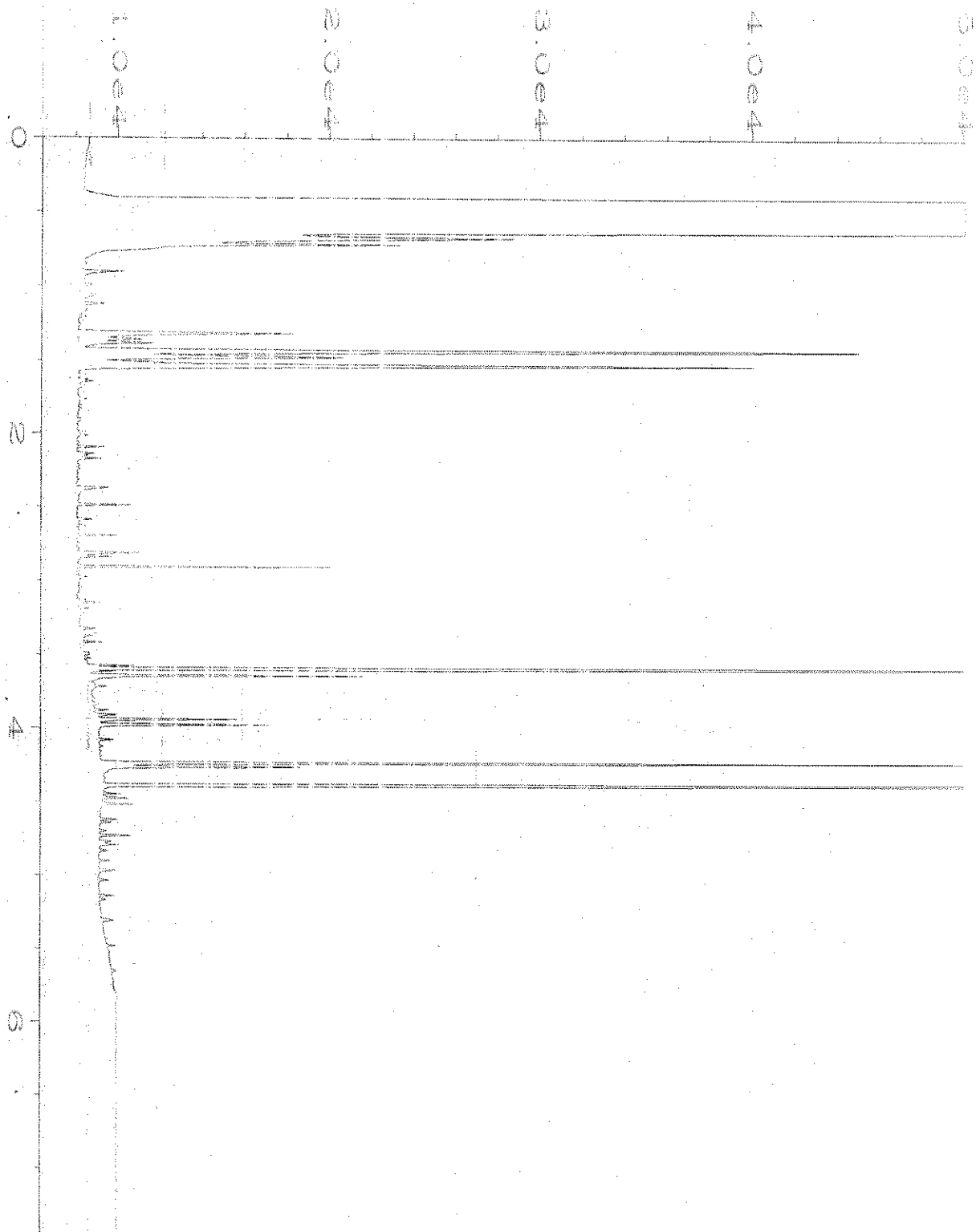
Data File Name : C:\HPCHEM\1\DATA\04-13-20\020F0401.D
Operator : TL
Instrument : GC1
Sample Name : 004119-01
Run Time Bar Code:
Acquired on : 13 Apr 20 03:01 PM
Report Created on: 14 Apr 20 08:05 AM

Page Number : 1
Vial Number : 20
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



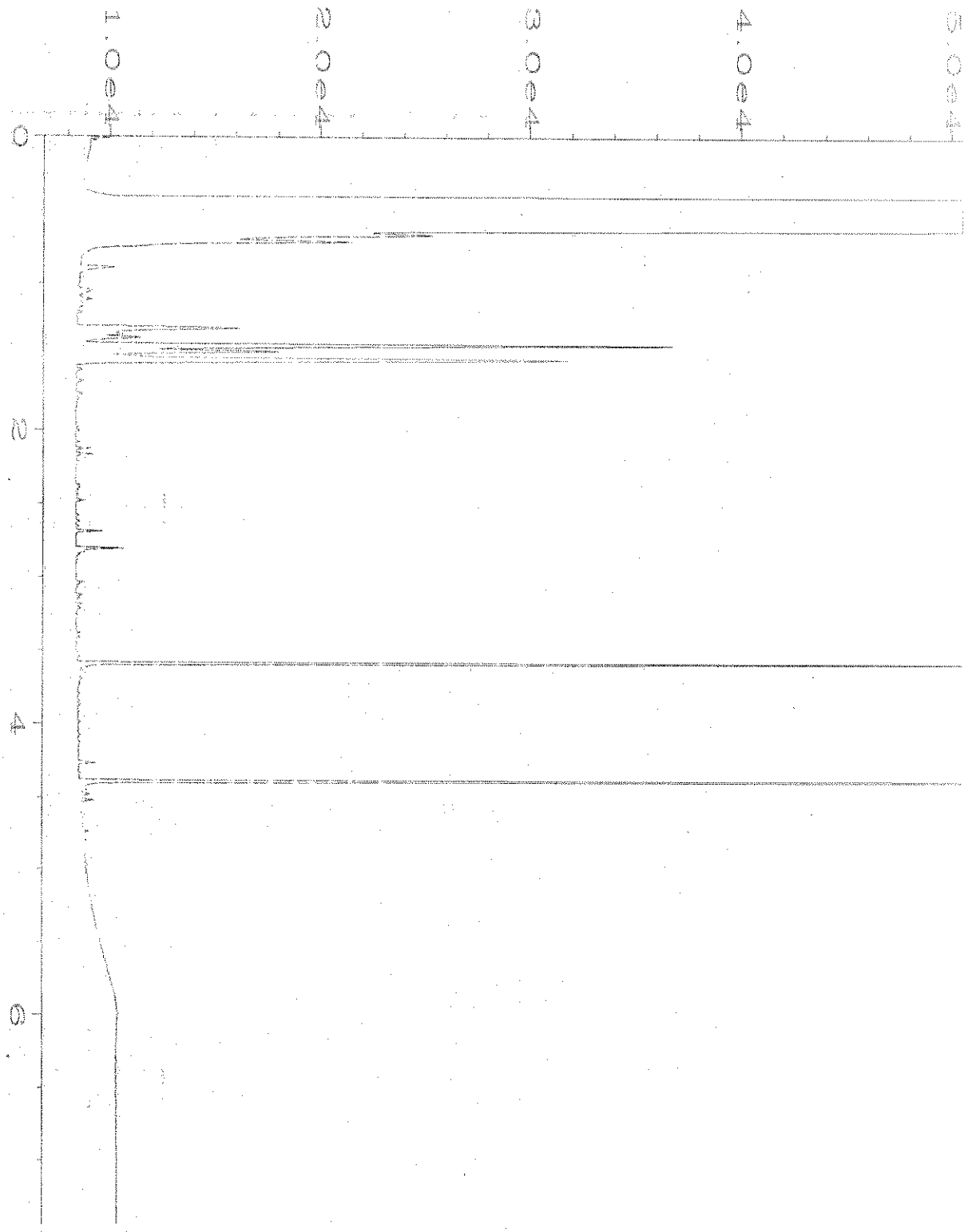
Data File Name : C:\HPCHEM\1\DATA\04-13-20\021F0401.D
Operator : TL
Instrument : GC1
Sample Name : 004119-04
Run Time Bar Code:
Acquired on : 13 Apr 20 03:12 PM
Report Created on: 14 Apr 20 08:05 AM

Page Number : 1
Vial Number : 21
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



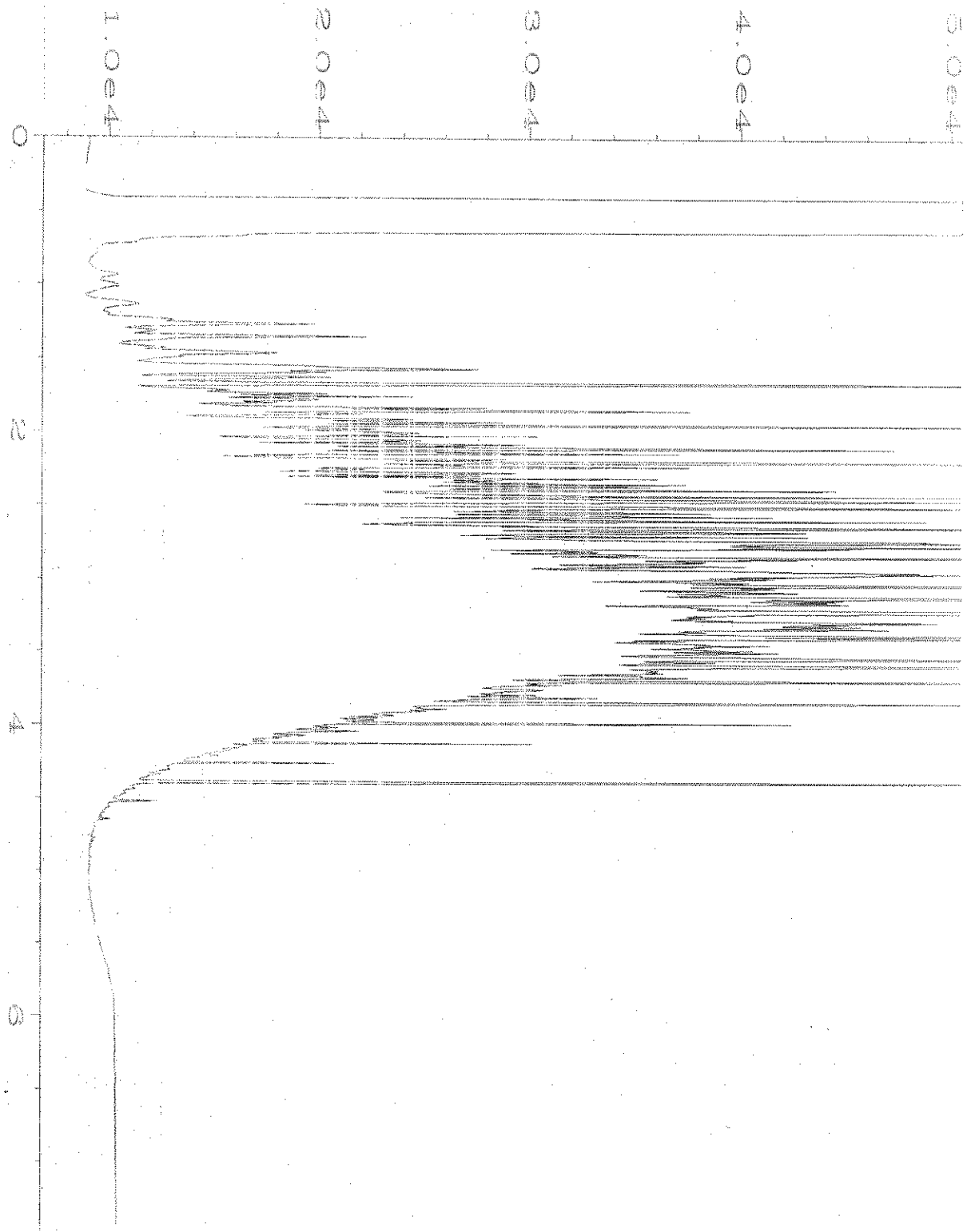
Data File Name : C:\HPCHEM\1\DATA\04-13-20\022F0401.D
Operator : TL
Instrument : GC1
Sample Name : 004119-05
Run Time Bar Code:
Acquired on : 13 Apr 20 03:23 PM
Report Created on: 14 Apr 20 08:05 AM

Page Number : 1
Vial Number : 22
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\1\DATA\04-13-20\006F0401.D
Operator : TL
Instrument : GC1
Sample Name : 00-897 mb
Run Time Bar Code:
Acquired on : 13 Apr 20 12:24 PM
Report Created on: 14 Apr 20 08:04 AM

Page Number : 1
Vial Number : 6
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\1\DATA\04-13-20\003F0301.D
Operator : TL
Instrument : GC1
Sample Name : 500 Dx 58-146H
Run Time Bar Code:
Acquired on : 13 Apr 20 08:39 AM
Report Created on: 14 Apr 20 08:04 AM

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

004119

SAMPLE CHAIN OF CUSTODY ME 04-10-20

C05/VW1/A13

Report To Matthew Lewis, Dave Heffner

Company Aspect

Address Seattle

City, State, ZIP

Phone Email

SAMPLERS (*signature*) [signature]

PROJECT NAME	PO #
Cownhill Elementary	100094
REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

Page # 1 of 1

TURNAROUND TIME
- X Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days (circled)

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Total As	TCE			Notes
MW-5-041020	01	4/10/20	1100	GW	1	X											
MW-6-041020	02	|	1305	|	1								X				
MW-9-041020	03 A-C	|	1015	|	3									X			
MW-10-041020	04 A-E	|	1400	|	3 5	X							X	X			
NW-15-041020	05	|	1205	|	2 1	X											
McKinney-041020	06 A-C	|	1230	|	3									X			

BY 4/10

Samples received at 3 °C

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

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Matthew M. Lewis	Aspect	4/10/20	1705
Received by: [signature]	BISRAT TADESSE	FBI	|	|
Relinquished by:				
Received by:				

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

October 23, 2020

Matthew Lewis, Project Manager
Aspect Consulting, LLC
350 Madison Ave. N.
Bainbridge Island, WA 98110-1810

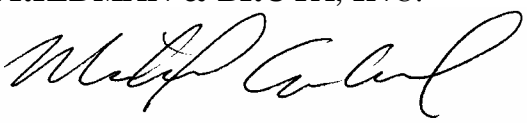
Dear Mr Lewis:

Included are the results from the testing of material submitted on October 16, 2020 from the Crownhill PO 100094, F&BI 010287 project. There are 12 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 have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Aspect Data
ASP1023R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 16, 2020 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Crownhill PO 100094, F&BI 010287 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
010287 -01	McKinney-101520
010287 -02	MW-12-101520
010287 -03	MW-09-101520
010287 -04	MW-06-101520
010287 -05	MW-10-101520

All quality control requirements were acceptable.

Date of Report: 10/23/20
Date Received: 10/16/20
Project: Crownhill PO 100094, F&BI 010287
Date Extracted: 10/19/20
Date Analyzed: 10/19/20

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 41-152)
MW-12-101520 010287-02	1,600 x	1,400 x	119
Method Blank 00-2345 MB	<50	<250	105

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-06-101520	Client:	Aspect Consulting, LLC
Date Received:	10/16/20	Project:	Crownhill PO 100094
Date Extracted:	10/20/20	Lab ID:	010287-04
Date Analyzed:	10/20/20	Data File:	010287-04.133
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	35.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-10-101520	Client:	Aspect Consulting, LLC
Date Received:	10/16/20	Project:	Crownhill PO 100094
Date Extracted:	10/20/20	Lab ID:	010287-05
Date Analyzed:	10/20/20	Data File:	010287-05.134
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.44

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	Crownhill PO 100094
Date Extracted:	10/20/20	Lab ID:	I0-647 mb
Date Analyzed:	10/20/20	Data File:	I0-647 mb.039
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	McKinney-101520	Client:	Aspect Consulting, LLC
Date Received:	10/16/20	Project:	Crownhill PO 100094
Date Extracted:	10/16/20	Lab ID:	010287-01
Date Analyzed:	10/16/20	Data File:	101624.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	104	60	133

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW-09-101520	Client:	Aspect Consulting, LLC
Date Received:	10/16/20	Project:	Crownhill PO 100094
Date Extracted:	10/16/20	Lab ID:	010287-03
Date Analyzed:	10/16/20	Data File:	101625.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	103	60	133

Compounds:	Concentration ug/L (ppb)
Trichloroethene	5.0

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Crownhill PO 100094
Date Extracted:	10/16/20	Lab ID:	00-2606 mb
Date Analyzed:	10/16/20	Data File:	101608.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	103	60	133

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<1

Date of Report: 10/23/20
Date Received: 10/16/20
Project: Crownhill PO 100094, F&BI 010287

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)	2,500	104	108	63-142	4

Date of Report: 10/23/20
Date Received: 10/16/20
Project: Crownhill PO 100094, F&BI 010287

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 010326-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	<1	99	97	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	91	80-120

Date of Report: 10/23/20
Date Received: 10/16/20
Project: Crownhill PO 100094, F&BI 010287

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 010277-24 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Trichloroethene	ug/L (ppb)	10	<1	93	66-135

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Trichloroethene	ug/L (ppb)	10	85	84	67-133	1

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.

010287

SAMPLE CHAIN OF CUSTODY

ME 10/16/20 VW 2/AE3 1

Page # 1 of 1

Report To Matthew Lewis

Company Aspect

Address

City, State, ZIP

Phone 316.617.0499 Email MLewis@aspectconsulting.com

SAMPLERS (*signature*)

PROJECT NAME	PO #
Crowshill	100094
REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

TURNAROUND TIME
- ☒ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Total As	TCE by 8620			Notes
						ANALYSES REQUESTED											
McKinney-101520	01 A-C	10/15/20	0940	Water	3									X			
MW-12-101520	02		1209			X											
~~MW-15-101520~~ DI3		—	—	—	—												
MW-09-101520	03 A-B		1305											X			
MW-06-101520	04												X				
MW-10-101520	05		1459										X				
																	Samples received at 2 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Parker Babcock	Aspect	10/16/20	0938
Received by:	Nhan Phan	FCBI	10/16/20	0938
Relinquished by:				
Received by:				

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

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

October 29, 2020

Matthew Lewis, Project Manager
Aspect Consulting, LLC
710 2nd Ave S, Suite 550
Seattle, WA 98104

Dear Mr Lewis:

Included are the results from the testing of material submitted on October 22, 2020 from the Crownhill Elementary PO 100094, F&BI 010394 project. There are 7 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 have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Aspect Data
ASP1029R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 22, 2020 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Crownhill Elementary PO 100094, F&BI 010394 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
010394 -01	MW-10-101920

All quality control requirements were acceptable.

Date of Report: 10/29/20
Date Received: 10/22/20
Project: Crownhill Elementary PO 100094, F&BI 010394
Date Extracted: 10/23/20
Date Analyzed: 10/23/20

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 41-152)
MW-10-101920 010394-01	<50	<250	106
Method Blank 00-2374 MB	<50	<250	110

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW-10-101920	Client:	Aspect Consulting, LLC
Date Received:	10/22/20	Project:	Crownhill Elementary PO 100094
Date Extracted:	10/26/20	Lab ID:	010394-01
Date Analyzed:	10/26/20	Data File:	102635.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	100	60	133

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Crownhill Elementary PO 100094
Date Extracted:	10/26/20	Lab ID:	00-2626 mb
Date Analyzed:	10/26/20	Data File:	102608.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	103	60	133

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<1

Date of Report: 10/29/20
Date Received: 10/22/20
Project: Crownhill Elementary PO 100094, F&BI 010394

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)	2,500	108	116	63-142	7

Date of Report: 10/29/20
Date Received: 10/22/20
Project: Crownhill Elementary PO 100094, F&BI 010394

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 010441-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Trichloroethene	ug/L (ppb)	10	<1	93	66-135

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Trichloroethene	ug/L (ppb)	10	98	99	67-133	1

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.

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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.

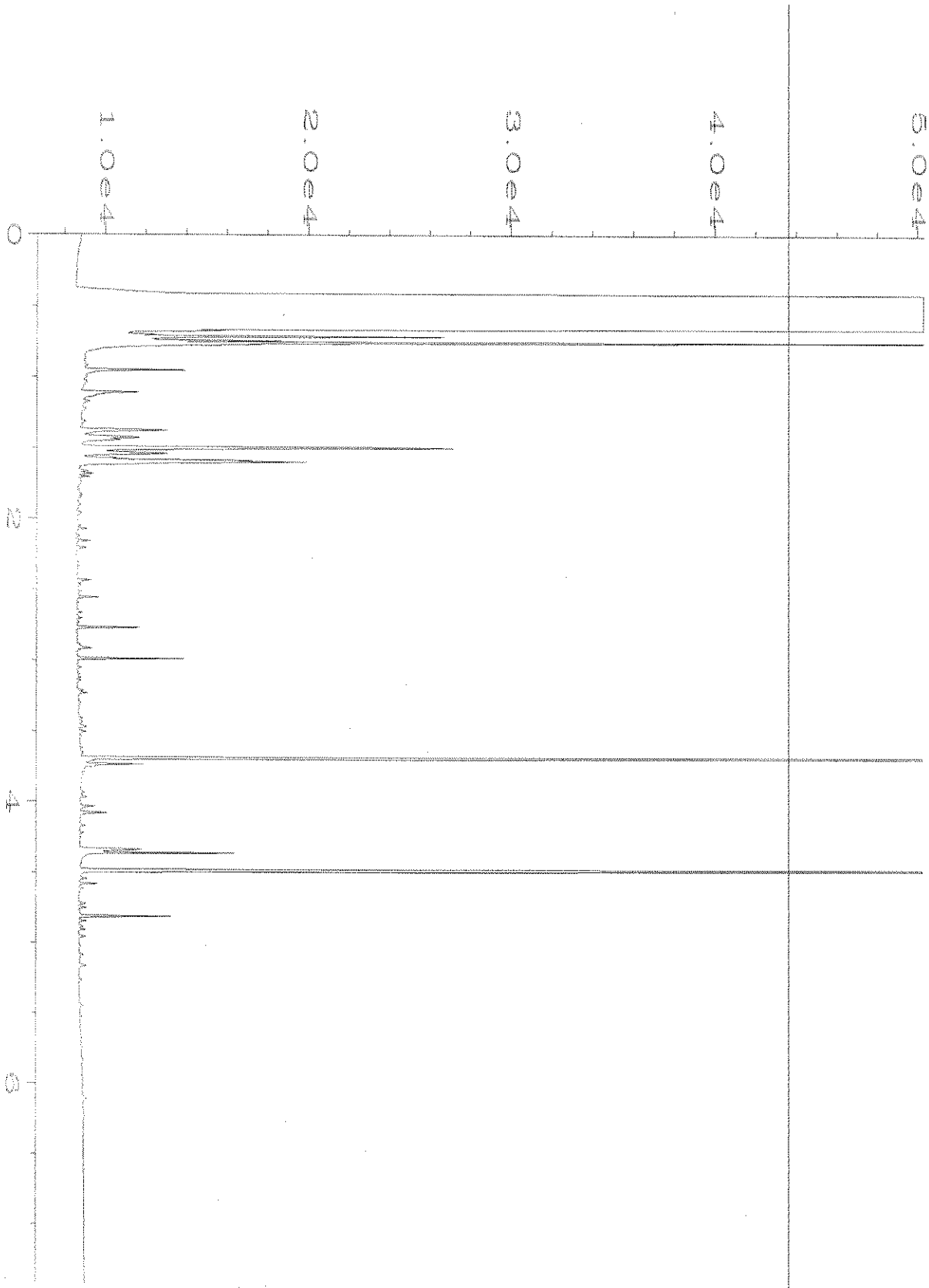
nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

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.

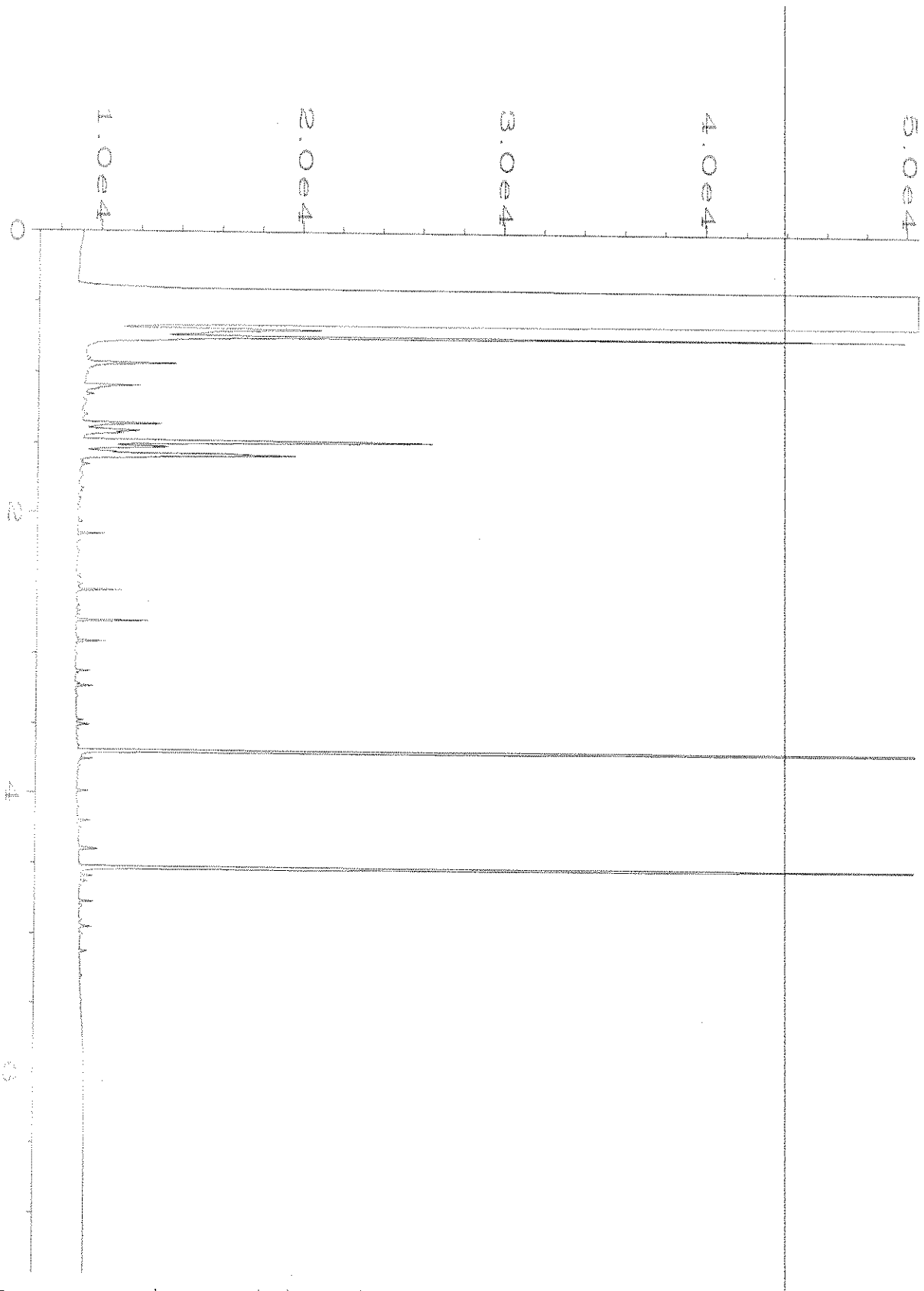
vo - The value reported fell outside the control limits established for this analyte.

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



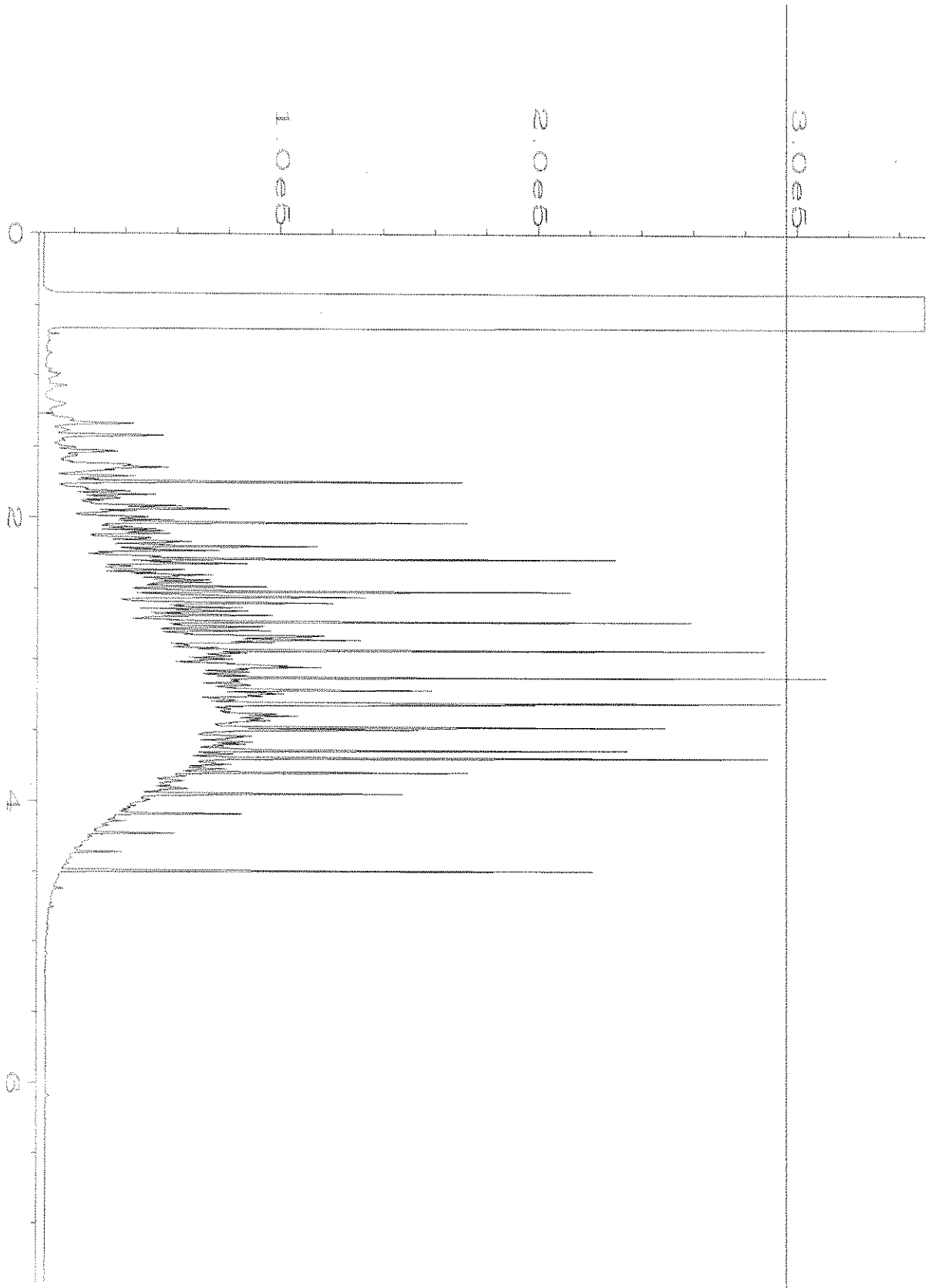
Data File Name : C:\HPCHEM\1\DATA\10-23-20\015F0301.D
Operator : TL
Instrument : GC1
Sample Name : 010394-01
Run Time Bar Code:
Acquired on : 23 Oct 20 11:55 AM
Report Created on: 26 Oct 20 11:20 AM

Page Number : 1
Vial Number : 15
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name : C:\HPCHEM\1\DATA\10-23-20\010F0301.D
Operator : TL
Instrument : GC1
Sample Name : 00-2374 mb
Run Time Bar Code:
Acquired on : 23 Oct 20 10:59 AM
Report Created on: 26 Oct 20 11:11 AM

Page Number : 1
Vial Number : 10
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name : C:\HPCHEM\1\DATA\10-23-20\005F0401.D
Operator : TL
Instrument : GC1
Sample Name : 1000 Dx 60-170B
Run Time Bar Code:
Acquired on : 23 Oct 20 02:39 PM
Report Created on: 26 Oct 20 11:12 AM

Page Number : 1
Vial Number : 5
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

010394

SAMPLE CHAIN OF CUSTODY

ME

10-22-20

EQ4/VW1

Report To Matthew Lewis
Company Aspect Consulting
Address 710 2nd Ave #550
City, State, ZIP Seattle, WA 98104
Phone 206-328-7443 Email mlewis@aspectconsulting.com

SAMPLERS (*signature*) Dylan Bauman

PROJECT NAME	PO #
Crownhill Elementary	100094
REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	TCE by 8260				Notes
MW-10-101920	01A-D	10/19/20	1210	water	4	x							x				

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Matthew vonder Ahe	Aspect	10/22/2020	12:12
Received by:	Ann Webber-Bruya	FAB	10/22	1212
Relinquished by:				
Received by:		Samples received at 6 °C		

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

APPENDIX D

Laboratory Reports, 2020
Subslab Vapor Sampling

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

February 11, 2021

Matthew Lewis, Project Manager
Aspect Consulting, LLC
350 Madison Ave. N.
Bainbridge Island, WA 98110-1810

Dear Mr Lewis:

Included is the amended report from the testing of material submitted on January 27, 2021 from the Crownhill Elementary, F&BI 101388 project. The analyte list has been amended to the site specific list.

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
c: Aspect Data
ASP0205R.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.

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www.friedmanandbruya.com

February 5, 2021

Matthew Lewis, Project Manager
Aspect Consulting, LLC
350 Madison Ave. N.
Bainbridge Island, WA 98110-1810

Dear Mr Lewis:

Included are the results from the testing of material submitted on January 27, 2021 from the Crownhill Elementary, F&BI 101388 project. There are 12 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
c: Aspect Data
ASP0205R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on January 27, 2021 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Crownhill Elementary, F&BI 101388 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
101388 -01	SSV-3-012721
101388 -02	SSV-4-012721
101388 -03	SSV-6-012721
101388 -04	SSV-5-012721
101388 -05	SSV-1-012721
101388 -06	SSV-2-012721

The samples were sent to Fremont Analytical for hydrogen sulfide analysis. The report is enclosed.

All quality control requirements were acceptable.

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SSV-3-012721	Client:	Aspect Consulting, LLC
Date Received:	01/27/21	Project:	Crownhill Elementary
Date Collected:	01/27/21	Lab ID:	101388-01 1/3.2
Date Analyzed:	01/28/21	Data File:	012812.D
Matrix:	Air	Instrument:	GCMS12
Units:	ug/m3	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	101	70	130

Compounds:	Concentration ug/m3	ppbv
Dichlorodifluoromethane	2.2	0.44
Vinyl chloride	<0.82	<0.32
1,1-Dichloroethene	<1.3	<0.32
trans-1,2-Dichloroethene	<1.3	<0.32
1,1-Dichloroethane	<1.3	<0.32
cis-1,2-Dichloroethene	<1.3	<0.32
Chloroform	<0.16	<0.032
1,2-Dichloroethane (EDC)	<0.13	<0.032
Benzene	<1	<0.32
Trichloroethene	0.48	0.090
Tetrachloroethene	<22	<3.2
Ethylbenzene	<1.4	<0.32
m,p-Xylene	5.6	1.3
o-Xylene	2.1	0.49
1,2,4-Trimethylbenzene	<7.9	<1.6
Naphthalene	0.92	0.18

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SSV-4-012721	Client:	Aspect Consulting, LLC
Date Received:	01/27/21	Project:	Crownhill Elementary
Date Collected:	01/27/21	Lab ID:	101388-02 1/3.5
Date Analyzed:	01/28/21	Data File:	012814.D
Matrix:	Air	Instrument:	GCMS12
Units:	ug/m3	Operator:	VM

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

Compounds:	Concentration ug/m3	ppbv
Dichlorodifluoromethane	2.7	0.55
Vinyl chloride	<0.89	<0.35
1,1-Dichloroethene	<1.4	<0.35
trans-1,2-Dichloroethene	<1.4	<0.35
1,1-Dichloroethane	<1.4	<0.35
cis-1,2-Dichloroethene	<1.4	<0.35
Chloroform	<0.17	<0.035
1,2-Dichloroethane (EDC)	<0.14	<0.035
Benzene	<1.1	<0.35
Trichloroethene	<0.38	<0.07
Tetrachloroethene	<24	<3.5
Ethylbenzene	<1.5	<0.35
m,p-Xylene	4.3	0.98
o-Xylene	1.7	0.40
1,2,4-Trimethylbenzene	<8.6	<1.7
Naphthalene	1.2	0.23

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SSV-6-012721	Client:	Aspect Consulting, LLC
Date Received:	01/27/21	Project:	Crownhill Elementary
Date Collected:	01/27/21	Lab ID:	101388-03 1/3.3
Date Analyzed:	01/28/21	Data File:	012815.D
Matrix:	Air	Instrument:	GCMS12
Units:	ug/m3	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	96	70	130

Compounds:	Concentration ug/m3	ppbv
Dichlorodifluoromethane	2.1	0.42
Vinyl chloride	<0.84	<0.33
1,1-Dichloroethene	<1.3	<0.33
trans-1,2-Dichloroethene	<1.3	<0.33
1,1-Dichloroethane	<1.3	<0.33
cis-1,2-Dichloroethene	<1.3	<0.33
Chloroform	<0.16	<0.033
1,2-Dichloroethane (EDC)	<0.13	<0.033
Benzene	<1.1	<0.33
Trichloroethene	<0.35	<0.066
Tetrachloroethene	<22	<3.3
Ethylbenzene	<1.4	<0.33
m,p-Xylene	4.9	1.1
o-Xylene	2.0	0.47
1,2,4-Trimethylbenzene	<8.1	<1.6
Naphthalene	1.0	0.19

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SSV-5-012721	Client:	Aspect Consulting, LLC
Date Received:	01/27/21	Project:	Crownhill Elementary
Date Collected:	01/27/21	Lab ID:	101388-04 1/3.4
Date Analyzed:	01/28/21	Data File:	012816.D
Matrix:	Air	Instrument:	GCMS12
Units:	ug/m3	Operator:	VM

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

Compounds:	Concentration ug/m3	ppbv
Dichlorodifluoromethane	3.1	0.64
Vinyl chloride	<0.87	<0.34
1,1-Dichloroethene	<1.3	<0.34
trans-1,2-Dichloroethene	<1.3	<0.34
1,1-Dichloroethane	<1.4	<0.34
cis-1,2-Dichloroethene	<1.3	<0.34
Chloroform	<0.17	<0.034
1,2-Dichloroethane (EDC)	<0.14	<0.034
Benzene	<1.1	<0.34
Trichloroethene	<0.37	<0.068
Tetrachloroethene	<23	<3.4
Ethylbenzene	<1.5	<0.34
m,p-Xylene	4.3	0.98
o-Xylene	1.8	0.40
1,2,4-Trimethylbenzene	<8.4	<1.7
Naphthalene	1.0	0.20

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SSV-1-012721	Client:	Aspect Consulting, LLC
Date Received:	01/27/21	Project:	Crownhill Elementary
Date Collected:	01/27/21	Lab ID:	101388-05 1/3.5
Date Analyzed:	01/28/21	Data File:	012817.D
Matrix:	Air	Instrument:	GCMS12
Units:	ug/m3	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	98	70	130

Compounds:	Concentration ug/m3	ppbv
Dichlorodifluoromethane	2.6	0.53
Vinyl chloride	<0.89	<0.35
1,1-Dichloroethene	<1.4	<0.35
trans-1,2-Dichloroethene	<1.4	<0.35
1,1-Dichloroethane	<1.4	<0.35
cis-1,2-Dichloroethene	<1.4	<0.35
Chloroform	<0.17	<0.035
1,2-Dichloroethane (EDC)	<0.14	<0.035
Benzene	<1.1	<0.35
Trichloroethene	<0.38	<0.07
Tetrachloroethene	<24	<3.5
Ethylbenzene	<1.5	<0.35
m,p-Xylene	3.5	0.80
o-Xylene	<1.5	<0.35
1,2,4-Trimethylbenzene	<8.6	<1.7
Naphthalene	1.1	0.20

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SSV-2-012721	Client:	Aspect Consulting, LLC
Date Received:	01/27/21	Project:	Crownhill Elementary
Date Collected:	01/27/21	Lab ID:	101388-06 1/3.4
Date Analyzed:	01/28/21	Data File:	012818.D
Matrix:	Air	Instrument:	GCMS12
Units:	ug/m3	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	101	70	130

Compounds:	Concentration ug/m3	ppbv
Dichlorodifluoromethane	2.9	0.59
Vinyl chloride	<0.87	<0.34
1,1-Dichloroethene	<1.3	<0.34
trans-1,2-Dichloroethene	<1.3	<0.34
1,1-Dichloroethane	<1.4	<0.34
cis-1,2-Dichloroethene	<1.3	<0.34
Chloroform	<0.17	<0.034
1,2-Dichloroethane (EDC)	<0.14	<0.034
Benzene	<1.1	<0.34
Trichloroethene	<0.37	<0.068
Tetrachloroethene	<23	<3.4
Ethylbenzene	<1.5	<0.34
m,p-Xylene	3.2	0.73
o-Xylene	<1.5	<0.34
1,2,4-Trimethylbenzene	<8.4	<1.7
Naphthalene	<0.89	<0.17

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Crownhill Elementary
Date Collected:	Not Applicable	Lab ID:	01-213 MB
Date Analyzed:	01/28/21	Data File:	012811.D
Matrix:	Air	Instrument:	GCMS12
Units:	ug/m3	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	101	70	130

Compounds:	Concentration ug/m3	ppbv
Dichlorodifluoromethane	<0.49	<0.1
Vinyl chloride	<0.26	<0.1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
Chloroform	<0.049	<0.01
1,2-Dichloroethane (EDC)	<0.04	<0.01
Benzene	<0.32	<0.1
Trichloroethene	<0.11	<0.02
Tetrachloroethene	<6.8	<1
Ethylbenzene	<0.43	<0.1
m,p-Xylene	<0.87	<0.2
o-Xylene	<0.43	<0.1
1,2,4-Trimethylbenzene	<2.5	<0.5
Naphthalene	<0.26	<0.05

Date of Report: 02/05/21
Date Received: 01/27/21
Project: Crownhill Elementary, F&BI 101388
Date Extracted: 02/04/21
Date Analyzed: 02/04/21

RESULTS FROM THE ANALYSIS OF AIR SAMPLES FOR HELIUM USING METHOD ASTM D1946

Results Reported as % Helium

Sample ID Laboratory ID	Helium
SSV-3-012721 101388-01	<0.6
SSV-4-012721 101388-02	<0.6
SSV-6-012721 101388-03	<0.6
SSV-5-012721 101388-04	<0.6
SSV-1-012721 101388-05	<0.6
SSV-2-012721 101388-06	<0.6
Method Blank	<0.6

Date of Report: 02/05/21
Date Received: 01/27/21
Project: Crownhill Elementary, F&BI 101388

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

Laboratory Code: 101388-01 1/3.2 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
Dichlorodifluoromethane	ug/m3	2.2	2.3	4
Vinyl chloride	ug/m3	<0.82	<0.82	nm
1,1-Dichloroethene	ug/m3	<1.3	<1.3	nm
trans-1,2-Dichloroethene	ug/m3	<1.3	<1.3	nm
1,1-Dichloroethane	ug/m3	<1.3	<1.3	nm
cis-1,2-Dichloroethene	ug/m3	<1.3	<1.3	nm
Chloroform	ug/m3	<0.16	<0.16	nm
1,2-Dichloroethane (EDC)	ug/m3	<0.13	<0.13	nm
Benzene	ug/m3	<1	<1	nm
Trichloroethene	ug/m3	0.48	0.52	8
Tetrachloroethene	ug/m3	<22	<22	nm
Ethylbenzene	ug/m3	<1.4	<1.4	nm
m,p-Xylene	ug/m3	5.6	5.4	4
o-Xylene	ug/m3	2.1	2.0	5
1,2,4-Trimethylbenzene	ug/m3	<7.9	<7.9	nm
Naphthalene	ug/m3	0.92	0.89	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Dichlorodifluoromethane	ug/m3	67	90	70-130
Vinyl chloride	ug/m3	35	87	70-130
1,1-Dichloroethene	ug/m3	54	98	70-130
trans-1,2-Dichloroethene	ug/m3	54	98	70-130
1,1-Dichloroethane	ug/m3	55	89	70-130
cis-1,2-Dichloroethene	ug/m3	54	99	70-130
Chloroform	ug/m3	66	96	70-130
1,2-Dichloroethane (EDC)	ug/m3	55	93	70-130
Benzene	ug/m3	43	94	70-130
Trichloroethene	ug/m3	73	95	70-130
Tetrachloroethene	ug/m3	92	102	70-130
Ethylbenzene	ug/m3	59	99	70-130
m,p-Xylene	ug/m3	120	103	70-130
o-Xylene	ug/m3	59	105	70-130
1,2,4-Trimethylbenzene	ug/m3	66	107	70-130
Naphthalene	ug/m3	71	127	70-130

Date of Report: 02/05/21
Date Received: 01/27/21
Project: Crownhill Elementary, F&BI 101388

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR HELIUM USING METHOD ASTM D1946

Laboratory Code: 101388-06 (Duplicate)

Analyte	Sample Result (%)	Duplicate Result (%)	Relative Percent Difference	Acceptance Criteria
Helium	<0.6	<0.6	nm	0-20

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.

101388

SAMPLE CHAIN OF CUSTODY 01-27-21

Page # 1 of 1

Report To Matthew Lewis

Company Aspect Consulting

Address

City, State, ZIP

Phone 316-617-0499 Email

SAMPLERS (*signature*)

PROJECT NAME & ADDRESS: Crownhill Elementary

PO #

NOTES:

INVOICE TO

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	TO15 Full Scan	TO15 BTEXN	TO15 cVOCs*	APH	Helium	H_2S	*Project Specific TO-15 Notes
SSV-3-012721	01	2432	307	IA / SG	1/27/21	28	1006	4	1011			X		X	X	
SSV-4-012721	02	2435	306	IA / SG	"	30	1059	5	1104			X		X	X	
SSV-6-012721	03	3254	308	IA / SG	"	30	1141	5	1146			X		X	X	
SSV-5-012721	04	3387	304	IA / SG	"	30	1224	5	1229			X		X	X	
SSV-1-012721	05	3673	302	IA / SG	"	30	1259	5	1304			X		X	X	
SSV-2-012721	06	3312	301	IA / SG	"	30	1340	5	1344			X		X	X	
				IA / SG												
				IA / SG										Samples received at 21 °C		

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Daniel Bibaak	Aspect	01/27/21	1555
Received by:	Michael Erdahl	Friedman & Bruya	1/27/21	1555
Relinquished by:				
Received by:				

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

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 101388
Work Order Number: 2101441

February 03, 2021

Attention Michael Erdahl:

Fremont Analytical, Inc. received 6 sample(s) on 1/27/2021 for the analyses presented in the following report.

Sulfur Compounds by EPA Method TO-15

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *02/03/2021*

CLIENT: Friedman & Bruya
Project: 101388
Work Order: 2101441

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2101441-001	SSV-3-012721	01/27/2021 10:11 AM	01/27/2021 4:37 PM
2101441-002	SSV-4-012721	01/27/2021 11:04 AM	01/27/2021 4:37 PM
2101441-003	SSV-6-012721	01/27/2021 11:46 AM	01/27/2021 4:37 PM
2101441-004	SSV-5-012721	01/27/2021 12:29 PM	01/27/2021 4:37 PM
2101441-005	SSV-1-012721	01/27/2021 1:04 PM	01/27/2021 4:37 PM
2101441-006	SSV-2-012721	01/27/2021 1:44 PM	01/27/2021 4:37 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original

Case Narrative

WO#: **2101441**
Date: **2/3/2021**

CLIENT: Friedman & Bruya
Project: 101388

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Air samples are reported in ppbv and ug/m3.

The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Standard temperature and pressure assumes 24.45 = (25C and 1 atm).

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Client: **Friedman & Bruya**
WorkOrder: 2101441
Project: 101388

Client Sample ID: SSV-3-012721
Lab ID: 2101441-001A
Sample Type: Tedlar Bag

Date Sampled: 1/27/2021
Date Received: 1/27/2021

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Sulfur Compounds by EPA Method TO-15								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
Hydrogen Sulfide	<10.0	<13.9	10.0	13.9		EPA-TO-15	01/28/2021	MS
Surr: 4-Bromofluorobenzene	83.7 %Rec	--	70-130	--		EPA-TO-15	01/28/2021	MS

Client: **Friedman & Bruya**
WorkOrder: 2101441
Project: 101388

Client Sample ID: SSV-4-012721
Lab ID: 2101441-002A
Sample Type: Tedlar Bag

Date Sampled: 1/27/2021
Date Received: 1/27/2021

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Sulfur Compounds by EPA Method TO-15								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
Hydrogen Sulfide	<10.0	<13.9	10.0	13.9		EPA-TO-15	01/28/2021	MS
Surr: 4-Bromofluorobenzene	88.4 %Rec	--	70-130	--	I	EPA-TO-15	01/28/2021	MS

NOTES:
I - Indicates an analyte with an internal standard that does not meet established acceptance criteria.

Client: **Friedman & Bruya**
WorkOrder: 2101441
Project: 101388

Client Sample ID: SSV-6-012721
Lab ID: 2101441-003A
Sample Type: Tedlar Bag

Date Sampled: 1/27/2021
Date Received: 1/27/2021

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Sulfur Compounds by EPA Method TO-15								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
Hydrogen Sulfide	<10.0	<13.9	10.0	13.9		EPA-TO-15	01/28/2021	MS
Surr: 4-Bromofluorobenzene	86.9 %Rec	--	70-130	--		EPA-TO-15	01/28/2021	MS

Client: **Friedman & Bruya**
WorkOrder: 2101441
Project: 101388

Client Sample ID: SSV-5-012721
Lab ID: 2101441-004A
Sample Type: Tedlar Bag

Date Sampled: 1/27/2021
Date Received: 1/27/2021

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Sulfur Compounds by EPA Method TO-15								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
Hydrogen Sulfide	<10.0	<13.9	10.0	13.9		EPA-TO-15	01/28/2021	MS
Surr: 4-Bromofluorobenzene	84.3 %Rec	--	70-130	--		EPA-TO-15	01/28/2021	MS

Client: **Friedman & Bruya**
WorkOrder: 2101441
Project: 101388

Client Sample ID: SSV-1-012721
Lab ID: 2101441-005A
Sample Type: Tedlar Bag

Date Sampled: 1/27/2021
Date Received: 1/27/2021

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Sulfur Compounds by EPA Method TO-15								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
Hydrogen Sulfide	<10.0	<13.9	10.0	13.9		EPA-TO-15	01/28/2021	MS
Surr: 4-Bromofluorobenzene	83.4 %Rec	--	70-130	--		EPA-TO-15	01/28/2021	MS

Client: **Friedman & Bruya**
WorkOrder: 2101441
Project: 101388

Client Sample ID: SSV-2-012721
Lab ID: 2101441-006A
Sample Type: Tedlar Bag

Date Sampled: 1/27/2021
Date Received: 1/27/2021

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Sulfur Compounds by EPA Method TO-15								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
Hydrogen Sulfide	<10.0	<13.9	10.0	13.9		EPA-TO-15	01/28/2021	MS
Surr: 4-Bromofluorobenzene	82.2 %Rec	--	70-130	--		EPA-TO-15	01/28/2021	MS

Work Order: 2101441
CLIENT: Friedman & Bruya
Project: 101388

QC SUMMARY REPORT

Sulfur Compounds by EPA Method TO-15

Sample ID: **LCS-R64972**	SampType: **LCS**	Units: **ppbv**	Prep Date: **1/28/2021**	RunNo: **64972**
Client ID: **LCSW**	Batch ID: **R64972**		Analysis Date: **1/28/2021**	SeqNo: **1307025**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hydrogen Sulfide	93.4	10.0	100.0	0	93.4	70	130				
Surr: 4-Bromofluorobenzene	3.76		4.000		94.1	70	130				

Sample ID: **2101441-006AREP**	SampType: **REP**	Units: **ppbv**	Prep Date: **1/28/2021**	RunNo: **64972**
Client ID: **SSV-2-012721**	Batch ID: **R64972**		Analysis Date: **1/28/2021**	SeqNo: **1307032**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hydrogen Sulfide	ND	10.0						0		25	H
Surr: 4-Bromofluorobenzene	3.29		4.000		82.2	70	130		0		H

Sample ID: **MB-R64972**	SampType: **MBLK**	Units: **ppbv**	Prep Date: **1/28/2021**	RunNo: **64972**
Client ID: **MBLKW**	Batch ID: **R64972**		Analysis Date: **1/28/2021**	SeqNo: **1307033**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hydrogen Sulfide	ND	10.0									
Surr: 4-Bromofluorobenzene	3.30		4.000		82.5	70	130				

Sample Log-In Check List

Client Name:	**FB**	Work Order Number:	**2101441**
Logged by:	**Carissa True**	Date Received:	**1/27/2021 4:37:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☐	No ☑	NA ☐
		Air samples		
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
6.	Was an attempt made to cool the samples?	Yes ☐	No ☐	NA ☑
7.	Were all items received at a temperature of >2°C to 6°C *	Yes ☐	No ☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☑	No ☐	NA ☐

Person Notified:	Michael Erdahl	Date:	1/28/2021
By Whom:	Carissa True	Via:	☑ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:	Confirm method		
Client Instructions:	TO15		

19. Additional remarks:

Item Information

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2101441

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER Fremont

PROJECT NAME/NO.	PO #
101388	B-128

REMARKS

Please Email Results Aspect EDD

TURNAROUND TIME

☒ Standard TAT

☐ RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Dispose after 30 days

☐ Return samples

☐ Will call with instructions

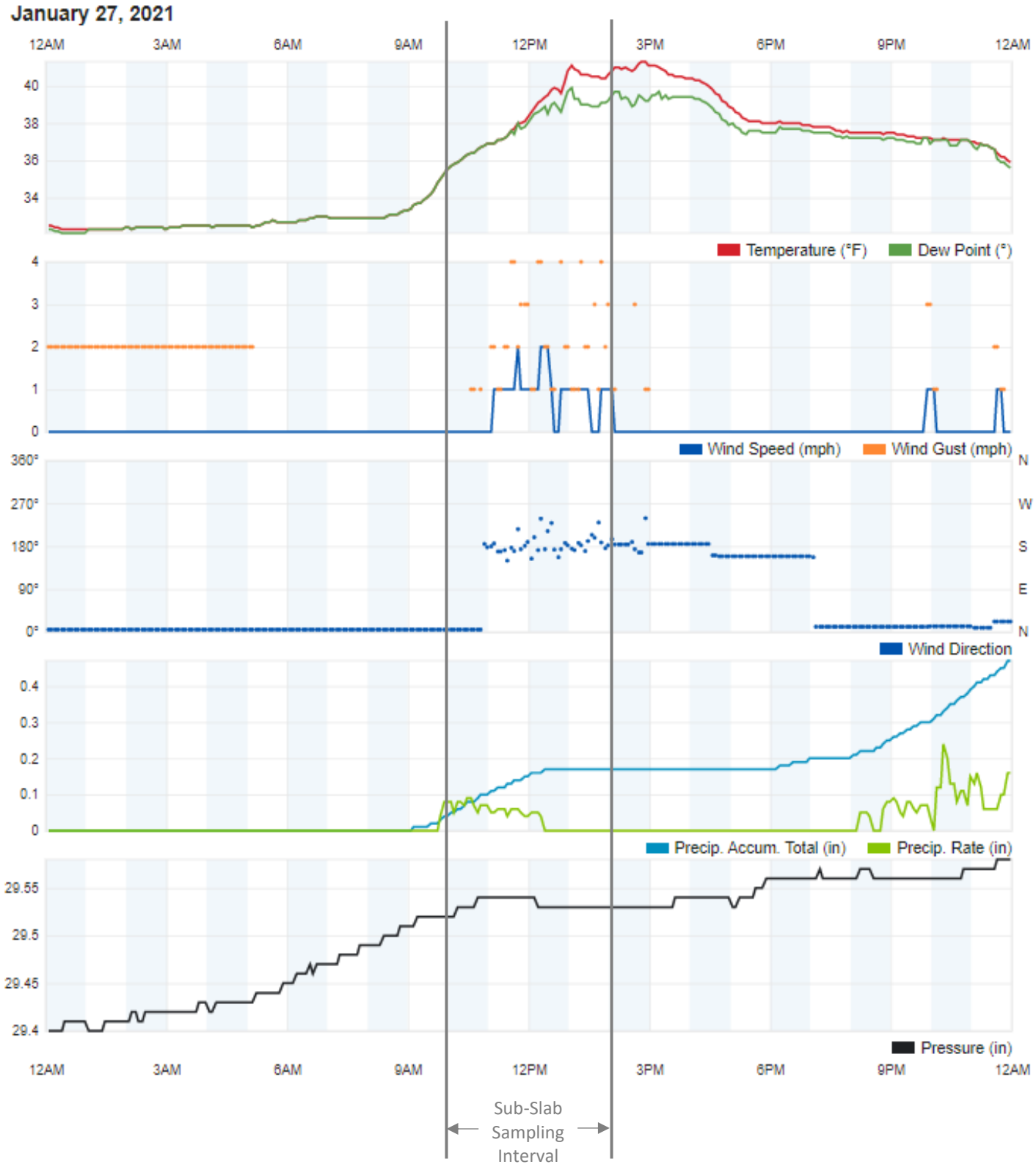
Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Dioxins/Furans	EPH	VPH	H_2S							Notes
SSV-3-012721		1/27/21	1011	air	1				x							
SSV-4-012721			1104		1				x							
SSV-6-012721			1146		1				x							
SSV-5-012721			1229		1				x							
SSV-1-012721			1304		1				x							
SSV-2-012721			1344		1				x							

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:		Michael Erdahl	Friedman & Bruya	1/27/21	1604
Received by:		Carter Johnson	FAI	1/27/21	1637
Relinquished by:					
Received by:					

APPENDIX E

Weather Conditions on January 27, 2021



Appendix E

Weather Conditions during Sub-Slab Vapor Sampling on January 27, 2021

Bridletree Station, Bremerton, (KWABREME21)

Aspect Consulting, LLC

APPENDIX F

Report Limitations and Guidelines for Use

REPORT LIMITATIONS AND USE GUIDELINES

Reliance Conditions for Third Parties

This report was prepared for the exclusive use of the Client. No other party may rely on this report or the product of our services without the express written consent of Aspect Consulting, LLC (Aspect). This limitation is to provide our firm with reasonable protection against liability claims by third parties with whom there would otherwise be no contractual conditions or limitations and guidelines governing their use of the report. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and recognized standards of professionals in the same locality and involving similar conditions.

Services for Specific Purposes, Persons and Projects

Aspect has performed the services in general accordance with the scope and limitations of our Agreement. This report has been prepared for the exclusive use of the Client and their authorized third parties, approved in writing by Aspect. This report is not intended for use by others, and the information contained herein is not applicable to other properties.

This report is not, and should not, be construed as a warranty or guarantee regarding the presence or absence of hazardous substances or petroleum products that may affect the subject property. The report is not intended to make any representation concerning title or ownership to the subject property. If real property records were reviewed, they were reviewed for the sole purpose of determining the subject property's historical uses. All findings, conclusions, and recommendations stated in this report are based on the data and information provided to Aspect, current use of the subject property, and observations and conditions that existed on the date and time of the report.

Aspect structures its services to meet the specific needs of our clients. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and subject property. This report should not be applied for any purpose or project except the purpose described in the Agreement.

This Report Is Project-Specific

Aspect considered a number of unique, project-specific factors when establishing the Scope of Work for this project and report. You should not rely on this report if it was:

- Not prepared for you
- Not prepared for the specific purpose identified in the Agreement
- Not prepared for the specific real property assessed
- Completed before important changes occurred concerning the subject property, project or governmental regulatory actions

If changes are made to the project or subject property after the date of this report, Aspect should be retained to assess the impact of the changes with respect to the conclusions contained in the report.

Geoscience Interpretations

The geoscience practices (geotechnical engineering, geology, and environmental science) require interpretation of spatial information that can make them less exact than other engineering and natural science disciplines. It is important to recognize this limitation in evaluating the content of the report. If you are unclear how these "Report Limitations and Use Guidelines" apply to your project or site, you should contact Aspect.

Discipline-Specific Reports Are Not Interchangeable

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually address any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding the subject property.

Environmental Regulations Are Not Static

Some hazardous substances or petroleum products may be present near the subject property in quantities or under conditions that may have led, or may lead, to contamination of the subject property, but are not included in current local, state or federal regulatory definitions of hazardous substances or petroleum products or do not otherwise present potential liability. Changes may occur in the standards for appropriate inquiry or regulatory definitions of hazardous substance and petroleum products; therefore, this report has a limited useful life.

Property Conditions Change Over Time

This report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time (for example, Phase I ESA reports are applicable for 180 days), by events such as a change in property use or occupancy, or by natural events, such as floods, earthquakes, slope failure or groundwater fluctuations. If more than six months have passed since issuance of our report, or if any of the described events may have occurred following the issuance of the report, you should contact Aspect so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Phase I ESAs – Uncertainty Remains After Completion

Aspect has performed the services in general accordance with the scope and limitations of our Agreement and the current version of the “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process”, ASTM E1527, and U.S. Environmental Protection Agency (EPA)'s Federal Standard 40 CFR Part 312 "Innocent Landowners, Standards for Conducting All Appropriate Inquiries".

No ESA can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with subject property. Performance of an ESA study is intended to reduce, but not eliminate, uncertainty regarding the potential for environmental conditions affecting the subject property. There is always a potential that areas with contamination that were not identified during this ESA exist at the subject property or in the study area. Further evaluation of such potential would require additional research, subsurface exploration, sampling and/or testing.

Historical Information Provided by Others

Aspect has relied upon information provided by others in our description of historical conditions and in our review of regulatory databases and files. The available data does not provide definitive information with regard to all past uses, operations or incidents affecting the subject property or adjacent properties. Aspect makes no warranties or guarantees regarding the accuracy or completeness of information provided or compiled by others.

Exclusion of Mold, Fungus, Radon, Lead, and HBM

Aspect’s services do not include the investigation, detection, prevention or assessment of the presence of molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detection, assessment, prevention or abatement of molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts. Aspect’s services also do not include the investigation or assessment of hazardous building materials (HBM) such as asbestos, polychlorinated biphenyls (PCBs) in light ballasts, lead based paint, asbestos-containing building materials, urea-formaldehyde insulation in on-site structures or debris or any other HBMs. Aspect’s services do not include an evaluation of radon or lead in drinking water, unless specifically requested.