



February 28, 2022

Big Village LLLP  
Attn: Josh Sellers Park  
409 Maynard Avenue South, Suite P2  
Seattle, Washington 98104

Via email: [joshuap@scidpda.org](mailto:joshuap@scidpda.org)

Regarding: First Quarter 2022 Groundwater Monitoring Event

- Site Name: King County Archives Warehouse
- Site Address: 1215 E Fir Street, Seattle, Washington, 98122
- Facility/Site ID: 64730
- Cleanup Site ID: 15096
- VCP Project No.: NW3300

Dear Josh Sellers Park:

PBS has prepared this letter report on behalf of Big Village LLLP (Big Village) to present analytical results of the first quarter (Q1) 2022 groundwater monitoring event (GME) conducted at 1215 E Fir Street in Seattle, Washington (site or subject property). A Site Vicinity Map is presented as Figure 1. A summary of the monitoring event and the analytical results are presented below.

## **BACKGROUND AND REGULATORY CORRESPONDENCE**

The Site is listed on the Washington State Department of Ecology's (Ecology) Confirmed and Suspected Contaminated Sites List (CSCSL) under Cleanup Site ID 15096 due to concentrations of dissolved arsenic in exceedance of Ecology's Model Toxics Control Act (MTCA) Method A Cleanup Level (CUL). The Site is enrolled in Ecology's Voluntary Cleanup Program (VCP) under Project Number NW3300 while investigation and cleanup actions take place.

Investigation of the Site are summarized in the Remedial Investigation (RI) Report and RI Supplemental Report prepared by PBS dated February 25, and May 25, 2021, respectively. A Request for Opinion (RFO) form was submitted to Ecology June 29, 2021 and is pending Ecology response. A summary of requests made in the RFO, discussion of recent Ecology assessment of background arsenic concentrations in groundwater in Washington State, and groundwater monitoring data collected since issuance of the Supplemental RI are presented in the Q3 and Q4 2021 Groundwater Monitoring Report dated December 6, 2021.

PBS has completed a Q1 groundwater monitoring event (GME) at the Site to adhere to a quarterly groundwater monitoring schedule, pending Ecology opinions on previous submittals described above. The Q1 GME consisted of sampling the remaining two on-site monitoring wells (MW-3 and MW-4) for dissolved arsenic only, the only remaining contaminant of concern at the Site.

## **Q1 2022 GROUNDWATER MONITORING EVENT**

PBS conducted the Q1 2022 GME on February 10, 2022. The GME included gauging depth to groundwater and sampling on-site monitoring wells MW-3 and MW-4. It is noted that MW-2 was decommissioned prior to the Q3 GME and MW-1 was decommissioned prior to the Q4 GME.

Depth to groundwater measurements ranged from 5.82 feet below ground surface (bgs) in MW-4 to 7.00 feet bgs in MW-3 prior to sampling during the Q1 2022 GME. Groundwater purging and sampling was conducted employing low flow sampling methodology via peristaltic pump with pumping rates not exceeding 0.2 liters/minute and creating minimal drawdown in the well. Groundwater field parameters (conductivity, pH, temperature, dissolved oxygen, and oxidation-reduction potential) were recorded during purging using a YSI ProDSS water-quality analyzer equipped with a flow-through cell.

Once groundwater parameters stabilized, which indicates groundwater is representative of the aquifer formation, a sample was collected. PBS personnel wore new disposable nitrile gloves when collecting samples. Detailed groundwater sampling information is presented in Attachment I: Groundwater Sampling Datasheets.

A total of 2 primary and 1 duplicate groundwater samples were collected from monitoring wells MW-3 and MW-4. The samples were collected in laboratory-supplied containers, placed on ice in a cooler, and transported to Friedman and Bruya Laboratory in Seattle, Washington, within specified holding times and under chain-of-custody documentation. Samples for metals analyses were collected into non-preserved sample containers and filtered at the laboratory with a 0.045-micron filter for analysis of dissolved metals concentrations. Analyses for contaminants of concern were conducted under a 5-day turnaround time and included the following:

- Dissolved Arsenic by Environmental Protection Agency (EPA) Method 6020B.

The above analytical suite is based on dissolved arsenic being the only contaminant of concern detected in exceedance of CULs during Q1 through Q4 2021 GMEs.

Groundwater sampling datasheets are presented in Attachment I. Ecology's April 2021 opinion letter requested that a summary of groundwater chemistry parameters collected during sampling events be presented for future monitoring events to aid in evaluating the effect of groundwater chemistry on dissolved arsenic concentrations. The summary of groundwater chemistry parameters is presented in Attachment II.

## **GROUNDWATER FLOW DIRECTION**

Groundwater elevations were determined using depth to water measured from top of casing (TOC) in each well, TOC elevation data acquired during the April 2021 monitoring well survey and assumptions based on previous flow regimes. Groundwater elevations are potentially influenced by subsurface lithology, localized precipitation infiltration, subsurface hydraulic conductivity, and construction dewatering performed at the west adjacent TD Auto and repair site during its redevelopment.

Groundwater flow direction in Q1 2022 was estimated to be in a southerly direction. Hydraulic gradient could not be calculated based on the well network in place at the time of the Q1 2022 GME.

Groundwater elevation data and flow direction for the Q1 2022 GME are presented in Table 1 and shown on Figure 2.

## GROUNDWATER ANALYTICAL RESULTS

MTCA Method A Cleanup Levels (CULs) are the adopted cleanup criteria for this site.

The concentration of dissolved arsenic in groundwater was below the adopted CUL of 5 micrograms per liter ( $\mu\text{g/L}$ ) in monitoring wells MW-3 and MW-4. This marks a reduction in dissolved arsenic concentration to below the CUL in MW-3 since previous groundwater monitoring events.

Groundwater analytical results are presented in Table 2. Groundwater analytical results for Q1 2022 are presented on Figure 3. A plot of dissolved arsenic concentrations versus time is presented in Attachment III. Laboratory reports and chain-of-custody documentation for the Q1 2022 GME are presented in Attachment IV.

## ESTABLISHING BACKGROUND ARSENIC CONCENTRATIONS IN GROUNDWATER

In July 2021, Ecology issued a draft Publication No. 14-09-044 *Natural Background Groundwater Arsenic Concentrations in Washington State* for public comment. The publication has yet to be finalized, but based on telephone conversations with Jeff Johnston, Manager within Ecology's Information and Policy Section, the document is expected to be finalized near the end of November 2021. The document presents the results of a study begun in 2010 by Ecology evaluating natural background concentrations of arsenic in groundwater in 7 distinct watershed basins within the State of Washington. The Puget Sound Lowlands was established as one such basin. The study established a natural background concentration of arsenic in groundwater within the Puget Sound Lowlands watershed basin of 8.0  $\mu\text{g/L}$ . The study further concludes that:

*During the second rulemaking to update the MTCA Cleanup Rule, Chapter 173-340 WAC, Ecology should consider the results of this study when revising groundwater cleanup levels for arsenic. Specifically, the current Ecology arsenic cleanup level of 5  $\mu\text{g/L}$  is likely too low in some parts of the state.*

## CONCLUSIONS AND RECOMMENDATIONS

The Q1 2022 sampling event marks the fifth consecutive quarterly groundwater monitoring event conducted at the property. To date, contaminants of concern have not been detected in exceedance of CULs with the exception of arsenic in MW-3. Dissolved arsenic concentrations in MW-3 were observed to increase since groundwater monitoring commenced in January 2021 to a peak concentration of 12.7  $\mu\text{g/L}$  detected in July 2021 during the Q3 monitoring event. The concentration has since been observed to decrease to 3.92  $\mu\text{g/L}$  in February 2022. Concentration reductions are attributed to attenuation of artificially elevated dissolved arsenic concentrations due to remedial injections at the west adjacent property at locations very proximal to well MW-3. A concentration vs. time plot for dissolved arsenic concentrations at the property is presented as Attachment III.

Based on dissolved arsenic concentration trends established during four consecutive quarters of groundwater monitoring, dissolved arsenic concentrations as a result of remedial injections performed at the west adjacent site are presumed to have peaked in the third quarter of 2021. Based on the most recent groundwater monitoring event, dissolved arsenic concentrations in groundwater at MW-3 have attenuated to below the CUL. Additional sampling for dissolved arsenic in this well is required to further evaluate and establish this trend.

Based on the above stated declining trend in arsenic concentrations at MW-3 and internal recommendations from within the Department of Ecology regarding revision of the CUL for arsenic in groundwater, the following actions are proposed to work toward regulatory closure at the property:

1. Continue sampling the remaining two on-site monitoring wells for dissolved arsenic on a quarterly basis.
2. Continue to plot arsenic concentrations vs time at the property to further establish concentration trends. These trends will be reported to Ecology on a quarterly basis.

3. Develop a site-specific CUL for dissolved arsenic in groundwater based on recommendations from within Ecology presented in draft Publication No. 14-09-044 *Natural Background Groundwater Arsenic Concentrations in Washington State*.
4. Cease laboratory analysis of chemical constituents other than dissolved arsenic, which have been demonstrated to no longer be current contaminants of concern.

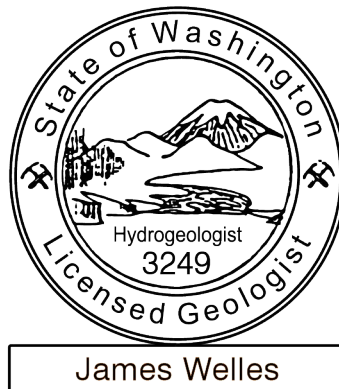
## LIMITATIONS

PBS has prepared this report for use by Big Village LLLP. This report is for the exclusive use of the client and is not to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced, in total or in part, without the expressed written consent of the client and PBS.

Sincerely,  
PBS Engineering and Environmental Inc.

James Welles, LHG  
Senior hydrogeologist

Reviewed by: Melanie Young, PE

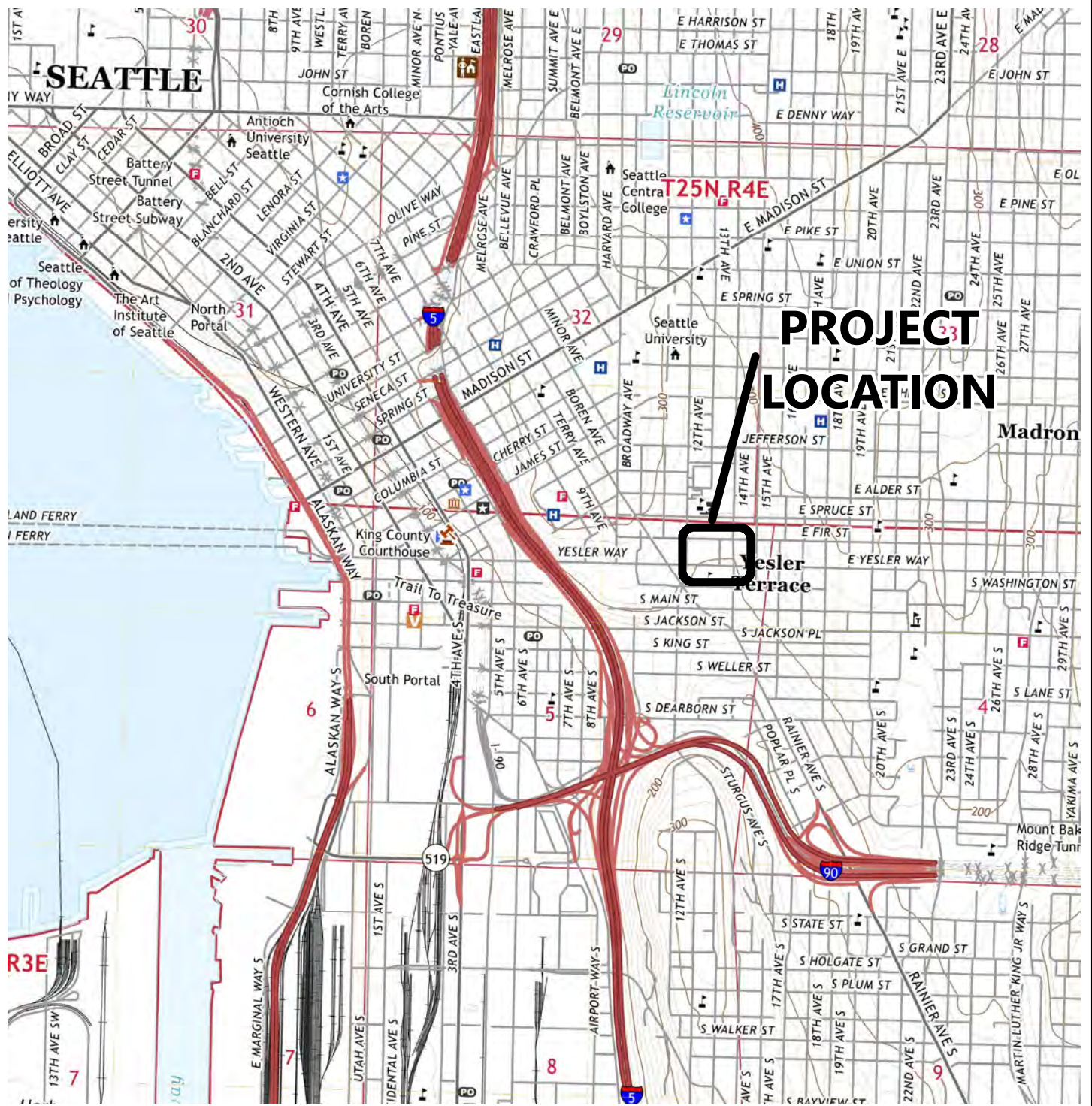


Enclosed:      Figures  
                 Tables  
                 Attachment I: Q1 2022 Groundwater Sampling Datasheets  
                 Attachment II: Summary of Groundwater Chemistry Parameters  
                 Attachment III: Concentration vs. Time – Dissolved Arsenic in Groundwater  
                 Attachment IV: Laboratory Reports and Chain-of-Custody Documentation

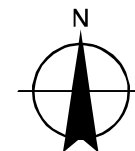
## Figures



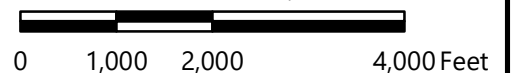
L:\Projects\41000\41593 Big Village LLLP-SCID\41593.005 1215 E Fir St\GIS\data\Fig1\_SiteVicinity.mxd



SOURCES: USGS TOPOGRAPHIC MAP, SEATTLE SOUTH QUADRANGLE, 2020, 1:24,000.  
PROJECTION: NAD 2011 WA STATE PLANE NORTH LAMBERT INTL FT



SCALE: 1" = 2,000 feet



PREPARED FOR: BIG VILLAGE LLLP-SCID



## SITE VICINITY

1215 E FIR STREET, SEATTLE, WASHINGTON

FEB 2022  
41593.005

FIGURE





**1**



L:\Projects\41000\41593 Big Village LLP-SCID\41593.005 1215 E Fir St\GIS\data\Fig3\_GW\_Elev\_Oct08\_Dec2021.mxd



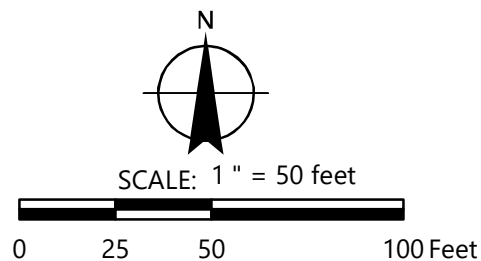
### LEGEND

-  MW-3 Monitoring Well on Property  
(191.39) (Groundwater Elevation in ft amsl, Q1 2022)
-  MW-1 Decommissioned Monitoring Well
-  Subject Property
-  Inferred groundwater flow direction

### Notes:

1. ft amsl is feet above mean sea level

SOURCES: GOOGLE EARTH, DATED AUGUST 2020  
PROJECTION: NAD 2011 WA STATE PLANE NORTH LAMBERT INTL FT



PREPARED FOR: BIG VILLAGE LLP-SCID



Q1 GROUNDWATER ELEVATION: February 10, 2022

1215 E FIR STREET,  
SEATTLE, WASHINGTON

FEB 2022  
41593.005




FIGURE

2

L:\Projects\24000\24100-24199\24159 Mill Pond\GIS\mxd\Fig5\_GW\_As\_Oct08\_Dec2021.mxd



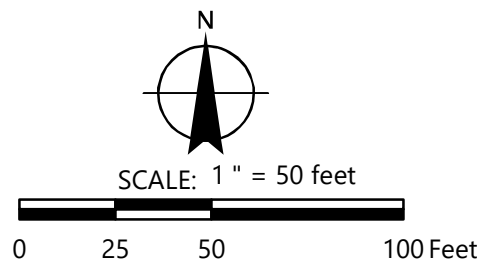
#### LEGEND

-  MW-3 Monitoring Well on Property  
(3.92) Dissolved Arsenic Concentration in µg/L - Q1 2022
-  MW-1 Decommissioned Monitoring Well
- 

#### Notes:

1. The MTCA Method A cleanup level for arsenic in groundwater is 5 µg/L.
2. µg/L - micrograms per liter.

SOURCES: GOOGLE EARTH, DATED AUGUST 2020  
PROJECTION: NAD 2011 WA STATE PLANE NORTH LAMBERT INTL FT



PREPARED FOR: BIG VILLAGE LLLP-SCID



Q1 2022 Dissolved Arsenic Concentration in  
Groundwater: February 10, 2022  
1215 E FIR STREET, SEATTLE, WASHINGTON

FEB 2022  
41593.005

FIGURE

**3**



## Tables

**TABLE 1**  
**Groundwater Elevation and Flow Direction**

1215 E Fir Street,  
Seattle, Washington  
PBS Project No.: 41593.005

Monitoring Well Identification	Screened Interval (approximate ft bgs)	Measurement Date	Top of Casing (TOC) elevation (ft amsl)	Depth to water (ft btoc)	Groundwater Elevation (ft asml)
MW1	15-20	January 25, 2021	203.968	7.68	196.29
		April 12, 2021		8.41	195.56
		July 7, 2021		8.83	195.14
MW2*	15-20	January 25, 2021	201.159	6.12	195.04
		April 12, 2021		6.85	194.31
MW3	15-20	January 25, 2021	198.394	8.62	189.77
		April 12, 2021		8.80	189.59
		July 7, 2021		10.52	187.87
		July 7, 2021		10.52	187.87
		October 8, 2021		9.37	189.02
		February 10, 2022		7.00	191.39
MW4	15-20	January 25, 2021	197.487	6.72	190.77
		April 12, 2021		7.50	189.99
		July 7, 2021		9.23	188.26
		July 7, 2021		9.23	188.26
		October 8, 2021		9.09	188.40
		February 10, 2022		5.82	191.67

Notes & Abbreviations:

\* MW1 was decommissioned on July 9, 2021  
\* MW2 was decommissioned on April 16, 2021

ft bgs = feet below ground surface  
ft amsl = feet above mean sea level  
ft btoc = feet below top of casing

**Elevation vertical datum is NAVD 88**

Date of Depth to Water Measurement	Groundwater Flow Direction**	Hydraulic Gradient** (feet/feet)
January 25, 2021	South Southwest	0.0476
April 12, 2021	South Southwest	0.0533
July 7, 2021	South Southwest	0.0335
October 8, 2021	South Southeast	insufficient data
February 10, 2022	South	insufficient data

\*\*Groundwater flow direction and hydraulic gradient was determined numerically by calculating a planar regression of the tabulated groundwater elevations. It is noted that the groundwater flow directions presented represent the generalized flow direction across the majority of the subject property at the time of measurement.

**TABLE 2**  
**Groundwater Analytical Results**

1215 E Fir Street,  
Seattle, Washington  
PBS Project No.: 41593.005

Location		Date Sampled	TPH (µg/L)			VOCs	Dissolved Metals (µg/L)				
			Gasoline	Diesel	Heavy Oil		Arsenic	Cadmium	Chromium	Lead	Mercury
Adopted Criteria	MTCA Method A Cleanup Levels For Groundwater		800	500	500	Varies	5	5	50	15	2
Monitoring well samples collected January 25, 2021											
MW-1 <sup>a</sup>		January 25, 2021	<100	<50	<250	--	2.08	<1	<1	<1	<1
		April 12, 2021	<100	66 x	<250	--	1.76	<1	<1	<1	<1
		July 7, 2021	<100	<70	<350	ND	1.17	<1	<1	<1	<1
MW-2 <sup>b</sup>		January 25, 2021	<100	<50	<250	--	3.37	<1	<1	<1	<1
		April 12, 2021	<100	<50	<250	--	2.98	<1	<1	<1	<1
MW-3		January 25, 2021	<100	<50	<250	--	<b>9.78</b>	<1	<1	<1	<1
		April 12, 2021	<100	<50	<250	--	<b>11.4</b>	<1	<1	<1	<1
		July 7, 2021	<100	<65	<320	ND	<b>12.1</b>	<1	<1	<1	<1
			<100	<70	<350	ND	<b>12.7</b>	<1	<1	<1	<1
		October 8, 2021	<100	<50	<250	--	<b>10.9</b>	<1	<1	<1	<1
			<100	<50	<250	--	<b>11.2</b>	<1	<1	<1	<1
		February 10, 2022	--	--	--	--	3.89	--	--	--	--
			--	--	--	--	3.92	--	--	--	--
		MW-4		January 25, 2021	<100	<50	<250	--	1.75	<1	<1
<100	<50				<250	--	1.57	<1	<1	<1	<1
April 12, 2021	<100			<50	<250	--	1.01	1.91	<1	<1	<1
July 7, 2021	<100			<70	<350	ND	1.40	1.21	<1	<1	<1
October 8, 2021	<100			<50	<250	--	1.91	<1	<1	<1	<1
February 10, 2022	--			--	--	--	<1	--	--	--	--

Analytical Methods:

Gasoline range TPH analyzed by Method NWTPH-Gx

Diesel range TPH analyzed by Method NWTPH-Dx, method includes reporting TPH in the heavy oil range

Metals analyzed by US EPA Method 6020B

VOCs (including BTEX) analyzed by US EPA Method 8260B

Footnotes:

<sup>a</sup> - MW1 was decommissioned to facilitate installation of foundation elements on July 9, 2021.

<sup>b</sup> - MW2 was decommissioned prior to site demolition on April 16, 2021.

Notes & Abbreviations:

**BOLD** indicates above MTCA Method A Cleanup Levels for Groundwater

-- - not analyzed

< - detected concentration less than indicated method reporting limit

ND – not detected above laboratory reporting limits. Reporting limits vary by compound. Refer to lab results in Attachment III for reporting limits for individual compounds.

MTCA - Washington State Department of Ecology Model Toxic Control Act

TPH - total petroleum hydrocarbons


VOCs - volatile organic compounds

µg/L - micrograms per liter

# **Attachment I**


Q3 and Q4 Groundwater Sampling Datasheets



	<b>PBS Engineering and Environmental Inc.</b>  <b>GROUNDWATER SAMPLING FORM (YSI Pro)</b>	<b>Project No:</b> 41593.005  <b>Project Name/ Location:</b> 1215 E Fir St  <b>Date:</b> February 10, 2022	
		<b>Monitoring Well ID</b>	MW-3
<b>Initial DTW (feet bgs)</b>	7.00	<b>Sample ID (if not well ID)</b>	
<b>Screen Interval (feet bgs)</b>	5-20	<b>Sample Time</b>	1150
<b>Well depth (feet bgs)</b>	20	<b>QC Sample type:</b> <u>Duplicate</u> <input type="checkbox"/> Not collected ID: <u>DUP-Q1</u> Time: <u>11:30</u>	
<b>Depth of pump/tubing inlet (feet bgs)</b>	~12		
<b>Sampling method (describe pump or sampler)</b>	Peristaltic Pump	<b>Field Personnel</b>	MB
<b>Purge Rate (L/min)</b>	avg 0.15	<b>Weather Conditions</b>	Cool, overcast

WELL PURGING INFORMATION									
Time <input type="checkbox"/> elapsed <input checked="" type="checkbox"/> actual	DTW (feet)	Temp. ( F )	Dissolved oxygen (mg/L)	Specific conductivity <input type="checkbox"/> mS/cm <input checked="" type="checkbox"/> µS/cm	pH	ORP (mV)	Turbidity (NTU)	Observations	Volume purged <input checked="" type="checkbox"/> ltr <input type="checkbox"/> gal
1135	7.01	56.7	2.63	743	6.85	84	0		
1140	7.11	57.6	1.38	759	6.80	83.4	0		0.75
1145	7.20	57.8	1.07	764	6.74	78.6	0.4		1.5
1148	7.24	57.8	1.03	764	6.80	76.3	1.3		1.95
1150	7.24	57.8	1.02	763	6.80	75.8	1.8		2.25
Total Volume Purged									2.25

<b>FIELD OBSERVATIONS / NOTES</b> (such as well head condition, groundwater color, sediment load, recovery, sheen, odor, equipment)
purge water clear / no odor.
Signature of Field Personnel: MB

	<b>PBS Engineering and Environmental Inc.</b>  <b>GROUNDWATER SAMPLING FORM (YSI Pro)</b>	<b>Project No:</b> 41593.005  <b>Project Name/ Location:</b> 1215 E Fir St  <b>Date:</b> February 10, 2022	
		<b>Monitoring Well ID</b>	MW-4
<b>Initial DTW (feet bgs)</b>	5.82	<b>Sample ID (if not well ID)</b>	
<b>Screen Interval (feet bgs)</b>	5-20	<b>Sample Time</b>	1100
<b>Well depth (feet bgs)</b>	20	<b>QC Sample type:</b> _____	<input checked="" type="checkbox"/> Not collected ID_____ Time_____
<b>Depth of pump/tubing inlet (feet bgs)</b>	~10		
<b>Sampling method (describe pump or sampler)</b>	Peristaltic Pump	<b>Field Personnel</b>	MB
<b>Purge Rate (L/min)</b>	0.15	<b>Weather Conditions</b>	Cool, overcast

WELL PURGING INFORMATION									
Time <input type="checkbox"/> elapsed <input checked="" type="checkbox"/> actual	DTW (feet)	Temp. ( F )	Dissolved oxygen (mg/L)	Specific conductivity <input type="checkbox"/> mS/cm <input checked="" type="checkbox"/> µS/cm	pH	ORP (mV)	Turbidity (NTU)	Observations	Volume purged <input checked="" type="checkbox"/> ltr <input type="checkbox"/> gal
1045	5.90	56.7	6.23	273	6.42	58.6	14		
1049	5.91	56.6	6.08	259	6.30	71.2	12		0.6
1052	5.91	56.4	6.06	257	6.28	75.1	18		1.05
1058	6.02	56.1	6.06	256	6.27	81.8	18		1.95
Total Volume Purged									1.95

<b>FIELD OBSERVATIONS / NOTES</b> (such as well head condition, groundwater color, sediment load, recovery, sheen, odor, equipment)
purge water clear / no odor
Signature of Field Personnel: MB

# **Attachment II**

Summary of Groundwater Chemistry Parameters

### Summary of Groundwater Chemistry Parameters

1215 East Fir Street

Seattle, Washington

PBS Project No. 41593.005

Location	Date	Temperature (°C)	Dissolved Oxygen (mg/L)	Specific Conductivity (μS/cm)	pH	Oxygen Reduction Potential (mV)
MW-1	1/18/2021	15.7	6.82	412.2	7.22	168.9
	4/12/2021	13.9	2.43	306.0	6.69	136.5
	7/7/2021	18.2	2.40	357.8	6.50	156.0
MW-2	1/18/2021	19.2	2.63	617	7.39	173.9
	4/12/2021	19.5	0.18	700	7.08	120.5
MW-3	1/18/2021	15.4	11.72	537	7.94	82.6
	4/12/2021	15.0	0.03	532	7.71	-55.3
	7/7/2021	18.8	0.14	694	7.23	90.2
	10/8/2021	19.6	0.25	587	7.29	-116.0
	2/10/2022	14.3	1.02	763	6.80	75.8
MW-4	1/18/2021	14.2	5.54	243.1	6.85	166.3
	4/12/2021	13.2	4.84	185.1	6.07	158.2
	7/7/2021	18.0	1.42	361.1	6.46	69.8
	10/8/2021	18.7	2.35	452	6.85	-59.4
	2/10/2022	13.4	6.06	256	6.27	81.8

#### Notes & Abbreviations:

Data presented in this table represent stabilized groundwater chemistry parameters measured in the field after low-flow micropurging of wells.

°C - degrees Celsius

mg/L - milligrams per liter

μS/cm - microSiemens per centimeter

pH - presented in standard pH scale

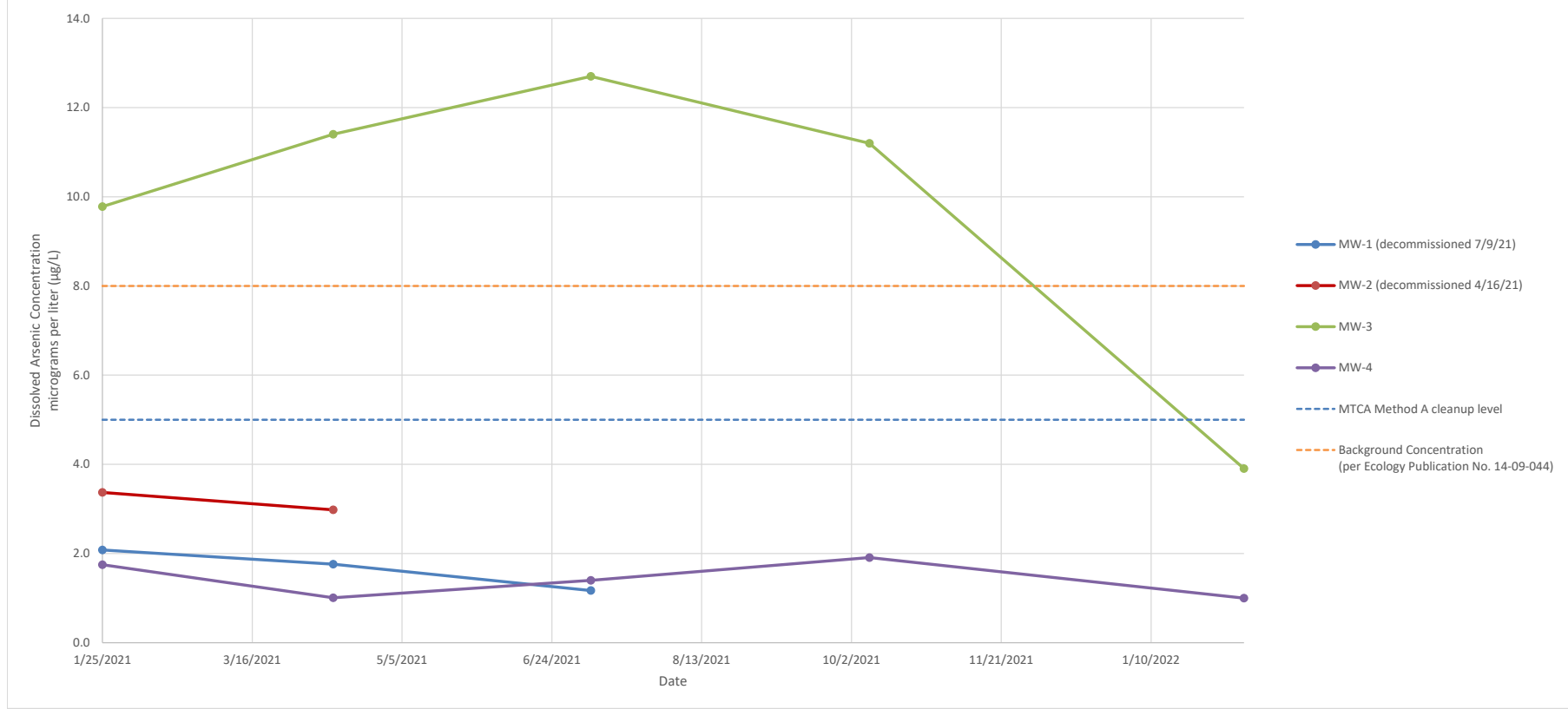
mV - millivolts



## **Attachment III**

Concentration vs. Time – Dissolved Arsenic in Groundwater

Concentration vs. Time: Dissolved Arsenic in Groundwater



# **Attachment IV**

Laboratory Reports

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

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

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

February 18, 2022

James Welles, Project Manager  
PBS Engineering and Environmental, Inc.  
214 E. Galer St, Suite 300  
Seattle, WA 98102

Dear Mr Welles:

Included are the results from the testing of material submitted on February 10, 2022 from the 1215 E Fir St 41593.005, F&BI 202185 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

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

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl  
Project Manager

Enclosures  
PBS0218R.DOC



FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on February 10, 2022 by Friedman & Bruya, Inc. from the PBS Engineering and Environmental 1215 E Fir St 41593.005, F&BI 202185 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>PBS Engineering and Environmental</u>
202185 -01	MW3-021022
202185 -02	MW4-021022
202185 -03	Dup-01

The 6020B dissolved metals samples were filtered at the laboratory on 02/10/22. The data were qualified accordingly.

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW3-021022 f	Client:	PBS Engineering and Environmental
Date Received:	02/10/22	Project:	1215 E Fir St 41593.005, F&BI 202185
Date Extracted:	02/15/22	Lab ID:	202185-01
Date Analyzed:	02/15/22	Data File:	202185-01.078
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
----------	-----------------------------

Arsenic	3.89
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FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW4-021022 f	Client:	PBS Engineering and Environmental
Date Received:	02/10/22	Project:	1215 E Fir St 41593.005, F&BI 202185
Date Extracted:	02/15/22	Lab ID:	202185-02
Date Analyzed:	02/15/22	Data File:	202185-02.079
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
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Arsenic	<1
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FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Dup-01 f	Client:	PBS Engineering and Environmental
Date Received:	02/10/22	Project:	1215 E Fir St 41593.005, F&BI 202185
Date Extracted:	02/15/22	Lab ID:	202185-03
Date Analyzed:	02/15/22	Data File:	202185-03.080
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
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Arsenic	3.92
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FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank f	Client:	PBS Engineering and Environmental
Date Received:	Not Applicable	Project:	1215 E Fir St 41593.005, F&BI 202185
Date Extracted:	02/15/22	Lab ID:	I2-122 mb
Date Analyzed:	02/15/22	Data File:	I2-122 mb.052
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
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Arsenic	<1
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FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 02/18/22

Date Received: 02/10/22

Project: 1215 E Fir St 41593.005, F&BI 202185

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

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	85	85	80-120	0

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

### **Data Qualifiers & Definitions**

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

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

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

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

AT 2  
of 1

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Phone 360 830 3359 Email \_\_\_\_\_

INVOICE TO

Project specific RIs? - Yes / No

Default: Dispose after 30 days

ANALYSES REQUESTED

						ANALYSES REQUESTED								
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		Notes
Mw 3-021022	01	2/10	11:56	Gw	1								X	* LHS FILTER FOR PSS MS
Mw 4-021022	02	2/10	11:00	Gw	1								X	CD
DUP-01	03	2/10	11:30	Gw	1								X	2/10 -
														Samples received at 4 <sup>00</sup>

Ph. (206) 285-8282

# TIME

12:25

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