



September 22, 2022
Project No. M0615.18.003

Scott Hooton
Project Manager, Environmental Programs
Port of Tacoma
One Sitcum Plaza, Tacoma, WA 98421

Re: Groundwater Monitoring Report
Former Murray Pacific No. 2 Sort Yard Site
Consent Decree No. 94-2-09922-7
Facility Site ID: 1211
Monitoring Date: August 21 and 22, 2022

Dear Scott Hooton:

On August 21 and 22, 2022, Maul Foster & Alongi, Inc. (MFA), conducted a groundwater monitoring event on behalf of the Port of Tacoma (the Port) at the former Murray Pacific Corporation (Murray Pacific) No. 2 Log Sort Yard Site, located at 2407 Port of Tacoma Road in Tacoma, Washington (the Site) (Figure 1). Groundwater monitoring activities were conducted consistent with the requirements set forth in Consent Decree No. 94-2-09922-7 (CD), dated September 1994, between the Port and the Washington State Department of Ecology (Ecology) and the operation and maintenance plan (HLA 1997). The field activities and the analytical results of the monitoring event are discussed below.

SITE BACKGROUND

The Site is located adjacent to the Blair Waterway at 2407 Port of Tacoma Road in Tacoma, Washington (Figure 1). The Site was previously leased to Murray Pacific and operated as a log sort yard. Before 1970, the Site was unleased and undeveloped. Asarco slag was used as ballast to provide a stable surface for operating log handling machinery. The Port is the property owner and leases the Site to Washington United Terminals for use as a marine terminal.

Ecology collected stormwater runoff samples from the Site between November 1983 and June 1984 (Norton 1985). Metals were detected in stormwater leaving the Site at concentrations above the U.S. Environmental Protection Agency (EPA) water-quality standards. Kennedy/Jenks Consultants performed a remedial investigation and feasibility study as an independent action for the Port in compliance with Ecology's Model Toxics Control Act (Kennedy/Jenks 1993). In September 1994, Ecology and the Port entered the CD for the Site (Ecology 1994). In 1997, a low-permeability asphalt cap and stormwater drainage system was constructed. In 1998, monitoring wells were installed for groundwater compliance monitoring.

A restrictive covenant (no. 9808240631) was recorded for the Site in 1998, limiting activities that may interfere with or reduce the effectiveness of the cleanup action and requiring that the Site be used for industrial uses only (Port 1998).

In July 2019, Ecology conducted a periodic review of post-cleanup site conditions and site data and concluded that human health and the environment continue to be protected by the remedy. Ecology determined that the requirements of the restrictive covenants and the CD were met (Ecology 2017).

Groundwater monitoring has been conducted at monitoring wells MW-X, MW-Y, and MW-Z since 1998 to monitor groundwater quality on the Site (Figure 2). Groundwater monitoring is conducted every 18 months consistent with a 2011 memorandum of understanding between Ecology and the Port (Ecology 2011). The contaminant of concern in groundwater is arsenic. The groundwater cleanup level (CUL) was modified from 0.14 micrograms per liter (ug/L) to 5 ug/L in 2009 (Ecology 2009).

The last groundwater monitoring event was conducted by MFA in February 2021 (MFA 2021). According to the 18-month schedule, the next groundwater monitoring event is scheduled for February 2024. MFA also completed a cap inspection in February 2022 (MFA 2022). Additional cap repairs resulting from MFA's cap inspection recommendations are scheduled to occur in autumn 2022. According to the 30-month schedule, the next cap inspection event is scheduled for August 2024.

GROUNDWATER MONITORING FIELD PROCEDURES

On August 21 and 22, 2022, four groundwater samples, including one field duplicate, were collected from MW-X, MW-Y, and MW-Z using low-flow sampling procedures. The groundwater level in each well was measured prior to sampling (Table 1). During purging, flow rates, water levels, and water quality parameters (pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction potential, and turbidity) were recorded on field sampling data sheets (Attachment A). Water-quality field parameters were stabilized before sample collection. Samples were collected directly into laboratory-provided bottles and were immediately placed in a cooler on ice. Groundwater samples were field filtered with a 0.45-micron filter and preserved with nitric acid during sample collection. Under standard chain-of-custody procedures, groundwater samples were submitted to ALS Environmental in Kelso, Washington, for laboratory analysis.

GROUNDWATER MONITORING RESULTS AND DISCUSSION

The laboratory analytical report is provided as Attachment B, and analytical data are presented in Table 2. Analytical data and the laboratory's internal quality assurance and quality control data were reviewed to assess whether they met project-specific data quality objectives. A data validation memorandum summarizing data evaluation procedures, data usability, and

deviations from specific field and/or laboratory methods is included as Attachment C. The data are considered acceptable for their intended use, with appropriate data qualifiers assigned. Results from the groundwater monitoring indicate the following:

- In MW-X, dissolved arsenic was not detected in groundwater at or above the method detection limit of 0.18 ug/L. The field duplicate was collected from MW-X and dissolved arsenic concentrations also remained below the method detection limit of 0.18 ug/L in the duplicate sample.
- In MW-Y, dissolved arsenic was detected in groundwater at a concentration of 42.3 ug/L, above the groundwater CUL of 5 ug/L.
- In MW-Z, dissolved arsenic was detected at an estimated concentration of 0.25 J ug/L, below the groundwater CUL of 5 ug/L.

Plots depicting dissolved arsenic concentrations over time (since monitoring began in 1994) for MW-X, MW-Y, and MW-Z are presented in Figure 3.

Groundwater monitoring results from this event will be submitted to Ecology's Environmental Information Management database within 45 days after completion of data validation.

Please contact Audrey Hackett at (206) 556-2015 if you have any questions related to the groundwater monitoring activities or results presented above.

Scott Hooton
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Sincerely,

Maul Foster & Alongi, Inc.



Audrey Hackett
Senior Environmental Scientist

Carolyn R. Wise, LHG 09-22-2022
Project Hydrogeologist

Attachments: Limitations
References
Tables
Figures
Attachment A—Water Field Sampling Data Sheets
Attachment B—Analytical Laboratory Reports
Attachment C—Data Validation Memorandum

LIMITATIONS

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

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

REFERENCES

- Anchor QEA. 2019. N. Bacher, Anchor QEA, LLC. *Groundwater Monitoring Report—Former Murray Pacific No. 2 Sort Yard, Consent Decree No. 94-2-09922-7*. Memorandum to P. Balaraju and A. Smith, Washington State Department of Ecology. November 14.
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- Ecology. 2009. G. Barrett, Washington State Department of Ecology. *Groundwater Monitoring Summary Report for 23 July 2009, Former Murray Pacific No. 2 Log Yard*. Letter to M. Rettman, Port of Tacoma. October 26.
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- MFA. 2022. *Environmental Cap and Drainage System Inspection Report, Former Murray Pacific No. 2 Log Sort Yard*. Prepared for Port of Tacoma. Maul Foster & Alongi, Inc. June 15.
- Norton, D., and A. Johnson. 1985. *Completion report on WQIS Project 1 for the Commencement Bay nearshore/tideflats remedial investigation: assessment of log sort yards as metal sources to Commencement Bay waterways, November 1983 to June 1984*. Washington State Department of Ecology. February 27.

TABLES



Table 1
Water Level Measurements
Former Murray Pacific No. 2 Log Sort Yard
Tacoma, Washington



Location	Date	Depth to Water (feet)
MW-X	07/22/1998	10.62
	01/21/1999	10.08
	07/20/1999	10.14
	02/24/2000	10.09
	07/27/2000	10.76
	07/17/2001	11.02
	01/16/2002	10.97
	07/16/2002	10.78
	01/13/2003	10.95
	07/15/2003	10.90
	02/04/2004	10.80
	08/02/2004	11.00
	07/26/2005	10.93
	08/11/2006	10.84
	01/29/2007	10.72
	02/08/2008	10.14
	09/12/2008	11.80
	02/27/2009	11.12
	07/23/2009	11.05
	02/04/2010	10.90
	09/17/2010	10.89
	02/15/2011	10.70
	02/14/2012	11.85
	08/23/2013	10.91
	02/12/2015	10.69
	08/26/2016	10.83
	02/12/2018	10.55
	08/23/2019	10.90
	02/19/2021	10.95
	08/22/2022	10.56
MW-Y	07/22/1998	9.48
	01/21/1999	8.18
	07/20/1999	9.37
	02/24/2000	9.15
	07/27/2000	9.56
	07/17/2001	9.70
	01/16/2002	9.51
	07/16/2002	9.42
	01/13/2003	9.77

Table 1
Water Level Measurements
Former Murray Pacific No. 2 Log Sort Yard
Tacoma, Washington



Location	Date	Depth to Water (feet)
MW-Y (continued)	07/15/2003	9.72
	02/04/2004	9.41
	08/02/2004	9.86
	07/26/2005	9.84
	08/11/2006	9.79
	01/29/2007	9.70
	02/08/2008	9.46
	09/12/2008	9.73
	02/27/2009	9.58
	07/23/2009	9.62
	02/04/2010	9.41
	09/17/2010	9.56
	02/15/2011	9.3
	02/14/2012	9.95
	08/23/2013	9.43
	02/12/2015	9.38
	08/26/2016	9.71
	02/12/2018	9.44
	08/23/2019	9.8
	02/19/2021	9.40
	08/21/2022	9.41
MW-Z	07/22/1998	15.35
	01/21/1999	12.01
	07/20/1999	13.07
	02/24/2000	12.27
	07/27/2000	13.29
	07/17/2001	12.48
	01/16/2002	13.28
	07/16/2002	12.71
	01/13/2003 ^(a)	28.10
	07/15/2003	12.92
	02/04/2004	12.15
	08/02/2004	13.17
	07/26/2005	13.38
	08/11/2006	13.26
	01/29/2007	13.17
	02/08/2008	12.54
	09/12/2008	13.13
	02/27/2009	13.14

Table 1
Water Level Measurements
Former Murray Pacific No. 2 Log Sort Yard
Tacoma, Washington



Location	Date	Depth to Water (feet)
MW-Z (continued)	07/23/2009	13.36
	02/04/2010	11.5
	09/17/2010	12.51
	02/15/2011	11.62
	02/14/2012	12.95
	08/23/2013	13.23
	02/12/2015	11.64
	08/26/2016	12.65
	02/08/2018	12.33
	08/23/2019	12.9
	02/19/2021	12.21
	08/21/2022	12.46
Notes Depth to water measurements collected before February 2021 provided to Maul Foster Alongi, Inc., by Port of Tacoma. ^(a) The water level measured in MW-Z on January 13, 2003 is an outlier and may have been incorrectly recorded at the time of data collection and reporting.		

Table 2
Groundwater Analytical Data
Former Murray Pacific No. 2 Log Sort Yard
Tacoma, Washington



Location	Sample Type	Collection Date	Dissolved Arsenic	Dissolved Copper ^(a)	Dissolved Lead ^(a)	Dissolved Zinc ^(a)
Units:			ug/L	ug/L	ug/L	ug/L
Groundwater Cleanup Levels ^(b) :			5	2.9	8.5	86
MW-X	N	07/22/1998	20	3.2	0.52	8.9
	FD	07/22/1998	3.4	3.3	ND	8
	N	01/21/1999	0.98	ND	ND	23
	FD	01/21/1999	0.52	ND	ND	18
	N	07/20/1999	7.7	2.2	ND	79
	FD	07/20/1999	8.7	2	ND	71
	N	02/24/2000	4.5	2.2	ND	86
	FD	02/24/2000	4.8	2.3	ND	100
	N	07/27/2000	4.9	1.4	ND	5.5
	FD	07/27/2000	5.4	1.6	ND	4.4
	N	07/17/2001	4.4	1.2	ND	50
	FD	07/17/2001	4.3	ND	ND	64
	N	01/16/2002	3.88	1.5	--	ND
	FD	01/16/2002	4.15	1.9	--	7.93
	N	07/16/2002	5.06	1.53	--	1.29
	FD	07/16/2002	5.33	1.95	--	2.6
	N	01/13/2003	4.97	ND	--	ND
	FD	01/13/2003	4.73	ND	--	ND
	N	07/15/2003	4.81	ND	--	ND
	FD	07/15/2003	4.97	ND	--	ND
	N	02/04/2004	9.22	1.32	--	5.46
	FD	02/04/2004	8.9	1.17	--	6.23
	N	08/02/2004	8.24	2.61	--	18.6
	FD	08/02/2004	7.45	1.49	--	14.7
	N	07/26/2005	5.37	ND	--	ND
	FD	07/26/2005	6.26	3.57	--	7.44
	N	08/11/2006	3	ND	--	ND
	FD	08/11/2006	ND	ND	--	--
	N	01/29/2007	6.7	ND	ND	ND
	N	02/08/2008	3.1	--	--	--
	FD	02/08/2008	1.9 J	--	--	--
	N	09/12/2008	0.7	--	--	--
	FD	09/12/2008	0.9	--	--	--
	N	02/27/2009	0.6	--	--	--
	FD	02/27/2009	0.6	--	--	--
	N	07/23/2009	0.7	--	--	--
	FD	07/23/2009	0.4	--	--	--

Table 2
Groundwater Analytical Data
Former Murray Pacific No. 2 Log Sort Yard
Tacoma, Washington



Location	Sample Type	Collection Date	Dissolved Arsenic	Dissolved Copper ^(a)	Dissolved Lead ^(a)	Dissolved Zinc ^(a)
MW-X (continued)	N	02/04/2010	<0.5	--	--	--
	FD	02/04/2010	<0.5	--	--	--
	N	09/17/2010	<0.5	--	--	--
	FD	09/17/2010	<0.5	--	--	--
	N	02/15/2011	<0.5	--	--	--
	FD	02/15/2011	<0.5	--	--	--
	N	02/14/2012	<0.5	--	--	--
	FD	02/14/2012	<0.5	--	--	--
	N	08/23/2013	1.4	--	--	--
	FD	08/23/2013	1.3	--	--	--
	N	02/12/2015	3.0	--	--	--
	FD	02/12/2015	3.0	--	--	--
	N	08/26/2016	0.217	--	--	--
	FD	08/26/2016	0.230	--	--	--
	N	02/12/2018	0.357	--	--	--
	FD	02/12/2018	0.388	--	--	--
	N	08/23/2019	0.76	--	--	--
	N	02/19/2021	6.99	--	--	--
	FD	02/19/2021	7.15	--	--	--
	N	8/22/2022	< 0.18	--	--	--
	FD	08/22/2022	< 0.18	--	--	--
MW-Y	N	07/22/1998	15	2	1.7	8.5
	N	01/21/1999	0.52	ND	ND	24
	N	07/20/1999	3	ND	ND	73
	N	02/24/2000	2	ND	ND	94
	N	07/27/2000	ND	ND	ND	ND
	N	07/17/2001	8	ND	ND	23
	N	01/16/2002	13.1	ND	--	6.92
	N	07/16/2002	18.7	0.584	--	2.77
	N	01/13/2003	9.49	ND	--	ND
	N	07/15/2003	16.5	ND	--	ND
	N	02/04/2004	8.45	2.45	--	9.64
	N	08/02/2004	7.64	ND	--	12.9
	N	07/26/2005	10.7	ND	--	ND
	N	08/11/2006	13	ND	--	ND
	N	01/29/2007	7	ND	--	ND
	N	02/08/2008	9.3	--	--	--
	N	09/12/2008	8.9	--	--	--
	N	02/27/2009	7.4	--	--	--

Table 2
Groundwater Analytical Data
Former Murray Pacific No. 2 Log Sort Yard
Tacoma, Washington



Location	Sample Type	Collection Date	Dissolved Arsenic	Dissolved Copper ^(a)	Dissolved Lead ^(a)	Dissolved Zinc ^(a)
MW-Y (continued)	N	07/23/2009	2.3	--	--	--
	N	02/04/2010	10.9	--	--	--
	N	09/17/2010	26.6	--	--	--
	N	02/15/2011	3.3	--	--	--
	N	02/14/2012	19	--	--	--
	N	08/23/2013	7.4	--	--	--
	N	02/12/2015	6.5	--	--	--
	N	08/26/2016	8.62	--	--	--
	N	02/12/2018	10.2	--	--	--
	N	08/23/2019	15.4	--	--	--
	N	02/19/2021	6.74	--	--	--
	N	08/21/2022	42.3	--	--	--
MW-Z	N	07/22/1998	6.5	ND	0.84	3.7
	N	01/22/1999	ND	ND	ND	16
	N	07/20/1999	30	2.3	ND	68
	N	02/24/2000	11	2.3	0.52	44
	N	07/27/2000	11	1.9	ND	ND
	N	07/17/2001	7.3	1.4	ND	16
	N	01/16/2002	5.68	1.84	--	5.69
	N	07/16/2002	5.99	2.25	--	3.3
	N	01/13/2003	5.1	2.92	--	ND
	N	07/15/2003	5.12	ND	--	ND
	N	02/04/2004	8.62	1.62	--	6.62
	N	08/02/2004	8.41	2.07	--	14.3
	N	07/26/2005	5.88	ND	--	ND
	N	08/11/2006	2.6	ND	--	ND
	N	01/29/2007	14	ND	--	ND
	N	02/08/2008	3.4	--	--	--
	N	09/12/2008	0.6	--	--	--
	N	02/27/2009	0.8	--	--	--
	N	07/23/2009	0.4	--	--	--
	N	02/04/2010	<0.5	--	--	--
	N	09/17/2010	0.6	--	--	--
	N	02/15/2011	2.9	--	--	--
	N	02/14/2012	<0.5	--	--	--
	N	08/23/2013	1.9	--	--	--
	N	02/12/2015	3.1	--	--	--
	N	08/26/2016	0.401	--	--	--
	N	02/12/2018	0.405	--	--	--

Table 2
Groundwater Analytical Data
Former Murray Pacific No. 2 Log Sort Yard
Tacoma, Washington



Location	Sample Type	Collection Date	Dissolved Arsenic	Dissolved Copper ^(a)	Dissolved Lead ^(a)	Dissolved Zinc ^(a)
MW-Z (continued)	N	08/23/2019	0.542	--	--	--
	FD	08/23/2019	0.485	--	--	--
	N	02/19/2021	37.6	--	--	--
	N	08/21/2022	0.25 J	--	--	--

Notes

Values in **bold** exceed cleanup levels. Non-detect data (indicated by ND or <) were not compared to cleanup levels.

All groundwater analytical results prior to February 2021 provided by Port of Tacoma.

Samples collected between 2019 and 2021 were analyzed by EPA Method 6020B. All other samples analyzed by EPA Method 200.8.

-- = not analyzed.

< = result is non-detect at the detection limit or reporting limit.

Ecology = Washington State Department of Ecology.

EPA = U.S. Environmental Protection Agency.

FD = field duplicate sample.

J = result is estimated.

MTCA = Model Toxics Control Act.

N = normal environmental sample.

ND = result is non-detect. Reporting limit is not available.

ug/L = micrograms per liter.

^(a)Lead analysis was discontinued on September 28, 2001, and copper and zinc analyses were discontinued on February 20, 2007, with Ecology approval.

^(b)Groundwater cleanup levels established in Consent Decree 94-2-09922-7. The arsenic cleanup level was modified from 0.14 ug/L (National Toxics Rule) to 5 ug/L (MTCA Method A) in 2009 (Ecology 2009).

FIGURES





Note:
 US Geological Survey 7.5-minute
 topographic quadrangle: Tacoma North.
 Township 21 North, Range 3 East, Section 35.
 Murray Pacific = Murray Pacific Corporation.

Data Source:
 Property boundary obtained from Pierce County.

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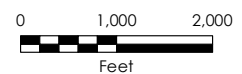
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

Legend

Site Boundary

Figure 1 Site Location

Former Murray Pacific
 No. 2 Sort Yard Site
 Tacoma, WA



Path: X:\061518\003\Fig2_Site_Features.mxd
Print Date: 7/19/2022
Reviewed By: jlenahanen
Produced By: sturner
Project: M061518.003

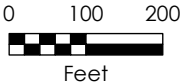


Figure 2
Site Features
Former Murray Pacific
No. 2 Sort Yard Site
Tacoma, WA

Legend

-  Monitoring Well
-  Site Boundary
-  Tax Lot

Note:
Murray Pacific = Murray Pacific Corporation.

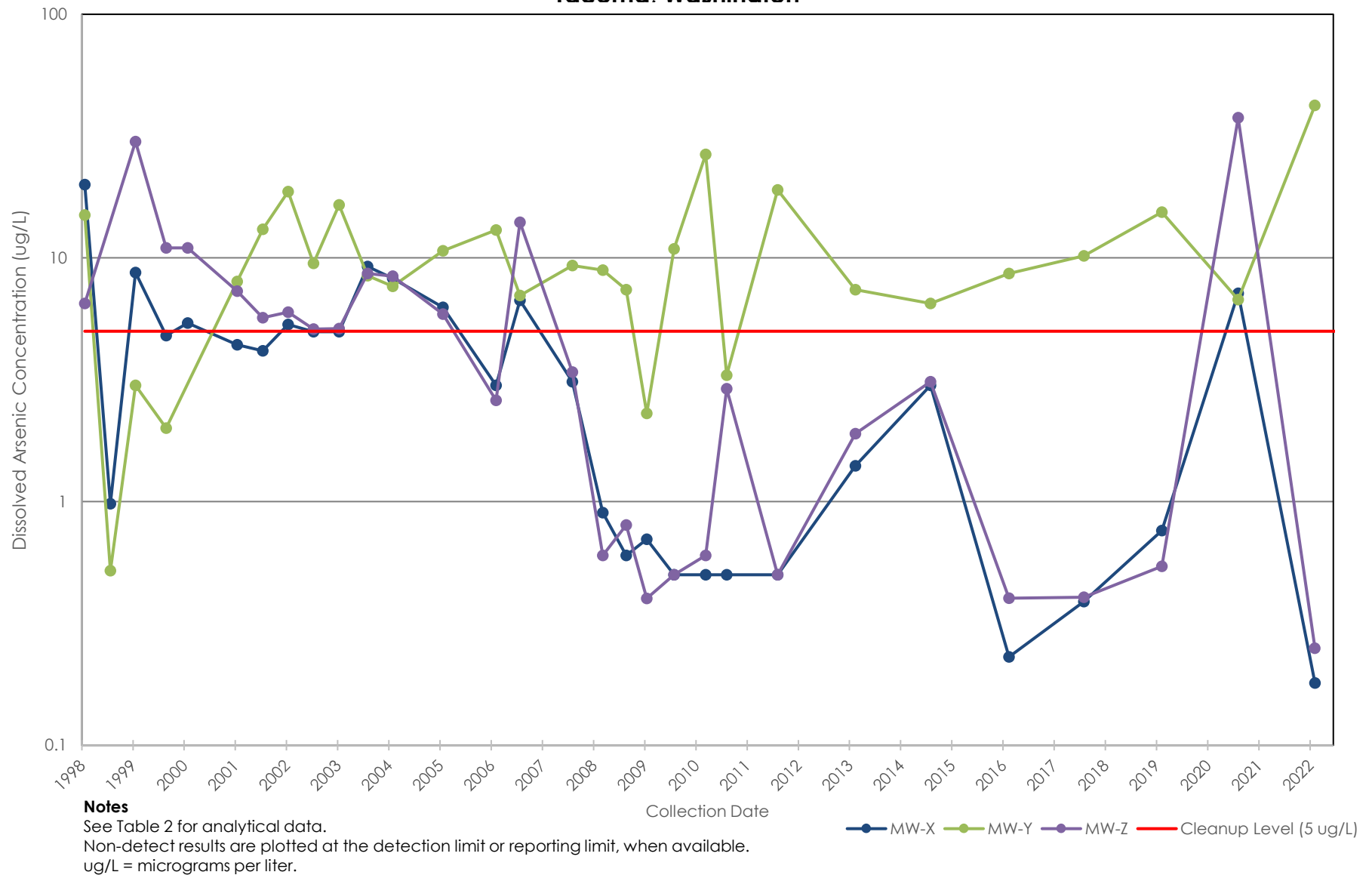


Data Sources:
Aerial photograph obtained from Esri;
tax lot data obtained from Pierce County.

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Figure 3
MW-X, MW-Y, and MW-Z
Dissolved Arsenic Trend Plot
Former Murray Pacific No. 2 Log Sort Yard
Tacoma, Washington



ATTACHMENT A

WATER FIELD SAMPLING DATA SHEETS



Maul Foster & Alongi, Inc.

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

Water Field Sampling Data Sheet

Client Name	Port of Tacoma	Sample Location	MW-X				
Project #	M0615.18.003	Sampler	C. Sifford				
Project Name	Murray Pacific GW Monitoring	Sampling Date	8/22/2022				
Sampling Event	August 2022	Sample Name	MW-X-GW-12.0				
Sub Area		Sample Depth	12				
FSDS QA:	A. Bixby 8/31/2022	Easting		Northing		TOC	

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT-Product	DT-Water	(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
					DTP-DTW	DTB-DTW	Pore Volume
8/22/2022	15:41	13.45		10.56		2.89	0.47

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

Water Quality Data

Purge Method	Time	Purge Vol (gal)	Flowrate l/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
(2) Peristaltic Pump	3:50:00 PM	0.2	0.2						10.2
Final Field Parameters	3:53:00 PM	0.3	0.2	6.74	19	4838	0.54	-76.2	5.87
	3:56:00 PM	0.5	0.2	6.76	18.9	4948	0.4	-82.6	5.24
	3:59:00 PM	0.7	0.2	6.77	18.7	5034	0.35	-85.8	4.85
	4:02:00 PM	0.9	0.2	6.78	18.7	5098	0.33	-87.5	4.83
	4:05:00 PM	1.1	0.2	6.78	18.7	5134	0.3	-89.3	4.83
	4:08:00 PM	1.3	0.2	6.79	18.7	5170	0.29	-90.1	4.71

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

Water Quality Observations: Clear; slight yellow tint; no odor; no sheen.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	4:15:00 PM	VOA-Glass		
			Amber Glass		
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly	2	Yes
			Total Bottles	2	

General Sampling Comments

Began purge at 15:42.
Water level 10.73' at 15:53, then 10.74' at 16:08.
Field duplicate sample, MWDUP-GW-12.0, collected here.

Maul Foster & Alongi, Inc.

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

Water Field Sampling Data Sheet

Client Name	Port of Tacoma	Sample Location	MW-Y				
Project #	M0615.18.003	Sampler	C. Sifford				
Project Name	Murray Pacific GW Monitoring	Sampling Date	8/21/2022				
Sampling Event	August 2022	Sample Name	MW-Y-GW-12.5				
Sub Area		Sample Depth	12.5				
FSDS QA:	A. Bixby 8/31/2022	Easting		Northing		TOC	

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT-Product	DT-Water	(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
					DTP-DTW	DTB-DTW	Pore Volume
8/21/2022	12:57	14.9		9.41		5.49	0.89

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

Water Quality Data

Purge Method	Time	Purge Vol (gal)	Flowrate l/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
(2) Peristaltic Pump	1:11:00 PM	0.5	0.2						30
	1:16:00 PM	1.6	0.2	6.65	19	3291	0.42	-131	10.3
	1:21:00 PM	1.8	0.2	6.66	19.1	3321	0.3	-137.2	5.5
	2:52:00 PM	2.5	0.2	6.66	19.7	3434	0.18	-141.5	9.05
	2:55:00 PM	2.7	0.2	6.66	19.7	3446	0.16	-143	5.32
	2:59:00 PM	2.9	0.2	6.66	19.7	3439	0.16	-144	5.29
Final Field Parameters	3:03:00 PM	3.1	0.2	6.67	19.6	3433	0.16	-144.3	4.97

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

Water Quality Observations:

Cloudy; orange tint; no odor; blocky sheen.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	3:10:00 PM	VOA-Glass		
			Amber Glass		
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly	2	Yes
			Total Bottles	2	

General Sampling Comments

Began purge at 13:01.
Paused purging from 13:25 to 14:44 in order to locate MW-X.
Water level 9.73' at 13:11, then 9.60' at 15:03.

Maul Foster & Alongi, Inc.

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

Water Field Sampling Data Sheet

Client Name	Port of Tacoma	Sample Location	MW-Z				
Project #	M0615.18.003	Sampler	C. Sifford				
Project Name	Murray Pacific GW Monitoring	Sampling Date	8/21/2022				
Sampling Event	August 2022	Sample Name	MW-Z-GW-23.0				
Sub Area		Sample Depth	23				
FSDS QA:	A. Bixby 8/31/2022	Easting		Northing		TOC	

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT-Product	DT-Water	(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
					DTP-DTW	DTB-DTW	Pore Volume
8/21/2022	15:28	28.26		12.46		15.8	2.58

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

Water Quality Data

Purge Method	Time	Purge Vol (gal)	Flowrate l/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
(2) Peristaltic Pump	4:09:00 PM	2.3	0.2	6.62	15.6	5336	0.23	-76.6	7.28
	4:12:00 PM	2.5	0.2	6.62	15.7	5318	0.23	-77.3	6.6
	4:15:00 PM	2.7	0.2	6.63	15.7	5312	0.24	-77.6	6.36
	4:18:00 PM	2.9	0.2	6.63	15.6	5314	0.25	-77.6	6.26
	4:21:00 PM	3.2	0.2	6.63	15.5	5288	0.24	-77.8	5.86
	4:24:00 PM	3.4	0.2	6.63	15.5	5287	0.23	-77.9	5.76
	4:27:00 PM	3.6	0.2	6.62	15.5	5280	0.24	-78	4.63
Final Field Parameters									

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

Water Quality Observations:

Clear; green tint; no odor; blocky sheen.

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
(2) Peristaltic Pump	Groundwater	4:30:00 PM	VOA-Glass		
			Amber Glass		
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly	2	Yes
			Total Bottles	2	

General Sampling Comments

Began purge at 15:31.
Water level 12.49' at 15:38, 12:51' at 16:09, and 12.50' at 16:27.

ATTACHMENT B

ANALYTICAL LABORATORY REPORT





September 07, 2022

Service Request No:K2209718

Audrey Hackett
Maul Foster & Alongi, Incorporated
2815 2nd Avenue, Suite 540
Seattle, WA 98121

Laboratory Results for: Murray Pacific

Dear Audrey,

Enclosed are the results of the sample(s) submitted to our laboratory August 24, 2022
For your reference, these analyses have been assigned our service request number **K2209718**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3377. You may also contact me via email at Sydney.Wolf@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Sydney A. Wolf
Project Manager

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626
PHONE +1 360 577 7222 | FAX +1 360 636 1068
ALS Group USA, Corp.
dba ALS Environmental



Narrative Documents

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Maul Foster & Alongi, Incorporated
Project: Murray Pacific
Sample Matrix: Brackish Water

Service Request: K2209718
Date Received: 08/24/2022

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

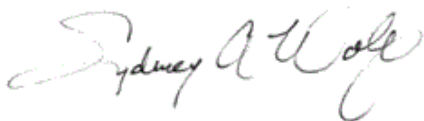
Sample Receipt:

Four brackish water samples were received for analysis at ALS Environmental on 08/24/2022. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Approved by



Date

09/07/2022



SAMPLE DETECTION SUMMARY

This form includes only detections above the reporting levels. For a full listing of sample results, continue to the Sample Results section of this Report.

CLIENT ID: MW-Y-GW-12.5			Lab ID: K2209718-001			
--------------------------------	--	--	-----------------------------	--	--	--

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	42.3		0.18	0.50	ug/L	200.8

CLIENT ID: MW-Z-GW-23.0			Lab ID: K2209718-002			
--------------------------------	--	--	-----------------------------	--	--	--

Analyte	Results	Flag	MDL	MRL	Units	Method
Arsenic, Dissolved	0.25	J	0.18	0.50	ug/L	200.8



Sample Receipt Information

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Client: Maul Foster & Alongi, Incorporated
Project: Murray Pacific/M0615.18.003

Service Request:K2209718

SAMPLE CROSS-REFERENCE

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
K2209718-001	MW-Y-GW-12.5	8/21/2022	1510
K2209718-002	MW-Z-GW-23.0	8/21/2022	1630
K2209718-003	MW-X-GW-12.0	8/22/2022	1615
K2209718-004	MWDUP-GW-12.0	8/22/2022	1615



CHAIN OF CUSTODY

125550

001

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068

www.alsglobal.com

SR#

K2209718

COC Set 1 of 1

COC#

Page 1 of 1

Project Name <u>Huffman Pacific</u>		Project Number <u>10615.18.003</u>		NUMBER OF CONTAINERS 180D 200.8 / As Se D Seal 20								Remarks	
Project Manager <u>Andrea Hackett</u>													
Company <u>Paul Foster & Son</u>													
Address <u>2815 2nd Ave, Suite 540, Seattle, WA</u>													
Phone # <u>206-331-1835</u>		email <u>ahackett@paulfoster.com</u>											
Sampler Signature 		Sampler Printed Name <u>Christian Sifford</u>											
CLIENT SAMPLE ID	LABID	SAMPLING Date Time	Matrix										
1. MW-Y-GW-12.5		8/21/22 15:10	GW	2	X								
2. MW-Z-GW-23.0		8/21/22 16:30	GW	2	X								
3. MW-X-GW-12.0		8/22/22 16:15	GW	2	X								
4. MWDUP-GW-12.0		8/22/22 16:15	GW	2	X								
5.													
6.													
7.													
8.													
9.													
10.													

Report Requirements ☐ I. Routine Report: Method Blank, Surrogate, as required ☐ II. Report Dup., MS, MSD as required ☐ III. CLP Like Summary (no raw data) ☐ IV. Data Validation Report ☐ V. EDD		Invoice Information P.O.# <u>10615.18.003-003</u> Bill To: <u>Andrea Hackett</u> <u>ahackett@paulfoster.com</u> <u>206-331-1835</u>		Turnaround Requirements ☐ 24 hr. ☐ 48 hr. ☒ 5 Day ☒ Standard Requested Report Date						Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al <u>As</u> Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg									
				Special Instructions/Comments: <u>No reductive precipitation analysis</u>						*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other (Circle One)									
Relinquished By:		Received By:		Relinquished By:		Received By:		Relinquished By:		Received By:		Relinquished By:		Received By:					
Signature 		Signature 		Signature		Signature		Signature		Signature		Signature		Signature					
Printed Name <u>Christian Sifford</u>		Printed Name <u>Linzey Mejia</u>		Printed Name		Printed Name		Printed Name		Printed Name		Printed Name		Printed Name					
Firm <u>MFA</u>		Firm <u>ALS</u>		Firm		Firm		Firm		Firm		Firm		Firm					
Date/Time <u>8/23/22 2:37</u> <u>16:15</u>		Date/Time <u>8/24/22 10:20</u>		Date/Time		Date/Time		Date/Time		Date/Time		Date/Time		Date/Time					

Cooler Receipt and Preservation Form

Client Maul Foster 3 Alongi Service Request K22 09718
 Received: 8/24/22 Opened: 8/24/22 By: Lu Unloaded: 8/24/22 By: Lu

1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
 2. Samples were received in: (circle) Cooler Box Envelope Other NA
 3. Were custody seals on coolers? NA Y N If yes, how many and where? 1 Front
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Temp Blank	Sample Temp	IR Gun	Cooler #/COC ID / NA	Out of temp Indicate with 'X'	PM Notified If out of temp	Tracking Number NA	Filed
<u>3.0</u>	<u>—</u>	<u>1202</u>	<u>125550</u>	<u>—</u>	<u>—</u>	<u>2771 3617 8158</u>	

4. Was a Temperature Blank present in cooler? NA Y N If yes, notate the temperature in the appropriate column above:
 If no, take the temperature of a representative sample bottle contained within the cooler; notate in the column "Sample Temp":

5. Were samples received within the method specified temperature ranges?

NA Y N
NA Y N

If no, were they received on ice and same day as collected? If not, notate the cooler # below and notify the PM.

If applicable, tissue samples were received: Frozen Partially Thawed Thawed

6. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves

7. Were custody papers properly filled out (ink, signed, etc.)?

NA Y N

8. Were samples received in good condition (unbroken)?

NA Y N

9. Were all sample labels complete (ie, analysis, preservation, etc.)?

NA Y N

10. Did all sample labels and tags agree with custody papers?

NA Y N

11. Were appropriate bottles/containers and volumes received for the tests indicated?

NA Y N

12. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below

NA Y N

13. Were VOA vials received without headspace? Indicate in the table below.

NA Y N

14. Was C12/Res negative?

NA Y N

15. Were 100ml sterile microbiology bottles filled exactly to the 100ml mark? NA Y N

Under filled Overfilled

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Head- space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, Resolutions: Samples were Field Filtered per client



Miscellaneous Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L16-58-R4
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjllabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdwlabservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

ALS Group USA, Corp.
dba ALS Environmental

Analyst Summary report

Client: Maul Foster & Alongi, Incorporated
Project: Murray Pacific/M0615.18.003

Service Request: K2209718

Sample Name: MW-Y-GW-12.5
Lab Code: K2209718-001
Sample Matrix: Brackish Water

Date Collected: 08/21/22
Date Received: 08/24/22

Analysis Method
200.8

Extracted/Digested By
SSOLADEY

Analyzed By
JCHAN

Sample Name: MW-Z-GW-23.0
Lab Code: K2209718-002
Sample Matrix: Brackish Water

Date Collected: 08/21/22
Date Received: 08/24/22

Analysis Method
200.8

Extracted/Digested By
SSOLADEY

Analyzed By
JCHAN

Sample Name: MW-X-GW-12.0
Lab Code: K2209718-003
Sample Matrix: Brackish Water

Date Collected: 08/22/22
Date Received: 08/24/22

Analysis Method
200.8

Extracted/Digested By
SSOLADEY

Analyzed By
JCHAN

Sample Name: MWDUP-GW-12.0
Lab Code: K2209718-004
Sample Matrix: Brackish Water

Date Collected: 08/22/22
Date Received: 08/24/22

Analysis Method
200.8

Extracted/Digested By
SSOLADEY

Analyzed By
JCHAN



Sample Results

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com



Metals

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360) 577-7222 Fax (360) 425-9096
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Maul Foster & Alongi, Incorporated
Project: Murray Pacific/M0615.18.003
Sample Matrix: Brackish Water
Sample Name: MW-Y-GW-12.5
Lab Code: K2209718-001

Service Request: K2209718
Date Collected: 08/21/22 15:10
Date Received: 08/24/22 10:20
Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	42.3	ug/L	0.50	0.18	2	08/29/22 12:18	08/26/22	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Maul Foster & Alongi, Incorporated
Project: Murray Pacific/M0615.18.003
Sample Matrix: Brackish Water
Sample Name: MW-Z-GW-23.0
Lab Code: K2209718-002

Service Request: K2209718
Date Collected: 08/21/22 16:30
Date Received: 08/24/22 10:20
Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	0.25 J	ug/L	0.50	0.18	2	08/29/22 12:22	08/26/22	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Maul Foster & Alongi, Incorporated
Project: Murray Pacific/M0615.18.003
Sample Matrix: Brackish Water
Sample Name: MW-X-GW-12.0
Lab Code: K2209718-003

Service Request: K2209718
Date Collected: 08/22/22 16:15
Date Received: 08/24/22 10:20
Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	ND U	ug/L	0.50	0.18	2	08/29/22 12:24	08/26/22	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Maul Foster & Alongi, Incorporated
Project: Murray Pacific/M0615.18.003
Sample Matrix: Brackish Water
Sample Name: MWDUP-GW-12.0
Lab Code: K2209718-004

Service Request: K2209718
Date Collected: 08/22/22 16:15
Date Received: 08/24/22 10:20
Basis: NA

Dissolved Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	ND U	ug/L	0.50	0.18	2	08/29/22 12:25	08/26/22	



QC Summary Forms

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
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Metals

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1317 South 13th Avenue, Kelso, WA 98626
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www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: Maul Foster & Alongi, Incorporated
Project: Murray Pacific/M0615.18.003
Sample Matrix: Brackish Water
Sample Name: Method Blank
Lab Code: KQ2214454-03

Service Request: K2209718
Date Collected: NA
Date Received: NA
Basis: NA

Total Metals

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Arsenic	200.8	ND U	ug/L	0.50	0.18	2	08/29/22 12:14	08/26/22	

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Maul Foster & Alongi, Incorporated
Project: Murray Pacific/M0615.18.003
Sample Matrix: Brackish Water

Service Request: K2209718
Date Collected: 08/21/22
Date Received: 08/24/22
Date Analyzed: 08/29/22
Date Extracted: 08/26/22

Matrix Spike Summary
Dissolved Metals

Sample Name: MW-Y-GW-12.5
Lab Code: K2209718-001
Analysis Method: 200.8
Prep Method: EPA CLP ILM04.0

Units: ug/L
Basis: NA

Matrix Spike
KQ2214454-05

Analyte Name	Sample Result	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	42.3	77.5	50.0	71	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Matrix Spike and Matrix Spike Duplicate Data is presented for information purposes only. The matrix may or may not be relevant to samples reported in this report. The laboratory evaluates system performance based on the LCS and LCSD control limits.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Maul Foster & Alongi, Incorporated
Project Murray Pacific/M0615.18.003
Sample Matrix: Brackish Water

Service Request: K2209718
Date Collected: 08/21/22
Date Received: 08/24/22
Date Analyzed: 08/29/22

Replicate Sample Summary**Dissolved Metals**

Sample Name: MW-Y-GW-12.5
Lab Code: K2209718-001

Units: ug/L
Basis: NA

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample	Average	RPD	RPD Limit
					KQ2214454-06 Result			
Arsenic	200.8	0.50	0.18	42.3	41.5	41.9	2	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.

dba ALS Environmental

QA/QC Report

Client: Maul Foster & Alongi, Incorporated
Project: Murray Pacific/M0615.18.003
Sample Matrix: Brackish Water

Service Request: K2209718
Date Analyzed: 08/29/22

Lab Control Sample Summary
Total Metals

Units:ug/L
Basis:NA

Lab Control Sample
KQ2214454-04

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Arsenic	200.8	53.3	50.0	107	85-115

ATTACHMENT C

DATA VALIDATION MEMORANDUM



DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. M0615.18.003 | SEPTEMBER 7, 2022 | PORT OF TACOMA

Maul Foster & Alongi, Inc. (MFA), conducted an independent stage 2A review of the quality of analytical results for groundwater samples and associated quality control samples collected at the former Murray Pacific No. 2 Log Sort Yard located at 2407 Port of Tacoma Road, Tacoma, Washington. Samples were collected on August 21 and 22, 2022.

ALS Group USA Corp. dba ALS Environmental (ALS) performed the analyses. ALS report number K2209718 was reviewed. The analysis performed and samples analyzed are listed below.

Analysis	Reference
Dissolved arsenic	EPA 200.8
Note EPA = U.S. Environmental Protection Agency.	

Samples Analyzed
Report K2209718
MW-Y-GW-12.5
MW-Z-GW-23.0
MW-X-GW-12.0
MWDUP-GW-12.0

DATA QUALIFICATION

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) guidelines for data review (EPA 2020) and appropriate laboratory- and method-specific guidelines (ALS 2021, EPA 1986).

Based on the results of the data quality review procedures described below, the data are considered acceptable for their intended use, with the appropriate final data qualifiers assigned. Final data qualifiers represent qualifiers originating from the laboratory and accepted by the reviewer, as well as data qualifiers assigned by the reviewer during validation.

- Final data qualifier:
 - U = result is non-detect at the method detection limit (MDL).

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

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

Preservation and Sample Storage

The samples were preserved and stored appropriately.

Field samples for dissolved EPA Method 200.8 analysis were filtered in the field during sample collection with a 0.45-micron filter.

BLANKS

Method Blanks

Laboratory method blanks are used to assess whether laboratory contamination was introduced during sample preparation and analysis. Laboratory method blank analysis was performed at the required frequency. For purposes of data qualification, the laboratory method blank was associated with all samples prepared in the analytical batch.

The laboratory method blank result was non-detect to the MDL.

Equipment Rinse Blanks

Equipment rinse blanks are used to evaluate field equipment decontamination. These blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample (LCS) and a laboratory control sample duplicate (LCSD) are spiked with target analytes to provide information about laboratory precision and accuracy.

ALS did not report LCSD results. The LCS was extracted and analyzed at the required frequency, and the LCS result was within acceptance limits for percent recovery.

LABORATORY DUPLICATE RESULTS

Laboratory duplicate results are used to evaluate laboratory precision. The laboratory duplicate samples were extracted and analyzed at the required frequency.

Laboratory duplicate results greater than five times the method reporting limit (MRL) were compared to laboratory relative percent difference control limits. Where laboratory duplicate

results were less than five times the MRL the reviewer compared the absolute difference of the laboratory duplicate and parent sample result to the MRL of the parent sample.

All laboratory duplicate results met the acceptance criteria.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike (MS) and matrix spike duplicate (MSD) results are used to evaluate laboratory precision and accuracy as well as the effect of the sample matrix on sample preparation and analysis.

ALS did not report MSD results. The MS samples were extracted and analyzed at the required frequency, and all MS results were within acceptance limits for percent recovery.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. The following field duplicate and parent sample pair was submitted for analysis:

Report	Parent Sample	Field Duplicate Sample
K2209718	MW-X-GW-12.0	MWDUP-GW-12.0

Both parent sample and field duplicate sample results were non-detect. Relative percent difference was not evaluated, and no qualification was required.

REPORTING LIMITS

ALS reported results using routine MDLs and MRLs. Samples requiring dilutions because of high analyte concentrations and/or matrix interferences were reported with raised MDLs and MRLs and required no action by the reviewer. Results between the MDL and MRL were qualified by the laboratory with “J,” as estimated.

DATA PACKAGE

The data package was reviewed for transcription errors, omissions, and anomalies.

At MFA’s request, ALS released a revision for report K2209718 on September 8, 2022, with tier II information only, as well as a sample name correction to match the chain-of-custody form. ALS included tier IV information in the original report, which was not required for this project.

No other issues were found.

REFERENCES

ALS. 2021. *Quality Assurance Manual*. Rev. 29.0. ALS Group USA Corp. dba ALS Environmental: Kelso, WA. July 16.

EPA. 1986. *Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods*. EPA publication SW-846. 3rd ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), VI phase II (2018), VI phase III (2019), VII phase I (2019), and VII phase II (2020).

EPA. 2020. *National Functional Guidelines for Inorganic Superfund Methods Data Review*. EPA 542-R-20-006. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation: Washington, DC. November.