2021 ANNUAL REPORT

Remedy Implementation
Crownhill Elementary School Site

Prepared for: Bremerton School District

Project No. 100094-H-009 • June 14, 2022

Aspect CONSULTING

earth + water

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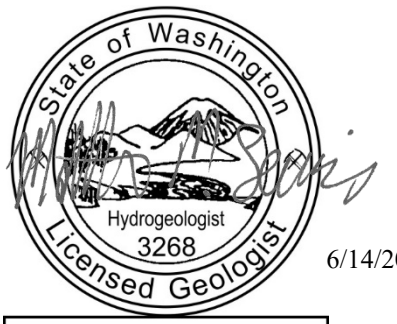

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1 Introduction

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)

[1] Requirements for sampling subslab soil vapor are specified in the Cover System Inspection and Maintenance Plan (Aspect, 2015c). Subslab soil vapor sampling was last conducted in November 2020 and is next required in November 2025. 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, 2015c).

- "Cover System Inspection and Maintenance Plan" (Aspect, 2015c)

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 2020 (Aspect, 2016 through Aspect, 2021) are referenced in Section 6 of this report. This report documents activities completed in 2021.

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 2021

This section documents routine cleanup-related activities completed by BSD during the 2021 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

The Groundwater/LNAPL Monitoring and Contingency Plan (Aspect, 2015b) requires periodic monitoring activities during the second and fourth quarters of the year. Locations of groundwater monitoring wells and LNAPL monitoring/recovery wells are shown on Figure 1. Table 1 lists 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.

2.1.1 Groundwater Sampling Results and Interpretation

Semiannual groundwater monitoring was conducted by Aspect on April 14 and 21, 2021 and November 11 and 22, 2021[4]. Samples were collected in laboratory-supplied containers and submitted for analysis to Friedman and Bruya Laboratory under chain-of-custody procedures. Results for the groundwater monitoring wells from December 2013 through 2021 are summarized 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

[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.

[4] Groundwater sampling originally scheduled for October 2021 was delayed due to equipment issues and COVID-related supply-chain complications.

groundwater samples submitted for analysis in April and November 2021 are provided in Appendix C.

Diesel-range TPHs were detected in groundwater at concentrations above the Site cleanup level of 500 micrograms per liter (µg/L) at monitoring wells MW-5 (1,300 µg/L) and MW-12 (1,900 µg/L). Diesel-range TPHs were detected at concentrations below the Site cleanup level at MW-10 (55 µg/L in November) and MW-15 (50 µg/L in April). Diesel-range TPHs were not detected at the reporting limit at MW-10 (50 µg/L in April) and MW-15 (95 µg/L in November). The laboratory qualified all diesel-range TPH detections with "sample chromatographic pattern does not resemble the fuel standard used for quantitation."

MW-15 is located immediately downgradient of the LNAPL area, is the conditional point of compliance for LNAPL migration, and serves as a sentinel well for TPH plume migration[5]. Diesel-range TPH was detected at this well in the April 2021 monitoring round at a concentration of 50 µg/L, however it was not detected in the November 2021 round due to a higher detection limit of 95 µg/L in the analysis. The April 2021 round marks the fifth 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).

Motor oil-range TPHs were detected in groundwater at a concentration above the Site cleanup level of 500 µg/L at monitoring well MW-12 (990 µg/L). Motor oil-range TPHs were detected at concentrations below the Site cleanup level at MW-5 (490 µg/L), and were not detected at the reporting limit at MW-10 (250 µg/L), and MW-15 (480 µg/L). The laboratory qualified all diesel-range TPH detections with "sample chromatographic pattern does not resemble the fuel standard used for quantitation."

Consistent with previous years, motor oil-range TPH was not detected at the reporting limit (480 µg/L) at MW-15 in 2021.

TCE was detected in groundwater at a concentration above the Site cleanup level of 5 µg/L at monitoring well MW-9 (7.2 µg/L in April and 5.4 µg/L in November). TCE was not detected at the reporting limit at MW-10 (1.0 µg/L in April and 0.5 µg/L in November), and the McKinney domestic well (1.0 µg/L in April and 0.5 µg/L in November).

MW-9 is the only well with TCE cleanup level exceedances. TCE concentrations measured at this well increased marginally from 2020 to 2021 and remained within the range of previous measurements.

Water samples collected from the McKinney domestic well (sampled in both 2021 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.

Total arsenic was detected in groundwater at a concentration above the Site cleanup level of 5 µg/L at monitoring well MW-6 (28.6 µg/L in April and 37.1 µg/L in November). Arsenic was detected in groundwater below the Site cleanup level at MW-10 (2.0 µg/L in April and 1.9 µg/L in November).

Well MW-6 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

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

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 2021.

Figure 2 shows arsenic concentrations measured at MW-6 and MW-10 since those wells were installed. Concentrations at MW-6 have exhibited an increasing and fluctuating trend, and the cause is uncertain but may be related to complex geochemical mechanisms mobilizing naturally occurring arsenic in aquifer materials. The 40 µg/L total arsenic threshold at MW-6 may trigger a contingency action sometime by 2023. These contingency actions include submitting a report within 30 days of receiving lab results that details possible causes of the increasing concentrations and potential solutions to address them. In anticipation of this requirement, Aspect recommends adding alkalinity, dissolved iron, and dissolved manganese to the list of analytes for select wells during routine 2022 groundwater monitoring events. These supplemental groundwater quality parameters will help further characterize groundwater conditions and begin development of cost-effective remediation to reverse the arsenic trend in MW-6 if required.

2.1.2 LNAPL Thickness Monitoring

LNAPL thickness monitoring was conducted on April 14, 2021 and November 11, 2021. 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. Thicknesses measured in 2021 ranged from 0.6 feet in EW-17 to 1.8 feet in MW-13 (November measurements).

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 2021, 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 November 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 3.4 liters of LNAPL was bailed in 2021. Since bailing began in 2012, an estimated total of about 29.4 liters of LNAPL have been removed.

2.3 Site Inspections

Semiannual Site inspections were conducted on June 23 and December 9, 2021, 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 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 2021 inspection events. The 2021 inspections did not identify any cover system deficiencies in other areas of the Site or other action items.

3 Nonroutine Activities Completed in 2021

3.1 New Garden Area Fence

In October 2021, on-ground garden beds were constructed, and wood fence posts were constructed around a new gardening area on the east side of the Site. The fence posts were installed by a volunteer due to a miscommunication about prohibitions against soil disturbances and therefore, Ecology was notified as required by the Agreed Order. Aspect conducted an inspection of the new garden area to document the planter bed construction and fence hole depths and submitted a report to Ecology (Aspect, 2022). Ecology has since issued a letter instructing the school to remove the fence posts and find an alternative planter box solution that is not in contact with the ground surface. The new gardening area is presented in figure 4, please see the Crownhill Elementary School Site: Garden Inspection for details of the inspection. BSD has since complied with the Ecology decision and constructed approved garden containers separated from contact with the ground by concrete pavers. Construction details will be included in the 2022 Annual Monitoring Report.

4 Statement of Compliance

On behalf of BSD, Aspect certifies that the remedy implementation activities completed at the Site in 2021 complied with the requirements of the CAP, Agreed Order No. DE11107, and the remedy implementation work plans approved by Ecology.

5 Plans for 2022

The following remedy implementation activities are planned for 2022:

- Conduct semiannual rounds of groundwater/LNAPL monitoring and LNAPL removal (scheduled for April and October 2022)[6]
- Conduct semiannual Site inspections (scheduled for June and December 2022)

In addition to routine monitoring and inspection, Aspect recommends temporary, supplemental groundwater sampling to better understand and address total arsenic concentrations at MW-6. Supplemental groundwater sampling includes total alkalinity, dissolved iron, and dissolved manganese to further assess the geochemical conditions in groundwater. These samples will be collected from monitoring wells MW-5, MW-6, MW-9, MW-10, MW-12, and MW-15 when these wells are routinely sampled in April and/or October 2022. This is to prepare for analysis that will be required if arsenic concentrations are detected above 40 µg/L in MW-6.

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.

[6] 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 2022.

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.

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

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Aspect Consulting, LLC (Aspect), 2022, Crownhill Elementary School Site: Garden Inspection, prepared for Bremerton School District, January 24, 2022.

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 D titled "Report Limitations and Guidelines for Use" for additional information governing the use of this report.

TABLES

Table 1. 2021 Well Monitoring Program Summary

Project No. 100094-H-009, 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]	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) Includes both total and dissolved arsenic; 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
	04/14/21	116.92	20.03	**1,300 x**	490 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**
	04/14/21	125.13	8.74	na	na	na	**28.6**
	11/22/21	125.15	8.72	na	na	na	**37.1**
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
	04/21/21	114.00	20.39	na	na	**7.2**	na
	11/11/21	nm[4]	--	na	na	**5.4**	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
	04/14/21	120.80	11.53	50 U	250 U	1.0 U	2.0
	11/11/21	121.20	11.13	55 x	250 U	0.5 U	1.9
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
	11/11/21	115.60	18.27	**1,900 x**	**990 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]	na	na
	04/14/21	nm[4]	--	50 x	250 U	na	na
	11/11/21	nm[4]	--	95 U	480 U	na	na
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
	04/14/21	nm	--	na	na	1.0 U	na
	11/11/21	nm	--	na	na	0.5 U	na

na not analyzed
nm not measured
TCE trichloroethene
TPH total petroleum hydrocarbons
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) Samples from McKinney well were initially 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)
	04/15/21	1.20	0.19	(Note 4)
	11/11/21	1.20	0.34	(Note 4)
Cumulative LNAPL Removal			2.91	
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)
	04/15/21	1.00	0.33	(Note 4)
	11/11/21	1.80	0.37	(Note 4)
Cumulative LNAPL Removal			4.98	
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	
	04/15/21	0.90	0.39	
	11/11/21	0.80	0.34	
Cumulative LNAPL Removal			5.18	
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)
	04/15/21	0.80	0.60	(Note 4)
	11/11/21	0.80	0.40	(Note 4)
Cumulative LNAPL Removal			9.90	
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)
	04/15/21	0.50	0.25	(Note 4)
	11/11/21	0.60	0.23	(Note 4)
Cumulative LNAPL Removal			5.60	
TOTAL LNAPL REMOVED			**28.6**	**(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.

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

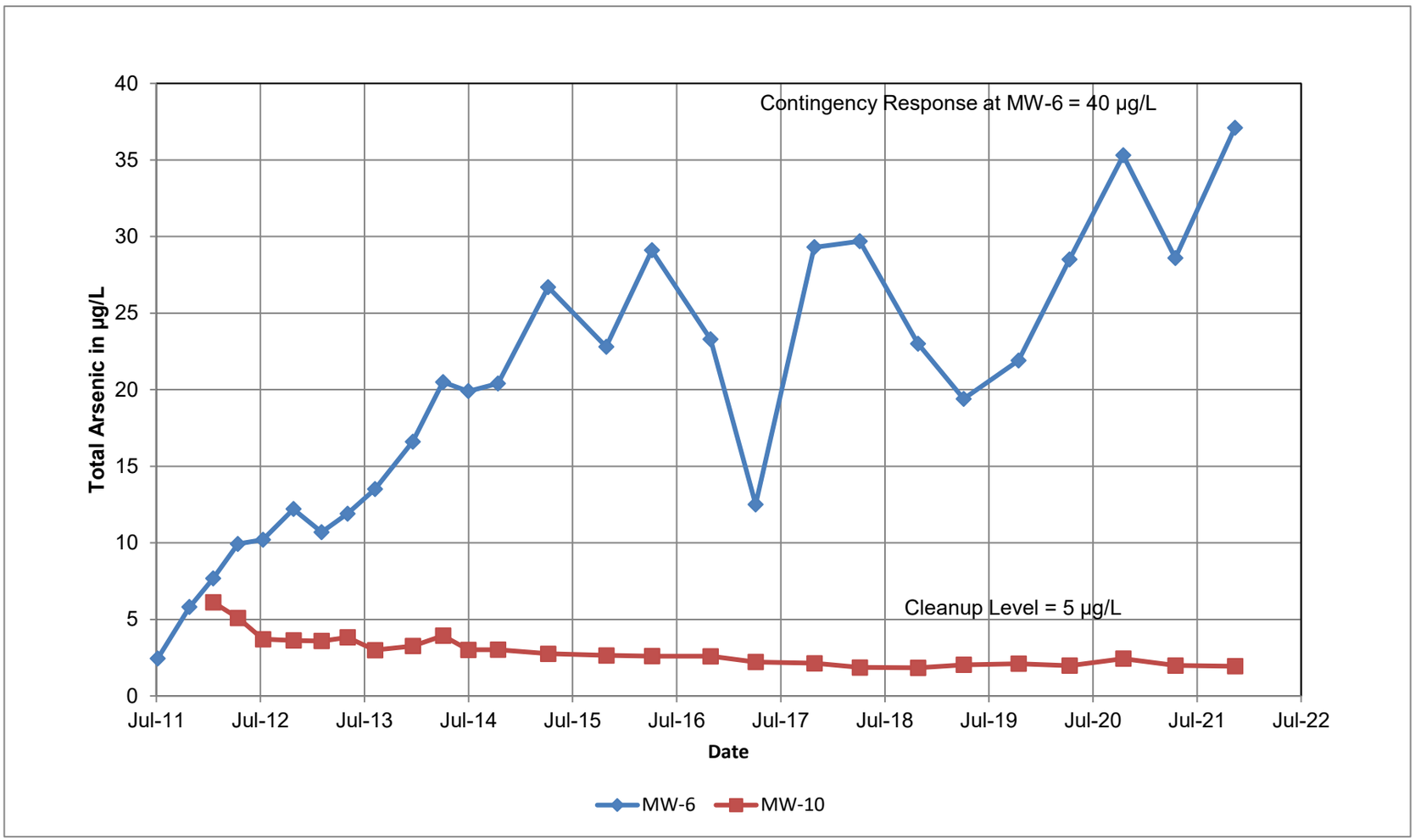
2021 Annual Report
Crownhill Elementary
Bremerton, Washington

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

GIS Path: T:\projects_8\CrownHillElementary\Delivered\Annual Report 2019\01-Site Plan.mxd || User: ecrumbaker || Print Date: 1/10/2020 || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 1/10/2020

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

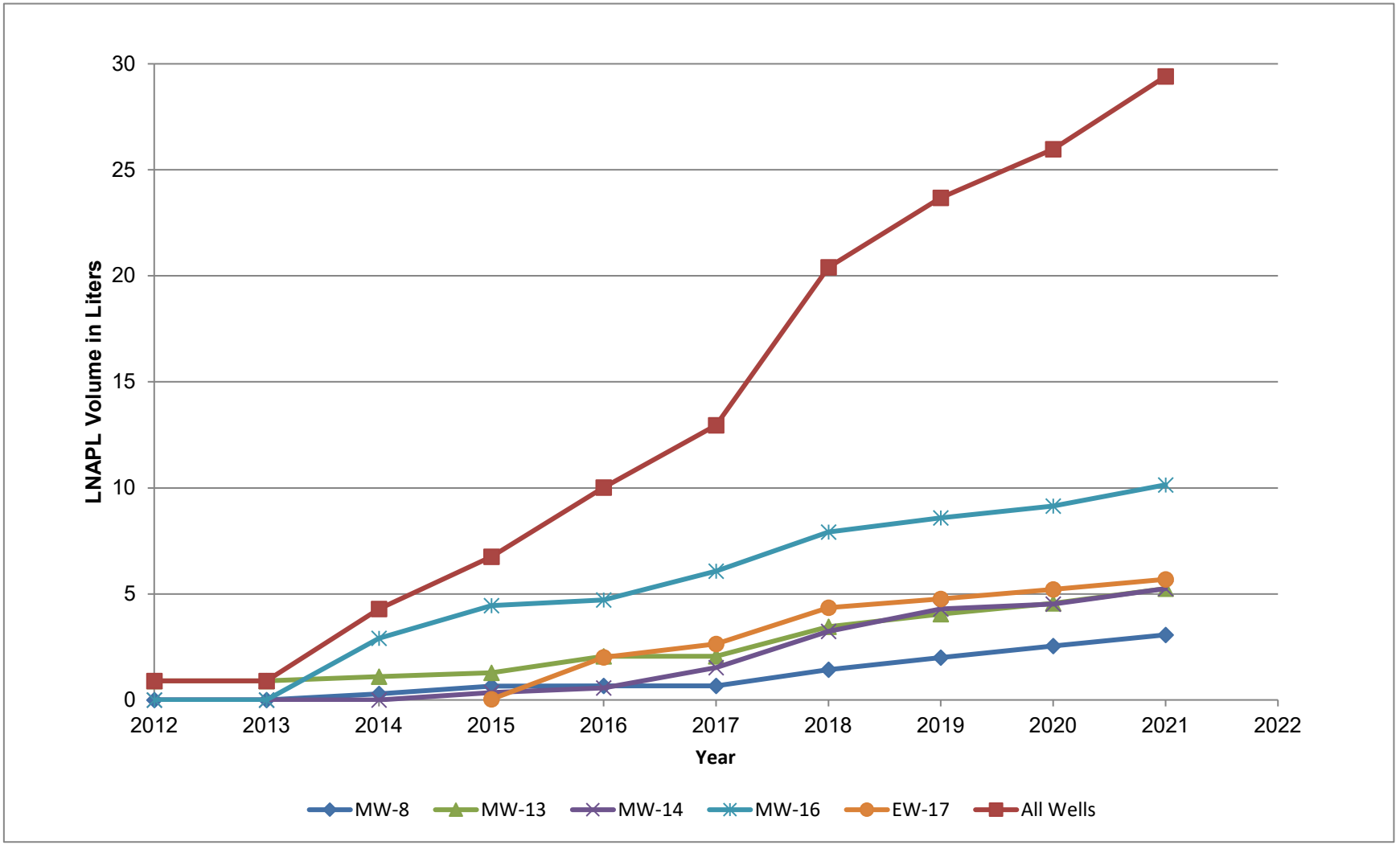
Crownhill Elementary, Bremerton, Washington



Notes:

1) Well MW-6, installed in March 2011, provides early warning of potential arsenic migration.

2) Well MW-10, installed in December 2011, is the conditional point of compliance for arsenic in groundwater.

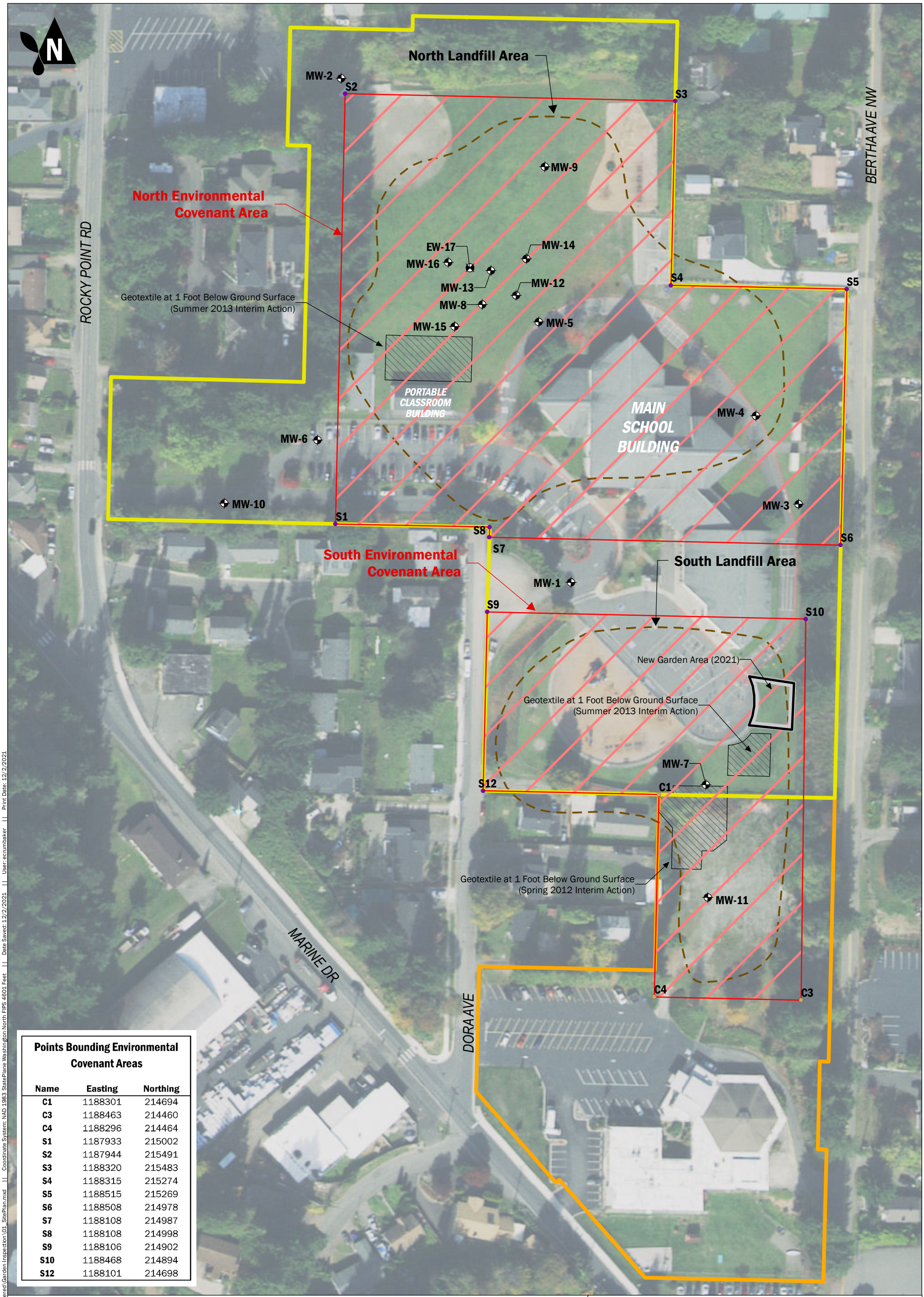


Aspect Consulting

12/11/2021

V:\100094 BSD Crownhill Elementary RIFS\Deliverables\Remediation Implementation\2021 Annual Report\Tables and Figures\Tbls 1-3 and Figs 2-3_Nov

Figure 3. Cumulative LNAPL Removal Over Time



Points Bounding Environmental Covenant Areas

Name	Easting	Northing
C1	1188301	214694
C3	1188463	214460
C4	1188296	214464
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
S12	1188101	214698

Monitoring Well

Extraction Well

Area of Environmental Covenant Soil and Structure Prohibitions

Interpreted Extent of Landfill Activity

Bremerton School District Property Boundary

Bremerton United Methodist Church Property Boundary

0 100 200
Feet

Garden Area

2021 Annual Report
Crownhill Elementary
Bremerton, Washington

Aspect Consulting	DEC-2021	BY: PPW	FIGURE NO. 4
	PROJECT NO. 100094-H	REV BY: EAC / ML	

GIS Path: T:\projects_8\CrownHillElementary\Delivered\Garden Inspection\01_SitePlan.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 12/2/2021 || User: ecrumbaker || Print Date: 12/2/2021

APPENDIX A

June 2021 Inspection Record and Photos

Aspect CONSULTING

Project Name: **Crownhill Elementary School**

Project No.: 100094

Date: 6/23/21

Inspector's Name: Matthew M. Lewis

Weather Conditions: Sunny, partly

Inspector's Signature: Matthew M. Lewis

Inspector's Title/Affiliation: Project Hydrogeologist

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 the custodian via phone on 6/24/21

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. 6/23/2021 site inspection

Photo Location 2. 6/23/2021 site inspection

Photo Location 3. 6/23/2021 site inspection

Photo Location 4. 6/23/2021 site inspection

APPENDIX B

December 2021 Inspection Record and Photos

Aspect CONSULTING

Project Name: **Crownhill Elementary School**
Project No.: 100094
Weather Conditions: Cloudy, 50°Fs

Date: 12/9/2021
Inspector's Name: Matthew M. Lewis
Inspector's Signature: Matthew M. Lewis
Inspector's Title/Affiliation: Project Hydrogeologist

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		New garden area and fence posts. Ecology notified.
b. Evidence of soil disturbance?	X		Fence posts installed less than 1 foot. See report*
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 school custodian via phone 12/10/2021.

* New Garden inspection report, Aspect December 2021.

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. 12/9/2021 site inspection

Photo Location 2. 12/9/2021 site inspection

Photo Location 3. 12/9/2021 site inspection

Photo Location 4. 6/23/2021 site inspection

APPENDIX C

Laboratory Reports,
2021 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

November 19, 2021

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

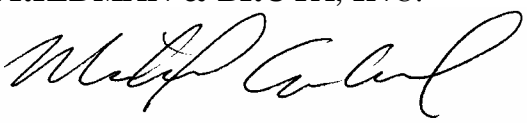
Dear Mr Lewis:

Included are the results from the testing of material submitted on November 12, 2021 from the 100094, F&BI 111268 project. There are 19 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
ASP1119R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on November 12, 2021 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC 100094, F&BI 111268 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
111268 -01	MW-09-111121
111268 -02	MW-10-111121
111268 -03	MW-15-111121
111268 -04	McKinney-111121
111268 -05	MW-12-111121

The dissolved arsenic for MW-15-111121 was filtered at Friedman and Bruya on November 15, 2021 at 12:42. The data were flagged accordingly.

All other quality control requirements were acceptable.

Date of Report: 11/19/21
Date Received: 11/12/21
Project: 100094, F&BI 111268
Date Extracted: 11/16/21
Date Analyzed: 11/16/21

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 47-140)
MW-10-111121 111268-02	55 x	<250	101
MW-15-111121 111268-03 1/1.9	<95	<480	133
MW-12-111121 111268-05 1/1.3	1,900 x	990 x	119
Method Blank 01-2695 MB	<50	<250	106

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-10-111121	Client:	Aspect Consulting, LLC
Date Received:	11/12/21	Project:	100094, F&BI 111268
Date Extracted:	11/16/21	Lab ID:	111268-02
Date Analyzed:	11/18/21 16:12:50	Data File:	111268-02.106
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.96

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-15-111121 f	Client:	Aspect Consulting, LLC
Date Received:	11/12/21	Project:	100094, F&BI 111268
Date Extracted:	11/15/21	Lab ID:	111268-03
Date Analyzed:	11/15/21	Data File:	111268-03.161
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.19

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	100094, F&BI 111268
Date Extracted:	11/16/21	Lab ID:	I1-752 mb
Date Analyzed:	11/16/21	Data File:	I1-752 mb.084
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank f	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	100094, F&BI 111268
Date Extracted:	11/15/21	Lab ID:	I1-746 mb
Date Analyzed:	11/15/21	Data File:	I1-746 mb.055
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-10-111121	Client:	Aspect Consulting, LLC
Date Received:	11/12/21	Project:	100094, F&BI 111268
Date Extracted:	11/15/21	Lab ID:	111268-02
Date Analyzed:	11/15/21	Data File:	111268-02.162
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.94

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-15-111121	Client:	Aspect Consulting, LLC
Date Received:	11/12/21	Project:	100094, F&BI 111268
Date Extracted:	11/15/21	Lab ID:	111268-03
Date Analyzed:	11/15/21	Data File:	111268-03.163
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.24

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	100094, F&BI 111268
Date Extracted:	11/15/21	Lab ID:	I1-747 mb
Date Analyzed:	11/15/21	Data File:	I1-747 mb.117
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 Dual Acquisition

Client Sample ID:	MW-09-111121	Client:	Aspect Consulting, LLC
Date Received:	11/12/21	Project:	100094, F&BI 111268
Date Extracted:	11/16/21	Lab ID:	111268-01
Date Analyzed:	11/16/21	Data File:	111609.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	85	117
Toluene-d8	95	88	112
4-Bromofluorobenzene	95	90	111

Compounds:	Concentration ug/L (ppb)
Trichloroethene	5.4

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW-10-111121	Client:	Aspect Consulting, LLC
Date Received:	11/12/21	Project:	100094, F&BI 111268
Date Extracted:	11/16/21	Lab ID:	111268-02
Date Analyzed:	11/16/21	Data File:	111610.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	85	117
Toluene-d8	95	88	112
4-Bromofluorobenzene	96	90	111

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<0.5

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	McKinney-111121	Client:	Aspect Consulting, LLC
Date Received:	11/12/21	Project:	100094, F&BI 111268
Date Extracted:	11/16/21	Lab ID:	111268-04
Date Analyzed:	11/16/21	Data File:	111611.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	85	117
Toluene-d8	99	88	112
4-Bromofluorobenzene	98	90	111

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<0.5

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	100094, F&BI 111268
Date Extracted:	11/16/21	Lab ID:	01-2584 mb
Date Analyzed:	11/16/21	Data File:	111607.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	85	117
Toluene-d8	99	88	112
4-Bromofluorobenzene	100	90	111

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<0.5

Date of Report: 11/19/21
Date Received: 11/12/21
Project: 100094, F&BI 111268

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	102	61-133	2

Date of Report: 11/19/21
Date Received: 11/12/21
Project: 100094, F&BI 111268

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

Laboratory Code: 111261-01 (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	92	87	75-125	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	90	80-120

Date of Report: 11/19/21
Date Received: 11/12/21
Project: 100094, F&BI 111268

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

Laboratory Code: 111231-03 (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	91	92	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	94	80-120

Date of Report: 11/19/21
Date Received: 11/12/21
Project: 100094, F&BI 111268

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

Laboratory Code: 111261-01 (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	93	95	75-125	2

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: 11/19/21
Date Received: 11/12/21
Project: 100094, F&BI 111268

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

Laboratory Code: 111268-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Trichloroethene	ug/L (ppb)	10	<0.5	98	43-133

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	97	70-130	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.

11268

SAMPLE CHAIN OF CUSTODY 11-12-21

E02/VW2/AI3

Page # 1 of 1

Report To Matthew Lewic

Company Aspect Consulting

Address 710 2nd Ave Ste 550

City, State, ZIP Seattle, Wa, 98104

Phone 2068241545 Email MLewis@aspectconsulting.com

SAMPLERS (signature)

PROJECT NAME

PO # 100094

REMARKS

Project specific RLs? - Yes / No

INVOICE TO AP

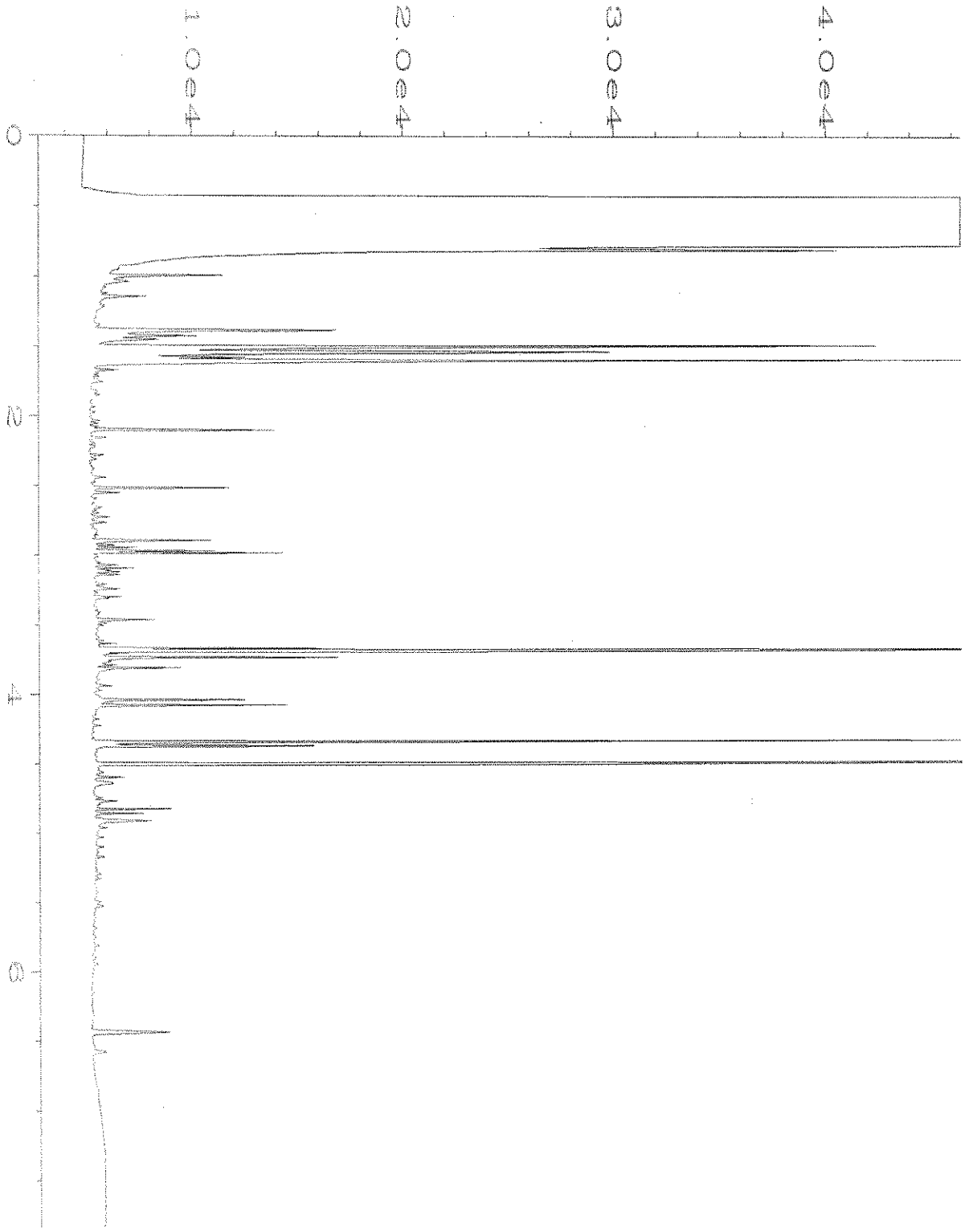
TURNAROUND TIME
- [x] Standard turnaround
- [ ] RUSH
- Rush charges authorized by:

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

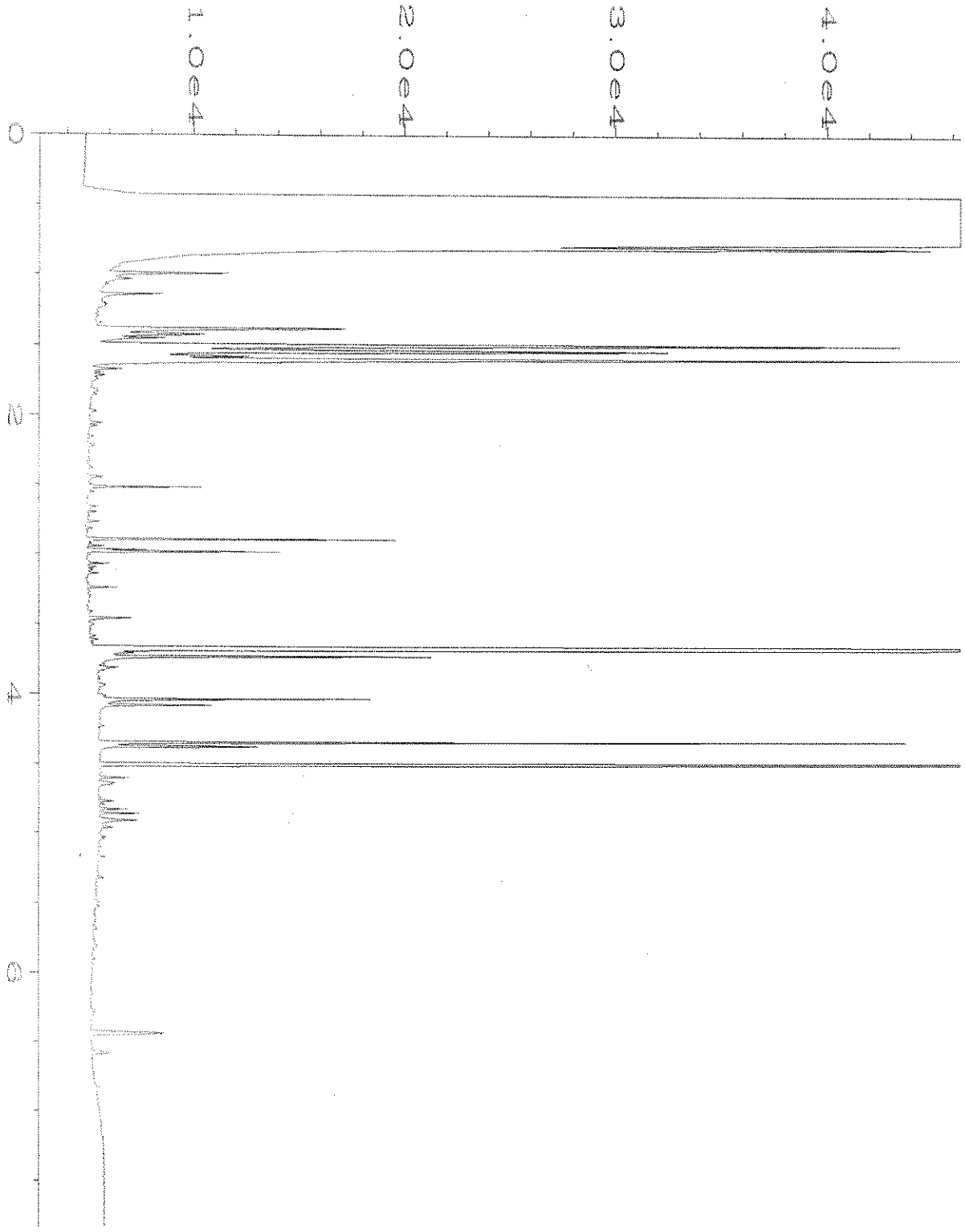
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	TLE hydrocarbons	Dissolved Arsenic	Total Arsenic		Notes
																(X)	per AP
MW-09-111121	01A-C	11/11/21	1050	W	3								X	~~X~~	~~X~~		11/15/21 ME
MW-10-111121	02A-F		1630		6	X							X	X	X		
MW-15-111121	03		1312		1	X								X	X		
McKinney-111121	04A-C		0902		3								X				
MW-12-111121	05	11/11/21	1200	W	1	(X)											added at lab 11/15

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Ashley Provow	Ashley Provow	Aspect	11/12/21	1809
Received by:	Mac Goldman	F&BI	11.12.21	1909
Relinquished by:				
Received by:		Samples received at 4 °C		

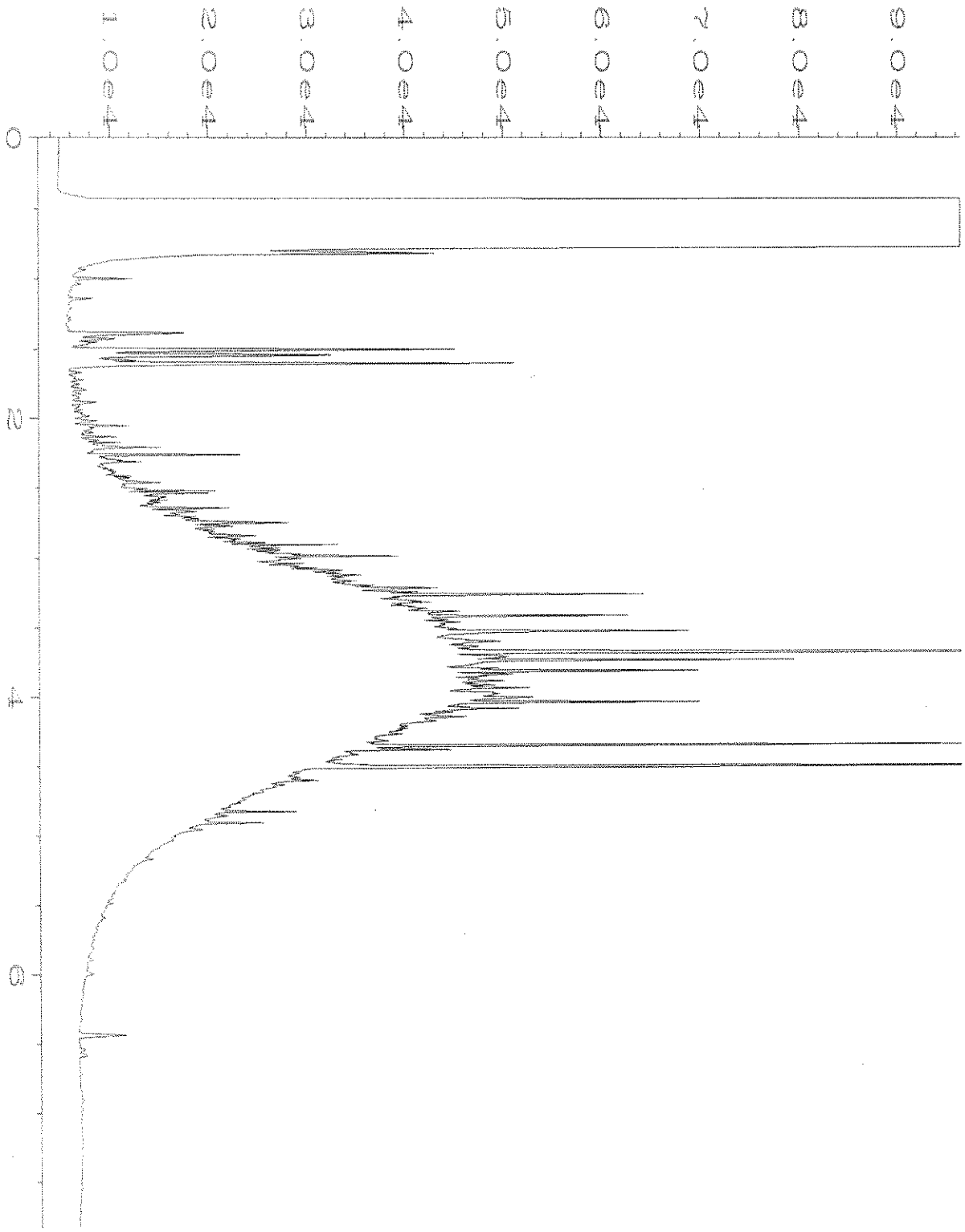
Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282



Data File Name	: C:\HPCHEM\4\DATA\11-16-21\026F1801.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 26
Sample Name	: 111268-02	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 18
Acquired on	: 16 Nov 21 06:36 PM	Instrument Method	: DX.MTH
Report Created on	: 17 Nov 21 08:37 AM	Analysis Method	: DEFAULT.MTH

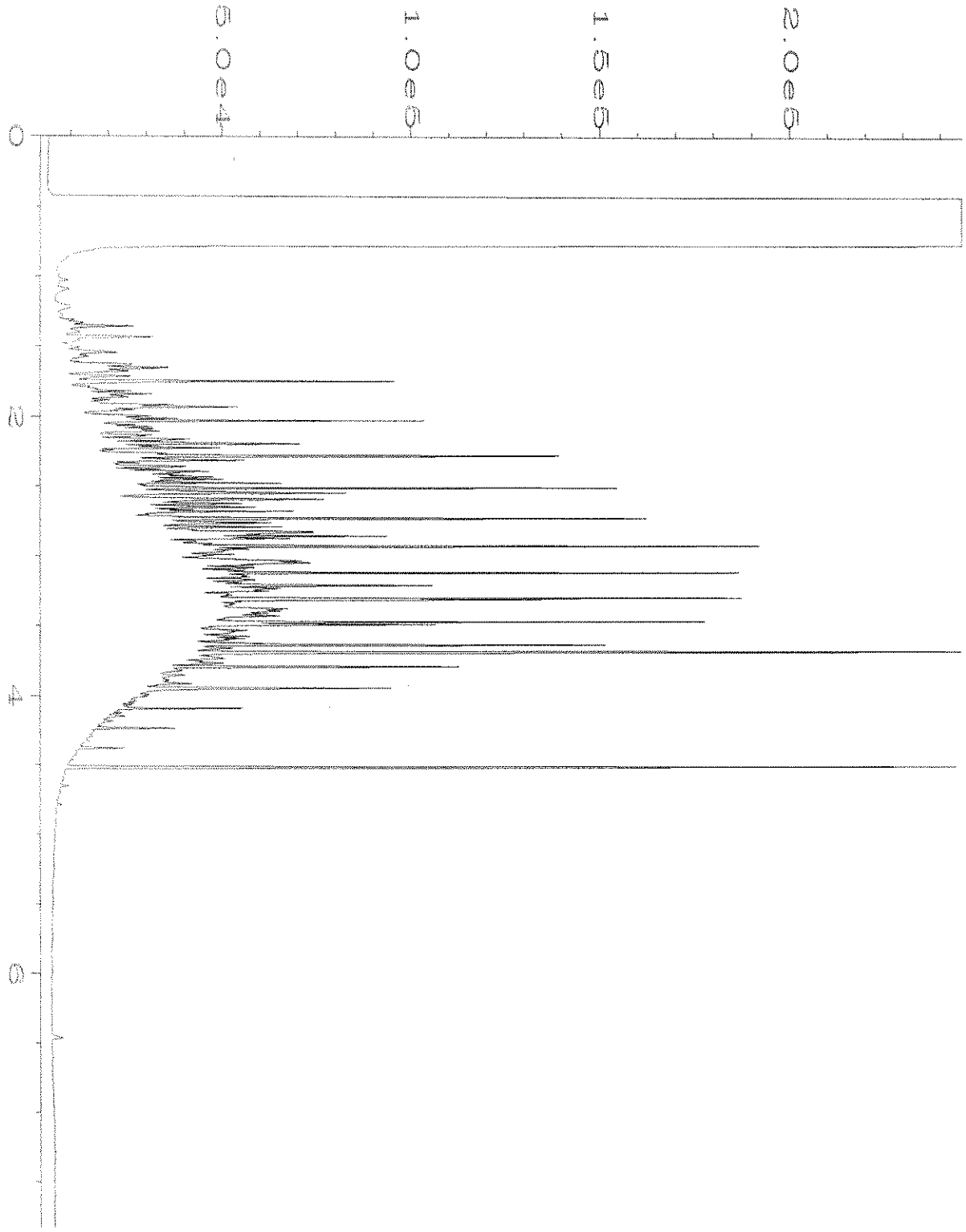


Data File Name	: C:\HPCHEM\4\DATA\11-16-21\027F1801.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 27
Sample Name	: 111268-03	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 18
Acquired on	: 16 Nov 21 06:48 PM	Instrument Method	: DX.MTH
Report Created on	: 17 Nov 21 08:37 AM	Analysis Method	: DEFAULT.MTH



Data File Name : C:\HPCHEM\4\DATA\11-16-21\028F1801.D
Operator : TL
Instrument : GC#4
Sample Name : 111268-05
Run Time Bar Code:
Acquired on : 16 Nov 21 07:00 PM
Report Created on: 17 Nov 21 08:37 AM

Page Number : 1
Vial Number : 28
Injection Number : 1
Sequence Line : 18
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name : C:\HPCHEM\4\DATA\11-16-21\003F0401.D
Operator : TL
Instrument : GC#4
Sample Name : 500 Dx 64-13H
Run Time Bar Code:
Acquired on : 16 Nov 21 11:27 AM
Report Created on: 17 Nov 21 08:38 AM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

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

November 30, 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 November 22, 2021 from the 100094, F&BI 111432 project. There are 8 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
ASP1130R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on November 22, 2021 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC 100094, F&BI 111432 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
111432 -01	MW-06-112221

All quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-06-112221	Client:	Aspect Consulting, LLC
Date Received:	11/22/21	Project:	100094, F&BI 111432
Date Extracted:	11/23/21	Lab ID:	111432-01
Date Analyzed:	11/23/21	Data File:	111432-01.118
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	40.3

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	100094, F&BI 111432
Date Extracted:	11/23/21	Lab ID:	I1-773 mb
Date Analyzed:	11/23/21	Data File:	I1-773 mb.115
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Total Metals By EPA Method 200.8

Client ID:	MW-06-112221	Client:	Aspect Consulting, LLC
Date Received:	11/22/21	Project:	100094, F&BI 111432
Date Extracted:	11/23/21	Lab ID:	111432-01
Date Analyzed:	11/23/21	Data File:	111432-01.119
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	37.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	100094, F&BI 111432
Date Extracted:	11/23/21	Lab ID:	I1-773 mb
Date Analyzed:	11/23/21	Data File:	I1-773 mb.115
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Date of Report: 11/30/21
Date Received: 11/22/21
Project: 100094, F&BI 111432

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

Laboratory Code: 111432-01 (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	37.1	95	89	75-125	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	90	80-120

Date of Report: 11/30/21
Date Received: 11/22/21
Project: 100094, F&BI 111432

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

Laboratory Code: 111432-01 (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	37.1	95	89	75-125	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	90	80-120

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.

111432

SAMPLE CHAIN OF CUSTODY

11-22-21

AI2

Page # 1 of 1

Report To Matthew Lewis

Company Aspect Consulting

Address 710 2nd Ave Ste 550

City, State, ZIP Seattle, WA

Phone 2069124545 Email mlewis@aspectconsulting.com

SAMPLERS (*signature*)

PROJECT NAME

PO # 100094

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
- [x] 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	Dissolved As			Notes
MW-IW-112221	01 A,B	11/22/21	1212	W	2								X	X			

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Ashley Prow	Aspect	11/22	1606
Received by:	Khoi Hoang	FBI	11/22/21	16:06
Relinquished by:				
Received by:		Samples received at 4 °C		

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

April 26, 2021

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

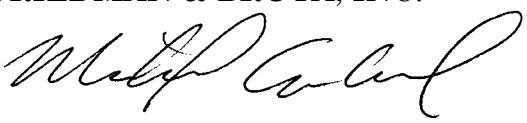
Dear Mr Lewis:

Included are the results from the testing of material submitted on April 16, 2021 from the Crownhill Elementary 100094, F&BI 104305 project. There are 13 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
ASP0426R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 16, 2021 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Crownhill Elementary 100094, F&BI 104305 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
104305 -01	McKinney-041421
104305 -02	MW-5-041421
104305 -03	MW-15-041421
104305 -04	MW-6-041421
104305 -05	MW-10-041421

All quality control requirements were acceptable.

Date of Report: 04/26/21
Date Received: 04/16/21
Project: Crownhill Elementary 100094, F&BI 104305
Date Extracted: 04/16/21
Date Analyzed: 04/16/21

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-5-041421 104305-02	1,300 x	490 x	ip
MW-15-041421 104305-03	50 x	<250	ip
MW-10-041421 104305-05	<50	<250	88
Method Blank 01-936 MB	<50	<250	94

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-6-041421	Client:	Aspect Consulting, LLC
Date Received:	04/16/21	Project:	Crownhill Elementary 100094, F&BI 104305
Date Extracted:	04/20/21	Lab ID:	104305-04
Date Analyzed:	04/21/21	Data File:	104305-04.161
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	28.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-10-041421	Client:	Aspect Consulting, LLC
Date Received:	04/16/21	Project:	Crownhill Elementary 100094, F&BI 104305
Date Extracted:	04/20/21	Lab ID:	104305-05
Date Analyzed:	04/21/21	Data File:	104305-05.162
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.99

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	Crownhill Elementary 100094, F&BI 104305
Date Extracted:	04/21/21	Lab ID:	I1-252 mb
Date Analyzed:	04/21/21	Data File:	I1-252 mb.055
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-041421	Client:	Aspect Consulting, LLC
Date Received:	04/16/21	Project:	Crownhill Elementary 100094, F&BI 104305
Date Extracted:	04/20/21	Lab ID:	104305-01
Date Analyzed:	04/20/21	Data File:	042014.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	86	113
Toluene-d8	103	88	114
4-Bromofluorobenzene	102	88	112

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

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW-10-041421	Client:	Aspect Consulting, LLC
Date Received:	04/16/21	Project:	Crownhill Elementary 100094, F&BI 104305
Date Extracted:	04/20/21	Lab ID:	104305-05
Date Analyzed:	04/20/21	Data File:	042015.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	86	113
Toluene-d8	102	88	114
4-Bromofluorobenzene	101	88	112

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, F&BI 104305
Date Extracted:	04/20/21	Lab ID:	01-828 mb
Date Analyzed:	04/20/21	Data File:	042008.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	86	113
Toluene-d8	103	88	114
4-Bromofluorobenzene	98	88	112

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

Date of Report: 04/26/21
Date Received: 04/16/21
Project: Crownhill Elementary 100094, F&BI 104305

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	92	88	63-142	4

Date of Report: 04/26/21
Date Received: 04/16/21
Project: Crownhill Elementary 100094, F&BI 104305

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

Laboratory Code: 104328-01 (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	3.18	86	88	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	92	80-120

Date of Report: 04/26/21
Date Received: 04/16/21
Project: Crownhill Elementary 100094, F&BI 104305

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

Laboratory Code: 104322-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Trichloroethene	ug/L (ppb)	10	<1	107	66-135

Date of Report: 04/26/21
Date Received: 04/16/21
Project: Crownhill Elementary 100094, F&BI 104305

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

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	112	106	67-133	6

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.

104305

SAMPLE CHAIN OF CUSTODY ME 04/16/21

VWI/AIB/DOH

Page # 1 of 1

Report To Matthew Lewis

Company Aspect Consulting

Address

City, State, ZIP

Phone 316.617.0499 Email MLewis@aspectconsulting.com

SAMPLERS (signature)

PROJECT NAME: Crownhill Elementary

PO #: 100044

REMARKS

INVOICE TO

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	NW/TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	TCE 8260	Total As			Notes
						ANALYSES REQUESTED											
McKinney-041421	01 A-C	4/14/21	PB 0900 1000	Water	3								X				
MW-5-041421	02		1000		1		X										
MW-15-041421	03		1235		1		X										
MW-6-041421	04		1335		1									X			
MW-10-041421	05 A-E		1440		5		X						X	X			
														Samples received at 4 °C			

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Daniel Brook	Aspect	4/16/21	1005
Received by:	Tom Ruciński	Fri Ex	4/16/21	10:05
Relinquished by:				
Received by:	Nhan Phan	FedEx	4/16/21	1320

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

April 29, 2021

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

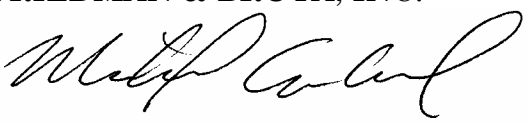
Dear Mr Lewis:

Included are the results from the testing of material submitted on April 21, 2021 from the Crownhill Elementary 100094, F&BI 104376 project. There are 5 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
ASP0429R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 21, 2020 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Crownhill Elementary 100094, F&BI 104376 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
104376 -01	MW-9-042121

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW-9-042121	Client:	Aspect Consulting, LLC
Date Received:	04/21/21	Project:	Crownhill Elementary 100094
Date Extracted:	04/23/21	Lab ID:	104376-01
Date Analyzed:	04/25/21	Data File:	042521.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	86	113
Toluene-d8	100	88	114
4-Bromofluorobenzene	103	88	112

Compounds:	Concentration ug/L (ppb)
Trichloroethene	7.2

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:	04/23/21	Lab ID:	01-836 mb
Date Analyzed:	04/23/21	Data File:	042308.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	86	113
Toluene-d8	99	88	114
4-Bromofluorobenzene	103	88	112

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

Date of Report: 04/29/21
Date Received: 04/21/21
Project: Crownhill Elementary 100094, F&BI 104376

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

Laboratory Code: 104376-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Trichloroethene	ug/L (ppb)	10	7.2	101 b	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	95	99	67-133	4

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.

104376

SAMPLE CHAIN OF CUSTODY

ME 04-21-21

Page # 1 of 1 VWI

Report To Matthew Lewis

Company Aspect

Address

City, State, ZIP Seattle office

Phone Email

SAMPLERS (*signature*) Matthew M. Lewis

PROJECT NAME: Counhill Elementary

PO #: 100094

REMARKS

INVOICE TO

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

SAMPLE DISPOSAL
- ☒ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	TCE				Notes
MW-9-042121	01A-C	4/21/21	1155	water	3								X				
																	Samples received at 4 °C

ANALYSES REQUESTED

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Matthew M. Lewis	Matthew M. Lewis	Aspect	4/21/21	15:55
Received by: Liz Webber-Bruya	Liz Webber-Bruya	F.B	4/21/21	1555
Relinquished by:				
Received by:				

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

APPENDIX D

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.